

IOWA RIVER BASIN
05464000 CEDAR RIVER AT WATERLOO, IOWA

LOCATION.--Lat 42°29'44", long 92°20'03" referenced to North American Datum of 1927, in SE 1/4 NW 1/4 NW 1/4 sec.25, T.89 N., R.13 W., Black Hawk County, IA, Hydrologic Unit 07080205, on left bank near end of East 7th Street, 0.3 mi upstream from bridge on 11th Street in Waterloo, 1.1 mi downstream from Black Hawk Creek, and 162.3 mi upstream from mouth.

DRAINAGE AREA.--5,146 mi².

PERIOD OF RECORD.--Discharge records from October 1940 to current year. Prior to April 1941, monthly mean discharge for some periods published in WSP 1308.

GAGE.--Water-stage recorder. Datum of gage is 824.14 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Minor diurnal fluctuations during periods of low flow due to operations of power plant located 30.3 mi upstream.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of March 16, 1929, reached a stage of about 20.0 ft, determined by U.S. Army Corps of Engineers, from information by city of Waterloo, discharge about 65,000 ft³/s. Flood of April 2, 1933, reached a stage of about 19.5 ft, from information by city of Waterloo, discharge about 61,000 ft³/s.

A summary of all available data for this streamgage is provided through the USGS National Water Information System web interface (NWISWeb). The following link provides access to current/historical observations, daily data, daily statistics, monthly statistics, annual statistics, peak streamflow, field measurements, field/lab water-quality samples, and the latest water-year summaries. Data can be filtered by parameter and/or dates, and can be output in various tabular and graphical formats.

http://waterdata.usgs.gov/nwis/inventory/?site_no=05464000

The USGS WaterWatch Toolkit is available at:

http://waterwatch.usgs.gov/?id=ww_toolkit

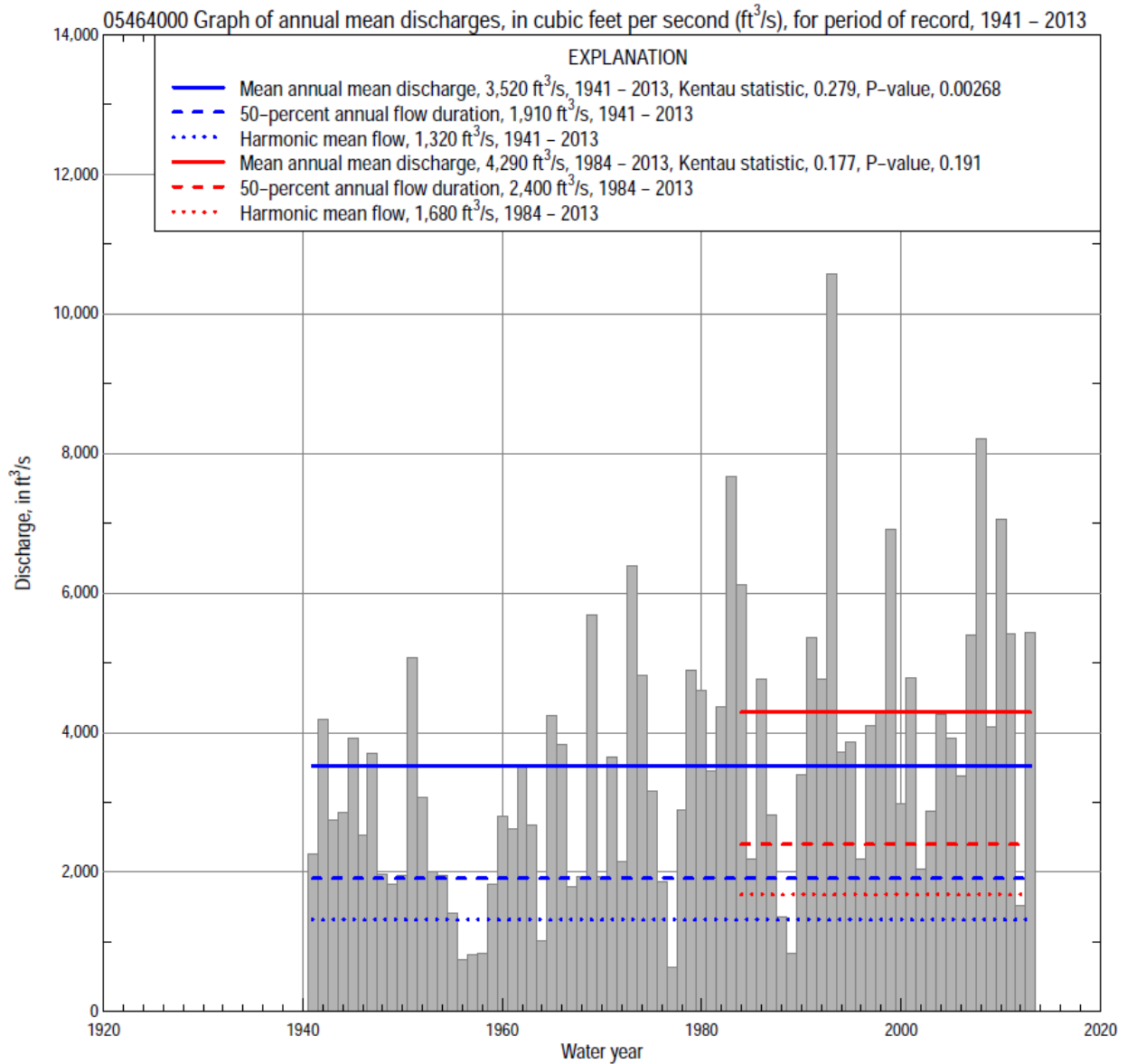
Tools for summarizing streamflow information include the duration hydrograph builder, the cumulative streamflow hydrograph builder, the streamgage statistics retrieval tool, the rating curve builder, the flood tracking chart builder, the National Weather Service Advanced Hydrologic Prediction Service (AHPS) river forecast hydrograph builder, and the raster-hydrograph builder. Entering the above number for this streamgage into these toolkit webpages will provide streamflow information specific to this streamgage.

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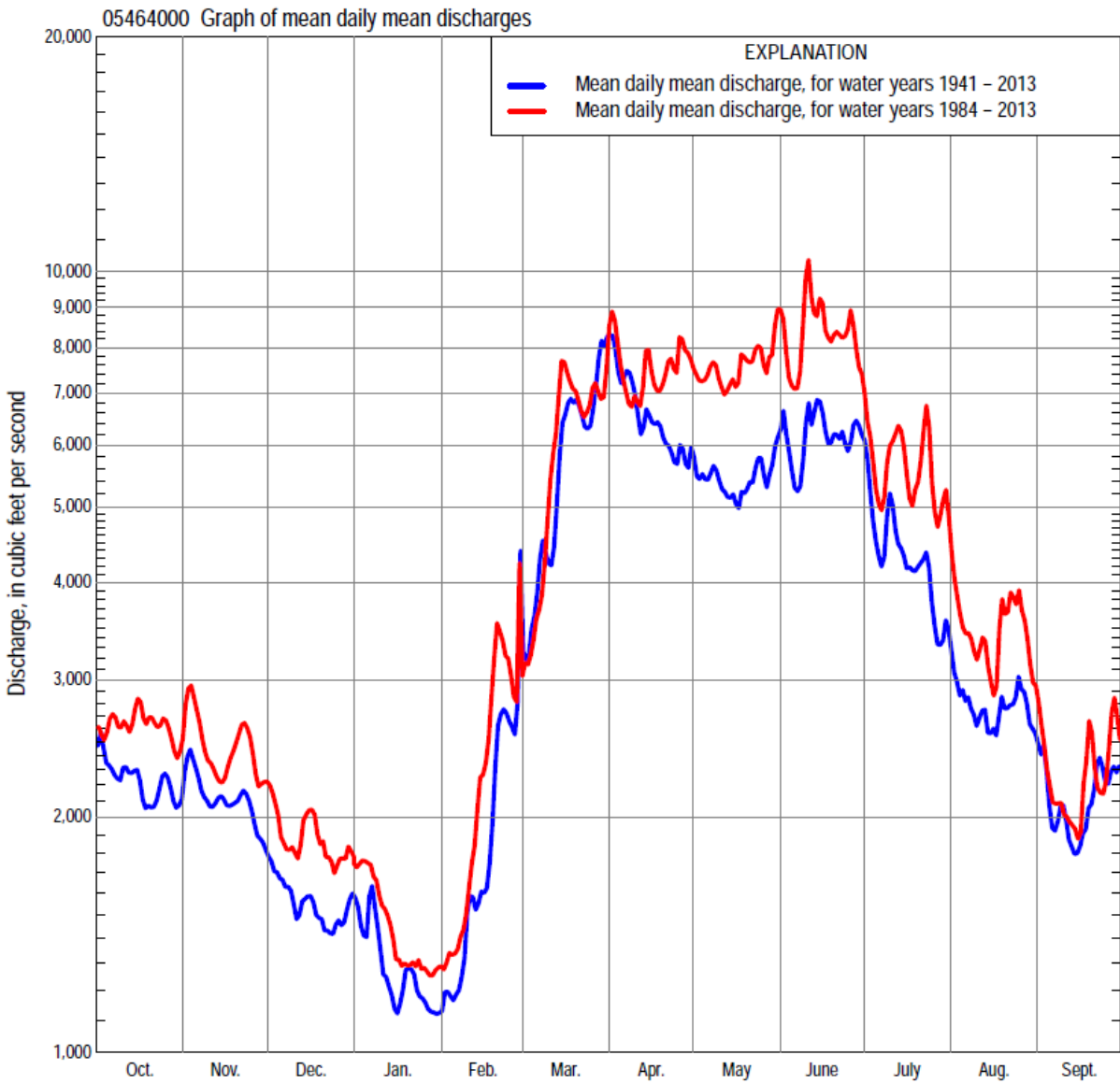
A description of the statistics presented for this streamgage is available in the main body of the report at:

<http://dx.doi.org/10.3133/ofr20151214>

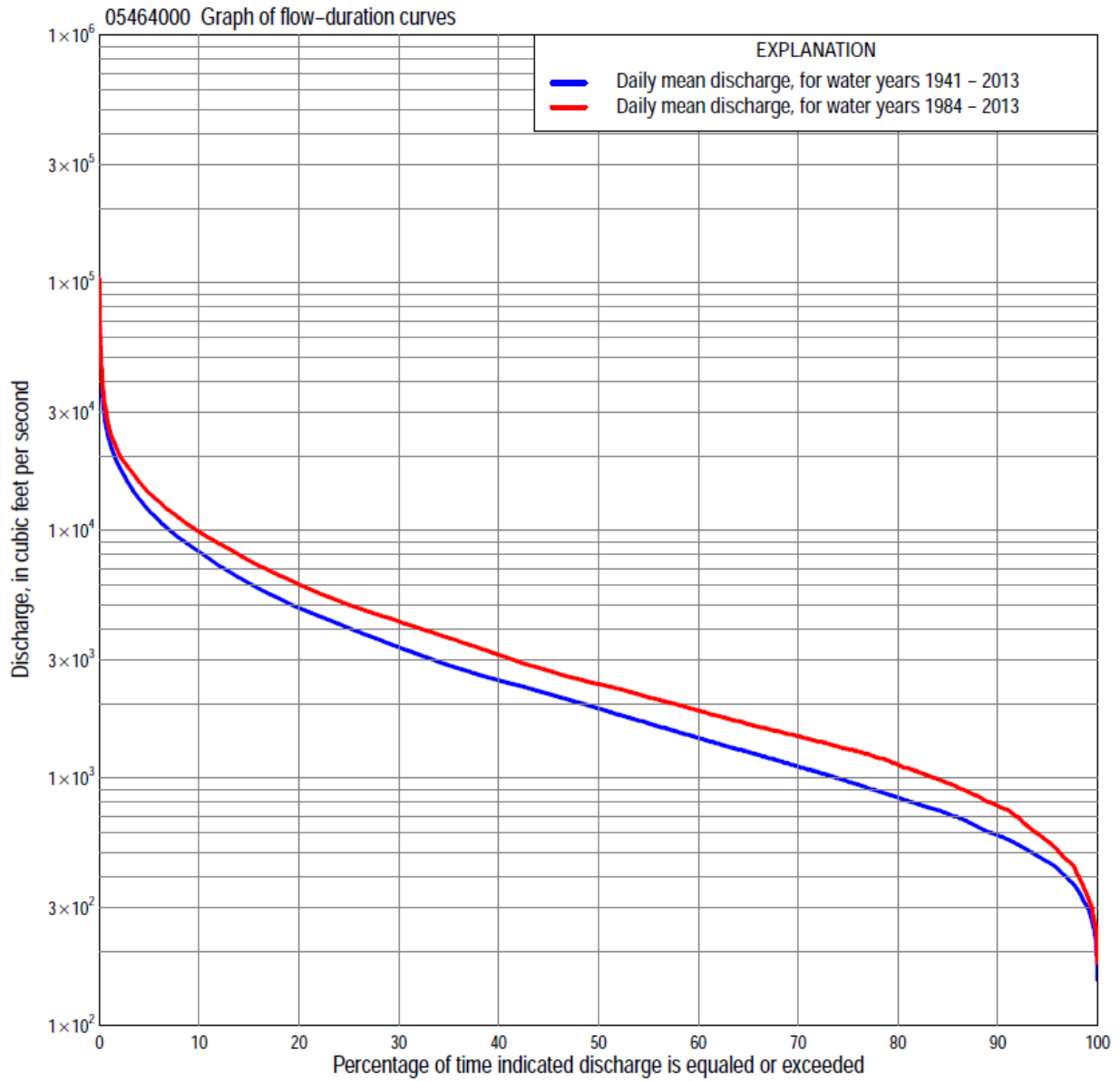
A link to other streamgages included in this report, a map showing the location of the streamgages, information on the programs used to compute the statistical analyses, and references are included in the main body of the report.



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Statistics Based on the Entire Streamflow Period of Record

05464000 Monthly and annual flow durations, based on 1941–2013 period of record (73 years)

Percentage of days discharge equaled or exceeded	Discharge (cubic feet per second)												Annual flow durations		
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual	Kentau statistic	P-value
99	345	345	240	230	192	449	686	591	468	411	339	373	300	0.229	0.004
98	358	375	260	255	267	525	762	707	524	471	416	396	352	0.245	0.002
95	417	431	364	300	315	697	1,000	962	818	618	505	464	460	0.265	0.001
90	528	545	442	386	450	824	1,420	1,260	1,120	852	600	552	587	0.259	0.001
85	631	618	520	474	540	962	1,790	1,540	1,500	1,020	717	658	717	0.263	0.001
80	730	750	600	530	600	1,330	2,200	1,930	1,810	1,200	834	773	834	0.254	0.001
75	778	869	693	591	672	1,600	2,480	2,230	2,090	1,420	962	884	966	0.257	0.001
70	862	992	778	640	726	1,900	2,750	2,450	2,460	1,730	1,110	987	1,110	0.242	0.002
65	964	1,150	926	725	770	2,220	3,090	2,710	2,810	2,010	1,220	1,070	1,270	0.233	0.004
60	1,080	1,270	1,040	800	825	2,590	3,520	2,990	3,230	2,260	1,360	1,150	1,450	0.231	0.004
55	1,280	1,420	1,130	880	881	2,940	3,920	3,330	3,590	2,500	1,520	1,220	1,660	0.268	0.001
50	1,400	1,550	1,200	950	998	3,370	4,520	3,820	4,030	2,820	1,690	1,320	1,910	0.269	0.001
45	1,550	1,700	1,300	1,030	1,110	3,820	5,030	4,190	4,490	3,170	1,880	1,440	2,190	0.283	0.000
40	1,730	1,870	1,390	1,100	1,300	4,420	5,800	4,650	5,210	3,570	2,070	1,570	2,480	0.306	0.000
35	2,020	2,060	1,540	1,200	1,500	5,020	6,580	5,230	5,920	3,980	2,260	1,760	2,850	0.298	0.000
30	2,300	2,320	1,700	1,370	1,730	5,820	7,470	5,980	6,730	4,510	2,490	2,000	3,380	0.306	0.000
25	2,650	2,570	1,930	1,600	1,950	7,040	8,500	6,760	7,810	5,070	2,810	2,290	4,030	0.321	0.000
20	3,270	2,900	2,280	1,800	2,290	8,720	9,550	7,880	8,900	5,860	3,450	2,640	4,860	0.309	0.000
15	4,050	3,550	2,510	2,050	2,900	10,900	11,000	9,240	10,300	7,080	4,120	3,180	6,120	0.297	0.000
10	4,900	4,400	3,010	2,390	3,840	13,800	13,400	11,400	13,000	9,010	5,310	4,300	8,190	0.287	0.000
5	6,730	5,770	4,000	3,120	6,000	18,600	18,300	15,400	18,100	13,000	9,810	6,920	12,000	0.234	0.004
2	9,730	7,830	5,430	4,700	10,700	25,500	25,900	20,700	25,300	20,400	16,700	10,000	18,100	0.150	0.061
1	11,600	9,740	6,140	6,280	16,700	30,700	35,800	25,500	33,200	25,900	20,400	13,900	23,200	0.090	0.263

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05464000 Annual exceedance probability of instantaneous
 peak discharges, in cubic feet per second (ft³/s), based on
 the Weighted Independent Estimates method,

Annual exceed- ance probability	Recur- rence interval (years)	Discharge (ft ³ /s)	95- percent lower confi- dence interval (ft ³ /s)	95- percent upper confi- dence interval (ft ³ /s)
0.500	2	25,800	22,400	29,700
0.200	5	43,200	37,500	49,900
0.100	10	55,000	47,100	64,300
0.040	25	71,100	59,200	85,400
0.020	50	82,800	67,100	102,000
0.010	100	94,100	73,900	120,000
0.005	200	110,000	83,200	145,000
0.002	500	123,000	88,900	170,000

and based on the expected moments algorithm/multiple
 Grubbs-Beck analysis computed using a historical period
 length of 85 years (1929–2013)

0.500	2	25,900	21,700	30,100
0.200	5	43,600	37,400	51,800
0.100	10	56,600	47,900	69,400
0.040	25	74,000	61,200	96,200
0.020	50	87,500	70,700	120,000
0.010	100	101,000	79,800	148,000
0.005	200	116,000	88,500	181,000
0.002	500	135,000	99,300	233,000
Kantau statistic		0.008		
P-value		0.924		
Begin year		1941		
End year		2013		
Number of peaks		73		

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05464000 Annual exceedance probability of high discharges, based on 1941–
 2013 period of record (73 years)

[ND, not determined]

Annual exceedance probability	Recurrence interval (years)	Maximum average discharge (ft ³ /s) for indicated number of consecutive days				
		1	3	7	15	30
0.990	1.01	ND	2,340	2,000	1,610	1,320
0.950	1.05	ND	4,930	4,130	3,310	2,720
0.900	1.11	ND	7,090	5,870	4,670	3,820
0.800	1.25	ND	10,700	8,720	6,870	5,560
0.500	2	ND	21,300	16,900	13,000	10,200
0.200	5	ND	37,800	29,200	21,800	16,400
0.100	10	ND	49,000	37,300	27,400	20,000
0.040	25	ND	62,500	46,800	33,700	23,900
0.020	50	ND	72,100	53,500	38,000	26,300
0.010	100	ND	81,100	59,600	41,900	28,500
0.005	200	ND	89,700	65,300	45,400	30,300
0.002	500	ND	100,000	72,200	49,600	32,400
Kantau statistic		0.023	0.055	0.101	0.161	0.187
P-value		0.779	0.496	0.207	0.045	0.019

05464000 Annual nonexceedance probability of low discharges, based on April 1941
 to March 2013 period of record (72 years)

Annual nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	157	163	166	176	193	212	220	236	248
0.02	50	185	193	199	210	230	253	266	286	307
0.05	20	235	248	259	273	297	328	351	380	421
0.10	10	289	307	323	341	370	410	446	487	554
0.20	5	369	393	417	441	478	535	593	653	765
0.50	2	573	611	653	693	755	870	999	1,120	1,380
0.80	1.25	863	915	973	1,040	1,150	1,380	1,640	1,880	2,390
0.90	1.11	1,060	1,110	1,180	1,250	1,410	1,740	2,100	2,430	3,150
0.96	1.04	1,300	1,350	1,420	1,520	1,730	2,200	2,720	3,190	4,180
0.98	1.02	1,480	1,530	1,590	1,700	1,970	2,560	3,190	3,780	5,000
0.99	1.01	1,650	1,700	1,750	1,880	2,190	2,920	3,680	4,390	5,840
Kantau statistic		0.267	0.248	0.287	0.299	0.300	0.262	0.256	0.230	0.204
P-value		0.001	0.002	0.000	0.000	0.000	0.001	0.002	0.004	0.011

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05464000 Annual nonexceedance probability of seasonal low discharges, based on October 1940 to
September 2013 period of record (73 years)

Annual nonexceedance probability	Recurrence interval (years)	Minimum average discharge (cubic feet per second) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	159	170	180	200	313	342	355	430
0.02	50	190	204	215	236	391	429	449	544
0.05	20	246	267	279	303	543	597	632	770
0.10	10	308	337	351	379	721	794	851	1,040
0.20	5	402	443	461	498	1,000	1,110	1,210	1,480
0.50	2	654	731	766	846	1,820	2,030	2,280	2,840
0.80	1.25	1,040	1,170	1,250	1,450	3,180	3,570	4,160	5,240
0.90	1.11	1,300	1,490	1,610	1,920	4,180	4,710	5,610	7,110
0.96	1.04	1,650	1,900	2,090	2,610	5,530	6,250	7,630	9,750
0.98	1.02	1,910	2,220	2,460	3,190	6,570	7,460	9,260	11,900
0.99	1.01	2,180	2,540	2,860	3,820	7,650	8,710	11,000	14,200
Kantau statistic		0.231	0.243	0.246	0.208	0.314	0.307	0.304	0.301
P-value		0.004	0.002	0.002	0.009	0.000	0.000	0.000	0.000
		July-August-September				October-November-December			
0.01	100	260	297	311	339	167	198	205	228
0.02	50	298	336	352	384	200	237	248	276
0.05	20	366	407	425	467	259	309	328	364
0.10	10	442	486	508	561	325	390	419	466
0.20	5	559	609	637	711	426	514	559	624
0.50	2	889	960	1,020	1,160	705	861	953	1,080
0.80	1.25	1,450	1,570	1,700	2,020	1,150	1,410	1,580	1,850
0.90	1.11	1,890	2,060	2,270	2,760	1,470	1,820	2,050	2,430
0.96	1.04	2,520	2,790	3,120	3,910	1,910	2,370	2,670	3,240
0.98	1.02	3,050	3,420	3,880	4,950	2,250	2,800	3,160	3,890
0.99	1.01	3,630	4,110	4,740	6,160	2,610	3,250	3,660	4,580
Kantau statistic		0.244	0.234	0.230	0.224	0.222	0.206	0.218	0.221
P-value		0.002	0.004	0.004	0.005	0.006	0.010	0.007	0.006

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05464000 CEDAR RIVER AT WATERLOO, IOWA

Statistics Based on the 1984–2013 Streamflow Period of Record

05464000 Monthly and annual flow durations, based on 1984–2013 period of record (30 years)

Percentage of days discharge equaled or exceeded	Discharge (cubic feet per second)												Annual flow durations		
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Annual	Kentau statistic	P-value
99	350	366	230	260	300	430	1,000	851	494	403	307	401	333	-0.025	0.858
98	355	380	260	270	323	535	1,040	999	578	455	320	437	405	-0.034	0.803
95	452	557	474	459	474	776	1,230	1,480	885	638	498	472	555	-0.028	0.844
90	700	813	582	560	619	1,430	1,570	2,180	1,500	896	685	772	771	-0.018	0.901
85	792	974	724	637	700	1,660	2,270	2,480	2,240	1,390	1,040	904	951	-0.032	0.817
80	921	1,160	900	742	757	1,870	2,520	2,810	2,830	1,930	1,280	1,010	1,130	-0.037	0.789
75	1,030	1,250	1,040	820	815	2,110	2,870	3,320	3,380	2,240	1,490	1,080	1,310	-0.034	0.803
70	1,270	1,380	1,140	897	880	2,500	3,420	3,880	3,770	2,510	1,640	1,170	1,480	-0.076	0.568
65	1,360	1,480	1,230	978	982	2,790	3,800	4,260	4,220	2,870	1,830	1,250	1,650	-0.080	0.544
60	1,450	1,570	1,310	1,040	1,100	2,990	4,460	4,780	4,700	3,230	1,990	1,330	1,870	-0.057	0.668
55	1,550	1,680	1,390	1,100	1,250	3,340	4,880	5,180	5,380	3,630	2,110	1,430	2,120	0.025	0.858
50	1,650	1,870	1,500	1,170	1,400	3,750	5,640	5,710	6,050	3,980	2,250	1,490	2,400	0.037	0.789
45	1,810	2,070	1,610	1,300	1,600	4,280	6,500	6,300	6,820	4,390	2,390	1,580	2,710	0.064	0.630
40	2,070	2,330	1,790	1,400	1,740	4,680	7,180	6,850	7,490	4,790	2,570	1,710	3,150	0.117	0.372
35	2,310	2,560	2,080	1,600	1,820	5,220	8,070	7,460	8,350	5,240	2,800	1,890	3,680	0.122	0.354
30	2,710	2,820	2,320	1,760	1,950	5,880	8,810	8,380	9,320	5,780	3,200	2,100	4,300	0.140	0.284
25	3,470	3,150	2,440	1,910	2,200	6,590	9,860	9,260	10,300	6,420	3,620	2,340	5,000	0.168	0.199
20	4,030	3,550	2,600	2,050	2,830	8,450	10,800	10,500	11,800	7,420	4,070	2,620	6,050	0.168	0.199
15	4,520	3,970	3,000	2,210	3,550	10,600	12,500	12,500	13,500	8,950	4,680	3,080	7,560	0.177	0.175
10	5,430	4,610	3,350	2,530	4,970	13,600	15,200	14,900	17,200	11,800	6,580	4,760	9,880	0.209	0.108
5	7,770	5,790	4,410	3,230	7,290	17,600	19,100	19,400	22,400	16,400	11,400	7,070	14,100	0.209	0.108
2	10,900	7,740	5,570	4,090	11,200	23,400	27,300	27,300	30,500	24,400	18,700	9,940	20,300	0.177	0.175
1	12,400	9,170	6,140	4,720	15,500	32,000	35,800	38,000	40,300	32,600	23,600	14,100	25,700	0.191	0.143

IOWA RIVER BASIN
05464000 CEDAR RIVER AT WATERLOO, IOWA

05464000 Annual exceedance probability of high discharges, based on 1984–2013 period of record (30 years)

Annual exceedance probability	Recurrence interval (years)	Maximum average discharge (ft ³ /s) for indicated number of consecutive days				
		1	3	7	15	30
0.990	1.01	3,860	3,760	3,500	2,830	2,430
0.950	1.05	6,620	6,370	5,730	4,770	4,020
0.900	1.11	8,790	8,400	7,420	6,210	5,180
0.800	1.25	12,400	11,700	10,100	8,460	6,940
0.500	2	23,400	21,800	18,100	14,700	11,600
0.200	5	43,800	39,900	31,700	24,600	18,500
0.100	10	60,300	54,400	42,300	31,500	23,100
0.040	25	84,600	75,400	57,300	40,600	28,800
0.020	50	105,000	92,800	69,500	47,500	32,900
0.010	100	127,000	112,000	82,600	54,500	37,000
0.005	200	152,000	132,000	96,600	61,500	41,000
0.002	500	187,000	162,000	116,000	70,800	46,100
Kantau statistic		0.177	0.182	0.191	0.191	0.182
P-value		0.175	0.164	0.143	0.143	0.164

05464000 Annual nonexceedance probability of low discharges, based on April 1983 to March 2013 period of record (30 years)

Annual nonexceedance probability	Recurrence interval (years)	Minimum average discharge (ft ³ /s) for indicated number of consecutive days								
		1	3	7	14	30	60	90	120	183
0.01	100	183	197	206	225	248	259	271	286	287
0.02	50	220	237	254	277	304	321	339	361	372
0.05	20	287	310	338	368	403	433	466	501	540
0.10	10	359	386	427	464	507	555	605	658	734
0.20	5	461	494	551	598	652	729	811	891	1,030
0.50	2	709	749	830	898	983	1,140	1,320	1,470	1,810
0.80	1.25	1,020	1,060	1,130	1,220	1,350	1,640	1,970	2,220	2,860
0.90	1.11	1,210	1,230	1,290	1,390	1,550	1,910	2,360	2,660	3,480
0.96	1.04	1,420	1,430	1,450	1,550	1,740	2,200	2,780	3,140	4,170
0.98	1.02	1,520	1,530	1,540	1,650	1,860	2,380	3,050	3,460	4,630
0.99	1.01	1,590	1,600	1,610	1,730	1,960	2,540	3,300	3,740	5,030
Kantau statistic		-0.057	-0.048	-0.002	-0.007	0.025	-0.048	-0.057	-0.090	-0.080
P-value		0.668	0.721	1.000	0.972	0.858	0.721	0.669	0.498	0.544

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05464000 Annual nonexceedance probability of seasonal low discharges, based on October 1983 to September 2013 period of record (30 years)

Annual nonexceedance probability	Recurrence interval (years)	Minimum average discharge (cubic feet per second) for indicated number of consecutive days							
		1	7	14	30	1	7	14	30
		January-February-March				April-May-June			
0.01	100	211	240	258	267	389	392	397	482
0.02	50	252	286	306	321	509	519	532	646
0.05	20	325	369	394	418	743	772	806	979
0.10	10	404	459	489	525	1,020	1,070	1,140	1,390
0.20	5	521	591	629	682	1,450	1,550	1,680	2,060
0.50	2	821	930	991	1,090	2,600	2,870	3,270	4,070
0.80	1.25	1,240	1,410	1,510	1,650	4,220	4,770	5,730	7,280
0.90	1.11	1,520	1,720	1,850	2,030	5,230	5,970	7,380	9,520
0.96	1.04	1,870	2,100	2,280	2,480	6,400	7,380	9,390	12,300
0.98	1.02	2,120	2,380	2,600	2,810	7,180	8,340	10,800	14,400
0.99	1.01	2,360	2,660	2,910	3,120	7,900	9,220	12,200	16,300
Kantau statistic		-0.057	-0.025	-0.021	-0.011	0.172	0.172	0.191	0.186
P-value		0.668	0.858	0.887	0.943	0.187	0.187	0.143	0.154
		July-August-September				October-November-December			
0.01	100	309	336	346	367	170	207	221	262
0.02	50	355	385	397	425	214	262	282	331
0.05	20	441	473	489	533	297	363	399	461
0.10	10	535	571	593	656	390	476	529	606
0.20	5	681	724	755	849	528	644	724	823
0.50	2	1,100	1,160	1,230	1,430	875	1,070	1,210	1,380
0.80	1.25	1,800	1,930	2,080	2,490	1,320	1,610	1,820	2,100
0.90	1.11	2,340	2,550	2,780	3,380	1,590	1,930	2,160	2,530
0.96	1.04	3,130	3,450	3,820	4,720	1,890	2,290	2,540	3,020
0.98	1.02	3,790	4,220	4,720	5,890	2,080	2,520	2,770	3,340
0.99	1.01	4,510	5,080	5,740	7,230	2,250	2,730	2,980	3,630
Kantau statistic		-0.039	-0.011	0.002	0.034	-0.034	-0.094	-0.094	-0.080
P-value		0.775	0.943	1.000	0.803	0.803	0.475	0.475	0.544