

Water Resources Data Michigan Water Year 2004

Water-Data Report MI-04-1



**U.S. Department of the Interior
U.S. Geological Survey**



**Prepared in cooperation with the
State of Michigan
and with other agencies**

Calendar for Water Year 2004

2003

October							November							December						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
			1	2	3	4							1		1	2	3	4	5	6
5	6	7	8	9	10	11	2	3	4	5	6	7	8	7	8	9	10	11	12	13
12	13	14	15	16	17	18	9	10	11	12	13	14	15	14	15	16	17	18	19	20
19	20	21	22	23	24	25	16	17	18	19	20	21	22	21	22	23	24	25	26	27
26	27	28	29	30	31		23	24	25	26	27	28	29	28	29	30	31			
							30													

2004

January							February							March						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
				1	2	3	1	2	3	4	5	6	7		1	2	3	4	5	6
4	5	6	7	8	9	10	8	9	10	11	12	13	14	7	8	9	10	11	12	13
11	12	13	14	15	16	17	15	16	17	18	19	20	21	14	15	16	17	18	19	20
18	19	20	21	22	23	24	22	23	24	25	26	27	28	21	22	23	24	25	26	27
25	26	27	28	29	30	31	29							28	29	30	31			
April							May							June						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
				1	2	3							1			1	2	3	4	5
4	5	6	7	8	9	10	2	3	4	5	6	7	8	6	7	8	9	10	11	12
11	12	13	14	15	16	17	9	10	11	12	13	14	15	13	14	15	16	17	18	19
18	19	20	21	22	23	24	16	17	18	19	20	21	22	20	21	22	23	24	25	26
25	26	27	28	29	30		23	24	25	26	27	28	29	27	28	29	30			
							30	31												
July							August							September						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
				1	2	3	1	2	3	4	5	6	7				1	2	3	4
4	5	6	7	8	9	10	8	9	10	11	12	13	14	5	6	7	8	9	10	11
11	12	13	14	15	16	17	15	16	17	18	19	20	21	12	13	14	15	16	17	18
18	19	20	21	22	23	24	22	23	24	25	26	27	28	19	20	21	22	23	24	25
25	26	27	28	29	30	31	29	30	31					26	27	28	29	30		

U.S. Department of the Interior
U.S. Geological Survey

Water Resources Data Michigan Water Year 2004

By S.P. Blumer, T.E. Behrendt, C.R. Whited, J.M. Ellis, R.J. Minnerick,
and R.L. LeuVoy

Water-Data Report MI-04-1



Prepared in cooperation with the
State of Michigan and with other agencies



U.S. DEPARTMENT OF THE INTERIOR

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2005

PREFACE

This volume of the annual hydrologic data report of Michigan is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface- and ground-water data-collection networks in each state, Puerto Rico, and the Trust Territories. These records of streamflow, ground-water levels, and quality of water provide the hydrologic information needed by State, local, and Federal agencies, and the private sector for developing and managing our Nation's land and water resources.

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. In addition to the authors, who had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines, the following individuals contributed significantly to the collection, processing, and tabulation of the data:

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SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

Letters after station name designate type of data collected: (d) discharge, (b) biological, (c) chemical, (e) elevation, gage heights, or contents, (m) microbiological, (o) dissolved oxygen, (p) pH, (s) sediment, (t) water temperature, (sc) specific conductance.

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ST. LAWRENCE RIVER BASIN		
STREAMS TRIBUTARY TO LAKE SUPERIOR		
Black River near Bessemer (d)	04031000	39
Middle Branch Ontonagon River near Paulding (d)	04033000	40
Bond Falls Reservoir:		
Bond Falls Canal near Paulding (d)	04033500	41
Bond Falls Reservoir near Paulding (e)	04034000	42
Middle Branch Ontonagon River near Trout Creek (d)	04034500	43
Middle Branch Ontonagon River near Rockland (d)	04035500	44
Lake Gogebic near Bergland (e)	04035995	45
West Branch Ontonagon River near Bergland (d)	04036000	46
South Branch Ontonagon River:		
Cisco Lake near Watersmeet (e)	04037400	47
Cisco Branch Ontonagon River at Cisco Lake Outlet (d)	04037500	48
Ontonagon River near Rockland (d)	04040000	49
Portage River (Portage Lake):		
Sturgeon River near Sidnaw (d)	04040500	50
Sturgeon River near Alston (d,t)	04041500	51
Trap Rock River near Lake Linden (d)	04043050	54
Silver River near L'Anse (d,t)	04043150	55
Dead River:		
McClure Storage Basin Release near Marquette (d)	04043800	58
Au Train River at Forest Lake (d)	04044724	59
Grand Sable Lake near Grand Marais (e)	463910086014201	60
Tahquamenon River near Paradise (d)	04045500	61
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Black River near Garnet (d)	04046000	62
Walsh Creek near Seney (d)	04052500	63
Manistique River near Manistique (d)	04056500	64
Sturgeon River near Nahma Junction (d)	04057510	65
Middle Branch Escanaba River at Humboldt (d)	04057800	66
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Greenwood Afterbay near Greenwood (e)	04057812	69
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Greenwood Release (Middle Branch Escanaba River) near Greenwood (d)	04057814	71
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STREAMS TRIBUTARY TO LAKE HURON		
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South Branch Flint River:		
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Pine River near Marysville (d,t,o,sc,p)	04160398	288
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Belle River near Marine City (d,t,o,sc,p)	04160625	293
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STREAMS TRIBUTARY TO LAKE ST. CLAIR		
Clinton River:		
Sashabaw Creek near Drayton Plains (d)	04160800	300
Clinton River near Drayton Plains (d,t,o,sc,p)	04160900	301
Clinton River at Auburn Hills (d,t,o,sc,p)	04161000	305
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Stony Creek near Romeo (d)	04161580	313
Stony Lake near Washington (e)	04161790	314
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East Pond Creek at Romeo (d)	04164100	336
Coon Creek:		
East Branch Coon Creek at Armada (d)	04164300	337
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SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME--Continued

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Middle River Rouge near Garden City (d)	04167000	377
Middle River Rouge at Dearborn Heights (d,t,o)	04167150	378
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Lower River Rouge at Inkster (d)	04168000	388
Lower River Rouge at Dearborn (d,t,o)	04168400	389
River Rouge at Allen Park (e,t,o)	04168530	394
Ecorse River at Dearborn Heights (d)	04168580	399
<u>STREAMS TRIBUTARY TO LAKE ERIE</u>		
Huron River at Milford (d,t,sc)	04170000	400
Kent Lake near New Hudson (e)	04170490	404
Huron River near New Hudson (d)	04170500	405
Huron River near Hamburg (d)	04172000	406
Mill Creek near Dexter (d)	04173500	407
Huron River at Ann Arbor (d)	04174500	408
Malletts Creek at Ann Arbor (d)	04174518	409
River Raisin near Manchester (d,c,s)	04175600	410
River Raisin near Adrian (d)	04176000	415
River Raisin near Monroe (d)	04176500	416
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DISCONTINUED SURFACE-WATER-DISCHARGE OR STAGE-ONLY STATIONS

The following continuous-record surface-water discharge or stage-only stations (gaging stations) in Michigan have been discontinued. Daily streamflow or stage records were collected and published for the period of record, expressed in water years, shown for each station. Those stations with an asterisk (*) after the station number have had previous or subsequent operation as a crest-stage partial-record station. Information regarding these stations may be obtained from the District Office at the address given on the back side of the title page of this report.

[Letters after station name designate type of data collected: (d) discharge, (e) elevation (stage only). Letter (a) before drainage area means approximately.]

Station name	Station number	Drainage area (mi ²)	Period of record
STREAMS TRIBUTARY TO LAKE SUPERIOR			
Washington Creek at Windigo, MI (d)	04001000	13.2	1965-03
Montreal River at Ironwood, MI (d)	04028000	63.0	1918-22, 1924-26, 1949-54
Montreal River near Saxon, WI (d)	04030000	262	1938-70
Black River at Ramsay, MI (d)	04030500	a82	1924-25
Presque Isle River at Marenisco, MI (d)	04031500	171	1945-82
Presque Isle River near Tula, MI (d)	04032000*	261	1945-73
Iron River near White Pine, MI (d)	04032500	98.1	1952-57
East Branch Ontonagon River near Mass, MI (d)	04035000	272	1942-79
Cisco Branch Ontonagon River near Watersmeet, MI (d)	04038000	62.2	1942-44
South Branch Ontonagon River at Ewen, MI (d)	04039500*	348	1942-71
Perch River near Sidnaw, MI (d)	04041000*	63.1	1913-15
Sturgeon River near Baraga, MI (d)	04042000	379	1927-31, 1943-47
Otter River near Elo, MI (d)	04042500*	162	1942-72
Sturgeon River near Arnheim, MI (d)	04043000	705	1942-74
Dead River near Negaunee, MI (d)	04043500	138	1902-1903
Dead River at Forestville, MI (d)	04044000	158	1899-1902
Carp River near Negaunee, MI (d)	04044400	51.4	1961-87
Carp River near Marquette, MI (d)	04044500	a86	1902-04
Silver Lead Creek near Gwinn, MI (d)	040445315	a2.1	1997-99
Big Creek near Harvey, MI (d)	04044563	17.0	1979-81
Cedar Creek near Harvey, MI (d)	04044573	9.04	1979-81
Cherry Creek near Harvey, MI (d)	04044583	4.53	1965-70, 1979-81
Silver Creek at Harvey, MI (d)	04044595	8.58	1979-81
Sand River Wildlife Flooding at Sand River (e)	04044609	28.6	1984-02
Tahquamenon River at Newberry, MI (d)	04045000	a200	1934-36
STREAMS TRIBUTARY TO LAKE MICHIGAN			
South Manistique Lake Outlet at Curtis, MI (d)	04046500	a44	1942-44
North Manistique Lake Outlet at Helmer, MI (d)	04047000	a15	1942-44
Manistique Lake near Curtis, MI (e)	04047200	118	1942-91
Manistique River near Germfask, MI (d)	04047500	a120	1942-50
Fox River at Seney, MI (d)	04048000	107	1942-44
East Branch Fox River near Germfask, MI (d)	04048500	104	1942-44
Holland Creek near Seney, MI (d)	04049000	a13	1938-42
Manistique River at Germfask, MI (d)	04049500*	341	1938-70
Goose Pen Outlet at Germfask, MI (d)	04050000	--	1939-41
Grays Creek near Germfask, MI (d)	04050500	a36	1938-40
Pine Creek near Germfask, MI (d)	04051000	a11	1938-40
Sand Creek near Germfask, MI (d)	04051500	a6	1938-40
Driggs River near Seney, MI (d)	04052000	a70	1938-42
Driggs River near C-3 Pool near Diversion Ditch near Seney, MI (d)	04052600	--	2002-03
Driggs River near Germfask, MI (d)	04053000	114	1938-41
Marsh Creek near Shingleton, MI (d)	04053500	a20	1938-42
Marsh Creek near Germfask, MI (d)	04054000	--	1938-41
Duck Creek near Blaney, MI (d)	04054500	a92	1938-54
Manistique River near Blaney, MI (d)	04055000*	704	1938-70
Creighton River near Shingleton, MI (d)	04055500	a35	1938-42

DISCONTINUED SURFACE-WATER-DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued			
West Branch Manistique River near Manistique, MI (d)	04056000	322	1938-56
Indian Lake near Manistique, MI (e)	04057000	302	1938-95
Indian River near Manistique, MI (d)	04057000*	302	1938-71, 1992-93
Manistique River above Manistique, MI (d)	04057004	a1,445	1994-96
Sturgeon River near St. Jacques, MI (d)	04057500	167	1950-52
Middle Branch Escanaba River near Greenwood, MI (d)	04057820*	73.3	1973-82
Black River near Republic, MI (d)	04057900*	34.4	1961-68
Middle Branch Escanaba River near Ishpeming, MI (d)	04058000	128	1954-75
Green Creek near Princeton, MI (d)	04058130	13.8	1977-82
Warner Creek near Palmer, MI (d)	04058300*	14.2	1961-68, 1972-78
Goose Lake Outlet near Sands Station, MI (d)	04058400*	37.5	1966-82
East Branch Escanaba River at Gwinn, MI (d)	04058500	124	1955-80
Tenmile Creek at Perronville, MI (d)	04059400*	38.4	1971-77
Iron River near Iron River, MI (d)	04060000	a65	1901-04
Iron River at Caspian, MI (d)	04060500	92.1	1948-80
Paint River at Crystal Falls, MI (d)	04061500*	597	1944-96
Peshekee River near Michigamme, MI (d)	04062100	66.5	1961-68, 1993-95
Lake Michigamme near Champion, MI (e)	04062228	193	1942-91
Michigamme River near Michigamme, MI (d)	04062230	194	1969-82
Michigamme River near Champion, MI (d)	04062270	231	1964-69
Michigamme River at Republic, MI (d)	04062300*	240	1961-75
Michigamme River near Witch Lake, MI (d)	04062400*	316	1964-80
Menominee River near Iron Mountain, MI (d)	04065000	2,430	1898-99, 1903-14
West Branch Sturgeon River near Randville, MI (d)	04065300	56.1	1958-81
East Branch Sturgeon River below Skunk Creek near Felch, MI (d)	04065393	61.8	1974-84
East Branch Sturgeon River at Hardwood, MI (d)	04065397	90.8	1978-83
Sturgeon River near Foster City, MI (d)	04065500	237	1955-80
Pine Creek near Iron Mountain, MI (d)	04065600	16.8	1972-81
Galien River near New Troy, MI (d)	04095500	a47	1945-47
East Branch Galien River near New Troy, MI (d)	04096000	19.2	1945-47
Beebe Creek near Hillsdale, MI (d)	04096272*	42.4	1974-78
Sand Creek at Litchfield, MI (d)	04096312*	20.6	1974-77
Soap Creek near Litchfield, MI (d)	04096325	10.9	1975-77
St. Joseph River at Clarendon, MI (d)	04096340*	144	1974-77
Sauk (East Branch Coldwater) River at Coldwater, MI (d)	04096500	--	1938-62
Coldwater River near Hodunk, MI (d)	04096600	293	1963-89
Nottawa Creek near Athens, MI (d)	04096900	162	1967-97
St. Joseph River at Mendon, MI (d)	04097000	918	1903-05
Little Portage Creek near Fulton, MI (d)	04097060*	27.0	1965-67
Portage River near Vicksburg, MI (d)	04097170*	68.2	1946-51, 1965-80
Gourdneck Canal near Schoolcraft, MI (d)	04097195	--	1966-73, 1983-92
Gourdneck Creek near Schoolcraft, MI (d)	04097200	7.29	1964-73
Fawn River near White Pigeon, MI (d)	04098500*	192	1903-04, 1958-75
St. Joseph River at Berrien Springs, MI (d)	04102000*	4,081	1901-07, 1909-32, 1951-56
Paw Paw River near Paw Paw, MI (d)	04102320	195	1980-82

DISCONTINUED SURFACE-WATER-DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued			
Paw Paw River near Hartford, MI (d)	04102420	311	1980-82
St. Joseph River at St. Joseph, MI (d)	04102533	4,670	1994-96
South Branch Kalamazoo River near Albion, MI (d)	04102850	146	1972-76
Reed's Springs near Albion, MI (d)	04103000	--	1905-06
Battle Creek at Charlotte, MI (d)	04104000	a67	1948-54
Battle Creek at Bellevue, MI (d)	04104500	178	1948-53
Gull Creek near Galesburg, MI (d)	04105800*	38.1	1965-73
Portage Creek near Portage, MI (d)	04106190	18.6	1965-67
Portage Creek at Kalamazoo, MI (d)	04106500	46.8	1948-58, 1975-86
Gun River at dam near Shelbyville, MI (d)	04107000	a30	1946-47
Gun River near Martin, MI (d)	04107500	a35	1946-47
Kalamazoo River near Allegan, MI (d)	04108000	a1,470	1903-08
Kalamazoo River near Fennville, MI (d)	04108500	a 1,600	1929-36, 1938-93
Portage River below Little Portage Lake near Munith, MI (d)	04109500	a55	1944-56
Orchard Creek at Munith, MI (d)	04110000	a49	1944-56
Portage River near Munith, MI (d)	04110500	118	1944-46
Sycamore Creek near Holt, MI (d)	04112850	80.6	1975-80, 1989-90, 1995-98
Mud Lake Drain at Lansing, MI (d)	04112904	4.28	1975-76
Carrier Creek near Lansing, MI (d)	04113097	12.1	1975-80
Sebewa Creek near Sunfield, MI (d)	04113500	24.1	1954-56
Fish Creek near Carson City, MI (d)	04115500	145	1936-38
Flat River at Smyrna, MI (d)	04116500*	528	1951-86
Thornapple River near Caledonia, MI (d)	04118000*	773	1931-38, 1952-82, 1984-94
Grand River at Eastmanville, MI (d)	04119300	a5,230	1976-77
Crockery Creek at Slocums Grove, MI (d)	04120000	--	1903
Grand River at Grand Haven, MI (d)	04120250	5,518	1994-96
Higgins Lake Outlet (head of Muskegon River) near Roscommon, MI (d)	04120500	49.2	1942-50
Muskegon River near Merritt, MI (d)	04121000*	355	1947-74
Muskegon River at Big Rapids (d)	04121650	1,751	2000-02
Little Muskegon River near Morley, MI (d)	04121900	121	1967-96
Muskegon River at Newaygo, MI (d)	04122000	a2,350	1908-20, 1931-93
Muskegon River at Muskegon, MI (d)	04122150	2,680	1994-96
Big Sable River near Freesoil, MI (d)	04123000*	115	1942-74
Manistee River near Grayling, MI (d)	04123500*	123	1943-74
Pine River near Le Roy, MI (d)	04125000*	128	1952-63
Manistee River near Manistee, MI (d)	04126000	1,677	1952-93
Little Manistee River near Freesoil, MI (d)	04126200*	178	1957-75
Little Manistee River near Stronach, MI (d)	04126500	a196	1931
Boardman River near Mayfield, MI (d)	04127000	182	1952-89
Boardman River at Traverse City, MI (d)	04127500	--	1903-04
Intermediate River at Bellaire, MI (d)	04127565	146	1991
Elk Lake near Elk Rapids, MI (e)	445256085240001	a410	1952-95
STREAMS TRIBUTARY TO LAKE HURON			
Burt Lake at Indian River, MI (e)	04128500	598	1942-88
Indian River at Indian River, MI (d)	04128500	598	1942-82
Pigeon River at Afton, MI (d)	04129500	139	1942-81
Cheboygan River near Cheboygan, MI (d)	04130000	889	1943-82
Mullett Lake near Cheboygan, MI (e)	04130000	889	1943-91

DISCONTINUED SURFACE-WATER-DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
STREAMS TRIBUTARY TO LAKE HURON--Continued			
Black River near Tower, MI (d)	04130500	311	1943-00
Rainy River near Onaway, MI (d)	04131000	75.7	1942-52
Rainy River near Ocqueoc, MI (d)	04131500*	87.9	1953-79
Black River near Cheboygan, MI (d)	04132000*	558	1943-74
Cheboygan Pond at Cheboygan, MI (e)	04132052	a1,500	1943-91
Thunder Bay River near Hillman, MI (d)	04132500*	232	1945-73
Upper South Branch Thunder Bay River near Lachine, MI (d)	04133000	171	1945-54
North Branch Thunder Bay River near Bolton, MI (d)	04134000	184	1945-80
Lower South Branch Thunder Bay River near Hubbard Lake, MI (d)	04134500	146	1945-54
Thunder Bay River near Alpena, MI (d)	04135000	1,238	1901-09 1980-93
Au Sable River at Grayling, MI (d)	04135500*	110	1943-93
East Branch Au Sable River at Grayling, MI (d)	04135600	76.0	1958-84
Au Sable River at Bamfield, MI (d)	04137000	--	1902-14
East Branch Au Gres River at McIvor, MI (d)	04138000*	a84	1951-74
Au Gres River near National City, MI (d)	04138500	154	1951-81
Houghton Creek near Lupton, MI (d)	04139000*	29.7	1950-73
Rifle River at "The Ranch" near Lupton, MI (d)	04139500	56.8	1950-71
Prior Creek near Selkirk, MI (d)	04140000*	21.4	1950-73
Rifle River at Selkirk, MI (d)	04140500*	117	1950-82
South Branch Shepards Creek near Selkirk, MI (d)	04141000*	1.15	1952-78
West Branch Rifle River near Selkirk, MI (d)	04141500*	a52	1952-63
Rifle River at Omer, MI (d)	04143000	364	1902-04
North Branch Kawkawlin River near Kawkawlin, MI (d)	04143500	101	1951-82
Shiawassee River at Linden, MI (d)	04143900	83.7	1968-94, 2001-03
Shiawassee River at Byron, MI (d)	04144000	365	1948-83
Bad River near Brant, MI (d)	04145500*	a89	1949-59
Flint River at Columbiaville, MI (d)	04146500	470	1932-33, 1948-52
Holloway Reservoir near Otisville, MI (e)	04147000	526	1954-91
Butternut Creek near Genesee, MI (d)	04147990	34.7	1970-84
Flint River at Genesee, MI (d)	04148000	a593	1931-52
Gilkey Creek near Flint, MI (d)	04148160	6.43	1970-84
Swartz Creek near Holly, MI (d)	04148200*	12.1	1956-75
Swartz Creek at Flint, MI (d)	04148300*	115	1970-84
Thread Creek near Flint, MI (d)	04148440*	54.4	1970-84
Brent Run near Montrose, MI (d)	04148720	20.8	1970-84
Flint River near Alicia, MI (e)	04149500	--	1949-84
South Branch Cass River near Cass City, MI (d)	04150000	238	1949-80
Cass River at Wahjamega, MI (d)	04150800	645	1969-94
Cass River at Vassar, MI (d)	04151000*	710	1910-28, 1949-70
Tobacco River at Beaverton, MI (d)	04152500	487	1948-82
Kinney Creek near Clare, MI (d)	04153000	a9	1935-36
Salt River near North Bradley, MI (d)	04153500	138	1934-71
Chippewa River near Midland, MI (d)	04154500*	597	1948-73
Tittabawassee River at Freeland, MI (d)	04156500	a2,530	1903-10, 1912-36
State Drain near Sebewaing, MI (d)	04157500	67.3	1940-54
Columbia Drain near Sebewaing, MI (d)	04158000	33.9	1940-54, 1988-90
Pigeon River near Owendale, MI (d)	04158500	53.2	1953-82
Pigeon River near Pigeon, MI (d)	04159000	93.3	1947-52
Pigeon River near Caseville, MI (d)	04159010	125	1987-93

DISCONTINUED SURFACE-WATER-DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
STREAMS TRIBUTARY TO ST. CLAIR RIVER			
Silver Creek near Jeddo, MI (d)	04159488	20.6	1978-82
Mill Creek near Abbottsford, MI (d)	04160000*	185	1947-64
Black River near Port Huron, MI (d)	04160050	684	1931, 1933-44
North Branch Belle River at Imlay City, MI (d)	04160570	18.0	1965-01
STREAMS TRIBUTARY TO LAKE ST. CLAIR			
Galloway Creek near Auburn Heights, MI (d)	04161100	17.9	1960-91
Paint Creek near Lake Orion, MI (d)	04161500*	38.5	1955-75, 1989-91
Red Run near Warren, MI (d)	04162010	--	1980-88
Bear Creek at Warren, MI (d)	04162500	17.3	1954-57
Big Beaver Creek near Warren, MI (d)	04162900	--	1959-88
Big Beaver Creek at Warren, MI (d)	04163000	25.2	1954-58
Plum Brook near Utica, MI (d)	04163500	22.9	1954-66
Red Run near Cady, MI (e)	04163900	--	1980-82
North Branch Clinton River at Almont, MI (d)	04164010*	9.56	1963-68
North Branch Clinton River near Romeo, MI (d)	04164050*	49.7	1965-69
North Branch Clinton River near Meade, MI (d)	04164150*	89.6	1968-72
Coon Creek near Armada, MI (d)	04164200*	10.0	1966-70
Tupper Brook at Ray Center, MI (d)	04164250*	8.62	1960-64
Highbank Creek near Armada, MI (d)	04164350*	14.9	1965-70
East Branch Coon Creek near New Haven, MI (d)	04164360*	36.1	1968-72
Deer Creek near Meade, MI (d)	04164400*	12.7	1960-65
McBride Drain near Macomb, MI (d)	04164450*	5.79	1960-64
Middle Branch Clinton River near Macomb, MI (d)	04164600*	22.2	1965-69
Middle Branch Clinton River at Macomb, MI (d)	04164800*	41.0	1963-68, 1970-82
Middle Branch Clinton River near Mount Clemens, MI (d)	04165000	a51	1947-49
Gloede Ditch near Waldenburg, MI (d)	04165200*	16.0	1959-64
Clinton River By-Pass below weir at Mount Clemens, MI (e)	04165556	--	1980-83
STREAMS TRIBUTARY TO DETROIT RIVER			
Lower River Rouge at Dearborn, MI (d)	04168500	91.9	1931-33
STREAMS TRIBUTARY TO LAKE ERIE			
Hayes Creek at Commerce, MI (d)	04169000	a8	1946-51
Huron River at Commerce, MI (d)	04169500*	57.3	1946-75
Davis Creek near Whitmore Lake, MI (d)	04171000	65.8	1953-54
South Ore Creek near Brighton, MI (d)	04171500	a31	1951-68
Portage River near Pinckney, MI (d)	04172500*	79.1	1945-71
Huron River near Dexter, MI (d)	04173000*	522	1904, 1946-72, 1976-77
Huron River at Dexter, MI (e)	04174000	--	1904-16
Huron River at Ypsilanti, MI (d)	04174800	807	1974-84, 1990-94
Willow Run near Rawsonville (d)	04174950	--	1986-97
Huron River at Flat Rock, MI (d)	04175100	851	1904-11
Huron River at Flat Rock, MI (e)	04175100	851	1912-22
Stony Creek at Oakville, MI (d)	04175340	68.0	1970-81, 2003
North Branch Amos Palmer Drain near Oakville, MI (d)	04175352	--	2002-03
River Raisin near Tecumseh, MI (d)	04175700	267	1956-80
South Branch River Raisin at Adrian, MI (d)	04175957	164	1992-95
Saline River near Saline, MI (d)	04176400*	94.6	1966-77

DISCONTINUED SURFACE-WATER-QUALITY STATIONS

The following continuous-record surface-water-quality stations in Michigan have been discontinued. Daily records of temperature, specific conductance, or sediment were collected and published for the record shown for each station. Information regarding these stations may be obtained from the District office at the address given on the back side of the title page of this report.

[Type of record: Temp. (temperature), S.C. (specific conductance), D.O. (dissolved oxygen) Sed. (sediment). Letter (a) before drainage area means approximately.]

Station name	Station number	Drainage area (mi ²)	Type of record	Period of record
STREAMS TRIBUTARY TO LAKE SUPERIOR				
Washington Creek at Windigo, MI	04001000	13.2	Temp.	1965-91
Black River near Bessemer, MI	04031000	200	Temp.	1955-71
Ontonagon River near Rockland, MI	04040000	1,340	Temp., S.C.	1975-81
Sturgeon River near Chassell, MI	04043004	723	Temp., S.C.	1978-81
Trap Rock River near Lake Linden, MI	04043050	28.0	Temp.	1972-83
Salmon Trout River near Big Bay, MI	04043250	37.8	Temp.	1971-73
Tahquamenon River near Paradise, MI	04045500	790	Temp., S.C.	1975-81
STREAMS TRIBUTARY TO ST. MARYS RIVER				
St. Marys River above Sault Ste. Marie, MI	04045580	a80,900	Temp., S.C.	1974-81
STREAMS TRIBUTARY TO LAKE MICHIGAN				
Black River near Garnet, MI	04046000	a28	Temp.	1952-75 1977-78
Manistique River above Manistique, MI	04057004	a1,445	Temp., S.C.	1976-81
Manistique River at Manistique, MI	04057005	a1,450	Temp., S.C.	1975
Middle Branch Escanaba River at Humboldt, MI	04057800	46.0	Temp.	1973-78
Greenwood Afterbay near Greenwood, MI	04057812	67.4	Temp.	1973-86
Greenwood Diverson near Greenwood, MI	04057813	—	Temp.	1973-82
Greenwood Release near Greenwood, MI	04057814	67.4	Temp.	1973-82
Middle Branch Escanaba River near Greenwood, MI	04057820	73.3	Temp.	1973-78
Black River near Republic, MI	04057900	34.4	Sed.	1962-63, 1965, 1962-68
Middle Branch Escanaba River near Ishpeming, MI	04058000	128	Temp.	1962-75, 1977-82
Green Creek near Palmer, MI	04058120	8.42	Temp., Sed.	1965, 1979-80
Green Creek near Princeton, MI	04058130	13.8	Temp.	1977-81
Schweitzer Creek near Palmer, MI	04058200	23.6	Temp.	1962-71
Goose Lake Outlet near Sands Station, MI	04058400	37.5	Temp.	1977-81
East Branch Escanaba River at Gwinn, MI	04058500	124	Temp. Sed.	1955-64 1962-63
Ford River near Hyde, MI	04059500	450	Temp. S.C.	1956-81 1975-81
Paint River near Alpha, MI	04062000	631	Temp.	1953-54, 1956-57
Peshekee River near Champion, MI	04062200	133	Temp.	1962, 1964-78
Michigamme River near Witch Lake, MI	04062400	316	Temp., Sed.	1965-69
East Branch Sturgeon River at Hardwood, MI	04065397	90.8	Temp.	1978-83
Sturgeon River near Foster City, MI	04065500	237	Temp.	1957-80
Pine Creek near Iron Mountain, MI	04065600	16.8	Temp.	1972-81
Beebe Creek near Hillsdale, MI	04096272	42.4	Sed.	1975, 1976-77
Sand Creek at Litchfield, MI	04096312	20.6	Temp., Sed. Sed.	1975-76, 1977
Soap Creek near Litchfield, MI	04096325	10.9	Temp., Sed. Sed.	1975-76, 1977

DISCONTINUED SURFACE-WATER-QUALITY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Type of record	Period of record
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued				
St. Joseph River at Clarendon, MI	04096340	144	Temp., Sed.	1975-76, 1977
St. Joseph River at Niles, MI	04101500	3,666	Temp., S.C.	1979-84
Paw Paw River near Paw Paw, MI	04102320	195	Temp., Sed.	1981-82
Paw Paw River near Hartford, MI	04102420	311	Sed.	1981-82
Black River near Bangor, MI	04102700	83.6	Temp., Sed.	1981-82
Kalamazoo River at Comstock, MI	04106000	a1,010	Temp.	1969-75
Portage Creek near Kalamazoo, MI	04106300	22.4	Temp., S.C.	1968-71
West Fork Portage Creek at Kalamazoo, MI	04106400	18.7	Temp., S.C.	1971, 1972-73
Portage Creek at Kalamazoo, MI	04106500	46.8	S.C. Temp., S.C.	1968, 1972-75, 1976-86
Kalamazoo River near Cooper Center, MI	04106770	1,248	Temp. Temp., S.C.	1968, 1970, 1969, 1971-75
Kalamazoo River at Saugatuck, MI	04108690	a2,020	S.C. Temp., S.C.	1974, 1975-81
Grand River near Eaton Rapids, MI	04111000	661	Temp.	1964-74, 1976-77
Grand River at Lansing, MI	04113000	a1,230	Temp.	1964, 1967-68, 1970-73
Grand River at Portland, MI	04114000	1,385	Temp.	1964-68
Grand River at Eastmanville, MI	04119300	a5,230	Temp., S.C.	1979-83
Muskegon River at Evart, MI	04121500	a1,450	Temp.	1957-83
Little Muskegon River near Morley, MI	04121900	138	Temp.	1967-83
Muskegon River near Bridgeton, MI	04122030	a2,420	Temp., S.C.	1975-81
Pere Marquette River near Scottville, MI	04122500	681	Temp.	1968-83
Manistee River near Grayling, MI	04123500	123	Temp.	1957-77
East Branch Pine River near Tustin, MI	04124500	60	Temp.	1952-63
Pine River near LeRoy, MI	04125000	128	Temp.	1953-63
Pine River near Luther, MI	04125200	194	Sed.	1967-70
Silver Creek near Luther, MI	04125210	4.7	Sed.	1969-70
Poplar Creek near Hoxeyville, MI	04125350	--	Sed.	1969-70
Pine River near Dublin, MI	04125450	241	Sed.	1968-70
Pine River near Hoxeyville, MI	04125500	251	Temp.	1952-63
Pine River near Wellston, MI	04125510	265	Sed.	1967-70
Little Manistee River near Freesoil, MI	04126200	178	Temp.	1957-77
Manistee River at Manistee, MI	04126520	1,928	Temp., S.C.	1975-81
Boardman River at Brown Bridge Road nr Mayfield, MI	04126970	141	Temp., S.C.	1998
Boardman River near Mayfield, MI	04127000	182	Temp.	1962-77
Boardman River at Traverse City, MI	04127499	283	Temp., S.C.	1998
Jordan River near East Jordan, MI	04127800	67.9	Temp.	1967-83

STREAMS TRIBUTARY TO LAKE HURON

Sturgeon River near Wolverine, MI	04128000	198	Temp.	1959-83
Pigeon River near Vanderbilt, MI	04129000	62.6	Temp.	1951-66
Cheboygan River at Cheboygan, MI	04132052	a1,500	Temp., S.C.	1975-81
Thunder Bay River near Alpena, MI	04135000	1,238	Temp., S.C.	1980-85
Thunder Bay River at Alpena, MI	04135020	a1,240	Temp., S.C.	1979

DISCONTINUED SURFACE-WATER-QUALITY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Type of record	Period of record
STREAMS TRIBUTARY TO LAKE HURON--Continued				
Au Sable River at Grayling, MI	04135500	110	Temp.	1953-80
South Branch Au Sable River near Luzerne, MI	04135700	401	Temp.	1967-83
East Branch Au Gres River at McIvor, MI	04138000	a84	Temp.	1952-66
Au Gres River near National City, MI	04138500	154	Temp.	1952-59
Houghton Creek near Lupton, MI	04139000	29.7	Temp.	1950-68
Rifle River near Lupton, MI	04139500	56.8	Temp.	1950-71
Prior Creek near Selkirk, MI	04140000	21.4	Temp.	1951-68
Rifle River at Selkirk, MI	04140500	117	Temp.	1951-76
West Branch Rifle River near Selkirk, MI	04141500	a52	Temp.	1952-61
Rifle River near Sterling, MI	04142000	a320	Sed.	1966,
			Temp., S.C.	1970-72,
				1975-81
Shiawassee River at Holly, MI	04143830	49.2	Temp., S.C.	2001-03
Shiawassee River at Byron, MI	04144000	365	Temp.	1962-81
Shiawassee River at Owosso, MI	04144500	538	Sed.	1966-72
Cass River at Frankenmuth, MI	04151500	841	Sed.	1966-72
Pigeon River near Caseville, MI	04159010	125	Temp., S.C.	1978-81
STREAMS TRIBUTARY TO ST. CLAIR RIVER				
St. Clair River at Port Huron, MI	04159130	a222,400	Temp., S.C.	1978-81
Black River at Fargo, MI	04159500	480	Sed.	1966,
			Temp.	1979-82
STREAMS TRIBUTARY TO LAKE ST. CLAIR				
Sashabaw Creek near Drayton Plains, MI	04160800	20.9	Temp., S.C.	2001-03
Clinton River at Mount Clemens, MI	04165500	734	Temp., S.C.	1975-81
STREAMS TRIBUTARY TO DETROIT RIVER				
Detroit River at Detroit, MI	04165700	a228,800	Temp., S.C.	1974-81
Upper River Rouge at Clarenceville, MI	04166315	19.8	Temp., S.C.	2001-03
STREAMS TRIBUTARY TO LAKE ERIE				
Huron River at Ann Arbor, MI	04174500	729	Temp., D.O., S.C., pH	2000-03
Malletts Creek at Ann Arbor, MI	04174518	10.9	Temp., D.O., S.C., pH	2000-03
River Raisin near Manchester, MI	04175600	132	Temp.	1997
River Raisin near Monroe, MI	04176500	1,042	Temp., Sed.	1966-72
			Temp., S.C.	1978-81

WATER RESOURCES DATA - MICHIGAN, 2004

INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Michigan each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled "Water Resources Data - Michigan."

This report includes records on both surface and ground water in the State. Specifically, it contains: (1) Discharge records for 173 streamflow-gaging stations, 30 crest-stage partial-record stations and 117 miscellaneous sites; (2) stage only records for 2 stream-gaging stations and 26 lake-gaging stations; (3) stage and content records for 1 reservoir; (4) water-quality records for 48 streamflow-gaging stations; (5) water-level records for 48 ground-water wells. These data represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State, local, and Federal agencies in Michigan.

This series of annual reports for Michigan began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report format was changed to present, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for Michigan were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States, Part 4." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States," and water levels for the 1935 through 1974 water years were published under the title "Ground-Water Levels in the United States." The above mentioned Water-Supply Papers may be consulted in the libraries of the principal cities of the United States and may be purchased from U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, CO 80225.

Publications similar to this report are published annually by the Geological Survey for all states. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this volume is identified as "U.S. Geological Survey Water-Data Report MI-04-1." For archiving and general distribution, the reports for 1971-74 water years also are identified as water-data reports. These water-data reports are for sale in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the Director at the address given on the back of the title page or by telephone (517) 887-8903.

COOPERATION

The U.S. Geological Survey and agencies of the State of Michigan have had cooperative agreements for the collection of water-resource records since 1930. Organizations that assisted in collecting the data in this report through cooperative agreement with the Survey are:

Michigan Department of Environmental Quality, Steven E. Chester, Director.

Michigan Department of Natural Resources, Rebecca A. Humphries, Director.

Michigan Department of Transportation, Gloria J. Jeff, Director.

Assistance with funds or services was given by the U.S. Army Corps of Engineers in collecting records for 6 gaging stations published in this report. Assistance was also furnished by the National Weather Service, National Oceanic Atmospheric Administration, and U.S. Department of Commerce.

The following organizations aided in collecting records:

Macomb County Board of Supervisors; Oakland County Drain Commission; Washtenaw County Drain Commission; Delta Township (Eaton County); Huron County; Kalamazoo County; Otsego County; Wayne County; Huron-Clinton Metropolitan Authority; Ann Arbor, Battle Creek, Cadillac, Coldwater, Dearborn Heights, Flint, Kalamazoo, Norway, Portage, Portland, and Sturgis; American Aggregates Co.; Consumers Energy; Cleveland Cliffs Iron Co.; Dow Chemical Co.; French Paper Co.; Lansing Board of Water and Light; Mead Corporation; American Electric Power; Pfizer; STS Hydropower, Ltd; Swift-Eckrich, Inc.; Upper Peninsula Power Co.; White's Bridge Hydro Co.; and We Energies Co.

Organizations that supplied data are acknowledged in the station descriptions.

WATER RESOURCES DATA - MICHIGAN, 2004

SUMMARY OF HYDROLOGIC CONDITIONS

Streamflow

In the western Upper Peninsula, monthly-mean streamflow (discharge) of the Sturgeon River near Sidnaw (fig. 1) was considerably below the 25th percentile in October, increasing to about the 50th percentile from November through January. Streamflow in February was below the 25th percentile, but above-average temperatures in February and March and considerable rainfall occurring late in March resulted in streamflow increasing to near the 75th percentile. Minor flooding occurred in lower-lying downstream areas on March 29-30 when the river approached flood stage. Streamflow exceeded the 75th percentile in April, in response to continuing above-normal precipitation as well as snow melt. The yearly peak of 3,270 ft³/s occurred on April 20, accompanying widespread flooding of many streams across the Upper Peninsula. Streamflow fell considerably below the 50th percentile in May, although a significant-rainfall event on May 30 and 31 resulted in flooding downstream of the gage, and affected streamflow through early June. Streamflow exceeded the 75th percentile in June, and decreased to about the 50th percentile in July and August. In September, with temperatures considerably above average and little precipitation, streamflow declined to about the 25th percentile. Annual mean streamflow of the Sturgeon River near Sidnaw for 2004 was 207 ft³/s. Long-term statistics confirm that the 2004 annual mean streamflow at the Sturgeon River near Sidnaw was average (the 1971-2000 annual mean streamflow is 211 ft³/s; annual mean streamflow for period of record (1931-2004) is 209 ft³/s).

Dry conditions that had prevailed in the eastern Upper Peninsula throughout much of 2003 moderated in November and December. Streamflow of the Tahquamenon River near Paradise (fig. 1) was considerably below the 25th percentile in October, but increased to about the 50th percentile from November through January. Streamflow decreased to about 25th percentile in February, then increased to the 50th percentile in March and about the 75th percentile in April, primarily in response to above-normal precipitation, and snowmelt. Streamflow decreased to near the 50th percentile in May, rose above the 75th percentile again in June, then decreased to near the 50th percentile in July, and the 25th percentile in August and September. Temperatures in the eastern Upper Peninsula were below average from April through August, but were well-above average in September. Annual mean streamflow of the Tahquamenon River near Paradise for 2004 was 901 ft³/s. Long-term statistics confirm that the 2004 annual mean streamflow at the Tahquamenon River near Paradise was average (the 1971-2000 annual mean is 917 ft³/s; annual mean for period of record (1953-2004) is 908 ft³/s).

Dry conditions that had prevailed in the northern Lower Peninsula through much of the past several years largely moderated during 2004. Monthly-mean streamflow of the Muskegon River at Evart (fig. 1) was considerably below the 25th percentile in October, but responded to above-normal precipitation in November when it considerably exceeded the 75th percentile. Normal precipitation in December impacted streamflow, which decreased to between the 50th and 75th percentile. Below-average temperatures in January and February resulted in streamflow below the 25th percentile. Above-average temperatures and above-normal precipitation in March resulted in streamflow that considerably exceeded the 75th percentile, although it declined again in April to between the 25th and 50th percentile. Several precipitation events in May and June resulted in streamflow that was equal to or exceeded the 75th percentile from May through July. August and September were very dry however, and streamflow fell below the 25th percentile. Annual mean streamflow of the Muskegon River at Evart for 2004 was 1,310 ft³/s, which is about twice the 2003 mean. The 2004 mean is 15 percent greater than the 1971-2000 annual mean of 1,140 ft³/s, and about 25 percent greater than the annual mean for period of record (1931-2004) of 1,050 ft³/s.

In the northern Lower Peninsula, new monthly-mean-maximum streamflows were established in March and May at the East Branch Pine River near Tustin with 24 years of record; from March through May and July at the Boardman River near Mayfield, with 7 years of record; and in May at the Thunder Bay River near Bolton and the Pine River near Hoxeyville, with 37 and 38 years of record, respectively. In response to dry conditions in August and September, new monthly-mean-minimum streamflows were established at the Thunder Bay River near Bolton.

In May, heavy rainfall in the central Lower Peninsula resulted in new monthly-mean-maximum streamflows at 11 sites on 10 streams with 17 to 74 years of record. In July, perhaps as a result of localized precipitation events, new monthly-mean-maximum streamflows were established at South Branch Flint River near Columbiaville and Farmers Creek near Lapeer, with 24 and 72 years of record, respectively.

Dry conditions that had prevailed across the southern Lower Peninsula throughout much of 2003, continued through April 2004. Streamflow of the Red Cedar River at East Lansing (fig. 1) was between the 25th and 50th percentile from October through March, but declined to less than half the 25th percentile in April. Above-normal precipitation and cool temperatures from May through August resulted in streamflow well in excess of the 75th percentile throughout the period. Above-normal temperatures and dry conditions in September resulted in streamflow near the 50th percentile. Annual mean streamflow of the

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Red Cedar River at East Lansing for 2004 was 222 ft³/s, which is more than double the 2003 mean of 108 ft³/s and similar to the 1971-2000 and period of record (1902-2004) annual mean streamflows of 241 ft³/s and 216 ft³/s, respectively.

In the southern Lower Peninsula in 2004, an extraordinary number of period-of-record streamflows and resultant statistics were established at sites with long operational periods. In the Grand River Basin in October, a new monthly-mean-minimum streamflow was established at Sloan Creek near Williamston, which has 50 years of record. At Fish Creek near Crystal, which has 17 years of record, new monthly-mean-minimum streamflows were established in October, January, February, and April, followed by new monthly-mean-maximum streamflows in May and June. Period-of-record or near period-of-record instantaneous-peak streamflows were recorded from May 23-25 in response to heavy rainfall at the Grand River at Eaton Rapids, Grand River at Portland, Looking Glass River near Eagle, Grand River at Ionia, and Thornapple River near Hastings, which have 41 to 60 years of record. New monthly-mean-maximum streamflows were recorded in May at Thornapple River near Hastings, Quaker Brook near Nashville, and Rogue River near Rockford; and in June at Looking Glass River near Eagle.

In the Clinton River Basin, new monthly-mean-minimum streamflows were established in April at six streams with 37 to 57 years of record. In May, flooding occurred in much of the southeastern Lower Peninsula, including the Clinton River Basin. New monthly-mean-maximum streamflows were established in May at six streams with 29 to 46 years of record; in June at one stream with 40 years of record; and in July at two streams with 29 and 42 years of record. New instantaneous-peak streamflows were recorded in May at five streams with 40 to 57 years of record. New monthly-mean-minimum streamflows were established in April at three streams in the Huron River Basin with 40 to 56 years of record, and two streams in the River Raisin Basin with 17 and 30 years of record.

In the Kalamazoo River Basin, new monthly-mean-minimum streamflows were established at three streams in October; one stream in December; two streams in February; and eleven streams in April; with periods of record ranging from 2 to 45 years. New monthly-mean-maximum streamflows were established during the spring and summer at four streams, and instantaneous-peak streamflows were recorded at two of the same streams. These data are of limited use however, as three of the four sites had four or less years of record and the oldest site has only operated ten years.

Water Quality

Surface-water-quality data were collected at a number of sites in 2004. Daily records of water temperature were collected at three stations in the Upper Peninsula. In the Lower Peninsula, daily records of one or more water-quality parameters including specific conductance, pH, water temperature, and dissolved oxygen were collected at 42 stations. Sediment samples were collected at five sites, including two where water-quality samples for chemical analysis were also collected. Quarterly microbiological samples were collected at one site on the Saginaw River.

Ground Water

Pleistocene glacial deposits cover most of Michigan. Outwash sand and gravel in these deposits form the most productive aquifers, although lacustrine sand aquifers are also productive. Till deposits formed of poorly-sorted, relatively impermeable mixtures of clay, silt, sand, and gravel tend to be poor aquifers; clay deposits generally yield little or no water. In most areas, glacial deposits are less than 200 ft thick, although deposits greater than 800 ft thick are found in some areas of the northern Lower Peninsula.

Sandstone, limestone, and dolomite are the principal bedrock aquifers. Where bedrock aquifers are hydraulically connected to overlying freshwater-bearing units, they yield freshwater. However, when bedrock aquifers are isolated from overlying freshwater-bearing units by impermeable deposits (confining units) such as till, clay, or shale, they typically yield brackish, saline, or briny water. Annual recharge to aquifers in Michigan, which ranges from 3 to 18 inches, is derived from precipitation that averages 31 inches annually.

Ground-water levels were measured at 48 wells statewide in 2004 (fig. 8); 41 of the wells are equipped with continuous-data recorders and 7 additional wells are measured periodically. Distribution of wells equipped with continuous-data recorders primarily defines localized ground-water conditions, while periodic measurements made at other wells located throughout the state typically define less perturbed aquifer conditions. Most of the periodically-measured wells are located far from major municipal, industrial, or agricultural ground-water users and, as a result, reflect regional ground-water conditions.

Ground-water levels in the southern Lower Peninsula typically follow seasonal precipitation patterns with lowest levels occurring during the mid- to late-summer months followed by recovery in late winter and spring. Ground-water levels in wells in the northern Lower Peninsula and Upper Peninsula typically have lowest levels occurring in late winter as a result of little or no recharge occurring during the winter months followed by recovery in the spring and summer months.

Although several of the wells have a fairly-short period-of-record, a decade or more of previous record is available for some of the wells for comparison purposes. During 2004, wells located in Coldwater in Branch County and near Petersburg in Monroe County had record-low water levels. The Branch County well is located adjacent to municipal water-supply wells and reflects increased withdrawals from those wells, but the Monroe County well is not. The declining trend in ground-water levels throughout Monroe County has been investigated for a number of years, and is currently interpreted as being the effect of increased domestic and commercial withdrawals, as well as quarry dewatering. Interestingly, the response of the water level in the Monroe County well during the last quarter of 2004 is most typical of wells that are being effected by significant nearby

WATER RESOURCES DATA - MICHIGAN, 2004

withdrawal, although none is known to have occurred. Only one record-high ground-water level was measured in 2004, in a well in Cheboygan County with about 20 years of record.

Great Lakes Basin

The following information is largely summarized from information contained in monthly bulletins and yearly summaries of Great Lakes water levels from the U.S. Army Corps of Engineers. All of the Great Lakes had water levels that were higher in 2004 than in 2003. Basinwide precipitation in the last quarter of 2003 was below normal in the Lake Superior Basin, below normal during two of three months in the Lakes Michigan and Huron Basins, and above-normal in the Lakes Erie and Ontario Basins. Frigid air temperatures in early 2004 resulted in significant ice cover on all of the Lakes reducing evaporation and slowing seasonal water-level declines. During the winter of 2003-04, the snow pack across the upper Great Lakes Basin was 40 percent greater than average with nearly a foot of snow-water equivalent in most snowbelt areas. Above-normal precipitation and temperatures that averaged 2 to 5 degrees below normal were typical from May through August throughout the basin. In May alone, Lakes Michigan and Huron rose 9 inches, while the other lakes rose 4 to 9 inches.

At the end of September 2004, Great Lakes water levels varied from long-term (1918-2003) September mean levels as follows: Lake Superior was about 0.25 ft lower; Lakes Michigan and Huron were 0.80 ft lower; Lake St. Clair was about 0.10 ft lower; Lake Erie was about 0.25 ft higher; and Lake Ontario was about 0.75 ft higher. At the end of September 2004, the water level in Lakes Michigan and Huron was about 4.0 ft lower than record-high levels recorded in 1986, and about 1.5 ft higher than the minimum-monthly level recorded in 1964. No new record high- or low-water levels on any of the Great Lakes were recorded during the 2004 water year.

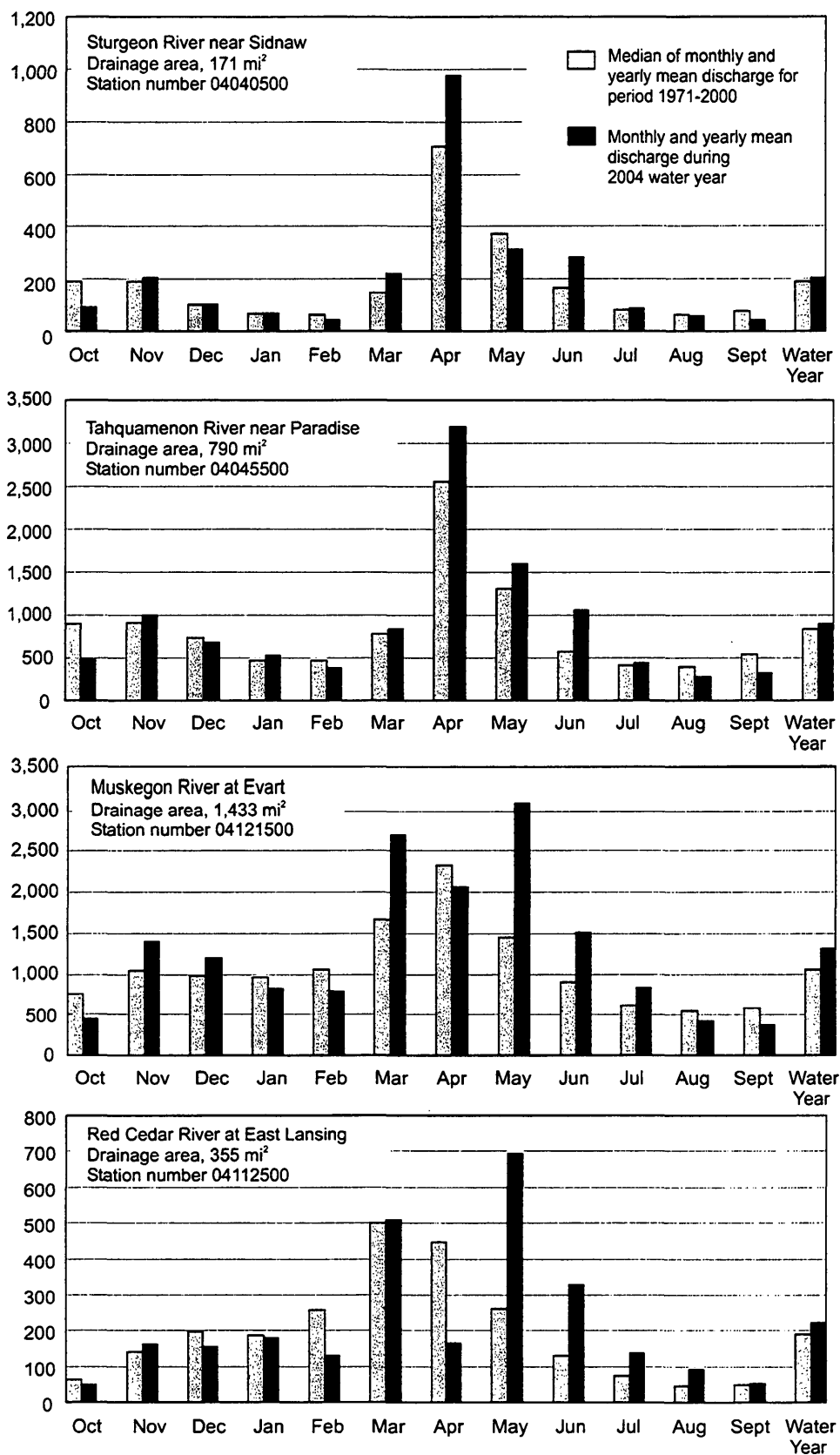


Figure 1. Discharge during 2004 water year compared with median discharge for period 1971-2000 for four representative stations.

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The principal aquifers in Michigan are glacial outwash deposits and sandstone, limestone, and dolomite bedrock. The following table lists the aquifers and some of their characteristics.

Aquifer name and description	Well characteristics		Remarks
	Depth, in feet	Yield, in gallons per minute	
	Common range	Common range	
Glacial aquifers:			
Outwash: Mostly sand and gravel.	25-200	1-1,000	Water generally hard; iron concentrations common; deep wells may produce salty water in places.
Lacustrine sand: Mostly sand, some gravel.	25-100	80-500	Used for domestic supply in Saginaw Bay and Detroit areas; is salty in places at depth
Till: Intermixed clay, silt, sand, gravel and boulders; abundant sand and gravel lenses in some areas.	25-200	5-200	Primary source of domestic supply in western Upper Peninsula.
Bedrock aquifers:			
Saginaw Formation: Sandstone, siltstone, some shale, limestone, and coal	25-300	100-300	One of Michigan's most important bedrock aquifers; water generally hard; salty in places at depth.
Marshall Formation: Sandstone and siltstone.	25-200	100-500	Another of Michigan's important bedrock aquifers; salty in places and at depth.
Silurian-Devonian rocks: Limestone and dolomite; some shale and sandstone.	25-150	10-300	Important aquifer in parts of eastern Upper Peninsula; water commonly hard.
Cambrian-Ordovician rocks: Sandstone, limestone, and dolomite.	25-150	10-100	Important aquifer in eastern Upper Peninsula; water commonly very hard; salty in places and at depth.
Precambrian sandstone: Sandstone interbedded with siltstone.	25-400	5-50	Important aquifer in western Upper Peninsula; salty in places.

Natural chemical characteristics of ground water in Michigan are determined primarily by the geologic environment through which the water flows. Natural ground water generally is suitable for human consumption and most other uses. Water from glacial deposits, at places, contains elevated concentrations of iron [2.5 to 5.0 mg/L (milligrams per liter)]; water from carbonate rocks is likely to be very hard (400 to 900 mg/L as calcium carbonate); and water from the Saginaw Formation in the Saginaw Bay-Thumb area commonly is highly mineralized (2,000 to 80,000 mg/L of dissolved solids). Throughout the State, salty water underlies and is in contact with freshwater at depths ranging from about 100 ft to about 900 ft. Average dissolved-solids concentration of water from bedrock (535 mg/L) is about twice as great as the average concentration from glacial deposits (241 mg/L) (Cummings, 1980).

REFERENCES CITED

Cummings, T.R., 1980, Chemical and physical characteristics of natural ground waters in Michigan--A preliminary report: U.S. Geological Survey Open-File Report 80-953, 34 p.

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DOWNSTREAM ORDER AND STATION NUMBER

Since October 1, 1950, hydrologic-station records in USGS reports have been listed in order of downstream direction along the main stream. All stations on a tributary entering upstream from a main-stream station are listed before that station. A station on a tributary entering between two main-stream stations is listed between those stations. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary on which a station is located with respect to the stream to which it is immediately tributary is indicated by an indentation in that list of stations in the front of this report. Each indentation represents one rank. This downstream order and system of indentation indicates which stations are on tributaries between any two stations and the rank of the tributary on which each station is located.

As an added means of identification, each hydrologic station and partial-record station has been assigned a station number. These station numbers are in the same downstream order used in this report. In assigning a station number, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list composed of both types of stations. Gaps are consecutive. The complete 8-digit (or 10-digit) number for each station such as 04037500, which appears just to the left of the station name, includes a 2-digit part number "04" plus the 6-digit (or 8-digit) downstream order number "037500." In areas of high station density, an additional two digits may be added to the station identification number to yield a 10-digit number. The stations are numbered in downstream order as described above between stations of consecutive 8-digit numbers.

NUMBERING SYSTEM FOR WELLS AND MISCELLANEOUS SITES

The USGS well and miscellaneous site-numbering system is based on the grid system of latitude and longitude. The system provides the geographic location of the well or miscellaneous site and a unique number for each site. The number consists of 15 digits. The first 6 digits denote the degrees, minutes, and seconds of latitude, and the next 7 digits denote degrees, minutes, and seconds of longitude; the last 2 digits are a sequential number for wells within a 1-second grid. In the event that the latitude-longitude coordinates for a well and miscellaneous site are the same, a sequential number such as "01," "02," and so forth, would be assigned as one would for wells (see fig. 2). The 8-digit, downstream order station numbers are not assigned to wells and miscellaneous sites where only random water-quality samples or discharge measurements are taken. In the instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description.

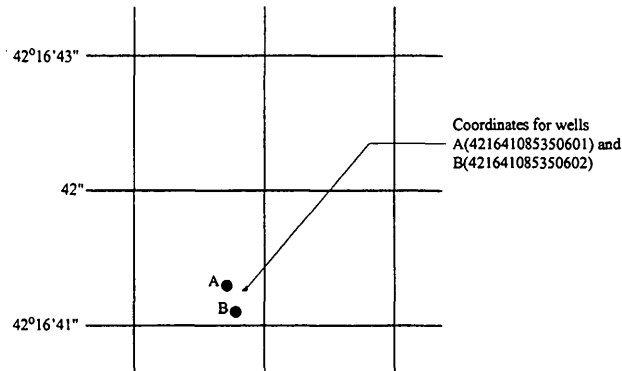


Figure 2.--System for numbering wells (latitude and longitude).

In addition to the well number that is based on the latitude and longitude for each well, another well number may be provided which in many States is based on the Public Land Survey System, a set of rectangular surveys that is used to identify land parcels. This well number is familiar to the water users of Michigan and shows the location of the well by quadrant, township, range section, and position within the section (see fig. 3). The local well number indicates the location of wells within the rectangular subdivision of land with reference to the Michigan meridian and base line. The first two segments of the well number designate township and range, the third segment of the number designates the section and the letters A through D designate successively smaller subdivisions of the section as shown in figure 3. Thus, a well designated as 32N 6E 16CCCB would be located to the nearest 2.5 acres and would be within the shaded area in section 16. In the event that two or more wells are located in the same 2.5 acre tract, a sequential number designation follows the letter designations--for example, 16CCCB1, 16CCCB2, 16CCCB3, etc.

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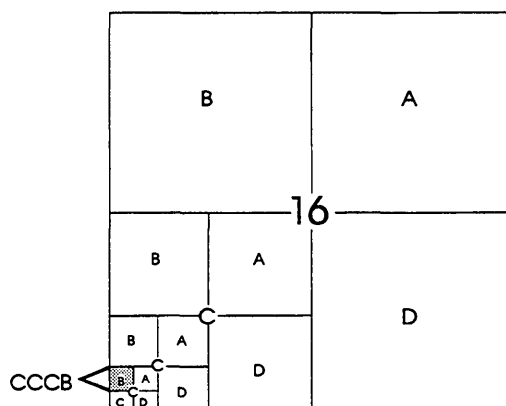


Figure 3.--Local well numbering system in Michigan.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Benchmark Network is a network of 61 sites in small drainage basins in 39 States that was established in 1963 to provide consistent streamflow data representative of undeveloped watersheds nationwide, and from which data could be analyzed on a continuing basis for use in comparison and contrast with conditions observed in basins more obviously affected by human activities. At selected sites, water-quality information is being gathered on major ions and nutrients, primarily to assess the effects of acid deposition on stream chemistry. Additional information on the Hydrologic Benchmark Program may be accessed from <http://water.usgs.gov/hbn/>.

National Stream-Quality Accounting Network (NASQAN) is a network of sites used to monitor the water quality of large rivers within the Nation's largest river basins. From 1995 through 1999, a network of approximately 40 stations was operated in the Mississippi, Columbia, Colorado, and Rio Grande River basins. For the period 2000 through 2004, sampling was reduced to a few index stations on the Colorado and Columbia Rivers so that a network of 5 stations could be implemented on the Yukon River. Samples are collected with sufficient frequency that the flux of a wide range of constituents can be estimated. The objective of NASQAN is to characterize the water quality of these large rivers by measuring concentration and mass transport of a wide range of dissolved and suspended constituents, including nutrients, major ions, dissolved and sediment-bound heavy metals, common pesticides, and inorganic and organic forms of carbon. This information will be used (1) to describe the long-term trends and changes in concentration and transport of these constituents; (2) to test findings of the National Water-Quality Assessment (NAWQA) Program; (3) to characterize processes unique to large-river systems such as storage and re-mobilization of sediments and associated contaminants; and (4) to refine existing estimates of off-continent transport of water, sediment, and chemicals for assessing human effects on the world's oceans and for determining global cycles of carbon, nutrients, and other chemicals. Additional information about the NASQAN Program may be accessed from <http://water.usgs.gov/nasqan/>.

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) is a network of monitoring sites that provides continuous measurement and assessment of the chemical constituents in precipitation throughout the United States. As the lead Federal agency, the USGS works together with over 100 organizations to provide a long-term, spatial and temporal record of atmospheric deposition generated from this network of 250 precipitation-chemistry monitoring sites. The USGS supports 74 of these 250 sites. This long-term, nationally consistent monitoring program, coupled with ecosystem research, provides critical information toward a national scorecard to evaluate the effectiveness of ongoing and future regulations intended to reduce atmospheric emissions and subsequent impacts to the Nation's land and water resources. Reports and other information on the NADP/NTN Program, as well as data from the individual sites, may be accessed from <http://bqs.usgs.gov/acidrain/>.

The USGS National Water-Quality Assessment (NAWQA) Program is a long-term program with goals to describe the status and trends of water-quality conditions for a large, representative part of the Nation's ground- and surface-water resources; to provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and to provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

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Assessment activities are being conducted in 42 study units (major watersheds and aquifer systems) that represent a wide range of environmental settings nationwide and that account for a large percentage of the Nation's water use. A wide array of chemical constituents is measured in ground water, surface water, streambed sediments, and fish tissues. The coordinated application of comparative hydrologic studies at a wide range of spatial and temporal scales will provide information for water-resources managers to use in making decisions and a foundation for aggregation and comparison of findings to address water-quality issues of regional and national interest.

Communication and coordination between USGS personnel and other local, State, and Federal interests are critical components of the NAWQA Program. Each study unit has a local liaison committee consisting of representatives from key Federal, State, and local water-resources agencies, Indian nations, and universities in the study unit. Liaison committees typically meet semiannually to discuss their information needs, monitoring plans and progress, desired information products, and opportunities to collaborate efforts among the agencies. Additional information about the NAWQA Program may be accessed from <http://water.usgs.gov/nawqa/>.

The USGS National Streamflow Information Program (NSIP) is a long-term program with goals to provide framework streamflow data across the Nation. Included in the program are creation of a permanent Federally funded streamflow network, research on the nature of streamflow, regional assessments of streamflow data and databases, and upgrades in the streamflow information delivery systems. Additional information about NSIP may be accessed from <http://water.usgs.gov/nsip/>.

EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS

Data Collection and Computation

The base data collected at gaging stations (fig. 4, 5) consist of records of stage and measurements of discharge of streams or canals, and stage, surface area, and volume of lakes or reservoirs. In addition, observations of factors affecting the stage-discharge relation or the stage-capacity relation, weather records, and other information are used to supplement base data in determining the daily flow or volume of water in storage. Records of stage are obtained from a water-stage recorder that is either downloaded electronically in the field to a laptop computer or similar device or is transmitted using telemetry such as GOES satellite, land-line or cellular-phone modems, or by radio transmission. Measurements of discharge are made with a current meter or acoustic Doppler current profiler, using the general methods adopted by the USGS. These methods are described in standard textbooks, USGS Water-Supply Paper 2175, and the Techniques of Water-Resources Investigations of the United States Geological Survey (TWRIs), Book 3, Chapters A1 through A19 and Book 8, Chapters A2 and B2, which may be accessed from <http://water.usgs.gov/pubs/twri/>. The methods are consistent with the American Society for Testing and Materials (ASTM) standards and generally follow the standards of the International Organization for Standardization (ISO).

For stream-gaging stations, discharge-rating tables for any stage are prepared from stage-discharge curves. If extensions to the rating curves are necessary to express discharge greater than measured, the extensions are made on the basis of indirect measurements of peak discharge (such as slope-area or contracted-opening measurements, or computation of flow over dams and weirs), step-backwater techniques, velocity-area studies, and logarithmic plotting. The daily mean discharge is computed from gage heights and rating tables, then the monthly and yearly mean discharges are computed from the daily values. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features of the stream channel, the daily mean discharge is computed by the shifting-control method in which correction factors based on individual discharge measurements and notes by engineers and observers are used when applying the gage heights to the rating tables. If the stage-discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the controlling section, the daily mean discharge is computed by the shifting-control method.

The stage-discharge relation at some stream-gaging stations is affected by backwater from reservoirs, tributary streams, or other sources. Such an occurrence necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage at some distance from the base gage.

An index velocity is measured using ultrasonic or acoustic instruments at some stream-gaging stations and this index velocity is used to calculate an average velocity for the flow in the stream. This average velocity along with a stage-area relation is then used to calculate average discharge.

At some stations, stage-discharge relation is affected by changing stage. At these stations, the rate of change in stage is used as a factor in computing discharge.

At some stream-gaging stations in the northern United States, the stage-discharge relation is affected by ice in the winter; therefore, computation of the discharge in the usual manner is impossible. Discharge for periods of ice effect is computed on the basis of gage-height record and occasional winter-discharge measurements. Consideration is given to the available information

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on temperature and precipitation, notes by gage observers and hydrologists, and comparable records of discharge from other stations in the same or nearby basins.

For a lake or reservoir station, capacity tables giving the volume or contents for any stage are prepared from stage-area relation curves defined by surveys. The application of the stage to the capacity table gives the contents, from which the daily, monthly, or yearly changes are computed.

If the stage-capacity curve is subject to changes because of deposition of sediment in the reservoir, periodic resurveys of the reservoir are necessary to define new stage-capacity curves. During the period between reservoir surveys, the computed contents may be increasingly in error due to the gradual accumulation of sediment.

For some stream-gaging stations, periods of time occur when no gage-height record is obtained or the recorded gage height is faulty and cannot be used to compute daily discharge or contents. Such a situation can happen when the recorder stops or otherwise fails to operate properly, the intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods, the daily discharges are estimated on the basis of recorded range in stage, prior and subsequent records, discharge measurements, weather records, and comparison with records from other stations in the same or nearby basins. Likewise, lake or reservoir volumes may be estimated on the basis of operator's log, prior and subsequent records, inflow-outflow studies, and other information.

Data Presentation

The records published for each continuous-record surface-water discharge station (stream-gaging station) consist of five parts: (1) the station manuscript or description; (2) the data table of daily mean values of discharge for the current water year with summary data; (3) a tabular statistical summary of monthly mean flow data for a designated period, by water year; and (4) a summary statistics table that includes statistical data of annual, daily, and instantaneous flows as well as data pertaining to annual runoff, 7-day low-flow minimums, and flow duration.

Station Manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments follow that clarify information presented under the various headings of the station description.

LOCATION.—Location information is obtained from the most accurate maps available. The location of the gaging station with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages, given for only a few stations, were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA.—Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.—This term indicates the time period for which records have been published for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not and whose location was such that its flow reasonably can be considered equivalent to flow at the present station.

REVISED RECORDS.—If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

GAGE.—The type of gage in current use, the datum of the current gage referred to a standard datum, and a condensed history of the types, locations, and datums of previous gages are given under this heading.

REMARKS.—All periods of estimated daily discharge either will be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily discharge table. (See section titled Identifying Estimated Daily Discharge.) Information is presented relative to the accuracy of the records, to special methods of computation, and to conditions that affect natural flow at the station. In addition, information may be presented pertaining to average discharge data for the period of record; to extremes data for the period of record and the current year; and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, the outlet works and spillway, and the purpose and use of the reservoir.

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COOPERATION.—Records provided by a cooperating organization or obtained for the USGS by a cooperating organization are identified here.

EXTREMES OUTSIDE PERIOD OF RECORD.—Information here documents major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the USGS.

REVISIONS.—Records are revised if errors in published records are discovered. Appropriate updates are made in the USGS distributed data system, NWIS, and subsequently to its Web-based National data system, NWISWeb (<http://water.usgs.gov/nwis/nwis>). Users are encouraged to obtain all required data from NWIS or NWISWeb to ensure that they have the most recent data updates. Updates to NWISWeb are made on an annual basis.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because no current or, possibly, future station manuscript would be published for these stations to document the revision in a REVISED RECORDS entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the District Office (address given on the back of the title page of this report) to determine if the published records were revised after the station was discontinued. If, however, the data for a discontinued station were obtained by computer retrieval, the data would be current. Any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the REMARKS and in the inclusion of a stage-capacity table when daily volumes are given.

Peak Discharge Greater than Base Discharge

Tables of peak discharge above base discharge are included for some stations where secondary instantaneous peak discharge data are used in flood-frequency studies of highway and bridge design, flood-control structures, and other flood-related projects. The base discharge value is selected so an average of three peaks a year will be reported. This base discharge value has a recurrence interval of approximately 1.1 years or a 91-percent chance of exceedence in any 1 year.

Data Table of Daily Mean Values

The daily table of discharge records for stream-gaging stations gives mean discharge for each day of the water year. In the monthly summary for the table, the line headed TOTAL gives the sum of the daily figures for each month; the line headed MEAN gives the arithmetic average flow in cubic feet per second for the month; and the lines headed MAX and MIN give the maximum and minimum daily mean discharges, respectively, for each month. Discharge for the month is expressed in cubic feet per second per square mile (line headed CFSM); or in inches (line headed IN); or in acre-feet (line headed AC-FT). Values for cubic feet per second per square mile and runoff in inches or in acre-feet may be omitted if extensive regulation or diversion is in effect or if the drainage area includes large noncontributing areas. At some stations, monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversion data or reservoir volumes are given. These values are identified by a symbol and a corresponding footnote.

Statistics of Monthly Mean Data

A tabular summary of the mean (line headed MEAN), maximum (MAX), and minimum (MIN) of monthly mean flows for each month for a designated period is provided below the mean values table. The water years of the first occurrence of the maximum and minimum monthly flows are provided immediately below those values. The designated period will be expressed as FOR WATER YEARS __-__, BY WATER YEAR (WY), and will list the first and last water years of the range of years selected from the PERIOD OF RECORD paragraph in the station manuscript. The designated period will consist of all of the station record within the specified water years, including complete months of record for partial water years, and may coincide with the period of record for the station. The water years for which the statistics are computed are consecutive, unless a break in the station record is indicated in the manuscript.

Summary Statistics

A table titled SUMMARY STATISTICS follows the statistics of monthly mean data tabulation. This table consists of four columns with the first column containing the line headings of the statistics being reported. The table provides a statistical summary of yearly, daily, and instantaneous flows, not only for the current water year but also for the previous calendar year and for a designated period, as appropriate. The designated period selected, WATER YEARS __-__, will consist of all of the station records within the specified water years, including complete months of record for partial water years, and may coincide with the period of record for the station. The water years for which the statistics are computed are consecutive, unless a break in the station record is indicated in the manuscript. All of the calculations for the statistical characteristics designated ANNUAL (see line headings below), except for the ANNUAL 7-DAY MINIMUM statistic, are calculated for the designated period using complete water years. The other statistical characteristics may be calculated using partial water years.

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The date or water year, as appropriate, of the first occurrence of each statistic reporting extreme values of discharge is provided adjacent to the statistic. Repeated occurrences may be noted in the REMARKS paragraph of the manuscript or in footnotes. Because the designated period may not be the same as the station period of record published in the manuscript, occasionally the dates of occurrence listed for the daily and instantaneous extremes in the designated-period column may not be within the selected water years listed in the heading. When the dates of occurrence do not fall within the selected water years listed in the heading, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration-curve statistics and runoff data also are given. Runoff data may be omitted if extensive regulation or diversion of flow is in effect in the drainage basin.

The following summary statistics data are provided with each continuous record of discharge. Comments that follow clarify information presented under the various line headings of the SUMMARY STATISTICS table.

ANNUAL TOTAL.—The sum of the daily mean values of discharge for the year.

ANNUAL MEAN.—The arithmetic mean for the individual daily mean discharges for the year noted or for the designated period.

HIGHEST ANNUAL MEAN.—The maximum annual mean discharge occurring for the designated period.

LOWEST ANNUAL MEAN.—The minimum annual mean discharge occurring for the designated period.

HIGHEST DAILY MEAN.—The maximum daily mean discharge for the year or for the designated period.

LOWEST DAILY MEAN.—The minimum daily mean discharge for the year or for the designated period.

ANNUAL 7-DAY MINIMUM.—The lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1-March 31). The date shown in the summary statistics table is the initial date of the 7-day period. This value should not be confused with the 7-day 10-year low-flow statistic.

MAXIMUM PEAK FLOW.—The maximum instantaneous peak discharge occurring for the water year or designated period. Occasionally the maximum flow for a year may occur at midnight at the beginning or end of the year, on a recession from or rise toward a higher peak in the adjoining year. In this case, the maximum peak flow is given in the table and the maximum flow may be reported in a footnote or in the REMARKS paragraph in the manuscript.

MAXIMUM PEAK STAGE.—The maximum instantaneous peak stage occurring for the water year or designated period. Occasionally the maximum stage for a year may occur at midnight at the beginning or end of the year, on a recession from or rise toward a higher peak in the adjoining year. In this case, the maximum peak stage is given in the table and the maximum stage may be reported in the REMARKS paragraph in the manuscript or in a footnote. If the dates of occurrence of the maximum peak stage and maximum peak flow are different, the REMARKS paragraph in the manuscript or a footnote may be used to provide further information.

INSTANTANEOUS LOW FLOW.—The minimum instantaneous discharge occurring for the water year or for the designated period.

ANNUAL RUNOFF.—Indicates the total quantity of water in runoff for a drainage area for the year. Data reports may use any of the following units of measurement in presenting annual runoff data:

Acre-foot (AC-FT) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Cubic feet per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming the runoff is distributed uniformly in time and area.

Inches (INCHES) indicate the depth to which the drainage area would be covered if all of the runoff for a given time period were uniformly distributed on it.

10 PERCENT EXCEEDS.—The discharge that has been exceeded 10 percent of the time for the designated period.

50 PERCENT EXCEEDS.—The discharge that has been exceeded 50 percent of the time for the designated period.

90 PERCENT EXCEEDS.—The discharge that has been exceeded 90 percent of the time for the designated period.

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Data collected at partial-record stations follow the information for continuous-record sites. Data for partial-record discharge stations are presented in two tables. The first table lists annual maximum stage and discharge at crest-stage stations, and the second table lists discharge measurements at low-flow partial-record stations. The tables of partial-record stations are followed by a listing of discharge measurements made at sites other than continuous-record or partial-record stations. These measurements are often made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for a special reason are called measurements at miscellaneous sites.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified. This identification is shown either by flagging individual daily values with the letter "e" and noting in a table footnote, "e—Estimated," or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

Accuracy of Field Data and Computed Results

The accuracy of streamflow data depends primarily on (1) the stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of observations of stage, measurements of discharge, and interpretations of records.

The degree of accuracy of the records is stated in the REMARKS in the station description. "Excellent" indicates that about 95 percent of the daily discharges are within 5 percent of the true value; "good" within 10 percent; and "fair," within 15 percent. "Poor" indicates that daily discharges have less than "fair" accuracy. Different accuracies may be attributed to different parts of a given record.

Values of daily mean discharge in this report are shown to the nearest hundredth of a cubic foot per second for discharges of less than 1 ft³/s; to the nearest tenths between 1.0 and 10 ft³/s; to whole numbers between 10 and 1,000 ft³/s; and to 3 significant figures above 1,000 ft³/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharge values listed for partial-record stations.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, values of cubic feet per second per square mile and of runoff in inches are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

Other Data Records Available

Information of a more detailed nature than that published for most of the stream-gaging stations such as discharge measurements, gage-height records, and rating tables is available from the District office. Also, most stream-gaging station records are available in computer-usable form and many statistical analyses have been made.

Information on the availability of unpublished data or statistical analyses may be obtained from the District office (see address that is shown on the back of the title page of this report).

EXPLANATION OF PRECIPITATION RECORDS

Data Collection and Computation

Rainfall data generally are collected using electronic data loggers that measure the rainfall in 0.01-inch increments every 15 minutes using either a tipping-bucket rain gage or a collection well gage. Twenty-four hour rainfall totals are tabulated and presented. A 24-hour period extends from just past midnight of the previous day to midnight of the current day. Snowfall-affected data can result during cold weather when snow fills the rain-gage funnel and then melts as temperatures rise. Snowfall-affected data are subject to errors. Missing values are indicated by this symbol "---" in the table.

Data Presentation

Precipitation records collected at surface-water gaging stations are identified with the same station number and name as the stream-gaging station. Where a surface-water daily-record station is not available, the precipitation record is published with its own name and latitude-longitude identification number.

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Information pertinent to the history of a precipitation station is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, period of record, and general remarks.

The following information is provided with each precipitation station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.—See Data Presentation in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

PERIOD OF RECORD.—See Data Presentation in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

INSTRUMENTATION.—Information on the type of rainfall collection system is given.

REMARKS.—Remarks provide added information pertinent to the collection, analysis, or computation of records.

EXPLANATION OF WATER-QUALITY RECORDS

Collection and Examination of Data

Surface-water samples for analysis usually are collected at or near stream-gaging stations. The quality-of-water records are given immediately following the discharge records at these stations.

The descriptive heading for water-quality records gives the period of record for all water-quality data; the period of daily record for parameters that are measured on a daily basis (specific conductance, water temperature, sediment discharge, and so forth); extremes for the current year; and general remarks.

For ground-water records, no descriptive statements are given; however, the well number, depth of well, sampling date, or other pertinent data are given in the table containing the chemical analyses of the ground water.

Water Analysis

Most of the methods used for collecting and analyzing water samples are described in the TWRI's, which may be accessed from <http://water.usgs.gov/pubs/twri/>.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross-section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled at several verticals to obtain a representative sample needed for an accurate mean concentration and for use in calculating load.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum and minimum values (and sometimes mean or median values) for each constituent measured, and are based on 15-minute or 1-hour intervals of recorded data beginning at 0000 hours and ending at 2400 hours for the day of record.

SURFACE-WATER-QUALITY RECORDS

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because discharge data are useful in the interpretation of surface-water quality. Records of surface-water quality in this report involve a variety of types of data and measurement frequencies.

Classification of Records

Water-quality data for surface-water sites are grouped into one of three classifications. A *continuous-record station* is a site where data are collected on a regularly scheduled basis. Frequency may be one or more times daily, weekly, monthly, or quarterly. A *partial-record station* is a site where limited water-quality data are collected systematically over a period of years.

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Frequency of sampling is usually less than quarterly. A *miscellaneous sampling site* is a location other than a continuous- or partial-record station, where samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between *continuous records* as used in this report and *continuous recordings* that refer to a continuous graph or a series of discrete values recorded at short intervals. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figure 6.

Accuracy of the Records

One of four accuracy classifications is applied for measured physical properties at continuous-record stations on a scale ranging from poor to excellent. The accuracy rating is based on data values recorded before any shifts or corrections are made. Additional consideration also is given to the amount of publishable record and to the amount of data that have been corrected or shifted.

Rating classifications for continuous water-quality records

[≤, less than or equal to; ±, plus or minus value shown; °C, degree Celsius; >, greater than; %, percent; mg/L, milligram per liter; pH unit, standard pH unit]

Measured physical property	Rating			
	Excellent	Good	Fair	Poor
Water temperature	≤ ±0.2 °C	> ±0.2 to 0.5 °C	> ±0.5 to 0.8 °C	> ±0.8 °C
Specific conductance	≤ ±3%	> ±3 to 10%	> ±10 to 15%	> ±15%
Dissolved oxygen	≤ ±0.3 mg/L	> ±0.3 to 0.5 mg/L	> ±0.5 to 0.8 mg/L	> ±0.8 mg/L
pH	≤ ±0.2 unit	> ±0.2 to 0.5 unit	> ±0.5 to 0.8 unit	> ±0.8 unit
Turbidity	≤ ±5%	> ±5 to 10%	> ±10 to 15%	> ±15%

Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

On-Site Measurements and Sample Collection

In obtaining water-quality data, a major concern is assuring that the data obtained represent the naturally occurring quality of the water. To ensure this, certain measurements, such as water temperature, pH, and dissolved oxygen, must be made on site when the samples are taken. To assure that measurements made in the laboratory also represent the naturally occurring water, carefully prescribed procedures must be followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures for on-site measurements and for collecting, treating, and shipping samples are given in TWRI's Book 1, Chapter D2; Book 3, Chapters A1, A3, and A4; and Book 9, Chapters A1-A9. Most of the methods used for collecting and analyzing water samples are described in the TWRI's, which may be accessed from <http://water.usgs.gov/pubs/twri/>. Also, detailed information on collecting, treating, and shipping samples can be obtained from the USGS District office (see address that is shown on the back of title page in this report).

Water Temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at the time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

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At stations where recording instruments are used, either mean temperatures or maximum and minimum temperatures for each day are published. Water temperatures measured at the time of water-discharge measurements are on file in the District office.

Sediment

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samplers. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross section.

During periods of rapidly changing flow or rapidly changing concentration, samples may be collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

At other stations, suspended-sediment samples are collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observation, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of suspended-sediment discharge, records of the periodic measurements of the particle-size distribution of the suspended sediment and bed material are included for some stations.

Laboratory Measurements

Samples for biochemical oxygen demand (BOD) and indicator bacteria are analyzed locally. All other samples are analyzed in the USGS laboratory in Lakewood, Colorado, unless otherwise noted. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chapter C1. Methods used by the USGS laboratories are given in the TWRI's, Book 1, Chapter D2; Book 3, Chapter C2; and Book 5, Chapters A1, A3, and A4. The TWRI publications may be accessed from <http://water.usgs.gov/pubs/twri/>. These methods are consistent with ASTM standards and generally follow ISO standards.

Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.—See Data Presentation information in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

DRAINAGE AREA.—See Data Presentation information in the EXPLANATION OF STAGE- AND WATER-DISCHARGE RECORDS section of this report (same comments apply).

PERIOD OF RECORD.—This indicates the time periods for which published water-quality records for the station are available. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.—Information on instrumentation is given only if a water-quality monitor temperature record, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.—Remarks provide added information pertinent to the collection, analysis, or computation of the records.

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COOPERATION.—Records provided by a cooperating organization or obtained for the USGS by a cooperating organization are identified here.

EXTREMES.—Maximums and minimums are given only for parameters measured daily or more frequently. For parameters measured weekly or less frequently, true maximums or minimums may not have been obtained. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.—Records are revised if errors in published water-quality records are discovered. Appropriate updates are made in the USGS distributed data system, NWIS, and subsequently to its Web-based National data system, NWISWeb (<http://waterdata.usgs.gov/nwis>). Users of USGS water-quality data are encouraged to obtain all required data from NWIS or NWISWeb to ensure that they have the most recent updates. Updates to the NWISWeb are made on an annual basis.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

Remark Codes

The following remark codes may appear with the water-quality data in this section:

Printed Output	Remark
E	Value is estimated.
>	Actual value is known to be greater than the value shown.
<	Actual value is known to be less than the value shown.
M	Presence of material verified, but not quantified.
N	Presumptive evidence of presence of material.
U	Material specifically analyzed for, but not detected.
A	Value is an average.
V	Analyte was detected in both the environmental sample and the associated blanks.
S	Most probable value.

Water-Quality Control Data

The USGS National Water Quality Laboratory collects quality-control data on a continuing basis to evaluate selected analytical methods to determine long-term method detection levels (LT-MDLs) and laboratory reporting levels (LRLs). These values are re-evaluated each year on the basis of the most recent quality-control data and, consequently, may change from year to year.

This reporting procedure limits the occurrence of false positive error. Falsely reporting a concentration greater than the LT-MDL for a sample in which the analyte is not present is 1 percent or less. Application of the LRL limits the occurrence of false negative error. The chance of falsely reporting a non-detection for a sample in which the analyte is present at a concentration equal to or greater than the LRL is 1 percent or less.

Accordingly, concentrations are reported as less than LRL for samples in which the analyte was either not detected or did not pass identification. Analytes detected at concentrations between the LT-MDL and the LRL and that pass identification criteria are estimated. Estimated concentrations will be noted with a remark code of "E." These data should be used with the understanding that their uncertainty is greater than that of data reported without the E remark code.

Data generated from quality-control (QC) samples are a requisite for evaluating the quality of the sampling and processing techniques as well as data from the actual samples themselves. Without QC data, environmental sample data cannot be adequately interpreted because the errors associated with the sample data are unknown. The various types of QC

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samples collected by this District office are described in the following section. Procedures have been established for the storage of water-quality-control data within the USGS. These procedures allow for storage of all derived QC data and are identified so that they can be related to corresponding environmental samples. These data are not presented in this report but are available from the District office.

Blank Samples

Blank samples are collected and analyzed to ensure that environmental samples have not been contaminated in the overall data-collection process. The blank solution used to develop specific types of blank samples is a solution that is free of the analytes of interest. Any measured value signal in a blank sample for an analyte (a specific component measured in a chemical analysis) that was absent in the blank solution is believed to be due to contamination. Many types of blank samples are possible; each is designed to segregate a different part of the overall data-collection process. The types of blank samples collected in this district are:

Field blank—A blank solution that is subjected to all aspects of sample collection, field processing preservation, transportation, and laboratory handling as an environmental sample.

Trip blank—A blank solution that is put in the same type of bottle used for an environmental sample and kept with the set of sample bottles before and after sample collection.

Equipment blank—A blank solution that is processed through all equipment used for collecting and processing an environmental sample (similar to a field blank but normally done in the more controlled conditions of the office).

Sampler blank—A blank solution that is poured or pumped through the same field sampler used for collecting an environmental sample.

Filter blank—A blank solution that is filtered in the same manner and through the same filter apparatus used for an environmental sample.

Splitter blank—A blank solution that is mixed and separated using a field splitter in the same manner and through the same apparatus used for an environmental sample.

Preservation blank—A blank solution that is treated with the sampler preservatives used for an environmental sample.

Reference Samples

Reference material is a solution or material prepared by a laboratory. The reference material composition is certified for one or more properties so that it can be used to assess a measurement method. Samples of reference material are submitted for analysis to ensure that an analytical method is accurate for the known properties of the reference material. Generally, the selected reference material properties are similar to the environmental sample properties.

Replicate Samples

Replicate samples are a set of environmental samples collected in a manner such that the samples are thought to be essentially identical in composition. Replicate is the general case for which a duplicate is the special case consisting of two samples. Replicate samples are collected and analyzed to establish the amount of variability in the data contributed by some part of the collection and analytical process. Many types of replicate samples are possible, each of which may yield slightly different results in a dynamic hydrologic setting, such as a flowing stream. The types of replicate samples collected in this district are:

Concurrent samples—A type of replicate sample in which the samples are collected simultaneously with two or more samplers or by using one sampler and alternating the collection of samples into two or more compositing containers.

Sequential samples—A type of replicate sample in which the samples are collected one after the other, typically over a short time.

Split sample—A type of replicate sample in which a sample is split into subsamples, each subsample contemporaneous in time and space.

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Spike Samples

Spike samples are samples to which known quantities of a solution with one or more well-established analyte concentrations have been added. These samples are analyzed to determine the extent of matrix interference or degradation on the analyte concentration during sample processing and analysis.

EXPLANATION OF GROUND-WATER-LEVEL RECORDS

Generally, only ground-water-level data from selected wells with continuous recorders from a basic network of observation wells are published in this report. This basic network contains observation wells located so that the most significant data are obtained from the fewest wells in the most important aquifers.

Site Identification Numbers

Each well is identified by means of (1) a 15-digit number that is based on latitude and longitude and (2) a local number that is produced for local needs. (See NUMBERING SYSTEM FOR WELLS AND MISCELLANEOUS SITES in this report for a detailed explanation).

Data Collection and Computation

Measurements are made in many types of wells, under varying conditions of access and at different temperatures; hence, neither the method of measurement nor the equipment can be standardized. At each observation well, however, the equipment and techniques used are those that will ensure that measurements at each well are consistent.

Most methods for collecting and analyzing water samples are described in the TWRI's referred to in the On-site Measurements and Sample Collection and the Laboratory Measurements sections in this report. In addition, TWRI Book 1, Chapter D2, describes guidelines for the collection and field analysis of ground-water samples for selected unstable constituents. Procedures for on-site measurements and for collecting, treating, and shipping samples are given in TWRI's Book 1, Chapter D2; Book 3, Chapters A1, A3, and A4; and Book 9, Chapters A1 through A9. The TWRI publications may be accessed from <http://water.usgs.gov/pubs/twri/>. The values in this report represent water-quality conditions at the time of sampling, as much as possible, and that are consistent with available sampling techniques and methods of analysis. These methods are consistent with ASTM standards and generally follow ISO standards. Trained personnel collected all samples. The wells sampled were pumped long enough to ensure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possibly metal, comprising the casings.

Water-level measurements in this report are given in feet with reference to land-surface datum (lsd). Land-surface datum is a datum plane that is approximately at land surface at each well. If known, the elevation of the land-surface datum above sea level is given in the well description. The height of the measuring point (MP) above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month (EOM).

Water levels are reported to as many significant figures as can be justified by the local conditions. For example, in a measurement of a depth of water of several hundred feet, the error in determining the absolute value of the total depth to water may be a few tenths of a foot, whereas the error in determining the net change of water level between successive measurements may be only a hundredth or a few hundredths of a foot. For lesser depths to water the accuracy is greater. Accordingly, most measurements are reported to a hundredth of a foot, but some are given only to a tenth of a foot or a larger unit.

Data Presentation

Water-level data are presented in alphabetical order by county. The primary identification number for a given well is the 15-digit site identification number that appears in the upper left corner of the table. The secondary identification number is the local or county well number. Well locations are shown in figure 9.

Each well record consists of three parts: the well description, the data table of water levels observed during the water year, and, for most wells, a hydrograph following the data table. Well descriptions are presented in the headings preceding the tabular data.

The following comments clarify information presented in these various headings.

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LOCATION.—This paragraph follows the well-identification number and reports the hydrologic-unit number and a geographic point of reference. Latitudes and longitudes used in this report are reported as North American Datum of 1927 unless otherwise specified.

AQUIFER.—This entry designates by name and geologic age the aquifer that the well taps.

WELL CHARACTERISTICS.—This entry describes the well in terms of depth, casing diameter and depth or screened interval, method of construction, use, and changes since construction.

INSTRUMENTATION.—This paragraph provides information on both the frequency of measurement and the collection method used, allowing the user to better evaluate the reported water-level extremes by knowing whether they are based on continuous, monthly, or some other frequency of measurement.

DATUM.—This entry describes both the measuring point and the land-surface elevation at the well. The altitude of the land-surface datum is described in feet above the altitude datum; it is reported with a precision depending on the method of determination. The measuring point is described physically (such as top of casing, top of instrument shelf, and so forth), and in relation to land surface (such as 1.3 ft above land-surface datum). The elevation of the land-surface datum is described in feet above National Geodetic Vertical Datum of 1929 (NGVD 29); it is reported with a precision depending on the method of determination.

REMARKS.—This entry describes factors that may influence the water level in a well or the measurement of the water level, when various methods of measurement were begun, and the network (climatic, terrane, local, or areal effects) or the special project to which the well belongs.

PERIOD OF RECORD.—This entry indicates the time period for which records are published for the well, the month and year at the start of publication of water-level records by the USGS, and the words “to current year” if the records are to be continued into the following year. Time periods for which water-level records are available, but are not published by the USGS, may be noted.

EXTREMES FOR PERIOD OF RECORD.—This entry contains the highest and lowest instantaneously recorded or measured water levels of the period of published record, with respect to land-surface datum or sea level, and the dates of occurrence.

Water-Level Tables

A table of water levels follows the well description for each well. Water-level measurements in this report are given in feet with reference to either sea level or land-surface datum (lsd). Missing records are indicated by dashes in place of the water-level value.

For wells not equipped with recorders, water-level measurements were obtained periodically by steel or electric tape. Tables of periodic water-level measurements in these wells show the date of measurement and the measured water-level value.

Hydrographs

Hydrographs are a graphic display of water-level fluctuations over a period of time. In this report, current water year hydrographs are shown. Hydrographs that display periodic water-level measurements show points that may be connected with a dashed line from one measurement to the next. Hydrographs that display recorder data show a solid line representing the lowest water level recorded for each day. Missing data are indicated by a blank space or break in a hydrograph. Missing data may occur as a result of recorder malfunctions, battery failures, or mechanical problems related to the response of the recorder's float mechanism to water-level fluctuations in a well.

GROUND-WATER-QUALITY DATA

Data Collection and Computation

The ground-water-quality data in this report were obtained as a part of special studies in specific areas. Consequently, a number of chemical analyses are presented for some wells within a county but not for others. As a result, the records for this year, by themselves, do not provide a balanced view of ground-water quality Statewide.

Most methods for collecting and analyzing water samples are described in the TWRI's, which may be accessed from <http://water.usgs.gov/pubs/twri/>. Procedures for on-site measurements and for collecting, treating, and shipping samples are given in TWRI, Book 1, Chapter D2; Book 5, Chapters A1, A3, and A4 and Book 9, Chapters A1-A6. Also, detailed information on collecting, treating, and shipping samples may be obtained from the USGS District office (see address shown on back of title page in this report).

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Laboratory Measurements

Analysis for sulfide and measurement of alkalinity, pH, water temperature, specific conductance, and dissolved oxygen are performed on site. All other sample analyses are performed at the USGS laboratory in Lakewood, Colorado, unless otherwise noted. Methods used by the USGS laboratory are given in TWRI, Book 1, Chapter D2; and Book 5, Chapters A1, A3, and A4, which may be accessed from <http://water.usgs.gov/pubs/twri/>.

ACCESS TO USGS WATER DATA

The USGS provides near real-time stage and discharge data for many of the gaging stations equipped with the necessary telemetry and historic daily mean and peak-flow discharge data for most current or discontinued gaging stations through the World Wide Web (WWW). These data may be accessed from <http://water.usgs.gov>.

Water-quality data and ground-water data also are available through the WWW. In addition, data can be provided in various machine-readable formats on various media. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each Water Science Center (See address that is shown on the back of the title page of this report.)

DEFINITION OF TERMS

Specialized technical terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. Terms such as algae, water level, and precipitation are used in their common everyday meanings, definitions of which are given in standard dictionaries. Not all terms defined in this alphabetical list apply to every State. See also table for converting English units to International System (SI) Units. Other glossaries that also define water-related terms are accessible from <http://water.usgs.gov/glossaries.html>.

Acid neutralizing capacity (ANC) is the equivalent sum of all bases or base-producing materials, solutes plus particulates, in an aqueous system that can be titrated with acid to an equivalence point. This term designates titration of an "unfiltered" sample (formerly reported as alkalinity).

Acre-foot (AC-FT, acre-ft) is a unit of volume, commonly used to measure quantities of water used or stored, equivalent to the volume of water required to cover 1 acre to a depth of 1 foot and equivalent to 43,560 cubic feet, 325,851 gallons, or 1,233 cubic meters. (See also "Annual runoff")

Adenosine triphosphate (ATP) is an organic, phosphate-rich compound important in the transfer of energy in organisms. Its central role in living cells makes ATP an excellent indicator of the presence of living material in water. A measurement of ATP therefore provides a sensitive and rapid estimate of biomass. ATP is reported in micrograms per liter.

Adjusted discharge is discharge data that have been mathematically adjusted (for example, to remove the effects of a daily tide cycle or reservoir storage).

Algal growth potential (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample. (See also "Biomass" and "Dry weight")

Alkalinity is the capacity of solutes in an aqueous system to neutralize acid. This term designates titration of a "filtered" sample.

Annual runoff is the total quantity of water that is discharged ("runs off") from a drainage basin in a year. Data reports may present annual runoff data as volumes in acre-feet, as discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches.

Annual 7-day minimum is the lowest mean value for any 7-consecutive-day period in a year. Annual 7-day minimum values are reported herein for the calendar year and the water year (October 1 through September 30). Most low-flow frequency analyses use a climatic year (April 1-March 31), which tends to prevent the low-flow period from being artificially split between adjacent years. The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day, 10-year low-flow statistic.)

Aroclor is the registered trademark for a group of poly-chlorinated biphenyls that were manufactured by the Monsanto Company prior to 1976. Aroclors are assigned specific 4-digit reference numbers dependent upon molecular type and degree of substitution of the biphenyl ring hydrogen atoms by chlorine atoms. The first two digits of a numbered aroclor represent the molecular type, and the last two digits represent the percentage weight of the hydrogen-substituted chlorine.

Artificial substrate is a device that purposely is placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is collected. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton collection. (See also "Substrate")

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Ash mass is the mass or amount of residue present after the residue from a dry-mass determination has been ashed in a muffle furnace at a temperature of 500°C for 1 hour. Ash mass of zooplankton and phytoplankton is expressed in grams per cubic meter (g/m^3), and periphyton and benthic organisms in grams per square meter (g/m^2). (See also "Biomass" and "Dry mass")

Aspect is the direction toward which a slope faces with respect to the compass.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, whereas others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Bankfull stage, as used in this report, is the stage at which a stream first overflows its natural banks formed by floods with 1- to 3-year recurrence intervals.

Base discharge (for peak discharge) is a discharge value, determined for selected stations, above which peak discharge data are published. The base discharge at each station is selected so that an average of about three peak flows per year will be published. (See also "Peak flow")

Base flow is sustained flow of a stream in the absence of direct runoff. It includes natural and human-induced streamflows. Natural base flow is sustained largely by ground-water discharge.

Bed material is the sediment mixture of which a stream-bed, lake, pond, reservoir, or estuary bottom is composed. (See also "Bedload" and "Sediment")

Bedload is material in transport that primarily is supported by the streambed. In this report, bedload is considered to consist of particles in transit from the bed to the top of the bedload sampler nozzle (an elevation ranging from 0.25 to 0.5 foot). These particles are retained in the bedload sampler. A sample collected with a pressure-differential bedload sampler also may contain a component of the suspended load.

Bedload discharge (tons per day) is the rate of sediment moving as bedload, reported as dry weight, that passes through a cross section in a given time. NOTE: Bedload discharge values in this report may include a component of the suspended-sediment discharge. A correction may be necessary when computing the total sediment discharge by summing the bedload discharge and the suspended-sediment discharge. (See also "Bedload," "Dry weight," "Sediment," and "Suspended-sediment discharge")

Benthic organisms are the group of organisms inhabiting the bottom of an aquatic environment. They include a number of types of organisms, such as bacteria, fungi, insect larvae and nymphs, snails, clams, and crayfish. They are useful as indicators of water quality.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria.

Biomass is the amount of living matter present at any given time, expressed as mass per unit area or volume of habitat.

Biomass pigment ratio is an indicator of the total proportion of periphyton that are autotrophic (plants). This also is called the Autotrophic Index.

Blue-green algae (*Cyanophyta*) are a group of phytoplankton and periphyton organisms with a blue pigment in addition to a green pigment called chlorophyll. Blue-green algae can cause nuisance water-quality conditions in lakes and slow-flowing rivers; however, they are found commonly in streams throughout the year. The abundance of blue-green algae in phytoplankton samples is expressed as the number of cells per milliliter (cells/mL) or biovolume in cubic micrometers per milliliter (mm^3/mL). The abundance of blue-green algae in periphyton samples is given in cells per square centimeter (cells/cm^2) or biovolume per square centimeter (mm^3/cm^2). (See also "Phytoplankton" and "Periphyton")

Bottom material (See "Bed material")

Bulk electrical conductivity is the combined electrical conductivity of all material within a doughnut-shaped volume surrounding an induction probe. Bulk conductivity is affected by different physical and chemical properties of the material including the dissolved-solids content of the pore water, and the lithology and porosity of the rock.

Canadian Geodetic Vertical Datum 1928 is a geodetic datum derived from a general adjustment of Canada's first order level network in 1928.

Cell volume (biovolume) determination is one of several common methods used to estimate biomass of algae in aquatic systems. Cell members of algae are used frequently in aquatic surveys as an indicator of algal production. However, cell numbers alone cannot represent true biomass because of considerable cell-size variation among the algal species. Cell volume (mm^3) is determined by obtaining critical cell measurements or cell dimensions (for example, length, width, height, or radius) for 20 to 50 cells of each important species to obtain an average biovolume per cell. Cells are categorized according to the correspondence of their cellular shape to the nearest geometric solid or combinations of simple solids (for example, spheres, cones, or cylinders). Representative formulae used to compute biovolume are as follows:

$$\text{sphere } \frac{4}{3} \pi r^3 \quad \text{cone } \frac{1}{3} \pi r^2 h \quad \text{cylinder } \pi r^2 h.$$

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pi (p) is the ratio of the circumference to the diameter of a circle; $\pi = 3.14159\dots$

From cell volume, total algal biomass expressed as biovolume (mm^3/mL) is thus determined by multiplying the number of cells of a given species by its average cell volume and then summing these volumes for all species.

Cells/volume refers to the number of cells of any organism that is counted by using a microscope and grid or counting cell.

Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample volume, and generally are reported as cells or units per milliliter (mL) or liter (L).

Cfs-day (See "Cubic foot per second-day")

Channel bars, as used in this report, are the lowest prominent geomorphic features higher than the channel bed.

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with BOD or with carbonaceous organic pollution from sewage or industrial wastes. [See also "Biochemical oxygen demand (BOD)"]

***Clostridium perfringens* (*C. perfringens*)** is a spore-forming bacterium that is common in the feces of human and other warmblooded animals. Clostridial spores are being used experimentally as an indicator of past fecal contamination and the presence of microorganisms that are resistant to disinfection and environmental stresses. (See also "Bacteria")

Coliphages are viruses that infect and replicate in coliform bacteria. They are indicative of sewage contamination of water and of the survival and transport of viruses in the environment.

Color unit is produced by 1 milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Confined aquifer is a term used to describe an aquifer containing water between two relatively impermeable boundaries.

The water level in a well tapping a confined aquifer stands above the top of the confined aquifer and can be higher or lower than the water table that may be present in the material above it. In some cases, the water level can rise above the ground surface, yielding a flowing well.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Continuous-record station is a site where data are collected with sufficient frequency to define daily mean values and variations within a day.

Control designates a feature in the channel that physically affects the water-surface elevation and thereby determines the stage-discharge relation at the gage. This feature may be a constriction of the channel, a bedrock outcrop, a gravel bar, an artificial structure, or a uniform cross section over a long reach of the channel.

Control structure, as used in this report, is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of saltwater.

Cubic foot per second (CFS, ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point in 1 second. It is equivalent to approximately 7.48 gallons per second or approximately 449 gallons per minute, or 0.02832 cubic meters per second. The term "second-foot" sometimes is used synonymously with "cubic foot per second" but is now obsolete.

Cubic foot per second-day (CFS-DAY, Cfs-day, $[(\text{ft}^3/\text{s})/\text{d}]$) is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, 1.98347 acre-feet, 646,317 gallons, or 2,446.6 cubic meters. The daily mean discharges reported in the daily value data tables numerically are equal to the daily volumes in cfs-days, and the totals also represent volumes in cfs-days.

Cubic foot per second per square mile [CFSM, $(\text{ft}^3/\text{s})/\text{mi}^2$] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming the runoff is distributed uniformly in time and area. (See also "Annual runoff")

Daily mean suspended-sediment concentration is the time-weighted mean concentration of suspended sediment passing a stream cross section during a 24-hour day. (See also "Sediment" and "Suspended-sediment concentration")

Daily record station is a site where data are collected with sufficient frequency to develop a record of one or more data values per day. The frequency of data collection can range from continuous recording to data collection on a daily or near-daily basis.

Data collection platform (DCP) is an electronic instrument that collects, processes, and stores data from various sensors, and transmits the data by satellite data relay, line-of-sight radio, and/or landline telemetry.

Data logger is a microprocessor-based data acquisition system designed specifically to acquire, process, and store data. Data usually are downloaded from onsite data loggers for entry into office data systems.

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Datum is a surface or point relative to which measurements of height and/or horizontal position are reported. A vertical datum is a horizontal surface used as the zero point for measurements of gage height, stage, or elevation; a horizontal datum is a reference for positions given in terms of latitude-longitude, State Plane coordinates, or Universal Transverse Mercator (UTM) coordinates. (See also "Gage datum," "Land-surface datum," "National Geodetic Vertical Datum of 1929," and "North American Vertical Datum of 1988")

Diatoms (*Bacillariophyta*) are unicellular or colonial algae with a siliceous cell wall. The abundance of diatoms in phytoplankton samples is expressed as the number of cells per milliliter (cells/mL) or biovolume in cubic micrometers per milliliter (mm^3/mL). The abundance of diatoms in periphyton samples is given in cells per square centimeter (cells/cm^2) or biovolume per square centimeter (mm^3/cm^2). (See also "Phytoplankton" and "Periphyton")

Diel is of or pertaining to a 24-hour period of time; a regular daily cycle.

Discharge, or **flow**, is the rate that matter passes through a cross section of a stream channel or other water body per unit of time. The term commonly refers to the volume of water (including, unless otherwise stated, any sediment or other constituents suspended or dissolved in the water) that passes a cross section in a stream channel, canal, pipeline, and so forth, within a given period of time (cubic feet per second). Discharge also can apply to the rate at which constituents, such as suspended sediment, bedload, and dissolved or suspended chemicals, pass through a cross section, in which cases the quantity is expressed as the mass of constituent that passes the cross section in a given period of time (tons per day).

Dissolved refers to that material in a representative water sample that passes through a 0.45-micrometer membrane filter. This is a convenient operational definition used by Federal and State agencies that collect water-quality data. Determinations of "dissolved" constituent concentrations are made on sample water that has been filtered.

Dissolved oxygen (DO) is the molecular oxygen (oxygen gas) dissolved in water. The concentration in water is a function of atmospheric pressure, temperature, and dissolved-solids concentration of the water. The ability of water to retain oxygen decreases with increasing temperature or dissolved-solids concentration. Photosynthesis and respiration by plants commonly cause diurnal variations in dissolved-oxygen concentration in water from some streams.

Dissolved-solids concentration in water is the quantity of dissolved material in a sample of water. It is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. In the mathematical calculation, the bicarbonate value, in milligrams per liter, is multiplied by 0.4917 to convert it to carbonate. Alternatively, alkalinity concentration (as mg/L CaCO_3) can be converted to carbonate concentration by multiplying by 0.60.

Diversity index (H) (Shannon index) is a numerical expression of evenness of distribution of aquatic organisms. The formula for diversity index is:

$$\bar{d} = - \sum_{i=1}^s \frac{n_i}{n} \log_2 \frac{n_i}{n} ,$$

where n_i is the number of individuals per taxon, n is the total number of individuals, and s is the total number of taxa in the sample of the community. Index values range from zero, when all the organisms in the sample are the same, to some positive number, when some or all of the organisms in the sample are different.

Drainage area of a stream at a specific location is that area upstream from the location, measured in a horizontal plane, that has a common outlet at the site for its surface runoff from precipitation that normally drains by gravity into a stream. Drainage areas given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

Drainage basin is a part of the Earth's surface that contains a drainage system with a common outlet for its surface runoff. (See "Drainage area")

Dry mass refers to the mass of residue present after drying in an oven at 105°C , until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry-mass values are expressed in the same units as ash mass. (See also "Ash mass," "Biomass," and "Wet mass")

Dry weight refers to the weight of animal tissue after it has been dried in an oven at 65°C until a constant weight is achieved. Dry weight represents total organic and inorganic matter in the tissue. (See also "Wet weight")

Embeddedness is the degree to which gravel-sized and larger particles are surrounded or enclosed by finer-sized particles. (See also "Substrate embeddedness class")

Enterococcus bacteria commonly are found in the feces of humans and other warmblooded animals. Although some strains are ubiquitous and not related to fecal pollution, the presence of enterococci in water is an indication of fecal pollution and the possible presence of enteric pathogens. Enterococcus bacteria are those bacteria that produce pink to red colonies with black or reddish-brown precipitate after incubation at 41°C on mE agar (nutrient medium for bacterial growth) and subsequent

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quent transfer to EIA medium. Enterococci include *Streptococcus fecalis*, *Streptococcus faecium*, *Streptococcus avium*, and their variants. (See also "Bacteria")

EPT Index is the total number of distinct taxa within the insect orders Ephemeroptera, Plecoptera, and Trichoptera. This index summarizes the taxa richness within the aquatic insects that generally are considered pollution sensitive; the index usually decreases with pollution.

***Escherichia coli* (*E. coli*)** are bacteria present in the intestine and feces of warmblooded animals. *E. coli* are a member species of the fecal coliform group of indicator bacteria. In the laboratory, they are defined as those bacteria that produce yellow or yellow-brown colonies on a filter pad saturated with urea substrate broth after primary culturing for 22 to 24 hours at 44.5 °C on mTEC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

Estimated (E) value of a concentration is reported when an analyte is detected and all criteria for a positive result are met. If the concentration is less than the method detection limit (MDL), an E code will be reported with the value. If the analyte is identified qualitatively as present, but the quantitative determination is substantially more uncertain, the National Water Quality Laboratory will identify the result with an E code even though the measured value is greater than the MDL. A value reported with an E code should be used with caution. When no analyte is detected in a sample, the default reporting value is the MDL preceded by a less than sign (<). For bacteriological data, concentrations are reported as estimated when results are based on non-ideal colony counts.

Euglenoids (*Euglenophyta*) are a group of algae that usually are free-swimming and rarely creeping. They have the ability to grow either photosynthetically in the light or heterotrophically in the dark. (See also "Phytoplankton")

Extractable organic halides (EOX) are organic compounds that contain halogen atoms such as chlorine. These organic compounds are semivolatile and extractable by ethyl acetate from air-dried streambed sediment. The ethyl acetate extract is combusted, and the concentration is determined by microcoulometric determination of the halides formed. The concentration is reported as micrograms of chlorine per gram of the dry weight of the streambed sediment.

Fecal coliform bacteria are present in the intestines or feces of warmblooded animals. They often are used as indicators of the sanitary quality of the water. In the laboratory, they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5 °C plus or minus 0.2 °C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

Fecal streptococcal bacteria are present in the intestines of warmblooded animals and are ubiquitous in the environment. They are characterized as gram-positive, cocci bacteria that are capable of growth in brain-heart infusion broth. In the laboratory, they are defined as all the organisms that produce red or pink colonies within 48 hours at 35 °C plus or minus 1.0 °C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample. (See also "Bacteria")

Filtered pertains to constituents in a water sample passed through a filter of specified pore diameter, most commonly 0.45 micrometer or less for inorganic analytes and 0.7 micrometer for organic analytes.

Filtered, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that has passed through a filter has been extracted. Complete recovery is not achieved by the extraction procedure and thus the analytical determination represents something less than 95 percent of the total constituent concentration in the sample. To achieve comparability of analytical data, equivalent extraction procedures are required of all laboratories performing such analyses because different procedures are likely to produce different analytical results.

Fire algae (*Pyrrophyta*) are free-swimming unicells characterized by a red pigment spot. (See also "Phytoplankton")

Flow-duration percentiles are values on a scale of 100 that indicate the percentage of time for which a flow is not exceeded. For example, the 90th percentile of river flow is greater than or equal to 90 percent of all recorded flow rates.

Gage datum is a horizontal surface used as a zero point for measurement of stage or gage height. This surface usually is located slightly below the lowest point of the stream bottom such that the gage height is usually slightly greater than the maximum depth of water. Because the gage datum is not an actual physical object, the datum is usually defined by specifying the elevations of permanent reference marks such as bridge abutments and survey monuments, and the gage is set to agree with the reference marks. Gage datum is a local datum that is maintained independently of any national geodetic datum. However, if the elevation of the gage datum relative to the national datum (North American Vertical Datum of 1988 or National Geodetic Vertical Datum of 1929) has been determined, then the gage readings can be converted to elevations above the national datum by adding the elevation of the gage datum to the gage reading.

Gage height (G.H.) is the water-surface elevation, in feet above the gage datum. If the water surface is below the gage datum, the gage height is negative. Gage height often is used interchangeably with the more general term "stage," although gage height is more appropriate when used in reference to a reading on a gage.

Gage values are values that are recorded, transmitted, and/or computed from a gaging station. Gage values typically are collected at 5-, 15-, or 30-minute intervals.

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Gaging station is a site on a stream, canal, lake, or reservoir where systematic observations of stage, discharge, or other hydrologic data are obtained.

Gas chromatography/flame ionization detector (GC/FID) is a laboratory analytical method used as a screening technique for semivolatile organic compounds that are extractable from water in methylene chloride.

Geomorphic channel units, as used in this report, are fluvial geomorphic descriptors of channel shape and stream velocity. Pools, riffles, and runs are types of geomorphic channel units considered for National Water-Quality Assessment (NAWQA) Program habitat sampling.

Green algae (*Chlorophyta*) are unicellular or colonial algae with chlorophyll pigments similar to those in terrestrial green plants. Some forms of green algae produce mats or floating "moss" in lakes. The abundance of green algae in phytoplankton samples is expressed as the number of cells per milliliter (cells/mL) or biovolume in cubic micrometers per milliliter (mm^3/mL). The abundance of green algae in periphyton samples is given in cells per square centimeter (cells/cm^2) or biovolume per square centimeter (mm^3/cm^2). (See also "Phytoplankton" and "Periphyton")

Habitat, as used in this report, includes all nonliving (physical) aspects of the aquatic ecosystem, although living components like aquatic macrophytes and riparian vegetation also are usually included. Measurements of habitat typically are made over a wider geographic scale than are measurements of species distribution.

Habitat quality index is the qualitative description (level 1) of instream habitat and riparian conditions surrounding the reach sampled. Scores range from 0 to 100 percent with higher scores indicative of desirable habitat conditions for aquatic life. Index only applicable to wadable streams.

Hardness of water is a physical-chemical characteristic that commonly is recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations (primarily calcium and magnesium) and is expressed as the equivalent concentration of calcium carbonate (CaCO_3).

High tide is the maximum height reached by each rising tide. The high-high and low-high tides are the higher and lower of the two high tides, respectively, of each tidal day. See NOAA Web site: <http://www.csc.noaa.gov/text/glossary.html> (see "High water")

Hilsenhoff's Biotic Index (HBI) is an indicator of organic pollution that uses tolerance values to weight taxa abundances; usually increases with pollution. It is calculated as follows:

$$HBI = \sum \frac{(n)(a)}{N} ,$$

where n is the number of individuals of each taxon, a is the tolerance value of each taxon, and N is the total number of organisms in the sample.

Horizontal datum (See "Datum")

Hydrologic index stations referred to in this report are continuous-record gaging stations that have been selected as representative of streamflow patterns for their respective regions. Station locations are shown on index maps.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as defined by the former Office of Water Data Coordination and delineated on the State Hydrologic Unit Maps by the USGS. Each hydrologic unit is identified by an 8-digit number.

Inch (IN., in.), in reference to streamflow, as used in this report, refers to the depth to which the drainage area would be covered with water if all of the runoff for a given time period were distributed uniformly on it. (See also "Annual runoff")

Instantaneous discharge is the discharge at a particular instant of time. (See also "Discharge")

International Boundary Commission Survey Datum refers to a geodetic datum established at numerous monuments along the United States-Canada boundary by the International Boundary Commission.

Island, as used in this report, is a mid-channel bar that has permanent woody vegetation, is flooded once a year, on average, and remains stable except during large flood events.

Laboratory reporting level (LRL) generally is equal to twice the yearly determined long-term method detection level (LT-MDL). The LRL controls false negative error. The probability of falsely reporting a nondetection for a sample that contained an analyte at a concentration equal to or greater than the LRL is predicted to be less than or equal to 1 percent. The value of the LRL will be reported with a "less than" (<) remark code for samples in which the analyte was not detected. The National Water Quality Laboratory (NWQL) collects quality-control data from selected analytical methods on a continuing basis to determine LT-MDLs and to establish LRLs. These values are reevaluated annually on the basis of the most current quality-control data and, therefore, may change. The LRL replaces the term 'non-detection value' (NDV).

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Land-surface datum (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

Latent heat flux (often used interchangeably with latent heat-flux density) is the amount of heat energy that converts water from liquid to vapor (evaporation) or from vapor to liquid (condensation) across a specified cross-sectional area per unit time. Usually expressed in watts per square meter.

Light-attenuation coefficient, also known as the extinction coefficient, is a measure of water clarity. Light is attenuated according to the Lambert-Beer equation:

$$I = I_0 e^{-\lambda L}$$

where I_0 is the source light intensity, I is the light intensity at length L (in meters) from the source, λ is the light-attenuation coefficient, and e is the base of the natural logarithm. The light-attenuation coefficient is defined as

$$\lambda = -\frac{1}{L} \log_e \frac{I}{I_0}$$

Lipid is any one of a family of compounds that are insoluble in water and that make up one of the principal components of living cells. Lipids include fats, oils, waxes, and steroids. Many environmental contaminants such as organochlorine pesticides are lipophilic.

Long-term method detection level (LT-MDL) is a detection level derived by determining the standard deviation of a minimum of 24 method detection limit (MDL) spike-sample measurements over an extended period of time. LT-MDL data are collected on a continuous basis to assess year-to-year variations in the LT-MDL. The LT-MDL controls false positive error. The chance of falsely reporting a concentration at or greater than the LT-MDL for a sample that did not contain the analyte is predicted to be less than or equal to 1 percent.

Low tide is the minimum height reached by each falling tide. The high-low and low-low tides are the higher and lower of the two low tides, respectively, of each tidal day. *See NOAA Web site:*
<http://www.csc.noaa.gov/text/glossary.html> (see "Low water")

Macrophytes are the macroscopic plants in the aquatic environment. The most common macrophytes are the rooted vascular plants that usually are arranged in zones in aquatic ecosystems and restricted in the area by the extent of illumination through the water and sediment deposition along the shoreline.

Mean concentration of suspended sediment (Daily mean suspended-sediment concentration) is the time-weighted concentration of suspended sediment passing a stream cross section during a given time period. (See also "Daily mean suspended-sediment concentration" and "Suspended-sediment concentration")

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period. (See also "Discharge")

Mean high or low tide is the average of all high or low tides, respectively, over a specific period.

Mean sea level is a local tidal datum. It is the arithmetic mean of hourly heights observed over the National Tidal Datum Epoch. Shorter series are specified in the name; for example, monthly mean sea level and yearly mean sea level. In order that they may be recovered when needed, such datums are referenced to fixed points known as benchmarks. (See also "Datum")

Measuring point (MP) is an arbitrary permanent reference point from which the distance to water surface in a well is measured to obtain water level.

Megahertz is a unit of frequency. One megahertz equals one million cycles per second.

Membrane filter is a thin microporous material of specific pore size used to filter bacteria, algae, and other very small particles from water.

Metamorphic stage refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic stages of insects are egg-larva-adult or egg-nymph-adult.

Method code is a one-character code that identifies the analytical or field method used to determine a value stored in the National Water Information System (NWIS).

Method detection limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99-percent confidence that the analyte concentration is greater than zero. It is determined from the analysis of a sample in a given

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matrix containing the analyte. At the MDL concentration, the risk of a false positive is predicted to be less than or equal to 1 percent.

Method of Cubatures is a method of computing discharge in tidal estuaries based on the conservation of mass equation.

Methylene blue active substances (MBAS) indicate the presence of detergents (anionic surfactants). The determination depends on the formation of a blue color when methylene blue dye reacts with synthetic anionic detergent compounds.

Micrograms per gram (UG/G, mg/g) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per kilogram (UG/KG, mg/kg) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the constituent per unit mass (kilogram) of the material analyzed. One microgram per kilogram is equivalent to 1 part per billion.

Micrograms per liter (UG/L, mg/L) is a unit expressing the concentration of chemical constituents in water as mass (micrograms) of constituent per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. One microgram per liter is equivalent to 1 part per billion.

Microsiemens per centimeter (US/CM, mS/cm) is a unit expressing the amount of electrical conductivity of a solution as measured between opposite faces of a centimeter cube of solution at a specified temperature. Siemens is the International System of Units nomenclature. It is synonymous with mhos and is the reciprocal of resistance in ohms.

Milligrams per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in water as the mass (milligrams) of constituent per unit volume (liter) of water. Concentration of suspended sediment also is expressed in milligrams per liter and is based on the mass of dry sediment per liter of water-sediment mixture.

Minimum reporting level (MRL) is the smallest measured concentration of a constituent that may be reliably reported by using a given analytical method.

Miscellaneous site, miscellaneous station, or miscellaneous sampling site is a site where streamflow, sediment, and/or water-quality data or water-quality or sediment samples are collected once, or more often on a random or discontinuous basis to provide better areal coverage for defining hydrologic and water-quality conditions over a broad area in a river basin.

Most probable number (MPN) is an index of the number of coliform bacteria that, more probably than any other number, would give the results shown by the laboratory examination; it is not an actual enumeration. MPN is determined from the distribution of gas-positive cultures among multiple inoculated tubes.

Multiple-plate samplers are artificial substrates of known surface area used for obtaining benthic invertebrate samples. They consist of a series of spaced, hardboard plates on an eyebolt.

Nanograms per liter (NG/L, ng/L) is a unit expressing the concentration of chemical constituents in solution as mass (nanograms) of solute per unit volume (liter) of water. One million nanograms per liter is equivalent to 1 milligram per liter.

National Geodetic Vertical Datum of 1929 (NGVD 29) is a fixed reference adopted as a standard geodetic datum for elevations determined by leveling. It formerly was called "Sea Level Datum of 1929" or "mean sea level." Although the datum was derived from the mean sea level at 26 tide stations, it does not necessarily represent local mean sea level at any particular place. See NOAA Web site: <http://www.ngs.noaa.gov/faq.shtml#WhatVD29VD88> (See "North American Vertical Datum of 1988")

Natural substrate refers to any naturally occurring immersed or submersed solid surface, such as a rock or tree, upon which an organism lives. (See also "Substrate")

Nekton are the consumers in the aquatic environment and consist of large, free-swimming organisms that are capable of sustained, directed mobility.

Nonfilterable refers to the portion of the total residue retained by a filter.

North American Datum of 1927 (NAD 27) is the horizontal control datum for the United States that was defined by a location and azimuth on the Clarke spheroid of 1866.

North American Datum of 1983 (NAD 83) is the horizontal control datum for the United States, Canada, Mexico, and Central America that is based on the adjustment of 250,000 points including 600 satellite Doppler stations that constrain the system to a geocentric origin. NAD 83 has been officially adopted as the legal horizontal datum for the United States by the Federal government.

North American Vertical Datum of 1988 (NAVD 88) is a fixed reference adopted as the official civilian vertical datum for elevations determined by Federal surveying and mapping activities in the United States. This datum was established in 1991 by minimum-constraint adjustment of the Canadian, Mexican, and United States first-order terrestrial leveling networks.

Open or screened interval is the length of unscreened opening or of well screen through which water enters a well, in feet below land surface.

Organic carbon (OC) is a measure of organic matter present in aqueous solution, suspension, or bottom sediment. May be reported as dissolved organic carbon (DOC), particulate organic carbon (POC), or total organic carbon (TOC).

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Organic mass or volatile mass of a living substance is the difference between the dry mass and ash mass and represents the actual mass of the living matter. Organic mass is expressed in the same units as for ash mass and dry mass. (See also "Ash mass," "Biomass," and "Dry mass")

Organism count/area refers to the number of organisms collected and enumerated in a sample and adjusted to the number per area habitat, usually square meter (m^2), acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.

Organochlorine compounds are any chemicals that contain carbon and chlorine. Organochlorine compounds that are important in investigations of water, sediment, and biological quality include certain pesticides and industrial compounds.

Parameter code is a 5-digit number used in the USGS computerized data system, National Water Information System (NWIS), to uniquely identify a specific constituent or property.

Partial-record station is a site where discrete measurements of one or more hydrologic parameters are obtained over a period of time without continuous data being recorded or computed. A common example is a crest-stage gage partial-record station at which only peak stages and flows are recorded.

Particle size is the diameter, in millimeters (mm), of a particle determined by sieve or sedimentation methods. The sedimentation method uses the principle of Stokes Law to calculate sediment particle sizes. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube, sedigraph) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification, as used in this report, agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

Classification	Size (mm)	Method of analysis
Clay	>0.00024 - 0.004	Sedimentation
Silt	>0.004 - 0.062	Sedimentation
Sand	>0.062 - 2.0	Sedimentation/sieve
Gravel	>2.0 - 64.0	Sieve
Cobble	>64 - 256	Manual measurement
Boulder	>256	Manual measurement

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. For the sedimentation method, most of the organic matter is removed, and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native water analysis.

Peak flow (peak stage) is an instantaneous local maximum value in the continuous time series of streamflows or stages, preceded by a period of increasing values and followed by a period of decreasing values. Several peak values ordinarily occur in a year. The maximum peak value in a year is called the annual peak; peaks lower than the annual peak are called secondary peaks. Occasionally, the annual peak may not be the maximum value for the year; in such cases, the maximum value occurs at midnight at the beginning or end of the year, on the recession from or rise toward a higher peak in the adjoining year. If values are recorded at a discrete series of times, the peak recorded value may be taken as an approximation of the true peak, which may occur between the recording instants. If the values are recorded with finite precision, a sequence of equal recorded values may occur at the peak; in this case, the first value is taken as the peak.

Percent composition or percent of total is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, weight, mass, or volume.

Percent shading is a measure of the amount of sunlight potentially reaching the stream. A clinometer is used to measure left and right bank canopy angles. These values are added together, divided by 180, and multiplied by 100 to compute percentage of shade.

Periodic-record station is a site where stage, discharge, sediment, chemical, physical, or other hydrologic measurements are made one or more times during a year but at a frequency insufficient to develop a daily record.

Periphyton is the assemblage of microorganisms attached to and living upon submerged solid surfaces. Although primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms. Periphyton are useful indicators of water quality.

Pesticides are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

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pH of water is the negative logarithm of the hydrogen-ion activity. Solutions with pH less than 7.0 standard units are termed "acidic," and solutions with a pH greater than 7.0 are termed "basic." Solutions with a pH of 7.0 are neutral. The presence and concentration of many dissolved chemical constituents found in water are affected, in part, by the hydrogen-ion activity of water. Biological processes including growth, distribution of organisms, and toxicity of the water to organisms also are affected, in part, by the hydrogen-ion activity of water.

Phytoplankton is the plant part of the plankton. They usually are microscopic, and their movement is subject to the water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials to the surrounding water, the phytoplankton have a profound effect upon the quality of the water. They are the primary food producers in the aquatic environment and commonly are known as algae. (See also "Plankton")

Picocurie (PC, pCi) is one-trillionth (1×10^{-12}) of the amount of radioactive nuclide represented by a curie (Ci). A curie is the quantity of radioactive nuclide that yields 3.7×10^{10} radioactive disintegrations per second (dps). A picocurie yields 0.037 dps, or 2.22 dpm (disintegrations per minute).

Plankton is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers. Concentrations are expressed as a number of cells per milliliter (cells/mL) of sample.

Polychlorinated biphenyls (PCBs) are industrial chemicals that are mixtures of chlorinated biphenyl compounds having various percentages of chlorine. They are similar in structure to organochlorine insecticides.

Polychlorinated naphthalenes (PCNs) are industrial chemicals that are mixtures of chlorinated naphthalene compounds. They have properties and applications similar to polychlorinated biphenyls (PCBs) and have been identified in commercial PCB preparations.

Pool, as used in this report, is a small part of a stream reach with little velocity, commonly with water deeper than surrounding areas.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photo-synthetic and chemosynthetic activity of producer organisms (chiefly, green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated (carbon method) by the plants.

Primary productivity (carbon method) is expressed as milligrams of carbon per area per unit time [$\text{mg C}/(\text{m}^2/\text{time})$] for periphyton and macrophytes or per volume [$\text{mg C}/(\text{m}^3/\text{time})$] for phytoplankton. The carbon method defines the amount of carbon dioxide consumed as measured by radioactive carbon (carbon-14). The carbon-14 method is of greater sensitivity than the oxygen light- and dark-bottle method and is preferred for use with unenriched water samples. Unit time may be either the hour or day, depending on the incubation period. (See also "Primary productivity")

Primary productivity (oxygen method) is expressed as milligrams of oxygen per area per unit time [$\text{mg O}/(\text{m}^2/\text{time})$] for periphyton and macrophytes or per volume [$\text{mg O}/(\text{m}^3/\text{time})$] for phytoplankton. The oxygen method defines production and respiration rates as estimated from changes in the measured dissolved-oxygen concentration. The oxygen light- and dark-bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period. (See also "Primary productivity")

Radioisotopes are isotopic forms of elements that exhibit radioactivity. Isotopes are varieties of a chemical element that differ in atomic weight but are very nearly alike in chemical properties. The difference arises because the atoms of the isotopic forms of an element differ in the number of neutrons in the nucleus; for example, ordinary chlorine is a mixture of isotopes having atomic weights of 35 and 37, and the natural mixture has an atomic weight of about 35.453. Many of the elements similarly exist as mixtures of isotopes, and a great many new isotopes have been produced in the operation of nuclear devices such as the cyclotron. There are 275 isotopes of the 81 stable elements, in addition to more than 800 radioactive isotopes.

Reach, as used in this report, is a length of stream that is chosen to represent a uniform set of physical, chemical, and biological conditions within a segment. It is the principal sampling unit for collecting physical, chemical, and biological data.

Recoverable is the amount of a given constituent that is in solution after a representative water sample has been extracted or digested. Complete recovery is not achieved by the extraction or digestion and thus the determination represents something less than 95 percent of the constituent present in the sample. To achieve comparability of analytical data, equivalent extraction or digestion procedures are required of all laboratories performing such analyses because different procedures are likely to produce different analytical results. (See also "Bed material")

Recurrence interval, also referred to as return period, is the average time, usually expressed in years, between occurrences of hydrologic events of a specified type (such as exceedances of a specified high flow or nonexceedance of a specified low flow). The terms "return period" and "recurrence interval" do not imply regular cyclic occurrence. The actual times between occurrences vary randomly, with most of the times being less than the average and a few being substantially greater than the average. For example, the 100-year flood is the flow rate that is exceeded by the annual maximum peak flow at intervals whose average length is 100 years (that is, once in 100 years, on average); almost two-thirds of all exceedances of the 100-year flood occur less than 100 years after the previous exceedance, half occur less than 70 years after the previous exceedance, and

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about one-eighth occur more than 200 years after the previous exceedance. Similarly, the 7-day, 10-year low flow ($7Q_{10}$) is the flow rate below which the annual minimum 7-day-mean flow dips at intervals whose average length is 10 years (that is, once in 10 years, on average); almost two-thirds of the nonexceedances of the $7Q_{10}$ occur less than 10 years after the previous non-exceedance, half occur less than 7 years after, and about one-eighth occur more than 20 years after the previous nonexceedance. The recurrence interval for annual events is the reciprocal of the annual probability of occurrence. Thus, the 100-year flood has a 1-percent chance of being exceeded by the maximum peak flow in any year, and there is a 10-percent chance in any year that the annual minimum 7-day-mean flow will be less than the $7Q_{10}$.

Replicate samples are a group of samples collected in a manner such that the samples are thought to be essentially identical in composition.

Return period (See "Recurrence interval")

Riffle, as used in this report, is a shallow part of the stream where water flows swiftly over completely or partially submerged obstructions to produce surface agitation.

River mileage is the curvilinear distance, in miles, measured upstream from the mouth along the meandering path of a stream channel in accordance with Bulletin No. 14 (October 1968) of the Water Resources Council and typically is used to denote location along a river.

Run, as used in this report, is a relatively shallow part of a stream with moderate velocity and little or no surface turbulence.

Runoff is the quantity of water that is discharged ("runs off") from a drainage basin during a given time period. Runoff data may be presented as volumes in acre-feet, as mean discharges per unit of drainage area in cubic feet per second per square mile, or as depths of water on the drainage basin in inches. (See also "Annual runoff")

Salinity is the total quantity of dissolved salts, measured by weight in parts per thousand. Values in this report are calculated from specific conductance and temperature. Seawater has an average salinity of about 35 parts per thousand (for additional information, refer to: Miller, R.L., Bradford, W.L., and Peters, N.E., 1988, Specific conductance: theoretical considerations and application to analytical quality control: U.S. Geological Survey Water-Supply Paper 2311, 16 p.)

Sea level, as used in this report, refers to one of the two commonly used national vertical datums (NGVD 1929 or NAVD 1988). See separate entries for definitions of these datums.

Sediment is solid material that originates mostly from disintegrated rocks; when transported by, suspended in, or deposited from water, it is referred to as "fluvial sediment." Sediment includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are affected by environmental and land-use factors. Some major factors are topography, soil characteristics, land cover, and depth and intensity of precipitation.

Sensible heat flux (often used interchangeably with latent sensible heat-flux density) is the amount of heat energy that moves by turbulent transport through the air across a specified cross-sectional area per unit time and goes to heating (cooling) the air. Usually expressed in watts per square meter.

Seven-day, 10-year low flow ($7Q_{10}$) is the discharge below which the annual 7-day minimum flow falls in 1 year out of 10 on the long-term average. The recurrence interval of the $7Q_{10}$ is 10 years; the chance that the annual 7-day minimum flow will be less than the $7Q_{10}$ is 10 percent in any given year. (See also "Annual 7-day minimum" and "Recurrence interval")

Shelves, as used in this report, are streambank features extending nearly horizontally from the flood plain to the lower limit of persistent woody vegetation.

Sodium adsorption ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Sodium hazard in water is an index that can be used to evaluate the suitability of water for irrigating crops.

Soil heat flux (often used interchangeably with soil heat-flux density) is the amount of heat energy that moves by conduction across a specified cross-sectional area of soil per unit time and goes to heating (or cooling) the soil. Usually expressed in watts per square meter.

Soil-water content is the water lost from the soil upon drying to constant mass at 105 °C; expressed either as mass of water per unit mass of dry soil or as the volume of water per unit bulk volume of soil.

Specific electrical conductance (conductivity) is a measure of the capacity of water (or other media) to conduct an electrical current. It is expressed in microsiemens per centimeter at 25 °C. Specific electrical conductance is a function of the types and quantity of dissolved substances in water and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is from 55 to 75 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stable isotope ratio (per MIL) is a unit expressing the ratio of the abundance of two radioactive isotopes. Isotope ratios are used in hydrologic studies to determine the age or source of specific water, to evaluate mixing of different water, as an aid in determining reaction rates, and other chemical or hydrologic processes.

WATER RESOURCES DATA - MICHIGAN, 2004

Stage (See "Gage height")

Stage-discharge relation is the relation between the water-surface elevation, termed stage (gage height), and the volume of water flowing in a channel per unit time.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Substrate is the physical surface upon which an organism lives.

Substrate embeddedness class is a visual estimate of riffle streambed substrate larger than gravel that is surrounded or covered by fine sediment (<2 mm, sand or finer). Below are the class categories expressed as the percentage covered by fine sediment:

0	no gravel or larger substrate	3	26-50 percent
1	> 75 percent	4	5-25 percent
2	51-75 percent	5	< 5 percent

Surface area of a lake is that area (acres) encompassed by the boundary of the lake as shown on USGS topographic maps, or other available maps or photographs. Because surface area changes with lake stage, surface areas listed in this report represent those determined for the stage at the time the maps or photographs were obtained.

Surficial bed material is the upper surface (0.1 to 0.2 foot) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Surrogate is an analyte that behaves similarly to a target analyte, but that is highly unlikely to occur in a sample. A surrogate is added to a sample in known amounts before extraction and is measured with the same laboratory procedures used to measure the target analyte. Its purpose is to monitor method performance for an individual sample.

Suspended is the amount (concentration) of undissolved material in a water-sediment mixture. Most commonly refers to that material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45-micrometer filter has been extracted or digested. Complete recovery is not achieved by the extraction or digestion procedures and thus the determination represents less than 95 percent of the constituent present in the sample. To achieve comparability of analytical data, equivalent extraction or digestion procedures are required of all laboratories performing such analyses because different procedures are likely to produce different analytical results. (See also "Suspended")

Suspended sediment is sediment carried in suspension by the turbulent components of the fluid or by the Brownian movement (a law of physics). (See also "Sediment")

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 foot above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L). The analytical technique uses the mass of all of the sediment and the net weight of the water-sediment mixture in a sample to compute the suspended-sediment concentration. (See also "Sediment" and "Suspended sediment")

Suspended-sediment discharge (tons/d) is the rate of sediment transport, as measured by dry mass or volume, that passes a cross section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge (ft³/s) x 0.0027. (See also "Sediment," "Suspended sediment," and "Suspended-sediment concentration")

Suspended-sediment load is a general term that refers to a given characteristic of the material in suspension that passes a point during a specified period of time. The term needs to be qualified, such as "annual suspended-sediment load" or "sand-size suspended-sediment load," and so on. It is not synonymous with either suspended-sediment discharge or concentration. (See also "Sediment")

Suspended solids, total residue at 105 °C concentration is the concentration of inorganic and organic material retained on a filter, expressed as milligrams of dry material per liter of water (mg/L). An aliquot of the sample is used for this analysis.

Suspended, total is the total amount of a given constituent in the part of a water-sediment sample that is retained on a 0.45-micrometer membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. Knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total." Determinations of "suspended, total" constituents are made either by directly analyzing portions of the suspended material collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total concentrations of the constituent. (See also "Suspended")

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Synoptic studies are short-term investigations of specific water-quality conditions during selected seasonal or hydrologic periods to provide improved spatial resolution for critical water-quality conditions. For the period and conditions sampled, they assess the spatial distribution of selected water-quality conditions in relation to causative factors, such as land use and contaminant sources.

Taxa (Species) richness is the number of species (taxa) present in a defined area or sampling unit.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchical scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, *Hexagenia limbata*, is the following:

Kingdom:	Animal
Phylum:	Arthropoda
Class:	Insecta
Order:	Ephemeroptera
Family:	Ephemeridae
Genus:	<i>Hexagenia</i>
Species:	<i>Hexagenia limbata</i>

Thalweg is the line formed by connecting points of minimum streambed elevation (deepest part of the channel).

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table descriptions and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water resulting from the mixing of flow proportionally to the duration of the concentration.

Tons per acre-foot (T/acre-ft) is the dry mass (tons) of a constituent per unit volume (acre-foot) of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY, tons/d) is a common chemical or sediment discharge unit. It is the quantity of a substance in solution, in suspension, or as bedload that passes a stream section during a 24-hour period. It is equivalent to 2,000 pounds per day, or 0.9072 metric ton per day.

Total is the amount of a given constituent in a representative whole-water (unfiltered) sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determined at least 95 percent of the constituent in the sample.)

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. This group includes coliforms that inhabit the intestine of warmblooded animals and those that inhabit soils. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria that ferment lactose with gas formation within 48 hours at 35°C. In the laboratory, these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C plus or minus 1.0°C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 milliliters of sample. (See also "Bacteria").

Total discharge is the quantity of a given constituent, measured as dry mass or volume, that passes a stream cross section per unit of time. When referring to constituents other than water, this term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total in bottom material is the amount of a given constituent in a representative sample of bottom material. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total in bottom material."

Total length (fish) is the straight-line distance from the anterior point of a fish specimen's snout, with the mouth closed, to the posterior end of the caudal (tail) fin, with the lobes of the caudal fin squeezed together.

Total load refers to all of a constituent in transport. When referring to sediment, it includes suspended load plus bed load.

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Total organism count is the number of organisms collected and enumerated in any particular sample. (See also "Organism count/volume")

Total recoverable is the amount of a given constituent in a whole-water sample after a sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data for whole-water samples, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures may produce different analytical results.

Total sediment discharge is the mass of suspended-sediment plus bed-load transport, measured as dry weight, that passes a cross section in a given time. It is a rate and is reported as tons per day. (See also "Bedload," "Bedload discharge," "Sediment," "Suspended sediment," and "Suspended-sediment concentration")

Total sediment load or total load is the sediment in transport as bedload and suspended-sediment load. The term may be qualified, such as "annual suspended-sediment load" or "sand-size suspended-sediment load," and so on. It differs from total sediment discharge in that load refers to the material, whereas discharge refers to the quantity of material, expressed in units of mass per unit time. (See also "Sediment," "Suspended-sediment load," and "Total load")

Transect, as used in this report, is a line across a stream perpendicular to the flow and along which measurements are taken, so that morphological and flow characteristics along the line are described from bank to bank. Unlike a cross section, no attempt is made to determine known elevation points along the line.

Turbidity is an expression of the optical properties of a liquid that causes light rays to be scattered and absorbed rather than transmitted in straight lines through water. Turbidity, which can make water appear cloudy or muddy, is caused by the presence of suspended and dissolved matter, such as clay, silt, finely divided organic matter, plankton and other microscopic organisms, organic acids, and dyes (ASTM International, 2003, D1889-00 Standard test method for turbidity of water, *in* ASTM International, Annual Book of ASTM Standards, Water and Environmental Technology, v. 11.01: West Conshohocken, Pennsylvania, 6 p.). The color of water, whether resulting from dissolved compounds or suspended particles, can affect a turbidity measurement. To ensure that USGS turbidity data can be understood and interpreted properly within the context of the instrument used and site conditions encountered, data from each instrument type are stored and reported in the National Water Information System (NWIS) using parameter codes and measurement reporting units that are specific to the instrument type, with specific instruments designated by the method code. The respective measurement units, many of which also are in use internationally, fall into two categories: (1) the designations NTU, NTRU, BU, AU, and NTMU signify the use of a broad spectrum incident light in the wavelength range of 400-680 nanometers (nm), but having different light detection configurations; (2) The designations FNU, FNRU, FBU, FAU, and FNMU generally signify an incident light in the range between 780-900 nm, also with varying light detection configurations. These reporting units are equivalent when measuring a calibration solution (for example, formazin or polymer beads), but their respective instruments may not produce equivalent results for environmental samples. Specific reporting units are as follows:

NTU (Nephelometric Turbidity Units): white or broadband [400-680 nm] light source, 90 degree detection angle, one detector.

NTRU (Nephelometric Turbidity Ratio Units): white or broadband [400-680 nm] light source, 90 degree detection angle, multiple detectors with ratio compensation.

BU (Backscatter Units): white or broadband [400-680 nm] light source, 30 ± 15 degree detection angle (backscatter).

AU (Attenuation Units): white or broadband [400-680 nm] light source, 180 degree detection angle (attenuation).

NTMU (Nephelometric Turbidity Multibeam Units): white or broadband [400-680 nm] light source, multiple light sources, detectors at 90 degrees and possibly other angles to each beam.

FNU (Formazin Nephelometric Units): near infrared [780-900 nm] or monochrome light source, 90 degree detection angle, one detector.

FNRU (Formazin Nephelometric Ratio Units): near infrared [780-900 nm] or monochrome light source, 90 degree detection angle, multiple detectors, ratio compensation.

FBU (Formazin Backscatter Units): near infrared [780-900 nm] or monochrome light source, 30±15 degree detection angle.

FAU (Formazin Attenuation Units): near infrared [780-900 nm] light source, 180 degree detection angle.

FNMU (Formazin Nephelometric Multibeam Units): near infrared [780-900 nm] or monochrome light source, multiple light sources, detectors at 90 degrees and possibly other angles to each beam.

For more information please see http://water.usgs.gov/owq/FieldManual/Chapter6/6.7_contents.html.

Ultraviolet (UV) absorbance (absorption) at 254 or 280 nanometers is a measure of the aggregate concentration of the mixture of UV absorbing organic materials dissolved in the analyzed water, such as lignin, tannin, humic substances, and various aromatic compounds. UV absorbance (absorption) at 254 or 280 nanometers is measured in UV absorption units per centimeter of path length of UV light through a sample.

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Unconfined aquifer is an aquifer whose upper surface is a water table free to fluctuate under atmospheric pressure. (See "Water-table aquifer")

Unfiltered pertains to the constituents in an unfiltered, representative water-suspended sediment sample.

Unfiltered, recoverable is the amount of a given constituent in a representative water-suspended sediment sample that has been extracted or digested. Complete recovery is not achieved by the extraction or digestion treatment and thus the determination represents less than 95 percent of the constituent present in the sample. To achieve comparability of analytical data, equivalent extraction or digestion procedures are required of all laboratories performing such analyses because different procedures are likely to produce different analytical results.

Vertical datum (See "Datum")

Volatile organic compounds (VOCs) are organic compounds that can be isolated from the water phase of a sample by purging the water sample with inert gas, such as helium, and, subsequently, analyzed by gas chromatography. Many VOCs are human-made chemicals that are used and produced in the manufacture of paints, adhesives, petroleum products, pharmaceuticals, and refrigerants. They often are components of fuels, solvents, hydraulic fluids, paint thinners, and dry-cleaning agents commonly used in urban settings. VOC contamination of drinking-water supplies is a human-health concern because many are toxic and are known or suspected human carcinogens.

Water table is that surface in a ground-water body at which the water pressure is equal to the atmospheric pressure.

Water-table aquifer is an unconfined aquifer within which the water table is found.

Water year in USGS reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 2004, is called the "2004 water year."

Watershed (See "Drainage basin")

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports. (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976.)

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

Wet mass is the mass of living matter plus contained water. (See also "Biomass" and "Dry mass")

Wet weight refers to the weight of animal tissue or other substance including its contained water. (See also "Dry weight")

WSP is used as an acronym for "Water-Supply Paper" in reference to previously published reports.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and often are large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers. (See also "Plankton")

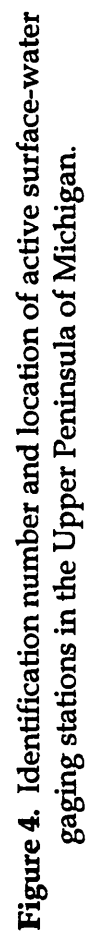


Figure 4. Identification number and location of active surface-water gaging stations in the Upper Peninsula of Michigan.

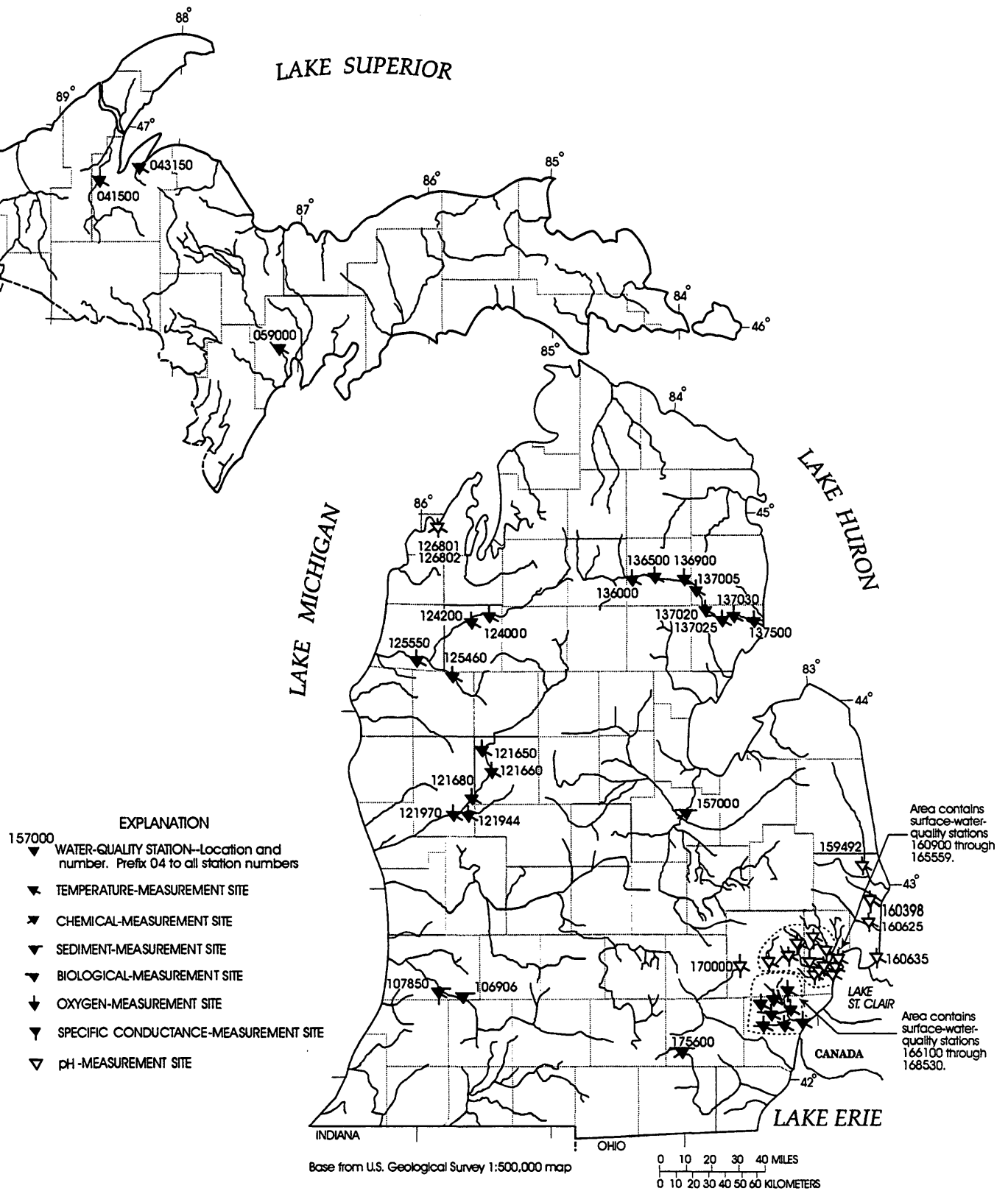


Figure 6. Identification number and location of active surface-water-quality stations in Michigan.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04033000 MIDDLE BRANCH ONTONAGON RIVER NEAR PAULDING, MI

LOCATION.--Lat 46°21'25", long 89°04'38", in SE1/4 NE1/4 sec.29, T.46 N., R.38 W., Ontonagon County, Hydrologic Unit 04020102, Ottawa National Forest, on right bank 25 ft downstream from bridge on Forest Service Road 5250, 2.4 mi upstream from Bond Falls Reservoir, and 5.7 mi southeast of Paulding.

DRAINAGE AREA.--164 mi².

PERIOD OF RECORD.--June 1942 to September 1995, October 2000 to current year.

REVISED RECORDS.--WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,485.66 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Sept. 28, 1942, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. 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	119	145	e90	e110	e80	e105	e270	325	323	110	107	81
2	124	132	e84	e105	e80	e115	e260	293	319	111	98	83
3	124	125	e84	e100	e80	e134	e250	264	270	105	89	83
4	125	124	e84	e96	e78	e170	e245	234	235	118	84	80
5	117	126	e84	e92	e78	e170	244	220	213	159	81	80
6	111	125	e84	e90	e75	e160	266	209	226	150	79	93
7	106	108	e84	e86	e74	e160	335	197	204	158	78	100
8	104	118	e84	e86	e72	e160	410	188	182	164	78	93
9	101	146	e84	e86	e72	e160	488	178	169	154	83	87
10	98	121	e84	e86	e72	e160	469	171	163	138	100	88
11	97	119	e84	e86	e70	e155	413	162	152	128	131	83
12	109	122	e84	e86	e70	e155	356	161	148	122	154	81
13	114	123	e84	e86	e70	e155	320	237	146	119	136	80
14	110	120	e84	e87	e70	e150	311	280	158	125	114	80
15	105	117	e84	e86	e70	e150	314	284	155	115	101	99
16	102	120	e84	e86	e70	e140	362	246	146	109	94	135
17	100	122	e84	e86	e70	e140	413	218	138	106	95	123
18	100	195	e84	e86	e70	e140	477	198	133	101	96	110
19	99	250	e84	e86	e70	e140	846	179	125	96	92	100
20	99	207	e84	e86	e70	e135	1080	192	118	e94	87	93
21	102	174	e84	e86	e70	e135	1020	193	112	e91	83	89
22	99	156	e84	e86	e70	e130	848	178	109	e90	83	86
23	102	149	e84	e86	e70	e130	690	188	122	86	84	83
24	106	147	e84	e86	e70	e125	564	305	138	82	83	86
25	108	132	e84	e86	e70	e125	488	290	135	80	88	86
26	107	e125	e84	e84	e75	e150	460	246	127	80	91	83
27	105	e120	e86	e84	e80	e175	424	235	119	78	86	82
28	114	e115	e110	e84	e88	e225	383	230	113	76	82	83
29	118	e105	e120	e82	e96	e320	346	206	108	77	80	82
30	127	e98	e120	e82	--	e320	343	200	104	79	82	81
31	148	--	e115	e82	--	e290	--	255	--	99	83	--
TOTAL	3400	4086	2741	2726	2150	5079	13695	6962	4910	3400	2902	2693
MEAN	110	136	88.4	87.9	74.1	164	456	225	164	110	93.6	89.8
MAX	148	250	120	110	96	320	1080	325	323	164	154	135
MIN	97	98	84	82	70	105	244	161	104	76	78	80
CFSM	0.67	0.83	0.54	0.54	0.45	1.00	2.78	1.37	1.00	0.67	0.57	0.55
IN.	0.77	0.93	0.62	0.62	0.49	1.15	3.11	1.58	1.11	0.77	0.66	0.61

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2004, BY WATER YEAR (WY)

	MEAN	158	160	127	108	104	142	360	269	195	145	123	138
MAX	377	293	186	168	176	352	586	591	438	414	267	308	
(WY)	1955	1989	1952	1969	1984	1973	2002	1965	1944	1953	1978	1951	
MIN	76.5	92.2	81.9	78.4	73.9	82.7	152	114	89.4	80.7	69.8	76.4	
(WY)	1949	1949	1964	2001	2001	1965	1987	1977	1948	1990	1990	1948	

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1942 - 2004
ANNUAL TOTAL	54522	54744	
ANNUAL MEAN	149	150	169
HIGHEST ANNUAL MEAN			226
LOWEST ANNUAL MEAN			107
HIGHEST DAILY MEAN	1420	May 13	2000
LOWEST DAILY MEAN	75	Aug 18	57
ANNUAL SEVEN-DAY MINIMUM	78	Aug 13	61
MAXIMUM PEAK FLOW		1080	(a)2050
MAXIMUM PEAK STAGE		8.04	Apr 20
INSTANTANEOUS LOW FLOW			10.60
ANNUAL RUNOFF (CFSM)	0.911	0.912	(b)27
ANNUAL RUNOFF (INCHES)	12.37	12.42	1.03
10 PERCENT EXCEEDS	238	270	14.01
50 PERCENT EXCEEDS	102	110	291
90 PERCENT EXCEEDS	83	80	128
			88

(a) Gage height 10.0 ft, from floodmark.

(b) Result of freezeup.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04033500 BOND FALLS CANAL NEAR PAULDING, MI

LOCATION.--Lat 46°23'57", long 89°08'47", in SW1/4 NE1/4 sec.11, T.46 N., R.39 W., Ontonagon County, Hydrologic Unit 04020102, on right bank 40 ft upstream from intake to pipeline No. 2, 0.8 mi downstream from Bond Falls Reservoir on Middle Branch Ontonagon River, and 1.6 mi east of Paulding.

PERIOD OF RECORD.--July 1942 to current year.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,441.59 ft above sea level. Prior to Oct. 1, 1968, nonrecording gage at same site and at datum 3.00 ft higher.

REMARKS.--Records good except for daily discharges below 5.0 ft³/s, which are poor. Canal diverts water from Bond Falls Reservoir (station 04034000) to South Branch Ontonagon River; water is used for power production at Victoria Dam near Rockland. Several measurements of water temperature were made during the year. Gage-height telemeter 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	42	33	32	33	32	32	32	30	30	103	128	54
2	41	34	32	33	32	32	32	30	30	102	122	87
3	41	34	32	33	32	32	33	30	30	102	112	94
4	41	33	32	32	31	32	33	30	30	102	106	97
5	41	32	32	32	31	32	31	30	31	102	106	97
6	39	32	32	32	31	32	26	30	30	102	105	97
7	34	32	32	32	31	32	27	30	30	88	105	83
8	34	32	32	32	30	32	27	30	30	52	105	60
9	34	32	32	32	31	32	27	30	30	34	112	51
10	34	32	32	32	31	32	27	30	30	34	111	50
11	34	32	32	32	30	32	27	30	30	34	82	50
12	33	32	32	32	31	32	28	30	30	34	46	75
13	34	32	32	32	e31	32	28	30	30	31	33	98
14	34	32	32	32	e31	32	28	30	30	27	27	98
15	34	32	32	31	e31	32	29	30	30	28	28	92
16	34	32	32	31	31	32	18	30	30	28	54	72
17	34	32	32	31	32	32	5.0	30	30	28	87	58
18	34	33	32	e31	32	32	4.6	30	30	28	97	74
19	34	32	32	e31	32	32	4.6	30	30	57	81	74
20	33	32	32	e31	32	32	4.2	30	30	93	55	74
21	33	32	32	e31	32	32	3.3	30	55	e75	35	74
22	33	32	32	e31	32	32	19	30	88	e75	35	74
23	33	32	32	31	32	32	78	31	89	e100	34	80
24	33	32	32	32	32	32	79	30	98	e100	34	87
25	32	32	32	32	32	32	79	30	106	e100	34	87
26	32	32	32	32	32	32	70	30	106	e100	34	87
27	32	32	32	32	32	32	45	30	106	e100	33	86
28	33	32	32	31	32	32	31	30	106	e125	33	86
29	32	32	32	e31	32	32	30	30	106	e125	33	86
30	33	32	32	e31	—	32	30	31	105	129	33	97
31	33	—	33	31	—	32	—	31	—	129	32	—
TOTAL	1078	967	993	982	913	992	935.7	933	1566	2367	2072	2379
MEAN	34.8	32.2	32.0	31.7	31.5	32.0	31.2	30.1	52.2	76.4	66.8	79.3
MAX	42	34	33	33	32	32	79	31	106	129	128	98
MIN	32	32	32	31	30	32	3.3	30	30	27	27	50

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2004, BY WATER YEAR (WY)

MEAN	106	96.2	136	178	192	128	30.9	109	162	165	157	135
MAX	296	253	292	303	305	287	194	310	312	300	320	275
(WY)	1998	1972	1972	1986	1969	1984	1973	1986	1966	1997	1947	1944
MIN	0.00	6.24	8.68	31.7	31.5	2.21	0.33	0.92	3.37	14.5	2.98	1.37
(WY)	1965	1944	2001	2004	2004	1959	1962	1962	1943	1949	1966	1959

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1942 - 2004
ANNUAL TOTAL	26663.6	16177.7	
ANNUAL MEAN	73.1	44.2	133
HIGHEST ANNUAL MEAN			206
LOWEST ANNUAL MEAN			44.2
HIGHEST DAILY MEAN	181	129	368
LOWEST DAILY MEAN	2.2	3.3	(a)
ANNUAL SEVEN-DAY MINIMUM	3.6	8.4	(b)
10 PERCENT EXCEEDS	172	97	294
50 PERCENT EXCEEDS	41	32	127
90 PERCENT EXCEEDS	26	30	5.4

(a) No flow for several days in 1963-70, 1973-75, 1982, 1987, 1991, 1994, 2000.

(b) No flow in 1963-65, 1967, 1975, 1987, 1991.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04034000 BOND FALLS RESERVOIR NEAR PAULDING, MI

LOCATION.--Lat 46°24'29", long 89°07'42", in SW1/4 sec.1, T.46 N., R.39 W., Ontonagon County, Hydrologic Unit 04020102, at Bond Falls Dam on Middle Branch Ontonagon River, 2.5 mi east of Paulding.

DRAINAGE AREA.--190 mi².

PERIOD OF RECORD.--June 1942 to current year. Prior to October 1950, monthend contents only published in WSP 1307.

REVISED RECORDS.--WSP 1911: Drainage area.

GAGE.--Nonrecording gage read once daily. Datum of gage is 1,335.59 ft above sea level.

REMARKS.--Reservoir is formed by earthfill and concrete dam with one taintor gate; dam completed in 1937. Capacity of reservoir, 41,300 acre-ft between gage heights of 120 ft (maximum drawdown) and 141 ft (full pond). Dead storage unknown. Water diverted to South Branch Ontonagon River through Bond Falls Canal (station 04033500); water used for power production at Victoria Dam near Rockland.

COOPERATION.--Gage-height record provided by Upper Peninsula Power Co. and converted to acre-feet by U.S. Geological Survey.

EXTREMES FOR PERIOD OF RECORD (SINCE 1947).--Maximum contents observed, 42,980 acre-ft, July 3, 1953, gage height, 141.7 ft, of which 1,680 acre-ft was uncontrolled storage; no usable storage at times; minimum gage height observed, 116.0 ft, Mar. 21, 1970.

EXTREMES FOR CURRENT YEAR.--Maximum contents observed, 36,830 acre-ft, May 25, gage height, 139.1 ft; minimum observed, 19,900 acre-ft, Feb. 19 to Mar. 2, gage height, 131.2 ft.

MONTHEND GAGE HEIGHT AND CONTENTS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)	(equivalent in ft ³ /s)
Sept. 30	134.0	25,500		
Oct. 31	133.2	23,900	-1,600	-26
Nov. 30	133.1	23,700	-200	-3.4
Dec. 31	132.4	22,300	-1,400	-22.8
CAL YR 2003			-10,620	-14.7
Jan. 31	131.6	20,700	-1,600	-26
Feb. 29	131.2	19,900	-800	-13.9
Mar. 31	132.4	22,300	+2,400	+3.9
Apr. 30	138.1	34,530	+12,230	+206
May 31	138.8	36,140	+1,610	+26.2
June 30	136.9	31,780	-4,360	-73.3
July 31	135.1	27,820	-3,960	-64.4
Aug. 31	133.4	24,300	-3,520	-57.2
Sept. 30	131.4	20,300	-4,000	-67.2
WTR YR 2004			-5,200	-7.2

STREAMS TRIBUTARY TO LAKE SUPERIOR

04034500 MIDDLE BRANCH ONTONAGON RIVER NEAR TROUT CREEK, MI

LOCATION.—Lat 46°28'40", long 89°05'25", in SW1/4 sec.8, T.47 N., R.38 W., Ontonagon County, Hydrologic Unit 04020102, on right bank 0.1 mi upstream from State Highway 28, 3.8 mi west of village of Trout Creek, and 7.5 mi downstream from Bond Falls Reservoir.

DRAINAGE AREA.—203 mi².

PERIOD OF RECORD.—June 1942 to current year.

REVISED RECORDS.—WSP 1911: Drainage area.

GAGE.—Water-stage recorder. Datum of gage is 1,132.03 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Nov. 4, 1942, nonrecording gage at same site and datum.

REMARKS.—Records good except for estimated daily discharges, which are fair. Flow regulated by Bond Falls Reservoir (station 04034000) 7.5, mi upstream. Diversion to South Branch Ontonagon River 8.5 mi upstream by Bond Falls Canal (station 04033500). Several measurements of water temperature were made during the year.

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	112	118	125	115	109	109	120	203	259	114	e100	e95
2	112	118	121	116	109	109	122	189	352	110	e100	e95
3	111	118	e125	114	e110	109	135	183	302	107	e100	e95
4	110	120	e125	112	e110	109	151	182	201	109	e100	e95
5	110	119	e130	e110	e110	110	150	176	206	107	e100	e92
6	110	119	131	e110	108	109	155	170	208	104	e100	e90
7	111	119	132	e110	110	111	159	166	227	109	e100	e90
8	111	118	131	e110	e110	110	172	160	231	106	e100	e90
9	111	117	131	e110	106	e110	164	155	232	104	e100	e87
10	111	116	131	e110	108	108	157	152	287	103	e105	e90
11	110	113	130	e110	e110	109	155	150	286	103	e110	e90
12	110	115	e130	e110	107	e110	156	145	288	102	e110	e90
13	107	126	e130	111	105	e110	157	146	289	104	e110	e90
14	107	125	132	111	105	112	156	149	220	102	e110	e94
15	107	125	129	109	110	108	159	146	130	101	e105	e100
16	105	126	121	109	e105	111	164	143	120	100	e105	e110
17	104	126	119	111	106	108	162	140	107	101	e100	e105
18	104	136	120	e110	106	109	179	138	104	100	e100	e100
19	103	130	119	108	105	109	292	135	102	100	e100	e98
20	102	131	e120	e110	105	109	244	135	100	100	e100	e92
21	103	130	122	e110	107	106	429	126	98	e100	e100	e90
22	103	130	120	e110	e105	e105	617	122	97	e100	e100	e90
23	105	131	118	e110	109	105	612	127	98	e100	e100	e90
24	106	130	118	109	107	106	593	161	95	e100	e100	e90
25	105	129	115	108	107	108	611	246	92	e100	e100	e90
26	105	128	119	109	107	114	539	334	92	e100	e100	e90
27	105	127	118	110	106	115	395	336	110	e100	e100	e90
28	111	127	118	e110	107	132	272	286	153	e100	e100	e90
29	120	127	117	e110	108	135	207	199	147	e100	e98	e90
30	121	127	116	e110	—	127	207	202	130	e100	e98	e90
31	120	—	114	e110	—	122	—	202	—	e100	e96	—
TOTAL	3372	3721	3827	3422	3117	3464	7791	5504	5483	3186	3147	2788
MEAN	109	124	123	110	107	112	260	178	183	103	102	92.9
MAX	121	136	132	116	110	135	617	336	352	114	110	110
MIN	102	113	114	108	105	105	120	122	92	100	96	87

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2004, BY WATER YEAR (WY)

MEAN	56.6	57.4	51.6	47.8	47.3	51.4	99.0	128	95.8	69.5	58.3	54.5
MAX	221	239	181	110	107	118	530	745	461	253	105	216
(WY)	1943	1943	2002	2004	2004	1943	2002	1996	1943	1953	1952	1942
MIN	41.2	33.1	32.0	31.7	31.0	32.4	36.5	38.8	50.1	49.3	42.6	43.2
(WY)	2000	1949	1949	1949	1949	1949	1949	1949	1998	1998	1944	1967

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1942 - 2004

ANNUAL TOTAL	40040	48822	67.7
ANNUAL MEAN	110	133	187
HIGHEST ANNUAL MEAN			42.4
LOWEST ANNUAL MEAN			1943
HIGHEST DAILY MEAN	1380	617	2030
LOWEST DAILY MEAN	47	87	30
ANNUAL SEVEN-DAY MINIMUM	48	90	31
MAXIMUM PEAK FLOW		676	2120
MAXIMUM PEAK STAGE		3.29	5.61
INSTANTANEOUS LOW FLOW			14
10 PERCENT EXCEEDS	131	182	72
50 PERCENT EXCEEDS	70	110	50
90 PERCENT EXCEEDS	48	100	44

(a) Sometime during period Jan. 23 to Feb. 13, 1947, result of ice jam upstream.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04035500 MIDDLE BRANCH ONTONAGON RIVER NEAR ROCKLAND, MI

LOCATION.--Lat 46°41'57", long 89°09'36", in SE1/4 sec.27, T.50 N., R.39 W., Ontonagon County, Hydrologic Unit 04020102, on left bank 10 ft upstream from bridge on U.S. Highway 45, 700 ft downstream from East Branch, and 2.8 mi southeast of Rockland.

DRAINAGE AREA.--671 mi².

PERIOD OF RECORD.--July 1942 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 661.1 ft above sea level. Prior to Apr. 1, 1959, nonrecording gage at site 400 ft upstream at same datum. Apr. 1, 1959, to Oct. 21, 1968, nonrecording gage at present site and datum.

REMARKS.--Records fair. Regulation by Bond Falls Reservoir (station 04034000) 30.0 mi upstream. Diversion to South Branch Ontonagon River by Bond Falls Canal (station 04033500) 31.0 mi upstream. Several measurements of water temperature were made during the year. Gage-height telemeter 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	331	416	216	e280	e230	e340	1780	1420	2520	365	286	283
2	364	364	173	e270	e230	e400	e1700	1350	1800	359	278	292
3	358	319	167	e270	e230	e533	e1800	1310	1350	348	272	285
4	356	306	e200	e270	e230	e640	1520	1250	978	356	270	286
5	336	316	e250	e270	e230	e620	1370	1070	873	375	265	283
6	311	310	e240	e280	e230	e600	2290	1010	1940	364	263	289
7	299	281	e230	e280	e230	e580	e3300	663	1500	390	268	284
8	291	240	e220	e280	e230	e580	e4200	e640	1230	478	272	273
9	278	310	e210	e280	e230	e580	e2600	e620	1190	461	288	267
10	266	305	e205	e280	e230	e580	e2000	e580	1180	398	355	267
11	262	294	e200	e280	e230	e580	1430	e560	1100	358	494	265
12	294	286	e200	e280	e230	e580	1200	e540	1080	335	537	265
13	304	332	e200	e280	e230	e580	1100	e700	1080	326	356	265
14	285	311	e200	e280	e230	e560	1300	e1300	1140	325	306	260
15	269	295	e200	e280	e230	e540	1490	e1500	984	319	295	266
16	262	312	e200	e280	e230	e540	2040	e1400	913	306	288	291
17	256	316	e200	e280	e230	e520	1870	e1200	866	308	285	288
18	253	874	e200	e280	e230	e500	5050	e1100	725	307	281	273
19	251	1180	e200	e270	e230	e500	11100	e1000	587	294	278	268
20	251	784	e200	e260	e230	e500	4960	e950	e500	288	272	259
21	249	576	e200	e260	e230	e500	3130	e880	e460	285	266	256
22	245	465	e200	e250	e230	e500	2770	e800	e450	279	270	262
23	251	407	e210	e250	e230	e500	2310	e900	e420	273	269	264
24	254	388	e210	e250	e230	e500	2050	1630	e410	270	280	258
25	257	334	e210	e240	e240	e600	2380	1850	e405	274	287	255
26	254	e320	e230	e240	e260	1760	2730	1940	404	274	1110	255
27	252	312	e260	e230	e280	2530	2150	2070	385	272	475	257
28	256	e300	e300	e230	e290	4590	1780	1660	400	271	331	257
29	281	299	e350	e230	e300	6590	1520	1660	401	272	294	251
30	300	274	e350	e230	---	4020	1460	1980	384	272	288	248
31	401	---	e320	e230	---	2050	---	2490	---	289	279	---
TOTAL	8887	11826	6951	8170	6890	34993	76380	38023	27655	10091	10358	8072
MEAN	287	394	224	264	238	1129	2546	1227	922	326	334	269
MAX	401	1180	350	280	300	6590	11100	2490	2520	478	1110	292
MIN	245	240	167	230	230	340	1100	540	384	270	263	248

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2004, BY WATER YEAR (WY)

MEAN	431	448	321	263	273	591	1586	780	533	357	324	342
MAX	1068	1145	618	378	634	1652	3078	1974	1396	1181	1091	1224
(WY)	2003	1989	1983	1946	1984	1973	2002	1996	1944	1949	1953	1942
MIN	191	214	190	193	187	183	385	222	189	182	173	175
(WY)	1949	1949	2001	1995	1949	1965	1987	2000	1992	1988	1976	1948

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1942 - 2004

ANNUAL TOTAL	201969	248296	
ANNUAL MEAN	553	678	518
HIGHEST ANNUAL MEAN			756
LOWEST ANNUAL MEAN			331
HIGHEST DAILY MEAN	11000	May 12	16300
LOWEST DAILY MEAN	167	Dec 3	145
ANNUAL SEVEN-DAY MINIMUM	176	Jan 1	163
MAXIMUM PEAK FLOW			13300
MAXIMUM PEAK STAGE			13.86
INSTANTANEOUS LOW FLOW			127
10 PERCENT EXCEEDS	1060		1000
50 PERCENT EXCEEDS	252		288
90 PERCENT EXCEEDS	204		208

(a) From rating curve extended above 7,500 ft³/s on basis of slope-area measurement of peak flow.

(b) From floodmark.

(c) Result of freezeup.

(d) Dec. 2, 3, 2000.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04035995 LAKE GOGEBIC NEAR BERGLAND, MI

LOCATION.--Lat 46°35'19", long 89°32'52", in SW1/4 NW1/4 sec.3, T.48 N., R.42 W., Ontonagon County, Hydrologic Unit 04020102, at upstream side of dam on lake outlet, 1.0 mi southeast of Bergland, and 4.3 mi east of Merriweather.

DRAINAGE AREA.--162 mi².

PERIOD OF RECORD.--July 1958 to September 1959 (no winter record), February 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,292.70 ft above sea level. July 1958 to September 1959, nonrecording gage at mouth of Merriweather Creek at different datum. February 1969 to September 1988, at datum 1.00 ft higher.

REMARKS.--Lake Gogebic is used as a storage reservoir (capacity 35,200 acre-ft) by Upper Peninsula Power Co. for power production at Victoria Dam near Rockland. Lake level is controlled at the outlet by a concrete and steel dam with removable flash boards. Major inlets to Lake Gogebic are Slate River, Trout Brook, and Merriweather Creek. Streamflow records are currently collected at the outlet, West Branch Ontonagon River (station 04036000). Surface area of lake is 14,780 acres. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 5.10 ft, present datum, Apr. 19, 2002; minimum daily, 0.68 ft, present datum, Apr. 5, 6, 1970.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 3.57 ft, Apr. 23; minimum, 1.19 ft, Mar. 23, 24.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.99	1.82	1.93	1.99	1.79	1.36	1.83	3.17	3.32	2.79	2.54	2.41
2	2.01	1.81	1.94	1.99	1.79	1.37	1.90	3.16	3.31	2.79	2.53	2.44
3	1.97	1.76	1.94	2.02	1.82	1.35	1.96	3.21	3.30	2.79	2.51	2.44
4	1.95	1.78	1.94	2.00	1.78	1.34	2.01	3.21	3.27	2.76	2.47	2.43
5	1.95	1.84	1.94	2.00	1.73	1.35	2.06	3.23	3.26	2.74	2.47	2.45
6	1.95	1.83	1.92	—	1.72	1.36	2.08	3.21	3.29	2.74	2.44	2.54
7	1.95	—	1.93	1.98	1.71	1.37	2.14	3.20	3.32	2.72	2.44	2.48
8	1.96	—	1.93	1.96	1.70	1.37	2.28	3.21	3.25	2.73	2.43	2.44
9	1.95	—	1.94	1.95	1.68	1.35	2.41	3.23	3.18	2.74	2.45	2.43
10	1.95	1.81	1.96	1.94	1.67	1.36	2.48	3.21	3.12	2.73	2.47	2.46
11	1.98	1.72	1.99	1.93	1.65	1.34	2.51	3.21	3.09	2.73	2.49	2.42
12	2.01	1.70	—	1.93	1.64	1.34	2.53	3.24	3.08	2.73	2.52	2.40
13	1.95	1.76	1.99	1.92	1.62	1.35	2.52	3.26	3.00	2.72	2.51	2.45
14	1.92	1.78	1.97	1.92	1.60	1.37	2.51	3.31	2.97	2.69	2.51	2.41
15	1.91	1.75	1.96	1.91	1.58	1.35	2.50	3.35	2.95	2.70	2.52	2.50
16	1.91	1.76	1.97	1.90	1.56	1.34	2.50	3.34	2.95	2.66	2.51	2.51
17	1.87	1.79	1.99	1.91	1.55	1.33	2.52	3.34	2.94	2.67	2.50	2.40
18	1.86	1.83	1.99	1.90	1.53	1.31	2.63	3.31	2.97	2.67	2.56	2.40
19	1.85	1.87	1.99	1.89	1.51	1.32	3.08	3.30	2.92	2.66	2.53	2.43
20	1.85	1.90	1.99	1.88	1.52	1.30	3.38	3.25	2.96	2.63	2.44	2.43
21	1.81	1.90	1.98	1.89	1.52	1.27	3.48	3.21	2.91	2.66	2.43	2.36
22	1.83	1.85	1.98	1.89	1.50	1.27	3.50	3.16	2.89	2.62	2.45	2.34
23	1.81	1.87	1.99	1.87	1.51	1.25	3.51	3.12	2.88	2.59	2.41	2.37
24	1.82	1.93	1.99	1.86	1.48	1.24	3.45	3.23	2.89	2.58	2.42	2.38
25	1.81	—	1.99	1.85	1.46	1.25	3.41	3.31	2.87	2.58	2.40	2.32
26	1.80	—	1.99	1.84	1.43	1.27	3.37	3.30	2.84	2.56	2.48	2.32
27	1.80	1.93	1.97	1.84	1.41	1.29	3.34	3.26	2.82	2.55	2.47	2.28
28	1.80	1.89	2.00	1.84	1.40	1.38	3.30	3.24	2.83	2.58	2.42	2.26
29	1.78	1.89	1.99	1.83	1.36	1.55	3.21	3.22	2.81	2.57	2.43	2.26
30	1.79	1.92	1.99	1.82	—	1.67	3.19	3.21	2.79	2.52	2.44	2.28
31	1.83	—	2.00	1.80	—	1.75	—	3.28	—	2.56	2.40	—
MEAN	1.89	—	—	—	1.59	1.36	2.72	3.24	3.03	2.67	2.47	2.40
MAX	2.01	—	—	—	1.82	1.75	3.51	3.35	3.32	2.79	2.56	2.54
MIN	1.78	—	—	—	1.36	1.24	1.83	3.12	2.79	2.52	2.40	2.26

STREAMS TRIBUTARY TO LAKE SUPERIOR

04036000 WEST BRANCH ONTONAGON RIVER NEAR BERGLAND, MI

LOCATION.--Lat 46°35'15", long 89°32'30", in SW1/4 NE1/4 sec.3, T.48 N., R.42 W., Ontonagon County, Hydrologic Unit 04020102, on right bank 0.4 mi downstream from dam at outlet of Lake Gogebic, and 1.5 mi east of Bergland.

DRAINAGE AREA.--162 mi².

PERIOD OF RECORD.--July 1942 to current year.

REVISED RECORDS.--WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,290.81 ft above sea level. Prior to Nov. 5, 1942, nonrecording gage 0.4 mi upstream at different datum.

REMARKS.--Records good. Flow regulated by Lake Gogebic (station 04035995). Several measurements of water temperature were made during the year. Gage-height telemeter 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	61	70	57	62	106	162	256	348	528	62	31	39
2	63	65	57	63	106	161	273	197	557	59	32	36
3	59	50	57	e63	109	160	288	119	547	59	32	31
4	57	56	57	63	139	157	301	80	526	57	31	31
5	56	69	57	64	166	158	314	78	515	57	31	32
6	56	63	56	64	164	162	321	75	547	56	31	34
7	56	67	56	65	161	164	343	73	604	56	31	33
8	57	61	56	108	160	164	382	72	575	56	30	32
9	58	62	57	127	157	161	416	70	547	57	31	35
10	58	61	59	126	155	163	434	67	525	57	32	34
11	59	60	61	125	152	161	445	65	514	57	32	33
12	63	55	61	125	152	164	449	64	508	57	32	33
13	58	59	61	124	e150	159	450	125	480	58	31	34
14	55	61	60	124	145	165	451	209	381	56	31	34
15	55	59	60	123	143	161	449	250	211	42	31	37
16	53	60	61	121	141	160	450	326	88	33	29	36
17	50	64	62	121	140	159	448	341	50	33	31	31
18	49	69	62	121	137	157	483	390	53	32	32	32
19	48	60	62	120	133	156	639	412	59	32	31	32
20	48	54	62	118	134	155	756	395	63	32	30	33
21	45	53	62	118	135	149	800	378	59	33	33	32
22	51	50	62	122	132	149	811	362	58	33	33	32
23	52	51	62	119	133	146	810	296	57	33	33	31
24	55	59	63	117	161	147	787	308	58	33	39	31
25	54	64	63	115	178	150	774	335	57	33	39	30
26	51	58	63	112	174	152	758	332	54	33	41	30
27	51	59	62	111	171	155	742	407	52	33	41	30
28	50	58	64	112	167	173	728	433	52	32	40	36
29	49	60	64	111	163	203	689	427	50	32	40	39
30	60	58	64	110	---	223	580	424	53	30	40	35
31	74	---	65	108	---	240	---	456	---	31	39	---
TOTAL	1711	1795	1875	3282	4264	5096	15827	7914	8428	1364	1040	998
MEAN	55.2	59.8	60.5	106	147	164	528	255	281	44.0	33.5	33.3
MAX	74	70	65	127	178	240	811	456	604	62	41	39
MIN	45	50	56	62	106	146	256	64	50	30	29	30

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2004, BY WATER YEAR (WY)

MEAN	129	151	168	165	155	149	344	300	209	133	75.8	75.9
MAX	698	489	346	360	257	327	789	995	550	578	550	408
(WY)	1986	1989	1968	1966	1969	1973	2002	1996	1954	1952	1972	1980
MIN	0.65	2.99	18.5	23.3	35.8	55.8	10.7	3.09	21.5	7.09	1.25	0.88
(WY)	1990	1999	1949	1949	1949	1949	1949	1987	1986	1988	1963	1963

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1942 - 2004

ANNUAL TOTAL	52705.7	53594	170
ANNUAL MEAN	144	146	288
HIGHEST ANNUAL MEAN			70.1
LOWEST ANNUAL MEAN			1952
HIGHEST DAILY MEAN	1230	811	1650
LOWEST DAILY MEAN	4.0	29	0.38
ANNUAL SEVEN-DAY MINIMUM	4.4	31	0.39
MAXIMUM PEAK FLOW		848	1700
MAXIMUM PEAK STAGE		4.71	6.06
ANNUAL RUNOFF (CFMS)	0.891	0.904	1.05
ANNUAL RUNOFF (INCHES)	12.10	12.31	14.30
10 PERCENT EXCEEDS	314	429	364
50 PERCENT EXCEEDS	62	63	125
90 PERCENT EXCEEDS	30	32	8.4

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04037400 CISCO LAKE NEAR WATERSMEET, MI

LOCATION.—Lat 46°15'10", long 89°27'07", in NE1/4 sec.32, T.45 N., R.41 W., Gogebic County, Hydrologic Unit 04020102, on right bank at outlet, 100 ft upstream from dam, and 13 mi west of Watersmeet.

DRAINAGE AREA.—50.6 mi².

PERIOD OF RECORD.—July 1942 to current year.

GAGE.—Water-stage recorder. Datum of gage is 1,679.53 ft above sea level (levels by Michigan Department of Natural Resources). July 15, 1942, to Oct. 28, 1969, nonrecording gage, and Oct. 28, 1969, to Oct. 23, 1989, water-stage recorder at site 90 ft downstream at same datum.

REMARKS.—Cisco Lake (capacity 15,600 acre-ft) is the downstream lake in a chain of lakes used as storage reservoirs by Upper Peninsula Power Company for power production at Victoria Dam near Rockland. Lake level is controlled at the outlet by a concrete dam with two bays and removable flash boards. The major inlet to Cisco Lake is the combined outlet from Lindsley Lake and Thousand Island Lake. Streamflow records are currently collected at the outlet, Cisco Branch Ontonagon River (station 04037500). The lake level is maintained at an elevation of approximately 1,683.5 ft, above sea level, during winter months and 1,684.0 ft, above sea level, during summer months. Surface area of lake is 506 acres.

EXTREMES FOR PERIOD OF RECORD.—Maximum gage height, 4.69 ft, July 19, 1942; minimum, 1.72 ft, Mar. 20-22, 1948.

EXTREMES FOR CURRENT YEAR.—Maximum gage height, 4.31 ft, Apr. 22, 23; minimum, 3.76 ft, Apr. 12, 13.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.92	3.87	3.88	3.90	3.92	3.90	3.81	4.01	3.90	3.92	3.87	3.90
2	3.92	3.88	3.88	3.91	3.93	3.92	3.84	3.95	3.88	3.92	3.87	3.92
3	3.90	3.88	3.89	3.93	3.92	3.93	3.85	3.91	3.89	3.91	3.87	3.93
4	3.90	3.91	3.89	3.93	3.91	3.93	3.87	3.85	3.91	3.90	3.85	3.94
5	3.91	3.90	3.89	3.95	3.88	3.93	3.89	3.86	3.93	3.91	3.83	3.95
6	3.92	3.90	3.90	3.94	3.87	3.89	3.89	3.84	3.92	3.91	3.83	4.00
7	3.92	3.86	3.91	3.93	3.88	3.87	3.87	3.86	3.92	3.91	3.83	3.95
8	3.92	3.88	3.90	3.92	3.89	3.85	3.89	3.86	3.84	3.91	3.85	3.93
9	3.92	3.87	3.92	3.91	3.89	3.85	3.87	3.87	3.83	3.92	3.84	3.91
10	3.92	3.87	3.93	3.90	3.89	3.87	3.83	3.86	3.85	3.92	3.85	3.90
11	3.91	3.87	3.91	3.90	3.90	3.90	3.79	3.88	3.86	3.92	3.88	3.87
12	3.90	3.88	3.89	3.89	3.90	3.92	3.77	3.88	3.88	3.91	3.92	3.88
13	3.90	3.89	3.89	3.89	3.91	3.92	3.77	3.89	3.88	3.89	3.91	3.91
14	3.87	3.90	3.88	3.90	3.90	3.93	3.78	3.88	3.90	3.87	3.91	3.90
15	3.86	3.91	3.87	3.90	3.91	3.92	3.82	3.87	3.91	3.88	3.90	3.94
16	3.85	3.92	3.89	3.90	3.90	3.89	3.85	3.85	3.91	3.88	3.90	3.88
17	3.86	3.94	3.91	3.89	3.89	3.86	3.86	3.83	3.90	3.88	3.90	3.90
18	3.86	3.99	3.91	3.89	3.88	3.84	3.96	3.82	3.87	3.88	3.89	3.90
19	3.88	3.96	3.91	3.88	3.88	3.85	4.17	3.85	3.86	3.88	3.87	3.92
20	3.87	3.91	3.92	3.88	3.92	3.84	4.27	3.86	3.87	3.89	3.85	3.91
21	3.86	3.86	3.92	3.88	3.93	3.85	4.29	3.88	3.85	3.89	3.85	3.88
22	3.88	3.87	3.92	3.89	3.92	3.86	4.30	3.88	3.85	3.86	3.86	3.87
23	3.89	3.89	3.92	3.89	3.92	3.86	4.28	3.91	3.87	3.85	3.86	3.89
24	3.92	3.90	3.92	3.88	3.89	3.87	4.27	3.95	3.88	3.85	3.88	3.88
25	3.92	3.91	3.92	3.88	3.87	3.88	4.24	3.95	3.88	3.85	3.87	3.86
26	3.91	3.89	3.92	3.87	3.87	3.90	4.20	3.90	3.88	3.84	3.89	3.87
27	3.93	3.89	3.90	3.87	3.87	3.88	4.17	3.89	3.88	3.84	3.88	3.86
28	3.96	3.89	3.89	3.88	3.88	3.88	4.15	3.86	3.88	3.85	3.87	3.86
29	3.93	3.89	3.88	3.89	3.88	3.87	4.08	3.88	3.88	3.84	3.87	3.86
30	3.92	3.88	3.88	3.90	—	3.83	4.07	3.90	3.89	3.83	3.88	3.87
31	3.88	—	3.89	3.91	—	3.80	—	3.91	—	3.86	3.88	—
MEAN	3.90	3.90	3.90	3.90	3.90	3.88	3.99	3.88	3.88	3.88	3.87	3.90
MAX	3.96	3.99	3.93	3.95	3.93	3.93	4.30	4.01	3.93	3.92	3.92	4.00
MIN	3.85	3.86	3.87	3.87	3.87	3.80	3.77	3.82	3.83	3.83	3.83	3.86

WTR YR 2004 MEAN 3.90 MAX 4.30 MIN 3.77

STREAMS TRIBUTARY TO LAKE SUPERIOR

04037500 CISCO BRANCH ONTONAGON RIVER AT CISCO LAKE OUTLET, MI

LOCATION.--Lat 46°15'12", long 89°27'05", in NE1/4 sec.32, T.45 N., R.41 W., Gogebic County, Hydrologic Unit 04020102, on left bank 80 ft downstream from Cisco Lake Dam, 2.5 mi upstream from Langford Creek, 5.0 mi upstream from U.S. Highway 2, and 13 mi west of Watersmeet.

DRAINAGE AREA.--50.7 mi².

PERIOD OF RECORD.--October 1944 to current year.

REVISED RECORDS.--WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,672.69 ft above sea level. Prior to Oct. 1, 1968, nonrecording gage at same site and at datum 4.00 ft higher.

REMARKS.--Records good except for daily discharges below 3.0 ft³/s, which are poor. Flow regulated by Cisco Lake (station 04037400). Several measurements of water temperature were made during the year. Gage-height telemeter 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	41	93	17	2.2	12	12	41	178	91	e6.0	0.68	e0.07
2	54	61	17	2.2	27	16	19	172	53	21	0.69	e0.07
3	38	45	17	2.1	53	21	20	167	15	21	0.57	e0.07
4	13	37	17	2.1	63	43	21	119	15	20	0.50	e0.07
5	13	42	17	15	61	89	47	68	43	21	0.43	e0.07
6	14	42	17	37	40	114	88	47	92	21	0.40	28
7	14	40	17	42	19	112	124	23	125	20	0.37	62
8	18	41	17	41	19	78	147	23	124	20	0.37	61
9	31	40	29	41	19	24	157	24	44	21	0.37	59
10	36	27	86	41	20	11	153	22	5.5	21	0.40	59
11	32	11	115	40	20	12	152	56	4.3	21	5.5	40
12	32	11	80	40	20	29	95	90	3.6	21	15	16
13	32	11	43	40	20	44	58	105	2.7	33	20	17
14	30	11	42	41	20	45	31	116	2.2	29	19	16
15	23	12	33	41	21	67	13	116	8.0	8.0	19	58
16	6.2	12	21	40	34	87	17	115	17	3.6	18	79
17	1.9	38	21	40	41	85	22	83	20	3.5	19	18
18	1.5	110	21	40	30	59	e70	44	19	3.2	31	17
19	0.44	153	23	40	15	24	204	21	18	2.7	25	19
20	0.41	162	25	35	28	11	217	22	18	1.8	4.2	18
21	0.32	92	25	29	42	11	219	22	11	1.2	0.63	13
22	0.33	42	25	29	42	11	213	22	1.7	0.95	0.22	8.1
23	0.33	43	25	29	67	11	212	24	1.3	0.73	0.19	4.7
24	0.32	44	25	29	76	11	207	55	1.3	0.73	e0.07	e0.07
25	0.34	44	25	29	54	16	207	100	1.1	0.70	e0.07	e0.07
26	0.32	43	47	29	34	57	201	116	0.99	0.64	e0.07	e0.07
27	9.1	43	63	29	18	103	198	116	0.91	0.58	e0.07	e0.07
28	37	43	62	19	11	139	196	86	0.82	0.61	e0.07	e0.07
29	73	43	41	11	11	158	188	65	0.76	0.61	e0.07	e0.07
30	112	33	15	11	—	155	186	78	0.70	0.63	e0.07	e0.07
31	137	—	8.4	11	—	103	—	91	—	0.70	e0.07	—
TOTAL	801.51	1469	1036.4	877.6	937	1758	3723	2386	740.88	326.88	182.08	593.64
MEAN	25.9	49.0	33.4	28.3	32.3	56.7	124	77.0	24.7	10.5	5.87	19.8
MAX	137	162	115	42	76	158	219	178	125	33	31	79
MIN	0.32	11	8.4	2.1	11	11	13	21	0.70	0.58	0.07	0.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2004, BY WATER YEAR (WY)

	MEAN	66.2	65.1	46.8	38.5	34.9	44.2	64.6	49.6	44.2	31.7	24.8	35.8
MAX	151	116	84.1	62.6	81.0	92.1	156	160	123	113	99.7	104	
(WY)	1986	1968	1961	1983	1945	1973	2002	1996	1953	1953	1978	1977	
MIN	13.1	14.5	23.5	23.1	20.6	24.1	2.02	0.17	0.11	0.25	0.15	0.23	
(WY)	1958	1945	1990	1959	1950	1956	1948	1977	1977	1977	1970	1976	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1945 - 2004

ANNUAL TOTAL	15025.76	14831.99	
ANNUAL MEAN	41.2	40.5	
HIGHEST ANNUAL MEAN			45.5
LOWEST ANNUAL MEAN			65.9
HIGHEST DAILY MEAN	239	219	25.2
LOWEST DAILY MEAN	0.24	0.07	288
ANNUAL SEVEN-DAY MINIMUM	0.24	0.07	0.07
MAXIMUM PEAK FLOW		223	288
MAXIMUM PEAK STAGE		5.78	(b)6.10
ANNUAL RUNOFF (CFSM)	0.812	0.799	0.898
ANNUAL RUNOFF (INCHES)	11.02	10.88	12.20
10 PERCENT EXCEEDS	111	113	103
50 PERCENT EXCEEDS	23	22	36
90 PERCENT EXCEEDS	0.41	0.48	0.90

(a) Aug. 24 to Sept. 5, Sept. 24-30, 2004.

(b) Present datum.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04040000 ONTONAGON RIVER NEAR ROCKLAND, MI

LOCATION.--Lat 46°43'15", long 89°12'25", in NE1/4 sec.20, T.50 N., R.39 W., Ontonagon County, Hydrologic Unit 04020102, on left bank 150 ft downstream from bridge on Victoria Road, 1.8 mi southwest of Rockland, and 2.4 mi downstream from confluence of Middle and West Branches.

DRAINAGE AREA.--1,340 mi².

PERIOD OF RECORD.--June 1942 to current year.

REVISED RECORDS.--WSP 1387: 1943, 1946-47. WSP 1911: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 638.72 ft above sea level. Prior to Nov. 23, 1943, nonrecording gage, and Nov. 23, 1943, to Oct. 17, 1967, water-stage recorder at site 50 ft upstream at same datum.

REMARKS.--Records fair. Flow regulated by Victoria powerplant on West Branch 5 mi upstream; Bond Falls Reservoir (station 04034000), 3.4 mi upstream; Lake Gogebic (station 04035995); and Cisco Lake (station 04037400), in headwaters. Several measurements of water temperature were made during the year. Gage-height telemeter 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	602	787	e660	e800	e550	e800	5310	2370	4920	558	495	471
2	553	845	e720	e700	e550	e980	4790	1950	3880	545	482	480
3	554	771	e500	e660	e550	e1220	4570	1670	2870	517	473	470
4	590	661	e500	e660	e550	e1500	3760	1460	2170	606	466	459
5	656	691	e580	e660	e550	e1500	3230	1420	1750	637	459	448
6	586	682	e600	e670	e550	e1450	4330	1290	3170	627	457	453
7	513	602	e600	e680	e550	e1400	5740	1130	2930	661	445	466
8	464	457	e600	e700	e550	e1400	6890	980	2410	747	460	464
9	455	505	e600	e700	e550	e1400	6640	993	2010	763	471	468
10	451	682	e600	e700	e550	e1400	5160	966	1920	672	566	480
11	450	678	e580	e700	e550	e1400	4050	894	1650	581	872	477
12	482	621	e540	e700	e550	e1350	3070	837	1490	546	1260	476
13	619	756	e590	e700	e550	e1350	2710	1280	1350	536	750	463
14	546	603	e700	e700	e550	e1300	2950	2620	1380	533	531	448
15	495	543	e700	e700	e550	e1250	3010	2780	1210	523	492	464
16	489	624	e700	e700	e550	e1250	4170	2340	774	512	462	509
17	483	681	e700	e690	e550	e1220	3920	2080	684	459	391	548
18	484	1230	e500	e680	e550	e1200	8280	1920	576	419	413	530
19	481	2070	e500	e670	e550	e1200	19900	1790	589	424	446	509
20	445	1670	e500	e660	e550	e1200	12200	1730	571	429	484	472
21	425	1290	e500	e640	e550	e1200	8800	1690	551	429	453	460
22	454	1090	e500	e630	e550	e1200	6530	1420	544	442	459	458
23	462	1040	e500	e620	e550	e1200	5190	1610	537	461	443	464
24	469	962	e500	e610	e560	e1200	4060	3600	653	458	399	461
25	502	679	e500	e600	e570	e1200	4320	3310	653	452	396	457
26	544	708	e500	e580	e600	e1300	4770	2580	668	452	1060	456
27	541	731	e520	e580	e620	e2800	4060	2570	556	454	606	457
28	518	e800	e660	e570	e700	6010	3390	2600	614	450	514	458
29	459	767	e1000	e560	e750	9510	2980	2070	628	455	458	457
30	547	632	e1000	e550	---	8790	2660	1840	607	464	425	456
31	750	---	e1000	e550	---	6680	---	3440	---	498	446	---
TOTAL	16069	24858	19150	20320	16450	66860	161440	59230	44315	16310	16534	14139
MEAN	518	829	618	655	567	2157	5381	1911	1477	526	533	471
MAX	750	2070	1000	800	750	9510	19900	3600	4920	763	1260	548
MIN	425	457	500	550	550	800	2660	837	537	419	391	448

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2004, BY WATER YEAR (WY)

	MEAN	1119	1209	920	816	846	1556	4121	2061	1431	983	785	844
MAX	3767	3232	1683	1473	1525	4355	7707	5257	3309	2879	2563	2679	
(WY)	1986	1989	1983	1969	1984	1973	2002	1996	1951	1952	1942	1942	
MIN	333	400	410	396	413	667	922	404	431	314	359	312	
(WY)	1949	1949	1949	1949	2002	1956	1987	1977	1988	1988	1976	1976	

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR			FOR 2004 WATER YEAR			WATER YEARS 1942 - 2004		
ANNUAL TOTAL	485065			475675			1383		
ANNUAL MEAN	1329			1300			1967		
HIGHEST ANNUAL MEAN							774		
LOWEST ANNUAL MEAN							31200		
HIGHEST DAILY MEAN	25500			19900			Aug 22 1942		
LOWEST DAILY MEAN	231			391			170		
ANNUAL SEVEN-DAY MINIMUM	290			437			246		
MAXIMUM PEAK FLOW				22500			(b)42000		
MAXIMUM PEAK STAGE				18.57			(c)28.6		
ANNUAL RUNOFF (CFMS)	0.992			0.970			1.03		
ANNUAL RUNOFF (INCHES)	13.47			13.21			14.02		
10 PERCENT EXCEEDS	2790			2990			2730		
50 PERCENT EXCEEDS	621			622			867		
90 PERCENT EXCEEDS	402			458			500		

(a) Aug. 13, 14, 1991.

(b) From rating curve extended above 14,000 ft³/s on basis of slope-area measurement of peak flow.

(c) From floodmark.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04040500 STURGEON RIVER NEAR SIDNAW, MI

LOCATION.--Lat 46°35'03", long 88°34'33", in NE1/4 SE1/4 sec.5, T.48 N., R.34 W., Baraga County, Hydrologic Unit 04020104, on right bank 30 ft downstream from highway bridge, 3.0 mi downstream from Rock River, 3.5 mi northwest of Covington, 6.5 mi upstream from Perch River, 8.5 mi northeast of Sidnaw, and at mile 71.

DRAINAGE AREA.--171 mi².

PERIOD OF RECORD.--October 1912 to September 1915, April 1943 to current year.

REVISED RECORDS.--WSP 1507: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,214.40 ft above sea level. October 1912 to September 1915, nonrecording gage at site 200 ft upstream at different datum. Apr. 2, 1943, to Oct. 1, 1946, nonrecording gage at present site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	121	217	140	136	e50	e70	892	457	1010	70	32	29
2	136	190	e130	125	e50	e90	777	406	923	59	31	31
3	141	160	e120	118	e49	e130	762	355	782	53	29	31
4	158	140	107	e100	e48	e120	653	314	609	55	25	28
5	156	137	102	e90	e48	e120	582	280	471	67	22	25
6	137	128	96	e80	e46	e120	660	249	582	68	19	29
7	117	107	87	e72	e46	e120	795	220	514	115	17	28
8	101	97	91	e65	e44	e119	960	200	429	319	16	24
9	89	85	93	e62	e44	e120	1040	184	347	292	35	24
10	79	90	92	e60	e42	e120	951	171	294	207	90	22
11	72	92	e92	e60	e40	e120	807	156	245	144	145	20
12	96	107	e94	e60	e40	e120	675	148	205	111	235	18
13	101	139	e94	e60	e40	e110	575	206	182	114	196	17
14	95	141	e94	e58	e40	e110	564	365	194	178	136	17
15	85	134	e95	e58	e40	e110	588	429	186	144	91	27
16	77	140	e95	e58	e40	e105	719	370	166	109	71	170
17	69	149	e95	e58	e40	e100	914	313	144	93	59	166
18	64	368	e95	e58	e42	e100	1190	271	126	79	55	122
19	61	532	e95	e58	e42	e100	2690	235	106	69	64	90
20	57	498	e95	e58	e42	e98	2990	305	91	61	64	73
21	54	427	e94	e56	e42	e96	2100	320	79	55	50	60
22	53	343	e94	e56	e42	e94	1530	288	71	48	46	50
23	52	289	e92	e56	e42	e92	1150	300	75	42	42	43
24	53	271	91	e56	e42	e92	906	433	113	37	38	38
25	55	228	96	e54	e42	e95	783	409	128	33	37	33
26	56	223	103	e54	e42	e100	744	375	114	30	39	30
27	56	197	91	e52	e44	e250	668	396	96	27	37	28
28	57	178	116	e52	e50	e500	595	400	82	25	33	25
29	72	165	167	e52	e60	e1300	522	351	73	26	30	22
30	107	154	163	e52	—	e1100	490	292	86	26	29	22
31	210	—	154	e50	—	e900	—	554	—	30	28	—
TOTAL	2837	6126	3263	2084	1279	6821	29202	9752	8523	2786	1841	1342
MEAN	91.5	204	105	67.2	44.1	220	973	315	284	89.9	59.4	44.7
MAX	210	532	167	136	60	1300	2990	554	1010	319	235	170
MIN	52	85	87	50	40	70	490	148	71	25	16	17
CFSM	0.54	1.19	0.62	0.39	0.26	1.29	5.69	1.84	1.66	0.53	0.35	0.26
IN.	0.62	1.33	0.71	0.45	0.28	1.48	6.35	2.12	1.85	0.61	0.40	0.29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2004, BY WATER YEAR (WY)

	MEAN	176	189	114	69.5	63.1	165	764	453	211	125	79.9	117
MAX	547	599	242	162	191	744	1321	1147	579	503	319	586	
(WY)	1986	1989	1983	1969	1984	1973	1960	1965	1944	1968	1978	1968	
MIN	11.5	17.3	16.0	15.5	15.4	39.8	266	33.8	24.4	8.00	7.86	4.63	
(WY)	1977	1977	1977	1977	1977	1956	1946	1998	1988	1988	1976	1976	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1913 - 2004

ANNUAL TOTAL	67509.1	75856	209
ANNUAL MEAN	185	207	311
HIGHEST ANNUAL MEAN			99.9
LOWEST ANNUAL MEAN			1968
HIGHEST DAILY MEAN	2410	2990	4820
LOWEST DAILY MEAN	9.3	16	2.7
ANNUAL SEVEN-DAY MINIMUM	10	20	3.2
MAXIMUM PEAK FLOW		3270	(a)4990
MAXIMUM PEAK STAGE		9.68	11.63
INSTANTANEOUS LOW FLOW		15	2.7
ANNUAL RUNOFF (CFSM)	1.08	1.21	1.22
ANNUAL RUNOFF (INCHES)	14.69	16.50	16.64
10 PERCENT EXCEEDS	450	557	509
50 PERCENT EXCEEDS	75	95	97
90 PERCENT EXCEEDS	21	32	32

(a) Gage height, 11.44 ft.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04041500 STURGEON RIVER NEAR ALSTON, MI

LOCATION.--Lat 46°43'35", long 88°39'43", in SE1/4 sec.15, T.50 N., R.35 W., Baraga County, Hydrologic Unit 04020104, on right bank in powerhouse of Upper Peninsula Power Co. at Prickett Dam, 4.0 mi upstream from Clear Creek, 5.0 mi southeast of Alston, and at mile 45.

DRAINAGE AREA.--346 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1932 to June 1941, October 1942 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 709.64 ft above sea level. Prior to Jan. 5, 1948, nonrecording gage, and Jan. 5, 1948 to Sept. 30, 1963, water-stage recorder at same site at datum 39.34 ft lower.

REMARKS.--Records good. Flow regulated by powerplant at station. Gage-height telemeter 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	266	362	337	252	179	201	1530	764	1900	225	151	162
2	251	479	265	231	178	240	1450	770	1550	213	147	139
3	245	305	184	253	177	363	1330	749	1340	201	144	154
4	260	240	177	214	163	389	1270	642	1080	217	139	146
5	281	268	210	190	156	361	1060	503	821	225	134	140
6	285	275	277	174	173	288	1120	449	905	218	128	146
7	262	256	252	158	173	268	1500	551	1050	241	124	145
8	246	222	227	164	162	285	1660	466	784	320	128	142
9	225	188	240	181	159	301	1830	412	656	463	145	137
10	195	176	260	198	177	268	1710	366	559	445	166	134
11	163	227	223	194	167	288	1490	362	485	375	208	131
12	180	256	188	194	165	302	1200	355	490	314	275	127
13	194	256	171	192	169	278	999	526	423	276	318	126
14	207	255	186	197	172	297	974	678	357	284	301	122
15	207	246	265	181	171	383	1020	939	430	301	259	134
16	201	246	281	176	165	301	1140	764	523	283	223	154
17	196	253	229	187	165	255	1470	633	492	258	198	247
18	184	567	212	186	163	271	2090	626	478	234	186	277
19	185	1190	200	181	162	280	3590	456	397	218	154	255
20	184	905	182	176	163	274	4230	446	404	204	190	223
21	154	737	175	178	171	254	3520	645	355	193	177	200
22	163	713	202	186	164	222	2540	580	375	183	174	184
23	160	660	243	176	165	224	1890	481	323	172	166	170
24	150	603	220	166	179	252	1520	989	367	163	158	160
25	154	389	171	174	179	277	1320	907	328	155	160	150
26	161	336	168	180	167	478	1360	683	304	151	201	143
27	165	415	208	176	167	1010	1190	766	279	146	177	139
28	165	339	243	175	178	1410	1010	770	258	141	157	138
29	165	341	273	165	190	2580	991	733	241	139	148	134
30	179	338	317	160	---	2130	853	541	228	138	114	129
31	327	---	305	169	---	1520	---	708	---	153	134	---
TOTAL	6360	12043	7091	5784	4919	16250	48857	19260	18182	7249	5484	4788
MEAN	205	401	229	187	170	524	1629	621	606	234	177	160
MAX	327	1190	337	253	190	2580	4230	989	1900	463	318	277
MIN	150	176	168	158	156	201	853	355	228	138	114	122
CFSM	0.59	1.16	0.66	0.54	0.49	1.52	4.71	1.80	1.75	0.68	0.51	0.46
IN.	0.68	1.29	0.76	0.62	0.53	1.75	5.25	2.07	1.95	0.78	0.59	0.51

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 2004, BY WATER YEAR (WY)

	342	376	266	209	202	377	1180	791	437	299	225	263
MEAN	342	376	266	209	202	377	1180	791	437	299	225	263
MAX	973	1001	433	380	412	1255	2093	1799	973	894	595	1056
(WY)	1986	1989	1988	1969	1984	1973	1960	1996	1944	1968	1978	1968
MIN	99.4	120	101	111	133	164	420	146	138	94.2	100	70.9
(WY)	1949	1949	1977	1977	1964	1940	1987	1998	1988	1988	1976	1976

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1932 - 2004
ANNUAL TOTAL	150478	156267	
ANNUAL MEAN	412	427	415
HIGHEST ANNUAL MEAN			582
LOWEST ANNUAL MEAN			247
HIGHEST DAILY MEAN	4210	4230	6820
LOWEST DAILY MEAN	76	114	(a)1.0
ANNUAL SEVEN-DAY MINIMUM	102	130	1.1
MAXIMUM PEAK FLOW		4380	7360
MAXIMUM PEAK STAGE		9.74	(c)13.75
ANNUAL RUNOFF (CFSM)	1.19	1.23	1.20
ANNUAL RUNOFF (INCHES)	16.18	16.80	16.31
10 PERCENT EXCEEDS	893	1010	846
50 PERCENT EXCEEDS	207	240	262
90 PERCENT EXCEEDS	135	151	138

(a) Approximately; result of draining pond for dam repair.

(b) Aug. 14-19, 1960.

(c) Present datum.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04041500 STURGEON RIVER NEAR ALSTON, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: April 1998 to current year.

INSTRUMENTATION.--Water temperature recorder with telemetry since Apr. 7, 1998.

REMARKS.--Records rated good. Records represent water temperature at sensor within 0.5°C, from Apr. 1 to Sept. 30.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 29.5°C, Aug. 7, 2001.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 23.5°C, July 21.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	--	--	--	--	--	--	1.0	0.5	1.0	10.0	8.5	9.5
2	--	--	--	--	--	--	1.5	0.5	1.0	9.5	8.5	9.0
3	--	--	--	--	--	--	1.5	0.5	1.0	11.5	9.5	10.0
4	--	--	--	--	--	--	2.0	1.0	1.5	11.0	10.0	10.5
5	--	--	--	--	--	--	2.5	1.5	2.0	12.0	10.0	11.0
6	--	--	--	--	--	--	2.5	1.5	2.0	12.0	10.0	11.0
7	--	--	--	--	--	--	2.5	2.0	2.0	10.5	9.5	10.0
8	--	--	--	--	--	--	3.5	2.0	3.0	12.5	10.0	11.0
9	--	--	--	--	--	--	4.0	3.5	3.5	13.0	10.5	11.5
10	--	--	--	--	--	--	4.0	3.5	3.5	14.0	12.0	13.0
11	--	--	--	--	--	--	3.5	3.0	3.5	14.5	12.5	13.5
12	--	--	--	--	--	--	3.5	2.5	3.0	16.0	13.5	15.0
13	--	--	--	--	--	--	3.0	2.5	2.5	16.0	14.0	15.0
14	--	--	--	--	--	--	3.0	2.5	3.0	14.5	13.5	14.0
15	--	--	--	--	--	--	3.5	2.5	3.0	14.5	13.0	13.5
16	--	--	--	--	--	--	4.0	3.0	3.5	14.0	13.0	13.5
17	--	--	--	--	--	--	7.5	3.5	5.5	14.0	13.0	13.5
18	--	--	--	--	--	--	8.5	6.0	7.0	14.5	13.0	13.5
19	--	--	--	--	--	--	9.0	8.0	8.5	16.0	13.5	14.5
20	--	--	--	--	--	--	8.5	7.0	8.0	15.5	14.0	15.0
21	--	--	--	--	--	--	7.5	5.5	6.5	14.5	13.5	14.0
22	--	--	--	--	--	--	6.5	5.0	5.5	14.0	13.0	13.5
23	--	--	--	--	--	--	6.5	5.5	6.0	13.5	11.5	12.5
24	--	--	--	--	--	--	7.0	5.5	6.0	12.5	11.5	12.0
25	--	--	--	--	--	--	8.0	6.5	7.5	13.0	12.0	12.5
26	--	--	--	--	--	--	7.5	7.0	7.0	14.5	12.0	13.0
27	--	--	--	--	--	--	8.0	6.5	7.5	13.5	12.0	12.5
28	--	--	--	--	--	--	9.0	7.0	8.0	13.5	11.5	12.5
29	--	--	--	--	--	--	8.5	8.0	8.0	15.0	12.0	13.5
30	--	--	--	--	--	--	10.0	7.5	8.5	15.0	13.5	14.0
31	--	--	--	--	--	--	--	--	--	14.0	13.0	13.5
MONTH	--	--	--	--	--	--	10.0	0.5	4.6	16.0	8.5	12.6

STREAMS TRIBUTARY TO LAKE SUPERIOR

04041500 STURGEON RIVER NEAR ALSTON, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	13.5	13.0	13.5	21.0	18.0	19.5	23.0	20.5	21.5	17.5	16.5	17.0
2	13.5	12.5	13.0	20.0	18.0	19.0	22.5	20.5	22.0	20.0	16.5	18.0
3	14.0	12.5	13.0	23.0	18.5	21.0	23.5	21.0	22.0	21.0	18.5	20.0
4	15.5	13.0	14.0	22.5	18.0	20.0	21.5	19.5	20.5	21.5	19.5	20.5
5	17.0	14.0	15.5	18.5	17.5	18.0	21.0	20.0	20.5	22.0	20.5	21.0
6	19.0	16.0	16.5	18.5	17.0	18.0	21.5	19.5	20.5	22.0	20.5	21.5
7	19.5	16.0	17.5	17.5	16.5	17.0	21.0	19.5	20.5	21.0	19.0	20.0
8	20.5	18.5	19.5	17.5	16.0	16.5	21.5	20.0	20.5	20.0	18.5	19.0
9	20.0	18.0	18.5	19.0	16.0	17.5	21.5	20.5	21.0	19.5	18.0	18.5
10	19.0	18.0	18.5	21.0	17.0	18.5	21.0	19.0	20.0	20.0	18.0	19.0
11	19.5	18.0	18.5	20.0	17.5	18.5	19.0	17.5	18.5	19.5	19.0	19.5
12	20.5	18.5	19.5	23.0	18.5	20.5	18.0	17.0	17.5	19.0	18.0	19.0
13	20.5	19.0	19.5	22.0	20.0	21.0	18.0	17.0	17.5	20.5	18.0	19.5
14	21.0	19.0	20.0	20.5	19.0	19.5	18.5	16.5	17.5	20.5	19.5	20.0
15	20.0	18.0	19.0	21.0	19.5	20.5	19.0	17.5	18.5	20.5	19.0	20.0
16	19.5	18.5	19.0	21.0	19.0	20.0	19.0	18.0	18.5	20.0	18.0	19.0
17	19.0	18.5	18.5	21.0	19.5	20.0	19.0	18.0	18.5	19.0	18.0	18.0
18	20.5	18.5	19.5	22.0	20.0	21.0	19.0	18.0	18.5	18.5	17.0	18.0
19	20.5	19.0	19.5	22.5	20.5	21.5	19.0	17.5	18.0	18.5	17.0	18.0
20	20.0	19.0	19.5	21.0	19.0	20.0	18.5	17.5	18.0	19.0	17.5	18.0
21	20.5	19.0	20.0	23.5	19.0	21.5	18.5	17.0	18.0	19.0	17.5	18.5
22	20.5	19.0	20.0	23.0	20.5	22.0	18.5	17.5	18.0	18.5	17.5	18.0
23	20.5	19.0	19.5	21.5	20.0	21.0	18.0	16.5	17.5	19.5	17.5	18.5
24	19.0	18.0	18.5	21.5	20.0	20.5	19.0	16.5	18.0	19.0	18.0	18.5
25	18.5	17.5	18.0	21.5	19.5	20.5	20.0	18.0	19.0	19.0	17.5	18.0
26	18.5	17.0	17.5	22.0	20.5	21.0	21.0	19.0	20.0	19.0	17.5	18.5
27	18.5	17.0	18.0	22.5	20.5	21.0	21.0	20.0	20.5	18.5	17.5	18.0
28	19.5	17.0	18.5	23.0	20.5	22.0	20.5	18.0	19.0	17.5	16.5	17.0
29	19.5	17.5	18.5	22.5	21.5	22.0	19.0	18.0	18.5	17.5	16.0	16.5
30	22.0	17.5	20.0	23.0	20.5	21.5	19.0	18.0	18.5	17.0	15.5	16.5
31	--	--	--	21.5	20.0	21.0	19.0	15.5	18.0	--	--	--
MONTH	22.0	12.5	18.0	23.5	16.0	20.0	23.5	15.5	19.2	22.0	15.5	18.7

STREAMS TRIBUTARY TO LAKE SUPERIOR

04043050 TRAP ROCK RIVER NEAR LAKE LINDEN, MI

LOCATION.--Lat 47°13'43", long 88°23'07", in SE1/4 SE1/4 sec.20, T.56 N., R.32 W., Houghton County, Hydrologic Unit 04020103, on right bank 20 ft upstream from bridge on county highway, 2.0 mi northeast of Lake Linden, and 3.0 mi upstream from mouth.

DRAINAGE AREA.--28.0 mi².

PERIOD OF RECORD.--October 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 621.7 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	21	33	25	29	e14	e19	139	55	407	16	14	16
2	22	24	e24	28	e14	e22	e120	49	131	16	13	14
3	22	21	e23	28	e14	e32	e110	44	81	15	11	14
4	21	17	22	e27	e14	e32	e90	40	63	19	9.8	13
5	19	24	20	e26	e14	e31	83	38	52	25	9.3	13
6	18	21	20	e24	e13	e30	112	37	66	21	9.1	13
7	16	e19	19	e22	e13	e30	211	34	55	26	8.2	14
8	15	e18	17	e20	e13	30	374	32	47	42	9.2	13
9	14	e16	19	e20	e13	30	280	32	46	32	14	12
10	e13	14	e19	e19	e13	28	168	39	42	23	18	12
11	12	15	e21	e19	e13	e27	120	33	35	19	47	12
12	15	23	e21	e19	e13	e26	88	29	31	18	64	12
13	17	37	e21	e18	e13	e26	78	34	32	16	34	12
14	16	28	e21	e18	e13	e25	110	58	31	15	24	12
15	16	26	e21	e18	e13	e25	135	63	28	14	20	13
16	16	24	e21	e18	e13	e24	228	46	26	14	17	13
17	15	27	e21	e17	e13	e24	290	62	24	13	16	12
18	14	66	e21	e17	e13	24	424	65	23	13	15	12
19	14	105	e21	e17	e13	e24	786	45	21	12	14	12
20	13	60	e21	e17	e13	e24	418	44	20	12	14	11
21	13	46	e21	e17	e13	e24	255	38	19	12	14	11
22	13	37	e21	e17	e13	e24	178	41	18	12	17	11
23	13	32	e21	e17	e13	24	132	65	18	11	20	12
24	14	e31	e21	e16	e13	27	108	61	18	11	17	11
25	16	31	e21	e16	e13	29	94	51	18	11	17	11
26	18	28	e21	e16	e14	58	91	44	17	10	27	11
27	16	27	22	e16	e15	72	78	47	16	9.9	23	11
28	16	26	26	e16	e15	87	68	45	16	9.8	21	12
29	25	e25	35	e15	e17	230	73	37	18	9.9	21	11
30	30	e25	34	e15	---	e220	65	35	18	9.9	19	11
31	50	---	31	e15	---	e200	---	274	---	17	17	---
TOTAL	553	926	692	597	392	1528	5506	1617	1437	504.5	593.6	367
MEAN	17.8	30.9	22.3	19.3	13.5	49.3	184	52.2	47.9	16.3	19.1	12.2
MAX	50	105	35	29	17	230	786	274	407	42	64	16
MIN	12	14	17	15	13	19	65	29	16	9.8	8.2	11
CFSM	0.64	1.10	0.80	0.69	0.48	1.76	6.55	1.86	1.71	0.58	0.68	0.44
IN.	0.73	1.23	0.92	0.79	0.52	2.03	7.32	2.15	1.91	0.67	0.79	0.49

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2004, BY WATER YEAR (WY)

	MEAN	30.5	37.8	25.9	20.4	20.1	43.7	178	77.4	36.5	21.3	16.9	20.9
MAX	94.6	134	43.9	33.2	42.8	112	288	223	117	63.5	70.2	92.5	
(WY)	1986	1989	1988	1969	1984	1973	2001	1972	1968	1968	1988	1968	
MIN	8.71	9.66	9.28	9.03	9.00	16.1	63.5	16.5	11.7	11.4	9.34	7.84	
(WY)	1977	1977	1977	1977	1977	1972	1998	1998	1977	1967	2000	1998	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1967 - 2004

ANNUAL TOTAL	14333.2	14713.1	
ANNUAL MEAN	39.3	40.2	
HIGHEST ANNUAL MEAN			44.0
LOWEST ANNUAL MEAN			62.6
HIGHEST DAILY MEAN	687	May 12	1120
LOWEST DAILY MEAN	8.2	Aug 17	6.5
ANNUAL SEVEN-DAY MINIMUM	8.6	Sep 3	6.8
MAXIMUM PEAK FLOW			1590
MAXIMUM PEAK STAGE			10.72
INSTANTANEOUS LOW FLOW			(a)1.7
ANNUAL RUNOFF (CFSM)	1.40	1.44	1.57
ANNUAL RUNOFF (INCHES)	19.04	19.55	21.36
10 PERCENT EXCEEDS	72	74	88
50 PERCENT EXCEEDS	19	21	21
90 PERCENT EXCEEDS	10	12	12

(a) Result of ice jam upstream.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04043150 SILVER RIVER NEAR L'ANSE, MI

LOCATION.--Lat 46°48'15", long 88°19'01", in SW1/4 NW1/4 sec.24, T.51 N., R.32 W., Baraga County, Hydrologic Unit 04020105, on left bank, 30 ft upstream from bridge on Skanee Road, 2.0 mi upstream from mouth, and 7.5 mi northeast of L'Anse.

DRAINAGE AREA.--64.0 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 2001 to current year.

REVISED RECORDS.--WDR MI-03-1: 2002(M).

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 630 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Gage-height telemeter 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	65	94	e60	e58	e34	e45	315	145	523	28	23	20
2	64	73	e58	e58	e34	e48	270	126	284	24	18	20
3	57	60	e58	e58	e34	e50	259	113	175	22	16	18
4	65	54	e56	e56	e32	e52	213	104	131	44	14	16
5	57	59	e56	e54	e32	e54	179	95	110	71	13	15
6	47	52	e55	e52	e32	e55	222	88	175	52	12	16
7	40	57	e54	e50	e32	e56	303	80	141	149	11	16
8	34	48	e54	e48	e30	e56	531	74	105	423	12	14
9	29	51	e54	e46	e30	e55	497	71	95	249	18	14
10	26	41	e52	e45	e30	e55	327	69	87	130	51	13
11	23	45	e50	e45	e30	e54	236	63	71	85	140	13
12	42	57	e50	e45	e30	e54	185	64	62	66	182	12
13	41	78	e50	e42	e30	e52	162	112	59	54	100	12
14	35	67	e50	e42	e30	e52	176	217	66	55	61	11
15	31	61	e50	e42	e30	e52	201	227	56	44	43	31
16	28	62	e50	e40	e30	e50	365	161	50	39	34	76
17	26	68	e50	e40	e30	e50	480	129	46	38	30	45
18	26	200	e50	e40	e30	e50	827	112	41	32	27	34
19	25	258	e50	e40	e30	e50	2010	95	36	28	31	26
20	24	170	e50	e40	e30	e50	776	141	32	26	26	21
21	23	120	e50	e40	e30	e50	493	123	32	24	23	18
22	23	94	e50	e38	e30	e50	367	108	33	22	33	16
23	24	91	e50	e38	e30	e50	272	130	38	20	35	16
24	26	98	e50	e38	e32	e50	222	207	59	18	28	15
25	27	e85	e50	e36	e34	e80	239	160	50	17	27	14
26	32	74	e50	e36	e35	e150	252	131	41	16	26	13
27	33	67	e52	e36	e38	315	212	170	35	15	24	13
28	33	64	e55	e36	e40	693	181	171	30	14	21	14
29	48	63	e58	e35	e42	1130	165	129	28	14	20	13
30	67	61	e60	e34	---	641	166	107	29	16	20	13
31	110	---	e60	e34	---	404	---	296	---	25	19	---
TOTAL	1231	2472	1642	1342	931	4653	11103	4018	2720	1860	1138	588
MEAN	39.7	82.4	53.0	43.3	32.1	150	370	130	90.7	60.0	36.7	19.6
MAX	110	258	60	58	42	1130	2010	296	523	423	182	76
MIN	23	41	50	34	30	45	162	63	28	14	11	11
CFSM	0.62	1.29	0.83	0.68	0.50	2.35	5.78	2.03	1.42	0.94	0.57	0.31
IN.	0.72	1.44	0.95	0.78	0.54	2.70	6.45	2.34	1.58	1.08	0.66	0.34

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2004, BY WATER YEAR (WY)

	MEAN	77.7	64.1	55.0	33.5	28.1	112	392	168	82.8	37.8	26.6	27.1
MAX	167	82.4	61.0	43.3	32.1	150	522	258	90.7	60.0	36.7	41.6	
(WY)	2003	2004	2002	2004	2004	2004	2002	2003	2004	2004	2004	2002	
MIN	26.7	33.7	51.1	27.0	25.8	36.1	285	117	71.2	24.2	20.5	19.6	
(WY)	2002	2002	2003	2002	2002	2002	2003	2002	2003	2002	2003	2004	

SUMMARY STATISTICS FOR 2003 CALENDAR YEAR FOR 2004 WATER YEAR WATER YEARS 2002 - 2004

ANNUAL TOTAL	32487.1	33698	
ANNUAL MEAN	89.0	92.1	
HIGHEST ANNUAL MEAN		99.1	2003
LOWEST ANNUAL MEAN		85.0	2002
HIGHEST DAILY MEAN	2660	2010	2660
LOWEST DAILY MEAN	7.9	11	7.9
ANNUAL SEVEN-DAY MINIMUM	8.7	13	8.7
MAXIMUM PEAK FLOW		2400	(a)3180
MAXIMUM PEAK STAGE		12.57	15.18
INSTANTANEOUS LOW FLOW		11	7.0
ANNUAL RUNOFF (CFSM)	1.39	1.44	1.44
ANNUAL RUNOFF (INCHES)	18.88	19.59	19.54
10 PERCENT EXCEEDS	201	203	179
50 PERCENT EXCEEDS	37	50	42
90 PERCENT EXCEEDS	16	18	18

(a) Result of dam failure.

(b) Aug. 7, 8, Sept. 13, 15.

(c) Sept. 11, 12, 2003.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04043150 SILVER RIVER NEAR L'ANSE, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: May 2002 to current year.

INSTRUMENTATION.--Water temperature recorder with telemetry since May 23, 2002.

REMARKS.--Records for Oct. 1 to Mar. 24 rated good, Mar. 25 to Sept. 30 rated excellent. Records represent water temperature at sensor within 0.5°C.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 26.5°C, July 16, 2002.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 22.0°C, July 21.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
1	6.5	5.5	6.0	5.0	3.5	4.0	0.5	-0.5	0.0	-0.5	-0.5	-0.5			
2	6.0	4.5	5.5	4.0	3.0	3.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
3	6.5	5.5	6.0	4.0	3.0	3.5	0.0	-0.5	-0.5	-0.5	-0.5	-0.5			
4	6.0	5.5	5.5	3.0	2.0	2.5	-0.5	-0.5	-0.5	0.0	-0.5	-0.5			
5	6.0	4.5	5.5	2.5	2.0	2.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
6	6.5	4.0	5.5	2.0	0.5	1.0	-0.5	-0.5	-0.5	0.0	-0.5	-0.5			
7	9.5	6.5	8.0	0.5	-0.5	0.0	-0.5	-0.5	-0.5	0.0	-0.5	-0.5			
8	11.5	8.5	10.0	0.0	-0.5	-0.5	0.0	-0.5	-0.5	-0.5	-0.5	-0.5			
9	13.0	11.0	12.0	0.0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
10	14.0	12.0	13.0	1.0	-0.5	0.0	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
11	14.5	13.0	13.5	2.0	1.0	1.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
12	13.5	11.5	12.5	2.0	1.0	1.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
13	11.5	10.0	10.5	1.0	0.0	0.5	0.0	-0.5	-0.5	-0.5	-0.5	-0.5			
14	10.5	8.5	9.5	1.0	0.0	0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
15	8.5	7.0	7.5	2.0	0.0	1.0	-0.5	-0.5	-0.5	0.0	-0.5	-0.5			
16	7.0	5.5	6.5	3.0	2.0	2.5	0.0	-0.5	-0.5	-0.5	-0.5	-0.5			
17	6.0	5.0	5.5	4.0	2.5	3.5	0.0	-0.5	-0.5	-0.5	-0.5	-0.5			
18	7.5	5.5	6.5	5.0	4.0	4.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
19	8.0	7.0	7.5	4.5	2.5	3.0	0.0	-0.5	-0.5	0.0	-0.5	-0.5			
20	9.0	7.0	8.0	3.0	1.5	2.5	0.0	-0.5	-0.5	0.0	-0.5	-0.5			
21	9.0	7.5	8.5	3.0	1.5	2.0	0.0	-0.5	-0.5	-0.5	-0.5	-0.5			
22	7.5	7.0	7.0	1.5	0.5	1.5	-0.5	-0.5	-0.5	0.0	-0.5	-0.5			
23	7.0	6.0	6.5	1.0	0.5	0.5	-0.5	-0.5	-0.5	0.0	-0.5	-0.5			
24	6.0	5.0	5.5	1.0	-0.5	0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
25	6.0	4.5	5.0	0.0	-0.5	-0.5	0.0	-0.5	-0.5	0.0	-0.5	-0.5			
26	6.0	4.5	5.0	0.5	-0.5	0.0	0.0	-0.5	-0.5	-0.5	-0.5	-0.5			
27	4.5	3.0	4.0	1.0	-0.5	0.0	0.0	-0.5	-0.5	-0.5	-0.5	-0.5			
28	4.5	3.5	4.0	1.0	0.5	0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5			
29	5.0	4.5	5.0	0.5	0.5	0.5	-0.5	-0.5	-0.5	0.0	-0.5	-0.5			
30	5.0	4.0	4.5	0.5	0.0	0.5	-0.5	-0.5	-0.5	0.0	-0.5	-0.5			
31	5.5	4.5	5.0	—	—	—	-0.5	-0.5	-0.5	0.0	-0.5	-0.5			
MONTH	14.5	3.0	7.2	5.0	-0.5	1.4	0.5	-0.5	-0.5	0.0	-0.5	-0.5			

STREAMS TRIBUTARY TO LAKE SUPERIOR

04043150 SILVER RIVER NEAR L'ANSE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	3.0	0.0	1.5	9.5	6.5	8.0
2	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	4.0	0.0	2.0	8.5	5.5	7.0
3	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	3.0	1.0	1.5	9.0	4.5	6.5
4	0.0	-0.5	-0.5	-0.5	-0.5	-0.5	3.0	0.5	1.5	8.5	7.0	8.0
5	0.0	-0.5	-0.5	-0.5	-0.5	-0.5	4.0	0.0	2.0	10.5	6.0	8.0
6	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	6.5	2.5	4.0	11.5	9.0	10.0
7	0.0	-0.5	-0.5	-0.5	-0.5	-0.5	5.0	2.5	4.0	10.0	7.0	9.0
8	0.0	-0.5	-0.5	0.0	-0.5	-0.5	4.5	3.0	3.5	12.0	8.0	10.0
9	-0.5	-0.5	-0.5	0.0	-0.5	-0.5	3.5	2.0	2.5	12.5	9.0	11.0
10	-0.5	-0.5	-0.5	1.0	-0.5	0.0	2.5	1.0	2.0	16.0	11.5	13.5
11	0.0	-0.5	-0.5	0.5	-0.5	0.0	2.0	1.0	1.5	14.0	10.0	12.5
12	-0.5	-0.5	-0.5	0.0	-0.5	-0.5	2.0	0.5	1.5	17.5	12.0	15.0
13	-0.5	-0.5	-0.5	0.0	-0.5	-0.5	5.0	0.0	2.5	17.0	11.5	14.0
14	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	6.5	2.5	4.5	11.5	8.0	9.5
15	0.0	-0.5	-0.5	-0.5	-0.5	-0.5	7.0	3.0	5.0	11.0	7.0	9.0
16	0.0	-0.5	-0.5	-0.5	-0.5	-0.5	8.5	6.0	7.5	13.0	9.5	11.5
17	-0.5	-0.5	-0.5	0.0	-0.5	0.0	8.0	4.5	6.5	12.5	11.5	12.0
18	-0.5	-0.5	-0.5	1.0	-0.5	0.5	8.0	6.0	7.0	15.0	10.0	12.5
19	-0.5	-0.5	-0.5	0.5	-0.5	0.0	8.0	4.5	6.0	15.5	11.5	14.0
20	-0.5	-0.5	-0.5	1.0	0.0	0.5	6.5	4.0	5.0	14.5	13.0	14.0
21	-0.5	-0.5	-0.5	0.0	-0.5	0.0	6.0	5.0	5.5	13.0	10.5	11.5
22	-0.5	-0.5	-0.5	0.0	-0.5	-0.5	7.5	4.0	5.5	11.5	9.5	10.0
23	-0.5	-0.5	-0.5	1.0	-0.5	0.0	7.5	4.5	6.0	9.5	8.0	9.0
24	-0.5	-0.5	-0.5	1.5	-0.5	0.5	8.0	4.0	6.0	9.5	7.5	8.5
25	-0.5	-0.5	-0.5	2.0	0.0	1.0	7.0	5.0	6.0	11.0	9.0	9.5
26	-0.5	-0.5	-0.5	0.5	0.0	0.0	6.0	4.5	5.0	13.5	9.5	11.5
27	-0.5	-0.5	-0.5	1.5	0.0	0.5	6.0	2.5	4.5	12.5	9.5	11.0
28	-0.5	-0.5	-0.5	1.5	0.5	1.0	11.0	5.5	8.0	12.5	7.5	10.0
29	-0.5	-0.5	-0.5	2.0	0.5	1.0	11.0	8.5	10.0	14.5	10.0	12.0
30	--	--	--	1.5	0.5	1.0	9.0	7.0	8.0	14.5	12.5	13.5
31	--	--	--	2.5	0.0	1.0	--	--	--	13.5	10.5	12.0
MONTH	0.0	-0.5	-0.5	2.5	-0.5	0.0	11.0	0.0	4.5	17.5	4.5	10.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	11.0	10.0	10.5	20.0	15.5	17.5	21.5	16.0	18.5	15.0	13.5	14.0
2	13.5	9.5	11.0	19.5	14.5	17.0	21.5	18.5	19.5	18.5	14.0	15.5
3	14.5	10.0	12.0	20.0	16.0	18.0	21.5	17.5	19.5	20.5	17.0	18.5
4	15.5	11.0	13.5	19.0	15.0	17.0	21.0	17.0	18.5	20.5	17.5	19.0
5	15.0	13.5	14.5	16.5	13.5	15.0	20.0	15.0	17.5	20.0	18.5	19.0
6	18.0	13.5	15.5	15.0	12.5	13.0	20.5	15.0	17.5	19.5	18.0	19.0
7	20.0	13.5	16.5	12.5	11.5	12.0	18.5	15.0	16.5	18.0	15.5	16.5
8	21.5	19.0	20.0	13.5	11.5	12.0	18.0	15.0	16.5	16.5	14.0	15.0
9	19.5	14.0	16.5	15.0	11.5	13.5	18.5	16.5	17.5	16.0	12.5	14.0
10	16.0	11.5	14.0	19.0	14.0	16.0	17.5	14.0	16.0	17.5	13.5	15.0
11	16.0	12.0	14.0	17.5	16.0	17.0	14.0	12.0	13.0	18.0	16.0	17.0
12	19.0	14.0	16.0	20.5	16.0	18.0	14.5	11.0	12.5	18.0	15.0	16.0
13	18.0	15.5	16.5	20.5	17.5	19.0	15.0	11.0	13.0	19.0	15.5	17.0
14	17.5	15.0	16.5	21.0	17.0	19.0	15.5	11.5	13.5	19.0	17.5	18.0
15	18.0	13.5	15.5	20.5	16.5	18.5	16.0	12.5	14.5	19.0	17.5	18.0
16	17.0	15.0	16.0	19.5	17.5	18.0	16.0	14.5	15.5	18.0	14.0	15.5
17	18.0	15.0	16.5	20.0	16.0	18.0	17.5	14.5	15.5	14.0	11.5	13.0
18	17.5	14.5	16.0	19.0	15.5	17.5	16.5	14.5	15.5	16.0	13.0	14.5
19	17.5	12.5	15.0	21.0	16.5	19.0	15.5	12.5	14.0	16.5	14.0	15.5
20	18.5	13.5	16.0	21.0	18.0	19.5	16.0	13.0	14.5	17.5	15.5	16.5
21	17.5	15.5	16.5	22.0	18.5	20.0	16.0	12.0	14.0	17.5	15.5	16.5
22	17.5	14.0	16.0	21.0	17.0	19.0	15.5	13.5	14.5	18.0	16.5	17.0
23	17.5	13.5	15.5	18.0	14.5	16.5	16.5	14.0	15.0	17.0	15.0	16.0
24	15.5	12.5	13.5	18.5	13.5	16.0	17.0	13.5	15.0	16.0	15.0	15.5
25	13.5	11.0	12.0	19.5	14.0	16.5	19.0	16.5	17.5	16.0	14.0	14.5
26	15.0	10.5	12.5	21.0	16.5	18.5	19.5	17.0	18.5	15.5	13.0	14.0
27	16.0	12.0	14.0	22.0	17.0	19.0	19.5	17.5	18.5	15.0	13.0	14.0
28	17.5	12.5	15.0	22.0	17.5	19.5	18.0	14.5	16.0	13.0	11.0	12.0
29	19.0	15.0	17.0	22.0	19.0	20.0	15.0	13.5	14.0	12.0	9.0	10.5
30	20.5	16.0	18.0	20.5	17.0	19.0	15.5	12.5	14.0	12.0	9.0	10.5
31	---	---	---	19.0	17.5	18.0	14.5	13.0	14.0	---	---	---
MONTH	21.5	9.5	15.1	22.0	11.5	17.3	21.5	11.0	15.8	20.5	9.0	15.6

STREAMS TRIBUTARY TO LAKE SUPERIOR

04043800 McCLURE STORAGE BASIN RELEASE NEAR MARQUETTE, MI

LOCATION.--Lat 46°34'19", long 87°28'35", in SW1/4 NE1/4 sec. 7, T.48 N., R.25 W., Marquette County, Hydrologic Unit 04020105, on left bank in powerhouse of Upper Peninsula Power Co., 600 ft upstream from Reany Creek, 2.5 mi downstream from McClure Dam, and 4.3 mi northwest of Marquette.

PERIOD OF RECORD.--April 1990 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 785 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow completely regulated by powerplant at station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	96	0.00	165	339	258	147	341	339	e340	118	115	351
2	96	22	165	340	246	120	341	337	341	116	115	350
3	96	133	144	340	227	153	340	338	339	117	115	351
4	96	165	120	339	205	159	339	317	338	117	114	350
5	96	277	105	339	192	159	339	339	339	113	107	351
6	97	243	118	257	158	163	340	326	339	118	103	234
7	96	182	118	178	133	152	342	215	338	129	103	175
8	96	178	126	276	127	148	343	166	339	136	103	138
9	96	156	119	337	132	147	342	167	339	159	103	117
10	97	142	141	247	161	147	340	174	338	243	108	117
11	97	150	174	169	179	150	339	171	242	279	111	117
12	100	167	146	170	259	148	339	168	179	185	111	116
13	99	219	118	170	294	146	339	176	241	152	104	110
14	99	302	118	214	286	146	339	180	251	168	103	117
15	97	339	118	338	279	146	340	180	160	169	103	120
16	97	339	118	339	214	147	e340	180	155	140	271	111
17	97	338	120	338	178	143	e340	277	147	118	355	108
18	99	339	126	339	177	131	e340	338	131	118	355	109
19	100	341	129	338	174	120	e340	232	125	118	353	105
20	100	341	129	324	200	117	e340	280	121	117	353	110
21	100	340	129	305	239	118	e340	338	119	115	352	112
22	99	341	130	233	252	117	341	339	119	115	352	111
23	98	341	132	187	248	117	324	342	119	115	352	109
24	98	341	132	175	247	118	339	e340	121	115	352	107
25	98	340	130	266	244	130	339	342	120	115	353	106
26	98	340	130	338	219	260	339	340	119	115	351	107
27	98	315	128	338	195	340	338	339	119	115	351	108
28	98	284	131	299	188	342	338	339	119	115	351	108
29	51	277	157	263	189	e340	339	339	119	115	351	110
30	0.00	217	174	264	—	e340	339	339	119	115	351	108
31	0.00	—	279	262	—	342	—	e340	—	115	350	—
TOTAL	2785.00	7509.00	4269	8661	6100	5453	10179	8637	6335	4195	7171	4743
MEAN	89.8	250	138	279	210	176	339	279	211	135	231	158
MAX	100	341	279	340	294	342	343	342	341	279	355	351
MIN	0.00	0.00	105	169	127	117	324	166	119	113	103	105

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 2004, BY WATER YEAR (WY)

MEAN	118	151	162	158	165	221	285	267	213	150	117	109
MAX	213	295	304	279	337	334	348	355	347	323	267	194
(WY)	1991	1991	1992	2004	1997	1998	1998	1996	1996	2002	2000	1997
MIN	78.6	2.53	57.5	52.4	66.8	145	195	99.6	73.7	14.9	6.29	57.3
(WY)	1999	2000	2001	2001	2001	2001	1995	2000	1991	1997	1997	1993

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1990 - 2004

ANNUAL TOTAL	61857.00	76037.00	
ANNUAL MEAN	169	208	
HIGHEST ANNUAL MEAN			177
LOWEST ANNUAL MEAN			234
HIGHEST DAILY MEAN	341	Nov 19	140
LOWEST DAILY MEAN	0.00	Oct 30	1998
ANNUAL SEVEN-DAY MINIMUM	38	Sep 15	May 20 1996
10 PERCENT EXCEEDS	326		(a)
50 PERCENT EXCEEDS	111		339
90 PERCENT EXCEEDS	97		166
			65

(a) On several days in water years 1992, 1994, 1998, 1999, 2000, 2004.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04044724 AU TRAIN RIVER AT FOREST LAKE, MI

LOCATION.--Lat 46°20'27", long 86°51'00", in SE1/4 NE1/4 sec.31, T.46N., R.20W., Alger County, Hydrologic Unit 04020201, on left bank 800 ft downstream from Upper Peninsula Power Co. powerhouse, 0.6 mi downstream from Au Train Dam, and 0.6 mi northwest of Forest Lake.

DRAINAGE AREA.--81 mi², approximately.

PERIOD OF RECORD.--October 1993 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 650 ft above sea level, from topographic map.

REMARKS.--Records good. Flow regulated by powerplant 800 ft upstream and by Au Train Basin, capacity 12,342 acre-ft, 0.6 mi upstream. Several measurements of water temperature were made during the year.

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	67	63	126	126	93	104	137	248	236	86	78	126
2	67	63	125	126	90	104	137	227	263	86	78	96
3	67	62	119	126	88	105	137	218	253	86	79	74
4	67	63	110	126	88	105	137	200	233	85	79	74
5	67	63	75	126	89	105	137	193	207	85	79	74
6	65	62	68	126	89	106	138	172	180	89	80	75
7	66	62	68	125	89	109	138	161	185	93	79	75
8	66	62	67	125	86	113	140	161	162	94	79	75
9	65	62	66	126	82	118	144	154	144	94	79	75
10	65	62	67	126	75	119	147	151	137	94	73	75
11	65	62	69	126	68	113	149	147	138	93	78	75
12	65	59	69	126	69	109	150	138	129	93	78	76
13	65	29	69	126	70	109	151	102	98	93	77	76
14	65	69	69	126	69	110	152	84	87	114	77	76
15	65	69	69	126	67	109	153	92	86	148	76	76
16	65	69	69	126	67	107	160	147	86	158	76	76
17	64	69	69	126	67	85	244	162	86	157	76	76
18	64	68	69	126	67	70	366	142	85	156	78	76
19	64	68	69	126	68	71	465	136	84	155	77	76
20	64	68	69	118	68	71	553	121	84	118	76	76
21	64	67	69	107	70	71	572	111	85	80	76	76
22	64	68	69	108	71	71	543	112	84	77	75	76
23	64	68	69	100	73	79	498	125	84	75	74	76
24	63	68	69	93	81	88	427	200	85	75	73	76
25	63	85	77	93	88	92	373	292	84	75	73	76
26	63	98	85	93	99	118	349	308	84	74	73	76
27	63	95	85	93	114	135	335	277	84	74	118	74
28	63	102	101	93	109	136	335	245	85	74	146	72
29	63	97	120	93	104	138	278	219	85	74	145	68
30	63	59	126	93	--	137	274	195	86	74	144	71
31	63	--	126	93	--	137	--	198	--	76	133	--
TOTAL	2004	2061	2577	3569	2358	3244	7919	5438	3809	3005	2682	2319
MEAN	64.6	68.7	83.1	115	81.3	105	264	175	127	96.9	86.5	77.3
MAX	67	102	126	126	114	138	572	308	263	158	146	126
MIN	63	29	66	93	67	70	137	84	84	74	73	68
CFSM	0.80	0.85	1.03	1.42	1.00	1.29	3.26	2.17	1.57	1.20	1.07	0.95
IN.	0.92	0.95	1.18	1.64	1.08	1.49	3.64	2.50	1.75	1.38	1.23	1.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 2004, BY WATER YEAR (WY)

	MEAN	71.8	79.4	75.3	82.3	89.1	111	182	161	87.7	66.8	79.5	75.0
MAX	142	136	120	124	127	133	281	428	151	96.9	192	109	109
(WY)	2003	1994	2002	2002	1996	1999	2001	1996	2002	2004	2002	1998	1998
MIN	35.0	25.4	27.4	48.6	57.8	84.4	82.6	46.5	51.3	30.7	45.5	53.0	53.0
(WY)	1995	1995	1999	1999	1995	1995	1994	2000	1994	1998	1994	1995	1995

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1994 - 2004

ANNUAL TOTAL	36103	40985	
ANNUAL MEAN	98.9	112	96.7
HIGHEST ANNUAL MEAN			131
LOWEST ANNUAL MEAN			65.8
HIGHEST DAILY MEAN	563	Apr 22	670
LOWEST DAILY MEAN	29	Nov 13	2.5
ANNUAL SEVEN-DAY MINIMUM	57	Nov 7	22
MAXIMUM PEAK FLOW			686
MAXIMUM PEAK STAGE			6.08
ANNUAL RUNOFF (CFSM)	1.22		1.19
ANNUAL RUNOFF (INCHES)	16.58		16.22
10 PERCENT EXCEEDS	158		143
50 PERCENT EXCEEDS	72		75
90 PERCENT EXCEEDS	65		42

STREAMS TRIBUTARY TO LAKE SUPERIOR

463910086014201 GRAND SABLE LAKE NEAR GRAND MARAIS, MI

LOCATION.--Lat 46°39'10", long 86°01'42", in SW1/4 SW1/4 sec.11, T.49 N., R.14 W., Alger County, Hydrologic Unit 04020201, at National Park Service Public Access Site, 2.5 mi southwest of Grand Marais.

DRAINAGE AREA.--15 mi², approximately.

PERIOD OF RECORD.--October 1944 to September 1950, June 1979 to September 1982, October 1992 to current year.

GAGE.--Nonrecording gage. Datum of gage is 743.44 ft above sea level. Oct. 18, 1944 to Sept. 23, 1950, nonrecording gage at different site and datum.

REMARKS.--Staff gage read by observer. Intermittent record only for some periods. Inlets are Rhody Creek, DeMull Creek, and Towes Creek. The outlet is Sable Creek. Partial-record site at outlet 1979-82. Surface area of lake is 628 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 3.38 ft, Apr. 16, 2002; minimum observed, 0.55 ft, Sept. 5, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 2.77 ft, Apr. 23; minimum observed, 1.48 ft, Sept. 27-30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	—	2.12	—	—	—	—	—	2.60	2.20	1.98	2.00	2.00
2	2.22	—	—	—	—	—	—	2.54	2.19	1.98	2.00	1.96
3	—	2.08	2.29	—	—	—	—	2.50	2.18	1.98	2.00	1.88
4	2.28	—	—	—	—	—	—	2.50	2.16	1.98	2.00	1.88
5	2.28	—	—	—	—	—	—	2.42	—	1.98	2.10	1.88
6	—	—	—	—	—	—	—	2.40	2.12	2.02	2.10	1.86
7	2.30	—	—	—	—	—	—	2.38	2.10	2.00	2.10	1.84
8	—	2.14	—	—	—	—	—	2.30	2.10	2.14	2.12	1.79
9	2.20	—	—	—	—	—	—	2.28	2.10	2.15	—	1.80
10	—	—	—	—	—	2.10	—	2.28	2.00	2.16	2.15	1.78
11	—	—	—	—	—	—	—	2.26	2.00	2.16	2.18	1.76
12	2.20	2.18	—	—	—	—	—	2.26	2.10	2.14	2.20	1.70
13	—	—	—	—	—	—	—	2.20	1.98	2.10	2.26	1.68
14	2.16	—	—	—	—	—	—	2.18	2.00	2.14	2.24	1.70
15	—	—	—	—	—	—	—	2.20	1.99	2.14	2.26	1.70
16	—	—	—	—	—	—	—	2.20	2.00	2.12	2.24	1.68
17	2.12	—	—	—	—	—	—	2.20	1.99	2.14	2.22	1.68
18	—	—	—	—	—	—	—	2.16	1.99	2.12	2.20	1.66
19	2.08	—	—	—	—	—	—	2.14	1.96	2.12	2.20	1.64
20	—	—	—	—	—	—	—	2.16	1.96	2.10	2.20	1.60
21	2.08	—	—	2.21	—	—	—	2.18	1.92	2.08	2.18	1.60
22	—	—	—	—	—	—	—	2.18	1.96	2.04	2.18	1.60
23	2.10	—	—	—	—	—	2.77	2.18	2.00	2.02	2.16	1.58
24	—	—	—	—	—	—	2.68	2.28	1.98	2.00	2.12	1.54
25	2.06	—	—	—	—	—	2.68	2.28	2.00	2.00	2.10	1.50
26	2.06	—	—	—	—	—	2.68	2.28	2.00	2.00	2.08	1.50
27	—	—	—	—	—	—	2.70	2.24	2.00	1.98	2.08	1.48
28	2.08	—	—	—	—	—	2.68	2.26	1.98	1.98	2.06	1.48
29	—	—	—	—	—	—	2.60	2.28	1.98	1.98	2.04	1.48
30	2.12	—	—	—	—	—	2.60	—	1.98	2.00	2.02	1.48
31	—	—	—	—	—	—	—	2.14	—	2.00	2.00	—

STREAMS TRIBUTARY TO LAKE SUPERIOR

04045500 TAHQUAMENON RIVER NEAR PARADISE, MI

LOCATION.--Lat 46°34'30", long 85°16'10", in NE1/4 sec.11, T.48 N., R.8 W., Luce County, Hydrologic Unit 04020202, on left bank 0.7 mi upstream from Tahquamenon Falls (upper), 11.5 mi west of Paradise, and 19 mi northeast of Newberry.

DRAINAGE AREA.--790 mi².

PERIOD OF RECORD.--August 1953 to current year. Prior to October 1989, published as "near Tahquamenon Paradise".

GAGE.--Water-stage recorder. Datum of gage is 698.03 ft above sea level.

REMARKS.--Records good. Several measurements of water temperature were made during the year. Gage-height telemeter 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	539	637	1360	849	380	444	2740	2610	1830	470	293	312
2	533	645	1170	871	379	498	3050	2520	1860	464	286	307
3	537	633	1130	873	379	550	3340	2440	1860	443	286	292
4	570	621	1060	853	379	592	3530	2350	1830	424	294	286
5	622	641	974	823	378	626	3670	2230	1740	467	286	277
6	655	686	894	783	377	636	3710	2080	1620	540	264	277
7	653	715	798	725	379	637	3690	1920	1530	606	249	271
8	625	700	715	667	384	645	3670	1780	1390	652	243	274
9	586	657	660	623	383	650	3670	1620	1270	682	237	278
10	551	647	623	582	382	661	3620	1480	1210	673	243	286
11	519	666	e600	542	385	663	3520	1360	1150	630	258	278
12	490	722	e560	511	388	668	3390	1280	1030	569	269	273
13	475	798	e550	483	391	673	3240	1160	943	539	275	278
14	458	902	e540	463	e390	676	3110	1090	911	558	278	280
15	460	921	e540	449	e390	669	2950	1070	971	590	276	328
16	459	940	e520	442	e390	670	2870	1070	997	573	269	373
17	453	970	e520	436	e390	670	2870	1010	959	530	263	418
18	444	1000	e520	421	e390	670	2920	972	925	498	266	441
19	435	1090	e520	408	e390	673	3020	970	870	461	263	438
20	426	1170	e500	401	e390	669	3100	994	835	425	257	414
21	407	1200	e500	394	e390	673	3180	1090	745	415	257	388
22	408	1220	e500	391	e390	683	3220	1150	643	378	260	365
23	401	1290	e500	383	389	679	3230	1190	582	365	254	354
24	399	1430	e500	381	389	679	3160	1430	580	349	263	341
25	398	1520	e500	379	391	711	3120	1640	608	339	268	320
26	402	1560	e500	381	394	903	3070	1800	609	323	291	318
27	408	1570	505	382	400	1150	2920	1900	594	311	304	307
28	418	1560	526	385	411	1410	2870	1930	562	309	317	296
29	462	1520	638	386	421	1800	2750	1930	518	304	328	299
30	536	1470	743	383	—	2170	2680	1850	498	285	330	296
31	602	—	812	383	—	2430	—	1760	—	286	317	—
TOTAL	15331	30101	20978	16433	11269	25928	95880	49676	31670	14458	8544	9665
MEAN	495	1003	677	530	389	836	3196	1602	1056	466	276	322
MAX	655	1570	1360	873	421	2430	3710	2610	1860	682	330	441
MIN	398	621	500	379	377	444	2680	970	498	285	237	271
CFSM	0.63	1.27	0.86	0.67	0.49	1.06	4.05	2.03	1.34	0.59	0.35	0.41
IN.	0.72	1.42	0.99	0.77	0.53	1.22	4.51	2.34	1.49	0.68	0.40	0.46

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2004, BY WATER YEAR (WY)

MEAN	852	1002	771	491	477	764	2737	1638	679	483	417	585
MAX	1792	2284	1756	983	894	2517	4575	4511	1736	1081	1126	1623
(WY)	2002	1989	1967	1983	1999	2000	1976	1960	1974	1956	1973	1970
MIN	256	373	317	303	279	335	1259	323	244	209	167	220
(WY)	1964	2001	2001	1963	1963	1956	2000	1998	1988	1963	2000	2000

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1953 - 2004
ANNUAL TOTAL	295580	329933	
ANNUAL MEAN	810	901	908
HIGHEST ANNUAL MEAN			1294
LOWEST ANNUAL MEAN			600
HIGHEST DAILY MEAN	5160	Apr 23	6820
LOWEST DAILY MEAN	214	Jul 8	143
ANNUAL SEVEN-DAY MINIMUM	223	Jul 4	147
MAXIMUM PEAK FLOW		3720	6990
MAXIMUM PEAK STAGE		8.18	10.26
INSTANTANEOUS LOW FLOW		231	136
ANNUAL RUNOFF (CFSM)	1.03		1.15
ANNUAL RUNOFF (INCHES)	13.92		15.61
10 PERCENT EXCEEDS	1770	2190	1900
50 PERCENT EXCEEDS	433	572	570
90 PERCENT EXCEEDS	252	290	293

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04046000 BLACK RIVER NEAR GARNET, MI

LOCATION.--Lat 46°07'05", long 85°21'55", in SE1/4 sec.13, T.43 N., R.9 W., Mackinac County, Hydrologic Unit 04060107, on right bank 20 ft upstream from footbridge, 15 ft downstream from Peters Creek, 3.5 mi upstream from mouth, and 3.7 mi southwest of Garnet.

DRAINAGE AREA.--28 mi², approximately.

PERIOD OF RECORD.--September 1951 to September 1978, October 1978 to September 1994 (operated as a crest-stage partial-record station), October 1994 to current year.

REVISED RECORDS.--WSP 1707: 1959.

GAGE.--Water-stage recorder. Datum of gage is 629.7 ft above sea level. Oct. 1, 1978 to Sept. 30, 1994, nonrecording gage at same site and datum.

REMARKS.--Records good. Several measurements of water temperature were made during the year.

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	16	25	32	25	e10	11	103	71	108	25	12	9.8
2	16	23	30	24	10	16	127	61	81	22	12	9.7
3	16	22	e29	24	10	17	162	54	63	21	13	9.4
4	19	24	28	22	10	16	151	50	52	23	12	8.9
5	18	31	24	20	10	15	133	46	45	26	12	8.6
6	16	29	23	e18	10	15	118	43	47	28	11	9.0
7	15	25	e22	18	10	15	112	39	44	38	11	9.1
8	14	23	20	15	e10	14	119	37	39	32	11	8.6
9	13	21	20	15	10	14	118	36	40	28	12	8.6
10	13	20	e20	14	10	14	104	39	39	26	14	8.4
11	12	27	e20	13	9.9	15	92	36	34	25	12	8.4
12	12	29	e20	13	9.8	15	81	33	31	24	12	8.3
13	13	33	e20	12	9.8	e15	76	32	33	23	11	8.0
14	11	29	e20	e12	9.7	15	75	34	39	26	11	7.9
15	11	28	e20	12	e9.5	15	77	35	33	22	10	15
16	12	28	e20	e12	9.1	e15	88	31	29	21	10	12
17	12	28	e20	12	9.0	e14	118	30	32	21	11	10
18	12	41	20	11	9.0	14	123	32	32	20	11	10
19	12	52	20	11	9.0	14	141	29	30	19	11	9.7
20	11	43	18	11	9.4	14	122	39	27	18	10	9.5
21	11	39	18	11	9.4	e14	128	36	25	17	10	9.4
22	10	35	18	11	9.4	e14	119	32	25	17	10	9.2
23	10	62	17	e10	9.4	15	98	45	23	16	10	8.9
24	9.6	68	17	10	9.4	15	82	93	29	15	10	8.7
25	9.8	54	16	10	9.0	17	79	76	27	14	10	8.4
26	9.6	48	16	9.8	9.0	40	83	66	25	13	11	8.1
27	9.3	43	15	9.8	9.0	47	74	59	23	13	11	8.0
28	14	40	21	9.9	9.1	53	66	55	22	12	10	8.0
29	32	37	31	9.8	9.4	91	62	47	21	12	10	7.5
30	28	34	28	9.9	---	90	69	41	21	12	9.8	7.5
31	26	---	27	10	---	90	---	77	---	12	9.8	---
TOTAL	443.3	1041	670	425.2	277.3	779	3100	1434	1119	641	340.6	272.6
MEAN	14.3	34.7	21.6	13.7	9.56	25.1	103	46.3	37.3	20.7	11.0	9.09
MAX	32	68	32	25	10	91	162	93	108	38	14	15
MIN	9.3	20	15	9.8	9.0	11	62	29	21	12	9.8	7.5
CFSM	0.51	1.24	0.77	0.49	0.34	0.90	3.69	1.65	1.33	0.74	0.39	0.32
IN.	0.59	1.38	0.89	0.56	0.37	1.03	4.12	1.91	1.49	0.85	0.45	0.36

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2004, BY WATER YEAR (WY)

	MEAN	23.9	29.5	23.4	14.8	13.0	22.0	86.9	45.6	24.3	17.2	13.9	18.0
MAX	68.0	69.9	60.0	26.0	24.7	61.7	168	141	75.3	38.6	38.7	65.5	
(WY)	1960	1978	1971	1967	1966	1953	1971	1960	1974	1952	1973	1970	
MIN	6.06	7.12	6.46	5.65	5.98	7.43	28.4	11.2	10.1	7.64	5.38	5.94	
(WY)	1964	1977	2001	2001	2003	1956	2000	1998	2000	1998	2000	2000	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1952 - 2004

ANNUAL TOTAL	7259.3	10543.0	
ANNUAL MEAN	19.9	28.8	
HIGHEST ANNUAL MEAN			27.7
LOWEST ANNUAL MEAN			49.9
HIGHEST DAILY MEAN	241	162	14.2
LOWEST DAILY MEAN	3.6	7.5	1971
ANNUAL SEVEN-DAY MINIMUM	3.6	8.0	1998
MAXIMUM PEAK FLOW		176	752
MAXIMUM PEAK STAGE		4.86	May 7 1960
INSTANTANEOUS LOW FLOW		7.5	3.6
ANNUAL RUNOFF (CFSM)	0.710	1.03	Mar 5 2003
ANNUAL RUNOFF (INCHES)	9.64	14.01	Mar 5 2003
10 PERCENT EXCEEDS	38	70	May 7 1960
50 PERCENT EXCEEDS	13	18	May 7 1960
90 PERCENT EXCEEDS	6.7	9.4	8.3

(a) From rating curve extended above 400 ft³/s.

(b) Feb. 5, Sept. 29, 30.

(c) Mar. 4-16, 2003.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04052500 WALSH CREEK AT M-28 NEAR SENEY, MI

LOCATION.--Lat 46°20'44", long 86°10'37", in NW1/4 NW1/4 sec.34, T.46 N., R.15 W., Schoolcraft County, Hydrologic Unit 04060106, at State Highway 28, 11.1 mi west of Seney.

DRAINAGE AREA.--12 mi², approximately.

PERIOD OF RECORD.--April 1938 to April 1942; periodic discharge measurements 1943-2002; August 2002 to June 2004 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 768.95 ft above sea level. Prior to April 30, 1942, nonrecording gage at same site and datum.

REMARKS.--Records fair.

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	53	18	20	30	9.8	11	109	48	85	--	--	--
2	48	17	19	28	9.8	15	179	42	70	--	--	--
3	48	16	17	26	9.8	15	244	35	53	--	--	--
4	61	17	15	23	9.6	14	201	31	39	--	--	--
5	58	25	14	20	9.5	e14	184	27	31	--	--	--
6	48	26	13	18	9.6	e14	182	25	28	--	--	--
7	39	21	12	16	9.5	e14	189	22	24	--	--	--
8	32	18	12	15	9.4	14	202	20	20	--	--	--
9	27	16	e12	14	9.5	14	173	19	20	--	--	--
10	22	15	e12	13	9.5	15	130	18	17	--	--	--
11	19	23	e12	e12	9.3	16	105	16	15	--	--	--
12	23	26	e12	12	9.3	16	88	15	13	--	--	--
13	22	29	e12	e11	9.3	15	79	15	16	--	--	--
14	19	27	e12	e11	9.2	e15	77	19	26	--	--	--
15	17	27	e12	e11	9.1	e14	77	25	25	--	--	--
16	18	29	e12	11	9.0	e14	87	18	19	--	--	--
17	18	30	e12	11	8.9	e14	112	14	17	--	--	--
18	17	35	e12	11	8.9	14	120	13	15	--	--	--
19	15	41	e12	11	8.8	14	149	12	13	--	--	--
20	14	35	e12	11	9.0	14	128	21	12	--	--	--
21	14	30	e12	11	9.1	14	117	19	12	--	--	--
22	13	26	e12	10	9.0	14	113	17	13	--	--	--
23	13	37	e12	e10	9.0	14	90	28	12	--	--	--
24	13	49	e12	10	9.1	14	76	66	14	--	--	--
25	12	40	12	10	9.1	17	70	63	12	--	--	--
26	12	35	12	10	9.1	e36	78	55	12	--	--	--
27	11	29	12	10	9.1	39	76	44	11	--	--	--
28	14	26	22	10	9.2	48	65	35	10	--	--	--
29	21	24	33	9.9	9.8	71	58	28	10	--	--	--
30	19	22	34	10	--	e72	53	23	9.8	--	--	--
31	20	--	32	10	--	86	--	45	--	--	--	--
TOTAL	780	809	471	425.9	269.3	711	3611	878	673.8	--	--	--
MEAN	25.2	27.0	15.2	13.7	9.29	22.9	120	28.3	22.5	--	--	--
MAX	61	49	34	30	9.8	86	244	66	85	--	--	--
MIN	11	15	12	9.9	8.8	11	53	12	9.8	--	--	--
CFSM	2.10	2.25	1.27	1.14	0.77	1.91	10.0	2.36	1.87	--	--	--
IN.	2.42	2.51	1.46	1.32	0.83	2.20	11.19	2.72	2.09	--	--	--

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2004, BY WATER YEAR (WY)

MEAN	19.3	21.4	15.2	11.6	7.84	14.7	85.5	26.2	16.0	7.38	4.38	7.25
MAX	43.0	37.9	27.4	19.1	9.29	26.7	120	50.1	29.1	14.6	9.97	15.8
(WY)	1942	1942	1942	1939	2004	2003	2004	1940	1939	2003	2002	2003
MIN	4.85	9.23	7.93	5.41	5.61	5.68	58.7	9.90	5.88	3.26	1.92	2.65
(WY)	1941	1940	1940	1940	1940	1940	1941	1941	1941	1941	1939	1939

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

WATER YEARS 1938 - 2004

ANNUAL TOTAL	7763.7		
ANNUAL MEAN	21.3		
HIGHEST ANNUAL MEAN		18.4	
LOWEST ANNUAL MEAN		22.0	1939
HIGHEST DAILY MEAN	225	13.9	1941
LOWEST DAILY MEAN	2.1	598	Apr 25 1939
ANNUAL SEVEN-DAY MINIMUM	2.3	0.70	Sep 3 1939
MAXIMUM PEAK FLOW		0.97	Aug 28 1939
MAXIMUM PEAK STAGE		618	Apr 25 1939
INSTANTANEOUS LOW FLOW		7.50	Apr 25 1939
ANNUAL RUNOFF (CFSM)	1.77	0.70	Sep 3 1939
ANNUAL RUNOFF (INCHES)	24.07	1.54	
10 PERCENT EXCEEDS	54	20.87	
50 PERCENT EXCEEDS	12	38	
90 PERCENT EXCEEDS	3.3	8.8	
		3.1	

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04056500 MANISTIQUE RIVER NEAR MANISTIQUE, MI

LOCATION.--Lat 46°01'50", long 86°09'40", in SE1/4 sec.15, T.42 N., R.15 W., Schoolcraft County, Hydrologic Unit 04060106, on left bank 1.0 mi downstream from West Branch, 6.0 mi northeast of Manistique, and at mile 19.5.

DRAINAGE AREA.--1,100 mi², approximately.

PERIOD OF RECORD.--March 1938 to current year.

REVISED RECORDS.--WSP 1387: 1940-42(M), 1943, 1945. WSP 1627, 1727: 1938, 1939.

GAGE.--Water-stage recorder. Datum of gage is 608.46 ft above sea level. Prior to July 15, 1939, non-recording gage at site 1,600 ft upstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Since July 1948, slight regulation by dam on outlet of Manistique Lake. Several measurements of water temperature were made during the year.

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	1720	1310	2000	e1700	e900	e1100	4510	3980	3030	1180	677	814
2	1730	1290	1890	e1650	e900	e1150	6030	3870	3260	1160	686	776
3	1720	1260	1660	e1600	e900	e1200	7190	3700	3390	1120	723	748
4	1750	1250	1500	e1600	e900	e1200	7270	3500	3420	1100	727	722
5	1820	1290	e1400	e1500	e900	e1250	6990	3280	3290	1160	696	693
6	1870	1410	e1350	e1450	e900	e1250	6680	3060	3030	1240	669	683
7	1850	1500	e1300	e1400	e900	e1300	6470	2820	2710	1340	648	714
8	1780	1500	e1300	e1300	e900	e1300	6500	2600	2420	1430	632	728
9	1670	1350	e1250	e1250	e900	e1350	6570	2430	2240	1440	645	741
10	1550	1380	e1200	e1200	e900	e1350	6580	2310	2130	1410	694	715
11	1470	1390	e1200	e1100	e900	e1400	6370	2220	2030	1330	733	682
12	1390	1400	e1200	e1050	e900	e1400	5930	2130	1910	1230	753	659
13	1370	1490	e1200	e1000	e900	e1400	5410	2040	1790	1140	737	637
14	1380	1550	e1150	e1000	e900	e1400	4930	1960	1760	1090	706	627
15	1390	1590	e1150	e950	e900	e1400	4560	1920	1790	1070	677	722
16	1340	1610	e1150	e950	e900	e1400	4290	1900	1810	1050	652	834
17	1300	1610	e1100	e950	e900	e1400	4140	1890	1760	1010	638	820
18	1280	1650	e1100	e950	e900	e1400	4080	1860	1650	963	628	781
19	1260	1800	e1100	e900	e900	e1400	4190	1800	1560	926	622	736
20	1220	1950	e1100	e900	e900	e1400	4480	1750	1460	909	642	696
21	1190	2010	e1100	e900	e950	e1400	4800	1770	1380	894	652	670
22	1150	2010	e1100	e900	e950	e1400	5000	1810	1340	881	635	644
23	1110	2010	e1100	e900	e950	e1400	5000	1870	1310	850	630	623
24	1100	2140	e1100	e900	e950	e1400	4850	2290	1350	817	619	609
25	1100	2310	e1100	e900	e950	e1500	4630	2950	1380	790	671	599
26	1080	2380	e1100	e900	e980	e1700	4410	3330	1390	768	771	583
27	1060	2380	e1100	e900	e1000	e2000	4290	3510	1360	748	814	574
28	1050	2330	e1150	e900	e1000	e2400	4210	3550	1290	729	831	568
29	1120	2220	e1300	e900	e1050	2770	4130	3430	1230	709	839	558
30	1230	2100	e1500	e900	---	3240	4060	3160	1190	696	865	552
31	1300	---	e1650	e900	---	3790	---	2940	---	687	852	---
TOTAL	43350	51470	39600	34300	26780	49450	158550	81630	59660	31867	21764	20508
MEAN	1398	1716	1277	1106	923	1595	5285	2633	1989	1028	702	684
MAX	1870	2380	2000	1700	1050	3790	7270	3980	3420	1440	865	834
MIN	1050	1250	1100	900	900	1100	4060	1750	1190	687	619	552
CFSM	1.27	1.56	1.16	1.01	0.84	1.45	4.80	2.39	1.81	0.93	0.64	0.62
IN.	1.47	1.74	1.34	1.16	0.91	1.67	5.36	2.76	2.02	1.08	0.74	0.69

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2004, BY WATER YEAR (WY)

	MEAN	1148	1501	1251	941	863	1344	4025	2320	1309	884	699	794
	MAX	2720	3777	2569	1777	1516	3358	6401	6963	4531	1783	1733	2657
	(WY)	1979	1989	1966	1966	1966	1946	1976	1960	1943	1993	1996	1978
	MIN	386	606	480	469	480	547	1926	789	602	402	384	350
	(WY)	1949	1977	1977	1977	1963	1963	2000	2000	1988	1955	1963	1948

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1938 - 2004
ANNUAL TOTAL	514403	618929	
ANNUAL MEAN	1409	1691	1422
HIGHEST ANNUAL MEAN			2229
LOWEST ANNUAL MEAN			806
HIGHEST DAILY MEAN	7100	7270	16500
LOWEST DAILY MEAN	451	552	290
ANNUAL SEVEN-DAY MINIMUM	463	578	294
MAXIMUM PEAK FLOW		7330	16900
MAXIMUM PEAK STAGE		10.99	12.85
INSTANTANEOUS LOW FLOW		547	288
ANNUAL RUNOFF (CFSM)	1.28	1.54	1.29
ANNUAL RUNOFF (INCHES)	17.40	20.93	17.57
10 PERCENT EXCEEDS	2970	3500	2730
50 PERCENT EXCEEDS	1060	1290	1000
90 PERCENT EXCEEDS	620	696	562

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057510 STURGEON RIVER NEAR NAHMA JUNCTION, MI

LOCATION.--Lat 45°56'35", long 86°42'20", in SW 1/4 SE 1/4 sec. 17, T. 41 N., R. 19 W., Delta County, Hydrologic Unit 04030112, Hiawatha National Forest, on left bank 30 ft upstream from bridge on Forest Service Road 2231, 500 ft downstream from Mormon Creek, 0.1 mi east of Federal Forest Highway 13, and 3.2 mi north of Nahma Junction.

DRAINAGE AREA.--183 mi².

PERIOD OF RECORD.--October 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 610.99 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. 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	237	173	215	e170	e80	e110	e550	540	748	140	69	124
2	249	162	201	e160	e80	e130	603	474	675	132	82	134
3	297	150	e190	e150	e80	e160	619	419	576	120	154	121
4	331	155	e180	e140	e80	e150	594	377	499	125	122	109
5	339	202	e170	e135	e80	e145	553	344	424	149	101	101
6	303	232	e165	e130	e80	e145	628	316	371	150	87	105
7	272	217	e160	e120	e80	e145	737	293	325	182	77	128
8	242	191	e155	e115	e80	e145	842	271	286	194	70	122
9	217	182	e150	e110	e80	e145	929	260	260	184	94	108
10	196	186	e150	e100	e80	e145	901	260	245	165	160	97
11	179	156	e145	e98	e80	e146	823	245	222	147	158	88
12	187	166	e140	e95	e80	e145	743	229	200	136	140	84
13	203	176	e140	e90	e80	e145	663	220	196	129	120	80
14	189	178	e140	e90	e80	e150	651	233	235	154	104	77
15	175	172	e140	e90	e80	e150	677	276	280	138	92	102
16	166	184	e140	e88	e80	e150	737	268	253	126	82	104
17	156	198	e135	e85	e80	e150	894	250	218	124	80	93
18	146	252	e130	e80	e80	e150	995	246	193	113	77	86
19	139	348	e130	e80	e80	e150	1140	231	175	106	77	81
20	133	320	e130	e80	e80	e150	1190	228	159	107	71	77
21	129	283	e125	e80	e80	e150	1070	238	147	104	65	73
22	126	252	e120	e80	e80	e150	1000	228	146	103	63	69
23	122	302	e120	e80	e80	e150	902	265	144	95	67	66
24	119	437	e115	e80	e80	e150	783	751	160	87	68	64
25	117	382	e115	e80	e80	e150	701	862	158	82	111	62
26	114	328	e115	e80	e80	e170	701	696	149	78	151	60
27	111	288	e120	e80	e82	e250	667	613	140	75	147	59
28	138	265	e130	e80	e86	e330	609	557	133	71	139	57
29	196	252	e200	e80	e90	e400	560	469	131	69	137	55
30	191	234	e195	e80	—	e550	576	395	126	73	127	54
31	184	—	e180	e80	—	e500	—	465	—	71	124	—
TOTAL	5903	7023	4641	3086	2338	5856	23038	11519	7974	3729	3216	2640
MEAN	190	234	150	99.5	80.6	189	768	372	266	120	104	88.0
MAX	339	437	215	170	90	550	1190	862	748	194	160	134
MIN	111	150	115	80	80	110	550	220	126	69	63	54
CFSM	1.04	1.28	0.82	0.54	0.44	1.03	4.20	2.03	1.45	0.66	0.57	0.48
IN.	1.20	1.43	0.94	0.63	0.48	1.19	4.68	2.34	1.62	0.76	0.65	0.54

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2004, BY WATER YEAR (WY)

	MEAN	178	216	164	105	96.6	182	550	287	180	116	107	122
MAX	365	532	369	198	181	396	847	590	411	254	330	354	
(WY)	2003	1978	1971	1997	1984	2000	1979	1996	1979	1968	1978	1978	
MIN	55.5	64.4	49.8	50.0	54.2	72.6	219	88.4	50.3	45.7	48.1	40.7	
(WY)	1977	1977	1977	1977	1977	1994	2000	1998	1988	1988	1976	1976	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1967 - 2004

ANNUAL TOTAL	67763	80963	
ANNUAL MEAN	186	221	192
HIGHEST ANNUAL MEAN			289
LOWEST ANNUAL MEAN			121
HIGHEST DAILY MEAN	1320	1190	2030
LOWEST DAILY MEAN	34	54	32
ANNUAL SEVEN-DAY MINIMUM	36	59	34
MAXIMUM PEAK FLOW		1230	2120
MAXIMUM PEAK STAGE		8.86	11.50
INSTANTANEOUS LOW FLOW		52	32
ANNUAL RUNOFF (CFSM)	1.01	1.21	1.05
ANNUAL RUNOFF (INCHES)	13.77	16.46	14.25
10 PERCENT EXCEEDS	378	554	392
50 PERCENT EXCEEDS	130	147	128
90 PERCENT EXCEEDS	60	80	65

(a) July 8, 1988, Aug. 5-7, 1998.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057800 MIDDLE BRANCH ESCANABA RIVER AT HUMBOLDT, MI

LOCATION.--Lat 46°29'57", long 87°53'11", in SW1/4 sec.1, T.47 N., R.29 W., Marquette County, Hydrologic Unit 04030110, on left bank 15 ft upstream from county road FX, 1.5 mi downstream from Halfway Creek, and 0.3 mi north of Humboldt.

DRAINAGE AREA.--46.0 mi².

PERIOD OF RECORD.--June 1959 to current year.

REVISED RECORDS.--WSP 1911: Drainage area.

GAGE.--Water-stage recorder. V-notch sharp-crested weir since Oct. 3, 1960. Datum of gage is 1,521.20 ft above sea level (Cleveland-Cliffs Iron Co. bench mark). Prior to Sept. 1, 1960, nonrecording gage at same site and datum.

REMARKS.--Records excellent except for estimated daily discharges, which are fair. From July 1960 to June 1972, some diversion 100 ft upstream by industry for iron ore processing; figures of runoff adjusted. Several measurements of water temperature were made during the year. Gage-height telemeter 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	29	52	33	e32	e20	e18	280	156	281	38	15	11
2	35	44	e32	e30	e20	e20	280	131	330	35	14	11
3	37	37	e30	e30	e20	e22	250	112	222	31	13	11
4	41	33	e26	e28	e20	e25	195	100	147	33	12	9.8
5	39	35	e25	e27	e19	e26	164	92	112	40	11	9.3
6	33	31	e24	e26	e18	e26	169	84	135	39	11	9.4
7	28	27	e24	e24	e18	e26	199	76	121	60	10	9.2
8	24	24	e24	e22	e18	e26	260	70	99	67	12	8.9
9	20	21	e24	e20	e18	e27	327	67	92	59	21	8.7
10	18	21	e25	e20	e18	26	311	64	80	48	19	8.3
11	17	24	e26	e20	e17	27	254	60	67	40	21	8.2
12	22	31	e27	e20	e16	e27	212	59	59	37	24	8.2
13	25	44	e27	e20	e16	e27	176	86	60	34	18	8.5
14	21	41	e27	e21	e16	e26	177	98	63	33	15	8.0
15	19	39	e27	e21	e16	e26	182	111	59	28	13	16
16	16	40	e27	e21	e16	e26	213	96	53	25	12	23
17	15	43	e26	e21	e16	e26	297	82	49	24	13	14
18	14	63	e26	e21	e16	e25	379	73	43	22	13	12
19	15	79	e25	e21	e16	e24	720	64	38	20	13	11
20	15	68	e24	e21	e16	e23	851	91	34	19	12	10
21	15	58	e24	e21	e17	e23	530	94	33	18	11	9.4
22	15	49	e23	e21	e18	e23	408	85	35	17	12	8.9
23	15	46	e23	e21	e18	23	317	92	44	16	12	8.3
24	15	e46	e23	e21	e17	25	253	144	55	15	12	8.1
25	15	e42	e23	e21	e16	28	214	147	47	14	12	8.0
26	15	40	e23	e20	e16	50	199	118	41	13	12	8.1
27	14	37	e23	e20	e16	62	182	107	36	13	11	7.5
28	16	35	e28	e20	e16	83	162	105	32	13	11	7.3
29	33	35	e36	e20	e17	155	147	88	30	13	11	7.5
30	36	34	e35	e20	---	206	164	76	30	13	11	7.2
31	55	---	e34	e20	---	254	---	117	---	16	10	---
TOTAL	727	1219	824	691	501	1431	8472	2945	2527	893	417	295.8
MEAN	23.5	40.6	26.6	22.3	17.3	46.2	282	95.0	84.2	28.8	13.5	9.86
MAX	55	79	36	32	20	254	851	156	330	67	24	23
MIN	14	21	23	16	16	18	147	59	30	13	10	7.2
CFSM	0.51	0.88	0.58	0.48	0.38	1.00	6.14	2.07	1.83	0.63	0.29	0.21
IN.	0.59	0.99	0.67	0.56	0.41	1.16	6.85	2.38	2.04	0.72	0.34	0.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2004, BY WATER YEAR (WY)

	MEAN	52.5	55.1	36.6	23.2	20.5	41.0	201	122	60.1	32.4	25.7	34.2
MAX	191	198	77.5	41.5	55.9	149	423	326	153	89.9	76.5	184	184
(WY)	1986	1989	1992	1966	1984	1973	1985	1972	1989	1968	1978	1978	1978
MIN	5.87	5.97	5.57	5.30	6.00	11.5	74.9	21.1	13.3	7.57	5.80	4.91	4.91
(WY)	1977	1977	1977	1977	1977	1964	1987	1998	1988	1988	1976	1976	1976

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1959 - 2004

ANNUAL TOTAL	16719.9	20942.8	58.5	1960
ANNUAL MEAN	45.8	57.2	95.3	1998
HIGHEST ANNUAL MEAN			30.7	1998
LOWEST ANNUAL MEAN				
HIGHEST DAILY MEAN	583	May 13	851	Apr 20 1985
LOWEST DAILY MEAN	7.1	Sep 10	7.2	Sep 30 1976
ANNUAL SEVEN-DAY MINIMUM	7.4	Sep 6	7.7	Sep 24 1976
MAXIMUM PEAK FLOW			1020	Apr 19 1985
MAXIMUM PEAK STAGE			7.16	Apr 19 1985
INSTANTANEOUS LOW FLOW			6.5	Sep 13 1985
ANNUAL RUNOFF (CFSM)	0.996		1.24	Aug 22 1998
ANNUAL RUNOFF (INCHES)	13.52		16.94	
10 PERCENT EXCEEDS	104		149	128
50 PERCENT EXCEEDS	23		26	30
90 PERCENT EXCEEDS	11		12	12

(e) Estimated.

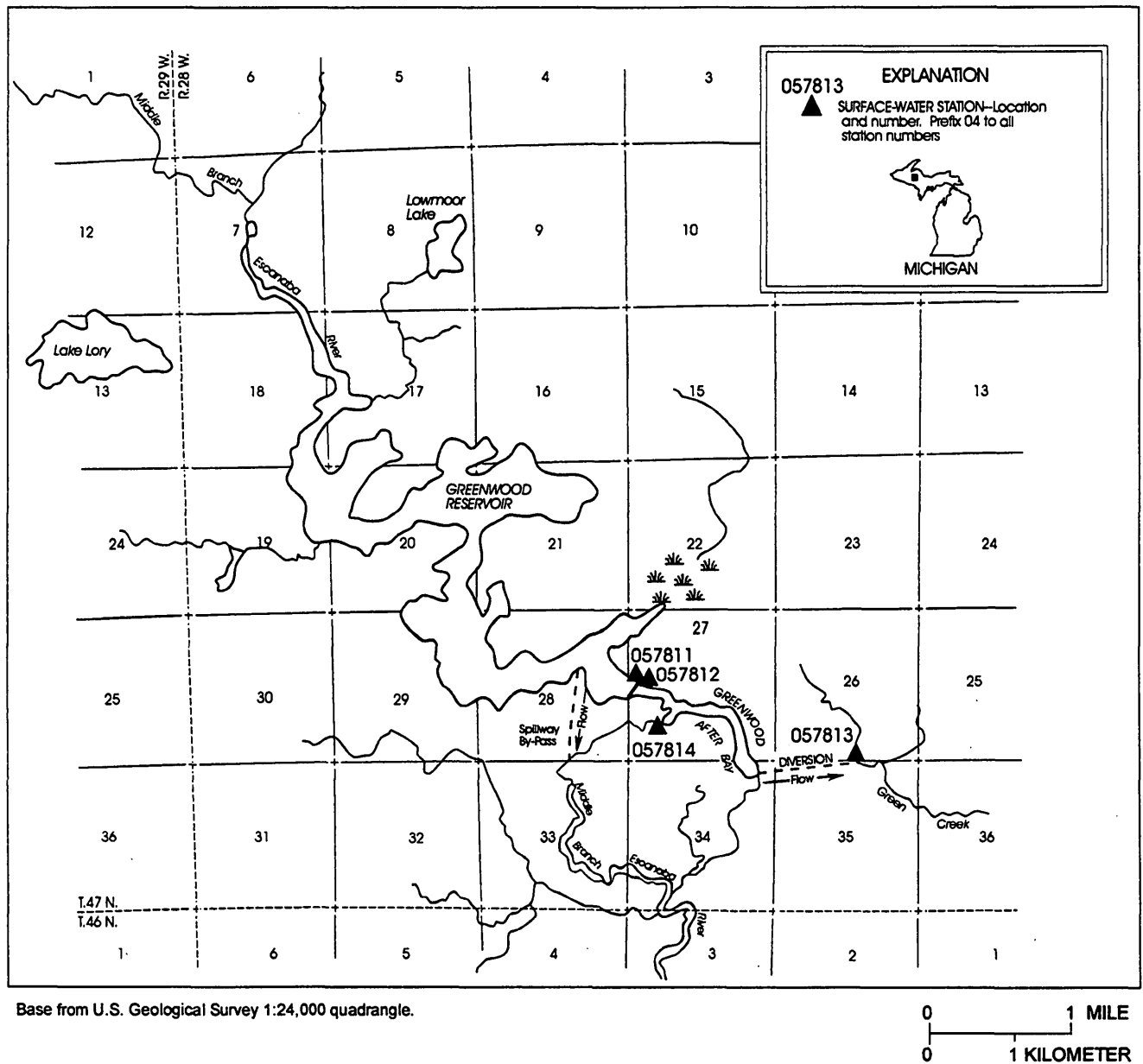


Figure 7. Identification number and location of active surface-water gaging stations in and around the Greenwood Reservoir Complex.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057811 GREENWOOD RESERVOIR NEAR GREENWOOD, MI

LOCATION.--Lat 46°26'32", long 87°48'02", in NW1/4 SW1/4 sec.27, T.47 N., R.28 W., Marquette County, Hydrologic Unit 04030110, at control structure on Middle Branch Escanaba River, 3.7 mi southwest of Greenwood.

DRAINAGE AREA.--67.4 mi².

PERIOD OF RECORD.--December 1972 to current year. Prior to October 1997, monthend elevations and contents only.

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft above sea level (levels by Cleveland-Cliffs Iron Co.); EXTREMES reported below have been converted to sea level elevations. Prior to Feb. 20, 1973, nonrecording gage at same site and datum.

REMARKS.--The reservoir is formed by an earth/rockfill main dam and several earthfill dikes surrounding the storage area. Storage began Dec. 22, 1972. The fixed-crest concrete spillway was completed in September 1973. Capacity of reservoir, 23,300 acre-ft at spillway elevation 1,515 ft. Above elevation 1,515 ft, water flows over concrete spillway into Middle Branch Escanaba River approximately 2,000 ft downstream from Greenwood Release (station 04057814). The main dam is equipped with an outlet structure with 4 valves to control flow to Greenwood Afterbay (station 04057812) which has a capacity of 420 acre-ft at elevation 1,480 ft. Two outlet systems from the afterbay provide for diversion and release flow. Diverted flow to Green Creek gaged at Greenwood Diversion (station 04057813); released flow to Middle Branch Escanaba River gaged at Greenwood Release (station 04057814). Reservoir impounds water for diversion to Schweitzer Reservoir (station 04058190), for use in iron ore processing. Satellite telemetry at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 1,517.3 ft, Apr. 21, 22, 23, 1985; minimum since first filling, 1,491.1 ft, Mar. 12, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 1,516.25 ft, Apr. 20, 21; minimum, 1,506.85 ft, Mar. 22, 24.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	—	109.57	109.86	109.55	—	107.17	108.95	115.46	115.54	114.90	114.02	112.14
2	110.74	109.57	109.86	109.54	—	107.14	109.45	115.43	115.65	114.88	113.97	112.09
3	110.73	109.56	109.86	109.53	—	107.10	109.96	115.39	115.65	114.86	113.90	112.04
4	110.74	109.56	109.85	109.50	—	107.07	110.40	115.36	115.56	114.86	113.82	111.98
5	110.72	109.55	109.83	109.48	—	107.07	110.73	115.33	115.48	114.86	113.74	111.91
6	110.69	109.52	109.81	109.44	—	107.07	111.07	115.31	115.45	114.86	113.66	111.86
7	110.67	109.48	109.79	109.40	—	107.05	111.43	115.28	115.42	114.90	113.59	111.79
8	110.63	109.43	109.77	109.35	—	107.02	111.92	115.26	—	114.93	113.54	111.72
9	110.59	109.37	109.76	109.31	—	106.99	112.49	115.24	—	114.96	113.54	111.65
10	110.54	109.32	109.79	109.27	108.23	106.96	113.09	115.24	115.25	114.97	113.51	111.57
11	110.49	109.28	109.81	109.24	108.19	106.97	113.59	115.21	115.17	114.97	113.46	111.51
12	110.49	109.27	109.80	109.22	108.15	106.96	113.98	115.21	115.17	114.96	113.42	111.43
13	110.44	109.29	109.80	109.18	108.11	106.95	114.28	115.26	115.16	114.95	113.36	111.36
14	110.40	109.28	109.80	109.15	108.06	106.98	114.55	115.29	115.14	114.95	113.30	111.31
15	110.36	109.27	109.79	109.11	108.01	106.97	114.81	115.31	115.10	114.93	113.24	111.34
16	110.30	109.27	109.80	109.07	107.96	106.96	115.10	115.32	115.10	114.90	113.16	111.37
17	110.23	109.26	109.79	109.04	107.91	106.93	115.37	115.30	115.07	114.85	113.10	111.32
18	110.16	109.32	109.78	109.01	107.86	106.92	115.62	115.27	114.99	114.80	113.05	111.27
19	110.09	109.42	109.77	108.97	107.80	106.90	115.89	115.24	114.99	114.76	112.97	111.20
20	110.02	109.50	109.75	108.92	107.78	106.90	116.20	115.27	114.95	114.71	112.90	111.14
21	109.96	109.57	109.73	108.89	107.73	106.89	116.19	115.28	114.91	114.65	112.81	111.08
22	109.89	109.61	109.70	108.86	107.66	106.88	116.01	115.29	114.94	114.61	112.74	111.02
23	109.84	109.66	109.68	108.82	107.61	106.87	115.86	115.31	114.96	114.55	112.67	110.95
24	109.77	109.71	109.65	108.78	107.54	106.86	115.73	115.38	115.01	114.49	112.60	110.88
25	109.72	109.73	109.61	108.73	107.48	106.87	115.65	115.41	115.01	114.43	112.57	110.79
26	109.65	109.77	109.57	108.68	107.41	106.96	115.59	115.42	115.00	114.38	112.50	110.72
27	109.59	109.79	109.53	108.65	107.35	107.07	115.54	115.40	114.99	114.32	112.45	110.64
28	109.54	109.81	109.54	108.61	107.28	107.24	115.49	115.38	114.97	114.25	112.37	110.56
29	109.54	109.83	109.55	108.56	107.22	107.62	115.47	115.34	114.94	114.19	112.30	110.47
30	109.53	109.85	109.56	—	—	108.05	115.47	115.31	114.91	114.13	112.24	110.38
31	109.55	—	109.56	—	—	108.48	—	115.39	—	114.09	112.19	—
MEAN	—	109.51	109.73	—	—	107.09	113.86	115.32	—	114.70	113.12	111.32
MAX	—	109.85	109.86	—	—	108.48	116.20	115.46	—	114.97	114.02	112.14
MIN	—	109.26	109.53	—	—	106.86	108.95	115.21	—	114.09	112.19	110.38

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057812 GREENWOOD AFTERBAY NEAR GREENWOOD, MI

LOCATION.--Lat 46°26'32", long 87°48'02", in NW1/4 SW1/4 sec.27, T.47 N., R.28 W., Marquette County, Hydrologic Unit 04030110, at control structure on Middle Branch Escanaba River, 3.7 mi southwest of Greenwood.

DRAINAGE AREA--67.4 mi².

PERIOD OF RECORD.--March 1999 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft above sea level (levels by Cleveland-Cliffs Iron Co.).

REMARKS.--Flow completely regulated by four valve outlet structure from Greenwood Reservoir (station 04057811) immediately upstream. Capacity of afterbay, 420 acre-ft at elevation 1,480 ft. Two outlet systems provide for diversion for use in iron ore processing and for release flow. Diverted flow to Green Creek gaged at Greenwood Diversion (station 04057813); released flow to Middle Branch Escanaba River gaged at Greenwood Release (station 04057814). Satellite telemetry at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 81.61 ft, Apr. 17, 2002; minimum daily, 79.22 ft, Sept. 21, 2001.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 80.96 ft, Apr. 21; minimum, 79.71 ft, June 27.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	80.20	80.09	80.06	80.39	80.51	80.12	80.54	80.49	80.81	80.80	80.27	80.35
2	80.31	80.09	80.06	80.37	80.54	80.12	80.59	80.54	80.80	80.83	80.31	80.25
3	80.38	80.09	80.14	80.36	80.56	80.11	80.66	80.59	80.77	80.83	80.33	80.25
4	80.44	80.12	80.21	80.34	80.55	80.11	80.73	80.63	80.72	80.87	80.34	80.36
5	80.47	80.13	80.28	80.32	80.54	80.21	80.76	80.68	80.61	80.88	80.35	80.45
6	80.49	80.11	80.32	80.30	80.53	80.28	80.75	80.71	80.57	80.87	80.36	80.54
7	80.51	80.10	80.36	80.29	80.52	80.33	80.75	80.70	80.48	80.87	80.37	80.58
8	80.52	80.09	80.40	80.28	80.50	80.35	80.79	80.61	---	80.78	80.39	80.62
9	80.51	80.08	80.43	80.27	80.49	80.36	80.67	80.53	---	80.69	80.44	80.64
10	80.39	80.07	80.50	80.26	80.42	80.35	80.52	80.47	---	80.62	80.46	80.65
11	80.29	80.09	80.53	80.28	80.35	80.31	80.37	80.40	---	80.55	80.47	80.60
12	80.25	80.10	80.53	80.28	80.32	80.25	80.25	80.37	---	80.50	80.48	80.55
13	80.18	80.13	80.53	80.27	80.27	80.22	80.14	80.40	---	80.45	80.47	80.52
14	80.14	80.11	80.54	80.27	80.23	80.23	80.10	80.42	---	80.42	80.46	80.52
15	80.23	80.10	80.53	80.26	80.19	80.21	80.17	80.45	80.18	80.37	80.45	80.62
16	80.34	80.10	80.43	80.24	80.15	80.31	80.26	80.45	80.24	80.29	80.46	80.65
17	80.40	80.11	80.33	80.24	80.08	80.41	80.34	80.46	80.30	80.42	80.46	80.62
18	80.47	80.15	80.23	80.24	80.03	80.49	80.46	80.47	80.32	80.57	80.46	80.60
19	80.52	80.16	80.15	80.22	80.09	80.51	80.71	80.46	80.33	80.69	80.44	80.58
20	80.56	80.16	80.08	80.21	80.18	80.41	80.83	80.52	80.34	80.77	80.44	80.56
21	80.59	80.18	80.03	80.21	80.24	80.33	80.93	80.51	80.37	80.68	80.43	80.55
22	80.59	80.31	80.03	80.21	80.20	80.25	80.88	80.51	80.38	80.59	80.44	80.55
23	80.45	80.46	80.24	80.20	80.20	80.19	80.72	80.56	80.30	80.49	80.45	80.53
24	80.30	80.54	80.42	80.18	80.19	80.10	80.57	80.63	79.99	80.42	80.45	80.54
25	80.17	80.35	80.56	80.17	80.16	80.01	80.43	80.64	79.77	80.36	80.48	80.49
26	80.06	80.15	80.65	80.17	80.14	80.01	80.30	80.64	79.76	80.31	80.45	80.36
27	79.98	80.10	80.59	80.28	80.13	80.07	80.19	80.62	79.75	80.25	80.37	80.25
28	80.01	80.10	80.56	80.37	80.12	80.16	80.20	80.60	79.85	80.20	80.34	80.17
29	80.07	80.08	80.51	80.42	80.11	80.35	80.30	80.58	80.26	80.17	80.53	80.10
30	80.08	80.06	80.46	80.46	---	80.43	80.42	80.57	80.60	80.15	80.64	80.06
31	80.11	---	80.42	80.49	---	80.49	---	80.68	---	80.22	80.49	---
MEAN	80.32	80.15	80.36	80.29	80.29	80.26	80.51	80.54	---	80.55	80.43	80.47
MAX	80.59	80.54	80.65	80.49	80.56	80.51	80.93	80.71	---	80.88	80.64	80.65
MIN	79.98	80.06	80.03	80.17	80.03	80.01	80.10	80.37	---	80.15	80.27	80.06

CAL YR 2003 MEAN 80.22 MAX 80.76 MIN 79.87

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057813 GREENWOOD DIVERSION NEAR GREENWOOD, MI

LOCATION.--Lat 46°26'04", long 87°46'10", in NW1/4 NE1/4 sec.35, T.47 N., R.28 W., Marquette County, Hydrologic Unit 04030110, on left bank at downstream end of pipeline, 200 ft upstream from Green Creek, 0.7 mi downstream from Greenwood Afterbay, and 3.6 mi south of Greenwood.

PERIOD OF RECORD.--January 1973 to current year.

GAGE.--Water-stage recorder and concrete flume. Datum of gage is 1,454.57 ft above sea level (Cleveland-Cliffs Iron Co. bench mark). Prior to Aug. 22, 1973, nonrecording gage at same site and datum.

REMARKS.--Records good. Flow completely regulated; diversion began January 7, 1973. A pipeline, 0.7 mi long, diverts water from Greenwood Afterbay (station 04057812), which regulates released flow from Greenwood Reservoir (station 04057811), into Green Creek, tributary to Schweitzer Reservoir (station 04058190). Water is used for iron ore processing, some returned to Middle Branch Escanaba River 27 mi downstream via another Green Creek, some returned 31 mi downstream via Goose Lake Outlet and East Branch Escanaba River. Several measurements of water temperature were made during the year. Gage-height telemeter 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	16	24	9.0	17	15	19	4.2	1.5	14	16	25	18
2	19	24	9.0	17	15	19	4.2	1.5	14	16	25	18
3	19	24	9.0	17	15	19	4.3	1.6	14	16	25	18
4	20	24	9.1	17	14	17	4.3	1.6	14	16	25	18
5	20	24	9.2	17	13	14	2.8	1.6	14	16	25	18
6	20	24	9.2	17	13	14	1.5	1.6	14	16	25	18
7	20	24	9.2	17	13	14	1.5	2.8	14	15	25	18
8	20	24	9.2	17	13	14	1.6	3.4	14	14	e25	18
9	21	24	9.2	17	12	14	1.5	3.4	14	14	e25	19
10	22	24	9.2	17	11	13	1.5	3.4	14	14	24	19
11	22	24	9.2	17	11	12	1.5	3.4	14	14	24	e18
12	22	24	9.3	17	11	12	1.5	e3.4	14	14	24	e18
13	22	24	9.3	17	11	12	1.5	e8.0	14	15	24	e18
14	23	24	9.3	17	11	11	1.5	14	15	14	24	e18
15	25	24	11	17	11	10	1.5	14	16	18	24	18
16	25	24	12	17	13	8.4	1.5	14	16	23	24	18
17	25	21	12	17	15	8.4	1.5	14	17	24	24	18
18	25	18	12	17	15	8.5	1.5	14	17	24	24	18
19	25	19	12	17	15	8.5	1.5	14	17	25	24	18
20	25	15	12	17	16	8.4	1.5	14	17	25	24	18
21	25	11	12	17	19	8.4	1.5	14	18	25	24	18
22	25	9.2	13	17	20	8.3	3.8	14	19	25	24	18
23	25	9.3	13	17	20	6.9	4.9	14	16	25	24	18
24	25	9.4	14	17	20	6.3	4.9	14	14	25	24	19
25	24	9.2	14	17	19	6.3	4.9	14	12	25	24	23
26	24	9.1	15	16	19	5.0	4.9	14	12	25	24	23
27	24	9.0	18	15	19	4.1	4.8	14	12	25	24	23
28	24	9.1	18	15	19	4.1	e2.0	14	12	25	21	23
29	24	9.0	18	15	19	4.2	1.5	14	13	25	18	23
30	24	9.0	18	15	—	4.2	1.5	14	15	25	18	23
31	24	—	17	15	—	4.2	—	14	—	25	18	—
TOTAL	704	550.3	369.4	516	437	318.2	77.1	289.2	440	624	732	573
MEAN	22.7	18.3	11.9	16.6	15.1	10.3	2.57	9.33	14.7	20.1	23.6	19.1
MAX	25	24	18	17	20	19	4.9	14	19	25	25	23
MIN	16	9.0	9.0	15	11	4.1	1.5	1.5	12	14	18	18

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1973 - 2004, BY WATER YEAR (WY)

MEAN	14.8	12.9	14.2	17.4	17.0	12.8	6.26	9.25	12.1	17.1	17.2	16.7
MAX	26.5	26.4	25.5	26.0	26.0	25.8	17.2	24.2	26.0	26.1	28.5	28.1
(WY)	1995	1995	1995	1994	1995	1982	1980	1998	1977	1988	1994	1994
MIN	0.05	0.37	0.19	0.19	0.28	0.31	0.11	0.22	0.28	1.63	1.20	0.39
(WY)	1978	1974	1974	1974	1974	1974	1977	1973	1974	1982	1977	1977

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1973 - 2004

ANNUAL TOTAL	5441.5	5630.2	
ANNUAL MEAN	14.9	15.4	
HIGHEST ANNUAL MEAN			14.1
LOWEST ANNUAL MEAN			22.4
HIGHEST DAILY MEAN	25	25	4.06
LOWEST DAILY MEAN	3.4	1.5	30
ANNUAL SEVEN-DAY MINIMUM	3.6	1.5	0.00
10 PERCENT EXCEEDS	24	24	0.00
50 PERCENT EXCEEDS	15	16	Apr 7 1998
90 PERCENT EXCEEDS	6.5	4.2	1.6

(a) June 25-28, 1977, Nov. 9, 1979.

(b) Apr. 8-13, 1998; result of shutdown of flume for maintenance.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057814 GREENWOOD RELEASE NEAR GREENWOOD, MI

LOCATION.--Lat 46°26'22", long 87°47'52", in NW1/4 SW1/4 sec.27, T.47 N., R.28 W., Marquette County, Hydrologic Unit 04030110, on left bank at outlet of Greenwood Afterbay releasing to Middle Branch Escanaba River, 2.6 mi upstream from Bell Creek, and 3.8 mi southwest of Greenwood.

DRAINAGE AREA.--67.4 mi².

PERIOD OF RECORD.--October 1972 to current year.

GAGE.--Water-stage recorder and concrete flume. Datum of gage is 1,473.77 ft above sea level (Cleveland-Cliffs Iron Co. bench mark). Prior to Nov. 7, 1973, nonrecording gage at same site and different datum.

REMARKS.--Records good. Since December 1972, flow from Greenwood Reservoir (station 04057811) below spillway elevation 1,515 ft is completely regulated by Greenwood Afterbay release structure (station 04057812) into the Middle Branch Escanaba River. Since January 1973, water diverted immediately upstream from station via Greenwood Diversion (station 04057813) to Green Creek for iron ore processing and some returned to Middle Branch Escanaba River 27 mi downstream via another Green Creek. Since October 1979, some of the diversion returned 31 mi downstream via Goose Lake Outlet and East Branch Escanaba River. Overflow from reservoir spillway bypasses and returns to the Middle Branch Escanaba River 0.5 mi downstream from station. Several measurements of water temperature were made during the year. 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	24	24	24	25	25	24	25	25	26	26	24	24
2	25	24	24	25	25	24	25	25	26	26	24	24
3	25	24	24	25	25	24	25	25	26	26	24	23
4	25	24	24	25	25	24	25	25	26	26	24	23
5	25	24	24	25	25	24	25	25	25	26	24	23
6	25	24	24	25	25	24	25	25	25	26	24	24
7	25	24	24	25	25	24	25	25	25	26	24	24
8	25	24	25	25	25	24	26	25	25	25	25	24
9	25	24	25	25	25	24	25	25	e24	25	25	24
10	25	24	25	24	25	24	25	25	e24	25	25	25
11	25	24	25	24	25	24	24	25	e24	25	25	25
12	25	24	25	24	24	24	24	25	e24	25	25	25
13	24	24	25	24	24	24	24	25	e24	25	25	25
14	24	24	25	24	24	24	24	25	24	25	25	24
15	24	24	25	24	24	24	24	25	24	25	25	24
16	24	24	25	24	24	24	24	25	24	24	25	24
17	25	24	25	24	24	24	24	25	24	25	25	24
18	25	24	24	e24	24	25	24	25	24	25	25	24
19	25	24	24	e24	24	25	25	25	25	25	25	24
20	25	24	24	e24	24	24	25	25	25	25	25	24
21	25	24	24	24	24	24	27	25	25	25	25	24
22	25	24	24	24	24	24	28	25	25	25	25	24
23	25	25	24	24	24	24	27	25	24	25	25	24
24	24	25	25	24	24	24	26	25	23	25	25	24
25	24	24	25	24	24	23	25	25	23	24	25	24
26	23	24	25	24	24	23	24	25	23	24	25	24
27	24	24	25	24	24	24	24	25	23	24	25	24
28	24	24	25	24	24	24	24	25	23	24	24	24
29	24	24	25	25	24	24	24	25	24	24	25	24
30	24	24	25	25	—	25	25	25	25	24	25	24
31	24	—	25	25	—	25	—	25	—	24	25	—
TOTAL	761	722	762	756	707	746	747	775	732	774	767	721
MEAN	24.5	24.1	24.6	24.4	24.4	24.1	24.9	25.0	24.4	25.0	24.7	24.0
MAX	25	25	25	25	25	25	28	25	26	26	25	25
MIN	23	24	24	24	24	23	24	25	23	24	24	23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1973 - 2004, BY WATER YEAR (WY)

	MEAN	29.0	28.3	25.6	25.3	26.1	28.0	27.4	26.6	26.7	26.1	25.5	25.5
MAX	141	122	35.6	32.6	35.9	56.3	44.9	40.3	42.2	42.2	42.2	30.6	30.2
(WY)	1973	1973	1974	1974	1986	1989	1989	1976	1975	1974	1997	1984	1984
MIN	21.7	14.1	13.0	18.9	22.0	22.0	12.1	17.3	21.7	20.3	21.8	22.0	22.0
(WY)	1996	1999	1999	1973	1973	1973	1998	1999	1995	1973	1995	1995	1995

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1973 - 2004

ANNUAL TOTAL	8931	8970	
ANNUAL MEAN	24.5	24.5	26.7
HIGHEST ANNUAL MEAN			44.8
LOWEST ANNUAL MEAN			21.0
HIGHEST DAILY MEAN	26	28	290
LOWEST DAILY MEAN	23	23	0.00
ANNUAL SEVEN-DAY MINIMUM	24	23	0.00
10 PERCENT EXCEEDS	25	25	29
50 PERCENT EXCEEDS	24	24	25
90 PERCENT EXCEEDS	24	24	24

(a) Prior to regulation; since regulation began, 63 ft³/s, July 10, 11, 1974.

(b) Apr. 15-29, 1998; result of shutdown of flume for maintenance.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04058100 MIDDLE BRANCH ESCANABA RIVER NEAR PRINCETON, MI

LOCATION.—Lat 46°19'02", long 87°30'07", in NW1/4 sec. 12, T.45 N., R.26 W., Marquette County, Hydrologic Unit 04030110, on right bank 400 ft downstream from powerplant, 0.3 mi upstream from Green Creek, and 2.2 mi northwest of Princeton.

DRAINAGE AREA.-210 mi².

PERIOD OF RECORD.—July 1961 to September 1982, October 1989 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,102.68 ft above sea level.

REMARKS.—Records excellent. Flow regulated by powerplant 400 ft upstream from station. Since December 1972, additional regulation 27 mi upstream by Greenwood Release (station 04057814). Since January 1973, some flow diverted to Green Creek via Greenwood Diversion (station 04057813) 27 mi upstream by industry for iron ore processing and some returned 0.3 mi downstream via another Green Creek. Since October 1979, some of the diversion returned 5.0 mi downstream via Goose Lake Outlet and East Branch Escanaba River. From 1973 to 1991 annual mean discharge and runoff figures adjusted for diversion and change in contents in Greenwood Reservoir (station 04057811). Several measurements of water temperature were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 22, 1985, reached a stage of 11.84 ft, from floodmark, discharge, 4,200 ft³/s, from rating curve extended above 2,400 ft³/s.

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	131	183	126	136	102	114	435	497	601	150	124	107
2	144	175	119	128	101	122	459	484	700	140	108	110
3	159	161	110	130	101	124	494	448	743	123	94	107
4	163	160	116	117	101	119	477	408	685	154	94	104
5	153	160	130	111	101	119	445	373	569	197	94	91
6	150	187	124	108	101	116	432	337	491	153	94	88
7	143	181	119	99	102	118	471	315	474	193	93	130
8	128	136	118	101	103	114	541	275	449	191	93	97
9	114	118	122	101	103	110	665	260	401	161	116	97
10	116	123	133	100	103	111	700	247	362	152	144	97
11	117	128	130	101	103	121	615	246	324	156	110	97
12	117	138	115	103	95	119	521	242	270	150	116	97
13	136	158	109	109	96	104	461	273	247	138	116	90
14	134	168	115	112	101	106	433	326	282	142	110	83
15	124	164	120	103	102	121	412	339	276	143	106	157
16	113	161	120	103	98	113	408	345	253	125	95	133
17	108	155	120	105	97	112	419	339	241	114	96	128
18	108	163	120	107	97	112	578	301	191	124	103	125
19	114	196	120	107	97	112	839	277	175	121	114	109
20	120	203	109	105	102	112	1120	262	164	117	105	105
21	117	196	103	102	101	111	1470	310	135	121	92	105
22	110	174	115	101	94	106	1550	291	152	120	90	100
23	102	171	122	103	96	106	1320	320	169	117	90	96
24	109	185	114	102	106	114	1040	435	180	107	90	87
25	109	165	110	102	108	114	857	472	197	99	168	83
26	103	160	110	102	103	144	745	467	173	101	161	91
27	110	156	110	102	101	200	656	441	152	101	115	94
28	109	153	127	102	101	206	593	419	152	94	105	88
29	115	153	174	103	101	387	528	381	152	85	106	91
30	165	131	146	103	—	426	499	316	132	89	103	92
31	180	—	141	103	—	420	—	366	—	109	103	—
TOTAL	3921	4862	3767	3311	2917	4633	20183	10812	9492	4087	3348	3079
MEAN	126	162	122	107	101	149	673	349	316	132	108	103
MAX	180	203	174	136	108	426	1550	497	743	197	168	157
MIN	102	118	103	99	94	104	408	242	132	85	90	83

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2004, BY WATER YEAR (WY)

MEAN	173	174	135	105	100	148	515	426	241	153	127	145
MAX	422	349	235	196	162	348	917	1056	518	318	319	566
(WY)	2003	1973	1992	1969	1969	1973	1976	1972	1968	1968	2002	1978
MIN	54.4	70.0	79.4	61.0	56.1	71.0	179	97.4	101	63.5	53.0	60.4
(WY)	1964	1977	1977	1964	1963	1964	1990	1998	1977	1965	1963	1963

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1961 - 2004

ANNUAL TOTAL	66677		74412			
ANNUAL MEAN	183		203		204	
HIGHEST ANNUAL MEAN					296	1979
LOWEST ANNUAL MEAN					122	1998
HIGHEST DAILY MEAN	957	May 15	1550	Apr 22	2880	Apr 19 2002
LOWEST DAILY MEAN	80	Jul 20	83	Sep 14	4.1	Feb 4 1967
ANNUAL SEVEN-DAY MINIMUM	86	Sep 2	89	Sep 24	28	Aug 29 1961
MAXIMUM PEAK FLOW			1590	Apr 22	2980	Apr 18 2002
MAXIMUM PEAK STAGE			6.44	Apr 22	9.52	Apr 18 2002
INSTANTANEOUS LOW FLOW			18	Dec 5	2.2	Oct 5 1964
10 PERCENT EXCEEDS	373		446		406	
50 PERCENT EXCEEDS	118		121		126	
90 PERCENT EXCEEDS	91		97		82	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04058200 SCHWEITZER CREEK NEAR PALMER, MI

LOCATION.--Lat 46°24'40", long 87°37'27", in SW1/4 sec.1, T.46 N., R.27 W., Marquette County, Hydrologic Unit 04030110, on right bank 10 ft upstream from bridge on County Road PFS, 1.0 mi downstream from Schweitzer Reservoir, and 2.5 mi southwest of Palmer.

DRAINAGE AREA.--23.6 mi².

PERIOD OF RECORD.--October 1960 to current year.

GAGE.--Water-stage recorder. Concrete control since Oct. 1, 1963. Datum of gage is 1,268.28 ft above sea level (Cleveland-Cliffs Iron Co. bench mark). Prior to Aug. 21, 1961, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Since August 1962, flow completely regulated by Schweitzer Reservoir (station 04058190) 1.0 mi upstream. Prior to June 1994, some diversion from headwaters of basin for municipal supply and the effluent discharged to the Carp River basin. An average of 46 ft³/s (figure furnished by Cleveland Cliffs Iron Co.) was diverted from Schweitzer Reservoir by industry for iron ore processing, some returned to the Middle Branch Escanaba River via Green Creek and some returned via Goose Lake Outlet and East Branch Escanaba River. Diversion into Schweitzer Reservoir from Greenwood Reservoir (station 04057811) via Greenwood Diversion (station 04057813). Several measurements of water temperature were made during the year. Gage-height telemeter 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	4.2	5.5	4.8	4.7	4.5	4.7	89	32	e110	5.6	4.1	5.5
2	4.2	5.5	4.6	4.7	4.6	4.7	80	26	e85	5.7	4.2	5.4
3	4.2	7.8	4.7	4.7	4.6	4.6	79	20	e60	5.8	4.5	5.3
4	4.1	5.7	4.6	4.6	e4.6	4.6	69	17	38	6.3	4.9	5.3
5	4.0	5.9	4.7	4.6	e4.6	4.7	56	14	27	6.1	4.2	5.3
6	3.9	5.6	4.6	e4.6	4.6	4.6	59	12	32	6.2	4.2	5.5
7	3.9	5.5	4.6	e4.6	4.6	4.6	77	9.9	35	6.4	4.2	5.2
8	3.8	5.6	4.7	e4.6	e4.6	4.5	107	8.0	27	6.2	4.3	5.2
9	3.8	5.5	4.8	e4.6	4.6	4.6	121	7.6	19	6.8	4.7	5.1
10	3.8	5.0	5.0	4.6	4.6	4.6	92	8.4	13	7.7	4.1	5.2
11	3.8	6.4	4.8	4.6	4.5	4.6	65	5.8	9.1	6.9	4.1	5.7
12	3.9	6.8	4.7	4.7	4.5	4.5	49	4.2	6.4	6.4	4.0	6.0
13	3.8	6.5	e4.6	4.6	4.5	4.6	37	4.3	5.8	6.2	3.9	5.9
14	3.8	6.3	4.6	e4.6	4.5	4.7	36	5.5	6.4	7.4	3.8	5.9
15	3.8	6.3	4.6	e4.6	e4.5	4.6	38	11	6.6	4.4	3.8	6.1
16	3.8	6.4	4.8	e4.6	e4.5	4.6	47	12	5.7	4.6	3.8	5.8
17	3.8	6.3	4.8	4.6	4.4	4.6	64	11	5.2	4.4	3.9	5.8
18	3.8	6.3	4.8	4.4	4.5	4.6	76	9.4	4.5	4.4	4.8	5.7
19	3.8	5.7	4.7	4.4	4.4	4.6	154	6.2	4.2	4.5	5.4	5.7
20	3.8	5.6	4.6	4.4	4.6	4.6	161	11	4.1	4.5	5.3	5.6
21	3.8	5.5	4.6	4.6	4.5	4.5	121	15	4.7	4.5	5.3	5.6
22	3.9	5.6	4.6	e4.6	4.5	4.5	92	14	5.6	4.4	5.3	5.2
23	3.8	6.0	4.6	e4.6	4.6	4.6	67	18	6.0	4.5	5.2	5.2
24	3.9	5.5	4.5	e4.6	4.4	4.6	49	45	6.2	4.4	5.3	5.2
25	3.7	4.8	4.6	e4.6	4.4	4.8	44	50	5.8	4.4	6.9	5.1
26	3.7	4.7	4.5	4.6	4.4	5.6	44	39	5.8	4.4	5.5	5.2
27	3.8	4.8	4.6	4.6	4.5	5.2	38	30	5.7	4.3	5.4	5.2
28	4.2	4.8	5.2	4.5	4.5	7.1	33	23	6.0	4.0	5.3	5.2
29	4.4	4.8	4.9	e4.5	4.6	11	31	17	5.7	4.1	5.4	5.1
30	5.5	4.8	4.8	e4.5	—	81	32	13	5.7	4.1	5.4	5.3
31	5.6	—	4.7	e4.5	—	103	—	e35	—	4.3	5.4	—
TOTAL	124.3	171.5	145.7	142.0	131.2	328.1	2107	534.3	561.2	163.9	146.6	163.5
MEAN	4.01	5.72	4.70	4.58	4.52	10.6	70.2	17.2	18.7	5.29	4.73	5.45
MAX	5.6	7.8	5.2	4.7	4.6	103	161	50	110	7.7	6.9	6.1
MIN	3.7	4.7	4.5	4.4	4.4	4.5	31	4.2	4.1	4.0	3.8	5.1

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2004, BY WATER YEAR (WY)

	MEAN	10.7	11.1	7.47	5.49	5.01	7.38	47.3	27.2	15.4	7.98	7.15	8.43
MAX	41.8	41.3	24.0	13.5	9.98	35.3	115	98.1	55.8	24.2	28.9	56.5	
(WY)	1986	1989	1966	1966	1961	1966	1985	1972	1968	1979	1973	1978	
MIN	2.85	3.02	2.90	2.15	1.92	2.40	1.45	1.69	4.07	3.80	3.46	3.62	
(WY)	2000	1999	1999	1963	1963	1963	1963	1963	1998	1999	1963	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1961 - 2004

ANNUAL TOTAL	4236.2	4719.3	
ANNUAL MEAN	11.6	12.9	
HIGHEST ANNUAL MEAN			13.4
LOWEST ANNUAL MEAN			26.4
HIGHEST DAILY MEAN	161	May 13	161
LOWEST DAILY MEAN	3.6	Jul 8	3.7
ANNUAL SEVEN-DAY MINIMUM	3.8	Oct 13	3.8
MAXIMUM PEAK FLOW			184
MAXIMUM PEAK STAGE			4.41
INSTANTANEOUS LOW FLOW			
10 PERCENT EXCEEDS	34		35
50 PERCENT EXCEEDS	4.3		4.8
90 PERCENT EXCEEDS	3.9		4.1

(a) Apr. 9-18, May 5, 6, 1963.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04058940 ESCANABA RIVER NEAR ST. NICHOLAS, MI

LOCATION.--Lat 45°58'45", long 87°16'13", in SW1/4 NE1/4 sec.2, T.41 N., R.24 W., Delta County, Hydrologic Unit 04030110, on right bank 600 ft downstream from Boney Falls Dam, 2.1 mi west of St. Nicholas, and 23 mi upstream from mouth.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--December 1987 to current year (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is 854.03 ft above sea level.

REMARKS.--Diurnal fluctuation caused by hydroelectric plant 600 ft upstream. Some regulation by Schweitzer Reservoir (station 04058190) approximately 40 mi upstream and Greenwood Reservoir (station 04057811) approximately 50 mi upstream. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 7.12 ft, Apr. 19, 2002; minimum daily, 1.81 ft, July 26, 27, 1998.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 5.47 ft, Apr. 11; minimum daily recorded, 1.99 ft, Aug. 9, Sept. 25, 26, 29, but may have been lower during period of no gage-height record, Aug. 19-27.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.20	2.53	2.35	2.45	2.12	2.20	4.02	3.54	4.17	2.24	2.15	2.24
2	2.26	2.47	2.22	2.50	2.12	2.28	4.26	3.49	4.52	2.30	2.20	2.26
3	2.30	2.40	2.21	2.41	2.12	2.29	4.22	3.38	4.37	2.21	2.10	2.22
4	2.39	2.43	2.23	2.33	2.12	2.28	4.02	3.26	3.95	2.26	2.05	2.17
5	2.41	2.49	2.31	2.29	2.11	2.26	3.82	3.14	3.59	2.48	2.04	2.13
6	2.37	2.53	2.30	2.12	2.11	2.19	3.88	3.09	3.37	2.46	2.01	2.11
7	2.42	2.50	2.22	2.10	2.11	2.25	4.15	2.98	3.27	2.51	2.01	2.09
8	2.34	2.35	2.35	2.12	2.12	2.26	4.56	2.91	3.12	2.69	2.02	2.17
9	2.33	2.25	2.30	2.16	2.12	2.26	4.89	2.84	3.00	2.58	1.99	2.08
10	2.21	2.34	2.25	2.12	2.13	2.26	4.81	2.85	2.90	2.47	2.15	2.06
11	2.24	2.30	2.22	2.15	2.13	2.27	4.58	2.80	2.79	2.39	2.14	2.04
12	2.23	2.39	2.18	2.16	2.12	2.29	4.15	2.77	2.69	2.37	2.13	2.04
13	2.30	2.43	2.10	2.15	2.11	2.22	3.87	2.86	2.59	2.34	2.12	2.03
14	2.31	2.47	2.21	2.14	2.12	2.21	3.81	2.99	2.65	2.45	2.08	2.02
15	2.24	2.44	2.30	2.15	2.12	2.29	3.81	3.13	2.78	2.48	2.04	2.09
16	2.22	2.44	2.35	2.14	2.12	2.27	3.96	3.07	2.62	2.40	2.02	2.42
17	2.18	2.45	2.27	2.16	2.11	2.29	4.25	3.00	2.62	2.34	2.01	2.31
18	2.17	2.54	2.28	2.16	2.12	2.29	4.64	2.91	2.53	2.33	2.04	2.25
19	2.19	2.67	2.26	2.17	2.12	2.30	4.85	2.81	2.40	2.29	—	2.18
20	2.16	2.69	2.14	2.17	2.12	2.30	4.96	2.76	2.38	2.28	—	2.11
21	2.17	2.65	2.21	2.16	2.10	2.28	5.10	2.79	2.30	2.28	—	2.09
22	2.19	2.57	2.23	2.14	2.13	2.22	5.07	2.78	2.31	2.24	—	2.07
23	2.17	2.59	2.29	2.12	2.13	2.27	4.71	2.90	2.39	2.21	—	2.04
24	2.13	2.75	2.19	2.13	2.12	2.28	4.66	3.75	2.43	2.19	—	2.03
25	2.16	2.68	2.22	2.12	2.15	2.34	4.41	4.02	2.48	2.14	—	1.99
26	2.15	2.62	2.18	2.12	2.16	2.44	4.14	3.97	2.43	2.15	—	1.99
27	2.13	2.55	2.25	2.13	2.15	2.61	3.93	3.79	2.35	2.09	—	2.00
28	2.18	2.52	2.36	2.12	2.15	2.78	3.80	3.60	2.32	2.09	2.42	2.01
29	2.25	2.50	2.57	2.18	2.16	3.30	3.68	3.43	2.29	2.05	2.34	1.99
30	2.42	2.47	2.64	2.13	—	3.67	3.63	3.27	2.27	2.03	2.29	2.00
31	2.51	—	2.54	2.13	—	3.81	—	3.36	—	2.12	2.25	—
MEAN	2.26	2.50	2.28	2.18	2.12	2.43	4.29	3.17	2.86	2.31	—	2.11
MAX	2.51	2.75	2.64	2.50	2.16	3.81	5.10	4.02	4.52	2.69	—	2.42
MIN	2.13	2.25	2.10	2.10	2.10	2.19	3.63	2.76	2.27	2.03	—	1.99

CAL YR 2003 MEAN 2.49 MAX 4.67 MIN 1.93

STREAMS TRIBUTARY TO LAKE MICHIGAN

04059000 ESCANABA RIVER AT CORNELL, MI

LOCATION.--Lat 45°54'31", long 87°12'49", in NW1/4 sec.32, T.41 N., R.23 W., Delta County, Hydrologic Unit 04030110, on right bank 50 ft downstream from bridge on County Road 519, 0.4 mi downstream from Bobs Creek, 0.7 mi northeast of Cornell, and 16 mi upstream from mouth.

DRAINAGE AREA.--870 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1903 to December 1912, January 1913 to November 1915 (gage heights only), October 1950 to current year. Monthly discharge only for some periods, published in WSP 1307. Published as "near Escanaba" 1903-15.

REVISED RECORDS.--WSP 1387: 1904. WDR MI-85-1: 1970 (M).

GAGE.--Water-stage recorder. Datum of gage is 749.26 ft above sea level (levels by Michigan Department of Natural Resources). August 1903 to November 1915, nonrecording gage at site 10 mi downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Since 1950, diurnal fluctuation and slight regulation by Boney Falls powerplant 7 mi upstream. Since August 1962, some regulation by Schweitzer Reservoir (station 04058190) approximately 50 mi upstream. Since December 1972, some regulation by Greenwood Reservoir (station 04057811) approximately 60 mi upstream. Gage-height telemeter 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	369	632	580	e650	e270	e350	3180	1870	2870	400	311	387
2	403	582	516	e580	e270	e380	3420	1760	3170	437	366	402
3	446	547	e500	e500	e270	e390	3340	1580	2900	390	323	388
4	501	581	e480	e450	e270	e390	2990	1440	2470	425	279	353
5	547	660	e450	e400	e270	e380	2710	1290	1980	590	258	324
6	497	668	e440	e320	e270	e380	2770	1200	1680	612	245	319
7	542	662	e430	e300	e270	e380	3350	1090	1520	651	242	298
8	491	593	e420	e300	e270	e380	3730	1030	1330	794	242	347
9	475	501	e410	e300	e270	e380	4120	950	1280	681	246	289
10	396	480	e410	e300	e270	e380	3920	963	1130	589	320	276
11	409	471	e410	e300	e270	e380	3340	892	984	528	338	267
12	415	504	e400	e300	e270	e380	2830	865	883	488	304	262
13	462	571	e400	e300	e270	e370	2540	929	845	481	303	259
14	449	599	e400	e300	e270	e370	2510	1250	962	537	285	250
15	420	573	e400	e300	e270	e380	2540	1300	1050	567	266	289
16	396	577	e400	e300	e270	e400	2780	1200	840	517	249	510
17	371	602	e400	e300	e270	e400	3160	1140	811	470	246	443
18	364	746	e400	e300	e270	e420	3590	1060	705	465	256	401
19	363	820	e400	e300	e280	e410	4560	921	572	432	274	352
20	362	825	e400	e300	e280	e400	4970	882	550	422	285	315
21	343	784	e400	e290	e280	e400	5210	881	480	426	258	293
22	370	713	e400	e280	e280	e380	5080	879	476	391	245	282
23	353	885	e400	e280	e280	e400	4320	1240	522	364	240	263
24	334	963	e400	e280	e290	e450	3540	2730	577	349	243	255
25	348	886	e400	e280	e300	e480	3090	2890	604	323	280	239
26	346	809	e400	e270	e300	e600	2860	2720	556	326	460	235
27	334	742	e420	e270	e300	e750	2600	2450	490	297	626	234
28	361	696	e500	e270	e320	e950	2360	2090	456	286	546	238
29	431	663	e600	e270	e330	e2000	2160	1740	438	275	478	230
30	534	653	e750	e270	---	e2400	2130	1430	427	245	430	229
31	612	---	e700	e270	---	2750	---	1770	---	307	396	---
TOTAL	13044	19988	14016	10130	8100	19260	99700	44432	33558	14065	9840	9229
MEAN	421	666	452	327	279	621	3323	1433	1119	454	317	308
MAX	612	963	750	650	330	2750	5210	2890	3170	794	626	510
MIN	334	471	400	270	270	350	2130	865	427	245	240	229
CFSM	0.48	0.77	0.52	0.38	0.32	0.71	3.82	1.65	1.29	0.52	0.36	0.35
IN.	0.56	0.85	0.60	0.43	0.35	0.82	4.26	1.90	1.43	0.60	0.42	0.39

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 2004, BY WATER YEAR (WY)

	MEAN	705	765	534	365	342	597	2562	1653	935	590	492	593
MAX	1736	2230	945	720	959	1879	4329	4388	2172	1859	2014	1874	
(WY)	2003	1989	1907	1969	1984	2000	1951	1907	1968	1951	1911	1978	
MIN	196	218	230	190	185	227	830	312	255	193	191	194	
(WY)	1964	1977	1977	1964	1959	1964	1990	1998	1988	1998	1998	1976	

SUMMARY STATISTICS FOR 2003 CALENDAR YEAR FOR 2004 WATER YEAR WATER YEARS 1903 - 2004

	ANNUAL TOTAL	251137	295362	(a)819
ANNUAL MEAN	688	807	1385	1960
HIGHEST ANNUAL MEAN			506	1963
LOWEST ANNUAL MEAN			10400	Apr 22 1985
HIGHEST DAILY MEAN	4450	Apr 21	5210	Sep 30
LOWEST DAILY MEAN	198	Aug 17	229	(b)90
ANNUAL SEVEN-DAY MINIMUM	225	Aug 17	237	Sep 24
MAXIMUM PEAK FLOW			(c)5520	Apr 21
MAXIMUM PEAK STAGE			(f)4.33	Mar 30
INSTANTANEOUS LOW FLOW			150	Sep 15
ANNUAL RUNOFF (CFSM)	0.791		0.938	0.94
ANNUAL RUNOFF (INCHES)	10.74		12.63	12.79
10 PERCENT EXCEEDS	1560		2420	1740
50 PERCENT EXCEEDS	403		420	482
90 PERCENT EXCEEDS	243		270	252

(a) Does not include water years 1904-12.

(b) Observed; site and datum then in use, but may have been less during extended periods of no gage-height record during winter periods of 1903-12, or periods of ice effect in 1959.

(c) Gage height 3.90 ft.

(d) Gage height 5.00 ft.

(e) Estimated.

(f) Backwater from ice.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04059000 ESCANABA RIVER AT CORNELL, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967, 1969-73, 1975-94, 1998 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: February 1975 to September 1981.

WATER TEMPERATURE: February 1975 to September 1981, April 1998 to current year.

INSTRUMENTATION.--Water-quality monitor from Oct. 15, 1975 to Sept. 30, 1981. Water-temperature recorder with telemetry since Apr. 14, 1998.

REMARKS.--Records for Apr. 1 to Sept. 30 rated excellent. Records represent water temperature at sensor within 0.5°C, from Apr. 1 to Sept. 30.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1975, 1978-81): Maximum daily recorded (more than 20 percent missing record), 360 microsiemens, Sept. 10, 1975; minimum measured, 114 microsiemens, Apr. 15, 1981.

WATER TEMPERATURE (water years 1975, 1977-81, 1998 to current year): Maximum daily recorded (more than 20 percent missing record), 35.0°C, July 31, 1975; minimum, -0.5°C Apr. 1-6, 2004.

EXTREMES OUTSIDE PERIOD OF DAILY RECORD.--A specific conductance of 72 microsiemens was measured Apr. 24, 1985.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 28.5°C, July 27, Aug. 1.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	--	--	--	--	--	--	0.5	-0.5	0.0	9.0	6.0	7.5
2	--	--	--	--	--	--	1.0	-0.5	0.0	8.5	6.0	7.0
3	--	--	--	--	--	--	1.0	-0.5	0.0	9.5	5.0	7.0
4	--	--	--	--	--	--	0.5	-0.5	0.0	9.0	6.0	7.5
5	--	--	--	--	--	--	1.0	-0.5	0.0	11.0	6.5	8.5
6	--	--	--	--	--	--	1.5	-0.5	0.5	10.5	7.5	9.0
7	--	--	--	--	--	--	2.0	0.0	1.0	11.5	7.0	9.0
8	--	--	--	--	--	--	2.0	0.0	1.0	9.5	8.0	8.5
9	--	--	--	--	--	--	2.0	0.5	1.0	9.0	7.5	8.5
10	--	--	--	--	--	--	1.5	0.0	1.0	13.5	8.0	11.0
11	--	--	--	--	--	--	1.5	0.0	0.5	14.5	9.0	11.5
12	--	--	--	--	--	--	2.0	0.0	0.5	18.5	11.0	14.5
13	--	--	--	--	--	--	3.5	0.0	1.5	16.0	12.5	14.5
14	--	--	--	--	--	--	5.0	1.0	3.0	13.0	9.5	11.0
15	--	--	--	--	--	--	5.0	2.0	3.5	13.0	8.5	10.5
16	--	--	--	--	--	--	7.5	4.0	5.5	15.0	9.5	12.0
17	--	--	--	--	--	--	8.5	5.0	6.5	14.5	11.0	12.5
18	--	--	--	--	--	--	7.5	5.5	6.5	16.5	11.0	13.5
19	--	--	--	--	--	--	7.0	6.0	6.5	17.0	11.5	14.0
20	--	--	--	--	--	--	6.0	4.5	5.0	17.0	13.0	14.5
21	--	--	--	--	--	--	5.0	4.0	4.5	14.0	11.5	12.5
22	--	--	--	--	--	--	6.0	3.0	5.0	12.5	11.0	12.0
23	--	--	--	--	--	--	6.5	3.0	5.0	11.0	9.0	10.0
24	--	--	--	--	--	--	7.0	3.5	5.5	9.5	8.0	9.0
25	--	--	--	--	--	--	6.0	4.5	5.0	10.0	8.5	9.0
26	--	--	--	--	--	--	6.5	3.5	5.0	12.5	9.0	11.0
27	--	--	--	--	--	--	7.0	3.5	5.5	12.0	10.0	11.0
28	--	--	--	--	--	--	8.5	5.0	7.0	13.0	9.0	11.0
29	--	--	--	--	--	--	10.5	7.5	9.0	13.5	9.5	11.5
30	--	--	--	--	--	--	8.0	6.5	7.5	14.5	11.5	13.0
31	--	--	--	--	--	--	--	--	--	12.5	10.5	11.0
MONTH	--	--	--	--	--	--	10.5	-0.5	3.4	18.5	5.0	10.7

STREAMS TRIBUTARY TO LAKE MICHIGAN

04059000 ESCANABA RIVER AT CORNELL, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	12.0	10.5	11.0	26.5	16.0	20.5	28.5	17.0	22.5	17.0	14.5	16.0
2	14.0	10.5	12.0	26.0	15.0	20.0	26.5	19.5	22.5	24.5	15.5	19.0
3	15.0	11.5	13.5	26.5	15.0	20.5	28.0	17.5	22.5	25.0	16.0	20.0
4	15.5	12.0	14.0	20.0	16.0	18.5	26.0	16.5	20.5	25.5	16.5	20.5
5	15.5	13.0	14.5	22.5	14.0	17.5	25.0	14.5	19.5	23.5	18.0	20.0
6	18.0	14.0	16.0	16.0	14.5	15.0	26.5	14.5	20.0	22.0	17.0	19.5
7	20.5	15.5	18.0	16.0	13.5	14.5	26.0	14.0	20.0	21.5	15.0	18.5
8	23.0	18.5	20.5	17.0	13.5	15.0	23.0	16.0	19.5	23.0	15.0	18.0
9	20.0	15.5	18.0	21.0	12.5	16.0	26.5	18.0	20.5	24.0	13.5	18.0
10	19.0	14.0	16.5	23.0	13.5	18.0	20.0	16.0	18.0	23.5	14.5	18.5
11	18.0	14.5	16.0	21.5	15.5	18.5	19.0	15.0	16.5	22.5	16.0	19.0
12	18.5	14.5	16.0	27.0	16.0	21.0	21.0	14.5	17.0	24.0	15.0	19.0
13	17.0	15.0	16.0	22.5	18.0	20.0	21.5	14.0	17.0	25.5	17.5	20.5
14	18.0	14.0	16.0	25.5	17.5	20.5	25.0	12.0	18.0	25.0	17.5	20.5
15	18.0	14.0	16.0	26.0	17.0	21.5	23.5	13.0	18.0	22.0	18.0	20.0
16	20.0	15.0	17.5	22.0	18.5	19.5	21.5	14.0	18.0	22.0	15.0	18.0
17	20.0	16.0	18.0	25.5	17.0	20.5	24.0	16.5	20.0	21.5	13.0	16.5
18	20.5	15.5	17.5	25.5	16.0	20.5	24.5	15.0	18.5	22.5	14.0	17.5
19	19.5	13.5	16.5	27.5	17.0	21.5	23.5	12.5	17.5	22.0	13.0	17.0
20	21.0	13.5	17.0	27.5	18.5	22.5	23.5	13.5	17.5	22.5	14.5	18.0
21	22.0	14.5	18.0	26.0	18.5	22.5	24.0	11.5	17.5	23.0	13.5	18.0
22	21.0	15.0	17.5	25.5	18.0	21.5	22.5	14.0	17.5	25.0	15.5	19.5
23	22.0	14.5	17.5	26.5	15.0	20.0	24.0	14.0	18.5	22.5	14.0	18.0
24	18.5	13.5	16.0	25.5	14.5	19.5	22.0	15.0	18.0	20.5	16.0	18.0
25	17.5	12.0	15.0	27.0	14.0	20.0	23.5	17.5	20.0	22.0	14.5	17.5
26	19.5	11.5	15.5	26.5	15.0	20.5	22.5	18.0	20.0	23.0	12.5	17.0
27	21.5	12.0	16.5	28.5	16.0	21.5	25.5	18.5	21.0	21.5	13.5	16.5
28	21.5	12.5	17.0	28.0	17.0	22.0	19.5	15.5	17.5	18.5	11.5	14.5
29	23.5	14.5	18.5	24.0	18.0	21.5	18.5	14.5	16.5	19.5	8.5	13.5
30	26.5	14.5	20.0	27.5	17.5	22.5	19.0	13.5	15.5	18.5	9.0	13.5
31	—	—	—	26.0	19.5	22.0	22.5	13.0	17.5	—	—	—
MONTH	26.5	10.5	16.4	28.5	12.5	19.8	28.5	11.5	18.8	25.5	8.5	18.0

STREAMS TRIBUTARY TO LAKE MICHIGAN

04059500 FORD RIVER NEAR HYDE, MI

LOCATION.--Lat 45°45'20", long 87°12'05", in SW1/4 sec.19, T.39 N., R.23 W., Delta County, Hydrologic Unit 04030109, on right bank 40 ft downstream from bridge on County Road 533, 1.4 mi downstream from Tenmile Creek, and 1.5 mi north of Hyde.

DRAINAGE AREA.--450 mi².

PERIOD OF RECORD.--October 1954 to current year.

GAGE.--Water-stage recorder. Datum of gage is 681.77 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	168	152	e200	e160	e55	e100	1970	1040	1820	126	70	147
2	156	164	e180	e140	e55	e100	2350	936	1830	115	81	130
3	148	169	e170	e130	e55	e100	2640	844	1660	107	99	125
4	142	187	e165	e120	e55	e95	2670	755	1520	112	88	118
5	138	210	e155	e110	e55	e90	2570	665	1400	119	74	113
6	139	235	e150	e100	e55	e90	2770	592	1210	132	65	107
7	130	228	e145	e90	e55	e90	2800	525	999	158	59	105
8	123	164	e140	e84	e55	e90	2750	478	762	182	56	94
9	114	135	e135	e82	e55	e90	2870	450	596	196	71	89
10	104	193	e130	e80	e55	e90	2640	463	541	202	80	88
11	97	218	e130	e78	e54	e90	2350	450	457	180	73	84
12	103	195	e125	e76	e54	e90	2060	420	396	157	71	78
13	99	177	e125	e74	e54	e90	1770	407	375	139	73	72
14	99	175	e120	e72	e54	e90	1610	519	439	129	73	69
15	103	194	e120	e70	e54	e90	1510	640	481	127	67	81
16	108	205	e115	e68	e54	e90	1510	642	437	136	62	83
17	103	195	e115	e66	e54	e90	1680	601	413	145	59	85
18	99	219	e110	e64	e54	e90	1820	566	355	149	59	118
19	96	272	e110	e62	e54	e90	2010	486	307	142	65	144
20	92	301	e105	e60	e54	e90	2130	451	261	128	70	131
21	89	320	e105	e60	e54	e92	2260	410	227	139	73	111
22	87	317	e105	e58	e55	e95	2470	375	222	129	75	96
23	89	358	e100	e58	e55	e100	2320	638	206	115	73	85
24	88	e375	e100	e56	e56	e137	1980	1890	204	104	67	77
25	86	e370	e100	e56	e56	e200	1740	1930	203	96	72	70
26	84	e365	e100	e56	e56	e250	1630	1680	195	90	80	65
27	84	e350	e100	e56	e60	e350	1470	1560	180	90	107	63
28	92	e300	e110	e55	e70	e500	1310	1480	164	84	179	62
29	102	e260	e170	e55	e85	e700	1180	1310	150	75	213	59
30	105	e230	e200	e55	—	e1200	1130	1120	135	70	192	56
31	123	—	e180	e55	—	1670	—	1280	—	71	166	—
TOTAL	3390	7233	4115	2406	1637	7129	61970	25603	18145	3944	2712	2805
MEAN	109	241	133	77.6	56.4	230	2066	826	605	127	87.5	93.5
MAX	168	375	200	160	85	1670	2870	1930	1830	202	213	147
MIN	84	135	100	55	54	90	1130	375	135	70	56	56
CFSM	0.24	0.54	0.29	0.17	0.13	0.51	4.59	1.84	1.34	0.28	0.19	0.21
IN.	0.28	0.60	0.34	0.20	0.14	0.59	5.12	2.12	1.50	0.33	0.22	0.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1955 - 2004, BY WATER YEAR (WY)

	MEAN	302	368	202	111	101	273	1321	782	403	201	161	235
MAX	1053	1246	589	346	493	1078	2353	2483	1006	793	713	1013	
(WY)	2003	1986	1966	1966	1984	1973	1979	1960	1966	1968	1978	1978	
MIN	39.9	42.5	27.7	26.5	29.6	48.5	345	99.7	52.4	34.7	37.4	26.2	
(WY)	1977	1977	1977	1977	1977	1964	1990	1998	1988	1988	2001	1976	

SUMMARY STATISTICS FOR 2003 CALENDAR YEAR FOR 2004 WATER YEAR WATER YEARS 1955 - 2004

	ANNUAL TOTAL	113765	141089	
ANNUAL MEAN	312	385	371	
HIGHEST ANNUAL MEAN			640	1960
LOWEST ANNUAL MEAN			183	1963
HIGHEST DAILY MEAN	2950	Apr 21	2870	Apr 9
LOWEST DAILY MEAN	31	Sep 11	54	Feb 11
ANNUAL SEVEN-DAY MINIMUM	33	Sep 6	54	Feb 11
MAXIMUM PEAK FLOW			(a)3100	Apr 6
MAXIMUM PEAK STAGE			(b)6.04	Mar 30
INSTANTANEOUS LOW FLOW				8.27
ANNUAL RUNOFF (CFSM)	0.693		0.857	
ANNUAL RUNOFF (INCHES)	9.40		11.66	
10 PERCENT EXCEEDS	980		1470	922
50 PERCENT EXCEEDS	110		123	171
90 PERCENT EXCEEDS	35		57	54

(a) Gage height 5.83 ft.

(b) Backwater from ice.

(c) Aug. 30, 1976, July 7, 8, 1988.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04060993 BRULE RIVER NEAR FLORENCE, WI

LOCATION.--Lat 45°57'39", long 88°18'57", in NW1/4 SE1/4 sec.9, T.41 N., R.32 W., Michigan Meridian, Iron County, Hydrologic Unit 04030106, on left bank 30 ft upstream from bridge on U.S. Highway 2, 4.0 mi upstream from Paint River, 4.0 mi northwest of Florence, WI, and 8.0 mi upstream from confluence with Michigamme River.

DRAINAGE AREA.--366 mi², approximately.

PERIOD OF RECORD.--January 1914 to February 1916, June 1944 to current year.

REVISED RECORDS.--WSP 1387: 1914-16. WDR MI-92-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,240 ft above sea level, from topographic map. Prior to Aug. 29, 1944, nonrecording gage, and Aug. 29, 1944 to Apr. 4, 1994, water-stage recorder at site 3.0 mi downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Discharge includes some mine pumpage prior to August 1977. Several measurements of water temperature were made during the year. Gage-height telemeter 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	244	274	253	e180	e170	e240	612	585	896	268	250	207
2	238	257	226	e180	e170	e250	608	526	792	263	231	229
3	237	249	213	e170	e170	e260	650	484	637	247	218	217
4	240	270	306	e170	e165	e260	628	455	531	314	217	205
5	234	291	340	e170	e165	e250	583	432	471	334	221	198
6	227	278	353	e170	e165	e250	669	412	453	322	206	209
7	223	256	335	e170	e165	e250	845	393	425	388	197	216
8	222	237	313	e170	e165	e250	986	377	385	353	203	214
9	228	219	283	e170	e165	e250	1110	368	375	317	209	200
10	223	257	274	e170	e165	e250	998	374	364	294	224	195
11	221	254	220	e170	e165	e250	823	366	339	279	228	191
12	263	260	e210	e170	e165	e250	704	356	333	271	246	190
13	259	266	e200	e170	e165	e250	618	445	382	267	230	190
14	240	243	e190	e170	e165	e250	594	529	552	280	213	191
15	230	256	e190	e170	e165	e250	591	566	495	263	205	279
16	224	261	e190	e170	e165	e250	636	500	410	255	202	406
17	222	270	e190	e170	e165	e250	707	449	377	256	218	336
18	227	344	e190	e170	e165	e250	792	411	347	245	231	280
19	223	435	e190	e170	e170	e250	1210	374	314	235	253	249
20	224	382	e180	e170	e170	e250	1840	360	295	232	225	236
21	219	330	e180	e170	e170	e250	2090	352	290	237	208	223
22	218	299	e180	e170	e170	e250	1570	349	312	228	205	217
23	225	296	e180	e170	e180	e250	1170	444	303	222	200	209
24	227	310	e180	e170	e190	e250	906	692	319	215	198	211
25	226	283	e180	e170	e200	e250	803	650	307	210	199	204
26	223	270	e180	e170	e200	e270	778	558	294	206	202	202
27	220	290	e180	e170	e210	e350	722	485	276	203	240	201
28	233	270	e180	e170	e220	502	652	458	271	201	210	199
29	256	256	e180	e170	e230	841	603	416	261	199	199	196
30	258	249	e180	e170	—	812	623	385	254	200	196	197
31	282	—	e180	e170	—	667	—	604	—	267	195	—
TOTAL	7236	8412	6826	5290	5095	9702	26121	14155	12060	8071	6679	6697
MEAN	233	280	220	171	176	313	871	457	402	260	215	223
MAX	282	435	353	180	230	841	2090	692	896	388	253	406
MIN	218	219	180	170	165	240	583	349	254	199	195	190
CFSM	0.64	0.77	0.60	0.47	0.48	0.86	2.38	1.25	1.10	0.71	0.59	0.61
IN.	0.74	0.85	0.69	0.54	0.52	0.99	2.65	1.44	1.23	0.82	0.68	0.68

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 2004, BY WATER YEAR (WY)

	MEAN	322	330	273	248	242	318	658	497	390	334	286	305
MAX	612	600	424	369	406	833	1235	1104	712	983	604	582	
(WY)	1986	1916	1986	1986	1984	1973	1967	1965	1981	1953	1972	1959	
MIN	179	202	175	156	163	178	235	242	194	185	186	182	
(WY)	1949	1990	1990	1995	1995	1965	1990	1998	1988	1989	1948	1948	

SUMMARY STATISTICS FOR 2003 CALENDAR YEAR FOR 2004 WATER YEAR WATER YEARS 1914 - 2004

ANNUAL TOTAL	113755	116344	
ANNUAL MEAN	312	318	349
HIGHEST ANNUAL MEAN			512
LOWEST ANNUAL MEAN			221
HIGHEST DAILY MEAN	1600	May 13	2090
LOWEST DAILY MEAN	180	Sep 7	165
ANNUAL SEVEN-DAY MINIMUM	180	Dec 20	165
MAXIMUM PEAK FLOW			2210
MAXIMUM PEAK STAGE			6.46
INSTANTANEOUS LOW FLOW			160
ANNUAL RUNOFF (CFSM)	0.852	0.869	(a)8.41
ANNUAL RUNOFF (INCHES)	11.56	11.83	(b)95
10 PERCENT EXCEEDS	478	597	548
50 PERCENT EXCEEDS	240	249	285
90 PERCENT EXCEEDS	198	170	203

(a) Present site and datum; peak stage at previous site and datum, 8.60 ft, Dec. 20, 1983, backwater from ice.

(b) Result of freezeup.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04062011 BRULE RIVER NEAR COMMONWEALTH, WI

LOCATION.--Lat 45°56'51", long 88°12'55", in NW1/4 sec. 14, T.40 N., R.18 E., Wisconsin Meridian, Florence County, Hydrologic Unit 04030106, on right bank 900 ft downstream from Brule Island Dam, 1.5 mi upstream from confluence with Michigamme River, and 2.8 mi north of Commonwealth, WI.

DRAINAGE AREA.--1,020 mi².

PERIOD OF RECORD.--October 1989 to current year.

REVISED RECORDS.--WDR MI-91-1: 1990(M).

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 1,130 ft above sea level, from topographic map.

REMARKS.--Records excellent. Flow regulated by powerplant 900 ft upstream and by Lower Paint Dam 8.2 mi upstream. Records not adjusted for diversion to Michigamme River by Paint River Diversion Canal. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

COOPERATION.--Gage-height record was provided by We Energies, under general supervision of the Geological Survey.

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	517	566	506	434	427	514	1060	994	1800	555	498	505
2	517	501	401	420	439	507	1000	911	2300	521	493	502
3	516	561	331	509	439	577	1140	881	1880	495	479	501
4	517	563	357	373	382	521	996	874	1570	580	481	500
5	517	561	493	414	378	480	1040	824	1300	658	484	470
6	517	556	461	349	437	485	1030	761	904	589	490	467
7	516	485	411	358	450	481	1300	783	757	723	508	495
8	517	426	405	388	450	473	1470	804	745	627	478	515
9	502	417	496	395	441	429	2030	743	741	597	444	466
10	490	564	495	391	414	438	2110	718	723	594	548	518
11	515	565	346	403	408	507	1870	767	637	518	476	487
12	551	505	362	434	420	465	1740	782	667	522	459	469
13	566	573	367	439	431	450	1310	833	715	579	540	460
14	529	504	416	436	433	422	977	914	945	578	481	455
15	514	509	493	437	435	436	975	990	856	561	490	631
16	512	509	460	438	433	506	1040	936	768	483	500	667
17	466	509	490	434	429	489	1120	843	613	509	499	639
18	463	629	448	440	424	452	1260	734	680	570	521	534
19	497	757	446	439	427	446	2810	733	572	529	527	525
20	510	689	399	440	426	448	5540	690	612	445	526	509
21	512	584	394	389	410	442	6050	671	604	518	512	510
22	504	565	428	441	411	477	5310	681	526	487	480	539
23	474	558	474	446	452	461	4580	813	640	498	472	488
24	474	597	478	445	473	459	3730	1100	601	501	470	489
25	472	470	426	418	399	455	3410	1010	610	483	461	479
26	527	502	428	391	416	507	2740	913	639	465	484	481
27	493	571	422	415	486	603	2370	888	563	467	525	478
28	490	577	465	443	451	792	2160	820	559	504	529	481
29	560	515	497	445	459	1180	1680	748	557	467	477	471
30	571	519	506	439	---	1010	1230	682	552	443	470	465
31	513	---	449	366	---	1000	---	977	---	628	504	---
TOTAL	15839	16407	13550	13009	12480	16912	65078	25818	25636	16694	15306	15196
MEAN	511	547	437	420	430	546	2169	833	855	539	494	507
MAX	571	757	506	509	486	1180	6050	1100	2300	723	548	667
MIN	463	417	331	349	378	422	975	671	526	443	444	455

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 2004, BY WATER YEAR (WY)

	MEAN	447	416	372	352	360	451	1232	885	534	473	400	394
MAX	923	603	545	476	497	634	3128	2757	855	887	680	569	
(WY)	2003	2003	2002	2003	2003	1998	2002	1996	2004	1999	2002	2002	
MIN	276	307	270	259	270	327	322	355	334	272	296	285	
(WY)	1990	1990	1990	1991	1991	2001	1990	1998	1992	1990	1990	1998	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1990 - 2004

ANNUAL TOTAL	240812						251925					
ANNUAL MEAN	660						688			526		
HIGHEST ANNUAL MEAN										810		1996
LOWEST ANNUAL MEAN										325		1990
HIGHEST DAILY MEAN										10500		Apr 17 2002
LOWEST DAILY MEAN	4580				May 13		6050		Apr 21	182		Feb 11 1994
ANNUAL SEVEN-DAY MINIMUM	331				Dec 3		381		Dec 3	202		Mar 26 1990
MAXIMUM PEAK FLOW	408				Dec 2		6220		Apr 21	11200		Apr 17 2002
MAXIMUM PEAK STAGE							12.26		Apr 21	15.67		Apr 17 2002
10 PERCENT EXCEEDS							1000			762		
50 PERCENT EXCEEDS							509			394		
90 PERCENT EXCEEDS							452			288		

STREAMS TRIBUTARY TO LAKE MICHIGAN

04062200 PESHEKEE RIVER NEAR CHAMPION, MI

LOCATION.--Lat 46°33'25", long 88°00'09", in NW1/4 sec.13, T.48 N., R.30 W., Marquette County, Hydrologic Unit 04030107, on left bank 10 ft downstream from bridge on County Road 607, 0.6 mi downstream from West Branch, and 3.5 mi northwest of Champion.

DRAINAGE AREA.--133 mi².

PERIOD OF RECORD.--July 1961 to September 1978, October 1979 to September 1982 (operated as a crest-stage partial-record station), October 2000 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,557.49 ft above sea level. Prior to Aug. 15, 1961, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. 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	159	232	136	e98	e56	e70	e650	677	931	83	32	28
2	153	211	e130	e95	e55	e80	e600	575	887	76	31	28
3	158	174	e120	e90	e54	e85	e550	487	723	67	27	27
4	194	146	e110	e85	e54	e88	e500	416	545	67	24	25
5	204	135	e100	e85	e54	e88	e500	365	422	89	22	24
6	179	122	e95	e80	e52	e90	e550	323	428	101	19	26
7	150	112	e90	e80	e50	e92	663	285	405	139	17	24
8	126	123	e85	e80	e50	e93	858	248	356	241	16	23
9	104	114	e85	e78	e50	e92	1060	220	303	342	17	21
10	86	101	e85	e75	e48	e90	1020	202	262	320	30	19
11	73	91	e82	e70	e48	e88	858	181	219	227	52	16
12	81	101	e82	e70	e48	e88	705	175	184	159	107	16
13	91	153	e82	e70	e48	e86	579	314	169	120	141	14
14	90	179	e82	e68	e48	e85	561	386	186	123	125	13
15	79	155	e80	e68	e48	e84	580	424	173	111	93	21
16	70	135	e80	e66	e48	e82	785	399	152	94	69	53
17	62	138	e80	e66	e48	e80	1230	333	135	83	55	78
18	59	218	e80	e66	e48	e80	1640	292	118	73	53	75
19	56	389	e80	e66	e48	e80	3120	248	102	63	64	60
20	53	436	e80	e66	e48	e78	3230	353	89	57	57	47
21	51	377	e80	e64	e48	e76	2170	387	77	52	48	38
22	51	297	e80	e62	e48	e75	1600	332	76	46	44	32
23	52	245	e80	e60	e50	e74	1280	327	94	41	46	27
24	54	218	e80	e60	e52	e73	1050	452	123	37	47	24
25	56	202	e80	e60	e54	e74	908	460	132	33	51	22
26	56	e180	e80	e60	e55	e100	831	402	116	29	49	21
27	56	e160	e80	e58	e58	e250	771	382	98	27	44	19
28	59	145	e85	e58	e60	e400	697	400	83	24	40	17
29	75	146	e90	e58	e65	e600	693	356	74	23	38	15
30	104	142	e95	e56	—	e900	746	305	75	24	34	15
31	193	—	e100	e56	—	e750	—	431	—	30	29	—
TOTAL	3034	5577	2774	2174	1493	5071	30985	11137	7737	3001	1521	868
MEAN	97.9	186	89.5	70.1	51.5	164	1033	359	258	96.8	49.1	28.9
MAX	204	436	136	98	65	900	3230	677	931	342	141	78
MIN	51	91	80	56	48	70	500	175	74	23	16	13
CFSM	0.74	1.40	0.67	0.53	0.39	1.23	7.77	2.70	1.94	0.73	0.37	0.22
IN.	0.85	1.56	0.78	0.61	0.42	1.42	8.67	3.12	2.16	0.84	0.43	0.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2004, BY WATER YEAR (WY)

MEAN	156	173	120	68.8	54.1	128	828	525	197	83.4	56.5	109
MAX	475	327	226	150	112	512	1303	1253	463	339	238	539
(WY)	2003	1968	1976	1969	1969	1973	1976	1965	1967	1968	1978	1968
MIN	5.53	10.3	11.2	10.1	10.1	42.9	280	105	39.1	8.26	2.13	1.90
(WY)	1977	1977	1977	1977	1977	1970	1972	1977	1977	1976	1976	1976

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1961 - 2004

ANNUAL TOTAL	66040.0	75372	
ANNUAL MEAN	181	206	
HIGHEST ANNUAL MEAN			209
LOWEST ANNUAL MEAN			273
HIGHEST DAILY MEAN			136
LOWEST DAILY MEAN	3000	May 13	1968
ANNUAL SEVEN-DAY MINIMUM	7.1	Sep 12	1977
MAXIMUM PEAK FLOW	8.1	Sep 7	136
MAXIMUM PEAK STAGE			5860
INSTANTANEOUS LOW FLOW			0.71
ANNUAL RUNOFF (CFSM)	1.36		0.83
ANNUAL RUNOFF (INCHES)	18.47		6740
10 PERCENT EXCEEDS	454		10.73
50 PERCENT EXCEEDS	68		0.70
90 PERCENT EXCEEDS	19		1.57
			21.33
			477
			90
			20

(a) Sept. 7, 8, 9, 10, 11, 1976.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04062500 MICHIGAMME RIVER NEAR CRYSTAL FALLS, MI

LOCATION.--Lat 46°06'50", long 88°12'57", in NW1/4 sec.20, T.43 N., R.31 W., Iron County, Hydrologic Unit 04030107, on right bank 400 ft upstream from highway bridge, 5.0 mi downstream from Michigamme Reservoir, 6.0 mi east of Crystal Falls, and 15 mi upstream from confluence with Brule River.

DRAINAGE AREA.--656 mi².

PERIOD OF RECORD.--August 1944 to current year.

REVISED RECORDS.--WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,300 ft above sea level, from topographic map.

REMARKS.--Records excellent. Flow regulated by powerplant and by Michigamme Reservoir, capacity, 119,950 acre-ft, 5 mi upstream. Gage-height telemeter 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	246	272	339	423	922	665	362	1300	1750	613	520	402
2	246	272	349	423	922	608	476	1410	1720	612	517	400
3	249	272	364	422	919	593	528	1420	1690	611	514	399
4	248	277	341	421	916	562	593	1460	1680	618	508	399
5	248	277	347	529	913	530	590	1560	1670	614	505	398
6	248	276	364	749	912	500	609	1550	1390	624	513	395
7	248	274	365	904	909	455	625	1380	1310	564	506	386
8	313	272	359	941	906	452	647	1190	1450	544	506	354
9	289	271	368	942	905	448	652	1040	1430	541	514	314
10	348	273	397	942	902	434	641	797	1410	538	509	291
11	349	275	422	941	901	433	628	697	1270	537	505	298
12	349	279	423	938	897	430	645	703	1140	606	500	299
13	342	275	422	935	895	433	789	722	1150	638	497	266
14	342	278	423	934	892	432	872	861	1140	676	494	260
15	318	285	423	930	891	430	873	1010	1050	644	491	263
16	262	290	426	928	890	431	880	1010	950	624	490	262
17	262	284	423	927	887	374	885	993	773	620	509	263
18	263	294	423	923	885	427	920	951	530	620	489	261
19	262	293	422	921	882	429	931	1130	502	620	484	260
20	264	301	421	919	883	432	1740	1260	456	616	482	258
21	261	369	422	918	877	430	2660	1250	458	669	480	258
22	262	346	422	914	874	403	3200	1230	457	646	481	258
23	263	358	422	912	874	293	3220	1260	464	578	478	258
24	262	358	422	910	868	292	2990	1310	461	586	475	258
25	263	355	422	908	864	294	2970	967	459	583	474	257
26	263	343	422	906	836	300	2960	734	458	580	488	258
27	263	349	421	924	877	301	2690	730	458	579	486	253
28	270	361	427	942	855	318	2250	919	463	545	485	235
29	262	332	424	928	775	340	1780	1200	532	520	483	223
30	272	375	423	926	---	351	1340	1360	603	519	452	184
31	273	---	423	924	---	358	---	1600	---	527	419	---
TOTAL	8610	9136	12471	26104	25729	13178	40946	35004	29274	18412	15254	8870
MEAN	278	305	402	842	887	425	1365	1129	976	594	492	296
MAX	349	375	427	942	922	665	3220	1600	1750	676	520	402
MIN	246	271	339	421	775	292	362	697	456	519	419	184

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2004, BY WATER YEAR (WY)

MEAN	495	538	766	863	835	519	673	1091	808	663	587	506
MAX	1220	1432	1427	1274	1252	819	1705	2865	1650	1461	1035	1325
(WY)	1952	1989	1989	1983	1983	1971	2002	1960	1983	1953	1987	1968
MIN	151	88.3	238	390	350	160	142	130	257	261	292	157
(WY)	1970	1949	1949	1977	1948	1977	1987	1987	1987	1959	1977	1975

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1944 - 2004

ANNUAL TOTAL	214741	242988	
ANNUAL MEAN	588	664	695
HIGHEST ANNUAL MEAN			1049
LOWEST ANNUAL MEAN			382
HIGHEST DAILY MEAN	2320	May 15	6940
LOWEST DAILY MEAN	220	Sep 11	71
ANNUAL SEVEN-DAY MINIMUM	237	Sep 11	83
MAXIMUM PEAK FLOW			7260
MAXIMUM PEAK STAGE			10.73
10 PERCENT EXCEEDS	1040		1180
50 PERCENT EXCEEDS	421		644
90 PERCENT EXCEEDS	263		179

STREAMS TRIBUTARY TO LAKE MICHIGAN

04065106 MENOMINEE RIVER AT NIAGARA, WI

LOCATION.--Lat 45°46'04", long 87°58'50", in NE 1/4 NE 1/4 sec.15, T.38 N., R.20 E., Wisconsin Meridian, Marinette County, Hydrologic Unit 04030108, on right bank 0.7 mi downstream from Little Quinnesec Falls Dam, at Niagara, WI.

DRAINAGE AREA--2,470 mi².

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

GAGE.--Water-stage recorder. Elevation of gage is 880 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by powerplants, by Michigamme Reservoir, capacity, 119,950 acre-ft, by Peavy Pond, capacity, 33,860 acre-ft, on Michigamme River, and by many smaller reservoirs upstream from station. Gage-height telemeter 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	1230	1340	1430	1550	e1800	e1700	3460	4070	6050	1670	1460	1300
2	1210	1330	1260	1520	e1800	e1800	3540	4150	6840	1750	1650	1310
3	1380	1380	1200	1600	e1700	e1900	3820	4010	6050	1690	1560	1310
4	1250	1530	1250	1580	e1700	e2000	3780	3880	5420	1700	1510	1180
5	1260	1630	1650	1780	e1700	2380	3780	4010	4950	1930	1490	1290
6	1270	1610	1430	1810	e1700	2300	3790	3570	4070	1940	1490	1340
7	1270	1590	1250	1580	e1700	2210	3810	3480	3710	2420	1370	1340
8	1270	1460	1460	e1500	e1800	2130	4060	2660	3610	2310	1320	1290
9	1190	1290	1660	e1600	e1700	2220	4860	2580	3910	2200	1440	1160
10	1250	1310	1330	e1400	e1600	2330	4920	2560	3360	2070	1440	1140
11	1230	1380	1340	e1500	e1600	e2300	4950	2530	3380	2000	1360	1190
12	1300	1430	1230	e1700	e1600	2230	4990	2590	2730	1970	1370	1170
13	1350	1420	1200	e1700	e1700	2030	4600	2540	2950	1790	1380	1040
14	1430	1460	1200	e1700	e1600	2060	4250	2860	3270	1840	1440	1070
15	1310	1410	1250	e1800	e1700	1960	3760	3670	3330	1760	1400	1320
16	1340	1480	1510	e1800	e1600	2070	4150	3750	2940	1710	1410	1450
17	1240	1520	1490	e1900	e1700	1990	4750	3720	3010	1670	1460	1540
18	1280	1590	1470	e1900	e1600	1950	5030	3330	2350	1660	1530	1430
19	1330	1980	1530	e1800	e1600	2090	6490	3200	2230	1790	1420	1280
20	1370	2240	1260	e1800	e1700	1890	10100	3160	2000	1720	1320	1450
21	1210	2160	1400	e1800	e1600	1910	12100	3080	1970	1860	1410	1340
22	1210	2150	1260	e1800	e1600	1870	11400	2780	1860	1750	1310	1280
23	1230	2160	1490	e1800	e1800	1880	10200	3310	1750	1540	1450	1260
24	1230	2200	1450	e1800	e1700	1860	8130	4750	1810	1500	1320	1160
25	1250	1960	1350	e1800	e1700	1900	7770	5030	1830	1420	1380	1190
26	1160	1630	1240	e1800	e1700	2010	7190	4730	1720	1360	1260	1160
27	1240	1680	1300	e1800	e1700	2310	6160	4000	1700	1430	1410	1040
28	1180	1690	1500	e1700	e1700	2580	6130	3580	1720	1440	1300	1150
29	1230	1580	1650	e1600	e1700	3360	5160	3590	1730	1460	1340	1160
30	1230	1550	1720	e1800	—	3420	4410	3610	1770	1490	1290	1100
31	1230	—	1630	e1900	—	3370	—	4050	—	1520	1250	—
TOTAL	39160	49140	43390	53120	48800	68010	171540	108830	94020	54360	43540	37440
MEAN	1263	1638	1400	1714	1683	2194	5718	3511	3134	1754	1405	1248
MAX	1430	2240	1720	1900	1800	3420	12100	5030	6840	2420	1650	1540
MIN	1160	1290	1200	1400	1600	1700	3460	2530	1700	1360	1250	1040

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

MEAN	1777	1724	1690	1711	1841	2082	4033	3675	2564	2022	1640	1573
MAX	3689	2531	2458	2258	2286	2800	7476	7555	4184	3547	2290	2225
(WY)	2003	1993	1993	1993	1997	2000	2002	1996	1993	1999	1996	1994
MIN	1151	1245	1161	1369	1391	1553	1953	1175	1587	1176	1080	1180
(WY)	2001	2001	2001	1995	1995	2001	1994	1998	1998	2003	1998	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1993 - 2004

ANNUAL TOTAL	722541	811350	2194
ANNUAL MEAN	1980	2217	3135
HIGHEST ANNUAL MEAN			1707
LOWEST ANNUAL MEAN			1996
HIGHEST DAILY MEAN	9730	May 14	18400
LOWEST DAILY MEAN	826	Sep 11	826
ANNUAL SEVEN-DAY MINIMUM	997	Sep 6	951
MAXIMUM PEAK FLOW			18900
MAXIMUM PEAK STAGE		13.21	16.22
10 PERCENT EXCEEDS	3340	4000	3540
50 PERCENT EXCEEDS	1500	1700	1790
90 PERCENT EXCEEDS	1150	1250	1200

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04065722 MENOMINEE RIVER NEAR VULCAN, MI

LOCATION.--Lat 45°44'12", long 87°51'48", sec.34, T.39 N., R.29 W., Michigan Meridian, Dickinson County, Hydrologic Unit 04030108, on left bank 0.35 mi downstream from Sturgeon Falls Dam, 3.0 mi south of Vulcan, and at mile 78.7.

DRAINAGE AREA.--2,900 mi².

PERIOD OF RECORD.--December 1987 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 820 ft above sea level, from topographic map.

REMARKS.--Records good. Flow regulated by powerplants, by Michigamme Reservoir, capacity, 119,950 acre-ft, by Peavy Pond, capacity, 33,860 acre-ft, on Michigamme River, and by smaller reservoirs upstream from station. Several measurements of water temperature were made during the year.

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	1310	1360	1550	1620	1900	1840	5410	5030	7380	1850	1530	1390
2	1260	1350	1270	1650	1860	1930	5510	4970	8560	1920	1710	1440
3	1330	1400	1230	1740	1820	2040	6070	4840	7960	1880	1750	1430
4	1330	1570	1380	1680	1840	2150	6000	4520	6960	1910	1570	1390
5	1220	1670	1630	1790	1830	2450	5800	4830	6320	2200	1530	1380
6	1340	1870	1590	1900	1830	2410	5500	4110	5070	2290	1530	1390
7	1260	1730	1270	1640	1760	2270	5750	4230	4750	2710	1430	1460
8	1310	1570	1540	1610	1890	2220	5980	3280	4390	2830	1380	1530
9	1170	1280	1700	1730	1830	2380	6970	3240	4480	2560	1480	1250
10	1230	1460	1420	1450	1740	2460	7220	2980	4100	2450	1570	1250
11	1230	1420	1320	1570	1700	2430	7010	3070	4240	2280	1380	1260
12	1360	1440	1240	1810	1730	2380	6790	3070	3190	2270	1490	1290
13	1340	1650	1230	1850	1780	2130	6180	3060	3400	2020	1450	1150
14	1470	1560	1230	1780	1690	2160	5660	3320	4100	2180	1480	1080
15	1280	1470	1260	1860	1810	2080	5040	4340	3980	2010	1550	1270
16	1380	1640	1550	1920	1750	2170	5280	4450	3600	1990	1490	1650
17	1220	1590	1500	1970	1850	2090	6160	4450	3700	1870	1520	1650
18	1240	1710	1540	2010	1700	2090	6390	3910	2810	1910	1590	1600
19	1360	2120	1590	1910	1760	2180	7480	3810	2690	2010	1520	1460
20	1400	2580	1350	1900	1860	1990	10900	3680	2370	1750	1490	1450
21	1200	2480	1410	1870	1720	2010	13300	3730	2490	2160	1390	1610
22	1170	2400	1300	1900	1750	1970	13500	3220	2150	1990	1360	1410
23	1280	2470	1470	2020	1860	2030	11900	3920	2080	1660	1390	1240
24	1130	2560	1500	1890	1810	1960	10100	6060	2070	1630	1450	1310
25	1260	2390	1350	1880	1760	1990	8990	6900	2130	1540	1370	1130
26	1180	1840	1250	1850	1830	2210	8570	6650	1990	1420	1390	1280
27	1220	1860	1300	1860	1780	2620	7230	5600	1950	1510	1580	1250
28	1220	1910	1560	1790	1770	2960	7460	4980	1940	1490	1670	1090
29	1190	1760	1750	1740	1750	4360	6280	4850	1950	1560	1500	1140
30	1330	1740	1900	1930	---	4820	5420	4650	2000	1560	1470	1190
31	1280	---	1850	2000	---	4910	---	4890	---	1620	1370	---
TOTAL	39500	53850	45030	56120	51960	75690	219850	134640	114800	61030	46380	40420
MEAN	1274	1795	1453	1810	1792	2442	7328	4343	3827	1969	1496	1347
MAX	1470	2580	1900	2020	1900	4910	13500	6900	8560	2830	1750	1650
MIN	1130	1280	1230	1450	1690	1840	5040	2980	1940	1420	1360	1080

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 2004, BY WATER YEAR (WY)

	2001	2158	2053	1967	2021	2505	4783	3973	2915	2149	1701	1772
MEAN	2001	2158	2053	1967	2021	2505	4783	3973	2915	2149	1701	1772
MAX	4574	4412	3008	2533	2548	3701	9292	8850	4832	4196	2598	2456
(WY)	2003	1989	1989	1993	1997	2000	2002	1996	1993	1999	1996	1994
MIN	1081	1382	1376	1489	1442	1855	1356	1344	1062	1100	1184	1223
(WY)	1990	1990	2001	1995	1995	2001	1990	1998	1988	1988	1998	1989

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1988 - 2004

ANNUAL TOTAL	849905						939270					
ANNUAL MEAN	2329						2566					
HIGHEST ANNUAL MEAN										2534		
LOWEST ANNUAL MEAN										3781		1996
HIGHEST DAILY MEAN	11100						13500			1864		1990
LOWEST DAILY MEAN	884				May 14		1080		Apr 22	22800		Apr 19 2002
ANNUAL SEVEN-DAY MINIMUM	1030				Sep 12		1200		Sep 14	846		Aug 3 1988
MAXIMUM PEAK FLOW					Aug 31		14100		Sep 24	932		Oct 1 1989
MAXIMUM PEAK STAGE							14.20		Apr 21	23000		Apr 19 2002
INSTANTANEOUS LOW FLOW							414		Apr 21	17.72		Apr 19 2002
10 PERCENT EXCEEDS	4230						5410		Nov 13	414		Nov 13 2003
50 PERCENT EXCEEDS	1760						1830			2030		
90 PERCENT EXCEEDS	1190						1280			1310		

STREAMS TRIBUTARY TO LAKE MICHIGAN

04066003 MENOMINEE RIVER BELOW PEMENE CREEK NEAR PEMBINE, WI

LOCATION.--Lat 45°34'46", long 87°47'13", in NE 1/4, sec.29, T. 37 N., R.28 W., Michigan Meridian, Menominee County, Hydrologic Unit 04030108, on left bank 40 ft downstream from County Trunk Z bridge, 0.9 mi downstream from Pemene Creek, 3.9 mi west of Nathan, 10.6 mi southeast of Pembine, WI, and at mile 64.3.

DRAINAGE AREA.--3,140 mi².

PERIOD OF RECORD.--October 1949 to current year. Published as "near Pembine" (04066000) prior to August 1982. Monthly discharges for some periods published in WSP 1307.

GAGE.--Water-stage recorder. Elevation of gage is 740 ft above sea level, from topographic map. October 1949 to Oct. 27, 1972, water-stage recorder at site 1.0 mi upstream at elevation 745, from river-profile map, and Oct. 28, 1972, to August 1982, water-stage recorder at site 1.5 mi upstream at elevation 770, from river-profile map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by powerplants, by Michigamme Reservoir, capacity, 119,950 acre-ft, by Peavy Pond, capacity, 33,860 acre-ft, on Michigamme River, and by many smaller reservoirs upstream from station. Gage-height telemeter 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	1530	1570	1820	e1600	e1700	e1900	5980	5330	7650	2010	1560	1460
2	1430	1520	1800	e1900	e1700	e2000	6280	5130	9320	2030	1730	1510
3	1410	1540	1750	e1700	e1700	e2200	6960	5010	8980	2010	2020	1570
4	1610	1700	2700	e1500	e1700	e2300	6690	4720	7630	2140	1730	1490
5	1310	1880	2160	e1700	e1700	e2600	6830	4890	6830	2490	1530	1480
6	1440	2070	e1900	e1500	e1700	e2600	6380	4400	5690	2540	1570	1510
7	1360	2090	e1600	e1400	e1700	e2500	6490	4380	4980	2940	1540	1520
8	1370	1780	e1500	e1600	e1700	e2400	6720	3710	4520	3100	1510	1730
9	1370	1630	e1700	e1700	e1700	e2600	7810	3280	4560	2790	1510	1280
10	1240	1630	e1600	e1700	e1700	e2700	8150	3230	4520	2730	1700	1360
11	1310	1650	e1600	e1600	e1600	e2700	7770	3260	4310	2420	1520	1350
12	1500	1660	e1500	e1900	e1600	e2600	7410	3210	3610	2420	1460	1360
13	1410	1830	e1600	e2000	e1700	e2400	6710	3260	3540	2190	1540	1310
14	1470	1690	e1600	e1900	e1700	e2400	6140	3430	4200	2400	1560	1200
15	1610	1700	e1600	e2000	e1700	e2300	5420	4260	4430	2160	1600	1220
16	1340	1810	e1600	e2000	e1700	2370	5600	4600	3890	2190	1550	1740
17	1470	1790	e1700	e2000	e1700	2290	6550	4580	4160	1960	1630	1750
18	1350	1870	e1600	e2000	e1700	2280	6700	4170	3680	2040	1630	1720
19	1370	2260	e1600	e1900	e1700	2270	7680	3980	2870	2060	1680	1600
20	1440	2800	e1500	e2000	e1800	2150	11000	3810	2790	1960	1640	1450
21	1480	2700	e1500	e1900	e1700	2170	13500	3910	2610	2040	1490	1590
22	1340	2630	e1700	e1800	e1800	2140	14200	3530	2320	2150	1440	1600
23	1350	2730	e1500	e1800	e1900	2170	12800	3760	2340	1760	1400	1310
24	1340	2810	e1600	e1800	e1800	2110	11000	6470	2230	1710	1560	1420
25	1410	2740	e1400	e1800	e1800	2110	9480	7730	2350	1690	1470	1260
26	1410	2110	e1500	e1800	e1800	2350	9210	7530	2160	1570	1540	1280
27	1350	2060	e1500	e1800	e1800	2760	7780	6600	2090	1510	1610	1420
28	1460	2170	e1700	e1800	e1700	3090	7680	5540	2090	1540	1860	1230
29	1370	2050	e1600	e1700	e1800	4640	6750	5250	2070	1590	1680	1170
30	1450	1970	e1900	e1700	—	5420	5770	4970	2110	1550	1660	1210
31	1450	—	e1700	e1800	—	5530	—	5190	—	1640	1520	—
TOTAL	43750	60440	52030	55300	50000	82050	237440	143120	124530	65330	49440	43100
MEAN	1411	2015	1678	1784	1724	2647	7915	4617	4151	2107	1595	1497
MAX	1610	2810	2700	2000	1900	5530	14200	7730	9320	3100	2020	1750
MIN	1240	1520	1400	1400	1600	1900	5420	3210	2070	1510	1400	1170

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 2004, BY WATER YEAR (WY)

	MEAN	2452	2563	2261	2105	2097	2629	5642	4785	3366	2506	2066	2250
MAX	5660	5766	3939	3035	3810	7461	10000	12100	6118	6523	3505	5335	
(WY)	1986	1986	1986	1986	1984	1973	1967	1960	1953	1953	1952	1968	
MIN	1028	1043	1167	1080	1201	1461	1432	1341	1152	1201	1003	1009	
(WY)	1977	1977	1977	1977	1964	1964	1990	1987	1988	1988	1977	1976	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1950 - 2004

ANNUAL TOTAL	933970												
ANNUAL MEAN	2559												
HIGHEST ANNUAL MEAN										2893			
LOWEST ANNUAL MEAN										4318			1960
HIGHEST DAILY MEAN	11900									1778			1977
LOWEST DAILY MEAN	1040									26700			May 8 1960
ANNUAL SEVEN-DAY MINIMUM	1170									840			Aug 14 1977
MAXIMUM PEAK FLOW										914			Aug 8 1977
MAXIMUM PEAK STAGE										(a)26900			May 8 1960
10 PERCENT EXCEEDS	4630									(b)18.94			Dec 17 1985
50 PERCENT EXCEEDS	1900												
90 PERCENT EXCEEDS	1310												

(a) Gage height, 13.90 ft, site and datum then in use.

(b) Backwater from ice.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04066030 MENOMINEE RIVER AT WHITE RAPIDS DAM NEAR BANAT, MI

LOCATION.--Lat 45°28'55", long 87°48'08", in SE 1/4 SE 1/4, sec.30, T. 36 N., R.28 W., Michigan Meridian, Menominee County, Hydrologic Unit 04030108, on left bank at powerplant at White Rapids Dam, 5.7 mi southwest of Banat.

DRAINAGE AREA.--3,190 mi².

PERIOD OF RECORD.--October 1998 to current year.

GAGE.--Water-stage recorder. Datum of gage is 680.00 ft above sea level (levels by We Energies).

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by powerplants, by Michigamme Reservoir, capacity, 119,950 acre-ft, by Peavy Pond, capacity, 33,860 acre-ft, on the Michigamme River, and by many smaller reservoirs upstream from station. Gage-height telemeter 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	1700	1730	2030	1770	e2000	e2000	6010	5450	7630	2190	1630	1600
2	1600	1650	1580	2230	e2000	e2000	6590	5220	9200	2070	1790	1460
3	1410	1510	1250	2010	e1900	e2200	7310	5130	9060	2110	2030	1640
4	1490	2020	1420	1650	e1800	2620	7020	5040	7690	2310	1780	1510
5	1550	1940	1770	2100	e1900	2730	6910	4740	6780	2660	1650	1500
6	1470	1980	2040	1780	e2000	2730	6440	4710	5940	2610	1840	1530
7	1590	2250	1620	e1500	e2000	2730	6860	4310	4930	2910	1570	1690
8	1580	1970	1640	e1500	e2000	2670	6700	3970	4890	3390	1270	1650
9	1490	1640	1890	e1800	e1900	2630	8110	3370	4470	2900	1460	1390
10	1400	1590	2050	e1800	e1900	2560	8280	3490	4930	2640	1750	1390
11	1320	1710	1680	e1600	e1900	2710	7730	3240	4240	2820	1620	1370
12	1820	1710	1190	1870	e1900	2760	7660	3300	3880	2220	1620	1390
13	1560	1760	1290	2180	e1900	2410	6870	3400	3440	2520	1460	1470
14	1440	1910	1500	2130	e1800	2330	6440	3440	4320	2320	1660	1220
15	1670	1900	1680	1990	e1800	2640	5660	4340	4960	2480	1630	1140
16	1500	1870	1650	2020	e1800	2350	5810	4630	3820	2070	1600	1640
17	1520	1890	2080	2150	e2100	2340	6620	4650	4510	2310	1440	1770
18	1550	1920	1670	2320	e2000	2480	6810	4390	4350	2120	1900	1510
19	1520	2420	1870	2220	e2000	2400	7750	3990	2780	2170	1520	1710
20	1410	2760	1580	e2100	e2000	2260	10500	3880	3090	2240	1630	1560
21	1410	2760	1600	e1800	e2000	2150	12800	3800	2480	1770	1620	1500
22	1540	2770	1780	e1900	e2000	2240	13800	3930	2820	2440	1430	1520
23	1270	2960	1770	e1700	e1900	2260	12500	3670	2410	1780	1400	1310
24	1450	2780	1650	e2000	e1900	2240	10900	6530	2290	1800	1610	1240
25	1390	2880	1650	e2000	e2200	2190	9470	7840	2440	1680	1530	1260
26	1390	2240	1440	e1900	e2000	2570	9080	7720	2350	1690	1490	1240
27	1420	2290	1480	e2000	e1900	2790	7900	6760	2190	1630	1800	1380
28	1440	2130	1940	e2000	e2000	3280	7570	5630	2350	1490	1860	1280
29	1710	2100	2160	e1900	e2000	4820	6760	5450	1970	1750	1800	1240
30	1460	2100	2020	e1800	---	5770	5880	4980	2130	1680	1500	1170
31	1480	---	2400	e1900	---	5900	---	5260	---	1610	1660	---
TOTAL	46550	63140	53370	59620	56500	85760	238740	146260	128340	68380	50550	43280
MEAN	1502	2105	1722	1923	1948	2766	7958	4718	4278	2206	1631	1443
MAX	1820	2960	2400	2320	2200	5900	13800	7840	9200	3390	2030	1770
MIN	1270	1510	1190	1500	1800	2000	5660	3240	1970	1490	1270	1140

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 2004, BY WATER YEAR (WY)

	2081	1974	1845	1914	2153	2865	5880	4512	3208	2472	1957	1716
MEAN	2081	1974	1845	1914	2153	2865	5880	4512	3208	2472	1957	1716
MAX	4909	2882	2619	2068	2345	4118	9373	6120	4278	4584	2674	2237
(WY)	2003	2003	2002	2002	1999	2000	2002	2002	2004	1999	2002	2000
MIN	1417	1659	1493	1774	1948	2065	3147	2156	2087	1395	1436	1410
(WY)	2001	1999	2001	1999	2004	2001	2000	2000	2000	2003	2001	2001

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1999 - 2004
ANNUAL TOTAL	941764	1040490	
ANNUAL MEAN	2580	2843	2714
HIGHEST ANNUAL MEAN			3244
LOWEST ANNUAL MEAN			2253
HIGHEST DAILY MEAN	11500	May 14	20800
LOWEST DAILY MEAN	954	Sep 6	954
ANNUAL SEVEN-DAY MINIMUM	1150	Sep 5	1110
MAXIMUM PEAK FLOW			22200
MAXIMUM PEAK STAGE			14.98
10 PERCENT EXCEEDS	4610	5960	4670
50 PERCENT EXCEEDS	1940	2000	2090
90 PERCENT EXCEEDS	1330	1460	1390

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04066800 MENOMINEE RIVER AT KOSS, MI

LOCATION.—Lat 45°23'14", long 87°42'07", in NE 1/4, sec.36, T. 35 N., R.28 W., Michigan Meridian, Menominee County, Hydrologic Unit 04030108, on left upstream bank 30 ft from river and 18 ft west of County Trunk JJ (Koss) bridge, 0.3 mi southeast of Koss and 3.4 mi upstream of Grand Rapids Dam.

DRAINAGE AREA.—3,700 mi².

PERIOD OF RECORD.—July 1907 to March 1909 monthly discharge only (published as "at Koss"), July 1913 to September 1981 (published as 04067000 Menominee River below Koss, MI), June 1998 to current year. Records prior to October 1913 published in WSP 244, 264, and 384.

REVISED RECORDS.—WDR WI-80-1: Drainage area.

GAGE.—Water-stage recorder. Elevation of gage is 665 ft above sea level, from topographic map. June 1913 to September 1981, headwater and tailwater gages and generation data entered hourly in daily log sheet by Wisconsin Public Service Corp. employees at powerplant 4 mi downstream. Records of daily discharge furnished by Wisconsin Public Service Corp. Prior to June 1913, chain gage on railroad bridge at Koss.

REMARKS.—Records good except for estimated daily discharges, which are fair. Flow regulated by powerplants by Michigamme Reservoir, capacity, 119,950 acre-ft, by Peavy Pond, capacity, 33,860 acre-ft, on Michigamme River, and by many smaller reservoirs upstream from station. Gage-height telemeter 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	1710	1850	2270	e2300	e2200	e2200	8370	6690	7690	2530	1920	1730
2	1690	2010	e2200	e2300	e2300	e2200	8710	6360	10100	2450	1940	1570
3	1660	1790	e1700	e2400	e2300	e2400	9230	5980	11100	2450	1900	1590
4	1500	2000	e1500	e2100	e2000	e2500	9690	5850	10700	2620	1990	1640
5	1670	2330	e1900	e2000	e2000	e2700	9310	5590	8930	3070	1840	1550
6	1620	2250	e2200	e1900	e2100	e2800	8820	5560	7790	3390	1800	1600
7	1720	2540	e2100	e1900	e2100	e2800	8720	4890	6250	3350	2100	1620
8	1810	2470	e1800	e1800	e2200	e2900	9120	4940	5930	3730	1650	1660
9	1880	1950	e2000	e1900	e2200	e2800	9620	4120	5330	3890	1520	1600
10	1820	1740	e2100	e2200	e2200	e2800	10500	4150	5320	3150	1860	1460
11	1630	1750	e1700	e2000	e2200	e2700	10400	3890	5150	3160	1920	1490
12	1470	1820	e1500	e1900	e2200	e3000	9730	4040	5050	2860	1850	1430
13	1940	1800	e1400	e2100	e2100	e2700	9250	3970	3970	2760	1800	1460
14	1560	1940	e1500	e2300	e2100	e2500	8060	4060	4580	2860	1580	1590
15	1740	2040	e1800	e2200	e2000	e2500	7380	4630	5670	2770	1950	1550
16	1880	1990	e1900	e2100	e2000	e2800	6840	5470	5160	2590	1820	1530
17	1500	2010	e1900	e2100	e2000	e2500	7430	5380	5030	2510	1690	1880
18	1820	2040	e2300	e2200	e2200	e2400	8270	5330	5500	2570	1860	1880
19	1790	2160	e1800	e2200	e2100	e2700	8560	4670	4150	2280	1950	1730
20	1750	2830	e1700	e2100	e2200	e2600	10000	4570	3890	2630	1800	1740
21	1620	2980	e1600	e2000	e2200	e2500	12700	4430	3230	2200	1860	1620
22	1890	2840	e1600	e2000	e2200	e2400	15000	4300	3350	2430	1900	1640
23	1830	3070	e1800	e2000	e2200	e2500	15700	4350	2950	2420	1780	1580
24	1790	3170	e1700	e2000	e2100	e2500	14600	6260	2780	2200	1790	1430
25	1760	3040	e1700	e2000	e2000	e2400	12700	8900	2830	2020	1970	1480
26	1730	3000	e1600	e2100	e2200	e2500	11300	10000	2830	2070	1620	1450
27	1750	2380	e1600	e2100	e2100	e3100	10400	9410	2650	2010	1750	1470
28	1820	2420	e1800	e2100	e2100	e4500	9020	7910	2580	1930	2070	1480
29	1870	2350	e2200	e2100	e2200	e7500	8920	6710	2450	1860	2120	1450
30	1800	2340	e2400	e2100	—	12200	7660	6330	2500	2070	1730	1370
31	1690	—	e2600	e2100	—	12200	—	6110	—	1870	1740	—
TOTAL	53710	68900	57870	64600	62000	106800	296010	174850	155440	80700	57070	47270
MEAN	1733	2297	1867	2084	2138	3445	9867	5640	5181	2603	1841	1576
MAX	1940	3170	2600	2400	2300	12200	15700	10000	11100	3890	2120	1880
MIN	1470	1740	1400	1800	2000	2200	6840	3890	2450	1860	1520	1370

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2004, BY WATER YEAR (WY)

	MEAN	2556	2795	2193	1986	1895	2734	6682	5711	3880	2741	2149	2394
MAX	6178	5597	3588	3174	3176	7973	13650	13180	10780	6159	3800	5538	
(WY)	1929	1917	1919	1969	1969	1973	1916	1960	1916	1953	1972	1928	
MIN	1131	1170	1166	989	864	1199	2479	2220	1708	1111	731	1013	
(WY)	1977	1977	1931	1926	1926	1934	1964	1977	1977	1934	1934	1933	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1913 - 2004

ANNUAL TOTAL	1062540	1225220	
ANNUAL MEAN	2911	3348	
HIGHEST ANNUAL MEAN			3148
LOWEST ANNUAL MEAN			5262
HIGHEST DAILY MEAN	12900	15700	1642
LOWEST DAILY MEAN	1070	1370	1931
ANNUAL SEVEN-DAY MINIMUM	1290	1450	33000
MAXIMUM PEAK FLOW		16000	162
MAXIMUM PEAK STAGE		15.26	402
10 PERCENT EXCEEDS	5670	7830	5940
50 PERCENT EXCEEDS	2000	2200	2330
90 PERCENT EXCEEDS	1500	1620	1400

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04067500 MENOMINEE RIVER NEAR McALLISTER, WI

LOCATION.--Lat 45°19'33", long 87°39'48", in SW 1/4 SE 1/4 sec.17, T.33 N., R.23 E., Wisconsin Meridian, Marinette County, Hydrologic Unit 04030108, on right bank 85 ft downstream from bridge on County Highway JJ, 2.9 mi downstream from Grand Rapids Dam, 2.6 mi east of McAllister, WI, 1.9 mi downstream from Little Cedar River, and at mile 22.6.

DRAINAGE AREA.--3,930 mi².

PERIOD OF RECORD.--March 1945 to September 1961; October 1961 to September 1979, miscellaneous measurements and peaks only; October 1979 to September 1986; October 1986 to March 1987, crest-stage partial-record station; April 1988 to September 1990; April 1993 to September 1995; October 1997 to current year.

REVISED RECORDS.--WDR WI-80-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 622.20 ft above sea level (Michigan Department of Transportation reference mark). Prior to May 15, 1945, nonrecording gage 1,400 ft downstream at same datum; May 16, 1945 to September 1961, water-stage recorder 1,000 ft downstream at same datum; October 1961 to September 1979, crest-stage gage 1,100 ft downstream at same datum; October 1979 to September 1986, water-stage recorder at same site and datum; October 1986 to March 1987, crest-stage gage at same site and datum. April 1988 to September 1990, and April 1993 to September 1995, water-stage recorder at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by powerplants, by Michigamme Reservoir, capacity, 119,950 acre-ft, by Peavy Pond, capacity, 33,860 acre-ft on Michigamme River, and by many smaller reservoirs upstream from station. Gage-height telemeter 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	2000	1650	e2300	e2300	e2200	e2300	9510	6930	8030	2540	1910	1890
2	1930	1950	e2000	e2400	e2300	e2300	9620	6640	10300	2510	2070	1780
3	1810	1720	e1600	e2500	e2300	e2400	10100	6220	11300	2460	2300	1710
4	1630	1860	1490	e2100	e2100	e2600	10500	6130	10900	2770	2370	1800
5	1820	2400	1860	e2000	e2100	e2800	10000	5930	9140	3300	2160	1650
6	1700	2270	2260	e2000	e2200	e2800	9490	5820	7980	3740	2010	1690
7	1710	2310	2170	e1900	e2200	e2800	9380	5200	6590	3670	2100	1710
8	1740	2510	1880	e1800	e2200	e3000	9710	5190	6080	4040	1760	1860
9	1700	2040	2000	e1900	e2300	e2900	10200	4500	5570	4160	1620	1770
10	1610	1820	2160	e2200	e2200	e2900	11100	4400	5360	3370	1790	1580
11	1590	1860	1700	e2100	e2200	e2800	11000	4200	5330	3320	1960	1570
12	1560	1970	e1500	e1900	e2100	e3100	10100	4380	5170	3080	1880	1570
13	2000	1950	e1500	e2100	e2100	e2900	9450	4240	4240	2940	1840	1560
14	1660	2010	1550	e2300	e2100	e2700	8320	4330	4620	3180	1640	1600
15	1690	2130	1810	e2200	e2100	e2700	7630	4740	5690	2980	1930	1450
16	1830	2080	1970	e2200	e2000	e2900	7150	5630	5450	e2900	1830	1480
17	1700	2100	1990	e2200	e2000	e2700	7620	5540	5140	e2700	1770	2040
18	1670	2170	2380	e2300	e2300	e2600	8450	5490	5570	e2800	1780	2110
19	1660	2300	1920	e2300	e2200	e2900	8740	4830	4580	e2500	2020	1790
20	1700	2850	e1800	e2300	e2200	e2800	9840	4710	4080	2740	1800	1940
21	1540	3100	e1700	e2100	e2200	e2700	12300	4580	3590	2400	1790	1760
22	1760	e2800	e1800	e2200	e2200	e2600	14600	4510	3620	2480	1770	1750
23	1720	e3100	e1900	e2100	e2200	e2600	15500	4700	3290	2560	1560	1710
24	1620	e3200	e1900	e2000	e2100	e2600	14400	6560	3080	2180	1540	1480
25	1680	e3100	e1900	e2100	e2100	e2700	12600	9310	3060	1990	1890	1480
26	1580	e3100	e1800	e2100	e2400	e3000	11200	10300	3060	2050	1710	1460
27	1600	e2500	e1700	e2100	e2200	e3700	10400	9830	2800	2100	1780	1490
28	1620	e2400	e2000	e2100	e2200	e4800	9110	8440	2670	1930	2100	1580
29	1680	e2300	e2300	e2100	e2300	7390	8960	7170	2600	1810	2220	1510
30	1870	e2400	e2500	e2100	—	10900	7820	6770	2580	2140	1920	1440
31	1640	—	e2600	e2000	—	12500	—	6520	—	1920	1920	—
TOTAL	53020	69950	59940	66000	63300	110390	304800	183740	161470	85260	58740	50210
MEAN	1710	2332	1934	2129	2183	3561	10160	5927	5382	2750	1895	1674
MAX	2000	3200	2600	2500	2400	12500	15500	10300	11300	4160	2370	2110
MIN	1540	1650	1490	1800	2000	2300	7150	4200	2580	1810	1540	1440

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2004, BY WATER YEAR (WY)

MEAN	2887	3115	2536	2357	2390	3111	6691	5325	3932	3098	2340	2565
MAX	6755	7332	4561	3777	4710	5687	12800	15930	6958	7127	4056	5952
(WY)	1986	1986	1986	1983	1984	1983	1951	1960	1993	1951	1952	1959
MIN	1195	1753	1532	1621	1245	1897	1869	1636	1296	1374	1312	1390
(WY)	1949	1990	1990	1949	1948	1956	1990	1998	1988	1988	1998	1989

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1945 - 2004

ANNUAL TOTAL	1096560	1266820	
ANNUAL MEAN	3004	3461	
HIGHEST ANNUAL MEAN			3372
LOWEST ANNUAL MEAN			5496
HIGHEST DAILY MEAN	12900	15500	31800
LOWEST DAILY MEAN	1040	1440	810
ANNUAL SEVEN-DAY MINIMUM	1260	1490	952
MAXIMUM PEAK FLOW		15800	32500
MAXIMUM PEAK STAGE		15.95	(a)20.00
INSTANTANEOUS LOW FLOW			(b)538
10 PERCENT EXCEEDS	5880	8120	5960
50 PERCENT EXCEEDS	2100	2210	2560
90 PERCENT EXCEEDS	1520	1660	1640

(a) From graph based on gage readings.

(b) Observed.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04096015 GALIEN RIVER NEAR SAWYER, MI

LOCATION.--Lat 41°52'25", long 86°34'30", in SW1/4 SE1/4 sec.12, T.7 S., R.20 W., Berrien County, Hydrologic Unit 04040001, on right bank 10 ft downstream from bridge on Minnich Road, 1.3 mi southeast of Sawyer.

DRAINAGE AREA.--80.7 mi².

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

GAGE.--Water-stage recorder. Datum of gage is 600.92 ft above sea level (levels by Fishbeck, Thompson, Carr & Huber, Inc.).

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

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	25	37	72	76	e33	192	71	46	143	e39	e28	31
2	23	130	66	71	e34	522	65	50	91	e38	e26	29
3	22	196	63	68	e34	256	61	46	72	e38	e24	27
4	26	149	61	64	e34	170	58	43	60	e47	e30	27
5	24	297	64	65	e34	642	57	42	54	e48	e32	25
6	22	219	72	e62	e34	395	56	39	50	e50	e28	26
7	21	126	70	e59	e33	217	54	38	47	e60	e26	25
8	19	96	67	e57	e33	159	53	37	44	e55	e24	24
9	19	81	65	e55	e33	133	51	35	44	e50	e22	24
10	19	75	103	e53	e33	115	50	35	59	e45	22	23
11	20	72	156	e51	e33	106	48	39	141	e40	20	23
12	22	69	101	e50	e33	92	52	37	552	e44	21	22
13	24	63	79	e49	e32	82	47	38	592	e48	22	22
14	39	61	72	e48	e32	81	45	65	262	e44	21	21
15	70	59	67	e47	e32	77	44	82	e175	e41	20	21
16	43	58	65	e46	e32	74	45	59	e120	e38	20	28
17	35	57	64	e45	e32	72	44	51	e95	e35	20	26
18	32	80	62	e44	e33	71	42	47	e80	e33	21	24
19	30	230	61	e43	e37	70	40	45	e65	e31	23	22
20	28	135	59	e42	57	74	40	42	e58	e29	21	21
21	28	100	58	e41	160	71	43	81	e55	e29	21	20
22	29	86	65	e40	145	65	41	126	e60	e51	19	19
23	28	82	80	e40	202	63	46	92	e58	e44	19	19
24	28	286	84	e39	249	67	42	70	e55	e36	18	18
25	34	176	77	e38	216	76	47	68	e52	e33	26	18
26	37	117	69	e37	160	149	44	67	e49	e30	70	18
27	40	100	65	e36	133	148	41	59	e47	e31	43	18
28	43	90	82	e35	119	108	40	53	e45	e30	41	18
29	43	83	123	e35	112	93	39	49	e43	e27	49	19
30	40	77	107	e34	—	83	39	90	e41	e28	43	18
31	38	—	91	e33	—	77	—	261	—	e30	35	—
TOTAL	951	3487	2390	1503	2184	4600	1445	1932	3309	1222	855	676
MEAN	30.7	116	77.1	48.5	75.3	148	48.2	62.3	110	39.4	27.6	22.5
MAX	70	297	156	76	249	642	71	261	592	60	70	31
MIN	19	37	58	33	32	63	39	35	41	27	18	18
CFSM	0.38	1.44	0.96	0.60	0.93	1.84	0.60	0.77	1.37	0.49	0.34	0.28
IN.	0.44	1.61	1.10	0.69	1.01	2.12	0.67	0.89	1.53	0.56	0.39	0.31

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

	MEAN	51.1	73.2	70.6	101	125	116	105	134	88.2	49.4	31.8	24.0
MAX	201	134	174	229	292	228	228	196	449	213	127	51.5	38.5
(WY)	2002	1997	1997	1998	1997	1998	1998	1999	1996	1996	1996	1995	1997
MIN	17.5	20.7	34.0	27.5	29.5	44.1	48.2	52.1	35.8	26.1	17.4	14.2	14.2
(WY)	2000	2000	2000	2003	2003	2000	2004	2001	1998	2002	1999	1999	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1995 - 2004

ANNUAL TOTAL	22621	24554	
ANNUAL MEAN	62.0	67.1	80.5
HIGHEST ANNUAL MEAN			119
LOWEST ANNUAL MEAN			44.5
HIGHEST DAILY MEAN	839	May 10	2640
LOWEST DAILY MEAN	16	Sep 18	13
ANNUAL SEVEN-DAY MINIMUM	18	Sep 15	14
MAXIMUM PEAK FLOW		888	Jun 12
MAXIMUM PEAK STAGE		11.10	Jun 12
INSTANTANEOUS LOW FLOW		16	(a)
ANNUAL RUNOFF (CFSM)	0.768	0.831	0.997
ANNUAL RUNOFF (INCHES)	10.43	11.32	13.55
10 PERCENT EXCEEDS	109	126	148
50 PERCENT EXCEEDS	35	46	46
90 PERCENT EXCEEDS	21	22	21

(a) Aug. 24, 25.

(b) Sept. 27, 1999; Jan. 17, 2000, result of freezeup.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04096405 ST. JOSEPH RIVER AT BURLINGTON, MI

LOCATION.--Lat 42°06'11", long 85°04'48", in SE1/4 SE1/4 sec.23, T.4 S., R.7 W., Calhoun County, Hydrologic Unit 04050001, on right bank 10 ft downstream from bridge on Elevenmile Road in Burlington, 4.1 mi upstream from Burnett Creek, 6.7 mi downstream from Tekonsha Creek, and at mile 161.

DRAINAGE AREA.--206 mi².

PERIOD OF RECORD.--October 1962 to current year. Published as "near Burlington" prior to October 1991.

GAGE.--Water-stage recorder. Elevation of gage is 905 ft above sea level, from topographic map. October 1962 to September 1990 water-stage recorder and October 1990 to September 1991 nonrecording gage at site 2.7 mi upstream at different datum (station 04096400).

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	103	103	190	249	e110	212	302	131	244	143	114	90
2	96	123	179	256	e110	283	286	152	229	135	109	81
3	91	155	169	263	e110	308	262	157	216	129	106	76
4	90	166	162	262	e110	301	240	160	203	146	124	71
5	87	185	157	258	e110	339	221	148	195	145	122	68
6	80	188	153	232	e110	370	207	140	186	151	117	66
7	73	181	149	192	e110	356	197	136	169	182	110	68
8	68	173	146	211	e105	347	188	130	155	200	103	65
9	63	164	144	198	e105	340	181	139	148	198	96	64
10	61	152	149	e200	e105	330	172	225	156	188	92	61
11	57	148	158	e200	e105	320	163	285	228	172	90	58
12	50	143	159	e195	e105	302	157	275	336	161	89	56
13	48	138	153	e185	e105	273	149	254	392	147	88	54
14	61	136	155	e170	e105	253	144	250	410	137	88	52
15	94	134	156	e160	e100	234	141	256	433	127	84	50
16	107	133	155	e150	e100	219	141	249	424	125	81	49
17	116	130	156	e145	e100	207	140	239	434	141	79	48
18	118	147	155	e140	e105	198	139	231	474	148	85	44
19	115	202	153	e135	e115	192	135	214	437	152	89	43
20	111	217	147	e135	e125	215	131	199	405	149	82	42
21	103	209	135	e130	e130	267	130	200	380	129	80	41
22	96	200	153	e130	141	256	132	249	357	150	77	40
23	92	197	156	e125	152	248	131	255	330	149	74	38
24	89	225	178	e125	163	248	132	255	305	137	70	37
25	98	224	186	e120	160	271	134	247	270	126	68	37
26	101	213	188	e120	164	301	133	243	233	117	69	37
27	103	207	187	e115	164	332	133	239	201	121	77	36
28	102	203	189	e115	166	324	130	227	182	128	108	38
29	103	203	222	e115	180	321	125	208	167	140	119	46
30	101	200	261	e115	---	319	120	195	152	135	114	52
31	101	---	256	e110	---	313	---	250	---	127	102	---
TOTAL	2778	5199	5256	5256	3570	8799	4996	6538	8451	4535	2906	1608
MEAN	89.6	173	170	170	123	284	167	211	282	146	93.7	53.6
MAX	118	225	261	263	180	370	302	285	474	200	124	90
MIN	48	103	135	110	100	192	120	130	148	117	68	36
CFSM	0.44	0.84	0.82	0.82	0.60	1.38	0.81	1.02	1.37	0.71	0.46	0.26
IN.	0.50	0.94	0.95	0.95	0.64	1.59	0.90	1.18	1.53	0.82	0.52	0.29

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

MEAN	103	137	175	181	209	303	302	233	192	113	85.2	83.1
MAX	357	378	308	508	510	668	567	426	640	308	270	237
(WY)	1987	1993	1983	1993	2001	1982	1982	1983	1989	1968	1981	1981
MIN	16.4	26.3	26.7	34.6	36.0	74.0	140	96.4	48.9	23.8	16.2	14.5
(WY)	1964	1965	1964	1977	1963	1964	1964	1971	1964	1988	1964	1963

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1963 - 2004

ANNUAL TOTAL	41231	59892	
ANNUAL MEAN	113	164	176
HIGHEST ANNUAL MEAN			270
LOWEST ANNUAL MEAN			47.6
HIGHEST DAILY MEAN	362	Apr 11	1330
LOWEST DAILY MEAN	31	Jul 31	8.0
ANNUAL SEVEN-DAY MINIMUM	36	Aug 25	9.4
MAXIMUM PEAK FLOW			(b)1390
MAXIMUM PEAK STAGE		5.23	(c)6.64
INSTANTANEOUS LOW FLOW		36	(d)
ANNUAL RUNOFF (CFSM)	0.548	0.794	0.855
ANNUAL RUNOFF (INCHES)	7.45	10.82	11.61
10 PERCENT EXCEEDS	209	270	350
50 PERCENT EXCEEDS	94	148	143
90 PERCENT EXCEEDS	42	71	45

(a) Mar. 21, 1982, June 1, 5, 1989.

(b) Gage height 5.82 ft, site and datum then in use.

(c) Present site and datum, backwater from ice.

(d) Sept. 27, 28.

(e) Estimated.

(f) Aug. 9, 10, 11, 1964.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04096515 SOUTH BRANCH HOG CREEK NEAR ALLEN, MI

LOCATION.--Lat 41°56'55", long 84°49'40", in NE1/4 SE1/4 sec.13, T.6 S., R.5 W., Branch County, Hydrologic Unit 04050001, on left bank 12 ft downstream from bridge on U.S. Highway 12, 1.0 mi downstream from Little Hog Creek, and 3.1 mi west of Allen.

DRAINAGE AREA.--48.7 mi².

PERIOD OF RECORD.--October 1969 to current year. Prior to October 1987, published as Hog Creek near Allen.

GAGE.--Water-stage recorder. Elevation of gage is 1,010 ft above sea level, from topographic map. Prior to May 23, 1970, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

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	46	34	52	110	e27	69	81	28	79	28	33	13
2	40	35	48	103	e27	96	71	42	75	26	31	12
3	36	41	43	98	e27	108	63	43	65	24	29	11
4	38	49	40	94	e27	104	58	35	56	37	34	11
5	36	54	40	87	e27	112	53	32	49	48	42	10
6	33	56	41	e79	e27	134	50	30	43	39	37	9.8
7	30	54	39	e71	e27	138	48	31	39	57	31	12
8	28	50	36	e65	e27	125	46	29	34	72	27	10
9	26	46	36	e60	e27	109	44	29	32	67	25	8.7
10	24	42	40	e56	e26	94	42	54	41	56	23	7.6
11	23	43	48	e54	e26	82	41	70	83	47	23	7.6
12	21	44	49	52	e26	72	39	72	136	43	22	7.3
13	21	42	e45	49	e26	e64	37	64	179	39	21	6.6
14	26	39	42	e45	e26	59	36	60	194	35	20	6.2
15	51	37	39	e43	e26	56	34	57	189	31	19	5.8
16	66	36	39	e41	e26	53	33	52	173	32	20	5.5
17	71	35	41	e39	e26	51	33	48	157	64	18	5.3
18	66	38	39	e38	e27	50	33	49	147	77	17	4.9
19	58	56	38	e37	e29	51	31	49	130	74	17	4.7
20	52	69	e36	e36	e31	59	30	46	105	64	17	4.6
21	46	73	e34	e35	e33	77	30	47	84	53	17	4.4
22	41	70	34	e34	e35	77	30	63	70	59	15	4.1
23	38	64	43	e33	38	70	28	71	60	62	14	3.7
24	35	66	57	e32	44	66	27	76	52	53	13	3.4
25	35	71	63	e32	e46	75	28	75	46	45	13	3.4
26	41	71	e61	e31	46	96	28	68	41	39	14	3.4
27	41	68	e57	e30	47	122	26	61	37	43	14	3.3
28	40	63	53	e29	51	128	24	56	34	47	13	3.9
29	39	59	65	e29	58	118	23	50	32	41	18	10
30	37	56	91	e28	---	106	22	47	30	36	17	7.4
31	35	---	111	e28	---	93	---	67	---	34	15	---
TOTAL	1220	1561	1500	1598	936	2714	1169	1601	2492	1472	669	210.6
MEAN	39.4	52.0	48.4	51.5	32.3	87.5	39.0	51.6	83.1	47.5	21.6	7.02
MAX	71	73	111	110	58	138	81	76	194	77	42	13
MIN	21	34	34	28	26	50	22	28	30	24	13	3.3
CFSM	0.81	1.07	0.99	1.06	0.66	1.80	0.80	1.06	1.71	0.98	0.44	0.14
IN.	0.93	1.19	1.15	1.22	0.71	2.07	0.89	1.22	1.90	1.12	0.51	0.16

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2004, BY WATER YEAR (WY)

	MEAN	22.3	32.6	42.0	46.6	55.5	84.1	78.5	55.6	47.7	21.6	18.1	17.1
MAX	75.0	110	80.2	159	155	220	163	114	159	62.4	67.9	60.3	
(WY)	1987	1993	1991	1993	2001	1982	1978	1983	1989	1981	1981	1981	
MIN	2.40	4.53	7.53	6.55	5.79	22.7	34.3	20.1	4.18	1.55	1.86	1.93	
(WY)	2003	2000	2003	2003	2003	2000	1971	1971	1988	1988	1988	1999	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1970 - 2004

ANNUAL TOTAL	11494.2	17142.6	
ANNUAL MEAN	31.5	46.8	
HIGHEST ANNUAL MEAN			43.4
LOWEST ANNUAL MEAN			67.4
HIGHEST DAILY MEAN	122	Apr 7	1993
LOWEST DAILY MEAN	3.2	Jul 31	2003
ANNUAL SEVEN-DAY MINIMUM	4.7	Jul 25	Feb 25 1985
MAXIMUM PEAK FLOW		194	Jun 14
MAXIMUM PEAK STAGE		3.3	Sep 27
INSTANTANEOUS LOW FLOW		3.6	Sep 22
ANNUAL RUNOFF (CFSM)	0.647	4.20	0.58
ANNUAL RUNOFF (INCHES)	8.78	3.1	0.84
10 PERCENT EXCEEDS	66	Sep 28	0.62
50 PERCENT EXCEEDS	28		0.48
90 PERCENT EXCEEDS	5.1		0.891
			12.11
			93
			30
			6.6

(a) Gage height 6.0 ft, from floodmark.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04097187 LONG LAKE NEAR KALAMAZOO, MI

LOCATION.--Lat 42°11'45", long 85°31'03", in SW1/4 NE1/4 sec. 19, T.3 S., R.10 W., Kalamazoo County, Hydrologic Unit 04050001, on east side of lake, 1.7 mi southeast of Portage, and 5 mi south of Kalamazoo.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--April 1958 to March 1963, December 1963 to December 1970, September 1998 to current year.

GAGE.--Water-stage recorder. Datum of gage is 847.59 ft above sea level (City of Portage bench mark). Prior to March 2000, nonrecording gage at different datums.

REMARKS.--The channel connecting Long Lake and Austin Lake is both an inlet and an outlet, depending on relative lake levels. Under natural conditions with fairly high water levels, flow will be from Long to Austin Lake. In recent years, the levels of Austin and West Lakes have been raised by water diverted from Gourdneck Creek plus water piped to Austin Lake from the nearby Pfizer recharge ponds. Under these conditions flow has been from Austin to Long Lake. During the drought years of 1963-64, the channel was dry.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 8.92 ft, June 12, 13, 2004; minimum, 2.63 ft, Apr. 7, 2000.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 8.92 ft, June 12, 13; minimum, 6.29 ft, Oct. 13, 14.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.33	6.50	7.02	7.69	7.95	8.00	8.33	8.27	8.82	8.55	8.43	8.37
2	6.32	6.54	7.04	7.71	7.94	8.07	8.33	8.30	8.82	8.53	8.42	8.36
3	6.33	6.63	—	7.73	7.95	8.05	8.32	8.29	8.79	8.52	8.42	8.35
4	6.35	6.66	7.09	7.74	7.95	8.06	8.32	8.27	8.77	8.54	8.45	8.34
5	6.35	6.72	7.12	7.78	7.96	8.14	8.31	8.28	8.75	8.53	8.44	8.33
6	6.34	6.73	7.14	7.79	7.96	8.16	8.31	8.27	8.73	8.53	8.42	8.33
7	6.33	6.73	7.16	7.80	7.96	8.17	8.32	8.28	8.71	8.58	8.40	8.33
8	6.33	6.72	7.18	7.81	—	8.19	8.31	8.29	8.69	8.56	8.40	8.31
9	6.33	6.72	7.21	7.82	7.97	8.19	8.31	8.33	8.67	8.55	8.39	8.29
10	6.32	6.73	7.25	7.83	7.96	8.19	8.31	8.48	8.71	8.54	8.39	8.28
11	6.32	6.74	7.29	7.84	7.96	8.19	8.30	8.57	8.79	8.53	8.39	8.26
12	6.31	6.75	7.31	7.84	7.96	8.18	8.29	8.56	8.90	8.52	8.38	8.25
13	6.30	6.75	7.33	7.85	7.95	8.18	8.29	8.59	8.91	8.51	8.38	8.24
14	6.36	6.74	7.35	7.86	7.95	8.18	8.29	8.63	8.90	8.49	8.37	8.23
15	6.44	6.74	7.37	7.87	—	8.17	8.29	8.65	8.89	8.46	8.37	8.21
16	6.44	6.74	7.39	7.88	—	8.17	8.30	8.63	8.87	8.45	8.36	8.24
17	6.44	6.73	7.42	7.88	—	8.17	8.31	8.64	8.86	8.43	8.35	8.23
18	6.43	6.81	7.45	7.89	—	8.18	8.32	8.65	8.85	8.41	8.35	8.21
19	6.43	6.91	7.47	7.88	—	8.18	8.31	8.64	8.82	8.40	8.34	8.19
20	6.43	6.90	7.49	7.88	7.96	8.21	8.30	8.62	8.78	8.39	8.33	8.18
21	6.43	6.89	7.50	7.88	7.97	8.21	8.30	8.66	8.76	8.39	8.32	8.16
22	6.42	6.87	7.51	7.88	7.98	8.21	8.30	8.75	8.75	8.49	8.31	8.15
23	6.41	6.88	7.54	7.88	7.97	8.21	8.29	8.78	8.73	8.48	8.30	8.14
24	6.41	6.96	7.57	7.89	7.97	8.22	8.28	8.80	8.71	8.47	8.30	8.13
25	6.45	6.94	7.58	—	7.97	8.24	8.27	8.81	8.68	8.46	8.30	8.11
26	6.46	6.93	7.59	7.89	7.97	8.30	8.27	8.81	8.65	8.45	8.33	8.10
27	6.46	6.92	7.60	7.91	7.96	8.32	8.26	8.79	8.63	8.45	8.33	8.08
28	6.48	6.93	7.62	7.93	7.96	8.33	8.24	8.78	8.61	8.44	8.38	8.07
29	6.50	6.97	7.66	7.93	7.95	8.34	8.23	8.76	8.58	8.44	8.40	8.06
30	6.50	7.00	7.67	7.95	—	8.34	8.23	8.78	8.57	8.43	8.39	8.04
31	6.50	—	7.68	7.95	—	8.34	—	8.84	—	8.44	8.38	—
MEAN	6.40	6.79	—	—	—	8.20	8.29	8.57	8.76	8.48	8.37	8.22
MAX	6.50	7.00	—	—	—	8.34	8.33	8.84	8.91	8.58	8.45	8.37
MIN	6.30	6.50	—	—	—	8.00	8.23	8.27	8.57	8.39	8.30	8.04

STREAMS TRIBUTARY TO LAKE MICHIGAN

04097188 AUSTIN LAKE NEAR KALAMAZOO, MI

LOCATION.--Lat 42°11'27", long 85°33'03", in NE1/4 SE1/4 sec. 23, T.3 S., R 11 W., Kalamazoo County, Hydrologic Unit 04050001, at outlet of discharge pipe from Pfizer recharge ponds, 1.3 mi southeast of Portage, and 5.0 mi south of Kalamazoo.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.—July 1944 to July 1950, April 1958 to March 1963, December 1963 to September 1979, September 1998 to current year.

GAGE.--Water-stage recorder. Datum of gage is 850.15 ft above sea level (City of Portage bench mark). Prior to May 31, 2002, nonrecording gage at different datums.

REMARKS.—The principal inlet is the diversion canal from Gourdneck Creek which flows through West Lake into the northwest side of Austin Lake. At times, depending on relative lake levels, water will flow through a connecting channel from Long Lake into the northeast side of Austin Lake. At other times the flow will be reversed, or if both lake levels are low, there will be no flow. Inflow to Austin Lake is also supplemented at times by water discharge from the nearby Pfizer recharge ponds. The outlet leaves the southeast end of the lake and flows south about 1.5 mi to Gourdneck Creek. Surface area is 1,050 acres. Established legal level is 855.64 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum gage height observed, 6.72 ft, May 2-4, 1950, present datum; minimum observed, 2.23 ft, Oct. 20, Dec. 10, 1964, present datum.

EXTREMES FOR CURRENT YEAR.—Maximum gage height, 6.40 ft, June 14; minimum, 5.55 ft, Oct. 1.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.58	5.67	6.01	5.77	5.75	5.64	5.89	5.78	6.32	6.06	6.00	5.95
2	5.57	5.71	6.00	5.78	5.75	5.69	5.89	5.81	6.30	6.05	5.99	5.94
3	5.60	5.77	5.99	5.78	5.76	5.67	5.88	5.80	6.28	6.05	5.98	5.93
4	5.60	5.79	5.97	5.77	5.76	5.68	5.86	5.80	6.26	6.10	6.02	5.92
5	5.60	5.82	5.96	5.80	5.75	5.75	5.87	5.78	6.25	6.09	6.00	5.92
6	5.59	5.81	5.96	5.81	5.75	5.75	5.88	5.78	6.23	6.10	5.98	5.92
7	5.59	5.79	5.94	5.80	5.75	5.74	5.88	5.78	6.21	6.15	5.96	5.91
8	5.59	5.77	5.93	5.80	5.74	5.75	5.88	5.79	6.19	6.12	5.95	5.88
9	5.60	5.75	5.92	5.78	5.74	5.73	5.88	5.85	6.17	6.10	5.95	5.86
10	5.60	5.75	5.94	5.78	5.72	5.72	5.87	5.98	6.20	6.08	5.94	5.85
11	5.60	5.75	5.94	5.77	5.72	5.72	5.86	6.06	6.29	6.08	5.95	5.84
12	5.60	5.75	5.93	5.76	5.71	5.70	5.85	6.07	6.33	6.07	5.95	5.83
13	5.60	5.72	5.91	5.76	5.71	5.71	5.84	6.09	6.33	6.06	5.94	5.83
14	5.64	5.74	5.89	5.75	5.70	5.73	5.84	6.13	6.33	6.03	5.94	5.82
15	5.72	5.72	5.89	5.75	5.69	5.73	5.85	6.15	6.31	6.00	5.93	5.81
16	5.71	5.72	5.88	5.74	5.68	5.72	5.85	6.15	6.29	5.99	5.92	5.82
17	5.69	5.73	5.88	5.75	5.68	5.73	5.85	6.15	6.29	5.99	5.92	5.80
18	5.69	5.83	5.87	5.75	5.68	5.74	5.88	6.17	6.28	5.98	5.91	5.79
19	5.68	5.93	5.87	5.75	5.67	5.75	5.85	6.16	6.24	5.97	5.90	5.77
20	5.69	5.95	5.86	5.74	5.68	5.77	5.82	6.15	6.21	5.97	5.89	5.76
21	5.67	5.93	5.84	5.74	5.70	5.76	5.84	6.20	6.21	5.98	5.88	5.74
22	5.66	5.93	5.83	5.74	5.69	5.77	5.81	6.28	6.20	6.10	5.87	5.73
23	5.66	5.96	5.83	5.74	5.69	5.77	5.80	6.30	6.19	6.07	5.86	5.72
24	5.66	6.06	5.83	5.75	5.69	5.78	5.79	6.30	6.17	6.04	5.87	5.71
25	5.69	6.04	5.81	5.75	5.68	5.81	5.81	6.30	6.15	6.03	5.88	5.68
26	5.70	6.02	5.79	5.75	5.67	5.86	5.79	6.30	6.13	6.02	5.91	5.66
27	5.69	6.02	5.78	5.76	5.65	5.89	5.76	6.29	6.11	6.01	5.92	5.65
28	5.70	6.03	5.77	5.77	5.63	5.90	5.79	6.27	6.10	6.00	5.95	5.64
29	5.70	6.06	5.80	5.77	5.62	5.91	5.75	6.26	6.09	6.00	5.98	5.64
30	5.69	6.05	5.79	5.77	—	5.91	5.74	6.29	6.08	6.00	5.97	5.63
31	5.69	—	5.78	5.76	—	5.90	—	6.35	—	6.00	5.96	—
MEAN	5.65	5.85	5.88	5.76	5.70	5.76	5.84	6.08	6.22	6.04	5.94	5.80
MAX	5.72	6.06	6.01	5.81	5.76	5.91	5.89	6.35	6.33	6.15	6.02	5.95
MIN	5.57	5.67	5.77	5.74	5.62	5.64	5.74	5.78	6.08	5.97	5.86	5.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04097500 ST. JOSEPH RIVER AT THREE RIVERS, MI

LOCATION.--Lat 41°56'25", long 85°37'58", in SW1/4 SE1/4 sec.18, T.6 S., R.11 W., St. Joseph County, Hydrologic Unit 04050001, on right bank in Scidmore Park at Three Rivers, 250 ft downstream from Rocky River, and at mile 112.

DRAINAGE AREA.--1,350 mi².

PERIOD OF RECORD.--May 1953 to September 1983, October 1992 to current year.

REVISED RECORDS.--WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 781.34 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records good. Flow regulated by powerplant upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge since at least 1918, 8,260 ft³/s, Apr. 27, 1950.

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	677	700	1680	1930	1030	1460	2230	872	2340	1110	1030	814
2	640	697	1620	2140	945	1780	2070	922	2320	1110	920	774
3	636	1050	1590	1950	1040	2080	1670	1030	2260	1010	837	754
4	556	905	1520	1790	983	2460	1730	1170	1900	1030	714	681
5	425	1250	1390	1870	984	2420	1740	1110	1790	1250	752	535
6	598	1410	1360	1790	1020	2560	1610	1110	1710	1290	704	509
7	644	1510	1310	1390	1020	2670	1430	1080	1350	1460	715	602
8	565	1370	1350	1460	949	2700	1300	1020	1320	1420	681	542
9	514	1290	1260	1480	911	2630	1470	898	1280	1470	662	534
10	478	1210	1270	1360	914	2500	1400	1010	1320	1410	689	523
11	385	1190	1330	1340	908	2360	1290	1310	1660	1370	723	508
12	406	1180	1410	1460	904	2240	1250	1820	2070	1470	649	477
13	528	1050	1370	1440	930	2030	1220	1800	2640	1330	630	464
14	580	1080	1320	1460	900	1830	1200	1910	3070	1240	603	467
15	651	1070	1230	1350	868	1800	1210	1880	3210	956	591	469
16	660	961	1240	1100	858	1760	1140	1870	3180	1020	559	479
17	712	949	1270	1120	828	1750	1050	1590	3250	977	515	487
18	694	1120	1300	1180	804	1710	1040	1710	3160	950	593	503
19	757	1450	1300	1210	982	1580	966	1740	2960	976	628	483
20	780	1590	1220	1130	1020	1360	987	1390	2580	1220	501	515
21	721	1880	1120	1020	910	1550	1000	1380	2500	1310	420	475
22	657	1810	1160	925	875	1710	960	2090	2490	1480	460	454
23	598	1820	1200	1030	1160	1790	923	1830	2290	1550	525	452
24	594	1900	1280	873	1140	1980	933	2290	2120	1480	519	434
25	604	1990	1390	888	1170	1870	862	2160	1780	1450	431	419
26	640	2020	1530	1090	1230	1920	1010	1900	1750	1400	420	418
27	717	2060	1510	1030	1200	2200	900	1820	1640	1360	610	423
28	749	1940	1430	1010	1220	2300	874	1760	1530	1270	577	430
29	736	1830	1570	1000	1290	2300	866	1680	1460	908	797	441
30	733	1780	1670	1030	---	2320	847	1700	1060	937	847	433
31	719	---	1770	1100	---	2320	---	1940	---	1010	830	---
TOTAL	19354	42062	42970	40946	28993	63940	37178	47792	63990	38224	20132	15499
MEAN	624	1402	1386	1321	1000	2063	1239	1542	2133	1233	649	517
MAX	780	2060	1770	2140	1290	2700	2230	2290	3250	1550	1030	814
MIN	385	697	1120	873	804	1360	847	872	1060	908	420	418
CFSM	0.46	1.04	1.03	0.98	0.74	1.53	0.92	1.14	1.58	0.91	0.48	0.38
IN.	0.53	1.16	1.18	1.13	0.80	1.76	1.02	1.32	1.76	1.05	0.55	0.43

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2004, BY WATER YEAR (WY)

	MEAN	746	938	1112	1198	1361	1943	1993	1630	1208	795	643	627
MAX	2081	2582	2053	3493	3148	3969	3320	2870	2587	1780	1639	1628	
(WY)	2002	1993	1983	1993	2001	1982	1982	1983	1980	1978	1981	1980	
MIN	218	294	288	328	328	488	793	650	286	243	187	199	
(WY)	1964	1965	1964	1963	1963	1964	1964	1964	1964	1964	1964	1964	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1953 - 2004

ANNUAL TOTAL	308000	461080	
ANNUAL MEAN	844	1260	1185
HIGHEST ANNUAL MEAN			1850
LOWEST ANNUAL MEAN			365
HIGHEST DAILY MEAN	2340	Apr 8	7810
LOWEST DAILY MEAN	212	Jul 27	78
ANNUAL SEVEN-DAY MINIMUM	261	Jul 26	126
MAXIMUM PEAK FLOW		3350	8180
MAXIMUM PEAK STAGE		6.73	10.69
INSTANTANEOUS LOW FLOW		306	
ANNUAL RUNOFF (CFSM)	0.625	0.933	0.878
ANNUAL RUNOFF (INCHES)	8.49	12.71	11.93
10 PERCENT EXCEEDS	1590	2070	2290
50 PERCENT EXCEEDS	659	1180	973
90 PERCENT EXCEEDS	381	532	410

STREAMS TRIBUTARY TO LAKE MICHIGAN

04097540 PRAIRIE RIVER NEAR NOTTAWA, MI

LOCATION.--Lat 41°53'18", long 85°24'34", in NW1/4 SW1/4 sec.6, T.7 S., R.9 W., St. Joseph County, Hydrologic Unit 04050001, on left bank 10 ft upstream from bridge on State Highway 66, 3.0 mi upstream from unnamed tributary, and 3.0 mi southeast of Nottawa.

DRAINAGE AREA.--106 mi².

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

GAGE.--Water-stage recorder. Elevation of gage is 850 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Since 1987, some diversion by pumping for sprinkler irrigation. Several measurements of water temperature were made during the year.

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	65	70	116	151	e78	121	135	80	160	104	91	59
2	60	71	113	145	e77	146	128	92	163	97	86	57
3	58	75	109	142	e77	158	122	92	154	96	81	55
4	59	75	104	136	e77	157	117	88	143	102	83	53
5	58	86	103	132	e77	168	114	85	132	107	81	53
6	56	90	103	124	e76	174	111	82	120	119	79	54
7	54	88	102	112	e76	182	110	97	110	174	77	56
8	52	84	100	106	e76	180	108	104	103	170	75	e54
9	50	80	99	111	e75	171	106	106	101	162	72	e52
10	49	76	103	106	75	161	103	146	115	152	69	49
11	49	76	107	102	e74	151	101	149	163	138	66	47
12	50	76	105	99	73	142	98	137	245	128	62	47
13	50	74	101	98	73	134	95	129	336	119	60	48
14	58	72	97	96	e72	130	93	132	375	112	59	47
15	75	70	94	e93	e72	126	91	132	366	102	57	46
16	79	70	94	91	e71	122	89	124	333	95	57	47
17	79	68	95	89	e71	118	88	115	293	117	58	46
18	75	76	93	87	71	116	88	113	259	142	59	47
19	72	107	92	85	70	114	87	108	233	141	59	47
20	69	126	91	e83	73	117	85	103	214	129	57	46
21	69	136	88	e82	81	121	85	106	194	120	56	45
22	72	131	88	e81	86	123	83	126	183	162	55	43
23	67	124	98	e81	90	120	80	137	172	172	54	43
24	63	135	110	e80	92	117	77	135	160	162	53	42
25	68	137	115	e80	93	121	78	129	151	145	52	42
26	74	134	114	e79	96	138	77	123	140	130	52	43
27	75	127	110	e79	99	156	75	117	134	119	50	43
28	75	122	107	e79	102	163	73	110	127	111	51	43
29	74	123	125	e78	107	160	72	104	119	105	60	45
30	74	120	146	e78	—	152	72	107	113	99	61	46
31	73	—	154	e78	—	144	—	140	—	95	60	—
TOTAL	2001	2899	3276	3063	2330	4403	2841	3548	5611	3926	1992	1445
MEAN	64.5	96.6	106	98.8	80.3	142	94.7	114	187	127	64.3	48.2
MAX	79	137	154	151	107	182	135	149	375	174	91	59
MIN	49	68	88	78	70	114	72	80	101	95	50	42
CFSM	0.61	0.91	1.00	0.93	0.76	1.34	0.89	1.08	1.76	1.19	0.61	0.45
IN.	0.70	1.02	1.15	1.07	0.82	1.55	1.00	1.25	1.97	1.38	0.70	0.51

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

	MEAN	64.9	82.5	104	106	116	151	154	123	102	65.5	53.3	54.1
MAX	150	222	177	258	240	336	259	226	254	144	148	135	135
(WY)	1987	1993	1983	1993	2001	1982	1978	1983	1989	1986	1981	1997	1997
MIN	17.2	22.9	25.2	29.7	29.1	47.2	75.6	58.7	32.9	13.3	15.8	14.1	14.1
(WY)	1965	1965	1964	1963	1963	1964	1964	1963	1964	1988	1964	1964	1964

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1963 - 2004

ANNUAL TOTAL	26033						37335						
ANNUAL MEAN	71.3						102			97.8			
HIGHEST ANNUAL MEAN										153		1993	
LOWEST ANNUAL MEAN										33.5		1964	
HIGHEST DAILY MEAN	214					May 13	375		Jun 14	782		Feb 26	1985
LOWEST DAILY MEAN	18					Aug 21	42		Sep 24	5.7		Aug 5	1988
ANNUAL SEVEN-DAY MINIMUM	24					Aug 18	43		Sep 22	7.9		Jul 31	1988
MAXIMUM PEAK FLOW							382		Jun 14	797		Feb 26	1985
MAXIMUM PEAK STAGE							5.17		Jun 14	6.30		Feb 26	1985
INSTANTANEOUS LOW FLOW							42		(a)	5.4		(b)	
ANNUAL RUNOFF (CFSM)	0.673						0.962			0.923			
ANNUAL RUNOFF (INCHES)	9.14						13.10			12.54			
10 PERCENT EXCEEDS	119						152			174			
50 PERCENT EXCEEDS	66						95			84			
90 PERCENT EXCEEDS	40						54			36			

(a) Part or all of each day Sept. 23-28.

(b) Aug. 4, 5, 1988.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04099000 ST. JOSEPH RIVER AT MOTTVILLE, MI

LOCATION.--Lat 41°48'03", long 85°45'22", in SW1/4 sec.6, T.8 S., R.12 W., St. Joseph County, Hydrologic Unit 04050001, on right bank 575 ft upstream from bridge on U.S. Highway 12 in Mottville, 0.4 mi downstream from American Electric Power Co. hydroelectric plant, 4 mi upstream from Pigeon River, and at mile 96.

DRAINAGE AREA.--1,866 mi².

PERIOD OF RECORD.--October 1923 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 1387: 1930, 1932, 1938, 1940-42, 1945. WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 755.3 ft above sea level (American Electric Power Co. bench mark). Prior to Oct. 1, 1951, at site 0.4 mi upstream at datum 4.2 ft higher.

REMARKS.--Records good. Flow regulated by powerplants upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	1100	1070	2370	2500	1650	1890	2910	1280	3060	1660	1680	1370
2	1020	1070	2270	2710	1360	2320	2780	1310	3160	1690	1690	1290
3	1040	1400	2200	2750	1440	2690	2450	1410	3130	1600	1520	1140
4	926	1330	2180	2480	1460	3070	2330	1520	2850	1640	1380	1230
5	754	1660	2050	2500	1410	3210	2350	1510	2440	1830	1450	973
6	905	1790	1960	2470	1450	3280	2230	1510	2420	1980	1290	877
7	996	1880	1900	2080	1470	3410	2120	1630	2220	2150	1300	1030
8	872	1820	2040	2020	1400	3490	1760	1480	1950	2160	1240	918
9	817	1790	1780	2110	1290	3410	2020	1360	1880	2300	1240	888
10	774	1710	1840	1990	1270	3340	1910	1530	2130	2310	938	888
11	675	1660	1880	1760	1400	3150	1740	1880	2530	2190	1150	874
12	665	1640	1920	2100	1310	3030	1680	2390	2980	2430	1140	795
13	816	1570	1920	2010	1310	2830	1650	2420	3550	2170	1120	798
14	983	1380	1860	2000	1280	2600	1630	2660	3900	2130	1070	791
15	1040	1420	1790	1910	1240	2520	1650	2580	4270	1590	1090	795
16	1040	1400	1750	1710	1140	2450	1590	2510	4230	1720	1030	877
17	1120	1310	1780	1540	1180	2410	1510	2390	4330	1610	929	789
18	1060	1490	1780	1670	1170	2390	1420	2170	4400	1610	1030	855
19	1130	2060	1810	1680	1350	2320	1390	2400	4160	1570	1110	800
20	1190	2130	1760	1610	1410	2060	1380	2130	3820	1770	921	870
21	1190	2340	1600	1370	1330	2170	1420	1640	3460	1890	839	885
22	1050	2400	1640	1300	1200	2180	1360	2700	3470	2500	829	719
23	988	2380	1730	1410	1520	2340	1300	2610	3290	2450	1130	799
24	994	2580	1810	1390	1530	2510	1320	3000	3090	2400	1100	738
25	993	2600	1860	1390	1540	2570	1220	3180	2840	2360	845	753
26	1000	2660	2010	1480	1630	2640	1400	2730	2630	2280	761	730
27	1100	2720	2070	1460	1610	2800	1240	2570	2550	e2100	806	740
28	1150	2650	1980	1470	1650	2980	1210	2390	2400	e2000	1050	756
29	1100	2510	2170	1470	1710	2980	1240	2260	2290	1580	1360	769
30	1090	2450	2280	1570	---	2970	1190	2290	1840	1550	1400	761
31	1090	---	2380	1750	---	2980	---	2630	---	1610	1400	---
TOTAL	30668	56870	60370	57660	40710	84990	51400	66070	91270	60830	35838	26498
MEAN	989	1896	1947	1860	1404	2742	1713	2131	3042	1962	1156	883
MAX	1190	2720	2380	2750	1710	3490	2910	3180	4400	2500	1690	1370
MIN	665	1070	1600	1300	1140	1890	1190	1280	1840	1550	761	719
CFSM	0.53	1.02	1.04	1.00	0.75	1.47	0.92	1.14	1.63	1.05	0.62	0.47
IN.	0.61	1.13	1.20	1.15	0.81	1.69	1.02	1.32	1.82	1.21	0.71	0.53

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 2004, BY WATER YEAR (WY)

	MEAN	1112	1351	1568	1732	1886	2552	2661	2152	1707	1171	955	956
MAX	3290	3378	4065	4589	3956	5335	7646	5009	5004	2953	2413	2286	
(WY)	1987	1993	1928	1993	2001	1982	1950	1943	1989	1937	1981	1980	
MIN	372	483	507	531	505	751	904	786	509	407	335	357	
(WY)	1964	1965	1964	1963	1963	1964	1931	1931	1964	1988	1964	1964	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1924 - 2004

ANNUAL TOTAL	469079	663174	
ANNUAL MEAN	1285	1812	(a)1651
HIGHEST ANNUAL MEAN			2856
LOWEST ANNUAL MEAN			580
HIGHEST DAILY MEAN	3140	4400	10700
LOWEST DAILY MEAN	479	665	39
ANNUAL SEVEN-DAY MINIMUM	532	748	278
MAXIMUM PEAK FLOW		4610	(b)11400
MAXIMUM PEAK STAGE		6.46	(c)10.76
INSTANTANEOUS LOW FLOW		285	
ANNUAL RUNOFF (CFSM)	0.689	0.971	0.885
ANNUAL RUNOFF (INCHES)	9.35	13.22	12.02
10 PERCENT EXCEEDS	2210	2790	3010
50 PERCENT EXCEEDS	1050	1660	1400
90 PERCENT EXCEEDS	681	914	645

(a) Does not include water year 1924.

(b) Gage height 10.41 ft.

(c) Present datum.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04101000 ST. JOSEPH RIVER AT ELKHART, IN

LOCATION.--Lat 41°41'30", long 85°58'30", in SW1/4 NE1/4 sec.5, T.37 N., R.5 E., Elkhart County, Hydrologic Unit 04050001, on left bank 200 ft downstream from Elkhart River, 200 ft upstream from Main Street bridge in Elkhart, IN, 2,000 ft downstream from Christiana Creek, 0.5 mi downstream from Elkhart Hydroelectric Plant, and at mile 76.5.

DRAINAGE AREA.--3,370 mi².

PERIOD OF RECORD.--August 1947 to current year. Gage heights at site 0.8 mi downstream at different datum from September 1924 to March 1926 are available from the Indiana District Office.

REVISED RECORDS.--WSP 2111: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 700.00 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated by Elkhart Hydroelectric Plant.

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	2230	2080	3840	4550	3360	3800	4360	2320	6170	3150	2670	2270
2	2120	2050	3700	4600	3080	4700	4210	2430	5800	3070	2680	2140
3	2100	2250	3580	4700	3030	4900	3900	2480	5240	2980	2480	1950
4	2160	2370	3540	4440	2950	4980	3670	2530	4680	3040	2460	2130
5	1910	2690	3470	4390	2830	5770	3610	2540	4060	3170	2500	1870
6	1960	2860	3370	4270	2870	6140	3530	2500	3870	3330	2330	1750
7	2070	2870	3310	3580	2870	5190	2890	2590	3690	3450	2300	1890
8	1970	2800	3390	3550	2740	5850	3110	2520	3280	3510	2230	1730
9	1870	2720	3440	3820	2600	5680	3190	2460	3290	3470	2250	1700
10	1810	2670	3460	3620	2570	5550	3140	2580	3470	3390	2080	1670
11	1680	2600	3660	3620	2610	5370	2990	2910	4130	3220	2150	1640
12	1600	2580	3490	3750	2540	5190	2890	3210	6550	3370	2150	1580
13	1670	2550	3380	3640	2540	4890	2840	3320	8990	3220	2120	1550
14	2020	2360	3280	3530	2520	4600	2820	3730	8840	3130	2040	1530
15	2180	2310	3220	3410	2430	4420	2820	3750	8410	2750	1980	1500
16	2240	2320	3190	3220	2230	4250	2750	3620	7910	2710	1960	1630
17	2230	2260	3200	2970	2380	4130	2660	3540	7550	2670	1850	1540
18	2170	2550	3190	3170	2360	4070	2570	3370	7340	2720	1890	1540
19	2190	3800	3190	3100	2490	3960	2580	3530	7020	2620	1990	1500
20	2250	4150	3130	3010	2600	3770	2470	3440	6610	e2720	1910	1550
21	2280	3880	3000	2670	2890	3750	2530	3160	6110	2860	1790	1550
22	2150	3770	2980	2520	2730	3590	2520	3840	5980	4210	1740	1440
23	2070	3680	3340	2430	3070	3620	2400	4170	5710	4550	1900	1450
24	2030	4330	3990	2690	3230	3820	2420	4420	5340	3970	1910	1420
25	2120	4460	3950	2480	3180	3900	2320	4920	4980	3650	1900	1420
26	2150	4290	3750	2460	3310	4230	2410	4260	4560	3440	1740	1400
27	2230	4230	3700	2780	3340	4440	2360	3930	4350	3260	1560	1390
28	2250	4140	3640	e3090	3380	4540	2230	3680	4090	3120	1970	1440
29	2170	3990	4150	e2890	3470	4530	2210	3490	3890	2840	2310	1490
30	2120	3900	4820	2990	—	4470	2230	3590	3540	2590	2390	1460
31	2070	—	4770	3270	—	4440	—	5320	—	2660	2300	—
TOTAL	64070	93510	110120	105210	82200	143280	87160	104150	165450	98840	65530	49120
MEAN	2067	3117	3552	3394	2834	4622	2905	3360	5515	3188	2114	1637
MAX	2280	4460	4820	4700	3470	6140	4360	5320	8990	4550	2680	2270
MIN	1600	2050	2980	2430	2230	3590	2210	2320	3280	2590	1560	1390
CFSM	0.61	0.92	1.05	1.01	0.84	1.37	0.86	1.00	1.64	0.95	0.63	0.49
IN.	0.71	1.03	1.22	1.16	0.91	1.58	0.96	1.15	1.83	1.09	0.72	0.54

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2004, BY WATER YEAR (WY)

	MEAN	2195	2623	3171	3542	3866	5022	5113	4122	3299	2365	1958	1881
MAX	5752	5883	5795	9270	7039	10760	12690	7725	7535	4409	4180	3855	
(WY)	1987	1993	1991	1993	1968	1982	1950	1956	1989	1968	1981	1981	
MIN	791	856	958	1127	1120	1679	2633	1911	1280	898	737	721	
(WY)	1964	1965	1964	1964	1963	1964	1958	1958	1988	1988	1964	1964	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1948 - 2004

ANNUAL TOTAL	837480						1168640						
ANNUAL MEAN	2294						3193				3259		
HIGHEST ANNUAL MEAN											5264		1950
LOWEST ANNUAL MEAN											1283		1964
HIGHEST DAILY MEAN	5630				May 10		8990		Jun 13		18500		Mar 21 1982
LOWEST DAILY MEAN	1020				Jan 18		1390		Sep 27		336		Aug 5 1964
ANNUAL SEVEN-DAY MINIMUM	1140				Jan 15		1420		Sep 22		561		Aug 2 1964
MAXIMUM PEAK FLOW							9970		Jun 13		18800		Feb 27 1985
MAXIMUM PEAK STAGE							23.46		Jun 13		27.91		Mar 21 1982
ANNUAL RUNOFF (CFSM)	0.681						0.947				0.967		
ANNUAL RUNOFF (INCHES)	9.24						12.90				13.14		
10 PERCENT EXCEEDS	3810						4600				5780		
50 PERCENT EXCEEDS	2100						3000				2780		
90 PERCENT EXCEEDS	1200						1890				1380		

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04101500 ST. JOSEPH RIVER AT NILES, MI

LOCATION.—Lat 41°49'45", long 86°15'35", in SW1/4 sec.26, T.7 S., R.17 W., Berrien County, Hydrologic Unit 04050001, on right bank 100 ft upstream from Main Street Bridge in Niles, 0.6 mi downstream from dam at French Paper Co., 1.3 mi upstream from Dowagiac River, and at mile 44.

DRAINAGE AREA.—3,666 mi².

PERIOD OF RECORD.—October 1930 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.—WSP 1387: 1931, 1933-36, 1940-43, 1945-46(M). WSP 1911: Drainage area.

GAGE.—Water-stage recorder. Datum of gage is 633.02 ft above sea level. Prior to Oct. 1, 1968, at datum 2.00 ft higher. Oct. 1, 1930 to Feb. 11, 1931, nonrecording gage on Main Street Bridge, and Feb. 12 to June 30, 1931, nonrecording gage 50 ft upstream from present site (gage heights referred to sea level datum). Oct. 1, 1943 to Apr. 12, 1970, auxiliary gage was headwater gage at hydroelectric plant at Buchanan Dam, 8 mi downstream from base gage at different datum. Since Apr. 13, 1970, auxiliary water-stage recorder at sewage-treatment plant, 1.1 mi downstream from base gage at same datum.

REMARKS.—Records good. Flow regulated by powerplants upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	2550	2490	4560	5160	3390	4350	4930	2740	7230	3660	3260	2720
2	2550	2440	4350	5070	3200	5520	4770	2850	6930	3540	3280	2640
3	2300	2720	4210	5250	3080	5660	4570	2810	6050	3510	3250	2780
4	2540	2850	4040	5120	3080	5560	4230	2910	5500	3510	3270	2590
5	2310	3320	4070	4920	3030	6820	4100	2970	4680	3510	e3050	2470
6	2240	3590	3960	4760	3000	7440	4060	2820	4390	3740	e2750	2200
7	2390	3510	3730	4030	3060	6810	3880	2990	4180	3720	2440	2110
8	2310	3430	3860	3870	3130	6580	3620	2840	3810	4070	2630	2310
9	2180	3330	4000	4260	2920	6400	3560	2910	3690	3840	2540	1930
10	2020	3240	4020	4050	2860	6170	3680	2930	3850	3760	2880	1910
11	1990	3150	4370	4150	2870	5960	3470	3240	4620	3750	2230	1860
12	1740	3100	4150	4130	2840	5850	3320	3530	8210	3680	2550	1920
13	1790	3100	3990	4230	2830	5510	3330	4040	11800	3730	2360	1910
14	2350	2890	3830	3990	2680	5160	3190	4250	11500	3680	2420	1730
15	2660	2830	3760	3840	2820	5010	3220	4460	10200	3260	2230	1780
16	2640	2850	3620	3800	2520	4780	3210	4290	9440	3020	2200	1840
17	2620	2820	3710	3350	2540	4650	3080	4260	8750	3030	2090	1860
18	2500	3220	3700	3600	2620	4600	2980	4090	8410	3140	2110	1630
19	2480	5150	3590	3520	2640	4500	2910	4160	7980	3160	2300	1780
20	2570	5520	3590	3360	2950	4300	2920	4090	7540	3030	2230	2000
21	2670	4860	3480	3020	3270	4220	2840	3950	6920	3090	2120	1630
22	2490	4480	3390	2960	3330	4080	2950	4170	6690	5280	1980	1850
23	2380	4500	3720	2680	3460	3960	2790	4950	6440	6000	2110	1550
24	2340	5560	4790	2940	3860	4160	2800	4890	6010	5030	2300	1580
25	2460	5680	4620	3230	3820	4320	2700	5690	5650	4510	2170	1590
26	2470	5280	4420	2950	3920	4810	2680	5190	5080	4270	2500	1620
27	2650	4940	4190	2970	4040	5090	2760	4600	4890	4030	2110	1760
28	2590	4920	4170	2870	3970	5150	2570	4340	4630	3920	2390	1510
29	2590	4770	4630	2970	4140	5100	2480	4140	4380	3680	2900	1840
30	2590	4580	5660	2960	—	5070	2520	4250	4110	3250	3020	1500
31	2510	—	5490	3070	—	5050	—	5970	—	3300	2930	—
TOTAL	74470	115120	127670	117080	91870	162640	100120	121320	193560	116700	78600	58400
MEAN	2402	3837	4118	3777	3168	5246	3337	3914	6452	3765	2535	1947
MAX	2670	5680	5660	5250	4140	7440	4930	5970	11800	6000	3280	2780
MIN	1740	2440	3390	2680	2520	3960	2480	2740	3690	3020	1980	1500
CFSM	0.66	1.05	1.12	1.03	0.86	1.43	0.91	1.07	1.76	1.03	0.69	0.53
IN.	0.76	1.17	1.30	1.19	0.93	1.65	1.02	1.23	1.96	1.18	0.80	0.59

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2004, BY WATER YEAR (WY)

	MEAN	2363	2764	3179	3585	3977	5228	5416	4453	3555	2551	2131	2057
MAX	6217	6564	6689	9810	7765	11560	13590	10760	8176	4989	4497	4103	
(WY)	1987	1993	1991	1993	2001	1982	1950	1943	1989	1981	1981	1981	
MIN	1056	932	1131	1239	1196	1857	2164	1579	1254	1033	828	885	
(WY)	1964	1965	1964	1964	1964	1964	1931	1931	1934	1934	1941	1941	

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1931 - 2004
ANNUAL TOTAL	995820	1357550	
ANNUAL MEAN	2728	3709	3434
HIGHEST ANNUAL MEAN			5718
LOWEST ANNUAL MEAN			1464
HIGHEST DAILY MEAN	7470	11800	19800
LOWEST DAILY MEAN	1240	1500	420
ANNUAL SEVEN-DAY MINIMUM	1520	1630	728
MAXIMUM PEAK FLOW		12600	20200
MAXIMUM PEAK STAGE		11.34	(a)15.10
ANNUAL RUNOFF (CFSM)	0.744	1.01	0.937
ANNUAL RUNOFF (INCHES)	10.10	13.78	12.73
10 PERCENT EXCEEDS	4440	5500	6130
50 PERCENT EXCEEDS	2480	3440	2850
90 PERCENT EXCEEDS	1610	2200	1500

(a) Present datum.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04101800 DOWAGIAC RIVER AT SUMNERVILLE, MI

LOCATION.--Lat 41°54'48", long 86°12'47", in SE1/4 sec.30, T.6 S., R.16 W., Cass County, Hydrologic Unit 04050001, on right bank 30 ft upstream from bridge on Indian Lake Road, 0.3 mi west of Sumnerville.

DRAINAGE AREA.--255 mi².

PERIOD OF RECORD.--October 1960 to current year.

GAGE.--Water-stage recorder. Datum of gage is 692.62 ft above sea level.

REMARKS.--Records good. Flow regulated by millpond and lake-level control dam upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	178	202	320	286	203	507	312	232	537	208	183	232
2	167	269	309	283	223	736	293	269	419	202	173	213
3	167	390	298	277	223	632	281	252	350	202	166	201
4	192	438	286	268	217	524	272	236	307	257	198	197
5	185	502	286	272	217	662	263	225	281	259	216	189
6	174	479	287	260	221	629	262	214	263	252	196	184
7	167	386	275	241	220	524	210	251	210	304	184	188
8	160	331	268	252	209	475	253	204	239	295	175	183
9	155	304	264	248	215	438	243	203	231	267	169	177
10	151	286	290	236	215	398	240	217	306	245	170	171
11	148	283	334	236	212	374	238	258	515	230	168	164
12	143	279	314	239	213	343	235	253	834	240	168	162
13	145	261	287	239	210	325	230	254	912	248	174	160
14	185	255	271	236	206	327	227	385	647	243	172	157
15	310	253	264	230	204	319	226	650	596	224	169	154
16	287	250	260	226	186	310	222	490	478	209	163	178
17	246	246	261	224	212	306	221	366	416	201	158	185
18	220	310	259	226	203	304	220	319	374	191	158	174
19	203	510	259	226	205	304	210	287	339	185	169	165
20	191	484	260	224	223	329	207	264	311	178	163	160
21	183	401	257	216	316	343	222	378	298	177	161	156
22	178	345	266	216	315	312	215	526	330	245	154	155
23	174	322	305	192	319	301	211	470	300	240	146	152
24	172	523	325	227	327	307	208	485	276	214	145	149
25	193	512	309	201	332	327	221	453	265	202	158	148
26	212	433	286	222	333	376	224	427	250	191	260	148
27	206	378	272	216	330	412	213	360	237	192	251	148
28	213	348	272	216	337	373	208	324	229	190	333	148
29	226	338	315	209	365	344	201	294	223	180	352	155
30	219	332	332	212	--	321	199	344	214	174	319	155
31	211	--	309	209	--	333	--	632	--	188	263	--
TOTAL	5961	10650	8900	7265	7211	12515	7038	10481	11228	6833	6034	5108
MEAN	192	355	287	234	249	404	235	338	374	220	195	170
MAX	310	523	334	286	365	736	312	650	912	304	352	232
MIN	143	202	257	192	186	301	199	203	214	174	145	148
CFSM	0.75	1.39	1.13	0.92	0.98	1.58	0.92	1.33	1.47	0.86	0.76	0.67
IN.	0.87	1.55	1.30	1.06	1.05	1.83	1.03	1.53	1.64	1.00	0.88	0.75

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2004, BY WATER YEAR (WY)

	254	304	323	311	334	401	392	331	272	217	193	205
MEAN	254	304	323	311	334	401	392	331	272	217	193	205
MAX	530	490	513	548	508	629	552	490	414	333	326	401
(WY)	1987	1991	1992	1993	1985	1985	1993	1981	1996	1978	1992	1993
MIN	132	166	179	166	177	225	235	205	142	133	101	112
(WY)	1964	2000	1964	1963	1963	2000	2004	1964	1964	1988	1964	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1961 - 2004

ANNUAL TOTAL	86296		99224									
ANNUAL MEAN	236		271									
HIGHEST ANNUAL MEAN										294		
LOWEST ANNUAL MEAN										401		1993
HIGHEST DAILY MEAN	793	May 12	912	Jun 13						1550	Feb 25	1985
LOWEST DAILY MEAN	99	Aug 26	143	Oct 12						87	Sep 8	1964
ANNUAL SEVEN-DAY MINIMUM	101	Aug 25	150	Sep 22						89	Aug 3	1964
MAXIMUM PEAK FLOW			1010	Jun 13						1590	Feb 24	1985
MAXIMUM PEAK STAGE			7.62	Jun 13						9.26	Feb 24	1985
INSTANTANEOUS LOW FLOW			(a)136	Feb 16						(b)70	Jan 2	1999
ANNUAL RUNOFF (CFSM)	0.927		1.06							1.15		
ANNUAL RUNOFF (INCHES)	12.59		14.48							15.68		
10 PERCENT EXCEEDS	352		399							450		
50 PERCENT EXCEEDS	210		242							273		
90 PERCENT EXCEEDS	129		168							161		

(a) Result of freezeup.

(b) Result of regulation.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04102500 PAW PAW RIVER AT RIVERSIDE, MI

LOCATION.--Lat 42°11'10", long 86°22'06", in SW1/4 SE1/4 sec.23, T.3 S., R.18 W., Berrien County, Hydrologic Unit 04050001, on left bank 40 ft upstream from bridge on Coloma Road, 0.8 mi east of Riverside.

DRAINAGE AREA.--390 mi².

PERIOD OF RECORD.--October 1951 to current year.

REVISED RECORDS.--WSP 1337: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 588.80 ft above sea level. May 10, 1966 to July 11, 1967, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Diurnal fluctuation, principally during low flow, caused by paper mill upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	307	344	510	441	e310	534	607	330	656	337	259	418
2	301	348	488	441	e320	698	532	355	644	321	250	396
3	283	417	475	432	e325	941	478	381	638	313	260	351
4	287	489	475	415	e325	939	446	381	675	334	277	325
5	283	557	481	399	e325	1230	420	380	699	365	289	314
6	280	615	474	383	e325	1550	399	370	622	405	287	279
7	284	634	449	370	e320	1320	389	343	503	421	292	281
8	276	632	422	373	e320	1210	385	339	433	433	266	278
9	264	642	406	350	e320	1150	383	358	398	420	251	289
10	243	632	402	373	e320	1040	382	362	407	402	247	273
11	235	574	414	427	e320	910	350	384	514	379	249	272
12	253	497	425	450	e315	782	351	419	742	391	250	267
13	242	443	428	379	e315	673	339	446	1030	404	261	260
14	253	409	434	347	e310	601	337	478	913	366	266	250
15	324	390	435	349	e300	550	337	522	800	336	265	255
16	362	371	421	344	e290	518	324	565	826	320	262	279
17	372	364	401	e340	e300	493	325	600	836	313	245	274
18	367	371	394	e335	e305	475	323	665	774	285	247	282
19	367	424	385	e330	e310	461	318	760	660	288	248	297
20	356	466	386	e325	e315	473	314	739	554	285	244	259
21	344	475	381	e320	355	495	310	616	493	279	243	250
22	314	474	379	e320	397	503	311	602	473	271	237	254
23	293	486	401	e315	422	498	319	688	455	280	225	239
24	294	535	423	e315	450	500	314	789	439	303	225	223
25	296	584	432	e315	473	497	330	824	432	317	240	219
26	296	573	434	e320	485	494	350	937	426	297	324	221
27	310	535	432	e320	486	547	354	1000	407	271	368	225
28	327	529	430	e320	485	621	352	945	386	267	400	224
29	326	540	421	e315	493	635	334	848	366	263	430	210
30	332	529	431	e315	—	652	321	744	347	264	439	218
31	348	—	441	e310	—	661	—	667	—	263	430	—
TOTAL	9419	14879	13310	11088	10336	22651	11034	17837	17548	10193	8776	8182
MEAN	304	496	429	358	356	731	368	575	585	329	283	273
MAX	372	642	510	450	493	1550	607	1000	1030	433	439	418
MIN	235	344	379	310	290	461	310	330	347	263	225	210
CFSM	0.78	1.27	1.10	0.92	0.91	1.87	0.94	1.48	1.50	0.84	0.73	0.70
IN.	0.90	1.42	1.27	1.06	0.99	2.16	1.05	1.70	1.67	0.97	0.84	0.78

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2004, BY WATER YEAR (WY)

	MEAN	374	440	496	500	536	664	631	507	402	314	281	296
	MAX	1217	826	906	1038	1004	1234	961	799	686	581	557	569
	(WY)	1987	1989	1991	1952	1997	1979	1985	1974	1969	1982	1980	1975
	MIN	178	223	232	226	256	336	361	287	200	180	163	158
	(WY)	1964	1954	1959	1959	1963	2000	1958	1958	1964	1963	1964	1963

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1952 - 2004

ANNUAL TOTAL	125259												
ANNUAL MEAN	343							155253					
HIGHEST ANNUAL MEAN								424					
LOWEST ANNUAL MEAN										453			
HIGHEST DAILY MEAN										606			1991
LOWEST DAILY MEAN										273			1964
HIGHEST SEVEN-DAY MEAN										3460			Oct 4 1986
LOWEST SEVEN-DAY MEAN										120			Sep 8 1964
ANNUAL SEVEN-DAY MINIMUM										134			Sep 7 1964
MAXIMUM PEAK FLOW										3580			Oct 4 1986
MAXIMUM PEAK STAGE										10.90			Oct 4 1986
INSTANTANEOUS LOW FLOW										99			Jul 5 1964
ANNUAL RUNOFF (CFSM)										1.16			
ANNUAL RUNOFF (INCHES)										15.78			
10 PERCENT EXCEEDS										743			
50 PERCENT EXCEEDS										399			
90 PERCENT EXCEEDS										230			

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04102700 SOUTH BRANCH BLACK RIVER NEAR BANGOR, MI

LOCATION.--Lat 42°21'15", long 86°11'15", in NW1/4 sec.28, T.1 S., R.16 W., Van Buren County, Hydrologic Unit 04050002, on left bank 50 ft upstream from bridge on 66th Street, 4.9 mi northwest of Bangor.

DRAINAGE AREA.--83.6 mi².

PERIOD OF RECORD.--June 1966 to current year. Prior to October 1981, published as Black River near Bangor.

REVISED RECORDS.--WDR MI-81-1: 1973-75(M), 1979(M).

GAGE.--Water-stage recorder. Elevation of gage is 610 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Occasional regulation caused by mills upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	41	48	134	103	e61	253	120	69	252	39	30	52
2	38	55	134	94	e62	545	109	84	183	37	29	46
3	38	133	122	92	e63	572	100	80	144	36	27	40
4	48	186	108	88	e64	423	93	69	115	57	35	37
5	44	246	101	85	e64	556	87	64	95	58	34	35
6	40	256	95	81	e64	645	82	62	83	57	31	34
7	37	181	89	e79	e63	437	81	66	75	51	31	33
8	34	139	85	e78	e63	345	79	61	68	47	28	31
9	33	113	e83	e77	e63	290	75	97	64	43	28	30
10	32	97	e84	e76	e62	241	72	118	74	40	29	29
11	31	90	e95	e75	e62	202	70	102	167	38	32	28
12	30	86	e100	e74	e62	172	67	91	218	43	33	27
13	40	80	e92	71	e61	145	65	83	198	45	34	27
14	56	76	e88	65	e60	135	63	103	143	44	32	27
15	90	72	84	e64	e58	130	61	195	112	41	30	24
16	76	70	81	e64	e56	122	60	202	94	38	29	28
17	65	68	82	e65	e54	115	59	166	83	38	29	29
18	56	77	81	e65	e53	111	58	132	75	35	30	28
19	52	165	80	e66	e54	109	55	110	68	34	29	31
20	48	169	80	e64	57	117	53	93	62	32	29	26
21	46	140	79	e62	77	142	55	103	59	31	28	23
22	42	116	82	e60	96	136	54	319	70	34	27	18
23	40	104	102	e55	109	119	53	446	64	34	27	22
24	39	165	121	e57	119	112	51	408	64	34	28	25
25	41	191	120	e59	125	124	69	310	62	32	31	25
26	45	172	107	e61	128	157	82	258	58	31	68	25
27	45	134	97	e62	129	234	78	205	53	31	54	25
28	49	117	94	e62	131	214	69	160	48	30	86	25
29	49	119	116	e61	161	177	64	125	45	29	80	25
30	48	131	132	e60	—	153	60	120	42	29	71	26
31	54	—	120	e60	—	135	—	265	—	30	63	—
TOTAL	1427	3796	3068	2185	2281	7368	2144	4766	2938	1198	1172	881
MEAN	46.0	127	99.0	70.5	78.7	238	71.5	154	97.9	38.6	37.8	29.4
MAX	90	256	134	103	161	645	120	446	252	58	86	52
MIN	30	48	79	55	53	109	51	61	42	29	27	18
CFSM	0.55	1.51	1.18	0.84	0.94	2.84	0.85	1.84	1.17	0.46	0.45	0.35
IN.	0.63	1.69	1.37	0.97	1.01	3.28	0.95	2.12	1.31	0.53	0.52	0.39

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2004, BY WATER YEAR (WY)

	MEAN	67.7	93.6	123	119	140	180	159	108	85.6	55.9	43.6	55.5
MAX	362	282	272	244	377	389	327	206	261	181	141	329	329
(WY)	1987	1991	1983	1973	1997	1979	1975	2000	1997	1986	1980	1986	1986
MIN	28.5	27.6	39.9	41.2	46.7	52.9	68.9	44.4	31.7	26.7	22.5	20.1	20.1
(WY)	2000	2000	2000	2000	2003	2000	1971	1971	1971	2003	1999	1999	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1966 - 2004

ANNUAL TOTAL	25064		33224									
ANNUAL MEAN	68.7		90.8									
HIGHEST ANNUAL MEAN										102		
LOWEST ANNUAL MEAN										134		1997
HIGHEST DAILY MEAN	466									56.5		2003
LOWEST DAILY MEAN	19				Apr 5	645		Mar 6	1810			Feb 22 1997
ANNUAL SEVEN-DAY MINIMUM	20				Sep 13	18		Sep 22	17			Oct 1 2002
MAXIMUM PEAK FLOW					Sep 7	23		Sep 21	19			Sep 15 1999
MAXIMUM PEAK STAGE						741		Mar 6	(a)2390			Feb 21 1997
INSTANTANEOUS LOW FLOW						9.87		Mar 6	14.90			Feb 21 1997
ANNUAL RUNOFF (CFSM)	0.821					18		(b)	16			(c)
ANNUAL RUNOFF (INCHES)	11.15					1.09			1.23			
10 PERCENT EXCEEDS	139					14.78			16.65			
50 PERCENT EXCEEDS	46					166			198			
90 PERCENT EXCEEDS	23					65			72			
						30			32			

(a) From rating curve extended above 1,800 ft³/s.

(b) Sept. 22, 23.

(c) Sept. 7, 1999, Sept. 30, Oct. 1, 2002.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04102776 MIDDLE BRANCH BLACK RIVER NEAR SOUTH HAVEN, MI

LOCATION.--Lat 42°25'57", long 86°12'25", in NE1/4 NE1/4 sec.32, T.1 N., R.16 W., Allegan County, Hydrologic Unit 04050002, on left bank 10 ft downstream from bridge on 68th Street, 4.0 mi northeast of South Haven.

DRAINAGE AREA.--83.0 mi².

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

GAGE.--Water-stage recorder. Elevation of gage is 590 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

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	40	48	135	101	e64	156	111	90	314	49	32	64
2	37	58	127	95	e65	310	104	101	241	46	30	57
3	38	100	122	94	e66	351	99	96	199	45	29	52
4	45	123	117	90	e67	354	94	87	153	69	46	48
5	43	148	109	87	e68	413	90	83	122	76	51	45
6	39	169	106	81	e68	435	87	77	105	65	41	42
7	36	146	101	e84	e67	369	90	76	95	59	37	42
8	35	129	96	e83	e66	335	87	75	86	55	35	40
9	33	113	92	e82	e65	293	84	84	79	51	34	36
10	33	99	96	e80	e65	244	82	88	83	47	32	34
11	32	92	110	e79	e64	201	79	80	135	46	33	33
12	32	89	104	e78	e64	175	77	78	181	45	35	32
13	31	83	97	e78	e64	153	76	78	161	47	35	31
14	38	79	92	e72	e63	144	74	85	134	45	33	30
15	60	76	88	e68	e62	140	71	107	119	42	32	29
16	59	74	86	e69	e61	130	70	105	104	40	31	31
17	51	73	89	e70	e60	124	70	105	94	39	32	33
18	48	84	87	e69	e59	120	70	102	88	39	38	31
19	46	138	86	e68	e60	121	66	99	80	37	37	30
20	45	142	87	e67	e62	127	64	89	73	35	34	30
21	43	123	87	e66	e77	137	66	115	71	35	32	30
22	42	116	92	e64	e89	123	65	364	89	45	30	29
23	42	109	106	e63	97	117	64	616	79	44	29	28
24	41	143	112	e62	106	117	62	566	75	40	28	27
25	43	159	109	e63	108	132	82	433	73	37	33	28
26	48	136	104	e64	110	134	99	337	67	35	56	28
27	48	127	99	e65	109	148	87	267	62	34	59	28
28	49	119	99	e65	112	139	80	196	59	35	82	27
29	51	128	113	e65	121	136	74	150	56	32	133	27
30	52	140	115	e64	—	133	72	136	53	31	99	27
31	50	—	107	e63	—	121	—	253	—	33	76	—
TOTAL	1330	3363	3170	2297	2209	6132	2396	5218	3330	1378	1364	1049
MEAN	42.9	112	102	74.1	76.2	198	79.9	168	111	44.5	44.0	35.0
MAX	60	169	135	101	121	435	111	616	314	76	133	64
MIN	31	48	86	62	59	117	62	75	53	31	28	27
CFSM	0.52	1.35	1.23	0.89	0.92	2.38	0.96	2.03	1.34	0.54	0.53	0.42
IN.	0.60	1.51	1.42	1.03	0.99	2.75	1.07	2.34	1.49	0.62	0.61	0.47

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

MEAN	56.9	86.4	86.9	107	130	136	122	130	120	47.6	38.7	40.7
MAX	168	155	122	167	317	200	162	215	397	90.5	60.2	89.8
(WY)	2002	1995	1997	1997	1997	1998	1998	2000	1997	1997	2001	2000
MIN	23.5	26.4	47.8	47.5	51.9	56.7	79.0	70.4	40.2	28.4	23.5	17.6
(WY)	2000	2000	2000	2003	2003	2000	1996	1999	1998	1998	1999	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1995 - 2004

ANNUAL TOTAL	24966	33236	
ANNUAL MEAN	68.4	90.8	91.5
HIGHEST ANNUAL MEAN			145
LOWEST ANNUAL MEAN			56.9
HIGHEST DAILY MEAN	379	Apr 5	2980
LOWEST DAILY MEAN	18	Aug 25	16
ANNUAL SEVEN-DAY MINIMUM	20	Sep 8	16
MAXIMUM PEAK FLOW			(a)4340
MAXIMUM PEAK STAGE		7.92	12.85
INSTANTANEOUS LOW FLOW		27	15
ANNUAL RUNOFF (CFSM)	0.824	1.09	1.10
ANNUAL RUNOFF (INCHES)	11.19	14.90	14.98
10 PERCENT EXCEEDS	129	141	155
50 PERCENT EXCEEDS	50	76	73
90 PERCENT EXCEEDS	25	33	29

(a) From rating curve extended above 1,400 ft³/s.

(b) Sept. 23, 24, 28-30.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04103010 KALAMAZOO RIVER NEAR MARENGO, MI

LOCATION.--Lat 42°15'42", long 84°51'21", in SW1/4 SE1/4 sec.26, T.2 S., R.5 W., Calhoun County, Hydrologic Unit 04050003, on right bank at upstream side of bridge on B Drive North, 0.8 mi south of Marengo, and 5.0 mi west of Albion.

DRAINAGE AREA.--267 mi².

PERIOD OF RECORD.--October 1986 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 910 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Some diversion by pumping for irrigation. Several measurements of water temperature were made during the year. Gage-height telemeter 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	132	137	166	221	e150	205	225	170	266	179	181	175
2	124	160	159	215	e150	258	214	191	247	174	176	166
3	124	195	154	212	e150	273	208	194	233	170	172	156
4	126	209	152	207	e150	259	198	187	220	197	199	150
5	123	228	150	205	e150	314	194	175	206	195	192	147
6	122	203	152	189	e155	324	194	168	197	195	188	147
7	118	189	149	e180	e150	312	193	162	186	251	178	156
8	115	170	148	e185	e140	278	192	161	182	305	171	149
9	115	160	146	e190	e145	253	186	160	179	294	166	144
10	114	153	156	e185	e150	233	181	256	197	246	162	141
11	114	156	166	e180	141	218	178	311	278	218	159	138
12	114	157	167	e175	143	205	176	296	376	218	160	138
13	112	151	e155	170	142	195	176	257	434	200	160	134
14	141	147	163	168	127	192	174	236	470	192	159	133
15	194	145	153	162	e125	185	171	230	457	180	154	131
16	208	143	154	e160	e135	186	169	215	391	174	152	136
17	198	140	155	e165	e140	184	168	210	331	179	152	130
18	177	169	152	e155	141	181	169	200	301	188	177	129
19	159	244	149	150	141	183	163	185	289	200	173	128
20	151	236	143	e145	143	209	159	178	266	183	167	126
21	142	221	145	e140	158	252	165	241	248	182	165	124
22	140	202	145	e145	162	263	157	366	241	217	162	123
23	139	190	162	e135	165	238	154	369	228	193	159	122
24	135	210	182	e145	169	225	157	341	219	182	158	121
25	148	201	191	e155	167	256	159	305	207	174	155	120
26	149	200	182	e150	168	289	155	281	202	169	160	120
27	150	190	171	e150	168	313	152	256	195	199	155	122
28	150	180	169	e145	170	309	154	238	193	213	168	125
29	149	173	209	e145	182	285	151	224	188	213	187	138
30	143	169	241	e145	---	258	147	227	182	198	202	141
31	142	---	243	e145	---	239	---	270	---	191	191	---
TOTAL	4368	5428	5129	5219	4377	7574	5239	7260	7809	6269	5260	4110
MEAN	141	181	165	168	151	244	175	234	260	202	170	137
MAX	208	244	243	221	182	324	225	369	470	305	202	175
MIN	112	137	143	135	125	181	147	160	179	169	152	120
CFSM	0.53	0.68	0.62	0.63	0.57	0.92	0.65	0.88	0.97	0.76	0.64	0.51
IN.	0.61	0.76	0.71	0.73	0.61	1.06	0.73	1.01	1.09	0.87	0.73	0.57

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 2004, BY WATER YEAR (WY)

	2007	2030	222	243	253	296	304	265	244	183	169	167
MEAN	207	230	222	243	253	296	304	265	244	183	169	167
MAX	349	383	356	466	445	445	468	386	530	274	226	272
(WY)	1987	1989	1991	1993	2001	1990	1993	1990	1989	1993	1989	1993
MIN	128	129	151	140	128	169	175	177	126	111	113	111
(WY)	2000	2000	2003	2003	2003	2000	2004	1987	1988	1988	2003	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1987 - 2004

ANNUAL TOTAL	57825	68042	
ANNUAL MEAN	158	186	232
HIGHEST ANNUAL MEAN			332
LOWEST ANNUAL MEAN			154
HIGHEST DAILY MEAN	484	470	1140
LOWEST DAILY MEAN	93	112	93
ANNUAL SEVEN-DAY MINIMUM	99	115	98
MAXIMUM PEAK FLOW		(a)492	1160
MAXIMUM PEAK STAGE		(b)8.68	10.18
INSTANTANEOUS LOW FLOW		(d)86	(d)73
ANNUAL RUNOFF (CFSM)	0.593	0.696	0.867
ANNUAL RUNOFF (INCHES)	8.06	9.48	11.78
10 PERCENT EXCEEDS	235	256	357
50 PERCENT EXCEEDS	145	171	208
90 PERCENT EXCEEDS	106	138	132

(a) Gage height 7.96 ft.

(b) Backwater from ice.

(c) Jan. 8, 9.

(d) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04103500 KALAMAZOO RIVER AT MARSHALL, MI

LOCATION.--Lat 42°15'53", long 84°57'50", in SW1/4 SW1/4 sec.25, T.2 S., R.6 W., Calhoun County, Hydrologic Unit 04050003, on left bank at upstream side of bridge on Kalamazoo Avenue in Marshall.

DRAINAGE AREA.--449 mi².

PERIOD OF RECORD.--October 1948 to March 1982, October 2001 to current year. Monthly discharge only for October 1948, published in WSP 1307.

GAGE.--Water-stage recorder. Datum of gage is 876.65 ft above sea level (NAVD 1988). Formerly published as 877.09 ft above sea level (NGVD 1929). Prior to Nov. 11, 1948, nonrecording gage at same site and datum.

REMARKS.--Records good. Flow regulated by powerplant upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	214	199	281	300	228	362	357	257	474	253	258	253
2	164	253	278	302	227	481	334	313	442	241	242	239
3	191	299	257	363	234	500	315	310	396	244	247	227
4	164	320	249	360	228	483	316	290	354	282	289	215
5	191	382	245	343	218	542	300	273	333	283	268	210
6	152	347	245	313	230	600	297	247	302	263	254	210
7	169	301	241	243	230	569	296	250	297	338	254	218
8	167	286	237	281	212	542	290	246	265	390	240	212
9	165	267	235	297	216	460	284	265	271	379	233	205
10	163	296	251	267	229	419	276	445	304	321	223	187
11	163	202	269	274	223	368	266	539	419	297	226	204
12	156	174	274	275	221	364	267	525	535	298	223	196
13	155	255	253	266	220	346	265	447	610	292	217	195
14	221	243	253	253	208	307	263	369	650	262	221	189
15	271	239	248	236	211	338	260	394	645	254	218	185
16	277	234	244	240	193	297	253	348	573	257	215	196
17	264	233	279	251	213	306	253	334	485	257	219	194
18	244	278	342	249	219	300	252	346	417	260	249	172
19	195	405	312	250	219	299	236	332	417	287	251	187
20	222	425	226	220	231	333	238	289	379	265	238	174
21	198	400	239	217	243	396	235	426	340	278	226	182
22	177	360	247	226	262	411	236	649	343	370	221	178
23	192	339	257	198	278	374	236	726	331	319	231	177
24	202	377	327	226	276	353	228	712	304	279	236	175
25	218	385	312	244	274	379	232	686	291	255	230	174
26	217	364	321	224	274	489	229	601	284	242	234	175
27	220	340	282	227	274	500	228	553	278	286	218	177
28	213	316	285	223	279	493	224	486	273	305	268	178
29	213	310	363	221	308	445	221	402	267	293	269	187
30	213	293	434	222	—	420	219	427	261	277	290	193
31	202	—	385	221	—	367	—	487	—	258	264	—
TOTAL	6173	9122	8671	8032	6878	12843	7906	12974	11540	8885	7462	5864
MEAN	199	304	280	259	237	414	264	419	385	287	241	195
MAX	277	425	434	363	308	600	357	726	650	390	290	253
MIN	152	174	226	198	193	297	219	246	261	241	215	172
CFSM	0.44	0.68	0.62	0.58	0.53	0.92	0.59	0.93	0.86	0.64	0.54	0.44
IN.	0.51	0.76	0.72	0.67	0.57	1.06	0.66	1.07	0.96	0.74	0.62	0.49

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 2004, BY WATER YEAR (WY)

	242	264	302	304	342	474	477	388	313	263	224	213
MEAN	242	264	302	304	342	474	477	388	313	263	224	213
MAX	578	443	470	666	627	890	1143	702	544	500	461	445
(WY)	2002	2002	1976	1952	1949	1982	1950	1956	1969	1968	1973	1975
MIN	87.0	102	112	113	113	156	213	167	121	104	84.7	84.9
(WY)	1964	1965	1964	1964	1964	1964	1963	1964	1964	1964	1964	1964

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1949 - 2004

ANNUAL TOTAL	90442	106350	
ANNUAL MEAN	248	291	315
HIGHEST ANNUAL MEAN			498
LOWEST ANNUAL MEAN			122
HIGHEST DAILY MEAN	727	726	2050
LOWEST DAILY MEAN	131	152	31
ANNUAL SEVEN-DAY MINIMUM	141	162	59
MAXIMUM PEAK FLOW		832	2130
MAXIMUM PEAK STAGE		5.59	8.20
INSTANTANEOUS LOW FLOW		70	12
ANNUAL RUNOFF (CFSM)	0.552	0.647	0.701
ANNUAL RUNOFF (INCHES)	7.49	8.81	9.53
10 PERCENT EXCEEDS	385	422	544
50 PERCENT EXCEEDS	218	264	269
90 PERCENT EXCEEDS	156	196	147

(a) Nov. 11, 12.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04104945 WANADOGA CREEK NEAR BATTLE CREEK, MI

LOCATION.--Lat 42°23'47", long 85°07'54", in NW1/4 SE1/4 sec.9, T.1 S., R.7 W., Calhoun County, Hydrologic Unit 04050003, on right bank 30 ft upstream from bridge on State Highway 66, 5.0 mi north of Battle Creek.

DRAINAGE AREA.--48.3 mi².

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

GAGE.--Water-stage recorder. Elevation of gage is 830 ft above sea level, from topographic map.

REMARKS.--Records fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	13	22	44	50	21	61	54	30	88	20	18	45
2	12	29	39	46	21	116	49	42	83	20	17	34
3	12	47	34	43	23	207	44	46	73	19	16	26
4	15	62	31	41	22	217	40	43	60	33	23	23
5	15	80	33	39	20	195	37	37	50	38	25	21
6	15	89	33	32	20	216	35	31	43	37	22	21
7	12	85	28	33	20	222	33	27	37	40	19	23
8	11	72	26	30	19	173	32	26	33	41	17	23
9	9.5	54	26	26	19	134	31	30	30	40	16	22
10	8.9	41	30	24	20	110	30	48	31	34	22	21
11	10	35	36	22	20	92	30	85	46	26	22	20
12	16	31	34	22	19	76	29	112	69	24	22	19
13	22	28	30	22	18	62	28	113	83	25	21	18
14	27	25	30	20	17	57	27	99	83	23	21	18
15	38	22	26	21	16	53	26	88	76	20	21	17
16	38	21	25	20	16	49	26	85	61	21	18	20
17	35	20	27	19	16	46	26	82	50	24	17	21
18	29	32	27	19	16	44	26	72	42	25	35	20
19	23	83	26	19	16	43	25	62	38	22	40	19
20	20	128	24	17	17	48	24	63	34	19	33	18
21	19	148	24	17	24	58	24	101	30	22	25	18
22	19	123	25	17	25	56	24	492	32	51	20	17
23	18	97	29	16	29	52	23	758	32	56	19	17
24	18	95	35	17	32	49	22	556	30	47	24	17
25	22	97	36	17	32	51	24	401	28	35	26	16
26	26	100	35	18	35	60	25	278	26	25	47	17
27	25	95	31	19	35	71	24	197	24	24	53	16
28	24	76	30	21	38	76	23	138	23	24	46	17
29	25	60	39	22	44	77	22	101	23	21	49	19
30	25	53	47	21	—	69	21	80	21	19	56	19
31	24	—	49	21	—	61	—	86	—	19	53	—
TOTAL	626.4	1950	989	771	670	2901	884	4409	1379	894	863	622
MEAN	20.2	65.0	31.9	24.9	23.1	93.6	29.5	142	46.0	28.8	27.8	20.7
MAX	38	148	49	50	44	222	54	758	88	56	56	45
MIN	8.9	20	24	16	16	43	21	26	21	19	16	16
CFSM	0.42	1.35	0.66	0.51	0.48	1.94	0.61	2.94	0.95	0.60	0.58	0.43
IN.	0.48	1.50	0.76	0.59	0.52	2.23	0.68	3.40	1.06	0.69	0.66	0.48

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

	MEAN	26.5	38.5	35.5	39.3	52.9	60.3	57.6	65.6	32.6	19.8	17.9	17.7
MAX	77.9	69.0	60.0	66.1	125	93.6	86.6	142	46.0	28.8	27.8	27.6	
(WY)	2002	1995	1995	1998	2001	2004	1998	2004	2004	2004	2004	1997	
MIN	13.0	16.0	20.7	18.3	16.0	24.9	29.5	26.7	18.4	12.1	10.5	9.45	
(WY)	2000	2000	2000	2003	2003	2000	2004	1999	1999	1996	1999	1999	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1995 - 2004

ANNUAL TOTAL	11503.5	16958.4	
ANNUAL MEAN	31.5	46.3	
HIGHEST ANNUAL MEAN			38.6
LOWEST ANNUAL MEAN			26.6
HIGHEST DAILY MEAN	243	758	758
LOWEST DAILY MEAN	7.5	8.9	7.5
ANNUAL SEVEN-DAY MINIMUM	8.1	12	8.1
MAXIMUM PEAK FLOW		802	802
MAXIMUM PEAK STAGE		8.05	(a)8.17
ANNUAL RUNOFF (CFSM)	0.653	0.959	0.799
ANNUAL RUNOFF (INCHES)	8.86	13.06	10.86
10 PERCENT EXCEEDS	65	85	73
50 PERCENT EXCEEDS	21	28	28
90 PERCENT EXCEEDS	11	17	13

(a) Backwater from ice.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04105000 BATTLE CREEK AT BATTLE CREEK, MI

LOCATION.--Lat 42°19'55", long 85°09'15", in NW1/4 sec.5, T.2 S., R.7 W., Calhoun County, Hydrologic Unit 04050003, on right bank 350 ft upstream from bridge on Emmett Street in Battle Creek, 3.0 mi upstream from mouth.

DRAINAGE AREA.--241 mi².

PERIOD OF RECORD.--October 1930 to September 1931, October 1932 to July 1933, January 1934 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 1387: 1931, 1944. WSP 1507: 1956.

GAGE.--Water-stage recorder. Datum of gage is 823.24 ft above sea level (levels by Michigan Department of Natural Resources). Prior to May 14, 1951, nonrecording gage at same site and datum.

REMARKS.--Records good. Occasional slight regulation prior to November 1943. Several measurements of water temperature were made during the year. Gage-height telemeter 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	79	98	293	322	111	281	367	134	771	138	111	216
2	72	102	256	374	111	348	343	166	810	121	107	207
3	68	135	226	378	111	519	315	201	782	118	103	164
4	73	180	204	353	111	855	284	221	674	148	108	136
5	82	238	188	329	113	967	255	223	569	175	114	120
6	76	298	177	286	114	955	235	193	479	176	111	108
7	72	356	164	184	112	1030	220	163	404	177	108	110
8	70	393	154	190	114	1040	210	152	345	173	102	111
9	68	389	152	206	111	879	201	157	301	176	95	113
10	65	346	155	205	108	729	190	203	276	176	96	111
11	61	299	165	200	109	595	180	316	284	153	99	109
12	53	252	176	190	111	492	180	400	350	137	101	108
13	51	211	180	182	111	416	179	516	467	134	101	103
14	62	185	176	172	113	374	166	588	630	143	101	97
15	90	168	167	152	112	339	162	544	677	142	100	97
16	116	159	156	149	107	308	158	485	673	122	95	96
17	129	144	161	141	103	286	154	465	624	122	96	98
18	128	158	163	136	101	270	147	467	535	118	117	97
19	119	224	159	141	103	253	143	437	434	116	146	88
20	106	306	157	134	109	246	139	406	364	111	153	90
21	97	434	140	126	125	263	138	479	318	109	140	85
22	85	592	153	118	148	282	136	998	285	147	116	79
23	83	564	153	114	168	296	134	2270	254	189	106	78
24	82	508	183	110	194	299	132	2560	234	206	92	77
25	86	453	208	106	209	291	131	2250	218	198	112	78
26	94	424	220	104	220	301	134	1860	200	167	154	76
27	99	421	227	105	232	331	134	1550	177	147	191	75
28	104	412	223	102	238	366	130	1300	165	136	213	79
29	101	377	228	104	252	407	127	1090	158	129	215	80
30	99	334	250	106	—	413	122	919	148	123	202	79
31	98	—	276	108	—	391	—	821	—	117	204	—
TOTAL	2668	9160	5890	5627	3981	14822	5546	22534	12606	4544	3909	3165
MEAN	86.1	305	190	182	137	478	185	727	420	147	126	106
MAX	129	592	293	378	252	1040	367	2560	810	206	215	216
MIN	51	98	140	102	101	246	122	134	148	109	92	75
CFSM	0.36	1.27	0.79	0.75	0.57	1.98	0.77	3.02	1.74	0.61	0.52	0.44
IN.	0.41	1.41	0.91	0.87	0.61	2.29	0.86	3.48	1.95	0.70	0.60	0.49

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2004, BY WATER YEAR (WY)

MEAN	124	164	193	207	248	407	387	275	193	109	88.1	96.7
MAX	673	474	468	591	748	936	1162	825	678	281	313	276
(WY)	1987	1993	1991	1952	2001	1948	1947	1943	1943	1968	1994	1950
MIN	32.4	46.1	46.8	57.5	61.5	87.6	93.7	69.6	49.2	34.3	27.8	30.6
(WY)	1964	1964	1964	1964	1963	1931	1931	1931	1964	1936	1936	1963

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1931 - 2004
ANNUAL TOTAL	56664	94452	(a)210
ANNUAL MEAN	155	258	394
HIGHEST ANNUAL MEAN			64.1
LOWEST ANNUAL MEAN			1943
HIGHEST DAILY MEAN	923	2560	3560
LOWEST DAILY MEAN	44	51	22
ANNUAL SEVEN-DAY MINIMUM	47	61	25
MAXIMUM PEAK FLOW		2630	3640
MAXIMUM PEAK STAGE		3.64	(b)4.48
INSTANTANEOUS LOW FLOW		50	22
ANNUAL RUNOFF (CFSM)	0.644	1.07	0.873
ANNUAL RUNOFF (INCHES)	8.75	14.58	11.87
10 PERCENT EXCEEDS	317	487	425
50 PERCENT EXCEEDS	108	164	138
90 PERCENT EXCEEDS	60	96	60

(a) Does not include water year 1931.

(b) From floodmark.

(c) Oct. 12, 13.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04105500 KALAMAZOO RIVER NEAR BATTLE CREEK, MI

LOCATION.--Lat 42°19'26", long 85°11'51", in SW1/4 sec.1, T.2 S., R.8 W., Calhoun County, Hydrologic Unit 04050003, on left bank 20 ft upstream from bridge on Kendall Street in Battle Creek.

DRAINAGE AREA.--824 mi².

PERIOD OF RECORD.--July 1937 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 924: 1938-39. WSP 1387: 1938, 1945-46, 1948.

GAGE.--Water-stage recorder. Elevation of gage is 815 ft above sea level, from topographic map. Prior to Oct. 1, 1957, water-stage recorder at site 4.7 mi downstream at different datum. Oct. 1, 1957 to June 15, 1959, nonrecording gage at bridge 1,800 ft upstream at different datum. June 16, 1959 to Oct. 13, 1960, nonrecording gage at same site and datum.

REMARKS.--Records good. Diurnal fluctuation below 1,500 ft³/s caused by powerplants upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	337	353	710	854	430	871	929	499	1600	502	476	657
2	345	438	673	810	436	1120	853	635	1560	477	454	623
3	288	608	617	907	448	1390	799	666	1470	482	438	547
4	350	648	574	875	451	1680	737	646	1280	639	497	486
5	308	876	553	832	434	1980	699	621	1130	633	529	444
6	305	888	534	701	437	2000	661	560	986	619	476	454
7	294	855	516	490	447	2020	645	529	856	695	459	458
8	293	818	497	568	440	2000	629	503	791	710	438	443
9	288	793	495	637	425	1760	606	554	750	737	425	427
10	289	727	534	606	434	1510	584	1020	757	669	411	402
11	281	725	563	610	436	1270	558	1260	990	606	419	398
12	263	491	586	605	430	1120	553	1290	1190	574	416	395
13	259	523	570	582	429	1010	549	1300	1410	576	408	390
14	370	533	547	532	426	934	531	1320	1670	539	407	387
15	514	493	531	466	421	847	521	1250	1730	520	401	378
16	514	483	520	452	411	805	516	1100	1620	519	392	403
17	501	462	545	473	407	741	510	1020	1460	567	467	386
18	469	631	592	521	417	739	501	1040	1260	504	537	366
19	437	928	666	467	430	699	483	968	1060	527	517	324
20	382	985	545	471	477	794	471	868	955	515	503	361
21	376	1070	471	433	532	834	473	1030	855	552	469	317
22	354	1180	511	451	556	898	452	1860	812	797	427	344
23	337	1130	549	403	599	859	485	3310	747	705	435	330
24	338	1160	633	414	636	848	446	3960	705	666	465	324
25	402	1090	673	e430	629	851	459	3650	647	600	495	324
26	385	1010	672	428	645	1060	454	3120	610	543	560	322
27	378	969	662	430	644	1110	449	2630	570	541	581	322
28	387	918	632	430	675	1120	442	2230	545	590	712	340
29	392	851	764	428	713	1110	427	1860	532	553	771	349
30	394	786	871	424	—	1080	430	1680	510	525	734	353
31	372	—	901	429	—	996	—	1690	—	500	675	—
TOTAL	11202	23422	18707	17159	14295	36056	16852	44669	31058	18182	15394	12054
MEAN	361	781	603	554	493	1163	562	1441	1035	587	497	402
MAX	514	1180	901	907	713	2020	929	3960	1730	797	771	657
MIN	259	353	471	403	407	699	427	499	510	477	392	317
CFSM	0.44	0.95	0.73	0.67	0.60	1.41	0.68	1.75	1.26	0.71	0.60	0.49
IN.	0.51	1.06	0.84	0.77	0.65	1.63	0.76	2.02	1.40	0.82	0.69	0.54

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2004, BY WATER YEAR (WY)

	MEAN	496	591	650	675	778	1108	1087	868	685	490	424	430
MAX	1446	1284	1248	1557	1748	2183	2834	1998	1703	1000	899	855	
(WY)	1987	1993	1991	1993	2001	1948	1947	1943	1943	1943	1994	1975	
MIN	173	204	215	229	218	317	441	336	238	186	189	167	
(WY)	1964	1965	1964	1964	1964	1964	1946	1958	1964	1964	1964	1963	

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1937 - 2004
ANNUAL TOTAL	182699	259050	
ANNUAL MEAN	501	708	689
HIGHEST ANNUAL MEAN			1081
LOWEST ANNUAL MEAN			250
HIGHEST DAILY MEAN	1850	Apr 7	7130
LOWEST DAILY MEAN	222	Sep 21	86
ANNUAL SEVEN-DAY MINIMUM	239	Sep 15	106
MAXIMUM PEAK FLOW		4050	(a)7290
MAXIMUM PEAK STAGE		6.54	(b)7.95
INSTANTANEOUS LOW FLOW		244	50
ANNUAL RUNOFF (CFSM)	0.607	0.859	0.837
ANNUAL RUNOFF (INCHES)	8.25	11.69	11.37
10 PERCENT EXCEEDS	857	1170	1230
50 PERCENT EXCEEDS	416	552	553
90 PERCENT EXCEEDS	284	384	300

(a) Gage height 9.13 ft, site and datum then in use.

(b) Present site and datum.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04105700 AUGUSTA CREEK NEAR AUGUSTA, MI

LOCATION.--Lat 42°21'12", long 85°21'14", in SW1/4 sec.27, T.1 S., R.9 W., Kalamazoo County, Hydrologic Unit 04050003, on left bank 15 ft downstream from bridge on EF Road, 1.3 mi north of Augusta.

DRAINAGE AREA.--38.9 mi².

PERIOD OF RECORD.--October 1964 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 815 ft above sea level, from topographic map. Prior to June 15, 1965, nonrecording gage at same site and datum.

REMARKS.--Records good. Several measurements of water temperature were made during the year. Gage-height telemeter 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	28	29	44	38	e27	52	40	36	67	31	28	43
2	26	40	40	39	e28	81	38	48	61	30	27	41
3	26	68	37	41	e29	82	37	44	57	29	27	43
4	30	71	35	40	29	75	36	38	52	38	41	41
5	28	72	35	39	26	90	34	34	48	39	39	38
6	26	64	35	35	29	92	34	33	46	36	34	37
7	25	55	33	37	29	81	34	32	43	50	31	49
8	23	46	33	38	26	74	34	32	41	43	29	42
9	23	39	34	34	28	66	32	37	39	37	29	37
10	23	34	40	34	26	59	31	56	44	34	36	33
11	23	35	46	33	26	55	31	80	61	33	34	31
12	22	34	45	33	26	50	30	74	70	33	35	30
13	21	33	38	33	25	45	32	66	68	31	33	29
14	34	30	38	31	25	46	32	66	70	30	30	28
15	49	29	37	31	23	45	32	67	62	29	28	27
16	45	28	38	32	24	43	32	58	52	27	26	32
17	38	28	40	32	23	41	31	52	52	27	33	32
18	32	48	39	32	21	40	31	57	54	26	45	30
19	29	83	38	31	21	40	28	54	49	25	39	28
20	27	79	36	29	26	49	27	46	45	30	34	25
21	26	69	35	31	37	50	28	64	43	32	32	27
22	25	60	36	26	36	46	29	102	46	40	30	25
23	24	57	40	e25	37	41	28	129	43	36	31	26
24	23	75	42	e26	37	42	27	135	42	32	34	26
25	28	72	40	e27	35	48	30	121	40	30	39	25
26	30	64	37	e27	35	57	31	97	37	28	62	25
27	28	57	36	e27	33	59	29	78	35	32	57	22
28	27	53	37	e27	35	55	27	71	34	32	58	24
29	31	50	44	e28	38	51	25	63	33	30	63	27
30	32	47	45	e28	—	48	26	64	32	30	60	26
31	30	—	42	e28	—	44	—	74	—	30	50	—
TOTAL	882	1549	1195	992	840	1747	936	2008	1466	1010	1174	949
MEAN	28.5	51.6	38.5	32.0	29.0	56.4	31.2	64.8	48.9	32.6	37.9	31.6
MAX	49	83	46	41	38	92	40	135	70	50	63	49
MIN	21	28	33	25	21	40	25	32	32	25	26	22
CFSM	0.73	1.33	0.99	0.82	0.74	1.45	0.80	1.67	1.26	0.84	0.97	0.81
IN.	0.84	1.48	1.14	0.95	0.80	1.67	0.90	1.92	1.40	0.97	1.12	0.91

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2004, BY WATER YEAR (WY)

	MEAN	39.6	45.5	46.5	42.9	45.7	55.9	57.4	48.0	42.1	34.6	33.5	35.3
MAX	85.2	67.3	65.3	66.3	66.3	81.3	86.9	81.8	73.2	51.4	53.8	70.7	
(WY)	1987	1986	1992	1993	1976	1985	1975	1975	1978	1986	1980	1986	
MIN	18.9	23.4	31.9	26.4	23.6	33.4	31.2	30.0	23.9	17.4	17.9	17.5	
(WY)	1965	1965	1965	2003	2003	2000	2004	1965	1988	1965	1984	1999	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1965 - 2004

ANNUAL TOTAL	12341	14748	
ANNUAL MEAN	33.8	40.3	43.9
HIGHEST ANNUAL MEAN			57.5
LOWEST ANNUAL MEAN			30.3
HIGHEST DAILY MEAN	107	Apr 5	454
LOWEST DAILY MEAN	14	Jan 30	14
ANNUAL SEVEN-DAY MINIMUM	16	Jan 27	14
MAXIMUM PEAK FLOW			560
MAXIMUM PEAK STAGE			3.41
INSTANTANEOUS LOW FLOW			(b)5.6
ANNUAL RUNOFF (CFSM)	0.869	(b)8.3	1.13
ANNUAL RUNOFF (INCHES)	11.80	1.04	15.33
10 PERCENT EXCEEDS	57	64	66
50 PERCENT EXCEEDS	29	35	40
90 PERCENT EXCEEDS	20	26	26

(a) Aug. 24-27, 1984, Jan. 30, 31, 2003.

(b) Result of freezeup.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106000 KALAMAZOO RIVER AT COMSTOCK, MI

LOCATION.--Lat 42°17'08", long 85°30'50", in NE1/4 sec.19, T.2 S., R.10 W., Kalamazoo County, Hydrologic Unit 04050003, on left bank at downstream side of bridge on River Street in Comstock, 0.2 mi downstream from Comstock Creek.

DRAINAGE AREA.--1,010 mi², approximately.

PERIOD OF RECORD.--April to August 1931, October 1932 to December 1979, October 1984 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 824: 1933-36. WSP 1387: 1933, 1934(M), 1935, 1936(M), 1938(M), 1940(M), 1941.

GAGE.--Water-stage recorder. Datum of gage is 756.12 ft above sea level. Prior to Oct. 1, 1987, at datum 3.00 ft higher. Prior to November 1945, nonrecording gage at same site and datum.

REMARKS.--Records good. Flow regulated by powerplant 1.2 mi upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	498	649	1030	1060	515	906	1210	792	2110	740	612	966
2	499	700	995	1120	589	1350	1140	698	1980	675	633	941
3	495	806	973	1070	686	1510	1040	852	1850	520	690	915
4	496	942	939	1050	628	1650	1010	910	1780	703	589	856
5	497	1050	909	1070	637	1930	979	828	1540	926	783	690
6	645	1240	760	988	636	2130	974	819	1360	901	695	552
7	487	1220	765	940	646	2170	946	802	1300	894	691	751
8	414	1140	765	779	633	2180	923	690	1100	892	549	766
9	485	1010	685	717	633	2170	912	657	1030	893	630	611
10	485	942	704	862	625	2000	763	885	1050	896	617	626
11	485	955	843	849	594	1700	765	1250	1320	891	483	652
12	485	943	905	826	637	1560	831	1570	1530	765	643	481
13	420	941	753	857	629	1360	700	1600	1550	736	694	640
14	420	780	769	707	657	1230	704	1620	1660	812	535	607
15	910	751	809	705	499	1230	711	1690	1770	687	630	479
16	915	756	700	577	509	1140	846	1450	1860	679	555	635
17	481	697	712	677	646	1070	772	1400	1780	689	488	695
18	653	732	792	729	625	1010	629	1400	1600	695	785	537
19	783	1070	790	717	622	1000	577	1390	1440	698	830	478
20	539	1410	880	574	630	1020	824	1270	1260	690	692	628
21	477	1340	831	633	662	1100	683	1160	1170	659	697	544
22	635	1330	690	613	729	1130	487	1610	1160	1020	692	469
23	607	1480	699	402	849	1140	659	2260	1050	1110	617	474
24	464	1640	717	462	774	1130	717	2830	988	899	784	478
25	497	1580	878	627	854	1130	702	3900	980	823	639	614
26	690	1370	935	631	835	1240	619	4150	948	708	794	541
27	553	1230	850	634	784	1410	635	3670	912	833	928	465
28	551	1270	854	641	915	1430	695	3010	819	691	918	467
29	695	1250	926	628	834	1380	553	2570	691	698	944	474
30	597	1120	945	607	—	1340	631	2290	829	827	983	474
31	477	—	962	606	—	1310	—	2190	—	756	988	—
TOTAL	17335	32344	25765	23358	19512	44056	23637	52213	40417	24406	21808	18506
MEAN	559	1078	831	753	673	1421	788	1684	1347	787	703	617
MAX	915	1640	1030	1120	915	2180	1210	4150	2110	1110	988	966
MIN	414	649	685	402	499	906	487	657	691	520	483	465
CFSM	0.55	1.07	0.82	0.75	0.67	1.41	0.78	1.67	1.33	0.78	0.70	0.61
IN.	0.64	1.19	0.95	0.86	0.72	1.62	0.87	1.92	1.49	0.90	0.80	0.68

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2004, BY WATER YEAR (WY)

	MEAN	688	805	861	914	993	1363	1340	1087	884	676	581	584
MAX	1990	1652	1674	1958	2048	2802	3018	2484	2063	1446	1217	1170	
(WY)	1987	1993	1991	1993	2001	1985	1950	1943	1989	1943	1994	1975	
MIN	268	285	347	371	370	461	617	405	302	269	235	278	
(WY)	1964	1964	1964	1964	1964	1964	1964	1931	1934	1934	1934	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1931 - 2004

ANNUAL TOTAL	264485		343357									
ANNUAL MEAN	725		938									
HIGHEST ANNUAL MEAN										898		
LOWEST ANNUAL MEAN										1387		1943
HIGHEST DAILY MEAN										368		1964
LOWEST DAILY MEAN										6830	Apr 8	1947
ANNUAL SEVEN-DAY MINIMUM	2170	Apr 9	4150	May 26						185	Aug 7	1934
MAXIMUM PEAK FLOW	269	Jul 20	402	Jan 23						217	Aug 1	1934
INSTANTANEOUS LOW FLOW	337	Sep 16	456	Oct 8						6910	Apr 8	1947
ANNUAL RUNOFF (CFSM)			8.57	May 25						(a)10.94	Apr 8	1947
ANNUAL RUNOFF (INCHES)			225	Apr 29						106	Dec 24	1999
10 PERCENT EXCEEDS	0.717		0.929							0.889		
50 PERCENT EXCEEDS	9.74		12.65							12.08		
90 PERCENT EXCEEDS	1210		1530							1540		
	607		792							752		
	416		518							415		

(a) Present datum.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106137 HAMPTON LAKE NEAR PORTAGE, MI

LOCATION.--Lat 42°11'24", long 85°37'50", in SE1/4 sec. 19, T.3 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, on left bank at outlet of Hampton Lake (Portage Creek), 1.8 mi south of Portage.

DRAINAGE AREA--Not determined.

PERIOD OF RECORD.—November 1998 to current year.

GAGE.--Water-stage recorder. Datum of gage is 855 ft above sea level, from topographic map.

REMARKS.—Records good.

EXTREMES FOR PERIOD OF RECORD.—Maximum gage height, 3.53 ft, Aug. 22, 2001; minimum, 1.89 ft, Apr. 6, 2000.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 3.01 ft, June 11; minimum, 1.98 ft, Feb. 9, 13, 15-19.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.17	2.14	2.27	2.11	2.01	2.27	2.13	2.15	2.58	2.39	2.43	2.52
2	2.16	2.23	2.22	2.12	2.01	2.67	2.11	2.21	2.49	2.38	2.42	2.51
3	2.18	2.55	2.19	2.11	2.02	2.52	2.10	2.16	2.46	2.40	2.42	2.51
4	2.23	2.50	2.16	2.10	2.00	2.41	2.08	2.12	2.45	2.67	2.50	2.51
5	2.19	2.53	2.16	2.12	2.00	2.67	2.08	2.13	2.45	2.55	2.48	2.52
6	2.16	2.40	2.15	2.10	2.01	2.51	2.09	2.12	2.46	2.49	2.44	2.54
7	2.15	2.29	2.13	2.10	2.00	2.35	2.10	2.15	2.46	2.77	2.42	2.62
8	2.14	2.22	2.12	2.09	1.99	2.29	2.09	2.16	2.46	2.59	2.41	2.55
9	2.13	2.17	2.12	2.07	1.99	2.23	2.08	2.32	2.46	2.48	2.41	2.52
10	2.12	2.14	2.18	2.06	1.99	2.19	2.07	2.78	2.60	2.44	2.42	2.50
11	2.12	2.16	2.22	2.05	1.99	2.17	2.07	2.71	2.94	2.42	2.45	2.50
12	2.13	2.15	2.17	2.06	1.99	2.14	2.07	2.45	2.93	2.43	2.45	2.48
13	2.13	2.14	2.14	2.05	1.99	2.12	2.07	2.40	2.76	2.41	2.44	2.47
14	2.30	2.12	2.12	2.05	1.99	2.13	2.06	2.42	2.66	2.40	2.43	2.45
15	2.48	2.12	2.11	2.04	1.99	2.13	2.05	2.40	2.58	2.39	2.43	2.44
16	2.32	2.12	2.12	2.03	1.98	2.12	2.06	2.32	2.52	2.38	2.43	2.50
17	2.23	2.12	2.13	2.04	1.98	2.12	2.07	2.37	2.56	2.39	2.43	2.47
18	2.19	2.33	2.12	2.04	1.98	2.12	2.07	2.45	2.57	2.39	2.44	2.43
19	2.17	2.73	2.11	2.02	1.99	2.13	2.05	2.36	2.50	2.38	2.44	2.41
20	2.16	2.46	2.10	2.02	2.03	2.20	2.05	2.31	2.47	2.37	2.43	2.39
21	2.15	2.31	2.09	2.01	2.10	2.20	2.08	2.40	2.47	2.39	2.43	2.38
22	2.14	2.23	2.10	2.00	2.07	2.14	2.07	2.79	2.50	2.60	2.43	2.37
23	2.14	2.24	2.15	2.01	2.07	2.11	2.07	2.61	2.47	2.49	2.46	2.36
24	2.13	2.57	2.17	2.02	2.06	2.14	2.06	2.58	2.47	2.43	2.52	2.36
25	2.21	2.42	2.14	2.01	2.05	2.17	2.08	2.51	2.46	2.41	2.51	2.35
26	2.21	2.31	2.11	2.01	2.05	2.32	2.08	2.47	2.43	2.40	2.57	2.34
27	2.18	2.25	2.09	2.02	2.05	2.33	2.07	2.42	2.42	2.40	2.52	2.33
28	2.17	2.24	2.10	2.03	2.06	2.23	2.06	2.40	2.41	2.40	2.73	2.33
29	2.19	2.28	2.18	2.02	2.08	2.20	2.05	2.39	2.41	2.40	2.74	2.34
30	2.17	2.26	2.17	2.01	—	2.16	2.06	2.50	2.40	2.41	2.62	2.33
31	2.16	—	2.13	2.01	—	2.15	—	2.73	—	2.44	2.55	—
MEAN	2.18	2.29	2.14	2.05	2.02	2.25	2.07	2.40	2.53	2.45	2.48	2.44
MAX	2.48	2.73	2.27	2.12	2.10	2.67	2.13	2.79	2.94	2.77	2.74	2.62
MIN	2.12	2.12	2.09	2.00	1.98	2.11	2.05	2.12	2.40	2.37	2.41	2.33
CAL YR 2003	MEAN	2.17	MAX	2.86	MIN	1.98						
WTR YR 2004	MEAN	2.28	MAX	2.94	MIN	1.98						

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106180 PORTAGE CREEK AT PORTAGE, MI

LOCATION.--Lat 42°12'21", long 85°35'23", in SE1/4 sec.16, T.3 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, on right bank 750 ft upstream from bridge on Westnedge Avenue in Portage.

DRAINAGE AREA.--16.5 mi².

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 850 ft above sea level, from topographic map.

REMARKS.--Records good. Several measurements of water temperature were made during the year. Gage-height telemeter 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	11	12	18	15	12	24	16	17	24	16	15	16
2	11	16	17	15	13	37	15	20	20	16	15	16
3	12	30	16	15	13	27	15	17	18	18	15	15
4	13	23	15	15	13	24	15	16	17	30	18	15
5	12	27	15	15	13	37	14	16	17	22	17	15
6	11	20	15	15	13	26	15	15	17	21	16	16
7	11	16	15	14	13	21	15	17	16	34	15	17
8	11	15	14	14	13	20	15	16	16	23	15	16
9	11	14	15	14	13	18	14	27	16	19	15	15
10	11	14	17	14	13	17	14	43	26	18	15	15
11	11	14	18	14	13	17	14	37	42	17	16	14
12	10	14	16	14	13	16	14	25	41	17	16	14
13	10	14	15	14	13	16	14	25	29	17	16	14
14	e17	14	14	14	13	16	14	25	24	16	15	14
15	e19	14	14	13	12	16	14	23	21	16	15	14
16	14	14	15	13	e12	16	14	19	19	16	15	17
17	13	14	15	13	12	16	15	26	22	16	15	15
18	12	26	15	13	12	16	14	26	21	16	15	14
19	12	37	14	13	13	16	14	20	19	15	15	14
20	12	23	14	13	14	19	14	18	18	15	14	14
21	12	18	14	13	15	18	15	25	19	17	14	14
22	12	16	15	13	14	16	14	43	19	25	14	14
23	12	19	17	13	14	15	14	31	18	18	16	13
24	12	31	16	13	14	16	14	30	18	16	17	14
25	14	22	16	e13	14	17	15	27	18	16	17	14
26	13	19	15	13	14	25	14	23	17	15	19	14
27	13	17	14	13	14	22	14	20	16	15	16	13
28	13	17	15	13	14	19	14	19	16	15	27	14
29	13	18	18	13	15	18	14	18	16	15	25	14
30	13	18	17	13	—	17	14	27	16	15	20	14
31	13	—	15	13	—	16	—	34	—	16	17	—
TOTAL	384	566	479	423	384	614	431	745	616	561	510	438
MEAN	12.4	18.9	15.5	13.6	13.2	19.8	14.4	24.0	20.5	18.1	16.5	14.6
MAX	19	37	18	15	15	37	16	43	42	34	27	17
MIN	10	12	14	13	12	15	14	15	15	15	14	13
CFSM	0.75	1.14	0.94	0.83	0.80	1.20	0.87	1.46	1.24	1.10	1.00	0.88
IN.	0.87	1.28	1.08	0.95	0.87	1.38	0.97	1.68	1.39	1.26	1.15	0.99

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2004, BY WATER YEAR (WY)

MEAN	17.1	18.9	18.1	17.4	17.9	19.9	20.3	19.4	17.4	15.7	15.4	15.4
MAX	25.7	25.5	23.6	21.4	21.5	28.1	26.6	24.1	24.9	21.4	19.2	20.3
(WY)	1992	1991	1991	1992	2001	1985	1985	1983	1989	1986	1994	1993
MIN	10.5	11.2	13.0	12.0	12.2	12.0	14.4	15.5	13.3	11.8	10.8	10.7
(WY)	2000	2000	2000	2000	2000	2000	2004	1999	2000	2003	2003	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1983 - 2004

ANNUAL TOTAL	5219.7	6151	
ANNUAL MEAN	14.3	16.8	
HIGHEST ANNUAL MEAN			17.7
LOWEST ANNUAL MEAN			21.2
HIGHEST DAILY MEAN	48	43	1991
LOWEST DAILY MEAN	9.2	10	2000
ANNUAL SEVEN-DAY MINIMUM	9.4	11	2000
MAXIMUM PEAK FLOW		59	Jun 21 1997
MAXIMUM PEAK STAGE		3.31	
ANNUAL RUNOFF (CFSM)	0.867	1.02	
ANNUAL RUNOFF (INCHES)	11.77	13.87	
10 PERCENT EXCEEDS	19	24	
50 PERCENT EXCEEDS	13	15	
90 PERCENT EXCEEDS	10	13	

(a) Sept. 18-21, 2003.

(b) Gage height 3.87 ft.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106300 PORTAGE CREEK NEAR KALAMAZOO, MI

LOCATION.--Lat 42°14'46", long 85°34'33", in SE1/4 sec.34, T.2 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, on left bank 5 ft upstream from bridge on Lovers Lane, 3.0 mi south of Kalamazoo.

DRAINAGE AREA.--22.4 mi².

PERIOD OF RECORD.—October 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is 814.88 ft above sea level.

REMARKS.—Records good. Flow includes water which is pumped from ground-water sources by industry and discharged into stream 2.0 mi upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	23	17	28	24	19	42	30	36	50	28	32	35
2	24	27	25	25	20	68	30	42	40	26	37	34
3	30	48	23	25	20	50	29	32	36	29	30	33
4	27	37	22	26	20	45	29	30	36	50	38	33
5	25	46	24	26	21	77	28	30	40	36	35	32
6	23	32	24	26	20	54	30	29	39	37	33	38
7	22	29	24	24	21	48	30	34	33	59	30	37
8	20	27	24	24	20	45	29	33	30	40	29	33
9	20	22	24	24	21	36	28	65	34	35	29	32
10	18	21	29	23	21	37	28	82	46	34	30	31
11	16	21	30	23	21	37	28	63	73	32	30	30
12	18	21	26	23	23	36	27	45	95	32	31	29
13	18	22	24	23	22	35	28	50	54	31	30	27
14	33	19	25	23	22	37	27	50	44	31	30	26
15	32	20	24	24	24	36	27	46	39	31	29	24
16	25	19	24	22	20	31	28	44	35	30	27	36
17	22	19	24	22	22	34	30	60	40	31	27	27
18	21	51	22	23	21	34	29	51	37	31	26	24
19	21	67	21	22	e23	34	31	40	39	30	26	23
20	21	40	20	21	e26	44	33	42	37	30	25	22
21	19	33	20	20	28	39	35	55	42	35	25	21
22	19	30	21	19	27	32	33	94	35	49	24	20
23	17	35	23	20	28	32	31	60	32	35	27	23
24	17	53	23	20	27	34	30	53	33	32	30	24
25	24	36	21	19	28	34	35	51	31	31	33	24
26	20	31	20	20	29	53	38	44	30	31	37	24
27	19	28	20	20	32	40	31	41	29	31	32	23
28	20	29	22	20	32	35	34	40	28	30	60	21
29	20	29	33	20	33	34	29	36	28	31	52	23
30	17	29	30	20	—	32	29	60	29	31	43	23
31	17	—	27	20	—	32	—	64	—	32	38	—
TOTAL	668	938	747	691	691	1257	904	1502	1194	1051	1005	832
MEAN	21.5	31.3	24.1	22.3	23.8	40.5	30.1	48.5	39.8	33.9	32.4	27.7
MAX	33	67	33	26	33	77	38	94	95	59	60	38
MIN	16	17	20	19	19	31	27	29	28	26	24	20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2004, BY WATER YEAR (WY)

MEAN	36.5	38.4	38.3	37.7	40.1	45.1	47.3	44.2	40.9	37.8	36.9	36.0
MAX	56.0	56.4	53.5	48.9	53.0	61.4	63.3	57.5	55.3	54.0	50.3	51.9
(WY)	1992	1991	1992	1988	1971	1985	1991	1991	1989	1991	1980	1992
MIN	21.5	24.7	24.1	20.6	22.9	24.9	30.1	30.4	23.1	23.1	26.0	23.0
(WY)	2004	2003	2004	2001	2003	2003	2004	1977	2003	2003	2003	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1965 - 2004

ANNUAL TOTAL	9466		11480			
ANNUAL MEAN	25.9		31.4		39.9	
HIGHEST ANNUAL MEAN					51.5	1991
LOWEST ANNUAL MEAN					25.9	2003
HIGHEST DAILY MEAN	77	Apr 5	95	Jun 12	257	May 31 1989
LOWEST DAILY MEAN	16	Oct 11	16	Oct 11	15	Sep 24 1999
ANNUAL SEVEN-DAY MINIMUM	19	Oct 26	19	Oct 26	17	Sep 21 1999
MAXIMUM PEAK FLOW			164	May 9	(a)407	May 30 1989
MAXIMUM PEAK STAGE			2.08	May 9	4.49	Jun 26 1978
INSTANTANEOUS LOW FLOW			14	Oct 11	(b)8.0	Jan 19 1965
10 PERCENT EXCEEDS	35		45		52	
50 PERCENT EXCEEDS	24		30		38	
90 PERCENT EXCEEDS	20		20		28	

(a) Gage height 3.09 ft.

(b) Result of bridge construction upstream.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106320 WEST FORK PORTAGE CREEK NEAR OSHTIMO, MI

LOCATION.--Lat 42°14'07", long 85°38'54", in SE1/4 sec.1, T.3 S., R.12 W., Kalamazoo County, Hydrologic Unit 04050003, on right bank at upstream side of culvert on 12th Street, 2.1 mi southeast of Oshtimo.

DRAINAGE AREA.--13.0 mi².

PERIOD OF RECORD.--May 1972 to current year.

GAGE.--Water-stage recorder. Datum of gage is 868.86 ft above sea level (Kalamazoo County Road Commission bench mark).

REMARKS.--Records good. At times, flow is affected by ground-water withdrawals. Several measurements of water temperature were made during the year.

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	1.6	3.3	5.0	3.1	2.1	3.8	3.2	2.2	6.0	1.9	1.7	3.7
2	1.5	3.8	4.6	3.0	e2.2	6.3	3.0	2.6	5.4	1.8	1.7	3.4
3	1.5	5.6	4.2	3.0	e2.3	6.9	2.8	2.7	4.8	2.0	1.7	3.1
4	1.7	6.5	4.0	2.9	e2.5	6.5	2.7	2.6	4.4	2.9	2.0	2.8
5	1.6	7.0	3.8	2.9	e2.5	7.7	2.6	2.5	4.3	3.2	1.8	2.7
6	1.6	6.5	3.8	2.7	e2.5	7.4	2.4	2.4	4.2	3.4	1.8	2.8
7	1.6	5.8	3.7	2.3	2.4	6.6	2.3	2.4	4.0	3.8	1.7	3.1
8	1.5	5.0	3.5	2.3	2.4	5.7	2.2	2.4	3.8	3.4	1.7	3.0
9	1.5	4.3	3.4	2.3	2.4	4.7	2.0	2.8	3.6	3.1	1.6	2.9
10	1.5	4.0	3.6	2.3	2.5	4.2	2.0	3.7	4.0	2.9	1.5	2.8
11	1.5	4.0	3.9	2.3	2.5	3.9	2.0	4.3	5.6	2.7	1.6	2.6
12	1.5	4.0	3.8	2.3	2.6	3.6	1.9	4.3	7.8	2.6	1.7	2.5
13	1.5	3.9	3.5	2.3	2.7	3.3	1.9	4.4	7.8	2.5	1.7	2.3
14	2.1	3.7	3.3	2.3	2.7	3.2	1.8	4.6	7.5	2.3	1.6	2.1
15	3.0	3.6	3.2	2.3	e2.6	3.0	1.6	4.6	6.5	2.1	1.6	2.0
16	3.3	3.6	3.2	2.2	e2.5	2.9	1.6	4.3	5.5	1.9	1.5	2.4
17	3.3	3.6	3.2	2.2	e2.5	2.9	1.7	4.0	4.9	1.9	1.5	2.3
18	3.2	4.6	3.2	2.2	e2.6	2.8	1.8	3.8	4.4	1.8	1.5	2.3
19	3.0	6.5	3.2	2.2	2.7	2.7	1.7	3.3	4.0	1.7	1.4	2.1
20	2.8	6.5	3.2	2.1	2.8	3.0	1.7	3.1	3.5	1.7	1.4	2.0
21	2.7	6.0	3.1	2.1	3.1	3.1	1.7	3.6	3.3	2.0	1.4	1.9
22	2.6	5.3	3.1	2.0	3.3	3.0	1.7	4.9	3.3	2.7	1.3	1.8
23	2.5	5.2	3.2	2.0	3.3	2.8	1.6	5.4	3.1	2.6	1.5	1.7
24	2.5	6.8	3.3	2.0	3.3	2.8	1.6	5.9	3.1	2.5	1.7	1.7
25	2.9	6.5	3.3	2.0	3.2	3.0	1.7	5.8	3.0	2.3	2.1	1.6
26	3.2	6.0	3.1	2.0	3.1	3.9	1.8	5.4	2.8	2.1	2.7	1.6
27	3.2	5.4	3.0	2.0	3.0	4.4	1.8	4.9	2.7	2.0	2.8	1.5
28	3.3	5.1	2.9	2.1	3.0	4.3	1.8	4.4	2.5	1.9	4.0	1.5
29	3.5	5.5	3.2	2.1	3.1	4.1	1.7	4.2	2.3	1.8	4.4	1.5
30	3.4	5.1	3.3	2.1	—	3.7	1.7	4.7	2.1	1.8	4.4	1.5
31	3.4	—	3.2	2.1	—	3.4	—	6.0	—	1.8	4.1	—
TOTAL	74.0	152.7	108.0	71.7	78.4	129.6	60.0	122.2	130.2	73.1	63.1	69.2
MEAN	2.39	5.09	3.48	2.31	2.70	4.18	2.00	3.94	4.34	2.36	2.04	2.31
MAX	3.5	7.0	5.0	3.1	3.3	7.7	3.2	6.0	7.8	3.8	4.4	3.7
MIN	1.5	3.3	2.9	2.0	2.1	2.7	1.6	2.2	2.1	1.7	1.3	1.5

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 2004, BY WATER YEAR (WY)

	5.68	6.56	6.56	6.31	6.26	6.78	6.73	5.68	4.84	4.24	4.54	5.00
MEAN	5.68	6.56	6.56	6.31	6.26	6.78	6.73	5.68	4.84	4.24	4.54	5.00
MAX	9.74	11.0	11.8	9.79	9.63	10.4	11.2	12.5	11.4	10.7	11.8	12.6
(WY)	1976	1986	1976	1973	1976	1973	1973	1973	1973	1973	1975	1975
MIN	1.82	2.54	3.35	2.31	2.70	3.17	2.00	2.16	1.13	1.20	0.81	0.84
(WY)	2000	2000	2001	2004	2004	2000	2004	2001	1988	1988	2003	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1972 - 2004

ANNUAL TOTAL	1044.66	1132.2	5.73
ANNUAL MEAN	2.86	3.09	10.0
HIGHEST ANNUAL MEAN			2.82
LOWEST ANNUAL MEAN			35
HIGHEST DAILY MEAN	8.5	Apr 5	7.8
LOWEST DAILY MEAN	0.34	Sep 21	1.3
ANNUAL SEVEN-DAY MINIMUM	0.41	Sep 15	1.4
MAXIMUM PEAK FLOW			8.5
MAXIMUM PEAK STAGE			1.45
INSTANTANEOUS LOW FLOW			1.3
10 PERCENT EXCEEDS	5.0		5.1
50 PERCENT EXCEEDS	3.2		2.8
90 PERCENT EXCEEDS	0.78		1.7

(a) Dec. 6, 1992, Oct. 28, 1994.

(b) July 27, 1996, Sept. 21, 2003.

(c) Dec. 5, 1992, Oct. 28, 1994, Apr. 16, 1995.

(d) Aug. 21-23.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106362 ASYLUM LAKE NEAR KALAMAZOO, MI

LOCATION.--Lat 42°15'57", long 85°38'20", in NE1/4 SW1/4 sec. 30, T.2 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, on south side of lake, 0.5 mi west of Kalamazoo.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--October 1998 to current year.

GAGE.--Water-stage recorder. Datum of gage is 863.69 ft above sea level (levels by City of Kalamazoo).

REMARKS.--Records good.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 5.50 ft, Mar. 9, 2002; minimum, 4.33 ft, Aug. 22, 2000, Sept. 21, 2003.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 4.92 ft, June 12; minimum, 4.45 ft, Oct. 13, 14.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.51	4.51	4.67	4.55	4.53	4.56	4.64	4.54	4.79	4.58	4.60	4.71
2	4.49	4.55	4.65	4.55	4.52	4.64	4.62	4.58	4.75	4.57	4.59	4.69
3	4.51	4.67	4.63	4.55	4.53	4.63	4.60	4.56	4.72	4.58	4.58	4.67
4	4.53	4.69	4.61	4.55	4.53	4.64	4.58	4.55	4.70	4.77	4.63	4.65
5	4.52	4.72	4.60	4.58	4.52	4.75	4.57	4.54	4.68	4.76	4.62	4.64
6	4.50	4.70	4.59	4.58	4.53	4.74	4.57	4.53	4.66	4.74	4.60	4.67
7	4.50	4.67	4.58	4.59	4.52	4.72	4.57	4.55	4.64	4.77	4.58	4.74
8	4.49	4.64	4.57	4.58	4.52	4.73	4.57	4.55	4.62	4.73	4.57	4.70
9	4.48	4.62	4.56	4.57	4.51	4.70	4.56	4.62	4.61	4.70	4.56	4.67
10	4.48	4.60	4.60	4.56	4.51	4.69	4.55	4.79	4.66	4.68	4.56	4.65
11	4.47	4.60	4.62	4.55	4.51	4.67	4.55	4.85	4.77	4.66	4.57	4.63
12	4.47	4.59	4.60	4.55	4.50	4.65	4.54	4.82	4.89	4.66	4.58	4.62
13	4.46	4.58	4.59	4.54	4.50	4.63	4.53	4.82	4.88	4.64	4.57	4.61
14	4.54	4.56	4.58	4.53	4.49	4.63	4.52	4.84	4.88	4.62	4.56	4.59
15	4.63	4.55	4.57	4.53	4.49	4.62	4.52	4.84	4.86	4.60	4.55	4.58
16	4.61	4.55	4.57	4.53	4.49	4.61	4.51	4.79	4.82	4.59	4.54	4.62
17	4.58	4.54	4.58	4.53	4.49	4.61	4.52	4.76	4.79	4.59	4.53	4.61
18	4.57	4.62	4.57	4.53	4.48	4.60	4.53	4.76	4.76	4.59	4.54	4.58
19	4.55	4.72	4.57	4.52	4.48	4.60	4.52	4.73	4.73	4.58	4.54	4.57
20	4.54	4.69	4.56	4.51	4.49	4.63	4.51	4.70	4.70	4.57	4.52	4.56
21	4.53	4.67	4.55	4.51	4.53	4.63	4.52	4.72	4.69	4.61	4.52	4.54
22	4.51	4.65	4.55	4.50	4.53	4.61	4.51	4.82	4.71	4.81	4.51	4.53
23	4.50	4.65	4.56	4.51	4.53	4.60	4.50	4.86	4.69	4.77	4.53	4.53
24	4.49	4.75	4.56	4.52	4.52	4.61	4.50	4.87	4.70	4.73	4.57	4.52
25	4.53	4.73	4.56	4.51	4.52	4.62	4.51	4.85	4.68	4.70	4.62	4.51
26	4.53	4.70	4.55	4.50	4.52	4.70	4.52	4.82	4.66	4.67	4.73	4.51
27	4.52	4.68	4.54	4.51	4.51	4.71	4.50	4.79	4.64	4.65	4.71	4.50
28	4.52	4.68	4.54	4.53	4.51	4.69	4.49	4.75	4.62	4.63	4.77	4.50
29	4.53	4.72	4.56	4.53	4.51	4.69	4.48	4.72	4.61	4.62	4.81	4.51
30	4.52	4.70	4.57	4.53	—	4.67	4.49	4.75	4.59	4.61	4.78	4.50
31	4.51	—	4.56	4.53	—	4.65	—	4.82	—	4.62	4.75	—
MEAN	4.52	4.64	4.58	4.54	4.51	4.65	4.54	4.73	4.72	4.66	4.60	4.60
MAX	4.63	4.75	4.67	4.59	4.53	4.75	4.64	4.87	4.89	4.81	4.81	4.74
MIN	4.46	4.51	4.54	4.50	4.48	4.56	4.48	4.53	4.59	4.57	4.51	4.50

WTR YR 2004 MEAN 4.61 MAX 4.89 MIN 4.46

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106400 WEST FORK PORTAGE CREEK AT KALAMAZOO, MI

LOCATION.--Lat 42°14'40", long 85°36'50", in NE1/4 sec.5, T.3 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, on right bank 30 ft upstream from culvert on Oakland Drive, 2.5 mi upstream from mouth, and 3.7 mi southwest of main business district of Kalamazoo.

DRAINAGE AREA.--18.7 mi².

PERIOD OF RECORD.--September 1959 to current year.

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 858.09 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records fair. At times, flow is affected by ground-water withdrawals. Several measurements of water temperature were made during the year. Gage-height telemeter 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	2.5	3.2	6.1	3.4	e2.2	7.1	4.2	2.7	e7.7	2.5	e2.5	e5.0
2	2.2	4.0	5.3	3.4	e2.3	11	3.7	3.3	e7.0	2.5	e2.4	4.6
3	2.3	6.5	4.9	3.3	e2.3	9.7	3.4	3.0	e6.4	3.1	e2.4	4.2
4	2.8	7.2	4.6	e3.2	e2.4	9.4	3.1	3.0	e5.7	5.4	2.4	3.5
5	2.6	7.9	4.3	e3.1	e2.4	14	2.8	2.9	e5.4	5.1	e2.3	3.1
6	2.3	7.3	4.0	e2.9	e2.5	12	2.7	2.6	e5.2	4.6	e2.3	3.7
7	2.1	6.3	3.8	e2.5	e2.5	9.9	2.7	2.9	e5.0	5.3	e2.2	5.0
8	2.0	5.4	3.6	e2.5	e2.5	9.0	2.5	3.0	e4.8	4.8	e2.1	4.3
9	1.9	4.5	3.6	e2.5	e2.5	7.7	2.2	4.0	e4.6	4.2	e2.0	3.8
10	1.8	3.9	4.2	e2.5	e2.6	6.5	e2.1	6.3	e4.9	3.8	e1.9	3.4
11	e1.8	3.8	4.6	e2.5	e2.6	5.7	e2.1	6.7	6.0	3.6	e2.0	3.4
12	e1.7	3.4	4.2	e2.5	e2.7	4.9	e2.0	6.2	9.0	3.4	e2.0	3.3
13	e1.7	3.3	4.0	e2.5	e2.8	4.3	e2.0	6.6	9.5	3.2	e2.0	3.1
14	2.9	3.2	3.7	e2.5	e2.8	3.5	e1.9	6.9	10	2.9	e2.0	2.9
15	4.8	3.2	3.6	e2.4	e2.7	3.4	e1.8	7.0	8.4	2.6	e2.0	2.7
16	4.2	3.2	3.6	e2.4	e2.6	3.2	e1.7	6.0	7.0	2.4	e2.1	3.5
17	3.7	3.2	3.6	e2.4	e2.6	3.0	e1.8	5.4	6.4	2.5	e2.1	3.3
18	3.4	5.0	3.6	e2.4	e2.7	3.0	e1.9	5.4	5.6	2.4	e2.0	3.1
19	3.3	8.3	3.6	e2.3	e2.8	3.0	e1.9	4.6	e5.0	2.3	e1.9	2.9
20	3.1	7.5	3.5	e2.3	e2.9	4.0	e2.0	4.0	e4.5	2.2	e1.8	2.6
21	2.9	6.7	3.6	e2.3	e3.2	3.9	2.0	5.3	e4.2	3.2	e1.7	2.5
22	2.7	6.1	3.6	e2.2	e3.5	3.5	2.0	8.4	e4.0	6.4	e1.6	2.2
23	2.5	6.2	3.6	e2.2	e3.6	3.4	e2.0	7.9	e3.9	5.1	e1.7	2.2
24	2.5	8.8	3.6	e2.1	e3.5	3.6	e2.0	8.2	e3.8	3.9	e1.9	2.0
25	3.0	7.9	3.6	e2.1	e3.4	3.9	e2.1	7.7	e3.6	3.3	e2.2	1.9
26	3.4	6.9	e3.5	e2.1	e3.3	6.6	2.1	7.1	e3.4	2.9	e2.8	1.9
27	3.2	6.4	3.3	e2.1	e3.2	7.2	2.1	e6.4	e3.2	2.7	e4.4	1.9
28	3.3	6.3	3.3	e2.2	e3.2	6.1	1.9	e5.8	e3.0	2.6	5.3	1.8
29	3.4	6.8	3.7	e2.2	e3.7	5.8	2.0	e5.4	e2.9	2.5	6.4	1.8
30	3.4	6.4	3.7	e2.2	---	5.1	2.0	e6.5	e2.7	2.5	e5.8	1.6
31	3.4	---	3.6	e2.2	---	4.6	---	e7.2	---	2.5	e5.4	---
TOTAL	86.8	168.8	121.5	77.4	82.0	188.0	68.7	168.4	162.8	106.4	81.6	91.2
MEAN	2.80	5.63	3.92	2.50	2.83	6.06	2.29	5.43	5.43	3.43	2.63	3.04
MAX	4.8	8.8	6.1	3.4	3.7	14	4.2	8.4	10	6.4	6.4	5.0
MIN	1.7	3.2	3.3	2.1	2.2	3.0	1.7	2.6	2.7	2.2	1.6	1.6

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2004, BY WATER YEAR (WY)

	MEAN	8.83	9.68	9.82	9.32	9.66	10.9	10.9	9.31	8.18	7.05	6.97	7.77
	MAX	15.2	16.8	16.8	14.5	15.9	18.0	18.2	15.2	14.9	12.7	13.9	18.8
	(WY)	1970	1986	1992	1993	1971	1971	1975	1975	1969	1970	1975	1975
	MIN	1.77	2.32	3.78	2.50	2.83	3.78	2.29	2.94	2.36	1.74	1.43	1.31
	(WY)	2000	2000	2001	2004	2004	2000	2004	2001	1988	2000	2003	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1959 - 2004

ANNUAL TOTAL	1553.09		1403.6		9.02	
ANNUAL MEAN	4.26		3.83		14.1	1975
HIGHEST ANNUAL MEAN					3.33	2000
LOWEST ANNUAL MEAN						(a)
HIGHEST DAILY MEAN	15	Apr 5	14	Mar 5	40	Sep 27 1999
LOWEST DAILY MEAN	0.47	Sep 21	1.6	Aug 22	0.34	Sep 21 1999
ANNUAL SEVEN-DAY MINIMUM	0.81	Sep 15	1.8	Aug 18	0.57	Sep 21 1999
MAXIMUM PEAK FLOW			16	Mar 5	46	Jun 21 1997
MAXIMUM PEAK STAGE			2.68	Mar 5	3.33	Jun 21 1997
INSTANTANEOUS LOW FLOW					0.23	Sep 21 2003
10 PERCENT EXCEEDS	7.3		6.6		14	
50 PERCENT EXCEEDS	3.8		3.3		8.8	
90 PERCENT EXCEEDS	1.4		2.0		3.9	

(a) Dec. 7, 1992, June 21, 1997.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106906 KALAMAZOO RIVER AT PLAINWELL, MI

LOCATION.--Lat 42°26'55", long 85°38'58", in NW1/4 NE1/4 sec.30, T.1 N., R.11 W., Allegan County, Hydrologic Unit 04050003, on left bank 0.4 mi downstream from bridge on 10th Street in Plainwell, 0.4 mi upstream from bridge on U.S. Highway 131, and 2.2 mi upstream from Gun River.

DRAINAGE AREA.--1,260 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 2000 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 720 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good. Flow regulated by powerplant upstream from station. Gage-height telemeter 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	610	733	1360	1210	818	1160	1550	1010	2390	1000	877	1270
2	615	1040	1270	1330	712	1660	1430	973	2240	840	744	1240
3	636	1280	1240	1310	880	1830	1380	939	2100	765	894	1210
4	688	1360	1210	1260	862	1940	1280	1080	1980	836	951	1180
5	625	1470	1180	1280	715	2520	1260	1070	1830	1120	913	998
6	667	1560	1100	1280	875	2590	1230	911	1570	1110	900	916
7	806	1600	926	1150	733	2710	1210	1060	1540	1200	886	949
8	448	1480	1070	1110	863	2710	1170	870	1370	1110	835	1140
9	598	1410	909	916	719	2690	1150	886	1230	1100	713	952
10	592	1260	972	974	863	2610	1070	1150	1290	1090	906	779
11	578	1280	1040	1140	678	2300	903	1440	1590	1080	710	931
12	568	1270	1160	967	862	1910	1080	1710	1830	1050	759	742
13	568	1240	1080	1140	718	1810	907	1830	1840	831	932	745
14	506	1170	916	940	863	1580	879	1910	1910	1070	835	913
15	1010	972	1100	906	689	1570	887	1970	2000	864	717	678
16	1130	1070	935	850	e650	1530	947	1790	2040	833	844	822
17	735	952	933	758	708	1430	1060	1610	2070	852	701	940
18	660	1100	937	930	868	1380	886	1680	1900	848	889	834
19	882	1460	1090	914	709	1350	694	1590	1700	854	1170	637
20	822	1660	1000	874	887	1450	928	1530	1530	841	939	699
21	585	1710	1140	714	815	1410	1070	1510	1400	850	916	813
22	654	1570	928	865	928	1460	690	1880	1420	1330	910	607
23	829	1690	915	653	990	1450	736	2290	1320	1520	930	622
24	606	2100	927	e550	1070	1470	906	2940	1210	1130	914	622
25	649	1990	988	e750	964	1490	936	3360	1190	1110	1130	673
26	773	1760	1150	955	1190	1650	899	4130	1160	922	1120	802
27	820	1580	1130	759	933	1730	720	4040	1110	975	1250	605
28	635	1530	994	913	1120	1780	867	3450	1080	984	1320	603
29	864	1590	1190	743	1140	1750	801	2940	883	892	1370	607
30	888	1460	1170	877	—	1660	688	2650	918	956	1310	595
31	672	—	1190	729	—	1640	—	2620	—	1060	1300	—
TOTAL	21719	42347	33150	29747	24752	56220	30214	58819	47641	31023	29585	25124
MEAN	701	1412	1069	960	854	1814	1007	1897	1588	1001	954	837
MAX	1130	2100	1360	1330	1140	2710	1550	4130	2390	1520	1370	1270
MIN	448	733	909	550	650	1160	688	870	883	765	701	595
CFSM	0.56	1.12	0.85	0.76	0.68	1.44	0.80	1.51	1.26	0.79	0.76	0.66
IN.	0.64	1.25	0.98	0.88	0.73	1.66	0.89	1.74	1.41	0.92	0.87	0.74

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2004, BY WATER YEAR (WY)

MEAN	1043	1236	1146	1013	1399	1696	1418	1753	1314	837	900	791
MAX	1811	1592	1581	1355	2466	2003	1748	2086	1749	1001	1087	1059
(WY)	2002	2002	2002	2002	2001	2001	2002	2001	2001	2004	2001	2001
MIN	701	822	820	737	690	1029	1007	1333	796	598	559	619
(WY)	2004	2003	2003	2003	2003	2003	2004	2003	2003	2003	2003	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 2001 - 2004

ANNUAL TOTAL	331958	430341	1211
ANNUAL MEAN	909	1176	1417
HIGHEST ANNUAL MEAN			841
LOWEST ANNUAL MEAN			2003
HIGHEST DAILY MEAN	2550	4130	4510
LOWEST DAILY MEAN	293	448	293
ANNUAL SEVEN-DAY MINIMUM	447	551	447
MAXIMUM PEAK FLOW		4180	4580
MAXIMUM PEAK STAGE		4.10	4.17
ANNUAL RUNOFF (CFSM)	0.722	0.933	0.961
ANNUAL RUNOFF (INCHES)	9.80	12.71	13.06
10 PERCENT EXCEEDS	1490	1830	1930
50 PERCENT EXCEEDS	782	1040	1080
90 PERCENT EXCEEDS	516	690	648

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106906 KALAMAZOO RIVER AT PLAINWELL, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--February 2001 to current year.

REMARKS.--Cross-sectional samples for suspended sediment were collected from bridge 0.4 mi upstream from gage.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Time	Specif. conduc- tance, wat unf uS/cm 25 degC (00095)	Temper- ature, water, deg C (00010)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)
OCT 2003					
09...	0805	762	13.8	69	50
29...	0930	736	8.8	80	14
NOV					
18...	0915	743	8.2	66	73
DEC					
08...	0905	706	2.6	67	80
22...	0910	780	2.8	84	54
JAN 2004					
07...	1240	654	.0	74	62
21...	1140	773	.5	61	53
FEB					
03...	1235	753	.5	68	48
18...	0950	747	1.5	74	28
MAR					
01...	0900	753	5.0	61	42
08...	0915	513	4.2	69	17
31...	0945	633	12.4	76	16
31...	0950	633	12.4	74	17
APR					
30...	0805	762	15.7	40	118
MAY					
17...	0840	589	18.3	86	39
26...	1000	388	17.1	56	28
JUN					
10...	0805	653	23.0	68	65
SEP					
08...	1000	678	21.0	66	50

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI

LOCATION.--Lat 42°28'56", long 85°47'54", in NW1/4 SW1/4 sec.12, T.1 N., R.13 W., Allegan County, Hydrologic Unit 04050003, on left bank 10 ft upstream from bridge on 26th Street, 600 ft downstream from Trowbridge Dam, and 4.0 mi southeast of Allegan.

DRAINAGE AREA.--1,530 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 2000 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 650 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Flow regulated by powerplant upstream from station. Gage-height telemeter 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	861	896	1900	1540	e1000	1980	2050	1290	3340	1340	1120	1620
2	834	1180	1750	1680	e1200	3110	1910	1440	3030	1150	991	1540
3	844	1600	1680	1690	e1000	3020	1830	1310	2760	1130	1100	1480
4	904	1840	1610	1630	e1200	2790	1690	1470	2630	1440	1200	1440
5	849	2030	1550	1650	1010	3500	1650	1460	2510	1750	1130	1290
6	845	2070	1490	1640	1160	3670	1620	1300	2210	1510	1130	1140
7	983	2050	1240	e1600	1030	3450	1600	1410	2090	1610	1090	1150
8	747	1890	1360	e1450	1120	3380	1560	1280	1920	1520	1070	1350
9	803	1770	1220	1220	1020	3320	1520	1250	1710	1470	908	1180
10	820	1570	1290	1210	1130	3220	1470	1530	1720	1440	1080	1020
11	813	1560	1430	1380	996	2970	1270	1840	2090	1420	967	1120
12	802	1550	1550	1250	1100	2610	1390	2170	2410	1400	925	1010
13	806	1510	1480	1370	1010	2460	1310	2340	2500	1180	1090	920
14	775	1460	1240	1250	1120	2210	1240	2660	2470	1330	1060	1080
15	1210	1220	1390	1160	1010	2120	1230	3160	2620	1210	892	940
16	1380	1280	1280	1130	933	2060	1240	2710	2580	1130	1050	952
17	1220	1180	1240	987	954	1970	1400	2290	2610	1140	906	1100
18	951	1310	1240	1160	1120	1890	1230	2430	2460	1140	1070	1060
19	1120	2070	1390	1150	994	1840	1060	2370	2240	1140	1360	875
20	1180	2170	1260	1120	1140	1940	1130	2270	2030	1120	1210	875
21	908	2240	1460	959	1170	1960	1360	2380	1830	1130	1130	1030
22	897	2040	1280	e1150	1300	1960	1050	3750	1870	1590	1120	860
23	1060	2090	1220	e950	1370	1930	997	3940	1770	1780	1140	853
24	933	2620	1250	e850	1540	1940	1170	4280	1620	1450	1160	854
25	907	2610	1260	e1000	1350	2010	1260	4330	1580	1360	1340	862
26	983	2380	1470	e1300	1550	2210	1240	4920	1530	1200	1600	1020
27	1080	2120	1460	e1050	1380	2420	1080	4830	1460	1170	1600	e840
28	921	2000	1310	e1250	1510	2440	1180	4390	1430	1240	1850	e840
29	1030	2120	1520	e1100	1660	2340	1160	3770	1260	1110	2020	e840
30	1090	2020	1550	e1000	---	2170	985	3410	1190	1130	1900	e900
31	948	---	1550	e1200	---	2150	---	3550	---	1300	1730	---
TOTAL	29504	54446	43920	39076	34077	77040	40882	81530	63470	41030	37939	32041
MEAN	952	1815	1417	1261	1175	2485	1363	2630	2116	1324	1224	1068
MAX	1380	2620	1900	1690	1660	3670	2050	4920	3340	1780	2020	1620
MIN	747	896	1220	850	933	1840	985	1250	1190	1110	892	840
CFSM	0.62	1.19	0.93	0.82	0.77	1.62	0.89	1.72	1.38	0.87	0.80	0.70
IN.	0.72	1.32	1.07	0.95	0.83	1.87	0.99	1.98	1.54	1.00	0.92	0.78

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2004, BY WATER YEAR (WY)

	2001	2002	2003	2004
MEAN	1423	1638	1547	1415
MAX	2532	2062	2100	1935
(WY)	2002	2002	2002	2001
MIN	929	1053	1086	1000
(WY)	2003	2003	2003	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 2001 - 2004

ANNUAL TOTAL	449137	574955	1613	
ANNUAL MEAN	1231	1571	1915	2003
HIGHEST ANNUAL MEAN			1138	2003
LOWEST ANNUAL MEAN			5050	Feb 15 2001
HIGHEST DAILY MEAN	3380	Apr 5	617	Jul 31 2003
LOWEST DAILY MEAN	617	Jul 31	665	Sep 16 2003
ANNUAL SEVEN-DAY MINIMUM	665	Sep 16	5150	Feb 15 2001
MAXIMUM PEAK FLOW			11.06	Feb 15 2001
MAXIMUM PEAK STAGE			1.03	
ANNUAL RUNOFF (CFSM)	0.804		14.32	
ANNUAL RUNOFF (INCHES)	10.92		2610	
10 PERCENT EXCEEDS	2040	2460	1440	
50 PERCENT EXCEEDS	1040	1340	875	
90 PERCENT EXCEEDS	751	938		

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 2001 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 2001 to current year.

WATER TEMPERATURE: June 2001 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval. Automatic suspended sediment pumping sampler since Feb. 13, 2001.

REMARKS.--Water-quality monitor sensors and automatic pump sampler intake located approximately 6 ft into channel from left bank. Cross-sectional samples for suspended sediment were collected from bridge 5 ft downstream from gage. Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except for the following periods: Oct. 2-6, Nov. 9 to Dec. 8, Jan. 29 to Mar. 3, Apr. 8-19, 25-30, July 7-28, rated good; Mar. 5-31, rated poor. Water temperature records rated excellent.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 891 microsiemens, Feb. 3, 2003; minimum, 378 microsiemens, Aug. 23, 2001.

WATER TEMPERATURE: Maximum, 29.5°C, Aug. 9, 2001, July 4, 2002; minimum, 0.0°C, on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 868 microsiemens, Feb. 8; minimum, 410 microsiemens, May 26.

WATER TEMPERATURE: Maximum, 26.3°C, July 21; minimum, 0.0°C, on many days during winter period.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	690	659	669	728	714	722	657	647	650	722	699	710
2	702	688	695	728	692	709	669	647	658	699	673	687
3	707	691	699	692	651	666	677	665	670	673	661	666
4	701	692	697	654	604	633	688	673	680	665	656	661
5	704	680	687	654	646	651	695	685	690	669	646	657
6	724	694	707	652	637	645	701	690	693	724	662	696
7	726	681	706	644	634	640	719	700	707	714	704	708
8	688	655	670	640	630	634	723	707	716	710	692	701
9	742	688	725	643	624	634	727	699	715	766	704	737
10	733	705	723	658	636	645	722	707	715	764	747	757
11	736	713	727	667	655	661	711	684	694	747	728	738
12	740	707	726	672	663	668	706	696	702	766	721	737
13	747	710	727	683	666	674	720	696	710	768	748	757
14	743	699	721	693	676	684	726	701	714	758	737	747
15	733	593	667	709	688	697	732	710	719	778	748	760
16	691	629	672	709	697	703	724	706	713	785	755	772
17	690	676	683	713	694	701	743	703	724	795	755	774
18	702	688	698	713	695	705	812	716	761	790	763	773
19	703	676	688	695	604	634	760	717	744	804	767	786
20	676	664	668	653	612	640	783	704	741	798	774	786
21	697	674	680	650	631	643	769	738	753	803	765	781
22	711	692	700	637	624	629	753	731	745	805	789	800
23	716	706	711	637	617	628	751	731	739	805	785	797
24	707	699	703	617	572	594	756	731	744	812	792	803
25	731	700	711	594	572	585	746	729	735	855	804	834
26	731	701	717	599	590	595	738	722	729	842	827	834
27	721	701	712	609	595	603	735	718	727	833	803	813
28	723	706	714	621	608	615	741	719	730	823	812	818
29	728	713	721	643	617	628	732	712	721	823	808	815
30	713	701	707	664	643	658	725	712	719	853	823	841
31	714	705	709	--	--	--	716	706	712	834	803	814
MONTH	747	593	701	728	572	651	812	647	715	855	646	760

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	830	810	819	704	605	668	620	607	614	717	659	698	
2	823	781	799	605	540	555	621	608	617	665	649	660	
3	811	783	794	595	552	580	622	607	616	689	646	669	
4	838	776	810	571	545	558	633	608	623	688	667	677	
5	824	802	810	562	520	542	631	622	627	684	670	677	
6	830	784	802	528	518	522	633	620	628	690	663	673	
7	851	771	800	529	516	524	645	623	637	685	662	675	
8	868	825	844	532	518	526	651	635	644	671	648	659	
9	830	781	792	554	530	547	664	641	655	—	—	—	
10	807	788	796	543	538	541	669	651	661	—	—	—	
11	808	778	788	550	538	547	695	660	677	—	—	—	
12	818	798	807	570	549	565	688	664	678	655	631	646	
13	810	785	795	587	565	580	695	662	678	634	570	597	
14	818	791	805	604	582	594	708	687	699	579	460	544	
15	803	774	786	632	598	620	712	695	704	538	482	518	
16	823	803	815	627	609	620	732	706	717	574	529	556	
17	825	785	800	653	608	639	717	705	712	589	571	582	
18	803	785	792	652	636	647	725	700	712	587	568	577	
19	812	775	788	657	633	648	725	707	716	606	570	595	
20	826	806	813	655	633	648	743	706	726	618	601	614	
21	833	785	805	652	619	640	711	685	697	623	523	593	
22	834	817	826	653	641	649	700	678	689	523	432	458	
23	818	781	796	653	637	647	703	662	689	524	472	509	
24	791	765	780	655	642	649	701	650	677	524	498	504	
25	787	770	779	648	638	643	685	639	659	499	438	474	
26	780	754	767	638	608	626	697	672	680	439	410	419	
27	770	746	758	619	594	609	711	682	697	427	411	419	
28	768	732	755	623	612	619	738	711	727	457	427	445	
29	732	704	722	621	614	618	739	721	730	483	456	472	
30	—	—	—	628	614	623	731	701	717	501	483	493	
31	—	—	—	628	608	620	—	—	—	499	478	491	
MONTH	868	704	795	704	516	600	743	607	677	—	—	—	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	523	498	514	643	611	629	705	666	684	609	591	602
2	541	523	533	641	610	628	712	677	692	—	—	—
3	566	541	557	645	594	632	721	698	711	645	620	634
4	576	562	571	606	541	575	700	665	678	663	617	642
5	583	572	577	590	535	571	698	648	669	670	638	652
6	592	573	585	617	589	609	690	653	675	682	660	671
7	597	578	590	606	566	593	689	670	681	687	599	653
8	618	587	605	607	564	592	683	664	672	678	609	662
9	638	612	629	611	594	601	686	641	666	684	658	672
10	643	621	633	622	594	611	688	652	670	690	669	679
11	624	588	612	611	592	602	694	642	658	709	678	697
12	607	568	595	607	589	598	715	681	702	679	659	670
13	599	567	590	624	589	608	715	691	702	697	677	685
14	597	573	586	645	611	625	693	680	687	701	669	683
15	580	563	572	628	601	611	690	669	679	689	657	667
16	581	568	576	640	619	631	698	618	665	704	671	685
17	574	562	569	634	610	616	709	649	681	701	653	676
18	582	564	574	615	582	597	708	640	668	706	674	691
19	586	569	581	606	582	594	706	663	687	726	676	693
20	593	581	588	611	592	602	692	673	682	725	684	706
21	609	585	600	619	592	610	690	664	677	722	677	699
22	611	592	603	603	450	539	667	634	645	720	667	684
23	624	598	615	593	476	562	656	624	645	725	697	712
24	640	615	630	604	580	594	661	599	633	728	691	705
25	641	618	631	597	582	590	672	585	641	697	656	673
26	647	629	640	602	579	590	595	549	575	736	671	706
27	646	627	638	609	589	598	638	586	627	—	—	—
28	644	626	637	622	602	611	637	546	596	—	—	—
29	649	638	643	638	621	630	617	559	576	—	—	—
30	656	629	644	672	620	639	607	560	585	—	—	—
31	—	—	—	693	657	677	611	589	602	—	—	—
MONTH	656	498	597	693	450	605	721	546	658	—	—	—

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

TEMPERATURE, WATER, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	12.7	10.9	11.8	11.7	11.2	11.4	4.5	3.4	4.0	3.0	2.3	2.7
2	11.4	9.6	10.6	11.6	10.9	11.2	3.7	2.9	3.3	5.4	2.9	4.1
3	10.6	9.3	9.8	11.6	10.9	11.4	3.1	2.5	2.8	6.0	5.3	5.7
4	11.0	9.5	10.2	12.2	10.7	11.3	3.3	2.6	2.9	5.3	3.4	4.4
5	11.6	9.1	10.4	12.2	10.9	11.7	3.9	3.2	3.5	3.4	2.4	2.8
6	11.7	8.9	10.4	10.9	9.7	10.5	3.3	2.7	3.0	2.4	0.0	1.0
7	12.8	9.7	11.3	9.7	8.0	8.9	2.7	1.9	2.4	0.0	0.0	0.0
8	15.1	11.6	13.3	8.0	6.5	7.5	3.2	2.5	2.9	0.2	0.0	0.1
9	15.6	13.4	14.6	6.5	5.4	6.0	4.5	3.2	3.8	0.4	0.0	0.1
10	16.0	13.3	14.7	6.2	4.8	5.5	5.5	4.5	5.0	0.2	0.0	0.1
11	17.3	14.7	16.0	7.7	6.2	7.1	5.4	3.5	4.4	1.4	0.1	0.7
12	17.1	15.5	16.3	8.1	7.4	7.7	3.5	2.3	3.0	2.1	1.4	1.8
13	16.0	13.9	15.0	7.4	5.3	6.1	2.3	1.4	1.7	2.0	1.2	1.8
14	15.0	12.7	13.9	5.4	4.8	5.2	2.8	1.7	2.2	1.2	0.3	0.7
15	13.3	11.9	12.6	6.1	5.4	5.7	2.9	2.4	2.6	0.6	0.0	0.2
16	13.4	12.0	12.7	6.4	6.0	6.2	2.9	2.2	2.5	0.5	0.0	0.2
17	12.0	10.7	11.3	7.9	6.3	7.1	2.8	2.4	2.6	1.0	0.1	0.4
18	12.4	10.5	11.4	9.6	7.7	8.6	2.7	2.3	2.5	1.2	0.5	0.9
19	12.8	11.1	11.9	10.4	9.3	9.8	2.8	2.3	2.5	0.7	0.1	0.3
20	13.6	11.2	12.3	9.3	8.2	8.8	2.3	1.7	2.0	0.4	0.0	0.1
21	13.5	12.0	12.8	9.6	8.9	9.2	2.4	1.3	1.9	0.5	0.0	0.2
22	12.0	10.7	11.3	9.0	8.5	8.8	3.6	2.2	2.8	0.4	0.0	0.1
23	11.0	10.3	10.7	10.3	9.0	9.8	3.8	3.5	3.6	0.1	0.0	0.1
24	11.1	9.3	10.2	10.1	6.7	8.5	3.5	2.8	3.1	0.2	0.1	0.1
25	11.4	10.6	11.0	6.7	5.5	6.0	2.8	2.4	2.5	0.1	0.0	0.0
26	11.4	10.3	10.8	5.8	5.2	5.5	2.6	1.7	2.2	0.0	0.0	0.0
27	10.3	9.2	9.7	5.8	5.3	5.6	3.0	1.9	2.4	0.0	0.0	0.0
28	9.2	8.6	8.8	5.8	4.5	5.3	4.2	2.6	3.2	0.0	0.0	0.0
29	8.9	8.5	8.7	4.5	4.1	4.3	4.6	4.1	4.4	0.0	0.0	0.0
30	10.6	8.2	9.2	4.8	3.8	4.3	4.1	2.9	3.3	0.0	0.0	0.0
31	11.8	10.4	11.2	—	—	—	3.6	2.8	3.2	0.1	0.0	0.1
MONTH	17.3	8.2	11.8	12.2	3.8	7.8	5.5	1.3	3.0	6.0	0.0	0.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	0.1	0.0	0.0	5.0	4.4	4.6	12.6	10.8	11.7	16.7	14.1	15.4	
2	0.1	0.0	0.1	4.5	4.3	4.4	12.7	10.1	11.4	15.6	13.1	14.3	
3	0.2	0.0	0.1	5.0	4.3	4.6	11.8	10.1	11.1	15.0	12.4	13.6	
4	1.2	0.2	0.6	5.5	4.7	5.1	10.3	9.0	9.6	14.6	12.4	13.4	
5	0.8	0.3	0.4	7.0	5.4	6.2	10.2	7.8	8.9	15.9	13.1	14.4	
6	1.1	0.4	0.8	6.6	4.5	5.4	9.8	8.5	9.1	16.6	14.0	15.3	
7	1.8	0.7	1.2	5.0	4.3	4.7	12.0	8.6	10.2	16.9	15.0	15.8	
8	1.2	0.0	0.5	4.4	3.9	4.1	11.8	10.7	11.2	17.1	14.8	15.9	
9	1.0	0.0	0.5	4.2	3.3	3.8	11.8	9.8	10.8	—	—	—	
10	1.4	0.9	1.1	4.9	3.2	4.0	10.9	9.8	10.3	—	—	—	
11	1.9	0.6	1.2	5.0	4.0	4.7	10.7	9.1	9.8	—	—	—	
12	1.8	1.2	1.5	4.0	2.9	3.4	10.8	8.5	9.6	22.0	19.3	20.5	
13	2.0	0.8	1.4	4.0	2.0	3.0	10.7	8.7	9.7	21.7	20.8	21.2	
14	2.3	0.9	1.5	4.0	3.4	3.7	12.1	8.5	10.2	21.1	18.9	20.5	
15	1.6	0.3	0.9	5.1	3.0	4.0	14.0	10.4	12.1	18.9	17.0	17.9	
16	0.7	0.0	0.3	4.5	3.6	4.1	15.8	12.8	14.1	18.9	16.3	17.5	
17	2.2	0.0	1.0	4.3	3.5	3.9	17.7	14.6	15.9	20.0	17.5	18.7	
18	3.0	1.6	2.3	4.8	3.9	4.3	19.4	16.4	17.8	19.6	18.2	19.0	
19	4.1	2.2	3.1	6.6	4.2	5.3	18.3	16.5	17.5	20.3	17.6	18.8	
20	4.0	3.0	3.6	7.6	6.0	6.6	16.5	14.6	15.2	20.0	19.0	19.5	
21	3.0	2.0	2.4	6.8	4.8	5.7	16.2	14.4	15.2	19.8	18.7	19.3	
22	4.2	2.2	3.2	5.6	4.0	4.8	15.5	13.9	14.8	19.5	18.0	18.7	
23	4.0	3.2	3.6	6.8	4.1	5.4	16.4	13.3	14.9	20.4	19.3	19.8	
24	3.5	2.8	3.1	6.5	6.2	6.3	15.8	14.0	14.9	20.2	18.1	19.2	
25	3.9	1.8	2.8	8.9	6.5	7.7	15.8	13.9	14.8	18.1	17.0	17.5	
26	4.3	2.7	3.4	11.3	8.9	10.1	16.2	13.7	14.8	17.6	16.9	17.2	
27	4.8	2.5	3.5	12.7	10.8	11.7	14.4	12.3	13.0	17.3	16.0	16.6	
28	5.1	3.2	4.0	13.4	11.6	12.5	15.0	11.1	12.9	18.2	16.4	17.2	
29	5.3	3.7	4.4	14.0	12.5	13.2	17.0	14.0	15.5	17.2	16.1	16.5	
30	—	—	—	13.6	11.9	12.8	17.2	15.6	16.4	16.7	16.1	16.5	
31	—	—	—	13.7	11.9	12.8	—	—	—	17.8	16.3	17.0	
MONTH	5.3	0.0	1.8	14.0	2.0	6.2	19.4	7.8	12.8	—	—	—	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

TEMPERATURE, WATER, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	18.9	16.8	17.8	24.2	21.0	22.4	24.4	20.9	22.5	21.6	19.8	20.6
2	18.6	17.8	18.1	24.6	21.6	23.0	25.3	22.3	23.8	—	—	—
3	19.7	17.4	18.4	24.5	21.9	23.1	26.0	23.0	24.5	23.2	21.3	22.1
4	20.2	17.9	19.0	23.4	22.0	22.6	25.2	23.3	24.0	23.4	21.4	22.4
5	21.2	18.9	20.0	23.8	21.3	22.5	23.7	21.4	22.6	23.9	21.9	22.9
6	21.8	19.6	20.7	25.0	22.4	23.6	23.4	20.7	22.0	24.0	22.0	23.0
7	22.9	20.1	21.4	24.1	22.0	23.3	23.1	20.4	21.8	23.4	21.6	22.4
8	24.5	21.3	22.8	22.2	21.2	21.7	23.2	20.9	21.9	22.2	20.2	21.1
9	25.1	22.8	23.9	22.9	20.0	21.4	23.4	20.6	22.0	22.1	19.6	20.8
10	24.1	21.3	22.7	24.4	21.2	22.6	22.7	20.9	21.6	21.8	19.1	20.5
11	21.3	19.4	20.5	25.4	22.3	23.7	20.9	19.2	20.1	22.1	19.4	20.7
12	20.2	18.7	19.4	24.6	23.2	23.9	19.4	18.2	18.9	22.7	19.8	21.2
13	21.7	19.3	20.4	25.5	23.4	24.3	19.7	18.0	18.8	22.6	19.9	21.4
14	21.9	20.1	21.0	24.6	23.1	23.8	20.9	17.5	19.0	23.4	20.8	22.1
15	22.8	20.5	21.6	24.6	21.8	23.1	21.1	17.4	19.2	23.9	21.7	22.8
16	23.1	21.7	22.4	24.8	21.7	23.2	21.6	18.3	19.9	23.2	21.6	22.4
17	23.6	22.4	22.9	24.4	22.2	23.2	20.8	19.1	20.0	21.6	19.6	20.4
18	23.6	21.9	22.7	24.9	21.4	23.0	21.1	19.2	20.2	20.9	18.5	19.6
19	22.9	21.3	22.1	25.0	22.3	23.6	22.5	20.1	21.1	20.5	17.8	19.2
20	22.2	20.1	21.1	25.9	22.8	24.2	20.9	19.5	20.0	20.4	17.6	19.0
21	20.9	19.4	20.0	26.3	23.9	24.9	21.4	18.4	19.8	20.7	17.8	19.3
22	21.4	19.2	20.1	25.3	23.7	24.4	21.2	18.3	19.8	20.7	17.9	19.4
23	21.6	19.1	20.3	25.2	23.3	24.2	22.1	19.5	20.8	20.8	18.0	19.5
24	20.8	18.8	20.0	24.1	22.4	23.3	22.6	20.6	21.6	20.7	18.8	19.9
25	20.9	17.9	19.2	24.3	21.7	22.9	22.5	21.5	22.0	20.1	18.4	18.9
26	21.0	18.3	19.6	22.9	21.1	22.1	22.0	20.8	21.4	19.9	17.3	18.6
27	21.6	18.7	20.0	21.9	20.8	21.2	24.7	21.6	23.1	—	—	—
28	21.5	19.7	20.5	23.6	20.0	21.7	23.9	22.9	23.3	—	—	—
29	22.1	19.1	20.5	23.6	21.4	22.4	22.9	20.7	21.7	—	—	—
30	23.2	19.9	21.4	22.6	21.2	21.7	21.9	19.8	20.8	—	—	—
31	—	—	—	23.2	21.1	22.0	22.3	20.0	21.0	—	—	—
MONTH	25.1	16.8	20.7	26.3	20.0	23.0	26.0	17.4	21.3	—	—	—

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Time	Sam- pling method, code (82398)	Suspnd. sediment, sieve diameter percent <.063mm (70331)	Sus- pended sediment concentration mg/L (80154)
OCT 2003				
09...	0910	20	70	44
09...	0915	50	77	60
14...	1300	50	86	95
15...	1300	50	81	174
16...	1300	50	96	238
17...	1300	50	94	289
29...	1130	20	81	9
29...	1135	50	77	47
NOV				
02...	1300	50	71	89
03...	1300	50	77	45
05...	1300	50	78	90
18...	1120	20	56	77
18...	1125	50	69	54
19...	1300	50	89	52
21...	1300	50	84	76
24...	1300	50	87	50
DEC				
08...	1035	20	59	82
08...	1040	50	84	99
22...	1030	20	52	77
22...	1035	50	89	73
JAN 2004				
07...	1115	20	71	32
21...	1015	20	45	69
FEB				
03...	1130	20	61	72
18...	1100	20	62	28
MAR				
01...	1020	20	70	37
01...	1025	50	61	133
04...	1300	50	57	134
05...	1300	50	70	141
08...	1030	20	55	27
08...	1035	50	88	22
31...	1130	20	69	16
31...	1135	20	65	19
31...	1140	50	70	21
31...	1145	50	78	19
APR				
30...	1000	20	47	103
MAY				
17...	1010	20	86	40
26...	1210	20	42	65
26...	1215	50	73	92
JUN				
10...	1010	20	75	47
SEP				
08...	1340	20	67	55

Sampling method code: 20 is cross-sectional sample; 50 is automatic pump sampler.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04108600 RABBIT RIVER NEAR HOPKINS, MI

LOCATION.--Lat 42°38'32", long 85°43'19", in SE1/4 sec.16, T.3 N., R.12 W., Allegan County, Hydrologic Unit 04050003, on left bank at downstream side of bridge on 18th Street, 2.5 mi northeast of Hopkins.

DRAINAGE AREA.--71.4 mi².

PERIOD OF RECORD.--October 1965 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 700 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Gage-height telemeter 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	17	27	61	34	e29	188	63	54	163	32	20	30
2	16	42	51	34	e29	592	59	69	93	30	20	28
3	16	111	45	36	e30	376	54	57	81	30	19	26
4	20	135	42	34	e31	242	51	46	72	51	22	25
5	18	163	41	32	e30	419	47	42	66	50	23	24
6	17	160	39	e30	e30	386	46	39	61	40	20	24
7	17	89	37	e33	e29	265	45	37	57	36	18	25
8	16	63	36	e38	e29	221	44	37	53	33	18	23
9	16	51	36	e34	e29	178	42	47	49	31	17	22
10	16	45	49	e32	e29	132	41	65	50	29	19	20
11	16	46	79	e33	e28	110	40	57	94	28	19	19
12	16	48	59	e34	e28	95	39	50	112	27	21	19
13	17	44	46	e33	e28	81	38	54	77	27	20	19
14	19	41	e43	e30	e28	84	37	120	73	26	19	18
15	35	38	41	e28	e28	81	36	282	68	24	17	18
16	30	37	41	e32	e28	73	35	195	58	23	17	20
17	26	35	48	e31	e28	67	36	92	53	26	17	20
18	25	60	44	e30	e28	65	36	189	50	23	24	19
19	25	179	43	e28	e35	63	34	230	46	21	20	18
20	24	131	40	e26	44	74	32	123	42	21	18	18
21	24	73	38	e28	67	83	34	207	41	25	18	17
22	24	57	43	e27	70	66	33	598	58	49	17	17
23	23	52	50	e29	76	61	32	549	49	32	17	16
24	23	152	45	e29	74	63	31	372	58	26	19	16
25	24	139	40	e30	58	117	56	246	54	24	19	16
26	27	81	36	e29	53	133	64	158	46	23	43	17
27	26	65	36	e29	47	130	47	115	40	22	31	17
28	25	59	36	e29	54	92	41	93	38	22	37	17
29	27	71	41	e29	83	89	37	78	36	20	61	17
30	29	66	42	e29	—	83	35	79	34	20	47	17
31	28	—	37	e29	—	71	—	178	—	21	35	—
TOTAL	682	2360	1365	959	1180	4780	1265	4558	1872	892	732	602
MEAN	22.0	78.7	44.0	30.9	40.7	154	42.2	147	62.4	28.8	23.6	20.1
MAX	35	179	79	38	83	592	64	598	163	51	61	30
MIN	16	27	36	26	28	61	31	37	34	20	17	16
CFSM	0.31	1.10	0.62	0.43	0.57	2.16	0.59	2.06	0.87	0.40	0.33	0.28
IN.	0.36	1.23	0.71	0.50	0.61	2.49	0.66	2.37	0.98	0.46	0.38	0.31

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2004, BY WATER YEAR (WY)

	MEAN	40.3	57.3	68.1	65.4	76.6	105	93.1	69.7	57.0	32.9	27.9	32.4
MAX	119	171	131	146	192	227	152	152	183	99.0	86.8	123	123
(WY)	1987	1991	1976	1993	1997	1979	1993	2000	1997	1986	1994	1978	1978
MIN	15.0	14.5	21.7	19.8	22.1	32.0	42.2	25.1	16.4	13.6	12.5	10.1	10.1
(WY)	1969	2000	1999	1970	2003	2000	2004	1977	1987	1987	1970	1999	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1966 - 2004

ANNUAL TOTAL	16108	21247	
ANNUAL MEAN	44.1	58.1	
HIGHEST ANNUAL MEAN			60.4
LOWEST ANNUAL MEAN			89.3
HIGHEST DAILY MEAN	432	Apr 5	598
LOWEST DAILY MEAN	12	Sep 8	16
ANNUAL SEVEN-DAY MINIMUM	12	Sep 8	16
MAXIMUM PEAK FLOW			707
MAXIMUM PEAK STAGE			8.17
INSTANTANEOUS LOW FLOW			15
ANNUAL RUNOFF (CFSM)	0.618	0.813	0.846
ANNUAL RUNOFF (INCHES)	8.39	11.07	11.49
10 PERCENT EXCEEDS	87	111	113
50 PERCENT EXCEEDS	26	36	42
90 PERCENT EXCEEDS	16	19	19

(a) Mar. 2, May 22.

(b) From rating curve extended above 1,200 ft³/s.

(c) Oct. 2, 3, 12, Sept. 23.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04108670 KALAMAZOO RIVER NEAR NEW RICHMOND, MI

LOCATION.--Lat 42°38'41", long 86°06'58", in NE1/4 SE1/4 sec.18, T.3 N., R.15 W., Allegan County, Hydrologic Unit 04050003, on right bank at downstream side of bridge on 58th Street, 0.5 mi west of New Richmond, and 0.7 mi downstream from Mann Creek.

DRAINAGE AREA.--1,994 mi².

PERIOD OF RECORD.--April 1994 to October 1995, October 2002 to current year. Published as "at New Richmond" prior to October 2002.

GAGE.--Water-stage recorder. Elevation of gage is 595 ft above sea level, from topographic map. April 1994 to October 1995 water-stage recorder at site 1.2 mi upstream at different datum (station 04108660).

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by powerplants upstream from station. Gage-height telemeter 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	991	1160	2530	1720	e1500	2380	2430	1400	5210	1600	1530	2120
2	1110	1150	2340	1780	e1300	3180	2550	1470	4970	1530	1520	2000
3	1030	1410	2220	1910	e1500	4080	2350	1700	4750	1540	1440	1730
4	1020	1930	2050	2020	e1300	5030	1980	1680	4290	1900	1470	1920
5	965	2240	1910	1970	e1500	5350	1900	1670	3730	2170	1500	1580
6	954	2510	1850	1900	e1300	5250	1890	1650	3310	2160	1500	1740
7	952	2680	1830	2020	e1500	5670	1870	1630	3180	2120	1430	1480
8	965	2630	1780	2080	e1300	5700	1850	1600	2420	1790	1430	1330
9	953	2510	1500	e2000	e1400	5240	1850	1650	2630	2130	1410	1440
10	891	2070	1760	e1600	e1300	4850	1880	1630	2450	1740	1380	1490
11	873	1930	1690	e1500	e1400	4600	1820	1630	2350	1950	1350	1370
12	991	1880	1880	e1700	e1300	4200	1490	2130	2560	1650	1360	1320
13	871	1890	1730	e1600	e1400	3780	1540	2170	2860	1750	1300	1310
14	960	1560	1810	e1650	e1300	3360	1790	2500	3040	1660	1370	1260
15	1110	1760	1740	e1600	e1400	2920	1410	2970	3120	1600	1360	1160
16	1010	1780	1690	e1500	e1300	2540	1330	3460	3160	1710	1230	1170
17	1260	1490	1870	e1400	e1300	2410	1400	3700	3160	1570	1300	1130
18	1580	1550	1540	e1300	e1300	2400	1630	3640	3130	1510	1320	1260
19	1180	1920	1580	e1500	e1400	2340	1590	3400	3020	1450	1360	1350
20	1000	2030	1850	e1450	e1300	2200	1450	3240	2840	1420	1450	1260
21	1050	2590	1630	e1400	e1400	2200	1300	3230	2520	1440	1470	1090
22	1120	2640	1740	e1300	e1500	2280	1410	3550	2480	1660	1310	1090
23	1020	2690	1840	e1450	e1650	2320	1450	4760	2410	1820	1330	1120
24	1000	2700	1640	e1300	e1800	2280	1210	6460	2350	2030	1390	1120
25	1080	2830	1730	e1100	e1850	2290	1420	6870	2200	2150	1460	1110
26	1150	3160	1580	e1400	1870	2430	1550	6590	2090	1690	1720	1110
27	1070	3140	1710	e1600	1900	2720	1550	6400	2020	1650	2060	1100
28	1120	2910	1790	e1400	2000	2990	1540	6410	1970	1510	1750	1130
29	1190	2690	1810	e1600	1970	3170	1350	6260	1690	1420	2180	1120
30	1080	2660	1770	e1400	---	3110	1330	5860	1660	1430	2450	1090
31	1130	---	1740	e1400	---	2710	---	5590	---	1510	2320	---
TOTAL	32676	66090	56130	49550	43140	105980	50110	106900	87570	53260	47450	40500
MEAN	1054	2203	1811	1598	1488	3419	1670	3448	2919	1718	1531	1350
MAX	1580	3160	2530	2080	2000	5700	2550	6870	5210	2170	2450	2120
MIN	871	1150	1500	1100	1200	2200	1210	1400	1660	1420	1230	1090
CFSM	0.53	1.10	0.91	0.80	0.75	1.71	0.84	1.73	1.46	0.86	0.77	0.68
IN.	0.61	1.23	1.05	0.92	0.80	1.98	0.93	1.99	1.63	0.99	0.89	0.76

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 2004, BY WATER YEAR (WY)

	MEAN	1211	2042	1873	1785	1531	2591	2254	2570	1913	1575	1609	1180
MAX	1528	2704	2448	2495	1938	3419	2488	3448	2919	2193	2544	1444	
(WY)	1995	1995	1995	1995	1995	2004	2003	2004	2004	1994	1994	1994	
MIN	1054	1220	1360	1261	1169	1797	1670	1995	1273	979	888	837	
(WY)	2004	2003	2003	2003	2003	2003	2004	1994	2003	2003	2003	2003	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1994 - 2004

ANNUAL TOTAL	557981						739356						
ANNUAL MEAN	1529						2020						
HIGHEST ANNUAL MEAN										1807			
LOWEST ANNUAL MEAN										2020			2004
HIGHEST DAILY MEAN	5130	Apr 8					6870	May 25		1412			2003
LOWEST DAILY MEAN	665	Sep 21					871	Oct 13		6870	May 25	2004	
ANNUAL SEVEN-DAY MINIMUM	696	Sep 16					928	Oct 7		665	Sep 21	2003	
MAXIMUM PEAK FLOW							6970	May 25		696	Sep 16	2003	
MAXIMUM PEAK STAGE							10.01	May 25		6970	May 25	2004	
ANNUAL RUNOFF (CFSM)	0.767						1.01			10.01			
ANNUAL RUNOFF (INCHES)	10.41						13.79			0.906			
10 PERCENT EXCEEDS	2650						3170			12.31			
50 PERCENT EXCEEDS	1250						1680			2890			
90 PERCENT EXCEEDS	820						1130			1550			
										1020			

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04108801 MACATAWA RIVER NEAR ZEELAND, MI

LOCATION.--Lat 42°47'01", long 86°02'11", in NW1/4 NW1/4 sec.36, T.5 N., R.15 W., Ottawa County, Hydrologic Unit 04050002, on right bank 5 ft upstream from bridge on Adams Road, 0.1 mi upstream from North Branch, and 2.5 mi south of Zeeland.

DRAINAGE AREA.--68.5 mi².

PERIOD OF RECORD.--October 1960 to current year. Prior to October 1978, published as Black River near Zeeland.

GAGE.--Water-stage recorder. Datum of gage is 583.4 ft above sea level. Prior to Oct. 1, 2003, at site 1.5 mi upstream at different datum (station 04108800).

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	3.1	4.0	179	37	e19	681	52	33	354	11	4.4	7.2
2	2.9	151	76	32	e19	1330	43	32	106	10	4.1	6.3
3	7.7	398	52	35	e19	616	38	25	54	10	3.8	5.7
4	16	434	42	31	e19	384	33	21	39	53	26	4.9
5	6.2	662	38	27	e19	1030	28	19	32	39	e15	4.8
6	4.1	400	33	e25	e19	748	27	17	28	24	9.3	4.7
7	3.5	211	29	e24	e19	413	27	16	23	17	7.8	4.6
8	3.0	94	27	e23	e19	376	26	19	21	14	8.5	4.2
9	2.8	46	27	e23	e19	286	24	71	18	12	8.0	3.2
10	2.8	34	132	e23	e19	150	22	53	18	10	8.5	3.6
11	3.2	36	234	e23	e19	130	20	31	118	8.8	10	3.5
12	3.1	36	76	e24	e19	91	19	45	90	8.1	12	2.7
13	4.3	32	e40	e25	e19	56	19	74	46	8.2	13	2.4
14	6.6	27	e30	e24	e19	80	18	143	33	9.0	12	2.1
15	13	24	e25	e23	e19	98	17	268	27	7.4	10	1.9
16	6.8	23	e35	e23	e19	62	17	85	22	6.6	8.4	2.0
17	5.1	22	60	e22	e19	50	22	41	21	14	9.6	2.2
18	4.7	162	e35	e22	e20	46	20	272	20	12	13	2.2
19	4.1	539	e25	e21	e25	47	16	149	17	7.4	9.2	2.2
20	4.1	285	e25	e21	50	91	14	128	14	6.5	6.8	2.2
21	4.4	128	e30	e20	148	92	19	366	21	11	5.8	2.1
22	4.6	60	113	e20	264	45	17	1050	135	42	4.8	2.1
23	3.6	53	182	e20	322	39	15	859	49	18	4.7	2.4
24	3.2	488	102	e20	372	97	13	511	46	9.4	4.4	2.4
25	3.8	297	64	e19	371	456	47	243	40	7.1	5.1	2.6
26	4.9	143	48	e19	359	414	40	111	28	5.9	7.4	2.7
27	4.6	85	43	e19	280	328	26	72	21	5.8	7.0	2.7
28	3.9	97	53	e19	287	143	21	56	18	5.8	50	2.8
29	9.4	291	98	e19	395	159	17	37	16	5.2	31	3.3
30	8.8	309	63	e19	—	94	18	61	13	5.4	14	4.5
31	5.5	—	42	e19	—	64	—	611	—	5.7	9.2	—
TOTAL	163.8	5571.0	2058	721	3216	8696	735	5519	1488	409.3	342.8	100.2
MEAN	5.28	186	66.4	23.3	111	281	24.5	178	49.6	13.2	11.1	3.34
MAX	16	662	234	37	395	1330	52	1050	354	53	50	7.2
MIN	2.8	4.0	25	19	19	39	13	16	13	5.2	3.8	1.9
CFSM	0.08	2.71	0.97	0.34	1.62	4.10	0.36	2.60	0.72	0.19	0.16	0.05
IN.	0.09	3.03	1.12	0.39	1.75	4.72	0.40	3.00	0.81	0.22	0.19	0.05

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2004, BY WATER YEAR (WY)

	MEAN	33.2	76.2	91.9	84.9	115	165	103	69.4	47.2	22.3	16.5	30.9
MAX	273	333	328	278	408	499	206	308	295	185	122	252	
(WY)	2002	1991	1983	1974	1997	1979	1993	2000	1997	1982	1994	1986	
MIN	2.56	2.98	3.99	2.89	6.71	20.5	21.2	8.89	3.10	1.94	2.03	2.09	
(WY)	1964	1977	1977	1977	1963	2000	1986	1968	1987	1965	1962	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1961 - 2004

ANNUAL TOTAL	19400.4	29020.1	
ANNUAL MEAN	53.2	79.3	
HIGHEST ANNUAL MEAN			71.0
LOWEST ANNUAL MEAN			115
HIGHEST DAILY MEAN			24.6
LOWEST DAILY MEAN	862	Apr 5	1997
ANNUAL SEVEN-DAY MINIMUM	2.5	Sep 12	1987
MAXIMUM PEAK FLOW	2.6	Sep 8	1987
MAXIMUM PEAK STAGE			1530
INSTANTANEOUS LOW FLOW			11.12
ANNUAL RUNOFF (CFSM)	0.776		1.7
ANNUAL RUNOFF (INCHES)	10.54		1.16
10 PERCENT EXCEEDS	123		15.76
50 PERCENT EXCEEDS	13		269
90 PERCENT EXCEEDS	3.4		22
			4.1
			3.4

(a) From rating curve extended above 2,000 ft³/s.

(b) From floodmark.

(c) Sept. 15, 16.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04109000 GRAND RIVER AT JACKSON, MI

LOCATION.—Lat 42°17'01", long 84°24'32", in NW1/4 SE1/4 sec.22, T.2 S., R.1 W., Jackson County, Hydrologic Unit 04050004, on left bank on grounds of sewage-treatment plant, 1 mi north of Jackson, 2.2 mi upstream from Portage River, and at mile 216.

DRAINAGE AREA.—174 mi².

PERIOD OF RECORD.—April 1935 to current year.

REVISED RECORDS.—WSP 974: 1937(M). WSP 1387: 1936. WSP 1727: 1950(M).

GAGE.—Water-stage recorder. Datum of gage is 900.00 ft above sea level (Fargo Engineering Co. bench mark). Prior to Sept. 24, 1935, nonrecording gage at same site and datum.

REMARKS.—Records good. Slight regulation by mills upstream from station. Flow includes about 20 ft³/s as sewage effluent, which originates from ground-water sources, from the City of Jackson. Several measurements of water temperature were made during the year. Gage-height telemeter 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	77	67	87	114	71	176	210	113	268	83	81	72
2	72	101	82	123	71	191	203	127	224	80	83	70
3	77	115	79	121	75	200	194	102	158	73	125	69
4	71	96	75	119	74	216	184	97	191	103	129	67
5	65	98	75	119	75	280	172	97	183	83	120	64
6	65	92	74	107	76	266	160	96	117	94	123	69
7	62	103	72	78	76	263	154	115	126	197	115	74
8	60	149	72	96	72	261	147	169	123	148	86	64
9	57	148	107	104	77	257	139	183	118	97	83	59
10	57	143	133	92	76	254	134	254	148	89	83	57
11	56	150	128	87	75	250	130	264	265	87	81	55
12	61	139	123	87	75	239	130	261	240	94	79	56
13	79	87	114	85	75	227	125	249	269	88	82	57
14	203	71	122	81	73	220	90	266	276	85	73	57
15	178	70	119	78	69	211	86	265	267	80	72	91
16	152	69	123	80	71	199	83	258	267	e75	70	59
17	88	70	120	78	74	189	83	191	281	e90	92	53
18	84	123	116	77	71	184	81	153	297	e110	145	49
19	84	119	114	75	72	180	82	141	262	e130	98	50
20	86	99	109	72	83	227	79	149	248	122	90	53
21	83	98	108	74	85	192	87	e400	179	119	82	50
22	78	99	110	72	83	182	83	e410	147	129	81	50
23	75	104	143	68	87	183	82	360	137	103	69	51
24	70	149	128	72	90	198	75	344	128	136	71	49
25	88	174	119	69	91	219	82	335	119	89	76	43
26	71	174	90	70	94	232	80	327	112	78	72	45
27	68	166	88	69	98	226	78	323	103	137	69	47
28	79	162	89	68	115	223	77	310	99	148	83	68
29	129	145	136	69	165	224	75	291	93	137	100	57
30	127	92	119	70	—	220	74	297	88	86	76	50
31	120	—	113	71	—	216	—	289	—	90	74	—
TOTAL	2722	3472	3287	2645	2389	6805	3459	7236	5533	3260	2763	1755
MEAN	87.8	116	106	85.3	82.4	220	115	233	184	105	89.1	58.5
MAX	203	174	143	123	165	280	210	410	297	197	145	91
MIN	56	67	72	68	69	176	74	96	88	73	69	43
CFSM	0.50	0.67	0.61	0.49	0.47	1.26	0.66	1.34	1.06	0.60	0.51	0.34
IN.	0.58	0.74	0.70	0.57	0.51	1.45	0.74	1.55	1.18	0.70	0.59	0.38

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 2004, BY WATER YEAR (WY)

	MEAN	81.4	106	116	124	147	222	224	169	130	84.7	68.2	66.4
MAX	222	305	211	343	308	501	589	484	433	349	193	222	222
(WY)	2002	1993	2002	1993	2001	1976	1950	1943	1943	1968	1995	1975	1975
MIN	23.4	25.5	27.7	27.2	31.5	73.2	64.3	54.7	34.3	19.5	15.1	25.2	25.2
(WY)	1964	1964	1964	1964	1964	1964	1935	1936	1936	1936	1936	1936	1963

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1935 - 2004

ANNUAL TOTAL	38098		45326									
ANNUAL MEAN	104		124									
HIGHEST ANNUAL MEAN												
LOWEST ANNUAL MEAN												
HIGHEST DAILY MEAN	347		410		May 22							
LOWEST DAILY MEAN	35		43		Sep 25							
ANNUAL SEVEN-DAY MINIMUM	41		48		Sep 21							
MAXIMUM PEAK FLOW			558		May 21							
MAXIMUM PEAK STAGE			(b)13.40		May 21							
INSTANTANEOUS LOW FLOW			38		(c)							
ANNUAL RUNOFF (CFSM)	0.600		0.712									
ANNUAL RUNOFF (INCHES)	8.15		9.69									
10 PERCENT EXCEEDS	204		239									
50 PERCENT EXCEEDS	80		96									
90 PERCENT EXCEEDS	45		69									

(a) Gage height 13.50 ft.

(b) From floodmark.

(c) Sept. 25, 26.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04111000 GRAND RIVER NEAR EATON RAPIDS, MI

LOCATION.--Lat 42°32'05", long 84°37'23", in NE1/4 sec.26, T.2 N., R.3 W., Eaton County, Hydrologic Unit 04050004, on right bank 400 ft upstream from bridge on Petrieville Highway, 2 mi northeast of Eaton Rapids, 2.5 mi downstream from Spring Brook, 25 mi upstream from Red Cedar River, and at mile 178.

DRAINAGE AREA.--661 mi².

PERIOD OF RECORD.--October 1950 to September 1982, October 1995 to current year. Gage-height records collected in this vicinity 1905-28 (flood seasons only) are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 1707: 1951 (m).

GAGE.--Water-stage recorder. Datum of gage is 852.68 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by powerplant at Smithville Dam and mills at Eaton Rapids. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 4, 1950, reached a stage of 8.15 ft, discharge, 3,860 ft³/s.

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	187	286	509	693	e240	684	748	281	1600	511	405	375
2	181	308	476	687	e245	830	707	406	1550	480	356	318
3	198	392	416	664	e245	893	682	469	1440	458	340	265
4	192	421	387	641	e250	929	657	472	1250	439	353	254
5	186	521	379	606	e255	1190	637	431	1130	442	383	251
6	182	513	330	555	e255	1230	616	412	1010	413	413	242
7	184	462	341	e400	e255	1220	586	361	888	458	372	240
8	168	424	330	e370	e260	1210	571	352	867	527	361	248
9	141	389	306	e360	e260	1110	547	366	816	565	325	236
10	159	397	310	e360	e255	1030	531	519	912	576	287	214
11	172	401	364	e410	e250	969	490	893	1090	513	276	203
12	154	399	e390	e450	e250	904	480	764	1310	512	278	199
13	135	399	e370	e470	e255	862	448	746	1410	473	263	185
14	136	386	e350	e400	e255	813	429	728	1520	452	241	185
15	210	366	e350	e340	e250	779	423	726	1420	418	255	189
16	339	341	e355	e320	e240	772	382	686	1290	405	273	199
17	345	281	e340	e300	e230	735	362	670	1230	419	275	212
18	328	326	e330	e310	e220	712	360	748	1200	469	235	200
19	263	604	e350	e320	e300	700	350	748	1050	493	288	168
20	253	613	e330	e330	e300	722	323	719	951	491	359	146
21	235	625	e300	e300	e310	743	306	2370	888	598	301	160
22	234	596	e290	e270	e360	749	302	2960	854	579	247	165
23	216	542	374	e250	e430	742	300	3380	825	532	227	162
24	201	565	484	e250	e450	736	291	3300	777	559	250	149
25	235	590	509	e255	e470	739	295	2820	690	533	241	157
26	235	574	510	e255	e460	797	292	2380	659	426	204	156
27	272	565	496	e250	e455	867	290	1980	623	396	246	151
28	262	545	460	e245	e470	868	290	1780	590	395	259	152
29	253	517	509	e245	570	858	277	1610	560	438	306	181
30	255	518	681	e240	—	829	263	1490	539	450	386	190
31	265	—	700	e240	—	788	—	1540	—	434	433	—
TOTAL	6776	13866	12626	11786	8975	27010	13235	37107	30939	14854	9438	6152
MEAN	219	462	407	380	309	871	441	1197	1031	479	304	205
MAX	345	625	700	693	570	1230	748	3380	1600	598	433	375
MIN	135	281	290	240	220	684	263	281	539	395	204	146
CFSM	0.33	0.70	0.62	0.58	0.47	1.32	0.67	1.81	1.56	0.72	0.46	0.31
IN.	0.38	0.78	0.71	0.66	0.51	1.52	0.74	2.09	1.74	0.84	0.53	0.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2004, BY WATER YEAR (WY)

	MEAN	254	348	428	464	583	918	913	678	432	276	202	193
MAX	875	744	877	1406	1489	1932	1561	1848	1041	1234	591	800	
(WY)	1955	2002	1976	1952	2001	1974	1974	1956	1968	1968	2000	1975	
MIN	64.6	94.7	86.0	96.5	111	223	378	200	138	94.7	78.8	64.6	
(WY)	1964	1964	1964	1963	1964	1964	1964	1958	1964	1965	1963	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1951 - 2004

ANNUAL TOTAL	123430	192764	
ANNUAL MEAN	338	527	473
HIGHEST ANNUAL MEAN			769
LOWEST ANNUAL MEAN			147
HIGHEST DAILY MEAN	1150	3380	3400
LOWEST DAILY MEAN	79	135	21
ANNUAL SEVEN-DAY MINIMUM	94	152	52
MAXIMUM PEAK FLOW		3500	3500
MAXIMUM PEAK STAGE		8.04	8.19
INSTANTANEOUS LOW FLOW		95	14
ANNUAL RUNOFF (CFSM)	0.512	0.797	0.716
ANNUAL RUNOFF (INCHES)	6.95	10.85	9.73
10 PERCENT EXCEEDS	704	906	1000
50 PERCENT EXCEEDS	250	399	335
90 PERCENT EXCEEDS	124	211	121

(a) Feb. 21, 1971, gage height 7.52 ft; May 23, 2004, gage height 8.04 ft.

(b) Dec. 20, 1962, Oct. 14, 1966.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04111379 RED CEDAR RIVER NEAR WILLIAMSTON, MI

LOCATION.--Lat 42°40'59", long 84°13'09", in NE1/4 sec.4, T.3 N., R.2 E., Ingham County, Hydrologic Unit 04050004, on right bank 20 ft upstream from bridge on State Highway 52, 1.5 mi upstream from Squaw Creek, 3.5 mi east of Williamston, and at mile 26.

DRAINAGE AREA.--163 mi².

PERIOD OF RECORD.--July 1975 to September 1989, July 2001 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 870 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. At times, low flow is affected by pumpage for irrigation. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 19, 1975, reached a stage of 10.41 ft, from floodmark, discharge, 2,670 ft³/s.

DISCHARGE, IN 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	23	34	83	230	e49	191	154	63	257	49	73	53
2	22	47	77	211	e49	300	133	93	223	45	66	46
3	22	83	69	213	e50	333	119	111	185	45	60	41
4	24	104	66	201	e51	313	112	103	150	46	67	38
5	23	114	63	178	e51	358	106	92	124	51	79	35
6	22	117	61	154	e51	432	106	82	108	48	72	33
7	21	103	56	e100	e51	394	105	72	98	93	64	36
8	19	88	56	e100	e51	350	101	66	88	104	57	34
9	18	72	54	e110	e50	317	97	87	85	99	51	33
10	17	61	57	e100	e49	287	92	170	102	90	47	31
11	17	59	74	e93	e49	256	88	272	131	82	46	29
12	17	64	81	e86	e49	221	83	315	199	73	46	27
13	18	63	e70	e80	e50	178	79	273	215	69	44	27
14	30	59	71	e75	e50	148	75	269	208	65	43	27
15	53	54	65	e66	e48	131	72	307	238	68	40	26
16	55	52	61	e71	e46	119	69	305	207	67	37	26
17	52	51	60	e72	e45	113	68	252	176	60	36	26
18	45	55	59	e71	e45	110	66	216	157	55	35	25
19	40	108	58	e69	e46	109	64	201	138	64	35	25
20	37	140	e53	e64	e55	117	62	166	117	71	33	23
21	31	134	e58	e60	e70	148	61	170	100	63	32	24
22	27	119	62	e58	e90	145	60	447	95	73	31	23
23	24	107	64	e56	e110	132	59	730	87	90	31	22
24	22	107	92	e54	e120	121	57	822	82	80	31	22
25	24	118	104	e52	e110	147	57	753	76	67	30	23
26	31	114	97	e50	e100	206	59	665	70	59	30	22
27	34	105	86	e50	e90	249	57	549	65	62	28	21
28	33	96	83	e49	102	241	54	450	61	115	37	21
29	33	91	123	e49	132	219	50	364	58	119	51	23
30	35	88	242	e49	—	197	49	305	53	96	62	24
31	35	—	264	e49	—	176	—	278	—	83	61	—
TOTAL	904	2607	2569	2920	1909	6758	2414	9048	3953	2251	1455	866
MEAN	29.2	86.9	82.9	94.2	65.8	218	80.5	292	132	72.6	46.9	28.9
MAX	55	140	264	230	132	432	154	822	257	119	79	53
MIN	17	34	53	49	45	109	49	63	53	45	28	21
CFSM	0.18	0.53	0.51	0.58	0.40	1.34	0.49	1.79	0.81	0.45	0.29	0.18
IN.	0.21	0.59	0.59	0.67	0.44	1.54	0.55	2.06	0.90	0.51	0.33	0.20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2004, BY WATER YEAR (WY)

	74.3	78.4	105	75.0	129	253	218	122	88.7	35.2	23.4	39.7
MEAN	74.3	78.4	105	75.0	129	253	218	122	88.7	35.2	23.4	39.7
MAX	329	265	248	155	411	504	354	292	306	72.6	49.1	133
(WY)	1982	1989	1976	1985	1976	1982	1985	2004	1989	2004	1980	1975
MIN	15.7	26.9	25.6	22.3	20.8	103	80.5	40.8	16.6	10.8	9.27	11.3
(WY)	2003	1977	2003	1977	2003	2003	2004	1987	1988	1988	1984	1978

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1975 - 2004

ANNUAL TOTAL	24538	37654	103
ANNUAL MEAN	67.2	103	157
HIGHEST ANNUAL MEAN			56.3
LOWEST ANNUAL MEAN			1700
HIGHEST DAILY MEAN	564	Apr 6	May 24
LOWEST DAILY MEAN	12	Sep 11	Oct 10
ANNUAL SEVEN-DAY MINIMUM	13	Sep 10	Oct 7
MAXIMUM PEAK FLOW		831	May 24
MAXIMUM PEAK STAGE		7.36	May 24
INSTANTANEOUS LOW FLOW		16	Oct 12
ANNUAL RUNOFF (CFSM)	0.412	0.631	2.2
ANNUAL RUNOFF (INCHES)	5.60	8.59	8.57
10 PERCENT EXCEEDS	140	220	250
50 PERCENT EXCEEDS	36	68	55
90 PERCENT EXCEEDS	16	28	18

(a) July 13, 14, 1988.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04111500 DEER CREEK NEAR DANSVILLE, MI

LOCATION.--Lat 42°36'30", long 84°19'15", in SE1/4 NE1/4 sec.33, T.3 N., R.1 E., Ingham County, Hydrologic Unit 04050004, on right bank 15 ft upstream from bridge on Clark Road, 3.5 mi north of Dansville, and 7.2 mi upstream from mouth.

DRAINAGE AREA.--16.3 mi².

PERIOD OF RECORD.--May 1954 to current year.

REVISED RECORDS.--WSP 1727: 1954(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 889.08 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

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	0.87	1.8	7.7	22	e5.4	59	15	7.8	37	3.2	4.5	2.2
2	0.76	4.5	6.7	29	e5.4	81	13	18	29	3.0	3.7	1.9
3	0.74	17	6.1	28	e5.4	51	12	15	33	2.8	3.2	1.8
4	0.98	16	6.0	20	e5.5	41	11	11	21	3.0	19	1.7
5	0.86	23	5.9	17	e5.6	102	10	9.3	16	3.1	17	1.6
6	0.76	15	5.5	14	e5.5	66	9.7	8.0	13	2.8	9.0	1.6
7	0.73	9.8	5.1	13	e5.4	43	9.2	6.8	11	15	6.1	1.8
8	0.73	7.2	5.0	12	e5.4	38	9.1	7.3	9.0	9.8	4.7	1.6
9	0.71	5.9	5.0	10	e5.3	32	8.2	9.3	14	6.3	3.8	1.4
10	0.68	5.3	5.9	e9.7	e5.3	25	7.7	49	17	4.9	3.3	1.2
11	0.65	5.7	8.8	e9.2	e5.2	21	7.4	129	48	4.0	3.2	1.1
12	0.51	6.0	7.2	e8.8	e5.2	17	7.0	57	51	3.7	3.2	1.1
13	0.86	5.2	6.1	8.0	e5.1	15	6.8	36	39	3.9	2.8	1.1
14	2.1	4.5	5.7	7.3	e5.1	15	6.5	29	41	23	2.7	0.99
15	5.0	4.3	5.4	e7.1	e5.0	13	6.0	34	29	11	2.4	0.91
16	3.1	4.2	5.6	e7.5	e5.0	12	5.7	25	20	6.5	2.2	1.0
17	2.1	4.0	5.8	e8.3	e5.0	12	5.6	19	18	5.3	2.1	0.98
18	1.8	6.7	5.4	e7.5	e5.0	11	5.5	30	19	4.6	2.1	0.95
19	1.6	47	5.4	e5.0	e6.0	11	5.2	25	13	3.9	2.1	0.90
20	1.5	27	5.0	e5.6	e11	20	4.8	20	11	3.3	1.8	1.00
21	1.4	16	5.0	e6.0	33	21	5.1	122	9.3	3.4	1.8	0.91
22	1.3	12	5.5	e6.4	29	15	4.6	215	9.8	14	1.7	0.89
23	1.2	11	11	e6.4	31	13	4.5	122	7.8	7.9	1.6	0.86
24	1.2	21	19	e6.3	21	14	4.2	104	6.7	5.0	1.6	0.81
25	1.7	18	14	e6.2	e17	27	4.8	58	6.2	3.9	1.5	0.82
26	2.2	14	12	e6.0	16	42	4.7	51	5.5	3.3	1.6	0.86
27	2.0	12	10	e5.8	16	40	4.4	40	4.7	5.9	1.5	0.88
28	1.8	11	11	e5.7	23	31	4.2	33	4.5	14	1.9	0.86
29	1.9	9.6	57	e5.6	39	24	4.1	28	4.1	8.8	4.3	1.2
30	2.0	8.8	56	e5.5	—	20	4.2	23	3.6	6.3	4.1	1.1
31	1.9	—	34	e5.4	—	17	—	45	—	5.8	2.7	—
TOTAL	45.64	353.5	353.8	315.3	336.8	949	210.2	1386.5	551.2	201.4	123.2	36.02
MEAN	1.47	11.8	11.4	10.2	11.6	30.6	7.01	44.7	18.4	6.50	3.97	1.20
MAX	5.0	47	57	29	39	102	15	215	51	23	19	2.2
MIN	0.51	1.8	5.0	5.4	5.0	11	4.1	6.8	3.6	2.8	1.5	0.81
CFSM	0.09	0.72	0.70	0.62	0.71	1.88	0.43	2.74	1.13	0.40	0.24	0.07
IN.	0.10	0.81	0.81	0.72	0.77	2.17	0.48	3.16	1.26	0.46	0.28	0.08

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2004, BY WATER YEAR (WY)

	MEAN	5.64	9.08	11.7	11.5	17.4	28.6	23.4	13.8	8.78	3.96	2.42	2.88
MAX	33.8	45.1	32.7	40.1	62.5	70.6	64.8	57.2	43.3	30.5	17.1	20.6	
(WY)	1960	1993	1973	1974	2001	1982	1975	1956	1968	1957	1992	1992	
MIN	0.35	0.65	0.48	0.88	1.28	3.00	5.93	2.58	1.03	0.39	0.19	0.19	
(WY)	1964	1964	1964	1977	2003	1964	1963	1958	1988	1965	1971	2002	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1954 - 2004

ANNUAL TOTAL	2592.69						4862.56						
ANNUAL MEAN	7.10						13.3			11.5			
HIGHEST ANNUAL MEAN										22.8		1993	
LOWEST ANNUAL MEAN										1.86		1964	
HIGHEST DAILY MEAN	148					Apr 5	215		May 22	720		Apr 19 1975	
LOWEST DAILY MEAN	0.09					Sep 14	0.51		Oct 12	0.05		Sep 9 1978	
ANNUAL SEVEN-DAY MINIMUM	0.16					Sep 8	0.68		Oct 6	0.08		Sep 9 2002	
MAXIMUM PEAK FLOW							253		May 22	(a)962		Apr 19 1975	
MAXIMUM PEAK STAGE							7.69		May 22	(b)12.18		Apr 19 1975	
INSTANTANEOUS LOW FLOW							0.39		Oct 12	0.03		Sep 13 2003	
ANNUAL RUNOFF (CFSM)	0.436						0.815			0.708			
ANNUAL RUNOFF (INCHES)	5.92						11.10			9.62			
10 PERCENT EXCEEDS	16						32			25			
50 PERCENT EXCEEDS	2.1						6.0			4.8			
90 PERCENT EXCEEDS	0.44						1.3			0.70			

(a) From rating curve extended above 610 ft³/s.

(b) From floodmark.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04112000 SLOAN CREEK NEAR WILLIAMSTON, MI

LOCATION.--Lat 42°40'33", long 84°21'50", in SE1/4 NE1/4 sec.1, T.3 N., R.1 W., Ingham County, Hydrologic Unit 04050004, on left bank 30 ft downstream from culvert on Meridian Road, 2.1 mi upstream from mouth, and 4.2 mi west of Williamston.

DRAINAGE AREA.--9.34 mi².

PERIOD OF RECORD.--June 1954 to current year.

GAGE.--Water-stage recorder and concrete control with V-notch sharp-crested weir. Datum of gage is 862.12 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records good except for estimated daily discharges, which are fair. At times, low flow is affected by pumpage for irrigation. Several measurements of water temperature were made during the year.

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	0.06	0.11	2.0	8.4	1.3	43	6.0	1.7	12	1.1	1.0	0.60
2	0.06	0.34	1.7	11	1.3	53	5.2	4.3	7.8	0.98	0.84	0.46
3	0.06	2.2	1.5	11	1.5	33	4.7	4.1	6.2	0.88	0.76	0.38
4	0.06	2.0	1.5	7.8	1.3	24	4.4	3.1	5.0	0.99	4.5	0.35
5	0.05	3.6	1.5	6.4	1.2	77	3.9	2.6	4.3	0.99	5.1	0.33
6	0.06	2.4	1.3	5.1	1.4	39	3.8	2.2	3.6	0.86	2.6	0.33
7	0.06	1.3	1.2	4.5	1.4	27	3.6	1.9	3.1	1.7	1.8	0.40
8	0.05	0.93	1.2	4.0	1.2	22	3.4	1.8	2.6	1.3	1.3	0.34
9	0.05	0.72	1.2	3.4	1.3	17	3.1	2.3	3.3	1.0	1.1	0.28
10	0.05	0.62	1.3	3.0	1.3	13	2.8	9.5	5.0	0.87	0.93	0.25
11	0.05	0.69	1.9	3.1	1.3	11	2.6	17	27	0.78	0.94	0.23
12	0.05	0.68	1.7	3.0	1.2	8.9	2.5	9.7	31	e0.66	0.87	0.20
13	0.05	0.54	1.4	2.6	1.2	7.1	2.4	6.5	19	e0.63	0.76	0.19
14	0.11	0.47	1.4	2.4	1.2	7.0	2.3	5.6	15	1.6	0.67	e0.18
15	0.14	0.45	1.4	2.3	1.1	6.1	2.1	9.1	9.8	1.3	0.55	e0.17
16	0.09	0.43	1.4	2.0	1.1	5.6	2.0	6.6	6.9	0.91	0.52	e0.16
17	0.08	0.43	1.3	2.1	1.2	5.2	2.0	4.9	5.9	0.87	0.46	e0.16
18	0.07	0.98	1.2	2.2	1.2	4.9	1.9	8.7	5.0	e0.85	0.47	0.15
19	0.07	15	1.2	1.9	1.3	4.5	1.8	8.0	3.8	0.77	0.43	0.14
20	0.07	6.9	1.1	1.6	1.9	7.7	1.7	5.7	3.2	0.66	0.37	e0.14
21	0.08	3.9	1.0	e1.6	6.3	8.3	1.8	47	3.0	0.62	0.34	e0.13
22	0.08	2.8	1.1	1.6	7.9	6.4	1.6	76	3.0	0.77	0.32	e0.13
23	0.08	2.4	1.9	e1.4	9.0	5.5	1.4	74	2.4	0.69	0.31	0.12
24	0.08	10	6.3	1.5	9.4	5.5	1.4	44	2.5	0.59	0.28	0.11
25	0.12	7.1	4.7	1.5	8.6	12	1.6	38	2.1	0.50	0.28	0.11
26	0.11	4.6	3.4	e1.4	7.5	24	1.5	32	1.9	0.48	0.30	0.13
27	0.10	3.5	3.0	e1.5	7.4	17	1.4	22	1.6	1.1	0.29	0.12
28	0.11	3.0	3.1	1.5	11	12	1.3	15	1.5	2.9	0.28	0.13
29	0.11	2.7	33	1.4	24	9.3	1.2	10	1.4	2.0	0.79	0.16
30	0.11	2.4	26	1.4	---	8.0	1.2	8.1	1.2	1.6	1.3	0.15
31	0.11	---	13	1.3	---	7.0	---	13	---	1.4	0.85	---
TOTAL	2.43	83.19	124.9	103.9	117.0	531.0	76.6	494.4	200.1	32.35	31.31	6.73
MEAN	0.08	2.77	4.03	3.35	4.03	17.1	2.55	15.9	6.67	1.04	1.01	0.22
MAX	0.14	15	33	11	24	77	6.0	76	31	2.9	5.1	0.60
MIN	0.05	0.11	1.0	1.3	1.1	4.5	1.2	1.7	1.2	0.48	0.28	0.11
CFSM	0.01	0.30	0.43	0.36	0.43	1.83	0.27	1.71	0.71	0.11	0.11	0.02
IN.	0.01	0.33	0.50	0.41	0.47	2.11	0.31	1.97	0.80	0.13	0.12	0.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2004, BY WATER YEAR (WY)

	MEAN	2.68	4.04	5.56	5.26	8.64	15.6	12.4	6.44	4.50	1.80	1.05	1.38
MAX	20.9	21.9	24.9	21.4	36.5	39.9	47.2	37.6	35.3	26.5	8.15	7.19	
(WY)	1960	1993	1973	1974	2001	1982	1975	1956	1968	1957	1980	1993	
MIN	0.08	0.13	0.11	0.11	0.12	0.78	1.45	0.94	0.25	0.07	0.05	0.05	
(WY)	2004	2000	1964	1963	1963	1964	1963	1955	1988	1988	2003	1999	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1954 - 2004

ANNUAL TOTAL	863.66	1803.91	
ANNUAL MEAN	2.37	4.93	
HIGHEST ANNUAL MEAN			5.76
LOWEST ANNUAL MEAN			10.5
HIGHEST DAILY MEAN	72	Apr 5	77
LOWEST DAILY MEAN	0.03	Aug 20	0.05
ANNUAL SEVEN-DAY MINIMUM	0.03	Sep 4	0.05
MAXIMUM PEAK FLOW			119
MAXIMUM PEAK STAGE			3.87
INSTANTANEOUS LOW FLOW			0.05
ANNUAL RUNOFF (CFSM)	0.253		0.528
ANNUAL RUNOFF (INCHES)	3.44		7.18
10 PERCENT EXCEEDS	5.6		11
50 PERCENT EXCEEDS	0.31		1.5
90 PERCENT EXCEEDS	0.05		0.13

(a) 1973, 1993.

(b) From rating curve extended above 660 ft³/s on basis of computation of peak flow through culvert and over road embankment.

(c) Part or all of each day Oct. 1-14.

(d) Sept. 11, 1954, Jan. 18, 1957, Aug. 3, 1988.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04112500 RED CEDAR RIVER AT EAST LANSING, MI

LOCATION.--Lat 42°43'40", long 84°28'40", in SW1/4 sec.18, T.4 N., R.1 W., Ingham County, Hydrologic Unit 04050004, in left downstream bridge abutment of Farm Lane Bridge on Michigan State University Campus in East Lansing, 4.0 mi upstream from Sycamore Creek, and 5.6 mi upstream from mouth.

DRAINAGE AREA.--355 mi².

PERIOD OF RECORD.--August 1902 to December 1903, March 1931 to current year. Monthly discharge only for some periods, published in WSP 1307. Published as Red Cedar River at Agricultural College, August 1902 to December 1903 and as Cedar River at East Lansing, March 1931 to September 1965. Gage-height records collected in this vicinity 1911-19, and 1920-28 (flood seasons only), are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 1307: 1936(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 824.39 ft above sea level. August 1902 to December 1903 nonrecording gage at site 0.8 mi downstream at different datum. March 1931 to November 1940 water-stage recorder at site 250 ft upstream at present datum.

REMARKS.--Records good. Prior to April 1975, occasional regulation at low flow by mill at Williamston, 16 mi upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 24, 1904, reached a stage of 13.4 ft, discharge, 8,000 ft³/s.

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	37	47	152	482	91	485	338	140	592	103	138	95
2	35	87	142	419	91	830	301	194	528	94	126	83
3	36	140	129	404	92	906	265	244	437	87	112	74
4	38	174	118	389	94	813	244	248	367	99	139	70
5	37	224	111	353	95	908	227	223	303	96	169	63
6	35	217	108	297	93	1100	211	196	256	95	157	70
7	34	191	104	183	95	1030	208	174	225	147	131	79
8	33	160	97	186	96	842	204	159	202	215	112	64
9	32	135	95	210	92	689	197	186	191	190	99	58
10	31	113	104	186	93	581	185	301	242	165	89	55
11	31	107	117	181	93	507	177	547	358	152	92	53
12	30	102	132	177	92	448	169	712	541	148	87	51
13	30	100	119	165	93	386	160	698	578	138	82	47
14	53	96	119	141	93	336	152	564	581	145	79	46
15	63	91	120	120	89	299	146	543	623	159	76	44
16	77	86	112	134	86	266	140	552	558	144	71	49
17	88	84	110	138	83	243	136	510	449	127	66	44
18	87	118	106	132	83	229	135	483	382	111	65	43
19	80	198	103	129	84	223	129	463	337	101	64	41
20	73	291	97	119	97	247	126	397	287	109	62	41
21	68	271	90	112	126	299	122	457	248	122	59	40
22	65	229	104	107	169	311	121	982	238	145	58	41
23	51	203	119	102	203	283	117	1640	218	157	55	38
24	40	230	150	96	231	269	114	2220	217	152	54	36
25	50	240	205	94	240	318	117	2090	192	128	56	36
26	47	230	204	93	239	446	118	1790	171	107	58	37
27	46	206	180	93	237	549	120	1450	152	119	54	39
28	50	185	168	91	243	543	117	1130	136	151	78	40
29	51	173	252	91	319	483	112	871	123	216	130	40
30	48	161	482	91	—	425	108	697	113	194	113	e38
31	47	—	548	91	—	379	—	616	—	160	106	—
TOTAL	1523	4889	4797	5606	3832	15673	5016	21477	9845	4276	2837	1555
MEAN	49.1	163	155	181	132	506	167	693	328	138	91.5	51.8
MAX	88	291	548	482	319	1100	338	2220	623	216	169	95
MIN	30	47	90	91	83	223	108	140	113	87	54	36
CFSM	0.14	0.46	0.44	0.51	0.37	1.42	0.47	1.95	0.92	0.39	0.26	0.15
IN.	0.16	0.51	0.50	0.59	0.40	1.64	0.53	2.25	1.03	0.45	0.30	0.16

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1902 - 2004, BY WATER YEAR (WY)

MEAN	105	144	180	209	291	492	460	293	182	89.7	60.9	74.1
MAX	571	735	494	739	1036	1162	1494	1310	627	578	366	426
(WY)	1982	1993	1995	1993	2001	1948	1947	1956	1968	1994	1992	1903
MIN	14.8	21.2	20.5	29.0	28.6	58.6	62.3	52.9	20.4	5.70	9.24	14.6
(WY)	1935	1964	1964	1940	1940	1934	1931	1931	1934	1934	1934	1939

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1902 - 2004

ANNUAL TOTAL	46745	81326	216
ANNUAL MEAN	128	222	431
HIGHEST ANNUAL MEAN			43.3
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	1270	2220	5720
LOWEST DAILY MEAN	15	30	3.0
ANNUAL SEVEN-DAY MINIMUM	18	32	3.9
MAXIMUM PEAK FLOW		2260	5940
MAXIMUM PEAK STAGE		7.48	11.95
INSTANTANEOUS LOW FLOW		30	3.0
ANNUAL RUNOFF (CFSM)	0.361	0.626	0.608
ANNUAL RUNOFF (INCHES)	4.90	8.52	8.26
10 PERCENT EXCEEDS	285	508	506
50 PERCENT EXCEEDS	62	132	107
90 PERCENT EXCEEDS	27	49	30

(a) Oct. 12, 13.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04113000 GRAND RIVER AT LANSING, MI

LOCATION.--Lat 42°45'02", long 84°33'19", in NW1/4 sec.9, T.4 N., R.2 W., Ingham County, Hydrologic Unit 04050004, on right bank 30 ft upstream from bridge on North Grand River Avenue in Lansing, 2.0 mi downstream from Red Cedar River, and at mile 152.

DRAINAGE AREA.--1,230 mi², approximately.

PERIOD OF RECORD.--March 1901 to September 1906, October 1934 to current year. Monthly discharge only for some periods, published in WSP 1307. Published as "at North Lansing" 1901-6. Gage-height records collected in this vicinity 1907-10 (flood seasons only), 1911-19, 1920-28 (flood seasons only), and since 1931 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 1174: 1949. WSP 1387: 1901, 1903-4, 1935, 1937, 1942.

GAGE.--Water-stage recorder. Datum of gage is 805.53 ft above sea level (levels by Michigan Department of Natural Resources). Prior to August 1906, nonrecording gage at same site at different datum. November 1934 to June 1949 water-stage recorder at site 1.8 mi downstream at datum 2.42 ft lower.

REMARKS.--Records good. Large diurnal fluctuation at low and medium flow caused by powerplants upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	413	348	795	1530	412	1580	1340	649	2490	716	634	673
2	214	693	734	1430	412	2220	1220	781	2490	651	610	492
3	281	816	683	1360	409	2410	1170	899	2200	624	534	418
4	346	841	607	1260	421	2320	1050	950	1950	617	810	375
5	253	1130	555	1210	435	2980	1050	789	1700	612	667	410
6	327	1040	587	1100	415	3180	973	778	1600	611	743	442
7	177	945	447	712	420	3040	943	635	1330	713	664	442
8	294	686	581	647	456	2710	910	675	1260	824	580	474
9	222	708	430	694	420	2320	900	798	1230	842	514	498
10	205	578	552	659	444	2070	834	1260	1300	814	516	368
11	163	673	523	721	391	1850	816	1830	1830	785	431	378
12	317	591	627	796	415	1670	749	2240	2100	753	510	292
13	150	605	606	877	443	1580	755	2120	2360	893	395	180
14	322	527	593	589	419	1410	710	1860	2590	1060	397	183
15	397	528	576	562	401	1340	686	1730	2490	911	398	189
16	350	577	597	532	432	1250	687	1640	2170	792	369	241
17	526	418	560	488	393	1150	653	1550	1920	774	415	286
18	522	706	540	541	368	1130	610	1670	1900	673	423	327
19	411	1010	585	551	378	1100	653	1680	1730	753	341	290
20	342	1300	537	538	508	1230	565	1520	1600	703	399	195
21	369	1270	489	523	532	1230	560	3290	1370	904	518	211
22	315	1130	531	432	582	1310	539	5380	1340	1120	319	255
23	320	955	567	409	787	1240	490	7150	1190	840	371	219
24	292	1130	673	412	789	1200	485	7550	1290	859	287	200
25	356	1130	845	447	876	1390	592	6650	1010	773	454	192
26	369	1030	881	417	854	1620	474	5540	919	716	435	233
27	277	993	763	431	854	1720	480	4500	930	644	229	251
28	390	886	793	397	833	1850	510	3560	786	666	608	232
29	383	857	947	413	1040	1650	514	3000	821	722	764	224
30	310	811	1370	411	---	1600	399	2680	665	732	511	218
31	372	---	1630	378	---	1450	---	2590	---	744	646	---
TOTAL	9985	24912	21204	21467	15539	54800	22317	77944	48561	23841	15492	9388
MEAN	322	830	684	692	536	1768	744	2514	1619	769	500	313
MAX	526	1300	1630	1530	1040	3180	1340	7550	2590	1120	810	673
MIN	150	348	430	378	368	1100	399	635	665	611	229	180
CFSM	0.26	0.68	0.56	0.56	0.44	1.44	0.60	2.04	1.32	0.63	0.41	0.25
IN.	0.30	0.75	0.64	0.65	0.47	1.66	0.67	2.36	1.47	0.72	0.47	0.28

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1901 - 2004, BY WATER YEAR (WY)

	MEAN	468	628	735	820	1044	1885	1748	1162	842	487	359	358
MAX	1880	2559	1666	2669	3091	7242	5113	3815	2803	2204	1178	1277	
(WY)	1987	1993	1976	1993	2001	1904	1947	1956	1905	1902	1992	1903	
MIN	88.5	138	124	150	158	348	488	330	168	98.3	61.1	93.6	
(WY)	1964	1965	1964	1963	1963	1964	1935	1958	1936	1936	1936	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1901 - 2004

ANNUAL TOTAL	212942						345450					
ANNUAL MEAN	583						944			876		
HIGHEST ANNUAL MEAN										1638		1993
LOWEST ANNUAL MEAN										232		1964
HIGHEST DAILY MEAN	3120				Apr 6		7550		May 24	22700		Mar 26 1904
LOWEST DAILY MEAN	105				Aug 12		150		Oct 13	20		Aug 25 1941
ANNUAL SEVEN-DAY MINIMUM	154				Jul 28		215		Sep 20	44		Aug 15 1936
MAXIMUM PEAK FLOW							8150		May 23	(a)24500		Mar 26 1904
MAXIMUM PEAK STAGE							12.85		May 23	(b)15.43		Apr 20 1975
INSTANTANEOUS LOW FLOW							72		Aug 20	2.8		Sep 9 1963
ANNUAL RUNOFF (CFSM)	0.474						0.767			0.712		
ANNUAL RUNOFF (INCHES)	6.44						10.45			9.67		
10 PERCENT EXCEEDS	1270						1840			1910		
50 PERCENT EXCEEDS	386						673			555		
90 PERCENT EXCEEDS	178						321			186		

(a) From rating curve extended above 15,000 ft³/s; gage height, 18.60 ft, datum then in use.

(b) Present site and datum.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04114000 GRAND RIVER AT PORTLAND, MI

LOCATION.--Lat 42°51'23", long 84°54'44", in NW1/4 sec.4, T.5 N., R.5 W., Ionia County, Hydrologic Unit 04050004, on left bank at downstream side of bridge on Kent Street, 1.0 mi south of Portland, 1.9 mi upstream from Looking Glass River, and at mile 115.

DRAINAGE AREA--1,385 mi².

PERIOD OF RECORD.--August 1952 to March 1982, June 1988 to current year. Gage-height records collected in this vicinity 1907-28 (flood seasons only) are contained in reports of the National Weather Service.

GAGE.--Water-stage recorder. Datum of gage is 705.00 ft above sea level (levels by Michigan Department of Natural Resources). Prior to July 6, 1953, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Slight diurnal fluctuation caused by powerplants upstream from station. Gage-height telemeter 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	433	436	985	1690	e450	1580	1640	597	2830	753	e800	703
2	381	513	934	1590	e480	3040	1480	929	2770	763	e710	719
3	317	1050	892	1480	e480	3250	1390	975	2580	713	662	540
4	296	1120	819	1410	e480	3010	1310	1060	2280	729	700	450
5	423	1180	743	1350	e500	3770	1190	1040	1970	731	995	428
6	259	1240	692	1240	e500	4200	1180	918	1810	677	753	425
7	370	1110	710	e1100	e490	3820	1110	907	1630	769	793	505
8	269	978	575	e850	e480	3500	1100	772	1420	784	702	489
9	298	765	710	e750	e530	2980	1050	951	1370	904	612	478
10	311	795	578	e800	e500	2570	1020	1130	1400	887	558	523
11	280	684	728	e780	e520	2270	959	2190	1700	853	553	409
12	243	775	671	857	e470	2120	938	2410	2200	849	492	434
13	319	686	764	890	e500	1860	849	2410	2350	840	542	332
14	273	683	719	949	e520	1760	876	2420	2430	1100	442	269
15	397	593	709	790	e480	1600	807	2210	3040	1060	422	234
16	515	604	703	e660	e470	1500	785	1880	2500	942	428	248
17	371	637	741	e600	e500	1450	784	1790	2110	901	400	297
18	554	546	682	e560	e450	1360	735	1930	1970	801	444	327
19	552	1420	660	e640	e430	1300	707	2010	1900	752	452	370
20	474	1450	694	e640	447	1390	725	1890	1670	816	393	367
21	397	1510	639	e620	656	1470	661	4010	1540	844	421	281
22	405	1410	602	e600	674	1470	650	7380	1440	1390	541	257
23	418	1280	641	e500	819	1480	623	8220	1340	1120	364	306
24	344	1430	738	e470	1020	1420	581	10800	1330	929	419	306
25	409	1400	854	e500	1070	1620	605	8580	1250	920	309	278
26	417	1340	979	e520	1110	1800	717	7110	1070	845	586	256
27	449	1220	1010	e480	1100	2080	576	5650	984	794	493	265
28	377	1140	883	e500	1090	2040	584	4490	974	750	348	324
29	445	1080	984	e470	1140	2020	614	3600	846	759	822	304
30	495	994	1230	e480	---	1870	611	3140	872	e820	1010	316
31	385	---	1600	e480	---	1780	---	3070	---	e825	620	---
TOTAL	11876	30069	24869	25246	18366	67380	26857	96469	53576	26620	17786	11440
MEAN	383	1002	802	814	633	2174	895	3112	1786	859	574	381
MAX	554	1510	1600	1690	1140	4200	1640	10800	3040	1390	1010	719
MIN	243	436	575	470	430	1300	576	597	846	677	309	234
CFSM	0.28	0.72	0.58	0.59	0.46	1.57	0.65	2.25	1.29	0.62	0.41	0.28
IN.	0.32	0.81	0.67	0.68	0.49	1.81	0.72	2.59	1.44	0.71	0.48	0.31

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2004, BY WATER YEAR (WY)

MEAN	559	785	900	954	1180	1998	1905	1368	880	571	445	431
MAX	1766	2743	1975	2989	3655	4202	3936	4676	2587	2268	1297	1433
(WY)	1982	1993	1976	1993	2001	1974	1975	1956	1989	1968	1992	1975
MIN	132	174	161	184	186	382	683	373	258	155	166	133
(WY)	1964	1965	1964	1963	1963	1964	1964	1958	1988	1965	1965	1963

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1952 - 2004
ANNUAL TOTAL	245784	410554	
ANNUAL MEAN	673	1122	995
HIGHEST ANNUAL MEAN			1830
LOWEST ANNUAL MEAN			282
HIGHEST DAILY MEAN	3700	10800	12200
LOWEST DAILY MEAN	174	234	58
ANNUAL SEVEN-DAY MINIMUM	206	278	85
MAXIMUM PEAK FLOW		11800	12400
MAXIMUM PEAK STAGE		12.84	12.98
INSTANTANEOUS LOW FLOW			38
ANNUAL RUNOFF (CFSM)	0.486	0.810	0.718
ANNUAL RUNOFF (INCHES)	6.60	11.03	9.76
10 PERCENT EXCEEDS	1410	2110	2130
50 PERCENT EXCEEDS	432	782	657
90 PERCENT EXCEEDS	239	384	242

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04114498 LOOKING GLASS RIVER NEAR EAGLE, MI

LOCATION.--Lat 42°49'41", long 84°45'34", in NE1/4 NE1/4 sec.15, T.5 N., R.4 W., Clinton County, Hydrologic Unit 04050004, on right bank at downstream side of bridge on Tallman Road, 1.9 mi northeast of Eagle, and 11 mi upstream from mouth.

DRAINAGE AREA.--280 mi².

PERIOD OF RECORD.--August 1944 to September 1996, October 2001 to current year.

REVISED RECORDS.--WSP 1387: 1946-47.

GAGE.--Water-stage recorder. Elevation of gage is 760 ft above sea level, from topographic map. Prior to June 2, 1962, nonrecording gage and June 3, 1962 to Sept. 30, 1996, water-stage recorder at site 1.0 mi downstream at different datum (station 04114500).

REMARKS.--Records good except for estimated daily discharges, which are fair. Small intermittent diversion at times into Lake Geneva when discharge is above 50 ft³/s. Several measurements of water temperature were made during the year. Gage-height telemeter 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	24	30	108	123	e60	e200	268	105	1160	243	89	87
2	24	51	101	127	e60	409	267	138	1110	217	90	82
3	23	105	96	136	e61	358	264	143	1050	192	92	77
4	25	153	91	141	e62	307	259	140	970	181	132	72
5	24	145	85	148	e63	570	249	144	891	160	124	67
6	24	132	83	142	e64	531	240	147	809	142	112	60
7	24	109	e77	e140	e64	472	228	149	724	139	101	60
8	25	89	75	e135	e63	453	219	150	642	127	96	59
9	23	81	76	e135	e62	444	210	170	567	120	91	57
10	22	78	78	e130	e61	448	199	265	543	112	89	55
11	23	80	83	e125	e60	461	190	378	549	107	86	51
12	22	78	84	e120	e59	463	181	348	512	104	81	49
13	22	73	e83	e110	e58	457	171	296	471	e105	79	46
14	28	65	e78	e100	e58	455	164	331	444	e165	74	44
15	39	62	74	e92	e58	442	155	342	450	141	70	41
16	33	59	75	e88	e57	423	149	354	480	128	67	41
17	36	56	76	e84	e57	402	145	367	484	128	64	41
18	34	70	72	e81	e56	379	139	420	485	122	62	41
19	32	155	72	e78	e57	357	129	425	485	115	58	41
20	31	160	e70	e75	e60	348	120	423	486	111	56	40
21	32	120	e68	e72	e75	332	119	755	493	115	54	40
22	31	101	69	e70	e100	302	113	997	502	125	50	38
23	29	100	72	e68	e130	279	108	1210	483	109	49	37
24	29	136	82	e66	e150	268	101	1830	470	99	49	38
25	32	138	86	e64	e160	306	104	1220	437	91	51	37
26	31	127	83	e63	e155	329	101	996	403	89	74	37
27	28	115	e86	e62	e150	315	97	947	367	95	60	36
28	31	111	88	e61	e160	286	93	973	333	98	63	37
29	33	111	109	e60	e170	275	92	1030	303	94	166	39
30	32	110	134	e60	---	269	90	1090	272	88	129	40
31	31	---	133	e60	---	268	---	1160	---	90	99	---
TOTAL	877	3000	2647	3016	2450	11608	4964	17443	17375	3952	2557	1490
MEAN	28.3	100	85.4	97.3	84.5	374	165	563	579	127	82.5	49.7
MAX	39	160	134	148	170	570	268	1830	1160	243	166	87
MIN	22	30	68	60	56	200	90	105	272	88	49	36
CFSM	0.10	0.36	0.30	0.35	0.30	1.34	0.59	2.01	2.07	0.46	0.29	0.18
IN.	0.12	0.40	0.35	0.40	0.33	1.54	0.66	2.32	2.31	0.53	0.34	0.20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2004, BY WATER YEAR (WY)

	MEAN	92.8	128	158	168	210	430	404	258	148	85.9	56.2	70.4
MAX	614	414	445	505	673	1058	1131	910	579	405	206	532	532
(WY)	1987	1991	1976	1993	1976	1985	1947	1956	2004	1994	1994	1975	1975
MIN	15.3	25.0	21.6	24.0	24.3	47.0	85.9	64.8	31.3	13.6	16.9	15.3	15.3
(WY)	1964	1964	1964	1963	1963	1964	1964	1958	1964	1965	1965	1963	1963

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1944 - 2004

ANNUAL TOTAL	31713						71379						
ANNUAL MEAN	86.9						195						
HIGHEST ANNUAL MEAN										184			
LOWEST ANNUAL MEAN										321			1993
HIGHEST DAILY MEAN	704						1830		May 24	2400		Apr 5	1947
LOWEST DAILY MEAN	13						22		Oct 10	11		Jul 21	1965
ANNUAL SEVEN-DAY MINIMUM	15						23		Oct 7	11		Jul 25	1965
MAXIMUM PEAK FLOW							2120		May 24	(a)2860		Apr 5	1947
MAXIMUM PEAK STAGE							8.24		May 24	(b)8.24		May 24	2004
INSTANTANEOUS LOW FLOW							18		Oct 13	10		Jul 28	1965
ANNUAL RUNOFF (CFSM)	0.310						0.697			0.658			
ANNUAL RUNOFF (INCHES)	4.21						9.48			8.93			
10 PERCENT EXCEEDS	215						465			430			
50 PERCENT EXCEEDS	48						102			100			
90 PERCENT EXCEEDS	23						38			32			

(a) From rating curve extended above 1,900 ft³/s; gage height 7.70 ft, from graph based on gage readings, site and datum then in use.

(b) Present site and datum; maximum peak stage at previous site and datum, 9.9 ft, Mar. 7, 1956, from floodmark, backwater from ice.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04115000 MAPLE RIVER AT MAPLE RAPIDS, MI

LOCATION.--Lat 43°06'35", long 84°41'35", in sec.5, T.8 N., R.3 W., Clinton County, Hydrologic Unit 04050005, on right bank at downstream side of bridge on Maple Road in Maple Rapids, 50 ft upstream from Pine Creek, and 2.3 mi upstream from Hayworth Creek. Records include flow of Pine Creek.

DRAINAGE AREA.--434 mi².

PERIOD OF RECORD.--August 1944 to current year.

REVISED RECORDS.--WSP 1707: 1956.

GAGE.--Water-stage recorder. Datum of gage is 642.58 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Oct. 4, 1968, nonrecording gage at same site and datum.

REMARKS.--Records good. At times, water is pumped from the river about 8 mi upstream to fill the wetlands in the Maple River State Game Area. Some of the water is returned to the river at a later date, when water levels in the wetlands are lowered. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1904 reached a stage of 13.8 ft, from information by local resident.

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	10	43	253	271	e73	220	435	150	1160	255	65	78
2	11	81	239	278	e72	398	419	178	997	231	65	74
3	11	105	221	282	e71	770	393	208	867	209	64	70
4	13	127	202	292	e70	1280	364	224	749	198	72	67
5	14	142	188	291	e69	2330	340	233	646	190	81	65
6	14	151	170	275	e69	3170	317	233	561	176	86	63
7	12	143	148	259	e69	2880	298	228	500	162	86	65
8	10	136	128	e224	e69	2590	282	248	454	155	82	64
9	12	141	114	225	e68	2230	266	646	418	148	77	61
10	12	117	109	e210	e68	1860	252	1580	447	138	72	58
11	12	101	117	190	e68	1540	236	2020	548	124	69	57
12	13	92	137	176	e68	1280	223	2050	624	110	68	56
13	15	103	130	161	e68	1100	209	1870	671	101	67	56
14	18	94	125	e150	e69	943	193	1860	703	98	66	54
15	18	84	125	e140	e70	834	181	2160	857	102	64	51
16	22	77	120	e131	e71	740	168	1880	888	104	62	50
17	23	71	117	123	e72	645	161	1530	826	118	59	50
18	24	74	111	114	75	572	153	1290	736	127	58	49
19	28	172	105	108	77	516	143	1130	636	119	58	49
20	29	226	96	e102	78	478	147	993	546	107	56	49
21	29	266	89	97	84	452	142	910	490	96	55	49
22	30	272	89	91	97	430	141	990	462	89	54	48
23	28	261	93	88	114	411	133	1660	433	84	54	48
24	28	271	111	85	132	395	125	3280	421	79	52	47
25	30	300	142	83	148	381	129	3060	411	76	52	47
26	30	311	155	82	159	382	153	2760	389	73	61	47
27	33	310	153	e78	167	413	159	2470	364	70	65	47
28	35	300	156	e77	174	439	156	2210	337	68	67	47
29	37	284	180	e75	182	451	147	1940	306	67	70	46
30	38	269	218	e74	---	454	143	1670	281	66	77	43
31	36	---	248	e73	---	448	---	1390	---	65	79	---
TOTAL	675	5124	4589	4905	2671	31032	6608	43051	17728	3805	2063	1655
MEAN	21.8	171	148	158	92.1	1001	220	1389	591	123	66.5	55.2
MAX	38	311	253	292	182	3170	435	3280	1160	255	86	78
MIN	10	43	89	73	68	220	125	150	281	65	52	43
CFSM	0.05	0.39	0.34	0.36	0.21	2.31	0.51	3.20	1.36	0.28	0.15	0.13
IN.	0.06	0.44	0.39	0.42	0.23	2.66	0.57	3.69	1.52	0.33	0.18	0.14

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2004, BY WATER YEAR (WY)

	144	183	245	251	315	697	604	398	206	109	58.5	121
MEAN	144	183	245	251	315	697	604	398	206	109	58.5	121
MAX	1461	837	813	1035	1137	2049	1582	1812	937	1243	361	1634
(WY)	1987	1991	1991	1973	2001	1985	1947	1956	1996	1994	1994	1986
MIN	9.77	21.8	20.9	17.3	16.9	103	139	74.1	24.6	10.6	8.47	8.34
(WY)	1967	1963	1963	1963	1963	1964	1945	1977	1977	1965	1965	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1944 - 2004

ANNUAL TOTAL	35054.4						123906					
ANNUAL MEAN	96.0						339					
HIGHEST ANNUAL MEAN										277		
LOWEST ANNUAL MEAN										501		1976
HIGHEST DAILY MEAN	579						3280			65.1		1963
LOWEST DAILY MEAN	3.3						10			3.3		Mar 20 1948
ANNUAL SEVEN-DAY MINIMUM	4.1						12			4.1		Sep 19 2003
MAXIMUM PEAK FLOW							3400			(a)8770		Sep 12 1986
MAXIMUM PEAK STAGE							9.80			(b)12.33		Sep 12 1986
ANNUAL RUNOFF (CFSM)	0.221						0.780			0.639		
ANNUAL RUNOFF (INCHES)	3.00						10.62			8.68		
10 PERCENT EXCEEDS	271						873			662		
50 PERCENT EXCEEDS	36						132			120		
90 PERCENT EXCEEDS	11						47			23		

(a) Result of dam failure on Rainbow Lake (Pine Creek).

(b) From floodmark.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04115265 FISH CREEK NEAR CRYSTAL, MI

LOCATION.--Lat 43°14'59", long 84°58'52", in NW1/4 NE1/4 sec.23, T.10 N., R.6 W., Montcalm County, Hydrologic Unit 04050005, on left bank 10 ft downstream from bridge on Sidney Road, 3.5 mi southwest of Crystal.

DRAINAGE AREA.--39.7 mi².

PERIOD OF RECORD.--October 1987 to current year.

REVISED RECORDS.--WDR MI-92-1: Drainage area. WDR MI-99-1: 1988-90, 1991 (M).

GAGE.--Water-stage recorder. Elevation of gage is 795 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are poor. At times, low flow is affected by pumpage for irrigation. Several measurements of water temperature were made during the year.

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	11	15	22	18	e14	22	28	35	55	28	18	20
2	11	28	20	19	e14	52	26	32	45	26	17	19
3	13	44	19	24	e14	59	25	27	43	26	19	18
4	16	60	18	22	e14	59	25	25	38	37	20	18
5	13	82	18	19	e14	115	24	25	36	36	20	18
6	12	45	18	e16	e15	174	24	23	34	30	17	18
7	12	31	17	e16	e15	84	24	22	33	29	16	20
8	12	25	17	e16	e15	70	24	56	31	28	15	19
9	12	21	18	e16	e15	55	25	171	34	27	17	18
10	12	19	29	e16	e15	47	24	277	62	26	24	16
11	11	25	44	e15	e16	45	23	119	57	25	22	16
12	11	23	28	e15	16	39	22	76	60	25	21	16
13	12	21	e22	e15	16	34	22	71	56	25	21	16
14	13	19	20	e15	e15	35	21	85	88	25	20	16
15	16	19	19	e15	e14	34	21	190	75	23	19	16
16	15	18	20	e15	e14	32	21	85	50	21	16	15
17	14	18	22	e14	e14	30	25	60	47	24	17	15
18	14	38	21	e14	e14	30	28	75	43	24	17	15
19	14	64	20	e14	e14	29	25	63	37	21	16	15
20	14	38	19	e14	15	35	23	50	33	21	16	15
21	14	30	19	e14	17	36	24	53	37	23	16	15
22	14	26	19	e14	17	29	23	78	55	29	15	14
23	13	25	20	e13	17	28	22	149	40	23	16	14
24	14	46	20	e14	17	30	21	198	69	21	15	14
25	15	35	19	e14	17	33	38	89	52	20	14	14
26	15	29	19	e14	17	44	35	70	40	20	26	14
27	14	26	18	e14	16	43	28	59	34	19	22	14
28	15	25	18	e14	16	36	26	52	35	20	23	14
29	17	25	21	e14	17	34	24	47	32	18	25	14
30	16	23	21	e14	—	31	23	44	30	18	23	14
31	15	—	19	e14	—	29	—	59	—	20	21	—
TOTAL	420	943	644	481	444	1453	744	2465	1381	758	584	480
MEAN	13.5	31.4	20.8	15.5	15.3	46.9	24.8	79.5	46.0	24.5	18.8	16.0
MAX	17	82	44	24	17	174	38	277	88	37	26	20
MIN	11	15	17	13	14	22	21	22	30	18	14	14
CFSM	0.34	0.79	0.52	0.39	0.39	1.18	0.62	2.00	1.16	0.62	0.47	0.40
IN.	0.39	0.88	0.60	0.45	0.42	1.36	0.70	2.31	1.29	0.71	0.55	0.45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 2004, BY WATER YEAR (WY)

	MEAN	27.4	35.1	30.4	29.8	34.3	47.5	41.6	39.5	30.3	21.2	21.5	20.7
MAX	39.2	59.5	46.1	48.9	61.2	75.9	66.6	79.5	46.0	50.9	41.7	33.8	
(WY)	1992	1995	1992	1993	1997	1990	1991	2004	2004	1994	1994	1993	
MIN	13.5	17.7	19.8	15.5	15.3	25.3	24.8	26.5	14.9	11.6	10.8	9.66	
(WY)	2004	2000	1990	2004	2004	2000	2004	1999	2003	1998	2003	2003	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1988 - 2004

ANNUAL TOTAL	7152.3												
ANNUAL MEAN	19.6												
HIGHEST ANNUAL MEAN										31.6			
LOWEST ANNUAL MEAN										40.7			1993
HIGHEST DAILY MEAN	100									19.8			2003
LOWEST DAILY MEAN	7.5									450			Mar 12 1990
ANNUAL SEVEN-DAY MINIMUM	8.3									5.6			Aug 2 1999
MAXIMUM PEAK FLOW										7.7			Jul 28 1998
MAXIMUM PEAK STAGE										558			Mar 12 1990
ANNUAL RUNOFF (CFSM)	0.494									5.53			Mar 12 1990
ANNUAL RUNOFF (INCHES)	6.70									0.796			
10 PERCENT EXCEEDS	32									10.81			
50 PERCENT EXCEEDS	16									51			
90 PERCENT EXCEEDS	9.9									27			
										15			

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04116000 GRAND RIVER AT IONIA, MI

LOCATION.—Lat 42°58'19", long 85°04'09", in NW1/4 sec.30, T.7 N., R.6 W., Ionia County, Hydrologic Unit 04050006, on left bank 15 ft downstream from bridge on State Highway 66 in Ionia, 2.7 mi downstream from Prairie Creek, and at mile 87.

DRAINAGE AREA.—2,840 mi², approximately.

PERIOD OF RECORD.—March to June 1931, July 1951 to current year. Gage-height records collected in this vicinity 1907-28 (flood seasons only) are contained in reports of the National Weather Service.

GAGE.—Water-stage recorder. Datum of gage is 615.38 ft above sea level. Mar. 19 to Sept. 24, 1931, nonrecording gage at site 1.5 mi upstream at different datum.

REMARKS.—Records good except for estimated daily discharges, which are fair. Diurnal fluctuation below approximately 5,000 ft³/s caused by powerplants upstream from station. Gage-height telemeter 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	595	536	1740	2280	e973	2240	3160	1190	7560	1990	1220	1040
2	415	871	1640	2400	e973	4170	2890	1390	6880	1800	1130	1130
3	498	1460	1920	2320	e973	5820	2770	1780	6370	1770	995	1030
4	506	1800	1110	2210	e973	5960	2670	1800	5840	1760	1350	850
5	492	1980	1160	2150	e973	6860	2490	1850	5260	1720	1470	759
6	453	2060	1290	2120	e946	10200	2430	1730	4630	1600	1400	777
7	488	1890	1110	1860	e973	11500	2280	1600	4210	1490	1170	730
8	438	1560	1080	1560	e1000	10800	2190	1590	3670	1560	1210	822
9	424	1440	1070	e1330	e994	9470	2150	2080	3410	1630	1070	785
10	392	1130	1110	e1250	e1030	8060	2030	4360	3260	1550	1010	754
11	506	1310	1160	e1330	e958	6890	1950	6350	3460	1570	891	744
12	374	1110	1170	e1460	e1010	6030	1820	7300	4050	1660	907	674
13	433	1140	1120	e1610	e1030	5320	1730	7080	4390	1520	894	630
14	423	1010	1270	e1130	e1030	4710	1660	6880	4600	1950	860	560
15	502	965	1180	e1160	e982	4260	1560	7560	4810	2030	760	541
16	583	897	1130	e1160	e848	3820	1510	7510	4940	1650	783	509
17	608	950	1240	e1030	e911	3530	1470	6780	4670	1600	760	399
18	535	991	1140	e1070	e817	3310	1440	6140	4350	1600	723	535
19	614	1730	1100	e1100	e898	3120	1330	5840	4150	1350	744	529
20	674	2560	998	e1100	e1000	3010	1240	5400	3870	1370	722	556
21	606	2270	1040	e1030	e1000	3150	1280	5650	3590	1490	693	547
22	516	2200	1020	e973	e1100	3040	1250	10000	3510	1790	696	500
23	557	2040	991	e934	e1340	2910	1180	14000	3290	2050	784	413
24	505	2260	1080	e973	e1350	2860	1080	18200	3160	1470	623	517
25	530	2630	1270	e973	e1470	2890	1160	21000	3060	1430	689	499
26	532	2360	1370	e973	e1500	3290	1270	18900	2830	1360	797	402
27	565	2190	1480	e973	e1500	3830	1250	15800	2580	1190	983	419
28	634	2010	1420	e934	e1470	3770	1170	12900	2510	1230	893	459
29	532	1940	1560	e973	e1710	3650	1140	10600	2290	1150	1080	511
30	559	1810	1790	e973	—	3450	1140	9110	2160	1140	1610	494
31	580	—	2180	e946	—	3290	—	8130	—	1170	1380	—
TOTAL	16069	49100	39939	42285	31732	155210	52690	230500	123360	48640	30297	19115
MEAN	518	1637	1288	1364	1094	5007	1756	7435	4112	1569	977	637
MAX	674	2630	2180	2400	1710	11500	3160	21000	7560	2050	1610	1130
MIN	374	536	991	934	817	2240	1080	1190	2160	1140	623	399
CFSM	0.18	0.58	0.45	0.48	0.39	1.76	0.62	2.62	1.45	0.55	0.34	0.22
IN.	0.21	0.64	0.52	0.55	0.42	2.03	0.69	3.02	1.62	0.64	0.40	0.25

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2004, BY WATER YEAR (WY)

	MEAN	1204	1589	1887	1961	2432	4290	3953	2738	1676	1060	776	902
MAX	7613	4931	4672	5715	6595	9398	7492	9715	4963	4468	2416	4613	
(WY)	1987	1993	1991	1993	2001	1985	1993	1956	1989	1994	1994	1975	
MIN	254	380	346	375	377	802	702	567	464	287	310	300	
(WY)	1964	1965	1964	1963	1963	1964	1931	1931	1988	1965	1965	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1931 - 2004

ANNUAL TOTAL	411421												
ANNUAL MEAN	1127												
HIGHEST ANNUAL MEAN													1993
LOWEST ANNUAL MEAN													1964
HIGHEST DAILY MEAN	4960												Apr 1 1960
LOWEST DAILY MEAN	250												Jul 16 1977
ANNUAL SEVEN-DAY MINIMUM	308												Jul 14 1977
MAXIMUM PEAK FLOW													Apr 1 1960
MAXIMUM PEAK STAGE													Apr 1 1960
INSTANTANEOUS LOW FLOW													May 13 1968
ANNUAL RUNOFF (CFSM)	0.397												
ANNUAL RUNOFF (INCHES)	5.39												
10 PERCENT EXCEEDS	2610												
50 PERCENT EXCEEDS	658												
90 PERCENT EXCEEDS	371												

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04117000 QUAKER BROOK NEAR NASHVILLE, MI

LOCATION.--Lat 42°33'57", long 85°05'37", in NW1/4 sec.13, T.2 N., R.7 W., Barry County, Hydrologic Unit 04050007, on left bank 150 ft upstream from culvert on Clark Road, 500 ft upstream from unnamed tributary, and 2.5 mi south of Nashville.

DRAINAGE AREA.--7.60 mi².

PERIOD OF RECORD.--August 1954 to September 1975, October 1975 to September 1994 (operated as a crest-stage partial-record station), October 1994 to current year.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 821.89 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records good. Several measurements of water temperature were made during the year.

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	2.6	3.4	5.1	5.0	3.6	17	6.8	8.2	13	4.1	3.5	5.1
2	2.5	10	4.7	7.9	3.7	37	6.0	13	9.8	3.9	3.4	4.6
3	2.8	19	4.3	7.2	4.0	22	5.5	7.2	9.2	3.8	3.4	4.2
4	3.7	16	4.3	5.9	3.7	15	5.3	5.1	7.9	12	11	4.0
5	3.1	16	4.6	5.4	3.6	39	5.0	4.5	7.2	7.0	6.4	4.0
6	2.8	12	4.5	4.4	3.9	25	4.9	4.1	6.9	5.5	4.2	4.2
7	2.8	6.4	4.0	4.7	3.9	15	5.0	3.9	6.6	22	3.7	6.5
8	2.7	5.0	4.1	4.4	3.4	14	4.9	4.8	6.0	9.5	3.5	4.5
9	2.6	4.2	4.5	4.0	3.8	11	4.8	12	6.8	6.0	3.4	4.1
10	2.6	4.0	6.9	3.7	3.8	8.6	4.7	24	8.8	5.3	3.4	3.7
11	2.5	5.6	8.7	4.0	3.8	8.3	4.7	20	19	4.8	3.9	3.5
12	2.4	5.2	5.7	4.4	3.8	7.3	4.6	9.4	18	4.5	3.9	3.5
13	2.5	4.8	4.4	4.3	3.8	6.5	4.4	10	13	4.3	4.2	3.4
14	4.8	4.2	4.3	3.9	3.8	7.1	4.3	15	11	4.2	6.1	3.3
15	9.9	4.1	4.3	3.9	3.5	6.8	4.2	15	8.3	3.9	4.1	3.3
16	5.1	4.2	5.0	3.6	3.4	6.2	4.1	7.6	7.3	3.7	3.6	6.0
17	3.7	4.1	5.3	3.7	3.6	6.0	4.7	5.8	7.4	4.0	4.1	4.7
18	3.4	11	4.9	3.8	3.7	6.1	4.5	17	6.9	3.8	12	3.8
19	3.2	32	5.0	3.4	3.8	6.6	3.9	11	5.9	3.8	5.8	3.5
20	3.1	16	4.4	2.8	4.8	11	3.9	6.8	5.3	3.6	4.4	3.4
21	3.0	8.4	4.2	2.8	6.9	9.1	4.3	176	5.7	4.1	4.0	3.3
22	3.0	6.4	4.8	2.8	6.0	6.3	4.0	104	9.0	8.3	3.6	3.2
23	3.0	7.2	6.4	2.2	6.5	5.9	3.9	101	6.0	4.7	6.4	3.2
24	3.0	24	6.8	2.9	6.2	7.2	3.7	107	5.8	3.9	17	3.1
25	4.5	15	5.6	3.1	5.7	10	4.8	31	5.5	3.6	9.7	3.2
26	4.2	8.8	4.9	3.2	5.5	13	4.7	24	4.9	3.5	24	3.2
27	3.5	7.2	4.5	3.4	5.2	13	4.1	16	4.7	4.8	9.9	3.1
28	3.6	6.5	5.3	3.5	6.3	8.8	3.9	13	4.9	4.3	9.8	3.2
29	4.3	6.1	10	3.6	8.8	8.5	3.7	12	4.6	3.7	18	3.5
30	3.7	5.6	8.2	3.5	---	7.6	4.0	12	4.3	3.7	12	3.3
31	3.5	---	5.9	3.6	---	8.5	---	19	---	4.0	6.3	---
TOTAL	108.1	282.4	165.6	125.0	132.5	373.4	137.3	819.4	239.7	168.3	218.7	115.6
MEAN	3.49	9.41	5.34	4.03	4.57	12.0	4.58	26.4	7.99	5.43	7.05	3.85
MAX	9.9	32	10	7.9	8.8	39	6.8	176	19	22	24	6.5
MIN	2.4	3.4	4.0	2.2	3.4	5.9	3.7	3.9	4.3	3.5	3.4	3.1
CFSM	0.46	1.24	0.70	0.53	0.60	1.58	0.60	3.48	1.05	0.71	0.93	0.51
IN.	0.53	1.38	0.81	0.61	0.65	1.83	0.67	4.01	1.17	0.82	1.07	0.57

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2004, BY WATER YEAR (WY)

	MEAN	4.95	6.45	6.70	6.54	8.24	11.2	9.99	9.03	5.83	3.75	3.68	3.49
MAX	14.2	14.3	14.9	15.6	19.0	25.0	23.7	26.4	12.8	7.78	13.5	8.17	
(WY)	1955	1995	1973	1974	2001	1974	1975	2004	1973	1969	1972	1972	
MIN	1.59	2.33	2.11	2.78	2.36	4.23	4.07	2.97	2.05	1.22	1.36	1.52	
(WY)	1964	1964	1964	1964	1964	1964	1963	1958	1959	1964	1964	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1954 - 2004

ANNUAL TOTAL	2033.0	2886.0	
ANNUAL MEAN	5.57	7.89	
HIGHEST ANNUAL MEAN			6.60
LOWEST ANNUAL MEAN			11.1
HIGHEST DAILY MEAN	63	Apr 5	176
LOWEST DAILY MEAN	1.9	Sep 12	2.2
ANNUAL SEVEN-DAY MINIMUM	2.0	Sep 7	2.6
MAXIMUM PEAK FLOW			270
MAXIMUM PEAK STAGE			6.63
INSTANTANEOUS LOW FLOW			(a)2.0
ANNUAL RUNOFF (CFSM)	0.733	1.04	(a)0.44
ANNUAL RUNOFF (INCHES)	9.95	14.13	0.869
10 PERCENT EXCEEDS	10	13	11.81
50 PERCENT EXCEEDS	3.9	4.7	12
90 PERCENT EXCEEDS	2.4	3.4	4.5
			2.3

(a) Result of freezeup.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04117500 THORNAPPLE RIVER NEAR HASTINGS, MI

LOCATION.--Lat 42°36'57", long 85°14'11", in SE1/4 sec.27, T.3 N., R.8 W., Barry County, Hydrologic Unit 04050007, on right bank 100 ft upstream from bridge on McKeown Road, 0.6 mi downstream from Cedar Creek, 2.0 mi downstream from Thornapple Lake, and 3.2 mi southeast of Hastings.

DRAINAGE AREA.--385 mi².

PERIOD OF RECORD.--October 1944 to current year.

GAGE.--Water-stage recorder. Datum of gage is 786.71 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Oct. 1, 1965, nonrecording gage at same site and datum.

REMARKS.--Records good. Several measurements of water temperature were made during the year. Gage-height telemeter 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	90	116	377	382	148	417	513	192	1270	193	170	364
2	87	138	332	370	148	699	460	237	1100	181	165	299
3	85	218	293	357	149	1050	408	282	959	174	169	250
4	89	306	263	354	152	1310	370	293	838	199	193	216
5	90	382	245	344	150	1630	340	279	726	232	231	194
6	90	428	233	311	150	1970	313	253	629	237	261	180
7	89	442	222	247	151	2020	298	233	547	236	249	180
8	88	419	211	227	150	1880	284	220	471	255	215	175
9	88	364	206	228	147	1640	271	227	412	256	187	166
10	87	305	217	229	148	1360	262	320	387	232	168	158
11	86	267	246	228	148	1120	252	525	424	208	160	151
12	82	246	266	227	148	938	242	692	492	189	155	143
13	82	232	254	224	148	786	236	810	544	176	153	137
14	89	215	237	209	150	666	226	997	580	182	155	134
15	111	203	227	188	147	586	220	1070	603	200	148	132
16	131	191	219	186	136	520	212	984	596	221	139	133
17	139	185	221	190	135	460	211	862	599	213	134	139
18	131	205	224	188	139	418	211	810	589	204	147	134
19	123	337	219	185	e145	391	202	804	530	200	158	133
20	114	513	213	171	e150	387	201	813	449	192	157	128
21	108	619	204	164	180	408	192	e1000	384	179	148	124
22	105	643	201	160	204	411	195	e2200	354	201	137	122
23	102	631	207	154	233	393	188	e3450	333	253	132	118
24	99	643	225	149	264	375	184	4720	322	300	130	115
25	103	676	252	145	279	392	184	5430	304	311	136	114
26	110	680	271	142	289	458	193	4630	283	284	179	113
27	113	647	266	142	286	569	199	3560	258	250	208	113
28	115	584	255	142	286	644	192	2810	236	225	240	111
29	116	510	268	142	313	649	180	2220	220	202	325	109
30	120	438	310	142	---	616	178	1770	207	187	405	107
31	115	---	357	144	---	565	---	1480	---	178	414	---
TOTAL	3177	11783	7741	6671	5273	25728	7617	44173	15646	6750	5968	4692
MEAN	102	393	250	215	182	830	254	1425	522	218	193	156
MAX	139	680	377	382	313	2020	513	5430	1270	311	414	364
MIN	82	116	201	142	135	375	178	192	207	174	130	107
CFSM	0.27	1.02	0.65	0.56	0.47	2.16	0.66	3.70	1.35	0.57	0.50	0.41
IN.	0.31	1.14	0.75	0.64	0.51	2.49	0.74	4.27	1.51	0.65	0.58	0.45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2004, BY WATER YEAR (WY)

MEAN	201	264	317	342	403	673	624	424	276	161	130	146
MAX	1072	939	895	1049	1140	1506	1914	1425	1011	410	385	358
(WY)	1987	1991	1991	1973	2001	1948	1947	2004	1989	1968	1980	1992
MIN	54.5	73.6	75.2	90.4	87.5	129	176	111	87.0	56.0	50.2	54.4
(WY)	1964	1964	1964	1964	1963	1964	1946	1958	1964	1964	1946	1963

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1945 - 2004

ANNUAL TOTAL	80874	145219	
ANNUAL MEAN	222	397	
HIGHEST ANNUAL MEAN			534
LOWEST ANNUAL MEAN			99.2
HIGHEST DAILY MEAN	1290	Apr 8	6590
LOWEST DAILY MEAN	70	Sep 12	35
ANNUAL SEVEN-DAY MINIMUM	72	Sep 8	36
MAXIMUM PEAK FLOW			6810
MAXIMUM PEAK STAGE			(a)10.20
INSTANTANEOUS LOW FLOW			33
ANNUAL RUNOFF (CFSM)	0.576		0.856
ANNUAL RUNOFF (INCHES)	7.81		11.63
10 PERCENT EXCEEDS	470		684
50 PERCENT EXCEEDS	127		200
90 PERCENT EXCEEDS	88		92

(a) From graph based on gage readings.

(b) Oct. 3, 12, 13.

(c) Estimated.

(a) 1976, 1991.
(b) Oct. 12, 13.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04119000 GRAND RIVER AT GRAND RAPIDS, MI

LOCATION.—Lat 42°57'52", long 85°40'35", in NE1/4 sec.25, T.7 N., R.12 W., Kent County, Hydrologic Unit 04050006, on right bank 500 ft upstream from bridge on Fulton Street in Grand Rapids, 1.7 mi upstream from Plaster Creek, and at mile 41.

DRAINAGE AREA.—4,900 mi², approximately.

PERIOD OF RECORD.—March 1901 to December 1905, January 1906 to August 1918 (gage heights only), October 1930 to current year. Monthly discharge only for some periods, published in WSP 1307. Gage-height records collected in this vicinity since 1907 are contained in reports of the National Weather Service.

REVISED RECORDS.—WSP 924: 1938(M). WSP 1387: 1901-5, 1940.

GAGE.—Water-stage recorder. Datum of gage is 585.70 ft above sea level (levels by City of Grand Rapids). March 1901 to August 1918, nonrecording gage at Fulton Street Bridge and Oct. 1, 1930 to Oct. 26, 1953, water-stage recorder at sewage pumping station 1 mi downstream at datum 2.99 ft higher.

REMARKS.—Records good except for estimated daily discharges, which are fair. Moderate diurnal fluctuation at low and medium flow caused by powerplants upstream from station. Gage-height telemeter 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	1270	1470	3750	3490	e2100	3990	5800	2830	16500	3740	2290	2820
2	1260	2180	3530	3670	e2100	6450	5390	2790	14200	3420	2390	2440
3	1230	3460	3290	3810	e2100	8660	4980	3100	12300	3300	2320	2230
4	1300	4230	3310	3750	e2110	9550	4670	3460	10700	3660	2380	2170
5	1270	5180	2670	3650	e2130	11600	4430	3430	9700	3590	2630	1930
6	1250	5080	2450	3660	e2140	14200	4150	3310	8680	3490	2670	1820
7	1190	4390	2570	3030	e2150	15700	3990	3200	7690	3380	2530	1790
8	1180	3990	2380	2530	e2150	17500	3900	3150	6810	3150	2170	1750
9	1230	3660	2270	e2560	e2150	18200	4130	3760	6140	3100	2210	1760
10	1580	3190	2440	e2540	e2150	17400	3720	5260	5760	3090	2140	1720
11	1180	2870	2760	e2620	e2030	15600	3410	7440	5760	2970	2030	1670
12	1180	2830	2890	e2800	e2010	13300	2990	8840	6080	3000	1970	1630
13	981	2550	2820	e3000	e2160	11200	2910	9950	6600	3100	1920	1570
14	901	2520	2580	e2490	e2210	9730	3110	10900	7030	3030	1890	1460
15	888	2220	2670	e2410	e2190	8640	3010	12300	7270	3380	1790	1360
16	1080	2170	2750	e2410	e2140	7730	2850	12800	7400	3410	1710	1350
17	1320	2030	2630	e2310	e2030	6880	2850	12600	7550	3510	1730	1270
18	1490	2550	2620	e2300	e1910	6290	2900	12700	7310	3590	1650	1180
19	1400	3570	2460	e2320	e1930	5840	2890	11800	6840	3510	1690	1220
20	1450	4250	2360	e2320	e1940	5530	2750	10900	6370	3020	1640	1310
21	1550	4690	2350	e2280	e1950	5360	2730	11700	6270	3120	1610	1260
22	1460	4440	2310	e2190	1920	5460	3060	14700	6100	3230	1570	1330
23	1280	4400	2130	e2170	2160	5060	2650	17700	5850	3350	1490	1220
24	1340	5180	2170	e2170	2510	4960	2500	20900	5690	3220	1630	1150
25	1320	5350	2340	e2130	2810	5190	2830	24500	5480	2900	1440	1250
26	1300	5350	2500	e2130	3120	5870	2670	27800	5130	2820	1650	1180
27	1300	4860	2660	e2130	3020	6390	2860	28900	4750	2720	1970	1080
28	1410	4570	2810	e2100	3030	6690	2880	27600	4580	2550	2510	1150
29	1550	4290	2720	e2130	3140	6730	2770	24700	4170	2450	2500	1170
30	1460	3980	2780	e2130	—	6610	2740	21600	4160	2310	2650	1230
31	1440	—	3190	e2030	—	6140	—	19200	—	2290	3120	—
TOTAL	40040	111500	83160	81260	65490	278450	102520	383820	218870	97400	63890	46470
MEAN	1292	3717	2683	2621	2258	8982	3417	12380	7296	3142	2061	1549
MAX	1580	5350	3750	3810	3140	18200	5800	28900	16500	3740	3120	2820
MIN	888	1470	2130	2030	1910	3990	2500	2790	4160	2290	1440	1080
CFSM	0.26	0.76	0.55	0.53	0.46	1.83	0.70	2.53	1.49	0.64	0.42	0.32
IN.	0.30	0.85	0.63	0.62	0.50	2.11	0.78	2.91	1.66	0.74	0.49	0.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1901 - 2004, BY WATER YEAR (WY)

	MEAN	2403	2932	3351	3673	4344	7560	6897	4918	3433	2183	1733	1944
MAX	13630	7966	8794	12020	14720	21580	17900	15650	15670	7885	5225	7600	
(WY)	1987	1991	1991	1973	1938	1904	1947	1956	1905	1994	1994	1975	
MIN	906	1004	1080	1069	1079	1858	1759	1459	930	650	617	949	
(WY)	1965	1931	1964	1963	1963	1931	1931	1931	1934	1934	1934	1964	

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1901 - 2004
ANNUAL TOTAL	881205	1572870	
ANNUAL MEAN	2414	4297	3776
HIGHEST ANNUAL MEAN			6314
LOWEST ANNUAL MEAN			1264
HIGHEST DAILY MEAN	7630	Apr 8	53300
LOWEST DAILY MEAN	820	Sep 20	381
ANNUAL SEVEN-DAY MINIMUM	850	Sep 16	438
MAXIMUM PEAK FLOW		29000	54000
MAXIMUM PEAK STAGE		19.54	(a)22.49
INSTANTANEOUS LOW FLOW		841	(b)
ANNUAL RUNOFF (CFSM)	0.493	0.877	0.771
ANNUAL RUNOFF (INCHES)	6.69	11.94	10.47
10 PERCENT EXCEEDS	4900	8730	7610
50 PERCENT EXCEEDS	1720	2820	2580
90 PERCENT EXCEEDS	1090	1360	1200

(a) Present datum; from graph based on gage readings.

(b) Oct. 13, 14, 15.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

442400084472801 HOUGHTON LAKE NEAR HOUGHTON LAKE HEIGHTS, MI

LOCATION.--Lat 44°24'16", long 84°47'28", in NW1/4 NW1/4 sec.10, T.23 N., R.4 W., Roscommon County, Hydrologic Unit 04060102, on right bank of Muskegon River at upstream side of bridge on Old U.S. Highway 27, 0.4 mi downstream from Houghton Lake, and 5.2 mi north of Houghton Lake Heights.

DRAINAGE AREA--222 mi².

PERIOD OF RECORD.--June 1942 to September 1991, September 1993 to current year, except winter period of 1942-43.

GAGE.--Water-stage recorder. Datum of gage is 1,130.00 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Sept. 28, 1960, nonrecording gage at datum 6.21 ft higher. Sept. 28, 1960 to Sept. 30, 1991, water-stage recorder. September 1993 to Nov. 26, 1996, nonrecording gage.

REMARKS.—Backus Creek and "The Cut" from Higgins Lake, join about 1 mi upstream from Houghton Lake and become the major inlet. There are also many small tributaries which feed the lake. The outlet is Muskegon River. Houghton Lake is the largest inland lake in Michigan. Established legal level, summer, 1,138.1 ft, minimum winter, 1,137.6 ft, above sea level. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.—Maximum gage height, 10.18 ft, Apr. 23, 1985; minimum observed, 6.95 ft, Sept. 3, 5, Nov. 8, 1958, present datum.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 9.78 ft, May 30; minimum, 7.91 ft, Sept. 28.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.15	8.37	8.62	8.62	8.50	8.31	9.05	9.10	9.61	8.93	8.53	8.35
2	8.17	8.42	8.71	8.62	8.49	8.34	9.07	9.06	9.60	8.93	8.51	8.34
3	8.27	8.44	8.76	8.64	8.50	8.34	9.03	9.06	9.57	8.92	8.50	8.32
4	8.22	8.61	8.75	8.63	8.49	8.35	8.95	9.09	9.57	8.92	8.46	8.33
5	8.24	8.58	8.74	8.63	8.47	8.45	9.06	9.05	9.55	8.84	8.42	8.35
6	8.27	8.62	8.73	8.64	8.47	8.50	9.09	9.04	9.53	8.91	8.40	8.40
7	8.29	8.54	8.72	8.65	8.47	8.53	9.08	9.05	9.53	8.82	8.41	8.30
8	8.28	8.63	8.71	8.62	8.46	8.56	9.08	9.11	9.50	8.79	8.42	8.30
9	8.29	8.66	8.69	8.60	8.46	8.58	9.06	9.12	9.46	8.78	8.45	8.26
10	8.29	8.68	8.74	8.59	8.44	8.60	9.07	9.13	9.48	8.76	8.38	8.30
11	8.32	8.69	8.77	8.59	8.43	8.63	9.05	9.17	9.47	8.76	8.39	8.30
12	8.28	8.60	8.77	8.59	8.42	8.65	9.06	9.17	9.43	8.72	8.38	8.30
13	8.31	8.37	8.78	8.57	8.42	8.67	9.00	9.23	9.40	8.71	8.38	8.32
14	8.26	8.60	8.77	8.59	8.39	8.69	9.01	9.23	9.42	8.61	8.38	8.33
15	8.24	8.62	8.77	8.61	8.38	8.69	9.05	9.28	9.41	8.59	8.39	8.35
16	8.27	8.62	8.78	8.59	8.37	8.70	9.04	9.34	9.41	8.63	8.38	8.22
17	8.29	8.63	8.76	8.59	8.36	8.71	9.01	9.35	9.36	8.62	8.38	8.22
18	8.32	8.76	8.76	8.59	8.35	8.71	9.18	9.35	9.31	8.61	8.36	8.24
19	8.31	8.73	8.75	8.58	8.34	8.72	9.07	9.41	9.23	8.62	8.32	8.25
20	8.35	8.80	8.75	8.57	8.34	8.75	9.20	9.40	9.24	8.64	8.30	8.24
21	8.20	8.74	8.74	8.57	8.35	8.75	9.18	9.43	9.24	8.66	8.30	8.20
22	8.28	8.77	8.72	8.57	8.35	8.76	9.14	9.44	9.17	8.61	8.33	8.19
23	8.31	8.81	8.70	8.56	8.35	8.77	9.14	9.54	9.17	8.59	8.30	8.20
24	8.34	8.79	8.68	8.54	8.36	8.78	9.16	9.59	9.09	8.61	8.34	8.19
25	8.35	8.85	8.68	8.53	8.35	8.79	9.20	9.63	9.10	8.60	8.33	8.13
26	8.32	8.80	8.69	8.52	8.34	8.84	9.10	9.62	9.04	8.60	8.36	8.15
27	8.34	8.79	8.68	8.53	8.33	8.88	9.05	9.63	9.01	8.58	8.35	8.14
28	8.45	8.76	8.67	8.55	8.32	8.93	9.20	9.61	9.01	8.57	8.32	8.07
29	8.38	8.75	8.65	8.54	8.30	8.98	9.14	9.64	8.98	8.59	8.32	8.11
30	8.40	8.76	8.64	8.53	—	9.01	9.10	9.69	8.97	8.56	8.34	8.11
31	8.37	—	8.62	8.52	—	9.04	—	9.66	—	8.51	8.31	—
MEAN	8.30	8.66	8.72	8.58	8.40	8.68	9.09	9.33	9.33	8.70	8.38	8.25
MAX	8.45	8.85	8.78	8.65	8.50	9.04	9.20	9.69	9.61	8.93	8.53	8.40
MIN	8.15	8.37	8.62	8.52	8.30	8.31	8.95	9.04	8.97	8.51	8.30	8.07
CAL YR 2003	MEAN 8.46		MAX 8.91		MIN 7.94							
WTR YR 2004	MEAN 8.70		MAX 9.69		MIN 8.07							

STREAMS TRIBUTARY TO LAKE MICHIGAN

441508085244001 LAKE MITCHELL-CADILLAC AT CADILLAC, MI

LOCATION.--Lat 44°14'21", long 85°27'17", in SW1/4 SW1/4 sec.6, T.21 N., R.9 W., Wexford County, Hydrologic Unit 04060102, on right bank of channel between lakes, at William Mitchell State Park, at Cadillac.

DRAINAGE AREA.--46.6 mi².

PERIOD OF RECORD.--August 1942 to December 1959, July 1960 to current year.

GAGE.--Nonrecording gage. Once daily reading by observer. Datum of gage is 1,283.41 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--The major inlet is Mitchell Creek. The outlet is Clam River. Lake elevation controlled by dam. Established legal levels; annual maximum level, 1,290.0 ft, minimum winter level, 1,288.9 ft, summer minimum level, 1,289.7 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 7.86 ft, Sept. 6, 1975; minimum observed, 4.62 ft, Oct. 4, 1955.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 7.36 ft, May 26; minimum observed, 5.78 ft, Sept. 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.02	6.32	6.82	6.50	6.44	6.16	7.24	7.06	7.22	6.60	6.36	6.14
2	6.04	6.34	6.80	6.50	6.42	6.20	7.22	7.04	7.20	6.58	6.34	6.14
3	6.08	6.36	6.78	6.50	6.42	6.24	7.22	7.02	7.19	6.58	6.31	6.12
4	6.12	6.38	6.76	6.48	6.40	6.26	7.24	7.00	7.16	6.58	6.30	6.12
5	6.14	6.44	6.74	6.48	6.38	6.34	7.24	6.98	7.14	6.56	6.28	6.12
6	6.14	6.54	6.72	6.48	6.38	6.36	7.24	6.96	7.10	6.56	6.26	6.12
7	6.14	6.54	6.68	6.46	6.36	6.40	7.22	6.94	7.06	6.56	6.24	6.10
8	6.14	6.52	6.66	6.46	6.34	6.42	7.22	6.94	7.02	6.54	6.24	6.10
9	6.14	6.52	6.64	6.44	6.32	6.44	7.20	6.98	6.98	6.54	6.22	6.08
10	6.14	6.50	6.62	6.44	6.30	6.48	7.16	7.10	6.94	6.54	6.20	6.08
11	6.14	6.50	6.60	6.44	6.28	6.50	7.16	7.08	6.90	6.52	6.20	6.06
12	6.14	6.50	6.58	6.44	6.26	6.52	7.12	7.12	6.86	6.52	6.20	6.04
13	6.14	6.52	6.56	6.40	6.24	6.54	7.08	7.16	6.86	6.52	6.18	6.02
14	6.16	6.52	6.54	6.44	6.24	6.54	7.06	7.18	6.84	6.52	6.18	6.02
15	6.16	6.52	6.52	6.44	6.22	6.56	7.04	7.22	6.84	6.52	6.18	6.00
16	6.16	6.52	6.52	6.44	6.22	6.58	7.02	7.24	6.82	6.52	6.16	6.00
17	6.18	6.52	6.52	6.44	6.20	6.58	7.00	7.24	6.80	6.52	6.16	5.98
18	6.18	6.60	6.52	6.44	6.18	6.58	6.98	7.22	6.78	6.52	6.16	5.98
19	6.18	6.72	6.52	6.44	6.16	6.58	7.12	7.22	6.76	6.52	6.14	5.96
20	6.18	6.74	6.52	6.44	6.14	6.60	7.14	7.20	6.74	6.52	6.14	5.94
21	6.19	6.78	6.52	6.44	6.14	6.62	7.16	7.20	6.72	6.50	6.14	5.92
22	6.18	6.80	6.52	6.44	6.14	6.64	7.14	7.22	6.70	6.50	6.14	5.90
23	6.18	6.80	6.52	6.44	6.14	6.66	7.14	7.26	6.68	6.48	6.14	5.90
24	6.17	6.82	6.52	6.44	6.14	6.68	7.14	7.30	6.66	6.48	6.14	5.88
25	6.17	6.82	6.50	6.44	6.14	6.72	7.12	7.34	6.66	6.46	6.14	5.86
26	6.20	6.84	6.50	6.44	6.14	6.78	7.12	7.36	6.64	6.46	6.14	5.84
27	6.22	6.84	6.50	6.44	6.14	6.80	7.12	7.34	6.64	6.44	6.14	5.84
28	6.24	6.82	6.50	6.44	6.14	6.84	7.10	7.30	6.62	6.42	6.14	5.82
29	6.26	6.80	6.50	6.44	6.14	6.90	7.10	7.26	6.60	6.42	6.14	5.80
30	6.28	6.80	6.50	6.44	---	7.04	7.08	7.24	6.60	6.40	6.14	5.78
31	6.30	---	6.50	6.44	---	7.22	---	7.24	---	6.38	6.14	---
MEAN	6.16	6.61	6.59	6.45	6.25	6.57	7.14	7.16	6.86	6.51	6.19	5.99
MAX	6.30	6.84	6.82	6.50	6.44	7.22	7.24	7.36	7.22	6.60	6.36	6.14
MIN	6.02	6.32	6.50	6.40	6.14	6.16	6.98	6.94	6.60	6.38	6.14	5.78

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121500 MUSKEGON RIVER AT EVART, MI

LOCATION.--Lat 43°53'57", long 85°15'19", in NW1/4 NE1/4 sec.3, T.17 N., R.8 W., Osceola County, Hydrologic Unit 04060102, on right bank 500 ft downstream from bridge on U.S. Highway 10 in Evart, 0.4 mi upstream from Twin Creek, and at mile 123.9.

DRAINAGE AREA.--1,433 mi².

PERIOD OF RECORD.--October 1930 to September 1931, October 1933 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 1437: 1934, 1947(M). WDR MI-96-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 977.72 ft above sea level. Prior to Nov. 7, 1956, nonrecording gages at sites 400 ft and 500 ft upstream at present datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Some regulation at low flow by dams upstream from station. Gage-height telemeter 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	372	508	1570	885	e780	1020	3240	2030	2730	980	471	460
2	382	544	1500	885	e780	1220	3030	2040	2560	962	464	439
3	424	609	1360	1220	e780	1500	2790	1980	2380	935	464	426
4	521	890	1270	1380	e780	1800	2590	1870	2200	1020	446	415
5	528	1510	1230	1250	e780	2620	2400	1810	2040	1130	425	407
6	521	1630	1220	1020	e780	4090	2240	1740	1920	1070	415	406
7	501	1540	1170	828	e780	4270	2140	1670	1820	1030	398	425
8	e490	1350	1170	694	e780	4580	2060	2090	1710	1010	393	419
9	479	1190	1130	664	e780	4150	2000	2900	1620	983	388	406
10	469	1110	1260	627	e760	3680	1930	2930	1560	957	398	397
11	455	1140	1630	649	e760	3360	1850	2920	1500	923	396	382
12	442	1150	1670	788	e760	3200	1760	2850	1440	902	400	379
13	430	1130	1440	848	e760	2860	1680	3030	1410	885	407	379
14	431	1070	1310	852	e760	2770	1610	3490	1420	875	402	373
15	452	1020	1380	698	e760	2640	1540	3810	1450	874	388	376
16	462	982	1380	e690	e760	2430	1490	3780	1410	849	384	374
17	461	976	1420	e700	e760	2270	1470	3550	1350	842	377	362
18	457	1210	e1360	e720	e760	2130	1670	3470	1320	1010	377	363
19	448	1920	1310	e720	e760	2000	1920	3460	1270	1100	375	362
20	441	2060	e1200	e750	e750	2030	2010	3350	1240	930	366	360
21	431	2080	e1080	e750	e760	2290	2000	3100	1210	833	360	353
22	426	1920	e980	e750	e780	2290	2040	3060	1200	810	349	352
23	420	1750	940	e760	e840	2220	2060	3260	1170	751	346	344
24	419	1880	963	e760	875	2170	2030	4370	1200	680	346	342
25	443	1950	944	e760	890	2150	2060	4530	1180	624	347	342
26	447	1960	867	e760	e820	2400	2120	4630	1120	586	379	340
27	437	1880	791	e760	e800	2710	2100	4500	1060	553	553	340
28	449	1770	866	e760	e800	2940	2050	4110	1050	534	568	338
29	495	1690	900	e760	e860	3150	2040	3530	1040	509	585	334
30	517	1630	1010	e760	---	3260	2010	3100	1000	493	537	338
31	518	---	1010	e760	---	3330	---	2860	---	490	495	---
TOTAL	14168	42049	37331	25208	22795	83530	61930	95820	45580	26130	12999	11333
MEAN	457	1402	1204	813	786	2695	2064	3091	1519	843	419	378
MAX	528	2080	1670	1380	890	4580	3240	4630	2730	1130	585	460
MIN	372	508	791	627	750	1020	1470	1670	1000	490	346	334
CFSM	0.32	0.98	0.84	0.57	0.55	1.88	1.44	2.16	1.06	0.59	0.29	0.26
IN.	0.37	1.09	0.97	0.65	0.59	2.17	1.61	2.49	1.18	0.68	0.34	0.29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2004, BY WATER YEAR (WY)

	MEAN	768	997	972	866	905	1586	2187	1383	985	677	545	620
MAX	2402	2656	2270	1700	2353	4115	3869	3091	2945	2901	1243	2269	
(WY)	1987	1992	1992	1973	1938	1976	1971	2004	1945	1957	1969	1975	
MIN	374	433	499	418	327	594	928	548	409	327	316	325	
(WY)	1949	1950	1977	1936	1936	1940	2000	1977	1988	1934	1941	2003	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1931 - 2004

ANNUAL TOTAL	261363						478873						
ANNUAL MEAN	716						1308			(a)1048			
HIGHEST ANNUAL MEAN										1532		1992	
LOWEST ANNUAL MEAN										581		2003	
HIGHEST DAILY MEAN										8770		Mar 31 1989	
LOWEST DAILY MEAN	2080				Nov 21		4630		May 26	252		Aug 28 1941	
ANNUAL SEVEN-DAY MINIMUM	289				Sep 20		334		Sep 29	274		Aug 27 1941	
MAXIMUM PEAK FLOW	298				Sep 9		339		Sep 24	9040		Mar 31 1989	
MAXIMUM PEAK STAGE							4670		May 26	14.99		Mar 31 1989	
INSTANTANEOUS LOW FLOW							11.60		May 26	(c)164		Dec 20 1947	
ANNUAL RUNOFF (CFSM)							333		(b)	0.731			
ANNUAL RUNOFF (INCHES)	0.500						0.913			9.94			
10 PERCENT EXCEEDS	6.78						12.43						
50 PERCENT EXCEEDS	1300						2850			1970			
90 PERCENT EXCEEDS	521						980			805			
90 PERCENT EXCEEDS	354						395			442			

(a) Does not include water years 1931, 1934.

(b) Sept. 26, 28-30.

(c) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121650 MUSKEGON RIVER AT BIG RAPIDS, MI

LOCATION.--Lat 43°41'37", long 85°28'03", in SE1/4 NE1/4 sec.14, T.15 N., R.10 W., Mecosta County, Hydrologic Unit 04060102, on right bank at sewage treatment plant in Big Rapids.

DRAINAGE AREA.--1,751 mi².

PERIOD OF RECORD.--Water years 1999 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: December 1999 to September 2001.

WATER TEMPERATURE: October 1998 to current year.

DISSOLVED OXYGEN: October 1998 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval. Automatic suspended sediment pump sampler from December 22, 1999 to Apr. 14, 2002.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent.

Dissolved oxygen records rated excellent except the following periods: Oct. 4-9, 19, Nov. 22 to Dec. 1, Feb. 19-23, Apr. 27 to May 8, July 16-19, Aug. 18-24, Sept. 11-17, 26-28 rated good; Oct. 10-17, 20, 21, Dec. 2-4, Feb. 24, 25, Feb. 28 to Mar. 2, May 9-11, July 20-27, Aug. 25-30, Sept. 18-22, 29, 30 rated fair; and Oct. 22-27, Mar. 3-11, July 28 to Aug. 5 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 461 microsiemens, Feb. 16, 2000; minimum, 200 microsiemens, May 17, 2001.

WATER TEMPERATURE: Maximum, 29.0°C, Aug. 7, 8, 2001; minimum, -0.5°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum, 16.1 mg/L, Jan. 6, 2003; minimum, 3.7 mg/L, July 5, 6, 2000.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 25.0°C, July 22; minimum, -0.5°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 14.6 mg/L, Dec. 27; minimum, 4.2 mg/L, July 15.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	10.0	7.5	8.5	10.0	9.0	9.5	2.5	1.5	2.0	0.5	-0.5	0.0
2	10.0	6.5	8.0	9.0	8.5	8.5	1.5	0.5	1.0	2.0	0.5	1.0
3	8.5	7.5	7.5	8.5	7.0	8.0	0.5	-0.5	0.0	2.5	2.0	2.5
4	8.5	7.0	7.5	8.0	6.5	7.0	0.5	-0.5	0.0	2.0	0.5	1.0
5	9.0	6.0	7.5	8.0	7.5	8.0	1.0	0.0	0.5	0.5	-0.5	0.0
6	10.0	6.0	8.0	7.5	6.0	7.0	1.0	0.0	0.5	-0.5	-0.5	-0.5
7	11.0	6.5	8.5	6.0	4.0	5.0	0.0	-0.5	0.0	-0.5	-0.5	-0.5
8	13.5	9.0	11.0	4.0	2.5	3.5	1.0	0.0	0.5	-0.5	-0.5	-0.5
9	14.0	10.5	12.0	3.0	1.5	2.0	1.5	1.0	1.5	-0.5	-0.5	-0.5
10	14.5	11.0	12.5	2.5	1.0	2.0	2.5	1.5	2.0	-0.5	-0.5	-0.5
11	15.0	12.0	13.5	4.0	2.5	3.5	2.5	1.0	2.0	-0.5	-0.5	-0.5
12	15.5	13.0	14.0	5.5	4.0	5.0	1.0	-0.5	0.5	-0.5	-0.5	-0.5
13	14.0	11.0	12.5	5.0	3.0	3.5	0.0	-0.5	-0.5	-0.5	-0.5	-0.5
14	13.0	10.5	12.0	4.0	2.5	3.0	0.0	-0.5	0.0	-0.5	-0.5	-0.5
15	11.5	9.0	10.0	3.5	3.0	3.5	0.5	0.0	0.0	-0.5	-0.5	-0.5
16	10.0	7.5	9.0	4.5	3.5	4.0	1.0	0.5	0.5	-0.5	-0.5	-0.5
17	9.5	7.0	8.0	5.5	4.5	5.0	0.5	0.0	0.5	0.0	-0.5	-0.5
18	11.0	8.0	9.0	7.5	5.0	6.5	0.5	0.0	0.5	0.0	-0.5	-0.5
19	10.5	7.5	9.0	7.5	6.5	7.0	0.5	0.0	0.5	0.0	-0.5	0.0
20	12.0	8.0	10.0	6.5	5.5	6.0	0.0	-0.5	0.0	0.0	-0.5	0.0
21	11.0	9.5	10.5	6.5	6.0	6.0	0.5	-0.5	0.0	0.0	-0.5	0.0
22	9.5	8.5	9.0	6.0	5.5	5.5	1.5	0.5	1.0	0.0	-0.5	-0.5
23	8.5	7.0	7.5	7.0	5.5	6.0	2.0	1.0	1.5	0.0	-0.5	0.0
24	8.0	6.0	7.0	7.0	4.0	5.5	1.5	1.0	1.5	0.0	-0.5	0.0
25	9.5	7.5	8.5	4.0	3.0	3.5	1.0	0.5	1.0	0.0	-0.5	-0.5
26	8.5	7.5	8.0	3.5	2.5	3.0	1.0	0.0	0.5	0.0	-0.5	0.0
27	8.0	7.0	7.5	3.0	2.5	2.5	1.0	-0.5	0.0	0.0	-0.5	0.0
28	7.0	6.5	6.5	3.0	2.5	2.5	2.0	0.5	1.0	0.0	-0.5	0.0
29	7.0	6.0	6.5	2.5	2.0	2.5	2.5	2.0	2.0	0.0	-0.5	0.0
30	8.5	6.0	7.5	3.0	1.5	2.5	2.0	1.0	1.5	0.0	-0.5	0.0
31	10.5	8.5	9.5	—	—	—	1.5	0.5	1.0	0.0	-0.5	0.0
MONTH	15.5	6.0	9.2	10.0	1.0	4.9	2.5	-0.5	0.7	2.5	-0.5	-0.1

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121650 MUSKEGON RIVER AT BIG RAPIDS, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	0.0	0.0	0.0	2.0	1.5	1.5	8.0	6.0	7.0	12.5	11.5	12.5
2	0.0	-0.5	0.0	2.0	1.5	2.0	8.5	6.0	7.0	12.5	10.5	11.5
3	0.0	-0.5	0.0	1.5	1.0	1.5	8.0	6.5	7.5	11.5	9.5	10.5
4	0.0	-0.5	-0.5	2.0	1.0	1.5	8.0	6.0	7.0	10.0	8.5	9.5
5	0.0	-0.5	-0.5	1.5	0.5	1.0	7.5	5.0	6.5	12.0	8.5	10.5
6	0.0	-0.5	0.0	0.5	0.0	0.5	7.5	5.5	6.5	12.5	10.0	11.5
7	0.0	-0.5	0.0	0.5	0.0	0.5	9.0	6.0	7.5	14.5	11.0	12.5
8	0.0	-0.5	-0.5	0.5	0.0	0.5	8.0	7.5	8.0	13.0	11.0	12.0
9	0.0	-0.5	0.0	1.0	0.0	0.5	8.5	6.5	7.5	12.0	11.0	11.5
10	0.0	-0.5	0.0	2.0	0.0	1.0	7.5	6.0	7.0	15.0	12.0	13.5
11	0.0	-0.5	0.0	1.5	0.5	1.0	7.0	5.5	6.5	16.5	13.5	15.0
12	0.0	-0.5	0.0	0.5	-0.5	0.0	6.5	5.0	6.0	18.0	15.5	16.5
13	0.0	-0.5	0.0	1.0	-0.5	0.0	9.0	5.5	7.0	18.5	17.5	18.0
14	0.0	-0.5	0.0	1.0	0.5	0.5	10.0	6.0	8.0	18.5	17.0	18.0
15	0.0	-0.5	-0.5	2.0	0.0	1.0	11.5	8.0	10.0	17.0	15.5	16.5
16	0.0	-0.5	-0.5	2.5	0.5	1.5	13.5	10.0	11.5	16.5	14.0	15.5
17	0.0	-0.5	0.0	2.0	0.5	1.5	15.0	12.0	13.5	17.0	14.5	15.5
18	0.0	-0.5	0.0	2.0	1.0	1.5	16.0	13.0	14.5	17.5	16.0	16.5
19	0.5	-0.5	0.0	3.0	1.0	2.0	15.0	14.0	14.5	17.5	15.0	16.5
20	0.0	0.0	0.0	5.0	2.5	3.5	14.0	12.0	13.0	17.5	16.0	17.0
21	0.0	0.0	0.0	3.5	2.5	3.0	13.0	12.0	12.5	17.5	16.0	16.5
22	0.5	0.0	0.0	2.5	1.0	1.5	13.0	11.0	12.0	16.0	15.0	15.5
23	0.0	0.0	0.0	3.5	1.0	2.0	13.5	10.5	12.0	—	—	—
24	0.5	-0.5	0.0	3.5	2.5	3.0	13.0	11.0	12.0	—	—	—
25	0.5	-0.5	0.0	5.0	3.5	4.0	12.0	10.5	11.0	—	—	—
26	0.5	-0.5	0.0	6.5	5.0	6.0	12.0	10.0	11.0	—	—	—
27	0.5	-0.5	0.0	7.5	6.5	7.0	11.0	9.0	10.0	—	—	—
28	1.0	-0.5	0.5	8.0	6.5	7.0	12.0	8.5	10.0	—	—	—
29	2.5	0.5	1.5	8.5	7.0	7.5	14.5	11.0	12.5	—	—	—
30	—	—	—	8.0	7.0	7.5	14.0	12.5	13.0	—	—	—
31	—	—	—	7.5	6.5	7.0	—	—	—	—	—	—
MONTH	2.5	-0.5	0.0	8.5	-0.5	2.5	16.0	5.0	9.7	—	—	—

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	--	--	--	22.5	19.0	21.0	22.5	18.5	20.5	20.0	17.5	19.0
2	16.5	15.0	16.0	22.5	19.0	21.0	22.5	19.5	21.0	22.0	18.0	20.0
3	18.0	14.5	16.0	22.0	19.0	21.0	24.0	19.5	21.5	22.5	18.5	20.5
4	18.5	15.0	17.0	21.5	20.0	21.0	24.0	20.5	22.0	23.5	19.5	21.5
5	18.5	16.0	17.5	21.5	19.0	20.0	22.0	19.0	20.5	22.0	20.0	21.0
6	18.5	16.5	17.5	20.5	18.5	19.5	22.0	17.0	19.5	22.0	19.5	20.5
7	20.5	17.0	19.0	19.5	17.5	18.5	22.0	17.0	19.5	21.5	18.0	19.5
8	23.0	19.0	21.0	17.5	16.5	17.0	21.5	17.5	19.5	20.0	16.5	18.5
9	22.5	20.5	21.5	18.5	15.5	17.0	20.0	18.0	19.0	20.0	16.5	18.0
10	21.5	19.0	20.0	21.5	16.5	19.0	19.0	17.5	18.5	20.0	15.5	18.0
11	19.0	17.5	18.0	22.5	19.0	20.5	17.5	15.5	17.0	20.0	16.5	18.0
12	19.5	16.5	18.0	23.5	20.5	21.5	17.0	14.5	15.5	21.0	16.5	18.5
13	20.5	18.0	19.0	24.0	20.5	22.0	17.5	14.5	16.0	21.5	17.5	19.5
14	20.0	18.0	19.0	22.0	20.5	21.0	19.5	14.5	17.0	22.0	18.5	20.0
15	21.0	18.0	19.5	22.5	19.0	21.0	19.5	15.5	17.5	22.5	19.0	20.5
16	22.0	19.0	20.5	21.5	19.0	20.5	20.0	15.5	17.5	21.5	18.5	20.5
17	21.5	20.0	20.5	23.0	20.0	21.0	18.0	17.0	17.5	19.5	16.0	18.0
18	22.5	19.5	20.5	23.0	19.0	21.0	20.5	16.0	18.0	19.0	15.0	17.0
19	21.0	18.5	20.0	22.5	20.0	21.0	20.5	16.5	18.5	19.0	14.5	16.5
20	20.5	17.5	19.0	23.5	20.0	22.0	19.0	16.0	17.5	18.5	14.5	16.5
21	18.5	17.0	18.0	24.0	21.0	22.5	19.5	14.5	17.0	19.0	14.5	16.5
22	19.5	16.5	18.0	25.0	22.0	23.0	19.5	14.5	17.0	19.0	14.5	16.5
23	19.0	16.5	18.0	23.5	20.0	21.5	21.0	17.5	19.0	19.5	15.0	17.0
24	17.5	15.5	16.5	21.5	18.5	20.0	21.5	17.5	19.5	19.5	16.0	17.5
25	18.0	14.5	16.0	22.0	18.0	20.0	21.0	19.5	20.0	17.5	15.0	16.5
26	18.5	15.5	17.0	22.5	18.0	20.0	20.5	19.0	20.0	17.5	13.0	15.0
27	19.0	16.0	17.5	20.5	18.0	19.5	23.0	19.5	21.0	17.5	13.0	15.5
28	20.0	17.0	18.5	22.0	16.5	19.0	21.0	18.0	19.5	17.0	14.5	15.5
29	21.0	17.0	19.0	22.0	18.5	20.5	19.5	17.5	18.0	15.5	12.5	14.0
30	22.0	18.5	20.0	20.5	19.0	19.5	20.0	16.5	18.0	15.5	11.0	13.0
31	--	--	--	22.0	18.0	20.0	20.5	16.5	18.5	--	--	--
MONTH	--	--	--	25.0	15.5	20.4	24.0	14.5	18.7	23.5	11.0	17.9

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121650 MUSKEGON RIVER AT BIG RAPIDS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	11.8	10.3	11.1	—	—	—	13.0	12.5	12.7	14.2	12.9	13.5
2	11.9	10.8	11.4	—	—	—	13.5	13.0	13.3	14.1	12.2	13.5
3	11.5	10.7	11.0	—	—	—	13.7	12.4	13.1	13.2	12.9	13.0
4	11.9	10.7	11.3	—	—	—	14.0	12.0	13.3	13.6	13.0	13.3
5	12.1	11.1	11.6	10.0	8.7	9.6	14.1	13.3	13.7	13.8	12.9	13.3
6	12.3	11.1	11.6	10.6	10.0	10.3	14.1	13.3	13.6	13.7	12.4	13.0
7	12.0	10.5	11.3	11.5	10.5	10.9	13.4	12.8	13.1	12.6	8.8	10.7
8	11.5	10.0	10.8	12.2	11.4	12.0	13.8	13.0	13.4	11.8	9.8	10.8
9	11.3	9.7	10.4	12.8	12.2	12.6	13.5	13.1	13.3	11.9	11.5	11.6
10	11.2	9.4	10.2	12.7	11.4	12.3	13.1	12.5	12.8	12.0	11.7	11.8
11	10.5	9.1	9.7	12.0	10.8	11.4	13.3	12.4	12.9	12.1	11.7	12.0
12	11.3	7.7	9.9	11.9	10.7	11.3	13.9	12.8	13.3	12.0	11.7	11.9
13	11.4	9.7	10.4	11.5	10.7	11.0	—	—	—	12.2	11.8	12.0
14	10.0	9.6	9.7	11.6	11.0	11.3	13.5	13.0	13.2	12.2	11.6	12.0
15	11.2	9.7	10.4	11.2	10.9	11.0	13.8	13.1	13.4	12.1	11.5	11.8
16	11.7	10.3	11.0	11.2	10.7	10.9	13.6	13.3	13.4	12.2	10.8	11.6
17	11.8	10.4	11.1	11.2	10.5	10.8	14.0	13.1	13.4	11.7	11.2	11.5
18	11.6	10.3	10.8	10.5	9.9	10.2	14.1	13.1	13.4	11.5	10.6	11.2
19	11.5	9.9	10.6	10.7	9.8	10.5	13.8	13.1	13.4	10.9	10.5	10.7
20	11.4	9.5	10.5	11.0	10.6	10.8	—	—	—	10.7	10.4	10.6
21	10.2	9.1	9.6	11.1	10.2	10.8	14.2	12.8	13.3	10.6	10.1	10.3
22	10.4	9.3	9.9	11.2	11.0	11.1	14.0	13.4	13.6	10.8	9.2	10.2
23	10.9	9.5	10.3	11.2	10.8	11.0	13.8	13.3	13.5	10.4	9.1	9.8
24	11.3	9.8	10.7	11.4	10.7	11.0	13.8	13.2	13.5	10.0	8.8	9.5
25	11.3	9.7	10.2	12.1	11.4	11.8	14.1	13.4	13.7	9.4	8.6	9.1
26	10.7	9.8	10.3	12.4	12.0	12.2	14.4	13.0	13.6	9.0	8.8	8.9
27	11.3	9.9	10.6	12.5	12.3	12.4	14.6	13.1	13.6	8.9	7.7	8.7
28	—	—	—	12.5	12.3	12.4	14.0	13.3	13.7	8.8	8.4	8.6
29	—	—	—	12.8	12.1	12.5	13.7	12.9	13.3	8.8	8.2	8.6
30	—	—	—	12.8	12.3	12.6	13.8	13.0	13.3	8.9	8.2	8.5
31	—	—	—	—	—	—	14.1	13.3	13.7	8.7	8.4	8.5
MONTH	—	—	—	—	—	—	—	—	—	14.2	7.7	11.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	8.8	8.5	8.7	13.4	12.8	13.0	11.6	11.1	11.3	10.0	9.2	9.6	
2	8.9	8.6	8.8	13.3	12.8	13.0	11.6	11.1	11.4	10.3	9.6	9.9	
3	9.0	8.7	8.9	13.4	12.9	13.1	11.4	11.1	11.2	10.7	9.8	10.2	
4	—	—	—	13.3	12.8	13.1	11.7	11.1	11.4	10.7	10.0	10.4	
5	—	—	—	12.9	12.4	12.8	12.2	11.5	11.9	10.9	10.1	10.5	
6	9.6	9.2	9.4	12.6	11.9	12.2	12.0	11.7	11.8	10.2	9.6	10	
7	—	—	—	12.3	12.0	12.1	12.0	11.4	11.7	10.5	9.4	9.9	
8	—	—	—	12.5	11.9	12.2	11.4	11.1	11.2	9.8	9.3	9.5	
9	10.5	9.3	9.9	12.8	11.9	12.4	11.7	11.1	11.5	9.4	9.1	9.3	
10	10.7	10.1	10.4	12.7	12.1	12.5	12.2	11.4	11.7	9.1	8.6	8.9	
11	10.9	10.2	10.5	13.2	12.4	12.8	12.2	11.5	11.9	8.8	8.4	8.6	
12	11.2	10.6	10.9	13.2	12.5	12.9	12.5	11.9	12.2	8.6	8.0	8.3	
13	—	—	—	13.6	12.6	13.0	12.3	11.6	12.0	8.1	7.7	7.9	
14	—	—	—	13.4	13.1	13.2	12.0	11.1	11.6	7.7	7.5	7.6	
15	—	—	—	13.5	12.8	13.2	11.6	10.7	11.2	8.1	7.6	7.9	
16	—	—	—	13.9	13.1	13.3	11.2	10.1	10.7	8.6	8.0	8.3	
17	—	—	—	13.4	13.0	13.2	10.7	9.7	10.2	8.4	8.1	8.3	
18	—	—	—	13.4	12.1	13.2	10.5	9.4	9.8	8.3	8.0	8.1	
19	11.9	11.0	11.3	13.6	13.1	13.3	9.9	9.2	9.5	8.4	8.0	8.2	
20	11.6	11.2	11.3	13.1	12.6	12.9	10.2	9.5	9.8	8.1	7.9	8.0	
21	11.8	10.5	11.4	13.0	12.6	12.8	10.0	9.4	9.7	8.3	7.8	8.1	
22	12.6	11.6	12.0	13.5	13.0	13.3	10.6	9.6	10.1	8.4	8.0	8.2	
23	12.4	11.9	12.1	13.5	13.0	13.4	10.7	9.9	10.3	—	—	—	
24	13.2	12.1	12.5	13.0	12.7	12.9	10.8	9.8	10.3	—	—	—	
25	13.5	11.7	12.6	12.8	12.4	12.6	10.3	9.5	10.0	—	—	—	
26	—	—	—	12.4	11.6	12.0	10.6	10.0	10.3	—	—	—	
27	—	—	—	11.8	11.5	11.6	11.0	10.0	10.4	—	—	—	
28	14.0	12.4	13.2	11.5	11.1	11.4	10.9	10.1	10.5	—	—	—	
29	13.6	12.8	13.2	11.3	11.1	11.2	10.5	9.6	10.1	—	—	—	
30	—	—	—	11.2	10.9	11.0	9.6	9.2	9.4	—	—	—	
31	—	—	—	11.3	10.9	11.1	—	—	—	—	—	—	
MONTH	—	—	—	13.9	10.9	12.6	12.5	9.2	10.8	—	—	—	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121650 MUSKEGON RIVER AT BIG RAPIDS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	10.5	6.8	8.6	9.4	7.8	8.5	10.2	8.2	9.0
2	8.6	8.2	8.4	10.3	6.8	8.5	9.6	8.0	8.7	10.2	8.2	9.0
3	8.8	8.3	8.5	9.8	6.7	8.2	9.6	7.9	8.7	10.1	7.9	8.8
4	8.8	8.3	8.5	8.5	6.3	7.4	9.5	7.6	8.5	10.0	7.7	8.7
5	8.7	8.2	8.4	9.6	6.7	8.0	9.6	7.9	8.7	9.9	7.7	8.6
6	8.6	8.1	8.3	8.9	6.6	7.5	9.8	8.1	8.9	9.3	7.5	8.2
7	8.7	7.9	8.3	8.7	6.6	7.7	10.0	8.1	9.0	9.4	7.3	8.3
8	8.5	7.6	8.0	8.0	6.2	7.1	10.0	8.1	9.0	9.5	7.7	8.5
9	8.2	7.4	7.8	8.6	6.6	7.5	9.4	8.1	8.7	9.5	7.8	8.6
10	8.4	7.5	7.9	8.0	5.3	6.9	9.7	8.0	8.8	9.7	8.0	8.7
11	8.8	7.9	8.3	7.7	5.3	6.6	10.2	8.5	9.3	10.0	7.8	8.8
12	9.2	8.1	8.6	7.5	5.5	6.4	10.6	9.0	9.7	9.9	8.0	8.9
13	8.8	8.0	8.3	6.7	5.1	6.2	10.3	9.0	9.6	9.7	7.9	8.6
14	8.8	7.8	8.3	6.3	4.6	5.5	10.5	8.8	9.6	9.5	7.7	8.4
15	9.1	7.8	8.4	7.7	4.2	5.6	10.5	8.7	9.5	9.4	6.9	8.0
16	9.1	7.7	8.3	7.5	4.8	6.5	10.6	8.8	9.6	9.4	6.7	8.1
17	8.4	7.4	7.8	7.5	5.7	6.7	10.0	8.5	9.1	9.4	7.5	8.3
18	9.2	7.5	8.2	9.5	6.5	8.2	10.4	8.4	9.4	9.6	7.8	8.6
19	9.7	7.6	8.5	8.7	7.5	8.2	10.2	8.2	9.1	9.8	7.9	8.8
20	9.8	7.8	8.7	8.2	7.1	7.7	10.3	8.3	9.2	9.4	8.1	8.6
21	9.0	7.7	8.3	8.3	7.1	7.7	10.4	8.5	9.3	9.4	7.9	8.6
22	9.9	7.9	8.8	8.6	6.6	7.7	10.5	8.6	9.4	9.4	7.8	8.5
23	10.0	7.8	8.7	8.9	7.3	8.0	10.0	8.0	8.9	9.3	7.7	8.3
24	9.6	7.6	8.4	9.6	7.6	8.6	10.0	7.2	8.8	9.4	7.6	8.3
25	10.8	8.3	9.4	9.7	8.0	8.8	9.5	7.2	8.4	9.3	7.7	8.4
26	11.0	7.8	9.2	9.9	8.3	9.0	8.9	7.6	8.2	9.0	7.3	8.2
27	11.6	7.7	9.4	9.4	8.0	8.7	8.8	7.2	8.0	8.5	7.2	7.8
28	11.0	7.4	9.0	9.8	8.4	9.1	8.6	7.0	7.8	8.4	7.2	7.7
29	11.5	7.4	9.2	9.4	8.0	8.6	9.4	7.9	8.6	8.7	7.3	7.9
30	11.0	7.1	8.9	9.3	7.9	8.5	10.0	8.2	9.0	10.0	7.3	8.8
31	—	—	—	9.3	8.0	8.5	10.0	8.3	9.0	—	—	—
MONTH	—	—	—	10.5	4.2	7.7	10.6	7.0	8.9	10.2	6.7	8.5

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121660 MUSKEGON RIVER NEAR STANWOOD, MI

LOCATION.—Lat 43°36'47", long 85°28'40", in SE1/4 SW1/4 sec.11, T.14 N., R.10 W., Mecosta County, Hydrologic Unit 04060102, on left bank downstream from Rogers Dam, 2.8 mi northwest of Stanwood.

DRAINAGE AREA.—1,834 mi².

PERIOD OF RECORD.—Water years 1996 to current year.

PERIOD OF DAILY RECORD.—

WATER TEMPERATURE: October 1995 to current year.

DISSOLVED OXYGEN: October 1995 to current year.

INSTRUMENTATION.—Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.—Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent except the following period: Jan. 12 to Mar. 5 rated good. Dissolved oxygen records rated excellent except the following periods: Oct. 7-14, 21, 22, Nov. 22-30, Feb. 1-9, May 7-11, 18-21, June 15-21, 28-30, July 22-24, Aug. 9-11, Sept. 5-7 rated good; Oct. 15-17, 23-25, Dec. 1-4, May 22-26, July 1-6, 25-30, Aug. 12-15, Sept. 8-12 rated fair; and Oct. 26 to Nov. 4, May 27 to June 1, July 7-15, July 31 to Aug. 4, Aug. 16-30, Sept. 13-22 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.—

WATER TEMPERATURE: Maximum, 27.5°C, Aug. 8-10, 2001, July 4, 2002; minimum, -0.5°C, Feb. 25, 26, Mar. 10-12, 1999.

DISSOLVED OXYGEN: Maximum, 14.9 mg/L, Feb. 3, 4, 2002; minimum, 3.9 mg/L, July 5, 2002.

EXTREMES FOR CURRENT YEAR.—

WATER TEMPERATURE: Maximum, 24.0°C, July 22; minimum, 0.0°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 13.8 mg/L, Dec. 4; minimum, 6.3 mg/L, July 14, 15, Aug. 11.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	11.5	11.0	11.5	9.5	8.0	8.5	2.5	2.0	2.5	1.5	1.0	1.0
2	11.0	9.5	10.0	9.5	9.0	9.0	2.0	1.0	1.5	1.0	0.0	0.5
3	9.5	9.0	9.0	9.0	8.5	9.0	1.0	0.5	1.0	2.0	0.5	1.0
4	9.0	8.0	8.5	8.5	7.5	8.0	0.5	0.5	0.5	2.5	1.5	2.0
5	9.0	8.0	8.5	8.0	7.5	7.5	0.5	0.0	0.0	1.5	0.5	1.0
6	8.5	8.0	8.0	8.0	7.0	7.5	0.5	0.0	0.5	0.5	0.0	0.0
7	8.5	8.0	8.0	7.0	5.5	6.5	0.5	0.5	0.5	0.0	0.0	0.0
8	10.0	8.5	9.0	5.5	4.0	5.0	0.5	0.0	0.0	0.0	0.0	0.0
9	11.5	10.0	10.5	4.0	3.0	3.5	0.5	0.0	0.0	0.0	0.0	0.0
10	12.5	11.0	11.5	3.0	2.5	2.5	1.5	0.5	1.0	0.0	0.0	0.0
11	13.0	12.0	12.5	3.0	2.0	2.5	2.0	1.5	2.0	0.0	0.0	0.0
12	13.5	12.5	13.0	4.0	3.0	3.5	2.0	0.5	1.5	0.0	0.0	0.0
13	13.5	13.0	13.5	4.5	4.0	4.5	0.5	0.0	0.5	0.0	0.0	0.0
14	13.5	13.0	13.5	4.0	3.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0
15	13.0	12.0	12.5	3.5	3.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0
16	12.0	10.5	11.5	3.5	3.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0
17	10.5	9.5	10.0	4.5	3.5	4.0	0.0	0.0	0.0	0.0	0.0	0.0
18	10.0	9.0	9.5	6.0	4.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0
19	10.0	9.5	9.5	7.5	5.5	7.0	0.0	0.0	0.0	0.0	0.0	0.0
20	10.0	9.5	9.5	7.5	6.5	7.0	0.0	0.0	0.0	0.0	0.0	0.0
21	10.0	10.0	10.0	6.5	6.5	6.5	0.0	0.0	0.0	0.0	0.0	0.0
22	10.0	10.0	10.0	6.5	5.5	6.0	0.0	0.0	0.0	0.0	0.0	0.0
23	10.0	9.0	9.5	6.0	5.5	5.5	1.0	0.0	0.5	0.0	0.0	0.0
24	9.0	8.0	8.5	6.5	5.5	6.0	1.0	1.0	1.0	0.0	0.0	0.0
25	8.5	8.0	8.0	5.5	3.5	4.5	1.0	1.0	1.0	0.0	0.0	0.0
26	8.5	8.0	8.5	3.5	3.0	3.0	1.0	1.0	1.0	0.0	0.0	0.0
27	8.5	8.0	8.5	3.0	3.0	3.0	1.0	0.5	0.5	0.0	0.0	0.0
28	8.5	8.0	8.0	3.0	2.5	3.0	0.5	0.0	0.0	0.0	0.0	0.0
29	8.0	7.0	7.5	2.5	2.5	2.5	1.5	0.5	1.0	0.0	0.0	0.0
30	7.5	7.0	7.0	2.5	2.0	2.5	2.0	1.5	1.5	0.0	0.0	0.0
31	8.0	7.5	7.5	—	—	—	1.5	1.5	1.5	0.0	0.0	0.0
MONTH	13.5	7.0	9.8	9.5	2.0	5.1	2.5	0.0	0.6	2.5	0.0	0.2

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121660 MUSKEGON RIVER NEAR STANWOOD, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	0.0	0.0	0.0	1.0	0.0	0.5	7.5	6.5	7.0	13.5	12.5	13.0	
2	0.0	0.0	0.0	1.0	1.0	1.0	8.0	7.0	7.0	12.5	11.5	12.0	
3	0.0	0.0	0.0	1.5	1.0	1.5	8.0	7.5	8.0	11.5	10.5	11.0	
4	0.0	0.0	0.0	1.5	1.0	1.5	7.5	6.5	7.0	11.0	10.0	10.5	
5	0.0	0.0	0.0	1.5	1.0	1.0	7.0	6.0	6.5	10.5	10.0	10.0	
6	0.0	0.0	0.0	—	—	—	7.0	6.5	7.0	11.5	10.5	11.0	
7	0.0	0.0	0.0	—	—	—	7.5	7.0	7.0	12.5	11.5	12.0	
8	0.0	0.0	0.0	—	—	—	8.0	7.5	8.0	13.0	12.5	12.5	
9	0.0	0.0	0.0	—	—	—	8.0	7.5	7.5	12.5	12.0	12.0	
10	0.0	0.0	0.0	—	—	—	8.0	7.0	7.5	14.5	12.0	13.0	
11	0.0	0.0	0.0	—	—	—	7.5	6.5	7.0	15.5	14.5	15.0	
12	0.0	0.0	0.0	1.5	0.0	0.5	6.5	6.0	6.5	17.5	15.5	16.5	
13	0.0	0.0	0.0	0.0	0.0	0.0	7.0	6.0	6.0	18.5	17.5	18.0	
14	0.0	0.0	0.0	1.0	0.0	0.5	8.5	6.5	7.5	18.5	18.0	18.5	
15	0.0	0.0	0.0	1.0	0.5	1.0	10.0	8.0	9.0	18.0	16.0	16.5	
16	0.0	0.0	0.0	1.5	1.0	1.5	12.0	10.0	11.0	16.5	15.5	16.0	
17	0.0	0.0	0.0	1.5	1.5	1.5	13.5	12.0	13.0	16.5	15.5	16.0	
18	0.0	0.0	0.0	1.5	1.5	1.5	15.0	13.5	14.0	17.0	16.5	16.5	
19	0.0	0.0	0.0	2.0	1.5	1.5	15.0	14.5	15.0	17.0	16.5	17.0	
20	0.0	0.0	0.0	3.0	2.0	2.5	14.5	13.0	14.0	17.5	17.0	17.0	
21	0.0	0.0	0.0	3.5	3.0	3.5	13.0	12.5	13.0	17.5	16.5	17.0	
22	0.0	0.0	0.0	3.0	2.0	2.5	12.5	12.0	12.5	16.5	15.5	16.0	
23	0.0	0.0	0.0	2.5	2.0	2.0	12.5	12.0	12.0	16.0	14.5	15.5	
24	0.0	0.0	0.0	3.0	2.5	3.0	12.5	12.0	12.5	14.5	13.5	14.0	
25	0.0	0.0	0.0	4.5	3.0	3.5	12.0	11.5	12.0	13.5	13.0	13.0	
26	0.0	0.0	0.0	6.0	4.5	5.5	11.5	11.0	11.0	14.5	13.5	13.5	
27	0.0	0.0	0.0	7.0	6.0	6.5	11.0	10.0	10.5	14.5	13.5	14.0	
28	0.0	0.0	0.0	7.5	7.0	7.5	10.5	10.0	10.0	15.0	14.0	14.5	
29	0.0	0.0	0.0	8.0	7.5	8.0	13.0	10.5	11.5	15.0	14.0	14.5	
30	—	—	—	8.0	7.5	8.0	14.0	13.0	13.5	14.5	14.0	14.0	
31	—	—	—	8.0	7.0	7.5	—	—	—	15.0	14.5	14.5	
MONTH	0.0	0.0	0.0	—	—	—	15.0	6.0	9.8	18.5	10.0	14.3	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	16.0	15.0	15.5	21.5	20.5	21.0	21.5	20.5	20.5	19.0	19.0	19.0
2	16.0	16.0	16.0	22.0	21.0	21.5	22.0	21.0	21.0	20.0	19.0	19.5
3	16.5	16.0	16.0	22.0	21.5	21.5	22.5	21.5	22.0	20.5	20.0	20.0
4	17.5	16.5	17.0	22.0	21.0	21.5	23.0	22.0	22.5	21.0	20.0	20.5
5	18.0	17.0	17.5	21.5	21.0	21.5	22.5	21.5	22.0	21.5	21.0	21.5
6	18.5	18.0	18.0	21.0	20.0	20.5	22.0	20.5	21.5	21.5	21.5	21.5
7	20.0	18.0	18.5	21.0	20.0	20.5	21.5	20.0	20.5	21.5	21.0	21.5
8	22.0	19.5	20.5	20.0	18.0	19.0	21.0	20.0	20.5	21.5	20.0	21.0
9	22.5	22.0	22.0	18.0	17.0	17.5	21.0	20.0	20.5	20.5	19.5	20.0
10	22.5	20.5	21.5	19.0	17.5	18.0	20.5	20.0	20.0	19.5	18.5	19.0
11	20.5	18.5	19.5	20.5	19.0	19.5	20.0	18.5	19.5	19.0	18.5	19.0
12	18.5	18.0	18.0	21.5	20.5	21.0	18.5	18.0	18.5	19.5	18.5	19.0
13	19.5	18.5	18.5	23.0	21.5	22.0	18.0	17.0	17.5	20.0	19.5	19.5
14	20.0	19.5	19.5	23.0	22.0	22.5	18.0	17.0	17.5	20.5	19.5	20.0
15	20.5	19.5	20.0	22.0	21.0	21.5	18.0	17.0	17.5	21.0	20.0	20.5
16	21.5	20.0	20.5	22.0	21.0	21.5	18.5	17.5	18.0	21.5	21.0	21.0
17	21.5	21.0	21.5	21.5	21.0	21.0	18.5	18.0	18.0	21.0	20.0	20.5
18	21.5	20.5	21.0	22.0	21.0	21.5	18.5	18.0	18.0	20.0	19.0	19.5
19	21.5	20.5	21.0	22.5	21.5	22.0	19.0	18.5	18.5	19.0	18.5	18.5
20	20.5	19.5	20.0	22.5	21.5	22.0	19.0	18.5	19.0	18.5	18.0	18.0
21	20.0	19.0	19.5	23.0	22.0	22.5	19.0	18.0	18.5	18.0	17.5	18.0
22	19.0	18.0	18.5	24.0	23.0	23.5	18.0	17.5	18.0	18.0	17.5	17.5
23	18.5	18.0	18.5	23.5	22.5	23.0	19.5	18.0	19.0	18.0	17.5	17.5
24	18.5	17.0	18.0	22.5	21.5	22.0	19.5	19.0	19.0	18.5	17.5	18.0
25	17.0	15.5	16.5	21.5	21.0	21.5	20.5	19.5	20.0	18.5	18.0	18.0
26	17.5	16.5	17.0	21.5	21.0	21.0	20.5	20.0	20.5	18.0	17.0	17.5
27	18.0	17.0	17.5	21.0	20.0	21.0	21.5	20.5	20.5	17.0	16.0	16.5
28	19.0	18.0	18.5	20.0	19.0	20.0	21.5	20.5	21.5	17.5	16.5	17.0
29	19.5	18.5	19.0	21.0	19.5	20.0	20.5	19.0	20.0	17.0	15.5	16.0
30	21.0	19.5	20.0	21.0	20.5	20.5	19.5	18.0	19.0	15.5	14.5	15.0
31	—	—	—	20.5	20.5	20.5	19.5	18.5	19.0	—	—	—
MONTH	22.5	15.0	18.8	24.0	17.0	21.0	23.0	17.0	19.6	21.5	14.5	19.0

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121660 MUSKEGON RIVER NEAR STANWOOD, MI—Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
1	11.7	11.3	11.5	10.7	9.8	10.3	12.8	12.1	12.4	12.7	11.9	12.4			
2	12.1	11.5	11.8	10.3	9.4	10.0	13.0	12.4	12.8	13.2	11.9	12.4			
3	12.1	11.8	12.0	10.4	10.1	10.3	13.3	12.9	13.1	13.2	12.6	13.0			
4	12.0	11.6	11.8	10.5	10.0	10.3	13.8	13.0	13.4	12.6	12.2	12.4			
5	11.8	11.5	11.6	10.6	10.1	10.4	13.7	13.6	13.7	12.6	12.1	12.4			
6	11.9	11.7	11.7	10.3	10.1	10.1	13.6	13.2	13.5	13.0	12.1	12.7			
7	12.3	11.9	12.0	10.8	10.2	10.5	13.5	13.1	13.3	12.9	12.6	12.8			
8	12.1	11.9	12.0	11.3	10.8	11.0	13.6	13.2	13.4	12.9	12.6	12.8			
9	11.9	11.6	11.7	12.0	11.3	11.6	13.5	13.3	13.5	13.1	12.4	12.6			
10	11.7	11.1	11.4	12.4	11.8	12.1	13.4	12.8	13.1	12.5	12.1	12.3			
11	11.3	10.7	11.0	12.6	12.2	12.4	12.9	12.1	12.4	12.6	11.8	12.2			
12	10.8	10.4	10.6	12.5	12.0	12.2	12.9	12.3	12.6	12.8	11.9	12.5			
13	10.4	9.8	10.2	12.0	11.4	11.7	13.4	12.4	13.0	12.4	12.1	12.2			
14	10.0	9.6	9.8	12.1	11.3	11.8	13.1	12.6	12.9	12.1	12.0	12.0			
15	9.6	8.8	9.2	12.2	11.7	12.0	13.1	12.8	13.0	12.1	11.5	11.9			
16	9.3	8.7	9.0	12.0	11.7	11.9	13.2	12.5	12.8	11.9	11.4	11.7			
17	9.7	9.1	9.4	12.1	11.8	12.0	12.9	12.6	12.7	11.7	11.2	11.5			
18	9.7	8.7	9.1	12.1	11.5	11.8	13.0	12.5	12.8	11.4	11.3	11.3			
19	9.2	8.7	9.1	11.7	10.4	10.8	13.1	12.8	13.0	11.3	11.1	11.2			
20	10.3	8.7	9.7	10.5	10.3	10.4	13.2	12.2	12.7	11.1	10.8	11.0			
21	10.4	10.3	10.3	10.8	10.4	10.6	13.3	12.5	12.9	10.8	10.7	10.7			
22	10.4	10.1	10.3	11.0	10.5	10.8	13.5	12.5	13.0	10.7	10.5	10.6			
23	10.1	9.0	9.9	11.1	10.8	11.0	13.3	12.0	12.5	10.5	10.2	10.3			
24	9.7	8.9	9.4	11.0	10.6	10.9	12.4	11.7	12.0	10.3	9.9	10.1			
25	10.3	9.1	9.7	11.6	10.9	11.2	12.2	11.6	11.9	9.9	9.6	9.8			
26	10.3	9.8	10.0	12.1	11.6	11.8	12.4	11.6	12.0	9.6	9.2	9.4			
27	10.8	9.7	10.0	12.3	12.0	12.2	12.8	11.9	12.4	9.2	9.0	9.1			
28	10.7	9.7	10.0	12.4	12.2	12.3	12.8	12.2	12.6	9.0	8.8	8.9			
29	10.5	9.8	10.2	12.6	12.3	12.4	12.7	12.0	12.3	8.8	8.6	8.7			
30	10.9	10.1	10.4	12.6	12.0	12.4	12.6	11.6	12.0	8.7	8.6	8.6			
31	10.9	10.1	10.5	—	—	—	12.6	12.3	12.4	8.7	8.5	8.6			
MONTH	12.3	8.7	10.5	12.6	9.4	11.3	13.8	11.6	12.8	13.2	8.5	11.2			

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	8.7	8.4	8.5	12.0	11.7	11.9	11.6	11.3	11.4	9.8	9.4	9.6	
2	8.7	8.5	8.6	11.7	11.6	11.6	11.6	11.4	11.5	10.2	9.6	10.0	
3	8.7	8.6	8.7	11.7	11.6	11.6	11.6	11.2	11.4	10.7	10.2	10.4	
4	8.9	8.7	8.8	11.8	11.7	11.8	11.6	11.4	11.4	11.0	10.6	10.7	
5	9.1	8.9	8.9	11.8	11.4	11.7	12.8	11.6	12.1	11.0	10.6	10.8	
6	9.2	9.0	9.2	—	—	—	12.9	12.5	12.8	11.1	10.2	10.8	
7	9.2	9.1	9.2	—	—	—	12.7	12.5	12.6	10.5	9.9	10.2	
8	9.3	9.2	9.2	—	—	—	12.6	11.9	12.4	10.2	9.2	9.8	
9	9.6	9.3	9.4	—	—	—	12.2	11.9	12.0	10.0	9.3	9.6	
10	9.6	9.5	9.5	—	—	—	12.3	12.0	12.2	9.6	9.0	9.1	
11	9.7	9.5	9.6	—	—	—	12.6	12.2	12.4	9.1	8.4	8.7	
12	9.9	9.7	9.7	13.3	12.8	13.0	12.9	12.4	12.7	8.7	8.2	8.4	
13	10.1	9.9	9.9	12.9	12.4	12.7	13.2	12.7	13.0	8.4	7.8	8.0	
14	10.4	10.1	10.2	12.5	12.3	12.4	12.9	12.3	12.7	7.8	7.5	7.6	
15	10.5	10.3	10.4	12.4	12.2	12.3	12.5	11.9	12.3	8.0	7.5	7.7	
16	10.7	10.5	10.6	12.4	12.2	12.3	12.0	11.3	11.6	8.4	7.9	8.1	
17	10.8	10.6	10.7	12.3	12.2	12.3	11.5	10.5	11.2	8.5	8.1	8.3	
18	10.9	10.6	10.7	12.4	12.2	12.3	10.9	10.3	10.6	8.4	8.1	8.2	
19	10.8	10.6	10.7	12.6	12.3	12.5	10.4	9.8	10.1	8.4	8.0	8.2	
20	10.7	10.5	10.6	12.8	12.6	12.7	10.0	9.7	9.8	8.4	8.0	8.2	
21	10.7	10.5	10.6	12.8	12.6	12.7	10.1	9.8	10.0	8.2	7.8	8.0	
22	11.0	10.6	10.7	13.1	12.8	12.9	10.2	9.9	10.0	8.2	8.0	8.1	
23	11.2	10.9	11.1	13.3	13.1	13.1	10.6	10.2	10.4	8.5	8.1	8.3	
24	11.5	11.2	11.3	13.3	12.9	13.1	10.7	10.4	10.6	8.5	8.2	8.4	
25	11.7	11.4	11.5	12.9	12.7	12.8	10.7	10.3	10.5	8.6	8.2	8.4	
26	11.8	11.6	11.7	12.8	12.3	12.6	10.7	10.2	10.4	8.6	8.2	8.4	
27	12.0	11.8	11.9	12.3	11.9	12.0	10.8	10.5	10.7	8.5	8.2	8.3	
28	12.1	12.0	12.0	11.9	11.7	11.8	10.9	10.7	10.8	8.5	8.1	8.3	
29	12.1	12.0	12.0	11.7	11.3	11.5	11.0	10.7	10.8	8.6	8.2	8.4	
30	—	—	—	11.5	11.2	11.3	10.7	9.8	10.3	8.6	8.4	8.5	
31	—	—	—	11.4	11.1	11.2	—	—	—	8.5	8.0	8.3	
MONTH	12.1	8.4	10.2	—	—	—	13.2	9.7	11.4	11.1	7.5	8.8	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121660 MUSKEGON RIVER NEAR STANWOOD, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.6	8.1	8.4	9.3	8.6	9.1	8.5	7.3	7.8	8.9	8.2	8.6
2	8.6	8.3	8.4	9.3	8.2	8.8	8.6	7.6	8.1	9.6	8.2	8.8
3	8.8	8.3	8.5	9.0	8.2	8.6	8.3	7.5	7.8	9.9	8.7	9.3
4	8.9	8.5	8.7	8.7	7.5	8.1	8.8	7.6	8.2	9.2	8.5	8.9
5	8.8	8.3	8.6	8.2	7.2	7.8	8.7	7.1	8.2	9.0	8.2	8.6
6	8.7	8.2	8.4	8.4	7.2	8.0	7.9	6.6	7.2	8.2	7.5	7.9
7	8.8	8.3	8.4	8.5	7.3	7.9	7.9	7.2	7.6	8.4	7.3	7.9
8	8.7	8.2	8.5	8.0	7.3	7.7	8.3	7.3	7.9	8.8	7.1	7.9
9	8.7	7.7	8.1	8.4	7.4	7.9	8.4	7.2	7.7	8.8	7.8	8.3
10	7.9	7.3	7.5	8.9	7.8	8.4	7.6	6.5	7.1	8.8	7.7	8.4
11	8.0	7.3	7.6	9.2	8.6	8.9	7.5	6.3	6.9	9.1	8.1	8.6
12	8.5	7.9	8.1	8.9	7.9	8.4	8.0	6.6	7.4	9.2	8.1	8.8
13	8.5	8.0	8.3	8.3	7.1	7.8	8.6	7.4	8.0	9.2	8.7	8.9
14	8.5	7.7	8.1	8.2	6.3	7.2	8.9	8.3	8.6	9.3	8.3	8.8
15	9.1	7.7	8.2	7.5	6.3	6.9	9.6	8.6	9.1	9.3	8.5	8.9
16	9.1	7.7	8.5	7.8	6.6	7.4	10.0	9.1	9.5	9.0	8.5	8.7
17	8.4	7.5	8.0	7.5	7.0	7.3	10.0	8.9	9.2	9.0	7.6	8.4
18	7.9	6.9	7.5	7.7	7.0	7.5	9.1	8.0	8.6	8.1	6.6	7.6
19	8.1	7.5	7.8	8.2	6.9	7.6	9.4	8.7	9.0	8.6	7.8	8.1
20	8.7	7.4	8.1	8.2	7.0	7.6	9.3	8.4	9.0	8.7	8.0	8.3
21	8.7	7.7	8.3	8.1	6.7	7.6	9.2	7.3	8.6	9.0	7.8	8.3
22	8.9	8.0	8.4	7.9	7.2	7.5	9.4	8.2	8.9	9.0	8.0	8.4
23	8.9	8.1	8.7	7.9	6.7	7.5	10.3	9.3	9.7	9.2	8.2	8.9
24	8.9	8.1	8.5	8.2	7.0	7.6	9.9	9.4	9.7	9.3	8.3	9.0
25	9.3	8.2	8.7	8.2	7.5	7.8	9.7	8.8	9.2	9.1	8.1	8.7
26	9.6	9.0	9.3	8.6	7.6	8.2	9.2	7.9	8.5	8.5	6.4	7.7
27	9.8	9.1	9.3	8.6	7.1	8.1	8.9	7.6	8.1	8.7	7.7	8.1
28	9.9	9.1	9.6	8.2	6.9	7.3	9.2	8.0	8.6	9.7	8.5	9.1
29	9.5	8.9	9.1	9.1	8.2	8.7	8.0	7.2	7.6	9.4	7.5	8.6
30	9.7	9.0	9.3	9.1	7.4	8.4	8.4	6.9	7.7	9.1	7.5	8.3
31	—	—	—	8.0	7.1	7.5	8.9	7.8	8.3	—	—	—
MONTH	9.9	6.9	8.4	9.3	6.3	7.9	10.3	6.3	8.3	9.9	6.4	8.5

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121680 MUSKEGON RIVER NEAR OXBOW, MI

LOCATION.--Lat 43°29'09", long 85°37'50", in SW1/4 SE1/4 sec.28, T.13 N., R.11 W., Newaygo County, Hydrologic Unit 04060102, on right bank downstream from Hardy Dam, 0.6 mi northwest of Oxbow.

DRAINAGE AREA.--1,931 mi².

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1995 to current year.

DISSOLVED OXYGEN: October 1995 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruption in the water-quality record was due to malfunction of the instrument. Water temperature records rated excellent except the following period: July 13 to Sept. 30 rated good. Dissolved oxygen records rated excellent except the following periods: Oct. 24-27, Nov. 10-13, Dec. 27 to Jan. 8, Feb. 1-9, Mar. 26 to Apr. 2, May 13, 14, July 22-26, Aug. 11-14, Sept. 7-10 rated good; Oct. 28 to Nov. 2, Nov. 14-18, Jan. 9-12, Apr. 3-5, May 15-20, July 27 to Aug. 2, Aug. 15-20, Sept. 11-16 rated fair; and Nov. 3, 4, Nov. 19 to Dec. 4, May 21 to June 1, Aug. 3, 4, 21-30, Sept. 17-22 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 22.0°C, on several days during summer periods, 1996, 1999; minimum, 0.5°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum, 15.1 mg/L, Apr. 21, 2003; minimum, 0.4 mg/L, Sept. 8-10, 2002.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 21.0°C, Aug. 4, 5; minimum, 0.5°C, on several days during winter period.

DISSOLVED OXYGEN: Maximum, 13.0 mg/L, Mar. 31; minimum, 0.5 mg/L, Sept. 6, 8, 29, 30.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	18.5	17.5	18.0	12.5	12.0	12.0	6.5	6.0	6.5	2.5	2.0	2.5
2	18.0	17.5	17.5	12.0	11.5	12.0	6.0	6.0	6.0	2.5	2.0	2.0
3	17.5	17.0	17.0	12.0	11.5	12.0	6.0	6.0	6.0	2.5	2.0	2.0
4	17.0	16.5	17.0	11.5	11.5	11.5	6.0	5.5	5.5	2.0	1.5	2.0
5	17.0	16.5	17.0	11.5	11.5	11.5	6.0	5.5	5.5	1.5	1.5	1.5
6	16.5	16.0	16.5	11.5	11.5	11.5	5.5	5.0	5.5	1.5	1.5	1.5
7	16.0	15.5	16.0	11.5	11.0	11.0	5.0	5.0	5.0	2.0	1.5	1.5
8	15.5	15.0	15.5	11.0	10.5	11.0	5.0	5.0	5.0	2.0	1.0	1.5
9	15.5	14.5	15.0	10.5	10.5	10.5	5.0	5.0	5.0	2.0	1.5	1.5
10	15.0	13.5	14.5	10.5	10.0	10.5	5.0	4.5	4.5	2.0	1.5	1.5
11	15.0	13.5	14.5	10.5	10.0	10.0	4.5	4.0	4.5	2.0	1.5	1.5
12	14.5	13.0	14.0	10.0	9.5	10.0	4.0	4.0	4.0	2.0	1.5	1.5
13	14.0	12.5	13.5	9.5	9.0	9.0	4.0	4.0	4.0	2.0	1.5	1.5
14	14.0	12.5	13.5	9.0	9.0	9.0	4.0	3.5	4.0	2.0	1.5	1.5
15	14.0	12.5	13.5	9.0	9.0	9.0	4.0	3.5	3.5	2.0	1.5	1.5
16	14.0	12.0	13.0	9.0	9.0	9.0	4.0	3.5	4.0	2.0	1.5	1.5
17	13.5	12.0	13.0	9.0	8.5	8.5	3.5	3.0	3.5	2.0	1.5	1.5
18	13.5	12.0	13.0	9.0	8.5	8.5	3.5	3.0	3.0	2.0	1.5	1.5
19	13.5	12.0	13.0	8.5	8.0	8.5	3.5	2.5	3.0	2.0	1.5	1.5
20	13.5	12.0	13.0	8.0	7.5	7.5	3.0	2.5	3.0	2.5	1.5	1.5
21	13.5	12.0	13.0	8.0	7.0	8.0	3.5	3.0	3.0	2.0	1.5	1.5
22	13.5	12.0	13.0	8.0	7.5	8.0	3.5	2.5	3.0	1.5	1.5	1.5
23	13.5	12.0	12.5	7.5	7.5	7.5	3.0	2.5	2.5	2.0	1.5	1.5
24	13.0	12.0	12.5	7.5	7.0	7.5	3.0	2.5	2.5	2.0	1.5	1.5
25	13.0	12.0	12.5	7.5	7.0	7.5	3.0	2.0	2.5	2.0	1.5	1.5
26	13.0	12.0	12.5	7.0	7.0	7.0	3.0	2.0	2.5	2.0	1.0	1.5
27	13.0	12.0	12.5	7.0	7.0	7.0	2.5	2.0	2.5	2.5	1.5	1.5
28	12.5	12.0	12.5	7.0	7.0	7.0	3.0	2.0	2.5	2.0	1.5	1.5
29	12.5	12.0	12.5	7.0	6.5	6.5	3.0	2.5	2.5	2.0	1.5	1.5
30	12.5	12.0	12.5	6.5	6.5	6.5	3.0	2.5	2.5	2.0	1.5	1.5
31	12.5	12.0	12.0	—	—	—	2.5	2.0	2.5	2.5	1.5	1.5
MONTH	18.5	12.0	14.1	12.5	6.5	9.2	6.5	2.0	3.9	2.5	1.0	1.6

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121680 MUSKEGON RIVER NEAR OXBOW, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	2.5	1.5	1.5	2.5	1.0	1.5	3.0	2.5	2.5	10.5	9.0	10.5
2	2.5	1.0	1.5	2.5	1.0	1.5	3.5	3.0	3.0	11.0	9.0	10.5
3	2.5	1.0	1.5	2.0	1.0	1.0	5.0	3.5	4.0	11.0	9.0	10.5
4	2.5	1.0	1.5	1.5	1.0	1.0	5.0	4.5	4.5	10.5	9.5	10.5
5	2.5	1.0	1.5	1.0	1.0	1.0	4.5	4.5	4.5	11.0	10.0	10.5
6	2.5	1.0	1.5	1.0	0.5	0.5	4.5	4.5	4.5	11.5	9.5	10.5
7	2.5	1.0	1.5	0.5	0.5	0.5	5.5	4.5	5.0	11.5	10.0	11.5
8	2.5	1.0	1.5	0.5	0.5	0.5	6.5	5.0	6.0	12.0	10.0	11.0
9	2.5	1.0	1.5	0.5	0.5	0.5	6.0	5.5	6.0	12.0	12.0	12.0
10	2.5	1.0	1.5	1.0	0.5	0.5	6.5	5.0	6.0	12.0	11.5	12.0
11	2.5	1.0	1.5	1.0	0.5	1.0	6.5	5.5	6.0	12.5	11.5	12.0
12	3.0	1.0	1.5	1.0	0.5	0.5	6.5	5.5	6.0	12.5	11.5	12.0
13	2.5	1.0	1.5	1.0	0.5	0.5	7.0	5.5	6.5	13.0	12.0	12.5
14	2.5	1.0	1.5	0.5	0.5	0.5	6.5	5.5	6.5	13.5	13.0	13.0
15	2.5	1.0	1.5	1.0	0.5	0.5	7.0	5.5	6.5	13.5	13.5	13.5
16	2.5	1.0	1.5	1.0	0.5	1.0	6.5	5.5	6.0	13.5	13.5	13.5
17	2.5	1.0	1.5	1.0	1.0	1.0	7.5	5.5	7.0	13.5	13.0	13.5
18	2.5	1.0	1.5	1.0	1.0	1.0	8.0	6.0	7.0	14.5	13.5	14.0
19	2.5	1.0	1.5	1.0	1.0	1.0	8.0	6.0	7.0	15.0	14.5	14.5
20	3.0	1.0	1.5	1.0	1.0	1.0	8.0	7.0	8.0	15.0	14.5	14.5
21	2.5	1.0	1.5	1.0	1.0	1.0	8.0	7.0	8.0	15.0	15.0	15.0
22	2.5	1.0	1.5	1.0	1.0	1.0	9.0	7.5	8.5	15.0	15.0	15.0
23	2.5	1.0	1.5	1.5	1.0	1.0	9.5	7.5	9.0	15.5	15.0	15.0
24	2.5	1.0	1.5	1.5	1.0	1.5	10.0	8.0	9.5	15.5	15.0	15.5
25	2.5	1.0	1.5	1.5	1.5	1.5	10.0	8.0	9.5	15.5	15.0	15.5
26	2.0	1.0	1.5	1.5	1.5	1.5	9.5	8.5	9.0	15.5	15.0	15.5
27	2.5	1.0	1.5	1.5	1.5	1.5	10.0	8.0	9.5	15.5	15.0	15.0
28	2.5	1.0	1.5	2.0	1.5	2.0	9.5	8.5	9.0	16.0	15.5	15.5
29	2.0	1.0	1.5	2.5	2.0	2.0	10.0	8.5	9.5	16.0	15.5	15.5
30	—	—	—	2.5	2.5	2.5	10.5	9.0	10.0	16.0	15.5	15.5
31	—	—	—	2.5	2.5	2.5	—	—	—	16.0	15.0	15.5
MONTH	3.0	1.0	1.5	2.5	0.5	1.1	10.5	2.5	6.8	16.0	9.0	13.3

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	15.5	15.0	15.0	18.0	15.0	17.0	20.0	16.5	19.0	20.0	17.5	19.5
2	16.0	15.0	15.5	19.0	15.0	17.5	20.0	16.5	19.0	20.0	18.0	19.5
3	16.0	15.5	16.0	19.0	15.0	17.5	20.5	16.5	19.5	20.5	18.0	19.5
4	16.0	15.5	16.0	19.0	15.0	17.5	21.0	16.5	19.5	20.5	18.0	19.5
5	16.0	15.5	15.5	19.0	15.0	17.5	21.0	17.0	19.5	20.5	18.0	19.5
6	16.0	15.5	15.5	19.0	15.0	17.5	20.5	16.5	19.0	20.0	18.0	19.0
7	16.0	15.5	15.5	19.0	15.5	17.5	20.5	16.5	19.0	20.5	18.0	19.5
8	16.0	15.5	15.5	18.5	15.5	17.5	20.5	17.0	19.0	20.5	17.5	19.5
9	17.5	15.0	16.5	19.0	15.0	18.0	20.0	17.0	19.0	20.5	18.0	19.5
10	18.0	17.0	17.5	19.5	15.0	18.0	20.0	16.5	18.5	20.5	18.5	19.5
11	17.5	17.0	17.5	19.5	15.5	18.0	19.5	17.0	18.5	20.0	18.0	19.5
12	17.5	17.0	17.5	19.5	15.5	18.0	20.0	17.0	19.0	20.0	18.0	19.5
13	17.0	15.5	17.0	19.0	15.5	18.0	20.0	17.0	19.0	20.5	18.0	19.5
14	17.0	15.0	16.5	19.5	15.5	18.0	20.0	17.0	19.0	20.0	18.0	19.5
15	18.0	14.5	17.0	19.5	15.5	18.0	20.0	17.0	19.0	20.0	18.5	19.5
16	18.0	14.5	17.0	19.5	15.5	18.0	19.5	19.0	19.0	20.0	18.0	19.5
17	18.0	15.5	17.5	20.0	15.5	18.5	19.0	19.0	19.0	20.5	18.0	19.5
18	18.0	15.5	17.5	20.0	16.0	18.5	19.5	19.0	19.0	20.5	18.0	19.5
19	18.5	15.0	17.5	20.0	16.0	18.5	19.5	18.0	19.0	20.5	18.5	19.5
20	18.0	15.0	17.0	20.0	16.0	18.5	19.5	17.5	18.5	20.0	18.0	19.5
21	17.5	15.5	17.0	20.0	16.0	18.5	20.0	17.5	19.0	20.0	18.5	19.5
22	18.0	15.0	17.0	20.0	16.0	19.0	19.5	17.5	18.5	20.0	18.0	19.5
23	18.0	15.0	17.0	20.5	16.0	19.0	19.5	17.0	18.5	20.0	18.0	19.5
24	18.0	14.5	17.0	20.5	16.0	19.0	20.0	17.0	19.0	20.0	18.0	19.5
25	17.5	15.0	17.0	20.5	16.0	19.0	19.5	17.5	18.5	20.0	18.0	19.5
26	18.0	15.0	17.5	20.5	16.0	19.0	19.5	17.5	19.0	20.0	18.0	19.0
27	18.0	15.0	17.0	20.5	16.5	19.0	19.5	17.5	19.0	20.0	18.5	19.0
28	18.0	15.0	17.0	20.5	16.5	18.5	20.0	17.5	19.5	20.0	18.0	19.0
29	18.0	15.0	17.0	20.0	16.5	19.0	20.0	20.0	20.0	19.5	18.0	19.0
30	18.0	15.0	17.0	20.0	16.5	19.0	20.5	18.5	19.5	19.5	18.0	19.0
31	—	—	—	20.0	16.5	19.0	20.5	17.5	19.5	—	—	—
MONTH	18.5	14.5	16.7	20.5	15.0	18.2	21.0	16.5	19.0	20.5	17.5	19.4

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121680 MUSKEGON RIVER NEAR OXBOW, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	5.6	2.1	4.8	8.5	4.6	7.1	11.4	9.8	11.0	11.7	9.4	11.0
2	6.0	5.1	5.5	8.4	5.7	7.5	11.4	10.2	10.9	11.7	9.3	11.1
3	6.1	4.8	5.6	8.9	6.1	7.9	11.8	9.0	11.1	11.8	9.3	11.3
4	6.4	5.5	6.1	9.1	7.4	8.3	11.2	9.4	10.5	12.0	10.8	11.6
5	6.7	6.2	6.5	8.6	8.1	8.3	10.7	10.3	10.5	12.1	11.3	11.9
6	7.0	5.9	6.6	8.4	7.5	8.1	10.7	10.3	10.5	12.0	10.8	11.6
7	6.9	6.2	6.7	8.5	7.1	8.2	10.8	8.6	10.6	12.1	9.5	11.4
8	7.4	6.7	7.1	9.0	7.4	8.1	10.6	8.4	10.0	12.1	9.0	11.2
9	7.5	6.8	7.2	9.0	7.7	8.5	10.3	9.6	10.1	12.2	9.6	11.6
10	7.6	7.0	7.4	9.1	7.2	8.3	10.7	9.4	10.3	12.2	8.9	11.0
11	8.2	7.1	7.7	9.1	6.6	8.3	10.9	8.5	10.4	12.1	9.3	11.5
12	7.9	7.4	7.6	9.3	6.7	8.3	10.9	10.0	10.5	12.2	8.6	11.1
13	7.8	7.3	7.5	9.6	8.3	9.0	10.8	10.0	10.6	12.2	11.7	12.0
14	8.2	7.5	7.8	9.6	7.0	9.1	11.1	8.2	10.3	12.1	11.6	11.9
15	8.2	7.5	8.0	9.6	8.5	9.0	11.0	8.2	10.0	12.2	11.6	12.0
16	8.1	7.5	7.8	9.8	7.4	9.2	10.9	7.9	10.1	12.2	11.6	12.0
17	8.6	7.5	8.2	9.8	6.8	8.6	11.0	8.1	10.3	12.1	11.5	11.9
18	8.1	5.4	7.5	9.9	7.8	9.2	11.0	10.4	10.6	12.2	11.4	11.9
19	7.7	5.3	6.7	10.1	8.8	9.8	11.3	9.8	10.9	12.2	11.3	11.9
20	8.6	5.6	7.5	10.1	8.8	9.7	11.3	8.5	10.7	12.1	11.0	11.9
21	8.1	5.7	7.3	10.3	9.2	9.8	11.2	10.1	10.6	12.2	11.5	12.0
22	7.7	4.9	6.8	10.5	9.1	10.2	11.4	9.1	10.8	12.2	11.6	12.0
23	8.7	5.2	7.6	10.6	9.7	10.4	11.4	8.5	10.7	12.2	11.4	12.0
24	8.3	5.7	7.3	10.6	10.3	10.5	11.6	10.1	11.0	12.2	11.2	11.9
25	8.0	5.2	6.9	10.8	9.5	10.4	11.5	10.1	10.9	12.2	11.0	11.9
26	8.8	5.5	7.5	11.0	9.8	10.7	11.6	10.0	11.2	12.3	11.2	11.9
27	8.6	5.2	7.5	11.0	10.2	10.8	11.7	8.7	11.0	12.3	10.8	11.8
28	7.6	4.9	6.8	11.1	10.0	10.7	11.4	9.1	10.7	12.2	10.9	11.8
29	8.4	4.9	7.1	11.1	10.0	10.5	11.6	9.3	10.8	12.2	10.8	11.8
30	8.2	5.7	7.4	11.2	9.8	10.8	11.5	8.7	10.8	12.2	11.1	11.8
31	7.4	5.7	6.9	—	—	—	11.6	8.8	10.6	12.1	10.5	11.8
MONTH	8.8	2.1	7.1	11.2	4.6	9.2	11.8	7.9	10.6	12.3	8.6	11.7

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	12.3	10.7	11.8	10.6	7.3	9.6	12.9	12.4	12.7	10.6	6.8	9.8
2	12.2	10.1	11.8	10.6	7.5	9.7	12.9	12.3	12.7	10.6	6.8	9.8
3	12.1	7.8	10.8	10.5	7.8	9.6	12.8	12.0	12.4	10.4	6.5	9.3
4	12.2	8.3	10.9	10.6	8.7	10.2	12.8	11.6	12.3	10.3	6.4	9.4
5	12.1	8.4	10.9	10.6	10.0	10.4	12.9	11.3	12.4	10.2	6.3	9.4
6	12.0	8.1	10.7	10.8	10.0	10.3	12.4	12.2	12.4	10.2	6.4	9.0
7	12.0	7.7	10.7	11.0	10.3	10.8	12.4	12.2	12.3	10.1	6.3	9.3
8	12.0	8.0	10.7	11.4	10.4	11.0	12.3	11.8	12.0	10.0	6.2	9.1
9	12.2	7.8	10.7	11.4	10.9	11.2	12.2	11.6	12.0	10.0	8.4	9.3
10	12.2	10.1	11.6	12.1	10.6	11.6	12.1	11.8	12.0	9.9	8.5	9.4
11	12.1	9.7	11.5	12.2	11.6	12.0	12.1	11.1	11.9	9.8	9.0	9.4
12	12.0	9.6	11.3	12.2	11.6	12.0	11.9	10.9	11.7	9.1	8.9	9.0
13	12.1	9.6	11.4	12.3	11.6	12.0	11.6	8.1	10.6	9.0	8.8	8.9
14	11.9	9.4	11.3	12.3	11.4	12.0	11.6	7.8	10.4	9.1	8.9	9.0
15	11.8	9.7	11.3	12.3	11.3	11.8	11.6	8.1	10.8	9.2	8.8	9.0
16	11.8	9.6	11.2	12.3	11.2	12.0	11.5	7.7	10.4	9.2	8.8	9.0
17	11.6	9.9	11.2	12.5	11.9	12.2	11.4	7.7	10.2	8.9	8.6	8.8
18	11.6	9.6	11.1	12.4	11.9	12.2	11.4	7.7	10.5	8.9	8.6	8.8
19	11.6	9.4	10.9	12.4	11.9	12.1	11.3	8.1	10.3	9.0	8.7	8.8
20	11.3	9.0	10.7	12.4	11.0	11.8	11.3	7.4	10.3	8.8	8.3	8.5
21	11.2	9.6	10.8	12.5	10.8	11.9	11.3	7.4	10.7	8.6	8.3	8.5
22	11.2	9.1	10.7	12.4	10.5	11.8	11.1	7.2	10.2	8.4	7.5	8.0
23	11.1	9.1	10.5	12.4	11.0	12.0	11.1	7.3	10.4	8.2	7.2	7.8
24	11.0	9.0	10.5	12.4	11.1	11.9	10.9	6.6	9.9	8.4	7.6	8.1
25	11.0	9.1	10.4	12.3	9.9	11.7	10.8	6.6	9.8	8.1	7.5	7.8
26	10.8	7.8	10.0	12.4	11.7	12.1	10.8	7.0	9.9	8.1	7.1	7.6
27	10.8	8.7	10.2	12.5	11.2	12.1	10.8	6.9	9.7	7.9	7.1	7.5
28	10.8	8.3	10.0	12.6	11.3	12.1	10.6	6.7	9.6	8.2	7.2	7.7
29	10.5	8.3	9.8	12.6	11.2	12.0	10.5	7.5	9.9	8.1	7.1	7.7
30	—	—	—	13.0	11.5	12.4	10.6	6.7	9.8	8.2	7.1	7.8
31	—	—	—	13.0	12.5	12.6	—	—	—	8.2	7.3	7.7
MONTH	12.3	7.7	10.9	13.0	7.3	11.5	12.9	6.6	11.0	10.6	6.2	8.7

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121680 MUSKEGON RIVER NEAR OXBOW, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.8	7.1	7.5	5.7	2.3	4.4	3.9	1.5	2.7	4.6	1.6	3.5
2	7.6	7.5	7.6	6.6	2.2	4.9	4.3	1.4	3.0	4.9	1.5	3.2
3	7.8	7.4	7.7	6.3	2.0	4.7	4.6	1.4	3.4	4.8	1.1	3.3
4	7.8	7.5	7.6	6.0	2.0	4.5	5.4	1.9	4.2	4.8	0.7	3.0
5	7.9	7.3	7.6	5.8	1.8	4.4	5.9	1.6	4.4	4.6	0.7	3.0
6	7.5	7.2	7.4	6.0	2.0	4.5	5.3	1.6	3.9	3.9	0.5	2.3
7	7.4	7.2	7.3	5.3	1.9	4.0	5.1	1.4	3.6	4.6	0.8	2.8
8	7.4	7.0	7.2	5.3	1.9	4.1	4.6	1.5	3.2	4.8	0.5	2.9
9	7.1	4.4	6.6	5.7	1.7	4.1	4.0	1.4	2.9	4.7	0.8	2.9
10	7.1	6.4	6.9	—	—	—	3.5	1.3	2.5	4.3	1.0	2.7
11	7.1	6.7	6.9	—	—	—	3.8	1.3	2.6	4.0	1.1	2.5
12	7.0	6.1	6.6	—	—	—	4.5	1.2	3.3	3.9	0.7	2.4
13	6.8	3.6	6.1	—	—	—	4.6	1.1	3.2	4.8	0.8	3.0
14	6.7	3.4	5.7	5.3	1.5	3.7	4.7	1.1	3.3	3.4	0.9	2.2
15	6.6	3.3	5.5	5.2	1.6	3.8	4.3	1.0	3.0	3.4	0.9	2.2
16	6.6	3.2	5.7	5.1	1.5	3.8	4.8	3.1	4.2	3.1	0.9	2.1
17	6.5	3.2	5.7	5.2	1.6	3.9	4.6	4.0	4.3	4.3	0.9	2.6
18	6.7	3.5	5.8	5.2	1.5	3.8	4.6	3.4	4.1	5.1	1.0	3.2
19	6.8	3.5	5.8	5.0	1.9	3.9	5.5	1.9	4.4	4.9	1.1	3.1
20	6.3	3.4	5.1	5.0	1.9	4.0	4.1	1.3	2.8	3.8	1.1	2.4
21	6.2	2.9	5.2	4.9	1.5	3.7	4.7	1.3	3.2	5.0	1.2	3.1
22	6.5	4.6	5.8	4.9	1.7	3.9	4.3	1.3	2.7	5.1	1.2	3.3
23	6.1	4.4	5.6	5.4	1.6	3.9	4.5	1.2	2.9	4.8	1.0	3.0
24	6.0	3.9	5.5	5.4	1.5	3.9	5.0	1.4	3.4	4.7	0.9	2.6
25	6.2	4.6	5.8	5.3	1.7	3.7	4.3	1.4	2.9	3.9	0.8	2.4
26	6.2	4.6	5.8	5.3	1.4	3.4	4.3	1.4	3.0	4.3	0.8	2.6
27	6.0	4.2	5.6	5.1	1.5	3.5	3.9	1.2	2.9	4.2	0.7	2.6
28	6.3	3.3	5.3	4.7	1.4	3.1	4.8	1.3	3.6	4.9	0.8	3.0
29	5.6	2.4	4.4	4.4	1.4	3.2	4.8	3.9	4.2	5.3	0.5	3.1
30	5.4	2.6	4.4	4.0	1.3	2.9	5.0	1.9	4.2	4.4	0.5	2.8
31	—	—	—	4.1	1.2	3.0	5.0	1.6	3.7	—	—	—
MONTH	7.9	2.4	6.2	—	—	—	5.9	1.0	3.4	5.3	0.5	2.8

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121944 LITTLE MUSKEGON RIVER NEAR OAK GROVE, MI

LOCATION.--Lat 43°25'51", long 85°35'44", in NE1/4 SW1/4 sec.14, T.13 N., R.11 W., Newaygo County, Hydrologic Unit 04060102, on left bank 1.6 mi downstream from Tamarack Creek, 2.4 mi northeast of Oak Grove.

DRAINAGE AREA.--345 mi².

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WDR MI-98-1: 1996-97.

GAGE.--Water-stage recorder. Elevation of gage is 750 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are poor. Gage-height telemeter 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	156	e225	302	266	e253	282	428	340	773	366	211	220
2	157	e270	291	264	e253	e377	394	386	709	346	208	212
3	171	e334	276	296	e253	617	375	364	656	348	210	210
4	207	e447	265	339	e253	696	353	325	573	367	209	209
5	202	629	253	317	e251	1020	315	309	487	411	200	216
6	181	649	256	284	e251	1960	305	301	471	400	190	211
7	170	495	246	275	e247	1850	314	292	440	373	186	208
8	164	376	242	e270	e245	1390	312	446	413	367	186	202
9	168	e320	244	e267	e247	1050	312	1200	604	359	188	194
10	164	e307	299	e267	e249	865	307	1790	511	344	187	185
11	161	281	473	e267	e249	752	299	1940	465	342	189	177
12	158	302	448	e267	e247	687	294	1360	500	330	194	177
13	157	299	378	274	e247	567	291	1280	568	320	206	179
14	160	288	346	271	e247	578	280	1390	590	336	208	174
15	167	272	303	e260	e247	546	265	1820	494	297	198	171
16	170	262	288	e253	e247	506	288	1610	453	293	187	175
17	166	253	296	e251	e247	470	306	1200	479	296	182	174
18	162	316	296	e251	e247	446	319	1120	488	326	186	168
19	160	644	289	e251	e247	429	340	1030	426	310	191	166
20	158	613	276	e251	e256	431	319	881	382	287	185	164
21	158	500	274	e251	e258	462	329	778	382	273	187	159
22	159	397	276	e251	e260	451	354	911	422	275	184	158
23	158	348	280	e251	268	418	331	1170	410	263	180	159
24	159	413	283	e251	263	403	309	1770	581	245	174	158
25	173	459	280	e251	254	402	336	1680	682	242	176	158
26	188	407	271	e253	251	500	410	1350	598	233	185	161
27	183	359	264	e253	248	680	386	1040	455	228	215	161
28	181	332	267	e253	251	643	342	860	431	231	294	162
29	193	318	277	e253	253	615	317	746	414	223	366	164
30	195	312	289	e253	—	541	306	702	391	216	310	165
31	186	—	280	e253	—	476	—	752	—	214	258	—
TOTAL	5292	11427	9108	8214	7289	21110	9836	31143	15248	9461	6430	5397
MEAN	171	381	294	265	251	681	328	1005	508	305	207	180
MAX	207	649	473	339	268	1960	428	1940	773	411	366	220
MIN	156	225	242	251	245	282	265	292	382	214	174	158
CFSM	0.49	1.10	0.85	0.77	0.73	1.97	0.95	2.91	1.47	0.88	0.60	0.52
IN.	0.57	1.23	0.98	0.89	0.79	2.28	1.06	3.36	1.64	1.02	0.69	0.58

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2004, BY WATER YEAR (WY)

	MEAN	235	297	281	291	351	447	392	457	320	210	203	191
MAX	426	393	410	443	491	681	480	1005	508	305	272	247	
(WY)	2002	1996	2002	1997	1997	2004	2002	2004	2004	2004	1996	2001	
MIN	171	195	204	200	198	270	328	256	183	131	133	142	
(WY)	2004	2000	1998	2003	2003	1999	2004	1998	1998	1998	1998	2003	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1996 - 2004

ANNUAL TOTAL	93009	139955	
ANNUAL MEAN	255	382	
HIGHEST ANNUAL MEAN		306	
LOWEST ANNUAL MEAN		382	2004
HIGHEST DAILY MEAN	732	1960	Mar 6 2004
LOWEST DAILY MEAN	129	156	Oct 1 1998
ANNUAL SEVEN-DAY MINIMUM	131	159	Oct 18 1998
MAXIMUM PEAK FLOW		2150	Mar 7 2004
MAXIMUM PEAK STAGE		8.69	Mar 7 2004
INSTANTANEOUS LOW FLOW		151	Sep 22 1998
ANNUAL RUNOFF (CFSM)	0.739	1.11	
ANNUAL RUNOFF (INCHES)	10.03	15.09	
10 PERCENT EXCEEDS	413	663	
50 PERCENT EXCEEDS	206	284	
90 PERCENT EXCEEDS	150	174	

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121944 LITTLE MUSKEGON RIVER NEAR OAK GROVE, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1995 to current year.

DISSOLVED OXYGEN: October 1995 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent except the following period: Mar. 10 to May 8 rated good. Dissolved oxygen records rated excellent except the following periods: Oct. 9-16, Nov. 16-19, Dec. 14-19, Jan. 27, 28, Mar. 7-10, 23-30, July 12-14, 25, 26, Aug. 22-30, Sept. 12-17 rated good; Nov. 20-25, Dec. 20-27, Jan. 29 to Feb. 5, Mar. 31 to Apr. 5, July 27-30 rated fair; and Nov. 26 to Dec. 3, Dec. 28 to Jan. 11, Feb. 6-10, July 31 to Aug. 4 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 25.5°C, July 4, 2002; minimum, -0.5°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum recorded (more than 20 percent missing record), 16.5 mg/L, Dec. 7, 1995; minimum, 5.2 mg/L, Aug. 11, Sept. 2, 2000.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 22.5°C, July 22; minimum, 0.0°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 14.6 mg/L, Jan. 1; minimum, 7.2 mg/L, Aug. 25.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	9.5	8.0	8.5	—	—	—	4.0	2.5	3.5	2.0	1.0	1.0
2	8.5	7.0	7.5	—	—	—	2.5	1.5	2.0	4.0	1.5	2.5
3	8.0	7.5	7.5	—	—	—	1.5	0.5	0.5	4.5	3.5	4.0
4	8.0	7.0	7.5	—	—	—	1.5	0.5	1.0	3.5	1.5	2.5
5	8.0	6.5	7.0	9.0	8.5	9.0	2.0	1.5	2.0	1.5	0.5	1.0
6	8.0	6.0	7.0	8.5	7.0	8.0	1.5	1.5	1.5	0.5	0.0	0.0
7	9.0	6.5	8.0	7.0	4.5	5.5	1.5	0.5	1.0	0.0	0.0	0.0
8	11.5	9.0	10.5	4.5	3.0	3.5	2.5	1.0	2.0	0.0	0.0	0.0
9	12.5	10.5	11.5	—	—	—	3.0	2.5	3.0	0.0	0.0	0.0
10	13.0	11.0	12.0	—	—	—	4.5	3.0	4.0	0.0	0.0	0.0
11	14.0	12.0	13.0	5.0	3.5	4.5	4.0	2.0	3.5	0.0	0.0	0.0
12	14.0	12.5	13.5	6.5	5.0	6.0	2.0	0.0	1.0	0.0	0.0	0.0
13	12.5	10.5	11.5	6.5	4.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0
14	11.5	11.0	11.5	4.5	3.5	4.0	0.5	0.0	0.0	0.0	0.0	0.0
15	11.0	9.5	10.0	5.0	4.5	4.5	1.0	0.5	1.0	0.0	0.0	0.0
16	9.5	8.0	9.0	5.5	5.0	5.5	2.0	1.0	1.5	0.0	0.0	0.0
17	8.5	7.0	7.5	6.5	5.5	6.0	1.5	1.5	1.5	0.0	0.0	0.0
18	10.0	8.0	9.0	8.5	6.5	7.5	1.5	1.5	1.5	0.0	0.0	0.0
19	9.0	7.5	8.5	8.5	8.0	8.5	1.5	1.0	1.5	0.0	0.0	0.0
20	10.5	7.5	9.0	8.0	6.5	7.0	1.0	0.0	0.5	0.0	0.0	0.0
21	10.5	10.0	10.5	7.5	6.5	7.0	1.5	0.5	1.0	—	—	—
22	10.0	8.5	9.0	6.5	6.5	6.5	2.0	1.5	2.0	—	—	—
23	8.5	7.0	7.5	8.0	6.5	7.5	3.0	2.0	2.5	—	—	—
24	8.0	6.5	7.5	8.0	5.0	6.5	3.0	2.5	2.5	—	—	—
25	9.0	8.0	8.5	5.0	3.5	4.0	2.5	2.0	2.0	—	—	—
26	8.5	7.5	8.0	3.5	3.0	3.5	2.0	1.0	1.5	0.0	0.0	0.0
27	7.5	7.0	7.0	4.0	3.0	3.5	1.5	0.5	1.0	0.0	0.0	0.0
28	7.0	6.5	7.0	4.0	4.0	4.0	3.0	1.5	2.5	0.0	0.0	0.0
29	7.0	6.5	7.0	4.0	3.5	3.5	4.0	3.0	3.5	0.0	0.0	0.0
30	8.5	7.0	7.5	4.0	3.0	3.5	3.5	2.5	3.0	0.0	0.0	0.0
31	10.5	8.5	10.0	—	—	—	2.5	2.0	2.5	0.0	0.0	0.0
MONTH	14.0	6.0	9.0	—	—	—	4.5	0.0	1.8	—	—	—

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121944 LITTLE MUSKEGON RIVER NEAR OAK GROVE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH				APRIL				MAY
1	0.0	0.0	0.0	2.5	1.5	2.0	9.0	7.5	8.0	13.5	12.0	13.0
2	0.0	0.0	0.0	—	—	—	9.5	7.0	8.5	12.5	11.0	11.5
3	0.0	0.0	0.0	3.0	2.5	2.5	9.5	8.0	8.5	11.0	9.0	10.0
4	0.0	0.0	0.0	2.5	2.0	2.5	8.0	6.5	7.5	10.5	8.5	9.5
5	0.0	0.0	0.0	2.5	1.5	2.0	7.0	5.0	6.5	12.0	9.5	11.0
6	0.0	0.0	0.0	1.5	1.0	1.5	7.5	6.5	7.0	12.5	11.0	11.5
7	0.0	0.0	0.0	1.5	1.0	1.5	9.0	6.5	8.0	14.5	12.0	13.5
8	0.0	0.0	0.0	1.5	1.0	1.0	9.0	7.5	8.5	14.0	11.5	12.5
9	0.0	0.0	0.0	1.5	1.0	1.5	8.0	6.5	7.5	—	—	—
10	0.0	0.0	0.0	3.0	1.0	2.0	7.5	6.0	7.0	—	—	—
11	0.0	0.0	0.0	3.5	2.5	3.0	7.0	6.0	6.5	—	—	—
12	0.0	0.0	0.0	2.5	0.5	1.5	6.5	5.0	6.0	19.0	17.0	18.0
13	0.0	0.0	0.0	2.0	0.0	0.5	8.5	6.0	7.0	19.0	18.5	19.0
14	0.0	0.0	0.0	2.5	1.5	2.0	9.5	6.5	8.0	19.0	17.0	18.0
15	0.0	0.0	0.0	2.5	1.0	2.0	12.0	9.0	10.5	17.0	15.0	15.5
16	0.0	0.0	0.0	3.0	1.5	2.5	14.0	11.5	13.0	15.5	13.5	14.5
17	0.0	0.0	0.0	3.0	2.0	2.5	15.5	13.5	14.5	16.5	15.0	16.0
18	0.0	0.0	0.0	3.0	2.5	3.0	17.0	14.5	15.5	17.5	16.5	17.0
19	0.0	0.0	0.0	4.0	2.5	3.0	16.5	14.0	15.5	17.5	15.5	16.5
20	0.0	0.0	0.0	6.0	4.0	5.0	14.0	12.0	12.5	18.0	17.0	17.5
21	0.0	0.0	0.0	5.5	4.0	4.5	13.0	12.0	12.5	18.0	16.0	17.0
22	1.0	0.0	0.5	4.0	2.0	2.5	12.5	10.5	11.5	16.0	15.0	15.0
23	1.0	0.5	0.5	4.5	2.0	3.5	13.0	10.5	12.0	15.0	14.5	15.0
24	1.5	0.5	1.0	5.5	3.5	4.5	12.0	10.5	11.5	14.5	14.0	14.0
25	1.5	0.0	0.5	7.5	5.5	6.5	11.5	10.5	11.0	14.5	13.5	14.0
26	1.0	0.0	0.5	9.5	7.5	8.5	11.5	10.0	11.0	15.0	14.0	14.5
27	1.5	0.0	0.5	10.5	9.5	9.5	11.0	9.0	10.0	15.0	14.0	14.5
28	2.0	0.0	1.0	10.0	9.0	9.5	12.5	8.5	10.5	15.5	14.0	15.0
29	3.0	1.0	2.0	10.5	9.5	10.0	15.0	12.0	13.5	15.0	14.0	14.0
30	—	—	—	10.0	8.5	9.5	15.0	13.5	14.0	14.5	13.5	14.5
31	—	—	—	10.0	8.5	9.0	—	—	—	15.5	14.0	15.0
MONTH	3.0	0.0	0.2	—	—	—	17.0	5.0	10.1	—	—	—

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
		JUNE			JULY			AUGUST			SEPTEMBER		
1	16.5	15.0	15.5	20.0	18.0	19.5	19.5	17.5	18.5	17.0	16.0	16.5	
2	16.5	16.0	16.0	20.5	19.0	19.5	20.5	18.5	19.5	18.5	16.0	17.5	
3	16.5	15.0	16.0	20.0	19.0	19.5	20.5	18.5	19.5	18.5	17.5	18.0	
4	17.5	15.0	16.5	20.0	19.0	19.5	21.5	19.5	20.0	20.0	18.0	19.0	
5	17.5	15.5	16.5	20.0	18.5	19.0	20.0	18.0	19.0	19.5	18.5	19.0	
6	18.0	16.5	17.5	19.5	18.5	19.0	18.5	16.0	17.5	20.0	19.0	19.5	
7	19.5	17.0	18.5	19.5	17.5	18.5	18.5	16.0	17.5	19.0	17.5	18.5	
8	21.0	19.0	20.0	17.5	16.0	16.5	19.5	16.5	18.0	17.5	16.0	17.0	
9	21.5	20.0	21.0	16.5	15.0	16.0	18.5	17.0	18.0	17.5	15.5	16.5	
10	21.0	17.5	19.5	19.0	16.0	17.5	18.0	17.0	17.5	17.0	15.0	16.0	
11	17.5	16.0	16.5	19.5	18.0	19.0	17.0	15.0	16.0	17.0	15.5	16.5	
12	16.5	15.5	16.0	21.0	19.5	20.0	15.5	14.0	14.5	18.0	16.0	17.0	
13	18.0	16.0	17.0	21.0	19.5	20.5	16.0	14.5	15.0	18.5	16.5	17.5	
14	18.5	17.0	18.0	20.5	19.5	20.0	16.5	14.0	15.5	19.0	17.0	18.0	
15	19.0	17.5	18.5	20.5	18.5	19.5	16.5	14.0	15.5	20.0	18.0	19.0	
16	19.5	18.0	19.0	---	---	---	16.5	14.5	15.5	19.5	17.5	19.0	
17	20.0	19.0	19.5	---	---	---	16.5	15.5	16.0	17.5	15.0	16.0	
18	20.0	19.0	19.5	---	---	---	17.5	15.5	16.5	16.0	14.0	15.0	
19	19.5	17.5	18.5	---	---	---	18.5	16.0	17.0	16.0	13.5	15.0	
20	18.0	16.0	17.0	---	---	---	16.5	14.5	15.5	16.0	13.5	14.5	
21	17.0	16.0	16.5	21.5	20.0	20.5	16.5	14.0	15.0	15.5	13.5	14.5	
22	17.5	15.5	16.5	22.5	20.5	21.5	16.0	13.5	15.0	16.0	13.5	14.5	
23	17.0	15.5	16.5	21.5	19.0	20.0	18.5	16.0	17.0	16.0	14.0	15.0	
24	16.5	14.5	15.5	19.0	17.0	18.0	19.0	16.5	17.5	17.0	15.0	16.0	
25	15.0	13.5	14.5	19.5	17.0	18.0	19.5	18.0	18.5	16.0	14.5	15.5	
26	16.0	14.0	15.5	19.5	16.5	18.0	19.0	18.0	18.5	14.5	12.5	13.5	
27	17.0	15.0	16.0	18.5	16.5	17.5	21.0	18.5	19.5	14.5	12.5	13.5	
28	18.0	16.0	17.0	18.5	15.5	17.0	20.5	18.5	19.5	14.5	13.5	14.0	
29	18.5	16.5	17.5	19.0	17.5	18.0	18.5	17.0	18.0	14.0	12.0	13.0	
30	19.5	17.5	18.5	18.5	17.5	18.0	17.0	15.5	16.5	12.5	11.0	12.0	
31	---	---	---	20.0	17.5	18.5	17.5	15.5	16.5	---	---	---	
MONTH	21.5	13.5	17.4	---	---	---	21.5	13.5	17.2	20.0	11.0	16.2	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121944 LITTLE MUSKEGON RIVER NEAR OAK GROVE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	12.5	11.0	11.7	--	--	--	12.7	12.0	12.4	14.6	13.7	14.2
2	12.8	11.5	12.0	--	--	--	13.3	12.6	13.1	13.9	13.0	13.6
3	12.0	11.3	11.6	--	--	--	14.0	13.2	13.7	13.2	12.7	12.9
4	12.4	11.3	11.7	--	--	--	14.1	13.4	13.8	13.5	13.0	13.3
5	12.6	11.4	11.9	10.8	9.9	10.3	13.5	13.2	13.3	14.1	13.3	13.8
6	12.5	11.5	11.9	11.2	9.8	10.6	13.8	13.2	13.5	14.0	12.9	13.6
7	12.4	10.9	11.7	12.3	10.9	11.6	14.0	13.4	13.7	13.4	12.7	13.1
8	11.5	10.1	10.8	13.1	12.0	12.7	13.5	13.0	13.3	13.5	12.8	13.1
9	11.4	9.4	10.4	--	--	--	13.1	12.7	12.9	13.2	12.5	12.9
10	11.0	9.5	10.1	--	--	--	12.7	12.0	12.3	12.8	12.5	12.6
11	10.8	9.0	9.8	12.2	11.3	11.8	13.1	12.0	12.6	12.7	12.1	12.5
12	9.9	8.8	9.2	11.4	10.6	11.0	14.0	13.1	13.7	--	--	--
13	10.5	9.1	9.7	11.8	10.6	11.3	13.9	12.4	12.8	--	--	--
14	9.6	9.1	9.4	12.0	11.1	11.6	14.1	12.2	13.2	--	--	--
15	10.7	9.4	10.0	11.6	11.3	11.4	13.9	13.5	13.8	12.6	11.8	12.2
16	11.4	9.8	10.6	11.6	11.1	11.4	13.5	13.2	13.4	13.0	11.8	12.5
17	11.7	10.7	11.1	12.1	11.1	11.7	13.8	13.3	13.5	13.0	11.4	12.0
18	11.2	10.2	10.7	11.4	10.5	11.0	13.8	13.3	13.5	11.7	11.2	11.4
19	11.4	10.2	10.7	10.6	9.7	10.1	13.7	13.4	13.5	11.8	11.4	11.5
20	11.1	9.6	10.5	10.8	10.0	10.3	14.3	13.6	14.0	--	--	--
21	10.0	9.5	9.7	10.9	10.3	10.6	14.2	13.5	13.8	--	--	--
22	11.0	9.7	10.3	10.9	10.5	10.8	13.6	13.2	13.4	--	--	--
23	11.2	10.2	10.7	10.9	10.2	10.6	13.3	12.9	13.1	--	--	--
24	11.6	10.4	10.9	11.4	10.3	10.8	13.3	12.9	13.1	--	--	--
25	10.9	10.1	10.4	12.2	11.3	11.8	13.6	12.9	13.3	--	--	--
26	10.9	10.2	10.5	12.5	11.9	12.2	13.9	13.3	13.6	--	--	--
27	11.2	10.5	10.7	12.4	12.0	12.2	14.0	13.5	13.8	13.0	12.7	12.8
28	10.9	10.5	10.7	12.2	12.0	12.1	13.5	13.0	13.3	12.7	12.6	12.7
29	11.2	9.7	10.7	12.4	11.9	12.2	13.0	12.6	12.8	12.8	12.6	12.6
30	11.3	10.2	10.8	12.7	12.2	12.4	13.4	12.9	13.1	12.8	12.6	12.7
31	10.4	9.6	10.0	--	--	--	13.9	13.4	13.6	12.7	12.3	12.5
MONTH	12.8	8.8	10.7	--	--	--	14.3	12.0	13.3	--	--	--

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	12.8	12.4	12.7	13.1	12.6	13.0	11.6	11.0	11.3	10.9	9.5	10.1
2	12.9	12.6	12.8	--	--	--	11.6	10.7	11.2	11.2	10.0	10.6
3	12.7	12.6	12.6	12.9	12.4	12.6	11.4	10.7	11.1	11.8	10.3	11.0
4	13.1	12.6	12.9	12.8	11.8	12.4	12.0	11.0	11.5	11.8	10.5	11.0
5	13.2	12.9	13.1	12.6	11.2	12.2	12.4	11.5	11.9	11.9	10.2	11.0
6	12.9	12.6	12.7	--	--	--	12.2	11.3	11.7	11.3	9.9	10.5
7	12.9	12.6	12.8	13.1	12.7	13.0	12.1	11.0	11.6	11.5	9.6	10.4
8	13.1	12.8	13.0	13.4	13.1	13.2	11.5	10.7	11.1	--	--	--
9	12.8	12.7	12.7	13.4	13.0	13.2	12.3	11.2	11.7	--	--	--
10	12.9	12.7	12.8	13.2	12.4	12.9	12.6	11.4	12.0	--	--	--
11	13.0	12.9	12.9	12.4	12.0	12.2	12.6	11.5	12.1	--	--	--
12	13.1	12.9	13.0	13.1	12.2	12.7	12.9	11.7	12.3	7.7	7.5	7.6
13	13.2	12.9	13.0	13.5	12.7	13.2	12.7	11.3	12.0	7.5	7.4	7.5
14	13.3	12.9	13.1	12.8	12.6	12.7	12.6	10.9	11.7	7.7	7.4	7.5
15	13.5	13.1	13.3	13.0	12.6	12.8	12.2	10.3	11.2	8.4	7.7	8.2
16	13.5	13.1	13.3	12.9	12.5	12.7	11.8	9.7	10.7	8.7	8.3	8.5
17	13.4	13.0	13.2	12.8	12.5	12.6	11.3	9.4	10.1	8.4	8.1	8.3
18	13.3	13.0	13.2	12.6	12.4	12.5	10.9	9.0	9.8	8.2	8.0	8.1
19	13.0	12.4	12.9	12.8	12.3	12.6	10.3	8.8	9.5	8.4	8.0	8.2
20	12.9	12.4	12.7	12.3	11.7	12.1	11.3	9.5	10.4	8.2	7.9	8.1
21	13.5	12.7	13.2	12.5	11.7	12.2	10.6	9.7	10.1	8.4	7.9	8.1
22	13.7	13.1	13.5	13.0	12.3	12.8	11.4	9.9	10.6	8.7	8.4	8.6
23	13.6	13.3	13.5	12.9	12.2	12.7	11.6	10.2	10.8	8.6	8.4	8.5
24	13.7	13.3	13.5	12.5	11.9	12.3	11.8	10.1	10.8	8.7	8.3	8.5
25	13.9	13.5	13.7	11.9	11.3	11.8	11.1	10.1	10.5	8.8	8.6	8.7
26	14.0	13.5	13.8	11.3	10.8	11.1	11.1	10.2	10.6	8.6	8.5	8.6
27	14.0	12.7	13.6	10.8	10.6	10.7	11.7	10.2	10.9	8.7	8.4	8.6
28	13.9	13.3	13.7	10.9	10.6	10.8	11.7	10.1	10.9	8.9	8.5	8.7
29	13.6	12.9	13.3	10.7	10.5	10.6	11.3	9.4	10.3	9.1	8.6	8.9
30	--	--	--	10.9	10.5	10.7	10.1	9.1	9.6	9.1	8.8	9.0
31	--	--	--	11.3	10.5	10.9	--	--	--	8.9	8.6	8.8
MONTH	14.0	12.4	13.1	--	--	--	12.9	8.8	11.0	--	--	--

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121944 LITTLE MUSKEGON RIVER NEAR OAK GROVE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.7	8.5	8.6	9.5	8.0	8.6	10.2	9.1	9.7	9.9	8.8	9.3
2	8.8	8.5	8.7	9.6	7.9	8.5	10.1	7.9	9.2	10.0	8.6	9.3
3	9.2	8.7	9.0	9.2	7.8	8.4	9.3	7.8	8.4	9.9	8.4	9.0
4	9.2	8.7	8.9	8.4	7.7	8.0	9.2	7.4	8.2	9.7	8.3	8.8
5	9.1	8.6	8.8	9.1	7.8	8.3	9.3	7.4	8.1	9.6	8.3	8.8
6	9.0	8.5	8.8	9.0	7.8	8.3	9.4	7.7	8.4	9.3	8.1	8.5
7	9.1	8.2	8.7	8.9	7.9	8.3	9.7	7.8	8.5	9.6	8.1	8.7
8	8.8	7.8	8.4	9.0	8.2	8.6	9.6	7.8	8.5	9.9	8.5	9.1
9	7.8	7.5	7.6	10.1	8.6	9.2	9.1	7.7	8.3	10.0	8.7	9.2
10	8.1	7.5	7.8	10.1	8.3	9.0	9.0	7.6	8.2	10.1	8.7	9.3
11	8.7	8.1	8.4	9.7	8.0	8.7	9.1	7.9	8.4	10.4	8.8	9.4
12	8.9	8.4	8.6	9.5	7.8	8.4	9.8	8.2	8.9	10.1	8.6	9.2
13	8.5	8.0	8.4	9.5	7.7	8.3	9.5	8.3	8.8	10.1	8.6	9.2
14	8.2	7.9	8.1	9.3	7.6	8.3	9.5	8.3	8.8	9.9	8.3	8.9
15	8.4	7.8	8.1	10.4	8.2	9.1	9.5	8.0	8.5	9.7	8.2	8.7
16	8.4	7.6	8.0	10.3	8.1	8.8	9.4	7.8	8.5	9.4	8.0	8.6
17	8.0	7.6	7.8	—	—	—	8.8	7.7	8.2	10.1	8.5	9.1
18	8.1	7.7	7.9	—	—	—	9.2	7.7	8.3	10.3	8.7	9.3
19	8.8	7.7	8.3	—	—	—	9.2	7.6	8.2	10.4	8.8	9.4
20	9.0	8.2	8.6	9.1	7.9	8.6	9.5	7.8	8.5	10.4	8.9	9.4
21	8.9	8.3	8.6	9.3	7.7	8.3	9.4	8.1	8.6	10.5	8.9	9.4
22	9.2	8.5	8.7	9.1	7.7	8.2	9.6	7.9	8.7	10.4	8.8	9.4
23	9.2	8.5	8.7	9.2	7.7	8.5	9.2	7.7	8.3	10.3	8.6	9.3
24	8.9	8.4	8.7	9.8	8.5	9.2	9.1	7.4	8.2	10.1	8.4	9.0
25	9.5	8.9	9.2	9.8	8.9	9.3	8.7	7.2	7.8	9.6	8.1	8.9
26	9.4	8.8	9.1	10.0	8.9	9.4	8.8	7.5	8.0	10.3	8.7	9.3
27	9.5	8.6	9.0	10.1	8.9	9.5	8.4	7.6	7.9	10.3	8.7	9.3
28	9.3	8.5	8.8	11.2	9.4	10.5	8.1	7.6	7.8	10.2	8.7	9.2
29	9.5	8.3	8.8	10.6	9.4	10.2	8.6	7.9	8.3	10.4	8.8	9.5
30	9.5	8.2	8.7	10.4	9.0	9.9	9.5	8.3	8.8	10.4	9.1	9.6
31	—	—	—	9.8	9.0	9.3	9.9	8.8	9.2	—	—	—
MONTH	9.5	7.5	8.5	—	—	—	10.2	7.2	8.5	10.5	8.0	9.1

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121970 MUSKEGON RIVER NEAR CROTON, MI

LOCATION.--Lat 43°26'05", long 85°39'55", in SE1/4 NE1/4 sec.18, T.12 N., R.11 W., Newaygo County, Hydrologic Unit 04060102, on right bank 75 ft downstream from Croton Drive, 0.4 mi southwest of Croton.

DRAINAGE AREA.--2,313 mi².

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 675.62 ft above sea level (Consumers Energy bench mark).

REMARKS.--Water-discharge records good. Flow completely regulated by Croton Dam 1,000 ft upstream. Gage-height telemeter 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	901	976	2530	1940	1950	2140	4310	3040	4730	1770	1110	1110
2	922	1120	2500	1900	1950	2240	4180	3130	4260	1740	1100	1150
3	1070	1580	2340	2150	1970	2740	3890	3090	3900	1730	1110	1130
4	1530	2210	1940	2600	1940	3370	3680	2990	3560	1920	1110	1130
5	1580	4070	1760	2810	1910	4990	3360	2820	3210	1990	1090	1140
6	1590	3590	1740	2480	1970	6410	2970	2740	3080	1970	1060	1120
7	1260	2640	1710	1870	1900	6740	2840	2610	3080	1960	1000	1130
8	983	2450	1770	1710	1770	6340	2830	3080	2900	1950	987	1140
9	975	2230	1970	1730	1810	6040	2750	e6010	3280	1850	1070	1120
10	1040	2000	2160	1730	1890	5980	2650	e7770	3480	1750	1060	1080
11	1070	1930	2800	1690	1830	5860	2600	6560	3290	1750	1050	1050
12	1010	2010	2910	1710	1850	5780	2560	4950	2860	1730	1070	1010
13	988	1960	2500	1730	1920	5580	2350	5680	2720	1800	1090	989
14	1000	2130	2170	1870	1960	5450	2260	6770	2440	e1810	1110	991
15	1080	1750	2190	1840	1890	5350	2240	6860	2470	1640	1100	1040
16	1070	1590	2310	1750	1880	5060	2150	6730	2610	e1610	1090	1090
17	1040	1610	2280	1740	1970	4340	2250	6510	2870	1720	1080	1090
18	994	2400	2230	1740	1980	3700	2400	5980	2650	e1780	1050	1010
19	957	3450	2230	1770	1970	3570	2950	5730	2400	e1840	982	974
20	944	3550	2230	1780	2030	3520	3040	5860	2350	e1850	1080	971
21	929	3530	1970	1770	2010	3440	3040	5590	2230	1820	1080	907
22	923	3510	1780	1760	1940	3500	3060	5450	2300	1820	1080	898
23	964	3370	1780	1760	1950	3540	3050	6390	2220	1650	967	896
24	979	3320	1800	1750	2010	3550	2980	9210	2360	1550	925	895
25	987	3360	1860	1720	2000	3540	3130	8310	2660	1440	987	915
26	977	3290	1940	1700	2000	3590	3250	7140	2580	1360	1090	941
27	994	3130	1880	1750	2030	3730	3270	7270	2320	1220	1160	947
28	1030	2870	1820	1780	2040	3800	3200	6370	2230	1130	2140	937
29	1020	2530	1800	1900	2050	4510	3090	5980	1950	1100	2210	917
30	991	2450	1820	1940	—	4620	3010	5670	1790	1120	1640	887
31	988	—	1880	1940	—	4370	—	5310	—	1130	1180	—
TOTAL	32786	76606	64600	58310	56370	137390	89340	171600	84780	51500	35858	30605
MEAN	1058	2554	2084	1881	1944	4432	2978	5535	2826	1661	1157	1020
MAX	1590	4070	2910	2810	2050	6740	4310	9210	4730	1990	2210	1150
MIN	901	976	1710	1690	1770	2140	2150	2610	1790	1100	925	887
CFSM	0.46	1.10	0.90	0.81	0.84	1.92	1.29	2.39	1.22	0.72	0.50	0.44
IN.	0.53	1.23	1.04	0.94	0.91	2.21	1.44	2.76	1.36	0.83	0.58	0.49

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2004, BY WATER YEAR (WY)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
MEAN	1384	1773	1706	1946	2203	2803	2639	2829	1984
MAX	2239	2554	2520	2919	3046	4432	3322	5535	2946
(WY)	2002	2004	2002	1997	1997	2004	1998	2004	1996
MIN	1058	1229	1201	1211	1169	1338	1900	1373	1060
(WY)	2004	2003	2003	2003	2003	2003	2000	1999	1998

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1996 - 2004

ANNUAL TOTAL	539217	889745	1896
ANNUAL MEAN	1477	2431	2431
HIGHEST ANNUAL MEAN			2004
LOWEST ANNUAL MEAN			2003
HIGHEST DAILY MEAN	4070	Nov 5	9210
LOWEST DAILY MEAN	748	Sep 11	887
ANNUAL SEVEN-DAY MINIMUM	783	Sep 8	914
MAXIMUM PEAK FLOW			9580
MAXIMUM PEAK STAGE			10.45
INSTANTANEOUS LOW FLOW			689
ANNUAL RUNOFF (CFSM)	0.639	1.05	0.820
ANNUAL RUNOFF (INCHES)	8.67	14.31	11.14
10 PERCENT EXCEEDS	2310	4650	3160
50 PERCENT EXCEEDS	1230	1950	1630
90 PERCENT EXCEEDS	923	994	991

(a) July 6, 2000, Aug. 22, 2003.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121970 MUSKEGON RIVER NEAR CROTON, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1995 to current year.

DISSOLVED OXYGEN: October 1995 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated good.

Dissolved oxygen records rated excellent except the following periods: Jan. 25-31, Apr. 18-24, July 12, 13, Sept. 1, 6-8 rated good;

Feb. 1-9, Apr. 25 to May 5, July 15, 17, Sept. 9-12 rated fair; and May 6-8, 11, July 21-28, Sept. 13-17 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 25.0°C, Aug. 10, 2001; minimum recorded, 0.5°C, on many days during winter periods,

but may have been lower during instrument malfunction Jan. 3-29, Feb. 19, 1996.

DISSOLVED OXYGEN: Maximum, 14.6 mg/L, Mar. 5, 2004; minimum, 2.3 mg/L, Aug. 24, Sept. 3, 2003.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 23.5°C, Aug. 4; minimum, 0.5°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 14.6 mg/L, Mar. 5; minimum, 2.9 mg/L, June 13.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
1	15.5	14.5	15.0	11.0	11.0	11.0	6.0	5.0	5.5	2.5	2.0	2.0			
2	15.0	14.5	14.5	11.0	11.0	11.0	5.5	5.0	5.0	2.5	2.0	2.0			
3	14.5	14.0	14.0	11.0	10.5	11.0	5.5	4.5	5.0	2.5	2.5	2.5			
4	14.0	13.5	13.5	10.5	10.0	10.5	5.0	4.0	4.5	2.5	2.0	2.0			
5	14.0	13.5	13.5	10.5	10.0	10.5	5.0	4.0	4.5	2.0	2.0	2.0			
6	14.5	13.5	14.0	10.5	10.0	10.5	4.5	4.0	4.5	2.0	1.5	1.5			
7	14.5	13.5	14.0	10.5	9.5	10.0	4.5	3.5	4.0	1.5	1.0	1.0			
8	15.0	14.0	14.5	9.5	9.0	9.5	4.5	3.5	4.0	1.0	0.5	1.0			
9	15.5	14.5	15.0	9.0	9.0	9.0	4.5	3.5	4.0	1.0	0.5	0.5			
10	15.5	15.0	15.5	9.0	8.0	8.5	4.5	3.5	4.0	1.0	1.0	1.0			
11	16.0	15.0	15.5	9.0	8.0	8.5	4.5	4.0	4.0	1.0	1.0	1.0			
12	15.5	14.5	15.0	9.0	8.5	8.5	4.0	3.5	4.0	1.0	1.0	1.0			
13	15.0	14.0	14.5	9.0	8.0	8.0	3.5	3.0	3.5	1.0	1.0	1.0			
14	15.0	14.5	15.0	8.5	7.5	8.0	3.0	2.5	3.0	1.0	1.0	1.0			
15	14.5	13.5	14.0	8.0	7.5	8.0	3.0	2.5	3.0	1.0	1.0	1.0			
16	14.0	13.5	13.5	8.0	7.5	8.0	3.0	2.5	2.5	1.5	1.0	1.0			
17	13.5	13.0	13.0	8.0	7.5	7.5	3.0	2.5	2.5	1.0	1.0	1.0			
18	13.0	12.5	13.0	8.5	7.0	7.5	3.0	2.5	2.5	1.0	1.0	1.0			
19	13.0	12.5	13.0	8.5	8.0	8.0	3.0	2.5	2.5	1.0	1.0	1.0			
20	13.0	12.5	12.5	8.0	7.5	8.0	3.0	2.0	2.5	1.0	1.0	1.0			
21	12.5	12.5	12.5	8.5	8.0	8.0	3.0	2.0	2.5	1.0	1.0	1.0			
22	12.5	12.0	12.0	8.0	7.5	7.5	2.5	2.0	2.5	1.0	1.0	1.0			
23	12.0	12.0	12.0	7.5	7.5	7.5	2.5	2.0	2.0	1.0	1.0	1.0			
24	12.0	11.5	11.5	7.5	7.0	7.5	2.0	2.0	2.0	1.0	1.0	1.0			
25	12.0	11.5	11.5	7.0	6.5	7.0	2.0	2.0	2.0	1.0	0.5	1.0			
26	11.5	11.5	11.5	6.5	6.0	6.5	2.5	2.0	2.0	1.0	0.5	1.0			
27	11.5	11.0	11.0	6.5	6.0	6.0	2.5	2.0	2.0	1.0	0.5	1.0			
28	11.0	10.5	10.5	6.5	6.0	6.0	2.5	2.0	2.5	1.0	1.0	1.0			
29	10.5	10.5	10.5	6.0	5.5	6.0	2.5	2.5	2.5	1.0	0.5	1.0			
30	10.5	10.5	10.5	6.0	5.5	6.0	2.5	2.0	2.0	1.0	0.5	1.0			
31	11.0	10.5	11.0	—	—	—	2.5	2.0	2.5	1.0	0.5	1.0			
MONTH	16.0	10.5	13.1	11.0	5.5	8.3	6.0	2.0	3.2	2.5	0.5	1.2			

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121970 MUSKEGON RIVER NEAR CROTON, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	1.0	0.5	1.0	1.5	1.0	1.0	4.0	3.5	3.5	11.5	11.0	11.5	
2	1.0	0.5	1.0	1.5	1.0	1.0	4.5	3.5	4.0	11.5	11.0	11.0	
3	1.0	1.0	1.0	1.5	1.0	1.5	5.0	4.0	4.0	11.0	10.5	11.0	
4	1.0	0.5	1.0	1.5	1.5	1.5	5.0	4.0	4.0	11.0	10.5	10.5	
5	1.0	0.5	1.0	1.5	1.0	1.5	5.0	4.0	4.5	11.5	10.5	11.0	
6	1.0	1.0	1.0	1.5	1.0	1.5	5.5	4.5	5.0	11.5	10.5	11.0	
7	1.0	1.0	1.0	1.0	1.0	1.0	6.0	5.0	5.5	12.0	11.5	12.0	
8	1.0	0.5	1.0	1.0	1.0	1.0	6.5	5.5	6.0	12.0	11.5	12.0	
9	1.0	0.5	1.0	1.0	0.5	1.0	6.5	5.5	6.0	—	—	—	
10	1.0	1.0	1.0	1.0	0.5	1.0	6.5	5.5	6.0	—	—	—	
11	1.0	0.5	1.0	1.0	1.0	1.0	6.5	6.0	6.0	14.0	13.5	13.5	
12	1.0	0.5	1.0	1.0	1.0	1.0	6.5	6.0	6.5	14.5	13.5	14.0	
13	1.0	0.5	1.0	1.0	0.5	0.5	6.5	6.5	6.5	15.0	14.5	14.5	
14	1.0	0.5	1.0	1.0	0.5	1.0	7.5	6.5	7.0	15.0	14.5	15.0	
15	1.0	1.0	1.0	1.0	1.0	1.0	7.5	7.0	7.0	15.0	14.5	15.0	
16	1.0	1.0	1.0	1.0	1.0	1.0	8.0	7.5	7.5	14.5	14.0	14.5	
17	1.0	1.0	1.0	1.5	1.0	1.0	10.5	8.0	9.0	15.0	14.5	14.5	
18	1.0	1.0	1.0	1.5	1.0	1.5	9.5	8.0	8.5	15.5	14.5	15.0	
19	1.0	1.0	1.0	1.5	1.5	1.5	10.5	8.0	9.5	15.5	14.5	15.0	
20	1.0	1.0	1.0	2.0	1.5	1.5	10.5	9.5	10.0	16.0	15.5	15.5	
21	1.0	1.0	1.0	1.5	1.5	1.5	10.0	8.5	9.5	16.5	15.5	16.0	
22	1.5	1.0	1.0	2.0	1.5	2.0	10.0	9.5	9.5	15.5	15.0	15.5	
23	1.0	1.0	1.0	2.0	2.0	2.0	10.0	9.0	9.5	16.0	15.5	15.5	
24	1.0	1.0	1.0	2.0	1.5	2.0	10.0	9.0	9.5	15.5	15.0	15.0	
25	1.5	1.0	1.0	2.5	2.0	2.0	10.0	9.5	10.0	15.5	15.0	15.0	
26	1.0	1.0	1.0	3.0	2.5	2.5	10.0	9.5	10.0	15.5	15.0	15.5	
27	1.5	1.0	1.0	3.5	3.0	3.0	10.5	9.5	10.0	15.5	15.5	15.5	
28	1.5	1.0	1.0	4.0	3.0	3.5	10.5	9.5	10.0	15.5	14.5	15.0	
29	1.5	1.0	1.0	4.0	3.5	4.0	10.5	10.0	10.5	15.0	14.0	14.5	
30	—	—	—	4.5	3.5	4.0	11.5	10.5	11.0	15.0	13.5	15.0	
31	—	—	—	4.5	3.5	3.5	—	—	—	15.5	14.5	15.0	
MONTH	1.5	0.5	1.0	4.5	0.5	1.7	11.5	3.5	7.5	—	—	—	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	16.0	15.0	15.5	19.5	18.5	19.0	21.5	20.5	21.0	20.5	20.0	20.5
2	16.5	15.5	16.0	20.0	19.0	19.5	21.5	20.5	21.0	21.0	20.0	20.5
3	17.0	15.5	16.0	20.5	19.5	20.0	22.0	21.0	21.5	21.5	20.5	21.0
4	16.5	15.5	16.0	20.0	19.0	19.5	23.5	22.0	22.5	21.5	20.5	21.0
5	16.5	16.0	16.0	20.5	19.0	20.0	23.0	21.5	22.0	21.5	21.0	21.0
6	16.5	16.0	16.5	20.0	19.0	19.5	22.0	21.0	21.5	21.5	20.0	20.5
7	17.0	16.0	16.5	20.0	19.5	19.5	22.0	20.5	21.0	22.0	20.5	21.5
8	17.5	16.5	17.0	19.5	19.0	19.5	21.5	20.5	21.0	21.5	20.5	21.0
9	19.0	17.5	18.0	19.5	19.0	19.0	21.0	20.0	20.5	21.5	20.5	21.0
10	19.0	18.0	18.5	20.0	19.0	19.5	21.0	20.5	20.5	21.0	20.0	20.5
11	18.0	17.5	18.0	20.5	19.5	20.0	20.5	20.0	20.0	20.5	20.0	20.5
12	18.0	17.5	17.5	21.5	20.0	20.5	20.5	19.5	20.0	21.0	20.0	20.5
13	18.0	17.5	17.5	20.0	19.5	19.5	20.5	19.5	20.0	21.5	20.0	20.5
14	18.5	17.5	18.0	22.0	20.0	21.0	20.5	19.0	20.0	21.0	20.0	20.5
15	19.0	18.0	18.5	21.5	20.0	20.5	20.5	19.5	20.0	21.0	20.0	20.5
16	—	—	—	21.0	19.5	20.5	20.0	19.5	19.5	22.0	21.0	21.5
17	—	—	—	21.5	20.5	21.0	19.5	19.5	19.5	21.5	20.5	21.0
18	—	—	—	22.0	20.5	21.5	20.0	19.0	19.5	21.5	20.5	21.0
19	—	—	—	21.0	20.5	20.5	21.0	19.5	20.0	21.0	20.0	20.5
20	—	—	—	21.0	20.5	21.0	20.0	19.5	19.5	21.0	20.0	20.5
21	—	—	—	21.5	20.0	21.0	20.5	19.0	20.0	21.0	20.0	20.0
22	—	—	—	23.0	21.0	22.0	19.5	19.0	19.0	20.5	19.5	20.0
23	18.5	18.0	18.0	22.5	21.5	22.0	20.5	19.0	20.0	20.5	19.5	20.0
24	18.0	17.5	18.0	22.5	21.0	21.5	20.5	19.5	20.0	20.5	19.5	20.0
25	18.0	17.5	17.5	22.5	21.0	21.5	20.5	20.0	20.0	20.0	19.5	20.0
26	18.0	17.0	17.5	22.5	21.0	21.5	20.5	20.0	20.0	20.0	19.0	19.5
27	18.5	17.5	18.0	21.5	21.0	21.5	—	—	—	20.0	19.0	19.5
28	19.5	17.5	18.5	21.5	20.5	21.0	—	—	—	19.5	19.0	19.0
29	18.5	17.5	18.0	20.5	20.0	20.5	—	—	—	19.5	18.5	19.0
30	19.0	18.0	18.5	21.0	20.5	20.5	—	—	—	19.0	18.5	18.5
31	—	—	—	21.0	20.5	21.0	21.5	19.5	20.5	—	—	—
MONTH	—	—	—	23.0	18.5	20.5	—	—	—	22.0	18.5	20.4

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121970 MUSKEGON RIVER NEAR CROTON, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	--	--	--	5.9	3.9	5.1	6.0	4.8	5.4
2	--	--	--	--	--	--	5.9	4.1	5.4	6.5	4.2	5.5
3	8.0	6.7	7.2	--	--	--	6.4	5.2	6.0	6.4	5.3	5.9
4	6.8	3.9	6.2	--	--	--	7.9	6.0	6.8	6.4	5.2	5.9
5	6.8	3.9	6.4	--	--	--	8.3	6.4	7.3	6.4	5.1	5.8
6	6.4	5.6	6.0	--	--	--	6.9	5.3	6.4	5.7	3.4	4.1
7	6.3	3.5	5.6	--	--	--	6.5	5.1	5.7	6.8	4.7	5.9
8	6.6	5.7	6.0	5.1	4.7	4.9	5.9	4.1	5.3	7.4	6.3	6.8
9	6.9	5.9	6.3	5.3	4.6	4.9	5.8	3.0	4.5	7.2	6.3	6.8
10	6.6	5.4	6.1	5.3	4.5	4.9	5.5	4.1	5.1	6.8	5.9	6.4
11	6.0	5.2	5.6	5.5	4.8	5.1	5.9	4.9	5.4	6.5	4.3	5.7
12	5.7	4.9	5.3	5.7	4.7	5.2	5.4	4.8	5.2	6.5	4.9	5.9
13	5.0	2.9	3.8	5.3	4.2	4.6	5.8	5.2	5.5	7.0	4.8	6.2
14	5.1	4.1	4.8	--	--	--	5.9	5.3	5.5	6.0	4.1	5.2
15	5.1	4.1	4.5	6.5	5.1	5.8	6.2	5.2	5.7	5.6	3.7	4.8
16	--	--	--	--	--	--	6.1	4.8	5.4	6.7	5.5	6.2
17	--	--	--	6.0	5.0	5.5	5.8	4.4	5.1	6.5	6.0	6.3
18	--	--	--	--	--	--	5.8	3.3	5.0	6.8	6.0	6.3
19	--	--	--	--	--	--	6.8	3.4	5.7	6.6	4.8	6.0
20	--	--	--	--	--	--	6.1	5.5	5.8	6.5	4.9	5.8
21	--	--	--	5.7	3.9	5.0	6.6	5.9	6.3	6.4	4.9	5.7
22	--	--	--	5.9	5.1	5.4	6.0	4.1	5.4	6.4	4.7	5.7
23	5.9	4.9	5.6	6.0	5.1	5.6	6.2	4.2	5.5	6.7	5.6	6.1
24	6.1	5.4	5.8	6.1	4.5	5.3	7.1	5.5	6.3	6.8	4.4	6.0
25	6.1	5.5	5.8	6.5	4.8	5.5	6.4	5.4	6.0	6.3	5.0	5.9
26	6.3	5.6	5.9	6.8	5.1	5.8	6.6	5.1	6.0	6.8	6.0	6.3
27	6.4	5.5	5.9	6.1	5.1	5.7	--	--	--	6.7	5.7	6.2
28	6.5	5.4	6.0	6.0	4.6	5.4	--	--	--	6.3	5.5	5.9
29	5.7	4.6	5.3	5.1	3.8	4.4	--	--	--	6.5	5.7	6.0
30	--	--	--	5.5	4.5	5.0	--	--	--	6.8	6.0	6.3
31	--	--	--	5.6	4.6	5.1	5.6	4.3	4.9	--	--	--
MONTH	--	--	--	--	--	--	--	--	--	7.4	3.4	5.9

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122100 BEAR CREEK NEAR MUSKEGON, MI

LOCATION.--Lat 43°17'19", long 86°13'22", in SW1/4 NW1/4 sec.4, T.10 N., R.16 W., Muskegon County, Hydrologic Unit 04060102, on left bank at upstream side of bridge on North Getty Street, 1.5 mi upstream from Little Bear Creek, and 3.9 mi northeast of Muskegon.

DRAINAGE AREA.--16.7 mi².

PERIOD OF RECORD.--October 1965 to current year.

REVISED RECORDS.--WDR MI-80-1: 1976(M), 1978(M), 1979(P). WDR MI-97-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 590.00 ft above sea level (Michigan Department of Natural Resources bench mark). Prior to Mar. 17, 1978, at different datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Some regulation during low flow by dams and irrigation upstream from station. Gage-height telemeter 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	3.5	7.2	17	12	e10	35	25	18	98	13	6.0	4.2
2	3.5	12	14	13	e10	78	22	17	47	12	5.4	4.9
3	7.5	18	13	18	e10	57	20	15	35	12	6.1	5.3
4	7.3	28	13	15	e10	42	19	15	29	30	5.8	3.6
5	5.1	38	13	14	e10	139	18	15	25	26	4.5	4.3
6	4.4	19	12	e11	e10	123	18	14	24	19	4.6	4.3
7	4.2	14	11	e12	e10	60	18	14	22	17	4.0	4.6
8	4.0	12	12	e12	e10	61	18	26	20	15	4.2	4.5
9	3.7	11	12	e11	e10	42	17	43	27	14	4.2	3.7
10	3.5	11	27	e11	e9.9	34	16	48	26	13	4.9	3.1
11	3.4	13	28	e11	e10	34	16	49	32	12	5.1	3.4
12	4.2	12	19	e11	e10	31	16	32	34	11	5.7	3.6
13	4.1	12	16	e11	e10	28	15	53	27	11	5.5	3.1
14	5.4	11	16	e11	e11	32	15	73	23	15	4.7	3.6
15	5.8	11	15	e11	e11	31	15	59	22	12	4.1	3.1
16	4.1	11	17	e11	e10	26	15	36	19	11	4.3	3.5
17	4.2	12	19	e11	e10	24	17	30	18	13	4.8	3.4
18	4.3	36	17	e11	e11	23	22	70	e18	15	4.9	3.0
19	4.3	49	16	e11	e11	21	20	52	16	12	4.9	3.4
20	4.3	24	15	e10	13	23	17	48	15	10	4.4	3.5
21	4.3	19	15	e10	15	21	21	59	17	9.7	3.8	4.0
22	4.3	17	17	e9.6	14	20	19	90	19	9.3	3.3	4.5
23	4.3	18	16	e9.0	15	20	17	107	17	8.2	3.8	3.2
24	4.5	32	15	e9.5	16	21	16	121	34	7.7	3.3	3.3
25	7.4	23	14	e10	17	21	25	66	29	7.7	3.7	2.6
26	5.7	19	14	e10	17	34	23	47	21	6.8	3.3	3.5
27	5.5	17	13	e10	17	34	20	37	18	6.5	4.8	3.3
28	7.5	17	14	e10	18	27	18	32	19	6.5	10	3.2
29	8.7	20	14	e10	20	51	17	28	16	6.0	8.6	3.5
30	7.8	20	13	e10	—	36	16	32	14	6.6	6.4	3.4
31	7.4	—	13	e10	—	29	—	104	—	6.8	5.4	—
TOTAL	158.2	563.2	480	346.1	355.9	1258	551	1450	781	374.8	154.5	110.6
MEAN	5.10	18.8	15.5	11.2	12.3	40.6	18.4	46.8	26.0	12.1	4.98	3.69
MAX	8.7	49	28	18	20	139	25	121	98	30	10	5.3
MIN	3.4	7.2	11	9.0	9.9	20	15	14	14	6.0	3.3	2.6
CFSM	0.31	1.12	0.93	0.67	0.73	2.43	1.10	2.80	1.56	0.72	0.30	0.22
IN.	0.35	1.25	1.07	0.77	0.79	2.80	1.23	3.23	1.74	0.83	0.34	0.25

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2004, BY WATER YEAR (WY)

	MEAN	12.7	17.4	19.0	17.5	20.2	28.9	26.7	19.6	12.3	6.93	7.64	8.04
MAX	45.2	55.2	40.5	31.3	47.8	87.9	50.6	46.8	26.0	17.6	30.2	43.0	
(WY)	1987	1986	1992	1986	1976	1976	1982	2004	2004	1994	1980	1986	
MIN	3.48	4.54	4.98	6.15	6.05	10.2	11.0	6.84	4.32	3.17	2.29	2.67	
(WY)	1972	1972	1977	1977	2003	2003	2003	1977	1977	1971	1971	2003	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1966 - 2004

ANNUAL TOTAL	3101.0	6583.3	
ANNUAL MEAN	8.50	18.0	16.4
HIGHEST ANNUAL MEAN			27.4
LOWEST ANNUAL MEAN			7.05
HIGHEST DAILY MEAN	49	Nov 19	139
LOWEST DAILY MEAN	1.4	Sep 7	2.6
ANNUAL SEVEN-DAY MINIMUM	1.6	Sep 7	3.2
MAXIMUM PEAK FLOW			231
MAXIMUM PEAK STAGE			14.99
INSTANTANEOUS LOW FLOW			2.3
ANNUAL RUNOFF (CFSM)	0.509		1.08
ANNUAL RUNOFF (INCHES)	6.91		14.66
10 PERCENT EXCEEDS	16		34
50 PERCENT EXCEEDS	6.2		13
90 PERCENT EXCEEDS	2.8		4.1
			720
		Mar 5	Mar 5
		Sep 25	Sep 25
		Sep 23	Sep 23
		Mar 5	Mar 5
		Mar 5	Mar 5
		Sep 25	Sep 25
			(a)930
			(b)16.61
			1.0
			0.981
			13.32
			31
			12
			4.5
			(c)

(a) Gage height 11.00 ft, datum then in use.

(b) Backwater from ice.

(c) Part of each day Aug. 5, 17, 22, 1971.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122200 WHITE RIVER NEAR WHITEHALL, MI

LOCATION.--Lat 43°27'51", long 86°13'57", in SE1/4 NW1/4 sec.4, T.12 N., R.16 W., Muskegon County, Hydrologic Unit 04060101, on right bank 30 ft downstream from bridge on Fruitvale Road, 6.3 mi downstream from North Branch, and 6.9 mi northeast of Whitehall.

DRAINAGE AREA.--406 mi².

PERIOD OF RECORD.--August 1957 to current year.

REVISED RECORDS.--WDR MI-83-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 594.10 ft above sea level. Nov. 18, 1957 to Oct. 22, 1958, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Gage-height telemeter 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	211	254	484	352	e308	408	695	474	1090	498	327	393
2	208	260	446	345	e308	561	626	518	1160	464	348	357
3	228	323	410	405	e308	850	571	494	987	441	414	337
4	302	412	384	531	e308	1000	542	461	868	507	393	324
5	312	522	368	540	e308	1020	519	439	764	650	349	329
6	278	608	358	476	e308	1980	499	426	670	706	325	321
7	251	619	349	423	e308	1920	486	416	612	622	313	322
8	234	553	341	e373	e308	1560	481	538	574	549	307	317
9	223	451	339	e348	e308	1340	494	1880	576	511	308	305
10	215	374	388	e321	e308	1130	495	2520	761	487	324	297
11	208	358	505	e322	e308	1020	484	e1950	889	464	328	290
12	203	361	603	e322	e308	955	468	e1650	888	442	340	284
13	205	353	551	e322	e308	875	453	e1350	886	428	353	279
14	209	349	474	e322	e308	822	439	1200	827	424	342	274
15	226	341	430	e317	e308	784	419	1190	764	443	329	271
16	247	330	401	e316	e308	762	412	1130	712	445	316	307
17	241	322	419	e315	e308	711	421	1000	643	417	309	315
18	236	388	434	e308	e309	662	487	932	635	468	320	292
19	231	555	414	e308	e310	627	562	905	705	542	313	281
20	227	794	397	e308	e313	615	546	861	703	481	302	274
21	224	791	383	e308	e319	636	518	798	611	426	297	270
22	221	653	380	e308	e333	647	540	799	559	410	290	265
23	219	570	387	e308	e353	613	512	1000	551	394	286	262
24	218	542	388	e308	e373	586	476	1660	580	367	284	260
25	224	610	382	e308	e386	569	489	1820	700	359	282	255
26	247	612	369	e308	372	592	556	1410	750	349	289	256
27	248	553	356	e308	362	684	555	1230	699	343	312	264
28	245	503	354	e308	357	763	514	1100	636	339	413	267
29	263	489	369	e308	365	758	477	975	557	336	507	267
30	279	506	377	e308	—	804	453	863	529	332	540	264
31	266	—	367	e308	—	776	—	846	—	331	467	—
TOTAL	7349	14356	12607	10662	9388	27030	15189	32835	21886	13975	10627	8799
MEAN	237	479	407	344	324	872	506	1059	730	451	343	293
MAX	312	794	603	540	386	1980	695	2520	1160	706	540	393
MIN	203	254	339	308	308	408	412	416	529	331	282	255
CFSM	0.58	1.18	1.00	0.85	0.80	2.15	1.25	2.61	1.80	1.11	0.84	0.72
IN.	0.67	1.32	1.16	0.98	0.86	2.48	1.39	3.01	2.01	1.28	0.97	0.81

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 2004, BY WATER YEAR (WY)

	MEAN	377	452	469	444	462	634	647	511	414	310	300	337
MAX	912	906	896	641	760	1449	1224	1059	747	523	484	1071	
(WY)	1987	1986	1992	1973	1985	1976	1967	2004	1989	1982	1982	1986	
MIN	226	263	286	252	240	380	315	259	230	202	186	188	
(WY)	1972	2000	1959	1959	1959	2000	1958	1958	1958	1964	1958	2003	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1957 - 2004

ANNUAL TOTAL	115929						184703						
ANNUAL MEAN	318						505						
HIGHEST ANNUAL MEAN										446			
LOWEST ANNUAL MEAN										635			1976
HIGHEST DAILY MEAN										288			1958
LOWEST DAILY MEAN										4650		Sep 1	1975
ANNUAL SEVEN-DAY MINIMUM										162		Sep 13	2003
MAXIMUM PEAK FLOW										167		Sep 8	2003
MAXIMUM PEAK STAGE										5400		Sep 1	1975
INSTANTANEOUS LOW FLOW										7.46		Sep 1	1975
ANNUAL RUNOFF (CFSM)										161			(a)
ANNUAL RUNOFF (INCHES)										1.10			
10 PERCENT EXCEEDS										14.94			
50 PERCENT EXCEEDS										695			
90 PERCENT EXCEEDS										390			
										252			

(a) Part of each day Sept. 12-14, 2003.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122500 PERE MARQUETTE RIVER AT SCOTTVILLE, MI

LOCATION.--Lat 43°56'42", long 86°16'43", in NW1/4 NW1/4 sec.19, T.18 N., R.16 W., Mason County, Hydrologic Unit 04060101, on right bank 20 ft upstream from bridge on South Main Street at south edge of Scottville, 1.4 mi upstream from India Creek, and 5.6 mi downstream from Big South Branch.

DRAINAGE AREA.--681 mi².

PERIOD OF RECORD.--August 1939 to current year. Prior to October 1942, published as "at Custer".

REVISED RECORDS.--WSP 1437: 1941(M), 1943(M), 1949(M), 1950. WDR MI-81-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 597.66 ft above sea level. Prior to June 12, 1943, nonrecording gage at bridge 4.5 mi upstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Gage-height telemeter 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	439	505	1010	758	e750	809	1400	857	1610	877	634	716
2	440	525	961	729	e750	1080	1280	851	1560	840	624	664
3	477	572	897	781	e800	1370	1170	911	1520	808	617	631
4	541	807	829	851	e800	1610	1090	905	1420	916	617	617
5	581	966	768	916	e800	2020	1010	848	1320	1000	596	601
6	562	1080	727	897	e800	2500	958	803	1220	1100	610	592
7	501	1160	701	e700	e750	2760	914	785	1130	1120	592	589
8	468	1140	679	e600	e700	2880	893	925	e1040	1060	582	579
9	450	954	663	e650	e750	2660	881	1230	e1750	981	594	565
10	442	819	753	e650	e750	2340	892	1590	2310	922	607	550
11	442	760	893	e700	e750	2110	893	1920	2140	883	611	538
12	442	726	990	e850	e750	1930	864	2030	2020	850	634	527
13	442	724	1020	e850	e750	1790	833	1980	1880	814	636	516
14	460	711	914	e850	e750	1650	807	1900	1670	792	633	506
15	487	690	850	e700	e750	1510	790	1810	1520	786	614	497
16	504	660	842	e600	e700	1470	776	1730	1470	797	594	518
17	501	637	850	e600	e700	1370	754	1630	1480	849	586	513
18	482	741	854	e650	e750	1280	809	1590	1500	869	596	523
19	467	949	839	e700	e750	1210	866	1640	1510	925	629	508
20	459	1160	811	e750	e750	1170	925	1730	1480	1030	624	493
21	453	1300	784	e750	e750	1160	985	1750	1320	1030	610	483
22	452	1320	767	e750	e750	1200	980	1650	1150	886	588	474
23	448	1200	768	e700	e750	1220	974	1750	1040	794	571	467
24	450	1140	766	e700	744	1180	936	2110	1010	749	561	461
25	466	1170	764	e700	718	1110	883	2160	1000	714	585	454
26	473	1220	748	e700	729	1150	878	2240	1050	690	569	452
27	480	1200	732	e700	726	1230	927	2240	1060	673	647	452
28	484	1130	734	e750	716	1360	955	1990	1000	664	667	452
29	488	1090	769	e750	726	1570	925	1700	948	653	755	450
30	511	1050	778	e750	---	1580	885	1500	916	647	784	451
31	517	---	780	e750	---	1490	---	1550	---	640	777	---
TOTAL	14809	28106	25241	22782	21659	49769	28133	48305	42044	26359	19344	15839
MEAN	478	937	814	735	747	1605	938	1558	1401	850	624	528
MAX	581	1320	1020	916	800	2880	1400	2240	2310	1120	784	716
MIN	439	505	663	600	700	809	754	785	916	640	561	450
CFSM	0.70	1.38	1.20	1.08	1.10	2.36	1.38	2.29	2.06	1.25	0.92	0.78
IN.	0.81	1.54	1.38	1.24	1.18	2.72	1.54	2.64	2.30	1.44	1.06	0.87

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2004, BY WATER YEAR (WY)

MEAN	602	708	729	704	725	980	1029	804	688	535	495	542
MAX	1507	1523	1311	1129	1301	1779	1732	1558	1401	1232	826	1880
(WY)	1987	1986	1992	1985	1984	1976	1993	2004	2004	1969	1994	1986
MIN	379	439	449	427	440	526	550	425	408	368	354	369
(WY)	1957	1945	1945	1945	1958	1940	1945	1958	1964	1963	1941	1948

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1939 - 2004

ANNUAL TOTAL	213535						342390					
ANNUAL MEAN	585						935			711		
HIGHEST ANNUAL MEAN										1087		1986
LOWEST ANNUAL MEAN										472		1958
HIGHEST DAILY MEAN	1320				Nov 22		2880	Mar 8		6020	Sep 13	1986
LOWEST DAILY MEAN	335				Sep 14		439	Oct 1		310	Aug 9	1941
ANNUAL SEVEN-DAY MINIMUM	341				Sep 9		449	Oct 8		322	Aug 5	1941
MAXIMUM PEAK FLOW							2910	Mar 8		6440	Sep 13	1986
MAXIMUM PEAK STAGE							5.70	Mar 8		8.07	Sep 13	1986
INSTANTANEOUS LOW FLOW							437	(a)		(b)209	Dec 11	1962
ANNUAL RUNOFF (CFSM)	0.859						1.37			1.04		
ANNUAL RUNOFF (INCHES)	11.66						18.70			14.19		
10 PERCENT EXCEEDS	919						1600			1080		
50 PERCENT EXCEEDS	497						791			633		
90 PERCENT EXCEEDS	379						501			428		

(a) Oct. 1, 2.

(b) Discharge measurement.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

444351084561801 BEAR LAKE NEAR KALKASKA, MI

LOCATION (REVISED).--Lat 44°43'57", long 84°56'56", in NW1/4 SE1/4 sec.17, T.27 N., R.5 W., Kalkaska County, Hydrologic Unit 04060103, on west shore of Bear Lake, 11.7 mi east of Kalkaska.

DRAINAGE AREA.--Not determined.

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

GAGE.--Nonrecording gage. Elevation of gage is 1,180 ft above sea level, from topographic map. August 1994 to Sept. 30, 1997, at datum 3.00 ft higher. Oct. 1, 1997 to Sept. 30, 1999, at datum 2.00 ft higher. Prior to June 19, 2000 at site on east shore. June 19, 2000 to May 21, 2002 at site on south shore.

REMARKS.--Staff gage read by observer. No inlets or outlets.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 4.68 ft, Aug. 26, 28, 1994, present datum; minimum observed, 0.96 ft, Nov. 12, 2000.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 3.55 ft, June 18; minimum observed, 1.89 ft, Oct. 30, Nov. 3.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.96	1.92	2.14	--	--	--	--	--	--	3.43	3.33	2.24
2	1.97	1.90	2.15	--	--	--	--	--	--	3.42	3.32	2.23
3	2.02	1.89	2.14	--	--	--	--	--	--	3.41	3.33	2.23
4	2.04	2.01	2.13	--	--	--	--	--	3.37	3.42	3.32	2.21
5	2.06	2.03	2.14	--	--	--	--	--	3.37	3.43	3.32	2.19
6	2.05	2.01	2.13	--	--	--	--	--	3.38	3.44	3.31	2.27
7	2.04	1.99	--	--	--	--	--	--	3.38	3.42	3.28	2.25
8	2.03	1.98	--	--	--	--	--	--	3.38	3.41	3.27	2.22
9	--	1.96	--	--	--	--	--	--	3.40	3.43	3.26	2.19
10	--	1.96	--	--	--	--	--	--	3.41	3.43	3.29	2.20
11	--	1.97	--	--	--	--	--	--	--	3.44	3.29	2.19
12	2.03	1.99	--	--	--	--	--	3.09	--	3.44	3.32	2.20
13	2.02	2.06	--	--	--	--	--	3.12	--	3.46	3.33	2.21
14	2.01	2.07	--	--	--	--	--	3.13	--	3.47	3.33	2.21
15	2.01	2.07	--	--	--	--	--	3.15	--	3.46	3.31	2.20
16	2.00	2.06	--	--	--	--	--	3.17	--	3.47	3.29	2.19
17	1.99	2.04	--	--	--	--	--	3.16	--	3.48	3.29	2.19
18	1.97	2.09	--	--	--	--	--	3.18	3.55	3.46	3.29	2.18
19	1.97	2.10	--	--	--	--	--	3.16	3.51	3.44	3.26	2.17
20	1.95	2.10	--	--	--	--	--	3.19	3.50	3.44	3.25	2.16
21	1.94	2.11	--	--	--	--	--	3.20	3.49	3.45	3.23	2.15
22	1.95	2.13	--	--	--	--	--	3.22	3.49	3.43	3.25	2.14
23	1.94	2.14	--	--	--	--	--	3.26	3.47	3.42	3.21	2.12
24	1.93	2.14	--	--	--	--	--	3.32	3.47	3.40	3.20	2.11
25	1.93	2.13	--	--	--	--	--	--	3.46	3.39	3.20	2.09
26	1.93	2.14	--	--	--	--	--	--	3.43	3.37	3.19	2.10
27	1.92	2.15	--	--	--	--	--	--	3.41	3.37	3.20	2.09
28	1.91	2.18	--	--	--	--	--	--	--	3.35	3.26	2.07
29	1.92	2.16	--	--	--	--	--	--	--	3.34	2.27	2.04
30	1.89	2.16	--	--	--	--	--	--	--	3.33	2.26	2.02
31	1.90	--	--	--	--	--	--	--	--	3.34	2.25	--
MEAN	--	2.05	--	--	--	--	--	--	--	3.42	3.18	2.17
MAX	--	2.18	--	--	--	--	--	--	--	3.48	3.33	2.27
MIN	--	1.89	--	--	--	--	--	--	--	3.33	2.25	2.02

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124000 MANISTEE RIVER NEAR SHERMAN, MI

LOCATION.--Lat 44°26'11", long 85°41'55", in NE1/4 NE1/4 sec.36, T.24 N., R.12 W., Wexford County, Hydrologic Unit 04060103, on right bank 50 ft downstream from bridge on State Highway 37, 200 ft upstream from Wheeler Creek, 0.9 mi north of Sherman, and at mile 60.8.

DRAINAGE AREA.--857 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1903 to May 1916, October 1930 to September 1931, October 1933 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 1004: 1936(M). WSP 1307: 1911, 1913-14(M), 1934(M), 1936(M), 1937, 1939-40(M). WSP 1437: 1911, 1913(M), 1937. WDR MI-88-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 804.24 ft above sea level. Prior to Apr. 13, 1934, at various datums. Apr. 14, 1934 to Oct. 25, 1990, nonrecording gage at same site and datum.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Gage-height telemeter 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	831	820	1140	1010	e1000	992	2170	1300	1520	943	821	805
2	856	816	1110	994	e1000	1130	2010	1300	1520	926	817	793
3	967	832	1070	1030	e1000	1270	1820	1260	1470	915	811	785
4	1150	1210	1030	1110	e1000	1330	1690	1210	1440	950	801	778
5	1140	1800	1000	1110	e1000	1670	1580	1170	1350	966	798	771
6	1120	1730	985	1050	e1000	2220	1520	1170	1280	979	791	778
7	1080	1550	971	e1000	e950	2070	1490	1160	1230	987	781	801
8	1010	1360	952	e750	e950	1850	1470	1220	1210	972	774	797
9	933	1170	953	e900	e950	1690	1490	1380	1280	958	780	773
10	868	1070	1040	e900	e950	1570	1450	1440	1210	946	802	759
11	827	1040	1210	e950	e950	1530	1400	1440	1170	930	826	750
12	816	1050	1280	e1150	e950	1510	1340	1370	1150	921	847	758
13	800	1130	1210	e1150	e950	1380	1290	1450	1120	912	857	746
14	810	1160	1150	e1150	e950	1340	1250	1620	1110	910	845	756
15	857	1150	1110	e950	e950	1330	1220	1650	1120	914	818	757
16	854	1140	1110	e800	894	1270	1210	1540	1120	930	801	760
17	837	1110	1130	e850	894	1220	1230	1450	1140	913	793	767
18	821	1230	1100	e850	932	1190	1540	1390	1240	902	797	760
19	806	1700	1070	e950	985	1170	1880	1410	1220	884	801	755
20	799	1750	1060	e1000	1000	1250	1770	1440	1170	880	784	747
21	796	1680	1030	e1000	1040	1430	1740	1470	1130	886	775	736
22	800	1570	1020	e1000	1030	1400	1710	1420	1060	905	764	726
23	806	1400	1020	e900	1010	1320	1580	1550	1040	913	761	722
24	794	1440	1010	e900	973	1290	1480	2140	1020	886	757	720
25	800	1420	1010	e950	949	1310	1420	2290	1000	868	792	717
26	806	1340	996	e950	942	1660	1420	2230	983	847	801	717
27	812	1270	972	e950	940	1970	1440	2240	972	841	849	717
28	817	1210	976	e1000	941	2050	1420	2000	983	848	e850	728
29	825	1170	1060	e1000	950	2190	1370	1690	977	828	e845	735
30	831	1160	1080	e1000	--	2240	1310	1510	960	821	e840	747
31	830	--	1050	e1000	--	2240	--	1440	--	822	826	--
TOTAL	27099	38478	32905	30304	28030	48082	45710	47350	35195	28103	25005	22661
MEAN	874	1283	1061	978	967	1551	1524	1527	1173	907	807	755
MAX	1150	1800	1280	1150	1040	2240	2170	2290	1520	987	857	805
MIN	794	816	952	750	894	992	1210	1160	960	821	757	717
CFSM	1.02	1.50	1.24	1.14	1.13	1.81	1.78	1.78	1.37	1.06	0.94	0.88
IN.	1.18	1.67	1.43	1.32	1.22	2.09	1.98	2.06	1.53	1.22	1.09	0.98

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 2004, BY WATER YEAR (WY)

MEAN	971	1050	1032	996	984	1201	1526	1206	1054	934	880	906
MAX	1803	1597	1417	1224	1458	1811	2198	1742	1603	1336	1200	1610
(WY)	1987	1989	1912	1916	1938	1913	1916	1904	1954	1994	1903	1986
MIN	754	780	805	752	604	808	943	834	802	740	722	717
(WY)	2001	1982	2003	2003	1936	1940	2000	1958	1958	1936	1964	1966

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1903 - 2004

ANNUAL TOTAL	338967						408922					
ANNUAL MEAN	929						1117			(a)1061		
HIGHEST ANNUAL MEAN										1261		1912
LOWEST ANNUAL MEAN										864		2003
HIGHEST DAILY MEAN	1800				Nov 5		2290	May 25	3500		Mar 25	1913
LOWEST DAILY MEAN	650				Jan 15		717	Sep 25	540		Feb 21	1936
ANNUAL SEVEN-DAY MINIMUM	675				Sep 8		721	Sep 22	549		Feb 19	1936
MAXIMUM PEAK FLOW							2320	May 25	(b)3570		Mar 25	1913
MAXIMUM PEAK STAGE							14.86	May 25	(c)15.30		Apr 15	2001
ANNUAL RUNOFF (CFSM)	1.08						1.30		1.24			
ANNUAL RUNOFF (INCHES)	14.71						17.75		16.82			
10 PERCENT EXCEEDS	1230						1560		1420			
50 PERCENT EXCEEDS	850						1000		979			
90 PERCENT EXCEEDS	700						792		811			

(a) Does not include water years 1931, 1934.

(b) Gage height 7.1 ft, from graph based on gage readings, datum then in use.

(c) Does not include water years 1903-90.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124000 MANISTEE RIVER NEAR SHERMAN, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1997 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1996 to current year.

DISSOLVED OXYGEN: October 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent.

Dissolved oxygen records rated excellent except the following periods: Dec. 3-6, Feb. 17-19, Mar. 10-14, June 27-30, July 11-16,

Aug. 13-19, Sept. 10-15 rated good; Oct. 1, 2, 7-9, Dec. 7-13, Feb. 20-24, Mar. 15-20, July 1, 17-24, Aug. 20-28, Sept. 16-23 rated fair;

and Oct. 3-6, 10-13, Nov. 18-20, Dec. 14 to Jan. 13, Feb. 25 to Mar. 1, Mar. 21 to Apr. 6, July 25 to Aug. 3 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 24.5°C, Aug. 7, 8, 2001, July 2, 2002; minimum, -0.5°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum, 15.4 mg/L, Mar. 1, 2001; minimum, 5.4 mg/L, Oct. 30, 1996.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 21.5°C, July 22; minimum, 0.0°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 14.7 mg/L, Dec. 27; minimum, 7.3 mg/L, July 1, Aug. 26.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	9.0	7.5	8.0	8.0	8.0	8.0	3.5	2.5	3.0	2.0	1.0	1.5
2	8.0	7.0	7.5	8.0	7.5	8.0	2.5	1.5	2.0	2.5	1.5	2.0
3	7.5	6.5	7.0	8.0	7.0	7.5	1.5	0.5	1.0	3.5	2.5	3.0
4	7.0	6.5	7.0	7.0	6.5	6.5	1.0	0.0	0.5	3.0	2.0	2.5
5	7.0	6.0	6.5	7.0	7.0	7.0	1.5	0.5	1.0	2.0	1.0	1.5
6	7.5	6.0	7.0	7.0	6.0	6.5	1.5	1.0	1.0	1.0	0.0	0.0
7	8.5	6.5	7.5	6.0	4.0	5.0	1.0	0.5	0.5	0.0	0.0	0.0
8	10.0	8.0	9.0	4.0	3.0	3.5	1.5	1.0	1.0	0.0	0.0	0.0
9	11.0	9.5	10.5	3.0	1.5	2.0	3.0	1.5	2.5	0.0	0.0	0.0
10	12.0	10.0	11.0	3.0	1.5	2.0	3.5	3.0	3.0	0.0	0.0	0.0
11	13.0	11.0	12.0	4.0	3.0	3.5	3.5	2.5	3.0	0.0	0.0	0.0
12	13.0	12.0	12.5	5.5	4.0	4.5	2.5	1.5	2.0	0.0	0.0	0.0
13	12.0	11.0	11.5	5.0	3.5	4.0	1.5	0.5	0.5	0.0	0.0	0.0
14	12.0	10.5	11.0	4.0	3.5	3.5	0.5	0.0	0.5	0.0	0.0	0.0
15	10.5	9.5	10.0	3.5	3.0	3.5	1.5	0.5	1.0	0.0	0.0	0.0
16	9.5	8.5	9.0	4.5	3.5	4.0	2.0	1.5	1.5	0.0	0.0	0.0
17	8.5	7.0	8.0	5.0	4.5	5.0	2.0	1.5	2.0	0.0	0.0	0.0
18	9.0	7.5	8.0	6.5	5.0	6.0	2.0	1.5	1.5	0.0	0.0	0.0
19	8.5	7.5	8.0	7.0	6.5	7.0	1.5	1.0	1.5	0.0	0.0	0.0
20	10.0	7.5	8.5	6.5	6.0	6.5	1.0	1.0	1.0	0.0	0.0	0.0
21	10.0	9.0	9.5	6.5	6.0	6.5	1.5	0.5	1.0	0.0	0.0	0.0
22	9.0	8.0	8.5	6.0	5.5	5.5	2.0	1.5	1.5	0.0	0.0	0.0
23	8.0	7.0	7.5	7.0	5.5	6.0	2.5	2.0	2.0	0.0	0.0	0.0
24	7.5	6.5	7.0	7.0	4.5	6.0	2.5	2.0	2.0	0.0	0.0	0.0
25	8.5	7.5	8.0	4.5	4.0	4.0	2.0	2.0	2.0	0.0	0.0	0.0
26	8.0	7.5	7.5	4.0	3.0	3.5	2.0	1.0	1.0	0.0	0.0	0.0
27	7.5	6.5	7.0	3.5	3.0	3.0	1.5	0.5	1.0	0.0	0.0	0.0
28	6.5	6.0	6.5	3.5	3.0	3.5	2.5	1.5	2.0	0.0	0.0	0.0
29	6.5	6.0	6.0	3.5	3.0	3.5	3.0	2.5	3.0	0.0	0.0	0.0
30	7.5	6.0	6.5	3.5	3.0	3.0	3.0	2.5	2.5	0.0	0.0	0.0
31	8.0	7.5	8.0	—	—	—	2.5	2.0	2.5	0.0	0.0	0.0
MONTH	13.0	6.0	8.4	8.0	1.5	4.9	3.5	0.0	1.6	3.5	0.0	0.3

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124000 MANISTEE RIVER NEAR SHERMAN, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	0.0	0.0	0.0	4.5	3.5	4.0	6.5	5.0	6.0	11.5	10.5	11.0
2	0.0	0.0	0.0	4.5	4.0	4.0	7.0	5.0	6.0	10.5	9.5	10.0
3	0.0	0.0	0.0	4.0	4.0	4.0	6.5	5.5	6.0	10.5	8.5	9.5
4	0.0	0.0	0.0	4.5	3.5	4.0	7.0	5.5	6.0	9.5	8.0	9.0
5	0.0	0.0	0.0	4.0	3.0	3.5	7.0	4.5	5.5	11.0	8.0	9.5
6	0.0	0.0	0.0	3.0	2.0	2.0	7.5	5.5	6.5	11.0	9.5	10.0
7	0.0	0.0	0.0	2.5	2.0	2.0	8.5	6.0	7.0	12.0	9.5	10.5
8	0.0	0.0	0.0	2.5	2.0	2.5	8.0	7.0	7.5	11.5	10.0	10.5
9	0.0	0.0	0.0	3.0	2.0	2.5	8.0	7.0	7.5	11.0	10.0	10.5
10	0.0	0.0	0.0	3.5	2.0	3.0	7.5	6.5	6.5	13.0	10.5	12.0
11	0.0	0.0	0.0	3.5	2.5	3.5	7.0	5.5	6.0	15.0	12.0	13.5
12	0.0	0.0	0.0	2.5	1.5	2.0	6.0	5.0	5.5	17.5	14.0	15.5
13	0.0	0.0	0.0	2.0	0.0	1.0	7.5	5.0	6.0	17.0	16.0	16.5
14	0.0	0.0	0.0	2.0	1.5	1.5	9.0	6.0	7.5	17.0	14.5	15.5
15	0.0	0.0	0.0	2.5	1.5	2.0	10.5	7.5	9.0	14.5	13.0	13.5
16	0.0	0.0	0.0	3.0	1.5	2.5	12.5	9.5	11.0	14.5	12.0	13.5
17	0.0	0.0	0.0	3.0	2.0	2.5	13.0	11.5	12.5	15.5	13.0	14.0
18	0.0	0.0	0.0	4.0	2.5	3.0	13.0	11.5	12.5	15.0	13.5	14.0
19	0.0	0.0	0.0	5.0	3.5	4.0	13.0	12.0	12.5	15.0	12.5	14.0
20	0.5	0.0	0.0	6.0	4.5	5.0	12.0	10.5	11.0	16.0	14.0	14.5
21	0.5	0.0	0.0	5.0	3.5	4.0	11.0	10.0	10.5	15.5	14.0	14.5
22	1.5	0.0	1.0	3.5	2.0	3.0	11.5	9.5	10.5	14.5	13.5	14.0
23	1.5	0.5	1.0	3.5	2.5	3.0	11.5	9.0	10.5	13.5	12.0	13.0
24	2.5	1.5	2.0	4.0	3.0	3.0	11.5	9.5	10.5	12.0	11.5	11.5
25	3.5	2.0	2.5	5.5	4.0	4.5	11.0	9.5	10.0	12.0	11.0	11.5
26	3.0	1.5	2.5	6.0	5.5	5.5	10.0	8.5	9.5	13.0	11.5	12.0
27	3.5	1.5	2.5	6.5	5.5	6.0	9.5	8.0	8.5	13.0	11.5	12.5
28	3.5	2.0	2.5	6.0	5.5	6.0	10.0	8.0	9.0	14.0	11.5	12.5
29	4.5	3.0	3.5	7.0	6.0	6.5	12.5	10.0	11.0	13.5	11.5	12.5
30	---	---	---	6.5	5.5	6.5	12.0	11.0	11.5	14.0	12.5	13.5
31	---	---	---	7.0	5.5	6.0	---	---	---	14.0	13.0	13.5
MONTH	4.5	0.0	0.6	7.0	0.0	3.6	13.0	4.5	8.7	17.5	8.0	12.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	15.0	13.0	14.0	20.0	17.5	18.5	19.0	16.5	18.0	17.0	15.0	16.0
2	16.0	14.0	15.0	20.0	17.0	18.5	19.5	17.5	18.5	18.0	15.5	16.5
3	16.0	13.5	14.5	20.0	17.5	19.0	20.0	17.5	19.0	18.0	16.0	17.0
4	16.5	13.5	15.0	19.5	18.0	18.5	20.5	18.0	19.0	18.5	16.5	17.5
5	16.5	14.0	15.5	18.5	17.0	17.5	19.0	17.0	18.0	18.5	16.5	17.5
6	17.0	15.0	16.0	17.5	16.0	16.5	18.5	15.5	17.0	18.5	17.0	18.0
7	19.0	15.5	17.0	16.0	15.0	15.5	18.0	15.5	16.5	18.0	16.5	17.0
8	20.5	17.5	19.0	15.0	14.0	14.5	18.0	15.5	17.0	17.0	15.0	16.0
9	20.0	19.0	19.5	14.5	13.5	14.0	18.0	16.5	17.5	16.0	14.5	15.5
10	19.5	18.0	18.0	17.5	13.5	15.5	17.5	16.0	17.0	15.5	13.5	15.0
11	18.0	16.0	16.5	18.5	15.5	17.0	16.0	14.5	15.0	16.0	14.0	15.0
12	17.5	15.0	16.0	20.0	17.5	18.5	14.5	13.5	14.0	17.0	15.0	16.0
13	18.0	15.5	16.5	20.5	18.0	19.5	15.5	13.5	14.5	18.0	15.5	16.5
14	18.0	16.0	17.0	19.5	18.5	19.0	15.5	13.0	14.5	18.5	16.5	17.5
15	19.0	16.0	17.5	19.5	17.0	18.5	16.5	13.5	15.0	19.5	17.0	18.5
16	20.0	17.0	18.5	19.0	17.0	18.0	16.0	13.5	15.0	19.0	17.0	18.0
17	19.5	18.0	18.5	19.5	17.0	18.0	16.5	15.0	15.5	17.0	15.0	16.0
18	19.0	17.0	18.0	20.0	17.5	18.5	17.0	15.0	16.0	15.5	13.5	14.5
19	18.5	16.5	17.5	20.0	17.0	18.5	17.0	15.0	16.0	15.0	13.0	14.0
20	18.0	15.5	17.0	21.0	18.0	19.5	16.5	14.5	15.5	15.0	13.5	14.5
21	17.0	15.5	16.0	21.0	18.5	20.0	15.5	13.0	14.5	15.0	13.0	14.0
22	17.0	15.0	16.0	21.5	19.5	20.5	16.0	12.5	14.5	15.0	13.0	14.0
23	17.5	15.0	16.5	20.0	18.0	19.0	17.5	14.5	16.0	15.5	13.0	14.5
24	17.0	15.0	15.5	18.5	16.5	17.5	18.0	15.5	17.0	16.0	14.0	15.0
25	16.0	13.5	15.0	18.5	15.5	17.0	18.0	17.0	17.5	15.5	14.0	14.5
26	16.5	14.0	15.0	18.5	15.5	17.0	18.5	17.5	18.0	14.5	12.5	13.5
27	17.0	14.0	15.5	18.5	16.5	17.5	19.5	17.5	18.5	14.0	12.0	13.0
28	17.5	15.0	16.5	19.5	16.5	18.0	18.5	17.5	18.0	14.0	13.0	13.5
29	18.5	16.0	17.0	19.5	17.0	18.5	---	---	---	13.0	11.5	12.5
30	19.5	16.5	18.0	19.0	17.5	18.0	---	---	---	12.0	10.5	11.5
31	---	---	---	18.5	17.0	17.5	16.5	14.5	15.5	---	---	---
MONTH	20.5	13.0	16.6	21.5	13.5	17.9	---	---	---	19.5	10.5	15.4

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124000 MANISTEE RIVER NEAR SHERMAN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
1	11.2	10.6	10.9	10.8	10.2	10.5	13.0	12.5	12.7	14.4	13.0	13.7			
2	11.5	10.8	11.1	10.8	10.4	10.5	13.6	12.9	13.3	14.2	13.5	13.9			
3	11.1	10.8	11.0	11.0	10.4	10.7	13.9	13.3	13.7	13.5	12.6	13.2			
4	10.8	10.5	10.7	11.0	10.1	10.7	13.8	13.0	13.5	13.4	13.0	13.2			
5	11.1	10.6	10.8	10.5	9.3	9.8	14.0	13.3	13.7	13.7	13.1	13.4			
6	11.1	10.9	11.0	10.7	10.0	10.5	14.0	13.6	13.8	13.1	11.8	12.5			
7	11.2	10.7	11.0	11.2	10.6	11.0	14.2	13.2	13.8	13.5	11.4	12.5			
8	11.0	10.4	10.7	12.1	11.1	11.7	14.1	13.6	13.9	13.4	12.9	13.1			
9	11.1	10.5	10.8	12.3	11.8	12.0	13.6	13.2	13.4	13.1	12.6	12.8			
10	11.3	10.7	10.9	12.0	11.5	11.8	13.3	12.7	12.9	13.1	12.7	12.9			
11	11.0	10.5	10.7	11.7	11.0	11.3	13.1	12.6	12.8	12.9	12.3	12.6			
12	10.7	9.8	10.1	11.3	10.7	11.0	13.9	13.1	13.5	12.5	11.6	12.0			
13	10.6	9.9	10.3	11.6	10.6	11.1	14.1	13.7	13.9	12.6	11.7	12.3			
14	—	—	—	11.4	10.8	11.2	14.1	13.6	13.8	12.8	12.1	12.5			
15	—	—	—	11.4	10.9	11.2	13.9	13.5	13.7	12.3	11.8	12.1			
16	—	—	—	11.2	10.3	10.7	13.6	13.0	13.3	12.3	11.8	12.1			
17	—	—	—	11.0	10.5	10.8	13.8	13.4	13.6	12.3	11.9	12.1			
18	—	—	—	10.7	10.2	10.5	14.0	13.6	13.8	12.2	11.7	12.1			
19	—	—	—	10.3	9.5	10.0	14.2	13.8	14.0	12.1	11.7	11.8			
20	—	—	—	10.3	9.6	10.0	14.6	14.1	14.3	12.1	11.5	11.8			
21	—	—	—	—	—	—	14.5	14.1	14.3	12.0	11.7	11.9			
22	10.9	10.3	10.6	—	—	—	14.2	13.8	14.0	12.0	11.6	11.8			
23	11.3	10.6	10.9	—	—	—	13.8	13.3	13.5	11.9	11.6	11.7			
24	11.4	11.0	11.2	—	—	—	13.7	13.0	13.4	11.6	11.4	11.6			
25	11.1	10.7	10.9	—	—	—	13.9	13.3	13.6	11.6	11.4	11.5			
26	10.9	10.7	10.8	12.4	11.8	12.1	14.4	13.6	14.1	11.5	11.2	11.3			
27	11.0	10.6	10.8	12.5	12.1	12.3	14.7	13.9	14.3	11.3	11.0	11.2			
28	11.0	10.1	10.8	12.4	12.2	12.3	14.3	13.5	13.9	11.1	10.8	11.0			
29	11.1	10.8	10.9	12.6	12.2	12.4	13.6	13.2	13.3	11.3	10.8	11.1			
30	11.2	10.8	11.0	12.7	12.4	12.6	13.3	12.8	13.0	11.3	10.8	11.0			
31	10.9	10.3	10.5	—	—	—	13.1	12.5	12.8	11.2	10.8	11.0			
MONTH	—	—	—	—	—	—	14.7	12.5	13.6	14.4	10.8	12.2			

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	11.5	10.7	11.0	12.9	11.8	12.4	12.9	12.0	12.7	10.1	9.7	9.9	
2	11.7	11.3	11.5	11.9	11.6	11.8	13.2	12.7	13.0	10.5	10.0	10.3	
3	11.8	11.0	11.4	11.9	11.8	11.8	12.9	11.9	12.6	10.7	10.3	10.5	
4	11.9	11.5	11.8	11.9	11.8	11.8	13.5	11.9	12.4	11.0	10.0	10.6	
5	11.8	11.3	11.6	11.9	11.7	11.8	12.7	11.6	12.0	10.8	10.3	10.6	
6	11.6	11.2	11.4	12.2	11.8	12.0	11.8	11.2	11.5	10.3	10.0	10.2	
7	11.6	11.1	11.4	11.8	11.2	11.4	11.5	11.0	11.4	10.6	10.0	10.3	
8	11.9	11.5	11.7	11.8	11.4	11.7	11.0	10.9	11.0	10.3	10.0	10.1	
9	11.8	11.3	11.6	12.0	11.7	11.9	11.2	10.9	11.1	10.2	9.9	10.1	
10	11.7	11.3	11.5	11.9	11.4	11.8	11.6	11.1	11.4	10.0	9.5	9.9	
11	11.9	11.5	11.8	12.0	11.2	11.5	11.8	11.4	11.6	9.7	9.1	9.5	
12	11.9	11.4	11.7	12.4	11.8	12.1	12.0	11.6	11.8	9.2	8.7	9.0	
13	12.1	11.7	11.9	12.6	11.3	12.1	11.9	11.5	11.8	8.7	8.4	8.6	
14	12.2	11.7	11.9	12.5	12.0	12.3	11.5	11.0	11.4	8.7	8.4	8.5	
15	13.1	11.4	12.3	12.5	12.2	12.4	11.1	10.6	10.9	9.3	8.7	9.1	
16	13.4	11.6	12.7	12.5	12.1	12.4	10.6	10.1	10.4	9.6	9.2	9.4	
17	13.5	13.1	13.3	12.4	12.0	12.2	10.2	9.9	10.0	9.3	8.9	9.2	
18	13.6	12.9	13.3	12.2	11.5	11.9	9.9	9.5	9.8	9.2	8.8	9.0	
19	13.5	13.0	13.2	11.8	11.1	11.6	9.5	9.3	9.4	9.6	9.0	9.3	
20	13.2	12.9	13.1	11.1	10.5	10.7	10.0	9.5	9.8	9.2	8.8	9.0	
21	13.7	12.8	13.1	11.1	10.3	10.7	10.0	9.9	10.0	9.1	8.8	8.9	
22	14.4	13.0	13.7	11.5	10.4	11.0	10.3	10.0	10.2	9.2	8.8	9.0	
23	14.2	13.3	13.6	11.5	10.0	10.4	10.5	10.2	10.3	9.3	9.0	9.1	
24	13.9	13.2	13.4	12.5	11.4	12.2	10.4	10.1	10.3	9.3	9.2	9.2	
25	14.0	13.5	13.7	12.4	11.6	12.1	10.3	10.1	10.2	9.3	9.2	9.3	
26	14.1	13.2	13.8	11.6	9.9	11.1	10.5	10.2	10.4	9.2	8.9	9.1	
27	13.8	13.2	13.6	11.8	11.0	11.6	10.9	10.4	10.7	9.0	8.8	8.9	
28	13.8	13.1	13.5	12.2	11.2	11.7	10.9	10.4	10.7	—	—	—	
29	13.2	12.6	13.0	12.0	11.4	11.7	10.4	9.8	10.2	—	—	—	
30	—	—	—	12.0	11.4	11.8	9.9	9.7	9.8	—	—	—	
31	—	—	—	12.4	11.8	12.1	—	—	—	—	—	—	
MONTH	14.4	10.7	12.5	12.9	9.9	11.7	13.5	9.3	11.0	—	—	—	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124000 MANISTEE RIVER NEAR SHERMAN, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	8.6	7.3	7.9	9.3	8.6	8.9	9.1	8.4	8.7
2	—	—	—	9.2	8.3	8.7	8.9	8.3	8.7	8.9	8.2	8.5
3	9.4	8.9	9.2	9.2	8.2	8.6	9.6	8.4	9.0	8.8	8.1	8.4
4	9.4	9.0	9.2	8.4	7.9	8.1	9.6	8.7	9.1	8.7	8.0	8.3
5	9.2	8.8	9.0	9.0	8.0	8.5	9.7	8.8	9.2	8.4	7.8	8.2
6	8.9	8.5	8.7	8.9	8.4	8.7	9.9	9.1	9.4	8.3	7.8	8.0
7	8.9	8.4	8.6	9.3	8.7	9.0	9.9	9.1	9.5	8.7	7.9	8.2
8	8.8	8.2	8.4	9.5	8.9	9.2	9.8	9.1	9.4	8.9	8.1	8.5
9	8.2	7.9	8.1	10.0	9.2	9.5	9.4	8.9	9.1	9.1	8.3	8.7
10	8.6	7.9	8.2	9.9	9.1	9.5	9.2	8.7	8.9	9.2	8.5	8.8
11	8.9	8.3	8.5	9.4	8.7	9.0	9.6	8.8	9.2	9.0	8.3	8.6
12	8.9	8.5	8.7	9.1	8.3	8.7	9.8	9.1	9.4	8.9	8.1	8.5
13	8.6	8.2	8.4	9.0	8.1	8.5	9.9	9.2	9.6	9.0	8.1	8.5
14	8.7	8.1	8.3	8.8	8.0	8.4	9.7	9.1	9.3	8.7	7.9	8.3
15	8.6	8.0	8.2	9.1	8.2	8.6	9.6	8.9	9.3	8.6	8.0	8.3
16	8.4	7.8	8.1	8.9	8.2	8.6	9.6	8.9	9.2	8.8	7.9	8.3
17	8.1	7.6	7.8	9.2	8.4	8.7	9.1	8.5	8.8	9.1	8.3	8.7
18	8.1	7.7	7.9	9.1	8.4	8.7	9.0	8.4	8.7	9.2	8.4	8.8
19	8.6	7.8	8.2	9.0	8.2	8.5	9.1	8.3	8.7	9.3	8.5	8.9
20	8.7	8.2	8.4	8.7	8.0	8.3	9.2	8.4	8.8	9.4	8.6	9.0
21	8.6	8.2	8.4	8.5	7.9	8.2	9.4	8.5	9.0	9.5	8.7	9.1
22	8.8	8.3	8.5	8.5	7.7	8.1	9.3	8.5	8.9	9.4	8.7	9.0
23	8.9	8.3	8.5	8.8	7.9	8.3	8.9	8.2	8.5	9.6	8.5	9.0
24	8.8	8.1	8.4	9.1	8.3	8.7	8.6	7.8	8.2	9.2	8.7	9.0
25	9.2	8.4	8.8	9.4	8.7	9.0	8.0	7.5	7.7	9.2	8.6	8.9
26	9.0	8.3	8.6	9.6	8.7	9.1	8.1	7.3	7.7	9.5	8.8	9.1
27	8.9	8.2	8.5	9.3	8.6	8.9	8.1	7.5	7.8	9.6	8.9	9.2
28	8.8	8.0	8.3	8.8	8.3	8.6	8.2	7.6	7.8	9.1	8.6	8.8
29	8.6	7.9	8.2	8.6	7.9	8.2	—	—	—	9.4	8.8	9.0
30	8.5	7.6	7.9	8.4	7.7	8.1	—	—	—	9.4	8.8	9.1
31	—	—	—	8.8	8.1	8.4	9.0	8.5	8.7	—	—	—
MONTH	—	—	—	10.0	7.3	8.6	—	—	—	9.6	7.8	8.7

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124200 MANISTEE RIVER NEAR MESICK, MI

LOCATION.--Lat 44°21'47", long 85°49'15", in SE1/4 NE1/4 sec.25, T.23 N., R.13 W., Manistee County, Hydrologic Unit 04060103, on right bank 200 ft downstream from Hodenpyl Dam, 6.2 mi southwest of Mesick.

DRAINAGE AREA.--1,018 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--December 1996 to current year.

GAGE.--Water-stage recorder. Datum of gage is 732.22 ft above sea level (Consumers Energy bench mark).

REMARKS.--Water-discharge records good. Flow completely regulated by Hodenpyl Dam 200 ft upstream. Gage-height telemeter 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	1000	916	1250	1190	1070	1200	2350	1460	1660	1170	1030	985
2	1020	993	1210	1150	1090	1260	2090	1460	1560	1150	1000	964
3	1190	979	1180	1150	1110	1340	1950	1390	1530	1140	986	952
4	1330	1360	1160	1150	1140	1480	1840	1320	1550	1270	943	974
5	1210	1640	1110	1240	1160	1780	1560	1310	1510	1180	913	978
6	1190	1700	1080	1240	1110	2090	1760	1330	1400	1110	914	924
7	1190	1620	1080	962	1060	2270	1660	1360	1320	1110	914	936
8	1190	1510	1080	764	1020	1960	1590	1500	1300	1150	914	972
9	1070	1280	1080	975	1070	1710	1550	1560	1480	1170	956	935
10	996	1180	1210	943	1170	1640	1530	1570	1420	1140	964	931
11	980	1150	1380	968	1140	1620	1500	1590	1320	1120	1010	926
12	977	1190	1380	1200	1110	1600	1460	1460	1280	1110	1020	900
13	903	1250	1350	1230	1100	1510	1410	1640	1240	1080	1010	893
14	926	1280	1270	1220	1080	1450	1370	1880	1250	1070	996	900
15	986	1280	1210	990	1080	1440	1370	1810	1250	1070	992	911
16	986	1270	1280	830	957	1400	1340	1610	1240	1070	958	923
17	986	1240	1330	900	946	1400	1370	1570	1410	1090	962	935
18	965	1410	1270	898	1040	1300	1690	1580	1380	1100	873	926
19	955	1700	1190	1040	1130	1250	1990	1480	1330	1100	903	910
20	892	1710	1160	1050	1170	1460	1950	1680	1290	1100	943	879
21	866	1650	1160	1080	1190	1530	1890	1670	1260	1090	958	887
22	974	1700	1160	1080	1190	1490	1790	1620	1210	1090	951	906
23	1010	1610	1160	922	1160	1490	1690	1770	1190	1090	936	907
24	946	1480	1160	1010	1130	1510	1610	2180	1190	1090	911	909
25	900	1440	1160	1010	1050	1460	1610	2550	1180	1070	950	904
26	938	1420	1160	1010	1020	1820	1540	2450	1170	996	973	856
27	984	1380	1130	1020	1070	2090	1530	2350	1130	998	1140	838
28	984	1340	1100	1080	1150	2130	1610	2270	1100	1010	1070	875
29	985	1310	1130	1040	1140	2430	1570	1680	1130	1010	959	879
30	986	1280	1210	1070	—	2410	1490	1620	1150	1020	909	881
31	932	—	1250	1070	—	2410	—	1630	—	1030	960	—
TOTAL	31447	41268	37040	32482	31853	51930	49660	52350	39430	33994	29918	27496
MEAN	1014	1376	1195	1048	1098	1675	1655	1689	1314	1097	965	917
MAX	1330	1710	1380	1240	1190	2430	2350	2550	1660	1270	1140	985
MIN	866	916	1080	764	946	1200	1340	1310	1100	996	873	838
CFSM	1.00	1.35	1.17	1.03	1.08	1.65	1.63	1.66	1.29	1.08	0.95	0.90
IN.	1.15	1.51	1.35	1.19	1.16	1.90	1.81	1.91	1.44	1.24	1.09	1.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2004, BY WATER YEAR (WY)

	MEAN	1038	1106	1091	1077	1142	1317	1546	1364	1150	1001	939	920
MAX	1204	1376	1266	1359	1328	1675	1954	1761	1314	1155	1042	1006	
(WY)	2002	2004	1997	1997	1997	2004	1997	1997	2004	1999	1997	1997	
MIN	901	965	937	881	932	1080	1042	1076	1032	897	860	867	
(WY)	2001	2003	2001	2003	2003	2001	2000	1999	2003	2000	2001	2003	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1997 - 2004

ANNUAL TOTAL	389801		458868										
ANNUAL MEAN	1068		1254							1119			
HIGHEST ANNUAL MEAN										1254		2004	
LOWEST ANNUAL MEAN										1009		2003	
HIGHEST DAILY MEAN	1870					2550		May 25		2950		Apr 15 2001	
LOWEST DAILY MEAN	708			Apr 19		764		Jan 8		648		Dec 4 2002	
ANNUAL SEVEN-DAY MINIMUM	792			Jan 15		877		Sep 24		792		Jan 18 2003	
MAXIMUM PEAK FLOW				Jan 18		2610		May 25		(a)3060		Apr 15 2001	
MAXIMUM PEAK STAGE						5.90		May 25		6.46		Mar 31 1998	
INSTANTANEOUS LOW FLOW						736		Aug 24		449		Aug 31 2001	
ANNUAL RUNOFF (CFSM)	1.05					1.23				1.10			
ANNUAL RUNOFF (INCHES)	14.24					16.77				14.94			
10 PERCENT EXCEEDS	1370					1670				1440			
50 PERCENT EXCEEDS	996					1160				1060			
90 PERCENT EXCEEDS	832					925				877			

(a) Gage height 6.37 ft.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124200 MANISTEE RIVER NEAR MESICK, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1997 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: December 1996 to current year.

DISSOLVED OXYGEN: December 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent.

Dissolved oxygen records rated excellent except the following periods: Oct. 1-3, Dec. 17-24, Jan 28 to Feb. 4, May 12-16, Aug. 6-13, Sept. 8-12 rated good; Oct. 4, Dec. 25 to Jan. 6, Feb. 5-11, May 17-22, July 2 to Aug. 5, Sept. 13-18 rated fair; and Jan. 7-13, May 23 to June 2, Sept. 19-23 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 23.5°C, Aug. 13, 2001; minimum, 0.0°C, Feb. 10-13, 1997, Feb. 18, 19, 2004.

DISSOLVED OXYGEN: Maximum, 15.3 mg/L, Mar. 15, 1999; minimum, 6.3 mg/L, July 11, 2003.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 20.5°C, Aug. 4, 5; minimum, 0.0°C, Feb. 18, 19.

DISSOLVED OXYGEN: Maximum, 15.0 mg/L, Jan. 15; minimum, 6.5 mg/L, July 27.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	14.5	14.0	14.0	9.0	9.0	9.0	4.0	4.0	4.0	2.0	2.0	2.0
2	14.0	13.5	13.5	9.0	8.5	9.0	4.0	3.5	3.5	2.0	2.0	2.0
3	13.5	13.0	13.0	8.5	8.5	8.5	3.5	3.5	3.5	2.0	2.0	2.0
4	13.0	12.5	12.5	8.5	8.5	8.5	3.5	3.5	3.5	2.0	2.0	2.0
5	—	—	—	8.5	8.0	8.5	3.5	3.0	3.5	2.0	2.0	2.0
6	—	—	—	8.0	8.0	8.0	3.5	3.0	3.0	2.0	2.0	2.0
7	11.5	11.0	11.0	8.0	7.0	7.5	3.0	3.0	3.0	2.0	2.0	2.0
8	11.0	10.5	10.5	7.0	7.0	7.0	3.0	3.0	3.0	2.0	2.0	2.0
9	10.5	10.0	10.0	7.0	6.5	6.5	3.0	3.0	3.0	2.0	2.0	2.0
10	10.5	10.0	10.0	6.5	6.0	6.5	3.0	3.0	3.0	2.0	1.5	1.5
11	10.0	9.5	10.0	6.0	6.0	6.0	3.0	2.5	3.0	1.5	1.5	1.5
12	10.0	9.0	9.5	6.0	6.0	6.0	3.0	2.5	2.5	1.5	1.5	1.5
13	10.5	9.5	10.0	6.0	5.5	5.5	2.5	2.5	2.5	1.5	1.5	1.5
14	11.0	10.0	10.5	5.5	5.5	5.5	2.5	2.0	2.5	1.5	1.5	1.5
15	10.5	10.5	10.5	5.5	5.0	5.5	2.0	2.0	2.0	1.5	1.5	1.5
16	10.5	10.5	10.5	5.0	5.0	5.0	2.0	2.0	2.0	1.5	1.0	1.5
17	10.5	10.5	10.5	5.0	4.5	5.0	2.0	2.0	2.0	1.5	1.0	1.5
18	10.5	10.5	10.5	5.0	4.5	5.0	2.0	2.0	2.0	1.5	1.0	1.0
19	10.5	10.5	10.5	4.5	4.5	4.5	2.0	2.0	2.0	1.0	1.0	1.0
20	10.5	10.5	10.5	4.5	4.5	4.5	2.0	2.0	2.0	1.0	1.0	1.0
21	11.0	10.5	11.0	4.5	4.5	4.5	2.0	2.0	2.0	1.0	1.0	1.0
22	11.0	10.5	10.5	4.5	4.5	4.5	2.0	2.0	2.0	1.0	1.0	1.0
23	10.5	10.5	10.5	4.5	4.5	4.5	2.0	2.0	2.0	1.0	1.0	1.0
24	10.5	10.5	10.5	4.5	4.5	4.5	2.0	2.0	2.0	1.0	1.0	1.0
25	10.5	10.5	10.5	4.5	4.5	4.5	2.0	2.0	2.0	1.0	0.5	1.0
26	10.5	10.0	10.0	4.5	4.5	4.5	2.0	2.0	2.0	0.5	0.5	0.5
27	10.0	10.0	10.0	4.5	4.5	4.5	2.0	2.0	2.0	0.5	0.5	0.5
28	10.0	9.5	9.5	4.5	4.5	4.5	2.0	1.5	2.0	0.5	0.5	0.5
29	9.5	9.5	9.5	4.5	4.5	4.5	2.0	2.0	2.0	0.5	0.5	0.5
30	9.5	9.0	9.5	4.5	4.0	4.0	2.0	1.5	2.0	0.5	0.5	0.5
31	9.0	9.0	9.0	—	—	—	2.0	1.5	2.0	0.5	0.5	0.5
MONTH	—	—	—	9.0	4.0	5.9	4.0	1.5	2.5	2.0	0.5	1.3

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124200 MANISTEE RIVER NEAR MESICK, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	0.5	0.5	0.5	0.5	0.5	0.5	6.0	5.0	5.5	11.5	11.0	11.0	
2	0.5	0.5	0.5	0.5	0.5	0.5	6.5	5.5	6.0	11.0	11.0	11.0	
3	0.5	0.5	0.5	0.5	0.5	0.5	6.5	6.0	6.0	11.0	11.0	11.0	
4	0.5	0.5	0.5	1.0	0.5	0.5	6.5	6.0	6.0	11.0	10.5	10.5	
5	0.5	0.5	0.5	1.0	1.0	1.0	6.5	6.0	6.0	11.0	10.5	11.0	
6	0.5	0.5	0.5	1.5	1.0	1.0	6.5	6.0	6.0	11.0	10.5	11.0	
7	0.5	0.5	0.5	1.5	1.5	1.5	7.0	6.0	6.5	11.0	11.0	11.0	
8	0.5	0.5	0.5	2.0	1.5	1.5	7.0	6.5	6.5	11.0	11.0	11.0	
9	0.5	0.5	0.5	2.0	2.0	2.0	7.0	6.5	7.0	11.5	11.0	11.0	
10	0.5	0.5	0.5	2.5	2.0	2.0	7.0	6.5	7.0	11.5	11.0	11.5	
11	0.5	0.5	0.5	2.5	2.5	2.5	7.0	6.5	7.0	12.0	11.5	11.5	
12	0.5	0.5	0.5	2.5	2.5	2.5	7.0	6.5	7.0	12.0	11.5	11.5	
13	0.5	0.5	0.5	2.5	2.5	2.5	7.5	6.5	7.0	12.5	12.0	12.5	
14	0.5	0.5	0.5	2.5	2.0	2.5	7.5	7.0	7.0	13.5	12.5	13.0	
15	0.5	0.5	0.5	2.5	2.0	2.5	7.5	7.0	7.0	14.0	13.0	13.5	
16	0.5	0.5	0.5	2.5	2.5	2.5	8.0	7.0	7.5	14.0	13.5	13.5	
17	0.5	0.5	0.5	2.5	2.5	2.5	8.5	8.0	8.5	14.0	13.5	13.5	
18	0.5	0.0	0.5	2.5	2.0	2.0	9.0	8.5	8.5	14.5	14.0	14.0	
19	0.5	0.0	0.5	2.0	2.0	2.0	10.0	8.5	9.5	14.5	14.0	14.5	
20	0.5	0.5	0.5	2.0	2.0	2.0	10.0	9.5	9.5	15.0	14.5	14.5	
21	0.5	0.5	0.5	2.5	2.0	2.0	10.0	10.0	10.0	15.0	14.5	15.0	
22	0.5	0.5	0.5	2.0	2.0	2.0	11.0	10.0	10.5	15.0	15.0	15.0	
23	0.5	0.5	0.5	2.0	2.0	2.0	11.0	10.5	10.5	15.0	15.0	15.0	
24	0.5	0.5	0.5	2.5	2.0	2.5	11.0	10.5	11.0	15.5	15.0	15.0	
25	0.5	0.5	0.5	2.5	2.5	2.5	11.0	11.0	11.0	15.0	15.0	15.0	
26	0.5	0.5	0.5	2.5	2.5	2.5	11.0	11.0	11.0	15.0	14.5	15.0	
27	0.5	0.5	0.5	3.0	2.5	2.5	11.0	11.0	11.0	14.5	14.0	14.5	
28	0.5	0.5	0.5	3.0	3.0	3.0	11.0	10.5	10.5	14.5	14.0	14.5	
29	0.5	0.5	0.5	3.5	3.0	3.5	11.0	10.5	11.0	14.5	14.0	14.0	
30	--	--	--	4.0	3.0	3.5	11.0	11.0	11.0	14.5	14.0	14.0	
31	--	--	--	5.0	4.0	4.5	--	--	--	14.5	14.0	14.0	
MONTH	0.5	0.0	0.5	5.0	0.5	2.1	11.0	5.0	8.3	15.5	10.5	13.0	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
JUNE				JULY				AUGUST			SEPTEMBER		
1	14.0	14.0	14.0	18.5	17.5	18.0	19.5	19.5	19.5	18.5	18.5	18.5	
2	15.0	14.0	14.5	18.5	18.5	18.5	19.5	19.5	19.5	18.5	18.5	18.5	
3	15.0	14.5	14.5	18.5	18.5	18.5	20.0	19.5	20.0	18.5	18.5	18.5	
4	15.5	14.5	15.0	19.0	18.5	18.5	20.5	20.0	20.5	18.5	18.5	18.5	
5	15.0	14.5	15.0	19.0	18.5	18.5	20.5	20.0	20.5	18.5	18.5	18.5	
6	15.0	14.5	14.5	19.0	18.5	19.0	20.0	20.0	20.0	18.5	18.0	18.0	
7	15.0	14.5	14.5	18.5	18.5	18.5	20.0	20.0	20.0	18.5	18.0	18.5	
8	15.5	15.0	15.0	18.5	18.5	18.5	20.0	19.5	20.0	19.0	18.5	18.5	
9	17.0	15.5	16.0	18.5	18.5	18.5	20.0	19.5	19.5	19.0	18.5	19.0	
10	17.0	16.5	17.0	19.0	18.5	18.5	19.5	19.5	19.5	19.0	18.5	18.5	
11	17.5	17.0	17.0	18.5	18.5	18.5	19.5	19.0	19.5	18.5	18.5	18.5	
12	17.0	17.0	17.0	18.5	18.0	18.5	19.5	19.0	19.0	18.5	18.5	18.5	
13	17.0	16.5	17.0	18.5	17.5	18.0	19.5	19.0	19.5	18.5	18.0	18.5	
14	17.0	17.0	17.0	18.5	17.5	18.0	19.5	19.0	19.5	18.5	18.0	18.0	
15	18.0	17.0	17.5	18.5	17.5	18.0	19.5	19.0	19.0	18.5	18.0	18.0	
16	17.5	17.5	17.5	18.5	18.0	18.0	19.0	18.5	19.0	18.5	18.0	18.0	
17	18.0	17.5	18.0	19.0	18.5	18.5	18.5	18.0	18.5	18.5	18.0	18.5	
18	18.5	18.0	18.0	19.0	18.5	18.5	18.0	17.5	18.0	18.5	18.5	18.5	
19	18.5	18.0	18.5	18.5	18.5	18.5	18.0	17.5	17.5	18.5	18.5	18.5	
20	18.5	18.0	18.0	19.0	18.5	18.5	18.0	17.5	17.5	18.5	18.0	18.5	
21	18.5	18.0	18.0	19.0	18.5	18.5	17.5	17.5	17.5	18.5	18.0	18.0	
22	18.5	18.0	18.5	19.5	18.5	19.0	17.5	17.0	17.5	18.0	18.0	18.0	
23	18.5	18.0	18.5	20.0	19.5	19.5	18.0	17.5	17.5	18.0	18.0	18.0	
24	18.5	18.0	18.0	20.0	19.5	19.5	18.0	17.0	17.5	18.0	17.5	17.5	
25	18.0	18.0	18.0	20.0	19.5	20.0	18.0	17.5	18.0	17.5	17.5	17.5	
26	18.5	18.0	18.0	20.0	19.5	20.0	18.0	17.5	18.0	17.5	17.0	17.5	
27	18.0	18.0	18.0	20.0	19.5	20.0	18.0	17.5	18.0	17.5	17.0	17.0	
28	18.0	18.0	18.0	20.0	19.5	19.5	19.0	18.0	18.5	17.5	17.0	17.5	
29	18.0	18.0	18.0	20.0	19.5	19.5	18.5	18.5	18.5	17.5	17.0	17.5	
30	18.0	17.5	18.0	19.5	19.5	19.5	18.5	18.5	18.5	17.5	17.0	17.0	
31	---	---	---	19.5	19.5	19.5	18.5	18.5	18.5	---	---	---	
MONTH	18.5	14.0	16.9	20.0	17.5	18.8	20.5	17.0	18.8	19.0	17.0	18.1	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124200 MANISTEE RIVER NEAR MESICK, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER				DECEMBER			JANUARY	
1	9.7	9.1	9.4	11.1	10.4	10.8	12.0	11.7	11.8	13.5	13.3	13.4
2	9.6	9.1	9.4	10.7	10.4	10.5	12.2	12.0	12.1	13.5	13.3	13.3
3	9.6	8.8	9.2	10.9	10.7	10.7	12.2	12.2	12.2	13.5	13.3	13.5
4	9.5	8.8	9.2	10.9	10.3	10.5	12.4	12.2	12.3	13.6	13.5	13.5
5	—	—	—	10.5	10.3	10.4	12.6	12.3	12.4	13.6	13.4	13.5
6	—	—	—	10.6	10.5	10.5	12.6	12.5	12.6	13.5	13.3	13.4
7	9.9	9.3	9.7	10.8	10.6	10.7	12.7	12.5	12.6	14.3	13.5	14.0
8	10.1	9.9	10.0	11.0	10.8	10.9	12.7	12.5	12.6	14.4	14.3	14.4
9	10.5	10.1	10.3	11.2	11.0	11.1	12.7	12.6	12.7	14.4	13.7	14.1
10	10.6	10.4	10.5	11.4	11.2	11.3	12.7	12.4	12.6	14.5	13.7	14.1
11	10.6	10.5	10.5	11.4	11.2	11.3	12.7	12.5	12.6	14.2	13.8	14.0
12	10.6	10.5	10.6	11.4	11.2	11.3	13.0	12.7	12.8	13.9	13.8	13.9
13	11.0	10.5	10.7	11.5	11.3	11.4	13.2	13.0	13.1	14.2	13.8	14.0
14	10.8	10.2	10.5	11.5	11.4	11.5	13.2	13.0	13.1	14.2	14.1	14.1
15	10.4	10.3	10.4	11.5	11.4	11.5	13.1	13.0	13.1	15.0	14.1	14.5
16	10.5	10.4	10.4	11.6	11.4	11.5	13.1	13.0	13.0	14.9	14.4	14.6
17	10.5	10.4	10.4	11.7	11.6	11.6	13.2	13.0	13.1	14.4	14.2	14.3
18	10.4	10.3	10.3	11.6	11.4	11.5	13.2	13.0	13.1	14.4	14.2	14.3
19	10.4	10.3	10.3	11.6	11.5	11.6	13.3	13.0	13.1	14.4	13.9	14.1
20	10.6	10.3	10.5	11.7	11.6	11.7	13.2	13.1	13.1	14.4	13.9	14.1
21	10.6	10.5	10.6	11.8	11.7	11.8	13.3	13.1	13.2	14.3	13.7	14.0
22	10.6	10.1	10.2	11.8	11.7	11.8	13.2	13.1	13.2	14.4	13.7	14.0
23	10.1	10.1	10.1	11.7	11.6	11.7	13.2	13.1	13.1	14.4	13.8	14.1
24	10.6	10.1	10.3	11.7	11.6	11.7	13.2	13.0	13.1	13.9	13.8	13.9
25	10.7	10.6	10.6	11.8	11.7	11.8	13.3	13.0	13.2	13.9	13.8	13.9
26	10.6	10.1	10.4	11.7	11.7	11.7	13.3	13.2	13.3	14.1	13.8	13.8
27	10.2	10.1	10.1	11.8	11.6	11.7	13.3	13.2	13.3	13.8	13.7	13.7
28	10.2	10.0	10.1	11.7	11.6	11.6	13.3	13.2	13.3	13.7	13.5	13.6
29	10.3	10.1	10.2	11.7	11.6	11.6	13.3	13.1	13.3	13.8	13.5	13.7
30	10.3	10.2	10.3	11.7	11.6	11.7	13.4	13.2	13.3	13.7	13.4	13.5
31	11.0	10.2	10.5	—	—	—	13.5	13.2	13.3	13.6	13.4	13.5
MONTH	—	—	—	11.8	10.3	11.3	13.5	11.7	12.9	15.0	13.3	13.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH				APRIL				MAY
1	13.6	13.2	13.4	12.8	12.5	12.6	11.2	10.2	10.8	9.3	8.9	9.1
2	13.3	13.1	13.2	12.6	12.5	12.6	10.7	10.2	10.5	9.3	8.8	9.1
3	13.2	13.0	13.1	12.6	12.4	12.5	10.8	10.3	10.5	9.4	8.9	9.2
4	13.2	13.1	13.1	12.4	12.3	12.3	10.8	10.4	10.6	9.3	9.0	9.2
5	13.1	12.9	13.0	12.3	11.9	12.1	10.8	10.5	10.6	9.5	9.1	9.3
6	13.0	12.8	12.9	12.1	12.0	12.0	10.7	10.3	10.5	9.4	8.9	9.3
7	13.1	13.0	13.0	12.1	11.8	11.9	10.7	10.2	10.5	9.5	9.1	9.3
8	13.3	13.0	13.2	12.0	11.9	11.9	10.6	10.1	10.4	9.5	8.8	9.2
9	13.2	12.7	12.9	11.9	11.8	11.9	10.5	10.2	10.4	9.4	8.9	9.1
10	12.7	12.7	12.7	11.8	11.7	11.8	10.5	10.2	10.3	9.3	8.9	9.1
11	12.9	12.3	12.6	11.7	11.6	11.7	10.5	10.0	10.2	9.2	8.7	9.0
12	12.4	12.2	12.3	11.8	11.7	11.7	10.4	10.0	10.2	9.3	8.7	9.0
13	12.5	12.3	12.4	11.8	11.7	11.7	10.5	10.0	10.3	9.2	8.4	8.9
14	12.5	12.4	12.5	11.7	11.7	11.7	10.5	10.0	10.3	9.0	8.5	8.7
15	12.6	12.5	12.6	11.8	11.7	11.8	10.4	10.1	10.3	8.9	8.4	8.6
16	13.1	11.8	12.8	11.8	11.7	11.8	10.4	10.0	10.2	8.6	8.2	8.4
17	13.1	12.7	12.8	11.8	11.7	11.8	10.2	9.8	10.0	8.5	8.0	8.3
18	12.7	12.5	12.6	12.1	11.7	11.9	10.1	9.6	9.8	8.9	7.9	8.5
19	12.6	12.4	12.5	12.1	12.0	12.1	9.9	9.5	9.7	8.7	8.4	8.6
20	12.5	12.4	12.4	13.6	12.0	12.4	9.8	9.4	9.7	8.7	8.3	8.4
21	12.6	12.4	12.5	13.7	12.0	12.4	9.7	9.4	9.6	8.8	8.4	8.5
22	12.7	12.6	12.6	12.2	12.1	12.1	9.6	9.1	9.4	8.8	8.4	8.6
23	12.7	12.6	12.7	12.1	12.0	12.0	9.4	9.0	9.2	8.7	8.4	8.5
24	12.8	12.7	12.8	12.0	11.8	11.9	9.4	8.9	9.1	8.9	8.0	8.6
25	13.1	12.8	12.9	12.0	11.8	11.9	9.2	8.7	8.9	8.2	7.8	8.0
26	13.1	12.9	13.0	11.9	11.5	11.7	9.1	8.7	8.9	8.3	7.9	8.1
27	13.0	12.9	12.9	11.6	11.4	11.5	9.3	8.8	9.0	8.3	7.8	8.1
28	12.9	12.7	12.8	11.6	11.4	11.5	9.2	8.8	9.0	8.6	8.1	8.3
29	12.9	12.7	12.7	11.5	11.3	11.4	9.3	8.9	9.1	8.9	8.3	8.8
30	--	--	--	11.5	11.1	11.4	9.4	9.0	9.2	9.1	8.9	9.0
31	--	--	--	11.3	10.6	11.1	--	--	--	9.1	8.9	9.0
MONTH	13.6	11.8	12.8	13.7	10.6	11.9	11.2	8.7	9.9	9.5	7.8	8.8

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124200 MANISTEE RIVER NEAR MESICK, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.3	9.0	9.2	8.8	8.6	8.8	8.1	8.0	8.1	7.7	7.6	7.7
2	9.7	9.2	9.4	8.8	8.7	8.8	8.2	8.1	8.1	7.6	7.5	7.6
3	9.8	9.6	9.7	8.8	8.6	8.7	8.2	8.0	8.1	7.6	7.5	7.6
4	9.8	9.6	9.7	8.6	8.5	8.6	8.2	8.0	8.1	7.5	7.4	7.5
5	9.6	9.5	9.6	8.7	8.5	8.6	8.3	8.1	8.2	7.6	7.0	7.5
6	9.6	9.5	9.5	8.6	8.5	8.6	8.3	8.2	8.3	7.6	6.9	7.5
7	9.5	9.4	9.5	8.5	8.5	8.5	8.3	8.2	8.2	7.7	6.8	7.5
8	9.5	9.3	9.4	8.5	8.5	8.5	8.3	8.2	8.2	7.8	7.6	7.7
9	9.4	9.2	9.2	8.5	8.4	8.5	8.2	8.0	8.1	7.8	7.7	7.8
10	9.3	9.2	9.2	8.5	8.3	8.4	8.2	8.0	8.2	8.0	7.8	7.8
11	9.2	9.1	9.2	8.4	8.3	8.3	8.2	8.1	8.1	7.9	7.6	7.8
12	9.2	9.0	9.1	8.4	8.3	8.3	8.4	8.1	8.3	7.8	7.6	7.7
13	9.1	8.9	9.0	8.5	8.3	8.4	8.7	8.2	8.3	7.8	7.5	7.7
14	8.9	8.8	8.9	8.6	8.4	8.5	8.4	8.2	8.3	7.6	7.3	7.4
15	8.9	8.8	8.8	8.6	8.5	8.6	8.4	8.3	8.4	7.6	7.3	7.5
16	8.8	8.6	8.7	8.6	8.5	8.6	8.8	8.2	8.4	7.8	7.5	7.7
17	8.7	8.3	8.5	8.6	8.4	8.5	8.8	8.2	8.4	7.9	7.7	7.7
18	8.5	8.4	8.4	8.4	8.3	8.4	8.9	8.3	8.7	8.1	7.8	7.9
19	8.6	8.4	8.5	8.4	8.3	8.3	9.2	8.6	8.8	8.2	7.9	8.0
20	8.4	8.3	8.4	8.4	8.3	8.3	8.8	8.7	8.7	8.3	8.0	8.2
21	8.4	8.3	8.4	8.3	8.2	8.3	8.8	8.7	8.8	8.3	7.9	8.1
22	8.5	8.3	8.4	8.2	8.1	8.2	8.8	8.7	8.7	8.2	8.0	8.1
23	8.5	8.3	8.4	8.2	8.1	8.2	8.9	8.6	8.7	8.2	7.6	8.0
24	8.4	8.2	8.3	8.2	8.1	8.2	8.8	7.6	8.4	8.1	8.0	8.0
25	8.5	8.4	8.4	8.2	8.1	8.1	7.9	6.9	7.4	8.3	8.0	8.1
26	8.6	8.4	8.5	8.2	8.1	8.1	7.6	6.9	7.2	8.4	8.2	8.3
27	8.8	8.5	8.7	8.1	6.5	7.9	7.5	6.9	7.1	8.5	8.3	8.3
28	8.8	8.6	8.7	8.1	7.9	8.0	7.5	6.9	7.2	8.4	8.2	8.3
29	8.7	8.6	8.7	8.0	7.9	8.0	7.6	7.0	7.4	8.6	8.2	8.5
30	8.7	8.6	8.7	8.0	7.9	7.9	8.4	7.1	7.8	8.6	8.6	8.6
31	—	—	—	8.0	7.9	8.0	7.9	7.0	7.7	—	—	—
MONTH	9.8	8.2	8.9	8.8	6.5	8.4	9.2	6.9	8.1	8.6	6.8	7.9

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124500 EAST BRANCH PINE RIVER NEAR TUSTIN, MI

LOCATION.--Lat 44°06'09", long 85°31'02", in NE1/4 NW1/4 sec. 28, T.20 N., R.10 W., Osceola County, Hydrologic Unit 04060103, on left bank 75 ft downstream from bridge on Marion Road, 3.0 mi west of Tustin.

DRAINAGE AREA.--60.0 mi².

PERIOD OF RECORD.--July 1952 to September 1963, October 1963 to September 1991 (operated as a crest-stage partial-record station), October 1991 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,077.65 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records good.

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	12	26	38	23	17	30	116	65	96	16	7.8	9.4
2	13	32	e33	26	17	64	98	56	79	14	7.8	8.9
3	23	36	e30	74	17	79	87	50	66	16	8.6	8.5
4	31	126	e26	48	17	83	79	44	55	19	9.5	8.3
5	22	117	e22	37	17	238	72	43	48	15	8.7	8.0
6	20	82	20	26	17	319	71	43	41	13	7.9	15
7	18	60	18	29	17	254	67	41	34	14	7.8	15
8	17	45	18	26	17	187	69	128	30	12	7.7	13
9	26	36	18	22	17	153	67	175	28	11	7.8	12
10	17	31	43	18	17	137	57	178	33	10	11	12
11	13	37	57	17	17	126	51	134	40	9.7	20	11
12	14	36	40	17	18	94	51	106	35	11	14	10
13	14	38	34	17	18	93	47	121	33	11	12	10
14	12	34	32	15	18	80	41	140	32	23	11	9.2
15	15	31	28	17	17	68	37	123	30	20	8.6	9.1
16	11	29	28	16	16	60	35	92	28	14	8.2	12
17	20	27	30	15	16	55	39	78	29	12	7.4	11
18	20	87	29	16	16	50	92	159	30	29	7.5	8.9
19	18	137	27	16	16	48	77	116	27	34	7.2	10
20	16	92	25	17	17	85	63	102	25	38	7.1	16
21	12	71	26	17	20	107	89	100	22	30	7.2	13
22	10	56	25	17	21	83	77	124	20	25	7.4	11
23	9.6	57	25	17	22	80	63	218	19	20	7.1	10
24	12	102	25	17	22	85	51	298	20	13	7.0	8.9
25	19	75	24	17	21	112	69	240	18	9.2	7.8	8.0
26	18	62	20	16	20	271	71	182	15	8.4	11	7.2
27	17	54	21	16	20	237	60	138	14	8.2	17	7.2
28	18	49	23	17	20	195	67	109	17	8.0	12	8.5
29	23	44	35	17	23	202	62	87	18	7.8	18	7.9
30	19	40	32	17	---	168	52	78	15	7.9	23	7.5
31	20	---	28	17	---	143	---	93	---	8.1	12	---
TOTAL	529.6	1749	880	677	528	3986	1977	3661	997	487.3	317.1	306.5
MEAN	17.1	58.3	28.4	21.8	18.2	129	65.9	118	33.2	15.7	10.2	10.2
MAX	31	137	57	74	23	319	116	298	96	38	23	16
MIN	9.6	26	18	15	16	30	35	41	14	7.8	7.0	7.2
CFSM	0.28	0.97	0.47	0.36	0.30	2.14	1.10	1.97	0.55	0.26	0.17	0.17
IN.	0.33	1.08	0.55	0.42	0.33	2.47	1.23	2.27	0.62	0.30	0.20	0.19

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2004, BY WATER YEAR (WY)

	25.1	32.7	25.5	22.6	26.9	57.4	77.8	42.4	24.7	16.8	17.3	14.7
MEAN	25.1	32.7	25.5	22.6	26.9	57.4	77.8	42.4	24.7	16.8	17.3	14.7
MAX	99.9	90.8	83.8	48.4	54.4	129	190	118	70.4	45.1	68.5	44.2
(WY)	1992	1993	1992	1997	1994	2004	1959	2004	1993	1994	1956	1993
MIN	9.54	12.3	12.4	10.1	9.39	18.7	31.6	10.7	8.90	7.22	6.29	6.82
(WY)	1956	1954	1956	1956	1963	1956	2000	1958	1959	1959	1957	1955

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1952 - 2004

ANNUAL TOTAL	8003.7		16095.5									
ANNUAL MEAN	21.9		44.0							32.0		
HIGHEST ANNUAL MEAN										54.5		1992
LOWEST ANNUAL MEAN										16.0		1958
HIGHEST DAILY MEAN	137				Nov 19	319		Mar 6	753		Aug 4	1956
LOWEST DAILY MEAN	5.4				Sep 11	7.0		Aug 24	5.3		Aug 4	1958
ANNUAL SEVEN-DAY MINIMUM	5.8				Aug 30	7.2		Aug 18	5.5		Aug 1	1959
MAXIMUM PEAK FLOW						371		Mar 5	(a)1410		Aug 4	1956
MAXIMUM PEAK STAGE						4.57		Mar 5	6.23		Aug 4	1956
INSTANTANEOUS LOW FLOW						6.6		(b)	(c)4.1		Mar 13	1958
ANNUAL RUNOFF (CFSM)	0.365					0.733			0.533			
ANNUAL RUNOFF (INCHES)	4.96					9.98			7.24			
10 PERCENT EXCEEDS	45					103			67			
50 PERCENT EXCEEDS	13					23			20			
90 PERCENT EXCEEDS	6.9					8.9			8.6			

(a) From rating curve extended above 450 ft³/s.

(b) Part of each day Aug. 20, 24, 25.

(c) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125460 PINE RIVER NEAR HOXEYVILLE, MI

LOCATION.--Lat 44°11'36", long 85°46'11", in NW1/4 NE1/4 sec.28, T.21 N., R.12 W., Wexford County, Hydrologic Unit 04060103, on right bank 75 ft downstream from High School Bridge on S 5 1/2 Road, 2.5 mi west of Hoxeyville.

DRAINAGE AREA--245 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1952 to September 1982, October 1996 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 850 ft above sea level, from topographic map. July 1952 to September 1982, water-stage recorder at site 3.5 mi downstream at different datum (station 04125500).

REMARKS.--Water-discharge records good. Gage-height telemeter 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	206	218	282	262	229	252	478	365	448	254	231	220
2	209	234	274	251	231	340	432	381	415	252	229	216
3	227	266	259	310	230	432	405	351	380	251	236	214
4	276	426	246	363	227	440	392	335	353	264	230	213
5	267	570	244	294	216	683	378	328	334	275	225	212
6	231	467	242	267	234	1020	380	325	324	267	221	213
7	219	357	236	247	227	1010	396	322	315	263	220	219
8	212	298	232	258	216	682	395	401	304	261	219	218
9	206	267	233	242	233	533	408	687	304	258	220	214
10	209	251	267	239	229	477	384	665	308	257	222	213
11	203	255	348	253	226	470	358	590	313	250	229	212
12	200	272	330	239	225	438	344	480	308	247	237	211
13	199	271	278	234	225	392	339	463	303	254	230	213
14	206	268	267	233	225	403	329	501	300	289	224	211
15	215	255	264	221	216	374	321	510	304	286	220	210
16	217	247	262	235	227	355	316	449	291	264	217	219
17	206	242	270	235	234	345	323	400	288	255	217	221
18	207	337	265	234	230	335	400	466	305	270	216	214
19	206	544	257	231	223	327	474	549	295	287	216	211
20	205	500	250	219	225	381	411	456	281	321	215	211
21	203	376	246	221	232	481	423	447	275	306	211	214
22	201	321	245	235	233	429	451	487	273	279	211	212
23	202	305	245	232	236	398	399	584	268	262	211	211
24	200	401	244	232	234	400	363	856	270	251	209	210
25	204	429	242	234	233	422	363	885	272	243	211	208
26	211	351	238	233	232	636	414	629	264	238	220	208
27	209	320	232	233	231	888	393	501	260	236	256	208
28	211	304	237	230	231	725	379	444	262	234	268	209
29	222	298	267	230	234	677	392	409	263	232	250	209
30	228	288	303	227	---	632	362	387	258	232	242	207
31	221	---	287	229	---	550	---	406	---	232	231	---
TOTAL	6638	9938	8092	7603	6624	15927	11602	15059	9138	8070	6994	6381
MEAN	214	331	261	245	228	514	387	486	305	260	226	213
MAX	276	570	348	363	236	1020	478	885	448	321	268	221
MIN	199	218	232	219	216	252	316	322	258	232	209	207
CFSM	0.87	1.35	1.07	1.00	0.93	2.10	1.58	1.98	1.24	1.06	0.92	0.87
IN.	1.01	1.51	1.23	1.15	1.01	2.42	1.76	2.29	1.39	1.23	1.06	0.97

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2004, BY WATER YEAR (WY)

	MEAN	260	276	271	254	265	349	427	319	275	245	240	243
MAX	373	339	408	350	361	629	670	486	391	427	393	504	504
(WY)	1955	1976	1966	1973	1976	1976	1959	2004	1974	1969	1956	1975	1975
MIN	212	212	207	199	199	252	258	222	206	196	191	190	190
(WY)	2003	2003	2003	2003	2003	2003	2000	1958	1964	1966	2003	2003	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1952 - 2004

ANNUAL TOTAL	85258												
ANNUAL MEAN	234												
HIGHEST ANNUAL MEAN										285			
LOWEST ANNUAL MEAN										356			1976
HIGHEST DAILY MEAN	570									1830			Aug 5 1956
LOWEST DAILY MEAN	180									170			Oct 3 1996
ANNUAL SEVEN-DAY MINIMUM	182									180			Jan 21 1961
MAXIMUM PEAK FLOW										(a)2440			Aug 6 1956
MAXIMUM PEAK STAGE										7.45			Apr 13 2001
INSTANTANEOUS LOW FLOW										(b)161			Feb 2 1961
ANNUAL RUNOFF (CFSM)	0.953									1.16			
ANNUAL RUNOFF (INCHES)	12.95									15.81			
10 PERCENT EXCEEDS	303									387			
50 PERCENT EXCEEDS	209									252			
90 PERCENT EXCEEDS	188									212			

(a) From rating curve extended above 1,000 ft³/s; gage height 6.82 ft, site and datum then in use.

(b) Result of freezeup.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125460 PINE RIVER NEAR HOXEYVILLE, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1997 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: December 1996 to current year.

DISSOLVED OXYGEN: December 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent.

Dissolved oxygen records rated excellent except the following periods: Oct. 1, 2, 19-24, Dec. 13-18, Jan. 30 to Feb. 8, Feb. 20-24, May 1-4,

May 25 to June 3, July 16-23, Sept. 1-5, 28, 29 rated good; Oct. 3-9, Oct. 25 to Nov. 1, Dec. 19-27, Feb. 9-11, Feb. 25 to Mar. 2, July 24 to

Aug. 3, Sept. 30 rated fair; and Nov. 2, 3, Dec. 28 to Jan. 12, Mar. 3-11, Sept. 6-18 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum recorded, 21.0°C, July 25, 1999, but may have been higher during instrument malfunction

July 23, 24, 1999; minimum, -0.5°C, on several days during winter periods.

DISSOLVED OXYGEN: Maximum, 15.6 mg/L, Mar. 23, 1999; minimum, 6.9 mg/L, July 6, 2000.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 18.5°C, July 22; minimum, 0.0°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 14.7 mg/L, Jan. 15; minimum, 7.3 mg/L, Aug. 25.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
1	8.5	7.0	7.5	9.0	8.5	8.5	4.0	3.0	3.5	2.5	2.0	2.0			
2	7.0	6.0	6.5	8.5	8.0	8.0	3.0	2.5	3.0	4.0	2.5	3.5			
3	7.0	6.5	7.0	8.0	7.0	7.5	2.5	1.5	2.0	4.5	4.0	4.5			
4	7.5	7.0	7.0	7.5	6.5	7.0	2.0	1.5	1.5	4.0	1.5	2.5			
5	7.0	6.5	7.0	7.5	7.0	7.0	3.0	2.0	2.5	1.5	1.0	1.5			
6	7.0	6.0	6.5	7.0	6.0	6.5	3.0	2.5	3.0	1.0	0.0	0.0			
7	8.0	6.5	7.0	6.0	4.5	5.0	3.0	2.0	2.0	0.0	0.0	0.0			
8	9.5	8.0	8.5	4.5	3.0	3.5	3.5	2.5	3.0	1.0	0.0	0.5			
9	10.5	9.0	10.0	3.0	2.5	3.0	4.5	3.5	4.0	0.5	0.0	0.0			
10	10.5	9.5	10.0	4.0	2.5	3.5	5.0	4.5	5.0	0.5	0.0	0.0			
11	11.5	10.0	10.5	6.0	4.0	5.0	5.0	2.5	4.0	1.5	0.5	1.0			
12	11.5	10.5	11.0	7.0	6.0	6.5	2.5	1.5	2.0	2.5	1.0	2.0			
13	10.5	9.5	10.0	6.5	4.5	5.0	1.5	0.5	1.0	2.5	1.5	2.0			
14	10.0	9.5	10.0	4.5	4.0	4.0	2.0	1.0	1.5	1.5	0.0	0.5			
15	9.5	8.0	8.5	5.0	4.0	4.5	3.0	2.0	2.5	0.5	0.0	0.0			
16	8.0	7.0	7.5	5.5	5.0	5.5	3.5	3.0	3.0	0.5	0.0	0.0			
17	7.5	6.5	7.0	6.5	5.5	6.0	3.0	2.5	3.0	0.5	0.0	0.0			
18	8.5	7.0	7.5	8.0	6.5	7.5	3.0	2.5	2.5	0.5	0.0	0.5			
19	8.0	7.0	7.5	8.0	7.0	7.5	3.0	2.5	2.5	0.5	0.0	0.5			
20	9.0	7.0	8.0	7.0	6.0	6.5	2.5	2.0	2.0	0.5	0.0	0.0			
21	9.5	9.0	9.0	6.5	6.0	6.5	2.5	2.0	2.0	0.0	0.0	0.0			
22	9.0	7.5	8.0	6.0	5.5	6.0	3.5	2.5	3.0	0.0	0.0	0.0			
23	7.5	6.5	7.0	8.0	6.0	7.0	4.0	3.5	3.5	0.0	0.0	0.0			
24	7.5	6.5	7.0	8.0	5.0	6.5	3.5	3.5	3.5	0.0	0.0	0.0			
25	8.5	7.5	8.0	5.0	3.5	4.0	3.5	3.0	3.0	0.0	0.0	0.0			
26	8.0	7.5	8.0	3.5	3.0	3.5	3.0	2.0	2.5	0.0	0.0	0.0			
27	7.5	7.0	7.0	4.0	3.5	3.5	3.0	2.0	2.0	0.5	0.0	0.0			
28	7.0	6.5	6.5	4.5	4.0	4.0	4.5	3.0	3.5	0.5	0.0	0.5			
29	7.0	6.5	6.5	4.5	4.0	4.0	4.5	4.0	4.5	0.0	0.0	0.0			
30	8.0	6.5	7.0	4.0	3.5	4.0	4.0	3.0	3.5	0.5	0.0	0.0			
31	9.0	8.0	8.5	—	—	—	3.0	2.5	3.0	1.0	0.0	0.5			
MONTH	11.5	6.0	8.0	9.0	2.5	5.5	5.0	0.5	2.8	4.5	0.0	0.7			

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125460 PINE RIVER NEAR HOXEYVILLE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	1.5	0.0	0.5	4.5	4.5	4.5	7.0	5.0	6.0	11.0	10.0	10.5	
2	1.5	0.5	1.0	4.5	4.0	4.0	7.5	5.5	6.5	10.0	9.0	9.5	
3	2.0	1.0	1.5	4.0	3.0	3.5	7.0	6.0	6.5	9.0	7.5	8.5	
4	2.0	1.0	1.5	3.5	3.0	3.5	6.5	5.5	6.0	8.5	7.0	8.0	
5	1.0	0.0	0.5	3.5	2.0	2.5	6.5	4.5	5.5	10.5	7.5	9.0	
6	1.5	0.0	1.0	2.0	0.5	1.0	7.5	5.5	6.0	11.0	9.0	10.0	
7	2.0	1.0	1.5	1.0	0.5	0.5	8.0	6.0	7.0	12.0	9.5	11.0	
8	1.5	0.0	0.5	1.5	1.0	1.5	8.0	7.0	7.5	11.5	9.5	10.5	
9	1.5	0.5	1.0	2.5	1.5	2.0	7.5	6.5	7.0	11.5	10.0	10.5	
10	2.0	1.5	2.0	3.0	1.5	2.5	7.0	6.0	6.0	13.0	11.0	12.0	
11	2.0	1.5	2.0	3.0	2.0	3.0	7.0	5.5	6.0	15.0	12.5	13.5	
12	2.5	2.0	2.5	2.0	1.0	1.5	6.0	4.5	5.5	16.0	14.0	15.0	
13	2.0	1.5	2.0	2.0	0.0	1.0	7.5	4.5	6.0	16.0	15.0	15.5	
14	2.0	1.5	1.5	2.5	2.0	2.5	9.0	6.0	7.5	16.0	13.5	15.0	
15	1.5	0.0	0.5	3.5	2.0	2.5	10.5	8.0	9.0	14.0	12.5	13.0	
16	0.5	0.0	0.0	4.0	2.5	3.0	12.5	9.5	11.0	13.5	11.0	12.5	
17	1.5	0.0	0.5	3.5	2.5	3.0	13.0	11.0	12.0	14.0	12.5	13.0	
18	2.0	0.0	1.0	4.5	3.0	3.5	13.0	11.5	12.5	14.0	13.0	13.5	
19	3.5	1.5	2.5	5.0	4.0	4.5	13.0	11.5	12.5	15.0	12.5	14.0	
20	4.0	3.0	3.5	6.0	4.5	5.0	11.5	10.0	10.5	14.5	13.5	14.0	
21	4.0	3.0	3.5	5.0	2.5	4.0	10.5	10.0	10.0	14.5	13.0	13.5	
22	4.5	3.0	3.5	2.5	1.0	2.0	11.0	9.0	10.0	13.5	12.5	13.0	
23	4.0	3.0	3.5	4.5	2.5	3.5	11.0	8.5	10.0	12.5	12.0	12.5	
24	4.0	3.0	3.5	4.5	3.5	4.0	10.5	9.0	10.0	12.0	11.5	12.0	
25	4.5	3.0	3.5	5.5	4.5	5.0	10.0	8.5	9.0	12.5	11.5	12.0	
26	4.0	2.5	3.5	6.0	5.5	6.0	9.0	8.0	9.0	13.5	12.0	12.5	
27	3.5	2.5	3.0	5.5	4.5	5.0	9.0	7.5	8.5	12.5	11.5	12.0	
28	4.0	2.5	3.0	6.5	5.0	5.5	10.5	7.5	9.0	13.0	11.0	12.0	
29	5.0	3.5	4.0	7.5	6.0	7.0	13.0	10.5	11.5	12.5	11.0	12.0	
30	—	—	—	7.5	6.0	7.0	12.5	11.0	12.0	12.5	11.5	12.0	
31	—	—	—	7.0	5.5	6.5	—	—	—	13.0	12.0	12.5	
MONTH	5.0	0.0	2.0	7.5	0.0	3.6	13.0	4.5	8.5	16.0	7.0	12.1	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY				AUGUST			SEPTEMBER	
1	14.0	12.0	13.0	16.5	14.5	15.5	15.5	13.5	14.5	14.5	13.0	13.5
2	14.0	13.0	13.5	16.0	14.0	15.0	16.0	14.5	15.5	15.0	13.0	14.0
3	14.5	12.0	13.0	16.5	14.5	15.5	17.0	14.5	15.5	15.5	13.5	14.5
4	14.0	12.0	13.0	16.0	14.5	15.5	17.0	15.5	16.0	15.5	14.0	14.5
5	14.5	12.5	13.5	15.0	14.0	14.5	16.0	14.0	14.5	15.0	14.0	14.5
6	14.0	13.5	14.0	15.0	13.5	14.0	15.0	12.5	14.0	15.0	14.0	14.5
7	16.5	13.5	15.0	13.5	13.0	13.0	14.5	12.5	13.5	14.5	13.0	14.0
8	18.0	15.5	17.0	13.0	12.0	12.5	14.5	13.0	14.0	13.5	12.0	13.0
9	18.0	16.5	17.0	13.0	11.5	12.5	14.5	13.5	14.0	13.5	12.0	12.5
10	16.5	15.0	15.5	15.5	12.5	14.0	14.5	13.0	13.5	13.0	11.5	12.5
11	15.0	13.5	14.0	16.0	14.0	15.0	13.0	12.0	12.5	13.5	12.0	12.5
12	15.5	13.0	14.0	16.5	15.0	15.5	12.5	11.5	12.0	13.5	12.5	13.0
13	15.5	14.0	15.0	16.5	14.5	16.0	13.0	11.5	12.5	14.5	13.0	13.5
14	15.5	14.0	15.0	16.0	15.0	15.5	13.5	11.5	12.5	15.0	13.5	14.5
15	16.0	14.0	15.0	16.0	14.0	15.0	13.0	11.5	12.5	15.5	14.0	15.0
16	17.0	14.5	16.0	15.5	14.5	15.0	13.5	11.5	12.5	15.5	14.0	15.0
17	17.0	15.0	15.5	16.0	14.0	15.0	13.5	13.0	13.0	14.0	12.0	13.0
18	16.5	14.5	15.5	16.5	14.5	15.5	14.5	12.5	13.0	12.5	11.5	12.0
19	16.0	14.0	15.0	16.0	14.5	15.5	14.0	12.5	13.5	12.5	11.0	12.0
20	14.5	13.0	14.0	17.0	15.0	16.0	13.5	12.0	13.0	12.5	11.0	12.0
21	14.0	13.0	13.5	17.0	16.0	16.5	13.0	11.0	12.0	12.5	11.0	12.0
22	15.0	12.5	13.5	18.5	16.0	17.0	13.0	10.5	12.0	12.5	11.0	11.5
23	15.0	13.0	14.0	17.0	15.0	16.0	15.0	13.0	13.5	13.0	11.5	12.0
24	14.5	12.0	13.0	15.5	13.5	14.5	15.0	13.5	14.0	13.5	12.0	13.0
25	13.5	11.0	12.0	15.0	13.0	14.0	15.5	14.5	15.0	13.0	12.0	12.5
26	14.0	12.0	13.0	15.5	13.0	14.5	15.0	14.5	14.5	12.0	10.5	11.0
27	14.5	12.0	13.0	15.0	13.5	14.5	16.0	14.5	15.0	11.5	10.0	11.0
28	15.0	13.0	14.0	15.0	13.0	14.5	15.0	14.0	14.5	12.0	11.0	11.5
29	15.5	13.5	14.5	15.5	14.0	14.5	14.0	13.5	14.0	11.0	9.5	10.0
30	16.5	14.0	15.5	15.0	14.5	14.5	13.5	12.5	13.0	10.0	8.5	9.0
31	---	---	---	15.5	14.0	14.5	14.0	12.5	13.5	---	---	---
MONTH	18.0	11.0	14.3	18.5	11.5	14.9	17.0	10.5	13.6	15.5	8.5	12.8

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125460 PINE RIVER NEAR HOXEYVILLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
OCTOBER				NOVEMBER				DECEMBER				JANUARY	
1	11.2	9.9	10.5	10.9	10.0	10.4	11.9	11.4	11.6	13.5	13.0	13.2	
2	11.8	10.3	10.9	11.0	10.3	10.6	12.3	11.9	12.1	13.0	12.4	12.7	
3	10.5	9.8	10.1	11.2	10.4	10.7	12.6	12.2	12.5	12.6	12.2	12.4	
4	10.7	9.8	10.2	11.3	10.7	11.1	12.7	12.4	12.6	13.2	12.6	13.0	
5	10.9	10.0	10.4	10.8	10.7	10.7	12.4	12.1	12.2	13.5	13.2	13.4	
6	11.1	10.1	10.5	11.2	10.8	11.0	12.3	12.0	12.1	14.3	13.5	14.0	
7	11.2	9.8	10.4	11.8	11.2	11.6	12.8	12.1	12.5	14.1	13.9	14.0	
8	10.8	9.4	10.0	12.5	11.8	12.2	12.4	11.8	12.2	14.1	13.9	14.0	
9	10.8	9.2	9.8	12.9	12.3	12.6	11.9	11.5	11.7	14.4	14.1	14.3	
10	10.8	9.3	9.8	12.6	11.9	12.4	11.7	11.4	11.5	14.3	14.0	14.2	
11	10.7	9.1	9.8	11.9	11.1	11.5	12.4	11.4	11.9	14.0	13.5	13.8	
12	10.2	8.8	9.4	11.1	10.7	11.0	13.0	12.4	12.7	13.6	13.2	13.4	
13	10.4	9.1	9.7	11.8	10.8	11.4	13.5	13.0	13.3	14.1	13.1	13.6	
14	9.6	9.1	9.3	12.0	11.7	11.8	13.2	12.7	13.0	14.5	13.8	14.2	
15	10.8	9.3	10.0	11.8	11.4	11.7	12.8	12.3	12.6	14.7	14.3	14.5	
16	11.3	9.8	10.5	11.5	11.1	11.3	12.4	12.2	12.2	14.6	14.3	14.4	
17	11.6	10.3	10.8	11.4	10.8	11.1	12.6	12.2	12.4	14.3	13.8	14.2	
18	11.2	10.0	10.5	10.8	10.2	10.6	12.6	12.4	12.5	14.3	13.8	14.0	
19	11.7	10.0	10.6	10.4	10.2	10.3	12.8	12.5	12.7	14.3	14.0	14.1	
20	11.2	9.7	10.4	10.8	10.4	10.6	13.2	12.8	13.0	14.5	14.1	14.3	
21	10.4	9.4	9.8	10.9	10.6	10.8	13.0	12.6	12.8	14.2	13.8	14.0	
22	11.2	9.7	10.4	11.0	10.8	10.9	12.8	12.5	12.6	14.2	13.8	14.0	
23	11.2	10.2	10.6	10.8	10.2	10.5	12.5	12.2	12.3	14.0	13.8	13.9	
24	11.6	10.4	10.8	11.1	10.2	10.6	12.6	12.2	12.4	14.1	13.9	14.0	
25	11.3	10.2	10.6	11.7	11.1	11.5	12.9	12.5	12.7	14.2	13.1	14.0	
26	11.0	10.1	10.5	11.9	11.7	11.8	13.3	12.7	13.0	13.9	13.7	13.8	
27	11.3	10.2	10.7	11.8	11.5	11.7	13.3	12.9	13.1	13.7	13.5	13.6	
28	10.8	10.4	10.6	11.5	11.3	11.4	12.9	12.3	12.6	13.8	13.7	13.7	
29	11.1	10.4	10.7	11.6	11.3	11.4	12.5	12.2	12.3	14.0	13.8	13.9	
30	11.7	10.4	10.9	11.7	11.4	11.5	12.8	12.3	12.5	13.8	13.6	13.7	
31	10.5	10.0	10.2	—	—	—	13.0	12.7	12.8	13.8	13.6	13.7	
MONTH	11.8	8.8	10.3	12.9	10.0	11.2	13.5	11.4	12.5	14.7	12.2	13.8	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	13.9	13.5	13.7	12.4	12.0	12.1	11.6	11.0	11.3	10.1	9.5	9.9	
2	13.7	13.1	13.5	12.4	12.0	12.2	11.4	10.8	11.1	10.5	10.0	10.3	
3	13.3	12.9	13.1	12.8	12.4	12.7	11.2	10.7	11.0	11.0	10.2	10.6	
4	13.6	13.0	13.3	12.9	12.6	12.8	11.5	11.0	11.2	11.2	10.2	10.8	
5	14.0	13.3	13.7	13.1	12.5	12.8	11.8	11.2	11.6	11.2	10.3	10.8	
6	13.4	12.9	13.2	13.5	12.6	13.0	11.7	11.1	11.4	10.7	10.2	10.4	
7	13.2	12.8	13.0	13.4	13.1	13.3	11.5	10.8	11.2	11.1	10.2	10.5	
8	13.9	13.2	13.6	13.4	13.0	13.2	11.1	10.8	11.0	10.7	10.1	10.4	
9	13.2	12.8	13.1	13.2	12.4	12.8	11.5	11.0	11.2	10.5	9.9	10.3	
10	13.1	12.7	12.8	12.7	12.1	12.5	11.6	11.1	11.4	10.0	9.5	9.8	
11	13.0	12.5	12.8	12.6	11.8	12.2	11.8	11.0	11.6	9.7	9.0	9.4	
12	12.9	12.4	12.6	13.2	12.6	13.0	12.0	11.4	11.7	9.2	8.7	9.0	
13	12.9	12.5	12.7	13.6	12.7	13.2	11.9	11.0	11.5	9.2	8.6	9.0	
14	12.9	12.4	12.7	12.8	12.5	12.6	11.4	10.6	11.0	9.5	8.9	9.2	
15	13.7	12.7	13.3	12.8	12.3	12.6	11.0	10.1	10.6	9.9	9.5	9.7	
16	13.6	13.2	13.5	12.6	12.0	12.4	10.4	9.5	10.1	10.1	9.4	9.8	
17	13.7	13.2	13.4	12.5	12.0	12.2	10.0	9.5	9.7	9.7	9.2	9.5	
18	13.5	12.7	13.2	12.2	11.8	12.0	9.7	9.2	9.5	9.6	9.1	9.3	
19	12.9	12.2	12.6	12.0	11.5	11.8	9.6	8.9	9.3	9.8	9.2	9.5	
20	12.2	11.6	11.9	11.8	11.5	11.7	10.2	9.3	9.9	9.4	9.1	9.2	
21	12.5	11.7	12.1	12.8	11.8	12.4	10.0	9.4	9.9	9.5	9.1	9.3	
22	12.8	12.1	12.4	13.4	12.6	13.1	10.4	9.6	10.2	9.7	9.3	9.5	
23	12.5	12.0	12.3	12.7	11.6	12.3	10.6	9.9	10.3	10.0	9.5	9.8	
24	12.9	12.3	12.5	12.1	11.3	11.7	10.5	9.9	10.2	10.1	9.9	10.0	
25	13.0	12.3	12.6	12.0	11.3	11.6	10.3	10.0	10.2	10.3	10.0	10.1	
26	13.1	12.3	12.6	12.0	11.7	11.8	10.4	9.7	10.2	10.1	9.7	9.9	
27	13.4	12.4	12.9	12.4	12.0	12.2	10.8	10.1	10.5	10.0	9.6	9.8	
28	13.4	12.4	12.9	12.2	11.5	11.9	10.7	9.8	10.4	10.1	9.6	9.8	
29	13.0	12.0	12.5	11.5	11.1	11.4	9.9	9.2	9.7	10.2	9.6	9.8	
30	—	—	—	11.4	11.0	11.2	9.6	9.1	9.4	9.9	9.3	9.7	
31	—	—	—	11.5	11.1	11.3	—	—	—	9.7	9.3	9.5	
MONTH	14.0	11.6	12.9	13.6	11.0	12.3	12.0	8.9	10.6	11.2	8.6	9.8	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125460 PINE RIVER NEAR HOXEYVILLE, MI--Continued

OXYGEN DISSOLVED (MGL), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.8	9.3	9.6	9.8	7.6	8.5	10.4	8.6	9.3	9.3	7.8	8.7
2	9.6	9.3	9.5	9.8	8.3	8.9	10.0	8.5	9.1	9.2	8.2	8.6
3	9.9	9.2	9.6	9.8	8.2	8.9	10.2	8.4	9.1	9.3	7.6	8.5
4	10.0	9.4	9.7	8.6	7.9	8.3	10.1	7.8	8.8	9.2	7.6	8.6
5	9.8	9.3	9.5	9.7	8.3	8.9	9.5	7.7	8.4	8.6	7.5	8.0
6	9.6	9.2	9.4	9.1	8.3	8.7	9.8	8.0	8.7	8.4	7.5	7.9
7	9.7	8.8	9.3	9.5	8.5	8.9	9.8	8.1	8.7	8.9	7.6	8.2
8	9.2	8.5	8.9	9.7	8.7	9.2	9.3	7.9	8.5	9.1	7.9	8.4
9	9.1	8.5	8.7	10.4	8.9	9.5	8.6	7.7	8.1	9.1	8.1	8.5
10	9.5	8.7	9.1	10.5	8.5	9.4	8.4	7.8	8.1	9.5	8.2	8.7
11	9.9	9.1	9.5	9.9	8.3	9.0	9.0	8.0	8.5	9.4	8.1	8.6
12	9.9	9.1	9.5	9.9	8.1	8.9	9.4	8.5	9.0	9.2	8.0	8.5
13	9.6	8.9	9.2	9.8	8.1	8.8	9.5	8.6	9.0	9.4	8.1	8.5
14	8.9	8.1	8.5	9.1	8.0	8.4	9.6	8.4	8.9	9.1	7.9	8.4
15	8.8	8.0	8.4	9.8	8.3	8.9	9.3	8.4	8.8	8.9	7.8	8.2
16	8.7	7.7	8.2	9.8	8.2	8.9	9.5	8.1	8.8	8.9	7.6	8.2
17	8.3	7.5	8.0	10.1	8.4	9.1	9.0	8.0	8.5	9.5	8.1	8.7
18	8.8	8.0	8.4	10.3	8.3	9.0	9.2	8.2	8.7	9.9	8.4	9.0
19	9.2	8.0	8.6	9.7	8.2	8.8	9.4	8.2	8.7	—	—	—
20	9.3	8.3	8.7	8.9	8.1	8.4	9.5	8.3	8.8	—	—	—
21	9.0	8.2	8.6	8.8	8.0	8.3	9.9	8.6	9.1	—	—	—
22	9.4	8.4	8.8	9.6	8.0	8.6	10.0	8.4	9.1	—	—	—
23	9.6	8.4	8.9	9.9	8.1	8.8	9.4	8.1	8.6	—	—	—
24	9.5	8.2	8.9	10.5	8.5	9.4	9.1	7.7	8.4	10.2	8.6	9.2
25	10.0	8.8	9.4	10.8	8.8	9.5	8.5	7.3	7.9	10.0	8.3	9.0
26	9.9	8.5	9.2	10.7	8.7	9.4	8.7	7.7	8.2	10.6	8.6	9.4
27	10.0	8.5	9.1	10.3	8.5	9.2	8.2	7.7	7.9	10.5	8.9	9.6
28	9.7	8.2	8.8	10.7	8.6	9.4	8.2	7.7	7.9	10.6	8.8	9.5
29	9.7	8.1	8.8	10.3	8.5	9.2	8.8	7.8	8.2	10.9	9.1	9.7
30	9.4	7.8	8.4	9.5	8.4	8.9	9.0	8.1	8.5	10.8	9.2	9.9
31	—	—	—	10.0	8.5	9.1	9.3	8.1	8.6	—	—	—
MONTH	10.0	7.5	9.0	10.8	7.6	8.9	10.4	7.3	8.6	—	—	—

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125550 MANISTEE RIVER NEAR WELLSTON, MI

LOCATION.--Lat 44°15'34", long 85°56'30", in NE1/4 SE1/4 sec.36, T.22 N., R.14 W., Manistee County, Hydrologic Unit 04060103, on right bank 700 ft downstream from Tippy Dam, at public access site, 3.2 mi north of Wellston, and 5.0 mi southeast of Brethren.

DRAINAGE AREA.--1,451 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1996 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 640 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good. Flow completely regulated by Tippy Dam 700 ft upstream. Gage-height telemeter 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	1340	1350	1760	1640	1550	1640	3250	2070	2360	1510	1410	1380
2	1470	1530	1670	1630	1560	1880	2930	2050	2300	1490	1400	1400
3	1870	1470	1580	1640	1590	2080	2690	1970	2060	1490	1400	1370
4	1900	2520	1680	1650	1610	2240	2650	1750	2120	1710	1380	1370
5	1700	2610	1610	1800	1580	2960	2180	1680	2120	1620	1350	1380
6	1600	2570	1580	1730	1590	3490	2490	e1680	1980	1510	1340	1350
7	1610	2300	1570	1460	1570	3860	2470	e1830	1780	1450	1340	1310
8	1610	2100	1600	1270	1490	3320	2340	2170	1690	1500	1320	1330
9	1550	1860	1600	1470	1540	2580	2230	2670	1940	1530	1390	1390
10	1430	1640	1760	1510	1620	2500	2220	2740	1990	1490	1410	1340
11	1410	1640	1990	1390	1590	2440	2160	2690	1790	1480	1410	1230
12	1450	1750	2030	1610	1570	2460	2070	2390	1730	1480	e1480	1270
13	1390	1790	1910	1670	1580	2240	2030	2550	1720	1460	e1470	1290
14	1370	1750	1730	1660	1580	2190	1950	2820	1640	e1490	1440	1270
15	1450	1700	1660	1530	1540	2110	1880	e2790	1780	1480	1400	1290
16	1460	1690	1780	1210	1480	2020	1890	e2490	1690	e1440	1390	1330
17	1460	1670	1850	1400	1440	2030	1920	2420	1880	e1450	1420	1330
18	1470	2010	1720	1420	1490	1890	2380	e2450	1830	e1450	1400	1340
19	1420	2810	1640	1460	1620	1750	2750	2460	1680	e1460	1290	1330
20	1330	2690	1620	1600	1650	2090	2750	2580	1680	e1450	1340	1260
21	1270	2410	1620	1560	1640	2280	2680	2630	1650	e1440	1390	1220
22	1350	2440	1630	1490	1600	2410	2600	2550	1590	1560	e1450	1300
23	1500	2380	1620	1370	1600	2160	2360	e2810	1580	1430	1410	1320
24	1430	2180	1620	1520	1610	2240	2230	e3630	1610	1440	1430	1290
25	1370	2270	1620	1530	1530	2160	2200	3740	1570	1430	1420	1250
26	1390	2290	1620	1520	1520	2890	2250	3530	1550	1400	e1430	1250
27	1450	2080	1600	1570	1580	3400	2170	3130	1540	1370	e1800	1230
28	1450	1930	1600	1570	1620	3370	2280	3020	1490	1410	1620	1270
29	1450	1880	1610	1550	1610	3500	2150	2430	1490	1400	1460	1290
30	1480	1860	1710	1530	—	3580	2090	2300	1510	1390	1380	1280
31	1440	—	1710	1570	—	3370	—	2400	—	1410	1350	—
TOTAL	45870	61170	52300	47530	45550	79130	70240	78420	53340	45620	43920	39260
MEAN	1480	2039	1687	1533	1571	2553	2341	2530	1778	1472	1417	1309
MAX	1900	2810	2030	1800	1650	3860	3250	3740	2360	1710	1800	1400
MIN	1270	1350	1570	1210	1440	1640	1880	1680	1490	1370	1290	1220
CFSM	1.02	1.41	1.16	1.06	1.08	1.76	1.61	1.74	1.23	1.01	0.98	0.90
IN.	1.18	1.57	1.34	1.22	1.17	2.03	1.80	2.01	1.37	1.17	1.13	1.01

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2004, BY WATER YEAR (WY)

	1997	1998	1999	2000	2001	2002	2003	2004
MEAN	1487	1596	1550	1520	1615	1843	2094	1889
MAX	1645	2039	1722	1823	1856	2553	2512	2530
(WY)	2002	2004	1997	1997	1997	2004	1997	2004
MIN	1316	1405	1361	1288	1349	1528	1508	1504
(WY)	2001	2003	2001	2003	2003	2003	2000	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1997 - 2004

ANNUAL TOTAL	552640	662350	
ANNUAL MEAN	1514	1810	1607
HIGHEST ANNUAL MEAN			1810
LOWEST ANNUAL MEAN			1429
HIGHEST DAILY MEAN	2810	Nov 19	3860
LOWEST DAILY MEAN	1060	Mar 10	1210
ANNUAL SEVEN-DAY MINIMUM	1180	Jan 18	1270
MAXIMUM PEAK FLOW			3970
MAXIMUM PEAK STAGE			9.97
INSTANTANEOUS LOW FLOW			989
ANNUAL RUNOFF (CFSM)	1.04		1.25
ANNUAL RUNOFF (INCHES)	14.17		16.98
10 PERCENT EXCEEDS	1840		2560
50 PERCENT EXCEEDS	1450		1610
90 PERCENT EXCEEDS	1260		1350

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125550 MANISTEE RIVER NEAR WELLSTON, MI—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.—Water years 1997 to current year.

PERIOD OF DAILY RECORD.—

WATER TEMPERATURE: October 1996 to current year.

DISSOLVED OXYGEN: October 1996 to current year.

INSTRUMENTATION.—Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.—Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent except the following period: Dec. 10 to Mar. 1 rated good. Dissolved oxygen records rated excellent except the following periods:

Dec. 18-27, Jan. 30 to Feb. 8, Mar. 15-22, Apr. 7-10, May 13-17, Sept. 16-20 rated good; Dec. 28 to Jan. 10, Feb. 9-16, Mar. 23 to Apr. 3, Apr. 11 to May 4, May 18-23, Sept. 21-27 rated fair; and Nov. 3-5, Jan. 11-13, Feb. 17-23, Apr. 4-6, Sept. 28-30 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.—

WATER TEMPERATURE: Maximum, 24.0°C, Aug. 9, 10, 2001, Aug. 1, 2002; minimum, 0.0°C, on several days during winter periods.

DISSOLVED OXYGEN: Maximum, 16.0 mg/L, Mar. 11, 12, 1997; minimum, 5.9 mg/L, July 29, Aug. 1, 2002.

EXTREMES FOR CURRENT YEAR.—

WATER TEMPERATURE: Maximum, 21.0°C, July 23, 24, 29, Aug. 3-5; minimum, 0.0°C, on several days during winter period.

DISSOLVED OXYGEN: Maximum, 14.7 mg/L, Feb. 16; minimum, 6.1 mg/L, Sept. 7.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	14.0	13.5	14.0	9.5	9.0	9.5	4.0	4.0	4.0	2.0	1.5	2.0
2	13.5	13.5	13.5	9.0	9.0	9.0	4.0	3.5	4.0	2.0	1.5	2.0
3	13.5	13.0	13.0	9.0	9.0	9.0	3.5	3.5	3.5	2.0	2.0	2.0
4	13.0	12.5	13.0	9.0	8.5	9.0	3.5	3.0	3.0	2.0	1.5	1.5
5	12.5	12.0	12.5	9.0	8.5	8.5	3.0	3.0	3.0	2.0	1.0	2.0
6	12.0	11.5	12.0	8.5	8.5	8.5	3.0	3.0	3.0	2.0	1.5	1.5
7	12.0	11.5	11.5	8.5	8.0	8.0	3.0	2.5	3.0	1.5	1.0	1.5
8	12.0	11.5	12.0	8.0	7.5	7.5	2.5	2.5	2.5	1.0	1.0	1.0
9	12.5	11.5	12.0	7.5	7.0	7.5	3.0	2.5	2.5	1.0	1.0	1.0
10	12.5	12.0	12.5	7.0	7.0	7.0	3.0	2.5	3.0	1.0	1.0	1.0
11	13.0	12.0	12.5	7.0	6.5	6.5	3.0	2.5	3.0	1.0	1.0	1.0
12	12.5	11.5	12.0	6.5	6.0	6.5	2.5	2.5	2.5	1.0	1.0	1.0
13	12.5	12.0	12.0	6.5	5.5	6.0	2.5	2.5	2.5	1.0	1.0	1.0
14	12.5	11.5	12.0	5.5	5.5	5.5	2.5	2.0	2.5	1.0	1.0	1.0
15	11.5	11.5	11.5	5.5	5.5	5.5	2.5	2.0	2.0	1.0	1.0	1.0
16	11.5	11.5	11.5	5.5	5.5	5.5	2.5	2.0	2.0	1.0	1.0	1.0
17	11.5	11.0	11.5	5.5	5.5	5.5	2.5	2.0	2.0	1.0	1.0	1.0
18	11.0	11.0	11.0	6.0	5.5	5.5	2.0	2.0	2.0	1.0	1.0	1.0
19	11.0	11.0	11.0	5.5	5.5	5.5	2.0	2.0	2.0	1.0	0.5	1.0
20	11.0	10.5	11.0	5.5	5.5	5.5	2.0	2.0	2.0	1.0	0.5	0.5
21	11.0	10.5	10.5	6.0	5.5	6.0	2.0	1.5	2.0	0.5	0.5	0.5
22	10.5	10.5	10.5	6.0	5.5	5.5	2.0	1.0	1.5	0.5	0.5	0.5
23	10.5	10.0	10.0	6.0	5.5	6.0	2.0	1.5	1.5	0.5	0.5	0.5
24	10.0	10.0	10.0	6.0	5.5	5.5	2.0	1.5	1.5	0.5	0.5	0.5
25	10.0	10.0	10.0	5.5	5.0	5.0	2.0	1.5	2.0	0.5	0.0	0.5
26	10.0	10.0	10.0	5.0	5.0	5.0	2.0	1.5	1.5	0.5	0.0	0.0
27	10.0	9.5	10.0	5.0	5.0	5.0	2.0	1.5	2.0	0.0	0.0	0.0
28	9.5	9.5	9.5	5.0	4.5	4.5	2.0	1.5	2.0	0.0	0.0	0.0
29	9.5	9.5	9.5	4.5	4.5	4.5	2.0	1.5	2.0	0.0	0.0	0.0
30	9.5	9.0	9.5	4.5	4.0	4.0	2.0	2.0	2.0	0.0	0.0	0.0
31	9.5	9.5	9.5	—	—	—	2.0	2.0	2.0	0.0	0.0	0.0
MONTH	14.0	9.0	11.3	9.5	4.0	6.4	4.0	1.0	2.4	2.0	0.0	0.9

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125550 MANISTEE RIVER NEAR WELLSTON, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	0.0	0.0	0.0	2.0	1.5	1.5	5.5	5.0	5.5	11.5	11.5	11.5	
2	0.0	0.0	0.0	1.5	1.5	1.5	6.0	5.0	5.5	11.5	11.0	11.5	
3	0.0	0.0	0.0	2.0	1.5	2.0	5.5	5.5	5.5	11.5	11.0	11.0	
4	0.5	0.0	0.0	2.0	2.0	2.0	6.0	5.5	5.5	11.0	11.0	11.0	
5	0.0	0.0	0.0	2.5	2.0	2.0	6.0	6.0	6.0	11.5	11.0	11.0	
6	0.5	0.0	0.5	2.5	2.0	2.0	6.5	6.0	6.5	—	—	—	
7	0.5	0.0	0.5	2.5	2.0	2.0	6.5	6.5	6.5	—	—	—	
8	0.5	0.0	0.5	2.0	1.5	2.0	7.0	6.5	7.0	11.5	11.5	11.5	
9	0.5	0.0	0.5	2.0	1.5	1.5	7.0	6.5	7.0	12.0	11.5	11.5	
10	0.5	0.5	0.5	2.0	1.5	1.5	7.0	7.0	7.0	12.0	11.5	12.0	
11	0.5	0.5	0.5	2.0	1.5	2.0	7.5	7.0	7.0	13.5	12.0	12.5	
12	0.5	0.0	0.5	2.0	2.0	2.0	7.5	7.0	7.0	14.0	13.0	13.0	
13	0.5	0.0	0.5	2.0	2.0	2.0	8.0	7.0	7.5	14.0	13.5	13.5	
14	0.5	0.5	0.5	2.0	2.0	2.0	7.5	7.0	7.5	14.0	13.0	13.5	
15	0.5	0.5	0.5	2.0	2.0	2.0	8.5	7.5	8.0	14.0	13.0	13.5	
16	0.5	0.5	0.5	2.0	1.5	2.0	9.0	8.0	8.5	14.0	13.5	13.5	
17	0.5	0.5	0.5	2.0	2.0	2.0	9.5	8.5	9.0	14.0	13.5	14.0	
18	0.5	0.5	0.5	2.5	2.0	2.5	10.5	9.0	10.0	14.5	14.0	14.0	
19	0.5	0.5	0.5	2.5	2.5	2.5	10.5	10.0	10.5	15.0	14.0	14.5	
20	0.5	0.5	0.5	3.0	2.5	2.5	10.5	10.0	10.5	15.0	14.5	14.5	
21	0.5	0.5	0.5	3.0	2.5	3.0	10.5	10.5	10.5	15.0	14.5	15.0	
22	0.5	0.5	0.5	3.0	3.0	3.0	11.0	10.0	10.5	15.0	14.5	15.0	
23	0.5	0.5	0.5	3.5	3.0	3.0	10.5	10.0	10.5	15.0	14.5	14.5	
24	1.0	0.5	1.0	3.0	3.0	3.0	11.0	10.0	10.5	14.5	14.0	14.0	
25	1.0	0.5	1.0	3.5	3.0	3.0	10.5	10.5	10.5	14.5	14.0	14.0	
26	1.0	1.0	1.0	3.5	3.0	3.5	10.5	10.5	10.5	14.5	14.0	14.0	
27	1.5	1.0	1.0	4.0	3.5	3.5	10.5	10.5	10.5	14.5	14.5	14.5	
28	1.5	1.0	1.5	4.5	4.0	4.0	11.0	10.5	10.5	15.0	14.0	14.5	
29	1.5	1.0	1.5	5.0	4.5	4.5	11.5	11.0	11.0	15.0	14.5	14.5	
30	—	—	—	6.0	5.0	5.5	11.5	11.5	11.5	15.0	15.0	15.0	
31	—	—	—	5.5	5.5	5.5	—	—	—	15.0	14.5	14.5	
MONTH	1.5	0.0	0.6	6.0	1.5	2.6	11.5	5.0	8.5	—	—	—	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	14.5	14.5	14.5	19.5	19.0	19.0	20.5	20.0	20.5	19.0	18.5	18.5
2	15.0	14.5	14.5	20.0	19.0	19.5	20.5	20.0	20.0	19.0	18.5	19.0
3	15.5	14.5	15.0	20.5	19.5	20.0	21.0	20.0	20.5	19.5	19.0	19.0
4	15.5	15.0	15.0	20.0	18.5	19.5	21.0	20.0	20.5	19.5	19.0	19.0
5	15.5	15.0	15.0	19.5	18.5	19.0	21.0	20.0	20.5	20.0	19.0	19.5
6	16.0	15.0	15.5	20.0	19.0	19.5	20.5	20.0	20.0	20.0	19.5	20.0
7	17.0	15.5	16.5	19.0	18.5	18.5	20.5	20.0	20.5	19.5	18.5	19.0
8	17.5	16.0	16.5	18.5	18.0	18.5	20.5	20.0	20.5	19.5	19.0	19.0
9	17.5	16.5	17.0	18.5	18.0	18.0	20.5	20.5	20.5	19.0	18.5	19.0
10	18.5	17.0	18.0	18.5	18.0	18.0	20.5	19.5	19.5	19.0	18.5	19.0
11	19.0	18.0	18.5	19.0	18.0	18.5	19.5	19.5	19.5	19.0	19.0	19.0
12	18.0	17.0	17.5	19.0	18.5	19.0	—	—	—	19.0	18.5	19.0
13	17.5	17.0	17.0	19.5	18.5	19.0	19.0	18.5	19.0	19.5	18.5	19.0
14	18.0	17.0	17.5	19.0	18.0	19.0	19.0	18.5	18.5	20.0	19.5	19.5
15	18.0	17.0	17.5	19.5	18.5	19.5	19.0	18.5	18.5	20.0	19.5	20.0
16	18.5	17.5	18.0	20.0	19.5	20.0	19.0	18.5	18.5	20.0	18.5	19.0
17	18.5	17.5	18.0	20.0	19.5	20.0	19.0	18.5	18.5	19.5	19.0	19.0
18	18.5	17.5	18.0	20.5	19.5	20.0	18.5	18.5	18.5	19.5	19.0	19.0
19	18.0	17.5	18.0	—	—	—	18.5	18.0	18.5	19.0	18.5	19.0
20	18.5	18.0	18.5	—	—	—	18.5	18.0	18.5	19.0	18.5	18.5
21	19.0	18.5	18.5	20.5	20.0	20.5	18.5	18.0	18.0	18.5	18.0	18.5
22	18.5	17.5	18.0	20.5	20.0	20.0	18.5	18.0	18.0	18.5	18.0	18.5
23	18.5	18.0	18.5	21.0	20.0	20.5	19.0	18.0	18.5	18.5	18.0	18.5
24	18.5	17.5	18.0	21.0	20.0	20.5	19.5	19.0	19.0	18.5	18.0	18.0
25	18.5	18.0	18.0	20.5	20.0	20.5	19.0	18.5	18.5	18.0	17.5	18.0
26	18.0	17.5	17.5	20.5	20.0	20.0	19.0	18.5	19.0	18.0	17.5	18.0
27	18.0	17.5	18.0	20.5	20.0	20.0	18.5	18.5	18.5	18.0	17.5	17.5
28	18.5	17.5	18.0	20.5	20.0	20.5	19.0	18.5	19.0	18.0	17.0	17.5
29	18.5	18.0	18.5	21.0	20.0	20.5	18.5	18.5	18.5	17.5	17.0	17.0
30	19.0	18.5	18.5	20.5	20.0	20.5	19.0	18.5	18.5	17.0	17.0	17.0
31	—	—	—	20.5	19.5	20.0	18.5	18.0	18.5	—	—	—
MONTH	19.0	14.5	17.2	—	—	—	—	—	—	20.0	17.0	18.7

STREAMS TRIBUTARY TO LAKE MICHIGAN

04063000 MENOMINEE RIVER NEAR FLORENCE, WI

LOCATION.—Lat 45°57'05", long 88°11'21", in SE1/4 sec.12, T.41 N., R.18 E., Wisconsin Meridian, Florence County, Hydrologic Unit 04030108, on right bank 0.4 mi downstream from confluence of Brule and Michigamme Rivers, 3.5 mi northeast of Florence, WI, and at mile 117.

DRAINAGE AREA.—1,760 mi².

PERIOD OF RECORD.—January 1914 to current year. Published as "at Twin Falls near Iron Mountain, MI", January 1914 to June 1950, October 1996 to September 1998. Records published for both sites July 1950 to September 1957, October 1989 to September 1996, October 1998 to current year.

REVISED RECORDS.—WSP 1707: 1953(M). WDR MI-92-1: Drainage area.

GAGE.—Water-stage recorder and crest-stage gage. Datum of gage is 1,119.23 ft above sea level (levels by Owen Ayres Associates). Prior to July 5, 1950, headwater and tailwater gages and generation data entered hourly in daily log sheets by company employees at the We Energies Twin Falls Powerplant, 10.4 mi downstream. July 5, 1950 to Oct. 19, 2000, water-stage recorder at site 500 ft downstream at same datum.

REMARKS.—Records good except for estimated daily discharges, which are fair. Prior to July 1950, discharge determined from powerplant records computed on basis of load-discharge rating of hydroelectric units and rating for tailwater gage during periods of spill; ratings developed by U.S. Geological Survey. Flow regulated by powerplants, by Michigamme Reservoir, capacity, 119,950 acre-ft, by Peavy Pond, capacity, 33,860 acre-ft, on Michigamme River, and by many smaller reservoirs upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	852	858	1040	1210	e1500	1520	1940	3220	4300	1310	1130	898
2	985	940	967	1150	e1400	1430	2060	3200	4800	1330	1250	990
3	901	969	894	1260	e1600	1860	1960	3180	4400	1180	1060	826
4	861	991	881	1170	e1600	1650	2260	3160	4080	1330	1060	975
5	769	1160	1480	e1600	e1600	1990	2320	3160	3700	1360	1140	920
6	950	905	1020	e1350	e1600	1760	2390	3020	3150	1320	1110	859
7	892	1290	909	e1300	1600	1780	2230	2530	3030	1650	998	939
8	870	1000	1030	e1400	e1600	1740	2340	2110	2860	1510	972	875
9	841	928	1270	e1400	e1700	2070	2890	2030	2860	1520	1040	847
10	899	1020	1040	e1300	e1420	1970	2920	1970	2830	1420	1100	1010
11	938	902	817	e1530	1490	1930	3300	2010	2490	1390	938	810
12	827	953	925	1510	1640	1850	3320	1870	2300	1370	940	807
13	1040	984	1010	e1600	1530	e1800	3230	1870	2270	1450	1050	728
14	1010	1050	949	e1530	1550	1550	2850	2240	2460	1350	893	759
15	934	1150	850	e1700	1530	e1800	2510	2710	2220	1180	981	966
16	930	923	933	e1700	1670	e1800	2980	2780	2180	1100	1060	1030
17	884	1100	1300	e1790	1590	1620	3320	2690	1860	1350	1070	991
18	949	1090	1070	e1550	e1500	1570	e3500	2650	1420	1200	1130	873
19	1010	1570	e1140	e1440	1480	1600	e5200	2420	1390	1430	1030	1040
20	956	1420	e1000	1750	e1600	1580	8760	2460	1520	1260	1040	1050
21	880	1440	926	e1500	e1600	1480	9470	2450	1340	1500	1030	920
22	912	1590	1120	e1600	1540	1580	8560	2300	1240	1230	1000	959
23	935	1580	1120	e1600	1630	1550	7260	2360	1230	1100	970	892
24	806	1600	e1160	e1550	1510	1580	6210	3140	1150	1090	1020	892
25	802	1410	985	e1600	e1500	1410	5910	3270	1330	921	914	815
26	888	1100	1060	e1600	e1500	1590	5200	3160	1220	889	931	808
27	907	1130	1020	e1600	1530	1940	4830	2700	1340	1020	945	811
28	884	1220	1060	e1550	1480	1720	4570	2500	1200	1110	955	786
29	834	1080	1290	e1500	1400	1860	3900	2750	1300	1130	880	752
30	863	1170	1190	e1600	—	1960	3250	2900	1250	1030	845	663
31	836	—	1160	e1700	—	1870	—	3050	—	1190	1050	—
TOTAL	27845	34523	32616	46640	44890	53410	121440	81860	68720	39220	31532	26491
MEAN	898	1151	1052	1505	1548	1723	4048	2641	2291	1265	1017	883
MAX	1040	1600	1480	1790	1700	2070	9470	3270	4800	1650	1250	1050
MIN	769	858	817	1150	1400	1410	1940	1870	1150	889	845	663

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 2004, BY WATER YEAR (WY)

	MEAN	1458	1569	1440	1398	1387	1597	3168	3021	2108	1580	1291	1375
MAX	3537	3465	2640	2253	2514	3544	8159	6319	5035	4253	2359	3149	
(WY)	1986	1986	1984	1983	1984	1973	1916	1960	1916	1953	1972	1968	
MIN	726	725	765	691	647	692	735	595	799	721	545	718	
(WY)	1949	1964	1925	1924	1926	1914	1990	1987	1988	1925	1925	1925	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1914 - 2004

ANNUAL TOTAL	548416	609187	
ANNUAL MEAN	1503	1664	1782
HIGHEST ANNUAL MEAN			3069
LOWEST ANNUAL MEAN			922
HIGHEST DAILY MEAN	7550	May 13	18800
LOWEST DAILY MEAN	629	Sep 11	57
ANNUAL SEVEN-DAY MINIMUM	728	Sep 8	277
MAXIMUM PEAK FLOW			19500
MAXIMUM PEAK STAGE			14.15
INSTANTANEOUS LOW FLOW			38
10 PERCENT EXCEEDS	2370		3000
50 PERCENT EXCEEDS	1270		1460
90 PERCENT EXCEEDS	846		848

(a) Aug. 21, 1962, Sept. 26, 1975.

(e) Estimated.

(b) Present site and datum.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125550 MANISTEE RIVER NEAR WELLSTON, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
1	8.6	8.3	8.4	10.3	10.0	10.1	12.4	12.1	12.3	13.8	13.3	13.5			
2	8.6	8.4	8.5	10.3	10.0	10.2	12.5	11.8	12.1	13.9	13.4	13.6			
3	8.6	8.2	8.4	10.5	10.1	10.2	12.1	11.7	11.9	13.8	13.4	13.5			
4	8.8	8.5	8.7	10.3	9.9	10.2	12.3	11.8	12.1	13.9	13.5	13.7			
5	9.1	8.7	8.9	10.7	10.1	10.4	12.5	12.2	12.3	13.8	13.4	13.6			
6	9.4	8.9	9.2	10.8	10.7	10.7	12.7	12.1	12.3	13.9	13.4	13.6			
7	9.2	7.9	8.3	11.2	10.8	10.9	12.4	12.2	12.3	13.8	13.0	13.4			
8	9.4	7.9	8.4	11.1	10.9	11.0	12.6	12.3	12.4	13.5	13.0	13.3			
9	9.9	9.4	9.6	11.2	11.0	11.1	12.7	12.3	12.5	14.0	13.1	13.6			
10	9.8	9.6	9.7	11.4	10.7	11.1	12.7	12.4	12.5	14.0	13.0	13.5			
11	9.9	9.7	9.8	11.5	10.9	11.2	12.7	12.4	12.5	13.8	13.0	13.5			
12	9.9	9.6	9.7	11.6	11.1	11.3	12.7	12.5	12.6	14.1	13.2	13.6			
13	10.0	9.7	9.9	11.8	11.5	11.7	12.8	12.5	12.7	14.6	13.2	13.8			
14	9.9	9.7	9.8	11.9	11.6	11.8	13.0	12.6	12.8	14.2	13.3	13.7			
15	9.9	9.7	9.7	11.9	11.7	11.8	12.9	12.6	12.8	14.0	13.1	13.7			
16	10.0	9.7	9.9	11.9	11.7	11.8	12.9	12.6	12.8	14.3	13.4	13.7			
17	10.1	9.8	9.9	11.9	11.7	11.8	13.0	12.7	12.9	14.1	13.6	13.8			
18	10.0	9.8	9.9	11.9	11.6	11.8	13.0	12.7	12.8	14.5	13.5	13.9			
19	10.1	9.8	9.9	12.0	11.8	11.9	13.2	12.8	13.0	14.6	13.1	13.9			
20	10.0	9.7	9.9	12.1	11.8	11.9	13.2	12.8	13.0	14.5	13.2	13.8			
21	10.1	9.8	9.9	11.9	11.8	11.9	13.3	12.9	13.1	13.8	13.4	13.6			
22	10.1	9.8	10.0	12.0	11.8	11.9	13.6	13.1	13.3	13.8	13.4	13.6			
23	10.0	9.8	9.9	11.9	11.6	11.8	13.6	13.2	13.4	13.8	13.4	13.6			
24	10.1	9.2	9.9	11.9	11.7	11.8	13.6	13.1	13.3	13.8	13.3	13.6			
25	10.3	10.0	10.1	12.0	11.9	12.0	13.5	13.0	13.2	13.8	13.3	13.6			
26	10.2	10.0	10.1	12.2	11.9	12.0	13.6	13.2	13.3	13.7	13.4	13.5			
27	10.2	9.0	10.0	12.2	11.9	12.1	13.7	13.1	13.4	13.6	13.2	13.4			
28	10.1	9.9	10.0	12.2	12.0	12.1	13.7	13.3	13.4	13.6	13.3	13.4			
29	10.2	10.0	10.1	12.3	12.1	12.2	13.6	13.2	13.3	13.7	13.3	13.5			
30	10.3	10.0	10.1	12.2	12.0	12.1	13.6	13.1	13.3	13.7	13.3	13.5			
31	10.2	10.0	10.1	—	—	—	13.6	13.2	13.4	13.8	13.2	13.5			
MONTH	10.3	7.9	9.6	12.3	9.9	11.4	13.7	11.7	12.8	14.6	13.0	13.6			

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	13.8	13.4	13.6	—	—	—	12.2	11.9	12.1	9.9	9.6	9.8	
2	13.7	13.3	13.5	12.9	12.3	12.6	12.1	12.0	12.1	9.9	9.5	9.7	
3	13.6	13.2	13.4	12.7	12.3	12.5	12.1	11.9	12.0	9.8	9.3	9.6	
4	14.1	13.4	13.7	12.6	12.3	12.4	12.4	11.9	12.0	9.5	9.4	9.4	
5	13.9	13.3	13.6	12.4	12.0	12.1	12.0	11.6	11.8	9.7	9.4	9.6	
6	13.8	13.5	13.7	12.2	11.8	12.0	11.8	11.5	11.7	—	—	—	
7	14.1	13.5	13.8	12.3	12.0	12.2	11.6	11.2	11.5	—	—	—	
8	14.1	13.6	13.9	12.4	12.1	12.3	11.5	11.2	11.4	10.1	9.7	9.9	
9	14.0	13.6	13.9	12.4	12.2	12.3	11.5	11.2	11.3	10.0	9.9	9.9	
10	14.1	13.7	13.9	12.3	12.1	12.2	11.4	11.1	11.3	10.0	9.8	9.9	
11	14.5	13.8	14.1	12.3	12.1	12.2	11.3	11.0	11.1	10.0	9.6	9.8	
12	14.4	13.9	14.1	12.3	12.2	12.2	11.2	11.0	11.1	9.7	9.3	9.6	
13	14.1	13.7	14.0	12.3	12.2	12.3	11.2	10.9	11.0	9.5	9.2	9.3	
14	14.1	13.7	13.9	12.3	12.1	12.2	11.1	10.8	11.0	9.3	9.1	9.2	
15	14.2	13.6	13.9	12.4	12.1	12.3	11.1	10.8	11.0	9.4	9.1	9.2	
16	14.7	13.5	13.9	12.4	12.1	12.3	11.0	10.7	10.9	9.4	9.0	9.2	
17	14.0	13.4	13.7	12.3	12.0	12.1	10.9	10.7	10.8	9.2	8.8	9.0	
18	13.9	13.3	13.5	12.5	11.7	12.0	10.8	10.6	10.7	9.2	8.8	9.0	
19	13.7	13.1	13.4	12.3	11.7	11.9	10.7	10.4	10.6	9.3	8.8	9.1	
20	13.4	12.9	13.1	11.9	11.7	11.9	10.6	10.1	10.4	9.3	8.7	9.0	
21	13.2	12.8	13.0	12.1	11.8	11.9	10.3	10.1	10.2	9.5	9.1	9.3	
22	13.5	12.8	13.1	12.1	11.7	12.0	10.4	10.1	10.2	9.2	8.3	8.8	
23	13.1	12.2	12.9	12.1	11.8	12.0	10.3	10.0	10.2	9.0	8.2	8.7	
24	—	—	—	12.1	12.0	12.1	10.2	9.9	10.1	—	—	—	
25	—	—	—	12.3	11.9	12.2	10.1	9.6	10.0	8.9	8.7	8.9	
26	—	—	—	12.4	11.9	12.2	10.1	9.9	10.0	8.9	8.8	8.8	
27	—	—	—	12.6	12.3	12.4	10.1	9.8	9.9	8.9	8.8	8.9	
28	—	—	—	12.6	12.3	12.4	10.0	9.7	9.9	9.0	8.9	8.9	
29	—	—	—	12.3	12.0	12.2	10.1	9.7	9.9	9.1	8.9	9.0	
30	—	—	—	12.3	11.9	12.1	10.0	9.6	9.8	9.1	8.9	9.0	
31	—	—	—	12.1	11.9	12.0	—	—	—	9.0	8.9	8.9	
MONTH	—	—	—	—	—	—	12.4	9.6	10.9	—	—	—	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125550 MANISTEE RIVER NEAR WELLSTON, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.1	8.8	8.9	8.3	8.0	8.2	7.5	6.9	7.2	7.3	6.8	7.1
2	9.1	8.8	8.9	8.4	8.1	8.3	7.6	6.8	7.2	7.2	6.5	6.9
3	9.2	8.8	9.0	8.3	8.0	8.1	7.8	6.8	7.1	6.9	6.3	6.6
4	9.4	8.8	9.0	8.0	7.8	7.9	7.9	6.6	7.0	7.1	6.2	6.6
5	9.2	8.7	8.9	9.0	7.7	8.0	7.9	6.6	7.0	7.5	6.2	6.6
6	9.1	8.6	8.8	12.0	7.7	8.8	7.9	6.7	7.3	6.9	6.2	6.5
7	9.3	8.7	9.0	11.4	7.6	9.0	7.9	7.0	7.6	7.3	6.1	6.8
8	9.2	8.6	8.9	9.7	8.1	8.4	8.0	7.4	7.8	7.4	6.9	7.2
9	9.1	8.5	8.7	8.7	8.2	8.4	8.1	7.5	7.7	7.5	7.1	7.3
10	9.3	8.3	8.8	8.6	8.2	8.4	7.6	7.3	7.4	7.6	7.0	7.4
11	9.1	8.5	8.9	8.6	8.3	8.5	7.9	7.4	7.6	7.6	7.0	7.3
12	9.1	8.5	8.8	8.7	8.3	8.5	—	—	—	7.5	7.0	7.3
13	8.9	8.2	8.5	8.7	8.3	8.5	8.4	7.3	7.8	7.6	7.1	7.3
14	8.8	8.0	8.3	8.4	8.2	8.3	8.4	7.3	7.8	7.7	7.0	7.4
15	8.9	7.9	8.5	8.5	8.2	8.4	8.6	7.2	7.7	7.6	7.0	7.3
16	—	—	—	8.5	8.3	8.4	8.6	7.4	7.9	7.7	7.1	7.3
17	—	—	—	8.5	8.2	8.3	8.1	7.5	7.7	7.7	7.1	7.4
18	—	—	—	8.5	8.1	8.3	8.7	7.5	7.8	8.0	7.3	7.6
19	—	—	—	—	—	—	8.7	7.5	7.8	7.9	7.3	7.6
20	—	—	—	—	—	—	8.7	7.4	7.8	7.8	7.3	7.5
21	—	—	—	8.5	7.9	8.1	9.1	7.5	7.9	7.7	7.2	7.5
22	—	—	—	8.4	7.8	8.1	8.9	7.7	8.0	8.1	7.3	7.6
23	8.2	7.8	8.0	8.5	8.1	8.3	8.9	7.7	8.1	8.3	7.5	7.8
24	8.1	7.9	8.0	8.3	7.9	8.2	9.6	8.0	8.9	8.1	7.4	7.7
25	8.4	8.0	8.1	8.3	7.7	8.0	9.4	6.2	8.8	7.9	7.3	7.5
26	8.2	7.9	8.1	8.1	7.6	7.9	8.1	6.2	7.9	8.4	7.5	7.8
27	8.3	8.0	8.1	8.0	7.6	7.8	—	—	—	8.4	7.3	7.9
28	8.3	8.1	8.2	8.0	7.4	7.7	7.7	7.3	7.5	8.4	7.4	7.9
29	8.4	8.1	8.2	7.8	7.2	7.6	7.5	7.2	7.4	8.5	7.5	7.9
30	8.4	8.2	8.3	7.6	7.2	7.4	7.6	7.1	7.3	8.8	7.7	8.1
31	—	—	—	7.5	6.9	7.2	7.4	6.9	7.1	—	—	—
MONTH	—	—	—	—	—	—	—	—	—	8.8	6.1	7.4

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126740 PLATTE RIVER AT HONOR, MI

LOCATION.--Lat 44°40'05", long 86°02'05", in SW1/4 NW1/4 sec.8, T.26 N., R.14 W., Benzie County, Hydrologic Unit 04060104, on right bank 20 ft downstream from bridge on U.S. Highway 31, 1.0 mi west of Honor.

DRAINAGE AREA.--118 mi².

PERIOD OF RECORD.--April 1990 to current year.

GAGE.--Water-stage recorder. Datum of gage is 589.73 ft above sea level (Michigan Department of Transportation bench mark).

REMARKS.--Records good. Some diversion for fish hatchery 6 mi upstream from station. Gage-height telemeter 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	115	108	120	116	111	115	148	137	183	132	134	130
2	118	109	118	117	111	128	146	134	163	131	131	128
3	163	111	116	129	112	124	147	133	158	129	e130	126
4	139	174	115	118	111	120	148	134	155	170	e127	126
5	123	133	114	116	e111	198	143	135	153	152	e126	126
6	118	122	114	e115	112	162	154	136	152	144	125	132
7	116	118	113	e115	111	153	147	134	150	142	122	129
8	114	115	113	115	e111	146	148	156	150	140	122	126
9	113	113	114	112	111	141	144	152	159	139	149	124
10	111	113	140	112	111	138	141	149	157	136	138	123
11	111	120	137	114	111	148	138	140	153	134	149	123
12	115	115	125	114	111	140	136	137	157	134	142	132
13	111	119	122	113	110	138	136	153	153	134	132	126
14	118	115	119	113	108	140	133	195	151	137	129	124
15	119	113	118	113	107	135	133	162	147	133	127	123
16	113	113	125	e114	e108	133	133	149	144	132	125	125
17	110	112	127	114	108	131	133	146	146	131	125	123
18	110	173	122	115	107	131	145	146	145	129	124	122
19	109	148	121	116	106	132	136	142	142	128	123	122
20	109	127	120	113	109	149	134	156	141	153	122	122
21	108	121	120	113	114	138	174	147	141	138	120	121
22	108	119	120	e112	110	131	149	147	140	135	119	120
23	109	133	118	e112	111	130	141	189	139	129	118	120
24	110	143	118	e112	111	132	138	194	139	127	118	119
25	108	127	117	e112	110	144	151	164	137	126	157	119
26	108	124	115	112	109	186	147	158	135	125	130	119
27	108	122	115	113	109	159	144	155	135	125	193	120
28	110	123	128	113	108	161	141	153	137	125	143	120
29	118	124	129	e113	110	196	137	150	134	124	141	120
30	108	122	120	113	--	168	136	150	133	134	139	120
31	108	--	118	112	--	151	--	190	--	142	140	--
TOTAL	3558	3729	3731	3541	3189	4498	4281	4723	4429	4190	4120	3710
MEAN	115	124	120	114	110	145	143	152	148	135	133	124
MAX	163	174	140	129	114	198	174	195	183	170	193	132
MIN	108	108	113	112	106	115	133	133	124	124	118	119
CFSM	0.97	1.05	1.02	0.97	0.93	1.23	1.21	1.29	1.25	1.15	1.13	1.05
IN.	1.12	1.18	1.18	1.12	1.01	1.42	1.35	1.49	1.40	1.32	1.30	1.17

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 2004, BY WATER YEAR (WY)

MEAN	122	125	123	123	123	133	141	134	129	121	119	123
MAX	148	150	151	147	144	164	169	155	165	152	136	158
(WY)	1992	1993	1992	1992	1992	1992	1992	1997	1993	1993	2002	1993
MIN	93.7	96.3	98.3	97.8	102	98.5	96.0	95.6	98.5	93.2	96.2	99.6
(WY)	2001	2000	2001	2001	2001	2001	2000	2000	2000	2000	1998	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1990 - 2004

ANNUAL TOTAL	45523	47699	
ANNUAL MEAN	125	130	126
HIGHEST ANNUAL MEAN			147
LOWEST ANNUAL MEAN			101
HIGHEST DAILY MEAN	218	May 11	386
LOWEST DAILY MEAN	101	Aug 15	87
ANNUAL SEVEN-DAY MINIMUM	103	Sep 7	88
MAXIMUM PEAK FLOW			545
MAXIMUM PEAK STAGE			4.37
INSTANTANEOUS LOW FLOW		(a)100	75
ANNUAL RUNOFF (CFSM)	1.06	1.10	1.07
ANNUAL RUNOFF (INCHES)	14.35	15.04	14.48
10 PERCENT EXCEEDS	148	153	151
50 PERCENT EXCEEDS	121	127	125
90 PERCENT EXCEEDS	107	111	100

(a) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

445331085564501 GLEN LAKE NEAR GLEN ARBOR, MI

LOCATION.--Lat 44°51'31", long 85°59'46", in SW1/4 NW1/4 sec.3, T.28 N., R.14 W., Leelanau County, Hydrologic Unit 04060104, at bridge on State Highway 22, 2.6 mi south of Glen Arbor.

DRAINAGE AREA.--30.8 mi².

PERIOD OF RECORD.--June 1942 to current year.

GAGE.--Nonrecording gage. Datum of gage is 596.00 ft above sea level.

REMARKS.--Staff gage read by observer. There is one small inlet on the south side near Burdickville. The outlet is the Crystal River. Lake elevation controlled by dam. Established legal level 596.75 ft above sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 1.90 ft, June 23, 1943; minimum observed, 0.34 ft, Nov. 8, 2000.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 0.99 ft, May 31; minimum observed, 0.43 ft, Jan. 6, 7.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.56	0.46	0.59	0.45	--	--	0.56	0.57	0.94	0.83	0.80	0.88
2	0.55	0.44	0.56	0.44	--	--	0.55	0.57	0.94	0.80	0.79	0.88
3	0.57	0.44	0.54	0.46	--	--	0.55	0.58	0.92	0.80	0.79	0.86
4	0.59	0.53	0.52	0.46	--	--	0.54	0.56	0.90	0.85	0.79	0.84
5	0.58	0.56	0.51	0.45	--	--	0.53	0.56	0.89	0.86	0.77	0.84
6	0.57	0.56	0.50	0.43	--	--	0.53	0.59	0.87	0.88	0.75	0.82
7	0.57	0.52	0.48	0.43	--	--	0.53	0.59	0.87	0.89	0.73	0.80
8	0.57	0.50	0.46	--	--	--	0.52	0.60	0.88	0.88	0.73	0.78
9	0.56	0.49	0.47	--	--	--	0.51	0.60	0.88	0.88	0.79	0.77
10	0.56	0.47	0.48	--	--	--	0.51	0.58	0.88	0.88	0.78	0.75
11	0.56	0.49	0.50	--	--	--	0.50	0.65	0.87	0.88	0.80	0.72
12	0.60	0.50	0.50	--	--	--	0.48	0.68	0.87	0.89	0.80	0.70
13	0.60	0.51	--	--	--	--	0.48	0.69	0.85	0.90	0.79	0.70
14	0.61	0.49	--	--	--	--	0.47	0.76	0.88	0.90	0.78	0.68
15	0.64	0.46	0.47	--	--	--	0.45	0.80	0.87	0.90	0.76	0.68
16	0.61	0.46	0.50	--	--	--	0.44	0.80	0.87	0.90	0.74	0.67
17	0.58	0.45	0.50	--	--	--	0.45	0.76	0.87	0.90	0.72	0.64
18	0.56	0.49	0.50	--	--	--	0.49	0.79	0.90	0.89	0.74	0.61
19	0.54	0.58	--	--	--	--	0.51	0.81	0.88	0.89	0.73	0.60
20	0.53	0.54	0.49	--	--	--	0.49	0.86	0.87	0.88	0.71	0.59
21	0.54	0.53	0.49	--	--	--	0.54	0.86	0.84	0.88	0.69	0.58
22	0.52	0.52	0.47	--	--	--	0.56	0.85	0.84	0.87	0.67	0.58
23	0.53	0.57	0.46	--	--	--	0.56	0.86	0.80	0.86	0.67	0.55
24	0.52	0.61	0.46	--	--	--	0.54	0.97	0.84	0.84	0.66	0.54
25	0.50	0.59	0.45	--	--	--	0.56	0.96	0.84	0.83	0.82	0.53
26	0.49	--	0.44	--	--	--	0.56	0.96	0.82	0.82	0.84	0.52
27	0.49	--	0.44	--	--	0.54	0.57	0.95	0.82	0.82	0.90	0.50
28	0.49	--	0.47	--	--	--	0.54	0.97	0.81	0.81	0.90	0.50
29	0.50	--	0.48	--	--	--	0.56	0.94	0.81	0.79	0.90	0.48
30	0.49	0.60	0.46	--	--	0.58	0.56	0.90	0.79	0.78	0.89	0.46
31	0.48	--	0.45	--	--	0.56	--	0.99	--	0.80	0.90	--
MEAN	0.55	--	--	--	--	--	0.52	0.76	0.86	0.86	0.78	0.67
MAX	0.64	--	--	--	--	--	0.57	0.99	0.94	0.90	0.90	0.88
MIN	0.48	--	--	--	--	--	0.44	0.56	0.79	0.78	0.66	0.46

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126801 CRYSTAL RIVER BELOW DAM NEAR GLEN ARBOR, MI

LOCATION.--Lat 44°53'56", long 85°57'23", in SW1/4 NE1/4 sec.24, T.29 N., R.14 W., Leelanau County, Hydrologic Unit 04060104, downstream from Glen Lake Dam, 1.6 mi east of Glen Arbor.

DRAINAGE AREA.-- 44.5 mi².

PERIOD OF RECORD.--May to September 2004.

REMARKS.--Cross-sectional samples were collected by wading 200 ft downstream from dam. Water-discharge measurement made at time of sampling.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Time	Gage height, feet (000655)	Instantaneous discharge, cfs (00061)	UV absorbance, 254 nm, watflt units /cm (50624)	UV absorbance, 280 nm, watflt units /cm (61726)	Barometric pressure, mmHg (00025)	Dissolved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Specif. conductance, wat unf lab, uS/cm 25 degC (90095)	Specif. conductance, wat unf uS/cm 25 degC (00095)
MAY 05...	1415	10.94	33	.057	.043	747	11.7	8.1	8.1	265	281
Date	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)	Calcium, water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, watflt inc tit field, mg/L as CaCO3 (39086)	Bicarbonate, watflt incrm. titr., field, mg/L (00453)	Carbonate, watflt incrm. titr., field, mg/L (00452)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)
MAY 05...	11.0	150	38.8	14.0	.63	3.60	123	148	1	3.26	.5
Date	Silica, water, fltrd, mg/L (00955)	Sulfate, water, fltrd, mg/L (00945)	Residue on evap. at 180degC watflt mg/L (70300)	Ammonia + org-N, water, fltrd, mg/L asN (00623)	Ammonia + org-N, water, unfltrd mg/L asN (00625)	Ammonia, water, fltrd, mg/L asN (00608)	Nitrite + nitrate, water, fltrd, mg/L asN (00631)	Nitrite, water, fltrd, mg/L asN (00613)	Particulate nitrogen, susp., water, mg/L (49570)	Orthophosphate, water, fltrd, mg/L asP (00671)	Phosphorus, water, fltrd, mg/L (00666)
MAY 05...	5.64	10.8	166	.20	.23	<.04	<.06	<.008	.07	<.006	E.003
Date	Phosphorus, water, unfltrd mg/L (00665)	Total carbon, suspnd sedimnt total, mg/L (00694)	Inorganic carbon, suspnd sedimnt total, mg/L (00688)	Organic carbon, suspnd sedimnt total, mg/L (00689)	Organic carbon, water, fltrd, mg/L (00681)	Aluminum, water, fltrd, ug/L (01106)	Antimony, water, fltrd, ug/L (01095)	Arsenic, water, fltrd, ug/L (01000)	Barium, water, fltrd, ug/L (01005)	Beryllium, water, fltrd, ug/L (01010)	
MAY 05...	.007	.3	<.1	.8	2.9	2	<.20	<2	24	<.06	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126801 CRYSTAL RIVER BELOW DAM NEAR GLEN ARBOR, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Cadmium water, fltrd, ug/L (01025)	Chrom- ium, water, fltrd, ug/L (01030)	Cobalt water, fltrd, ug/L (01035)	Copper, water, fltrd, ug/L (01040)	Iron, water, fltrd, ug/L (01046)	Lead, water, fltrd, ug/L (01049)	Mangan- ese, water, fltrd, ug/L (01056)	Molyb- denum, water, fltrd, ug/L (01060)	Nickel, water, fltrd, ug/L (01065)	Selen- ium, water, fltrd, ug/L (01145)
MAY 05...	E.03	<.8	.177	.9	E4	.09	.8	.4	.85	<3
Date	Silver, water, fltrd, ug/L (01075)	Zinc, water, fltrd, ug/L (01090)	1,4-Di- chloro- benzene water, fltrd, ug/L (34572)	1- Methyl- naphth- alene, water, fltrd, ug/L (62054)	2,6-Di- methyl- naphth- alene, water, fltrd, ug/L (62055)	2- Methyl- naphth- alene, water, fltrd, ug/L (62056)	3-beta- Copros- tanol, water, fltrd, ug/L (62057)	3- Methyl- 1H- indole, water, fltrd, ug/L (62058)	3-tert- Butyl- 4-hy- droxy- anisole watfltr ug/L (62059)	4- Cumyl- phenol, water, fltrd, ug/L (62060)
MAY 05...	<2	1.3	<.5	M	M	E.1	<2	<1	<.5	<1
Date	4- Octyl- phenol, water, fltrd, ug/L (62061)	4- Nonyl- phenol, water, fltrd, ug/L (62085)	4-tert- Octyl- phenol, water, fltrd, ug/L (62062)	5-Meth- yl-1H- benzo- triazole, watfltr ug/L (62063)	9,10- Anthra- quinone water, fltrd, ug/L (62066)	Aceto- phenone water, fltrd, ug/L (62064)	AHTN, water, fltrd, ug/L (62065)	Anthra- cene, water, fltrd, ug/L (34221)	Benzo- [a]- pyrene, water, fltrd, ug/L (34248)	Benzo- phenone water, fltrd, ug/L (62067)
MAY 05...	<1	E1	<1	<2	<.5	E.1	M	<.5	<.5	E.2
Date	beta- Sitos- terol, water, fltrd, ug/L (62068)	beta- Stigma- stanol, water, fltrd, ug/L (62086)	Bisphen- ol A, water, fltrd, ug/L (62069)	Bisphen- ol A-d3 surSch 2033 & 8033, watfltr pctrcv (99583)	Broma- cil, water, fltrd, ug/L (04029)	Caf- feine, water, fltrd, ug/L (50305)	Caffe- ine-13C surSch 2033 & 8033, watfltr pctrcv (99584)	Camphor water, fltrd, ug/L (62070)	Carba- ryl, water, fltrd 0.7uGF ug/L (82680)	Carba- zole, water, fltrd, ug/L (62071)
MAY 05...	<2	<2	<1	78.3	<.5	<.5	139	M	<1	<.5
Date	Chlor- pyrifos water, fltrd, ug/L (38933)	Choles- terol, water, fltrd, ug/L (62072)	Cot- inine, water, fltrd, ug/L (62005)	DecaF- biphenl sur Sch 2033 & 8033, watfltr pctrcv (99585)	DEET, water, fltrd, ug/L (62082)	Diazi- non, water, fltrd, ug/L (39572)	Di- ethoxy- nonyl- phenol, water, fltrd, ug/L (62083)	Di- ethoxy- octyl- phenol, water, fltrd, ug/L (61705)	D-Limo- nene, water, fltrd, ug/L (62073)	Ethoxy- octyl- phenol, water, fltrd, ug/L (61706)
MAY 05...	<.5	<2	<1.00	78.3	E.2	<.5	<.5	<1	<.5	<1

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126801 CRYSTAL RIVER BELOW DAM NEAR GLEN ARBOR, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Fluor-anthene water, fltrd, ug/L (34377)	Fluor-anthene -d10, sur Sch 20/8033 watflt pctr cv (99536)	HHCB, water, fltrd, ug/L (62075)	Indole, water, fltrd, ug/L (62076)	Isobor- neol, water, fltrd, ug/L (62077)	Iso- phorone water, fltrd, ug/L (34409)	Iso- propyl- benzene water, fltrd, ug/L (62078)	Iso- quin- oline, water, fltrd, ug/L (62079)	Menthol water, fltrd, ug/L (62080)	Meta- laxyl, water, fltrd, ug/L (50359)
MAY 05...	<.5	135	E.1	<.5	<.5	M	<.5	<.5	E.1	<.5
Date	Methyl salicy- late, water, fltrd, ug/L (62081)	Metola- chlor, water, fltrd, ug/L (39415)	Naphth- alene, water, fltrd, ug/L (34443)	p- Cresol, water, fltrd, ug/L (62084)	Penta- chloro- phenol, water, fltrd, ug/L (34459)	Phenan- threne, water, fltrd, ug/L (34462)	Phenol, water, fltrd, ug/L (34466)	Prome- ton, water, fltrd, ug/L (04037)	Pyrene, water, fltrd, ug/L (34470)	Tetra- chloro- ethene, water, fltrd, ug/L (34476)
MAY 05...	E.1	<.5	E.1	M	<2	<.5	.5	<.5	<.5	<.5
Date	Tri- bromo- methane water, fltrd, ug/L (34288)	Tri- butyl phos- phate, water, fltrd, ug/L (62089)	Triclo- san, water, fltrd, ug/L (62090)	Tri- ethyl citrate water, fltrd, ug/L (62091)	Tri- phenyl phos- phate, water, fltrd, ug/L (62092)	Tris(2- butoxy- ethyl) phos- phate, watflt ug/L (62093)	Tris(2- chloro- ethyl) phos- phate, watflt ug/L (62087)	Tris(di- chloro- i-Pr) phos- phate, watflt ug/L (62088)	Xylenes water unfltrd ug/L (81551)	1,2-Di- chloro- ethane- d4, sur Sch2090 wat unf pct rcv (99832)
MAY 05...	<.5	E.1	<1	<.5	<.5	<.5	<.5	<.5	<.2	107
Date	14Bromo fluoro- benzene surrog. VOC Sch wat unf pct rcv (99834)	Benzene water unfltrd ug/L (34030)	Ethyl- benzene water unfltrd ug/L (34371)	meta- +para- Xylene, water, unfltrd ug/L (85795)	o- Xylene, water, unfltrd ug/L (77135)	Methyl t-butyl ether, water, unfltrd ug/L (78032)	Toluene water unfltrd ug/L (34010)	Toluene -d8, surrog, Sch2090 watunf percent recovery (99833)	Di- chloro- vos, water fltrd, ug/L (38775)	Uranium natural water, fltrd, ug/L (22703)
MAY 05...	96.4	<.1	<.1	<.2	<.1	<.2	.3	101	<1.00	.33

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126802 CRYSTAL RIVER NEAR GLEN ARBOR, MI

LOCATION.--Lat 44°54'12", long 85°57'44", in SE1/4 NE1/4 sec.23, T.29 N., R.14 W., Leelanau County, Hydrologic Unit 04060104, on right bank at County Highway 675, 1.4 mi northeast of Glen Arbor.

DRAINAGE AREA.--45.1 mi², revised.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 2003 to September 2004.

GAGE.--Water-stage recorder. Datum of gage is 582.20 ft above sea level (Michigan Department of Transportation bench mark).

REMARKS.--Water-discharge records good except for estimated daily discharges, which are poor. Some regulation by dam at outlet of Glen Lake. Gage-height telemeter 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	e31	70	85	e65	e65	67	80	34	133	30	30	80
2	31	69	79	e65	e70	70	79	34	126	30	29	80
3	39	69	78	e70	e70	69	78	34	112	29	29	78
4	45	83	e73	e65	e70	69	76	34	78	32	28	82
5	43	85	67	e65	e70	84	76	34	75	33	27	80
6	43	82	55	e65	e70	88	77	35	73	34	26	82
7	42	78	54	e65	e70	91	77	35	62	35	28	80
8	42	74	57	e65	e70	91	76	36	52	34	28	77
9	43	73	58	e65	e70	89	75	33	51	34	32	76
10	43	72	64	e60	e70	87	74	32	51	33	33	78
11	43	72	64	e60	e70	90	73	27	50	33	34	76
12	46	72	60	e60	e70	91	71	27	50	33	32	75
13	47	73	65	e60	e70	e90	70	27	51	34	40	64
14	53	72	65	e60	e70	85	67	30	52	34	50	50
15	60	70	67	e60	e70	82	56	31	50	33	50	49
16	59	70	68	e60	e70	83	55	31	49	33	43	48
17	57	69	67	e60	e70	79	54	33	51	33	33	45
18	56	80	67	e65	e70	78	58	33	52	32	33	45
19	55	88	64	e65	e70	78	59	32	50	33	31	44
20	62	87	65	e65	e70	78	59	33	49	33	30	43
21	69	81	e65	e65	e70	76	64	34	49	33	30	42
22	69	79	e65	e65	e70	76	65	34	47	33	31	41
23	70	87	e65	e65	e70	74	64	37	46	32	29	40
24	70	99	e65	e65	e70	74	57	48	46	31	28	40
25	70	96	e65	e65	e70	74	47	64	33	30	39	38
26	68	90	64	e65	e70	82	48	69	32	30	40	37
27	69	86	61	e65	e70	82	48	93	31	30	44	36
28	71	88	e65	e65	e70	81	49	111	32	30	43	35
29	73	89	e65	e65	69	87	50	116	31	30	43	35
30	71	88	e65	e65	--	84	40	113	31	30	42	34
31	70	--	e65	e65	--	82	--	122	--	30	51	--
TOTAL	1710	2391	2032	1980	2024	2511	1922	1486	1695	994	1086	1710
MEAN	55.2	79.7	65.5	63.9	69.8	81.0	64.1	47.9	56.5	32.1	35.0	57.0
MAX	73	99	85	70	70	91	80	122	133	35	51	82
MIN	31	69	54	60	65	67	40	27	31	29	26	34
CFSM	1.22	1.77	1.45	1.42	1.55	1.80	1.42	1.06	1.25	0.71	0.78	1.26
IN.	1.41	1.97	1.68	1.63	1.67	2.07	1.59	1.23	1.40	0.82	0.90	1.41

SUMMARY STATISTICS

ANNUAL TOTAL
ANNUAL MEAN
HIGHEST DAILY MEAN
LOWEST DAILY MEAN
ANNUAL SEVEN-DAY MINIMUM
MAXIMUM PEAK FLOW
MAXIMUM PEAK STAGE
INSTANTANEOUS LOW FLOW
ANNUAL RUNOFF (CFSM)
ANNUAL RUNOFF (INCHES)
10 PERCENT EXCEEDS
50 PERCENT EXCEEDS
90 PERCENT EXCEEDS

FOR 2004 WATER YEAR

21541
58.9
133 Jun 1
26 Aug 6
28 Aug 2
(a)137 May 31
(b)6.64 (c)
24 Jul 31
1.30
17.77
82
65
32

- (a) Gage height, 5.64 ft.
(b) Backwater from ice.
(c) Date not determined.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126802 CRYSTAL RIVER NEAR GLEN ARBOR, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH				APRIL				MAY
1	285	283	284	293	287	290	258	248	253	273	271	272
2	286	282	284	295	291	293	266	256	261	275	273	274
3	286	284	285	295	292	293	272	263	267	277	275	276
4	287	284	286	294	290	292	276	268	272	280	276	278
5	288	285	287	292	284	287	278	269	274	284	280	281
6	287	285	286	290	286	288	274	269	272	285	279	282
7	288	285	287	290	281	287	279	269	274	283	279	281
8	290	286	288	291	286	288	277	271	275	283	274	279
9	289	287	288	289	286	288	277	270	273	284	279	282
10	289	287	288	290	286	288	275	270	272	289	263	282
11	289	286	288	288	282	285	274	269	271	289	281	286
12	290	281	288	287	283	285	272	267	269	289	281	286
13	290	286	289	290	281	285	270	265	267	289	277	284
14	291	287	289	292	287	289	268	260	266	286	270	279
15	292	288	290	291	286	288	261	257	259	283	276	280
16	293	288	290	291	283	287	263	256	259	282	276	279
17	292	288	290	289	285	287	261	255	258	284	276	281
18	292	287	290	290	286	288	268	255	261	284	277	281
19	292	287	290	289	285	287	268	259	263	283	275	280
20	290	287	288	290	285	287	263	256	260	284	276	281
21	290	288	290	290	285	286	260	255	257	285	279	282
22	291	287	289	288	283	285	260	253	256	283	277	280
23	290	288	289	286	281	284	260	254	257	282	268	276
24	290	288	289	285	280	282	262	252	256	281	274	278
25	289	285	287	284	280	281	254	251	253	282	279	281
26	291	285	287	281	271	275	256	253	255	287	279	282
27	291	285	288	275	267	272	260	256	257	282	278	280
28	288	286	287	272	259	270	266	259	262	282	278	280
29	291	287	289	259	255	257	270	265	268	281	277	279
30	—	—	—	257	250	253	273	267	270	283	279	280
31	—	—	—	250	244	247	—	—	—	282	273	277
MONTH	293	281	288	295	244	282	279	248	264	289	263	280

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	279	275	277	270	261	266	271	255	264	269	263	266
2	280	277	278	269	259	265	266	255	261	271	264	268
3	281	277	278	268	257	264	266	253	260	272	268	270
4	280	276	278	267	258	263	262	252	259	274	267	271
5	282	276	278	267	260	264	264	254	259	274	267	271
6	284	278	281	269	261	264	262	253	258	274	269	272
7	291	280	285	269	261	266	261	251	257	277	270	273
8	291	282	286	269	263	266	261	251	256	274	268	271
9	290	280	284	269	261	266	260	244	253	272	267	270
10	283	277	280	268	263	266	261	251	257	272	267	270
11	281	275	279	268	259	264	261	254	257	273	267	270
12	281	275	277	268	260	264	261	254	258	273	266	270
13	281	275	279	268	257	264	274	259	262	279	269	273
14	283	274	279	268	260	264	268	262	266	282	269	275
15	280	273	276	266	255	262	270	263	265	279	269	275
16	278	269	275	266	259	262	271	256	264	281	271	276
17	278	272	275	266	257	262	263	256	260	278	270	274
18	278	270	274	265	256	261	263	254	259	277	270	273
19	277	269	273	265	256	261	263	257	261	277	269	273
20	276	268	273	265	257	262	263	255	259	275	269	272
21	275	268	272	265	257	262	261	255	258	275	266	270
22	276	270	273	267	256	262	263	254	258	272	265	269
23	276	261	273	265	256	260	264	255	260	271	264	268
24	273	261	268	263	254	259	262	253	258	270	264	268
25	274	266	271	263	255	259	261	230	250	271	265	268
26	274	266	270	262	253	258	269	259	263	271	264	268
27	273	264	269	262	252	257	273	261	269	270	263	268
28	272	264	268	261	251	256	278	263	269	270	264	267
29	272	262	268	261	251	256	273	264	268	268	262	266
30	271	261	266	262	256	259	270	264	268	272	264	268
31	—	—	—	267	260	263	274	264	269	—	—	—
MONTH	291	261	275	270	251	262	278	230	261	282	262	270

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126802 CRYSTAL RIVER NEAR GLEN ARBOR, MI-Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		FEBRUARY			MARCH			APRIL			MAY	
1	--	--	--	--	--	--	8.2	7.9	8.0	8.3	8.0	8.1
2	--	--	--	--	--	--	8.2	7.9	8.0	8.4	8.0	8.1
3	--	--	--	--	--	--	8.2	7.9	8.0	8.4	8.0	8.1
4	--	--	--	--	--	--	8.1	7.8	7.9	8.2	7.9	8.0
5	--	--	--	--	--	--	8.2	7.8	8.0	8.6	7.9	8.2
6	--	--	--	--	--	--	8.2	7.9	8.0	8.5	8.2	8.3
7	--	--	--	--	--	--	8.3	7.9	8.1	8.6	8.2	8.3
8	--	--	--	--	--	--	8.3	8.1	8.1	8.4	8.2	8.3
9	--	--	--	--	--	--	8.3	8.1	8.1	8.6	8.2	8.3
10	--	--	--	--	--	--	8.3	8.0	8.1	8.6	8.2	8.4
11	--	--	--	--	--	--	8.3	8.0	8.1	8.6	8.2	8.3
12	--	--	--	--	--	--	8.2	8.0	8.1	8.7	8.2	8.4
13	--	--	--	--	--	--	8.3	7.9	8.1	8.5	8.2	8.3
14	--	--	--	--	--	--	8.4	8.0	8.2	8.5	8.2	8.3
15	--	--	--	--	--	--	8.5	8.1	8.3	8.6	8.2	8.3
16	--	--	--	--	--	--	8.6	8.2	8.4	8.6	8.2	8.4
17	--	--	--	--	--	--	8.6	8.3	8.4	8.7	8.3	8.4
18	--	--	--	--	--	--	8.5	8.2	8.4	8.7	8.2	8.4
19	--	--	--	--	--	--	8.5	8.3	8.3	8.7	8.2	8.4
20	--	--	--	--	--	--	8.5	8.2	8.3	8.7	8.3	8.4
21	--	--	--	--	--	--	8.3	8.2	8.2	8.6	8.3	8.4
22	--	--	--	--	--	--	8.5	8.1	8.3	8.6	8.3	8.4
23	--	--	--	--	--	--	8.5	8.2	8.3	8.5	8.3	8.3
24	--	--	--	--	--	--	8.5	8.1	8.3	8.5	8.2	8.3
25	--	--	--	--	--	--	8.3	8.1	8.2	8.5	8.2	8.3
26	--	--	--	--	--	--	8.5	8.1	8.3	8.5	8.2	8.4
27	--	--	--	--	--	--	8.4	8.0	8.2	8.5	8.3	8.4
28	--	--	--	--	--	--	8.4	8.1	8.3	8.4	8.2	8.3
29	--	--	--	--	--	--	8.5	8.2	8.3	8.4	8.2	8.3
30	--	--	--	--	--	--	8.4	8.1	8.2	8.4	8.2	8.3
31	--	--	--	--	--	--	--	--	--	8.3	8.2	8.2
MAX	--	--	--	--	--	--	8.6	8.3	8.4	8.7	8.3	8.4
MIN	--	--	--	--	--	--	8.1	7.8	7.9	8.2	7.9	8.0

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.4	8.1	8.2	8.6	8.1	8.3	8.6	8.0	8.2	8.5	8.2	8.3
2	8.4	8.2	8.3	8.6	8.1	8.3	8.6	8.1	8.3	8.5	8.2	8.3
3	8.4	8.2	8.3	8.6	8.1	8.3	8.6	8.1	8.3	8.5	8.2	8.3
4	8.4	8.2	8.3	8.4	8.0	8.1	8.6	8.1	8.3	8.5	8.2	8.2
5	8.5	8.2	8.3	8.5	8.0	8.2	8.6	8.1	8.3	8.4	8.2	8.2
6	8.4	8.1	8.2	8.3	8.1	8.1	8.6	8.1	8.3	8.3	8.2	8.2
7	8.4	8.1	8.2	8.5	8.0	8.2	8.6	8.1	8.3	8.4	8.2	8.2
8	8.4	8.1	8.2	8.5	8.1	8.2	8.6	8.1	8.3	8.4	8.2	8.3
9	8.4	8.0	8.2	8.5	8.1	8.2	8.5	8.1	8.2	8.5	8.2	8.3
10	8.5	8.1	8.2	8.5	8.1	8.3	8.4	8.1	8.2	8.5	8.2	8.3
11	8.5	8.1	8.2	8.6	8.1	8.3	8.5	8.1	8.3	8.5	8.2	8.3
12	8.5	8.1	8.2	8.6	8.1	8.3	8.6	8.1	8.3	8.5	8.2	8.3
13	8.4	8.1	8.2	8.5	8.1	8.2	8.5	8.1	8.2	8.4	8.2	8.2
14	8.5	8.1	8.2	8.5	8.1	8.3	8.5	8.1	8.2	8.5	8.1	8.2
15	8.5	8.1	8.3	8.6	8.1	8.3	8.5	8.2	8.2	8.5	8.1	8.2
16	8.5	8.2	8.3	8.5	8.1	8.3	8.6	8.2	8.3	8.4	8.1	8.2
17	8.4	8.1	8.2	8.6	8.1	8.3	8.6	8.2	8.3	8.5	8.1	8.2
18	8.5	8.2	8.3	8.6	8.1	8.3	8.6	8.2	8.3	8.5	8.1	8.2
19	8.5	8.1	8.3	8.6	8.1	8.3	8.5	8.2	8.3	8.5	8.1	8.2
20	8.5	8.2	8.3	8.6	8.1	8.3	8.6	8.2	8.3	8.5	8.1	8.2
21	8.5	8.2	8.3	8.5	8.1	8.3	8.6	8.2	8.3	8.5	8.2	8.2
22	8.4	8.1	8.2	8.6	8.1	8.3	8.6	8.2	8.3	8.5	8.2	8.2
23	8.4	8.1	8.2	8.6	8.1	8.3	8.6	8.2	8.3	8.5	8.2	8.3
24	8.4	8.0	8.1	8.6	8.1	8.3	8.6	8.2	8.3	8.5	8.2	8.3
25	8.4	8.0	8.2	8.6	8.1	8.3	8.4	7.9	8.2	8.5	8.2	8.3
26	8.4	8.0	8.1	8.6	8.1	8.3	8.5	8.1	8.2	8.5	8.2	8.2
27	8.5	8.0	8.2	8.6	8.1	8.3	8.4	8.0	8.2	8.5	8.2	8.3
28	8.5	8.0	8.2	8.6	8.1	8.3	8.5	8.1	8.2	8.5	8.2	8.2
29	8.5	8.0	8.2	8.6	8.1	8.3	8.5	8.1	8.3	8.5	8.2	8.2
30	8.6	8.0	8.3	8.4	8.1	8.2	8.5	8.1	8.3	8.5	8.1	8.2
31	--	--	--	8.5	8.1	8.2	8.5	8.2	8.3	--	--	--
MAX	8.6	8.2	8.3	8.6	8.1	8.3	8.6	8.2	8.3	8.5	8.2	8.3
MIN	8.4	8.0	8.1	8.3	8.0	8.1	8.4	7.9	8.2	8.3	8.1	8.2

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126802 CRYSTAL RIVER NEAR GLEN ARBOR, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	3.5	2.5	3.0	--	--	--
6	--	--	--	--	--	--	3.5	2.5	3.0	--	--	--
7	--	--	--	--	--	--	3.0	2.0	2.5	--	--	--
8	--	--	--	--	--	--	3.0	2.5	3.0	0.0	0.0	0.0
9	--	--	--	--	--	--	3.5	3.0	3.0	0.0	0.0	0.0
10	--	--	--	--	--	--	3.5	3.0	3.5	0.0	0.0	0.0
11	--	--	--	--	--	--	3.0	2.0	2.5	0.5	0.0	0.0
12	--	--	--	--	--	--	2.0	1.5	1.5	0.5	0.0	0.5
13	--	--	--	--	--	--	2.0	1.0	1.5	0.5	0.0	0.0
14	--	--	--	--	--	--	1.5	1.0	1.5	0.0	0.0	0.0
15	--	--	--	--	--	--	1.5	1.5	1.5	0.0	0.0	0.0
16	--	--	--	--	--	--	2.0	1.5	2.0	0.0	0.0	0.0
17	--	--	--	--	--	--	2.0	1.0	1.5	0.0	0.0	0.0
18	--	--	--	--	--	--	1.5	1.0	1.5	0.0	0.0	0.0
19	--	--	--	--	--	--	1.0	0.5	1.0	0.0	0.0	0.0
20	--	--	--	--	--	--	1.0	0.5	1.0	0.0	0.0	0.0
21	--	--	--	--	--	--	2.0	0.5	1.5	0.0	0.0	0.0
22	--	--	--	--	--	--	2.0	1.5	1.5	0.0	0.0	0.0
23	--	--	--	--	--	--	2.0	1.5	1.5	0.0	0.0	0.0
24	--	--	--	--	--	--	1.5	1.5	1.5	0.0	0.0	0.0
25	--	--	--	--	--	--	2.0	1.0	1.5	0.0	0.0	0.0
26	--	--	--	--	--	--	2.0	1.0	1.5	0.0	0.0	0.0
27	--	--	--	--	--	--	3.0	1.5	2.0	0.0	0.0	0.0
28	--	--	--	--	--	--	3.5	2.5	3.0	0.0	0.0	0.0
29	--	--	--	--	--	--	3.5	3.0	3.0	0.0	0.0	0.0
30	--	--	--	--	--	--	3.0	2.0	2.5	0.0	0.0	0.0
31	--	--	--	--	--	--	2.5	1.5	2.0	0.0	0.0	0.0
MONTH	--	--	--	--	--	--	--	--	--	--	--	--

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH				APRIL				MAY
1	0.0	0.0	0.0	1.0	0.5	1.0	5.5	2.5	4.0	10.5	8.5	9.5
2	0.0	0.0	0.0	1.5	1.0	1.0	6.5	3.0	4.5	13.0	8.0	9.5
3	0.0	0.0	0.0	1.5	0.5	1.0	5.0	3.5	4.0	13.5	8.0	10.0
4	0.0	0.0	0.0	2.0	1.0	1.0	5.5	2.5	3.5	11.0	8.5	9.5
5	0.0	0.0	0.0	1.5	1.0	1.0	6.0	2.0	3.5	13.5	8.0	10.0
6	0.0	0.0	0.0	1.5	0.5	1.0	7.0	3.5	5.0	11.5	9.5	10.5
7	0.0	0.0	0.0	1.5	0.0	1.0	7.5	4.0	5.5	13.5	8.5	10.5
8	0.0	0.0	0.0	1.5	0.5	1.0	7.5	6.0	6.5	10.0	9.0	9.5
9	0.0	0.0	0.0	2.5	0.5	1.0	7.5	5.5	6.0	13.0	9.5	11.0
10	0.0	0.0	0.0	2.5	0.5	1.0	7.0	4.5	5.5	16.0	11.5	13.5
11	0.0	0.0	0.0	1.5	0.0	1.0	7.5	4.5	5.5	18.5	11.0	14.5
12	0.0	0.0	0.0	0.5	0.0	0.5	6.0	4.5	5.0	22.0	14.5	17.5
13	0.0	0.0	0.0	2.0	0.0	0.5	7.5	4.0	5.5	18.0	16.0	17.0
14	0.0	0.0	0.0	1.5	0.5	1.0	9.0	5.0	6.5	16.0	12.0	13.5
15	0.0	0.0	0.0	1.5	0.5	1.0	10.0	5.5	7.5	17.0	11.0	13.0
16	0.0	0.0	0.0	2.5	0.0	1.0	12.5	8.0	9.5	18.5	11.5	14.0
17	0.0	0.0	0.0	2.0	0.5	1.0	12.5	9.5	10.5	19.0	14.0	16.0
18	0.0	0.0	0.0	2.5	0.5	1.5	12.5	9.0	11.0	17.5	13.5	15.0
19	0.0	0.0	0.0	3.0	1.0	1.5	12.0	9.5	10.5	19.5	12.0	15.0
20	0.0	0.0	0.0	3.5	1.5	2.0	10.5	8.0	9.5	19.5	15.0	16.5
21	0.0	0.0	0.0	2.5	0.5	1.0	9.5	8.0	9.0	17.0	13.5	15.0
22	1.0	0.0	0.5	3.0	0.5	1.5	11.0	7.5	8.5	14.5	13.5	14.0
23	0.5	0.0	0.0	3.0	1.5	2.0	10.0	7.0	8.5	13.5	12.5	13.0
24	1.0	0.0	0.5	2.5	1.0	2.0	10.5	7.0	8.5	13.0	12.0	12.5
25	1.5	0.0	0.5	3.5	2.0	2.5	8.5	7.0	7.5	14.0	12.0	12.5
26	1.5	0.0	0.5	3.0	2.5	3.0	10.0	7.0	8.0	15.5	12.0	13.5
27	2.0	0.0	0.5	4.0	2.0	3.0	10.5	6.0	7.5	13.5	12.0	13.0
28	2.0	0.0	0.5	5.0	2.5	3.5	11.5	7.0	9.0	15.0	11.5	13.0
29	2.5	0.5	1.0	6.0	3.0	4.0	14.0	10.0	11.5	14.5	11.5	13.0
30	—	—	—	4.5	3.0	3.5	11.0	9.0	10.0	15.0	13.0	14.0
31	—	—	—	5.5	3.0	3.5	—	—	—	14.0	13.0	13.5
MONTH	2.5	0.0	0.1	6.0	0.0	1.6	14.0	2.0	7.2	22.0	8.0	13.0

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126802 CRYSTAL RIVER NEAR GLEN ARBOR, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.5	9.5	10.0	10.4	7.8	8.9	10.2	7.6	8.6	9.7	8.3	8.8
2	10.6	9.6	10.1	10.3	8.0	8.9	10.0	7.6	8.6	9.5	8.1	8.7
3	10.7	9.8	10.2	10.3	7.4	8.8	9.9	7.5	8.5	9.2	7.9	8.5
4	10.8	9.8	10.2	9.1	7.3	8.0	9.7	7.6	8.4	9.2	7.8	8.3
5	10.7	9.3	10.1	10.2	7.6	8.7	9.8	7.8	8.6	9.1	7.7	8.2
6	10.5	9.0	9.7	9.4	7.8	8.4	9.8	8.0	8.7	8.5	7.6	8.0
7	10.0	8.0	9.3	9.9	7.9	8.7	10.1	8.0	8.8	8.9	7.6	8.1
8	9.8	7.6	8.8	10.2	8.1	8.9	10.0	7.7	8.7	9.0	7.9	8.3
9	9.8	7.6	8.7	10.6	8.3	9.3	9.5	7.5	8.3	9.2	8.0	8.4
10	10.3	8.4	9.2	10.6	8.6	9.4	9.1	7.5	8.2	9.4	8.1	8.5
11	10.4	8.4	9.3	10.7	8.2	9.4	9.8	7.8	8.7	9.3	8.0	8.5
12	10.4	8.6	9.4	10.4	7.9	9.0	10.2	8.1	8.9	9.2	7.9	8.4
13	10.1	8.5	9.2	9.7	7.7	8.4	9.6	8.2	8.8	9.0	7.4	8.2
14	10.2	8.5	9.3	9.8	7.7	8.5	9.6	8.4	8.8	9.1	7.3	8.0
15	10.4	8.6	9.4	10.1	7.9	8.8	9.7	8.3	8.8	9.0	7.1	7.9
16	10.3	8.4	9.3	9.7	7.8	8.7	10.1	8.1	8.9	8.9	7.1	7.9
17	9.6	8.0	8.8	10.0	7.9	8.7	10.1	8.1	8.8	9.0	7.6	8.1
18	10.4	8.4	9.3	9.9	7.7	8.6	9.9	8.0	8.8	9.1	7.7	8.2
19	10.3	8.5	9.3	9.8	7.5	8.5	9.9	8.0	8.8	9.2	7.7	8.2
20	10.1	8.6	9.2	9.4	7.3	8.2	10.2	8.3	9.1	9.2	7.7	8.2
21	10.1	8.5	9.2	9.1	7.1	8.0	10.2	8.6	9.2	9.2	7.7	8.2
22	10.2	8.5	9.2	9.2	7.0	7.9	10.4	8.4	9.3	10.2	7.7	8.7
23	10.3	8.3	9.3	9.6	7.4	8.3	10.3	8.2	9.0	10.3	8.4	9.2
24	10.3	8.6	9.3	9.7	7.7	8.5	10.4	8.1	9.1	10.2	8.4	9.1
25	10.3	8.5	9.3	9.7	7.8	8.6	9.5	7.5	8.4	10.3	8.5	9.1
26	10.3	8.4	9.2	9.9	7.7	8.6	9.4	7.8	8.4	10.1	8.6	9.1
27	10.1	8.3	9.1	9.9	7.6	8.7	9.1	7.4	8.0	10.2	8.5	9.1
28	9.9	8.0	8.8	10.1	7.9	8.8	9.4	7.5	8.3	10.4	8.5	9.3
29	10.1	8.0	8.9	10.0	7.7	8.7	9.8	8.0	8.7	10.4	8.9	9.4
30	10.5	8.0	9.0	9.0	7.6	8.2	9.6	8.1	8.7	10.3	8.6	9.4
31	—	—	—	9.8	7.7	8.5	9.6	8.0	8.7	—	—	—
MONTH	10.8	7.6	9.3	10.7	7.0	8.6	10.4	7.4	8.7	10.4	7.1	8.5

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126802 CRYSTAL RIVER NEAR GLEN ARBOR, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Time	Gage height, feet (00065)	Instan- taneous dis- charge, cfs (00061)	Dis- solved oxygen, mg/L (00300)	pH, water, unfltrd field, std units (00400)	Specif. conduc- tance, watunf uS/cm 25degC (00095)	Temper- ature, water, deg C (00010)
JUL 08...	1215	4.76	36	9.4	8.3	265	17.5
AUG 24...	0900	4.61	28	9.3	8.3	261	18.0

Date	Ammonia + org-N, water, fltrd, mg/L asN (00623)	Ammonia + org-N, water, unfltrd mg/L asN (00625)	Ammonia water, fltrd, mg/L asN (00608)	Nitrite + nitrate water, fltrd, mg/L asN (00631)	Nitrite water, fltrd, mg/L asN (00613)	Ortho- phos- phate, water, fltrd, mg/L asP (00671)	Phos- phorus, water, fltrd, mg/L (00666)	Phos- phorus, water, unfltrd mg/L (00665)
JUL 08...	.22	.28	<.04	<.06	<.008	<.02	<.004	.008
AUG 24...	.18	.23	<.04	<.06	<.008	<.02	E.002	.006

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126970 BOARDMAN RIVER AT BROWN BRIDGE ROAD NEAR MAYFIELD, MI

LOCATION.--Lat 44°39'24", long 85°26'12", in NE1/4 NE1/4 sec.18, T.26 N., R.9 W., Grand Traverse County, Hydrologic Unit 04060105, on right bank 200 ft upstream from Brown Bridge Road, 5.1 mi northeast of Mayfield.

DRAINAGE AREA.--141 mi².

PERIOD OF RECORD.--October 1997 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 830 ft above sea level, from topographic map.

REMARKS.--Records good. Gage-height telemeter 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	92	87	115	111	97	108	304	170	187	123	112	98
2	101	87	111	111	98	120	264	168	186	123	109	98
3	116	88	106	121	99	126	242	165	173	122	108	97
4	127	139	105	120	97	130	230	160	163	127	107	96
5	123	143	104	118	94	168	217	159	156	127	105	97
6	121	145	103	107	101	180	212	161	152	127	105	97
7	112	133	100	107	97	179	209	161	151	127	104	98
8	101	117	102	107	95	173	212	169	149	127	103	97
9	93	108	102	104	100	161	208	168	151	130	111	95
10	88	105	116	107	97	154	203	169	149	129	114	95
11	86	106	126	109	96	155	195	165	145	126	124	94
12	86	106	121	107	97	148	187	167	142	123	121	96
13	84	112	119	105	96	142	181	194	142	123	117	95
14	89	110	117	102	97	145	176	243	142	129	112	94
15	92	111	114	97	95	139	171	239	138	125	109	93
16	89	109	114	96	93	134	169	217	135	123	108	93
17	87	107	115	102	97	133	170	196	155	122	107	93
18	86	128	113	102	94	130	193	182	175	120	108	92
19	86	151	114	100	95	129	204	172	185	119	107	92
20	85	158	110	99	98	140	203	178	167	127	104	91
21	85	150	110	100	102	148	210	172	152	135	102	91
22	88	132	110	98	99	145	210	170	148	136	103	90
23	86	125	110	98	99	145	202	190	140	136	101	90
24	86	134	109	97	100	141	187	237	137	130	100	89
25	86	133	109	97	100	152	186	265	133	122	107	89
26	87	131	106	98	99	205	184	255	131	119	106	89
27	88	124	106	98	100	256	185	221	129	117	107	89
28	89	119	108	98	101	302	182	197	131	116	104	90
29	89	118	114	95	103	345	177	181	128	115	105	89
30	89	116	113	97	---	370	170	171	126	115	101	89
31	88	---	113	97	---	356	---	177	---	115	99	---
TOTAL	2905	3632	3435	3205	2836	5459	6043	5839	4498	3855	3330	2796
MEAN	93.7	121	111	103	97.8	176	201	188	150	124	107	93.2
MAX	127	158	126	121	103	370	304	265	187	136	124	98
MIN	84	87	100	95	93	108	169	159	126	115	99	89
CFSM	0.66	0.86	0.79	0.73	0.69	1.25	1.43	1.34	1.06	0.88	0.76	0.66
IN.	0.77	0.96	0.91	0.85	0.75	1.44	1.59	1.54	1.19	1.02	0.88	0.74

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2004, BY WATER YEAR (WY)

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MEAN	98.0	103	102	98.1	102	126	162	138	122	104	90.7	87.2
MAX	125	122	125	113	119	176	201	188	152	124	111	97.4
(WY)	2002	2002	2002	2002	2002	2004	2004	2004	2002	2004	2002	2001
MIN	77.9	83.7	82.0	79.3	81.9	89.3	89.4	94.6	95.2	82.8	74.5	74.0
(WY)	2001	2000	2001	2001	2003	2001	2000	2000	2000	2000	2003	2003

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1998 - 2004
ANNUAL TOTAL	36954	47833	
ANNUAL MEAN	101	131	111
HIGHEST ANNUAL MEAN			132
LOWEST ANNUAL MEAN			90.4
HIGHEST DAILY MEAN	214	370	423
LOWEST DAILY MEAN	69	84	69
ANNUAL SEVEN-DAY MINIMUM	70	86	70
MAXIMUM PEAK FLOW		382	449
MAXIMUM PEAK STAGE		5.00	5.44
INSTANTANEOUS LOW FLOW		(a)75	(a)62
ANNUAL RUNOFF (CFSM)	0.718	0.927	0.788
ANNUAL RUNOFF (INCHES)	9.75	12.62	10.71
10 PERCENT EXCEEDS	137	187	154
50 PERCENT EXCEEDS	91	115	102
90 PERCENT EXCEEDS	74	92	81

(a) Result of freezeup.

STREAMS TRIBUTARY TO LAKE MICHIGAN

450415085153501 INTERMEDIATE LAKE AT CENTRAL LAKE, MI

LOCATION.--Lat 45°04'15", long 85°15'35", in SW 1/4 sec.23, T.31 N., R.8 W., Antrim County, Hydrologic Unit 04060105, on upstream side of bridge, at Central Lake.

DRAINAGE AREA--112 mi².

PERIOD OF RECORD.—November 1945 to February 1975, October 2001 to current year.

GAGE.—Water-stage recorder. Datum of gage is 599.38 ft above sea level (Antrim County Department of Public Works bench mark) November 6, 1945 to February 28, 1975, non-recording gage at datum of 605.73 ft above sea level.

REMARKS.—A long string of small lakes drain into the north end of Intermediate Lake. The outlet is located at the south end of Intermediate Lake and flows into Lake Bellaire. Lake elevation controlled by dam. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.—Maximum gage height observed, 9.55 ft, Apr. 6, 1963, present datum; minimum observed, 6.05 ft, Sept. 12-15, 1973, present datum.

EXTREMES FOR CURRENT YEAR.—Maximum gage height, 8.08 ft, Apr. 1, 2; minimum, 6.34 ft, Feb. 18.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.24	6.63	6.88	6.65	6.48	6.42	8.07	7.12	7.50	7.11	7.22	7.17
2	7.27	6.61	6.85	6.66	6.46	6.47	8.05	7.09	7.45	7.12	7.18	7.19
3	7.32	6.60	6.82	6.71	6.47	6.52	8.00	7.06	7.38	7.12	7.15	7.18
4	7.40	6.73	6.78	6.73	6.46	6.56	7.92	7.07	7.31	7.14	7.16	7.17
5	7.42	6.82	6.75	6.74	6.44	6.69	7.85	7.10	7.24	7.14	7.15	7.17
6	7.40	6.84	6.71	6.75	6.46	6.84	7.78	7.16	7.21	7.15	7.15	7.17
7	7.36	6.83	6.68	6.74	6.45	6.94	7.70	7.15	7.18	7.17	7.15	7.16
8	7.31	6.83	6.65	6.73	6.45	7.01	7.63	7.13	7.13	7.15	7.15	7.14
9	7.27	6.83	6.61	6.71	6.45	7.06	7.55	7.13	7.07	7.14	7.20	7.14
10	7.22	6.82	6.65	6.69	6.45	7.08	7.47	7.11	7.03	7.13	7.27	7.16
11	7.17	6.82	6.71	6.68	6.44	7.11	7.39	7.11	7.02	7.13	7.26	7.18
12	7.13	6.81	6.74	6.69	6.43	7.15	7.32	7.10	7.03	7.13	7.24	7.18
13	7.08	6.83	6.75	6.67	6.42	7.15	7.24	7.12	7.06	7.14	7.19	7.20
14	7.05	6.83	6.74	6.66	6.41	7.14	7.18	7.28	7.16	7.15	7.16	7.20
15	7.01	6.81	6.74	6.64	6.40	7.13	7.12	7.40	7.20	7.13	7.15	7.21
16	6.96	6.81	6.74	6.61	6.40	7.10	7.10	7.39	7.19	7.13	7.14	7.21
17	6.93	6.80	6.77	6.60	6.39	7.07	7.12	7.38	7.22	7.13	7.14	7.20
18	6.91	6.85	6.77	6.59	6.38	7.04	7.17	7.32	7.30	7.12	7.17	7.20
19	6.88	6.95	6.77	6.57	6.37	7.01	7.20	7.25	7.31	7.12	7.22	7.20
20	6.86	6.98	6.76	6.55	6.39	7.01	7.24	7.20	7.26	7.19	7.20	7.20
21	6.82	6.97	6.75	6.53	6.43	7.02	7.32	7.17	7.19	7.20	7.16	7.19
22	6.81	6.95	6.73	6.53	6.42	7.03	7.35	7.14	7.16	7.22	7.13	7.19
23	6.78	6.97	6.71	6.52	6.43	7.01	7.31	7.22	7.15	7.17	7.13	7.18
24	6.77	7.01	6.70	6.51	6.44	7.01	7.28	7.58	7.16	7.14	7.16	7.18
25	6.74	7.02	6.68	6.50	6.43	7.03	7.27	7.69	7.14	7.12	7.24	7.16
26	6.72	7.00	6.67	6.48	6.42	7.21	7.25	7.71	7.10	7.11	7.26	7.16
27	6.70	6.99	6.64	6.48	6.41	7.43	7.22	7.69	7.07	7.09	7.24	7.15
28	6.69	6.97	6.64	6.50	6.40	7.62	7.19	7.66	7.08	7.08	7.20	7.16
29	6.67	6.96	6.64	6.50	6.40	7.83	7.15	7.61	7.09	7.10	7.16	7.16
30	6.65	6.93	6.65	6.50	—	7.97	7.13	7.55	7.11	7.15	7.12	7.15
31	6.64	—	6.65	6.49	—	8.04	—	7.52	—	7.23	7.12	—
MEAN	7.01	6.86	6.72	6.61	6.43	7.09	7.42	7.30	7.18	7.14	7.18	7.18
MAX	7.42	7.02	6.88	6.75	6.48	8.04	8.07	7.71	7.50	7.23	7.27	7.21
MIN	6.64	6.60	6.61	6.48	6.37	6.42	7.10	7.06	7.02	7.08	7.12	7.14
CAL YR 2003	MEAN 6.94	MAX 7.51	MIN 6.41									
WTR YR 2004	MEAN 7.01	MAX 8.07	MIN 6.37									

STREAMS TRIBUTARY TO LAKE MICHIGAN

04127800 JORDAN RIVER NEAR EAST JORDAN, MI

LOCATION.--Lat 45°06'09", long 85°05'53", in NW1/4 NW1/4 sec.7, T.31 N., R.6 W., Antrim County, Hydrologic Unit 04060105, on right bank 300 ft downstream from Webster Bridge, 4.2 mi south of East Jordan, and 4.5 mi upstream from mouth.

DRAINAGE AREA.--67.9 mi².

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1960-65. October 1966 to current year.

REVISED RECORDS.--WDR MI-83-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 596.43 ft above sea level (Antrim County Road Commission bench mark). Nov. 19, 1959 to Sept. 30, 1966, nonrecording gage at site 600 ft upstream at same datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Some regulation at low flow by fish hatchery upstream from station. Gage-height telemeter 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	216	170	190	182	e183	195	220	194	222	167	170	174
2	214	168	183	185	e175	230	212	188	193	167	166	175
3	243	171	179	258	e176	219	209	187	183	166	165	169
4	236	321	176	206	e181	216	204	185	179	171	162	168
5	196	235	176	184	e181	287	194	187	178	172	161	169
6	178	190	176	180	e184	287	198	191	180	173	161	170
7	172	178	171	e184	e186	237	201	188	178	183	161	176
8	169	173	174	e184	e191	220	198	187	174	175	160	169
9	167	170	176	e184	e192	205	196	188	174	174	178	167
10	165	171	220	e184	e191	202	192	188	176	171	234	166
11	167	186	254	e181	e190	216	190	183	171	167	204	165
12	174	182	197	e182	e188	215	188	194	170	166	188	165
13	167	215	187	179	e188	197	188	247	208	167	177	165
14	180	188	184	180	e188	195	188	347	242	195	169	163
15	192	182	185	e182	e188	192	188	279	183	170	167	163
16	173	185	191	e191	e188	188	188	207	175	168	165	166
17	169	181	207	e191	e188	186	191	200	217	171	168	164
18	171	238	189	e191	e184	185	204	195	214	166	170	164
19	170	293	185	e191	e184	186	222	189	180	165	174	162
20	168	202	182	e191	e184	227	214	198	175	166	167	163
21	167	188	181	e191	e179	237	277	195	173	184	166	161
22	171	185	181	e191	e175	199	262	190	174	214	165	163
23	168	200	181	e191	175	192	207	266	174	171	168	162
24	169	247	181	e191	175	195	196	e561	197	166	165	161
25	167	201	182	e188	174	259	212	282	178	165	202	161
26	167	190	178	e189	175	412	215	226	173	164	184	162
27	167	187	177	e179	175	324	226	209	171	163	215	162
28	169	188	190	e179	175	305	203	204	171	163	181	167
29	173	192	210	e185	180	355	194	192	170	162	179	164
30	169	190	196	e190	—	273	189	186	168	173	173	163
31	168	—	187	e183	—	237	—	217	—	185	171	—
TOTAL	5542	5967	5826	5847	5293	7273	6166	6850	5521	5330	5436	4969
MEAN	179	199	188	189	183	235	206	221	184	172	175	166
MAX	243	321	254	258	192	412	277	561	242	214	234	176
MIN	165	168	171	179	174	185	188	183	168	162	160	161
CFSM	2.63	2.93	2.77	2.78	2.69	3.46	3.03	3.25	2.71	2.53	2.58	2.44
IN.	3.04	3.27	3.19	3.20	2.90	3.98	3.38	3.75	3.02	2.92	2.98	2.72

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2004, BY WATER YEAR (WY)

	185	189	186	180	181	208	220	194	182	172	172	179
MEAN	185	189	186	180	181	208	220	194	182	172	172	179
MAX	235	226	217	202	209	281	273	237	230	210	203	223
(WY)	1987	1993	1983	1997	1984	1979	1979	1983	1969	1975	1972	1986
MIN	163	163	163	157	157	174	163	164	160	151	150	150
(WY)	2001	1982	1982	1971	1982	1972	2000	1982	1982	1981	2001	1981

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1967 - 2004

ANNUAL TOTAL	65702						70020					
ANNUAL MEAN	180						191					
HIGHEST ANNUAL MEAN										187		
LOWEST ANNUAL MEAN										204		1979
HIGHEST DAILY MEAN										170		2000
LOWEST DAILY MEAN	321				Nov 4		561	May 24		840		Sep 29 1972
ANNUAL SEVEN-DAY MINIMUM	135				Jan 29		160	Aug 8		130		Jan 19 1971
MAXIMUM PEAK FLOW	154				Jan 26		162	Sep 21		136		Dec 28 1968
MAXIMUM PEAK STAGE							644	May 24		1360		Jul 19 1975
INSTANTANEOUS LOW FLOW							5.45	May 24		6.51		Jul 19 1975
ANNUAL RUNOFF (CFSM)							158	(a)		(b)91		Mar 8 1982
ANNUAL RUNOFF (INCHES)	2.65						2.82			2.76		
10 PERCENT EXCEEDS	36.00						38.36			37.46		
50 PERCENT EXCEEDS	214						221			220		
90 PERCENT EXCEEDS	171						184			178		
	160						166			159		

(a) Part of each day Aug. 5-9.

(b) Result of freezeup.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

451540084560301 WALLOON LAKE AT WALLOON LAKE, MI

LOCATION.--Lat 45°15'40", long 84°56'03", in NW1/4 NW1/4 sec.16, T.33 N., R.5 W., Charlevoix County, Hydrologic Unit 04060105, on left upstream wingwall of dam at outlet of Walloon Lake (Bear River), 0.1 mi south of Walloon Lake.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--July 1942 to September 1950, September 1995 to current year.

GAGE.--Nonrecording gage. Datum of gage is 684.60 ft above sea level, (Charlevoix Abstract & Engineering Co.). Prior to September 30, 1950, nonrecording gage at approximately same elevation.

REMARKS.--Staff gage read by observer. Lake level maintained by a fix-crest concrete dam. Crest of dam is divided into two parts. The right sill is about 22 ft wide and has its crest at elevation 2.64 ft, gage datum. The left sill, 13 ft wide, is at elevation 1.93 ft, gage datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 3.47 ft, Apr. 3, 1998; minimum observed, 2.14 ft, Sept. 10, 1947, Oct. 7, 1948.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 3.01 ft, May 30, June 1; minimum observed, 2.20 ft, Sept. 27, 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.36	--	--	--	--	--	--	2.89	3.01	--	2.56	--
2	2.49	--	--	--	--	--	--	--	--	2.71	--	--
3	2.50	--	2.74	2.76	--	--	2.99	--	--	--	--	--
4	--	2.64	--	--	--	--	--	--	--	--	--	2.40
5	2.55	--	--	--	--	2.79	--	--	2.93	2.69	--	--
6	--	--	2.76	--	--	--	--	--	2.95	--	--	--
7	--	--	--	--	--	--	2.93	2.80	--	--	2.32	--
8	--	2.64	--	2.79	--	--	--	--	--	2.67	2.32	2.40
9	2.54	--	--	2.79	--	2.94	--	--	--	--	--	--
10	--	--	--	--	--	--	--	--	2.84	2.66	--	2.40
11	--	2.64	--	--	--	--	--	2.81	--	--	2.48	--
12	--	--	--	--	--	--	2.87	--	2.84	--	2.48	2.38
13	--	--	2.76	--	--	--	--	2.83	2.92	2.64	--	--
14	2.54	2.80	--	--	--	--	--	--	--	--	--	--
15	--	--	--	2.79	--	--	--	2.86	--	--	2.44	2.33
16	--	--	--	--	--	--	2.86	2.86	--	--	--	--
17	2.57	--	2.79	--	--	2.89	--	--	--	2.60	--	2.32
18	--	--	--	--	--	--	--	--	2.94	2.60	--	--
19	--	--	2.79	--	2.75	2.89	--	2.81	--	--	2.48	2.32
20	--	--	--	--	--	--	2.91	--	--	--	--	--
21	--	--	--	2.74	--	--	--	--	--	2.56	--	--
22	2.52	2.77	2.77	--	--	--	--	2.81	--	2.60	--	2.25
23	--	--	--	2.76	2.80	2.87	2.94	--	--	--	--	--
24	2.52	2.75	--	--	--	--	--	2.99	--	2.56	2.33	2.24
25	--	--	--	--	--	--	--	--	2.80	--	--	--
26	--	--	--	2.79	--	2.92	2.80	--	--	2.51	2.48	--
27	--	2.75	2.78	--	--	--	--	--	--	--	2.47	2.20
28	2.49	--	--	--	2.79	--	2.89	--	2.80	--	--	--
29	--	2.75	2.75	--	--	--	--	2.99	--	--	--	--
30	--	--	--	--	--	2.99	2.89	3.01	2.74	2.47	2.44	2.20
31	--	--	2.76	--	--	--	--	--	--	2.56	--	--

STREAMS TRIBUTARY TO LAKE HURON

04127918 PINE RIVER NEAR RUDYARD, MI

LOCATION.--Lat 46°11'09", long 84°35'52", in NW1/4 NE1/4 sec.30, T.44 N., R.2 W., Chippewa County, Hydrologic Unit 04070002, on right bank 15 ft upstream from bridge on Mackinac Trail, 3.2 mi south of Rudyard.

DRAINAGE AREA.--184 mi².

PERIOD OF RECORD.--April 1972 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 601.50 ft above sea level. Prior to Aug. 4, 1972, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	96	111	223	e260	e75	e75	e700	495	789	151	89	81
2	94	105	186	e210	e75	e90	e800	372	464	139	81	78
3	117	100	e180	e190	e74	e180	e1000	302	307	119	83	77
4	152	104	e170	e180	e74	e180	1040	259	239	161	76	74
5	140	134	e170	e150	e74	e170	823	237	198	314	71	72
6	122	156	e160	e140	e74	e170	739	217	187	251	69	78
7	108	138	e160	e130	e74	e170	620	198	186	272	67	103
8	99	126	e160	e120	e72	e170	727	181	169	236	65	94
9	95	110	e155	e106	e72	e165	712	171	218	193	67	84
10	88	126	e150	e100	e72	e160	586	176	219	161	91	86
11	82	169	e150	e100	e72	e160	458	180	170	141	104	75
12	76	220	e150	e95	e72	e170	369	239	143	128	92	74
13	76	317	e150	e90	e72	e160	331	262	135	121	83	74
14	76	266	e150	e90	e72	e160	337	448	150	171	77	72
15	82	242	e150	e90	e72	e160	356	511	147	165	72	75
16	81	243	e150	e90	e72	e160	430	310	132	134	70	82
17	79	289	e150	e85	e72	e160	674	250	127	121	69	83
18	76	604	e150	e80	e70	e160	705	318	144	111	85	76
19	75	845	e150	e80	e70	e160	767	250	139	104	83	73
20	75	478	e150	e79	e70	e160	651	393	127	103	81	71
21	75	344	145	e78	e70	e160	781	348	115	102	73	69
22	75	273	137	e78	e70	e160	883	262	114	95	71	69
23	76	1070	132	e78	e70	e160	618	493	112	89	73	68
24	75	1470	e130	e78	e70	e165	447	1330	130	84	75	69
25	84	786	e130	e78	e70	e180	378	814	148	80	81	64
26	91	499	e120	e75	e70	e300	472	527	133	78	108	64
27	88	378	e120	e75	e70	e350	428	403	122	76	109	64
28	88	317	e200	e75	e70	e400	351	368	115	75	112	62
29	123	279	e350	e75	e70	e600	316	284	116	73	99	63
30	120	247	e320	e75	—	e650	563	235	116	72	92	63
31	116	—	e310	e75	—	e680	—	396	—	75	86	—
TOTAL	2900	10546	5308	3305	2080	6935	18062	11229	5611	4195	2554	2237
MEAN	93.5	352	171	107	71.7	224	602	362	187	135	82.4	74.6
MAX	152	1470	350	260	75	680	1040	1330	789	314	112	103
MIN	75	100	120	75	70	75	316	171	112	72	65	62
CFSM	0.51	1.91	0.93	0.58	0.39	1.22	3.27	1.97	1.02	0.74	0.45	0.41
IN.	0.59	2.13	1.07	0.67	0.42	1.40	3.65	2.27	1.13	0.85	0.52	0.45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 2004, BY WATER YEAR (WY)

	MEAN	216	272	177	116	108	262	785	263	168	108	101	141
	MAX	485	807	340	248	217	544	1589	633	432	261	349	383
	(WY)	2002	1989	2002	1980	1984	1973	1985	1972	1974	1979	1973	1996
	MIN	60.4	72.7	59.1	60.3	57.6	90.7	189	83.7	73.6	59.7	48.7	55.3
	(WY)	2001	1977	2001	1977	2003	1978	2000	2000	2000	2001	2000	2000

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1972 - 2004

ANNUAL TOTAL	63164							74962				
ANNUAL MEAN	173							205				
HIGHEST ANNUAL MEAN										225		
LOWEST ANNUAL MEAN										344		1985
HIGHEST DAILY MEAN	1700							1470		Nov 24		Apr 21 1985
LOWEST DAILY MEAN	48					Apr 20		62		Sep 28		Aug 29 2000
ANNUAL SEVEN-DAY MINIMUM	49					Aug 15		64		Sep 24		Aug 25 2000
MAXIMUM PEAK FLOW								(a)2040		Nov 23	(b)4500	Mar 30 1986
MAXIMUM PEAK STAGE								(c)19.34		Mar 29	(c)19.34	Mar 29 2004
INSTANTANEOUS LOW FLOW								61		(d)	(f)33	Nov 16 1989
ANNUAL RUNOFF (CFSM)	0.941							1.11			1.22	
ANNUAL RUNOFF (INCHES)	12.77							15.16			16.59	
10 PERCENT EXCEEDS	424							466			453	
50 PERCENT EXCEEDS	85							130			122	
90 PERCENT EXCEEDS	56							72			67	

(a) Gage height 10.23 ft.

(b) Gage height 18.44 ft.

(c) Backwater from ice.

(d) Sept. 28, 29.

(e) Estimated.

(f) Result of Freezeup.

STREAMS TRIBUTARY TO LAKE HURON

04127937 EAST LAKE NEAR FIBRE, MI

LOCATION.—Lat 46°07'56", long 84°47'31", in SE1/4 SW1/4 sec.10, T.43 N., R.4 W., Mackinac County, Hydrologic Unit 04070002, 5.9 mi southwest of Fibre.

DRAINAGE AREA.—5.87 mi².

PERIOD OF RECORD.—July 1967 to September 1971, June 1990 to current year.

REVISED RECORDS.—WDR MI-96-1: 1991 (M).

GAGE.—Nonrecording gage. Elevation of gage is 805 ft above sea level, from topographic map. July 12, 1967 to Sept. 1, 1971, nonrecording gage at different datum.

REMARKS.—Staff gage read by observer. The inlet to East Lake is a small unnamed stream draining a marsh at the north end of the lake. The outlet is the East Lake Branch of the Carp River. Surface area of lake is 995 acres.

EXTREMES FOR PERIOD OF RECORD.—Maximum gage height observed, 5.62 ft, Dec. 2, 1991; minimum observed, 3.00 ft, Sept. 27-30, 2004.

EXTREMES FOR CURRENT YEAR.—Maximum gage height observed, 4.19 ft, Apr. 22-24; minimum observed, 3.00 ft, Sept. 27-30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.44	3.52	--	--	--	--	--	4.13	4.03	3.60	3.20	--
2	3.42	3.52	3.98	--	--	--	--	4.13	4.01	3.60	3.20	--
3	3.44	3.52	--	--	--	--	--	4.11	4.01	3.58	3.20	--
4	3.50	3.54	--	--	--	--	--	4.09	3.97	3.58	3.20	--
5	3.48	3.54	--	--	--	--	--	4.07	3.95	3.60	3.18	--
6	3.48	3.58	--	--	--	--	--	4.07	3.95	3.62	3.18	--
7	3.48	3.58	--	--	--	--	--	4.05	3.93	3.66	3.18	3.16
8	3.48	3.62	--	--	--	--	--	4.03	3.89	3.64	3.17	3.17
9	3.48	--	--	--	--	3.78	--	--	3.87	3.64	3.17	3.16
10	3.48	--	--	--	--	--	--	4.01	3.85	3.60	3.17	3.16
11	3.48	--	--	--	--	--	--	3.95	3.85	3.58	3.17	3.16
12	3.48	--	--	--	--	--	--	4.03	3.83	3.58	3.17	--
13	3.48	--	--	--	--	--	--	3.97	3.81	3.58	3.17	3.14
14	3.48	--	--	--	--	--	--	4.01	3.81	3.60	3.17	3.14
15	3.48	--	--	--	--	--	4.05	3.99	3.79	3.58	3.17	3.14
16	3.48	--	--	--	--	--	4.05	3.99	3.77	3.58	3.17	3.12
17	3.48	--	--	--	--	--	4.05	3.97	3.77	3.54	--	3.12
18	3.48	3.78	--	--	--	--	4.09	3.97	3.75	3.54	--	3.12
19	3.48	3.78	--	--	--	--	4.11	3.95	3.73	3.50	--	3.10
20	3.46	3.76	--	3.79	--	--	4.13	3.97	3.73	3.46	3.08	3.08
21	3.46	3.78	--	--	--	--	4.17	3.97	3.71	3.48	3.08	3.08
22	3.46	3.78	--	--	--	--	4.19	3.95	3.69	3.44	3.08	3.08
23	3.46	3.93	--	--	--	--	4.19	4.05	3.67	3.40	--	3.06
24	3.46	3.98	--	--	--	--	4.19	4.05	3.67	3.40	--	3.06
25	3.48	--	--	--	--	--	4.17	4.05	3.67	3.38	--	3.04
26	3.48	--	--	--	--	--	4.17	4.03	3.63	3.38	--	3.02
27	3.48	--	--	--	--	--	4.13	4.03	3.63	3.30	--	3.00
28	3.48	--	--	--	--	--	4.13	4.03	3.62	3.28	--	3.00
29	3.52	--	--	--	--	--	4.13	4.01	3.58	3.28	--	3.00
30	3.52	--	--	--	--	--	4.13	4.01	3.60	--	--	3.00
31	3.52	--	--	--	--	--	--	4.01	--	3.20	--	--

STREAMS TRIBUTARY TO LAKE HURON

452600084472001 CROOKED LAKE NEAR CONWAY, MI

LOCATION.—Lat 45°23'52", long 84°49'22", in NE1/4 SW1/4 sec.29, T.35 N., R.4 W., Emmet County, Hydrologic Unit 04070004, at Minnehaha Creek Inlet on Channel Road, 2.5 mi southeast of Conway.

DRAINAGE AREA.—101 mi².

PERIOD OF RECORD.—June 1942 to July 1945 (summer months only), August 1945 to September 2004 (discontinued).

GAGE.—Water-stage recorder. Datum of gage is 593.38 ft above sea level. Prior to June 13, 1960, nonrecording gage at datum 1.00 ft higher. June 13, 1960 to June 29, 1964, nonrecording gage at same datum.

REMARKS.—Crooked Lake is the upstream end of the navigable inland water route. Major inlets are Minnehaha Creek, Round Lake Outlet, and Pickerel Lake Outlet. The outlet is Crooked River. Lake elevation controlled by dam and boat lock at Alanson. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.—Maximum gage height, 3.60 ft, Apr. 12, 1948, present datum; minimum, 0.54 ft, Mar. 30, 1982, possibly affected by ice in well.

EXTREMES FOR CURRENT YEAR.—Maximum gage height, 2.93 ft, May 25, 26; minimum, 1.41 ft, Dec. 9, 10.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.45	2.05	1.58	1.58	1.59	1.57	2.31	2.34	2.75	2.28	2.13	2.24
2	2.46	1.96	1.56	1.59	1.60	1.60	2.26	2.35	2.73	2.28	2.13	2.24
3	2.49	1.89	1.54	1.65	1.63	1.61	2.21	2.34	2.69	2.26	2.12	2.23
4	2.54	1.97	1.52	1.65	1.63	1.63	2.16	2.35	2.64	2.27	2.12	2.22
5	2.53	1.97	1.49	1.65	1.62	1.73	2.11	2.35	2.60	2.27	2.09	2.21
6	2.51	1.93	1.47	1.64	1.63	1.82	2.07	2.35	2.57	2.30	2.06	2.20
7	2.48	1.84	1.45	1.64	1.64	1.87	2.04	2.35	2.55	2.30	2.05	—
8	2.47	1.81	1.42	1.64	1.63	1.90	2.02	2.35	2.51	2.30	2.04	—
9	2.46	1.75	1.42	1.63	1.62	1.91	1.98	2.36	2.50	2.29	2.12	—
10	2.46	1.70	1.47	1.63	1.63	1.91	1.95	2.37	2.47	2.28	2.24	—
11	2.44	1.67	1.55	1.62	1.61	1.93	1.92	2.39	2.44	2.28	2.26	—
12	2.41	1.66	1.58	1.64	1.60	1.96	1.89	2.39	2.41	2.26	2.28	—
13	2.40	1.65	1.58	1.64	1.59	1.95	1.86	2.43	2.43	2.26	2.27	—
14	2.43	1.59	1.57	1.63	1.58	1.96	1.83	—	2.48	2.29	2.26	—
15	2.44	1.57	1.56	1.63	1.58	1.95	1.81	—	2.48	2.27	2.24	—
16	2.42	1.58	1.56	1.63	1.57	1.94	1.79	2.55	2.46	2.25	2.23	—
17	2.41	1.56	1.58	1.62	1.57	1.93	1.79	2.52	2.48	2.25	2.21	—
18	2.40	1.62	1.57	1.62	1.55	1.91	1.81	2.51	2.49	2.22	2.21	—
19	2.40	1.70	1.56	1.61	1.54	1.90	—	2.49	2.47	2.21	2.21	—
20	2.39	1.70	1.55	1.61	1.56	1.91	—	2.49	2.44	2.20	2.20	2.14
21	2.39	1.68	1.54	1.60	1.59	1.92	1.97	2.49	2.41	2.21	2.19	2.13
22	2.38	1.67	1.52	1.59	1.58	1.93	2.06	2.47	2.39	2.23	2.17	2.14
23	2.37	1.67	1.52	1.59	1.59	1.91	2.11	2.54	2.39	2.23	2.19	2.15
24	2.36	1.67	1.52	1.59	1.60	1.88	2.16	2.80	2.34	2.22	2.19	2.13
25	2.35	1.65	1.54	1.59	1.60	1.86	2.21	2.92	2.35	2.17	2.22	2.12
26	2.35	1.65	1.54	1.59	1.59	1.99	2.25	2.90	2.32	2.16	2.24	2.11
27	2.34	1.64	1.54	1.59	1.58	2.15	2.27	2.87	2.30	2.15	2.26	2.11
28	2.33	1.63	1.55	1.59	1.57	2.23	2.30	2.83	2.29	2.13	2.25	2.12
29	2.27	1.61	1.57	1.59	1.56	2.32	2.29	2.79	2.28	2.12	2.25	2.11
30	2.22	1.59	1.59	1.59	—	2.36	2.33	2.75	2.27	2.13	2.24	2.11
31	2.13	—	1.60	1.59	—	2.35	—	2.73	—	2.14	2.23	—
MEAN	2.40	1.72	1.54	1.61	1.59	1.93	—	—	2.46	2.23	2.19	—
MAX	2.54	2.05	1.60	1.65	1.64	2.36	—	—	2.75	2.30	2.28	—
MIN	2.13	1.56	1.42	1.58	1.54	1.57	—	—	2.27	2.12	2.04	—

STREAMS TRIBUTARY TO LAKE HURON

04127997 STURGEON RIVER AT WOLVERINE, MI

LOCATION.--Lat 45°16'28", long 84°36'00", in SE1/4 SW1/4 sec.6, T.33 N., R.2 W., Cheboygan County, Hydrologic Unit 04070004, on right bank at Cedar Street in Wolverine, 0.2 mi downstream from West Branch, and 11.7 mi upstream from mouth.

DRAINAGE AREA.--192 mi².

PERIOD OF RECORD.--April 1942 to current year. Published as "near Wolverine" prior to October 1994.

REVISED RECORDS.--WSP 1307: 1944(M), 1948(M). WSP 1727: 1951(M). WDR MI-83-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 770 ft above sea level, from topographic map. Prior to June 15, 1942, nonrecording gages at site 1.7 mi downstream and June 16, 1942 to Sept. 30, 1958, at site 2.0 mi downstream at different datums. Oct. 1, 1958 to Sept. 30, 1994, water-stage recorder at site 2.7 mi downstream at different datum (Station 04128000).

REMARKS.--Records good except for estimated daily discharges, which are poor. Gage-height telemeter 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	224	168	205	185	e190	223	355	243	339	185	175	170
2	233	166	201	187	e190	257	330	231	254	181	169	181
3	212	167	189	252	e190	258	326	226	219	178	167	168
4	259	395	184	228	196	247	294	220	206	201	162	166
5	249	407	184	192	e190	347	264	218	198	219	159	163
6	197	258	181	180	e200	412	259	219	197	202	158	166
7	177	216	188	e190	209	300	278	218	199	222	156	170
8	169	197	176	e190	e210	278	281	214	196	205	155	163
9	163	188	177	e190	214	256	271	220	198	198	168	166
10	155	185	245	e190	206	246	260	224	213	192	249	167
11	162	202	330	e190	200	248	244	221	190	185	202	164
12	185	205	235	e190	201	246	238	232	181	178	186	162
13	177	252	210	178	200	252	237	285	228	205	177	160
14	190	227	199	e180	201	237	236	391	308	427	169	157
15	216	215	195	e190	e200	228	230	428	220	314	166	153
16	178	236	197	e190	e200	216	243	299	204	237	161	154
17	168	228	211	e190	e200	215	269	250	228	206	161	152
18	171	291	200	e190	e200	218	284	240	274	191	170	149
19	169	422	195	e200	195	217	312	231	216	182	197	148
20	166	285	189	e200	194	247	307	221	199	178	167	147
21	163	237	187	e200	199	262	396	221	194	177	163	148
22	162	218	188	e200	196	229	400	218	194	249	162	147
23	167	217	187	e200	197	222	295	355	190	204	178	146
24	167	250	185	e190	201	220	252	674	215	182	169	145
25	167	222	187	e200	197	276	284	497	203	176	196	142
26	163	206	180	e200	194	502	307	322	193	172	205	144
27	163	201	180	e190	194	502	291	275	186	168	238	145
28	166	210	186	e190	195	470	267	273	183	168	240	148
29	176	214	203	e200	207	549	252	236	182	164	189	152
30	172	205	199	e200	—	512	237	219	178	169	179	147
31	168	—	191	e200	—	409	—	245	—	182	170	—
TOTAL	5654	7090	6164	6052	5766	9301	8499	8566	6385	6297	5563	4690
MEAN	182	236	199	195	199	300	283	276	213	203	179	156
MAX	259	422	330	252	214	549	400	674	339	427	249	181
MIN	155	166	176	178	190	215	230	214	178	164	155	142
CFSM	0.95	1.23	1.04	1.02	1.04	1.56	1.48	1.44	1.11	1.06	0.93	0.81
IN.	1.10	1.37	1.19	1.17	1.12	1.80	1.65	1.66	1.24	1.22	1.08	0.91

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2004, BY WATER YEAR (WY)

	211	223	211	200	198	244	306	237	208	184	180	199
MEAN	211	223	211	200	198	244	306	237	208	184	180	199
MAX	326	301	306	295	275	354	431	353	272	255	301	290
(WY)	1984	1993	1972	1973	1984	1976	1971	1983	1969	1994	1972	1986
MIN	153	164	157	133	130	172	179	154	149	130	134	141
(WY)	1957	1950	1949	1957	1957	1954	2000	1958	1958	1981	1944	1948

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1942 - 2004

ANNUAL TOTAL	68847		80027									
ANNUAL MEAN	189		219							217		
HIGHEST ANNUAL MEAN										268		1972
LOWEST ANNUAL MEAN										167		1958
HIGHEST DAILY MEAN	427		Jul 11			674		May 24		1080		Sep 29 1972
LOWEST DAILY MEAN	131		Jul 9			142		Sep 25		113		Aug 6 1958
ANNUAL SEVEN-DAY MINIMUM	137		Sep 8			145		Sep 21		118		Aug 3 1958
MAXIMUM PEAK FLOW						(a)723		May 24		(b)1290		Sep 29 1972
MAXIMUM PEAK STAGE						(c)6.76		Jan 25		(d)6.99		Feb 14 2003
INSTANTANEOUS LOW FLOW						141		Sep 25		(f)93		Mar 18 1993
ANNUAL RUNOFF (CFSM)	0.982					1.14				1.13		
ANNUAL RUNOFF (INCHES)	13.34					15.51				15.33		
10 PERCENT EXCEEDS	253					287				290		
50 PERCENT EXCEEDS	172					200				200		
90 PERCENT EXCEEDS	145					163				158		

(a) Gage height 5.00 ft.

(b) Gage height 3.72 ft, site and datum then in use.

(c) Backwater from ice.

(d) Backwater from ice; peak stage at previous site and datum, 4.48 ft, Sept. 14, 1961.

(e) Estimated.

(f) Result of freezeup.

STREAMS TRIBUTARY TO LAKE HURON

04128990 PIGEON RIVER NEAR VANDERBILT, MI

LOCATION.--Lat 45°09'24", long 84°28'00", in NW1/4 NW1/4 sec.20, T.32 N., R.1 W., Otsego County, Hydrologic Unit 04070004, on left bank at Sturgeon Valley Road, 9.7 mi east of Vanderbilt, 1.0 mi downstream from Lansing Club Dam, and 28.5 mi upstream from Mullett Lake.

DRAINAGE AREA.--57.7 mi².

PERIOD OF RECORD.--September 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 909.03 ft above sea level (Wade-Trim Inc. bench mark). September 1950 to October 1990, water-stage recorder at site 2.5 mi downstream at different datum (Station 04129000).

REMARKS.--Records good except for estimated daily discharges, which are poor. Prior to May 16, 1957, and since Apr. 22, 1958, regulation by Lansing Club Dam 1.0 mi upstream. Gage-height telemeter 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	81	55	82	58	e55	77	133	80	111	50	49	66
2	99	62	67	70	e55	78	106	83	95	49	57	61
3	79	67	65	94	e60	105	114	77	68	45	55	52
4	113	185	69	92	e60	69	102	66	63	55	44	52
5	139	244	55	63	56	125	90	68	65	88	53	53
6	80	114	72	69	e60	204	89	67	63	83	41	51
7	68	95	57	60	e60	107	78	69	63	79	38	53
8	62	66	54	e60	58	108	114	71	62	68	47	55
9	66	60	67	e60	e60	81	85	66	63	57	45	55
10	55	76	117	e60	e60	74	87	83	65	60	63	57
11	59	93	186	49	e60	72	89	68	64	59	67	51
12	61	76	94	e50	e60	80	77	69	60	57	57	50
13	62	112	89	e50	e60	81	66	69	59	57	51	48
14	59	72	71	54	e60	72	77	109	88	207	53	46
15	84	97	68	54	e60	64	79	189	73	81	52	48
16	65	91	79	e55	e60	73	88	95	61	57	49	51
17	66	87	73	e60	e60	67	102	76	62	60	49	57
18	65	125	70	e60	e60	67	105	75	142	58	49	56
19	53	234	76	e55	e60	63	117	74	77	56	53	53
20	51	112	64	e55	57	70	121	66	64	52	49	51
21	56	80	64	51	65	95	121	70	63	55	48	50
22	57	84	74	e60	62	81	144	73	58	106	48	50
23	60	73	58	e55	62	66	92	123	61	86	49	47
24	58	98	70	e55	63	72	78	306	57	54	50	48
25	55	84	72	e55	62	90	95	197	56	50	52	48
26	51	74	61	e55	61	196	129	91	58	71	65	48
27	53	74	58	e55	62	221	111	94	56	46	79	48
28	62	76	71	e55	60	176	81	88	63	52	90	51
29	76	85	76	e55	62	230	77	76	57	52	60	49
30	61	74	66	e55	---	204	77	71	66	46	54	49
31	54	---	77	e55	---	127	---	74	---	49	53	---
TOTAL	2110	2925	2322	1834	1740	3295	2924	2883	2063	2045	1669	1554
MEAN	68.1	97.5	74.9	59.2	60.0	106	97.5	93.0	68.8	66.0	53.8	51.8
MAX	139	244	186	94	65	230	144	306	142	207	90	66
MIN	51	55	54	49	55	63	66	66	56	45	38	46
CFSM	1.18	1.69	1.30	1.03	1.04	1.84	1.69	1.61	1.19	1.14	0.93	0.90
IN.	1.36	1.89	1.50	1.18	1.12	2.12	1.89	1.86	1.33	1.32	1.08	1.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2004, BY WATER YEAR (WY)

	MEAN	77.6	81.9	75.7	70.2	70.2	88.3	118	86.5	70.6	64.6	63.7	71.7
MAX	112	112	105	94.9	90.1	136	164	142	94.5	106	116	120	120
(WY)	1987	1989	1972	1973	1984	1976	1960	1983	1993	1994	1995	1961	1961
MIN	56.6	63.1	60.1	50.8	50.1	62.8	69.8	54.4	50.7	46.7	42.6	50.0	50.0
(WY)	1964	2000	2003	2003	2003	2001	2000	1958	1958	2000	1958	2003	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1951 - 2004

ANNUAL TOTAL	24832	27364	
ANNUAL MEAN	68.0	74.8	78.2
HIGHEST ANNUAL MEAN			90.7
LOWEST ANNUAL MEAN			62.3
HIGHEST DAILY MEAN	244	306	829
LOWEST DAILY MEAN	23	38	23
ANNUAL SEVEN-DAY MINIMUM	42	46	38
MAXIMUM PEAK FLOW		438	(a)1500
MAXIMUM PEAK STAGE		4.21	6.49
INSTANTANEOUS LOW FLOW		10	6.6
ANNUAL RUNOFF (CFSM)	1.18	1.30	1.36
ANNUAL RUNOFF (INCHES)	16.01	17.64	18.41
10 PERCENT EXCEEDS	106	108	109
50 PERCENT EXCEEDS	58	64	70
90 PERCENT EXCEEDS	46	50	54

(a) From rating curve extended above 500 ft³/s, result of failure of Lansing Club Dam; gage height 6.80 ft, from floodmark, site and datum then in use.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04133501 THUNDER BAY RIVER AT HERRON ROAD NEAR BOLTON, MI

LOCATION.--Lat 45°07'27", long 83°38'08", in NE 1/4 SE 1/4, sec.36, T.32 N., R.6 E., Alpena County, Hydrologic Unit 04070006, on right bank at upstream side of bridge on Herron Road, 4.5 mi southwest of Bolton, and 14.6 mi upstream from mouth.

DRAINAGE AREA.--586 mi².

PERIOD OF RECORD.--March 1945 to September 1980, July 2002 to current year. Prior to October 1980, published as "Thunder Bay River near Bolton".

REVISED RECORDS--WSP 1437: 1946. WSP 1727: 1947 (M).

GAGE.--Water-stage recorder. Elevation of gage is 680 ft above sea level, from topographic map. Prior to August 12, 1945, nonrecording gage at site 0.7 mi upstream, August 13, 1945 to September 1980, water-stage recorder at site 0.8 mi upstream at different datums (station 04133500).

REMARKS.--Records good except for estimated daily discharges, which are poor. Occasional regulation by dams upstream from station. Gage-height telemeter 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	230	368	656	e411	e356	e412	1050	829	859	217	187	189
2	228	e365	637	e407	e356	e442	917	824	853	205	186	184
3	233	e365	e535	e399	e356	e495	789	839	859	212	207	176
4	236	482	e649	e396	e356	e537	699	785	812	220	270	170
5	256	587	e652	e392	e356	e652	647	719	684	244	259	175
6	278	641	e668	e392	e356	e743	616	667	625	320	222	188
7	259	619	e656	e389	e356	e841	585	631	574	337	176	174
8	250	589	e659	e385	e356	e941	564	569	488	322	164	169
9	287	545	e667	e392	e353	e970	574	550	404	301	172	173
10	303	489	697	e392	e353	e960	563	571	468	268	196	178
11	305	528	781	e392	e348	e946	537	584	453	244	231	175
12	285	562	947	e389	e342	e929	496	565	369	215	233	173
13	268	601	e904	e389	e338	e884	482	561	362	235	216	171
14	280	625	e822	e385	e333	e856	480	613	382	378	206	167
15	308	611	e792	e385	e331	812	458	835	539	632	192	163
16	355	604	e680	e381	e331	759	432	1020	541	638	184	154
17	391	598	e623	e378	e331	667	476	1020	511	413	179	147
18	366	628	e563	e374	e330	625	565	846	532	248	174	150
19	336	705	e526	e374	e330	593	601	724	598	197	166	146
20	386	820	e493	e374	e330	644	679	668	583	207	160	143
21	360	889	e483	e371	e334	786	738	608	502	214	151	138
22	394	818	e461	e371	e334	833	799	566	394	267	147	136
23	396	756	e447	e367	e334	782	876	590	296	463	145	135
24	357	695	e433	e367	e334	758	785	998	259	495	148	132
25	345	660	e430	e363	e337	813	707	1640	254	359	150	117
26	354	671	e430	e363	e342	1120	728	2340	227	245	168	116
27	352	665	e430	e363	e342	1600	904	2070	234	242	185	113
28	348	646	e430	e356	e360	1910	1010	1670	223	223	229	106
29	370	647	e430	e356	e383	1710	996	1340	211	202	250	102
30	379	667	e430	e356	—	1400	892	1130	213	199	223	103
31	378	—	e417	e356	—	1220	—	971	—	198	203	—
TOTAL	9873	18446	18528	11765	10002	27640	20645	28343	14309	9160	5979	4563
MEAN	318	615	598	380	345	892	688	914	477	295	193	152
MAX	396	889	947	411	383	1910	1050	2340	859	638	270	189
MIN	228	365	417	356	330	412	432	550	211	197	145	102
CFSM	0.54	1.05	1.02	0.65	0.59	1.52	1.17	1.56	0.81	0.50	0.33	0.26
IN.	0.63	1.17	1.18	0.75	0.63	1.75	1.31	1.80	0.91	0.58	0.38	0.29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2004, BY WATER YEAR (WY)

	MEAN	361	414	437	412	394	624	859	545	443	377	337	329
MAX	620	651	754	892	709	1408	1632	1099	954	765	594	542	
(WY)	1955	1952	1972	1973	1974	1976	1971	1960	1967	1974	1973	1975	
MIN	242	202	198	256	225	305	360	254	189	202	193	152	
(WY)	2003	1950	1949	1959	1950	2003	1945	1977	1964	1966	2004	2004	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1945 - 2004

ANNUAL TOTAL	133155						179253					
ANNUAL MEAN	365						490			463		
HIGHEST ANNUAL MEAN										650		1974
LOWEST ANNUAL MEAN										315		1964
HIGHEST DAILY MEAN										4190		Mar 26 1976
LOWEST DAILY MEAN	947				Dec 12		2340		May 26	102		Sep 29 2004
ANNUAL SEVEN-DAY MINIMUM	186				Sep 10		113		Sep 24	113		Sep 24 2004
MAXIMUM PEAK FLOW	199				Sep 6		2530		May 26	(a)4290		Mar 26 1976
MAXIMUM PEAK STAGE							16.31		May 26	(b)16.31		May 26 2004
INSTANTANEOUS LOW FLOW							101		(c)	92		(d)
ANNUAL RUNOFF (CFSM)		0.623					0.836			0.790		
ANNUAL RUNOFF (INCHES)		8.45					11.38			10.74		
10 PERCENT EXCEEDS		654					848			708		
50 PERCENT EXCEEDS		286					392			380		
90 PERCENT EXCEEDS		217					176			250		

(a) Gage height 10.29 ft, site and datum then in use.

(b) Present site and datum; peak stage at previous site and datum, 10.49 ft, Mar. 25, 1976, backwater from ice.

(c) Part of each day Sept. 27, 29, 30.

(d) Sept. 28, 29, 1955, site then in use.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

442409084274001 LAKE ST. HELEN AT ST. HELEN, MI

LOCATION.--Lat 44°22'27", long 84°25'17", in SE1/4 NW1/4 sec.22, T.23 N., R.1 W., Roscommon County, Hydrologic Unit 04070007, at marina, at end of Monroe Sreet, in St. Helen.

DRAINAGE AREA.--72.2 mi² at outlet.

PERIOD OF RECORD.--June 1942 to December 1959, August 1993 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,149.01 ft above sea level. June 18, 1942 to May 21, 1947, nonrecording gage at Artesia Beach at same datum. May 22, 1947 to Dec. 31, 1959, and Aug. 17, 1993 to May 21, 1998, nonrecording gage at outlet at same datum.

REMARKS.--Inlets are Marsh Creek, Russell Creek and Cameron Creek. The outlet is the South Branch Au Sable River. Lake elevation controlled by dam. Established legal level; 1,155.25 ft, minimum winter level 1,154.75 ft, above sea level. Prior to May 5, 1998, established legal level; 1,154.15 ft, minimum winter level 1,153.65 ft, above sea level. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 7.71 ft, May 26, 2004; minimum observed, 4.64 ft, Jan. 21, 1954.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 7.71 ft, May 26; minimum, 5.80 ft, Oct. 22, 24.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.07	5.87	6.60	6.35	6.17	5.99	7.02	6.94	7.50	6.63	6.57	6.47
2	6.04	5.92	6.55	6.35	6.16	6.03	7.01	6.93	7.45	6.61	6.58	6.47
3	6.06	5.93	6.52	6.39	6.16	6.05	7.01	6.92	7.41	6.60	6.59	6.47
4	6.09	6.09	6.50	6.39	6.15	6.07	6.99	6.90	7.35	6.64	6.57	6.46
5	6.07	6.24	6.48	6.41	6.13	6.20	6.96	6.90	7.30	6.65	6.56	6.46
6	6.04	6.27	6.46	6.42	6.14	6.29	6.94	6.89	7.25	6.62	6.54	6.47
7	6.03	6.31	6.44	6.41	6.13	6.36	6.92	6.86	7.20	6.65	6.53	6.48
8	6.02	6.28	6.42	6.39	6.12	6.45	6.90	6.85	7.16	6.65	6.52	6.45
9	6.00	6.28	6.40	6.38	6.11	6.53	6.89	6.89	7.09	6.64	6.51	6.45
10	5.98	6.28	6.46	6.36	6.10	6.59	6.86	7.02	7.02	6.63	6.54	6.44
11	5.97	6.31	6.52	6.35	6.09	6.65	6.83	7.03	6.96	6.62	6.52	6.44
12	6.00	6.34	6.53	6.35	6.08	6.70	6.79	7.06	6.91	6.63	6.51	6.43
13	5.96	6.40	6.53	6.34	6.07	6.70	6.78	7.15	6.90	6.66	6.50	6.43
14	5.93	6.35	6.53	6.34	6.06	6.72	6.76	7.25	6.91	6.71	6.49	6.42
15	5.96	6.32	6.52	6.34	6.04	6.72	6.73	7.34	6.85	6.70	6.49	6.41
16	5.92	6.32	6.52	6.32	6.03	6.71	6.72	7.36	6.82	6.69	6.48	6.43
17	5.89	6.31	6.52	6.32	6.02	6.70	6.75	7.37	6.82	6.68	6.48	6.39
18	5.87	6.36	6.51	6.33	6.01	6.70	6.87	7.45	6.83	6.68	6.49	6.38
19	5.85	6.47	6.50	6.31	6.00	6.68	6.96	7.44	6.79	6.69	6.47	6.37
20	5.87	6.48	6.48	6.29	6.01	6.70	6.90	7.46	6.75	6.67	6.46	6.37
21	5.86	6.50	6.47	6.27	6.03	6.71	6.98	7.42	6.71	6.68	6.44	6.36
22	5.83	6.48	6.45	6.27	6.02	6.70	6.96	7.44	6.71	6.70	6.45	6.35
23	5.83	6.51	6.44	6.25	6.02	6.69	6.96	7.48	6.70	6.66	6.41	6.34
24	5.81	6.63	6.43	6.24	6.03	6.69	6.93	7.61	6.70	6.64	6.39	6.35
25	5.83	6.57	6.44	6.22	6.02	6.69	6.95	7.66	6.67	6.63	6.41	6.34
26	5.83	6.56	6.43	6.20	6.01	6.75	6.98	7.69	6.66	6.61	6.46	6.32
27	5.82	6.55	6.41	6.21	6.01	6.82	6.95	7.68	6.66	6.61	6.49	6.32
28	5.83	6.56	6.39	6.23	6.00	6.89	6.94	7.65	6.66	6.61	6.48	6.31
29	5.87	6.59	6.38	6.22	5.99	6.95	6.98	7.59	6.66	6.60	6.49	6.30
30	5.85	6.58	6.38	6.20	—	6.99	6.90	7.52	6.65	6.58	6.49	6.30
31	5.88	—	6.37	6.19	—	7.01	—	7.51	—	6.59	6.49	—
MEAN	5.93	6.36	6.47	6.31	6.07	6.59	6.90	7.27	6.93	6.64	6.50	6.40
MAX	6.09	6.63	6.60	6.42	6.17	7.01	7.02	7.69	7.50	6.71	6.59	6.48
MIN	5.81	5.87	6.37	6.19	5.99	5.99	6.72	6.85	6.65	6.58	6.39	6.30

WTR YR 2004 MEAN 6.53 MAX 7.69 MIN 5.81

STREAMS TRIBUTARY TO LAKE HURON

04135700 SOUTH BRANCH AU SABLE RIVER NEAR LUZERNE, MI

LOCATION.--Lat 44°36'53", long 84°27'20", in SE1/4 SE1/4 sec.29, T.26 N., R.1 W., Crawford County, Hydrologic Unit 04070007, on right bank 10 ft upstream from Smith Bridge, 400 ft downstream from bridge on State Highway 72, 4.6 mi upstream from mouth, and 9.1 mi west of Luzerne.

DRAINAGE AREA.--401 mi².

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1951-66. October 1966 to September 1989, October 1990 to current year.

REVISED RECORDS.--WSP 2111: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,070 ft above sea level, from topographic map. Apr. 19, 1951 to Nov. 14, 1966, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Occasional regulation by dam upstream from station. Gage-height telemeter 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	135	122	248	197	159	169	e520	329	461	151	118	115
2	136	122	239	197	e155	190	e470	327	464	144	125	113
3	141	127	216	213	e155	212	438	319	447	141	128	112
4	158	198	211	224	e155	222	410	314	423	148	128	110
5	161	245	210	206	e150	275	385	309	395	157	124	109
6	160	246	202	196	e155	331	369	305	369	159	118	109
7	159	243	193	187	e160	337	359	300	352	155	116	113
8	154	237	193	e180	e150	343	351	293	336	151	115	116
9	143	223	186	e180	e155	343	348	302	321	150	116	115
10	138	207	214	e180	e155	342	342	340	311	143	120	111
11	136	202	265	176	e155	374	333	346	299	139	118	109
12	142	203	256	164	e155	347	324	360	294	141	118	108
13	138	210	236	161	e155	323	313	398	292	159	118	107
14	137	208	246	163	e155	330	300	465	301	226	117	105
15	138	209	248	174	e150	306	290	512	314	225	116	104
16	138	210	243	174	e150	287	283	523	319	215	115	107
17	138	210	235	e170	e155	293	284	515	317	184	112	105
18	138	234	227	e170	e155	293	338	511	314	159	112	106
19	136	297	220	e170	e155	279	365	492	302	147	112	104
20	136	296	207	e170	e155	289	368	473	268	140	110	103
21	136	291	211	e170	156	306	398	468	253	138	110	103
22	132	293	206	e170	156	296	400	454	238	138	109	105
23	130	288	205	e170	157	303	380	492	228	138	107	100
24	124	293	205	180	157	293	358	605	219	137	107	99
25	126	287	203	181	156	298	357	646	213	131	107	98
26	125	273	185	172	157	371	361	658	201	124	124	99
27	125	263	186	158	158	473	350	618	182	122	126	101
28	126	262	194	163	162	e547	344	557	176	121	126	100
29	128	262	198	164	164	e590	338	505	161	119	125	102
30	129	253	202	166	—	e587	325	460	157	118	119	101
31	126	—	205	152	—	564	—	446	—	119	117	—
TOTAL	4269	7014	6695	5498	4512	10513	10801	13642	8927	4639	3633	3189
MEAN	138	234	216	177	156	339	360	440	298	150	117	106
MAX	161	297	265	224	164	590	520	658	464	226	128	116
MIN	124	122	185	152	150	169	283	293	157	118	107	98
CFSM	0.34	0.58	0.54	0.44	0.39	0.85	0.90	1.10	0.74	0.37	0.29	0.27
IN.	0.40	0.65	0.62	0.51	0.42	0.98	1.00	1.27	0.83	0.43	0.34	0.30

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2004, BY WATER YEAR (WY)

	MEAN	203	230	227	192	182	255	384	284	208	161	144	165
MAX	456	444	373	275	251	508	596	440	307	251	255	379	
(WY)	1987	1992	1992	1973	1984	1976	1985	2004	1993	1969	1994	1975	
MIN	110	121	134	118	105	130	178	145	124	107	102	95.0	
(WY)	2003	2003	2003	2003	2003	2003	2000	1999	1977	1977	2002	2002	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1967 - 2004

ANNUAL TOTAL	56061	83332	
ANNUAL MEAN	154	228	220
HIGHEST ANNUAL MEAN			280
LOWEST ANNUAL MEAN			135
HIGHEST DAILY MEAN	297	Apr 22	1110
LOWEST DAILY MEAN	94	Mar 6	87
ANNUAL SEVEN-DAY MINIMUM	96	Aug 15	88
MAXIMUM PEAK FLOW			663
MAXIMUM PEAK STAGE			6.26
INSTANTANEOUS LOW FLOW			98
ANNUAL RUNOFF (CFSM)	0.383	0.568	0.548
ANNUAL RUNOFF (INCHES)	5.20	7.73	7.44
10 PERCENT EXCEEDS	235	382	346
50 PERCENT EXCEEDS	130	186	194
90 PERCENT EXCEEDS	102	114	128

(a) Gage height 7.30 ft.

(b) Backwater from ice.

(c) Part of each day Sept. 24-26.

(d) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

445512084415301 OTSEGO LAKE NEAR GAYLORD, MI

LOCATION.--Lat 44°55'52", long 84°41'33", in SW1/4 SE1/4 sec.5, T.29 N., R.3 W., Otsego County, Hydrologic Unit 04070007, at Otsego Lake State Park, 200 ft northwest of boat ramp, 6.7 mi south of Gaylord.

DRAINAGE AREA--Not determined.

PERIOD OF RECORD.—August 1942 to current year, except for winter months 1942-43, 1943-44, 1977-78.

GAGE.--Water-stage recorder. Datum of gage is 1,270.03 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Aug. 18, 1958, nonrecording gage at datum 2.00 ft higher.

REMARKS.—Otsego Lake has no natural inlets or outlets. In December 1972 an outlet tube and pump system was installed connecting the lake with the North Branch Au Sable River to lower lake levels. Established legal level; maximum, 1,273.5 ft, minimum, 1,272.0 ft, above sea level.

EXTREMES FOR PERIOD OF RECORD.—Maximum gage height, 5.10 ft, May 6, 7, 1972; minimum, 0.96 ft, Aug. 14, 1959.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 2.35 ft, June 2; minimum, 0.99 ft, Oct. 1.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.99	1.07	1.40	1.53	1.64	1.74	2.08	2.14	2.30	2.06	1.82	1.68
2	1.00	1.07	1.40	1.53	1.65	1.74	2.08	2.15	2.31	2.03	1.81	1.68
3	1.02	1.07	1.40	1.54	1.66	1.74	2.08	2.15	2.30	2.01	1.83	1.67
4	1.05	1.07	1.40	1.54	1.66	1.75	2.08	2.15	2.28	2.03	1.82	1.67
5	1.07	1.09	1.40	1.54	1.66	1.75	2.08	2.15	2.26	2.06	1.80	1.66
6	1.08	1.11	1.40	1.55	1.66	1.79	2.08	2.15	2.25	2.04	1.77	1.63
7	1.09	1.12	1.40	1.55	1.67	1.83	2.08	2.15	2.23	2.05	1.75	1.67
8	1.09	1.13	1.40	1.55	1.67	1.84	2.08	2.15	2.22	2.04	1.72	1.67
9	1.11	1.14	1.41	1.56	1.68	1.85	2.08	2.15	2.24	2.03	1.71	1.66
10	1.11	1.14	1.41	1.56	1.68	1.85	2.08	2.15	2.23	2.03	1.75	1.63
11	1.12	1.15	1.41	1.56	1.68	1.86	2.09	2.15	2.20	2.01	1.77	1.61
12	1.12	1.15	1.43	1.57	1.69	1.86	2.09	2.16	2.16	2.01	1.76	1.60
13	1.12	1.18	1.44	1.57	1.69	1.87	2.09	2.16	2.17	2.02	1.76	1.60
14	1.12	1.19	1.45	1.58	1.70	1.87	2.09	2.16	2.19	2.05	1.74	1.58
15	1.12	1.20	1.45	1.58	1.70	1.88	2.09	2.16	2.19	2.04	1.73	1.56
16	1.12	1.20	1.46	1.58	1.70	1.88	2.09	2.17	2.16	2.01	1.72	1.56
17	1.12	1.21	1.46	1.58	1.70	1.88	2.09	2.18	2.22	2.00	1.71	1.57
18	1.12	1.24	1.47	1.59	1.70	1.88	2.09	2.18	2.29	1.99	1.70	1.56
19	1.12	1.28	1.48	1.59	1.70	1.89	2.09	2.17	2.27	1.96	1.69	1.54
20	1.11	1.31	1.48	1.60	1.70	1.89	2.09	2.17	2.22	1.95	1.67	1.52
21	1.11	1.32	1.48	1.60	1.70	1.89	2.10	2.17	2.20	1.94	1.66	1.51
22	1.11	1.33	1.49	1.60	1.70	1.90	2.11	2.16	2.20	2.00	1.63	1.50
23	1.10	1.35	1.50	1.61	1.70	1.90	2.11	2.19	2.18	1.98	1.62	1.49
24	1.10	1.38	1.50	1.61	1.70	1.90	2.12	2.29	2.16	1.94	1.61	1.47
25	1.09	1.38	1.51	1.62	1.71	1.90	2.12	2.28	2.14	1.92	1.62	1.46
26	1.09	1.38	1.52	1.62	1.72	1.93	2.13	2.28	2.13	1.91	1.63	1.45
27	1.09	1.39	1.52	1.62	1.72	1.99	2.14	2.27	2.11	1.89	1.68	1.44
28	1.08	1.39	1.52	1.63	1.72	2.03	2.14	2.28	2.10	1.89	1.71	1.44
29	1.08	1.40	1.53	1.63	1.73	2.05	2.14	2.25	2.08	1.86	1.71	1.43
30	1.07	1.40	1.53	1.63	—	2.07	2.14	2.23	2.06	1.85	1.69	1.41
31	1.07	—	1.53	1.64	—	2.08	—	2.25	—	1.84	1.68	—
MEAN	1.09	1.23	1.46	1.58	1.69	1.88	2.10	2.19	2.20	1.98	1.72	1.56
MAX	1.12	1.40	1.53	1.64	1.73	2.08	2.14	2.29	2.31	2.06	1.83	1.68
MIN	0.99	1.07	1.40	1.53	1.64	1.74	2.08	2.14	2.06	1.84	1.61	1.41
CAL YR 2003	MEAN 1.60	MAX 2.15	MIN 0.99									
WTR YR 2004	MEAN 1.72	MAX 2.31	MIN 0.99									

STREAMS TRIBUTARY TO LAKE HURON

04136000 AU SABLE RIVER NEAR RED OAK, MI

LOCATION.--Lat 44°40'37", long 84°17'33", in SE1/4 NE1/4 sec.3, T.26 N., R.1 E., Oscoda County, Hydrologic Unit 04070007, at Parmalee Bridge Campground, 2.6 mi south of Red Oak, on County Road 489, and 85.0 mi upstream from mouth.

DRAINAGE AREA.--1,108 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1908 to May 1916, December 1930 to June 1931, October 1995 to current year. Prior to October 1914, published as "near Lovells".

REVISED RECORDS.--WDR MI-96-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,000 ft above sea level, from topographic map. October 1908 to May 1916, nonrecording gage at site 5 mi upstream, datum of gage 1,004.69 ft above sea level (levels by Fargo Engineering Co.). December 1930 to June 1931, nonrecording gage at present site at different datum.

REMARKS.--Water-discharge records fair. Gage-height telemeter 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	577	549	820	695	e600	651	1540	1050	1390	668	581	577
2	590	552	792	686	e600	719	1410	1050	1510	652	577	579
3	608	557	731	759	e600	777	1320	994	1360	645	658	572
4	700	826	752	796	e600	784	1250	959	1230	663	622	571
5	703	1040	770	756	e550	935	1170	967	1140	726	595	560
6	666	948	707	e650	e600	1170	1120	950	1080	718	576	557
7	630	846	659	e550	e600	1120	1110	946	1050	709	566	579
8	606	777	677	e550	e550	1080	1110	923	1010	692	560	570
9	579	732	677	e600	e600	1030	1090	918	968	685	566	566
10	562	692	789	e500	e600	1000	1050	977	947	672	609	556
11	551	716	1090	e650	e600	1010	1020	995	916	655	633	e550
12	558	742	1010	e700	e600	1000	995	975	889	646	621	e550
13	557	786	919	e700	e600	903	971	1060	888	695	611	545
14	555	778	833	e600	e600	935	948	e1200	906	960	599	539
15	567	753	823	e500	e550	897	924	e1400	923	877	589	536
16	578	738	804	e500	e550	857	916	e1300	913	808	584	548
17	569	733	791	e600	e600	836	972	e1250	907	745	570	550
18	575	816	773	e600	e600	831	1190	1250	983	690	571	547
19	563	1180	755	e600	e600	813	1330	1220	969	659	562	542
20	558	1130	730	e600	e600	835	1210	1160	899	639	555	537
21	553	998	725	e550	e600	918	1260	1150	847	625	551	532
22	546	927	727	e650	e600	889	1280	1130	818	714	546	530
23	543	896	715	e600	634	872	1180	1240	793	685	544	529
24	540	979	715	e600	631	856	1090	2000	779	658	543	e525
25	544	952	717	e600	612	878	1120	2120	763	634	548	e525
26	545	886	684	e600	609	1170	1210	1950	747	618	621	e525
27	539	845	680	e600	612	1480	1140	1710	721	608	637	521
28	550	844	692	e600	618	1600	1080	1520	709	595	626	523
29	578	860	709	e600	629	1750	1040	1360	691	587	621	522
30	571	836	712	e600	—	1810	992	1260	675	583	610	521
31	562	—	707	e600	—	1690	—	1230	—	587	593	—
TOTAL	17923	24914	23685	19192	17345	32096	34038	38214	28421	21098	18245	16384
MEAN	578	830	764	619	598	1035	1135	1233	947	681	589	546
MAX	703	1180	1090	796	634	1810	1540	2120	1510	960	658	579
MIN	539	549	659	500	550	651	916	918	675	583	543	521
CFSM	0.52	0.75	0.69	0.56	0.54	0.93	1.02	1.11	0.86	0.61	0.53	0.49
IN.	0.60	0.84	0.80	0.64	0.58	1.08	1.14	1.28	0.95	0.71	0.61	0.55

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 2004, BY WATER YEAR (WY)

MEAN	738	808	801	722	715	875	1243	1060	862	693	662	668
MAX	1156	1289	1336	1004	900	1349	1747	1592	1380	1093	1129	1223
(WY)	1912	1912	1912	1912	1912	1913	1913	1912	1912	1912	1912	1912
MIN	535	589	562	532	534	624	639	668	613	537	521	510
(WY)	2001	2003	2001	2003	2003	2003	2000	1999	2003	2000	2001	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1909 - 2004

ANNUAL TOTAL	232120	291555	821
ANNUAL MEAN	636	797	1207
HIGHEST ANNUAL MEAN			599
LOWEST ANNUAL MEAN			1912
HIGHEST DAILY MEAN	1180	Nov 19	2120
LOWEST DAILY MEAN	400	Mar 3	500
ANNUAL SEVEN-DAY MINIMUM	472	Sep 8	523
MAXIMUM PEAK FLOW			2190
MAXIMUM PEAK STAGE			5.25
INSTANTANEOUS LOW FLOW			(c)500
ANNUAL RUNOFF (CFSM)	0.574	0.719	(d)
ANNUAL RUNOFF (INCHES)	7.79	9.79	(b)6.85
10 PERCENT EXCEEDS	826	1170	(c)400
50 PERCENT EXCEEDS	579	700	0.741
90 PERCENT EXCEEDS	489	550	10.06

(a) Gage height 6.66 ft; does not include water years 1909-16, 1931.

(b) Backwater from ice; does not include water years 1909-16, 1931.

(c) Result of freezeup.

(d) Jan. 10, 15, 16.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04136000 AU SABLE RIVER NEAR RED OAK, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: July 1996 to current year.

DISSOLVED OXYGEN: July 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent.

Dissolved oxygen records rated excellent except the following periods: Oct. 1-8, 26-28, Dec. 31 to Jan. 6, Feb. 10, 21-25, June 18-22 rated good; Nov. 17, 18, 20, Jan. 7-18, 26, Feb. 26 to Mar. 5, June 23-30 rated fair; and Nov. 19, Jan. 19-21, Jan. 29 to Feb. 4, Mar. 6-16, July 1-8 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 25.0°C, July 2, 2002; minimum, -0.5°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum recorded, 15.1 mg/L, Dec. 17, 19, 1999, but may have been higher during instrument malfunction Dec. 19, 1999; minimum, 5.9 mg/L, July 3, 2002.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 22.0°C, June 8, 9; minimum, -0.5°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 14.3 mg/L, Mar. 13; minimum recorded, 6.9 mg/L, July 21, but may have been lower during instrument malfunction July 21, 22.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	9.0	7.0	8.0	9.5	8.0	9.0	3.0	1.5	2.5	1.5	1.0	1.5
2	7.5	6.0	7.0	8.0	7.5	8.0	1.5	1.0	1.5	3.0	1.5	2.0
3	7.0	7.0	7.0	8.0	6.5	7.5	1.0	0.0	0.5	3.5	2.5	3.0
4	7.5	6.5	7.0	6.5	6.0	6.0	0.0	0.0	0.0	2.5	0.5	1.5
5	7.5	6.5	7.0	7.5	6.5	7.0	0.5	0.0	0.0	0.5	0.0	0.5
6	7.5	6.0	7.0	7.0	5.5	6.5	1.0	0.5	0.5	0.0	0.0	0.0
7	9.0	6.5	7.5	5.5	3.0	4.0	0.5	0.0	0.0	0.0	0.0	0.0
8	11.0	8.5	9.5	3.0	2.0	2.0	1.5	0.0	0.5	0.0	0.0	0.0
9	12.0	10.5	11.0	2.0	0.5	1.0	3.0	1.5	2.5	0.0	0.0	0.0
10	12.0	11.0	11.5	2.5	1.0	1.5	3.5	3.0	3.0	0.0	0.0	0.0
11	13.0	11.0	12.0	4.5	2.5	3.5	3.5	1.5	2.5	0.0	0.0	0.0
12	13.5	12.0	13.0	5.5	4.5	5.0	1.5	0.0	1.0	0.0	0.0	0.0
13	12.0	10.5	11.0	—	—	—	—	—	—	0.0	0.0	0.0
14	11.0	10.0	11.0	3.0	2.5	3.0	1.0	0.0	0.5	0.0	0.0	0.0
15	10.0	8.5	9.0	3.5	2.5	3.0	1.5	1.0	1.5	0.0	0.0	0.0
16	8.5	7.5	8.0	4.5	3.5	4.0	1.5	1.5	1.5	0.0	0.0	0.0
17	7.5	6.5	7.0	5.5	4.5	5.0	—	—	—	0.0	0.0	0.0
18	7.5	6.5	7.0	7.0	5.5	6.0	1.5	1.0	1.5	0.0	0.0	0.0
19	8.5	7.5	8.0	7.5	6.5	7.0	1.5	1.0	1.5	0.0	0.0	0.0
20	10.0	7.5	8.5	6.5	5.5	6.0	1.0	0.5	0.5	0.0	0.0	0.0
21	10.0	8.5	9.5	—	—	—	1.5	0.5	1.0	0.0	-0.5	0.0
22	8.5	6.5	7.5	5.0	4.5	4.5	2.0	1.5	2.0	-0.5	-0.5	-0.5
23	6.5	6.0	6.5	7.5	5.0	6.0	3.0	2.0	2.5	0.0	-0.5	-0.5
24	7.0	6.0	6.5	7.5	4.5	6.5	2.5	1.5	2.5	0.0	-0.5	-0.5
25	8.5	7.0	7.5	4.5	2.5	3.0	1.5	1.0	1.0	0.0	-0.5	-0.5
26	8.0	6.5	7.0	2.5	2.0	2.5	1.0	0.0	0.5	0.0	-0.5	-0.5
27	6.5	5.5	6.0	3.0	2.5	2.5	1.0	0.0	0.5	0.0	-0.5	-0.5
28	6.0	6.0	6.0	3.5	3.0	3.5	2.5	1.0	1.5	-0.5	-0.5	-0.5
29	6.5	6.0	6.0	3.0	2.5	2.5	3.0	2.5	3.0	0.0	-0.5	-0.5
30	7.5	6.0	6.5	3.0	2.0	2.5	3.0	2.0	2.5	0.0	-0.5	-0.5
31	9.5	7.5	8.5	—	—	—	2.0	1.5	2.0	0.0	-0.5	-0.5
MONTH	13.5	5.5	8.2	—	—	—	—	—	—	3.5	-0.5	0.1

STREAMS TRIBUTARY TO LAKE HURON

04136000 AU SABLE RIVER NEAR RED OAK, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	0.0	-0.5	-0.5	4.5	3.5	4.0	6.5	4.5	5.5	11.0	10.0	10.5	
2	0.0	-0.5	-0.5	4.0	3.5	4.0	8.0	5.0	6.5	10.5	8.5	9.0	
3	-0.5	-0.5	-0.5	4.0	3.5	3.5	8.0	6.0	7.0	9.0	7.5	8.0	
4	-0.5	-0.5	-0.5	4.0	3.5	4.0	7.5	5.5	6.5	8.5	7.0	7.5	
5	0.0	-0.5	-0.5	4.0	2.5	3.0	6.0	4.0	5.5	11.5	7.5	9.0	
6	0.0	-0.5	-0.5	2.5	2.0	2.5	6.0	5.0	5.5	11.5	10.5	11.0	
7	0.0	-0.5	-0.5	2.5	2.0	2.0	9.0	5.5	7.0	12.0	9.5	11.0	
8	0.0	-0.5	-0.5	2.5	2.0	2.0	9.0	7.5	8.0	12.0	9.5	10.5	
9	-0.5	-0.5	-0.5	3.5	2.0	2.5	7.5	6.0	7.0	10.5	9.5	10.0	
10	0.0	-0.5	-0.5	3.5	2.0	3.0	7.5	5.5	6.5	14.5	10.5	12.5	
11	0.0	-0.5	-0.5	3.5	2.5	3.0	6.5	5.0	6.0	16.0	13.5	14.5	
12	0.0	-0.5	-0.5	2.5	0.5	1.0	6.5	5.5	6.0	18.5	15.0	16.5	
13	0.0	-0.5	-0.5	1.5	-0.5	0.5	8.5	5.5	7.5	18.5	17.0	17.5	
14	0.0	-0.5	-0.5	2.0	1.5	1.5	9.0	6.5	8.0	18.0	17.0	17.5	
15	0.0	-0.5	0.0	3.0	1.0	2.0	10.5	7.5	9.0	—	—	—	
16	0.0	0.0	0.0	2.5	1.5	2.0	12.5	9.0	10.5	—	—	—	
17	0.0	-0.5	0.0	2.0	1.5	2.0	13.5	11.5	12.5	—	—	—	
18	0.0	-0.5	0.0	2.5	2.0	2.0	13.0	11.5	12.0	15.5	14.5	15.0	
19	0.0	-0.5	0.0	4.0	2.0	3.0	12.5	11.5	12.0	16.0	13.0	14.5	
20	0.0	-0.5	0.0	6.0	4.0	5.0	11.5	9.0	10.0	16.5	14.5	15.5	
21	0.0	0.0	0.0	5.0	3.0	3.5	11.0	9.0	9.5	16.5	14.0	15.0	
22	1.5	0.0	0.5	3.0	1.0	2.0	11.5	9.5	10.5	14.0	12.5	13.0	
23	1.5	1.0	1.5	3.5	2.0	2.5	11.5	9.5	10.5	12.5	11.0	11.5	
24	2.0	1.0	1.5	3.5	2.5	3.0	11.5	9.5	10.5	11.0	10.0	10.5	
25	2.0	1.0	1.5	6.0	3.5	4.5	11.0	8.5	9.0	12.0	10.0	10.5	
26	2.5	1.0	2.0	6.5	6.0	6.0	9.5	8.0	9.0	13.5	11.5	12.5	
27	2.5	1.0	2.0	6.0	5.0	5.5	9.5	8.0	8.5	13.5	12.0	12.5	
28	3.0	1.5	2.5	5.0	4.0	4.5	9.5	6.5	8.0	15.0	12.0	13.5	
29	4.5	2.5	3.5	6.5	4.5	5.5	14.0	9.5	11.5	14.5	12.0	13.5	
30	—	—	—	6.0	4.5	5.5	14.0	11.0	12.5	15.0	13.5	14.5	
31	—	—	—	6.0	4.5	5.5	—	—	—	15.0	13.0	13.5	
MONTH	4.5	-0.5	0.3	6.5	-0.5	3.2	14.0	4.0	8.6	—	—	—	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	14.0	13.0	13.5	20.5	18.0	19.0	19.0	16.5	18.0	16.0	15.0	15.5
2	15.5	13.5	14.5	19.5	17.5	18.0	18.5	17.0	17.5	17.5	14.5	16.0
3	16.5	13.5	15.0	19.5	16.5	18.0	20.0	17.5	19.0	18.5	16.0	17.0
4	17.0	14.0	15.5	19.0	17.5	18.0	20.0	18.5	19.0	19.0	17.0	18.0
5	17.5	15.0	16.0	18.0	16.5	17.0	18.5	16.5	17.5	18.5	17.5	18.0
6	17.5	16.0	16.5	17.5	15.5	16.0	17.5	15.0	16.5	19.5	17.5	18.5
7	19.5	15.5	17.0	16.0	15.0	15.5	17.5	15.5	16.5	18.5	16.5	17.5
8	22.0	19.0	20.0	15.5	14.0	14.5	17.5	15.5	16.5	16.5	14.5	15.5
9	22.0	19.0	20.5	15.0	14.0	14.5	17.0	16.0	16.5	15.5	13.5	14.5
10	19.0	17.5	18.0	18.5	14.5	16.0	17.0	15.5	16.5	15.5	13.5	14.5
11	18.0	16.0	16.5	20.0	17.5	18.5	16.0	14.5	15.5	---	---	---
12	17.0	15.0	16.0	21.5	19.0	20.0	14.5	13.5	14.0	---	---	---
13	18.0	16.0	17.0	20.5	19.0	19.5	14.5	13.5	14.0	---	---	---
14	18.0	17.0	17.5	17.5	17.0	17.5	15.0	12.5	14.0	18.5	16.5	17.5
15	18.5	16.5	17.5	19.0	16.0	17.5	16.0	13.5	15.0	19.0	17.0	18.0
16	20.5	17.0	18.5	19.0	17.0	18.0	16.5	14.0	15.5	18.5	17.0	18.0
17	20.5	18.5	19.5	20.0	18.0	19.0	16.0	15.0	15.5	17.0	13.5	15.0
18	19.5	17.5	18.5	20.0	18.0	19.0	17.0	14.5	15.5	13.5	12.0	13.0
19	19.5	17.0	18.0	19.5	17.5	18.5	17.0	15.0	16.0	14.0	12.0	13.0
20	17.5	15.5	16.5	20.5	18.0	19.5	16.0	14.0	15.0	14.5	12.5	13.5
21	16.5	15.5	15.5	20.0	19.5	20.0	15.0	13.0	14.0	14.5	12.5	14.0
22	17.0	14.5	15.5	21.5	19.5	21.0	15.0	12.5	13.5	15.0	13.0	14.0
23	16.5	15.0	16.0	20.5	18.0	19.0	17.0	15.0	15.5	---	---	---
24	16.5	14.0	15.5	18.0	16.5	17.5	17.0	15.0	16.0	---	---	---
25	15.0	12.5	13.5	18.0	15.5	17.0	18.0	16.5	17.5	---	---	---
26	16.0	14.0	15.0	18.5	16.0	17.5	19.0	17.5	18.0	---	---	---
27	16.5	14.5	15.5	18.0	16.5	17.5	20.0	18.0	19.0	---	---	---
28	17.5	15.5	16.5	19.0	16.5	17.5	19.5	16.5	18.0	14.5	13.0	13.5
29	18.0	16.0	17.0	18.5	17.0	18.0	16.5	15.5	16.0	13.0	11.5	12.5
30	19.0	16.5	17.5	18.0	17.0	17.5	15.5	14.0	15.0	12.0	10.0	11.0
31	---	---	---	19.0	16.5	17.5	16.5	14.5	15.5	---	---	---
MONTH	22.0	12.5	16.6	21.5	14.0	17.9	20.0	12.5	16.2	---	---	---

STREAMS TRIBUTARY TO LAKE HURON

04136000 AU SABLE RIVER NEAR RED OAK, MI—Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	11.7	10.3	11.0	11.4	10.1	10.7	12.3	11.6	11.9	13.5	12.9	13.1
2	12.2	11.0	11.6	11.4	10.6	11.0	12.9	12.2	12.5	13.1	12.5	12.8
3	11.4	10.7	11.1	11.6	10.6	11.1	13.2	12.6	12.9	12.6	12.1	12.4
4	11.7	10.7	11.1	11.3	11.0	11.2	—	—	—	13.5	12.5	13.0
5	11.7	10.6	11.2	11.0	10.6	10.8	—	—	—	13.8	13.2	13.5
6	12.0	10.9	11.4	11.7	10.9	11.3	12.8	12.4	12.6	13.9	11.9	13.3
7	11.8	10.7	11.2	12.7	11.5	12.1	13.2	12.7	12.9	13.9	12.4	13.3
8	11.8	10.1	10.9	13.5	12.6	13.0	12.9	12.4	12.7	13.2	11.9	12.7
9	11.6	9.8	10.6	14.1	13.2	13.6	12.4	11.9	12.1	13.5	12.7	13.1
10	11.5	9.7	10.5	13.8	13.1	13.5	11.9	11.4	11.7	13.5	12.9	13.2
11	11.4	9.7	10.5	13.1	11.9	12.4	12.1	11.3	11.7	13.0	12.3	12.6
12	10.8	9.2	10.0	11.9	11.3	11.6	12.8	12.1	12.5	12.5	12.3	12.4
13	11.3	9.5	10.3	—	—	—	—	—	—	12.8	12.4	12.5
14	10.2	9.4	9.8	—	—	—	12.9	12.4	12.6	12.8	12.3	12.6
15	11.4	9.8	10.6	—	—	—	12.4	12.0	12.2	12.6	12.2	12.4
16	11.9	10.5	11.1	11.4	11.0	11.2	12.0	11.8	11.9	12.4	12.2	12.3
17	12.1	10.9	11.5	11.6	11.0	11.3	—	—	—	12.3	11.9	12.1
18	11.8	10.9	11.3	11.2	10.7	11.0	12.9	12.5	12.7	11.9	11.7	11.8
19	11.8	10.6	11.1	10.9	10.4	10.6	12.9	12.1	12.6	12.0	11.8	11.9
20	11.5	10.4	10.9	11.3	10.7	11.0	13.3	12.7	12.9	12.1	11.5	11.9
21	10.4	9.7	10.1	—	—	—	13.1	12.6	12.9	12.1	11.9	12.0
22	11.7	10.2	11.0	11.6	11.2	11.3	12.8	12.4	12.6	12.0	11.4	11.6
23	11.9	10.9	11.4	11.4	10.6	11.1	12.6	12.0	12.3	12.0	11.6	11.9
24	12.0	11.0	11.5	11.1	10.1	10.5	12.8	11.9	12.4	—	—	—
25	11.6	10.7	11.2	12.3	11.1	11.8	13.1	12.6	12.8	—	—	—
26	11.7	10.7	11.1	12.4	12.0	12.2	13.5	12.9	13.2	12.4	11.8	12.1
27	12.2	11.1	11.6	12.2	11.8	12.0	13.6	13.1	13.3	—	—	—
28	11.7	10.9	11.3	11.8	11.5	11.6	13.2	12.5	12.8	—	—	—
29	12.0	11.0	11.5	12.1	11.6	11.8	12.6	12.2	12.4	12.2	11.9	12.1
30	12.2	11.2	11.6	12.2	11.7	11.9	12.8	12.1	12.5	12.3	11.9	12.1
31	11.4	10.3	10.8	—	—	—	13.1	12.6	12.8	12.1	11.8	11.9
MONTH	12.2	9.2	11.0	—	—	—	—	—	—	—	—	—

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	12.4	11.7	11.9	12.7	11.9	12.3	11.9	11.3	11.6	10.6	9.7	10.1	
2	12.6	12.0	12.2	12.6	11.7	12.2	11.7	10.9	11.3	10.8	9.9	10.3	
3	12.3	11.7	12.0	12.9	12.1	12.5	11.4	10.7	11.0	11.3	10.5	10.9	
4	12.9	11.8	12.2	13.0	12.2	12.5	11.8	10.8	11.3	11.2	10.5	10.8	
5	13.1	12.3	12.7	12.6	12.1	12.3	12.3	11.3	11.8	11.0	9.8	10.6	
6	13.1	12.2	12.5	13.1	12.2	12.7	11.7	11.2	11.4	9.9	9.3	9.6	
7	12.4	12.0	12.1	13.0	12.6	12.8	11.4	10.5	11.1	10.6	9.3	10.0	
8	12.7	11.8	12.2	13.2	12.7	12.9	10.8	10.0	10.4	10.4	9.3	9.8	
9	12.6	12.0	12.2	13.2	12.8	13.0	11.4	10.5	11.0	10.5	9.9	10.1	
10	12.3	11.7	12.0	13.4	12.5	12.9	11.4	10.5	11.0	10.0	8.9	9.6	
11	12.6	12.1	12.3	12.9	12.3	12.6	11.6	10.5	11.1	9.7	8.5	9.0	
12	12.6	12.2	12.5	14.0	12.7	13.4	11.6	10.6	11.1	9.7	8.0	8.9	
13	12.6	12.3	12.5	14.3	13.8	14.1	—	—	—	9.0	8.1	8.5	
14	12.6	12.1	12.4	13.8	13.1	13.3	11.1	10.1	10.6	—	—	—	
15	12.8	12.3	12.5	14.0	13.3	13.6	10.9	9.8	10.3	—	—	—	
16	12.8	11.9	12.4	13.7	12.8	13.3	10.6	9.6	10.1	—	—	—	
17	12.8	11.9	12.4	13.8	12.9	13.3	9.9	9.1	9.5	—	—	—	
18	12.8	12.0	12.4	13.6	12.8	13.2	10.2	9.1	9.7	9.6	8.6	9.0	
19	12.5	12.0	12.3	13.7	12.7	13.1	10.0	9.4	9.7	10.1	9.1	9.5	
20	12.5	11.5	11.8	12.8	12.0	12.4	10.9	9.8	10.4	9.3	8.5	8.9	
21	12.2	11.4	11.7	13.4	11.9	12.6	10.6	10.1	10.3	9.6	8.5	9.0	
22	12.8	11.9	12.3	14.0	12.8	13.3	10.9	9.9	10.4	9.5	8.9	9.2	
23	13.1	12.3	12.6	13.5	12.7	13.1	11.0	10.0	10.5	9.7	9.1	9.4	
24	13.3	12.9	13.1	13.1	12.5	12.8	11.0	9.9	10.4	9.7	9.3	9.5	
25	13.7	12.8	13.2	12.7	11.8	12.4	10.8	10.1	10.5	9.6	9.3	9.4	
26	13.7	12.9	13.2	11.8	11.2	11.5	11.0	10.5	10.8	9.3	8.8	9.1	
27	13.6	12.9	13.2	11.9	11.4	11.6	11.3	10.3	10.8	9.3	8.6	9.0	
28	13.6	12.7	13.1	11.9	11.7	11.8	11.5	10.7	11.1	9.3	8.6	9.0	
29	13.1	12.4	12.7	11.7	11.2	11.5	10.8	9.2	10.2	9.5	8.6	9.0	
30	—	—	—	11.5	11.1	11.3	9.9	8.8	9.4	9.1	8.4	8.7	
31	—	—	—	11.7	11.2	11.5	—	—	—	8.7	8.0	8.3	
MONTH	13.7	11.4	12.4	14.3	11.1	12.6	—	—	—	—	—	—	

STREAMS TRIBUTARY TO LAKE HURON

04136500 AU SABLE RIVER AT MIO, MI

LOCATION.--Lat 44°39'36", long 84°07'52", in SE1/4 NE1/4 sec.12, T.26 N., R.2 E., Oscoda County, Hydrologic Unit 04070007, on right bank 150 ft upstream from bridge on State Highway 33 in Mio, 500 ft downstream from Mio Dam, 9.5 mi downstream from Big Creek, and 73.0 mi upstream from mouth.

DRAINAGE AREA.--1,361 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1952 to current year.

REVISED RECORDS.--WDR MI-96-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 929.60 ft above sea level.

REMARKS.--Water-discharge records good. Flow regulated by Mio Dam 500 ft upstream. Gage-height telemeter 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	745	724	1020	884	790	854	1770	1280	1620	839	741	763
2	750	722	971	872	812	911	1640	1260	1760	820	851	740
3	791	726	912	973	834	1010	1560	1210	1580	821	938	759
4	858	1060	855	1040	827	1050	1460	1150	1430	913	830	738
5	889	1310	912	968	740	1280	1390	1190	1350	886	773	725
6	836	1190	920	833	839	1620	1340	1150	1300	906	751	766
7	805	1040	828	673	823	1460	1330	1170	1260	913	732	743
8	774	964	858	754	722	1360	1310	1120	1220	870	732	736
9	751	915	891	797	846	1280	1290	1120	1180	857	737	719
10	723	868	1000	672	823	1240	1260	1220	1150	852	806	733
11	701	907	1370	898	811	1250	1200	1200	1110	835	805	716
12	729	953	1240	933	807	1230	1180	1160	1080	811	807	703
13	713	1010	1090	909	792	1090	1170	1310	1110	930	777	706
14	712	981	1030	828	808	1200	1130	1510	1150	1180	856	698
15	729	940	1020	717	730	1120	1100	1730	1130	1070	932	709
16	734	920	1000	709	666	1060	1090	1580	1100	1010	624	690
17	728	920	989	813	785	1050	1170	1470	1170	934	696	726
18	753	1020	966	830	835	1040	1470	1510	1210	860	673	698
19	725	1450	948	857	818	1050	1600	1450	1170	852	741	698
20	724	1350	917	811	833	1060	1400	1380	1080	810	712	696
21	709	1210	914	e779	825	1200	1500	1360	1040	839	730	708
22	701	1120	911	e874	e825	1140	1480	1350	1020	861	710	684
23	705	1100	886	778	e825	1110	1390	1550	954	863	719	683
24	700	1180	909	795	e825	1080	1270	2640	965	855	710	682
25	709	1150	928	762	e800	1120	1350	2340	944	821	725	698
26	707	1080	870	815	787	1570	1430	2140	906	820	805	663
27	693	1040	861	821	810	1860	1360	1910	903	802	850	693
28	715	1040	887	783	792	1910	1300	1700	871	779	813	689
29	766	1070	899	789	819	2020	1250	1550	862	769	811	675
30	734	1050	890	779	—	2060	1180	1430	860	753	783	677
31	724	—	912	810	—	1960	—	1450	—	767	763	—
TOTAL	23033	31010	29604	25556	23249	40245	40370	45590	34485	26898	23933	21314
MEAN	743	1034	955	824	802	1298	1346	1471	1150	868	772	710
MAX	889	1450	1370	1040	846	2060	1770	2640	1760	1180	938	766
MIN	693	722	828	672	666	854	1090	1120	860	753	624	663
CFSM	0.55	0.76	0.70	0.61	0.59	0.95	0.99	1.08	0.84	0.64	0.57	0.52
IN.	0.63	0.85	0.81	0.70	0.64	1.10	1.10	1.25	0.94	0.74	0.65	0.58

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2004, BY WATER YEAR (WY)

	MEAN	929	986	959	890	880	1086	1445	1159	988	864	817	860
MAX	1779	1430	1303	1321	1152	1813	2241	1636	1422	1520	1195	1575	
(WY)	1987	1992	1967	1973	1973	1976	1971	1983	1954	1994	1994	1986	
MIN	659	717	711	657	659	733	799	723	683	655	578	661	
(WY)	2001	2003	1964	2003	2003	1956	2000	1958	1958	1958	1958	1958	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1952 - 2004

ANNUAL TOTAL	294831						365287						
ANNUAL MEAN	808						998						
HIGHEST ANNUAL MEAN										988			
LOWEST ANNUAL MEAN										1213			1986
HIGHEST DAILY MEAN	1450						2640			746			1958
LOWEST DAILY MEAN	513						624			4230			Apr 1 1998
ANNUAL SEVEN-DAY MINIMUM	611						682			21			Aug 9 1977
MAXIMUM PEAK FLOW							3030			420			Aug 8 1977
MAXIMUM PEAK STAGE							5.16			4380			(a)
INSTANTANEOUS LOW FLOW							493			6.37			Apr 1 1998
ANNUAL RUNOFF (CFSM)	0.594						0.733			7.0			Aug 4 1977
ANNUAL RUNOFF (INCHES)	8.06						9.98			0.726			
10 PERCENT EXCEEDS	1040						1430			9.86			
50 PERCENT EXCEEDS	748						890			1340			
90 PERCENT EXCEEDS	636						712			918			

(a) Sept. 30, 1986, Apr. 1, 1998.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04136500 AU SABLE RIVER AT MIO, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: July 1996 to current year.

DISSOLVED OXYGEN: July 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated good.

Dissolved oxygen records rated excellent except the following periods: Oct. 1-8, 20-25, Jan. 11-20, Feb. 3, 4, Apr. 5-13, 18-20, May 25 to June 1, June 17-21, July 23-31, Aug. 10-13, Sept. 22-28 rated good; Oct. 26, 27, Apr. 21-25, June 2-8, 22-29, Aug. 1-3, 14-19, Sept. 29, 30 rated fair; and Apr. 26 to May 11, June 30 to July 8, Aug. 20-31 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 26.0°C, Aug. 9, 2001; minimum, 0.0°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum, 14.3 mg/L, Feb. 23-25, 1999; minimum, 5.8 mg/L, July 27, 2001.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 23.0°C, July 22; minimum, 0.0°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 13.2 mg/L, Mar. 15; minimum recorded, 7.1 mg/L, Aug. 31, but may have been lower during instrument malfunction Sept. 1-9.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	11.0	10.5	10.5	7.0	7.0	7.0	2.5	2.0	2.5	2.0	1.5	1.5
2	10.5	10.0	10.0	7.0	7.0	7.0	2.0	1.5	2.0	2.0	1.5	2.0
3	10.0	8.5	9.0	7.5	7.0	7.5	2.0	1.5	1.5	2.0	1.5	1.5
4	8.5	8.0	8.5	7.5	7.0	7.5	1.5	1.5	1.5	1.5	1.5	1.5
5	8.0	7.5	8.0	7.5	7.0	7.5	1.5	1.5	1.5	2.0	1.5	1.5
6	8.0	7.0	7.5	7.0	6.5	7.0	1.5	1.0	1.5	1.5	1.0	1.5
7	8.5	7.5	8.0	6.5	5.5	6.0	1.0	1.0	1.0	1.0	0.5	1.0
8	9.0	8.0	8.5	5.5	5.0	5.0	1.0	1.0	1.0	0.5	0.5	0.5
9	9.5	9.0	9.0	5.0	3.5	4.0	1.0	1.0	1.0	0.5	0.5	0.5
10	10.0	9.0	9.5	3.5	3.0	3.0	1.0	0.5	1.0	0.5	0.5	0.5
11	11.5	10.0	10.5	3.0	2.5	3.0	1.5	0.5	1.0	0.5	0.5	0.5
12	12.5	11.0	12.0	3.0	2.5	2.5	2.0	1.5	2.0	0.5	0.0	0.5
13	12.5	11.5	12.0	3.0	2.5	2.5	2.0	1.5	2.0	0.0	0.0	0.0
14	12.0	12.0	12.0	3.0	2.5	3.0	1.5	1.0	1.5	0.0	0.0	0.0
15	12.0	11.5	12.0	3.5	3.0	3.5	1.0	0.5	1.0	0.5	0.0	0.0
16	11.5	11.0	11.0	3.5	3.5	3.5	0.5	0.5	0.5	0.5	0.0	0.0
17	11.0	10.0	10.5	3.5	3.5	3.5	1.0	0.5	0.5	0.0	0.0	0.0
18	10.0	9.0	9.5	4.5	3.5	4.0	1.0	1.0	1.0	0.0	0.0	0.0
19	9.0	8.5	9.0	5.5	4.5	5.0	1.0	1.0	1.0	0.0	0.0	0.0
20	9.0	8.0	8.5	6.5	5.5	6.0	1.0	1.0	1.0	0.0	0.0	0.0
21	8.5	8.0	8.5	7.0	6.5	6.5	1.0	1.0	1.0	0.0	0.0	0.0
22	8.0	8.0	8.0	6.5	6.0	6.5	1.0	1.0	1.0	0.0	0.0	0.0
23	8.0	8.0	8.0	6.0	6.0	6.0	1.0	1.0	1.0	0.0	0.0	0.0
24	8.0	8.0	8.0	6.0	5.0	5.5	1.5	1.0	1.0	0.0	0.0	0.0
25	8.0	8.0	8.0	5.0	4.5	4.5	1.5	1.5	1.5	0.0	0.0	0.0
26	8.0	7.5	7.5	4.5	4.0	4.0	1.5	1.5	1.5	0.0	0.0	0.0
27	7.5	7.0	7.0	4.0	3.0	4.0	1.5	1.5	1.5	0.0	0.0	0.0
28	7.0	7.0	7.0	3.0	2.5	3.0	1.5	1.0	1.5	0.0	0.0	0.0
29	7.0	6.5	6.5	2.5	2.5	2.5	1.0	1.0	1.0	0.0	0.0	0.0
30	6.5	6.5	6.5	2.5	2.0	2.5	1.0	1.0	1.0	0.0	0.0	0.0
31	7.0	6.5	6.5	—	—	—	1.5	1.0	1.5	0.0	0.0	0.0
MONTH	12.5	6.5	8.9	7.5	2.0	4.8	2.5	0.5	1.3	2.0	0.0	0.4

STREAMS TRIBUTARY TO LAKE HURON

04136500 AU SABLE RIVER AT MIO, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH				APRIL				MAY
1	0.0	0.0	0.0	1.5	1.0	1.5	6.0	6.0	6.0	12.0	10.5	11.5
2	0.0	0.0	0.0	2.0	1.5	2.0	6.5	6.0	6.0	11.5	11.0	11.5
3	0.0	0.0	0.0	2.5	2.0	2.5	7.5	6.5	7.0	11.0	10.0	10.5
4	0.0	0.0	0.0	3.0	2.5	3.0	7.5	7.0	7.0	10.0	9.0	9.5
5	0.0	0.0	0.0	3.0	3.0	3.0	7.0	6.5	6.5	10.0	8.5	9.5
6	0.0	0.0	0.0	3.0	2.5	3.0	6.5	6.5	6.5	9.5	9.5	9.5
7	0.0	0.0	0.0	2.5	2.0	2.5	7.0	6.0	6.5	10.5	9.5	10.0
8	0.0	0.0	0.0	2.5	2.0	2.0	7.0	6.5	6.5	11.0	10.5	10.5
9	0.0	0.0	0.0	2.0	2.0	2.0	8.0	7.0	7.5	11.0	11.0	11.0
10	0.0	0.0	0.0	2.5	2.0	2.5	8.0	7.5	7.5	12.5	11.0	11.5
11	0.0	0.0	0.0	3.0	2.5	2.5	7.5	7.0	7.5	12.5	12.0	12.0
12	0.0	0.0	0.0	2.5	2.0	2.5	7.0	6.5	7.0	16.0	12.5	14.5
13	0.0	0.0	0.0	2.0	2.0	2.0	7.0	6.5	7.0	16.5	15.0	16.0
14	0.0	0.0	0.0	2.0	1.5	1.5	8.0	6.5	7.5	17.5	16.0	17.0
15	0.5	0.0	0.0	1.5	1.0	1.0	8.0	7.5	7.5	17.5	16.0	16.5
16	0.5	0.0	0.0	1.5	1.0	1.5	10.0	8.0	9.0	16.0	15.0	15.5
17	0.0	0.0	0.0	2.0	1.5	2.0	11.5	10.0	10.5	15.5	14.5	15.0
18	0.0	0.0	0.0	2.5	2.0	2.0	12.5	10.5	11.5	15.5	14.5	15.0
19	0.0	0.0	0.0	2.5	2.0	2.5	13.0	12.5	12.5	15.5	15.0	15.0
20	0.0	0.0	0.0	2.5	2.5	2.5	12.5	11.5	12.0	17.0	15.0	16.0
21	0.0	0.0	0.0	3.0	2.5	3.0	12.0	11.5	11.5	16.0	15.5	15.5
22	0.0	0.0	0.0	3.5	3.0	3.0	11.5	10.5	11.0	15.5	15.0	15.5
23	0.0	0.0	0.0	3.0	3.0	3.0	12.0	10.5	11.0	15.0	13.5	14.5
24	0.5	0.0	0.0	3.0	2.5	3.0	11.5	11.0	11.0	13.5	11.5	12.5
25	0.5	0.0	0.5	3.0	2.5	2.5	11.0	10.5	11.0	11.5	10.5	11.0
26	0.5	0.5	0.5	4.5	3.0	3.5	10.5	10.0	10.5	12.0	11.0	11.5
27	1.0	0.5	0.5	5.0	4.5	5.0	10.0	9.0	9.5	13.0	11.5	12.5
28	1.0	0.5	1.0	5.5	5.0	5.5	9.5	8.5	9.0	14.0	12.5	13.0
29	1.5	1.0	1.0	5.5	5.5	5.5	10.5	9.0	10.0	14.5	13.0	13.5
30	—	—	—	6.0	5.5	6.0	10.5	10.5	10.5	14.5	13.5	14.0
31	—	—	—	6.5	6.0	6.0	—	—	—	14.5	14.5	14.5
MONTH	1.5	0.0	0.1	6.5	1.0	2.9	13.0	6.0	8.8	17.5	8.5	13.1

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	15.0	14.5	14.5	20.0	18.5	19.0	21.0	20.0	20.5	18.5	17.0	18.0
2	15.0	14.0	14.5	19.5	19.0	19.0	21.0	19.5	20.0	18.5	17.0	17.5
3	15.5	14.5	15.0	20.5	19.0	19.5	20.5	20.0	20.0	18.5	17.5	18.0
4	16.5	15.5	15.5	21.0	19.5	20.0	20.5	20.0	20.0	18.5	18.0	18.0
5	17.5	15.5	16.5	21.0	19.5	20.0	20.5	20.0	20.5	19.0	18.0	18.5
6	17.0	16.0	16.5	19.5	19.0	19.5	20.5	19.5	20.0	20.5	18.0	19.5
7	18.5	16.0	17.0	20.0	19.0	19.5	20.5	20.0	20.0	20.0	19.0	19.5
8	19.5	17.5	18.5	19.0	18.0	18.5	20.5	19.5	20.0	19.5	19.0	19.0
9	19.5	19.0	19.5	18.0	17.0	17.5	19.5	19.0	19.0	19.0	19.0	19.0
10	20.0	19.5	20.0	17.5	16.5	17.0	19.5	19.0	19.0	19.0	17.5	18.5
11	20.0	19.5	20.0	18.0	16.5	17.0	19.0	18.0	18.5	19.0	17.5	18.0
12	19.5	18.5	19.0	19.0	16.5	18.0	18.0	17.0	17.5	18.0	17.0	17.5
13	19.5	18.0	18.5	21.0	19.0	20.0	17.5	16.5	17.0	18.0	17.0	17.5
14	19.5	18.5	19.0	20.5	20.0	20.5	17.0	16.0	16.5	19.5	17.5	18.5
15	19.0	18.0	18.5	21.0	20.0	20.5	17.0	16.0	16.5	19.5	18.0	19.0
16	20.0	18.5	19.0	20.0	19.5	20.0	17.5	16.0	16.5	20.0	19.0	19.5
17	20.0	19.0	19.0	20.0	19.0	19.5	17.5	16.0	16.5	19.5	18.5	19.0
18	21.0	20.0	20.5	20.5	20.0	20.0	18.0	16.5	17.0	19.0	18.0	18.5
19	20.5	19.5	20.0	21.5	20.5	21.0	18.0	17.0	17.5	18.0	17.0	17.5
20	19.5	19.0	19.0	21.5	20.5	21.0	18.0	17.0	17.5	17.5	16.0	17.0
21	19.0	18.5	18.5	22.5	20.5	21.5	18.0	17.0	17.5	18.0	16.0	17.0
22	18.5	18.0	18.5	23.0	21.5	22.0	18.0	17.0	17.5	17.0	16.0	16.5
23	18.0	17.5	18.0	22.0	21.0	21.5	17.5	16.5	17.0	16.5	16.0	16.0
24	17.5	16.5	17.0	21.5	21.0	21.0	17.0	16.5	16.5	18.0	16.0	17.0
25	17.0	16.5	16.5	21.0	20.0	21.0	18.5	16.5	17.5	17.0	16.5	16.5
26	17.5	16.5	17.0	20.0	19.5	20.0	19.0	17.5	18.5	17.0	16.0	16.5
27	17.0	16.5	16.5	20.0	19.5	19.5	20.5	18.5	19.5	17.0	16.0	16.5
28	17.5	16.5	17.0	20.0	19.5	20.0	19.5	19.5	19.5	16.0	15.5	15.5
29	18.5	17.0	17.5	20.5	19.0	20.0	20.0	19.5	19.5	16.0	15.0	15.5
30	19.5	17.5	18.5	20.0	19.5	19.5	20.0	19.0	19.5	15.5	14.5	15.0
31	—	—	—	21.0	19.5	20.0	19.5	18.5	19.0	—	—	—
MONTH	21.0	14.0	17.8	23.0	16.5	19.8	21.0	16.0	18.4	20.5	14.5	17.6

STREAMS TRIBUTARY TO LAKE HURON

04136500 AU SABLE RIVER AT MIO, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	9.8	9.6	9.7	11.0	10.9	10.9	12.3	12.0	12.1	11.9	11.8	11.9
2	10.0	9.8	9.9	10.9	10.8	10.8	12.4	12.3	12.4	11.9	11.8	11.8
3	10.2	9.9	10.1	10.8	10.7	10.8	12.5	12.4	12.4	12.1	11.8	12.0
4	10.4	10.2	10.3	10.7	10.4	10.6	12.4	12.4	12.4	12.2	12.0	12.1
5	10.7	10.4	10.5	10.6	10.4	10.5	12.6	12.4	12.5	12.0	11.9	12.0
6	10.8	10.6	10.7	10.8	10.6	10.7	12.9	12.6	12.8	12.0	11.9	11.9
7	10.7	10.6	10.7	10.8	10.6	10.7	13.0	12.9	12.9	12.1	11.9	12.0
8	10.8	10.6	10.7	10.9	10.8	10.9	13.0	12.8	12.9	12.3	12.1	12.2
9	10.6	10.4	10.5	11.3	10.8	11.1	12.9	12.8	12.8	12.4	12.2	12.3
10	10.6	10.4	10.5	11.6	11.3	11.4	12.9	12.7	12.8	12.5	12.1	12.3
11	10.4	10.0	10.2	12.1	11.5	11.8	12.8	12.2	12.5	12.4	12.2	12.3
12	10.1	9.6	9.8	12.3	12.0	12.2	12.2	11.8	12.0	12.3	12.1	12.2
13	9.7	9.6	9.6	12.4	12.2	12.3	11.9	11.8	11.8	12.1	11.9	12.0
14	9.6	9.2	9.4	12.3	12.1	12.2	12.1	11.8	12.0	11.9	11.3	11.6
15	9.3	9.1	9.2	12.1	11.8	11.9	12.5	12.1	12.3	11.4	11.2	11.3
16	9.3	9.0	9.1	11.8	11.7	11.7	12.6	12.4	12.5	11.3	11.1	11.2
17	9.3	9.2	9.3	11.8	11.7	11.8	12.5	12.2	12.4	11.4	11.2	11.3
18	9.4	9.2	9.3	11.8	11.6	11.7	12.3	12.1	12.2	11.3	11.2	11.3
19	9.7	9.3	9.6	11.7	11.2	11.4	12.2	12.1	12.1	11.3	11.2	11.3
20	10.1	9.7	9.9	11.2	10.7	10.9	12.3	12.1	12.2	11.2	11.0	11.1
21	10.4	10.0	10.1	10.7	10.3	10.5	12.2	12.1	12.1	—	—	—
22	10.4	10.1	10.3	10.6	10.3	10.5	12.3	12.1	12.2	—	—	—
23	10.4	10.3	10.4	10.7	10.6	10.6	12.4	12.2	12.3	11.5	11.3	11.4
24	10.4	10.1	10.3	11.1	10.6	10.9	12.3	12.2	12.3	11.5	11.4	11.4
25	10.2	10.0	10.1	11.2	11.1	11.1	12.2	12.1	12.1	11.4	11.3	11.4
26	10.4	10.0	10.1	11.1	11.0	11.1	12.1	11.9	12.0	11.4	11.3	11.3
27	10.7	10.4	10.6	11.4	11.0	11.1	12.0	11.8	11.9	11.5	11.4	11.4
28	—	—	—	11.8	11.4	11.6	12.0	11.8	11.9	11.5	11.4	11.4
29	—	—	—	11.9	11.7	11.8	12.2	12.0	12.1	11.5	11.3	11.4
30	10.9	10.8	10.9	12.0	11.9	12.0	12.3	12.1	12.2	11.4	11.3	11.3
31	10.9	10.8	10.9	—	—	—	12.1	11.9	12.0	11.4	11.3	11.4
MONTH	—	—	—	12.4	10.3	11.2	13.0	11.8	12.3	—	—	—

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	11.5	11.4	11.4	12.6	12.4	12.5	11.5	11.4	11.4	10.6	9.9	10.2	
2	11.7	11.4	11.6	12.5	12.4	12.5	11.6	11.4	11.5	9.9	9.6	9.7	
3	11.8	11.6	11.7	12.4	12.0	12.2	11.5	11.3	11.4	10.1	9.5	9.8	
4	12.3	11.7	12.0	12.1	11.9	12.0	11.3	10.9	11.1	10.3	10.0	10.2	
5	12.2	12.1	12.2	12.0	11.9	11.9	11.4	10.9	11.2	10.6	10.3	10.5	
6	12.1	12.0	12.1	12.1	11.9	12.0	11.3	10.9	11.1	10.8	10.5	10.6	
7	12.3	12.1	12.2	12.1	12.0	12.0	11.4	11.0	11.3	10.7	10.3	10.5	
8	12.5	12.3	12.4	12.2	12.0	12.1	11.4	11.0	11.1	10.3	9.8	10.1	
9	12.4	12.3	12.4	12.3	12.1	12.2	11.4	10.9	11.3	10.0	9.7	9.8	
10	12.4	12.3	12.3	12.4	12.2	12.3	11.0	10.4	10.7	9.8	9.6	9.7	
11	12.6	12.3	12.4	12.4	12.3	12.4	10.9	10.6	10.8	9.8	9.5	9.7	
12	12.4	12.3	12.4	12.5	12.3	12.4	11.0	10.6	10.9	10.0	9.4	9.7	
13	12.4	12.3	12.3	12.5	12.3	12.5	11.3	10.9	11.1	9.5	9.0	9.2	
14	12.5	12.3	12.4	12.8	12.4	12.6	11.5	11.3	11.4	9.1	8.4	8.7	
15	12.6	12.4	12.5	13.2	12.8	13.0	11.5	11.3	11.4	8.4	7.8	8.1	
16	12.7	12.5	12.6	13.0	12.8	12.9	11.3	10.9	11.1	8.2	7.8	8.0	
17	12.6	12.5	12.5	12.9	12.7	12.8	11.0	10.7	10.9	9.0	8.1	8.6	
18	12.7	12.5	12.6	12.8	12.7	12.8	10.7	10.1	10.5	8.9	8.6	8.8	
19	12.9	12.7	12.8	12.9	12.8	12.9	10.2	9.7	9.9	8.7	8.2	8.4	
20	12.7	12.6	12.7	12.9	12.8	12.8	9.9	9.6	9.8	8.5	8.2	8.3	
21	12.7	12.5	12.6	12.8	12.6	12.8	9.9	9.5	9.7	8.3	8.1	8.2	
22	12.6	12.3	12.5	12.6	12.5	12.6	10.1	9.8	10.0	8.2	7.9	8.0	
23	12.3	12.1	12.2	12.6	12.4	12.5	10.3	10.1	10.2	8.0	7.8	7.9	
24	12.3	12.1	12.2	13.0	12.5	12.7	10.3	10.0	10.2	9.3	8.0	8.8	
25	12.5	12.3	12.4	13.1	12.9	13.0	10.3	10.1	10.2	9.6	8.4	8.8	
26	12.5	12.3	12.4	13.0	12.6	12.8	10.4	10.3	10.3	8.5	8.3	8.4	
27	12.5	12.3	12.4	12.6	11.8	12.3	10.6	10.3	10.5	8.3	8.0	8.2	
28	12.6	12.4	12.5	11.8	11.6	11.6	10.8	10.6	10.7	8.0	7.8	7.9	
29	12.7	12.4	12.5	11.8	11.5	11.7	10.9	10.7	10.8	8.0	7.8	7.9	
30	—	—	—	11.8	11.5	11.7	10.8	10.6	10.7	7.9	7.7	7.8	
31	—	—	—	11.5	11.4	11.4	—	—	—	8.0	7.9	7.9	
MONTH	12.9	11.4	12.3	13.2	11.4	12.4	11.6	9.5	10.8	10.8	7.7	9.0	

STREAMS TRIBUTARY TO LAKE HURON

04136500 AU SABLE RIVER AT MIO, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.0	7.7	7.8	9.2	8.9	9.1	8.0	7.4	7.7	—	—	—
2	8.0	7.6	7.8	9.4	8.9	9.1	7.7	7.2	7.4	—	—	—
3	8.0	7.8	7.9	9.3	8.9	9.1	7.6	7.4	7.5	—	—	—
4	8.2	7.8	8.0	9.5	8.5	8.9	7.7	7.3	7.5	—	—	—
5	8.6	8.0	8.3	9.1	8.5	8.8	7.8	7.5	7.6	—	—	—
6	8.6	8.2	8.4	8.5	7.8	8.1	8.2	7.4	7.8	—	—	—
7	8.5	8.1	8.3	8.8	7.8	8.4	8.0	7.3	7.7	—	—	—
8	8.3	8.1	8.2	8.4	8.0	8.2	8.1	7.4	7.8	—	—	—
9	8.1	7.8	7.9	8.4	8.1	8.3	8.0	7.6	7.8	—	—	—
10	7.9	7.4	7.7	8.8	8.3	8.5	8.2	7.6	7.9	8.0	7.5	7.8
11	7.7	7.4	7.5	9.3	8.8	9.0	8.0	7.8	7.9	8.9	7.6	8.4
12	7.9	7.5	7.8	9.7	9.2	9.5	7.8	7.5	7.7	8.7	8.2	8.5
13	8.6	7.9	8.2	9.3	9.0	9.2	7.8	7.5	7.6	8.8	8.4	8.6
14	8.9	8.2	8.5	9.1	8.5	8.8	8.3	7.8	8.1	9.1	8.5	8.8
15	8.4	7.9	8.2	8.6	8.0	8.4	8.7	8.3	8.5	8.9	8.4	8.6
16	8.5	8.1	8.2	8.1	7.8	8.0	9.1	8.6	8.8	8.8	8.3	8.6
17	8.4	7.9	8.1	8.4	7.8	8.1	9.2	8.6	8.9	8.4	7.9	8.3
18	8.6	8.0	8.4	8.5	8.2	8.4	9.1	8.7	8.9	8.6	7.8	8.2
19	8.1	7.8	8.0	8.7	8.2	8.4	8.9	8.6	8.7	8.0	7.5	7.8
20	8.3	7.7	8.0	8.5	8.1	8.3	8.8	8.5	8.7	8.7	7.9	8.3
21	8.2	8.0	8.1	8.3	7.8	8.0	8.8	8.4	8.5	9.1	8.3	8.7
22	8.4	7.9	8.2	8.3	7.8	8.0	8.8	8.4	8.5	9.0	8.6	8.8
23	8.4	8.2	8.3	7.9	7.6	7.8	8.5	7.9	8.2	9.1	8.8	9.0
24	8.7	8.1	8.4	8.0	7.4	7.7	8.4	8.0	8.2	9.4	8.7	9.0
25	8.9	8.4	8.6	7.9	7.3	7.6	8.5	8.0	8.3	9.3	8.7	9.0
26	9.0	8.5	8.7	8.0	7.5	7.8	8.4	7.9	8.1	8.9	8.6	8.8
27	9.2	8.7	9.0	8.2	7.8	8.1	8.0	7.8	7.9	8.9	8.4	8.6
28	9.5	9.0	9.2	8.3	7.8	8.0	8.1	7.7	7.8	8.5	7.8	8.2
29	9.4	9.1	9.2	7.9	7.5	7.7	7.8	7.4	7.7	8.8	8.4	8.6
30	9.5	8.9	9.2	7.8	7.4	7.6	7.7	7.3	7.5	9.1	8.6	8.9
31	—	—	—	8.2	7.4	7.8	7.7	7.1	7.4	—	—	—
MONTH	9.5	7.4	8.3	9.7	7.3	8.3	9.2	7.1	8.0	—	—	—

STREAMS TRIBUTARY TO LAKE HURON

04136900 AU SABLE RIVER NEAR MC KINLEY, MI

LOCATION.—Lat 44°36'46", long 83°50'16", in SE1/4 SW1/4 sec.28, T.26 N., R.5 E., Alcona County, Hydrologic Unit 04070007, on right bank, upstream side of U.S. Forest Service 4001 bridge on Au Sable River Road, 5.5 mi southeast of McKinley.

DRAINAGE AREA—1,513 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.—October 1996 to current year.

GAGE.—Water-stage recorder. Elevation of gage is 830 ft above sea level, from topographic map.

REMARKS.—Water-discharge records good except for estimated daily discharges, which are fair.

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	883	866	1110	944	e920	1030	1950	1440	1730	961	843	867
2	887	879	1060	944	e942	1080	1790	1450	1970	929	851	855
3	917	876	1010	1020	e966	1180	1690	1360	1790	930	1100	846
4	941	1140	931	1120	e954	1250	1600	1310	1610	975	930	850
5	1010	1490	967	1060	e858	1470	1500	1340	1490	1040	882	840
6	962	1350	1000	953	e964	1960	1430	1310	1410	1050	841	836
7	930	1200	918	e781	e942	1790	1460	1320	1380	1030	832	900
8	919	1090	916	e840	e834	1630	1400	1270	1350	988	824	842
9	887	1040	944	e907	e912	1530	1410	1260	1280	995	832	830
10	889	991	1020	e779	e946	1460	1390	1360	1240	968	885	825
11	842	1010	1450	e953	e930	1460	1330	1370	1200	955	893	824
12	863	1050	1370	e1050	e925	1460	1300	1330	1190	927	900	805
13	844	1130	1190	e1010	e911	1320	1290	1450	1200	1030	885	789
14	843	1100	1100	e935	e934	1380	1250	1620	1220	1340	895	810
15	858	1060	1080	e832	e848	1330	1230	2000	1250	1250	1010	787
16	864	1030	1080	e731	e765	1220	1210	1790	1220	1160	860	803
17	850	1030	1060	e882	e867	1190	1270	1650	1250	1070	760	788
18	869	1100	1030	e942	e961	1160	1550	1640	1340	1000	739	788
19	872	1560	1010	e979	e944	1160	1820	1610	1290	958	821	781
20	855	1520	983	e939	e963	1160	1590	1540	1210	942	794	786
21	867	1360	961	e899	e958	1330	1620	1500	1160	916	804	796
22	861	1230	971	e951	e981	1290	1690	1490	1120	1000	786	780
23	860	1190	945	e900	e991	1230	1560	1620	1080	993	799	760
24	860	1260	964	e924	e969	1220	1420	2810	1090	935	782	769
25	850	1250	982	e884	e925	1230	1450	2840	1040	908	795	780
26	850	1190	958	e942	e910	1750	1590	2410	1030	900	873	749
27	838	1130	920	e946	e940	2090	1530	2180	1020	872	954	753
28	845	1100	951	e902	968	2080	1450	1950	994	873	904	769
29	911	1140	954	e921	973	2160	1420	1740	977	856	908	756
30	901	1130	962	e896	—	2290	1300	1600	969	845	888	755
31	870	—	976	e938	—	2190	—	1570	—	875	855	—
TOTAL	27298	34492	31773	28704	26901	46080	44490	51130	38100	30471	26725	24119
MEAN	881	1150	1025	926	928	1486	1483	1649	1270	983	862	804
MAX	1010	1560	1450	1120	991	2290	1950	2840	1970	1340	1100	900
MIN	838	866	916	731	765	1030	1210	1260	969	845	739	749
CFSM	0.58	0.76	0.68	0.61	0.61	0.98	0.98	1.09	0.84	0.65	0.57	0.53
IN.	0.67	0.85	0.78	0.71	0.66	1.13	1.09	1.26	0.94	0.75	0.66	0.59

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2004, BY WATER YEAR (WY)

	1997	1998	1999	2000	2001	2002	2003	2004
MEAN	953	1015	1008	954	993	1174	1484	1272
MAX	1074	1150	1229	1179	1162	1486	2300	1662
(WY)	1997	2004	1997	1997	1997	2004	1997	2004
MIN	809	875	839	803	805	939	979	967
(WY)	2001	2003	2001	2003	2003	2003	2000	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1997 - 2004

ANNUAL TOTAL	342102	410283	
ANNUAL MEAN	937	1121	
HIGHEST ANNUAL MEAN			1046
LOWEST ANNUAL MEAN			899
HIGHEST DAILY MEAN	1560	2840	4790
LOWEST DAILY MEAN	659	731	659
ANNUAL SEVEN-DAY MINIMUM	724	762	724
MAXIMUM PEAK FLOW		(a)3490	(b)4990
MAXIMUM PEAK STAGE		(c)12.59	(c)14.40
INSTANTANEOUS LOW FLOW		670	(d)363
ANNUAL RUNOFF (CFSM)	0.619	0.741	0.691
ANNUAL RUNOFF (INCHES)	8.41	10.09	9.39
10 PERCENT EXCEEDS	1170	1580	1330
50 PERCENT EXCEEDS	884	986	980
90 PERCENT EXCEEDS	745	831	797

(a) Gage height 9.85 ft.

(b) Gage height 10.73 ft.

(c) Backwater from ice.

(d) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04136900 AU SABLE RIVER NEAR MC KINLEY, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1997 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1996 to current year.

DISSOLVED OXYGEN: October 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.-- Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent.

Dissolved oxygen records rated excellent except the following periods: Oct. 6-8, Jan. 28, 29, May 8-11, June 17-19, Sept. 16-19 rated good; Jan. 30 to Feb. 2, June 20-24, Sept. 20-25 rated fair; and Oct. 14-29, Feb. 3, 4, June 25 to July 8, Sept. 26-30 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 26.0°C, Aug. 7, 2001, July 2, 2002; minimum, -0.5°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum, 16.2 mg/L, Feb. 26, 2001, minimum, 5.2 mg/L, Aug. 28, 1998, July 28, 31, 1999.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 23.5°C, July 22; minimum, -0.5°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 14.6 mg/L, Mar. 16; minimum, 6.0 mg/L, July 20.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
1	10.5	8.5	9.5	8.5	7.0	7.5	3.0	2.0	2.0	1.5	1.0	1.5			
2	10.0	7.5	9.0	7.5	7.0	7.0	2.0	1.0	1.5	2.5	1.5	2.0			
3	10.0	8.0	8.5	7.5	6.5	7.0	1.5	0.0	0.5	3.0	2.0	2.5			
4	9.5	7.5	8.5	7.5	6.5	6.5	1.0	-0.5	0.5	2.0	1.0	1.0			
5	8.5	7.0	8.0	8.0	7.0	7.5	1.5	0.5	1.0	1.0	0.5	1.0			
6	8.5	6.0	7.5	7.0	6.0	6.5	1.5	0.5	1.0	1.0	-0.5	0.0			
7	9.5	6.5	8.0	6.0	4.5	5.0	1.5	0.0	0.5	0.0	-0.5	-0.5			
8	11.0	7.5	9.5	4.5	3.0	4.0	1.5	1.0	1.5	0.0	-0.5	0.0			
9	11.5	8.5	10.5	4.0	2.5	3.5	2.0	1.5	1.5	-0.5	-0.5	-0.5			
10	11.5	9.0	10.5	4.0	2.5	3.5	2.5	2.0	2.0	-0.5	-0.5	-0.5			
11	12.5	9.5	11.0	4.5	3.5	4.0	2.5	0.5	1.0	-0.5	-0.5	-0.5			
12	12.5	11.5	12.0	4.5	4.0	4.0	1.0	0.5	1.0	0.0	-0.5	-0.5			
13	12.5	10.0	11.5	4.5	2.5	3.0	1.5	0.5	1.0	0.0	-0.5	-0.5			
14	12.5	11.0	11.5	3.5	2.0	2.5	1.5	1.0	1.5	-0.5	-0.5	-0.5			
15	11.0	9.5	10.5	4.5	2.0	3.0	1.5	1.0	1.5	-0.5	-0.5	-0.5			
16	10.5	9.0	10.0	4.5	4.0	4.0	1.5	1.0	1.0	-0.5	-0.5	-0.5			
17	10.0	8.0	9.0	4.5	4.0	4.5	1.5	1.0	1.0	-0.5	-0.5	-0.5			
18	9.5	8.5	9.0	6.0	4.5	5.0	1.5	0.5	1.0	-0.5	-0.5	-0.5			
19	10.0	8.5	9.0	6.0	5.0	5.5	1.5	1.0	1.0	-0.5	-0.5	-0.5			
20	10.5	8.0	9.0	6.5	4.5	5.5	1.0	0.5	0.5	-0.5	-0.5	-0.5			
21	10.5	8.0	9.0	6.5	6.0	6.0	1.5	1.0	1.0	-0.5	-0.5	-0.5			
22	8.0	7.0	7.5	6.0	5.5	6.0	2.0	1.0	1.5	-0.5	-0.5	-0.5			
23	7.5	6.5	7.0	7.5	6.0	7.0	2.0	1.0	1.5	-0.5	-0.5	-0.5			
24	8.0	6.5	7.5	7.5	4.0	6.0	2.0	1.0	1.0	-0.5	-0.5	-0.5			
25	9.0	7.5	8.0	4.0	3.0	3.5	1.0	0.5	1.0	-0.5	-0.5	-0.5			
26	8.5	7.0	7.5	4.5	3.5	4.0	1.5	0.5	1.0	-0.5	-0.5	-0.5			
27	7.5	6.0	7.0	4.0	3.5	4.0	2.0	0.5	1.0	-0.5	-0.5	-0.5			
28	7.0	6.0	6.5	4.0	3.0	3.5	2.5	1.5	2.0	-0.5	-0.5	-0.5			
29	7.0	6.0	6.5	3.0	2.0	2.5	2.5	2.0	2.0	-0.5	-0.5	-0.5			
30	7.5	5.5	6.5	3.0	2.0	2.5	2.0	1.0	1.5	-0.5	-0.5	-0.5			
31	8.5	7.5	8.0	—	—	—	1.5	1.0	1.0	-0.5	-0.5	-0.5			
MONTH	12.5	5.5	8.8	8.5	2.0	4.8	3.0	-0.5	1.2	3.0	-0.5	-0.1			

STREAMS TRIBUTARY TO LAKE HURON

04136900 AU SABLE RIVER NEAR MC KINLEY, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	-0.5	-0.5	-0.5	3.5	1.5	2.5	7.5	5.0	6.5	11.5	9.5	10.5	
2	-0.5	-0.5	-0.5	3.0	2.5	3.0	8.5	5.0	7.0	11.5	10.5	10.5	
3	-0.5	-0.5	-0.5	3.5	2.5	3.0	8.0	5.5	6.5	11.0	9.5	10.0	
4	-0.5	-0.5	-0.5	4.5	2.5	3.5	8.0	5.5	7.0	10.0	8.0	9.0	
5	-0.5	-0.5	-0.5	4.0	2.5	3.0	8.0	5.0	6.5	12.5	8.5	10.5	
6	0.0	-0.5	-0.5	3.5	2.5	3.0	7.5	5.5	6.5	11.0	9.5	10.5	
7	0.0	-0.5	-0.5	3.0	1.5	2.5	9.0	5.5	7.5	12.5	8.5	10.5	
8	0.0	-0.5	0.0	3.5	1.5	2.5	8.0	6.0	7.0	11.0	8.5	9.5	
9	0.0	-0.5	-0.5	4.0	1.5	3.0	8.0	5.5	7.0	11.5	10.0	10.5	
10	0.0	-0.5	-0.5	4.0	1.0	2.5	8.0	6.0	7.0	15.0	10.5	13.0	
11	0.0	-0.5	0.0	3.5	2.0	3.0	8.0	6.0	7.0	15.0	11.5	13.5	
12	0.0	-0.5	-0.5	3.0	1.0	1.5	7.5	5.5	7.0	17.0	12.0	14.5	
13	0.0	-0.5	0.0	3.5	0.5	2.0	9.0	5.5	7.5	17.5	15.5	16.5	
14	0.0	-0.5	-0.5	3.5	1.5	2.0	9.5	5.5	8.0	17.0	16.0	16.5	
15	0.0	-0.5	-0.5	3.0	1.0	2.0	10.0	6.5	8.5	16.5	15.0	16.0	
16	0.0	-0.5	0.0	2.5	0.0	1.5	11.5	7.0	9.5	18.0	14.0	16.0	
17	0.0	-0.5	0.0	2.5	0.5	1.5	12.5	9.5	11.0	16.5	14.5	15.5	
18	0.0	-0.5	-0.5	3.5	1.0	2.0	12.5	10.5	11.5	16.0	14.5	15.5	
19	0.0	-0.5	-0.5	4.5	1.5	3.0	13.5	12.0	12.5	17.5	13.0	15.5	
20	0.0	-0.5	0.0	5.0	2.5	4.0	12.0	10.5	11.5	17.5	14.0	15.5	
21	0.0	-0.5	0.0	4.5	1.5	3.0	13.5	10.5	12.0	17.0	15.0	15.5	
22	0.0	-0.5	0.0	4.0	1.0	2.5	12.5	10.0	11.5	15.0	14.0	14.5	
23	0.0	0.0	0.0	4.0	2.0	3.0	13.0	9.0	11.0	14.5	13.0	13.5	
24	0.0	0.0	0.0	4.0	2.0	3.0	12.0	10.0	11.0	13.0	11.5	12.5	
25	1.0	-0.5	0.5	6.0	3.5	4.5	11.0	9.0	9.5	11.5	11.0	11.5	
26	1.5	-0.5	1.0	5.5	4.0	4.5	12.0	9.5	10.5	13.0	11.0	12.0	
27	2.0	-0.5	1.0	5.5	4.0	4.5	10.5	8.5	9.5	13.5	11.0	12.5	
28	2.5	0.0	1.5	6.0	4.5	5.0	10.0	7.5	8.5	15.5	12.0	13.5	
29	4.0	1.0	2.5	7.0	6.0	6.5	14.0	9.0	11.5	16.0	12.0	14.0	
30	—	—	—	7.5	5.0	6.0	12.5	10.0	10.5	15.5	12.5	14.0	
31	—	—	—	7.5	5.5	6.0	—	—	—	14.5	13.0	13.5	
MONTH	4.0	-0.5	0.0	7.5	0.0	3.2	14.0	5.0	8.9	18.0	8.0	13.1	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	16.0	13.0	14.5	21.5	18.0	19.5	21.0	18.0	19.5	19.0	16.5	17.5
2	16.5	14.0	15.0	20.5	17.0	19.0	21.0	19.0	20.0	19.5	16.0	18.0
3	17.5	13.0	15.5	21.5	16.5	19.0	22.0	19.0	20.5	20.0	17.0	18.5
4	18.5	13.0	16.0	21.0	18.0	19.5	21.5	18.5	20.5	20.0	17.0	19.0
5	18.0	14.0	16.0	20.5	18.5	19.5	20.5	17.5	19.0	20.0	17.5	19.0
6	17.0	15.5	16.5	20.0	17.5	18.5	21.0	17.0	19.0	20.5	18.0	19.5
7	20.0	16.0	17.5	20.0	17.5	18.5	20.5	17.0	19.0	20.0	17.5	19.0
8	22.0	17.5	20.0	19.0	17.0	17.5	21.5	17.5	19.5	18.5	16.5	17.5
9	21.5	19.0	19.5	18.0	16.5	17.5	20.5	17.5	18.5	18.5	15.5	17.5
10	20.0	17.0	19.0	20.5	16.5	18.5	19.5	17.5	18.5	19.0	15.5	17.5
11	19.5	16.5	18.0	20.5	16.5	19.0	19.0	17.0	18.0	19.0	16.5	18.0
12	20.0	16.5	18.0	21.0	17.5	19.5	17.5	16.0	16.5	19.5	17.0	18.5
13	20.0	16.5	18.5	21.5	18.0	20.0	17.5	15.5	16.5	19.5	17.0	18.5
14	20.0	17.0	19.0	20.5	18.0	19.0	17.5	14.5	16.5	19.5	17.0	18.5
15	20.5	17.5	19.0	22.0	18.0	20.0	18.0	14.0	16.0	20.5	18.0	19.0
16	22.0	16.5	19.0	21.5	18.0	20.0	18.0	14.5	16.5	19.5	18.0	19.0
17	21.5	18.5	19.5	22.0	18.5	20.5	17.0	15.5	16.5	18.0	15.0	16.5
18	22.0	18.0	20.0	22.0	17.5	20.0	19.0	15.5	17.5	17.5	14.5	16.0
19	20.5	17.5	19.5	22.0	17.5	20.0	18.5	15.5	17.5	17.5	15.0	16.5
20	20.0	16.5	18.5	22.5	19.0	21.0	18.0	15.0	17.0	17.0	14.5	16.0
21	19.0	16.5	17.5	22.5	19.5	21.5	17.5	14.5	16.5	17.0	14.5	16.0
22	20.0	16.5	18.0	23.5	20.5	22.0	18.0	14.0	16.0	17.0	14.5	16.0
23	19.0	15.5	17.5	22.0	19.0	20.5	18.5	16.5	17.5	17.5	14.5	16.0
24	18.5	15.5	16.5	21.0	17.5	19.5	18.0	15.0	16.5	17.5	15.0	16.5
25	18.0	13.5	16.0	21.5	17.5	20.0	19.0	16.5	18.0	16.5	15.0	16.0
26	18.5	15.0	17.0	21.5	17.5	20.0	20.5	18.0	19.0	16.5	13.5	15.0
27	18.5	14.5	16.5	20.5	17.0	19.0	21.0	18.5	20.0	16.0	13.5	15.0
28	18.5	15.5	17.5	22.0	17.5	19.5	21.0	18.0	19.0	16.0	14.5	15.5
29	19.0	15.5	17.5	21.5	18.0	20.0	18.5	17.0	18.0	15.5	12.5	14.0
30	20.0	16.0	18.0	20.0	18.0	19.0	19.0	16.5	18.0	14.5	11.5	13.5
31	—	—	—	21.5	18.5	20.0	19.5	17.0	18.5	—	—	—
MONTH	22.0	13.0	17.7	23.5	16.5	19.6	22.0	14.0	18.0	20.5	11.5	17.1

STREAMS TRIBUTARY TO LAKE HURON

04136900 AU SABLE RIVER NEAR MC KINLEY, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
1	11.2	9.8	10.5	12.0	10.4	11.1	12.0	11.2	11.6	13.1	12.4	12.7			
2	11.5	10.2	10.8	11.7	10.8	11.1	12.3	11.7	12.0	12.5	12.0	12.3			
3	11.3	10.1	10.6	11.7	10.7	11.1	12.5	11.5	12.1	12.5	11.8	12.1			
4	11.6	10.4	10.9	11.2	10.7	10.9	12.7	10.8	12.2	13.0	12.2	12.7			
5	11.6	10.6	11.0	10.8	10.0	10.5	12.8	11.9	12.4	13.1	12.6	12.8			
6	11.7	10.1	11.1	11.4	10.3	10.8	—	—	—	12.6	12.0	12.5			
7	11.3	9.9	10.7	11.5	10.6	10.9	—	—	—	12.7	12.2	12.4			
8	11.5	9.8	10.6	11.6	10.6	11.0	—	—	—	12.6	12.2	12.4			
9	11.6	9.9	10.6	11.5	10.8	11.1	—	—	—	12.6	12.3	12.4			
10	11.4	9.8	10.4	11.7	10.8	11.2	—	—	—	12.6	12.3	12.4			
11	11.1	9.4	10.2	11.2	10.6	10.9	—	—	—	12.3	11.9	12.1			
12	10.6	9.0	9.7	11.1	10.6	10.8	—	—	—	12.2	11.8	12.0			
13	10.5	9.1	9.7	11.7	10.5	11.2	—	—	—	12.6	11.8	12.2			
14	10.2	9.0	9.6	11.6	10.8	11.2	—	—	—	12.4	12.2	12.3			
15	10.9	9.4	10.2	11.6	10.7	11.1	—	—	—	12.3	12.0	12.1			
16	12.0	9.7	10.8	11.1	10.4	10.7	—	—	—	12.2	11.9	12.0			
17	11.8	10.6	11.2	11.0	10.3	10.6	—	—	—	11.9	11.4	11.6			
18	11.9	10.5	11.2	10.4	9.5	10.1	—	—	—	11.5	11.1	11.3			
19	12.1	10.8	11.3	11.5	9.5	10.7	13.1	12.5	12.8	11.5	11.2	11.3			
20	12.1	10.6	11.2	11.5	10.5	11.2	13.3	12.6	12.9	11.5	11.2	11.3			
21	10.9	9.5	10.4	11.1	10.3	10.6	13.0	12.2	12.7	11.5	11.0	11.2			
22	11.4	10.3	10.8	10.7	10.3	10.5	12.7	12.2	12.4	11.0	10.8	10.9			
23	12.2	10.5	11.2	10.7	10.2	10.4	12.7	12.2	12.3	11.1	10.8	11.0			
24	12.0	10.3	11.2	10.9	10.1	10.5	12.8	12.2	12.4	11.1	10.9	11.0			
25	11.8	10.6	11.2	10.9	10.3	10.6	12.8	12.4	12.6	11.3	11.0	11.1			
26	11.8	10.7	11.1	11.2	10.3	10.7	13.1	12.5	12.7	11.3	11.0	11.1			
27	11.9	10.4	11.1	10.8	10.4	10.7	13.1	12.4	12.7	11.2	10.9	11.1			
28	11.1	10.3	10.7	10.9	10.4	10.6	12.8	12.2	12.4	11.3	11.0	11.1			
29	11.8	10.1	11.0	12.0	10.7	11.5	12.8	12.1	12.4	11.4	11.2	11.3			
30	12.1	10.9	11.4	12.0	11.3	11.6	13.0	12.3	12.6	11.5	11.2	11.3			
31	11.5	10.5	10.9	—	—	—	13.0	12.6	12.7	11.5	11.3	11.4			
MONTH	12.2	9.0	10.8	12.0	9.5	10.9	—	—	—	13.1	10.8	11.8			

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	11.8	11.5	11.6	—	—	—	12.0	11.3	11.6	10.7	9.7	10.1
2	11.9	11.6	11.8	—	—	—	11.9	11.0	11.4	10.5	9.6	10.0
3	12.0	11.7	11.8	—	—	—	11.8	11.0	11.3	10.5	9.6	10.0
4	12.3	11.9	12.1	—	—	—	11.7	10.9	11.2	10.4	9.6	10.0
5	12.5	12.3	12.4	—	—	—	11.7	10.8	11.2	10.5	9.5	10.0
6	12.5	12.1	12.2	—	—	—	11.3	10.6	10.9	10.2	9.4	9.8
7	12.5	12.1	12.2	13.1	12.7	12.9	11.3	10.6	10.9	10.5	9.3	10
8	12.6	12.4	12.5	13.4	12.7	13.1	11.5	10.6	11.0	10.2	9.5	9.9
9	12.6	12.2	12.3	13.5	13.0	13.2	11.4	10.7	11.1	10.2	9.3	9.8
10	12.5	12.2	12.3	13.7	13.1	13.4	11.5	10.5	11.1	10.0	8.9	9.4
11	12.6	12.4	12.5	13.3	12.8	13.1	11.5	10.5	11.0	11.0	8.9	9.9
12	12.7	12.4	12.6	14.0	13.0	13.6	11.4	10.5	10.9	10.8	9.0	10
13	12.7	12.5	12.6	14.1	13.3	13.7	11.4	10.4	10.9	10.1	8.6	9.3
14	12.9	12.2	12.6	13.6	13.0	13.3	11.5	10.4	11.0	9.5	8.5	9.0
15	13.0	12.6	12.9	14.4	13.2	13.8	11.2	10.1	10.7	9.7	8.6	9.1
16	13.0	12.9	12.9	14.6	13.3	14.0	10.7	9.5	10.2	10.0	8.7	9.3
17	12.9	12.7	12.9	14.3	13.2	13.8	10.5	9.4	9.9	9.8	8.6	9.2
18	12.9	12.6	12.8	14.3	13.2	13.7	10.6	9.5	10.0	9.9	8.6	9.2
19	12.9	12.6	12.8	14.3	13.0	13.6	9.6	9.0	9.3	10.1	8.8	9.4
20	12.8	12.4	12.5	13.5	12.5	13.0	10.1	9.1	9.5	9.7	8.5	9.0
21	12.8	12.3	12.5	13.7	12.6	13.1	9.7	9.1	9.4	9.9	8.3	9.1
22	13.0	12.6	12.8	13.6	12.7	13.1	10.3	9.1	9.8	9.2	8.6	8.9
23	13.1	12.4	12.9	13.3	12.1	12.7	10.4	9.4	10.0	9.2	8.6	8.9
24	—	—	—	12.7	11.9	12.3	10.2	9.4	9.8	9.3	8.8	9.1
25	—	—	—	13.0	11.4	12.1	10.3	9.6	9.9	9.6	9.3	9.5
26	—	—	—	12.8	11.3	12.2	10.3	9.5	10.0	9.7	9.2	9.5
27	—	—	—	13.3	11.9	12.7	10.9	9.9	10.4	9.6	9.0	9.3
28	—	—	—	12.6	11.8	12.2	11.1	10.2	10.6	9.7	9.0	9.3
29	—	—	—	12.4	11.6	12.0	10.6	9.7	10.3	9.8	9.0	9.4
30	—	—	—	12.3	11.6	11.9	10.3	9.6	9.9	10.0	8.9	9.4
31	—	—	—	12.0	11.5	11.7	—	—	—	9.5	8.8	9.1
MONTH	—	—	—	—	—	—	12.0	9.0	10.5	11.0	8.3	9.5

STREAMS TRIBUTARY TO LAKE HURON

04136900 AU SABLE RIVER NEAR MC KINLEY, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.6	8.7	9.1	9.2	7.7	8.4	9.0	7.1	8.0	9.6	7.4	8.5
2	9.5	8.6	9.0	9.0	7.4	8.3	8.7	6.9	7.7	9.8	7.8	8.7
3	10.0	8.8	9.3	9.0	7.3	8.2	9.0	7.2	8.1	9.9	7.5	8.6
4	10.0	8.7	9.4	9.1	7.1	8.0	9.4	7.1	8.3	10.0	7.6	8.7
5	9.8	8.5	9.2	10.0	7.9	8.8	9.6	7.6	8.6	9.8	7.6	8.5
6	9.1	8.1	8.6	9.8	8.2	9.0	9.6	7.7	8.7	9.2	7.5	8.2
7	9.4	7.9	8.6	10.1	8.2	9.1	9.6	7.6	8.6	9.5	7.2	8.3
8	9.1	7.5	8.3	9.9	8.1	8.9	9.5	7.5	8.5	9.4	7.5	8.5
9	8.8	7.2	7.9	10.2	8.2	9.2	9.3	7.3	8.2	—	—	—
10	9.7	7.5	8.5	10.4	8.3	9.3	9.4	7.5	8.4	9.6	7.6	8.6
11	9.8	7.8	8.8	10.4	8.1	9.2	9.7	7.7	8.7	9.7	7.6	8.5
12	9.7	7.9	8.7	10.2	7.9	9.0	9.5	8.0	8.8	9.6	7.5	8.5
13	9.6	7.8	8.6	9.7	7.4	8.5	9.7	8.0	8.8	9.5	7.5	8.5
14	9.6	7.8	8.6	8.8	7.3	8.0	9.9	8.2	9.0	9.6	7.5	8.5
15	10.0	8.1	9.0	9.1	7.4	8.3	9.9	8.2	9.1	9.4	7.2	8.2
16	10.0	8.1	9.0	8.9	7.2	8.0	9.8	7.5	8.6	9.3	7.3	8.3
17	9.1	7.7	8.4	9.0	7.0	8.0	10.0	7.0	8.4	9.7	7.7	8.7
18	9.8	7.9	8.8	8.7	6.9	7.8	9.8	7.8	8.8	9.9	8.0	8.9
19	9.8	7.8	8.8	8.7	6.6	7.6	9.8	7.8	8.8	9.8	8.1	8.9
20	9.7	8.0	8.9	8.3	6.0	7.1	10.0	8.0	9.0	9.9	7.9	8.9
21	9.6	8.0	8.7	8.6	6.2	7.3	10.2	8.0	9.1	9.4	8.0	8.7
22	10.0	8.1	8.9	8.4	6.4	7.4	10.2	8.2	9.1	9.9	8.1	9.0
23	10.3	8.5	9.3	8.8	6.8	7.7	9.8	7.8	8.8	9.8	8.1	8.9
24	10.2	8.3	9.3	8.9	7.0	8.0	10.0	8.1	9.0	9.9	8.0	8.7
25	10.5	8.9	9.7	8.8	6.9	7.9	9.6	7.8	8.7	9.5	7.9	8.7
26	10.2	8.6	9.4	9.1	6.7	8.0	9.7	7.6	8.6	9.6	8.2	8.8
27	10.4	8.6	9.5	9.1	6.9	8.0	9.3	7.4	8.3	9.8	8.0	8.8
28	10.1	8.4	9.2	9.1	7.2	8.1	9.8	7.5	8.5	9.3	7.7	8.4
29	10.0	8.4	9.2	9.3	7.1	8.2	9.6	7.7	8.5	9.4	7.9	8.6
30	9.8	8.1	9.0	9.0	7.2	8.0	9.7	7.7	8.6	9.4	7.9	8.5
31	—	—	—	9.0	7.1	8.1	9.3	7.3	8.3	—	—	—
MONTH	10.5	7.2	8.9	10.4	6.0	8.2	10.2	6.9	8.6	—	—	—

STREAMS TRIBUTARY TO LAKE HURON

04137005 AU SABLE RIVER NEAR CURTISVILLE, MI

LOCATION.--Lat 44°33'39", long 83°48'10", in SW1/4 NW1/4 sec.14, T.25 N., R.5 E., Alcona County, Hydrologic Unit 04070007, on left bank 200 ft upstream from Bamfield Road, 3.2 mi east of Curtisville.

DRAINAGE AREA.--1,598 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1996 to current year.

GAGE.--Water-stage recorder. Datum of gage is 778.11 ft above sea level (levels by Consumers Energy).

REMARKS.--Water-discharge records good. Flow completely regulated by Alcona Dam 300 ft upstream. Gage-height telemeter 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	904	884	1230	1090	977	1040	2020	1520	1760	1030	897	952
2	921	900	1190	1080	963	1100	1850	1500	2000	978	1150	924
3	944	905	1140	1150	1070	1220	1780	1440	1820	977	1220	899
4	1020	1260	1030	1290	1010	1300	1670	1370	1650	1060	1010	924
5	1090	1680	1060	1220	916	1530	1550	1410	1550	1130	957	881
6	1050	1450	1120	1060	968	2030	1550	1400	1480	1110	908	912
7	992	1300	1020	803	1050	1820	1540	1380	1460	1110	902	998
8	969	1160	993	829	909	1660	1490	1340	1430	1050	878	883
9	925	1100	1060	925	937	1540	1500	1350	1360	1050	906	876
10	906	1050	1200	789	1070	1480	1460	1430	1320	1030	963	874
11	887	1110	1610	979	1010	1480	1420	1420	1290	1030	976	903
12	899	1120	1560	1230	1010	1490	1400	1400	1260	980	973	863
13	890	1260	1350	1110	964	1340	1390	1540	1330	1190	1060	858
14	886	1190	1260	943	981	1400	1340	1730	1300	1440	1150	890
15	885	1160	1230	831	906	1340	1320	2100	1340	1390	1220	842
16	926	1130	1230	673	834	1280	1310	1820	1310	1260	982	915
17	891	1110	1210	854	875	1290	1380	1730	1410	1170	699	835
18	890	1270	1180	1080	1020	1230	1620	1760	1430	1090	687	865
19	917	1680	1150	965	1020	1270	1970	1700	1370	1020	854	845
20	871	1680	1130	1010	1040	1270	1650	1600	1310	1030	814	851
21	910	1480	1090	908	1020	1410	1700	1550	1240	1000	839	869
22	856	1360	1100	960	1050	1380	1760	1580	1220	1120	844	859
23	856	1310	1090	974	1120	1320	1610	1710	1170	1050	895	840
24	848	1390	1090	941	1110	1310	1520	2870	1170	1010	854	833
25	888	1390	1110	921	926	1300	1520	2930	1090	977	875	845
26	858	1320	1100	993	964	1860	1660	2370	1120	974	970	827
27	863	1270	1040	1040	998	2190	1590	2180	1070	934	1060	810
28	869	1230	1070	987	986	2140	1510	1960	1070	968	1000	861
29	906	1270	1080	938	967	2230	1480	1780	1030	925	987	822
30	922	1300	1090	950	---	2330	1400	1640	1020	929	961	810
31	896	---	1100	979	---	2180	---	1630	---	960	916	---
TOTAL	28335	37719	35913	30502	28671	47760	46960	53140	40380	32972	29407	26166
MEAN	914	1257	1158	984	989	1541	1565	1714	1346	1064	949	872
MAX	1090	1680	1610	1290	1120	2330	2020	2930	2000	1440	1220	998
MIN	848	884	993	673	834	1040	1310	1340	1020	925	687	810
CFSM	0.57	0.79	0.72	0.62	0.62	0.96	0.98	1.07	0.84	0.67	0.59	0.55
IN.	0.66	0.88	0.84	0.71	0.67	1.11	1.09	1.24	0.94	0.77	0.68	0.61

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2004, BY WATER YEAR (WY)

MEAN	1006	1071	1066	1019	1066	1245	1559	1350	1153	964	908	894
MAX	1132	1257	1227	1236	1235	1541	2390	1786	1346	1083	1054	1098
(WY)	2002	2004	1997	1997	1997	2004	1997	1997	2004	1997	1997	1997
MIN	842	932	874	820	833	970	1020	993	1022	832	819	837
(WY)	2001	2003	2001	2003	2003	2003	2000	1999	2003	2001	2001	2000

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1997 - 2004
ANNUAL TOTAL	367343	437925	
ANNUAL MEAN	1006	1197	1108
HIGHEST ANNUAL MEAN			1320
LOWEST ANNUAL MEAN			958
HIGHEST DAILY MEAN			2003
LOWEST DAILY MEAN	1680	Nov 5	5410
ANNUAL SEVEN-DAY MINIMUM	671	Jan 21	671
MAXIMUM PEAK FLOW	723	Jan 17	723
MAXIMUM PEAK STAGE			5520
INSTANTANEOUS LOW FLOW			13.56
ANNUAL RUNOFF (CFSM)	0.630	0.749	0.693
ANNUAL RUNOFF (INCHES)	8.55	10.19	9.42
10 PERCENT EXCEEDS	1260	1650	1420
50 PERCENT EXCEEDS	929	1090	1040
90 PERCENT EXCEEDS	810	869	840

STREAMS TRIBUTARY TO LAKE HURON

04137005 AU SABLE RIVER NEAR CURTISVILLE, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1997 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1996 to current year.

DISSOLVED OXYGEN: October 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruption in the water-quality record was due to malfunction of the instrument. Water temperature records rated excellent except the following periods: Oct. 1 to Dec. 5, Feb. 5-9 rated good. Dissolved oxygen records rated excellent except the following periods: Oct. 2-7, 22-28, Jan. 20-22, Feb. 4, Aug. 25 to Sept. 5 rated good; Oct. 8-21, Dec. 5, Sept. 6-9 rated fair; and Dec. 4, 6-9, Feb. 5-10 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 26.5°C, Aug. 8, 2001, July 4, 2002; minimum, -0.5°C, Feb. 18, 21, 2000.

DISSOLVED OXYGEN: Maximum, 14.1 mg/L, Feb. 20, 2002; minimum, 4.0 mg/L, July 6, 2002.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 23.5°C, July 22; minimum, 0.0°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 12.9 mg/L, Jan. 13; minimum, 5.5 mg/L, July 13.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	13.0	12.0	12.5	8.0	7.5	7.5	3.0	2.5	3.0	1.5	1.5	1.5
2	12.5	11.5	12.0	7.5	7.5	7.5	2.5	2.0	2.0	1.5	1.5	1.5
3	11.5	11.0	11.0	7.5	7.5	7.5	2.5	2.0	2.0	1.5	1.5	1.5
4	11.0	10.5	11.0	7.5	7.0	7.0	2.5	2.0	2.5	1.5	1.5	1.5
5	10.5	10.0	10.5	7.5	7.0	7.5	2.5	2.0	2.5	2.0	1.5	2.0
6	10.0	9.0	9.5	7.0	7.0	7.0	2.0	2.0	2.0	2.0	1.5	1.5
7	9.5	9.0	9.0	7.0	6.0	6.5	2.0	2.0	2.0	1.5	1.5	1.5
8	10.0	9.5	9.5	6.0	5.5	5.5	2.0	2.0	2.0	1.5	1.5	1.5
9	10.0	9.5	9.5	5.5	5.0	5.5	2.0	1.5	2.0	1.5	1.0	1.0
10	10.5	9.5	10.0	5.0	5.0	5.0	1.5	1.5	1.5	1.0	1.0	1.0
11	10.5	10.0	10.5	5.0	4.5	4.5	2.0	1.5	1.5	1.0	1.0	1.0
12	12.0	10.0	11.5	4.5	4.0	4.5	2.0	2.0	2.0	1.0	1.0	1.0
13	12.0	10.5	11.5	4.5	3.5	4.0	2.0	1.5	1.5	1.0	0.5	1.0
14	12.0	12.0	12.0	3.5	3.0	3.5	1.5	1.5	1.5	0.5	0.5	0.5
15	12.0	11.0	11.5	3.5	3.5	3.5	1.5	1.0	1.5	0.5	0.5	0.5
16	11.0	10.5	11.0	3.5	3.5	3.5	1.5	1.0	1.0	0.5	0.5	0.5
17	10.5	10.5	10.5	3.5	3.5	3.5	1.5	1.0	1.5	0.5	0.5	0.5
18	10.5	10.0	10.5	4.0	3.5	3.5	1.5	1.5	1.5	0.5	0.5	0.5
19	10.5	10.0	10.0	4.5	4.0	4.5	1.5	1.5	1.5	0.5	0.5	0.5
20	10.5	9.5	10.0	5.0	4.5	5.0	1.5	1.0	1.0	0.5	0.5	0.5
21	10.5	10.0	10.0	5.5	4.5	5.0	1.0	1.0	1.0	0.5	0.0	0.0
22	10.0	9.0	9.5	5.5	5.0	5.0	1.0	1.0	1.0	0.0	0.0	0.0
23	9.0	9.0	9.0	5.5	5.0	5.0	1.0	1.0	1.0	0.0	0.0	0.0
24	9.0	9.0	9.0	6.0	5.5	5.5	1.0	1.0	1.0	0.5	0.0	0.0
25	9.0	8.5	9.0	5.5	5.0	5.0	1.5	1.0	1.5	0.0	0.0	0.0
26	9.0	8.5	9.0	5.0	4.5	5.0	1.5	1.5	1.5	0.0	0.0	0.0
27	8.5	8.0	8.0	5.0	4.5	5.0	1.5	1.0	1.5	0.0	0.0	0.0
28	8.0	7.5	8.0	4.5	3.5	4.0	1.0	1.0	1.0	0.0	0.0	0.0
29	7.5	7.5	7.5	3.5	3.5	3.5	1.0	1.0	1.0	0.0	0.0	0.0
30	7.5	7.5	7.5	3.5	3.0	3.5	1.5	1.0	1.0	0.0	0.0	0.0
31	8.0	7.5	7.5	--	--	--	1.5	1.5	1.5	0.0	0.0	0.0
MONTH	13.0	7.5	9.9	8.0	3.0	5.1	3.0	1.0	1.6	2.0	0.0	0.7

STREAMS TRIBUTARY TO LAKE HURON

04137005 AU SABLE RIVER NEAR CURTISVILLE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH				APRIL				MAY
1	0.0	0.0	0.0	0.0	0.0	0.0	6.0	5.5	5.5	11.5	11.0	11.5
2	0.0	0.0	0.0	0.5	0.0	0.0	7.0	5.5	6.0	11.5	10.5	11.0
3	0.0	0.0	0.0	0.5	0.5	0.5	7.0	6.0	6.5	10.5	10.0	10.5
4	0.0	0.0	0.0	1.0	0.5	1.0	6.5	5.5	6.0	10.0	10.0	10.0
5	0.0	0.0	0.0	1.5	1.0	1.5	6.5	5.5	6.0	11.0	9.5	10.0
6	0.0	0.0	0.0	2.0	1.5	2.0	6.5	6.0	6.0	11.0	10.0	10.0
7	0.0	0.0	0.0	2.5	2.0	2.5	7.5	6.0	6.5	11.5	10.5	11.0
8	0.0	0.0	0.0	2.5	2.5	2.5	7.0	6.5	7.0	10.5	10.5	10.5
9	0.0	0.0	0.0	2.5	2.5	2.5	7.5	6.5	7.0	10.5	10.5	10.5
10	0.0	0.0	0.0	2.5	2.0	2.5	7.5	7.0	7.0	12.0	10.5	11.5
11	0.0	0.0	0.0	2.5	2.5	2.5	7.0	6.5	7.0	12.0	11.5	11.5
12	0.0	0.0	0.0	2.5	2.5	2.5	7.0	6.5	7.0	15.0	12.0	13.0
13	0.0	0.0	0.0	2.5	2.5	2.5	7.5	6.5	7.0	14.5	13.5	14.0
14	0.0	0.0	0.0	2.5	2.0	2.0	8.0	7.0	7.5	17.0	14.5	15.5
15	0.0	0.0	0.0	2.0	2.0	2.0	7.5	7.0	7.5	16.5	15.0	15.5
16	0.0	0.0	0.0	2.0	2.0	2.0	9.0	7.5	8.0	16.0	15.0	15.0
17	0.0	0.0	0.0	2.0	2.0	2.0	10.0	9.0	9.5	16.0	15.0	15.5
18	0.0	0.0	0.0	2.0	2.0	2.0	10.0	8.5	9.5	17.0	16.0	16.5
19	0.0	0.0	0.0	2.0	2.0	2.0	12.0	9.5	11.0	16.5	16.0	16.0
20	0.0	0.0	0.0	2.0	2.0	2.0	11.5	11.0	11.5	17.5	16.0	16.5
21	0.0	0.0	0.0	2.5	2.0	2.0	12.0	11.0	11.5	17.0	16.0	16.5
22	0.0	0.0	0.0	2.5	2.5	2.5	12.5	11.5	11.5	16.0	16.0	16.0
23	0.0	0.0	0.0	2.5	2.5	2.5	12.0	11.5	12.0	16.0	15.0	15.5
24	0.0	0.0	0.0	2.5	2.5	2.5	12.0	11.5	12.0	15.0	14.0	14.5
25	0.0	0.0	0.0	2.5	2.5	2.5	11.5	11.0	11.5	14.0	13.0	13.0
26	0.0	0.0	0.0	3.0	2.5	3.0	11.5	11.0	11.0	13.5	12.5	13.0
27	0.0	0.0	0.0	3.5	3.0	3.5	11.5	10.5	10.5	14.0	12.0	12.5
28	0.0	0.0	0.0	4.0	3.5	4.0	10.5	10.0	10.5	14.0	12.5	13.5
29	0.0	0.0	0.0	4.0	4.0	4.0	11.5	10.0	10.5	13.5	12.5	13.0
30	--	--	--	4.5	4.0	4.5	11.5	11.0	11.0	14.0	13.0	13.5
31	--	--	--	5.5	4.5	5.0	--	--	--	14.5	14.0	14.0
MONTH	0.0	0.0	0.0	5.5	0.0	2.3	12.5	5.5	8.7	17.5	9.5	13.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	15.5	14.5	14.5	19.5	18.5	19.0	21.5	21.0	21.0	19.5	19.0	19.5
2	15.0	14.5	14.5	19.5	19.0	19.0	22.0	20.5	21.0	19.5	19.0	19.0
3	16.5	15.0	15.5	20.0	19.0	19.5	22.0	21.0	21.5	19.5	19.0	19.5
4	16.0	15.0	15.5	20.5	19.5	20.0	22.0	21.5	22.0	20.0	19.5	19.5
5	16.5	15.5	16.0	21.0	20.0	20.5	22.5	21.5	22.0	20.0	19.5	19.5
6	17.0	16.0	16.5	20.5	19.5	20.0	22.5	21.0	21.5	21.0	19.0	20.0
7	18.0	16.0	16.5	20.5	20.0	20.0	21.5	21.0	21.0	21.0	20.5	21.0
8	19.5	17.0	18.0	20.0	19.5	20.0	21.0	21.0	21.0	20.5	20.0	20.5
9	19.5	18.5	19.0	19.5	19.0	19.5	21.0	20.0	20.5	21.0	20.0	20.5
10	19.5	19.0	19.0	19.5	19.0	19.0	21.0	20.5	20.5	20.0	19.5	20.0
11	19.5	19.0	19.0	19.5	19.0	19.0	21.0	20.5	20.5	19.5	19.0	19.5
12	19.0	18.5	19.0	19.5	19.0	19.5	20.5	20.0	20.0	19.5	19.0	19.5
13	19.5	18.5	19.0	22.0	19.5	20.5	20.0	19.0	19.5	20.0	19.0	19.5
14	20.0	19.0	19.5	21.5	20.5	21.0	19.5	18.5	19.0	20.0	19.0	19.5
15	20.0	19.0	19.5	21.5	20.5	21.0	19.0	18.0	18.5	20.0	19.0	19.5
16	20.0	19.0	19.5	21.0	20.5	20.5	18.5	18.0	18.0	21.5	19.5	20.5
17	21.0	19.5	20.0	21.0	20.5	21.0	18.5	17.5	18.0	20.5	20.0	20.5
18	22.0	20.5	21.0	21.5	20.5	21.0	19.0	17.5	18.0	20.0	19.5	19.5
19	22.0	20.0	21.0	21.5	21.0	21.0	19.5	18.0	18.5	19.5	18.5	19.0
20	20.0	20.0	20.0	21.5	21.0	21.0	19.0	18.0	18.5	18.5	18.0	18.0
21	20.0	19.5	19.5	22.0	21.0	21.5	19.0	18.0	18.5	18.5	18.0	18.0
22	20.5	19.5	19.5	23.5	21.5	22.5	18.5	17.5	18.0	18.5	18.0	18.0
23	19.5	19.0	19.5	23.0	22.0	22.5	19.0	18.0	18.5	18.0	17.5	18.0
24	19.0	18.5	19.0	22.5	21.5	22.0	18.5	18.0	18.0	18.5	17.5	18.0
25	18.5	18.0	18.5	22.0	21.5	21.5	19.0	18.0	18.5	18.5	18.0	18.5
26	18.5	18.0	18.5	21.5	21.0	21.0	19.5	18.5	19.0	18.0	18.0	18.0
27	19.0	18.0	18.5	21.5	21.0	21.0	20.5	19.0	19.5	18.0	17.5	17.5
28	19.0	18.0	18.5	21.0	21.0	21.0	20.5	20.0	20.0	18.5	17.0	18.0
29	19.5	18.0	18.5	21.0	20.5	20.5	20.5	20.0	20.0	17.0	17.0	17.0
30	19.0	18.5	18.5	21.0	20.5	21.0	20.0	19.5	19.5	17.0	16.5	16.5
31	—	—	—	22.5	20.5	21.0	20.0	19.5	19.5	—	—	—
MONTH	22.0	14.5	18.4	23.5	18.5	20.6	22.5	17.5	19.7	21.5	16.5	19.1

STREAMS TRIBUTARY TO LAKE HURON

04137005 AU SABLE RIVER NEAR CURTISVILLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	9.3	9.0	9.1	10.5	10.2	10.3	12.0	11.6	11.8	12.2	12.0	12.1
2	9.3	9.0	9.2	10.4	10.2	10.3	12.3	12.0	12.2	12.3	12.1	12.2
3	9.4	9.1	9.3	10.5	10.3	10.4	12.2	12.1	12.1	12.4	12.3	12.3
4	9.7	9.3	9.4	10.5	10.3	10.5	12.4	12.1	12.2	12.4	12.3	12.3
5	9.8	9.3	9.7	10.7	10.3	10.5	12.8	12.1	12.4	12.3	12.1	12.2
6	9.9	9.3	9.8	10.7	10.5	10.6	12.5	12.4	12.4	12.3	12.1	12.2
7	10.0	9.8	9.9	10.9	10.5	10.7	12.4	12.3	12.4	12.6	12.3	12.4
8	10.1	9.8	9.9	10.9	10.8	10.9	12.4	12.3	12.3	12.6	12.5	12.5
9	10.0	9.8	9.9	10.9	10.8	10.8	12.7	12.3	12.5	12.6	12.4	12.5
10	10.0	9.8	9.9	11.1	10.9	11.0	12.8	12.6	12.7	12.7	12.6	12.7
11	10.0	9.8	9.9	11.1	11.0	11.0	12.7	12.4	12.5	12.8	12.6	12.7
12	9.9	9.6	9.7	11.2	10.9	11.1	12.5	12.3	12.4	12.8	12.6	12.7
13	9.6	9.1	9.6	11.7	11.2	11.5	12.5	12.3	12.4	12.9	12.7	12.8
14	9.5	9.2	9.4	11.7	11.6	11.7	12.5	12.4	12.5	12.8	12.7	12.8
15	9.5	9.2	9.3	11.7	11.5	11.6	12.5	12.4	12.5	12.7	12.6	12.7
16	9.4	9.2	9.3	11.6	11.5	11.6	12.5	12.4	12.4	12.7	12.5	12.6
17	9.5	9.4	9.4	11.7	11.5	11.6	12.5	12.3	12.4	12.7	12.5	12.6
18	9.5	9.2	9.3	11.6	11.5	11.6	12.4	12.2	12.3	12.6	12.5	12.6
19	9.3	9.1	9.2	11.6	11.4	11.5	12.3	12.2	12.3	12.6	12.5	12.5
20	9.4	9.1	9.1	11.4	11.3	11.3	12.4	12.2	12.3	12.5	12.4	12.5
21	9.5	9.2	9.4	11.4	11.0	11.2	12.4	12.3	12.3	12.4	12.1	12.3
22	9.8	9.4	9.6	11.1	11.0	11.0	12.5	12.3	12.4	12.2	11.6	11.9
23	9.7	9.5	9.7	11.1	10.9	11.0	12.5	12.4	12.4	—	—	—
24	9.8	9.6	9.6	10.9	10.8	10.9	12.4	12.3	12.4	11.7	11.5	11.6
25	9.7	9.5	9.6	11.0	10.9	10.9	12.3	12.1	12.2	—	—	—
26	9.9	9.6	9.7	11.0	10.8	11.0	—	—	—	—	—	—
27	10.0	9.8	9.9	10.9	10.7	10.8	—	—	—	11.4	11.3	11.3
28	10.1	9.9	10.0	11.3	10.8	11.0	—	—	—	11.3	11.2	11.2
29	10.2	10.0	10.1	11.4	11.2	11.3	—	—	—	11.2	11.0	11.1
30	10.3	10.1	10.2	11.6	11.4	11.4	12.4	12.3	12.4	11.0	10.9	11.0
31	10.3	10.2	10.2	—	—	—	12.3	12.0	12.2	11.0	10.9	10.9
MONTH	10.3	9.0	9.6	11.7	10.2	11.0	—	—	—	—	—	—

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	10.9	10.8	10.9	12.3	11.9	12.2	11.3	11.1	11.2	10.3	10.1	10.2	
2	10.9	10.8	10.9	12.2	12.0	12.2	11.2	11.1	11.2	10.2	10.0	10.1	
3	10.8	10.8	10.8	12.0	11.7	11.9	11.2	11.0	11.1	10.1	10.0	10.1	
4	10.9	10.3	10.8	11.9	11.7	11.8	11.4	11.0	11.3	10.1	10.0	10.0	
5	11.4	10.6	10.9	11.9	11.6	11.7	11.4	11.2	11.3	10.3	10.1	10.2	
6	11.6	11.4	11.5	12.0	11.7	11.8	11.2	11.1	11.2	10.4	10.1	10.2	
7	11.6	11.5	11.6	12.0	11.8	11.9	11.1	11.0	11.0	10.6	10.3	10.5	
8	11.6	11.5	11.6	11.9	11.7	11.8	11.0	10.9	10.9	10.4	10.3	10.3	
9	11.6	11.5	11.5	12.0	11.8	11.9	11.0	10.8	10.9	10.4	10.0	10.2	
10	11.8	11.5	11.7	12.1	11.8	11.9	10.8	10.7	10.8	10.3	10.1	10.2	
11	11.8	11.7	11.8	12.0	11.8	11.9	10.9	10.7	10.8	10.3	9.9	10.1	
12	11.8	11.7	11.8	12.2	12.0	12.1	10.9	10.8	10.8	10.2	9.8	10.0	
13	11.8	11.6	11.7	12.1	12.0	12.1	—	—	—	9.9	9.6	9.7	
14	11.8	11.6	11.7	12.3	12.1	12.2	11.2	10.8	11.0	9.7	9.3	9.5	
15	12.0	11.8	11.9	12.3	12.2	12.3	11.3	11.0	11.2	9.4	9.0	9.2	
16	12.1	11.8	11.9	12.3	12.1	12.2	11.2	10.9	11.1	9.1	8.7	8.9	
17	12.1	11.8	11.9	12.4	12.3	12.4	11.2	10.9	11.0	9.0	8.5	8.8	
18	11.9	11.8	11.9	12.5	12.3	12.4	11.0	10.8	10.9	9.2	8.9	9.0	
19	12.0	11.8	11.9	12.7	12.5	12.6	10.9	10.4	10.6	8.9	8.5	8.7	
20	12.0	11.9	12.0	12.7	12.5	12.6	10.5	10.3	10.4	9.0	8.4	8.6	
21	12.1	12.0	12.0	12.6	12.4	12.5	10.3	10.0	10.2	8.9	8.4	8.6	
22	12.1	12.0	12.0	12.6	12.4	12.5	10.1	9.9	10.0	8.7	8.5	8.6	
23	12.1	11.9	12.0	12.5	12.3	12.4	10.0	9.8	9.9	8.7	8.3	8.5	
24	12.0	11.9	11.9	12.5	12.4	12.5	9.9	9.6	9.8	8.5	8.3	8.4	
25	12.3	11.9	12.0	12.5	12.4	12.5	9.8	9.6	9.7	8.8	8.4	8.6	
26	12.2	12.0	12.1	12.5	12.3	12.4	10.0	9.7	9.9	8.9	8.8	8.9	
27	12.2	12.1	12.1	12.3	12.2	12.3	10.3	10.0	10.1	9.4	8.9	9.1	
28	12.3	12.2	12.2	12.3	11.9	12.1	10.2	10.1	10.2	9.3	9.2	9.3	
29	12.3	12.1	12.2	12.0	11.8	11.9	10.3	10.1	10.2	9.4	9.2	9.3	
30	—	—	—	11.8	11.4	11.6	10.3	10.2	10.2	9.4	9.0	9.2	
31	—	—	—	11.4	11.2	11.3	—	—	—	9.2	9.0	9.1	
MONTH	12.3	10.3	11.7	12.7	11.2	12.1	—	—	—	10.6	8.3	9.4	

STREAMS TRIBUTARY TO LAKE HURON

04137005 AU SABLE RIVER NEAR CURTISVILLE, MI--Continued

OXYGEN DISSOLVED (MGL), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.1	8.8	8.9	8.1	7.7	7.9	7.4	7.0	7.2	8.0	7.5	7.8
2	8.9	8.7	8.8	8.1	7.7	7.8	7.4	6.6	7.1	7.9	7.6	7.8
3	9.2	8.7	9.0	8.0	7.6	7.7	7.2	7.0	7.1	7.8	7.5	7.6
4	9.0	8.6	8.8	7.8	7.3	7.6	7.8	7.1	7.4	8.0	7.5	7.7
5	8.9	8.7	8.8	7.6	7.1	7.3	8.6	7.7	8.0	8.3	7.7	7.9
6	9.0	8.6	8.7	7.2	6.7	7.0	8.6	7.5	8.0	8.1	7.5	7.8
7	8.8	8.0	8.5	7.3	6.9	7.1	7.9	7.3	7.6	8.0	7.5	7.8
8	8.6	8.1	8.3	7.2	6.8	7.0	7.9	7.4	7.8	7.7	7.4	7.6
9	8.3	8.0	8.2	7.1	6.8	7.0	8.0	7.6	7.8	8.6	7.4	7.9
10	8.0	7.7	7.9	7.1	6.1	6.9	8.1	7.5	7.8	7.8	7.1	7.5
11	7.9	7.4	7.6	7.4	6.9	7.2	8.1	7.8	7.9	7.9	7.1	7.5
12	7.7	7.2	7.5	7.6	7.0	7.4	8.0	7.6	7.9	8.0	7.4	7.8
13	7.9	7.5	7.7	8.1	5.5	7.2	8.2	7.5	7.8	8.3	7.9	8.1
14	8.2	7.7	7.9	7.9	6.0	7.2	7.9	7.6	7.7	8.2	7.8	8.0
15	8.1	7.8	7.9	8.2	7.6	7.8	8.4	7.8	8.1	8.0	7.5	7.8
16	7.9	7.4	7.7	7.7	7.3	7.5	8.7	8.3	8.4	8.4	7.6	7.9
17	7.9	7.3	7.5	7.8	7.4	7.7	8.5	8.2	8.4	8.3	7.8	8.0
18	8.3	7.5	7.7	8.1	7.6	7.8	8.7	8.2	8.4	8.0	7.6	7.8
19	8.3	7.5	8.0	7.9	7.7	7.8	8.7	7.7	8.2	7.6	7.0	7.2
20	7.9	7.5	7.7	7.7	7.4	7.5	8.6	7.6	8.3	7.9	7.3	7.6
21	7.9	7.4	7.6	7.8	7.3	7.5	8.6	8.0	8.4	8.2	7.7	8.0
22	7.8	7.3	7.5	7.6	7.2	7.4	8.5	7.3	8.0	8.2	8.0	8.1
23	7.7	7.1	7.4	7.6	7.2	7.4	8.7	8.0	8.4	8.4	8.1	8.2
24	7.7	7.3	7.5	7.4	7.0	7.3	8.7	8.3	8.6	8.5	7.9	8.1
25	7.9	7.6	7.7	7.2	6.7	7.0	8.8	8.4	8.6	8.5	8.0	8.3
26	7.9	7.5	7.7	7.2	6.8	7.0	8.6	8.2	8.4	8.3	8.1	8.2
27	8.3	7.6	7.9	7.4	7.1	7.3	8.5	8.3	8.4	8.3	7.7	8.0
28	8.0	7.7	7.8	7.4	7.2	7.3	8.4	8.1	8.2	8.9	7.9	8.4
29	8.0	7.5	7.8	7.4	7.0	7.2	8.2	7.9	8.1	8.3	8.0	8.2
30	8.0	7.6	7.8	7.3	6.9	7.1	8.0	7.7	7.9	8.4	8.2	8.3
31	—	—	—	7.8	7.0	7.3	8.1	7.6	7.9	—	—	—
MONTH	9.2	7.1	8.0	8.2	5.5	7.4	8.8	6.6	8.0	8.9	7.0	7.9

STREAMS TRIBUTARY TO LAKE HURON

04137020 AU SABLE RIVER NEAR SOUTH BRANCH, MI

LOCATION.--Lat 44°27'48", long 83°43'17", in SW1/4 NW1/4 sec.21, T.24 N., R.6 E., Iosco County, Hydrologic Unit 04070007, on right bank 75 ft downstream from Loud Dam, 8.4 mi east of South Branch.

DRAINAGE AREA.--1,689 mi².

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: July 1996 to current year.

DISSOLVED OXYGEN: July 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: Nov. 7-11, 19, Jan. 5-14, 26-28, Feb. 4-6, Sept. 17-20 rated good; Nov. 12-17, Jan. 15-25, Feb. 12, 13, Sept. 21-27 rated fair; and Nov. 18, Feb. 14-19, June 25 to July 1, Sept. 28-30 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 27.0°C, Aug. 8, 9, 2001, July 3, 4, 2002; minimum, 0.0°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum, 14.5 mg/L, Dec. 5, 2002; minimum, 3.3 mg/L, Aug. 1, 2003.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 24.5°C, July 22; minimum, 0.0°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 13.6 mg/L, Dec. 6; minimum, 4.3 mg/L, July 22.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	13.5	12.5	13.0	8.0	8.0	8.0	3.0	2.5	3.0	1.0	1.0	1.0
2	12.5	12.0	12.0	8.0	8.0	8.0	2.5	2.0	2.5	1.0	1.0	1.0
3	12.0	11.0	11.5	8.0	8.0	8.0	2.5	2.0	2.0	1.5	1.0	1.0
4	11.0	10.5	10.5	8.0	7.5	7.5	2.0	1.5	2.0	1.5	1.5	1.5
5	10.5	10.0	10.0	7.5	7.0	7.5	1.5	1.5	1.5	1.5	1.0	1.0
6	10.0	9.5	10.0	7.5	7.0	7.0	1.5	1.5	1.5	1.0	0.5	0.5
7	10.0	9.5	10.0	7.0	6.0	6.5	1.5	1.5	1.5	0.5	0.5	0.5
8	11.0	10.0	10.5	6.0	5.0	5.5	1.5	1.5	1.5	0.5	0.5	0.5
9	11.0	10.5	10.5	5.0	4.5	5.0	1.5	1.5	1.5	0.5	0.5	0.5
10	11.5	11.0	11.5	4.5	4.0	4.0	1.5	1.5	1.5	0.5	0.5	0.5
11	12.0	11.5	11.5	4.5	4.0	4.0	1.5	1.5	1.5	0.5	0.5	0.5
12	13.0	12.0	12.5	4.5	4.0	4.5	1.5	1.0	1.5	0.5	0.0	0.5
13	12.5	12.0	12.5	4.5	4.0	4.5	1.0	1.0	1.0	0.0	0.0	0.0
14	12.5	12.0	12.0	4.0	3.5	3.5	1.0	1.0	1.0	0.0	0.0	0.0
15	12.0	11.5	11.5	3.5	3.0	3.5	1.0	1.0	1.0	0.0	0.0	0.0
16	11.5	11.0	11.0	3.5	3.5	3.5	1.0	1.0	1.0	0.0	0.0	0.0
17	11.0	10.5	10.5	3.5	3.5	3.5	1.0	1.0	1.0	0.0	0.0	0.0
18	10.5	10.0	10.0	4.5	3.5	4.0	1.0	1.0	1.0	0.0	0.0	0.0
19	10.0	9.5	10.0	5.0	4.5	5.0	1.0	1.0	1.0	0.0	0.0	0.0
20	10.5	9.5	10.0	5.0	5.0	5.0	1.0	0.5	1.0	0.0	0.0	0.0
21	10.5	10.0	10.0	5.0	4.5	5.0	1.0	0.5	0.5	0.0	0.0	0.0
22	10.0	9.5	10.0	5.0	5.0	5.0	1.0	0.5	0.5	0.0	0.0	0.0
23	9.5	9.5	9.5	5.5	5.0	5.0	1.0	1.0	1.0	0.0	0.0	0.0
24	9.5	9.0	9.0	5.5	5.0	5.5	1.0	1.0	1.0	0.0	0.0	0.0
25	9.0	8.5	8.5	5.0	4.5	4.5	1.0	1.0	1.0	0.0	0.0	0.0
26	8.5	8.5	8.5	4.5	3.5	4.0	1.0	0.5	1.0	0.0	0.0	0.0
27	8.5	8.5	8.5	4.0	3.5	3.5	0.5	0.5	0.5	0.0	0.0	0.0
28	8.5	8.0	8.5	4.0	4.0	4.0	1.0	0.5	1.0	0.0	0.0	0.0
29	8.0	7.5	8.0	4.0	3.5	3.5	1.0	1.0	1.0	0.0	0.0	0.0
30	7.5	7.5	7.5	3.5	3.0	3.5	1.0	1.0	1.0	0.0	0.0	0.0
31	8.0	7.5	8.0	—	—	—	1.0	1.0	1.0	0.0	0.0	0.0
MONTH	13.5	7.5	10.2	8.0	3.0	5.0	3.0	0.5	1.3	1.5	0.0	0.3

STREAMS TRIBUTARY TO LAKE HURON

04137020 AU SABLE RIVER NEAR SOUTH BRANCH, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH				APRIL				MAY
1	0.0	0.0	0.0	0.0	0.0	0.0	5.5	5.0	5.0	12.0	11.5	12.0
2	0.0	0.0	0.0	0.0	0.0	0.0	6.5	5.5	6.0	11.5	11.0	11.0
3	0.0	0.0	0.0	0.0	0.0	0.0	7.5	6.0	7.0	11.0	10.5	10.5
4	0.0	0.0	0.0	0.0	0.0	0.0	7.0	6.5	6.5	10.5	10.0	10.0
5	0.0	0.0	0.0	0.5	0.0	0.5	7.0	6.0	6.5	11.0	10.0	10.0
6	0.0	0.0	0.0	0.5	0.5	0.5	6.5	6.0	6.0	11.5	10.5	11.0
7	0.0	0.0	0.0	1.0	0.5	1.0	7.0	6.0	6.5	11.5	11.0	11.5
8	0.0	0.0	0.0	1.5	1.0	1.0	7.0	6.5	7.0	11.5	11.0	11.5
9	0.0	0.0	0.0	2.0	1.5	1.5	7.5	7.0	7.0	11.5	11.0	11.5
10	0.0	0.0	0.0	2.0	2.0	2.0	7.0	6.5	7.0	13.0	11.0	12.0
11	0.0	0.0	0.0	2.0	2.0	2.0	7.0	7.0	7.0	13.5	12.0	12.5
12	0.0	0.0	0.0	2.0	1.5	2.0	7.5	7.0	7.0	16.0	13.5	14.5
13	0.0	0.0	0.0	1.5	1.5	1.5	8.0	7.0	7.5	16.0	15.0	15.5
14	0.0	0.0	0.0	2.0	1.5	1.5	8.5	7.0	7.5	16.5	15.5	16.0
15	0.0	0.0	0.0	2.0	1.5	2.0	9.0	8.0	8.5	16.0	15.0	15.0
16	0.0	0.0	0.0	2.0	2.0	2.0	10.0	9.0	9.0	16.0	14.5	15.5
17	0.0	0.0	0.0	2.0	2.0	2.0	10.0	9.5	9.5	16.5	15.5	16.0
18	0.0	0.0	0.0	2.0	1.5	1.5	11.5	9.5	10.0	17.0	16.0	16.5
19	0.0	0.0	0.0	2.0	1.5	1.5	11.5	11.0	11.0	17.5	16.0	16.5
20	0.0	0.0	0.0	2.0	2.0	2.0	11.5	11.0	11.0	18.0	17.0	17.5
21	0.0	0.0	0.0	2.5	2.0	2.5	11.5	11.0	11.5	17.5	16.5	16.5
22	0.0	0.0	0.0	2.5	2.0	2.0	12.0	11.0	11.5	16.5	16.0	16.0
23	0.0	0.0	0.0	2.0	1.5	2.0	12.5	11.5	12.0	16.0	14.5	15.5
24	0.0	0.0	0.0	2.0	2.0	2.0	12.0	11.5	12.0	14.5	14.0	14.5
25	0.0	0.0	0.0	3.0	2.0	2.5	12.0	11.5	11.5	14.0	13.5	14.0
26	0.0	0.0	0.0	4.0	3.0	3.5	11.5	11.0	11.0	14.0	13.5	13.5
27	0.0	0.0	0.0	4.0	3.5	4.0	11.0	10.5	11.0	14.5	13.5	14.0
28	0.0	0.0	0.0	4.0	3.5	3.5	11.0	10.5	10.5	15.0	13.5	14.0
29	0.0	0.0	0.0	4.5	4.0	4.5	12.0	10.5	11.0	15.0	14.0	14.5
30	—	—	—	5.0	4.5	5.0	12.5	12.0	12.0	15.5	14.0	15.0
31	—	—	—	5.5	5.0	5.5	—	—	—	15.0	14.5	14.5
MONTH	0.0	0.0	0.0	5.5	0.0	2.0	12.5	5.0	8.9	18.0	10.0	13.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	15.5	14.0	14.5	21.0	19.5	20.0	22.0	21.5	22.0	20.0	20.0	20.0
2	16.0	15.0	15.5	20.5	20.0	20.0	23.0	22.0	22.5	20.5	20.0	20.0
3	16.5	15.5	16.0	21.0	20.0	20.5	23.0	22.0	22.5	21.0	20.0	20.5
4	17.5	16.0	16.5	22.0	20.5	21.0	22.5	22.0	22.5	21.5	20.5	21.0
5	18.0	17.0	17.0	21.5	20.5	21.0	22.5	22.0	22.5	22.0	20.5	21.0
6	17.5	17.0	17.5	20.5	20.5	20.5	22.5	21.5	22.0	22.0	21.0	21.5
7	18.5	17.0	17.5	21.0	20.5	20.5	22.0	21.5	21.5	22.0	21.5	22.0
8	20.5	18.0	19.5	20.5	20.0	20.0	22.5	21.5	22.0	21.5	21.0	21.0
9	20.5	19.5	20.0	20.0	19.5	20.0	22.0	21.5	21.5	21.0	20.5	21.0
10	20.0	19.5	20.0	20.5	19.5	19.5	22.0	21.5	21.5	20.5	20.0	20.0
11	20.0	19.0	19.5	21.0	19.5	20.5	21.5	20.5	21.0	20.5	20.0	20.0
12	19.5	18.5	19.0	21.5	20.0	20.5	20.5	20.0	20.5	21.0	20.5	20.5
13	20.5	19.0	19.5	22.5	20.5	21.5	20.0	19.5	20.0	21.0	20.0	20.5
14	21.0	19.5	20.0	22.5	21.0	22.0	19.5	19.5	19.5	21.5	20.5	21.0
15	20.5	20.0	20.0	21.5	21.0	21.5	20.0	19.0	19.5	21.5	21.0	21.0
16	21.5	20.0	20.5	21.5	20.5	21.0	20.0	19.5	20.0	21.5	21.0	21.5
17	21.5	20.5	21.0	22.0	21.0	21.5	20.0	19.5	19.5	21.0	20.5	21.0
18	22.0	21.0	21.5	22.0	21.5	22.0	20.0	19.5	19.5	20.5	19.5	20.0
19	21.5	20.5	21.0	22.5	22.0	22.0	20.0	19.5	19.5	19.5	19.0	19.0
20	21.0	20.5	21.0	23.0	21.5	22.5	19.5	19.0	19.5	19.5	19.0	19.0
21	20.5	20.0	20.5	23.5	22.0	22.5	19.5	19.0	19.0	19.5	19.0	19.0
22	20.5	20.0	20.0	24.5	22.5	23.5	19.0	18.5	19.0	19.5	18.5	19.0
23	--	--	--	23.0	22.5	23.0	19.0	19.0	19.0	19.0	18.5	19.0
24	--	--	--	22.5	22.5	22.5	19.0	18.5	19.0	19.5	19.0	19.0
25	19.5	18.5	19.0	22.5	22.0	22.0	20.0	19.0	19.5	19.0	18.5	19.0
26	19.5	18.5	19.0	22.0	21.5	22.0	21.0	19.5	20.0	19.0	18.0	18.5
27	19.0	18.5	19.0	22.0	21.5	22.0	22.0	20.5	21.0	18.5	18.0	18.5
28	19.5	18.5	19.0	22.0	21.5	21.5	21.5	21.0	21.0	18.5	17.5	18.0
29	20.0	19.0	19.5	22.5	21.0	22.0	21.0	20.5	21.0	17.5	17.0	17.5
30	20.5	19.0	19.5	22.0	21.5	22.0	20.5	20.0	20.5	17.5	17.0	17.0
31	--	--	--	22.5	21.5	22.0	20.5	20.0	20.5	--	--	--
MONTH	--	--	--	24.5	19.5	21.4	23.0	18.5	20.6	22.0	17.0	19.9

STREAMS TRIBUTARY TO LAKE HURON

04137020 AU SABLE RIVER NEAR SOUTH BRANCH, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER				DECEMBER			JANUARY	
1	9.4	8.8	9.1	10.5	10.4	10.5	13.0	12.0	12.6	13.1	13.0	13.0
2	9.6	9.1	9.4	10.6	10.3	10.5	13.2	12.8	12.9	13.2	12.5	13.0
3	9.7	9.4	9.5	10.6	10.5	10.5	13.2	12.9	13.1	13.2	12.8	13.0
4	9.9	9.5	9.7	10.8	10.5	10.6	13.4	13.1	13.3	13.0	12.8	12.9
5	9.9	9.7	9.8	10.8	10.5	10.7	13.5	13.2	13.4	12.9	12.8	12.8
6	10.0	9.8	9.9	11.0	10.6	10.8	13.6	13.2	13.4	13.0	12.9	12.9
7	10.3	9.9	10.1	11.4	10.8	11.1	13.5	13.3	13.4	13.1	12.9	13.1
8	10.5	10.1	10.3	11.4	11.2	11.3	13.5	13.3	13.4	13.2	13.1	13.2
9	10.6	9.9	10.3	11.7	11.4	11.6	13.5	13.3	13.4	13.3	13.2	13.3
10	10.6	9.7	10.3	12.0	11.7	11.9	13.5	13.2	13.3	13.3	13.1	13.2
11	10.5	9.1	10.1	12.1	11.9	12.1	13.3	13.1	13.2	13.3	13.2	13.3
12	10.3	9.8	10.1	12.1	11.9	12.0	13.3	13.1	13.2	13.4	13.1	13.3
13	10.2	9.7	10.0	12.2	11.9	12.0	13.4	13.2	13.3	13.1	12.8	12.9
14	10.1	9.4	9.8	12.3	12.1	12.2	13.4	13.2	13.3	12.9	12.7	12.8
15	10.0	9.4	9.7	12.4	12.3	12.3	13.4	13.2	13.3	12.8	12.6	12.7
16	10.0	9.4	9.6	12.6	12.4	12.5	13.3	13.2	13.2	12.8	12.7	12.8
17	9.7	9.4	9.6	12.6	12.4	12.5	13.2	13.2	13.2	12.8	12.6	12.7
18	9.7	9.2	9.6	12.5	12.4	12.4	13.2	13.1	13.2	12.8	12.6	12.7
19	9.9	9.6	9.7	12.6	12.1	12.4	13.3	13.2	13.3	12.6	12.4	12.5
20	9.8	6.2	7.9	12.5	12.2	12.3	13.4	13.2	13.3	12.4	12.2	12.2
21	9.9	6.5	9.7	12.5	12.3	12.4	13.3	13.2	13.2	12.3	12.2	12.3
22	9.8	9.5	9.7	12.5	12.2	12.3	13.3	13.2	13.3	12.3	12.1	12.3
23	9.9	9.4	9.7	12.4	12.2	12.3	13.3	13.2	13.2	12.4	12.2	12.3
24	9.7	9.5	9.6	12.2	12.0	12.1	13.3	13.2	13.2	12.2	12.1	12.1
25	10.0	9.7	9.8	12.1	12.0	12.0	13.2	13.1	13.2	12.2	12.1	12.1
26	10.1	9.8	10.0	12.4	12.1	12.3	13.2	13.0	13.1	12.1	12.0	12.1
27	10.1	10.0	10.1	12.4	12.1	12.3	13.1	12.9	13.0	12.1	12.0	12.1
28	10.1	10.1	10.1	12.3	12.0	12.2	13.1	13.0	13.0	12.0	11.9	12.0
29	10.2	10.1	10.2	12.2	12.1	12.1	13.2	13.0	13.1	12.0	11.7	11.9
30	10.2	10.1	10.2	12.5	12.2	12.3	13.1	13.0	13.1	11.9	11.7	11.8
31	10.5	10.0	10.2	—	—	—	13.0	12.9	12.9	11.7	11.7	11.7
MONTH	10.6	6.2	9.8	12.6	10.3	11.8	13.6	12.0	13.2	13.4	11.7	12.6

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH				APRIL				MAY
1	11.7	11.5	11.6	12.6	12.5	12.5	11.8	11.4	11.6	9.5	9.2	9.4
2	11.6	11.4	11.5	12.6	12.5	12.5	11.6	11.3	11.5	9.5	9.2	9.3
3	11.5	11.4	11.5	12.6	12.4	12.5	11.4	11.0	11.3	9.5	9.3	9.4
4	11.5	11.3	11.4	12.6	12.5	12.5	11.3	11.1	11.2	9.6	9.5	9.5
5	11.3	11.1	11.2	12.6	12.4	12.4	11.4	11.1	11.2	9.7	9.6	9.7
6	11.5	11.2	11.4	12.4	12.1	12.3	11.5	11.3	11.3	9.7	9.7	9.7
7	11.7	11.4	11.6	12.1	12.0	12.1	11.4	11.2	11.3	9.7	9.5	9.6
8	11.7	11.5	11.6	12.1	12.0	12.0	11.2	11.0	11.1	9.7	9.5	9.6
9	11.8	11.6	11.6	12.1	12.0	12.0	11.0	10.9	10.9	9.7	9.5	9.6
10	12.0	11.7	11.8	12.2	12.0	12.1	10.9	10.8	10.8	9.6	9.5	9.5
11	11.9	11.8	11.9	12.3	12.1	12.2	10.9	10.8	10.9	9.6	9.4	9.5
12	12.1	11.9	12.0	12.3	12.1	12.2	10.9	10.8	10.8	9.6	9.4	9.5
13	12.3	12.1	12.2	12.5	12.2	12.4	10.9	10.8	10.9	9.4	9.2	9.3
14	12.4	12.2	12.3	12.5	12.3	12.4	11.0	10.8	10.9	9.2	8.8	9.0
15	12.4	12.3	12.4	12.5	12.3	12.4	11.0	10.7	10.8	8.8	8.4	8.6
16	12.4	12.3	12.3	12.5	12.4	12.4	10.8	10.6	10.7	8.8	8.3	8.5
17	12.4	12.3	12.3	12.9	12.5	12.7	10.7	10.4	10.5	8.9	8.6	8.7
18	12.5	12.3	12.4	13.0	12.7	12.8	10.5	10.2	10.3	8.7	8.3	8.5
19	12.6	12.3	12.4	12.8	12.6	12.7	10.2	9.9	10.0	8.5	8.1	8.3
20	12.4	12.1	12.3	12.7	12.6	12.7	9.9	9.7	9.8	8.6	8.3	8.4
21	12.2	12.0	12.1	12.7	12.6	12.6	9.7	9.6	9.6	8.3	8.0	8.1
22	12.1	11.9	12.0	13.0	12.6	12.8	9.6	9.1	9.5	8.1	7.8	7.9
23	12.2	12.0	12.1	13.0	12.7	12.8	9.5	9.4	9.5	8.0	7.9	7.9
24	12.2	12.1	12.2	12.9	12.4	12.7	9.6	9.4	9.5	8.0	7.9	7.9
25	12.3	12.1	12.2	12.7	12.5	12.6	9.5	9.4	9.5	8.0	7.9	8.0
26	12.4	12.2	12.3	12.6	12.3	12.5	9.5	9.4	9.4	8.2	8.0	8.1
27	12.5	12.3	12.4	12.4	12.0	12.3	9.6	9.4	9.5	8.5	8.2	8.4
28	12.6	12.4	12.5	12.4	11.9	12.2	9.7	9.4	9.5	8.5	8.4	8.5
29	12.6	12.5	12.5	12.2	11.8	12.1	9.8	9.7	9.7	8.7	8.5	8.6
30	---	---	---	12.1	11.8	11.9	9.7	9.5	9.6	8.7	8.5	8.6
31	---	---	---	11.9	11.7	11.8	---	---	---	8.7	8.5	8.6
MONTH	12.6	11.1	12.0	13.0	11.7	12.4	11.8	9.1	10.4	9.7	7.8	8.8

STREAMS TRIBUTARY TO LAKE HURON

04137020 AU SABLE RIVER NEAR SOUTH BRANCH, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.5	8.2	8.4	9.1	5.7	7.8	7.8	4.7	6.5	8.3	5.7	7.1
2	8.3	8.1	8.2	9.0	7.6	8.4	8.2	4.6	6.9	8.4	5.9	7.2
3	8.2	7.5	8.1	9.0	7.5	8.3	7.4	5.6	6.8	8.6	5.9	7.4
4	8.5	7.5	8.3	8.8	7.3	8.2	7.7	4.9	6.4	8.6	6.0	7.6
5	8.5	7.3	8.3	8.8	7.2	8.2	7.7	4.6	6.3	8.6	5.9	7.3
6	8.4	6.5	8.2	8.1	7.2	7.8	7.5	4.7	6.1	8.5	5.5	7.0
7	8.3	8.0	8.1	8.4	7.4	8.0	7.7	4.6	6.2	8.2	5.6	7.2
8	8.3	8.0	8.1	8.1	7.4	7.8	8.0	5.2	6.6	7.8	5.4	6.6
9	8.0	7.6	7.8	8.0	7.2	7.8	8.2	4.8	6.6	7.8	5.4	6.6
10	7.7	7.3	7.5	8.3	7.1	7.8	7.9	5.2	6.8	7.9	5.3	6.7
11	7.7	7.2	7.5	8.7	6.9	8.1	7.6	5.1	6.5	8.2	5.3	6.9
12	7.8	7.3	7.5	8.7	7.1	8.1	7.5	5.6	6.7	8.3	5.4	7.2
13	8.0	7.5	7.7	8.9	7.1	8.2	7.3	6.5	7.0	8.5	5.9	7.3
14	7.9	7.5	7.7	8.7	7.3	8.2	7.4	6.6	7.0	8.6	5.8	7.3
15	7.6	7.3	7.4	8.2	7.7	7.8	8.4	6.6	7.5	8.6	6.3	7.4
16	7.8	7.2	7.5	8.2	7.5	7.8	8.6	7.6	8.1	8.4	6.4	7.4
17	7.7	7.1	7.3	8.2	7.9	8.0	8.4	7.8	8.2	8.2	6.0	7.4
18	7.5	7.1	7.3	8.2	7.7	7.9	8.3	7.6	8.1	8.1	6.0	7.3
19	7.4	7.1	7.2	8.4	7.3	8.1	8.5	7.6	8.2	8.3	6.0	7.5
20	7.8	7.0	7.4	8.5	4.9	7.1	8.3	7.9	8.1	8.7	6.4	7.5
21	7.6	7.2	7.4	8.0	4.6	6.3	8.1	7.3	7.9	8.8	6.8	7.7
22	—	—	—	8.0	4.3	6.4	8.3	7.4	8.0	8.8	7.2	8.1
23	—	—	—	7.9	4.7	6.1	8.7	6.1	7.9	8.7	8.0	8.4
24	—	—	—	7.0	6.2	6.7	8.7	6.6	7.5	8.7	8.2	8.5
25	8.3	7.6	7.9	7.1	6.2	6.8	8.5	5.4	7.4	8.7	7.8	8.4
26	9.0	7.4	8.2	7.9	5.3	6.9	8.6	5.1	7.2	8.6	7.4	8.3
27	8.3	7.3	7.8	8.1	4.8	6.6	8.7	6.2	7.7	8.7	8.1	8.4
28	9.2	7.3	8.4	8.1	5.2	6.5	8.5	6.1	7.4	8.9	8.3	8.6
29	9.1	6.0	8.3	7.9	5.4	6.6	8.3	5.7	7.2	8.6	8.0	8.4
30	9.4	5.7	7.5	8.2	5.5	6.8	8.0	5.7	6.9	8.8	8.1	8.5
31	—	—	—	8.0	5.5	6.7	8.2	5.6	7.1	—	—	—
MONTH	—	—	—	9.1	4.3	7.5	8.7	4.6	7.2	8.9	5.3	7.6

STREAMS TRIBUTARY TO LAKE HURON

04137025 AU SABLE RIVER NEAR GLENNIE, MI

LOCATION.--Lat 44°27'15", long 83°40'28", in SW1/4 SE1/4 sec.23, T.24 N., R.6 E., Iosco County, Hydrologic Unit 04070007, center of bridge on State Highway 65, 400 ft downstream from Five-Channels Dam, 7.6 mi southeast of Glennie.

DRAINAGE AREA.--1,696 mi².

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: July 1996 to current year.

DISSOLVED OXYGEN: July 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent.

Dissolved oxygen records rated excellent except the following periods: Apr. 2-10, Aug. 12-15, Sept. 21-24 rated good; Apr. 11-13, Aug. 16-21, Sept. 25-30 rated fair; and Aug. 22 to Sept. 9 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 27.0°C, Aug. 8-10, 2001, July 4, 2002; minimum, -0.5°C, on many days during winter period, 2004.

DISSOLVED OXYGEN: Maximum, 14.1 mg/L, Feb. 21, 2002; minimum, 2.2 mg/L, July 2, 2002.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 23.5°C, July 22, 23; minimum, -0.5°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 13.5 mg/L, Dec. 7, 8; minimum, 4.4 mg/L, June 27, July 4, 8.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	13.5	12.5	13.5	8.0	8.0	8.0	3.5	2.5	3.0	1.0	0.5	0.5
2	13.0	12.5	12.5	8.0	8.0	8.0	2.5	2.0	2.5	1.0	1.0	1.0
3	12.5	11.5	12.0	8.0	7.5	8.0	2.0	2.0	2.0	1.0	1.0	1.0
4	11.5	11.0	11.5	7.5	7.5	7.5	2.0	1.5	2.0	1.0	0.5	1.0
5	11.0	10.0	10.5	7.5	7.5	7.5	2.0	1.5	1.5	1.0	0.5	1.0
6	10.0	10.0	10.0	7.5	7.0	7.0	1.5	1.0	1.5	1.0	0.5	1.0
7	10.0	10.0	10.0	7.0	6.5	7.0	1.5	1.0	1.0	0.5	0.0	0.5
8	10.5	10.0	10.0	6.5	5.5	6.0	1.0	1.0	1.0	0.5	0.0	0.5
9	11.0	10.5	10.5	5.5	5.0	5.5	1.5	1.0	1.5	0.5	0.5	0.5
10	11.0	10.5	11.0	5.0	4.5	5.0	1.5	1.5	1.5	0.5	0.0	0.5
11	11.5	11.0	11.5	4.5	4.0	4.5	1.5	1.0	1.5	0.0	0.0	0.0
12	12.0	11.5	12.0	4.0	4.0	4.0	1.0	1.0	1.0	0.0	0.0	0.0
13	12.5	12.0	12.5	4.0	4.0	4.0	1.0	1.0	1.0	0.0	0.0	0.0
14	12.5	12.0	12.5	4.0	3.5	3.5	1.0	1.0	1.0	0.0	0.0	0.0
15	12.0	12.0	12.0	3.5	3.5	3.5	1.0	0.5	0.5	0.0	0.0	0.0
16	12.0	11.0	11.5	3.5	3.5	3.5	0.5	0.5	0.5	0.0	0.0	0.0
17	11.0	11.0	11.0	3.5	3.5	3.5	0.5	0.5	0.5	0.0	0.0	0.0
18	11.0	10.5	10.5	4.0	3.5	3.5	0.5	0.5	0.5	0.0	0.0	0.0
19	10.5	10.0	10.5	4.5	4.0	4.0	0.5	0.5	0.5	0.0	0.0	0.0
20	10.5	10.0	10.0	5.0	4.5	4.5	0.5	0.5	0.5	0.0	0.0	0.0
21	10.5	9.5	10.0	5.0	5.0	5.0	0.5	0.5	0.5	0.0	0.0	0.0
22	9.5	9.5	9.5	5.0	4.5	4.5	0.5	0.5	0.5	0.0	0.0	0.0
23	9.5	9.5	9.5	5.0	4.5	5.0	0.5	0.5	0.5	0.0	-0.5	0.0
24	9.5	9.0	9.0	5.0	5.0	5.0	0.5	0.5	0.5	0.0	-0.5	-0.5
25	9.5	9.0	9.0	5.0	4.5	4.5	0.5	0.5	0.5	0.0	-0.5	0.0
26	9.0	9.0	9.0	4.5	4.0	4.5	0.5	0.5	0.5	0.0	0.0	0.0
27	9.0	8.5	8.5	4.0	3.5	4.0	0.5	0.5	0.5	0.0	-0.5	0.0
28	8.5	8.0	8.5	3.5	3.5	3.5	0.5	0.5	0.5	0.0	-0.5	0.0
29	8.0	8.0	8.0	3.5	3.5	3.5	0.5	0.5	0.5	0.0	-0.5	0.0
30	8.0	8.0	8.0	3.5	3.5	3.5	0.5	0.5	0.5	0.0	-0.5	-0.5
31	8.0	8.0	8.0	—	—	—	0.5	0.5	0.5	0.0	-0.5	-0.5
MONTH	13.5	8.0	10.4	8.0	3.5	5.0	3.5	0.5	1.0	1.0	-0.5	0.2

STREAMS TRIBUTARY TO LAKE HURON

04137025 AU SABLE RIVER NEAR GLENNIE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	0.0	-0.5	-0.5	0.0	0.0	0.0	5.5	5.0	5.0	12.0	11.5	11.5	
2	0.0	-0.5	-0.5	0.0	0.0	0.0	5.5	5.0	5.5	11.5	11.0	11.5	
3	0.0	-0.5	-0.5	0.0	0.0	0.0	6.5	5.5	6.0	11.0	10.5	11.0	
4	0.0	-0.5	-0.5	0.0	0.0	0.0	7.0	6.0	6.5	10.5	10.0	10.5	
5	0.0	-0.5	0.0	0.0	0.0	0.0	6.5	6.0	6.5	10.5	10.0	10.0	
6	0.0	-0.5	0.0	0.0	0.0	0.0	6.5	6.0	6.0	10.5	10.5	10.5	
7	0.0	-0.5	0.0	0.5	0.0	0.0	6.5	6.0	6.0	11.0	10.5	10.5	
8	0.0	-0.5	0.0	0.5	0.5	0.5	6.5	6.5	6.5	11.5	11.0	11.0	
9	0.0	-0.5	0.0	1.0	0.5	1.0	6.5	6.0	6.5	11.0	11.0	11.0	
10	0.0	-0.5	0.0	1.5	1.0	1.0	7.0	6.5	7.0	12.5	11.0	11.5	
11	0.0	-0.5	0.0	2.0	1.5	1.5	7.0	6.5	7.0	12.5	11.5	12.0	
12	0.0	-0.5	0.0	2.0	1.5	1.5	7.0	6.5	7.0	14.5	12.5	13.5	
13	0.0	-0.5	0.0	1.5	1.5	1.5	7.5	7.0	7.0	15.0	14.0	14.5	
14	0.0	-0.5	0.0	1.5	1.0	1.5	8.0	7.0	7.5	15.5	15.0	15.5	
15	0.0	-0.5	0.0	1.0	1.0	1.0	8.0	7.5	7.5	15.5	14.5	15.0	
16	0.0	-0.5	0.0	1.5	1.0	1.5	9.0	8.0	8.5	15.0	14.5	14.5	
17	0.0	-0.5	0.0	1.5	1.5	1.5	9.5	9.0	9.0	16.0	15.0	15.5	
18	0.0	0.0	0.0	1.5	1.5	1.5	10.0	9.5	9.5	16.5	15.5	16.0	
19	0.0	0.0	0.0	1.5	1.5	1.5	11.0	10.0	10.5	16.5	16.0	16.0	
20	0.0	0.0	0.0	1.5	1.5	1.5	11.0	11.0	11.0	17.0	16.5	17.0	
21	0.0	-0.5	0.0	2.0	1.5	1.5	11.5	11.0	11.0	17.0	16.5	17.0	
22	0.0	-0.5	0.0	2.0	1.5	2.0	11.5	11.0	11.0	16.5	16.0	16.0	
23	0.0	-0.5	-0.5	2.0	1.5	2.0	11.5	11.0	11.5	16.0	15.0	15.5	
24	0.0	-0.5	0.0	2.0	1.5	2.0	11.5	11.5	11.5	15.0	14.0	14.5	
25	0.0	-0.5	-0.5	2.0	1.5	2.0	11.5	11.0	11.5	14.0	13.5	14.0	
26	0.0	-0.5	0.0	3.0	2.0	2.5	11.5	11.0	11.5	13.5	13.5	13.5	
27	0.0	-0.5	0.0	4.0	3.0	3.5	11.0	10.5	11.0	14.0	13.5	13.5	
28	0.0	-0.5	0.0	4.0	3.5	3.5	10.5	10.5	10.5	14.5	14.0	14.0	
29	0.0	-0.5	0.0	4.0	3.5	4.0	11.5	10.5	11.0	14.5	14.0	14.0	
30	—	—	—	5.0	4.0	4.5	11.5	11.5	11.5	15.0	14.5	14.5	
31	—	—	—	5.0	5.0	5.0	—	—	—	15.0	14.5	14.5	
MONTH	0.0	-0.5	-0.1	5.0	0.0	1.6	11.5	5.0	8.6	17.0	10.0	13.5	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	15.0	14.5	14.5	20.0	19.5	20.0	22.5	22.0	22.0	20.5	20.0	20.5
2	15.0	14.5	14.5	20.5	19.5	20.0	22.5	22.0	22.5	20.5	20.0	20.0
3	16.0	15.0	15.5	20.5	20.0	20.5	23.0	22.0	22.5	21.0	20.0	20.5
4	16.5	15.5	16.0	21.0	20.5	21.0	23.0	22.0	22.5	21.0	20.5	21.0
5	17.0	16.5	16.5	21.0	21.0	21.0	22.5	22.0	22.5	21.5	21.0	21.0
6	17.5	17.0	17.0	21.0	20.5	21.0	22.5	21.5	22.0	21.5	21.0	21.5
7	18.0	17.0	17.5	21.0	20.5	20.5	22.5	22.0	22.0	22.0	21.5	21.5
8	19.5	17.5	18.5	20.5	20.0	20.5	22.5	21.5	22.0	21.5	21.5	21.5
9	19.5	19.0	19.5	20.0	19.5	20.0	22.0	21.5	22.0	—	—	—
10	19.5	19.5	19.5	20.0	19.5	20.0	22.0	21.5	22.0	—	—	—
11	19.5	19.0	19.5	20.5	20.0	20.0	21.5	21.0	21.5	21.0	20.5	20.5
12	19.0	19.0	19.0	21.0	20.0	20.5	21.0	20.5	21.0	20.5	20.5	20.5
13	19.5	19.0	19.0	22.0	21.0	21.5	20.5	20.0	20.5	21.0	20.5	20.5
14	20.0	19.5	19.5	22.0	21.5	21.5	20.0	19.5	20.0	21.0	20.5	21.0
15	20.0	19.5	20.0	22.0	21.5	21.5	20.0	19.5	19.5	21.5	21.0	21.0
16	20.5	20.0	20.0	21.5	21.0	21.5	20.0	19.5	19.5	21.5	21.0	21.5
17	21.0	20.5	21.0	21.5	21.5	21.5	20.0	19.5	19.5	21.0	20.5	21.0
18	21.5	21.0	21.5	22.0	21.5	22.0	20.0	19.5	20.0	20.5	20.0	20.5
19	21.5	21.0	21.0	22.5	22.0	22.0	20.0	19.5	20.0	20.0	19.5	20.0
20	21.0	20.5	20.5	22.5	22.0	22.0	20.0	19.5	19.5	20.0	19.0	19.5
21	20.5	20.5	20.5	23.0	22.0	22.5	20.0	19.0	19.5	19.5	19.0	19.5
22	20.5	20.0	20.0	23.5	22.5	23.0	19.5	19.0	19.5	19.5	19.0	19.0
23	20.5	20.0	20.0	23.5	22.5	23.0	19.5	19.0	19.0	19.0	19.0	19.0
24	20.0	19.0	19.5	23.0	22.5	23.0	19.0	19.0	19.0	19.5	19.0	19.5
25	19.5	19.0	19.0	22.5	22.0	22.5	20.0	19.0	19.5	19.0	19.0	19.0
26	19.5	19.0	19.0	22.5	21.5	22.0	20.5	19.5	20.0	19.0	18.5	19.0
27	19.5	19.0	19.0	22.5	21.5	22.0	21.0	20.0	20.5	19.0	18.5	18.5
28	19.5	19.0	19.0	22.0	21.5	22.0	21.5	21.0	21.0	18.5	18.0	18.5
29	19.5	19.0	19.0	22.5	21.5	22.0	21.0	21.0	21.0	18.0	17.5	18.0
30	20.0	19.0	19.5	22.0	21.5	22.0	21.0	20.5	20.5	17.5	17.0	17.5
31	—	—	—	22.5	22.0	22.0	21.0	20.5	20.5	—	—	—
MONTH	21.5	14.5	18.8	23.5	19.5	21.4	23.0	19.0	20.7	—	—	—

STREAMS TRIBUTARY TO LAKE HURON

04137025 AU SABLE RIVER NEAR GLENNIE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
OCTOBER				NOVEMBER				DECEMBER				JANUARY			
1	8.7	7.8	8.4	10.2	10.1	10.1	11.4	11.1	11.2	13.0	12.9	13.0			
2	8.8	8.0	8.6	10.2	9.4	10.0	11.7	10.8	11.4	13.0	11.9	12.8			
3	9.1	8.4	8.7	10.4	10.1	10.2	11.7	10.7	11.5	13.0	12.2	12.8			
4	9.2	8.6	9.0	10.3	10.1	10.2	11.9	10.7	11.5	13.0	12.9	13.0			
5	—	—	—	10.4	10.2	10.3	12.2	11.0	11.8	13.0	12.8	12.9			
6	—	—	—	10.4	10.3	10.3	12.3	11.2	12.0	13.0	12.8	12.9			
7	—	—	—	10.6	10.2	10.3	12.4	11.6	12.2	13.1	12.9	13.1			
8	—	—	—	10.9	10.6	10.7	12.5	11.5	12.2	13.2	13.0	13.1			
9	—	—	—	11.0	10.8	10.9	12.4	11.4	12.1	13.2	13.0	13.1			
10	10.4	9.5	10.1	11.8	10.9	11.1	12.4	11.4	12.2	13.3	13.1	13.2			
11	10.4	9.4	10.0	11.4	11.2	11.3	12.4	12.3	12.4	13.3	13.2	13.3			
12	10.2	9.1	9.8	11.5	11.3	11.4	12.5	12.2	12.3	13.4	13.2	13.3			
13	10.1	9.0	9.6	11.7	11.3	11.6	12.8	12.2	12.3	13.5	13.3	13.4			
14	9.9	8.8	9.4	11.7	11.6	11.7	12.4	12.3	12.4	13.3	13.1	13.2			
15	9.7	8.5	9.3	11.7	11.5	11.6	12.6	12.3	12.4	13.2	13.0	13.1			
16	9.7	8.7	9.3	11.8	11.5	11.6	12.5	12.3	12.4	13.1	12.9	13.0			
17	9.6	8.7	9.3	11.8	11.6	11.7	12.5	12.3	12.4	13.1	13.0	13.0			
18	9.5	8.8	9.3	11.8	11.5	11.7	12.9	12.3	12.6	13.1	13.0	13.0			
19	9.6	8.7	9.3	11.6	11.3	11.5	13.0	12.9	12.9	13.0	12.9	13.0			
20	9.7	8.7	9.3	11.4	11.1	11.3	13.1	13.0	13.0	13.0	12.8	12.9			
21	10.1	9.0	9.6	11.2	11.0	11.1	13.2	13.0	13.1	12.8	12.6	12.7			
22	9.9	9.1	9.5	11.2	11.0	11.1	13.2	13.0	13.1	12.7	12.6	12.6			
23	9.8	8.7	9.4	11.1	10.9	11.0	13.2	13.1	13.1	12.7	12.6	12.6			
24	9.8	9.2	9.5	11.0	10.9	11.0	13.2	13.0	13.1	12.7	12.6	12.6			
25	9.7	8.8	9.4	10.9	10.8	10.8	13.1	13.0	13.0	12.6	12.5	12.6			
26	9.6	8.9	9.3	11.0	10.8	10.9	13.0	13.0	13.0	12.5	12.4	12.5			
27	9.7	9.2	9.5	11.2	10.8	11.0	13.0	12.9	13.0	12.5	12.4	12.4			
28	9.9	9.7	9.8	11.2	11.0	11.1	13.0	12.9	12.9	12.4	12.3	12.4			
29	9.9	9.8	9.8	11.1	11.0	11.1	13.0	12.9	12.9	12.4	12.0	12.2			
30	10.1	9.7	9.9	11.1	10.9	11.0	13.0	12.9	12.9	12.1	11.3	11.7			
31	10.1	10.0	10.1	—	—	—	13.0	12.9	12.9	11.4	11.1	11.2			
MONTH	—	—	—	11.8	9.4	11.0	13.2	10.7	12.5	13.5	11.1	12.8			

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	11.2	11.1	11.2	12.8	12.6	12.7	11.9	11.6	11.8	9.6	9.4	9.5	
2	11.3	11.1	11.2	12.9	12.7	12.8	11.8	11.4	11.6	9.4	9.2	9.3	
3	11.2	11.0	11.1	12.9	12.8	12.9	11.5	11.2	11.4	9.4	9.2	9.3	
4	11.2	11.1	11.2	12.9	12.7	12.8	11.3	11.0	11.1	9.5	9.3	9.4	
5	11.7	11.1	11.4	13.4	12.7	13.0	11.1	10.9	11.0	9.6	9.4	9.5	
6	11.7	11.6	11.7	13.4	12.6	13.1	11.3	10.8	11.0	9.7	9.6	9.6	
7	11.7	11.6	11.7	13.1	12.7	12.9	11.3	11.1	11.2	9.7	9.4	9.6	
8	11.8	11.7	11.8	12.9	11.8	12.2	11.2	10.9	11.1	9.6	9.4	9.5	
9	11.9	11.7	11.8	12.9	11.8	12.1	11.0	10.7	10.8	9.5	9.3	9.4	
10	11.8	11.7	11.8	12.7	11.8	12.1	10.8	10.5	10.7	9.4	9.2	9.3	
11	11.8	11.7	11.8	12.0	11.8	11.9	10.8	10.5	10.6	9.6	9.2	9.4	
12	11.9	11.8	11.8	12.1	11.9	12.0	10.9	10.6	10.8	9.7	9.4	9.5	
13	11.9	11.8	11.8	13.0	12.0	12.1	11.2	10.8	11.0	9.4	9.0	9.2	
14	11.9	11.8	11.8	12.1	12.0	12.1	11.3	11.2	11.2	9.1	8.7	8.9	
15	11.9	11.8	11.9	12.2	11.9	12.1	11.3	11.2	11.3	8.7	8.3	8.5	
16	12.1	11.9	12.0	12.1	11.5	12.0	11.2	11.0	11.2	8.3	8.0	8.2	
17	12.1	12.0	12.1	12.6	12.0	12.3	11.1	10.9	11.0	8.2	8.1	8.2	
18	12.2	12.0	12.1	12.6	10.1	11.9	10.9	10.7	10.8	8.3	8.0	8.2	
19	12.3	12.2	12.3	12.5	11.9	12.4	11.2	10.3	10.5	8.1	7.8	8.0	
20	12.4	12.3	12.3	12.6	12.4	12.5	10.3	10.0	10.1	8.0	7.8	7.9	
21	12.4	12.3	12.3	12.8	12.5	12.7	10.1	9.9	10.0	7.8	7.7	7.8	
22	12.3	12.2	12.3	13.0	11.1	12.7	10.0	9.8	9.9	7.7	7.5	7.6	
23	12.2	12.0	12.2	13.1	9.7	12.0	9.9	9.7	9.8	7.6	7.4	7.5	
24	12.3	12.0	12.2	13.3	10.2	12.3	10.0	9.6	9.8	7.6	7.2	7.4	
25	12.5	12.2	12.4	13.2	10.4	12.2	10.1	10.0	10.0	7.7	7.4	7.6	
26	12.5	12.4	12.4	13.0	10.4	12.2	10.0	9.9	10.0	—	—	—	
27	12.6	12.4	12.5	12.8	12.3	12.6	10.1	10.0	10.0	—	—	—	
28	12.7	12.5	12.6	12.5	12.3	12.4	10.2	10.0	10.1	—	—	—	
29	12.7	12.6	12.7	12.5	12.2	12.4	10.2	10.1	10.2	—	—	—	
30	—	—	—	12.3	12.0	12.2	10.2	9.5	10.0	—	—	—	
31	—	—	—	12.1	11.9	12.0	—	—	—	—	—	—	
MONTH	12.7	11.0	11.9	13.4	9.7	12.4	11.9	9.5	10.7	—	—	—	

STREAMS TRIBUTARY TO LAKE HURON

04137025 AU SABLE RIVER NEAR GLENNIE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	9.2	6.9	8.4	7.5	3.5	5.8	8.3	5.8	7.1
2	--	--	--	9.3	7.4	8.6	7.3	4.0	6.4	8.1	6.0	7.0
3	--	--	--	9.3	5.5	8.4	7.1	6.8	6.9	8.1	6.0	7.1
4	--	--	--	8.7	5.0	7.8	7.4	3.9	6.6	8.2	6.1	7.3
5	--	--	--	8.6	4.2	6.9	7.3	3.8	5.7	8.3	6.2	7.2
6	--	--	--	8.6	4.0	6.9	7.0	3.6	5.4	8.2	6.2	7.3
7	--	--	--	8.3	4.5	6.9	7.1	3.7	5.6	8.3	5.5	7.3
8	--	--	--	8.3	6.3	7.9	7.0	3.7	5.8	8.3	5.5	7.0
9	9.1	8.7	8.9	8.1	4.6	7.5	7.0	3.9	5.7	--	--	--
10	8.7	8.3	8.5	8.1	4.5	6.9	7.3	4.6	6.0	--	--	--
11	8.5	8.1	8.2	7.7	4.2	6.2	7.0	4.2	6.0	8.1	5.5	6.8
12	8.2	8.0	8.1	7.9	4.6	6.5	7.2	4.5	6.4	8.1	5.3	6.9
13	8.4	8.0	8.1	8.8	4.4	6.6	7.5	6.9	7.1	8.2	5.7	6.9
14	8.7	8.2	8.4	8.4	4.3	7.3	7.5	7.0	7.2	8.2	5.6	6.9
15	8.4	8.1	8.3	8.4	7.5	7.8	7.9	7.3	7.4	8.1	5.7	6.9
16	8.4	8.0	8.1	7.6	7.1	7.4	7.7	7.2	7.5	8.3	5.5	6.9
17	8.3	8.0	8.2	7.4	7.1	7.2	7.7	7.2	7.5	8.1	5.5	6.7
18	8.1	8.0	8.1	8.2	6.8	7.2	7.8	7.4	7.6	8.2	5.6	6.9
19	8.1	8.0	8.0	7.5	4.5	6.7	7.7	7.5	7.6	8.2	5.7	6.9
20	8.1	7.8	8.0	7.5	3.8	6.0	7.7	7.4	7.6	8.2	5.7	7.0
21	8.1	7.8	7.9	7.5	3.8	6.0	7.7	7.4	7.5	8.4	6.1	7.2
22	8.2	8.0	8.1	7.9	3.9	6.3	7.9	7.4	7.6	8.4	5.9	7.7
23	8.3	8.0	8.1	7.7	3.8	6.6	8.4	6.3	7.7	8.3	7.9	8.1
24	8.3	8.1	8.2	7.5	7.0	7.2	8.4	6.2	7.2	8.3	8.0	8.2
25	8.4	8.1	8.3	7.2	6.8	7.0	8.5	6.2	7.3	8.5	8.3	8.4
26	8.4	7.3	7.7	7.5	3.8	6.4	8.5	6.4	7.5	8.4	8.2	8.3
27	7.4	6.6	7.2	7.6	3.8	5.9	8.5	6.2	7.6	8.5	8.3	8.4
28	7.2	6.8	7.0	7.5	3.8	6.0	8.4	5.8	7.2	8.5	8.3	8.4
29	7.7	4.3	6.9	7.5	4.4	6.0	8.2	5.8	7.2	8.6	8.3	8.4
30	7.8	4.0	6.2	7.5	3.8	5.9	8.1	5.9	7.5	8.7	8.4	8.6
31	--	--	--	7.8	3.6	6.2	8.0	5.6	7.2	--	--	--
MONTH	--	--	--	9.3	3.6	6.9	8.5	3.5	6.9	--	--	--

STREAMS TRIBUTARY TO LAKE HURON

04137030 AU SABLE RIVER NEAR SIDTOWN, MI

LOCATION.--Lat 44°28'22", long 83°34'16", in NW1/4 SE1/4 sec.15, T.24 N., R.7 E., Iosco County, Hydrologic Unit 04070007, on right bank 100 ft downstream from Cooke Dam, 2 mi northeast of Sidtown.

DRAINAGE AREA--1,718 mi².

PERIOD OF RECORD.--Water years 1996 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: July 1996 to current year.

DISSOLVED OXYGEN: July 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for one hour measurement interval.

REMARKS.--Water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: Oct. 28-30, Dec. 25-28, Mar. 6-16, May 3-11, May 26 to June 2, Sept. 28-30 rated good; Oct. 1-7, Dec. 29 to Jan. 2, June 3-9 rated fair; and Oct. 8, 9, Jan. 3-29, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 27.5°C, Aug. 9, 2001; minimum, 0.0°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum, 14.8 mg/L, Mar. 31, Apr. 1, 1999; minimum, 1.5 mg/L, July 12, 2004.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 24.5°C, July 22; minimum, 0.0°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 13.8 mg/L, Jan. 11-14, 18; minimum, 1.5 mg/L, July 12.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	16.5	15.5	16.0	9.5	9.0	9.5	4.0	3.5	3.5	1.0	1.0	1.0
2	15.5	15.0	15.0	9.0	9.0	9.0	3.5	3.0	3.5	1.0	1.0	1.0
3	15.0	14.5	14.5	9.0	9.0	9.0	3.5	3.0	3.0	1.0	1.0	1.0
4	14.5	13.5	14.0	9.0	8.5	9.0	3.0	2.5	3.0	1.0	1.0	1.0
5	13.5	13.5	13.5	8.5	8.5	8.5	3.0	2.5	3.0	1.0	1.0	1.0
6	13.5	12.5	13.0	8.5	8.5	8.5	3.0	2.5	2.5	1.0	1.0	1.0
7	13.0	12.5	12.5	8.5	7.5	8.0	2.5	2.5	2.5	1.0	1.0	1.0
8	13.5	12.0	12.5	7.5	7.5	7.5	2.5	2.5	2.5	1.0	1.0	1.0
9	12.5	12.0	12.5	7.5	7.0	7.0	2.5	2.5	2.5	1.0	1.0	1.0
10	12.5	12.0	12.0	7.0	6.5	7.0	2.5	2.5	2.5	1.0	1.0	1.0
11	12.5	12.0	12.5	6.5	6.5	6.5	2.5	2.0	2.0	1.0	1.0	1.0
12	14.0	12.0	13.0	6.5	6.5	6.5	2.0	1.5	1.5	1.0	0.5	0.5
13	13.0	12.0	13.0	6.5	5.5	6.0	1.5	1.5	1.5	0.5	0.5	0.5
14	13.0	12.5	13.0	5.5	5.0	5.5	1.5	1.5	1.5	0.5	0.5	0.5
15	13.0	12.5	12.5	5.0	5.0	5.0	1.5	1.5	1.5	0.5	0.5	0.5
16	12.5	12.0	12.0	5.0	4.5	5.0	1.5	1.5	1.5	0.5	0.5	0.5
17	12.0	12.0	12.0	5.0	4.5	4.5	1.5	1.0	1.5	0.5	0.5	0.5
18	12.0	12.0	12.0	5.0	4.5	4.5	1.5	1.0	1.0	0.5	0.5	0.5
19	12.0	11.5	12.0	5.5	5.0	5.0	1.0	1.0	1.0	0.5	0.5	0.5
20	12.0	11.5	11.5	5.0	5.0	5.0	1.0	1.0	1.0	0.5	0.5	0.5
21	12.0	11.5	12.0	5.0	5.0	5.0	1.0	1.0	1.0	0.5	0.5	0.5
22	11.5	11.0	11.5	5.0	5.0	5.0	1.0	1.0	1.0	0.5	0.5	0.5
23	11.0	11.0	11.0	5.5	5.0	5.0	1.0	1.0	1.0	0.5	0.5	0.5
24	11.0	10.5	11.0	5.5	5.0	5.5	1.0	1.0	1.0	0.5	0.5	0.5
25	10.5	10.5	10.5	5.0	5.0	5.0	1.0	0.5	1.0	0.5	0.5	0.5
26	10.5	10.5	10.5	5.0	4.5	4.5	1.0	0.5	0.5	0.5	0.5	0.5
27	10.5	10.0	10.5	4.5	4.0	4.5	1.0	1.0	1.0	0.5	0.5	0.5
28	10.0	10.0	10.0	4.5	4.5	4.5	1.0	1.0	1.0	0.5	0.0	0.5
29	10.0	9.5	10.0	4.5	4.0	4.0	1.0	1.0	1.0	0.5	0.0	0.0
30	9.5	9.5	9.5	4.0	4.0	4.0	1.0	1.0	1.0	0.5	0.0	0.0
31	10.0	9.5	9.5	—	—	—	1.0	1.0	1.0	0.5	0.0	0.0
MONTH	16.5	9.5	12.1	9.5	4.0	6.1	4.0	0.5	1.7	1.0	0.0	0.6

STREAMS TRIBUTARY TO LAKE HURON

04137030 AU SABLE RIVER NEAR SIDTOWN, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	0.5	0.0	0.0	0.5	0.0	0.0	4.0	3.5	4.0	11.5	11.5	11.5	
2	0.0	0.0	0.0	0.5	0.0	0.0	4.5	4.0	4.5	11.5	11.5	11.5	
3	0.0	0.0	0.0	0.0	0.0	0.0	5.0	4.5	4.5	11.5	11.0	11.0	
4	0.0	0.0	0.0	0.5	0.0	0.0	5.5	5.0	5.0	11.0	11.0	11.0	
5	0.5	0.0	0.0	0.5	0.0	0.5	6.0	5.0	5.5	12.0	11.0	11.0	
6	0.5	0.0	0.0	0.5	0.5	0.5	6.0	5.5	6.0	12.0	11.0	11.5	
7	0.5	0.0	0.0	0.5	0.0	0.5	6.0	6.0	6.0	11.5	11.5	11.5	
8	0.5	0.0	0.0	0.5	0.0	0.5	6.5	6.0	6.0	11.5	11.0	11.5	
9	0.5	0.0	0.0	0.5	0.5	0.5	6.5	6.0	6.5	11.5	11.5	11.5	
10	0.5	0.0	0.0	0.5	0.5	0.5	6.5	6.5	6.5	13.5	11.5	12.0	
11	0.5	0.0	0.0	0.5	0.5	0.5	7.0	6.5	6.5	12.5	12.0	12.0	
12	0.5	0.0	0.0	0.5	0.5	0.5	7.0	6.5	6.5	14.5	12.5	13.5	
13	0.0	0.0	0.0	0.5	0.5	0.5	7.5	6.5	7.0	14.5	13.5	14.0	
14	0.0	0.0	0.0	1.0	0.5	0.5	8.0	7.0	7.5	16.0	14.0	15.0	
15	0.0	0.0	0.0	1.0	0.5	1.0	8.0	7.5	7.5	15.5	15.0	15.0	
16	0.0	0.0	0.0	1.0	1.0	1.0	9.0	7.5	8.0	15.5	15.0	15.0	
17	0.5	0.0	0.0	1.0	1.0	1.0	9.0	8.5	8.5	16.0	15.0	15.5	
18	0.5	0.0	0.0	1.5	1.0	1.0	9.5	8.5	9.0	16.5	16.0	16.0	
19	0.5	0.0	0.0	1.5	1.0	1.0	10.5	9.5	10.0	16.0	16.0	16.0	
20	0.5	0.0	0.0	1.5	1.0	1.5	10.0	10.0	10.0	17.0	16.0	16.5	
21	0.0	0.0	0.0	1.5	1.5	1.5	11.0	10.0	10.5	17.0	16.0	16.5	
22	0.5	0.0	0.0	1.5	1.5	1.5	11.0	10.5	11.0	16.5	16.5	16.5	
23	0.5	0.0	0.5	2.0	1.5	1.5	11.0	10.5	11.0	16.5	16.0	16.0	
24	0.5	0.0	0.0	2.0	1.5	2.0	11.5	11.0	11.0	16.0	15.5	15.5	
25	0.5	0.0	0.0	2.0	1.5	2.0	11.5	11.0	11.0	15.5	15.0	15.5	
26	0.5	0.0	0.0	2.0	2.0	2.0	11.5	11.0	11.5	15.0	15.0	15.0	
27	0.5	0.0	0.0	2.0	2.0	2.0	11.5	11.0	11.0	16.0	15.0	15.5	
28	0.5	0.0	0.0	2.5	2.0	2.5	11.0	11.0	11.0	15.5	15.0	15.0	
29	0.5	0.0	0.0	3.5	2.5	3.0	12.0	11.0	11.5	15.5	15.0	15.0	
30	—	—	—	4.0	3.5	3.5	11.5	11.5	11.5	15.5	15.0	15.0	
31	—	—	—	4.0	3.5	3.5	—	—	—	15.5	15.0	15.5	
MONTH	0.5	0.0	0.0	4.0	0.0	1.2	12.0	3.5	8.2	17.0	11.0	14.0	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	16.5	15.5	16.0	20.5	20.0	20.5	23.5	23.0	23.5	21.0	21.0	21.0
2	16.0	15.5	15.5	20.5	20.0	20.0	24.0	23.0	23.5	21.5	21.0	21.5
3	16.5	15.5	16.0	21.0	20.0	20.5	23.5	23.5	23.5	22.0	21.0	21.5
4	16.5	15.5	16.0	22.0	20.0	21.0	23.5	23.5	23.5	22.0	21.5	21.5
5	17.0	16.0	16.5	21.5	21.0	21.5	23.5	23.0	23.5	22.0	21.5	22.0
6	17.5	16.5	17.0	21.0	20.5	21.0	23.5	23.0	23.0	23.0	21.5	22.0
7	18.5	17.0	17.5	22.0	21.0	21.5	23.5	23.0	23.0	23.0	22.0	22.5
8	20.0	17.5	18.5	21.5	21.0	21.0	24.0	23.0	23.5	22.5	22.0	22.0
9	19.5	18.5	19.0	21.0	21.0	21.0	23.5	23.0	23.0	22.0	22.0	22.0
10	19.0	18.0	18.5	21.0	21.0	21.0	23.0	23.0	23.0	22.0	21.5	21.5
11	19.0	18.0	18.5	21.0	21.0	21.0	23.0	22.5	22.5	22.0	21.5	22.0
12	19.0	18.0	18.5	21.5	21.0	21.0	22.5	22.0	22.5	22.0	22.0	22.0
13	20.0	19.0	19.0	23.0	21.0	22.0	22.0	22.0	22.0	22.5	22.0	22.0
14	21.5	19.5	20.0	23.0	21.0	22.0	22.0	21.5	21.5	22.5	22.0	22.0
15	20.5	19.5	20.0	23.0	22.0	22.5	21.5	21.5	21.5	22.5	22.0	22.5
16	21.5	20.0	20.5	22.5	22.0	22.0	22.0	21.5	21.5	22.5	22.0	22.5
17	21.0	20.5	21.0	22.5	22.0	22.5	21.5	21.0	21.5	22.0	21.5	22.0
18	22.0	21.0	21.5	22.5	22.0	22.5	21.5	21.0	21.0	21.5	21.5	21.5
19	22.0	20.5	21.0	23.5	22.0	22.5	21.5	21.0	21.5	21.5	21.0	21.5
20	21.5	20.5	21.0	24.0	22.0	23.0	21.0	20.5	21.0	21.5	21.0	21.0
21	21.0	21.0	21.0	24.0	22.5	23.5	21.0	20.5	20.5	21.5	21.0	21.0
22	21.5	20.5	21.0	24.5	23.0	24.0	20.5	20.5	20.5	21.5	21.0	21.5
23	21.5	20.5	21.0	24.0	23.0	23.5	20.5	20.0	20.5	21.0	21.0	21.0
24	20.5	20.0	20.5	23.5	23.0	23.0	20.5	20.0	20.0	21.5	21.0	21.0
25	20.5	20.0	20.0	23.0	23.0	23.0	21.0	20.0	20.5	21.5	20.5	21.0
26	20.5	20.0	20.0	23.5	23.0	23.0	21.5	20.5	21.0	21.0	20.5	20.5
27	20.5	20.0	20.0	23.5	23.0	23.0	22.0	21.0	21.5	20.5	20.5	20.5
28	20.5	20.0	20.0	23.5	23.0	23.0	21.5	21.0	21.5	20.5	20.0	20.5
29	21.0	19.5	20.0	23.5	23.0	23.0	21.5	21.0	21.0	20.0	19.5	19.5
30	21.0	19.5	20.0	23.5	23.0	23.0	21.5	21.0	21.0	19.5	19.0	19.5
31	—	—	—	24.0	23.0	23.5	21.5	21.0	21.5	—	—	—
MONTH	22.0	15.5	19.2	24.5	20.0	22.1	24.0	20.0	21.9	23.0	19.0	21.4

STREAMS TRIBUTARY TO LAKE HURON

04137030 AU SABLE RIVER NEAR SIDTOWN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	8.4	7.4	7.8	10.3	10.1	10.2	12.1	11.7	12.0	13.3	13.0	13.1
2	8.6	7.4	8.1	10.3	10.1	10.2	12.4	11.7	12.2	13.3	12.7	13.1
3	8.6	7.6	8.1	10.3	10.1	10.2	12.5	10.9	12.1	13.4	13.0	13.2
4	8.8	7.7	8.3	10.4	10.1	10.2	12.5	11.0	12.2	13.4	13.3	13.3
5	9.0	7.9	8.6	10.6	10.3	10.5	12.5	10.9	12.2	13.4	13.2	13.3
6	9.2	8.1	8.7	10.7	10.5	10.6	12.5	11.7	12.2	13.4	13.2	13.3
7	9.3	8.3	8.8	10.9	10.6	10.7	12.5	11.6	12.2	13.5	13.2	13.4
8	9.5	8.4	9.0	10.9	10.5	10.7	12.6	11.6	12.2	13.6	13.4	13.5
9	9.8	8.4	9.2	10.7	10.6	10.7	12.4	11.6	12.2	13.6	13.4	13.6
10	9.9	8.9	9.5	10.8	10.7	10.8	12.3	11.9	12.1	13.7	13.5	13.6
11	10.1	9.2	9.6	11.1	10.7	10.9	12.4	12.1	12.3	13.8	13.6	13.7
12	10.1	9.0	9.6	11.1	10.9	11.0	12.6	12.3	12.4	13.8	13.6	13.7
13	10.2	9.2	9.7	11.6	11.1	11.4	12.5	12.3	12.4	13.8	13.6	13.7
14	10.1	8.9	9.6	11.7	11.5	11.6	12.5	12.3	12.4	13.8	13.6	13.7
15	10.1	8.8	9.6	11.9	11.6	11.7	12.5	12.3	12.4	13.6	12.9	13.4
16	10.1	8.8	9.5	12.0	11.7	11.9	12.6	12.4	12.5	13.7	13.5	13.6
17	10.2	9.0	9.6	12.1	11.9	12.0	12.6	12.4	12.5	13.6	13.4	13.5
18	10.1	8.9	9.6	12.1	11.9	12.0	12.7	12.4	12.5	13.8	13.5	13.6
19	10.1	8.9	9.6	12.1	11.8	11.9	12.6	12.3	12.5	13.7	13.5	13.6
20	10.0	9.0	9.6	12.2	12.0	12.1	12.6	12.3	12.5	13.6	13.3	13.4
21	10.0	9.1	9.7	12.1	11.9	12.0	12.6	12.4	12.5	13.4	13.3	13.3
22	10.1	9.0	9.6	12.1	11.9	12.0	12.7	12.5	12.6	13.4	13.2	13.3
23	10.0	9.0	9.5	12.0	11.9	12.0	12.8	12.5	12.7	13.2	13.0	13.1
24	10.0	8.9	9.5	12.0	11.9	11.9	12.7	12.6	12.7	13.0	12.9	13.0
25	9.9	8.7	9.4	12.0	11.8	11.9	12.8	12.5	12.6	13.1	12.8	12.9
26	10.0	8.7	9.4	12.0	11.8	11.9	12.8	12.6	12.7	13.0	12.7	12.9
27	10.0	8.7	9.4	12.0	11.8	11.9	13.0	12.7	12.9	12.9	12.6	12.7
28	10.0	9.7	9.8	11.9	11.7	11.8	13.0	12.7	12.9	12.7	12.3	12.5
29	9.8	9.5	9.7	12.0	11.9	11.9	13.1	12.8	13.0	12.8	12.3	12.6
30	10.2	9.2	9.8	12.0	11.7	11.9	13.0	12.9	12.9	12.8	12.5	12.7
31	10.3	10.0	10.1	—	—	—	13.2	12.9	13.0	12.8	12.5	12.6
MONTH	10.3	7.4	9.3	12.2	10.1	11.3	13.2	10.9	12.5	13.8	12.3	13.3

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	12.6	12.3	12.4	11.5	11.1	11.2	12.9	12.5	12.7	10.3	9.9	10.1
2	12.5	12.2	12.4	11.5	11.2	11.3	12.7	12.4	12.5	10.3	9.8	10.1
3	12.3	12.0	12.2	11.4	11.2	11.3	12.5	12.4	12.4	10.3	9.8	10.1
4	12.3	12.0	12.1	11.6	11.3	11.4	12.5	12.3	12.4	10.2	9.7	9.9
5	12.2	11.6	11.9	11.6	11.4	11.5	12.4	12.2	12.3	10.1	9.5	9.8
6	12.0	11.5	11.7	11.8	11.5	11.6	12.5	12.0	12.2	10.0	9.4	9.7
7	11.7	11.4	11.6	11.9	11.8	11.8	12.3	12.0	12.1	10.0	9.3	9.6
8	11.6	11.3	11.5	12.1	11.8	11.9	12.2	11.9	12.0	9.9	9.2	9.5
9	11.5	11.2	11.3	12.3	11.9	12.0	12.1	11.6	11.9	9.9	9.2	9.6
10	11.4	11.3	11.3	12.4	12.1	12.2	12.0	11.6	11.7	10.0	9.2	9.6
11	11.5	11.2	11.3	12.6	12.2	12.4	11.9	11.5	11.6	10.1	9.0	9.7
12	11.4	11.2	11.3	12.5	12.3	12.4	11.8	11.4	11.6	10.2	9.9	10.1
13	11.2	11.0	11.1	12.5	12.3	12.4	11.6	11.3	11.4	10.1	9.9	10.0
14	11.1	11.0	11.0	12.6	12.3	12.5	11.6	11.3	11.4	10.1	9.9	10.0
15	11.1	10.9	11.0	12.9	12.5	12.7	11.4	11.1	11.3	10.3	9.9	10.1
16	11.2	10.9	11.0	13.0	12.6	12.8	11.3	10.9	11.1	10.2	9.6	10.0
17	11.2	11.0	11.1	12.8	12.5	12.7	11.2	10.5	11.1	10.0	9.3	9.7
18	11.4	11.0	11.2	12.7	12.1	12.5	11.1	10.8	10.9	10.0	9.6	9.8
19	11.4	11.1	11.2	12.8	12.5	12.6	10.9	10.7	10.8	9.8	9.4	9.6
20	11.3	10.9	11.2	12.9	12.6	12.7	10.8	10.5	10.7	9.7	8.9	9.2
21	11.1	10.9	11.0	12.9	12.8	12.8	10.8	10.4	10.5	9.1	8.7	8.9
22	11.2	10.9	11.1	12.9	12.6	12.7	10.5	10.3	10.4	9.2	9.0	9.0
23	11.3	11.1	11.2	12.8	12.3	12.6	10.6	10.2	10.4	9.0	8.8	8.9
24	11.3	11.1	11.2	12.9	12.2	12.6	10.5	10.1	10.3	9.3	8.4	9.0
25	11.5	11.1	11.2	13.0	12.2	12.7	10.3	9.2	9.8	8.8	8.3	8.6
26	11.4	11.1	11.2	13.0	12.3	12.8	10.3	9.9	10.0	8.7	8.2	8.5
27	11.4	11.2	11.3	13.2	13.0	13.1	10.3	9.9	10.1	9.1	8.4	8.7
28	11.3	11.0	11.1	13.1	13.1	13.1	10.4	9.9	10.2	9.0	7.5	8.3
29	11.3	11.0	11.1	13.1	13.0	13.1	10.4	10.0	10.2	8.5	7.3	8.0
30	—	—	—	13.0	12.9	13.0	10.4	9.9	10.2	8.4	7.7	8.1
31	—	—	—	13.0	12.9	12.9	—	—	—	9.0	7.8	8.3
MONTH	12.6	10.9	11.4	13.2	11.1	12.4	12.9	9.2	11.2	10.3	7.3	9.4

STREAMS TRIBUTARY TO LAKE HURON

04137030 AU SABLE RIVER NEAR SIDTOWN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.0	7.6	8.5	8.2	2.2	7.5	7.6	4.8	6.1	8.4	5.5	7.0
2	8.5	7.7	8.2	8.0	1.9	5.6	7.4	4.5	6.1	8.5	4.9	7.0
3	8.6	7.6	8.2	8.2	1.9	6.3	7.0	5.8	6.4	8.4	4.6	6.7
4	8.5	7.2	7.9	8.1	1.7	5.7	7.6	4.7	6.7	8.4	5.0	6.9
5	8.4	7.2	7.8	8.1	1.8	6.1	7.8	4.9	6.4	8.6	5.5	6.9
6	9.1	7.3	8.3	7.9	1.9	5.9	7.6	4.6	6.3	8.5	5.4	6.9
7	8.7	8.0	8.4	8.1	1.9	6.0	7.7	3.9	6.1	8.6	5.3	7.0
8	9.1	7.6	8.2	8.0	1.7	6.1	7.8	4.7	6.5	8.3	5.5	6.9
9	8.6	7.5	8.2	7.9	2.3	6.0	7.8	4.9	6.3	8.5	5.7	7.3
10	8.5	8.1	8.3	7.7	2.3	5.6	7.7	5.2	6.5	8.1	7.2	7.7
11	8.6	8.0	8.3	7.9	1.5	5.5	7.6	5.3	6.6	8.3	7.4	7.8
12	8.5	8.0	8.3	7.9	1.5	5.5	7.6	5.2	6.4	8.1	5.4	7.4
13	8.7	8.3	8.5	7.9	2.0	5.8	7.2	6.2	6.7	8.0	4.9	6.9
14	8.9	7.9	8.4	8.1	1.9	6.2	7.6	6.7	7.2	8.0	4.9	6.6
15	8.2	7.3	7.8	7.9	6.8	7.6	7.4	6.0	6.6	7.9	5.6	6.8
16	8.3	7.4	7.8	7.6	5.7	6.8	7.5	6.1	6.8	7.8	5.5	6.8
17	8.1	7.4	7.8	7.9	6.2	7.4	7.2	6.2	6.7	7.8	5.6	6.8
18	8.1	7.6	7.8	7.9	6.8	7.3	7.1	6.3	6.7	7.8	5.2	6.7
19	8.1	7.4	7.8	8.1	2.5	7.0	8.1	6.2	7.0	8.0	5.1	6.8
20	8.3	7.4	7.9	8.1	2.4	5.8	7.8	6.5	7.1	7.8	4.9	6.5
21	8.0	7.4	7.6	8.2	1.7	6.0	7.6	6.5	7.1	7.9	4.9	6.7
22	7.9	7.0	7.5	7.8	2.6	5.8	7.6	6.6	7.0	7.7	5.7	6.7
23	7.9	7.2	7.5	7.3	3.6	5.7	8.1	4.7	7.0	7.3	6.3	6.9
24	7.6	7.1	7.3	6.8	6.2	6.5	8.4	4.6	6.4	7.6	6.1	7.0
25	7.3	6.4	7.0	7.1	5.9	6.6	8.6	5.3	7.0	7.5	6.6	7.2
26	8.0	6.6	7.3	7.8	4.9	6.5	8.4	5.3	6.9	7.8	6.0	7.1
27	7.7	6.5	7.2	8.0	4.5	6.2	8.7	4.7	7.2	7.6	6.3	7.0
28	7.9	6.7	7.2	7.6	4.5	6.0	8.9	4.7	6.9	7.8	6.7	7.3
29	8.3	2.8	7.3	7.6	4.8	6.2	8.5	5.1	7.2	7.9	6.7	7.3
30	8.1	2.2	5.7	7.6	4.6	5.9	8.7	5.4	7.1	7.9	6.8	7.3
31	—	—	—	7.7	4.1	6.0	8.5	5.0	7.0	—	—	—
MONTH	9.1	2.2	7.8	8.2	1.5	6.2	8.9	3.9	6.7	8.6	4.6	7.0

STREAMS TRIBUTARY TO LAKE HURON

04137500 AU SABLE RIVER NEAR AU SABLE, MI

LOCATION.--Lat 44°26'09", long 83°26'28", in NE1/4 NW1/4 sec.35, T.24 N., R.8 E., Iosco County, Hydrologic Unit 04070007, at bridge on Rea Road, 5.5 mi northwest of Au Sable, and 10.4 mi upstream from mouth.

DRAINAGE AREA.--1,739 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1987 to current year. Records for July 1939 to September 1940, published in WSP 874, 894, and 1307, have been found to be unreliable and should not be used.

REVISED RECORDS.--WDR MI-96-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 583.93 ft above sea level.

REMARKS.--Water-discharge records good. Flow regulated by Foote Dam 0.6 mi upstream. Gage-height telemeter 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	918	947	1420	1210	1180	1230	2460	1710	2020	1060	883	1020
2	947	1140	1390	1220	1240	1270	2030	1790	2060	1070	1090	1020
3	1020	1260	1130	1280	1220	1510	1770	1750	2120	1080	1900	1030
4	1130	1830	1130	1520	1150	1420	1840	1640	1950	1150	1430	1030
5	1240	2210	1110	1590	1090	1770	1730	1610	1780	1210	978	1030
6	1300	1880	1050	1460	1110	2260	1770	1630	1650	1230	848	1040
7	1240	1830	1050	1150	1150	2340	1860	1610	1680	1230	842	1150
8	1090	1490	1050	888	1160	1980	1710	1610	1800	1400	870	1080
9	1020	1140	1070	911	1150	1760	1610	1580	1680	1520	867	951
10	987	1060	1580	898	1160	1980	1550	1570	1400	1420	979	954
11	1030	1160	2290	1030	1150	1880	1570	1650	1350	1180	1100	992
12	1000	1400	1920	1570	1140	1660	1570	1740	1380	1080	1250	1010
13	949	1500	1630	1690	1140	1650	1500	1790	1350	1060	1190	917
14	963	1360	1350	1240	1180	1680	1460	1820	1510	1820	1230	948
15	1020	1260	1290	887	1090	1460	1370	2310	1600	1980	1500	1040
16	1100	1250	1340	869	811	1250	1380	2420	1390	1480	1290	1090
17	1040	1250	1390	800	970	1180	1610	2410	1320	1270	973	1060
18	1000	1600	1350	1070	1200	1580	2040	2400	1750	1200	693	919
19	1000	2310	1270	1270	1140	1570	2290	2390	1640	1080	687	870
20	1000	2480	1250	1220	1290	1420	2030	1960	1700	938	911	869
21	981	1820	1230	1070	1500	1590	1920	1710	1620	1070	912	953
22	945	1430	1220	993	1290	1640	1990	1870	1440	1140	913	1010
23	955	1380	1290	1170	1160	1380	1800	2220	1410	1160	854	973
24	946	1820	1250	1240	1200	1340	1800	3370	1310	1180	770	1010
25	949	1710	1180	1120	1090	1410	2050	3790	1210	1180	759	1060
26	944	1310	1220	1110	1130	2200	1950	2970	1120	1180	1090	1030
27	1050	1550	1230	1220	1190	2760	1690	2430	1100	1060	1260	999
28	1180	1710	1230	1230	1380	2520	1750	2250	1130	996	1260	952
29	1090	1460	1240	1170	1390	2520	1740	1980	1160	964	1250	891
30	1030	1190	1240	1040	---	2470	1620	1940	1030	874	1150	911
31	1050	---	1250	1060	---	2580	---	2030	---	782	1040	---
TOTAL	32114	45737	40640	36196	34051	55260	53460	63950	45660	37044	32769	29809
MEAN	1036	1525	1311	1168	1174	1783	1782	2063	1522	1195	1057	994
MAX	1300	2480	2290	1690	1500	2760	2460	3790	2120	1980	1900	1150
MIN	918	947	1050	800	811	1180	1370	1570	1030	782	687	869
CFSM	0.60	0.88	0.75	0.67	0.68	1.03	1.02	1.19	0.88	0.69	0.61	0.57
IN.	0.69	0.98	0.87	0.77	0.73	1.18	1.14	1.37	0.98	0.79	0.70	0.64

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 2004, BY WATER YEAR (WY)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
MEAN	1321	1453	1374	1298	1294	1605	1970	1607	1389	1251	1223	1185						
MAX	1770	1944	1870	1596	1618	2097	2749	2084	1952	2205	1834	1605						
(WY)	1992	1992	1992	1997	1997	1990	1997	1997	1993	1994	1994	1994						
MIN	938	998	972	871	903	1090	1187	1111	1062	916	934	912						
(WY)	2001	2003	2003	2003	2003	2003	2000	1999	2003	2001	2001	2002						

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1987 - 2004
ANNUAL TOTAL	413386	506690	
ANNUAL MEAN	1133	1384	1412
HIGHEST ANNUAL MEAN			1640
LOWEST ANNUAL MEAN			1057
HIGHEST DAILY MEAN	2480	Nov 20	5740
LOWEST DAILY MEAN	623	Jan 22	455
ANNUAL SEVEN-DAY MINIMUM	760	Jan 18	656
MAXIMUM PEAK FLOW		4030	5850
MAXIMUM PEAK STAGE		13.60	16.27
INSTANTANEOUS LOW FLOW		491	135
ANNUAL RUNOFF (CFSM)	0.651	0.796	0.812
ANNUAL RUNOFF (INCHES)	8.84	10.84	11.03
10 PERCENT EXCEEDS	1490	1980	1940
50 PERCENT EXCEEDS	1050	1240	1310
90 PERCENT EXCEEDS	834	949	964

STREAMS TRIBUTARY TO LAKE HURON

04137500 AU SABLE RIVER NEAR AU SABLE, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978-94, 1996 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1978 to September 1981.

WATER TEMPERATURE: April 1978 to September 1981, July 1996 to current year.

DISSOLVED OXYGEN: July 1996 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter from July 11, 1996, set for one hour measurement interval.

REMARKS.--Water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: Oct. 7-9, Nov. 9-14, July 19-28, Sept. 5-9, 25-30 rated good; and Nov. 15-19, July 29 to Aug. 5 rated fair.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1978-79): Maximum daily, 346 microsiemens, Nov. 21, 1978; minimum daily, 229 microsiemens, Apr. 19, 21, 1979.

WATER TEMPERATURE (water years 1979-80, 1996-2004): Maximum measured, 28.0°C, Aug. 8, 1979; minimum, 0.0°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum, 13.7 mg/L, Jan. 8, 9, 2004; minimum, 5.5 mg/L, July 19, 2002.

EXTREMES OUTSIDE PERIOD OF DAILY RECORD.--Specific conductance of 354 microsiemens was measured Feb. 3, 1988.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 25.0°C, July 22; minimum, 0.0°C, on many days during winter period.

DISSOLVED OXYGEN: Maximum, 13.7 mg/L, Jan. 8, 9; minimum, 6.5 mg/L, July 22.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	16.5	16.0	16.5	10.5	10.0	10.0	4.0	3.5	4.0	1.0	0.5	1.0
2	16.0	15.5	15.5	10.0	10.0	10.0	3.5	3.0	3.5	1.0	0.5	1.0
3	15.5	14.5	15.0	10.0	9.5	10.0	3.0	2.5	3.0	1.0	0.5	1.0
4	14.5	14.0	14.5	9.5	9.5	9.5	3.0	2.5	3.0	0.5	0.5	0.5
5	14.0	13.5	14.0	9.5	9.5	9.5	3.0	3.0	3.0	0.5	0.5	0.5
6	14.0	13.5	13.5	9.5	9.0	9.0	3.0	2.0	2.5	0.5	0.5	0.5
7	14.0	13.0	13.5	9.0	8.5	8.5	2.5	2.0	2.5	0.5	0.5	0.5
8	14.5	13.5	13.5	8.5	8.0	8.0	2.5	2.0	2.5	0.5	0.5	0.5
9	14.5	13.5	14.0	8.0	7.5	7.5	2.5	2.5	2.5	0.5	0.5	0.5
10	14.0	13.5	14.0	7.5	7.0	7.5	2.5	2.5	2.5	0.5	0.5	0.5
11	14.5	13.5	14.0	7.0	7.0	7.0	2.5	2.0	2.5	0.5	0.5	0.5
12	14.5	14.0	14.0	7.0	7.0	7.0	2.0	2.0	2.0	0.5	0.5	0.5
13	14.5	14.0	14.0	7.0	6.0	6.5	2.0	1.5	2.0	0.5	0.5	0.5
14	14.0	14.0	14.0	6.0	6.0	6.0	2.0	2.0	2.0	0.5	0.5	0.5
15	14.0	13.5	13.5	6.0	6.0	6.0	2.0	1.5	2.0	0.5	0.5	0.5
16	13.5	13.0	13.0	6.0	6.0	6.0	2.0	1.5	2.0	0.5	0.5	0.5
17	13.0	13.0	13.0	6.0	6.0	6.0	2.0	1.5	1.5	0.5	0.5	0.5
18	13.0	12.5	12.5	6.0	6.0	6.0	1.5	1.5	1.5	0.5	0.5	0.5
19	12.5	12.5	12.5	6.0	6.0	6.0	1.5	1.0	1.5	0.5	0.5	0.5
20	13.0	12.0	12.5	6.0	6.0	6.0	1.0	1.0	1.0	0.5	0.5	0.5
21	12.5	12.0	12.5	6.0	6.0	6.0	1.0	1.0	1.0	0.5	0.0	0.5
22	12.0	11.5	12.0	6.0	5.5	6.0	1.0	1.0	1.0	0.5	0.0	0.5
23	11.5	11.5	11.5	6.0	5.5	6.0	1.0	1.0	1.0	0.5	0.0	0.5
24	11.5	11.5	11.5	6.0	5.5	6.0	1.0	0.5	1.0	0.5	0.0	0.5
25	11.5	11.0	11.0	5.5	5.0	5.5	1.0	0.5	0.5	0.5	0.0	0.0
26	11.0	11.0	11.0	5.0	5.0	5.0	1.0	0.5	0.5	0.5	0.0	0.0
27	11.0	10.5	11.0	5.0	4.5	5.0	1.0	0.5	1.0	0.5	0.0	0.0
28	10.5	10.5	10.5	4.5	4.5	4.5	1.0	0.5	1.0	0.5	0.0	0.0
29	10.5	10.0	10.0	4.5	4.5	4.5	1.0	1.0	1.0	0.5	0.0	0.0
30	10.0	10.0	10.0	4.5	4.0	4.0	1.0	0.5	1.0	0.0	0.0	0.0
31	10.5	10.0	10.0	—	—	—	1.0	0.5	1.0	0.5	0.0	0.0
MONTH	16.5	10.0	12.8	10.5	4.0	6.8	4.0	0.5	1.8	1.0	0.0	0.4

STREAMS TRIBUTARY TO LAKE HURON

04137500 AU SABLE RIVER NEAR AU SABLE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	0.5	0.0	0.0	0.0	0.0	0.0	3.0	2.5	3.0	11.0	11.0	11.0	
2	0.5	0.0	0.0	0.5	0.0	0.0	3.5	3.0	3.5	11.0	10.5	11.0	
3	0.0	0.0	0.0	0.5	0.0	0.0	4.0	3.5	3.5	10.5	10.5	10.5	
4	0.5	0.0	0.0	0.5	0.0	0.5	4.0	3.5	3.5	11.0	10.5	10.5	
5	0.0	0.0	0.0	0.5	0.0	0.5	4.0	3.5	4.0	11.0	10.5	11.0	
6	0.0	0.0	0.0	0.5	0.5	0.5	4.0	4.0	4.0	11.0	11.0	11.0	
7	0.0	0.0	0.0	0.5	0.5	0.5	4.5	4.0	4.0	11.5	11.0	11.0	
8	0.0	0.0	0.0	0.5	0.5	0.5	4.5	4.5	4.5	11.5	11.0	11.0	
9	0.0	0.0	0.0	0.5	0.5	0.5	5.0	4.5	5.0	11.5	11.0	11.0	
10	0.0	0.0	0.0	0.5	0.5	0.5	5.0	4.5	5.0	12.5	11.0	12.0	
11	0.0	0.0	0.0	1.0	0.5	0.5	5.5	5.0	5.0	12.5	12.0	12.5	
12	0.0	0.0	0.0	0.5	0.5	0.5	6.0	5.5	5.5	13.5	12.0	12.5	
13	0.5	0.0	0.0	1.0	0.5	0.5	6.0	5.5	6.0	14.0	13.0	13.5	
14	0.0	0.0	0.0	0.5	0.5	0.5	6.5	6.0	6.0	15.0	13.5	14.0	
15	0.0	0.0	0.0	1.0	0.5	1.0	7.0	6.0	6.5	15.0	14.0	14.5	
16	0.5	0.0	0.0	1.0	0.5	0.5	7.5	6.5	7.0	14.5	14.0	14.0	
17	0.0	0.0	0.0	1.0	0.5	1.0	8.0	7.0	7.5	15.0	14.0	14.5	
18	0.0	0.0	0.0	1.0	0.5	1.0	9.0	7.5	8.0	15.5	15.0	15.0	
19	0.5	0.0	0.0	1.0	0.5	1.0	9.0	8.5	9.0	15.5	15.0	15.0	
20	0.0	0.0	0.0	1.0	0.5	1.0	9.0	9.0	9.0	16.5	15.0	15.5	
21	0.0	0.0	0.0	1.0	0.5	1.0	10.0	9.0	9.5	16.5	15.5	16.0	
22	0.0	0.0	0.0	1.5	1.0	1.0	10.0	9.5	9.5	15.5	15.5	15.5	
23	0.0	0.0	0.0	1.5	1.0	1.0	10.0	10.0	10.0	15.5	15.0	15.5	
24	0.5	0.0	0.0	1.5	1.0	1.5	10.0	10.0	10.0	15.0	15.0	15.0	
25	0.5	0.0	0.0	1.5	1.5	1.5	10.0	10.0	10.0	15.0	15.0	15.0	
26	0.5	0.0	0.0	1.5	1.5	1.5	10.5	10.0	10.0	15.0	15.0	15.0	
27	0.5	0.0	0.0	1.5	1.5	1.5	10.5	10.0	10.0	15.5	15.0	15.0	
28	0.5	0.0	0.0	2.0	1.5	1.5	10.0	10.0	10.0	15.5	15.0	15.5	
29	0.5	0.0	0.0	2.0	2.0	2.0	11.0	10.0	10.5	15.5	15.0	15.5	
30	—	—	—	2.5	2.0	2.5	11.0	11.0	11.0	15.5	15.5	15.5	
31	—	—	—	3.0	2.5	2.5	—	—	—	15.5	15.5	15.5	
MONTH	0.5	0.0	0.0	3.0	0.0	0.9	11.0	2.5	7.0	16.5	10.5	13.5	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	16.5	15.5	16.0	20.5	20.0	20.0	23.5	23.0	23.0	21.5	21.0	21.5
2	16.0	16.0	16.0	20.5	20.0	20.0	24.0	23.0	23.5	21.5	21.0	21.5
3	16.5	16.0	16.0	21.0	20.0	20.5	23.5	23.0	23.5	22.0	21.0	21.5
4	16.5	16.0	16.0	21.5	20.5	20.5	24.0	23.5	23.5	22.0	21.5	21.5
5	17.0	16.0	16.5	22.0	21.0	21.5	23.5	23.0	23.5	22.0	21.5	22.0
6	17.0	16.5	17.0	21.5	20.5	21.0	23.0	22.5	23.0	22.5	21.5	22.0
7	18.5	17.0	17.5	21.5	20.5	21.0	23.5	22.5	23.0	22.5	22.0	22.5
8	19.5	17.5	18.5	21.0	21.0	21.0	23.5	22.5	23.0	22.5	22.0	22.0
9	19.5	18.5	19.0	21.0	20.5	21.0	23.0	22.5	23.0	22.0	21.5	22.0
10	18.5	18.0	18.5	21.0	20.5	21.0	23.0	22.5	22.5	22.0	21.5	21.5
11	18.5	17.5	18.0	21.5	20.5	21.0	22.5	22.0	22.5	22.0	21.5	21.5
12	18.5	18.0	18.0	21.5	21.0	21.0	22.0	21.5	22.0	22.0	21.5	21.5
13	19.5	18.0	18.5	22.5	21.5	22.0	21.5	21.5	21.5	22.5	21.5	22.0
14	20.0	19.0	19.5	23.0	22.0	22.5	21.5	21.0	21.5	22.5	22.0	22.0
15	20.0	19.0	19.5	22.5	22.0	22.5	21.5	21.0	21.5	22.5	22.0	22.0
16	20.5	19.0	19.5	22.5	22.0	22.0	22.0	21.0	21.5	22.5	22.0	22.0
17	20.5	19.5	20.0	22.5	22.0	22.0	21.5	21.0	21.5	22.0	21.5	22.0
18	21.5	20.0	21.0	22.5	22.0	22.0	22.0	21.0	21.5	21.5	21.0	21.5
19	21.5	21.0	21.0	23.0	22.0	22.5	22.0	21.0	21.5	21.5	21.0	21.0
20	21.0	20.5	21.0	23.0	22.5	23.0	21.5	21.0	21.0	21.5	21.0	21.0
21	20.5	20.0	20.5	23.5	22.5	23.0	21.5	20.5	21.0	21.5	21.0	21.0
22	21.0	20.0	20.5	25.0	23.0	24.0	21.5	20.5	21.0	21.5	21.0	21.0
23	20.5	20.0	20.0	24.5	23.0	24.0	21.0	20.5	21.0	21.5	21.0	21.0
24	20.0	19.5	20.0	23.5	22.5	23.0	21.0	20.5	20.5	21.5	21.0	21.5
25	20.0	19.5	19.5	23.0	22.5	22.5	21.5	20.5	21.0	21.0	21.0	21.0
26	20.5	19.5	20.0	23.0	22.5	22.5	21.5	21.0	21.0	21.5	20.5	21.0
27	20.0	19.5	20.0	22.5	22.5	22.5	22.5	21.5	22.0	21.0	20.5	20.5
28	20.5	19.5	20.0	23.0	22.5	22.5	22.0	21.5	22.0	20.5	20.0	20.5
29	20.5	20.0	20.0	23.0	22.5	23.0	21.5	21.5	21.5	20.0	19.5	19.5
30	20.5	20.0	20.0	23.0	22.5	23.0	21.5	21.0	21.5	20.0	19.5	19.5
31	---	---	---	23.5	22.5	23.0	21.5	21.0	21.5	---	---	---
MONTH	21.5	15.5	18.9	25.0	20.0	22.0	24.0	20.5	22.0	22.5	19.5	21.4

STREAMS TRIBUTARY TO LAKE HURON

04137500 AU SABLE RIVER NEAR AU SABLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	8.8	8.2	8.5	10.0	9.7	9.8	12.5	12.0	12.3	13.2	12.9	13.0
2	9.1	8.4	8.7	9.9	9.6	9.8	12.7	12.4	12.6	13.1	12.9	13.0
3	9.1	8.4	8.8	9.9	9.6	9.8	12.8	12.6	12.7	13.2	13.0	13.1
4	9.0	8.5	8.8	9.9	9.8	9.8	12.9	12.6	12.7	13.2	13.0	13.1
5	9.1	8.6	8.9	10.0	9.8	9.9	12.9	12.7	12.8	13.4	13.0	13.2
6	9.4	8.8	9.1	10.1	9.5	9.9	13.2	12.8	13.0	13.4	13.1	13.2
7	9.5	9.1	9.4	10.4	10.0	10.2	13.2	12.9	13.0	13.5	13.3	13.4
8	9.5	9.1	9.3	10.5	10.3	10.4	13.1	12.9	13.0	13.7	13.3	13.5
9	9.7	9.1	9.3	10.8	10.5	10.6	13.0	12.8	12.9	13.7	13.3	13.5
10	9.4	9.1	9.2	10.8	10.6	10.7	12.9	12.6	12.7	13.6	13.4	13.5
11	9.2	8.9	9.1	10.8	10.6	10.7	13.0	12.8	12.9	13.4	13.1	13.3
12	9.4	8.9	9.1	10.8	10.7	10.7	13.0	12.7	12.9	13.3	12.8	13.2
13	9.3	8.8	9.1	11.3	10.7	11.1	13.2	12.9	13.0	13.3	13.1	13.2
14	9.0	8.8	8.9	12.1	11.2	11.3	13.1	12.9	13.0	13.3	13.1	13.2
15	9.1	8.8	8.9	11.5	11.3	11.4	13.0	12.6	12.9	13.4	13.2	13.3
16	9.1	8.9	9.0	12.5	11.3	11.5	13.0	12.8	12.9	13.4	13.1	13.3
17	9.2	8.9	9.0	11.5	11.4	11.4	12.9	12.7	12.8	13.3	13.1	13.2
18	9.2	8.9	9.0	11.6	11.5	11.5	13.0	12.7	12.8	13.2	13.0	13.1
19	9.2	8.9	9.1	12.0	11.4	11.7	13.0	12.8	12.9	13.2	12.7	13.0
20	9.2	8.9	9.0	11.9	11.7	11.8	13.2	12.8	13.0	13.2	12.8	13.0
21	9.1	8.7	8.9	11.9	11.7	11.8	13.2	12.8	13.0	13.1	12.7	13.0
22	9.1	8.8	8.9	11.9	11.7	11.8	13.1	12.7	13.0	13.2	12.9	13.0
23	9.2	8.7	8.9	11.9	11.6	11.8	13.1	12.8	13.0	13.0	12.7	12.9
24	9.5	9.1	9.3	12.1	11.8	11.9	13.2	12.6	13.0	12.9	12.8	12.9
25	9.6	9.2	9.4	12.2	12.0	12.1	13.1	12.9	13.0	13.0	12.8	12.9
26	9.5	9.2	9.3	12.3	12.0	12.1	13.2	12.8	13.0	12.9	12.6	12.8
27	9.5	9.2	9.3	12.1	12.0	12.1	13.2	12.7	13.0	12.9	12.5	12.8
28	9.4	9.1	9.3	12.2	12.0	12.1	13.1	12.6	13.0	12.8	12.3	12.6
29	9.6	9.3	9.4	12.4	12.0	12.2	13.1	12.6	12.9	12.8	12.3	12.6
30	9.9	9.4	9.6	12.3	11.3	12.1	13.2	12.7	12.9	12.6	12.2	12.5
31	9.8	9.6	9.7	—	—	—	13.1	12.7	12.9	12.6	12.3	12.5
MONTH	9.9	8.2	9.1	12.5	9.5	11.1	13.2	12.0	12.9	13.7	12.2	13.1

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	12.7	12.4	12.6	12.1	11.7	11.9	12.9	12.6	12.8	10.4	9.8	10.2
2	12.7	12.1	12.4	12.0	11.4	11.8	12.9	12.4	12.7	10.3	9.8	10.1
3	12.6	12.1	12.4	12.1	11.7	11.9	12.8	12.5	12.6	10.4	9.7	10.2
4	12.6	12.2	12.4	12.1	11.7	11.9	12.8	12.5	12.7	10.3	9.7	10.1
5	13.0	12.1	12.7	12.0	11.8	11.9	12.8	12.5	12.7	10.2	9.4	10.0
6	12.9	12.6	12.8	11.9	11.7	11.8	12.8	12.4	12.7	10.1	9.5	9.9
7	12.9	12.6	12.7	12.0	11.8	11.9	12.8	12.5	12.7	10.2	9.5	9.9
8	12.8	12.5	12.7	12.3	11.9	12.1	12.7	12.3	12.5	10.0	9.6	9.9
9	12.7	12.5	12.6	12.3	11.6	12.1	12.6	12.1	12.4	10.0	9.0	9.7
10	12.7	12.4	12.6	12.4	12.1	12.2	12.5	11.9	12.2	10.2	9.4	9.8
11	12.7	12.4	12.5	12.4	12.2	12.3	12.4	11.9	12.2	10.1	9.3	9.8
12	12.6	12.4	12.5	12.5	12.0	12.3	12.3	11.6	12.0	9.8	9.3	9.6
13	12.5	12.3	12.4	12.6	12.2	12.5	12.3	11.6	11.9	9.7	9.1	9.5
14	12.5	12.1	12.4	12.6	12.2	12.5	12.1	11.5	11.8	9.5	9.1	9.3
15	12.6	12.2	12.4	12.7	12.3	12.5	11.9	11.5	11.8	9.6	8.9	9.3
16	12.7	12.3	12.5	12.8	12.5	12.7	11.9	11.3	11.7	9.5	9.0	9.3
17	12.6	12.1	12.4	12.7	12.5	12.7	11.8	11.3	11.6	9.4	9.0	9.2
18	12.3	12.1	12.2	12.8	12.6	12.7	11.8	11.4	11.6	9.3	8.9	9.1
19	12.4	12.0	12.2	13.0	12.7	12.9	11.6	11.0	11.3	9.2	8.3	9.0
20	12.2	11.9	12.1	12.9	12.5	12.7	11.4	10.9	11.2	8.9	8.2	8.7
21	12.1	11.9	12.0	12.9	12.5	12.7	11.1	10.5	10.9	8.9	8.0	8.5
22	12.3	12.0	12.1	13.0	12.5	12.8	11.0	10.5	10.8	9.0	8.4	8.8
23	12.3	11.9	12.2	13.0	12.7	12.8	10.9	10.4	10.7	8.9	8.4	8.7
24	12.2	11.8	12.0	12.9	12.6	12.8	10.8	10.0	10.6	9.4	8.5	9.0
25	12.2	11.9	12.0	12.9	12.6	12.8	10.7	10.4	10.5	9.3	8.7	9.0
26	12.2	11.9	12.0	13.0	12.7	12.8	10.6	10.2	10.4	8.9	8.4	8.6
27	12.1	11.8	12.0	13.0	12.7	12.9	10.4	9.7	10.1	8.7	8.4	8.6
28	12.1	11.8	11.9	13.0	12.8	12.9	10.6	9.4	10.2	8.8	8.5	8.6
29	12.1	11.7	11.9	13.0	12.8	12.9	10.4	10.1	10.3	8.7	8.3	8.5
30	—	—	—	12.9	12.8	12.9	10.4	10.0	10.2	8.6	8.1	8.4
31	—	—	—	12.9	12.7	12.8	—	—	—	8.6	8.3	8.4
MONTH	13.0	11.7	12.3	13.0	11.4	12.5	12.9	9.4	11.6	10.4	8.0	9.3

STREAMS TRIBUTARY TO LAKE HURON

04137500 AU SABLE RIVER NEAR AU SABLE, MI--Continued

OXYGEN DISSOLVED (MGL), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.7	8.2	8.5	7.8	7.1	7.4	8.0	7.3	7.5	8.3	7.7	7.9
2	8.5	8.1	8.4	7.7	7.1	7.4	7.7	7.0	7.3	8.2	7.5	7.8
3	8.5	8.1	8.3	7.8	7.1	7.3	7.5	7.1	7.3	8.4	7.6	8.0
4	8.6	7.9	8.2	7.5	7.0	7.2	7.6	7.0	7.3	8.5	7.7	8.0
5	8.5	8.0	8.3	7.7	7.2	7.4	7.9	7.0	7.5	8.3	7.7	8.0
6	8.5	7.8	8.2	7.3	6.6	7.0	8.0	7.3	7.7	8.3	7.6	7.8
7	9.1	8.2	8.6	7.3	6.6	7.0	8.0	7.4	7.6	8.3	7.7	7.9
8	8.9	8.2	8.5	7.4	7.1	7.2	7.9	7.4	7.6	8.4	7.6	8.0
9	8.7	7.9	8.3	7.6	7.2	7.3	8.0	7.3	7.6	8.4	7.6	7.9
10	8.0	7.8	7.9	7.5	7.0	7.2	8.1	7.3	7.7	8.5	7.8	8.1
11	8.0	7.7	7.8	7.3	6.9	7.1	7.9	7.2	7.6	8.4	7.6	7.9
12	8.1	7.7	7.9	7.5	6.7	7.1	8.7	7.2	8.0	8.3	7.6	8.0
13	8.1	7.7	7.9	7.4	6.8	7.1	7.7	7.2	7.5	8.4	7.6	7.9
14	8.2	7.7	8.0	7.6	6.9	7.3	7.8	7.2	7.5	8.2	7.5	7.8
15	8.1	7.5	7.8	7.7	7.2	7.5	7.8	7.3	7.5	8.2	7.4	7.7
16	7.9	7.4	7.6	7.5	7.1	7.3	8.1	7.2	7.6	8.4	7.5	7.9
17	7.8	7.3	7.5	7.4	6.8	7.1	7.9	7.2	7.5	8.3	7.4	7.9
18	7.9	7.4	7.6	7.4	6.8	7.0	8.2	7.3	7.6	8.2	7.4	7.9
19	7.7	7.4	7.6	7.4	6.8	7.1	8.2	7.4	7.8	8.1	7.3	7.8
20	7.7	7.3	7.5	7.4	6.8	7.1	8.2	7.6	7.8	8.1	7.3	7.7
21	7.4	7.0	7.2	7.2	6.5	6.8	8.2	7.5	7.8	8.3	7.5	7.8
22	7.3	7.0	7.1	7.2	6.5	6.9	8.2	7.3	7.7	8.4	7.6	7.9
23	7.2	6.8	7.0	7.3	6.7	7.0	8.0	7.3	7.6	8.3	7.5	7.8
24	7.3	6.9	7.1	7.3	6.7	7.0	8.3	7.6	7.8	8.2	7.4	7.7
25	7.4	7.1	7.2	7.2	6.7	7.0	8.4	7.6	7.8	8.0	7.4	7.7
26	7.5	7.0	7.3	7.3	6.7	7.0	8.3	7.6	7.9	8.0	7.4	7.7
27	7.6	7.2	7.4	7.3	6.9	7.1	8.5	7.7	8.0	8.1	7.4	7.7
28	7.5	7.2	7.3	7.5	7.1	7.3	8.2	7.7	7.9	8.0	7.5	7.7
29	7.6	7.2	7.4	7.8	7.2	7.5	8.2	7.7	7.9	8.2	7.5	7.8
30	7.5	7.1	7.3	7.5	7.1	7.3	8.2	7.6	7.9	8.2	7.7	7.9
31	—	—	—	7.7	7.1	7.4	8.3	7.6	7.9	—	—	—
MONTH	9.1	6.8	7.8	7.8	6.5	7.2	8.7	7.0	7.7	8.5	7.3	7.9

STREAMS TRIBUTARY TO LAKE HURON

04142000 RIFLE RIVER NEAR STERLING, MI

LOCATION.--Lat 44°04'21", long 84°01'12", in NE1/4 SW1/4 sec.5, T.19 N., R.4 E., Arenac County, Hydrologic Unit 04080101, on left bank 30 ft downstream from bridge on Melita Road, 2.8 mi north of Sterling, and 20 mi upstream from mouth.

DRAINAGE AREA.--320 mi², approximately.

PERIOD OF RECORD.--November 1905 to December 1908 (gage heights and discharge measurements only), October 1936 to current year. Monthly discharge only for some periods, published in WSP 1307. Published as Rifle River at Michigan Highway 70 near Sterling 1936-61.

REVISED RECORDS.--WSP 1437: 1937(M), 1939-40(M).

GAGE.--Water-stage recorder. Datum of gage is 649.48 ft above sea level. November 1905 to December 1908, nonrecording gage at site 400 ft downstream at different datum. Jan. 13, 1937 to Jan. 10, 1939, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Occasional regulation by dams upstream from station. Gage-height telemeter 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	149	188	272	266	e232	e286	e550	679	797	202	174	147
2	149	221	252	255	e229	e340	e480	791	752	196	169	146
3	150	e300	229	561	e227	e441	e420	610	714	192	193	143
4	170	e450	223	704	e227	e730	378	524	548	210	202	141
5	177	e810	240	e406	e227	e1200	341	490	454	251	168	140
6	163	593	220	e347	e230	e2050	e330	464	403	225	160	142
7	154	356	224	e216	e230	2140	e340	492	369	220	156	171
8	151	269	209	e198	e230	1660	357	539	337	215	153	165
9	148	230	200	e195	e230	1380	362	1070	344	218	153	149
10	147	268	265	e200	e231	1190	334	2170	384	234	156	144
11	147	288	720	e220	e231	1140	320	1620	357	213	157	141
12	147	297	676	e229	e236	989	308	1050	321	190	158	139
13	150	281	408	e229	e236	828	296	855	320	e190	160	139
14	151	262	375	e226	e232	734	284	1140	338	e220	164	138
15	156	230	307	e219	e228	629	274	1890	314	e240	168	136
16	165	222	277	e219	e228	e576	268	1440	314	211	150	136
17	161	255	291	e222	e228	513	298	988	297	198	151	146
18	159	372	284	e218	e235	481	e590	1110	276	191	156	140
19	158	893	268	e218	e239	445	e970	1220	257	181	154	139
20	158	852	251	e221	e242	527	718	923	238	207	147	136
21	159	525	249	e224	e242	793	576	723	245	304	144	136
22	163	366	239	e227	e250	675	629	700	273	287	142	135
23	160	311	239	e226	e260	554	499	1130	246	262	142	134
24	158	404	243	e226	e260	487	444	2480	278	201	142	132
25	165	427	246	e226	e258	508	509	e2460	256	186	143	132
26	170	334	243	e226	e248	923	635	1630	247	178	159	134
27	161	296	251	e226	e248	1310	533	1130	248	174	185	138
28	162	286	248	e226	e248	1140	470	898	253	175	174	138
29	177	311	259	e230	e263	884	446	730	241	171	163	134
30	174	290	317	e231	---	766	393	610	210	169	159	135
31	163	---	294	e231	---	644	---	578	---	176	152	---
TOTAL	4922	11187	9019	8068	6905	26963	13352	33134	10631	6487	4954	4226
MEAN	159	373	291	260	238	870	445	1069	354	209	160	141
MAX	177	893	720	704	263	2140	970	2480	797	304	202	171
MIN	147	188	200	195	227	286	268	464	210	169	142	132
CFSM	0.50	1.17	0.91	0.81	0.74	2.72	1.39	3.34	1.11	0.65	0.50	0.44
IN.	0.57	1.30	1.05	0.94	0.80	3.13	1.55	3.85	1.24	0.75	0.58	0.49

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2004, BY WATER YEAR (WY)

MEAN	237	291	283	251	288	556	623	403	290	194	180	202
MAX	741	826	579	538	741	1035	1160	1069	842	335	339	712
(WY)	1987	1993	1992	1973	1938	1991	1959	2004	1945	1969	1995	1986
MIN	142	160	156	150	138	206	262	175	124	126	122	124
(WY)	1964	1964	1964	2003	2003	1964	1945	1977	1964	1966	1964	1948

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1937 - 2004

ANNUAL TOTAL	86087	139848	
ANNUAL MEAN	236	382	(a)317
HIGHEST ANNUAL MEAN			501
LOWEST ANNUAL MEAN			166
HIGHEST DAILY MEAN	1250	May 25	4500
LOWEST DAILY MEAN	118	Mar 10	98
ANNUAL SEVEN-DAY MINIMUM	120	Mar 5	105
MAXIMUM PEAK FLOW		(b)2740	(c)5340
MAXIMUM PEAK STAGE		(d)11.39	13.74
INSTANTANEOUS LOW FLOW		131	(f)75
ANNUAL RUNOFF (CFSM)	0.737	1.19	0.990
ANNUAL RUNOFF (INCHES)	10.01	16.26	13.45
10 PERCENT EXCEEDS	416	794	560
50 PERCENT EXCEEDS	173	243	230
90 PERCENT EXCEEDS	131	148	150

(a) Does not include water year 1937.

(b) Gage height 8.61 ft.

(c) From rating curve extended above 3,800 ft³/s.

(d) Backwater from ice.

(e) Estimated.

(f) Part of each day Sept. 24, 25.

(g) Result of freezeup.

STREAMS TRIBUTARY TO LAKE HURON

04144500 SHIAWASSEE RIVER AT OWOSSO, MI

LOCATION.--Lat 43°00'54", long 84°10'52", in SW1/4 sec.12, T.7 N., R.2 E., Shiawassee County, Hydrologic Unit 04080203, on right bank on grounds of sewage-treatment plant, 1.5 mi north of Owosso.

DRAINAGE AREA.--538 mi².

PERIOD OF RECORD.--March 1931 to current year. Gage-height records for flood seasons collected in this vicinity 1904, 1910-30 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 1307: 1949(M). WSP 1337: 1932, 1934, 1936-38, 1944.

GAGE.--Water-stage recorder. Datum of gage is 707.25 ft above sea level. Prior to Oct. 15, 1933, at site 1.5 mi upstream at datum 5.46 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated below approximately 800 ft³/s by powerplant at Shiawassee town prior to February 1953; occasional regulation at low stages since. Gage-height telemeter 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	122	146	364	654	e175	927	484	187	907	165	456	220
2	112	295	341	742	e200	1440	442	260	756	159	456	210
3	108	309	315	680	228	1340	407	335	690	151	441	167
4	88	423	288	632	e225	1070	387	373	631	158	587	139
5	65	474	271	602	e250	1940	336	395	550	140	510	133
6	60	489	261	525	250	1750	322	347	500	148	438	131
7	60	483	252	338	253	1280	322	334	439	242	406	143
8	56	450	245	377	e250	1190	335	353	311	321	348	171
9	62	340	237	357	e250	1160	328	1030	301	376	294	174
10	63	242	244	381	244	1040	368	1190	413	427	226	143
11	71	190	249	e350	e250	921	329	1680	578	461	243	108
12	98	160	250	e350	241	774	325	1250	651	513	212	85
13	98	216	207	e300	244	602	316	1060	702	429	189	92
14	114	243	244	e250	e250	576	277	1140	731	392	174	85
15	81	266	245	e175	e250	545	237	1280	848	350	160	75
16	70	262	204	e175	e225	522	222	1060	873	444	147	78
17	93	230	189	e225	e225	489	219	900	822	463	137	77
18	92	259	175	e250	e225	461	216	840	774	322	132	83
19	80	374	167	e250	236	438	207	729	693	333	133	82
20	75	377	164	e250	244	467	204	624	593	437	130	78
21	83	392	155	e275	281	489	205	842	529	512	123	70
22	127	402	201	e250	338	490	216	1940	422	546	115	65
23	132	373	197	e250	412	457	224	3010	384	570	113	63
24	135	460	306	e250	e500	510	196	3970	356	531	110	60
25	157	438	354	e225	e525	468	198	3310	336	514	109	58
26	140	405	366	e200	e550	638	185	2910	343	456	100	55
27	115	393	329	e200	e525	762	153	2420	324	381	97	53
28	113	363	334	e175	e525	746	139	1980	278	426	115	53
29	85	363	596	e175	710	707	145	1580	196	412	182	53
30	88	375	848	e175	—	643	146	1320	180	444	159	56
31	110	—	724	e175	—	573	—	1100	—	462	237	—
TOTAL	2953	10192	9322	10213	9081	25415	8090	39749	16111	11685	7279	3060
MEAN	95.3	340	301	329	313	820	270	1282	537	377	235	102
MAX	157	489	848	742	710	1940	484	3970	907	570	587	220
MIN	56	146	155	175	175	438	139	187	180	140	97	53
CFSM	0.18	0.63	0.56	0.61	0.58	1.52	0.50	2.38	1.00	0.70	0.44	0.19
IN.	0.20	0.70	0.64	0.71	0.63	1.76	0.56	2.75	1.11	0.81	0.50	0.21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2004, BY WATER YEAR (WY)

	198	263	316	348	461	751	707	471	283	167	125	147
MEAN	198	263	316	348	461	751	707	471	283	167	125	147
MAX	1442	985	922	1066	1728	1682	2060	1950	1051	868	578	922
(WY)	1982	1993	1976	1993	1938	1948	1947	1956	1989	1994	1992	1975
MIN	32.6	52.1	56.6	66.9	65.5	119	162	119	34.0	24.0	13.2	25.0
(WY)	1964	1964	1964	1940	1940	1964	1931	1958	1934	1934	1931	1931

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1931 - 2004

ANNUAL TOTAL	83441	153150	355
ANNUAL MEAN	229	418	629
HIGHEST ANNUAL MEAN			97.7
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	1320	3970	5920
LOWEST DAILY MEAN	34	53	2.0
ANNUAL SEVEN-DAY MINIMUM	36	55	7.7
MAXIMUM PEAK FLOW		4220	6240
MAXIMUM PEAK STAGE		9.04	10.35
INSTANTANEOUS LOW FLOW		52	0.20
ANNUAL RUNOFF (CFSM)	0.425	0.778	0.659
ANNUAL RUNOFF (INCHES)	5.77	10.59	8.96
10 PERCENT EXCEEDS	499	827	796
50 PERCENT EXCEEDS	127	298	205
90 PERCENT EXCEEDS	49	96	65

(a) Part of each day Oct. 8, Sept. 28-30.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04145000 SHIAWASSEE RIVER NEAR FERGUS, MI

LOCATION.--Lat 43°15'17", long 84°06'20", in SE 1/4 NW 1/4 sec.22, T.10 N., R.3 E., Saginaw County, Hydrologic Unit 04080203, on right bank at downstream side of bridge on Fergus Road, 1.2 mi east of Fergus, 1.8 mi upstream from Bear Creek, and 14 mi upstream from mouth.

DRAINAGE AREA.--637 mi².

PERIOD OF RECORD.--October 1939 to September 1984, October 1988 to September 1994, October 2001 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 1337: 1940(M), 1941-42, 1943(M), 1944, 1945(M), 1946, 1947(M), 1948, 1950. WSP 1627: 1952, 1954(M), 1957.

GAGE.--Water-stage recorder. Datum of gage is 585.80 ft above sea level. Prior to Aug. 22, 1968, nonrecording gage at same site and datum. Prior to Oct. 1, 1970, at datum 2.00 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor. Some regulation at low stages by powerplant at Shiawassee town prior to February 1953; occasional regulation at low stages since. Gage-height telemeter 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	141	102	386	784	e220	e950	671	212	1420	260	498	259
2	136	198	362	790	e230	e1590	576	279	1170	245	485	234
3	133	373	339	846	e240	e1700	530	367	1010	238	483	226
4	140	402	334	756	e260	e1580	519	401	902	236	661	192
5	136	499	316	703	e270	e2480	464	436	778	241	848	168
6	125	518	297	e665	e280	3260	414	426	662	217	560	160
7	119	502	284	e610	e290	2050	412	380	595	229	475	161
8	110	470	290	e490	e280	1740	407	453	505	310	429	168
9	104	430	254	e440	e290	1610	419	1610	461	381	369	190
10	105	336	248	e415	e280	1490	407	2160	1130	433	334	190
11	107	299	263	e425	e290	1350	455	1940	839	471	267	164
12	110	249	255	e410	e280	1200	406	1940	911	581	294	139
13	127	234	e265	e400	e280	935	405	1480	988	566	250	117
14	135	266	e240	e360	e280	795	376	1570	1160	492	229	119
15	147	287	e260	e320	e280	751	341	1690	1260	452	212	114
16	132	310	e260	e240	e270	700	297	1560	1250	396	198	109
17	117	302	251	e250	e260	660	276	1330	1220	892	187	110
18	119	280	219	e280	e260	612	269	1290	1130	517	179	107
19	121	386	190	e300	e260	571	254	1190	1010	400	169	111
20	111	461	e190	e300	e280	572	247	971	842	407	166	112
21	108	417	e180	e300	e305	635	247	846	715	514	164	110
22	107	424	e190	e320	e390	610	244	1980	651	605	157	104
23	124	422	218	e300	e460	603	252	3440	521	625	152	99
24	128	448	226	e290	e530	598	257	4670	534	613	151	95
25	137	542	345	e290	e570	643	245	4870	473	574	149	93
26	161	459	358	e270	e590	655	242	3970	443	544	152	93
27	152	426	401	e250	e600	974	225	3370	430	474	142	92
28	142	404	363	e240	e580	979	191	2790	401	446	139	94
29	144	383	480	e220	e680	933	175	2280	349	466	179	97
30	129	390	1030	e220	—	854	186	1930	274	458	220	95
31	112	—	968	e220	—	767	—	1670	—	509	195	—
TOTAL	3919	11219	10262	12704	10085	34847	10409	53501	24034	13792	9093	4122
MEAN	126	374	331	410	348	1124	347	1726	801	445	293	137
MAX	161	542	1030	846	680	3260	671	4870	1420	892	848	259
MIN	104	102	180	220	220	571	175	212	274	217	139	92
CFSM	0.20	0.59	0.52	0.64	0.55	1.76	0.54	2.71	1.26	0.70	0.46	0.22
IN.	0.23	0.66	0.60	0.74	0.59	2.04	0.61	3.12	1.40	0.81	0.53	0.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 2004, BY WATER YEAR (WY)

	MEAN	246	325	396	423	545	996	921	616	352	222	150	170
MAX	1921	1286	1274	1358	1843	2047	2564	2532	1212	1135	669	1271	
(WY)	1982	1993	1976	1993	1976	1976	1947	1956	1989	1994	1992	1975	
MIN	40.6	58.9	62.9	80.5	76.4	140	253	155	86.1	42.1	42.2	42.1	
(WY)	1965	1965	1964	1940	1940	1964	1946	1958	1941	1965	1964	1964	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1940 - 2004

ANNUAL TOTAL	95809	197987	
ANNUAL MEAN	262	541	(a)450
HIGHEST ANNUAL MEAN			797
LOWEST ANNUAL MEAN			118
HIGHEST DAILY MEAN	1610	4870	7290
LOWEST DAILY MEAN	43	92	29
ANNUAL SEVEN-DAY MINIMUM	44	94	35
MAXIMUM PEAK FLOW		5170	(b)7500
MAXIMUM PEAK STAGE		12.74	(c)15.44
INSTANTANEOUS LOW FLOW		90	27
ANNUAL RUNOFF (CFSM)	0.412	0.849	0.706
ANNUAL RUNOFF (INCHES)	5.60	11.56	9.59
10 PERCENT EXCEEDS	539	1180	1050
50 PERCENT EXCEEDS	143	354	246
90 PERCENT EXCEEDS	51	129	79

(a) Does not include water year 1940.

(b) Including overflow by-passing gage.

(c) Present datum.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04146063 SOUTH BRANCH FLINT RIVER NEAR COLUMBIAVILLE, MI

LOCATION.--Lat 43°09'34", long 83°21'03", in NE1/4 NE1/4 sec.36, T.9 N., R.9 E., Lapeer County, Hydrologic Unit 04080204, on right bank at upstream side of bridge on Columbiaville Road, 3.0 mi east of Columbiaville, and 3.2 mi upstream from confluence of North and South Branches.

DRAINAGE AREA.--221 mi².

PERIOD OF RECORD.--March 1980 to current year.

REVISED RECORDS.--WDR MI-00-1: 1999 (M).

GAGE.--Water-stage recorder. Elevation of gage is 765 ft above sea level, from topographic map. Jan. 9, 1996 to Jan. 15, 1997, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Gage-height telemeter 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	37	68	180	321	e80	e260	214	76	355	117	120	83
2	34	97	161	301	e80	e340	202	162	294	96	118	74
3	32	212	141	311	e80	468	190	222	260	85	114	66
4	35	265	e125	288	e80	483	178	193	228	90	140	61
5	32	261	118	260	e80	528	164	164	191	229	203	57
6	30	256	113	219	e80	713	152	137	172	171	176	55
7	30	216	105	170	e80	701	146	113	156	253	146	68
8	30	171	97	e180	e80	632	142	132	145	405	121	62
9	28	138	95	e175	e80	591	135	366	148	299	103	57
10	29	119	96	e165	e80	509	124	593	211	228	95	53
11	29	112	124	e150	e80	427	119	740	258	185	86	50
12	28	115	139	e140	e80	369	114	890	205	219	85	49
13	29	109	124	e130	e80	312	109	693	173	398	83	48
14	30	105	e110	e125	e80	278	106	626	166	453	78	45
15	42	97	e110	e120	e80	259	105	580	199	494	74	43
16	45	92	107	e110	e80	233	100	472	179	419	69	42
17	48	86	107	e110	e80	213	95	373	187	289	66	41
18	68	94	108	e110	e80	201	93	312	199	256	63	39
19	52	188	107	e100	e80	195	89	290	169	255	62	38
20	47	198	102	e100	e85	201	84	254	144	240	59	36
21	50	176	106	e100	e90	234	80	232	126	208	58	34
22	53	162	100	e90	e100	223	88	e390	129	190	58	33
23	52	151	106	e90	e110	208	79	e985	124	171	56	32
24	52	168	146	e90	e120	196	75	e1330	175	148	54	31
25	56	216	152	e90	e130	203	73	1420	158	130	51	30
26	67	183	146	e85	e145	234	75	1420	128	114	54	30
27	68	164	140	e85	e155	263	73	1200	107	111	63	30
28	70	152	136	e80	e180	263	71	936	95	156	61	31
29	74	191	210	e80	e200	250	69	714	91	156	78	32
30	69	196	390	e80	—	229	66	556	131	137	99	32
31	69	—	387	e80	—	225	—	437	—	124	92	—
TOTAL	1415	4758	4388	4535	2835	10441	3410	17008	5303	6826	2785	1382
MEAN	45.6	159	142	146	97.8	337	114	549	177	220	89.8	46.1
MAX	74	265	390	321	200	713	214	1420	355	494	203	83
MIN	28	68	95	80	80	195	66	76	91	85	51	30
CFSM	0.21	0.72	0.64	0.66	0.44	1.52	0.51	2.48	0.80	1.00	0.41	0.21
IN.	0.24	0.80	0.74	0.76	0.48	1.76	0.57	2.86	0.89	1.15	0.47	0.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2004, BY WATER YEAR (WY)

MEAN	137	166	167	166	219	322	293	186	129	80.6	66.2	114
MAX	583	474	349	354	577	712	630	549	325	220	166	635
(WY)	1987	1986	1988	1993	2001	1985	1985	2004	1996	2004	1992	1985
MIN	35.9	50.8	58.0	40.3	36.8	99.5	114	82.4	31.2	38.2	26.8	24.2
(WY)	2003	1999	2003	2003	2003	2000	2004	1999	1988	2002	1999	2002

SUMMARY STATISTICS FOR 2003 CALENDAR YEAR FOR 2004 WATER YEAR WATER YEARS 1980 - 2004

ANNUAL TOTAL	35874	65086	
ANNUAL MEAN	98.3	178	169
HIGHEST ANNUAL MEAN			295
LOWEST ANNUAL MEAN			81.8
HIGHEST DAILY MEAN	525	1420	2950
LOWEST DAILY MEAN	18	28	14
ANNUAL SEVEN-DAY MINIMUM	19	29	16
MAXIMUM PEAK FLOW		1490	(a)3090
MAXIMUM PEAK STAGE		6.70	(b)9.61
INSTANTANEOUS LOW FLOW		26	12
ANNUAL RUNOFF (CFSM)	0.445	0.805	0.766
ANNUAL RUNOFF (INCHES)	6.04	10.96	10.41
10 PERCENT EXCEEDS	232	358	343
50 PERCENT EXCEEDS	55	120	114
90 PERCENT EXCEEDS	29	49	42

- (a) Gage height 9.60 ft.
(b) Backwater from ice.
(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04147500 FLINT RIVER NEAR OTISVILLE, MI

LOCATION.--Lat 43°06'40", long 83°31'10", in SE1/4 sec.9, T.8 N., R.8 E., Genesee County, Hydrologic Unit 04080204, on left bank 20 ft downstream from bridge on State Highway 15, 1.5 mi downstream from Holloway Reservoir, 3.5 mi upstream from Powers-Cullen Drain, and 3.8 mi south of Otisville.

DRAINAGE AREA.--530 mi².

PERIOD OF RECORD.--October 1952 to September 1989, October 1990 to current year.

REVISED RECORDS.--WDR MI-78-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 721.39 ft above sea level.

REMARKS.--Records good. Flow regulated by Holloway Reservoir, 1.5 mi upstream from station. From 1954 to 1991 annual mean discharge and runoff figures adjusted for change in contents in Holloway Reservoir. Gage-height telemeter 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	64	70	482	918	168	400	606	136	750	255	230	126
2	64	128	501	955	167	597	562	140	692	240	219	125
3	64	200	473	920	169	942	515	138	707	216	224	124
4	64	195	426	881	169	1270	486	138	652	196	273	122
5	65	196	382	794	169	1690	442	139	582	224	300	120
6	65	492	330	696	172	2050	408	142	518	268	311	117
7	65	811	293	570	172	2340	382	142	377	333	290	125
8	65	804	263	515	173	2320	360	155	317	456	259	127
9	65	794	239	470	172	2080	334	253	349	554	228	119
10	65	1320	234	448	171	1870	323	890	527	547	207	115
11	65	1100	236	386	171	1590	310	1610	622	499	188	112
12	66	579	260	354	170	1150	292	1920	658	530	176	110
13	66	372	275	318	171	949	271	1920	680	595	168	108
14	67	322	267	299	171	889	255	1530	718	667	162	106
15	68	281	270	271	170	832	249	1190	803	685	157	104
16	69	243	263	248	168	761	236	1190	933	666	151	103
17	69	218	257	240	164	609	234	1090	983	578	147	104
18	69	235	250	236	162	475	224	992	902	475	145	103
19	69	333	242	229	160	479	204	905	793	443	121	103
20	69	394	236	224	161	510	231	561	664	482	101	103
21	70	438	221	216	167	539	204	352	502	487	102	103
22	70	455	218	207	177	530	213	532	415	452	102	103
23	69	449	231	202	200	518	200	1190	404	387	103	103
24	69	489	263	193	227	510	198	2490	438	316	104	103
25	70	539	312	194	249	504	190	3350	434	271	103	103
26	70	529	343	181	272	555	178	3790	386	236	103	103
27	70	512	343	181	293	618	194	3370	341	224	103	103
28	70	498	344	180	313	644	209	2610	302	231	106	104
29	70	499	465	174	341	660	169	1960	248	247	107	103
30	70	504	665	171	—	673	152	1590	243	254	112	103
31	70	—	796	168	—	649	—	967	—	244	118	—
TOTAL	2091	13999	10380	12039	5609	30203	8831	37382	16940	12258	5220	3307
MEAN	67.5	467	335	388	193	974	294	1206	565	395	168	110
MAX	70	1320	796	955	341	2340	606	3790	983	685	311	127
MIN	64	70	218	168	160	400	152	136	243	196	101	103

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2004, BY WATER YEAR (WY)

	MEAN	211	282	303	298	400	783	622	398	266	167	133	205
MAX	1688	911	900	1153	1323	1984	1549	1789	1668	839	369	1507	
(WY)	1987	1993	1988	1973	2001	1976	1960	1956	1996	1994	1994	1986	
MIN	59.4	19.1	14.0	49.7	66.4	76.5	175	43.6	20.3	47.4	36.3	42.3	
(WY)	1966	1972	1972	1961	1964	1964	1964	1977	1977	1977	1977	1954	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1953 - 2004

ANNUAL TOTAL	80452						158259						
ANNUAL MEAN	220						432						
HIGHEST ANNUAL MEAN										339			
LOWEST ANNUAL MEAN										638			1985
HIGHEST DAILY MEAN	1320						3790	May 26	7240				1964
LOWEST DAILY MEAN	61						64	Oct 1	2.1				Oct 11 1971
ANNUAL SEVEN-DAY MINIMUM	63						64	Oct 1	3.6				Dec 1 1971
MAXIMUM PEAK FLOW							3860	May 26	7470				Jun 24 1996
MAXIMUM PEAK STAGE							13.30	May 26	15.73				Jun 24 1996
INSTANTANEOUS LOW FLOW							64	(a)	2.1				(b)
10 PERCENT EXCEEDS	533						903		776				
50 PERCENT EXCEEDS	100						255		181				
90 PERCENT EXCEEDS	65						103		67				

(a) Part of each day Oct. 1-5.

(b) Oct. 11, 12, 1971.

STREAMS TRIBUTARY TO LAKE HURON

04148140 KEARSLEY CREEK NEAR DAVISON, MI

LOCATION.--Lat 43°02'01", long 83°34'53", in NE1/4 sec.12, T.7 N., R.7 E., Genesee County, Hydrologic Unit 04080204, on right bank 10 ft upstream from bridge on Davison Road, 1.4 mi downstream from Black Creek, and 3.3 mi west of Davison.

DRAINAGE AREA.--99.4 mi².

PERIOD OF RECORD.--October 1965 to current year.

REVISED RECORDS.--WDR MI-78-1: Drainage area. WDR MI-85-1: 1968(M), 1973(M), 1975, 1982(P).

GAGE.--Water-stage recorder. Datum of gage is 747.39 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are poor. Some diurnal fluctuation caused by small dams, and occasional diversion for irrigation upstream from station. Gage-height telemeter 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	16	26	79	179	e37	e210	99	56	168	23	50	31
2	12	87	72	172	e37	e300	88	97	135	21	57	24
3	9.4	113	66	158	e37	304	79	111	117	18	57	20
4	10	115	63	137	e37	288	75	114	112	22	117	17
5	8.2	136	56	e110	e37	445	69	118	108	30	98	14
6	8.8	110	49	e85	e37	406	63	79	73	38	78	13
7	9.2	79	44	e70	e37	321	59	62	68	76	61	27
8	8.7	63	41	e65	e37	323	54	77	63	67	44	17
9	7.8	54	38	e60	e37	283	50	269	60	95	34	16
10	7.7	48	39	e55	e37	227	47	352	77	84	32	15
11	7.0	50	51	e50	e37	195	45	716	77	64	28	13
12	5.7	43	51	e45	e37	172	45	484	83	188	32	10
13	6.2	37	58	e40	e37	143	47	375	83	135	33	9.6
14	11	34	53	e40	e37	115	46	325	86	174	29	8.7
15	25	33	44	e39	e37	109	41	323	86	173	25	8.4
16	13	31	45	e40	e37	104	38	209	93	126	22	9.6
17	18	29	46	e39	e37	99	34	166	93	110	19	8.4
18	26	53	45	e40	e38	97	32	158	84	108	18	7.6
19	29	114	43	e37	e41	94	32	131	76	117	17	8.2
20	23	79	38	e35	e44	111	33	115	65	119	15	8.9
21	15	82	43	e35	e48	116	33	119	59	109	14	10
22	12	80	47	e36	e51	109	34	243	60	81	13	9.0
23	10	81	58	e36	e54	104	30	679	50	67	13	7.8
24	9.4	128	86	e36	e62	101	28	831	68	55	12	7.4
25	14	116	81	e36	e68	110	30	736	49	43	12	7.3
26	13	95	74	e36	e71	145	31	749	42	36	12	6.6
27	13	79	62	e36	e81	147	31	585	35	50	12	6.2
28	18	73	67	e36	e97	124	29	404	30	70	16	5.8
29	22	90	220	e36	e132	121	28	278	28	72	27	6.2
30	18	83	264	e36	---	113	28	211	26	73	29	6.4
31	23	---	212	e35	---	106	---	185	---	60	35	---
TOTAL	429.1	2241	2235	1890	1416	5642	1378	9357	2254	2504	1061	359.1
MEAN	13.8	74.7	72.1	61.0	48.8	182	45.9	302	75.1	80.8	34.2	12.0
MAX	29	136	264	179	132	445	99	831	168	188	117	31
MIN	5.7	26	38	35	37	94	28	56	26	18	12	5.8
CFSM	0.14	0.75	0.73	0.61	0.49	1.83	0.46	3.04	0.76	0.81	0.34	0.12
IN.	0.16	0.84	0.84	0.71	0.53	2.11	0.52	3.50	0.84	0.94	0.40	0.13

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2004, BY WATER YEAR (WY)

	MEAN	41.4	59.6	71.9	69.1	95.8	160	148	84.9	49.4	28.1	21.5	41.0
MAX	236	181	213	192	307	317	350	302	159	93.2	107	314	
(WY)	1982	1986	1976	1973	2001	1973	1975	2004	1996	1994	1975	1985	
MIN	8.01	13.8	15.3	10.9	10.5	41.2	45.9	24.7	7.39	5.48	4.63	3.31	
(WY)	1999	1999	2003	2003	2003	2000	2004	1977	1988	1966	2001	2002	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1966 - 2004

ANNUAL TOTAL	14902.3		30766.2									
ANNUAL MEAN	40.8		84.1									
HIGHEST ANNUAL MEAN										72.3		
LOWEST ANNUAL MEAN										122		1985
HIGHEST DAILY MEAN	264									31.0		2003
LOWEST DAILY MEAN	1.9									1370		Sep 9 1985
ANNUAL SEVEN-DAY MINIMUM	3.0									0.96		Jul 19 2002
MAXIMUM PEAK FLOW										1.2		Sep 8 2002
MAXIMUM PEAK STAGE										1500		Sep 9 1985
INSTANTANEOUS LOW FLOW										(a)11.85		Sep 9 1985
ANNUAL RUNOFF (CFSM)	0.411									0.62		Jul 19 2002
ANNUAL RUNOFF (INCHES)	5.58									9.89		
10 PERCENT EXCEEDS	108									165		
50 PERCENT EXCEEDS	18									40		
90 PERCENT EXCEEDS	5.2									10		

(a) From floodmark.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04148500 FLINT RIVER NEAR FLINT, MI

LOCATION.--Lat 43°02'20", long 83°46'18", in SW1/4 sec.4, T.7 N., R.6 E., Genesee County, Hydrologic Unit 04080204, on left bank on grounds of sewage-treatment plant, 1.2 mi upstream from Pirnie Creek, and 5.0 mi downstream from Swartz Creek.

DRAINAGE AREA.--956 mi².

PERIOD OF RECORD.--September 1903 to March 1904 (gage heights only), August 1932 to current year. Gage-height records for flood seasons collected in this vicinity 1911-32, are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 954: 1941. WSP 1337: 1933-34(M), 1935-37. WDR MI-78-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 678.80 ft above sea level (levels by the National Weather Service and City of Flint).

REMARKS.--Records good except for estimated daily discharges, which are poor. Some regulation by small reservoirs upstream from station and by Holloway Reservoir. From 1954 to 1991 annual mean discharge and runoff figures adjusted for change in contents in Holloway Reservoir. Occasional diversion for industrial use. Since Dec. 17, 1967, flow contains up to 50 ft³/s as sewage effluent which originates outside the basin. Gage-height telemeter 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	136	147	927	1720	300	1470	1060	579	1700	374	525	263
2	138	1200	847	1580	311	2530	980	746	1440	370	586	256
3	147	1580	795	1600	334	2690	914	692	1220	332	546	243
4	175	1100	643	1610	347	2440	765	594	1070	348	1570	199
5	148	976	555	1430	332	4020	656	545	985	400	876	183
6	131	797	518	1200	339	4170	635	437	912	428	641	193
7	108	1070	501	1030	344	3900	607	407	740	929	515	351
8	115	1100	462	827	326	4010	600	704	605	736	458	236
9	110	1040	431	784	325	3680	551	2650	670	803	439	225
10	110	1150	465	689	327	3170	543	3360	1140	763	499	214
11	109	1660	523	685	325	2700	533	4660	1070	710	431	205
12	107	945	480	667	321	2170	500	3820	1000	1500	362	192
13	108	558	452	552	325	1500	473	3310	992	1440	333	161
14	260	475	452	472	337	1470	451	3140	1190	1240	313	284
15	349	429	442	443	322	1400	446	2920	1400	1120	295	150
16	187	396	457	414	312	1300	429	2060	1550	1090	285	134
17	293	370	458	445	326	1100	418	1770	1590	1090	267	131
18	136	828	444	456	316	884	400	2000	1380	839	270	127
19	132	1270	421	431	320	865	379	1620	1210	996	260	128
20	142	902	402	401	387	1080	406	1210	984	950	212	147
21	135	812	363	405	524	1100	377	1030	888	1250	199	140
22	138	761	364	399	504	992	383	2160	795	817	189	147
23	134	747	493	372	558	934	363	5200	751	657	194	146
24	137	1220	649	388	648	913	339	7720	955	538	173	146
25	201	1140	683	355	655	1020	388	6450	730	440	180	142
26	157	992	645	360	695	1330	336	6310	e650	449	212	140
27	194	898	611	356	735	1380	346	6010	e560	1050	e210	141
28	163	886	638	331	797	1300	359	5030	e490	1050	e370	145
29	196	1110	1940	297	976	1230	310	3570	429	713	e470	140
30	156	1040	2190	289	—	1160	331	2930	383	627	e310	133
31	149	—	1830	294	—	1120	—	2240	—	570	e280	—
TOTAL	4901	27599	21081	21282	12668	59028	15278	85874	29479	24619	12470	5442
MEAN	158	920	680	687	437	1904	509	2770	983	794	402	181
MAX	349	1660	2190	1720	976	4170	1060	7720	1700	1500	1570	351
MIN	107	147	363	289	300	865	310	407	383	332	173	127
CFSM	0.17	0.96	0.71	0.72	0.46	1.99	0.53	2.90	1.03	0.83	0.42	0.19
IN.	0.19	1.07	0.82	0.83	0.49	2.30	0.59	3.34	1.15	0.96	0.49	0.21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 2004, BY WATER YEAR (WY)

	MEAN	345	475	546	590	804	1485	1278	795	493	281	238	340
MAX	2764	1734	1739	2008	2890	3514	4209	3575	2512	1294	868	2635	
(WY)	1987	1993	1976	1973	2001	1985	1947	1956	1996	1994	1975	1986	
MIN	60.6	69.9	70.8	84.8	87.6	187	335	110	81.3	56.1	31.3	45.9	
(WY)	1936	1965	1964	1940	1940	1964	1946	1958	1934	1936	1936	1941	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1932 - 2004

ANNUAL TOTAL	158799		319721									
ANNUAL MEAN	435		874									
HIGHEST ANNUAL MEAN										638		1985
LOWEST ANNUAL MEAN										1258		1964
HIGHEST DAILY MEAN	2190									153		
LOWEST DAILY MEAN	93									14500		Apr 6 1947
ANNUAL SEVEN-DAY MINIMUM	98									14		Aug 7 1934
MAXIMUM PEAK FLOW										23		Aug 14 1936
MAXIMUM PEAK STAGE										(a)14900		Apr 6 1947
INSTANTANEOUS LOW FLOW										14.03		Sep 6 1985
ANNUAL RUNOFF (CFSM)	0.455									May 24		Aug 7 1934
ANNUAL RUNOFF (INCHES)	6.18									(b)		
10 PERCENT EXCEEDS	1090									9.0		
50 PERCENT EXCEEDS	237									0.667		
90 PERCENT EXCEEDS	131									9.06		

(a) Gage height 16.35 ft.

(b) Oct. 7, 12.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04149000 FLINT RIVER NEAR FOSTERS, MI

LOCATION.--Lat 43°18'30", long 83°57'13", in SE 1/4 SE 1/4 sec.35, T.11 N., R.4 E., Saginaw County, Hydrologic Unit 04080204, on left bank 20 ft downstream from bridge on State Highway 13, 2.0 mi west of Fosters, and 6.5 mi downstream from Silver Creek.

DRAINAGE AREA--1,153 mi².

PERIOD OF RECORD.--October 1939 to September 1984, October 1987 to September 1992, October 2001 to current year. Gage-height records for flood seasons collected in this vicinity 1910-20, 1922-27 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 954: 1941. WSP 1337: 1940, 1942, 1943-44(M), 1945, 1946-47(M), 1948-50. WDR MI-78: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 600 ft above sea level, from topographic map. Prior to Oct. 1, 1969, nonrecording gage at site 2.2 mi upstream at datum 582.22 ft above sea level. Oct. 1, 1969 to Sept. 30, 1992, water-stage recorder at datum 5.00 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor. Prior to Oct. 1, 1992 records include flow of Birch Run. Some regulation by reservoirs upstream from the City of Flint. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of March 1904 reached a stage of 18.4 ft, from National Weather Service data, site and datum then in use.

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	175	175	1180	1950	e325	1550	1300	507	2180	535	692	335
2	171	261	1040	1780	e325	3050	1230	883	1920	523	640	322
3	171	1730	985	1770	e350	4250	1150	1040	1710	495	763	310
4	184	1930	885	1770	e350	3400	1120	861	1440	459	1030	290
5	206	1240	754	1700	e375	4440	936	751	1340	556	1920	257
6	183	1140	733	1470	e350	6330	867	659	1210	538	982	243
7	168	994	693	e1300	e375	4910	849	544	1110	1020	759	347
8	147	1130	665	e1100	e375	4690	811	641	925	1130	637	392
9	145	1090	616	e900	e350	4490	814	2890	1010	951	565	295
10	145	1040	590	e850	e350	4030	756	4680	2430	961	626	268
11	140	1480	736	e750	e350	3440	739	4800	2240	907	582	251
12	141	1510	734	e750	e350	3000	711	4670	1540	1170	545	247
13	137	946	658	e700	e350	2160	674	3840	1360	1720	460	236
14	136	660	638	e600	e350	1800	649	3640	1820	1550	430	210
15	355	584	618	e550	e375	1660	617	3450	2490	1350	403	317
16	339	529	608	e500	e350	1560	600	3040	1800	1220	379	202
17	229	488	640	e450	e350	1440	570	2180	2020	1260	364	180
18	294	481	633	e500	e350	1220	560	2260	1800	1110	345	180
19	166	1480	611	e500	e350	1090	542	2250	1550	1070	345	173
20	162	1490	572	e500	e375	1140	512	1700	1320	1030	326	170
21	170	1050	548	e450	e450	1460	533	1290	1140	1560	280	184
22	166	962	507	e450	e550	1290	482	2150	1170	1230	264	186
23	168	904	522	e450	e550	1180	491	5050	1000	929	257	182
24	160	1100	825	e400	e550	1120	448	10700	1220	760	255	185
25	166	1570	935	e425	e725	1230	447	9290	1150	621	236	184
26	227	1230	882	e400	e750	1440	525	6930	964	543	251	181
27	202	1110	815	e400	e800	1830	442	6110	864	611	270	181
28	240	1040	809	e400	e800	1630	440	5550	738	1510	256	193
29	215	1340	1300	e375	e1000	1540	458	4140	670	1040	421	184
30	231	1330	3040	e350	—	1440	394	3530	591	824	502	187
31	188	—	2400	e325	—	1380	—	2940	—	761	334	—
TOTAL	5927	32014	27172	24815	13400	75190	20667	102966	42722	29944	16119	7072
MEAN	191	1067	877	800	462	2425	689	3321	1424	966	520	236
MAX	355	1930	3040	1950	1000	6330	1300	10700	2490	1720	1920	392
MIN	136	175	507	325	325	1090	394	507	591	459	236	170
CFSM	0.17	0.93	0.76	0.69	0.40	2.10	0.60	2.88	1.24	0.84	0.45	0.20
IN.	0.19	1.03	0.88	0.80	0.43	2.43	0.67	3.32	1.38	0.97	0.52	0.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 2004, BY WATER YEAR (WY)

	MEAN	362	497	666	679	897	1844	1593	1022	602	343	291	341
MAX	2781	1433	2311	2348	3249	4351	4963	4160	2039	1470	1331	1781	
(WY)	1982	1991	1976	1973	1976	1976	1947	1956	1943	1957	1975	1975	
MIN	75.4	85.5	78.2	93.1	98.3	219	404	166	106	71.6	56.0	50.3	
(WY)	1964	1965	1964	1940	1940	1964	1946	1958	1941	1941	1941	1941	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1940 - 2004

ANNUAL TOTAL	196327	398008	
ANNUAL MEAN	538	1087	760
HIGHEST ANNUAL MEAN			1460
LOWEST ANNUAL MEAN			180
HIGHEST DAILY MEAN	3040	Dec 30	18200
LOWEST DAILY MEAN	126	Sep 8	28
ANNUAL SEVEN-DAY MINIMUM	128	Sep 8	35
MAXIMUM PEAK FLOW		12200	(a)19000
MAXIMUM PEAK STAGE		21.59	(b)18.60
INSTANTANEOUS LOW FLOW		126	(c)27
ANNUAL RUNOFF (CFSM)	0.467	0.943	0.659
ANNUAL RUNOFF (INCHES)	6.33	12.84	8.96
10 PERCENT EXCEEDS	1330	2180	1740
50 PERCENT EXCEEDS	292	692	400
90 PERCENT EXCEEDS	160	199	126

(a) Including flow by-passing gage.

(b) Present site and datum; peak stage at previous site and datum, 18.60 ft, Feb. 2, 1968.

(c) Observed.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04150500 CASS RIVER AT CASS CITY, MI

LOCATION.—Lat 43°35'03", long 83°10'34", in NE1/4 NE1/4 sec.4, T.13 N., R.11 E., Tuscola County, Hydrologic Unit 04080205, on left bank 600 ft downstream from bridge on Cemetery Road, 0.3 mi downstream from confluence of North and South Branches, and 1.1 mi south of Cass City.

DRAINAGE AREA.—359 mi².

PERIOD OF RECORD.—October 1947 to September 1997, August 2001 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.—WSP 1337: 1949-50. WSP 1727: 1948(M), 1950. WDR MI-78-1: Drainage area.

GAGE.—Water-stage recorder. Datum of gage is 697.92 ft above sea level. Prior to Nov. 14, 1952, nonrecording gage at site 600 ft upstream at present datum.

REMARKS.—Records good except for estimated daily discharges, which are poor. Gage-height telemeter 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	10	19	320	570	e63	e231	314	175	265	75	27	14
2	9.3	25	246	446	e63	e404	274	310	241	63	24	13
3	10	111	e166	470	e63	e786	241	562	211	54	22	12
4	9.9	266	e131	528	e62	e1640	219	501	175	52	20	41
5	10	319	e109	400	e62	4000	196	471	153	115	20	28
6	10	293	e100	268	e61	5920	178	417	139	141	22	18
7	10	211	e97	e203	e60	3260	171	401	130	247	19	16
8	9.1	148	e95	e120	e60	2100	163	452	119	739	17	15
9	8.6	107	e95	e87	e60	1350	155	1340	113	429	15	16
10	8.3	80	96	e83	e60	947	142	2180	142	234	14	14
11	7.3	77	121	e80	e60	746	132	1630	215	154	14	14
12	7.4	79	e119	e78	e60	636	124	1020	186	113	16	13
13	7.2	80	e102	e77	e60	510	117	650	148	90	16	13
14	7.6	76	e103	e78	e60	474	114	635	254	81	16	12
15	9.3	68	e112	e76	e60	416	106	612	524	80	16	13
16	8.7	62	119	e75	e60	358	101	519	385	75	15	12
17	14	58	117	e77	e60	292	99	391	234	65	14	10
18	15	64	109	e73	e60	285	115	320	219	54	14	9.9
19	11	239	e105	e70	e60	273	161	286	212	45	13	9.0
20	8.8	480	e89	e67	e60	269	167	248	150	40	13	7.4
21	9.1	321	e68	e67	e61	340	166	227	115	36	12	7.4
22	9.9	234	e84	e66	e70	309	147	234	124	33	11	7.6
23	10	177	101	e65	e73	280	132	944	127	29	10	7.0
24	11	177	140	e65	e80	248	119	3690	129	25	9.6	6.7
25	12	363	e166	e64	e93	287	118	2560	154	22	9.5	6.1
26	14	340	e153	e64	e104	472	129	1330	129	21	9.9	5.8
27	15	272	e116	e64	e120	790	132	864	108	23	10	5.6
28	16	223	e153	e64	e134	584	141	577	93	29	11	5.2
29	17	361	356	e64	e166	489	159	408	84	42	13	5.1
30	19	449	1520	e64	—	412	160	311	77	36	14	5.3
31	21	—	1080	e64	—	356	—	265	—	29	15	—
TOTAL	345.5	5799	6488	4637	2115	29464	4692	24530	5355	3271	472.0	362.1
MEAN	11.1	193	209	150	72.9	950	156	791	178	106	15.2	12.1
MAX	21	480	1520	570	166	5920	314	3690	524	739	27	41
MIN	7.2	19	68	64	60	231	99	175	77	21	9.5	5.1
CFSM	0.03	0.54	0.58	0.42	0.20	2.65	0.44	2.20	0.50	0.29	0.04	0.03
IN.	0.04	0.60	0.67	0.48	0.22	3.05	0.49	2.54	0.55	0.34	0.05	0.04

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2004, BY WATER YEAR (WY)

MEAN	89.6	147	197	183	283	745	509	254	139	70.6	34.3	98.1
MAX	952	683	653	840	1100	2260	1296	1157	1087	629	201	2239
(WY)	1987	1993	1985	1952	1997	1985	1960	1996	1996	1994	1953	1986
MIN	2.58	7.23	6.26	5.16	6.36	59.8	100	27.5	12.9	5.04	2.48	1.33
(WY)	1949	1950	1959	1959	1959	1964	1964	1958	1964	1966	1963	1948

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1948 - 2004

ANNUAL TOTAL	41476.8	87530.6	
ANNUAL MEAN	114	239	(a)229
HIGHEST ANNUAL MEAN			471
LOWEST ANNUAL MEAN			27.6
HIGHEST DAILY MEAN	1520	5920	11800
LOWEST DAILY MEAN	3.7	5.1	0.50
ANNUAL SEVEN-DAY MINIMUM	3.8	5.7	0.76
MAXIMUM PEAK FLOW		6330	12500
MAXIMUM PEAK STAGE		13.96	(b)19.82
INSTANTANEOUS LOW FLOW		5.0	0.50
ANNUAL RUNOFF (CFSM)	0.317	0.666	0.637
ANNUAL RUNOFF (INCHES)	4.30	9.07	8.65
10 PERCENT EXCEEDS	289	483	546
50 PERCENT EXCEEDS	39	96	65
90 PERCENT EXCEEDS	7.2	10	8.0

(a) Does not include water year 1948.

(b) From floodmark.

(c) Sept. 28, 29.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04151500 CASS RIVER AT FRANKENMUTH, MI

LOCATION.--Lat 43°19'40", long 83°44'53", in NW1/4 SE1/4 sec.27, T.11 N., R.6 E., Saginaw County, Hydrologic Unit 04080205, on right bank 2,000 ft downstream from dam in Frankenmuth, 3,600 ft upstream from highway bridge on Dehmel Road, 3.4 mi upstream from Dead Creek, and 17 mi upstream from mouth.

DRAINAGE AREA.--841 mi².

PERIOD OF RECORD.--February 1908 to March 1909, July 1935 to September 1936, June 1939 to current year.

REVISED RECORDS.--WSP 1307: 1936(M), 1940(M). WSP 1727: 1952. WSP 1911: 1952. WDR MI-78-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 583.96 ft above sea level (levels by Michigan Department of Natural Resources). February 1908 to March 1909, nonrecording gage at site 2,000 ft upstream at datum 1.81 ft lower. July 18 to Sept. 11, 1935, nonrecording gage, Sept. 12, 1935 to Sept. 30, 1936, and June 20, 1939 to Sept. 30, 1949, water-stage recorder, at site 3,600 ft downstream at datum 0.04 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor. Occasional regulation by dams upstream from station. Prior to 1950, regulation at low and medium flows by mill upstream from station. Gage-height telemeter 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	52	57	798	1580	e133	e591	792	394	770	244	113	63
2	50	92	562	1150	e133	1450	688	594	700	208	101	62
3	50	172	419	1040	e132	2770	598	1100	572	182	85	61
4	50	236	e296	1100	e131	4890	542	1240	472	165	100	63
5	49	482	e230	1060	e126	7440	485	1080	390	198	102	62
6	49	560	e215	759	e126	9930	442	961	339	192	91	68
7	45	476	e207	423	e125	10500	421	797	301	335	101	76
8	44	350	e202	e250	e125	6430	401	817	271	585	75	73
9	44	253	201	e183	e124	3830	384	2120	326	1200	73	67
10	44	197	209	e174	e124	2280	363	4570	1050	730	71	61
11	44	171	242	e169	e124	1780	340	4640	1120	429	85	58
12	46	163	e253	e166	e124	1550	324	2800	798	317	75	57
13	43	159	e213	e166	e124	1320	309	1770	572	266	72	55
14	42	151	e212	e166	e124	1190	290	1380	891	247	75	53
15	49	145	e236	e164	e124	1120	278	1370	1600	222	77	51
16	48	144	e247	e156	e124	990	261	1330	1570	196	75	49
17	45	138	246	e159	e124	838	250	1130	1130	174	72	48
18	44	154	239	e156	e124	723	251	971	727	160	69	47
19	44	316	222	e147	e124	693	281	856	595	150	68	47
20	44	597	e187	e142	e126	712	324	704	484	169	64	45
21	46	835	e141	e140	e131	837	324	604	368	254	62	44
22	47	548	e187	e139	e148	852	323	852	396	179	61	44
23	47	403	234	e136	e154	723	297	2160	403	138	59	43
24	47	420	301	e134	e167	664	269	6480	407	110	57	43
25	46	509	e350	e135	e193	695	260	8880	397	94	56	43
26	50	745	e319	e136	e216	917	294	5810	378	87	58	42
27	49	617	e243	e135	e255	1350	309	2620	317	89	55	41
28	49	499	e299	e135	e285	1450	310	1760	270	91	58	41
29	50	519	669	e135	e347	1210	354	1330	249	120	71	40
30	51	742	1410	e135	—	1070	380	1030	292	119	69	39
31	53	—	2160	e134	—	928	—	800	—	123	64	—
TOTAL	1461	10850	11949	10804	4417	71723	11144	62950	18155	7773	2294	1586
MEAN	47.1	362	385	349	152	2314	371	2031	605	251	74.0	52.9
MAX	53	835	2160	1580	347	10500	792	8880	1600	1200	113	76
MIN	42	57	141	134	124	591	250	394	249	87	55	39
CFSM	0.06	0.43	0.46	0.41	0.18	2.75	0.44	2.41	0.72	0.30	0.09	0.06
IN.	0.06	0.48	0.53	0.48	0.20	3.17	0.49	2.78	0.80	0.34	0.10	0.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1908 - 2004, BY WATER YEAR (WY)

MEAN	225	326	418	445	676	1623	1131	677	393	190	106	221
MAX	2637	1374	1335	2185	2790	4943	3122	2715	3217	1884	523	5000
(WY)	1987	1993	1985	1973	2001	1976	1947	1996	1996	1994	1953	1986
MIN	31.7	43.1	50.7	45.1	55.6	179	202	104	60.4	20.4	20.1	23.5
(WY)	1947	1965	1940	1959	1959	1964	1946	1941	1964	1936	1944	1941

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1908 - 2004

ANNUAL TOTAL	103918	215106	
ANNUAL MEAN	285	588	
HIGHEST ANNUAL MEAN			532
LOWEST ANNUAL MEAN			1063
HIGHEST DAILY MEAN	2230	Mar 18	10500
LOWEST DAILY MEAN	26	Sep 18	39
ANNUAL SEVEN-DAY MINIMUM	28	Sep 15	41
MAXIMUM PEAK FLOW			11000
MAXIMUM PEAK STAGE			21.09
INSTANTANEOUS LOW FLOW			39
ANNUAL RUNOFF (CFSM)	0.339		0.699
ANNUAL RUNOFF (INCHES)	4.60		9.51
10 PERCENT EXCEEDS	731		1200
50 PERCENT EXCEEDS	120		219
90 PERCENT EXCEEDS	43		49

(a) Approximately.

(b) Part of each day Sept. 29, 30.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04152238 SOUTH BRANCH TOBACCO RIVER NEAR BEAVERTON, MI

LOCATION.--Lat 43°52'01", long 84°32'43", in SE1/4 NE1/4 sec.16, T.17 N., R.2 W., Gladwin County, Hydrologic Unit 04080201, on left bank 40 ft upstream from bridge on Grout Road, 3.0 mi upstream from Ross Lake, and 3.2 mi southwest of Beaverton.

DRAINAGE AREA.--160 mi².

PERIOD OF RECORD.--January 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 709.92 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are poor. Gage-height telemeter 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	53	61	110	117	e82	e109	165	289	225	88	64	83
2	52	61	98	112	e84	e153	151	320	200	82	63	84
3	52	90	90	228	e85	e299	142	211	193	80	63	79
4	61	138	e87	319	e86	e635	134	164	173	85	63	77
5	74	342	e85	215	e87	e1150	128	149	148	103	60	80
6	63	447	e85	e118	e87	e1320	126	140	137	99	58	82
7	56	221	86	e77	e87	1220	133	128	137	91	57	85
8	54	138	74	e60	e87	877	132	324	124	89	56	81
9	52	111	72	e59	e87	636	138	862	118	88	56	76
10	50	95	103	e61	e87	443	130	907	143	85	57	73
11	49	97	399	e62	e87	371	123	718	143	80	60	71
12	49	120	435	e65	e87	321	122	378	130	76	61	69
13	53	111	e186	e65	e86	254	119	289	120	77	64	68
14	52	95	e140	e65	e86	234	115	378	134	73	67	68
15	55	87	e119	e65	e86	215	109	610	159	73	64	67
16	59	83	e111	e65	e86	200	107	490	134	70	61	65
17	57	80	e112	e65	e86	185	111	287	119	70	60	64
18	54	101	e112	e67	e86	173	178	298	118	74	62	63
19	54	364	e112	e67	e86	166	247	322	110	74	62	63
20	53	453	e112	e67	e86	181	175	240	101	73	61	63
21	52	241	e114	e67	e86	258	156	215	96	86	60	63
22	52	168	115	e69	e86	217	164	246	100	83	58	63
23	52	135	119	e69	e88	180	148	406	100	74	58	63
24	52	181	124	e69	e89	173	132	1050	120	68	87	62
25	56	213	123	e69	e88	178	143	1260	164	65	35	62
26	63	156	e112	e69	e90	207	205	818	122	64	54	63
27	60	130	e108	e69	e90	286	173	449	107	63	93	63
28	57	121	e108	e74	e90	245	159	289	100	68	156	63
29	61	129	e120	e74	e92	220	175	232	100	66	155	64
30	70	121	143	e74	---	213	150	202	93	64	127	64
31	64	---	132	e75	---	185	---	189	---	65	102	---
TOTAL	1741	4890	4046	2797	2520	11504	4390	12860	3968	2396	2204	2091
MEAN	56.2	163	131	90.2	86.9	371	146	415	132	77.3	71.1	69.7
MAX	74	453	435	319	92	1320	247	1260	225	103	156	85
MIN	49	61	72	59	82	109	107	128	93	63	35	62
CFSM	0.35	1.02	0.82	0.56	0.54	2.32	0.91	2.59	0.83	0.48	0.44	0.44
IN.	0.40	1.14	0.94	0.65	0.59	2.67	1.02	2.99	0.92	0.56	0.51	0.49

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 2004, BY WATER YEAR (WY)

	MEAN	99.0	140	119	103	126	216	209	163	120	70.5	71.6	70.7
MAX	202	364	253	176	213	371	478	415	282	92.3	86.6	127	127
(WY)	1991	1993	1992	1993	2000	2004	1991	2004	1996	1992	1996	1992	1992
MIN	56.2	62.7	61.2	49.9	43.8	86.5	115	77.6	57.2	47.9	52.2	41.5	41.5
(WY)	2004	2000	1990	2003	2003	2003	1987	1999	1988	2001	1999	2003	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1987 - 2004

ANNUAL TOTAL	31382												
ANNUAL MEAN	86.0												
HIGHEST ANNUAL MEAN										127			
LOWEST ANNUAL MEAN										184			1991
HIGHEST DAILY MEAN	453									75.4			2003
LOWEST DAILY MEAN	33									1340			Apr 16 1991
ANNUAL SEVEN-DAY MINIMUM	33									33			Sep 7 2003
MAXIMUM PEAK FLOW										33			Sep 7 2003
INSTANTANEOUS LOW FLOW										(a)1450			Apr 16 1991
ANNUAL RUNOFF (CFSM)	0.537									(b)12.75			Mar 6 2004
ANNUAL RUNOFF (INCHES)	7.30									30			Aug 25 2004
10 PERCENT EXCEEDS	149									0.793			
50 PERCENT EXCEEDS	63									10.77			
90 PERCENT EXCEEDS	41									56			

(a) Gage height 10.74 ft.

(b) Backwater from ice.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04154000 CHIPPEWA RIVER NEAR MOUNT PLEASANT, MI

LOCATION.--Lat 43°37'32", long 84°42'28", in NW1/4 NW1/4 sec.8, T.14 N., R.3 W., Isabella County, Hydrologic Unit 04080202, on right bank 12 ft downstream from bridge on South Leaton Road, 3.8 mi northeast of Mount Pleasant, and 36 mi upstream from mouth.

DRAINAGE AREA.--416 mi².

PERIOD OF RECORD.--October 1930 to September 1931, October 1932 to current year. Gage-height records for flood seasons collected in this vicinity 1910-27, are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 744: Drainage area. WSP 1337: 1931, 1933-40, 1945, 1948-49.

GAGE.--Water-stage recorder. Datum of gage is 710.38 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Oct. 21, 1938, nonrecording gage at site 30 ft upstream at present datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Diurnal fluctuation below 750 ft³/s caused by powerplant at Mount Pleasant prior to 1962, occasional regulation at low flow since. Since July 30, 1968, occasional regulation by control structures on lake outlets. Gage-height telemeter 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	125	164	358	275	e233	e288	554	450	741	284	153	239
2	124	175	337	268	e232	369	512	520	687	266	151	221
3	122	210	320	359	e231	605	478	451	668	253	153	207
4	133	293	297	413	e227	751	447	406	628	270	150	212
5	141	462	293	422	e227	1210	418	389	579	286	147	209
6	149	577	290	407	e227	2080	397	359	531	308	137	200
7	147	567	277	e369	e227	2120	383	335	491	306	133	203
8	143	491	264	e355	e227	1990	371	451	459	291	132	188
9	139	423	250	e344	e227	1700	359	978	434	276	132	178
10	134	369	292	e330	e227	1410	357	1290	416	263	135	172
11	131	347	496	e317	e227	1210	346	1350	419	249	135	167
12	129	339	521	e306	e227	1060	341	1170	427	245	137	166
13	130	336	459	e294	e227	917	327	970	426	234	147	165
14	130	318	398	e282	e228	801	314	961	422	230	148	164
15	141	297	375	e277	e228	744	302	1330	412	223	144	162
16	142	280	363	e273	e230	685	288	1340	403	211	141	163
17	138	274	353	e269	e231	630	302	1310	409	226	140	158
18	136	328	344	e264	e231	584	323	1180	395	208	144	153
19	138	521	329	e261	e231	548	363	1050	363	202	151	151
20	136	574	313	e257	e233	535	360	902	331	202	144	149
21	139	547	297	e253	e236	593	365	809	317	208	142	146
22	134	493	293	e249	e238	587	368	811	324	227	140	144
23	133	452	289	e245	e242	571	368	990	310	208	143	142
24	135	491	286	e243	e243	540	352	1600	386	188	139	144
25	155	491	286	e242	e245	524	387	1730	397	177	140	143
26	153	449	281	e242	e247	539	427	1750	376	166	163	143
27	153	419	274	e239	e252	627	423	1550	346	159	189	145
28	155	403	262	e238	e253	640	409	1270	340	159	240	149
29	164	390	265	e236	e271	640	408	1040	322	158	271	146
30	163	377	277	e235	—	614	390	870	302	156	276	143
31	164	—	281	e235	—	579	—	778	—	155	265	—
TOTAL	4356	11857	10020	8999	6805	26691	11439	30390	13061	6994	4962	5072
MEAN	141	395	323	290	235	861	381	980	435	226	160	169
MAX	164	577	521	422	271	2120	554	1750	741	308	276	239
MIN	122	164	250	235	227	288	288	335	302	155	132	142
CFSM	0.34	0.95	0.78	0.70	0.56	2.07	0.92	2.36	1.05	0.54	0.38	0.41
IN.	0.39	1.06	0.90	0.80	0.61	2.39	1.02	2.72	1.17	0.63	0.44	0.45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2004, BY WATER YEAR (WY)

	MEAN	250	304	302	278	332	568	577	400	288	194	174	221
MAX	1058	836	627	655	1401	1709	1204	980	711	694	585	1682	
(WY)	1987	1986	1992	1973	1938	1976	1967	2004	1943	1969	1972	1986	
MIN	117	151	144	112	124	204	231	175	117	77.3	70.6	97.7	
(WY)	1947	1939	1931	1945	1940	1937	1945	1977	1941	1936	1931	1931	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1931 - 2004

ANNUAL TOTAL	87649												
ANNUAL MEAN	240												
HIGHEST ANNUAL MEAN										324			
LOWEST ANNUAL MEAN										585			1976
HIGHEST DAILY MEAN	594									6210			Sep 12 1986
LOWEST DAILY MEAN	86									19			Aug 16 1936
ANNUAL SEVEN-DAY MINIMUM	89									49			Aug 10 1936
MAXIMUM PEAK FLOW										6660			Sep 12 1986
MAXIMUM PEAK STAGE										(a)15.58			Sep 12 1986
INSTANTANEOUS LOW FLOW										12			Aug 18 1945
ANNUAL RUNOFF (CFSM)	0.577									0.778			
ANNUAL RUNOFF (INCHES)	7.84									10.57			
10 PERCENT EXCEEDS	451									583			
50 PERCENT EXCEEDS	182									245			
90 PERCENT EXCEEDS	121									134			

(a) From floodmark.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04155500 PINE RIVER NEAR MIDLAND, MI

LOCATION.--Lat 43°33'52", long 84°22'09", in SW1/4 NW1/4 sec.4, T.13 N., R.1 E., Midland County, Hydrologic Unit 04080202, on left bank at downstream side of bridge on Meridian Road, 7.2 mi southwest of Midland, and 7.8 mi upstream from Chippewa River.

DRAINAGE AREA.--390 mi², approximately.

PERIOD OF RECORD.--May 1934 to September 1938, February 1948 to September 1997, October 2000 to current year.

REVISED RECORDS.--WSP 1207: Drainage area. WSP 1307: 1935(M). WSP 1337: 1936-38, 1948-49.

GAGE.--Water-stage recorder. Datum of gage is 623.94 ft above sea level. Prior to Sept. 30, 1938, nonrecording gage at same site at datum 5.55 ft lower. Feb. 3, 1948 to Dec. 13, 1951, nonrecording gage at present site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Regulation at low and medium flows by hydroelectric powerplant at St. Louis. Some diversion upstream from station for irrigation. Gage-height telemeter 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	58	69	211	235	e129	e340	495	374	654	306	98	204
2	55	75	187	214	e133	e400	441	428	530	302	99	129
3	58	126	175	204	e125	e830	360	525	506	253	97	124
4	60	149	142	187	e127	e1720	358	461	483	248	91	129
5	66	293	157	e180	e131	e2660	369	426	423	247	87	111
6	75	303	118	e114	e133	e3350	419	368	400	276	84	121
7	76	296	113	e109	e131	2260	318	314	359	262	90	151
8	104	295	169	e111	e133	2090	284	415	330	280	95	149
9	99	283	109	e118	e134	1920	294	1360	299	223	91	199
10	98	254	101	e124	e138	1540	332	1930	531	197	91	143
11	74	126	133	e145	e147	1280	300	1780	1000	191	36	109
12	61	133	e210	e161	e145	1100	296	1480	796	184	75	115
13	59	170	e300	e171	e154	919	284	1370	730	173	97	119
14	61	112	e250	e145	e153	725	271	1280	882	175	67	119
15	88	82	194	e140	e153	770	266	1730	853	160	56	121
16	84	86	231	e138	e150	610	265	1420	841	137	63	114
17	62	126	244	e142	e153	601	271	1230	834	147	71	111
18	50	162	185	e140	e153	578	274	1270	799	152	69	105
19	51	273	176	e147	e154	496	268	1210	623	175	70	104
20	61	422	187	e149	e159	503	267	912	543	147	67	48
21	90	295	169	e136	e157	507	305	866	419	147	64	47
22	99	330	119	e132	e164	487	355	1080	471	147	61	101
23	61	358	90	e110	e173	486	266	1650	540	168	66	107
24	46	312	166	e108	e171	457	256	2390	521	199	58	101
25	46	401	191	e132	e170	468	290	1920	688	192	56	92
26	54	393	198	e137	e176	495	316	1620	527	133	188	82
27	60	291	180	e139	e200	538	453	1500	560	135	208	91
28	92	194	147	e130	e195	572	360	1170	543	107	84	96
29	75	252	159	e121	e232	562	425	923	440	100	119	104
30	71	231	232	e119	---	556	343	866	293	96	139	91
31	70	---	235	e128	---	560	---	605	---	96	168	---
TOTAL	2164	6892	5478	4466	4473	30380	9801	34873	17418	5755	2805	3437
MEAN	69.8	230	177	144	154	980	327	1125	581	186	90.5	115
MAX	104	422	300	235	232	3350	495	2390	1000	306	208	204
MIN	46	69	90	108	125	340	256	314	293	96	36	47
CFSM	0.18	0.59	0.45	0.37	0.40	2.51	0.84	2.88	1.49	0.48	0.23	0.29
IN.	0.21	0.66	0.52	0.43	0.43	2.90	0.93	3.33	1.66	0.55	0.27	0.33

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 2004, BY WATER YEAR (WY)

	224	272	295	259	348	684	605	386	259	149	136	194
MEAN	224	272	295	259	348	684	605	386	259	149	136	194
MAX	1238	784	647	865	1356	1725	1549	1125	900	655	421	2034
(WY)	1987	1993	1983	1973	1938	1976	1967	2004	1989	1994	1972	1986
MIN	69.8	94.8	96.9	70.5	87.2	207	212	106	43.9	35.5	37.4	54.5
(WY)	2004	1950	1963	1977	2003	1964	1963	1958	1934	1934	1936	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1934 - 2004

ANNUAL TOTAL	64006	127942	
ANNUAL MEAN	175	350	
HIGHEST ANNUAL MEAN			317
LOWEST ANNUAL MEAN			541
HIGHEST DAILY MEAN	733	3350	150
LOWEST DAILY MEAN	24	36	8750
ANNUAL SEVEN-DAY MINIMUM	36	62	7.8
MAXIMUM PEAK FLOW		(a)	17
MAXIMUM PEAK STAGE		(c)9.20	(b)9360
INSTANTANEOUS LOW FLOW		Mar 5	(c)13.81
ANNUAL RUNOFF (CFSM)	0.450	0.896	(d)7.6
ANNUAL RUNOFF (INCHES)	6.11	12.20	0.814
10 PERCENT EXCEEDS	353	836	660
50 PERCENT EXCEEDS	129	176	200
90 PERCENT EXCEEDS	58	75	85

(a) Not determined.

(b) Gage height 11.74 ft.

(c) Backwater from ice.

(d) Does not include water years 1934-52.

(e) Estimated.

(f) Part of each day July 1, 2, 1988.

STREAMS TRIBUTARY TO LAKE HURON

04156000 TITTABAWASSEE RIVER AT MIDLAND, MI

LOCATION.--Lat 43°35'43", long 84°14'08", in NW1/4 NE1/4 sec.28, T.14 N., R.2 E., Midland County, Hydrologic Unit 04080201, on right bank 2,000 ft downstream from dam at Dow Chemical Co. in Midland, 0.7 mi upstream from Bullock Creek, 1.4 mi downstream from Chippewa River, and 23 mi upstream from mouth.

DRAINAGE AREA.--2,400 mi², approximately.

PERIOD OF RECORD.--March 1936 to current year. Gage-height records for flood seasons collected in this vicinity 1910-26, 1928, are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 1045: 1945. WSP 1144: 1948.

GAGE.--Water-stage recorder. Datum of gage is 580.08 ft above sea level (levels by Wade-Trim Assoc.). Prior to Sept. 30, 1955, at datum 10.20 ft higher, Oct. 1, 1955 to Sept. 30, 1993, at datum 0.20 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor. Prior to 1992 water year, diversion was used in computing annual mean discharge and runoff figures, extremes and daily discharge were not adjusted for diversion. Prior to May 20, 1970, discharge below 4,000 ft³/s regulated by dam 2,000 ft upstream from station; fixed crest dam since. Gage-height telemeter 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	458	478	1300	968	e852	e1270	2140	2570	3260	1130	530	789
2	360	502	1430	1520	e855	e1850	2030	3710	3370	1170	633	647
3	483	646	1280	2710	e1220	e3880	2090	3820	3280	899	616	659
4	390	1160	1210	3050	e1260	7490	1740	3160	2650	845	569	593
5	364	1950	1230	e2650	e1220	12700	1420	2720	2460	861	503	567
6	481	1860	1100	e1690	e1170	21400	1550	1990	1900	1070	513	549
7	622	2020	e704	e1480	e909	23300	1480	1810	1910	1450	472	634
8	542	1950	e998	e1690	e813	19200	1610	3030	1780	1210	468	625
9	506	1110	1100	e1850	e1040	14500	1330	12000	1570	1260	465	802
10	512	1010	1230	e1370	e1180	10700	1660	16100	1980	818	463	624
11	414	1270	1690	e1020	e1280	7910	1330	15800	2480	746	605	520
12	357	1120	3030	e1550	e1180	7040	1500	11100	2240	813	772	488
13	460	1330	e1710	e1940	e1270	5390	1660	7210	2180	904	666	482
14	547	965	e1050	e1900	e949	4430	1400	7390	2390	718	513	469
15	534	760	e1450	e2280	e816	4030	1260	13400	2430	866	454	447
16	430	645	1890	e1870	e982	3660	1200	13300	2540	881	443	433
17	396	753	1700	e1590	e827	3390	1390	8790	2020	888	436	423
18	371	1450	1360	e952	e1150	2720	1870	9030	2150	762	414	421
19	366	2590	1510	e1370	e1600	2600	3120	8700	1870	725	405	413
20	424	3080	e973	e1530	e1650	2590	3250	6730	1350	747	409	393
21	598	2570	e717	e1460	e1470	3490	2430	4800	1370	770	399	359
22	492	1950	e1150	e1360	e896	3300	2750	5000	1300	789	383	367
23	498	1440	1480	e1170	e921	3090	2040	7500	1590	925	379	399
24	459	1670	1550	e940	e1110	2630	1960	15500	2170	702	377	401
25	406	3030	e872	e821	e1230	2650	2050	19700	2150	651	387	396
26	399	2170	e1270	e821	e1280	2720	2500	15700	1790	719	678	383
27	522	1340	1690	e833	e1350	3540	2670	10800	1420	694	792	372
28	716	1570	e1010	e838	e1390	3460	2910	7030	1700	579	854	377
29	629	2090	e1200	e855	e924	3420	2840	4900	1530	628	656	460
30	591	1390	1810	e855	---	3370	2490	3840	1330	654	948	398
31	562	---	1680	e855	---	2790	---	3360	---	556	951	---
TOTAL	14889	45869	42374	45788	32794	194510	59670	250490	62160	26430	17153	14890
MEAN	480	1529	1367	1477	1131	6275	1989	8080	2072	853	553	496
MAX	716	3080	3030	3050	1650	23300	3250	19700	3370	1450	951	802
MIN	357	478	704	821	813	1270	1200	1810	1300	556	377	359
CFSM	0.20	0.64	0.57	0.62	0.47	2.61	0.83	3.37	0.86	0.36	0.23	0.21
IN.	0.23	0.71	0.66	0.71	0.51	3.01	0.92	3.88	0.96	0.41	0.27	0.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1936 - 2004, BY WATER YEAR (WY)

	MEAN	1046	1448	1513	1405	1778	3865	3585	2270	1424	730	601	883
MAX	6318	6097	3907	5564	6455	10660	8096	8080	5270	4492	2236	10300	
(WY)	1987	1986	1992	1973	1938	1976	1967	2004	1945	1957	1972	1986	
MIN	344	493	462	388	466	1027	969	567	355	234	217	250	
(WY)	1949	1950	1964	1945	1963	1964	1945	1977	1964	1941	1936	1948	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1936 - 2004

ANNUAL TOTAL	353924	807017	
ANNUAL MEAN	970	2205	
HIGHEST ANNUAL MEAN			1717
LOWEST ANNUAL MEAN			3318
HIGHEST DAILY MEAN	3820	May 13	36200
LOWEST DAILY MEAN	208	Sep 14	111
ANNUAL SEVEN-DAY MINIMUM	268	Sep 5	126
MAXIMUM PEAK FLOW			38700
MAXIMUM PEAK STAGE		27.42	(a)33.89
INSTANTANEOUS LOW FLOW		339	39
ANNUAL RUNOFF (CFSM)	0.404	0.919	0.715
ANNUAL RUNOFF (INCHES)	5.49	12.51	9.72
10 PERCENT EXCEEDS	1930	3740	3910
50 PERCENT EXCEEDS	753	1270	962
90 PERCENT EXCEEDS	366	446	381

(a) From floodmark.

(b) Part of each day Oct. 2, 3.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04157000 SAGINAW RIVER AT SAGINAW, MI

LOCATION.--Lat 43°24'46", long 83°57'47", in NW1/4 SE1/4 sec.26, T.12 N., R.4 E., Saginaw County, Hydrologic Unit 04080206, on right bank 1,000 ft downstream from bridge on Rust Avenue in Saginaw, 1.9 mi downstream from Tittabawassee River, and 20.3 mi upstream from mouth.

DRAINAGE AREA.--6,060 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--1904, 1908-9, 1912-13, 1916, 1918-19, 1929-30, and 1942 (flood discharge for certain periods only) in WSP 1084; December 1942 to September 1991 and October 1994 to September 1996, daily discharges greater than 10,000 ft³/s only; no daily discharges greater than 10,000 ft³/s water years 1944, 1949, 1953, 1955, 1958, 1961, 1963, 1964, 1966. Continuous-record station October 1991 to July 1994, and October 1996 to current year. Gage-height records for flood seasons 1910-20 are contained in reports of National Weather Service.

GAGE.--Water-stage recorder. Datum of gage is 565.05 ft, International Great Lakes datum. Prior to Oct. 1, 1972, nonrecording gage at site 1.9 mi downstream at same datum. Auxiliary water-stage recorder, Saginaw River at Essexville (04157065).

REMARKS.--Water-discharge records good except for estimated daily discharges, which are poor. Minimum flows affected by wind direction and seiche on Saginaw Bay, 20.3 mi downstream. Considerable diversion through metropolitan area of Saginaw. Gage-height telemeter 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	e949	e1170	e3750	6380	e1690	e3180	8020	5990	10800	2470	e2510	e2600
2	e1030	e928	e4240	4890	e1660	e6020	7500	8180	10600	3220	e1700	e1980
3	e864	e1330	e3830	5200	e1680	9820	5470	7900	9020	2690	e2370	e1060
4	e763	e3370	e3550	7570	e1850	13100	8060	6740	7580	1850	1800	e1850
5	e949	e2460	e3190	e7360	e2050	19700	5970	6840	6990	1880	e2070	e1210
6	e763	e4030	e2910	e5520	e2150	29300	4250	4880	6160	2770	e2310	e965
7	e963	3650	e2630	e4590	e2030	36700	4200	5930	5480	2430	e3220	e1510
8	e871	5830	2320	e4050	e1870	37500	5150	5540	3540	2950	e1530	e995
9	e1160	3470	e2130	e3680	e1690	36700	3690	11400	4240	3260	e1640	e1130
10	e912	2310	e2400	e3380	e1770	33300	4910	19000	7750	3450	e1960	e1570
11	e769	2260	2300	e2850	e2020	27100	4760	25900	10800	2610	e1390	e1310
12	e934	e3140	e3070	e2520	e2120	22400	6010	27100	9800	2860	e1340	e921
13	e679	e3550	e4400	e2960	e2090	18900	5910	23900	8180	2440	e2260	e1460
14	e706	2950	e2580	e3270	e2030	9490	4490	19100	7180	4420	e1480	e848
15	e919	2450	e2750	e3040	e2120	8920	4010	18100	9900	e3120	e1210	e702
16	e1440	1660	e2150	e3400	e1740	9410	2370	19500	9900	e2150	e1620	e1340
17	e1140	1970	e2670	e3160	e1690	7580	3310	18400	8640	e3410	e1020	827
18	e818	2010	3550	e2750	e1840	6650	3710	15900	7470	4020	e1180	e694
19	e884	e2470	3310	e2250	e1640	5750	3230	14800	7060	2080	e1420	846
20	e793	e4230	e2320	e1910	e2090	5450	6240	12300	6120	1770	e899	e1090
21	e728	e5890	e1910	e2420	e2580	8050	3220	11500	4560	2150	e1410	e719
22	e825	e5120	e1640	e2540	e2580	7050	4950	10700	4020	1850	e858	e548
23	e1020	e4760	e2120	e2370	e2400	5560	4990	15400	4420	3940	e1360	e728
24	e905	e3830	e2560	e2200	e2100	5840	5400	23100	4620	3190	e899	e969
25	e909	e3330	e3010	e1970	e2500	5480	4560	32700	5250	3090	e694	e662
26	e857	e4710	e2620	e1880	e2820	5860	2070	35300	4050	2360	e1220	e988
27	e934	e5890	e3030	e1800	e3010	8030	5570	34500	2940	2000	e858	e639
28	e881	4510	2350	e1780	e3130	7190	4340	31500	3450	1820	e1740	e1020
29	e1410	e3750	3510	e1740	e3300	6550	1780	26500	3810	e2310	e1130	e662
30	e1180	e4500	4770	e1730	---	7420	5320	19600	3010	e2540	e1960	e840
31	e994	---	4720	e1720	---	8070	---	14400	---	e2280	e1240	---
TOTAL	28949	102528	92290	102880	62240	422070	143470	532600	197340	83380	48298	32683
MEAN	934	3418	2977	3319	2146	13620	4782	17180	6578	2690	1558	1089
MAX	1440	6120	4770	7570	3300	37500	8060	35300	10800	4420	3220	2600
MIN	679	928	1640	1720	1640	3180	1780	4880	2940	1770	694	548
CFSM	0.15	0.56	0.49	0.55	0.35	2.25	0.79	2.84	1.09	0.44	0.26	0.18
IN.	0.18	0.63	0.57	0.63	0.38	2.59	0.88	3.27	1.21	0.51	0.30	0.20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 2004, BY WATER YEAR (WY)

MEAN	2606	3771	3801	4511	6005	9003	7808	6663	3793	2547	1917	2006
MAX	4471	11430	7638	10950	12550	14310	16440	17180	6578	7758	4133	5202
(WY)	1994	1993	1992	1993	1997	1997	1993	2004	2004	1994	1992	1992
MIN	934	1210	1419	1348	1086	3263	3631	2595	1998	1039	960	767
(WY)	2004	2000	2003	2003	2003	2003	2000	1999	1999	2001	2003	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1992 - 2004

ANNUAL TOTAL	864797	1848728	(a)4499	
ANNUAL MEAN	2369	5051	6769	1993
HIGHEST ANNUAL MEAN			2112	2003
LOWEST ANNUAL MEAN			(b)67800	Mar 29 1904
HIGHEST DAILY MEAN	9450	May 12	37500	Mar 8
LOWEST DAILY MEAN	490	Sep 14	548	Sep 22
ANNUAL SEVEN-DAY MINIMUM	573	Sep 5	750	Sep 21
MAXIMUM PEAK FLOW			38200	Mar 8
MAXIMUM PEAK STAGE			19.92	Mar 8
ANNUAL RUNOFF (CFSM)	0.391	0.834		0.742
ANNUAL RUNOFF (INCHES)	5.31	11.35		10.09
10 PERCENT EXCEEDS	4990	10100		9230
50 PERCENT EXCEEDS	1540	2880		3170
90 PERCENT EXCEEDS	766	926		1000

(a) Does not include water years 1995, 1996.

(b) Includes water years 1904-1991.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04157000 SAGINAW RIVER AT SAGINAW, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967, 1975-86, 1989 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: November 1974 to September 1981.

WATER TEMPERATURE: November 1974 to September 1981.

INSTRUMENTATION.--Water-quality monitor from Nov. 6, 1976 to Sept. 30, 1981.

REMARKS.--Cross-sectional samples were collected at Rust Avenue bridge.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1975, 1977, 1979): Maximum recorded (more than 20 percent missing record), 1,230 microsiemens, Jan. 5, 1977; minimum recorded (more than 20 percent missing record), 224 microsiemens, Mar. 13, 1977.

WATER TEMPERATURE (water years 1975-77, 1979): Maximum, 30.0°C, July 10, 14, 20, 1977; minimum, 0.0°C, on many days during winter periods.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Time	Instantaneous discharge, cfs (00061)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	pH, water, unfltrd lab, std units (00403)	Specific conductance, wat unfltrd uS/cm 25 degC (00095)	Specific conductance, wat unfltrd lab, uS/cm 25 degC (90095)	Temperature, water, deg C (00010)	Hardness, water, mg/L as CaCO3 (00900)	Noncarbohardness, wat flt field, mg/L as CaCO3 (00904)
NOV 2003											
05...	1300	3970	8.9	80	8.0	7.7	562	567	10.5	200	--
MAR 2004											
30...	1130	8220	10.4	91	8.1	7.8	629	608	9.5	270	76
MAY											
26...	1400	37400	7.0	70	7.8	7.9	490	366	15.0	180	--
AUG											
25...	1300	615	8.8	105	8.5	8.3	876	784	23.0	270	94

Date	Calcium water, fltrd, mg/L (00915)	Magnesium, water, fltrd, mg/L (00925)	Potassium, water, fltrd, mg/L (00935)	Sodium, water, fltrd, mg/L (00930)	Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086)	ANC, wat unfltrd fixed end pt, lab, mg/L as CaCO3 (90410)	Bicarbonate, wat flt incrm. titr., field, mg/L (00453)	Carbonate, wat flt incrm. titr., field, mg/L (00452)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)
NOV 2003											
05...	52.0	17.4	3.63	34.2	--	160	--	--	64.9	.2	5.10
MAR 2004											
30...	74.4	19.9	3.21	28.8	192	172	230	2	60.4	.2	5.41
MAY											
26...	49.4	12.5	4.25	10.6	--	131	--	--	21.9	<.2	6.57
AUG											
25...	70.4	23.6	4.15	72.8	179	202	208	5	128	.4	2.08

Date	Sulfate water, fltrd, mg/L (00945)	Ammonia + org-N, water, unfltrd as N (00625)	Turbidity, wat unfltrd lab, Hach 2100AN NTU (99872)	Residue water, fltrd, tons/acre-ft (70303)	Residue water, fltrd, tons/d (70302)	Residue on evap. at 180degC wat flt mg/L (70300)	Ammonia water, fltrd, mg/L as N (00608)	Nitrite + nitrate water, fltrd, mg/L as N (00631)	Nitrite water, fltrd, mg/L as N (00613)	Orthophosphate, water, fltrd, mg/L as P (00671)	Phosphorus, water, fltrd, mg/L (00666)
NOV 2003											
05...	39.1	.72	33	.46	3600	335	E.03	.65	.010	E.01	E.04
MAR 2004											
30...	53.5	.82	20	.51	8360	377	E.03	3.11	.012	<.02	E.02
MAY											
26...	17.3	1.3	89	.34	25100	248	E.04	2.50	.044	.02	.06
AUG											
25...	47.4	.81	21	.66	800	482	<.04	1.23	.010	<.02	<.04

STREAMS TRIBUTARY TO LAKE HURON

04157000 SAGINAW RIVER AT SAGINAW, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Phosphorus, water, unfltrd mg/L (00665)	Fecal coli- form, M-FC 0.7u MF col/ 100 mL (31625)	Fecal strep- tococci KF MF, col/ 100 mL (31673)	Alum- inum, water, fltrd, ug/L (01106)	Barium, water, fltrd, ug/L (01005)	Cobalt water, fltrd, ug/L (01035)	Iron, water, fltrd, ug/L (01046)	Lithium water, fltrd, ug/L (01130)	Mangan- ese, water, fltrd, ug/L (01056)	Molyb- denum, water, fltrd, ug/L (01060)	Nickel, water, fltrd, ug/L (01065)
NOV 2003											
05...	.09	>240	E560	3	41	.218	23	3.5	14.2	2.4	1.63
MAR 2004											
30...	.07	--	E25	14	48	.339	36	2.9	14.8	1.9	2.89
MAY											
26...	.14	330	500	17	30	.280	96	1.5	5.9	1.3	2.48
AUG											
25...	.07	50	E5	5	49	.490	8	5.1	2.6	4.4	4.00

Date	Selen- ium, water, fltrd, ug/L (01145)	Silver, water, fltrd, ug/L (01075)	Stront- ium, water, fltrd, ug/L (01080)	Vanad- ium, water, fltrd, ug/L (01085)	Suspnd. sedi- ment, sieve diametr percent <.063mm (70331)	Sus- pended sedi- ment concen- tration mg/L (80154)	Sus- pended sedi- ment dis- charge, tons/d (80155)
NOV 2003							
05...	E.3	<.2	254	.8	92	41	439
MAR 2004							
30...	.7	<.2	219	2.4	97	47	1040
MAY							
26...	.4	<.2	126	.8	70	148	15000
AUG							
25...	E.3	<.2	313	1.5	98	12	20

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04159492 BLACK RIVER NEAR JEDDO, MI

LOCATION.--Lat 43°09'09", long 82°37'27", in SE1/4 SE1/4 sec.6, T.8 N., R.16 E., St. Clair County, Hydrologic Unit 04090001, on right bank 650 ft upstream from bridge on Jeddo Road, 0.4 mi downstream from Silver Creek, and 2.2 mi west of Jeddo.

DRAINAGE AREA.--464 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1944 to current year. Published as "near Fargo" prior to October 1991.

REVISED RECORDS.--WSP 1307: 1950(M). WSP 1627: 1956-58. WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 655 ft above sea level, from topographic map. Prior to July 9, 1954, nonrecording gage and July 10, 1954 to September 1991 water-stage recorder, at site 7.6 mi downstream, at different datum (station 04159500).

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Diurnal fluctuation, principally during low flow, caused by an unknown source upstream from station. Gage-height telemeter 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	27	41	479	838	e65	489	468	159	298	93	101	41
2	23	92	328	583	e64	1880	397	558	255	74	79	37
3	22	694	243	812	e62	3350	343	857	212	67	86	37
4	21	1170	180	820	e60	3180	295	562	180	64	190	35
5	20	884	163	540	e58	4230	242	413	159	70	247	32
6	20	618	138	365	e58	6790	209	380	140	120	169	32
7	24	381	112	179	e56	3690	202	333	128	227	118	40
8	21	255	108	e170	e54	1980	196	335	113	1280	85	41
9	21	172	102	e160	e54	1380	187	2850	119	692	68	47
10	19	122	100	e150	e53	967	167	3030	174	360	61	39
11	22	108	184	e140	e52	742	149	2220	290	235	57	37
12	20	132	271	e130	e52	629	140	1090	257	168	55	33
13	19	139	171	e120	e51	483	137	650	194	132	53	31
14	23	117	140	e110	e51	425	133	491	922	152	55	35
15	28	99	148	e105	e50	388	127	571	1310	235	49	33
16	24	88	126	e100	e49	336	116	514	704	183	45	33
17	24	81	123	e98	e48	292	114	360	394	133	43	32
18	25	94	117	e94	e47	293	110	300	399	105	44	37
19	28	833	110	e92	e47	292	142	278	315	91	42	33
20	21	979	91	e88	e48	354	160	248	212	85	40	29
21	22	508	80	e86	e52	555	138	219	161	76	40	28
22	22	326	103	e82	e62	407	133	387	144	68	40	31
23	22	240	109	e80	e72	325	121	2680	134	61	33	26
24	22	238	242	e78	e84	286	109	7770	142	57	35	26
25	25	456	329	e76	106	334	97	4810	165	52	34	29
26	26	392	279	e74	125	681	98	1660	137	46	35	26
27	26	300	207	e72	141	1010	104	983	108	144	34	26
28	30	299	200	e70	165	682	105	685	90	379	46	22
29	34	1070	680	e70	238	502	117	493	87	252	48	25
30	36	828	2990	e68	—	440	116	379	92	168	45	23
31	39	—	1850	e66	—	511	—	317	—	127	47	—
TOTAL	756	11756	10503	6516	2124	37903	5172	36582	8035	5996	2124	976
MEAN	24.4	392	339	210	73.2	1223	172	1180	268	193	68.5	32.5
MAX	39	1170	2990	838	238	6790	468	7770	1310	1280	247	47
MIN	19	41	80	66	47	286	97	159	87	46	33	22
CFSM	0.05	0.84	0.73	0.45	0.16	2.64	0.37	2.54	0.58	0.42	0.15	0.07
IN.	0.06	0.94	0.84	0.52	0.17	3.04	0.41	2.93	0.64	0.48	0.17	0.08

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2004, BY WATER YEAR (WY)

	MEAN	123	172	250	257	448	972	622	319	193	82.0	59.2	110
MAX	1316	972	1031	1315	1855	3218	2102	1511	1625	517	559	2237	
(WY)	1987	1993	1951	1952	1954	1985	1947	1956	1996	1994	1953	1986	
MIN	7.62	10.5	10.3	8.37	15.8	48.9	54.2	40.4	22.4	13.1	8.34	5.53	
(WY)	1964	1945	1959	1945	1959	1964	1946	1958	1949	1966	1948	1948	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1944 - 2004

ANNUAL TOTAL	69299.3		128443		301	
ANNUAL MEAN	190		351		705	1985
HIGHEST ANNUAL MEAN					28.7	1964
LOWEST ANNUAL MEAN						
HIGHEST DAILY MEAN	2990	Dec 30	7770	May 24	10100	Apr 6 1947
LOWEST DAILY MEAN	7.3	Jan 7	19	Oct 10	2.0	Aug 17 1948
ANNUAL SEVEN-DAY MINIMUM	12	Sep 12	21	Oct 8	2.7	Sep 13 1946
MAXIMUM PEAK FLOW			8570	May 24	(a)14400	Apr 5 1947
MAXIMUM PEAK STAGE			14.79	May 24	(b)16.72	Feb 22 1997
INSTANTANEOUS LOW FLOW					(c)1.8	(d)
ANNUAL RUNOFF (CFSM)	0.409		0.756		0.649	
ANNUAL RUNOFF (INCHES)	5.56		10.30		8.81	
10 PERCENT EXCEEDS	493		697		664	
50 PERCENT EXCEEDS	56		122		66	
90 PERCENT EXCEEDS	18		29		16	

(a) Gage height 16.06 ft, from floodmark, site and datum then in use; from rating curve extended above 9,500 ft³/s.

(b) Present site and datum; peak stage observed at previous site and datum, 18.05 ft, Feb. 20, 1951, backwater from ice.

(c) Observed; site then in use.

(d) Sept. 18, 19, 1946.

(e) Estimated.

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04159492 BLACK RIVER NEAR JEDDO, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996-98, June to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: November 1996 to April 1997, June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water temperature recorder from Nov. 1996 to Apr. 1997. Water-quality monitor telemeter, set for 15 minute measurement interval from June to Sept. 2004.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: June 14, July 3-8, 18-31, Sept. 10-14, rated good; Aug. 1-3, rated fair; Aug. 4, 5, rated poor. pH records rated excellent except the following period: Sept. 9-14, rated good. Water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: June 13-15, July 9-14, Aug. 17, 18, 29, Sept. 10-12, 14, 18, 19, 26, 27, rated good; June 17, July 15-18, Aug. 6, 30, 31, Sept. 13, 20, 21, rated fair; June 18-21, 30, July 1, 8, 19-26, Aug. 7, 19-21, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 898 microsiemens, Sept. 30, 2004; minimum, 319 microsiemens, June 15, 2004.

pH: Maximum, 8.5 std. units, June 29, 30, July 1, 2004; minimum, 7.6 std. units, June 15, 16, July 8, 2004.

WATER TEMPERATURE: Maximum, 26.8°C, July 22, 2004; minimum, 0.0°C, on many days during 1997 winter period.

DISSOLVED OXYGEN: Maximum recorded, 12.1 mg/L, Aug. 21, 2004, but may have been higher during instrument malfunction Aug. 8-16, 2004; minimum recorded, 5.2 mg/L, July 22, 23, 2004.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 898 microsiemens, Sept. 30; minimum, 319 microsiemens, June 15.

pH: Maximum, 8.5 std. units, June 29, 30, July 1; minimum, 7.6 std. units, June 15, 16, July 8.

WATER TEMPERATURE: Maximum, 26.8°C, July 22; minimum, 13.6°C, Sept. 30.

DISSOLVED OXYGEN: Maximum recorded, 12.1 mg/L, Aug. 21, but may have been higher during instrument malfunction Aug. 8-16; minimum recorded, 5.2 mg/L, July 22, 23.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	---	---	---	817	795	806	587	576	580	851	833	842
2	---	---	---	814	796	808	590	578	585	843	828	836
3	---	---	---	835	809	826	588	572	584	847	835	841
4	805	801	803	858	824	836	572	449	522	862	837	849
5	817	803	807	827	814	820	583	523	541	860	841	851
6	828	817	823	848	816	839	711	583	661	846	807	835
7	834	826	831	856	664	790	746	711	736	813	795	804
8	862	827	855	669	338	452	731	719	723	820	796	804
9	871	772	843	550	421	485	737	725	731	824	804	813
10	806	708	759	646	550	602	727	707	713	817	805	810
11	767	714	748	715	646	684	742	700	716	818	805	812
12	836	728	802	768	715	742	741	707	720	818	806	814
13	739	696	723	793	768	780	768	713	732	822	816	818
14	698	338	490	785	723	758	764	736	747	830	820	826
15	415	319	362	812	769	801	769	751	759	841	822	833
16	449	380	416	807	696	732	790	769	780	831	821	827
17	671	449	522	757	700	738	807	783	794	848	823	834
18	700	641	664	777	751	764	816	805	810	848	842	844
19	704	662	685	805	777	795	827	811	818	852	838	844
20	735	684	707	819	799	812	834	825	830	842	834	837
21	771	735	756	825	797	815	843	834	839	834	830	832
22	808	769	789	831	800	817	847	831	839	833	827	829
23	850	787	824	830	813	822	847	832	840	838	826	831
24	835	789	813	821	801	808	848	821	837	838	829	833
25	836	804	822	820	792	805	833	819	827	844	833	837
26	830	797	809	820	797	809	840	820	833	855	835	845
27	812	789	800	820	378	682	828	815	822	857	845	848
28	793	779	785	519	394	449	848	821	837	882	852	862
29	801	778	793	559	519	551	851	825	845	880	865	870
30	825	792	804	621	559	593	851	838	843	898	869	883
31	---	---	---	611	582	589	856	836	844	---	---	---
MONTH	---	---	---	858	338	729	856	449	751	898	795	835

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04159492 BLACK RIVER NEAR JEDDO, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	8.5	8.3	8.4	8.0	7.9	8.0	8.3	8.1	8.2
2	--	--	--	8.4	8.3	8.4	8.0	7.9	8.0	8.4	8.1	8.3
3	--	--	--	8.4	8.3	8.4	8.0	7.9	8.0	8.4	8.2	8.2
4	8.3	8.2	8.2	8.4	8.2	8.3	8.0	7.8	7.9	8.4	8.2	8.2
5	8.3	8.2	8.2	8.4	8.1	8.3	8.0	7.8	7.9	8.4	8.1	8.2
6	8.3	8.2	8.3	8.4	8.2	8.3	8.1	8.0	8.1	8.4	8.2	8.3
7	8.4	8.2	8.3	8.3	7.8	8.1	8.2	8.0	8.1	8.3	8.0	8.2
8	8.4	8.2	8.3	7.8	7.6	7.7	8.3	8.2	8.2	8.4	8.1	8.3
9	8.4	8.2	8.3	7.9	7.7	7.8	8.3	8.2	8.2	8.4	8.1	8.3
10	8.2	8.1	8.2	8.0	7.8	7.9	8.3	8.2	8.2	8.3	8.1	8.2
11	8.2	8.1	8.1	8.1	8.0	8.0	8.3	8.1	8.2	8.2	8.0	8.1
12	8.2	8.1	8.2	8.3	8.1	8.1	8.3	8.1	8.2	8.2	8.0	8.1
13	8.2	8.0	8.1	8.3	8.2	8.2	8.3	8.1	8.2	8.3	8.0	8.1
14	8.1	7.7	7.9	8.3	8.2	8.2	8.3	8.1	8.2	8.3	8.0	8.2
15	7.8	7.6	7.6	8.4	8.2	8.3	8.3	8.1	8.2	8.3	8.1	8.2
16	7.8	7.6	7.7	8.3	8.2	8.3	8.3	8.1	8.2	8.3	8.1	8.2
17	7.9	7.8	7.9	8.3	8.2	8.2	8.3	8.0	8.2	8.3	8.0	8.2
18	8.0	7.9	7.9	8.4	8.2	8.3	8.2	8.1	8.1	8.3	8.0	8.2
19	8.0	8.0	8.0	8.4	8.3	8.3	8.3	8.1	8.2	8.3	8.1	8.2
20	8.0	8.0	8.0	8.4	8.3	8.3	8.3	8.1	8.2	8.3	8.1	8.2
21	8.1	8.0	8.1	8.4	8.2	8.3	8.3	8.1	8.2	8.2	8.0	8.2
22	8.2	8.1	8.1	8.3	8.1	8.2	8.3	8.1	8.2	8.2	8.1	8.2
23	8.2	8.1	8.2	8.3	8.2	8.3	8.3	8.1	8.2	8.2	8.1	8.1
24	8.2	8.2	8.2	8.4	8.2	8.3	8.2	8.1	8.2	8.2	8.0	8.2
25	8.2	8.2	8.2	8.4	8.2	8.3	8.2	8.0	8.1	8.2	8.0	8.1
26	8.3	8.2	8.2	8.3	8.2	8.2	8.3	8.0	8.1	8.2	8.1	8.2
27	8.3	8.2	8.2	8.2	7.9	8.1	8.3	8.0	8.2	8.2	8.1	8.1
28	8.3	8.2	8.3	7.9	7.8	7.9	8.2	8.0	8.1	8.2	8.0	8.2
29	8.5	8.2	8.4	8.0	7.9	7.9	8.2	8.0	8.1	8.2	8.1	8.2
30	8.5	8.3	8.4	8.0	7.9	8.0	8.3	8.0	8.1	8.2	8.1	8.2
31	--	--	--	8.1	7.9	8.0	8.2	8.0	8.2	--	--	--
MAX	--	--	--	8.5	8.3	8.4	8.3	8.2	8.2	8.4	8.2	8.3
MIN	--	--	--	7.8	7.6	7.7	8.0	7.8	7.9	8.2	8.0	8.1

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	23.5	21.0	22.5	24.0	21.6	23.1	21.9	19.1	20.5
2	--	--	--	23.2	20.8	22.2	25.4	22.8	24.2	23.1	19.4	21.3
3	--	--	--	23.4	20.6	22.2	24.6	23.5	24.1	23.0	20.1	21.8
4	19.7	15.9	17.8	23.2	22.5	23.0	24.0	20.2	21.7	23.8	21.5	22.7
5	20.0	16.5	18.3	23.1	20.8	22.1	21.0	19.6	20.4	24.7	21.4	23.1
6	20.2	18.0	19.1	22.6	19.4	21.0	21.0	18.4	19.8	24.0	21.7	23.0
7	22.2	19.0	20.7	22.5	21.3	21.9	21.5	18.7	20.3	24.2	21.9	23.3
8	24.6	20.6	22.7	21.3	19.0	20.2	22.4	19.9	21.4	22.7	20.4	21.7
9	24.8	22.0	23.6	19.8	18.1	18.9	22.6	21.2	21.9	21.2	19.2	20.2
10	22.0	18.1	19.8	21.2	18.2	19.7	22.3	20.6	21.6	20.8	17.9	19.6
11	18.6	17.7	18.1	23.1	19.1	21.0	21.2	19.3	20.5	20.8	18.5	19.8
12	19.4	16.2	17.7	24.7	21.3	22.8	19.5	17.9	18.9	21.9	18.6	20.5
13	20.9	17.6	19.1	25.7	22.3	23.7	19.0	17.3	18.1	22.3	19.9	21.4
14	21.0	19.0	20.1	25.0	22.1	23.1	20.2	17.2	18.6	22.5	20.5	21.7
15	20.6	19.3	20.0	23.9	21.5	22.6	20.9	17.6	19.3	23.4	21.1	22.2
16	20.7	18.8	19.8	23.8	20.9	22.4	21.6	18.0	19.9	23.1	21.1	22.0
17	22.0	19.9	20.7	23.2	21.3	22.4	21.4	18.3	19.9	21.4	18.7	19.8
18	22.8	20.2	21.3	24.3	21.3	22.9	20.7	18.9	19.8	18.8	16.7	18.0
19	21.9	19.8	20.9	24.2	22.1	23.4	21.9	19.4	20.5	18.3	16.3	17.3
20	21.3	18.0	19.7	25.1	22.6	24.0	20.1	18.1	19.4	18.4	15.4	17.0
21	20.2	18.5	19.5	25.8	24.1	25.1	19.8	16.7	18.4	18.5	15.9	17.3
22	20.7	19.0	19.7	26.8	25.1	25.9	20.2	16.8	18.7	19.1	16.4	17.9
23	21.8	18.4	20.1	25.7	22.3	24.6	20.1	18.6	19.3	19.5	17.2	18.4
24	21.4	19.5	20.4	23.5	21.0	22.2	21.0	18.3	19.8	19.6	17.5	18.8
25	20.9	17.8	19.3	23.3	20.6	21.8	22.9	19.8	21.4	19.0	17.9	18.4
26	20.6	18.4	19.6	23.1	20.2	21.6	24.5	21.8	23.1	18.8	16.5	17.8
27	20.9	18.3	19.8	20.8	17.6	19.4	25.1	22.5	24.0	18.2	15.8	17.1
28	20.7	18.8	19.6	20.9	17.4	19.0	24.8	21.7	23.3	17.1	15.9	16.5
29	21.7	17.9	19.8	21.7	19.2	20.4	21.7	19.4	20.7	16.4	14.9	15.5
30	22.9	19.3	21.3	21.3	20.3	20.9	20.8	18.0	19.5	16.0	13.6	14.9
31	--	--	--	23.4	20.7	22.0	21.1	17.6	19.5	--	--	--
MONTH	--	--	--	26.8	17.4	22.1	25.4	16.7	20.7	24.7	13.6	19.6

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04159492 BLACK RIVER NEAR JEDDO, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	11.6	9.2	10.5	—	—	—	10.5	8.0	9.2
2	—	—	—	—	—	—	—	—	—	11.3	8.2	9.6
3	—	—	—	—	—	—	—	—	—	11.2	7.8	9.5
4	9.9	8.6	9.2	—	—	—	—	—	—	11.3	7.7	9.5
5	10.5	8.5	9.5	—	—	—	—	—	—	11.4	6.9	9.3
6	10.4	8.2	9.3	—	—	—	9.4	8.2	8.9	10.1	7.0	8.6
7	10.7	8.1	9.5	—	—	—	10.0	8.7	9.4	9.6	6.2	8.3
8	10.6	7.8	9.3	7.4	6.9	7.1	—	—	—	9.8	6.4	8.4
9	9.2	7.3	8.2	8.1	7.4	7.8	—	—	—	9.4	7.6	8.4
10	8.6	7.5	8.0	8.3	7.8	8.1	—	—	—	10.2	6.8	8.8
11	8.9	8.3	8.6	8.2	7.5	7.9	—	—	—	10.2	7.2	8.9
12	10.0	8.6	9.3	8.1	7.2	7.7	—	—	—	10.1	6.6	8.5
13	9.6	8.3	8.9	8.0	6.9	7.4	—	—	—	10.2	7.5	8.8
14	8.5	7.7	8.0	7.6	6.6	7.1	—	—	—	10.2	7.6	9.0
15	7.8	7.1	7.5	8.5	6.8	7.5	—	—	—	11.2	7.8	9.4
16	7.9	7.5	7.8	8.1	6.9	7.4	—	—	—	11.0	8.1	9.4
17	8.2	7.9	8.1	8.0	6.6	7.3	11.1	8.9	10.1	10.8	7.9	9.4
18	8.5	8.1	8.3	8.3	6.7	7.5	10.5	8.6	9.4	10.7	8.5	9.8
19	9.0	8.4	8.8	8.2	6.4	7.5	11.4	8.3	9.7	11.0	8.0	10.0
20	9.6	8.9	9.4	8.0	6.5	7.4	11.0	9.2	10.0	11.1	8.9	10.0
21	10.0	9.4	9.8	7.5	6.3	6.9	12.1	9.2	10.6	10.6	9.2	9.8
22	—	—	—	6.9	5.2	6.0	—	—	—	10.6	9.0	9.6
23	—	—	—	6.8	5.2	5.9	—	—	—	10.5	7.8	9.4
24	—	—	—	7.5	5.7	6.6	—	—	—	10.7	8.7	9.6
25	—	—	—	7.7	5.9	6.7	—	—	—	10.1	7.9	9.3
26	—	—	—	7.8	5.8	6.6	—	—	—	10.8	8.9	9.7
27	—	—	—	—	—	—	9.8	7.0	8.4	11.1	8.2	9.9
28	—	—	—	—	—	—	8.7	6.7	7.6	10.6	8.9	9.6
29	—	—	—	—	—	—	8.7	6.7	7.7	10.6	8.6	9.5
30	11.4	8.7	10.2	—	—	—	10.2	7.5	8.8	11.1	9.1	9.9
31	—	—	—	—	—	—	10.0	8.2	9.1	—	—	—
MONTH	—	—	—	—	—	—	—	—	—	11.4	6.2	9.3

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04159900 MILL CREEK NEAR AVOCA, MI

LOCATION.--Lat 43°03'16", long 82°44'05", in NW1/4 sec.8, T.7 N., R.15 E., St. Clair County, Hydrologic Unit 04090001, on left bank at downstream side of bridge on Bricker Road, 0.2 mi upstream from Gleason Drain, and 2.3 mi west of Avoca.

DRAINAGE AREA.--169 mi².

PERIOD OF RECORD.--April 1963 to September 1975, October 1975 to September 1978 (operated as a crest-stage partial-record station), October 1978 to September 1979 (operated as a low-flow and crest-stage partial-record station), October 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 711.31 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Gage-height telemeter 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	5.0	8.8	148	375	e22	e110	167	47	203	43	78	19
2	4.7	23	114	309	e22	e290	150	144	156	46	64	18
3	4.5	72	86	316	e21	e485	126	222	125	48	55	16
4	4.6	139	e70	285	e21	e600	107	184	111	46	72	15
5	4.7	127	e55	225	e20	1110	90	141	97	44	115	15
6	4.7	102	e50	164	e20	1170	81	110	76	52	134	14
7	6.1	76	e45	87	e20	918	77	87	60	98	113	16
8	6.3	55	e35	e91	e20	712	72	140	51	219	86	16
9	6.0	42	e35	e72	e20	563	68	736	48	222	59	16
10	5.8	34	36	e61	e20	437	63	936	68	169	44	15
11	4.3	32	68	e58	e20	346	57	1030	96	128	35	e15
12	5.1	31	87	e53	e19	283	53	889	100	101	30	e14
13	4.1	33	68	e48	e19	216	53	635	90	85	27	e13
14	5.0	32	80	e42	e18	169	49	529	357	90	26	e14
15	11	31	58	e38	e18	141	47	476	335	89	23	13
16	7.4	29	50	e36	e17	118	44	375	229	96	21	12
17	6.5	28	46	e34	e16	96	42	290	165	86	20	12
18	7.2	35	43	e32	e16	99	41	228	135	80	19	12
19	7.6	112	42	e31	e16	99	42	184	112	105	18	12
20	7.0	143	e39	e30	e16	129	44	151	86	106	17	12
21	6.9	121	e34	e29	e17	169	44	135	68	96	17	13
22	6.7	91	e41	e28	e19	157	43	330	60	81	15	12
23	6.5	70	43	e27	e21	126	40	1510	55	62	15	12
24	6.6	71	68	e26	e24	108	35	2070	81	45	15	11
25	7.1	103	98	e25	e29	117	34	1340	115	36	15	11
26	8.0	102	99	e24	e33	215	35	1080	127	29	15	10
27	7.9	83	94	e24	e38	302	38	794	104	41	15	11
28	10	86	97	e23	e45	254	39	574	79	93	15	11
29	12	198	217	e23	e64	202	38	433	61	135	17	10
30	11	184	586	e23	—	171	36	334	51	119	18	9.5
31	12	—	518	e22	—	179	—	261	—	96	20	—
TOTAL	212.3	2293.8	3150	2661	671	10091	1852	16395	3501	2786	1233	399.5
MEAN	6.85	76.5	102	85.8	23.1	326	61.7	529	117	89.9	39.8	13.3
MAX	12	198	586	375	64	1170	167	2070	357	222	134	19
MIN	4.1	8.8	34	22	16	96	34	47	48	29	15	9.5
CFSM	0.04	0.45	0.60	0.51	0.14	1.93	0.37	3.13	0.69	0.53	0.24	0.08
IN.	0.05	0.50	0.69	0.59	0.15	2.22	0.41	3.61	0.77	0.61	0.27	0.09

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

	MEAN	27.8	56.4	85.4	104	153	263	213	115	76.8	24.5	15.6	15.2
MAX	269	261	266	404	586	664	715	529	659	89.9	57.3	95.9	
(WY)	2002	1993	1988	1974	2001	1973	1975	2004	1996	2004	1973	1992	
MIN	2.76	5.25	3.72	5.74	6.21	11.2	26.1	16.2	5.91	2.36	3.17	2.39	
(WY)	1964	1965	1964	2003	1964	1964	1964	1964	1964	1963	1964	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1963 - 2004

ANNUAL TOTAL	19232.2		45245.6									
ANNUAL MEAN	52.7		124							96.5		
HIGHEST ANNUAL MEAN										174		1974
LOWEST ANNUAL MEAN										7.84		1964
HIGHEST DAILY MEAN	600	Mar 18	2070	May 24	3940	Apr 19	1975					
LOWEST DAILY MEAN	2.7	Sep 10	4.1	Oct 13	0.90	Aug 9	1964					
ANNUAL SEVEN-DAY MINIMUM	2.9	Sep 5	4.9	Oct 1	1.2	Jul 6	1963					
MAXIMUM PEAK FLOW			2420	May 24	(a)4570	Apr 19	1975					
MAXIMUM PEAK STAGE			7.95	May 24	(b)9.33	Feb 10	2001					
INSTANTANEOUS LOW FLOW			4.0	May 24	(c)							
ANNUAL RUNOFF (CFSM)	0.312		0.731	(c)	0.80							(d)
ANNUAL RUNOFF (INCHES)	4.23		9.96		0.571							
10 PERCENT EXCEEDS	149		286		7.76							
50 PERCENT EXCEEDS	13		50		235							
90 PERCENT EXCEEDS	3.7		11		29							
					5.8							

(a) Gage height 8.87 ft.

(b) Backwater from ice.

(c) Oct. 11, 13.

(d) Part of each day Aug. 9-11, 1964.

(e) Estimated.

[illegible]

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04160398 PINE RIVER NEAR MARYSVILLE, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--June to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: June 30 to July 3, July 30 to Aug. 3, rated good; July 4, 5, rated fair; July 6-8, rated poor. pH and water temperature records rated excellent except the following period: July 25-28, rated good. Dissolved oxygen records rated excellent except the following periods: July 28-30, Aug. 7, 8, 20, Sept. 13, 14, rated good; July 31, Aug. 1, 9, 10, 21, 22, rated fair; Aug. 2-4, 11-17, 23-31, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 771 microsiemens, Sept. 7, 2004; minimum, 279 microsiemens, July 31, 2004.

pH: Maximum, 8.6 std. units, July 25, 2004; minimum, 7.7 std. units, June 14, 15, July 31, Aug. 1, 4, 5, 2004.

WATER TEMPERATURE: Maximum, 26.4°C, July 22, 2004; minimum, 12.0°C, Sept. 30, 2004.

DISSOLVED OXYGEN: Maximum, 13.5 mg/L, June 29, 2004; minimum, 6.0 mg/L, July 23, 2004.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	--	--	--	553	475	528	440	298	371	632	617	622
2	--	--	--	538	501	521	525	440	486	634	630	632
3	--	--	--	526	497	512	555	525	542	632	626	629
4	620	572	589	509	487	500	572	415	522	640	630	637
5	604	508	534	517	488	508	500	415	457	638	633	636
6	539	518	526	506	491	498	501	450	481	633	627	629
7	554	539	546	518	484	497	467	456	460	771	572	635
8	574	554	564	548	480	502	463	456	459	673	595	624
9	597	574	581	616	548	586	468	457	462	634	614	627
10	621	584	599	607	560	589	482	467	472	652	618	637
11	609	578	592	607	572	588	498	482	487	626	609	619
12	586	570	579	602	450	540	504	498	502	609	604	606
13	623	584	604	574	453	526	509	503	507	612	607	610
14	615	406	518	610	561	584	523	509	515	613	608	611
15	506	405	444	612	599	604	530	523	526	610	609	610
16	452	415	429	613	604	606	540	530	533	614	610	612
17	479	452	467	604	552	579	549	540	545	613	608	610
18	507	479	494	573	554	563	558	548	555	613	609	610
19	536	507	525	573	561	567	569	557	565	614	612	614
20	555	536	546	562	553	558	576	569	574	615	612	613
21	568	555	563	563	552	559	584	574	581	614	611	613
22	581	563	570	579	559	569	590	584	588	614	611	613
23	582	571	577	595	574	579	597	590	594	616	613	615
24	586	581	583	600	535	586	604	597	600	616	612	615
25	581	577	579	--	--	--	612	604	606	620	615	616
26	585	572	579	--	--	--	613	607	610	623	619	621
27	579	561	572	--	--	--	620	511	612	627	623	625
28	578	566	572	630	356	408	665	568	607	629	625	627
29	571	438	526	544	358	463	720	585	643	631	628	630
30	522	439	473	442	346	385	667	618	638	634	628	631
31	--	--	--	464	279	350	626	614	618	--	--	--
MONTH	--	--	--	--	--	--	720	298	539	771	572	621

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04160398 PINE RIVER NEAR MARYSVILLE, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	8.3	8.0	8.1	7.8	7.7	7.7	8.2	8.0	8.1
2	--	--	--	8.3	8.0	8.1	7.9	7.8	7.9	8.2	8.0	8.2
3	--	--	--	8.2	8.0	8.1	7.9	7.9	7.9	8.3	8.1	8.2
4	8.0	7.9	8.0	8.2	8.0	8.0	7.9	7.7	7.9	8.2	8.1	8.2
5	8.0	7.9	7.9	8.1	7.9	8.0	7.9	7.7	7.8	8.2	8.1	8.2
6	7.9	7.8	7.9	8.2	7.9	8.1	7.9	7.9	7.9	8.2	8.1	8.1
7	8.0	7.9	7.9	8.2	8.0	8.0	7.9	7.9	7.9	8.1	8.0	8.0
8	8.1	7.9	7.9	8.1	8.0	8.0	7.9	7.8	7.8	8.1	7.9	8.0
9	8.0	7.9	7.9	8.2	8.1	8.1	7.9	7.8	7.8	8.2	8.0	8.0
10	7.9	7.8	7.9	8.3	8.1	8.2	7.9	7.8	7.9	8.2	8.0	8.1
11	8.0	7.9	8.0	8.3	8.0	8.1	8.0	7.8	7.9	8.2	8.0	8.1
12	8.1	8.0	8.0	8.1	7.9	8.0	8.1	7.9	8.0	8.2	8.0	8.1
13	8.1	8.0	8.0	8.1	7.8	8.0	8.1	7.9	8.0	8.2	8.0	8.1
14	8.0	7.7	7.8	8.1	8.0	8.0	8.2	8.0	8.0	8.2	8.0	8.1
15	7.9	7.7	7.8	8.2	8.0	8.1	8.2	8.0	8.1	8.2	8.1	8.2
16	7.8	7.8	7.8	8.2	8.1	8.2	8.3	8.0	8.1	8.2	8.1	8.1
17	7.8	7.8	7.8	8.3	8.1	8.2	8.4	8.0	8.2	8.2	8.1	8.2
18	7.9	7.8	7.9	8.3	8.0	8.1	8.4	8.1	8.2	8.2	8.2	8.2
19	7.9	7.9	7.9	8.4	8.0	8.1	8.3	8.1	8.2	8.2	8.1	8.2
20	8.0	7.9	8.0	8.4	8.0	8.1	8.2	8.1	8.2	8.2	8.1	8.2
21	8.0	8.0	8.0	8.4	8.0	8.1	8.2	8.1	8.2	8.2	8.1	8.2
22	8.0	8.0	8.0	8.3	7.9	8.1	8.3	8.1	8.2	8.2	8.1	8.2
23	8.1	8.0	8.0	8.3	7.9	8.1	8.2	8.2	8.2	8.2	8.1	8.1
24	8.2	8.0	8.0	8.4	8.0	8.2	8.3	8.2	8.2	8.2	8.1	8.1
25	8.2	8.0	8.1	8.6	8.4	8.5	8.2	8.1	8.2	8.2	8.1	8.1
26	8.3	8.0	8.1	8.5	7.9	8.4	8.2	8.0	8.1	8.2	8.1	8.1
27	8.3	8.0	8.2	8.5	8.0	8.1	8.2	8.0	8.1	8.2	8.1	8.1
28	8.3	8.0	8.2	8.0	7.8	7.8	8.1	8.0	8.0	8.2	8.1	8.1
29	8.4	8.0	8.2	8.0	7.8	7.9	8.0	8.0	8.0	8.2	8.0	8.1
30	8.4	8.0	8.1	7.8	7.8	7.8	8.1	8.0	8.0	8.1	8.0	8.1
31	--	--	--	7.8	7.7	7.8	8.2	8.0	8.1	--	--	--
MAX	--	--	--	8.6	8.4	8.5	8.4	8.2	8.2	8.3	8.2	8.2
MIN	--	--	--	7.8	7.7	7.8	7.8	7.7	7.7	8.1	7.9	8.0

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	23.2	19.2	21.0	21.7	20.8	21.3	21.1	18.1	19.5
2	--	--	--	22.8	19.2	20.8	23.1	20.8	21.9	21.6	18.4	20.0
3	--	--	--	23.3	18.5	20.9	23.9	21.7	22.7	21.8	18.9	20.4
4	16.7	14.6	15.6	23.2	21.0	22.1	22.2	19.2	20.3	22.3	19.8	21.1
5	17.4	14.2	15.8	22.2	19.7	21.3	19.4	18.6	19.0	22.8	20.3	21.6
6	18.6	15.7	17.0	21.9	18.5	20.2	18.8	17.6	18.2	23.2	21.1	22.3
7	20.6	17.0	18.8	22.8	20.8	21.6	19.1	17.0	18.1	23.3	20.8	22.1
8	23.1	18.6	20.8	21.2	19.0	19.7	20.4	17.6	19.0	20.8	19.0	19.7
9	24.0	20.8	22.2	20.4	18.1	19.2	21.1	18.0	19.6	19.8	18.2	18.9
10	21.6	17.8	19.3	21.4	18.9	20.0	21.2	19.2	20.2	19.2	16.3	17.8
11	17.8	16.7	17.4	22.6	18.9	20.8	20.2	18.7	19.5	19.4	16.4	17.9
12	17.6	15.8	16.7	22.3	20.3	21.1	18.7	16.9	17.8	20.1	16.9	18.6
13	19.5	16.8	18.0	23.3	19.9	21.6	17.8	15.7	16.8	20.7	17.9	19.4
14	20.7	18.6	19.7	22.5	20.8	21.7	18.3	15.8	17.0	21.1	18.9	20.0
15	20.5	19.5	20.0	22.0	19.7	20.8	19.4	15.8	17.5	21.9	19.8	20.9
16	20.0	19.1	19.4	22.7	20.1	21.3	19.8	16.0	17.9	22.2	20.1	21.2
17	20.3	19.0	19.6	21.9	20.6	21.2	19.7	17.0	18.4	20.1	16.9	18.4
18	20.8	19.6	20.1	23.0	19.8	21.3	20.7	18.2	19.5	17.7	15.6	16.6
19	20.4	18.0	19.5	23.4	19.8	21.6	21.4	19.1	20.2	17.0	14.4	15.7
20	19.0	16.6	17.8	23.9	20.6	22.2	19.7	17.4	18.1	16.1	13.4	14.9
21	18.9	16.6	17.7	25.6	21.9	23.7	19.3	16.2	17.7	16.7	13.9	15.4
22	20.0	17.3	18.4	26.4	23.2	24.6	19.2	15.4	17.5	17.1	14.3	15.9
23	20.8	16.6	18.8	24.7	20.6	22.7	19.1	18.1	18.5	17.6	14.9	16.4
24	21.4	18.2	19.5	21.8	18.3	20.0	20.9	17.8	19.4	17.8	15.8	17.0
25	19.7	16.5	18.0	20.6	17.5	18.9	22.8	19.7	21.3	17.6	16.8	17.2
26	19.8	16.4	18.1	20.3	16.6	18.5	23.7	21.8	22.7	17.8	15.6	16.7
27	20.6	16.2	18.4	18.8	17.6	18.3	25.1	22.5	23.7	16.4	14.0	15.4
28	19.0	17.3	18.0	18.5	16.6	17.6	24.1	21.2	22.7	16.1	14.4	15.0
29	20.5	16.6	18.5	19.4	18.5	19.1	21.2	19.0	19.9	15.3	13.6	14.3
30	21.7	17.9	19.8	19.8	18.9	19.3	19.6	17.4	18.6	14.8	12.0	13.3
31	--	--	--	21.4	19.4	20.1	20.1	17.1	18.7	--	--	--
MONTH	--	--	--	26.4	16.6	20.7	25.1	15.4	19.5	23.3	12.0	18.1

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04160398 PINE RIVER NEAR MARYSVILLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	12.1	7.5	9.4	8.1	7.7	7.9	9.8	7.4	8.4
2	--	--	--	11.5	7.3	9.1	8.4	7.8	8.1	9.8	7.3	8.5
3	--	--	--	10.7	7.6	8.9	8.4	7.8	8.0	10.5	7.3	8.8
4	9.5	8.9	9.2	9.2	6.8	7.9	8.4	7.7	7.9	9.8	7.4	8.6
5	9.5	8.9	9.2	8.6	6.4	7.4	8.4	7.9	8.1	9.6	7.3	8.4
6	9.5	8.6	8.9	11.2	7.3	8.8	8.7	8.4	8.5	8.8	7.2	7.9
7	9.6	8.2	8.8	9.9	6.9	8.1	8.8	8.4	8.6	7.5	6.8	7.2
8	9.8	7.7	8.5	8.3	7.0	7.7	8.8	8.3	8.5	8.3	6.7	7.4
9	9.1	7.2	7.8	9.2	7.6	8.2	9.0	8.2	8.5	9.2	7.1	8.0
10	8.1	7.1	7.7	9.8	7.7	8.5	8.8	8.0	8.3	10.0	7.6	8.6
11	8.8	8.1	8.5	10.6	7.4	8.6	9.3	7.9	8.5	10.3	7.8	8.9
12	9.8	8.8	9.3	8.7	7.0	7.5	10.0	8.4	9.1	10.2	7.8	8.9
13	9.8	8.3	9.1	8.5	7.0	7.6	10.6	9.0	9.7	9.7	7.8	8.7
14	8.3	7.4	7.9	8.1	6.7	7.3	11.3	9.2	10.1	9.9	7.5	8.7
15	8.0	7.4	7.6	9.2	7.1	7.9	11.6	9.3	10.3	9.0	7.5	8.2
16	7.8	7.5	7.7	8.8	7.4	7.9	12.1	9.3	10.6	8.2	6.8	7.4
17	7.8	7.6	7.7	9.1	7.4	8.0	12.2	9.3	10.6	9.2	6.8	7.9
18	7.7	7.6	7.6	10.0	7.2	8.2	11.7	8.6	10.2	9.3	8.1	8.6
19	8.1	7.6	7.9	10.8	7.0	8.5	10.4	8.3	9.6	9.6	8.0	8.7
20	8.6	8.0	8.3	11.2	6.8	8.6	10.1	8.5	9.4	10.0	8.4	9.1
21	8.8	8.2	8.4	11.4	6.6	8.5	10.4	8.9	9.7	10.1	8.5	9.3
22	8.9	8.0	8.3	10.7	6.1	8.0	10.8	9.2	9.9	9.8	8.6	9.1
23	9.3	8.0	8.5	10.4	6.0	8.2	10.0	9.0	9.5	9.6	8.3	8.8
24	9.6	7.8	8.4	11.4	7.0	8.8	10.0	8.9	9.4	9.8	8.0	8.8
25	10.4	8.1	9.0	--	--	--	9.6	8.0	8.8	9.4	7.9	8.6
26	11.0	8.3	9.3	--	--	--	8.8	7.6	8.1	9.0	7.8	8.3
27	12.4	8.4	9.8	--	--	--	9.1	7.3	8.1	9.3	7.7	8.5
28	12.2	8.0	9.7	8.5	8.0	8.3	8.0	7.1	7.6	9.9	8.0	8.7
29	13.5	8.2	10.4	8.3	8.0	8.1	8.3	7.5	7.9	9.3	7.8	8.5
30	13.3	7.8	10	8.2	7.9	8.0	9.1	7.9	8.4	9.1	8.0	8.4
31	--	--	--	8.3	7.7	7.9	9.6	7.9	8.7	--	--	--
MONTH	--	--	--	--	--	--	12.2	7.1	8.9	10.5	6.7	8.5

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04160600 BELLE RIVER AT MEMPHIS, MI

LOCATION.--Lat 42°54'03", long 82°46'09", in NW1/4 SE1/4 sec.35, T.6 N., R.14 E., St. Clair County, Hydrologic Unit 04090001, on right bank at downstream side of bridge on State Highway 19 in Memphis.

DRAINAGE AREA.--151 mi².

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

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 705.41 ft above sea level (Michigan Department of Transportation bench mark).

REMARKS.--Records good except for estimated daily discharges, which are fair.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1947 reached a stage of about 9 ft, from information by local residents.

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	12	21	164	329	e29	e220	176	41	140	55	115	28
2	11	73	110	228	e30	e490	144	93	126	51	85	25
3	10	246	81	269	e29	924	120	189	151	42	64	23
4	9.6	321	64	248	e29	685	103	158	128	41	110	21
5	10	264	60	182	e28	967	87	114	96	44	245	20
6	9.9	169	52	133	e28	1260	75	90	80	64	186	19
7	9.1	109	50	65	e28	745	70	74	71	69	103	22
8	9.0	79	46	e62	e28	426	67	68	64	183	70	23
9	9.4	61	41	e60	e28	314	65	340	59	163	54	21
10	9.3	52	54	e58	e28	235	60	808	61	103	46	20
11	9.1	50	175	e56	e28	187	55	928	136	75	41	19
12	9.4	53	176	e52	e28	160	52	679	142	76	39	18
13	9.1	53	106	e48	e27	133	50	380	101	198	38	19
14	12	52	94	e44	e27	115	49	250	208	314	35	18
15	13	44	66	e41	e26	109	47	294	301	298	32	17
16	17	39	57	e38	e26	101	47	240	199	196	29	17
17	20	36	57	e37	e25	91	48	154	128	123	26	17
18	17	58	e54	e35	e25	92	47	124	112	145	25	17
19	15	280	e51	e33	e26	100	45	118	100	336	25	16
20	14	339	e48	e32	e26	153	43	103	81	393	25	15
21	12	206	e47	e30	e29	227	43	138	68	181	24	15
22	12	121	49	e30	e32	176	43	555	61	116	22	15
23	13	89	54	e30	e37	123	41	2580	61	95	22	15
24	14	104	107	e30	e44	106	40	2220	57	78	21	15
25	15	167	153	e30	e52	139	39	1640	75	64	22	14
26	15	145	123	e30	e62	203	36	1270	76	54	23	14
27	19	100	103	e30	e72	245	36	877	60	86	23	14
28	19	114	89	e30	e89	198	38	499	51	324	22	15
29	24	256	221	e30	e125	154	39	297	45	234	26	14
30	25	259	635	e30	—	142	39	207	43	119	30	14
31	24	—	626	e29	—	186	—	161	—	104	31	—
TOTAL	426.9	3960	3813	2379	1091	9406	1844	15689	3081	4424	1659	540
MEAN	13.8	132	123	76.7	37.6	303	61.5	506	103	143	53.5	18.0
MAX	25	339	635	329	125	1260	176	2580	301	393	245	28
MIN	9.0	21	41	29	25	91	36	41	43	41	21	14
CFSM	0.09	0.87	0.81	0.51	0.25	2.01	0.41	3.35	0.68	0.95	0.35	0.12
IN.	0.11	0.98	0.94	0.59	0.27	2.32	0.45	3.87	0.76	1.09	0.41	0.13

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

	MEAN	43.5	68.1	91.0	84.9	144	247	193	103	61.0	30.2	21.0	32.8
MAX	330	375	247	315	567	595	617	506	300	143	91.3	256	
(WY)	1982	1986	1988	1973	2001	1973	1975	2004	1996	2004	1992	1985	
MIN	5.00	7.62	5.50	8.92	8.00	15.8	25.9	20.9	6.44	5.21	5.08	5.54	
(WY)	1964	1965	1964	1964	1963	1964	1964	1977	1964	1965	1963	1979	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1963 - 2004

ANNUAL TOTAL	25182.0	48312.9	93.1
ANNUAL MEAN	69.0	132	168
HIGHEST ANNUAL MEAN			11.3
LOWEST ANNUAL MEAN			1985
HIGHEST DAILY MEAN	651	2580	3320
LOWEST DAILY MEAN	7.0	9.0	2.4
ANNUAL SEVEN-DAY MINIMUM	7.0	9.2	2.6
MAXIMUM PEAK FLOW		3110	(a)4520
MAXIMUM PEAK STAGE		8.72	8.98
INSTANTANEOUS LOW FLOW			2.3
ANNUAL RUNOFF (CFSM)	0.457	0.874	0.616
ANNUAL RUNOFF (INCHES)	6.20	11.90	8.37
10 PERCENT EXCEEDS	205	260	220
50 PERCENT EXCEEDS	24	58	32
90 PERCENT EXCEEDS	9.0	17	9.7

(a) Gage height 8.96 ft.

(b) Sept. 6, 10, 1978.

(c) Estimated.

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04160625 BELLE RIVER NEAR MARINE CITY, MI

LOCATION.--Lat 42°46'06", long 82°30'44", in NE1/4 sec.23, T.4 N., R.16 E., St. Clair County, Hydrologic Unit 04090001, on left bank at upstream side of bridge on King Road, 3.6 mi north of Marine City.

DRAINAGE AREA.--213 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.-- June to September 2004.

GAGE.--Water-stage recorder. Elevation of gage is 590 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good. Gage-height telemeter 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	--	--	--	--	--	--	--	--	e180	47	240	37
2	--	--	--	--	--	--	--	--	e175	51	138	33
3	--	--	--	--	--	--	--	--	e200	53	101	30
4	--	--	--	--	--	--	--	--	e160	46	90	26
5	--	--	--	--	--	--	--	--	e120	48	199	25
6	--	--	--	--	--	--	--	--	e105	47	266	23
7	--	--	--	--	--	--	--	--	e96	62	193	27
8	--	--	--	--	--	--	--	--	89	68	115	38
9	--	--	--	--	--	--	--	--	80	143	84	30
10	--	--	--	--	--	--	--	--	91	137	69	28
11	--	--	--	--	--	--	--	--	103	93	60	24
12	--	--	--	--	--	--	--	--	142	186	53	23
13	--	--	--	--	--	--	--	--	146	250	49	21
14	--	--	--	--	--	--	--	--	176	213	48	20
15	--	--	--	--	--	--	--	--	521	322	45	20
16	--	--	--	--	--	--	--	--	360	310	40	19
17	--	--	--	--	--	--	--	--	214	200	37	18
18	--	--	--	--	--	--	--	--	148	132	34	18
19	--	--	--	--	--	--	--	--	126	142	33	18
20	--	--	--	--	--	--	--	--	110	338	31	17
21	--	--	--	--	--	--	--	--	92	386	30	16
22	--	--	--	--	--	--	--	--	80	188	29	15
23	--	--	--	--	--	--	--	--	71	126	27	15
24	--	--	--	--	--	--	--	--	68	103	26	14
25	--	--	--	--	--	--	--	--	65	88	25	15
26	--	--	--	--	--	--	--	--	72	74	26	15
27	--	--	--	--	--	--	--	--	77	65	27	14
28	--	--	--	--	--	--	--	--	64	174	29	14
29	--	--	--	--	--	--	--	--	55	355	39	15
30	--	--	--	--	--	--	--	--	50	236	41	16
31	--	--	--	--	--	--	--	--	--	200	37	--
TOTAL	--	--	--	--	--	--	--	--	4036	4883	2261	644
MEAN	--	--	--	--	--	--	--	--	135	158	72.9	21.5
MAX	--	--	--	--	--	--	--	--	521	386	266	38
MIN	--	--	--	--	--	--	--	--	50	46	25	14
CFSM	--	--	--	--	--	--	--	--	0.63	0.74	0.34	0.10
IN.	--	--	--	--	--	--	--	--	0.70	0.85	0.39	0.11

(e) Estimated.

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04160625 BELLE RIVER NEAR MARINE CITY, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--June to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: July 7, 8, 19-27, Aug. 12-17, rated good. pH and water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: June 27 to July 1, July 27, Aug. 30, 31, Sept. 6-8, rated good; Sept. 9-12, rated fair; Sept. 13, 14, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 1,630 microsiemens, Sept. 30, 2004; minimum, 366 microsiemens, July 20, 2004.

pH: Maximum, 8.3 std. units, June 26 to July 4, Aug. 18-20, 2004; minimum, 7.7 std. units, June 15, July 13, 2004.

WATER TEMPERATURE: Maximum, 23.9°C, July 22, Aug. 27, 2004; minimum, 12.9°C, Sept. 30, 2004.

DISSOLVED OXYGEN: Maximum, 9.9 mg/L, Sept. 20, 2004; minimum, 6.2 mg/L, Aug. 28, 2004.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	995	928	961	673	454	521	1220	1130	1170
2	---	---	---	1040	995	1010	795	673	750	1280	1220	1260
3	---	---	---	1140	1040	1080	897	794	853	1340	1280	1320
4	---	---	---	1200	1140	1180	876	832	854	1330	1020	1240
5	---	---	---	1220	1200	1220	859	719	780	1020	887	918
6	---	---	---	1210	904	1030	788	593	671	887	852	862
7	---	---	---	1000	917	974	684	622	649	859	829	837
8	935	899	916	1160	986	1080	762	682	724	1110	827	935
9	945	905	929	1210	800	985	861	761	805	1160	1070	1120
10	910	861	887	980	720	798	909	861	889	1190	1070	1130
11	881	841	863	795	721	755	915	903	909	1220	1190	1220
12	936	855	876	797	534	639	988	904	938	1300	1200	1240
13	960	783	882	636	485	557	1030	987	1020	1390	1300	1350
14	783	637	682	986	593	767	1080	1030	1050	1390	1380	1390
15	639	441	503	893	540	651	1120	1080	1100	1390	1380	1390
16	608	493	576	641	534	593	1150	1120	1130	1410	1370	1380
17	682	588	634	720	641	683	1160	1150	1160	1420	1340	1380
18	781	682	736	791	720	756	1150	1110	1120	1420	1340	1380
19	860	781	822	885	778	815	1150	1120	1140	1470	1420	1450
20	912	860	889	934	366	646	1140	1060	1120	1490	1470	1480
21	923	912	920	559	367	462	1170	1060	1130	1500	1450	1480
22	923	917	918	706	559	637	1210	1170	1190	1470	1420	1440
23	953	923	941	775	706	747	1250	1210	1230	1510	1470	1500
24	978	952	964	858	775	819	1270	1250	1260	1510	1500	1510
25	999	974	991	914	858	886	1290	1270	1280	1520	1510	1520
26	1010	979	990	934	914	921	1290	1280	1290	1510	1500	1500
27	1040	1000	1020	941	912	931	1300	1280	1290	1510	1500	1510
28	1060	981	1040	920	711	864	1310	1290	1300	1550	1500	1520
29	981	819	859	711	403	494	1310	1270	1290	1600	1550	1570
30	928	835	892	620	504	577	1290	1100	1190	1630	1600	1610
31	---	---	---	671	526	638	1190	1130	1160	---	---	---
MONTH	---	---	---	1220	366	811	1310	454	1030	1630	827	1320

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04160625 BELLE RIVER NEAR MARINE CITY, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	8.3	8.2	8.2	8.0	7.8	7.9	8.2	8.1	8.1
2	--	--	--	8.3	8.2	8.3	8.0	8.0	8.0	8.2	8.1	8.2
3	--	--	--	8.3	8.2	8.3	8.0	8.0	8.0	8.2	8.1	8.2
4	--	--	--	8.3	8.2	8.2	8.1	8.0	8.0	8.2	8.2	8.2
5	--	--	--	8.2	8.2	8.2	8.1	8.0	8.0	8.2	8.1	8.2
6	--	--	--	8.2	8.1	8.2	8.1	7.9	8.0	8.2	8.2	8.2
7	--	--	--	8.2	8.1	8.2	8.0	7.9	8.0	8.2	8.1	8.1
8	8.1	8.0	8.1	8.2	8.2	8.2	8.0	8.0	8.0	8.2	8.1	8.1
9	8.1	8.0	8.1	8.2	8.2	8.2	8.0	8.0	8.0	8.1	8.1	8.1
10	8.1	8.0	8.0	8.2	8.1	8.1	8.1	8.0	8.1	8.1	8.0	8.1
11	8.0	8.0	8.0	8.2	8.1	8.1	8.1	8.1	8.1	8.2	8.1	8.1
12	8.2	8.0	8.1	8.2	7.8	7.9	8.2	8.1	8.1	8.2	8.1	8.1
13	8.2	8.0	8.1	7.9	7.7	7.9	8.2	8.2	8.2	8.2	8.1	8.1
14	8.0	7.8	7.9	8.1	7.9	8.0	8.2	8.2	8.2	8.2	8.1	8.1
15	7.9	7.7	7.8	8.1	8.0	8.1	8.2	8.2	8.2	8.2	8.2	8.2
16	7.9	7.8	7.9	8.0	8.0	8.0	8.2	8.2	8.2	8.2	8.1	8.2
17	7.9	7.9	7.9	8.1	8.0	8.1	8.2	8.2	8.2	8.2	8.1	8.1
18	8.0	7.9	8.0	8.1	8.1	8.1	8.3	8.2	8.2	8.2	8.1	8.2
19	8.1	8.0	8.0	8.2	8.1	8.2	8.3	8.2	8.2	8.2	8.2	8.2
20	8.1	8.1	8.1	8.2	7.8	8.0	8.3	8.2	8.2	8.2	8.2	8.2
21	8.1	8.1	8.1	8.0	7.8	7.9	8.2	8.2	8.2	8.2	8.2	8.2
22	8.2	8.1	8.1	8.0	8.0	8.0	8.2	8.2	8.2	8.2	8.2	8.2
23	8.2	8.2	8.2	8.1	8.0	8.1	8.2	8.2	8.2	8.2	8.1	8.2
24	8.2	8.2	8.2	8.2	8.1	8.1	8.2	8.2	8.2	8.2	8.1	8.2
25	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.1	8.1
26	8.3	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.1	8.1
27	8.3	8.3	8.3	8.2	8.2	8.2	8.2	8.1	8.2	8.2	8.1	8.1
28	8.3	8.3	8.3	8.2	8.0	8.2	8.2	8.1	8.1	8.2	8.1	8.1
29	8.3	8.2	8.3	8.0	7.8	7.8	8.1	8.1	8.1	8.1	8.1	8.1
30	8.3	8.2	8.2	7.9	7.8	7.9	8.1	8.1	8.1	8.1	8.1	8.1
31	--	--	--	8.0	7.9	7.9	8.1	8.0	8.1	--	--	--
MAX	--	--	--	8.3	8.2	8.3	8.3	8.2	8.2	8.2	8.2	8.2
MIN	--	--	--	7.9	7.7	7.8	8.0	7.8	7.9	8.1	8.0	8.1

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	21.8	19.6	20.7	22.2	20.7	21.3	19.9	18.7	19.5
2	--	--	--	21.6	19.7	20.7	22.9	21.2	22.1	20.4	18.9	19.8
3	--	--	--	22.1	19.5	20.9	23.4	22.3	22.9	21.0	19.6	20.4
4	--	--	--	22.9	21.2	22.0	22.8	20.7	21.7	21.7	20.4	21.1
5	--	--	--	22.6	20.8	21.8	20.7	19.4	20.0	22.2	20.9	21.5
6	--	--	--	21.7	19.6	20.7	19.5	18.4	19.0	22.8	21.4	22.0
7	--	--	--	22.4	21.1	21.7	19.4	17.7	18.6	22.8	21.4	22.1
8	22.2	19.6	20.9	21.6	19.6	20.5	20.0	18.2	19.2	21.4	19.9	20.5
9	23.5	21.6	22.4	20.2	19.0	19.7	20.7	19.4	20.1	19.9	18.8	19.4
10	22.1	19.2	20.4	21.0	19.3	20.1	21.0	20.2	20.7	18.8	17.5	18.3
11	19.2	17.6	18.3	22.2	20.4	21.2	20.6	19.5	20.1	19.1	17.6	18.3
12	17.7	16.6	17.2	22.1	20.3	21.1	19.5	17.8	18.5	19.5	17.8	18.6
13	19.2	17.5	18.2	22.5	20.7	21.6	17.8	16.8	17.3	20.2	18.6	19.3
14	20.8	19.2	20.0	22.6	21.7	22.2	17.7	16.5	17.2	20.8	19.4	20.0
15	20.8	20.4	20.6	22.3	21.0	21.5	18.3	16.5	17.5	21.5	20.1	20.7
16	20.7	19.8	20.3	21.8	20.3	21.1	18.7	16.7	17.8	21.6	20.6	21.0
17	20.8	19.6	20.2	21.7	20.5	21.1	19.1	17.5	18.4	20.6	17.5	19.0
18	21.1	20.3	20.7	21.7	20.7	21.3	20.1	18.7	19.4	17.5	16.1	16.7
19	21.0	19.5	20.3	22.3	20.9	21.6	20.5	19.5	20.0	16.7	15.4	15.9
20	19.6	18.3	19.1	22.2	20.7	21.4	19.8	18.0	18.7	16.2	14.6	15.3
21	19.1	18.4	18.7	22.5	20.4	21.5	18.6	17.2	17.8	16.5	14.8	15.6
22	19.5	18.2	18.8	23.9	22.0	22.8	18.3	16.7	17.6	17.0	15.2	16.1
23	19.7	17.7	18.9	23.7	21.8	22.7	19.0	18.2	18.6	17.6	15.8	16.6
24	20.7	19.0	19.7	21.8	20.5	21.0	20.1	18.2	19.1	18.0	16.6	17.3
25	19.1	17.8	18.5	20.5	19.8	20.1	21.7	19.7	20.7	17.8	17.2	17.5
26	18.9	17.3	18.3	19.9	19.1	19.6	22.9	21.5	22.1	17.6	16.4	16.9
27	19.2	17.6	18.5	19.5	18.3	18.9	23.9	22.5	23.1	16.6	15.0	15.8
28	18.8	18.0	18.4	19.2	17.9	18.5	23.5	21.5	22.7	15.8	15.0	15.4
29	19.5	17.5	18.6	19.6	17.9	18.8	21.5	19.8	20.6	15.0	14.1	14.5
30	20.7	18.3	19.6	20.2	18.8	19.5	19.8	18.7	19.4	14.3	12.9	13.6
31	--	--	--	21.2	19.9	20.5	19.7	18.2	19.1	--	--	--
MONTH	--	--	--	23.9	17.9	20.9	23.9	16.5	19.7	22.8	12.9	18.3

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04160625 BELLE RIVER NEAR MARINE CITY, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	—	—	—	9.3	8.2	8.7	7.5	7.3	7.4	9.0	7.5	8.1
2	—	—	—	9.4	7.7	8.5	7.6	7.3	7.5	9.2	7.6	8.2
3	—	—	—	9.5	7.8	8.6	7.4	7.2	7.3	9.5	7.5	8.3
4	—	—	—	8.6	7.4	7.9	7.6	7.2	7.4	9.4	7.3	8.3
5	—	—	—	8.1	7.0	7.5	8.1	7.6	7.9	9.2	7.3	8.2
6	—	—	—	9.2	7.6	8.3	8.2	8.0	8.1	8.8	7.2	7.9
7	—	—	—	8.2	7.4	7.8	8.4	8.1	8.3	7.8	6.9	7.3
8	8.3	7.5	7.9	8.0	7.5	7.7	8.3	8.0	8.2	8.2	7.2	7.6
9	8.1	7.1	7.5	8.2	7.7	8.0	8.2	7.8	8.0	8.7	7.3	7.9
10	7.4	7.0	7.2	8.2	7.7	8.0	7.9	7.7	7.8	9.3	7.6	8.4
11	8.0	7.4	7.7	8.2	7.6	7.8	8.0	7.7	7.8	9.6	8.0	8.7
12	8.8	8.0	8.5	7.8	6.8	7.2	8.5	7.8	8.2	9.7	8.1	8.8
13	8.5	7.9	8.3	7.2	6.8	7.1	8.9	8.3	8.6	9.8	7.9	8.7
14	7.9	7.0	7.4	7.5	7.0	7.3	9.1	8.6	8.8	9.5	7.8	8.5
15	7.1	6.6	6.8	7.7	7.2	7.4	9.3	8.6	8.9	8.8	7.0	7.8
16	7.3	6.9	7.2	7.6	7.4	7.6	9.5	8.5	8.9	8.0	6.8	7.3
17	7.6	7.3	7.5	7.8	7.5	7.7	9.4	8.2	8.7	8.6	6.8	7.6
18	7.5	7.4	7.5	7.8	7.4	7.6	9.3	7.6	8.3	9.2	7.6	8.3
19	7.8	7.4	7.6	7.9	7.4	7.7	9.4	7.3	8.2	9.6	8.0	8.6
20	8.3	7.8	8.1	7.8	7.4	7.6	8.9	7.6	8.2	9.9	8.2	8.9
21	8.4	8.1	8.2	7.6	7.2	7.4	9.5	7.8	8.5	—	—	—
22	8.4	8.1	8.2	7.3	6.9	7.2	9.6	8.0	8.7	—	—	—
23	8.7	8.2	8.4	7.4	6.9	7.1	8.8	7.8	8.3	—	—	—
24	8.4	8.1	8.3	7.8	7.3	7.5	9.2	7.7	8.3	—	—	—
25	8.9	8.3	8.6	8.1	7.6	7.8	8.6	7.3	7.9	—	—	—
26	9.2	8.5	8.8	8.1	7.6	7.9	8.1	6.7	7.3	—	—	—
27	9.4	8.8	9.0	8.2	7.6	7.9	7.7	6.5	7.0	—	—	—
28	9.2	8.6	8.9	8.3	8.1	8.2	7.1	6.2	6.7	—	—	—
29	9.6	8.6	9.1	8.3	7.8	8.1	7.3	6.7	7.0	8.6	7.6	8.1
30	9.7	8.4	9.0	8.0	7.7	7.9	8.2	7.2	7.7	8.8	7.9	8.3
31	—	—	—	7.8	7.5	7.7	8.7	7.6	8.1	—	—	—
MONTH	—	—	—	9.5	6.8	7.8	9.6	6.2	8.0	—	—	—

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160635 ST. CLAIR RIVER NEAR ROBERTS LANDING, MI

LOCATION.--Lat 42°40'32", long 82°30'39", in NE1/4 SE1/4 sec.23, T.3 N., R.16 E., St. Clair County, Hydrologic Unit 04090001, on right bank 1.1 mi north of Roberts Landing.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--July to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July to September 2004.

pH: July to September 2004.

WATER TEMPERATURE: July to September 2004.

DISSOLVED OXYGEN: July to September 2004.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Specific conductance, pH, water temperature, and dissolved oxygen records rated excellent.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 270 microsiemens, July 21, 2004; minimum, 203 microsiemens, Aug. 15, 2004.

pH: Maximum, 8.5 std. units, Aug. 7-9, 14-19, 21-25, 2004; minimum, 8.1 std. units, July 22, Aug. 1-3, Sept. 9-14, 2004.

WATER TEMPERATURE: Maximum, 22.4°C, Aug. 3, 2004; minimum, 17.2°C, Sept. 30, 2004.

DISSOLVED OXYGEN: Maximum, 10.2 mg/L, Sept. 27, 2004; minimum, 8.3 mg/L, Aug. 7, 2004.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	--	--	--	--	--	--	250	230	240	226	223	224
2	--	--	--	--	--	--	232	224	227	230	222	226
3	--	--	--	--	--	--	233	223	227	228	224	226
4	--	--	--	--	--	--	232	225	228	225	221	224
5	--	--	--	--	--	--	248	230	240	223	219	222
6	--	--	--	--	--	--	247	241	244	226	220	222
7	--	--	--	--	--	--	243	235	238	228	222	224
8	--	--	--	--	--	--	236	230	233	227	222	224
9	--	--	--	--	--	--	233	230	232	228	221	224
10	--	--	--	--	--	--	235	229	231	227	223	226
11	--	--	--	--	--	--	234	219	229	225	219	222
12	--	--	--	--	--	--	231	228	230	222	218	220
13	--	--	--	--	--	--	233	226	230	221	219	220
14	--	--	--	--	--	--	237	221	230	221	218	219
15	--	--	--	--	--	--	230	203	219	220	217	219
16	--	--	--	--	--	--	230	219	225	221	216	218
17	--	--	--	--	--	--	233	226	229	221	216	219
18	--	--	--	--	--	--	230	225	227	220	217	218
19	--	--	--	--	--	--	228	224	226	221	217	220
20	--	--	--	--	--	--	229	225	227	225	218	221
21	--	--	--	270	229	242	228	225	226	223	219	220
22	--	--	--	231	226	229	229	225	227	221	218	219
23	--	--	--	231	226	229	229	223	227	220	217	218
24	--	--	--	232	227	230	229	224	226	220	217	218
25	--	--	--	231	226	229	227	223	225	218	214	216
26	--	--	--	229	224	227	227	222	224	218	215	216
27	--	--	--	232	226	229	227	221	224	222	215	218
28	--	--	--	251	228	235	230	221	224	220	216	217
29	--	--	--	259	241	252	234	225	228	221	215	218
30	--	--	--	243	231	237	229	224	226	222	217	220
31	--	--	--	244	227	233	231	224	227	--	--	--
MONTH	--	--	--	--	--	--	250	203	229	230	214	221

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160635 ST. CLAIR RIVER NEAR ROBERTS LANDING, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	--	--	--	8.3	8.1	8.2	8.4	8.2	8.3
2	--	--	--	--	--	--	8.4	8.1	8.2	8.4	8.2	8.3
3	--	--	--	--	--	--	8.4	8.1	8.2	8.4	8.2	8.3
4	--	--	--	--	--	--	8.3	8.2	8.2	8.3	8.2	8.3
5	--	--	--	--	--	--	8.4	8.2	8.3	8.3	8.2	8.2
6	--	--	--	--	--	--	8.4	8.2	8.3	8.3	8.2	8.2
7	--	--	--	--	--	--	8.5	8.2	8.3	8.3	8.2	8.2
8	--	--	--	--	--	--	8.5	8.3	8.4	8.3	8.2	8.2
9	--	--	--	--	--	--	8.5	8.3	8.4	8.3	8.1	8.2
10	--	--	--	--	--	--	8.4	8.3	8.3	8.2	8.1	8.2
11	--	--	--	--	--	--	8.4	8.3	8.3	8.3	8.1	8.2
12	--	--	--	--	--	--	8.4	8.3	8.4	8.3	8.1	8.2
13	--	--	--	--	--	--	8.4	8.3	8.4	8.3	8.1	8.2
14	--	--	--	--	--	--	8.5	8.4	8.4	8.3	8.1	8.2
15	--	--	--	--	--	--	8.5	8.3	8.4	8.4	8.2	8.3
16	--	--	--	--	--	--	8.5	8.4	8.4	8.3	8.2	8.3
17	--	--	--	--	--	--	8.5	8.4	8.4	8.3	8.2	8.2
18	--	--	--	--	--	--	8.5	8.4	8.4	8.3	8.2	8.2
19	--	--	--	--	--	--	8.5	8.4	8.4	8.4	8.2	8.2
20	--	--	--	--	--	--	8.4	8.4	8.4	8.4	8.2	8.3
21	--	--	--	8.3	8.2	8.2	8.5	8.4	8.4	8.4	8.2	8.3
22	--	--	--	8.4	8.1	8.2	8.5	8.3	8.4	8.4	8.2	8.3
23	--	--	--	8.4	8.2	8.2	8.5	8.4	8.4	8.4	8.2	8.3
24	--	--	--	8.4	8.2	8.2	8.5	8.4	8.4	8.4	8.2	8.3
25	--	--	--	8.4	8.2	8.2	8.5	8.4	8.4	8.4	8.2	8.3
26	--	--	--	8.4	8.2	8.2	8.4	8.3	8.4	8.4	8.2	8.3
27	--	--	--	8.3	8.2	8.2	8.4	8.3	8.3	8.4	8.2	8.3
28	--	--	--	8.4	8.2	8.2	8.3	8.2	8.3	8.3	8.2	8.3
29	--	--	--	8.4	8.2	8.3	8.2	8.2	8.2	8.3	8.2	8.2
30	--	--	--	8.4	8.2	8.3	8.4	8.2	8.3	8.3	8.2	8.2
31	--	--	--	8.4	8.2	8.2	8.4	8.2	8.3	--	--	--
MAX	--	--	--	--	--	--	8.5	8.4	8.4	8.4	8.2	8.3
MIN	--	--	--	--	--	--	8.2	8.1	8.2	8.2	8.1	8.2

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	--	--	--	21.8	20.6	21.1	21.8	20.7	21.1
2	--	--	--	--	--	--	22.1	21.1	21.5	21.9	20.9	21.3
3	--	--	--	--	--	--	22.4	21.4	21.8	22.1	21.1	21.4
4	--	--	--	--	--	--	21.7	21.2	21.5	21.7	21.1	21.3
5	--	--	--	--	--	--	21.7	20.8	21.1	22.0	21.1	21.4
6	--	--	--	--	--	--	21.3	20.6	20.9	22.2	21.2	21.6
7	--	--	--	--	--	--	21.6	20.5	20.9	21.9	20.4	21.4
8	--	--	--	--	--	--	21.8	20.7	21.2	20.9	20.3	20.6
9	--	--	--	--	--	--	22.1	21.0	21.4	20.8	20.1	20.4
10	--	--	--	--	--	--	21.7	21.1	21.4	21.1	19.9	20.4
11	--	--	--	--	--	--	21.5	20.9	21.2	21.0	20.1	20.4
12	--	--	--	--	--	--	21.2	20.5	20.8	21.1	20.2	20.5
13	--	--	--	--	--	--	20.8	20.3	20.5	21.4	20.3	20.6
14	--	--	--	--	--	--	21.2	20.2	20.5	21.1	20.5	20.7
15	--	--	--	--	--	--	21.6	20.3	20.8	21.2	20.3	20.6
16	--	--	--	--	--	--	21.8	20.6	21.0	20.7	19.7	20.2
17	--	--	--	--	--	--	21.7	20.8	21.2	19.7	18.9	19.2
18	--	--	--	--	--	--	21.4	20.8	21.1	19.3	18.3	18.7
19	--	--	--	--	--	--	21.6	20.8	21.1	19.3	18.4	18.7
20	--	--	--	--	--	--	20.9	20.4	20.7	19.3	18.3	18.7
21	--	--	--	22.0	21.0	21.4	21.0	20.2	20.5	19.3	18.4	18.7
22	--	--	--	21.6	21.0	21.2	21.1	19.9	20.4	19.6	18.4	18.8
23	--	--	--	21.6	20.5	21.1	20.6	20.2	20.4	19.0	18.2	18.4
24	--	--	--	21.1	20.2	20.6	21.3	20.1	20.6	19.1	18.1	18.6
25	--	--	--	20.9	20.2	20.5	21.7	20.5	21.0	18.7	18.2	18.4
26	--	--	--	20.8	20.3	20.5	22.0	20.9	21.3	19.1	18.2	18.6
27	--	--	--	20.4	19.9	20.1	22.1	21.3	21.5	19.3	18.2	18.6
28	--	--	--	20.8	19.7	20.1	21.6	21.0	21.4	18.6	17.9	18.3
29	--	--	--	21.0	20.0	20.4	21.0	20.5	20.8	18.4	17.6	18.0
30	--	--	--	20.8	20.3	20.5	21.1	20.2	20.6	18.3	17.2	17.7
31	--	--	--	21.2	20.4	20.7	21.6	20.3	20.8	--	--	--
MONTH	--	--	--	--	--	--	22.4	19.9	21.0	22.2	17.2	19.8

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160635 ST. CLAIR RIVER NEAR ROBERTS LANDING, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	--	--	--	9.5	8.6	8.9	9.4	8.6	8.9
2	--	--	--	--	--	--	9.6	8.6	9.0	9.4	8.7	9.0
3	--	--	--	--	--	--	9.6	8.6	9.0	9.4	8.7	9.0
4	--	--	--	--	--	--	9.1	8.5	8.8	9.4	8.7	9.0
5	--	--	--	--	--	--	9.6	8.5	8.9	9.5	8.9	9.1
6	--	--	--	--	--	--	9.2	8.4	8.8	9.2	8.7	8.9
7	--	--	--	--	--	--	9.3	8.3	8.9	9.3	8.6	8.9
8	--	--	--	--	--	--	9.5	8.5	9.0	9.2	8.8	8.9
9	--	--	--	--	--	--	9.7	8.7	9.2	9.3	8.7	8.9
10	--	--	--	--	--	--	9.5	8.8	9.1	9.1	8.5	8.8
11	--	--	--	--	--	--	9.4	8.8	9.0	9.4	8.6	8.9
12	--	--	--	--	--	--	9.4	8.8	9.1	9.4	8.8	9.0
13	--	--	--	--	--	--	9.4	8.8	9.1	9.6	8.9	9.1
14	--	--	--	--	--	--	9.7	8.9	9.2	9.7	8.9	9.2
15	--	--	--	--	--	--	9.7	9.0	9.3	9.6	8.9	9.2
16	--	--	--	--	--	--	9.9	9.1	9.4	9.6	9.0	9.3
17	--	--	--	--	--	--	9.8	8.9	9.3	9.6	9.1	9.4
18	--	--	--	--	--	--	9.3	8.8	9.0	9.7	9.1	9.3
19	--	--	--	--	--	--	9.2	8.8	8.9	9.8	9.1	9.4
20	--	--	--	--	--	--	9.1	8.6	8.8	9.9	9.2	9.5
21	--	--	--	9.4	8.6	8.9	9.3	8.7	9.0	9.9	9.3	9.5
22	--	--	--	9.7	8.6	9.0	9.3	8.8	9.0	10.0	9.3	9.6
23	--	--	--	9.8	8.7	9.0	9.2	8.8	9.0	10.0	9.4	9.7
24	--	--	--	9.7	8.6	9.0	9.5	8.8	9.1	10.0	9.4	9.7
25	--	--	--	9.5	8.7	9.0	9.5	8.8	9.1	10.1	9.4	9.7
26	--	--	--	9.5	8.7	9.0	9.3	8.8	8.9	10.0	9.4	9.6
27	--	--	--	9.0	8.7	8.8	9.3	8.7	8.9	10.2	9.3	9.6
28	--	--	--	9.6	8.6	9.0	9.1	8.7	8.9	9.7	9.3	9.5
29	--	--	--	9.6	8.7	9.1	8.9	8.7	8.8	9.6	9.0	9.3
30	--	--	--	9.4	8.8	9.1	9.3	8.7	8.9	9.5	9.0	9.2
31	--	--	--	9.5	8.7	9.0	9.5	8.7	9.0	--	--	--
MONTH	--	--	--	--	--	--	9.9	8.3	9.0	10.2	8.5	9.2

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160800 SASHABAW CREEK NEAR DRAYTON PLAINS, MI

LOCATION.--Lat 42°43'12", long 83°21'13", in SE1/4 sec.26, T.4 N., R.9 E., Oakland County, Hydrologic Unit 04090003, on right bank at upstream side of culverts on Maybee Road, 1.1 mi upstream from mouth, and 2.5 mi northeast of Drayton Plains.

DRAINAGE AREA.--20.9 mi².

PERIOD OF RECORD.--October 1959 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Metal V-notch weir Aug. 30, 1961 to Mar. 6, 1968. Elevation of gage is 970 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	1.0	2.2	9.0	14	e4.8	14	22	5.2	41	9.7	10	2.6
2	0.94	6.6	8.6	18	e4.9	25	20	12	37	8.7	8.4	2.3
3	1.0	12	7.7	17	e5.1	28	18	9.5	35	7.8	7.4	2.2
4	1.3	11	6.1	15	e5.0	28	15	7.8	31	11	9.9	2.1
5	1.3	7.8	5.0	14	e4.9	47	13	6.9	28	13	10	2.0
6	1.2	6.8	4.6	14	e4.9	53	11	6.0	24	11	8.4	1.8
7	1.2	7.9	4.7	11	e4.8	39	10	5.2	20	12	7.2	2.3
8	1.1	6.3	4.6	9.6	e4.7	33	10	4.7	17	11	6.3	2.2
9	1.1	5.6	4.7	8.4	e4.7	29	9.6	10	17	9.4	5.7	2.1
10	1.1	5.4	5.9	7.7	e4.6	26	8.8	26	29	8.3	5.2	1.9
11	1.3	6.3	9.1	7.6	e4.6	25	7.9	33	30	7.4	5.3	1.9
12	1.8	6.6	7.4	e7.9	e4.5	23	7.3	27	27	8.2	5.1	1.8
13	2.1	5.6	11	e7.7	e4.3	21	8.1	22	26	8.0	4.7	1.7
14	3.3	5.3	5.5	e6.6	e4.3	20	7.3	23	49	8.7	4.3	1.7
15	6.6	5.3	5.1	e6.0	e4.2	21	6.5	23	51	8.4	3.9	1.6
16	3.4	5.1	5.4	e5.7	e4.1	18	6.0	19	40	7.4	3.7	1.5
17	2.2	5.2	5.9	e5.6	e4.0	16	5.9	16	35	7.0	3.5	1.4
18	1.8	7.6	5.6	e5.4	e4.0	15	5.6	16	30	8.1	3.5	1.3
19	1.6	14	5.3	e5.0	e4.1	15	4.9	14	27	8.4	3.2	1.3
20	1.6	10	5.1	e5.0	e4.1	20	4.7	11	25	7.3	3.0	1.2
21	1.5	9.1	4.9	e5.0	e4.4	22	4.6	21	23	7.1	2.8	1.2
22	1.4	8.0	5.1	e4.9	e4.8	19	4.3	58	23	12	2.6	1.2
23	1.4	6.7	7.6	e4.7	e5.5	20	4.2	e145	21	10	2.5	1.2
24	1.4	7.6	9.4	e4.8	e6.1	17	4.0	e160	20	8.7	2.4	1.2
25	2.3	7.6	8.5	e4.8	e6.6	25	4.1	129	18	7.6	2.4	1.1
26	3.4	7.5	7.8	e4.8	e7.1	29	4.0	101	16	6.9	2.6	1.1
27	3.0	6.9	7.3	e4.8	8.1	27	3.7	78	15	7.4	2.5	1.1
28	2.5	8.0	7.2	e4.8	8.9	24	3.4	63	13	9.5	2.9	1.1
29	2.9	10	14	e4.8	11	23	3.2	53	12	7.9	3.4	1.2
30	2.9	9.5	23	e4.8	—	22	3.3	47	11	7.2	3.3	1.1
31	2.4	—	18	e4.8	—	25	—	45	—	11	2.8	—
TOTAL	62.04	223.5	239.1	244.2	153.1	769	240.4	1197.3	791	276.1	148.9	48.4
MEAN	2.00	7.45	7.71	7.88	5.28	24.8	8.01	38.6	26.4	8.91	4.80	1.61
MAX	6.6	14	23	18	11	53	22	160	51	13	10	2.6
MIN	0.94	2.2	4.6	4.7	4.0	14	3.2	4.7	11	6.9	2.4	1.1
CFSM	0.10	0.36	0.37	0.38	0.25	1.19	0.38	1.85	1.26	0.43	0.23	0.08
IN.	0.11	0.40	0.43	0.43	0.27	1.37	0.43	2.13	1.41	0.49	0.27	0.09

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2004, BY WATER YEAR (WY)

MEAN	7.09	10.4	12.5	12.3	14.9	25.6	27.4	18.5	11.7	5.99	4.49	5.83
MAX	38.4	38.2	28.2	36.5	42.6	61.2	45.5	41.6	28.5	15.0	19.5	34.9
(WY)	1982	1986	1988	1993	2001	1976	1975	1974	1996	2000	1975	2000
MIN	0.37	1.02	0.95	1.46	1.67	6.28	8.01	8.03	1.58	0.74	0.30	0.35
(WY)	1964	1965	1964	1961	2003	1964	2004	1988	1988	1965	1984	2002

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1960 - 2004

ANNUAL TOTAL	2221.36	4393.04	13.0
ANNUAL MEAN	6.09	12.0	21.5
HIGHEST ANNUAL MEAN			1975
LOWEST ANNUAL MEAN			1964
HIGHEST DAILY MEAN	44	160	160
LOWEST DAILY MEAN	0.31	0.94	0.04
ANNUAL SEVEN-DAY MINIMUM	0.33	1.1	0.04
MAXIMUM PEAK FLOW		188	(a)188
MAXIMUM PEAK STAGE		(b)4.46	4.53
INSTANTANEOUS LOW FLOW			0.03
ANNUAL RUNOFF (CFSM)	0.291	0.574	0.624
ANNUAL RUNOFF (INCHES)	3.95	7.82	8.48
10 PERCENT EXCEEDS	15	26	30
50 PERCENT EXCEEDS	3.1	7.1	9.2
90 PERCENT EXCEEDS	0.80	1.8	1.6

(a) Gage height 4.46 ft.

(b) From floodmark.

(c) July 9, 1988.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160900 CLINTON RIVER NEAR DRAYTON PLAINS, MI

LOCATION.--Lat 42°39'37", long 83°23'25", in NE1/4 sec.21, T.3 N., R.9 E., Oakland County, Hydrologic Unit 04090003, on left bank at downstream side of bridge on State Highway 59, 2.0 mi south of Drayton Plains.

DRAINAGE AREA--79.2 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1959 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 940 ft above sea level, from topographic map. Jan. 29 to July 9, 1964, nonrecording gage at same site and datum.

REMARKS.--Water-discharge records good. Some regulation and occasional diversion for lake-level control at many lakes upstream from station. Gage-height telemeter 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	4.0	43	52	49	e43	32	68	17	173	11	78	12
2	4.1	47	52	51	e42	35	68	30	165	13	67	12
3	4.2	49	52	52	41	37	64	42	151	12	52	11
4	4.1	49	51	52	37	45	63	41	135	17	57	11
5	4.1	49	51	53	e35	67	65	41	113	16	60	11
6	4.1	52	51	55	32	74	62	41	74	20	67	11
7	4.1	52	51	56	31	87	59	39	73	27	65	13
8	4.1	49	51	57	e29	96	57	38	72	28	44	13
9	4.1	48	50	e58	e28	100	34	46	70	53	42	12
10	4.1	49	51	e58	e27	103	16	65	74	76	42	11
11	4.1	49	50	58	e26	104	16	85	73	30	21	11
12	4.1	50	48	68	e25	103	16	88	73	30	9.0	11
13	4.3	59	47	75	24	101	15	94	72	27	10	10
14	7.4	60	47	75	23	97	15	97	83	31	11	10
15	4.9	60	47	74	e21	91	16	97	98	31	11	9.9
16	4.2	57	48	70	e20	88	16	88	142	37	10	9.3
17	4.6	56	47	51	19	85	16	65	149	74	10	9.1
18	4.6	60	46	46	20	82	16	63	145	22	11	8.2
19	4.3	58	45	43	20	79	16	64	140	24	11	7.3
20	4.3	54	43	e41	21	82	16	63	131	26	11	6.9
21	4.2	53	41	e40	22	73	17	73	115	29	11	7.3
22	4.6	53	41	40	22	71	18	87	107	35	22	7.4
23	4.7	52	43	e40	22	65	16	143	92	33	34	6.8
24	5.0	54	43	e39	23	59	16	156	55	31	16	5.8
25	7.8	53	42	e40	24	57	16	210	56	29	15	4.9
26	12	52	43	e40	26	58	16	252	57	27	6.6	4.5
27	14	52	43	e40	28	59	16	256	57	30	7.3	4.4
28	14	54	43	e41	29	60	16	237	55	33	13	4.5
29	38	53	47	e42	30	63	16	215	52	31	14	3.7
30	49	53	48	e43	—	67	16	196	44	55	14	3.5
31	45	—	48	e43	—	69	—	184	—	83	13	—
TOTAL	286.1	1579	1462	1590	790	2289	877	3213	2896	1021	854.9	262.5
MEAN	9.23	52.6	47.2	51.3	27.2	73.8	29.2	104	96.5	32.9	27.6	8.75
MAX	49	60	52	75	43	104	68	256	173	83	78	13
MIN	4.0	43	41	39	19	32	15	17	44	11	6.6	3.5
CFM	0.12	0.66	0.60	0.65	0.34	0.93	0.37	1.31	1.22	0.42	0.35	0.11
IN.	0.13	0.74	0.69	0.75	0.37	1.08	0.41	1.51	1.36	0.48	0.40	0.12

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2004, BY WATER YEAR (WY)

MEAN	37.4	51.7	59.6	56.0	58.3	82.8	87.9	62.6	46.5	28.7	24.5	28.9
MAX	114	107	109	114	115	188	168	137	115	82.0	68.9	129
(WY)	1982	1986	1986	1973	1974	1976	1974	1974	1996	1968	2000	1975
MIN	4.08	7.90	15.6	15.5	16.6	28.8	27.3	22.9	6.47	4.07	3.94	3.57
(WY)	1999	1965	1964	1964	1964	1964	2000	1988	1988	2003	2003	2002

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1960 - 2004

ANNUAL TOTAL	11121.5	17120.5	
ANNUAL MEAN	30.5	46.8	
HIGHEST ANNUAL MEAN			52.0
LOWEST ANNUAL MEAN			87.9
HIGHEST DAILY MEAN	114	256	274
LOWEST DAILY MEAN	2.1	3.5	2.1
ANNUAL SEVEN-DAY MINIMUM	2.8	4.1	2.8
MAXIMUM PEAK FLOW		266	(b)276
MAXIMUM PEAK STAGE		5.22	5.22
INSTANTANEOUS LOW FLOW			2.1
ANNUAL RUNOFF (CFM)	0.385	0.591	0.657
ANNUAL RUNOFF (INCHES)	5.22	8.04	8.92
10 PERCENT EXCEEDS	70	88	103
50 PERCENT EXCEEDS	27	43	46
90 PERCENT EXCEEDS	3.6	7.4	10

(a) Jan. 25-27, 2003.

(b) Gage height 4.95 ft.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160900 CLINTON RIVER NEAR DRAYTON PLAINS, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1962 to 1974, June to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: October 1961 to September 1974, June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water temperature recorder from Oct. 1961 to Sept. 1974. Water-quality monitor telemeter, set for 15 minute measurement interval from June to Sept. 2004.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: June 11-17, July 22-30, rated good. pH and water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: July 3-6, 20, 21, Aug. 2, 21-23, Sept. 6-9, 20-23, rated good; July 7-9, 22-25, Aug. 3, 24, 25, Sept. 10-13, 24-29, rated fair; July 10-14, 26-30, Aug. 4-9, 26-30, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 912 microsiemens, Sept. 30, 2004; minimum, 356 microsiemens, July 4, 2004.

pH: Maximum, 8.5 std. units, Aug. 1, 2004; minimum, 7.5 std. units, Aug. 26-29, 2004.

WATER TEMPERATURE: Maximum, 30.5°C, July 1, 1963, July 24, 1964; minimum, 0.0°C, many days in winter periods 1962 and 1963.

DISSOLVED OXYGEN: Maximum, 9.5 mg/L, June 4, 2004; minimum, 4.9 mg/L, July 7, 2004.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 912 microsiemens, Sept. 30; minimum, 356 microsiemens, July 4.

pH: Maximum, 8.5 std. units, Aug. 1; minimum, 7.5 std. units, Aug. 26-29.

WATER TEMPERATURE: Maximum, 27.7°C, July 13, minimum, 11.7°C, Sept. 30.

DISSOLVED OXYGEN: Maximum, 9.5 mg/L, June 4; minimum, 4.9 mg/L, July 7.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	--	--	--	812	787	799	676	666	671	775	760	767
2	--	--	--	794	785	789	694	626	678	773	761	767
3	741	732	736	797	787	792	693	658	681	774	765	770
4	750	737	741	795	356	750	678	649	669	773	767	770
5	765	736	744	781	736	747	682	662	672	775	767	771
6	758	753	755	764	740	757	670	664	667	780	664	770
7	761	753	756	764	698	745	688	664	670	771	745	763
8	763	752	759	740	728	736	697	680	687	762	749	754
9	766	695	756	745	690	724	691	661	685	772	757	765
10	754	716	743	740	694	705	700	661	685	776	766	772
11	748	732	740	760	717	732	849	680	763	780	768	774
12	760	729	741	728	706	722	831	791	807	785	771	776
13	758	677	743	736	627	725	795	778	784	784	769	775
14	749	616	711	723	668	717	782	774	778	784	771	776
15	729	674	717	739	719	725	790	773	778	780	775	778
16	729	713	724	732	691	719	790	771	780	790	778	783
17	726	702	715	739	659	691	781	772	776	790	780	783
18	714	704	711	753	732	739	784	774	778	799	790	795
19	710	705	708	741	724	734	784	779	781	805	792	799
20	716	706	708	729	720	725	784	775	779	816	805	811
21	710	700	705	736	599	712	782	774	777	817	802	811
22	710	698	707	712	651	694	776	682	739	816	802	809
23	737	706	715	706	692	701	755	684	698	822	809	815
24	732	719	726	712	702	707	752	704	731	842	817	829
25	730	719	725	719	704	709	818	703	743	856	840	849
26	727	719	723	724	705	712	820	806	815	863	852	857
27	742	707	721	724	683	703	829	500	805	869	859	864
28	730	722	727	711	687	697	817	592	748	886	865	876
29	733	722	728	713	692	703	748	622	717	904	886	897
30	797	722	737	717	673	692	767	748	759	912	901	907
31	--	--	--	674	628	661	771	757	765	--	--	--
MONTH	--	--	--	812	356	725	849	500	738	912	664	801

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160900 CLINTON RIVER NEAR DRAYTON PLAINS, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	7.8	7.6	7.7	8.5	8.0	8.2	7.9	7.7	7.7
2	—	—	—	7.9	7.7	7.7	8.4	8.0	8.1	7.9	7.7	7.7
3	8.3	8.1	8.2	7.8	7.7	7.7	8.3	7.9	8.1	7.9	7.6	7.7
4	8.4	8.2	8.3	7.7	7.6	7.7	8.2	7.8	8.0	7.9	7.6	7.7
5	8.4	8.2	8.2	7.8	7.6	7.7	8.4	7.9	8.0	7.9	7.6	7.7
6	8.3	8.1	8.2	7.9	7.7	7.8	8.4	8.0	8.2	7.8	7.6	7.7
7	8.3	8.1	8.2	7.9	7.8	7.8	8.4	8.0	8.2	7.9	7.6	7.7
8	8.3	8.1	8.2	7.9	7.8	7.9	8.3	7.9	8.1	7.9	7.6	7.7
9	8.3	8.1	8.2	8.4	7.8	7.9	8.3	7.9	8.1	7.9	7.6	7.7
10	8.1	8.0	8.0	8.4	8.0	8.1	8.2	7.9	8.0	7.8	7.6	7.7
11	8.2	8.0	8.0	8.2	7.9	8.0	8.1	7.6	7.7	7.8	7.6	7.7
12	8.2	8.1	8.2	8.1	7.9	8.0	7.8	7.6	7.7	7.9	7.6	7.7
13	8.2	8.1	8.2	8.1	7.8	7.9	7.8	7.6	7.7	7.8	7.6	7.7
14	8.1	8.0	8.0	8.0	7.8	7.9	7.9	7.7	7.7	7.9	7.6	7.7
15	8.3	8.0	8.1	8.2	7.8	7.9	7.9	7.7	7.8	7.8	7.6	7.7
16	8.3	8.1	8.2	8.3	7.9	8.0	7.9	7.7	7.7	7.8	7.6	7.6
17	8.2	8.0	8.1	8.4	7.7	8.1	7.8	7.6	7.7	7.8	7.6	7.7
18	8.2	8.0	8.0	7.9	7.7	7.8	7.8	7.6	7.7	7.8	7.6	7.7
19	8.2	7.9	8.0	8.0	7.7	7.8	7.8	7.6	7.7	7.8	7.6	7.7
20	8.2	8.0	8.1	8.1	7.8	7.9	7.8	7.6	7.7	7.8	7.6	7.6
21	8.1	7.9	8.0	8.1	7.8	7.9	7.8	7.6	7.7	7.8	7.6	7.7
22	8.2	7.9	8.0	8.0	7.8	7.9	8.3	7.7	7.8	7.8	7.6	7.7
23	8.2	7.9	8.0	8.1	7.8	8.0	8.2	7.7	8.0	7.8	7.6	7.6
24	8.0	7.8	7.9	8.2	7.9	8.0	8.2	7.7	7.8	7.8	7.6	7.6
25	8.1	7.9	8.0	8.2	7.9	8.0	8.1	7.6	7.9	7.7	7.6	7.6
26	8.2	7.9	8.0	8.1	7.9	8.0	7.8	7.5	7.6	7.7	7.6	7.6
27	8.2	7.9	8.1	8.0	7.8	7.8	7.8	7.5	7.6	7.7	7.6	7.6
28	8.1	8.0	8.1	8.0	7.7	7.8	7.7	7.5	7.6	7.6	7.6	7.6
29	8.2	8.0	8.1	8.1	7.8	7.9	7.7	7.5	7.6	7.7	7.6	7.6
30	8.2	7.7	8.0	8.2	7.9	8.0	7.8	7.6	7.7	7.7	7.6	7.6
31	—	—	—	8.4	7.9	8.1	7.9	7.6	7.7	—	—	—
MAX	—	—	—	8.4	8.0	8.1	8.5	8.0	8.2	7.9	7.7	7.7
MIN	—	—	—	7.7	7.6	7.7	7.7	7.5	7.6	7.6	7.6	7.6

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	25.4	19.0	22.1	25.4	21.6	23.5	23.7	18.7	21.0
2	—	—	—	24.7	19.7	22.1	26.5	22.8	24.6	24.4	19.4	21.7
3	21.0	17.5	19.2	25.7	19.3	22.4	27.1	23.4	25.1	24.9	20.1	22.2
4	21.8	17.9	19.8	24.4	21.3	22.6	25.3	22.7	23.5	24.8	20.8	22.8
5	22.7	18.7	20.6	23.6	20.9	22.0	24.2	21.6	22.7	25.3	21.8	23.2
6	22.2	19.8	21.0	24.9	19.9	22.1	23.9	21.0	22.4	25.4	21.5	23.3
7	23.7	19.9	21.7	24.9	21.9	23.0	24.3	20.9	22.5	24.8	21.4	22.9
8	25.4	20.8	23.0	22.0	20.0	21.1	25.1	21.2	23.0	21.9	19.7	20.8
9	24.6	22.6	23.7	23.8	18.9	21.5	24.4	21.7	23.1	22.1	18.8	20.1
10	23.4	20.6	21.8	25.4	22.4	23.7	23.1	21.7	22.4	22.4	17.2	19.6
11	20.6	19.3	19.9	26.5	22.0	24.1	21.7	18.1	20.6	22.8	17.9	20.2
12	21.5	18.6	19.9	24.9	23.2	24.0	19.2	16.7	17.9	23.8	18.6	20.9
13	23.2	20.0	21.5	27.7	23.2	25.2	19.8	17.0	18.2	24.0	19.3	21.4
14	23.2	20.6	21.9	25.2	22.7	23.9	21.9	17.0	19.0	24.0	20.0	21.8
15	24.5	20.8	22.7	24.4	21.2	22.8	22.0	17.2	19.5	24.4	20.6	22.2
16	23.6	22.4	23.0	25.7	21.0	23.1	22.7	17.3	19.9	23.5	19.9	21.7
17	24.2	22.2	23.1	24.5	21.9	23.3	21.7	18.4	20.0	20.0	17.2	18.9
18	24.6	22.4	23.4	23.9	20.7	22.0	21.6	18.8	20.1	20.4	15.5	17.8
19	23.9	21.5	22.7	24.9	20.6	22.6	23.1	19.0	20.7	20.4	15.5	17.8
20	23.7	20.6	22.0	25.9	21.7	23.6	19.6	18.0	18.8	20.6	15.2	17.7
21	22.2	20.7	21.3	26.9	22.9	24.7	21.6	16.8	18.9	21.3	15.8	18.3
22	22.8	20.5	21.4	27.1	23.7	25.1	22.4	16.5	19.5	21.7	16.1	18.8
23	23.6	19.4	21.3	25.1	22.0	23.7	21.7	19.4	20.8	22.0	16.8	19.3
24	22.4	20.1	21.1	24.3	20.6	22.3	23.1	18.5	20.7	21.1	17.6	19.3
25	22.7	18.8	20.6	24.1	20.8	22.2	24.4	21.0	22.4	19.7	17.4	18.2
26	22.6	19.4	20.9	22.8	20.7	21.6	24.6	20.6	22.3	20.1	15.8	17.8
27	22.8	19.1	20.9	21.1	18.9	19.9	25.8	21.3	23.1	19.8	14.4	17.0
28	21.7	20.0	20.8	23.7	18.4	20.8	23.0	21.0	22.2	17.7	14.5	15.7
29	23.6	19.4	21.3	23.5	20.6	22.1	21.0	19.4	20.2	16.9	13.0	14.8
30	24.1	20.0	21.9	23.0	21.4	22.2	21.9	17.9	19.9	16.7	11.7	14.2
31	—	—	—	24.9	21.8	23.2	22.7	18.0	20.2	—	—	—
MONTH	—	—	—	27.7	18.4	22.7	27.1	16.5	21.2	25.4	11.7	19.7

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160900 CLINTON RIVER NEAR DRAYTON PLAINS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	6.9	5.1	6.0	8.3	6.6	7.4	8.1	5.8	6.8
2	—	—	—	7.1	5.2	6.1	7.9	6.6	7.2	8.1	5.7	6.6
3	9.2	7.8	8.5	7.1	5.4	6.1	7.9	6.5	7.2	8.4	5.6	6.6
4	9.5	8.0	8.6	6.7	5.0	5.7	7.6	6.5	7.0	8.1	5.4	6.5
5	8.9	7.4	8.3	6.7	5.0	5.8	8.4	6.9	7.6	8.3	5.3	6.4
6	8.5	7.4	8.0	7.0	5.6	6.3	8.5	7.2	7.8	8.0	5.2	6.4
7	8.6	7.7	8.1	6.9	4.9	6.0	8.6	7.3	7.9	7.9	5.1	6.3
8	8.3	7.4	7.8	6.9	6.0	6.5	8.4	7.2	7.8	8.6	5.6	6.8
9	7.7	6.7	7.2	8.3	6.6	7.3	8.5	7.4	7.9	8.5	6.1	7.0
10	6.8	6.3	6.6	8.1	6.6	7.2	—	—	—	8.6	6.3	7.2
11	7.7	6.7	7.1	7.7	6.3	7.0	—	—	—	8.6	6.3	7.2
12	8.0	7.2	7.6	7.1	6.3	6.7	—	—	—	8.8	6.2	7.2
13	7.6	6.8	7.3	7.2	6.2	6.7	—	—	—	8.0	5.4	6.8
14	7.5	6.6	7.0	6.7	6.1	6.3	—	—	—	8.1	5.3	6.4
15	7.9	6.5	7.2	7.3	5.8	6.5	—	—	—	7.9	5.2	6.2
16	7.7	6.8	7.2	7.7	6.2	6.8	—	—	—	7.6	5.0	6.0
17	7.7	6.5	7.0	7.7	5.7	6.8	8.2	5.9	6.8	8.5	5.4	6.7
18	7.8	6.4	7.0	7.1	5.5	6.1	8.0	5.7	6.6	8.3	6.1	7.0
19	8.2	6.4	7.3	7.4	5.9	6.6	8.2	5.8	6.8	8.5	6.2	7.1
20	8.2	6.7	7.4	7.2	6.0	6.5	7.7	6.1	6.8	8.7	6.2	7.2
21	7.8	6.8	7.3	7.2	5.9	6.5	8.5	6.3	7.3	8.5	6.3	7.1
22	8.2	6.7	7.4	6.9	5.8	6.3	9.0	6.6	7.7	8.6	6.2	7.1
23	8.4	7.0	7.6	7.5	5.9	6.7	8.7	6.8	7.9	8.6	6.0	7.0
24	7.9	6.7	7.4	7.8	6.5	7.0	9.0	6.8	7.8	8.6	5.8	6.9
25	8.4	7.3	7.8	7.8	6.6	7.1	8.5	5.8	7.6	8.3	5.6	6.7
26	8.4	7.5	8.0	7.8	6.6	7.1	8.5	5.1	6.5	8.6	5.9	7.0
27	8.5	7.6	8.0	7.1	6.6	6.8	8.4	5.3	6.5	8.5	6.0	7.0
28	8.4	7.4	7.9	7.8	6.5	7.0	7.3	5.4	6.3	7.7	5.7	6.6
29	8.2	7.5	7.8	7.6	6.7	7.1	7.9	6.0	6.9	8.2	6.0	7.0
30	8.1	5.9	7.4	7.7	6.7	7.1	8.1	5.8	7.2	8.0	5.7	6.7
31	—	—	—	8.0	6.2	7.1	8.2	5.8	6.8	—	—	—
MONTH	—	—	—	8.3	4.9	6.6	—	—	—	8.8	5.0	6.8

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161000 CLINTON RIVER AT AUBURN HILLS, MI

LOCATION.--Lat 42°38'00", long 83°13'28", in NW1/4 sec.36, T.3 N., R.10 E., Oakland County, Hydrologic Unit 04090003, on right bank 10 ft upstream from bridge on Auburn Road in Auburn Hills, 2.8 mi upstream from Galloway Creek.

DRAINAGE AREA.--123 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1935 to June 1939 and February to September 1940 (published as "at Pontiac"), October 1956 to September 1982 (published as "at Auburn Heights"), October 1982 to September 1991 (operated as a crest-stage partial-record station; published as "at Auburn Heights"), July 2001 to September 2002, October 2002 to September 2003 (operated as a crest-stage partial-record station), April to September 2004.

REVISED RECORDS.--WSP 1307: 1937(M). WSP 1507: Drainage area at former site.

GAGE.--Water-stage recorder. Datum of gage is 846.50 ft above sea level. Prior to October 1940 nonrecording gage at site 3.3 mi upstream at datum 876.01 ft above sea level.

REMARKS.--Water-discharge records good. Some regulation by many lakes upstream from station. Flow includes sewage effluent, most of which originates from sources outside the basin. Gage-height telemeter 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	--	--	--	--	--	--	106	51	397	73	92	82
2	--	--	--	--	--	--	77	88	372	73	120	45
3	--	--	--	--	--	--	91	42	301	73	170	45
4	--	--	--	--	--	--	95	44	191	106	237	39
5	--	--	--	--	--	--	97	39	177	83	166	35
6	--	--	--	--	--	--	96	36	178	88	155	38
7	--	--	--	--	--	--	90	34	177	107	117	113
8	--	--	--	--	--	--	86	35	180	58	113	45
9	--	--	--	--	--	--	82	153	e210	33	118	41
10	--	--	--	--	--	--	78	211	e280	30	151	36
11	--	--	--	--	--	--	73	201	274	30	121	35
12	--	--	--	--	--	--	70	174	218	68	99	34
13	--	--	--	--	--	--	72	199	229	40	59	35
14	--	--	--	--	--	--	66	220	301	66	31	34
15	--	--	--	--	--	--	51	193	234	85	31	33
16	--	--	--	--	--	--	46	170	230	74	34	31
17	--	--	--	--	--	--	40	143	219	121	33	29
18	--	--	--	--	--	--	28	138	218	108	33	25
19	--	--	--	--	--	--	30	128	218	121	33	25
20	--	--	--	--	--	--	30	124	241	151	32	26
21	--	--	--	--	--	--	43	331	229	180	31	24
22	--	--	--	--	--	--	29	282	214	179	29	24
23	--	--	--	--	--	--	25	978	203	124	29	25
24	--	--	--	--	--	--	23	378	162	105	29	25
25	--	--	--	--	--	--	31	314	145	55	31	24
26	--	--	--	--	--	--	26	321	90	47	29	24
27	--	--	--	--	--	--	24	379	77	87	60	25
28	--	--	--	--	--	--	25	389	67	114	134	24
29	--	--	--	--	--	--	23	388	71	105	142	24
30	--	--	--	--	--	--	24	408	70	106	101	25
31	--	--	--	--	--	--	--	410	--	184	94	--
TOTAL	--	--	--	--	--	--	1677	7001	6173	2874	2654	1070
MEAN	--	--	--	--	--	--	55.9	226	206	92.7	85.6	35.7
MAX	--	--	--	--	--	--	106	978	397	184	237	113
MIN	--	--	--	--	--	--	23	34	67	30	29	24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 2004, BY WATER YEAR (WY)

	MEAN	75.9	85.7	102	102	117	155	175	128	93.9	70.3	58.0	61.4
MAX	257	192	177	264	225	421	338	304	206	223	126	279	
(WY)	1982	2002	1973	1974	1974	1974	1974	1974	2004	1968	1980	1975	
MIN	8.08	14.4	12.6	29.2	36.5	58.1	55.9	51.3	11.6	8.85	8.26	12.7	
(WY)	1936	1939	1939	1961	1963	1964	2004	1958	1936	1936	1936	1936	

SUMMARY STATISTICS

ANNUAL MEAN
HIGHEST ANNUAL MEAN
LOWEST ANNUAL MEAN
HIGHEST DAILY MEAN
LOWEST DAILY MEAN
ANNUAL SEVEN-DAY MINIMUM
MAXIMUM PEAK FLOW
MAXIMUM PEAK STAGE
INSTANTANEOUS LOW FLOW
10 PERCENT EXCEEDS
50 PERCENT EXCEEDS
90 PERCENT EXCEEDS

WATER YEARS 1935 - 2004

104	
193	1974
42.4	1936
978	May 23 2004
5.5	Sep 1 1936
6.0	Aug 30 1936
(a)2040	May 23 2004
6.05	May 23 2004
(b)4.8	Sep 4 1936
194	
90	
33	

(a) From rating curve extended above 1,300 ft³/s.

(b) Observed; site then in use.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161000 CLINTON RIVER AT AUBURN HILLS, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--June to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following period: July 8-12, rated good. pH and water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: June 21-23, Aug. 27-30, Sept. 6-9, rated good; June 24-26, Sept. 10-13, rated fair; June 27-30, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 1,360 microsiemens, July 11, 12, 2004; minimum, 257 microsiemens, Aug. 2, 3, 2004.

pH: Maximum, 8.5 std. units, July 3, 2004; minimum, 7.3 std. units, July 13, 2004.

WATER TEMPERATURE: Maximum, 25.8°C, July 22, 2004; minimum, 15.2°C, Sept. 29, 30, 2004.

DISSOLVED OXYGEN: Maximum, 11.8 mg/L, Aug. 24, 2004; minimum, 4.6 mg/L, July 17, 2004.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	--	--	--	1030	978	1010	883	844	865	956	826	861
2	--	--	--	1060	977	1010	868	257	830	1020	948	976
3	917	783	814	1030	983	1000	800	257	742	1030	974	996
4	892	822	854	1060	589	953	822	411	667	1060	988	1010
5	915	843	863	1000	964	982	781	740	766	1110	1040	1060
6	863	841	851	973	928	946	810	774	791	1090	586	1050
7	900	840	859	1020	727	882	873	794	838	914	295	713
8	879	830	845	1110	969	1030	855	824	838	1010	914	967
9	934	474	797	1180	1110	1130	877	686	842	1060	995	1030
10	758	368	640	1230	1160	1190	888	449	785	1060	1040	1040
11	808	717	766	1360	989	1230	873	807	832	1130	1030	1050
12	856	803	834	1360	584	958	897	829	851	1130	1040	1060
13	865	502	812	1150	841	1030	1080	883	954	1130	1040	1070
14	854	381	757	1080	708	970	1140	1070	1100	1150	1040	1070
15	836	765	812	984	879	903	1160	1120	1150	1100	1060	1080
16	853	562	807	984	927	959	1210	1150	1170	1150	1090	1110
17	877	796	838	1010	346	868	1300	1170	1210	1140	1100	1120
18	878	828	849	918	835	893	1250	1170	1200	1180	1120	1150
19	850	822	836	866	837	853	1240	1180	1210	1240	1140	1190
20	843	799	817	849	774	820	1220	1160	1190	1220	1180	1200
21	912	811	839	885	316	791	1280	1180	1230	1230	1180	1200
22	882	817	836	824	314	748	1220	1160	1190	1280	1170	1210
23	879	799	831	840	815	828	1250	1170	1190	1210	1170	1190
24	880	842	864	864	819	839	1330	1210	1260	1250	1160	1220
25	938	840	873	944	863	911	1290	1230	1260	1230	1160	1210
26	969	927	954	957	943	950	1300	1190	1230	1230	1150	1190
27	1080	960	999	--	--	--	1220	405	1090	1300	1150	1210
28	1090	1010	1060	--	--	--	891	405	682	1240	1160	1220
29	1060	983	1020	876	814	855	783	545	711	1240	1200	1220
30	1070	977	1010	905	846	869	845	783	821	1220	1120	1170
31	--	--	--	868	376	724	863	827	842	--	--	--
MONTH	--	--	--	--	--	--	1330	257	979	1300	295	1090

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161000 CLINTON RIVER AT AUBURN HILLS, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	--	--	--	8.3	7.8	8.0	8.1	7.8	7.9	8.0	7.7	7.8
2	--	--	--	8.3	7.8	8.0	8.3	7.9	8.0	7.8	7.6	7.7
3	8.4	8.0	8.1	8.5	7.8	8.1	8.1	7.8	8.0	7.9	7.6	7.7
4	8.3	8.1	8.2	7.9	7.7	7.8	8.0	7.7	7.9	7.8	7.6	7.7
5	8.3	8.1	8.1	8.1	7.8	7.9	8.1	7.8	7.9	7.8	7.6	7.7
6	8.3	8.1	8.2	8.2	7.8	7.9	8.1	7.9	8.0	7.8	7.6	7.7
7	8.3	8.0	8.2	8.0	7.6	7.8	8.1	7.9	8.0	7.8	7.5	7.6
8	8.3	8.1	8.2	7.8	7.6	7.7	8.2	7.9	8.0	7.7	7.5	7.6
9	8.2	7.8	8.0	7.6	7.5	7.5	8.2	7.9	8.0	7.7	7.5	7.6
10	7.9	7.8	7.8	7.6	7.5	7.5	8.1	7.7	7.9	7.6	7.5	7.6
11	8.1	7.8	7.9	7.7	7.6	7.6	8.0	7.8	7.9	7.7	7.5	7.6
12	8.1	7.9	8.0	8.1	7.4	7.5	8.0	7.8	7.9	7.8	7.5	7.7
13	8.1	7.9	8.0	7.7	7.3	7.4	7.8	7.5	7.7	7.8	7.6	7.6
14	8.1	7.9	7.9	7.9	7.4	7.7	7.6	7.4	7.4	8.0	7.6	7.7
15	8.1	7.9	8.0	8.0	7.7	7.9	7.7	7.4	7.5	7.8	7.5	7.6
16	8.0	7.9	8.0	8.1	7.7	7.8	7.9	7.4	7.6	7.7	7.5	7.6
17	8.0	7.9	7.9	8.0	7.6	7.7	7.8	7.6	7.7	7.8	7.5	7.6
18	8.2	7.9	8.0	7.9	7.7	7.8	7.9	7.6	7.7	7.8	7.5	7.6
19	8.2	8.0	8.1	8.1	7.8	7.9	7.9	7.6	7.7	7.8	7.6	7.6
20	8.3	8.0	8.2	8.1	7.9	8.0	7.8	7.6	7.7	7.8	7.6	7.6
21	8.2	8.0	8.1	8.1	7.8	8.0	7.9	7.6	7.8	7.7	7.5	7.6
22	8.2	8.0	8.1	8.0	7.6	7.9	8.0	7.6	7.8	7.8	7.5	7.6
23	8.3	8.0	8.1	8.1	7.8	7.9	7.8	7.6	7.7	7.8	7.6	7.6
24	8.2	8.0	8.0	8.1	7.9	8.0	8.0	7.6	7.7	7.8	7.5	7.6
25	8.3	7.9	8.0	8.0	7.6	7.7	8.0	7.6	7.7	7.8	7.6	7.6
26	8.2	7.9	8.0	7.6	7.5	7.6	7.8	7.5	7.6	7.8	7.6	7.6
27	8.2	7.8	7.9	--	--	--	7.9	7.5	7.7	7.8	7.6	7.6
28	8.1	7.8	7.9	--	--	--	7.8	7.5	7.7	7.6	7.5	7.6
29	8.3	7.8	8.0	8.2	7.8	7.9	7.8	7.7	7.8	7.7	7.6	7.6
30	8.4	7.8	8.0	8.1	7.8	7.9	7.9	7.8	7.8	7.7	7.5	7.6
31	--	--	--	8.1	7.7	7.9	8.0	7.8	7.8	--	--	--
MAX	--	--	--	--	--	--	8.3	7.9	8.0	8.0	7.7	7.8
MIN	--	--	--	--	--	--	7.6	7.4	7.4	7.6	7.5	7.6

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	--	--	--	23.2	20.4	21.8	24.0	21.2	22.7	23.1	21.0	22.0
2	--	--	--	22.9	20.3	21.6	25.2	22.6	23.9	23.0	20.1	21.5
3	20.1	18.0	18.9	23.5	20.0	21.7	25.5	22.6	24.3	23.2	20.7	22.0
4	20.3	17.7	18.9	23.4	21.1	22.2	24.6	20.7	22.3	23.6	21.3	22.4
5	20.8	18.0	19.4	22.4	21.3	21.9	23.0	21.5	22.1	23.3	21.5	22.3
6	21.0	19.2	20.1	23.5	20.4	21.9	22.5	20.6	21.6	23.4	21.2	22.3
7	22.4	19.9	21.2	23.3	21.1	22.2	22.4	20.5	21.5	22.9	21.2	22.1
8	24.0	21.2	22.6	21.5	19.0	20.2	23.3	21.0	22.1	21.3	19.5	20.2
9	24.3	22.4	23.4	21.3	17.6	19.4	23.4	21.8	22.6	20.8	18.9	19.7
10	22.5	20.3	21.1	21.6	18.7	20.1	22.5	20.8	21.9	20.9	17.8	19.4
11	20.5	19.3	19.7	22.3	18.9	20.6	21.6	20.2	21.1	21.3	18.5	19.9
12	20.4	18.7	19.5	21.9	19.4	20.9	20.2	19.4	19.9	22.0	19.0	20.4
13	21.8	19.4	20.5	23.5	20.0	21.6	20.0	18.5	19.3	22.2	19.5	20.8
14	22.4	20.5	21.4	21.9	20.6	21.4	19.8	17.6	18.6	22.4	20.0	21.2
15	23.3	20.9	22.1	23.5	21.2	22.2	20.4	17.7	18.9	22.7	20.7	21.6
16	22.7	21.5	21.9	23.5	20.7	22.1	20.6	17.7	19.1	22.5	20.2	21.3
17	22.9	21.4	22.1	22.8	20.8	21.8	20.5	18.4	19.5	20.2	17.6	18.9
18	23.5	22.1	22.8	22.8	21.0	21.7	20.8	19.1	19.8	19.6	16.7	18.0
19	23.2	21.8	22.5	23.8	21.2	22.5	21.4	19.3	20.2	19.5	16.5	17.8
20	22.9	20.9	21.9	25.1	22.4	23.7	19.6	18.1	18.7	19.7	16.4	17.8
21	22.0	20.5	21.4	25.7	23.8	24.6	20.3	17.2	18.6	19.9	17.0	18.3
22	21.9	20.6	21.1	25.8	23.5	24.6	20.5	17.1	18.7	20.5	17.2	18.7
23	22.3	19.9	21.1	25.1	22.5	23.7	20.3	18.9	19.4	20.8	17.6	19.1
24	21.8	20.2	21.0	23.2	21.3	22.3	21.3	18.3	19.7	20.6	18.1	19.3
25	21.6	19.3	20.4	22.0	20.0	21.0	22.6	19.9	21.2	19.5	18.3	18.8
26	21.2	19.0	20.1	20.9	19.5	20.2	23.1	21.0	21.9	19.5	17.6	18.4
27	21.4	18.6	20.0	--	--	--	24.4	21.4	22.7	19.4	16.3	17.8
28	20.4	18.7	19.5	--	--	--	24.2	22.4	23.0	17.8	16.0	17.1
29	21.8	18.6	20.1	22.4	20.9	21.8	22.5	20.4	21.4	17.8	15.2	16.4
30	23.0	19.4	21.1	22.3	21.4	21.8	22.0	20.1	21.1	18.3	15.2	16.5
31	--	--	--	23.5	20.9	22.2	22.6	20.5	21.6	--	--	--
MONTH	--	--	--	--	--	--	25.5	17.1	20.9	23.6	15.2	19.7

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161000 CLINTON RIVER AT AUBURN HILLS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	10.1	6.3	7.7	9.1	6.6	7.6	8.5	6.7	7.6
2	--	--	--	9.9	6.3	7.8	8.9	6.6	7.5	8.5	6.6	7.2
3	9.1	8.0	8.7	10.5	6.3	8.0	8.2	6.3	7.1	8.6	6.5	7.4
4	9.1	8.1	8.6	7.4	6.1	6.6	8.1	6.3	7.2	8.8	6.1	7.2
5	9.1	8.1	8.6	8.6	6.0	7.1	8.4	7.0	7.6	8.8	6.2	7.2
6	9.1	7.9	8.5	9.2	6.4	7.6	8.8	7.2	7.8	8.7	6.1	7.2
7	9.0	7.6	8.3	7.8	6.1	6.7	8.9	7.1	7.9	7.6	6.3	7.0
8	8.7	7.2	8.0	7.4	5.9	6.5	9.1	7.0	7.8	8.6	6.2	7.2
9	8.2	6.4	7.3	--	--	--	9.1	7.0	7.8	8.5	6.0	7.0
10	7.9	7.4	7.6	--	--	--	8.3	6.7	7.3	8.6	6.3	7.2
11	8.3	7.5	8.0	--	--	--	8.4	6.9	7.5	8.6	6.5	7.3
12	9.0	7.9	8.4	--	--	--	8.6	6.8	7.6	9.4	6.6	7.7
13	8.8	7.2	8.2	--	--	--	8.6	6.5	7.4	9.4	6.7	7.6
14	8.3	7.3	7.7	--	--	--	--	--	--	9.5	6.5	7.6
15	8.2	7.2	7.6	8.0	5.4	6.6	--	--	--	9.1	6.1	7.2
16	8.4	6.8	7.5	8.1	5.2	6.5	10.2	7.4	9.1	8.5	5.6	6.7
17	8.0	6.7	7.5	7.6	4.6	6.0	10.0	6.3	7.8	9.2	6.0	7.4
18	8.2	7.0	7.6	7.3	6.0	6.4	9.8	6.4	7.8	9.4	6.8	7.8
19	8.6	7.3	7.9	7.6	6.1	6.8	10.3	6.3	8.0	9.6	7.0	7.8
20	8.8	7.7	8.2	7.6	6.2	6.7	9.3	6.6	7.9	9.7	7.1	7.9
21	8.7	7.8	8.2	7.3	5.5	6.6	10.6	6.8	8.4	9.2	6.2	7.4
22	9.0	7.8	8.3	6.8	5.8	6.3	11.0	7.2	8.7	9.6	6.7	7.7
23	9.3	7.3	8.4	7.6	5.8	6.6	9.7	6.7	8.0	9.5	6.9	7.7
24	9.3	7.6	8.3	8.0	6.0	7.1	11.8	6.7	8.5	9.2	6.6	7.5
25	9.9	7.8	8.8	--	--	--	10.5	6.4	7.9	9.0	6.5	7.5
26	9.8	7.6	8.6	--	--	--	9.7	5.3	7.1	9.2	7.0	7.7
27	10.2	7.3	8.6	--	--	--	9.6	5.6	7.2	9.3	7.1	7.8
28	10.2	7.0	8.4	9.1	7.2	8.2	7.9	6.0	6.8	8.5	6.6	7.4
29	11.0	7.4	8.9	9.3	7.0	7.9	8.0	7.0	7.6	9.4	7.2	8.0
30	11.0	6.5	8.5	8.7	7.0	7.6	8.4	7.3	7.8	9.3	6.8	7.6
31	--	--	--	8.3	6.7	7.6	8.5	7.2	7.7	--	--	--
MONTH	--	--	--	--	--	--	--	--	--	9.7	5.6	7.5

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161540 PAINT CREEK AT ROCHESTER, MI

LOCATION.--Lat 42°41'18", long 83°08'35", in NW1/4 SE1/4 sec.10, T.3 N., R.11 E., Oakland County, Hydrologic Unit 04090003, on right bank at upstream side of bridge on Ludlow Street in Rochester, 1.5 mi upstream from mouth.

DRAINAGE AREA.--70.9 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1959 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 755.11 ft above sea level.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Occasional regulation by Lake Orion. Gage-height telemeter 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	13	42	51	65	e27	69	71	24	115	30	56	34
2	13	92	45	78	e27	103	63	56	97	28	45	31
3	14	125	41	74	e34	92	59	43	86	26	46	28
4	17	97	39	67	e33	90	55	37	75	38	76	26
5	17	65	38	66	e30	223	53	32	67	41	63	24
6	17	52	36	e59	e31	172	53	31	61	34	48	24
7	14	48	34	e51	e31	129	49	29	56	42	41	50
8	13	46	34	e47	e28	130	47	29	51	37	36	31
9	13	44	35	e42	e29	119	41	83	e68	32	33	28
10	15	43	63	e38	e29	108	39	163	e135	30	33	24
11	15	55	91	e39	e29	104	35	151	130	28	32	21
12	13	49	63	e39	e30	96	34	113	96	63	32	21
13	13	43	51	e38	e30	91	32	104	92	56	30	20
14	38	41	47	e36	e29	87	32	125	184	81	28	19
15	62	53	44	e34	e28	80	30	114	180	77	26	18
16	35	48	47	e34	e26	75	27	87	124	54	25	18
17	21	45	54	e36	e27	74	25	76	116	61	23	17
18	19	85	49	e36	e27	71	23	70	95	75	22	16
19	16	135	45	e35	e29	64	21	65	80	63	21	16
20	14	79	43	e34	e45	96	22	54	66	52	21	15
21	14	63	41	e33	e64	80	25	105	59	52	20	15
22	19	56	40	e35	e48	68	23	248	62	93	20	15
23	19	50	58	e36	45	65	21	1180	55	65	18	14
24	18	69	66	e31	43	65	20	470	51	49	19	14
25	30	61	55	e31	41	97	22	293	47	41	19	14
26	36	51	52	e31	44	100	23	261	43	35	19	14
27	33	46	47	e32	46	87	21	221	39	38	35	14
28	63	65	42	e31	49	83	16	189	37	52	79	15
29	61	79	78	e29	58	76	17	162	37	43	62	14
30	51	61	112	e29	—	74	16	142	32	39	50	14
31	45	—	76	e29	—	76	—	135	—	80	39	—
TOTAL	781	1888	1617	1295	1037	2944	1015	4892	2436	1535	1117	624
MEAN	25.2	62.9	52.2	41.8	35.8	95.0	33.8	158	81.2	49.5	36.0	20.8
MAX	63	135	112	78	64	223	71	1180	184	93	79	50
MIN	13	41	34	29	26	64	16	24	32	26	18	14
CFSM	0.36	0.89	0.74	0.59	0.50	1.34	0.48	2.23	1.15	0.70	0.51	0.29
IN.	0.41	0.99	0.85	0.68	0.54	1.54	0.53	2.57	1.28	0.81	0.59	0.33

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2004, BY WATER YEAR (WY)

	MEAN	39.5	46.0	50.7	50.1	61.1	94.0	94.6	65.8	48.1	29.4	25.6	34.1
MAX	123	120	103	127	166	204	194	158	125	58.0	66.7	104	
(WY)	1982	1986	1976	1973	2001	1976	1975	2004	1996	1992	1975	1975	
MIN	8.50	11.0	14.5	14.9	15.4	25.9	33.8	28.5	13.5	11.7	12.0	12.2	
(WY)	1964	1964	1965	1964	1963	1964	2004	1977	1988	1963	1965	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1960 - 2004

ANNUAL TOTAL	13506.3	21181	
ANNUAL MEAN	37.0	57.9	
HIGHEST ANNUAL MEAN			53.2
LOWEST ANNUAL MEAN			86.7
HIGHEST DAILY MEAN	264	Apr 4	1180
LOWEST DAILY MEAN	7.1	Sep 13	13
ANNUAL SEVEN-DAY MINIMUM	7.5	Sep 8	14
MAXIMUM PEAK FLOW			1930
MAXIMUM PEAK STAGE			6.52
INSTANTANEOUS LOW FLOW			May 23
ANNUAL RUNOFF (CFSM)	0.522		0.816
ANNUAL RUNOFF (INCHES)	7.09		11.11
10 PERCENT EXCEEDS	68		98
50 PERCENT EXCEEDS	28		43
90 PERCENT EXCEEDS	13		18

(a) Result of regulation due to bridge construction.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161540 PAINT CREEK AT ROCHESTER, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 2001 to 2003, June to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 2001 to September 2003, June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: June 2001 to September 2003, June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: Oct. 12-28, June 25-30, July 6-14, 28-30, Aug. 9-19, 23-30, Sept. 6-13, rated good. pH and water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: June 14-17, July 28, 29, Aug. 24-26, Sept. 11-13, rated good; Aug. 27-30, rated fair.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 3,910 microsiemens, Aug. 12, 2001; minimum, 216 microsiemens, Sept. 8, 2001.

pH: Maximum, 8.4 std. units, July 2, Aug. 16-18, Sept. 14, 15, 17-21, 24, 25, 29, 2004; minimum, 7.9 std. units, Aug. 27, 28, 2004.

WATER TEMPERATURE: Maximum, 26.0°C, July 29, 2002; minimum, 0.0°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum, 11.1 mg/L, Aug. 13, 17, 22, 2004; minimum, 7.6 mg/L, July 13, 2004

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 1,620 microsiemens, Sept. 16; minimum, 315 microsiemens, July 21.

pH: Maximum, 8.4 std. units, July 2, Aug. 16-18, Sept. 14, 15, 17-21, 24, 25, 29; minimum, 7.9 std. units Aug. 27, 28.

WATER TEMPERATURE: Maximum, 24.5°C, Aug. 27; minimum, 11.1°C, Sept. 30.

DISSOLVED OXYGEN: Maximum, 11.1 mg/L, Aug. 13, 17, 22; minimum, 7.6 mg/L, July 13.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	--	--	--	823	768	773	692	662	678	754	731	735
2	--	--	--	802	776	781	698	474	687	1110	742	753
3	685	663	674	830	777	797	717	512	687	774	752	758
4	699	677	684	901	462	791	721	410	620	1090	761	772
5	756	678	688	774	715	752	672	629	657	778	770	772
6	698	687	693	775	753	760	685	670	675	813	543	772
7	700	677	688	771	565	740	695	681	685	749	480	699
8	692	676	688	755	730	745	704	691	694	755	711	732
9	--	--	--	755	746	749	705	684	701	1090	732	760
10	--	--	--	779	753	756	727	608	705	790	765	772
11	650	621	637	775	592	758	720	708	713	1300	776	794
12	728	650	661	755	423	702	738	717	725	789	780	783
13	689	431	656	731	609	701	733	725	727	794	786	790
14	624	419	562	712	588	674	744	727	732	806	788	794
15	609	486	575	685	630	666	741	726	735	808	785	795
16	635	503	619	686	677	679	746	735	740	1620	795	816
17	705	601	650	698	370	663	793	743	768	807	796	801
18	691	668	679	658	564	636	816	787	799	1380	800	818
19	747	689	694	681	654	670	840	805	811	812	801	805
20	708	689	698	713	680	692	822	798	810	813	801	804
21	740	702	713	730	315	695	840	808	815	813	800	804
22	751	721	736	673	589	639	836	813	820	814	800	806
23	771	730	745	693	670	681	843	812	825	1110	807	818
24	800	743	749	719	692	705	847	821	829	830	815	823
25	753	741	747	724	708	714	880	831	844	1020	827	835
26	779	750	755	738	721	727	885	838	846	848	832	836
27	768	756	761	753	695	730	885	350	791	859	833	838
28	785	765	771	773	734	750	729	472	618	863	831	850
29	790	771	779	751	724	736	711	666	682	847	830	837
30	773	756	768	764	719	728	724	704	714	1150	835	844
31	--	--	--	764	554	651	732	719	725	--	--	--
MONTH	--	--	--	901	315	717	885	350	737	1620	480	794

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161540 PAINT CREEK AT ROCHESTER, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	8.3	8.2	8.2	8.2	8.1	8.2	8.3	8.2	8.2
2	—	—	—	8.4	8.2	8.2	8.3	8.2	8.2	8.3	8.1	8.2
3	8.3	8.2	8.2	8.3	8.2	8.2	8.3	8.1	8.2	8.3	8.2	8.2
4	8.3	8.2	8.3	8.2	8.2	8.2	8.2	8.0	8.1	8.3	8.1	8.2
5	8.3	8.2	8.3	8.2	8.1	8.2	8.2	8.1	8.2	8.3	8.1	8.2
6	8.3	8.2	8.3	8.3	8.2	8.2	8.3	8.2	8.2	8.3	8.1	8.2
7	8.3	8.2	8.3	8.3	8.1	8.2	8.3	8.2	8.2	8.2	8.0	8.1
8	8.3	8.2	8.2	8.2	8.1	8.2	8.3	8.2	8.2	8.3	8.1	8.2
9	—	—	—	8.3	8.2	8.2	8.3	8.1	8.2	8.3	8.1	8.2
10	—	—	—	8.3	8.2	8.2	8.3	8.1	8.2	8.3	8.2	8.2
11	8.2	8.2	8.2	8.3	8.2	8.2	8.3	8.2	8.2	8.3	8.1	8.2
12	8.2	8.2	8.2	8.2	8.1	8.1	8.3	8.2	8.2	8.3	8.1	8.2
13	8.3	8.1	8.2	8.3	8.1	8.2	8.3	8.2	8.2	8.3	8.1	8.2
14	8.3	8.0	8.1	8.2	8.1	8.1	8.3	8.2	8.2	8.4	8.2	8.3
15	8.2	8.0	8.2	8.2	8.1	8.1	8.3	8.2	8.2	8.4	8.2	8.3
16	8.2	8.2	8.2	8.2	8.1	8.2	8.4	8.2	8.2	8.3	8.1	8.3
17	8.2	8.0	8.1	8.2	8.0	8.1	8.4	8.2	8.2	8.4	8.2	8.3
18	8.2	8.1	8.1	8.2	8.0	8.1	8.4	8.2	8.2	8.4	8.2	8.3
19	8.2	8.1	8.2	8.2	8.1	8.2	8.3	8.2	8.2	8.4	8.2	8.3
20	8.2	8.1	8.2	8.2	8.1	8.2	8.3	8.2	8.2	8.4	8.2	8.3
21	8.2	8.1	8.2	8.2	8.0	8.2	8.3	8.2	8.2	8.4	8.2	8.2
22	8.2	8.1	8.2	8.1	8.0	8.0	8.3	8.2	8.2	8.3	8.2	8.2
23	8.2	8.2	8.2	8.2	8.1	8.2	8.3	8.2	8.2	8.3	8.1	8.2
24	8.2	8.2	8.2	8.2	8.2	8.2	8.3	8.2	8.2	8.4	8.2	8.2
25	8.3	8.2	8.2	8.3	8.2	8.2	8.3	8.1	8.2	8.4	8.2	8.3
26	8.3	8.2	8.2	8.3	8.2	8.2	8.3	8.1	8.2	8.3	8.2	8.2
27	8.3	8.2	8.2	8.2	8.1	8.2	8.3	7.9	8.2	8.3	8.2	8.3
28	8.3	8.2	8.2	8.2	8.1	8.2	8.1	7.9	7.9	8.3	8.2	8.2
29	8.3	8.2	8.2	8.2	8.1	8.2	8.1	8.0	8.1	8.4	8.1	8.2
30	8.3	8.2	8.2	8.3	8.1	8.2	8.2	8.1	8.1	8.2	8.0	8.1
31	—	—	—	8.2	8.0	8.1	8.2	8.2	8.2	—	—	—
MAX	—	—	—	8.4	8.2	8.2	8.4	8.2	8.2	8.4	8.2	8.3
MIN	—	—	—	8.1	8.0	8.0	8.1	7.9	7.9	8.2	8.0	8.1

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	20.1	17.2	18.7	20.8	19.0	19.9	19.0	16.8	17.9
2	—	—	—	19.7	17.1	18.5	21.7	19.3	20.5	19.5	17.0	18.3
3	17.6	15.7	16.7	19.8	16.5	18.3	22.2	20.3	21.2	19.7	17.3	18.5
4	17.2	15.2	16.4	22.9	18.0	19.5	20.8	18.6	19.6	20.3	18.0	19.1
5	17.6	15.4	16.6	19.9	18.4	19.3	18.8	17.4	18.2	20.4	18.5	19.4
6	18.4	16.5	17.5	19.6	17.2	18.4	18.0	16.3	17.2	21.4	18.6	19.8
7	20.3	17.8	19.0	21.5	18.7	19.6	18.5	16.2	17.4	21.8	19.3	20.6
8	21.6	18.8	20.3	19.2	16.8	17.9	19.2	16.9	18.0	19.3	17.7	18.2
9	23.1	20.9	21.5	18.3	15.6	17.1	19.3	17.2	18.3	18.3	16.8	17.5
10	19.7	18.0	18.7	19.9	17.1	18.5	19.4	18.0	18.6	17.5	15.2	16.4
11	18.0	17.2	17.5	20.9	17.8	19.2	18.1	16.5	17.4	17.7	15.1	16.5
12	18.1	16.5	17.3	21.2	19.4	20.0	16.5	15.4	15.9	18.4	15.6	17.1
13	20.8	17.7	18.8	22.0	19.4	20.6	16.0	14.7	15.4	18.8	16.3	17.6
14	21.0	19.6	20.2	21.1	19.8	20.5	16.7	14.6	15.7	19.1	16.8	18.0
15	21.5	19.5	20.5	20.6	18.9	19.8	17.3	14.8	16.1	19.8	17.8	18.8
16	21.2	19.7	20.2	20.7	18.8	19.8	17.2	14.6	16.0	19.8	18.0	19.0
17	21.0	19.5	20.2	20.8	19.3	19.8	17.2	15.0	16.2	18.0	15.3	16.5
18	22.0	20.6	21.2	19.8	18.7	19.2	17.8	15.9	16.8	16.0	13.8	14.9
19	21.2	18.5	20.0	20.1	18.2	19.2	18.1	16.6	17.3	15.4	13.1	14.3
20	18.5	16.9	17.8	21.0	19.1	20.0	16.8	15.2	15.8	15.0	12.6	13.9
21	17.9	17.0	17.5	23.0	19.9	21.1	16.4	14.2	15.2	15.5	12.8	14.2
22	18.9	17.4	18.0	23.3	21.4	22.4	16.7	13.5	15.3	15.9	13.3	14.7
23	19.0	16.7	17.9	22.8	19.2	21.2	17.0	15.8	16.4	16.5	13.8	15.2
24	19.3	16.9	18.3	19.2	17.6	18.4	18.4	15.7	17.1	16.4	14.7	15.6
25	17.4	15.8	16.6	18.9	17.5	18.1	20.1	17.5	18.8	16.0	15.4	15.7
26	17.7	15.7	16.7	18.2	17.1	17.7	20.8	18.9	19.7	16.4	14.6	15.4
27	18.1	15.6	16.9	17.5	16.4	16.9	24.5	19.4	20.7	15.5	13.1	14.4
28	17.5	16.2	16.8	19.0	15.9	17.4	22.4	19.5	20.9	14.7	13.2	14.0
29	18.5	15.6	17.1	19.1	17.7	18.5	19.5	18.0	18.7	14.1	12.3	13.1
30	19.4	16.4	17.9	19.0	18.1	18.5	18.4	17.0	17.6	13.4	11.1	12.2
31	—	—	—	20.8	18.4	19.8	18.5	16.3	17.5	—	—	—
MONTH	—	—	—	23.3	15.6	19.2	24.5	13.5	17.7	21.8	11.1	16.6

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161540 PAINT CREEK AT ROCHESTER, MI—Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	—	—	—	10.2	8.6	9.2	9.1	8.2	8.5	10.0	8.8	9.2
2	—	—	—	10.4	8.6	9.3	9.2	8.0	8.5	9.8	8.6	9.2
3	9.8	9.1	9.5	10.3	8.5	9.3	9.0	7.8	8.3	10.1	8.5	9.1
4	10.0	9.3	9.6	9.7	8.2	8.7	8.7	7.8	8.4	9.9	8.5	9.0
5	10.0	9.2	9.5	9.5	8.3	8.8	9.4	8.6	9.0	10.0	8.4	8.9
6	9.8	8.9	9.3	10.0	8.6	9.2	10.0	8.9	9.3	9.8	7.8	8.8
7	9.6	8.5	9.0	9.3	8.4	8.7	9.9	8.9	9.3	9.0	7.9	8.3
8	9.2	8.2	8.7	9.6	8.4	9.1	9.8	8.7	9.2	9.9	8.3	9.0
9	—	—	—	10.5	8.9	9.7	10.0	8.5	9.2	10.3	8.7	9.3
10	—	—	—	10.1	8.6	9.3	9.8	8.3	9.0	10.5	9.0	9.6
11	9.2	8.9	9.1	10.1	8.2	9.3	10.0	8.7	9.3	10.6	9.1	9.7
12	9.6	9.0	9.3	8.7	7.9	8.3	10.5	9.2	9.8	10.7	8.9	9.7
13	9.3	8.4	9.0	9.1	7.6	8.4	11.1	9.6	10.1	10.6	8.4	9.3
14	8.7	8.0	8.4	8.4	7.7	8.1	11.0	9.4	10.1	10.3	8.2	9.0
15	8.7	8.1	8.4	8.6	8.0	8.2	10.9	9.4	9.9	10.0	8.0	8.7
16	8.9	8.3	8.6	9.0	8.0	8.3	11.0	9.3	10.0	9.5	8.0	8.5
17	8.7	7.9	8.3	9.0	8.0	8.3	11.1	9.2	10.0	10.4	8.2	9.2
18	8.2	7.9	8.0	8.9	8.2	8.5	11.0	9.1	9.7	10.4	8.9	9.5
19	8.6	7.9	8.3	9.2	8.2	8.6	10.6	8.6	9.4	10.8	9.2	9.8
20	9.2	8.5	8.9	9.2	8.2	8.5	10.5	8.7	9.5	11.0	9.3	9.9
21	9.3	8.7	8.9	9.0	7.7	8.4	10.7	9.3	9.8	10.8	9.2	9.8
22	9.3	8.6	8.9	8.1	7.7	7.9	11.1	9.1	10.1	10.7	9.0	9.7
23	9.5	8.6	9.0	8.7	7.7	8.2	10.7	9.1	9.7	10.6	8.8	9.5
24	9.3	8.6	8.9	9.7	8.5	9.1	10.9	8.8	9.7	10.8	8.8	9.5
25	10.1	9.0	9.5	10.0	8.9	9.3	10.3	8.3	9.2	10.3	8.7	9.3
26	10.0	9.1	9.5	10.1	8.9	9.3	10.0	8.3	8.9	10.2	8.9	9.3
27	10.3	9.1	9.6	9.6	9.0	9.2	9.7	7.7	8.7	10.5	9.0	9.6
28	10.2	9.2	9.6	10.1	8.9	9.4	8.6	7.9	8.2	10.6	9.2	9.6
29	10.4	9.0	9.6	9.9	8.8	9.3	9.2	8.6	8.9	11.0	9.2	9.8
30	10.5	8.7	9.5	8.8	8.5	9.0	10.0	8.9	9.3	10.6	9.2	9.8
31	—	—	—	8.8	8.1	8.3	9.8	8.8	9.2	—	—	—
MONTH	—	—	—	10.5	7.6	8.8	11.1	7.7	9.3	11.0	7.8	9.3

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161580 STONY CREEK NEAR ROMEO, MI

LOCATION.--Lat 42°48'03", long 83°05'25", in SW1/4 sec.31, T.5 N., R.12 E., Macomb County, Hydrologic Unit 04090003, on right bank at upstream side of culvert on 32 Mile Road, 4.0 mi west of Romeo.

DRAINAGE AREA.--25.6 mi².

PERIOD OF RECORD.--October 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is 861.64 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	6.5	5.7	14	17	e7.2	16	16	8.2	44	6.9	10	7.0
2	6.1	13	12	20	e7.2	27	16	18	37	7.1	8.3	6.1
3	5.2	22	10	21	e8.8	35	14	15	32	6.4	7.6	5.4
4	6.3	24	12	19	e8.4	35	13	12	19	7.7	12	16
5	5.5	27	12	16	e7.5	60	12	11	15	10	14	22
6	4.8	26	11	15	e7.1	64	12	10	13	8.6	11	9.7
7	2.5	23	11	e13	e6.8	54	12	9.0	11	9.7	7.6	11
8	2.2	19	10	e12	e6.0	48	11	9.2	10	9.2	11	8.6
9	2.1	15	10	e11	e5.6	42	11	22	11	8.0	14	6.6
10	2.3	14	13	e9.7	e5.2	36	8.1	49	21	6.9	14	5.0
11	2.3	18	21	e9.4	e4.9	33	7.7	63	22	5.8	11	4.1
12	3.9	18	14	e9.4	4.7	30	6.6	56	17	11	4.6	3.7
13	3.0	12	12	e9.2	3.9	27	7.5	48	17	11	4.2	3.5
14	4.4	6.6	11	e8.7	3.8	25	7.0	48	37	12	4.1	4.6
15	11	14	11	e8.3	3.8	24	5.9	43	36	10	3.5	4.3
16	6.9	14	11	e8.1	e3.7	23	5.3	36	26	7.6	4.2	4.4
17	4.4	14	12	e8.4	3.6	21	5.4	30	22	7.7	4.8	5.4
18	4.1	19	11	e8.6	3.6	21	5.2	26	19	14	3.0	3.5
19	4.0	31	11	e8.4	3.8	21	6.5	23	15	10	2.9	2.6
20	3.4	23	9.9	e8.2	4.2	26	7.0	20	13	8.6	2.7	2.5
21	3.4	18	11	e8.0	e5.2	27	5.7	27	12	8.8	2.8	2.2
22	3.8	16	10	e8.3	6.3	22	5.5	50	13	15	2.6	1.9
23	5.0	15	13	e8.6	6.9	19	4.9	186	12	12	2.7	2.0
24	5.6	18	15	e7.8	e7.4	14	5.4	219	11	7.8	2.7	2.0
25	5.1	17	13	e7.6	e8.2	18	5.7	183	10	6.1	2.8	2.3
26	6.2	15	12	e7.7	e9.2	20	5.9	145	9.6	5.0	2.8	7.1
27	5.1	14	12	e7.9	e10	21	5.5	111	8.5	6.5	6.7	3.3
28	4.8	16	12	e7.7	e12	18	5.0	86	7.8	10	21	2.4
29	6.7	19	19	e7.4	e13	17	4.4	68	7.8	8.6	15	2.4
30	6.1	15	28	e7.5	---	17	4.3	55	7.1	7.3	11	2.2
31	5.6	---	21	e7.5	---	18	---	48	---	12	8.7	---
TOTAL	148.3	521.3	404.9	326.4	188.0	879	241.5	1734.4	535.8	277.3	233.3	163.8
MEAN	4.78	17.4	13.1	10.5	6.48	28.4	8.05	55.9	17.9	8.95	7.53	5.46
MAX	11	31	28	21	13	64	16	219	44	15	21	22
MIN	2.1	5.7	9.9	7.4	3.6	14	4.3	8.2	7.1	5.0	2.6	1.9
CFSM	0.19	0.68	0.51	0.41	0.25	1.11	0.31	2.19	0.70	0.35	0.29	0.21
IN.	0.22	0.76	0.59	0.47	0.27	1.28	0.35	2.52	0.78	0.40	0.34	0.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2004, BY WATER YEAR (WY)

	MEAN	10.4	15.5	17.0	15.9	20.7	33.7	32.5	19.8	13.9	7.88	6.64	8.74
MAX	25.1	46.2	41.3	47.7	62.9	79.7	75.1	57.1	49.5	20.0	48.5	41.2	
(WY)	1982	1986	1976	1973	1976	1976	1975	1974	1996	1969	1975	1975	
MIN	1.79	2.06	3.56	3.77	3.50	8.40	8.05	5.82	2.67	1.47	1.63	1.52	
(WY)	1967	1965	1965	2003	2003	2000	2004	1977	1988	1965	1965	1966	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1965 - 2004

ANNUAL TOTAL	3595.0		5654.0									
ANNUAL MEAN	9.85		15.4							16.8		
HIGHEST ANNUAL MEAN										31.5		1975
LOWEST ANNUAL MEAN										8.63		2003
HIGHEST DAILY MEAN	82			Apr 5		219		May 24		245		Apr 20 1975
LOWEST DAILY MEAN	1.4			Jul 19		1.9		Sep 22		0.92		Oct 9 1966
ANNUAL SEVEN-DAY MINIMUM	1.6			Jan 21		2.2		Sep 19		1.2		Sep 13 1966
MAXIMUM PEAK FLOW						271		May 23		290		Apr 19 1975
MAXIMUM PEAK STAGE						4.82		May 23		5.19		Apr 19 1975
INSTANTANEOUS LOW FLOW										(a)0.60		(b)
ANNUAL RUNOFF (CFSM)	0.385					0.603				0.658		
ANNUAL RUNOFF (INCHES)	5.22					8.22				8.94		
10 PERCENT EXCEEDS	21					27				36		
50 PERCENT EXCEEDS	5.8					10				11		
90 PERCENT EXCEEDS	1.9					3.8				3.2		

(a) Result of regulation from unknown source.

(b) July 19, 20, Sept. 13, 2003.

(c) Estimated.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12.16	12.16	8.90	9.50	8.48	7.72	9.90	11.39	12.66	12.18	12.25	12.26
2	12.14	12.22	8.82	9.58	8.39	8.01	9.79	11.58	12.60	12.18	12.24	12.23
3	12.13	12.31	8.83	9.67	8.31	8.36	9.73	11.76	12.55	12.17	12.24	12.21
4	12.15	12.34	8.86	9.74	8.29	8.70	9.70	11.92	12.49	12.17	12.28	12.20
5	12.14	12.30	8.89	9.81	8.28	9.23	9.65	12.05	12.43	12.19	12.29	12.20
6	12.13	12.22	8.92	9.82	8.17	9.80	9.68	12.13	12.37	12.20	12.27	12.22
7	12.13	12.04	8.93	9.80	8.05	10.30	9.73	12.18	12.33	12.22	12.24	12.30
8	12.13	11.92	8.95	9.78	7.95	10.74	9.79	12.19	12.30	12.22	12.21	12.26
9	12.12	11.84	8.97	9.76	7.87	11.03	9.84	12.31	12.33	12.20	12.21	12.24
10	12.11	11.76	9.03	9.72	7.82	11.17	9.89	12.50	12.49	12.20	12.22	12.21
11	12.11	11.66	9.20	9.67	7.77	11.22	9.92	12.61	12.52	12.18	12.22	12.19
12	12.10	11.54	9.32	9.59	7.69	11.22	9.94	12.63	12.49	12.26	12.22	12.17
13	12.09	11.38	9.38	9.55	7.61	11.17	10.04	12.62	12.46	12.29	12.20	12.15
14	12.14	11.16	9.43	9.53	7.53	11.11	10.12	12.63	12.53	12.31	12.17	12.14
15	12.18	10.93	9.46	9.51	7.44	11.02	10.20	12.65	12.62	12.28	12.15	12.13
16	12.17	10.72	9.44	9.45	7.30	10.93	10.29	12.59	12.61	12.25	12.14	12.13
17	12.16	10.51	9.42	9.41	7.18	10.85	10.39	12.54	12.58	12.23	12.14	12.12
18	12.15	10.36	9.39	9.38	7.08	10.76	10.46	12.51	12.51	12.22	12.14	12.10
19	12.14	10.36	9.34	9.34	6.94	10.65	10.53	12.46	12.45	12.22	12.13	12.10
20	12.12	10.29	9.29	9.32	6.86	10.61	10.60	12.41	12.39	12.22	12.13	12.10
21	12.13	10.18	9.21	9.28	6.84	10.60	10.70	12.46	12.35	12.22	12.12	12.10
22	12.12	10.02	9.15	9.25	6.81	10.54	10.78	12.75	12.34	12.26	12.11	12.10
23	12.11	9.84	9.13	9.24	6.80	10.45	10.85	13.45	12.32	12.25	12.11	12.10
24	12.11	9.70	9.16	9.23	6.88	10.35	10.91	13.72	12.30	12.23	12.11	12.10
25	12.14	9.55	9.18	9.23	6.98	10.32	10.98	13.50	12.27	12.20	12.11	12.09
26	12.16	9.39	9.18	9.23	7.10	10.31	11.04	13.30	12.24	12.18	12.12	12.09
27	12.17	9.25	9.15	9.05	7.22	10.28	11.11	13.14	12.22	12.19	12.13	12.09
28	12.16	9.16	9.12	8.76	7.36	10.22	11.16	13.00	12.22	12.21	12.23	12.09
29	12.17	9.09	9.14	8.72	7.52	10.15	11.22	12.88	12.20	12.21	12.29	12.07
30	12.16	8.99	9.29	8.70	—	10.07	11.28	12.79	12.19	12.21	12.31	12.07
31	12.16	—	9.41	8.63	—	10.00	—	12.72	—	12.25	12.29	—
MEAN	12.14	10.84	9.16	9.40	7.54	10.25	10.34	12.56	12.41	12.22	12.19	12.15
MAX	12.18	12.34	9.46	9.82	8.48	11.22	11.28	13.72	12.66	12.31	12.31	12.30
MIN	12.09	8.99	8.82	8.63	6.80	7.72	9.65	11.39	12.19	12.17	12.11	12.07
CAL YR 2003	MEAN 11.30	MAX 12.70	MIN 8.82									
WTR YR 2004	MEAN 10.95	MAX 13.72	MIN 6.80									

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161800 STONY CREEK NEAR WASHINGTON, MI

LOCATION.--Lat 42°42'55", long 83°05'31", in SW1/4 sec.31, T.4 N., R.12 E., Macomb County, Hydrologic Unit 04090003, on left bank at downstream side of bridge on Mt. Vernon Road, 500 ft downstream from Stony Lake Dam, and 2.9 mi west of Washington.

DRAINAGE AREA.--68.2 mi².

PERIOD OF RECORD.--July 1958 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 772.59 ft above sea level (levels by Huron-Clinton Metropolitan Authority).

REMARKS.--Records good. Occasional diurnal fluctuation caused by mills upstream from station prior to February 1963; occasional regulation by Stony Lake since (see preceding page). From 1963 to 1991 annual mean discharge and runoff figures adjusted for change in contents in Stony Lake. Several measurements of water temperature were made during the year. Gage-height telemeter 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	14	18	50	36	36	18	71	2.6	115	19	30	31
2	13	28	34	36	36	19	62	3.0	98	19	28	27
3	12	45	23	36	35	19	50	2.9	83	17	30	24
4	15	58	23	37	35	20	50	3.0	69	18	36	22
5	13	53	23	37	35	21	37	6.0	57	22	39	22
6	12	77	23	37	35	22	22	12	45	23	34	25
7	12	69	23	36	35	21	22	22	41	28	29	38
8	11	51	23	36	35	28	22	21	37	26	25	34
9	11	44	23	36	35	46	21	36	44	24	23	29
10	10	51	23	36	35	63	20	70	86	23	25	24
11	9.8	57	23	36	35	70	20	108	95	20	26	21
12	8.7	60	23	36	34	72	12	116	82	33	25	18
13	7.3	63	23	36	34	72	2.0	112	73	38	21	15
14	15	64	23	36	33	72	1.9	117	98	41	17	13
15	22	65	28	36	33	72	2.0	125	135	37	14	12
16	20	65	36	36	33	71	2.0	103	132	32	12	11
17	18	64	36	36	33	72	2.0	87	119	28	12	13
18	15	64	36	36	33	71	2.0	81	96	27	12	8.3
19	13	64	36	36	33	71	1.9	67	76	26	12	8.0
20	11	64	36	36	32	71	1.9	55	61	27	11	7.6
21	11	64	36	36	33	71	1.9	67	53	26	10	7.5
22	11	64	36	36	32	71	1.9	142	50	32	8.5	7.9
23	9.2	64	36	36	25	70	2.0	411	45	31	9.1	7.8
24	8.3	64	36	36	18	70	2.0	533	42	27	8.6	7.5
25	13	63	36	36	18	70	2.1	452	36	23	8.9	7.4
26	18	60	36	36	18	70	2.2	366	31	19	11	6.9
27	19	56	36	36	18	69	2.2	307	27	20	12	6.9
28	19	56	36	36	18	69	2.2	250	26	23	27	14
29	20	56	36	36	18	69	2.3	195	23	24	36	7.2
30	19	55	36	36	—	69	2.4	159	20	24	40	5.4
31	19	—	36	36	—	70	—	134	—	30	36	—
TOTAL	429.3	1726	964	1119	883	1759	445.9	4165.5	1995	807	668.1	481.4
MEAN	13.8	57.5	31.1	36.1	30.4	56.7	14.9	134	66.5	26.0	21.6	16.0
MAX	22	77	50	37	36	72	71	533	135	41	40	38
MIN	7.3	18	23	36	18	18	1.9	2.6	20	17	8.5	5.4

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2004, BY WATER YEAR (WY)

	31.5	43.3	44.5	40.4	49.3	74.1	73.4	52.1	37.2	21.0	18.5	24.2
MEAN	31.5	43.3	44.5	40.4	49.3	74.1	73.4	52.1	37.2	21.0	18.5	24.2
MAX	85.8	105	94.0	115	144	199	142	134	120	50.7	76.0	97.7
(WY)	1982	1986	1976	1973	1976	1976	1975	2004	1989	1969	1975	1975
MIN	10.3	10.2	5.02	3.03	9.79	5.14	10.0	17.2	6.93	4.41	4.00	4.72
(WY)	1963	1964	1999	2000	1963	1964	1963	1963	1964	1988	1964	1964

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1958 - 2004

ANNUAL TOTAL	9049.2		15443.2									
ANNUAL MEAN	24.8		42.2									
HIGHEST ANNUAL MEAN										42.4		
LOWEST ANNUAL MEAN										79.1		1976
HIGHEST DAILY MEAN	132	Apr 7	533	May 24	533					12.0		1963
LOWEST DAILY MEAN	2.6	Aug 25	1.9	Apr 14	1.3							Jul 31 1964
ANNUAL SEVEN-DAY MINIMUM	2.9	Sep 8	1.9	Apr 16	1.9							Apr 16 2004
MAXIMUM PEAK FLOW			549	May 24	(a)552							Jun 10 1988
MAXIMUM PEAK STAGE			5.83	May 24	(b)6.71							Mar 6 1959
INSTANTANEOUS LOW FLOW			1.9	(c)	0.90							Jul 10 1963
10 PERCENT EXCEEDS	56		72		86							
50 PERCENT EXCEEDS	16		33		32							
90 PERCENT EXCEEDS	4.6		8.3		9.1							

(a) From rating curve extended above 380 ft³/s; result of momentary release of water from Stony Lake; gage height 6.44 ft.

(b) Backwater from ice.

(c) Part or all of each day Apr. 13-16, 18-23.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161810 CLINTON RIVER AT YATES, MI

LOCATION.--Lat 42°40'18", long 83°05'47", in NE1/4 SE1/4 sec.13, T.3 N., R.11 E., Oakland County, Hydrologic Unit 04090003, on left bank at downstream side of bridge on Avon Road in Yates.

DRAINAGE AREA.--299 mi².

PERIOD OF RECORD.--Water years 2001 to 2004 (discontinued).

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 2001 to March 2004.

WATER TEMPERATURE: June 2001 to March 2004.

INSTRUMENTATION.--Water-quality monitor, set for 15 minute measurement interval.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: Oct. 11 to Mar. 11, rated good; Mar. 12-18, rated fair; Mar. 19-31, rated poor. Water temperature records rated excellent except the following period: Oct. 1 to Dec. 5, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 3,190 microsiemens, Feb. 4, 2004; minimum, 328 microsiemens, Sept.22, 2003.

WATER TEMPERATURE: Maximum recorded, 28.0°C, July 24, Aug. 8, 2001; minimum, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum recorded, 3,190 microsiemens, Feb. 4; minimum, 476 microsiemens, Oct. 15.

WATER TEMPERATURE: Maximum recorded, 15.5°C, Oct. 11, 12; minimum, 0.0°C, on many days during winter period.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
OCTOBER				NOVEMBER				DECEMBER				JANUARY	
1	945	911	931	880	866	873	899	883	892	1060	996	1030	
2	960	921	946	873	551	684	940	887	906	1180	981	1050	
3	1010	938	980	782	635	723	952	926	936	1050	1010	1030	
4	1020	895	950	839	690	797	955	929	941	1020	979	1000	
5	937	853	886	858	837	844	1010	934	974	2200	982	1530	
6	955	915	935	847	776	824	982	945	963	2480	1330	1790	
7	955	927	943	807	785	795	970	939	949	1370	1260	1280	
8	968	944	953	825	802	812	952	928	939	1590	1190	1390	
9	998	956	975	831	816	824	950	905	935	1260	1150	1200	
10	992	952	971	839	802	820	998	692	880	1160	1070	1130	
11	978	942	962	810	728	778	925	608	795	1070	983	1030	
12	1020	958	994	816	792	807	947	925	940	1300	983	1090	
13	1030	969	992	818	789	804	960	928	945	1650	1120	1290	
14	1010	543	872	807	796	801	1290	932	1020	1120	1040	1080	
15	866	476	637	805	789	798	1740	1110	1350	1390	1040	1190	
16	968	866	919	818	793	803	1380	1100	1190	1360	1120	1210	
17	999	948	963	816	797	806	1900	1260	1460	1140	1080	1110	
18	1010	968	983	803	615	728	2150	1260	1640	1790	1080	1380	
19	1020	972	996	847	580	723	1270	1080	1150	1370	1130	1240	
20	1020	996	1010	867	845	860	1120	1040	1080	1130	1090	1110	
21	1020	973	1000	876	853	864	1070	1030	1050	1090	1030	1070	
22	1030	979	997	860	842	849	1050	995	1020	1050	1010	1030	
23	1060	1010	1020	849	832	841	2080	994	1410	1120	1040	1070	
24	1050	993	1020	840	698	786	1460	1150	1290	1170	1020	1080	
25	1050	773	945	867	810	856	1990	1120	1320	1200	1070	1140	
26	861	697	790	871	855	863	2440	1440	1790	1070	1050	1060	
27	964	825	888	880	858	866	1810	1180	1430	1350	1050	1170	
28	965	790	889	867	752	828	1180	1100	1150	1650	1340	1530	
29	867	773	826	904	757	838	1670	1100	1280	1730	1390	1550	
30	882	849	870	907	886	894	1250	1080	1130	1390	1170	1290	
31	897	872	882	—	—	—	1120	1060	1090	1170	1060	1130	
MONTH	1060	476	933	907	551	813	2440	608	1120	2480	979	1200	

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161810 CLINTON RIVER AT YATES, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	1100	1050	1070	1740	1490	1560	—	—	—	—	—	—
2	1130	1040	1080	2110	1450	1670	—	—	—	—	—	—
3	2910	1040	1610	1450	1290	1350	—	—	—	—	—	—
4	3190	1540	2330	1380	1270	1310	—	—	—	—	—	—
5	1550	1260	1410	1310	898	1070	—	—	—	—	—	—
6	2200	1220	1560	1010	935	964	—	—	—	—	—	—
7	2940	1490	2130	1000	921	949	—	—	—	—	—	—
8	1580	1280	1430	1070	936	979	—	—	—	—	—	—
9	1300	1170	1240	1100	882	950	—	—	—	—	—	—
10	1290	1150	1200	890	833	858	—	—	—	—	—	—
11	1200	1120	1150	984	839	869	—	—	—	—	—	—
12	1180	1100	1140	1060	867	908	—	—	—	—	—	—
13	1130	1070	1100	903	833	868	—	—	—	—	—	—
14	1170	1040	1100	865	841	853	—	—	—	—	—	—
15	1130	1020	1080	893	826	859	—	—	—	—	—	—
16	1090	982	1050	965	830	874	—	—	—	—	—	—
17	1100	974	1030	1420	954	1280	—	—	—	—	—	—
18	1120	1020	1060	1630	1040	1210	—	—	—	—	—	—
19	1170	1020	1060	1210	990	1070	—	—	—	—	—	—
20	1760	1130	1370	1740	997	1190	—	—	—	—	—	—
21	2750	1730	2260	1280	1070	1160	—	—	—	—	—	—
22	2540	1820	2110	1070	965	1000	—	—	—	—	—	—
23	1830	1620	1700	971	918	945	—	—	—	—	—	—
24	2990	1660	2090	1030	916	941	—	—	—	—	—	—
25	2830	1680	2220	1110	903	1040	—	—	—	—	—	—
26	1800	1530	1650	1100	1010	1070	—	—	—	—	—	—
27	1670	1480	1550	1070	976	1020	—	—	—	—	—	—
28	1620	1460	1550	998	966	981	—	—	—	—	—	—
29	1620	1510	1540	989	943	964	—	—	—	—	—	—
30	—	—	—	997	926	943	—	—	—	—	—	—
31	—	—	—	1060	971	996	—	—	—	—	—	—
MONTH	3190	974	1480	2110	826	1050	—	—	—	—	—	—

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	11.5	9.5	10.5	12.5	11.5	12.0	5.0	3.0	4.0	2.5	1.5	2.0
2	10.5	8.0	9.0	12.0	11.5	11.5	3.0	2.0	2.5	5.0	2.5	3.5
3	9.5	8.0	9.0	12.0	11.0	11.5	2.0	0.5	1.5	5.5	5.0	5.5
4	10.5	9.0	9.5	12.0	10.5	11.0	3.0	1.0	2.0	5.0	2.0	3.5
5	9.5	7.5	9.0	12.0	10.5	11.5	4.0	2.5	3.0	2.5	1.5	2.0
6	10.0	7.0	8.5	10.5	9.0	9.5	3.5	2.5	3.0	1.5	0.0	0.5
7	10.5	7.5	9.0	9.0	7.0	8.0	2.5	1.5	2.0	0.0	0.0	0.0
8	13.5	9.5	11.5	7.0	5.5	6.0	3.5	2.0	2.5	0.0	0.0	0.0
9	14.5	12.0	13.0	5.5	4.0	5.0	4.5	3.5	4.0	0.0	0.0	0.0
10	15.0	13.5	14.0	6.0	4.0	5.0	6.0	4.5	5.0	0.0	0.0	0.0
11	15.5	13.5	14.5	8.5	6.0	7.5	6.0	3.0	4.5	0.0	0.0	0.0
12	15.5	14.0	14.5	8.5	7.5	8.5	3.0	1.0	2.0	1.5	0.0	0.5
13	14.0	12.0	13.0	8.5	5.0	6.5	1.0	0.0	0.5	1.5	0.5	1.0
14	13.0	11.5	12.0	5.5	4.0	5.0	2.5	1.0	1.5	0.5	0.0	0.0
15	12.5	10.5	11.5	6.0	5.0	5.5	3.0	2.0	2.5	0.0	0.0	0.0
16	11.5	9.5	10.5	6.5	6.0	6.5	3.5	2.0	2.5	0.0	0.0	0.0
17	10.0	8.5	9.5	7.0	6.5	7.0	3.0	2.0	2.5	0.0	0.0	0.0
18	10.0	9.0	9.5	9.5	7.0	8.0	2.5	2.0	2.0	0.0	0.0	0.0
19	11.5	9.0	10.0	10.5	8.5	9.5	2.5	2.0	2.5	0.0	0.0	0.0
20	12.5	9.0	10.5	8.5	6.5	7.5	2.0	1.0	1.5	0.0	0.0	0.0
21	12.5	11.5	12.0	8.0	7.0	7.5	2.0	1.0	1.5	0.0	0.0	0.0
22	11.5	9.0	10.0	8.0	6.5	7.5	3.5	2.0	3.0	0.0	0.0	0.0
23	9.0	8.0	8.5	10.0	7.5	9.0	3.5	3.0	3.5	0.0	0.0	0.0
24	10.0	7.5	9.0	10.0	6.0	8.5	3.5	2.5	3.0	0.0	0.0	0.0
25	11.0	9.5	10.0	6.0	4.5	5.0	2.5	2.0	2.0	0.0	0.0	0.0
26	11.5	10.5	11.0	6.0	4.5	5.0	2.5	1.5	2.0	0.0	0.0	0.0
27	10.5	9.0	10.0	6.0	5.0	5.5	2.5	1.0	2.0	0.0	0.0	0.0
28	9.5	8.5	9.0	6.0	5.0	5.5	3.5	1.5	2.5	0.0	0.0	0.0
29	9.5	8.5	9.0	5.0	4.0	4.5	4.5	3.5	4.0	0.0	0.0	0.0
30	10.5	8.5	9.5	5.0	3.5	4.5	4.5	2.0	3.5	0.0	0.0	0.0
31	13.0	10.0	11.5	—	—	—	3.0	2.0	2.5	0.0	0.0	0.0
MONTH	15.5	7.0	10.6	12.5	3.5	7.5	6.0	0.0	2.6	5.5	0.0	0.6

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161810 CLINTON RIVER AT YATES, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	0.0	0.0	0.0	4.0	3.0	3.5	--	--	--	--	--	--
2	0.0	0.0	0.0	5.5	4.0	4.5	--	--	--	--	--	--
3	0.5	0.0	0.0	4.5	4.0	4.0	--	--	--	--	--	--
4	0.5	0.0	0.0	5.5	4.0	4.5	--	--	--	--	--	--
5	0.5	0.0	0.0	7.0	4.5	5.5	--	--	--	--	--	--
6	0.5	0.0	0.5	6.5	4.5	5.0	--	--	--	--	--	--
7	1.0	0.0	0.5	4.5	3.5	4.0	--	--	--	--	--	--
8	0.5	0.0	0.0	4.0	3.0	3.5	--	--	--	--	--	--
9	1.5	0.0	0.5	5.0	3.0	4.0	--	--	--	--	--	--
10	1.5	0.5	1.0	5.0	2.5	4.0	--	--	--	--	--	--
11	1.5	0.0	0.5	4.5	3.5	4.0	--	--	--	--	--	--
12	2.0	0.5	1.5	3.5	2.0	2.5	--	--	--	--	--	--
13	2.0	1.0	1.5	4.0	1.0	2.5	--	--	--	--	--	--
14	1.5	0.5	1.0	3.5	3.0	3.5	--	--	--	--	--	--
15	1.0	0.0	0.5	5.0	2.5	3.5	--	--	--	--	--	--
16	0.0	0.0	0.0	4.0	2.0	2.5	--	--	--	--	--	--
17	1.0	0.0	0.5	3.0	1.5	2.5	--	--	--	--	--	--
18	2.0	0.0	1.0	3.5	2.5	3.0	--	--	--	--	--	--
19	3.0	1.0	2.0	5.5	3.0	4.0	--	--	--	--	--	--
20	3.0	2.0	2.5	5.5	4.0	4.5	--	--	--	--	--	--
21	2.5	1.5	2.0	5.0	3.0	4.0	--	--	--	--	--	--
22	3.5	2.0	2.5	4.5	1.5	3.0	--	--	--	--	--	--
23	3.5	2.0	2.5	5.0	2.5	3.5	--	--	--	--	--	--
24	3.5	2.0	2.5	5.0	3.5	4.0	--	--	--	--	--	--
25	4.0	1.0	2.5	8.5	5.0	7.0	--	--	--	--	--	--
26	4.5	2.0	3.0	9.5	8.0	9.0	--	--	--	--	--	--
27	4.5	1.5	3.0	9.5	8.5	9.0	--	--	--	--	--	--
28	4.5	1.5	3.0	9.0	8.0	8.5	--	--	--	--	--	--
29	5.0	2.5	4.0	8.5	7.5	8.0	--	--	--	--	--	--
30	--	--	--	8.5	8.0	8.0	--	--	--	--	--	--
31	--	--	--	8.0	6.5	7.0	--	--	--	--	--	--
MONTH	5.0	0.0	1.3	9.5	1.0	4.7	--	--	--	--	--	--

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI

LOCATION.--Lat 42°36'52", long 83°01'36", in NE1/4 SW1/4 sec.3, T.2 N., R.12 E., Macomb County, Hydrologic Unit 04090003, on right bank at downstream side of bridge on Riverland Road in Sterling Heights.

DRAINAGE AREA.--309 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1978 to December 1982, March 1996 to May 1998, July 2001 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 605 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Gage-height telemeter 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	64	142	252	254	e150	220	316	e68	728	130	250	214
2	61	347	224	302	e160	300	259	e460	640	127	208	164
3	60	428	186	276	e180	296	240	e290	567	123	302	137
4	82	436	177	254	e190	256	238	e190	406	168	482	126
5	67	311	154	253	e180	646	229	116	338	187	355	113
6	62	255	160	e235	e160	540	207	107	323	154	272	108
7	59	274	158	e220	e160	376	202	115	303	226	235	319
8	58	242	157	e200	e150	362	194	113	298	172	198	193
9	56	228	158	e190	e140	343	186	265	349	111	193	160
10	56	224	227	e170	e140	339	176	713	876	83	235	128
11	57	300	438	e170	e140	341	169	677	729	72	202	114
12	54	268	245	e190	e140	333	159	519	509	252	197	99
13	51	267	197	e180	e140	316	148	459	418	184	174	92
14	109	248	190	e170	e140	313	144	610	670	228	121	88
15	327	253	187	e160	e130	303	127	644	901	243	111	81
16	139	254	208	e170	e130	297	114	452	608	190	109	76
17	98	249	224	e180	e120	302	105	371	606	192	97	70
18	86	361	211	e190	e130	300	95	358	501	320	91	64
19	78	668	218	e180	e160	294	88	312	427	239	89	55
20	72	372	207	e170	e290	433	86	273	395	222	83	53
21	69	297	199	e170	293	383	114	426	373	255	85	52
22	68	271	198	e180	149	326	91	1250	366	442	75	48
23	69	256	251	e170	132	308	86	2680	332	271	68	47
24	66	343	278	e160	116	306	81	2560	304	208	71	47
25	110	300	232	e150	93	483	91	1810	263	169	68	47
26	156	260	219	e150	112	463	92	1440	221	131	78	45
27	119	239	210	e160	136	393	83	1160	178	141	89	43
28	151	294	204	e160	188	348	79	1020	158	236	444	48
29	193	370	289	e150	199	330	e74	870	152	208	337	51
30	162	281	448	e160	---	324	e70	778	142	190	277	43
31	151	---	297	e160	---	352	---	791	---	386	236	---
TOTAL	3010	9038	7003	5884	4548	10926	4343	21897	13081	6260	5832	2925
MEAN	97.1	301	226	190	157	352	145	706	436	202	188	97.5
MAX	327	668	448	302	293	646	316	2680	901	442	482	319
MIN	51	142	154	150	93	220	70	68	142	72	68	43
CFSM	0.31	0.97	0.73	0.61	0.51	1.14	0.47	2.29	1.41	0.65	0.61	0.32
IN.	0.36	1.09	0.84	0.71	0.55	1.32	0.52	2.64	1.57	0.75	0.70	0.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 2004, BY WATER YEAR (WY)

	MEAN	228	249	261	218	274	411	423	347	275	144	128	162
	MAX	574	396	391	315	514	672	619	706	511	243	268	317
	(WY)	1982	2002	2002	1997	1997	1982	1982	2004	1996	1997	1980	1981
	MIN	76.0	129	126	82.2	72.4	211	145	216	164	60.2	54.2	74.6
	(WY)	2003	2003	2003	2003	2003	2003	2004	1998	1981	2003	2002	2002

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1979 - 2004

ANNUAL TOTAL	59573	94747	
ANNUAL MEAN	163	259	257
HIGHEST ANNUAL MEAN			342
LOWEST ANNUAL MEAN			139
HIGHEST DAILY MEAN	948	2680	2680
LOWEST DAILY MEAN	34	43	34
ANNUAL SEVEN-DAY MINIMUM	35	46	35
MAXIMUM PEAK FLOW		(b)4600	(b)4600
MAXIMUM PEAK STAGE		16.51	16.51
INSTANTANEOUS LOW FLOW			26
ANNUAL RUNOFF (CFSM)	0.528	0.838	0.833
ANNUAL RUNOFF (INCHES)	7.17	11.41	11.32
10 PERCENT EXCEEDS	326	445	465
50 PERCENT EXCEEDS	121	196	210
90 PERCENT EXCEEDS	49	72	80

(a) Sept. 10-12, 14, 2003.

(b) From rating curve extended above 2,300 ft³/s.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1996-98, 2002 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: June 1996 to May 1998, June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water temperature recorder from June 6 to Aug. 22, 1996. Water-quality monitor from Aug. 22, 1996 to May 31, 1998.
 Water-quality monitor telemeter, set for 15 minute measurement interval, from June to Sept. 2004.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: June 7-16, July 7-14, Aug. 14-18, Aug. 28 to Sept. 2, rated good; June 17-24, rated fair; June 25-30, rated poor.
 pH and water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: June 29, 30, July 8-10, 19, 20, Aug. 2, 3, 30, 31, rated good; July 11-14, 21-24, Aug. 4-6, Sept. 1, 2, rated fair; July 25-30, Aug. 7-18, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 1,170 microsiemens, Aug. 26, 2004; minimum, 498 microsiemens, Aug. 28, 2004.

pH: Maximum, 8.5 std. units, July 2, 3, 2004; minimum, 7.7 std. units, Aug. 28, Sept. 7, 2004

WATER TEMPERATURE: Maximum, 26.0°C, June 30, July 1, 1996; minimum, -0.5°C, on several days during winter periods.

DISSOLVED OXYGEN: Maximum, 11.2 mg/L, Sept. 29, 2004; minimum, 6.2 mg/L, June 9, Aug. 27, 28, 2004.

EXTREMES OUTSIDE PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum measured, 2,640 microsiemens, Feb. 25, 2004; minimum measured, 401 microsiemens, Sept. 10, 1997.

pH: Minimum measured, 7.0 std. units, Jan. 29, 2004.

DISSOLVED OXYGEN: Maximum measured, 15.4 mg/L, Nov. 25, 1997.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 1,170 microsiemens, Aug. 26; minimum, 498 microsiemens, Aug. 28.

pH: Maximum, 8.5 std. units, July 2, 3; minimum, 7.7 std. units, Aug. 28, Sept. 7.

WATER TEMPERATURE: Maximum, 25.1°C, July 22; minimum, 13.6°C, Sept. 30.

DISSOLVED OXYGEN: Maximum, 11.2 mg/L, Sept. 29; minimum, 6.2 mg/L, June 9, Aug. 27, 28.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	--	--	--	1050	900	974	852	725	817	843	824	830
2	--	--	--	999	953	961	893	831	864	894	841	849
3	--	--	--	1080	955	964	880	584	754	911	854	893
4	812	759	778	1080	785	940	801	561	672	920	898	912
5	783	749	764	935	820	887	786	604	738	941	915	921
6	792	769	776	959	893	903	825	783	792	933	886	925
7	810	778	791	910	684	852	831	798	805	983	556	718
8	815	794	803	872	720	815	861	825	836	824	662	761
9	829	605	782	916	871	890	853	838	843	891	813	862
10	753	567	667	978	908	927	901	702	814	914	884	906
11	752	702	736	1060	961	990	865	795	841	953	910	925
12	799	752	780	1060	664	824	873	838	859	934	925	930
13	828	793	809	961	756	803	965	864	876	1070	929	947
14	809	644	732	951	750	851	915	886	900	1020	938	961
15	821	575	729	848	711	795	1040	912	963	1010	963	979
16	818	693	763	817	798	807	1000	889	962	996	969	983
17	804	685	761	852	782	829	1110	1000	1020	994	977	983
18	814	786	801	856	544	700	1040	1010	1030	--	--	--
19	828	801	813	971	809	830	1090	1030	1040	--	--	--
20	830	801	811	844	805	814	1120	1030	1040	--	--	--
21	809	775	788	844	775	803	1120	1030	1050	--	--	--
22	830	778	791	809	509	653	1060	1040	1050	1050	1040	1050
23	801	779	788	781	730	792	1140	896	1030	1140	1040	1050
24	838	784	806	800	778	792	1130	1050	1070	1140	1040	1050
25	840	826	833	850	793	809	1090	1020	1070	1060	1040	1050
26	878	831	850	892	816	859	1170	1070	1090	1150	1060	1070
27	987	877	895	1030	889	908	1150	762	1070	1080	1060	1070
28	925	898	911	975	733	835	1020	498	698	1150	1060	1070
29	1050	925	958	918	735	849	819	670	758	1060	1000	1040
30	954	886	933	894	862	873	838	723	796	1080	1010	1050
31	--	--	--	929	580	721	866	825	831	--	--	--
MONTH	--	--	--	1080	509	846	1170	498	903	--	--	--

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	8.4	8.3	8.4	8.1	8.0	8.1	8.1	8.0	8.1
2	--	--	--	8.5	8.3	8.4	8.2	8.1	8.1	8.1	8.0	8.1
3	--	--	--	8.5	8.3	8.4	8.2	7.9	8.0	8.1	8.0	8.1
4	8.3	8.2	8.2	8.4	8.2	8.3	8.1	7.8	8.0	8.1	8.0	8.1
5	8.3	8.2	8.3	8.2	8.0	8.2	8.1	7.9	8.0	8.1	8.0	8.1
6	8.3	8.2	8.3	8.3	8.2	8.2	8.2	8.1	8.1	8.1	8.0	8.1
7	8.3	8.2	8.3	8.3	8.0	8.2	8.2	8.1	8.1	8.1	7.7	7.9
8	8.3	8.2	8.3	8.2	8.0	8.1	8.2	8.1	8.1	8.0	7.9	8.0
9	8.3	8.0	8.2	8.3	8.2	8.2	8.2	8.1	8.1	8.1	8.0	8.0
10	8.2	8.0	8.1	8.3	8.1	8.2	8.2	8.0	8.1	8.1	8.0	8.0
11	8.2	8.1	8.2	8.2	8.0	8.1	8.2	8.0	8.1	8.1	8.0	8.1
12	8.3	8.2	8.2	8.1	7.9	8.0	8.2	8.1	8.2	8.1	8.0	8.0
13	8.3	8.2	8.3	8.1	8.0	8.0	8.2	8.1	8.2	8.1	8.0	8.0
14	8.3	8.1	8.2	8.1	8.0	8.1	8.2	8.1	8.1	8.1	8.0	8.1
15	8.3	8.0	8.2	8.2	8.0	8.1	8.2	8.1	8.1	8.2	8.0	8.1
16	8.3	8.2	8.2	8.2	8.1	8.2	8.2	8.0	8.1	8.2	8.0	8.1
17	8.2	8.1	8.2	8.2	8.1	8.1	8.2	8.1	8.2	8.2	8.1	8.2
18	8.3	8.2	8.2	8.1	7.9	8.0	8.2	8.1	8.1	8.2	8.1	8.2
19	8.3	8.3	8.3	8.2	8.1	8.1	8.2	8.1	8.1	8.2	8.1	8.1
20	8.3	8.3	8.3	8.2	8.1	8.1	8.2	8.1	8.1	8.2	8.1	8.1
21	8.3	8.3	8.3	8.2	8.1	8.1	8.2	8.1	8.2	8.2	8.0	8.1
22	8.4	8.3	8.3	8.2	7.8	7.9	8.2	8.1	8.2	8.2	8.0	8.1
23	8.4	8.3	8.3	8.2	8.0	8.1	8.2	8.1	8.1	8.2	8.0	8.1
24	8.4	8.2	8.3	8.2	8.1	8.1	8.3	8.1	8.2	8.2	8.0	8.1
25	8.4	8.3	8.3	8.2	8.1	8.1	8.2	8.1	8.1	8.2	8.0	8.1
26	8.4	8.3	8.3	8.2	8.1	8.1	8.1	8.0	8.0	8.2	8.0	8.1
27	8.4	8.3	8.3	8.2	8.1	8.1	8.1	7.8	8.0	8.2	8.0	8.1
28	8.4	8.3	8.3	8.2	8.0	8.1	8.0	7.7	7.8	8.2	8.1	8.1
29	8.4	8.3	8.4	8.2	8.1	8.1	8.0	7.8	7.9	8.2	8.1	8.2
30	8.4	8.3	8.4	8.2	8.0	8.1	8.1	7.9	8.0	8.2	8.1	8.2
31	--	--	--	8.1	7.9	8.0	8.1	8.0	8.0	--	--	--
MAX	--	--	--	8.5	8.3	8.4	8.3	8.1	8.2	8.2	8.1	8.2
MIN	--	--	--	8.1	7.8	7.9	8.0	7.7	7.8	8.0	7.7	7.9

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	22.3	19.9	21.1	23.1	20.9	22.0	21.2	19.4	20.4
2	--	--	--	21.9	20.3	21.2	23.9	21.4	22.7	21.7	20.0	20.9
3	--	--	--	22.2	19.7	21.1	24.5	22.3	23.5	21.8	20.2	21.1
4	18.9	16.7	17.9	22.9	21.4	22.0	24.0	20.3	21.5	22.6	21.0	21.8
5	19.4	17.0	18.3	22.4	21.1	21.7	21.1	19.8	20.4	22.6	21.4	22.1
6	20.2	17.9	19.0	21.8	19.7	20.8	20.9	18.7	19.8	23.0	21.6	22.3
7	21.7	19.0	20.3	22.6	21.2	21.9	20.8	18.9	19.9	22.7	21.6	22.2
8	23.4	20.3	21.8	22.1	19.4	20.4	21.6	19.4	20.5	21.9	19.8	20.4
9	23.6	22.2	22.9	20.5	18.1	19.3	21.9	20.1	21.0	19.9	19.0	19.5
10	22.7	19.2	20.6	21.9	19.8	20.8	21.8	20.8	21.3	19.2	17.7	18.6
11	19.2	18.2	18.6	22.5	20.7	21.6	21.0	19.4	20.1	19.6	18.0	18.8
12	19.3	17.6	18.3	22.2	21.0	21.6	19.4	18.0	18.4	20.1	18.4	19.3
13	21.1	18.7	19.7	24.0	21.0	22.4	18.4	17.2	17.9	20.6	19.2	20.0
14	21.7	20.3	20.9	23.6	21.3	22.2	18.5	17.2	17.9	20.9	19.8	20.4
15	22.2	20.3	21.2	21.9	20.0	21.0	18.9	17.3	18.2	21.8	20.5	21.1
16	21.8	20.9	21.2	22.5	20.3	21.5	19.3	17.5	18.5	21.9	20.6	21.3
17	21.9	20.5	21.1	22.3	20.9	21.4	18.9	17.9	18.5	20.6	17.6	19.1
18	22.9	21.6	22.2	21.3	20.0	20.7	19.7	18.5	19.1	17.8	16.4	17.2
19	22.6	20.9	21.7	22.0	19.8	20.9	20.2	19.1	19.6	17.4	15.9	16.7
20	20.9	18.9	20.1	23.3	20.7	21.9	19.6	17.5	18.3	16.9	15.2	16.2
21	20.4	19.2	19.8	24.8	22.4	23.5	18.4	16.6	17.5	17.3	15.2	16.4
22	20.8	19.3	20.0	25.1	23.0	24.1	18.7	16.5	17.7	17.9	15.8	16.9
23	21.3	18.7	20.0	24.7	22.0	23.2	19.2	18.2	18.7	18.4	16.4	17.4
24	21.2	19.8	20.6	22.0	19.7	20.7	20.2	18.1	19.1	18.4	17.1	17.8
25	19.8	18.0	19.0	20.8	19.6	20.3	22.1	19.8	20.9	18.1	17.4	17.7
26	19.8	17.9	18.9	20.5	19.4	19.9	23.1	21.6	22.2	18.0	16.7	17.4
27	19.9	17.8	19.0	19.7	17.9	18.8	23.9	22.4	23.0	17.1	15.7	16.5
28	19.6	18.4	18.9	20.5	17.4	18.8	23.4	21.6	22.5	16.4	15.1	15.8
29	20.2	17.7	19.0	21.2	19.5	20.4	21.6	19.9	20.5	15.5	14.3	14.9
30	21.4	19.0	20.2	21.1	20.4	20.7	20.1	18.8	19.5	14.9	13.6	14.3
31	--	--	--	22.5	20.4	21.4	20.5	18.7	19.6	--	--	--
MONTH	--	--	--	25.1	17.4	21.2	24.5	16.5	20.0	23.0	13.6	18.8

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	8.7	7.3	7.9	8.4	7.7	8.0	8.7	7.7	8.2
2	--	--	--	9.0	7.1	8.0	8.4	7.7	8.0	8.5	7.3	7.9
3	--	--	--	9.4	7.3	8.2	7.8	7.4	7.6	8.2	7.2	7.6
4	8.6	8.0	8.3	8.3	6.7	7.5	8.2	7.4	7.8	8.1	7.1	7.5
5	8.5	7.8	8.2	8.4	6.6	7.5	8.6	8.2	8.4	8.1	6.9	7.4
6	8.3	7.7	8.0	9.1	7.3	8.1	8.9	8.4	8.7	8.3	7.0	7.5
7	8.2	7.5	7.9	8.3	7.0	7.5	9.0	8.4	8.7	7.2	6.9	7.0
8	7.9	7.2	7.7	8.3	6.9	7.7	9.0	8.3	8.6	8.2	7.1	7.7
9	7.4	6.2	7.1	9.3	7.8	8.4	9.0	8.3	8.6	8.5	7.6	8.0
10	8.0	6.6	7.4	9.0	7.6	8.1	8.6	8.1	8.3	8.8	7.8	8.2
11	8.4	8.0	8.2	9.0	7.3	8.0	8.9	8.0	8.5	8.9	7.8	8.2
12	8.6	8.2	8.5	8.1	7.4	7.7	9.4	8.4	8.9	9.0	7.6	8.2
13	8.3	7.7	8.1	8.5	7.2	7.9	9.6	8.8	9.1	9.0	7.5	8.1
14	7.9	7.6	7.8	8.1	7.0	7.5	9.4	8.6	9.0	9.2	7.4	8.1
15	8.0	7.5	7.8	8.3	7.3	7.8	9.5	8.5	8.9	9.2	7.2	8.0
16	8.0	7.7	7.9	8.4	7.5	7.8	9.4	8.2	8.8	9.0	7.0	7.8
17	8.1	7.7	7.9	8.2	7.4	7.7	9.5	8.3	8.8	10.0	7.4	8.5
18	7.9	7.6	7.8	8.0	7.5	7.8	9.6	7.7	8.6	10.2	8.3	9.1
19	8.1	7.6	7.9	8.5	7.7	8.2	9.3	7.2	8.0	10.5	8.4	9.3
20	8.5	7.9	8.3	8.5	7.6	8.0	9.0	7.3	8.1	10.8	8.5	9.4
21	8.4	8.1	8.3	8.2	7.4	7.8	9.9	7.7	8.6	10.8	8.5	9.4
22	8.4	8.1	8.3	7.4	7.0	7.2	10.4	7.7	8.9	10.5	8.3	9.1
23	8.7	7.9	8.4	8.1	7.3	7.8	9.9	7.4	8.4	10.5	8.1	9.0
24	8.2	7.8	8.0	8.8	7.9	8.4	10.5	7.4	8.6	10.7	8.0	9.0
25	8.8	8.0	8.4	8.9	8.2	8.5	9.8	6.9	8.1	10.1	7.8	8.7
26	8.5	7.9	8.2	8.9	8.1	8.5	9.0	6.4	7.4	10.2	8.0	8.9
27	8.5	7.8	8.1	9.0	8.3	8.6	8.7	6.2	7.2	10.5	8.0	9.0
28	8.6	7.5	8.1	9.3	8.6	9.1	7.1	6.2	6.8	10.7	8.2	9.2
29	9.3	8.3	8.8	9.3	8.4	8.8	7.9	7.0	7.5	11.2	8.6	9.7
30	8.9	7.6	8.4	8.6	8.0	8.4	8.4	7.7	8.1	10.9	8.8	9.7
31	--	--	--	8.0	7.6	7.8	8.6	7.8	8.2	--	--	--
MONTH	--	--	--	9.4	6.6	8.0	10.5	6.2	8.3	11.2	6.9	8.4

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Time	Instantaneous discharge, cfs (00061)	Specific conductance, wat unf 25 deg C (00095)	pH, water, unftrd field, std units (00400)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)
Oct. 22	1015	67	1040	8.0	6.0	10.5	743	9.9	91
Nov. 25	1100	296	814	8.0	1.0	4.9	748	12.5	100
Dec. 9	1130	161	898	8.1	3.5	2.0	745	12.6	93
Jan. 29	1115	E150	1600	7.0	-11.0	.0	747	14.0	98
Feb. 25	1000	82	2640	8.2	-2.5	1.2	755	14.1	102
Apr. 21	1400	139	1260	8.1	18.5	13.4	738	11.0	109
May 12	1000	527	913	8.0	22.0	18.2	748	9.0	98
June 23	1200	323	797	8.1	23.0	19.1	735	9.4	106
July 28	1030	293	822	8.1	19.5	17.6	743	8.4	90
Aug. 25	0900	66	1030	8.1	24.5	20.1	749	8.9	100

Date	Bicarbonate, wat ftr incrm. titr., field, mg/L (00453)	Alkalinity, wat ftr inc. titr. field, mg/L as CaCO ₃ (39086)	Sulfate, water, ftrd, mg/L (00945)	Chloride, water, ftrd, mg/L (00940)	Nitrite water, ftrd, mg/L as N (00613)	Nitrite + nitrate, water, ftrd, mg/L as N (00631)	Ammonia, water, ftrd, mg/L as N (00608)	Phosphorus, water, unftrd mg/L (00665)	Orthophosphate, water, ftrd, mg/L as P (00671)
Oct. 22	233	191	47.6	172	.036	2.30	<.04	.100	.052
Nov. 25	184	151	39.4	127	.015	.88	<.04	.063	<.006
Dec. 9	215	176	41.1	140	.019	1.51	.12	.043	.014
Jan. 29	249	204	48.5	354	.025	1.50	.14	.028	.011
Feb. 25	273	224	54.3	671	.018	1.40	.07	.042	.008
Apr. 21	256	210	51.6	238	.043	1.75	.17	.070	E.005
May 12	217	178	38.7	150	.023	.57	E.03	.142	<.006
June 23	238	195	31.2	125	.017	.72	.05	.073	.018
July 28	201	165	31.4	140	.024	1.56	<.04	.140	.032
Aug. 25	248	215	42.5	161	.040	2.52	.08	.059	.027

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI—Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Suspended sediment concentration mg/L (80154)	Acetochlor, water, ftrd, g/L (49260)	Alachlor, water, ftrd, g/L (46342)	Atrazine, water, ftrd, g/L (39632)	CIAT, water, ftrd, g/L (04040)	Azinphosmethyl, water, ftrd, 0.7 GF g/L (82686)	Benfluralin, water, ftrd, 0.7 GF g/L (82673)	Butylate, water, ftrd, g/L (04028)
Oct. 22	6	<.006	<.004	.020	E.007	<.050	<.010	<.002
Nov. 25	15	—	—	—	—	—	—	—
Dec. 9	14	E.006	<.005	.016	E.005	<.050	<.010	<.004
Jan. 29	1	—	—	—	—	—	—	—
Feb. 25	17	<.006	<.005	.016	E.007	<.050	<.010	<.004
Apr. 21	22	.015	<.005	.040	E.012	<.050	<.010	<.004
May 12	50	.038	<.005	.169	E.058	<.050	<.010	<.004
June 23	33	.013	<.005	.158	E.030	<.050	<.010	<.004
July 28	59	E.005	<.005	.070	E.011	<.050	<.010	<.004
Aug. 25	15	<.006	<.005	.068	E.015	<.050	<.010	<.004

Date	Carbaryl, water, ftrd, 0.7 GF g/L (82680)	Carbofuran, water, ftrd, 0.7 GF g/L (82674)	Chlorpyrifos, water, ftrd, g/L (38933)	Cyanazine, water, ftrd, g/L (04041)	DCPA, water, ftrd, 0.7 GF g/L (82682)	p,p'-DDE, water, ftrd, g/L (34653)	Diazinon, water, ftrd, g/L (39572)	Dieldrin, water, ftrd, g/L (39381)
Oct. 22	E.012	<.020	<.005	<.018	<.003	<.003	.006	<.007
Nov. 25	—	—	—	—	—	—	—	—
Dec. 9	E.005	<.020	<.005	<.018	<.003	<.003	E.004	<.009
Jan. 29	—	—	—	—	—	—	—	—
Feb. 25	<.041	<.020	<.005	<.018	<.003	<.003	<.006	<.009
Apr. 21	E.024	<.020	<.005	<.018	<.003	<.003	<.005	<.009
May 12	E.023	<.020	<.005	<.018	<.003	<.003	.010	<.009
June 23	<.051	<.020	<.005	<.018	<.003	<.003	.005	<.009
July 28	E.028	<.020	<.005	<.018	<.003	<.003	.009	<.009
Aug. 25	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.009

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	2,6-Di- ethyl- aniline water ftrd 0.7 GF g/L (82660)	Disul- foton, water, ftrd 0.7 GF g/L (82677)	EPTC, water, ftrd 0.7 GF g/L (82668)	Ethal- flur- alin, water, ftrd 0.7 GF g/L (82663)	Etho- prop, water, ftrd 0.7 GF g/L (82672)	Fonofos, water, ftrd, g/L (04095)	alpha- HCH, water, ftrd, g/L (34253)	Lindane, water, ftrd, g/L (39341)
Oct. 22	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
Nov. 25	-	-	-	-	-	-	-	-
Dec. 9	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
Jan. 29	-	-	-	-	-	-	-	-
Feb. 25	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
Apr. 21	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
May 12	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
June 23	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
July 28	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
Aug. 25	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
Date	Linuron water, ftrd 0.7 GF g/L (82666)	Mala- thion, water, ftrd, g/L (39532)	Metola- chlor, water, ftrd, g/L (39415)	Metri- buzin, water, ftrd, g/L (82630)	Moli- nate, water, ftrd 0.7 GF g/L (82671)	Naprop- amide, water, ftrd 0.7 GF g/L (82684)	Para- thion, water, ftrd, g/L (39542)	Methyl para- thion, water, ftrd 0.7 GF g/L (82667)
Oct. 22	<.035	<.075	E.007	<.006	<.002	<.007	<.010	<.006
Nov. 25	-	-	-	-	-	-	-	-
Dec. 9	<.035	<.027	E.009	<.006	<.003	<.007	<.010	<.015
Jan. 29	-	-	-	-	-	-	-	-
Feb. 25	<.035	<.027	<.013	<.006	<.003	<.007	<.010	<.015
Apr. 21	<.035	<.027	.013	<.006	<.003	<.007	<.010	<.015
May 12	<.035	<.027	.030	<.006	<.003	<.007	<.010	<.015
June 23	<.035	<.027	.105	<.006	<.003	<.007	<.010	<.015
July 28	<.035	<.027	.034	<.006	<.003	<.007	<.010	<.015
Aug. 25	<.035	<.027	<.024	<.006	<.003	<.007	<.010	<.015

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI-Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Peb- ulate, water, ftrd 0.7 GF g/L (82669)	Pendi- meth- alin, water, ftrd 0.7 GF g/L (82683)	cis- Per- methrin, water, ftrd 0.7 GF g/L (82687)	Phorate, water, ftrd 0.7 GF g/L (82664)	Prome- ton, water, ftrd, g/L (04037)	Propy- zamide, water, ftrd 0.7 GF g/L (82676)	Propa- chlor, water, ftrd, g/L (04024)	Pro- panil, water, ftrd 0.7 GF g/L (82679)
Oct. 22	<.004	<.022	<.006	<.011	E.01	<.004	<.010	<.011
Nov. 25	-	-	-	-	-	-	-	-
Dec. 9	<.004	<.022	<.006	<.011	.01	<.004	<.025	E.006
Jan. 29	-	-	-	-	-	-	-	-
Feb. 25	<.004	<.022	<.006	<.011	.01	<.004	<.025	<.011
Apr. 21	<.004	<.022	<.006	<.011	.01	<.004	<.025	<.011
May 12	<.004	<.022	<.006	<.011	.01	<.004	<.025	<.011
June 23	<.004	<.022	<.006	<.011	E.01	<.004	<.025	<.011
July 28	<.004	<.022	<.006	<.011	.03	<.025	<.025	<.007
Aug. 25	<.004	<.022	<.006	<.011	.01	<.004	<.025	<.011

Date	Propar- gite, water, ftrd 0.7 GF g/L (82685)	Sima- zine, water, ftrd, g/L (04035)	Tebu- thiuron, water, ftrd 0.7 GF g/L (82670)	Terba- cil, water, ftrd 0.7 GF g/L (82665)	Terbu- fos, water, ftrd 0.7 GF g/L (82675)	Thio- bencarb, water, ftrd 0.7 GF g/L (82681)	Tri- allate, water, ftrd 0.7 GF g/L (82678)	Tri- flur- alin, water, ftrd 0.7 GF g/L (82661)
Oct. 22	<.02	.006	<.02	<.040	<.02	<.005	<.002	<.009
Nov. 25	-	-	-	-	-	-	-	-
Dec. 9	<.02	.008	<.02	<.034	<.02	<.010	<.002	<.009
Jan. 29	-	-	-	-	-	-	-	-
Feb. 25	<.02	<.007	<.02	<.034	<.02	<.010	<.002	<.009
Apr. 21	<.02	.011	<.02	<.034	<.02	<.010	<.002	E.005
May 12	<.02	.183	<.02	<.034	<.02	<.010	<.002	<.009
June 23	<.02	.020	<.02	<.034	<.02	<.010	<.002	<.009
July 28	<.02	.014	<.02	<.075	<.02	<.010	<.002	<.009
Aug. 25	<.02	.015	<.02	<.034	<.02	<.010	<.002	<.009

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04163030 RED RUN AT WARREN, MI

LOCATION.--Lat 42°32'16", long 83°00'21", in SW1/4 SW1/4 sec.35, T.2 N., R.12 E., Macomb County, Hydrologic Unit 04090003, on right bank 50 ft downstream from bridge on 14 Mile Road in Warren.

DRAINAGE AREA.--Indeterminate.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May to September 2004.

GAGE.--Water-stage recorder. Elevation of gage is 610 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good. Gage-height telemeter 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	--	--	--	--	--	--	--	80	101	42	47	38
2	--	--	--	--	--	--	--	172	83	43	41	35
3	--	--	--	--	--	--	--	61	64	40	342	34
4	--	--	--	--	--	--	--	54	49	96	381	33
5	--	--	--	--	--	--	--	62	45	59	143	30
6	--	--	--	--	--	--	--	44	43	46	58	31
7	--	--	--	--	--	--	--	50	44	57	47	180
8	--	--	--	--	--	--	--	44	43	49	37	53
9	--	--	--	--	--	--	--	125	73	43	38	60
10	--	--	--	--	--	--	--	256	417	42	36	43
11	--	--	--	--	--	--	--	205	288	43	36	35
12	--	--	--	--	--	--	--	84	108	107	35	33
13	--	--	--	--	--	--	--	74	71	55	34	36
14	--	--	--	--	--	--	--	103	136	73	35	36
15	--	--	--	--	--	--	--	90	159	58	35	37
16	--	--	--	--	--	--	--	58	99	46	34	33
17	--	--	--	--	--	--	--	57	94	51	37	37
18	--	--	--	--	--	--	--	60	62	64	41	33
19	--	--	--	--	--	--	--	52	53	53	34	31
20	--	--	--	--	--	--	--	51	47	44	37	32
21	--	--	--	--	--	--	--	308	49	42	39	34
22	--	--	--	--	--	--	--	426	53	69	30	35
23	--	--	--	--	--	--	--	599	46	46	32	33
24	--	--	--	--	--	--	--	800	50	38	35	34
25	--	--	--	--	--	--	--	480	45	35	35	33
26	--	--	--	--	--	--	--	335	43	37	50	33
27	--	--	--	--	--	--	--	255	42	68	35	34
28	--	--	--	--	--	--	--	196	46	84	280	33
29	--	--	--	--	--	--	--	149	44	44	192	32
30	--	--	--	--	--	--	--	109	43	43	65	31
31	--	--	--	--	--	--	--	133	--	141	42	--
TOTAL	--	--	--	--	--	--	--	5572	2540	1758	2363	1212
MEAN	--	--	--	--	--	--	--	180	84.7	56.7	76.2	40.4
MAX	--	--	--	--	--	--	--	800	417	141	381	180
MIN	--	--	--	--	--	--	--	44	42	35	30	30

STREAMS TRIBUTARY TO LAKE ST. CLAIR
04163030 RED RUN AT WARREN, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--June to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Interruptions in water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: June 11-28, July 22-29, Aug. 11-18, Aug. 24 to Sept. 2, Sept. 6-15, 22-30, rated good. pH records rated excellent except the following periods: June 25-28, Aug. 14-19, rated good. Water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: Aug. 12-15, 22, Sept. 4, 16, rated good; Aug. 16-19, 23-25, Sept. 5, 6, 17, rated fair; Aug. 26 to Sept. 2, Sept. 7-13, 18-21, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 2,150 microsiemens, July 12, 2004; minimum, 270 microsiemens, Aug. 28, 2004.

pH: Maximum, 8.4 std. units, Aug. 14, 2004; minimum, 7.1 std. units, Sept. 24, 25, 27, 28, 2004.

WATER TEMPERATURE: Maximum, 26.7°C, July 22, 2004; minimum, 15.4°C, June 4, 2004.

DISSOLVED OXYGEN: Maximum, 17.8 mg/L, Aug. 12, 14, 2004; minimum, 4.1 mg/L, July 5, 2004.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
JUNE				JULY				AUGUST			SEPTEMBER		
1	--	--	--	1240	729	911	981	694	850	1200	988	1110	
2	--	--	--	1150	887	977	1440	938	1020	1230	1050	1140	
3	--	--	--	1050	802	942	--	--	--	1280	1020	1160	
4	1490	1230	1360	1580	699	995	--	--	--	1380	1000	1140	
5	1600	1150	1350	981	721	838	--	--	--	1340	971	1090	
6	1700	1170	1340	1220	981	1080	1270	1040	1130	1520	1010	1180	
7	1460	1080	1250	1930	1190	1640	1320	1130	1220	1190	374	603	
8	1450	995	1150	1800	1160	1300	1420	1220	1310	1020	660	815	
9	1370	471	1020	1240	1110	1150	1580	1200	1310	1050	930	984	
10	1080	375	496	1520	1180	1310	1640	1290	1410	1040	913	977	
11	962	543	793	1540	1140	1310	1680	1290	1400	1210	974	1070	
12	1280	962	1110	2150	754	959	1610	1220	1370	1220	1060	1110	
13	1580	1150	1270	1040	876	980	1490	1150	1290	1280	976	1130	
14	1720	639	1150	1340	619	1080	1560	1150	1340	1300	1060	1170	
15	1070	726	883	1040	808	917	1580	1080	1250	1330	1050	1200	
16	1670	1070	1320	1210	1020	1090	1380	1070	1210	1470	1030	1250	
17	1530	1120	1180	1870	1080	1280	1780	1130	1310	1320	1000	1160	
18	1490	1160	1320	1870	644	1280	2020	1290	1540	1380	1010	1180	
19	1550	1360	1470	1020	744	828	1470	1120	1290	1300	919	1130	
20	1580	1380	1490	1080	861	925	1540	1110	1270	1390	928	1110	
21	1740	1340	1520	1200	1020	1130	1680	1140	1360	1280	1030	1140	
22	2070	1520	1710	1930	944	1310	1320	1040	1180	1370	1000	1150	
23	1600	1310	1460	1010	928	974	1260	966	1120	1190	936	1040	
24	1820	1380	1540	1120	946	1020	1490	1140	1310	1300	985	1090	
25	1610	1220	1380	1200	999	1090	1400	1110	1230	1290	913	1120	
26	1590	1310	1440	1240	1000	1130	1850	1100	1420	1270	912	1070	
27	1670	1280	1430	1910	763	1320	1170	983	1080	1220	899	1040	
28	1670	1080	1380	865	710	788	1860	270	643	1260	967	1090	
29	1480	859	1130	1090	849	954	698	336	523	1290	968	1110	
30	1410	786	1020	1310	1050	1150	938	528	750	1320	924	1090	
31	--	--	--	1550	485	738	1100	920	1010	--	--	--	
MONTH	--	--	--	2150	485	1080	--	--	--	1520	374	1090	

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04163030 RED RUN AT WARREN, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	8.0	7.3	7.5	7.9	7.3	7.5	7.7	7.3	7.5
2	--	--	--	7.9	7.3	7.5	7.9	7.3	7.5	8.0	7.4	7.5
3	--	--	--	8.0	7.3	7.5	--	--	--	8.1	7.4	7.5
4	8.2	7.6	7.7	7.8	7.3	7.6	--	--	--	8.1	7.2	7.5
5	8.1	7.6	7.7	7.7	7.4	7.5	--	--	--	8.0	7.3	7.5
6	8.1	7.6	7.7	7.7	7.4	7.5	7.5	7.3	7.4	7.9	7.3	7.4
7	8.1	7.4	7.7	7.9	7.4	7.8	7.7	7.3	7.5	7.8	7.3	7.6
8	7.9	7.4	7.5	7.7	7.4	7.6	7.8	7.4	7.6	7.6	7.3	7.5
9	7.8	7.4	7.6	7.8	7.3	7.5	7.9	7.4	7.5	7.7	7.4	7.6
10	8.0	7.5	7.7	7.9	7.3	7.5	8.0	7.4	7.6	7.8	7.3	7.4
11	7.7	7.5	7.6	8.0	7.3	7.6	8.3	7.5	7.7	7.8	7.3	7.4
12	7.7	7.5	7.6	8.1	7.4	7.6	8.3	7.5	7.6	7.9	7.3	7.4
13	7.8	7.5	7.6	7.7	7.3	7.5	8.2	7.4	7.6	8.0	7.3	7.5
14	8.0	7.6	7.7	7.8	7.4	7.6	8.4	7.5	7.8	8.0	7.4	7.5
15	7.6	7.4	7.5	7.6	7.3	7.5	8.3	7.5	7.7	8.0	7.3	7.5
16	8.0	7.4	7.6	7.8	7.3	7.4	8.3	7.4	7.6	8.0	7.2	7.4
17	7.7	7.3	7.5	7.9	7.3	7.5	8.2	7.4	7.8	7.8	7.3	7.4
18	7.6	7.3	7.5	7.9	7.4	7.6	8.2	7.6	7.8	7.9	7.2	7.4
19	7.6	7.4	7.6	7.6	7.2	7.5	8.1	7.3	7.6	7.9	7.2	7.4
20	7.6	7.5	7.5	7.6	7.2	7.3	7.8	7.3	7.5	7.9	7.2	7.4
21	7.6	7.4	7.5	7.8	7.2	7.4	8.1	7.3	7.6	8.0	7.2	7.4
22	7.7	7.4	7.5	7.9	7.3	7.5	8.1	7.3	7.4	8.0	7.2	7.4
23	7.6	7.3	7.4	7.8	7.3	7.5	7.8	7.3	7.4	7.9	7.2	7.3
24	7.6	7.3	7.5	8.0	7.3	7.6	8.1	7.3	7.4	7.7	7.1	7.3
25	7.6	7.2	7.4	8.0	7.4	7.6	7.8	7.3	7.4	7.7	7.1	7.3
26	7.5	7.2	7.3	8.0	7.4	7.6	7.8	7.3	7.5	7.7	7.2	7.2
27	7.6	7.2	7.4	8.0	7.4	7.7	7.8	7.2	7.4	7.7	7.1	7.2
28	7.9	7.2	7.5	7.9	7.5	7.7	8.1	7.2	7.7	7.6	7.1	7.2
29	7.9	7.3	7.5	8.0	7.4	7.5	7.9	7.3	7.5	7.7	7.2	7.3
30	8.0	7.3	7.5	7.7	7.3	7.5	7.6	7.4	7.5	7.8	7.2	7.3
31	--	--	--	7.9	7.4	7.7	7.6	7.4	7.5	--	--	--
MAX	--	--	--	8.1	7.5	7.8	--	--	--	8.1	7.4	7.6
MIN	--	--	--	7.6	7.2	7.3	--	--	--	7.6	7.1	7.2

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	24.9	19.0	21.5	26.6	20.1	22.7	25.0	19.6	21.8
2	--	--	--	24.0	19.0	21.2	26.5	21.0	23.3	25.8	20.2	22.4
3	--	--	--	25.6	18.6	21.6	--	--	--	24.2	20.6	22.3
4	21.5	15.4	18.2	24.3	20.4	21.9	--	--	--	25.5	21.0	22.8
5	22.1	15.9	18.6	23.4	19.9	21.8	--	--	--	24.9	21.0	22.7
6	21.6	16.8	18.7	24.6	18.9	21.3	22.2	18.5	20.1	25.7	20.9	22.8
7	23.0	17.4	19.9	24.4	20.3	22.2	23.7	18.8	20.7	23.5	21.3	22.3
8	24.5	18.4	21.0	21.0	18.6	19.7	25.1	19.0	21.5	21.4	19.3	20.4
9	24.4	20.1	22.1	24.1	17.6	20.7	24.2	19.5	21.5	22.4	19.0	20.1
10	21.7	18.0	19.2	24.9	19.5	21.6	23.3	20.1	21.4	23.6	18.0	20.7
11	18.0	16.6	17.3	24.6	19.3	21.7	22.1	19.4	20.6	24.3	18.8	21.1
12	19.5	16.2	17.5	22.8	20.7	21.4	20.9	18.4	19.6	24.7	19.2	21.6
13	20.5	17.6	18.9	26.1	20.2	22.7	21.1	18.1	19.6	24.8	19.7	21.8
14	22.8	18.2	20.4	23.3	20.2	21.6	22.8	18.0	20.0	24.7	20.5	22.1
15	22.4	19.3	20.7	23.6	19.0	21.1	23.9	18.1	20.3	25.1	20.8	22.4
16	20.7	19.1	19.8	25.8	19.1	21.9	23.7	18.1	20.6	24.7	20.6	22.2
17	21.9	18.6	20.0	23.2	20.3	21.6	23.1	18.8	20.8	21.3	18.9	20.2
18	22.9	19.6	20.8	24.3	19.6	21.3	23.4	19.8	21.5	23.4	17.3	20.0
19	22.9	18.3	20.3	24.1	19.2	21.5	24.2	20.1	21.5	23.3	17.5	20.0
20	22.7	17.1	19.5	25.1	19.9	22.1	21.2	18.8	20.1	23.0	17.2	20.0
21	21.1	17.5	19.0	26.2	21.0	23.1	23.9	17.9	20.3	23.6	18.2	20.6
22	22.2	18.2	19.7	26.7	21.1	23.5	24.3	17.7	20.6	24.1	18.1	20.8
23	23.6	17.2	20.1	25.0	20.0	22.3	22.4	19.6	20.7	24.2	18.7	21.1
24	23.3	18.2	20.0	24.7	18.5	21.2	25.0	19.3	21.7	23.0	19.4	21.2
25	22.8	17.4	19.5	23.3	19.3	20.9	25.2	20.7	22.6	21.5	19.4	20.4
26	23.1	17.2	19.7	22.5	19.1	20.4	25.3	21.6	23.0	23.2	18.7	20.6
27	23.3	17.3	19.9	19.9	17.9	19.0	25.5	21.9	23.4	23.0	17.7	20.1
28	21.5	18.2	19.5	22.9	17.9	20.2	24.7	21.3	22.1	20.9	18.2	19.2
29	23.6	17.5	20.2	23.8	20.2	21.9	21.3	18.4	19.7	21.6	16.9	18.9
30	23.8	18.5	20.9	22.7	20.7	21.5	23.0	18.2	20.2	22.1	16.1	19.1
31	--	--	--	24.3	20.2	21.9	23.6	19.0	21.0	--	--	--
MONTH	--	--	--	26.7	17.6	21.5	--	--	--	25.8	16.1	21.1

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04163030 RED RUN AT WARREN, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	--	--	--	13.9	6.7	9.9	10.1	5.7	7.5	10.4	7.5	8.7
2	--	--	--	13.8	6.6	10.0	11.4	5.6	8.2	11.7	7.5	9.1
3	--	--	--	14.6	6.5	9.8	--	--	--	13.0	7.1	9.3
4	14.3	8.6	11.0	6.7	4.7	5.7	--	--	--	13.7	7.2	9.5
5	13.9	8.3	10.9	8.1	4.1	5.9	--	--	--	13.0	6.9	9.2
6	14.3	7.9	10.4	10.4	5.5	7.5	8.5	7.1	7.8	12.5	6.9	9.0
7	14.8	7.8	10.7	9.5	5.5	7.1	9.4	7.5	8.2	8.0	7.2	7.5
8	14.2	6.9	10.1	9.7	5.4	7.1	10.4	7.3	8.7	9.3	7.2	8.1
9	--	--	--	12.4	5.9	8.8	12.5	7.5	9.7	9.2	7.2	8.1
10	--	--	--	13.4	5.8	9.0	14.5	7.8	10.8	11.0	7.7	9.0
11	--	--	--	14.1	6.1	9.6	17.0	7.9	11.7	12.0	8.0	9.3
12	--	--	--	9.2	5.4	6.6	17.8	8.4	12.1	12.6	7.9	9.7
13	--	--	--	9.9	5.1	7.1	17.0	8.0	11.9	--	--	--
14	--	--	--	8.9	4.6	6.8	17.8	7.8	11.8	--	--	--
15	--	--	--	9.6	4.2	6.6	16.0	7.0	10.4	--	--	--
16	--	--	--	11.0	6.0	8.1	16.0	7.4	10.8	12.2	6.5	8.7
17	--	--	--	10.8	6.0	8.2	14.6	7.2	10.2	11.8	7.2	9.0
18	--	--	--	10.3	4.4	7.0	14.1	6.3	10.1	12.3	7.6	9.3
19	--	--	--	9.8	4.9	7.0	12.7	5.4	8.5	12.6	7.6	9.4
20	--	--	--	10.8	5.3	7.7	12.0	6.2	8.7	12.7	7.7	9.4
21	--	--	--	11.8	5.2	8.0	12.9	6.8	9.2	--	--	--
22	--	--	--	8.3	5.1	6.5	12.7	6.4	8.9	--	--	--
23	--	--	--	10.9	5.1	7.7	11.3	6.2	8.4	--	--	--
24	--	--	--	12.4	6.4	9.0	12.8	6.6	9.1	--	--	--
25	--	--	--	13.1	6.3	9.3	11.3	6.3	8.3	--	--	--
26	--	--	--	13.2	6.3	9.1	10.6	5.7	7.5	--	--	--
27	--	--	--	9.3	6.5	7.3	11.8	5.4	7.9	--	--	--
28	--	--	--	9.7	7.0	8.1	9.3	6.3	7.1	--	--	--
29	13.3	7.5	10.0	10.7	6.2	8.3	9.0	6.4	7.7	--	--	--
30	13.2	7.0	9.9	10.9	6.4	8.1	8.4	7.5	8.0	--	--	--
31	--	--	--	7.6	6.0	6.8	9.0	7.2	8.2	--	--	--
MONTH	--	--	--	14.6	4.1	7.9	--	--	--	--	--	--

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04163400 PLUM BROOK AT UTICA, MI

LOCATION.--Lat 42°36'05", long 83°04'27", in SE1/4 NE1/4 sec.7, T.2 N., R.12 E., Macomb County, Hydrologic Unit 04090003, on left bank at downstream side of bridge on Ryan Road, 1.0 mi southwest of Utica.

DRAINAGE AREA.--16.5 mi².

PERIOD OF RECORD.--July 1965 to July 1998, October 1999 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 619.79 ft above sea level (levels by Johnson and Anderson, Inc.).

REMARKS.--Records good except for estimated daily discharges, which are fair. Prior to 1998, occasional diversion for sprinkler irrigation. Several measurements of water temperature were made during the year.

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	2.9	5.4	e10	17	4.9	26	20	7.5	20	5.7	18	8.1
2	2.0	44	e8.3	28	4.5	34	16	42	14	4.3	9.0	7.3
3	2.5	50	e6.8	23	6.4	23	14	18	9.9	5.1	101	6.5
4	4.9	32	e6.2	17	7.7	19	12	9.4	7.9	13	132	5.5
5	3.9	17	e5.3	e16	6.7	141	10	8.0	6.9	11	44	5.2
6	2.3	11	e5.1	e14	7.0	48	10	6.3	6.2	7.5	17	5.0
7	1.5	e11	e5.2	11	7.6	32	9.3	4.6	6.9	12	12	50
8	1.3	e9.4	e5.2	11	6.8	29	9.3	4.0	7.1	10	8.9	14
9	1.4	e8.3	5.4	9.4	6.0	21	8.2	24	10	6.9	7.1	10
10	1.8	e8.5	48	e8.2	6.0	17	7.5	89	96	5.5	10	8.0
11	1.4	22	e93	7.8	5.9	16	6.2	68	56	4.9	10	6.7
12	1.2	13	e24	8.2	5.5	15	7.1	26	25	67	9.1	5.2
13	0.96	11	14	8.1	5.4	12	7.2	17	17	21	7.3	4.4
14	33	e7.6	11	7.0	5.9	12	6.5	29	53	28	6.4	3.7
15	48	6.0	11	8.9	5.8	11	5.6	31	48	21	5.7	e3.4
16	12	9.1	14	8.0	5.2	12	5.8	15	33	13	5.6	e3.3
17	6.2	7.4	17	7.9	4.5	13	4.9	13	39	13	5.6	e3.2
18	5.0	54	12	8.3	4.6	13	3.9	16	21	28	5.6	e3.0
19	4.2	91	10	8.0	5.7	13	5.0	11	14	8.4	5.3	e2.9
20	3.8	e33	9.0	7.9	12	62	3.1	9.1	11	5.4	5.0	e2.9
21	3.3	17	8.1	8.1	61	31	11	83	9.2	5.3	5.1	e2.9
22	3.2	e11	8.0	9.0	30	19	9.2	145	10	28	4.7	e2.9
23	e3.4	9.5	25	9.0	27	23	5.7	326	8.2	9.5	4.4	e2.8
24	e3.3	e21	28	8.7	24	20	4.8	128	7.9	5.5	4.3	e2.8
25	e7.2	e16	18	8.8	20	59	4.3	51	4.1	4.2	4.5	e2.8
26	13	e10	15	8.6	20	54	5.5	32	2.6	5.8	6.4	e2.7
27	9.9	10	12	8.4	22	37	4.8	23	2.6	7.1	8.0	e2.7
28	7.2	e20	11	8.3	21	26	4.0	18	2.7	13	66	e2.8
29	11	e26	35	8.0	23	22	4.0	14	5.0	7.5	40	e3.0
30	8.1	e14	64	7.0	—	23	3.2	12	6.2	5.4	19	e2.7
31	4.8	—	26	5.7	—	27	—	18	—	66	12	—
TOTAL	214.66	605.2	570.6	324.3	372.1	910	228.1	1297.9	560.4	448.0	599.0	186.4
MEAN	6.92	20.2	18.4	10.5	12.8	29.4	7.60	41.9	18.7	14.5	19.3	6.21
MAX	48	91	93	28	61	141	20	326	96	67	132	50
MIN	0.96	5.4	5.1	5.7	4.5	11	3.1	4.0	2.6	4.2	4.3	2.7
CFSM	0.42	1.22	1.12	0.63	0.78	1.78	0.46	2.54	1.13	0.88	1.17	0.38
IN.	0.48	1.36	1.29	0.73	0.84	2.05	0.51	2.93	1.26	1.01	1.35	0.42

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2004, BY WATER YEAR (WY)

	MEAN	8.20	12.0	14.9	12.3	19.3	29.3	24.2	16.4	11.6	8.23	6.50	6.88
MAX	40.0	39.8	37.7	40.7	60.3	83.6	47.4	41.9	51.9	53.6	30.4	26.8	
(WY)	2002	1986	1973	1993	1976	1982	1979	2004	1996	2000	2000	2000	
MIN	0.82	1.45	1.99	1.23	2.62	7.24	7.60	3.46	1.51	0.29	0.43	0.44	
(WY)	1967	1966	1977	1977	1980	2000	2004	1971	1988	1965	1965	1969	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1965 - 2004

ANNUAL TOTAL	4451.66						6316.66						
ANNUAL MEAN	12.2						17.3						
HIGHEST ANNUAL MEAN										14.1			
LOWEST ANNUAL MEAN										20.5			1968
HIGHEST DAILY MEAN	211						326			6.67			1970
LOWEST DAILY MEAN	0.96						0.96			707			Jun 26 1968
ANNUAL SEVEN-DAY MINIMUM	1.4						1.4			0.04			Jul 19 1966
MAXIMUM PEAK FLOW							442			0.09			Aug 22 1969
MAXIMUM PEAK STAGE							7.13			(a)1290			Jun 18 1996
INSTANTANEOUS LOW FLOW										10.62			Jun 18 1996
ANNUAL RUNOFF (CFSM)	0.739						1.05			0.00			(b)
ANNUAL RUNOFF (INCHES)	10.04						14.24			0.856			
10 PERCENT EXCEEDS	28						36			11.63			
50 PERCENT EXCEEDS	6.3						9.1			30			
90 PERCENT EXCEEDS	2.5						3.6			6.3			

(a) From rating curve extended above 800 ft³/s.

(b) Part of each day July 19, 28, 1966, Aug. 22-28, Sept. 3, 11, 1969.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164000 CLINTON RIVER NEAR FRASER, MI

LOCATION.--Lat 42°34'38", long 82°57'05", in SE1/4 NE1/4 sec.19, T.2 N., R.13 E., Macomb County, Hydrologic Unit 04090003, on right bank 50 ft downstream from bridge on Garfield Road, 2.8 mi north of Fraser, and 4.0 mi upstream from North Branch.

DRAINAGE AREA.--444 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1947 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 577.71 ft above sea level (Macomb County bench mark). Prior to Nov. 17, 1949, and from May 29 to July 31, 1990, nonrecording gage at same site and datum. Nov. 17, 1949 to Apr. 5, 1990, water-stage recorder at site 800 ft downstream at same datum.

REMARKS.--Water-discharge records good. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 5 or 6, 1947, reached a stage of 20 ft, from floodmark, and discharge of approximately 9,000 ft³/s.

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	120	190	385	420	224	367	521	250	959	188	461	306
2	110	495	341	544	225	485	451	800	871	192	284	257
3	115	835	284	453	333	485	378	384	783	184	e700	209
4	182	698	263	397	321	418	355	232	619	409	1390	196
5	122	468	233	419	243	1150	337	233	497	406	986	178
6	110	354	225	400	257	1000	311	172	454	228	521	169
7	105	355	222	305	272	682	288	184	427	290	407	831
8	100	320	216	305	224	623	276	166	415	311	318	401
9	97	298	218	287	229	545	260	583	492	193	301	312
10	96	289	507	243	235	515	240	1210	1610	158	346	215
11	97	554	1120	264	223	509	228	1160	1480	146	315	179
12	93	413	485	296	224	500	211	803	933	569	299	161
13	93	354	340	290	223	445	223	640	671	409	250	155
14	488	335	299	258	222	432	198	817	910	363	197	150
15	932	336	283	244	213	421	183	846	1140	445	175	148
16	286	371	342	252	188	412	163	655	910	301	172	146
17	176	353	377	277	202	454	154	531	897	262	160	137
18	154	605	326	302	199	449	145	528	724	487	171	128
19	139	1230	306	284	212	435	134	460	605	385	149	116
20	131	705	292	259	381	911	129	386	534	310	143	114
21	117	486	273	248	823	774	247	939	508	325	155	115
22	113	406	270	273	469	528	156	1810	503	579	135	115
23	115	373	550	309	425	487	132	2490	449	440	129	109
24	109	662	569	247	381	492	120	4810	426	298	130	109
25	184	548	411	246	337	899	147	2280	359	240	135	108
26	329	407	362	229	324	926	147	1640	310	184	168	105
27	197	360	324	248	338	702	123	1400	245	261	140	105
28	194	557	300	253	318	568	115	1240	227	478	1100	108
29	319	749	496	242	319	538	110	1100	215	295	1010	116
30	234	470	960	228	---	568	108	975	213	256	585	107
31	207	---	542	249	---	631	---	1010	---	747	360	---
TOTAL	5864	14576	12121	9271	8584	18351	6590	30734	19386	10339	11792	5605
MEAN	189	486	391	299	296	592	220	991	646	334	380	187
MAX	932	1230	1120	544	823	1150	521	4810	1610	747	1390	831
MIN	93	190	216	228	188	367	108	166	213	146	129	105
CFSM	0.43	1.09	0.88	0.67	0.67	1.33	0.49	2.23	1.46	0.75	0.86	0.42
IN.	0.49	1.22	1.02	0.78	0.72	1.54	0.55	2.58	1.62	0.87	0.99	0.47

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2004, BY WATER YEAR (WY)

MEAN	276	337	385	378	461	651	637	473	367	267	230	246
MAX	1021	834	837	975	1119	1313	1237	1382	942	664	597	758
(WY)	1982	1986	1968	1950	1976	1976	1950	1956	1996	1957	2000	1975
MIN	72.3	78.2	93.1	91.8	112	217	220	127	120	87.1	69.5	73.3
(WY)	1954	1954	1959	1961	1963	1964	2004	1958	1949	1955	1954	1954

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1947 - 2004
ANNUAL TOTAL	112470	153213	
ANNUAL MEAN	308	419	391
HIGHEST ANNUAL MEAN			595
LOWEST ANNUAL MEAN			189
HIGHEST DAILY MEAN	2030	4810	6930
LOWEST DAILY MEAN	71	93	49
ANNUAL SEVEN-DAY MINIMUM	74	97	59
MAXIMUM PEAK FLOW		6040	8840
MAXIMUM PEAK STAGE		17.93	19.56
INSTANTANEOUS LOW FLOW		86	47
ANNUAL RUNOFF (CFSM)	0.694	0.943	0.881
ANNUAL RUNOFF (INCHES)	9.42	12.84	11.97
10 PERCENT EXCEEDS	621	838	750
50 PERCENT EXCEEDS	222	310	283
90 PERCENT EXCEEDS	98	130	116

(a) Oct. 12, 13.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164000 CLINTON RIVER NEAR FRASER, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1966, June to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Interruptions in water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: July 7-15, 20-28, Aug. 4-15, 20-23, rated good; June 3-24, rated poor. pH record rated excellent except the following periods: Aug. 10-16, rated good; Sept. 8-15, rated fair; Sept. 2-7, rated poor. Water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: July 5-10, 19, 20, Sept. 14-21, rated good; July 11-15, 21, 22, July 30 to Aug. 2, rated fair; June 10-20, July 23-29, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 1,320 microsiemens, June 9, 2004; minimum, 341 microsiemens, Aug. 4, 2004.

pH: Maximum, 8.5 std. units, July 2, 3, 4, 2004; minimum, 6.9 std. units, Sept. 7, 2004.

WATER TEMPERATURE: Maximum, 25.0°C, Aug. 27, 2004; minimum, 13.7°C, Sept. 30, 2004.

DISSOLVED OXYGEN: Maximum, 12.1 mg/L, Aug. 24, 2004; minimum, 4.5 mg/L, June 20, 2004.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	—	—	—	1170	1060	1120	768	572	689	—	—	—
2	—	—	—	1140	1070	1100	—	—	—	—	—	—
3	896	852	870	1110	1040	1060	—	—	—	1010	945	964
4	903	856	875	1230	768	1060	700	341	526	1040	955	994
5	908	855	874	896	821	856	809	523	673	1040	990	1010
6	883	868	876	967	896	933	817	799	809	1040	971	990
7	898	877	887	1030	963	1010	839	798	823	1040	580	736
8	912	895	904	1010	925	952	896	837	858	810	589	702
9	1320	838	960	1010	940	967	905	871	886	869	810	853
10	921	548	623	1120	1000	1040	894	805	858	922	857	890
11	779	596	693	1160	1100	1120	947	813	858	983	914	935
12	870	774	824	1240	739	924	929	880	902	1020	956	980
13	992	870	906	899	779	838	968	898	926	1050	996	1010
14	1000	759	894	990	820	879	1030	937	959	1070	1030	1050
15	768	622	692	878	789	839	1070	1020	1040	1130	1050	1080
16	879	744	806	855	837	845	1080	1010	1040	1120	1060	1090
17	870	791	842	902	853	871	1170	1040	1080	1130	1020	1080
18	867	834	848	871	714	816	1240	1090	1180	1120	1020	1050
19	892	859	874	985	821	871	1160	1080	1090	1110	1020	1060
20	903	857	883	872	831	847	1140	1080	1100	1110	1040	1070
21	902	871	881	876	841	857	1160	1080	1140	1130	1030	1080
22	926	877	907	934	656	822	1160	1070	1090	1180	1090	1120
23	907	774	818	857	816	828	1110	1060	1080	1140	1060	1090
24	852	753	797	859	829	837	1170	1050	1100	1100	1050	1080
25	—	—	—	935	852	879	1170	1060	1100	1140	1080	1100
26	—	—	—	999	901	936	1210	1050	1120	1120	1080	1100
27	—	—	—	1200	966	1040	—	—	—	1130	1080	1100
28	—	—	—	1120	804	899	—	—	—	1140	1080	1100
29	—	—	—	894	779	834	—	—	—	1140	1100	1110
30	1190	1090	1110	943	867	893	—	—	—	1180	1080	1110
31	—	—	—	1010	573	774	—	—	—	—	—	—
MONTH	—	—	—	1240	573	921	—	—	—	—	—	—

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164000 CLINTON RIVER NEAR FRASER, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	8.4	8.1	8.3	8.0	7.7	7.8	—	—	—
2	—	—	—	8.5	8.2	8.3	—	—	—	—	—	—
3	8.1	8.1	8.1	8.5	8.2	8.3	—	—	—	7.8	7.6	7.8
4	8.1	7.9	8.0	8.5	7.8	8.0	7.8	7.4	7.6	7.8	7.2	7.5
5	8.0	7.7	7.8	8.1	7.9	8.0	7.7	7.6	7.6	7.3	7.2	7.2
6	7.7	7.7	7.7	8.2	8.0	8.0	7.7	7.6	7.7	7.2	7.0	7.1
7	7.8	7.7	7.7	8.2	8.0	8.1	7.8	7.7	7.7	7.5	6.9	7.3
8	7.7	7.7	7.7	8.1	7.9	8.0	7.8	7.7	7.7	7.7	7.4	7.6
9	8.0	7.7	7.8	8.3	8.0	8.0	7.9	7.8	7.8	7.8	7.6	7.7
10	8.0	7.7	7.8	8.2	8.0	8.1	7.9	7.7	7.8	7.9	7.7	7.8
11	8.0	7.9	7.9	8.3	8.0	8.1	7.8	7.6	7.7	7.9	7.7	7.8
12	8.0	7.9	8.0	8.2	7.7	7.9	7.8	7.7	7.8	8.0	7.7	7.8
13	8.0	8.0	8.0	8.0	7.8	7.9	7.8	7.8	7.8	7.9	7.6	7.8
14	8.0	7.8	8.0	8.1	7.9	8.0	7.8	7.7	7.8	7.9	7.6	7.7
15	8.0	7.9	7.9	8.1	7.9	8.0	7.9	7.6	7.7	8.2	7.6	7.8
16	7.9	7.9	7.9	8.1	8.0	8.0	8.2	7.6	7.7	8.2	7.8	8.0
17	8.0	7.9	8.0	8.1	8.0	8.0	8.2	8.0	8.1	8.2	7.8	8.0
18	8.0	7.8	7.9	8.0	7.8	7.9	8.2	7.8	8.1	8.2	7.9	8.0
19	8.0	7.8	7.9	8.1	7.8	8.0	8.2	7.9	8.1	8.2	7.8	8.0
20	7.9	7.8	7.9	8.1	8.0	8.0	8.2	8.0	8.2	8.3	7.8	8.0
21	7.9	7.8	7.8	8.1	8.0	8.1	8.4	7.8	8.1	8.2	7.8	8.0
22	7.8	7.8	7.8	8.1	7.8	7.9	8.3	7.9	8.2	8.2	7.8	8.0
23	7.8	7.8	7.8	8.1	7.8	7.9	8.2	7.8	8.1	8.2	7.8	8.0
24	7.8	7.8	7.8	8.2	8.1	8.1	8.3	7.8	8.1	8.2	7.8	8.0
25	—	—	—	8.2	8.1	8.1	8.3	7.8	8.1	8.1	7.8	8.0
26	—	—	—	8.2	8.1	8.2	8.2	7.5	8.0	8.2	7.8	8.0
27	—	—	—	8.2	7.8	8.0	8.1	7.6	7.8	8.2	7.8	8.0
28	—	—	—	8.1	7.8	8.0	—	—	—	8.0	7.7	7.9
29	—	—	—	8.1	7.9	8.0	—	—	—	7.9	7.6	7.8
30	8.4	8.2	8.3	8.1	8.0	8.0	—	—	—	—	—	—
31	—	—	—	8.0	7.6	7.9	—	—	—	—	—	—
MAX	—	—	—	8.5	8.2	8.3	—	—	—	—	—	—
MIN	—	—	—	8.0	7.6	7.9	—	—	—	—	—	—

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	23.2	20.1	21.7	23.3	21.4	22.4	21.8	19.7	20.8
2	—	—	—	23.1	20.3	21.7	—	—	—	22.9	20.5	21.6
3	18.4	17.3	17.9	23.3	19.9	21.7	—	—	—	22.8	20.6	21.7
4	18.5	17.4	18.0	23.4	21.0	22.2	23.3	20.1	21.3	23.8	21.1	22.4
5	19.0	17.7	18.4	22.8	21.5	22.2	20.8	19.6	20.2	23.7	21.7	22.7
6	19.5	18.6	19.0	22.6	20.0	21.4	20.5	19.0	19.9	24.2	21.6	22.9
7	21.2	19.5	20.3	23.4	21.5	22.3	20.8	19.1	20.1	23.4	21.8	22.4
8	22.8	20.8	21.8	22.2	19.7	20.9	21.9	19.8	20.9	22.2	19.8	20.8
9	24.0	22.8	23.2	21.8	18.4	20.1	22.0	20.6	21.3	20.9	19.1	19.9
10	23.0	19.0	20.4	22.9	20.1	21.5	21.8	21.0	21.4	21.0	17.8	19.4
11	19.0	18.0	18.4	24.0	20.6	22.3	21.2	19.7	20.5	21.1	18.0	19.7
12	18.7	17.4	18.0	23.0	20.6	21.8	19.7	18.3	18.9	21.8	18.5	20.2
13	20.6	18.6	19.3	24.2	21.4	22.8	18.7	17.7	18.2	22.3	19.2	20.8
14	21.7	19.9	20.8	23.7	20.9	22.5	19.4	17.5	18.5	22.6	19.9	21.3
15	21.6	20.7	21.2	22.1	20.4	21.2	20.2	17.6	19.1	23.1	20.2	21.7
16	21.5	20.8	21.1	23.0	20.7	21.9	20.6	17.8	19.3	22.8	20.8	21.7
17	21.4	20.5	20.9	22.5	21.5	22.0	20.7	18.6	19.8	21.2	17.8	19.2
18	22.3	21.4	21.8	21.6	20.4	21.0	21.6	19.0	20.4	19.4	16.2	17.8
19	22.3	21.0	21.7	22.1	20.3	21.3	21.7	19.6	20.7	19.1	16.0	17.7
20	21.0	19.6	20.2	22.8	21.3	22.1	20.8	18.6	19.4	19.0	15.6	17.5
21	20.2	19.6	19.8	24.5	22.7	23.6	20.6	17.2	18.9	19.5	15.8	17.7
22	20.7	19.4	20.0	24.6	23.5	24.1	20.7	17.3	19.1	20.4	16.1	18.3
23	20.7	19.4	20.1	24.4	22.1	23.5	20.5	19.2	19.8	20.7	16.8	18.8
24	21.4	19.8	20.7	22.1	20.6	21.2	22.1	18.7	20.4	20.1	17.8	19.1
25	—	—	—	21.2	20.1	20.6	23.8	20.6	22.2	19.6	17.9	18.5
26	—	—	—	20.8	19.7	20.2	24.6	21.9	23.2	19.7	17.0	18.3
27	—	—	—	19.9	18.2	19.0	25.0	22.8	23.8	19.3	15.8	17.6
28	—	—	—	20.6	17.8	19.1	24.0	21.9	22.6	18.1	15.7	16.7
29	—	—	—	21.3	20.1	20.8	21.9	19.3	20.4	17.1	14.4	15.7
30	22.3	19.1	20.7	21.4	20.8	21.1	20.6	19.1	19.8	—	—	—
31	—	—	—	22.2	20.4	21.4	21.0	19.2	20.2	—	—	—
MONTH	—	—	—	24.6	17.8	21.6	—	—	—	—	—	—

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164000 CLINTON RIVER NEAR FRASER, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	9.0	7.0	8.0	8.0	6.5	7.1	--	--	--
2	--	--	--	9.5	7.0	8.3	--	--	--	--	--	--
3	8.1	7.6	7.9	9.9	7.2	8.5	--	--	--	--	--	--
4	--	--	--	9.0	5.2	6.4	--	--	--	--	--	--
5	--	--	--	7.7	5.2	6.6	--	--	--	--	--	--
6	--	--	--	8.6	6.7	7.5	--	--	--	--	--	--
7	--	--	--	8.5	6.5	7.5	--	--	--	--	--	--
8	--	--	--	8.0	6.1	7.2	--	--	--	7.8	6.2	7.0
9	--	--	--	9.7	7.2	8.4	--	--	--	8.2	5.7	7.3
10	6.5	4.6	5.9	9.3	7.1	8.2	--	--	--	8.8	6.9	7.9
11	7.2	6.4	6.8	9.9	6.8	8.3	--	--	--	9.2	7.4	8.2
12	7.4	6.9	7.2	8.7	6.2	7.0	--	--	--	9.3	7.3	8.3
13	7.2	6.5	6.8	8.1	6.4	7.2	--	--	--	9.7	7.3	8.5
14	6.9	6.1	6.5	7.9	5.5	7.0	--	--	--	9.8	7.2	8.5
15	6.4	6.0	6.2	7.7	5.5	7.0	--	--	--	9.9	7.1	8.4
16	6.2	5.0	5.8	8.0	6.6	7.3	--	--	--	8.3	6.0	7.2
17	6.5	4.9	6.1	7.9	6.4	7.1	9.8	7.6	8.8	9.0	6.3	7.7
18	6.4	5.1	6.0	7.3	6.6	6.8	10.3	6.7	8.6	9.3	7.0	8.1
19	5.6	4.7	5.2	7.6	6.2	7.0	10.0	6.8	8.4	9.5	7.0	8.3
20	6.3	4.5	5.5	7.7	6.2	7.1	9.7	7.2	8.6	9.8	7.1	8.5
21	--	--	--	7.6	6.3	7.0	11.2	6.8	9.1	10.0	7.1	8.5
22	--	--	--	7.2	5.4	6.0	11.5	7.6	9.5	--	--	--
23	--	--	--	7.6	5.4	6.4	10.8	7.3	9.1	--	--	--
24	--	--	--	8.7	6.9	7.7	12.1	7.1	9.5	--	--	--
25	--	--	--	9.2	7.3	8.1	11.7	6.8	9.1	--	--	--
26	--	--	--	9.2	7.3	8.3	11.6	5.3	8.1	--	--	--
27	--	--	--	8.7	6.0	7.3	--	--	--	--	--	--
28	--	--	--	9.0	6.6	7.6	--	--	--	--	--	--
29	--	--	--	8.6	6.4	7.5	--	--	--	--	--	--
30	9.0	7.3	8.2	8.3	6.8	7.6	--	--	--	--	--	--
31	--	--	--	7.9	5.9	6.9	--	--	--	--	--	--
MONTH	--	--	--	9.9	5.2	7.4	--	--	--	--	--	--

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164100 EAST POND CREEK AT ROMEO, MI

LOCATION.--Lat 42°49'21", long 83°01'13", in NE1/4 SE1/4 sec.27, T.5 N., R.12 E., Macomb County, Hydrologic Unit 04090003, on right bank at upstream side of bridge on Van Dyke Road, 1.4 mi north of Romeo.

DRAINAGE AREA--21.8 mi².

PERIOD OF RECORD.--September 1958 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 780 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Occasional regulation by lakes upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	5.0	7.1	14	25	e7.0	e21	27	9.6	37	7.5	11	5.2
2	4.7	16	12	30	e6.7	e29	25	20	32	6.0	8.4	4.9
3	4.6	26	15	29	e7.6	e31	22	18	29	5.5	7.9	4.6
4	4.9	23	13	27	e8.0	33	19	15	26	7.8	16	4.6
5	4.0	17	10	26	e7.6	57	18	13	24	8.8	16	5.0
6	3.6	14	15	24	e7.8	59	18	12	22	8.2	16	5.4
7	3.9	13	12	e21	e8.0	54	17	12	17	9.3	12	8.0
8	4.1	12	e12	e18	e7.5	52	16	13	14	9.1	9.7	6.6
9	5.0	11	e12	e16	e7.5	48	15	27	14	8.6	8.2	6.3
10	5.2	10	e16	e14	e7.7	44	14	45	22	8.2	6.1	5.5
11	4.4	13	e23	e14	e7.8	41	15	43	28	7.8	5.6	5.0
12	5.2	13	e20	e13	e8.0	38	15	34	26	32	5.8	4.6
13	4.7	14	16	e12	e8.1	33	15	29	21	22	5.8	4.2
14	11	9.3	15	e12	e8.0	30	14	34	33	22	5.7	4.0
15	22	8.2	13	e11	e7.9	27	16	35	39	17	5.3	3.8
16	16	8.3	13	e11	e7.5	23	17	31	29	13	5.2	3.6
17	12	7.9	14	e11	e7.6	22	16	28	25	12	5.0	3.6
18	8.8	15	13	e11	e7.7	21	15	32	22	10	4.9	3.5
19	6.7	30	11	e10	e8.1	19	13	31	20	11	5.1	3.5
20	5.4	23	9.6	e10	e11	25	9.7	27	17	11	4.9	3.5
21	4.9	18	8.7	e9.6	e15	24	11	28	16	12	5.2	3.3
22	4.5	15	8.9	e9.7	e14	19	9.9	47	16	16	5.3	3.1
23	3.8	12	14	e9.9	e14	18	9.4	267	13	14	5.4	3.0
24	4.5	18	17	e9.0	e14	18	8.7	201	11	12	5.3	3.0
25	6.1	17	15	e8.6	e13	24	9.1	134	9.6	10	4.5	3.2
26	7.2	15	14	e8.5	e13	26	9.3	96	9.1	9.3	4.5	3.1
27	8.0	13	13	e8.5	e14	24	8.7	73	8.6	9.9	5.5	3.0
28	7.7	16	12	e8.3	e15	22	8.3	63	8.4	13	18	2.9
29	9.6	21	23	e7.8	e18	21	7.7	54	8.3	10	13	3.0
30	8.2	17	35	e7.6	—	23	7.1	47	7.9	8.4	9.0	3.0
31	7.0	—	28	e7.5	—	27	—	42	—	14	6.0	—
TOTAL	212.7	452.8	467.2	440.0	287.1	953	425.9	1560.6	604.9	365.4	246.3	126.0
MEAN	6.86	15.1	15.1	14.2	9.90	30.7	14.2	50.3	20.2	11.8	7.95	4.20
MAX	22	30	35	30	18	59	27	267	39	32	18	8.0
MIN	3.6	7.1	8.7	7.5	6.7	18	7.1	9.6	7.9	5.5	4.5	2.9
CFSM	0.31	0.69	0.69	0.65	0.45	1.41	0.65	2.31	0.92	0.54	0.36	0.19
IN.	0.36	0.77	0.80	0.75	0.49	1.63	0.73	2.66	1.03	0.62	0.42	0.22

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2004, BY WATER YEAR (WY)

	MEAN	10.3	13.6	15.0	14.6	19.1	31.3	30.0	19.9	14.1	8.87	7.01	8.76
MAX	35.1	45.0	35.7	42.6	54.9	67.9	71.4	52.2	52.9	22.9	35.0	52.3	
(WY)	1987	1986	1988	1973	2001	1976	1975	1974	1989	1969	1975	1985	
MIN	1.92	2.32	1.64	2.89	2.93	7.81	12.8	7.77	2.76	2.07	1.30	2.02	
(WY)	1964	1964	1964	1959	1964	1964	2000	1977	1963	1964	1965	1966	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1958 - 2004

ANNUAL TOTAL	4212.3	6141.9	
ANNUAL MEAN	11.5	16.8	16.0
HIGHEST ANNUAL MEAN			29.0
LOWEST ANNUAL MEAN			4.99
HIGHEST DAILY MEAN	91	267	302
LOWEST DAILY MEAN	2.0	2.9	0.90
ANNUAL SEVEN-DAY MINIMUM	2.1	3.0	0.99
MAXIMUM PEAK FLOW		418	(a)418
MAXIMUM PEAK STAGE		4.54	(b)4.56
INSTANTANEOUS LOW FLOW		2.7	(c)
ANNUAL RUNOFF (CFSM)	0.529	0.770	0.735
ANNUAL RUNOFF (INCHES)	7.19	10.48	9.98
10 PERCENT EXCEEDS	24	30	32
50 PERCENT EXCEEDS	8.0	12	11
90 PERCENT EXCEEDS	3.6	4.9	3.4

(a) Gage height 4.54 ft.

(b) Backwater from ice.

(c) Sept. 23, 24.

(d) July 30, 31, 1964, Aug. 6, 7, 1965.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164300 EAST BRANCH COON CREEK AT ARMADA, MI

LOCATION.--Lat 42°50'45", long 82°53'06", in NE1/4 sec.23, T.5 N., R.13 E., Macomb County, Hydrologic Unit 04090003, on right bank at downstream side of bridge on Prospect Street in Armada.

DRAINAGE AREA--13.0 mi².

PERIOD OF RECORD.--October 1958 to current year.

REVISED RECORDS.--WDR MI-83-1: 1982.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 735 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges and those below 1.0 ft³/s, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	0.09	0.67	11	19	e1.0	69	15	1.9	5.4	0.46	5.3	0.27
2	0.09	6.8	6.8	20	e1.0	142	11	11	4.3	0.33	3.4	0.21
3	0.10	29	4.5	30	e1.0	98	8.5	17	3.7	0.28	2.0	0.18
4	0.12	36	3.6	20	e0.90	40	6.7	9.5	3.3	1.4	6.9	0.18
5	0.10	21	3.5	12	e0.90	192	5.1	6.4	2.7	0.77	16	0.18
6	0.12	11	3.0	7.9	e0.90	93	4.4	4.6	2.5	0.57	7.9	0.23
7	0.14	7.1	2.5	e3.8	e0.90	30	4.2	3.7	2.1	0.93	3.7	0.90
8	0.16	5.3	2.4	e3.7	e0.80	26	4.0	3.5	1.7	2.9	2.3	0.36
9	0.16	3.9	2.3	e3.4	e0.80	18	3.7	33	1.7	2.2	1.6	0.30
10	0.21	3.0	6.8	e2.5	e0.90	12	3.3	86	2.1	1.2	1.1	0.16
11	0.20	3.3	40	e2.4	e0.80	10	3.1	75	2.1	0.77	0.95	0.13
12	0.17	3.7	18	e2.4	e0.80	8.9	2.8	25	1.9	37	0.85	0.13
13	0.18	3.3	7.5	e2.1	e0.80	6.1	2.9	14	1.9	15	0.72	0.10
14	1.1	2.8	5.2	e1.6	e0.70	e6.1	2.7	11	5.3	21	0.57	0.12
15	0.67	2.3	4.4	e1.5	e0.64	e5.7	2.4	28	15	25	0.41	0.11
16	0.65	2.0	4.1	e1.4	e0.60	e4.8	2.1	12	9.4	9.4	0.34	0.08
17	0.60	1.8	4.4	e1.3	e0.56	e4.4	2.1	7.3	5.1	4.8	0.28	0.11
18	0.59	9.0	3.9	e1.2	e0.56	4.7	2.1	8.0	3.7	3.1	0.29	0.16
19	0.52	77	3.3	e1.1	e0.54	5.4	1.9	6.8	2.8	2.3	0.27	0.18
20	0.45	34	2.7	e1.0	e0.50	15	1.9	5.1	1.9	1.7	0.28	0.15
21	0.36	15	2.4	e1.0	0.96	20	2.3	13	1.6	1.4	0.31	0.09
22	0.36	8.5	2.4	e1.0	1.6	9.1	2.1	173	1.5	1.2	0.26	0.09
23	0.36	6.0	4.7	e1.0	2.7	6.3	1.8	485	1.3	1.00	0.24	0.08
24	0.36	13	12	e1.0	3.2	5.8	1.6	255	1.0	0.81	0.23	0.10
25	0.59	18	12	e1.0	4.0	9.7	1.5	127	0.88	0.62	0.22	0.09
26	0.39	9.1	7.6	e1.0	5.2	18	1.6	70	0.73	0.47	0.32	0.13
27	0.52	6.2	5.5	e1.0	11	16	1.8	25	0.58	1.4	1.0	0.14
28	0.41	13	5.7	e1.0	21	11	1.6	16	0.46	10	0.87	0.17
29	0.58	51	51	e1.0	38	9.0	1.4	9.9	0.44	6.2	1.3	0.22
30	0.80	21	155	e1.0	—	10	1.3	7.4	0.42	3.2	0.54	0.23
31	0.80	—	38	e0.90	—	23	—	6.2	—	4.7	0.35	—
TOTAL	11.95	423.77	436.2	149.20	103.26	929.0	106.9	1556.3	87.51	162.11	60.80	5.58
MEAN	0.39	14.1	14.1	4.81	3.56	30.0	3.56	50.2	2.92	5.23	1.96	0.19
MAX	1.1	77	155	30	38	192	15	485	15	37	16	0.90
MIN	0.09	0.67	2.3	0.90	0.50	4.4	1.3	1.9	0.42	0.28	0.22	0.08
CFSM	0.03	1.09	1.08	0.37	0.27	2.31	0.27	3.86	0.22	0.40	0.15	0.01
IN.	0.03	1.21	1.25	0.43	0.30	2.66	0.31	4.45	0.25	0.46	0.17	0.02

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2004, BY WATER YEAR (WY)

	MEAN	2.66	5.31	7.97	6.40	11.8	23.1	15.0	6.91	4.67	1.87	1.38	2.29
MAX	25.6	43.3	35.7	37.6	60.3	75.2	47.1	50.2	21.9	19.7	12.3	33.9	
(WY)	2002	1986	1973	1974	1976	1982	1967	2004	1989	1967	1975	1985	
MIN	0.05	0.09	0.07	0.08	0.09	0.23	0.83	0.61	0.06	0.05	0.05	0.06	
(WY)	1964	1964	1964	1961	1964	1964	1964	1977	1964	1964	1963	1964	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1959 - 2004

ANNUAL TOTAL	2344.34	4032.58	
ANNUAL MEAN	6.42	11.0	7.42
HIGHEST ANNUAL MEAN			14.9
LOWEST ANNUAL MEAN			0.36
HIGHEST DAILY MEAN	158	485	497
LOWEST DAILY MEAN	0.05	0.08	0.00
ANNUAL SEVEN-DAY MINIMUM	0.07	0.10	0.00
MAXIMUM PEAK FLOW		713	910
MAXIMUM PEAK STAGE		6.64	6.69
ANNUAL RUNOFF (CFSM)	0.494	0.848	0.571
ANNUAL RUNOFF (INCHES)	6.71	11.54	7.76
10 PERCENT EXCEEDS	14	21	15
50 PERCENT EXCEEDS	0.64	2.3	1.1
90 PERCENT EXCEEDS	0.12	0.22	0.11

(a) Jan. 25 to Feb. 9, 1961, result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164500 NORTH BRANCH CLINTON RIVER NEAR MOUNT CLEMENS, MI

LOCATION.--Lat 42°37'45", long 82°53'25", in SW1/4 sec.35, T.3 N., R.13 E., Macomb County, Hydrologic Unit 04090003, on left bank at upstream side of bridge on State Highway 59, 2 mi north of Mount Clemens, and 3.6 mi upstream from mouth.

DRAINAGE AREA.--199 mi².

PERIOD OF RECORD.--May 1947 to current year.

REVISED RECORDS.--WSP 1437: 1948. WSP 1557: Drainage area.

GAGE.--Water-stage recorder. Concrete control since September 1961. Datum of gage is 576.38 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Nov. 15, 1949 and Oct. 3, 1997 to Apr. 22, 1998, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Some regulation at times by mill upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 5 or 6, 1947, reached a stage of 20.0 ft, from floodmark.

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	18	31	367	655	e38	e285	364	43	154	27	92	30
2	15	46	222	376	e40	e610	274	75	144	24	70	23
3	14	170	147	337	e42	937	201	162	120	20	53	19
4	13	348	84	373	e43	934	164	184	115	26	69	16
5	13	411	80	309	e40	779	137	136	98	47	148	15
6	12	346	65	208	e37	1590	116	101	84	47	134	13
7	11	198	54	e125	e36	1530	108	82	77	38	82	27
8	9.2	116	50	e88	e34	796	100	70	69	48	57	36
9	9.7	76	47	e81	e33	503	95	98	61	47	43	31
10	11	60	55	e76	e32	372	90	431	109	40	34	24
11	10	56	281	54	e32	271	82	1170	232	35	29	19
12	9.8	65	504	57	e30	223	76	1050	185	95	28	17
13	8.3	74	375	60	e30	183	74	569	119	887	25	14
14	13	73	194	57	e28	158	73	269	137	737	25	13
15	24	60	139	44	e28	150	70	212	385	261	22	11
16	33	50	96	44	e27	141	68	268	420	163	22	11
17	32	47	93	e42	e26	130	70	210	268	98	20	9.0
18	27	52	110	e40	e26	125	67	153	167	73	18	7.5
19	23	214	101	e37	e27	134	63	139	115	63	18	6.7
20	19	468	83	e35	e28	176	60	121	86	64	16	6.7
21	17	507	67	e34	e30	343	57	126	73	58	15	7.0
22	15	325	73	e33	e36	318	62	549	68	57	14	6.7
23	14	184	68	e33	e44	195	60	2120	67	60	14	5.4
24	15	146	210	e33	e56	151	54	6200	60	49	15	5.3
25	15	224	303	e34	e66	215	50	3450	51	36	15	4.0
26	18	273	244	e34	e81	341	51	1710	46	30	15	4.3
27	24	196	172	e35	e100	419	52	925	41	29	15	4.7
28	27	148	141	e35	e120	378	48	536	36	32	25	5.4
29	31	269	146	e36	e160	260	47	349	33	51	58	3.1
30	35	432	425	e37	—	228	44	224	30	56	57	4.2
31	34	—	755	e37	—	322	—	167	—	62	41	—
TOTAL	570.0	5665	5751	3479	1350	13197	2877	21899	3650	3360	1289	399.0
MEAN	18.4	189	186	112	46.6	426	95.9	706	122	108	41.6	13.3
MAX	35	507	755	655	160	1590	364	6200	420	887	148	36
MIN	8.3	31	47	33	26	125	44	43	30	20	14	3.1
CFSM	0.09	0.95	0.93	0.56	0.23	2.14	0.48	3.55	0.61	0.54	0.21	0.07
IN.	0.11	1.06	1.08	0.65	0.25	2.47	0.54	4.09	0.68	0.63	0.24	0.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2004, BY WATER YEAR (WY)

	MEAN	53.7	90.4	133	127	205	345	262	149	82.8	35.7	26.4	41.0
MAX	479	595	460	507	766	928	560	790	448	127	247	484	
(WY)	1982	1986	1968	1974	1976	1982	1975	1956	1996	1992	1975	1985	
MIN	3.71	7.12	5.63	5.55	8.77	29.6	72.6	25.9	7.08	3.44	2.14	3.12	
(WY)	1964	1964	1959	1961	1963	1964	1963	1958	1988	1955	1955	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1947 - 2004

ANNUAL TOTAL	38269.0		63486.0									
ANNUAL MEAN	105		173									
HIGHEST ANNUAL MEAN												1986
LOWEST ANNUAL MEAN												1964
HIGHEST DAILY MEAN	1650					6200		May 24	6200		May 24	2004
LOWEST DAILY MEAN	2.5					3.1		Sep 29	0.09		Jul 7	1988
ANNUAL SEVEN-DAY MINIMUM	2.6					4.4		Sep 24	0.10		Jul 3	1988
MAXIMUM PEAK FLOW						6830		May 24	6830		May 24	2004
MAXIMUM PEAK STAGE						20.34		May 24	20.34		May 24	2004
INSTANTANEOUS LOW FLOW						2.7		Sep 29	0.08			(a)
ANNUAL RUNOFF (CFSM)	0.527					0.872			0.646			
ANNUAL RUNOFF (INCHES)	7.15					11.87			8.78			
10 PERCENT EXCEEDS	289					372			308			
50 PERCENT EXCEEDS	27					62			42			
90 PERCENT EXCEEDS	5.9					15			7.4			

(a) Part of each day July 4-10, 14, 15, 1988.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164980 MIDDLE BRANCH CLINTON RIVER NEAR WALDENBURG, MI

LOCATION.--Lat 42°38'34", long 82°56'00", in NW1/4 NW1/4 sec.33, T.3 N., R.13 E., Macomb County, Hydrologic Unit 04090003, on left bank at downstream side of bridge on 21 Mile Road, 1.0 mi south of Waldenburg.

DRAINAGE AREA.-- 46.2 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.-- June to September 2004.

GAGE.--Water-stage recorder. Elevation of gage is 590 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good. Gage-height telemeter 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	--	--	--	--	--	--	--	--	e38	12	44	19
2	--	--	--	--	--	--	--	--	e36	11	22	17
3	--	--	--	--	--	--	--	--	32	10	33	14
4	--	--	--	--	--	--	--	--	27	41	140	14
5	--	--	--	--	--	--	--	--	25	32	102	12
6	--	--	--	--	--	--	--	--	23	18	33	12
7	--	--	--	--	--	--	--	--	21	29	23	86
8	--	--	--	--	--	--	--	--	20	33	19	44
9	--	--	--	--	--	--	--	--	31	19	17	26
10	--	--	--	--	--	--	--	--	180	16	21	20
11	--	--	--	--	--	--	--	--	148	13	19	16
12	--	--	--	--	--	--	--	--	72	173	18	14
13	--	--	--	--	--	--	--	--	52	80	15	12
14	--	--	--	--	--	--	--	--	117	50	15	12
15	--	--	--	--	--	--	--	--	172	34	13	11
16	--	--	--	--	--	--	--	--	77	23	15	11
17	--	--	--	--	--	--	--	--	81	20	15	9.6
18	--	--	--	--	--	--	--	--	52	43	13	7.6
19	--	--	--	--	--	--	--	--	38	25	12	7.6
20	--	--	--	--	--	--	--	--	30	20	9.8	6.6
21	--	--	--	--	--	--	--	--	28	17	11	6.3
22	--	--	--	--	--	--	--	--	30	77	9.5	6.3
23	--	--	--	--	--	--	--	--	26	30	9.8	5.3
24	--	--	--	--	--	--	--	--	24	18	12	5.9
25	--	--	--	--	--	--	--	--	21	15	11	5.5
26	--	--	--	--	--	--	--	--	19	12	10	6.5
27	--	--	--	--	--	--	--	--	16	15	11	6.9
28	--	--	--	--	--	--	--	--	16	25	128	6.8
29	--	--	--	--	--	--	--	--	16	18	101	7.4
30	--	--	--	--	--	--	--	--	14	15	42	6.9
31	--	--	--	--	--	--	--	--	--	111	24	--
TOTAL	--	--	--	--	--	--	--	--	1482	1055	968.1	435.2
MEAN	--	--	--	--	--	--	--	--	49.4	34.0	31.2	14.5
MAX	--	--	--	--	--	--	--	--	180	173	140	86
MIN	--	--	--	--	--	--	--	--	14	10	9.5	5.3
CFSM	--	--	--	--	--	--	--	--	1.07	0.74	0.68	0.31
IN.	--	--	--	--	--	--	--	--	1.19	0.85	0.78	0.35

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164980 MIDDLE BRANCH CLINTON RIVER NEAR WALDENBURG, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--June to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June to September 2004.

pH: June to September 2004.

WATER TEMPERATURE: June to September 2004.

DISSOLVED OXYGEN: June to September 2004.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Interruptions in water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: June 29 to July 16, July 22-29, Aug. 9-18, 22-31, Sept. 2, 3, 14-16, 24-29, rated good; Sept. 1, 4, 5, rated fair; Sept. 6, 7, rated poor. pH and water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: June 22-24, July 20, Aug. 2, 3, Sept. 28, 29, rated good; June 25-30, July 21-24, Aug. 4-7, Aug. 27 to Sept. 1, rated fair; July 1-16, 25-29, Aug. 8-18, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 1,070 microsiemens, July 4, 2004; minimum, 336 microsiemens, July 31, Aug. 4, 2004.

pH: Maximum, 8.2 std. units, June 13, June 29 to July 4, July 12, 26, 27, Aug. 3, 10, 12-24, 2004; minimum, 7.3 std. units, Sept. 8, 2004.

WATER TEMPERATURE: Maximum, 24.8°C, July 22, 2004; minimum, 13.0°C, Sept. 30, 2004.

DISSOLVED OXYGEN: Maximum, 10.6 mg/L, Sept. 30, 2004; minimum, 5.5 mg/L, June 10, 2004.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	--	--	--	1040	1010	1020	692	606	654	879	797	835
2	--	--	--	1040	1020	1030	801	692	759	937	878	905
3	953	937	944	1050	1020	1040	802	632	690	944	928	936
4	963	947	953	1070	435	773	718	336	504	964	925	941
5	977	963	971	834	514	728	713	508	622	988	961	971
6	970	958	966	905	791	865	812	704	769	996	962	986
7	991	957	977	1000	774	935	879	802	859	966	494	629
8	1000	968	988	852	603	761	914	861	896	651	501	607
9	1050	610	935	924	848	881	950	893	920	853	490	693
10	807	558	622	968	917	944	939	745	886	866	826	849
11	809	635	727	1010	954	983	862	718	803	943	862	901
12	887	808	853	963	381	521	901	853	881	960	935	946
13	926	722	896	779	572	698	929	871	904	963	945	953
14	771	449	680	832	735	797	950	922	942	1000	957	968
15	753	520	634	855	802	836	992	926	960	1000	957	979
16	868	530	764	921	851	895	1010	960	992	967	945	957
17	857	674	783	962	905	932	960	798	874	983	935	955
18	929	857	903	975	547	721	938	904	919	972	955	965
19	966	929	951	876	742	818	953	938	948	984	967	975
20	968	952	962	932	876	909	982	952	969	979	968	974
21	987	968	980	959	900	938	997	976	984	983	963	975
22	999	961	977	944	477	624	991	960	974	982	964	972
23	970	927	956	786	682	747	993	974	985	976	965	970
24	979	947	968	881	785	843	1020	791	902	982	965	975
25	1020	977	995	927	881	903	993	926	948	992	952	976
26	1020	1000	1010	961	920	945	958	918	936	1000	983	992
27	1040	981	1010	993	952	974	967	854	934	995	986	989
28	1040	1020	1030	903	831	887	945	396	542	994	962	977
29	1040	1010	1030	970	840	869	603	476	525	998	958	979
30	1040	1010	1030	926	876	902	713	603	666	1040	984	1000
31	--	--	--	924	336	563	797	688	753	--	--	--
MONTH	--	--	--	1070	336	848	1020	336	835	1040	490	924

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164980 MIDDLE BRANCH CLINTON RIVER NEAR WALDENBURG, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	--	--	--	8.2	8.1	8.1	8.1	7.9	8.0	8.1	8.0	8.0
2	--	--	--	8.2	8.1	8.1	8.1	8.0	8.0	8.1	8.0	8.1
3	8.1	8.0	8.1	8.2	8.1	8.1	8.2	7.9	8.0	8.1	8.0	8.1
4	8.1	8.1	8.1	8.2	7.8	7.9	8.0	7.8	7.8	8.1	8.0	8.1
5	8.1	8.1	8.1	8.0	7.7	7.9	8.0	7.8	7.9	8.1	8.0	8.0
6	8.1	8.1	8.1	8.0	7.9	8.0	8.1	8.0	8.0	8.1	7.9	8.0
7	8.1	8.1	8.1	8.1	7.9	8.0	8.1	8.1	8.1	8.0	7.7	7.8
8	8.1	8.0	8.1	8.0	7.8	7.9	8.1	8.1	8.1	7.9	7.3	7.7
9	8.1	7.8	8.0	8.1	8.0	8.0	8.1	8.1	8.1	8.0	7.5	7.9
10	7.9	7.7	7.8	8.1	8.0	8.0	8.2	8.0	8.1	7.9	7.8	7.9
11	8.0	7.9	7.9	8.0	8.0	8.0	8.1	7.9	8.0	7.9	7.8	7.9
12	8.1	8.0	8.0	8.2	7.6	7.7	8.2	8.1	8.1	7.9	7.9	7.9
13	8.2	8.1	8.1	7.9	7.6	7.8	8.2	8.1	8.1	7.9	7.8	7.9
14	8.1	7.9	8.0	8.0	7.9	7.9	8.2	8.2	8.2	7.9	7.8	7.9
15	8.0	7.8	7.9	8.1	7.9	8.0	8.2	8.1	8.2	7.9	7.9	7.9
16	8.0	7.8	7.9	8.1	8.0	8.0	8.2	8.1	8.2	8.1	7.8	8.0
17	8.0	7.8	7.9	8.1	8.0	8.0	8.2	8.0	8.2	8.1	8.0	8.0
18	8.0	7.9	8.0	8.1	7.8	8.0	8.2	8.1	8.1	8.1	8.0	8.0
19	8.0	8.0	8.0	8.1	8.0	8.0	8.2	8.1	8.2	8.1	8.0	8.0
20	8.1	8.0	8.0	8.1	8.0	8.1	8.2	8.1	8.1	8.1	8.0	8.0
21	8.1	8.0	8.1	8.1	8.0	8.0	8.2	8.1	8.2	8.1	8.0	8.0
22	8.1	8.0	8.1	8.0	7.7	7.9	8.2	8.1	8.2	8.1	8.0	8.0
23	8.1	8.0	8.1	8.1	7.9	8.0	8.2	8.1	8.1	8.1	8.0	8.0
24	8.1	8.0	8.0	8.1	8.0	8.0	8.2	8.0	8.1	8.1	8.0	8.0
25	8.1	8.0	8.1	8.1	8.1	8.1	8.1	8.0	8.1	8.1	8.0	8.0
26	8.1	8.1	8.1	8.2	8.1	8.1	8.1	8.0	8.0	8.1	8.0	8.0
27	8.1	8.1	8.1	8.2	8.1	8.1	8.1	8.0	8.0	8.1	8.0	8.0
28	8.1	8.1	8.1	8.1	8.0	8.0	8.0	7.7	7.8	8.1	8.0	8.0
29	8.2	8.1	8.1	8.1	8.0	8.0	7.9	7.8	7.8	8.1	8.0	8.0
30	8.2	8.1	8.1	8.1	8.0	8.1	8.0	7.9	7.9	8.1	8.0	8.0
31	--	--	--	8.1	7.8	7.9	8.1	8.0	8.0	--	--	--
MAX	--	--	--	8.2	8.1	8.1	8.2	8.2	8.2	8.1	8.0	8.1
MIN	--	--	--	7.9	7.6	7.7	7.9	7.7	7.8	7.9	7.3	7.7

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	--	--	--	22.3	19.1	20.5	22.9	20.8	21.9	20.8	18.7	19.7
2	--	--	--	21.8	19.0	20.3	23.2	21.1	22.2	21.3	19.1	20.1
3	17.8	15.4	16.5	22.0	18.8	20.2	24.0	21.4	22.7	21.5	19.4	20.4
4	17.6	14.8	16.2	22.9	20.2	21.4	22.9	19.6	20.7	22.1	20.0	21.0
5	17.7	14.9	16.3	22.8	20.6	21.7	20.4	19.1	19.7	22.8	20.7	21.7
6	18.5	16.1	17.2	21.2	19.1	20.3	19.5	17.6	18.7	23.2	20.9	22.0
7	20.3	17.4	18.8	21.8	20.4	21.0	19.2	17.3	18.4	22.5	21.1	21.9
8	22.6	19.1	20.8	20.7	18.6	19.9	20.1	18.0	19.1	21.5	19.2	20.2
9	23.9	21.2	22.2	20.2	17.5	18.9	20.6	19.1	19.9	19.5	18.4	18.9
10	21.9	18.3	19.9	21.4	18.9	20.1	20.8	19.6	20.1	19.0	17.2	18.2
11	18.3	16.8	17.3	22.9	19.4	21.1	19.8	18.2	19.0	19.3	17.3	18.3
12	17.3	16.0	16.6	21.8	20.2	21.1	18.2	16.9	17.5	19.9	17.6	18.8
13	19.4	16.9	18.0	23.2	21.0	22.1	17.4	16.2	16.8	21.2	18.3	19.6
14	21.7	19.3	20.3	22.6	20.2	21.4	18.2	16.3	17.2	21.3	19.1	20.2
15	21.9	20.1	21.1	21.3	19.2	20.3	18.9	16.5	17.6	22.0	19.8	20.8
16	20.7	19.3	19.9	21.7	19.5	20.6	18.4	16.4	17.5	22.2	20.1	21.0
17	20.4	19.1	19.7	21.2	20.2	20.7	18.8	17.2	18.0	20.1	17.0	18.6
18	21.3	19.9	20.5	21.2	19.6	20.3	19.8	17.9	18.9	18.0	15.6	16.7
19	20.5	18.4	19.7	21.6	19.5	20.5	20.7	18.8	19.6	17.5	15.1	16.1
20	18.7	16.7	17.7	22.6	20.2	21.3	19.3	17.3	18.2	17.3	14.8	15.9
21	17.7	16.5	17.0	23.5	21.3	22.5	18.8	16.0	17.3	17.8	14.9	16.2
22	19.0	16.6	17.6	24.8	22.1	23.5	19.2	16.0	17.6	18.4	15.4	16.7
23	19.8	16.8	18.2	23.9	20.8	22.5	19.0	17.9	18.4	19.3	16.0	17.4
24	19.9	17.7	18.7	20.8	18.8	19.6	20.5	17.5	19.0	18.7	17.0	17.9
25	18.3	16.7	17.5	19.8	18.2	18.9	22.3	19.5	20.9	18.0	17.1	17.5
26	18.4	16.1	17.2	19.2	18.0	18.6	23.4	21.3	22.2	18.5	16.3	17.2
27	19.0	16.1	17.5	18.5	17.1	17.8	24.4	22.1	23.1	17.8	15.3	16.4
28	18.5	17.0	17.7	20.0	16.7	18.2	23.4	21.5	22.2	16.3	14.7	15.7
29	19.8	16.5	18.1	20.8	19.1	20.0	21.5	19.5	20.2	15.7	13.9	14.6
30	20.9	17.7	19.4	20.5	19.9	20.2	20.0	18.4	19.2	15.3	13.0	14.0
31	--	--	--	22.7	19.8	21.1	20.1	18.1	19.1	--	--	--
MONTH	--	--	--	24.8	16.7	20.5	24.4	16.0	19.4	23.2	13.0	18.5

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164980 MIDDLE BRANCH CLINTON RIVER NEAR WALDENBURG, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	8.8	7.4	8.0	7.9	6.6	7.2	8.1	7.4	7.7
2	--	--	--	8.7	7.6	8.0	7.6	6.9	7.2	7.8	7.2	7.5
3	8.9	8.3	8.6	9.0	7.7	8.1	7.3	5.9	6.6	7.9	7.1	7.4
4	9.1	8.5	8.8	7.7	6.0	6.7	7.4	6.0	6.8	8.2	7.0	7.5
5	9.0	8.5	8.8	7.2	5.8	6.5	8.0	6.8	7.4	7.9	6.9	7.3
6	8.8	8.3	8.5	7.8	6.5	7.2	8.2	7.2	7.9	--	--	--
7	8.5	7.7	8.1	7.5	6.8	7.1	8.2	7.7	8.0	--	--	--
8	8.2	7.2	7.7	7.5	6.6	7.1	8.2	7.6	8.0	--	--	--
9	7.6	5.6	6.8	8.2	7.4	7.9	8.3	7.7	7.9	--	--	--
10	7.5	5.5	6.7	8.0	7.6	7.8	8.4	7.1	7.7	8.2	7.1	7.6
11	8.5	7.4	8.0	8.0	7.3	7.5	8.3	7.0	7.7	8.2	7.5	7.8
12	9.0	8.2	8.6	7.4	6.6	6.9	9.0	7.8	8.3	8.2	7.4	7.7
13	8.7	7.6	8.3	7.5	6.4	6.9	9.2	8.3	8.8	8.3	7.3	7.7
14	7.8	7.0	7.3	7.2	6.6	6.9	9.5	8.5	8.9	8.3	7.1	7.5
15	7.8	6.6	7.2	7.7	7.1	7.4	9.1	8.4	8.8	8.2	7.0	7.5
16	7.6	6.8	7.1	7.6	7.2	7.4	9.5	8.2	8.9	8.1	6.8	7.3
17	7.8	6.7	7.2	7.6	6.9	7.2	9.5	8.2	8.8	8.7	6.9	7.7
18	7.7	7.0	7.4	7.9	6.9	7.4	9.0	7.7	8.2	9.6	7.7	8.4
19	8.0	7.3	7.6	8.2	7.2	7.6	8.7	7.2	7.8	10.0	8.2	8.7
20	8.5	7.8	8.2	8.0	7.2	7.6	8.5	7.5	7.9	10.4	8.4	8.9
21	8.4	8.0	8.2	7.4	6.5	7.1	9.0	7.6	8.2	10.2	8.2	8.8
22	8.5	8.0	8.2	7.0	5.9	6.5	9.4	7.8	8.3	10.2	8.1	8.7
23	8.3	7.7	8.0	7.8	6.2	7.0	8.3	7.4	7.8	10.3	7.7	8.5
24	8.0	7.2	7.8	8.2	7.2	7.7	8.4	6.8	7.5	9.8	7.5	8.2
25	8.8	7.8	8.2	8.5	7.5	8.0	7.8	6.3	7.1	9.9	7.4	8.1
26	8.9	8.3	8.5	8.5	8.0	8.2	7.4	6.1	6.5	9.9	7.6	8.2
27	9.0	8.3	8.6	8.4	7.9	8.1	7.6	5.9	6.5	9.9	7.7	8.4
28	8.7	8.1	8.4	8.8	8.0	8.3	6.9	6.6	6.8	10.1	7.9	8.5
29	9.6	8.2	8.7	8.3	7.4	7.9	7.4	6.5	7.0	10.5	7.6	8.5
30	9.1	8.0	8.4	7.7	7.1	7.4	8.1	7.0	7.6	10.6	8.0	8.8
31	--	--	--	7.5	6.7	7.1	8.1	7.4	7.8	--	--	--
MONTH	--	--	--	9.0	5.8	7.4	9.5	5.9	7.7	--	--	--

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165500 CLINTON RIVER AT MOUNT CLEMENS, MI

LOCATION.--Lat 42°35'45", long 82°54'32", Macomb County, Hydrologic Unit 04090003, on left bank at downstream side of bridge on Moravian Drive, 0.2 mi downstream from North Branch, and 0.5 mi west of Mount Clemens.

DRAINAGE AREA.--734 mi².

PERIOD OF RECORD.--May 1934 to current year.

REVISED RECORDS.--WSP 1084: 1943, 1945-46. WSP 1937: 1935, 1936(M), 1937-39, 1949(M), 1950. WSP 1557: Drainage area. WSP 1727: 1952(M), 1954(M).

GAGE.--Water-stage recorder and acoustic doppler current meter. Datum of gage is 570.43 ft above sea level. May 10, 1934 to Jan. 11, 1939, nonrecording gage at same site and datum. Mar. 15, 1938 to Jan. 3, 1952, auxiliary nonrecording gage 1.6 mi downstream from base gage at same datum. Jan. 4, 1952 to June 27, 2000, auxiliary water-stage recorder on right bank 2.0 mi downstream from base gage at same datum.

REMARKS.--Records fair. Gage-height telemeter 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	197	258	659	948	e290	785	909	368	e1300	281	675	387
2	174	572	522	841	e300	1020	752	990	e1150	275	426	337
3	176	1000	432	731	409	1170	619	665	e1000	255	1280	285
4	274	981	379	692	380	1130	564	509	e900	484	1640	266
5	191	746	354	655	309	2090	515	457	e700	614	1400	247
6	168	600	337	562	324	2790	472	366	e650	356	739	222
7	158	507	321	e480	341	2250	445	357	e600	377	550	912
8	149	430	313	e420	285	1450	435	316	e580	455	442	555
9	144	389	316	e390	297	1070	417	785	e800	329	396	412
10	138	366	563	e350	308	895	388	2080	e2000	277	417	e300
11	137	594	1580	e360	292	793	364	2690	e2000	252	374	e240
12	129	515	914	363	297	739	333	1890	e1500	812	363	e210
13	115	457	645	360	298	648	355	1240	e950	1250	308	e200
14	452	413	473	333	296	617	316	1150	e1400	1120	263	e190
15	1100	392	425	297	281	596	294	1130	e1800	779	238	e185
16	424	433	444	e310	265	581	279	955	e1600	543	244	e180
17	276	411	505	e340	268	610	279	778	e1300	429	226	e170
18	228	627	450	362	270	601	278	724	e1000	576	230	e160
19	200	1580	421	333	281	593	277	646	e900	495	193	e150
20	188	1090	400	361	434	1210	244	569	e750	419	206	e140
21	144	842	357	353	995	1240	398	1090	e680	420	202	e140
22	136	642	370	331	614	865	311	3200	e650	666	178	e135
23	142	522	622	e350	592	703	262	5570	e600	564	183	e135
24	138	784	765	e310	591	663	238	e12500	e550	413	183	e130
25	227	746	650	e300	562	1300	268	e7600	466	340	198	e130
26	401	601	559	e290	569	1450	284	e4500	418	282	229	e125
27	283	511	475	e300	611	1220	236	e3000	352	332	201	e125
28	253	666	429	e310	641	997	214	e2100	340	537	1170	e130
29	378	1020	606	e300	683	844	221	e1700	314	401	1270	e140
30	308	800	1410	e290	—	850	211	e1500	306	372	742	141
31	282	—	1120	e300	—	1040	—	e1400	—	863	456	—
TOTAL	7710	19495	17816	12922	12083	32810	11178	62825	27556	15568	15622	7079
MEAN	249	650	575	417	417	1058	373	2027	919	502	504	236
MAX	1100	1580	1580	948	995	2790	909	12500	2000	1250	1640	912
MIN	115	258	313	290	265	581	211	316	306	252	178	125
CFSM	0.34	0.89	0.78	0.57	0.57	1.44	0.51	2.76	1.25	0.68	0.69	0.32
IN.	0.39	0.99	0.90	0.65	0.61	1.66	0.57	3.18	1.40	0.79	0.79	0.36

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 2004, BY WATER YEAR (WY)

	MEAN	326	426	535	547	760	1116	1036	710	494	305	259	283
MAX	1550	1492	1615	1739	2407	2255	3090	2747	1543	865	907	1144	
(WY)	1982	1986	1968	1993	1938	1982	1947	1943	1989	1969	2000	1975	
MIN	64.1	79.0	84.3	93.9	118	263	249	164	52.9	50.9	51.7	52.5	
(WY)	1935	1945	1945	1945	1940	1964	1946	1958	1934	1934	1934	1941	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1934 - 2004

ANNUAL TOTAL	168247							242664				
ANNUAL MEAN	461							663				
HIGHEST ANNUAL MEAN										567		
LOWEST ANNUAL MEAN										929		1974
HIGHEST DAILY MEAN										230		1964
LOWEST DAILY MEAN										25		Aug 24 1934
ANNUAL SEVEN-DAY MINIMUM										28		Aug 22 1934
MAXIMUM PEAK FLOW										21200		Apr 6 1947
MAXIMUM PEAK STAGE										(a)23.55		Apr 6 1947
ANNUAL RUNOFF (CFSM)										0.772		
ANNUAL RUNOFF (INCHES)										10.49		
10 PERCENT EXCEEDS										1200		
50 PERCENT EXCEEDS										426		
90 PERCENT EXCEEDS										120		

(a) From floodmark.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165557 CLINTON RIVER BY-PASS AT MOUTH AT MOUNT CLEMENS, MI

LOCATION.--Lat 42°33'41", long 82°50'43", in SW1/4 sec.30, T.2 N., R.14 E., Macomb County, Hydrologic Unit 04090003, on left bank 15 ft upstream from bridge on Jefferson Avenue, 2.0 mi southeast of Mt. Clemens.

DRAINAGE AREA.--Not determined.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1979 to September 1983 (gage-heights only), July to September 2004.

GAGE.--Water-stage recorder. Datum of gage is 565.36 ft above sea level. October 1979 to September 1983, water-stage recorder 600 ft downstream at different datum.

REMARKS.--Records good. Gage height and discharge affected by wind direction and seiche on Lake St. Clair, 600 ft downstream. 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	--	--	--	--	--	--	--	--	--	--	146	32
2	--	--	--	--	--	--	--	--	--	--	64	86
3	--	--	--	--	--	--	--	--	--	--	341	66
4	--	--	--	--	--	--	--	--	--	--	695	52
5	--	--	--	--	--	--	--	--	--	--	430	38
6	--	--	--	--	--	--	--	--	--	--	34	44
7	--	--	--	--	--	--	--	--	--	--	20	163
8	--	--	--	--	--	--	--	--	--	--	63	103
9	--	--	--	--	--	--	--	--	--	--	76	22
10	--	--	--	--	--	--	--	--	--	--	0.41	105
11	--	--	--	--	--	--	--	--	--	--	-8.0	69
12	--	--	--	--	--	--	--	--	--	--	3.2	74
13	--	--	--	--	--	--	--	--	--	--	12	60
14	--	--	--	--	--	--	--	--	--	--	56	75
15	--	--	--	--	--	--	--	--	--	--	84	72
16	--	--	--	--	--	--	--	--	--	--	95	46
17	--	--	--	--	--	--	--	--	--	--	66	27
18	--	--	--	--	--	--	--	--	--	--	58	39
19	--	--	--	--	--	--	--	--	--	--	62	20
20	--	--	--	--	--	--	--	--	--	34	46	68
21	--	--	--	--	--	--	--	--	--	85	27	42
22	--	--	--	--	--	--	--	--	--	15	45	44
23	--	--	--	--	--	--	--	--	--	8.2	43	67
24	--	--	--	--	--	--	--	--	--	14	66	28
25	--	--	--	--	--	--	--	--	--	47	88	5.0
26	--	--	--	--	--	--	--	--	--	12	113	27
27	--	--	--	--	--	--	--	--	--	27	43	33
28	--	--	--	--	--	--	--	--	--	20	347	10
29	--	--	--	--	--	--	--	--	--	78	360	3.5
30	--	--	--	--	--	--	--	--	--	54	113	29
31	--	--	--	--	--	--	--	--	--	49	111	--
TOTAL	--	--	--	--	--	--	--	--	--	443.2	3699.61	1549.5
MEAN	--	--	--	--	--	--	--	--	--	36.9	119	51.6
MAX	--	--	--	--	--	--	--	--	--	85	695	163
MIN	--	--	--	--	--	--	--	--	--	8.2	-8.0	3.5

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165557 CLINTON RIVER BY-PASS AT MOUTH AT MOUNT CLEMENS, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--July to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July to September 2004.

pH: July to September 2004.

WATER TEMPERATURE: July to September 2004.

DISSOLVED OXYGEN: July to September 2004.

INSTRUMENTATION: Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Interruptions in water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: July 23-28, Aug. 27 to Sept. 1, rated good. pH records rated excellent. Water temperature records rated excellent except the following period: Aug. 15-17, rated good. Dissolved oxygen records rated excellent except the following periods: July 24-26, Aug. 6-9, 27, 28, Sept. 6-8, 13, 14, rated good; July 27-29, Aug. 10-16, Sept. 9, 15, rated fair; Aug. 17, 18, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 805 microsiemens, Aug. 3, 2004; minimum, 360 microsiemens, Aug. 4, 2004.

pH: Maximum, 9.0 std. units, July 22, 2004; minimum, 7.2 std. units, Sept. 8, 9, 10, 2004.

WATER TEMPERATURE: Maximum, 27.8°C, July 22, 2004; minimum, 18.0°C, Sept. 30, 2004.

DISSOLVED OXYGEN: Maximum, 13.2 mg/L, July 22, Aug. 11, 2004; minimum, 0.4 mg/L, Aug. 5, 6, 2004.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	--	--	--	--	--	--	798	605	713	633	468	527
2	--	--	--	--	--	--	718	551	619	543	474	490
3	--	--	--	--	--	--	805	403	547	507	464	482
4	--	--	--	--	--	--	714	360	487	565	463	487
5	--	--	--	--	--	--	550	429	513	497	464	477
6	--	--	--	--	--	--	565	542	550	473	422	456
7	--	--	--	--	--	--	582	533	554	760	458	557
8	--	--	--	--	--	--	641	550	574	731	692	705
9	--	--	--	--	--	--	649	506	562	702	677	690
10	--	--	--	--	--	--	610	515	536	686	598	666
11	--	--	--	--	--	--	569	517	545	671	530	578
12	--	--	--	--	--	--	555	513	537	604	533	563
13	--	--	--	--	--	--	585	490	534	621	508	557
14	--	--	--	--	--	--	614	526	548	541	445	502
15	--	--	--	--	--	--	608	549	583	481	438	463
16	--	--	--	--	--	--	620	518	575	514	443	482
17	--	--	--	--	--	--	587	518	540	503	454	480
18	--	--	--	--	--	--	588	520	544	511	464	480
19	--	--	--	--	--	--	583	521	551	556	467	504
20	--	--	--	--	--	--	570	528	551	513	481	502
21	--	--	--	644	503	562	594	491	554	561	449	511
22	--	--	--	662	510	538	591	508	543	593	475	528
23	--	--	--	575	525	551	585	532	553	632	450	530
24	--	--	--	689	520	580	587	521	562	539	448	466
25	--	--	--	693	554	624	595	477	542	505	443	478
26	--	--	--	688	542	610	595	484	515	518	483	498
27	--	--	--	619	584	598	575	444	487	547	498	519
28	--	--	--	710	581	629	745	399	525	532	494	514
29	--	--	--	737	502	651	595	402	472	527	478	495
30	--	--	--	734	475	529	472	442	457	523	431	488
31	--	--	--	683	513	603	557	444	478	--	--	--
MONTH	--	--	--	--	--	--	805	360	544	760	422	522

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165557 CLINTON RIVER BY-PASS AT MOUTH AT MOUNT CLEMENS, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	--	--	--	8.0	7.3	7.5	7.7	7.3	7.4
2	--	--	--	--	--	--	8.3	7.6	7.9	8.5	7.4	7.9
3	--	--	--	--	--	--	8.7	7.5	7.8	8.7	7.7	8.2
4	--	--	--	--	--	--	7.8	7.5	7.6	8.6	7.5	8.3
5	--	--	--	--	--	--	7.7	7.4	7.7	8.7	7.9	8.4
6	--	--	--	--	--	--	7.7	7.4	7.5	8.6	7.9	8.4
7	--	--	--	--	--	--	7.7	7.4	7.5	8.4	7.3	7.8
8	--	--	--	--	--	--	7.7	7.4	7.5	7.4	7.2	7.2
9	--	--	--	--	--	--	7.9	7.5	7.7	7.4	7.2	7.3
10	--	--	--	--	--	--	8.3	7.6	7.9	7.5	7.2	7.3
11	--	--	--	--	--	--	8.6	7.6	7.8	7.8	7.3	7.5
12	--	--	--	--	--	--	8.0	7.7	7.8	7.7	7.4	7.5
13	--	--	--	--	--	--	8.1	7.7	7.9	8.5	7.4	7.7
14	--	--	--	--	--	--	7.9	7.6	7.8	8.5	7.9	8.1
15	--	--	--	--	--	--	8.0	7.6	7.7	8.3	7.9	8.1
16	--	--	--	--	--	--	8.1	7.7	7.8	8.1	7.6	7.8
17	--	--	--	--	--	--	8.1	7.8	8.0	7.9	7.6	7.7
18	--	--	--	--	--	--	8.1	7.6	7.9	7.9	7.5	7.6
19	--	--	--	--	--	--	8.0	7.5	7.8	7.7	7.4	7.6
20	--	--	--	--	--	--	7.9	7.5	7.6	7.7	7.5	7.6
21	--	--	--	8.8	7.7	8.3	8.2	7.4	7.7	7.9	7.5	7.5
22	--	--	--	9.0	7.6	8.6	8.1	7.6	7.7	7.9	7.4	7.6
23	--	--	--	8.8	8.3	8.7	7.9	7.5	7.7	8.3	7.3	7.6
24	--	--	--	8.6	7.8	8.4	8.1	7.6	7.7	8.2	7.7	8.0
25	--	--	--	8.0	7.6	7.8	8.6	7.6	7.9	8.0	7.6	7.7
26	--	--	--	8.0	7.6	7.7	8.4	7.7	7.9	7.7	7.5	7.6
27	--	--	--	7.9	7.6	7.8	8.2	7.6	7.8	7.6	7.4	7.5
28	--	--	--	7.7	7.5	7.6	7.9	7.5	7.6	7.6	7.4	7.5
29	--	--	--	8.1	7.4	7.5	7.7	7.6	7.7	7.7	7.4	7.6
30	--	--	--	8.2	7.5	7.9	7.6	7.3	7.4	7.9	7.5	7.6
31	--	--	--	8.2	7.6	7.9	7.6	7.3	7.4	--	--	--
MAX	--	--	--	--	--	--	8.7	7.8	8.0	8.7	7.9	8.4
MIN	--	--	--	--	--	--	7.6	7.3	7.4	7.4	7.2	7.2

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	--	--	--	24.6	22.5	23.6	23.0	20.0	21.4
2	--	--	--	--	--	--	24.9	24.0	24.5	24.2	22.5	23.3
3	--	--	--	--	--	--	26.0	22.6	23.9	25.1	23.3	24.0
4	--	--	--	--	--	--	23.1	20.3	21.9	25.6	24.1	24.6
5	--	--	--	--	--	--	21.6	20.0	20.6	26.4	25.1	25.6
6	--	--	--	--	--	--	21.3	20.0	20.6	25.9	24.9	25.4
7	--	--	--	--	--	--	22.0	20.4	21.2	26.4	23.4	25.1
8	--	--	--	--	--	--	22.2	21.0	21.5	23.5	22.4	22.9
9	--	--	--	--	--	--	23.4	21.1	22.4	22.6	21.7	22.1
10	--	--	--	--	--	--	23.6	22.0	23.0	22.2	21.2	21.7
11	--	--	--	--	--	--	23.3	22.2	22.5	22.8	21.5	22.0
12	--	--	--	--	--	--	22.4	21.4	21.7	23.0	21.8	22.3
13	--	--	--	--	--	--	21.5	20.7	21.0	24.1	22.2	23.1
14	--	--	--	--	--	--	21.4	20.5	20.8	24.1	23.1	23.5
15	--	--	--	--	--	--	21.6	20.5	21.0	24.4	23.3	23.8
16	--	--	--	--	--	--	22.5	20.7	21.4	24.4	23.4	23.9
17	--	--	--	--	--	--	22.3	21.6	21.9	23.7	21.7	22.8
18	--	--	--	--	--	--	22.7	21.6	22.1	22.0	20.7	21.3
19	--	--	--	--	--	--	22.8	21.9	22.3	21.2	20.3	20.8
20	--	--	--	--	--	--	22.5	21.6	21.9	20.8	20.1	20.5
21	--	--	--	26.0	23.8	24.7	22.5	20.9	21.5	21.2	20.0	20.5
22	--	--	--	27.8	23.7	25.9	22.2	21.0	21.6	21.4	20.3	20.6
23	--	--	--	26.8	25.5	26.0	22.0	21.5	21.7	22.4	20.6	21.2
24	--	--	--	25.5	24.2	24.6	22.8	21.3	21.9	22.3	21.7	22.0
25	--	--	--	24.2	23.3	23.6	24.1	22.2	22.9	22.2	21.2	21.5
26	--	--	--	23.9	22.8	23.2	24.6	23.2	23.8	21.4	20.7	21.1
27	--	--	--	23.1	21.8	22.4	25.5	24.1	24.4	21.2	20.4	20.7
28	--	--	--	22.2	21.0	21.6	25.2	22.1	24.0	20.8	19.6	20.2
29	--	--	--	23.8	21.4	22.5	22.1	19.7	21.3	19.6	18.6	19.1
30	--	--	--	23.7	23.0	23.4	20.1	19.2	19.4	19.4	18.0	18.5
31	--	--	--	25.7	23.0	24.2	22.0	19.3	20.2	--	--	--
MONTH	--	--	--	--	--	--	26.0	19.2	22.0	26.4	18.0	22.2

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165559 CLINTON RIVER NEAR MOUNT CLEMENS, MI

LOCATION.--Lat 42°35'47", long 82°49'34", in SE1/4 NW1/4 sec.17, T.2 N., R.14 E., Macomb County, Hydrologic Unit 04090003, on left bank 400 ft upstream from bridge on Bridgeview Road, and 2.0 mi east of Mount Clemens.

DRAINAGE AREA.--Not determined.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July to September 2004.

GAGE.--Water-stage recorder. Datum of gage is 580.77 ft above sea level.

REMARKS.--Water-discharge records fair. Gage height and discharge affected by wind direction and seiche on Lake St. Clair, 3.5 mi downstream. 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	--	--	--	--	--	--	--	--	--	--	575	306
2	--	--	--	--	--	--	--	--	--	--	326	285
3	--	--	--	--	--	--	--	--	--	--	702	263
4	--	--	--	--	--	--	--	--	--	--	782	265
5	--	--	--	--	--	--	--	--	--	--	700	257
6	--	--	--	--	--	--	--	--	--	--	546	245
7	--	--	--	--	--	--	--	--	--	--	448	696
8	--	--	--	--	--	--	--	--	--	--	326	510
9	--	--	--	--	--	--	--	--	--	--	310	354
10	--	--	--	--	--	--	--	--	--	--	315	272
11	--	--	--	--	--	--	--	--	--	--	296	266
12	--	--	--	--	--	--	--	--	--	--	e291	251
13	--	--	--	--	--	--	--	--	--	--	e281	235
14	--	--	--	--	--	--	--	--	--	--	e279	253
15	--	--	--	--	--	--	--	--	--	--	e265	236
16	--	--	--	--	--	--	--	--	--	--	e265	226
17	--	--	--	--	--	--	--	--	--	--	e261	230
18	--	--	--	--	--	--	--	--	--	--	e250	203
19	--	--	--	--	--	--	--	--	--	--	254	214
20	--	--	--	--	--	--	--	--	--	--	254	186
21	--	--	--	--	--	--	--	--	--	256	241	217
22	--	--	--	--	--	--	--	--	--	418	236	193
23	--	--	--	--	--	--	--	--	--	401	228	211
24	--	--	--	--	--	--	--	--	--	272	242	217
25	--	--	--	--	--	--	--	--	--	288	263	187
26	--	--	--	--	--	--	--	--	--	282	244	213
27	--	--	--	--	--	--	--	--	--	263	233	190
28	--	--	--	--	--	--	--	--	--	399	715	206
29	--	--	--	--	--	--	--	--	--	328	835	217
30	--	--	--	--	--	--	--	--	--	309	615	204
31	--	--	--	--	--	--	--	--	--	655	386	--
TOTAL	--	--	--	--	--	--	--	--	--	--	11964	7808
MEAN	--	--	--	--	--	--	--	--	--	--	386	260
MAX	--	--	--	--	--	--	--	--	--	--	835	696
MIN	--	--	--	--	--	--	--	--	--	--	228	186

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165559 CLINTON RIVER NEAR MOUNT CLEMENS, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--July to September 2004.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July to September 2004.

pH: July to September 2004.

WATER TEMPERATURE: July to September 2004.

DISSOLVED OXYGEN: July to September 2004.

INSTRUMENTATION: Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Interruptions in water-quality record were due to malfunction of the instrument. Specific conductance, pH, and water temperature records rated excellent. Dissolved oxygen records rated excellent except the following periods: July 17, 20, 22, 30, Aug. 27 to Sept. 1, Sept. 5, 6, 21-24, rated good; July 18, 19, 23, 24, 31, Aug. 1, Sept. 7, 8, 25-29, rated fair; July 25-29, Aug. 2-6, 18, Sept. 9-15, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 1,190 microsiemens, Aug. 20, 21, 2004; minimum, 378 microsiemens, Aug. 5, 2004.

pH: Maximum, 8.2 std. units, Aug. 25, 2004; minimum, 7.5 std. units, Aug. 3, 4, 5, 6, 28, 29, 30, Sept. 7, 8, 2004.

WATER TEMPERATURE: Maximum, 25.8°C, July 22, 2004; minimum, 16.2°C, Sept. 30, 2004.

DISSOLVED OXYGEN: Maximum, 10.5 mg/L, Aug. 25, Sept. 22, 2004; minimum, 4.6 mg/L, Aug. 29, 2004.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	--	--	--	--	--	--	682	623	644	858	778	821
2	--	--	--	--	--	--	787	643	729	899	858	879
3	--	--	--	--	--	--	838	430	692	932	899	917
4	--	--	--	--	--	--	604	383	549	977	932	958
5	--	--	--	--	--	--	617	378	494	1010	970	984
6	--	--	--	--	--	--	780	617	725	1040	1010	1020
7	--	--	--	--	--	--	844	780	821	1040	589	920
8	--	--	--	--	--	--	881	844	864	620	576	604
9	--	--	--	--	--	--	923	881	901	778	620	694
10	--	--	--	--	--	--	956	923	946	882	778	843
11	--	--	--	--	--	--	967	916	951	909	881	890
12	--	--	--	--	--	--	--	--	--	953	909	928
13	--	--	--	--	--	--	--	--	--	988	952	963
14	--	--	--	--	--	--	--	--	--	1020	988	1000
15	--	--	--	--	--	--	--	--	--	1050	1020	1040
16	--	--	--	837	779	806	--	--	--	1080	1050	1070
17	--	--	--	849	830	837	--	--	--	1090	1080	1090
18	--	--	--	915	849	880	1060	1040	1050	1100	1090	1100
19	--	--	--	885	813	847	1100	1050	1060	1110	1100	1100
20	--	--	--	947	874	906	1190	1100	1130	1120	1110	1120
21	--	--	--	910	894	900	1190	1110	1150	1140	1100	1110
22	--	--	--	930	876	906	1120	1110	1110	1140	1110	1120
23	--	--	--	876	729	783	1150	1110	1130	1130	1120	1130
24	--	--	--	846	829	836	1170	1130	1160	1160	1130	1140
25	--	--	--	865	846	856	1130	1100	1110	1180	1150	1160
26	--	--	--	897	865	884	1110	1090	1100	1180	1140	1160
27	--	--	--	937	890	912	1120	1100	1120	1140	1130	1130
28	--	--	--	1080	929	1010	1120	483	937	1160	1130	1150
29	--	--	--	1010	849	903	561	433	498	1160	1140	1150
30	--	--	--	858	813	830	643	462	555	1150	1140	1150
31	--	--	--	893	682	865	778	643	707	--	--	--
MONTH	--	--	--	--	--	--	--	--	--	1180	576	1010

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165559 CLINTON RIVER NEAR MOUNT CLEMENS, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	--	--	--	7.8	7.6	7.7	7.9	7.6	7.7
2	--	--	--	--	--	--	7.9	7.7	7.7	7.9	7.8	7.8
3	--	--	--	--	--	--	7.9	7.5	7.8	7.9	7.8	7.9
4	--	--	--	--	--	--	7.6	7.5	7.6	8.0	7.8	7.9
5	--	--	--	--	--	--	7.6	7.5	7.5	8.0	7.8	7.9
6	--	--	--	--	--	--	7.7	7.5	7.6	8.0	7.9	7.9
7	--	--	--	--	--	--	7.8	7.6	7.6	8.0	7.5	7.9
8	--	--	--	--	--	--	7.8	7.6	7.7	7.7	7.5	7.6
9	--	--	--	--	--	--	7.8	7.6	7.7	7.8	7.6	7.6
10	--	--	--	--	--	--	7.8	7.7	7.8	7.8	7.6	7.7
11	--	--	--	--	--	--	7.9	7.8	7.8	7.8	7.7	7.8
12	--	--	--	--	--	--	7.8	7.8	7.8	7.9	7.7	7.8
13	--	--	--	--	--	--	--	--	--	7.8	7.7	7.8
14	--	--	--	--	--	--	--	--	--	7.9	7.7	7.8
15	--	--	--	7.8	7.8	7.8	--	--	--	8.1	7.8	7.9
16	--	--	--	8.0	7.8	7.8	--	--	--	8.0	7.9	8.0
17	--	--	--	7.9	7.8	7.9	--	--	--	8.0	7.9	7.9
18	--	--	--	7.9	7.8	7.9	8.0	7.8	7.9	8.0	7.9	8.0
19	--	--	--	7.9	7.8	7.8	8.0	7.8	7.9	8.1	7.9	7.9
20	--	--	--	8.0	7.8	7.8	8.0	7.9	7.9	8.0	7.9	7.9
21	--	--	--	8.0	7.9	7.9	8.0	7.9	7.9	8.1	7.9	8.0
22	--	--	--	8.1	7.8	8.0	8.1	7.9	8.0	8.1	7.9	8.0
23	--	--	--	7.8	7.7	7.8	8.0	7.9	7.9	8.1	7.9	8.0
24	--	--	--	8.0	7.8	7.8	8.1	7.9	8.0	8.0	7.9	7.9
25	--	--	--	8.0	7.9	8.0	8.2	8.0	8.1	8.0	7.9	7.9
26	--	--	--	8.1	8.0	8.0	8.1	8.0	8.0	8.0	7.8	7.9
27	--	--	--	8.0	7.9	8.0	8.1	8.0	8.0	7.9	7.8	7.9
28	--	--	--	8.0	7.8	7.9	8.0	7.5	7.8	8.0	7.8	7.9
29	--	--	--	7.9	7.7	7.8	7.6	7.5	7.5	8.0	7.8	7.9
30	--	--	--	7.9	7.8	7.8	7.6	7.5	7.6	8.1	7.9	8.0
31	--	--	--	7.9	7.6	7.9	7.7	7.6	7.6	--	--	--
MAX	--	--	--	--	--	--	--	--	--	8.1	7.9	8.0
MIN	--	--	--	--	--	--	--	--	--	7.7	7.5	7.6

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	--	--	--	23.6	21.5	22.5	21.8	19.9	20.7
2	--	--	--	--	--	--	24.1	22.2	23.0	22.5	21.0	21.6
3	--	--	--	--	--	--	24.6	22.9	23.7	23.2	22.0	22.3
4	--	--	--	--	--	--	22.9	20.2	22.2	24.0	22.3	23.0
5	--	--	--	--	--	--	21.2	20.0	20.4	24.5	22.8	23.4
6	--	--	--	--	--	--	21.1	19.4	20.2	24.8	23.1	23.9
7	--	--	--	--	--	--	21.0	19.1	20.0	24.3	21.9	23.4
8	--	--	--	--	--	--	21.5	19.7	20.6	21.9	21.2	21.7
9	--	--	--	--	--	--	21.7	20.7	21.2	21.2	20.1	20.5
10	--	--	--	--	--	--	21.9	21.3	21.6	20.3	19.1	19.6
11	--	--	--	--	--	--	21.7	20.9	21.2	21.0	19.9	20.3
12	--	--	--	--	--	--	20.9	20.1	20.4	21.8	19.7	20.5
13	--	--	--	--	--	--	--	--	--	22.0	20.3	20.9
14	--	--	--	--	--	--	--	--	--	22.3	20.8	21.4
15	--	--	--	--	--	--	--	--	--	23.5	21.5	22.1
16	--	--	--	22.8	20.8	21.8	--	--	--	23.0	22.1	22.5
17	--	--	--	22.5	21.6	22.1	--	--	--	22.4	20.3	21.3
18	--	--	--	22.6	21.5	22.0	20.9	19.8	20.5	20.4	19.6	20.0
19	--	--	--	22.6	20.7	21.6	21.3	20.2	20.6	20.2	19.2	19.6
20	--	--	--	23.1	21.4	22.1	20.9	20.4	20.5	19.5	18.6	18.9
21	--	--	--	24.1	22.6	23.2	20.8	19.6	20.2	19.7	18.0	18.6
22	--	--	--	25.8	23.7	24.5	21.3	19.8	20.4	19.8	18.2	18.7
23	--	--	--	24.7	23.6	24.1	20.4	19.8	20.1	20.1	18.5	19.0
24	--	--	--	23.7	22.4	23.0	21.5	19.8	20.4	20.1	19.1	19.5
25	--	--	--	22.5	21.3	21.8	23.0	20.7	21.7	19.7	19.3	19.5
26	--	--	--	21.5	20.7	21.1	23.3	22.0	22.5	20.0	18.9	19.4
27	--	--	--	20.7	19.5	20.3	24.6	23.0	23.5	19.4	18.7	19.0
28	--	--	--	20.3	18.9	19.5	24.2	22.1	23.5	19.1	17.9	18.6
29	--	--	--	21.4	19.4	20.2	22.1	19.7	21.3	17.9	17.0	17.3
30	--	--	--	21.7	21.2	21.4	20.6	19.0	19.8	17.5	16.2	16.6
31	--	--	--	22.7	21.2	21.9	21.1	19.2	20.1	--	--	--
MONTH	--	--	--	--	--	--	--	--	--	24.8	16.2	20.5

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165559 CLINTON RIVER NEAR MOUNT CLEMENS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	--	--	--	7.3	6.1	6.8	7.5	6.0	6.9
2	--	--	--	--	--	--	8.3	6.1	7.1	7.8	6.4	7.1
3	--	--	--	--	--	--	8.2	4.9	6.7	8.0	6.3	7.2
4	--	--	--	--	--	--	6.8	5.2	6.2	8.5	6.5	7.4
5	--	--	--	--	--	--	7.7	6.4	7.0	8.9	6.4	7.8
6	--	--	--	--	--	--	--	--	--	9.5	7.4	8.1
7	--	--	--	--	--	--	--	--	--	8.2	5.2	6.8
8	--	--	--	--	--	--	--	--	--	6.2	5.3	6.0
9	--	--	--	--	--	--	--	--	--	7.8	5.4	6.5
10	--	--	--	--	--	--	--	--	--	7.8	5.6	6.9
11	--	--	--	--	--	--	--	--	--	8.1	6.6	7.6
12	--	--	--	--	--	--	--	--	--	8.7	6.8	7.9
13	--	--	--	--	--	--	--	--	--	8.8	6.3	7.7
14	--	--	--	--	--	--	--	--	--	9.0	6.3	7.8
15	--	--	--	--	--	--	--	--	--	10.0	7.3	8.2
16	--	--	--	7.1	5.7	6.3	--	--	--	9.1	7.4	8.0
17	--	--	--	6.9	6.1	6.5	--	--	--	8.0	7.0	7.5
18	--	--	--	7.2	6.2	6.7	8.3	7.4	7.8	8.2	5.1	7.5
19	--	--	--	7.3	6.4	6.7	8.6	7.1	7.5	8.9	7.0	7.8
20	--	--	--	7.3	6.0	6.8	8.1	7.0	7.5	9.2	7.5	8.1
21	--	--	--	7.4	6.2	6.8	8.7	6.9	7.7	10.2	7.6	8.8
22	--	--	--	7.8	5.7	6.8	9.3	7.6	8.3	10.5	7.9	8.9
23	--	--	--	6.8	5.3	5.9	8.6	7.6	8.1	10.1	7.6	9.0
24	--	--	--	8.2	5.8	6.9	9.6	7.7	8.6	9.2	7.1	8.3
25	--	--	--	8.4	7.3	7.9	10.5	8.3	9.2	8.9	6.9	8.2
26	--	--	--	8.8	7.6	8.4	9.5	7.7	8.6	9.4	5.7	7.6
27	--	--	--	8.4	7.0	8.0	9.2	7.2	8.1	8.8	6.4	7.8
28	--	--	--	8.1	6.8	7.7	7.8	4.8	6.3	9.0	6.2	8.2
29	--	--	--	7.7	5.9	6.9	6.6	4.6	5.4	9.1	7.0	8.3
30	--	--	--	7.6	6.3	7.0	7.2	6.5	6.9	9.9	8.0	8.7
31	--	--	--	7.8	6.0	7.0	7.5	5.7	6.6	--	--	--
MONTH	--	--	--	--	--	--	--	--	--	10.5	5.1	7.8

STREAMS TRIBUTARY TO DETROIT RIVER

04166000 RIVER ROUGE AT BIRMINGHAM, MI

LOCATION.--Lat 42°32'45", long 83°13'25", in NW1/4 sec.36, T.2 N., R.10 E., Oakland County, Hydrologic Unit 04090004, on left bank 25 ft downstream from mouth of Quarton Lake outlet, and 100 ft upstream from bridge on Maple Road in Birmingham.

DRAINAGE AREA--33.3 mi². Prior to water year 1971, drainage area was 36.9 mi². An area of 3.6 mi² noncontributing since then.

PERIOD OF RECORD.--June 1950 to current year.

REVISED RECORDS.--WSP 1387: 1951-52(M). WSP 1557: Drainage area.

GAGE.--Water-stage recorder. Concrete control since July 27, 1962. Datum of gage is 715.94 ft above sea level.

REMARKS.--Records good. Occasional regulation by Quarton Lake upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	8.6	9.4	19	26	13	35	29	18	42	15	23	13
2	8.4	44	20	35	13	46	26	57	32	14	17	11
3	8.1	63	16	30	14	37	24	30	29	13	70	10
4	11	39	14	25	15	31	23	21	27	21	115	9.6
5	9.0	21	14	24	14	137	21	19	24	22	51	9.4
6	7.4	15	13	21	14	66	20	17	22	16	24	9.3
7	7.1	12	12	19	15	44	20	14	21	25	20	48
8	6.8	11	12	19	15	42	20	14	19	20	17	24
9	6.8	11	12	19	13	34	19	47	22	15	15	16
10	6.4	10	49	18	13	28	18	116	179	14	23	13
11	6.1	24	90	18	13	27	18	85	107	13	22	11
12	5.4	19	31	17	13	26	18	37	51	40	19	10
13	5.4	13	21	17	13	23	19	36	40	26	16	9.7
14	32	11	19	16	13	23	18	82	80	21	14	9.5
15	62	11	18	17	12	22	17	92	70	19	13	9.0
16	18	12	20	16	12	22	16	40	51	15	13	8.6
17	12	12	22	15	12	23	16	34	56	21	12	7.6
18	10	57	19	15	12	22	16	35	39	22	13	7.5
19	8.9	109	17	15	13	23	15	30	32	16	12	7.4
20	8.8	35	16	15	23	73	13	27	28	14	12	7.2
21	8.3	22	15	14	52	46	22	135	27	13	11	6.9
22	7.7	17	15	14	29	28	16	217	28	38	11	6.7
23	7.6	15	32	13	29	24	14	375	25	17	10	6.4
24	7.9	35	35	13	27	27	14	155	24	12	9.8	6.3
25	13	26	25	13	24	84	16	77	22	11	9.7	6.1
26	21	17	22	13	25	70	17	60	22	10	13	6.1
27	15	15	22	13	27	47	15	51	20	17	12	5.1
28	14	34	19	14	27	35	13	45	19	35	57	5.3
29	15	46	45	13	30	31	13	38	18	19	32	5.8
30	12	25	73	13	—	32	12	36	16	14	22	6.7
31	10	—	35	13	—	37	—	43	—	72	16	—
TOTAL	379.7	790.4	790	543	545	1245	538	2083	1192	640	724.5	312.2
MEAN	12.2	26.3	25.5	17.5	18.8	40.2	17.9	67.2	39.7	20.6	23.4	10.4
MAX	62	109	90	35	52	137	29	375	179	72	115	48
MIN	5.4	9.4	12	13	12	22	12	14	16	10	9.7	5.1
CFSM	0.37	0.79	0.77	0.53	0.56	1.21	0.54	2.02	1.19	0.62	0.70	0.31
IN.	0.42	0.88	0.88	0.61	0.61	1.39	0.60	2.33	1.33	0.71	0.81	0.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 2004, BY WATER YEAR (WY)

	MEAN	13.1	16.9	20.2	19.8	25.7	38.7	35.9	27.6	20.9	13.6	11.4	11.9
MAX	61.4	47.7	51.5	56.0	76.6	82.5	63.6	98.1	84.0	48.2	39.6	47.1	
(WY)	2002	1993	1988	1993	2001	1982	1974	1956	1989	1968	2000	2000	
MIN	1.48	2.11	1.88	2.18	2.21	7.59	10.4	5.82	4.33	1.42	1.58	1.42	
(WY)	1965	1965	1964	1963	1963	1964	1963	1958	1966	1966	1954	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1950 - 2004

ANNUAL TOTAL	6797.0	9782.8	
ANNUAL MEAN	18.6	26.7	(a)21.3
HIGHEST ANNUAL MEAN			35.6
LOWEST ANNUAL MEAN			4.55
HIGHEST DAILY MEAN	244	375	902
LOWEST DAILY MEAN	3.0	5.1	0.20
ANNUAL SEVEN-DAY MINIMUM	3.3	5.9	0.34
MAXIMUM PEAK FLOW		574	1390
MAXIMUM PEAK STAGE		5.23	8.70
INSTANTANEOUS LOW FLOW		4.2	0.10
ANNUAL RUNOFF (CFSM)	0.559	0.803	0.640
ANNUAL RUNOFF (INCHES)	7.59	10.93	8.70
10 PERCENT EXCEEDS	35	50	43
50 PERCENT EXCEEDS	13	18	13
90 PERCENT EXCEEDS	5.5	9.4	3.4

(a) Annual mean, water years 1951-70, 15.3 ft³/s, 5.63 in/yr; water years 1971-04, 24.8 ft³/s, 10.11 in/yr.

(b) Aug. 8, 9, 1963.

STREAMS TRIBUTARY TO DETROIT RIVER

04166040 FRANKLIN BRANCH AT SOUTHFIELD, MI

LOCATION.--Lat 42°30'05", long 83°16'44", in SW1/4 SW1/4 sec.9, T.1 N., R.10 E., Oakland County, Hydrologic Unit 04090004, on right bank 5 ft upstream from bridge on 12 Mile Road in Southfield.

DRAINAGE AREA.--17.0 mi².

PERIOD OF RECORD.--February to September 2004.

GAGE.--Water-stage recorder. Elevation of gage is 650 ft above sea level, from topographic map.

REMARKS.--Records good. Several measurements of water temperature were made during the year. Gage-height telemeter 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	--	--	--	--	e7.0	25	19	13	21	7.0	13	6.8
2	--	--	--	--	e7.0	36	17	35	20	6.2	9.7	6.0
3	--	--	--	--	e7.5	24	16	15	18	6.0	15	5.4
4	--	--	--	--	e8.0	23	15	12	16	12	41	4.9
5	--	--	--	--	e7.5	89	13	13	15	9.6	17	4.7
6	--	--	--	--	e7.5	43	13	10	14	8.4	12	5.3
7	--	--	--	--	e8.0	35	12	11	13	16	9.7	30
8	--	--	--	--	e8.0	33	12	9.7	12	10	8.2	9.8
9	--	--	--	--	e8.0	26	12	50	12	9.2	7.2	7.7
10	--	--	--	--	e7.5	21	11	98	78	7.2	7.4	5.9
11	--	--	--	--	e7.3	21	11	73	57	6.7	7.2	5.5
12	--	--	--	--	7.1	19	10	37	33	17	6.5	4.8
13	--	--	--	--	6.7	16	11	43	28	9.1	5.9	4.3
14	--	--	--	--	6.6	16	10	66	50	8.4	5.7	4.3
15	--	--	--	--	6.0	15	9.7	47	35	7.1	5.2	3.9
16	--	--	--	--	e6.5	15	9.7	31	30	6.0	4.8	4.0
17	--	--	--	--	e6.2	15	9.3	26	28	9.1	5.2	3.8
18	--	--	--	--	6.2	15	9.0	25	22	8.8	6.0	3.6
19	--	--	--	--	6.4	15	8.6	21	18	6.7	5.1	3.3
20	--	--	--	--	16	49	8.3	19	16	5.9	5.2	3.2
21	--	--	--	--	28	28	14	80	15	6.2	5.1	3.1
22	--	--	--	--	20	19	9.1	74	15	15	4.5	3.1
23	--	--	--	--	19	17	8.6	121	13	8.3	4.4	3.0
24	--	--	--	--	18	20	8.1	65	13	6.1	3.9	3.2
25	--	--	--	--	15	48	10	41	12	5.3	3.7	3.1
26	--	--	--	--	16	44	8.9	33	11	4.9	4.1	3.0
27	--	--	--	--	17	30	8.3	28	9.9	15	4.5	3.0
28	--	--	--	--	18	23	7.8	24	9.4	20	29	3.0
29	--	--	--	--	20	21	7.3	21	8.5	10	20	3.2
30	--	--	--	--	--	22	6.9	23	7.6	7.9	11	3.2
31	--	--	--	--	--	24	--	27	--	32	8.2	--
TOTAL	--	--	--	--	322.0	847	325.6	1191.7	650.4	307.1	295.4	158.1
MEAN	--	--	--	--	11.1	27.3	10.9	38.4	21.7	9.91	9.53	5.27
MAX	--	--	--	--	28	89	19	121	78	32	41	30
MIN	--	--	--	--	6.0	15	6.9	9.7	7.6	4.9	3.7	3.0
CFSM	--	--	--	--	0.65	1.61	0.64	2.26	1.28	0.58	0.56	0.31
IN.	--	--	--	--	0.70	1.85	0.71	2.61	1.42	0.67	0.65	0.35

(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166100 RIVER ROUGE AT SOUTHFIELD, MI

LOCATION.--Lat 42°26'52", long 83°17'52", in SW1/4 sec.32, T.1 N., R.10 E., Oakland County, Hydrologic Unit 04090004, on right bank at downstream side of bridge on Beech Road in Southfield.

DRAINAGE AREA.--87.9 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1958 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 609.62 ft above sea level (City of Southfield bench mark). Prior to Sept. 30, 1958, nonrecording gage at same site and datum.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Gage-height telemeter 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	20	25	71	110	e36	137	71	46	104	32	60	34
2	19	90	49	161	e37	187	62	185	82	31	39	31
3	20	180	46	135	e39	140	56	82	72	30	136	29
4	30	113	41	105	e40	114	53	51	61	48	260	27
5	23	45	40	105	e39	402	48	51	56	48	130	25
6	19	35	39	92	e39	219	46	42	52	35	54	24
7	19	29	37	73	e41	156	46	41	49	64	43	153
8	18	27	36	e60	e40	154	45	40	45	49	38	56
9	18	25	37	e52	e37	120	44	131	46	35	35	40
10	18	24	122	e48	e36	89	42	500	306	33	35	33
11	17	78	276	e48	e36	82	41	277	310	30	39	30
12	17	42	116	e47	e36	77	40	134	164	117	35	28
13	18	31	e60	e46	e36	63	42	114	105	59	33	25
14	124	28	45	e45	e35	61	40	239	176	40	31	23
15	305	27	44	e45	e34	60	38	e240	185	39	30	22
16	78	32	58	e43	e33	59	38	e120	122	37	29	21
17	37	31	78	e42	e33	65	37	e100	141	47	28	20
18	31	147	52	e41	e34	63	37	97	98	51	31	19
19	28	335	43	e39	e36	67	36	71	71	36	29	19
20	26	128	39	e37	e80	226	34	62	60	32	28	18
21	27	69	37	e37	246	158	61	304	55	31	30	17
22	29	44	38	e36	146	78	41	662	58	63	26	17
23	27	38	123	e36	133	63	35	523	51	42	24	16
24	27	129	135	e36	125	74	34	560	49	31	23	16
25	53	101	89	e36	102	208	40	194	45	28	22	16
26	71	50	68	e36	106	212	39	152	42	25	27	15
27	37	42	51	e36	114	147	36	133	39	52	25	15
28	30	109	45	e37	108	97	34	112	38	99	158	14
29	46	195	151	e37	121	75	33	92	36	46	132	15
30	31	106	277	e36	---	75	32	84	34	36	53	15
31	28	---	151	e36	---	113	---	126	---	162	39	---
TOTAL	1291	2355	2494	1773	1978	3841	1281	5565	2752	1508	1702	833
MEAN	41.6	78.5	80.5	57.2	68.2	124	42.7	180	91.7	48.6	54.9	27.8
MAX	305	335	277	161	246	402	71	662	310	162	260	153
MIN	17	24	36	36	33	59	32	40	34	25	22	14
CFSM	0.47	0.89	0.92	0.65	0.78	1.41	0.49	2.04	1.04	0.55	0.62	0.32
IN.	0.55	1.00	1.06	0.75	0.84	1.63	0.54	2.36	1.16	0.64	0.72	0.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2004, BY WATER YEAR (WY)

	MEAN	46.0	58.4	67.8	64.0	84.4	129	116	83.5	68.3	41.7	39.0	41.0
MAX	211	164	178	203	254	327	225	191	241	118	142	147	147
(WY)	2002	1993	1988	1993	1976	1982	1977	1983	1989	1968	1995	1986	1986
MIN	4.08	7.24	6.92	8.95	9.14	38.9	38.5	19.6	13.7	5.52	3.77	3.37	3.37
(WY)	1964	1964	1964	1961	1963	1964	1963	1958	1971	1964	1963	1963	1963

SUMMARY STATISTICS FOR 2003 CALENDAR YEAR FOR 2004 WATER YEAR WATER YEARS 1958 - 2004

ANNUAL TOTAL	23329.0	27373											
ANNUAL MEAN	63.9	74.8											
HIGHEST ANNUAL MEAN										70.2			
LOWEST ANNUAL MEAN										105			1993
HIGHEST DAILY MEAN	724	Apr 5	662	May 22	3210					20.4			1964
LOWEST DAILY MEAN	8.2	Jul 31	14	Sep 28	0.30								Jun 26 1968
ANNUAL SEVEN-DAY MINIMUM	9.0	Jul 25	15	Sep 24	0.66								Jul 31 1964
MAXIMUM PEAK FLOW			878	May 24	4900								Jul 26 1964
MAXIMUM PEAK STAGE			10.94	May 24	19.04								Jun 26 1968
INSTANTANEOUS LOW FLOW			14	(a)	0.10								Aug 2 1964
ANNUAL RUNOFF (CFSM)	0.727		0.851		0.799								
ANNUAL RUNOFF (INCHES)	9.87		11.58		10.86								
10 PERCENT EXCEEDS	135		152		138								
50 PERCENT EXCEEDS	39		44		40								
90 PERCENT EXCEEDS	17		25		12								

(a) Sept. 27, 28, 29.

(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166100 RIVER ROUGE AT SOUTHFIELD, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1999 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July 2001 to April 2004.

WATER TEMPERATURE: April 1999 to current year.

DISSOLVED OXYGEN: April 1999 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval, dissolved oxygen data not collected during winter months, prior to 2002 water year no parameters collected during winter months.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except for the following periods: Oct. 1, 2, 12-15, Nov. 11-19, Nov. 27 to Dec. 1, Feb. 10-17, Feb. 28 to Mar. 12, Mar. 14-18, Apr. 1-9, 13-16, rated good; Oct. 16, 17, Dec. 2-10, Mar. 19-23, rated fair; Dec. 11-15, Mar. 24-29, rated poor. Water temperature records rated excellent. Dissolved oxygen records rated excellent except for the following periods: Oct. 19, 20, 24, 25, Mar. 31, Apr. 12, 13, 25, 26, May 26, 27, July 14, 27, Aug. 13, rated good; Oct. 26-29, Apr. 1, 14-16, 27, July 28, Aug. 14-16, rated fair; Apr. 2-9, Aug. 17, 18, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 8,870 microsiemens, Feb. 4, 2004; minimum, 398 microsiemens, Sept. 15, 2002.

WATER TEMPERATURE: Maximum, 26.5°C, July 4, 2002; minimum, -0.5°C, on many days during the 2003 winter period.

DISSOLVED OXYGEN: Maximum, 15.3 mg/L, Apr. 19, 2003, Apr. 5, 2004; minimum, 4.4 mg/L, July 4, 1999, July 21, 2001.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 8,870 microsiemens, Feb. 4; minimum, 567 microsiemens, Oct. 15.

WATER TEMPERATURE: Maximum, 24.0°C, July 22; minimum, -0.2°C, Feb. 3-5, 7.

DISSOLVED OXYGEN: Maximum recorded, 15.3 mg/L, Apr. 5; minimum, 5.9 mg/L, June 10.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	1220	1130	1160	1300	1200	1250	1240	1160	1210	1410	1350	1390
2	1280	1160	1200	1490	958	1150	1310	1240	1270	1610	1310	1390
3	1420	1070	1190	1010	785	873	1340	1300	1310	1390	1320	1360
4	1370	1130	1260	959	791	865	1410	1340	1370	1380	1350	1360
5	1200	1120	1140	1030	958	998	1420	1390	1400	3830	1360	2360
6	1200	1130	1150	1090	1030	1060	1490	1410	1430	3670	2890	3150
7	1280	1150	1190	1130	1080	1110	1480	1450	1460	2950	2350	2750
8	1260	1190	1210	1180	1130	1160	1540	1480	1490	2590	2280	2440
9	1330	1200	1240	1200	1170	1190	1500	1490	1500	2440	2180	2340
10	1340	1210	1250	1300	1190	1250	1620	825	1430	2190	2070	2150
11	1360	1270	1300	1360	964	1110	1030	775	900	2070	1940	2000
12	1410	1270	1330	1090	977	1020	1150	1030	1100	2180	1920	2000
13	1400	1320	1350	1160	1090	1130	1260	1150	1220	2370	2040	2180
14	1510	649	1180	1250	1160	1200	1690	1260	1400	2420	2090	2210
15	836	567	678	1270	1220	1250	2530	1660	2000	2140	2030	2080
16	988	836	919	1420	1250	1330	3510	1930	2340	2360	2080	2180
17	1140	988	1050	1300	1250	1270	2730	1900	2280	2390	2110	2300
18	1150	1110	1130	1290	722	1070	3010	2210	2570	2920	2370	2630
19	1250	1140	1180	—	—	—	2880	2090	2430	3330	2920	3090
20	1230	1200	1210	—	—	—	2100	2030	2070	3000	2430	2700
21	1300	1210	1230	—	—	—	2070	1910	1980	2430	2220	2300
22	1280	1230	1250	—	—	—	1950	1840	1890	2300	2090	2210
23	1390	1240	1290	—	—	—	3000	1730	2120	2100	2030	2080
24	1350	1230	1270	—	—	—	2340	1660	1820	2320	2020	2080
25	1480	1120	1270	1070	851	966	2650	1620	1850	2620	2250	2410
26	1120	970	1040	1190	1070	1140	3940	2300	2680	2590	2240	2380
27	1060	988	1020	1260	1190	1210	3000	2420	2650	3170	2260	2510
28	1190	1060	1110	1330	913	1190	2540	2020	2190	4650	3170	3720
29	1260	1120	1180	1010	833	898	2890	1740	2150	6000	3970	4730
30	1180	1110	1140	1160	1010	1090	1740	1260	1330	4280	3300	3930
31	1200	1150	1180	—	—	—	1380	1350	1370	3310	2690	3010
MONTH	1510	567	1170	—	—	—	3940	775	1750	6000	1310	2430

STREAMS TRIBUTARY TO DETROIT RIVER

04166100 RIVER ROUGE AT SOUTHFIELD, MI-Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN			
FEBRUARY				MARCH				APRIL				MAY			
1	2690	2440	2550	2610	2040	2170	1610	1560	1590	---	---	---			
2	2610	2350	2530	2810	1940	2230	1620	1590	1610	---	---	---			
3	7120	2310	3330	1940	1890	1910	1640	1610	1620	---	---	---			
4	8870	4860	6400	2110	1890	1990	1680	1610	1630	---	---	---			
5	6560	3610	4540	2350	1310	1650	1660	1630	1650	---	---	---			
6	5900	3360	3870	1530	1380	1470	1700	1660	1680	---	---	---			
7	7000	4540	5510	1800	1530	1610	1670	1650	1660	---	---	---			
8	5580	3690	4440	1750	1640	1680	1710	1650	1670	---	---	---			
9	3690	3050	3360	1800	1630	1710	1720	1650	1680	---	---	---			
10	3290	2950	3170	1720	1660	1680	1660	1630	1640	---	---	---			
11	2960	2730	2880	2020	1670	1750	1630	1610	1630	---	---	---			
12	2850	2610	2780	1970	1750	1810	1640	1610	1630	---	---	---			
13	2850	2480	2650	1860	1760	1800	1770	1600	1670	---	---	---			
14	2600	2460	2540	1880	1780	1800	1650	1610	1630	---	---	---			
15	2670	2460	2600	1960	1850	1910	1620	1580	1600	---	---	---			
16	2710	2480	2590	3820	1850	2120	---	---	---	---	---	---			
17	2560	2210	2320	4470	2820	3330	---	---	---	---	---	---			
18	2280	2130	2220	4490	3210	3570	---	---	---	---	---	---			
19	2250	2040	2190	3420	2820	3110	---	---	---	---	---	---			
20	4310	2200	2770	3010	1560	2260	---	---	---	---	---	---			
21	4100	2620	2940	1700	1550	1650	---	---	---	---	---	---			
22	3040	2660	2880	1780	1700	1740	---	---	---	---	---	---			
23	2710	2530	2600	1810	1780	1800	---	---	---	---	---	---			
24	3950	2580	3080	2070	1770	1850	---	---	---	---	---	---			
25	3920	3160	3470	2020	1390	1590	---	---	---	---	---	---			
26	3160	2630	2820	1620	1420	1480	---	---	---	---	---	---			
27	2720	2450	2540	1570	1430	1510	---	---	---	---	---	---			
28	2480	2320	2370	1640	1570	1600	---	---	---	---	---	---			
29	2340	2120	2220	1700	1640	1680	---	---	---	---	---	---			
30	---	---	---	1870	1650	1700	---	---	---	---	---	---			
31	---	---	---	1870	1540	1630	---	---	---	---	---	---			
MONTH	8870	2040	3110	4490	1310	1930	---	---	---	---	---	---			

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	10.7	9.3	10.2	11.8	11.4	11.7	4.3	3.1	4.0	2.6	1.5	1.9
2	9.5	8.2	8.8	12.1	11.2	11.7	3.1	1.4	2.0	5.0	2.3	3.5
3	9.5	7.8	8.4	12.1	11.3	11.8	1.4	0.2	0.7	6.5	5.0	6.0
4	9.5	8.5	9.0	12.5	10.9	11.6	1.6	0.2	0.8	6.1	2.8	4.6
5	9.2	7.6	8.4	12.5	10.8	12.1	2.5	1.6	2.0	2.8	1.8	2.3
6	8.9	7.1	8.0	10.8	8.3	9.5	2.3	1.4	1.7	1.8	-0.1	0.5
7	9.5	7.1	8.2	8.3	5.7	6.8	1.4	0.3	0.8	0.0	-0.1	0.0
8	11.6	8.9	10.1	5.7	3.4	4.4	1.9	0.6	1.1	0.0	-0.1	0.0
9	12.8	10.8	11.7	3.4	2.0	2.7	3.3	1.9	2.6	0.0	0.0	0.0
10	14.0	12.3	13.1	3.2	1.4	2.3	5.6	3.3	4.3	0.1	0.0	0.0
11	14.8	13.0	13.8	7.2	3.2	5.5	5.7	3.2	4.7	0.1	0.0	0.0
12	14.8	13.7	14.1	8.6	7.1	7.8	3.2	0.8	1.8	0.1	0.0	0.0
13	13.7	11.8	12.7	8.1	4.6	6.3	0.8	-0.1	0.2	0.1	0.0	0.0
14	12.5	11.4	11.9	4.6	3.4	4.0	1.1	0.1	0.5	0.0	0.0	0.0
15	12.2	11.1	11.5	5.3	4.1	4.7	1.7	1.1	1.4	0.0	0.0	0.0
16	11.1	10.1	10.6	6.4	5.2	5.8	2.5	1.3	1.9	0.0	0.0	0.0
17	10.2	8.5	9.2	7.5	6.4	6.9	2.5	1.8	2.2	0.0	0.0	0.0
18	9.5	8.6	9.0	—	—	—	1.8	1.3	1.5	0.0	0.0	0.0
19	10.2	8.7	9.4	—	—	—	1.7	1.2	1.5	0.0	-0.1	0.0
20	11.2	8.6	9.8	—	—	—	1.4	0.3	0.7	0.0	-0.1	0.0
21	11.5	10.9	11.3	—	—	—	1.0	0.0	0.4	0.0	0.0	0.0
22	10.9	9.1	10.0	—	—	—	2.8	1.0	1.7	0.0	0.0	0.0
23	9.1	8.0	8.5	—	—	—	3.9	2.7	3.3	0.0	0.0	0.0
24	9.4	7.9	8.6	—	—	—	3.4	2.7	3.1	0.0	0.0	0.0
25	10.1	8.9	9.4	6.8	4.4	5.0	2.7	2.0	2.2	0.0	0.0	0.0
26	10.8	9.9	10.2	5.0	4.1	4.5	2.0	1.2	1.6	0.0	0.0	0.0
27	10.1	9.0	9.5	5.4	4.2	4.7	1.4	0.5	1.0	0.0	0.0	0.0
28	9.0	8.1	8.4	5.6	5.2	5.4	2.6	0.6	1.4	0.0	-0.1	0.0
29	8.6	8.0	8.3	5.2	3.9	4.4	4.9	2.6	3.8	-0.1	-0.1	-0.1
30	9.4	7.8	8.6	4.3	3.5	3.9	4.9	2.7	3.9	0.0	-0.1	-0.1
31	11.8	9.3	10.4	—	—	—	2.9	2.2	2.5	0.0	-0.1	0.0
MONTH	14.8	7.1	10.0	—	—	—	5.7	-0.1	2.0	6.5	-0.1	0.6

STREAMS TRIBUTARY TO DETROIT RIVER

04166100 RIVER ROUGE AT SOUTHFIELD, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	0.0	0.0	0.0	3.7	2.6	3.0	8.0	6.1	7.0	16.8	12.6	15.1	
2	0.0	0.0	0.0	5.5	3.7	4.6	8.3	6.9	7.5	12.7	9.7	10.4	
3	0.1	-0.2	0.0	5.3	4.7	4.9	9.5	6.7	8.1	10.6	9.0	9.8	
4	-0.1	-0.2	-0.2	5.8	4.5	5.0	9.3	6.8	8.0	11.4	8.0	9.8	
5	-0.1	-0.2	-0.1	7.5	5.2	6.2	8.2	5.0	6.8	14.9	11.0	12.8	
6	0.1	-0.1	-0.1	7.2	5.6	6.1	7.4	5.4	6.5	16.0	11.8	14.0	
7	-0.1	-0.2	-0.1	5.6	4.4	4.9	10.6	6.4	8.4	16.0	14.0	15.1	
8	0.0	-0.1	-0.1	4.4	3.4	3.9	9.9	8.4	9.2	14.0	12.3	13.2	
9	0.0	-0.1	0.0	5.0	3.1	4.0	10.6	7.4	9.1	16.7	12.5	14.2	
10	0.0	-0.1	0.0	5.1	3.1	4.2	10.9	8.0	9.6	18.8	16.1	17.3	
11	0.0	-0.1	0.0	4.7	3.8	4.2	9.9	8.0	9.0	18.8	17.6	18.3	
12	0.0	-0.1	0.0	3.8	1.6	2.5	9.5	6.5	8.1	20.2	17.5	18.9	
13	0.0	0.0	0.0	2.8	0.4	1.6	8.4	7.2	7.8	20.5	19.2	19.8	
14	0.6	0.0	0.0	3.1	1.9	2.5	10.6	6.1	8.4	20.3	19.4	19.9	
15	0.0	-0.1	0.0	4.7	2.0	3.3	12.4	8.3	10.3	—	—	—	
16	0.0	-0.1	0.0	4.1	1.3	2.5	13.5	9.4	11.5	—	—	—	
17	0.0	-0.1	0.0	2.3	0.8	1.5	15.6	12.1	13.8	—	—	—	
18	0.0	0.0	0.0	3.0	1.6	2.3	18.4	14.1	16.1	18.3	16.9	17.5	
19	0.6	0.0	0.0	4.6	2.3	3.4	18.5	16.0	17.1	17.7	16.0	16.9	
20	0.7	-0.1	0.0	5.4	3.8	4.5	16.2	12.9	14.1	17.8	16.1	16.9	
21	-0.1	-0.1	-0.1	5.3	3.7	4.4	14.3	11.3	12.9	18.3	16.6	17.4	
22	0.0	-0.1	-0.1	3.8	1.7	3.0	14.5	12.4	13.5	18.2	16.6	17.2	
23	0.0	-0.1	-0.1	5.1	2.0	3.5	15.4	11.4	13.4	19.2	18.1	18.5	
24	0.0	-0.1	-0.1	5.5	4.1	4.7	14.8	12.1	13.6	19.0	17.5	18.4	
25	0.0	-0.1	-0.1	9.1	5.5	7.0	13.6	11.7	12.7	17.5	15.9	16.3	
26	0.0	-0.1	-0.1	10.5	9.1	9.7	14.8	12.1	13.4	16.3	15.6	15.9	
27	0.5	-0.1	0.0	12.0	10.1	10.9	13.2	9.3	11.1	16.2	14.7	15.4	
28	2.8	0.5	1.5	11.0	9.6	10.0	11.7	7.4	9.5	16.2	15.3	15.8	
29	3.5	1.8	2.6	9.8	9.2	9.5	16.2	11.3	13.6	15.3	14.0	14.5	
30	—	—	—	9.5	8.8	9.2	17.6	14.8	16.2	16.5	14.8	15.6	
31	—	—	—	8.8	7.0	7.8	—	—	—	17.4	15.7	16.5	
MONTH	3.5	-0.2	0.1	12.0	0.4	5.0	18.5	5.0	10.9	—	—	—	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	17.7	16.4	17.0	21.4	18.7	20.0	22.2	20.5	21.4	20.0	17.8	19.0
2	17.4	16.7	17.0	21.4	19.1	20.3	23.1	20.5	21.8	20.7	18.5	19.6
3	17.5	15.6	16.6	21.8	18.7	20.3	23.6	21.8	22.6	21.0	18.9	19.9
4	17.4	15.1	16.3	22.4	20.3	21.3	23.1	19.9	21.0	21.4	19.7	20.5
5	18.1	15.3	16.8	22.0	20.9	21.5	20.5	19.1	19.9	22.1	20.3	21.1
6	18.0	16.2	17.1	21.8	19.4	20.6	19.2	17.6	18.5	22.7	20.6	21.5
7	20.1	16.9	18.4	22.0	20.7	21.3	19.5	17.2	18.5	21.7	21.1	21.4
8	22.1	18.7	20.3	21.2	18.9	20.0	20.3	17.8	19.0	21.1	19.4	20.2
9	22.7	20.8	21.7	20.3	17.8	19.1	20.4	18.4	19.5	19.7	18.4	19.0
10	21.8	18.9	20.2	21.5	19.2	20.2	20.6	19.5	20.0	18.7	16.8	17.9
11	18.9	16.9	17.7	22.8	20.1	21.4	19.9	18.4	19.2	18.9	16.8	17.9
12	17.9	16.2	17.0	22.6	20.6	21.8	18.4	16.9	17.4	19.5	17.1	18.3
13	19.6	17.7	18.5	23.9	21.6	22.7	17.4	16.2	16.8	20.1	17.8	18.9
14	20.9	19.4	20.1	23.3	21.3	22.2	17.7	16.0	16.9	20.7	18.5	19.5
15	21.7	20.1	20.9	22.0	19.9	21.0	18.1	16.3	17.2	21.4	19.5	20.4
16	21.5	20.3	20.6	22.1	19.4	20.6	18.4	16.0	17.2	21.6	20.0	20.7
17	21.4	20.0	20.6	21.4	20.2	20.6	18.3	16.7	17.6	20.0	17.1	18.5
18	21.8	20.9	21.3	21.4	19.4	20.3	—	—	—	17.5	15.5	16.5
19	21.4	19.1	20.5	21.5	19.2	20.3	—	—	—	17.0	15.0	15.9
20	19.1	17.3	18.2	22.0	19.6	20.8	—	—	—	16.7	14.4	15.5
21	18.4	17.0	17.8	23.5	21.0	22.2	18.2	16.0	16.9	16.8	14.2	15.5
22	19.4	17.6	18.5	24.0	21.8	23.0	18.1	15.2	16.7	17.3	14.7	16.0
23	19.6	17.1	18.5	23.9	20.6	22.5	18.5	17.3	17.9	17.8	15.2	16.5
24	20.6	18.4	19.2	20.6	18.3	19.5	20.1	17.2	18.6	17.9	16.0	17.0
25	18.9	16.9	17.9	19.6	18.2	18.9	21.8	19.2	20.4	17.6	16.8	17.1
26	18.7	16.4	17.5	19.4	18.2	18.8	22.6	20.8	21.6	17.5	16.0	16.7
27	18.8	16.2	17.6	18.7	17.1	17.8	23.6	21.8	22.6	16.5	14.4	15.5
28	18.4	17.2	17.8	19.5	16.8	18.0	22.8	21.7	22.2	15.6	14.4	14.9
29	19.6	16.4	18.0	20.6	18.8	19.7	21.8	19.0	20.1	14.9	13.6	14.3
30	20.3	17.8	19.1	20.5	19.4	20.0	19.5	18.2	18.9	14.4	12.3	13.4
31	—	—	—	21.8	19.7	20.7	19.5	17.4	18.6	—	—	—
MONTH	22.7	15.1	18.6	24.0	16.8	20.6	—	—	—	22.7	12.3	18.0

[illegible]

STREAMS TRIBUTARY TO DETROIT RIVER

04166100 RIVER ROUGE AT SOUTHFIELD, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.5	7.9	8.2	8.3	7.5	7.9	8.3	7.5	7.9	8.5	7.8	8.1
2	8.5	8.0	8.2	8.4	7.4	7.8	8.2	7.4	7.8	8.5	7.7	8.0
3	9.0	7.9	8.5	8.5	7.4	7.9	8.0	6.7	7.0	8.8	7.7	8.1
4	9.1	8.2	8.7	7.6	6.1	7.1	7.7	6.9	7.4	8.7	7.5	8.0
5	9.1	8.2	8.6	7.2	6.2	6.8	8.0	7.5	7.8	9.0	7.4	8.0
6	8.8	8.2	8.5	8.0	7.1	7.5	8.3	7.8	8.1	8.9	7.4	7.9
7	8.9	7.7	8.3	7.3	6.4	6.9	8.3	7.9	8.1	7.6	6.9	7.2
8	8.1	7.1	7.7	7.7	6.8	7.3	8.2	7.8	8.0	8.1	7.3	7.7
9	7.3	6.2	7.0	8.3	7.7	7.9	8.3	7.6	8.0	8.5	7.8	8.1
10	7.5	5.9	6.9	8.1	7.4	7.7	8.5	7.4	7.9	8.9	8.0	8.4
11	8.1	7.5	7.8	8.1	7.2	7.6	9.0	7.5	8.1	8.8	7.9	8.3
12	8.4	7.8	8.1	7.3	6.2	6.8	9.4	7.9	8.5	8.9	7.9	8.3
13	8.0	7.5	7.9	7.4	6.7	7.0	9.5	8.4	8.8	9.0	7.8	8.2
14	7.5	7.0	7.3	7.5	6.7	7.1	9.6	8.5	9.0	9.0	7.6	8.2
15	7.4	7.0	7.3	7.8	7.2	7.5	9.7	8.5	9.0	8.9	7.4	7.9
16	7.6	7.0	7.3	8.3	6.8	7.7	10.1	8.6	9.2	8.7	7.2	7.7
17	7.6	7.1	7.4	8.0	7.0	7.4	10.1	8.4	9.1	9.8	7.5	8.5
18	7.5	7.2	7.3	8.0	7.1	7.6	—	—	—	10.1	8.2	9.0
19	7.8	7.2	7.6	8.4	7.5	7.9	—	—	—	10.5	8.5	9.3
20	8.3	7.8	8.1	8.5	7.5	7.9	—	—	—	10.9	8.7	9.5
21	8.3	8.0	8.2	8.6	7.3	7.8	10.1	8.2	9.0	11.1	8.8	9.7
22	8.2	7.8	8.0	7.3	6.4	6.9	11.0	8.7	9.5	10.9	8.6	9.5
23	8.4	7.8	8.1	7.9	6.5	7.2	10.0	8.3	9.0	10.8	8.4	9.2
24	7.9	7.3	7.7	8.8	7.4	8.1	11.6	8.3	9.5	11.2	8.2	9.3
25	8.5	7.9	8.3	9.2	7.8	8.3	10.7	7.8	8.9	10.4	8.0	9.0
26	8.5	8.2	8.3	9.1	7.8	8.4	9.8	7.3	8.1	11.0	8.2	9.2
27	8.6	8.2	8.4	8.5	7.8	8.0	9.8	6.9	7.9	11.4	8.5	9.5
28	8.4	8.0	8.2	8.9	8.3	8.7	7.8	6.5	6.8	10.9	8.6	9.4
29	8.7	8.0	8.4	8.7	8.1	8.4	8.1	7.0	7.6	12.1	8.5	9.9
30	8.5	7.8	8.1	8.8	8.1	8.4	8.3	7.8	8.0	11.8	8.9	10.0
31	—	—	—	8.6	7.5	7.7	8.5	7.9	8.2	—	—	—
MONTH	9.1	5.9	7.9	9.2	6.1	7.7	—	—	—	12.1	6.9	8.6

STREAMS TRIBUTARY TO DETROIT RIVER

04166200 EVANS DITCH AT SOUTHFIELD, MI

LOCATION.--Lat 42°27'28", long 83°16'03", in SE1/4 sec.28, T.1 N., R.10 E., Oakland County, Hydrologic Unit 04090004, on right bank 70 ft upstream from bridge on 9 Mile Road in Southfield, 1.6 mi upstream from mouth.

DRAINAGE AREA--9.49 mi².

PERIOD OF RECORD.--September 1958 to current year.

REVISED RECORDS.--WSP 1912: 1963.

GAGE.--Water-stage recorder. Datum of gage is 615.07 ft above sea level (City of Southfield bench mark).

REMARKS.--Records good. Several measurements of water temperature were made during the year. Gage-height telemeter 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	e1.5	2.0	4.1	6.5	2.9	12	7.1	10	5.0	1.8	3.0	1.8
2	e1.7	19	2.9	15	2.8	15	5.9	46	7.1	1.7	2.4	1.5
3	4.1	25	3.2	8.3	8.7	9.1	5.2	5.5	4.8	1.6	46	1.4
4	4.2	6.8	3.6	6.2	5.1	9.8	4.5	4.3	3.5	15	76	1.6
5	1.9	3.7	3.3	8.7	3.4	52	4.4	5.7	3.3	2.6	9.4	1.5
6	1.8	3.0	2.9	5.7	4.8	13	4.2	3.6	3.2	1.9	5.2	1.3
7	1.5	2.8	2.7	4.6	4.2	13	3.9	3.7	2.9	12	4.0	3.3
8	1.8	2.3	2.8	4.2	3.1	12	4.2	4.2	2.7	2.4	3.5	2.0
9	1.5	2.5	2.8	3.7	3.4	7.4	3.6	32	5.6	1.8	3.1	2.5
10	1.5	2.3	4.9	3.4	3.6	5.9	3.4	60	39	1.7	2.9	1.4
11	1.8	16	21	3.4	3.1	6.6	3.2	27	17	1.6	2.8	1.3
12	2.3	3.3	7.3	4.0	3.1	5.1	3.6	7.5	5.6	4.2	2.6	1.3
13	3.0	3.6	5.0	3.8	3.2	3.9	4.3	10	5.4	4.4	2.5	1.2
14	6.9	3.0	5.4	3.4	3.6	4.4	3.1	12	11	4.5	2.4	1.2
15	20	4.5	4.9	3.5	3.1	4.4	2.9	7.4	4.4	3.9	2.4	1.2
16	3.9	4.3	9.6	3.2	2.9	5.4	2.9	4.6	3.9	2.0	2.3	1.2
17	2.7	3.3	7.2	3.2	2.8	6.6	2.8	6.9	4.0	2.3	2.2	1.2
18	2.3	4.2	5.3	3.6	3.0	5.8	2.6	6.5	3.0	8.1	2.8	1.2
19	2.3	2.4	4.4	3.0	4.6	6.5	2.9	3.8	2.8	3.6	2.4	1.1
20	2.3	6.2	3.7	2.5	2.4	4.8	2.7	3.7	2.4	2.5	3.0	1.1
21	2.3	4.8	3.7	2.5	2.5	12	2.6	4.8	2.4	2.3	2.7	1.0
22	3.5	3.7	3.8	2.6	12	7.9	3.6	4.4	2.9	6.8	2.1	0.98
23	2.2	3.3	2.2	2.5	12	6.7	2.8	30	2.4	2.5	2.3	0.98
24	2.0	19	10	2.8	12	11	2.5	32	4.6	1.8	2.0	1.1
25	9.0	5.4	8.1	2.8	8.7	20	5.6	12	2.1	1.7	2.2	1.1
26	9.3	3.7	6.3	2.9	9.3	28	3.3	8.8	2.0	1.7	3.6	1.1
27	3.1	3.2	5.2	3.1	9.2	12	2.7	9.2	2.0	1.6	2.1	1.1
28	3.6	20	4.9	4.5	8.2	8.7	2.4	6.2	2.4	10	37	1.1
29	6.5	12	27	3.4	8.8	7.8	2.3	5.1	1.8	2.5	2.4	1.3
30	2.3	5.4	21	2.8	—	11	2.3	7.5	1.8	2.2	3.3	1.2
31	2.3	—	8.2	2.9	—	12	—	11	—	2.4	1.9	—
TOTAL	177.2	260.1	271.3	132.7	200.6	383.0	130.9	478.2	161.0	209.6	264.1	70.96
MEAN	5.72	8.67	8.75	4.28	6.92	12.4	4.36	15.4	5.37	6.76	8.52	2.37
MAX	69	42	49	15	25	52	26	60	39	42	76	33
MIN	1.5	2.0	2.7	2.5	2.8	3.9	2.3	3.6	1.8	1.6	1.9	0.98
CFSM	0.60	0.91	0.92	0.45	0.73	1.30	0.46	1.63	0.57	0.71	0.90	0.25
IN.	0.69	1.02	1.06	0.52	0.79	1.50	0.51	1.87	0.63	0.82	1.04	0.28

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2004, BY WATER YEAR (WY)

	6.10	7.51	8.42	7.16	9.76	13.6	13.3	9.75	9.51	7.20	7.11	6.52
MEAN	6.10	7.51	8.42	7.16	9.76	13.6	13.3	9.75	9.51	7.20	7.11	6.52
MAX	23.3	19.8	25.4	26.7	32.1	32.6	27.4	27.1	30.5	23.7	22.4	20.0
(WY)	1982	1993	1968	1974	1971	1974	1977	1968	1968	1992	1995	1986
MIN	0.44	1.13	0.71	0.49	0.79	3.71	3.27	2.35	1.68	0.73	1.35	0.58
(WY)	1964	1964	1964	1963	1963	2000	1971	1962	1959	1962	1960	1965

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR	FOR 2004 WATER YEAR	WATER YEARS 1958 - 2004
ANNUAL TOTAL	2527.8	2739.66	
ANNUAL MEAN	6.93	7.49	8.82
HIGHEST ANNUAL MEAN			16.9
LOWEST ANNUAL MEAN			3.12
HIGHEST DAILY MEAN	88	76	442
LOWEST DAILY MEAN	1.0	0.98	0.00
ANNUAL SEVEN-DAY MINIMUM	1.0	1.1	0.27
MAXIMUM PEAK FLOW		261	(b)1200
MAXIMUM PEAK STAGE		9.68	(c)15.03
ANNUAL RUNOFF (CFSM)	0.730	0.789	0.930
ANNUAL RUNOFF (INCHES)	9.91	10.74	12.63
10 PERCENT EXCEEDS	16	19	18
50 PERCENT EXCEEDS	3.2	3.6	3.4
90 PERCENT EXCEEDS	1.2	1.7	1.2

(a) June 13-15, 1986, result of regulation from unknown source.

(b) From rating curve extended above 500 ft³/s.

(c) From floodmark.

(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166300 UPPER RIVER ROUGE AT FARMINGTON, MI

LOCATION.--Lat 42°27'52", long 83°22'11", in NW1/4 sec.27, T.1 N., R.9 E., Oakland County, Hydrologic Unit 04090004, on left bank 800 ft downstream from bridge on Shiawassee Road in Farmington.

DRAINAGE AREA.--17.5 mi².

PERIOD OF RECORD.--March 1958 to current year.

REVISED RECORDS.--WSP 1912: 1959(M), 1960(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 690.4 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

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	6.8	8.1	18	21	e7.1	26	16	11	18	6.1	21	9.3
2	5.9	18	14	26	e7.0	36	14	37	15	5.9	14	7.8
3	6.2	36	12	23	e7.3	27	13	22	13	5.6	17	7.1
4	7.3	28	10	18	e7.6	22	12	14	11	11	62	6.7
5	5.4	19	10	17	e7.7	80	11	13	9.6	11	41	6.4
6	4.8	14	9.5	14	e7.8	54	11	10	9.0	8.6	20	6.6
7	4.4	12	8.8	e13	e7.9	35	10	9.3	8.4	26	13	35
8	4.7	9.6	8.7	e12	e7.8	32	9.8	9.7	8.0	13	11	15
9	4.7	8.5	8.9	e12	e7.8	25	9.6	34	12	9.3	9.1	10
10	4.8	8.0	27	e11	e7.7	20	8.9	108	84	7.7	8.0	8.8
11	4.4	19	44	e11	e7.6	18	8.3	73	76	7.2	7.5	7.6
12	4.0	14	23	e10	e7.5	15	8.0	40	44	44	6.6	6.5
13	4.2	11	e17	e9.9	e7.4	13	8.5	43	28	23	5.8	5.5
14	31	9.9	14	e9.5	e7.2	12	8.2	82	41	13	4.7	5.4
15	56	9.5	12	e9.6	e7.0	12	7.7	55	40	10	e4.5	5.9
16	26	10	13	e9.0	e6.9	12	7.6	31	26	9.5	e4.2	5.7
17	16	9.5	15	e8.5	e6.9	12	7.5	22	28	17	4.7	5.5
18	12	35	13	e8.0	e7.0	13	7.2	20	21	18	5.7	5.0
19	9.4	71	11	e7.6	e7.2	14	7.1	16	15	14	5.4	5.1
20	7.7	35	9.9	e7.3	e14	42	7.1	14	12	10	6.5	5.0
21	7.4	21	9.5	e7.0	e50	33	11	73	11	8.7	7.0	4.7
22	6.8	17	9.2	e7.0	e30	20	8.3	120	11	24	6.1	5.0
23	6.5	14	23	e6.9	e27	16	7.8	115	9.8	16	5.5	5.0
24	6.3	28	26	e6.9	e24	17	7.6	74	9.2	10	5.4	5.1
25	11	22	20	e7.0	e20	39	10	40	8.3	8.3	5.6	5.1
26	16	18	17	e7.1	19	39	9.2	28	7.5	7.3	6.4	5.0
27	11	14	14	e7.2	21	29	7.9	24	7.1	27	6.1	5.1
28	11	27	13	e7.3	21	21	7.4	18	7.1	47	28	5.1
29	13	38	34	e7.4	23	18	7.3	14	6.8	24	27	4.8
30	10	25	53	e7.3	—	18	7.1	14	6.3	15	17	4.0
31	9.1	—	30	e7.2	—	20	—	24	—	44	12	—
TOTAL	333.8	609.1	547.5	335.7	389.4	790	276.1	1208.0	603.1	501.2	397.8	218.8
MEAN	10.8	20.3	17.7	10.8	13.4	25.5	20.1	39.0	20.1	16.2	12.8	7.29
MAX	56	71	53	26	50	80	16	120	84	47	62	35
MIN	4.0	8.0	8.7	6.9	6.9	12	7.1	9.3	6.3	5.6	4.2	4.0
CFSM	0.62	1.16	1.01	0.62	0.77	1.46	0.53	2.23	1.15	0.92	0.73	0.42
DN.	0.71	1.29	1.16	0.71	0.83	1.68	0.59	2.57	1.28	1.07	0.85	0.47

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2004, BY WATER YEAR (WY)

	MEAN	9.02	11.5	12.8	12.9	17.8	26.4	23.8	17.5	14.0	8.37	7.84	8.44
MAX	44.1	31.3	29.0	39.8	56.8	63.6	42.3	39.0	63.9	24.8	32.2	42.3	
(WY)	2002	1993	1991	1974	2001	1982	1977	2004	1989	1992	1998	2000	
MIN	1.10	1.69	1.70	2.06	2.20	6.81	9.10	3.46	2.13	1.00	0.97	1.00	
(WY)	1965	1965	1964	1961	1963	1964	1971	1971	1971	1964	1963	1964	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1958 - 2004

ANNUAL TOTAL	5134.9	6210.5	
ANNUAL MEAN	14.1	17.0	
HIGHEST ANNUAL MEAN			14.3
LOWEST ANNUAL MEAN			22.6
HIGHEST DAILY MEAN	128	Apr 5	4.54
LOWEST DAILY MEAN	2.6	Feb 10	0.32
ANNUAL SEVEN-DAY MINIMUM	3.1	Feb 8	0.61
MAXIMUM PEAK FLOW		173	May 21
MAXIMUM PEAK STAGE		4.26	May 21
INSTANTANEOUS LOW FLOW		3.9	(a)
ANNUAL RUNOFF (CFSM)	0.804	0.970	(b)0.07
ANNUAL RUNOFF (INCHES)	10.92	13.20	0.815
10 PERCENT EXCEEDS	29	35	11.07
50 PERCENT EXCEEDS	9.1	11	30
90 PERCENT EXCEEDS	3.9	5.8	8.0
			2.4

(a) Oct. 7, 12, 13, Sept. 30.

(b) Result of regulation.

(c) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166470 UPPER RIVER ROUGE AT DETROIT, MI

LOCATION.—Lat 42°23'39", long 83°16'42", in SW1/4 NE1/4 sec.20, T.1 S., R.8 E., Wayne County, Hydrologic Unit 04090004, on left bank 1,000 ft upstream from bridge on Telegraph Road in Detroit.

DRAINAGE AREA.—67.3 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.—October 1997 to current year.

GAGE.—Water-stage recorder. Elevation of gage is 605 ft above sea level, from topographic map.

REMARKS.—Water-discharge records good except for estimated daily discharges, which are fair. Gage-height telemeter 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	21	23	43	59	e18	70	47	41	57	12	50	24
2	19	75	33	90	e18	97	41	147	51	12	28	19
3	21	135	28	68	e18	73	37	61	65	11	131	17
4	28	94	26	54	e19	65	34	36	35	32	227	15
5	21	52	25	59	e19	232	30	34	29	35	115	15
6	17	38	23	48	e20	154	29	27	26	19	51	14
7	15	31	22	e38	e20	95	28	27	24	78	34	131
8	15	27	21	e33	e20	93	27	35	23	47	26	44
9	15	24	21	e29	e20	70	27	72	64	22	22	26
10	15	24	82	e27	e19	56	25	309	159	17	20	20
11	15	83	184	e26	e19	52	23	185	195	14	18	17
12	14	49	64	e25	e19	49	22	87	105	98	16	15
13	13	33	36	e24	e19	40	25	83	63	67	15	13
14	114	27	35	e23	e18	39	23	183	83	66	13	13
15	243	28	31	e22	e18	38	21	131	82	34	15	11
16	71	37	40	e21	e17	38	20	73	50	22	12	12
17	43	34	44	e20	e17	45	20	61	64	63	11	11
18	32	115	35	e19	e18	42	19	60	47	63	11	9.5
19	27	232	29	e18	e18	48	18	44	35	33	12	9.2
20	23	90	26	e18	e55	178	17	35	29	22	14	9.1
21	22	52	23	e17	150	124	64	242	25	19	19	9.1
22	21	39	24	e17	82	63	27	597	26	48	13	8.9
23	20	33	91	e17	74	49	20	244	23	29	12	8.6
24	19	93	88	e17	68	59	19	304	23	19	12	8.1
25	39	63	56	e17	55	117	28	110	20	15	11	8.6
26	64	40	45	e17	57	138	27	79	17	13	16	8.7
27	36	33	38	e18	62	90	20	66	16	78	13	8.4
28	31	76	34	e18	60	62	19	60	15	110	185	9.1
29	46	114	97	e19	63	51	18	44	15	49	134	9.3
30	31	62	172	e18	—	50	17	45	14	30	59	8.6
31	26	—	84	e18	—	65	—	77	—	115	32	—
TOTAL	1147	1856	1600	914	1080	2442	792	3599	1480	1292	1347	532.2
MEAN	37.0	61.9	51.6	29.5	37.2	78.8	26.4	116	49.3	41.7	43.5	17.7
MAX	243	232	184	90	150	232	64	597	195	115	227	131
MIN	13	23	21	17	17	38	17	27	14	11	11	8.1
CFSM	0.55	0.92	0.77	0.44	0.55	1.17	0.39	1.73	0.73	0.62	0.65	0.26
IN.	0.63	1.03	0.88	0.51	0.60	1.35	0.44	1.99	0.82	0.71	0.74	0.29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2004, BY WATER YEAR (WY)

	MEAN	48.9	37.3	41.4	42.6	74.3	66.6	78.6	74.2	53.8	42.9	47.6	43.1
MAX	154	61.9	66.5	83.8	171	132	113	116	91.6	85.6	118	107	107
(WY)	2002	2004	2002	1999	2001	1998	1999	2004	2000	2000	1998	2000	2000
MIN	16.4	19.4	24.5	14.7	16.5	30.2	26.4	45.8	25.3	14.3	19.0	15.8	15.8
(WY)	2003	2000	2003	2003	2003	2000	2004	1998	2002	2001	2002	1998	1998

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1998 - 2004

ANNUAL TOTAL	16342.7	18081.2	
ANNUAL MEAN	44.8	49.4	54.1
HIGHEST ANNUAL MEAN			64.1
LOWEST ANNUAL MEAN			38.3
HIGHEST DAILY MEAN	544	Apr 5	1180
LOWEST DAILY MEAN	7.1	Sep 12	6.1
ANNUAL SEVEN-DAY MINIMUM	8.8	Jul 25	6.4
MAXIMUM PEAK FLOW			1490
MAXIMUM PEAK STAGE			13.08
INSTANTANEOUS LOW FLOW			5.4
ANNUAL RUNOFF (CFSM)	0.665		0.804
ANNUAL RUNOFF (INCHES)	9.03		10.93
10 PERCENT EXCEEDS	92	100	109
50 PERCENT EXCEEDS	26	30	28
90 PERCENT EXCEEDS	11	14	12

(a) Sept. 24, 27.

(b) Aug. 7, 8, 9, 15, 2001, Sept. 6, 2002.

(c) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166470 UPPER RIVER ROUGE AT DETROIT, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH				APRIL			MAY	
1	--	--	--	--	--	--	8.1	6.0	7.0	16.5	12.2	14.7
2	--	--	--	--	--	--	8.6	6.8	7.5	12.2	9.1	10.0
3	--	--	--	--	--	--	9.9	6.8	8.2	10.1	8.4	9.3
4	--	--	--	--	--	--	9.2	6.6	7.8	11.0	7.7	9.5
5	--	--	--	--	--	--	8.6	5.1	6.8	14.2	10.4	12.2
6	--	--	--	--	--	--	7.6	5.6	6.6	16.0	11.7	13.9
7	--	--	--	--	--	--	10.6	6.5	8.4	15.6	13.5	14.5
8	--	--	--	--	--	--	9.6	8.2	8.9	13.8	11.8	12.9
9	--	--	--	--	--	--	10.9	7.5	9.2	16.2	12.2	14.0
10	--	--	--	--	--	--	11.4	8.0	9.6	18.6	16.2	17.5
11	--	--	--	--	--	--	10.5	7.9	9.1	18.8	18.1	18.4
12	--	--	--	--	--	--	10.2	6.8	8.4	20.1	17.6	18.8
13	--	--	--	--	--	--	8.1	6.9	7.5	20.7	18.8	19.6
14	--	--	--	--	--	--	10.9	5.8	8.3	20.8	19.4	20.1
15	--	--	--	--	--	--	12.8	8.2	10.3	19.5	15.6	17.7
16	--	--	--	--	--	--	14.3	9.3	11.7	16.2	14.5	15.3
17	--	--	--	--	--	--	16.3	12.1	13.9	17.2	14.2	15.7
18	--	--	--	--	--	--	19.0	13.8	16.2	18.5	16.3	17.3
19	--	--	--	--	--	--	18.6	15.6	16.8	18.2	15.8	17.0
20	--	--	--	--	--	--	15.7	12.9	14.1	18.3	16.0	17.0
21	--	--	--	--	--	--	13.5	10.4	12.4	20.5	14.4	17.6
22	--	--	--	--	--	--	14.4	11.8	13.0	18.3	16.4	17.2
23	--	--	--	--	--	--	15.8	11.2	13.4	19.5	18.2	18.8
24	--	--	--	--	--	--	15.3	11.8	13.5	19.4	17.4	18.7
25	--	--	--	--	--	--	13.6	11.8	12.6	17.4	15.5	16.2
26	--	--	--	--	--	--	14.8	11.7	13.1	16.0	15.1	15.6
27	--	--	--	--	--	--	12.4	9.2	10.8	16.0	14.3	15.2
28	--	--	--	--	--	--	12.1	7.7	9.7	16.1	14.9	15.3
29	--	--	--	--	--	--	16.2	10.8	13.4	15.1	13.5	14.4
30	--	--	--	9.5	8.6	9.1	17.9	14.2	15.9	16.6	13.9	15.1
31	--	--	--	8.6	6.8	7.7	--	--	--	17.4	15.3	16.2
MONTH	--	--	--	--	--	--	19.0	5.1	10.8	20.8	7.7	15.7

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	17.9	15.8	16.9	22.7	18.5	20.5	22.6	20.2	21.4	20.8	18.0	19.3
2	17.4	16.1	16.7	22.3	18.9	20.7	23.6	20.7	22.1	21.6	18.7	20.0
3	18.1	15.6	16.8	22.8	18.9	20.9	23.2	21.6	22.4	22.0	19.2	20.4
4	18.0	14.7	16.3	23.0	20.8	21.5	22.4	19.9	20.8	21.9	19.8	20.9
5	18.5	14.9	16.8	22.1	20.9	21.4	20.2	18.9	19.7	22.8	20.4	21.4
6	17.9	15.9	16.9	22.8	19.5	21.1	19.5	17.5	18.6	23.4	20.8	22.0
7	20.5	16.4	18.4	22.1	20.0	21.2	19.9	17.4	18.7	22.6	20.8	21.6
8	22.6	18.4	20.4	20.8	19.0	20.1	21.1	18.1	19.5	20.8	19.1	19.8
9	23.2	20.7	21.8	21.0	17.9	19.5	21.2	18.8	20.0	20.0	18.4	19.0
10	21.4	18.8	20.2	22.3	19.4	20.6	20.8	19.5	20.1	19.6	17.0	18.3
11	18.8	16.6	17.4	23.7	19.9	21.7	19.9	18.4	19.2	20.0	17.0	18.4
12	17.6	16.1	16.8	22.8	19.9	21.8	18.4	17.1	17.6	20.6	17.3	18.9
13	19.3	16.9	18.1	24.1	21.9	22.9	17.8	16.2	17.0	21.1	18.0	19.5
14	20.6	18.5	19.5	23.4	21.2	22.3	18.4	16.0	17.2	21.8	18.7	20.2
15	21.6	19.6	20.5	22.4	20.1	21.2	18.5	16.6	17.5	22.3	19.7	20.9
16	20.8	19.8	20.1	22.8	19.5	21.1	19.7	16.1	17.8	22.0	20.3	21.1
17	21.1	19.2	20.1	21.4	20.1	20.7	19.4	17.1	18.3	20.3	17.4	18.7
18	21.8	20.2	20.9	21.9	19.8	20.7	20.4	17.9	19.1	18.2	15.8	17.0
19	21.1	19.0	20.3	21.8	19.5	20.7	20.5	18.7	19.6	17.7	15.4	16.5
20	19.4	17.1	18.4	22.3	19.9	21.1	19.3	17.2	18.1	17.7	15.0	16.3
21	18.7	16.9	17.7	24.3	21.1	22.6	19.0	16.3	17.5	18.3	14.9	16.4
22	19.7	17.4	18.4	24.3	21.6	23.0	19.5	15.6	17.5	18.6	15.2	16.8
23	20.2	16.7	18.5	23.3	20.6	22.1	19.6	17.5	18.6	19.0	15.8	17.3
24	20.5	17.9	19.1	20.8	18.7	19.8	21.2	17.4	19.3	19.0	16.7	17.8
25	19.5	16.8	18.0	20.0	18.3	19.1	22.9	19.7	21.1	18.5	17.2	17.6
26	19.3	16.3	17.8	19.8	18.1	19.0	23.4	20.9	22.1	18.2	16.5	17.2
27	19.6	16.0	17.8	18.9	17.6	18.1	24.4	21.9	22.9	17.6	14.9	16.3
28	18.8	17.0	17.8	18.9	17.2	18.0	23.6	21.5	22.1	16.6	14.9	15.5
29	20.4	16.2	18.2	20.3	18.3	19.3	21.5	19.1	20.0	15.2	13.9	14.5
30	21.2	17.5	19.3	20.7	19.5	20.0	20.0	18.3	19.1	15.4	12.6	14.0
31	—	—	—	21.4	19.6	20.8	20.2	17.7	18.9	—	—	—
MONTH	23.2	14.7	18.5	24.3	17.2	20.8	24.4	15.6	19.5	23.4	12.6	18.5

STREAMS TRIBUTARY TO DETROIT RIVER

04166470 UPPER RIVER ROUGE AT DETROIT, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	8.0	7.4	7.8	7.2	6.7	6.9	—	—	—	8.1	7.6	7.9
2	8.4	7.7	8.0	7.3	6.6	6.9	—	—	—	7.8	7.0	7.4
3	8.5	7.9	8.2	7.9	6.8	7.2	7.2	6.2	6.6	7.3	6.9	7.1
4	8.6	7.5	8.1	7.4	5.0	6.4	7.5	6.7	7.0	7.3	6.8	7.0
5	7.8	7.3	7.6	6.2	5.6	6.0	7.9	7.1	7.7	7.4	6.8	7.0
6	7.6	7.3	7.5	6.4	5.3	6.1	8.2	7.9	8.0	7.2	6.5	6.8
7	7.5	6.7	7.2	6.8	5.1	6.0	8.1	7.7	7.9	7.4	1.1	6.3
8	6.9	6.0	6.6	7.1	6.6	6.9	7.8	7.5	7.7	7.7	7.3	7.5
9	7.1	5.4	6.1	7.3	6.8	7.1	7.6	7.2	7.5	7.8	7.4	7.6
10	6.9	3.1	5.6	7.0	6.2	6.7	7.4	7.1	7.2	8.0	7.4	7.7
11	8.5	3.1	6.9	6.6	5.6	6.2	7.7	7.2	7.4	7.8	7.3	7.6
12	8.5	7.6	8.3	6.8	4.6	6.1	8.2	7.5	7.9	7.7	7.0	7.4
13	8.2	7.4	7.9	7.0	6.3	6.7	8.6	7.8	8.2	7.6	6.8	7.2
14	7.7	7.2	7.5	6.7	6.1	6.5	8.8	7.7	8.4	7.5	6.7	7.0
15	7.7	7.2	7.5	7.0	6.5	6.7	8.8	7.7	8.3	7.0	6.2	6.7
16	7.3	7.0	7.2	6.9	5.8	6.6	8.5	7.7	8.1	6.8	6.1	6.5
17	7.7	7.1	7.5	7.0	5.8	6.7	8.9	7.4	8.1	7.5	6.5	7.0
18	7.4	7.1	7.3	7.3	6.5	7.0	9.1	7.1	8.1	7.8	7.3	7.5
19	—	—	—	7.2	6.5	6.8	9.0	7.2	8.0	8.4	7.6	7.9
20	—	—	—	6.9	6.2	6.6	8.5	7.3	7.9	8.5	7.7	8.0
21	—	—	—	6.5	5.8	6.2	8.8	7.2	8.0	8.5	7.8	8.0
22	—	—	—	6.8	5.7	6.2	8.9	7.5	8.1	8.6	7.7	8.0
23	7.3	6.8	7.0	6.3	5.8	6.1	8.4	7.2	7.8	8.5	7.5	7.9
24	7.1	6.8	6.9	7.0	6.3	6.7	8.8	7.4	7.9	8.3	6.8	7.7
25	7.3	6.8	7.1	7.1	6.6	6.8	7.9	6.9	7.4	8.0	7.2	7.5
26	7.5	7.3	7.4	—	—	—	7.4	6.3	7.0	8.1	7.3	7.7
27	7.8	7.3	7.5	—	—	—	6.7	5.6	6.1	8.4	7.6	7.9
28	7.8	7.2	7.5	—	—	—	—	—	—	8.4	7.6	8.0
29	7.9	7.1	7.6	8.7	8.3	8.4	8.1	7.2	7.7	8.8	7.9	8.4
30	7.4	7.0	7.2	9.4	8.2	8.6	8.2	7.9	8.1	9.2	8.0	8.6
31	—	—	—	—	—	—	8.3	7.9	8.1	—	—	—
MONTH	—	—	—	—	—	—	—	—	—	9.2	1.1	7.5

STREAMS TRIBUTARY TO DETROIT RIVER

04166500 RIVER ROUGE AT DETROIT, MI

LOCATION.--Lat 42°22'20", long 83°15'20", in SW1/4 sec.27, T.1 S., R.10 E., Wayne County, Hydrologic Unit 04090004, on right bank 500 ft upstream from bridge on Plymouth Road in Detroit, 4 mi upstream from Middle River Rouge.

DRAINAGE AREA.--187 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1930 to current year.

REVISED RECORDS.--WSP 1034: 1933(M). WSP 1054: 1939, 1943, 1945(M). WSP 1437: 1931-32, 1934, 1936(M), 1937-38, 1944(M), 1945. WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 584.00 ft above sea level. Prior to Oct. 16, 1948, nonrecording gage at site 1 mi downstream at datum 4.6 ft lower.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Regulation by water retention structure upstream from station and some diversion by pumping for sprinkler irrigation. Gage-height telemeter 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	35	46	132	166	e59	191	167	92	226	52	191	62
2	32	129	99	233	e60	291	139	425	173	45	88	51
3	30	356	87	193	e63	241	123	230	208	48	521	45
4	65	319	80	152	e64	186	112	120	132	68	640	42
5	41	137	72	145	e63	628	103	102	114	145	466	40
6	31	88	69	140	e64	609	94	87	103	70	165	37
7	27	68	64	96	e66	298	92	79	99	170	103	344
8	27	55	62	e88	e66	301	89	90	87	151	81	156
9	24	48	61	e84	e60	223	88	187	148	74	69	78
10	23	45	153	e80	e58	171	81	862	489	60	63	58
11	23	154	645	e76	e58	148	75	688	677	51	67	49
12	21	138	248	e76	e58	147	72	325	408	259	63	42
13	20	77	124	e75	e58	120	80	215	223	259	57	38
14	178	54	106	e72	e56	114	77	551	278	158	52	39
15	736	50	98	e72	e54	109	70	471	333	97	51	34
16	203	68	101	e74	e54	104	67	268	208	79	47	34
17	88	66	142	e70	e54	127	66	186	234	136	47	32
18	57	200	112	e67	e54	123	64	194	187	206	47	29
19	48	747	94	e65	e58	133	62	159	140	123	47	28
20	40	350	81	e62	e130	448	59	121	114	67	46	28
21	38	189	71	e60	509	475	169	539	99	60	57	28
22	38	139	73	e59	310	203	95	1360	103	125	45	27
23	39	112	203	e58	242	148	65	910	92	109	42	26
24	34	234	303	e58	217	152	57	1020	90	63	41	25
25	56	234	172	e58	182	375	71	485	80	49	38	25
26	150	124	142	e58	163	452	86	322	75	47	46	26
27	95	95	116	e58	179	335	68	252	67	162	44	24
28	60	154	103	e58	169	216	58	241	63	324	503	25
29	96	391	202	e58	175	173	55	184	61	147	425	25
30	72	203	569	e58	---	160	52	164	56	85	191	26
31	53	---	268	e58	---	223	---	245	---	333	85	---
TOTAL	2480	5070	4852	2727	3403	7624	2556	11174	5367	3822	4428	1523
MEAN	80.0	169	157	88.0	117	246	85.2	360	179	123	143	50.8
MAX	736	747	645	233	509	628	169	1360	677	333	640	344
MIN	20	45	61	58	54	104	52	79	56	45	38	24
CFSM	0.43	0.90	0.84	0.47	0.63	1.32	0.46	1.93	0.96	0.66	0.76	0.27
IN.	0.49	1.01	0.97	0.54	0.68	1.52	0.51	2.22	1.07	0.76	0.88	0.30

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2004, BY WATER YEAR (WY)

	MEAN	73.1	92.9	115	120	170	233	229	173	117	73.6	64.7	64.3
MAX	450	322	321	456	519	488	965	965	683	478	385	280	284
(WY)	1982	1993	1968	1950	1938	1950	1947	1943	1968	1957	1998	2000	
MIN	8.35	16.3	16.6	13.6	18.2	59.5	49.3	23.9	7.92	6.46	5.58	7.03	
(WY)	1964	1954	1940	1961	1963	1931	1931	1934	1934	1934	1931	1931	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1931 - 2004

ANNUAL TOTAL	43569	55026	
ANNUAL MEAN	119	150	
HIGHEST ANNUAL MEAN			127
LOWEST ANNUAL MEAN			222
HIGHEST DAILY MEAN			25.7
LOWEST DAILY MEAN	1350	Apr 5	7380
ANNUAL SEVEN-DAY MINIMUM	20	Jul 31	1.8
MAXIMUM PEAK FLOW	22	Sep 8	2.7
MAXIMUM PEAK STAGE			13000
INSTANTANEOUS LOW FLOW			21.40
ANNUAL RUNOFF (CFSM)	0.638		1.8
ANNUAL RUNOFF (INCHES)	8.67		0.678
10 PERCENT EXCEEDS	258		9.21
50 PERCENT EXCEEDS	71		270
90 PERCENT EXCEEDS	30		65
			17

(a) Aug. 1, 2, 1964.

(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166500 RIVER ROUGE AT DETROIT, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	--	--	--	--	--	--	7.7	6.5	7.1	16.9	13.4	15.4
2	--	--	--	--	--	--	8.0	6.9	7.4	13.8	9.4	10.8
3	--	--	--	--	--	--	9.2	7.0	8.0	10.1	9.0	9.5
4	--	--	--	--	--	--	8.9	7.2	8.1	11.0	8.5	9.7
5	--	--	--	--	--	--	8.1	6.0	7.2	13.5	10.4	11.8
6	--	--	--	--	--	--	7.5	5.9	6.8	15.6	12.1	13.7
7	--	--	--	--	--	--	9.7	6.4	8.0	15.4	14.1	14.7
8	--	--	--	--	--	--	9.6	8.2	8.9	14.6	12.6	13.5
9	--	--	--	--	--	--	10.4	8.1	9.3	14.9	12.8	13.8
10	--	--	--	--	--	--	10.6	8.4	9.6	18.1	14.7	16.8
11	--	--	--	--	--	--	10.2	8.4	9.3	18.4	17.9	18.2
12	--	--	--	--	--	--	9.4	7.5	8.6	19.4	17.8	18.6
13	--	--	--	--	--	--	8.9	7.3	7.8	20.2	17.6	19.4
14	--	--	--	--	--	--	10.0	6.5	8.2	20.3	19.5	19.9
15	--	--	--	--	--	--	11.6	8.3	9.9	19.5	16.7	18.3
16	--	--	--	--	--	--	13.3	9.9	11.4	16.7	15.3	15.8
17	--	--	--	--	--	--	15.2	12.2	13.4	16.8	14.5	15.8
18	--	--	--	--	--	--	17.6	14.2	15.7	17.9	16.5	17.1
19	--	--	--	--	--	--	17.7	15.4	16.9	17.8	16.0	17.1
20	--	--	--	--	--	--	16.3	12.6	14.8	17.9	16.1	17.1
21	--	--	--	--	--	--	14.2	11.6	12.8	19.3	14.6	17.4
22	--	--	--	--	--	--	14.0	12.0	13.0	18.0	16.5	17.1
23	--	--	--	--	--	--	14.8	12.0	13.4	19.3	17.9	18.4
24	--	--	--	--	--	--	14.5	12.8	13.7	19.1	17.9	18.7
25	--	--	--	--	--	--	14.0	12.4	13.1	17.9	15.9	16.7
26	--	--	--	--	--	--	14.1	12.3	13.2	16.1	15.5	15.8
27	--	--	--	--	--	--	13.4	10.5	11.6	15.9	15.0	15.5
28	--	--	--	--	--	--	11.5	8.6	10.0	15.7	15.0	15.5
29	--	--	--	--	--	--	15.0	11.0	12.8	15.4	14.2	14.8
30	--	--	--	--	--	--	16.9	14.4	15.5	16.0	14.2	15.1
31	--	--	--	8.9	7.4	8.1	--	--	--	17.0	15.4	16.2
MONTH	--	--	--	--	--	--	17.7	5.9	10.8	20.3	8.5	15.7

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	17.6	16.1	16.9	21.1	18.6	20.0	22.3	20.4	21.4	20.1	18.5	19.2
2	17.3	16.4	16.9	21.3	19.2	20.6	23.1	20.5	22.1	20.4	19.2	19.8
3	17.5	15.8	16.6	21.6	19.6	20.7	23.0	20.7	22.3	20.8	19.7	20.3
4	17.4	15.3	16.5	22.6	20.9	21.7	22.7	20.2	21.2	21.2	20.4	20.9
5	17.8	15.2	16.7	22.0	20.8	21.7	20.4	19.6	20.0	21.9	20.2	21.3
6	17.7	16.1	17.1	22.1	20.1	21.1	19.6	18.4	19.0	22.4	20.6	21.8
7	19.5	15.9	18.0	22.1	17.9	21.3	19.5	17.9	18.8	22.5	20.6	21.7
8	21.5	18.2	19.9	21.2	19.8	20.5	20.2	18.4	19.3	21.3	19.8	20.3
9	22.6	20.9	21.6	20.5	18.4	19.6	20.6	19.1	19.8	19.8	19.0	19.3
10	22.1	19.5	20.6	21.4	18.8	20.5	20.6	19.7	20.2	19.0	17.8	18.4
11	19.5	17.0	18.0	22.6	20.0	21.5	20.1	19.1	19.4	18.8	17.6	18.4
12	17.4	16.5	16.9	22.7	20.3	22.0	19.1	17.6	18.0	19.2	18.0	18.7
13	19.1	16.9	18.0	23.7	22.1	22.8	17.6	16.6	17.2	19.7	18.7	19.2
14	20.4	18.4	19.4	23.4	21.8	22.5	17.7	16.5	17.1	20.5	18.2	19.7
15	21.2	19.9	20.5	22.1	20.7	21.4	17.7	16.7	17.4	21.2	20.2	20.7
16	20.9	19.7	20.6	22.1	19.7	21.1	18.2	16.7	17.5	21.6	20.6	21.0
17	20.9	19.4	20.4	21.8	20.1	20.9	18.5	16.7	18.0	20.6	17.6	19.3
18	21.6	19.9	21.0	21.8	19.9	20.7	19.3	18.3	18.7	17.8	16.9	17.3
19	21.5	19.7	20.7	21.5	20.4	21.0	19.7	19.1	19.3	17.0	16.1	16.6
20	19.7	17.8	18.9	21.9	20.4	21.1	19.2	17.6	18.4	16.7	15.7	16.2
21	18.4	17.5	18.0	23.5	20.5	22.3	18.0	16.8	17.5	16.7	15.7	16.2
22	19.2	17.7	18.4	23.9	21.8	23.1	18.1	16.4	17.3	17.1	15.9	16.5
23	19.7	17.5	18.5	23.6	21.7	22.6	18.7	18.0	18.4	17.7	16.3	17.0
24	19.9	18.8	19.3	21.7	19.0	20.4	19.5	18.0	18.8	17.9	17.1	17.5
25	18.8	17.5	18.2	20.4	18.7	19.5	21.4	19.4	20.5	18.0	17.3	17.7
26	18.5	16.4	17.8	19.5	18.1	19.0	22.4	20.2	21.6	17.8	16.7	17.2
27	18.6	17.1	17.8	19.2	17.7	18.4	23.2	22.0	22.6	16.8	15.8	16.3
28	18.4	17.1	17.9	18.7	17.3	17.9	23.1	20.3	22.1	16.0	15.2	15.7
29	19.3	17.2	18.1	20.2	18.3	19.3	21.8	19.2	20.6	15.2	14.4	14.9
30	20.0	18.0	19.0	20.7	19.1	20.1	19.7	18.6	19.2	14.5	13.5	14.0
31	--	--	--	21.3	19.1	20.7	19.6	17.9	18.9	--	--	--
MONTH	22.6	15.2	18.6	23.9	17.3	20.8	23.2	16.4	19.4	22.5	13.5	18.4

STREAMS TRIBUTARY TO DETROIT RIVER

04166500 RIVER ROUGE AT DETROIT, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	9.8	9.3	9.5	8.7	8.2	8.3	—	—	—	—	—	—
2	10.4	9.7	10.1	8.6	7.5	8.0	—	—	—	—	—	—
3	10.4	9.9	10.2	—	—	—	—	—	—	—	—	—
4	10.2	9.5	9.9	—	—	—	—	—	—	—	—	—
5	9.9	9.8	9.9	—	—	—	—	—	—	—	—	—
6	10.6	9.8	10.2	—	—	—	—	—	—	—	—	—
7	10.5	10.1	10.3	—	—	—	—	—	—	—	—	—
8	10.4	8.7	9.8	—	—	—	—	—	—	—	—	—
9	9.6	9.0	9.3	—	—	—	—	—	—	—	—	—
10	9.3	8.6	8.9	—	—	—	—	—	—	—	—	—
11	8.7	8.2	8.4	—	—	—	—	—	—	—	—	—
12	8.2	7.3	7.7	—	—	—	—	—	—	—	—	—
13	7.8	7.3	7.5	—	—	—	—	—	—	—	—	—
14	9.0	7.2	7.9	—	—	—	—	—	—	—	—	—
15	8.4	8.0	8.2	—	—	—	—	—	—	—	—	—
16	9.1	8.4	8.8	—	—	—	—	—	—	—	—	—
17	9.6	8.9	9.3	—	—	—	—	—	—	—	—	—
18	9.8	9.4	9.6	—	—	—	—	—	—	—	—	—
19	9.7	9.3	9.5	—	—	—	—	—	—	—	—	—
20	9.6	9.0	9.4	—	—	—	—	—	—	—	—	—
21	9.0	8.2	8.4	—	—	—	—	—	—	—	—	—
22	8.8	8.2	8.5	—	—	—	—	—	—	—	—	—
23	9.5	8.8	9.2	—	—	—	—	—	—	—	—	—
24	9.5	9.2	9.3	—	—	—	—	—	—	—	—	—
25	9.2	8.2	8.9	—	—	—	—	—	—	—	—	—
26	8.8	7.5	8.0	—	—	—	—	—	—	—	—	—
27	8.7	7.8	8.3	—	—	—	—	—	—	—	—	—
28	9.2	8.6	9.0	—	—	—	—	—	—	—	—	—
29	9.6	9.0	9.2	—	—	—	—	—	—	—	—	—
30	9.6	9.4	9.5	—	—	—	—	—	—	—	—	—
31	9.4	8.7	9.1	—	—	—	—	—	—	—	—	—
MONTH	10.6	7.2	9.1	—	—	—	—	—	—	—	—	—

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	--	--	--	--	--	--	14.4	11.7	12.8	8.2	5.6	7.2
2	--	--	--	--	--	--	14.4	12.4	13.2	9.7	7.1	8.7
3	--	--	--	--	--	--	15.3	12.3	13.5	10.4	9.7	10.0
4	--	--	--	--	--	--	15.1	12.1	13.4	11.3	9.7	10.4
5	--	--	--	--	--	--	15.2	11.9	13.5	11.1	9.3	10.0
6	--	--	--	--	--	--	14.1	12.2	13.1	10.4	8.4	9.3
7	--	--	--	--	--	--	--	--	--	10.4	7.7	8.8
8	--	--	--	--	--	--	--	--	--	9.6	8.0	8.7
9	--	--	--	--	--	--	--	--	--	8.6	7.6	8.2
10	--	--	--	--	--	--	--	--	--	8.3	6.4	6.8
11	--	--	--	--	--	--	--	--	--	7.2	6.5	6.8
12	--	--	--	--	--	--	--	--	--	7.5	6.9	7.1
13	--	--	--	--	--	--	--	--	--	7.6	6.0	6.7
14	--	--	--	--	--	--	--	--	--	6.7	5.3	6.1
15	--	--	--	--	--	--	13.4	10.5	11.8	7.5	6.6	6.9
16	--	--	--	--	--	--	12.8	9.7	11.1	8.2	7.5	8.0
17	--	--	--	--	--	--	12.4	8.8	10.4	8.4	7.1	7.9
18	--	--	--	--	--	--	12.8	8.1	10.2	7.5	6.7	7.0
19	--	--	--	--	--	--	11.7	7.3	9.2	7.6	6.9	7.1
20	--	--	--	--	--	--	11.5	7.3	9.4	7.8	7.0	7.2
21	--	--	--	--	--	--	9.8	6.1	7.9	8.0	3.2	6.2
22	--	--	--	--	--	--	9.9	6.5	8.0	6.7	6.3	6.5
23	--	--	--	--	--	--	12.0	8.0	9.8	7.2	6.2	6.5
24	--	--	--	--	--	--	12.0	8.1	9.9	6.4	5.7	6.1
25	--	--	--	--	--	--	9.9	8.1	8.9	7.7	6.4	7.1
26	--	--	--	--	--	--	10.4	7.7	8.9	8.2	7.6	7.8
27	--	--	--	--	--	--	11.1	8.1	9.5	7.9	7.6	7.7
28	--	--	--	--	--	--	12.1	9.3	10.5	7.8	7.3	7.5
29	--	--	--	--	--	--	11.9	9.1	10.4	8.0	7.4	7.8
30	--	--	--	--	--	--	11.3	7.6	9.2	8.3	7.2	7.8
31	--	--	--	11.7	11.0	11.3	--	--	--	7.8	6.6	7.0
MONTH	--	--	--	--	--	--	--	--	--	11.3	3.2	7.6

STREAMS TRIBUTARY TO DETROIT RIVER

04166500 RIVER ROUGE AT DETROIT, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.3	6.7	6.9	7.2	6.3	6.6	7.4	7.0	7.1	7.3	6.1	6.5
2	7.8	6.9	7.1	6.9	6.0	6.3	7.5	6.5	6.9	6.9	6.0	6.2
3	7.4	6.9	7.1	7.2	5.9	6.4	6.8	2.6	5.2	6.6	5.8	5.9
4	7.8	7.0	7.3	6.9	4.2	5.9	7.0	5.6	6.4	6.1	5.5	5.8
5	7.8	7.1	7.4	5.9	4.4	5.1	7.2	6.8	7.0	6.5	5.5	5.9
6	7.6	7.0	7.2	6.6	5.3	5.7	7.9	7.2	7.4	6.5	5.4	5.7
7	7.8	6.8	7.2	7.4	4.9	5.6	7.7	7.1	7.3	7.3	5.3	6.0
8	7.3	5.8	6.5	6.2	5.5	6.0	7.5	6.8	7.1	6.8	6.2	6.5
9	5.8	4.2	5.4	7.0	6.2	6.5	7.4	6.6	6.9	7.2	6.6	6.9
10	6.2	4.0	5.1	7.1	6.1	6.5	7.2	6.5	6.6	7.5	6.8	7.0
11	7.4	6.2	6.9	7.0	5.8	6.1	7.5	6.5	7.1	7.2	6.6	6.8
12	7.6	7.1	7.3	7.1	4.0	5.6	8.3	7.0	7.5	7.3	6.4	6.7
13	7.4	6.5	6.9	6.2	5.5	5.8	8.2	7.4	7.8	7.2	6.3	6.5
14	6.9	6.0	6.5	6.7	4.7	5.6	8.3	7.6	7.9	6.9	6.0	6.3
15	6.5	5.8	6.2	6.3	5.4	5.9	8.1	7.5	7.8	6.1	5.4	5.7
16	6.6	6.0	6.2	6.9	5.8	6.2	8.2	7.4	7.7	6.6	5.3	5.6
17	6.9	6.0	6.4	6.6	5.2	5.8	8.1	7.1	7.6	6.7	5.5	5.9
18	6.9	6.2	6.3	7.0	5.6	6.2	8.0	6.9	7.4	6.9	6.1	6.5
19	6.8	6.2	6.4	6.3	4.0	5.6	8.2	6.9	7.4	7.4	6.6	7.0
20	7.4	6.4	6.8	6.5	5.5	5.8	8.1	6.7	7.3	8.2	7.1	7.5
21	7.5	6.8	7.0	5.8	5.3	5.6	7.8	7.0	7.3	7.9	7.3	7.6
22	7.7	6.9	7.1	6.0	5.1	5.4	8.2	7.1	7.5	7.8	7.3	7.5
23	7.7	6.8	7.1	6.0	5.3	5.6	7.8	6.8	7.2	7.7	7.1	7.4
24	7.4	6.5	6.8	6.9	5.6	6.4	7.6	6.8	7.2	7.6	6.8	7.1
25	7.5	6.5	6.7	7.6	6.4	6.8	7.1	6.2	6.6	7.7	6.4	6.9
26	7.9	6.6	7.0	7.6	6.6	7.0	6.9	5.7	6.3	7.5	6.8	7.1
27	7.6	6.9	7.2	7.9	6.6	7.0	6.2	5.1	5.6	7.8	7.1	7.4
28	7.7	6.9	7.1	8.1	7.5	7.7	7.2	1.4	5.4	7.7	7.2	7.5
29	7.4	6.7	7.0	7.8	7.1	7.4	7.3	5.6	6.5	8.4	7.3	7.8
30	7.4	6.4	6.8	7.5	7.0	7.1	7.5	6.5	7.0	8.4	7.6	8.0
31	—	—	—	7.7	6.5	6.9	7.4	6.5	6.8	—	—	—
MONTH	7.9	4.0	6.8	8.1	4.0	6.2	8.3	1.4	7.0	8.4	5.3	6.7

STREAMS TRIBUTARY TO DETROIT RIVER

04166750 MIDDLE RIVER ROUGE AT PLYMOUTH, MI

LOCATION.--Lat 42°22'18", long 83°26'44", in NE1/4 SW1/4 sec. 25, T.1 S., R.8 E., Wayne County, Hydrologic Unit 04090004, on right bank 30 ft upstream from bridge on Haggerty Road in Plymouth.

DRAINAGE AREA.--60.7 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 2002 to current year.

GAGE.--Water-stage recorder. Datum of gage is 690 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Regulation by storm water retention structures and occasional regulation by reservoirs upstream from station. 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	17	19	e47	67	e21	88	e62	27	63	16	92	36
2	15	39	37	74	e22	114	54	88	62	15	56	29
3	16	85	31	71	e22	102	48	65	67	15	153	26
4	e20	82	28	62	e23	84	46	38	48	29	254	24
5	e18	47	27	57	e23	191	41	32	39	40	223	22
6	e17	33	26	47	e23	188	37	29	34	23	115	23
7	e16	27	24	e45	e22	119	36	30	31	60	78	85
8	e15	24	23	e38	e22	104	35	31	28	60	54	54
9	e15	22	23	e33	e22	88	32	52	43	29	40	33
10	e14	21	49	e32	e21	74	30	265	86	22	35	26
11	14	49	118	e30	e21	66	29	199	126	18	30	24
12	14	47	67	28	e21	61	28	116	110	47	29	22
13	14	30	42	27	20	51	28	99	79	78	28	20
14	e40	25	36	e26	20	49	27	131	84	62	26	20
15	e165	25	32	e25	e20	46	26	129	77	42	24	19
16	65	28	34	e24	e20	44	24	90	61	36	23	19
17	36	27	39	e23	e19	43	24	81	72	55	22	18
18	27	76	35	e22	e19	44	24	78	59	52	22	17
19	23	185	31	e22	20	46	23	68	43	43	21	17
20	20	e90	27	e21	35	124	22	58	31	28	20	17
21	22	56	26	e21	93	155	30	148	27	22	22	17
22	19	42	25	e20	72	94	25	456	28	42	20	17
23	18	35	57	e20	69	70	22	332	24	33	19	17
24	17	e80	86	e20	70	68	21	195	24	22	19	18
25	24	e60	64	e20	60	108	24	127	21	19	19	23
26	43	e44	49	e20	62	124	25	101	20	17	20	18
27	31	e40	41	e21	66	112	21	88	18	63	20	17
28	25	e55	38	e21	70	88	20	82	18	197	146	16
29	29	e90	76	e21	80	74	19	68	17	139	142	16
30	26	e65	152	e21	---	68	19	57	16	72	86	17
31	21	---	97	e20	---	e72	---	72	---	119	50	---
TOTAL	856	1548	1487	999	1078	2759	902	3432	1456	1515	1908	727
MEAN	27.6	51.6	48.0	32.2	37.2	89.0	30.1	111	48.5	48.9	61.5	24.2
MAX	165	185	152	74	93	191	62	456	126	197	254	85
MIN	14	19	23	20	19	43	19	27	16	15	19	16
CFSM	0.45	0.85	0.79	0.53	0.61	1.47	0.50	1.82	0.80	0.81	1.01	0.40
IN.	0.52	0.95	0.91	0.61	0.66	1.69	0.55	2.10	0.89	0.93	1.17	0.45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2003 - 2004, BY WATER YEAR (WY)

MEAN	23.1	39.5	35.7	25.2	27.2	72.3	47.5	86.3	45.7	33.7	41.5	26.1
MAX	27.6	51.6	48.0	32.2	37.2	89.0	64.9	111	48.5	48.9	61.5	27.9
(WY)	2004	2004	2004	2004	2004	2004	2003	2004	2004	2004	2004	2003
MIN	18.6	27.4	23.4	18.2	16.9	55.7	30.1	61.8	42.9	18.5	21.5	24.2
(WY)	2003	2003	2003	2003	2003	2003	2004	2003	2003	2003	2003	2004

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 2003 - 2004

ANNUAL TOTAL	13883	18667	
ANNUAL MEAN	38.0	51.0	
HIGHEST ANNUAL MEAN			42.1
LOWEST ANNUAL MEAN			51.0
HIGHEST DAILY MEAN	312	Apr 5	456
LOWEST DAILY MEAN	11	Aug 31	14
ANNUAL SEVEN-DAY MINIMUM	11	Sep 7	15
MAXIMUM PEAK FLOW			550
MAXIMUM PEAK STAGE			9.25
INSTANTANEOUS LOW FLOW			10
ANNUAL RUNOFF (CFSM)	0.627	0.840	0.694
ANNUAL RUNOFF (INCHES)	8.51	11.44	9.43
10 PERCENT EXCEEDS	80	101	88
50 PERCENT EXCEEDS	24	32	25
90 PERCENT EXCEEDS	14	19	15

(a) Sept. 12, 13, 14, 2003.

(e) Estimated.

[illegible]

STREAMS TRIBUTARY TO DETROIT RIVER

04166750 MIDDLE RIVER ROUGE AT PLYMOUTH, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	--	--	--	--	--	--	--	--	--	17.0	13.7	15.7
2	--	--	--	--	--	--	--	--	--	13.7	11.6	12.4
3	--	--	--	--	--	--	--	--	--	12.4	10.3	11.4
4	--	--	--	--	--	--	--	--	--	13.0	9.6	11.4
5	--	--	--	--	--	--	--	--	--	15.7	11.8	13.6
6	--	--	--	--	--	--	9.0	6.9	8.0	17.8	13.0	15.3
7	--	--	--	--	--	--	10.8	7.5	9.2	16.6	14.7	15.6
8	--	--	--	--	--	--	10.4	9.0	9.6	15.7	14.0	14.9
9	--	--	--	--	--	--	11.6	8.4	10.1	18.5	14.5	16.6
10	--	--	--	--	--	--	12.2	8.7	10.5	19.1	16.6	18.0
11	--	--	--	--	--	--	10.6	9.4	10.0	19.9	18.5	19.2
12	--	--	--	--	--	--	10.9	8.4	9.6	21.9	18.8	20.1
13	--	--	--	--	--	--	9.7	8.5	9.0	22.3	20.2	21.2
14	--	--	--	--	--	--	11.7	7.2	9.5	21.6	20.5	21.0
15	--	--	--	--	--	--	12.9	9.3	11.1	20.6	17.7	19.0
16	--	--	--	--	--	--	14.8	10.4	12.6	19.1	16.7	17.6
17	--	--	--	--	--	--	16.3	12.8	14.5	18.8	16.3	17.6
18	--	--	--	--	--	--	19.3	14.4	16.7	20.2	17.9	18.9
19	--	--	--	--	--	--	18.6	16.3	17.2	20.4	17.6	19.0
20	--	--	--	--	--	--	16.3	14.2	14.9	20.8	18.4	19.4
21	--	--	--	--	--	--	16.2	13.3	15.0	20.4	17.9	19.1
22	--	--	--	--	--	--	15.6	13.5	14.6	19.1	17.2	18.1
23	--	--	--	--	--	--	17.5	13.2	15.3	20.3	19.0	19.5
24	--	--	--	--	--	--	16.5	13.6	15.1	20.0	18.9	19.6
25	--	--	--	--	--	--	15.4	13.6	14.5	18.9	17.1	17.8
26	--	--	--	--	--	--	15.9	13.0	14.4	17.7	16.5	17.1
27	--	--	--	--	--	--	13.9	10.7	12.0	18.0	15.8	16.8
28	--	--	--	--	--	--	13.6	9.6	11.5	17.8	16.3	16.8
29	--	--	--	--	--	--	16.8	12.7	14.7	17.5	15.3	16.4
30	--	--	--	--	--	--	18.1	15.3	16.6	18.3	15.6	16.9
31	--	--	--	--	--	--	--	--	--	19.1	17.0	17.8
MONTH	--	--	--	--	--	--	--	--	--	22.3	9.6	17.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	19.4	16.9	18.1	24.4	21.2	22.9	24.1	20.9	22.3	22.3	20.0	21.0
2	19.2	17.6	18.3	24.1	21.5	22.9	25.5	21.7	23.4	22.7	20.3	21.5
3	20.2	16.9	18.4	24.2	21.5	22.9	25.0	22.3	23.6	23.8	21.1	22.3
4	20.2	16.8	18.5	25.0	22.1	23.8	23.8	20.8	22.0	23.2	21.7	22.6
5	21.6	17.9	19.6	24.2	22.4	23.3	21.3	19.7	20.4	23.7	22.2	23.0
6	20.7	18.6	19.6	25.0	21.7	23.0	21.4	18.7	20.0	24.9	22.4	23.6
7	23.0	18.7	20.7	24.6	22.0	23.2	21.9	19.0	20.4	24.2	22.3	23.2
8	25.2	20.3	22.6	22.7	20.9	21.7	22.9	19.7	21.2	22.8	20.8	21.4
9	24.7	22.8	23.6	24.1	19.9	21.7	23.2	20.6	21.8	21.7	19.8	20.6
10	23.6	20.4	22.2	25.6	21.8	23.2	22.1	20.9	21.5	22.3	19.0	20.4
11	20.4	18.0	19.0	24.9	22.2	23.6	21.1	20.0	20.6	22.6	19.3	20.7
12	19.1	17.2	18.0	25.1	22.5	24.0	20.1	18.7	19.2	23.4	19.5	21.2
13	21.0	18.3	19.4	25.9	23.0	24.5	19.7	18.2	18.9	22.2	20.2	21.3
14	22.4	19.6	20.9	24.4	22.9	23.6	19.9	18.1	18.8	22.7	21.0	21.9
15	24.1	20.7	22.3	24.2	21.8	23.0	19.8	18.5	19.1	23.6	21.5	22.5
16	23.0	21.7	22.2	25.2	21.5	23.0	21.6	17.8	19.5	23.1	22.0	22.6
17	23.4	21.3	22.3	23.3	21.8	22.6	20.8	18.6	19.7	22.0	19.0	20.3
18	24.1	21.6	22.7	23.6	21.7	22.5	21.2	19.4	20.3	20.0	17.8	18.7
19	23.1	21.0	22.2	24.2	21.2	22.7	21.1	19.7	20.5	19.2	17.5	18.4
20	22.6	19.4	21.1	25.2	21.8	23.2	20.9	18.7	19.4	19.8	17.5	18.5
21	21.4	19.6	20.5	26.5	23.0	24.6	20.8	17.8	19.1	20.8	17.5	19.0
22	21.9	19.9	20.8	27.1	23.6	25.0	21.4	17.8	19.5	21.3	17.8	19.4
23	22.9	19.1	21.0	25.3	22.9	24.1	21.5	19.6	20.5	20.4	18.2	19.4
24	22.3	20.5	21.4	22.9	20.9	21.9	21.8	19.4	20.6	20.9	19.2	19.9
25	21.9	19.0	20.3	22.3	20.9	21.4	24.2	21.6	22.7	20.4	18.6	19.1
26	21.8	18.8	20.3	21.4	20.6	21.1	24.7	22.4	23.5	19.6	17.8	18.5
27	21.6	19.0	20.4	21.2	18.9	19.8	25.7	23.5	24.4	19.3	17.0	18.2
28	21.1	19.8	20.5	20.0	17.7	18.8	25.4	22.2	23.4	19.0	16.4	17.5
29	22.1	19.2	20.7	20.3	18.7	19.6	22.4	20.6	21.3	16.7	15.6	16.1
30	23.4	20.2	21.8	21.2	19.8	20.4	21.5	19.5	20.5	17.0	14.8	15.9
31	—	—	—	22.6	20.4	21.4	22.3	19.2	20.6	—	—	—
MONTH	25.2	16.8	20.6	27.1	17.7	22.6	25.7	17.8	20.9	24.9	14.8	20.3

STREAMS TRIBUTARY TO DETROIT RIVER

04166750 MIDDLE RIVER ROUGE AT PLYMOUTH, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	—	—	—	7.7	5.7	6.6	—	—	—	8.4	7.6	8.1
2	—	—	—	7.8	5.7	6.7	—	—	—	8.3	6.8	7.7
3	—	—	—	8.1	5.7	6.9	—	—	—	7.8	6.7	7.2
4	—	—	—	7.6	5.6	6.5	—	—	—	7.9	6.6	7.1
5	8.6	6.9	7.9	8.5	6.7	7.4	—	—	—	7.5	5.5	6.7
6	8.1	6.9	7.6	8.5	5.2	7.1	—	—	—	7.0	4.8	5.9
7	7.9	6.0	7.1	8.2	5.3	7.3	—	—	—	7.7	5.5	7.1
8	7.2	4.6	6.1	8.4	7.5	7.8	—	—	—	7.8	7.2	7.5
9	—	—	—	8.8	6.3	7.7	—	—	—	8.3	7.3	7.8
10	—	—	—	8.6	5.6	7.1	8.0	7.4	7.7	7.9	6.6	7.5
11	8.7	7.8	8.4	8.9	4.8	6.7	8.3	7.6	8.0	7.9	6.7	7.3
12	9.0	8.2	8.6	7.9	4.8	6.4	8.7	7.8	8.3	7.9	6.3	7.2
13	8.3	6.4	7.6	8.2	6.4	7.5	9.0	8.2	8.5	7.7	6.5	7.1
14	—	—	—	8.0	6.8	7.3	9.1	8.2	8.6	7.7	6.3	6.9
15	8.2	7.3	7.8	8.3	6.8	7.4	9.2	8.1	8.5	7.3	6.1	6.6
16	8.0	7.4	7.7	8.1	6.6	7.3	9.1	7.3	8.3	7.1	6.1	6.5
17	8.1	7.3	7.7	8.2	7.3	7.7	8.7	7.3	8.0	7.7	6.2	7.0
18	8.1	7.0	7.5	8.3	7.2	7.7	8.6	7.1	7.9	8.3	7.0	7.6
19	8.0	6.9	7.5	8.3	6.8	7.6	8.7	7.2	7.8	8.5	7.2	7.8
20	8.2	4.6	7.3	8.1	5.8	7.1	8.6	7.2	7.9	8.3	7.2	7.7
21	8.0	6.3	7.2	7.6	5.1	6.4	9.0	7.3	8.2	8.3	6.8	7.5
22	8.1	6.9	7.4	7.4	5.1	6.2	9.1	7.2	8.2	8.5	6.6	7.5
23	8.2	6.3	7.4	—	—	—	9.1	7.0	8.0	8.1	6.8	7.5
24	7.8	6.5	7.1	—	—	—	9.1	6.9	8.0	8.2	7.0	7.5
25	8.3	6.6	7.5	—	—	—	8.2	6.0	7.1	8.3	7.3	7.9
26	8.3	6.6	7.4	—	—	—	8.1	5.8	6.8	8.6	7.4	8.0
27	8.2	6.6	7.4	—	—	—	8.0	5.8	6.7	8.6	7.2	7.9
28	7.9	6.6	7.2	—	—	—	8.3	5.8	7.6	8.4	7.2	8.0
29	8.2	6.5	7.3	—	—	—	8.7	8.3	8.5	9.0	7.6	8.3
30	7.9	5.9	6.9	—	—	—	8.9	8.2	8.6	9.0	7.6	8.3
31	—	—	—	—	—	—	8.7	7.8	8.3	—	—	—
MONTH	—	—	—	—	—	—	—	—	—	9.0	4.8	7.4

STREAMS TRIBUTARY TO DETROIT RIVER

04167000 MIDDLE RIVER ROUGE NEAR GARDEN CITY, MI

LOCATION.--Lat 42°20'53", long 83°18'42", in SW1/4 NW1/4 sec.6, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, on right bank 200 ft downstream from bridge on Inkster Road, 1.8 mi northeast of Garden City, and 6.0 mi upstream from mouth.

DRAINAGE AREA.--99.9 mi².

PERIOD OF RECORD.--October 1930 to September 1933 (published as "at Detroit"), June 1947 to September 1977, October 1977 to September 1983 (operated as a crest-stage partial-record station), October 1983 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 600.95 ft above sea level. Nov. 21, 1930 to Sept. 30, 1933, nonrecording gage at site 4.8 mi downstream at datum 17.48 ft lower. June 6, 1947 to Oct. 18, 1948, nonrecording gage at site 200 ft upstream at present datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Regulation by storm water retention structures and occasional regulation by reservoirs upstream from station since 1956. Several measurements of water temperature were made during the year. Gage-height telemeter 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	36	31	82	125	e35	120	99	e60	e120	20	162	74
2	32	89	63	153	e35	150	88	e230	e100	19	106	58
3	36	195	53	122	e35	152	79	e120	e130	18	289	49
4	58	161	47	106	e36	138	75	e85	e100	54	463	63
5	42	94	44	e90	e36	343	67	e65	78	69	434	45
6	34	62	40	e80	e36	315	62	e54	67	46	226	39
7	30	48	38	e68	e35	218	60	e80	61	103	141	235
8	27	38	34	e64	e34	172	57	e76	55	93	105	121
9	27	32	33	e60	e32	137	54	e90	200	61	81	75
10	25	29	122	e55	e31	113	50	e450	248	38	68	55
11	24	98	242	e50	e30	100	46	357	314	27	60	45
12	24	75	128	e49	29	93	44	214	246	170	53	41
13	23	59	78	e47	29	81	52	e130	153	135	51	36
14	196	41	61	e46	e29	74	45	e320	146	314	50	32
15	396	40	57	e47	e28	73	41	e250	135	100	74	31
16	158	52	67	e46	e28	73	39	e160	107	82	57	31
17	74	49	71	e45	e27	76	37	129	141	190	41	28
18	46	158	61	e44	26	72	36	121	128	152	39	26
19	33	328	52	e42	30	80	35	102	87	102	38	24
20	25	188	47	e40	83	289	31	88	65	72	42	23
21	26	103	40	e39	198	284	e90	797	55	54	48	23
22	26	74	39	e38	133	173	e70	1060	54	81	36	23
23	22	60	144	e37	112	117	e40	684	47	69	32	23
24	20	138	144	e37	109	120	e34	654	40	50	30	23
25	42	112	108	e37	100	203	e43	299	37	37	30	27
26	83	81	88	e38	90	253	e47	204	32	32	35	30
27	59	62	73	e38	94	202	e36	165	28	167	32	25
28	49	111	62	e39	98	144	29	147	26	277	360	23
29	62	153	144	e38	103	119	28	122	24	240	326	23
30	45	114	279	e37	—	109	26	114	22	141	187	22
31	37	—	184	e36	—	115	—	158	—	205	106	—
TOTAL	1817	2875	2725	1793	1721	4708	1540	7585	3046	3218	3802	1373
MEAN	58.6	95.8	87.9	57.8	59.3	152	51.3	245	102	104	123	45.8
MAX	396	328	279	153	198	343	99	1060	314	314	463	235
MIN	20	29	33	36	26	72	26	54	22	18	30	22
CFSM	0.59	0.96	0.88	0.58	0.59	1.52	0.51	2.45	1.02	1.04	1.23	0.46
IN.	0.68	1.07	1.01	0.67	0.64	1.75	0.57	2.82	1.13	1.20	1.42	0.51

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2004, BY WATER YEAR (WY)

	MEAN	45.7	59.2	74.7	80.3	109	146	133	99.7	70.1	47.8	41.9	46.7
MAX	250	178	177	269	324	313	313	310	225	179	144	199	199
(WY)	2002	1993	1988	1952	1976	1976	1950	1956	1968	1957	1998	2000	2000
MIN	7.83	9.46	10.4	9.65	14.2	42.3	32.6	21.9	17.8	8.85	5.64	4.97	4.97
(WY)	1932	1965	1964	1961	1963	1931	1931	1958	1959	1931	1931	1931	1931

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1931 - 2004

ANNUAL TOTAL	27740	36203	79.2
ANNUAL MEAN	76.0	98.9	133
HIGHEST ANNUAL MEAN			20.8
LOWEST ANNUAL MEAN			2060
HIGHEST DAILY MEAN	557	1060	May 22
LOWEST DAILY MEAN	16	18	Jul 3
ANNUAL SEVEN-DAY MINIMUM	17	22	Jun 27
MAXIMUM PEAK FLOW		1310	May 22
MAXIMUM PEAK STAGE		9.50	May 22
INSTANTANEOUS LOW FLOW			(a)2330
ANNUAL RUNOFF (CFSM)	0.761	0.990	(b)10.50
ANNUAL RUNOFF (INCHES)	10.33	13.48	0.90
10 PERCENT EXCEEDS	167	203	0.793
50 PERCENT EXCEEDS	46	62	10.77
90 PERCENT EXCEEDS	23	28	169
			45
			15

(a) Gage height 9.96 ft.

(b) From floodmark.

(c) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04167150 MIDDLE RIVER ROUGE AT DEARBORN HEIGHTS, MI

LOCATION.--Lat 42°19'50", long 83°14'53", in SW1/4 sec.10, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, on right bank at downstream side of bridge on Hines Drive in Dearborn Heights.

DRAINAGE AREA.--110 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1997 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 585 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Regulation by storm water retention structures and occasional regulation by reservoirs upstream from station. Gage-height telemeter 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	41	32	88	120	e34	114	112	66	124	24	167	77
2	39	71	67	147	e34	156	95	254	119	22	107	57
3	38	203	53	121	e35	155	86	155	145	21	334	44
4	68	219	47	101	e36	129	81	87	97	40	463	58
5	52	105	42	100	e36	360	76	70	81	82	476	48
6	41	68	40	94	e36	437	70	59	71	49	206	34
7	36	48	37	74	e36	224	67	88	64	88	133	215
8	34	38	35	e65	e35	189	64	85	57	93	106	125
9	32	33	34	e56	e35	147	62	99	122	61	88	72
10	32	31	91	e50	e34	117	57	529	290	36	77	49
11	31	92	376	46	e34	104	52	505	383	26	70	38
12	32	92	166	46	e33	98	50	235	280	159	65	34
13	33	63	88	47	e32	87	58	148	151	174	61	31
14	143	42	68	e46	e32	80	54	362	145	247	59	29
15	556	36	61	e44	e31	79	49	264	153	114	80	27
16	202	48	65	e42	e31	78	46	165	112	87	68	27
17	85	48	83	e41	e31	84	45	124	130	167	49	25
18	52	120	69	e40	e31	81	43	122	129	147	46	23
19	39	457	57	e39	e35	91	40	104	91	122	46	22
20	33	249	48	e38	74	286	38	89	72	79	45	22
21	32	116	41	e37	298	369	97	533	58	65	60	24
22	32	80	40	e37	189	174	76	1190	56	87	44	20
23	30	63	125	e36	126	122	44	985	49	82	40	20
24	28	124	184	e36	115	117	37	900	43	63	37	19
25	38	141	117	e36	103	221	47	426	40	49	37	22
26	92	88	95	e35	93	284	51	207	34	44	43	26
27	67	66	79	e36	96	237	40	160	31	134	46	22
28	46	95	68	e36	98	155	34	145	28	243	360	20
29	66	203	115	e35	101	127	32	119	27	199	364	20
30	47	130	356	e34	—	116	30	107	26	132	201	19
31	38	—	196	e34	—	130	—	144	—	196	104	—
TOTAL	2135	3201	3031	1749	1934	5148	1733	8526	3208	3132	4082	1269
MEAN	68.9	107	97.8	56.4	66.7	166	57.8	275	107	101	132	42.3
MAX	556	457	376	147	298	437	112	1190	383	247	476	215
MIN	28	31	34	34	31	78	30	59	26	21	37	19
CFSM	0.63	0.97	0.89	0.51	0.61	1.51	0.53	2.50	0.97	0.92	1.20	0.38
IN.	0.72	1.08	1.03	0.59	0.65	1.74	0.59	2.88	1.08	1.06	1.38	0.43

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2004, BY WATER YEAR (WY)

MEAN	86.5	67.1	80.1	78.3	140	131	139	143	101	77.6	89.4	81.1
MAX	269	107	136	141	324	242	199	275	171	141	160	220
(WY)	2002	2004	2002	1998	2001	1998	2002	2004	2000	2000	1998	2000
MIN	36.7	32.1	44.8	31.8	32.8	55.7	57.8	84.3	50.7	33.0	30.3	35.1
(WY)	2003	2000	2003	2003	2003	2000	2004	1999	2002	2001	2002	1998

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1998 - 2004

ANNUAL TOTAL	29957	39148	
ANNUAL MEAN	82.1	107	101
HIGHEST ANNUAL MEAN			118
LOWEST ANNUAL MEAN			71.2
HIGHEST DAILY MEAN	708	1190	1540
LOWEST DAILY MEAN	16	19	13
ANNUAL SEVEN-DAY MINIMUM	18	21	14
MAXIMUM PEAK FLOW		1290	(a)1810
MAXIMUM PEAK STAGE		10.09	12.24
INSTANTANEOUS LOW FLOW		18	(b)
ANNUAL RUNOFF (CFSM)	0.746	0.972	0.917
ANNUAL RUNOFF (INCHES)	10.13	13.24	12.45
10 PERCENT EXCEEDS	184	216	205
50 PERCENT EXCEEDS	52	68	61
90 PERCENT EXCEEDS	25	32	25

(a) Gage height 12.10 ft.

(b) Sept. 23, 24, 28, 30.

(c) Sept. 14, 15, 2002.

(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04167150 MIDDLE RIVER ROUGE AT DEARBORN HEIGHTS, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	--	--	--	--	--	--	8.6	7.3	7.9	17.4	12.8	15.4	
2	--	--	--	--	--	--	8.9	8.0	8.5	12.9	9.8	10.8	
3	--	--	--	--	--	--	10.2	8.0	9.0	11.6	9.8	10.8	
4	--	--	--	--	--	--	9.5	7.3	8.6	12.6	10.9	11.7	
5	--	--	--	--	--	--	8.7	6.4	7.4	15.4	11.9	13.7	
6	--	--	--	--	--	--	9.0	6.4	7.8	17.0	12.8	15.0	
7	--	--	--	--	--	--	11.0	7.4	9.2	15.8	14.1	15.1	
8	--	--	--	--	--	--	10.6	8.7	9.7	14.1	13.0	13.4	
9	--	--	--	--	--	--	10.7	7.9	9.4	16.6	12.8	14.7	
10	--	--	--	--	--	--	11.6	8.3	9.9	18.6	16.1	17.5	
11	--	--	--	--	--	--	10.8	8.5	9.6	18.6	17.8	18.3	
12	--	--	--	--	--	--	10.5	7.4	8.9	20.2	18.0	18.8	
13	--	--	--	--	--	--	8.8	7.5	8.1	20.7	19.7	20.4	
14	--	--	--	--	--	--	10.7	6.5	8.5	21.1	20.1	20.7	
15	--	--	--	--	--	--	13.2	8.3	10.7	20.2	17.8	18.9	
16	--	--	--	--	--	--	14.2	9.7	12.0	18.0	17.0	17.5	
17	--	--	--	--	--	--	15.9	12.2	14.0	18.9	17.6	18.0	
18	--	--	--	--	--	--	18.7	13.9	16.2	18.9	18.0	18.6	
19	--	--	--	--	--	--	18.7	15.8	17.1	19.0	17.6	18.3	
20	--	--	--	--	--	--	16.3	13.7	14.6	19.3	17.6	18.5	
21	--	--	--	--	--	--	13.7	10.9	12.8	20.5	16.2	19.0	
22	--	--	--	--	--	--	14.9	12.4	13.7	19.8	17.1	18.3	
23	--	--	--	--	--	--	15.9	11.9	13.8	20.2	19.3	19.6	
24	--	--	--	--	--	--	15.6	12.3	14.1	19.7	18.5	19.1	
25	--	--	--	--	--	--	14.7	12.1	13.4	18.5	17.4	17.6	
26	--	--	--	--	--	--	15.5	12.5	13.9	17.7	17.2	17.4	
27	--	--	--	--	--	--	13.3	10.3	11.8	17.6	16.7	17.0	
28	--	--	--	--	--	--	12.3	8.6	10.4	17.6	16.2	17.0	
29	--	--	--	--	--	--	16.3	11.5	13.9	16.2	15.8	15.9	
30	--	--	--	--	--	--	17.8	14.9	16.3	17.4	15.8	16.7	
31	--	--	--	9.3	7.7	8.6	--	--	--	17.8	16.3	17.2	
MONTH	--	--	--	--	--	--	18.7	6.4	11.4	21.1	9.8	16.8	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
		JUNE				JULY		AUGUST				SEPTEMBER	
1	18.3	17.2	17.8	22.9	20.1	21.6	22.3	21.4	21.9	21.6	20.1	20.9	
2	18.3	17.5	18.0	22.9	20.5	21.9	23.7	22.2	22.9	22.4	20.3	21.4	
3	18.3	17.3	17.7	23.0	20.4	21.9	23.6	21.7	22.9	22.8	20.4	21.6	
4	18.5	17.1	17.8	23.7	22.1	22.8	23.7	20.8	21.8	23.3	20.9	21.9	
5	19.2	16.8	18.0	23.1	22.2	22.7	21.6	20.8	21.2	23.5	22.0	22.7	
6	19.5	17.4	18.6	23.6	21.2	22.4	21.2	19.9	20.5	23.7	21.8	22.7	
7	21.3	18.2	19.7	23.4	21.6	22.5	21.0	20.0	20.5	23.4	21.9	22.3	
8	23.6	19.8	21.7	22.0	20.9	21.6	21.7	20.5	21.1	22.1	20.3	21.4	
9	24.4	21.6	22.9	22.1	20.4	21.2	22.0	20.6	21.4	20.4	19.6	20.2	
10	23.5	20.0	21.8	24.2	20.9	22.4	22.1	21.0	21.5	20.4	18.4	19.4	
11	20.0	17.8	18.6	24.9	21.7	23.3	21.1	19.5	20.4	20.9	18.2	19.5	
12	19.0	17.5	18.2	24.2	22.5	23.2	19.5	18.3	18.8	21.4	18.6	20.0	
13	19.9	19.0	19.5	24.6	22.9	23.7	18.9	17.5	18.2	21.6	19.3	20.5	
14	21.1	19.7	20.4	24.4	22.2	22.9	19.3	17.4	18.4	22.3	20.1	21.2	
15	22.3	20.5	21.4	22.8	21.8	22.2	19.5	18.0	18.8	22.4	20.8	21.7	
16	21.9	20.4	21.4	23.4	21.5	22.2	19.7	17.6	18.7	22.4	21.3	21.8	
17	22.7	20.2	21.0	22.6	21.5	21.9	20.5	17.9	19.2	21.6	18.4	19.6	
18	22.8	21.3	22.3	22.9	21.3	21.9	21.2	19.0	20.1	18.4	16.8	17.5	
19	22.2	20.3	21.7	22.6	21.4	21.9	21.0	19.8	20.4	17.5	16.1	16.8	
20	21.0	19.3	20.1	23.7	21.5	22.7	20.5	18.8	19.2	17.2	16.1	16.8	
21	20.7	18.4	19.6	25.5	22.5	23.9	19.2	17.6	18.4	17.6	16.3	17.1	
22	21.2	19.1	20.1	25.2	23.1	24.2	20.0	16.5	18.3	18.1	16.6	17.5	
23	—	—	—	24.3	22.1	23.5	20.7	18.4	19.5	18.7	17.2	18.1	
24	—	—	—	22.1	20.3	21.2	21.5	18.8	20.2	19.4	18.3	18.9	
25	20.7	18.2	19.4	21.2	19.3	20.3	22.9	20.6	21.7	19.5	18.3	18.8	
26	20.4	17.5	19.0	20.5	19.3	20.0	23.8	21.8	22.8	18.4	17.6	18.1	
27	20.6	17.6	19.1	20.2	18.2	18.9	24.3	22.4	23.4	17.8	16.0	16.9	
28	19.9	18.3	19.1	20.9	18.0	19.0	24.2	21.9	22.6	17.4	15.7	16.5	
29	20.9	17.8	19.4	21.2	20.6	20.8	22.2	20.9	21.4	15.7	15.1	15.5	
30	22.0	18.8	20.4	21.2	20.4	20.6	21.0	20.3	20.7	15.1	13.8	14.5	
31	—	—	—	21.8	20.6	21.2	21.1	20.3	20.8	—	—	—	
MONTH	—	—	—	25.5	18.0	22.0	24.3	16.5	20.6	23.7	13.8	19.4	

STREAMS TRIBUTARY TO DETROIT RIVER

04167150 MIDDLE RIVER ROUGE AT DEARBORN HEIGHTS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	10.3	9.2	9.7	8.1	7.5	7.8	—	—	—	—	—	—
2	10.8	9.5	10.1	7.6	6.2	7.0	—	—	—	—	—	—
3	11.5	9.2	10.3	—	—	—	—	—	—	—	—	—
4	9.4	8.1	9.0	—	—	—	—	—	—	—	—	—
5	9.7	8.3	9.2	—	—	—	—	—	—	—	—	—
6	10.7	9.7	10.2	—	—	—	—	—	—	—	—	—
7	10.9	9.3	10.3	—	—	—	—	—	—	—	—	—
8	10.4	8.8	9.6	—	—	—	—	—	—	—	—	—
9	9.8	8.4	9.0	—	—	—	—	—	—	—	—	—
10	9.7	8.1	8.7	—	—	—	—	—	—	—	—	—
11	9.3	7.5	8.3	—	—	—	—	—	—	—	—	—
12	8.2	7.1	7.6	—	—	—	—	—	—	—	—	—
13	8.7	7.4	8.1	—	—	—	—	—	—	—	—	—
14	8.8	7.6	8.2	—	—	—	—	—	—	—	—	—
15	8.6	7.9	8.3	—	—	—	—	—	—	—	—	—
16	9.1	8.2	8.8	—	—	—	—	—	—	—	—	—
17	9.8	8.9	9.3	—	—	—	—	—	—	—	—	—
18	10.0	9.3	9.6	—	—	—	—	—	—	—	—	—
19	10.1	9.3	9.6	—	—	—	—	—	—	—	—	—
20	10.5	8.6	9.7	—	—	—	—	—	—	—	—	—
21	8.8	8.0	8.5	—	—	—	—	—	—	—	—	—
22	9.6	8.1	8.9	—	—	—	—	—	—	—	—	—
23	10.6	9.0	9.8	—	—	—	—	—	—	—	—	—
24	10.2	9.2	9.8	—	—	—	—	—	—	—	—	—
25	9.3	7.3	8.8	—	—	—	—	—	—	—	—	—
26	7.9	7.0	7.4	—	—	—	—	—	—	—	—	—
27	9.4	7.8	8.7	—	—	—	—	—	—	—	—	—
28	9.9	9.1	9.6	—	—	—	—	—	—	—	—	—
29	9.3	8.0	8.8	—	—	—	—	—	—	—	—	—
30	9.2	8.8	9.0	—	—	—	—	—	—	—	—	—
31	9.1	7.7	8.6	—	—	—	—	—	—	—	—	—
MONTH	11.5	7.0	9.1	—	—	—	—	—	—	—	—	—

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	--	--	--	--	--	--	12.6	10.9	11.6	7.4	4.8	6.2
2	--	--	--	--	--	--	12.4	10.8	11.5	9.6	6.4	8.5
3	--	--	--	--	--	--	12.9	10.7	11.7	10.3	8.8	9.8
4	--	--	--	--	--	--	13.0	10.6	11.7	11.4	9.1	10.1
5	--	--	--	--	--	--	13.7	11.1	12.3	11.3	8.7	9.7
6	--	--	--	--	--	--	13.0	11.2	12.0	11.1	8.2	9.3
7	--	--	--	--	--	--	13.6	10.9	12.0	8.2	6.7	7.5
8	--	--	--	--	--	--	12.2	10.4	11.3	9.3	7.2	8.2
9	--	--	--	--	--	--	13.7	10.6	12.0	9.8	7.2	8.4
10	--	--	--	--	--	--	13.6	10.7	11.9	7.6	6.6	7.0
11	--	--	--	--	--	--	13.9	10.5	12.0	7.6	7.0	7.3
12	--	--	--	--	--	--	14.2	11.0	12.4	7.6	7.0	7.4
13	--	--	--	--	--	--	12.6	10.5	11.5	7.6	5.8	6.8
14	--	--	--	--	--	--	14.7	10.8	12.4	6.2	5.4	5.9
15	--	--	--	--	--	--	14.4	10.4	12.1	7.2	6.2	6.7
16	--	--	--	--	--	--	13.9	9.9	11.7	7.7	7.0	7.4
17	--	--	--	--	--	--	13.0	9.2	10.8	7.6	5.9	7.1
18	--	--	--	--	--	--	13.3	8.7	10.6	7.0	5.9	6.5
19	--	--	--	--	--	--	12.0	8.0	9.7	7.6	6.7	7.2
20	--	--	--	--	--	--	12.6	8.4	10.3	7.5	6.9	7.2
21	--	--	--	--	--	--	10.0	7.0	8.1	7.9	5.1	5.9
22	--	--	--	--	--	--	10.2	7.2	8.6	6.0	5.1	5.6
23	--	--	--	--	--	--	13.0	8.3	10.3	6.8	5.1	5.6
24	--	--	--	--	--	--	13.6	8.4	10.6	5.9	5.4	5.7
25	--	--	--	--	--	--	10.2	8.2	9.1	6.9	5.4	6.3
26	--	--	--	--	--	--	12.4	7.8	9.8	7.2	6.9	7.1
27	--	--	--	--	--	--	12.6	8.5	10.4	7.6	7.0	7.4
28	--	--	--	--	--	--	14.1	9.8	11.6	7.8	7.2	7.5
29	--	--	--	--	--	--	13.6	8.8	10.9	8.3	7.8	8.1
30	--	--	--	--	--	--	11.6	7.4	9.1	8.2	7.3	8.0
31	--	--	--	11.0	10.3	10.6	--	--	--	7.3	6.3	6.9
MONTH	--	--	--	--	--	--	14.7	7.0	11.0	11.4	4.8	7.4

STREAMS TRIBUTARY TO DETROIT RIVER

04167150 MIDDLE RIVER ROUGE AT DEARBORN HEIGHTS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.8	7.2	7.6	7.8	6.7	7.3	8.1	6.8	7.4	7.8	7.1	7.4
2	8.0	6.8	7.5	7.9	6.7	7.2	7.8	6.8	7.3	7.4	6.9	7.3
3	7.9	6.7	7.4	8.0	6.7	7.2	7.7	5.7	6.1	7.6	6.9	7.2
4	8.4	7.7	8.0	7.2	4.4	6.3	7.2	6.1	6.6	7.8	6.3	7.0
5	8.3	7.8	8.1	6.2	4.7	5.4	7.2	6.6	6.9	6.8	5.5	6.2
6	8.0	7.6	7.8	7.1	6.1	6.7	7.7	7.1	7.4	7.6	6.5	7.0
7	8.0	7.4	7.7	6.7	5.0	5.8	7.9	7.3	7.6	7.2	5.9	6.5
8	7.4	6.8	7.3	7.2	5.5	6.5	8.1	7.2	7.6	7.5	6.5	7.2
9	7.0	4.1	6.2	7.7	7.2	7.4	8.0	7.0	7.5	8.0	7.5	7.7
10	6.2	4.4	5.1	8.0	7.1	7.4	7.8	6.8	7.2	7.9	7.2	7.6
11	7.6	6.2	7.1	8.5	6.9	7.5	7.9	7.1	7.4	7.5	7.0	7.3
12	7.6	7.4	7.5	8.0	5.3	6.3	8.0	7.5	7.8	7.3	6.9	7.1
13	7.5	7.1	7.3	6.5	5.3	6.0	8.2	7.9	8.0	7.5	7.0	7.2
14	7.2	6.7	7.0	7.9	5.9	6.2	8.2	7.8	8.1	7.6	6.8	7.2
15	7.1	6.4	6.8	7.1	6.2	6.7	7.8	6.6	7.1	7.6	6.8	7.1
16	7.1	6.5	6.9	7.8	6.8	7.2	7.7	6.6	7.4	7.5	6.8	7.1
17	7.1	6.0	6.6	7.2	6.0	6.4	8.0	7.6	7.7	8.3	7.0	7.7
18	6.5	5.9	6.2	8.0	6.5	7.2	7.9	7.5	7.7	8.7	7.8	8.3
19	6.9	6.5	6.7	7.5	3.9	6.5	7.8	7.5	7.6	9.3	8.2	8.7
20	7.2	6.9	7.1	7.9	7.0	7.4	8.2	7.5	7.8	8.9	8.0	8.5
21	7.4	6.9	7.3	9.0	6.7	7.7	7.8	6.9	7.5	8.9	7.8	8.3
22	7.2	6.9	7.0	7.0	5.8	6.5	8.6	7.7	8.1	8.9	7.8	8.2
23	—	—	—	7.7	5.9	6.8	8.4	7.8	8.1	8.8	7.6	8.1
24	—	—	—	8.6	7.3	7.9	8.7	7.7	8.1	9.0	7.5	8.1
25	7.5	7.0	7.3	8.8	7.7	8.1	8.6	7.2	7.9	8.8	7.3	8.0
26	7.8	7.3	7.5	8.8	7.7	8.2	7.6	6.0	7.0	9.0	7.7	8.2
27	7.9	7.3	7.6	8.6	7.1	7.6	7.3	6.2	6.6	9.2	8.1	8.5
28	7.9	7.3	7.6	7.8	7.3	7.6	8.4	5.9	6.4	9.4	7.9	8.5
29	8.1	7.2	7.7	8.0	7.1	7.4	7.2	1.7	5.9	9.8	8.2	8.9
30	8.2	7.0	7.5	7.5	7.0	7.2	7.3	7.0	7.1	9.7	8.6	9.1
31	—	—	—	7.2	3.6	6.2	7.3	7.0	7.2	—	—	—
MONTH	—	—	—	9.0	3.6	7.0	8.7	1.7	7.4	9.8	5.5	7.7

STREAMS TRIBUTARY TO DETROIT RIVER

04167625 LOWER RIVER ROUGE AT WAYNE, MI

LOCATION.—Lat 42°17'04", long 83°25'39", in NE1/4 SE1/4 sec.25, T.2 S., R.8 E., Wayne County, Hydrologic Unit 04090004, on left bank at upstream side of bridge on Hannan Road in Wayne, 0.35 mi north of Michigan Avenue, and 11.3 mi upstream from mouth.

DRAINAGE AREA.—54.5 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.—October 2001 to current year.

GAGE.—Water-stage recorder. Elevation of gage is 650 ft above sea level, from topographic map.

REMARKS.—Water-discharge records fair. Flow contains effluent from sewage-treatment plant, which originates outside the basin. Gage-height telemeter 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	44	44	66	104	46	142	88	53	84	36	80	46
2	44	64	58	142	44	184	81	145	83	36	62	43
3	39	121	53	131	50	142	73	94	87	35	127	43
4	49	111	51	104	51	118	70	70	69	54	348	44
5	44	79	50	101	50	450	62	64	61	50	206	57
6	43	61	51	85	50	267	61	57	58	41	100	44
7	42	54	47	74	52	160	61	80	55	61	73	129
8	40	46	45	67	49	132	58	78	51	45	60	70
9	40	46	42	62	47	110	57	85	57	40	56	52
10	38	43	100	59	50	95	e55	488	94	36	52	45
11	41	69	200	56	48	90	e53	203	221	34	50	39
12	43	65	96	60	49	83	e52	118	168	60	48	38
13	48	52	65	55	47	72	e54	191	99	47	46	38
14	143	47	57	54	49	73	e52	232	87	242	45	36
15	275	49	53	54	49	68	50	124	77	76	63	36
16	98	50	59	52	48	64	49	95	62	52	65	37
17	64	50	65	52	45	68	49	71	82	52	51	37
18	51	125	56	52	45	71	50	84	89	58	48	37
19	46	291	55	48	46	75	49	71	68	51	47	36
20	44	122	50	49	96	374	45	e65	56	45	51	38
21	43	81	48	47	207	286	58	e700	53	44	50	38
22	47	67	50	48	140	137	54	1250	51	64	44	36
23	43	60	154	46	141	94	51	585	48	49	45	35
24	40	107	192	44	136	99	48	405	45	44	45	37
25	48	96	115	46	111	210	51	195	42	39	43	35
26	61	69	84	47	114	259	48	139	39	40	35	35
27	51	61	71	44	126	221	44	112	36	170	49	36
28	46	88	68	48	129	140	44	98	39	255	237	34
29	57	127	145	48	134	108	43	82	37	116	126	37
30	51	86	283	47	—	98	42	79	38	77	80	36
31	47	—	145	46	—	102	—	105	—	108	55	—
TOTAL	1810	2431	2674	1972	2249	4592	1652	6218	2136	2157	2487	1304
MEAN	58.4	81.0	86.3	63.6	77.6	148	55.1	201	71.2	69.6	80.2	43.5
MAX	275	291	283	142	207	450	88	1250	221	255	348	129
MIN	38	43	42	44	44	64	42	53	36	34	35	34

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2004, BY WATER YEAR (WY)

	MEAN	78.0	68.5	75.9	57.0	91.4	115	94.1	127	58.1	57.3	55.5	50.3
MAX	136	81.0	90.9	65.8	158	148	129	201	71.2	69.6	80.2	59.1	
(WY)	2002	2004	2002	2002	2002	2004	2002	2004	2004	2004	2004	2003	
MIN	39.9	57.8	50.4	41.5	39.1	98.0	55.1	83.2	45.1	45.8	38.5	43.5	
(WY)	2003	2003	2003	2003	2003	2003	2004	2002	2002	2003	2002	2004	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 2002 - 2004

ANNUAL TOTAL	24698	31682	
ANNUAL MEAN	67.7	86.6	
HIGHEST ANNUAL MEAN			77.3
LOWEST ANNUAL MEAN			86.6
HIGHEST DAILY MEAN	459	Apr 5	1250
LOWEST DAILY MEAN	33	Jan 24	34
ANNUAL SEVEN-DAY MINIMUM	34	Jan 22	35
MAXIMUM PEAK FLOW			1430
MAXIMUM PEAK STAGE			11.62
INSTANTANEOUS LOW FLOW			May 22
10 PERCENT EXCEEDS	126		139
50 PERCENT EXCEEDS	50		56
90 PERCENT EXCEEDS	36		40

(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04167625 LOWER RIVER ROUGE AT WAYNE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	--	--	--	--	--	--	--	--	--	16.7	13.0	15.2	
2	--	--	--	--	--	--	--	--	--	13.0	10.4	11.0	
3	--	--	--	--	--	--	--	--	--	11.8	10.0	10.8	
4	--	--	--	--	--	--	--	--	--	13.5	10.2	11.6	
5	--	--	--	--	--	--	--	--	--	15.6	12.5	13.9	
6	--	--	--	--	--	--	--	--	--	17.1	13.3	15.1	
7	--	--	--	--	--	--	--	--	--	16.5	14.1	15.1	
8	--	--	--	--	--	--	--	--	--	15.1	12.7	13.9	
9	--	--	--	--	--	--	--	--	--	17.6	14.1	15.7	
10	--	--	--	--	--	--	--	--	--	18.7	16.0	17.0	
11	--	--	--	--	--	--	--	--	--	18.7	17.5	18.1	
12	--	--	--	--	--	--	--	--	--	19.6	17.3	18.5	
13	--	--	--	--	--	--	--	--	--	21.2	18.5	19.6	
14	--	--	--	--	--	--	--	--	--	20.2	18.8	19.4	
15	--	--	--	--	--	--	14.4	10.5	12.4	19.1	15.4	16.8	
16	--	--	--	--	--	--	16.0	11.2	13.4	16.8	14.8	15.7	
17	--	--	--	--	--	--	16.8	13.5	15.0	18.0	15.2	16.5	
18	--	--	--	--	--	--	18.9	14.4	16.5	18.4	16.9	17.6	
19	--	--	--	--	--	--	18.0	15.4	16.6	18.3	16.1	17.2	
20	--	--	--	--	--	--	16.2	13.4	14.3	--	--	--	
21	--	--	--	--	--	--	15.4	12.9	14.2	--	--	--	
22	--	--	--	--	--	--	14.9	13.2	14.2	19.6	16.6	17.6	
23	--	--	--	--	--	--	16.3	12.7	14.4	20.0	19.1	19.6	
24	--	--	--	--	--	--	15.6	12.9	14.4	19.8	17.4	18.4	
25	--	--	--	--	--	--	15.2	13.1	14.0	17.4	16.0	16.3	
26	--	--	--	--	--	--	16.0	13.2	14.6	16.8	15.9	16.3	
27	--	--	--	--	--	--	14.1	11.4	12.4	16.8	15.2	16.0	
28	--	--	--	--	--	--	14.6	10.4	12.1	16.7	15.9	16.3	
29	--	--	--	--	--	--	17.4	13.2	15.2	16.1	14.8	15.5	
30	--	--	--	--	--	--	17.6	14.9	16.2	17.2	15.4	16.3	
31	--	--	--	--	--	--	--	--	--	17.9	16.2	16.9	
MONTH	--	--	--	--	--	--	--	--	--	--	--	--	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	17.7	16.4	17.1	21.7	18.8	20.1	22.2	20.4	21.3	21.7	19.7	20.7
2	17.3	16.4	16.9	21.6	19.0	20.2	23.0	20.8	21.9	22.2	20.2	21.1
3	18.0	15.9	16.9	21.8	18.8	20.3	23.4	21.6	22.5	22.3	20.5	21.4
4	18.3	15.8	17.0	22.6	20.1	21.2	23.0	20.4	21.3	22.2	21.1	21.6
5	18.9	16.0	17.3	21.9	20.8	21.4	20.5	19.7	20.1	22.8	21.2	21.9
6	18.5	16.7	17.5	21.8	19.5	20.6	20.2	18.6	19.5	23.1	21.5	22.2
7	20.2	17.3	18.6	22.0	20.6	21.2	20.7	18.9	19.8	22.5	21.5	22.0
8	21.6	18.3	19.8	20.8	19.1	19.8	21.5	19.3	20.3	21.8	20.0	20.7
9	22.7	19.5	20.8	21.0	18.0	19.4	21.7	19.8	20.7	20.9	19.6	20.1
10	21.4	18.7	19.7	22.2	19.5	20.6	21.2	20.3	20.7	20.9	18.8	19.8
11	18.7	16.8	17.4	22.5	19.9	21.1	20.3	19.4	19.9	21.0	18.9	20.0
12	18.1	16.4	17.1	22.9	20.5	21.6	19.4	18.4	18.9	21.8	19.4	20.6
13	20.0	18.0	18.9	23.5	21.1	22.3	19.5	18.2	18.8	21.8	19.8	20.9
14	20.8	19.1	19.9	22.3	19.0	21.1	20.0	18.5	19.2	22.2	20.4	21.2
15	21.3	19.2	20.2	22.0	20.4	21.2	19.6	18.5	19.0	22.6	21.0	21.8
16	20.3	19.5	19.8	22.0	19.6	20.9	20.2	18.0	19.1	22.4	21.2	21.8
17	21.3	19.5	20.4	21.7	20.3	21.0	20.6	18.8	19.7	21.2	19.5	20.0
18	21.2	20.3	20.8	21.7	19.8	20.6	21.2	19.5	20.3	19.9	18.1	19.0
19	20.6	18.8	19.9	22.0	19.6	20.7	20.9	20.1	20.5	19.7	18.0	18.9
20	19.5	17.5	18.4	22.4	19.9	21.1	20.4	18.9	19.4	20.0	17.9	19.0
21	19.1	17.6	18.2	—	—	—	20.1	18.2	19.1	20.7	18.2	19.3
22	20.1	18.2	19.0	—	—	—	20.9	17.7	19.2	21.0	18.5	19.7
23	20.5	17.4	18.9	23.1	20.8	21.8	21.2	19.6	20.3	21.1	18.8	20.0
24	20.3	18.3	19.3	21.2	18.9	20.1	21.9	19.4	20.5	21.4	19.5	20.4
25	19.5	17.4	18.3	20.5	19.1	19.8	22.9	20.8	21.7	21.0	19.7	20.0
26	19.7	17.2	18.4	20.3	19.1	19.7	23.7	21.5	22.5	20.2	19.2	19.7
27	19.8	17.2	18.4	19.8	17.8	18.7	23.4	21.8	22.7	19.9	17.9	18.9
28	19.2	17.9	18.5	20.1	17.5	18.3	22.7	21.9	22.3	19.5	18.1	18.5
29	20.5	17.4	18.9	20.7	19.6	20.2	22.3	20.3	21.0	18.3	17.7	18.0
30	21.2	18.2	19.6	21.0	20.3	20.6	20.9	19.5	20.2	18.6	16.8	17.7
31	—	—	—	22.0	20.6	21.2	21.2	19.3	20.3	—	—	—
MONTH	22.7	15.8	18.7	—	—	—	23.7	17.7	20.4	23.1	16.8	20.2

[illegible]

STREAMS TRIBUTARY TO DETROIT RIVER

04167625 LOWER RIVER ROUGE AT WAYNE, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	--	--	--	8.2	7.8	8.0	7.9	7.5	7.7	--	--	--
2	--	--	--	8.3	7.7	7.9	7.8	7.5	7.7	--	--	--
3	--	--	--	8.2	7.7	7.9	7.6	7.0	7.2	7.8	7.4	7.6
4	--	--	--	7.7	6.6	7.2	7.6	7.0	7.3	7.6	7.0	7.3
5	8.3	8.0	8.2	7.7	6.9	7.3	7.9	7.5	7.8	7.4	7.0	7.2
6	8.1	7.9	8.0	8.1	7.5	7.8	8.1	7.8	8.0	7.6	7.1	7.2
7	8.0	7.8	7.9	7.6	7.0	7.3	7.9	7.7	7.8	7.3	6.7	7.1
8	7.8	7.4	7.6	8.1	7.4	7.8	7.8	7.6	7.7	7.7	7.2	7.5
9	7.5	6.1	7.2	8.4	7.9	8.1	8.0	7.5	7.7	7.8	7.6	7.7
10	7.5	6.2	7.0	8.2	7.8	7.9	7.6	7.3	7.5	8.1	7.6	7.9
11	8.4	7.5	7.9	8.2	7.6	7.9	7.8	7.4	7.6	8.1	7.7	7.9
12	8.4	8.1	8.3	7.6	6.5	7.3	8.0	7.5	7.7	8.0	7.6	7.8
13	8.1	7.6	7.9	7.8	7.3	7.5	8.1	7.6	7.8	8.1	7.6	7.8
14	7.6	7.4	7.5	7.9	6.6	7.0	8.1	7.6	7.8	8.1	7.5	7.7
15	7.6	7.4	7.5	7.9	7.3	7.6	7.7	7.3	7.6	7.9	7.2	7.5
16	7.4	7.1	7.4	8.1	7.6	7.8	8.1	7.4	7.8	7.7	7.2	7.4
17	7.4	7.2	7.3	8.0	7.7	7.8	7.9	7.5	7.7	8.3	7.4	7.8
18	7.8	7.3	7.6	8.4	7.5	7.9	8.0	7.4	7.6	8.5	7.8	8.1
19	8.1	7.7	7.9	8.1	7.5	7.8	7.8	7.4	7.6	8.6	7.9	8.2
20	8.3	8.0	8.2	8.2	7.6	7.8	8.0	7.5	7.7	8.7	8.0	8.3
21	8.4	8.1	8.2	--	--	--	8.1	7.7	7.9	8.7	7.9	8.2
22	8.4	8.0	8.1	--	--	--	8.2	7.6	7.9	8.9	7.9	8.1
23	8.2	7.8	8.1	8.0	7.2	7.6	7.9	7.5	7.7	8.5	7.8	8.1
24	8.1	7.8	7.9	8.4	7.7	8.1	8.2	7.4	7.7	8.4	7.7	8.0
25	8.4	8.0	8.2	8.6	7.9	8.2	7.7	7.2	7.4	8.2	7.6	7.9
26	8.4	8.0	8.1	8.5	7.9	8.2	7.3	6.3	7.0	8.4	7.8	8.0
27	8.5	8.0	8.1	8.2	7.8	8.0	7.4	6.3	6.9	8.6	7.9	8.2
28	8.3	8.0	8.1	8.4	7.8	8.2	7.5	6.4	6.7	8.1	7.8	8.0
29	8.6	7.9	8.2	8.0	7.8	7.9	7.5	6.8	7.2	8.4	7.8	8.0
30	8.4	7.9	8.1	7.9	7.6	7.7	7.9	7.5	7.7	9.2	7.7	8.1
31	--	--	--	7.7	7.2	7.5	8.0	7.5	7.7	--	--	--
MONTH	--	--	--	--	--	--	8.2	6.3	7.6	--	--	--

STREAMS TRIBUTARY TO DETROIT RIVER

04168000 LOWER RIVER ROUGE AT INKSTER, MI

LOCATION (REVISED).--Lat 42°18'02", long 83°18'01", in SW1/4 SE1/4 sec.19, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, on right bank 10 ft downstream from bridge on John Daly Road, 0.6 mi northeast of Inkster, and 4.8 mi upstream from mouth.

DRAINAGE AREA--83.2 mi².

PERIOD OF RECORD.--June 1947 to current year.

REVISED RECORDS.--WSP 1174: 1948(M). WSP 1437: 1949. WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 593.14 ft above sea level. Prior to Oct. 20, 1948, nonrecording gage at same site and datum.

REMARKS.--Records fair. Since 1995, flow contains effluent from sewage-treatment plant, which originates outside the basin. Several measurements of water temperature were made during the year. Gage-height telemeter 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	51	43	82	124	42	138	99	85	111	40	101	52
2	47	64	69	164	41	180	89	211	101	39	71	45
3	49	121	62	154	52	154	79	134	103	38	205	44
4	52	130	60	121	51	129	76	93	79	57	433	107
5	48	85	58	117	47	417	69	86	66	66	345	64
6	45	69	59	101	50	394	61	66	61	50	125	49
7	43	58	62	82	50	188	64	111	59	78	80	244
8	42	52	52	74	48	150	60	100	55	55	63	112
9	40	48	48	69	45	118	60	108	73	45	56	67
10	39	47	113	63	45	97	57	575	133	40	51	51
11	39	90	253	60	46	89	56	364	272	37	46	43
12	38	80	130	63	44	84	54	160	267	76	45	39
13	40	63	82	59	44	69	60	152	132	65	42	39
14	180	52	73	58	45	69	57	348	114	416	40	37
15	355	52	66	57	46	64	59	174	98	108	58	37
16	131	57	74	55	44	65	56	121	74	87	64	37
17	77	55	81	55	43	68	52	126	120	63	51	37
18	62	134	72	55	42	68	55	117	116	115	49	38
19	51	343	65	52	44	77	54	95	85	105	46	36
20	44	161	61	50	89	330	52	76	66	62	50	37
21	43	100	58	50	249	427	95	981	58	52	51	39
22	43	81	58	49	157	169	69	2030	60	129	41	37
23	42	70	176	53	146	111	58	1520	52	74	42	36
24	37	117	251	51	142	112	57	703	48	51	41	35
25	47	120	150	e48	118	239	63	329	45	45	39	36
26	66	84	110	45	116	299	60	206	43	44	41	35
27	51	72	92	44	125	302	54	152	39	241	33	37
28	46	106	84	44	125	169	49	127	40	378	559	37
29	56	150	146	44	133	127	49	102	40	164	262	38
30	49	106	345	43	—	112	48	95	40	93	116	36
31	45	—	184	42	—	114	—	136	—	124	68	—
TOTAL	1998	2810	3276	2146	2269	5129	1871	9683	2650	3037	3314	1581
MEAN	64.5	93.7	106	69.2	78.2	165	62.4	312	88.3	98.0	107	52.7
MAX	355	343	345	164	249	427	99	2030	272	416	559	244
MIN	37	43	48	42	41	64	48	66	39	37	33	35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2004, BY WATER YEAR (WY)

	MEAN	27.6	41.1	63.2	62.0	95.5	134	116	69.1	43.1	26.8	22.7	27.2
MAX	164	176	179	294	307	301	280	312	221	98.0	107	160	
(WY)	2002	1986	1968	1952	1976	1982	1950	2004	1968	2004	2004	2000	
MIN	2.11	3.23	2.32	1.86	4.18	19.4	22.2	4.47	2.75	2.26	0.83	1.86	
(WY)	1949	1964	1964	1961	1964	1964	1958	1958	1949	1948	1950	1952	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1947 - 2004

ANNUAL TOTAL	29819	39764	
ANNUAL MEAN	81.7	109	(a)60.5
HIGHEST ANNUAL MEAN			109
LOWEST ANNUAL MEAN			15.9
HIGHEST DAILY MEAN	586	Apr 5	2520
LOWEST DAILY MEAN	25	Jan 28	0.30
ANNUAL SEVEN-DAY MINIMUM	27	Jan 24	0.53
MAXIMUM PEAK FLOW			3600
MAXIMUM PEAK STAGE			12.07
INSTANTANEOUS LOW FLOW			May 22
10 PERCENT EXCEEDS	158	181	132
50 PERCENT EXCEEDS	59	64	24
90 PERCENT EXCEEDS	37	40	3.0

(a) Annual mean, water years 1948-95, 54.1 ft³/s, 8.83 in/yr; water years 1996-04, 94.6 ft³/s.

(b) Sept. 13, 1955, Jan. 23, 1961.

(c) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04168400 LOWER RIVER ROUGE AT DEARBORN, MI

LOCATION.--Lat 42°18'31", long 83°15'10", in NE1/4 sec.22, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, on right bank 100 ft upstream from bridge on Military Road in Dearborn.

DRAINAGE AREA.--91 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1997 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 585 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good. Flow contains effluent from sewage-treatment plant, which originates outside the basin. Gage-height telemeter 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	54	49	90	136	48	152	114	101	125	43	115	65
2	51	71	74	176	47	200	104	247	114	42	71	57
3	52	133	68	167	58	179	94	157	112	41	266	55
4	57	149	64	132	58	145	89	101	81	57	450	135
5	52	94	62	126	54	441	82	93	65	71	398	72
6	48	76	63	112	57	459	73	61	60	53	151	59
7	45	64	69	89	58	222	78	117	e58	78	89	229
8	46	58	58	80	56	172	75	105	e55	61	68	114
9	44	53	54	73	53	135	74	105	e79	49	60	71
10	42	53	141	64	52	113	71	566	161	44	56	58
11	41	97	287	60	54	104	69	418	313	40	50	52
12	40	84	150	63	53	98	68	174	339	110	49	46
13	41	68	92	61	52	84	76	138	156	72	48	46
14	219	56	81	61	54	81	72	362	119	436	45	44
15	421	56	74	60	53	77	75	179	102	129	61	43
16	151	63	81	57	51	77	75	118	75	102	72	42
17	84	59	89	58	50	82	71	148	134	80	56	42
18	68	141	80	58	49	81	73	111	118	106	52	42
19	58	395	72	54	51	90	74	92	85	123	49	40
20	54	191	68	52	96	364	72	77	66	66	51	41
21	50	109	65	e52	288	501	114	977	58	54	55	42
22	52	86	65	51	183	207	88	2020	61	128	44	41
23	51	75	194	e51	164	130	74	1580	54	74	44	41
24	46	129	290	e51	159	127	68	827	49	51	43	39
25	54	131	167	e51	133	282	72	415	47	44	42	39
26	77	91	120	51	129	353	64	251	45	42	44	39
27	61	78	99	55	138	364	52	176	42	239	33	40
28	54	116	92	50	139	202	46	140	42	396	579	38
29	64	165	155	51	149	146	44	107	43	206	320	37
30	57	117	385	e50	—	126	43	98	43	100	138	37
31	53	—	211	e49	—	128	—	165	—	132	83	—
TOTAL	2287	3107	3660	2301	2586	5922	2244	10226	2901	3269	3682	1746
MEAN	73.8	104	118	74.2	89.2	191	74.8	330	96.7	105	119	58.2
MAX	421	395	385	176	288	501	114	2020	339	436	579	229
MIN	40	49	54	49	47	77	43	61	42	40	33	37

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2004, BY WATER YEAR (WY)

	MEAN	81.7	64.0	79.5	91.2	151	139	150	139	91.3	72.9	79.7	79.6
MAX	205	104	122	163	301	285	201	330	133	105	119	175	175
(WY)	2002	2004	2002	1999	2001	1998	1999	2004	2000	2004	2004	2000	2000
MIN	46.7	40.9	43.2	44.6	41.1	62.1	74.8	66.7	47.5	45.1	45.4	43.0	43.0
(WY)	1998	1999	1999	2003	2003	2000	2004	1999	2002	2001	2002	1998	1998

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1998 - 2004

ANNUAL TOTAL	32413		43931									
ANNUAL MEAN	88.8		120									
HIGHEST ANNUAL MEAN												2004
LOWEST ANNUAL MEAN												2003
HIGHEST DAILY MEAN	511	Apr 5	2020	May 22	2020							2004
LOWEST DAILY MEAN	27	Jan 28	33	Aug 27	23							(a)
ANNUAL SEVEN-DAY MINIMUM	28	Jan 24	38	Sep 24	27							Dec 26 1998
MAXIMUM PEAK FLOW			2150	May 22	(b)2150							May 22 2004
MAXIMUM PEAK STAGE			10.01	May 22	10.30							Feb 10 2001
10 PERCENT EXCEEDS	175		213		195							
50 PERCENT EXCEEDS	65		73		62							
90 PERCENT EXCEEDS	40		44		37							

(a) Jan. 1, Oct. 10, 1999.

(b) Gage height 10.01 ft.

(c) Estimated.

[illegible]

STREAMS TRIBUTARY TO DETROIT RIVER

04168400 LOWER RIVER ROUGE AT DEARBORN, MI-Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	--	--	--	--	--	--	8.8	7.2	8.1	17.2	12.7	15.2
2	--	--	--	--	--	--	9.3	7.8	8.5	12.7	10.0	11.0
3	--	--	--	--	--	--	10.6	8.0	9.2	10.9	9.6	10.2
4	--	--	--	--	--	--	10.3	8.0	9.1	12.1	9.2	10.6
5	--	--	--	--	--	--	9.6	6.5	8.1	14.8	11.7	13.1
6	--	--	--	--	--	--	9.4	6.8	8.1	16.5	12.6	14.5
7	--	--	--	--	--	--	11.6	8.1	9.7	16.3	14.3	15.1
8	--	--	--	--	--	--	10.8	9.1	10.1	14.3	12.6	13.6
9	--	--	--	--	--	--	11.6	8.8	10.2	16.8	13.2	14.9
10	--	--	--	--	--	--	11.8	9.2	10.7	18.1	16.3	17.3
11	--	--	--	--	--	--	11.0	9.1	10.2	18.7	18.1	18.4
12	--	--	--	--	--	--	10.6	8.0	9.5	19.5	17.7	18.5
13	--	--	--	--	--	--	9.7	8.3	8.9	19.9	18.6	19.2
14	--	--	--	--	--	--	11.6	7.5	9.5	20.5	19.2	19.9
15	--	--	--	--	--	--	13.4	9.4	11.4	19.2	16.0	17.8
16	--	--	--	--	--	--	14.3	10.4	12.4	16.3	15.0	15.6
17	--	--	--	--	--	--	16.3	12.9	14.5	20.0	14.8	16.6
18	--	--	--	--	--	--	18.5	14.5	16.5	18.6	17.1	17.8
19	--	--	--	--	--	--	18.2	16.0	17.1	18.3	16.6	17.4
20	--	--	--	--	--	--	16.7	13.8	14.6	18.6	16.3	17.4
21	--	--	--	--	--	--	13.8	11.6	13.0	20.1	14.8	18.3
22	--	--	--	--	--	--	14.6	12.5	13.6	18.5	17.1	17.8
23	--	--	--	--	--	--	--	--	--	20.3	18.1	19.2
24	--	--	--	--	--	--	--	--	--	19.8	17.8	18.9
25	--	--	--	--	--	--	--	--	--	17.8	16.2	16.9
26	--	--	--	--	--	--	--	--	--	16.7	16.0	16.3
27	--	--	--	--	--	--	--	--	--	16.4	15.4	16.0
28	--	--	--	--	--	--	--	--	--	16.2	15.6	15.9
29	--	--	--	--	--	--	--	--	--	15.7	14.5	15.2
30	--	--	--	--	--	--	17.2	15.0	16.1	16.8	14.7	15.7
31	--	--	--	9.6	8.1	8.9	--	--	--	17.5	15.9	16.7
MONTH	--	--	--	--	--	--	--	--	--	20.5	9.2	16.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	17.9	16.4	17.1	21.5	19.2	20.4	22.3	20.8	21.5	21.0	18.9	19.9
2	17.2	16.4	16.8	21.4	19.5	20.6	23.1	20.7	21.9	21.4	19.5	20.5
3	17.8	15.8	16.7	21.7	19.4	20.6	23.1	21.5	22.4	21.8	20.0	20.9
4	17.9	15.5	16.7	22.3	20.8	21.5	22.6	20.5	21.2	22.5	20.6	21.5
5	18.4	15.6	17.0	22.2	20.9	21.6	20.5	19.6	20.1	22.4	21.1	21.7
6	18.3	16.4	17.4	22.1	20.0	21.1	20.0	18.8	19.4	22.7	21.2	22.0
7	--	--	--	22.2	20.5	21.5	20.2	18.4	19.3	22.6	21.4	21.9
8	--	--	--	21.3	19.4	20.1	21.0	18.8	19.8	21.4	19.8	20.6
9	--	--	--	20.4	18.2	19.3	21.3	19.3	20.3	19.8	19.1	19.5
10	21.4	18.8	20.2	21.5	19.5	20.4	21.1	20.1	20.6	19.7	17.9	18.8
11	18.8	16.9	17.7	22.7	20.6	21.6	20.6	19.2	19.6	19.8	17.9	18.9
12	17.7	16.4	17.0	22.9	21.4	22.2	19.3	17.8	18.2	20.3	18.4	19.4
13	19.5	17.2	18.3	23.8	21.2	22.5	18.1	17.1	17.6	20.7	19.1	20.0
14	20.8	18.8	19.7	23.4	20.1	21.0	18.5	17.2	17.9	21.3	19.8	20.5
15	21.6	19.6	20.5	21.9	20.7	21.2	18.8	17.6	18.3	21.6	20.5	21.1
16	21.0	19.8	20.2	21.9	19.9	20.9	19.5	17.4	18.4	21.6	20.9	21.3
17	21.4	19.3	20.3	21.4	20.2	20.8	19.8	18.0	18.9	21.0	18.3	19.4
18	21.7	20.3	21.0	22.2	19.9	20.8	20.3	18.8	19.5	18.3	16.8	17.5
19	21.2	19.6	20.3	21.7	20.2	21.0	20.3	19.4	19.9	17.7	16.3	17.0
20	19.6	17.6	18.6	22.4	20.2	21.3	19.8	18.4	18.8	17.6	16.2	17.0
21	18.7	17.2	18.0	23.5	21.1	22.2	19.0	17.3	18.2	18.1	16.4	17.3
22	19.6	17.8	18.7	23.9	22.4	23.2	19.3	16.8	18.0	18.6	16.9	17.8
23	20.1	17.3	18.7	23.6	21.5	22.6	19.9	18.5	19.2	19.0	17.5	18.3
24	20.0	18.7	19.5	21.5	19.2	20.1	20.9	18.7	19.8	19.5	18.3	18.9
25	19.1	17.2	18.2	20.1	18.7	19.3	22.2	20.4	21.2	19.5	18.4	18.8
26	18.9	16.8	17.9	19.5	18.7	19.1	22.9	21.5	22.2	18.5	17.8	18.2
27	19.0	17.0	18.1	19.3	18.0	18.4	23.1	22.4	22.8	18.0	16.5	17.2
28	18.8	17.7	18.2	18.6	17.7	18.1	23.0	21.5	22.2	17.5	16.3	16.7
29	19.7	17.1	18.4	20.6	18.5	19.6	22.1	20.3	21.2	16.3	15.5	15.9
30	20.6	18.3	19.4	20.7	19.9	20.3	20.4	19.5	20.0	15.8	14.5	15.2
31	--	--	--	21.7	20.2	20.9	20.6	18.8	19.7	--	--	--
MONTH	--	--	--	23.9	17.7	20.8	23.1	16.8	19.9	22.7	14.5	19.1

STREAMS TRIBUTARY TO DETROIT RIVER

04168400 LOWER RIVER ROUGE AT DEARBORN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	9.0	8.3	8.7	6.2	5.5	5.8	—	—	—	—	—	—
2	9.4	8.8	9.1	5.9	4.7	5.4	—	—	—	—	—	—
3	9.4	7.6	8.9	—	—	—	—	—	—	—	—	—
4	8.5	7.7	8.1	—	—	—	—	—	—	—	—	—
5	9.0	7.9	8.5	—	—	—	—	—	—	—	—	—
6	9.2	8.1	8.7	—	—	—	—	—	—	—	—	—
7	9.0	8.0	8.6	—	—	—	—	—	—	—	—	—
8	8.4	7.3	8.0	—	—	—	—	—	—	—	—	—
9	7.7	7.0	7.4	—	—	—	—	—	—	—	—	—
10	7.3	6.7	7.0	—	—	—	—	—	—	—	—	—
11	7.2	6.4	6.8	—	—	—	—	—	—	—	—	—
12	6.5	5.9	6.2	—	—	—	—	—	—	—	—	—
13	7.0	5.8	6.5	—	—	—	—	—	—	—	—	—
14	8.7	5.8	7.3	—	—	—	—	—	—	—	—	—
15	8.7	8.3	8.5	—	—	—	—	—	—	—	—	—
16	8.9	8.2	8.5	—	—	—	—	—	—	—	—	—
17	8.7	8.2	8.5	—	—	—	—	—	—	—	—	—
18	8.6	7.7	8.3	—	—	—	—	—	—	—	—	—
19	8.1	7.3	7.7	—	—	—	—	—	—	—	—	—
20	8.0	6.8	7.6	—	—	—	—	—	—	—	—	—
21	6.9	6.1	6.6	—	—	—	—	—	—	—	—	—
22	7.6	6.5	7.1	—	—	—	—	—	—	—	—	—
23	8.2	7.3	7.9	—	—	—	—	—	—	—	—	—
24	8.2	7.6	7.9	—	—	—	—	—	—	—	—	—
25	7.6	6.5	7.2	—	—	—	—	—	—	—	—	—
26	6.7	5.9	6.4	—	—	—	—	—	—	—	—	—
27	7.8	6.4	7.3	—	—	—	—	—	—	—	—	—
28	8.1	7.3	7.8	—	—	—	—	—	—	—	—	—
29	7.9	6.8	7.4	—	—	—	—	—	—	—	—	—
30	7.9	7.2	7.6	—	—	—	—	—	—	—	—	—
31	7.2	6.0	6.7	—	—	—	—	—	—	—	—	—
MONTH	9.4	5.8	7.7	—	—	—	—	—	—	—	—	—

[illegible]

STREAMS TRIBUTARY TO DETROIT RIVER

04168400 LOWER RIVER ROUGE AT DEARBORN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.8	7.4	7.7	7.4	6.9	7.2	7.3	6.9	7.2	7.4	6.7	7.1
2	7.9	7.1	7.5	7.3	6.7	7.1	7.3	6.5	7.0	7.2	6.6	6.9
3	8.0	7.2	7.8	7.3	6.6	7.0	7.1	4.8	6.3	7.1	6.5	6.9
4	8.2	7.3	8.0	6.7	3.6	5.8	7.3	6.3	6.9	7.5	4.8	6.6
5	8.2	7.3	7.8	6.3	5.2	6.0	7.6	7.1	7.4	6.4	5.4	6.0
6	7.8	7.1	7.6	6.9	5.9	6.5	7.9	7.0	7.7	6.6	5.3	6.2
7	—	—	—	6.4	5.8	6.2	7.8	6.9	7.5	6.8	5.1	6.4
8	—	—	—	6.7	6.2	6.5	7.6	6.7	7.2	7.0	5.4	6.6
9	—	—	—	7.3	6.4	6.9	7.3	6.8	7.1	7.7	6.8	7.5
10	6.6	4.0	5.4	7.0	6.0	6.6	7.2	6.7	6.9	7.7	6.9	7.4
11	8.0	6.5	7.3	6.7	5.8	6.2	7.2	6.8	7.0	7.4	6.7	7.1
12	8.3	7.9	8.1	6.6	4.7	5.7	7.5	7.0	7.3	7.2	6.4	6.9
13	8.0	6.7	7.6	6.2	5.5	5.9	7.5	7.3	7.4	6.9	5.6	6.6
14	7.3	5.8	6.8	7.0	5.2	6.6	7.6	6.5	7.4	6.9	5.6	6.6
15	7.0	6.4	6.8	6.8	6.6	6.7	7.5	6.6	7.3	6.7	6.1	6.4
16	6.9	6.3	6.8	7.2	4.8	6.8	7.6	6.6	7.4	6.4	5.9	6.2
17	6.9	5.3	6.4	6.9	5.0	6.3	7.7	7.3	7.5	7.1	5.9	6.6
18	6.9	6.4	6.8	7.1	5.2	6.6	7.4	6.6	7.1	7.4	6.7	7.1
19	7.2	6.8	7.1	6.7	5.4	6.3	7.4	6.7	7.2	7.9	7.0	7.5
20	7.7	7.1	7.4	6.9	6.0	6.7	7.7	7.1	7.4	7.7	7.1	7.4
21	7.7	7.1	7.5	6.8	5.8	6.5	7.8	7.3	7.7	7.7	7.0	7.4
22	7.4	7.1	7.3	6.2	4.2	5.8	8.2	7.0	7.8	7.4	6.8	7.2
23	7.7	7.0	7.4	6.4	5.8	6.2	7.8	6.9	7.5	7.3	6.6	7.0
24	7.3	7.0	7.2	7.2	6.3	6.9	8.0	7.2	7.5	7.2	6.5	6.8
25	7.8	7.1	7.5	7.3	6.7	7.1	7.6	6.8	7.3	6.9	6.4	6.6
26	7.9	7.3	7.6	7.2	6.7	7.0	6.8	6.1	6.5	7.0	6.4	6.8
27	7.8	7.3	7.6	7.6	5.4	7.2	6.5	5.2	5.8	7.5	6.6	7.1
28	7.8	7.0	7.4	8.2	7.6	8.0	7.4	6.0	6.4	7.5	6.8	7.1
29	8.0	7.3	7.7	8.1	7.5	7.7	6.8	6.1	6.5	8.2	6.8	7.5
30	7.8	7.2	7.5	7.5	7.0	7.4	7.2	6.8	7.1	8.3	7.7	8.0
31	—	—	—	7.2	6.8	7.0	7.4	6.9	7.2	—	—	—
MONTH	—	—	—	8.2	3.6	6.7	8.2	4.8	7.1	8.3	4.8	6.9

STREAMS TRIBUTARY TO DETROIT RIVER

04168530 RIVER ROUGE AT ALLEN PARK, MI

LOCATION.--Lat 42°18'03", long 83°11'58", in private claim 142, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, on right bank 10 ft downstream from bridge on Rotunda Drive in Allen Park, 2.3 mi downstream from Lower River Rouge, and 5.5 mi upstream from mouth.

DRAINAGE AREA.--410 mi², approximately.

WATER-LEVEL RECORDS

PERIOD OF RECORD.--May 2001 to September 2003, October 2003 to September 2004 (gage heights only).

GAGE.--Water-stage recorder. Elevation of gage is 611 ft above sea level, from topographic map. Prior to Oct. 1, 2003, acoustic doppler current meter at site.

REMARKS.--Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 14.47 ft, May 22, 2004; minimum, 7.47 ft, Nov. 13, 2003.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 14.47 ft, May 22; minimum, 7.47 ft, Nov. 13.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	—	9.47	8.90	9.94	9.54	9.66	10.18	10.27	10.85	11.08	11.16	11.03
2	—	—	9.42	10.00	9.58	9.63	10.22	10.55	10.94	11.15	11.12	11.06
3	9.42	—	9.68	9.87	9.79	9.73	10.13	10.40	11.04	11.19	11.57	10.96
4	9.45	10.01	9.85	10.13	9.87	9.79	10.11	10.27	11.07	11.03	12.07	11.00
5	9.68	9.58	10.23	9.97	10.12	10.61	10.22	10.25	10.99	11.01	11.73	10.96
6	9.81	9.63	9.62	9.14	10.10	10.64	10.23	10.33	10.94	11.15	10.70	10.95
7	9.79	9.26	9.61	9.17	10.04	10.01	10.22	10.42	10.94	10.96	11.16	11.08
8	9.71	9.60	9.62	9.71	9.90	9.92	10.26	10.51	10.90	10.91	11.10	11.35
9	9.78	9.60	9.62	9.95	9.75	10.06	10.13	10.52	10.93	11.05	11.08	10.97
10	9.79	9.58	9.94	9.93	9.70	10.05	10.16	11.40	11.33	11.11	10.81	10.99
11	9.81	9.59	9.99	9.89	9.74	9.79	10.34	11.34	11.59	11.14	10.79	10.96
12	9.63	9.43	9.50	10.11	9.62	9.33	10.33	10.77	11.47	11.28	10.95	10.90
13	9.71	8.07	9.67	9.92	9.19	9.84	10.29	10.65	11.12	11.18	10.96	10.98
14	10.26	8.92	9.74	10.06	9.24	9.61	10.11	10.97	11.05	11.12	11.01	10.94
15	10.67	9.37	9.56	9.85	9.46	9.66	10.24	10.76	11.21	10.92	11.01	10.92
16	9.96	9.43	9.53	9.91	9.45	10.41	10.19	10.70	11.21	11.10	10.98	10.74
17	9.79	9.46	9.06	9.87	9.36	9.94	10.12	10.67	11.24	11.19	10.92	11.01
18	9.64	9.80	9.26	9.55	9.26	9.90	10.13	10.58	11.19	11.20	10.83	10.99
19	9.68	10.41	9.40	9.37	9.23	9.87	9.82	10.64	11.21	11.13	10.88	10.96
20	9.66	9.85	9.32	9.29	9.44	10.49	10.31	10.52	11.18	11.09	10.88	10.89
21	9.40	9.62	9.14	9.33	9.56	10.56	10.17	12.11	11.20	11.07	10.92	10.76
22	9.56	9.77	9.28	9.02	9.63	10.00	10.19	14.11	11.02	11.06	10.92	10.75
23	9.63	9.63	9.72	9.14	9.65	9.72	10.22	13.59	11.11	11.15	10.87	10.78
24	—	9.04	9.83	9.26	9.61	9.96	10.25	12.64	10.98	11.23	11.08	10.71
25	—	9.36	9.41	9.39	9.58	10.17	10.33	11.68	11.16	11.21	10.92	10.60
26	—	9.41	9.57	9.68	9.62	10.39	9.99	11.24	11.00	11.19	10.90	10.70
27	—	9.52	9.72	9.37	9.65	10.38	9.96	11.18	10.98	11.17	10.83	10.52
28	—	9.39	9.72	9.13	9.58	10.30	10.20	11.22	11.06	11.25	11.69	10.74
29	—	9.37	9.79	9.28	9.58	10.09	10.03	11.17	10.92	11.19	11.39	10.75
30	9.56	9.26	10.23	9.35	—	10.14	10.20	11.30	11.02	11.11	11.15	10.60
31	9.45	—	9.76	9.35	—	10.22	—	11.02	—	11.16	11.01	—
MEAN	—	—	9.60	9.61	9.62	10.03	10.18	11.09	11.10	11.12	11.08	10.88
MAX	—	—	10.23	10.13	10.12	10.64	10.34	14.11	11.59	11.28	12.07	11.35
MIN	—	—	8.90	9.02	9.19	9.33	9.82	10.25	10.85	10.91	10.70	10.52

STREAMS TRIBUTARY TO DETROIT RIVER

04168530 RIVER ROUGE AT ALLEN PARK, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	—	—	—	—	—	—	8.2	7.3	7.8	16.4	13.6	15.5	
2	—	—	—	—	—	—	8.7	7.5	8.0	14.0	9.9	11.6	
3	—	—	—	—	—	—	9.3	7.8	8.6	10.6	9.4	10.1	
4	—	—	—	—	—	—	9.3	8.0	8.7	11.5	9.5	10.5	
5	—	—	—	—	—	—	8.7	7.0	7.9	13.9	11.2	12.5	
6	—	—	—	—	—	—	8.2	7.2	7.7	15.1	13.1	14.1	
7	—	—	—	—	—	—	9.7	7.8	8.7	15.7	14.7	15.2	
8	—	—	—	—	—	—	9.7	9.2	9.4	14.7	13.4	14.0	
9	—	—	—	—	—	—	10.2	9.0	9.7	16.0	13.5	14.6	
10	—	—	—	—	—	—	11.0	9.6	10.2	17.9	15.3	16.9	
11	—	—	—	—	—	—	10.3	9.4	10.0	18.6	17.8	18.3	
12	—	—	—	—	—	—	10.2	8.9	9.4	19.5	18.0	18.7	
13	—	—	—	—	—	—	9.2	8.1	8.7	20.8	19.1	19.7	
14	—	—	—	—	—	—	9.9	7.6	8.7	20.5	19.6	20.2	
15	—	—	—	—	—	—	11.5	9.1	10.3	19.9	17.5	18.7	
16	—	—	—	—	—	—	12.6	10.5	11.7	17.5	16.4	16.9	
17	—	—	—	—	—	—	14.8	12.0	13.5	19.3	15.8	17.0	
18	—	—	—	—	—	—	17.4	13.8	15.6	18.4	17.2	17.8	
19	—	—	—	—	—	—	18.1	15.9	17.0	18.7	17.0	17.8	
20	—	—	—	—	—	—	16.2	14.2	15.7	18.9	17.0	18.0	
21	—	—	—	—	—	—	14.2	12.9	13.6	20.0	16.0	18.1	
22	—	—	—	—	—	—	13.8	12.6	13.2	18.4	16.7	17.5	
23	—	—	—	—	—	—	14.8	12.9	13.8	19.6	18.3	18.9	
24	—	—	—	—	—	—	15.2	13.5	14.2	19.4	18.1	18.8	
25	—	—	—	—	—	—	14.2	13.1	13.6	18.1	16.6	17.3	
26	—	—	—	—	—	—	14.7	13.2	13.9	16.9	16.3	16.6	
27	—	—	—	—	—	—	13.5	11.0	12.6	16.7	15.9	16.3	
28	—	—	—	—	—	—	12.1	10.5	11.1	16.5	15.8	16.1	
29	—	—	—	—	—	—	14.8	10.9	12.9	15.9	15.1	15.5	
30	—	—	—	—	—	—	17.0	13.7	15.3	16.7	15.0	15.9	
31	—	—	—	9.4	8.0	8.7	—	—	—	17.4	15.9	16.6	
MONTH	—	—	—	—	—	—	18.1	7.0	11.4	20.8	9.4	16.3	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE		JULY		AUGUST		SEPTEMBER				
1	18.1	16.5	17.3	22.0	19.4	20.5	22.4	21.0	21.7	21.0	19.6	20.2
2	17.6	16.9	17.3	22.8	20.2	21.2	23.6	21.5	22.5	21.8	20.3	20.9
3	18.0	16.7	17.3	22.9	20.6	21.5	23.0	21.4	22.4	22.1	20.4	21.2
4	18.3	16.4	17.4	23.3	21.4	22.1	22.7	20.4	21.2	23.5	20.8	21.6
5	18.4	16.7	17.6	22.8	21.9	22.3	20.8	20.1	20.4	23.0	21.7	22.2
6	18.2	17.6	17.9	22.8	21.3	22.0	20.4	19.6	20.0	23.8	21.7	22.6
7	19.8	18.0	18.9	22.6	21.6	22.2	20.5	19.3	19.9	22.5	21.6	22.1
8	21.7	19.2	20.4	21.8	20.4	21.1	21.1	19.5	20.3	21.6	20.4	21.0
9	23.0	20.9	22.1	21.4	19.9	20.5	21.3	20.3	20.7	20.7	19.6	20.1
10	22.4	20.0	21.4	22.1	20.5	21.1	21.8	20.5	21.0	20.3	18.9	19.5
11	20.0	17.4	18.5	23.7	21.0	22.1	21.1	19.5	20.6	20.7	18.7	19.4
12	18.0	16.9	17.4	23.2	22.0	22.5	19.8	18.3	19.3	20.9	18.6	19.6
13	19.4	17.7	18.5	23.9	22.0	23.0	18.8	17.7	18.2	21.7	19.0	20.1
14	20.7	18.9	19.8	23.7	21.5	22.2	19.1	17.4	18.1	22.0	19.6	20.6
15	21.7	19.9	20.8	22.7	21.2	21.9	19.1	17.6	18.2	22.8	20.3	21.3
16	21.3	20.8	21.0	22.5	20.8	21.7	19.4	18.0	18.6	22.9	20.9	21.6
17	21.9	20.2	20.8	22.0	21.0	21.6	19.9	18.4	19.1	21.1	19.2	20.4
18	22.2	20.7	21.5	22.0	20.9	21.3	20.4	18.6	19.4	19.8	18.3	18.9
19	22.1	20.8	21.5	22.2	20.9	21.5	20.8	19.4	19.9	19.1	17.2	18.0
20	20.8	19.6	20.1	22.6	21.3	21.9	19.8	18.8	19.3	18.6	16.6	17.5
21	19.6	18.7	19.1	23.9	22.1	22.9	19.9	18.0	18.7	18.5	16.4	17.2
22	20.1	18.7	19.3	24.5	22.7	23.7	19.7	17.6	18.5	18.6	16.6	17.3
23	20.4	18.9	19.5	24.1	22.5	23.4	20.0	17.9	18.8	19.5	17.0	18.0
24	21.4	19.3	20.1	22.5	20.5	21.7	21.2	18.6	19.7	19.3	17.6	18.3
25	20.3	18.7	19.6	21.1	19.9	20.5	22.8	19.9	20.9	18.8	18.0	18.4
26	20.0	18.3	19.0	20.6	19.3	19.9	23.4	21.1	22.0	19.5	17.9	18.4
27	20.3	17.9	19.0	19.7	18.1	18.8	24.0	22.2	22.8	18.7	17.1	17.7
28	20.0	18.2	18.9	19.1	17.8	18.4	23.2	21.7	22.2	17.6	16.2	16.8
29	20.5	17.7	19.1	20.5	18.8	19.8	21.9	20.4	21.3	17.0	15.7	16.2
30	21.1	18.5	19.5	20.8	20.2	20.5	20.4	19.6	20.1	16.7	14.9	15.7
31	—	—	—	21.7	20.3	20.9	20.8	19.4	20.1	—	—	—
MONTH	23.0	16.4	19.4	24.5	17.8	21.4	24.0	17.4	20.2	23.8	14.9	19.4

STREAMS TRIBUTARY TO DETROIT RIVER

04168530 RIVER ROUGE AT ALLEN PARK, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	10.2	9.1	9.7	8.6	7.9	8.2	--	--	--	--	--	--
2	11.0	9.8	10.3	8.1	7.5	7.9	--	--	--	--	--	--
3	10.9	9.7	10.1	--	--	--	--	--	--	--	--	--
4	10.3	9.5	9.9	--	--	--	--	--	--	--	--	--
5	10.4	9.7	9.9	--	--	--	--	--	--	--	--	--
6	10.4	9.6	9.9	--	--	--	--	--	--	--	--	--
7	10.8	9.6	10.1	--	--	--	--	--	--	--	--	--
8	10.5	8.9	9.8	--	--	--	--	--	--	--	--	--
9	10.1	8.5	9.1	--	--	--	--	--	--	--	--	--
10	9.3	8.0	8.6	--	--	--	--	--	--	--	--	--
11	9.7	7.6	8.4	--	--	--	--	--	--	--	--	--
12	9.8	7.3	8.2	--	--	--	--	--	--	--	--	--
13	9.3	6.9	7.7	--	--	--	--	--	--	--	--	--
14	8.2	4.6	7.0	--	--	--	--	--	--	--	--	--
15	8.8	7.5	8.3	--	--	--	--	--	--	--	--	--
16	9.4	8.7	9.1	--	--	--	--	--	--	--	--	--
17	10.0	9.4	9.7	--	--	--	--	--	--	--	--	--
18	10.2	9.4	9.8	--	--	--	--	--	--	--	--	--
19	10.0	9.1	9.5	--	--	--	--	--	--	--	--	--
20	9.8	9.0	9.4	--	--	--	--	--	--	--	--	--
21	9.0	8.4	8.7	--	--	--	--	--	--	--	--	--
22	9.1	8.3	8.7	--	--	--	--	--	--	--	--	--
23	9.9	8.6	9.2	--	--	--	--	--	--	--	--	--
24	9.9	9.0	9.4	--	--	--	--	--	--	--	--	--
25	9.3	8.7	8.9	--	--	--	--	--	--	--	--	--
26	8.9	8.4	8.7	--	--	--	--	--	--	--	--	--
27	9.1	8.6	8.9	--	--	--	--	--	--	--	--	--
28	9.5	9.1	9.3	--	--	--	--	--	--	--	--	--
29	9.6	9.2	9.3	--	--	--	--	--	--	--	--	--
30	9.9	9.2	9.6	--	--	--	--	--	--	--	--	--
31	9.4	8.5	9.0	--	--	--	--	--	--	--	--	--
MONTH	11.0	4.6	9.2	--	--	--	--	--	--	--	--	--

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
FEBRUARY				MARCH				APRIL				MAY	
1	--	--	--	--	--	--	12.8	11.0	11.6	8.7	5.6	7.1	
2	--	--	--	--	--	--	12.1	11.3	11.7	10.2	6.6	8.9	
3	--	--	--	--	--	--	12.3	11.1	11.7	10.8	10.2	10.6	
4	--	--	--	--	--	--	12.2	11.0	11.6	11.5	10.5	11.0	
5	--	--	--	--	--	--	12.9	11.4	12.1	11.0	9.8	10.3	
6	--	--	--	--	--	--	12.7	11.8	12.2	10.0	9.1	9.5	
7	--	--	--	--	--	--	12.8	11.4	12.1	9.1	7.3	8.1	
8	--	--	--	--	--	--	12.3	11.1	11.6	8.8	7.7	8.3	
9	--	--	--	--	--	--	12.0	10.8	11.5	9.2	8.5	8.8	
10	--	--	--	--	--	--	12.3	11.4	11.8	8.6	7.2	7.6	
11	--	--	--	--	--	--	12.0	11.1	11.6	8.0	7.6	7.7	
12	--	--	--	--	--	--	12.4	11.7	12.1	8.3	8.0	8.1	
13	--	--	--	--	--	--	12.4	10.9	11.5	8.1	7.3	7.8	
14	--	--	--	--	--	--	12.8	11.0	11.8	7.7	6.9	7.1	
15	--	--	--	--	--	--	12.7	11.9	12.3	8.3	7.1	7.8	
16	--	--	--	--	--	--	12.5	11.1	11.8	8.9	8.3	8.7	
17	--	--	--	--	--	--	11.7	9.9	10.8	9.0	6.0	8.2	
18	--	--	--	--	--	--	10.5	9.8	10.1	7.9	7.0	7.6	
19	--	--	--	--	--	--	10.1	8.9	9.4	8.2	7.4	7.8	
20	--	--	--	--	--	--	9.4	8.8	9.1	7.9	7.3	7.6	
21	--	--	--	--	--	--	9.7	7.5	8.5	8.1	5.3	6.4	
22	--	--	--	--	--	--	8.6	7.2	7.9	6.2	5.4	6.1	
23	--	--	--	--	--	--	9.8	8.0	8.8	6.3	5.6	6.0	
24	--	--	--	--	--	--	10.8	9.7	10.2	6.9	5.7	6.4	
25	--	--	--	--	--	--	10.6	9.0	9.8	7.7	6.9	7.2	
26	--	--	--	--	--	--	10.0	8.6	9.2	8.1	7.5	7.8	
27	--	--	--	--	--	--	10.2	9.3	9.7	8.3	8.1	8.2	
28	--	--	--	--	--	--	11.4	9.8	10.7	8.4	7.9	8.1	
29	--	--	--	--	--	--	11.5	10.4	11.2	8.3	7.9	8.2	
30	--	--	--	--	--	--	10.4	8.7	9.9	8.5	7.8	8.2	
31	--	--	--	11.1	10.5	10.8	--	--	--	7.8	7.2	7.5	
MONTH	--	--	--	--	--	--	12.9	7.2	10.8	11.5	5.3	8.0	

STREAMS TRIBUTARY TO DETROIT RIVER

04168530 RIVER ROUGE AT ALLEN PARK, MI-Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.9	7.4	7.7	7.9	6.5	7.0	8.0	7.4	7.6	8.5	7.5	8.0
2	8.0	7.4	7.8	8.0	6.2	6.8	8.5	6.8	7.7	7.7	6.7	7.3
3	8.2	7.2	7.8	7.7	6.1	6.8	7.5	4.0	5.7	7.6	6.3	6.8
4	8.1	7.0	7.8	7.4	4.9	6.4	7.4	4.9	6.4	7.6	4.9	6.5
5	8.6	6.8	8.0	7.0	5.1	6.2	7.4	6.7	7.2	6.5	5.2	5.8
6	8.4	7.2	7.8	6.7	5.3	6.1	7.9	7.5	7.7	7.3	5.2	6.2
7	8.3	7.3	7.7	6.7	5.5	6.2	8.1	7.6	7.8	6.8	5.6	6.4
8	7.8	6.6	7.1	6.8	6.3	6.6	8.2	7.4	7.8	7.5	6.8	7.3
9	7.0	5.0	6.4	7.2	6.4	6.8	8.5	7.0	7.6	8.0	7.2	7.5
10	6.7	4.6	5.6	6.9	6.3	6.5	7.9	6.8	7.3	7.6	6.9	7.3
11	8.0	6.6	7.4	7.4	6.0	6.5	8.2	6.8	7.4	7.4	6.5	6.9
12	8.2	8.0	8.1	6.8	4.5	5.9	9.3	7.1	8.0	7.0	6.5	6.7
13	8.3	7.6	8.0	6.8	5.8	6.2	9.2	7.7	8.3	7.2	6.1	6.5
14	7.8	7.2	7.5	7.0	4.5	6.1	9.1	7.9	8.4	7.2	6.0	6.5
15	7.4	7.1	7.3	7.1	6.3	6.6	8.5	7.7	8.1	7.5	6.1	6.6
16	7.5	7.1	7.3	7.4	6.2	6.7	8.2	7.5	7.8	7.2	5.8	6.4
17	7.3	6.4	6.9	6.7	4.7	6.2	8.7	7.5	8.1	7.0	5.7	6.1
18	9.4	6.7	6.9	7.4	6.4	6.8	8.6	7.7	8.0	7.5	5.8	6.6
19	7.3	6.7	6.9	6.8	6.0	6.6	8.4	7.4	7.7	7.9	6.3	7.0
20	7.6	6.8	7.1	7.0	5.5	6.3	8.2	7.1	7.6	7.8	6.8	7.2
21	7.7	6.9	7.2	7.4	6.0	6.7	8.5	7.2	7.9	8.5	6.7	7.4
22	7.8	7.0	7.3	6.7	5.3	6.1	8.5	7.5	7.9	7.8	6.8	7.2
23	7.8	7.0	7.4	6.8	5.5	6.0	8.3	7.4	7.7	8.2	6.6	7.2
24	7.4	6.8	7.1	7.3	5.6	6.3	8.8	7.2	7.7	7.6	6.5	6.9
25	7.7	6.4	6.9	7.7	6.0	6.6	8.5	7.1	7.6	7.5	6.5	6.9
26	7.5	6.6	7.0	7.6	6.2	6.8	7.4	6.3	6.9	7.8	6.2	6.8
27	7.5	6.6	7.1	7.3	5.9	6.8	7.7	5.9	6.4	7.5	6.6	6.9
28	7.2	6.6	6.8	7.9	7.2	7.7	7.8	4.3	6.0	7.5	6.4	6.9
29	7.7	6.5	7.1	7.9	7.7	7.8	7.4	6.5	6.9	7.8	6.6	7.1
30	7.6	6.6	7.0	7.9	7.4	7.6	7.9	7.4	7.8	8.3	6.9	7.4
31	—	—	—	7.6	7.0	7.3	8.2	7.8	7.9	—	—	—
MONTH	9.4	4.6	7.3	8.0	4.5	6.6	9.3	4.0	7.5	8.5	4.9	6.9

STREAMS TRIBUTARY TO DETROIT RIVER

04168580 ECORSE RIVER AT DEARBORN HEIGHTS, MI

LOCATION.--Lat 42°16'10", long 83°17'23", in SE1/4 SE1/4 sec. 31, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, on left bank 33 ft upstream from bridge on Beech Daly Road in Dearborn Heights, 9.7 mi upstream from mouth.

DRAINAGE AREA.--11.5 mi², approximately.

PERIOD OF RECORD.--July 2002 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 610 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges and those below 1.0 ft³/s, which are poor. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

REVISIONS.--The maximum discharge for water year 2003 has been revised to 194 ft³/s, Aug. 12, 2003, gage height, 5.48 ft.

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	0.78	1.3	4.0	6.2	e0.60	9.7	7.3	16	6.0	0.51	1.3	2.4
2	0.63	6.1	2.7	15	e0.70	14	6.2	37	6.5	0.40	0.90	1.8
3	1.6	13	2.1	11	e1.7	9.4	5.0	9.9	4.4	0.38	35	1.6
4	2.5	7.5	1.6	5.9	e2.4	11	4.2	4.8	3.7	3.7	75	1.1
5	0.65	3.6	1.7	e6.0	e2.3	63	3.5	4.2	3.8	2.5	18	0.97
6	0.43	2.5	1.8	e4.5	e2.3	21	3.3	2.9	2.3	0.55	5.8	1.2
7	1.5	e1.7	1.3	e3.0	e2.8	14	3.0	13	1.6	3.1	3.0	19
8	0.41	e1.2	1.1	2.2	e2.0	11	2.7	7.0	1.4	1.0	1.7	5.5
9	0.38	e1.0	1.1	1.7	e1.7	6.7	2.5	12	4.9	0.52	1.3	2.9
10	0.32	e0.80	27	1.4	e1.6	4.7	2.2	58	23	0.34	1.1	1.6
11	0.37	12	27	1.2	e1.6	4.5	2.0	28	25	0.26	0.96	1.2
12	0.67	4.2	7.8	1.4	e1.5	6.7	1.9	10	9.1	1.6	0.76	0.78
13	0.86	3.0	3.7	1.6	e1.4	2.8	3.0	5.6	5.0	0.57	0.56	0.67
14	43	2.5	2.8	e1.3	e1.3	2.6	2.1	9.2	6.1	27	0.51	0.62
15	38	2.6	2.6	e1.2	e1.2	2.5	1.8	8.3	4.6	3.6	0.49	0.56
16	7.8	3.9	5.2	e1.1	e1.0	3.5	2.1	3.7	3.0	25	0.74	0.56
17	3.3	3.5	5.0	e1.0	e0.95	4.3	2.0	23	32	15	0.58	0.51
18	1.8	25	3.3	e0.90	e0.90	4.4	1.7	23	7.0	4.0	2.5	0.51
19	1.3	34	2.8	e0.80	e1.1	6.1	1.5	9.0	3.4	2.6	0.70	0.40
20	1.0	9.2	2.0	e0.70	e1.5	72	1.7	8.8	2.2	1.2	1.4	0.48
21	1.1	4.4	1.7	e0.60	28	31	5.8	362	2.2	1.4	1.5	0.31
22	1.2	2.9	2.0	e0.59	14	13	3.6	277	2.7	14	0.91	0.31
23	1.6	3.7	39	e0.58	13	8.2	1.9	92	1.5	4.3	0.66	0.32
24	1.6	17	21	e0.57	12	15	1.6	89	3.1	0.91	0.45	0.35
25	6.5	6.4	10	e0.59	9.3	33	3.4	24	0.99	0.57	0.50	0.43
26	8.1	3.2	6.4	e0.61	8.2	42	2.1	15	0.62	0.46	2.2	0.39
27	2.4	2.8	4.4	e0.63	8.8	24	1.4	9.4	0.49	35	0.52	0.38
28	2.0	18	3.6	e0.64	6.9	13	1.2	6.7	0.57	11	109	0.39
29	3.7	16	17	e0.64	6.8	9.8	1.1	4.5	0.64	3.1	34	0.37
30	2.0	6.6	27	e0.63	—	11	1.0	7.2	0.64	2.1	10	0.33
31	1.5	—	10	e0.62	—	13	—	12	—	3.3	3.7	—
TOTAL	139.00	219.60	248.7	74.80	151.05	486.9	82.8	1192.2	168.45	169.97	315.74	47.94
MEAN	4.48	7.32	8.02	2.41	5.21	15.7	2.76	38.5	5.62	5.48	10.2	1.60
MAX	43	34	39	15	28	72	7.3	362	32	35	109	19
MIN	0.32	0.80	1.1	0.57	0.60	2.5	1.0	2.9	0.49	0.26	0.45	0.31
CFSM	0.39	0.64	0.70	0.21	0.45	1.37	0.24	3.34	0.49	0.48	0.89	0.14
IN.	0.45	0.71	0.80	0.24	0.49	1.58	0.27	3.86	0.54	0.55	1.02	0.16

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2004, BY WATER YEAR (WY)

	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
MEAN	2.81	6.01	5.26	1.67	3.24	11.2	4.73	25.8	5.14	3.43	7.44	4.10
MAX	4.48	7.32	8.02	2.41	5.21	15.7	6.69	38.5	5.62	5.48	10.2	7.83
(WY)	2004	2004	2004	2004	2004	2004	2003	2004	2004	2004	2004	2003
MIN	1.13	4.71	2.50	0.92	1.20	6.67	2.76	13.1	4.67	2.38	3.49	1.60
(WY)	2003	2003	2003	2003	2003	2003	2004	2003	2003	2003	2002	2004

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 2002 - 2004

ANNUAL TOTAL	2200.48	3297.15	
ANNUAL MEAN	6.03	9.01	7.04
HIGHEST ANNUAL MEAN			9.01
LOWEST ANNUAL MEAN			5.06
HIGHEST DAILY MEAN	92	May 31	362
LOWEST DAILY MEAN	0.15	Jul 19	0.26
ANNUAL SEVEN-DAY MINIMUM	0.24	Jul 25	0.36
MAXIMUM PEAK FLOW			446
MAXIMUM PEAK STAGE			8.46
INSTANTANEOUS LOW FLOW			0.22
ANNUAL RUNOFF (CFSM)	0.524		0.783
ANNUAL RUNOFF (INCHES)	7.12		10.67
10 PERCENT EXCEEDS	16		21
50 PERCENT EXCEEDS	2.4		2.6
90 PERCENT EXCEEDS	0.47		0.57

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI

LOCATION.—Lat 42°34'44", long 83°37'36", in NE1/4 sec.16, T.2 N., R.7 E., Oakland County, Hydrologic Unit 04090005, on left bank 40 ft downstream from bridge on General Motors Road, 0.5 mi downstream from Sherwood Creek, and 0.5 mi west of Milford.

DRAINAGE AREA.—132 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.—September 1948 to current year.

REVISED RECORDS.—WSP 1337: 1952(m). WSP 2112: Drainage area.

GAGE.—Water-stage recorder. Datum of gage is 880.00 ft above sea level. Prior to Apr. 1, 1970, at site 240 ft upstream at same datum.

REMARKS.—Water-discharge records good. Flow below about 300 ft³/s regulated by powerplant 1.5 mi upstream from station prior to May 20, 1957; occasional regulation for lake level control since. Gage-height telemeter 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	33	61	129	119	60	102	106	50	e265	66	185	64
2	31	81	125	119	59	130	101	79	245	64	161	62
3	32	117	118	121	61	147	95	84	226	59	146	59
4	e33	119	113	119	62	142	93	67	204	61	162	60
5	e33	96	110	114	62	186	89	58	181	70	172	59
6	e30	77	109	107	64	211	85	57	160	65	160	59
7	29	78	105	89	65	201	82	57	142	79	135	71
8	30	79	101	104	65	185	81	58	125	78	116	77
9	30	71	101	94	64	175	77	90	117	71	103	66
10	28	68	108	86	64	162	74	170	180	69	105	61
11	24	83	126	86	63	154	70	239	239	70	97	58
12	23	87	119	86	62	149	68	242	252	81	87	56
13	24	75	102	84	60	145	67	222	241	93	78	55
14	38	73	94	80	58	138	64	212	256	91	72	53
15	82	69	90	85	56	137	62	204	284	78	69	51
16	83	66	88	84	54	136	59	181	290	71	64	47
17	61	65	89	81	53	128	52	156	273	81	63	42
18	52	85	87	80	51	123	49	156	248	97	62	40
19	49	127	83	78	52	118	46	146	223	101	59	38
20	52	130	79	75	55	133	51	127	206	97	56	37
21	56	113	76	73	74	145	48	151	192	99	52	37
22	59	98	74	71	74	131	50	226	185	148	46	36
23	58	90	90	70	70	119	47	e280	173	147	45	35
24	58	107	107	67	71	117	46	e360	166	126	46	35
25	65	119	101	66	69	141	46	e420	152	105	44	34
26	77	112	93	62	70	148	45	e400	128	91	48	34
27	72	108	88	64	73	140	44	371	109	140	47	34
28	69	119	85	64	79	126	45	345	97	219	67	34
29	71	144	107	62	88	114	42	321	88	231	85	34
30	70	143	140	61	—	111	43	e300	75	203	78	35
31	67	—	134	60	—	112	—	e280	—	210	68	—
TOTAL	1519	2860	3171	2611	1858	4406	1927	6109	5722	3261	2778	1463
MEAN	49.0	95.3	102	84.2	64.1	142	64.2	197	191	105	89.6	48.8
MAX	83	144	140	121	88	211	106	420	290	231	185	77
MIN	23	61	74	60	51	102	42	50	75	59	44	34
CFSM	0.37	0.72	0.77	0.64	0.49	1.08	0.49	1.49	1.44	0.80	0.68	0.37
IN.	0.43	0.81	0.89	0.74	0.52	1.24	0.54	1.72	1.61	0.92	0.78	0.41

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2004, BY WATER YEAR (WY)

	MEAN	81.8	97.9	109	105	114	154	157	117	90.1	66.4	55.3	65.2
MAX	283	179	218	211	226	337	389	340	197	233	142	247	
(WY)	1982	1993	1951	1993	1951	1976	1950	1956	1996	1968	1968	1975	
MIN	32.6	34.0	35.8	42.5	42.0	66.9	64.2	51.8	28.8	19.3	26.3	27.2	
(WY)	1965	1964	1964	1964	1963	1964	2004	1988	1988	1988	2003	1964	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1948 - 2004

ANNUAL TOTAL	24194	37685	
ANNUAL MEAN	66.3	103	
HIGHEST ANNUAL MEAN			101
LOWEST ANNUAL MEAN			157
HIGHEST DAILY MEAN	221	420	1974
LOWEST DAILY MEAN	17	23	1964
ANNUAL SEVEN-DAY MINIMUM	19	27	Oct 3 1981
MAXIMUM PEAK FLOW		432	Oct 21 1971
MAXIMUM PEAK STAGE		7.22	Jul 9 1988
ANNUAL RUNOFF (CFSM)	0.502	0.780	Oct 3 1981
ANNUAL RUNOFF (INCHES)	6.82	10.62	Jun 28 1968
10 PERCENT EXCEEDS	118	188	
50 PERCENT EXCEEDS	60	82	
90 PERCENT EXCEEDS	24	46	

(a) Gage height 7.87 ft.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 2000 to March 2004 (discontinued).

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 2000 to March 2004.

pH: March 2000 to September 2003.

WATER TEMPERATURE: March 2000 to March 2004.

DISSOLVED OXYGEN: March 2000 to September 2003.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval, pH and dissolved oxygen data not collected during winter months, prior to 2002 water year no parameters collected during winter months.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated excellent except the following periods: Oct. 1-6, Jan. 18 to Feb. 3, rated good; Feb. 4-13, rated fair; Feb. 14-23, rated poor. Water temperature records rated excellent.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 1,370 microsiemens, Mar. 16, 17, 2003; minimum, 574 microsiemens, Oct. 18, 2001.

pH: Maximum recorded, 8.5 std. units, Apr. 29, 2000, July 27, 2001, May 23, 24, 27, July 8, 10, 2002; minimum, 6.7 std. units, May 25, 2001.

WATER TEMPERATURE: Maximum recorded, 30.0°C, July 4, 2002; minimum, 0.0°C, on many days during winter periods.

DISSOLVED OXYGEN: Maximum recorded, 14.1 mg/L, Apr. 8, 9, 2003; minimum, 2.0 mg/L, July 26, 2001.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum recorded, 1,290 microsiemens, Feb. 23, 24; minimum, 747 microsiemens, Nov. 21.

WATER TEMPERATURE: Maximum recorded, 18.0°C, Oct. 11; minimum, 0.0°C, Jan. 27.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	797	777	786	814	803	809	812	801	805	894	876	886
2	797	779	787	811	783	799	820	809	814	891	852	866
3	819	783	795	794	765	777	841	815	825	864	848	855
4	—	—	—	771	753	762	836	829	832	865	836	847
5	—	—	—	770	749	756	835	828	830	871	830	844
6	—	—	—	762	750	756	835	826	830	882	857	867
7	835	814	823	774	757	765	833	825	830	914	873	887
8	829	799	814	778	767	772	832	826	829	934	892	915
9	844	810	824	792	773	781	835	824	828	960	922	938
10	833	813	823	789	779	783	827	809	816	954	927	939
11	835	814	826	786	768	780	816	800	805	940	919	927
12	847	813	830	796	775	782	813	806	807	925	881	900
13	849	824	837	792	780	787	811	803	808	885	878	881
14	856	800	827	795	786	790	811	802	807	892	867	878
15	827	799	811	801	786	793	828	805	818	893	882	887
16	802	784	793	807	790	797	840	822	830	889	878	882
17	792	768	775	828	795	811	853	839	843	910	881	894
18	790	766	778	821	790	806	887	853	872	922	897	909
19	794	775	785	800	781	794	915	882	899	921	907	911
20	795	779	788	782	758	771	907	890	897	928	907	916
21	802	783	791	758	747	751	901	886	893	927	910	922
22	808	785	796	774	756	766	898	881	888	919	900	914
23	804	792	797	790	770	780	893	869	878	930	892	905
24	806	797	801	788	767	778	927	880	894	903	885	894
25	812	780	799	793	785	789	984	927	955	901	880	893
26	807	792	800	794	786	791	986	949	962	915	869	895
27	805	792	798	802	786	794	953	943	949	917	901	911
28	806	792	799	801	792	796	946	931	939	914	898	906
29	—	—	—	809	793	801	931	913	924	926	895	910
30	813	796	801	808	797	803	939	898	915	940	917	928
31	809	798	803	—	—	—	936	894	918	960	930	946
MONTH	—	—	—	828	747	784	986	800	863	960	830	898

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	974	944	959	1140	1080	1100	---	---	---	---	---	---
2	965	943	955	1080	1030	1050	---	---	---	---	---	---
3	964	934	948	1040	1020	1040	---	---	---	---	---	---
4	977	948	966	1020	946	988	---	---	---	---	---	---
5	1000	955	974	946	887	914	---	---	---	---	---	---
6	1040	987	1010	911	889	903	---	---	---	---	---	---
7	1050	1030	1040	898	876	886	---	---	---	---	---	---
8	1060	1020	1040	876	860	867	---	---	---	---	---	---
9	1070	1020	1050	875	865	870	---	---	---	---	---	---
10	1070	1050	1060	873	857	868	---	---	---	---	---	---
11	1060	1010	1030	857	839	849	---	---	---	---	---	---
12	1020	990	1000	843	830	838	---	---	---	---	---	---
13	1010	987	998	845	836	842	---	---	---	---	---	---
14	1000	967	983	840	828	833	---	---	---	---	---	---
15	989	963	977	833	824	828	---	---	---	---	---	---
16	988	965	977	828	817	822	---	---	---	---	---	---
17	991	955	978	834	824	830	---	---	---	---	---	---
18	995	967	983	846	824	834	---	---	---	---	---	---
19	1000	974	989	857	842	850	---	---	---	---	---	---
20	1010	973	992	899	839	868	---	---	---	---	---	---
21	1040	987	1010	961	887	912	---	---	---	---	---	---
22	1270	1030	1160	960	945	952	---	---	---	---	---	---
23	1290	1270	1280	945	901	921	---	---	---	---	---	---
24	1290	1270	1280	912	881	899	---	---	---	---	---	---
25	1280	1240	1260	882	849	871	---	---	---	---	---	---
26	1260	1230	1240	920	837	861	---	---	---	---	---	---
27	1260	1220	1230	918	869	899	---	---	---	---	---	---
28	1220	1170	1190	911	874	887	---	---	---	---	---	---
29	1180	1140	1150	905	859	870	---	---	---	---	---	---
30	---	---	---	868	854	860	---	---	---	---	---	---
31	---	---	---	858	845	848	---	---	---	---	---	---
MONTH	1290	934	1060	1140	817	892	---	---	---	---	---	---

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER				DECEMBER			JANUARY	
1	14.5	12.0	14.5	11.5	10.4	11.5	4.5	3.5	4.5	2.5	1.9	2.5
2	14.5	11.5	14.5	11.5	11.2	11.5	3.5	2.4	3.5	3.0	2.1	3.0
3	12.5	11.5	12.5	11.5	11.1	11.5	3.0	2.4	3.0	3.5	2.8	3.5
4	---	---	---	11.5	10.9	11.5	3.5	2.5	3.5	4.0	3.1	4.0
5	---	---	---	11.5	11.2	11.5	3.0	2.8	3.0	3.0	2.4	3.0
6	---	---	---	11.5	10.1	11.5	3.0	2.7	3.0	2.5	0.8	2.5
7	14.0	10.1	14.0	10.0	8.2	10.0	3.5	2.4	3.5	1.5	0.7	1.5
8	15.0	11.4	15.0	8.5	6.8	8.5	3.5	2.8	3.5	1.5	0.5	1.5
9	16.0	12.5	16.0	7.5	5.8	7.5	3.5	3.0	3.5	1.0	0.3	1.0
10	16.5	13.8	16.5	7.0	5.4	7.0	4.0	3.2	4.0	1.0	0.2	1.0
11	18.0	14.2	18.0	6.5	6.0	6.5	4.0	2.8	4.0	1.0	0.6	1.0
12	17.5	14.5	17.5	8.0	6.6	8.0	3.0	2.1	3.0	1.0	0.8	1.0
13	17.5	13.6	17.5	7.0	5.5	7.0	2.5	1.4	2.5	1.0	0.6	1.0
14	14.5	13.7	14.5	6.0	4.9	6.0	2.5	1.8	2.5	0.5	0.3	0.5
15	14.0	12.4	14.0	5.5	5.0	5.5	2.0	1.8	2.0	1.0	0.2	1.0
16	13.0	11.7	13.0	6.0	5.3	6.0	2.5	1.8	2.5	1.0	0.3	1.0
17	12.5	11.1	12.5	6.5	5.9	6.5	2.5	1.8	2.5	1.0	0.4	1.0
18	12.0	10.9	12.0	7.5	6.3	7.5	2.0	1.8	2.0	1.0	0.3	1.0
19	13.0	10.5	13.0	8.5	7.5	8.5	2.0	1.6	2.0	1.0	0.3	1.0
20	13.0	10.6	13.0	8.5	8.0	8.5	2.0	1.3	2.0	1.0	0.1	1.0
21	12.0	11.6	12.0	9.0	7.7	9.0	2.5	1.4	2.5	0.5	0.2	0.5
22	12.0	10.8	12.0	8.5	7.5	8.5	2.5	1.7	2.5	1.0	0.1	1.0
23	11.5	10.4	11.5	9.0	7.9	9.0	2.5	1.8	2.5	1.0	0.1	1.0
24	11.5	10.2	11.5	9.0	7.4	9.0	2.5	2.2	2.5	1.0	0.1	1.0
25	11.0	10.4	11.0	7.5	5.7	7.5	2.5	1.8	2.5	1.0	0.1	1.0
26	11.5	10.5	11.5	5.5	4.9	5.5	2.5	1.5	2.5	0.5	0.3	0.5
27	11.0	10.1	11.0	5.5	5.0	5.5	2.5	1.4	2.5	1.0	0.0	1.0
28	10.0	9.8	10.0	5.5	4.9	5.5	2.5	1.8	2.5	1.0	0.3	1.0
29	---	---	---	5.0	4.1	5.0	2.5	2.2	2.5	1.0	0.1	1.0
30	10.5	8.9	10.5	4.5	3.8	4.5	3.0	2.2	3.0	1.0	0.1	1.0
31	11.0	9.6	11.0	---	---	---	3.0	2.1	3.0	1.0	0.2	1.0
MONTH	---	---	---	11.5	3.8	8.0	4.5	1.3	2.9	4.0	0.0	1.4

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	1.0	0.2	1.0	3.5	2.6	3.5	--	--	--	--	--	--
2	1.0	0.3	1.0	4.0	2.7	4.0	--	--	--	--	--	--
3	1.0	0.6	1.0	3.5	2.9	3.5	--	--	--	--	--	--
4	1.5	0.2	1.5	3.5	2.9	3.5	--	--	--	--	--	--
5	1.0	0.2	1.0	4.0	3.4	4.0	--	--	--	--	--	--
6	1.0	0.5	1.0	4.5	3.6	4.5	--	--	--	--	--	--
7	1.5	0.2	1.5	3.5	3.1	3.5	--	--	--	--	--	--
8	1.5	0.1	1.5	3.5	2.9	3.5	--	--	--	--	--	--
9	1.5	0.3	1.5	4.0	3.0	4.0	--	--	--	--	--	--
10	1.0	0.3	1.0	4.5	3.6	4.5	--	--	--	--	--	--
11	1.5	0.3	1.5	5.0	3.6	5.0	--	--	--	--	--	--
12	1.5	0.3	1.5	3.5	2.4	3.5	--	--	--	--	--	--
13	1.5	0.4	1.5	3.5	2.2	3.5	--	--	--	--	--	--
14	1.5	0.3	1.5	3.5	2.9	3.5	--	--	--	--	--	--
15	1.5	0.1	1.5	4.0	2.7	4.0	--	--	--	--	--	--
16	1.5	0.1	1.5	3.5	2.5	3.5	--	--	--	--	--	--
17	2.0	0.4	2.0	3.5	2.4	3.5	--	--	--	--	--	--
18	2.0	0.2	2.0	3.5	2.8	3.5	--	--	--	--	--	--
19	2.5	0.7	2.5	4.5	3.0	4.5	--	--	--	--	--	--
20	2.0	1.0	2.0	5.5	3.5	5.5	--	--	--	--	--	--
21	1.5	1.0	1.5	4.5	3.4	4.5	--	--	--	--	--	--
22	2.5	1.3	2.5	5.0	3.0	5.0	--	--	--	--	--	--
23	3.0	1.4	3.0	5.0	3.2	5.0	--	--	--	--	--	--
24	2.5	1.3	2.5	5.0	4.0	5.0	--	--	--	--	--	--
25	3.0	1.2	3.0	6.5	4.7	6.5	--	--	--	--	--	--
26	3.0	1.3	3.0	9.0	6.4	9.0	--	--	--	--	--	--
27	3.5	1.7	3.5	11.0	8.7	11.0	--	--	--	--	--	--
28	4.0	1.9	4.0	10.5	9.5	10.5	--	--	--	--	--	--
29	3.5	2.2	3.5	10.0	9.5	10.0	--	--	--	--	--	--
30	--	--	--	10.0	9.2	9.6	--	--	--	--	--	--
31	--	--	--	9.2	8.2	8.8	--	--	--	--	--	--
MONTH	4.0	0.1	1.9	11.0	2.2	5.3	--	--	--	--	--	--

STREAMS TRIBUTARY TO LAKE ERIE

04170490 KENT LAKE NEAR NEW HUDSON, MI

LOCATION.—Lat 42°30'45", long 83°40'34", in sec.1, T.1 N., R.6 E., Livingston County, Hydrologic Unit 04090005, at Kent Lake Dam, 2 mi upstream from Woodruff Creek, and 3 mi west of New Hudson.

DRAINAGE AREA.—148 mi².

PERIOD OF RECORD.—April 1949 to current year.

GAGE.—Water-stage recorder. Datum of gage is 868.00 ft above sea level (Huron-Clinton Metropolitan Authority bench mark).

REMARKS.—Records good. The inlet and outlet is the Huron River which enters the northeast end of the lake and leaves the southwest end of the lake. Streamflow records are currently collected on the Huron River at sites about 1 mi upstream (04170000) and 150 ft downstream (04170500) from Kent Lake. Maximum depth, 38 ft, surface area, 1,200 acres. A concrete dam with steel drum spillway is used to control the lake level.

EXTREMES FOR PERIOD OF RECORD.—Maximum gage height, 16.68 ft, Apr. 6, 1950; minimum observed, 9.46 ft, Jan. 9, 1996, due to construction, but may have been lower during period of no gage-height record Dec. 30, 1995 to Jan. 20, 1996.

EXTREMES FOR CURRENT YEAR.—Maximum gage height, 16.12 ft, May 25; minimum, 12.51 ft, Feb. 16, 18, 19, 20.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.43	15.35	12.83	12.74	12.54	12.63	14.19	15.09	15.91	15.49	15.89	15.60
2	15.42	15.29	12.81	12.73	12.54	12.67	14.22	15.15	15.89	15.47	15.83	15.58
3	15.42	15.25	12.76	12.73	12.54	12.73	14.23	15.19	15.86	15.46	15.83	15.57
4	15.44	15.11	12.74	12.73	12.54	12.76	14.25	15.21	15.80	15.46	15.85	15.57
5	15.44	15.00	12.72	12.72	12.54	12.84	14.27	15.24	15.76	15.48	15.83	15.56
6	15.43	14.80	12.70	12.69	12.55	12.90	14.36	15.24	15.72	15.47	15.81	15.54
7	15.42	14.62	12.69	12.68	12.55	12.92	14.43	15.24	15.69	15.52	15.78	15.57
8	15.43	14.43	12.68	12.67	12.55	12.92	14.46	15.25	15.67	15.51	15.74	15.58
9	15.43	14.32	12.67	12.65	12.55	12.90	14.49	15.33	15.65	15.50	15.70	15.57
10	15.44	14.20	12.69	12.63	12.55	12.86	14.58	15.51	15.74	15.49	15.71	15.56
11	15.44	14.01	12.72	12.62	12.55	12.83	14.64	15.66	15.82	15.48	15.69	15.55
12	15.43	13.90	12.72	12.62	12.55	12.81	14.68	15.72	15.86	15.58	15.66	15.54
13	15.42	13.86	12.70	12.61	12.54	12.79	14.71	15.76	15.87	15.59	15.64	15.54
14	15.47	13.79	12.68	12.62	12.54	12.77	14.78	15.76	15.92	15.59	15.62	15.53
15	15.54	13.60	12.65	12.62	12.53	12.77	14.83	15.75	15.96	15.56	15.59	15.52
16	15.58	13.50	12.64	12.62	12.52	12.71	14.86	15.71	15.95	15.55	15.57	15.52
17	15.58	13.37	12.64	12.62	12.52	12.65	14.90	15.68	15.94	15.56	15.56	15.50
18	15.56	13.22	12.64	12.61	12.51	12.63	14.89	15.67	15.91	15.59	15.55	15.48
19	15.55	13.20	12.62	12.60	12.51	12.60	14.88	15.64	15.86	15.60	15.55	15.48
20	15.53	13.15	12.61	12.59	12.52	12.76	14.90	15.61	15.80	15.59	15.53	15.47
21	15.54	13.07	12.60	12.58	12.55	12.90	14.89	15.64	15.77	15.61	15.53	15.46
22	15.56	12.99	12.59	12.58	12.57	12.96	14.92	15.73	15.74	15.73	15.51	15.46
23	15.56	12.92	12.62	12.57	12.58	13.00	14.93	15.95	15.72	15.71	15.51	15.46
24	15.55	12.91	12.65	12.57	12.59	13.10	14.96	16.05	15.71	15.69	15.51	15.45
25	15.58	12.91	12.67	12.55	12.58	13.21	14.96	16.09	15.68	15.65	15.49	15.45
26	15.61	12.85	12.66	12.55	12.58	13.44	14.98	16.09	15.65	15.62	15.50	15.45
27	15.62	12.81	12.65	12.56	12.58	13.62	15.01	16.07	15.61	15.67	15.50	15.45
28	15.61	12.80	12.63	12.57	12.58	13.65	15.01	16.04	15.59	15.80	15.59	15.46
29	15.61	12.81	12.66	12.55	12.60	13.79	15.02	15.99	15.54	15.85	15.63	15.45
30	15.60	12.82	12.72	12.55	—	13.98	15.05	15.95	15.51	15.87	15.63	15.45
31	15.52	—	12.74	12.54	—	14.12	—	15.93	—	15.92	15.61	—
MEAN	15.51	13.76	12.68	12.62	12.55	13.01	14.71	15.64	15.77	15.60	15.64	15.51
MAX	15.62	15.35	12.83	12.74	12.60	14.12	15.05	16.09	15.96	15.92	15.89	15.60
MIN	15.42	12.80	12.59	12.54	12.51	12.60	14.19	15.09	15.51	15.46	15.49	15.45

WTR YR 2004 MEAN 14.42 MAX 16.09 MIN 12.51

STREAMS TRIBUTARY TO LAKE ERIE

04170500 HURON RIVER NEAR NEW HUDSON, MI

LOCATION.--Lat 42°30'45", long 83°40'35", in NE1/4 sec.1, T.1 N., R.6 E., Livingston County, Hydrologic Unit 04090005, on right bank 150 ft downstream from Kent Lake Dam, 2 mi upstream from Woodruff Creek, and 3 mi west of New Hudson.

DRAINAGE AREA.--148 mi².

PERIOD OF RECORD.--August 1948 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 868.00 ft above sea level (Huron-Clinton Metropolitan Authority bench mark).

REMARKS.--Records good. Occasional regulation by Kent Lake (see preceding page). Several measurements of water temperature were made during the year. Gage-height telemeter 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	41	149	165	137	78	98	74	50	301	79	230	86
2	38	125	161	136	77	115	82	66	288	72	204	80
3	36	195	146	133	76	130	84	59	270	64	197	75
4	43	185	137	134	76	142	91	56	245	62	206	72
5	41	202	131	131	76	172	48	62	222	66	201	69
6	40	180	124	121	78	196	43	60	200	65	184	67
7	39	192	121	116	79	204	58	62	181	80	168	73
8	40	173	119	113	78	204	68	51	167	78	151	77
9	41	129	117	110	78	194	43	66	161	75	134	70
10	41	176	123	106	78	179	35	119	202	71	137	66
11	39	186	132	102	77	168	48	180	239	68	126	64
12	36	139	133	99	76	160	56	205	257	95	116	63
13	36	103	127	97	77	153	37	217	262	103	107	62
14	47	167	123	99	75	145	29	220	295	94	97	58
15	64	168	114	100	73	144	39	215	328	84	89	56
16	71	131	109	100	71	150	45	199	326	78	83	55
17	71	171	110	99	70	141	51	185	326	83	78	54
18	65	169	108	97	68	133	49	181	305	93	76	47
19	63	166	104	95	70	71	47	169	275	96	74	45
20	58	174	99	91	73	63	53	151	246	95	71	43
21	61	178	95	89	81	95	47	168	229	99	71	43
22	64	149	93	88	86	109	52	210	215	157	64	43
23	63	126	102	86	88	79	36	301	197	157	64	43
24	62	126	111	86	89	76	32	365	185	145	65	43
25	70	154	115	83	87	77	35	385	172	128	57	44
26	77	154	113	83	86	56	38	385	151	112	59	43
27	80	139	109	83	86	67	37	373	130	136	59	43
28	78	137	105	83	87	91	33	360	113	185	89	44
29	79	142	113	81	91	66	35	338	100	208	101	42
30	78	147	130	82	—	46	41	326	90	215	99	41
31	157	—	138	79	—	57	—	316	—	250	91	—
TOTAL	1819	4732	3727	3139	2285	3781	1466	6100	6678	3393	3548	1711
MEAN	58.7	158	120	101	78.8	122	48.9	197	223	109	114	57.0
MAX	157	202	165	137	91	204	91	385	328	250	230	86
MIN	36	103	93	79	68	46	29	50	90	62	57	41

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2004, BY WATER YEAR (WY)

	MEAN	96.7	154	134	122	130	161	137	124	105	74.7	65.2	75.2
MAX	262	246	248	236	252	315	357	379	228	219	165	231	
(WY)	1982	2002	1951	1951	1951	1974	1950	1956	1996	1957	2000	1975	
MIN	35.1	70.1	63.2	53.8	53.7	49.8	42.9	34.5	33.6	21.6	27.9	28.0	
(WY)	1964	1964	1961	1964	1964	2000	1966	1988	1988	1988	1963	2002	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1948 - 2004

ANNUAL TOTAL	28267		42379										
ANNUAL MEAN	77.4		116										
HIGHEST ANNUAL MEAN										115			
LOWEST ANNUAL MEAN										181			1974
HIGHEST DAILY MEAN										52.3			1964
LOWEST DAILY MEAN	216				Apr 6		385		May 25	582		Apr 6	1950
ANNUAL SEVEN-DAY MINIMUM	20				Jul 20		29		Apr 14	6.4		May 7	1963
MAXIMUM PEAK FLOW	22				Sep 8		35		Apr 23	12		Jul 10	1988
MAXIMUM PEAK STAGE							389		May 25	(a)1080		Dec 29	1950
INSTANTANEOUS LOW FLOW							2.97		May 25	5.05		Dec 29	1950
10 PERCENT EXCEEDS	140						204			204		May 27	1963
50 PERCENT EXCEEDS	71						94			102			
90 PERCENT EXCEEDS	26						44			43			

(a) From rating curve extended above 600 ft³/s.

(a) Gage height 8.35 ft.
(b) July 15, 16, 1988.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04173500 MILL CREEK NEAR DEXTER, MI

LOCATION.--Lat 42°18'00", long 83°53'55", in SW1/4 sec.18, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, on left bank 12 ft downstream from bridge on Parker Road, 2.5 mi south of Dexter, and 4 mi upstream from mouth.

DRAINAGE AREA.--128 mi².

PERIOD OF RECORD.--February 1952 to December 1982, October 1994 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 850 ft above sea level, from topographic map. Prior to May 23, 1958, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. Gage-height telemeter 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	24	32	56	105	e37	167	124	40	184	36	40	28
2	23	38	50	106	e37	246	112	82	147	35	34	27
3	23	63	45	115	e38	240	103	86	135	33	34	26
4	25	78	44	106	e38	197	96	65	114	37	58	26
5	24	62	43	97	e38	326	88	55	99	41	71	26
6	23	52	42	90	e38	372	82	48	88	36	47	26
7	23	45	39	e88	e38	282	78	46	79	50	37	31
8	23	41	39	e76	e37	230	74	50	69	48	33	28
9	22	37	39	e62	e37	190	70	50	63	39	32	27
10	22	36	44	e57	e36	161	66	233	75	36	30	25
11	22	43	72	55	e36	143	63	234	168	34	30	25
12	23	48	64	53	e36	129	60	166	246	36	29	24
13	24	44	e52	51	e35	111	60	120	186	41	29	24
14	28	40	46	e50	e35	109	58	134	164	37	28	23
15	64	39	43	e51	e34	104	55	146	158	34	27	23
16	49	39	44	e50	e34	98	53	116	121	32	29	23
17	39	40	49	e49	e33	95	51	94	120	32	28	23
18	35	52	46	e47	e33	96	50	94	160	39	33	23
19	33	104	45	e45	34	99	47	80	117	37	34	22
20	32	95	42	e43	37	171	45	66	93	33	31	22
21	31	77	42	e41	61	256	45	425	79	30	30	22
22	30	65	42	e40	64	183	45	930	75	46	28	22
23	30	58	66	e39	77	145	44	907	64	41	28	21
24	29	75	109	e38	89	134	41	735	56	34	30	21
25	32	88	99	e38	81	180	42	562	51	30	28	21
26	40	75	83	e38	87	215	42	419	47	29	27	21
27	39	65	71	e38	97	231	39	305	44	37	27	21
28	36	62	68	e38	110	193	38	216	42	48	29	22
29	35	66	95	e37	133	167	37	165	40	40	35	28
30	34	62	173	e37	--	152	36	140	38	34	34	26
31	33	--	138	e37	--	138	--	229	--	45	30	--
TOTAL	950	1721	1930	1817	1520	5560	1844	7038	3122	1160	1040	727
MEAN	30.6	57.4	62.3	58.6	52.4	179	61.5	227	104	37.4	33.5	24.2
MAX	64	104	173	115	133	372	124	930	246	50	71	31
MIN	22	32	39	37	33	95	36	40	38	29	27	21
CFSM	0.24	0.45	0.49	0.46	0.41	1.40	0.48	1.77	0.81	0.29	0.26	0.19
IN.	0.28	0.50	0.56	0.53	0.44	1.62	0.54	2.05	0.91	0.34	0.30	0.21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2004, BY WATER YEAR (WY)

MEAN	44.0	59.5	80.2	75.0	109	175	153	106	68.0	40.4	35.6	33.6
MAX	193	122	192	251	337	423	271	265	256	165	146	180
(WY)	1955	1996	1958	1974	1976	1982	1969	1956	1968	1968	1995	1975
MIN	11.0	14.6	13.8	18.8	18.4	47.7	61.5	29.7	20.9	16.0	12.9	11.0
(WY)	1964	1964	1964	1964	1964	1964	2004	1958	1958	1965	1963	1963

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1952 - 2004

ANNUAL TOTAL	19796	28429	
ANNUAL MEAN	54.2	77.7	81.1
HIGHEST ANNUAL MEAN			142
LOWEST ANNUAL MEAN			29.9
HIGHEST DAILY MEAN	451	Apr 5	1380
LOWEST DAILY MEAN	18	Aug 20	9.5
ANNUAL SEVEN-DAY MINIMUM	18	Sep 8	9.9
MAXIMUM PEAK FLOW		991	1500
MAXIMUM PEAK STAGE		11.47	12.95
INSTANTANEOUS LOW FLOW		21	7.3
ANNUAL RUNOFF (CFSM)	0.424	0.607	0.633
ANNUAL RUNOFF (INCHES)	5.75	8.26	8.61
10 PERCENT EXCEEDS	123	162	171
50 PERCENT EXCEEDS	34	45	48
90 PERCENT EXCEEDS	20	26	20

(a) Part or all of each day Sept. 20-28.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04174500 HURON RIVER AT ANN ARBOR, MI

LOCATION.--Lat 42°17'10", long 83°44'00", in NW1/4 sec.28, T.2 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, on left bank 100 ft upstream from bridge on Maiden Lane Street in Ann Arbor, 0.7 mi downstream from Argo Dam, and 4.2 mi upstream from Geddes Dam.

DRAINAGE AREA.--729 mi².

PERIOD OF RECORD.--February 1904 to current year. Monthly discharge only for February 1904 to September 1914 and October 1947 to July 1948, published in WSP 1307. Published as "at Geddes" February 1904 to December 1914 and as "at Barton" January 1914 to September 1940.

REVISED RECORDS.--WSP 874: 1938. WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 744.81 ft above sea level (levels by Michigan Department of Natural Resources). February 1904 to December 1914 at Geddes Dam, 4.2 mi downstream, and January 1914 to September 1947 at Barton Dam, 2.6 mi upstream, flow computed from records of operation of powerplants and records of depth of flow over dam and/or flow through undersluices.

REMARKS.--Records good. Prior to 1955 diversion upstream from station for Ann Arbor municipal supply had negligible effect on natural flow; annual mean discharge and runoff figures adjusted for diversion from 1955 to 1991. Flow regulated by powerplants prior to May 1962. From June 1962 to 1975 occasional regulation for lake level control operations upstream from station. Since 1975 extensive regulation of flow exists due to automation of gates at dams upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter 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	274	220	437	503	252	533	688	182	1290	346	536	310
2	235	273	421	569	254	608	625	265	1220	316	575	300
3	204	364	419	580	311	621	625	269	1170	252	573	293
4	198	467	410	724	316	606	560	242	699	278	743	286
5	191	473	411	626	294	881	476	232	883	298	704	282
6	198	484	432	564	308	1240	495	270	852	278	638	294
7	161	420	425	520	279	1100	484	340	769	333	598	319
8	112	422	400	421	264	1060	407	377	558	349	535	277
9	76	433	386	375	226	999	373	395	563	348	521	265
10	112	403	366	359	228	955	327	639	668	352	499	251
11	112	416	375	389	213	925	305	718	902	352	444	248
12	115	368	350	410	233	873	260	933	1020	476	432	146
13	146	361	310	398	231	814	266	851	867	455	353	122
14	222	355	301	357	223	799	266	832	830	451	366	125
15	201	355	287	356	223	681	251	812	964	435	371	126
16	188	368	298	372	231	679	256	826	919	411	362	129
17	180	358	308	378	243	664	254	791	942	393	350	133
18	178	455	302	386	223	659	191	806	979	406	343	126
19	178	525	298	346	245	519	158	774	973	408	339	120
20	190	537	298	339	261	658	184	703	894	391	233	115
21	184	600	297	210	275	778	217	1420	751	389	218	106
22	181	601	302	246	282	724	236	2310	611	419	232	105
23	176	462	380	258	305	669	231	2290	564	421	241	102
24	168	530	427	265	361	664	288	1940	597	403	231	95
25	238	509	498	320	352	709	276	1750	583	398	230	91
26	254	487	465	265	378	774	250	1760	560	402	222	94
27	237	471	440	263	433	772	234	1690	492	495	214	86
28	228	486	412	245	471	684	222	1610	372	510	268	93
29	215	475	475	247	497	668	183	1420	380	471	315	105
30	231	456	558	279	667	144	1350	370	447	287	100	100
31	223	--	533	253	--	734	--	1310	--	593	315	--
TOTAL	5806	13134	12021	11823	8412	23717	9732	30107	23242	12276	12288	5244
MEAN	187	438	388	381	290	765	324	971	775	396	396	175
MAX	274	601	558	724	497	1240	688	2310	1290	593	743	319
MIN	76	220	287	210	213	519	144	182	370	252	214	86

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1915 - 2004, BY WATER YEAR (WY)

MEAN	274	390	426	448	550	856	846	609	407	243	189	215
MAX	904	1018	1080	1257	1431	2308	2647	2085	1341	1130	689	919
(WY)	1982	1993	1951	1950	1976	1918	1947	1943	1943	1968	2000	1975
MIN	71.6	109	123	131	145	189	274	187	72.0	31.5	21.1	55.8
(WY)	1935	1935	1935	1925	1934	1934	1931	1925	1934	1934	1934	1934

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1915 - 2004

ANNUAL TOTAL	106646	167802	(a)454
ANNUAL MEAN	292	458	824
HIGHEST ANNUAL MEAN			171
LOWEST ANNUAL MEAN			1931
HIGHEST DAILY MEAN	1120	2310	5840
LOWEST DAILY MEAN	38	76	Mar 14 1918
ANNUAL SEVEN-DAY MINIMUM	53	95	(c)
MAXIMUM PEAK FLOW		2910	13
MAXIMUM PEAK STAGE		15.71	May 21
10 PERCENT EXCEEDS	560	831	(d)17.50
50 PERCENT EXCEEDS	237	372	928
90 PERCENT EXCEEDS	94	184	335
			120

(a) Does not include water year 1948.

(b) Plant leakage, but doubtful due to possible change in leakage.

(c) Aug. 2, Sept. 11, 1931.

(d) Present site and datum.

STREAMS TRIBUTARY TO LAKE ERIE

04174518 MALLETT'S CREEK AT ANN ARBOR, MI

LOCATION.--Lat 42°15'53", long 83°41'18", in SE1/4 sec.35, T.2 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, on right bank 250 ft upstream from bridge on Chalmers Drive in Ann Arbor.

DRAINAGE AREA.--10.9 mi².

PERIOD OF RECORD.--October 1973 to August 1975 (operated as a crest-stage partial-record station), April 1999 to current year. Prior to August 1975, published as Pittsfield-Ann Arbor Drain at Ann Arbor.

GAGE.--Water-stage recorder. Elevation of gage is 760 ft above sea level, from topographic map.

REMARKS.--Records good. Several measurements of water temperature were made during the year. Gage-height telemeter 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	2.1	2.4	4.3	8.8	2.5	13	5.3	9.3	9.1	2.1	7.9	2.3
2	2.0	14	3.5	14	2.6	17	4.6	33	13	2.1	5.5	2.2
3	3.5	29	3.1	7.9	3.7	9.0	4.6	4.9	6.6	2.6	13	2.1
4	4.7	11	3.0	5.6	3.8	13	6.3	3.0	4.5	8.0	60	2.1
5	2.3	5.5	3.1	7.5	3.1	64	4.1	2.6	3.7	4.2	9.6	4.1
6	2.1	3.9	2.9	5.4	3.9	17	3.8	2.3	3.5	2.8	4.3	3.8
7	2.2	3.2	2.7	4.5	3.6	11	3.9	5.8	3.5	14	3.0	30
8	2.1	2.9	2.7	4.2	3.0	10	3.5	5.9	3.1	3.9	2.6	4.5
9	2.0	2.5	3.0	3.8	3.0	7.4	2.9	14	7.9	2.6	2.4	3.1
10	2.1	2.5	3.1	3.5	3.0	5.9	2.9	56	15	2.6	2.4	2.4
11	2.0	14	18	3.7	2.8	6.0	2.5	11	40	2.8	2.2	2.1
12	2.0	5.3	5.5	4.4	2.7	4.9	2.5	5.1	11	7.7	2.0	2.1
13	2.2	3.4	3.7	4.2	2.6	3.9	2.9	5.5	9.0	4.3	2.2	2.0
14	60	2.9	3.7	3.9	2.8	4.0	3.1	19	12	3.4	2.5	2.0
15	34	3.9	3.5	3.6	2.6	3.9	2.5	10	6.7	2.2	3.5	2.1
16	6.1	5.1	5.8	3.2	2.5	4.6	2.7	3.8	7.0	2.0	2.7	2.0
17	3.7	4.2	5.3	3.4	2.6	5.2	2.6	4.7	74	3.5	2.4	1.7
18	2.9	4.7	4.0	3.6	2.6	6.0	2.7	4.0	23	3.1	5.5	1.7
19	2.5	36	3.5	3.2	3.6	7.3	2.5	2.5	74	2.0	3.0	1.7
20	2.6	8.9	3.4	2.9	2.1	72	2.0	2.2	4.6	2.0	4.2	1.7
21	2.4	5.5	3.2	2.8	25	18	5.0	316	4.5	11	4.0	1.8
22	2.3	4.2	3.3	2.9	10	7.6	3.1	241	4.4	30	2.5	1.9
23	2.2	4.7	36	2.7	10	5.7	2.3	33	3.4	3.9	2.3	1.9
24	2.2	30	14	2.8	11	14	2.0	24	2.9	2.5	2.8	1.8
25	6.1	7.4	7.4	2.7	7.8	32	4.2	11	2.5	2.3	2.6	1.9
26	9.5	4.7	5.9	2.8	8.0	43	3.3	9.2	2.4	2.3	3.2	1.7
27	3.9	4.0	e5.0	3.2	8.8	15	1.8	7.8	2.4	27	2.6	1.8
28	3.3	14	e4.5	3.2	8.8	8.2	2.0	6.5	2.2	31	12	1.6
29	4.6	11	35	2.8	9.0	7.0	2.0	5.2	2.1	5.8	7.4	1.8
30	3.1	5.8	22	2.6	—	7.2	1.8	18	2.2	4.1	4.1	1.6
31	2.8	—	7.4	2.6	—	7.7	—	22	—	45	2.6	—
TOTAL	185.5	298.9	259.4	132.4	176.4	450.5	95.4	898.3	293.6	242.8	187.0	93.5
MEAN	5.98	9.96	8.37	4.27	6.08	14.5	3.18	29.0	9.79	7.83	6.03	3.12
MAX	60	47	36	14	25	72	6.3	316	74	45	60	30
MIN	2.0	2.4	2.7	2.6	2.5	3.9	1.8	2.2	2.1	2.0	2.0	1.6
CFSM	0.55	0.91	0.77	0.39	0.56	1.33	0.29	2.66	0.90	0.72	0.55	0.29
IN.	0.63	1.02	0.89	0.45	0.60	1.54	0.33	3.07	1.00	0.83	0.64	0.32

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 2004, BY WATER YEAR (WY)

	MEAN	8.99	6.18	6.93	4.64	11.1	9.24	11.2	15.5	11.3	7.54	8.71	7.40
MAX	21.9	9.96	9.19	6.61	24.6	14.5	18.3	29.0	27.6	13.1	15.6	10.9	
(WY)	2002	2004	2000	2002	2001	2004	1999	2004	2000	2000	2000	2000	
MIN	4.33	3.64	4.22	2.50	2.48	3.84	3.18	8.25	3.44	4.53	5.21	3.12	
(WY)	2003	2000	2003	2003	2003	2000	2004	1999	2002	2001	1999	2004	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1999 - 2004

ANNUAL TOTAL	2970.1	3313.7	
ANNUAL MEAN	8.14	9.05	
HIGHEST ANNUAL MEAN			9.15
LOWEST ANNUAL MEAN			10.3
HIGHEST DAILY MEAN			7.34
LOWEST DAILY MEAN	68	316	410
ANNUAL SEVEN-DAY MINIMUM	1.3	1.6	1.3
MAXIMUM PEAK FLOW	1.5	1.7	1.5
MAXIMUM PEAK STAGE		(a)1040	(a)1560
INSTANTANEOUS LOW FLOW		7.55	9.32
ANNUAL RUNOFF (CFSM)	0.747	1.4	1.1
ANNUAL RUNOFF (INCHES)	10.14	0.831	0.839
10 PERCENT EXCEEDS	22	17	20
50 PERCENT EXCEEDS	3.4	3.8	3.7
90 PERCENT EXCEEDS	1.8	2.1	2.0

(a) From rating curve extended above 300 ft³/s on basis of contracted-opening measurement of peak flow.

(b) Sept. 20, 29, 30.

(c) Sept. 26, 27, 1999, Mar. 3, 2003.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04175600 RIVER RAISIN NEAR MANCHESTER, MI

LOCATION.--Lat 42°10'05", long 84°04'34", in NE1/4 SE1/4 sec.33, T.3 S., R.3 E., Washtenaw County, Hydrologic Unit 04100002, on left bank at downstream side of bridge on Sharon Valley Road, 2.5 mi northwest of Manchester.

DRAINAGE AREA--132 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1970 to September 1981, January 1985 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 900 ft above sea level, from topographic map. Prior to July 30, 1970, nonrecording gage at same site and datum.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Occasional regulation caused by many dams upstream from station. Gage-height telemeter 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	40	41	81	110	e52	93	134	40	115	69	73	33
2	34	45	73	113	e52	123	126	72	107	63	69	30
3	30	69	64	119	e52	128	119	81	107	57	68	28
4	35	88	63	113	e51	122	111	71	97	61	79	27
5	32	85	62	111	e51	168	103	65	90	70	84	26
6	28	79	62	106	e51	197	99	57	84	65	73	27
7	25	72	59	e80	e51	174	95	52	80	78	65	35
8	24	64	57	e81	e51	163	91	51	73	77	57	31
9	24	54	58	e82	e50	148	87	55	68	71	51	27
10	23	50	66	e81	e50	138	83	156	73	65	46	25
11	22	58	88	e80	e50	133	79	174	115	60	43	22
12	22	66	83	e78	e50	129	77	147	148	55	38	21
13	22	69	e75	e78	e50	119	75	132	153	52	35	20
14	28	53	69	e74	e50	118	74	129	160	52	32	19
15	71	50	68	e70	e50	115	70	124	156	45	31	18
16	75	50	70	e68	e50	107	67	117	142	38	33	18
17	65	52	75	e66	e50	105	68	e105	149	38	34	17
18	58	67	73	e65	e50	104	64	e100	173	49	56	15
19	52	112	72	e63	e50	104	68	91	160	54	58	15
20	46	109	e70	e60	e52	132	56	84	147	52	50	14
21	45	98	e69	e60	e54	176	57	e175	137	48	48	13
22	40	89	68	e58	e55	149	70	306	131	84	42	13
23	35	85	85	e58	e55	135	62	270	121	81	39	13
24	32	100	107	e58	e60	128	55	248	115	65	36	12
25	34	107	103	e56	e62	157	50	217	106	55	34	12
26	49	95	97	e55	e63	182	56	189	99	48	33	12
27	51	89	91	e54	e64	191	48	151	91	61	32	13
28	48	86	89	e54	e70	175	41	127	86	72	43	14
29	48	87	103	e54	e76	167	44	113	81	69	53	31
30	47	84	130	e53	---	157	39	105	75	66	48	31
31	43	---	120	e53	---	144	---	119	---	77	38	---
TOTAL	1228	2253	2450	2311	1572	4381	2268	3923	3439	1897	1521	632
MEAN	39.6	75.1	79.0	74.5	54.2	141	75.6	127	115	61.2	49.1	21.1
MAX	75	112	130	119	76	197	134	306	173	84	84	35
MIN	22	41	57	53	50	93	39	40	68	38	31	12
CFSM	0.30	0.57	0.60	0.56	0.41	1.07	0.57	0.96	0.87	0.46	0.37	0.16
IN.	0.35	0.63	0.69	0.65	0.44	1.23	0.64	1.11	0.97	0.53	0.43	0.18

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2004, BY WATER YEAR (WY)

	MEAN	64.6	88.6	105	108	126	192	181	127	92.6	52.6	46.3	50.5
MAX	169	212	160	280	241	356	275	275	191	249	114	116	142
(WY)	1987	1993	1991	1993	1976	1976	1978	1974	1989	1981	1981	1981	1981
MIN	20.9	25.1	30.7	27.6	33.0	84.3	75.6	52.7	13.9	10.4	12.4	12.6	12.6
(WY)	2003	1972	1977	1977	2003	2000	2004	1971	1988	1988	1971	1999	1999

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1970 - 2004

ANNUAL TOTAL	22363.0	27875	103
ANNUAL MEAN	61.3	76.2	155
HIGHEST ANNUAL MEAN			53.7
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	300	306	690
LOWEST DAILY MEAN	8.8	12	5.7
ANNUAL SEVEN-DAY MINIMUM	11	13	6.1
MAXIMUM PEAK FLOW		312	869
MAXIMUM PEAK STAGE		5.05	7.21
INSTANTANEOUS LOW FLOW		12	(c)4.0
ANNUAL RUNOFF (CFSM)	0.464	0.577	0.779
ANNUAL RUNOFF (INCHES)	6.30	7.86	10.58
10 PERCENT EXCEEDS	132	134	207
50 PERCENT EXCEEDS	46	66	84
90 PERCENT EXCEEDS	17	31	24

(a) July 9, 15, 1988.

(b) Part or all of each day Sept. 23-28.

(c) Observed; but may have been less during periods of no gage-height record July 3-11, 14-16, 1988.

(d) Oct. 20, 23, 1999.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04175600 RIVER RAISIN NEAR MANCHESTER, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1970-71, 1996-98, October 2001 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1996 to July 1997.

INSTRUMENTATION.--Water temperature recorder from Oct. 31, 1996 to July 7, 1997.

REMARKS.--Samples collected at or near bridge at Sharon Valley Road.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Minimum, 0.0°C on many days during winter period.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Time	Instantaneous discharge, cfs (00061)	Specific conductance, wat unf S/cm 25 deg C (00095)	pH, water, unftrd field, std units (00400)	Temperature, air, deg C (00020)	Temperature, water, deg C (00010)	Barometric pressure, mm Hg (00025)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)
Oct. 22	1445	39	521	8.0	9.0	10.2	743	11.0	101
Dec. 9	1330	58	537	8.1	2.0	2.5	745	12.5	94
Feb. 25	1330	58	563	8.0	3.5	1.4	745	13.8	100
Apr. 21	1130	54	537	8.2	13.5	14.0	745	10.8	107
May 12	1400	146	482	7.9	23.0	20.4	748	8.6	97
June 23	0930	122	503	7.9	23.0	18.4	735	7.1	79
July 28	1330	73	505	7.9	21.0	19.3	744	8.2	91
Aug. 26	0800	33	539	8.0	23.0	22.6	740	8.3	99

Date	Bicarbonate, wat fit incrm. titr., field, mg/L (00453)	Alkalinity, wat fit inc. titr. field, mg/L as CaCO ₃ (39086)	Sulfate, water, ftrd, mg/L (00945)	Chloride, water, ftrd, mg/L (00940)	Nitrite, water, ftrd, mg/L as N (00613)	Nitrite + nitrate, water, ftrd, mg/L as N (00631)	Ammonia, water, ftrd, mg/L as N (00608)	Phosphorus, water, unftrd mg/L (00665)	Orthophosphate, water, ftrd, mg/L as P (00671)
Oct. 22	227	186	33.3	28.1	E.004	.21	<.04	.013	<.006
Dec. 9	224	184	34.9	27.8	E.006	.58	E.03	.011	<.006
Feb. 25	273	224	35.3	29.4	.010	.72	.05	.016	<.006
Apr. 21	254	208	30.8	28.6	E.007	.34	<.04	.025	<.006
May 12	224	184	24.6	23.8	.009	.31	<.04	.029	<.006
June 23	249	204	25.0	27.3	E.004	.18	E.02	.030	E.004
July 28	251	206	19.9	23.9	<.008	.21	<.04	.025	E.004
Aug. 26	260	213	24.2	27.7	E.005	.28	<.04	.023	<.006

STREAMS TRIBUTARY TO LAKE ERIE

04175600 RIVER RAISIN NEAR MANCHESTER, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Sus- pended sedi- ment concen- tration mg/L (80154)	Aceto- chlor, water, ftrd, g/L (49260)	Ala- chlor, water, ftrd, g/L (46342)	Atra- zine, water, ftrd, g/L (39632)	CLAT, water, ftrd, g/L (04040)	Azin- phos- methyl, water, ftrd 0.7 GF g/L (82686)	Ben- flur- alin, water, ftrd 0.7 GF g/L (82673)	Butyl- ate, water, ftrd, g/L (04028)
Oct. 22	4	<.006	<.004	.027	E.008	<.050	<.010	<.002
Dec. 9	9	.006	<.005	.020	E.005	<.050	<.010	<.004
Feb. 25	7	<.006	<.005	.019	E.008	<.050	<.010	<.004
Apr. 21	6	.014	<.005	.034	E.009	<.050	<.010	<.004
May 12	11	.103	<.005	.319	E.039	<.050	<.010	<.004
June 23	38	.017	<.005	.150	E.020	<.050	<.010	<.004
July 28	7	.006	<.005	.053	E.008	<.050	<.010	<.004
Aug. 26	15	<.006	<.005	.039	E.009	<.050	<.010	<.004

Date	Car- baryl, water, ftrd 0.7 GF g/L (82680)	Carbo- furan, water, ftrd 0.7 GF g/L (82674)	Chlor- pyrifos, water, ftrd, g/L (38933)	Cyana- zine, water, ftrd, g/L (04041)	DCPA, water, ftrd 0.7 GF g/L (82682)	p,p'- DDE, water, ftrd, g/L (34653)	Diazi- non, water, ftrd, g/L (39572)	Diel- drin, water, ftrd, g/L (39381)
Oct. 22	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005
Dec. 9	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.009
Feb. 25	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.009
Apr. 21	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.009
May 12	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.009
June 23	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.009
July 28	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.009
Aug. 26	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.009

STREAMS TRIBUTARY TO LAKE ERIE

04175600 RIVER RAISIN NEAR MANCHESTER, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	2,6-Di-ethyl-aniline, water, ftrd 0.7 GF (82660)	Disulfoton, water, ftrd 0.7 GF (82677)	EPTC, water, ftrd 0.7 GF (82668)	Ethalfuralin, water, ftrd 0.7 GF (82663)	Ethoprop, water, ftrd 0.7 GF (82672)	Fonofos, water, ftrd 0.7 GF (04095)	alpha-HCH, water, ftrd 0.7 GF (34253)	Lindane, water, ftrd 0.7 GF (39341)
Oct. 22	<.006	<.02	<.002	<.009	<.005	<.003	<.005	<.004
Dec. 9	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
Feb. 25	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
Apr. 21	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
May 12	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
June 23	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
July 28	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
Aug. 26	<.006	<.02	<.004	<.009	<.005	<.003	<.005	<.004
Date	Linuron, water, ftrd 0.7 GF (82666)	Malathion, water, ftrd 0.7 GF (39532)	Metolachlor, water, ftrd 0.7 GF (39415)	Metribuzin, water, ftrd 0.7 GF (82630)	Molinate, water, ftrd 0.7 GF (82671)	Napropamide, water, ftrd 0.7 GF (82684)	Parathion, water, ftrd 0.7 GF (39542)	Methyl parathion, water, ftrd 0.7 GF (82667)
Oct. 22	<.035	<.027	E.006	<.006	<.002	<.007	<.010	<.006
Dec. 9	<.035	<.027	E.008	<.006	<.003	<.007	<.010	<.015
Feb. 25	<.035	<.027	<.013	<.006	<.003	<.007	<.010	<.015
Apr. 21	<.035	<.027	E.011	<.006	<.003	<.007	<.010	<.015
May 12	<.035	<.027	.021	<.006	<.003	<.007	<.010	<.015
June 23	<.035	<.027	E.011	<.006	<.003	<.007	<.010	<.015
July 28	<.035	<.027	E.006	<.006	<.003	<.007	<.010	<.015
Aug. 26	<.035	<.027	<.013	<.006	<.003	<.007	<.010	<.015

STREAMS TRIBUTARY TO LAKE ERIE

04175600 RIVER RAISIN NEAR MANCHESTER, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Peb- ulate, water, ftrd 0.7 GF g/L (82669)	Pendi- meth- alin, water, ftrd 0.7 GF g/L (82683)	cis- Per- methrin, water, ftrd 0.7 GF g/L (82687)	Phorate, water, ftrd 0.7 GF g/L (82664)	Prome- ton, water, ftrd, g/L (04037)	Propy- zamide, water, ftrd 0.7 GF g/L (82676)	Propa- chlor, water, ftrd, g/L (04024)	Pro- panil, water, ftrd 0.7 GF g/L (82679)
Oct. 22	<.004	<.022	<.006	<.011	M	<.004	<.010	<.011
Dec. 9	<.004	<.022	<.006	<.011	.01	<.004	<.025	<.011
Feb. 25	<.004	<.022	<.006	<.011	<.01	<.004	<.025	<.011
Apr. 21	<.004	<.022	<.006	<.011	.01	<.004	<.025	<.011
May 12	<.004	<.022	<.006	<.011	.02	<.004	<.025	<.011
June 23	<.004	<.022	<.006	<.011	E.04	<.004	<.025	<.011
July 28	<.004	<.022	<.006	<.011	.02	<.004	<.025	<.011
Aug. 26	<.004	<.022	<.006	<.011	.02	<.004	<.025	<.011

Date	Propar- gite, water, ftrd 0.7 GF g/L (82685)	Sima- zine, water, ftrd, g/L (04035)	Tebu- thiuron, water, ftrd 0.7 GF g/L (82670)	Terba- cil, water, ftrd 0.7 GF g/L (82665)	Terbu- fos, water, ftrd 0.7 GF g/L (82675)	Thio- bencarb, water, ftrd 0.7 GF g/L (82681)	Tri- allate, water, ftrd 0.7 GF g/L (82678)	Tri- flur- alin, water, ftrd 0.7 GF g/L (82661)
Oct. 22	<.02	.015	<.02	<.034	<.02	<.005	<.002	<.009
Dec. 9	<.02	.012	<.02	<.034	<.02	<.010	<.002	<.009
Feb. 25	<.02	.010	<.02	<.034	<.02	<.010	<.002	<.009
Apr. 21	<.02	.014	<.02	<.034	<.02	<.010	<.002	<.009
May 12	<.02	.014	<.02	<.034	<.02	<.010	<.002	<.009
June 23	<.02	3.64	<.02	<.034	<.02	<.010	<.002	<.009
July 28	<.02	.070	<.02	<.034	<.02	<.010	<.002	<.009
Aug. 26	<.02	.087	<.02	<.034	<.02	<.010	<.002	<.009

STREAMS TRIBUTARY TO LAKE ERIE

04176500 RIVER RAISIN NEAR MONROE, MI

LOCATION.--Lat 41°57'38", long 83°31'52", Monroe County, Hydrologic Unit 04100002, on left bank 0.8 mi downstream from bridge on Ida Maybee Road, 5.0 mi downstream from Saline River, and 7.5 mi west of Monroe.

DRAINAGE AREA.--1,042 mi².

PERIOD OF RECORD.--September 1937 to current year. Published as "Raisin River at Monroe" 1937-52 and as "River Raisin at Monroe" 1952-53.

REVISED RECORDS.--WSP 954: 1938-40(M), 1941. WSP 1437: 1939, 1948. WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 616.26 ft above sea level. Prior to Oct. 1, 1953, at site 9 mi downstream at datum 46.26 ft lower.

REMARKS.--Records good except for estimated daily discharges, which are fair. Diurnal fluctuation caused by powerplants upstream from station prior to June 27, 1968. At times, flow is affected by irrigation pumpage. Several measurements of water temperature were made during the year. Gage-height telemeter 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	446	247	706	1930	e405	1310	1230	344	1330	385	243	225
2	338	243	628	2000	e380	1820	1070	784	1370	331	249	209
3	269	246	541	1790	e360	1870	939	1280	1300	308	236	199
4	234	301	484	1480	e355	1860	835	1310	1010	306	250	195
5	216	327	450	1350	e360	2560	742	1130	794	313	279	166
6	205	328	419	1180	e340	2950	676	829	671	307	296	159
7	191	339	395	e880	e335	2570	607	679	589	297	303	198
8	180	338	379	e675	e340	2510	563	567	518	329	278	217
9	169	323	369	e650	e320	2200	545	519	453	315	245	219
10	176	313	388	e710	e320	1780	514	1770	484	301	218	223
11	191	298	984	e690	e305	1360	484	3250	1450	284	204	198
12	171	301	1070	676	e300	1100	456	2860	2510	267	179	170
13	135	307	1160	627	e290	918	442	2440	2480	264	165	147
14	149	310	1100	e610	e280	819	432	2180	2480	284	161	137
15	672	300	851	e520	e290	739	407	1890	2740	271	153	129
16	759	296	685	e500	e290	687	400	1600	2470	234	149	119
17	817	291	640	e540	e265	657	394	1310	3890	214	143	113
18	838	315	601	e515	e240	631	384	1170	4330	209	158	106
19	667	822	563	e500	e240	627	368	1070	3200	228	170	95
20	500	878	529	e530	e250	890	352	1050	3150	199	162	95
21	393	1070	498	e520	592	1790	377	1250	3030	184	161	98
22	342	1130	464	e500	716	1500	430	2850	2570	185	165	93
23	306	948	1030	e460	993	1520	477	2770	1680	191	169	88
24	277	805	2290	e430	1240	1380	442	4110	1070	207	164	86
25	260	898	2200	e450	e1150	1580	396	3420	824	202	165	84
26	253	844	2180	e430	e1200	1820	374	3110	701	211	188	86
27	253	907	2040	e375	e1180	2110	350	2930	602	285	175	81
28	259	851	1650	e360	e1180	2060	331	2390	529	270	187	77
29	260	821	1260	e380	e1220	1940	312	1530	476	262	285	77
30	253	759	1810	e400	—	1690	305	1090	425	267	284	74
31	247	—	1870	e400	—	1440	—	1260	—	258	239	—
TOTAL	10426	16156	30234	23058	15736	48688	15634	54742	49126	8168	6423	4163
MEAN	336	539	975	744	543	1571	521	1766	1638	263	207	139
MAX	838	1130	2290	2000	1240	2950	1230	4110	4330	385	303	225
MIN	135	243	369	360	240	627	305	344	425	184	143	74
CFSM	0.32	0.52	0.94	0.71	0.52	1.51	0.50	1.69	1.57	0.25	0.20	0.13
IN.	0.37	0.58	1.08	0.82	0.56	1.74	0.56	1.95	1.75	0.29	0.23	0.15

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2004, BY WATER YEAR (WY)

	MEAN	310	481	730	800	1111	1652	1457	975	664	342	230	239
MAX	1678	2267	2618	3058	3296	4440	4055	4678	2770	1453	1161	2666	
(WY)	1982	1993	1968	1952	1976	1982	1947	1943	1989	1951	1980	1981	
MIN	57.2	74.6	87.5	106	107	343	313	248	99.2	60.3	40.3	45.2	
(WY)	1964	1965	1964	1964	1963	1964	1946	1941	1988	1988	1941	1963	

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1937 - 2004

ANNUAL TOTAL	217124	282554	
ANNUAL MEAN	595	772	
HIGHEST ANNUAL MEAN			747
LOWEST ANNUAL MEAN			1374
HIGHEST DAILY MEAN	3920	May 11	4330
LOWEST DAILY MEAN	68	Aug 1	74
ANNUAL SEVEN-DAY MINIMUM	77	Sep 15	81
MAXIMUM PEAK FLOW			4860
MAXIMUM PEAK STAGE			7.04
INSTANTANEOUS LOW FLOW			70
ANNUAL RUNOFF (CFSM)	0.571	0.741	
ANNUAL RUNOFF (INCHES)	7.75	10.09	
10 PERCENT EXCEEDS	1570	1900	1850
50 PERCENT EXCEEDS	296	437	365
90 PERCENT EXCEEDS	114	170	108

(a) Gage height 10.4 ft.

(b) Backwater from ice.

(c) Approximately, site then in use.

(d) Sept. 4, 1938, Sept. 19, 20, 1941.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04176605 OTTER CREEK AT LA SALLE, MI

LOCATION.--Lat 41°52'01", long 83°27'13", in NW1/4 NW1/4 sec.23 (private claim 47), T.7 S., R.8 E., Monroe County, Hydrologic Unit 04100001, on right bank 100 ft upstream from bridge on State Highway 125 in La Salle, 2.3 mi downstream from South Branch, and 4.6 mi southwest of Monroe.

DRAINAGE AREA.--51.0 mi².

PERIOD OF RECORD.--October 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 571.07 ft above sea level.

REMARKS.--Records good except for estimated daily discharges and those below 1.0 ft³/s, which are poor. Several measurements of water temperature were made during the year. Gage-height telemeter 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	7.7	9.9	39	77	6.8	68	65	18	81	5.6	10	12
2	6.3	9.3	28	75	6.5	127	56	71	48	4.9	6.4	7.6
3	5.5	9.3	22	79	6.9	97	49	118	34	e4.8	4.5	5.6
4	5.4	9.5	19	65	7.2	74	41	69	26	e4.6	9.4	6.7
5	5.4	9.3	20	58	7.5	262	34	50	22	e4.5	15	7.0
6	5.0	8.5	26	49	8.0	213	30	39	19	4.5	9.4	4.9
7	4.6	7.6	28	e60	8.6	114	29	37	16	4.3	5.9	5.8
8	4.3	6.8	25	e52	8.8	80	28	38	14	3.8	4.2	7.8
9	4.1	6.0	23	e45	8.6	59	26	61	13	3.3	3.2	6.4
10	3.8	5.5	75	e38	8.9	47	23	522	15	2.9	2.7	4.8
11	3.9	6.9	258	e30	8.4	42	21	341	136	2.6	2.3	3.6
12	3.8	10	127	e21	8.2	37	20	215	209	2.4	2.1	2.9
13	3.7	12	65	e18	8.0	28	20	131	127	2.3	1.9	2.5
14	6.5	9.9	46	e15	7.8	28	20	90	82	2.3	1.8	2.1
15	90	8.6	37	e13	8.0	27	18	66	98	1.9	1.8	1.7
16	77	8.4	33	e12	7.1	25	17	50	62	1.7	1.9	1.7
17	43	8.9	48	e11	6.2	25	17	42	61	2.3	1.7	1.4
18	28	13	43	e10	6.0	28	16	44	140	2.2	1.6	1.3
19	22	52	36	e9.6	6.8	36	16	42	92	2.0	1.6	1.2
20	17	59	30	e9.5	29	123	15	40	50	1.9	1.6	1.0
21	15	39	27	9.4	177	190	17	70	33	1.6	1.7	0.96
22	13	29	27	9.1	96	96	32	243	25	1.8	1.7	0.88
23	11	24	221	7.9	84	66	33	155	19	1.8	1.4	0.84
24	9.6	24	300	7.7	73	60	31	246	15	1.5	1.2	0.80
25	8.8	34	164	7.6	63	200	27	168	12	1.3	1.3	0.71
26	9.3	29	92	7.4	62	189	28	100	11	1.2	1.7	0.72
27	11	24	67	7.6	60	146	24	65	9.3	25	2.0	0.72
28	11	40	57	7.7	54	104	20	42	8.1	42	8.7	0.73
29	11	88	69	7.1	55	81	18	37	7.3	18	48	0.73
30	11	58	214	7.4	---	71	17	33	6.5	9.8	62	0.76
31	10	---	127	7.1	---	74	---	96	---	15	25	---
TOTAL	467.7	659.4	2393	833.1	897.3	2817	808	3346	1491.2	183.8	243.7	95.85
MEAN	15.1	22.0	77.2	26.9	30.9	90.9	26.9	108	49.7	5.93	7.86	3.19
MAX	90	88	300	79	177	262	65	522	209	42	62	12
MIN	3.7	5.5	19	7.1	6.0	25	15	18	6.5	1.2	1.2	0.71
CFSM	0.30	0.43	1.51	0.53	0.61	1.78	0.53	2.12	0.97	0.12	0.15	0.06
IN.	0.34	0.48	1.75	0.61	0.65	2.05	0.59	2.44	1.09	0.13	0.18	0.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 2004, BY WATER YEAR (WY)

	MEAN	19.7	28.4	47.0	54.2	75.4	86.8	94.5	67.0	50.7	9.19	6.83	6.78
MAX	138	144	168	181	217	199	228	228	149	234	55.1	26.1	46.2
(WY)	2002	1993	1991	1993	1998	1993	2002	2000	1997	1989	1998	1992	1992
MIN	0.33	1.93	1.37	1.83	1.20	12.9	26.9	9.47	0.58	0.17	0.15	0.14	0.14
(WY)	1995	2000	2000	2000	2003	2000	2004	1988	1988	1988	1988	1991	1991

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 1988 - 2004

ANNUAL TOTAL	10182.31	14236.05	
ANNUAL MEAN	27.9	38.9	45.3
HIGHEST ANNUAL MEAN			75.0
LOWEST ANNUAL MEAN			18.8
HIGHEST DAILY MEAN	359	Mar 16	522
LOWEST DAILY MEAN	0.78	Jan 30	0.71
ANNUAL SEVEN-DAY MINIMUM	0.79	Jan 27	0.74
MAXIMUM PEAK FLOW			658
MAXIMUM PEAK STAGE			9.47
ANNUAL RUNOFF (CFSM)	0.547		0.763
ANNUAL RUNOFF (INCHES)	7.43		10.38
10 PERCENT EXCEEDS	76		96
50 PERCENT EXCEEDS	9.3		17
90 PERCENT EXCEEDS	1.5		1.9
			0.86

(a) On several days in water years 1988, 1991, 1992, 1994, 1996.

(b) From rating curve extended above 1,000 ft³/s.

(c) Estimated.

STREAMS TRIBUTARY TO WISCONSIN RIVER

05390100 LAC VIEUX DESERT NEAR LAND O'LAKES, WI

LOCATION.--Lat 46°07'18", long 89°09'07", in SE1/4 NW1/4 sec.17, T.42 N., R.11 E., Wisconsin Meridian, Vilas County, Hydrologic Unit 07070001, on right bank at dam, 500 ft upstream from culvert on Forest Highway 2205, and 4 mi southeast of Land O'Lakes, WI.

DRAINAGE AREA--34.4 mi².

PERIOD OF RECORD.--September 1973 to September 1992, (gage height record available in files of the U.S. Geological Survey); July 2002 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,600.00 ft above sea level.

REMARKS.--Inlets are Misery Creek, Marsh Bay Creek, Lobischer Creek, Scaup Lake Outlet and one unnamed tributary. The outlet is the Wisconsin River. Lake elevation controlled by dam. Surface area of lake is 4,260 acres. Satellite telemetry at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height, 81.98 ft, June 23, 24, 1983; minimum daily, 79.32 ft, Feb. 11, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum daily gage height, 80.87 ft, Apr. 30; minimum daily, 79.53 ft, Feb. 19.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	80.19	80.18	80.07	79.79	79.62	79.55	79.77	80.86	80.80	80.57	80.48	80.37
2	80.18	80.17	80.06	79.79	79.62	79.57	79.78	80.86	80.79	80.55	80.48	80.36
3	80.18	80.19	80.04	79.79	79.63	79.57	79.79	80.82	80.76	80.54	80.48	80.36
4	80.19	80.21	80.03	79.77	79.62	79.56	79.81	80.81	80.75	80.58	80.46	80.36
5	80.19	80.17	80.01	79.76	79.61	79.59	79.82	80.79	80.73	80.59	80.43	80.38
6	80.19	80.15	80.00	—	79.61	79.61	79.84	80.79	80.73	80.61	80.41	80.45
7	80.19	80.12	79.99	—	79.61	79.62	79.86	80.77	80.71	80.61	80.39	80.44
8	80.19	80.14	79.97	—	79.60	79.62	79.91	80.74	80.72	80.61	80.39	80.45
9	80.19	80.13	79.98	—	79.60	79.61	79.95	80.73	80.76	80.60	80.40	80.44
10	80.19	80.12	80.00	79.70	79.59	79.60	79.98	80.73	80.73	80.60	80.41	80.42
11	80.19	80.12	80.00	79.71	79.59	79.61	80.00	80.71	80.70	80.59	80.44	80.41
12	80.21	80.12	79.99	79.70	79.59	79.61	80.01	80.69	80.68	80.60	80.45	80.41
13	80.22	80.11	79.98	79.70	79.58	79.62	80.03	80.76	80.70	80.60	80.44	80.40
14	80.22	80.11	79.96	79.72	79.57	79.65	80.04	80.75	80.72	80.61	80.42	80.40
15	80.20	80.10	79.95	79.71	79.56	79.64	80.05	80.74	80.71	80.60	80.41	80.48
16	80.18	80.10	79.95	79.71	79.55	79.63	80.09	80.72	80.69	80.61	80.41	80.50
17	80.18	80.11	79.95	79.71	79.54	79.62	80.11	80.71	80.70	80.61	80.42	80.51
18	80.17	80.18	79.94	79.70	79.54	79.62	80.21	80.71	80.66	80.58	80.41	80.51
19	80.17	80.20	79.93	79.69	79.53	79.61	80.50	80.69	80.63	80.58	80.42	80.49
20	80.16	80.19	79.91	79.68	79.57	79.60	80.63	80.71	80.59	80.57	80.41	80.48
21	80.16	80.18	79.91	79.68	79.57	79.59	80.72	80.72	80.60	80.55	80.39	80.47
22	80.17	80.18	79.89	79.68	79.57	79.58	80.77	80.72	80.58	80.55	80.38	80.47
23	80.18	80.20	79.89	79.67	79.59	79.57	80.78	80.80	80.60	80.53	80.40	80.47
24	80.18	80.17	79.88	79.66	79.58	79.56	80.80	80.80	80.59	80.51	80.38	80.45
25	80.17	80.17	79.87	79.66	79.57	79.60	80.81	80.77	80.58	80.49	80.40	80.46
26	80.16	80.15	79.85	79.65	79.56	79.65	80.83	80.74	80.57	80.49	80.39	80.44
27	80.15	80.13	79.84	79.64	79.55	79.67	80.84	80.76	80.56	80.48	80.39	80.44
28	80.17	80.11	79.84	79.64	79.54	79.70	80.84	80.75	80.55	80.45	80.39	80.43
29	80.17	80.10	79.83	79.63	79.54	79.75	80.84	80.73	80.55	80.45	80.37	80.42
30	80.19	80.09	79.82	79.63	—	79.76	80.87	80.74	80.53	80.47	80.36	80.40
31	80.19	—	79.81	79.62	—	79.76	—	80.78	—	80.49	80.36	—
MEAN	80.18	80.15	79.94	—	79.58	79.62	80.28	80.75	80.67	80.56	80.41	80.44
MAX	80.22	80.21	80.07	—	79.63	79.76	80.87	80.86	80.80	80.61	80.48	80.51
MIN	80.15	80.09	79.81	—	79.53	79.55	79.77	80.69	80.53	80.45	80.36	80.36

STREAMS TRIBUTARY TO WISCONSIN RIVER

05390101 WISCONSIN RIVER NEAR LAND O'LAKES, WI

LOCATION.--Lat 46°07'18", long 89°09'07", in SE1/4 NW1/4 sec.17, T.42 N., R.11 E., Wisconsin Meridian, Vilas County, Hydrologic Unit 07070001, on right bank at downstream side of dam, 500 ft upstream from culvert on Forest Highway 2205, and 4 mi southeast of Land O'Lakes, WI.

DRAINAGE AREA.--34.4 mi².

PERIOD OF RECORD.--July 2002 to September 2004 (discontinued).

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 1,600.00 ft above sea level.

REMARKS.--Records fair. Flow regulated by dam immediately upstream. Several measurements of water temperature were made during the year. 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	11	22	50	33	30	30	8.6	43	51	9.5	11	9.3
2	11	22	49	33	30	31	8.6	42	50	8.9	11	9.6
3	11	22	47	33	31	31	8.6	47	49	9.3	12	10
4	11	24	47	33	30	31	8.6	53	49	10	12	11
5	11	25	45	32	30	33	8.7	51	49	9.9	12	11
6	11	24	45	32	30	33	9.1	51	49	9.9	12	11
7	12	25	43	32	30	34	8.9	50	31	10	12	11
8	12	25	43	31	30	34	9.2	48	16	10	12	12
9	12	25	43	30	30	34	9.1	46	21	10	12	12
10	12	24	44	30	30	34	9.0	48	23	9.9	14	12
11	13	24	45	31	30	35	8.9	48	22	9.3	14	13
12	14	25	43	31	30	35	8.9	47	18	9.2	13	12
13	12	24	43	31	30	36	8.9	52	15	9.7	9.3	13
14	12	25	42	31	30	37	8.8	52	31	11	9.1	13
15	12	25	41	32	29	37	8.9	49	44	10	9.1	14
16	12	25	41	31	29	36	9.0	47	28	10	9.5	14
17	12	25	41	32	29	36	8.8	46	14	10	9.8	14
18	12	26	40	32	29	36	9.8	44	15	11	11	14
19	12	29	40	31	29	36	11	30	13	12	11	15
20	12	33	39	31	30	36	7.7	8.1	9.7	11	11	15
21	12	33	39	31	31	36	6.5	7.6	9.7	11	11	15
22	10	33	39	31	30	36	11	7.3	9.5	11	12	15
23	9.7	34	38	31	31	35	22	8.0	9.4	12	9.6	15
24	11	34	38	31	31	35	22	7.8	9.4	12	6.8	15
25	17	34	37	31	31	20	29	30	9.3	12	6.8	16
26	21	45	37	30	30	9.2	25	44	9.1	11	6.7	16
27	21	56	36	30	30	9.0	13	44	9.1	11	7.4	17
28	21	54	36	31	30	9.0	26	44	9.1	12	8.2	16
29	21	52	35	30	30	9.1	42	44	8.5	12	8.5	16
30	22	51	35	30	—	8.7	43	47	9.1	12	9.0	16
31	22	—	34	30	—	8.6	—	50	—	12	9.2	—
TOTAL	424.7	925	1275	968	870	900.6	418.6	1235.8	689.9	328.6	322.0	402.9
MEAN	13.7	30.8	41.1	31.2	30.0	29.1	14.0	39.9	23.0	10.6	10.4	13.4
MAX	22	56	50	33	31	37	43	53	51	12	14	17
MIN	9.7	22	34	30	29	8.6	6.5	7.3	8.5	8.9	6.7	9.3
CFSM	0.40	0.90	1.20	0.91	0.87	0.84	0.41	1.16	0.67	0.31	0.30	0.39
IN.	0.46	1.00	1.38	1.05	0.94	0.97	0.45	1.34	0.75	0.36	0.35	0.44

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2004, BY WATER YEAR (WY)

	2002	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	2003
MEAN	32.4	55.1	52.5	36.0	30.8	23.9	12.0	40.5	22.8	12.3	12.6	12.8
MAX	51.1	79.3	63.9	40.8	31.6	29.1	14.0	41.1	23.0	13.7	15.6	15.2
(WY)	2003	2003	2003	2003	2003	2004	2004	2003	2004	2002	2002	2002
MIN	13.7	30.8	41.1	31.2	30.0	18.8	10.0	39.9	22.6	10.6	10.4	9.78
(WY)	2004	2004	2004	2004	2004	2003	2003	2004	2003	2004	2004	2003

SUMMARY STATISTICS

FOR 2003 CALENDAR YEAR

FOR 2004 WATER YEAR

WATER YEARS 2002 - 2004

ANNUAL TOTAL	8662.2	8761.1	
ANNUAL MEAN	23.7	23.9	
HIGHEST ANNUAL MEAN			28.4
LOWEST ANNUAL MEAN			32.8
HIGHEST DAILY MEAN	65	May 15	23.9
LOWEST DAILY MEAN	4.9	Apr 29	133
ANNUAL SEVEN-DAY MINIMUM	5.2	Apr 27	4.9
MAXIMUM PEAK FLOW			5.2
MAXIMUM PEAK STAGE			60
INSTANTANEOUS LOW FLOW			Nov 26
ANNUAL RUNOFF (CFSM)	0.690		80.04
ANNUAL RUNOFF (INCHES)	9.37		5.9
10 PERCENT EXCEEDS	45		Nov 26
50 PERCENT EXCEEDS	14		Nov 26
90 PERCENT EXCEEDS	10		Apr 22

(a) Observed.
(e) Estimated.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or flood-flow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in time of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at crest-stage partial-record stations are presented in the following table. Discharge measurements made at miscellaneous sites and for special studies are given in separate tables.

Crest-stage partial-record stations

The following table contains annual maximum discharges for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

Maximum discharge at crest-stage partial-record stations

Station name and number	Location and drainage area	Period of record	Date	Water year 2004 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE SUPERIOR								
Two Hearted River near Paradise, MI (04044813)	Lat 46°41'15", long 85°26'26", in SE1/4 NW1/4 sec.33, T.50 N., R.9 W., Luce County, Hydrologic Unit 04020201, on right bank 300 ft down- stream from end of two-track road, 3.2 mi upstream from mouth, and 20 mi northwest of Paradise. Drainage area is 200 mi ² .	1973-04	04-07-04	9.90	1,060	04-19-02	14.53	3,350
West Branch Waiska River near Brimley, MI (04045538) (locally known as Waishkey River)	Lat 46°21'18", long 84°35'35", in SW1/4 NW1/4 sec.29, T.46 N., R.2 W., Chippewa County, Hydrologic Unit 04020203, at Tilson Road, 3.2 mi upstream from mouth, and 3.5 mi south of Brimley. Drainage area is 40.7 mi ² .	1973-04	04-06-04	6.91	383	04-18-74	a9.19	1,200
STREAMS TRIBUTARY TO LAKE MICHIGAN								
Tenmile Creek at Perronville, MI (04059400)	Lat 45°48'38", long 87°22'00", in NW1/4 NW1/4 sec.2, T.39 N., R.25 W., Menominee County, Hydrologic Unit 04030109, at county road, 1.0 mi northwest of Perron- ville, and 11.5 mi upstream from Ford River. Drainage area is 38.4 mi ² .	1971-77†, 1978-04	04-09-04	b4.58	366	04-24-75	c5.42	810

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations—Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 2004 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued								
Portage River near Vicksburg, MI (04097170)	Lat 42°06'53", long 85°29'08", in SW1/4 sec.16, T.4 S., R.10 W., Kalamazoo County, Hydrologic Unit 04050001, at W Avenue, 2.4 mi east of Vicksburg. Datum of gage is 839.94 ft above sea level. Drainage area is 68.2 mi ² .	1946-51†, 1965-80†, 1980-04	05-24-04	4.75	145	06-02-89	d5.81	416
Rabbit River at Hamilton, MI (04108645)	Lat 42°40'31", long 86°00'13", in NE1/4 sec.6, T.3 N., R.14 W., Allegan County, Hydro- logic Unit 04050003, at State Highway 40 in Hamilton. Drainage area is 274 mi ² .	1979-04	05-22-04	15.38	2,240	06-21-97	f21.60	12,000
Sycamore Creek near Mason, MI (04112700)	Lat 42°36'40", long 84°27'58", in NE1/4 NE1/4 sec.31, T.3 N., R.1 W., Ingham County, Hydrologic Unit 04050004, at Harper Road, 0.7 mi downstream from Aurelius and Vevay Drain, and 2.6 mi northwest of Mason. Drain- age area is 39.5 mi ² .	1975-04	05-22-04	11.11	620	04-19-75	12.53	1,080
Flat River at Smyrna, MI (04116500)	Lat 43°03'10", long 85°15'53", in NW1/4 sec.28, T.8 N., R.8 W., Ionia County, Hydrologic Unit 04050006, on right bank at downstream side of bridge on Ingalls Road, 0.5 mi south of Smyrna. Datum of gage is 729.53 ft above sea level. Drainage area is 528 mi ² .	1951-86†, 1993-04	05-12-04	g6.83	2,470	09-13-86	9.05	4,700
Thornapple River near Caledonia, MI (04118000)	Lat 42°48'40", long 85°29'00", in NW1/4 sec.22, T.5 N., R.10 W., Kent County, Hydrologic Unit 04050007, on right bank 200 ft downstream from LaBarge powerplant, 200 ft upstream from 84th Street, 2.3 mi northeast of Caledonia, and 3.3 mi down- stream from Coldwater Riv- er. Datum of gage is 676.31 ft above sea level. Drainage area is 773 mi ² .	1931-38†, 1952-82†, 1984-94†, 1995-04	05-26-04	11.21	6,460	02-27-85	11.43	6,700

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations--Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 2004 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN—Continued								
Grand River at Ada, MI (04118105)	Lat 42°57'19", long 85°28'35", in NE1/4 sec.34, T.7 N., R.10 W., Kent County, Hydrologic Unit 04050006, on left bank at downstream side of bridge on State Highway 21 in Ada, 0.15 mi downstream from Thornapple River, and at mile 62. Datum of gage is 603.95 ft above sea level. Drainage area is 4,473 mi ² .	1999-04	05-26-04	21.56	27,400	05-26-04	21.56	27,400
Plaster Creek at Grand Rapids, MI (04119055)	Lat 42°54'46", long 85°39'02", in SE1/4 sec.7, T.6 N., R.11 W., Kent County, Hydrologic Unit 04050006, at 28th Street in Grand Rapids. Drainage area is 46.6 mi ² .	1974-04	05-22-04	10.15	1,180	02-22-97	13.43	2,300
Buck Creek at Grandville, MI (04119160)	Lat 42°54'09", long 85°45'46", in SE1/4 sec.18, T.6 N., R.12 W., Kent County, Hydrologic Unit 04050006, at Wilson Avenue in Grandville. Drainage area is 50.5 mi ² .	1974-04	05-22-04	8.51	777	05-12-81	10.30	1,580
North Branch Pentwater River near Pentwater, MI (04122230)	Lat 43°47'42", long 86°21'30", in NE1/4 SE1/4 sec.8, T.16 N., R.17 W., Oceana County, Hydrologic Unit 04060101, at Oceana Drive, 3.5 mi northeast of Pentwater. Drainage area is 42.3 mi ² .	1975-04	03-06-04	3.46	249	09-11-86	6.33	2,860
Betsie River near Benzonia, MI (04126600)	Lat 44°36'02", long 86°05'57", in NW1/4 NW1/4 sec.2, T.25 N., R.15 W., Benzie County, Hydrologic Unit 04060104, at U.S. Highway 31, 1.2 mi south of Benzonia. Datum of gage is 602.15 ft above sea level. Drainage area is approximately 170 mi ² .	1975-04	05-14-04	4.07	708	03-28-89	5.46	993
STREAMS TRIBUTARY TO LAKE HURON								
Rifle River at Selkirk, MI (04140500)	Lat 44°18'48", long 84°04'10", in SE1/4 NE1/4 sec.9, T.22 N., R.3 E., Ogemaw County, Hydrologic Unit 04080101, at State Road in Selkirk. Datum of gage is 828.47 ft above sea level. Drainage area is 117 mi ² .	1950-82+, 1983-04	05-24-04	h	e1,300	05-20-59	6.76	2,760

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations--Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 2004 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE HURON--Continued								
North Branch Flint River near Columbiaville, MI (04146450)	Lat 43°11'18", long 83°22'03", in NW1/4 sec. 24, T.9 N., R.9 E., Lapeer County, Hydro- logic Unit 04080204, at Barnes Lake Road, 2.9 mi northeast of Columbiaville. Drainage area is 223 mi ² .	1987-04	05-25-04	16.18	2,150	06-21-96	20.25	4,800
Swartz Creek at Flint, MI (04148300)	Lat 42°59'16", long 83°43'57", in NW1/4 sec. 26, T.7 N., R.6 E., Genesee County, Hydro- logic Unit 04080204, at South Ballenger Highway in Flint, 3.6 mi upstream from mouth. Datum of gage is 727.05 ft above sea level. Drainage area is 115 mi ² .	1970-84†, 1991-04	05-24-04	8.09	1,920	02-09-01	9.21	3,380
Thread Creek near Flint, MI (04148440)	Lat 42°58'30", long 83°38'09", in SE1/4 SE1/4 sec. 28, T.7 N., R.7 E., Genesee County, Hydrologic Unit 04080204, at Bristol Road, 4.0 mi southeast of Flint, and 6.0 mi upstream from mouth. Datum of gage is 764.36 ft above sea level. Drainage area is 54.4 mi ² .	1970-84†, 1991-04	05-23-04	6.74	631	04-19-75	7.65	1,260
STREAMS TRIBUTARY TO ST. CLAIR RIVER								
Pine River near Rattle Run, MI (04160350)	Lat 42°52'49", long 82°34'04", in NE1/4 sec.9, T.5 N., R.16 E., St. Clair County, Hydro- logic Unit 04090001, at Gratiot Road, 1.9 mi north- east of Rattle Run. Drainage area is 135 mi ² .	1974-04	05-23-04	25.64	17,070	05-23-04	25.64	17,070
STREAMS TRIBUTARY TO LAKE ST. CLAIR								
West Branch Stony Creek near Washington, MI (04161760)	Lat 42°43'53", long 83°06'02", in SE1/4 sec.25, T.4 N., R.11 E., Oakland County, Hydro- logic Unit 04090003, at Huron-Clinton Metropoli- tan Park Road, 3.4 mi west of Washington. Drainage area is 22.5 mi ² .	1965-04	05-23-04	5.17	434	04-19-75	4.42	470
North Branch Clinton River at Almont, MI (04164010)	Lat 42°54'59", long 83°02'42", in NE1/4 sec.28, T.6 N., R.12 E., Lapeer County, Hydro- logic Unit 04090003, at State Highway 53 in Almont. Drainage area is 9.56 mi ² .	1959-62, 1963-68†, 1969-04	05-23-04	7.07	498	09-06-85	8.60	818

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations--Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 2004 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE ST. CLAIR--Continued								
North Branch Clinton River near Romeo, MI (04164050)	Lat 42°49'11", long 82°58'35", in NW1/4 sec.31, T.5 N., R.13 E., Macomb County, Hydro- logic Unit 04090003, at 33 Mile Road, 2.2 mi north- east of Romeo. Drainage area is 49.7 mi ² .	1959-64, 1965-69‡, 1970-04	05-23-04	5.75	3,030	04-19-75	m5.44	3,500
North Branch Clinton River near Meade, MI (04164150)	Lat 42°43'50", long 82°54'23", in NE1/4 sec.34, T.4 N., R.13 E., Macomb County, Hydro- logic Unit 04090003, at 27 Mile Road, 1.9 mi northwest of Meade. Drainage area is 89.6 mi ² .	1959-67, 1968-72‡, 1973-04	05-23-04	8.66	2,990	04-19-75	n7.76	4,500
Coon Creek near Armada, MI (04164200)	Lat 42°47'41", long 82°52'58", in SW1/4 sec.1, T.4 N., R.13 E., Macomb County, Hydro- logic Unit 04090003, at North Road, 3.4 mi south of Armada. Drainage area is 10.0 mi ² .	1959-65, 1966-70‡, 1971-04	05-23-04	5.98	644	05-23-04	o5.98	644
Highbank Creek near Armada, MI (04164350)	Lat 42°48'24", long 82°51'08", in NW1/4 sec.6, T.4 N., R.14 E., Macomb County, Hydro- logic Unit 04090003, at 32 Mile Road, 3.0 mi southeast of Armada. Drainage area is 14.9 mi ² .	1959-65, 1965-70‡, 1971-04	05-23-04	18.07	e885	09-06-85	p16.77	2,240
East Branch Coon Creek near New Haven, MI (04164360)	Lat 42°45'46", long 82°50'57", in SW1/4 sec.18, T.4 N., R.14 E., Macomb County, Hydro- logic Unit 04090003, at 29 Mile Road, 3.4 mi northwest of New Haven. Drainage area is 36.1 mi ² .	1959-67, 1968-72‡, 1973-04	05-23-04	11.75	2,130	04-19-75	q8.95	2,700
Deer Creek near Meade, MI (04164400)	Lat 42°42'39", long 82°51'32", in NW1/4 sec.6, T.3 N., R.14 E., Macomb County, Hydro- logic Unit 04090003, at 25 1/2 Mile Road, 0.9 mi southeast of Meade. Drain- age area is 12.7 mi ² .	1959-60, 1960-65‡, 1966-04	05-24-04	8.64	759	05-24-04	r8.64	759
McBride Drain near Macomb, MI (04164450)	Lat 42°41'14", long 82°55'14", in NE1/4 NE1/4 sec.16, T.3 N., R.13 E., Macomb County, Hydrologic Unit 04090003, at 24 Mile Road, 2.2 mi southeast of Macomb. Drainage area is 5.79 mi ² .	1960-64‡, 1965-04	05-23-04	9.12	214	02-10-65	s8.82	220

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations--Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 2004 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE ST. CLAIR--Continued								
Middle Branch Clinton River near Macomb, MI (04164600)	Lat 42°42'03", long 82°59'44", in SE1/4 sec.2, T.3 N., R.12 E., Macomb County, Hydro- logic Unit 04090003, at Schoenherr Road, 2.0 mi west of Macomb. Drainage area is 22.2 mi ² .	1959-64, 1965-69‡, 1971-04	05-23-04	12.78	1,570	05-23-04	12.78	1,570
STREAMS TRIBUTARY TO DETROIT RIVER								
Frank and Poet Drain at Trenton, MI (04168660)	Lat 42°09'19", long 83°12'22", in NW1/4 sec.13, T.4 S., R.10 E., Wayne County, Hydro- logic Unit 04090004, at King Road in Trenton. Drainage area is 19.3 mi ² .	1972-04	05-21-04	8.25	300	09-07-90	9.55	655
STREAMS TRIBUTARY TO LAKE ERIE								
Saline River near Saline, MI (04176400)	Lat 42°07'50", long 83°46'35", in SW1/4 sec.18, T.4 S., R.6 E., Washtenaw County, Hydrologic Unit 04100002, 50 ft upstream from Maple Road, 2.8 mi south of Saline. Drainage area is 94.6 mi ² .	1966-77‡, 1978-04	05-24-04	11.90	2,050	06-26-68	13.37	3,990

‡ Operated as a continuous-record gaging station.

a Maximum gage height, 9.84 ft, Apr. 6, 1988.

b Maximum gage height, 5.30 ft, Mar. 30, backwater from ice.

c Maximum gage height, 8.94 ft, Mar. 30, 1977, backwater from ice.

d Maximum gage height, 5.86 ft, Dec. 31, 1988, backwater from ice.

e Estimated.

f From floodmark.

g Maximum gage height, 6.88 ft, Jan. 23, backwater from ice.

h Not determined.

i From rating curve extended above 3,000 ft³/s.

j Maximum gage height, 5.93 ft, Jan. 27, 1974, backwater from ice.

k Maximum gage height, 8.62 ft, Apr. 19, 1975.

m Maximum gage height, 7.1 ft, Mar. 12 or 13, 1962,
backwater from ice; site and datum then in use.

n Maximum gage height, 8.66 ft, May 23, 2004.

o Maximum gage height, 6.95 ft, Sept. 6, 1985.

p Maximum gage height, 18.07 ft, May 23, 2004.

q Maximum gage height, 11.75 ft, May 23, 2004.

r Maximum gage height, 9.09 ft, Feb. 9, 2001.

s Maximum gage height, 9.55 ft, June 26, 1968.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE SUPERIOR							
04034100	Bond Falls Lower By-Pass	Middle Branch Ontonagon River	Lat 46°24'27", long 89°07'44", in SE1/4 SW1/4 sec.1, T.46 N., R.39 W., Ontonagon County, Hydrologic Unit 04020102, at Bond Falls Road, 2.2 mi west of Calderwood.	—	1942,1945, 1963-64, 1967,1969, 1971-72, 1974, 1979-81, 1983-84, 1987-01, 2003	07-29-04	a46.1
04044400	Carp River	Lake Superior	Lat 46°31'29", long 87°34'25", in SE1/4 sec.29, T.48 N., R.26 W., Marquette County, Hydrologic Unit 04020105, at U.S. Highway 41, 2.0 mi northeast of Negaunee.	51.4	1961-86‡, 1987-92‡, 1993-03	10-16-03 06-09-04 07-28-04 09-15-04	a26.5 a111 a30.8 a24.7
04044573	Cedar Creek	Chocolay River	Lat 46°27'20", long 87°21'42", in NW1/4 SW1/4 sec.19, T.47 N., R.24 W., Marquette County, Hydrologic Unit 04020201, at Cherry Creek Road, 2.5 mi south of Harvey.	9.04	1979-81‡, 1982	12-18-03	11.3
04044583	Cherry Creek	Chocolay River	Lat 46°27'57", long 87°21'53", in NE1/4 SE1/4 sec.13, T.47 N., R.25 W., Marquette County, Hydrologic Unit 04020201, 0.5 mi upstream from County Highway 551, 2.0 mi south of Harvey.	4.53	1964-65, 1966-70‡, 1971-79‡, 1979-81‡, 1982, 1994-95	12-18-03	20.1
04044840	Tahquamenon River	Whitefish Bay	Lat 46°22'21", long 85°46'55", in NE1/4 NE1/4 sec.22, T.46 N., R.12 W., Luce County, Hydrologic Unit 04020202, at County Road 442, 2.0 mi north of Danaher.	29.3	1971-72	06-29-04 08-30-04	74.0 68.8
040455807	Ashmun Creek	St. Marys River	Lat 46°27'51", long 84°22'18", in SW1/4 SE1/4 sec.13, T.47 N., R.1 W., Chippewa County, Hydrologic Unit 04070001, at Business I-75, 2.2 mi south-west of Sault Ste. Marie.	1.41	—	08-06-04	d0.00
STREAMS TRIBUTARY TO LAKE MICHIGAN							
04047980	Fox River	Manistique River	Lat 46°24'01", long 86°01'42", in NW1/4 NW1/4 sec.11, T.46 N., R.14 W., Schoolcraft County, Hydrologic Unit 04060106, at forest campground, adjacent to Fox River Road, 5.3 mi northwest of Seney.	79.0	—	06-29-04 08-31-04	134 121

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
04052000	Driggs River	Manistique River	Lat 46°20'44", long 86°07'36", in NE1/4 NW1/4 sec.36, T.46 N., R.15 W., Schoolcraft County, Hydrologic Unit 04060106, at State Highway 28, 8.6 mi west of Seney.	b70	1938-42†,	04-05-04	141
					1943-45,	04-16-04	195
					1947-48,	04-19-04	309
					1950,	05-06-04	152
					2000, 2002-03	05-20-04	121
04052600	Driggs River	Manistique River	Lat 46°18'58", long 86°06'32", in NE1/4 NW1/4 sec.7, T.45 N., R.14 W., Schoolcraft County, Hydrologic Unit 04060106, 150 ft downstream from Diversion Ditch at Seney National Wildlife Refuge, 8.0 mi west of Seney. Previously published (2000 water year) as 04052010.	--	2000,	11-06-03	a101
					2002-03†	04-16-04	a254
						04-19-04	a345
						05-06-04	a159
						05-20-04	a134
04058120	Green Creek	Middle Branch Escanaba River	Lat 46°22'22", long 87°36'21", in NW1/4 sec.19, T.46 N., R.26 W., Marquette County, Hydrologic Unit 04030110, at County Highway 565, 4.5 mi south of Palmer.	8.42	1961-65,	10-14-03	a4.63
					1970-92†,	06-08-04	a19.2
					1993-03	07-27-04	a5.10
						09-14-04	a5.82
04058400	Goose Lake Outlet	East Branch Escanaba River	Lat 46°23'35", long 87°29'37", in SE1/4 SE1/4 sec.12, T.46 N., R.26 W., Marquette County, Hydrologic Unit 04030110, 0.8 mi upstream from mouth, 3.0 mi west of Sands Station.	37.5	1961-65, 1966-82†, 1983-86c	12-18-03	33.1
04058500	East Branch Escanaba River	Escanaba River	Lat 46°16'56", long 87°26'07", in SE1/4 sec.21, T.45 N., R.25 W., Marquette County, Hydrologic Unit 04030110, at State Highway 35, in Gwinn.	124	1955-80†, 1981, 2001	03-30-04 04-19-04	416 607
04059034	Escanaba River	Lake Michigan	Lat 45°48'22", long 87°05'51", in SW1/4 NW1/4 sec.1, T.39 N., R.23 W., Delta County, Hydrologic Unit 04030110, 600 ft downstream from Bichler Creek, 2.5 mi upstream from mouth, and 2.0 mi northwest of Wells.	b920	1981-92†,	07-27-04	a492
					1993-03	08-05-04	a335
						08-30-04	a438
						09-23-04	a376
04060500	Iron River	Brule River	Lat 46°03'31", long 88°37'38", in SE1/4 SW1/4 sec.1, T.42 N., R.35 W., Iron County, Hydrologic Unit 04030106, at County Highway 424, in Caspian.	92.1	1946-47,	04-06-04	197
					1948-80†,	04-20-04	796
					1983-84	06-01-04	259
						07-19-04	63.1
						09-07-04	53.5

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004—Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN—Continued							
04061500	Paint River	Brule River	Lat 46°06'21", long 88°20'05", in SE1/4 sec.20, T.43 N., R.32 W., Iron County, Hydrologic Unit 04030106, downstream from City of Crystal Falls powerplant, 0.9 mi upstream from State Highway 69 in Crystal Falls.	597	1944-96†, 1997-98c, 1999-03	11-05-03 04-06-04 04-21-04 08-31-04	a423 a1,440 a5,230 a227
04062400	Michigamme River	Menominee River	Lat 46°14'48", long 88°00'45", in NW1/4 NW1/4 sec.1, T.44 N., R.30 W., Dickinson County, Hydrologic Unit 04030107, on left bank 20 ft upstream from bridge on unnamed county road, 800 ft downstream from State High- way 95, 2.0 mi south of Witch Lake.	316	1964-80†, 1997-98c, 1999-03	10-29-03 04-05-04 04-21-04 09-13-04	a203 a1,120 a2,660 a86.2
04065650	Sturgeon River	Menominee River	Lat 45°46'35", long 87°49'39", in SW1/4 NE1/4 sec.13, T.39 N., R.29 W., Dickinson County, Hydrologic Unit 04030108 at U.S. Highway 2, 0.5 mi west of Loretto.	--	1967, 2002-03	11-04-03 04-06-04 04-28-04 07-27-04	a135 a1,750 a1,030 a101
04096517	South Branch Hog Creek Tributary	South Branch Hog Creek	Lat 41°57'33", long 84°49'33", in SW1/4 SW1/4 sec.7, T.6 S., R.4 W., Hillsdale County, Hydrologic Unit 04050001, at Squires Road, 0.3 mi upstream from mouth, 3.0 mi west of Allen.	2.61	1969-03	10-22-03 03-17-04 05-05-04 08-11-04	1.00 1.54 2.77 e0.05
04101531	Osborn Drain	Dowagiac River	Lat 42°03'56", long 86°04'30", in SW1/4 NE1/4 sec.5, T.5 S., R.15 W., Cass County, Hydro- logic Unit 04050001, 0.2 mi upstream from Corwin Street, 2.3 mi northwest of Glenwood.	13.6	—	09-10-04	4.60
04102726	Butternut Creek	South Branch Black Creek	Lat 42°24'42", long 86°12'58", in SE1/4 NW1/4 sec.6, T.1 S., R.16 W., Van Buren County, Hydrologic Unit 04050002, 0.8 mi downstream from 68th Street, 3.0 mi east of South Haven.	10.9	—	09-08-04	3.13
04104500	Battle Creek	Kalamazoo River	Lat 42°26'37", long 85°01'57", in SW1/4 NW1/4 sec.28, T.1 N., R.6 W., Eaton County, Hydrologic Unit 04050003, at former gaging station, at State Highway 78, in Bellevue.	178	1948-53†, 1977, 1988	05-25-04	d1,550

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
04106330	West Fork Portage Creek	Portage Creek	Lat 42°14'59", long 85°37'45", in SE1/4 sec.31, T.2 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, upstream from Asylum Lake outlet confluence in Kalamazoo.	--	1960	07-16-04	2.37
04106405	West Fork Portage Creek	Portage Creek	Lat 42°14'28", long 85°36'20", in NW1/4 sec.4, T.3 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, at Morningside Drive in Kalamazoo.	--	1960	07-16-04	1.12
041064182	West Fork Portage Creek	Portage Creek	Lat 42°14'39", long 85°35'17", in NW1/4 NW1/4 sec.3, T.3 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, at Old Kilgore Road in Kalamazoo.	--	--	07-16-04	0.00
041064187	West Fork Portage Creek	Portage Creek	Lat 42°14'53", long 85°35'06", in SW1/4 SW1/4 sec.34, T.2 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, at Pratt Road in Kalamazoo.	--	--	07-16-04	0.00
04106419	West Fork Portage Creek	Portage Creek	Lat 42°14'53", long 85°34'56", in SE1/4 SW1/4 sec.34, T.2 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, at Pratt Road in Kalamazoo.	--	--	07-16-04	0.00
04106420	West Fork Portage Creek	Portage Creek	Lat 42°14'52", long 85°34'31", in SE1/4 sec.34, T.2 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, at mouth near Lovers Lane in Kalamazoo.	21.7	1960, 1964, 1966	07-16-04	0.16
04107778	Unnamed Tributary	Pine Creek	Lat 42°27'00", long 85°42'02", in NW1/4 NW1/4 sec.26, T.1 N., R.12 W., Allegan County, Hydrologic Unit 04050003, at Farmer Street, 0.3 mi south of Otsego.	--	--	08-18-04	d0.05
04107800	Schnable Brook	Kalamazoo River	Lat 42°29'57", long 85°45'36", in NE1/4 SE1/4 sec.6, T.1 N., R.12 W., Allegan County, Hydrologic Unit 04050003, at 22nd Street, 4.2 mi north-west of Otsego.	--	1988	08-18-04	d6.12

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004—Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN—Continued							
04108665	Unnamed Tributary	Mann Creek	Lat 42°35'10", long 86°06'00", in NE1/4 sec.5, T.2 N., R.15 W., Allegan County, Hydrologic Unit 04050003, at 57th Street, 0.5 mi south of Fennville.	--	--	08-18-04	d0.26
04115851	Little Libhart Creek	Libhart Creek	Lat 42°57'31", long 84°57'58", in SW1/4 SE1/4 sec.25, T.7 N., R.6 W., Ionia County, Hydro- logic Unit 04050006, 0.8 mi downstream from Keefer Highway, 2.0 mi southwest of Lyons.	14.7	--	09-13-04	1.86
04116002	Unnamed Tributary	Grand River	Lat 42°58'57", long 85°05'43", in SE1/4 NE1/2 sec.23, T.7 N., R.7 W., Ionia County, Hydro- logic Unit 04050006 at Short Street, 1.0 mi west of Ionia.	--	--	06-25-04	d1.59
04116023	Bellamy Creek	Grand River	Lat 42°59'39", long 85°06'49", in NW1/4 SW1/4 sec.14, T.7 N., R.7 W., Ionia County, Hydrologic Unit 04050006, 1.0 mi upstream from Lincoln Avenue, 1.5 mi east of Ionia.	29.7	--	09-14-04	1.43
04117448	Cedar Creek	Thornapple River	Lat 42°36'03", long 85°14'30", in NE1/4 SW1/4 sec.34, T.3 N., R.8 W., Barry County, Hydrologic Unit 04050007, 0.1 mi upstream from Coburn Road, 1.0 mi southwest of Quimby.	44.8	--	09-23-04	23.5
04118185	Unnamed Tributary	Grand River	Lat 42°59'23", long 85°34'08", in NW1/4 SW1/4 sec.13, T.7 N., R.11 W., Kent County, Hydrologic Unit 04050006 at Winterwood Drive, 4.0 mi northeast of East Grand Rapids.	1.15	--	04-06-04 04-14-04 07-29-04	d0.04 d0.00 d0.00
04118189	Unnamed Tributary	Grand River	Lat 42°59'39", long 85°32'45", in SE1/4 NW1/4 sec.18, T.7 N., R.10 W., Kent County, Hydrologic Unit 04050006, at Grand River Drive, 4.9 mi northeast of East Grand Rapids.	1.88	--	04-14-04 07-29-04	d2.49 d2.12
04118530	Mill Creek	Grand River	Lat 43°05'14", long 85°41'19", in SW1/4 SW1/4 sec.12, T.8 N., R.12 W., Kent County, Hydrologic Unit 04050006, at 8 Mile Road, 1.0 mi north of Alpine.	11.5	--	04-28-04 07-29-04	d6.70 d2.42

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004—Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
04118540	Mill Creek	Grand River	Lat 43°02'53", long 85°40'17", in NE1/4 SE1/4 sec.25, T.8 N., R.12 W., Kent County, Hydrologic Unit 04050006, at footbridge at Maranatha Bible Church site, at Comstock Park.	16.6	--	04-28-04 07-29-04	d10.6 d6.3
04118544	Strawberry Creek	Mill Creek	Lat 43°02'52", long 85°40'21", in NE1/4 SE1/4 sec.25, T.8 N., R.12 W., Kent County, Hydrologic Unit 04050006, at Stony Creek Avenue, at Comstock Park.	2.98	--	04-28-04 07-29-04	d2.67 d2.27
04118550	Mill Creek	Grand River	Lat 43°02'01", long 85°39'58", in NW1/4 SW1/4 sec.31, T.8 N., R.11 W., Kent County, Hydrologic Unit 04050006, at West River Drive, at Comstock Park.	20.2	1952-53	04-28-04 07-29-04	d14.6 d9.19
04118569	York Creek	Grand River	Lat 43°02'46", long 85°41'58", in SE1/4 SW1/4 sec.26, T.8 N., R.12 W., Kent County, Hydrologic Unit 04050006, at Cordes Avenue, 1.5 mi north- west of Comstock Park.	0.53	--	04-14-04 05-14-04 07-30-04	d0.04 d0.38 d0.00
04118570	York Creek	Grand River	Lat 43°02'42", long 85°41'23", in SE1/4 SE1/4 sec.26, T.8 N., R.12 W., Kent County, Hydrologic Unit 04050006, at Alpine Avenue, 2.0 mi north- west of Grand Rapids.	0.81	1994	07-30-04	d0.10
04118571	York Creek	Grand River	Lat 43°02'37", long 85°41'11", in SW1/4 SW1/4 sec.25, T.8 N., R.12 W., Kent County, Hydrologic Unit 04050006, at Lamoreaux Drive, at Comstock Park.	0.88	--	04-14-04 05-14-04 07-30-04	d0.15 d0.54 d0.23
04118588	York Creek	Grand River	Lat 43°01'56", long 85°40'05", in SW1/4 SW1/4 sec.31, T.8 N., R.11 W., Kent County, Hydrologic Unit 04050006, at West River Drive, at Comstock Park.	2.73	--	07-30-04	d2.75
04118590	York Creek	Grand River	Lat 43°01'37", long 85°40'05", in NW1/4 NW1/4 sec.6, T.7 N., R.11 W., Kent County, Hydro- logic Unit 04050006, at North Park Street, 0.5 mi north of Grand Rapids.	2.90	1994	04-14-04 05-14-04 07-30-04	d1.95 d3.27 d2.88

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN—Continued							
04119243	Sand Creek	Grand River	Lat 43°01'52", long 85°49'49", in SE1/4 SE1/4 sec.34, T.8 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at Hayes Street, in Marne.	21.2	1971	04-29-04 05-20-04 06-28-04 08-30-04	d10.9 d147 d14.0 d5.37
04119244	East Fork	Sand Creek	Lat 43°01'50", long 85°46'06', in SW1/4 SW1/4 sec.32, T.8 N., R.12 W., Kent County, Hydrologic Unit 04050006 at Fourmile Road, 3.0 mi east of Marne.	10.6	—	04-29-04 05-20-04 06-28-04 08-30-04	d5.69 d52.1 d5.56 d2.59
041192445	East Fork	Sand Creek	Lat 43°01'51", long 85°48'02", in SE1/4 SW1/4 sec.36, T.8 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at Hayes Street, 1.4 mi east of Marne.	15.4	—	04-29-04 05-20-04 06-28-04 08-30-04	d7.53 d84.3 d7.49 d3.38
04119245	East Fork	Sand Creek	Lat 43°01'52", long 85°49'18", in SE1/4 SW1/4 sec.35, T.8 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at Hayes Street in Marne.	17.1	2002	04-29-04 06-28-04 08-30-04	d10.1 d10.7 d6.14
04119246	Sand Creek	Grand River	Lat 43°00'59", long 85°49'29", in SW1/4 SW1/4 sec.2, T.7 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at Johnson Street, 1.8 mi north- east of Tallmadge.	41.1	—	04-29-04	d23.2
04119247	Sand Creek	Grand River	Lat 43°00'08", long 85°49'34", in SW1/4 SW1/4 sec.11, T.7 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at Lincoln Street, 0.8 mi north- east of Tallmadge.	43.4	1971	06-28-04 08-30-04	d32.4 d16.2
04119250	Sand Creek	Grand River	Lat 42°58'20", long 85°50'23", in NW1/4 NW1/4 sec.27, T.7 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at State Highway 45, 1.5 mi south of Tallmadge.	48.7	1953-54, 1956, 1960, 1971	06-28-04	d35.1
04119251	Sand Creek	Grand River	Lat 42°57'59", long 85°49'56", in SW1/4 NE1/4 sec.27, T.7 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at private footbridge at end of Winans Street, 1.7 mi south of Tallmadge.	—	—	04-29-04	d34.5

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004—Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN—Continued							
04119252	Unnamed Tributary	Sand Creek	Lat 42°57'52", long 85°49'30", in NE1/4 SE1/4 sec.27, T.7 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at Lovers Lane, 1.9 mi southeast of Tallmadge.	3.43	—	05-20-04 08-30-04	d8.08 d1.45
04119253	Sand Creek	Grand River	Lat 42°56'59", long 85°50'57", in NW1/4 SE1/4 sec.33, T.7 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at Luce Street, 3.0 mi southwest of Tallmadge.	54.7	--	06-28-04 08-30-04	d41.6 d23.1
04119325	Bass Creek	Bass River	Lat 42°56'10", long 85°59'44", in SE1/4 NW1/4 sec.5, T.6 N., R.14 W., Ottawa County, Hydrologic Unit 04050006, at Stanton Street, 3.2 mi south- west of Allendale.	18.8	—	04-19-04 04-26-04 06-07-04 08-16-04	d8.86 d20.4 d12.3 d1.95
04119335	Bass Creek	Bass River	Lat 42°57'53", long 86°01'48", in SW1/4 NE1/4 sec.25, T.7 N., R.15 W., Ottawa County, Hydrologic Unit 04050006, at Vinans Street, 3.9 mi south- west of Allendale.	22.7	—	04-26-04 06-07-04 08-16-04	d30.0 d19.0 d3.31
04119345	Little Bass Creek	Bass River	Lat 42°57'58", long 86°01'26", in SW1/4 NW1/4 sec.30, T.7 N., R.14 W., Ottawa County, Hydrologic Unit 04050006, at 96th Avenue, 3.6 mi south- west of Allendale.	7.90	--	04-26-04 06-07-04 08-16-04	d11.6 d13.0 d2.28
04119355	Bear Creek	Bass River	Lat 42°58'37", long 86°02'38", in NW1/4 SW1/4 sec.24, T.7 N., R.15 W., Ottawa County, Hydrologic Unit 04050006, at 104th Avenue, 4.5 mi north- west of Allendale.	9.47	—	04-26-04 06-07-04 08-16-04	d9.24 d14.3 d2.25
04119360	Bass River	Grand River	Lat 42°59'12", long 86°01'53", in NW1/4 NE1/4 sec.24, T.7 N., R.15 W., Ottawa County, Hydrologic Unit 04050006, at Buchanan Street, 4.1 mi northwest of Allendale.	41.9	--	04-19-04 06-07-04 08-16-04	d31.7 d45.2 d8.24
04119365	Bass River	Grand River	Lat 42°59'43", long 86°01'03", in SE1/4 NW1/4 sec.18, T.7 N., R.14 W., Ottawa County, Hydrologic Unit 04050006, at Warner Street, 3.6 mi north- west of Allendale.	44.2	—	04-19-04 06-07-04 08-16-04	d35.1 d48.0 d8.92

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
04120033	Rio Grande Creek	Crockery Creek	Lat 43°09'09", long 85°52'09", in NW1/4 SW1/4 sec.21, T.9 N., R.13 W., Ottawa County, Hydrologic Unit 04050006, at 32nd Avenue, 4.4 mi south-east of Ravenna.	4.29	—	09-09-04	d18.1
04120038	Rio Grande Creek	Crockery Creek	Lat 43°08'47", long 85°56'51", in NW1/4 NW1/4 sec.26, T.9 N., R.14 W., Muskegon County, Hydrologic Unit 04050006, at Blackmer Road, 3.0 mi south of Ravenna.	18.7	—	09-09-04	d4.07
04120040	Crockery Creek	Grand River	Lat 43°08'38", long 85°57'58", in NW1/4 NW1/4 sec.27, T.9 N., R.14 W., Muskegon County, Hydrologic Unit 04050006, at Patterson Road, 3.0 mi southwest of Ravenna.	108	1999-00	09-09-04	d24.3
04121239	Clam River	Muskegon River	Lat 44°15'49", long 85°24'04", in NE1/4 NE1/4 sec.33, T.22 N., R.9 W., Wexford County, Hydrologic Unit 04060102, 1.0 mi downstream from dam at outlet of Lake Cadillac, at Smith Street in Cadillac.	b48	1983-84†, 1986-92†, 1993-03	11-06-03 02-12-04 05-07-04 08-31-04	a25.8 a35.5 a78.0 a7.57
04122081	Ryerson Creek	Muskegon Lake	Lat 43°14'13", long 86°11'30", in SW1/4 SE1/4 sec.22, T.10 N., R.16 W., Muskegon County, Hydrologic Unit 04060102, at West Street, in East Muskegon. Previously published as station 04122076.	--	--	08-16-00 08-17-00 08-17-00	d0.24 d0.25 d0.28
04122082	Ryerson Creek	Muskegon Lake	Lat 43°14'13", long 86°11'35", in SW1/4 SE1/4 sec.22, T.10 N., R.16 W., Muskegon County, Hydrologic Unit 04060102, at Carlton Street, in East Muskegon. Previously published as station 04122077.	--	--	06-21-00 08-17-00	d0.55 d0.29
04122083	Ryerson Creek	Muskegon Lake	Lat 43°14'08", long 86°12'24", in SE1/4 SE1/4 sec.21, T.10 N., R.16 W., Muskegon County, Hydrologic Unit 04060102, at Home Street, in East Muskegon. Previously published as station 04122078.	--	--	03-30-00 04-20-00 04-21-00 05-18-00 06-21-00 08-16-00 08-17-00	d1.25 d14.6 d7.27 d7.69 d2.49 d1.55 d5.85

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004—Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN—Continued							
04122087	Ruddiman Creek	Muskegon Lake	Lat 43°12'38", long 86°16'36", in NE1/4 SW1/4 sec.36, T.10 N., R.17 W., Muskegon County, Hydrologic Unit 04060102, at Glenside Boulevard, in Muskegon.	3.37	1973, 2001	04-29-04	d2.48
04123627	North Branch Manistee River	Manistee River	Lat 44°42'46", long 84°59'10", in NE1/4 NW1/4 sec.25, T.27 N., R.6 W., Kalkaska County, Hydrologic Unit 04060103, at State Highway 72, 8.0 mi northeast of Spencer.	55.1	1954	07-15-04 09-27-04	d12.4 d7.74
04124230	Slagle Creek	Manistee River	Lat 44°18'46", long 85°44'57", in NW1/4 SE1/4 sec.10, T.22 N., R.12 W., Wexford County, Hydrologic Unit 04060103, at Harrietta Hills Trout Farm, 2.0 mi south of Yuma.	--	--	07-15-04	d17.2
04126801	Crystal River	Lake Michigan	Lat 44°53'56", long 85°57'23", in SW1/4 sec.24, T.29 N., R.14 W., Leelanau County, Hydrologic Unit 04060104, downstream from Glen Lake dam, 1.6 mi east of Glen Arbor.	44.5	2003	10-01-03 10-27-03 12-04-03 02-18-04 03-30-04 05-05-04 05-28-04 05-28-04 06-30-04 06-30-04 08-26-04 08-26-04 09-22-04 09-22-04	a30.6 a62.9 a69.6 a66.5 a80.1 a33.0 a107 a105 a28.6 a29.5 a40.7 a38.9 a40.0 a39.2
04126803	Crystal River	Lake Michigan	Lat 44°54'15", long 85°58'10", in SE1/4 NW1/4 sec.23, T.29 N., R.14 W., Leelanau County, Hydrologic Unit 04060104, 1.1 mi northeast of Glen Arbor.	45.3	2003	10-01-03 10-27-03 12-04-03 03-30-04 03-30-04 05-05-04 05-28-04 06-30-04 06-30-04 08-26-04 08-26-04 09-22-04 09-22-04	a30.2 a68.1 a60.2 a81.1 a82.5 a35.0 a103 a30.4 a30.1 a39.1 a39.5 a39.7 a40.1
04127777	Green River	Jordan River	Lat 45°00'24", long 85°03'49", in SE1/4 SW1/4 sec.8, T.30 N., R.6 W., Antrim County, Hydrologic Unit 04060105, at State Highway M-66, 1.3 mi northwest of Green River.	--	--	10-21-03	d20.5

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
041277772	Diversion Inlet	Green River	Lat 45°02'25", long 85°03'48", in SE1/4 SW1/4 sec.8, T.30 N., R.6 W., Antrim County, Hydrologic Unit 04060105, at diversion inlet, 1.3 mi north- west of Green River.	--	--	10-21-03 10-21-03	d7.92 d14.8
041277774	Green River	Jordan River	Lat 45°00'25", long 85°03'49", in SE1/4 SW1/4 sec.8, T.30 N., R.6 W., Antrim County, Hydrologic Unit 04060105, downstream from diversion inlet, 1.3 mi northwest of Green River.	--	--	10-21-03	d12.6
041277776	Green River	Jordan River	Lat 45°00'27", long 85°03'46", in SE1/4 SW1/4 sec.8, T.30 N., R.6 W., Antrim County, Hydrologic Unit 04060105, downstream from diversion return, 1.3 mi northwest of Green River.	--	--	10-21-03	d21.7
STREAMS TRIBUTARY TO ST. MARYS RIVER							
041278856	Unnamed Tributary	Charlotte River	Lat 46°25'10", long 84°23'30", in NW1/4 NE1/4 sec.2, T.46 N., R.1 W., Chippewa County, Hydrologic Unit 04070001, at 6 Mile Road, 5.6 mi southwest of Sault Ste. Marie.	3.85	--	08-04-04	d0.00
041278858	Spring Creek	Charlotte River	Lat 46°20'49", long 84°18'17", in NE1/4 NE1/4 sec.33, T.46 N., R.1 E., Chippewa County, Hydrologic Unit 04070001, at 11 Mile Road, 1.5 mi north- west of McCarron.	1.4	--	08-04-04	d0.00
STREAMS TRIBUTARY TO LAKE HURON							
04127915	Bear Creek	Pine River	Lat 46°12'17", long 84°41'52", in NE1/4 SE1/4 sec.17, T.44 N., R.3 W., Chippewa County, Hydrologic Unit 04070002, at Biscuit Road, 1.0 mi south- west of Dryburg.	17.1	--	07-14-04 08-25-04	15.5 3.48
04135020	Thunder Bay River	Lake Huron	Lat 45°04'15", long 83°26'16", in SW1/4 NE1/4 sec.22, T.31 N., R.8 E., Alpena County, Hydrologic Unit 04070006, at 9th Avenue, at Alpena.	1,240	1949, 1975, 1979	07-12-04	a525
04138451	Johnson Creek	Au Gres River	Lat 44°11'53", long 83°57'26", in NE1/4 SW1/4 sec.21, T.21 N., R.4 E., Ogemaw County, Hydrologic Unit 04080101, at Ryan Road, 1.4 mi northwest of Prescott.	1.41	--	07-29-04	d0.00

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE HURON--Continued							
04138452	Johnson Creek	Au Gres River	Lat 44°11'44", long 83°56'41", in NE1/4 SE1/4 sec.21, T.21 N., R.4 E., Ogemaw County, Hydrologic Unit 04080101, at Clark Road, 0.8 mi northwest of Prescott.	1.88	--	07-29-04	d0.00
04138453	Johnson Creek	Au Gres River	Lat 44°11'39", long 83°56'05", in SE1/4 SW1/4 sec.22, T.21 N., R.4 E., Ogemaw County, Hydrologic Unit 04080101, at Melcher Road, at Prescott.	2.51	--	07-29-04	d0.00
04150592	South Branch White Creek	White Creek	Lat 43°30'16", long 83°14'47", in NW1/4 SW1/4 sec.36, T.13 N., R.10 E., Tuscola County, Hydrologic Unit 04080205, 1.6 mi upstream from Decker-ville Road, 2.9 mi east of Deford.	48.8	--	09-29-04	0.74
04153516	Weaver Drain	Sturgeon Creek	Lat 43°45'34", long 84°20'20", in SE1/4 SW1/4 sec.27, T.16 N., R.1 E., Midland County, Hydrologic Unit 04080201, at Hope Road, 0.5 mi south of Hope.	--	--	06-10-04 07-09-04 08-02-04	d0.88 d0.24 d0.00
041535165	Hope Drain	Sturgeon Creek	Lat 43°44'54", long 84°20'20", in NE1/4 SW1/4 sec.34, T.16 N., R.1 E., Midland County, Hydrologic Unit 04080201, at Hope Road, 1.3 mi south of Hope.	--	--	06-10-04 07-09-04 08-02-04	d0.60 d0.03 d0.00
041535173	Grass Creek	Sturgeon Creek	Lat 43°43'05", long 84°18'06", in NE1/4 SW1/4 sec.12, T.15 N., R.1 E., Midland County, Hydrologic Unit 04080201, at end of trail off Stark Road, 4.3 mi north of Midland.	--	--	08-02-04	d0.00
04153518	Dittmar Drain	Sturgeon Creek	Lat 43°42'11", long 84°18'34", in SW1/4 SW1/4 sec.13, T.15 N., R.1 E., Midland County, Hydrologic Unit 04080201, at Stark Road, 6.0 mi northeast of Sanford.	--	--	09-22-04	d0.00
04153528	Newell Drain	Sturgeon Creek	Lat 43°40'38", long 84°16'02", in SE1/4 NE1/4 sec.30, T.15 N., R.2 E., Midland County, Hydrologic Unit 04080201, at Sturgeon Road, 1.0 mi north of Midland.	--	--	08-02-04 09-22-04	d0.20 d0.05

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004—Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE HURON—Continued							
04153531	Jacobs Drain	Sturgeon Creek	Lat 43°39'26", long 84°16'02", in SE1/4 SE1/4 sec.31, T.15 N., R.2 E., Midland County, Hydrologic Unit 04080201, at Sturgeon Road, 3.0 mi north- west of Midland.	--	--	07-09-04 08-02-04	d0.89 d0.15
04153533	Sturgeon Creek	Tittabawassee River	Lat 43°38'29", long 84°15'59", in NW1/4 NW1/4 sec.8, T.14 N., R.2 E., Midland County, Hydrologic Unit 04080201, at Saginaw Road, 1.5 mi north- west of Midland.	--	--	08-02-04	d0.68
04153540	Inman Drain	Sturgeon Creek	Lat 43°38'38", long 84°16'37", in SW1/4 SE1/4 sec.6, T.14 N., R.2 E., Midland County, Hydrologic Unit 04080201, at Perrine Road, 2.0 mi north- west of Midland.	--	--	08-02-04	d0.15
04158495	Pigeon River	Lake Huron	Lat 43°44'44", long 83°13'10", in SE1/4 SE1/4 sec.6, T.15 N., R.11 E., Huron County, Hydrologic Unit 04080103, at Maxwell Road, 2.8 mi north- east of Rescue.	--	--	05-17-04 08-25-04	46.0 2.62
04159000	Pigeon River	Lake Huron	Lat 43°48'51", long 83°16'45", in NE1/4 sec.15, T.16 N., R.10 E., Huron County, Hydrologic Unit 04080103, at Caseville Road, 1.0 mi southwest of Pigeon.	94.1	1946-52‡	05-17-04 08-25-04	70.1 1.73
04159010	Pigeon River	Lake Huron	Lat 43°56'22", long 83°14'30", in NW1/4 SW1/4 sec.31, T.18 N., R.11 E., Huron County, Hydrologic Unit 04080103, at Kinde Road, 1.5 mi east of Caseville.	125	1987-93‡	05-17-04 08-25-04	128 1.21
041590107	Pigeon River	Lake Huron	Lat 43°56'38", long 83°16'22", in NE1/4 NW1/4 sec.35, T.18 N., R.10 E., Huron County, Hydrologic Unit 04080103, at State Highway 25, in Caseville.	--	--	05-20-04 08-26-04	184 63.0
041590114	Pinnebog River	Lake Huron	Lat 43°47'33", long 83°08'27", in SW1/4 SW1/4 sec.24, T.16 N., R.11 E., Huron County, Hydrologic Unit 04080103, at Moore Road, 2.6 mi southeast of Elkton.	--	--	05-17-04 08-25-04	40.0 0.77

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE HURON--Continued							
041590117	Pinnebog River	Lake Huron	Lat 43°50'00", long 83°10'25", in SE1/4 SW1/4 sec.3, T.16 N., R.11 E., Huron County, Hydrologic Unit 04080103, at Richardson Road, 1.1 mi northeast of Elkton.	--	--	05-17-04	50.6
						08-25-04	0.32
04159045	Pinnebog River	Lake Huron	Lat 43°55'14", long 83°07'32", in NE1/4 NE1/4 sec.12, T.17 N., R.11 E., Huron County, Hydrologic Unit 04080103, at Limerick Road, 1.5 mi south-west of Pinnebog.	124	1973-78, 1991-92	05-20-04	120
						08-26-04	2.42
04159064	Pinnebog River	Lake Huron	Lat 43°59'55", long 83°04'00", in SW1/4 sec.10, T.18 N., R.12 E., Huron County, Hydrologic Unit 04080103, at Port Crescent State Park, 0.6 mi south-west of Port Crescent.	--	--	05-20-04	193
						08-26-04	72.6
04159113	Forester Creek	Lake Huron	Lat 43°29'48", long 82°35'42", in SE1/4 NE1/4 sec.8, T.12 N., R.16 E., Sanilac County, Hydrologic Unit 04080104, at Ridge Road, 1.4 mi west of Forester.	6.39	--	11-21-03	d6.68
STREAMS TRIBUTARY TO ST. CLAIR RIVER							
04160075	Black River	St. Clair River	Lat 42°59'40", long 82°26'42", in NE1/4 NE1/4 sec.4, T.6 N., R.17 E., St. Clair County, Hydrologic Unit 04090001, in Port Huron.	--	1973	07-29-04	838
						09-16-04	118
STREAMS TRIBUTARY TO DETROIT RIVER							
04174288	Honey Creek	Huron River	Lat 42°17'22", long 83°50'21", in NE1/4 SE1/4 sec.21, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Zeeb Road, 4.2 mi northwest of Ann Arbor.	--	2003	10-17-03	4.44
04174293	Unnamed Tributary	Honey Creek	Lat 42°17'11", long 83°49'33", in SW1/4 SE1/4 sec.22, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Jackson Road, 3.2 mi west of Ann Arbor.	--	2003	10-17-03	4.48
04174295	Honey Creek	Huron River	Lat 42°17'46", long 83°49'14", in NE1/4 NE1/4 sec.22, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Dexter-Ann Arbor Road, 2.0 mi southeast of Scio.	16.2	1965, 2003	10-17-03	11.9

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO DETROIT RIVER--Continued							
04174310	Honey Creek	Huron River	Lat 42°19'05", long 83°47'44", in SW1/4 SW1/4 sec.12, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Huron River Drive, 3.25 mi northwest of Ann Arbor.	--	2003	10-17-03	11.2
STREAMS TRIBUTARY TO LAKE ERIE							
04175663	Evans Creek	River Raisin	Lat 42°03'12", long 84°05'47", in NE1/4 NW1/4 sec.8, T.5 S., R.3 E., Lenawee County, Hydrologic Unit 04100002, at Tripp Road, 2.6 mi northwest of Tipton.	7.1	2003	08-16-04	d0.00
04177085	Laird Creek	East Branch St. Joseph River	Lat 41°42'41", long 84°29'56", in SE1/4 sec.2, T.9 S., R.2 W., Hillsdale County, Hydrologic Unit 04100003, 200 ft upstream from Territorial Road, 4.5 mi southwest of Waldron.	16.3	1963	06-23-04 09-16-04	12.4 0.41
041843614	Lime Lake Inlet	Lime Lake	Lat 41°47'22", long 84°22'36", in SW1/4 NW1/4 sec.12, T.8 S., R.1 W., Hillsdale County, Hydrologic Unit 04100006, at Lime Lake Road, 1.1 mi northeast of Prattville.	--	--	08-04-04 09-02-04	d1.27 d0.09
041843616	Prattville Drain	Lime Lake	Lat 41°47'15", long 84°23'22", in NW1/4 SE1/4 sec.11, T.8 S., R.1 W., Hillsdale County, Hydrologic Unit 04100006, at Young Road, 0.5 mi northeast of Prattville.	--	--	08-04-04 09-02-04	d0.25 d0.00
041843618	Unnamed Tributary	Lime Lake	Lat 41°47'22", long 84°22'22", in SE1/4 NW1/4 sec.12, T.8 S., R.1 W., Hillsdale County, Hydrologic Unit 04100006, at Lime Lake Road, 1.3 mi northeast of Prattville.	--	--	09-02-04	d0.00
04184362	Lime Creek	Bean Creek	Lat 41°46'57", long 84°22'39", in SW1/4 SW1/4 sec.12, T.8 S., R.1 W., Hillsdale County, Hydrologic Unit 04100006, at Prattville Road, 1.3 mi east of Prattville.	4.4	--	08-04-04 09-02-04	d2.13 d0.00

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2004--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO WISCONSIN RIVER							
05390074	Marsh Bay Creek	Lac Vieux Desert	Lat 46°08'59", long 89°02'20", in NW1/4 SE1/4 sec.3, T.43 N., R.38 W., Gogebic County, Hydrologic Unit 07070001, at Federal Forest Highway 3218, 6.2 mi northeast of Phelps, WI.	--	2002-03	08-03-04	0.10
05390088	Lobischer Creek	Lac Vieux Desert	Lat 46°07'38", long 89°02'35", in NE1/4 NW1/4 sec.15, T.43 N., R.38 W., Gogebic County, Hydrologic Unit 07070001, at Forest Highway 3218, 4.8 mi northeast of Phelps, WI.	--	--	08-03-04	0.34
05390090	Lobischer Creek	Lac Vieux Desert	Lat 46°07'37", long 89°03'51", in NW1/4 NE1/4 sec.13, T.42 N., R.11 E., Vilas County, Hydrologic Unit 07070001, at private camp road, 0.5 mi northeast of south boat launch at Slaughter Bay, 4.3 mi northeast of Phelps, WI.	--	2002-03	05-12-04 08-03-04	1.22 1.69
05390096	Unnamed Tributary	Lac Vieux Desert	Lat 46°07'13", long 89°06'45", in SE1/4 NW1/4 sec.15, T.42 N., R.11 E., Vilas County, Hydrologic Unit 07070001, at South Shore Road, 4.0 mi northwest of Phelps, WI.	--	2003	05-12-04 08-03-04	0.95 0.69

† Operated as a low-flow partial-record station.

‡ Operated as a continuous-record gaging station.

a Affected by regulation and/or diversion.

b Approximately.

c Operated as a crest-stage partial-record station.

d Discharge measurement made by employees of Michigan Department of Environmental Quality.



GROUND-WATER LEVELS

BRANCH COUNTY

415602084593701. Local number, 6S 6W 22CABA.

LOCATION.--Lat 41°56'02", long 84°59'37", Hydrologic Unit 04050001, at North Waterworks Drive in Coldwater. Owner: City of Coldwater.

AQUIFER.--Sand and gravel.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 6 in, depth 113 ft, screened 108 ft to 113 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 970 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 2.5 ft above land-surface datum.

REMARKS.--Water levels affected by nearby pumping.

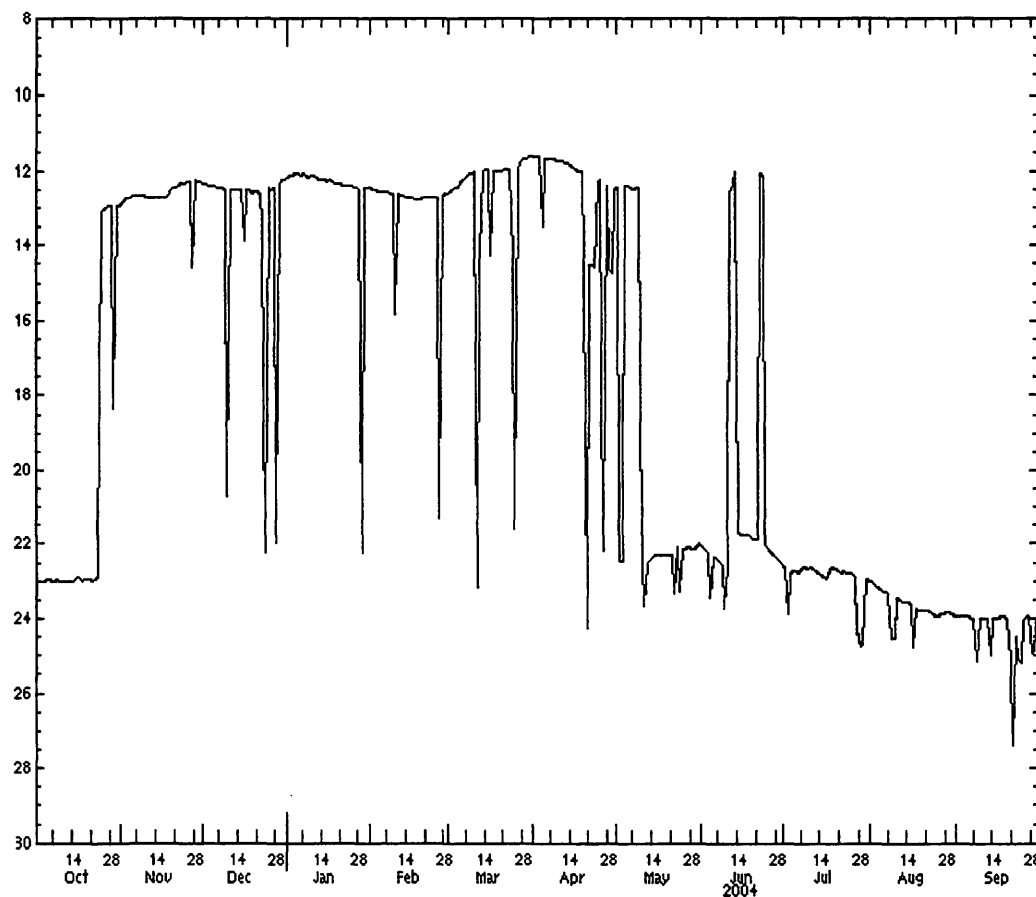
PERIOD OF RECORD.--January 1964 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 8.77 ft below land-surface datum, June 4, 1989; lowest recorded, 27.38 ft below land-surface datum, Sept. 21, 2004.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	22.97	12.69	12.42	12.09	12.54	12.30	11.67	12.42	22.34	22.75	23.26	23.95
10	22.99	12.70	20.70	12.15	15.84	12.04	11.74	22.50	22.55	22.64	23.44	24.00
15	22.91	12.72	12.51	12.26	12.71	11.98	11.90	22.32	21.73	22.91	23.59	24.01
20	22.95	12.47	12.57	12.35	12.75	12.02	24.28	22.31	21.89	22.74	23.80	25.17
25	13.05	12.30	12.46	12.41	12.75	21.59	12.24	22.14	22.15	22.82	23.92	24.07
EOM	12.93	12.27	12.22	12.46	12.62	11.65	12.49	21.98	22.59	23.03	23.93	23.78
WTR YR 2004	HIGHEST			11.08	APR 1, 2			LOWEST	27.38	SEP 21		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

CALHOUN COUNTY

422032085091801. Local number, 1S 7W 32BDCC1.

LOCATION.--Lat 42°20'31", long 85°09'19", Hydrologic Unit 04050003, at Hopkins Street and State Highway 66 in Battle Creek. Owner: Pennfield Township.

AQUIFER.--Marshall Formation.

WELL CHARACTERISTICS.--Drilled well, diameter 6 in, depth 95 ft, cased to about 40 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 845 ft above sea level, from topographic map. Measuring point: Top of shelter base, 1.0 ft above land-surface datum.

REMARKS--Water levels affected by nearby pumping.

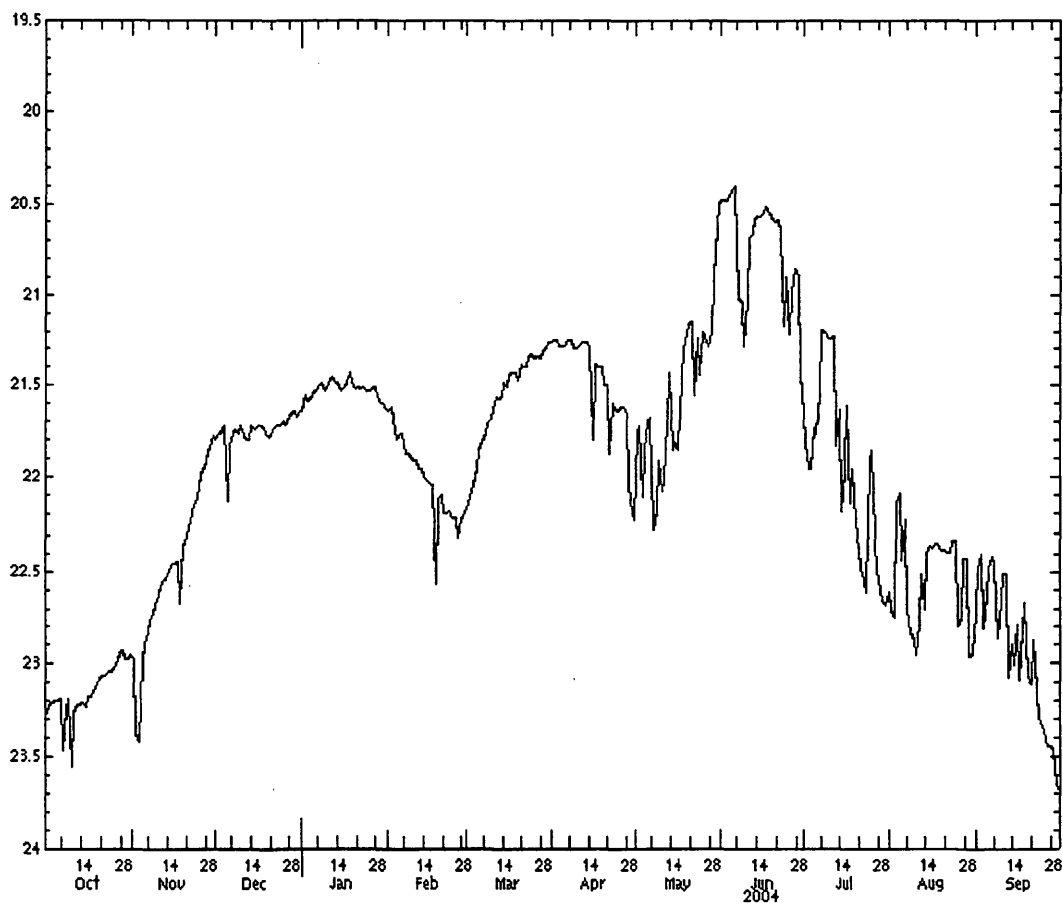
PERIOD OF RECORD.--February 1964 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 15.6 ft below land-surface datum, April 1974; lowest recorded, 27.0 ft below land-surface datum, August 1964.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	23.20	22.90	22.14	21.53	21.77	21.85	21.28	21.70	20.41	21.76	22.44	22.48
10	23.56	22.63	21.72	21.51	21.91	21.63	21.28	22.08	21.03	21.24	22.95	22.51
15	23.23	22.46	21.74	21.53	22.02	21.51	21.80	21.81	20.57	21.97	22.36	22.78
20	23.08	22.34	21.79	21.52	22.10	21.39	21.50	21.16	20.60	22.37	22.38	23.11
25	23.02	22.05	21.70	21.53	22.22	21.35	21.62	21.20	21.22	21.85	22.79	23.37
EOM	22.95	21.78	21.64	21.63	22.18	21.26	22.23	20.49	21.65	22.62	22.72	23.69
WTR YR 2004	HIGHEST			20.40	JUN 4-7, 17			LOWEST	23.69	SEP 30		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

CHEBOYGAN COUNTY

454427084424002. Local number, 39N 3W 29CBCB2.

LOCATION.—Lat 45°44'27", long 84°42'40", Hydrologic Unit 04070003, at Stimpson Road, 3 mi southeast of Mackinaw City. Owner: U.S. Geological Survey.

AQUIFER.—Sand and gravel.

WELL CHARACTERISTICS.—Drilled water-table well, diameter 6 in, depth 55 ft, screened 40 ft to 55 ft.

INSTRUMENTATION.—Water-level recorder.

DATUM.—Elevation of land-surface datum is 705 ft above sea level, from topographic map. Measuring point: Top of casing, 2.5 ft above land-surface datum.

REMARKS.—Water-level telemeter at well.

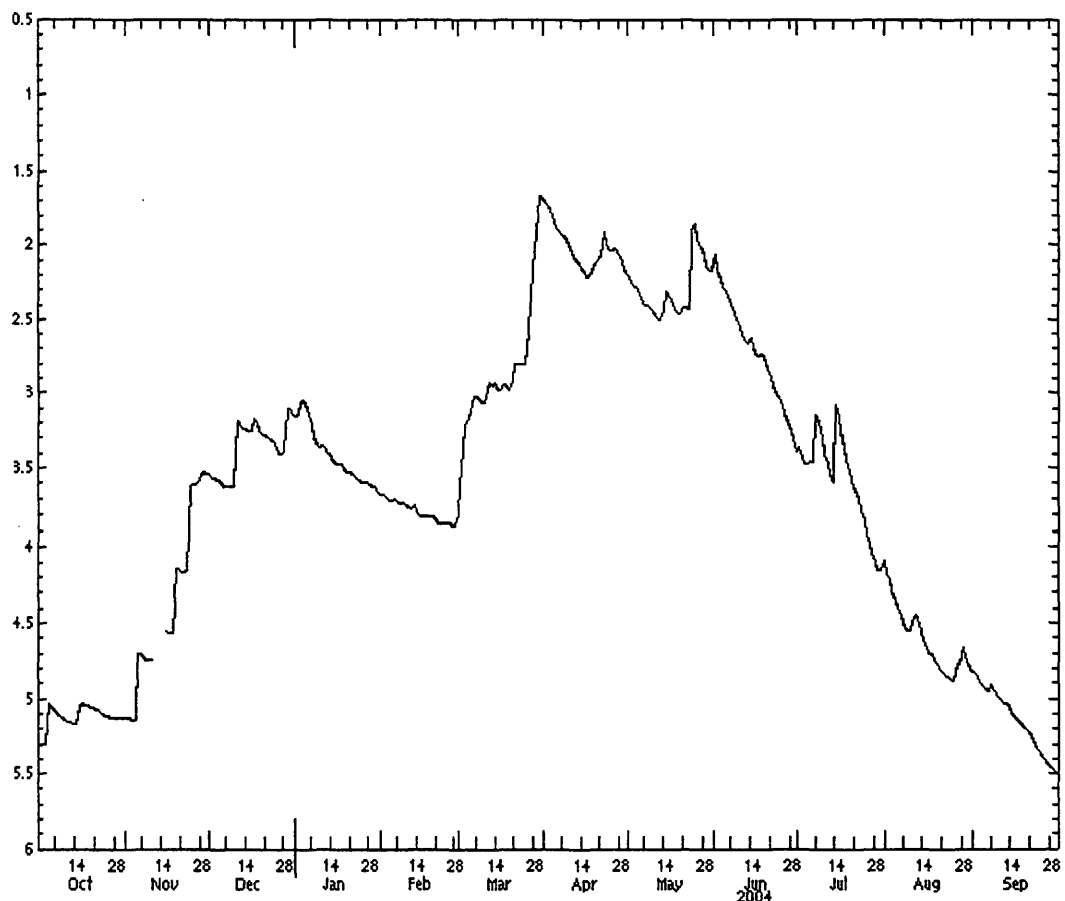
PERIOD OF RECORD.—February 1979 to May 1992, December 1997 to September 2001 (periodic measurements), September 2001 to current year (water-level recorder). Records for the 1992 water year are unpublished and available in files of the U.S. Geological Survey.

EXTREMES FOR PERIOD OF RECORD.—Highest water level recorded, 1.57 ft below land-surface datum, May 9, 2002; lowest measured, 6.58 ft below land-surface datum, Nov. 2, 2000, Jan. 23, 2001.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	5.06	4.71	3.60	3.10	3.72	3.12	1.89	2.32	2.31	3.46	4.40	4.94
10	5.14	4.74	3.63	3.36	3.75	3.06	2.03	2.45	2.55	3.40	4.49	5.01
15	5.06	4.56	3.25	3.46	3.81	2.98	2.18	2.31	2.70	3.16	4.67	5.12
20	5.06	4.14	3.28	3.53	3.81	2.91	2.09	2.46	2.85	3.62	4.81	5.22
25	5.12	3.61	3.37	3.60	3.86	2.80	2.04	1.86	3.08	3.91	4.88	5.39
EOM	5.13	3.54	3.14	3.67	3.80	1.68	2.19	2.18	3.39	4.09	4.83	5.50
WTR YR 2004	HIGHEST			1.61	MAR 29, 30			LOWEST	5.50	SEP 30		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

EATON COUNTY

424435084365001. Local number, 4N 3W 12CDAD.

LOCATION.--Lat 42°44'35", long 84°36'50", Hydrologic Unit 04050004, at Robins Road in Delta Township, 0.5 mi west of Lansing. Owner: F. Wheeler.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 6 in, depth 381 ft, cased to 140 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 861.91 ft above sea level. Measuring point: Plywood instrument shelf, 1.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

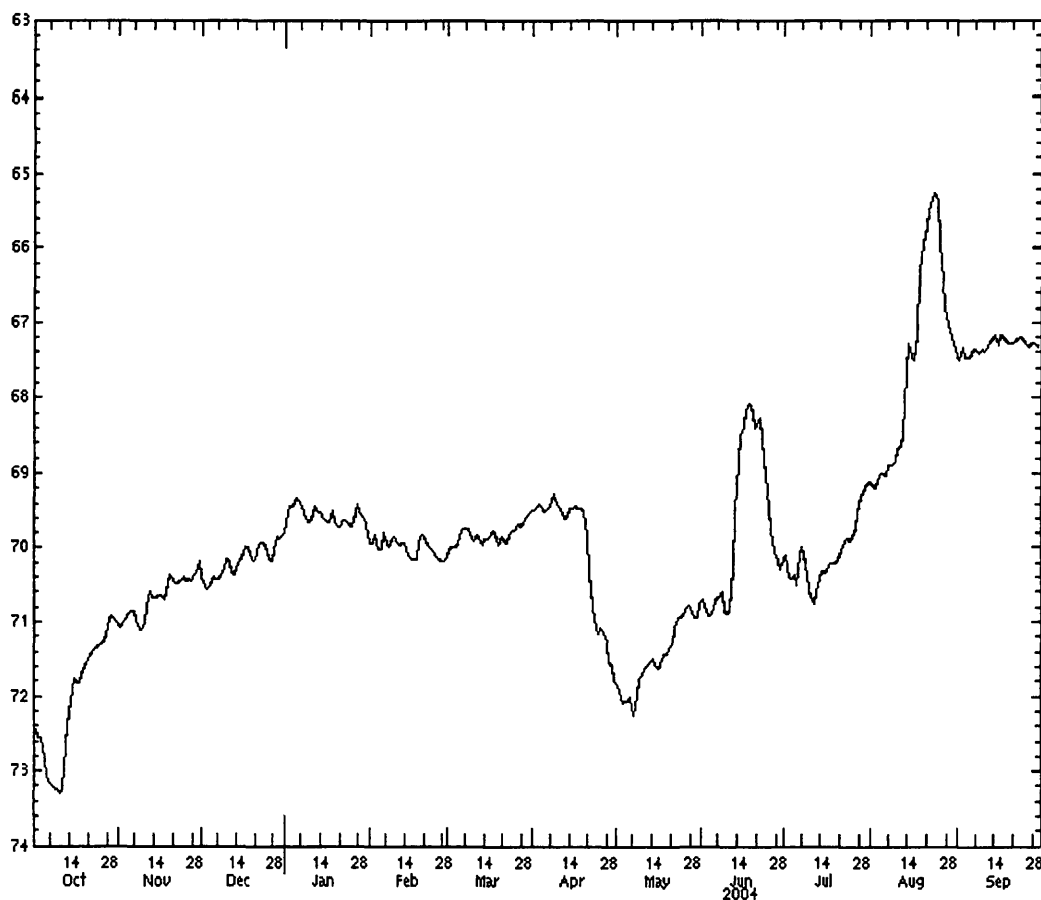
PERIOD OF RECORD.--October 1953 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 55.19 ft below land-surface datum, June 24, 25, 26, 1996; lowest recorded, 103.6 ft below land-surface datum, Aug. 28, 1969.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	73.07	70.85	70.41	69.34	70.02	69.82	69.53	72.07	70.84	70.50	69.01	67.47
10	73.29	71.02	70.16	69.67	69.86	69.90	69.45	71.70	70.89	70.67	68.66	67.38
15	71.77	70.64	70.18	69.61	70.11	69.89	69.48	71.57	68.51	70.33	67.44	67.31
20	71.56	70.39	70.17	69.70	69.82	69.84	69.81	71.36	68.40	70.10	65.72	67.27
25	71.31	70.44	70.05	69.71	70.12	69.76	71.07	70.92	69.44	69.85	65.93	67.28
EOM	71.01	70.17	69.81	69.79	70.12	69.50	71.79	70.74	70.16	69.12	67.44	67.33
WTR YR 2004	HIGHEST			64.96	AUG 23			LOWEST	73.29	OCT 10		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

GRAND TRAVERSE COUNTY

443921085213501. Local number, 26N 9W 14ABAA.

LOCATION.--Lat 44°39'21", long 85°21'35", Hydrologic Unit 04060105, 5.5 mi north of Fife Lake. Owner: U.S. Geological Survey.

AQUIFER.--Sand.

WELL CHARACTERISTICS.--Drilled water-table well, diameter 6 in, depth 80 ft, PVC pipe and screen.

INSTRUMENTATION.--Periodic measurements.

DATUM.--Elevation of land-surface datum is 960 ft above sea level, from topographic map. Measuring point: Top of casing, 1.24 ft above land-surface datum.

PERIOD OF RECORD.--June 1976 to September 1991 (water-level recorder), August 2000 to current year (periodic measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 21.32 ft below land-surface datum, Oct. 22, 26, 27, 1986; lowest measured, 29.24 ft below land-surface datum, Feb. 23, 2001.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR, OCTOBER 2003 TO SEPTEMBER 2004

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 30	28.18	FEB 18	27.47	JUN 22	24.64	JUL 28	24.83	SEP 9	25.41
DEC 15	27.89	MAR 29	27.38						

GROUND-WATER LEVELS

HURON COUNTY

434103083130301. Local number, 15N 11E 32BBCB.

LOCATION.--Lat 43°40'59", long 83°13'04", Hydrologic Unit 04080103, 2 mi northeast of Gagetown at Gagetown State Game Area. Owner: Huron County.

AQUIFER.--Sand.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 4 in, depth 91 ft, screened 87 ft to 91 ft.

INSTRUMENTATION.--Periodic measurements.

DATUM.--Elevation of land-surface datum is 746 ft above sea level, from topographic map. Measuring point: Top of casing, 1.6 ft above land-surface datum.

COOPERATION.--Water-level measurements Mar. 4 and June 8 were provided by Huron Conservation District.

PERIOD OF RECORD.--June 1988 to March 1990 (periodic measurements), February 1991 to December 2003 (water-level recorder), January to September 2004 (periodic measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 30.38 ft below land-surface datum, May 6, 1991; lowest recorded, 36.29 ft below land-surface datum, Aug. 29, 30, 2001.

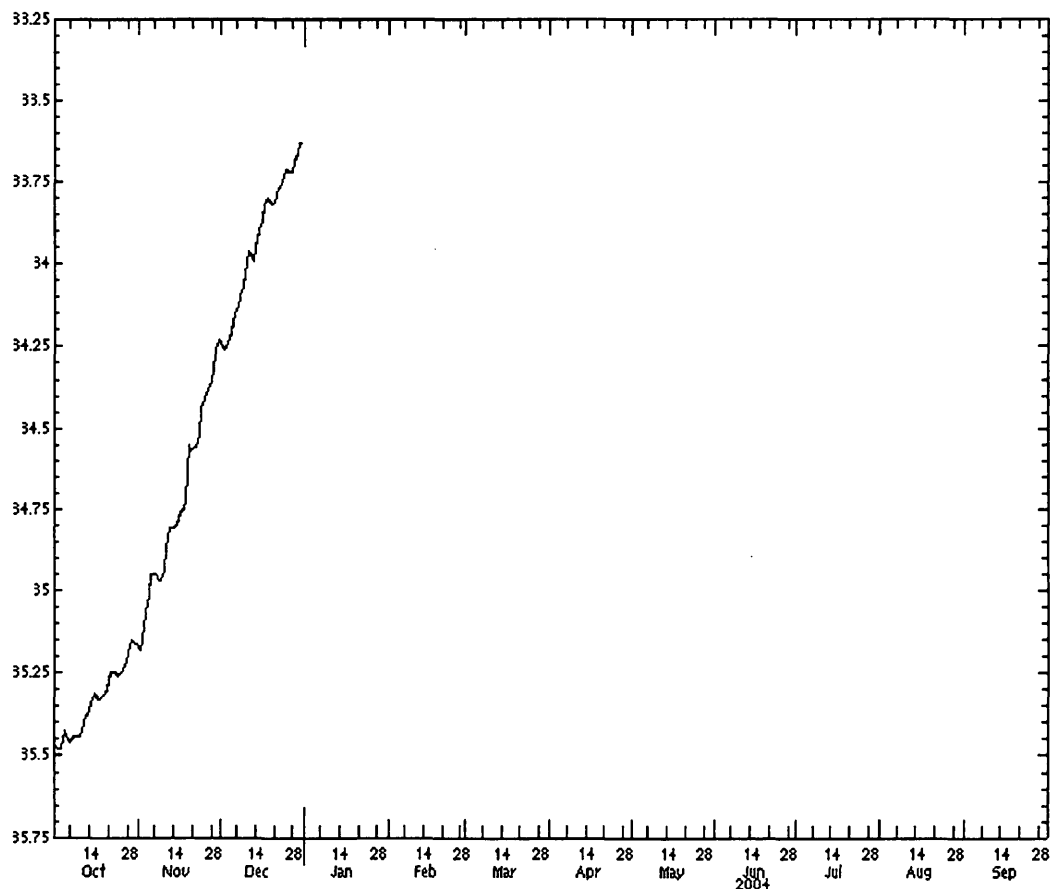
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	35.44	34.95	34.18	---	---	---	---	---	---	---	---	---
10	35.44	34.94	34.03	---	---	---	---	---	---	---	---	---
15	35.31	34.78	33.90	---	---	---	---	---	---	---	---	---
20	35.30	34.57	33.82	---	---	---	---	---	---	---	---	---
25	35.25	34.41	33.71	---	---	---	---	---	---	---	---	---
EOM	35.16	34.23	33.63	---	---	---	---	---	---	---	---	---

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 22	33.05	MAR 29	32.33	JUL 6	32.38	JUL 8	32.42	AUG 24	34.60	SEP 13	35.10
MAR 4	32.88	JUN 8	33.00								

WTR YR 2004 HIGHEST 32.33 MAR 29 LOWEST 35.48 OCT 2, 3

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

HURON COUNTY

434323082561901. Local number, 15N 13E 22BBBC.

LOCATION.--Lat. 43°43'23", long 82°56'19", Hydrologic Unit 04080205, on State Highway 19, 1 mi north of Uby. Owner: Huron County.

AQUIFER.--Napoleon Sandstone Member of Marshall Formation.

WELL CHARACTERISTICS.--Rotary drilled observation well, diameter 4 in, depth 170 ft, cased to 70 ft at the top of Napoleon Sandstone.

INSTRUMENTATION.--Periodic measurements.

DATUM.--Elevation of land-surface datum is 795 ft above sea level, from topographic map. Measuring point: Top of casing, 2.81 ft above land-surface datum.

COOPERATION.--Water-level measurements Mar. 4, June 8 and Sept. 13 were provided by Huron Conservation District.

PERIOD OF RECORD.--May 1988 to September 1989 (periodic measurements), December 1992 to December 2003 (water-level recorder), January to September 2004 (periodic measurements), discontinued.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 8.92 ft below land-surface datum, June 23, 1996; lowest recorded, 16.38 ft below land-surface datum, July 26, 1989.

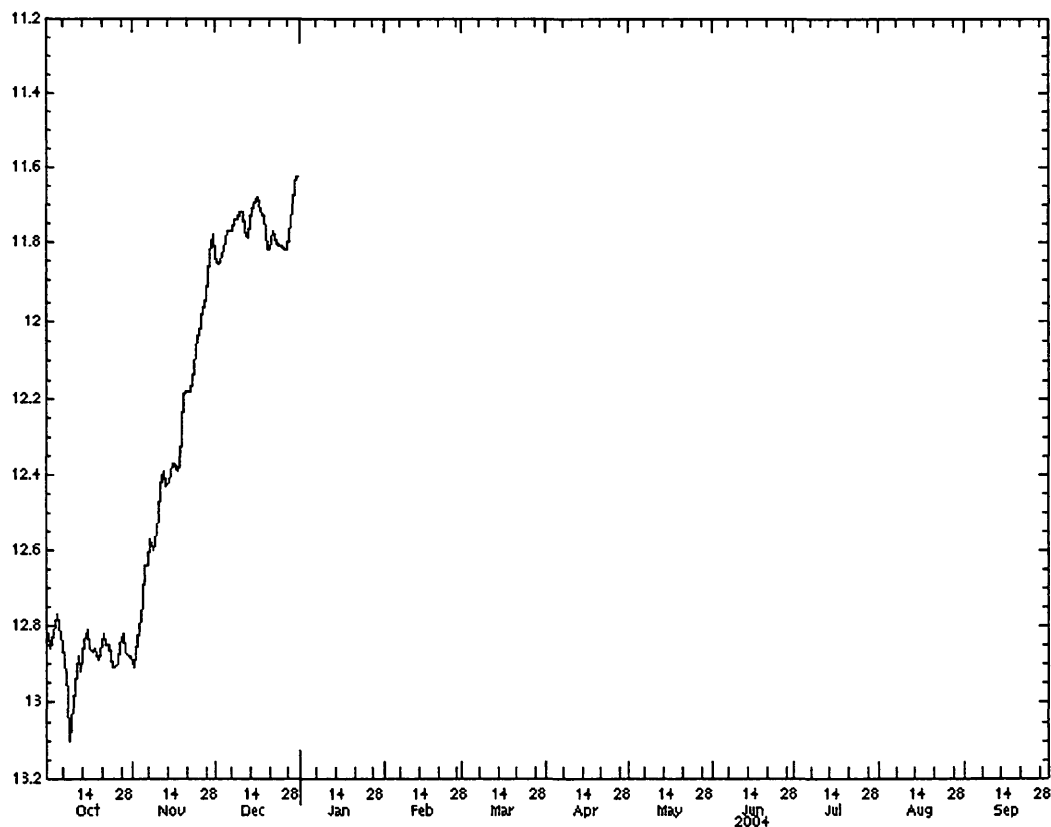
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	12.80	12.64	11.77	---	---	---	---	---	---	---	---	---
10	13.01	12.51	11.72	---	---	---	---	---	---	---	---	---
15	12.81	12.37	11.70	---	---	---	---	---	---	---	---	---
20	12.87	12.18	11.82	---	---	---	---	---	---	---	---	---
25	12.91	12.04	11.81	---	---	---	---	---	---	---	---	---
EOM	12.88	11.78	11.62	---	---	---	---	---	---	---	---	---

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
JAN 22	11.97	MAR 4	11.32	MAR 29	10.24	JUN 8	10.16	SEP 13	12.34

WTR YR 2004 HIGHEST 10.16 JUN 8 LOWEST 13.10 OCT 9

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

HURON COUNTY

434947083233301. Local number, 16N 9E 2CDCA.

LOCATION.--Lat 43°49'42", long 83°23'31", Hydrologic Unit 04080103, 6 mi west of Pigeon at Wildfowl Bay State Wildlife Area. Owner: Huron County.

AQUIFER.--Saginaw, Marshall Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 4 in, depth 180 ft, cased to 147 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 582 ft above sea level, from topographic map. Measuring point: Top of casing, 2.67 ft above land-surface datum.

PERIOD OF RECORD.--June 1988 to September 1989 (periodic measurements), February 1991 to current year (water-level recorder).

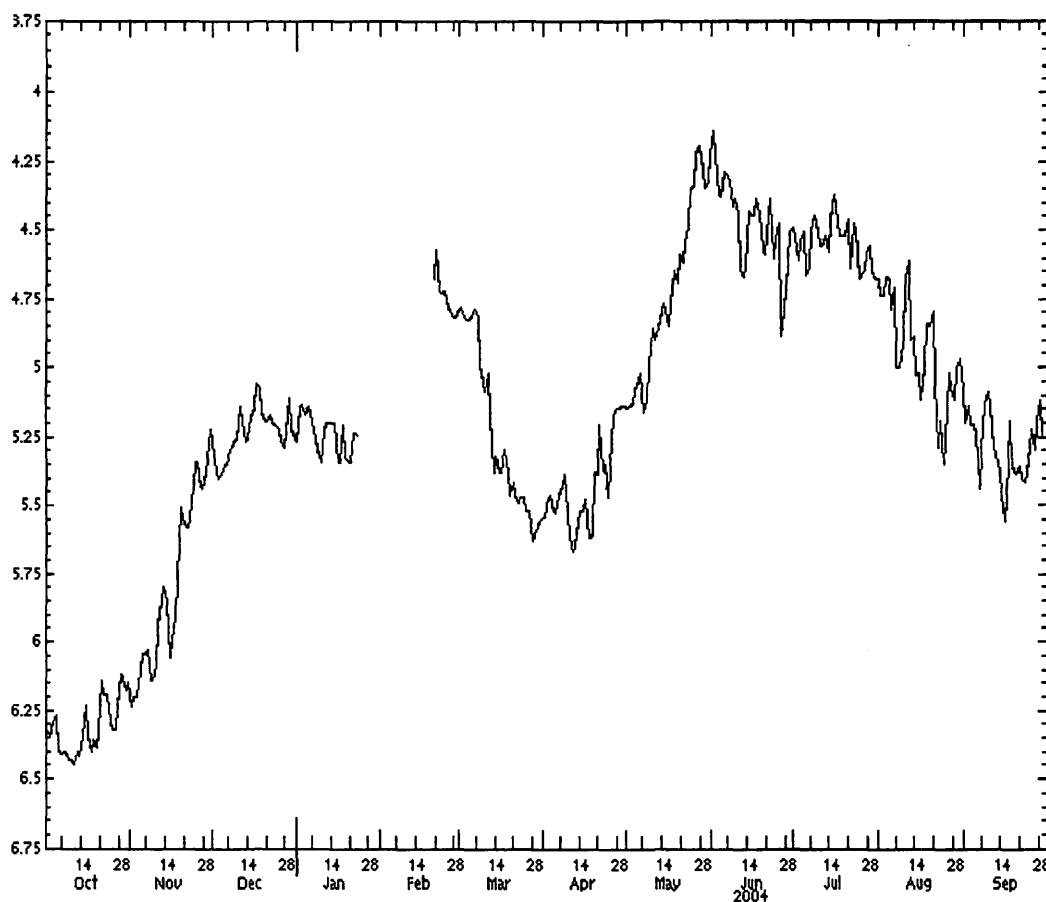
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 3.12 ft below land-surface datum, Apr. 20, 1993; lowest recorded, 9.21 ft below land-surface datum, Aug. 4, 1998.

EXTREMES OUTSIDE PERIOD OF RECORD.--Lowest water level measured, 12.30 ft below land-surface datum, June 2, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	6.40	6.04	5.35	5.14	---	4.81	5.53	5.05	4.29	4.66	4.79	5.24
10	6.43	6.09	5.26	5.34	---	5.09	5.62	4.86	4.44	4.56	4.68	5.14
15	6.23	6.06	5.18	5.20	---	5.38	5.52	4.80	4.45	4.37	5.02	5.56
20	6.33	5.54	5.19	5.34	4.68	5.42	5.39	4.59	4.59	4.46	4.80	5.36
25	6.32	5.34	5.22	---	4.78	5.52	5.36	4.34	4.48	4.66	5.27	5.22
EOM	6.15	5.22	5.25	---	4.79	5.54	5.14	4.22	4.49	4.68	5.08	5.25
WTR YR 2004	HIGHEST 4.06			JUN 1			LOWEST 6.45		OCT 11			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

HURON COUNTY

435736083094801. Local number, 18N 11E 27AADD.

LOCATION.--Lat 43°57'36", long 83°09'55", Hydrologic Unit 04080103, 6 mi northeast of Caseville at Rush Lake State Game Area. Owner: Huron County.

AQUIFER.--Marshall Sandstone.

WELL CHARACTERISTICS.--Rotary drilled observation well, diameter 4 in, depth 200 ft, cased to 179 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 600 ft above sea level, from topographic map. Measuring Point: Top of casing, 4.03 ft above land-surface datum.

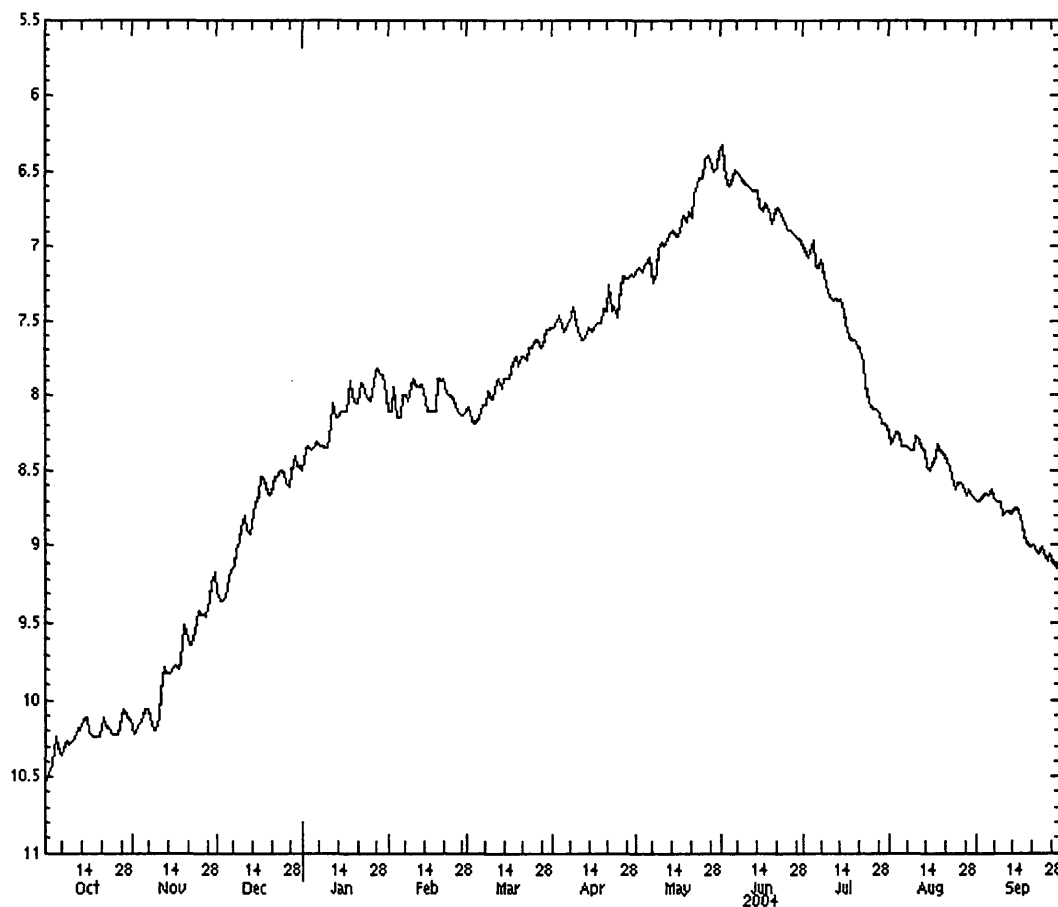
PERIOD OF RECORD.--June 1988 to August 1989 (periodic measurements), December 1992 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 4.71 ft below land-surface datum, Mar. 21, 1997; lowest recorded, 10.96 ft below land-surface datum, Sept. 10, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	10.31	10.06	9.19	8.33	8.15	8.14	7.57	7.10	6.54	7.13	8.33	8.67
10	10.27	10.11	8.88	8.35	7.88	8.02	7.56	6.97	6.58	7.34	8.27	8.80
15	10.11	9.79	8.72	8.10	8.10	7.89	7.57	6.92	6.73	7.43	8.50	8.75
20	10.24	9.56	8.66	8.05	7.90	7.74	7.44	6.76	6.79	7.67	8.39	9.01
25	10.23	9.45	8.52	8.03	8.07	7.64	7.37	6.54	6.89	8.08	8.58	9.05
EOM	10.13	9.16	8.48	8.00	8.10	7.54	7.20	6.37	7.00	8.24	8.69	9.13
WTR YR 2004	HIGHEST 6.22			MAY 31			LOWEST 10.53			OCT 1		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

INGHAM COUNTY

423127084321901. Local number, 4N 2W 16DAAA.

LOCATION.--Lat 42°43'57", long 84°32'51", Hydrologic Unit 04050004, between Cedar Street and Museum Drive, Lansing Township in Lansing.

Owner: City of Lansing.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 12 in, depth 417 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 829.10 ft above sea level. Measuring point: Plywood instrument shelf, 3.0 ft above land-surface datum.

REMARKS.--Water levels affected by regional pumping.

PERIOD OF RECORD.--September 1945 to current year.

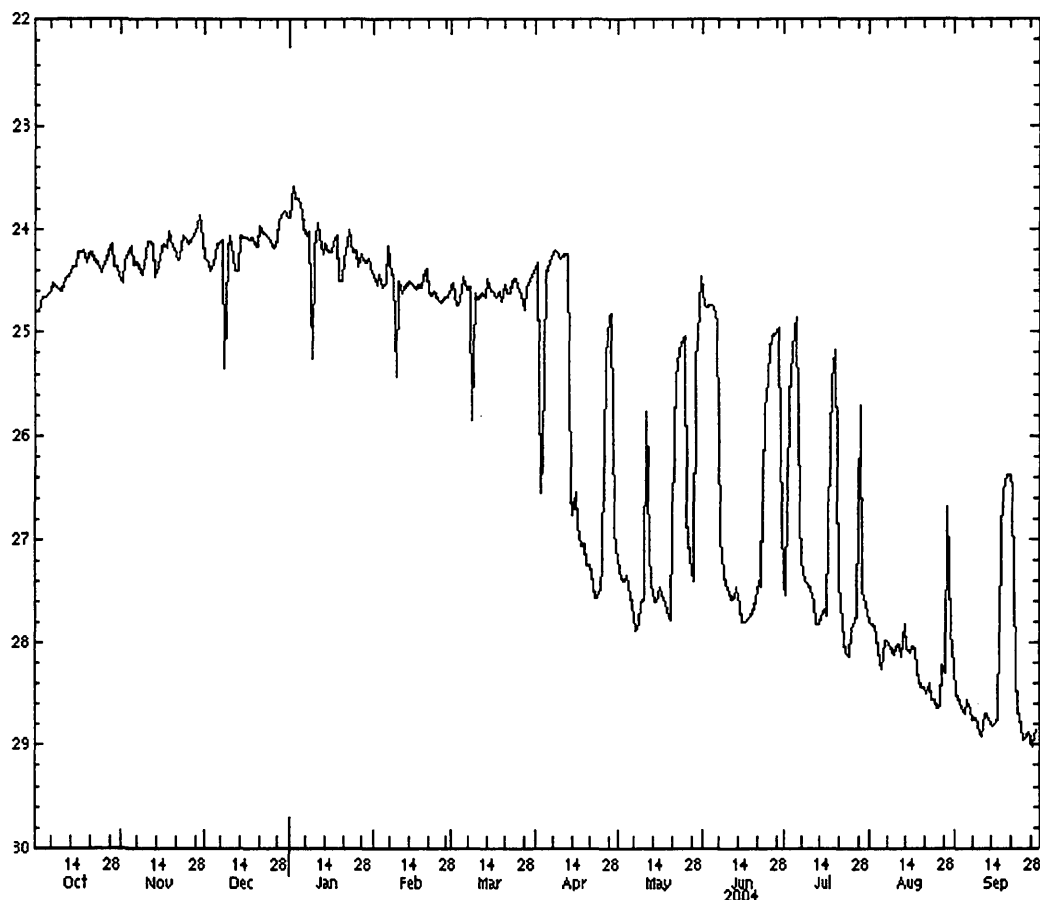
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 17.59 ft below land-surface datum, May 13, 1999; lowest recorded, 67.0 ft below land-surface datum, August 1949.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	24.64	24.34	24.14	23.82	24.52	24.45	24.38	27.54	24.80	24.85	28.25	28.56
10	24.59	24.12	24.05	24.19	24.50	24.67	24.26	27.57	27.50	27.48	28.04	28.92
15	24.36	24.17	24.07	24.22	24.54	24.59	26.55	27.60	27.79	27.68	28.09	28.78
20	24.24	24.18	24.15	24.50	24.38	24.53	27.24	27.78	27.57	27.40	28.44	26.39
25	24.36	24.14	24.14	24.20	24.71	24.54	27.25	25.04	25.20	27.87	28.63	28.95
EOM	24.46	24.08	23.88	24.42	24.56	24.38	27.09	24.46	27.42	27.79	28.23	28.83

WTR YR 2004 HIGHEST 23.34 JAN 2 LOWEST 29.01 SEP 28

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

INGHAM COUNTY

423805084311801. Local number, 3N 2W 23BCBD.

LOCATION.--Lat 42°38'05", long 84°31'18", Hydrologic Unit 04050004, at Holt High School, at Sycamore Street, Delhi Township in Holt. Owner: Holt High School.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 8 in, depth 188 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 895 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 3.0 ft above land-surface datum.

REMARKS.--Water levels affected by regional pumping.

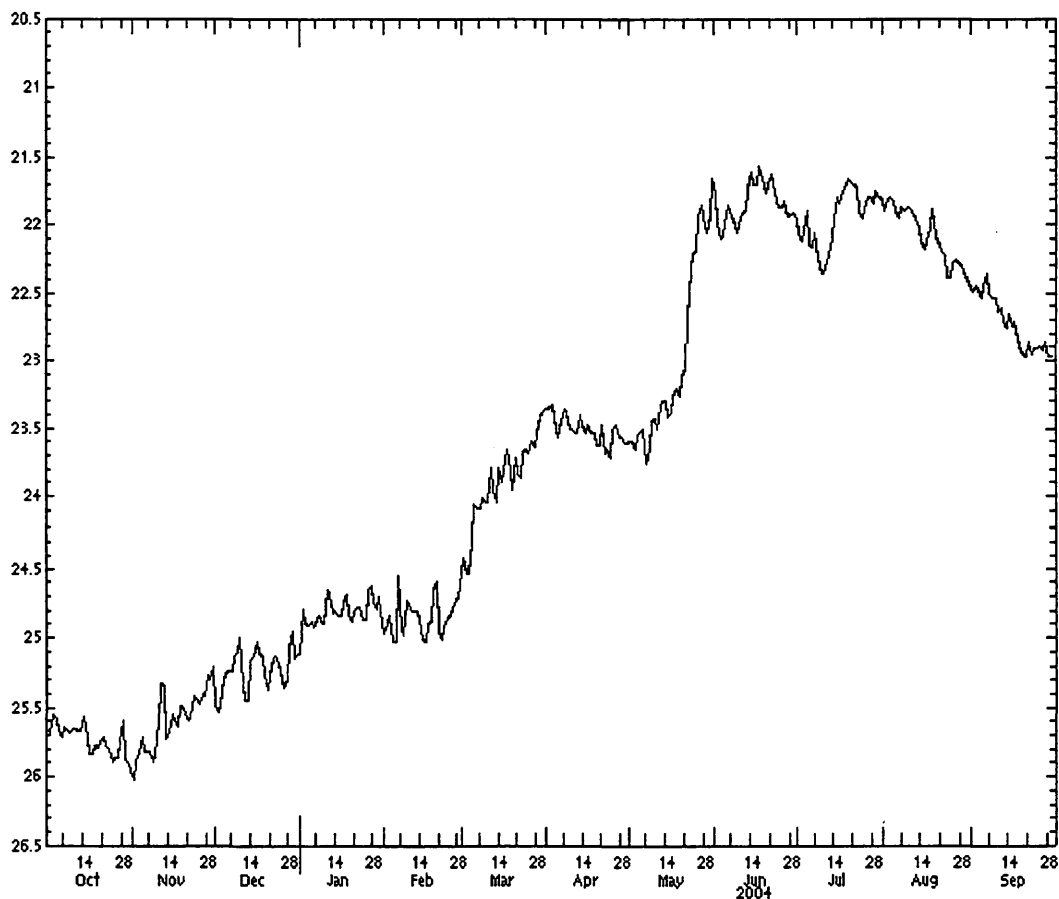
PERIOD OF RECORD.--March 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 18.3 ft below land-surface datum, May 1983; lowest recorded, 30.57 ft below land-surface datum, March 25, 1991.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	25.67	25.82	25.24	24.88	25.02	24.05	23.56	23.52	21.93	22.15	21.89	22.44
10	25.65	25.61	25.00	24.89	24.76	24.04	23.51	23.43	21.96	22.36	21.88	22.64
15	25.71	25.55	25.13	24.84	25.01	23.89	23.54	23.41	21.70	21.79	22.17	22.74
20	25.75	25.55	25.37	24.88	24.59	23.72	23.63	23.11	21.70	21.69	22.15	22.97
25	25.87	25.48	25.30	24.87	24.84	23.69	23.50	22.19	21.87	21.88	22.28	22.89
EOM	25.96	25.21	25.12	24.90	24.53	23.36	23.61	21.65	21.96	21.80	22.46	22.97
WTR YR 2004	HIGHEST			21.40	JUN 21, 22			LOWEST	26.03	NOV 1		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

INGHAM COUNTY

424235084311201. Local number, 4N 2W 26BBDB.

LOCATION.--Lat 42°42'35", long 84°31'12", Hydrologic Unit 04050004, at Fenner Arboretum in Lansing. Owner: U.S. Geological Survey.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled observation well, diameter 6 in, depth 215 ft, cased to 51 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 835 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 3.7 ft above land-surface datum.

REMARKS.--Water levels affected by regional pumping.

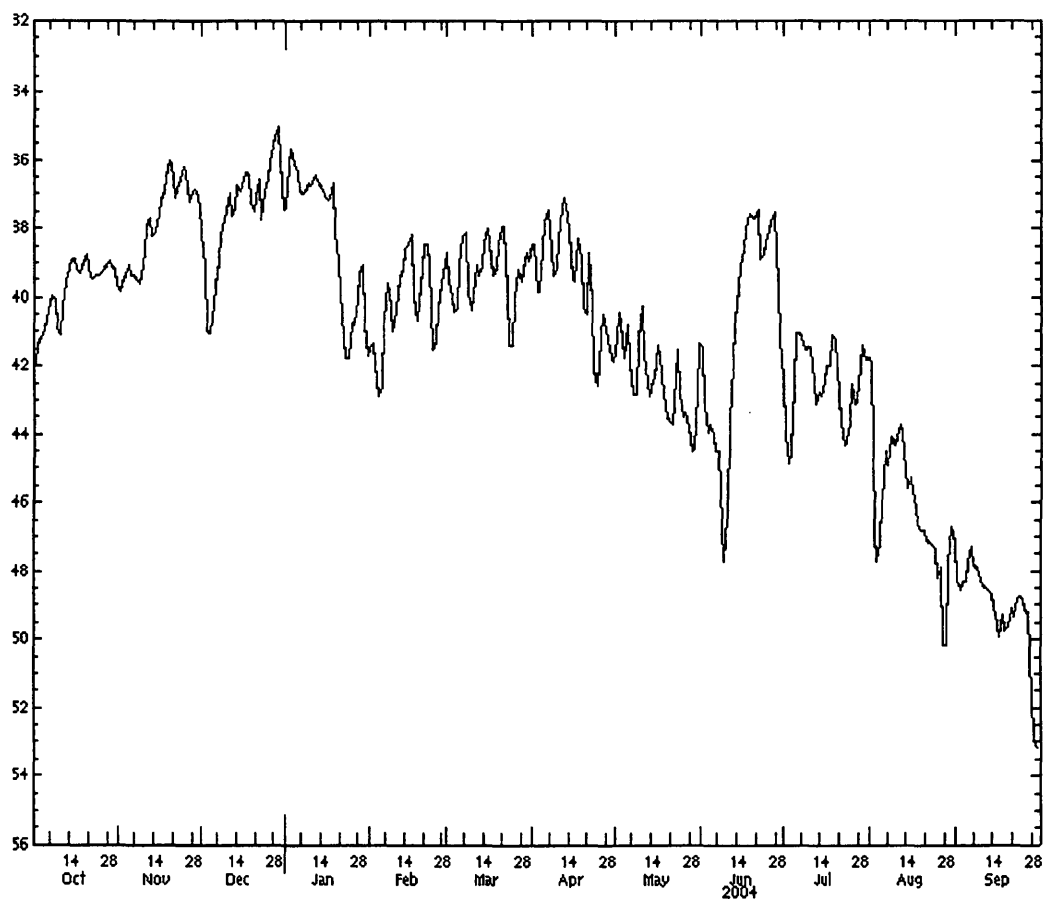
PERIOD OF RECORD.--July 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 20.24 ft below land-surface datum, Dec. 29, 1993; lowest recorded, 89.5 ft below land-surface datum, October 1972.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	40.59	39.34	40.21	36.35	42.59	39.08	37.83	40.79	44.05	41.01	46.02	47.75
10	41.12	38.69	37.43	36.75	40.76	39.89	38.28	40.26	46.42	41.45	44.08	48.46
15	38.86	37.55	36.92	37.02	38.48	37.99	39.50	42.37	39.06	42.45	45.29	49.60
20	38.77	36.10	37.52	38.93	39.19	37.93	40.47	43.59	37.68	42.84	46.80	49.09
25	39.33	36.39	36.56	40.74	41.28	40.02	41.88	43.49	38.03	42.52	48.19	49.13
EOM	39.64	37.32	37.45	41.69	38.73	38.44	41.90	41.34	42.35	41.77	47.17	53.22
WTR YR 2004	HIGHEST			34.78	DEC 30			LOWEST	53.22	SEP 30		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

INGHAM COUNTY

424424084340301. Local number, 4N 2W 17ABAA.

LOCATION.--Lat 42°44'24", long 84°34'03", Hydrologic Unit 04050004, at Kirby and Logan Streets in Lansing. Owner: City of Lansing.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 20 in, depth 424 ft.

INSTRUMENTATION.--Water-level recorder. Monthly measurements prior to August 1960.

DATUM.--Elevation of land-surface datum is 858.72 ft above sea level. Measuring point: Plywood instrument shelf, 3.0 ft above land-surface datum.

REMARKS.--Water levels affected by regional pumping.

PERIOD OF RECORD.--December 1929 to current year.

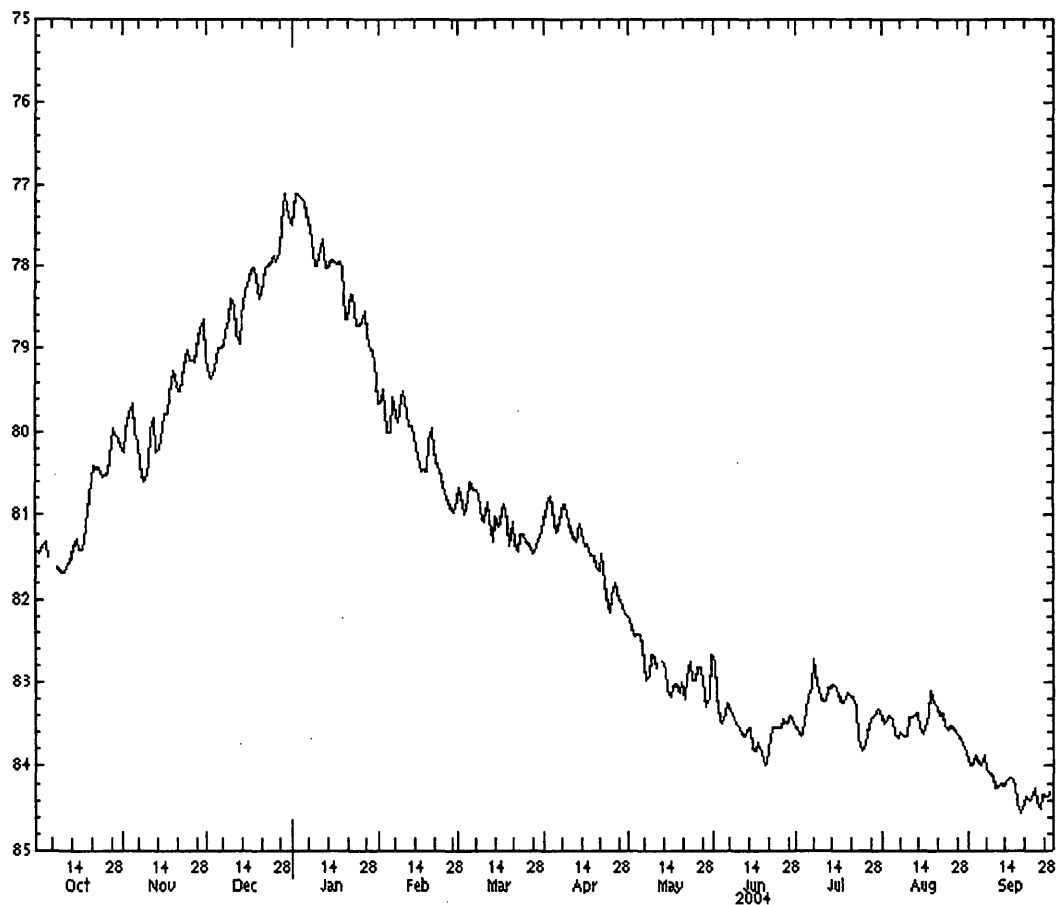
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.3 ft below land-surface datum, December 1929; lowest recorded, 168.3 ft below land-surface datum, May 7, 1968.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	81.50	80.01	78.98	77.19	80.02	80.60	81.17	82.41	83.37	83.17	83.61	83.99
10	81.68	80.40	78.40	78.00	79.50	81.08	81.15	82.70	83.54	83.22	83.42	84.25
15	81.25	79.96	78.30	77.91	80.30	81.12	81.32	83.09	83.80	83.07	83.61	84.13
20	80.78	79.36	78.39	78.64	79.95	81.07	81.64	83.00	83.94	83.16	83.28	84.44
25	80.54	79.13	77.87	78.72	80.80	81.27	81.96	82.96	83.54	83.80	83.52	84.43
EOM	80.19	78.63	77.44	79.35	80.82	81.07	82.17	82.68	83.51	83.40	83.91	84.29

WTR YR 2004 HIGHEST 76.72 JAN 3 LOWEST 84.56 SEP 19

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

INGHAM COUNTY

424502084331301. Local number, 4N 2W 9BDAD.

LOCATION.--Lat 42°45'02", long 84°33'13", Hydrologic Unit 04050004, at North Grand River Avenue, Lansing Township in Lansing. Owner: City of Lansing.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 14 in, depth 401 ft, cased to 49 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 828.81 ft above sea level. Measuring point: Plywood instrument shelf, 4.0 ft above land-surface datum.

REMARKS.--Water levels affected by regional pumping.

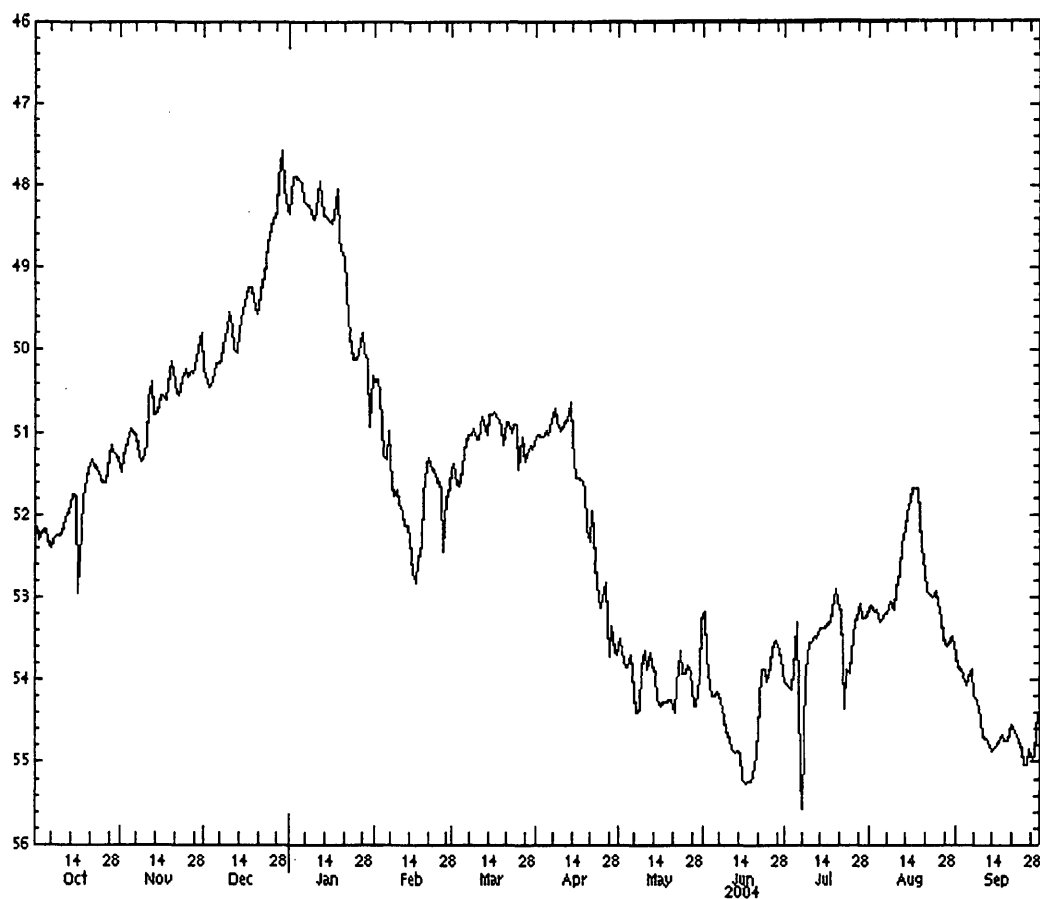
PERIOD OF RECORD.--1929 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 15.6 ft below land-surface datum, March 1931; lowest recorded, 179.4 ft below land-surface datum, April 1968.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	52.31	51.02	50.16	47.98	51.34	51.23	51.04	53.70	54.18	53.29	53.27	53.96
10	52.22	51.15	49.55	48.41	51.85	51.09	50.96	53.65	54.71	53.54	52.90	54.69
15	51.77	50.56	49.51	48.42	52.69	50.78	51.55	54.23	55.22	53.36	51.83	54.79
20	51.45	50.26	49.56	48.85	51.40	50.89	52.32	54.24	54.89	53.16	52.70	54.55
25	51.61	50.33	48.52	50.11	51.68	51.45	53.01	53.91	53.83	53.66	53.08	55.04
EOM	51.33	49.78	48.29	50.31	51.48	51.07	53.69	53.28	54.03	53.14	53.69	54.39
WTR YR 2004	HIGHEST		47.33	DEC 29	LOWEST		55.55	JUL 7				

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

ISABELLA COUNTY

433554084415401. Local number, 14N 3W 17CD03.

LOCATION.--Lat 43°35'54", long 84°41'54", Hydrologic Unit 04080202, 300 ft north of Remus Road, 0.5 mi east of Leaton Road, and 3 mi east of Mount Pleasant. Owner: Saginaw Chippewa Indian Tribe.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Rotary drilled observation well, diameter 5 in, depth 301.5 ft, screened 286 ft to 290 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 752 ft above sea level, from topographic map. Measuring point: Top of casing, 3.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

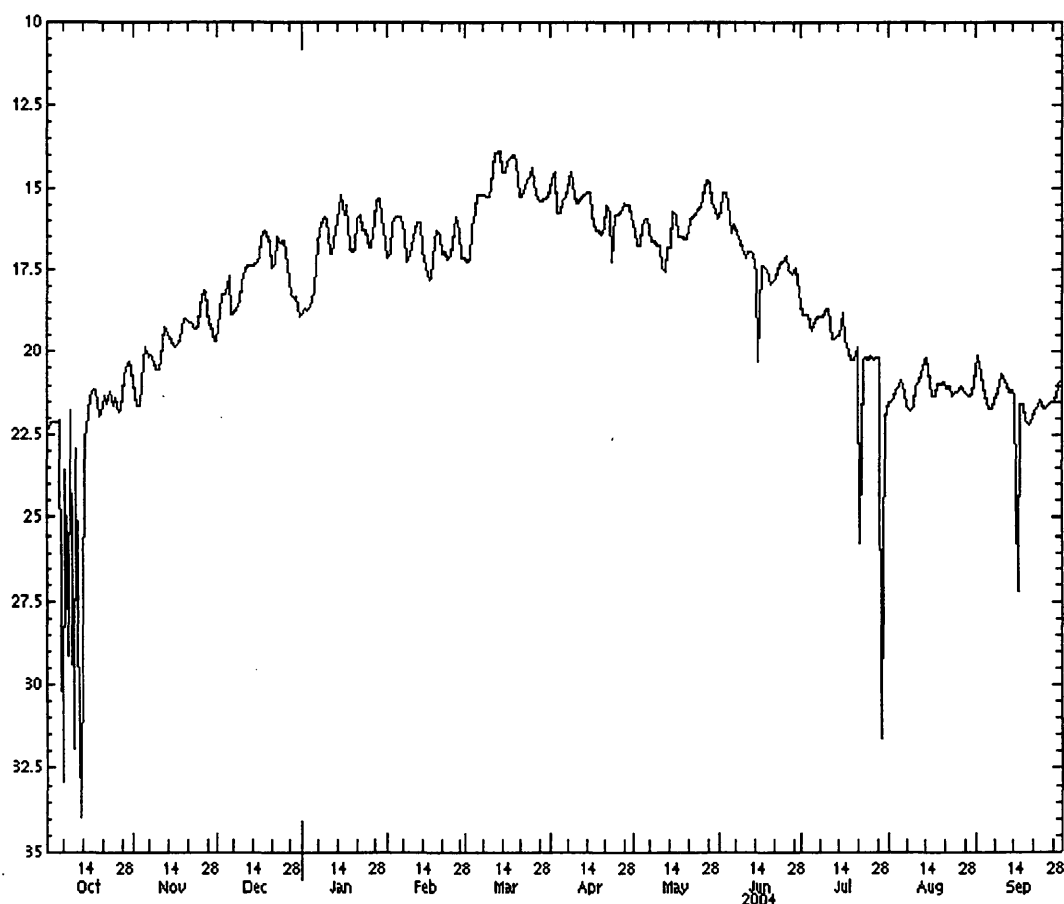
PERIOD OF RECORD.--February to June 2003 (periodic measurements), June 2003 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 12.74 ft below land-surface datum, Mar. 12, 2004; lowest recorded, 33.97 ft below land-surface datum, Oct. 13, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	22.11	19.83	17.70	18.14	15.88	15.16	15.34	15.90	16.34	19.18	20.86	21.71
10	31.93	20.55	17.88	15.90	16.73	14.96	15.43	16.73	17.14	18.67	21.04	20.81
15	21.93	19.78	17.29	15.20	17.40	14.52	15.10	15.66	20.28	18.80	20.88	27.16
20	21.92	18.99	16.67	16.85	16.45	15.27	16.26	16.58	17.88	19.87	20.91	22.04
25	21.42	18.63	16.64	16.82	16.33	14.40	15.78	15.57	17.07	20.10	21.19	21.69
EOM	20.55	19.67	18.94	16.69	17.13	15.05	15.84	15.91	18.50	21.54	20.52	20.82
WTR YR 2004	HIGHEST		12.74	MAR 12		LOWEST		33.97	OCT 13			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

ISABELLA COUNTY

43355084412101. Local number, 14N 3W 17DD01.

LOCATION.--Lat 43°35'55", long 84°41'21", Hydrologic Unit 04080202, 350 ft north of Remus Road, 350 ft west of Shepherd Road, and 3 mi east of Mount Pleasant. Owner: Saginaw Chippewa Indian Tribe.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Rotary drilled observation well, diameter 5 in, depth 212 ft, screened 83 ft to 87 ft.

INSTRUMENTATION.--Periodic measurements.

DATUM.--Elevation of land-surface datum is 745 ft above sea level, from topographic map. Measuring point: Top of casing, 2.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--February 2003 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.26 ft below land-surface datum, May 19, 2004; lowest measured, 10.52 ft below land-surface datum, Sept. 3, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
MAY 19	7.26	JUL 27	8.20	AUG 23	9.09	AUG 31	9.15	SEP 14	9.45

GROUND-WATER LEVELS

ISABELLA COUNTY

433604084412501. Local number, 14N 3W 17DA01.

LOCATION.--Lat 43°36'04", long 84°41'25", Hydrologic Unit 04080202, 1,400 ft north of Remus Road, 575 ft west of Shepherd Road, and 3 mi east of Mount Pleasant. Owner: Saginaw Chippewa Indian Tribe.

AQUIFER.--Glacial deposits of Pleistocene age.

WELL CHARACTERISTICS.--Rotary drilled observation well, diameter 5 in, depth 145 ft, screened 136 ft to 140 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 750 ft above sea level, from topographic map. Measuring point: Top of casing, 3.8 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--February to June 2003 (periodic measurements), June 2003 to current year (water-level recorder).

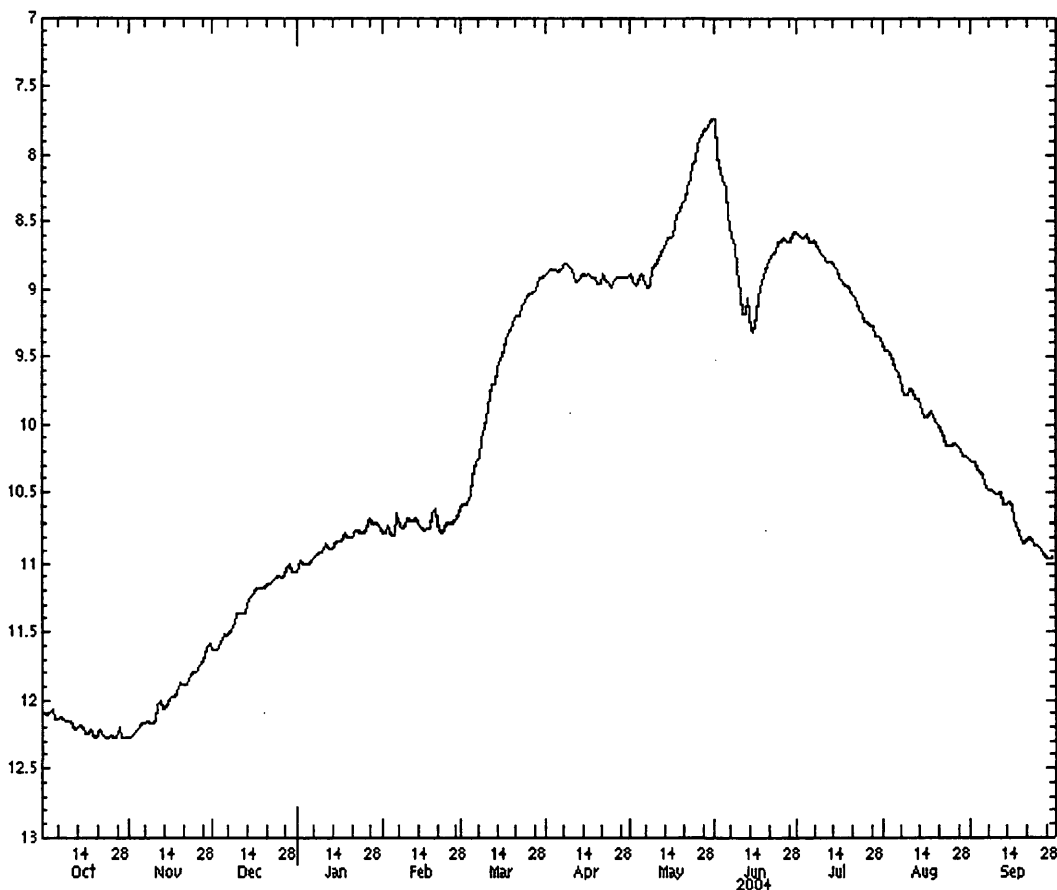
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.64 ft below land-surface datum, June 1, 2004; lowest recorded, 12.28 ft below land-surface datum, Oct. 30, Nov. 1, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	12.14	12.17	11.51	11.00	10.78	10.40	8.87	8.89	8.25	8.65	9.59	10.38
10	12.16	12.16	11.36	10.92	10.67	9.96	8.85	8.83	9.03	8.75	9.74	10.51
15	12.20	11.99	11.24	10.83	10.74	9.52	8.90	8.62	9.32	8.86	9.95	10.59
20	12.27	11.88	11.19	10.80	10.62	9.22	8.96	8.37	8.83	9.03	10.00	10.83
25	12.26	11.79	11.10	10.77	10.71	9.05	8.94	8.05	8.65	9.25	10.15	10.87
EOM	12.27	11.58	11.06	10.73	10.61	8.90	8.91	7.73	8.57	9.39	10.26	10.94

WTR YR 2004 HIGHEST 7.64 JUN 1 LOWEST 12.28 OCT 30, NOV 1

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

420838085344501. Local number, 4S 11W 3CDDA.

LOCATION.--Lat 42°08'38", long 85°34'45", Hydrologic Unit 04050003, in Prairie View Park, 300 ft north of U Avenue, and 3.0 mi south of Portage.

Owner: Kalamazoo County.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 190 ft, screened 180 ft to 190 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 870 ft above sea level, from topographic map. Measuring point: Top of shelter base, 2.5 ft above land-surface datum.

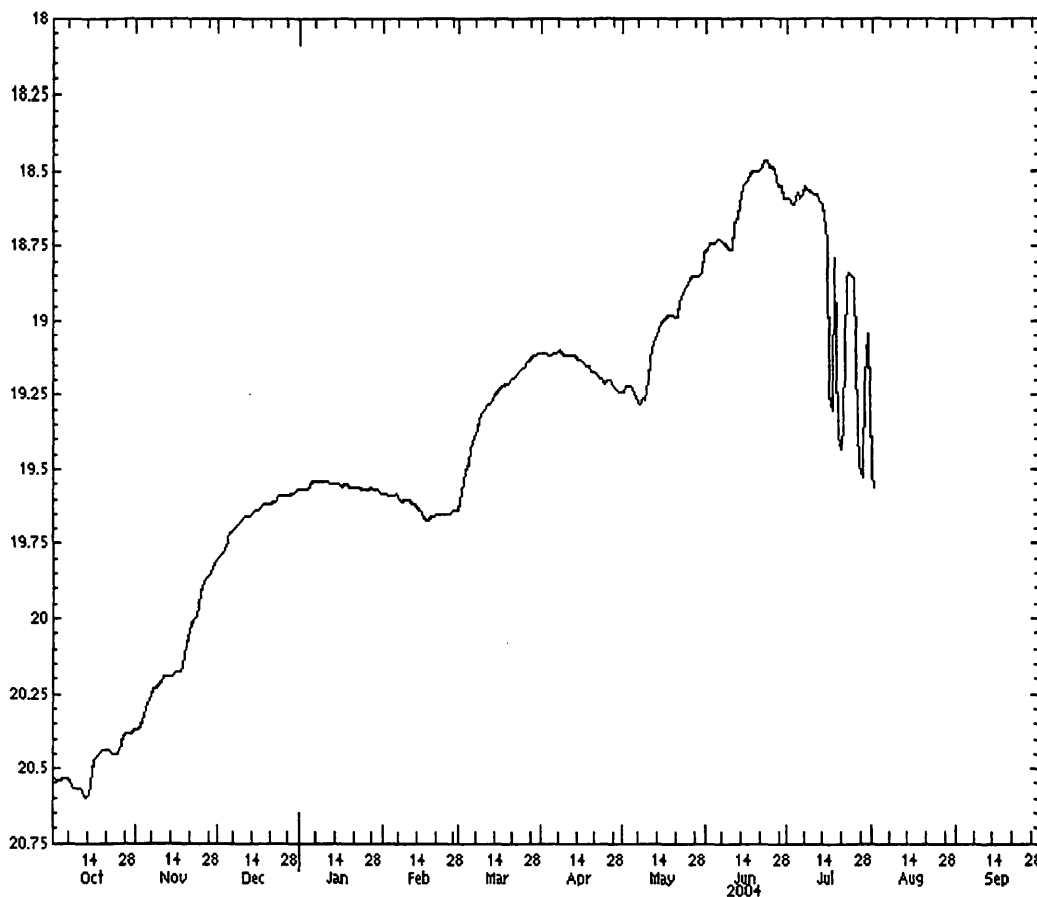
PERIOD OF RECORD.--October 1969 to September 1992, June 2001 to July 2004 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 18.03 ft below land-surface datum, Apr. 17, 1985; lowest recorded, 21.02 ft below land-surface datum, Aug. 23, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	20.53	20.28	19.71	19.54	19.59	19.43	19.11	19.24	18.73	18.59	---	---
10	20.57	20.21	19.67	19.54	19.60	19.30	19.12	19.20	18.76	18.58	---	---
15	20.51	20.18	19.64	19.55	19.64	19.24	19.13	19.01	18.54	18.73	---	---
20	20.44	20.06	19.62	19.56	19.66	19.19	19.17	18.99	18.50	19.43	---	---
25	20.45	19.89	19.59	19.57	19.65	19.16	19.20	18.88	18.49	18.86	---	---
EOM	20.37	19.81	19.57	19.58	19.64	19.11	19.24	18.77	18.59	19.51	---	---
WTR YR 2004	HIGHEST		18.46	JUN 21, 22		LOWEST		20.60	OCT 13			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421127085321701. Local number, 3S 11W 24DBCA.

LOCATION.--Lat 42°11'27", long 85°32'17", Hydrologic Unit 04050003, in Ramona Park in Portage. Owner: City of Portage.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 183 ft, screened 178 ft to 183 ft.

INSTRUMENTATION.--Periodic measurements.

DATUM.--Elevation of land-surface datum is 862.22 ft above sea level. Measuring point: Top of casing, 0.3 ft below land-surface datum.

REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--March 1999 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.35 ft below land-surface datum, Apr. 18, 2002, June 29, 2004; lowest measured, 15.87 ft below land-surface datum, May 8, 2000.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 06	13.90	FEB 05	11.20	MAR 22	10.50	MAY 12	11.44	JUN 29	9.35	AUG 18	12.00
DEC 17	12.88										
WTR YR 2004		HIGHEST	9.35	JUN 29		LOWEST	13.90	NOV 6			

GROUND-WATER LEVELS

KALAMAZOO COUNTY

421150085383901. Local number, 3S 11W 19BDD1.

LOCATION.--Lat 42°11'50", long 85°38'39", Hydrologic Unit 04050003, in Gourdneck State Game Area, near intersection of Angling Road and Centre Avenue, 1.5 mi southwest of Portage. Owner: Pfizer.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 6 in, depth 65 ft, screened 63 ft to 65 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 890.18 ft above sea level (City of Portage bench mark). Measuring point: Plywood shelter base, 2.8 ft above land-surface datum.

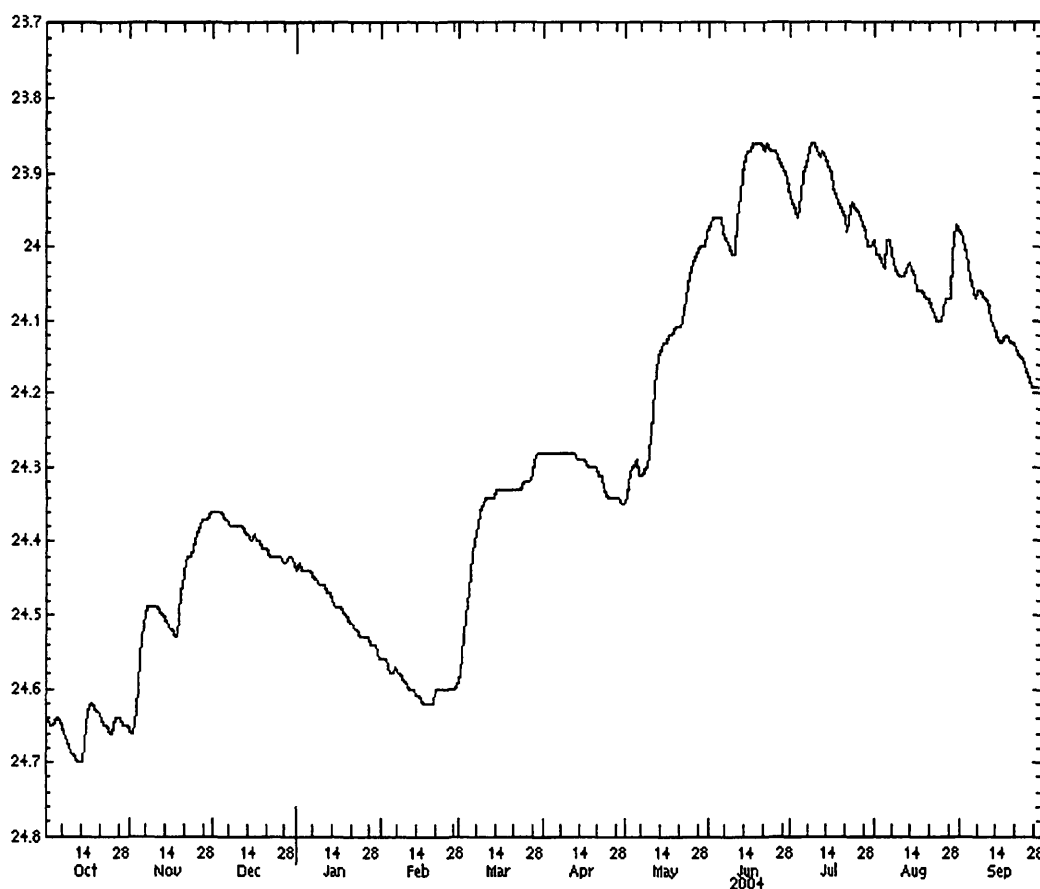
PERIOD OF RECORD.--November 1998 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 23.55 ft below land-surface datum, May 23, 24, 2002; lowest recorded, 24.81 ft below land-surface datum, Sept. 8-10, 2000.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	24.64	24.53	24.37	24.44	24.58	24.44	24.28	24.29	23.96	23.90	23.99	24.05
10	24.69	24.49	24.38	24.46	24.59	24.34	24.28	24.26	24.01	23.87	24.04	24.07
15	24.65	24.52	24.40	24.49	24.61	24.33	24.29	24.13	23.87	23.90	24.04	24.13
20	24.63	24.46	24.41	24.51	24.62	24.33	24.30	24.11	23.86	23.96	24.07	24.13
25	24.66	24.39	24.42	24.53	24.60	24.32	24.34	24.03	23.87	23.95	24.10	24.17
EOM	24.65	24.36	24.43	24.56	24.59	24.28	24.35	23.98	23.93	23.99	23.98	24.19
WTR YR 2004	HIGHEST			23.85	JUL 9			LOWEST	24.70	OCT 12-14		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421150085383902. Local number, 3S 11W 19BDD2.

LOCATION.—Lat 42°11'50", long 85°38'39", Hydrologic Unit 04050003, in Gourdneck State Game Area, near intersection of Angling Road and Centre Avenue, 1.5 mi southwest of Portage. Owner: Pfizer.

AQUIFER.—Glacial deposits.

WELL CHARACTERISTICS.—Drilled observation well, diameter 6 in, depth 177 ft, screened 175 ft to 177 ft.

INSTRUMENTATION.—Water-level recorder.

DATUM.—Elevation of land-surface datum is 889.90 ft above sea level (City of Portage bench mark). Measuring point: Plywood shelter base, 3.0 ft above land-surface datum.

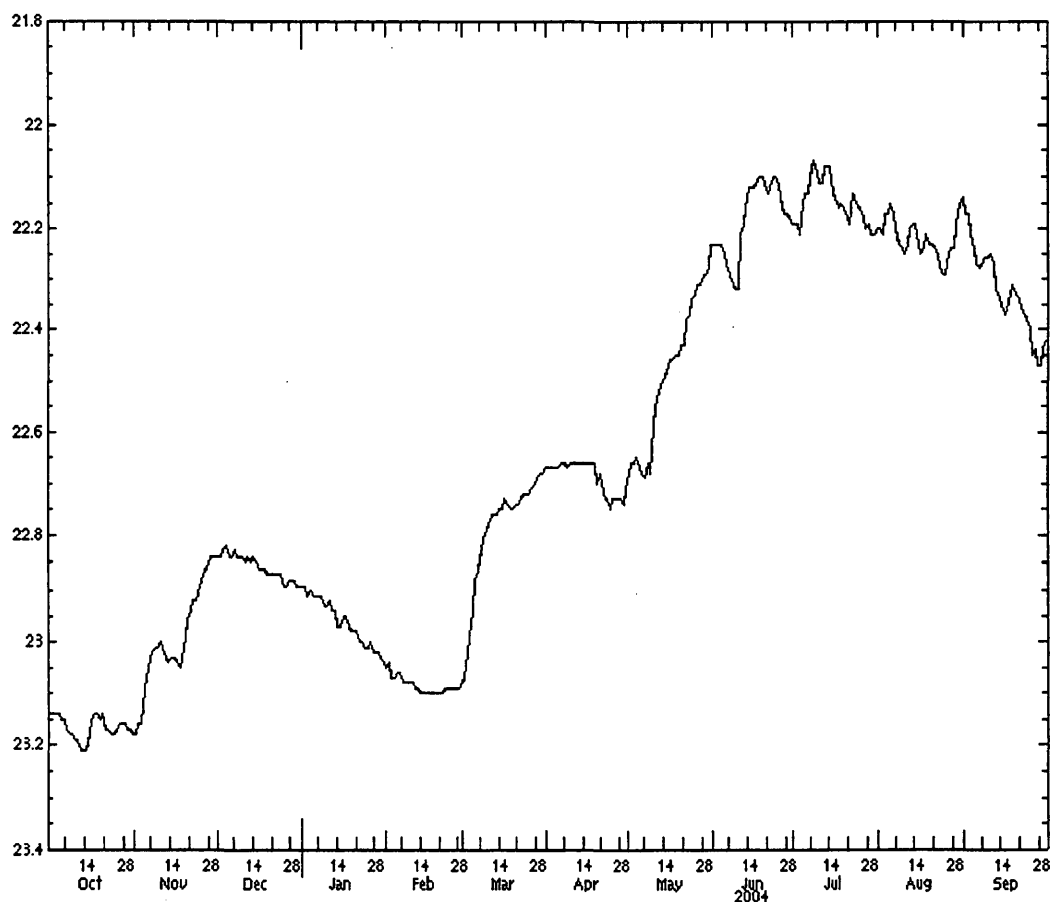
PERIOD OF RECORD.—November 1998 to current year.

EXTREMES FOR PERIOD OF RECORD.—Highest water level recorded, 21.50 ft below land-surface datum, May 23, 24, 2002; lowest recorded, 23.34 ft below land-surface datum, Sept. 8-10, 2000.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	23.15	23.07	22.84	22.91	23.06	22.88	22.67	22.67	22.25	22.13	22.15	22.27
10	23.19	23.00	22.84	22.93	23.08	22.78	22.66	22.59	22.32	22.11	22.25	22.25
15	23.18	23.03	22.85	22.97	23.10	22.75	22.66	22.48	22.12	22.13	22.23	22.37
20	23.14	22.96	22.87	22.98	23.10	22.74	22.68	22.43	22.11	22.18	22.23	22.34
25	23.17	22.88	22.89	23.01	23.09	22.72	22.73	22.33	22.11	22.16	22.29	22.45
EOM	23.18	22.84	22.89	23.04	23.08	22.67	22.71	22.23	22.19	22.20	22.14	22.42
WTR YR 2004	HIGHEST			22.05	JUL 13			LOWEST	23.21	OCT 12-14		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421151085351601. Local number, 3S 11W 22BBCD.

LOCATION.--Lat 42°11'51", long 85°35'16", Hydrologic Unit 04050003, at Portage Central High School, Kalamazoo Township in Portage. Owner: Portage Public Schools.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 12 in, depth 102 ft, screened 87 ft to 102 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 877 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 2.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

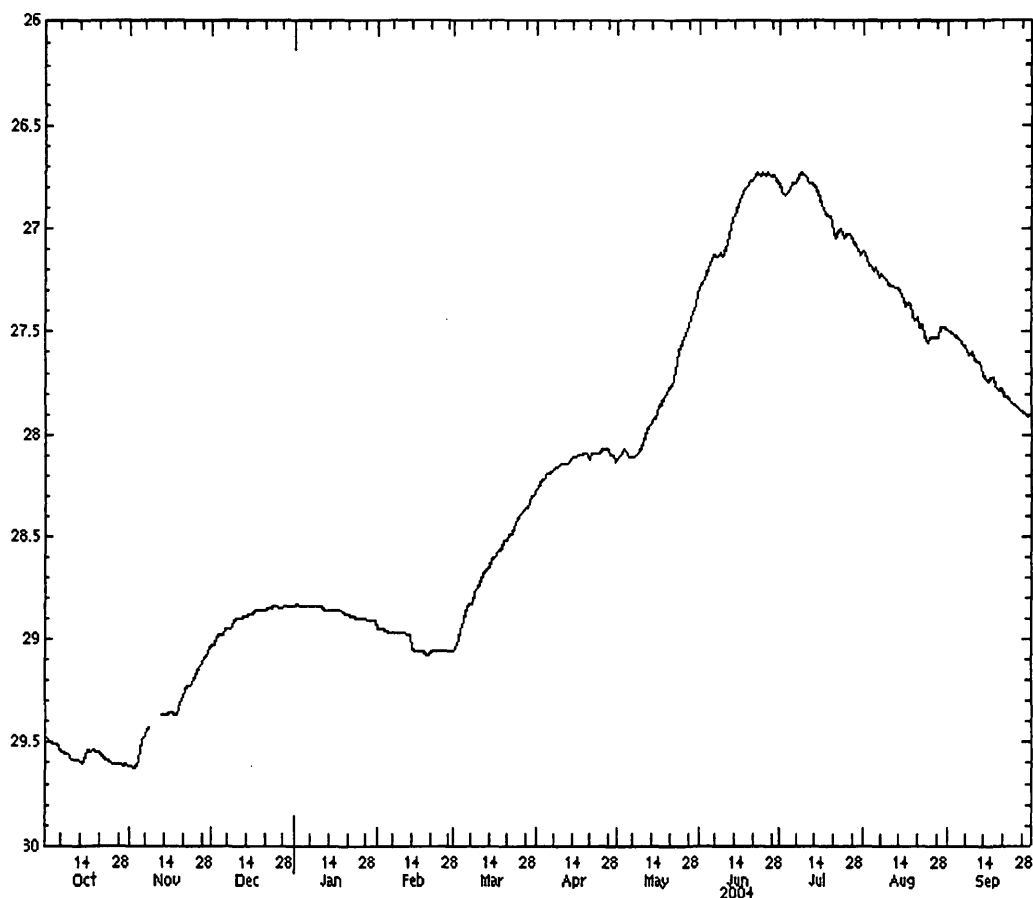
PERIOD OF RECORD.--June 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 24.8 ft below land-surface datum, April 1985; lowest recorded, 30.58 ft below land-surface datum, Feb. 21, 22, 2000.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	29.51	29.49	28.98	28.84	28.97	28.87	28.19	28.11	27.16	26.78	27.19	27.54
10	29.59	---	28.90	28.84	28.97	28.73	28.14	28.04	27.10	26.75	27.28	27.64
15	29.57	29.36	28.88	28.86	29.06	28.60	28.11	27.92	26.88	26.85	27.34	27.74
20	29.55	29.30	28.86	28.88	29.08	28.52	28.12	27.77	26.77	27.01	27.43	27.77
25	29.61	29.18	28.84	28.90	29.06	28.40	28.07	27.56	26.75	27.03	27.53	27.85
EOM	29.62	29.05	28.84	28.91	29.06	28.27	28.13	27.31	26.78	27.11	27.49	27.92
WTR YR 2004	HIGHEST		26.73	JUN 21-28, JUL 7-9		LOWEST	29.63	NOV 2				

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421325085404801. Local number, 3S 12W 11BDAD.

LOCATION.--Lat 42°13'25", long 85°40'48", Hydrologic Unit 04050003, at Kalamazoo Valley Community College. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 3 in, depth 248 ft, screened 245 ft to 248 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 880 ft above sea level, from topographic map. Measuring point: Top of shelter base, 3.5 ft above land-surface datum.

PERIOD OF RECORD.--March 1961 to current year.

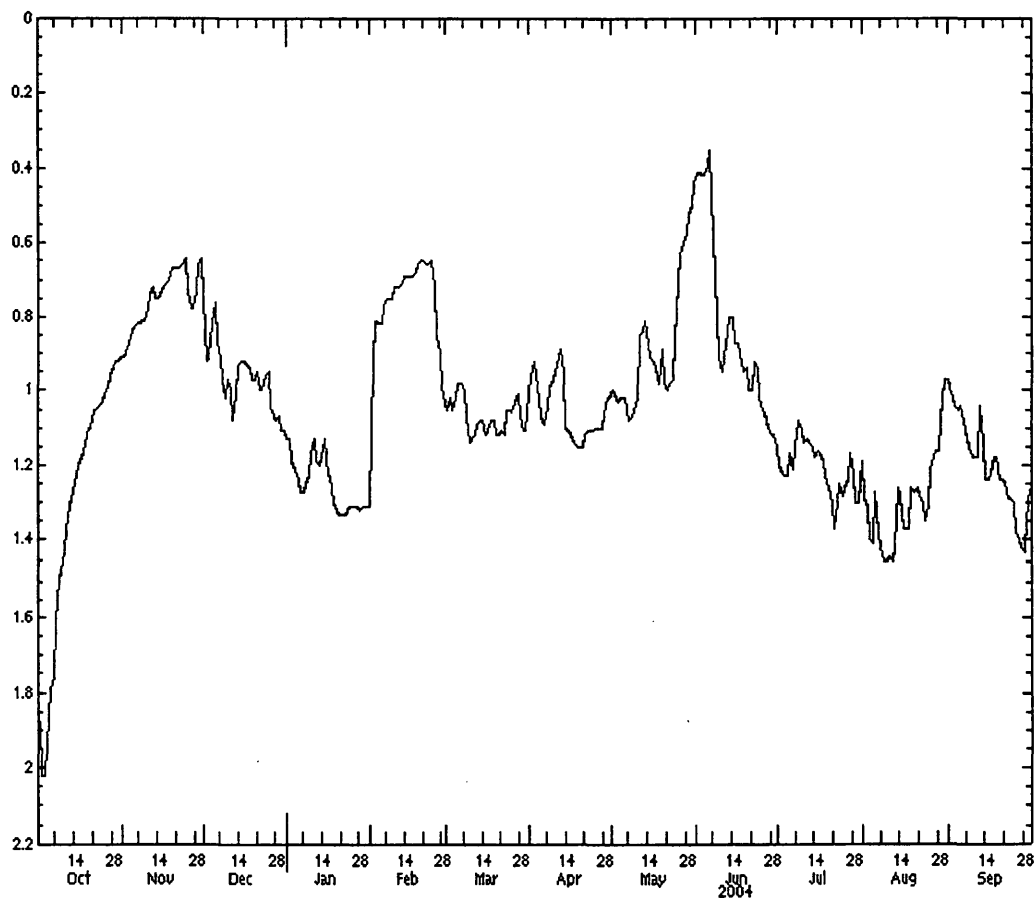
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, +2.98 ft above land-surface datum, Sept 4, 1969; lowest recorded, 2.48 ft below land-surface datum, Sept. 13, 14, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	1.79	0.83	0.76	1.24	0.82	0.98	1.07	1.02	0.39	1.17	1.27	1.04
10	1.43	0.78	0.97	1.17	0.72	1.13	0.95	1.02	0.95	1.14	1.44	1.18
15	1.20	0.73	0.92	1.13	0.69	1.12	1.11	0.91	0.87	1.16	1.37	1.24
20	1.10	0.67	0.97	1.33	0.65	1.12	1.15	0.98	1.00	1.30	1.26	1.24
25	1.01	0.73	0.95	1.31	0.72	1.06	1.10	0.71	1.05	1.26	1.21	1.38
EOM	0.91	0.64	1.11	1.31	1.03	1.01	1.02	0.44	1.15	1.19	0.97	1.26

WTR YR 2004 HIGHEST 0.34 JUN 6, 7 LOWEST 2.02 OCT 2, 3

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421332085401901. Local number, 3S 12W 11AD1.

LOCATION.--Lat 42°13'32", long 85°40'19", Hydrologic Unit 04050003, at Al Sabo Land Preserve, Texas Township, 3.0 mi west of Portage. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 300 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 877 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 2.5 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

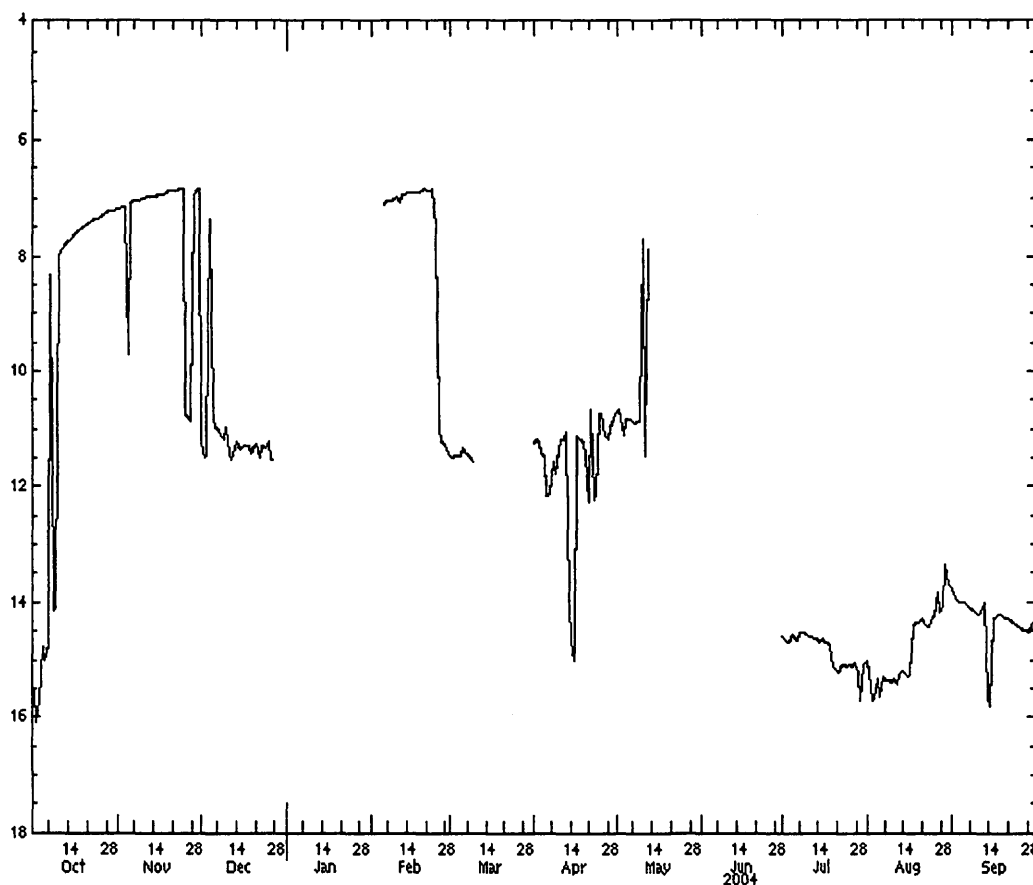
PERIOD OF RECORD.--December 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 4.5 ft below land-surface datum, July 1973; lowest recorded, 17.17 ft below land-surface datum, July 20, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	15.00	7.07	10.79	---	7.10	11.33	12.17	10.84	---	14.64	15.63	14.00
10	8.01	7.00	10.96	---	6.98	---	11.20	7.70	---	14.60	15.34	14.22
15	7.66	6.95	11.36	---	6.92	---	15.03	---	---	14.65	15.30	14.29
20	7.46	6.87	11.28	---	6.85	---	12.28	---	---	15.18	14.28	14.29
25	7.31	10.76	11.21	---	10.97	---	10.75	---	---	15.08	14.24	14.46
EOM	7.18	6.83	---	---	11.46	11.25	10.74	---	14.59	15.01	13.78	14.32
WTR YR 2004		HIGHEST	6.81	NOV 23-25, 30		LOWEST	16.09	OCT 2				

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421332085401902. Local number, 3S 12W 11AD2.

LOCATION.--Lat 42°13'32", long 85°40'19", Hydrologic Unit 04050003, at Al Sabo Land Preserve, Texas Township, 3.0 mi west of Portage. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 6 in, depth 38 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 877 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 2.5 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

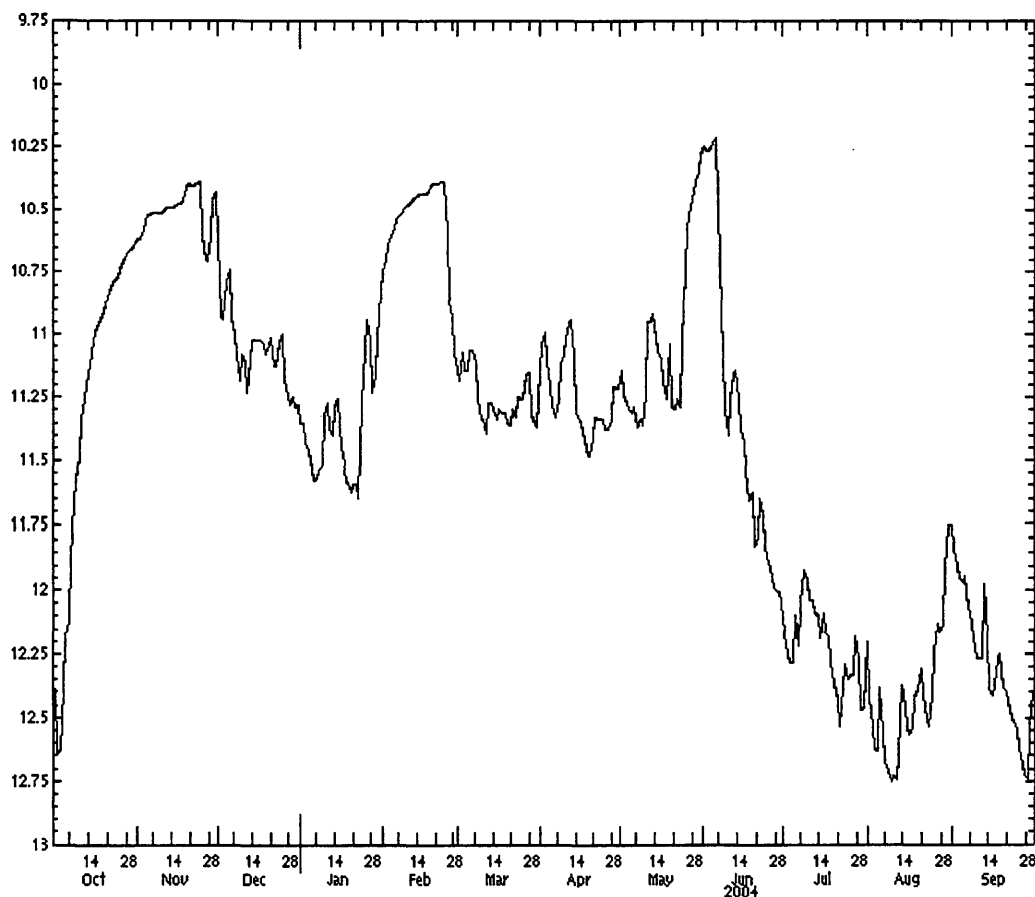
PERIOD OF RECORD.--January 1973 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 9.08 ft below land-surface datum, Aug. 31, 1975; lowest recorded, 13.82 ft below land-surface datum, Sept. 13, 14, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	12.18	10.52	10.74	11.53	10.58	11.06	11.28	11.31	10.22	12.10	12.38	11.94
10	11.48	10.51	11.08	11.32	10.48	11.34	11.01	11.24	11.40	12.04	12.73	12.27
15	11.03	10.48	11.02	11.26	10.43	11.34	11.34	11.06	11.38	12.09	12.53	12.41
20	10.88	10.39	11.04	11.63	10.39	11.36	11.41	11.29	11.82	12.43	12.31	12.40
25	10.74	10.60	11.00	11.06	10.59	11.26	11.38	10.74	11.89	12.33	12.24	12.62
EOM	10.63	10.42	11.28	10.83	11.14	11.14	11.22	10.28	12.10	12.20	11.76	12.40
WTR YR 2004	HIGHEST			10.20	JUN 6, 7			LOWEST	12.75	AUG 9		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421358085322401. Local number, 3S 11W 1DCBB.

LOCATION.--Lat 42°13'58", long 85°32'24", Hydrologic Unit 04050003, near intersection of Sprinkle Road and Winthrop Avenue in Portage.

Owner: City of Portage.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in, depth 179 ft, screened 134 ft to 179 ft.

INSTRUMENTATION.--Periodic measurements.

DATUM.--Elevation of land-surface datum is 854.64 ft above sea level (levels by City of Portage). Measuring point: Top of casing, 2.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--March 1999 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.59 ft below land-surface datum, Apr. 2, 2002; lowest measured, 18.73 ft below land-surface datum, Feb. 23, 2000.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 06	17.89	DEC 17	16.81	FEB 05	16.78	MAR 22	15.68	MAY 12	15.31	JUN 29	13.68
WTR YR 2004		HIGHEST	13.68	JUN 29		LOWEST	17.89	NOV 6			

GROUND-WATER LEVELS

KALAMAZOO COUNTY

421435085353701. Local number, 3S 11W 4ABAD1.

LOCATION.--Lat 42°14'35", long 85°35'37", Hydrologic Unit 04050003, at Kilgore Road pump station No. 9 in Kalamazoo. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 36 ft, screened 33 ft to 36 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 860 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 3.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--September 1987 to current year.

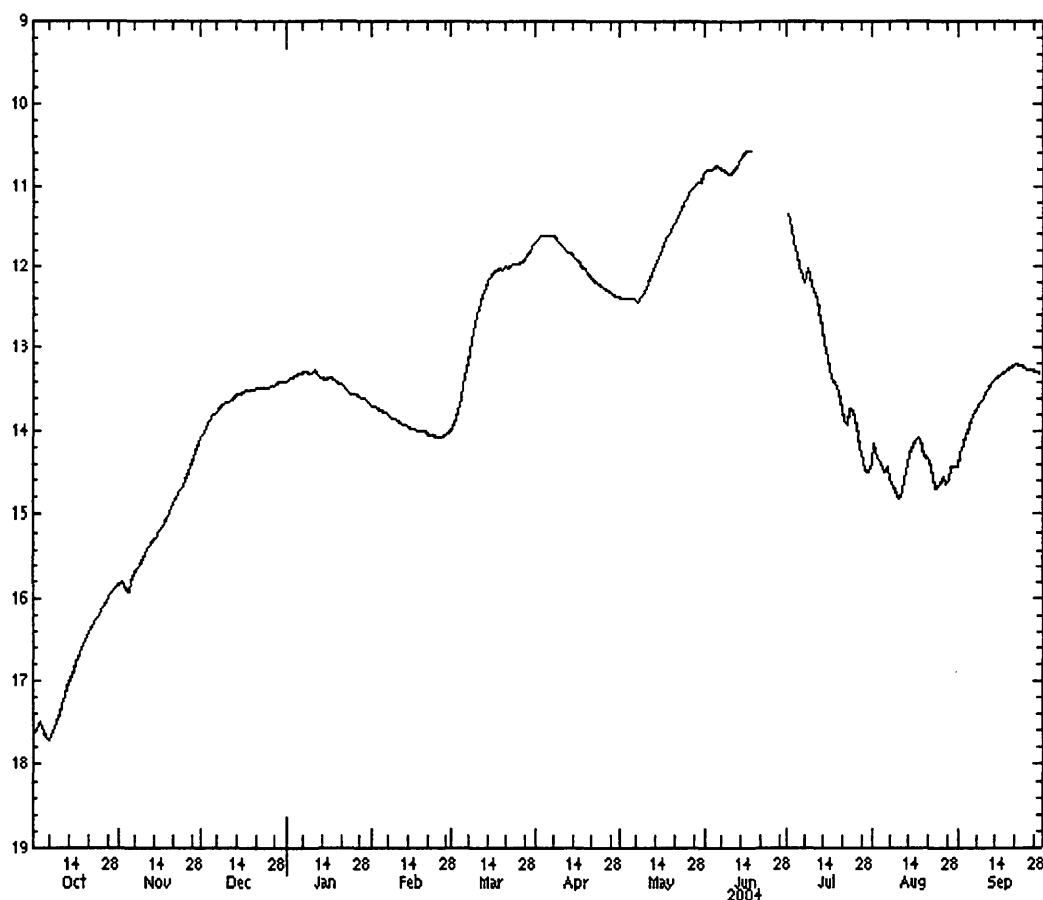
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 9.17 ft below land-surface datum, Apr. 27, 1993; lowest recorded, 17.78 ft below land-surface datum, Sept. 22, 2003

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	17.66	15.79	13.82	13.31	13.78	13.44	11.62	12.38	10.76	12.00	14.51	13.87
10	17.39	15.46	13.65	13.30	13.88	12.58	11.75	12.27	10.85	12.29	14.84	13.54
15	16.87	15.19	13.56	13.38	13.98	12.13	11.91	11.87	10.60	13.11	14.19	13.33
20	16.44	14.92	13.51	13.44	14.02	12.00	12.11	11.49	---	13.73	14.32	13.22
25	16.13	14.60	13.48	13.56	14.08	11.98	12.26	11.16	---	13.87	14.65	13.26
EOM	15.85	14.16	13.40	13.68	14.00	11.70	12.37	10.84	---	14.37	14.44	13.31

WTR YR 2004 HIGHEST 10.54 JUN 17 LOWEST 17.71 OCT 6

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421435085353702. Local number, 3S 11W 4ABAD2.

LOCATION.--Lat 42°14'35", long 85°35'37", Hydrologic Unit 04050003, at Kilgore Road pump station No. 9 in Kalamazoo. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 148 ft, screened 145 ft to 148 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 860 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 3.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

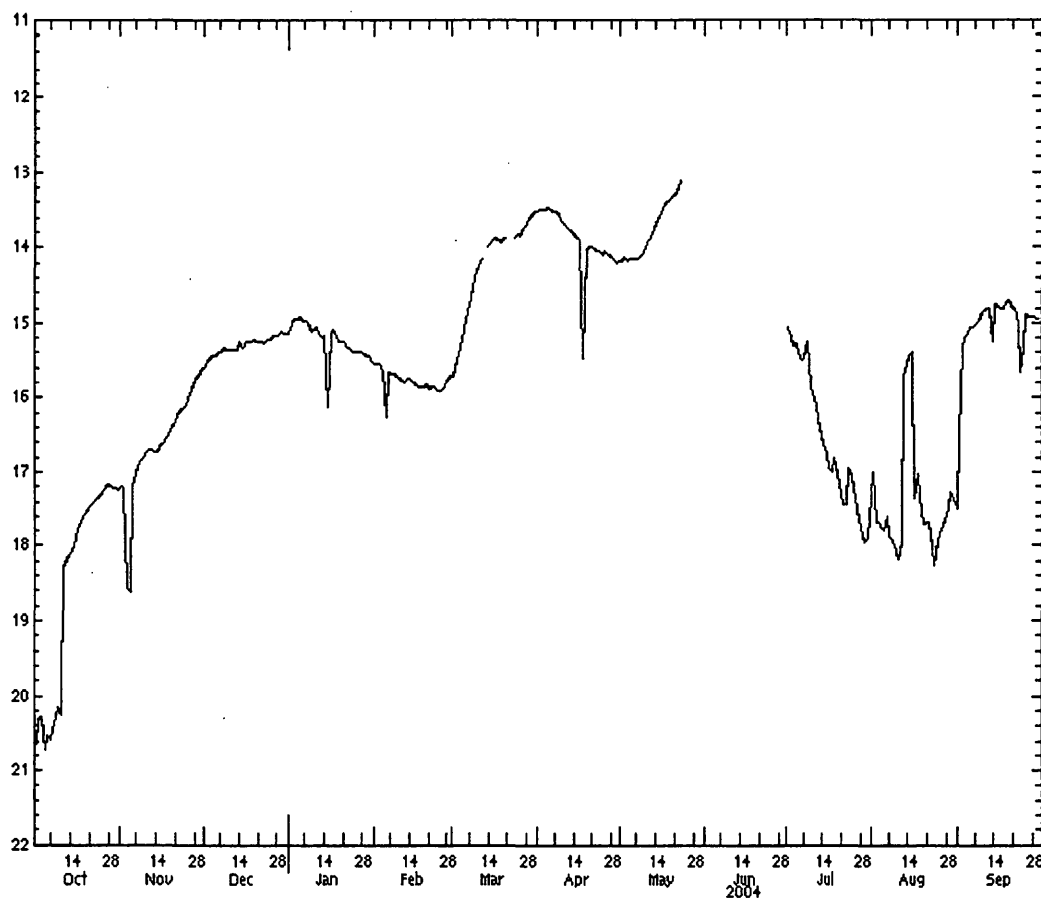
PERIOD OF RECORD.--September 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 10.73 ft below land-surface datum, May 4, 5, 1993; lowest recorded, 21.11 ft below land-surface datum, Sept. 21, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	20.53	17.20	15.44	14.91	16.26	15.08	13.49	14.15	---	15.41	17.79	15.07
10	20.25	16.74	15.36	15.08	15.73	14.26	13.70	13.95	---	15.94	18.18	14.83
15	17.90	16.62	15.34	16.12	15.81	13.90	13.89	13.58	---	16.76	15.38	14.78
20	17.50	16.37	15.26	15.25	15.83	13.88	14.00	13.30	---	17.31	17.68	14.82
25	17.28	16.01	15.23	15.40	15.90	13.85	14.06	---	---	17.22	17.85	14.90
EOM	17.24	15.60	15.15	15.53	15.72	13.52	14.18	---	---	17.34	17.49	14.95
WTR YR 2004		HIGHEST	12.99	MAY 23		LOWEST	20.71	OCT 4				

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421448085383601. Local number, 2S 11W 31CD.

LOCATION.--Lat 42°14'48", long 85°38'36", Hydrologic Unit 04050003, at city well field, 1,000 ft from U.S. Highway 131 in Kalamazoo. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 226 ft, screened 216 ft to 226 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 910 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 3.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 41.39 ft below land-surface datum, Sept. 12, 1982; lowest recorded, 71.75 ft below land-surface datum, May 22, 1978.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

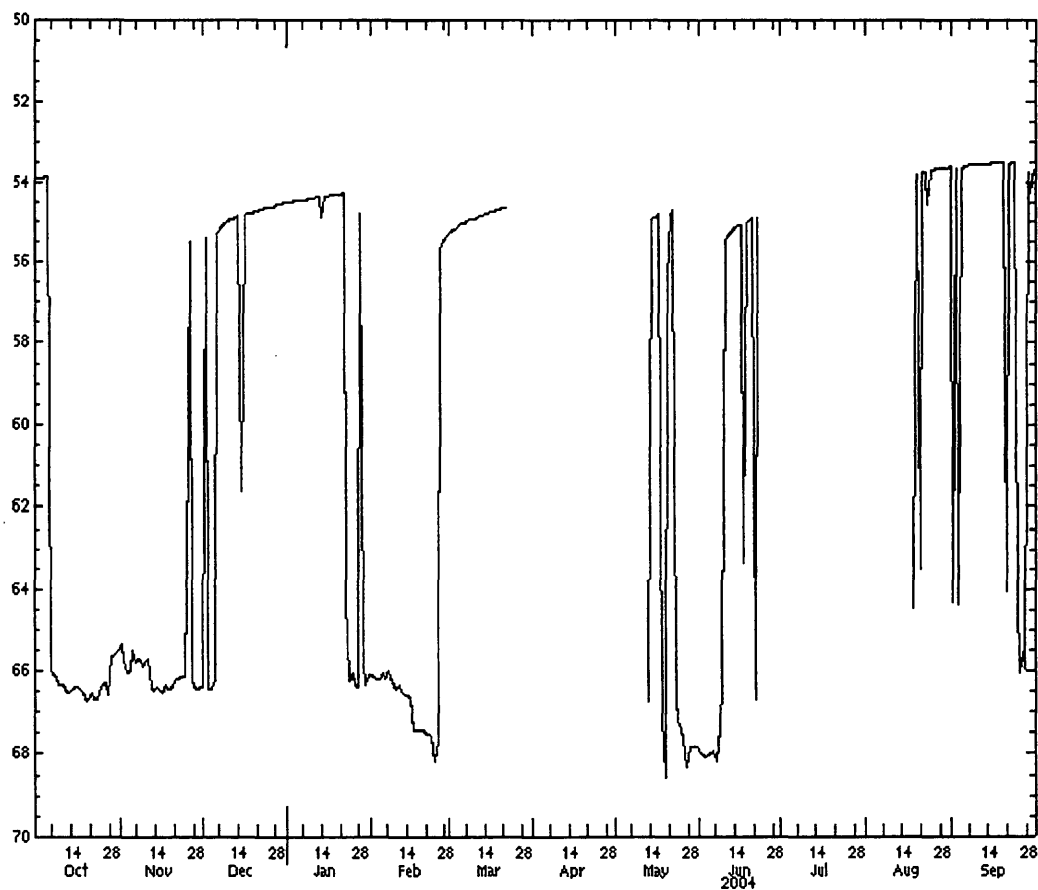
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	53.87	65.50	66.19	54.45	66.03	55.06	---	---	67.98	---	---	53.61
10	66.35	65.75	54.99	54.41	66.41	54.92	---	---	55.50	---	---	53.56
15	66.37	66.46	61.64	54.35	66.62	54.79	---	54.89	55.10	---	---	53.52
20	66.70	66.34	54.75	54.28	67.45	54.66	---	56.41	54.91	---	63.52	64.07
25	66.32	64.07	54.63	66.02	67.66	---	---	67.43	---	---	53.69	66.02
EOM	65.48	66.36	54.52	66.08	55.30	---	---	67.84	---	---	53.62	53.66

WTR YR 2004

HIGHEST 53.49 SEP 16, 17

LOWEST 68.57 MAY 19

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421457085325801. Local number, 2S 11W 36CB.

LOCATION.--Lat 42°14'57", long 85°32'58", Hydrologic Unit 04050003, in city well field, 500 ft from Emerald Street in Kalamazoo. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 226 ft, screened 216 ft to 226 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 860 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 3.5 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

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

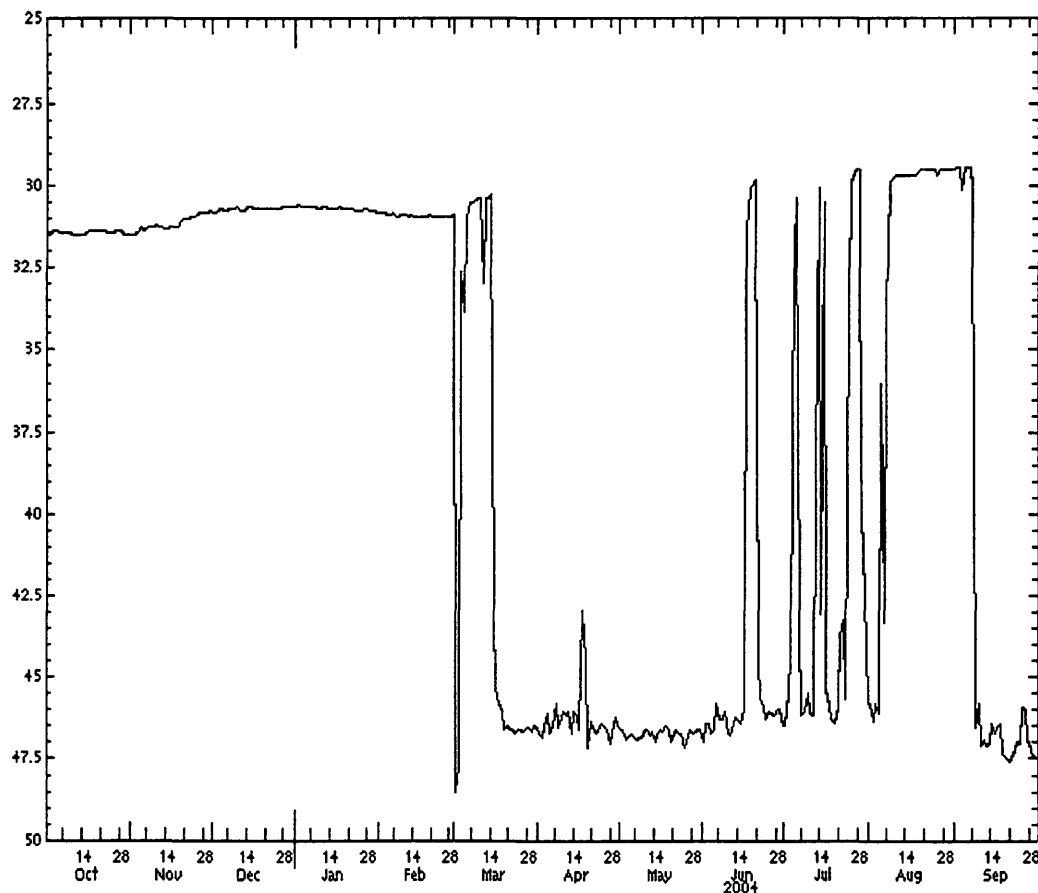
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 25.35 ft below land-surface datum, April 1985; lowest recorded, 51.48 ft below land-surface datum, Aug. 16, 2001.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	31.40	31.34	30.75	30.60	30.88	30.93	46.73	46.74	46.58	30.34	36.00	29.44
10	31.46	31.20	30.65	30.67	30.84	30.37	46.04	46.62	46.73	46.12	29.68	47.07
15	31.42	31.24	30.63	30.68	30.94	43.01	46.19	46.72	46.41	30.48	29.69	46.72
20	31.36	31.02	30.68	30.71	30.89	46.46	46.38	46.97	29.82	45.90	29.52	47.57
25	31.41	30.88	30.68	30.76	30.94	46.58	46.48	47.13	46.02	29.86	29.70	45.89
EOM	31.51	30.75	30.65	30.82	30.85	46.53	46.48	46.61	46.49	45.79	29.47	47.35

WTR YR 2004 HIGHEST 29.41 SEP 6 LOWEST 48.50 MAR 1

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421552085384001. Local number, 2S 11W 30CBDC1.

LOCATION.--Lat 42°15'52", long 85°38'40", Hydrologic Unit 04050003, at Western Michigan University Baker Farm in Kalamazoo. Owner: Western Michigan University.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 240 ft, screened 215 ft to 240 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 936.01 ft above sea level (levels by City of Kalamazoo). Measuring point: Plywood instrument shelf, 1.6 ft above land-surface datum.

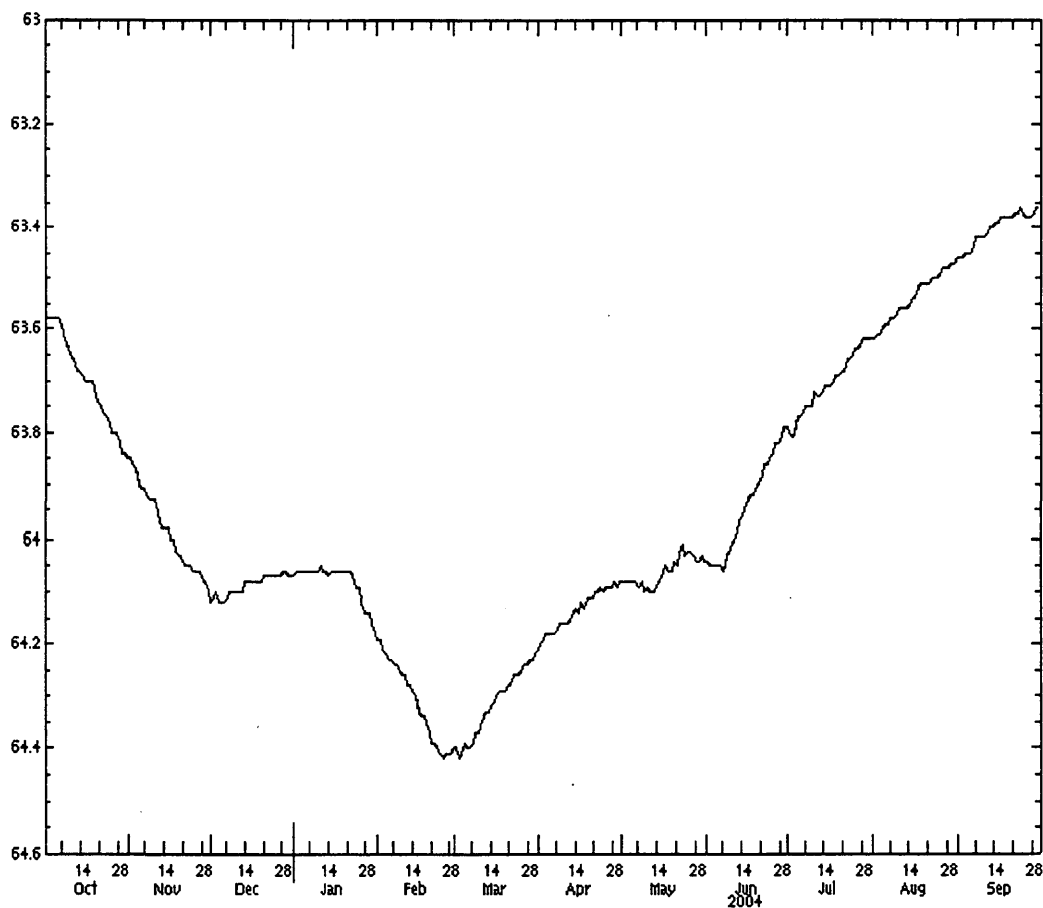
PERIOD OF RECORD.--October 1998 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 61.68 ft below land-surface datum, June 3, 2002; lowest recorded, 64.58 ft below land-surface datum, Jan. 12, 2001.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	63.58	63.91	64.12	64.06	64.23	64.40	64.18	64.08	64.05	63.77	63.59	63.45
10	63.66	63.93	64.10	64.06	64.26	64.36	64.16	64.09	64.01	63.72	63.56	63.42
15	63.70	63.98	64.08	64.06	64.30	64.31	64.14	64.08	63.95	63.71	63.54	63.39
20	63.74	64.03	64.08	64.06	64.37	64.28	64.11	64.04	63.90	63.68	63.51	63.38
25	63.80	64.06	64.07	64.09	64.42	64.25	64.09	64.02	63.84	63.64	63.49	63.38
EOM	63.85	64.10	64.07	64.18	64.40	64.21	64.08	64.04	63.79	63.62	63.46	63.36
WTR YR 2004	HIGHEST		63.36	SEP 22-24, 26-30			LOWEST	64.42	FEB 25, MAR 2			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421552085384002. Local number, 2S 11W 30CBDC2.

LOCATION.--Lat 42°15'52", long 85°38'40", Hydrologic Unit 04050003, at Western Michigan University Baker Farm in Kalamazoo. Owner: Western Michigan University.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 89 ft, screened 74 ft to 89 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 936.34 ft above sea level (levels by City of Kalamazoo). Measuring point: Plywood shelter base, 2.2 ft above land-surface datum; prior to Sept. 11, 2003, 3.0 ft above land-surface datum.

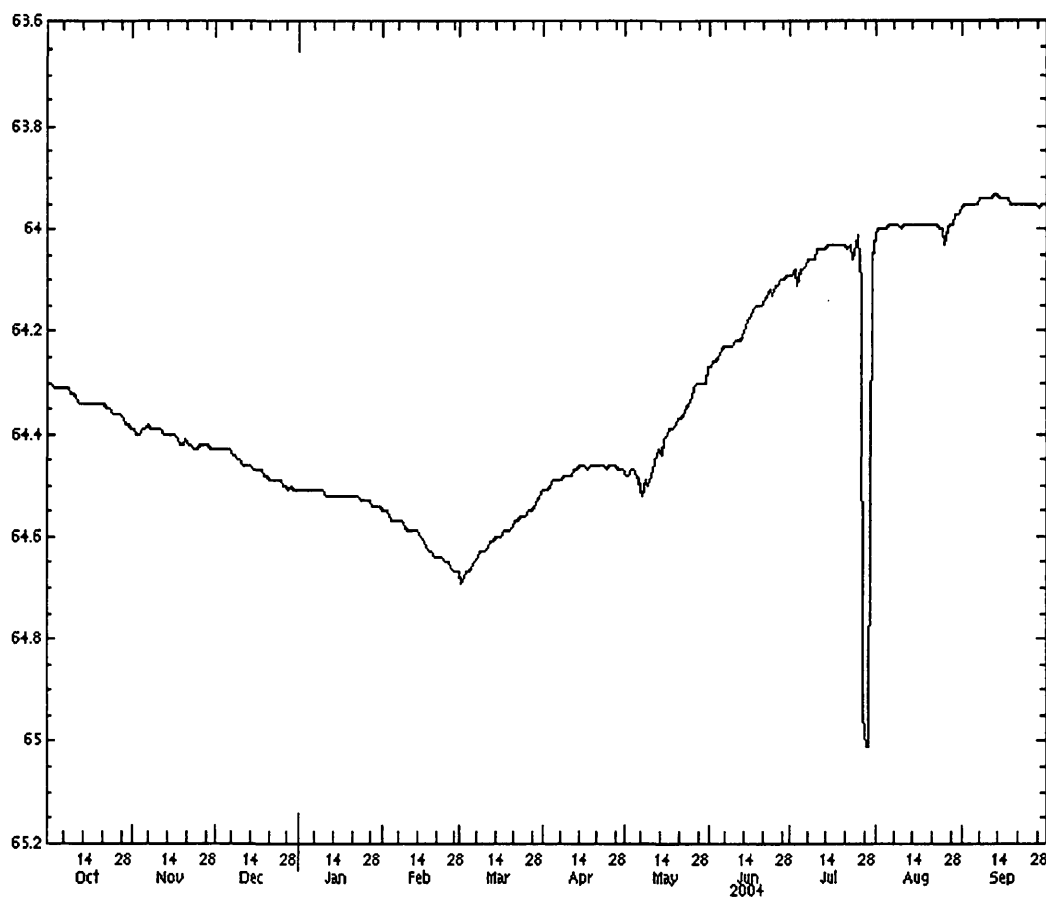
PERIOD OF RECORD.--October 1998 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 62.59 ft below land-surface datum, May 23, June 4, 2002; lowest recorded, 65.69 ft below land-surface datum, Aug. 3, 2000.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	64.31	64.39	64.43	64.51	64.57	64.66	64.49	64.48	64.24	64.08	63.99	63.95
10	64.32	64.39	64.45	64.51	64.59	64.63	64.48	64.48	64.22	64.04	63.99	63.94
15	64.34	64.40	64.47	64.52	64.60	64.60	64.46	64.41	64.18	64.03	63.99	63.94
20	64.34	64.41	64.48	64.52	64.64	64.58	64.46	64.37	64.15	64.03	63.99	63.95
25	64.36	64.42	64.49	64.53	64.65	64.56	64.46	64.33	64.11	64.01	64.03	63.95
EOM	64.39	64.43	64.51	64.54	64.67	64.51	64.47	64.27	64.09	64.01	63.96	63.95
WTR YR 2004	HIGHEST			63.92	SEP 16			LOWEST	65.01	JUL 28, 29		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421614085270801. Local number, 2S 10W 26BCC.

LOCATION.--Lat 42°16'14", long 85°27'08", Hydrologic Unit 04050003, at end of Miller Road by Morrow Lake, Comstock Township, 4 mi east of Kalamazoo. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 27 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 790 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 2.5 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

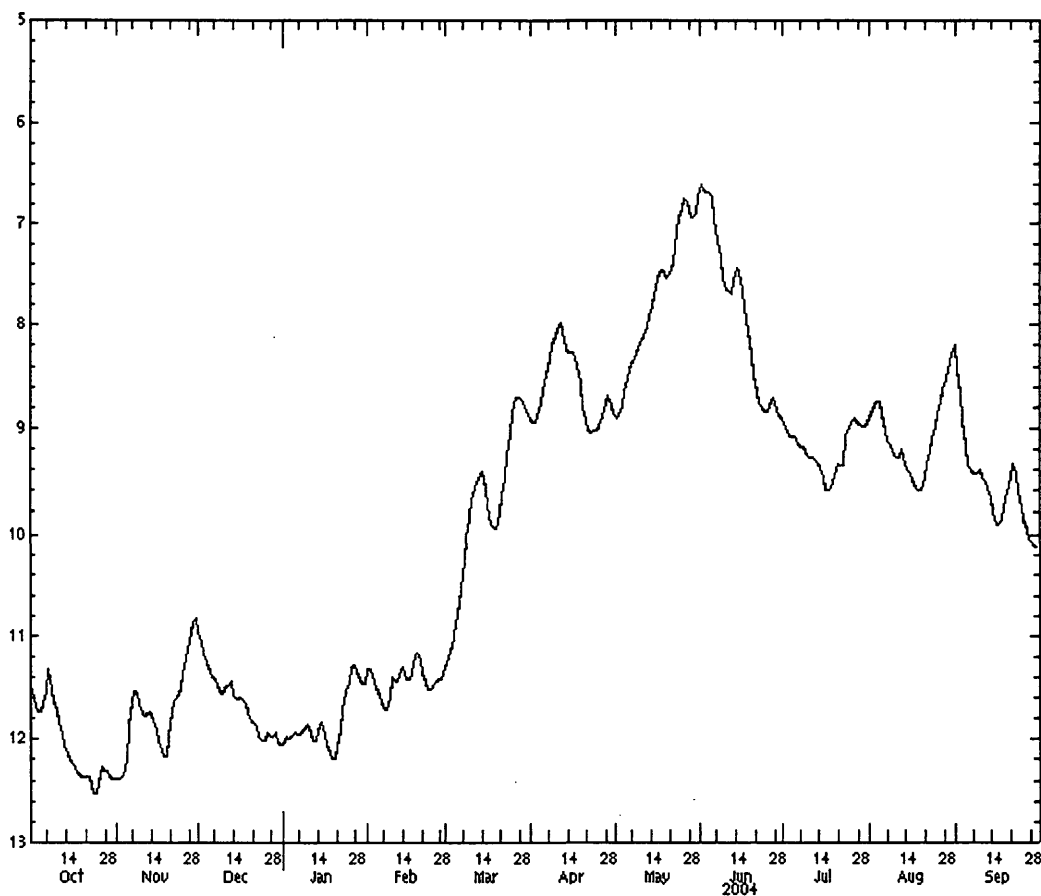
PERIOD OF RECORD.--February 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 5.88 ft below land-surface datum, Apr. 7-11, 1988; lowest recorded, 13.42 ft below land-surface datum, Mar. 12, 13, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	11.66	11.87	11.34	11.94	11.58	10.78	8.62	8.52	6.71	9.09	8.86	9.37
10	11.72	11.75	11.56	11.86	11.40	9.71	8.04	8.15	7.65	9.29	9.28	9.49
15	12.24	11.91	11.62	11.83	11.41	9.59	8.28	7.70	7.47	9.49	9.45	9.91
20	12.37	11.97	11.84	12.20	11.22	9.83	8.92	7.51	8.49	9.34	9.49	9.48
25	12.43	11.35	12.02	11.44	11.46	8.85	8.98	6.86	8.85	8.94	8.86	9.87
EOM	12.38	10.81	12.05	11.46	11.29	8.91	8.87	6.71	8.91	8.91	8.19	10.12
WTR YR 2004	HIGHEST		6.56	JUN 1		LOWEST		12.52	OCT 23, 24			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421614085354001. Local number, 2S 11W 28AA.

LOCATION.--Lat 42°16'14", long 85°35'40", Hydrologic Unit 04050003, near intersection of Peeler Street and Crosstown Parkway in Kalamazoo.

Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 245 ft, screened 235 ft to 245 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 820 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 4.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

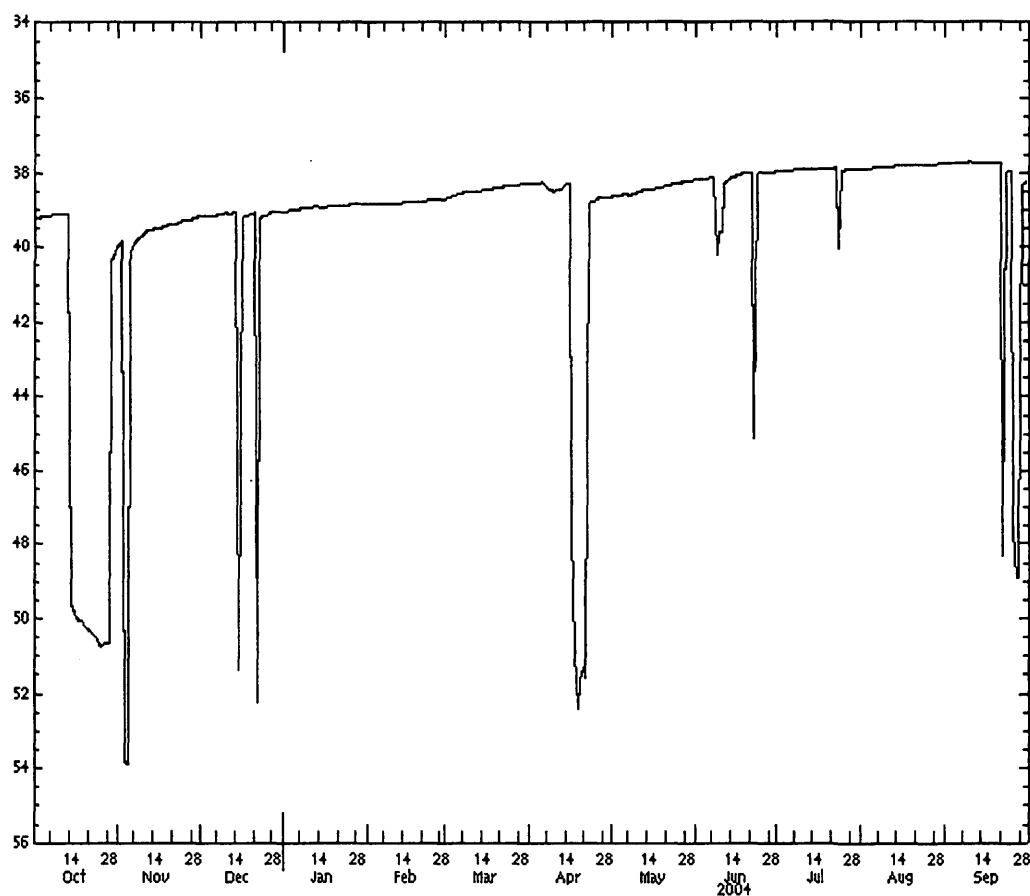
PERIOD OF RECORD.--August 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 29.0 ft below land-surface datum, May 1988; lowest recorded, 64.63 ft below land-surface datum, July 15, 1986.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	39.15	40.07	39.15	38.98	38.84	38.57	38.26	38.58	38.16	37.95	37.87	37.74
10	39.12	39.63	39.08	38.95	38.82	38.51	38.47	38.50	39.59	37.92	37.83	37.72
15	49.82	39.49	51.34	38.92	38.79	38.45	38.29	38.45	38.11	37.90	37.82	37.72
20	50.26	39.39	39.11	38.88	38.76	38.39	51.30	38.37	38.03	37.90	37.81	37.73
25	50.78	39.28	39.14	38.86	38.72	38.37	38.71	38.28	38.01	37.94	37.80	47.67
EOM	40.00	39.17	39.03	38.86	38.70	38.29	38.65	38.17	37.98	37.91	37.74	38.23
WTR YR 2004	HIGHEST			37.70	SEP 6	LOWEST			53.87	NOV 4		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421641085350601. Local number, 2S 11W 22CD.

LOCATION.--Lat 42°16'41", long 85°35'06", Hydrologic Unit 04050003, at intersection of Crosstown Parkway and Stockbridge Avenue in Kalamazoo. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 137 ft, screened 134 ft to 137 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 764.7 ft above sea level. Measuring point: Plywood instrument shelf, 2.6 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--August 1960 to current year.

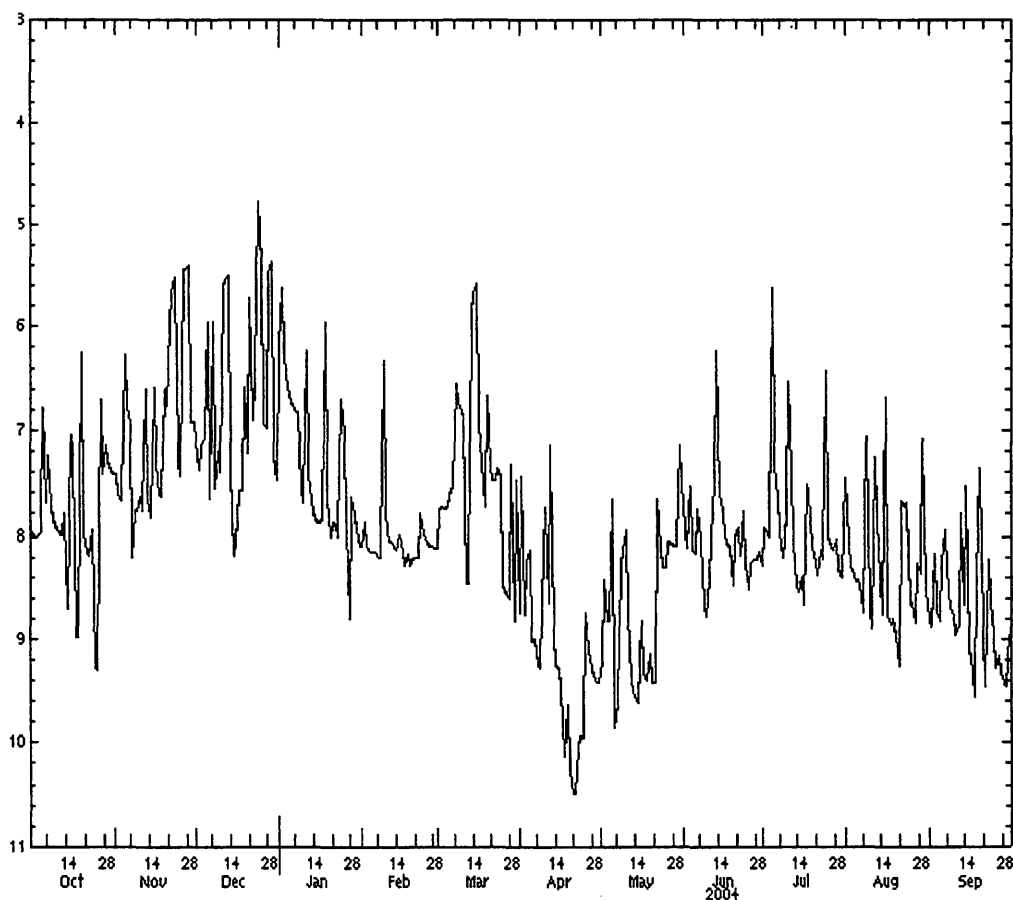
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 3.42 ft below land-surface datum, Feb. 8, 2002; lowest recorded, 31.1 ft below land surface datum, August 1961.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	6.78	6.79	5.95	6.72	8.15	7.62	9.02	7.66	8.17	7.32	8.42	8.25
10	7.94	7.64	7.41	7.70	7.83	6.87	7.74	7.95	8.42	6.52	8.90	8.96
15	7.04	6.58	8.18	7.88	7.98	5.57	9.28	9.61	7.66	8.39	6.69	9.13
20	7.97	6.76	7.22	8.01	8.20	7.34	10.48	9.41	8.01	8.24	9.25	8.94
25	9.30	7.44	5.39	7.04	8.04	8.47	8.74	8.30	8.51	8.01	8.63	9.27
EOM	7.43	6.93	7.49	8.08	8.11	8.74	9.41	7.50	8.28	7.46	8.80	8.94

WTR YR 2004 HIGHEST 3.80 DEC 22 LOWEST 10.48 APR 21

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421716085373702. Local number, 2S 11W 20BB2.

LOCATION.--Lat 42°17'16", long 85°37'37", Hydrologic Unit 04050003, at intersection of Howard Street and Kendall Street in Kalamazoo Township, in Kalamazoo. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 106 ft, screened 103 ft to 106 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 880 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 2.3 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

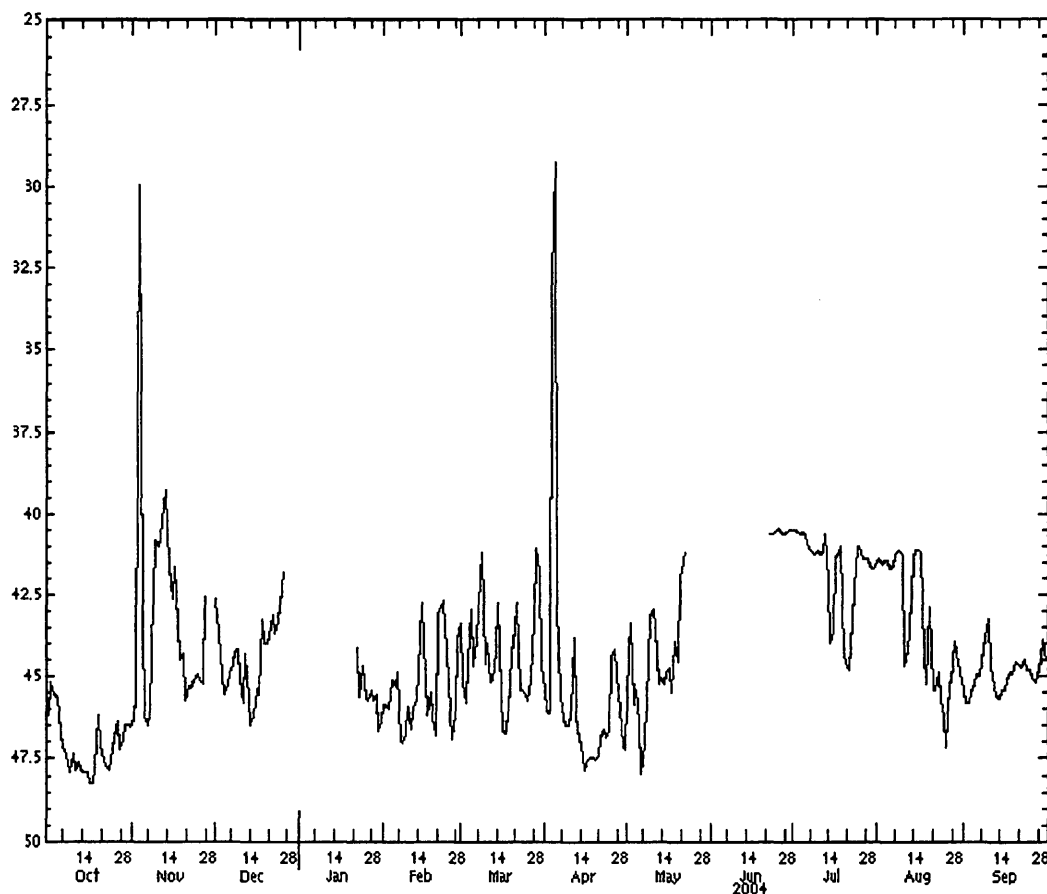
PERIOD OF RECORD.--May 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 12.5 ft below land-surface datum, February 1976; lowest recorded, 48.4 ft below land-surface datum, June 1971.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	46.19	46.17	45.25	---	45.28	44.69	42.75	46.37	---	40.69	41.66	44.94
10	47.33	41.01	45.05	---	45.93	43.98	46.09	42.96	---	41.23	44.66	44.65
15	47.92	42.65	46.19	---	42.72	45.47	47.86	44.89	---	43.61	41.12	45.39
20	47.09	45.76	43.97	---	46.78	43.57	47.40	41.98	---	44.75	45.39	44.66
25	46.88	45.11	42.28	45.69	46.11	45.75	44.36	---	40.44	41.00	47.18	45.05
EOM	46.55	---	---	46.37	43.35	45.37	47.23	---	40.49	41.51	45.39	44.55
WTR YR 2004	HIGHEST 24.68			MAY 23			LOWEST 48.21			OCT 17		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421918085283801. Local number, 2S 10W 4D.

LOCATION.--Lat 42°19'18", long 85°28'38", Hydrologic Unit 04050003, at Campbell well field near Campbell Lake, 2 mi east of Eastwood. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 13 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 836.50 ft above sea level. Measuring point: Plywood instrument shelf, 1.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

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

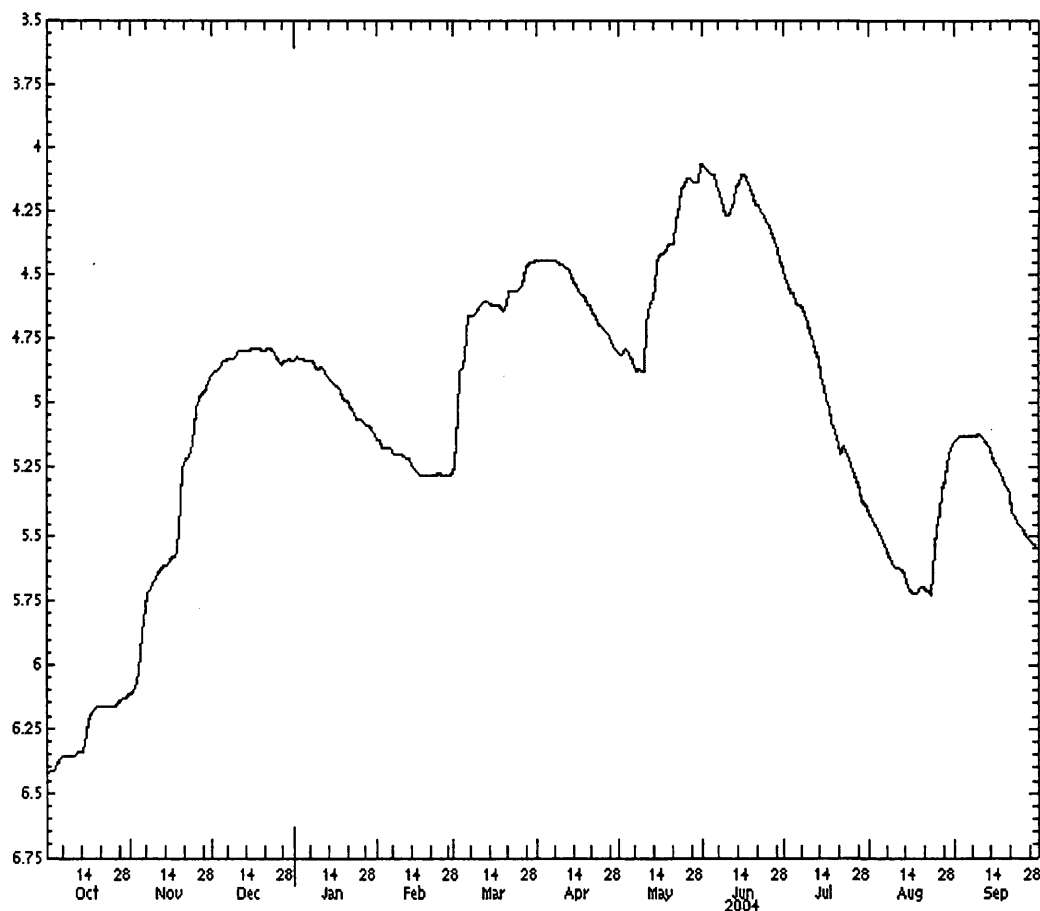
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 1.9 ft below land-surface datum, April 1974; lowest recorded, 7.51 ft below land-surface datum, Sept. 27 to Oct. 9, 1999.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	6.37	5.87	4.84	4.84	5.18	4.81	4.44	4.82	4.10	4.61	5.51	5.13
10	6.36	5.66	4.82	4.87	5.20	4.63	4.46	4.88	4.26	4.72	5.62	5.13
15	6.27	5.60	4.80	4.92	5.26	4.62	4.54	4.45	4.10	4.94	5.70	5.24
20	6.16	5.26	4.80	4.99	5.28	4.62	4.62	4.38	4.22	5.16	5.69	5.34
25	6.16	5.02	4.82	5.06	5.28	4.55	4.71	4.15	4.30	5.24	5.47	5.47
EOM	6.11	4.90	4.84	5.12	5.27	4.44	4.80	4.06	4.47	5.40	5.15	5.54

WTR YR 2004 HIGHEST 4.06 MAY 30, 31, JUN 1 LOWEST 6.42 OCT 1

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

MONROE COUNTY

415206083414401. Local number, 7S 6E 15ACAA.

LOCATION.--Lat 41°52'06", long 83°41'44", Hydrologic Unit 04100002, at Teal Road, 2 mi southeast of Petersburg. Owner: U.S. Geological Survey.

AQUIFER.--Detroit River Group.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 6 in, depth 72 ft, cased to 53 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 680 ft above sea level, from topographic map. Measuring point: Top of casing, 2.5 ft above land-surface datum.

REMARKS.--Water-level telemeter at well.

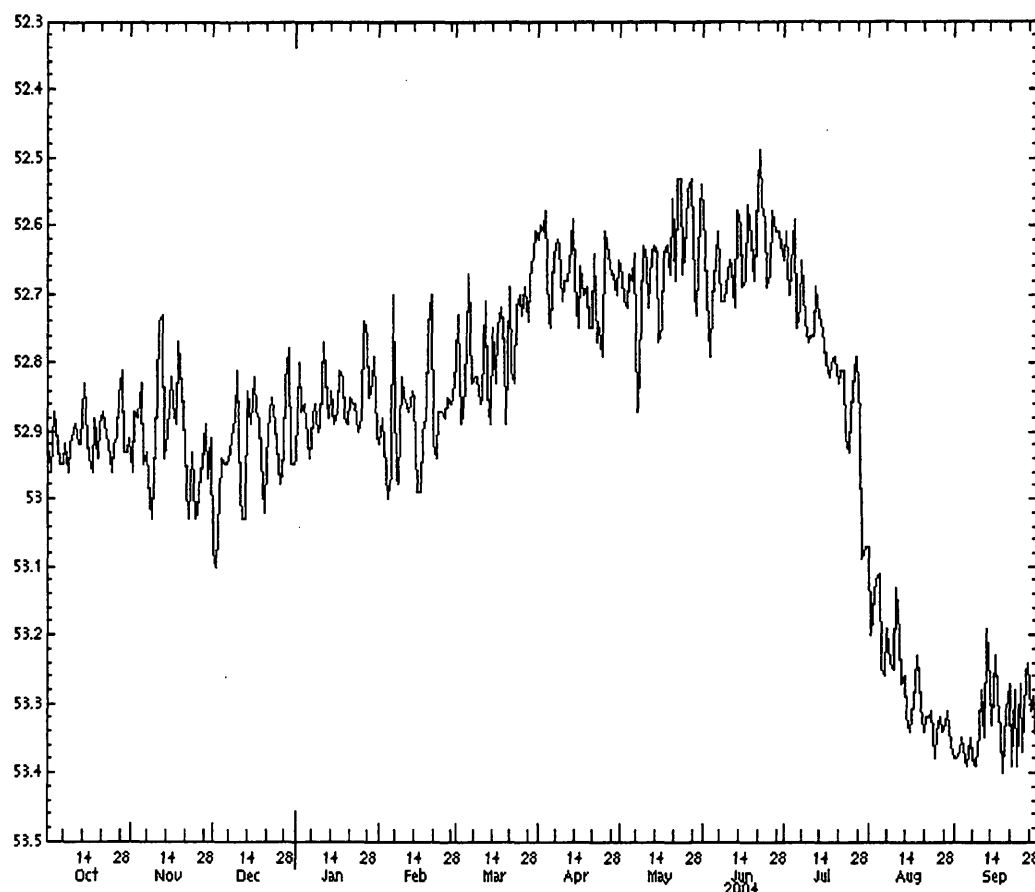
PERIOD OF RECORD.--November 1978 to September 1988 and December 1997 to September 1998 (periodic measurements), October 1988 to September 1991 and October 1998 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.30 ft below land-surface datum, Mar. 26, 1982; lowest recorded, 53.40 ft below land-surface datum, Sept. 18, 2004.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	52.95	52.95	52.95	52.91	52.96	52.67	52.75	52.68	52.65	52.75	53.25	53.39
10	52.90	52.85	52.81	52.89	52.85	52.85	52.68	52.65	52.65	52.76	53.13	53.28
15	52.91	52.82	52.89	52.89	52.99	52.83	52.75	52.77	52.69	52.77	53.34	53.23
20	52.89	52.87	53.02	52.89	52.70	52.69	52.75	52.56	52.61	52.83	53.34	53.27
25	52.92	53.02	52.95	52.88	52.88	52.73	52.61	52.60	52.67	52.87	53.34	53.37
EOM	52.91	52.91	52.95	52.90	52.80	52.62	52.65	52.54	52.65	53.07	53.38	53.36
WTR YR 2004	HIGHEST		52.28	MAY 31		LOWEST		53.40	SEP 18			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

MONROE COUNTY

415235083414001. Local number, 7S 6E 15ADBB.

LOCATION: --Lat 41°52'35", long 83°41'40", Hydrologic Unit 04100002, at Teal Road, 1.5 mi southeast of Petersburg. Owner: Michigan Department of Natural Resources.

AQUIFER.--Sand.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 17 ft, screened 14 ft to 17 ft.

INSTRUMENTATION.--Periodic measurements.

DATUM.—Elevation of land-surface datum is 675 ft above sea level, from topographic map. Measuring point: Top of casing, 4.0 ft above land-surface datum.

PERIOD OF RECORD.—December 1965 to September 1991 and February 1998 to June 2002 (periodic measurements), July 2002 to September 2003 (water-level recorder), October 2003 to September 2004 (periodic measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.00 ft below land-surface datum, Feb. 14, 1966; lowest recorded, 9.77 ft below land-surface datum, Dec. 25, 2002 to Jan. 7, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 1	8.68	JAN 5	8.24	APR 13	8.41	JUN 8	7.88	JUL 20	8.43	SEP 7	9.06
NOV 18	8.56	FEB 24	8.86								

GROUND-WATER LEVELS

MONROE COUNTY

420414083351501. Local number, 5S 7E 10ABB.

LOCATION.--Lat 42°04'15", long 83°35'17", Hydrologic Unit 04100001, 800 ft southwest from intersection of Darling Road and Tuttle Hill Road, 3.0 mi south of Oakville. Owner: London Township.

AQUIFER.--Silurian-Devonian.

WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 95 ft, cased to 72 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 665 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 2.45 ft above land-surface datum.

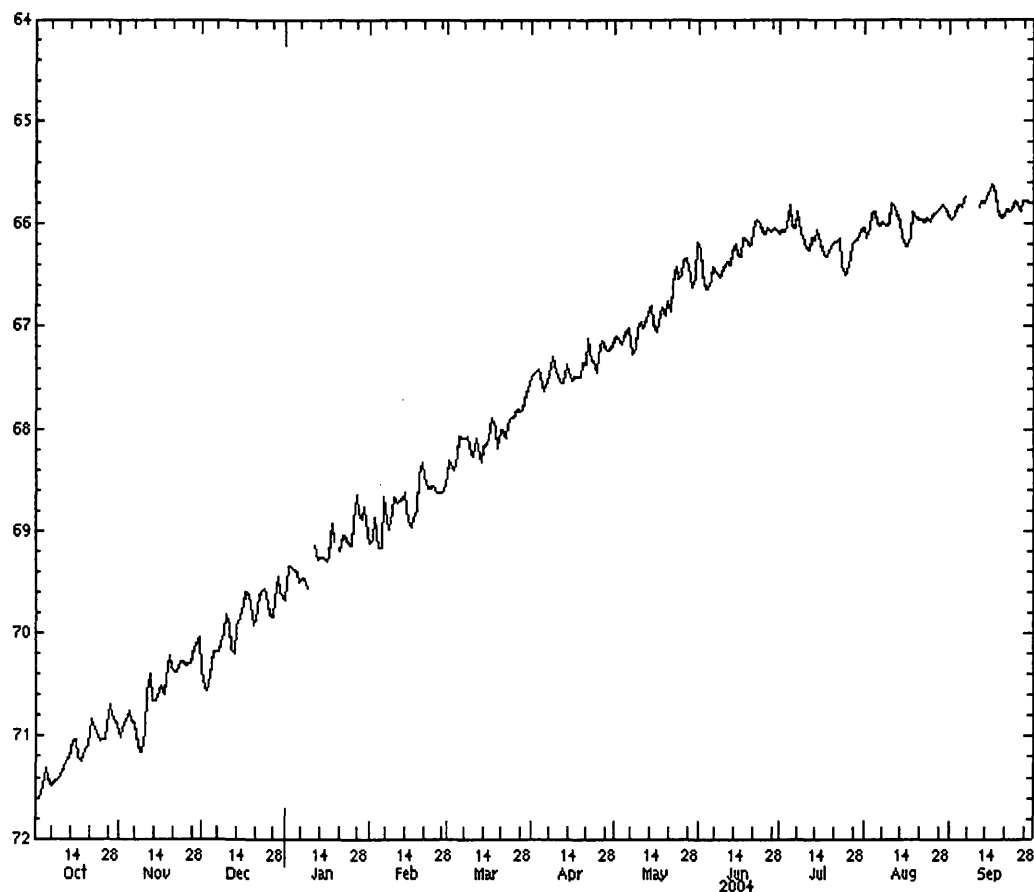
PERIOD OF RECORD.--December 1990 to July 1994 (periodic measurements), August 1994 to October 1995 and November 2001 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 47.20 ft below land-surface datum, Dec. 1, 1990; lowest recorded, 84.62 ft below land-surface datum, Jan. 16, 2002.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	71.41	70.85	70.18	69.39	69.16	68.06	67.63	67.03	66.54	66.02	65.99	65.83
10	71.35	70.96	69.81	69.56	68.66	68.26	67.49	66.95	66.40	66.24	65.80	---
15	71.04	70.55	69.84	69.27	68.90	68.14	67.53	66.98	66.30	66.17	66.22	65.67
20	71.09	70.33	69.91	---	68.32	68.00	67.37	66.76	66.18	66.18	65.95	65.92
25	71.04	70.32	69.70	69.15	68.63	67.88	67.28	66.49	66.10	66.46	65.91	65.82
EOM	70.89	70.03	69.63	69.02	68.47	67.49	67.18	66.17	66.10	66.03	65.93	65.82
WTR YR 2004	HIGHEST		65.50	SEP 16	LOWEST		71.60	OCT 2				

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

OAKLAND COUNTY

423423083324001. Local number, 2N 8E 18DBAD.

LOCATION.--Lat 42°34'23", long 83°32'40", Hydrologic Unit 04090005, at Proud Lake State Park. Owner: Michigan Department of Natural Resources.

AQUIFER.--Sand and gravel.

WELL CHARACTERISTICS.--Drilled observation well, diameter 6 in, depth 45 ft, screened 41 ft to 45 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 920 ft above sea level, from topographic map. Measuring point: Top of flange, 2.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

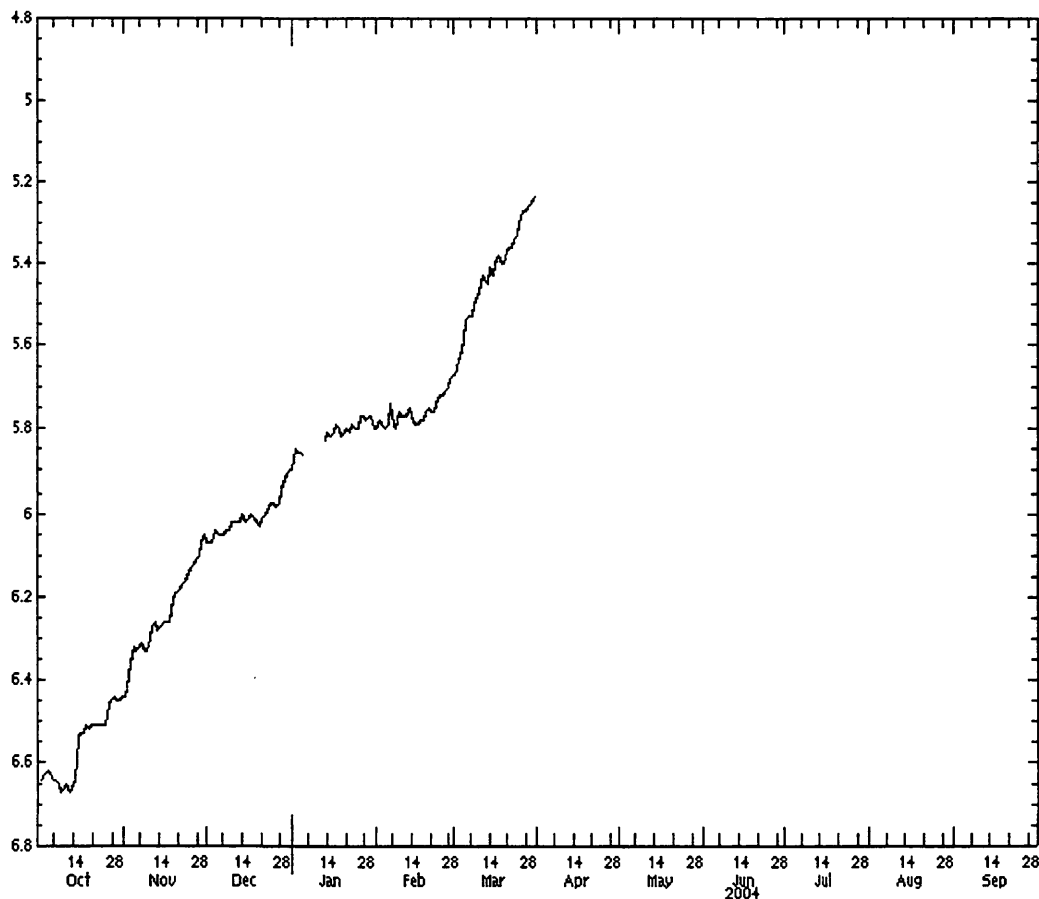
PERIOD OF RECORD.--July 1969 to December 1991 (water-level recorder), January to June 1992 and August 2000 to July 2001 (periodic measurements), August 2001 to April 2004 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 2.84 ft below land-surface datum, May 22, 1974; lowest recorded, 6.79 ft below land-surface datum, Sept. 8, 9, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	6.63	6.33	6.05	5.87	5.79	5.54	---	---	---	---	---	---
10	6.66	6.30	6.02	---	5.77	5.47	---	---	---	---	---	---
15	6.54	6.26	6.02	5.82	5.79	5.43	---	---	---	---	---	---
20	6.51	6.19	6.03	5.81	5.75	5.37	---	---	---	---	---	---
25	6.51	6.13	5.97	5.80	5.72	5.30	---	---	---	---	---	---
EOM	6.44	6.05	5.90	5.80	5.67	5.23	---	---	---	---	---	---
WTR YR 2004	HIGHEST 5.19			MAR 31			LOWEST 6.67		OCT 9, 12			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

OAKLAND COUNTY

424109083384301. Local number, 3N 7E 5DA (revised).

LOCATION.--Lat 42°41'09", long 83°38'44" (revised), Hydrologic Unit 04080203, 150 ft west of Fish Lake Road, 1.2 mi east of Clyde. Owner: American Aggregates Company.

AQUIFER.--Sand and gravel.

WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in, depth 49 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 1,055 ft above sea level, from topographic map. Measuring point: Top of flange, 3.0 ft above land-surface datum.

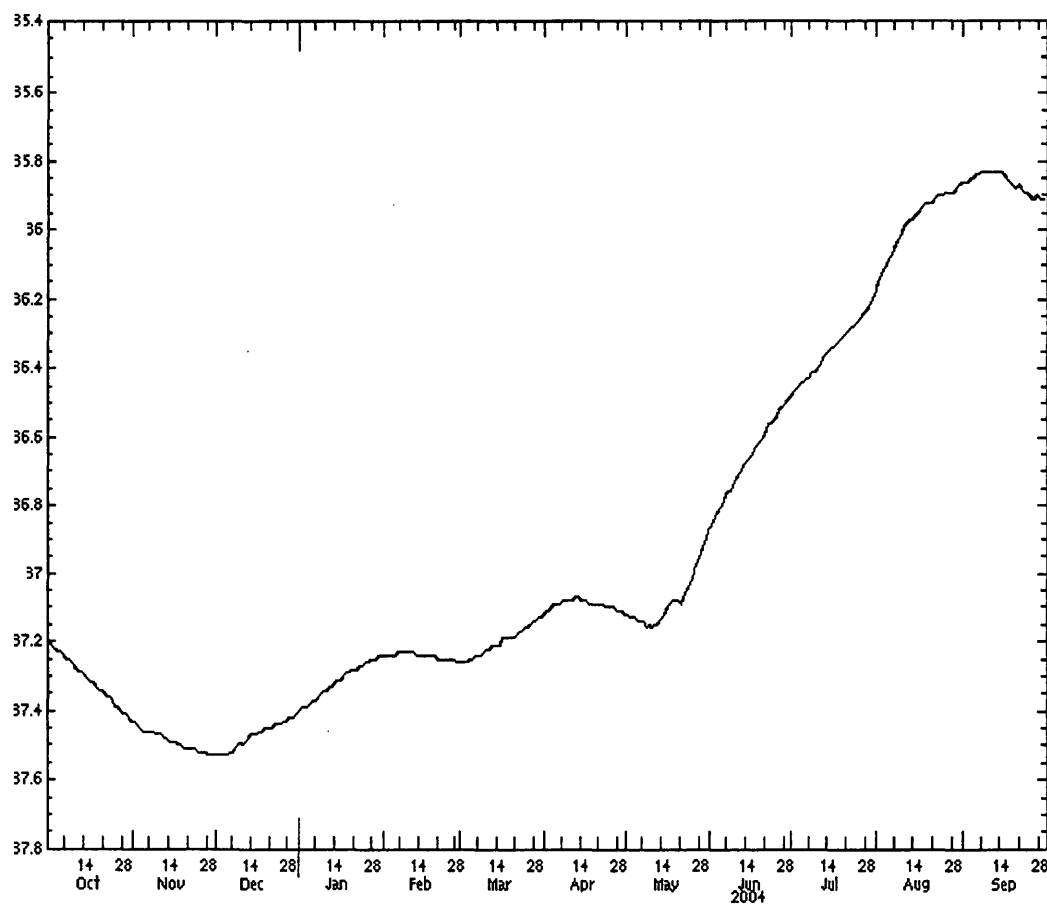
PERIOD OF RECORD.--April 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 29.5 ft below land-surface datum, June 1976; lowest recorded, 38.7 ft below land-surface datum, December 1972.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	37.23	37.46	37.53	37.38	37.24	37.25	37.09	37.14	36.80	36.44	36.08	35.84
10	37.27	37.47	37.49	37.34	37.23	37.22	37.08	37.16	36.72	36.40	35.99	35.83
15	37.31	37.49	37.47	37.31	37.24	37.21	37.08	37.12	36.66	36.34	35.95	35.84
20	37.34	37.51	37.45	37.28	37.24	37.19	37.09	37.08	36.60	36.30	35.92	35.87
25	37.39	37.52	37.44	37.26	37.25	37.16	37.10	37.02	36.54	36.26	35.89	35.91
EOM	37.43	37.53	37.41	37.24	37.26	37.12	37.12	36.87	36.48	36.17	35.86	35.91
WTR YR 2004	HIGHEST		35.82	SEP 7-9, 11-13			LOWEST	37.53	NOV 28 - DEC 5			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

OAKLAND COUNTY

424133083293101. Local number, 3N 8E 10ABDB.

LOCATION.--Lat 42°41'00", long 83°29'29", Hydrologic Unit 04090005, at Teggerdine Road, 3 mi southeast of White Lake. Owner: Huron-Clinton Metropolitan Authority.

AQUIFER.--Sand and gravel.

WELL CHARACTERISTICS.--Drilled observation well, diameter 6 in, depth 175 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 1,000 ft above sea level, from topographic map. Measuring point: Top of flange, 3.5 ft above land-surface datum.

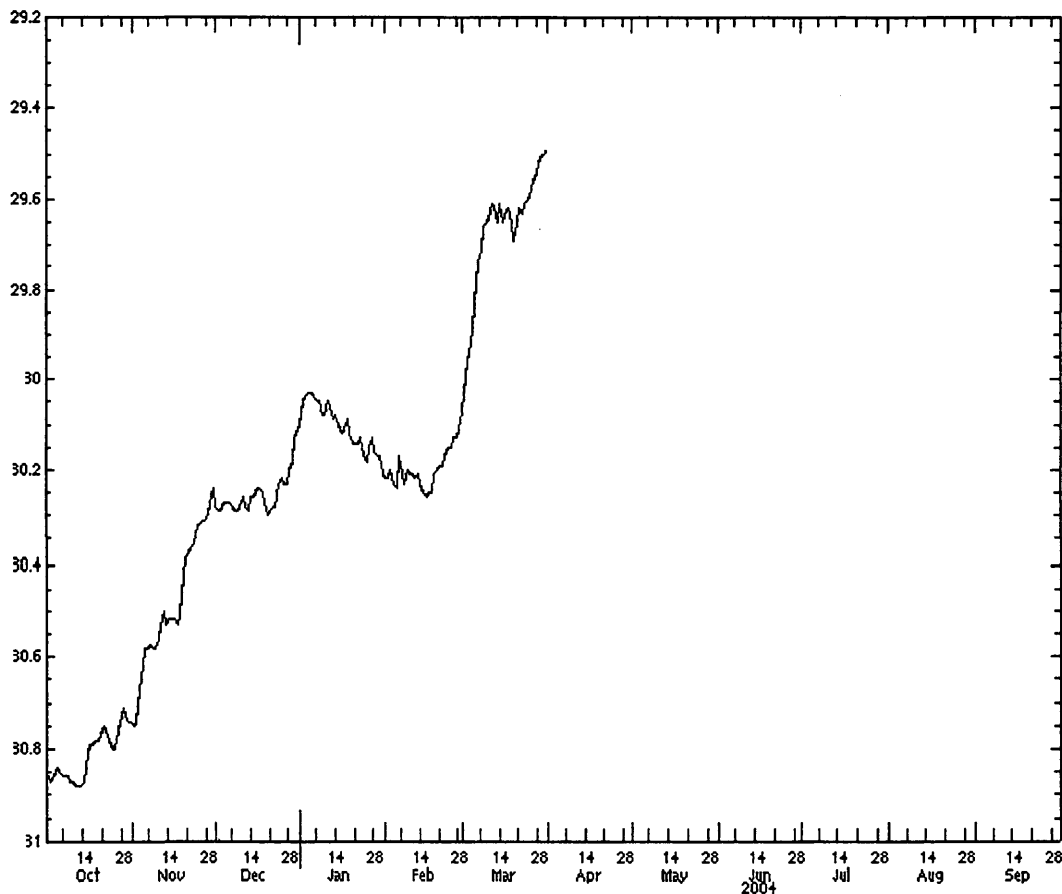
PERIOD OF RECORD.--June 1972 to September 1981, June 2001 to March 2004 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 27.8 ft below land-surface datum, March 1976; lowest recorded, 31.08 ft below land-surface datum, September 20, 21, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	30.85	30.58	30.27	30.03	30.24	29.83	---	---	---	---	---	---
10	30.87	30.56	30.28	30.08	30.21	29.64	---	---	---	---	---	---
15	30.81	30.52	30.26	30.10	30.25	29.65	---	---	---	---	---	---
20	30.77	30.39	30.30	30.14	30.20	29.65	---	---	---	---	---	---
25	30.80	30.32	30.22	30.18	30.15	29.59	---	---	---	---	---	---
EOM	30.74	30.24	30.11	30.21	30.07	29.49	---	---	---	---	---	---
WTR YR 2004	HIGHEST		29.47	MAR 31		LOWEST		30.88	OCT 11-13			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

OAKLAND COUNTY

424133083293201. Local number, 3N 8E 3DBAB.

LOCATION.--Lat 42°41'34", long 83°29'33", Hydrologic Unit 04090005, 3 mi east of White Lake at White Lake Road. Owner: Huron-Clinton Metropolitan Authority.

AQUIFER.--Sand and gravel.

WELL CHARACTERISTICS.--Drilled artesian observation well, diameter 6 in, depth 163 ft, screened 143 ft to 163 ft.

INSTRUMENTATION.--Periodic measurements.

DATUM.--Elevation of land-surface datum is 1,000 ft above sea level, from topographic map. Measuring point: Top of well casing, 3.5 ft above land-surface datum.

PERIOD OF RECORD.--July 1972 to October 1981 (water-level recorder), April 2001 to April 2004 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 7.20 ft below land-surface datum, May 7, 1976; lowest measured, 12.36 ft below land-surface datum, Sept. 8, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 8	11.75	NOV 18	10.51	DEC 15	10.27	FEB 5	10.23	APR 12	9.48

GROUND-WATER LEVELS

OAKLAND COUNTY

425116083321501. Local number, 5N 8E 8ACAC.

LOCATION.--Lat 42°51'09", long 83°32'15", Hydrologic Unit 04080204, at Van Road, 6 mi northeast of Holly. Owner: Michigan Department of Natural Resources.

AQUIFER.--Sand and gravel.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 42 ft, screened 39 ft to 42 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 930 ft above sea level, from topographic map. Measuring point: Inside lip of locking well cap, 4.39 ft above land-surface datum.

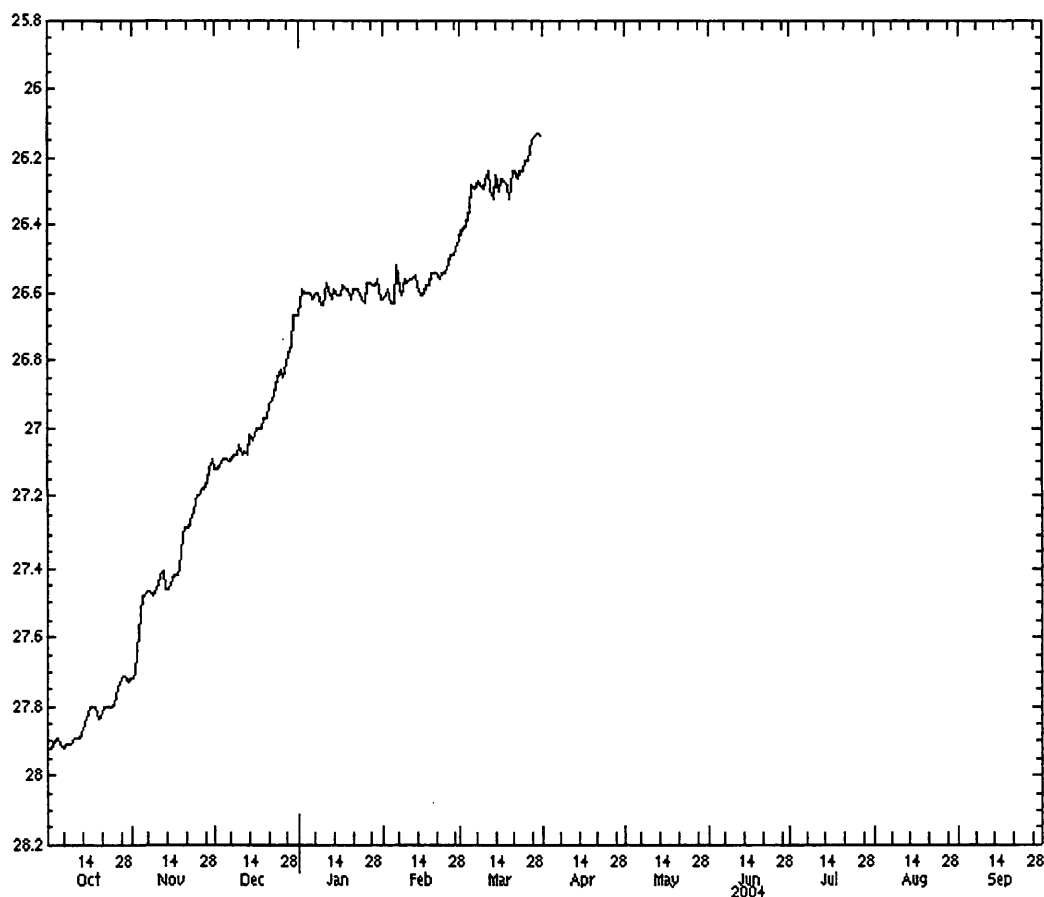
PERIOD OF RECORD.--November 1965 to March 1995 (periodic measurements), June 2001 to March 2004 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.30 ft below land-surface datum, April 24, 1974; lowest recorded, 28.23 ft below land-surface datum, September 13, 20, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	27.91	27.48	27.09	26.60	26.63	26.28	---	---	---	---	---	---
10	27.89	27.45	27.05	26.64	26.57	26.27	---	---	---	---	---	---
15	27.82	27.43	27.04	26.61	26.61	26.30	---	---	---	---	---	---
20	27.83	27.28	26.97	26.62	26.54	26.24	---	---	---	---	---	---
25	27.79	27.20	26.83	26.63	26.51	26.21	---	---	---	---	---	---
EOM	27.72	27.09	26.67	26.62	26.44	26.14	---	---	---	---	---	---
WTR YR 2004	HIGHEST 26.07			MAR 29			LOWEST 27.92			OCT 1, 2, 6		

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

SAGINAW COUNTY

431457084194401. Local number, 10N 1E 22DAD01.

LOCATION.--Lat 43°14'57", long 84°19'44", Hydrologic Unit 04080203, at west side of Merrill Road, 0.35 mi north of Marion Springs. Owner: U.S. Geological Survey.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 6 in, depth 210 ft, cased to 170 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 657 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 2.5 ft above land-surface datum or top of well casing, 2.12 ft above land-surface datum.

REMARKS.--Water-level telemeter at well.

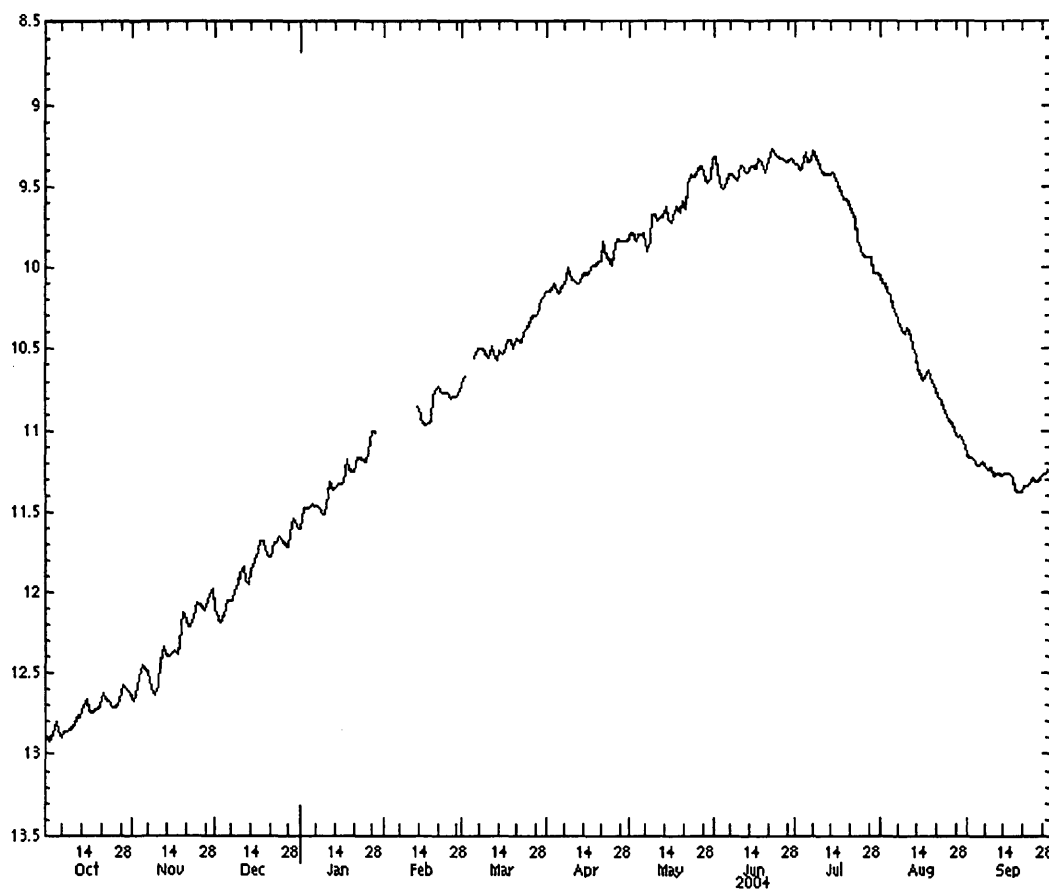
PERIOD OF RECORD.--December 1977 to September 1991, September 2000 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 7.93 ft below land-surface datum, Feb. 10, 1981; lowest recorded, 12.92 ft below land-surface datum, Oct. 2, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	12.86	12.47	12.05	11.45	---	10.56	10.16	9.80	9.47	9.35	10.25	11.22
10	12.83	12.57	11.87	11.51	---	10.56	10.07	9.67	9.38	9.41	10.37	11.28
15	12.66	12.37	11.80	11.33	10.96	10.53	10.05	9.70	9.38	9.45	10.67	11.26
20	12.70	12.14	11.78	11.25	10.74	10.43	9.96	9.59	9.37	9.62	10.74	11.38
25	12.71	12.08	11.67	11.19	10.80	10.35	9.91	9.43	9.32	9.92	10.94	11.31
EOM	12.62	11.97	11.60	---	10.72	10.15	9.84	9.33	9.36	10.05	11.14	11.23
WTR YR 2004	HIGHEST 9.19			JUN 21, 22			LOWEST 12.92		OCT 2			

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



GROUND-WATER LEVELS

WASHTENAW COUNTY

421322083441301. Local number, 3S 6E 16BCCD.

LOCATION.--Lat 42°13'22", long 83°44'13", Hydrologic Unit 04090005, at Ann Arbor Municipal Airport. Owner: City of Ann Arbor.

AQUIFER.--Sand and gravel.

WELL CHARACTERISTICS.--Drilled water-table well, diameter 10 in, depth 55 ft, screened 35 ft to 55 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 821.50 ft above sea level. Measuring point: Plywood instrument shelf, 2.5 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--September 1963 to current year.

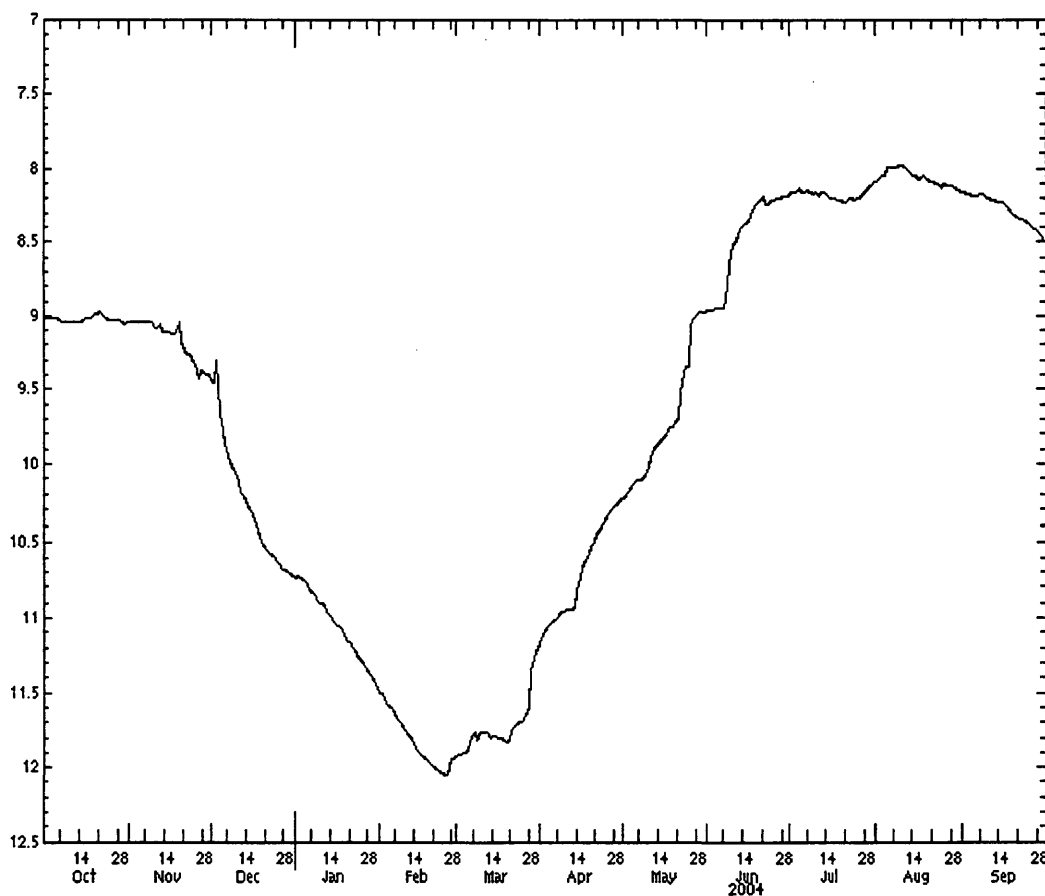
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 0.69 ft below land-surface datum, Mar. 10, 1974; lowest recorded, 15.86 ft below land-surface datum, Oct. 18, 1964.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	9.02	9.04	9.78	10.78	11.60	11.87	11.03	10.13	8.95	8.15	7.99	8.18
10	9.05	9.09	10.06	10.91	11.74	11.77	10.95	10.03	8.51	8.16	7.97	8.20
15	9.03	9.11	10.30	11.03	11.89	11.79	10.74	9.84	8.37	8.19	8.05	8.22
20	8.99	9.18	10.51	11.16	11.98	11.82	10.50	9.72	8.21	8.22	8.08	8.33
25	9.03	9.33	10.63	11.29	12.05	11.70	10.34	9.34	8.21	8.20	8.10	8.39
EOM	9.05	9.40	10.73	11.47	11.93	11.18	10.24	8.97	8.18	8.09	8.15	8.49

WTR YR 2004 HIGHEST 7.95 AUG 9, 10 LOWEST 12.05 FEB 25, 26

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM



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Bass River near Allendale	433	Cheboygan County, ground-water levels	445-446
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Conversion Factors

Multiply	By	To obtain
Length		
inch (in.)	2.54×10^1	millimeter (mm)
	2.54×10^{-2}	meter (m)
foot (ft)	3.048×10^{-1}	meter (m)
mile (mi)	1.609×10^0	kilometer (km)
Area		
acre	4.047×10^3	square meter (m ²)
	4.047×10^{-1}	square hectometer (hm ²)
	4.047×10^{-3}	square kilometer (km ²)
square mile (mi ²)	2.590×10^0	square kilometer (km ²)
Volume		
gallon (gal)	3.785×10^0	liter (L)
	3.785×10^{-3}	cubic meter (m ³)
	3.785×10^0	cubic decimeter (dm ³)
million gallons (Mgal)	3.785×10^3	cubic meter (m ³)
	3.785×10^{-3}	cubic hectometer (hm ³)
cubic foot (ft ³)	2.832×10^{-2}	cubic meter (m ³)
	2.832×10^1	cubic decimeter (dm ³)
cubic-foot-per-second day [(ft ³ /s) d]	2.447×10^3	cubic meter (m ³)
	2.447×10^{-3}	cubic hectometer (hm ³)
acre-foot (acre-ft)	1.233×10^3	cubic meter (m ³)
	1.233×10^{-3}	cubic hectometer (hm ³)
	1.233×10^{-6}	cubic kilometer (km ³)
Flow		
cubic foot per second (ft ³ /s)	2.832×10^1	liter per second (L/s)
	2.832×10^{-2}	cubic meter per second (m ³ /s)
	2.832×10^1	cubic decimeter per second (dm ³ /s)
gallon per minute (gal/min)	6.309×10^{-2}	liter per second (L/s)
	6.309×10^{-5}	cubic meter per second (m ³ /s)
	6.309×10^{-2}	cubic decimeter per second (dm ³ /s)
million gallons per day (Mgal/d)	4.381×10^{-2}	cubic meter per second (m ³ /s)
	4.381×10^1	cubic decimeter per second (dm ³ /s)
Mass		
ton (short)	9.072×10^{-1}	megagram (Mg) or metric ton

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$$

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