

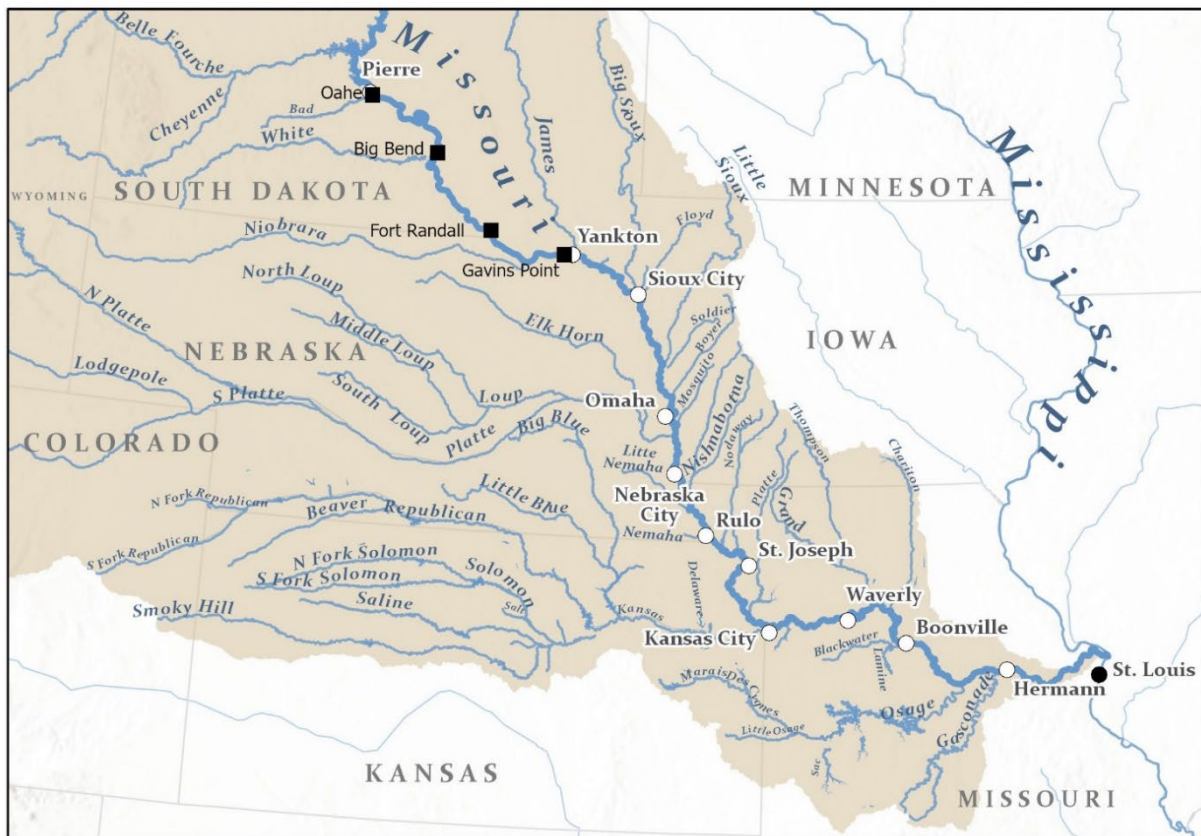


US Army Corps
of Engineers®

Missouri River Flow Frequency Study

Yankton, South Dakota to Hermann, Missouri

Appendix G: HEC-RAS Tabular Results by Year



U.S. Army Corps of Engineers
Northwestern Division
Omaha District, Kansas City District, and
Missouri River Basin Water Management

June 2023

Sioux City

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1930	83,235	87,854	65,163
1931	53,605	80,319	40,997
1932	123,555	148,425	37,149
1933	102,633	121,986	55,673
1934	66,159	73,262	49,880
1935	117,913	132,460	63,105
1936	88,151	89,919	34,834
1937	106,777	132,735	30,558
1938	131,962	166,468	32,022
1939	164,475	199,546	63,242
1940	52,674	87,204	48,575
1941	122,066	157,777	33,965
1942	125,549	162,361	53,630
1943	243,841	264,315	83,875
1944	175,665	205,802	67,176
1945	110,784	137,942	44,948
1946	86,973	134,014	47,119
1947	169,984	271,579	91,717
1948	108,409	167,641	70,698
1949	176,418	193,396	51,206
1950	219,405	237,137	69,574
1951	147,809	204,967	115,689
1952	445,032	523,198	133,328
1953	104,385	231,064	59,809
1954	49,333	102,834	47,286
1955	36,589	88,302	61,983
1956	36,709	132,360	45,495
1957	35,465	142,219	39,649
1958	35,779	98,977	34,100
1959	33,022	133,184	37,864
1960	94,351	283,633	89,321
1961	32,257	104,311	37,275
1962	84,087	187,082	83,650
1963	33,363	140,901	45,379
1964	37,789	200,833	47,066

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1965	35,297	169,968	56,833
1966	37,598	148,432	52,252
1967	36,807	239,968	53,403
1968	38,365	148,603	53,707
1969	97,282	233,192	125,529
1970	51,222	170,310	53,201
1971	69,899	167,513	61,149
1972	55,733	254,538	61,236
1973	54,010	125,192	54,060
1974	39,798	171,788	47,219
1975	64,176	178,010	67,174
1976	66,095	132,551	69,530
1977	38,981	93,754	39,374
1978	60,981	305,568	65,630
1979	57,599	184,707	72,126
1980	43,641	109,076	44,763
1981	40,469	135,112	39,163
1982	35,278	154,312	55,822
1983	50,657	145,396	88,790
1984	106,275	210,869	132,514
1985	50,222	79,369	54,790
1986	56,535	189,759	72,414
1987	55,611	222,819	75,612
1988	38,534	79,898	41,737
1989	35,222	91,832	38,662
1990	36,167	103,888	36,657
1991	32,586	165,640	38,834
1992	35,118	81,146	34,005
1993	78,754	174,950	78,450
1994	48,395	142,995	64,006
1995	64,970	173,512	86,948
1996	78,620	195,514	75,035
1997	97,053	275,743	111,489
1998	73,087	129,008	84,849
1999	54,174	147,062	74,960

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
2000	48,568	92,779	53,818
2001	64,387	120,706	64,363
2002	34,457	99,571	36,295
2003	34,895	105,371	35,176
2004	37,661	82,059	32,475
2005	39,794	117,714	33,337
2006	41,111	96,435	41,106
2007	43,845	120,188	43,842
2008	40,993	238,165	40,837
2009	43,529	206,199	53,636

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
2010	84,964	190,007	95,637
2011	188,931	336,434	189,801
2012	56,490	100,211	87,939
2013	39,488	157,646	37,785
2014	83,487	198,067	83,315
2015	48,801	144,162	54,451
2016	36,187	105,402	38,449
2017	44,279	129,350	55,388
2018	89,396	205,958	103,039
2019	153,624	333,896	160,104

Omaha

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1930	82,281	84,482	65,795
1931	50,777	78,898	39,800
1932	133,613	166,892	68,473
1933	90,483	117,197	52,295
1934	71,434	70,090	51,440
1935	94,163	116,768	62,748
1936	81,829	88,613	45,777
1937	108,567	131,338	38,853
1938	118,100	167,565	41,131
1939	161,703	218,297	75,935
1940	48,835	82,307	54,111
1941	110,400	136,725	29,911
1942	123,457	162,985	51,992
1943	219,186	253,266	87,977
1944	163,134	207,131	89,949
1945	108,658	127,291	71,085
1946	81,565	114,035	44,277
1947	166,295	272,666	110,738
1948	100,159	166,675	82,843
1949	182,337	223,804	85,831
1950	196,707	242,400	91,645
1951	165,532	223,483	132,303
1952	399,622	494,101	117,893

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1953	110,182	237,740	83,707
1954	80,632	120,645	63,768
1955	41,035	90,885	56,428
1956	38,460	126,426	43,869
1957	45,675	144,445	43,988
1958	34,907	98,721	33,449
1959	53,558	126,836	52,697
1960	115,506	317,783	114,260
1961	39,485	105,270	38,967
1962	98,313	188,593	100,916
1963	53,948	135,735	51,907
1964	48,673	194,745	44,347
1965	68,504	163,851	79,549
1966	49,417	140,289	58,872
1967	59,813	242,556	80,099
1968	42,451	149,711	53,813
1969	109,549	241,365	131,141
1970	52,323	165,101	53,294
1971	100,216	169,824	105,659
1972	63,566	249,408	66,081
1973	57,632	114,849	57,047
1974	44,816	169,286	47,006
1975	66,879	180,439	69,213

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1976	71,621	129,030	75,101
1977	42,676	96,980	43,412
1978	77,097	303,729	85,564
1979	80,382	175,785	80,391
1980	51,355	107,546	47,619
1981	45,766	136,713	41,465
1982	50,142	163,040	67,632
1983	79,898	165,429	95,176
1984	121,113	234,289	143,143
1985	67,418	82,653	61,187
1986	72,699	188,363	80,504
1987	61,145	214,201	84,537
1988	41,353	81,765	42,894
1989	41,510	93,699	41,792
1990	68,695	121,981	66,032
1991	68,733	165,062	67,143
1992	47,846	89,558	40,651
1993	117,183	202,684	116,919
1994	60,368	141,020	69,603
1995	78,510	180,781	100,134
1996	111,878	227,032	121,610
1997	106,027	275,844	117,907

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1998	77,006	132,302	88,936
1999	63,815	155,285	80,545
2000	50,884	94,910	56,264
2001	71,143	118,552	71,126
2002	38,700	102,635	40,041
2003	52,896	106,524	46,138
2004	50,434	92,748	44,528
2005	46,870	116,054	39,249
2006	46,046	97,574	46,053
2007	72,138	121,767	73,077
2008	71,047	255,498	70,882
2009	49,923	193,542	57,540
2010	100,930	202,499	110,718
2011	206,133	346,178	210,144
2012	65,262	100,215	92,339
2013	69,459	162,044	64,442
2014	102,174	215,371	101,667
2015	55,363	147,620	60,943
2016	64,239	114,501	64,181
2017	57,370	131,603	75,195
2018	116,523	229,737	122,054
2019	188,937	340,597	189,600

Nebraska City

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1930	95,221	117,334	76,887
1931	56,648	100,416	55,931
1932	163,379	186,912	143,243
1933	102,285	138,131	79,080
1934	80,258	98,286	61,915
1935	110,569	146,362	85,163
1936	105,489	107,388	88,195
1937	110,606	140,365	50,693
1938	128,247	195,459	56,998
1939	169,622	232,740	114,529

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1940	61,274	106,959	58,661
1941	107,340	138,998	39,570
1942	134,889	202,084	88,537
1943	209,878	252,540	90,062
1944	208,898	244,369	191,633
1945	136,630	160,051	95,712
1946	95,098	133,294	59,497
1947	189,694	282,036	179,039
1948	122,437	191,347	105,879
1949	186,317	237,107	121,966

Water Year	HEC-RAS, cfs			Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated		Observed	Unregulated	Regulated
1950	193,694	249,650	123,950	1985	81,747	110,559	81,201
1951	174,467	235,032	170,847	1986	96,224	200,210	95,899
1952	404,162	615,935	165,896	1987	124,918	240,422	129,887
1953	125,540	265,905	110,156	1988	48,918	100,114	48,342
1954	110,416	137,215	95,591	1989	82,928	113,348	78,923
1955	59,917	115,112	55,362	1990	120,572	175,342	117,366
1956	48,086	142,561	41,958	1991	87,942	192,325	85,115
1957	102,062	185,516	101,417	1992	54,852	105,391	50,746
1958	77,999	115,158	76,533	1993	218,442	324,011	215,899
1959	76,538	149,168	73,527	1994	86,705	150,922	85,535
1960	181,687	323,736	181,753	1995	109,352	214,680	129,087
1961	51,692	128,504	50,124	1996	143,757	268,686	146,094
1962	152,408	208,924	152,153	1997	115,102	268,377	125,243
1963	78,729	187,117	77,007	1998	93,976	160,605	101,938
1964	109,421	213,965	106,768	1999	104,328	192,853	110,633
1965	85,801	202,425	108,399	2000	66,353	116,125	64,557
1966	86,106	149,015	100,422	2001	95,597	129,190	95,177
1967	164,164	279,283	183,892	2002	51,254	118,993	51,098
1968	59,631	179,999	71,250	2003	63,402	124,468	59,758
1969	106,154	240,637	134,888	2004	79,617	107,886	72,432
1970	56,495	186,580	59,882	2005	59,240	140,291	57,938
1971	146,191	203,056	148,402	2006	51,414	116,719	51,476
1972	80,623	255,316	87,517	2007	121,758	144,308	122,590
1973	81,681	146,421	75,909	2008	142,139	297,157	142,248
1974	85,858	184,675	78,198	2009	64,901	204,449	64,928
1975	72,648	199,594	87,549	2010	166,960	292,527	169,531
1976	77,949	147,894	81,764	2011	225,262	385,691	243,186
1977	60,133	115,915	53,424	2012	78,023	116,921	103,898
1978	157,482	289,871	156,497	2013	92,740	183,203	88,237
1979	124,864	187,689	124,718	2014	121,470	251,433	119,860
1980	64,537	131,315	58,066	2015	82,617	187,574	88,818
1981	59,826	155,429	58,458	2016	103,656	150,553	106,911
1982	96,003	189,454	91,952	2017	97,880	158,709	110,220
1983	123,740	216,636	121,606	2018	138,588	278,647	152,680
1984	187,251	275,193	205,523	2019	330,017	356,151	328,169

Rulo

Water Year	HEC-RAS, cfs			Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated		Observed	Unregulated	Regulated
1930	92,885	113,597	70,545	1967	161,989	284,527	171,396
1931	59,914	102,263	54,866	1968	63,769	169,565	74,457
1932	148,061	170,709	138,053	1969	105,107	234,683	143,860
1933	95,078	137,444	64,197	1970	58,263	181,519	62,948
1934	67,710	93,868	60,242	1971	123,507	199,091	144,168
1935	105,679	146,208	91,403	1972	94,638	226,217	97,470
1936	102,860	101,604	86,471	1973	107,236	161,171	106,093
1937	102,318	136,038	54,766	1974	123,537	180,023	118,471
1938	121,452	184,426	49,308	1975	80,455	199,588	92,421
1939	142,025	200,288	113,781	1976	77,285	146,955	81,793
1940	59,530	102,393	55,849	1977	78,657	115,400	73,412
1941	97,591	135,145	52,574	1978	164,615	281,849	166,164
1942	133,529	196,687	97,126	1979	141,072	183,546	142,750
1943	169,268	241,524	95,235	1980	71,945	135,087	66,455
1944	212,297	236,947	191,702	1981	56,155	155,964	57,028
1945	141,256	164,926	119,849	1982	117,394	191,183	114,280
1946	95,783	137,181	80,598	1983	123,882	219,931	125,109
1947	177,089	241,218	176,426	1984	221,333	274,058	233,414
1948	123,185	181,229	119,666	1985	85,551	112,688	82,259
1949	175,974	224,418	135,011	1986	105,982	191,999	116,887
1950	179,587	229,166	162,100	1987	142,557	222,222	145,342
1951	174,251	216,766	183,864	1988	50,807	101,123	55,881
1952	389,867	739,590	248,088	1989	125,241	128,659	125,028
1953	119,019	232,624	104,900	1990	122,316	168,652	120,778
1954	112,746	133,622	106,083	1991	101,891	200,303	97,998
1955	53,925	112,872	53,298	1992	81,993	124,778	77,598
1956	51,415	142,779	48,329	1993	283,883	471,982	305,815
1957	111,820	175,520	109,226	1994	89,887	151,089	96,401
1958	91,214	133,562	89,621	1995	119,146	217,703	143,133
1959	96,495	156,655	96,535	1996	150,025	240,636	158,213
1960	187,218	277,931	187,070	1997	120,978	245,907	130,909
1961	70,692	130,283	66,725	1998	135,248	178,366	127,428
1962	150,982	210,051	152,650	1999	124,528	206,198	127,861
1963	89,315	166,739	87,108	2000	70,928	126,989	69,896
1964	109,068	213,085	106,218	2001	102,683	129,970	102,115
1965	96,130	210,875	109,334	2002	51,306	119,441	50,531
1966	80,540	144,341	97,804	2003	62,081	124,291	57,837

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
2004	101,076	117,079	94,691
2005	81,636	139,836	81,224
2006	48,195	116,721	52,292
2007	186,248	202,058	191,035
2008	161,326	298,419	164,417
2009	70,485	196,753	78,661
2010	212,886	330,558	211,697
2011	276,250	496,194	286,650

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
2012	88,274	118,677	109,746
2013	106,536	183,275	100,834
2014	121,196	235,680	120,549
2015	104,404	192,504	111,597
2016	123,998	165,681	126,601
2017	118,159	161,061	124,695
2018	138,016	269,136	151,380
2019	315,136	358,877	317,766

St. Joseph

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1930	107,943	124,969	80,600
1931	62,975	110,820	56,630
1932	151,010	176,185	139,480
1933	100,985	136,520	82,201
1934	75,754	103,915	70,859
1935	116,323	153,861	100,821
1936	104,170	109,994	89,196
1937	99,065	143,648	59,359
1938	123,018	191,722	61,258
1939	136,473	199,396	96,904
1940	61,833	103,475	58,207
1941	101,520	145,712	81,241
1942	141,256	196,899	98,253
1943	163,761	235,438	108,404
1944	186,704	202,453	171,734
1945	127,126	147,740	116,143
1946	96,959	139,467	81,160
1947	176,028	238,811	168,975
1948	141,086	178,061	138,591
1949	176,456	209,285	131,451
1950	177,267	220,948	165,060
1951	192,176	199,793	193,318
1952	370,370	704,859	199,337
1953	117,511	232,113	115,274
1954	107,451	130,527	98,633

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1955	76,518	126,278	72,123
1956	53,009	142,194	47,909
1957	123,014	177,324	121,820
1958	133,413	163,572	131,363
1959	130,611	154,073	130,267
1960	174,102	273,975	174,601
1961	93,249	130,353	90,662
1962	155,715	208,341	156,905
1963	91,235	164,659	90,226
1964	108,600	219,160	106,175
1965	151,488	220,812	168,663
1966	100,925	144,909	115,142
1967	157,849	284,190	166,534
1968	64,441	169,585	73,835
1969	114,605	233,451	141,369
1970	62,537	182,088	73,076
1971	132,675	189,744	136,095
1972	113,848	217,028	113,939
1973	153,890	166,482	152,866
1974	216,277	213,411	213,386
1975	89,352	196,207	103,842
1976	88,590	151,420	93,347
1977	115,380	116,236	108,546
1978	172,631	287,277	173,006
1979	171,371	198,794	172,782

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1980	91,167	141,071	83,825
1981	67,042	156,001	68,262
1982	149,240	202,994	146,572
1983	141,659	225,887	140,107
1984	203,447	280,645	213,179
1985	86,022	113,279	87,994
1986	146,883	204,260	151,426
1987	224,143	229,532	221,837
1988	59,191	103,307	68,194
1989	177,112	180,003	176,900
1990	131,603	175,200	129,799
1991	117,983	206,803	114,503
1992	133,421	161,245	128,719
1993	319,794	473,361	334,012
1994	98,600	153,641	98,656
1995	161,157	246,943	180,425
1996	160,952	246,621	163,494
1997	135,821	245,831	144,196
1998	158,223	186,807	151,775
1999	144,888	210,261	150,570

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
2000	78,275	131,084	72,260
2001	126,450	150,552	125,865
2002	56,545	121,192	56,527
2003	71,314	127,811	66,366
2004	109,668	123,590	102,709
2005	99,034	140,362	99,327
2006	48,615	117,524	52,969
2007	215,042	217,614	215,855
2008	177,368	297,829	177,583
2009	81,811	212,473	93,761
2010	195,568	310,546	193,587
2011	272,886	458,298	285,723
2012	93,343	122,531	106,461
2013	132,921	185,402	129,026
2014	121,199	238,511	126,643
2015	148,720	195,671	144,062
2016	150,242	175,309	152,297
2017	131,024	169,271	136,044
2018	138,300	267,605	148,434
2019	303,124	345,754	305,438

Kansas City

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1930	143,755	159,701	106,996
1931	64,271	111,615	68,523
1932	174,178	195,100	160,740
1933	107,903	140,761	76,619
1934	72,876	104,341	66,096
1935	215,046	254,900	133,790
1936	113,505	113,951	99,752
1937	101,835	144,179	75,360
1938	135,990	203,596	79,848
1939	135,379	187,799	111,019
1940	65,205	119,113	56,076
1941	205,402	258,440	110,851

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1942	201,834	267,816	150,707
1943	322,804	347,733	190,581
1944	300,992	299,035	212,302
1945	235,761	258,304	185,385
1946	122,262	166,449	116,520
1947	262,364	287,083	200,829
1948	208,750	219,104	168,916
1949	198,599	238,938	179,057
1950	194,377	258,801	164,425
1951	566,581	640,737	479,890
1952	406,305	594,563	197,010
1953	127,140	224,029	114,899

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1954	119,406	148,039	106,898
1955	96,585	152,943	85,954
1956	66,283	149,638	57,358
1957	144,627	236,661	133,611
1958	191,793	227,595	168,523
1959	152,447	194,284	133,354
1960	247,006	345,490	202,598
1961	173,925	169,063	150,975
1962	201,728	263,146	188,521
1963	92,783	183,040	94,737
1964	154,293	266,324	132,533
1965	223,891	292,275	218,074
1966	99,397	158,543	109,900
1967	251,865	360,914	245,034
1968	120,371	176,003	98,924
1969	189,078	290,030	181,287
1970	125,400	215,153	103,469
1971	141,797	205,042	134,072
1972	120,510	206,384	122,348
1973	253,957	306,723	239,583
1974	326,568	418,978	300,594
1975	109,645	227,485	115,071
1976	115,375	161,430	119,890
1977	201,248	241,023	184,949
1978	203,384	307,481	185,086
1979	206,010	270,741	194,544
1980	158,739	199,774	149,164
1981	126,753	205,494	119,672
1982	204,495	292,766	171,069
1983	185,441	250,694	166,015
1984	256,397	354,087	247,374
1985	119,214	135,618	124,080
1986	211,884	274,878	203,196

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1987	238,269	278,036	227,669
1988	64,548	106,351	73,570
1989	209,812	244,530	192,777
1990	135,979	207,600	130,442
1991	113,052	200,618	107,406
1992	171,331	236,098	149,977
1993	541,316	700,171	537,390
1994	101,435	161,858	125,745
1995	214,954	331,962	217,713
1996	185,380	263,108	184,358
1997	188,683	331,081	192,498
1998	160,487	211,709	151,169
1999	209,479	332,647	208,321
2000	80,992	144,283	78,640
2001	173,204	251,325	154,961
2002	74,321	127,414	81,676
2003	76,498	135,371	73,483
2004	110,133	139,379	103,615
2005	135,482	219,495	120,556
2006	97,970	128,542	99,055
2007	285,221	390,091	286,830
2008	197,028	329,279	199,355
2009	165,767	299,164	165,838
2010	213,499	357,809	210,910
2011	257,349	409,918	273,723
2012	108,612	132,136	113,190
2013	161,511	222,694	155,996
2014	134,154	252,755	135,762
2015	217,715	320,314	206,169
2016	232,276	311,637	216,951
2017	160,223	217,214	160,635
2018	139,825	276,968	148,737
2019	308,985	417,927	293,035

Waverly

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1930	147,847	164,559	110,911
1931	65,453	112,932	65,435
1932	164,854	193,860	149,774
1933	106,759	142,164	70,584
1934	71,806	101,867	65,227
1935	207,424	247,056	130,158
1936	119,939	115,262	100,091
1937	103,638	144,747	78,435
1938	136,768	207,880	84,442
1939	131,132	191,730	103,278
1940	68,632	123,091	59,442
1941	189,880	237,030	104,919
1942	198,419	268,441	138,452
1943	302,703	327,056	195,749
1944	331,854	330,132	268,289
1945	245,378	244,605	202,968
1946	120,221	168,520	112,963
1947	271,192	294,010	215,870
1948	215,461	221,009	188,268
1949	188,880	220,501	174,207
1950	192,693	257,563	163,713
1951	549,544	684,738	408,364
1952	359,154	534,669	190,092
1953	125,007	221,127	114,114
1954	114,281	145,092	99,748
1955	99,185	150,614	85,975
1956	63,990	149,840	54,860
1957	135,791	238,742	127,915
1958	192,936	224,500	172,515
1959	149,921	192,525	135,887
1960	245,721	317,148	210,951
1961	208,679	200,932	194,251
1962	192,160	241,552	181,002
1963	97,035	184,210	99,304
1964	157,240	262,095	134,026
1965	260,935	312,122	252,078

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1966	122,105	179,074	119,639
1967	246,803	339,410	241,119
1968	121,151	176,689	102,492
1969	182,735	280,926	179,171
1970	133,555	221,889	127,701
1971	124,278	208,151	129,536
1972	116,147	206,290	118,078
1973	240,978	275,792	231,633
1974	293,934	344,191	275,227
1975	105,021	225,949	110,490
1976	107,342	160,780	112,485
1977	229,068	260,381	215,609
1978	198,297	291,167	180,857
1979	192,939	253,744	187,938
1980	169,876	207,541	161,366
1981	136,379	204,189	129,882
1982	206,700	282,310	175,975
1983	219,530	241,391	201,913
1984	242,722	335,092	247,185
1985	124,684	136,551	131,007
1986	211,006	274,587	204,553
1987	219,684	280,207	209,425
1988	67,345	107,332	75,903
1989	202,204	233,293	184,654
1990	187,478	222,991	188,682
1991	124,190	208,156	117,733
1992	176,620	238,802	158,981
1993	629,865	784,216	638,965
1994	119,755	159,664	141,214
1995	250,862	358,293	264,349
1996	192,770	268,988	187,979
1997	201,436	314,102	203,468
1998	158,137	222,146	148,277
1999	228,103	307,320	228,048
2000	92,822	155,269	90,751
2001	166,523	238,640	151,574

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
2002	101,493	128,963	106,587
2003	77,117	135,597	75,836
2004	122,736	146,367	117,297
2005	156,997	234,663	141,978
2006	109,821	143,717	110,738
2007	298,321	337,131	298,213
2008	205,855	322,316	207,150
2009	174,928	293,926	175,761
2010	222,689	332,461	220,898

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
2011	261,547	394,146	266,089
2012	111,722	132,373	112,128
2013	206,925	252,270	202,268
2014	141,138	254,052	145,321
2015	262,398	329,037	257,346
2016	269,737	327,984	262,466
2017	166,371	217,725	167,272
2018	144,072	276,277	149,025
2019	323,114	444,380	305,285

Boonville

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1930	149,354	166,944	108,969
1931	73,548	115,962	79,110
1932	219,239	223,226	205,872
1933	105,446	148,034	91,003
1934	72,374	101,848	76,294
1935	300,024	316,025	254,753
1936	131,691	128,630	120,626
1937	118,339	159,722	121,478
1938	141,609	211,211	137,811
1939	165,728	189,118	139,341
1940	75,911	122,786	69,668
1941	214,289	253,276	129,955
1942	314,512	365,446	237,743
1943	350,752	362,661	237,993
1944	467,670	467,832	441,775
1945	277,033	288,899	237,213
1946	149,780	179,016	149,785
1947	433,235	445,175	383,403
1948	261,757	267,368	228,103
1949	196,851	230,071	181,466
1950	210,841	254,846	187,279
1951	439,131	572,136	389,941
1952	355,158	441,242	187,943
1953	147,276	223,436	136,599

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1954	130,506	176,961	113,387
1955	126,924	180,879	125,519
1956	82,549	169,567	76,240
1957	138,671	240,908	128,419
1958	249,953	280,283	219,094
1959	172,956	203,864	158,058
1960	326,484	380,398	274,500
1961	277,658	272,334	267,422
1962	211,628	257,554	201,115
1963	115,049	185,216	121,142
1964	182,039	288,154	168,090
1965	279,865	327,952	257,775
1966	178,997	235,849	175,055
1967	279,392	400,887	273,443
1968	133,073	181,215	131,832
1969	235,799	296,802	217,473
1970	215,910	249,833	213,288
1971	154,390	226,698	173,002
1972	143,111	208,640	148,517
1973	327,804	329,576	321,608
1974	310,937	372,698	298,871
1975	192,266	239,996	191,901
1976	161,077	187,941	165,402
1977	260,854	287,258	248,053

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1978	255,680	357,390	238,711
1979	239,312	302,500	234,452
1980	188,638	212,462	180,971
1981	238,103	291,879	231,245
1982	275,180	345,640	246,868
1983	309,629	336,732	288,214
1984	302,157	344,757	297,190
1985	287,777	296,366	292,839
1986	276,530	317,516	268,673
1987	330,365	389,778	339,616
1988	124,198	117,966	119,710
1989	225,539	253,993	208,981
1990	284,836	320,496	286,880
1991	134,168	209,449	135,532
1992	212,445	267,045	196,604
1993	752,543	1,042,555	793,274
1994	242,754	266,573	273,061
1995	362,070	415,038	367,764
1996	297,194	330,250	291,993
1997	280,538	362,506	284,095
1998	237,557	264,697	224,002

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1999	288,460	329,246	294,002
2000	125,734	191,891	121,658
2001	298,283	364,275	291,521
2002	227,960	245,477	233,356
2003	110,644	146,636	107,756
2004	177,294	204,806	178,068
2005	197,962	261,669	183,671
2006	102,760	134,859	104,615
2007	345,741	410,197	347,698
2008	278,404	407,663	283,328
2009	268,321	394,208	272,039
2010	298,937	336,061	281,925
2011	262,455	385,850	273,660
2012	135,783	143,964	132,943
2013	356,142	383,847	352,347
2014	205,217	268,484	211,823
2015	276,439	327,584	271,191
2016	283,508	302,507	278,748
2017	218,946	299,682	211,243
2018	165,135	274,434	161,652
2019	396,946	482,530	394,520

Hermann

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1930	163,599	195,551	131,463
1931	115,606	133,636	130,409
1932	265,800	269,596	246,674
1933	193,707	210,012	206,754
1934	77,743	101,992	108,005
1935	464,189	477,682	342,041
1936	157,077	163,208	154,132
1937	192,566	232,011	183,771
1938	241,459	265,175	199,811
1939	257,279	271,206	250,502
1940	110,344	157,613	106,232
1941	276,868	280,981	190,340

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1942	425,710	469,659	322,869
1943	545,888	588,903	397,469
1944	576,481	580,171	462,856
1945	401,818	401,325	295,397
1946	224,963	254,663	235,063
1947	490,714	502,148	405,153
1948	326,861	377,457	280,964
1949	236,344	269,351	223,413
1950	264,012	301,517	229,226
1951	563,473	686,169	417,415
1952	363,100	446,760	239,305
1953	172,867	225,118	152,211

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1954	147,901	195,205	126,125
1955	188,292	198,365	178,354
1956	146,369	183,780	143,705
1957	191,239	313,241	167,451
1958	334,382	365,674	268,062
1959	190,388	213,992	170,299
1960	331,434	376,470	272,057
1961	406,922	413,857	288,299
1962	292,969	308,141	283,698
1963	144,741	190,764	149,551
1964	200,719	296,103	209,550
1965	311,362	332,299	300,049
1966	188,790	232,398	200,596
1967	374,364	488,081	332,212
1968	190,112	215,778	194,349
1969	330,824	385,462	321,053
1970	379,352	362,956	373,528
1971	204,921	255,549	205,186
1972	193,671	214,194	193,532
1973	496,934	514,118	443,552
1974	320,112	394,963	293,741
1975	289,808	322,744	283,703
1976	194,806	223,041	189,740
1977	250,890	274,065	247,828
1978	356,014	402,391	345,622
1979	309,052	392,638	322,563
1980	209,986	257,750	208,156
1981	297,310	434,340	307,170
1982	305,615	434,677	276,687
1983	408,155	508,917	433,564
1984	327,099	374,593	305,563
1985	430,299	656,541	440,169
1986	337,470	455,657	340,439
1987	517,589	1,009,747	524,600
1988	191,997	262,150	186,706
1989	216,598	251,633	209,453
1990	402,301	512,944	407,548

Water Year	HEC-RAS, cfs		
	Observed	Unregulated	Regulated
1991	167,831	222,222	172,236
1992	243,365	299,392	228,545
1993	747,297	1,088,325	783,414
1994	449,159	746,298	460,487
1995	520,451	790,096	549,952
1996	292,731	353,848	288,291
1997	309,495	415,710	309,567
1998	296,204	346,458	270,003
1999	369,854	504,128	374,884
2000	145,722	221,045	146,804
2001	357,274	470,919	346,240
2002	353,511	462,511	351,335
2003	154,080	166,960	144,031
2004	222,172	309,529	227,844
2005	271,272	342,631	269,592
2006	138,851	189,934	143,735
2007	329,061	437,574	329,716
2008	388,845	488,564	399,912
2009	297,662	488,439	293,645
2010	318,836	436,591	303,782
2011	282,745	388,278	274,794
2012	192,240	250,574	194,346
2013	432,586	514,100	432,067
2014	191,743	285,432	199,645
2015	322,957	438,217	289,535
2016	478,616	684,142	460,667
2017	465,974	651,540	454,699
2018	173,921	278,883	170,235
2019	412,790	600,569	390,318