DES MOINES RIVER BASIN

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA

LOCATION.--Lat 41°25'27", long 93°35'14" referenced to North American Datum of 1927, in SE 1/4 SE 1/4 SW 1/4 sec.35, T.77 N., R.24 W., Warren County, IA, Hydrologic Unit 07100008, on right bank 10 ft downstream from bridge on 115th Avenue, 1.5 mi upstream from bridge on U.S. Highway 69, 4.6 mi northwest of Indianola, 0.4 mi upstream from Cavitt Creek, and 14.8 mi upstream from mouth.

DRAINAGE AREA.--489.4 mi².

PERIOD OF RECORD.--Discharge records from March 1940 to current year.

GAGE.--Water-stage recorder. Datum of gage is 776.15 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers benchmark). Prior to June 11, 1946, June 9, 1947, to November 23, 1948, and September 8, 1951, to October 30, 1952, non-recording gage at site 1.6 mi downstream at datum 2.81 ft lower; June 11, 1946, to June 8, 1947, destroyed by flood; November 24, 1948, to September 7, 1951, and October 31, 1952, to September 30, 1962, water-stage recorder at site 1.6 mi downstream at datum 2.81 ft lower.

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=05486490

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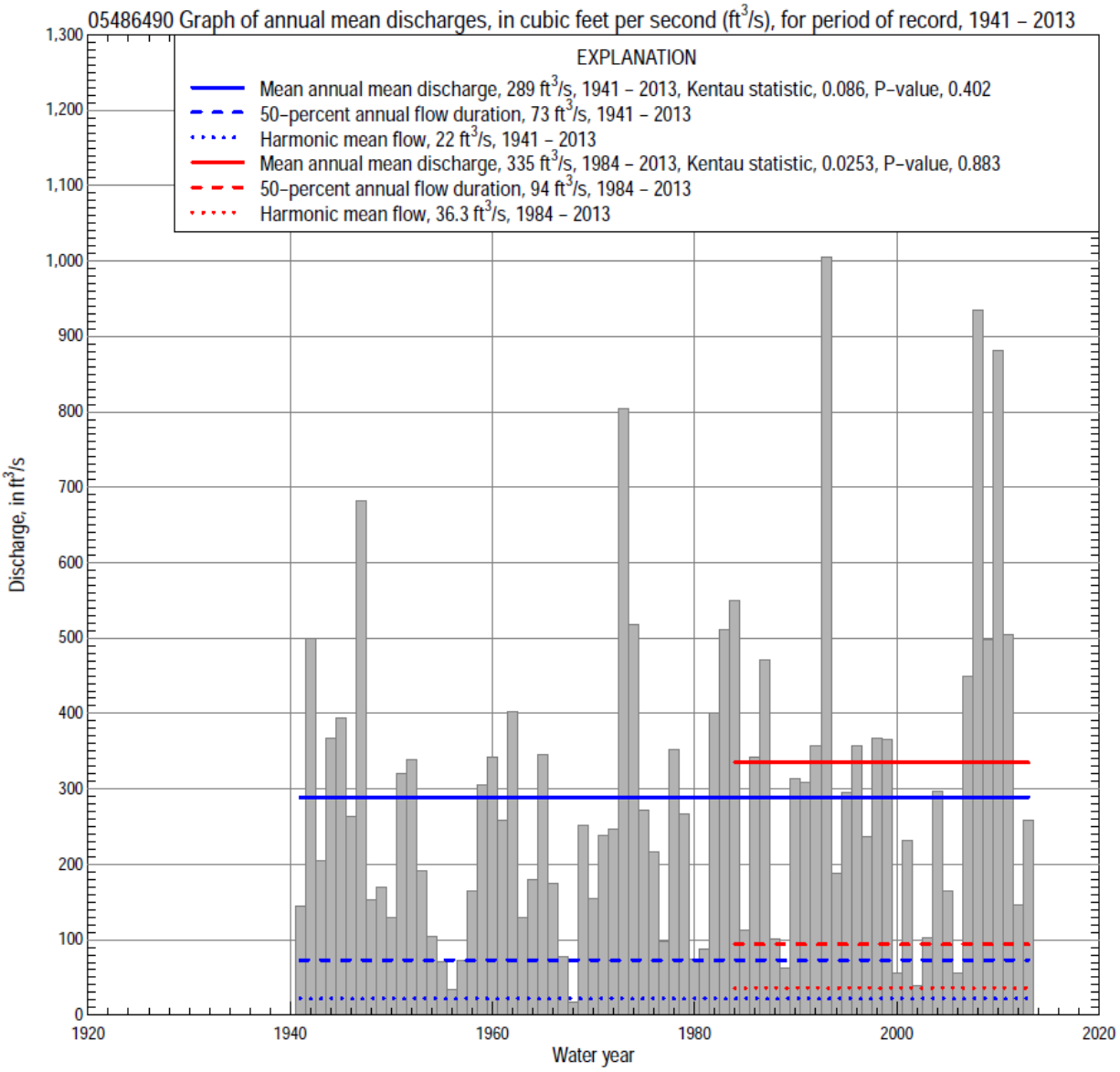
A description of the statistics presented for this streamgage is available in the main body of the report at:

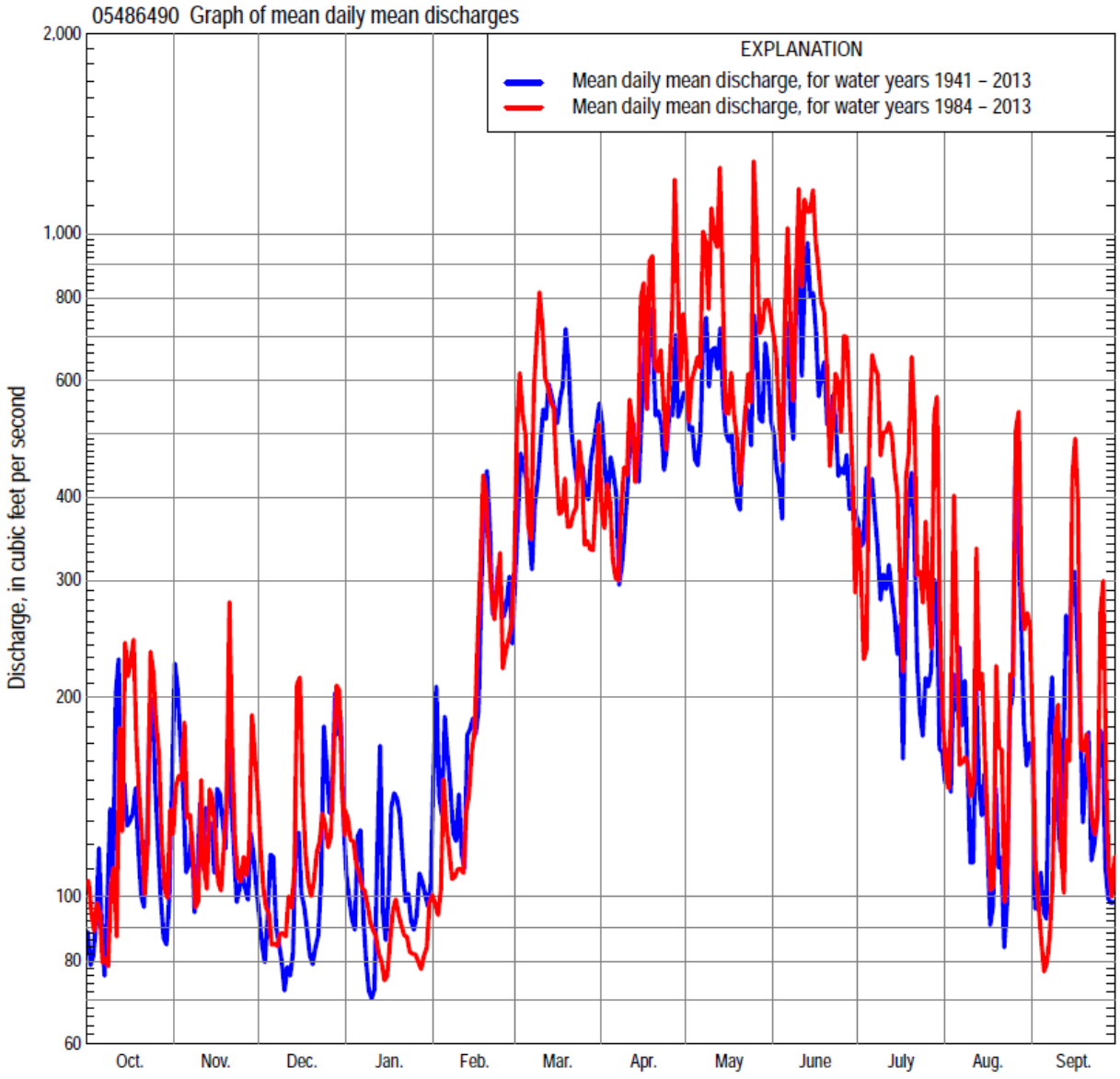
http://dx.doi.org/10.3133/ofr20151214

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.



DES MOINES RIVER BASIN

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA



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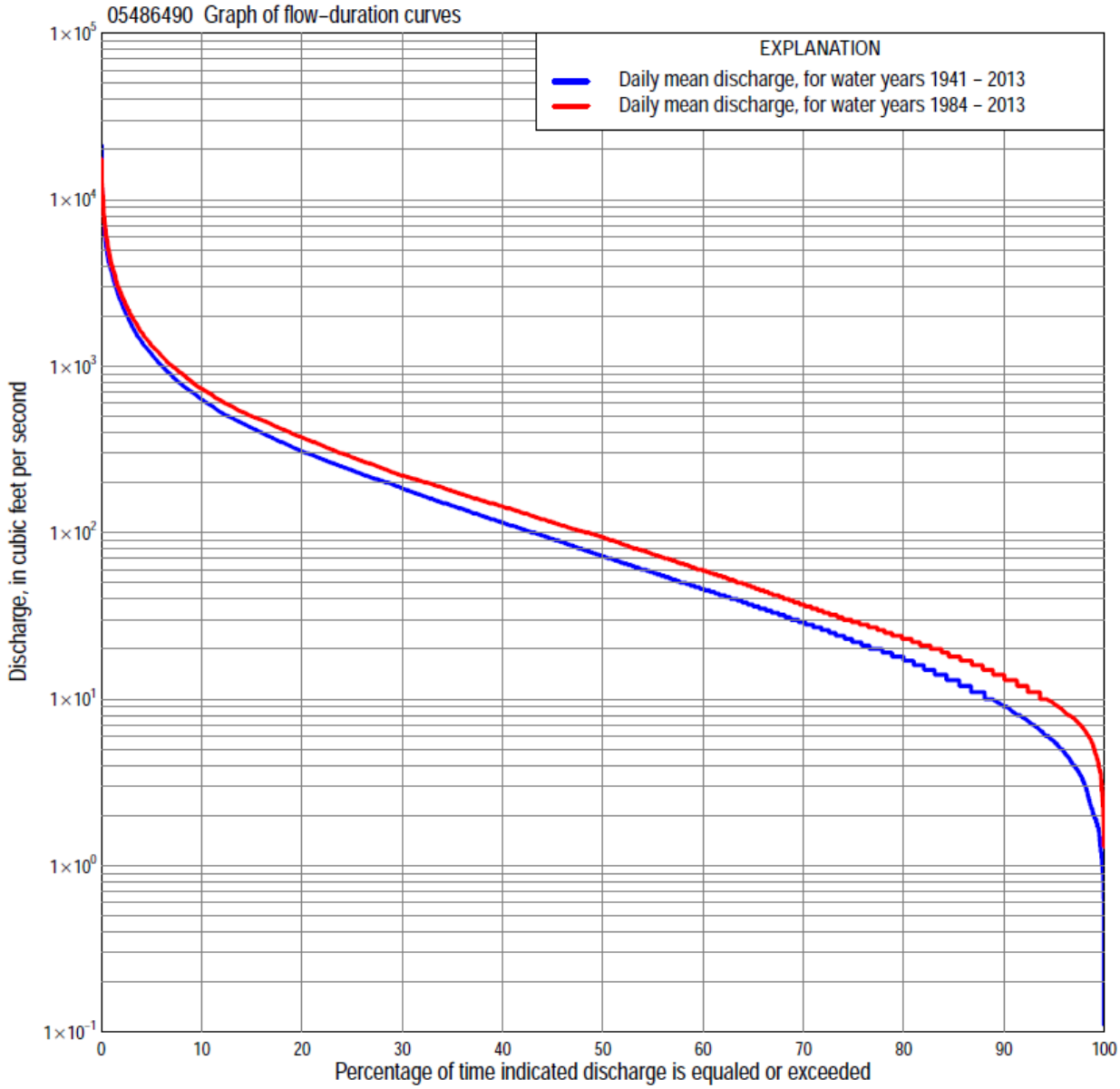

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA

Statistics Based on the Entire Streamflow Period of Record

05486490 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	1.6	2.7	1.7	0.98	2.2	7.0	5.6	5.0	3.8	1.8	1.9	1.9	2.0	0.166	0.038
98	2.6	3.5	2.1	1.6	2.5	8.8	12	8.0	5.0	3.7	3.3	2.2	3.2	0.166	0.038
95	3.8	5.7	4.2	2.8	5.0	13	22	15	15	12	6.5	5.4	5.6	0.153	0.055
90	5.0	7.9	6.7	4.8	7.2	24	35	24	29	19	11	7.0	9.1	0.155	0.053
85	6.3	9.4	9.2	8.0	11	36	50	48	46	26	15	8.4	13	0.150	0.060
80	7.8	13	11	11	15	50	65	75	61	33	19	10	18	0.137	0.087
75	9.8	16	14	13	21	70	80	102	79	41	22	12	23	0.129	0.107
70	13	19	16	15	29	92	99	124	99	49	25	15	29	0.098	0.221
65	15	23	19	18	37	110	119	154	116	56	28	18	37	0.097	0.226
60	19	29	22	22	44	136	139	185	137	65	32	21	46	0.082	0.306
55	22	34	28	29	56	163	173	219	163	75	38	24	58	0.076	0.343
50	26	39	33	34	70	198	227	261	197	85	44	29	73	0.077	0.336
45	33	45	42	42	90	231	265	306	228	102	50	36	92	0.079	0.324
40	42	54	52	50	112	275	301	358	278	118	58	44	116	0.093	0.247
35	54	66	64	62	150	330	354	423	338	139	69	52	146	0.100	0.214
30	68	90	80	80	190	403	423	496	417	168	79	71	187	0.092	0.251
25	84	126	102	110	230	481	507	585	501	210	95	93	239	0.105	0.190
20	110	167	138	140	274	600	631	703	640	257	121	129	310	0.118	0.141
15	156	215	176	170	350	854	805	911	875	358	170	188	428	0.125	0.119
10	239	292	235	230	500	1,180	1,120	1,320	1,320	550	278	306	635	0.104	0.197
5	463	522	380	370	959	2,040	1,970	2,240	2,340	1,180	592	594	1,190	0.085	0.288
2	925	915	735	712	1,500	3,350	3,350	3,920	4,400	2,590	1,410	1,250	2,420	0.002	0.981
1	1,770	1,290	1,220	1,000	2,220	4,180	5,320	4,940	6,870	3,790	2,850	2,130	3,760	0.023	0.779

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA

05486490 Annual exceedance probability of instantaneous peak discharges, in cubic feet per second (ft^3/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	7,640	6,740	8,670
0.200	5	11,500	10,100	13,000
0.100	10	14,000	12,200	16,000
0.040	25	17,200	14,600	20,100
0.020	50	19,400	16,100	23,300
0.010	100	21,600	17,500	26,700
0.005	200	24,500	19,200	31,300
0.002	500	26,800	20,100	35,700
and based on the expected moments algorithm/multiple Grubbs-Beck analysis computed using a historical period length of 74 years (1940–2013)				
0.500	2	7,670	6,700	8,700
0.200	5	11,700	10,300	13,500
0.100	10	14,400	12,600	17,000
0.040	25	17,700	15,200	22,000
0.020	50	20,100	16,900	26,000
0.010	100	22,400	18,400	30,400
0.005	200	24,700	19,800	35,300
0.002	500	27,700	21,400	42,500
Kentau statistic		0.184		
P-value		0.020		
Begin year		1940		
End year		2013		
Number of peaks		74		

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA

05486490 Annual exceedance probability of high discharges, based on 1941–2013 period of record (73 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	650	484	308	198	124
0.950	1.05	1,460	1,000	630	406	261
0.900	1.11	2,120	1,420	888	572	373
0.800	1.25	3,200	2,100	1,300	838	555
0.500	2	6,130	3,950	2,410	1,570	1,070
0.200	5	9,950	6,540	3,930	2,580	1,820
0.100	10	12,100	8,110	4,850	3,200	2,300
0.040	25	14,300	9,870	5,870	3,900	2,850
0.020	50	15,600	11,000	6,520	4,350	3,220
0.010	100	16,700	12,000	7,100	4,760	3,550
0.005	200	17,700	12,900	7,620	5,120	3,860
0.002	500	18,600	14,000	8,210	5,540	4,220
Kentau statistic		0.167	0.110	0.130	0.156	0.158
P-value		0.037	0.172	0.104	0.051	0.048

05486490 Annual nonexceedance probability of low discharges, based on April 1940 to March 2013 period of record (73 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	0.22	0.32	0.42	0.57	0.92	1.4	1.7	2.0	2.8
0.02	50	0.36	0.50	0.63	0.83	1.3	1.9	2.4	2.8	4.0
0.05	20	0.75	1.0	1.2	1.4	2.1	3.1	3.9	4.6	6.7
0.10	10	1.4	1.7	1.9	2.3	3.2	4.7	6.0	7.2	11
0.20	5	2.7	3.1	3.5	4.1	5.4	7.8	10	12	18
0.50	2	8.8	9.2	10	11	14	20	28	34	51
0.80	1.25	24	24	26	30	37	53	75	92	143
0.90	1.11	37	39	42	48	61	86	125	154	243
0.96	1.04	56	61	68	78	102	145	218	266	426
0.98	1.02	72	81	90	106	142	202	311	378	612
0.99	1.01	88	102	116	139	191	272	429	518	846
Kentau statistic		0.187	0.187	0.185	0.179	0.164	0.131	0.091	0.088	0.049
P-value		0.020	0.019	0.021	0.025	0.041	0.102	0.255	0.271	0.545

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA

05486490 Annual nonexceedance probability of seasonal low discharges, based on March 1940 to September 2013 period of record (73–74 years)

Annual nonexceed-ance probability	Recur-rence 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	0.59	0.65	0.76	1.0	1.1	1.6	2.2	3.7
0.02	50	0.89	1.0	1.2	1.6	2.0	2.8	3.7	6.1
0.05	20	1.6	1.9	2.2	3.1	4.6	6.1	7.9	13
0.10	10	2.7	3.3	3.8	5.5	9.1	12	15	23
0.20	5	5.1	6.2	7.2	11	19	23	29	46
0.50	2	16	20	23	35	59	70	90	145
0.80	1.25	49	59	68	107	134	164	225	386
0.90	1.11	85	101	118	184	185	231	335	602
0.96	1.04	152	176	204	321	243	312	484	921
0.98	1.02	219	248	289	455	279	367	596	1,180
0.99	1.01	302	335	392	616	310	417	706	1,460
Kentau statistic		0.113	0.104	0.098	0.063	0.161	0.157	0.148	0.140
P-value		0.160	0.197	0.221	0.432	0.043	0.048	0.063	0.078
		July-August-September				October-November-December			
0.01	100	0.34	0.97	1.5	2.8	0.51	0.67	0.83	1.5
0.02	50	0.59	1.4	2.0	3.5	0.75	0.96	1.2	2.0
0.05	20	1.3	2.3	3.0	4.9	1.3	1.7	2.0	3.2
0.10	10	2.3	3.5	4.4	6.8	2.2	2.7	3.2	4.8
0.20	5	4.6	5.9	7.0	10	4.0	4.8	5.7	8.1
0.50	2	15	15	17	25	13	14	17	23
0.80	1.25	36	39	44	65	37	44	52	67
0.90	1.11	54	62	71	112	65	77	94	122
0.96	1.04	78	100	120	208	116	143	175	232
0.98	1.02	96	135	170	315	169	212	264	356
0.99	1.01	113	177	231	464	235	303	381	525
Kentau statistic		0.130	0.110	0.096	0.039	0.175	0.150	0.141	0.127
P-value		0.102	0.169	0.227	0.627	0.029	0.061	0.079	0.113

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA

Statistics Based on the 1984–2013 Streamflow Period of Record

05486490 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	3.6	5.2	6.1	3.8	2.6	11	17	10	11	6.5	4.3	2.8	5.1	-0.025	0.858
98	4.2	7.3	7.9	5.0	5.7	12	21	16	14	11	5.7	5.1	6.6	-0.016	0.914
95	5.8	8.6	9.4	9.3	9.3	17	26	23	23	18	9.4	6.2	9.4	-0.044	0.748
90	7.6	12	12	12	13	29	39	59	37	25	13	7.8	14	-0.023	0.872
85	9.3	16	14	14	20	42	56	87	52	35	17	9.3	18	-0.011	0.943
80	12	19	16	16	28	63	73	119	70	44	20	11	23	-0.037	0.789
75	15	23	18	18	36	84	99	155	96	52	23	13	29	-0.083	0.532
70	18	28	22	22	44	104	121	189	114	59	26	17	37	-0.108	0.412
65	21	33	27	29	54	137	150	222	144	70	30	20	47	-0.101	0.443
60	23	37	30	32	68	162	193	274	177	81	36	23	59	-0.099	0.454
55	26	41	36	39	80	189	231	327	216	96	45	27	74	-0.108	0.412
50	31	49	45	47	92	213	267	389	262	110	53	32	94	-0.087	0.509
45	37	60	60	57	101	242	319	445	317	130	62	37	115	-0.064	0.630
40	47	79	80	70	120	280	377	499	383	153	72	45	144	-0.021	0.886
35	59	96	100	98	150	316	456	561	469	186	81	54	177	-0.016	0.915
30	73	124	126	113	193	384	528	643	532	224	94	70	220	-0.025	0.858
25	85	154	150	135	220	453	624	753	654	281	114	91	284	-0.011	0.943
20	119	192	170	151	262	553	756	929	846	378	149	121	373	0.037	0.789
15	189	234	198	170	305	775	961	1,210	1,170	528	223	178	500	0.062	0.643
10	330	301	263	215	414	1,120	1,320	1,710	1,600	800	403	359	730	0.048	0.721
5	538	496	392	312	829	1,880	2,070	2,800	3,000	1,580	704	642	1,320	0.085	0.521
2	1,060	815	756	422	1,260	2,910	3,210	4,280	5,780	3,740	1,700	1,220	2,680	0.097	0.464
1	1,850	1,050	1,040	575	1,700	4,260	5,320	6,120	7,930	5,690	3,940	1,940	4,080	0.099	0.454

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA

05486490 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	430	396	269	176	118
0.950	1.05	1,170	899	590	390	261
0.900	1.11	1,860	1,330	861	571	384
0.800	1.25	3,070	2,060	1,310	873	591
0.500	2	6,690	4,250	2,640	1,760	1,210
0.200	5	11,800	7,600	4,640	3,080	2,190
0.100	10	14,700	9,770	5,940	3,930	2,830
0.040	25	17,700	12,300	7,460	4,920	3,610
0.020	50	19,500	14,100	8,490	5,590	4,150
0.010	100	20,900	15,600	9,440	6,190	4,650
0.005	200	22,100	17,100	10,300	6,740	5,110
0.002	500	23,300	18,800	11,300	7,390	5,680
Kentau statistic		0.145	0.140	0.085	0.048	0.030
P-value		0.269	0.284	0.521	0.721	0.830

05486490 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	0.70	0.91	1.2	1.6	2.6	3.6	4.1	4.1	4.2
0.02	50	1.0	1.3	1.7	2.2	3.2	4.5	5.1	5.4	5.8
0.05	20	1.8	2.2	2.7	3.3	4.6	6.3	7.3	8.2	9.3
0.10	10	2.9	3.4	4.0	4.8	6.3	8.6	10	12	14
0.20	5	5.0	5.6	6.4	7.4	9.4	13	15	18	24
0.50	2	13	14	15	17	21	27	35	44	62
0.80	1.25	31	33	35	39	46	61	83	104	162
0.90	1.11	47	49	53	59	72	94	134	165	266
0.96	1.04	70	74	81	91	116	151	227	269	452
0.98	1.02	90	96	106	121	160	207	322	370	637
0.99	1.01	111	120	135	156	213	275	445	494	865
Kentau statistic		0.032	0.044	0.062	0.053	0.030	-0.039	-0.108	-0.117	-0.145
P-value		0.817	0.748	0.643	0.695	0.830	0.775	0.412	0.372	0.269

05486490 MIDDLE RIVER NEAR INDIANOLA, IOWA

05486490 Annual nonexceedance probability of seasonal low discharges, based on October 1983 to September 2013 period of record (30 years)

Annual nonexceed-ance probability	Recur-rence 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	0.85	1.6	2.0	3.1	4.4	5.4	5.7	7.3
0.02	50	1.4	2.3	2.9	4.4	6.5	7.9	8.5	11
0.05	20	2.6	4.1	5.1	7.3	11	14	15	21
0.10	10	4.6	6.6	8.1	11	18	22	25	37
0.20	5	8.5	11	14	19	30	36	44	68
0.50	2	24	30	35	47	72	88	117	196
0.80	1.25	59	70	80	108	153	189	278	497
0.90	1.11	88	105	118	160	214	269	417	769
0.96	1.04	128	156	173	239	297	379	621	1,180
0.98	1.02	159	199	218	306	360	463	791	1,530
0.99	1.01	191	244	267	378	422	549	971	1,900
Kentau statistic		-0.159	-0.122	-0.117	-0.122	0.124	0.113	0.136	0.163
P-value		0.225	0.354	0.372	0.354	0.344	0.392	0.301	0.212
		July-August-September				October-November-December			
0.01	100	1.8	2.3	3.2	4.6	1.7	2.0	2.3	2.6
0.02	50	2.3	2.9	3.7	5.2	2.2	2.6	3.0	3.4
0.05	20	3.3	4.0	4.9	6.5	3.2	3.7	4.4	5.2
0.10	10	4.7	5.5	6.4	8.3	4.6	5.2	6.2	7.6
0.20	5	7.3	8.2	9.2	12	7.1	8.1	9.6	12
0.50	2	18	19	21	27	17	19	23	30
0.80	1.25	46	50	56	78	44	50	57	78
0.90	1.11	78	87	100	152	73	84	94	130
0.96	1.04	141	162	198	338	129	148	163	226
0.98	1.02	209	248	317	595	187	217	235	324
0.99	1.01	299	367	494	1,020	263	308	328	450
Kentau statistic		0.062	0.034	0.021	-0.002	-0.009	0.007	-0.016	-0.048
P-value		0.643	0.803	0.887	1.000	0.957	0.972	0.915	0.721