

05487540 WALNUT CREEK NEAR PRAIRIE CITY, IA—Continued

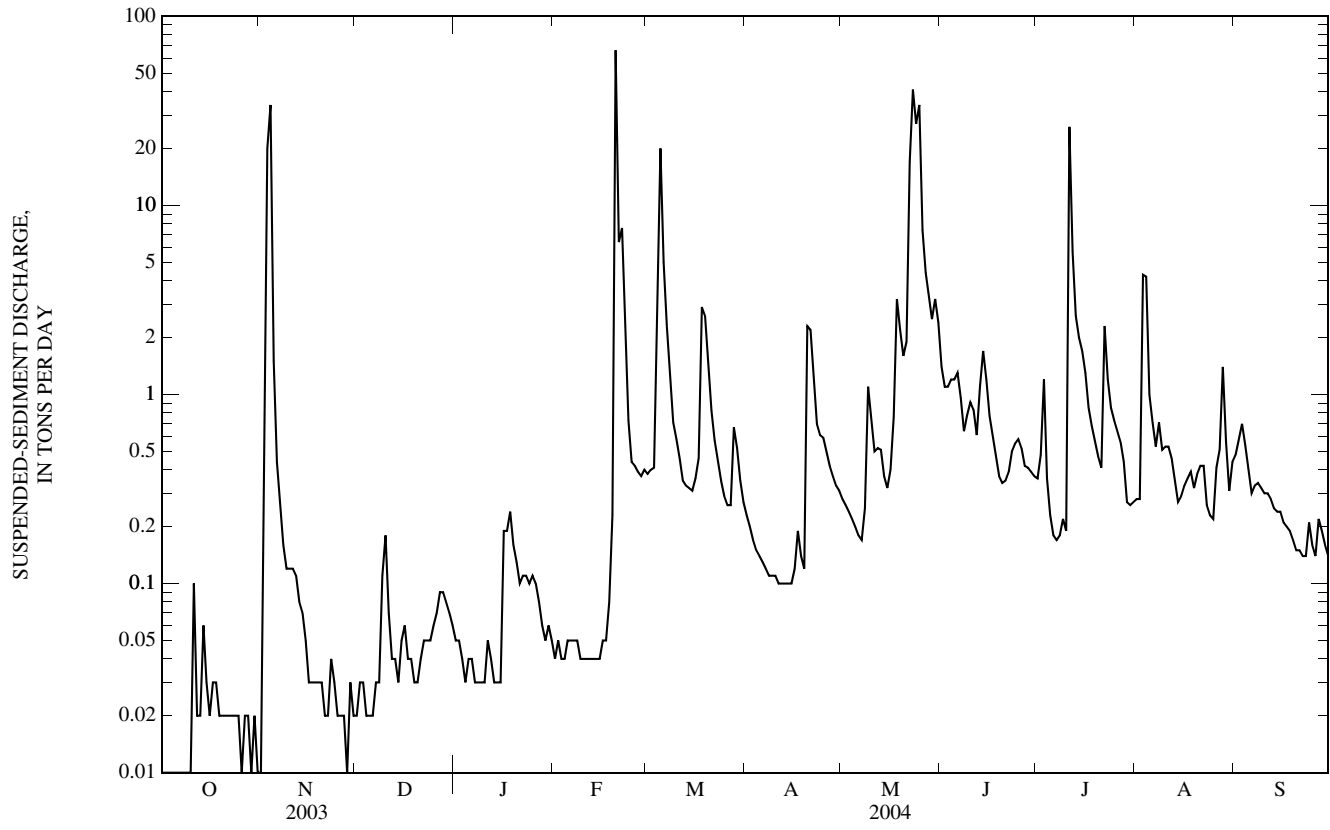
 TEMPERATURE, WATER, DEGREES CELSIUS
 WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
 DAILY INSTANTANEOUS VALUES

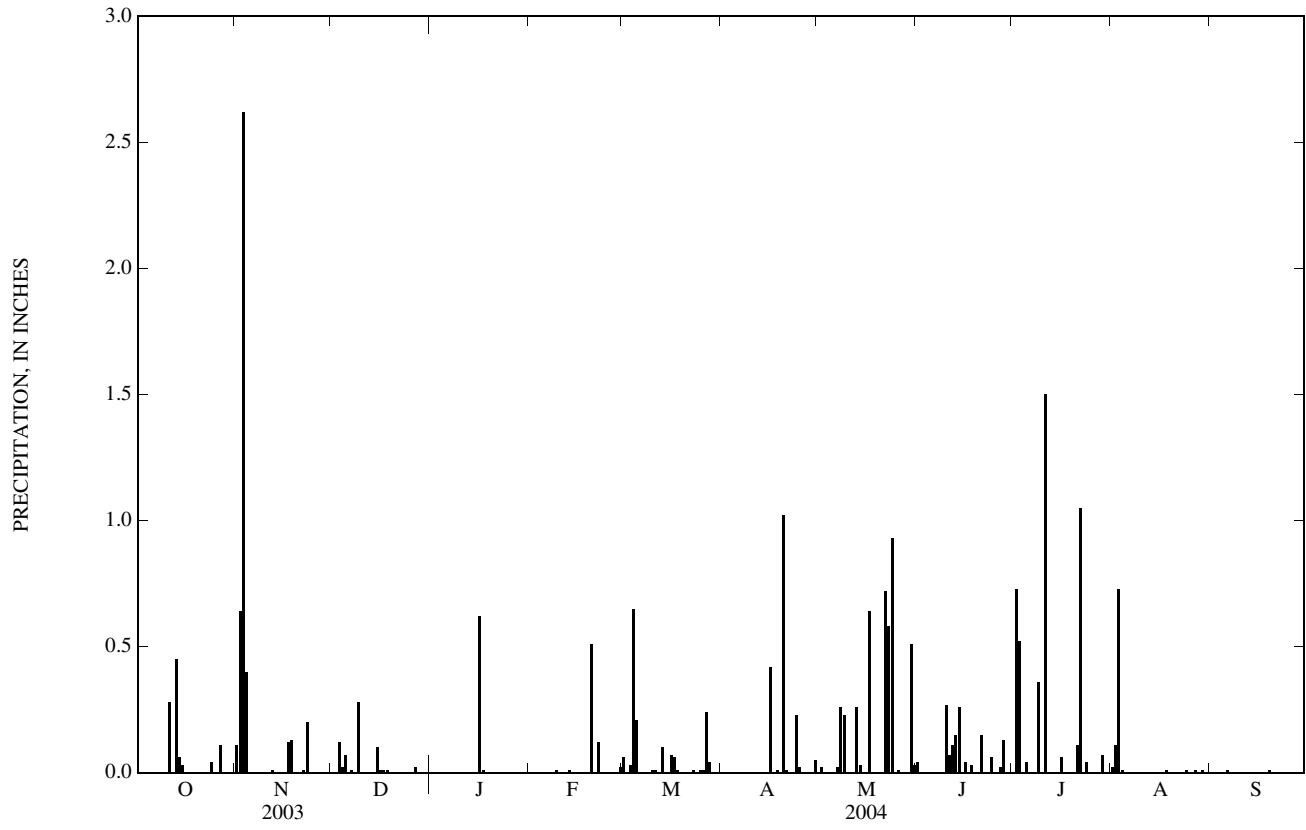
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	6.7	---	---	14.0	---	20.1	---
2	---	6.6	---	---	---	---	---	---	16.1	---	24.7	---
3	---	8.0	---	---	---	---	---	---	---	20.2	22.7	---
4	---	10.5	---	---	2.8	---	12.4	---	20.4	---	20.5	---
5	13.4	8.5	5.4	---	---	5.2	---	---	---	21.7	20.5	---
6	---	---	---	---	---	---	---	---	21.6	18.6	20.8	---
7	---	---	3.5	---	---	---	---	---	---	---	21.4	---
8	---	6.4	6.8	---	---	9.5	6.5	---	19.4	---	22.9	---
9	---	7.6	---	---	---	---	---	---	21.7	---	23.2	---
10	---	---	---	---	---	---	---	18.3	---	---	18.6	---
11	---	---	---	3.1	---	---	---	23.1	23.9	---	---	---
12	14.4	8.2	---	---	---	8.7	---	18.3	21.3	19.9	14.8	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	14.5	---	1.8	---	---	---	---	16.4	21.8	---	17.1	---
15	---	---	---	---	---	---	---	17.7	20.0	24.0	21.7	---
16	---	11.8	1.5	---	---	---	---	---	19.9	---	---	---
17	---	---	---	---	---	---	---	20.3	---	22.5	23.0	---
18	---	11.7	---	---	---	---	---	16.3	17.9	---	19.7	---
19	---	10.8	---	---	---	8.7	---	18.2	20.3	---	---	---
20	---	11.9	---	---	0.8	9.9	---	19.7	---	---	---	---
21	---	6.4	---	4.1	---	7.8	---	23.6	---	---	---	---
22	---	---	5.9	---	---	9.1	---	19.6	19.2	---	21.4	---
23	---	---	---	---	2.7	---	10.3	14.8	21.2	---	---	---
24	---	---	---	---	3.2	16.5	---	17.3	---	---	23.2	---
25	---	---	---	---	---	---	---	16.0	20.5	---	20.6	---
26	---	---	5.2	2.9	---	---	---	15.6	---	21.1	23.1	---
27	---	---	---	---	---	---	7.0	---	---	21.5	22.5	---
28	---	3.6	---	---	---	---	---	17.6	---	23.5	---	---
29	8.5	4.4	2.9	---	---	---	---	20.4	21.9	20.8	21.6	---
30	---	---	---	---	---	---	---	17.7	---	---	20.2	---
31	---	---	---	---	---	---	---	---	---	---	22.2	---

05487540 WALNUT CREEK NEAR PRAIRIE CITY, IA—Continued

 SUSPENDED-SEDIMENT
 WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Day	Mean concentration (mg/l)		Load (tons/day)		Mean concentration (mg/l)		Load (tons/day)		Mean concentration (mg/l)		Load (tons/day)		Mean concentration (mg/l)		Load (tons/day)	
	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH										
1	37	0.00	35	0.01	6	0.02	11	0.05	20	0.04	33	0.38				
2	45	0.01	87	0.17	8	0.03	10	0.05	19	0.05	35	0.40				
3	41	0.01	318	20	7	0.03	9	0.04	17	0.04	36	0.41				
4	42	0.01	210	34	6	0.02	8	0.03	16	0.04	107	4.4				
5	43	0.01	52	1.5	4	0.02	9	0.04	16	0.05	225	20				
6	43	0.01	28	0.44	5	0.02	10	0.04	15	0.05	119	5.0				
7	43	0.00	21	0.27	7	0.03	8	0.03	15	0.05	74	2.3				
8	43	0.00	16	0.16	7	0.03	8	0.03	15	0.05	54	1.3				
9	44	0.00	13	0.12	12	0.11	8	0.03	14	0.04	34	0.71				
10	45	0.01	13	0.12	13	0.18	8	0.03	13	0.04	29	0.58				
11	47	0.10	14	0.12	9	0.07	11	0.05	13	0.04	26	0.46				
12	49	0.02	16	0.11	6	0.04	10	0.04	14	0.04	22	0.35				
13	47	0.02	14	0.08	6	0.04	8	0.03	15	0.04	21	0.33				
14	45	0.06	11	0.07	5	0.03	8	0.03	16	0.04	22	0.32				
15	47	0.03	8	0.05	8	0.05	8	0.03	17	0.04	22	0.31				
16	48	0.02	6	0.03	9	0.06	14	0.19	19	0.05	23	0.36				
17	50	0.03	5	0.03	7	0.04	17	0.19	20	0.05	27	0.46				
18	52	0.03	5	0.03	7	0.04	27	0.24	21	0.08	72	2.9				
19	54	0.02	6	0.03	6	0.03	26	0.16	44	0.23	65	2.6				
20	53	0.02	6	0.03	7	0.03	24	0.13	467	66	47	1.4				
21	51	0.02	5	0.02	7	0.04	22	0.10	157	6.4	32	0.82				
22	50	0.02	6	0.02	7	0.05	22	0.11	148	7.6	25	0.57				
23	48	0.02	8	0.04	8	0.05	24	0.11	121	3.1	22	0.45				
24	47	0.02	6	0.03	10	0.05	25	0.10	59	0.73	19	0.35				
25	45	0.02	5	0.02	11	0.06	26	0.11	44	0.44	17	0.29				
26	44	0.01	5	0.02	13	0.07	28	0.10	41	0.42	16	0.26				
27	42	0.02	4	0.02	14	0.09	26	0.08	39	0.39	16	0.26				
28	41	0.02	4	0.01	14	0.09	24	0.06	37	0.37	32	0.67				
29	39	0.01	7	0.03	15	0.08	25	0.05	35	0.40	27	0.52				
30	38	0.02	5	0.02	14	0.07	29	0.06	---	---	20	0.35				
31	37	0.01	---	---	12	0.06	22	0.05	---	---	16	0.27				
TOTAL	---	0.60	---	57.60	---	1.63	---	2.39	---	86.91	---	49.78				





05487550 WALNUT CREEK NEAR VANDALIA, IA

LOCATION.--Lat 41°32'13", long 93°15'32", in NW¹/₄ NE¹/₄ sec.27, T.78 N., R.21 W., Jasper County, Hydrologic Unit 07100008, on right bank downstream side of bridge.

DRAINAGE AREA.--20.3 mi².

WATER DISCHARGE RECORDS

PERIOD OF RECORD.--October 1994 to current year.

GAGE.--Water-stage recorder. Concrete control. Datum of gage is 785.15 ft above NGVD of 1929.

REMARKS.--Records good except those for estimated daily discharge, which are poor. U.S. Geological Survey rain gage and data collection platform with satellite and telephone modem telemetry at station. Precipitation records are not published, but are available.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.15	e0.71	6.3	7.7	e3.3	e13	21	16	38	9.5	7.2	7.8
2	0.14	e2.8	6.3	7.0	5.6	12	20	15	31	10	7.3	6.9
3	0.16	e63	7.3	6.6	5.5	11	19	15	28	29	74	6.5
4	0.14	216	6.8	e6.5	5.1	31	18	14	25	13	98	6.0
5	0.15	34	6.9	e4.9	5.3	118	17	13	24	11	24	5.9
6	0.15	24	6.5	e5.1	7.1	39	17	13	22	11	14	6.3
7	0.15	18	6.8	e5.0	5.0	29	17	12	20	10	12	5.4
8	0.14	15	8.2	e5.8	5.5	23	16	12	18	9.9	11	4.9
9	0.12	13	13	e5.6	5.2	18	16	28	17	11	10	4.7
10	0.23	13	19	5.7	5.4	18	15	17	19	9.9	9.3	4.3
11	0.21	12	13	6.5	5.4	14	15	15	17	137	8.8	4.1
12	1.0	11	11	6.8	5.3	13	15	15	16	65	8.3	4.0
13	0.26	9.6	9.9	6.1	7.1	12	14	16	18	26	8.0	3.8
14	1.7	9.8	10	5.9	8.0	12	14	15	21	17	7.5	3.8
15	0.89	9.8	9.8	5.3	7.6	11	14	14	16	13	7.2	4.1
16	0.43	9.1	8.9	12	12	12	14	13	15	12	6.9	3.9
17	0.32	9.1	8.5	26	10	16	16	18	14	11	6.7	3.6
18	0.32	9.8	8.3	8.9	9.8	64	14	58	14	10	7.6	3.4
19	0.26	8.6	7.4	7.6	e24	61	13	26	13	9.5	7.5	3.1
20	0.27	8.2	7.9	7.0	e127	42	57	22	13	8.9	6.7	3.0
21	0.23	7.6	8.2	6.9	e34	30	50	19	13	8.7	6.2	2.8
22	0.20	7.6	8.8	6.2	e37	27	27	50	12	28	5.9	2.5
23	0.19	9.8	8.3	7.1	e22	25	23	135	11	16	5.7	2.3
24	0.19	8.1	7.3	6.9	15	22	23	139	11	11	7.3	2.4
25	0.20	7.7	7.5	6.7	e11	21	24	225	11	9.5	6.9	2.1
26	0.20	7.3	7.3	6.9	e9.8	20	21	89	10	8.8	6.9	2.4
27	0.20	7.2	8.4	5.8	e10	20	18	61	10	8.6	15	2.4
28	0.26	6.3	9.0	e5.1	e11	34	18	51	11	8.1	65	2.2
29	0.28	7.2	7.5	e5.1	e11	24	17	47	10	7.8	13	2.3
30	0.23	7.1	6.9	e2.5	---	24	17	59	10	7.5	10	2.5
31	0.22	---	6.9	e1.6	---	23	---	48	---	7.4	8.5	---
TOTAL	9.59	572.41	267.9	212.8	430.0	839	600	1,290	508	555.1	492.4	119.4
MEAN	0.31	19.1	8.64	6.86	14.8	27.1	20.0	41.6	16.9	17.9	15.9	3.98
MAX	1.7	216	19	26	127	118	57	225	38	137	98	7.8
MIN	0.12	0.71	6.3	1.6	3.3	11	13	12	10	7.4	5.7	2.1
AC-FT	19	1,140	531	422	853	1,660	1,190	2,560	1,010	1,100	977	237
CFSM	0.02	0.94	0.43	0.34	0.73	1.33	0.99	2.05	0.83	0.88	0.78	0.20
IN.	0.02	1.05	0.49	0.39	0.79	1.54	1.10	2.36	0.93	1.02	0.90	0.22

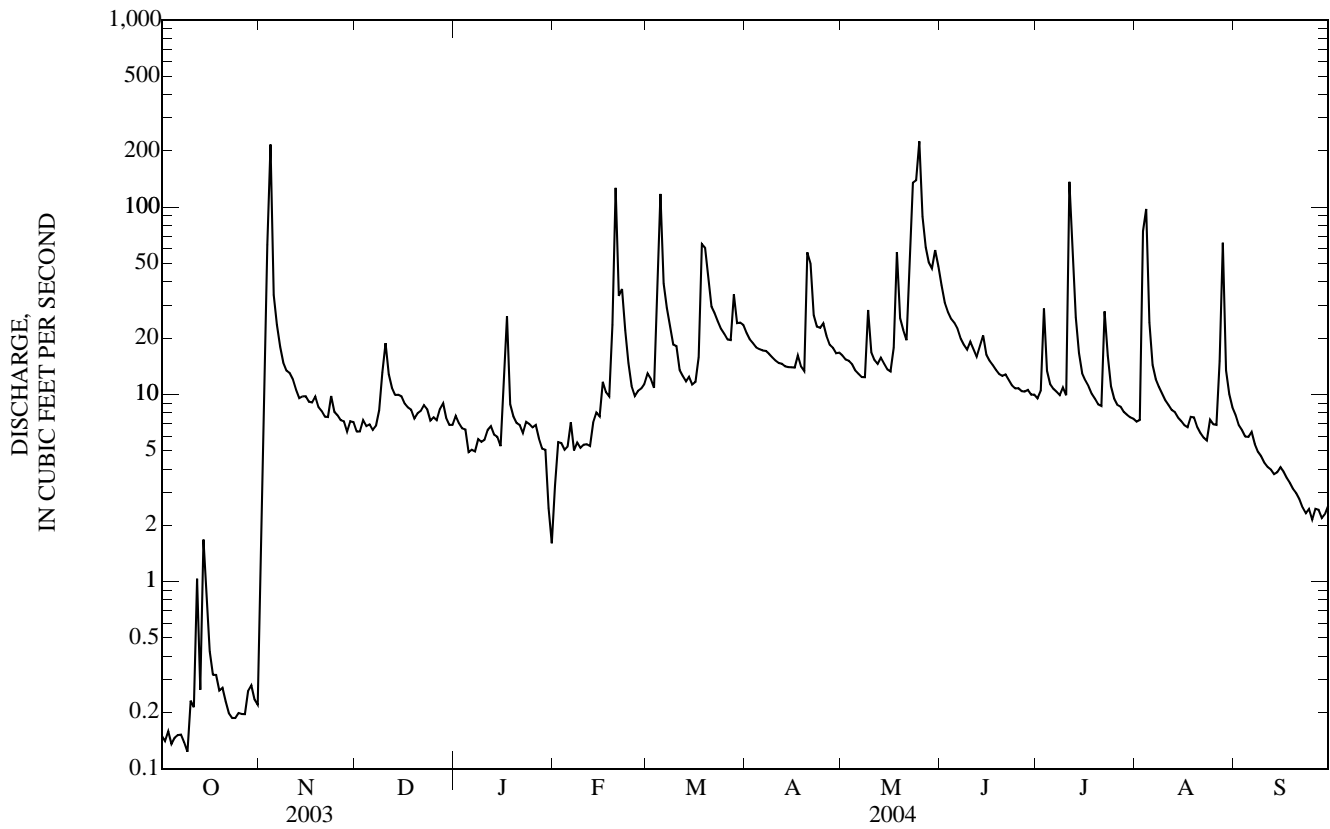
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 2004, BY WATER YEAR (WY)

MEAN	3.43	5.63	3.53	3.40	17.2	18.1	19.0	44.0	31.6	19.2	8.47	2.45
MAX	8.36	19.1	8.64	10.3	58.8	66.3	47.4	86.1	97.8	42.4	31.2	7.02
(WY)	(2003)	(2004)	(2004)	(1998)	(1996)	(2001)	(1995)	(1996)	(1998)	(1998)	(1999)	(1999)
MIN	0.21	0.49	0.27	0.79	1.32	3.82	5.62	14.3	15.2	6.40	2.44	0.62
(WY)	(1995)	(1995)	(2001)	(2003)	(2003)	(2000)	(1996)	(2002)	(1995)	(2001)	(1997)	(2003)

05487550 WALNUT CREEK NEAR VANDALIA, IA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1995 - 2004	
ANNUAL TOTAL	5,321.39		5,896.60			
ANNUAL MEAN	14.6		16.1		14.6	
HIGHEST ANNUAL MEAN					27.5	1998
LOWEST ANNUAL MEAN					7.13	2002
HIGHEST DAILY MEAN	329	Jul 8	225	May 25	573	May 24, 1996
LOWEST DAILY MEAN	0.04	Sep 8 a	0.12	Oct 9	0.04	Sep 8, 2003 a
ANNUAL SEVEN-DAY MINIMUM	0.06	Sep 4	0.14	Oct 3	0.06	Sep 4, 2003
MAXIMUM PEAK FLOW			672	May 24	1,380	Jun 14, 1998
MAXIMUM PEAK STAGE			9.52	Feb 20 b	10.85	Jun 14, 1998
INSTANTANEOUS LOW FLOW			0.10	Oct 4 c	0.01	Jan 8, 1996
ANNUAL RUNOFF (AC-FT)	10,550		11,700		10,610	
ANNUAL RUNOFF (CFSM)	0.718		0.794		0.721	
ANNUAL RUNOFF (INCHES)	9.75		10.81		9.80	
10 PERCENT EXCEEDS	24		28		31	
50 PERCENT EXCEEDS	5.1		9.9		5.9	
90 PERCENT EXCEEDS	0.23		2.3		0.69	

- a Also Sept. 9, 10.
- b Ice affected.
- c Also Oct. 8, 9.
- e Estimated.



05487550 WALNUT CREEK NEAR VANDALIA, IA—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--March 1995 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March 1995 to current year.

WATER TEMPERATURES: March 1995 to current year.

SUSPENDED-SEDIMENT DISCHARGE: March 1995 to current year.

REMARKS.--Records of specific conductance are obtained from suspended-sediment samples at time of analysis.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 771 microsiemens Oct. 10, 1995; minimum daily, 137 microsiemens Feb. 18, 1997.

WATER TEMPERATURES: Maximum daily, 33.5°C Aug. 1, 2001; minimum daily, 0.0°C many days in winter.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 3,120 mg/L Mar. 30, 1998; minimum daily mean, 4.0 mg/L Feb. 15, 17, 19, 21, 2001.

SEDIMENT LOADS: Maximum daily, 4,600 tons Mar. 30, 1998; minimum daily, 0.00 tons Sept. 4-10, 2003 and Oct. 9, 2003.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 582 microsiemens Oct. 12; minimum daily, 291 microsiemens Nov. 3.

WATER TEMPERATURES: Maximum daily, 26.6°C Aug. 2; minimum daily, 0.5°C Jan. 21.

SEDIMENT CONCENTRATIONS: Maximum daily mean, 1,400 mg/L May 23; minimum daily mean, 6.0 mg/L Dec. 5, 6.

SEDIMENT LOADS: Maximum daily, 527 tons May 23; minimum daily, 0.00 tons Oct. 9.

SPECIFIC CONDUCTANCE, WATER, UNFILTERED, LABORATORY, MICROSIEMENS PER CENTIMETER AT 25 DEGREES CELSIUS
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	463	---	---	---	---	421	---	---	500	---	522	474
2	---	442	---	---	---	---	---	---	503	476	492	509
3	---	291	---	---	---	---	---	---	507	479	360	526
4	---	329	---	---	414	---	---	---	---	---	436	522
5	444	---	461	---	---	405	---	---	506	518	495	453
6	---	460	---	---	---	---	---	---	511	514	502	503
7	---	469	438	---	---	---	---	---	---	---	---	469
8	472	472	---	---	---	464	484	---	515	520	507	430
9	---	472	---	---	---	460	---	---	517	---	472	---
10	---	---	---	---	---	464	---	511	---	---	486	489
11	---	---	---	377	---	---	---	---	521	---	473	---
12	582	480	482	---	---	480	---	516	520	474	---	---
13	---	---	---	---	---	---	---	484	---	---	---	---
14	549	---	462	---	---	467	---	510	480	---	481	---
15	---	---	---	---	---	---	---	471	517	514	488	---
16	---	476	465	---	---	---	---	---	521	---	464	---
17	---	480	---	---	---	523	---	504	---	519	489	---
18	---	470	---	---	---	---	---	490	527	---	498	---
19	491	472	---	---	---	---	---	494	526	525	478	---
20	---	475	---	---	---	460	---	504	---	---	456	---
21	---	477	---	394	---	466	---	511	528	---	---	---
22	---	---	465	---	---	467	---	405	471	---	498	546
23	---	---	418	---	381	---	485	381	467	---	---	549
24	---	482	---	---	429	468	475	490	424	---	496	507
25	---	---	---	---	443	---	---	437	465	---	489	---
26	---	468	---	423	---	---	---	471	---	502	525	545
27	---	---	---	---	---	---	490	---	---	486	513	551
28	---	466	---	---	---	---	---	---	---	538	---	510
29	470	482	452	---	---	---	---	494	509	---	501	---
30	---	---	---	---	---	---	---	---	---	---	512	---
31	---	---	---	---	---	---	---	496	---	---	507	---

05487550 WALNUT CREEK NEAR VANDALIA, IA—Continued

 TEMPERATURE, WATER, DEGREES CELSIUS
 WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
 DAILY INSTANTANEOUS VALUES

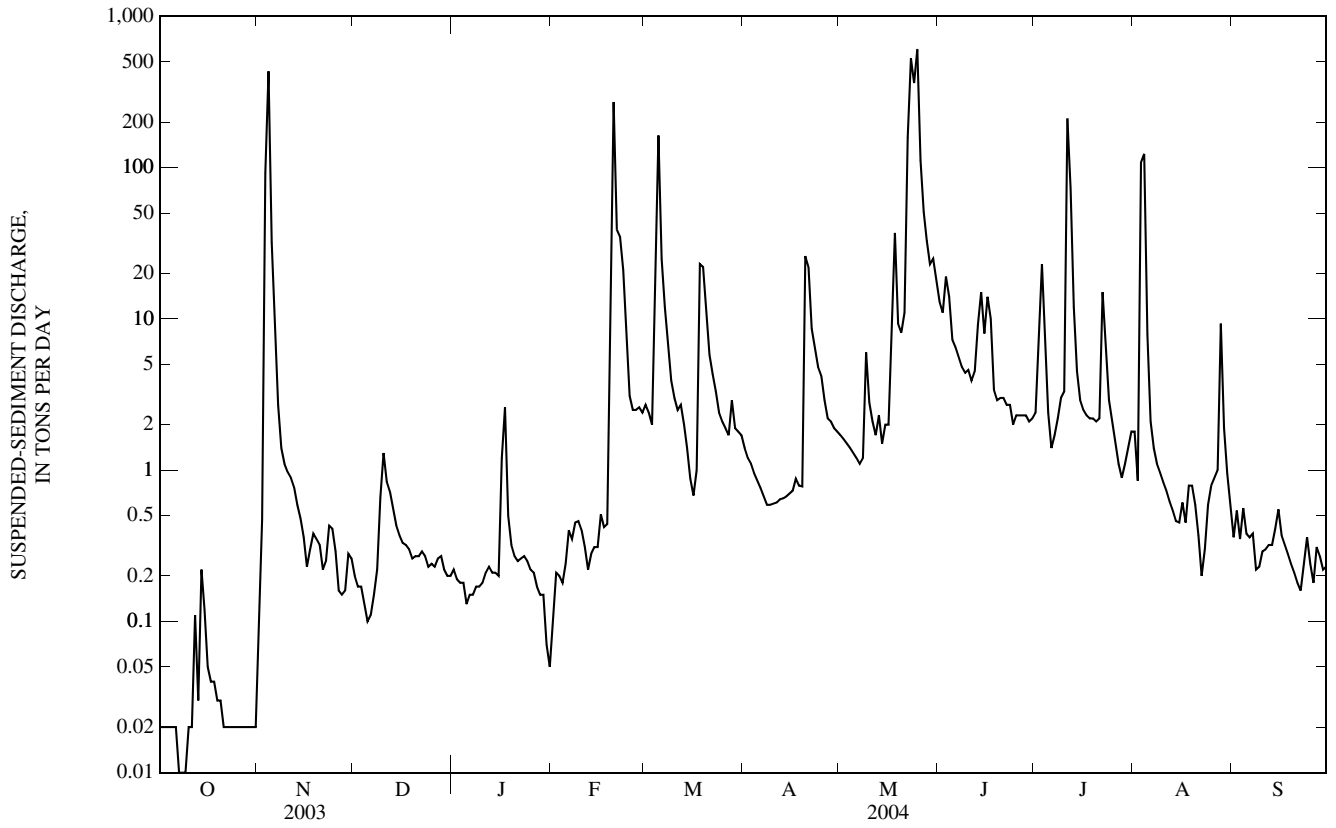
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	6.5	---	---	17.1	---	22.5	---
2	---	6.8	---	---	---	---	---	---	16.4	24.6	26.6	---
3	---	7.6	---	---	---	---	---	---	17.9	21.9	25.1	---
4	---	9.5	---	---	3.4	---	---	---	---	---	20.7	---
5	12.7	---	3.4	---	---	4.9	---	---	17.6	21.0	23.9	---
6	---	8.3	---	---	---	---	---	---	17.6	22.0	22.4	---
7	---	6.9	1.9	---	---	---	---	---	---	---	---	---
8	16.5	4.4	---	---	---	9.0	9.2	---	20.7	---	24.0	---
9	---	5.9	---	---	---	---	---	---	23.1	---	24.8	---
10	---	---	---	---	---	---	---	21.0	---	---	20.8	---
11	---	---	---	2.3	---	---	---	---	23.9	---	17.3	---
12	13.7	7.7	---	---	---	7.6	---	20.8	22.4	21.6	---	---
13	---	---	---	---	---	---	---	14.0	---	---	---	---
14	15.5	---	3.8	---	---	8.8	---	12.9	24.5	---	20.2	---
15	---	---	---	---	---	---	---	17.5	21.8	25.1	21.5	---
16	---	10.7	1.5	---	---	---	---	---	22.1	---	19.2	---
17	---	6.8	---	---	---	8.3	---	21.7	---	23.6	19.3	---
18	---	11.4	---	---	---	---	---	17.6	18.1	---	20.4	---
19	---	10.7	---	---	---	---	---	18.8	19.1	26.1	17.0	---
20	---	11.9	---	---	---	10.2	---	20.1	---	---	17.5	---
21	---	6.7	---	0.5	---	6.8	---	24.2	---	---	---	---
22	---	---	4.9	---	---	9.0	---	21.1	22.0	---	23.6	---
23	---	---	1.8	---	2.2	---	16.1	16.4	21.6	---	---	---
24	---	1.5	---	---	2.9	15.8	12.4	17.6	15.8	---	23.7	---
25	---	---	---	---	---	---	---	17.2	20.6	---	21.9	---
26	---	---	---	4.3	---	---	---	16.5	---	23.2	25.9	---
27	---	---	---	---	---	---	9.5	---	---	---	25.0	---
28	---	3.4	---	---	---	---	---	---	---	24.6	---	15.0
29	8.8	2.7	1.2	---	---	---	---	19.1	20.8	---	21.5	---
30	---	---	---	---	---	---	---	---	---	---	18.6	---
31	---	---	---	---	---	---	---	17.0	---	---	23.5	---

05487550 WALNUT CREEK NEAR VANDALIA, IA—Continued

SUSPENDED-SEDIMENT
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Day	Mean concentration (mg/l)		Mean concentration (mg/l)		Mean concentration (mg/l)		Mean concentration (mg/l)		Mean concentration (mg/l)		Mean concentration (mg/l)	
	Mean concentration (mg/l)	Load (tons/day)	Mean concentration (mg/l)	Load (tons/day)	Mean concentration (mg/l)	Load (tons/day)	Mean concentration (mg/l)	Load (tons/day)	Mean concentration (mg/l)	Load (tons/day)	Mean concentration (mg/l)	Load (tons/day)
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	48	0.02	45	0.09	12	0.20	10	0.22	12	0.11	77	2.7
2	47	0.02	62	0.47	10	0.17	10	0.19	14	0.21	72	2.4
3	44	0.02	540	92	8	0.17	10	0.18	14	0.20	67	2.0
4	43	0.02	639	433	7	0.13	10	0.18	13	0.18	113	20
5	41	0.02	346	32	6	0.10	10	0.13	17	0.24	488	163
6	37	0.02	148	9.6	6	0.11	11	0.15	21	0.40	230	25
7	33	0.01	54	2.7	8	0.15	11	0.15	26	0.35	159	12
8	30	0.01	35	1.4	10	0.22	11	0.17	30	0.45	114	7.2
9	30	0.00	29	1.1	16	0.66	11	0.17	33	0.46	78	3.9
10	31	0.02	28	0.97	26	1.3	12	0.18	28	0.40	61	3.0
11	35	0.02	27	0.89	24	0.84	12	0.21	21	0.31	68	2.5
12	38	0.11	27	0.77	24	0.72	12	0.23	15	0.22	80	2.7
13	42	0.03	23	0.59	21	0.55	13	0.21	14	0.28	64	2.0
14	48	0.22	18	0.48	16	0.43	13	0.21	14	0.31	41	1.4
15	49	0.12	13	0.36	14	0.37	14	0.20	15	0.31	29	0.88
16	48	0.05	9	0.23	14	0.33	30	1.2	16	0.51	22	0.68
17	47	0.04	12	0.30	14	0.32	34	2.6	15	0.42	20	1.0
18	45	0.04	15	0.38	13	0.30	21	0.50	17	0.44	118	23
19	44	0.03	15	0.35	13	0.26	16	0.32	112	7.3	132	22
20	40	0.03	15	0.32	13	0.27	14	0.27	789	271	100	11
21	36	0.02	11	0.22	12	0.27	14	0.25	426	39	72	5.8
22	35	0.02	12	0.25	12	0.29	16	0.26	355	35	58	4.3
23	34	0.02	16	0.43	12	0.27	14	0.27	347	21	49	3.3
24	33	0.02	19	0.41	12	0.23	13	0.25	170	7.0	40	2.4
25	33	0.02	14	0.29	12	0.24	12	0.22	103	3.1	37	2.1
26	32	0.02	8	0.16	12	0.23	11	0.21	95	2.5	35	1.9
27	31	0.02	8	0.15	11	0.26	11	0.17	91	2.5	33	1.7
28	31	0.02	10	0.16	11	0.27	11	0.15	86	2.6	32	2.9
29	30	0.02	14	0.28	11	0.22	11	0.15	82	2.4	30	1.9
30	31	0.02	13	0.26	11	0.20	11	0.07	---	---	28	1.8
31	33	0.02	---	---	11	0.20	12	0.05	---	---	26	1.7
TOTAL	---	1.07	---	580.61	---	10.28	---	9.72	---	399.20	---	338.16

05487550 WALNUT CREEK NEAR VANDALIA, IA—Continued



05487550 WALNUT CREEK NEAR VANDALIA, IA—Continued

PRECIPITATION RECORDS

PERIOD OF RECORD.--April 1995 to current year.

INSTRUMENTATION.--Tipping bucket rain gage.

REMARKS.--Records good except for the winter period, which is poor due to intermittent snow accumulation and subsequent melting.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily accumulation, 4.72 in., May 9, 1996.

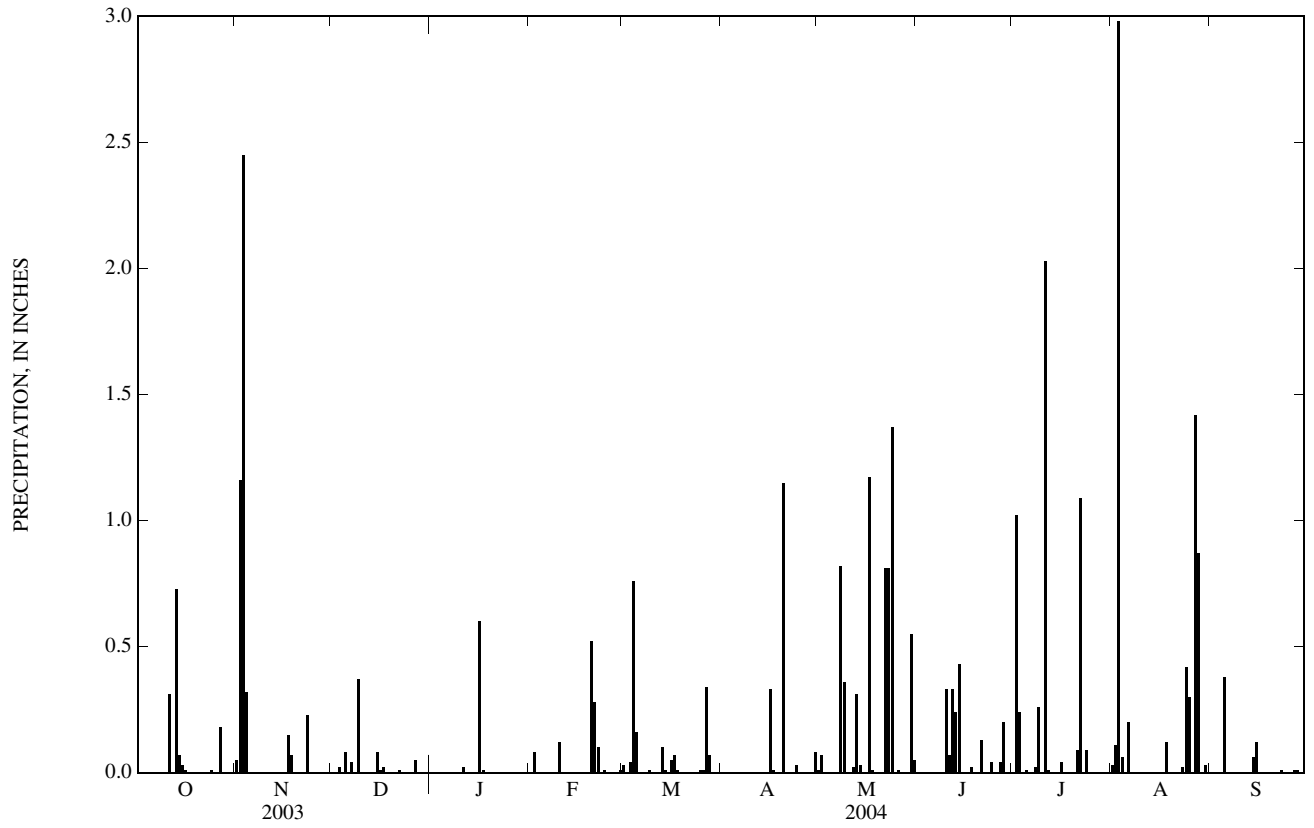
EXTREMES FOR CURRENT YEAR.--Maximum daily accumulation, 2.98 in., August 3.

PRECIPITATION, TOTAL, INCHES
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.05	0.00	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.03	0.00
2	0.00	1.16	0.00	0.00	0.08	0.00	0.00	0.07	0.00	1.02	0.11	0.00
3	0.00	2.45	0.02	0.00	0.00	0.04	0.00	0.00	0.00	0.24	2.98	0.00
4	0.00	0.32	0.00	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.06	0.00
5	0.00	0.00	0.08	0.00	0.00	0.16	0.00	0.00	0.00	0.01	0.00	0.38
6	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00
7	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.82	0.00	0.02	0.00	0.00
9	0.00	0.00	0.37	0.00	e0.00	0.01	0.00	0.36	0.00	0.26	0.00	0.00
10	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.33	0.00	0.00	0.00
11	0.31	0.00	0.00	0.02	e0.00	0.00	0.00	0.00	0.07	2.03	0.00	0.00
12	0.00	0.00	0.00	0.00	e0.00	0.00	0.00	0.02	0.33	0.01	0.00	0.00
13	0.73	0.00	0.00	0.00	e0.00	0.10	0.00	0.31	0.24	0.00	0.00	0.00
14	0.07	0.00	0.00	0.00	e0.00	0.01	0.00	0.03	0.43	0.00	0.00	0.06
15	0.03	0.00	0.08	0.00	e0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
16	0.01	0.00	0.01	0.60	e0.00	0.05	0.33	0.00	0.00	0.04	0.00	0.00
17	0.00	0.15	0.02	0.01	e0.00	0.07	0.01	1.17	0.00	0.00	0.00	0.00
18	0.00	0.07	0.00	0.00	e0.00	0.01	0.00	0.01	0.02	0.00	0.12	0.00
19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.52	0.00	1.15	0.00	0.00	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.13	0.09	0.00	0.00
22	0.00	0.00	0.01	0.00	0.10	0.00	0.00	0.81	0.00	1.09	0.00	0.00
23	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.81	0.00	0.00	0.02	0.01
24	0.01	0.00	0.00	0.00	0.01	0.00	0.03	1.37	0.04	0.09	0.42	0.00
25	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.30	0.00
26	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00
27	0.18	0.00	0.05	0.00	0.00	0.34	0.00	0.00	0.04	0.00	1.42	0.01
28	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.20	0.00	0.87	0.01
29	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	---	0.00	0.08	0.55	0.00	0.00	0.03	0.00
31	0.00	---	0.00	0.00	---	0.00	---	0.05	---	0.00	0.00	---
TOTAL	1.34	4.43	0.68	0.63	1.12	1.67	1.60	6.40	1.83	4.90	6.56	0.59
MEAN	0.04	0.15	0.02	0.02	0.04	0.05	0.05	0.21	0.06	0.16	0.21	0.02
MAX	0.73	2.45	0.37	0.60	0.52	0.76	1.15	1.37	0.43	2.03	2.98	0.38
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

e Estimated

05487550 WALNUT CREEK NEAR VANDALIA, IA—Continued



05487980 WHITE BREAST CREEK NEAR DALLAS, IA

LOCATION.--(revised) Lat 41°14'49", long 93°15'57", in NW¼ NW¼ sec.3, T.74 N., R.21 W., Marion County, Hydrologic Unit 07100008, on left bank 15 ft downstream from bridge on county highway, 0.5 mi downstream from Kirk Branch, and 1.7 mi northwest of Dallas.

DRAINAGE AREA.--342 mi².

PERIOD OF RECORD.--October 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is 759.21 ft above NGVD of 1929.

REMARKS.--Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers rain gage and data collection platform with satellite telemetry at station. Precipitation records are available online at the U.S. Army Corps of Engineers website: www2.mvr.usace.army.mil/WaterControl/datamining2.cfm.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 11, 1962 reached a stage of 28.87 ft, from floodmark, discharge, about 12,000 ft³/s. Flood of June 6, 1947 may have been slightly higher.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.7	2.6	6.3	14	e7.1	202	185	43	355	23	18	224
2	1.6	12	5.9	12	e13	162	150	41	178	26	20	172
3	1.5	361	6.4	13	e11	110	131	41	123	62	163	138
4	2.6	432	7.5	e9.9	e11	219	113	36	99	63	1,810	116
5	2.7	199	11	e8.4	e12	3,510	99	32	84	39	926	101
6	2.1	103	11	e8.6	e10	1,280	89	30	70	39	221	241
7	1.9	57	12	e7.6	e7.7	457	88	28	60	31	101	483
8	1.7	34	11	e9.2	e8.7	259	82	26	56	26	e59	195
9	1.6	22	28	e7.8	e11	183	74	38	38	209	e43	124
10	1.5	17	158	e7.4	e10	161	66	31	179	112	34	103
11	1.5	16	e60	e6.7	e8.7	127	49	28	752	429	29	90
12	2.0	14	e41	e6.5	e7.1	100	47	27	137	1,710	24	73
13	1.6	9.6	e33	e7.5	e6.1	98	46	39	147	288	22	59
14	3.9	8.3	e24	e9.9	e8.2	101	44	52	1,780	109	19	49
15	2.8	7.6	e23	e9.6	e8.2	93	42	50	1,860	56	17	44
16	3.8	8.5	e24	e31	e8.3	113	41	40	576	43	15	46
17	2.0	6.8	e24	e51	e8.2	147	39	35	846	39	14	39
18	1.6	8.1	e22	e35	e11	769	36	81	308	31	14	36
19	2.2	12	e19	e24	e38	1,090	34	89	186	29	126	33
20	2.6	9.9	e20	e19	e339	541	67	93	128	26	164	26
21	2.1	8.5	e23	e21	e548	271	333	75	106	35	53	18
22	1.9	7.9	e23	e15	e406	181	246	271	89	337	32	14
23	1.8	9.3	e18	e12	e318	159	118	1,830	81	150	24	12
24	1.9	e8.3	e14	e11	e239	151	78	1,800	58	57	42	12
25	2.0	e7.5	e13	e11	183	142	69	4,100	47	43	935	11
26	2.0	e7.8	e12	e10	130	147	61	949	47	32	1,420	11
27	2.1	e7.3	18	e9.8	e124	147	60	333	38	27	2,240	10
28	2.5	e6.4	24	e9.3	170	1,070	48	201	32	22	4,440	11
29	2.5	e6.1	18	e7.1	193	897	41	154	24	19	2,430	12
30	2.5	6.0	15	e6.1	---	392	38	2,470	22	21	616	12
31	2.6	---	14	e5.9	---	248	---	1,100	---	21	327	---
TOTAL	66.8	1,415.5	739.1	416.3	2,855.3	13,527	2,614	14,163	8,506	4,154	16,398	2,515
MEAN	2.15	47.2	23.8	13.4	98.5	436	87.1	457	284	134	529	83.8
MAX	3.9	432	158	51	548	3,510	333	4,100	1,860	1,710	4,440	483
MIN	1.5	2.6	5.9	5.9	6.1	93	34	26	22	19	14	10
AC-FT	132	2,810	1,470	826	5,660	26,830	5,180	28,090	16,870	8,240	32,530	4,990
CFSM	0.01	0.14	0.07	0.04	0.29	1.28	0.25	1.34	0.83	0.39	1.55	0.25
IN.	0.01	0.15	0.08	0.05	0.31	1.47	0.28	1.54	0.93	0.45	1.78	0.27

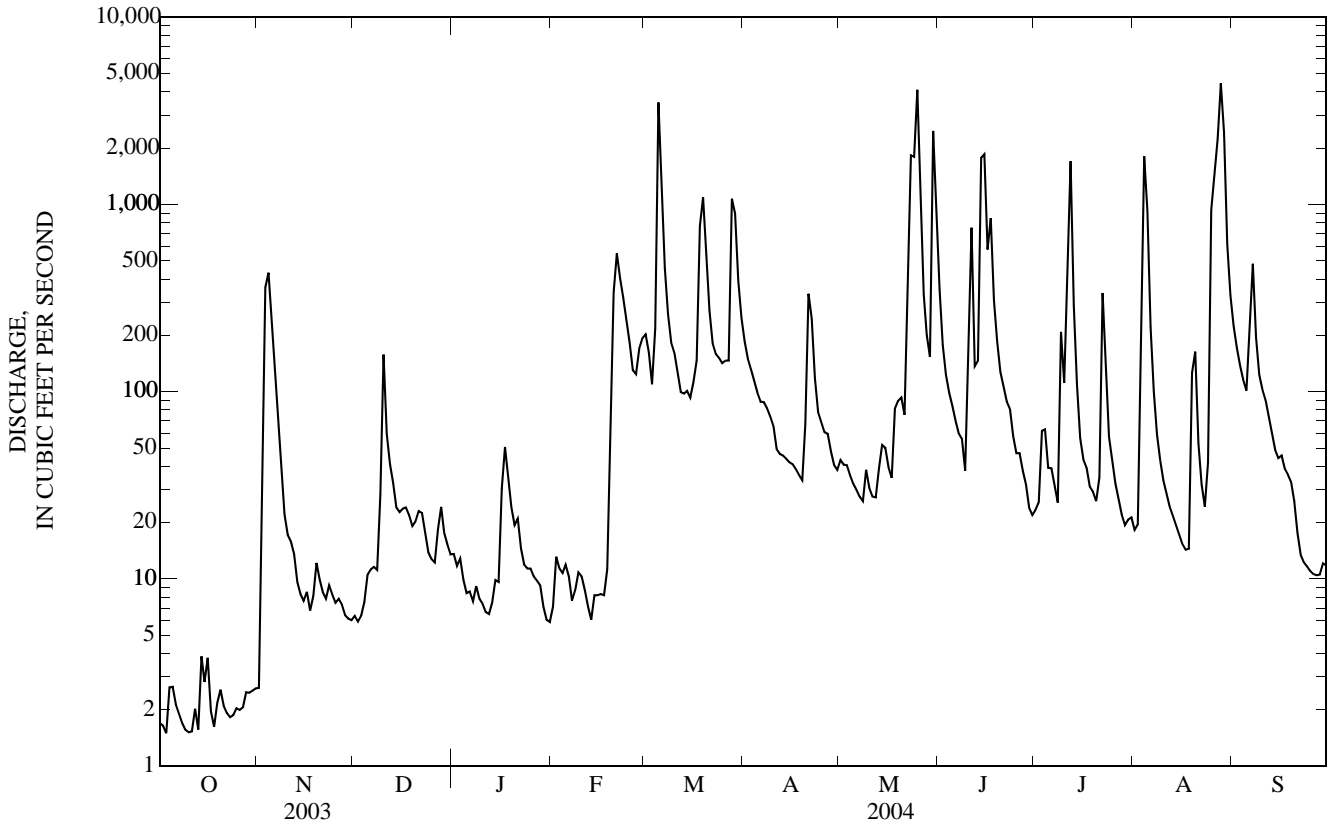
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2004, BY WATER YEAR (WY)

MEAN	112	106	100	60.2	161	341	428	403	289	268	123	172
MAX	1,153	756	718	601	718	1,056	1,592	1,823	1,146	3,641	1,202	1,902
(WY)	(1974)	(1984)	(1983)	(1974)	(1973)	(1998)	(1991)	(1996)	(1967)	(1993)	(1993)	(1992)
MIN	1.16	1.35	0.80	0.49	1.82	4.05	3.85	6.44	5.13	1.47	2.09	1.11
(WY)	(1990)	(1977)	(1964)	(1977)	(1964)	(1964)	(1989)	(1980)	(1977)	(1988)	(1971)	(1968)

05487980 WHITE BREAST CREEK NEAR DALLAS, IA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1963 - 2004	
ANNUAL TOTAL	24,194.9		67,370.0		214	
ANNUAL MEAN	66.3		184		816	
HIGHEST ANNUAL MEAN					1993	
LOWEST ANNUAL MEAN					1989	
HIGHEST DAILY MEAN	2,560	May 4	4,440	Aug 28	24,700	Sep 16, 1992
LOWEST DAILY MEAN	1.3	Aug 27	1.5	Oct 3 a	0.02	Oct 14, 1989
ANNUAL SEVEN-DAY MINIMUM	1.5	Aug 24	1.7	Oct 7	0.05	Aug 9, 1989
MAXIMUM PEAK FLOW			7,580	May 25	37,300	Jul 16, 1982
MAXIMUM PEAK STAGE			20.21	May 25	33.45	Jul 16, 1982
INSTANTANEOUS LOW FLOW			1.2	Oct 13		
ANNUAL RUNOFF (AC-FT)	47,990		133,600		154,700	
ANNUAL RUNOFF (CF5M)	0.194		0.538		0.625	
ANNUAL RUNOFF (INCHES)	2.63		7.33		8.49	
10 PERCENT EXCEEDS	115		344		420	
50 PERCENT EXCEEDS	11		36		34	
90 PERCENT EXCEEDS	1.9		6.1		2.7	

a Also Oct. 10, 11.
e Estimated.



05488100 LAKE RED ROCK NEAR PELLA, IA

LOCATION.--Lat 41°22'11", long 92°58'48", in NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.19, T.76 N., R.18 W., Marion County, Hydrologic Unit O7100008, at outlet works near right end of Red Rock Dam on Des Moines River, 1.4 mi upstream from Lake Creek, 4.5 mi southwest of Pella, and at mile 142.3.

DRAINAGE AREA.--12,323 mi².

PERIOD OF RECORD.--March 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is at NGVD of 1929 level (levels by U.S. Army Corps of Engineers).

REMARKS.--Reservoir is formed by earthfill dam completed in 1969. Storage began in March 1969. Releases controlled through 14 concrete conduits extending through the concrete ogee spillway section into the stilling basin. Inlet invert elevation at 690 ft above sea level. Maximum design discharge through the conduits is 37,500 ft³/s but normal flood control operation limits maximum outflow to 30,000 ft³/s. Spillway section consists of 5 tainter gates, 41 ft wide and 45 ft high, on concrete ogee crest at elevation 736 ft. The storage capacity of the reservoir at full flood-control pool level, 780 ft, is 1,489,900 acre-ft, surface area, 65,440 acres. Conservation pool level, 742 feet, is 265,500 acre-feet, surface area, 19,100 acres. Reservoir is used for flood control, low-flow augmentation, conservation and recreation. Normal operation will maintain an elevation of 742 ft with minimum release of 300 ft³/s and maximum release of 30,000 ft³/s during the non-growing season, providing discharges at Ottumwa and Keosauqua do not exceed 30,000 ft³/s and 35,000 ft³/s respectively. Storage tables for water years 1985-1986 published as day second-feet instead of acre-feet storage. Prior to October 1, 2000 published as contents in acre feet, and as elevation in feet NGVD thereafter.

COOPERATION.--Records provided by U.S. Army Corps of Engineers.

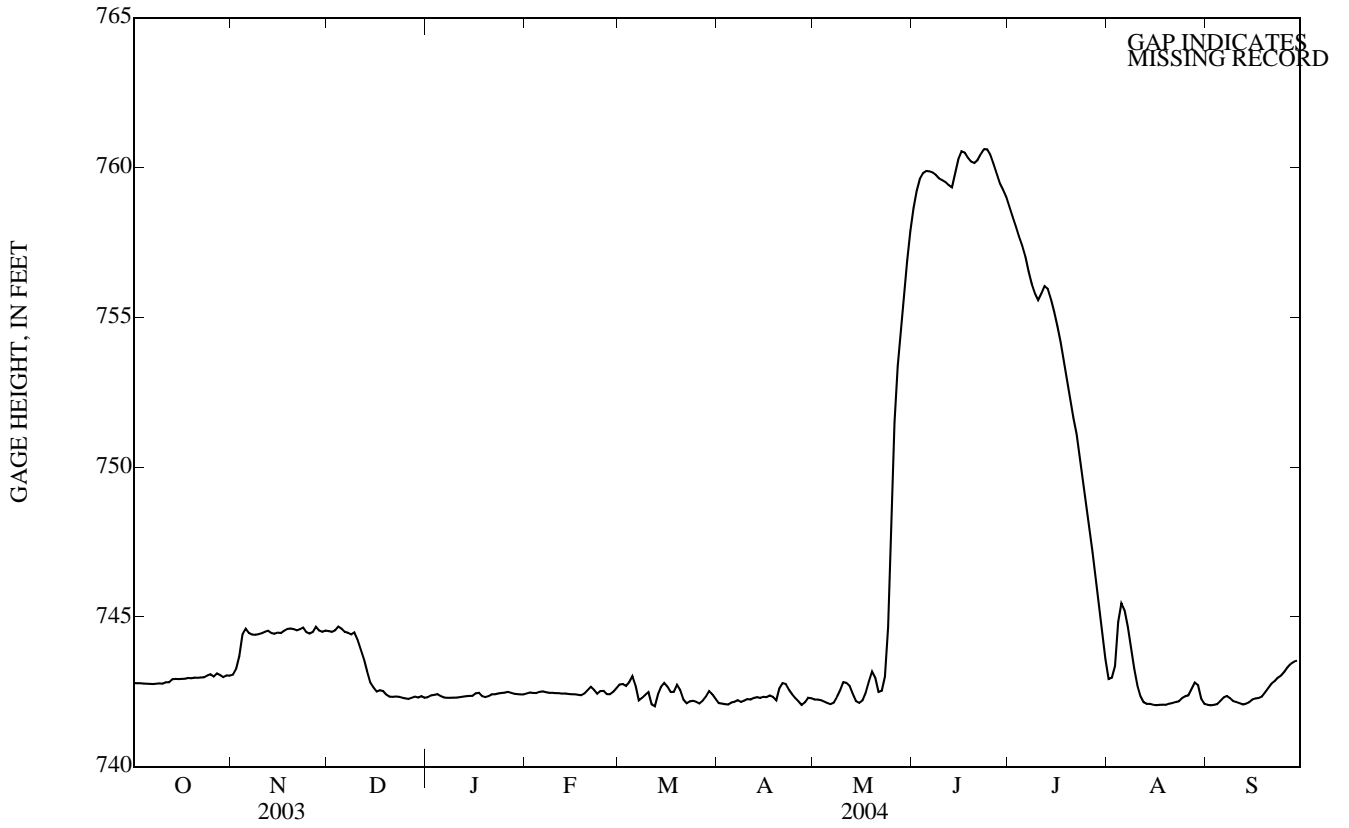
EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 782.67 ft July 13, 1993; minimum elevation, 719.68 ft Feb. 17, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 756.28 ft May 18; minimum elevation, 742.04 ft July 30.

ELEVATION ABOVE NGVD 1929, FEET
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY OBSERVATION AT 0600 HOURS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	742.81	743.02	744.55	742.27	742.41	742.64	742.23	742.26	758.10	758.95	743.40	742.08
2	742.78	743.08	744.51	742.33	742.45	742.77	742.08	742.23	758.83	758.60	742.76	742.05
3	742.78	743.32	744.49	742.39	742.48	742.75	742.11	742.24	759.36	758.26	743.03	742.04
4	742.78	743.81	744.56	742.39	742.45	742.67	742.07	742.21	759.72	757.95	743.46	742.07
5	742.77	744.62	744.71	742.43	742.46	742.86	742.07	742.15	759.85	757.62	745.28	742.09
6	742.76	744.60	744.57	742.33	742.50	743.07	742.16	742.11	759.90	757.32	745.51	742.23
7	742.76	744.41	744.47	742.30	742.51	742.57	742.16	742.07	759.86	756.93	745.12	742.33
8	742.75	744.40	744.47	742.29	742.47	742.08	742.23	742.15	759.82	756.40	744.52	742.36
9	742.77	744.40	744.39	742.30	742.46	742.36	742.13	742.37	759.73	756.01	743.77	742.26
10	742.78	744.42	744.51	742.30	742.46	742.40	742.22	742.60	759.60	755.72	743.11	742.16
11	742.76	744.46	744.15	742.30	742.45	742.51	742.26	742.89	759.57	755.52	742.57	742.15
12	742.83	744.51	743.84	742.32	742.45	741.93	742.23	742.76	759.49	755.88	742.28	742.10
13	742.81	744.54	743.50	742.34	742.43	742.04	742.31	742.67	759.38	756.09	742.10	742.06
14	742.95	744.43	743.07	742.35	742.44	742.54	742.32	742.34	759.32	755.90	742.09	742.11
15	742.92	744.43	742.71	742.36	742.42	742.70	742.28	742.13	759.95	755.50	742.09	742.16
16	742.92	744.48	742.61	742.36	742.41	742.82	742.34	742.12	760.38	755.07	742.05	742.26
17	742.93	744.45	742.47	742.47	742.41	742.62	742.31	742.23	760.59	754.58	742.05	742.28
18	742.93	744.56	742.57	742.46	742.39	742.44	742.39	742.54	760.46	754.04	742.06	742.29
19	742.96	744.60	742.50	742.31	742.38	742.51	742.30	742.93	760.28	753.43	742.07	742.35
20	742.94	744.61	742.37	742.32	742.46	742.80	742.18	743.25	760.17	752.81	742.06	742.51
21	742.98	744.58	742.32	742.36	742.58	742.47	742.75	742.87	760.14	752.14	742.11	742.65
22	742.96	744.53	742.33	742.43	742.69	742.16	742.80	742.36	760.28	751.47	742.12	742.80
23	742.98	744.60	742.34	742.41	742.52	742.10	742.74	742.58	760.50	750.98	742.16	742.87
24	742.98	744.65	742.32	742.45	742.40	742.20	742.50	743.14	760.65	750.24	742.18	743.00
25	743.06	744.43	742.29	742.46	742.56	742.19	742.38	745.16	760.59	749.47	742.32	743.05
26	743.09	744.44	742.27	742.47	742.51	742.15	742.25	749.37	760.37	748.65	742.36	743.20
27	742.98	744.51	742.25	742.50	742.39	742.09	742.15	752.20	760.04	747.77	742.38	743.35
28	743.15	744.72	742.31	742.45	742.42	742.23	742.02	753.76	759.71	746.93	742.66	743.45
29	743.02	744.48	742.34	742.42	742.52	742.37	742.18	754.74	759.39	745.85	742.85	743.51
30	742.97	744.50	742.29	742.42	---	742.57	742.33	755.91	759.21	744.94	742.67	743.54
31	743.07	---	742.37	742.40	---	742.36	---	757.21	---	744.14	742.13	---
MEAN	742.90	744.35	743.24	742.38	742.46	742.45	742.28	744.76	759.84	753.39	742.82	742.51
MAX	743.15	744.72	744.71	742.50	742.69	743.07	742.80	757.21	760.65	758.95	745.51	743.54
MIN	742.75	743.02	742.25	742.27	742.38	741.93	742.02	742.07	758.10	744.14	742.05	742.04

05488100 LAKE RED ROCK NEAR PELLA, IA—Continued



DES MOINES RIVER BASIN

05488110 DES MOINES RIVER NEAR PELLA, IA

LOCATION.--Lat 41°21'38", long 92°58'23", in SW¹/₄ SE¹/₄ sec.19, T.76 N., R.18 W., Marion County, Hydrologic Unit 07100009, on right bank, 0.4 mile downstream of outlet of Red Rock Reservoir, and 0.75 mile upstream of Lake Creek.

DRAINAGE AREA.--12,330 mi².

PERIOD OF RECORD.--October 1992 to current year.

GAGE.--Water-stage recorder. Datum of gage is 600.00 ft above NGVD of 1929.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow regulated by Lake Red Rock (station 05488100) 0.4 mi upstream. U.S. Army Corps of Engineers data collection platform with satellite telemetry at station.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	355	391	378	876	435	8,870	13,300	8,270	16,500	17,900	10,300	2,500
2	366	399	635	873	535	11,300	10,500	6,840	18,000	17,900	7,870	2,080
3	369	401	386	862	633	12,700	8,480	6,220	18,000	17,900	6,830	1,450
4	377	812	506	885	649	12,900	7,580	6,000	18,100	17,800	6,500	1,350
5	403	3,370	846	e882	661	15,800	6,550	5,620	18,100	17,800	9,520	1,360
6	555	4,170	1,060	e874	646	19,900	5,990	5,010	18,100	17,900	13,100	2,000
7	344	2,380	1,180	e850	637	18,400	5,650	4,130	18,100	18,000	13,100	3,020
8	352	935	1,680	e826	666	14,200	5,410	3,530	18,100	17,900	13,000	3,530
9	355	918	2,520	750	636	12,400	4,630	4,880	18,100	17,900	11,700	2,940
10	367	896	3,260	712	633	12,400	4,090	7,910	18,100	17,800	9,250	2,090
11	363	871	3,350	675	633	11,600	4,120	10,500	18,100	18,100	6,970	1,780
12	362	808	3,830	653	637	7,280	3,890	10,800	18,000	18,200	5,660	1,500
13	368	815	4,830	641	649	4,000	3,710	9,180	18,000	18,200	3,940	952
14	355	677	4,510	625	640	3,280	3,710	8,120	16,100	18,100	3,150	688
15	364	376	3,150	647	647	4,620	3,470	7,670	14,900	18,100	3,170	688
16	369	371	1,650	654	653	6,540	3,280	6,550	17,200	18,000	2,800	667
17	371	385	984	e1,130	648	7,210	3,290	6,040	19,300	18,000	2,520	657
18	372	363	988	2,090	654	7,210	3,300	7,950	20,600	18,000	2,520	667
19	376	503	e983	e1,100	653	8,180	3,250	11,000	21,400	18,100	2,520	1,500
20	373	746	e975	659	2,400	10,200	3,290	13,400	21,600	18,000	2,650	3,760
21	375	969	964	639	5,490	10,100	4,320	13,100	21,700	17,900	2,610	5,540
22	380	1,050	866	653	7,160	7,880	6,020	10,700	21,800	18,100	2,180	6,590
23	378	1,030	857	642	7,300	6,090	6,900	12,900	21,900	18,200	1,890	7,190
24	387	1,040	e895	647	6,140	5,920	6,770	16,700	21,900	18,000	2,080	7,190
25	375	782	887	671	6,320	6,090	6,750	15,500	21,900	17,900	2,780	6,310
26	378	525	877	646	6,560	5,710	6,960	16,200	21,800	17,900	3,930	5,810
27	394	370	886	769	5,410	5,490	7,010	17,700	21,700	16,600	4,510	5,790
28	371	349	870	768	5,150	6,130	6,570	17,900	20,900	18,600	6,070	5,790
29	399	387	864	652	6,340	9,540	7,170	18,100	18,600	17,000	8,010	5,470
30	392	380	878	666	---	13,400	8,590	15,300	18,000	14,600	8,070	5,200
31	380	---	867	540	---	14,100	---	14,600	---	12,500	4,830	---
TOTAL	11,725	27,469	47,412	24,557	70,215	299,440	174,550	318,320	574,600	546,900	184,030	96,059
MEAN	378	916	1,529	792	2,421	9,659	5,818	10,270	19,150	17,640	5,936	3,202
MAX	555	4,170	4,830	2,090	7,300	19,900	13,300	18,100	21,900	18,600	13,100	7,190
MIN	344	349	378	540	435	3,280	3,250	3,530	14,900	12,500	1,890	657
AC-FT	23,260	54,480	94,040	48,710	139,300	593,900	346,200	631,400	1,140,000	1,085,000	365,000	190,500
CFSM	0.03	0.07	0.12	0.06	0.20	0.78	0.47	0.83	1.55	1.43	0.48	0.26
IN.	0.04	0.08	0.14	0.07	0.21	0.90	0.53	0.96	1.73	1.65	0.56	0.29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1993 - 2004, BY WATER YEAR (WY)

MEAN	2,775	3,152	3,521	1,704	3,486	8,357	11,430	13,920	15,950	19,570	8,299	4,041
MAX	11,150	11,990	12,380	3,997	8,246	17,480	22,040	28,520	27,950	79,340	44,600	33,490
(WY)	(1994)	(1993)	(1993)	(1993)	(1997)	(1993)	(1998)	(1993)	(1993)	(1993)	(1993)	(1993)
MIN	285	327	654	642	824	930	916	1,105	5,516	2,323	1,498	351
(WY)	(2001)	(2000)	(2000)	(2000)	(2000)	(2000)	(2000)	(2000)	(2000)	(2002)	(2000)	(2003)