Prepared in cooperation with the Oklahoma Water Resources Board

Statistical Summaries of Streamflow in and near Oklahoma Through 2007

Scientific Investigations Report 2009–5135

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

On cover: Photograph of North Canadian River near El Reno, Okla. Photograph was taken in 2001 by David L. Adams, U.S. Geological Survey.

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KEN SALAZAR, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2009

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Suggested citation:
Lewis, J.M., and Esralew, R.A., 2009, Statistical Summaries of Streamflow in and near Oklahoma Through 2007: U.S. Geological Survey Scientific Investigations Report 2009–5135, 633 p.

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Conversion Factors

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	2.590	square kilometer (km^2)
	Flow rate	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

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By Jason M. Lewis and Rachel A. Esralew

Abstract

Statistical summaries of streamflow records through 2007 for gaging stations in Oklahoma and parts of adjacent states are presented for 238 stations with at least 10 years of streamflow record. Streamflow at 120 of the stations is regulated for specific periods. Data for these periods were analyzed separately to account for changes in streamflow because of regulation by dams or other human modification of streamflow. A brief description of the location, drainage area, and period of record is given for each gaging station. A brief regulation history also is given for stations with a regulated streamflow record. This descriptive information is followed by tables of mean and median monthly and annual discharges, magnitude and probability of exceedance of annual instantaneous peak flows, durations of daily mean flow, magnitude and probability of nonexceedance of annual low flows, and magnitude and probability of nonexceedance of seasonal low flows.

Introduction

Streamflow statistics are used by individuals and organizations involved in the planning of projects with surface-water resources. The last report that published summaries of streamflow statistics in Oklahoma used streamflow data through 1999 (Tortorelli, 2002). The U.S. Geological Survey (USGS), in cooperation with the Oklahoma Water Resources Board, conducted an investigation to update streamflow statistics in Oklahoma by using streamflow data through 2007.

At least 10 years of daily streamflow data exist for 182 streamflow gaging stations in Oklahoma and 56 streamflow gaging stations in nearby parts of adjacent states. Since 1999 several streamflow sites have acquired additional years of record, enough years of record (10) to be included in statistical analyses, or new years of record that are affected by regulation. Useful summaries for streamflow data represent monthly and annual mean and median flows, peak-flow statistics, flow-duration statistics, and low-flow frequency statistics. Information about monthly and annual mean and median flows, flow-duration, and low-flow characteristics statistics is essential to water-management agencies dealing with problems related to irrigation, municipal and industrial water supplies, and fish and wildlife conservation.

Low-flow statistics are particularly valuable to assess the capability of a stream to receive and assimilate treated wastewater. Low-flow statistics are used in granting wastewater permits and determining total maximum daily loads of streams. Annual and seasonal 7-day, 2-year low-flow streamflows (7Q2) are used as part of the criteria for granting wasteload allocations for permits and are specifically cited in State statutes. Other low-flow durations (1, 3, 10, 30, and 60 days) and frequencies (5, 10, and 20 years) also are useful to characterize streamflow at a site.

Knowledge of peak-flow statistics is required for the safe and economical design of highway bridges, culverts, dams, levees, and other structures on or near streams and for disaster planning. Floodplain management programs and flood-insurance zones and rates also are based on peak-flow magnitude and frequency information.

Purpose and Scope

The purpose of this report is to: (1) present monthly and annual mean and median flows, annual low-flow statistics, and flow-duration statistics for each streamflow-gaging station with 10 years or more of streamflow record; (2) present seasonal low-flow statistics for these gaging stations for three Oklahoma growth seasons: (a) spring (April 1–May 31), (b) summer (June 1–October 31), and (c) winter (November 1–March 31); (3) update annual peak-flow statistics of these gaging stations; and (4) present analyses of unregulated and regulated periods of record separately to reconcile changes in streamflow because of regulating structures and other human modifications to basin hydrology.

The scope of this report was limited to streamflow-gaging stations with at least 10 years of unregulated or regulated streamflow records through September 2007 (water year 2007). A total of 238 streamflow gaging station records were analyzed, including 182 stations in Oklahoma and 56 nearby stations in Kansas, Missouri, Arkansas, and Texas. The streamflow records are from unregulated streams with no substantial flow regulation, irrigation, or urbanization, and from streams that are substantially affected by regulation, irrigation, and urbanization. Regulation by dams or other human modification of streamflow is defined as substantial if 20 percent or more of the contributing drainage basin is affected (Heimann and Tortorelli, 1988).

Acknowledgments

Several U.S. Geological Survey personnel in Oklahoma provided assistance with this report. Robert L. Tortorelli assisted with all aspects of this report and S. Jerrod Smith assisted with creating the new Oklahoma skew map. The authors gratefully acknowledge and appreciate their contribution.

Statistical Summaries

Site Selection

The streamflow-gaging stations selected for analysis are shown in figure 1 and described in table 1. Gaging stations selected for analysis are in 8-digit hydrologic unit boundaries (based on the 8-digit hydrologic unit codes, or HUC) that are in or are adjacent to the Oklahoma state boundary (*http://www.ncgc.nrcs.usda.gov/products/datasets/watershed/*, accessed June 2009). Fifty-six streamflow-gaging stations on rivers in adjacent states and 182 streamflow-gaging stations in Oklahoma were selected. Only continuous-record sites with at least 10 years of unregulated or regulated data were selected for analysis. Streamflow at 120 of the gaging stations is affected by regulation, urbanization, or irrigation well development (Wahl and Tortorelli, 1997) for specific periods. Sixty of the 120 gaging stations were analyzed for unregulated and human-modified periods (table 1). Six of the 120 gaging stations were analyzed for periods of unregulated flow and separate periods of unregulated flow that were affected by irrigation. Five of the 120 gaging stations were analyzed for separate periods of flow regulation with irrigation. Eight of the 120 gaging stations were analyzed for periods of unregulated flow that were affected by urban development.

A regulated period of record in this report is defined as the period during which at least 20 percent of the contributing drainage area upstream from a station is controlled by dams, floodwater-retarding structures, or other human modification of streamflow (Heimann and Tortorelli, 1988). An urban period of record is defined as the period during which at least 20 percent of the drainage basin upstream from a station is impervious cover because of urbanization. An irrigation period of record is defined at stations that are affected by known irrigation (Wahl and Tortorelli, 1997, Esralew and Lewis. U.S. Geological Survey. written commun., 2009). Streamflow at some other stations likely has been affected by groundwater development, but that has not been documented. If the flow at a streamflow-gaging station is regulated, and the regulated drainage basin area increased during the period of record, an attempt was made to summarize only the regulated period when further change had substantively stopped. However, regulated statistics may be biased for some gaging stations because of the extent of increases in regulated area during the analyzed period or record. The differences in statistical results for different periods of record at a site also may be the result of differences in climate rather than differences in regulation. The period of record by type of streamflow modification is listed in table 1.

Description of Streamflow Statistics Tables

The statistical summaries of streamflow by station are presented in the appendix of this report. The summary streamflow statistics tables presented in the appendix for each station are preceded by a station description and include mean, median, and average percentage of annual runoff for annual and monthly discharges, magnitude and probability of exceedance of annual instantaneous peak flows, durations of daily mean flow, magnitude and probability of nonexceedance of annual low flows, and magnitude and probability of nonexceedance of seasonal low flows. An alphabetical index is provided to assist the reader, listed by stream and nearby municipality.

The beginning and end years are listed for complete water years in the period of record analyzed for mean and median annual and monthly discharges and durations of daily mean flow. The beginning and end years are listed for water years in the record analyzed for annual instantaneous peak flows. For flow-duration statistics, the beginning and end years are listed for water years that encompass the entire period of daily streamflow record, which may or may not be complete water years. The beginning and end years are listed for complete climatic years or seasons in the period of record analyzed for annual and seasonal low flows. Any gaps in the period of record at the site, or incomplete years of record is noted in the station description.

The mean daily streamflow discharges were retrieved by station number from the USGS National Water Information System (NWIS, *http://waterdata.usgs.gov/nwis*) and processed by using the computer program Input and Output for Watershed Data Management (IOWDM) (U.S. Geological Survey, 2002a). Mean and median annual and monthly statistics were computed by using the Automated Data Processing System (ADAPS), while flow-duration and low-flow statistics were computed by using the computer program Surface-Water

Table 1. Summary of streamflow period of record used in statistical analyses for selected continuous-record streamflow-gaging stations with at least 10 years of streamflow data from unregulated, regulated, irrigated, and urban basins within and near Oklahoma.

[I, irrigation; N, unregulated; R, regulated; U, urban; mi^2, square miles; dms, degrees, minutes, seconds; R., river; nr, near; Ck, Creek; abv, above; St, Street; Hwy, Highway; L, Little; SWS, subwatershed; blw, below; Ave, Avenue; N., North; S. South; SCS, Soil Conservation Service; Lk, Lake; OKC, Oklahoma City; L&D, Lock and Dam; Fk, Fork; No., number; WY, water year]

Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
1	07146500	Arkansas River at Arkansas City, Kans.	N	1903-05, 22-42	36,106	370323	970328
			R	1943-2007			
2	07148140	Arkansas River near Ponca City, Okla.	R	1977-93	38,923	364136	965548
3	07148350	Salt Fork Arkansas R. nr Winchester, Okla.	N	1960-93	856	365742	984655
4	07148400	Salt Fork Arkansas R. near Alva, Okla.	N	1938-51, 80-07	1,009	364854	983852
5	07149000	Medicine Lodge R. near Kiowa, Kans.	N	1938-50, 55, 60-07	903	370220	982814
6	07149500	Salt Fork Arkansas R. near Cherokee, Okla.	N	1941-50	2,439	364906	981908
7	07150500	Salt Fork Arkansas River near Jet, Okla.	N	1938-40	3,194	364509	980743
			R	1942-1993			
8	07151000	Salt Fork Arkansas R. at Tonkawa, Okla.	N	1936-40	4,520	364019	971833
			R	1942-07			
9	07151500	Chikaskia River near Corbin, Kans.	N	1951-65, 76-07	794	370744	973606
10	07152000	Chikaskia River near Blackwell, Okla.	N	1937-07	1,859	364841	971637
11	07152500	Arkansas River at Ralston, Okla.	N	1926-75	46,850	363015	964341
			R	1977-07			
12	07153000	Black Bear Creek at Pawnee, Okla.	N	1945-62	576	362037	964757
			R	1968-07			
13	07153100	Ranch Ck at Clev Dam nr Cleveland, Okla.	R	1946-63	21.9	361700	963435
14	07154500	Cimarron River near Kenton, Okla.[1]	N	1951-66	1,038	365536	1025731
			N,I	1971-07			
15	07155000	Cimarron R. abv Ute Ck nr Boise City, Okla.	N	1943-54	1,879	365446	1023708
16	07155590	Cimarron River near Elkhart, Kans.[1]	N	1972-81	2,406	370719	1015351
			N,I	1983-07			
17	07156900	Cimarron River near Forgan, Okla.	N	1966-77	4,220	370040	1002929
			N,I	1983-86, 88-07			

Table 1. Summary of streamflow period of record used in statistical analyses for selected continuous-record streamflow-gaging stations with at least 10 years of streamflow data from unregulated, regulated, irrigated, and urban basins within and near Oklahoma. —Continued

[I, irrigation; N, unregulated; R, regulated; U, urban; mi², square miles; dms, degrees, minutes, seconds; R., river; nr, near; Ck, Creek; abv, above; St, Street; Hwy, Highway; L, Little; SWS, subwatershed; blw, below; Ave, Avenue; N., North; S. South; SCS, Soil Conservation Service; Lk, Lake; OKC, Oklahoma City; L&D, Lock and Dam; Fk, Fork; No., number; WY, water year]

Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
18	07157000	Cimarron River near Mocane, Okla.	N	1943-65	4,305	365833	1001850
19	07157500	Crooked Creek nr Englewood, Kans.[1]	N	1943-63	813	370157	1001239
			N,I	1983-07			
20	07157900	Cavalry Creek at Coldwater, Kans.	N	1967-81	39	371556	992046
21	07157950	Cimarron River near Buffalo, Okla.	N	1961-94, 02-07	7,191	365107	991854
22	07157960	Buffalo Creek near Lovedale, Okla.	N	1967-93	408	364614	992200
23	07158000	Cimarron River near Waynoka, Okla.	N	1938-07	8,504	363102	985245
24	07158400	Salt Creek near Okeene, Okla.	N	1962-67, 75-79	196	360611	981136
25	07159000	Turkey Creek near Drummond, Okla.[2]	N	1948-1970	248	361905	980003
26	07159100	Cimarron River near Dover, Okla.	N	1974-07	10,787	355706	975451
27	07159750	Cottonwood Creek near Seward, Okla.	R	1974-82, 91-01	320	354849	972840
28	07160000	Cimarron River near Guthrie, Okla.	N	1938-76, 84-07	11,966	355514	972532
29	07160350	Skeleton Creek at Enid, Okla.	N	1997-07	70.3	362234	974800
30	07160500	Skeleton Creek near Lovell, Okla.	N	1950-93, 02-07	410	360336	973505
31	07161000	Cimarron River at Perkins, Okla.	N	1940-89	12,926	355727	970154
32	07161450	Cimarron River near Ripley, Okla.[3]	N	1988-07	13,053	355909	965443
33	07163000	Council Creek near Stillwater, Okla.	N	1935-93	31.0	360658	965203
34	07163500	Cimarron River at Oilton, Okla.	N	1935-45	13,743	360538	963452
35	07164000	Cimarron River at Mannford, Okla.	N	1939-50, 60-62	13,923	360932	962354
36	07164500	Arkansas River at Tulsa, Okla.	N	1926-64	62,074	360826	960022
			R	1965-07			
37	07164600	Joe Creek at 61st Street at Tulsa, Okla.	N,U	1989-07	12.2	360432	955737
38	07165500	Polecat Creek below Heyburn Reservoir near Heyburn, Okla.	N	1943-50	123	355642	961739
			R	1951-1979			

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi²)	Latitude (dms)	Longitude (dms)
39	07165562	Haikey Ck at 101St st South at Tulsa, Okla.	N,U	1989-07	17.8	360101	955055
40	07165565	L Haikey Ck at 101St st South at Tulsa, Okla.	N,U	1988-07	5.45	360103	955138
41	07165570	Arkansas River near Haskell, Okla.	R	1973-07	62,932	354915	953819
42	07170500	Verdigris R. at Independence, Kans.	N	1896-1903, 22-59	2,892	371325	954039
			R	1967-07			
43	07170700	Big Hill Creek near Cherryvale, Kans.	N	1958-80	37.0	371600	952808
			R	1982-07			
44	07171000	Verdigris River near Lenapah, Okla.	N	1939-59	3,639	365104	953509
			R	1967-07			
45	07171400	Verdigris River near Oologah, Okla.	R	1964-92	4,339	362514	954103
46	07172000	Caney River near Elgin, Kans.	N	1940-64	445	370014	961859
			R	1965-07			
47	07173000	Caney River near Hulah, Okla.	N	1938-49	733	365537	960506
			R	1952-93			
48	07174200	Little Caney River below Cotton Cr,	N	1944-64	502	365342	955809
		near Copan, Okla.[4]	R	1969-80			
49	07174400	Caney R abv Coon Ck at Bartlesville, Okla.	R	1986-07	1,392	364520	955819
50	07174600	Sand Creek at Okesa, Okla.	N	1960-93	139	364310	960756
51	07174700	Caney River near Ochelata, Okla.	R	1957-76	1,753	363826	955602
52	07175000	Double Creek SWS No. 5 nr Ramona, Okla.	R	1956-69	2.39	363050	955625
53	07175500	Caney River near Ramona, Okla.	N	1945-50	1,955	363032	955030
			R	1984-07			
54	07176000	Verdigris River near Claremore, Okla.	N	1936-62	6,534	361826	954152
			R	1964-07			
55	07176465	Birch Ck blw Birch Lake near Barnsdall, Okla.	R	1978-92	66.0	363200	960943

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
56	07176500	Bird Creek at Avant, Okla.	N	1946-76	364	362906	960336
			R	1978-07			
57	07176800	Candy Creek near Wolco, Okla.	N	1970-80	30.6	363206	960254
58	07177000	Hominy Creek near Skiatook, Okla.	N	1945-80	340	362055	960635
59	07177500	Bird Creek near Sperry, Okla.	N	1939-84	905	361642	955714
			R	1985-07			
60	07177650	Flat Rock Ck at Cincinnati Ave at Tulsa, Okla.	N,U	1989-07	8.20	361255	955942
63	07178040	Mingo Ck at 46th St North at Tulsa, Okla.	N,U	1988-97	59.9	361314	955130
64	07178200	Bird Ck at State Hwy 266 nr Catoosa, Okla.	R	1989-07	1,103	361323	954909
65	07178600	Verdigris River near Inola, Okla.	N	1945-62	7,911	360951	953711
			R	1964-70			
66	07184000	Lightning Creek near Mccune, Kans.	N	1939-46, 1960-07	197	371652	950157
67	07185000	Neosho River near Commerce, Okla.	N	1940-62	5,876	365543	945726
			R	1964-07			
68	07185095	Tar Ck at 22nd St Bridge at Miami, Okla.	N,U	1985-93, 2005-07	44.7	365400	945205
69	07185500	Stahl Creek near Miller, Mo.	N	1951-76	3.86	371136	935042
70	07185700	Spring River at LaRussell, Mo.	N	1958-73, 1976-80	306	370901	940341
71	07185765	Spring River at Carthage, Mo.	N	1967-80, 2002-07	425	371119	941933
72	07186000	Spring River near Waco, Mo.	N	1925-07	1,164	371444	943359
73	07186400	Center Creek near Carterville, Mo.	N	1963-91	232	370826	942257
74	07187000	Shoal Creek above Joplin, Mo.	N	1942-07	427	370123	943060
75	07188000	Spring River near Quapaw, Okla.	N	1940-07	2,510	365604	944449
76	07188500	Lost Creek at Seneca, Mo.	N	1949-59	42.0	365028	943630
77	07189000	Elk River near Tiff City, Mo.	N	1940-07	872	363753	943512

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
78	07189500	Neosho River near Grove, Okla.	N	1925-39	9,969	363645	944925
79	07189540	Cave Springs Branch nr S. West City, Mo.	N	1998-07	7.90	363250	943704
80	07189542	Honey Creek near South West City, Mo.	N	1998-07	48.2	363256	944101
81	07190500	Neosho River near Langley, Okla.	R	1940-07	10,335	362620	950254
82	07191000	Big Cabin Creek near Big Cabin, Okla.	N	1948-07	450	363406	950907
83	07191220	Spavinaw Creek near Sycamore, Okla.	N	1962-07	133	362005	943829
84	07191500	Neosho River near Chouteau, Okla.	N	1938-39	11,534	361346	951057
			R	1965-07			
85	07192000	Pryor Creek near Pryor, Okla.	N	1948-63	229	361652	951932
86	07192500	Neosho River near Wagoner, Okla.	N	1925, 38-39	12,307	355544	951608
			R	1940-49			
87	07193500	Neosho River below Fort Gibson Lake near Fort Gibson, Okla.	R	1954-89	12,495	355110	951344
88	07194500	Arkansas River near Muskogee, Okla.	N	1926-52	84,133	354610	951749
			R	1965-70			
89	07194800	Illinois River at Savoy, Ark.	N	1980-81, 86, 96-07	167	360611	942040
90	07195000	Osage Creek near Elm Springs, Ark.	N	1951-75, 1996-07	130	361319	941718
91	07195430	Illinois River South Of Siloam Springs, Ark.	N	1996-07	575	360631	943200
92	07195500	Illinois River near Watts, Okla.	N	1956-07	635	360748	943419
93	07195800	Flint Creek at Springtown, Ark.	N	1962-07	14.2	361522	942601
94	07195855	Flint Creek near West Siloam Springs, Okla.	R	1980-07	59.8	361258	943615
95	07195865	Sager Ck near West Siloam Springs, Okla.	N	1997-07	19	361206	943618
96	07196000	Flint Creek near Kansas, Okla.	N	1956-76, 80-90, 93-07	110	361111	944224
97	07196500	Illinois River near Tahlequah, Okla.	N	1936-07	959	355522	945524
98	07196900	Baron Fork at Dutch Mills, Ark.	N	1959-07	40.6	355248	942911

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
99	07196973	Peacheater Creek at Christie, Okla.	N	1993-03	25.0	355717	944146
100	07197000	Baron Fork at Eldon, Okla.	N	1949-07	307	355516	945018
101	07197360	Caney Creek near Barber, Okla.	N	1998-07	89.6	354705	945121
102	07198000	Illinois River near Gore, Okla.	N	1925, 40-51	1,626	353423	950407
			R	1953-07			
103	07228500	Canadian River at Bridgeport, Okla.	N	1945-64	20,475	353237	981903
			R	1970-07			
104	07229100	Canadian River near Noble, Okla.	N	1960-64	21,110	350455	972252
			R	1965-75			
105	07229200	Canadian River at Purcell, Okla.	R	1980-83, 86-07	21,138	350050	972050
106	07229300	Walnut Creek at Purcell, Okla.	N	1966-93	202	345956	972200
107	07230000	Little River below Lake Thunderbird near Norman, Okla.	N	1953-64	257	351318	971249
			R	1966-07			
108	07230500	Little River near Tecumseh, Okla.	N	1944-64	456	351021	965554
			R	1966-07			
109	07231000	Little River near Sasakwa, Okla.	N	1943-61	884	345755	963044
			R	1966-07			
110	07231500	Canadian River at Calvin, Okla.	N	1906, 39-42, 45-64	23,151	345840	961436
			R	1965-07			
111	07232000	Gaines Creek near Krebs, Okla.	N	1943-63	588	345900	953700
112	07232500	Beaver River near Guymon, Okla.[5]	N	1938-71	1,175	364317	1012921
			N,I	1978-93			
113	07232900	Coldwater Creek near Guymon, Okla.[5]	N,I	1981-07	725	363419	1012252
114	07233000	Coldwater Creek near Hardesty, Okla.[5]	N	1940-64	767	363838	1011238
115	07233500	Palo Duro Creek near Spearman, Tex.	N	1946-79, 2000-07	556	361208	1011820

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
116	07233650	Palo Duro Creek at Range, Okla.	R	1992-07	826	363238	1010450
117	07234000	Beaver River at Beaver, Okla.[5]	N	1938-71	3,685	364920	1003108
			R,I	1979-07			
118	07234100	Clear Creek near Elmwood, Okla.[1]	N	1966-93	170	363842	1003007
119	07234500	Beaver River near Fort Supply, Okla.	N	1938-50	5,068	363530	993530
120	07235000	Wolf Creek at Lipscomb, Tex.[5]	N	1938-41	475	361419	1001631
			R	1962-71			
			R,I	1978-07			
121	07236000	Wolf Creek near Fargo, Okla.[5]	N	1943-58	1,386	362357	993722
			N,I	1959-76			
122	07237000	Wolf Creek near Fort Supply, Okla.[1,5]	N,I	1938-41	1,498	363400	993305
			R	1943-71			
			R,I	1978-93			
123	07237500	North Canadian River at Woodward, Okla.[5]	N	1939-71	6,777	362612	991641
			R,I	1979-07			
124	07238000	North Canadian River near Seiling, Okla.[5]	N	1947-71	7,414	361100	985515
			R,I	1979-07			
125	07239000	North Canadian River at Canton, Okla.	N	1938-47	7,601	360437	983547
			R	1949-93, 2001-02			
126	07239300	North Canadian R. blw Weavers Ck nr Watonga,Okla.	R	1984-07	7,837	354843	982514
127	07239450	North Canadian River near Calumet, Okla.	R	1989-07	8,063	353701	980354
128	07239500	North Canadian River near El Reno, Okla.	N	1903-07, 38-47	8,143	353347	975726
			R	1949-07			
129	07241000	N. Canadian R. blw Lake Overholser nr OKC, Okla.	R	1953-07	8,323	352843	973947

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
130	07241500	N. Canadian R. near Oklahoma City, Okla.	R	1939-53, 1960	8,455	352940	972540
131	07241520	N. Canadian R. at Britton Rd at OKC, Okla.	R	1989-07	8,514	353356	972201
132	07241550	North Canadian River near Harrah, Okla.	R	1969-07	8,602	353001	971137
133	07242000	North Canadian R. near Wetumka, Okla.	R	1938-07	9,391	351556	961221
134	07242350	Deep Fork near Arcadia, Okla.	N,U	1970-86	105	353850	972135
			R,U	1988-93			
135	07242380	Deep Fork at Warwick, Okla.	N	1984-86	532	354051	970029
			R	1988-07			
136	07243000	Dry Creek near Kendrick, Okla.	N	1956-94	69.0	354655	965114
137	07243500	Deep Fork near Beggs, Okla.	N	1939-67	2,018	354026	960406
			R	1968-07			
138	07244000	Deep Fork near Dewar, Okla.	N	1938-50	2,307	352843	955257
139	07245000	Canadian River near Whitefield, Okla.	N	1939-63	37,876	351544	951413
			R	1965-07			
140	07245500	Sallisaw Creek near Sallisaw, Okla.	N	1943-63	182	352752	945143
			R	1964-76			
141	07247000	Poteau River at Cauthron, Ark.	N	1940-72	203	345508	941758
			R	1975-07			
142	07247015	Poteau River at Loving, Okla.	R	1993-07	269	345247	942902
143	07247250	Black Fork below Big Ck near Page, Okla.	N	1993-07	74.4	344625	943043
144	07247500	Fourche Maline near Red Oak, Okla.	N	1939-63	122	345445	950920
			R	1966-07			
145	07248500	Poteau River near Wister, Okla.	N	1939-48	993	345615	944254
			R	1950-84			

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
146	07249400	James Fork near Hackett, Ark.	N	1959-07	147	350945	942425
147	07249413	Poteau River near Panama, Okla.	R	1990, 93-07	1,767	350956	943910
148	07249500	Cove Creek near Lee Creek, Ark.	N	1951-70	35.3	354320	942428
149	07249985	Lee Creek near Short, Okla.[6]	N	1931-36, 50-07	420	353102	942751
150	07250000	Lee Creek near Van Buren, Ark.	N	1931-36, 51-92	426	352940	942658
151	07250550	Arkansas R. at James W. Trimble L&D, near Van Buren, Ark.[7]	N	1928-63	128,306	352056	941754
			R	1970-07			
152	07299300	Little Red River near Turkey, Tex.	N	1969-81	139	343227	1004613
153	07299540	Prairie Dog Town Fork Red River nr Childress, Tex.	N	1966-07	2,958	343409	1001137
154	07299570	Red River near Quanah, Tex.	N	1961-82	3,552	342447	994403
155	07299670	Groesbeck Creek at State Highway 6 near Quanah, Tex.	N	1963-07	303	342116	994424
156	07299890	Lelia Lake Ck blw Bell Ck near Hedley, Tex.	N	1998-07	74.0	345608	1004146
157	07300000	Salt Fork Red River near Wellington, Tex.	N	1953-66	1,013	345727	1001314
			R	1968-07			
158	07300500	Salt Fork Red River at Mangum, Okla.	N	1938-07	1,357	345130	993030
159	07301110	Salt Fork Red River near Elmer, Okla.	N	1980-07	1,669	342844	992255
160	07301300	North Fork Red River near Shamrock, Tex.	N	1965-79	703	351551	1001429
			R	1982-91, 2001-07			
161	07301410	Sweetwater Creek near Kelton, Tex.	N	1963-77	267	352823	1000714
			N,I	1978-07			
162	07301420	Sweetwater Ck near Sweetwater, Okla.	N,I	1987-07	404	352520	995808
163	07301500	North Fork Red River near Carter, Okla.[8]	N	1945-62	1,938	351005	993025
			R	1987-07			
164	07303000	North Fork Red River below Altus Dam near Lugert, Okla.	R	1978-2007	2,116	345322	991824
165	07303400	Elm Fork Of N. Fork Red R. near Carl, Okla.	N	1960-79, 95-07	416	350042	995412

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
166	07303500	Elm Fork Of N. Fork Red R. nr Mangum, Okla.	N	1906-07, 31, 38-47, 66-67, 69-70	838	345536	993000
167	07304500	Elk Creek near Hobart, Okla.[1]	N	1905-07, 50-66	549	345451	990649
			R	1967-93			
168	07305000	North Fork Red River near Headrick, Okla.	N	1906-07, 38-43	3,845	343817	990612
			R	1945-2007			
169	07305500	West Otter Creek at Snyder Lake near Mountain Park, Okla.	N	1904-07	132	344402	985910
			R	1951-71, 73-75			
			R	1976-02			
170	07307028	North Fork Red River near Tipton, Okla.	R	1985-07	4,292	343025	991228
171	07308500	Red River near Burkburnett, Tex.	N	1961-07	14,634	340636	983153
172	07311000	East Cache Creek near Walters, Okla.	N	1939-60	675	342144	981656
			R	1962-63, 70-07			
173	07311200	Blue Beaver Creek near Cache, Okla.	R	1965-03	24.6	343724	983348
174	07311500	Deep Red Creek near Randlett, Okla.	N	1950-07	617	341315	982710
175	07313000	Little Beaver Creek near Duncan, Okla.	N	1949-63	158	342935	980650
176	07313500	Beaver Creek near Waurika, Okla.	N	1954-76	563	341300	980257
			R	1978-93			
177	07315500	Red River near Terral, Okla.	N	1939-43	22,787	335243	975603
			R	1945-99, 2001-07			
178	07315700	Mud Creek near Courtney, Okla.	N	1961-07	572	340015	973400
179	07316000	Red River near Gainesville, Tex.	N	1937-43	24,846	334340	970935
			R	1945-07			
180	07316500	Washita River near Cheyenne, Okla.	N	1938-60	794	353735	994005
			R	1961-07			

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi²)	Latitude (dms)	Longitude (dms)
181	07319500	Sandstone Creek near Berlin, Okla.	R	1953-72	40.9	353026	993327
182	07323000	Sandstone Creek near Cheyenne, Okla.	R	1952-73	87.1	353310	993150
183	07324200	Washita River near Hammon, Okla.	R	1970-87, 90-07	1,387	353923	991821
184	07324400	Washita River near Foss, Okla.	R	1962-87, 90-07	1,551	353220	991010
185	07325000	Washita River near Clinton, Okla.	N	1936-60	1,977	353151	985800
			R	1962-07			
186	07325500	Washita River at Carnegie, Okla.	N	1938-60	3,129	350702	983349
			R	1962-07			
187	07325800	Cobb Creek near Eakly, Okla.	R	1969-07	132	351726	983538
188	07325850	Lake Creek near Eakly, Okla.	N	1970-77, 2006-07	59.6	351727	983144
189	07326000	Cobb Creek near Fort Cobb, Okla.	N	1940-58	307	350837	982633
			R	1960-07			
190	07326500	Washita River at Anadarko, Okla.	N	1903-08, 36-37	3,656	350503	981435
			R	1964-2007			
191	07327000	Sugar Creek near Gracemont, Okla.	N	1956-62	208	351030	981520
			R	1963-1974			
192	073274406	Little Washita R. above SCS Pond No. 26 near Cyril, Okla.	N	1995-07	3.44	345453	981502
193	07327442	Little Washita River near Cyril, Okla.	R	1993-07	11.6	345333	981358
194	07327447	Little Washita River near Cement, Okla.	R	1993-2007	61.9	345016	980727
195	07327490	Little Washita River near Ninnekah, Okla.[9]	N	1964-73	208	345641	975708
			R	1974-85			
196	07327550	Little Washita R. East of Ninnekah, Okla.	R	1993-07	236	345748	975357
197	07328000	Washita River near Tabler, Okla.	N	1940-52	4,706	345818	975221
198	07328070	Winter Creek near Alex, Okla.	N	1965-66	33.0	345935	974540
			R	1967-86			

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
199	07328100	Washita River at Alex, Okla.	R	1965-86, 89-07	4,787	345533	974625
200	07328180	North Criner Creek near Criner, Okla.	R	1990-07	7.33	345817	973504
201	07328500	Washita River near Pauls Valley, Okla.	N	1938-60	5,330	344517	971504
			R	1962-07			
202	07329000	Rush Creek at Purdy, Okla.	N	1940-53	145	344146	973555
			R	1983-93			
203	07329500	Rush Creek near Maysville, Okla.[10]	N	1955-59	206	344436	972418
			R	1960-76			
204	07329700	Wildhorse Creek near Hoover, Okla.	R	1970-95, 2001-07	604	343229	971449
205	07329852	Rock Creek at Sulphur, Okla.	R	1990-07	44.1	342943	965918
206	07329900	Rock Creek at Dougherty, Okla.	N	1957-66	138	342350	970210
207	07330500	Caddo Creek near Ardmore, Okla.	N	1937-50, 97	298	341433	970628
208	07331000	Washita River near Dickson, Okla.	N	1929-60	7,202	341400	965832
			R	1962-07			
209	07331600	Red R. at Denison Dam near Denison, Tex.[11]	N	1924-43	39,720	334908	963347
			R	1945-89, 98-07			
210	07332400	Blue River at Milburn, Okla.	N	1966-86	203	341502	963255
211	07332500	Blue River near Blue, Okla.	N	1937-07	476	335949	961427
212	07332600	Bois D'Arc Creek near Randolph, Tex.	N	1963-85	72	332832	961252
213	07333500	Chickasaw Creek near Stringtown, Okla.[12]	N	1956-68	32.7	342741	960136
214	07333800	Mcgee Creek near Stringtown, Okla.[12]	N	1957-68	87	342633	955210
215	07334000	Muddy Boggy Creek near Farris, Okla.	N	1938-86	1,087	341617	955443
			R	1988-07			
216	07335000	Clear Boggy Creek near Caney, Okla.	N	1943-61	720	341509	961219
			R	1965-89, 2006-07			

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217	07335300	Muddy Boggy Creek near Unger, Okla.	R	1983-88	2,273	340136	954500
			R	1989-07			
218	07335400	Sanders Creek near Chicota, Tex.	R	1968-86	175	335109	953240
219	07335500	Red River at Arthur City, Tex.	U	1906-11, 37-43	38,595	335230	953006
			R	1945-07			
220	07335700	Kiamichi River near Big Cedar, Okla.	N	1966-07	40.1	343818	943645
221	07335790	Kiamichi River near Clayton, Okla.	N	1982	708	343429	952026
			R	1984-07			
222	07336000	Tenmile Creek near Miller, Okla.	N	1956-70	68.0	341755	954440
223	07336200	Kiamichi River near Antlers, Okla.	N	1973-82	1,138	341455	953618
			R	1984-07			
224	07336500	Kiamichi River near Belzoni, Okla.	N	1926-72	1,423	341202	952903
225	07336750	Little Pine Creek near Kanawha, Tex.	N	1970-80	75.4	335026	951555
226	07336800	Pecan Bayou near Clarksville, Tex.	N	1963-78	100	334107	945941
227	07336820	Red River near De Kalb, Tex.	R	1969-99, 2005-07	41,412	334102	944139
228	07337500	Little River near Wright City, Okla.	N	1930-31, 45-68	645	340410	950247
			R	1970-89			
229	07337900	Glover River near Glover, Okla.	N	1962-07	315	340551	945407
230	07338500	Little River below Lukfata Creek, near Idabel, Okla.[13]	N	1947-68	1,226	335628	944530
			R	1970-07			
231	07338750	Mountain Fork at Smithville, Okla.	N	1992-07	320	342744	943806
232	07339000	Mountain Fork near Eagletown, Okla.	N	1925, 30-68	787	340230	943711
			R	1969-07			
233	07339500	Rolling Fork near DeQueen, Ark.	N	1949-73	182	340251	942446

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Site numbe (fig. 1)	Station number	Station name	Type of record (I/N/R/U)	Period of record (complete water year)	Contributing drainage area (mi^2)	Latitude (dms)	Longitude (dms)
234	07340000	Little River near Horatio, Ark.	N	1931-67	2,662	335510	942312
			R	1979-07			
235	07340300	Cossatot River near Vandervoort, Ark.	N	1968-07	89.6	342248	941411
236	07340500	Cossatot River near DeQueen, Ark.	N	1938-74	361	340242	941244
			R	1975-80			
237	07341000	Saline River near Dierks, Ark.	N	1939-74	124	340546	940506
238	07341200	Saline River near Lockesburg, Ark.	N	1964-74	256	335744	940342
			R	1976-07			

[1] Pre- and post-irrigation development as defined by Esralew and Lewis, oral commun., 2009

[2] Crest-stage partial-record site beginning WY 1971

[3] Statistical analyses include streamflow record from nearby station 07161000

[4] Statistical analyses include streamflow record from nearby station 07174000

[5] Pre- and post-irrigation development as defined in Wahl and Tortorelli (1997)

[6] Was 07250000, Lee Creek near Van Buren, Ark., prior to WY 1993 and above Lee Creek Reservoir

[7] Was 07250500, Arkansas River at Van Buren, Ark., prior to WY 1970

[8] Statistical analyses include streamflow record from nearby station 07302000

[9] Statistical analyses include streamflow record from nearby station 07327500

[10] Crest-stage partial-record site beginning WY 1977

[11] Statistical analyses include streamflow record from nearby station 07332000

[12] Crest-stage partial-record site beginning WY 1969

[13] Statistical analyses include streamflow record from nearby station 07338000

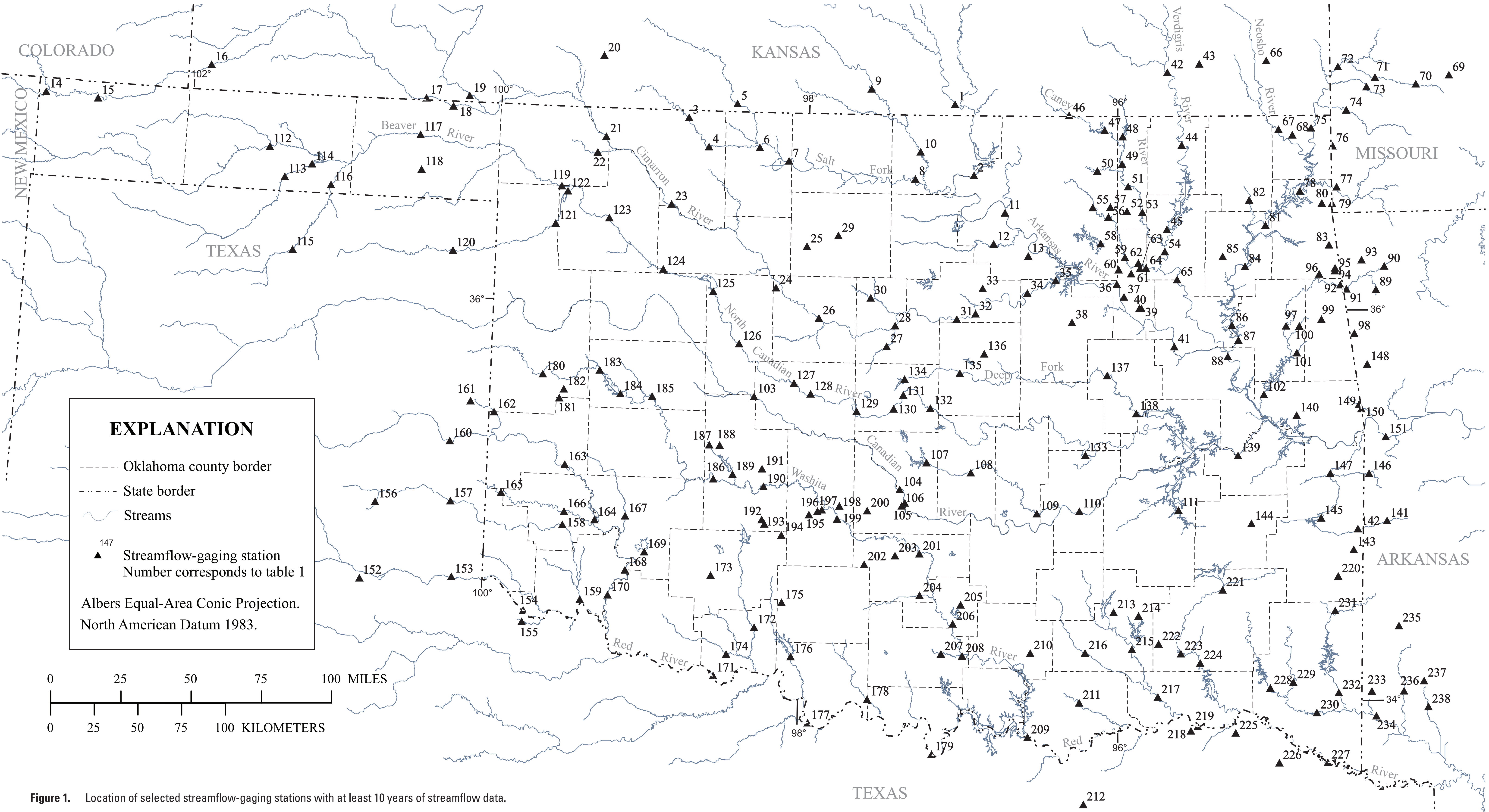

Figure 1. Location of selected streamflow-gaging stations with at least 10 years of streamflow data.

Statistics (SWSTAT) (U.S. Geological Survey, 2002b). Instantaneous peak-flow statistics were calculated by using an updated version of the Annual Flood Frequency Analysis computer program (PEAKFQ) (U.S. Geological Survey, 2007) and the methods of PEAKFQ reported by Tortorelli and McCabe (2001).

Station descriptions

The station descriptions include: station location, drainage area, period of record, and remarks. Remarks include information on the chronological history of regulating structures and comments on other factors that may affect unregulated flow.

Monthly and Annual Maximum, Minimum, Mean, Median, and Average Percentage of Annual Discharges

The annual statistics were computed on complete water years only, which is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which the water year ends; thus the water year ending September 30, 2007, is called the “water year 2007”. The average percentage of annual runoff, based on the mean, is left out of the annual row in all tables. This annual runoff is 100 but because of rounding and averaging, the monthly column amounts may not equal exactly100.

Annual Instantaneous Peak-Flow Frequency

Peak-flow frequency data are determined from an annual series of the highest instantaneous peak discharges for the period of record at a station. For example, an annual series of instantaneous peak flows consists of the highest instantaneous peak discharge during each year of record.

The statistical data were determined by fitting the logarithm of annual instantaneous peak flow to a Pearson Type III distribution (U.S. Geological Survey, 2007; Interagency Advisory Committee on Water Data, 1982). Results from the log Pearson Type III analyses are shown for recurrence intervals of 2, 5, 10, 25, 50, 100, and 500 years. The table also shows computed results in terms of exceedance probabilities in percent: 50, 20, 10, 4, 2, 1, and 0.2 percent, respectively. Exceedance probability is the reciprocal of the recurrence interval.

Each discharge in the table is an instantaneous peak flow that can be expected to be equaled or exceeded ***on the average*** once every “y” years, where “y” is the recurrence interval. Similarly, each instantaneous peak flow in the table has an “x”-percent probability of exceedance in any given year, where “x” is the exceedance probability, in percent. For example, the instantaneous peak flow corresponding to the 100-year recurrence interval can be expected to be equaled or exceeded ***on the average*** once every 100 years; similarly, an instantaneous peak flow corresponding to 1 percent exceedance probability will have a 1 percent chance of being equaled or exceeded in any given year. Skewness may be shown graphically as right or left relative to a normal distribution; in this report, skewness is described mathematically by a number, either negative or positive. Skew values are used in the calculation of the frequency curve statistics (Interagency Advisory Committee on Water Data, 1982; Tortorelli and McCabe, 2001). Skew values are commonly reported with instantaneous peak-flow statistics, but not with low- or high-flow statistics. The skew coefficient value used for each station analysis is listed at the bottom of the peak-flow frequency table. The skew is described as “Oklahoma weighted skew” if the skew was determined for those unregulated streamflow stations with drainage area of less than 2,510 square miles by weighting the station record skew with skew from a generalized skew map created for Oklahoma (fig. 2) by following the methods detailed in Bulletin 17B (Interagency Advisory Committee on Water Data, 1982). The mean square error of the Oklahoma generalized skew map (0.284) was used in the weighting process. The skew for those unregulated streamflow stations with a drainage area more than 2,510 square miles is described as “Water Resources Council weighted skew” if the skew was determined by weighting the station-record skew with skew from a generalized national skew map created by the U.S. Water Resources Council as described in Bulletin 17B (Interagency Advisory Committee on Water Data, 1982). The mean square error of the U.S.Water Resources Council generalized skew map was used in this weighting process (Interagency Advisory Committee on Water Data, 1982). The skew is described as “station skew” if station-record skew only was used for streamflow stations regulated by reservoirs and flood-water retarding structures and human modifications of streamflow. No station with a drainage area more than 2,510 square miles was considered as regulated solely by floodwater-retarding structures. A more detailed discussion of the log Pearson Type III analysis for instantaneous peak flow, including the use of historic years, and high and low outliers, may be found in Tortorelli and McCabe (2001).

Flow Duration

Flow-duration data are determined from all the daily mean discharges during the entire period of record and are used to plot a flow-duration curve (Searcy, 1959). A flow-duration curve is a cumulative frequency curve that shows how often a particular discharge has been equaled or exceeded based on the period of record. The flow-duration curve is not related to the sequences of flow, but does include the full range of daily mean discharges at the station. For example, the discharge on a flow-duration table that corresponds to a 10-percent exceedance is the amount that was equaled or exceeded on 10-percent of the flow record days without regard for when those days of exceedance occurred. The days of exceedance may not have been consecutive, and may be in a single year or during several years (Ludwig, 1992).

The U.S. Geological Survey computer program SWSTAT (U.S. Geological Survey, 2002b), computes flow-duration curve values by grouping the data into discharge size classes (bins). Daily mean flows for the period being analyzed are divided into 35 classes (or bins). SWSTAT uses log cycles to sort data because of the lognormal distribution of streamflow; therefore, the probability of choosing appropriate interval spacing is greater than if the data were separated into 35 equal-interval classes. The number of days in each class is computed for the entire record period, and the percentage of daily discharge in each class is determined. SWSTAT can report any specified flow-duration percentile by extrapolating from the class percentiles, and a log-probability plot (tabular and graphical) of the class percentiles is output by the program. For this study, the daily mean discharges that are equaled or exceeded 1, 2, 5, 10, 15, 20, 30, 40, 50, 60, 70, 80, 90, 95, 98, and 99 percent of the time were determined and are reported in the station tables. These discharges can be used to construct a flow-duration curve by plotting exceedance probability on the x-axis and discharge on the y-axis.

Flow-duration statistics in Tortorelli (2002) were determined for gages with continuous daily flow record through 1999. Flow-duration statistics in this report may differ from those statistics reported in Tortorelli (2002) because of a difference in the way that the daily mean flow classes were determined in SWSTAT. In Tortorelli (2002), SWSTAT was defaulted to allow for a minimum class measurement of 1 cubic foot per second (ft^3/s) and a maximum class measurement of 10,000 ft^3/s, regardless of the range of daily flows observed at a gage. For this study, class limits were set so that the minimum and maximum class discharge values were close to the range of observed daily flows for the period of record analyzed. Most of the substantial differences in discharge values in this report when compared to the previous study (Tortorelli, 2002) can be observed at the upper end (flow that is exceeded 10 percent or less of the time) and lower end (flow that is exceeded 90 percent or more of the time) of the flow-duration curve.

Annual and Seasonal Low-Flow Frequencies

Annual low-flow frequency data are determined from an annual series of the lowest mean discharges for some specified "n"-day consecutive time period. For example, an annual series of 7-day low flows consists of the lowest mean discharge during any 7-day consecutive period during each year of record. The data in the annual low-flow frequency tables were produced by fitting the logarithms of annual "n"-day low flows to a Pearson Type III distribution (U.S. Geological Survey, 2002b).

Seasonal low-flow frequency data are determined from an annual series of the lowest mean discharges for each of the spring (April through May), summer (June through October), and winter (November through March) seasons for some specified "n"-day consecutive time period. The data in the seasonal low-flow frequency tables were produced by fitting the logarithms of the annual series of seasonal "n"-day low flows to a Pearson Type III distribution.

The low-flow frequency tables report lowest mean discharges for consecutive periods of 1, 3, 7, 10, 30, and 60 days and at recurrence intervals of 2, 5, 10, and 20 years, which correspond to nonexceedance probabilities of 50, 20, 10, and 5 percent, respectively.

Each discharge in the annual or seasonal low-flow table is a mean low flow in the year or season for an "n"-day consecutive period of days that can be expected to be lower ***on the average*** once every "y"- years, where "y" is the recurrence interval. Similarly, each low flow in the table has an "x"-percent probability that, in any given year, a smaller value "n"-day mean low flow will occur, where "x" is the nonexceedance probability, in percent. For example, the low-flow corresponding to the 2-year recurrence interval and 7-day consecutive period of days can be expected to be lower ***on the average*** once every 2-years; similarly, a low flow corresponding to 50-percent nonexceedance probability and 7-day consecutive days will have a 50-percent chance of being lower in any given year.

For any "n"-day period, discharges decrease for increasing recurrence interval and decreasing nonexceedance probability. Conversely, for any given recurrence interval, or nonexceedance probability, discharge increases with increasing "n"-day period.

Annual low flows are computed on the basis of a climatic year (April 1 to March 31); thus the period of record for a climatic year is one year less than for a water year (Riggs, 1972). Seasonal low flows are computed on the basis of the seasons defined earlier. The values listed in the tables were computed from U.S. Geological Survey computer program SWSTAT (U.S. Geological Survey, 2002b) utilizing days of zero flow rather than omitting days of zero flow as was done prior to Heimann and Tortorelli (1988). Values may differ, because of this updated method of computation, from those in the study by Huntzinger (1978a), because the frequency analysis for that report was determined graphically and utilized only flows greater than zero. These differences can be large for streams in drier regions of Oklahoma.

The low-flow frequency curves for given "n"-day periods were computed independently. Inclusion of zero-flow days in the independent analyses resulted in some anomalies in the frequency tables. The anomalies included "n"-day low flows that did not consistently decrease with increasing recurrence interval, or low-flows for a given recurrence interval that did not consistently increase with increasing "n"-day period. These anomalies in the data are termed data reversals and were adjusted to produce consistent tabular results. Also some seasonal low flows for a given "n"-day period and recurrence interval were determined to be smaller than the annual low flows, which were usually because of rounding of values. Therefore, annual low flows were adjusted downward slightly to match the lowest seasonal low flows. An average of 5 low flows per station analysis were adjusted.

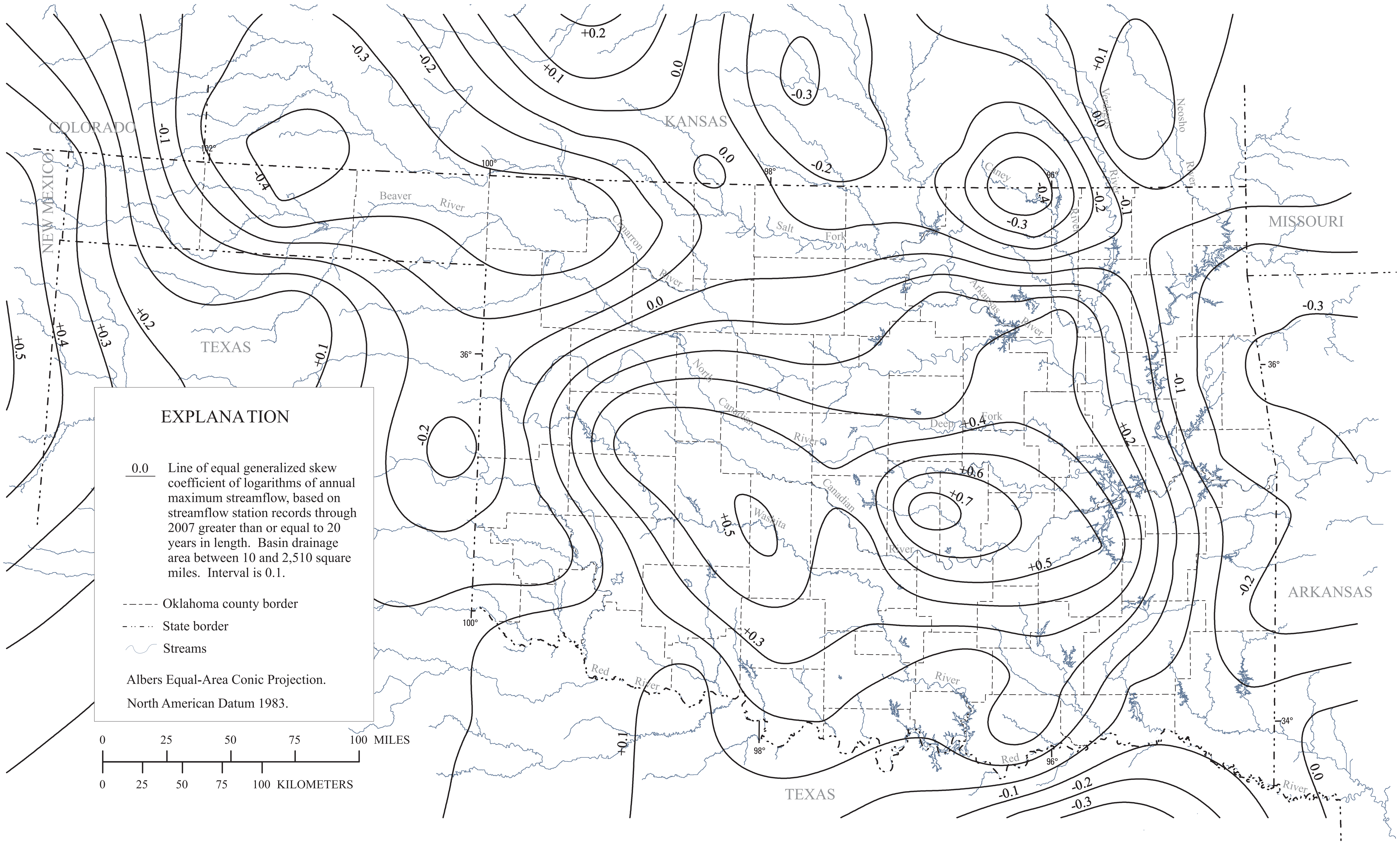

Figure 2. Generalized skew coefficients of logarithms of annual maximum streamflow of Oklahoma streams with drainage area less than or equal to 2,510 square miles.

Summary

Information about monthly and annual flow, peak flow, flow-duration, and low-flow statistics is essential to water-management agencies dealing with problems related to irrigation, municipal and industrial water supplies, and fish and wildlife conservation. Low-flow statistics are particularly valuable to assess the capability of a stream to receive and assimilate treated wastewater. Low-flow statistics are used in granting wastewater permits and determining total maximum daily loads of streams. Annual and seasonal 7-day, 2-year low-flow streamflows are used as part of the criteria for granting wasteload allocations for permits and is specifically cited in State statutes. Other low-flow durations (1, 3, 10, 30, and 60 days) and frequencies (5, 10, and 20 years) also are useful to characterize streamflow at a site. Knowledge of high-flow and peak-flow statistics is required for the safe and economical design of highway bridges, culverts, dams, levees, and other structures on or near streams and for disaster planning. Flood-plain management programs and flood-insurance rates also are based on peak-flow magnitude and frequency information. The U.S. Geological Survey, in cooperation with the Oklahoma Water Resources Board, conducted an investigation to update streamflow statistics in Oklahoma by using streamflow data through 2007.

The purpose of this report is to: (1) update mean annual flow, annual low- and high-flow statistics, and flow-duration statistics for each streamflow gaging station with 10 years or more of streamflow record; (2) present seasonal low-flow statistics of these gaging stations for three Oklahoma seasons: (a) spring (April 1–May 31), (b) summer (June 1–October 31), and (c) winter (November 1–March 31); (3) update peak-flow statistics of these gaging stations; and (4) present analyses of unregulated and regulated periods of record separately, to reconcile changes in streamflow because of regulating structures and other human modifications of streamflow.

Statistical summaries of streamflow records through 2007 for gaging stations in Oklahoma and parts of adjacent states are presented. Only continuous-record sites with at least 10 years of unregulated or regulated data were selected for analysis. A total of 238 streamflow-gaging stations were selected — 182 in Oklahoma and 56 in adjacent states. Streamflow at 120 of the gaging stations is affected by regulation, urbanization, or irrigation well development for specific periods. Sixty of the 120 gaging stations were analyzed for unregulated and human-modified periods. Six of those sixty unregulated gaging stations were analyzed for periods of unregulated flow and separate periods of unregulated with irrigation. Five of the regulated gaging stations in the 120 gaging stations were analyzed for a separate period of flow regulation with irrigation, and eight gaging stations were analyzed for periods of unregulated flow that were affected by urban development.

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