U.S. Department of the Interior
U.S. Geological Survey

Low Streamflow Conditions in Washington, Oregon, and Idaho During Water Year 2001

Water-Resources Investigations Report 03–4071

USGS
science for a changing world

Cover: Riffle Lake near Mossyrock on the Cowlitz River, Washington, February 7, 2001. Water level is 117 to 125 feet below full (photo by John McKenna, U.S. Geological Survey).

Low Streamflow Conditions in Washington, Oregon, and Idaho During Water Year 2001

By Jon E. Hortness

Water-Resources Investigations Report 03–4071

Boise, Idaho
2003

U.S. DEPARTMENT OF THE INTERIOR
Gale A. Norton, Secretary

U.S. GEOLOGICAL SURVEY
Charles G. Groat, Director

Additional information can be obtained from:

District Chief
U.S. Geological Survey
230 Collins Road
Boise, ID 83702-4520
http://idaho.usgs.gov

Copies of this report can be purchased from:

U.S. Geological Survey
Information Services
Box 25286
Federal Center
Denver, CO 80225
e-mail: infoservices@usgs.gov

Copies of this report also are available in PDF format, which can be viewed using Adobe Acrobat Reader, at URL:
http://idaho.usgs.gov/public/reports.html

Contents

FIGURES

TABLES

CONVERSION FACTORS AND WATER YEAR DEFINITION

Multiply	By	To obtain
acre-foot (acre-ft)	1,233	cubic meter (m^3)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
inch (in.)	2.54	centimeter (cm)
inch per year (in/yr)	2.54	centimeter per year (cm/yr)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.590	square kilometer (km^2)

Water year: In U.S. Geological Survey reports dealing with surface-water supply, a water year is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends; thus, the water year ending September 30, 2001, is called the "2001 water year."

Low Streamflow Conditions in Washington, Oregon, and Idaho During Water Year 2001

By Jon E. Hortness

Abstract

Below-normal precipitation levels and above-normal temperatures across most of the Columbia River Basin in the Pacific Northwest (Washington, Oregon, and Idaho) resulted in streamflows that, at times, approached long-term minimums. The period from October 1, 2000, through September 30, 2001 (water year 2001), was the second driest on record (1895–2001) for the three-State area. In addition, average temperatures during the April through September 2001 period were the twelfth highest since 1895. Conditions in the part of Canada included in the Columbia River Basin were similar.

Streamflow levels at several locations approached those during water year 1977, when several minimum-flow records were set. The drought of 1977 commonly is considered the drought of record in the region. Low streamflows were most noticeable in rivers east of the Cascade Range, where most of the streamflow above base flow is a direct result of snowmelt runoff. Because of below-normal precipitation across the region, snowpack levels in the three States were only about 59 to 62 percent of the long-term (1961–90) average.

Miscellaneous low-flow measurements were made at more than 700 locations across the three-State region and in some adjacent States. These measurements were made in late summer and early fall of 2001 during base-flow conditions. In general, these low-flow measurements were similar to those made at the same locations during water year 1977.

Reservoir storage values for seven major river basins in the three-State region were all below the 30-year average at the end of water year 2001. Reservoir storages were at average levels at the end of water year 2000; thus, the below-average levels in water year 2001 can be related directly to low streamflows during water year 2001.

Near the end of water year 2001, the Palmer Drought Severity Index ranked much of the region in the severe or extreme drought categories. Only the coastal area of Washington and Oregon and part of the mountain region in Idaho were in the near-normal category. The National Oceanic and Atmospheric Administration classified most of the area as exhibiting adverse agricultural, hydrological, and fire-danger effects from the drought.

Lack of available water for recharge and increased pumpage needed to augment the reduced surface-water supply likely reduced ground-water levels throughout the region. Twenty-five wells across the region were selected for extended monitoring to help define the possible short- and long-term relation between low streamflows and ground-water levels.

INTRODUCTION

Streamflow levels in Washington, Oregon, and Idaho during water year 2001 (WY01) were, in general, the lowest since WY77. Although no recurrence interval was calculated for the drought that encompassed the three-State area during 1977, it is commonly considered as the drought of record, and all-time low streamflows were recorded at many locations (Hubbard, 1987; Paulson and others, 1991). Late-summer base flows in a few rivers in WY01 were the lowest on record, and below-normal precipitation and above-normal temperatures were common across most of the Pacific Northwest and western Canada. For the purpose of this report, the term “normal” refers to the 30-year (1961–90) average precipitation or temperature as defined by the National Climatic Data Center. Low precipitation levels during the winter months resulted in snowpacks that were well below average across the region. Water levels in many of the reservoirs in the

region were also below the long-term averages, which created problems with adequate supplies of water to satisfy hydroelectric, recreational, and irrigation purposes, as well as fish and wildlife habitat needs. Major power companies raised rates following significant power shortages that resulted from below-normal hydroelectric power generation across the Western United States, most notably in California. In addition, recreational, agricultural, and biological interest groups waged public and sometimes legal battles while attempting to secure the rights to any available water. In the end, many reservoirs and rivers were too low for most recreational uses, irrigation was halted in several areas, and fish and wildlife suffered from lack of available water. Drought emergencies were declared throughout most of the three-State area. Low streamflow data are important to water-management agencies, interest groups, and the public. To adequately monitor and document the low streamflows during WY01, the Washington, Oregon, and Idaho Districts of the U.S. Geological Survey collected more than 700 miscellaneous streamflow measurements across the region and summarized long-term hydrologic and climatic data. In addition, 25 wells across the region were selected for extended monitoring to help define the possible short- and long-term effects of low streamflows on ground-water levels.

Purpose and Scope

The purpose of this report is to (1) document low streamflows at several ungaged locations on streams in Washington, Oregon, and Idaho; (2) provide comparisons between WY01 and historical streamflow data at several long-term gaging stations; and (3) relate miscellaneous low-flow measurements from WY01 to measurements from WY77. Precipitation and temperature data are used for comparing WY01 data to long-term data. The effects of low streamflows on reservoir storages and ground-water levels also are discussed.

Description of Study Area

The States of Washington, Oregon, and Idaho make up the area of study for this report (**figure 1**, back of report). Most of this area is included in the Columbia River Basin, and smaller areas are part of various Pacific Slope Basins; landlocked basins in Oregon (including Silver Lake, Lake Albert, Goose Lake, Harney Lake, and Malheur Lake); and the Great Basin (**figure 2**, back of report). The Columbia River Basin is highly regulated for hydroelectric, irrigation, and flood-control purposes. Parts of the other basins also are regulated to some extent.

The Cascade Range trends north-south through Washington and Oregon and provides a natural division between the western and eastern areas of each State. The climate west of the Cascade Range is characterized by moderate temperatures, wet winters, and dry summers. Parts of western slopes in Washington's Olympic Mountains receive as much as 200 in/yr of precipitation (**figure 3**, back of report); 120 to 150 in/yr of precipitation is common across the rest of the Cascade Range. Moderate to cold temperatures are prevalent in areas of Washington and Oregon east of the Cascade Range; however, a general lack of moisture in cloud masses after crossing the mountains commonly causes dry winters and very dry summers. The low-elevation areas east of the Cascade Range generally receive between 10 and 40 in/yr; high-elevation areas in northeastern Oregon receive as much as 80 in/yr. Idaho's climate is similar to that of eastern Washington and Oregon. Moderate to cold temperatures are common throughout the State, and precipitation ranges from 10 to 30 in/yr in the low elevations to as much as 70 in/yr in the central mountains.

Acknowledgments

The data-collection efforts of field office personnel in the Washington, Oregon, and Idaho Districts are greatly appreciated. The surface-water data sections in each District also provided assistance with data compilation and record keeping and are gratefully acknowledged.

CLIMATIC CONDITIONS DURING WATER YEAR 2001

Low streamflow conditions are generally a direct result of below-normal precipitation and often are made worse by above-normal temperatures. Lower streamflows also can result from residual effects of previous low-water years. The effects of reduced ground-water recharge might not be felt for some time and, in highly regulated basins with large reservoir storages, reduced reservoir levels will affect streamflows during future years. It is important to note that low stream-

flows in the Columbia River system also can be affected by conditions in the part of Canada that is included in the Columbia River Basin. About 15 percent (39,000 mi^2) of the Columbia River Basin is in Canada.

Precipitation

Most of the annual precipitation in the Pacific Northwest occurs during the months of November through March. The precipitation is typically in the form of snow across much of the region, with the exception of the low-elevation Pacific Slope Basins, and the resulting snowpack generally melts off during the months of April, May, and June. Precipitation levels prior to WY01 were near average across most of the study area. Water year 2000 precipitation levels across Washington ranged from 90 to 110 percent of normal (1961–90); the ranges for Oregon and Idaho were 85 to 112 percent and 78 to 102 percent of normal, respectively (Natural Resources Conservation Service, Precipitation Reports, 2002). In addition, with the exception of parts of central and southwestern Oregon, precipitation levels in September 2000 ranged from normal to well above normal.

The period November 2000 through March 2001, however, was the second driest on record (1895– 2001); the average regional precipitation level was approximately 8.5 in. Only the 1976–77 period was drier, with an average of about 7.5 in. The normal November through March precipitation level for the region was nearly 17 in. (National Oceanic and Atmospheric Administration, National Climatic Data Center, 2002). As a result of below-average precipitation during the winter months, snowpack levels across the region were also well below average. Average snowpack levels in Washington on April 1, 2001, were 59 percent of the 30-year average (1961–1990); Idaho, 61 percent of average; and Oregon, 62 percent of average. Snowpack levels in parts of northeastern Washington, southern Oregon, and central Idaho were less than 50 percent of average (Natural Resources Conservation Service, Snowpack Reports, 2002).

Precipitation levels for the remainder of the water year (May through September) were much improved but still below normal across most of the region. Overall, WY01 was the second driest on record (1895–2001) for the Pacific Northwest and the second, third, and seventh driest for Washington, Oregon, and Idaho, respectively (National Oceanic and Atmospheric Administration, National Climatic Data Center, 2002). Comparisons between monthly precipitation levels for WY01 and normal monthly precipitation levels are presented in **figure 4** (back of report) for selected sites across the study area. Well below-normal precipitation during November through March is evident in each of the precipitation plots.

Temperatures

Above-normal temperatures were prevalent across the three-State region during April through September 2001. The average temperature of the region was the twelfth highest since 1895. Idaho experienced the largest deviation from normal. Average temperatures for the April through September period were the fifth highest on record, and August average temperatures were the highest ever recorded in Idaho (1895–2001) (National Oceanic and Atmospheric Administration, National Climatic Data Center, 2002).

Conditions in Canada

Climatic conditions in the part of Canada included in the Columbia River Basin were similar to those in the three-State region during WY01. The accumulated precipitation since the beginning of November was about 50 percent of normal (1935–2001) for the Columbia River Basin. Snowpacks on April 1, 2001, in major subbasins of the Columbia River Basin in Canada ranged from 45 to 68 percent of normal. Temperatures across the region were also above normal, and average temperatures for the entire country were third highest on record (1935–2001). Despite cooler temperatures in early June that delayed snowmelt, snowpack levels were still well below average (Government of British Columbia, 2002).

STREAMFLOW CONDITIONS

WY01 began with near-average streamflows in most streams in the Pacific Northwest. Although streamflows increased in Pacific Slope Basin streams during the winter months, these flows were well below average. Snowmelt runoff resulted in increased flows during the spring months, but again, these flows were well below average. Streamflows stayed below average

across most of the region for the remainder of the water year.

Long-Term Data Comparisons

Eighteen continuous-recording gaging stations were selected as index sites for use in this report. The sites (**figure 5**, back of report) were selected on the basis of several factors: location, size of the basin, length of record, and absence of significant diversions or regulations. Plots of daily mean streamflow for WY01 in relation to the WY77 daily mean, long-term minimum, and long-term median streamflow for each site are presented in **figure 6**, **figure 7**, and **figure 8** (back of report).

Streamflows at index site 1 in Washington (**figure 6**) and sites 7 and 8 in Oregon (**figure 7**) originate in Pacific Slope Basins that receive large amounts of rainfall and little or no snowfall. Thus, streamflows are typically high during the wet-season months of November through March. In general, streamflows at these sites in WY01 were below the long-term median, with the exception of several instances when rainfall resulted in short-duration peaks that were higher than the long-term median. Compared with WY77, coastal rainfall in WY01 was generally smaller in magnitude; however, individual storms were more numerous and resulted in more cumulative streamflow.

Streamflows at sites 2, 3, and 9 (**figure 6** and **figure 7**) originate in high-elevation Pacific Slope Basins and are affected by wet-season rains and spring snowmelt (April through June). Streamflows are typically higher than those in comparable inland streams during the wet season as a result of rainfall and traditionally peak in the spring as a result of snowmelt runoff from high elevations. As was the case with the coastal sites, streamflows at these sites were well below the long-term median, with the exception of several short-duration peaks resulting from rainfall. In addition, typical peak flow resulting from snowmelt runoff was insignificant, likely a result of below-average snowpack at high elevations because of below-normal precipitation in the preceding months. Conditions were similar to those in WY77 when streamflows were below the long-term median and increases in streamflow resulting from snowmelt were insignificant.

The remaining index sites (4–6, Washington, **figure 6**; 10–12, Oregon, **figure 7**; 13 –18, Idaho, **figure 8**) are all east of the Cascade Range. Most of the streamflow above base flow at these sites is a direct result of snowmelt runoff during the spring or early summer months. Rainfall in this area contributes significantly less streamflow on an annual basis but, over a short period of time, can result in significant flow increases and possible flooding. Streamflows at some of these sites, most notably, sites 4, 6, and 12, were slightly above the long-term median at the beginning of WY01 but, in general, were below median values during most of the water year. Lack of available snowpack, exhibited by short-duration and low-magnitude spring runoff, is evident in the hydrographs for nearly every site. With few exceptions, increased runoff from snowmelt diminished by early June and, in many cases, streamflows approached long-term minimums. Site 12 in southeastern Oregon is the only site where streamflows were near the long-term median values for much of the snowmelt season.

Compared with WY77, streamflows resulting from snowmelt in WY01 were generally higher, with few exceptions. In many cases, the WY77 streamflows were at or near long-term minimums during much of the snowmelt season, with little, if any, increases from snowmelt. In contrast, streamflows at most sites in WY01 exhibited some form of runoff peak, albeit much lower than average.

Additional evidence of below-average streamflow in WY01 can be seen in the annual runoff data. Total annual runoff volumes at each of the index sites for WY01 compared with WY77 and long-term averages are presented in **table 1**.

As expected, the annual runoff volumes for WY01 were also well below the long-term averages. Values for the index sites across the three-State area ranged from 34 percent (Chetco River, Oregon) to 70 percent (Umatilla River, Oregon) of average. Runoff at only three of the index sites was lower in WY01 than in WY77 (Sauk River, Washington; Wilson River, Oregon; and Big Lost River, Idaho). However, at two of those sites (Sauk River, Washington; and Wilson River, Oregon), the WY01 value was the minimum for the period of record.

Miscellaneous Low-Flow Measurements

Streamflow was measured at 724 miscellaneous sites across the three-State region and at an additional

Table 1. Annual runoff volume comparisons for selected gaging stations in Washington, Oregon, and Idaho

[WA, Washington; OR, Oregon; ID, Idaho; WY, Wyoming]

Map No. (fig. 3)	Gaging-station No.	Gaging-station name	Period of record	Long-term average annual runoff volume (acre-ft)	Water year 2001		Water year 1977	
					Annual runoff volume (acre-ft)	Percent of long-term average/ (long-term ranking[1])	Annual runoff volume (acre-ft)	Percent of long-term average/ (long-term ranking[1])
1	12035000	Satsop River near Satsop, WA	1929-2001	1,478,000	922,700	62/(4)	868,200	59/(1)
2	12048000	Dungeness River near Sequim, WA	1923-2001	278,900	150,900	54/(3)	142,700	51/(1)
3	12186000	Sauk River above Whitechuck River near Darrington, WA	1918-22, 1929-2001	815,100	457,100	56/(1)	542,500	67/(4)
4	12488500	American River near Nile, WA	1940-2001	169,800	78,480	46/(2)	68,200	40/(1)
5	13351000	Palouse River at Hooper, WA	1898-1916, 1951-2001	441,900	189,600	43/(9)	76,610	17/(1)
6	12431000	Little Spokane River at Dartford, WA	1929-32, 1947-2001	220,000	144,700	66/(8)	112,000	51/(4)
7	14301500	Wilson River near Tillamook, OR	1915-16, 1931-2001	853,300	358,300	42/(1)	379,600	44/(2)
8	14400000	Chetco River near Brookings, OR	1970-2001	1,627,000	557,500	34/(2)	397,800	24/(1)
9	14178000	North Santiam River below Boulder Creek near Detroit, OR	1907-10, 1929-2001	728,800	431,300	59/(2)	412,300	57/(1)
10	14046500	John Day River at Service Creek, OR	1930-2001	1,408,000	635,000	45/(10)	448,400	32/(1)
11	10396000	Donner und Blitzen River near Frenchglen, OR	1911-21, 1929-30, 1938-2001	92,130	59,960	65/(11)	48,300	52/(6)
12	14020000	Umatilla River above Meacham Creek near Gibbon, OR	1933-2001	164,200	114,200	70/(8)	82,300	50/(1)
13	12414500	St. Joe River at Calder, ID	1911-12, 1920-2001	1,694,000	814,600	48/(3)	798,700	47/(2)
14	13317000	Salmon River at White Bird, ID	1910-17, 1920-2001	8,085,000	4,450,000	55/(3)	4,214,000	52/(2)
15	13313000	Johnson Creek at Yellow Pine, ID	1928-2001	249,000	99,860	40/(2)	88,920	36/(1)
16	13185000	Boise River near Twin Springs, ID	1911-2001	867,300	430,900	50/(4)	320,400	37/(1)
17	13120500	Big Lost River at Howell Ranch, near Chilly, ID	1949-2001	229,700	115,400	50/(2)	130,700	57/(6)
18	13023000	Greys River above Reservoir, near Alpine, WY	1937-39, 1954-2001	468,700	274,000	58/(3)	187,400	40/(1)

[1] Overall ranking for the period of record from minimum to maximum (ranking of 1 is the all-time minimum).

7 sites in Nevada, Utah, and Wyoming. These 731 measurements were made during base-flow conditions in late summer or early fall of 2001. The spatial extent of the measurement locations is shown in **figure 9** (back of report) and the low-flow measurement data are presented in **table 2, table 3,** and **table 4** (back of report) for Washington, Oregon, and Idaho, respectively. It is apparent that the values for low-flow measurements made in WY01 are generally similar to those made in WY77. Thus, although the timing of measurements was different at many sites, the low flows measured in WY01 generally are in the same range as those measured in WY77.

Canadian Streamflows

Because about 15 percent of the Columbia River Basin is in Canada, low streamflows in the Columbia River system in the United States also can be affected by conditions in the part of Canada that is included in the Columbia River Basin. Runoff was well below average in the Columbia River Basin. Runoff was well below average in the Columbia River Basin in Canada, and many streams reached their annual peak levels prior to June 1, 2001. In addition, streamflows in the Kootenay River in Canada were only 53 percent of average for the year (Government of British Columbia, 2002).

RESERVOIR STORAGE CONDITIONS

Depending on the time and spatial extent of below-average streamflows, both short-term and long-term effects with regard to reservoir storages can be noticeable. A summary of WY01 year-end storage values compared with long-term average storage values for reservoirs in seven major river basins in the Pacific Northwest is presented in **table 5** (Natural Resources Conservation Service, Reservoir Reports, 2002). As discussed previously, precipitation levels for several years prior to WY01 were at or above normal, resulting in average to above-average streamflows and reservoir storages. Thus, the below-average reservoir storage can be related directly to low streamflows during WY01. Compared with the 30-year average storage from 1961 through 1990, reservoir storage at the end of WY01 for the major basins listed in table 5 ranged from 17 to 92 percent of average.

The large variance in reservoir storage values likely can be attributed to varying management practices for each reservoir. Factors that influence how a reservoir is managed include hydroelectric potential, flood-control ability, recreational use, irrigation needs, and fish and wildlife habitat needs.

DROUGHT CONDITIONS DURING WATER YEAR 2001

The National Oceanic and Atmospheric Administration (NOAA) uses the Palmer Drought Severity Index (PDSI) as one measure of the intensity, duration, and spatial extent of a drought. NOAA also uses a multi-index drought classification system to summarize the primary physical effects of a drought. This system divides the primary physical effects of a drought into three categories: (1) agricultural (crops and livestock); (2) hydrological (rivers, ground water, reservoirs, and water supplies); and (3) fire danger.

A map showing the PDSI values for the continental United States on September 1, 2001, is presented in **figure 10** (back of report) (National Oceanic and Atmospheric Administration, 2001). The values for the index are derived from measurements of precipitation, air temperature, and local soil moisture. These values have been standardized by region to allow for accurate comparisons. Although the determination of the index does not make it suitable for estimating long-term hydrologic droughts that can impact streamflows, the map in **figure 10** does represent the conditions in the region near the end of the 2001 water year. At that time, nearly all of Idaho and Oregon and more than half of Washington were classified as being under severe or extreme drought conditions. Only in the coastal areas in Oregon and Washington and a high mountain region in Idaho were conditions classified as being near normal. It also is apparent that severe drought conditions extended into other Western States, including Montana, Wyoming, Utah, Nevada, and California. Conditions over much of the remainder of the country were generally near normal.

Even though the PDSI listed conditions in the coastal areas of Washington and Oregon as near normal, NOAA still classified this area as exhibiting adverse hydrological effects of the drought. This classification likely was the result of continuing below-average streamflows and reservoir levels. The remainder of the three-State region also exhibited adverse

Table 5. Water year 2001 year-end reservoir storage values and long-term averages for reservoirs in major river basins in Idaho, Wyoming, Oregon, Nevada, Washington, and California

[No., number; ft, feet; ID, Idaho; WY, Wyoming; OR, Oregon; NV, Nevada; WA, Washington; CA, California]

Basin	No. of reservoirs	Storage contents, in acre-ft		Percent of average
		September 30, 2001	Long-term average[1]	
Upper Snake River Basin (ID, WY)	8	668,300	2,322,700	29
Boise and Payette River Basins (ID)	7	633,000	1,080,400	59
Owyhee and Malheur River Basins (OR, ID, NV)	4	93,600	465,900	20
Upper Deschutes and Crooked River Basins (OR)	5	222,200	240,500	92
Upper Yakima River Basin (WA)	3	58,000	341,200	17
Willamette River Basin (OR)	13	380,800	950,500	40
Klamath River Basin (OR, CA)	3	353,200	523,500	67

[1] Based on year-end values for 30-year period, 1961–90 (Natural Resources Conservation Service, Reservoir Reports, 2002).

agricultural, hydrologic, and fire effects, according to the NOAA, U.S. Drought Monitor (2002).

GROUND-WATER MONITORING

Below-average streamflows can influence ground-water levels in local and regional aquifers. Ground-water levels in local alluvial aquifers can decline rapidly in response to below-average streamflow conditions, whereas levels in large regional aquifers might or might not be affected, depending on the time and spatial extent of low streamflow conditions. In addition, aquifers can be subject to increased pumpage necessary to augment decreases in the surface-water supply. Conversely, water stored in aquifers sustains base flow; therefore, ground-water discharge can ameliorate streamflow. If recharge is lessened as a result of drought, there may be a delayed response of reduced base flow. Monthly ground-water data are inadequate to describe the effect of the 2001 drought on ground water in storage.

Twenty-five wells across the study area (**figure 11**, back of report) were selected in WY02 to monitor the possible short- and long-term effects of low streamflows on ground-water levels. Data will be collected on at least a bimonthly basis, and several of the wells are equipped with real-time systems. Well selection was based on the following criteria: (1) located in aquifers stressed by both pumping and drought, in areas potentially affecting many people; (2) currently being measured at least seasonally and having a relatively long period of record; and (3) geographically distributed

Table 6. Site information and monitoring frequency for selected wells in Washington, Oregon, and Idaho

[No., number; latitude and longitude are based on the North American Datum of 1983 and shown in degrees, minutes, seconds; WA, Washington; OR, Oregon; ID, Idaho]

Map No. (fig. 11)	Well site No.	State	Latitude	Longitude	Monitoring frequency
1	465033122570202	WA	46° 50' 32"	122° 57' 38"	real-time[1]
2	472121122442011	WA	47° 21' 20"	122° 44' 24"	continuous
3	462913119362102	WA	46° 29' 12"	119° 36' 24"	monthly
4	473442118162201	WA	47° 34' 40"	118° 16' 31"	monthly
5	461935118081501	WA	46° 19' 33"	118° 08' 17"	monthly
6	470045117211701	WA	47° 00' 44"	117° 21' 20"	monthly
7	474011117072901	WA	47° 40' 10"	117° 07' 32"	monthly
8	441508123053001	OR	44° 15' 07"	123° 05' 34"	monthly
9	420825123040401	OR	42° 08' 24"	123° 04' 08"	monthly
10	444956123031701	OR	44° 49' 55"	123° 03' 21"	monthly
11	452033122195901	OR	45° 20' 32"	122° 20' 03"	monthly
12	442242121405501	OR	44° 22' 41"	121° 41' 03"	real-time[1]
13	434400121275801	OR	43° 43' 59"	121° 28' 02"	real-time[1]
14	475439116503401	ID	47° 54' 38"	116° 50' 38"	bimonthly
15	443736116263701	ID	44° 37' 36"	116° 26' 40"	real-time[1]
16	444351116030001	ID	44° 44' 35"	116° 03' 20"	monthly
17	431242115485501	ID	43° 12' 42"	115° 48' 57"	bimonthly
18	424523115451201	ID	42° 45' 23"	115° 45' 15"	real-time[1]
19	424353114494701	ID	42° 43' 52"	114° 49' 49"	monthly
20	423206113542301	ID	42° 32' 05"	113° 54' 25"	bimonthly
21	432854113201002	ID	43° 28' 54"	113° 20' 12"	bimonthly
22	423837113134302	ID	42° 38' 36"	113° 13' 45"	monthly
23	432700112470801	ID	43° 27' 01"	112° 47' 11"	bimonthly
24	440058112293601	ID	44° 00' 57"	112° 29' 39"	bimonthly
25	440353112135701	ID	44° 03' 52"	112° 13' 59"	monthly

[1] Continuous monitoring site with real-time data presented on World Wide Web.

across the region. Site information for the selected wells, including monitoring frequency, is given in **table 6**. The ground-water data will be an invaluable resource in the future for assisting hydrologists and water managers in understanding and planning for reduced ground-water resources resulting, in part, from low-water years.

SUMMARY

Below-normal precipitation and above-normal temperatures were common across most of the Pacific Northwest and western Canada during water year 2001 (WY01). Especially low precipitation levels during the winter months resulted in below-average snowpacks across the region. As a result, streamflow levels at several locations in the Pacific Northwest during WY01 were significantly lower than the long-term median values for much of the year. Late-summer base flows in a few rivers were the lowest on record. Low streamflows were most noticeable in rivers east of the Cascade Range where most of the streamflow above base flow is a direct result of snowmelt runoff.

Compared with WY77, commonly considered as the drought of record, the magnitude of peak flows at most sites in WY01 was higher (although much lower than average), and total annual flow volumes in WY01 were generally only slightly higher than in WY77. Although the timing of miscellaneous low-flow measurements at any given location can vary, the values show that late-summer base flows were similar in WY77 and WY01.

Reservoir storage values for seven major river basins in the three-State region were all below the 30-year (1961–90) average at the end of WY01. Reservoir storages were at average to above-average levels for several years prior to WY01; thus, the below-average levels in WY01 can be related directly to low streamflows during WY01.

Near the end of WY01, the Palmer Drought Severity Index ranked much of the region in the severe or extreme drought categories. Only the coastal area of Washington and Oregon and part of the mountain region in Idaho were in the near-normal category. The National Oceanic and Atmospheric Administration classified most of the area as exhibiting adverse agricultural, hydrological, and fire-danger effects from the drought.

The effects that the low streamflows of WY01 have on ground-water levels in local and regional aquifers might not be noticeable for several years. However, lack of available water for recharge and increased pumpage needed to augment the reduced surface-water supply likely reduced ground-water levels throughout the region. Twenty-five wells across the region were selected for extended monitoring to help define the possible short- and long-term effects of low streamflows on ground-water levels.

REFERENCES CITED

Daly, C., and Taylor, G., 1998, Western United States average monthly or annual precipitation, 1961–90, Oregon: Portland, Water and Climate Center of the Natural Resources Conservation Service, grid-cell resolution 4 km, accessed May 2002, at URL http://www.ocs.orst.edu/prism/prism_products.html

Government of British Columbia, River Forecast Centre-Archives, Snowpack and water supply outlook for British Columbia, April 1, 2001, accessed May 2002, at URL http://srmwww.gov.bc.ca/aib/wat/rfc/archive/2001/200104/bulletin.htm

Hubbard, L.L., 1987, Low streamflow conditions in the Western States during 1987: U.S. Geological Survey Water-Resources Investigations Report 87–4267, 29 p.

National Oceanic and Atmospheric Administration, National Climatic Data Center, Climate of 2001–September: U.S. Regional Drought Watch, accessed May 2002, at URL http://www.ncdc.noaa.gov/oa/climate/research/2001/sep/drought-regional-overview.html

——National Weather Service, Climate Prediction Center, 2001 Drought severity index by division: accessed December 2001, at URL http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer/2001/weekly_PALMER_2001.html

——U.S. Drought Monitor, September 2001: accessed May 2002, at URL http://www.drought.unl.edu/dm/archive/2001/drmon0925.htm

Natural Resources Conservation Service, National Water and Climate Center, Precipitation reports, water years 2000 and 2001: accessed May 2002, at URL

http://www.wcc.nrcs.usda.gov/water/precip/precip.html

——Reservoir reports, water year 2001: accessed May 2002, at URL

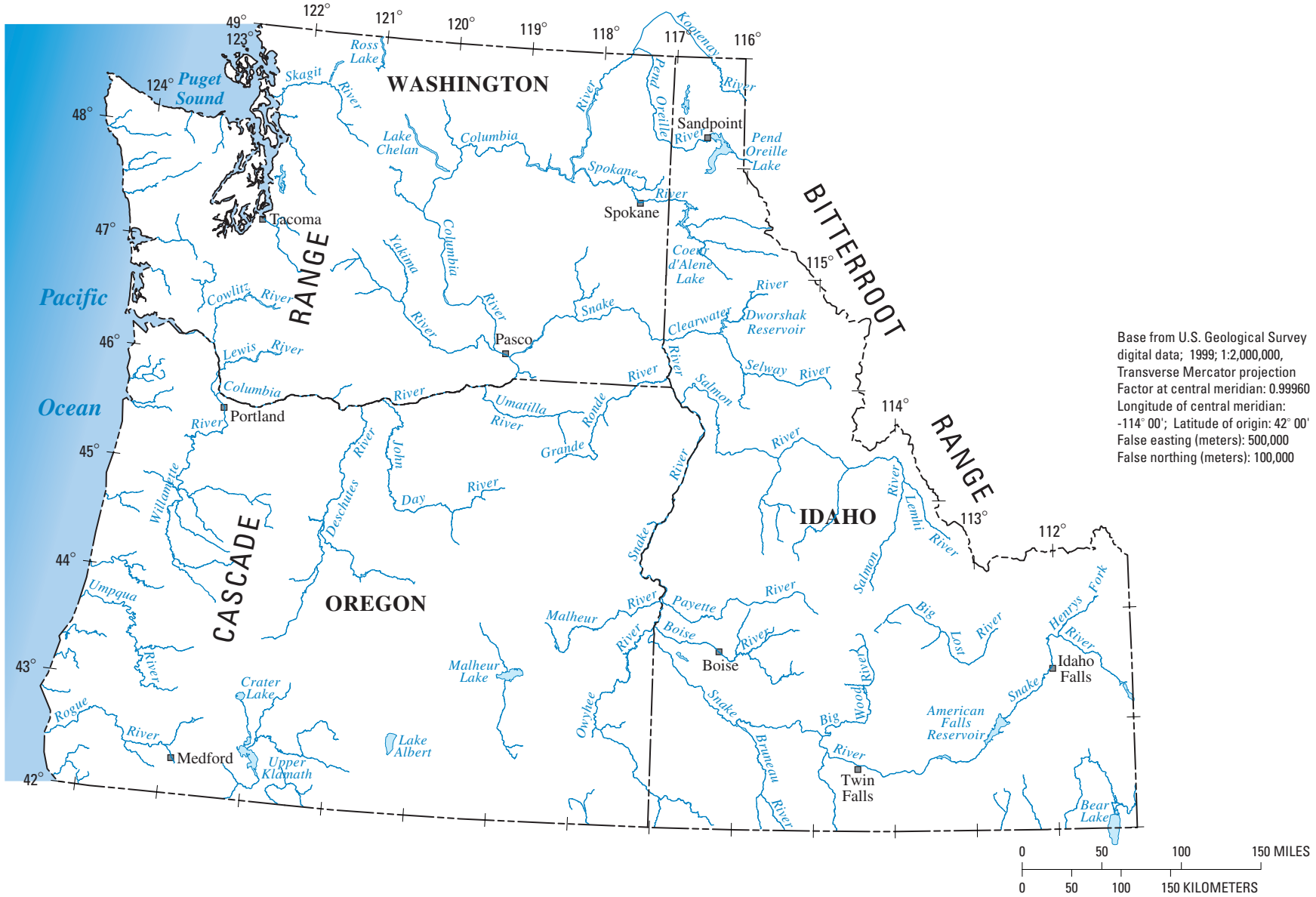
http://www.wcc.nrcs.usda.gov/water/reservoir/resv_rpt.html

——Snowpack reports, water years 2000 and 2001: accessed May 2002, at URL

http://www.wcc.nrcs.usda.gov/water/snow/snow_rpt.html

Paulson, R.W., Chase, E.B., Roberts, R.S., and Moody, D.W., 1991, National water summary 1988–89—hydrologic events and floods and droughts: U.S. Geological Survey Water-Supply Paper 2375, 591 p.

Figures 1 – 11



Base from U.S. Geological Survey digital data; 1999; 1:2,000,000, Transverse Mercator projection
Factor at central meridian: 0.99960
Longitude of central meridian: -114° 00'; Latitude of origin: 42° 00'
False easting (meters): 500,000
False northing (meters): 100,000

Figure 1. Location of study area, major lakes, reservoirs, and rivers, Washington, Oregon, and Idaho.

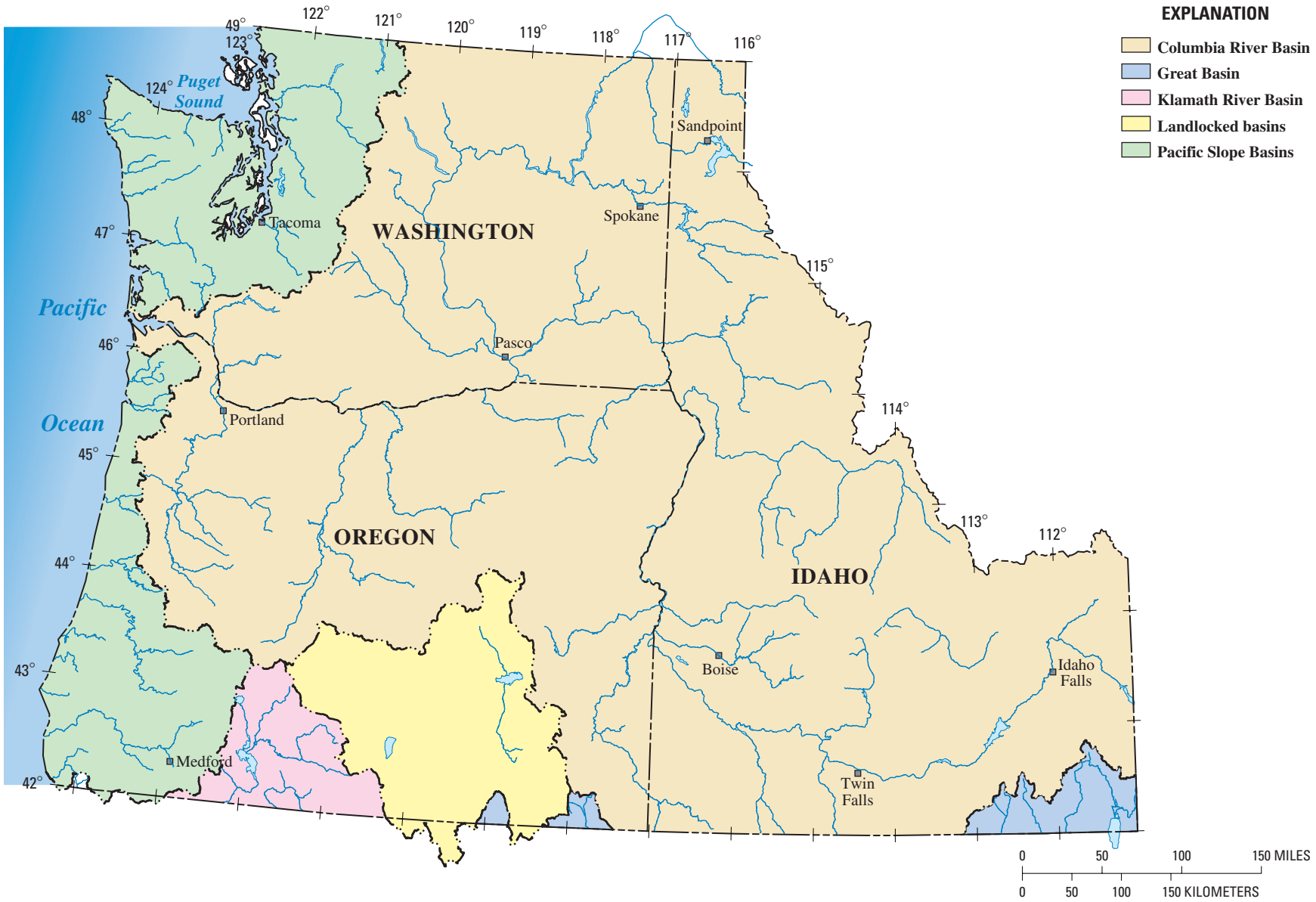


Figure 2. Location of major basins, Washington, Oregon, and Idaho.

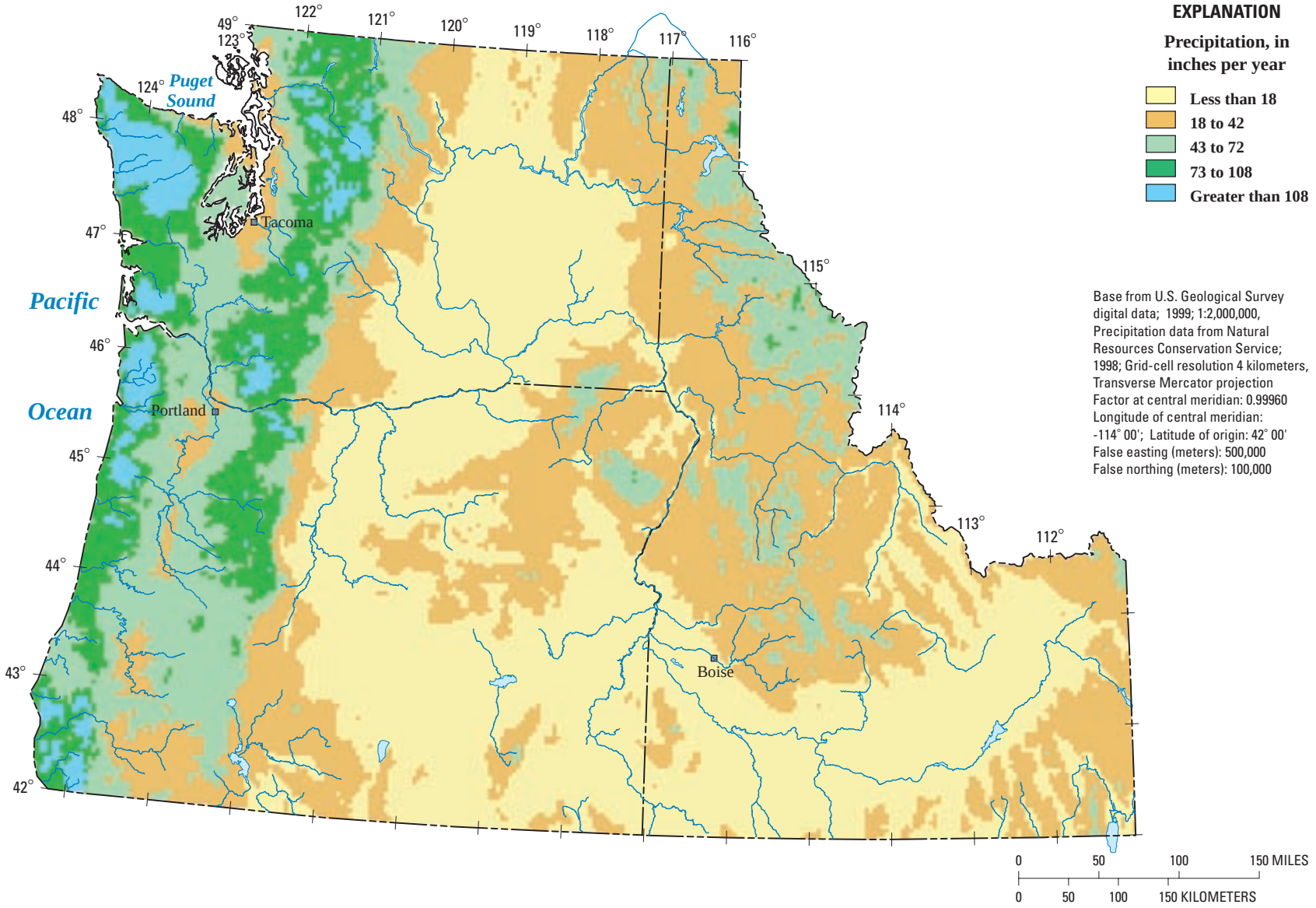


Figure 3. Yearly average precipitation in Washington, Oregon, and Idaho.

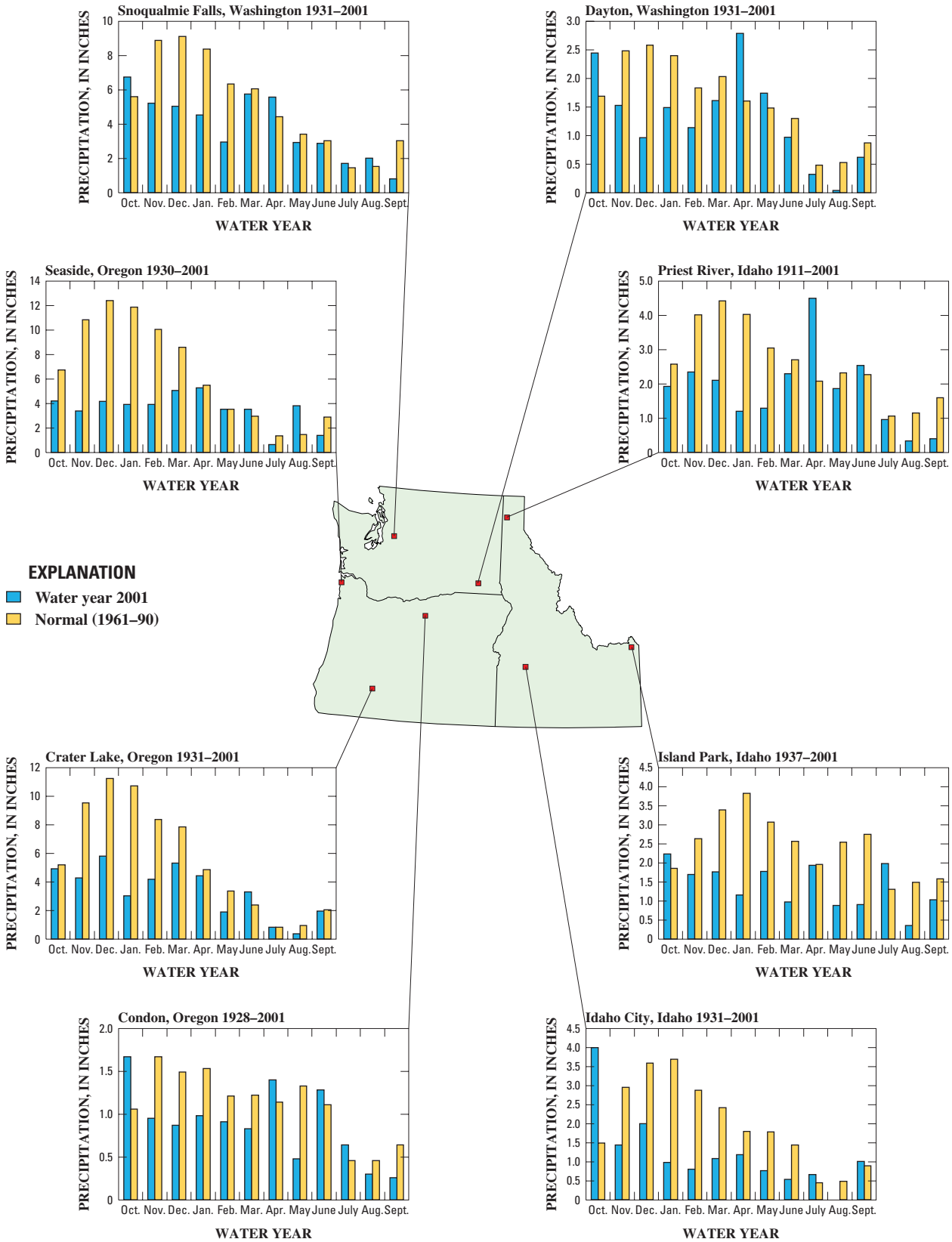


Figure 4. Monthly precipitation during water year 2001, and monthly normal precipitation during 1961–90 at selected weather stations in Washington, Oregon, and Idaho. (Natural Resources Conservation Service, Precipitation Reports, 2002)

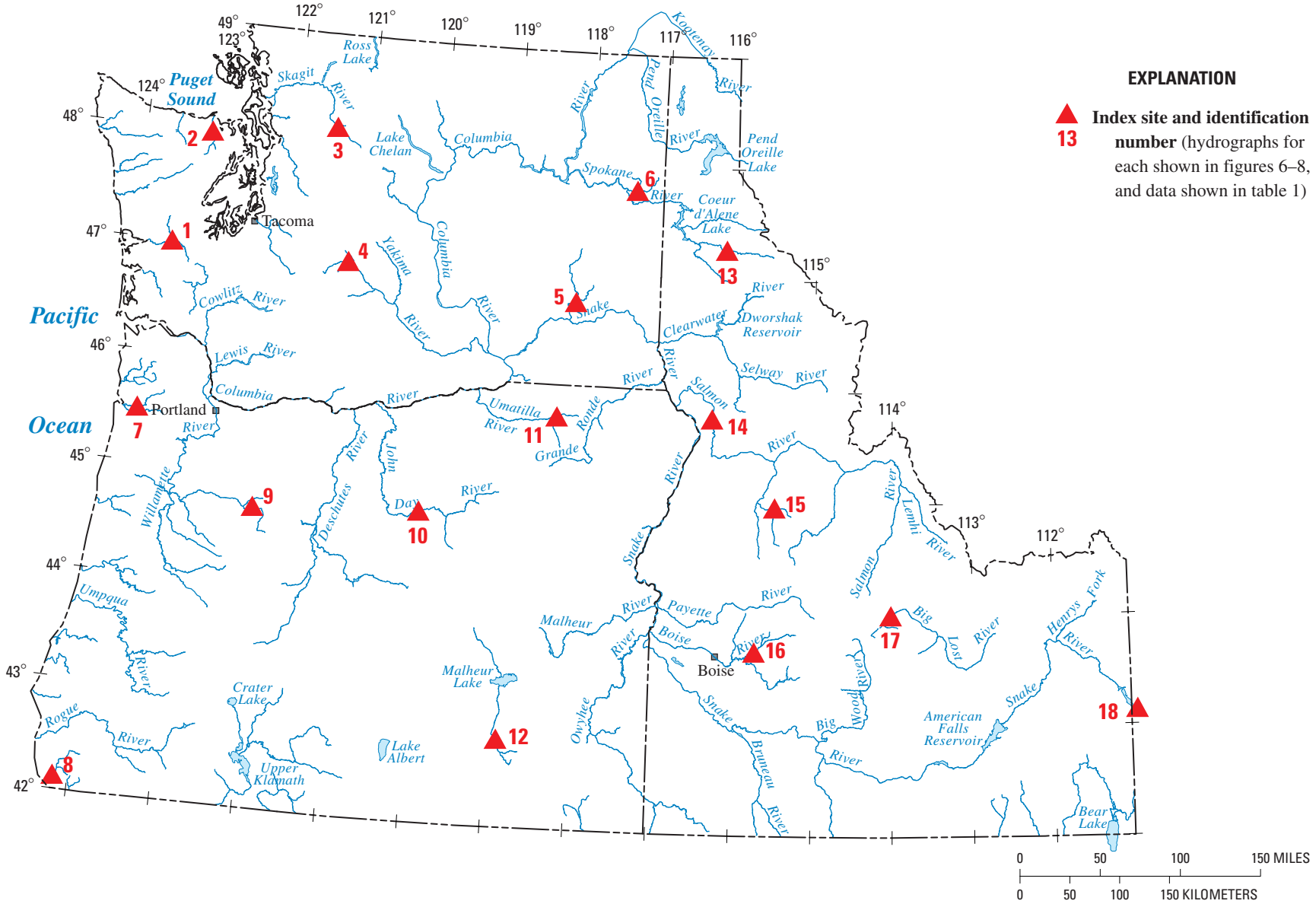


Figure 5. Location of long-term gaging stations used as index sites, Washington, Oregon, and Idaho.

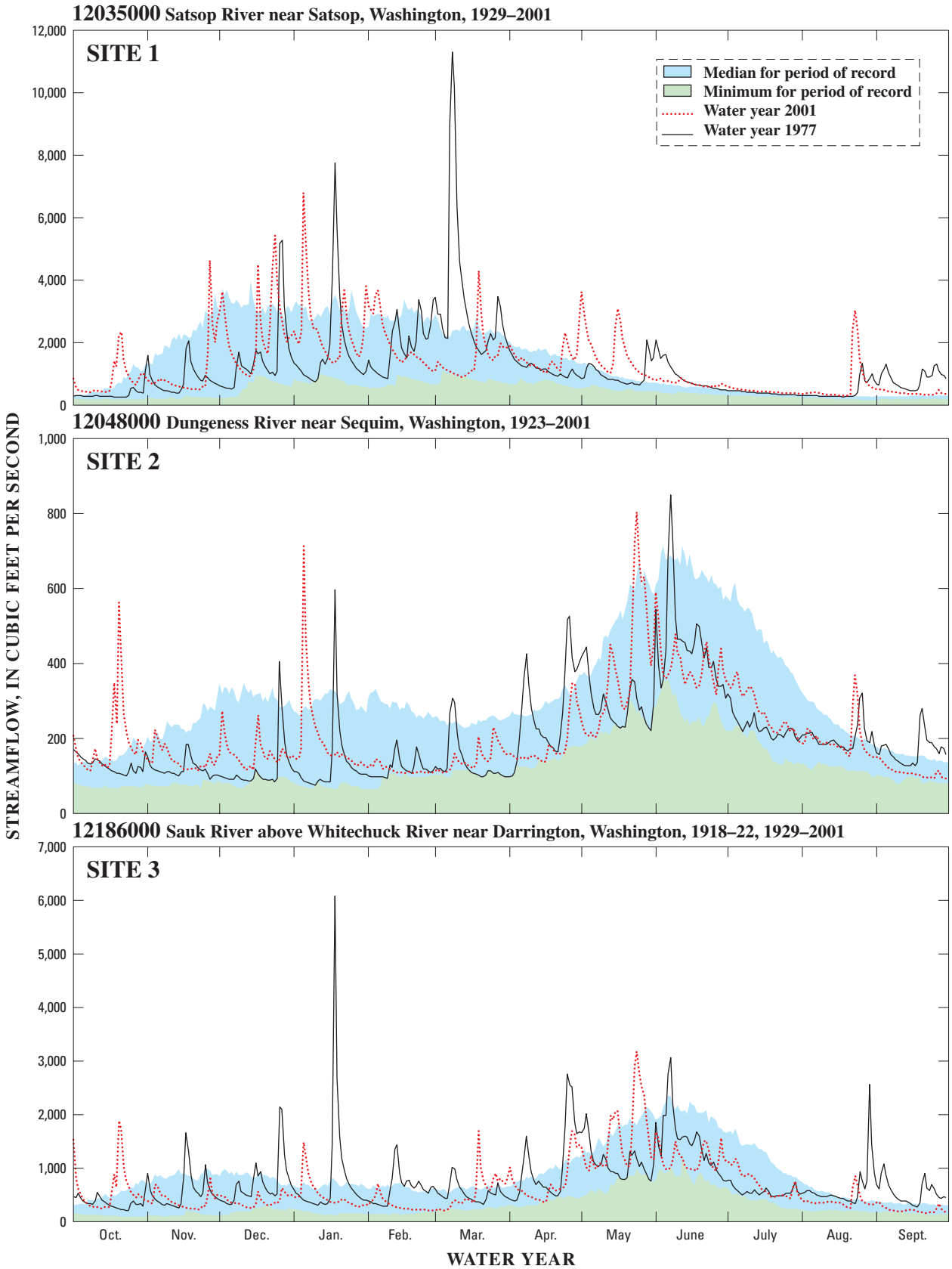


Figure 6. Daily mean streamflow for water years 1977 and 2001, and long-term minimum and median streamflow for selected gaging stations in Washington. (Locations shown in figure 5)

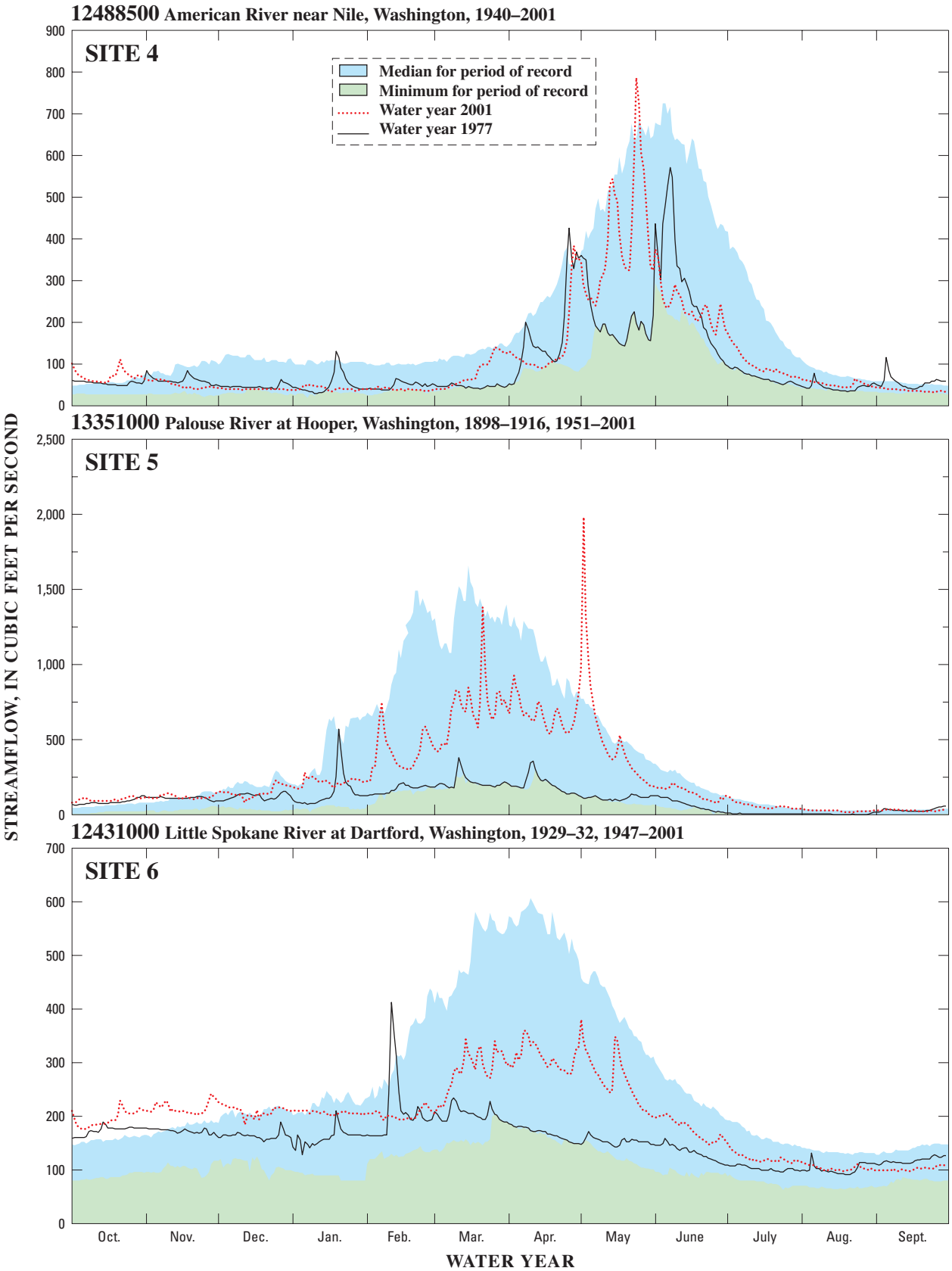


Figure 6. Daily mean streamflow for water years 1977 and 2001, and long-term minimum and median streamflow for selected gaging stations in Washington—Continued. (Locations shown in figure 5)

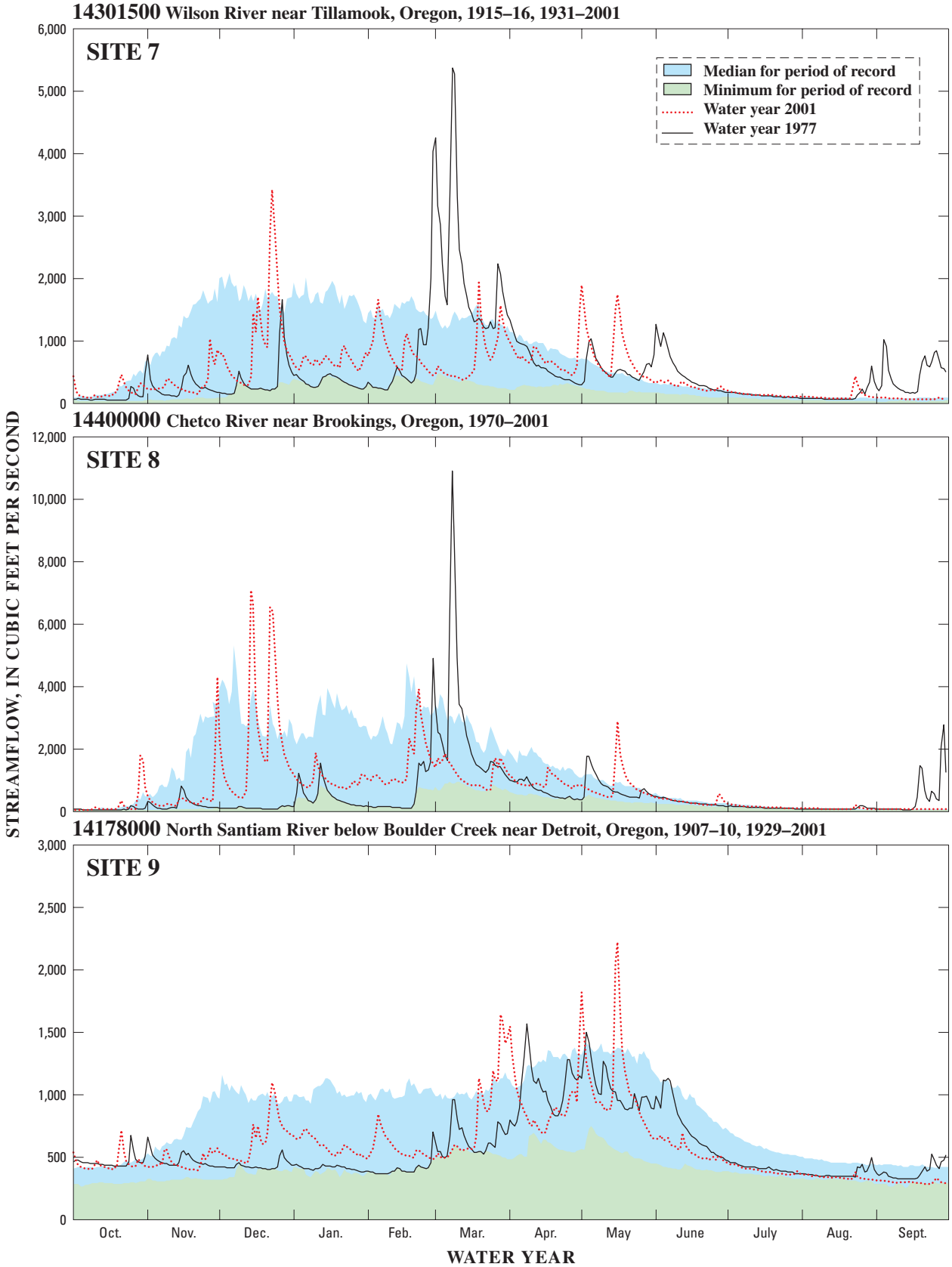


Figure 7. Daily mean streamflow for water years 1977 and 2001, and long-term minimum and median streamflow for selected gaging stations in Oregon. (Locations shown in figure 5)

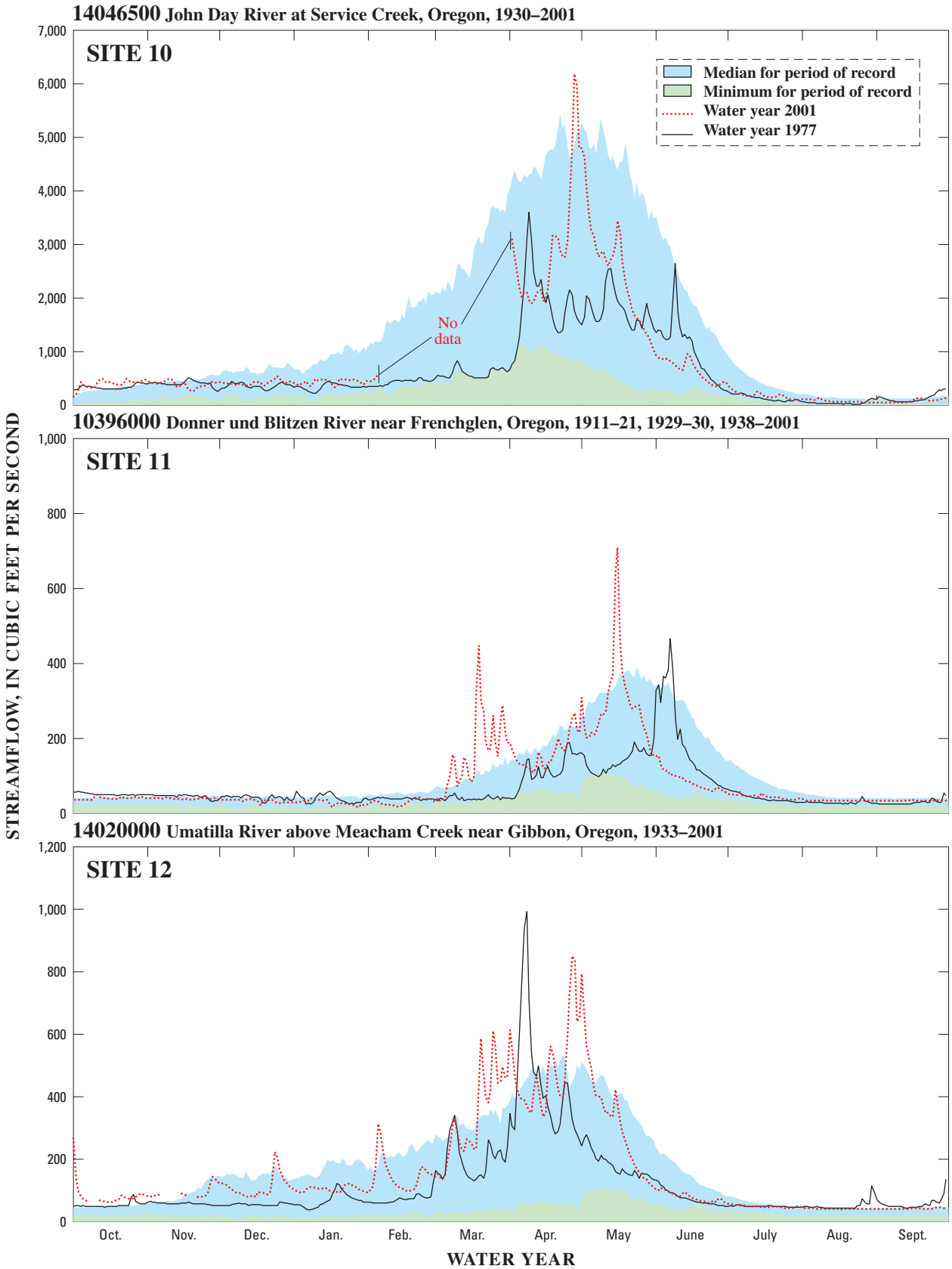


Figure 7. Daily mean streamflow for water years 1977 and 2001, and long-term minimum and median streamflow for selected gaging stations in Oregon—Continued. (Locations shown in figure 5)

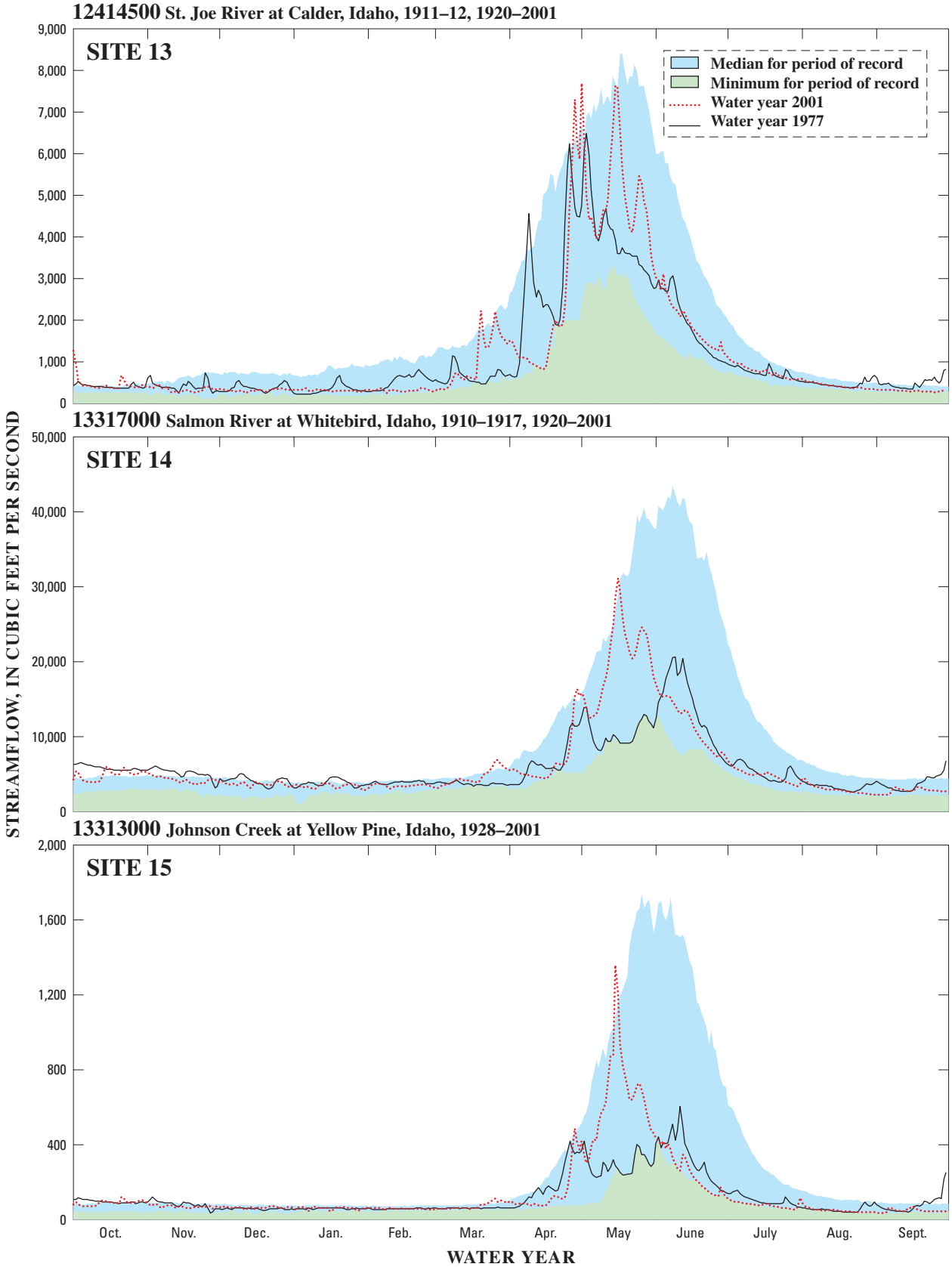


Figure 8. Daily mean streamflow for water years 1977 and 2001, and long-term minimum and median streamflow for selected gaging stations in Idaho. (Locations shown in figure 5)

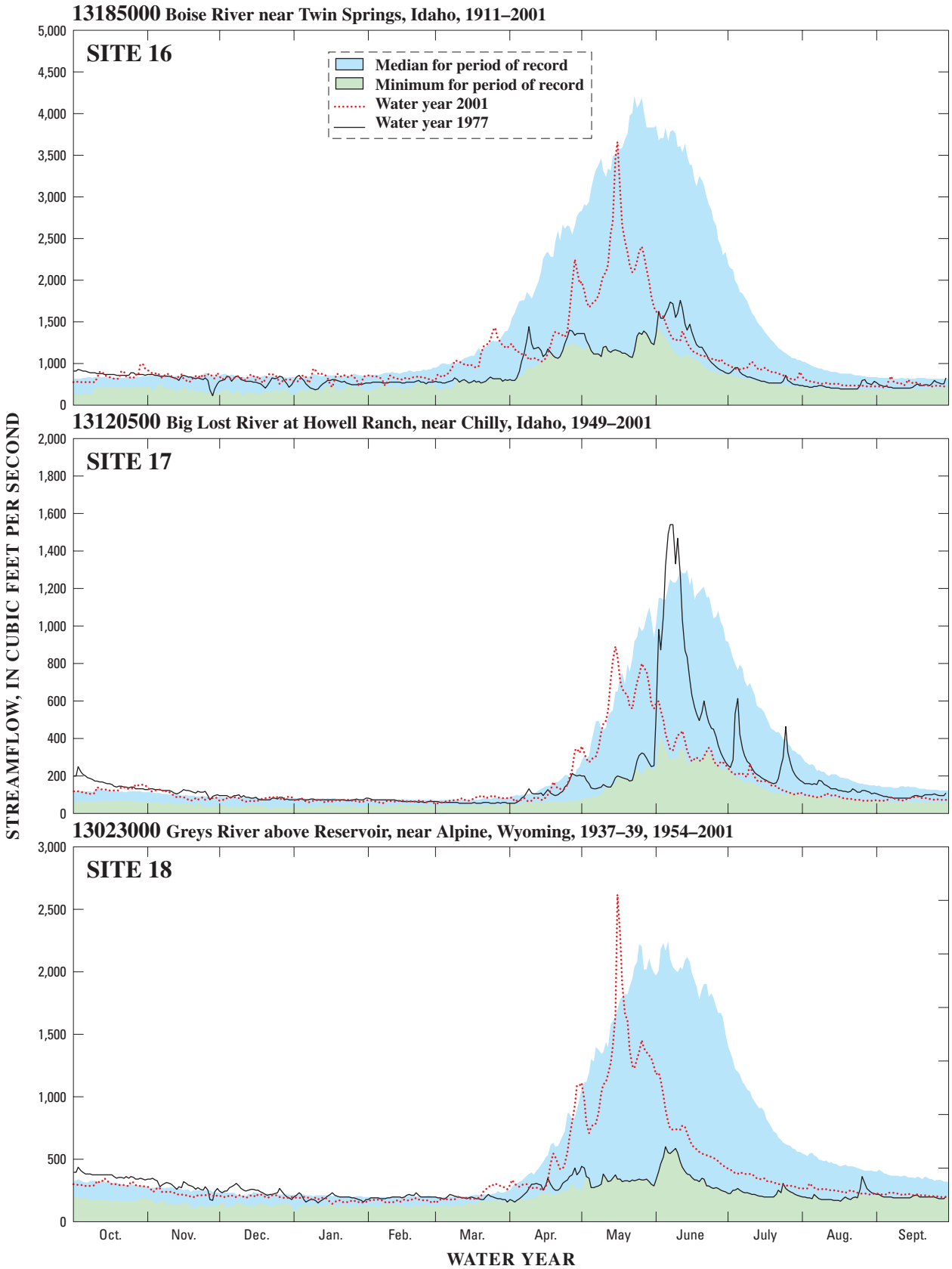


Figure 8. Daily mean streamflow for water years 1977 and 2001, and long-term minimum and median streamflow for selected gaging stations in Idaho—Continued. (Locations shown in figure 5)

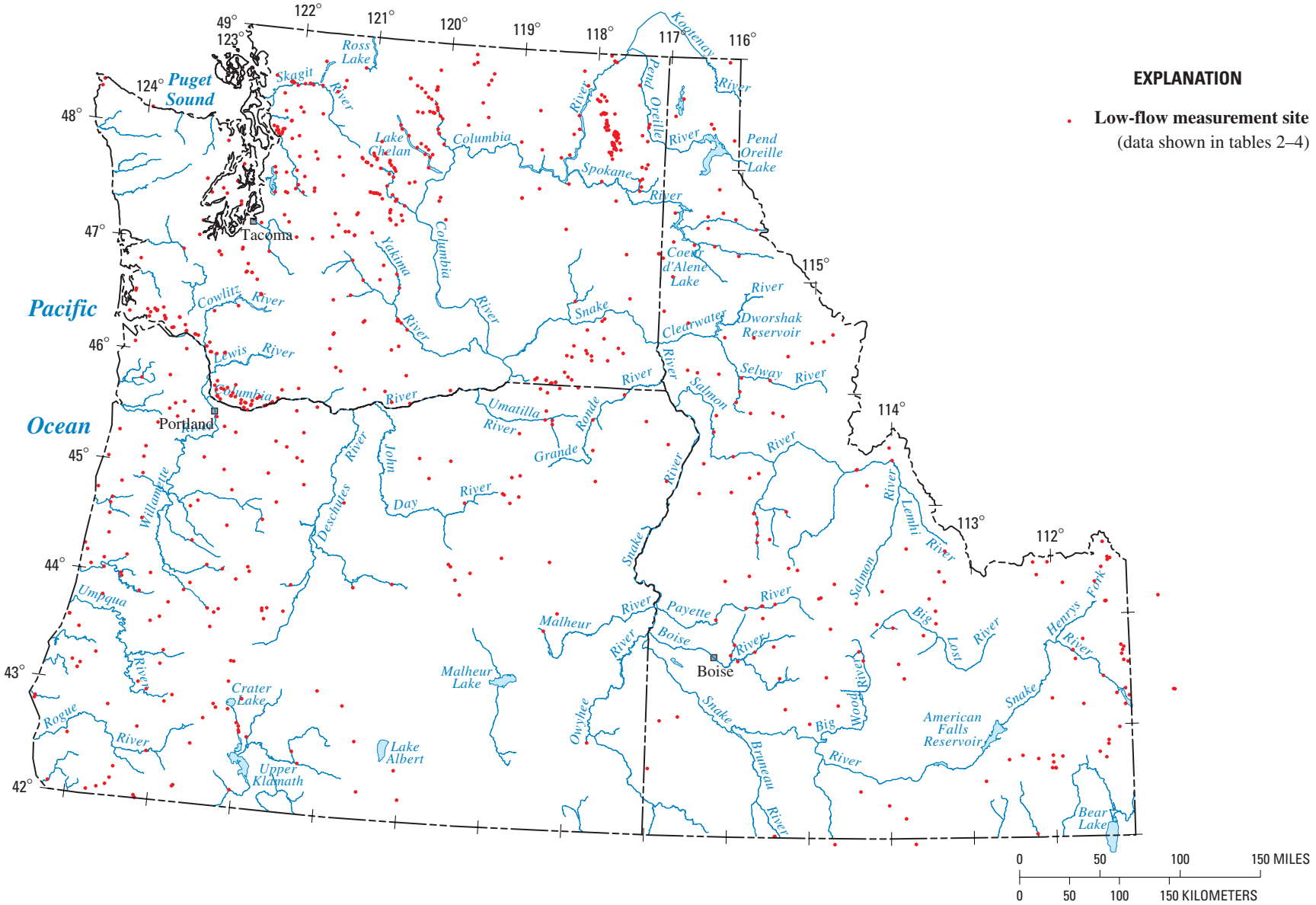


Figure 9. Location of low-flow measurement sites, Washington, Oregon, and Idaho, water year 2001.

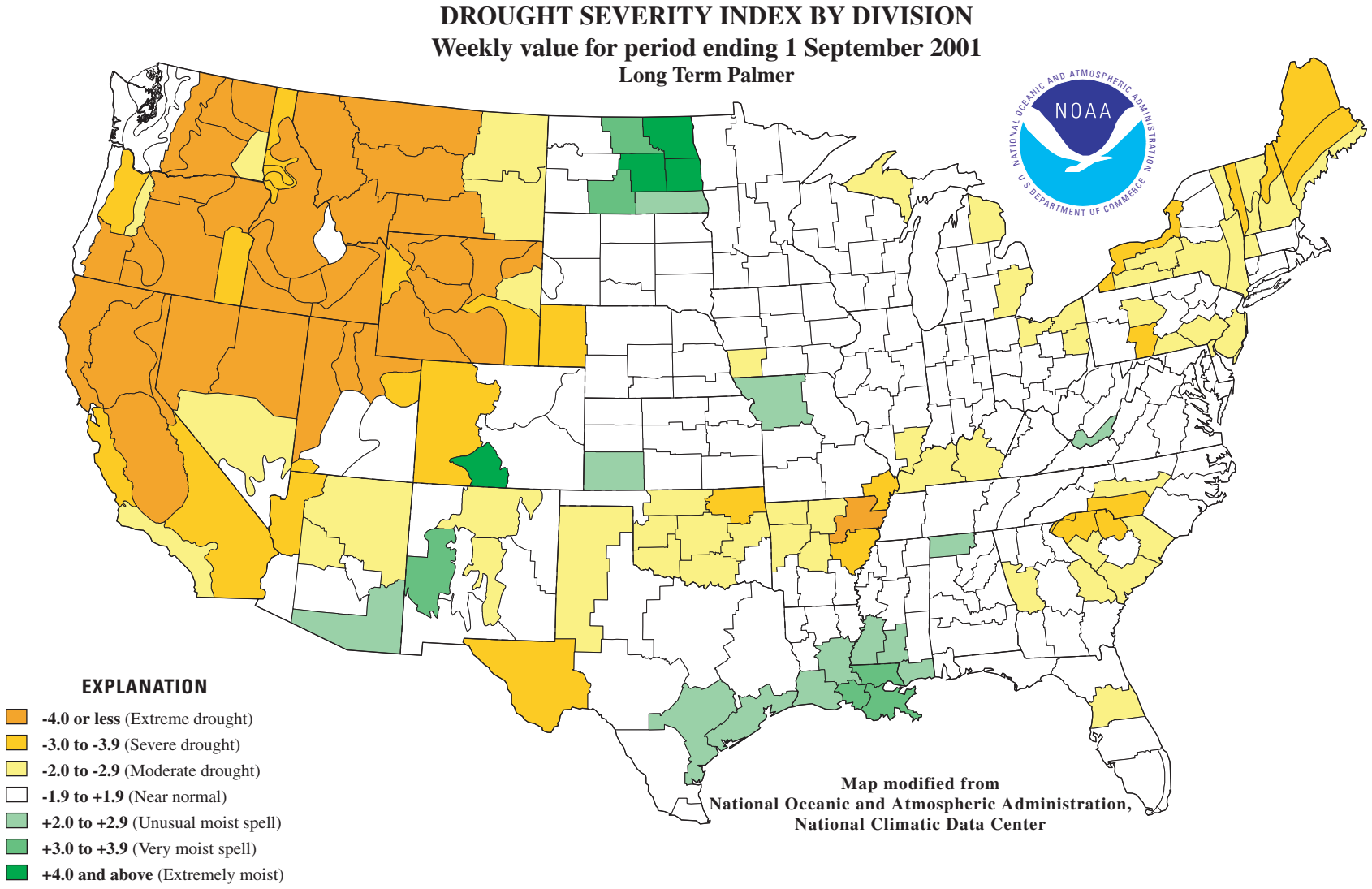


Figure 10. Palmer drought severity index map for the continental United States, September 1, 2001.

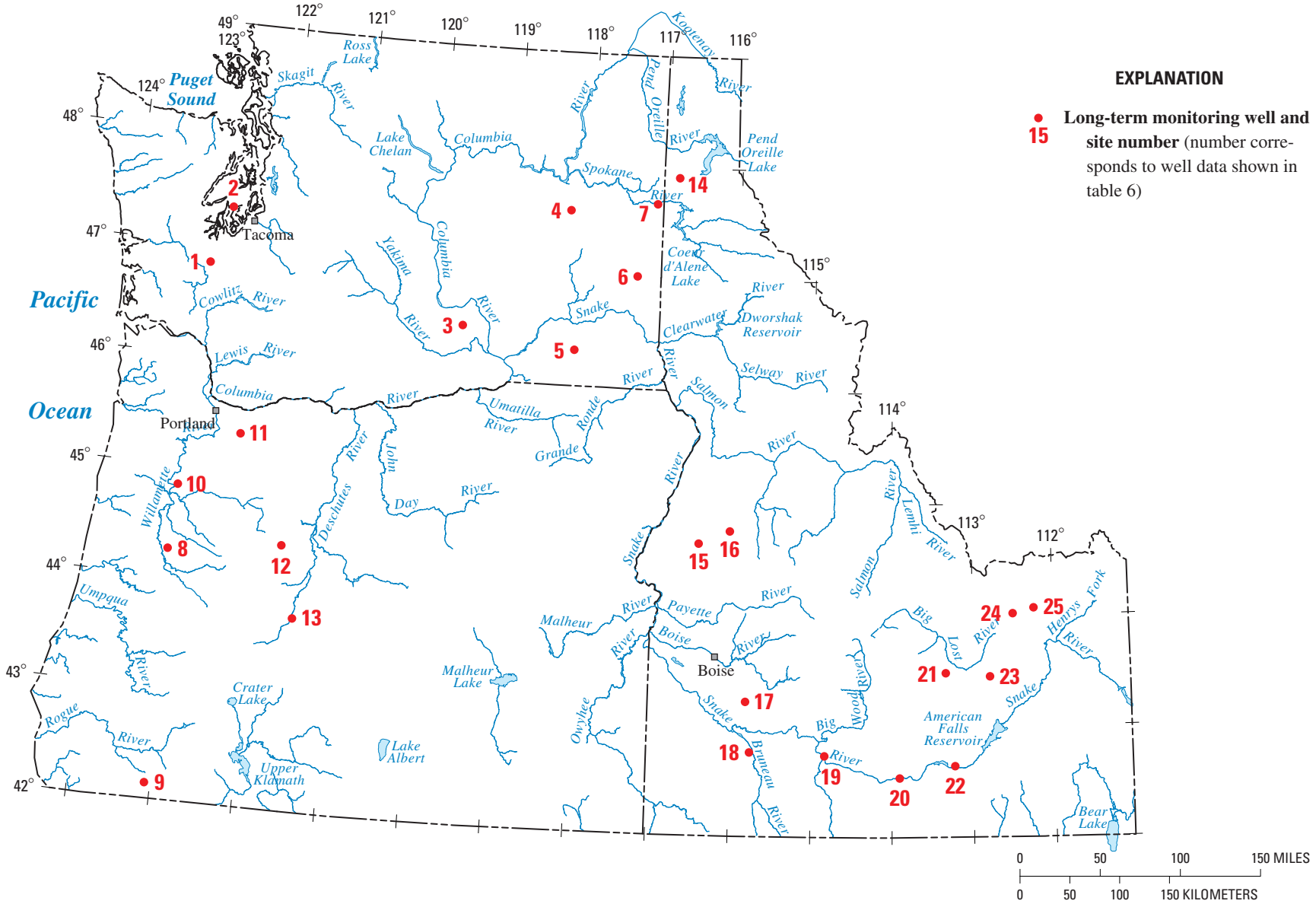


Figure 11. Location of long-term monitoring wells, Washington, Oregon, and Idaho, water year 2002.

Table 2

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001

[Latitude and longitude are based on the North American Datum of 1983 and shown in degrees, minutes, seconds; ft^3/s, cubic feet per second; WA, Washington; ---, no number assigned]

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Willapa Bay Basin						
12009500	Bear Branch near Naselle, WA	46° 19' 47"	123° 54' 40"	9-20-2001	11.0		
12011103	North Nemah River near Nemah, WA	46° 30' 49"	123° 51' 46"	9-21-2001	16.0		
12011200	Williams Creek near South Bend, WA	46° 31' 49"	123° 51' 39"	9-21-2001	13.0		
12017000	North River near Raymond, WA	46° 48' 26"	123° 51' 02"	9-21-2001	79.0	10-12-1977	245
	Chehalis River Basin						
---	Porter Creek at Railroad Bridge at Porter, WA	46° 56' 14"	123° 18' 34"	9-20-2001	15.0		
	Between Calawah River Basin and Cape Flattery						
12043163	Sooes River below Miller Creek near Ozette, WA	48° 17' 43"	124° 39' 11"	9-13-2001	41.0		
12043173	Wasatch River below Educket Creek at Neah Bay, WA	48° 21' 24"	124° 38' 08"	9-13-2001	7.6		
	Between Cape Flattery and Elwha River Basin						
12043430	East Twin River near Pysht, WA	48° 09' 47"	123° 56' 43"	9-14-2001	4.0		
	Between Dungeness and Quilcene River Basins						
12050500	Snow Creek near Maynard, WA	47° 56' 36"	122° 53' 12"	9-14-2001	2.1		
	Between Duckabush and Skokomish River Basins						
12054600	Jefferson Creek near Eldon, WA	47° 35' 00"	123° 06' 27"	9-18-2001	20.0		
	Hamma Hamma River near Eldon, WA	47° 35' 15"	123° 06' 18"	9-14-2001	71.0		
	Between Skokomish and Deschutes River Basins						
12063500	Union River near Belfair, WA	47° 28' 19"	122° 49' 44"	9-21-2001	14.0		
12067500	Tahuya River near Belfair, WA	47° 30' 59"	122° 53' 04"	9-21-2001	.30		
12068500	Dewatto River near Dewatto, WA	47° 28' 05"	123° 01' 40"	9-18-2001	11.0		
12070000	Dogfish Creek near Poulsbo, WA	47° 45' 10"	122° 38' 40"	9-20-2001	4.7		
12072000	Chico Creek near Bremerton, WA	47° 35' 27"	122° 42' 33"	9-20-2001	1.8		
12072800	Purdy Creek at Purdy,WA	47° 23' 17"	122° 37' 34"	9-20-2001	1.7		
12073000	Burley Creek at Burley, WA	47° 24' 54"	122° 37' 54"	9-20-2001	14.0		
12077000	Goldsborough Creek at Shelton, WA	47° 12' 29"	123° 06' 04"	9-21-2001	29.0		
12078400	Kennedy Creek near Kamilche, WA	47° 04' 38"	123° 07' 39"	9-21-2001	3.2		
	Deschutes River Basin						
---	Little Deschutes River near La Grande, WA	46° 47' 30"	122° 23' 23"	9-13-2001	.90		
---	Deschutes River near La Grande, WA	46° 47' 30"	122° 23' 33"	9-13-2001	15.0		
12078850	Deschutes River above Mitchell Creek near La Grande, WA	46° 47' 43"	122° 27' 26"	9-13-2001	12.0	9-12-1977	22.2
12078900	Mitchell Creek near La Grande, WA	46° 47' 25"	122° 28' 04"	9-13-2001	2.3	9-12-1977	2.7
12079382	Offutt Lake Outlet near Olympia, WA	46° 55' 12"	122° 48' 50"	9-12-2001	0		
12079400	Deschutes River near Turnwater, WA	46° 56' 42"	122° 50' 59"	9-12-2001	45.0	9-13-1977	58.7
12079500	Spurgeon Creek near Olympia, WA	46° 56' 57"	122° 50' 39"	9-12-2001	3.7	9-13-1977	5.4
	Nisqually River Basin						
---	Graiville Creek near Roy, WA	46° 59' 28"	122° 32' 50"	9-20-2001	0		
---	Little Nisqually River near Alder, WA	46° 44' 08"	122° 18' 52"	9-20-2001	11.0		
12089000	Tanwax Creek near McKenna, WA	46° 51' 59"	122° 27' 04"	9-20-2001	0		
12090200	Muck Creek at Roy, WA	47° 00' 19"	122° 32' 36"	9-20-2001	0		

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Puyallup River Basin						
12093000	Kapowsin Creek near Kapowsin, WA	46° 59' 44"	122° 11' 49"	9-20-2001	4.3		
12097000	White River at Greenwater, WA	47° 08' 48"	121° 38' 54"	9-19-2001	378		
12097850	White River below Clearwater River near Buckley, WA	47° 08' 48"	121° 51' 36"	9-19-2001	499		
	Between Puyallup and Duwamish River Basins						
12103020	Hylebos Creek at Highway 99 at Fife, WA	47° 14' 38"	122° 20' 17"	9-20-2001	6.0		
	Duwamish River Basin						
12103380	Green River above Twin Camp Creek near Lester, WA	47° 10' 54"	121° 23' 19"	9-18-2001	5.2		
12107300	Icy Creek near Black Diamond, WA	47° 16' 37"	121° 58' 36"	9-20-2001	4.8		
12111500	Covington Creek near Black Diamond, WA	47° 20' 08"	122° 02' 47"	9-20-2001	1.0		
	Lake Washington Basin						
12119600	May Creek at mouth, near Renton, WA	47° 31' 47"	122° 12' 04"	9-18-2001	3.7		
12120500	Juanita Creek near Kirkland, WA	47° 42' 19"	122° 13' 00"	9-18-2001	2.7		
12121500	East Fork Issaquah Creek at Issaquah, WA	47° 32' 07"	122° 02' 15"	9-19-2001	3.6		
12121700	Tibbetts Creek near Issaquah, WA	47° 32' 29"	122° 03' 51"	9-19-2001	.34		
12122500	Bear Creek near Redmond, WA	47° 43' 03"	122° 04' 38"	9-19-2001	8.1		
12127100	Swamp Creek at Kenmore, WA	47° 45' 21"	122° 14' 01"	9-18-2001	5.8		
	Snohomish River Basin						
12131000	Beckler River near Skykomish, WA	47° 44' 22"	121° 19' 27"	9-18-2001	64.0		
12133500	Troublesome Creek near Index, WA	47° 54' 02"	121° 23' 55"	9-18-2001	42.0		
12135000	Wallace River at Gold Bar, WA	47° 51' 49"	121° 40' 55"	9-21-2001	18.0		
12136000	Olney Creek near Startup, WA	47° 55' 39"	121° 43' 07"	9-18-2001	8.8		
12141000	Woods Creek near Monroe, WA	47° 52' 09"	121° 55' 32"	9-19-2001	19.0		
12142200	Calligan Creek near Snoqualmie, WA	47° 36' 06"	121° 41' 10"	9-17-2001	.23		
12142300	Hancock Creek near Snoqualmie, WA	47° 34' 19"	121° 41' 14"	9-17-2001	4.4		
12145000	Tokul Creek near Snoqualmie, WA	47° 33' 13"	121° 50' 09"	9-20-2001	23.0		
12146000	Patterson Creek near Fall City, WA	47° 34' 47"	121° 56' 11"	9-20-2001	7.3		
12147000	Griffin Creek near Carnation, WA	47° 36' 57"	121° 54' 13"	9-20-2001	2.4		
12148700	Stossel Creek near Carnation, WA	47° 41' 43"	121° 49' 51"	9-21-2001	1.2		
12150500	Cherry Creek near Duvall, WA	47° 44' 37"	121° 56' 29"	9-20-2001	3.0		
12152500	Pilchuck River near Granite Falls, WA	48° 03' 16"	121° 57' 25"	9-19-2001	39.0		
12153000	Little Pilchuck Creek near Lake Stevens, WA	48° 01' 24"	122° 03' 05"	9-19-2001	1.7		
	Between Snohomish and Stillaguamish River Basins						
---	Unnamed Spring #1 near Tulalip, WA	48° 04' 57"	122° 16' 19"	9-26-2001	.2		
---	Unnamed Spring #2 near Tulalip, WA	48° 03' 26"	122° 14' 23"	9-26-2001	.41		
12157000	Quilceda Creek near Marysville, WA	48° 06' 17"	122° 09' 46"	9-19-2001	5.5		
12157020	West Fork Quilceda Creek near Marysville, WA	48° 06' 02"	122° 11' 09"	9-25-2001	1.8		
12157030	Quilceda Creek Tributary near Marysville,WA	48° 04' 33"	122° 11' 21"	9-24-2001	.59		
12157035	Sturgeon Creek at Marysville,WA	48° 03' 26"	122° 11' 51"	9-26-2001	.86		
12157150	Mission Creek near Marysville,WA	48° 05' 07"	122° 14' 54"	9-25-2001	.61	9-07-1977	0.7
12157170	Mission Creek Tributary #1 near Tulalip,WA	48° 04' 59"	122° 15' 02"	9-25-2001	0		

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Between Snohomish and Stillaguamish River Basins--Continued						
12157210	Mission Creek Tributary #2 near Tulalip,WA	48° 04' 44"	122° 14' 40"	9-25-2001	0.33	9-07-1977	0.3
12158001	Lake Shoecraft Outlet near Tulalip, WA	48° 07' 23"	122° 18' 28"	9-25-2001	.10		
12158025	East Branch Creek above Mary Shelton Lake near Tulalip, WA	48° 06' 46"	122° 15' 49"	9-25-2001	0	9-06-1977	0
	Stillaguamish River Basin						
---	Lake Cavanaugh outlet near McMurray, WA	48° 18' 40"	121° 58' 34"	9-20-2001	0		
12162500	South Fork Stillaguamish River above Jim Creek near Arlington, WA	48° 10' 44"	122° 05' 07"	9-20-2001	205		
12164000	Jim Creek near Arlington, WA	48° 11' 00"	122° 04' 40"	9-19-2001	18.1		
12165000	Squire Creek near Darrington, WA	48° 16' 14"	121° 40' 16"	9-17-2001	56.4		
12166500	Deer Creek at Oso, WA	48° 16' 11"	121° 55' 58"	9-20-2001	48.9		
12168500	Pilchuck Creek near Bryant, WA	48° 15' 57"	122° 09' 50"	9-20-2001	28.6		
	Skagit River Basin						
12177500	Stetattle Creek near Newhalem, WA	48° 43' 03"	121° 09' 01"	9-17-2001	56.4		
12180000	Bacon Creek near Marblemount, WA	48° 35' 20"	121° 23' 45"	9-17-2001	133		
12182500	Cascade River at Marblemount, WA	48° 31' 37"	121° 24' 47"	9-18-2001	374		
12184500	Illabot Creek near Rockport, WA	48° 28' 54"	121° 30' 02"	9-18-2001	83.4		
12190000	Jackman Creek near Concrete, WA	48° 31' 26"	121° 42' 46"	9-18-2001	19.8		
12190718	Park Creek at Upper Bridge near Concrete, WA	48° 44' 32"	121° 41' 30"	9-18-2001	88.4		
12194500	Finney Creek near Concrete, WA	48° 31' 18"	121° 50' 23"	9-18-2001	24.0		
12195000	Grandy Creek near Concrete, WA	48° 31' 59"	121° 53' 03"	9-18-2001	9.1		
12196000	Alder Creek near Hamilton, WA	48° 31' 26"	121° 57' 00"	9-18-2001	7.5		
12196500	Day Creek near Lyman, WA	48° 30' 07"	122° 02' 48"	9-19-2001	21.2		
12197040	Tank Creek near Lyman, WA	48° 31' 35"	122° 06' 30"	9-19-2001	0		
12197110	Minkler Creek near Lyman, WA	48° 31' 23"	122° 05' 54"	9-19-2001	0		
12197680	Black Creek near Minkler, WA	48° 32' 00"	122° 07' 13"	9-19-2001	0		
12197700	Wiseman Creek near Lyman, WA	48° 31' 48"	122° 08' 12"	9-19-2001	1.7		
12200000	East Fork Nookachamps Creek near Clear Lake, WA	48° 25' 27"	122° 12' 34"	9-19-2001	3.8		
	Between Skagit and Nooksack River Basins						
12201000	Friday Creek near Burlington, WA	48° 34' 26"	122° 20' 19"	9-19-2001	13.0		
	Pend Oreille River Basin						
---	Le Clerc Creek near Metaline Falls, WA	48° 21' 18"	117° 16' 55"	10-04-2001	23.0		
---	Cee Cee Ah Creek near Metaline Falls, WA	48° 23' 07"	117° 16' 17"	10-04-2001	2.2		
12395900	Davis Creek near Dalkena, WA	48° 13' 50"	117° 17' 17"	10-04-2001	3.5	8-31-1977	2.4
12396100	Winchester Creek near Cusick, WA	48° 16' 51"	117° 21' 47"	10-04-2001	1.8	8-30-1977	1.1
12396450	Little Muddy Creek at Ione, WA	48° 43' 57"	117° 25' 39"	10-04-2001	.63		
	Between Pend Oreille and Kettle River Basins						
---	Little Sheep Creek at Velvet, WA	48° 59' 09"	117° 49' 38"	10-04-2001	1.5		
12399600	Deep Creek near Northport, WA	48° 55' 46"	117° 45' 02"	10-04-2001	8.5	8-29-1977	10.3
12400500	Sheep Creek near Northport, WA	48° 56' 26"	117° 46' 54"	10-04-2001	21.0		
	Kettle River Basin						
---	Boulder Creek near Orient, WA	48° 50' 09"	118° 11' 07"	10-05-2001	4.0	8-23-1977	3.6
---	Deadman Creek near Boyds, WA	48° 42' 26"	118° 07' 35"	10-05-2001	4.2		

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Colville River Basin						
---	Mill Creek near Colville, WA	48° 34' 13"	117° 56' 59"	9-13-2001	6.4		
---	Cottonwood Creek at mouth near Chewelah, WA	48° 13' 37"	117° 42' 24"	9-11-2001	2.7		
---	Sherwood Creek near Chewelah, WA	48° 15' 05"	117° 41' 07"	9-05-2001	.52		
---	Sheep Creek at Forest Center, WA	48° 05' 32"	117° 46' 02"	9-04-2001	8.1		
---	Clugston Creek near Chewelah, WA	48° 37' 48"	117° 56' 16"	9-07-2001	.39		
---	Colville River at Chewelah, WA	48° 16' 42"	117° 44' 57"	9-11-2001	32.0		
---	Sheep Creek near Valley, WA	48° 07' 09"	117° 45' 51"	9-11-2001	6.9		
---	Colville River near Valley, WA	48° 09' 01"	117° 44' 09"	9-05-2001	13.0		
---	Waitts Creek at mouth near Valley, WA	48° 11' 22"	117° 44' 16"	10-02-2001	.18		
---	Jump Off Joe Creek at mouth near Valley, WA	48° 09' 03"	117° 43' 22"	9-05-2001	2.7		
---	Sherwood Creek at mouth near Chewelah, WA	48° 14' 52"	117° 42' 00"	9-13-2001	.42		
---	Bulldog Creek at mouth at Valley, WA	48° 10' 05"	117° 43' 45"	10-02-2001	7.3		
---	Stensgar Creek at Addy, WA	48° 20' 54"	117° 50' 14"	9-13-2001	.04		
---	Addy Creek at Addy, WA	48° 21' 30"	117° 49' 51"	9-06-2001	.10		
---	Addy Creek at mouth at Addy, WA	48° 21' 26"	117° 50' 22"	9-13-2001	.01		
---	South Fork Chewelah Creek near Chewelah, WA	48° 17' 24"	117° 42' 57"	10-03-2001	1.8		
---	Cottonwood Creek at mouth near Chewelah, WA	48° 12' 19"	117° 39' 51"	9-05-2001	2.4		
---	North Fork Chewelah Creek near Chewelah, WA	48° 17' 24"	117° 43' 04"	10-03-2001	4.8		
---	Huckleberry Creek at Wright Valley Road near Valley, WA	48° 12' 09"	117° 45' 44"	9-05-2001	1.0		
---	Huckleberry Creek at mouth near Valley, WA	48° 12' 10"	117° 44' 42"	9-11-2001	.07		
---	Bulldog Creek near Valley, WA	48° 09' 22"	117° 42' 54"	9-11-2001	2.8		
---	Little Pend Oreille River at mouth at Arden, WA	48° 27' 26"	117° 53' 07"	9-13-2001	9.6		
---	East Branch South Fork Chewelah Creek near Chewelah, WA	48° 17' 16"	117° 42' 55"	10-03-2001	2.0		
---	Thomason Creek at Chewelah, WA	48° 15' 45"	117° 42' 40"	9-13-2001	.76		
---	North Fork Chewelah Creek at Chewelah, WA	48° 18' 24"	117° 43' 52"	9-07-2001	3.8		
---	Jump Off Joe Creek near Valley, WA	48° 08' 33"	117° 42' 15"	9-11-2001	2.8		
---	Blue Creek near Bluecreek, WA	48° 18' 57"	117° 50' 45"	9-06-2001	.08		
---	Colville River at Arden, WA	48° 27' 34"	117° 53' 16"	9-05-2001	41.0		
---	Colville River near Addy, WA	48° 24' 11"	117° 51' 13"	9-06-2001	31.0		
---	Chewelah Creek at mouth at Chewelah, WA	48° 15' 33"	117° 43' 30"	9-13-2001	7.1		
---	Stranger Creek at mouth near Addy, WA	48° 23' 01"	117° 50' 54"	9-13-2001	.04		
---	Little Pend Oreille River near Arden, WA	48° 27' 54"	117° 51' 55"	9-05-2001	14.0		
---	Colville River near Colville, WA	48° 35' 18"	117° 59' 31"	9-04-2001	47.0		
---	Paye Creek at Chewelah, WA	48° 17' 54"	117° 44' 32"	9-07-2001	3.4		
---	Paye Creek at mouth at Chewelah, WA	48° 16' 21"	117° 44' 26"	9-13-2001	3.0		
---	Deer Creek near Valley, WA	48° 06' 49"	117° 46' 57"	9-05-2001	4.7		
---	Deer Creek at mouth near Valley, WA	48° 07' 11"	117° 45' 53"	9-11-2001	4.1		
---	South Fork Chewelah Creek at Chewelah, WA	48° 18' 02"	117° 42' 25"	9-07-2001	3.7		
---	Haller Creek near Chewelah, WA	48° 27' 16"	117° 55' 49"	9-06-2001	1.0		
---	Thomason Creek near Chewelah, WA	48° 16' 57"	117° 41' 16"	9-07-2001	.89		

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001 Date	Water year 2001 Discharge, in ft^3/s	Water year 1977 Date	Water year 1977 Discharge, in ft^3/s
	Colville River Basin--Continued						
---	Stensgar Creek near Addy, WA	48° 20' 23"	117° 52' 18"	9-06-2001	0.33		
---	Haller Creek near Arden, WA	48° 28' 15"	117° 53' 39"	9-13-2001	0		
---	Mill Creek near Pinkney City, WA	48° 36' 48"	117° 53' 57"	9-04-2001	3.8		
---	Grouse Creek near Valley, WA	48° 08' 32"	117° 38' 43"	10-02-2001	.64	8-31-1977	0.38
---	Waitts Creek near Valley, WA	48° 11' 03"	117° 45' 28"	10-02-2001	.11		
---	Gold Creek near Colville, WA	48° 34' 19"	117° 57' 57"	9-07-2001	0		
---	Blue Creek at mouth near Bluecreek, WA	48° 19' 09"	117° 49' 09"	9-13-2001	.04		
12407500	Sheep Creek at Springdale, WA	48° 03' 27"	117° 45' 07"	9-04-2001	5.5		
12407520	Deer Creek near Valley, WA	48° 07' 05"	117° 47' 55"	10-03-2001	5.4	8-31-1977	3.9
12407560	Huckleberry Creek near Valley, WA	48° 12' 28"	117° 45' 52"	10-02-2001	.22	8-31-1977	.46
12407580	Cottonwood Creek near Chewelah, WA	48° 13' 22"	117° 42' 16"	10-03-2001	2.9		
12407700	Chewelah Creek at Chewelah, WA	48° 17' 00"	117° 42' 53"	10-03-2001	9.6	8-30-1977	5.6
12408000	Colville River at Blue Creek, WA	48° 19' 11"	117° 49' 09"	9-05-2001	31.0	8-30-1977	27.2
12408120	Stranger Creek near Addy, WA	48° 22' 19"	117° 51' 33"	10-03-2001	.75	8-30-1977	.60
12408300	Little Pend Oreille River near Colville, WA	48° 27' 57"	117° 44' 57"	10-03-2001	12.0		
12408420	Haller Creek near Arden, WA	48° 28' 01"	117° 54' 28"	10-03-2001	.63	8-30-1977	.41
12408500	Mill Creek near Colville, WA	48° 34' 43"	117° 52' 00"	9-04-2001	4.7	8-30-1977	5.2
	Between Colville and Spokane River Basins						
---	Nine Mile Creek near Fruitland, WA	48° 02' 49"	118° 26' 09"	10-16-2001	2.6		
---	Wilmont Creek near Fruitland, WA	48° 04' 33"	118° 19' 32"	10-16-2001	.02		
---	Barnaby Creek near Rice, WA	48° 26' 03"	118° 13' 35"	10-05-2001	2.8	8-22-1977	.75
---	Stranger Creek near Inchelium, WA	48° 15' 51"	118° 17' 02"	10-05-2001	.85		
12409500	Hall Creek at Inchelium, WA	48° 18' 40"	118° 12' 42"	10-04-2001	6.2		
	Spokane River Basin						
---	Little Chamokane Creek near Long Lake, WA	47° 51' 12"	117° 52' 47"	10-10-2001	.50		
---	Hangman Creek at Tekoa, WA	47° 13' 34"	117° 04' 49"	10-11-2001	.60	8-26-1977	.25
---	Dry Creek near Milan, WA	47° 59' 10"	117° 17' 42"	10-05-2001	2.6	8-29-1977	1.6
---	West Branch Little Spokane River near Chattaroy, WA	47° 59' 49"	117° 20' 58"	10-05-2001	4.2	9-06-1977	.47
---	Little Hangman Creek at Tekoa, WA	47° 13' 34"	117° 04' 21"	10-11-2001	.43	8-26-1977	.13
12425500	Deep Creek near Spokane, WA	47° 40' 56"	117° 40' 37"	10-10-2001	1.6	9-01-1977	.41
12427000	Little Spokane River at Elk, WA	48° 01' 19"	117° 16' 22"	10-05-2001	34.0	8-16-1977	27.3
12429600	Deer Creek near Chattaroy, WA	47° 53' 27"	117° 20' 09"	10-05-2001	.17	8-29-1977	0
12430100	Dragoon Creek at mouth near Chattaroy, WA	47° 52' 33"	117° 22' 11"	10-05-2001	17.0	8-31-1977	14.1
12430400	Deadman Creek below Highway 195 near Mead, WA	47° 46' 52"	117° 21' 52"	10-05-2001	3.2		
12430500	Deep Creek at Colbert, WA	47° 49' 16"	117° 20' 47"	10-05-2001	0	8-29-1977	0
	Between Spokane and Sanpoil River Basins						
---	Hawk Creek near Lincoln, WA	47° 48' 54"	118° 18' 59"	10-10-2001	7.9		
	Sanpoil River Basin						
12434110	West Fork Sanpoil River near Republic, WA	48° 27' 32"	118° 45' 01"	10-01-2001	5.1		
12434500	Sanpoil River near Keller, WA	48° 06' 25"	118° 41' 55"	10-01-2001	16.0	8-26-1977	9.7

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Between Sanpoil and Okanogan River Basins						
12437505	Nespelem River below millpond at Nespelem, WA	48° 09' 53"	118° 58' 49"	10-11-2001	7.6	8-26-1977	5.7
	Okanogan River Basin						
---	Bonaparte Creek at Tonasket, WA	48° 42' 04"	119° 26' 33"	10-02-2001	.36		
---	Loup Loup Creek at Malott, WA	48° 16' 57"	119° 42' 31"	10-03-2001	0		
---	Omak Creek near Omak, WA	48° 21' 58"	119° 26' 50"	10-03-2001	2.6	8-16-1977	0
---	Aeneas Creek near Tonasket, WA	48° 39' 33"	119° 28' 45"	10-10-2001	2.3		
---	Antoine Creek near Ellisford, WA	48° 45' 33"	119° 24' 33"	10-02-2001	.73		
---	Palmer Creek near Nighthawk, WA	48° 55' 24"	119° 39' 21"	10-02-2001	.28		
---	Johnson Creek near Riverside, WA	48° 29' 32"	119° 32' 09"	10-03-2001	3.7		
12442000	Toats Coulee Creek near Loomis, WA	48° 50' 00"	119° 41' 36"	10-02-2001	8.2	8-24-1977	5.6
12442300	Sinlahekin Creek above Chopaka Creek near Loomis, WA	48° 51' 05"	119° 38' 57"	10-02-2001	7.5	8-24-1977	3.6
	Methow River Basin						
---	Methow River at BVWA near Winthrop, WA	48° 30' 19"	120° 16' 43"	9-12-2001	112		
---	Methow River near Methow, WA	48° 05' 40"	120° 01' 11"	9-12-2001	231		
---	Gold Creek near Carlton, WA	48° 11' 17"	120° 05' 46"	9-21-2001	4.1		
---	Libby Creek near Carlton, WA	48° 13' 43"	120° 06' 52"	9-20-2001	2.2		
---	Boulder Creek near Winthrop, WA	48° 34' 42"	120° 09' 53"	9-19-2001	3.4	8-23-1977	3.9
---	Eightmile Creek below Eightmile Ditch near Winthrop, WA	48° 36' 14"	120° 09' 51"	9-19-2001	12.0		
---	Methow River at East Canal near Winthrop, WA	48° 25' 06"	120° 08' 34"	9-12-2001	107		
---	Twisp River at TVPI diversion near Twisp, WA	48° 22' 46"	120° 14' 40"	9-11-2001	19.0		
---	Methow River at Twisp, WA	48° 23' 44"	120° 08' 21"	9-12-2001	151		
---	Methow River above Bear Creek near Winthrop, WA	48° 27' 00"	120° 09' 48"	9-12-2001	140		
---	Methow River at Airport near Twisp, WA	48° 20' 43"	120° 05' 49"	9-12-2001	188		
---	Twisp River at West Canal near Twisp, WA	48° 22' 13"	120° 11' 19"	9-11-2001	24.0		
---	Twisp River above Poorman Creek near Twisp, WA	48° 22' 20"	120° 12' 05"	9-11-2001	25.0		
---	Twisp River below Buttermilk Creek near Twisp, WA	48° 21' 50"	120° 20' 11"	9-11-2001	25.0		
---	Methow River below Beaver Creek near Twisp, WA	48° 19' 21"	120° 03' 50"	9-12-2001	218		
---	Robinson Creek near Mazama, WA	48° 39' 41"	120° 32' 26"	9-13-2001	6.0		
---	Twisp River below Poorman Creek near Twisp, WA	48° 22' 06"	120° 10' 37"	9-11-2001	28.0		
---	Methow River above Early Winters Creek near Mazama, WA	48° 36' 03"	120° 26' 23"	9-13-2001	3.5		
12447350	Methow River above Robinson Creek near Mazama, WA	48° 39' 32"	120° 32' 31"	9-18-2001	13.0		
12447384	Goat Creek near Mazama, WA	48° 34' 52"	120° 22' 46"	9-18-2001	.44		
12447385	Methow River at Weeman Bridge near Mazama, WA	48° 32' 39"	120° 19' 26"	9-12-2001	29.0		
12447386	Methow River above Wolf Creek near Winthrop, WA	48° 29' 27"	120° 13' 56"	9-19-2001	103		
12447394	Lake Creek near Winthrop, WA	48° 45' 23"	120° 08' 08"	9-17-2001	6.1		
12447450	Chewuch River at Eightmile Ranch near Winthrop, WA	48° 36' 07"	120° 09' 49"	9-19-2001	35.0		
12447500	Chewuch River below Boulder Creek near Winthrop, WA	48° 34' 35"	120° 10' 34"	9-13-2001	45.0		
12448850	Twisp River above Buttermilk Creek near Twisp, WA	48° 22' 05"	120° 24' 18"	9-20-2001	15.0		

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Chelan River Basin						
---	Mitchell Creek at mouth near Manson, WA	47° 58' 10"	120° 11' 32"	10-22-2001	0.76		
---	Safety Harbor Creek near Lucerne, WA	48° 02' 46"	120° 22' 34"	10-22-2001	3.0		
---	Prince Creek near Lucerne, WA	48° 08' 49"	120° 29' 50"	10-22-2001	9.9		
---	Fish Creek near Lucerne, WA	48° 14' 10"	120° 36' 58"	10-22-2001	6.2		
---	North 25 Mile Creek near Manson, WA	47° 59' 32"	120° 15' 44"	10-29-2001	4.9		
---	Railroad Creek at Lucerne, WA	48° 12' 03"	120° 35' 40"	10-22-2001	54.0		
---	Poison Creek near Manson, WA	48° 02' 05"	120° 13' 10"	10-11-2001	.38		
---	First Creek near Manson, WA	47° 52' 25"	120° 12' 02"	10-29-2001	3.0		
12451610	Falls Creek near Manson, WA	48° 05' 07"	120° 19' 28"	10-11-2001	1.1	8-24-1977	0.8
12451620	Grade Creek near Manson, WA	48° 03' 35"	120° 15' 30"	10-11-2001	1.0	8-24-1977	.51
12451660	Mitchell Creek near Manson, WA	47° 59' 44"	120° 09' 38"	10-11-2001	0		
	Entiat River Basin						
12452880	Tillicum Creek near Ardenvoir, WA	47° 43' 24"	120° 26' 24"	9-19-2001	.50		
12452890	Mad River at Ardenvoir, WA	47° 44' 12"	120° 22' 07"	10-11-2001	15.0		
	Wenatchee River Basin						
---	Alder Creek near Plain, WA	47° 50' 54"	120° 39' 35"	10-09-2001	.70	9-20-1977	1.2
---	Doctor Creek near Leavenworth, WA	47° 36' 25"	120° 51' 58"	10-05-2001	0		
---	Hansel Creek near Peshastin, WA	47° 28' 16"	120° 39' 25"	10-10-2001	.35		
---	Jack Creek near Leavenworth, WA	47° 36' 30"	120° 54' 30"	10-05-2001	7.6		
---	Deep Creek near Plain, WA	47° 49' 11"	120° 38' 04"	10-10-2001	.27	9-21-1977	.33
---	Beaver Creek at Plain, WA	47° 45' 52"	120° 39' 22"	10-10-2001	1.6	9-21-1977	1.4
---	Icicle Creek above Black Pine Creek near Leavenworth, WA	47° 36' 45"	120° 56' 44"	10-05-2001	21.0		
---	Black Pine Creek near Leavenworth, WA	47° 36' 41"	120° 56' 43"	10-05-2001	0		
---	Goose Creek near Plain, WA	47° 50' 20"	120° 38' 50"	10-09-2001	.17		
---	Trout Creek near Leavenworth, WA	47° 36' 22"	120° 53' 37"	10-05-2001	2.7		
---	Negro Creek near Peshastin, WA	47° 26' 36"	120° 39' 42"	10-10-2001	1.9	9-19-1977	2.9
---	Big Meadow Creek near Plain, WA	47° 52' 03"	120° 41' 48"	10-04-2001	.74		
---	Ida Creek near Leavenworth, WA	47° 36' 25"	120° 50' 57"	10-05-2001	.02		
---	Johnny Creek near Leavenworth, WA	47° 35' 53"	120° 49' 05"	10-05-2001	.43		
---	Bridge Creek near Leavenworth, WA	47° 33' 40"	120° 46' 48"	10-10-2001	.16		
---	Chumstick Creek near Leavenworth, WA	47° 36' 17"	120° 38' 54"	10-09-2001	1.3	9-20-1977	3.9
---	Peshastin Creek near Peshastin, WA	47° 33' 08"	120° 36' 11"	10-10-2001	16.0		
---	Derby Canyon near Peshastin, WA	47° 34' 10"	120° 35' 14"	10-09-2001	0	9-19-1977	4.1
---	Scotty Creek near Blewett, WA	47° 22' 39"	120° 38' 45"	10-10-2001	.10	9-19-1977	.24
---	Shaser Creek near Blewett, WA	47° 23' 27"	120° 39' 32"	10-10-2001	.51	9-19-1977	.71
---	Ingalls Creek near Leavenworth, WA	47° 27' 47"	120° 39' 42"	10-10-2001	11.0	9-19-1977	23.8
---	Lake Creek near Telma, WA	47° 52' 34"	121° 02' 08"	10-03-2001	4.9		
---	White River near Telma, WA	47° 57' 49"	120° 56' 39"	10-01-2001	77.0		
---	Panther Creek near Telma, WA	47° 56' 23"	120° 55' 45"	10-02-2001	5.7		
---	Napeequa River near Telma, WA	47° 55' 16"	120° 53' 42"	10-02-2001	41.0		

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Wenatchee River Basin--Continued						
---	Canyon Creek near Telma, WA	47° 54' 26"	120° 53' 42"	10-02-2001	0.09	9-20-1977	1.1
---	Fish Creek near Telma, WA	47° 54' 19"	121° 05' 08"	10-03-2001	3.0		
---	Chikamin Creek near Telma, WA	47° 54' 30"	120° 43' 20"	10-09-2001	4.0	9-20-1977	6.5
---	Theseus Creek near Telma, WA	47° 52' 23"	121° 01' 02"	10-03-2001	.10		
---	Little Wenatchee River above Wenatchee Lake near Telma, WA	47° 50' 01"	120° 50' 15"	10-04-2001	31.0	9-20-1977	119
---	Minnow Creek near Plain, WA	47° 54' 35"	120° 43' 15"	10-09-2001	.13	9-20-1977	.32
---	Rock Creek near Telma, WA	47° 58' 12"	120° 47' 22"	10-04-2001	9.2		
---	Cady Creek near Telma, WA	47° 54' 49"	121° 05' 37"	10-03-2001	2.4		
---	Nason Creek near Coles Corner, WA	47° 47' 25"	120° 42' 59"	10-02-2001	30.0		
---	Rainy Creek near Telma, WA	47° 51' 01"	120° 57' 41"	10-03-2001	10.0		
12456000	Phelps Creek near Plain, WA	48° 04' 23"	120° 51' 02"	10-04-2001	11.0	9-20-1977	14.5
12456300	Brush Creek near Telma, WA	47° 53' 19"	120° 43' 19"	10-04-2001	.23	9-20-1977	.37
12457500	Chiwaukum Creek near Chiwaukum, WA	47° 40' 49"	120° 43' 54"	10-02-2001	8.5	9-21-1977	32.3
12457900	Chatter Creek near Leavenworth, WA	47° 36' 28"	120° 52' 56"	10-05-2001	.09		
12459400	Tronsen Creek near Peshastin, WA	47° 20' 23"	120° 34' 03"	10-10-2001	.15		
12461100	East Branch Mission Creek near Cashmere, WA	47° 22' 50"	120° 29' 20"	10-09-2001	.19	9-19-1977	.45
12461400	Mission Creek above Sand Creek near Cashmere, WA	47° 25' 47"	120° 30' 32"	9-19-2001	.78	9-19-1977	1.6
12461500	Sand Creek near Cashmere, WA	47° 25' 47"	120° 30' 29"	10-09-2001	.27	9-19-1977	.38
12462000	Mission Creek at Cashmere, WA	47° 30' 59"	120° 28' 34"	10-09-2001	0	9-19-1977	5.4
	Between Wenatchee River and Crab Creek Basins						
---	Douglas Creek at Palisades, WA	47° 25' 11"	119° 55' 00"	10-04-2001	2.5		
12462800	Moses Creek at Douglas, WA	47° 37' 02"	120° 00' 31"	10-04-2001	.21		
12463000	Douglas Creek near Alstown, WA	47° 35' 01"	120° 01' 23"	10-04-2001	.26		
	Crab Creek Basin						
---	Goose Creek at Wilbur, WA	47° 45' 24"	118° 42' 11"	10-01-2001	0		
---	Corbett Draw near Almira, WA	47° 39' 51"	118° 55' 39"	10-01-2001	2.0	8-23-1977	1.1
12464800	Coal Creek at Mohler, WA	47° 24' 24"	118° 19' 07"	10-01-2001	.41		
12465400	Wilson Creek below Corbett Draw near Almira, WA	47° 39' 46"	118° 55' 49"	10-01-2001	.13	8-23-1977	0
	Yakima River Basin						
---	Logy Creek near Toppenish, WA	46° 13' 02"	120° 29' 39"	10-04-2001	12.0		
---	Lateral 1 near Parker, WA	46° 28' 49"	120° 26' 53"	7-18-2001	29.0		
---	Yakima River at Donald, WA	46° 29' 01"	120° 25' 51"	7-18-2001	538		
---	Yakima River near Donald, WA	46° 27' 49"	120° 23' 41"	7-19-2001	437		
---	Yakima River near Toppenish, WA	46° 24' 25"	120° 18' 36"	7-19-2001	431		
---	North Fork Tieton River near White Pass, WA	46° 37' 13"	121° 18' 05"	10-02-2001	36.0		
---	Paris Creek near Salmon Ia Sac Guard Station, WA	47° 24' 54"	121° 04' 53"	10-03-2001	1.4	8-10-1977	2.6
---	Cle Elum River above Cle Elum Lake, WA	47° 24' 01"	121° 05' 44"	10-03-2001	50.0	8-10-1977	191
---	Yakima River below Easton Dam, WA	47° 14' 25"	121° 10' 57"	9-27-2001	145		
---	Gold Creek near Hyak, WA	47° 23' 27"	121° 22' 56"	10-01-2001	8.5	8-09-1977	17.1
---	Yakima River near Easton, WA	47° 12' 55"	121° 06' 00"	9-27-2001	169		

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Yakima River Basin--Continued						
---	Big Creek near Easton, WA	47° 12' 43"	121° 06' 13"	10-01-2001	0.10	8-10-1977	0.46
---	Little Naches River near Cliffdell, WA	46° 59' 16"	121° 05' 54"	9-18-2001	10.0	8-16-1977	28.9
---	Rattlesnake Creek near Nile, WA	46° 49' 09"	120° 56' 11"	10-02-2001	12.0	8-16-1977	11.7
---	Manastash Creek near Naches, WA	46° 58' 01"	120° 41' 06"	10-01-2001	4.9	8-11-1977	5.5
---	Wenas Creek above Wenas Lake, WA	46° 50' 13"	120° 43' 06"	10-04-2001	1.0	8-12-1977	.80
12474700	Mosquito Creek near Easton, WA	47° 17' 31"	121° 19' 27"	10-01-2001	.09	8-09-1977	.16
12475000	Cabin Creek near Easton, WA	47° 14' 22"	121° 13' 38"	10-01-2001	1.2	8-09-1977	8.2
12480000	Teanaway River Below Forks near Cle Elum, WA	47° 15' 02"	120° 52' 22"	10-03-2001	12.0		
12491700	Hause Creek near Rimrock, WA	46° 40' 32"	121° 04' 53"	10-02-2001	.01	8-12-1977	0
12505000	Yakima River near Parker, WA	46° 29' 49"	120° 26' 34"	7-18-2001	484		
12506300	North Fork Simcoe Creek near Fort Simcoe, WA	46° 27' 26"	120° 52' 10"	10-04-2001	3.7	8-16-1977	2.6
12506330	South Fork Simcoe Creek near Fort Simcoe, WA	46° 26' 40"	120° 53' 13"	10-04-2001	2.7	8-16-1977	.94
12508480	Dry Creek near Toppenish, WA	46° 15' 14"	120° 24' 13"	10-04-2001	0		
	Snake River Basin						
---	Pataha Creek near Pomeroy, WA	46° 21' 39"	117° 33' 24"	9-20-2001	.44		
---	Tucannon River near Dayton, WA	46° 14' 35"	117° 41' 18"	9-21-2001	40.0		
---	Pataha Creek near Starbuck, WA	46° 30' 43"	117° 58' 19"	9-17-2001	1.8		
13343510	Alpowa Creek at Peola, WA	46° 19' 02"	117° 29' 31"	9-20-2001	0	8-09-1977	0
13343680	Deadman Creek near Central Ferry, WA	46° 37' 07"	117° 45' 09"	9-20-2001	3.0		
13343800	Meadow Creek near Central Ferry, WA	46° 35' 50"	117° 46' 57"	9-20-2001	2.1	8-04-1977	1.2
13344000	Tucannon River near Pomeroy, WA	46° 26' 24"	117° 44' 59"	9-20-2001	45.0		
13349400	Pine Creek at Pine City, WA	47° 12' 23"	117° 30' 17"	10-09-2001	2.6		
13350500	Union Flat Creek near Colfax, WA	46° 48' 36"	117° 25' 55"	10-09-2001	1.6		
13352500	Cow Creek at Hooper, WA	46° 45' 45"	118° 08' 49"	10-05-2001	2.9		
	Walla Walla River Basin						
---	South Fork Touchet River at Dayton, WA	46° 18' 03"	117° 57' 33"	9-21-2001	1.3	8-10-1977	.75
---	Walla Walla River near College Place, WA	46° 01' 00"	118° 23' 57"	9-13-2001	14.0	8-01-1977	3.6
---	East Little Walla Walla River near State Line, WA	46° 00' 45"	118° 24' 42"	9-12-2001	12.0	8-11-1977	3.1
---	Mill Creek near Walla Walla, WA	45° 59' 23"	118° 03' 01"	9-05-2001	14.0		
---	Mud Creek near Lowden, WA	46° 02' 31"	118° 36' 52"	9-07-2001	1.3	8-12-1977	.54
---	Wolf Creek near Dayton, WA	46° 14' 17"	117° 53' 45"	9-21-2001	23.0		
---	Mill Creek near Whitman Mission, WA	46° 02' 30"	118° 28' 14"	10-04-2001	3.6		
---	Russell Creek near Langdon, WA	46° 01' 45"	118° 20' 40"	10-04-2001	0		
---	Cottonwood Creek near Langdon, WA	46° 01' 32"	118° 20' 45"	10-04-2001	0	8-11-1977	.04
14013500	Blue Creek near Walla Walla, WA	46° 03' 27"	118° 08' 24"	9-05-2001	.65		
14013600	Mill Creek below Blue Creek near Walla Walla, WA	46° 04' 52"	118° 11' 23"	9-05-2001	29.0		
14014400	Yellowhawk Creek near College Place, WA	46° 01' 08"	118° 23' 57"	9-13-2001	13.0	8-11-1977	7.0
14016000	Dry Creek near Walla Walla, WA	46° 07' 19"	118° 14' 13"	9-14-2001	.80		
14016050	Dry Creek at Lowden,WA	46° 03' 24"	118° 35' 26"	9-07-2001	.98	8-12-1977	.25
14016500	East Fork Touchet River near Dayton, WA	46° 16' 45"	117° 54' 07"	9-21-2001	38.0		

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Walla Walla River Basin--Continued						
14016800	Patit Creek near Dayton,WA	46° 19' 37"	117° 58' 25"	9-21-2001	0	8-10-1977	37.0
14016950	Coppei Creek near Waitsburg,WA	46° 15' 44"	118° 09' 11"	9-24-2001	.89	8-10-1977	.94
14017000	Touchet River at Bolles, WA	46° 16' 19"	118° 13' 16"	9-14-2001	32.0		
14017070	East Fork McKay Creek near Huntsville, WA	46° 21' 46"	118° 08' 00"	9-24-2001	.56		
	Between Walla Walla and Klickitat River Basins						
---	Rock Creek near Goldendale, WA	45° 50' 30"	120° 31' 53"	10-03-2001	.25		
---	Wood Gulch near Roosevelt, WA	45° 44' 59"	120° 12' 01"	10-03-2001	0		
---	Glade Creek near Patterson, WA	45° 53' 39"	119° 41' 34"	10-03-2001	18.0	8-12-1977	5.0
14034325	Alder Creek near Bickleton, WA	45° 59' 48"	120° 16' 35"	10-04-2001	0	8-12-1977	0
14036600	Rock Creek near Roosevelt, WA	45° 44' 54"	120° 26' 08"	10-03-2001	0	8-12-1977	0
	Klickitat River Basin						
---	Outlet Creek near Glenwood, WA	46° 00' 58"	121° 11' 24"	10-04-2001	4.3	8-11-1977	0
---	McCreedy Creek near Glenwood, WA	46° 19' 20"	121° 15' 10"	10-04-2001	34.0		
---	Summit Creek near Glenwood, WA	45° 59' 18"	121° 07' 27"	10-04-2001	7.6	8-11-1977	8.2
14106500	Pearl Creek near Glenwood, WA	46° 18' 41"	121° 15' 40"	10-03-2001	.18	8-11-1977	.25
14108500	Cunningham Creek near Glenwood, WA	46° 10' 47"	121° 17' 12"	10-03-2001	6.7	8-13-1977	5.7
14112000	Little Klickitat River near Goldendale, WA	45° 50' 39"	120° 47' 46"	10-02-2001	.30	8-10-1977	0
	Between White Salmon and Lewis River Basins						
---	Whipple Creek near Ridgefield, WA	45° 44' 57"	122° 42' 45"	9-19-2001	2.1		
---	Rock Creek at mouth at Stevenson, WA	45° 41' 43"	121° 53' 34"	9-21-2001	7.1	9-14-1977	31.3
---	Fifth Plain Creek near Proebstel, WA	45° 41' 58"	122° 28' 22"	9-21-2001	.22		
---	Salmon Creek near Felida, WA	45° 42' 47"	122° 41' 09"	9-18-2001	19.0		
---	Curtin Creek near Felida, WA	45° 43' 21"	122° 35' 27"	9-18-2001	2.1		
---	Mill Creek near Felida, WA	45° 43' 50"	122° 37' 39"	9-18-2001	.21		
---	Panther Creek near Carson, WA	45° 46' 16"	121° 50' 55"	9-21-2001	40.0	9-14-1977	93.2
---	Salmon Creek near Orchards, WA	45° 44' 34"	122° 32' 48"	9-18-2001	4.4		
---	Gee Creek near Ridgefield, WA	45° 47' 36"	122° 41' 04"	9-19-2001	.20		
---	Weaver Creek near Orchards, WA	45° 44' 31"	122° 32' 47"	9-18-2001	.68		
---	Burnt Bridge Creek at Vancouver, WA	45° 39' 11"	122° 39' 29"	9-19-2001	1.6		
---	Washougal River near Washougal, WA	45° 41' 33"	122° 07' 33"	9-21-2001	12.0	9-15-1977	33.8
---	Campen Creek near Camas, WA	45° 34' 39"	122° 18' 54"	9-21-2001	.05	9-13-1977	.34
---	Gibbons Creek near Camas, WA	45° 34' 47"	122° 18' 37"	9-21-2001	2.0	9-13-1977	2.1
---	Canyon Creek near Prindle, WA	45° 36' 16"	122° 13' 42"	9-21-2001	1.6	9-14-1977	2.2
---	Duncan Creek at Skamania, WA	45° 36' 49"	122° 03' 18"	9-21-2001	0	9-13-1977	2.0
---	Woodward Creek near Skamania, WA	45° 37' 17"	122° 01' 49"	9-21-2001	2.5		
---	Cougar Creek near Washougal, WA	45° 37' 32"	122° 18' 24"	9-21-2001	2.4	9-14-1977	2.0
---	Hamilton Creek near North Bonneville, WA	45° 38' 29"	121° 58' 43"	9-21-2001	.54		
---	Wildboy Creek near Prindle, WA	45° 38' 57"	122° 12' 54"	9-21-2001	3.7	9-14-1977	10.4
---	Stebbins Creek near Washougal, WA	45° 41' 27"	122° 07' 24"	9-21-2001	3.5	9-15-1977	12.8
---	Greenleaf Creek near North Bonneville, WA	45° 39' 19"	121° 57' 27"	9-21-2001	2.3	9-13-1977	5.5

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Between White Salmon and Lewis River Basins--Continued						
---	Lawton Creek near Camas, WA	45° 33' 43"	122° 15' 59"	9-21-2001	1.6	9-13-1977	1.5
---	Matney Creek near Camas, WA	45° 40' 03"	122° 26' 09"	9-24-2001	.33		
---	Dougan Creek near Washougal, WA	45° 40' 27"	122° 09' 23"	9-21-2001	2.2	9-15-1977	8.9
---	Little Washougal River near Washougal, WA	45° 38' 46"	122° 21' 24"	9-24-2001	6.0		
14124000	Little White Salmon River near Willard, WA	45° 47' 55"	121° 38' 24"	9-21-2001	23.0	8-17-1977	7.2
14143000	West Fork Washougal River near Washougal, WA	45° 36' 57"	122° 13' 10"	9-20-2001	20.0		
14143500	Washougal River near Washougal, WA	45° 37' 22"	122° 17' 39"	9-19-2001	59.0		
14144000	Little Washougal River near Washougal, WA	45° 36' 50"	122° 21' 30"	9-21-2001	8.1	9-14-1977	15.2
14144500	Lacamas Creek at Proebstel, WA	45° 40' 18"	122° 29' 17"	9-21-2001	3.0	9-15-1977	5.5
14144560	Fifth Plain Creek at Highway 500 near Proebstel, WA	45° 40' 20"	122° 29' 39"	9-21-2001	1.7	9-15-1977	3.2
14211898	Burnt Bridge Creek at 18th Street at Vancouver, WA	45° 38' 04"	122° 37' 25"	9-25-2001	1.2		
14211901	Cold Creek at mouth at Vancouver, WA	45° 39' 41"	122° 40' 03"	9-25-2001	.44		
14211902	Burnt Bridge Creek near mouth at Vancouver, WA	45° 39' 40"	122° 40' 08"	9-25-2001	2.4		
14212000	Salmon Creek near Battle Ground, WA	45° 46' 25"	122° 26' 44"	9-18-2001	2.9	9-16-1977	4.9
	Kalama River Basin						
---	Hatchery Creek near Kalama, WA	46° 02' 42"	122° 48' 15"	9-14-2001	9.0	9-14-1977	14.0
---	Wild Horse Creek near Pigeon Springs, WA	46° 02' 53"	122° 38' 02"	9-15-2001	3.6	9-14-1977	7.8
---	Italian Creek near Pigeon Springs, WA	46° 02' 00"	122° 43' 46"	9-15-2001	.66	9-14-1977	.92
---	Gobar Creek at Pigeon Springs, WA	46° 03' 06"	122° 37' 26"	9-15-2001	12.0	9-14-1977	15.4
14223500	Kalama River Below Italian Creek near Kalama, WA	46° 02' 41"	122° 48' 55"	9-14-2001	189	9-15-1977	269
	Between Kalama and Cowlitz River Basins						
---	Owl Creek near Carrolls, WA	46° 05' 29"	122° 52' 09"	9-14-2001	.21	9-15-1977	.51
	Cowlitz River Basin						
---	Tilton River near Morton, WA	46° 36' 09"	122° 14' 02"	9-17-2001	5.7		
14235500	West Fork Tilton River near Morton, WA	46° 36' 39"	122° 14' 40"	9-17-2001	6.8		
14237500	Winston Creek near Silver Lake, WA	46° 28' 56"	122° 31' 17"	9-17-2001	5.4		
14239000	Salmon Creek near Toledo, WA	46° 24' 49"	122° 49' 19"	9-15-2001	1.3		
14245000	Coweman River near Kelso, WA	46° 07' 41"	122° 50' 18"	9-22-2001	36.0		
	Lower Columbia River Basin						
---	Fall Creek near Grays River, WA	46° 22' 24"	123° 35' 24"	9-20-2001	1.5		
---	Fossil Creek near Grays River, WA	46° 21' 43"	123° 33' 14"	9-19-2001	2.6	9-14-1977	9.3
---	Klints Creek near Grays River, WA	46° 21' 21"	123° 33' 34"	9-19-2001	1.2	9-14-1977	4.5
---	Malone Creek at Rosbury, WA	46° 20' 07"	123° 38' 36"	9-20-2001	1.3	9-14-1977	3.9
---	West Fork Elochoman River near Skamokawa, WA	46° 19' 19"	123° 15' 46"	9-18-2001	8.2	9-13-1977	19.2
---	Skamokawa Creek near Skamokawa, WA	46° 19' 10"	123° 27' 20"	9-18-2001	8.2	9-15-1977	30.1
---	Deep River near Rosbury, WA	46° 21' 37"	123° 40' 59"	9-20-2001	.88	9-14-1977	2.1
---	Falk Creek near Skamokawa, WA	46° 17' 57"	123° 26' 24"	9-19-2001	1.0	9-14-1977	4.8
---	Clark Creek near Longview, WA	46° 10' 45"	122° 59' 35"	9-14-2001	.27	9-15-1977	.78
---	Crooked Creek near Rosbury, WA	46° 17' 55"	123° 38' 56"	9-19-2001	1.6		
---	Wilson Creek near Skamokawa, WA	46° 17' 19"	123° 26' 19"	9-19-2001	8.7	9-14-1977	21.9

Table 2. Low-flow measurement data for 410 selected sites in Washington, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Lower Columbia River Basin--Continued						
---	Abernathy Creek near Longview, WA	46° 15' 37"	123° 10' 36"	9-17-2001	6.2	9-15-1977	14.3
---	Beaver Creek near Cathlamet, WA	46° 13' 33"	123° 19' 14"	9-18-2001	1.9	9-13-1977	5.2
---	Slide Creek near Longview, WA	46° 12' 31"	123° 09' 08"	9-17-2001	.50	9-15-1977	1.1
---	Harmony Creek near Stella, WA	46° 11' 15"	123° 02' 10"	9-14-2001	.89	9-15-1977	1.8
---	Coal Creek near Stella, WA	46° 11' 15"	123° 02' 04"	9-14-2001	4.2	9-15-1977	9.3
---	Elochoman River near Skamokawa, WA	46° 19' 10"	123° 15' 27"	9-18-2001	23.0		
14246000	Abernathy Creek near Longview, WA	46° 12' 09"	123° 09' 19"	9-17-2001	10.0	9-15-1977	20.3
14247500	Elochoman River near Cathlamet, WA	46° 13' 16"	123° 20' 32"	9-18-2001	37.0		
14248000	Skamokawa Creek near Skamokawa, WA	46° 17' 56"	123° 26' 38"	9-18-2001	10.0	9-14-1977	31.0
14249000	Grays River above South Fork near Grays River, WA	46° 23' 35"	123° 28' 43"	9-19-2001	26.0	9-15-1977	73.9
14250900	Grays River near Grays River, WA	46° 21' 33"	123° 33' 59"	9-20-2001	62.0	8-12-1977	39.4

Table 3

Table 3. Low-flow measurement data for 166 selected sites in Oregon, water years 1977 and 2001

[latitude and longitude are based on the North American Datum of 1983 and shown in degrees, minutes, seconds; ft^3/s, cubic feet per second; OR, Oregon; ---, no number assigned]

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
		Warner Lakes Basin					
10371500	Deep Creek above Adel, OR	42° 11' 21"	120° 00' 06"	9-05-2001	6.4	8-01-1977	3.7
10378500	Honey Creek near Plush, OR	42° 27' 00"	120° 04' 04"	8-15-2001	.28	8-24-1977	.25
		Albert Lake Basin					
10384000	Chewaucan River near Paisley, OR	42° 41' 04"	120° 34' 12"	9-05-2001	16.5	7-29-1977	9.6
10388001	Ana River plus canal near Summer Lake, OR	42° 59' 42"	120° 44' 58"	9-12-2001	14.7	7-10-1977	75.0
		Summer Lake Basin					
10390001	Silver Creek plus canal near Silver Lake, OR	43° 06' 39"	121° 04' 09"	9-12-2001	39.9	9-30-1977	9.2
		Goose Lake Basin					
11340500	Cottonwood Creek near Lakeview, OR	42° 14' 04"	120° 30' 09"	9-13-2001	2.8	8-16-1977	0
		Klamath River Basin					
11497500	Sprague near Beatty, OR	42° 26' 49"	121° 14' 19"	9-14-2001	107	8-11-1977	57.0
11499000	Sycan River near Beatty, OR	42° 33' 00"	121° 19' 04"	9-14-2001	18.7	9-07-1977	7.8
11503100	Munson Creek near Rim Village, OR	42° 52' 45"	122° 08' 19"	9-12-2001	2.0	8-12-1977	.08
---	Sun Creek at Sun Meadow, OR	42° 45' 44"	122° 00' 57"	9-12-2001	7.0	8-11-1977	8.66
---	Bear Creek at Crater Lake Park Boundary, OR	42° 58' 50"	121° 58' 39"	9-13-2001	0	8-11-1977	0
---	Spring Creek at Collier State Park, OR	42° 38' 38"	121° 52' 48"	9-13-2001	281	8-23-1977	293
---	Wood River Springs above Wood River, OR	42° 44' 03"	121° 59' 18"	9-13-2001	18.8		
11504000	Wood River at Fort Klamath, OR	42° 41' 59"	121° 59' 04"	9-13-2001	132	8-26-1977	131
11504040	Fort Creek near Fort Klamath, OR	42° 40' 53"	121° 58' 32"	9-13-2001	52.5	8-26-1977	65.4
11510000	Spencer Creek near Keno, OR	42° 09' 29"	122° 01' 44"	9-13-2001	2.2	8-22-1977	6.2
		Owyhee River Basin					
13177985	Jordan Creek at DeLamar Mine near Jordan Valley, OR	43° 01' 26"	116° 51' 19"	9-11-2001	0		
13181500	Crooked Creek near Rome, OR	42° 48' 00"	117° 44' 03"	9-11-2001	21.8	9-09-1977	22.9
		Malheur River Basin					
13214000	Malheur River near Drewsey, OR	43° 47' 04"	118° 19' 54"	9-13-2001	1.8	9-06-1977	.73
13216500	North Fork Malheur River above Beulah Reservoir, OR	43° 56' 53"	118° 10' 28"	9-24-2001	38.0	8-10-1977	24.0
		Burnt River Basin					
13270800	South Fork Burnt River near Unity, OR	44° 24' 23"	118° 18' 06"	10-01-2001	16.8	9-04-1977	19.0
		Imnaha River Basin					
13291000	Imnaha River above Gumboot Creek, OR	45° 10' 59"	116° 52' 04"	9-07-2001	62.0	8-08-1977	53.4
---	Little Sheep Creek near Imnaha, OR	45° 30' 49"	116° 51' 46"	9-06-2001	12.0	8-11-1977	11.2
		Grande Ronde River Basin					
---	Chesnismus Creek near Lewis, OR	45° 42' 50"	117° 09' 15"	10-11-2001	7.5	8-10-1977	2.08
13320000	Catherine Creek near Union, OR	45° 09' 20"	117° 46' 30"	9-24-2001	17.5	8-21-1977	16.0
13323600	Indian Creek near Imbler, OR	45° 25' 59"	117° 49' 24"	10-11-2001	14.0	8-19-1977	3.32
13324300	Lookingglass Creek at Palmer Junction, OR	45° 42' 27"	117° 50' 34"	10-10-2001	52.0	8-11-1977	51.3
13333000	Wenaha River at Troy, OR	45° 56' 44"	117° 27' 07"	9-18-2001	144	8-10-1977	141

Table 3. Low-flow measurement data for 166 selected sites in Oregon, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Walla Walla River Basin						
---	Pine Creek near Umapine, OR	45° 57' 36"	118° 32' 12"	9-06-2001	0		
---	Dry Creek near Barrett, OR	45° 55' 43"	118° 26' 34"	9-06-2001	0		
---	Birch Creek near Spofford, OR	45° 58' 30"	118° 17' 15"	9-06-2001	.74	8-11-1977	0.40
	Umatilla River Basin						
---	Line Creek near Conway, OR	45° 38' 48"	118° 21' 32"	9-19-2001	.03	8-25-1977	.11
14022500	McKay Creek near Pilot Rock, OR	45° 32' 57"	118° 46' 28"	9-22-2001	0	8-21-1977	0
---	Boston Creek near Gibbon, OR	45° 41' 03"	118° 21' 47"	9-19-2001	.31	8-25-1977	1.47
---	Umatilla River near Thorn Hollow, OR	45° 41' 07"	118° 27' 13"	9-18-2001	50.0	8-25-1977	51.0
---	Eagle Creek near Athena, OR	45° 45' 51"	118° 26' 44"	9-12-2001	0	8-25-1977	1.47
	Willow Creek River Basin						
14034800	Rhea Creek near Heppner, OR	45° 15' 41"	119° 37' 26"	9-13-2001	1.6	8-21-1977	0
	John Day River Basin						
---	South Fork John Day River near Poison Creek near Izee, OR	44° 04' 00"	119° 24' 14"	9-19-2001	1.7	8-17-1977	0
---	Deer Creek near McMullen Spring near Dayville, OR	44° 11' 48"	119° 28' 13"	9-19-2001	.30	8-17-1977	0
---	Tex Creek near mouth near Mount Vernon, OR	44° 16' 01"	119° 17' 17"	9-21-2001	0	8-17-1977	0
---	Murderers Creek at mouth near Dayville, OR	44° 18' 52"	119° 32' 22"	9-19-2001	2.7	8-17-1977	.97
---	Black Canyon Creek above Black Canyon near Dayville, OR	44° 20' 02"	119° 34' 00"	9-19-2001	7.7	8-17-1977	5.31
14038530	John Day River near John Day, OR	44° 25' 07"	118° 54' 23"	8-22-2001	6.5	8-12-1977	4.5
---	Desolation Creek above Dale, OR	44° 55' 00"	118° 50' 34"	9-26-2001	13.2		
14041000	Desolation Creek near Dale, OR	44° 59' 20"	118° 55' 14"	9-20-2001	7.8	8-16-1977	7.78
14041500	North Fork John Day River near Dale, OR	44° 59' 55"	118° 56' 29"	9-20-2001	49.0	8-16-1977	50.2
---	North Fork John Day River above Oriental, OR	44° 58' 45"	118° 44' 04"	9-24-2001	35.9		
14042000	Camas Creek near Lehman, OR	45° 10' 15"	118° 43' 57"	9-21-2001	1.0	8-16-1977	.98
14043000	Cable Creek near Ukiah, OR	45° 09' 00"	118° 50' 04"	9-21-2001	1.3	8-16-1977	1.18
---	Wall Creek near Monument, OR	44° 53' 36"	119° 24' 50"	9-18-2001	0	8-16-1977	0
14047380	Lone Rock Creek near Lone Rock, OR	45° 05' 30"	119° 53' 14"	9-13-2001	0		
14047390	Rock Creek near Condon, OR	45° 15' 52"	120° 01' 19"	9-19-2001	.28	8-21-1977	.10
	Deschutes River Basin						
14050000	Deschutes River below Snow Creek near La Pine, OR	43° 48' 51"	121° 46' 37"	9-14-2001	64.7	9-16-1977	70.0
14052000	Deer Creek above Crane near La Pine, OR	43° 48' 17"	121° 50' 22"	9-14-2001	.04	9-16-1977	0
14052500	Quinn River near La Pine, OR	43° 47' 03"	121° 50' 10"	9-14-2001	12.1	9-21-1977	6.0
14054500	Brown Creek near La Pine, OR	43° 42' 47"	121° 48' 14"	9-14-2001	23.1	8-30-1977	26.0
14057500	Fall River near La Pine, OR	43° 47' 48"	121° 34' 22"	9-21-2001	120	9-16-1977	132
14073000	Tumalo Creek near Bend, OR	44° 02' 19"	121° 30' 24"	9-12-2001	34.5	8-18-1977	32.0
14079500	Crooked River near Post, OR	44° 07' 00"	120° 15' 04"	9-11-2001	8.3	8-18-1977	6.0
14080250	Bear Creek near Prineville, OR	44° 03' 39"	120° 43' 58"	9-12-2001	.32	7-10-1977	.36
---	Trout Creek near Gateway at Highway 97, OR	44° 48' 44"	120° 55' 57"	9-11-2001	.13		
14097200	White River near Government Camp, OR	45° 10' 40"	121° 34' 34"	9-11-2001	36.7	9-02-1977	45.0
14099000	White River near Wapinitia, OR	45° 09' 10"	121° 30' 24"	9-11-2001	59.1	9-01-1977	70.5
---	Badger Creek near Warm Springs, OR	44° 56' 37"	121° 27' 26"	9-10-2001	6.1	9-01-1977	7.52

Table 3. Low-flow measurement data for 166 selected sites in Oregon, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
		Mosier Creek Basin					
14113200	Mosier Creek near Mosier, OR	45° 38' 54"	121° 22' 39"	9-11-2001	1.7	8-17-1977	0.72
		Hood River Basin					
14113400	Dog River near Parkdale, OR	45° 24' 29"	121° 31' 14"	9-11-2001	1.5	9-01-1977	1.28
14118500	West Fork Hood River near Dee, OR	45° 35' 54"	121° 38' 09"	9-12-2001	97.0	8-23-1977	115
		Sandy River Basin					
14131400	Zigzag River near Rhododendron, OR	45° 18' 31"	121° 51' 35"	9-10-2001	44.8		
14134000	Salmon River near Government Camp, OR	45° 16' 00"	121° 43' 04"	9-10-2001	.36	8-23-1977	20.0
		Willamette River Basin					
14144800	Middle Fork Willamette River near Oakridge, OR	43° 35' 49"	122° 27' 24"	9-11-2001	193	9-15-1977	187
14146000	Salt Creek near Oakridge, OR	43° 43' 40"	122° 25' 34"	9-11-2001	81.2	8-10-1977	86.6
14146500	Salmon Creek near Oakridge, OR	43° 45' 44"	122° 22' 22"	9-11-2001	98.7	8-18-1977	122
14147500	North Fork of Middle Fork Willamette River near Oakridge, OR	43° 45' 29"	122° 30' 34"	9-11-2001	111	8-19-1977	105
14151500	Little Fall Creek near Fall Creek, OR	43° 58' 09"	122° 45' 24"	9-11-2001	9.5	8-10-1977	13.6
14152500	Coast Fork Willamette River at London, OR	43° 38' 30"	123° 05' 09"	9-11-2001	7.0	8-22-1977	10.4
14156500	Mosby Creek at mouth near Cottage Grove, OR	43° 46' 34"	122° 59' 59"	9-11-2001	0	8-16-1977	6.0
14159030	Separation Creek near McKenzie Bridge, OR	44° 07' 28"	122° 02' 12"	9-10-2001	243	8-11-1977	236
14159100	Horse Creek near McKenzie Bridge, OR	44° 09' 47"	122° 03' 36"	9-07-2001	234	8-11-1977	240
14159190	French Pete Creek near Rainbow, OR	44° 02' 31"	122° 11' 44"	9-06-2001	9.1	8-09-1977	13.5
---	Quartz Creek near Finn Rock, OR	44° 07' 18"	122° 22' 26"	9-04-2001	7.1	8-09-1977	10.1
---	Lost Creek at Rattlesnake Road near Dexter, OR	43° 54' 06"	122° 49' 28"	9-12-2001	2.4		
14163000	Gate Creek at Vida, OR	44° 08' 44"	122° 34' 19"	9-04-2001	14.7	8-18-1977	17.0
14167000	Coyote Creek near Crow, OR	44° 01' 18"	123° 15' 21"	9-12-2001	.04	8-26-1977	0
14170500	Rock Creek near Philomath, OR	44° 30' 04"	123° 26' 24"	9-13-2001	1.5	8-17-1977	1.8
14172000	Calapooia River at Holley, OR	44° 21' 04"	122° 47' 14"	9-14-2001	14.7	8-19-1977	24.0
14185800	Middle Santiam River near Cascadia, OR	44° 30' 55"	122° 22' 19"	9-13-2001	22.8	9-16-1977	58.0
---	Little North Santiam River at Elkhorn, OR	44° 50' 09"	122° 21' 20"	9-11-2001	13.1	7-12-1977	38.8
---	Marion Forks Creek near Marion Forks, OR	44° 35' 59"	121° 56' 16"	9-12-2001	92.8	9-15-1977	79.1
---	North Fork Breitenbrush River below Breitenbrush Lake, OR	44° 45' 56"	121° 47' 01"	9-11-2001	.02		
14188800	Thomas Creek near Scio, OR	44° 42' 42"	122° 45' 59"	9-13-2001	13.7	8-18-1977	15.0
14188700	Crabtree Creek near Crabtree, OR	44° 39' 15"	122° 51' 09"	9-13-2001	19.2		
14190660	Rickreall Creek above Mercer Reservoir near Falls City, OR	44° 54' 04"	123° 29' 37"	9-14-2001	2.8		
14192500	South Yamhill River near Willamina, OR	45° 02' 49"	123° 30' 14"	10-08-2001	12.8	8-17-1977	7.3
14193000	Willamina Creek near Willamina, OR	45° 08' 35"	123° 29' 40"	10-05-2001	13.1	8-17-1977	8.3
14194300	North Yamhill River near Fairdale, OR	45° 21' 54"	123° 22' 44"	9-19-2001	2.6	8-13-1977	2.6
14198500	Mollalla River near Wilhoit, OR	45° 00' 34"	122° 28' 49"	9-06-2001	27.6	8-18-1977	51.0
14201500	Butte Creek at Monitor, OR	45° 06' 06"	122° 44' 46"	9-13-2001	3.3	8-11-1977	1.2
14202510	Tualatin River near Gaston, OR	45° 26' 19"	123° 08' 27"	9-08-2001	16.7		
14202850	Scoggins Creek above Hagg Lake near Gaston, OR	45° 30' 06"	123° 15' 11"	9-25-2001	1.8		
14204500	Gales Creek near Forest Grove, OR	45° 33' 20"	123° 11' 09"	9-14-2001	6.9	8-13-1977	3.5
14205780	East Fork Dairy Creek near Roy, OR	45° 34' 43"	123° 04' 15"	9-14-2001	5.1	9-16-1977	6.0

Table 3. Low-flow measurement data for 166 selected sites in Oregon, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Willamette River Basin--Continued						
14206450	Rock Creek near Hillsboro, OR	45° 30' 08"	122° 56' 52"	8-20-2001	5.8	9-15-1977	13.7
14208000	Clackamas River at Big Bottom, OR	45° 01' 00"	121° 55' 14"	9-11-2001	207		
---	Eagle Creek at Bonny Lure State Park , OR	45° 21' 06"	122° 23' 01"	9-11-2001	23.1		
14211000	Clackamas River near Clackamas, OR	45° 23' 35"	122° 31' 58"	9-11-2001	744	8-18-1977	580
14211542	Crystal Springs Creek at Bybee St., OR	45° 28' 27"	122° 38' 31"	9-12-2001	11.0	9-26-1977	12.5
	Columbia River Main Stem						
14247000	Clatskanie River near Clatskanie, OR	46° 02' 54"	123° 07' 24"	9-11-2001	8.1		
14251500	Young's River near Astoria, OR	46° 04' 00"	123° 47' 25"	9-11-2001	12.4		
	Nehalem River Basin						
14299800	Nehalem River near Vernonia, OR	45° 47' 59"	123° 17' 35"	9-11-2001	4.4		
---	Salmonberry River near Salmonberry, OR	45° 45' 02"	123° 39' 07"	9-11-2001	33.4		
	Trask River Basin						
14303600	Nestucca River near Beaver, OR	45° 16' 00"	123° 50' 49"	9-10-2001	83.6	8-18-1977	68.0
	Salmon River Basin						
14303748	Salmon River near Otis, OR	45° 01' 24"	123° 56' 47"	9-11-2001	41.6	8-15-1977	33.2
	Siletz River Basin						
14304350	Sunshine Creek near Valestz, OR	44° 48' 40"	123° 44' 38"	9-15-2001	1.2		
	Yaquina River Basin						
14306010	Rocky Creek near Depoe Bay, OR	44° 44' 12"	124° 01' 46"	9-12-2001	1.8	8-16-1977	1.8
---	Big Elk Creek near Elk City, OR	44° 36' 24"	123° 51' 12"	9-12-2001	9.8	8-17-1977	8.4
14306030	Yaquina River near Chitwood, OR	44° 39' 29"	123° 50' 19"	9-15-2001	4.2	8-18-1977	7.3
	Alsea River Basin						
14306400	Five Rivers near Fisher, OR	44° 20' 14"	123° 49' 39"	9-11-2001	23.0	8-17-1977	23.0
14306600	Drift Creek near Salado, OR	44° 30' 49"	123° 50' 54"	9-12-2001	7.0	8-16-1977	6.36
	Tenmile Creek Basin						
---	Tenmile Creek near Searose Beach, OR	44° 13' 23"	124° 06' 15"	9-11-2001	12.3	8-15-1977	11.7
	Big Creek Basin						
14306900	Big Creek near Roosevelt Beach, OR	44° 10' 05"	124° 04' 00"	9-15-2001	5.5	8-17-1977	6.0
	Siuslaw River Basin						
14306920	Siuslaw River near Lorane, OR	43° 51' 04"	123° 22' 14"	9-12-2001	3.7	8-09-1977	1.51
14306980	Wolf Creek near Austa, OR	43° 58' 00"	123° 36' 34"	9-13-2001	5.7	8-10-1977	5.88
14307000	Siuslaw River above Wildcat at Austa, OR	43° 59' 35"	123° 37' 24"	9-13-2001	17.3	8-10-1977	18.7
14307500	Lake Creek at Triangle Lake, OR	44° 09' 39"	123° 34' 14"	9-13-2001	5.8	8-11-1977	2.93
14307600	Indian Creek near Rainrock, OR	44° 06' 44"	123° 50' 59"	9-13-2001	14.1	8-11-1977	13.9
14307625	Knowles Creek near Mapleton, OR	44° 01' 40"	123° 50' 14"	9-12-2001	.32	8-11-1977	.24
14307645	North Fork Siuslaw River near Minerva, OR	44° 02' 49"	124° 00' 14"	9-13-2001	16.2	8-17-1977	12.0
	Umpqua River Basin						
---	Middle Creek at mouth near Riddle, OR	42° 48' 42"	123° 35' 49"	9-12-2001	.56	9-16-1977	1.41
14307700	Jackson Creek near Tiller, OR	42° 57' 15"	122° 49' 44"	9-12-2001	10.8	8-17-1977	14.3
---	North Umpqua at Highway 60 above Spring River, OR	43° 18' 35"	122° 07' 15"	9-13-2001	26.8		
---	North Umpqua below Spring River, OR	43° 18' 38"	122° 09' 22"	9-13-2001	259		

Table 3. Low-flow measurement data for 166 selected sites in Oregon, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Umpqua River Basin--Continued						
14308500	Elk Creek near Drew, OR	42° 53' 25"	122° 55' 04"	9-12-2001	0	8-18-1977	0
14308700	Days Creek at Days Creek, OR	42° 58' 54"	123° 08' 59"	9-17-2001	.14		
14311000	North Myrtle Creek near Myrtle Creek, OR	43° 02' 30"	123° 15' 34"	9-12-2001	1.3	8-31-1977	2.27
14312400	Silent Creek near Diamond Lake, OR	43° 07' 36"	122° 09' 37"	9-13-2001	25.1	8-07-1977	24.0
14317600	Rock Creek near Glide, OR	43° 20' 44"	122° 59' 34"	9-19-2001	11.2	8-10-1977	23.1
14317800	Cavitt Creek near Peel, OR	43° 13' 19"	123° 01' 09"	9-25-2001	5.3		
14321400	Elk Creek near Elkhead, OR	43° 35' 44"	123° 11' 39"	9-13-2001	.88		
	Smith River Basin						
14323100	Smith River near Gardiner, OR	43° 47' 04"	123° 48' 54"	9-11-2001	.60		
	Coos River Basin						
14323200	Ten Mile Creek near Lakeside, OR	43° 34' 34"	124° 11' 35"	9-10-2001	16.0		
14323300	Eel Creek at Lakeside, OR	43° 34' 39"	124° 11' 22"	9-10-2001	2.1	8-17-1977	2.29
14323500	Tioga Creek near Tioga, OR	43° 15' 54"	123° 48' 44"	9-11-2001	.86	8-17-1977	1.51
14324500	West Fork Millicoma River near Allegany, OR	43° 28' 34"	124° 03' 25"	9-12-2001	4.5	8-14-1977	5.6
	Coquille River Basin						
---	East Fork Coquille River near Dora, OR	43° 09' 24"	123° 59' 20"	9-13-2001	10.2	8-17-1977	4.02
---	Elk Creek near Gravelford, OR	43° 06' 38"	124° 01' 04"	9-13-2001	.28	8-18-1977	.48
14326800	North Fork Coquille River near Fairview, OR	43° 10' 45"	124° 05' 10"	9-13-2001	7.2	8-17-1977	11.1
	Elk River Basin						
14327150	Sixes River at Sixes, OR	42° 49' 05"	124° 29' 00"	9-12-2001	16.6		
14327300	Elk River near Sixes, OR	42° 47' 44"	124° 29' 20"	9-12-2001	51.3		
	Rogue River Basin						
---	Whisky Creek near Rim Village, OR	42° 54' 46"	122° 19' 11"	9-12-2001	.38	9-20-1977	.30
---	Thousand Springs near Castle Point, OR	42° 52' 58"	122° 17' 15"	9-13-2001	27.6	9-20-1977	28.0
14333500	Red Blanket Creek near Prospect, OR	42° 46' 40"	122° 25' 39"	9-13-2001	49.6	9-15-1977	44.0
14335500	South Fork Big Butte near Butte Falls, OR	42° 32' 25"	122° 33' 19"	9-11-2001	67.9	9-13-1977	52.0
14353000	West Fork Ashland Creek near Ashland, OR	42° 08' 30"	122° 43' 14"	9-11-2001	2.1	9-06-1977	1.4
14353500	East Fork Ashland Creek near Ashland, OR	42° 09' 10"	122° 42' 34"	9-11-2001	2.1	9-06-1977	1.6
---	Galls Creek near Rock Point, OR	42° 25' 59"	123° 04' 15"	9-11-2001	0	8-08-1977	.05
14361590	Middle Fork Applegate River near Copper, OR	42° 00' 22"	123° 09' 27"	9-12-2001	6.2		
14361600	Elliott Creek near Copper, OR	42° 00' 15"	123° 09' 04"	9-12-2001	6.6	9-07-1977	6.9
14361700	Carberry Creek near Copper, OR	42° 01' 33"	123° 10' 14"	9-12-2001	5.9	9-16-1977	4.2
14371500	Grave Creek at Pease Bridge near Placer, OR	42° 38' 30"	123° 12' 44"	9-11-2001	0	8-22-1977	.37
14372500	East Fork Illinois River near Takilma, OR	42° 04' 09"	123° 37' 34"	9-10-2001	5.4	9-14-1977	5.4
14373500	Althouse Creek near Holland, OR	42° 05' 59"	123° 31' 34"	9-12-2001	5.7	9-05-1977	4.28
14375100	Sucker Creek below Little Grayback, OR	42° 09' 34"	123° 28' 44"	9-10-2001	14.9	9-11-1977	15.0
14375500	West Fork Illinois River near O'Brien, OR	42° 02' 19"	123° 44' 54"	9-12-2001	1.7	9-12-1977	2.3
14377500	Deer Creek near Dryden, OR	42° 15' 49"	123° 27' 04"	9-12-2001	0	9-14-1977	.62
14378200	Illinois River near Agness, OR	42° 31' 14"	124° 02' 39"	9-11-2001	145	8-17-1977	105
	Chetco River Basin						
14400060	North Fork Chetco River near Brookings, OR	42° 04' 36"	124° 12' 45"	9-10-2001	4.0	9-15-1977	1.45

Table 4

Table 4. Low-flow measurement data for 155 selected sites in Idaho, Wyoming, Utah, and Nevada, water years 1977 and 2001

[latitude and longitude are based on the North American Datum of 1983 and shown in degrees, minutes, seconds; ft^3/s, cubic feet per second; ID, Idaho; WY, Wyoming; UT, Utah; NV, Nevada; ---, no number assigned]

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
		Bear River Basin					
10125500	Malad River at Woodruff, ID	42° 01' 47"	112° 13' 47"	9-19-2001	9.0		
		Kootenai River Basin					
12306800	Round Prairie Creek near Eastport, ID	48° 57' 57"	116° 12' 15"	8-29-2001	.37		
		Pend Oreille River Basin					
12392100	Trapper Creek near Clark Fork, ID	48° 15' 54"	116° 07' 07"	9-05-2001	0		
12392350	Grouse Creek near Colburn, ID	48° 24' 26"	116° 26' 15"	9-05-2001	5.1		
12392450	Rapid Lightning Creek near Colburn, ID	48° 22' 02"	116° 24' 06"	9-05-2001	8.0		
12392950	Indian Creek near Coolin, ID	48° 37' 37"	116° 49' 14"	8-27-2001	6.8		
12393600	Binarch Creek near Coolin, ID	48° 28' 10"	116° 55' 20"	8-27-2001	2.6		
		Spokane River Basin					
12412600	Little North Fork Coeur d'Alene River near Enaville, ID	47° 36' 38"	116° 14' 23"	9-10-2001	18.0		
12413100	Boulder Creek at Mullan, ID	47° 28' 11"	115° 47' 45"	9-12-2001	.83		
12413200	Montgomery Creek near Kellogg, ID	47° 33' 19"	116° 04' 22"	9-10-2001	.10		
12413700	Latour Creek above Baldy Creek near Cataldo, ID	47° 28' 10"	116° 26' 20"	9-17-2001	3.3		
12413800	Fourth of July Creek above Bently Creek near Cataldo, ID	47° 34' 25"	116° 26' 32"	9-17-2001	.52		
12414200	Marble Creek near Calder, ID	47° 13' 38"	116° 01' 12"	9-18-2001	45.0		
12414750	Falls Creek near St. Joe, ID	47° 49' 15"	116° 17' 51"	9-18-2001	2.7		
12414800	Bond Creek at St. Joe, ID	47° 18' 25"	116° 20' 34"	9-18-2001	2.4		
12415000	Cherry Creek near St. Maries, ID	47° 19' 00"	116° 36' 47"	9-18-2001	.08		
12415200	Plummer Creek tributary at Plummer, ID	47° 20' 19"	116° 53' 17"	8-29-2001	0		
12415300	Mica Creek near Coeur d'Alene, ID	47° 36' 00"	116° 52' 53"	8-29-2001	1.2		
12422950	Hangman Creek near Tensed, ID	47° 11' 24"	117° 01' 06"	8-29-2001	.25		
		Snake River Basin					
13009500	Lewis River near Moose Falls, ID	44° 09' 00"	110° 40' 00"	9-29-2001	95.0		
		Hoback River Basin					
13019430	Granite Creek near Bondurant, WY	43° 17' 47"	110° 30' 08"	9-26-2001	50.8		
13019438	Little Granite Creek at mouth near Bondurant, WY	43° 17' 55"	110° 31' 05"	9-26-2001	5.3		
		Salt River Basin					
13027200	Bear Canyon Creek near Freedom, WY	42° 58' 36"	111° 11' 47"	9-13-2001	.60	9-20-1977	0.30
		McCoy Creek Basin					
13029500	McCoy Creek above Reservoir near Alpine, WY	43° 10' 53"	111° 07' 07"	9-13-2001	12.5	9-02-1977	10.6
		Indian Creek Basin					
13030000	Indian Creek above Reservoir near Alpine, WY	43° 15' 35"	111° 04' 00"	9-13-2001	0		
		Elk Creek Basin					
13030500	(Big) Elk Creek above Reservoir near Irwin, ID	43° 19' 24"	111° 06' 44"	9-13-2001	22.1	9-02-1977	21.3
		Bear Creek Basin					
13032000	Bear Creek above Reservoir near Irwin, ID	43° 17' 00"	111° 13' 17"	9-13-2001	18.3	9-02-1977	15.4

Table 4. Low-flow measurement data for 155 selected sites in Idaho, Wyoming, Utah, and Nevada, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
		Fall Creek Basin					
13034000	Fall Creek near Swan Valley, ID	43° 26' 30"	111° 22' 42"	9-13-2001	14.6		
		Birch Creek Basin					
13037600	Birch Creek near Heise, ID	43° 36' 00"	111° 43' 10"	9-04-2001	.10	9-09-1977	0.80
		Lyons Creek Basin					
13038410	Lyons Creek near Ririe, ID	43° 40' 54"	111° 44' 50"	9-04-2001	0		
		Henrys Fork Basin					
13038900	Targhee Creek near Macks Inn, ID	44° 38' 50"	111° 20' 30"	9-13-2001	3.3	9-07-1977	5.8
13040000	Henrys Fork near Big Springs, ID	44° 30' 40"	111° 17' 23"	9-13-2001	40.9		
13040500	Big Springs Creek at Big Springs, ID	44° 29' 58"	111° 15' 20"	9-13-2001	169		
13040800	Moose Creek near Big Springs, ID	44° 29' 05"	111° 17' 09"	9-13-2001	21.8		
13043000	Buffalo River at Island Park, ID	44° 25' 19"	111° 22' 17"	9-13-2001	205		
13043820	Henrys Fork at Pinehaven subdivision near Last Chance, ID	44° 17' 32"	111° 27' 19"	9-14-2001	794		
13044000	Henrys Fork at Warm River, ID	44° 06' 51"	111° 19' 59"	9-14-2001	784		
13044500	Warm River at Warm River, ID	44° 06' 56"	111° 19' 09"	9-14-2001	206		
13045500	Robinson Creek at Warm River, ID	44° 06' 52"	111° 19' 27"	9-14-2001	56.5		
13050598	Warm Creek near Victor, ID	43° 34' 40"	111° 07' 17"	9-26-2001	8.3		
13050800	Moose Creek near Victor, ID	43° 33' 48"	111° 04' 04"	9-10-2001	27.3		
13051240	Fox Creek Springs near Victor, ID	43° 38' 07"	111° 08' 43"	9-26-2001	11.3		
13051270	Fish Creek near Driggs, ID	43° 40' 13"	111° 07' 56"	8-07-2001	.72		
13051635	Six Springs near Driggs, ID	43° 41' 51"	111° 06' 58"	8-08-2001	3.9		
13051710	Woods Creek near Driggs, ID	43° 43' 05"	111° 09' 03"	9-26-2001	4.6		
13055319	Moody Creek near Rexburg, ID	43° 46' 48"	111° 37' 21"	9-26-2001	2.2		
		Willow Creek Basin					
13057600	Homer Creek near Herman, ID	43° 11' 42"	111° 37' 56"	9-04-2001	0	9-27-1977	0
		Blackfoot River Basin					
13062683	Sheep Creek at USFS boundary near Wayan, ID	42° 51' 47"	111° 20' 04"	9-18-2001	1.4		
13062700	Angus Creek at Road 095 crossing near Henry, ID	42° 49' 43"	111° 20' 15"	9-18-2001	0	9-28-1977	0
13062905	Slug Creek at Sweet Ranch near Soda Springs, ID	42° 42' 24"	111° 22' 04"	9-18-2001	.60		
13062960	Trail Creek at mouth near Soda Springs, ID	42° 45' 29"	111° 26' 50"	9-18-2001	.63		
13065940	Wolverine Creek near Goshen, ID	43° 15' 02"	112° 00' 57"	9-04-2001	.96	9-23-1977	6.1
13075300	East Fork Mink Creek near Pocatello, ID	42° 44' 20"	112° 23' 30"	9-19-2001	0		
13076100	Rattlesnake Creek near Pocatello, ID	42° 42' 04"	112° 33' 28"	9-20-2001	4.7	9-14-1977	2.0
		Portneuf River Basin					
13072100	Portneuf River tributary at Bancroft, ID	42° 43' 30"	111° 54' 25"	9-18-2001	0		
13072500	Pebble Creek near Pebble, ID	42° 44' 10"	112° 01' 16"	9-18-2001	5.6		
13072550	Portneuf River at Symmon's Road near Lava Hot Springs, ID	42° 40' 28"	112° 01' 12"	9-17-2001	72.8		
13072600	Portneuf River above Fish Creek near Lava Hot Springs, ID	42° 37' 19"	111° 59' 47"	9-18-2001	16.2		
13072790	Fish Creek at mouth near Lava Hot Springs, ID	42° 37' 14"	111° 59' 27"	9-18-2001	.14		
13072810	Portneuf River below Lava Hot Springs, ID	42° 37' 23"	112° 02' 06"	9-18-2001	52.3		
13073700	Robbers Roost Creek near McCammon, ID	42° 42' 30"	112° 12' 10"	9-18-2001	0	9-28-1977	0

Table 4. Low-flow measurement data for 155 selected sites in Idaho, Wyoming, Utah, and Nevada, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
		Rock Creek Basin					
13077400	Rock Creek above Dry Hollow near Rockland, ID	42° 30' 40"	112° 50' 30"	9-20-2001	4.1	9-14-1977	3.9
		Raft River Basin					
13077659	Raft River near Yost, UT	41° 56' 50"	113° 42' 00"	8-27-2001	1.1	9-14-1977	2.8
		Goose Creek Basin					
13084400	Birch Creek above diversions near Oakley, ID	42° 10' 40"	113° 49' 05"	8-27-2001	1.1		
		Cottonwood Creek Basin					
13088510	Cottonwood Creek near Oakley, ID	42° 17' 41"	114° 01' 25"	8-28-2001	0		
		Rock Creek Basin					
13092500	McMullen Creek near Rock Creek, ID	42° 25' 05"	114° 22' 18"	8-28-2001	0		
		Salmon Falls Creek Basin					
13104800	Shoshone Creek at mouth near San Jacinto, NV	41° 56' 36"	114° 41' 02"	8-30-2001	7.9	9-12-1977	13.8
		Camas Creek Basin					
13108200	West Camas Creek near Kilgore, ID	44° 28' 40"	112° 02' 40"	9-05-2001	3.1	9-08-1977	4.4
13108900	Camas Creek at Red Road near Kilgore, ID	44° 17' 20"	111° 51' 28"	9-05-2001	5.5		
13112300	Beaver Creek at Humphrey, ID	44° 28' 40"	112° 13' 30"	9-05-2001	.05	9-08-1977	2.5
13112900	Huntley Canyon at Spencer, ID	44° 21' 50"	112° 11' 00"	9-05-2001	.31	9-08-1977	.49
		Little Lost River Basin					
13117200	Main Fork near Goldburg, ID	44° 24' 06"	113° 24' 18"	9-10-2001	7.2	9-26-1977	12.3
13117300	Sawmill Creek near Goldburg, ID	44° 18' 40"	113° 20' 20"	9-10-2001	16.6	9-26-1977	16.9
13117600	Dry Creek below Dry Creek Reservoir near Clyde, ID	44° 09' 30"	113° 31' 45"	9-10-2001	0		
13118400	Wet Creek below Coal Creek near Mackay, ID	44° 02' 49"	113° 27' 00"	9-10-2001	3.2		
		Big Lost River Basin					
13119800	North Fork Big Lost River near Chilly, ID	43° 55' 35"	114° 11' 00"	9-11-2001	7.6		
13120240	East Fork Big Lost River at Rosenkance Ranch near Chilly, ID	43° 53' 45"	113° 59' 00"	9-11-2001	43.2		
13129800	Alder Creek below South Fork near Mackay, ID	43° 49' 40"	113° 36' 10"	9-11-2001	6.9		
13131500	Pass Creek near Leslie, ID	43° 56' 05"	113° 26' 50"	9-10-2001	2.3		
		Malad/Big Wood River Basin					
13137000	Warm Springs Creek (at Guyer Hot Springs) near Ketchum, ID	43° 40' 58"	114° 24' 24"	8-30-2001	22.4	9-22-1977	30.8
13138000	East Fork Big Wood River at Gimlet, ID	43° 36' 00"	114° 21' 00"	8-30-2001	3.4		
		Camas Creek Basin					
13141350	Soldier Creek near Fairfield, ID	43° 26' 44"	114° 48' 27"	8-27-2001	.18	9-22-1977	3.0
		Big Wood River Basin					
13145700	Schooler Creek near Gooding, ID	43° 11' 30"	114° 39' 25"	8-27-2001	0		
13147300	Muldoon Creek near Garfield Guard Station, ID	43° 34' 08"	113° 54' 50"	8-28-2001	1.3		
13149000	Fish Creek above Fish Creek Dam near Carey, ID	43° 26' 20"	113° 50' 30"	8-29-2001	2.9	9-26-1977	4.7
		Clover Creek Basin					
13154000	Clover Creek near Bliss, ID	43° 01' 30"	115° 00' 20"	8-28-2001	.61		
		Little Canyon Creek Basin					
13155300	Little Canyon Creek at Stout Crossing near Glenns Ferry, ID	43° 09' 14"	115° 18' 32"	8-28-2001	.10		

Table 4. Low-flow measurement data for 155 selected sites in Idaho, Wyoming, Utah, and Nevada, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Bruneau-Jarbidge River Basin						
13162300	Jarbidge River at Buck Creek near Murphy Hot Springs, ID	42° 00' 30"	115° 25' 00"	8-30-2001	6.5		
13162500	East Fork Jarbidge River near Three Creek, ID	42° 00' 33"	115° 24' 45"	8-30-2001	6.0	9-13-1977	11.6
	Snake River Basin						
13172290	Sinker Creek above Scotch Bob Creek near Murphy, ID	43° 03' 52"	116° 38' 06"	9-11-2001	0		
	Owyhee River Basin						
13177910	North Fork Owyhee River at Fairylawn, ID	42° 35' 30"	116° 58' 52"	9-11-2001	1.3		
	Boise River Basin						
13184200	Roaring River near Rocky Bar, ID	43° 42' 59"	115° 27' 56"	8-23-2001	8.0		
13184800	Beaver Creek near Lowman, ID	43° 58' 20"	115° 36' 27"	8-27-2001	1.2		
13184990	Alder Creek near Twin Springs, ID	43° 39' 59"	115° 42' 00"	8-22-2001	.13		
13187000	Fall Creek near Anderson Ranch Dam, ID	43° 25' 53"	115° 23' 05"	8-23-2001	6.7	9-22-1977	9.7
13193500	Grouse Creek near Arrowrock Dam, ID	43° 34' 40"	115° 54' 33"	8-22 2001	0	9-26-1977	.10
13199800	Grimes Creek at mouth near Idaho City, ID	43° 43' 35"	115° 57' 11"	8-27-2001	3.7	9-27-1977	26.3
13200500	Robie Creek near Arrowrock Dam, ID	43° 37' 49"	115° 59' 51"	8-22 2001	0	9-27-1977	.60
	Payette River Basin						
13234300	Fivemile Creek near Lowman, ID	44° 06' 03"	115° 27' 23"	8-27-2001	3.8		
13234500	Clear Creek at Lowman, ID	44° 04' 57"	115° 36' 45"	8-27-2001	23.0	9-27-1977	32.1
13235100	Rock Creek at Lowman, ID	44° 04' 58"	115° 37' 30"	8-27-2001	3.2	9-27-1977	5.3
13237300	Danskin Creek near Grimes Pass, ID	44° 03' 38"	115° 49' 11"	8-27-2001	.53		
13237600	Cabin Creek near Smiths Ferry, ID	44° 20' 53"	115° 47' 16"	8-31-2001	0		
13238300	Deep Creek near McCall, ID	45° 06' 00"	116° 02' 20"	8-28-2001	.10		
13245400	Tripod Creek at Smiths Ferry, ID	44° 17' 55"	116° 05' 21"	8-31-2001	.18		
13247000	Porter Creek near Gardena, ID	43° 56' 51"	116° 11' 35"	8-31-2001	0		
	Salmon River Basin						
13292200	Salmon River at head near Obsidian, ID	43° 53' 03"	114° 45' 47"	8-27-2001	4.4	9-28-1977	4.8
13293800	Salmon River at Highway 93 above Redfish Creek near Stanley, ID	44° 09' 50"	114° 53' 10"	8-27-2001	105		
13293900	Redfish Lake Creek below Redfish Lake near Stanley, ID	44° 09' 20"	114° 54' 40"	8-27-2001	28.7	9-28-1977	31.2
13296000	Yankee Fork Salmon River near Clayton, ID	44° 17' 15"	114° 43' 11"	8-28-2001	40.5	9-27-1977	50.4
13297500	Big Boulder Creek near Clayton, ID	44° 06' 55"	114° 26' 29"	9-03-2001	9.1	9-27-1977	10.2
13298000	East Fork Salmon River near Clayton, ID	44° 13' 29"	114° 07' 10"	9-03-2001	47.2		
13301700	Morse Creek above diversions near May, ID	44° 36' 32"	113° 49' 02"	9-04-2001	6.2		
13303000	Texas Creek near Leadore, ID	44° 35' 10"	113° 19' 45"	9-04-2001	13.0	9-29-1977	21.2
13305800	Hughes Creek near North Fork, ID	45° 31' 11"	114° 02' 02"	9-05-2001	3.6		
13306000	North Fork Salmon River at North Fork, ID	45° 24' 23"	113° 59' 40"	9-05-2001	26.0		
13306440	Panther Creek below Big Deer Creek near Salmon, ID	45° 10' 38"	114° 18' 57"	9-05-2001	45.0	9-30-1977	79.3
13307000	Salmon River near Shoup, ID	45° 19' 20"	114° 26' 28"	9-05-2001	572		
13307050	Owl Creek near Shoup, ID	45° 19' 05"	114° 26' 55"	9-05-2001	9.5	9-13-1977	9.7
13308500	Marsh Creek near Cape Horn, ID	44° 24' 33"	115° 10' 58"	9-03-2001	58.9	9-28-1977	75.7
13309000	Bear Valley Creek near Cape Horn, ID	44° 25' 35"	115° 17' 45"	9-03-2001	52.2	9-28-1977	102
13310500	South Fork Salmon River near Knox, ID	44° 39' 15"	115° 42' 05"	8-22-2001	23.9	9-27-1977	39.5

Table 4. Low-flow measurement data for 155 selected sites in Idaho, Wyoming, Utah, and Nevada, water years 1977 and 2001--Continued

Gaging-station number	Gaging-station name	Latitude	Longitude	Water year 2001		Water year 1977	
				Date	Discharge, in ft^3/s	Date	Discharge, in ft^3/s
	Salmon River Basin--Continued						
13310520	Dollar Creek near Warm Lake near Cascade, ID	44° 43' 13"	115° 41' 41"	8-23-2001	5.4		
13310565	Blackmare Creek near Poverty Flat near Cascade, ID	44° 49' 20"	115° 42' 18"	8-23-2001	6.9		
13310570	South Fork Salmon River at Poverty Flat near Cascade, ID	44° 49' 56"	115° 42' 16"	8-23-2001	56.6		
13310660	Little Buckhorn Creek near Krassel Ranger Station, ID	44° 54' 47"	115° 44' 59"	8-23-2001	1.2		
13310670	West Fork Buckhorn Creek near Krassel Ranger Station, ID	44° 55' 02"	115° 44' 34"	8-23-2001	2.7		
13311500	East Fork of South Fork Salmon River near Stibnite, ID	44° 56' 11"	115° 20' 16"	8-22-2001	16.0	9-28-1977	24.2
13312500	Johnson Creek near Landmark Ranger Station, ID	44° 40' 56"	115° 32' 23"	8-22-2001	7.1	9-27-1977	20.7
13313500	Secesh River near Burgdorf, ID	45° 13' 58"	115° 48' 40"	8-28-2001	28.3	9-29-1977	156
13314500	Warren Creek near Warren, ID	45° 16' 34"	115° 41' 49"	8-28-2001	6.5		
13315050	French Creek at French Creek near Riggins, ID	45° 25' 23"	116° 01' 38"	8-28-2001	15.8	9-21-1977	37.7
13316000	Boulder Creek near Tamarack, ID	45° 04' 58"	116° 26' 51"	8-30-2001	.98	9-29-1977	2.6
13316390	Rapid River above hatchery near Riggins, ID	45° 21' 04"	116° 23' 57"	9-10-2001	60.1		
13316600	Slate Creek at mouth at Slate Creek, ID	45° 38' 24"	116° 17' 01"	9-14-2001	28.7		
13317045	White Bird Creek near White Bird, ID	45° 47' 19"	116° 15' 29"	9-14-2001	5.2	9-30-1977	55.2
	Clearwater River Basin						
13336600	Swiftwater Creek near Lowell, ID	46° 06' 55"	115° 34' 23"	9-11-2001	2.5		
13336650	East Fork Papoose Creek near Powell Ranger Station, ID	46° 32' 07"	114° 45' 55"	8-29-2001	1.5		
13336800	Warm Springs Creek near Powell Ranger Station, ID	46° 28' 17"	114° 53' 00"	8-29-2001	19.4		
13336850	Weir Creek near Powell Ranger Station, ID	46° 27' 31"	115° 02' 04"	8-29-2001	4.2		
13336900	Fish Creek near Lowell, ID	46° 20' 00"	115° 20' 46"	8-29-2001	24.9		
13337100	Clear Creek near Kooskia, ID	46° 07' 56"	115° 56' 50"	8-29-2001	16.7		
13337200	Red Horse Creek near Elk City, ID	45° 47' 39"	115° 24' 02"	8-30-2001	.79		
13337520	Crooked River near mouth near Elk City, ID	45° 49' 18"	115° 31' 40"	8-30-2001	15.4		
13337700	Peasley Creek near Golden, ID	45° 49' 00"	115° 49' 09"	8-30-2001	3.0		
13338000	South Fork Clearwater River near Grangeville, ID	45° 54' 45"	116° 00' 20"	8-30-2001	139		
13338200	Sally Ann Creek near Stites, ID	46° 00' 35"	115° 57' 46"	8-30-2001	.43		
13338800	Lawyer Creek near Nezperce, ID	46° 09' 46"	116° 14' 27"	8-28-2001	1.7	8-24-1977	3.0
13339700	Canal Gulch Creek at Pierce Ranger Station, ID	46° 29' 49"	115° 47' 45"	8-29-2001	.18		
13339900	Deer Creek near Orofino, ID	46° 29' 30"	116° 10' 39"	8-29-2001	0		
13341100	Cold Springs Creek near Craigmont, ID	46° 10' 09"	116° 31' 09"	8-28-2001	0		
13341500	Potlatch River at Kendrick, ID	46° 36' 44"	116° 39' 27"	8-28-2001	3.4		
13342000	Mission Creek near Winchester, ID	46° 11' 20"	116° 38' 53"	8-28-2001	0		
13344700	Deep Creek tributary near Potlatch, ID	47° 01' 27"	116° 53' 01"	8-29-2001	0		
13346450	South Fork Palouse River near Moscow, ID	46° 42' 41"	116° 58' 46"	8-29-2001	0		

LOW STREAMFLOW CONDITIONS IN WASHINGTON, OREGON, AND IDAHO DURING WATER YEAR 2001 / HORTNESS, JON E. / WRIR 03–4071