SUMMARY OF HYDROLOGIC CONDITIONS

Hydrologic Setting

A distinctively varied climate characterizes Washington and results primarily from two features: (1) the Cascade Range, and (2) the prevailing marine influence of the Pacific Ocean. The north-south trending Cascade Range divides Washington into two areas: the wet western part and the dry eastern part. Average annual precipitation west of the Cascade Range is about 70 inches and ranges from about 30 to 40 inches in the Puget Sound Basin to about 150 to 200 inches on the western slopes of the Olympic Mountains, where temperate rain forests thrive. The Cascade Range acts as a barrier to air masses that move across the State, producing 100 to 150 inches of annual precipitation on the high western slopes of the Cascade Range and leaving much less moisture in the clouds for eastern Washington. Average annual precipitation in eastern Washington is 7 to 40 inches, with the driest area being the Columbia Basin, where sagebrush and grasses grow and irrigation is required for most crops. About two-thirds of precipitation in Washington occurs from October to March, either as rain at low elevations or as snow at high elevations. Occasionally during winter, western Washington receives large amounts of rainfall from Pacific storms, accompanied by mild temperatures. The combination of melting snowpack at high elevations and rainfall during these storms can produce flooding in the low elevations. Snowpack and glaciers in the Olympic Mountains and Cascade Range are sources of water for many rivers in Washington and become the primary source of flow during the relatively dry summer.

Washington's varied climate and topography (fig. 1) result in variable streamflow patterns throughout the State, as shown in monthly discharge graphs for selected long-term gaging stations (fig. 2, table 1). Discharge at Chehalis River near Grand Mound (fig. 2A) is representative of streamflow patterns in the southwest lowlands of the State, where seasonal high flow occurs from November to March, coinciding with typical winter rainfall. Flow normally decreases through the spring and summer months due to generally dry weather and absence of snowpack. Discharge at the Quinault River at Quinault Lake (fig. 2B) is representative of the Olympic Peninsula. Two seasonal peak periods at this gaging station result from winter rainfall from November to January and late spring snowmelt from high elevations in May and June. Winter rainfall and spring snowmelt in the East Fork Lewis River near Heisson in the southern Cascade Range overlap to produce a high-flow season generally lasting from November to April (fig. 2C). High flow in the Nooksack River at Deming (fig. 2D) is generated by rainfall in winter and in May and June from a combination of spring rainfall and snowmelt. Discharge at Puyallup River near Orting (fig. 2E) is representative of typical winter rainfall of the central Cascade Range and a late spring snowmelt sustained by permanent snowfields and glaciers on the west slope of the Cascade Range.

Peak flows in rivers draining the east side of the Cascade Range, such as the Wenatchee River at Plain (fig. 2F), normally occur in April to July because of snowmelt. Streamflow during winter generally stays low due to freezing weather that maintains or contributes to the snowpack; exceptions occur when mild weather and heavy rain combine to cause flooding. Discharge at Ahtanum Creek at Union Gap (fig. 2G) and the Walla Walla River near Touchet (fig. 2H) are representative of agricultural drainage basins in the lower Columbia Basin, where irrigation-return flows cause an increase in discharge from August to winter. During winter, high flows are sustained by a combination of precipitation and return flow. Discharge at Hangman Creek at Spokane (fig. 2I) is representative of rivers in central-eastern Washington, where a combination of precipitation and melting snow produces maximum discharge in late winter and early spring.

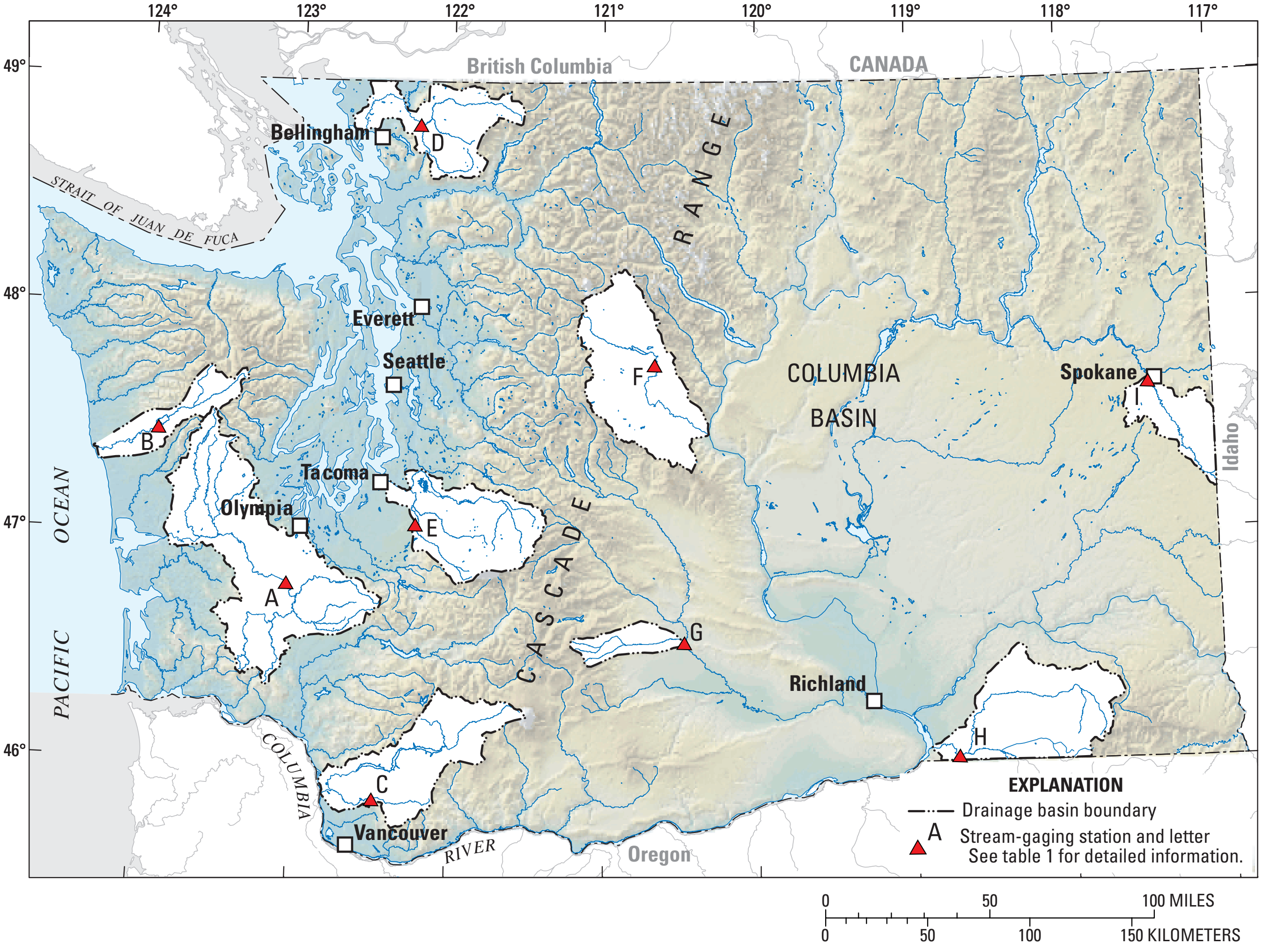


Figure 1. Selected stream-gaging stations and drainage basins in Washington.

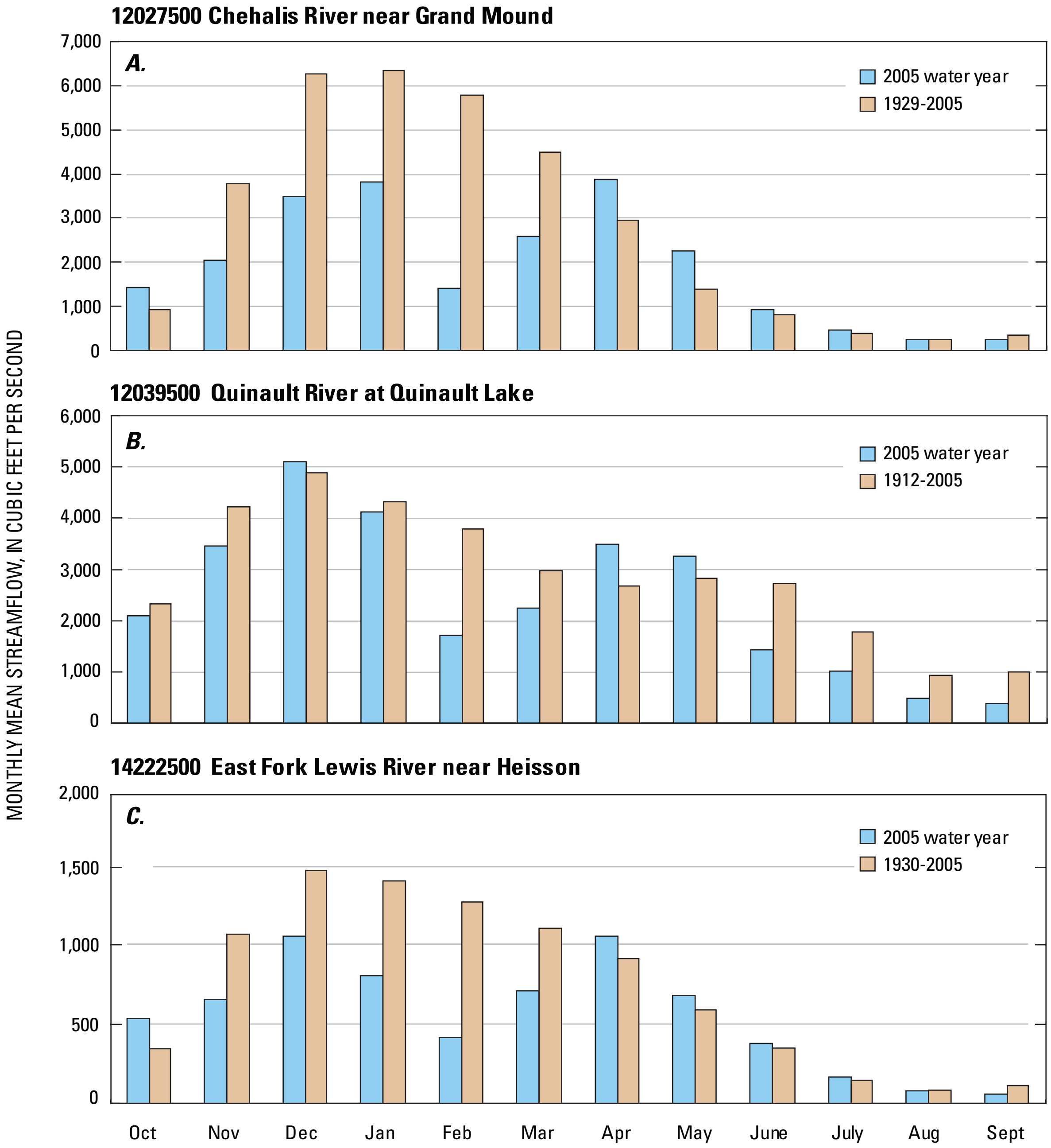


Figure 2. Monthly mean discharge for water year 2005 compared with mean monthly discharge for the period of record, for selected stream-gaging stations.

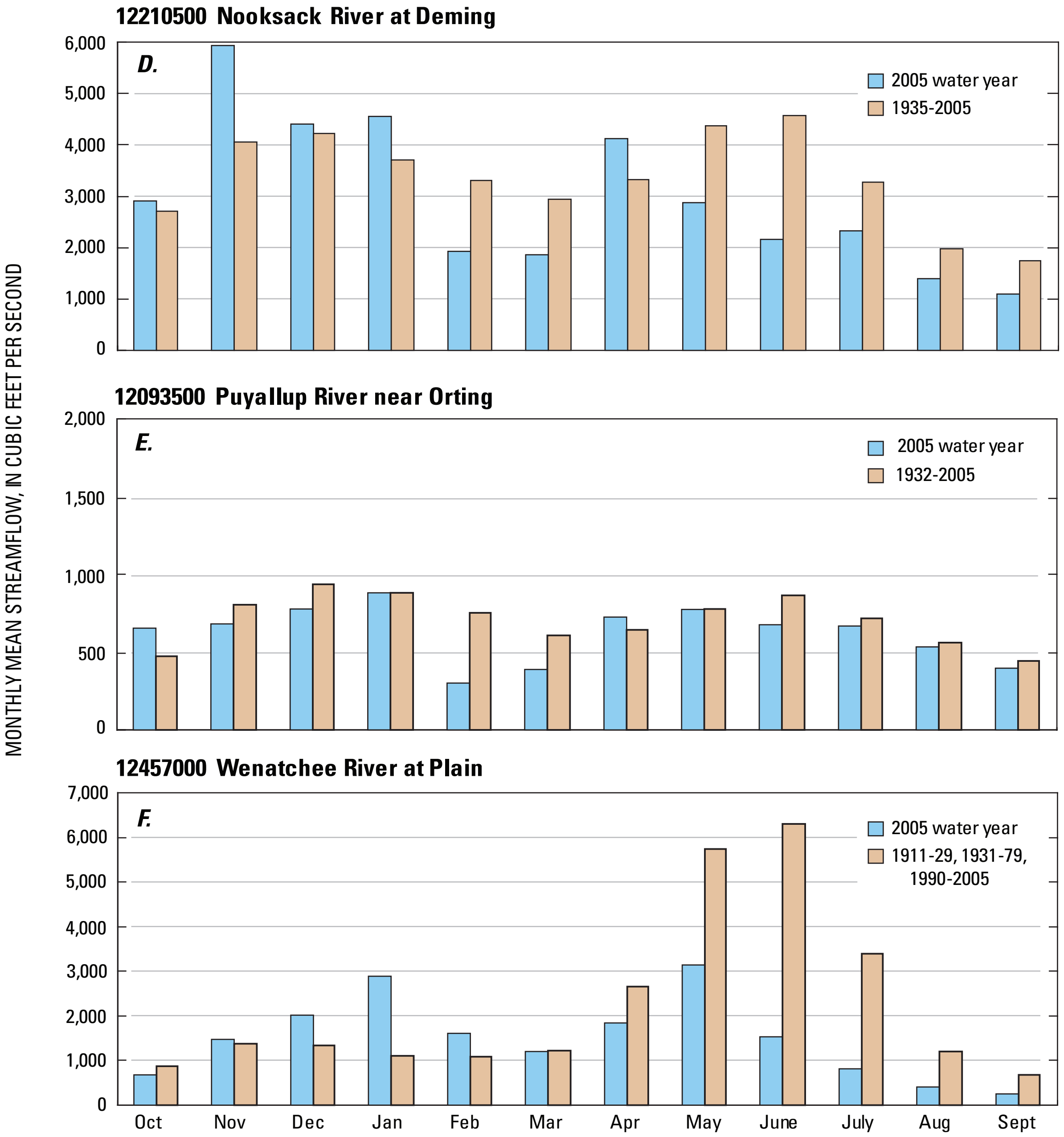
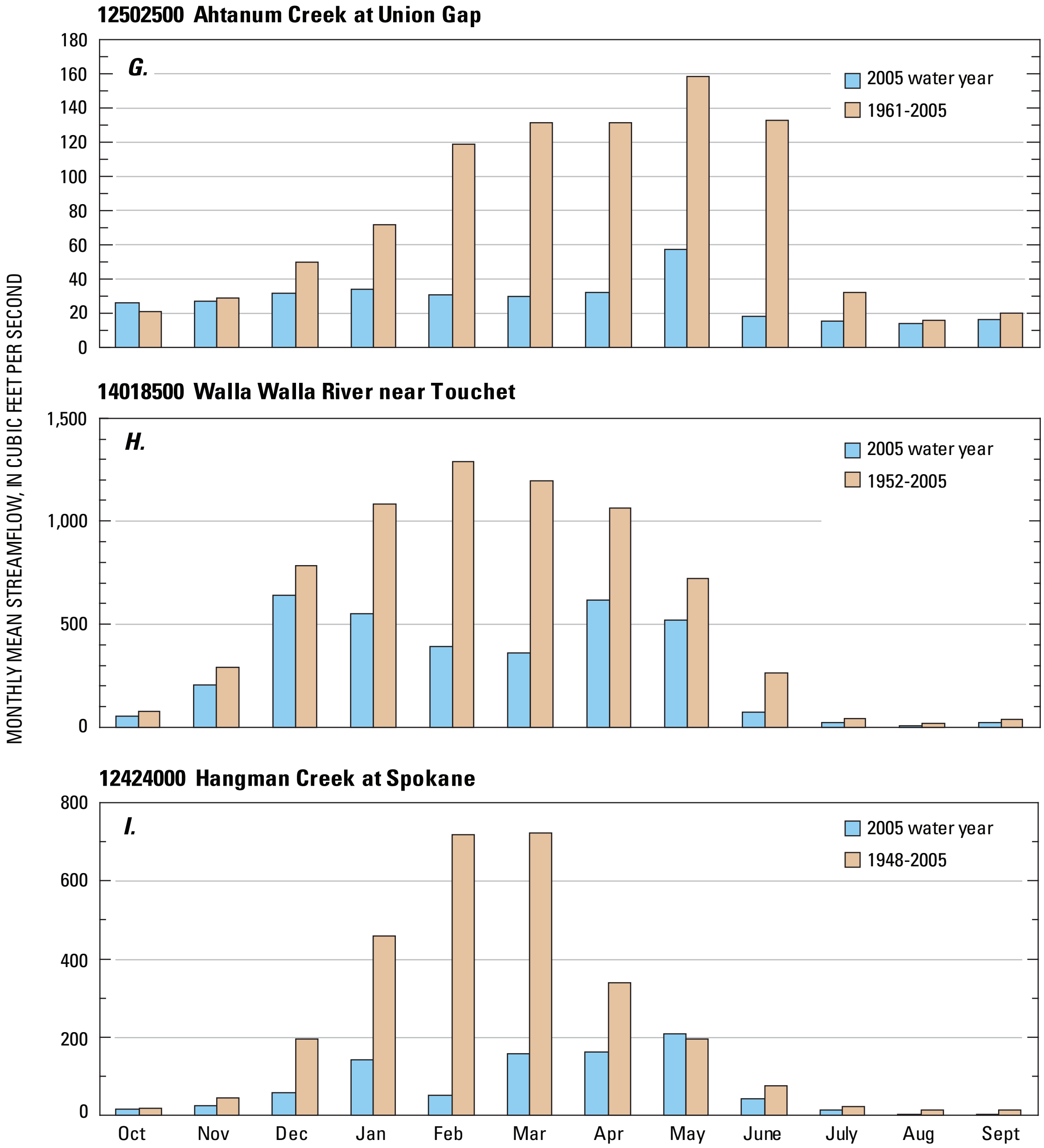


Figure 2. Continued.



12502500 Ahtanum Creek at Union Gap

14018500 Walla Walla River near Touchet

12424000 Hangman Creek at Spokane

Figure 2. Continued.

Hydrologic Conditions for Water Year 2005

In 2005, streamflow was below average throughout the State of Washington as indicated by data collected at selected long-term streamflow-gaging stations (fig. 1, table 1). Annual mean streamflow was highest in rivers draining the Olympic Mountains and the western side of the Cascade Range including the Quinault River (site B), the East Fork Lewis River (site C), the Nooksack River at Deming (site D), and the Puyallup River near Orting (site E). In eastern Washington, annual mean streamflow was significantly below average (sites F-I). Low streamflow primarily was caused by below average precipitation and a low snowpack in the mountains that produced very little runoff in the spring. Low precipitation and snowpack had a dramatic effect on some river flows. For example, annual flow in the Wenatchee River at Plain (site F) on the east side of the Cascade Range was only 66 percent of average and ranked the 9th lowest in 84 years of record. Annual flow in Hangman Creek (site I) was only 32 percent of average and ranked the 5th lowest in 58 years of record.

After above average flow in October, monthly mean streamflow in the Chehalis River, which drains to the Pacific Ocean, was below average from November through March (fig. 2A). During November through March, almost 80 percent of the total annual flow historically occurs in the Chehalis River. However, in 2005, streamflow was only 50 percent of average during this period. Beginning in April and continuing for the rest of the year, streamflow in the Chehalis River either was above or near average. In the Quinault River (fig. 2B), which flows from the Olympic Mountains to the Pacific Ocean, monthly mean streamflow was below average for nine months of the year, with the largest deficits occurring in February, June and July.

The monthly mean streamflow pattern in the East Fork Lewis River (fig. 2C), which flows from the west side of the southern Cascade Range, was similar to the Chehalis River streamflow pattern. After above average streamflow in October, monthly mean streamflow was below average from November through March, and was only 58 percent of average for this time frame. In the Nooksack River (fig. 2D), which drains from the west side of the northern Cascade Range, monthly mean streamflow was above average October through January due to rainfall events, below average during February and March due to drier-than-normal weather, and below average May through September due to below average snowmelt runoff. In the Puyallup River near Orting (fig. 2E), which drains from the west side of the central Cascade Range, monthly mean streamflow was near normal most of the year except during February and March, which were substantially below average due to drier-than-normal weather.

The effect of low snowpack was pronounced in rivers draining the eastern side of the Cascade Range (figs. 2F and 2G). During April through July 2005, when almost 70 percent of annual streamflow historically occurs in the Wenatchee River, flow was only 40 percent of average. During June, when flows are historically highest in the Wenatchee River, flow was only 24 percent of average. The effect of low snowpack on streamflow during summer also is shown in fig. 2F. Monthly mean streamflow in the Wenatchee River was only 33 percent in August and 37 percent in September. After near average flow in October and November, monthly mean streamflow in Ahtanum Creek in the Yakima River Basin (fig. 2G) was below average for most of year. From February through June, when almost 75 percent of streamflow in Ahtanum Creek historically occurs, monthly mean streamflows ranged from a low of only 14 percent of average in June to a high of 36 percent of average in May.

The effect of low precipitation and snowpack on streamflow also is evident in the graphs for rivers in eastern Washington. In the Walla Walla River (fig. 2H), streamflow was below average every month of the year and in Hangman Creek (fig. 2I), streamflow was below average 11 of 12 months. In these rivers, monthly mean flow deficits were large during January through May, when streamflows historically are highest.

Table 1. Selected streamflow-gaging stations in Washington.

Site (Letter in figure 2)	Station No.	Streamflow-gaging station	Period of record	Annual mean streamflow, 2005 water year: Streamflow, in cubic feet per second	Annual mean streamflow, 2005 water year: Percentage of long-term mean
A	12027500	Chehalis River near Grand Mound	1929-2005	1,907	68
B	12039500	Quinault River at Quinault Lake	1912-2005	2,406	84
C	14222500	East Fork Lewis River near Heisson	1930-2005	551	75
D	12210500	Nooksack River at Deming	1935-2005	2,970	89
E	12093500	Puyallup River near Orting	1932-2005	632	89
F	12457000	Wenatchee River at Plain	1911-29, 1931-79, 1990-2005	1,488	66
G	12502500	Ahtanum Creek at Union Gap	1961-2005	28	37
H	14018500	Walla Walla River near Touchet	1952-2005	288	51
I	12424000	Hangman Creek at Spokane	1948-2005	74	32

Surface-Water Quality

The National Water-Quality Assessment (NAWQA) program was established to assess the current water-quality conditions for a large part of the Nation’s freshwater streams, rivers, and aquifers and to describe how water quality changes over time. In 2005, the USGS Washington Water Science Center operated three surface-water-quality NAWQA stations throughout the State (fig. 3). One of the stations is in eastern Washington (Yakima River at Kiona) and is representative of agricultural land use; two are in western Washington, one representing urban land use (Thornton Creek near Seattle), and one representing relatively pristine conditions (North Fork Skokomish River near Hoodsport). In addition to these NAWQA stations, the USGS Washington Water Science Center also continued operation of two long-term monitoring sites on the middle Columbia River (Columbia River at Richland and Columbia River near Priest Rapids Dam), monitored irrigation return flow at four sites in the Columbia Basin Irrigation Project (CBIP)—Crab Creek near Beverly, Lind Coulee Wasteway near Warden, Sand Hollow near Vantage, and Red Rock Coulee near Smyrna, and resumed operation of the Hydrologic Benchmark Program at Andrews Creek near Mazama (fig. 3).

Specific conductance and dissolved-solids concentration generally have an inverse relation to streamflow. The smallest dissolved solids concentrations usually are during the high flows of late fall and winter and early spring runoff, when rainfall and snowmelt are the major sources of water. Dissolved solids in western Washington usually are most concentrated during late summer and early fall, when base flow from ground-water sources is the dominant component of flow; but in eastern Washington, dissolved solids may be more concentrated during irrigation season due to irrigation return flows. Analysis of dissolved solids at several sites was discontinued in 2001, but a good relation is indicated between dissolved solids and specific conductance. Specific conductance at the surface-water NAWQA, CBIP, Benchmark, and Columbia River stations during 2005 ranged from an average of 51 µS/cm (microsiemens per centimeter at 25 degrees celsius) at Andrews Creek near Mazama to a maximum of 543 µS/cm in a sample collected in October 2004 from Crab Creek near Beverly, the highest specific conductance value measured during the 2005 water year. The lowest specific conductance value measured was 36 µS/cm, in a sample from Andrews Creek near Mazama in May. The average specific conductance for all stations sampled was 191 µS/cm.

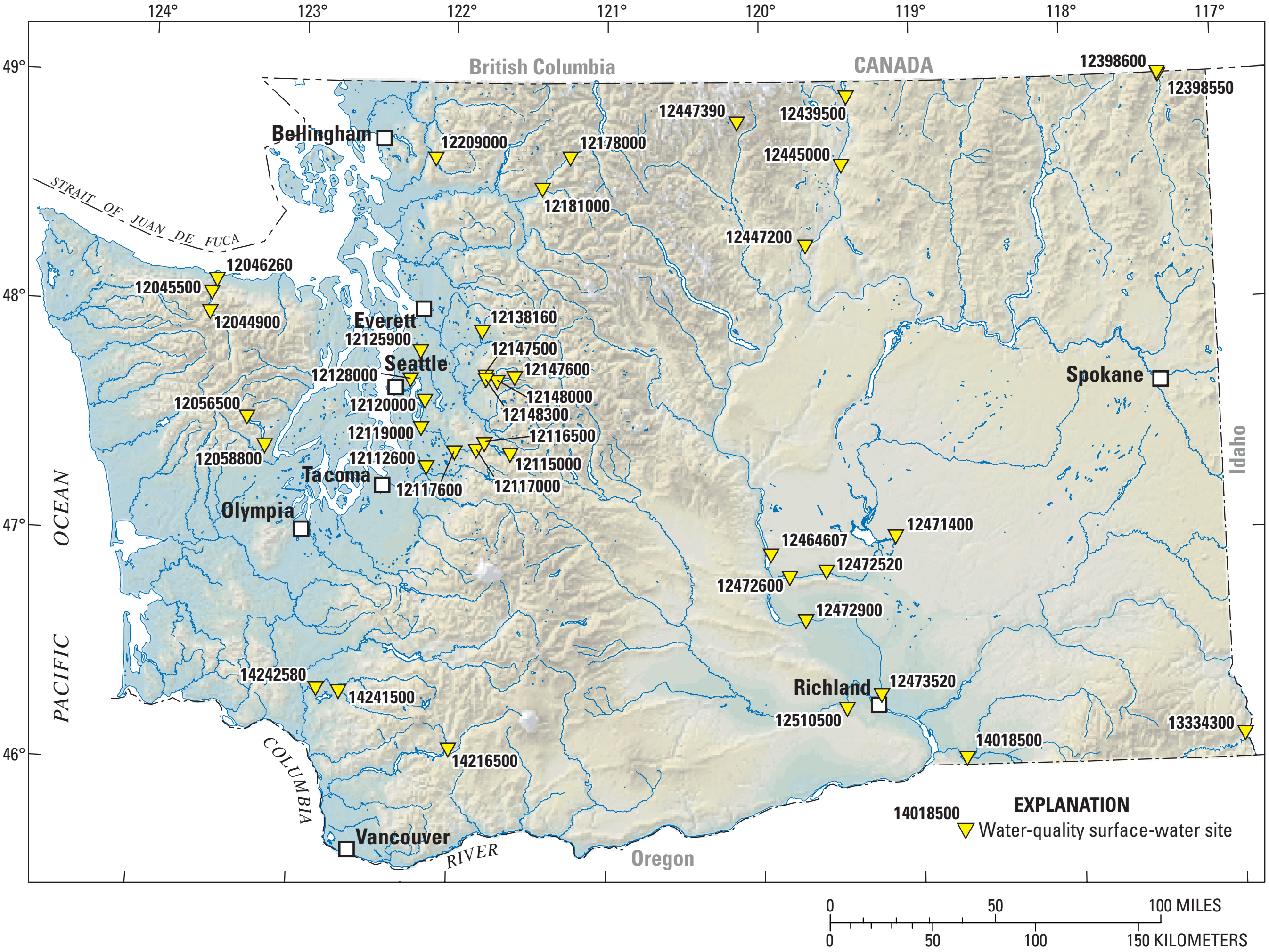


Figure 3. Streamflow-gaging stations with water-quality data, Washington, water year 2005.

Surface waters in Washington generally are classified as clear and carry only small amounts of sediment, except where influenced by glaciers, unconsolidated volcanic deposits, or disturbed soils. Water flowing in the Columbia River is low in sediment, usually less than 10 mg/L (milligrams per liter), and at times no measurable sediment is detected. Streams east of the Cascades that characteristically carry sediment concentrations greater than 10 mg/L are those that carry return flow from heavily irrigated and farmed lands in the semiarid region. Concentrations of suspended sediment in samples from the Columbia River during 2005 ranged from 1 to 4 mg/L. Concentrations of suspended sediment in samples from NAWQA stations ranged from a median of <0.5 mg/L at North Fork Skokomish River near Hoodsport to an average of 22 mg/L at Yakima River at Kiona. Generally, the highest sediment concentrations, ranging from 6 to 71 mg/L, were in samples from Yakima River at Kiona. The highest sediment concentration (71mg/L in a sample collected in December) was measured at Yakima River at Kiona. The lowest sediment concentration (less than 0.5 mg/L in several samples collected in 2005) was measured at North Fork Skokomish River near Hoodsport.

Forty-two pesticides, metabolites (degradation products), or other trace organic compounds were detected in samples collected from two NAWQA surface-water stations and four irrigation return flow stations during water year 2005. The herbicides atrazine, simazine, prometon, and bentazon, as well as the pesticide degradates 2-chloro-4-isopropylamino-6-amino-s-triazine, referenced in this report as CIAT and commonly referred to as deethylatrazine, and aminomethyl phosphoric acid (referenced in this report as AMPA) were the herbicides or degradates detected most frequently in samples from the stations in eastern and western Washington. Samples for analysis of pesticides were not collected from the reference station North Fork Skokomish River during 2005. Carbaryl and azinphos-methyl were the insecticides detected most frequently in samples collected from eastern and western Washington. Samples collected from Thornton Creek near Seattle contained 28 pesticides, degradates, or trace organic compounds. The stimulant caffeine was the most frequently detected organic compound in Thornton Creek, followed by the herbicide prometon. Concentrations in samples from this urban site ranged from at or near the limit of detection to a maximum of 1.49 µg/L in April for the herbicide metsulfuron.

Nine herbicides, four insecticides, and four herbicide degradates were detected in samples collected from the Yakima River at Kiona, ranging in concentration from at or near the limit of detection to a maximum concentration of 0.02 µg/L for the herbicide prometon. Six herbicides and two pesticide degradates were detected in the October sample from Sand Hollow near Vantage, ranging in concentration from at or near the limit of detection to a maximum of 0.17 µg/L for the herbicide bentazon. Five herbicides and two pesticide degradates were detected in the October sample from Lind Coulee Wasteway near Warden, ranging in concentration from at or near the limit of detection to a maximum of E0.04 µg/L for the herbicide 2,4-D. Six herbicides and two pesticide degradates were detected in samples from Red Rock Coulee near Smyrna, ranging in concentration from at or near the limit of detection to a maximum of E0.07 µg/L for the herbicide bentazon. Three herbicides and two pesticide degradates were detected in the October sample from Crab Creek near Beverly, ranging in concentrations from at or near the limit of detection to a maximum of E0.04 µg/L for the herbicide bentazon.

The USEPA fresh-water chronic criteria for the protection of aquatic life for carbaryl and azinphos-methyl, are 0.02, and 0.01 µg/L, respectively. Concentrations of carbaryl in three samples from Thornton Creek (in February, March, and April) exceeded the USEPA fresh-water chronic criteria for the protection of aquatic life. Concentrations of azinphos-methyl in three samples from Yakima River at Kiona during May, June, and August exceeded the USEPA fresh-water chronic criteria for the protection of aquatic life. Samples for analysis of volatile organic compounds (VOCs) were collected only from Thornton Creek during 2005. Six VOCs were detected in samples from Thornton Creek, ranging in concentration from at or near the limit of detection to a maximum of 1 µg/L for the VOC acetone. Trichloromethane (chloroform) was detected in 12 samples from Thornton Creek, ranging in concentration from at or near the limit of detection to a maximum of 0.24 µg/L. Toluene was also detected in 12 samples from Thornton Creek, ranging from near the limit of detection to a maximum of 0.06 µg/L.

Ground Water

Water levels measured in 59 wells (fig. 4) in Washington during water year 2005 are reported. Water levels were measured bimonthly or more frequently in a long-term monitoring network of 19 wells, and miscellaneous measurements were made in the other 40 wells.

In 2005, ground-water levels were neither remarkably high nor low when compared to long-term data (figs. 5 and 6), although monthly ground-water levels more often were below average than above average at selected long-term monitoring wells (table 2). The eastern Washington wells listed in table 2 include a water-table well in Spokane County (25N/45E-16C01), a water-table well in Whitman County (18N/43E-35L01), a water-table well in Columbia County (10N/37E-23R01), and a water-table well (24N/36E-16A01) co-located with two confined wells (24N/36E-16A06 and 24N/36E-16A08) in Lincoln County. The western Washington wells listed in table 2 include a confined well in Thurston County (16N/02W-29L02P2), and a confined well in Pierce County (22N/01W-36H01D11). During the winter of 2004-05, Washington received below normal precipitation, which led to a declared drought, but the dry winter was followed by abundant spring precipitation. The inconsistent pattern of above and below average monthly ground-water levels in long-term monitoring wells (table 2) indicates no direct relation between precipitation and ground-water levels in many wells.

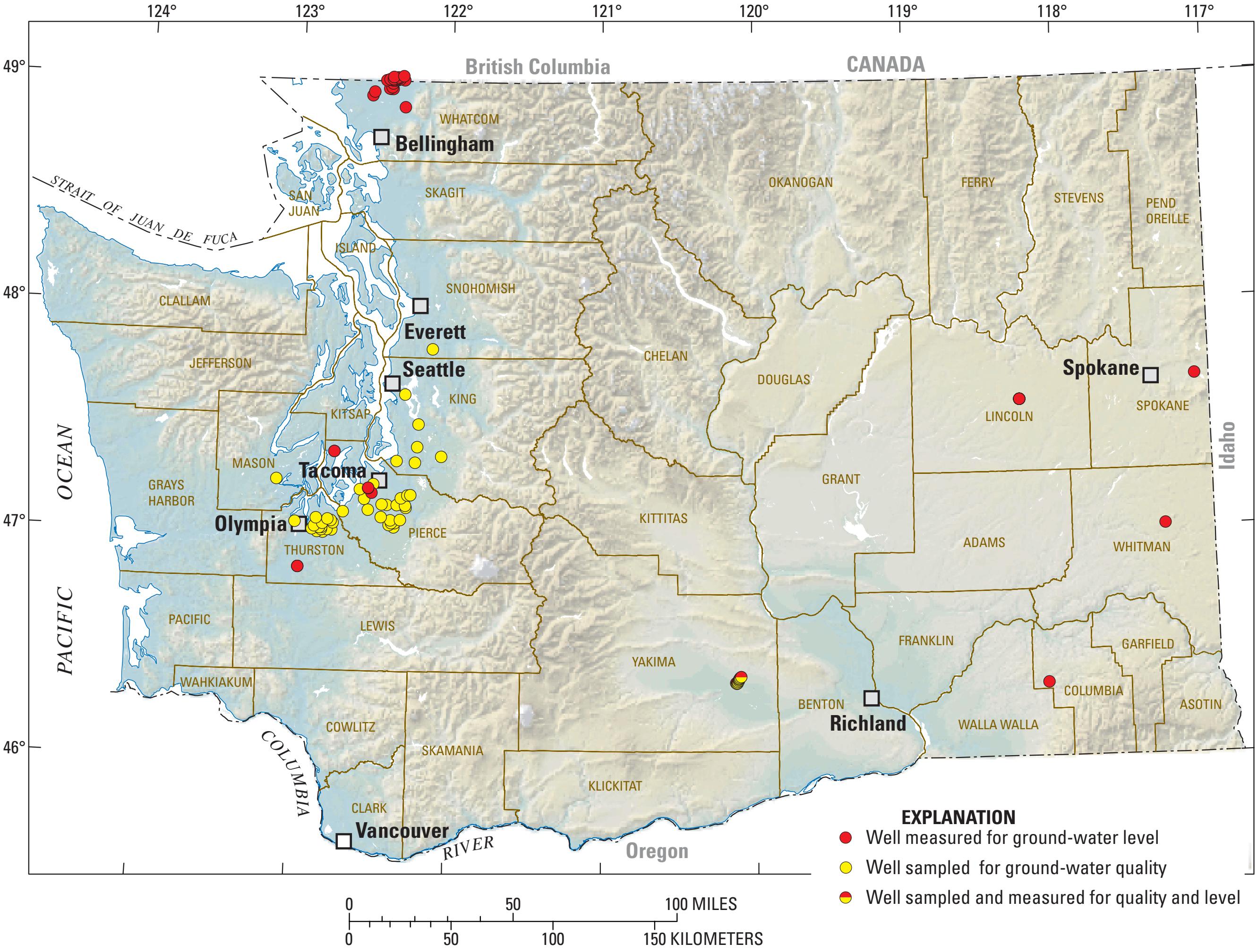


Figure 4. Wells with water-level and water-quality data, Washington, water year 2005.

Table 2. Departure from long-term average ground-water levels at eight wells in the long-term monitoring network, water year 2005.

[All values are in feet below land-surface datum; —, no data; *, less than 10 years of record]

Well No.	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept
Eastern Washington												
25N/45E-16C01	+3.4	+4.4	+5.9	+3.5	+3.1	-2.0	-0.8	-2.0	-2.7	-1.5	-1.4	-0.3
18N/43E-35L01	-.3	—	-1.3	—	+1.0	—	+.9	+.4	—	—	+1.3	—
10N/37E-23R01	—	-.6*	—	-.8*	—	—	-3.2*	—	-2.7*	-2.8	-2.8*	—
24N36E-16A01	+2.1	+.7	+2.5	+3.1	+3.1	+6.5	+7.1	+5.2	+5.5	+6.7	+5.3	+6.1
24N/36E-16A06	0	—	-.9	+2.0	—	+1.7	—	+.1	—	+2.0	—	—
24N/36E-16A08	+2.9	—	+6.7	+5.4	—	+7.8	—	+7.7	—	-.8	—	—
Western Washington												
16N/02W-29L02P2	+1.4	+0.3	+0.6	-0.9	+1.0	+4.0	+0.5	-0.7	-3.3	-2.8	-2.7	-3.3
22N/01W-36H01D11	—	—	-3.1*	—	-2.0*	-2.9*	-4.6*	—	1.2*	—	-2.7*	—

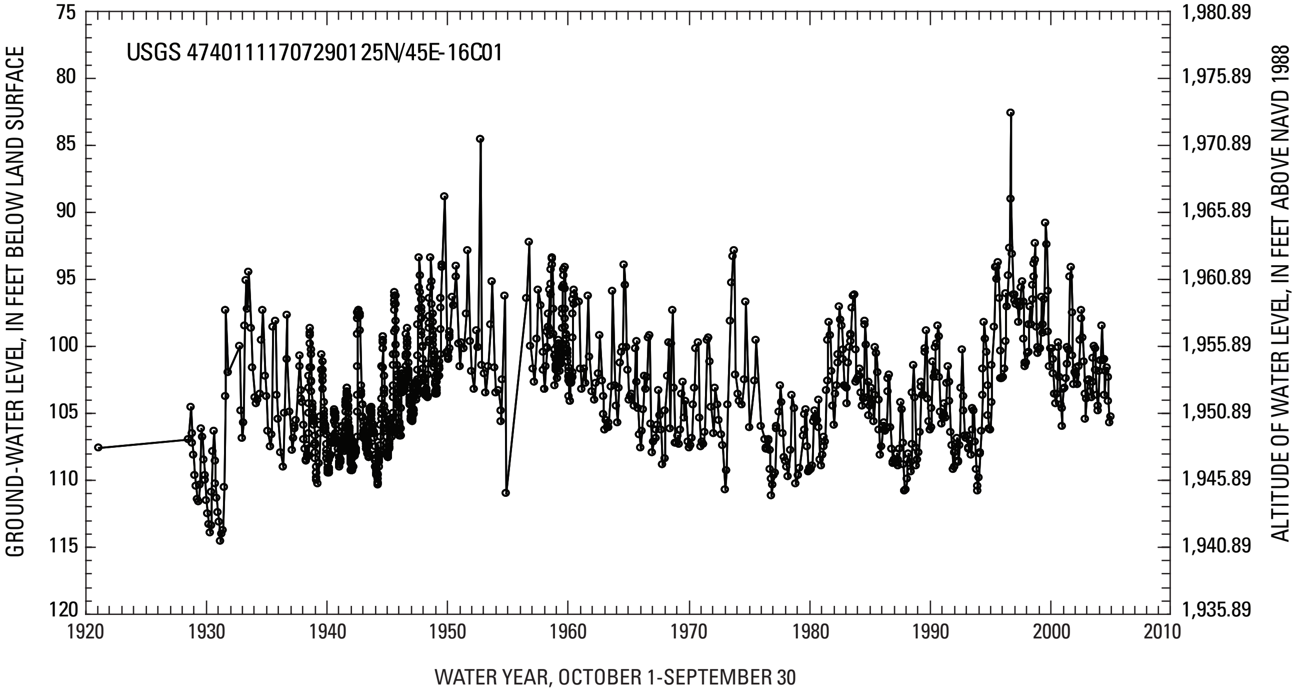


Figure 5. Long-term water levels for well 25N/45E-16C01.

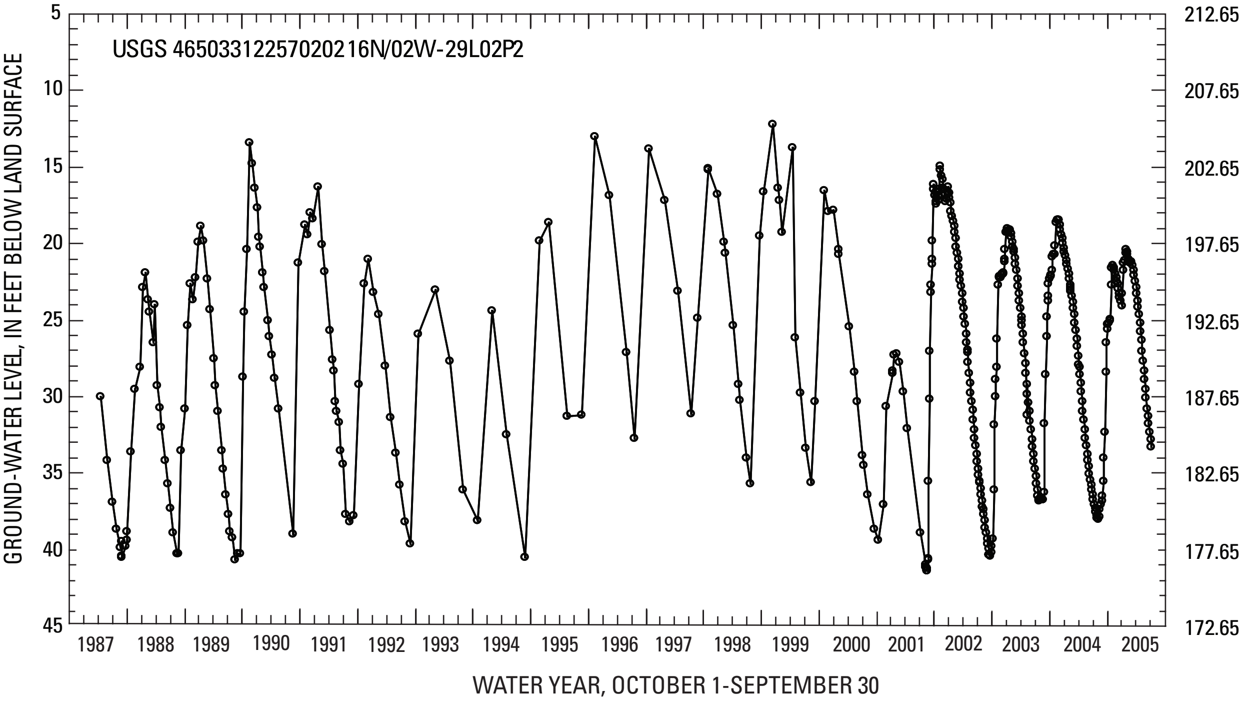


Figure 6. Long-term water levels for well 16N/02W-29LO2P2.

Ground-Water Quality

Chemical analysis samples were collected from 59 wells (fig. 4, table 3) in Washington during water year 2005. Samples were collected from 4 networks: 25 wells representing urban land-use in western Washington, 1 urban land-use reference well in western Washington, 18 agricultural flowpath wells in eastern Washington, and 15 source-water wells in western Washington. Well depths in the networks range from 10.5 to 884 ft in the western Washington urban land-use network, 380.6 ft in the western Washington source-water network, and 38.8 ft in the eastern Washington agricultural flowpath network.

In all 59 wells, specific conductance samples ranged from 96 µS/cm in UR-34 to 1,140 µS/cm in AS1-01A; dissolved oxygen ranged from 0.1 mg/L in SWQA01, SWQA03, SWQA08, and SWQA14 to 9.6 mg/L in LC-149C; and pH ranged from 5.7 units measured in UR-34 to 8.7 units measured in SWQA08.

Alkalinity and dissolved solids measured in samples from the network in eastern Washington generally were higher than those detected in samples from ground-water networks in western Washington. Average alkalinity and dissolved solids measured in samples from the eastern Washington agricultural flowpath network were 301.8 and 473.2 mg/L, respectively. Average alkalinity measured in samples from the western Washington urban land-use network was 60.5 mg/L and dissolved solids concentrations were 145.5 mg/L.

Nitrite plus nitrate concentrations in samples from all 44 wells in the urban land use and agricultural flowpath networks (nutrients and major ions were not analyzed for wells from the source-water network) ranged from less than the detection limit of 0.06 to 71.2 mg/L. In all cases, nitrite concentrations were negligible in comparison to nitrate concentrations, and nitrate was the major contributor to total nitrogen. Nitrite plus nitrate concentrations generally were higher in samples from wells in the eastern Washington agricultural flowpath networks, with average concentrations of 13.1 mg/L in samples from the agricultural flowpath network. Average concentration of nitrite plus nitrate in samples from the urban land-use networks was 4.55 mg/L. Nitrate concentrations in samples from several wells (AS1-01A, AS1-02A, FS1-04A, FS1-04B, FS1-05A, FS1-05B, UR-14, and UR-21) exceeded the USEPA Maximum Contaminant Level (MCL) drinking water criterion for nitrate. Phosphate concentrations in all wells were relatively low, ranging from at or near the limit of detection to a maximum of 0.185 mg/L in a sample from UR-26 and 0.189 mg/L in a sample from FS1-01A. Generally, trace element concentrations in ground-water samples were higher in eastern Washington than in samples from western Washington. Median arsenic, lead, molybdenum, nickel, and selenium concentrations in ground water samples from the western Washington urban land-use network were 0.25, <0.08, <0.4, 1.3, and <0.4 µg/L, respectively. Trace element concentrations in all ground water samples from the western Washington network were at or near the respective limits of detection except for nickel, which ranged in concentration from 0.59 to a maximum concentration of 15.4 µg/L detected in a sample from UR-30. Nickel concentrations detected in ground-water samples from UR-30 exceeded the USEPA MCL for drinking water.

Six herbicides and five herbicide degradation products were detected in ground-water samples in eastern and western Washington. Concentrations ranged from at or near the limit of detection to a maximum of 0.462 µg/L of simazine in a sample from AS1-03A. Atrazine was detected in 7 of the 41 wells sampled in western Washington and in only 2 samples from eastern Washington. The herbicide degradation product, CIAT, was detected in 4 samples from the eastern Washington ground-water network, ranging in concentrations from at or near the limit of detection to a maximum of 0.025 µg/L in a sample from AS1-01A. CIAT was detected in 7 samples in western Washington ground-water networks with a maximum of 0.010 µg/L in a sample from UR-25. Atrazine was detected in 7 samples collected from the two western Washington networks and in 2 samples from the eastern Washington network. Prometon was detected in 3 samples from ground-water networks in western Washington. Simazine was detected in 5 samples from ground-water networks in western Washington and in 2 samples from the eastern Washington agricultural land-use network. The insecticide chlorpyrifos was detected in only one sample (SWQA09) at a concentration of E0.005 µg/L from the western Washington source-water network. No pesticide concentrations exceeding USEPA MCLs or advisories for drinking water were detected in ground-water samples.

Eleven VOCs were detected in samples collected for analysis of VOCs in western Washington. Concentration ranged from at or near the limit of detection to a maximum of 1.61 µg/L trichloroethene in a sample from SWQA10. The solvent and fumigant 1,1,1-trichloroethane was the most frequently detected VOC in samples ranging in concentration from at or near the limit of detection to a maximum of 0.09 µg/L in a sample from SWQA10. Trichloromethane (chloroform) was detected in 4 samples, ranging in concentration from near the limit of detection to a maximum of 0.79 µg/L in a sample from SWQA07. Tetrachloroethene and tetrachloromethane (carbon tetrachloride), primarily used as dry cleaning solvents, were detected in 3 samples from wells in the western Washington network, ranging in concentrations from E0.03 to 1.59 µg/L. No VOC concentrations exceeding USEPA MCLs or advisories for drinking water were detected in ground-water samples.

Samples were collected from the source-water network in western Washington in 2005 and analyzed for the presence of wastewater compounds. Six wastewater compounds were detected in samples from the ground-water network, ranging in concentrations from detections that were less than the quantifiable limit (M) for the solvent isophorone, the antioxidant 3-*tert*-Butyl-4-hydroxyanisole (BHA), the topical cream or flavoring, methyl salicylate, and the wood preservative p-cresol to a maximum concentration of E0.1 for the flame retardent tris(2-butoxyethyl) phosphate.

Radionuclide samples were collected only from the urban land-use ground-water network in western Washington. Average natural uranium concentrations ranged from E0.02 to a maximum of 2.63 µg/L in a sample from UR-30.

Table 3. Wells where chemical analysis samples were collected from ground-water network wells in Washington, water year 2005.

Well identification No.	Local well No.	Station identification No.
Western Washington urban land-use network		
UR-01	18N/01W-26N04	470040122463601
UR-02	18N/01W-33C02	470045122463801
UR-04A	18N/01W-28G03	470110122484201
UR-05	18N/01W-33R01	465958122481001
UR-06	18N/01W-19N02	470135122514001
UR-07	18N/01W-29H02	470112122493501
UR-08	18N/02W-25Q01	470046122522301
UR-09	18N/01W-07H05	470343122504501
UR-10	18N/01W-13R01	470228122441701
UR-11	18N/01W-32M01	470005122502301
UR-12	18N/01W-36B01	470035122444601
UR-14	18N/01W-13C03	470306122450301
UR-21	18N/04E-19Q02	470135122202501
UR-23	18N/03E-12K01	470328122215501
UR-24	18N/03E-13K01	470240122214501
UR-25	18N/04E-18K03	470230122203001
UR-26	19N/03E-23G03	470705122230501
UR-29a	19N/04E-22A01	470720122162101
UR-30	19N/04E-23N01	470644122160801
UR-31	18N/04E-09K03	470330122181501
UR-32	19N/03E-21C01	470732122252801
UR-34	19N/04E-02F02	470958122154301
UR-35B	20N/04E-36P02	471018122143302
UR-36	20N/02E-28L01	471133122335501
UR-37	18N/03E-24D03	470208122223501

Table 3. Wells where chemical analysis samples were collected from ground-water network wells in Washington, water year 2005. —Continued

Well identification No.	Local well No.	Station identification No.
Western Washington urban land-use reference well		
LC-149C	19N/02E-26P01	470603122305101
Eastern Washington agricultural flowpath network		
ACTVZ1-1A	10N/21E-24A05	462044120073701
AS1-01A	10N/22E-08E01	462217120060901
AS1-02A	10N/22E-18G01	462114120064701
AS1-02B	10N/22E-18G02	462114120064702
AS1-03A	10N/21E-24C01	462044120081101
AS1-03B	10N/21E-24C02	462044120081102
FS1-01A	10N/21E-24G01	462027120075301
FS1-01B	10N/21E-24G02	462027120075302
FS1-02A	10N/21E-24A01	462033120074301
FS1-02B	10N/21E-24A02	462033120074302
FS1-02C	10N/21E-24A03	462033120074303
FS1-02D	10N/21E-24A04	462033120074304
FS1-03A	10N/22E-18M01	462105120071301
FS1-03B	10N/22E-18M02	462105120071302
FS1-04A	10N/22E-18F01	462125120070201
FS1-04B	10N/22E-18F02	462125120070202
FS1-05A	10N/22E-07P01	462138120065801
FS1-05B	10N/22E-07P02	462138120065802
Western Washington source-water network		
SWQA01	18N/01W-21B06	470216122481901
SWQA02	18N/02W-18L04	470243122585501
SWQA03	18N/03E-04Q01	470410122254601
SWQA04	19N/01E-33H01	470530122403301
SWQA05	19N/02E-10L01	470902122321701
SWQA06	19N/04E-09B03	470904122180803
SWQA07	20N/03E-18N01	471252122285601
SWQA08	20N/03W-07P01	471348123064801
SWQA09	21N/04E-07R02	471907122200401
SWQA10	21N/05E-18B02	471845122125301
SWQA11	21N/06E-04B08	472025122024501
SWQA12	22N/05E-20E03	472254122120401
SWQA13	23N/05E-17F04	472901122114901
SWQA14	25N/06E-34C02	473648122171201
SWQA15	27N/05E-24F03	474855122064201