



Water-Data Report 2009

05129115 VERMILION RIVER NEAR CRANE LAKE, MN

Rainy Basin
Vermilion Subbasin

LOCATION.--Lat 48°15'53", long 92°33'57" referenced to North American Datum of 1927, in NE ¼ NE ¼ sec.30, T.67 N., R.17 W., St. Louis County, MN, Hydrologic Unit 09030002, in Superior National Forest, on left bank 350 ft downstream from bridge on Forest Route 491, 3.5 mi upstream from mouth, and 3.5 mi west of city of Crane Lake.

DRAINAGE AREA.--905 mi².

SURFACE-WATER RECORDS

PERIOD OF RECORD.--August 1979 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,180 ft above sea level (from topographic map).

REMARKS.--Records good except those for estimated daily discharges and for Oct. 1-15, which are fair to poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1979 reached a stage of 15.15 ft, from high-water mark, discharge approximately 4,600 ft³/s.

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DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009
DAILY MEAN VALUES

[e, estimated]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	119	220	292	259	236	204	1,180	2,420	e1,410	584	352	494
2	113	219	288	263	236	199	1,130	2,420	e1,390	570	381	468
3	108	219	284	259	233	197	1,100	2,380	e1,350	549	397	446
4	103	222	276	265	223	203	1,070	2,310	e1,310	526	389	427
5	97	280	267	268	217	208	1,050	2,250	e1,270	500	369	412
6	98	412	263	270	215	212	1,030	2,220	e1,220	470	351	399
7	109	588	254	275	220	212	1,030	2,190	e1,150	444	330	387
8	122	686	250	271	221	206	1,050	2,140	e1,130	425	320	377
9	123	689	251	263	216	200	1,110	2,100	e1,070	415	314	376
10	118	642	261	258	221	200	1,190	2,060	1,030	405	299	367
11	132	580	265	261	229	204	1,290	2,000	990	383	289	356
12	187	535	260	265	236	203	1,430	1,960	962	358	280	346
13	270	517	258	258	236	203	1,640	2,000	945	338	271	337
14	313	512	259	248	234	209	1,970	2,000	913	327	265	327
15	323	503	258	242	229	216	2,310	2,020	878	357	305	317
16	308	484	254	235	226	232	2,520	2,150	839	342	365	309
17	293	461	259	242	228	265	2,720	2,220	802	329	434	303
18	281	435	259	256	229	286	2,870	2,180	768	318	453	290
19	269	419	259	269	227	296	2,920	2,100	751	310	431	280
20	253	398	260	275	217	299	2,850	2,050	730	303	680	269
21	239	376	267	273	220	295	2,730	1,960	703	324	1,070	261
22	232	355	266	271	216	295	2,570	1,880	730	318	1,170	258
23	226	342	265	262	209	339	2,440	1,800	790	313	1,110	248
24	222	333	269	248	209	508	2,320	1,730	804	317	994	236
25	219	321	266	234	215	793	2,300	1,650	776	314	859	228
26	219	310	267	223	217	1,080	2,270	1,640	736	310	730	221
27	225	306	273	218	215	1,210	2,270	1,650	706	306	631	227
28	227	305	272	219	210	1,270	2,300	1,630	682	301	595	233
29	228	301	271	232	---	1,270	2,310	e1,570	637	295	567	232
30	231	297	266	233	---	1,250	2,360	e1,500	604	300	544	236
31	224	---	259	232	---	1,210	---	e1,440	---	314	520	---
Total	6,231	12,267	8,218	7,847	6,240	13,974	57,330	61,620	28,076	11,665	16,065	9,667
Mean	201	409	265	253	223	451	1,911	1,988	936	376	518	322
Max	323	689	292	275	236	1,270	2,920	2,420	1,410	584	1,170	494
Min	97	219	250	218	209	197	1,030	1,440	604	295	265	221
Ac-ft	12,360	24,330	16,300	15,560	12,380	27,720	113,700	122,200	55,690	23,140	31,860	19,170
Cfsm	0.22	0.45	0.29	0.28	0.25	0.50	2.11	2.20	1.03	0.42	0.57	0.36
In.	0.26	0.50	0.34	0.32	0.26	0.57	2.36	2.53	1.15	0.48	0.66	0.40

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 2009, BY WATER YEAR (WY)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mean	524	529	400	283	229	277	1,223	1,401	994	706	479	419
Max	1,436	1,138	872	476	374	574	2,286	3,012	2,234	1,609	2,225	1,880
(WY)	(1996)	(1983)	(1983)	(1996)	(1997)	(1995)	(2001)	(2001)	(2001)	(1985)	(2001)	(1988)
Min	19.3	27.1	34.4	32.1	22.3	89.5	294	363	205	113	60.0	18.8
(WY)	(2007)	(2007)	(2007)	(2007)	(2007)	(1988)	(2003)	(2003)	(1980)	(1980)	(1980)	(2006)

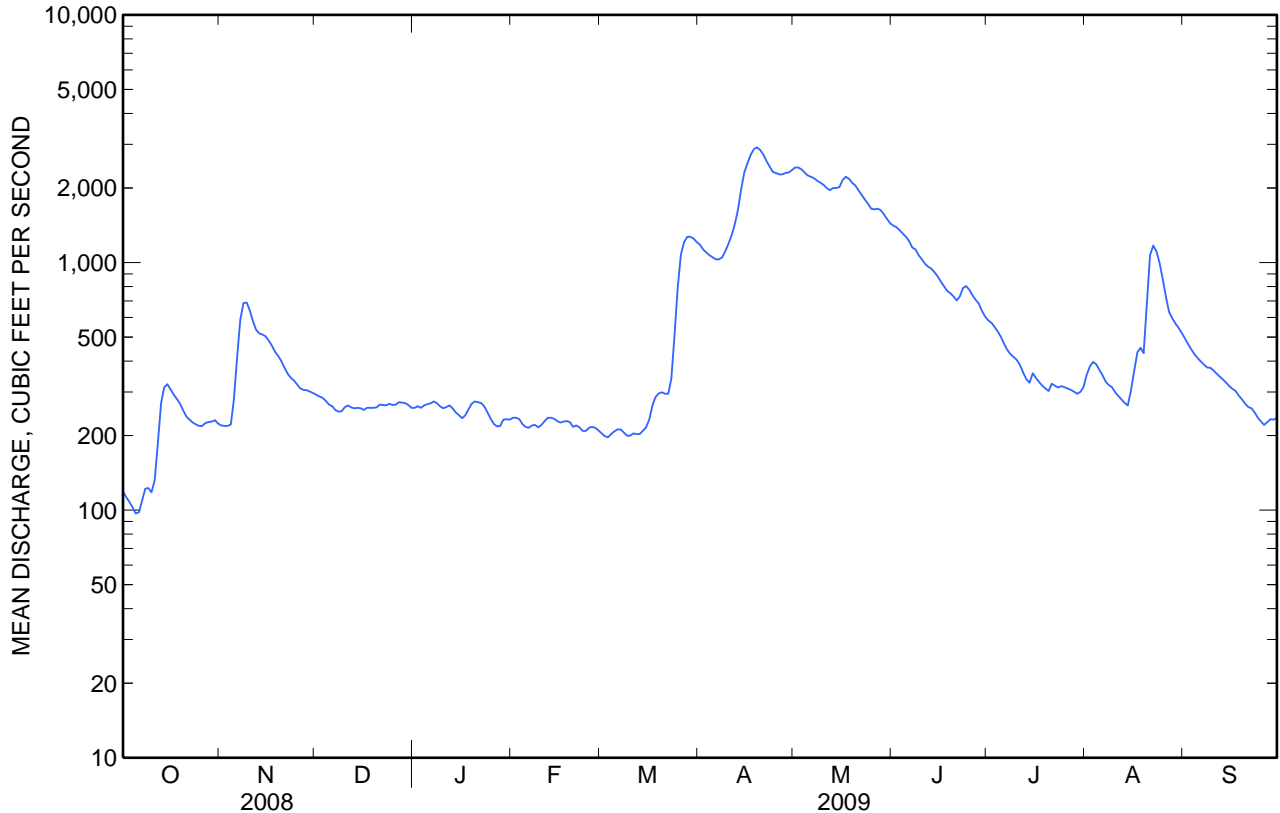
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SUMMARY STATISTICS

	Calendar Year 2008		Water Year 2009		Water Years 1979 - 2009	
Annual total	269,214		239,200			
Annual mean	736		655		624	
Highest annual mean					1,132	2001
Lowest annual mean					213	2003
Highest daily mean	3,600	Apr 26	2,920	Apr 19	4,300	Apr 25, 1985
Lowest daily mean	92	Sep 22	97	Oct 5	^a 11	Oct 9, 2006
Annual seven-day minimum	100	Sep 17	107	Oct 1	13	Oct 6, 2006
Maximum peak flow			2,930	Apr 19	4,360	Apr 25, 1985
Maximum peak stage			13.00	Apr 19	15.20	Apr 25, 1985
Instantaneous low flow			^b 90	Oct 6	11	Oct 8, 2006
Annual runoff (ac-ft)	534,000		474,500		451,900	
Annual runoff (cfsm)	0.813		0.724		0.689	
Annual runoff (inches)	11.07		9.83		9.36	
10 percent exceeds	2,400		1,960		1,440	
50 percent exceeds	302		314		404	
90 percent exceeds	136		217		139	

^a Also occurred Oct. 10, 2006.

^b From measurement of flow.



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WATER-QUALITY RECORDS

REMARKS.--This site is part of a nutrient cycling study in Kabetogama Lake, Voyageurs National Park. Objectives of this study are to determine if the changes in Kabetogama Lake water levels since a change in rules governing dam operation (2000 rule curves) are affecting algal production (chlorophyll-a) and nutrient enrichment (total phosphorus) in the lake. Another objective is to assess nutrient loading to the lake from inflow sources and the potential contribution of nutrients from lake bottom sediment.

**WATER-QUALITY DATA
WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009**

Part 1 of 2

Date	Time	Medium name	Baro-metric pressure, mm Hg (00025)	Dis-solved oxygen, mg/L (00300)	pH, water, unfltrd std units (00400)	Specific conductance, µS/cm @ 25 degC (00095)	Temperature, deg C (00010)	Altitude of land surface feet (72000)	Drainage area, mi2 (81024)	Sampling depth, feet (00003)
May										
14...	1130	Surface water	729	10.9	7.9	85	11.5	1,180	905	--
14...	1200	Surface water	729	10.9	7.9	85	11.5	1,180	905	--
Jun										
18...	0950	Surface water	--	--	--	--	--	1,180	905	--
Jul										
16...	1000	Surface water	--	--	--	--	--	1,180	905	--
Aug										
05...	1100	Surface water	--	9.6	7.2	103	19.4	1,180	905	.50
Sep										
09...	1327	Surface water	--	--	--	--	--	1,180	905	--

**WATER-QUALITY DATA
WATER YEAR OCTOBER 2008 TO SEPTEMBER 2009**

Part 2 of 2

Date	Alkalinity, wat flt inf tit field, mg/L as CaCO3 (39086)	Bicarbonate, wat flt infl pt titr., field, mg/L (00453)	Ammonia water, unfltrd mg/L (71845)	Nitrate + nitrite water, fltrd, mg/L as N (00631)	Ortho-phosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L as P (00666)	Phosphorus, water, unfltrd mg/L as P (00665)	Total nitrogen, wat unf by analysis, mg/L (62855)	Chlorophyll a phytoplankton, acid m, µg/L (32211)
May									
14...	20.2	24.7	--	--	--	--	--	--	--
14...	24.3	29.6	.01	.004	.003	.007	.023	.66	--
Jun									
18...	--	--	.03	.018	.004	.011	.012	.51	.700
Jul									
16...	--	--	.02	.022	.007	.011	.016	.58	1.70
Aug									
05...	10.1	--	.02	.006	.004	.010	.015	.56	1.60
Sep									
09...	--	--	.07	.025	.011	.015	.026	.74	2.00