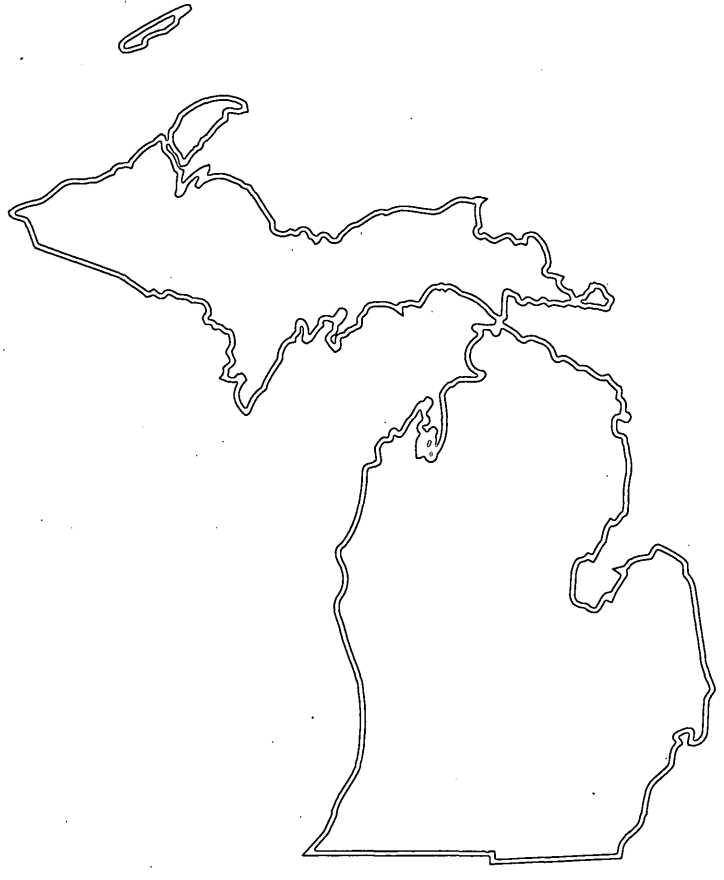
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Water Resources Data
Michigan
Water Year 2003

Water-Data Report MI-03-1



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 2003

2002

OCTOBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
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NOVEMBER

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2003

JANUARY

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SEPTEMBER

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28	29	30				

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

Water Resources Data Michigan Water Year 2003

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

Water-Data Report MI-03-1



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

U.S. DEPARTMENT OF THE INTERIOR

GALE A. NORTON, Secretary

U.S. GEOLOGICAL SURVEY

CHARLES G. GROAT, Director

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Lansing, Michigan 48911-5991

2004

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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This report was prepared in cooperation with the State of Michigan and with other agencies under the general supervision of J. R. Nicholas, District Chief, Michigan, and C. L. Hill, Regional Hydrologist, Northeastern Region.

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13. ABSTRACT *(Maximum 200 words)*

Water resources data for the 2003 water year for Michigan consists of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of ground-water wells. This report contains discharge records for 170 streamflow-gaging stations; stage only records for 1 stream-gaging station and 26 lake-gaging stations; stage and contents for 1 reservoir; water-quality records for 40 streamflow-gaging stations, and 1 lake-gaging station; and water-level records for 63 ground-water wells. Also included are 31 crest-stage partial-record stations. Additional water data were collected at various sites not involved in the systematic data-collection program. Miscellaneous data were collected at 131 discharge measuring sites. 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.

14. SUBJECT TERMS

*Michigan, *Hydrologic data, *Surface water, *Ground water, *Water quality, Flow rate, Gaging stations, Lakes, Reservoirs, Chemical analyses, Sediments, Water temperatures, Sampling sites, Water levels, Water analyses.

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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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Middle Branch Ontonagon River near Rockland (d)	04035500	44
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Cisco Lake near Watersmeet (e)	04037400	47
Cisco Branch Ontonagon River at Cisco Lake Outlet (d)	04037500	48
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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
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McClure Storage Basin Release near Marquette (d)	04043800	58
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Plum Brook at Utica (d)	04163400	304
Clinton River near Fraser (d)	04164000	305
North Branch Clinton River:		
East Pond Creek at Romeo (d)	04164100	306
Coon Creek:		
East Branch Coon Creek at Armada (d)	04164300	307
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River Raisin near Manchester (d,c,m,s)	04175600	392
River Raisin near Adrian (d)	04176000	396
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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			
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	1902-03
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 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
West Branch Manistique River near Manistique, MI (d)	04056000	322	1938-56

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			
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
Paw Paw River near Hartford, MI (d)	04102420	311	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			
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 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 (d)	04160570	18.0	1965-01
STREAMS TRIBUTARY TO LAKE ST. CLAIR			
Clinton River at Auburn Hills (d)	04161000*	123	1935-40, 1957-82, 2001-02
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
Clinton River By-Pass at mouth at Mount Clemens, MI (e)	04165557	--	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
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), 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. Temp.	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. Temp.	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. Temp., 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,
			Sed.	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,
			Temp.	1972-73
Portage Creek at Kalamazoo, MI	04106500	46.8	S.C.	1968,
			Temp., S.C.	1972-75,
			Temp.	1976-86
Kalamazoo River near Cooper Center, MI	04106770	1,248	Temp.	1968,
				1970,
			Temp., S.C.	1969,
				1971-75
Kalamazoo River at Saugatuck, MI	04108690	a2,020	S.C.	1974,
			Temp, S.C.	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		Sed.	1967-70
Silver Creek near Luther, MI	04125210		Sed.	1969-70
Poplar Creek near Hoxeyville, MI	04125350		Sed.	1969-70
Pine River near Dublin, MI	04125450		Sed.	1968-70
Pine River near Hoxeyville, MI	04125500	251	Temp.	1952-63
Pine River near Wellston, MI	04125510		Sed.	1967-70
Little Manistee River near Freesoil, MI	04126200	178	Temp.	1957-77
Manistee River at Manistee	04126520	1,928	Temp., S.C.	1975-81
Boardman River at Brown Bridge Road nr Mayfield	04126970	141	Temp., S.C.	1998
Boardman River near Mayfield, MI	04127000	182	Temp.	1962-77
Boardman River at Traverse City	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 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	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 near Jeddo, MI	04159492	464	Temp.	1997
Black River at Fargo, MI	04159500	480	Sed.	1966,
			Temp.	1979-82
STREAMS TRIBUTARY TO LAKE ST. CLAIR				
Clinton River near Drayton Plains, MI	04160900	79.2	Temp.	1962-74
Clinton River at Sterling Heights, MI	04161820	309	Temp.	1996-98
Clinton River near Fraser, MI	04164000	444	Sed.	1966
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
STREAMS TRIBUTARY TO LAKE ERIE				
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, 2003

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 170 streamflow-gaging stations, 31 crest-stage partial-record stations and 131 miscellaneous sites; (2) stage only records for 1 stream-gaging station and 26 lake-gaging stations; (3) stage and content records for 1 reservoir; (4) water-quality records for 40 streamflow-gaging stations, and 1 lake-gaging station; (5) water-level records for 63 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-03-1." 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 District Chief 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 Chester, Director, Water Division, Richard A. Powers, Chief, and Geologic and Land Management Division, Hal Fitch, Chief.

Michigan Department of Natural Resources, K. L. Cool, 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; Indiana Michigan Power Co.; 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, 2003

SUMMARY OF HYDROLOGIC CONDITIONS

Streamflow

In the western Upper Peninsula, monthly mean streamflow (discharge) of the Sturgeon River near Sidnaw (fig. 1) was considerably above the 75th percentile in October, but decreased to between the 25th and 50th percentile in November and December. Streamflow equalled the 25th percentile in January and decreased to below the 25th percentile in February, before rising to about the 75th percentile in March, as a result of moderating temperatures and snowmelt after the middle of the month. Streamflow in April equalled the 50th percentile, rising to between the 50th and 75th percentile in May. Peak streamflow of 2,410 ft^3/s occurred on May 12th, as a result of about three inches of rainfall. Streamflow in June was about the 50th percentile, but fell to about half of the 25th percentile in July as very dry conditions prevailed. Streamflow increased to about the 50th percentile in August but fell back below the 25th percentile in September. Annual mean streamflow for 2002 was 210 ft^3/s. The 1971-2000 annual mean streamflow is 211 ft^3/s and the annual mean streamflow for period of record (1931-2003) is 210 ft^3/s.

Dry conditions prevailed in the eastern Upper Peninsula throughout much of 2003. Streamflow of the Tahquamenon River near Paradise (fig. 1) began the year slightly below the 1971-2000 monthly mean in October, and was below the mean for every other month during the year except April and May. Streamflow in October was about the 50th percentile, but fell below the 25th percentile from November through February. Streamflow increased to near the 50th percentile in March and between the 50th and 75th percentile in April and May. Streamflow fell to about the 25 th percentile for the remainder of the year. Annual mean streamflow for 2003 was 797 ft^3/s, which is about 13 percent less than the 1971-2000 annual mean of 917 ft^3/s, and about 12 percent less than the annual mean for period of record (1931-2003) of 908 ft^3/s.

In the eastern Upper Peninsula, Black River near Garnet established a new minimum streamflow for period of record (record) throughout several days in March. On May 11-12, heavy rain fell across northern Baraga and Marquette Counties resulting in a dam failure on the Silver River, which flows into Huron Bay, and the Dead River, which flows into Lake Superior at Marquette. A record instantaneous peak occurred at the Silver River near L'Anse on May 12, although the gage has only been in operation since September 2001. Substantial damage occurred on the Dead River as a result of dam failures at the Silver Lake Basin in northwest Marquette County, and Tourist Park in the City of Marquette. A record-high stage was recorded May 12 at the McClure Storage Basin Release near Marquette. Streamflow at the site is limited to the maximum flow through the powerhouse and high stages were the result of backwater in the channel downstream of the powerhouse, which at that time contained overbank flow from the main river channel, as well as inflow from Reany Creek.

Dry conditions prevailed in the northern Lower Peninsula throughout 2003 as they have for several years. Monthly mean streamflow of the Muskegon River at Evart (fig. 1) was considerably below the 25th percentile every month of 2003, except July, when it was between the 25th and the 50th percentile. Annual mean streamflow for 2003 was 581 ft^3/s, which is only about 50 percent of the 1971-2000 annual mean of 1,140 ft^3/s, and about 44 percent less than the annual mean for period of record (1931-2003) of 1,044 ft^3/s.

Lower than normal streamflow was recorded at many sites in the northern Lower Peninsula. A number of sites had record-low annual-mean streamflow, including Pine River at Hoxeyville, Manistee River near Sherman (83 years of record), Au Sable River at Red Oak, Clam River at Vogel Center, and Bear Creek near Muskegon. Record seven-day-minimum streamflow was also established at the White River near Whitehall, South Branch Tobacco River near Beaverton, Au Sable River at Red Oak, Clam River at Vogel Center, and Bear Creek near Muskegon.

Dry conditions continued to prevail across the southern Lower Peninsula throughout much of 2003. Monthly mean streamflow of the Red Cedar River at East Lansing (fig. 1) was considerably below the 25th percentile from October through March, and was still below the 25th percentile in April, albeit less significantly than in the previous six months. Streamflow was about the 50th percentile in May and between the between the 50th and 75th percentile in June, but declined below the 25th percentile from July through September. Annual mean streamflow for 2003 was 108 ft^3/s, which is only about 45 percent of the 1971-2000 annual mean of 241 ft^3/s and about 50 percent less than the annual mean streamflow for period of record (1902-2003) of 216 ft^3/s.

Lower than normal streamflow also occurred at many other sites in the southern Lower Peninsula. In the Grand River Basin, record instantaneous-minimum flow occurred at Deer Creek near Dansville, and record monthly mean-minimum flows were established at six sites. In the St. Joseph River Basin, record-low annual-mean flows were established at Hog Creek near Allen and South Branch Black River near Bangor. In the Kalamazoo River Basin, record instantaneous-minimum flow occurred at four sites and record-low annual-mean flows were established at three sites. In the Clinton River Basin, record instantaneous-minimum flows occurred at two sites, record monthly mean-minimum flows were established at four sites, and a record-low annual-mean flow was established at Stony Creek near Romeo. In the Raisin River Basin, record-low annual-mean flows were established at the River Raisin near Manchester and Otter Creek near LaSalle, and a record monthly mean-minimum flow was also established at Manchester.

The following paragraph is summarized from information contained in monthly bulletins and yearly summary of Great Lakes water levels from the U.S. Army Corps of Engineers. In the entire Great Lakes Basin, abnormally dry to moderate drought conditions persisted from early summer through December 2002. For calendar year 2003, precipitation in the Basin was slightly above normal, particularly in the Lower Lakes area. Frigid air temperatures in early 2003 resulted in the most extensive ice cover on the Lakes since the late-1970's. Lakes Superior, Huron, St. Clair, and Erie were almost entirely ice covered. Cool conditions throughout the spring and near- normal summer temperatures resulted in below-average evaporation throughout the Basin. Nonetheless, water levels of Lakes Superior, Michigan-Huron, St. Clair, and Erie remained below their long-term average levels throughout the year. At the end of September 2003, Great Lakes water levels varied from long-term (1918-2002) September mean levels as follows: Lake Superior was about 1.0 ft lower; Lakes Michigan and Huron were 2.0 ft lower; Lake St. Clair was about 0.9 ft lower; Lake Erie was about 0.4 ft lower; and Lake Ontario was about 0.1 ft higher. At the end of September

2003, the water level in Lakes Michigan and Huron was about 4.7 ft lower than record-high levels recorded in 1986, and about 0.6 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 year.

Water Quality

Surface-water-quality data were collected at a number of sites in 2003. Daily records of water temperature were collected at 3 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 34 stations. Sediment samples were collected at 4 sites in the Lower Peninsula, including one site where water-quality samples were also collected. Water-quality samples were collected at one lake in the Upper Peninsula.

Ground Water

Pleistocene glacial deposits cover most of the State. 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 63 wells statewide in 2003 (fig. 9). 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. Many of these 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 and Upper Peninsulas 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, at least a decade of previous record is available for some of the wells for comparison purposes. During the 2002 water year, 10 wells located throughout the state had record-low water levels. In 2003, record-low water levels were measured in 20 wells statewide. In many, if not most, wells, the unusually low water levels measured in 2003 are probably the result of dry conditions during the second half of 2002. It is notable that 8 of 13 wells in Monroe County again had record-low water levels during the 2003 water year. Although water levels in most of the wells in Monroe County had not been measured by USGS for a number of years prior to 2002, County personnel have measured the wells periodically, and the general water level trend has continued to decline. Record-low water levels were also measured in 7 of 20 wells in Kalamazoo County. Low water-level data from Kalamazoo County wells should be interpreted with caution due to the short period of record for most of the wells and proximity to large-capacity community-water-supply wells. Record-low water levels were also measured in one well in Huron County with 12 years of data and one well in Saginaw County with 17 years of data.

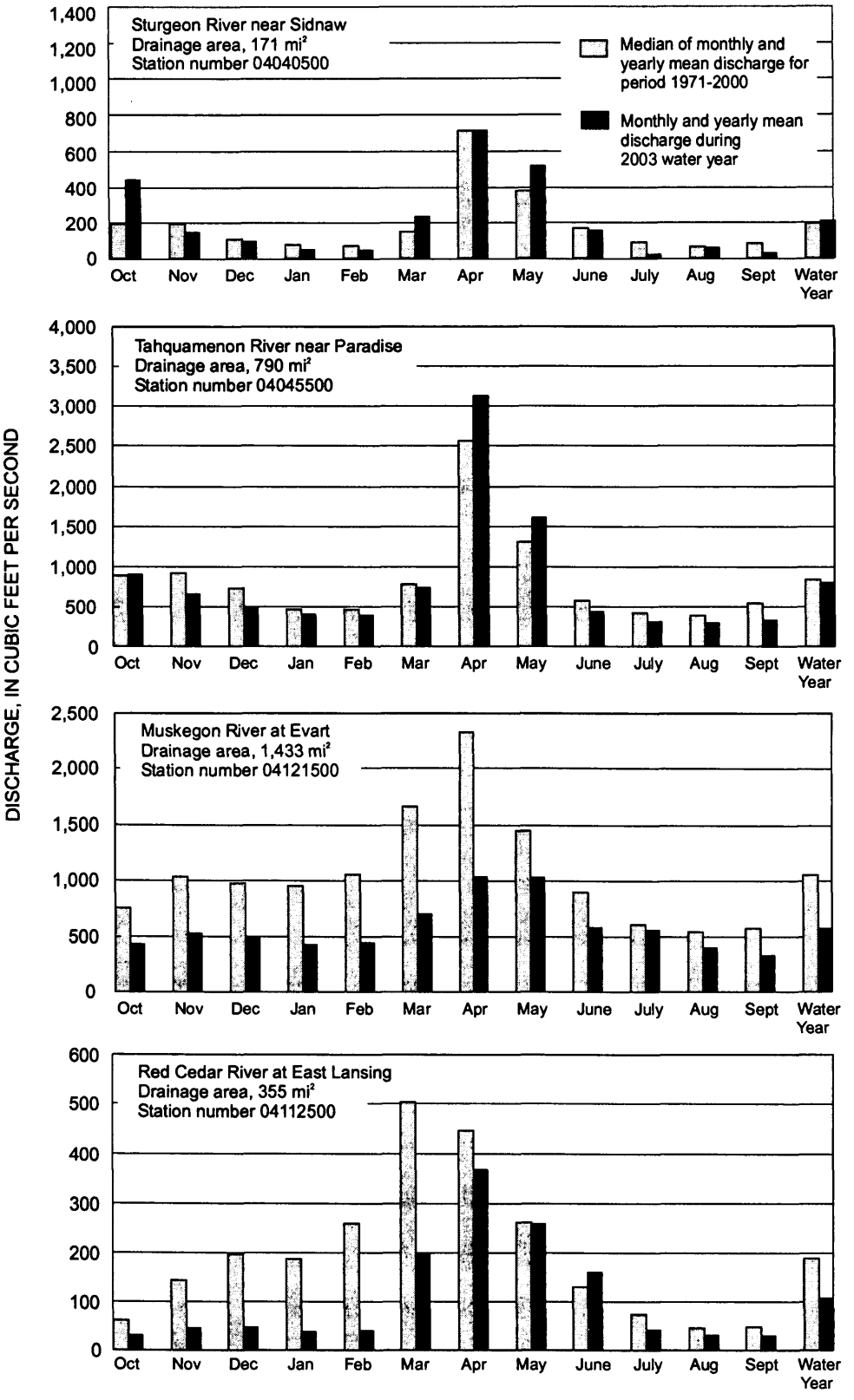


Figure 1. Discharge during 2003 water year compared with median discharge for period 1971-2000 for four representative stations.

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.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic Benchmark Network is a network of 50 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by human activities.

National Stream-Quality Accounting Network (NASQAN) monitors the water quality of large rivers within four of the Nation's largest river basins--the Mississippi, Columbia, Colorado, and Rio Grande. The network consists of 39 stations. 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 Program (NAWQA); (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.

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) provides continuous measurement and assessment of the chemical climate of precipitation throughout the United States. As the lead federal agency, the USGS works together with over 100 organizations to accomplish the following objectives; (1) Provide a long-term, spatial and temporal record of atmospheric deposition generated from a network of 191 precipitation chemistry monitoring sites. (2) Provide the mechanism to evaluate the effectiveness of the significant reduction in SO2 emissions that began in 1995 as implementation of the Clean Air Act Amendments (CAAA) occurred. (3) Provide the scientific basis and nationwide evaluation mechanism for implementation of the Phase II CAAA emission reductions for SO2 and NOx scheduled to begin in 2000.

Data from the network, as well as information about individual sites, are available through the world wide web at:

http://nadp.sws.uiuc.edu/

The National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey 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; provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

Assessment activities are being conducted in 53 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 will be 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 decision making by water-resources managers 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 is available through the world wide web at:

http://wwwrvares.er.usgs.gov/nawqa/nawqa_home.html

EXPLANATION OF THE RECORDS

The surface-water, water quality, and ground-water records published in this report are for the 2003 water year that began October 1, 2002, and ended September 30, 2003. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for surface water, and ground-water level data. The locations of the stations and wells where the data were collected are shown in figures 4-9. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

Station Identification Numbers

Each data station, whether streamsite, lake, or well, in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The systems used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. The "downstream order" system is used for all surface-water stations except some lakes and the "latitude-longitude" system is used for wells and lakes.

Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indention in the "List of Stations" in the front of this report. Each indention represents one rank. This downstream order and system of indention shows which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

The station-identification number is assigned according to downstream order. In assigning station numbers, 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 made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station, such as 04037500, which appears just to the left of the station name, includes the two-digit Part number "04" plus the six-digit downstream-order number "037500." The Part number designates the major river basin; for example, Part "04" is the St. Lawrence River basin.

Latitude-Longitude System

The identification numbers for wells are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a 1-second grid. This site-identification number, once assigned, is a pure number and has no locational significance. In the rare 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. (See figure 2.)

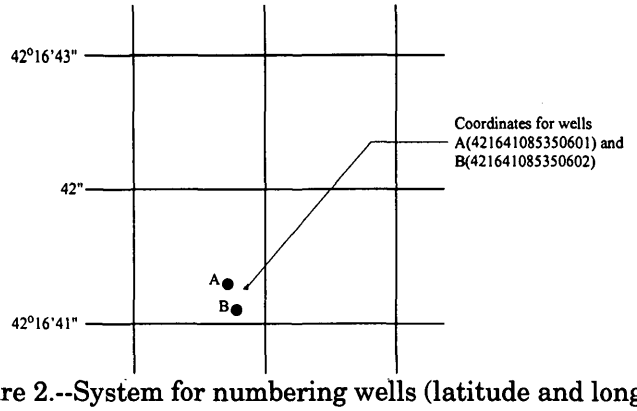


Figure 2.--System for numbering wells (latitude and longitude).

Local Well Numbering System

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.

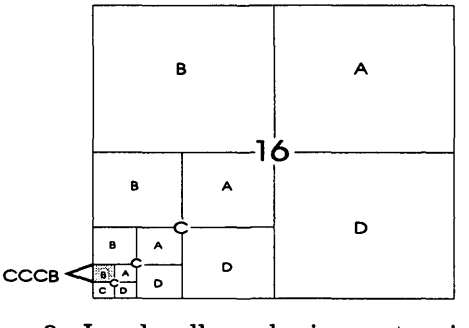


Figure 3.--Local well numbering system in Michigan.

Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for anytime, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-month contents commonly are published for such stations, they are referred to as "daily stations."

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "Crest-stage partial records," or "Low-flow partial records." Records of miscellaneous discharge measurements or of measurements from special studies, such as low-flow seepage studies, may be considered as partial records, but they are presented separately in this report. Location of all complete-record water-discharge stations for which data are given in this report are shown in figures 4 and 5.

Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relationships between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relationship between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

Continuous records of stage are obtained at selected time intervals with electronic data loggers. Measurements of discharge are made with current meters using methods adopted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow over dams or weirs; or (4) step-backwater techniques.

Discharges are computed by applying the stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the discharge is determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

At some stream-gaging stations, the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This 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 set at some distance from the base gage.

At some gaging stations, acoustic velocity meter (AVM) systems are used to compute discharge. The AVM system measures the stream's velocity at one or more paths in the cross section. Coefficients are developed to relate this path velocity to the mean velocity in the cross section. Because the AVM sensors are fixed in position, the adjustment coefficients generally vary with stage. Cross-sectional area curves are developed to relate stage, recorded as noted above, to area. Discharge is computed by multiplying path velocity by the appropriate stage related coefficient and area.

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves or tables defining the relationship of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relationship changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relationship. Even when this is done, the contents computed may become increasingly in error as the time lapse since the last survey increases. Discharges over lake or reservoir spillways are computed from stage-discharge relationships much as other stream discharges are computed.

For some gaging stations, there are periods when no gage-height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or for various reasons fails to operate properly. For such periods, the daily discharges are estimated from the recorded range in stage, previous or following record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

Data Presentation

The records published for each continuous-record surface-water discharge station (gaging station) consist of four parts, the manuscript or station description; the data table of daily mean values of discharge for the current water year with summary data; a tabular statistical summary of monthly mean flow data for a designated period, by water year; and 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 manuscripts

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 to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations 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 indicates the 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 flow at it can reasonably be considered equivalent to flow at the present station.

REVISED RECORDS.--Because of new information, published records occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to sea level (see glossary), 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 are flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge".) The REMARKS paragraph is used to present information 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, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the U.S. Geological Survey by a cooperating organization are identified here.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning 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 U.S. Geological Survey.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published 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 ever revised after the station was discontinued. Of course, if the data for a discontinued station were obtained by computer retrieval, the data would be current and there would be no need to check because 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 skeleton stage-capacity table when daily contents are given.

Headings for AVERAGE DISCHARGE, EXTREMES FOR PERIOD OF RECORD, AND EXTREMES FOR CURRENT YEAR are presented in the tabular summaries following the discharge table or in the REMARKS paragraph, as appropriate.

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 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 month. Discharge for the month also is usually 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"). Figures for cubic feet per second per square mile and runoff in inches or in acre- feet may be omitted if there is extensive regulation or diversion 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 contents are given. These figures are identified by a symbol and corresponding footnote.

Statistics of monthly mean data

A tabular summary of the mean (line headed "MEAN"), maximum (line headed "MAX"), and minimum (line headed "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 figures. 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. It will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be 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 record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be 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.

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 with footnotes or in the REMARKS paragraph of the manuscript. 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 designate-period column may not be within the selected water years listed in the heading. When this occurs, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration curve statistics and runoff data are also given. Runoff data may be omitted if there is extensive regulation or diversion of flow in the drainage basin.

The following summary statistics data, as appropriate, are provided with each continous record of discharge. Comments to 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. At some stations the annual total discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes.

ANNUAL MEAN.--The arithmetic mean of the individual daily mean discharges for the year noted or for the designated period. At some stations the yearly mean discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes.

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 data 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 discharge occurring for the water year or for the designated period. Note that secondary instantaneous peak discharges above a selected base discharge are stored in District computer files for stations meeting certain criteria. Those discharge values may be obtained by writing to the District Office. (See address on back of title page of this report.)

MAXIMUM PEAK STAGE.--The maximum instantaneous stage occurring for the water year or for the designated period. If the dates of occurrence for the instantaneous peak flow and instantaneous peak stage differ, 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 equal to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Cubic feet per second 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) indicates 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; also known as 10th percentile.

50 PERCENT EXCEEDS.--The discharge that has been exceeded 50 percent of the time for the designated period; also known as 50th percentile.

90 PERCENT EXCEEDS.--The discharge that has been exceeded 90 percent of the time for the designated period; also known as 90th percentile.

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 is a table of annual maximum stage and discharge at crest-stage partial-record stations, and the second is a table of 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 generally made in times 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.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified by flagging individual daily values with the letter symbol "e" and printing a table footnote, "e Estimated".

Accuracy of the Records

The accuracy of streamflow records 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 measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "Excellent" means that about 95 percent of the daily discharges are within 5 percent of their true values; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft^3/s; to the nearest tenth between 1.0 and 10 ft^3/s; to whole numbers between 10 and 1,000 ft^3/s; and to 3 significant figures for more than 1,000 ft^3/s. The number of significant figures used is based solely on the magnitude of the discharge value.

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, figures 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 Records Available

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables are on file in the Michigan District Office. Also, most of the daily mean discharges are in computer-readable form and have been analyzed statistically. Information on the availability of the unpublished information or on the results of statistical analyses of the published records may be obtained from the Michigan District Office.

Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may 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 continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be once 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. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station where random 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 "continuing records", as used in this report, and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. 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.

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.

On-site Measurements and Sample Collection

In obtaining water-quality data, a major concern needs to be assuring that the data obtained represent the in situ quality of the water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen, need to be made on site when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to 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 publications on "Techniques of Water-Resources Investigations," Book 1, Chap. D2; Book 3, Chap. A1, A3, and A4; Book 9, Chap. A1-A9. All of these references are listed under "PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS", which appears at the end of the introductory text. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey district office.

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 through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. Many samples obtained for the National Stream Quality Accounting Network (see definitions) are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals depends on flow conditions and other factors which must be evaluated by the collector.

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.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values for each constituent measured and are based upon logged readings for the day. More detailed records (logged values) may be obtained from the Geological Survey district office whose address is given on the back of the title page of this report.

Water Temperature

Water temperatures are measured at all the water-quality stations. In addition, water temperatures are taken at time of discharge measurements for water-discharge stations. 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.

At stations where recording instruments are used, either mean temperatures and/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 Michigan 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.

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

Laboratory Measurements

Sediment samples were analyzed in the USGS Eastern Region Sediment Laboratory in Louisville, Kentucky. Mercury samples were analyzed in the USGS Mercury Research Laboratory in Madison, Wisconsin. All other samples were analyzed in the USGS National Water-Quality Laboratory in Lakewood, Colorado. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used in the analyses of mercury samples can be accessed on the World Wide Web at http://infotrek.er.usgs.gov/mercury/. Methods used in analyzing samples at the USGS National Laboratory can be accessed on the World Wide Web at http://wwwnwql.cr.usgs.gov/USGS.

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 and water temperature 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, as appropriate, 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 under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. 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 is given only if a water-quality monitor or temperature recorder is or was in operation at a station.

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

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made in the U.S. Geological Survey's distributed data system, NWIS, and subsequently to its web-based National data system, NWISWeb [http://water.usgs.gov/nwis/nwis]. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from NWIS or NWISWeb to ensure the most recent updates. Updates to NWISWeb are currently made on an annual basis.

The surface-water quality records for miscellaneous sampling sites are published in a separate table 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 report:

PRINTED OUTPUT	REMARK
E	Estimated value.
>	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.

Dissolved Trace-Element Concentrations

NOTE: Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter (µg/L) level. Recent evidence, mostly from large rivers, indicates that actual dissolved-phase concentrations for a number of trace elements are within the range of 10's to 100's of nanograms per liter (ng/L). Data above the µg/L level should be viewed with caution. Such data may actually represent elevated environmental concentrations from natural or human causes; however, these data could reflect contamination introduced during sampling, processing, or analysis. To confidently produce dissolved trace-element data with insignificant contamination, the U.S. Geological Survey began using new trace-element protocols at some stations in water year 1994.

Change in National Trends Network Procedures

NOTE: Sample handling procedures at all National Trends Network stations were changed substantially on January 11, 1994, in order to reduce contamination from the sample shipping container. The data for samples before and after that date are different and not directly comparable. A tabular summary of the differences based on a special intercomparison study, is available from the NADP Program Office, Illinois State Water Survey, 2204 Griffith Drive, Champaign, IL 61820-7495 (217-333-7873).

Records of Ground-Water Levels

Only water-level data from the USGS network of observation wells are given in this report. These data are intended to provide a sampling and historical record of water-level changes in the Nation's most important aquifers. The number, by county, of observation wells in this network in Michigan are shown in figure 9.

Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensure that measurements at each well are of consistent accuracy and reliability.

Tables of water-level data are presented by counties arranged in alphabetical order. The prime identification number for a given well is the 15-digit number that appears at the top of the station description. The secondary identification number is the local well number, an alphanumeric number, derived from the township-range location of the well.

Water-level records are obtained from direct measurements with a steel tape, electric tape, or from electronic data loggers. The 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, in feet 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 to water of several hundred feet, the error of 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 to a tenth of a foot or a larger unit.

Data Presentation

Each well record consists of three parts, the station description, the data table of water levels observed during the current water year, and a graph of the water levels for the current water year or other selected period. The description of the well is presented first through use of descriptive headings preceding the tabular data. The comments to follow clarify information presented under the various headings of the well description.

LOCATION.--This paragraph follows the well-identification number and reports the latitude and longitude (given in degrees, minutes, and seconds); a landline location designation; the hydrologic-unit number; the distance and direction from a geographic point of reference; and the owner's name.

AQUIFER.--This entry designates by name (if a name exists) and geologic age the aquifer(s) open to the well.

WELL CHARACTERISTICS.--This entry describes the well in terms of depth, diameter, casing depth and/or screened interval, method of construction, use, and additional information such as casing breaks, collapsed screen, and other 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 weekly, monthly, or some other frequency of measurement.

DATUM.--This entry describes both the measuring point and the land-surface elevation at the well. The measuring point is described physically (such as plywood instrument shelf, top of casing, top of shelter base and so on), 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 (or below) sea level; 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. It should identify wells that also are water-quality observation wells, and may be used to acknowledge the assistance of local (non-Survey) observers.

PERIOD OF RECORD.--This entry indicates the period for which there are published records for the well. It reports the month and year of the start of publication of water-level records by the U.S. Geological Survey and the words "to current year" if the records are to be continued into the following year. Periods for which water-level records are available, but are not published by the Geological Survey, may be noted.

EXTREMES FOR PERIOD OF RECORD.--This entry contains the highest and lowest water levels of the period of published record, with respect to land-surface datum, and the dates of their occurrence.

A table of water levels follows the station description for each well. Water levels are reported in feet below land-surface datum and all taped measurements of water level are listed. For wells equipped with recorders, only abbreviated tables are published; only water-level lows are listed for every fifth day and at the end of the month (EOM). The highest and lowest water levels of the water year and their dates of occurrence are shown on a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level. A hydrograph for a selected period of record follows each water-level table.

ACCESS TO USGS WATER DATA

The U.S. Geological Survey 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 at:

http://water.usgs.gov

Some water-quality and ground-water data also are available through the WWW. In addition, data can be provided in various machine-readable formats on magnetic tape or 3-1/2 inch floppy disk. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division District offices (see address on the back of the title page).

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")

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 (μm^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 ($\mu m^3/cm^2$). (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 (μm^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:

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

pi (π) is the ratio of the circumference to the diameter of a circle; pi = 3.14159....

From cell volume, total algal biomass expressed as biovolume (μm^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 bound-aries. 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, [$(ft^3/s)/d$]) 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, $(ft^3/s)/mi^2$] 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.

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 (μm^3/mL). The abundance of diatoms in periphyton samples is given in cells per square centimeter (cells/cm^2) or biovolume per square centimeter ($\mu m^3/cm^2$). (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 0.4926 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:

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

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 transfer to EIA medium. Enterococci include *Streptococcus feacalis, Streptococcus feacium, 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")

Fire algae (*Pyrrhophyta*) 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-, 30-, or 60-minute intervals.

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 (μm^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 ($\mu m^3/cm^2$). (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.co-ops.nos.noaa.gov/tideglos.html*

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).

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.co-ops.nos.noaa.gov/tideglos.html*

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 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 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, µg/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, µg/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, µg/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, µS/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.

Nephelometric turbidity unit (NTU) is the measurement for reporting turbidity that is based on use of a standard suspension of formazin. Turbidity measured in NTU uses nephelometric methods that depend on passing specific light of a specific wavelength through the sample.

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).

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.

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 [mg C/(m^2/time)] for periphyton and macrophytes or per volume [mg C/(m^3/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 [mg O/(m^2/time)] for periphyton and macrophytes or per volume [mg O/(m^3/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 from bed (bottom) material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion 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 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 nonexceedance, 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")

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.

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 (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is defined operationally as the 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 suspended water-sediment sample that is retained on a 0.45-micrometer membrane filter 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 the 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 sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results. Determinations of "suspended, recoverable" constituents are made either by directly analyzing the suspended mate-rial collected on the filter or, more commonly, by difference, on the basis of determinations of (1) dissolved and (2) total recoverable concentrations of the constituent. (See also "Suspended")

Suspended sediment is the sediment maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid. (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 (ft^3/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")

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 hierarchial 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:	Arthropeda
Class:	Insecta
Order:	Ephemeroptera
Family:	Ephemeridae
Genus:	*Hexagenia*
Species:	*Hexagenia limbata*

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.

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 the reduction in the transparency of a solution because of the presence of suspended and some dissolved substances. The measurement technique records the collective optical properties of the solution that cause light to be scattered and attenuated rather than transmitted in straight lines; the higher the intensity of scattered or attenuated light, the higher the value of the turbidity. Turbidity is expressed in nephelometric turbidity units (NTU). Depending on the method used, the turbidity units as NTU can be defined as the intensity of light of a specified wavelength scattered or attenuated by suspended particles or absorbed at a method specified angle, usually 90 degrees, from the path of the incident light. Currently approved methods for the measurement of turbidity in the USGS include those that conform to USEPA Method 180.1, ASTM D1889-00, and ISO 7027. Measurements of turbidity by these different methods and different instruments are unlikely to yield equivalent values.

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.

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

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, 2003, is called the "2003 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")

Techniques of Water-Resources Investigations of the U.S. Geological Survey

The USGS publishes a series of manuals, the Techniques of Water-Resources Investigations, describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, section A of book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

Reports in the Techniques of Water-Resources Investigations series, which are listed below, are online at *http://water.usgs.gov/pubs/twri/*. Printed copies are for sale by the USGS, Information Services, Box 25286, Federal Center, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office), telephone 1-888-ASK-USGS. Please telephone 1-888-ASK-USGS for current prices, and refer to the title, book number, chapter number, and mention the "U.S. Geological Survey Techniques of Water-Resources Investigations." Products can then be ordered by telephone, or online at http://www.usgs.gov/sales.html, or by FAX to (303)236-469 of an order form available online at *http://mac.usgs.gov/isb/pubs/forms/*. Prepayment by major credit card or by a check or money order payable to the "U.S. Geological Survey" is required.

Book 1. Collection of Water Data by Direct Measurement

Section D. Water Quality

1–D1. *Water temperature—Influential factors, field measurement, and data presentation*, by H.H. Stevens, Jr., J.F. Ficke, and G.F. Smoot: USGS–TWRI book 1, chap. D1. 1975. 65 p.

1–D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W.W. Wood: USGS–TWRI book 1, chap. D2. 1976. 24 p.

Book 2. Collection of Environmental Data

Section D. Surface Geophysical Methods

2–D1. *Application of surface geophysics to ground-water investigations,* by A.A.R. Zohdy, G.P. Eaton, and D.R. Mabey: USGS–TWRI book 2, chap. D1. 1974. 116 p.

2–D2. *Application of seismic-refraction techniques to hydrologic studies,* by F.P. Haeni: USGS–TWRI book 2, chap. D2. 1988. 86 p.

Section E. Subsurface Geophysical Methods

2–E1. *Application of borehole geophysics to water-resources investigations,* by W.S. Keys and L.M. MacCary: USGS–TWRI book 2, chap. E1. 1971. 126 p.

2–E2. *Borehole geophysics applied to ground-water investigations,* by W.S. Keys: USGS–TWRI book 2, chap. E2. 1990. 150 p.

Section F. Drilling and Sampling Methods

2–F1. *Application of drilling, coring, and sampling techniques to test holes and wells*, by Eugene Shuter and W.E. Teasdale: USGS–TWRI book 2, chap. F1. 1989. 97 p.

Book 3. Applications of Hydraulics

Section A. Surface-Water Techniques

3–A1. *General field and office procedures for indirect discharge measurements,* by M.A. Benson and Tate Dalrymple: USGS–TWRI book 3, chap. A1. 1967. 30 p.
3–A2. *Measurement of peak discharge by the slope-area method,* by Tate Dalrymple and M.A. Benson: USGS–TWRI book 3, chap. A2. 1967. 12 p.
3–A3. *Measurement of peak discharge at culverts by indirect methods,* by G.L. Bodhaine: USGS–TWRI book 3, chap. A3. 1968. 60 p.
3–A4. *Measurement of peak discharge at width contractions by indirect methods,* by H.F. Matthai: USGS-TWRI book 3, chap. A4. 1967. 44 p.
3–A5. *Measurement of peak discharge at dams by indirect methods,* by Harry Hulsing: USGS–TWRI book 3, chap. A5. 1967. 29 p.
3–A6. *General procedure for gaging streams,* by R.W. Carter and Jacob Davidian: USGS–TWRI book 3, chap. A6. 1968. 13 p.
3–A7. *Stage measurement at gaging stations,* by T.J. Buchanan and W.P. Somers: USGS–TWRI book 3, chap. A7. 1968. 28 p.
3–A8. *Discharge measurements at gaging stations,* by T.J. Buchanan and W.P. Somers: USGS–TWRI book 3, chap. A8. 1969. 65 p.
3–A9. *Measurement of time of travel in streams by dye tracing,* by F.A. Kilpatrick and J.F. Wilson, Jr.: USGS–TWRI book 3, chap. A9. 1989. 27 p.
3–A10. *Discharge ratings at gaging stations,* by E.J. Kennedy: USGS–TWRI book 3, chap. A10. 1984. 59 p.
3–A11. *Measurement of discharge by the moving-boat method,* by G.F. Smoot and C.E. Novak: USGS–TWRI book 3, chap. A11. 1969. 22 p.
3–A12. *Fluorometric procedures for dye tracing*, Revised, by J.F. Wilson, Jr., E.D. Cobb, and F.A. Kilpatrick: USGS–TWRI book 3, chap. A12. 1986. 34 p.
3–A13. *Computation of continuous records of streamflow*, by E.J. Kennedy: USGS–TWRI book 3, chap. A13. 1983. 53 p.
3–A14. *Use of flumes in measuring discharge,* by F.A. Kilpatrick and V.R. Schneider: USGS–TWRI book 3, chap. A14. 1983. 46 p.
3–A15. *Computation of water-surface profiles in open channels,* by Jacob Davidian: USGS–TWRI book 3, chap. A15. 1984. 48 p.
3–A16. *Measurement of discharge using tracers*, by F.A. Kilpatrick and E.D. Cobb: USGS–TWRI book 3, chap. A16. 1985. 52 p.
3–A17. *Acoustic velocity meter systems,* by Antonius Laenen: USGS–TWRI book 3, chap. A17. 1985. 38 p.
3–A18. *Determination of stream reaeration coefficients by use of tracers,* by F.A. Kilpatrick, R.E. Rathbun, Nobuhiro Yotsukura, G.W. Parker, and L.L. DeLong: USGS–TWRI book 3, chap. A18. 1989. 52 p.
3–A19. *Levels at streamflow gaging stations*, by E.J. Kennedy: USGS–TWRI book 3, chap. A19. 1990. 31 p.
3–A20. *Simulation of soluble waste transport and buildup in surface waters using tracers*, by F.A. Kilpatrick: USGS–TWRI book 3, chap. A20. 1993. 38 p.
3–A21 *Stream-gaging cableways,* by C. Russell Wagner: USGS–TWRI book 3, chap. A21. 1995. 56 p.

Section B. Ground-Water Techniques

3–B1. *Aquifer-test design, observation, and data analysis,* by R.W. Stallman: USGS–TWRI book 3, chap. B1. 1971. 26 p.
3–B2. *Introduction to ground-water hydraulics, a programed text for self-instruction*, by G.D. Bennett: USGS–TWRI book 3, chap. B2. 1976. 172 p.
3–B3. *Type curves for selected problems of flow to wells in confined aquifers*, by J.E. Reed: USGS–TWRI book 3, chap. B3. 1980. 106 p.
3–B4. *Regression modeling of ground-water flow,* by R.L. Cooley and R.L. Naff: USGS–TWRI book 3, chap. B4. 1990. 232 p.

3–B4. *Supplement 1. Regression modeling of ground-water flow—Modifications to the computer code for nonlinear regression solution of steady-state ground-water flow problems,* by R.L. Cooley: USGS–TWRI book 3, chap. B4. 1993. 8 p.
3–B5. *Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems—An introduction,* by O.L. Franke, T.E. Reilly, and G.D. Bennett: USGS–TWRI book 3, chap. B5. 1987. 15 p.
3–B6. *The principle of superposition and its application in ground-water hydraulics,* by T.E. Reilly, O.L. Franke, and G.D. Bennett: USGS–TWRI book 3, chap. B6. 1987. 28 p.
3–B7. *Analytical solutions for one-, two-, and three-dimensional solute transport in ground-water systems with uniform flow,* by E.J. Wexler: USGS–TWRI book 3, chap. B7. 1992. 190 p.
3–B8. *System and boundary conceptualization in ground-water flow simulation,* by T.E. Reilly: USGS–TWRI book 3, chap. B8. 2001. 29 p.

Section C. Sedimentation and Erosion Techniques

3–C1. *Fluvial sediment concepts,* by H.P. Guy: USGS–TWRI book 3, chap. C1. 1970. 55 p.
3–C2. *Field methods for measurement of fluvial sediment,* by T.K. Edwards and G.D. Glysson: USGS–TWRI book 3, chap. C2. 1999. 89 p.
3–C3. *Computation of fluvial-sediment discharge,* by George Porterfield: USGS–TWRI book 3, chap. C3. 1972. 66 p.

Book 4. Hydrologic Analysis and Interpretation

Section A. Statistical Analysis

4–A1. *Some statistical tools in hydrology,* by H.C. Riggs: USGS–TWRI book 4, chap. A1. 1968. 39 p.
4–A2. *Frequency curves,* by H.C. Riggs: USGS–TWRI book 4, chap. A2. 1968. 15 p.
4–A3. *Statistical methods in water resources,* by D.R. Helsel and R.M. Hirsch: USGS–TWRI book 4, chap. A3. 1991. Available only online at http://water.usgs.gov/pubs/twri/twri4a3/. (Accessed August 30, 2002.)

Section B. Surface Water

4–B1. *Low-flow investigations,* by H.C. Riggs: USGS–TWRI book 4, chap. B1. 1972. 18 p.
4–B2. *Storage analyses for water supply,* by H.C. Riggs and C.H. Hardison: USGS–TWRI book 4, chap. B2. 1973. 20 p.
4–B3. *Regional analyses of streamflow characteristics,* by H.C. Riggs: USGS–TWRI book 4, chap. B3. 1973. 15 p.

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4–D1. *Computation of rate and volume of stream depletion by wells,* by C.T. Jenkins: USGS–TWRI book 4, chap. D1. 1970. 17 p.

Book 5. Laboratory Analysis

Section A. Water Analysis

5–A1. *Methods for determination of inorganic substances in water and fluvial sediments,* by M.J. Fishman and L.C. Friedman, editors: USGS–TWRI book 5, chap. A1. 1989. 545 p.
5–A2. *Determination of minor elements in water by emission spectroscopy,* by P.R. Barnett and E.C. Mallory, Jr.: USGS–TWRI book 5, chap. A2. 1971. 31 p.
5–A3. *Methods for the determination of organic substances in water and fluvial sediments,* edited by R.L. Wershaw, M.J. Fishman, R.R. Grabbe, and L.E. Lowe: USGS–TWRI book 5, chap. A3. 1987. 80 p.

5–A4. *Methods for collection and analysis of aquatic biological and microbiological samples,* by L.J. Britton and P.E. Greeson, editors: USGS–TWRI book 5, chap. A4. 1989. 363 p.
5–A5. *Methods for determination of radioactive substances in water and fluvial sediments,* by L.L. Thatcher, V.J. Janzer, and K.W. Edwards: USGS–TWRI book 5, chap. A5. 1977. 95 p.
5–A6. *Quality assurance practices for the chemical and biological analyses of water and fluvial sediments,* by L.C. Friedman and D.E. Erdmann: USGS–TWRI book 5, chap. A6. 1982. 181 p.

Section C. Sediment Analysis

5–C1. *Laboratory theory and methods for sediment analysis,* by H.P. Guy: USGS–TWRI book 5, chap. C1. 1969. 58 p.

Book 6. Modeling Techniques

Section A. Ground Water

6–A1. *A modular three-dimensional finite-difference ground-water flow model,* by M.G. McDonald and A.W. Harbaugh: USGS–TWRI book 6, chap. A1. 1988. 586 p.
6–A2. *Documentation of a computer program to simulate aquifer-system compaction using the modular finite-difference ground-water flow model,* by S.A. Leake and D.E. Prudic: USGS–TWRI book 6, chap. A2. 1991. 68 p.
6–A3. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 1: Model Description and User's Manual,* by L.J. Torak: USGS–TWRI book 6, chap. A3. 1993. 136 p.
6–A4. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 2: Derivation of finite-element equations and comparisons with analytical solutions,* by R.L. Cooley: USGS–TWRI book 6, chap. A4. 1992. 108 p.
6–A5. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 3: Design philosophy and programming details,* by L.J. Torak: USGS–TWRI book 6, chap. A5. 1993. 243 p.
6–A6. *A coupled surface-water and ground-water flow model (MODBRANCH) for simulation of stream-aquifer interaction,* by Eric D. Swain and Eliezer J. Wexler: USGS–TWRI book 6, chap. A6. 1996. 125 p.
6–A7. *User's guide to SEAWAT: A computer program for simulation of three-dimensional variable-density ground-water flow,* by Weixing Guo and Christian D. Langevin: USGS–TWRI book 6, chap. A7. 2002. 77 p.

Book 7. Automated Data Processing and Computations

Section C. Computer Programs

7–C1. *Finite difference model for aquifer simulation in two dimensions with results of numerical experiments,* by P.C. Trescott, G.F. Pinder, and S.P. Larson: USGS–TWRI book 7, chap. C1. 1976. 116 p.
7–C2. *Computer model of two-dimensional solute transport and dispersion in ground water,* by L.F. Konikow and J.D. Bredehoeft: USGS–TWRI book 7, chap. C2. 1978. 90 p.
7–C3. *A model for simulation of flow in singular and interconnected channels,* by R.W. Schaffranek, R.A. Baltzer, and D.E. Goldberg: USGS–TWRI book 7, chap. C3. 1981. 110 p.

Book 8. Instrumentation

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8–A1. *Methods of measuring water levels in deep wells,* by M.S. Garber and F.C. Koopman: USGS–TWRI book 8, chap. A1. 1968. 23 p.
8–A2. *Installation and service manual for U.S. Geological Survey manometers,* by J.D. Craig: USGS–TWRI book 8, chap. A2. 1983. 57 p.

Section B. Instruments for Measurement of Discharge

8–B2. *Calibration and maintenance of vertical-axis type current meters,* by G.F. Smoot and C.E. Novak: USGS–TWRI book 8, chap. B2. 1968. 15 p.

Book 9. Handbooks for Water-Resources Investigations

Section A. National Field Manual for the Collection of Water-Quality Data

9–A1. *National field manual for the collection of water-quality data: Preparations for water sampling*, by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A1. 1998. 47 p.

9–A2. *National field manual for the collection of water-quality data: Selection of equipment for water sampling*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A2. 1998. 94 p.

9–A3. *National field manual for the collection of water-quality data: Cleaning of equipment for water sampling*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A3. 1998. 75 p.

9–A4. *National field manual for the collection of water-quality data: Collection of water samples*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A4. 1999. 156 p.

9–A5. *National field manual for the collection of water-quality data: Processing of water samples*, edited by F.D. Wilde, D.B. Radtke, Jacob Gibs, and R.T. Iwatsubo: USGS–TWRI book 9, chap. A5. 1999, 149 p.

9–A6. *National field manual for the collection of water-quality data: Field measurements*, edited by F.D. Wilde and D.B. Radtke: USGS–TWRI book 9, chap. A6. 1998. Variously paginated.

9–A7. *National field manual for the collection of water-quality data: Biological indicators*, edited by D.N. Myers and F.D. Wilde: USGS–TWRI book 9, chap. A7. 1997 and 1999. Variously paginated.

9–A8. *National field manual for the collection of water-quality data: Bottom-material samples*, by D.B. Radtke: USGS–TWRI book 9, chap. A8. 1998. 48 p.

9–A9. *National field manual for the collection of water-quality data: Safety in field activities*, by S.L. Lane and R.G. Fay: USGS–TWRI book 9, chap. A9. 1998. 60 p.

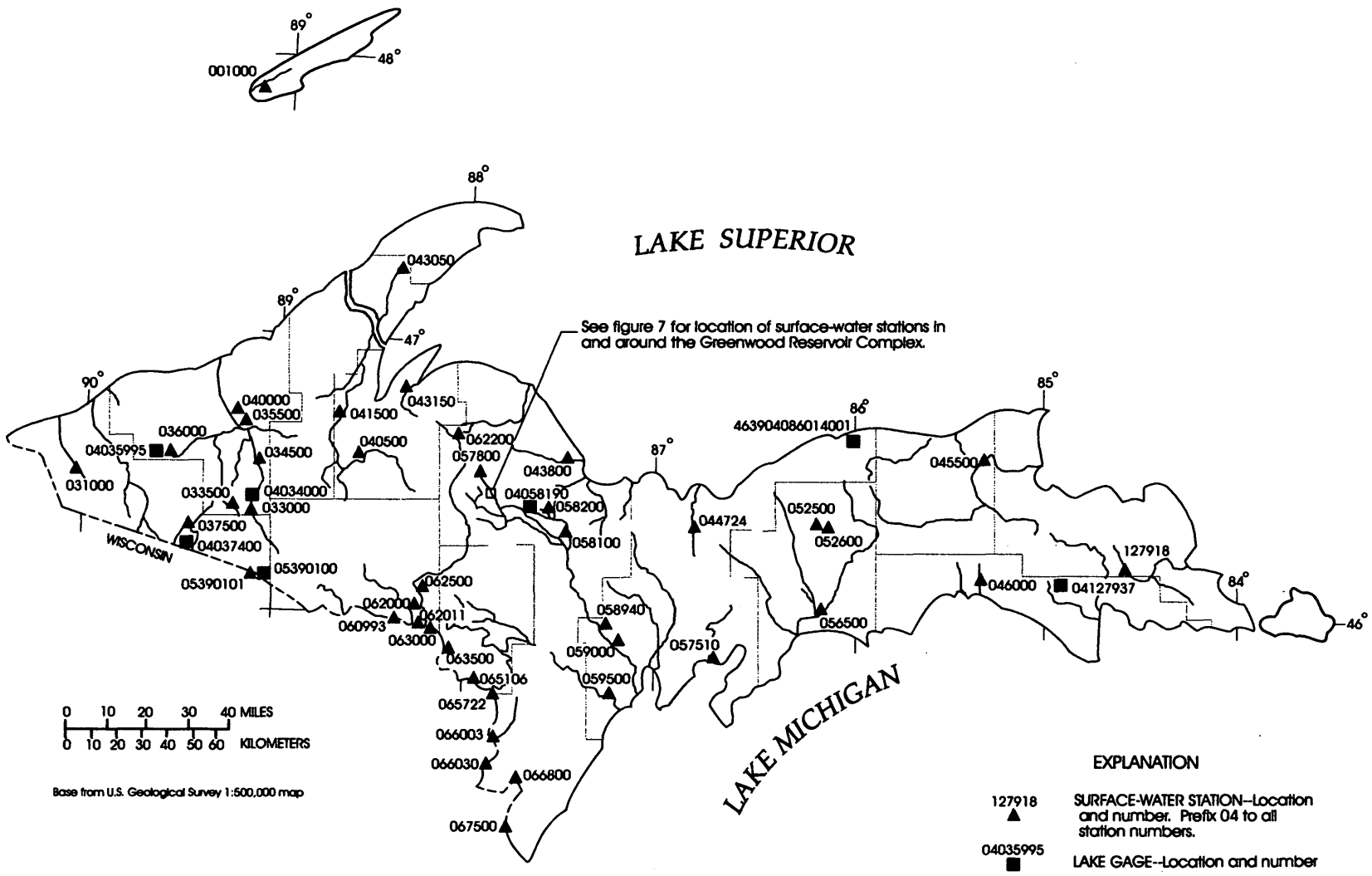


Figure 4. Identification number and location of active surface-water gaging stations in the Upper Peninsula of Michigan.

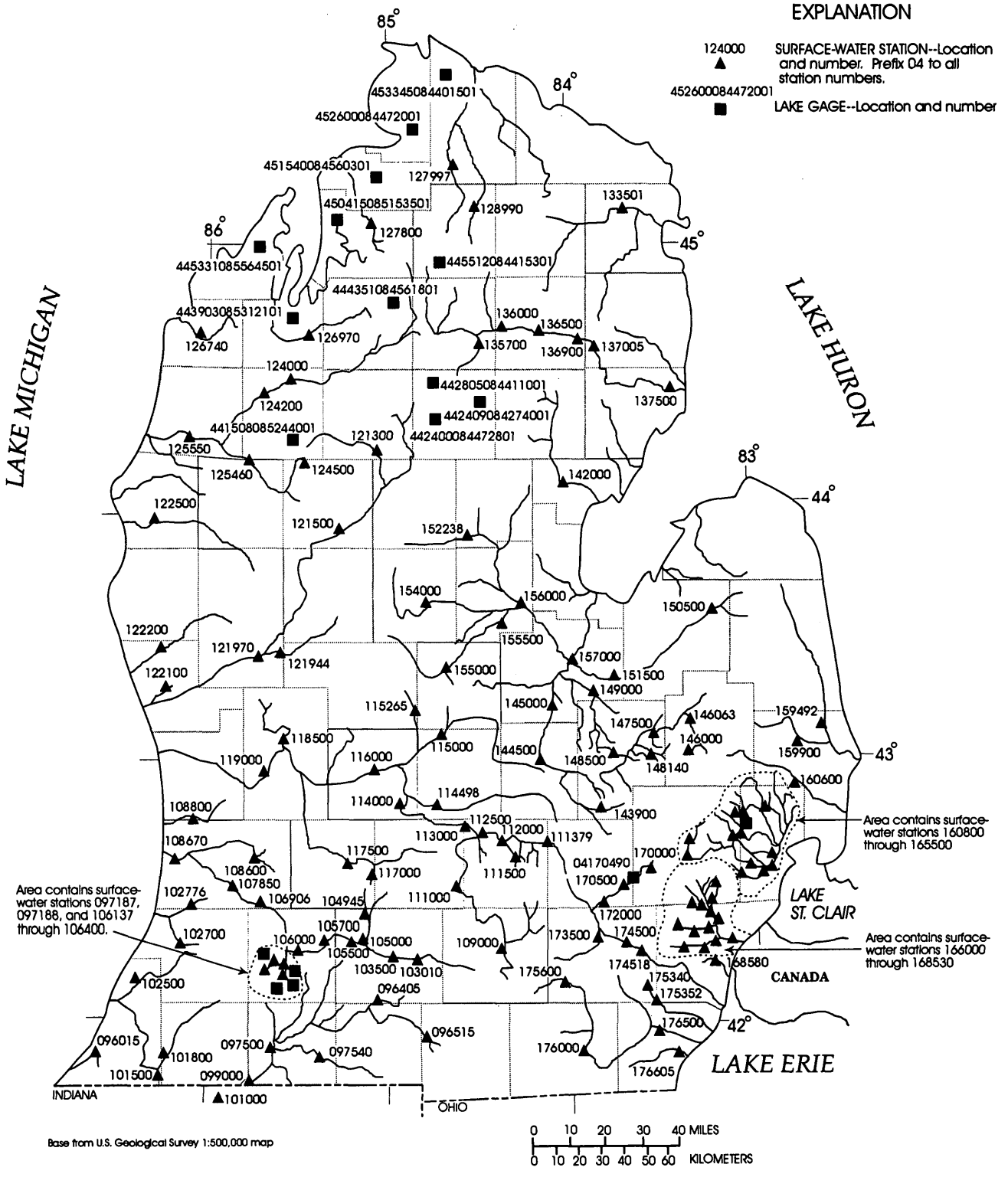


Figure 5. Identification number and location of active surface-water gaging stations in the Lower Peninsula of Michigan.

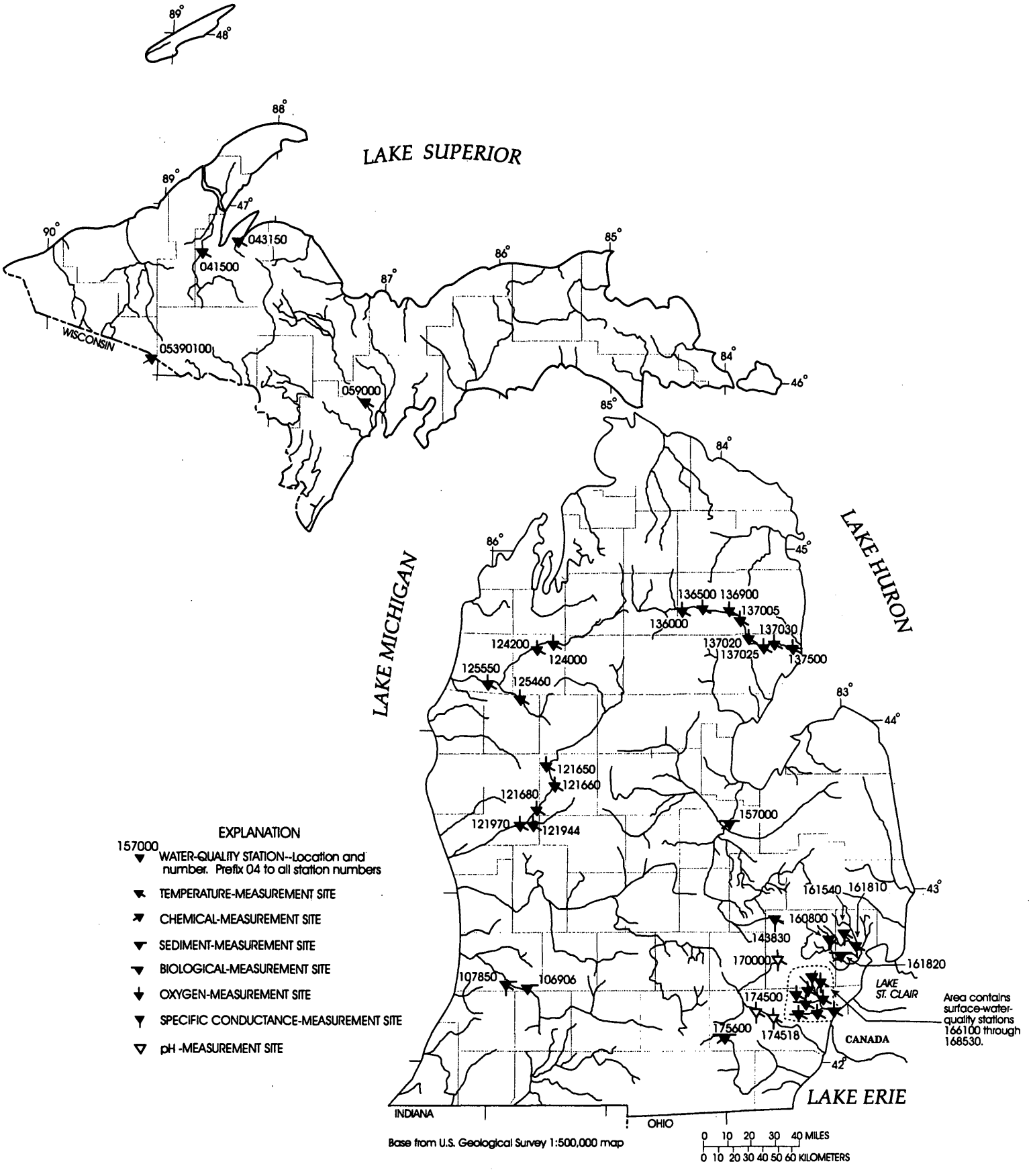


Figure 6. Identification number and location of active surface-water-quality stations in Michigan.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04001000 WASHINGTON CREEK AT WINDIGO, MI
(Hydrologic bench-mark station)

LOCATION.--Lat 47°55'23", long 89°08'42", in NW1/4 sec.28, T.64 N., R.38 W., Keweenaw County, Isle Royale National Park, Hydrologic Unit 04020300, on left bank 0.8 mi northeast of Windigo, and 35 mi southwest of Rock Harbor.

DRAINAGE AREA.--13.2 mi^2.

PERIOD OF RECORD.--October 1964 to September 2003 (discontinued).

GAGE.--Water-stage recorder, crest-stage gage, and concrete control. Elevation of gage is 605 ft above sea level, from topographic map.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	4.8	1.9	e1.7	e1.0	e1.1	e20	27	32	3.6	2.6	0.76
2	1.3	4.2	1.7	e1.7	e1.1	e1.1	e14	24	28	8.3	2.3	0.69
3	1.2	3.8	1.7	e1.7	e1.1	e1.1	e9.0	22	24	7.9	2.0	0.67
4	8.4	3.6	1.6	1.7	e1.2	e1.1	e7.0	21	20	5.3	1.8	0.64
5	17	3.5	1.5	e1.7	e1.2	e1.1	e5.0	21	18	4.1	1.7	0.61
6	14	3.2	1.6	1.6	e1.2	e1.1	e4.0	21	16	3.5	1.6	0.60
7	14	3.2	1.6	1.7	e1.2	e1.1	e2.8	20	14	4.2	1.5	0.58
8	10	3.0	1.2	e1.7	e1.2	e1.1	e2.7	20	13	3.6	1.4	0.56
9	8.3	2.9	1.1	e1.7	e1.2	e1.1	1.5	23	12	3.0	1.2	0.56
10	6.6	3.0	e1.1	1.4	e1.2	e1.1	14	71	11	2.9	0.81	0.56
11	5.6	2.8	e1.1	1.2	e1.2	e1.1	56	96	11	3.8	0.74	0.52
12	5.4	2.8	e1.1	e1.1	e1.2	e1.1	62	154	9.6	3.5	0.66	0.75
13	5.7	2.8	e1.1	e1.1	e1.2	e1.1	62	97	8.9	2.9	0.64	1.9
14	4.9	2.4	e1.1	e1.0	e1.2	e1.1	43	69	7.9	2.7	0.63	1.1
15	4.5	2.3	e1.1	e1.0	e1.2	e1.1	53	52	7.1	5.4	0.64	0.97
16	3.9	2.1	e1.1	e1.0	e1.1	e1.1	38	42	6.2	3.7	0.61	0.88
17	3.6	2.2	e1.3	e1.0	e1.1	e1.1	28	36	5.6	3.0	0.57	0.78
18	3.4	2.2	e3.8	e1.0	e1.1	e1.2	27	33	5.9	2.6	0.55	0.70
19	5.6	2.3	e10	e1.0	e1.1	e1.2	20	31	5.0	2.3	0.55	0.68
20	5.5	2.5	e9.0	e1.0	e1.1	e1.2	52	64	4.3	2.1	0.60	0.89
21	5.0	2.5	e7.0	e1.0	e1.1	e1.3	114	54	3.9	2.6	0.85	0.85
22	4.8	2.4	e4.5	e1.0	e1.1	e1.4	92	46	3.5	2.2	0.78	1.2
23	4.4	2.4	e2.9	e1.0	e1.1	e1.5	69	37	3.3	2.0	0.61	1.2
24	4.1	2.3	e2.5	e1.0	e1.1	e1.6	57	32	3.1	1.9	0.65	1.1
25	3.9	2.1	e2.2	e1.0	e1.1	e1.7	45	28	7.7	1.8	0.63	1.1
26	4.6	1.9	e1.9	e1.0	e1.1	e3.5	39	26	7.5	1.7	0.60	1.1
27	4.9	2.1	e1.8	e1.0	e1.1	e5.5	36	23	6.6	1.6	0.55	1.4
28	4.6	2.2	e1.8	e1.0	e1.1	e12	35	22	5.8	1.6	1.4	1.6
29	4.4	2.4	e1.7	e1.0	---	e20	32	21	4.9	1.6	1.7	1.5
30	5.6	2.2	e1.7	e1.0	---	e30	29	32	4.0	3.9	0.97	1.7
31	5.4	---	e1.7	e1.0	---	e25	---	37	---	3.8	0.86	---
TOTAL	182.1	82.1	75.4	38.0	31.9	125.8	1069.0	1302	309.8	103.1	32.70	28.15
MEAN	5.87	2.74	2.43	1.23	1.14	4.06	35.6	42.0	10.3	3.33	1.05	0.94
MAX	17	4.8	10	1.7	1.2	30	114	154	32	8.3	2.6	1.9
MIN	1.2	1.9	1.1	1.0	1.0	1.1	1.5	20	3.1	1.6	0.55	0.52
CFSM	0.45	0.21	0.18	0.09	0.09	0.31	2.70	3.18	0.78	0.25	0.08	0.07
IN.	0.51	0.23	0.21	0.11	0.09	0.35	3.01	3.67	0.87	0.29	0.09	0.08

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2003, BY WATER YEAR (WY)

MEAN	10.9	14.1	7.44	4.04	3.74	12.2	67.8	38.6	13.2	7.02	4.33	6.72
MAX	33.8	47.2	18.3	18.1	13.0	58.7	165	108	34.2	23.6	14.0	55.1
(WY)	1986	1992	2002	1966	1966	1966	2001	1996	1968	1999	1966	1977
MIN	0.76	0.88	0.63	0.60	0.61	1.10	20.3	4.87	2.47	0.87	0.65	0.57
(WY)	1977	1977	1977	1977	1977	1965	1987	1998	1998	1998	1998	1976

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1965 - 2003	
ANNUAL TOTAL	2630.57		3380.05			
ANNUAL MEAN	7.21		9.26		15.8	
HIGHEST ANNUAL MEAN					33.1	1966
LOWEST ANNUAL MEAN					8.12	1998
HIGHEST DAILY MEAN	130	Apr 15	154	May 12	439	May 18 1996
LOWEST DAILY MEAN	0.72	Jul 24	0.52	Sep 11	0.44	Aug 25 1977
ANNUAL SEVEN-DAY MINIMUM	0.80	Jul 19	0.57	Sep 5	0.47	Aug 19 1977
MAXIMUM PEAK FLOW			182	May 12	(a)657	May 18 1996
MAXIMUM PEAK STAGE			4.77	May 12	8.17	May 18 1996
INSTANTANEOUS LOW FLOW			0.49	(b)	0.43	Sep 2 1995
ANNUAL RUNOFF (CFSM)	0.55		0.70		1.20	
ANNUAL RUNOFF (INCHES)	7.41		9.53		16.29	
10 PERCENT EXCEEDS	16		28		37	
50 PERCENT EXCEEDS	2.8		2.2		5.6	
90 PERCENT EXCEEDS	1.1		0.89		1.3	

(a) From rating curve extended above 280 ft^3/s.
(b) Sept. 11, 12.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04031000 BLACK RIVER NEAR BESSEMER, MI

LOCATION.--Lat 46°30'41", long 90°04'28", in NE1/4 SE1/4 sec.32, T.48 N., R.46 W., Gogebic County, Hydrologic Unit 04020101, on right bank 450 ft downstream from bridge on county highway, 500 ft downstream from Powder Mill Creek, and 2.5 mi northwest of Bessemer.

DRAINAGE AREA.--200 mi^2.

PERIOD OF RECORD.--October 1954 to September 1982, October 2000 to current year.

REVISED RECORDS.--WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,154.3 ft above sea level (levels by registered surveyor).

REMARKS.--Records good except for estimated daily discharges, which are fair. Prior to 1967, flow included some ground water pumped from mines at Bessemer. Several measurements of water temperature were made during the year. Gage height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	567	210	e95	e68	e44	e34	458	296	123	47	33	17
2	502	201	e92	e65	e44	e34	468	261	109	51	31	15
3	342	186	e90	e62	e42	e34	414	237	98	68	33	15
4	920	182	e86	e60	e42	e34	e390	214	87	66	33	15
5	1680	170	e85	e58	e42	e34	e350	198	77	53	33	15
6	1800	162	e82	e56	e40	e34	e330	204	72	44	32	14
7	2470	150	e82	e54	e40	e34	e300	194	78	40	30	14
8	1620	157	e80	e52	e40	e34	284	189	77	36	27	14
9	1090	156	e80	e52	e40	e34	312	252	73	32	25	14
10	796	203	e80	e50	e40	e34	592	370	91	38	24	14
11	599	237	e80	e50	e40	e34	1190	2750	139	58	23	13
12	511	214	e82	e48	e39	e34	1460	7370	123	49	23	16
13	466	199	e85	e48	e38	e34	1500	3610	107	41	21	20
14	381	181	e88	e46	e38	e34	2560	1950	90	37	21	19
15	329	163	e90	e46	e37	e36	3170	1190	77	40	21	18
16	283	147	e95	e46	e36	e40	2060	804	67	35	20	17
17	250	139	e110	e46	e36	e55	1370	583	61	40	18	15
18	231	132	e115	e46	e36	e100	1110	441	56	39	18	13
19	298	128	e140	e46	e36	e200	1070	405	49	35	18	25
20	368	127	e160	e46	e36	e260	2520	744	44	44	20	25
21	333	126	e150	e46	e36	e340	3540	571	41	52	19	21
22	324	125	e130	e46	e36	417	2220	437	38	43	18	25
23	300	122	e120	e46	e36	496	1430	344	37	39	18	22
24	273	118	e110	e46	e36	1060	1040	280	56	35	25	20
25	256	e115	e100	e45	e36	1550	804	233	82	33	22	20
26	282	e110	e95	e44	e35	1220	636	197	88	33	27	20
27	279	e110	e90	e44	e34	1130	529	169	71	30	23	31
28	257	e105	e85	e44	e34	878	451	162	59	27	21	53
29	243	e100	e80	e44	---	643	385	153	57	25	22	44
30	235	e100	e75	e44	---	566	336	146	52	24	19	42
31	226	---	e70	e44	---	489	---	143	---	27	18	---
TOTAL	18511	4575	3002	1538	1069	9956	33279	25097	2279	1261	736	626
MEAN	597	152	96.8	49.6	38.2	321	1109	810	76.0	40.7	23.7	20.9
MAX	2470	237	160	68	44	1550	3540	7370	139	68	33	53
MIN	226	100	70	44	34	34	284	143	37	24	18	13
CFSM	2.99	0.76	0.48	0.25	0.19	1.61	5.55	4.05	0.38	0.20	0.12	0.10
IN.	3.44	0.85	0.56	0.29	0.20	1.85	6.19	4.67	0.42	0.23	0.14	0.12

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1955 - 2003, BY WATER YEAR (WY)

MEAN	200	219	109	63.2	55.5	204	1170	396	178	93.0	99.0	126
MAX	597	496	289	124	115	816	2148	810	475	362	590	553
(WY)	2003	1976	2002	1969	1981	1973	2002	2003	1974	1982	1972	1977
MIN	15.2	15.9	13.3	12.0	14.9	52.7	498	65.9	32.9	21.2	12.2	8.19
(WY)	1977	1977	1977	1977	1977	1964	1968	1977	1977	1963	1976	1976

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1955 - 2003	
ANNUAL TOTAL	130417		101929			
ANNUAL MEAN	357		279		242	
HIGHEST ANNUAL MEAN					338	2002
LOWEST ANNUAL MEAN					166	1977
HIGHEST DAILY MEAN	11700	Apr 17	7370	May 12	12700	Apr 24 1960
LOWEST DAILY MEAN	21	Jul 19	13	Sep 11	6.8	(a)
ANNUAL SEVEN-DAY MINIMUM	26	Jul 14	14	Sep 5	7.2	Sep 28 1976
MAXIMUM PEAK FLOW			8850	May 12	(b)14800	Apr 24 1960
MAXIMUM PEAK STAGE			12.16	May 12	(c)14.27	Apr 24 1960
INSTANTANEOUS LOW FLOW			13	(d)		
ANNUAL RUNOFF (CFSM)	1.79		1.40		1.21	
ANNUAL RUNOFF (INCHES)	24.26		18.96		16.45	
10 PERCENT EXCEEDS	543		614		558	
50 PERCENT EXCEEDS	115		72		87	
90 PERCENT EXCEEDS	51		22		29	

(a) Sept. 25, Oct. 1-3, 1976.
(b) From rating curve extended above 5,300 ft^3/s on basis of slope-area measurement of peak flow.
(c) From floodmark.
(d) On several days during the year.
(e) Estimated.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	165	164	e120	e100	e84	e82	e185	226	177	101	120	84
2	172	162	e120	e98	e84	e80	e180	214	166	103	111	83
3	159	165	e120	e96	e84	e80	e180	206	157	110	109	84
4	203	163	e120	e94	e84	e80	e165	198	149	108	105	81
5	326	162	e120	e94	e84	e80	e170	190	143	100	99	81
6	397	165	e120	e92	e84	e80	e160	207	143	96	95	81
7	520	160	e115	e92	e84	e80	e160	206	146	94	91	82
8	506	160	e115	e90	e84	e80	160	199	151	94	88	82
9	462	161	e115	e90	e84	e80	160	204	167	92	85	83
10	376	172	e115	e90	e84	e80	178	234	169	95	86	83
11	305	185	e115	e90	e84	e80	231	398	183	107	88	82
12	277	176	e115	e90	e84	e80	293	1150	169	113	85	88
13	272	163	e115	e90	e84	e82	316	1420	155	103	81	110
14	244	155	e115	e90	e84	e84	366	1190	144	96	79	123
15	236	151	e115	e90	e84	e90	498	879	137	102	78	127
16	227	148	e115	e90	e84	e100	545	696	131	100	77	113
17	213	144	e120	e90	e84	e110	489	561	127	95	76	102
18	199	143	e140	e90	e84	e120	421	447	126	93	75	96
19	203	139	e160	e90	e84	e130	401	378	120	89	79	92
20	201	137	e160	e90	e84	e140	528	401	115	89	82	92
21	190	139	e150	e88	e84	e150	696	385	111	95	87	90
22	193	139	e140	e88	e82	e160	705	329	109	93	89	93
23	189	139	e130	e86	e82	171	616	282	107	90	84	96
24	182	137	e125	e86	e82	201	504	251	111	87	82	93
25	179	139	e120	e84	e82	246	427	229	115	85	82	92
26	192	142	e120	e84	e82	246	374	210	116	86	98	96
27	198	152	e115	e84	e82	226	325	197	111	87	105	102
28	189	210	e110	e84	e82	215	292	190	106	85	94	114
29	180	185	e105	e84	---	e200	269	188	107	84	96	116
30	175	124	e100	e84	---	e195	244	183	105	88	92	116
31	170	---	e100	e84	---	e190	---	186	---	117	90	---
TOTAL	7700	4681	3765	2772	2338	4018	10238	12234	4073	2977	2788	2857
MEAN	248	156	121	89.4	83.5	130	341	395	136	96.0	89.9	95.2
MAX	520	210	160	100	84	246	705	1420	183	117	120	127
MIN	159	124	100	84	82	80	160	183	105	84	75	81
CFSM	1.51	0.95	0.74	0.55	0.51	0.79	2.08	2.41	0.83	0.59	0.55	0.58
IN.	1.75	1.06	0.85	0.63	0.53	0.91	2.32	2.78	0.92	0.68	0.63	0.65

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2003, BY WATER YEAR (WY)

MEAN	158	161	128	108	105	141	359	270	195	146	124	139
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1942 - 2003	
ANNUAL TOTAL	67776		60441			
ANNUAL MEAN	186		166		169	
HIGHEST ANNUAL MEAN					226	1943
LOWEST ANNUAL MEAN					107	1948
HIGHEST DAILY MEAN	1870	Apr 17	1420	May 13	2000	Apr 30 1951
LOWEST DAILY MEAN	64	Feb 4	75	Aug 18	57	Aug 8 1990
ANNUAL SEVEN-DAY MINIMUM	65	Feb 3	78	Aug 13	61	Aug 7 1990
MAXIMUM PEAK FLOW			1450	May 13	(a)2050	Apr 30 1951
MAXIMUM PEAK STAGE			9.31	May 13	10.60	Apr 17 2002
INSTANTANEOUS LOW FLOW			74	(b)	(c)27	Nov 22 1946
ANNUAL RUNOFF (CFSM)	1.13		1.01		1.03	
ANNUAL RUNOFF (INCHES)	15.37		13.71		14.04	
10 PERCENT EXCEEDS	319		286		292	
50 PERCENT EXCEEDS	122		115		128	
90 PERCENT EXCEEDS	87		83		88	

(a) Gage height 10.0 ft, from floodmark.
(b) Aug. 18, 19.
(c) Result of freezeup.
(e) 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 estimated daily discharges for Feb. 18 to Mar. 30 and daily discharges below 5.0 ft^3/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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	136	134	130	e170	e70	23	43	148	172	44	55
2	35	135	134	130	e170	e69	23	44	143	172	44	56
3	35	136	134	130	e170	e69	23	44	138	172	44	44
4	36	136	134	130	e169	e69	24	44	138	171	45	28
5	35	136	134	130	e169	e68	24	63	138	171	47	28
6	37	135	133	148	e169	e68	24	123	138	170	47	27
7	36	135	133	167	e169	e67	24	155	138	167	47	27
8	37	135	131	173	e169	e67	24	143	138	163	47	27
9	37	135	130	180	e169	e66	25	108	138	163	47	27
10	38	135	131	180	e169	e66	25	84	154	163	47	27
11	38	135	133	179	e169	e66	31	88	179	163	29	27
12	38	135	132	181	e169	e65	35	61	179	162	4.9	27
13	38	135	132	181	e169	e64	36	26	179	162	4.4	27
14	42	135	132	181	e169	e48	37	26	178	137	3.6	27
15	56	135	132	181	e169	e38	39	26	178	111	2.5	27
16	56	135	132	180	e169	e38	26	26	178	98	2.3	27
17	47	135	132	179	e169	e38	4.9	26	178	98	2.2	27
18	35	135	132	e172	e169	e38	4.4	26	178	98	5.2	26
19	35	135	131	e172	e157	e38	3.8	26	177	98	41	26
20	35	135	131	e172	e118	e39	3.4	26	177	98	42	26
21	30	135	131	e172	e84	e39	3.2	25	176	85	53	26
22	23	135	131	e172	e74	e39	3.0	26	176	55	53	26
23	23	134	131	e172	e73	e39	2.8	26	176	38	53	26
24	23	134	131	e172	e73	e34	22	26	175	38	54	26
25	23	134	131	e172	e72	e25	76	26	175	37	54	26
26	23	134	131	e172	e71	e22	70	26	175	37	55	26
27	23	134	131	e172	e71	e22	53	26	174	37	54	26
28	23	134	131	e172	e70	e22	43	50	173	41	54	26
29	42	134	131	e172	---	e22	43	106	173	45	53	31
30	99	134	130	e172	---	e23	43	148	173	45	54	42
31	135	---	130	e170	---	23	---	148	---	45	54	---
TOTAL	1248	4046	4086	5166	3908	1461	818.5	1841	4938	3412	1187.1	894
MEAN	40.3	135	132	167	140	47.1	27.3	59.4	165	110	38.3	29.8
MAX	135	136	134	181	170	70	76	155	179	172	55	56
MIN	23	134	130	130	70	22	2.8	25	138	37	2.2	26

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2003, BY WATER YEAR (WY)

MEAN	107	97.2	138	181	195	130	30.9	110	164	167	159	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	0.000	6.24	8.68	55.2	35.8	2.21	0.33	0.92	3.37	14.5	2.98	1.37
(WY)	1965	1944	2001	1990	1999	1959	1962	1962	1943	1949	1966	1959

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1942 - 2003	
ANNUAL TOTAL	40501.6		33005.6			
ANNUAL MEAN	111		90.4		135	
HIGHEST ANNUAL MEAN					206	1983
LOWEST ANNUAL MEAN					55.9	1977
HIGHEST DAILY MEAN	202	Jan 1	181	Jan 12	368	May 5 1960
LOWEST DAILY MEAN	4.2	May 23	2.2	Aug 17	(a)	
ANNUAL SEVEN-DAY MINIMUM	18	May 18	3.6	Aug 12	(b)	
10 PERCENT EXCEEDS	184		172		294	
50 PERCENT EXCEEDS	132		70		130	
90 PERCENT EXCEEDS	29		25		5.2	

(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.
(e) 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 mi^2.

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, 39,380 acre-ft, May 13, gage height, 140.2 ft; minimum observed, 22,900 acre-ft, Mar. 8, 9, gage height, 132.7 ft.

MONTHEND GAGE HEIGHT AND CONTENTS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)	Change in contents (equivalent in ft^3/s)
Sept. 30	135.5	28,700		
Oct. 31	139.2	37,060	+8,360	+136
Nov. 30	138.6	35,680	-1,380	-23.2
Dec. 31	137.4	32,920	-2,760	-44.9
CAL YR 2002			-920	-1.3
Jan. 31	135.1	27,820	-5,100	-83
Feb. 28	132.7	22,900	-4,920	-88.6
Mar. 31	135.0	27,600	+4,700	+76.4
Apr. 30	139.3	37,290	+9,690	+163
May 31	139.8	38,440	+1,150	+18.7
June 30	137.4	32,920	-5,520	-92.8
July 31	135.0	27,600	-5,320	-86.5
Aug. 31	134.7	26,970	-630	-10.2
Sept. 30	134.0	25,500	-1,470	-24.7
WTR YR 2003			-3,200	-4.4

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	79	65	58	e51	48	49	62	185	59	50	71	64
2	58	64	55	51	48	e49	63	145	58	52	71	78
3	55	63	56	e49	48	e49	62	147	58	51	71	100
4	76	62	56	e48	47	e49	62	142	57	50	71	95
5	71	62	57	e49	48	e49	63	103	57	49	69	95
6	101	62	59	e49	e49	e49	67	49	58	49	70	94
7	93	62	59	e49	e48	e49	53	49	56	49	71	94
8	67	60	e58	e48	e48	e50	54	48	57	49	70	94
9	63	58	e58	e48	e48	e50	55	50	56	61	70	93
10	60	62	e57	e48	e48	e49	64	121	60	81	70	92
11	62	60	e56	47	e48	e48	81	431	58	82	69	90
12	61	58	e56	49	e48	e47	82	692	57	80	69	92
13	60	58	e56	48	e48	e47	74	1240	56	79	69	92
14	59	57	e56	e48	e48	e47	92	1380	56	79	70	96
15	59	57	e56	48	e48	e47	85	1050	56	79	70	93
16	59	57	e56	48	49	e50	66	708	56	78	70	92
17	59	56	56	49	48	52	64	689	56	78	69	91
18	61	57	e55	48	48	52	64	653	56	77	67	83
19	61	57	e55	e48	48	52	69	446	55	66	68	79
20	61	57	e55	e47	48	52	157	231	55	53	69	78
21	61	58	e55	e50	49	53	351	219	55	54	67	80
22	130	57	e55	50	49	53	586	215	55	53	66	89
23	424	57	55	51	e58	58	758	219	55	52	65	104
24	390	58	e54	49	e55	65	643	224	53	63	66	103
25	260	59	e53	48	e50	64	354	224	53	76	66	104
26	232	58	e53	e48	49	55	161	225	53	74	70	106
27	172	56	e52	e48	49	54	263	224	52	71	66	108
28	172	59	e52	e48	48	55	358	151	52	71	65	109
29	117	59	e52	e48	---	62	357	62	52	71	64	109
30	65	58	e52	48	---	62	290	63	51	71	63	111
31	65	---	e50	48	---	62	---	60	---	72	64	---
TOTAL	3413	1773	1713	1506	1368	1629	5560	10445	1668	2020	2116	2808
MEAN	110	59.1	55.3	48.6	48.9	52.5	185	337	55.6	65.2	68.3	93.6
MAX	424	65	59	51	58	65	758	1380	60	82	71	111
MIN	55	56	50	47	47	47	53	48	51	49	63	64

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2003, BY WATER YEAR (WY)

MEAN	55.7	56.3	50.4	46.8	46.3	50.4	96.4	127	94.4	68.9	57.6	53.8
MAX	221	239	181	84.7	76.8	118	530	745	461	253	105	216
(WY)	1943	1943	2002	1943	1943	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1942 - 2003	
ANNUAL TOTAL	44059		36019			
ANNUAL MEAN	121		98.7		66.6	
HIGHEST ANNUAL MEAN					187	1943
LOWEST ANNUAL MEAN					42.4	1949
HIGHEST DAILY MEAN	2030	Apr 19	1380	May 14	(e)2030	Apr 19 2002
LOWEST DAILY MEAN	39	May 31	47	Jan 11	30	Dec 1 1948
ANNUAL SEVEN-DAY MINIMUM	45	Feb 26	48	Jan 29	31	Mar 6 1949
MAXIMUM PEAK FLOW			1840	May 13	2120	Apr 19 2002
MAXIMUM PEAK STAGE			5.26	May 13	5.61	Apr 19 2002
INSTANTANEOUS LOW FLOW			41	(a)	14	(b)
10 PERCENT EXCEEDS	272		149		67	
50 PERCENT EXCEEDS	54		59		50	
90 PERCENT EXCEEDS	46		48		44	

(a) Jan. 3, Feb. 5, Apr. 8.
(b) 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 mi^2.

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 except for estimated daily discharges, which are poor. 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2860	328	e240	174	e250	e220	562	e650	488	229	427	203
2	1140	309	e250	175	e250	e220	e560	e560	375	233	319	209
3	636	295	e255	e175	e250	e220	e550	e480	331	259	436	234
4	1730	303	e270	e175	e250	e220	e540	e430	304	252	443	227
5	3150	304	e270	e175	e250	e220	e520	e400	299	237	378	231
6	4140	318	e280	e180	e250	e220	437	e380	494	226	321	263
7	4530	317	e280	e180	e250	e220	435	e370	732	227	284	234
8	1800	328	e290	e180	e240	e220	340	e370	478	223	246	225
9	1180	331	e290	e180	e240	e220	444	e392	528	209	240	218
10	834	438	e290	e185	e240	e220	1540	e750	530	239	226	211
11	643	647	e290	e185	e240	e215	3560	e4000	765	277	219	200
12	535	483	e290	e190	e240	e214	2950	e11000	567	278	216	207
13	578	393	e290	e200	e240	e215	2220	4680	390	263	207	230
14	499	349	e280	e210	e240	e215	4650	3440	314	242	204	266
15	417	325	e260	e220	e235	e225	4060	2850	277	253	206	288
16	359	276	248	e230	e230	e250	2190	1810	277	251	206	267
17	317	241	223	e240	e230	e320	1430	1600	262	253	194	244
18	299	220	242	e240	e230	e500	1690	1430	247	233	190	228
19	343	276	e400	e250	e230	e1100	2210	1260	240	226	191	228
20	406	246	e500	e250	e230	e1400	4670	1180	233	218	201	231
21	415	250	e450	e250	e230	e1700	4770	1030	236	261	207	226
22	491	256	e370	e260	e230	e2200	2970	875	235	254	213	230
23	917	254	288	e255	e230	2670	2370	770	231	239	205	256
24	934	252	248	e250	e230	5010	2180	725	236	217	204	258
25	713	245	e240	e250	e230	3720	1590	676	250	231	201	249
26	746	232	e230	e250	e230	1990	1010	621	245	232	239	261
27	667	236	e210	e250	e225	1550	e950	600	235	236	252	273
28	585	218	e200	e250	e220	1020	e900	598	235	237	218	295
29	525	e220	e190	e250	---	703	e850	394	238	224	225	301
30	389	e230	e180	e250	---	635	e780	366	238	234	246	306
31	339	---	e175	e250	---	574	---	523	---	364	212	---
TOTAL	33117	9120	8519	6759	6640	28626	53928	45210	10510	7557	7776	7299
MEAN	1068	304	275	218	237	923	1798	1458	350	244	251	243
MAX	4530	647	500	260	250	5010	4770	11000	765	364	443	306
MIN	299	218	175	174	220	214	340	366	231	209	190	200

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2003, BY WATER YEAR (WY)

MEAN	433	448	322	263	273	582	1570	772	527	357	324	343
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1942 - 2003	
ANNUAL TOTAL	239911		225061			
ANNUAL MEAN	657		617		515	
HIGHEST ANNUAL MEAN					756	1943
LOWEST ANNUAL MEAN					331	1987
HIGHEST DAILY MEAN	9770	Apr 15	11000	May 12	16300	Aug 22 1942
LOWEST DAILY MEAN	169	Jul 20	174	Jan 1	145	Dec 3 1963
ANNUAL SEVEN-DAY MINIMUM	170	Feb 2	176	Dec 30	163	Sep 24 1948
MAXIMUM PEAK FLOW			(e)14600	May 12	(a)27000	Aug 22 1942
MAXIMUM PEAK STAGE			14.61	May 12	(b)21.2	Aug 22 1942
INSTANTANEOUS LOW FLOW					(c)110	(d)
10 PERCENT EXCEEDS	1190		1430		1000	
50 PERCENT EXCEEDS	295		256		288	
90 PERCENT EXCEEDS	190		211		208	

(a) From rating curve extended above 7,500 ft^3/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 mi^2.

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, 4.45 ft, May 14; minimum, 1.12 ft, Mar. 16, 17.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.15	2.53	2.16	1.86	1.72	1.40	1.80	3.11	2.99	2.86	2.65	2.36
2	3.10	2.46	2.15	1.86	1.71	1.38	1.83	3.11	2.95	2.90	2.63	2.40
3	3.10	2.47	2.16	1.85	1.73	1.38	1.84	3.10	2.93	2.91	2.64	2.31
4	3.12	2.41	2.14	1.83	1.77	1.36	1.85	3.10	2.92	2.93	---	2.27
5	3.22	2.41	2.13	1.84	1.76	1.36	1.86	3.04	2.93	2.91	---	2.28
6	3.27	2.40	2.14	1.82	1.75	1.34	1.86	3.08	2.93	2.89	---	2.26
7	3.46	2.42	2.12	1.82	1.75	1.30	1.84	3.07	2.95	2.88	---	2.25
8	3.50	2.35	2.10	1.81	1.74	1.29	1.84	3.04	2.93	2.85	---	2.24
9	3.49	2.34	2.09	1.81	1.76	---	1.83	3.09	2.94	2.81	---	2.25
10	3.46	2.34	2.07	---	---	---	1.83	3.12	2.93	2.79	---	2.26
11	3.44	2.34	2.05	---	---	1.27	1.90	3.26	2.95	2.82	---	2.26
12	3.35	2.37	2.04	---	---	1.22	2.01	4.10	2.97	2.82	2.59	2.23
13	3.30	2.34	2.02	---	---	1.20	2.11	4.39	2.97	2.82	2.58	2.20
14	3.26	2.30	2.01	---	1.73	1.19	2.26	4.40	2.94	2.85	2.60	2.19
15	3.12	2.30	1.98	1.80	1.69	1.17	2.48	4.34	2.94	2.77	2.60	2.19
16	3.07	2.29	1.98	1.78	1.69	1.17	2.61	4.25	2.95	2.80	2.54	2.15
17	3.01	2.28	1.96	1.78	1.67	1.17	2.74	4.15	2.94	2.76	2.53	2.18
18	2.94	2.27	1.96	1.79	1.67	1.17	2.79	4.06	2.92	2.77	2.56	2.16
19	2.91	2.25	1.99	1.83	---	1.18	2.81	3.96	2.91	2.79	2.54	2.17
20	2.87	2.23	1.99	---	1.62	1.19	2.97	3.89	2.91	2.79	2.54	2.10
21	2.81	2.22	1.99	---	1.57	1.22	3.15	3.82	2.91	2.73	2.54	2.08
22	2.76	2.22	1.98	---	1.55	1.27	3.25	3.72	2.89	2.71	2.50	2.08
23	2.75	2.23	1.96	1.78	1.53	1.29	3.28	3.59	2.88	2.71	2.48	2.08
24	2.70	2.20	1.95	1.78	---	1.35	3.27	3.49	2.89	2.72	2.52	2.09
25	2.66	2.19	1.95	1.78	---	1.46	3.23	3.39	2.95	2.72	2.46	2.01
26	2.64	2.18	1.93	---	1.50	1.53	3.20	3.31	3.03	2.70	2.48	2.01
27	2.58	2.17	1.92	1.76	1.44	1.59	3.18	3.23	2.91	2.66	2.45	1.97
28	2.56	2.16	1.91	1.76	1.42	1.70	3.10	3.15	2.88	2.67	2.50	1.96
29	2.55	2.15	1.90	1.75	---	1.77	3.10	3.10	2.88	2.66	2.42	1.99
30	2.52	2.16	1.89	1.74	---	1.79	3.12	3.02	2.87	2.67	2.41	2.01
31	2.54	---	1.89	1.73	---	1.80	---	2.99	---	2.67	2.41	---
MEAN	3.01	2.30	2.02	---	---	---	2.50	3.50	2.93	2.79	---	2.17
MAX	3.50	2.53	2.16	---	---	---	3.28	4.40	3.03	2.93	---	2.40
MIN	2.52	2.15	1.89	---	---	---	1.80	2.99	2.87	2.66	---	1.96

CAL YR 2002 MEAN 2.59 MAX 5.06 MIN 1.47

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	249	272	129	107	86	159	237	159	260	45	28	4.0
2	321	247	127	105	85	155	240	175	245	52	28	13
3	348	248	126	103	88	153	241	174	160	53	27	31
4	393	228	122	101	94	152	245	172	83	46	23	33
5	533	227	119	99	94	148	249	164	60	46	20	37
6	616	221	118	98	93	143	247	167	58	45	18	34
7	713	226	115	98	93	143	244	167	57	45	16	32
8	733	201	113	95	92	141	244	164	57	44	13	31
9	728	199	127	94	92	139	243	171	56	43	12	31
10	716	194	162	98	90	134	246	175	56	42	11	30
11	711	198	159	100	90	134	258	213	57	42	8.5	30
12	680	208	155	95	90	132	283	923	57	41	7.5	28
13	663	194	149	96	89	130	308	1220	55	41	7.3	37
14	643	181	146	98	87	128	346	1230	53	41	6.6	44
15	597	179	140	96	89	126	405	1190	52	40	6.8	54
16	576	177	138	94	89	125	447	1140	52	40	5.7	59
17	553	170	134	93	89	124	486	1090	49	40	5.8	60
18	530	168	133	94	89	124	502	1040	47	40	5.7	58
19	518	159	137	96	89	125	513	983	47	40	6.3	59
20	506	154	139	96	146	128	568	950	44	40	6.4	53
21	486	147	140	96	184	134	633	914	44	39	6.5	51
22	471	147	136	94	182	141	672	866	44	39	5.9	50
23	468	150	134	95	180	143	682	806	45	37	5.4	51
24	453	141	129	93	178	154	676	764	44	35	5.4	52
25	440	139	128	92	173	171	662	720	45	34	4.9	55
26	434	136	124	93	169	183	649	685	46	35	5.3	63
27	418	134	122	93	165	195	641	654	45	33	4.7	59
28	344	131	119	92	162	215	611	622	44	31	4.2	58
29	283	129	115	91	---	230	426	527	45	30	4.3	61
30	271	129	114	89	---	234	197	451	45	29	4.3	63
31	276	---	123	87	---	236	---	323	---	29	4.2	---
TOTAL	15671	5434	4072	2971	3247	4779	12401	18999	2052	1237	317.7	1321.0
MEAN	506	181	131	95.8	116	154	413	613	68.4	39.9	10.2	44.0
MAX	733	272	162	107	184	236	682	1230	260	53	28	63
MIN	249	129	113	87	85	124	197	159	44	29	4.2	4.0

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2003, BY WATER YEAR (WY)

MEAN	131	153	170	166	155	149	341	301	208	135	76.5	76.6
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1942 - 2003	
ANNUAL TOTAL	91512.3		72501.7			
ANNUAL MEAN	251		199		171	
HIGHEST ANNUAL MEAN					288	1952
LOWEST ANNUAL MEAN					70.1	1948
HIGHEST DAILY MEAN	1650	Apr 19	1230	May 14	1650	Apr 19 2002
LOWEST DAILY MEAN	4.9	Sep 4	4.0	Sep 1	0.38	Nov 16 1989
ANNUAL SEVEN-DAY MINIMUM	5.4	Aug 31	4.4	Aug 26	0.39	Nov 12 1989
MAXIMUM PEAK FLOW			1240	May 14	1700	Apr 19 2002
MAXIMUM PEAK STAGE			5.43	May 14	6.06	Apr 19 2002
ANNUAL RUNOFF (CFSM)	1.55		1.23		1.05	
ANNUAL RUNOFF (INCHES)	21.01		16.65		14.33	
10 PERCENT EXCEEDS	670		571		363	
50 PERCENT EXCEEDS	150		125		126	
90 PERCENT EXCEEDS	8.1		30		8.1	

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 mi^2.

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, 4.59 ft, May 14; minimum, 3.80 ft, Oct. 15.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.91	3.88	3.92	3.88	3.88	3.90	3.87	3.87	3.85	3.87	3.91	3.88
2	3.89	3.89	3.93	3.88	3.86	---	3.86	3.89	3.84	3.88	3.93	3.90
3	3.88	3.92	3.92	3.89	3.88	---	3.86	3.92	3.85	3.89	3.92	3.87
4	3.91	3.91	3.92	3.90	3.90	---	3.88	3.94	3.85	3.90	3.91	3.87
5	3.91	3.94	3.92	3.91	3.91	3.89	3.88	3.94	3.85	3.89	3.90	3.88
6	3.94	3.92	3.93	3.92	3.90	3.88	3.88	3.94	3.86	3.90	3.89	3.87
7	3.98	3.92	3.93	3.91	3.90	3.87	3.87	3.94	3.89	3.88	3.88	3.87
8	3.96	3.89	3.93	3.89	3.90	3.88	3.85	3.94	3.90	3.86	3.88	3.86
9	3.91	3.89	3.93	3.87	3.90	3.90	3.84	3.97	3.92	3.86	3.87	3.88
10	3.88	3.88	3.92	3.87	---	---	3.84	3.97	3.94	3.85	3.86	3.88
11	3.88	3.88	3.91	3.85	---	---	3.84	4.07	3.94	3.89	3.85	3.88
12	3.87	3.88	3.90	3.84	---	3.87	3.85	4.40	3.91	3.90	3.84	3.90
13	3.85	3.87	3.90	3.83	---	3.86	3.88	4.53	3.87	3.92	3.84	3.92
14	3.88	3.88	3.89	3.83	---	3.85	3.90	4.58	3.87	3.93	3.84	3.94
15	3.82	3.90	3.88	3.83	---	3.85	3.91	4.57	3.87	3.90	3.85	3.94
16	3.82	3.91	3.88	3.84	---	3.86	3.89	4.53	3.88	3.90	3.84	3.94
17	3.82	3.92	3.87	3.86	---	3.88	3.91	4.49	3.87	3.89	3.84	3.94
18	3.85	3.94	3.88	3.87	---	3.89	3.90	4.44	3.86	3.88	3.85	3.92
19	3.86	3.96	3.90	3.89	---	3.89	3.88	4.38	3.86	3.87	3.83	3.86
20	3.87	3.96	3.90	3.90	3.87	3.90	3.93	4.33	3.86	3.87	3.88	3.87
21	3.90	3.96	3.89	3.91	3.87	3.92	3.94	4.31	3.86	3.87	3.87	3.88
22	3.93	3.94	3.88	3.92	3.88	3.92	3.96	4.24	3.85	3.88	3.86	3.86
23	3.93	3.93	3.88	3.92	3.89	3.89	3.96	4.18	3.86	3.89	3.86	3.85
24	3.92	3.91	3.87	3.92	3.90	3.87	3.93	4.12	3.87	3.91	3.88	3.85
25	3.91	3.91	3.86	3.92	3.91	3.86	3.90	4.06	3.89	3.92	3.87	3.84
26	3.88	3.90	3.86	3.92	3.92	3.86	3.88	3.99	3.87	3.92	3.90	3.88
27	3.85	3.90	3.86	3.92	3.92	3.87	3.87	3.94	3.85	3.89	3.90	3.87
28	3.85	3.91	3.86	3.91	3.91	3.93	3.83	3.89	3.86	3.89	3.92	3.89
29	3.86	3.91	3.87	3.91	---	3.93	3.85	3.89	3.85	3.89	3.87	3.91
30	3.86	3.92	3.87	3.90	---	3.91	3.87	3.89	3.86	3.93	3.87	3.94
31	3.87	---	3.88	3.89	---	3.90	---	3.86	---	3.96	3.88	---
MEAN	3.89	3.91	3.89	3.89	---	---	3.88	4.13	3.87	3.89	3.87	3.89
MAX	3.98	3.96	3.93	3.92	---	---	3.96	4.58	3.94	3.96	3.93	3.94
MIN	3.82	3.87	3.86	3.83	---	---	3.83	3.86	3.84	3.85	3.83	3.84

CAL YR 2002 MEAN 3.94 MAX 4.59 MIN 3.82

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 mi^2.

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 ft^3/s, which are fair. 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	67	2.4	34	7.1	33	31	102	14	63	0.66	75	0.28
2	66	2.2	34	7.1	33	32	91	14	40	0.67	22	0.26
3	66	2.1	34	7.1	34	33	79	14	7.9	0.78	22	0.26
4	86	2.1	34	7.1	35	33	68	14	2.1	0.80	21	0.24
5	141	19	34	7.1	35	45	69	32	1.6	0.82	17	0.24
6	164	54	34	23	34	57	69	48	1.1	0.85	12	0.24
7	169	75	33	52	35	32	67	61	0.95	0.80	11	0.24
8	167	76	33	62	34	11	67	68	0.90	0.75	11	0.24
9	162	59	34	61	34	11	54	e70	10	0.72	11	0.24
10	158	58	33	60	34	22	46	e70	58	0.79	10	0.27
11	97	58	37	59	35	57	46	137	91	0.80	6.4	0.24
12	62	49	41	58	36	73	48	232	90	0.77	0.58	0.26
13	61	27	41	36	35	58	49	239	46	0.76	0.44	0.28
14	63	9.4	41	9.0	35	32	77	235	13	8.2	0.44	0.30
15	58	2.6	40	3.0	35	20	136	230	13	20	0.41	14
16	58	2.6	40	2.8	34	21	169	224	6.7	20	0.36	36
17	30	2.6	39	2.6	26	22	172	218	1.6	19	0.34	65
18	12	2.6	40	2.6	15	22	171	213	1.4	18	0.34	62
19	12	2.6	41	2.6	15	23	169	206	1.3	18	0.30	29
20	13	25	41	6.3	15	24	179	201	1.3	18	16	9.6
21	13	54	41	12	12	52	180	203	1.0	13	25	9.7
22	30	64	41	12	7.1	105	178	197	0.71	6.2	5.0	9.3
23	56	64	40	13	7.2	119	177	190	0.72	0.90	0.49	4.9
24	78	62	40	13	7.6	92	174	181	0.62	0.75	0.37	0.30
25	88	51	40	13	8.0	59	168	176	3.4	8.6	0.30	0.25
26	85	42	36	13	9.4	46	140	169	3.1	21	0.33	0.24
27	84	37	26	26	20	33	118	163	2.3	19	0.30	0.24
28	57	33	15	44	29	59	75	110	0.90	19	5.3	0.24
29	8.3	33	15	43	---	97	38	66	0.69	19	4.5	0.24
30	2.9	33	11	42	---	95	26	66	0.66	45	0.42	24
31	2.6	---	7.0	38	---	109	---	64	---	103	0.36	---
TOTAL	2216.8	1004.2	1050.0	744.4	722.3	1525	3202	4125	464.95	386.62	279.98	268.60
MEAN	71.5	33.5	33.9	24.0	25.8	49.2	107	133	15.5	12.5	9.03	8.95
MAX	169	76	41	62	36	119	180	239	91	103	75	65
MIN	2.6	2.1	7.0	2.6	7.1	11	26	14	0.62	0.66	0.30	0.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2003, BY WATER YEAR (WY)

MEAN	66.9	65.3	47.0	38.6	34.9	44.0	63.6	49.1	44.6	32.0	25.1	36.1
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1945 - 2003	
ANNUAL TOTAL	20526.11		15989.85			
ANNUAL MEAN	56.2		43.8		45.6	
HIGHEST ANNUAL MEAN					65.9	1973
LOWEST ANNUAL MEAN					25.2	1949
HIGHEST DAILY MEAN	242	Apr 19	239	May 13	288	May 1 1951
LOWEST DAILY MEAN	0.63	Aug 20	0.24	Sep 4	0.08	Jul 21 1988
ANNUAL SEVEN-DAY MINIMUM	0.98	Jul 14	0.24	Sep 3	0.09	Jul 28 1988
MAXIMUM PEAK FLOW			243	May 12	288	May 1 1951
MAXIMUM PEAK STAGE			5.86	May 12	(a)6.10	May 1 1951
ANNUAL RUNOFF (CFSM)	1.11		0.86		0.90	
ANNUAL RUNOFF (INCHES)	15.06		11.73		12.22	
10 PERCENT EXCEEDS	169		118		103	
50 PERCENT EXCEEDS	40		30		36	
90 PERCENT EXCEEDS	2.6		0.64		0.90	

(a) Present datum.
(e) 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 mi^2.

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) 34 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4470	1300	892	e800	e660	e550	e1600	1320	1340	626	525	231
2	3260	1280	751	e650	e650	e520	e1600	1430	1240	503	517	345
3	2170	1090	698	e500	e700	e500	e1550	1200	1020	642	645	424
4	3270	1120	e660	e550	e700	e500	e1400	1130	938	558	660	423
5	6780	1110	e700	e580	e660	e500	e1300	1090	711	621	518	429
6	7630	1150	e840	e600	e650	e500	e1200	930	815	524	489	338
7	9840	1080	e860	e600	e650	e520	e1150	1110	1120	609	444	265
8	6120	1110	e860	e600	e650	e540	e1150	1010	822	503	419	267
9	4770	1190	e820	e650	e650	e560	e1350	1090	813	477	406	310
10	3200	1270	e680	e650	e650	e550	2710	1490	1010	509	397	353
11	2400	1550	e780	e650	e650	e550	6780	7690	1150	632	390	343
12	2270	1490	e800	e620	e650	e540	6840	25500	1170	631	350	333
13	2190	1390	e950	e600	e650	e580	5650	16800	1080	615	328	363
14	1980	1240	e850	e600	e650	e650	8940	10400	853	601	325	408
15	1830	1100	e750	e620	e650	e700	9660	6930	770	554	326	452
16	1590	988	e720	e650	e640	e720	6130	4570	658	525	324	434
17	1560	940	e800	e650	e600	e750	4400	3880	651	505	320	465
18	1540	951	e950	e650	e600	e1200	4000	3460	681	517	320	439
19	1580	858	e1050	e650	e620	e1800	4670	3160	591	492	311	409
20	1570	840	e1100	e680	e640	e2100	8690	3390	565	472	322	484
21	1570	927	e1050	e670	e650	e3000	10400	3150	608	463	320	478
22	1670	879	e1000	e670	e660	e5000	7880	2770	484	453	280	458
23	2020	931	e900	e650	e660	5600	6040	2440	610	439	257	416
24	2050	864	e800	e650	e640	13800	4880	2200	578	386	267	388
25	1860	939	e750	e640	e600	15300	3900	2110	594	354	271	430
26	1920	983	e700	e640	e500	5680	3010	1920	637	363	426	463
27	2050	754	e650	e640	e500	4650	2830	1910	619	373	463	474
28	1860	703	e650	e650	e540	3200	2750	1760	521	365	447	496
29	1530	906	e640	e680	---	2020	2430	1570	550	360	431	500
30	1370	886	e650	e700	---	1720	2030	1520	604	368	366	547
31	1320	---	e700	e680	---	1670	---	1540	---	480	236	---
TOTAL	89240	31819	25001	19820	17720	76470	126920	120470	23803	15520	12100	12165
MEAN	2879	1061	806	639	633	2467	4231	3886	793	501	390	406
MAX	9840	1550	1100	800	700	15300	10400	25500	1340	642	660	547
MIN	1320	703	640	500	500	500	1150	930	484	354	236	231

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2003, BY WATER YEAR (WY)

MEAN	1129	1215	925	819	851	1546	4101	2063	1430	991	789	850
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1942 - 2003	
ANNUAL TOTAL	633517		571048			
ANNUAL MEAN	1736		1565		1384	
HIGHEST ANNUAL MEAN					1967	1996
LOWEST ANNUAL MEAN					774	1948
HIGHEST DAILY MEAN	23600	Apr 16	25500	May 12	31200	Aug 22 1942
LOWEST DAILY MEAN	360	Feb 3	231	Sep 1	170	(a)
ANNUAL SEVEN-DAY MINIMUM	360	Feb 3	290	Aug 19	246	Jul 25 1963
MAXIMUM PEAK FLOW			29500	May 12	(b)42000	Aug 22 1942
MAXIMUM PEAK STAGE			20.90	May 12	(c)28.6	Aug 22 1942
ANNUAL RUNOFF (CFSM)	1.30		1.17		1.03	
ANNUAL RUNOFF (INCHES)	17.59		15.85		14.04	
10 PERCENT EXCEEDS	3270		3320		2720	
50 PERCENT EXCEEDS	900		698		870	
90 PERCENT EXCEEDS	420		402		500	

(a) Aug. 13, 14, 1991.
(b) From rating curve extended above 14,000 ft^3/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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	360	189	e100	e75	e42	e34	377	404	391	31	41	17
2	365	175	e100	e70	e42	e34	348	354	326	31	64	16
3	329	162	e96	e66	e42	e34	306	313	255	32	182	15
4	373	159	e96	e62	e42	e34	284	278	205	29	297	14
5	688	151	e95	e60	e40	e34	e270	246	173	26	245	13
6	876	146	e94	e56	e40	e34	e260	231	155	23	160	12
7	1240	129	e94	e55	e40	e34	246	218	194	21	108	11
8	1140	140	e92	e54	e40	e34	222	202	177	20	82	11
9	956	137	e90	e54	e40	e34	226	189	224	18	68	10
10	744	179	e88	e52	e40	e34	348	190	252	17	57	9.8
11	590	274	e88	e52	e38	e34	633	587	361	23	47	9.3
12	497	278	e88	e52	e38	e35	734	2410	329	26	40	10
13	520	242	e88	e50	e38	e36	688	2360	265	22	34	15
14	471	210	e88	e50	e38	e37	927	1550	207	22	40	24
15	415	183	e90	e48	e38	e40	1320	993	171	28	31	39
16	355	167	e91	e48	e38	e60	1370	731	142	29	25	39
17	305	153	91	e46	e37	e90	1130	569	118	25	21	32
18	270	140	91	e46	e37	e120	949	456	101	21	20	28
19	272	129	130	e46	e37	e142	895	383	86	18	18	23
20	281	126	153	e46	e37	223	1180	440	75	17	19	22
21	278	123	141	e44	e37	274	1400	428	65	25	21	19
22	270	117	125	e44	e37	375	1370	370	56	31	20	20
23	261	114	115	e44	e36	446	1110	309	50	32	18	23
24	247	110	107	e44	e36	716	904	264	45	31	20	25
25	235	109	102	e44	e36	872	781	226	43	27	21	28
26	253	110	97	e44	e36	763	696	196	43	25	23	31
27	265	116	92	e44	e35	708	625	174	42	23	23	40
28	242	95	89	e44	e34	611	567	159	38	20	21	95
29	221	104	86	e43	---	471	520	196	36	18	22	136
30	208	102	83	e43	---	440	462	243	34	21	20	119
31	201	---	e80	e43	---	405	---	423	---	41	19	---
TOTAL	13728	4569	3060	1569	1071	7238	21148	16092	4659	773	1827	906.1
MEAN	443	152	98.7	50.6	38.2	233	705	519	155	24.9	58.9	30.2
MAX	1240	278	153	75	42	872	1400	2410	391	41	297	136
MIN	201	95	80	43	34	34	222	159	34	17	18	9.3
CFSM	2.59	0.89	0.58	0.30	0.22	1.37	4.12	3.04	0.91	0.15	0.34	0.18
IN.	2.99	0.99	0.67	0.34	0.23	1.57	4.60	3.50	1.01	0.17	0.40	0.20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2003, BY WATER YEAR (WY)

MEAN	177	188	115	69.6	63.4	164	761	455	209	126	80.2	118
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1913 - 2003	
ANNUAL TOTAL	95046		76640.1			
ANNUAL MEAN	260		210		210	
HIGHEST ANNUAL MEAN					311	1968
LOWEST ANNUAL MEAN					99.9	1998
HIGHEST DAILY MEAN	4820	Apr 17	2410	May 12	4820	Apr 17 2002
LOWEST DAILY MEAN	24	Sep 1	9.3	Sep 11	2.7	Sep 13 1976
ANNUAL SEVEN-DAY MINIMUM	32	Aug 27	10	Sep 6	3.2	Aug 28 1976
MAXIMUM PEAK FLOW			2710	May 12	(a)4990	Apr 17 2002
MAXIMUM PEAK STAGE			9.15	May 12	11.63	Apr 24 1960
INSTANTANEOUS LOW FLOW			9.1	(b)	2.7	Sep 13 1976
ANNUAL RUNOFF (CFSM)	1.52		1.23		1.23	
ANNUAL RUNOFF (INCHES)	20.68		16.67		16.65	
10 PERCENT EXCEEDS	526		568		508	
50 PERCENT EXCEEDS	117		90		97	
90 PERCENT EXCEEDS	46		21		32	

(a) Gage height, 11.44 ft.
(b) Sept. 11, 12.
(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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	593	372	279	204	171	170	812	e780	767	154	272	78
2	740	283	261	190	171	163	720	e700	675	157	141	77
3	738	254	218	189	294	161	618	e640	403	157	179	76
4	740	248	199	190	439	160	506	e560	389	156	591	127
5	1060	249	199	190	290	160	457	e520	407	148	433	158
6	1750	249	206	190	286	158	474	e480	388	144	371	155
7	2850	283	235	189	281	161	527	e449	392	144	312	135
8	2270	308	270	189	285	169	492	449	403	143	232	105
9	1850	317	269	196	286	170	406	426	404	132	199	95
10	1390	324	244	199	285	157	548	426	554	122	179	95
11	1140	448	231	199	279	150	1330	1170	660	159	174	95
12	984	561	233	199	273	158	1770	4210	702	163	157	94
13	911	540	261	189	273	163	1490	4120	596	140	140	94
14	911	506	260	191	272	160	1680	2970	384	115	127	143
15	901	414	262	198	271	159	2580	2040	365	111	127	171
16	771	315	244	184	270	164	2400	1450	368	121	135	170
17	583	291	231	151	271	227	2090	1210	359	140	139	171
18	528	290	231	177	272	364	1720	885	307	151	134	162
19	526	291	239	183	247	377	1690	770	239	150	127	156
20	524	313	274	185	229	415	2280	917	222	138	129	154
21	553	355	329	180	216	596	2590	857	192	176	132	153
22	660	325	316	175	192	692	2510	760	194	173	115	162
23	702	273	295	175	177	866	2040	733	202	137	89	166
24	561	259	269	174	178	1210	1660	566	198	116	89	133
25	468	255	248	174	169	1730	1440	451	197	119	111	120
26	468	266	234	175	170	1790	1360	567	172	124	169	121
27	495	265	207	175	176	1460	1020	449	138	124	172	122
28	555	259	205	176	179	1110	1000	378	124	135	165	169
29	503	261	222	178	---	1070	917	361	124	142	158	252
30	456	273	229	174	---	735	910	436	141	142	150	276
31	434	---	225	172	---	658	---	676	---	207	107	---
TOTAL	27615	9647	7625	5710	6902	15883	40037	31406	10666	4440	5755	4185
MEAN	891	322	246	184	246	512	1335	1013	356	143	186	140
MAX	2850	561	329	204	439	1790	2590	4210	767	207	591	276
MIN	434	248	199	151	169	150	406	361	124	111	89	76
CFSM	2.57	0.93	0.71	0.53	0.71	1.48	3.86	2.93	1.03	0.41	0.54	0.40
IN.	2.97	1.04	0.82	0.61	0.74	1.71	4.30	3.38	1.15	0.48	0.62	0.45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 2003, BY WATER YEAR (WY)

MEAN	344	375	266	210	203	375	1173	794	435	300	226	264
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1932 - 2003	
ANNUAL TOTAL	194018		169871			
ANNUAL MEAN	532		465		415	
HIGHEST ANNUAL MEAN					582	1960
LOWEST ANNUAL MEAN					247	1948
HIGHEST DAILY MEAN	6340	Apr 18	4210	May 12	6820	Apr 25 1960
LOWEST DAILY MEAN	119	Jul 13	76	Sep 3	(a)1.0	(b)
ANNUAL SEVEN-DAY MINIMUM	159	Sep 15	102	Sep 7	1.1	Aug 14 1960
MAXIMUM PEAK FLOW			4580	May 12	7360	Apr 24 1960
MAXIMUM PEAK STAGE			9.74	May 12	(c)13.75	Apr 24 1960
ANNUAL RUNOFF (CFSM)	1.54		1.35		1.20	
ANNUAL RUNOFF (INCHES)	20.86		18.26		16.31	
10 PERCENT EXCEEDS	1050		1040		844	
50 PERCENT EXCEEDS	273		259		263	
90 PERCENT EXCEEDS	180		135		137	

(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, 26.0°C, July 6, Aug. 20.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	1.0	0.0	0.5	9.5	8.0	9.0
2	---	---	---	---	---	---	1.0	0.0	0.5	10.0	9.0	9.5
3	---	---	---	---	---	---	1.0	0.0	0.5	10.5	9.5	10.0
4	---	---	---	---	---	---	1.0	0.0	0.5	12.0	9.5	10.5
5	---	---	---	---	---	---	1.0	0.5	0.5	11.5	9.5	10.5
6	---	---	---	---	---	---	1.0	0.5	1.0	11.0	10.0	10.5
7	---	---	---	---	---	---	1.0	0.5	1.0	11.5	10.5	11.0
8	---	---	---	---	---	---	1.0	0.5	1.0	11.5	10.5	11.0
9	---	---	---	---	---	---	1.0	0.5	0.5	11.5	11.0	11.5
10	---	---	---	---	---	---	1.0	0.5	1.0	12.5	11.0	11.5
11	---	---	---	---	---	---	1.0	0.5	1.0	11.5	10.5	11.0
12	---	---	---	---	---	---	2.5	0.5	1.5	11.5	8.5	10.5
13	---	---	---	---	---	---	3.0	2.0	2.5	8.5	7.5	8.0
14	---	---	---	---	---	---	3.0	2.5	2.5	10.0	8.0	8.5
15	---	---	---	---	---	---	3.0	2.0	2.5	10.5	9.5	10.0
16	---	---	---	---	---	---	4.0	2.5	3.5	12.0	10.5	11.5
17	---	---	---	---	---	---	4.0	3.0	3.5	12.5	12.0	12.0
18	---	---	---	---	---	---	3.5	2.5	3.0	14.5	12.0	13.5
19	---	---	---	---	---	---	3.0	2.0	2.5	16.0	14.0	15.0
20	---	---	---	---	---	---	3.0	2.0	2.5	16.0	14.5	15.0
21	---	---	---	---	---	---	4.0	2.5	3.0	15.5	14.0	15.0
22	---	---	---	---	---	---	5.0	3.5	4.0	15.0	14.0	14.5
23	---	---	---	---	---	---	5.0	4.0	4.5	14.0	12.5	13.5
24	---	---	---	---	---	---	5.5	4.0	4.5	14.0	13.5	13.5
25	---	---	---	---	---	---	6.0	4.5	5.5	14.5	13.5	14.0
26	---	---	---	---	---	---	8.0	5.5	7.0	15.0	14.0	14.5
27	---	---	---	---	---	---	9.0	6.5	8.0	17.0	14.5	15.5
28	---	---	---	---	---	---	9.0	8.0	8.5	17.0	15.0	16.5
29	---	---	---	---	---	---	9.5	8.0	9.0	18.5	15.0	16.5
30	---	---	---	---	---	---	10.0	8.5	9.0	17.5	13.5	15.5
31	---	---	---	---	---	---	---	---	---	15.0	13.5	14.0
MONTH	---	---	---	---	---	---	10.0	0.0	3.2	18.5	7.5	12.4

STREAMS TRIBUTARY TO LAKE SUPERIOR

04041500 STURGEON RIVER NEAR ALSTON, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	14.5	15.0	23.5	20.5	21.5	24.0	22.0	23.0	20.5	19.0	20.0
2	15.5	14.5	15.0	22.5	21.0	21.5	23.0	21.5	22.5	21.0	19.0	20.0
3	15.5	14.0	14.5	25.0	21.0	22.5	22.0	20.5	21.5	20.5	19.0	20.0
4	16.5	14.5	15.0	26.0	22.5	24.0	21.5	20.0	21.0	20.5	18.5	19.5
5	18.5	15.5	17.0	26.0	23.5	24.5	22.5	21.0	21.5	21.0	19.5	20.0
6	19.5	17.0	18.0	26.0	23.5	24.5	23.0	21.5	22.0	21.0	19.5	20.0
7	17.0	15.5	16.5	26.0	23.5	24.5	22.0	20.0	21.0	20.0	18.5	19.5
8	17.0	15.5	16.0	24.5	22.5	24.0	22.0	21.0	21.5	20.0	18.5	19.0
9	17.5	16.0	17.0	22.5	20.0	21.5	24.0	22.0	23.0	21.0	18.5	20.0
10	17.0	14.5	15.5	21.0	19.0	20.0	24.5	22.5	23.5	21.5	20.0	21.0
11	15.5	14.5	15.0	20.5	19.5	20.0	22.5	20.0	20.5	22.5	20.5	21.5
12	17.5	15.0	16.0	21.5	19.5	20.5	22.0	21.0	21.5	22.0	21.0	21.5
13	19.0	17.0	17.5	23.5	20.5	21.5	23.5	21.0	22.0	21.0	20.0	20.5
14	18.0	16.0	17.0	22.5	21.5	22.5	25.5	22.0	24.0	21.0	19.5	20.5
15	19.5	17.5	18.5	22.0	21.0	21.5	26.0	24.0	25.0	21.0	20.0	20.5
16	21.5	18.5	19.5	23.0	21.0	22.0	25.0	22.0	24.5	21.0	19.5	20.0
17	21.5	19.0	20.5	22.5	19.5	21.0	23.5	23.0	23.5	21.0	20.0	20.5
18	20.5	17.5	19.0	23.0	21.0	22.0	25.5	22.5	24.0	21.0	20.0	20.5
19	20.0	18.5	19.5	23.5	21.5	22.5	26.0	24.5	25.0	20.0	18.5	19.5
20	24.0	19.5	21.0	24.0	21.5	22.5	26.0	24.5	25.5	19.5	18.0	18.5
21	24.5	21.0	22.5	22.0	20.0	20.5	26.0	24.5	25.5	19.0	18.0	18.5
22	24.5	22.5	23.5	20.5	19.5	20.5	25.0	21.0	23.5	18.5	18.0	18.0
23	23.5	22.0	23.0	21.0	20.0	20.5	23.0	22.0	22.0	18.0	17.0	17.5
24	25.0	22.0	23.0	23.5	20.5	22.0	23.0	21.0	22.0	17.0	16.0	16.5
25	25.5	22.0	24.0	23.0	22.0	22.5	23.5	21.5	22.0	16.0	15.5	15.5
26	25.0	22.5	23.5	25.0	22.5	23.5	25.5	22.5	23.5	15.5	15.0	15.0
27	22.5	20.5	22.0	24.5	22.0	23.0	24.0	22.5	23.0	15.0	14.5	15.0
28	21.0	19.0	20.0	24.5	22.0	23.0	22.5	21.5	22.0	14.5	14.0	14.5
29	20.5	19.0	20.0	23.5	22.5	23.0	22.0	21.0	21.5	14.0	13.0	13.5
30	22.5	19.5	20.5	23.5	22.0	23.0	21.5	20.5	21.0	13.5	12.5	13.0
31	---	---	---	24.0	22.5	23.0	21.0	19.5	20.5	---	---	---
MONTH	25.5	14.0	18.8	26.0	19.0	22.2	26.0	19.5	22.7	22.5	12.5	18.6

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 mi^2.

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 and those for July 20 to Sept. 30, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	34	28	22	e16	e18	e56	68	80	18	15	8.6
2	20	32	24	21	e16	e18	e55	59	56	19	14	10
3	17	29	23	19	e17	e18	50	53	44	19	13	8.3
4	51	28	22	e19	e17	e18	45	48	37	18	13	8.3
5	116	26	22	e19	e18	e18	45	45	33	17	14	8.4
6	85	26	22	19	e18	e18	e43	42	33	17	12	8.7
7	112	25	22	19	e18	e18	e41	40	29	17	11	8.7
8	59	25	20	20	e18	e18	41	39	27	17	10	8.8
9	44	25	20	22	e18	e18	44	42	28	17	10	8.7
10	36	29	20	21	e18	e18	92	59	27	17	10	9.2
11	30	36	20	21	e18	e18	227	199	30	30	10	9.2
12	27	31	20	20	e18	e18	268	687	27	29	9.8	9.6
13	32	28	20	19	e18	e18	207	234	24	23	9.8	10
14	30	27	e20	19	e18	e18	328	114	23	21	9.4	12
15	29	25	e20	19	e18	18	476	86	22	39	8.5	13
16	26	24	e20	18	e18	19	299	69	21	34	8.4	12
17	24	24	20	18	e18	22	156	58	20	24	8.2	11
18	26	23	20	e17	e18	25	146	53	20	21	8.2	10
19	70	23	25	e16	e18	33	179	47	19	19	8.3	11
20	59	25	31	e16	e18	28	342	56	19	19	9.1	11
21	50	26	30	e16	e18	32	481	49	18	23	9.8	11
22	56	25	27	e15	e18	51	236	43	18	20	9.0	12
23	48	24	26	e15	e18	e60	166	38	18	e18	8.4	13
24	43	23	26	e15	e18	e110	148	34	19	e17	9.0	12
25	40	23	25	e15	e18	e200	129	31	39	e15	9.3	12
26	45	22	24	e15	e18	e170	117	29	39	e15	9.1	13
27	49	22	24	e15	e18	e120	112	28	28	e14	8.8	15
28	47	22	24	e15	e18	e90	106	29	24	13	9.3	27
29	42	23	22	e15	---	e70	93	76	21	12	10	26
30	39	28	22	e15	---	e68	78	108	20	13	9.4	21
31	36	---	22	e15	---	e64	---	170	---	14	8.9	---
TOTAL	1410	783	711	550	498	1432	4806	2733	863	609	312.7	358.5
MEAN	45.5	26.1	22.9	17.7	17.8	46.2	160	88.2	28.8	19.6	10.1	11.9
MAX	116	36	31	22	18	200	481	687	80	39	15	27
MIN	17	22	20	15	16	18	41	28	18	12	8.2	8.3
CFSM	1.62	0.93	0.82	0.63	0.64	1.65	5.72	3.15	1.03	0.70	0.36	0.43
IN.	1.87	1.04	0.94	0.73	0.66	1.90	6.39	3.63	1.15	0.81	0.42	0.48

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2003, BY WATER YEAR (WY)

MEAN	30.9	38.0	26.0	20.4	20.3	43.6	178	78.1	36.2	21.4	16.8	21.1
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1967 - 2003	
ANNUAL TOTAL	15605.9		15066.2			
ANNUAL MEAN	42.8		41.3		44.1	
HIGHEST ANNUAL MEAN					62.6	1979
LOWEST ANNUAL MEAN					26.8	1998
HIGHEST DAILY MEAN	610	Apr 16	687	May 12	1120	May 10 1979
LOWEST DAILY MEAN	9.9	Jul 24	8.2	Aug 17	6.5	Sep 11 1998
ANNUAL SEVEN-DAY MINIMUM	10	Jul 18	8.6	Sep 3	6.8	Sep 7 1998
MAXIMUM PEAK FLOW			851	May 12	1590	May 10 1979
MAXIMUM PEAK STAGE			9.87	May 12	10.72	May 10 1979
INSTANTANEOUS LOW FLOW					(a)1.7	Jan 18 1990
ANNUAL RUNOFF (CFSM)	1.53		1.47		1.58	
ANNUAL RUNOFF (INCHES)	20.73		20.02		21.41	
10 PERCENT EXCEEDS	61		79		88	
50 PERCENT EXCEEDS	23		22		22	
90 PERCENT EXCEEDS	12		10		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 mi^2.

WATER-DISCHARGE RECORDS

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

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.

REVISIONS.--The maximum discharge for water year 2002 has been revised to 2,650 ft^3/s, Apr. 17, 2002. Revised daily discharges, in cubic feet per second, for high-water period during the year, and revised monthly and yearly discharges are given below. These figures supersede those published in the report for 2002.

Daily discharges:

Apr. 12	1180	Apr. 14	1400	Apr. 16	2030
13	1180	15	1660	17	2010
				18	1110

MONTH/YEAR	TOTAL	MEAN	MAX	MIN	CFSM	IN.
April 2002	15672	522	2030	48	8.16	9.11
Water Year 2002	31017	85.0	2030	11	1.33	18.03

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	143	87	e56	e41	e29	e25	153	110	216	20	36	11
2	120	81	e54	e38	e29	e25	151	98	143	21	30	10
3	82	77	e52	e36	e30	e25	e140	91	109	22	52	9.4
4	155	76	e50	e34	e30	e25	e135	85	87	19	51	9.3
5	331	72	e48	e32	e29	e25	e130	82	73	17	40	9.3
6	507	72	e47	e31	e28	e25	126	79	68	15	32	9.0
7	737	66	e46	e31	e28	e25	122	77	90	15	27	8.9
8	334	74	e46	e30	e27	e25	113	76	79	14	24	9.0
9	216	75	e45	e30	e27	e25	132	78	121	13	22	8.9
10	158	114	e45	e30	e26	e25	257	84	143	14	20	8.5
11	123	155	e45	e30	e25	e25	432	757	202	57	18	7.9
12	128	124	e45	e30	e25	e25	425	2660	133	51	17	8.9
13	169	102	e45	e30	e25	e25	324	830	94	37	16	12
14	143	90	e45	e30	e25	e25	580	372	74	29	14	23
15	117	79	e45	e30	e25	e25	793	245	61	54	13	28
16	100	70	e45	e29	e25	e30	446	188	51	45	13	19
17	88	66	e48	e29	e25	e50	308	156	45	34	12	15
18	82	66	e54	e29	e25	e65	287	135	41	27	11	13
19	108	66	e70	e29	e25	e98	305	121	36	23	10	12
20	114	66	e68	e29	e25	e120	614	163	32	21	14	14
21	107	65	e66	e29	e25	e220	614	144	29	48	18	13
22	122	63	e64	e29	e25	e350	387	117	26	51	14	16
23	118	61	e60	e29	e25	e550	289	101	24	39	12	21
24	113	60	e58	e29	e25	e680	248	88	23	30	18	17
25	108	58	e55	e29	e25	e632	225	77	23	25	19	16
26	121	55	e52	e28	e25	381	196	70	24	23	18	18
27	126	58	e50	e28	e25	e280	176	64	23	29	16	25
28	112	71	e48	e28	e25	e250	166	71	22	24	14	81
29	100	63	e44	e28	---	e210	147	212	22	24	13	83
30	96	57	e44	e28	---	e180	127	230	22	29	12	65
31	91	---	e43	e28	---	166	---	344	---	34	11	---
TOTAL	5169	2289	1583	941	733	4637	8548	8005	2136	904	637	601.1
MEAN	167	76.3	51.1	30.4	26.2	150	285	258	71.2	29.2	20.5	20.0
MAX	737	155	70	41	30	680	793	2660	216	57	52	83
MIN	82	55	43	28	25	25	113	64	22	13	10	7.9
CFSM	2.61	1.19	0.80	0.47	0.41	2.34	4.45	4.03	1.11	0.46	0.32	0.31
IN.	3.00	1.33	0.92	0.55	0.43	2.70	4.97	4.65	1.24	0.53	0.37	0.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

MEAN	96.7	55.0	56.0	28.7	26.0	92.8	404	188	78.9	26.7	21.6	30.8
MAX	167	76.3	61.0	30.4	26.2	150	522	258	86.5	29.2	22.6	41.6
(WY)	2003	2003	2002	2003	2003	2003	2002	2003	2002	2003	2002	2002
MIN	26.7	33.7	51.1	27.0	25.8	36.1	285	117	71.2	24.2	20.5	20.0
(WY)	2002	2002	2003	2002	2002	2002	2003	2002	2003	2002	2003	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 2002 - 2003	
ANNUAL TOTAL	36328		36183.1			
ANNUAL MEAN	99.5		99.1		92.1	
HIGHEST ANNUAL MEAN					99.1	2003
LOWEST ANNUAL MEAN					85.0	2002
HIGHEST DAILY MEAN	2030	Apr 16	2660	May 12	2660	May 12 2003
LOWEST DAILY MEAN	11	Sep 1	7.9	Sep 11	7.9	Sep 11 2003
ANNUAL SEVEN-DAY MINIMUM	12	Aug 10	8.7	Sep 6	8.7	Sep 6 2003
MAXIMUM PEAK FLOW			(a)3180	May 12	(a)3180	May 12 2003
MAXIMUM PEAK STAGE			15.18	May 12	15.18	May 12 2003
INSTANTANEOUS LOW FLOW			7.0	(b)	7.0	(b)
ANNUAL RUNOFF (CFSM)	1.56		1.55		1.44	
ANNUAL RUNOFF (INCHES)	21.12		21.03		19.54	
10 PERCENT EXCEEDS	158		216		172	
50 PERCENT EXCEEDS	46		46		38	
90 PERCENT EXCEEDS	19		16		17	

(a) Result of dam failure.
(b) Sept. 11, 12.
(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 represent water temperature at sensor within 0.5°C, from Apr. 1 to Sept. 30. Records for May 5-8, May 30 to Sept. 30, rated excellent, Apr. 1-19, May 2-4, 9-11, 15-29 rated good and Apr. 20 to May 1, May 12-14 rated fair.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 26.5°C, July 16, 2002.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 24.0°C, Aug. 15.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	2.0	0.0	1.0	10.0	6.0	8.0
2	---	---	---	---	---	---	1.0	0.0	0.0	9.5	5.0	7.5
3	---	---	---	---	---	---	0.0	0.0	0.0	10.0	5.0	7.5
4	---	---	---	---	---	---	0.0	0.0	0.0	11.5	6.0	9.0
5	---	---	---	---	---	---	0.0	0.0	0.0	10.0	8.5	9.5
6	---	---	---	---	---	---	0.0	0.0	0.0	13.0	7.5	10.0
7	---	---	---	---	---	---	0.5	0.0	0.0	11.5	9.0	10.0
8	---	---	---	---	---	---	1.0	0.0	0.0	14.0	9.0	11.5
9	---	---	---	---	---	---	2.5	0.0	0.5	11.5	9.5	10.0
10	---	---	---	---	---	---	4.5	0.0	2.0	13.0	9.0	11.0
11	---	---	---	---	---	---	4.5	0.0	2.0	12.0	6.5	9.0
12	---	---	---	---	---	---	3.0	0.5	2.0	7.5	6.0	6.5
13	---	---	---	---	---	---	4.0	0.5	2.0	11.0	5.5	8.0
14	---	---	---	---	---	---	7.0	3.0	5.0	14.0	8.5	11.5
15	---	---	---	---	---	---	4.5	2.5	3.0	14.0	10.0	12.0
16	---	---	---	---	---	---	2.5	1.0	1.5	14.0	11.0	12.5
17	---	---	---	---	---	---	1.0	0.0	0.5	15.0	11.5	13.0
18	---	---	---	---	---	---	5.0	0.5	2.5	15.5	11.5	13.5
19	---	---	---	---	---	---	5.0	3.0	4.0	16.0	14.0	15.0
20	---	---	---	---	---	---	6.0	4.5	5.5	15.5	11.5	13.5
21	---	---	---	---	---	---	5.0	2.0	3.0	13.5	9.5	11.5
22	---	---	---	---	---	---	5.0	1.0	3.0	12.5	10.5	11.5
23	---	---	---	---	---	---	7.0	2.5	4.5	14.5	9.5	12.0
24	---	---	---	---	---	---	7.5	5.0	6.0	15.0	10.0	12.5
25	---	---	---	---	---	---	8.0	4.5	6.5	15.5	11.0	13.0
26	---	---	---	---	---	---	8.5	4.0	6.5	16.0	11.5	14.0
27	---	---	---	---	---	---	9.0	7.0	8.0	17.0	12.0	14.5
28	---	---	---	---	---	---	8.5	7.0	7.5	16.0	13.0	14.0
29	---	---	---	---	---	---	9.0	5.0	7.0	15.5	11.0	13.5
30	---	---	---	---	---	---	9.5	5.0	7.5	15.5	12.0	14.0
31	---	---	---	---	---	---	---	---	---	13.0	10.0	11.5
MONTH	---	---	---	---	---	---	9.5	0.0	3.0	17.0	5.0	11.3

STREAMS TRIBUTARY TO LAKE SUPERIOR

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

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.0	10.0	12.0	21.5	15.5	18.5	19.5	17.0	18.0	19.0	15.0	16.5
2	15.0	11.5	13.5	20.0	17.5	18.5	18.5	17.5	18.0	19.0	15.5	17.0
3	16.0	12.0	14.0	22.5	18.0	20.0	17.5	16.5	17.0	18.5	16.5	17.5
4	16.5	12.0	14.5	23.0	19.0	21.0	19.5	16.5	18.0	17.5	14.5	16.0
5	17.5	13.0	15.5	23.5	18.5	20.5	21.0	17.0	19.0	17.0	12.0	14.5
6	16.5	14.0	15.0	22.0	19.5	20.5	22.5	18.0	20.0	18.5	14.5	16.0
7	15.0	13.5	14.0	23.0	18.5	20.5	21.0	19.5	20.0	18.5	14.0	16.0
8	14.0	12.5	13.0	22.0	17.5	19.5	20.5	18.0	19.0	19.5	15.0	17.0
9	15.0	12.0	13.5	19.0	16.5	18.0	21.5	16.5	19.0	20.5	16.0	18.0
10	14.0	12.0	12.5	18.0	16.0	17.0	21.5	18.5	20.0	21.0	18.0	19.5
11	16.0	11.5	13.5	16.0	14.5	15.0	20.5	17.5	19.0	21.5	18.0	19.5
12	16.5	12.5	14.5	19.0	13.5	16.0	20.0	15.0	17.5	20.0	18.0	19.0
13	19.0	15.0	17.0	20.5	15.5	18.0	21.0	16.0	18.0	19.0	17.5	18.0
14	19.5	15.5	17.5	19.5	18.0	18.5	22.0	17.5	19.5	18.0	15.5	17.0
15	19.0	14.5	16.5	19.0	17.0	18.0	24.0	19.5	21.5	15.5	14.0	15.0
16	20.0	14.5	17.5	19.0	15.0	17.0	23.5	20.0	21.5	16.0	13.0	14.0
17	19.0	16.5	18.0	20.5	16.5	18.5	22.0	18.5	20.0	17.5	14.0	15.5
18	20.5	16.5	18.0	20.5	15.5	17.5	23.5	18.5	20.5	18.5	16.0	17.0
19	18.5	14.5	16.5	20.5	16.0	18.0	23.5	20.5	22.0	16.5	14.0	15.5
20	19.0	13.0	16.0	23.0	17.5	20.0	23.0	21.0	22.0	15.0	13.0	14.0
21	20.5	14.5	17.5	19.5	16.0	17.5	23.5	20.5	22.0	14.5	11.5	13.0
22	21.5	16.0	18.5	18.0	14.5	16.0	22.0	18.5	20.0	14.5	13.0	13.5
23	20.5	18.0	19.0	19.0	14.0	16.5	19.5	17.0	18.5	13.0	11.5	12.5
24	21.5	18.5	19.5	20.5	15.5	17.5	21.0	17.0	18.5	12.5	11.0	11.5
25	22.5	19.0	20.5	20.0	17.0	18.5	20.5	18.5	19.5	11.5	10.0	11.0
26	21.0	17.5	19.5	23.5	19.0	21.0	22.0	18.5	20.0	10.5	10.0	10.0
27	17.5	15.0	16.5	22.0	19.5	20.5	19.5	16.5	18.0	10.5	10.0	10.0
28	16.5	13.0	14.5	22.0	17.0	19.5	17.5	15.0	16.0	10.0	8.0	9.0
29	16.5	13.5	14.5	21.0	18.0	19.0	18.0	15.5	16.5	8.5	7.0	7.5
30	19.5	13.5	16.0	21.0	18.0	19.0	17.5	14.0	15.5	7.5	6.0	6.5
31	---	---	---	20.0	18.5	19.0	18.5	14.0	16.0	---	---	---
MONTH	22.5	10.0	15.9	23.5	13.5	18.5	24.0	14.0	19.0	21.5	6.0	14.6

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	166	313	110	109	112	321	319	327	120	e107	106
2	0.62	166	313	110	109	112	234	319	327	109	107	106
3	0.27	166	313	110	107	112	174	319	326	107	107	106
4	2.0	165	312	110	108	112	174	319	326	107	132	106
5	1.9	165	313	110	109	112	175	319	326	108	163	106
6	4.0	165	313	110	107	111	175	319	326	108	162	106
7	4.5	165	226	110	107	111	175	319	327	107	162	106
8	1.9	149	160	110	107	111	175	318	327	108	128	64
9	1.8	132	153	110	107	111	175	318	327	108	106	36
10	84	133	147	110	106	110	177	318	327	108	106	38
11	159	149	155	110	107	108	281	328	327	113	106	38
12	156	167	142	110	108	107	324	e325	327	113	106	38
13	156	229	133	110	108	107	323	e325	326	108	106	37
14	152	300	131	110	108	107	332	323	325	106	106	48
15	152	270	131	110	108	107	335	e160	326	107	106	38
16	152	231	131	110	108	108	325	e325	326	107	106	37
17	e154	180	122	110	108	109	323	e325	325	107	106	37
18	e155	158	114	110	108	109	322	e325	325	107	106	38
19	e156	153	115	110	109	108	324	326	321	107	106	39
20	e157	148	116	110	113	109	e325	326	318	107	106	38
21	e158	139	124	110	115	112	e325	326	318	101	106	37
22	e160	146	127	110	110	146	325	326	317	108	106	69
23	161	165	124	110	108	176	322	326	299	107	106	97
24	163	174	124	110	108	181	322	326	288	107	106	97
25	166	175	124	110	109	182	322	325	287	107	106	96
26	166	201	124	110	113	179	322	325	223	107	106	96
27	166	268	124	110	115	261	322	325	157	109	106	100
28	166	302	116	109	113	321	321	326	159	108	97	101
29	162	308	112	109	---	321	321	328	159	107	111	98
30	166	313	110	109	---	322	320	328	141	e107	104	97
31	166	---	109	109	---	322	---	328	---	e107	108	---
TOTAL	3451.39	5748	5171	3406	3052	4716	8391	9864	8860	3347	3502	2156
MEAN	111	192	167	110	109	152	280	318	295	108	113	71.9
MAX	166	313	313	110	115	322	335	328	327	120	163	106
MIN	0.27	132	109	109	106	107	174	160	141	101	97	36

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 2003, BY WATER YEAR (WY)

MEAN	120	143	164	149	162	225	281	266	214	151	109	105
MAX	213	295	304	254	337	334	348	355	347	323	267	194
(WY)	1991	1991	1992	1997	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1990 - 2003	
ANNUAL TOTAL	76312.39		61664.39			
ANNUAL MEAN	209		169		175	
HIGHEST ANNUAL MEAN					234	1996
LOWEST ANNUAL MEAN					140	1998
HIGHEST DAILY MEAN	340	Apr 12	335	Apr 15	(e)370	May 20 1996
LOWEST DAILY MEAN	0.27	Oct 3	0.27	Oct 3	0.00	(a)
ANNUAL SEVEN-DAY MINIMUM	2.1	Oct 1	2.1	Oct 1	0.00	Nov 2 1999
10 PERCENT EXCEEDS	332		325		339	
50 PERCENT EXCEEDS	179		116		166	
90 PERCENT EXCEEDS	107		105		64	

(a) On several days in water years 1992, 1994, 1998, 1999, 2000.
(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 mi^2, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	116	140	79	136	74	72	132	243	138	72	68	66
2	140	140	78	135	74	72	132	226	163	72	69	66
3	140	140	79	135	74	72	132	214	158	73	70	66
4	142	140	79	134	74	72	132	193	142	74	69	66
5	143	140	78	127	74	73	132	177	105	74	69	66
6	145	139	78	100	74	72	133	175	87	74	69	66
7	146	139	78	76	74	72	133	170	85	74	69	66
8	146	138	79	76	74	72	132	163	85	74	69	66
9	147	138	78	76	74	72	132	163	82	74	68	66
10	147	138	78	76	74	72	133	156	82	75	68	66
11	145	138	78	76	74	72	133	159	88	76	68	66
12	144	138	96	76	74	70	134	189	121	75	68	65
13	144	137	107	76	74	69	134	272	111	75	68	66
14	145	137	108	76	73	69	132	314	79	75	68	68
15	144	137	108	76	73	69	137	303	77	75	68	66
16	143	137	115	76	73	69	138	276	75	74	68	66
17	142	137	122	75	74	69	158	248	74	74	69	66
18	142	137	129	75	72	69	203	220	74	74	69	65
19	141	107	138	75	71	69	238	198	75	74	69	66
20	141	78	137	75	71	91	331	185	74	73	69	66
21	141	78	137	75	71	119	482	197	74	73	69	66
22	141	78	137	75	69	128	563	184	74	72	69	67
23	141	78	137	76	69	132	561	168	74	72	69	66
24	141	78	137	76	69	132	500	158	72	72	69	66
25	141	78	137	76	69	132	439	139	72	71	68	66
26	141	78	137	76	70	132	400	107	71	70	68	66
27	141	78	137	76	69	132	349	88	72	70	67	67
28	141	78	137	76	71	133	295	87	72	70	67	67
29	140	78	137	75	---	133	288	86	72	69	67	66
30	140	79	136	75	---	132	274	86	72	69	67	67
31	140	---	136	75	---	132	---	87	---	69	66	---
TOTAL	4391	3456	3427	2658	2026	2874	7212	5631	2700	2258	2118	1984
MEAN	142	115	111	85.7	72.4	92.7	240	182	90.0	72.8	68.3	66.1
MAX	147	140	138	136	74	133	563	314	163	76	70	68
MIN	116	78	78	75	69	69	132	86	71	69	66	65
CFSM	1.75	1.42	1.36	1.06	0.89	1.14	2.97	2.24	1.11	0.90	0.84	0.82
IN.	2.02	1.59	1.57	1.22	0.93	1.32	3.31	2.59	1.24	1.04	0.97	0.91

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 2003, BY WATER YEAR (WY)

MEAN	72.5	80.5	74.6	79.0	89.9	112	174	159	83.8	63.8	78.8	74.8
MAX	142	136	120	124	127	133	281	428	151	95.6	192	109
(WY)	2003	1994	2002	2002	1996	1999	2001	1996	2002	2002	2002	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
(WY)	1995	1995	1999	1999	1995	1995	1994	2000	1994	1998	1994	1995

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1994 - 2003	
ANNUAL TOTAL	50701		40735			
ANNUAL MEAN	139		112		95.2	
HIGHEST ANNUAL MEAN					131	2002
LOWEST ANNUAL MEAN					65.8	1995
HIGHEST DAILY MEAN	544	Aug 3	563	Apr 22	670	May 11 1996
LOWEST DAILY MEAN	58	Sep 13	65	Sep 12	2.5	Oct 26 2000
ANNUAL SEVEN-DAY MINIMUM	59	Sep 13	66	Sep 6	22	Jul 14 1998
MAXIMUM PEAK FLOW			585	Apr 22	686	May 11 1996
MAXIMUM PEAK STAGE			5.42	Apr 22	6.08	May 11 1996
ANNUAL RUNOFF (CFSM)	1.71		1.38		1.18	
ANNUAL RUNOFF (INCHES)	23.28		18.71		15.97	
10 PERCENT EXCEEDS	218		158		142	
50 PERCENT EXCEEDS	127		78		73	
90 PERCENT EXCEEDS	78		68		40	

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 mi^2, 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, 2.31 ft, Mar. 26; minimum observed, 1.30 ft, Sept. 10, 13.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	1.57	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	1.84	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	2.08	---	---	---	---	---	---	1.52
8	2.00	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	1.40	---	---
10	2.10	---	---	---	---	---	---	---	---	---	---	1.30
11	2.20	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---
13	---	2.28	---	---	---	---	---	---	---	---	---	1.30
14	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	1.74
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	1.74
21	---	---	---	---	---	---	---	---	---	---	---	1.74
22	---	---	---	---	---	---	---	---	---	1.92	---	---
23	---	---	---	---	---	---	---	---	---	---	---	1.90
24	---	---	---	---	---	---	---	---	---	---	---	1.94
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	2.31	---	---	---	---	1.31	2.00
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	2.18
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	1.88	---	---	---	2.18
31	---	---	2.04	---	---	---	---	---	---	---	---	---

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	357	590	469	522	358	e400	2010	3750	574	239	299	265
2	390	574	456	508	359	e400	2060	3490	577	238	291	263
3	415	565	453	481	e360	e400	2070	3240	547	236	286	253
4	450	556	446	459	e360	e400	2020	2960	507	233	348	243
5	584	556	441	423	e360	e400	1890	2680	462	227	417	249
6	738	560	430	395	e360	e400	1840	2430	433	233	445	240
7	864	580	417	380	e361	e400	1740	2210	394	226	442	237
8	970	601	416	363	e365	e400	1660	1990	389	214	420	237
9	1060	660	412	364	e370	e400	1600	1800	383	214	394	236
10	1120	716	395	373	e380	e400	1600	1650	390	214	369	232
11	1160	805	394	373	e385	e400	1720	1580	494	234	345	232
12	1170	874	394	370	e390	e400	1880	1590	650	278	334	231
13	1210	886	395	376	e390	e400	2070	1610	693	312	321	231
14	1240	880	400	376	e390	e400	2270	1610	669	308	311	238
15	1240	873	406	376	e390	e400	2590	1570	630	322	296	261
16	1230	829	410	373	e390	e410	3040	1510	574	423	278	290
17	1200	747	402	373	e390	433	3370	1440	502	464	273	304
18	1150	683	390	373	e390	482	3500	1350	425	464	265	302
19	1090	639	447	370	e395	537	3560	1250	376	428	257	292
20	1050	615	577	370	398	595	4140	1130	346	394	247	284
21	998	597	673	367	398	655	4800	1100	313	369	245	284
22	946	588	698	367	397	731	5030	1040	292	353	250	287
23	898	586	694	363	394	817	5160	967	272	345	253	321
24	847	579	663	361	394	952	5120	890	253	340	255	351
25	797	564	645	361	397	1110	5000	813	244	337	246	387
26	752	540	626	363	397	1250	4870	733	231	323	245	430
27	716	514	591	362	400	1370	4690	659	230	318	241	479
28	692	491	559	359	402	1540	4460	591	233	335	249	513
29	668	488	535	355	---	1750	4240	522	234	333	249	553
30	633	487	523	356	---	1870	4010	504	241	330	263	555
31	610	---	524	357	---	1950	---	518	---	312	274	---
TOTAL	27245	19223	15281	11969	10720	22452	94010	49177	12558	9596	9408	9280
MEAN	879	641	493	386	383	724	3134	1586	419	310	303	309
MAX	1240	886	698	522	402	1950	5160	3750	693	464	445	555
MIN	357	487	390	355	358	400	1600	504	230	214	241	231
CFSM	1.11	0.81	0.62	0.49	0.48	0.92	3.97	2.01	0.53	0.39	0.38	0.39
IN.	1.28	0.91	0.72	0.56	0.50	1.06	4.43	2.32	0.59	0.45	0.44	0.44

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2003, BY WATER YEAR (WY)

MEAN	859	1002	773	490	479	762	2728	1639	672	484	420	590
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1953 - 2003	
ANNUAL TOTAL	368828		290919			
ANNUAL MEAN	1010		797		908	
HIGHEST ANNUAL MEAN					1294	1971
LOWEST ANNUAL MEAN					600	1998
HIGHEST DAILY MEAN	5840	Apr 19	5160	Apr 23	6820	May 10 1960
LOWEST DAILY MEAN	238	Sep 4	214	Jul 8	143	Aug 26 2000
ANNUAL SEVEN-DAY MINIMUM	243	Sep 3	223	Jul 4	147	Aug 23 2000
MAXIMUM PEAK FLOW			5180	Apr 23	6990	May 10 1960
MAXIMUM PEAK STAGE			9.09	Apr 23	10.26	May 10 1960
INSTANTANEOUS LOW FLOW			208	(a)	136	Aug 29 2000
ANNUAL RUNOFF (CFSM)	1.28		1.01		1.15	
ANNUAL RUNOFF (INCHES)	17.37		13.70		15.62	
10 PERCENT EXCEEDS	2060		1770		1900	
50 PERCENT EXCEEDS	617		423		570	
90 PERCENT EXCEEDS	291		252		293	

(a) July 8, 9, 10.
(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 mi^2, 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 fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e9.4	e15	12	9.0	e7.2	4.6	37	42	19	13	11	9.3
2	e11	e15	12	8.6	e7.2	e4.3	36	39	16	12	11	8.7
3	e7.5	e15	11	8.1	e7.2	e4.2	32	36	14	12	10	8.3
4	e17	e15	11	7.7	e7.1	4.0	28	34	13	12	11	8.0
5	27	e15	10	7.6	e7.0	3.6	30	33	12	14	10	7.5
6	25	e17	10	7.5	e6.9	3.6	30	37	12	12	9.8	7.5
7	26	e17	10	7.7	e6.9	3.6	24	34	13	11	9.2	7.5
8	30	e19	10	7.9	e6.9	3.6	23	32	14	11	9.1	7.3
9	33	e22	9.7	7.9	e6.9	3.6	23	29	13	12	9.4	7.1
10	30	e24	9.5	7.7	e6.8	3.6	21	29	14	12	9.8	7.1
11	28	e30	9.3	e7.6	e6.8	3.6	23	43	25	14	11	7.1
12	27	e29	9.4	e7.5	e6.6	3.6	36	48	22	14	9.7	7.1
13	35	e24	9.4	7.5	e6.6	3.6	45	42	20	12	9.1	7.4
14	31	e19	9.4	7.5	e6.4	3.6	51	37	18	11	8.8	8.6
15	28	19	9.3	7.5	e6.0	3.6	85	33	16	14	8.3	10
16	28	17	8.7	7.5	e5.9	3.8	97	30	15	15	8.1	9.3
17	27	15	8.3	7.5	e5.8	4.3	73	29	14	14	7.9	8.5
18	27	15	8.8	7.5	e5.5	5.1	60	27	13	13	7.9	8.3
19	34	16	14	7.5	4.8	5.9	63	25	12	13	7.6	8.2
20	32	18	16	7.5	4.8	6.8	206	29	11	13	7.5	8.0
21	30	17	14	e7.3	4.7	11	241	27	11	17	7.7	7.7
22	e29	17	13	e7.2	4.8	15	169	24	11	22	7.6	9.2
23	e27	16	12	e7.1	4.8	16	118	22	10	18	7.1	10
24	e27	16	11	e7.1	4.8	18	94	21	9.8	16	7.1	9.8
25	e24	15	11	e7.0	e4.8	20	79	20	11	14	8.3	10
26	e22	15	10	e7.0	4.8	20	68	19	11	18	11	11
27	e17	13	9.7	e6.8	4.8	20	59	17	12	19	8.6	20
28	e17	13	9.7	e6.8	4.6	34	54	17	12	16	9.8	20
29	e17	13	8.9	e6.9	---	42	49	16	13	14	17	18
30	e17	13	9.1	e7.1	---	40	45	16	13	13	12	17
31	e15	---	10	e7.2	---	40	---	22	---	12	10	---
TOTAL	754.9	524	326.2	232.3	167.4	358.6	1999	909	419.8	433	292.4	293.5
MEAN	24.4	17.5	10.5	7.49	5.98	11.6	66.6	29.3	14.0	14.0	9.43	9.78
MAX	35	30	16	9.0	7.2	42	241	48	25	22	17	20
MIN	7.5	13	8.3	6.8	4.6	3.6	21	16	9.8	11	7.1	7.1
CFSM	0.87	0.62	0.38	0.27	0.21	0.41	2.38	1.05	0.50	0.50	0.34	0.35
IN.	1.00	0.70	0.43	0.31	0.22	0.48	2.66	1.21	0.56	0.58	0.39	0.39

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	24.2	29.4	23.5	14.8	13.1	22.0	86.4	45.5	23.9	17.1	14.0	18.3
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	10778.6		6710.1			
ANNUAL MEAN	29.5		18.4		27.7	
HIGHEST ANNUAL MEAN					49.9	1971
LOWEST ANNUAL MEAN					14.2	1998
HIGHEST DAILY MEAN	212	Apr 17	241	Apr 21	752	May 7 1960
LOWEST DAILY MEAN	7.2	Sep 23	3.6	Mar 5	3.6	Mar 5 2003
ANNUAL SEVEN-DAY MINIMUM	7.2	Sep 23	3.6	Mar 5	3.6	Mar 5 2003
MAXIMUM PEAK FLOW			292	Apr 20	(a)860	May 7 1960
MAXIMUM PEAK STAGE			6.03	Apr 20	8.55	May 7 1960
INSTANTANEOUS LOW FLOW			3.6	(b)	3.6	(b)
ANNUAL RUNOFF (CFSM)	1.05		0.66		0.99	
ANNUAL RUNOFF (INCHES)	14.32		8.91		13.42	
10 PERCENT EXCEEDS	63		34		56	
50 PERCENT EXCEEDS	17		12		16	
90 PERCENT EXCEEDS	9.5		6.7		8.3	

(a) From rating curve extended above 400 ft^3/s.
(b) 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 mi^2, approximately.

PERIOD OF RECORD.--April 1938 to April 1942; periodic discharge measurements 1943-2002; August 2002 to September 2003 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 775 ft above sea level. Prior to April 30, 1942, non-recording 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 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	28	3.3
2	---	---	---	---	---	---	---	---	---	---	47	3.3
3	---	---	---	---	---	---	---	---	---	---	28	3.2
4	---	---	---	---	---	---	---	---	---	---	21	3.1
5	---	---	---	---	---	---	---	---	---	---	17	3.1
6	---	---	---	---	---	---	---	---	---	---	14	3.1
7	---	---	---	---	---	---	---	---	---	---	12	3.0
8	---	---	---	---	---	---	---	---	---	---	10	2.9
9	---	---	---	---	---	---	---	---	---	---	9.0	2.8
10	---	---	---	---	---	---	---	---	---	---	8.1	2.8
11	---	---	---	---	---	---	---	---	---	---	7.3	2.7
12	---	---	---	---	---	---	---	---	---	---	6.8	2.6
13	---	---	---	---	---	---	---	---	---	---	7.2	2.6
14	---	---	---	---	---	---	---	---	---	---	7.3	2.8
15	---	---	---	---	---	---	---	---	---	---	6.6	3.1
16	---	---	---	---	---	---	---	---	---	---	6.2	2.9
17	---	---	---	---	---	---	---	---	---	---	6.1	2.7
18	---	---	---	---	---	---	---	---	---	---	5.8	2.7
19	---	---	---	---	---	---	---	---	---	---	5.3	3.1
20	---	---	---	---	---	---	---	---	---	---	4.7	3.4
21	---	---	---	---	---	---	---	---	---	---	5.4	3.8
22	---	---	---	---	---	---	---	---	---	---	6.4	3.5
23	---	---	---	---	---	---	---	---	---	---	5.7	3.4
24	---	---	---	---	---	---	---	---	---	---	5.4	4.2
25	---	---	---	---	---	---	---	---	---	---	4.9	4.0
26	---	---	---	---	---	---	---	---	---	---	4.7	4.2
27	---	---	---	---	---	---	---	---	---	---	4.3	4.5
28	---	---	---	---	---	---	---	---	---	---	4.1	4.1
29	---	---	---	---	---	---	---	---	---	---	3.8	3.9
30	---	---	---	---	---	---	---	---	---	---	3.6	4.0
31	---	---	---	---	---	---	---	---	---	---	3.5	---
TOTAL	---	---	---	---	---	---	---	---	---	---	309.2	98.8
MEAN	---	---	---	---	---	---	---	---	---	---	9.97	3.29
MAX	---	---	---	---	---	---	---	---	---	---	47	4.5
MIN	---	---	---	---	---	---	---	---	---	---	3.5	2.6
CFSM	---	---	---	---	---	---	---	---	---	---	0.83	0.27
IN.	---	---	---	---	---	---	---	---	---	---	0.96	0.31

STREAMS TRIBUTARY TO LAKE MICHIGAN

04052500 WALSH CREEK AT M-28 NEAR SENEY, MI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	15	12	e9.0	e6.0	e5.5	81	33	12	2.7	10	2.9
2	9.4	15	11	e9.0	e6.0	e5.5	77	28	9.9	2.5	9.2	2.8
3	7.6	14	11	8.7	e6.0	e5.5	71	25	8.4	2.4	9.5	2.6
4	19	15	10	7.9	e6.0	e5.5	64	22	7.3	2.7	11	2.7
5	40	15	10	7.6	e6.0	e5.5	57	20	6.8	3.4	9.6	2.6
6	37	17	9.9	7.4	e6.0	e5.5	52	21	6.3	3.0	9.2	2.5
7	52	16	9.8	7.4	e6.0	e5.5	47	20	6.8	3.0	8.6	2.4
8	51	16	9.7	7.6	e6.0	e5.5	43	18	7.3	3.8	7.9	2.3
9	63	16	9.4	e7.5	e6.0	e5.5	43	16	6.9	3.3	7.2	2.3
10	52	22	9.3	e7.5	e6.0	e5.5	52	16	7.5	4.7	6.4	2.2
11	40	31	9.2	e7.0	e6.0	e5.5	75	19	12	12	6.0	2.2
12	37	27	9.1	e7.0	e6.0	e5.5	102	23	10	9.6	5.4	2.1
13	50	25	9.1	e7.0	e6.0	e5.5	108	22	8.4	6.9	4.7	2.5
14	41	24	9.1	e7.0	e6.0	e5.5	123	19	7.2	6.4	4.4	6.6
15	35	22	9.1	e7.0	e6.0	e6.0	161	16	6.5	14	4.1	16
16	30	17	8.9	e7.0	e6.0	e7.0	153	15	5.9	15	3.8	21
17	25	13	8.5	e6.5	e6.0	e7.5	119	14	5.4	9.9	3.6	14
18	22	12	9.1	e6.5	e6.0	e9.0	107	13	5.1	7.5	3.4	11
19	25	15	19	e6.5	e6.0	e12	100	12	4.7	6.1	3.3	9.2
20	23	16	21	e6.5	e6.0	e15	184	14	4.2	17	3.2	7.7
21	22	15	20	e6.5	e5.5	e20	225	13	4.0	48	3.2	6.8
22	23	15	19	e6.0	e5.5	e25	163	11	3.7	75	3.1	12
23	24	14	18	e6.0	e5.5	e30	113	10	3.4	51	2.9	18
24	21	14	17	e6.0	e5.5	e45	90	9.6	3.2	34	2.9	15
25	19	13	e15	e6.0	e5.5	e55	76	8.8	3.1	23	2.9	17
26	19	13	e14	e6.0	e5.5	e65	64	8.1	3.1	21	3.3	22
27	19	12	e13	e6.0	e5.5	76	55	7.2	3.1	18	3.1	65
28	18	11	e11	e6.0	e5.5	97	49	7.0	3.0	15	3.1	78
29	17	11	e10	e6.0	---	101	43	7.1	2.9	12	3.7	68
30	16	12	e10	e6.0	---	92	37	8.4	2.8	11	3.3	56
31	15	---	e10	e6.0	---	87	---	14	---	9.7	3.0	---
TOTAL	884.0	493	371.2	214.1	164.0	826.5	2734	490.2	180.9	453.6	165.0	475.4
MEAN	28.5	16.4	12.0	6.91	5.86	26.7	91.1	15.8	6.03	14.6	5.32	15.8
MAX	63	31	21	9.0	6.0	101	225	33	12	75	11	78
MIN	7.6	11	8.5	6.0	5.5	5.5	37	7.0	2.8	2.4	2.9	2.1
CFSM	2.38	1.37	1.00	0.58	0.49	2.22	7.59	1.32	0.50	1.22	0.44	1.32
IN.	2.74	1.53	1.15	0.66	0.51	2.56	8.48	1.52	0.56	1.41	0.51	1.47

SUMMARY STATISTICS	FOR 2003 WATER YEAR		WATER YEARS 1938 - 2003	
ANNUAL TOTAL	7451.9			
ANNUAL MEAN	20.4		18.4	
HIGHEST ANNUAL MEAN			22.0	1939
LOWEST ANNUAL MEAN			13.9	1941
HIGHEST DAILY MEAN	225	Apr 21	598	Apr 25 1939
LOWEST DAILY MEAN	2.1	Sep 12	0.70	Sep 3 1939
ANNUAL SEVEN-DAY MINIMUM	2.3	Sep 6	0.97	Aug 28 1939
MAXIMUM PEAK FLOW	247	Apr 20	618	Apr 25 1939
MAXIMUM PEAK STAGE	4.49	Apr 20	7.50	Apr 25 1939
INSTANTANEOUS LOW FLOW	2.1	(a)	0.70	Sep 3 1939
ANNUAL RUNOFF (CFSM)	1.70		1.54	
ANNUAL RUNOFF (INCHES)	23.10		20.87	
10 PERCENT EXCEEDS	52		38	
50 PERCENT EXCEEDS	9.6		8.8	
90 PERCENT EXCEEDS	3.3		3.1	

(a) Sept. 12, 13.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04052600 DRIGGS RIVER NEAR C-3 POOL NEAR DIVERSION DITCH NEAR SENEY, MI

LOCATION.--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 mi west of Seney.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--March 2000 to May 2000 (discharge measurements only, station 04052010), August 2002 to September 2003 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 731.46 ft above sea level.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Flow can be regulated by Diversion Ditch, 150 ft upstream of gage or at control structure at confluence of Walsh Creek, .25 mi upstream. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	98	62
2	---	---	---	---	---	---	---	---	---	---	125	62
3	---	---	---	---	---	---	---	---	---	---	107	61
4	---	---	---	---	---	---	---	---	---	---	97	61
5	---	---	---	---	---	---	---	---	---	---	91	61
6	---	---	---	---	---	---	---	---	---	---	85	60
7	---	---	---	---	---	---	---	---	---	---	81	60
8	---	---	---	---	---	---	---	---	---	---	77	60
9	---	---	---	---	---	---	---	---	---	---	75	60
10	---	---	---	---	---	---	---	---	---	---	74	60
11	---	---	---	---	---	---	---	---	---	---	72	60
12	---	---	---	---	---	---	---	---	---	---	71	60
13	---	---	---	---	---	---	---	---	---	---	73	60
14	---	---	---	---	---	---	---	---	---	---	73	60
15	---	---	---	---	---	---	---	---	---	---	72	61
16	---	---	---	---	---	---	---	---	---	---	71	61
17	---	---	---	---	---	---	---	---	---	---	71	60
18	---	---	---	---	---	---	---	---	---	---	70	60
19	---	---	---	---	---	---	---	---	---	---	68	61
20	---	---	---	---	---	---	---	---	---	---	67	64
21	---	---	---	---	---	---	---	---	---	---	68	66
22	---	---	---	---	---	---	---	---	---	---	71	66
23	---	---	---	---	---	---	---	---	---	---	71	64
24	---	---	---	---	---	---	---	---	---	---	69	67
25	---	---	---	---	---	---	---	---	---	---	68	66
26	---	---	---	---	---	---	---	---	---	---	67	65
27	---	---	---	---	---	---	---	---	---	---	66	67
28	---	---	---	---	---	---	---	---	---	---	65	66
29	---	---	---	---	---	---	---	---	---	---	64	65
30	---	---	---	---	---	---	---	---	---	---	63	65
31	---	---	---	---	---	---	---	---	---	---	63	---
TOTAL	---	---	---	---	---	---	---	---	---	---	2353	1871
MEAN	---	---	---	---	---	---	---	---	---	---	75.9	62.4
MAX	---	---	---	---	---	---	---	---	---	---	125	67
MIN	---	---	---	---	---	---	---	---	---	---	63	60

STREAMS TRIBUTARY TO LAKE MICHIGAN

04052600 DRIGGS RIVER NEAR C-3 POOL NEAR DIVERSION DITCH NEAR SENEY, MI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	75	87	82	e72	e58	e56	182	e94	e100	e70	e107	60
2	81	88	104	e67	e58	e56	169	e86	e95	e65	e103	59
3	74	87	97	e64	e58	e56	154	e80	e82	e60	e102	58
4	80	87	96	e64	e58	e56	136	e76	e70	e55	e121	58
5	108	87	93	e64	e58	e56	e135	e72	e60	e52	e108	57
6	122	88	87	e64	e57	e56	e120	e70	e52	e50	e97	57
7	129	88	83	e64	e57	e56	e120	65	e50	e48	e90	56
8	123	87	82	e62	e57	e56	112	62	e52	e45	e86	56
9	125	87	e80	e62	e57	e56	110	59	e55	e44	83	56
10	116	91	e80	e62	e57	e56	114	58	e60	e46	80	55
11	107	102	81	e62	e57	e56	139	59	e70	e55	76	55
12	104	102	80	e62	e57	e56	183	e90	e130	e65	73	55
13	118	99	79	e62	e57	e56	203	e150	e120	e70	70	56
14	116	99	79	e62	e57	e56	213	e140	e115	e60	69	68
15	108	97	78	e62	e57	e58	281	e130	e100	e52	69	90
16	101	90	76	e60	e56	e58	313	e120	e90	e48	68	96
17	96	95	e76	e60	e56	e60	296	e115	e80	e45	67	91
18	93	89	80	e60	e56	e60	280	e100	e70	e40	66	85
19	93	90	86	e60	e56	e65	257	e90	e65	e36	65	80
20	93	90	90	e60	e56	e65	340	e80	e60	e34	64	76
21	93	88	89	e58	e56	e70	401	e75	e58	e60	63	72
22	94	88	87	e58	e56	e80	e380	e72	e58	e337	62	76
23	93	87	86	e58	e56	e90	e320	e70	e55	e234	61	90
24	92	86	86	e58	e56	e100	e250	e68	e55	e191	61	86
25	90	86	86	e58	e56	e120	e200	e64	e55	e176	61	89
26	89	85	84	e58	e56	e145	e160	e60	e55	e159	62	99
27	89	84	80	e58	e56	144	e140	e56	e55	e148	61	135
28	90	83	83	e58	e56	174	e120	e56	e60	e134	62	126
29	89	84	80	e58	---	198	e110	e58	e62	e123	64	120
30	87	84	79	e58	---	216	e100	e60	e68	e115	62	113
31	86	---	78	e58	---	239	---	e65	---	e109	61	---
TOTAL	3054	2685	2607	1893	1588	2726	6038	2500	2157	2826	2344	2330
MEAN	98.5	89.5	84.1	61.1	56.7	87.9	201	80.6	71.9	91.2	75.6	77.7
MAX	129	102	104	72	58	239	401	150	130	337	121	135
MIN	74	83	76	58	56	56	100	56	50	34	61	55

SUMMARY STATISTICS	FOR 2003 WATER YEAR		WATER YEARS 2002 - 2003	
ANNUAL TOTAL	32748			
ANNUAL MEAN	89.7		89.7	
HIGHEST DAILY MEAN	401	Apr 21	401	Apr 21 2003
LOWEST DAILY MEAN	34	Jul 20	34	Jul 20 2003
ANNUAL SEVEN-DAY MINIMUM	45	Jul 14	45	Jul 14 2003
MAXIMUM PEAK FLOW	413	Apr 21	413	Apr 21 2003
MAXIMUM PEAK STAGE	4.96	Apr 21	4.96	Apr 21 2003
10 PERCENT EXCEEDS	135		135	
50 PERCENT EXCEEDS	76		76	
90 PERCENT EXCEEDS	56		56	

(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 mi^2, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	783	1510	e940	e980	e720	e720	4500	3830	1250	e680	703	571
2	885	1480	e900	e960	e720	e720	4510	3560	1300	e680	696	540
3	958	1450	e880	e900	e720	e720	4350	3260	1250	e660	696	519
4	1060	1430	e860	e850	e720	e720	4090	2990	1170	e660	749	504
5	1460	1420	e840	e800	e720	e720	3670	2770	1100	e660	839	490
6	1890	1430	e820	e780	e720	e720	3350	2600	1040	e640	864	482
7	2220	1450	e800	e760	e720	e720	3240	2430	1010	e620	818	476
8	2500	1450	e800	e740	e720	e720	3130	2280	1020	e620	761	471
9	2710	1440	e780	e720	e720	e720	2950	2140	1040	e620	718	466
10	2830	1450	e740	e720	e720	e720	2780	2020	1060	e620	682	463
11	2810	1520	e740	e720	e720	e720	2760	1970	1190	e625	654	458
12	2710	1620	e720	e720	e720	e720	2930	2020	1340	673	627	451
13	2610	1700	e740	e720	e720	e720	3210	2090	1380	731	604	454
14	2540	1730	e760	e720	e720	e720	3480	2100	1330	748	587	487
15	2440	1680	e760	e720	e720	e720	3740	2070	1200	731	573	579
16	2340	1590	e760	e720	e720	e760	3980	2000	1090	734	561	726
17	2250	1350	e760	e720	e720	e800	4200	1920	1010	759	546	825
18	2150	1250	e740	e720	e720	e940	4420	1810	949	785	535	845
19	2080	1460	e940	e720	e720	e1100	4540	1700	894	748	526	800
20	2030	1480	e1300	e720	e720	e1200	4780	1670	848	699	517	728
21	1970	1370	e1450	e720	e720	e1400	5240	1670	814	715	513	674
22	1940	1320	e1500	e720	e720	e1700	6250	1660	788	862	515	676
23	1910	1290	e1450	e720	e720	e2000	7100	1620	765	984	509	759
24	1870	1260	e1400	e720	e720	e2300	7080	1540	746	1080	504	842
25	1810	1240	e1350	e720	e720	e2600	6530	1460	728	1060	501	926
26	1750	1210	e1250	e720	e720	e3000	5860	1360	714	989	525	969
27	1700	1140	e1200	e720	e720	e3400	5240	1280	706	907	537	1150
28	1650	1050	e1150	e720	e720	3820	4800	1200	696	848	530	1420
29	1620	e1000	e1050	e720	---	4010	4410	1150	694	807	597	1540
30	1580	e980	e1050	e720	---	4220	4100	1120	688	760	620	1640
31	1550	---	e1000	e720	---	4390	---	1170	---	720	600	---
TOTAL	60606	41750	30430	23330	20160	48440	131220	62460	29810	23425	19207	21931
MEAN	1955	1392	982	753	720	1563	4374	2015	994	756	620	731
MAX	2830	1730	1500	980	720	4390	7100	3830	1380	1080	864	1640
MIN	783	980	720	720	720	720	2760	1120	688	620	501	451
CFSM	1.78	1.27	0.89	0.68	0.65	1.42	3.98	1.83	0.90	0.69	0.56	0.66
IN.	2.05	1.41	1.03	0.79	0.68	1.64	4.44	2.11	1.01	0.79	0.65	0.74

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 2003, BY WATER YEAR (WY)

MEAN	1144	1497	1251	938	862	1340	4006	2316	1299	882	699	796
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1938 - 2003	
ANNUAL TOTAL	670494		512769			
ANNUAL MEAN	1837		1405		1418	
HIGHEST ANNUAL MEAN					2229	1960
LOWEST ANNUAL MEAN					806	1948
HIGHEST DAILY MEAN	8400	Apr 19	7100	Apr 23	16500	May 11 1960
LOWEST DAILY MEAN	642	Sep 14	451	Sep 12	290	Oct 4 1948
ANNUAL SEVEN-DAY MINIMUM	658	Sep 9	463	Sep 7	294	Sep 30 1948
MAXIMUM PEAK FLOW			7270	Apr 23	16900	May 11 1960
MAXIMUM PEAK STAGE			10.97	Apr 23	12.85	May 11 1960
INSTANTANEOUS LOW FLOW			449	(a)	288	Oct 4 1948
ANNUAL RUNOFF (CFSM)	1.67		1.28		1.29	
ANNUAL RUNOFF (INCHES)	22.67		17.34		17.52	
10 PERCENT EXCEEDS	3590		2970		2720	
50 PERCENT EXCEEDS	1300		885		1000	
90 PERCENT EXCEEDS	751		620		560	

(a) Sept. 12, 13.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057510 STURGEON RIVER NEAR NAHMA JUNCTION, MI

LOCATION.--Lat 45°56'35", long 86°42'20", in SW1/4 SE1/4 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	281	188	146	e130	e70	e60	586	379	219	73	63	51
2	324	182	e140	e120	e68	e60	500	347	201	71	63	47
3	279	176	e135	e115	e68	e60	422	318	184	70	82	43
4	402	172	e130	e110	e68	e60	337	295	170	69	141	40
5	756	170	e130	e100	e66	e60	e340	286	159	69	109	38
6	745	175	e130	e100	e66	e60	e320	347	152	64	93	38
7	728	170	e130	e96	e66	e60	e310	344	147	64	80	37
8	664	167	e130	e92	e66	e60	e310	319	157	66	72	36
9	623	165	e130	e90	e66	e60	300	300	162	66	65	36
10	549	195	e130	e90	e66	e60	287	304	173	67	59	35
11	467	279	e135	e88	e66	e60	362	345	296	98	54	43
12	406	265	e140	e88	e66	e60	471	451	275	103	50	47
13	407	249	e145	e86	e66	e60	485	431	233	93	46	60
14	362	236	e150	e86	e66	e60	505	377	202	86	43	174
15	324	216	e155	e84	e64	e60	583	338	179	83	41	251
16	295	194	e165	e84	e64	e60	617	307	161	81	40	235
17	268	175	173	e84	e64	e70	552	285	145	77	39	215
18	252	237	182	e82	e64	e100	517	266	133	72	38	177
19	273	218	299	e80	e64	e150	536	251	123	69	37	146
20	266	182	329	e80	e62	e200	903	250	114	67	36	123
21	252	177	e270	e80	e62	e250	1320	250	107	69	36	108
22	270	174	e230	e80	e62	e310	1160	233	99	71	35	120
23	280	168	e180	e78	e62	e380	959	219	95	70	34	150
24	263	163	e170	e76	e62	e500	805	206	90	68	34	158
25	247	158	e170	e76	e62	e600	692	192	88	65	43	168
26	245	150	e160	e76	e62	e800	614	184	83	66	70	165
27	237	153	e160	e75	e62	e760	551	177	80	71	59	333
28	224	237	e150	e74	e60	e740	501	171	78	67	52	367
29	213	211	e140	e74	---	e700	456	161	77	63	79	325
30	203	144	e140	e72	---	e600	414	155	75	60	68	274
31	195	---	e130	e70	---	594	---	201	---	59	57	---
TOTAL	11300	5746	5104	2716	1810	7714	16715	8689	4457	2237	1818	4040
MEAN	365	192	165	87.6	64.6	249	557	280	149	72.2	58.6	135
MAX	756	279	329	130	70	800	1320	451	296	103	141	367
MIN	195	144	130	70	60	60	287	155	75	59	34	35
CFSM	1.99	1.05	0.90	0.48	0.35	1.36	3.04	1.53	0.81	0.39	0.32	0.74
IN.	2.30	1.17	1.04	0.55	0.37	1.57	3.40	1.77	0.91	0.45	0.37	0.82

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2003, BY WATER YEAR (WY)

MEAN	178	216	164	105	97.1	181	544	284	178	116	107	123
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1967 - 2003	
ANNUAL TOTAL	87071		72346			
ANNUAL MEAN	239		198		191	
HIGHEST ANNUAL MEAN					289	1978
LOWEST ANNUAL MEAN					121	1987
HIGHEST DAILY MEAN	1180	Apr 15	1320	Apr 21	2030	Apr 21 1985
LOWEST DAILY MEAN	64	Sep 13	34	Aug 23	32	Aug 5 1998
ANNUAL SEVEN-DAY MINIMUM	67	Sep 8	36	Aug 18	34	Jul 31 1998
MAXIMUM PEAK FLOW			1360	Apr 21	2120	Apr 21 1985
MAXIMUM PEAK STAGE			9.22	Apr 21	11.50	Apr 21 1985
INSTANTANEOUS LOW FLOW			33	(a)	32	(b)
ANNUAL RUNOFF (CFSM)	1.30		1.08		1.04	
ANNUAL RUNOFF (INCHES)	17.70		14.71		14.19	
10 PERCENT EXCEEDS	492		439		388	
50 PERCENT EXCEEDS	170		144		126	
90 PERCENT EXCEEDS	83		60		65	

(a) Aug. 23, 24.
(b) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	66	e42	e27	e16	e11	82	98	94	15	21	9.0
2	88	63	e38	e26	e16	e10	77	86	75	14	29	8.6
3	70	62	e36	e26	e16	e10	69	77	62	14	107	7.9
4	85	60	e35	e25	e16	e10	e68	72	52	e14	92	8.0
5	163	57	e35	e23	e15	e10	e67	70	46	e14	59	7.9
6	197	56	e35	e22	e15	e10	66	76	43	e13	41	7.8
7	282	54	e35	e20	e15	e10	64	71	43	e13	32	7.4
8	309	62	e35	e20	e15	e10	60	67	43	e12	26	7.4
9	241	57	e35	e20	e15	e10	60	64	43	e12	22	7.3
10	185	79	e35	e20	e15	e10	79	69	52	11	19	7.1
11	136	114	e35	e19	e14	e11	121	102	75	16	17	7.2
12	114	107	e35	e19	e14	e12	153	281	64	15	16	7.8
13	138	87	e35	e19	e14	e12	149	583	53	13	14	11
14	128	78	e35	e18	e14	e14	176	410	45	12	13	20
15	108	68	e35	e18	e14	e15	273	258	40	14	12	22
16	91	65	e35	e18	e14	e17	332	181	43	14	12	16
17	80	59	35	e17	e14	e21	281	138	41	13	11	13
18	74	56	35	e17	e14	e25	212	117	38	11	11	13
19	87	53	46	e17	e14	e32	196	103	33	11	10	13
20	102	53	48	e17	e14	37	244	110	28	10	11	13
21	95	52	46	e17	e14	49	360	100	26	32	11	12
22	96	51	42	e17	e14	73	357	86	23	37	9.7	21
23	94	52	39	e17	e13	89	268	78	20	30	8.9	21
24	86	55	37	e17	e12	131	207	69	19	22	9.3	17
25	81	52	35	e16	e12	172	176	60	17	18	9.5	16
26	85	50	34	e16	e12	159	153	54	17	18	12	17
27	91	48	33	e16	e11	142	136	49	16	18	11	23
28	86	46	32	e16	e11	116	129	45	16	16	10	27
29	81	46	31	e16	---	106	119	48	16	15	11	27
30	77	e45	30	e16	---	e105	108	58	16	15	10	25
31	71	---	e28	e16	---	97	---	104	---	19	9.1	---
TOTAL	3708	1853	1122	588	393	1536	4842	3784	1199	501	686.5	420.4
MEAN	120	61.8	36.2	19.0	14.0	49.5	161	122	40.0	16.2	22.1	14.0
MAX	309	114	48	27	16	172	360	583	94	37	107	27
MIN	70	45	28	16	11	10	60	45	16	10	8.9	7.1
CFSM	2.60	1.34	0.79	0.41	0.31	1.08	3.51	2.65	0.87	0.35	0.48	0.30
IN.	3.00	1.50	0.91	0.48	0.32	1.24	3.92	3.06	0.97	0.41	0.56	0.34

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2003, BY WATER YEAR (WY)

MEAN	53.1	55.5	36.9	23.2	20.5	40.8	200	122	59.5	32.5	26.0	34.8
MAX	191	198	77.5	41.5	55.9	149	423	326	153	89.9	76.5	184
(WY)	1986	1989	1992	1966	1984	1973	1985	1972	1989	1968	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
(WY)	1977	1977	1977	1977	1977	1964	1987	1998	1988	1988	1976	1976

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1959 - 2003	
ANNUAL TOTAL	29079		20632.9			
ANNUAL MEAN	79.7		56.5		58.6	
HIGHEST ANNUAL MEAN					95.3	1960
LOWEST ANNUAL MEAN					30.7	1998
HIGHEST DAILY MEAN	1420	Apr 17	583	May 13	1830	Apr 20 1985
LOWEST DAILY MEAN	16	Sep 1	7.1	Sep 10	4.2	Sep 12 1976
ANNUAL SEVEN-DAY MINIMUM	17	Feb 5	7.4	Sep 6	4.5	Sep 7 1976
MAXIMUM PEAK FLOW			627	May 13	1930	Apr 20 1985
MAXIMUM PEAK STAGE			5.93	May 13	9.21	Apr 20 1985
INSTANTANEOUS LOW FLOW			6.5	Sep 11	3.5	Aug 22 1998
ANNUAL RUNOFF (CFSM)	1.73		1.23		1.27	
ANNUAL RUNOFF (INCHES)	23.52		16.69		17.30	
10 PERCENT EXCEEDS	144		124		128	
50 PERCENT EXCEEDS	41		34		30	
90 PERCENT EXCEEDS	19		11		12	

(e) Estimated.

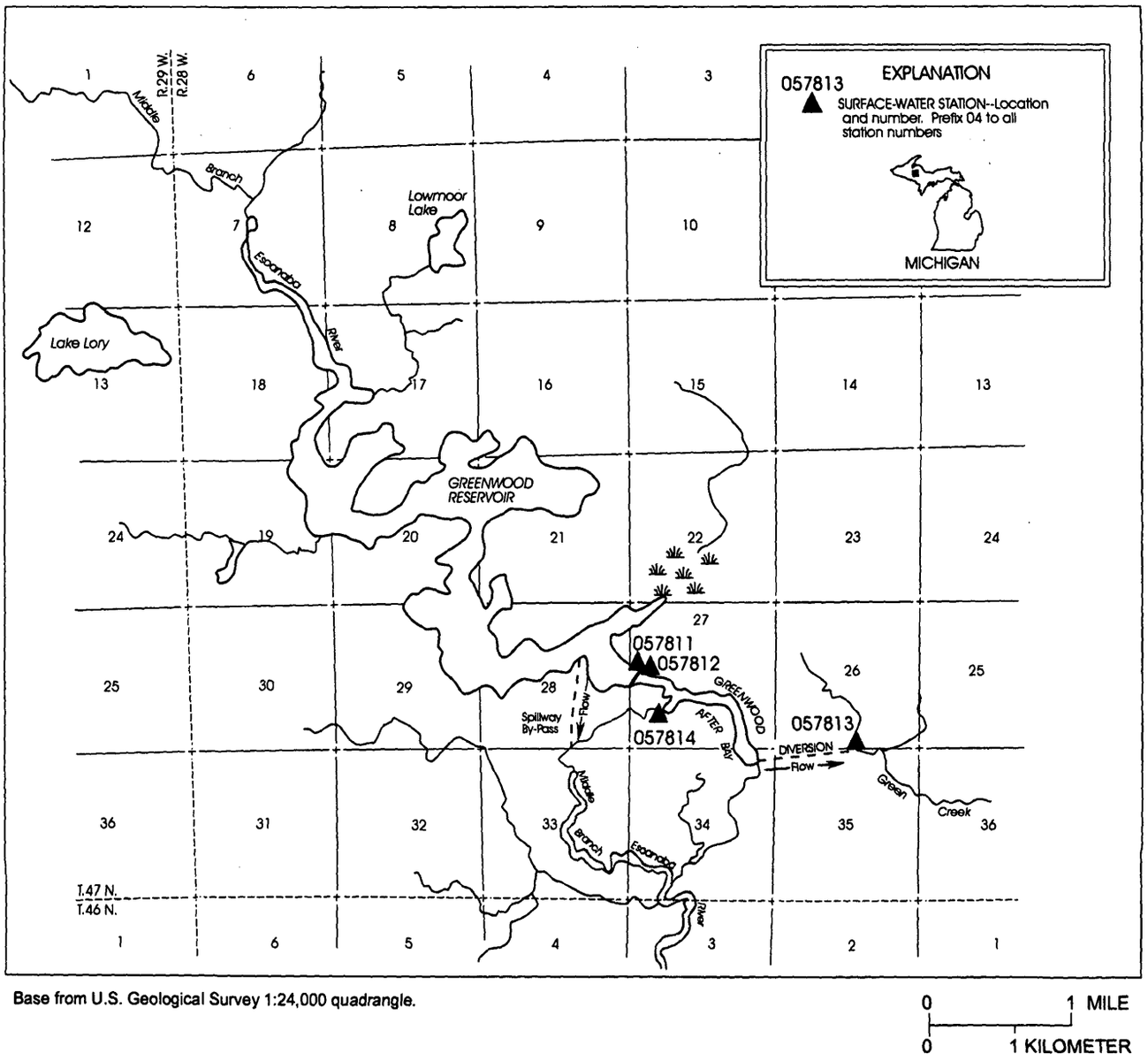


Figure 7. Identification number and location of active surface-water gaging stations in and around the Greenwood Reservoir Complex.

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 downstream side of dam on Middle Branch Escanaba River, 3.7 mi southwest of Greenwood.

DRAINAGE AREA.--67.4 mi^2.

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.

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, 1,515.91 ft, May 14; minimum, 1,510.83 ft, Sept. 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	115.21	115.23	115.15	114.99	114.18	112.99	114.46	115.37	115.30	114.53	113.52	112.30
2	115.21	115.22	115.15	114.97	114.14	112.94	114.57	115.33	115.28	114.48	113.54	112.22
3	115.19	115.20	115.14	114.95	114.13	112.87	114.65	115.31	115.25	114.44	113.69	112.14
4	115.24	115.20	115.13	114.93	114.14	112.82	114.74	115.28	115.21	114.40	113.80	112.06
5	115.31	115.19	115.12	114.92	114.10	112.76	114.82	115.27	115.18	114.34	113.87	111.97
6	115.42	115.19	115.11	114.91	114.06	112.69	114.88	115.28	115.16	114.29	113.89	111.89
7	115.48	115.18	115.09	114.90	114.01	112.64	114.94	115.27	115.15	114.24	113.88	111.81
8	115.56	115.19	115.09	114.89	113.97	112.58	114.98	115.26	115.14	114.17	113.86	111.72
9	115.57	115.19	115.08	114.88	113.92	112.52	115.03	115.25	115.13	114.11	113.83	111.63
10	115.52	115.23	115.07	114.88	113.88	112.46	115.09	115.25	115.15	114.06	113.80	111.55
11	115.44	115.28	115.07	114.86	113.84	112.39	115.20	115.32	115.18	114.05	113.76	111.46
12	115.40	115.31	115.06	114.83	113.80	112.35	115.31	115.53	115.18	114.01	113.72	111.38
13	115.39	115.31	115.05	114.80	113.76	112.30	115.39	115.75	115.17	113.97	113.66	111.36
14	115.35	115.30	115.05	114.78	113.72	112.26	115.42	115.89	115.14	113.91	113.54	111.39
15	115.33	115.27	115.05	114.75	113.67	112.23	115.53	115.79	115.11	113.90	113.46	111.38
16	115.30	115.24	115.04	114.72	113.62	112.20	115.63	115.66	115.08	113.84	113.40	111.34
17	115.27	115.23	115.04	114.69	113.58	112.20	115.68	115.55	115.05	113.78	113.33	111.28
18	115.25	115.21	115.04	114.67	113.54	112.20	115.64	115.47	115.03	113.71	113.24	111.22
19	115.26	115.19	115.06	114.64	113.49	112.21	115.59	115.42	114.99	113.64	113.16	111.18
20	115.27	115.18	115.08	114.62	113.45	112.24	115.62	115.42	114.95	113.58	113.09	111.11
21	115.28	115.18	115.09	114.59	113.41	112.32	115.68	115.38	114.92	113.64	113.02	111.04
22	115.32	115.17	115.09	114.56	113.38	112.49	115.73	115.36	114.89	113.66	112.93	111.05
23	115.31	115.17	115.08	114.52	113.33	112.64	115.72	115.32	114.84	113.64	112.85	111.02
24	115.29	115.17	115.07	114.49	113.27	112.86	115.65	115.29	114.81	113.64	112.78	110.97
25	115.27	115.16	115.06	114.46	113.22	113.16	115.58	115.26	114.79	113.62	112.73	110.93
26	115.26	115.17	115.05	114.42	113.16	113.43	115.52	115.23	114.75	113.62	112.71	110.90
27	115.26	115.16	115.04	114.39	113.11	113.67	115.48	115.21	114.71	113.60	112.64	110.90
28	115.26	115.15	115.03	114.37	113.05	113.92	115.45	115.19	114.65	113.57	112.58	110.90
29	115.25	115.15	115.02	114.31	---	114.09	115.41	115.18	114.61	113.54	112.53	110.87
30	115.25	115.16	115.01	114.26	---	114.22	115.39	115.20	114.57	113.51	112.45	110.85
31	115.25	---	115.00	114.22	---	114.34	---	115.29	---	113.49	112.38	---
MEAN	115.32	115.21	115.07	114.68	113.68	112.81	115.29	115.37	115.01	113.90	113.28	111.39
MAX	115.57	115.31	115.15	114.99	114.18	114.34	115.73	115.89	115.30	114.53	113.89	112.30
MIN	115.19	115.15	115.00	114.22	113.05	112.20	114.46	115.18	114.57	113.49	112.38	110.85

CAL YR 2002 MEAN 114.69 MAX 116.69 MIN 113.08
WTR YR 2003 MEAN 114.26 MAX 115.89 MIN 110.85

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 house on Middle Branch Escanaba River, 3.7 mi southwest of Greenwood.

DRAINAGE AREA.--67.4 mi^2.

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.).

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, 80.84 ft, Aug. 22; minimum, 79.82 ft, Jan. 10.

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).

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	80.16	80.15	80.03	80.47	80.48	80.22	80.36	80.08	80.09	80.14	80.11	80.05
2	80.11	80.14	80.02	80.50	80.42	80.25	80.42	80.04	80.07	80.17	80.10	80.03
3	80.07	80.13	79.99	80.50	80.39	80.26	80.44	80.02	80.05	80.20	80.13	80.03
4	80.13	80.12	79.97	80.33	80.39	80.29	80.38	80.00	80.02	80.21	80.11	80.03
5	80.17	80.11	79.96	80.18	80.34	80.29	80.29	80.00	80.00	80.20	80.09	80.06
6	80.23	80.12	79.98	80.06	80.30	80.29	80.21	80.02	79.99	80.20	80.08	80.19
7	80.27	80.10	80.10	79.97	80.27	80.31	80.14	80.01	80.00	80.21	80.19	80.30
8	80.26	80.10	80.18	79.90	80.25	80.31	80.09	80.00	79.99	80.20	80.29	80.36
9	80.25	80.12	80.22	79.87	80.23	80.30	80.05	79.99	79.98	80.20	80.37	80.42
10	80.21	80.15	80.23	79.88	80.21	80.28	80.03	80.00	80.01	80.21	80.42	80.47
11	80.19	80.18	80.24	80.08	80.20	80.29	80.05	80.06	80.04	80.24	80.46	80.52
12	80.18	80.19	80.23	80.27	80.20	80.25	80.08	80.28	80.02	80.24	80.48	80.56
13	80.19	80.19	80.23	80.39	80.19	80.23	80.08	80.35	80.00	80.22	80.36	80.53
14	80.19	80.19	80.23	80.33	80.18	80.23	80.10	80.34	79.97	80.21	80.20	80.59
15	80.22	80.19	80.24	80.26	80.17	80.24	80.16	80.32	79.95	80.23	80.08	80.30
16	80.19	80.17	80.21	80.20	80.16	80.25	80.17	80.29	79.94	80.09	79.99	80.22
17	80.16	80.17	80.12	80.15	80.15	80.25	80.18	80.26	80.05	79.95	80.00	80.18
18	80.20	80.17	80.12	80.12	80.16	80.25	80.21	80.24	80.14	79.96	80.31	80.15
19	80.23	80.18	80.14	80.09	80.16	80.23	80.22	80.22	80.20	80.05	80.58	80.14
20	80.22	80.17	80.14	80.07	80.15	80.24	80.33	80.23	80.25	80.16	80.69	80.15
21	80.21	80.16	80.13	80.04	80.15	80.34	80.38	80.20	80.29	80.37	80.76	80.16
22	80.24	80.16	80.12	80.02	80.13	80.31	80.38	80.16	80.33	80.51	80.76	80.27
23	80.23	80.18	80.11	80.00	80.12	80.21	80.34	80.13	80.35	80.73	80.60	80.36
24	80.22	80.20	80.11	80.00	80.11	80.13	80.31	80.09	80.33	80.43	80.48	80.46
25	80.21	80.19	80.11	79.99	80.09	80.06	80.27	80.06	80.14	80.23	80.39	80.53
26	80.22	80.15	80.11	79.98	80.08	79.98	80.22	80.04	79.98	80.21	80.35	80.56
27	80.20	80.11	80.19	79.97	80.11	79.92	80.20	80.00	79.93	80.18	80.25	80.42
28	80.19	80.09	80.27	80.04	80.17	80.07	80.17	79.97	79.99	80.13	80.20	80.28
29	80.18	80.07	80.33	80.28	---	80.18	80.14	79.98	80.06	80.11	80.17	80.17
30	80.18	80.06	80.39	80.43	---	80.25	80.11	80.02	80.10	80.10	80.11	80.16
31	80.17	---	80.43	80.53	---	80.30	---	80.11	---	80.09	80.08	---
MEAN	80.20	80.15	80.16	80.16	80.21	80.23	80.22	80.11	80.08	80.21	80.30	80.29
MAX	80.27	80.20	80.43	80.53	80.48	80.34	80.44	80.35	80.35	80.73	80.76	80.59
MIN	80.07	80.06	79.96	79.87	80.08	79.92	80.03	79.97	79.93	79.95	79.99	80.03

CAL YR 2002 MEAN 80.29 MAX 81.53 MIN 79.72
WTR YR 2003 MEAN 80.19 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	15	15	10	21	24	3.5	6.5	6.6	16	8.3	23
2	15	15	15	11	21	24	3.5	6.5	6.6	17	8.3	23
3	15	15	15	11	21	24	5.2	6.5	6.6	17	8.3	23
4	15	15	15	10	22	24	6.4	6.5	6.6	17	8.3	23
5	15	15	15	10	21	24	6.5	6.5	6.6	17	8.3	23
6	15	15	15	10	21	24	6.5	6.5	6.6	17	13	23
7	15	15	15	10	21	24	6.5	6.5	6.6	17	16	23
8	15	15	15	10	21	24	6.4	6.5	6.5	17	16	24
9	15	15	15	10	21	24	6.3	6.5	6.5	17	16	24
10	15	15	15	10	21	24	6.3	6.5	6.6	17	16	24
11	15	15	15	10	21	24	6.4	6.5	6.6	17	17	24
12	15	15	15	10	21	e18	6.5	6.6	6.6	17	18	24
13	15	15	15	12	21	e13	6.5	6.6	6.5	17	21	24
14	15	15	15	15	21	e13	6.5	6.6	6.5	17	21	24
15	15	15	15	15	21	e13	6.5	6.6	6.5	e19	20	18
16	15	15	15	15	21	e13	6.5	6.6	13	20	20	15
17	15	15	14	15	21	e13	6.5	6.6	16	20	20	15
18	15	15	13	15	21	e13	6.6	6.6	16	20	21	14
19	15	15	13	15	21	13	6.5	6.6	17	20	23	17
20	15	15	13	15	21	9.6	6.6	6.6	17	20	24	20
21	15	15	13	15	21	7.2	6.6	6.6	17	20	25	20
22	15	15	13	15	21	6.2	6.6	6.6	17	15	25	17
23	15	15	13	15	21	6.2	6.6	6.6	17	11	24	14
24	15	15	13	14	21	6.2	6.6	6.6	17	8.6	24	14
25	15	15	13	14	21	6.1	6.6	6.6	17	8.4	24	14
26	15	15	12	14	21	6.1	6.6	6.6	16	8.4	23	14
27	15	15	10	14	22	4.6	6.6	6.5	16	8.4	23	14
28	15	15	10	17	25	3.4	6.6	6.5	16	8.4	23	14
29	15	15	10	21	---	3.5	6.6	6.5	16	8.4	23	14
30	15	15	10	21	---	3.5	6.6	6.5	16	8.4	23	14
31	15	---	10	22	---	3.5	---	6.6	---	8.4	23	---
TOTAL	465	450	420	421	594	439.1	188.2	203.1	342.5	469.4	583.5	577
MEAN	15.0	15.0	13.5	13.6	21.2	14.2	6.27	6.55	11.4	15.1	18.8	19.2
MAX	15	15	15	22	25	24	6.6	6.6	17	20	25	24
MIN	15	15	10	10	21	3.4	3.5	6.5	6.5	8.4	8.3	14

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1973 - 2003, BY WATER YEAR (WY)

MEAN	14.5	12.7	14.3	17.5	17.0	12.9	6.38	9.25	12.0	17.0	17.0	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	0.046	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1973 - 2003	
ANNUAL TOTAL	3782.8		5152.8			
ANNUAL MEAN	10.4		14.1		14.0	
HIGHEST ANNUAL MEAN					22.4	1995
LOWEST ANNUAL MEAN					4.06	1974
HIGHEST DAILY MEAN	18	Mar 29	25	Feb 28	30	(a)
LOWEST DAILY MEAN	1.0	May 10	3.4	Mar 28	0.00	(b)
ANNUAL SEVEN-DAY MINIMUM	1.1	May 7	3.6	Mar 27	0.00	Apr 7 1998
10 PERCENT EXCEEDS	15		23		26	
50 PERCENT EXCEEDS	9.7		15		14	
90 PERCENT EXCEEDS	5.9		6.5		1.5	

(a) June 25-28, 1977, Nov. 9, 1979.
(b) Apr. 8-13, 1998; result of shutdown of flume for maintenance.
(e) 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 mi^2.

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 fair. 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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	23	24	25	24	e24	25	24	25	25	25	24
2	25	23	24	25	24	e24	25	24	25	25	25	24
3	24	23	24	e25	24	e24	25	24	25	25	25	24
4	24	23	24	25	24	e24	25	24	24	25	25	24
5	24	23	24	25	24	e24	24	24	24	25	25	24
6	25	23	24	25	24	24	24	24	24	25	25	24
7	24	23	24	24	24	24	24	24	24	25	25	24
8	24	23	24	24	24	24	24	24	24	25	25	25
9	24	24	25	24	24	24	24	24	24	25	25	25
10	24	24	25	24	24	24	24	24	24	25	26	25
11	24	24	25	24	24	24	24	24	24	25	26	25
12	24	24	25	25	24	24	24	25	24	25	26	25
13	24	24	25	25	24	24	24	25	24	25	25	25
14	24	24	25	25	24	24	24	25	24	25	25	25
15	24	24	25	25	24	24	24	25	24	25	25	25
16	24	24	25	25	24	24	24	25	24	25	24	25
17	24	24	25	25	24	24	24	25	25	24	24	24
18	24	24	25	25	24	24	24	25	25	24	25	24
19	24	24	25	24	24	24	25	25	25	25	26	24
20	24	24	25	24	e24	24	25	25	25	25	26	24
21	24	24	24	24	e24	24	25	25	25	25	26	24
22	24	e24	24	24	e24	24	25	25	25	26	26	24
23	24	e24	24	24	e24	24	25	25	25	25	26	25
24	24	e24	24	24	e24	24	25	25	25	24	26	25
25	24	24	24	24	e24	23	25	24	25	25	25	25
26	24	24	24	24	e24	23	25	24	24	25	25	25
27	24	24	25	24	e24	23	25	24	24	25	25	25
28	24	24	25	24	e24	24	25	24	25	25	25	24
29	23	24	25	24	---	24	25	24	25	25	25	24
30	23	24	25	24	---	24	24	24	25	25	25	24
31	23	---	25	24	---	24	---	25	---	25	24	---
TOTAL	744	712	761	757	672	741	735	758	735	773	781	734
MEAN	24.0	23.7	24.5	24.4	24.0	23.9	24.5	24.5	24.5	24.9	25.2	24.5
MAX	25	24	25	25	24	24	25	25	25	26	26	25
MIN	23	23	24	24	24	23	24	24	24	24	24	24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1973 - 2003, BY WATER YEAR (WY)

MEAN	29.2	28.5	25.6	25.3	26.2	28.1	27.5	26.6	26.7	26.1	25.5	25.6
MAX	141	122	35.6	32.6	35.9	56.3	44.9	40.3	42.2	42.2	30.6	30.2
(WY)	1973	1973	1974	1974	1986	1989	1989	1976	1975	1974	1997	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
(WY)	1996	1999	1999	1973	1973	1973	1998	1999	1995	1973	1995	1995

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1973 - 2003	
ANNUAL TOTAL	8964		8903			
ANNUAL MEAN	24.6		24.4		26.8	
HIGHEST ANNUAL MEAN					44.8	1973
LOWEST ANNUAL MEAN					21.0	1999
HIGHEST DAILY MEAN	33	Apr 11	26	Jul 22	(a)290	Oct 1 1972
LOWEST DAILY MEAN	22	Aug 10	23	Oct 29	0.00	(b)
ANNUAL SEVEN-DAY MINIMUM	23	Aug 7	23	Oct 29	0.00	Apr 15 1998
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 ft^3/s, July 10, 11, 1974.
(b) Apr. 15-29, 1998; result of shutdown of flume for maintenance.

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 mi^2.

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 ft^3/s, from rating curve extended above 2,400 ft^3/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	341	268	164	119	111	e96	213	366	420	106	145	89
2	396	250	137	107	108	e94	186	335	388	103	142	83
3	372	249	136	106	108	e92	167	310	342	99	128	87
4	348	236	158	110	108	e92	128	276	293	98	129	87
5	454	217	157	110	105	e92	153	259	259	110	139	87
6	537	215	143	110	102	e91	185	291	238	104	124	87
7	650	222	140	110	107	90	164	287	259	86	116	87
8	725	214	141	110	100	104	148	296	270	86	107	87
9	741	225	137	111	104	104	164	274	245	90	97	87
10	686	235	128	116	105	102	178	279	267	98	110	87
11	594	302	128	114	105	98	271	345	322	100	114	87
12	509	324	137	107	105	98	391	470	325	107	96	87
13	484	319	141	105	100	101	419	701	283	105	94	87
14	464	309	138	98	101	105	472	868	235	98	94	164
15	435	270	132	98	108	103	575	957	216	105	88	194
16	404	e250	130	99	e105	118	633	840	207	108	82	154
17	346	e240	130	97	e100	172	681	673	164	108	85	104
18	330	e240	130	97	e100	156	680	551	154	101	85	108
19	324	e220	142	97	e100	159	645	471	142	84	89	108
20	331	e210	153	98	e100	176	758	436	128	80	88	93
21	339	e200	162	96	e100	208	810	435	123	212	90	84
22	338	e200	147	96	e98	312	825	416	116	278	90	109
23	350	e200	132	94	e98	319	818	374	114	179	90	160
24	345	e200	132	91	e98	402	755	324	112	152	89	124
25	329	e200	132	90	e98	407	651	318	101	129	80	104
26	312	e180	134	92	e98	373	560	259	102	117	90	129
27	328	180	127	94	e98	322	497	224	107	118	99	145
28	336	168	120	92	e96	268	451	235	107	115	89	145
29	328	165	120	92	---	226	430	244	107	105	92	135
30	306	176	120	94	---	224	400	267	107	159	94	134
31	295	---	120	95	---	209	---	381	---	173	89	---
TOTAL	13077	6884	4248	3145	2866	5513	13408	12762	6253	3713	3144	3323
MEAN	422	229	137	101	102	178	447	412	208	120	101	111
MAX	741	324	164	119	111	407	825	957	420	278	145	194
MIN	295	165	120	90	96	90	128	224	101	80	80	83

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2003, BY WATER YEAR (WY)

MEAN	174	174	135	105	100	148	511	428	239	153	127	147
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1961 - 2003	
ANNUAL TOTAL	102821		78336			
ANNUAL MEAN	282		215		204	
HIGHEST ANNUAL MEAN					296	1979
LOWEST ANNUAL MEAN					122	1998
HIGHEST DAILY MEAN	2880	Apr 19	957	May 15	2880	Apr 19 2002
LOWEST DAILY MEAN	87	Feb 12	80	Jul 20	4.1	Feb 4 1967
ANNUAL SEVEN-DAY MINIMUM	89	Feb 10	86	Sep 2	28	Aug 29 1961
MAXIMUM PEAK FLOW			970	May 15	2980	Apr 18 2002
MAXIMUM PEAK STAGE			4.77	May 15	9.52	Apr 18 2002
INSTANTANEOUS LOW FLOW			16	Oct 28	2.2	Oct 5 1964
10 PERCENT EXCEEDS	542		432		404	
50 PERCENT EXCEEDS	168		137		126	
90 PERCENT EXCEEDS	99		91		82	

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04058190 SCHWEITZER RESERVOIR NEAR PALMER, MI

LOCATION.--Lat 46°25'00", long 87°38'48", in SE1/4 NW1/4 sec.2, T.46 N., R.27 W., Marquette County, Hydrologic Unit 04030110, on left bank 120 ft upstream from dam on Schweitzer Creek, 3.0 mi southwest of Palmer.

DRAINAGE AREA.--23.1 mi^2.

PERIOD OF RECORD.--January 1963 to current year. Prior to October 1997 monthend elevations and contents only.

GAGE.--Water-stage recorder. Datum of gage is 1,300.00 ft above sea level (Cleveland-Cliffs Iron Co. reference mark); EXTREMES reported below have been converted to sea level elevations. Prior to Oct. 25, 1967, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by an earthfill dam with fixed crest concrete spillway completed in 1963. Capacity of reservoir, 5,300 acre-ft at spillway elevation, 1,338.00 ft. The dam includes a discharge pipe equipped with valve to control release flow to Schweitzer Creek (station 04058200). An average of 41 ft^3/s (figure furnished by Cleveland Cliffs Iron Co.) was diverted from reservoir for iron ore processing, some returned to Middle Branch Escanaba River via Green Creek and some returned to the East Branch Escanaba River via Goose Lake Outlet. Since January 1973, controlled diversion from Greenwood Reservoir (station 04057811) via Greenwood Diversion (station 04057813) into Schweitzer Reservoir. Controlled inflow averaged 14 ft^3/s for the year. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation recorded, 1,339.5 ft, May 31, 1970, Apr. 20, 1985; minimum recorded since first filling, 1,329.7 ft, Apr. 10, 1974.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 1,338.96 ft, May 13; minimum, 1,336.29 ft, Mar. 10.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38.15	38.17	38.08	37.95	37.72	36.60	37.91	38.10	38.48	37.62	37.61	37.09
2	38.13	38.16	38.08	37.95	37.75	36.57	37.84	38.07	38.37	37.59	37.57	37.07
3	38.10	38.15	38.06	37.93	37.80	36.53	37.75	38.06	38.29	37.55	37.53	37.05
4	38.19	38.15	38.02	37.92	37.80	36.50	37.72	38.03	38.23	37.52	37.48	37.04
5	38.35	38.14	38.01	37.88	37.74	36.46	37.70	38.02	38.18	37.47	37.41	37.03
6	38.40	38.14	38.01	37.86	37.68	36.42	37.64	38.06	38.16	37.41	37.33	37.01
7	38.49	38.13	38.02	37.83	37.63	36.39	37.57	38.09	38.21	37.37	37.28	37.00
8	38.41	38.14	38.02	37.80	37.59	36.37	37.48	38.08	38.23	37.30	37.24	37.00
9	38.32	38.14	38.01	37.78	37.52	36.33	37.40	38.07	38.23	37.25	37.20	36.99
10	38.24	38.18	38.02	37.76	37.46	36.31	37.41	38.07	38.24	37.19	37.16	36.98
11	38.21	38.25	38.02	37.72	37.39	36.35	37.60	38.18	38.33	37.17	37.12	36.97
12	38.21	38.22	38.02	37.68	37.35	36.35	37.89	38.69	38.28	37.14	37.07	36.96
13	38.25	38.20	38.02	37.64	37.28	36.35	38.08	38.90	38.21	37.10	37.04	37.00
14	38.24	38.18	38.03	37.62	37.22	36.35	38.19	38.65	38.14	37.04	37.03	37.16
15	38.20	38.16	38.03	37.60	37.16	36.35	38.37	38.44	38.06	37.04	37.01	37.33
16	38.17	38.15	38.03	37.61	37.12	36.41	38.33	38.37	38.00	37.05	36.99	37.37
17	38.14	38.14	38.03	37.61	37.09	36.53	38.25	38.32	37.99	37.07	36.96	37.44
18	38.14	38.12	38.03	37.63	37.05	36.65	38.23	38.27	37.98	37.07	36.93	37.45
19	38.19	38.12	38.06	37.63	37.03	36.77	38.25	38.24	37.94	37.06	36.90	37.38
20	38.23	38.11	38.08	37.63	37.06	36.85	38.45	38.29	37.91	37.06	36.90	37.34
21	38.23	38.11	38.08	37.64	37.01	37.03	38.53	38.27	37.89	37.46	36.92	37.30
22	38.25	38.11	38.06	37.64	36.95	37.47	38.43	38.21	37.85	38.06	36.92	37.38
23	38.24	38.10	38.05	37.64	36.90	37.89	38.33	38.15	37.82	38.13	36.91	37.43
24	38.22	38.10	38.03	37.61	36.84	38.22	38.26	38.10	37.78	38.08	36.91	37.41
25	38.21	38.09	38.02	37.59	36.76	38.30	38.21	38.12	37.75	38.00	36.93	37.38
26	38.21	38.08	38.00	37.57	36.71	38.20	38.16	38.11	37.75	37.97	37.02	37.38
27	38.23	38.08	37.96	37.53	36.65	38.13	38.14	38.10	37.74	37.92	37.05	37.43
28	38.22	38.07	37.95	37.54	36.63	38.11	38.13	38.11	37.71	37.84	37.07	37.46
29	38.21	38.08	37.95	37.56	---	38.05	38.12	38.14	37.68	37.75	37.09	37.46
30	38.19	38.09	37.96	37.62	---	37.99	38.12	38.20	37.65	37.68	37.10	37.38
31	38.18	---	37.96	37.67	---	37.95	---	38.46	---	37.65	37.08	---
MEAN	38.23	38.14	38.02	37.70	37.25	36.99	38.02	38.22	38.04	37.47	37.12	37.22
MAX	38.49	38.25	38.08	37.95	37.80	38.30	38.53	38.90	38.48	38.13	37.61	37.46
MIN	38.10	38.07	37.95	37.53	36.63	36.31	37.40	38.02	37.65	37.04	36.90	36.96

CAL YR 2002 MEAN 37.72 MAX 39.10 MIN 36.70
WTR YR 2003 MEAN 37.70 MAX 38.90 MIN 36.31

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 mi^2.

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 41 ft^3/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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	24	12	4.4	e4.3	4.2	4.6	19	74	6.3	4.6	3.9
2	26	23	11	4.4	e4.3	4.2	4.6	15	59	3.8	4.6	3.9
3	20	22	11	4.2	e4.3	e4.3	4.5	13	44	3.8	4.5	3.9
4	35	21	9.0	4.2	e4.3	e4.3	4.6	10	35	3.9	4.3	3.9
5	69	19	7.3	4.2	e4.3	e4.3	4.6	8.8	29	3.9	4.2	3.9
6	78	20	7.4	4.2	e4.3	e4.2	4.6	13	26	3.9	4.2	3.9
7	98	19	7.5	4.2	e4.3	e4.3	4.6	16	31	5.1	4.2	3.9
8	82	19	8.0	4.2	e4.3	e4.3	4.6	15	35	3.6	4.2	3.9
9	63	19	7.5	4.2	e4.3	e4.3	4.7	14	34	3.6	4.1	3.9
10	47	26	7.6	4.2	e4.3	e4.3	5.4	14	35	3.9	4.1	3.9
11	38	37	8.2	e4.2	e4.3	e4.3	6.3	30	47	4.2	4.1	3.8
12	38	33	8.1	e4.2	e4.2	e4.3	5.7	105	40	3.9	4.1	4.0
13	45	28	8.2	e4.2	e4.2	e4.3	17	161	31	3.8	4.1	4.1
14	43	25	8.9	e4.2	e4.2	e4.3	34	113	23	3.8	4.0	5.5
15	35	22	9.5	e4.2	e4.2	e4.3	71	73	13	4.2	4.0	4.2
16	27	21	9.3	4.2	e4.2	e4.3	63	59	6.2	3.9	4.0	4.1
17	22	19	9.0	e4.3	e4.2	e4.3	48	51	5.6	3.9	4.2	4.2
18	21	17	9.4	e4.3	e4.2	e4.3	43	43	5.4	3.8	4.1	4.2
19	29	16	12	e4.3	e4.2	e4.3	47	38	4.6	3.9	4.1	4.1
20	36	16	15	e4.3	e4.2	e4.5	93	45	4.4	4.1	4.3	4.0
21	34	15	16	e4.3	4.2	6.9	113	43	4.3	e23	4.2	4.0
22	39	15	13	e4.3	4.2	6.6	87	34	4.3	e28	4.1	4.7
23	37	14	12	e4.3	4.2	6.8	67	26	4.3	e22	4.1	4.2
24	34	14	9.5	e4.3	4.2	39	50	20	4.3	e15	4.2	4.0
25	31	13	8.4	e4.3	4.2	58	38	23	5.2	7.3	5.0	4.0
26	32	12	6.7	e4.3	4.2	37	29	23	4.1	5.3	4.2	4.3
27	34	11	5.0	e4.3	4.2	23	25	22	4.1	4.4	4.0	4.4
28	34	10	4.5	e4.3	4.3	21	23	22	4.2	4.2	4.1	4.2
29	32	11	4.4	e4.3	---	13	22	26	4.1	4.2	4.0	4.1
30	29	13	4.6	e4.3	---	7.0	21	35	4.9	6.3	3.9	4.0
31	26	---	4.6	e4.3	---	6.0	---	70	---	4.2	3.9	---
TOTAL	1242	574	274.6	132.1	118.8	310.2	949.8	1199.8	626.0	205.2	129.7	123.1
MEAN	40.1	19.1	8.86	4.26	4.24	10.0	31.7	38.7	20.9	6.62	4.18	4.10
MAX	98	37	16	4.4	4.3	58	113	161	74	28	5.0	5.5
MIN	20	10	4.4	4.2	4.2	4.2	4.5	8.8	4.1	3.6	3.9	3.8

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2003, BY WATER YEAR (WY)

MEAN	10.8	11.3	7.54	5.51	5.02	7.31	46.8	27.4	15.3	8.05	7.21	8.50
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1961 - 2003	
ANNUAL TOTAL	8054.3		5885.3			
ANNUAL MEAN	22.1		16.1		13.4	
HIGHEST ANNUAL MEAN					26.4	1966
LOWEST ANNUAL MEAN					4.64	1987
HIGHEST DAILY MEAN	455	Apr 17	161	May 13	699	Apr 20 1985
LOWEST DAILY MEAN	3.9	Mar 7	3.6	Jul 8	(a)1.0	Apr 9 1963
ANNUAL SEVEN-DAY MINIMUM	4.2	Mar 1	3.8	Jul 8	1.0	Apr 9 1963
MAXIMUM PEAK FLOW			169	May 13	860	May 31 1970
MAXIMUM PEAK STAGE			4.48	May 13	6.50	May 31 1970
INSTANTANEOUS LOW FLOW					0.40	Sep 6 1962
10 PERCENT EXCEEDS	42		38		29	
50 PERCENT EXCEEDS	6.7		4.7		5.3	
90 PERCENT EXCEEDS	4.4		4.0		3.9	

(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, 5.15 ft, Apr. 17; minimum daily, 1.93 ft, Aug. 17.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.27	2.91	2.28	2.15	2.07	2.06	2.88	3.27	3.52	2.12	2.57	2.05
2	3.44	2.82	2.16	2.18	2.07	2.07	2.78	3.16	3.45	2.17	2.59	2.04
3	3.42	2.85	2.21	2.17	2.09	2.06	2.68	3.09	3.22	2.09	2.52	2.03
4	3.53	2.80	2.24	2.12	2.06	2.05	2.50	3.00	3.00	2.08	2.37	2.05
5	3.92	2.73	2.27	2.17	2.08	2.04	2.48	2.97	2.89	2.08	2.32	1.99
6	4.24	2.71	2.32	2.19	2.08	2.05	2.66	3.17	2.77	2.14	2.26	2.01
7	4.39	2.70	2.32	2.19	2.08	2.05	2.64	3.25	2.81	2.01	2.22	2.02
8	4.41	2.68	2.28	2.20	2.08	2.04	2.59	3.22	2.97	2.02	2.11	2.01
9	4.35	2.68	2.21	2.20	2.10	2.05	2.59	3.16	2.96	2.02	2.16	1.99
10	4.06	2.78	2.35	2.15	2.09	2.06	2.77	3.21	2.99	2.05	2.06	2.02
11	3.82	2.98	2.31	2.12	2.09	2.07	3.18	3.41	3.35	2.00	2.14	2.03
12	3.63	3.08	2.31	2.12	2.08	2.05	3.59	3.94	3.34	2.10	2.09	2.04
13	3.59	3.00	2.35	2.12	2.07	2.06	3.65	4.55	3.18	2.14	2.07	2.06
14	3.56	2.93	2.34	2.11	2.05	2.07	3.78	4.65	2.99	2.08	2.03	2.28
15	3.40	2.85	2.32	2.08	2.06	2.08	4.30	4.52	2.84	2.07	2.02	2.69
16	3.26	2.68	2.28	2.09	2.06	2.13	4.62	4.28	2.73	2.10	1.99	2.60
17	3.12	2.59	2.31	2.08	2.05	2.24	4.37	3.94	2.64	2.07	1.93	2.38
18	3.03	2.64	2.32	2.06	2.05	2.47	4.27	3.62	2.50	2.07	2.01	2.21
19	3.13	2.62	2.41	2.07	2.06	2.46	4.05	3.46	2.48	2.07	1.98	2.20
20	3.14	2.59	2.48	2.06	2.07	2.52	4.66	3.44	2.39	2.05	1.95	2.15
21	3.18	2.56	2.44	2.05	2.09	2.63	4.67	3.46	2.35	2.00	2.00	2.12
22	3.24	2.56	2.41	2.04	2.09	2.85	4.48	3.36	2.29	2.60	1.98	2.18
23	3.18	2.56	2.35	2.03	2.09	3.21	4.58	3.25	2.24	2.46	1.97	2.39
24	3.17	2.55	2.30	2.03	2.10	3.45	4.40	3.07	2.26	2.34	2.00	2.43
25	3.11	2.48	2.32	2.03	2.18	3.62	4.08	2.98	2.25	2.30	2.03	2.28
26	3.12	2.43	2.29	2.04	2.18	3.52	3.77	2.89	2.08	2.06	2.08	2.24
27	3.14	2.37	2.23	2.03	2.10	3.31	3.58	2.79	2.20	2.16	2.13	2.38
28	3.17	2.47	2.26	2.02	2.09	3.14	3.47	2.75	2.12	2.10	2.18	2.50
29	3.08	2.53	2.21	2.03	---	2.97	3.43	2.85	2.11	2.08	2.11	2.48
30	3.03	2.35	2.27	2.03	---	2.84	3.33	2.96	2.15	2.04	2.08	2.30
31	2.96	---	2.21	2.03	---	2.81	---	3.32	---	2.41	2.08	---
MEAN	3.45	2.68	2.30	2.10	2.08	2.48	3.56	3.39	2.70	2.13	2.13	2.21
MAX	4.41	3.08	2.48	2.20	2.18	3.62	4.67	4.65	3.52	2.60	2.59	2.69
MIN	2.96	2.35	2.16	2.02	2.05	2.04	2.48	2.75	2.08	2.00	1.93	1.99

CAL YR 2002 MEAN 2.79 MAX 6.89 MIN 2.09
WTR YR 2003 MEAN 2.60 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1500	1090	539	e400	e280	e240	e800	1540	1620	324	635	274
2	1550	993	476	e400	e280	e240	e750	1400	1540	339	626	270
3	1500	961	537	e400	e280	e240	e700	1310	1310	309	597	251
4	1880	933	589	e400	e280	e230	e650	1210	1090	281	475	259
5	2470	904	649	e400	e280	e230	e630	1210	969	312	439	235
6	2810	902	e620	e400	e270	e230	e660	1490	869	323	398	243
7	3030	854	e600	e390	e270	e230	e680	1520	989	247	380	247
8	2970	850	e580	e380	e270	e230	e700	1450	1170	254	287	241
9	2840	825	e540	e380	e260	e230	717	1380	1150	271	335	232
10	2490	964	e520	e380	e260	e240	992	1400	1290	248	270	238
11	2150	1200	e500	e380	e260	e240	1420	1740	1740	260	308	242
12	1890	1280	e500	e370	e250	e240	1940	2360	1640	297	296	245
13	1870	1190	e500	e360	e240	e250	1960	2920	1430	327	275	258
14	1740	1120	e500	e350	e240	e260	2190	3030	1210	327	252	584
15	1610	1020	e500	e350	e240	e280	2780	2820	1030	291	248	785
16	1450	884	e500	e350	e240	e320	3090	2450	903	307	230	701
17	1300	877	e500	e340	e240	e400	2810	2070	778	277	198	504
18	1230	861	e500	e340	e240	e500	2550	1790	656	276	246	381
19	1360	771	e500	e340	e240	e600	2400	1600	615	293	220	346
20	1330	735	e500	e330	e240	e750	3510	1600	536	277	214	313
21	1340	717	e500	e320	e250	e900	4450	1580	502	239	241	290
22	1410	704	e500	e320	e250	e1100	4140	1450	454	622	230	327
23	1460	697	e480	e320	e250	e1350	3500	1350	418	572	228	471
24	1440	691	e480	e320	e250	e1600	e3000	1180	433	452	244	580
25	1360	673	e480	e320	e250	e1700	e2600	1060	415	440	257	423
26	1380	619	e460	e310	e240	e1600	e2300	976	314	290	298	385
27	1380	565	e450	e300	e240	e1400	e2100	870	362	334	318	483
28	1390	669	e440	e300	e240	e1200	1780	831	320	304	350	582
29	1300	715	e440	e300	---	e1100	1770	916	308	285	319	573
30	1240	565	e420	e300	---	e1000	1630	1050	331	265	295	446
31	1140	---	e420	e290	---	e900	---	1420	---	469	295	---
TOTAL	53810	25829	15720	10840	7130	20030	59199	48973	26392	10112	10004	11409
MEAN	1736	861	507	350	255	646	1973	1580	880	326	323	380
MAX	3030	1280	649	400	280	1700	4450	3030	1740	622	635	785
MIN	1140	565	420	290	240	230	630	831	308	239	198	232
CFSM	2.00	0.99	0.58	0.40	0.29	0.74	2.27	1.82	1.01	0.37	0.37	0.44
IN.	2.30	1.10	0.67	0.46	0.30	0.86	2.53	2.09	1.13	0.43	0.43	0.49

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 2003, BY WATER YEAR (WY)

MEAN	710	766	536	366	343	596	2549	1657	932	592	495	597
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1903 - 2003	
ANNUAL TOTAL	412302		299448			
ANNUAL MEAN	1130		820		(a)819	
HIGHEST ANNUAL MEAN					1385	1960
LOWEST ANNUAL MEAN					506	1963
HIGHEST DAILY MEAN	8750	Apr 17	4450	Apr 21	10400	Apr 22 1985
LOWEST DAILY MEAN	284	Sep 11	198	Aug 17	(b)90	Jul5 1910
ANNUAL SEVEN-DAY MINIMUM	305	Sep 9	225	Aug 17	131	Jul 23 1998
MAXIMUM PEAK FLOW			(c)4830	Apr 21	(d)10700	Apr 26 1979
MAXIMUM PEAK STAGE			(f)5.15	Mar 26	(f)6.40	Apr 9 1971
INSTANTANEOUS LOW FLOW			134	(g)	(b)90	Jul 5 1910
ANNUAL RUNOFF (CFSM)	1.30		0.94		0.94	
ANNUAL RUNOFF (INCHES)	17.63		12.80		12.80	
10 PERCENT EXCEEDS	2480		1740		1730	
50 PERCENT EXCEEDS	619		500		485	
90 PERCENT EXCEEDS	341		243		251	

(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 3.74 ft.
(d) Gage height 5.00 ft.
(e) Estimated.
(f) Backwater from ice.
(g) July 6, 11.

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.--Interruption in water-quality record was due to malfunction of the instrument. Records rated excellent. Records represent water temperature at sensor within 0.5°C, from May 23 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, 0.0°C on many days during winter.

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

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 31.0°C, Aug. 15.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	14.5	9.5	12.0
24	---	---	---	---	---	---	---	---	---	16.0	10.0	12.5
25	---	---	---	---	---	---	---	---	---	17.0	10.5	13.5
26	---	---	---	---	---	---	---	---	---	18.0	11.5	14.5
27	---	---	---	---	---	---	---	---	---	20.0	12.0	15.5
28	---	---	---	---	---	---	---	---	---	16.5	13.0	14.5
29	---	---	---	---	---	---	---	---	---	19.0	13.0	15.5
30	---	---	---	---	---	---	---	---	---	15.0	13.0	14.0
31	---	---	---	---	---	---	---	---	---	15.0	11.0	12.5
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE MICHIGAN

04059000 ESCANABA RIVER AT CORNELL, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	15.0	10.5	12.5	27.5	15.5	21.0	25.5	19.0	21.5	26.0	15.0	20.0
2	15.5	11.5	13.5	27.0	16.5	21.5	23.5	19.0	20.5	26.0	15.0	20.0
3	17.5	12.5	14.5	28.0	19.0	23.0	21.5	19.0	20.0	23.5	16.5	19.5
4	18.5	12.5	15.0	28.5	18.5	23.0	22.0	18.5	20.0	22.0	14.5	18.0
5	20.5	13.5	16.0	29.0	18.0	23.0	28.5	17.0	22.0	24.5	12.0	17.5
6	20.0	14.0	16.5	29.0	18.0	23.0	28.5	18.0	23.0	25.5	14.0	19.5
7	15.5	14.5	15.0	28.0	18.5	23.0	23.0	19.0	21.0	24.5	15.0	19.5
8	14.5	13.0	14.0	26.5	17.0	21.5	26.5	18.0	21.5	23.5	17.0	19.5
9	18.5	13.0	15.0	25.5	16.0	21.0	28.5	18.5	23.0	25.5	16.5	20.5
10	14.5	12.0	13.5	19.5	17.0	18.5	29.0	17.5	23.0	25.5	18.0	21.0
11	16.0	12.0	13.5	20.0	16.0	18.0	25.5	18.0	21.0	26.0	16.5	20.5
12	17.0	13.0	15.0	27.5	15.5	21.0	28.5	16.0	22.0	23.5	18.0	20.0
13	18.0	14.0	16.0	28.5	16.0	21.5	28.5	16.0	22.0	21.5	19.0	20.0
14	19.5	15.0	17.0	26.5	17.0	21.5	29.5	17.0	23.0	19.5	15.5	17.5
15	20.0	15.0	17.5	26.0	17.0	21.0	31.0	19.5	24.5	19.0	14.5	16.0
16	21.0	15.0	18.0	28.5	14.5	21.5	30.0	20.0	24.5	20.5	14.0	16.5
17	21.5	14.5	18.0	26.0	17.0	21.5	29.0	19.0	23.0	22.0	15.0	17.5
18	21.5	16.0	18.5	27.0	14.5	20.5	29.5	18.0	23.0	24.0	16.0	19.0
19	21.0	14.5	17.0	29.5	15.5	22.5	30.0	19.5	24.0	20.0	14.0	17.0
20	23.0	13.0	17.5	29.0	18.5	23.0	28.0	20.5	24.0	20.5	12.0	15.0
21	24.0	13.5	18.5	23.5	18.0	20.5	30.5	21.0	24.5	20.5	11.0	15.0
22	25.0	14.5	19.5	23.5	15.5	19.0	28.5	17.5	22.5	17.5	13.0	15.0
23	26.5	16.0	21.0	26.0	16.5	20.5	27.0	16.5	21.0	17.0	12.0	14.0
24	26.5	18.5	22.0	26.5	15.5	20.5	26.5	18.0	22.0	14.5	11.0	12.5
25	29.5	19.5	23.5	26.5	17.0	21.5	30.5	19.5	24.0	16.0	10.0	12.0
26	26.5	18.5	22.5	27.0	20.0	23.0	28.5	20.0	23.5	13.0	10.0	11.0
27	24.0	16.0	19.5	26.0	18.0	22.0	26.0	17.5	21.0	12.5	10.0	11.5
28	19.5	14.0	17.0	28.5	16.0	21.5	22.5	16.0	19.5	11.5	8.0	10.0
29	22.0	15.5	18.0	26.5	17.0	21.5	23.0	16.0	19.5	11.5	7.5	9.0
30	25.0	14.5	20.0	24.5	18.0	21.0	24.5	13.5	18.5	11.5	6.0	8.5
31	---	---	---	24.0	18.5	21.5	24.5	14.0	19.0	---	---	---
MONTH	29.5	10.5	17.2	29.5	14.5	21.4	31.0	13.5	22.0	26.0	6.0	16.4

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 mi^2.

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 poor. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	548	569	188	e95	e38	e34	e1100	857	507	94	59	53
2	881	516	180	e90	e38	e34	1100	778	520	88	78	50
3	948	470	e180	e85	e38	e34	852	695	513	83	125	46
4	1230	435	e180	e80	e36	e34	574	640	459	80	148	42
5	1810	415	e180	e75	e36	e34	434	624	397	74	141	38
6	1850	411	e175	e70	e35	e34	e430	792	344	70	140	36
7	1950	396	e170	e65	e35	e34	e480	846	337	67	137	35
8	1930	376	e170	e60	e35	e34	e550	846	397	64	118	34
9	1930	367	e170	e58	e35	e34	608	839	460	58	101	33
10	1760	407	e170	e55	e35	e34	711	824	631	58	89	32
11	1560	530	e170	e52	e34	e34	1150	1060	1040	61	82	31
12	1380	577	e165	e50	e34	e34	1460	1270	1050	58	73	31
13	1280	579	e160	e48	e34	e34	1400	1280	966	61	68	39
14	1150	565	e160	e46	e34	e36	1540	1240	924	65	60	85
15	1020	517	e160	e45	e34	e40	1620	1200	780	63	54	115
16	905	421	e160	e44	e34	e45	1870	1130	596	57	50	144
17	795	312	e155	e42	e34	e60	1820	1030	459	54	47	157
18	695	300	e150	e42	e34	e80	1780	909	381	51	44	144
19	699	369	e150	e40	e34	e110	1750	783	335	48	41	123
20	672	351	e150	e38	e34	e150	2660	714	287	46	39	101
21	646	324	e150	e38	e34	e210	2950	700	248	50	37	85
22	677	298	e150	e37	e34	e300	2670	668	216	54	36	91
23	728	289	e150	e36	e34	e400	2400	629	188	54	39	99
24	727	277	e140	e36	e34	e550	2150	563	172	63	45	130
25	711	240	e130	e36	e34	e750	1810	493	154	66	47	143
26	720	212	e120	e36	e34	e1000	1510	435	139	62	55	142
27	733	195	e120	e36	e34	e1400	1280	390	128	54	47	152
28	720	189	e110	e36	e34	e1600	1130	354	117	49	49	162
29	699	243	e110	e36	---	e1500	1020	343	109	48	62	174
30	670	246	e105	e38	---	e1300	928	366	101	49	63	178
31	623	---	e100	e38	---	e1200	---	452	---	49	59	---
TOTAL	32647	11396	4728	1583	973	11173	41737	23750	12955	1898	2233	2725
MEAN	1053	380	153	51.1	34.8	360	1391	766	432	61.2	72.0	90.8
MAX	1950	579	188	95	38	1600	2950	1280	1050	94	148	178
MIN	548	189	100	36	34	34	430	343	101	46	36	31
CFSM	2.34	0.84	0.34	0.11	0.08	0.80	3.09	1.70	0.96	0.14	0.16	0.20
IN.	2.70	0.94	0.39	0.13	0.08	0.92	3.45	1.96	1.07	0.16	0.18	0.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1955 - 2003, BY WATER YEAR (WY)

MEAN	306	370	204	112	102	274	1306	781	399	202	162	238
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1955 - 2003	
ANNUAL TOTAL	185169		147798			
ANNUAL MEAN	507		405		371	
HIGHEST ANNUAL MEAN				640	1960	
LOWEST ANNUAL MEAN				183	1963	
HIGHEST DAILY MEAN	3510	Apr 16	2950	Apr 21	6850	May 8 1960
LOWEST DAILY MEAN	62	Sep 13	31	Sep 11	19	Aug 30 1976
ANNUAL SEVEN-DAY MINIMUM	65	Jan 30	33	Sep 6	22	Jul 31 1998
MAXIMUM PEAK FLOW			(a)3060	Apr 20	7590	May 7 1960
MAXIMUM PEAK STAGE			(b)6.27	Mar 23	8.27	May 7 1960
INSTANTANEOUS LOW FLOW			31	(c)	18	(d)
ANNUAL RUNOFF (CFSM)	1.13		0.90		0.82	
ANNUAL RUNOFF (INCHES)	15.31		12.22		11.21	
10 PERCENT EXCEEDS	1400		1150		916	
50 PERCENT EXCEEDS	228		150		173	
90 PERCENT EXCEEDS	77		35		54	

(a) Gage height 5.80 ft.
(b) Backwater from ice.
(c) Sept. 11, 12.
(d) 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 mi^2, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	563	338	221	e220	e220	e230	334	442	386	222	238	209
2	474	330	e210	e220	e220	e230	355	422	351	220	254	193
3	399	321	e200	e220	e230	e230	347	401	332	224	335	184
4	503	330	e200	e220	e230	e220	305	387	318	227	478	183
5	680	322	e200	e230	e230	e220	e310	386	309	217	387	185
6	744	328	e200	e240	e230	e220	e310	488	301	211	318	181
7	867	316	e200	e240	e240	e220	e310	500	336	208	282	180
8	725	328	e200	e240	e240	e220	312	470	357	205	271	181
9	602	331	e200	e240	e240	e220	307	445	400	203	254	181
10	513	367	e200	e240	e240	e220	354	478	458	207	238	183
11	452	422	e200	e230	e240	e220	608	630	567	230	232	181
12	427	383	e210	e220	e240	e220	914	1270	498	246	222	193
13	450	354	e210	e220	e240	e220	752	1600	406	222	210	281
14	412	339	e210	e220	e240	e220	776	1460	357	208	210	343
15	378	332	e220	e220	e240	e230	928	1040	332	214	205	352
16	356	330	e230	e220	e240	e300	1010	780	307	214	200	285
17	345	333	e250	e220	e240	e400	928	639	291	206	196	249
18	348	325	e270	e220	e240	e420	810	562	300	203	196	227
19	372	321	e280	e220	e240	e400	785	517	287	196	191	217
20	370	311	e280	e220	e240	e370	1050	582	272	201	198	214
21	362	305	e270	e220	e240	e390	1360	575	262	229	213	209
22	379	302	e250	e220	e240	e400	1310	507	251	231	207	251
23	373	300	e240	e220	e240	e420	1020	463	243	229	193	272
24	364	299	e240	e220	e240	e420	811	430	247	220	203	254
25	366	298	e240	e220	e240	e410	695	401	251	204	206	231
26	402	303	e240	e220	e240	e400	606	382	244	205	238	234
27	421	274	e240	e220	e240	e380	550	364	237	201	236	252
28	398	312	e240	e220	e230	e350	544	356	235	194	218	250
29	384	329	e240	e220	---	e330	501	358	230	198	215	241
30	364	299	e240	e220	---	e320	468	368	228	210	211	241
31	351	---	e230	e220	---	e320	---	417	---	225	236	---
TOTAL	14144	9782	7061	6940	6630	9370	19670	18120	9593	6630	7491	6837
MEAN	456	326	228	224	237	302	656	585	320	214	242	228
MAX	867	422	280	240	240	420	1360	1600	567	246	478	352
MIN	345	274	200	220	220	220	305	356	228	194	191	180
CFSM	1.25	0.89	0.62	0.61	0.65	0.83	1.79	1.60	0.87	0.58	0.66	0.62
IN.	1.44	0.99	0.72	0.71	0.67	0.95	2.00	1.84	0.98	0.67	0.76	0.69

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 2003, BY WATER YEAR (WY)

MEAN	324	331	274	249	243	318	655	498	390	335	287	306
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1914 - 2003	
ANNUAL TOTAL	148527		122268			
ANNUAL MEAN	407		335		350	
HIGHEST ANNUAL MEAN					512	1973
LOWEST ANNUAL MEAN					221	1990
HIGHEST DAILY MEAN	3500	Apr 17	1600	May 13	4420	Jul 2 1953
LOWEST DAILY MEAN	200	Dec 3	180	Sep 7	130	Dec 2 1963
ANNUAL SEVEN-DAY MINIMUM	200	Dec 3	182	Sep 5	140	Jan 2 1995
MAXIMUM PEAK FLOW			(a)1650	May 13	4700	Jul 2 1953
MAXIMUM PEAK STAGE			(b)6.92	Dec 3	(c)8.41	Jul 15 1999
INSTANTANEOUS LOW FLOW			180	(d)	(f)95	Dec 17 1999
ANNUAL RUNOFF (CFSM)	1.11		0.92		0.95	
ANNUAL RUNOFF (INCHES)	15.10		12.43		12.98	
10 PERCENT EXCEEDS	684		515		547	
50 PERCENT EXCEEDS	286		250		285	
90 PERCENT EXCEEDS	230		205		205	

(a) Gage height 5.91 ft.
(b) Backwater from ice.
(c) Present site and datum; peak stage at previous site and datum, 8.60 ft, Dec. 20, 1983, backwater from ice.
(d) Part or all of each day Sept. 3, 4, 6-12.
(e) Estimated.
(f) Result of freezeup.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04062000 PAINT RIVER NEAR ALPHA, MI

LOCATION.--Lat 46°00'40", long 88°15'30", in NW1/4 NW1/4 sec.25, T.42 N., R.32 W., Iron County, Hydrologic Unit 04030106, on right bank 0.6 mi downstream from Lower Paint Dam, 5.5 mi upstream from Brule River, and 6.0 mi southeast of Alpha.

DRAINAGE AREA.--631 mi^2.

PERIOD OF RECORD.--June 1952 to current year.

REVISED RECORDS.--WSP 1727: Drainage area, WDR MI-96-1: 1985 (M).

GAGE.--Water-stage recorder. Elevation of gage is 1,260 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow completely regulated by powerplant and Lower Paint Dam, 0.6 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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	248	257	254	242	e240	e240	e340	385	320	242	232	268
2	246	257	e255	242	e240	e240	e340	383	320	231	231	269
3	244	257	e255	243	e240	e240	e345	383	317	232	235	269
4	245	257	258	242	e240	e240	e345	384	314	231	233	273
5	225	260	257	242	e240	e240	e360	383	312	231	232	276
6	230	260	257	243	e240	e240	484	385	311	231	230	276
7	687	257	253	242	e240	e240	530	383	312	229	228	275
8	1250	257	259	242	e240	e240	550	383	314	228	251	276
9	1390	257	e250	242	e240	e240	375	383	317	225	265	275
10	1350	259	254	e240	e240	e240	346	383	321	226	265	275
11	811	257	250	e240	e240	e240	355	387	320	228	265	275
12	557	258	250	e240	e240	e240	375	1140	320	228	265	275
13	552	258	250	e240	e240	e240	391	3290	318	228	265	276
14	546	257	249	e240	e240	e240	395	3100	317	229	265	277
15	401	261	246	e240	e240	e240	389	1770	312	228	261	277
16	261	257	246	e240	e240	e240	404	1340	269	230	257	277
17	259	257	246	e240	e240	e240	409	1410	234	230	257	276
18	263	257	245	e240	e240	e240	390	1390	245	230	259	276
19	261	257	243	e240	e240	e240	387	1090	261	231	264	275
20	260	257	242	e240	e240	243	403	553	273	231	269	272
21	260	253	245	e240	e240	240	1440	331	283	231	267	272
22	259	253	246	e240	e240	238	2120	330	284	231	268	273
23	259	253	246	e240	e240	235	2070	327	283	231	268	272
24	261	253	244	e240	e240	242	1580	325	283	231	268	272
25	261	253	242	e240	e240	239	1510	323	282	231	269	272
26	261	255	248	e240	e240	e240	1650	322	282	231	275	273
27	265	253	245	e240	e240	e240	1350	321	282	231	269	273
28	263	252	242	e240	e240	243	891	320	254	231	271	272
29	261	253	242	e240	---	271	396	320	253	231	269	272
30	258	253	242	e240	---	e320	388	320	253	232	269	272
31	257	---	277	e240	---	e325	---	321	---	233	268	---
TOTAL	13151	7685	7738	7460	6720	7636	21308	22865	8766	7143	7990	8211
MEAN	424	256	250	241	240	246	710	738	292	230	258	274
MAX	1390	261	277	243	240	325	2120	3290	321	242	275	277
MIN	225	252	242	240	240	235	340	320	234	225	228	268

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	129	118	96.9	94.3	96.6	108	501	391	201	143	108	119
MAX	554	383	250	241	240	487	2512	1921	937	969	349	305
(WY)	1986	1989	2003	2003	2003	1973	2002	1996	1983	1953	2002	1980
MIN	81.5	81.3	81.3	71.4	76.8	84.0	81.4	83.5	85.4	82.0	81.7	66.8
(WY)	2000	2002	2001	1955	2001	1956	1990	1992	1975	1998	2001	1962

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	173650		126673			
ANNUAL MEAN	476		347		175	
HIGHEST ANNUAL MEAN					427	2002
LOWEST ANNUAL MEAN					87.9	2000
HIGHEST DAILY MEAN	12100	Apr 17	3290	May 13	(e)12100	Apr 17 2002
LOWEST DAILY MEAN	160	Feb 28	225	Oct 5	62	(a)
ANNUAL SEVEN-DAY MINIMUM	160	Feb 28	227	Jul 7	65	Jan 9 1955
MAXIMUM PEAK FLOW			3470	May 13	(b)12300	Apr 17 2002
MAXIMUM PEAK STAGE			7.99	May 13	(c)11.44	Apr 17 2002
10 PERCENT EXCEEDS	602		389		199	
50 PERCENT EXCEEDS	254		257		91	
90 PERCENT EXCEEDS	175		233		85	

(a) Mar. 22, 1963, Apr. 22, 2001.
(b) From rating curve extended above 6,000 ft^3/s.
(c) From floodmark.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	940	644	437	455	467	479	774	871	770	460	482	485
2	834	645	452	527	475	484	785	822	692	458	499	482
3	689	591	472	460	485	462	700	822	697	455	612	465
4	895	569	489	460	516	459	685	814	674	488	827	445
5	1010	638	560	466	498	462	555	808	611	506	705	501
6	1030	618	548	555	503	463	725	868	655	449	521	488
7	1580	576	498	501	517	457	785	972	707	476	582	458
8	1940	574	533	534	517	459	680	921	692	416	551	480
9	1920	614	482	529	497	482	709	864	773	461	528	478
10	1820	682	490	517	508	482	737	926	877	454	528	434
11	1250	717	569	449	495	463	1030	1040	982	489	483	455
12	1070	701	580	467	518	454	1460	2340	874	455	481	490
13	1040	632	563	435	500	452	1220	4580	800	496	508	584
14	980	666	498	507	495	482	1140	4310	726	454	515	681
15	834	594	584	432	498	475	1420	2620	664	443	485	689
16	668	643	526	499	502	522	1520	2020	622	446	477	647
17	564	590	492	445	509	899	1400	1940	588	484	452	496
18	656	540	567	457	484	974	1270	1820	535	414	473	485
19	681	612	617	481	509	868	1240	1590	521	451	473	512
20	669	650	606	496	502	747	1490	1220	598	437	472	491
21	696	550	594	463	509	787	2720	963	621	471	489	496
22	695	552	564	455	477	850	3240	842	551	523	490	526
23	691	552	498	453	475	882	2920	877	528	479	491	570
24	622	649	501	457	502	920	2180	781	524	444	476	552
25	656	547	539	455	499	909	2090	773	522	445	466	555
26	731	483	514	452	490	734	2210	719	526	468	501	495
27	728	535	496	472	484	690	1810	740	530	467	566	540
28	733	533	503	465	482	685	1350	719	534	470	486	543
29	740	575	521	431	---	619	977	702	531	471	496	520
30	579	619	525	486	---	586	895	722	513	468	493	518
31	668	---	534	505	---	647	---	816	---	469	490	---
TOTAL	28609	18091	16352	14766	13913	19334	40717	40822	19438	14367	16098	15561
MEAN	923	603	527	476	497	624	1357	1317	648	463	519	519
MAX	1940	717	617	555	518	974	3240	4580	982	523	827	689
MIN	564	483	437	431	467	452	555	702	513	414	452	434

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 2003, BY WATER YEAR (WY)

MEAN	443	407	368	347	354	444	1165	889	511	468	394	386
MAX	923	603	545	476	497	634	3128	2757	818	887	680	569
(WY)	2003	2003	2002	2003	2003	1998	2002	1996	2002	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1990 - 2003	
ANNUAL TOTAL	317873		258068			
ANNUAL MEAN	871		707		515	
HIGHEST ANNUAL MEAN					810	1996
LOWEST ANNUAL MEAN					325	1990
HIGHEST DAILY MEAN	10500	Apr 17	4580	May 13	10500	Apr 17 2002
LOWEST DAILY MEAN	357	Jan 18	414	Jul 18	182	Feb 11 1994
ANNUAL SEVEN-DAY MINIMUM	410	Mar 3	447	Jul 14	202	Mar 26 1990
MAXIMUM PEAK FLOW			5030	May 13	11200	Apr 17 2002
MAXIMUM PEAK STAGE			11.34	May 13	15.67	Apr 17 2002
10 PERCENT EXCEEDS	1410		1020		736	
50 PERCENT EXCEEDS	569		535		384	
90 PERCENT EXCEEDS	434		459		285	

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	318	191	e140	e72	e41	e34	e370	547	497	28	29	12
2	378	179	e130	e68	e40	e33	e340	472	416	26	65	11
3	334	167	e120	e64	e40	e33	e320	407	317	26	140	10
4	379	160	e115	e62	e40	e33	e320	346	238	24	179	9.7
5	733	151	e110	e58	e38	e33	e300	306	186	22	139	9.7
6	946	146	e100	e55	e38	e33	e280	282	156	20	99	9.1
7	1340	159	e96	e54	e38	e33	e270	256	141	19	92	8.6
8	1330	136	e92	e52	e38	e33	e280	232	133	18	81	8.6
9	1110	139	e90	e52	e38	e33	284	209	134	16	54	8.0
10	832	209	e86	e52	e38	e33	304	202	157	16	41	8.0
11	629	343	e83	e50	e37	e33	439	289	234	21	34	7.5
12	526	354	e83	e50	e37	e33	558	e1700	238	27	29	7.1
13	534	309	e82	e48	e36	e33	592	e3000	197	29	25	8.7
14	485	259	e82	e46	e36	e36	740	1790	155	30	22	e13
15	435	223	e82	e46	e36	e40	1260	1070	125	38	20	26
16	377	249	e82	e46	e36	e45	1370	748	104	40	18	25
17	326	261	e82	e46	e36	e50	1140	577	89	38	17	23
18	286	253	e90	e44	e36	e55	934	468	82	32	15	20
19	292	221	e110	e44	e36	e65	838	392	71	26	13	18
20	326	176	e130	e44	e36	e98	1150	384	61	22	13	17
21	315	154	e125	e44	e36	e150	1700	358	54	33	15	17
22	304	143	e120	e43	e36	e220	1550	317	48	52	14	19
23	289	144	e110	e43	e35	e350	1180	271	43	54	13	26
24	269	142	e100	e43	e35	e450	960	231	40	46	16	25
25	249	140	e96	e43	e35	e680	870	199	38	37	15	26
26	244	143	e92	e43	e34	e900	808	172	36	33	17	28
27	252	154	e90	e43	e34	e800	757	152	34	32	16	e55
28	241	160	e88	e43	e34	e700	745	138	32	28	16	68
29	227	155	e84	e43	---	e600	709	162	31	26	15	140
30	215	148	e80	e43	---	e500	625	251	30	24	14	171
31	204	---	e76	e42	---	e400	---	459	---	26	13	---
TOTAL	14725	5768	3046	1526	1030	6569	21993	16387	4117	909	1289	835.0
MEAN	475	192	98.3	49.2	36.8	212	733	529	137	29.3	41.6	27.8
MAX	1340	354	140	72	41	900	1700	3000	497	54	179	171
MIN	204	136	76	42	34	33	270	138	30	16	13	7.1
CFSM	3.57	1.45	0.74	0.37	0.28	1.59	5.51	3.97	1.03	0.22	0.31	0.21
IN.	4.12	1.61	0.85	0.43	0.29	1.84	6.15	4.58	1.15	0.25	0.36	0.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2003, BY WATER YEAR (WY)

MEAN	159	172	122	68.7	54.2	126	818	533	194	82.8	56.8	112
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1961 - 2003	
ANNUAL TOTAL	93405		78194.0			
ANNUAL MEAN	256		214		209	
HIGHEST ANNUAL MEAN					273	1968
LOWEST ANNUAL MEAN					136	1977
HIGHEST DAILY MEAN	5860	Apr 18	3000	May 13	5860	Apr 18 2002
LOWEST DAILY MEAN	18	Sep 1	7.1	Sep 12	0.71	Sep 11 1976
ANNUAL SEVEN-DAY MINIMUM	23	Aug 27	8.1	Sep 7	0.83	Sep 7 1976
MAXIMUM PEAK FLOW			3260	May 13	6740	Apr 18 2002
MAXIMUM PEAK STAGE			7.64	May 13	10.73	Apr 18 2002
INSTANTANEOUS LOW FLOW			6.5	Sep 12	0.70	(a)
ANNUAL RUNOFF (CFSM)	1.92		1.61		1.57	
ANNUAL RUNOFF (INCHES)	26.13		21.87		21.35	
10 PERCENT EXCEEDS	483		566		474	
50 PERCENT EXCEEDS	100		82		91	
90 PERCENT EXCEEDS	44		19		19	

(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 mi^2.

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 good except for estimated daily discharges, which are poor. Flow regulated by powerplant and by Michigamme Reservoir, capacity, 119,950 acre-ft, 5 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	414	855	605	593	e797	606	312	1460	978	431	407	357
2	394	714	560	623	e797	601	290	1480	814	376	402	356
3	359	709	596	662	e824	582	291	1460	702	379	368	370
4	371	706	597	678	e842	472	291	1340	946	369	341	387
5	387	705	598	678	e844	442	291	1120	1500	367	326	384
6	415	704	603	747	e856	376	290	1110	1780	366	324	383
7	680	702	601	834	e884	332	290	1040	1810	365	353	381
8	988	702	598	837	e925	293	291	1040	1730	363	378	320
9	1160	705	597	834	e922	293	294	1030	1220	440	376	273
10	1530	716	597	833	e946	292	306	1030	851	546	375	266
11	1560	716	597	831	e1000	293	329	1070	546	545	371	220
12	1160	714	597	831	1030	293	341	1290	513	540	404	226
13	1160	716	597	827	1030	e323	346	1780	508	538	460	227
14	1350	719	597	826	1030	e300	364	e2250	475	448	459	245
15	1510	989	597	824	1020	e310	417	e2320	497	421	458	250
16	1310	969	597	824	1020	e315	431	e2010	517	434	517	247
17	1320	917	597	822	1010	e317	416	1980	493	439	665	243
18	1430	913	598	822	1010	318	407	1970	494	450	547	244
19	1350	799	600	820	1010	315	408	1970	492	430	438	245
20	1120	708	598	840	1080	315	435	1970	490	431	436	243
21	991	709	597	856	1050	339	500	1630	496	398	429	243
22	889	708	597	856	1010	348	685	1040	517	373	426	252
23	948	709	596	856	1010	354	1110	1120	515	373	424	246
24	948	706	595	858	1030	351	1870	1190	514	373	424	245
25	950	707	595	861	1010	342	2120	1080	513	375	e410	244
26	956	684	593	861	1010	339	2130	979	509	376	e400	248
27	959	611	593	861	1000	346	2120	975	508	373	e380	250
28	1010	607	593	861	802	347	1880	998	507	379	369	248
29	1060	609	593	861	---	339	1580	1020	505	396	364	247
30	1080	606	594	863	---	337	1480	1030	504	401	360	246
31	975	---	593	e824	---	337	---	1030	---	402	359	---
TOTAL	30734	22034	18466	25004	26799	11167	22315	42812	22444	12897	12750	8336
MEAN	991	734	596	807	957	360	744	1381	748	416	411	278
MAX	1560	989	605	863	1080	606	2130	2320	1810	546	665	387
MIN	359	606	560	593	797	292	290	975	475	363	324	220

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2003, BY WATER YEAR (WY)

MEAN	499	542	773	864	834	521	661	1091	806	664	589	510
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1944 - 2003	
ANNUAL TOTAL	323625		255758			
ANNUAL MEAN	887		701		696	
HIGHEST ANNUAL MEAN					1049	1960
LOWEST ANNUAL MEAN					382	1977
HIGHEST DAILY MEAN	4540	Apr 21	2320	May 15	6940	Apr 27 1960
LOWEST DAILY MEAN	263	Aug 27	220	Sep 11	71	Nov 26 1950
ANNUAL SEVEN-DAY MINIMUM	337	Aug 23	237	Sep 11	83	Mar 21 1968
MAXIMUM PEAK FLOW			3100	May 15	7260	Apr 28 1960
MAXIMUM PEAK STAGE			(a)7.37	May 15	10.73	Apr 28 1960
10 PERCENT EXCEEDS	1410		1160		1180	
50 PERCENT EXCEEDS	730		597		645	
90 PERCENT EXCEEDS	533		304		177	

(a) From floodmark.
(e) Estimated.

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 mi^2.

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. 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1860	2160	1440	1170	1340	1630	1550	3060	1820	1060	e1100	811
2	2310	1790	1350	1360	1310	1660	1390	2670	2140	935	e1150	804
3	2180	1290	1100	1330	1460	1650	1260	2460	2070	948	e1650	759
4	2150	1440	1080	1330	1290	1620	1370	2350	2120	1030	1870	732
5	2240	1470	1280	1310	1670	1650	1250	2320	2610	992	1690	780
6	2590	1780	1370	1320	1520	1660	1730	2370	2540	922	1430	798
7	3980	1800	1410	1290	1700	1630	1340	2410	2590	954	1350	1260
8	4290	1710	1130	1330	1630	1630	1230	2380	2350	971	1120	779
9	4180	1610	1410	1370	1580	1700	1200	2330	2150	821	875	757
10	4050	1660	1270	1450	1800	1590	1170	2260	2230	854	903	637
11	3290	1760	1160	1530	1890	1520	1330	2920	2090	881	956	629
12	3130	1890	1240	e1500	1740	1510	1670	4630	2020	871	890	678
13	3380	1820	1260	1430	1670	1550	1830	7550	2040	957	882	758
14	3000	1850	1410	e1500	1610	1580	1450	7350	1640	936	919	856
15	2570	2140	e1380	1350	1610	1480	1570	5690	1630	870	1270	1020
16	2580	1950	e1400	1430	1550	1480	2280	4780	e1550	879	1190	1230
17	2720	1960	e1420	1440	1630	1670	3160	4330	e1500	957	871	964
18	2840	1820	e1430	1390	1630	1640	3420	4280	1500	775	909	902
19	2490	1660	e1450	1370	1670	1580	3430	3990	1470	866	849	1100
20	2430	1840	e1410	1490	1650	1400	3650	3770	1300	879	856	910
21	2360	1670	e1530	1450	1590	1320	4700	3170	1240	957	799	767
22	2360	1910	e1750	1430	1550	1380	5360	2870	1090	873	807	793
23	1800	1530	e1750	1460	1590	1540	5170	2900	1160	938	815	819
24	2050	1440	e1650	1390	1680	1410	4430	2480	1140	839	800	797
25	1960	1500	e1600	1450	1710	1500	4270	2320	1230	962	859	835
26	1810	1410	e1500	1450	1670	1450	4430	2290	1230	874	870	700
27	2100	1630	e1400	1440	1670	1430	4110	2320	1170	915	956	797
28	2550	1240	e1350	1370	1650	1530	3530	2050	1050	868	918	861
29	2740	1260	e1300	1410	---	1720	2990	2180	1140	894	968	864
30	2460	1390	e1250	1490	---	1640	3220	1850	1140	e820	915	811
31	2030	---	1250	1400	---	1730	---	1940	---	e950	859	---
TOTAL	82480	50380	42730	43430	45060	48480	79490	100270	50950	28248	32296	25208
MEAN	2661	1679	1378	1401	1609	1564	2650	3235	1698	911	1042	840
MAX	4290	2160	1750	1530	1890	1730	5360	7550	2610	1060	1870	1260
MIN	1800	1240	1080	1170	1290	1320	1170	1850	1050	775	799	629

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 2003, BY WATER YEAR (WY)

MEAN	1464	1573	1444	1397	1386	1595	3158	3025	2106	1583	1294	1380
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1914 - 2003	
ANNUAL TOTAL	794350		629022			
ANNUAL MEAN	2176		1723		1784	
HIGHEST ANNUAL MEAN					3069	1916
LOWEST ANNUAL MEAN					922	1925
HIGHEST DAILY MEAN	14500	Apr 18	7550	May 13	18800	Jul 2 1953
LOWEST DAILY MEAN	890	Aug 28	629	Sep 11	57	Sep 26 1975
ANNUAL SEVEN-DAY MINIMUM	1050	Aug 26	728	Sep 8	277	Oct 18 1975
MAXIMUM PEAK FLOW			8150	May 13	19500	Apr 26 1960
MAXIMUM PEAK STAGE			8.88	May 13	14.15	Apr 26 1960
INSTANTANEOUS LOW FLOW					38	(a)
10 PERCENT EXCEEDS	3540		2850		3000	
50 PERCENT EXCEEDS	1620		1490		1460	
90 PERCENT EXCEEDS	1330		865		847	

(a) Aug. 21, 1962, Sept. 26, 1975.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04063500 MENOMINEE RIVER AT TWIN FALLS NEAR IRON MOUNTAIN, MI

LOCATION.--Lat 45°52'17", long 88°04'12", in NE1/4 SE1/4 sec. 12, T.40 N., R.31 W., Michigan Meridian, Dickinson County, Hydrologic Unit 04030108, on left bank 150 ft downstream from We Energies powerhouse at Twin Falls Dam, 3.6 mi north of Iron Mountain, and at mile 106.6.

DRAINAGE AREA.--1,800 mi^2.

PERIOD OF RECORD.--January 1914 to current year. Published as "near Florence, WI", October 1957 to September 1989. Records published for both sites July 1950 to September 1957, October 1989 to September 1996, October 1998 to current year.

REVISED RECORDS.--WDR MI-91-1: 1990(M). WDR MI-92-1: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 1,062 ft above sea level (levels by We Energies). Prior to September 1957, headwater and tailwater gages and generation data entered hourly in daily log sheets by company employees. October 1957 to September 1989, water-stage recorder at site 10.4 mi upstream at different datum. November 1989 to July 1993, water-stage recorder at site 150 ft upstream at same datum.

REMARKS.--Records good. Prior to September 1957, 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.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2060	2290	1470	1290	1430	1670	1760	3320	1950	1020	1160	871
2	2490	1810	1430	1330	1380	1670	1530	2910	2290	921	1120	816
3	2320	1400	1090	1270	1450	1690	1450	2590	2140	895	1600	771
4	2310	1470	1190	1360	1490	1610	1490	2550	2050	988	2040	806
5	2280	1490	1380	1380	1570	1690	1430	2540	2650	895	1730	864
6	2860	1920	1390	1360	1610	1710	1930	2610	2640	959	1630	881
7	4140	1830	e1350	1340	1620	1630	1550	2550	2610	911	1430	1310
8	4580	1790	e1200	1350	1590	1730	1380	2610	2560	987	1200	907
9	4170	1700	1330	1430	1600	1670	1360	2570	2280	779	981	786
10	4190	1680	1230	1480	1710	1630	1360	2480	2280	850	900	703
11	3460	1940	1240	1570	1680	1560	1420	3120	2350	834	996	649
12	3240	1950	1300	1510	1660	1470	1940	4550	2080	892	988	711
13	3450	1940	1240	1470	1700	1610	2200	7610	2120	885	858	893
14	3240	1990	1400	1540	1650	1550	1700	7990	1730	867	988	1020
15	2620	2190	1390	1420	1660	1540	1780	6130	1570	867	1260	1180
16	2790	2110	1390	1400	1540	1600	2590	5000	1630	851	1200	1270
17	2790	2090	1460	1480	1750	1790	3380	4690	1450	908	1030	1140
18	2900	e1900	1440	1480	1630	1800	3760	4270	1500	801	986	952
19	2770	e1800	1500	1440	1670	1870	3900	4380	1410	839	896	992
20	2420	1820	1410	1530	1660	1580	4020	3950	1290	900	844	989
21	2550	1810	1730	1470	1580	1530	4990	3280	1210	957	827	920
22	2360	2000	e1900	1450	1630	1600	5780	2980	1180	897	815	874
23	1930	1550	e1800	1480	1600	1730	5510	3080	1100	942	834	855
24	2140	e1500	1620	1480	1680	1570	4820	2640	1100	870	884	1010
25	2040	1630	1630	1460	1720	1720	4470	2400	1200	955	924	1030
26	1950	1550	1570	1440	1650	1570	4930	2330	1150	901	888	783
27	2180	1630	1350	1380	1670	1630	4390	2530	1130	899	996	931
28	2660	1360	1380	1420	1690	1700	3940	2080	1120	907	1010	1010
29	2880	1340	1320	1430	---	1870	3140	2250	1140	885	1050	990
30	2550	1480	1360	1450	---	1880	3490	1820	1110	793	968	835
31	2180	---	1220	1460	---	2000	---	1970	---	902	868	---
TOTAL	86500	52960	43710	44350	45270	51870	87390	105780	52020	27757	33901	27749
MEAN	2790	1765	1410	1431	1617	1673	2913	3412	1734	895	1094	925
MAX	4580	2290	1900	1570	1750	2000	5780	7990	2650	1020	2040	1310
MIN	1930	1340	1090	1270	1380	1470	1360	1820	1100	779	815	649

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 2003, BY WATER YEAR (WY)

MEAN	1475	1587	1454	1406	1393	1609	3179	3041	2124	1597	1307	1393
MAX	3537	3465	2640	2253	2514	3544	8159	6319	5035	4309	2359	3149
(WY)	1986	1986	1984	1983	1984	1973	1916	1960	1916	1953	1972	1968
MIN	726	725	765	691	647	692	707	595	799	721	545	718
(WY)	1949	1964	1925	1924	1926	1914	1990	1987	1988	1925	1925	1925

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1914 - 2003	
ANNUAL TOTAL	813019		659257			
ANNUAL MEAN	2227		1806		1797	
HIGHEST ANNUAL MEAN					3069	1916
LOWEST ANNUAL MEAN					922	1925
HIGHEST DAILY MEAN	14200	Apr 18	7990	May 14	18100	Apr 26 1960
LOWEST DAILY MEAN	904	Aug 28	649	Sep 11	57	Sep 26 1975
ANNUAL SEVEN-DAY MINIMUM	1050	Aug 26	810	Sep 8	277	Oct 18 1975
MAXIMUM PEAK FLOW			8460	May 14	(a)19500	Apr 26 1960
MAXIMUM PEAK STAGE			11.06	May 14	(b)13.88	Apr 17 2002
10 PERCENT EXCEEDS	3660		2940		3020	
50 PERCENT EXCEEDS	1630		1550		1470	
90 PERCENT EXCEEDS	1360		894		858	

(a) Gage height 14.15 ft, site and datum then in use.
(b) Present site and datum.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04065106 MENOMINEE RIVER AT NIAGARA, WI

LOCATION.--Lat 45°46'04", long 87°58'50", in NE1/4 NE1/4 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 mi^2.

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 smaller reservoirs upstream from station. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2910	2820	e1600	e1400	e1500	e1600	2170	4070	2550	1390	1420	1100
2	3460	2350	e1500	e1500	e1400	e1800	2040	3640	2930	1160	1500	1020
3	3330	1890	e1100	e1400	e1500	e1800	1830	3190	2840	1280	1930	918
4	3440	1920	e1400	e1400	e1600	e1700	1760	3250	2420	1240	2850	944
5	3640	1830	e1500	e1400	e1600	e1700	1700	3120	3150	1190	2310	1010
6	4300	2290	e1500	e1500	e1700	e1700	2110	3340	3140	1290	2210	1020
7	5700	2260	e1500	e1400	e1600	e1700	2020	3420	3140	1250	1820	1430
8	6200	2340	e1500	e1500	e1700	e1700	1760	3390	3260	1190	1650	1030
9	5700	2050	e1400	e1500	e1700	e1700	1680	3350	3130	1190	1280	968
10	5480	1990	e1300	e1600	e1600	e1700	1750	3370	3270	1230	1440	864
11	4690	2470	e1400	e1600	e1700	e1500	2040	4030	3720	1150	1400	826
12	4210	2510	e1400	e1600	e1700	e1500	3210	5790	3300	1130	1360	841
13	4460	2570	e1500	e1500	e1800	e1600	3220	9230	3140	1080	1340	1120
14	4080	2540	e1600	e1500	e1700	e1600	2680	9730	2680	1070	1290	1610
15	3560	2540	e1600	e1500	e1700	e1700	2960	7790	2270	1250	1500	1630
16	3410	2560	e1500	e1400	e1600	e1700	4040	6480	2220	1150	1530	1690
17	3520	2420	e1500	e1500	e1700	e1900	4840	6050	1940	1120	1230	1500
18	3450	2200	e1600	e1500	e1700	e2600	5310	5270	2020	1120	1140	1280
19	3400	2210	e1700	e1500	e1700	e2600	5420	5460	1860	1120	1120	1290
20	3010	2160	e1700	e1500	e1700	2390	5810	5020	1660	1110	1130	1180
21	3120	2140	e1600	e1500	e1600	2350	6800	4320	1630	1110	1130	1100
22	3040	2280	e1700	e1500	e1600	2290	7640	4070	1610	1250	1070	1130
23	2570	2080	e1700	e1500	e1700	2290	7370	3860	1510	1180	1000	1190
24	2610	1860	e1600	e1500	e1600	2350	6430	3540	1560	1160	1070	1360
25	2620	1780	e1700	e1400	e1700	2340	5680	3160	1610	1280	1140	1220
26	2570	1840	e1700	e1400	e1700	2150	6180	3030	1450	1190	1130	1140
27	2870	1830	e1600	e1400	e1700	2210	5440	2910	1500	1190	1200	1210
28	3400	1710	e1500	e1500	e1700	2070	5100	2800	1450	1060	1280	1220
29	3490	e1600	e1400	e1500	---	2200	4050	2850	1490	1140	1280	1350
30	3270	e1700	e1400	e1500	---	2260	4280	2340	1510	1100	1220	1210
31	2860	---	e1300	e1500	---	2280	---	2620	---	1100	1160	---
TOTAL	114370	64740	47000	45900	46200	60980	117320	134490	69960	36470	44130	35401
MEAN	3689	2158	1516	1481	1650	1967	3911	4338	2332	1176	1424	1180
MAX	6200	2820	1700	1600	1800	2600	7640	9730	3720	1390	2850	1690
MIN	2570	1600	1100	1400	1400	1500	1680	2340	1450	1060	1000	826

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1993 - 2003, BY WATER YEAR (WY)

MEAN	1824	1732	1716	1711	1856	2072	3880	3690	2512	2047	1662	1603
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1993 - 2003	
ANNUAL TOTAL	1022980		816961			
ANNUAL MEAN	2803		2238		2192	
HIGHEST ANNUAL MEAN					3135	1996
LOWEST ANNUAL MEAN					1707	1998
HIGHEST DAILY MEAN	18400	Apr 19	9730	May 14	18400	Apr 19 2002
LOWEST DAILY MEAN	1100	Dec 3	826	Sep 11	826	Sep 11 2003
ANNUAL SEVEN-DAY MINIMUM	1390	Aug 27	997	Sep 6	951	May 24 1998
MAXIMUM PEAK FLOW			10800	May 13	18900	Apr 18 2002
MAXIMUM PEAK STAGE			12.62	May 13	16.22	Apr 18 2002
10 PERCENT EXCEEDS	4890		4030		3470	
50 PERCENT EXCEEDS	1950		1700		1800	
90 PERCENT EXCEEDS	1580		1140		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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3210	3510	2040	1720	1790	1930	3000	4960	3210	1480	1410	1150
2	4270	3010	1910	1770	1720	2050	2740	4560	3610	1280	1540	1030
3	4140	2420	1380	1690	1740	2180	2470	3870	3610	1230	1940	928
4	4310	2340	1670	1630	1890	1980	2300	3980	2940	1290	3280	918
5	4810	2270	1790	1660	1910	2050	2130	3750	3660	1190	2650	966
6	5580	2750	1780	1810	2020	2050	2510	4020	3680	1330	2620	1030
7	7230	2710	1760	1720	1890	2040	2670	4220	3680	1310	2190	1430
8	7770	2680	1860	1770	1970	1950	2190	4190	3850	1230	1950	1080
9	7300	2520	1810	1730	2070	2100	2090	4200	3830	1400	1460	985
10	7040	2510	1580	1930	1980	1990	2260	4020	4020	1250	1580	960
11	5950	3040	1740	1920	2040	1820	2620	5000	4890	1210	1520	927
12	5340	3130	1730	1910	2110	1800	4240	6650	4410	1170	1440	884
13	5520	3250	1740	1900	2150	1860	4460	9960	4250	1160	1510	990
14	5160	3240	1910	1780	2060	1920	4010	11100	3630	1140	1470	1860
15	4350	3010	1970	1850	2070	1920	4180	9280	3080	1270	1590	1780
16	4120	3100	1910	1650	2000	1940	5280	7780	3040	1390	1610	1960
17	4180	2860	1800	1810	2070	2220	6530	7170	2440	971	1290	1750
18	4140	2590	1950	1820	2120	2980	6870	6300	2520	1220	1150	1420
19	3980	2660	2090	1760	2020	3150	6880	6410	2290	1110	1180	1330
20	3650	2590	2170	1790	2110	3050	7370	6000	2050	1150	1140	1260
21	3600	2480	1950	1910	2020	3080	8660	5400	1930	1190	1110	1140
22	3870	2670	2050	1760	1870	3380	9740	5030	1850	1180	1110	1280
23	3170	2530	2030	1860	2070	3520	9450	4660	1810	1300	976	1270
24	3250	2110	1920	1790	1960	3680	8350	4460	1700	1200	1090	1510
25	3280	2100	1990	1680	2060	3650	7140	3840	1840	1310	1060	1370
26	3250	2130	2090	1750	2030	3320	7480	3650	1750	1260	1190	1250
27	3510	2110	2010	1760	2000	3150	6760	3460	1750	1220	1200	1270
28	4140	2090	1790	1740	2030	3000	6300	3550	1700	1040	1360	1460
29	4200	1880	1710	1790	---	3170	5080	3350	1700	1190	1310	1430
30	4010	1970	1740	1730	---	3220	4980	2850	1710	1050	1270	1340
31	3450	---	1620	1760	---	3110	---	3320	---	1120	1190	---
TOTAL	141780	78260	57490	55150	55770	79260	150740	160990	86430	37841	47386	37958
MEAN	4574	2609	1855	1779	1992	2557	5025	5193	2881	1221	1529	1265
MAX	7770	3510	2170	1930	2150	3680	9740	11100	4890	1480	3280	1960
MIN	3170	1880	1380	1630	1720	1800	2090	2850	1700	971	976	884

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 2003, BY WATER YEAR (WY)

MEAN	2050	2182	2091	1976	2036	2509	4624	3950	2858	2160	1713	1799
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1988 - 2003	
ANNUAL TOTAL	1222430		989055			
ANNUAL MEAN	3349		2710		2532	
HIGHEST ANNUAL MEAN					3781	1996
LOWEST ANNUAL MEAN					1864	1990
HIGHEST DAILY MEAN	22800	Apr 19	11100	May 14	22800	Apr 19 2002
LOWEST DAILY MEAN	1300	Aug 31	884	Sep 12	846	Aug 3 1988
ANNUAL SEVEN-DAY MINIMUM	1480	Aug 27	1030	Aug 31	932	Oct 1 1989
MAXIMUM PEAK FLOW			11700	May 13	23000	Apr 19 2002
MAXIMUM PEAK STAGE			13.06	May 13	17.72	Apr 19 2002
INSTANTANEOUS LOW FLOW			630	Jul 20	603	Aug 1 1992
10 PERCENT EXCEEDS	6250		4970		4180	
50 PERCENT EXCEEDS	2260		2030		2050	
90 PERCENT EXCEEDS	1790		1200		1320	

STREAMS TRIBUTARY TO LAKE MICHIGAN

04066003 MENOMINEE RIVER BELOW PEMENE CREEK NEAR PEMBINE, WI

LOCATION.--Lat 45°34'46", long 87°47'13", in NE1/4 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 mi^2.

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 ft, from river-profile map, and Oct. 28, 1972, to August 1982, water-stage recorder at site 1.5 mi upstream at elevation 770 ft, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3000	3760	e2100	e1900	e1900	e2200	e3300	5470	3500	1680	1300	1280
2	4310	3390	e2000	e1900	e1900	e2300	e3000	4950	3770	1540	1710	1240
3	4230	2660	e1600	e1800	e1900	e2300	e2700	4380	3980	1300	1890	1140
4	4520	2590	e1700	e1800	e2100	e2200	e2500	4170	3200	1360	3360	1040
5	5390	2500	e1900	e1900	e2100	e2200	e2400	4180	3660	1380	2900	1070
6	5780	2920	e1900	e1900	e2200	e2200	2610	4410	3890	1340	2980	1160
7	7540	2930	e1900	e1900	e2100	e2200	2960	4620	3890	1460	2410	1490
8	8320	2820	e1900	e1900	e2100	e2200	2430	4630	4010	1390	2220	1250
9	7940	2740	e1800	e2000	e2200	e2200	2250	4660	4160	1520	1890	1120
10	7650	2800	e1800	e2100	e2200	e2200	2460	4440	4200	1330	1670	1120
11	6480	3270	e1900	e2100	e2200	e2200	2870	5420	5150	1390	1740	1090
12	5630	3400	e1900	e2000	e2300	e2200	4330	6810	4860	1260	1740	1070
13	5900	3450	e1900	e2000	e2300	e2100	4970	10100	4630	1300	1680	1070
14	5540	3530	e2000	e1900	e2200	e2000	4640	11900	4110	1250	1710	1940
15	4650	3230	e2100	e1900	e2200	e2000	4430	10400	3210	1260	1650	1940
16	4330	3280	e2000	e1800	e2200	e2100	5730	8650	3150	1480	1790	2220
17	4440	3080	e1900	e2000	e2200	e2500	7270	7740	2680	1280	1740	1980
18	4220	2800	e2100	e2000	e2300	e3000	7440	6840	2590	1180	1320	1770
19	4240	2850	e2200	e1900	e2200	e3600	7570	6720	2510	1210	1210	1510
20	3980	2780	e2300	e1900	e2300	e3500	8120	6600	2250	1290	1290	1510
21	3710	2670	e2200	e2000	e2200	e3500	9360	6060	2070	1270	1300	1410
22	4230	2770	e2200	e2000	e2000	e3800	10600	5420	2020	1320	1200	1450
23	3460	2790	e2100	e2000	e2200	e3900	10300	5240	2020	1410	1170	1500
24	3470	2290	e2000	e2000	e2200	e4100	9010	4990	1750	1270	1210	1640
25	3660	2250	e2100	e1900	e2200	e4100	7770	4190	2030	1310	1210	1740
26	3590	2220	e2200	e1900	e2200	e3800	7950	3970	1860	1430	1330	1560
27	3640	2250	e2200	e1900	e2200	e3400	7420	3820	1780	1320	1330	1610
28	4420	2250	e2100	e1900	e2200	e3400	6660	3910	1850	1330	1410	1810
29	4480	2060	e1900	e1900	---	e3500	5590	3420	1790	1220	1430	1620
30	4390	e2000	e2000	e1900	---	e3500	5240	3480	1840	1280	1450	1660
31	3700	---	e1700	e1900	---	e3400	---	3490	---	1240	1330	---
TOTAL	150840	84330	61600	59900	60500	87800	163880	175080	92410	41600	52570	44010
MEAN	4866	2811	1987	1932	2161	2832	5463	5648	3080	1342	1696	1467
MAX	8320	3760	2300	2100	2300	4100	10600	11900	5150	1680	3360	2220
MIN	3000	2000	1600	1800	1900	2000	2250	3420	1750	1180	1170	1040

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 2003, BY WATER YEAR (WY)

MEAN	2471	2573	2272	2111	2104	2628	5600	4788	3351	2514	2075	2265
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1950 - 2003	
ANNUAL TOTAL	1286590		1074520			
ANNUAL MEAN	3525		2944		2896	
HIGHEST ANNUAL MEAN					4318	1960
LOWEST ANNUAL MEAN					1778	1977
HIGHEST DAILY MEAN	22100	Apr 19	11900	May 14	26700	May 8 1960
LOWEST DAILY MEAN	1280	Sep 1	1040	Sep 4	840	Aug 14 1977
ANNUAL SEVEN-DAY MINIMUM	1460	Aug 27	1170	Sep 7	914	Aug 8 1977
MAXIMUM PEAK FLOW			(a)12400	May 13	(b)26900	May 8 1960
MAXIMUM PEAK STAGE			14.49	Feb 14	(c)18.94	Dec 17 1985
10 PERCENT EXCEEDS	6580		5400		4900	
50 PERCENT EXCEEDS	2380		2200		2300	
90 PERCENT EXCEEDS	1880		1320		1430	

(a) Gage height, 12.80 ft.
(b) Gage height, 13.90 ft, site and datum then in use.
(c) Backwater from ice.
(e) 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 SE1/4 SE1/4 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 mi^2.

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 Michigamme River, and by many smaller reservoirs upstream from station. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3130	3630	2030	1700	1940	2230	3450	5470	3590	1790	1280	1230
2	4430	3410	2020	1890	1920	2330	3320	4890	3410	1550	1630	1240
3	4460	2740	1630	1900	2010	2370	3130	4190	4090	1510	2060	1170
4	4550	2520	1770	1870	1990	2310	2710	4020	3210	1310	3360	1140
5	5340	2820	1990	1880	e1900	2340	2340	4240	3330	1310	3130	980
6	6190	2840	1950	1880	e1600	2240	2870	4360	3810	1400	2840	954
7	7230	3110	1930	1920	e2200	2250	2920	4550	3740	1470	2600	1430
8	8320	2840	1910	1930	e2000	2300	2860	4630	3980	1420	2520	1460
9	7780	2830	1880	2000	e2100	2290	2400	4480	4190	1360	1730	1070
10	7410	2860	1860	1970	e2100	2300	2280	4590	4240	1590	1690	1080
11	6590	3350	1920	1820	e2100	2310	3180	5220	5230	1390	1910	1060
12	5770	3650	1910	1880	e2100	2210	4450	6900	5130	1370	1860	1050
13	5730	3320	1880	2050	e2100	2090	5360	9110	4510	1320	1720	1090
14	5460	3490	2060	1790	e2200	2060	4890	11500	4550	1320	1690	1910
15	4730	3400	2150	1940	e2200	1960	4320	9880	3390	1330	1780	2280
16	4490	3310	2320	1930	e2200	2210	6110	8100	3230	1460	1820	2200
17	4320	3290	2110	1740	e2100	2560	7610	7310	2750	1480	1800	2180
18	4230	2920	2050	1750	2090	3060	7360	6740	2300	1310	1470	1620
19	4210	2790	2340	1750	2370	3870	7720	6040	2850	1200	1200	1600
20	4170	2900	2320	1910	2160	3660	8050	6350	2270	1200	1280	1420
21	3690	2780	2390	1890	2400	3570	9380	5730	2030	1300	1310	1350
22	4120	2780	2390	1880	2210	4080	10300	5170	2140	1360	1310	1600
23	3960	2770	2090	1530	e2000	4480	10100	5180	1870	1590	1250	1500
24	3200	2520	1960	1910	e2300	4530	9020	4720	2090	1410	1170	1590
25	3740	2500	2240	1960	e2200	4480	7710	3970	1960	1380	1170	1960
26	3770	2220	2330	1580	e2200	4120	7730	3850	2140	1290	1220	1460
27	3790	2300	2260	e1500	e2200	3380	7300	3450	1820	1510	1510	1590
28	4320	2240	2080	e1500	2160	3820	6530	3940	1780	1330	1420	1910
29	4640	2200	1970	e1600	---	3830	5800	3400	2030	1310	1360	1800
30	4470	2140	1990	e1800	---	3900	5200	3300	1830	1370	1500	1780
31	3950	---	1710	1890	---	3780	---	3090	---	1310	1390	---
TOTAL	152190	86470	63440	56540	59050	92920	166400	168370	93490	43250	53980	44704
MEAN	4909	2882	2046	1824	2109	2997	5547	5431	3116	1395	1741	1490
MAX	8320	3650	2390	2050	2400	4530	10300	11500	5230	1790	3360	2280
MIN	3130	2140	1630	1500	1600	1960	2280	3090	1780	1200	1170	954

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 2003, BY WATER YEAR (WY)

MEAN	2197	1948	1870	1912	2195	2884	5464	4471	2994	2525	2022	1770
MAX	4909	2882	2619	2068	2345	4118	9373	6120	3850	4584	2674	2237
(WY)	2003	2003	2002	2002	1999	2000	2002	2002	2002	1999	2002	2000
MIN	1417	1659	1493	1774	2061	2065	3147	2156	2087	1395	1436	1410
(WY)	2001	1999	2001	1999	2002	2001	2000	2000	2000	2003	2001	2001

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1999 - 2003	
ANNUAL TOTAL	1306080		1080804			
ANNUAL MEAN	3578		2961		2688	
HIGHEST ANNUAL MEAN					3244	2002
LOWEST ANNUAL MEAN					2253	2001
HIGHEST DAILY MEAN	20800	Apr 19	11500	May 14	20800	Apr 19 2002
LOWEST DAILY MEAN	1450	Sep 2	954	Sep 6	954	Sep 6 2003
ANNUAL SEVEN-DAY MINIMUM	1600	Aug 27	1150	Sep 5	1110	Sep 2 2001
MAXIMUM PEAK FLOW			11900	May 14	22200	Apr 18 2002
MAXIMUM PEAK STAGE			11.81	May 14	14.98	Apr 18 2002
10 PERCENT EXCEEDS	6610		5270		4470	
50 PERCENT EXCEEDS	2510		2220		2100	
90 PERCENT EXCEEDS	1910		1360		1370	

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04066800 MENOMINEE RIVER AT KOSS, MI

LOCATION.--Lat 45°23'14", long 87°42'07", in NE1/4 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 mi^2.

PERIOD OF RECORD.--July 1907 to March 1909 (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 those 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2660	4240	e1600	e1900	e1900	e2100	4320	6470	3940	1810	1530	1410
2	4260	3960	e2000	e2100	e1900	e2200	4310	6090	3820	1710	1600	1410
3	4850	3470	e1900	e2200	e1900	e2200	4070	5360	4130	1570	1870	1320
4	4990	2590	e1800	e2000	e1900	e2200	4070	4750	4050	1550	2620	1300
5	5850	2830	e2100	e2000	e1900	e2200	3600	4880	3350	1420	4200	1330
6	6700	2780	e2100	e2000	e1800	e2200	3420	5060	4000	1460	3170	1070
7	7740	3470	e2100	e2000	e1800	e2100	3590	5490	4260	1600	3350	1210
8	8800	3060	e2100	e2000	e2100	e2200	3570	5650	4360	1590	2610	1770
9	9410	2930	e2000	e2000	e2000	e2100	3310	5450	4730	1510	2300	1300
10	8900	2970	e2100	e1900	e2100	e2100	2870	5640	4870	1600	1810	1340
11	8320	3370	e2100	e1800	e2100	e2100	3220	5730	5690	1570	1900	1310
12	7160	4310	e2000	e1800	e2100	e2200	4620	7160	6420	1580	2180	1340
13	6480	4160	e1900	e1900	e2000	e2100	6170	9150	5760	1540	2020	1350
14	6590	3730	e1900	e2000	e2100	e2000	6290	11600	5290	1500	1800	1540
15	5790	3990	e2100	e1800	e2200	e2000	5500	12800	4640	1460	1680	2710
16	5100	3800	e2200	e1900	e2200	e2000	6620	11200	3710	1520	1710	2180
17	4980	3820	e2400	e1800	e2100	e2400	9030	9260	3310	1520	1700	2370
18	4830	3710	e2200	e1600	e2100	e2900	9840	8670	2350	1540	1680	1980
19	4710	3110	e2400	e1600	e2000	e3600	9960	7250	2810	1360	1370	1650
20	4710	3320	e2600	e1800	e2100	e4200	10200	7380	2500	1340	1370	1620
21	4450	3090	e2600	e1900	e2200	e4500	11000	6930	2120	1220	1300	1460
22	4440	3130	e2700	e1900	e2200	e4700	12200	6390	2020	1480	1370	1540
23	4790	3120	e2500	e1700	e1900	e5000	12900	5970	1930	1580	1390	1690
24	4110	2930	e2100	e1700	e2000	e5400	12300	5700	1980	1630	1290	1620
25	3980	2820	e2100	e1900	e2200	e5400	10800	5040	1780	1520	1280	1770
26	4430	2670	e2300	e1800	e2100	e5400	9260	4340	2070	1490	1420	1910
27	4470	e2500	e2500	e1400	e2100	e5000	9150	4050	1960	1490	1540	1620
28	4660	e2600	e2300	e1600	e2100	e5000	8280	4010	1880	1540	1650	1850
29	5250	e2300	e2100	e1600	---	e5200	7600	4170	1840	1480	1530	2030
30	5220	e2300	e2100	e1700	---	e5200	6310	3700	1970	1490	1560	1690
31	4850	---	e2000	e1900	---	e4800	---	3500	---	1550	1590	---
TOTAL	173480	97080	66900	57200	57100	102700	208380	198840	103540	47220	58390	48690
MEAN	5596	3236	2158	1845	2039	3313	6946	6414	3451	1523	1884	1623
MAX	9410	4310	2700	2200	2200	5400	12900	12800	6420	1810	4200	2710
MIN	2660	2300	1600	1400	1800	2000	2870	3500	1780	1220	1280	1070

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 2003, BY WATER YEAR (WY)

MEAN	2567	2802	2198	1985	1892	2725	6638	5712	3862	2743	2154	2405
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1913 - 2003	
ANNUAL TOTAL	1460590		1219520			
ANNUAL MEAN	4002		3341		3145	
HIGHEST ANNUAL MEAN					5262	1916
LOWEST ANNUAL MEAN					1642	1931
HIGHEST DAILY MEAN	23000	Apr 20	12900	Apr 23	33000	May 10 1960
LOWEST DAILY MEAN	1600	Dec 1	1070	Sep 6	162	Sep 15 1931
ANNUAL SEVEN-DAY MINIMUM	1760	Aug 28	1290	Sep 1	402	Sep 9 1931
MAXIMUM PEAK FLOW			(a)13100	(b)		
MAXIMUM PEAK STAGE			14.42	May 15		
10 PERCENT EXCEEDS	8060	6340	5930			
50 PERCENT EXCEEDS	2750	2200	2330			
90 PERCENT EXCEEDS	1950	1520	1390			

(a) Gage height, 14.41 ft.
(b) Apr. 23, May 15.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04067500 MENOMINEE RIVER NEAR McALLISTER, WI

LOCATION.--Lat 45°19'33", long 87°39'48", in SW1/4 SE1/4 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2840	4300	e1700	2000	e2000	e2200	5060	6560	3900	1980	1650	1440
2	3940	4100	e2100	e2100	e2000	e2300	4580	6260	3950	1930	1670	1350
3	4810	3740	e2000	e2300	e2000	e2300	4260	5570	4060	1710	2020	1380
4	5040	3050	e1900	e2000	e2000	e2300	4090	5020	4220	1640	2530	1270
5	5780	3120	e2300	e2000	e2000	e2300	3030	5020	3490	1550	4050	1240
6	6720	3160	e2300	e2000	e2000	e2300	3450	5330	3920	1440	3220	1150
7	7760	3590	e2300	e2000	e1900	e2200	3600	5790	4220	1620	3290	1040
8	8670	3400	e2200	e2000	e2200	e2300	3570	5930	4320	1610	2770	1790
9	9280	3250	e2100	e2000	e2100	e2300	3250	5710	4790	1520	2560	1250
10	8900	3300	e2200	e2000	e2200	e2200	3010	5870	4950	1620	2060	1220
11	8380	3660	e2200	e1900	e2200	e2300	3550	5890	5810	1650	2090	1200
12	7330	4340	e2200	e2000	e2200	e2300	4980	7230	6640	1590	2360	1200
13	6600	4260	e2100	e2100	e2200	e2200	6460	8910	6100	1520	2200	1300
14	6670	3960	e2100	e2100	e2300	e2100	6780	11000	5560	1490	2060	1640
15	6000	4050	e2400	e1900	e2300	e2100	6020	12300	5000	1440	1970	2890
16	5230	3940	e2500	e1900	e2300	e2100	6970	10900	4080	1500	1970	2450
17	5080	3720	e2600	e1900	e2200	e2600	9340	9080	3690	1560	1950	2580
18	4910	3720	e2300	e1800	e2200	e3000	10200	8440	2860	1550	1900	2280
19	4800	3190	e2500	e1800	e2200	e3600	10200	7270	3040	1370	1480	1840
20	4750	3270	e2700	e1900	e2300	e4500	10600	7230	2890	1340	1430	1740
21	4560	3160	e2700	e2000	e2400	e4600	11300	6910	2450	1460	1500	1590
22	4470	3180	e2700	e2000	e2400	e4800	12400	6430	2290	1430	1460	1630
23	4940	3160	e2600	e1800	e2100	e5400	12900	6000	2300	1540	1430	1830
24	4360	3020	e2200	e1700	e2200	e5800	12300	5780	2220	1700	1440	1740
25	4130	2860	e2300	e2000	e2400	e5800	10800	5220	2110	1530	1300	1900
26	4550	2670	e2500	e2000	e2200	e5800	9240	4430	2260	e1600	1360	2140
27	4620	2450	2670	e1600	e2200	e5200	9140	4210	2180	e1600	1430	1790
28	4730	2820	2440	e1700	e2200	e4900	8310	4060	1990	e1600	1630	1950
29	5270	2460	2320	e1700	---	5520	7660	4370	1960	1440	1510	2300
30	5360	2420	2210	e1800	---	5600	6510	3770	2200	1470	1530	2030
31	5020	---	2140	e2000	---	5410	---	3680	---	1620	1650	---
TOTAL	175500	101320	71480	60000	60900	108330	213560	200170	109450	48620	61470	51150
MEAN	5661	3377	2306	1935	2175	3495	7119	6457	3648	1568	1983	1705
MAX	9280	4340	2700	2300	2400	5800	12900	12300	6640	1980	4050	2890
MIN	2840	2420	1700	1600	1900	2100	3010	3680	1960	1340	1300	1040

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2003, BY WATER YEAR (WY)

MEAN	2922	3139	2554	2364	2397	3098	6595	5308	3892	3108	2353	2590
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1945 - 2003	
ANNUAL TOTAL	1525440		1261950			
ANNUAL MEAN	4179		3457		3369	
HIGHEST ANNUAL MEAN					5496	1960
LOWEST ANNUAL MEAN					2118	1948
HIGHEST DAILY MEAN	23300	Apr 20	12900	Apr 23	31800	May 9 1960
LOWEST DAILY MEAN	1700	Dec 1	1040	Sep 7	810	Oct 26 1948
ANNUAL SEVEN-DAY MINIMUM	1880	Aug 28	1260	Sep 6	952	Oct 24 1948
MAXIMUM PEAK FLOW			13100	Apr 23	32500	May 9 1960
MAXIMUM PEAK STAGE			15.02	Apr 23	(a)20.00	May 9 1960
INSTANTANEOUS LOW FLOW					(b)538	Oct 6 1946
10 PERCENT EXCEEDS	8380		6530		5940	
50 PERCENT EXCEEDS	2920		2320		2580	
90 PERCENT EXCEEDS	2080		1540		1630	

(a) From graph based on gage readings.
(b) Observed.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	19	35	38	e25	26	35	74	55	25	31	30
2	17	20	35	35	e27	26	34	122	50	23	32	32
3	19	21	e35	33	e31	e25	32	78	54	24	33	24
4	20	22	e35	31	e40	e26	77	63	53	24	37	22
5	25	22	e35	31	e38	27	631	300	50	39	32	21
6	21	24	e34	31	e36	27	280	205	47	37	30	20
7	20	22	e34	30	e34	25	159	111	46	53	28	20
8	20	24	e34	30	e33	e26	128	143	44	55	27	19
9	19	23	e34	32	e32	e26	125	662	44	46	26	19
10	19	30	e32	31	e31	e26	108	839	42	40	24	18
11	18	28	31	e30	e30	e27	85	540	41	36	24	18
12	18	25	30	e30	e29	e32	73	554	40	33	25	17
13	20	24	30	e29	e29	e70	65	328	39	30	23	18
14	19	23	31	e28	e28	81	61	208	38	28	23	19
15	19	24	31	e28	e28	85	56	186	37	28	23	20
16	18	23	31	e27	e28	102	53	155	35	27	30	18
17	18	22	30	e26	e27	93	49	127	34	25	22	17
18	18	22	35	e26	e27	73	47	108	33	23	20	16
19	23	24	56	e25	e27	62	45	96	33	23	19	17
20	20	23	50	e25	e27	59	48	164	31	23	19	18
21	19	22	43	e24	e28	59	51	159	30	358	18	17
22	19	33	39	e24	e28	51	47	107	30	196	21	21
23	20	49	36	e24	e28	46	44	89	29	91	20	23
24	18	42	34	e23	e28	42	42	79	28	66	19	22
25	18	37	34	e23	e27	42	42	72	27	53	17	32
26	19	36	34	e23	e27	41	41	66	29	45	19	24
27	18	35	e33	e23	e26	38	44	62	31	41	19	28
28	17	35	32	e23	e26	37	39	58	28	44	17	26
29	18	35	32	e23	---	35	38	55	28	38	18	34
30	18	35	33	e23	---	34	42	53	27	35	18	30
31	19	---	42	e24	---	35	---	59	---	33	19	---
TOTAL	589	824	1090	853	825	1404	2621	5922	1133	1642	733	660
MEAN	19.0	27.5	35.2	27.5	29.5	45.3	87.4	191	37.8	53.0	23.6	22.0
MAX	25	49	56	38	40	102	631	839	55	358	37	34
MIN	15	19	30	23	25	25	32	53	27	23	17	16
CFSM	0.24	0.34	0.44	0.34	0.37	0.56	1.08	2.37	0.47	0.66	0.29	0.27
IN.	0.27	0.38	0.50	0.39	0.38	0.65	1.21	2.73	0.52	0.76	0.34	0.30

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 2003, BY WATER YEAR (WY)

MEAN	53.7	67.8	69.8	108	131	112	113	143	85.5	50.5	32.3	24.1
MAX	201	134	174	229	292	228	196	449	213	127	51.5	38.5
(WY)	2002	1997	1997	1998	1997	1998	1999	1996	1996	1996	1995	1997
MIN	17.5	20.7	34.0	27.5	29.5	44.1	64.1	52.1	35.8	26.1	17.4	14.2
(WY)	2000	2000	2000	2003	2003	2000	2000	2001	1998	2002	1999	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1995 - 2003	
ANNUAL TOTAL	25493		18296			
ANNUAL MEAN	69.8		50.1		82.1	
HIGHEST ANNUAL MEAN					119	1996
LOWEST ANNUAL MEAN					44.5	2000
HIGHEST DAILY MEAN	888	May 13	839	May 10	2640	May 10 1996
LOWEST DAILY MEAN	15	Sep 28	15	Oct 1	13	Sep 10 1999
ANNUAL SEVEN-DAY MINIMUM	16	Sep 25	18	Sep 15	14	Sep 20 1999
MAXIMUM PEAK FLOW			1030	May 9	3440	May 10 1996
MAXIMUM PEAK STAGE			11.42	May 9	14.13	May 10 1996
INSTANTANEOUS LOW FLOW					12	(a)
ANNUAL RUNOFF (CFSM)	0.87		0.62		1.02	
ANNUAL RUNOFF (INCHES)	11.75		8.43		13.83	
10 PERCENT EXCEEDS	124		77		150	
50 PERCENT EXCEEDS	37		30		46	
90 PERCENT EXCEEDS	18		19		21	

(a) Sept. 27, 1999; Jan. 17, 2000, result of freezeup.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	32	47	75	e46	e43	174	156	132	60	43	46
2	27	32	46	e71	e49	e43	172	177	125	54	71	57
3	29	32	e47	e68	e53	e42	166	176	118	49	94	68
4	32	31	e48	e65	e64	e42	199	165	114	46	132	80
5	35	32	e47	e63	e65	e42	324	183	112	47	134	75
6	34	35	e46	e61	e62	e42	358	189	108	49	123	67
7	34	36	e45	e59	e60	e41	341	183	104	59	119	60
8	34	35	e44	e57	e57	e41	340	181	103	67	117	55
9	32	36	e43	e55	e54	e41	343	202	102	73	109	50
10	29	42	e43	e53	e51	e41	359	233	98	73	100	46
11	28	47	e42	e51	e49	e41	362	240	97	72	92	43
12	28	43	e42	e50	e47	e48	345	264	98	67	88	40
13	28	49	e42	e48	e46	e62	317	272	96	62	87	37
14	27	58	e41	e47	e45	e88	279	268	96	55	83	40
15	27	59	e41	e47	e44	e120	246	286	94	50	77	49
16	27	55	e41	e46	e44	155	220	297	90	45	70	47
17	27	54	e46	e46	e44	196	198	291	88	41	63	42
18	28	54	e52	e45	e44	209	186	276	88	38	60	39
19	41	63	65	e44	e44	205	183	253	84	36	55	37
20	42	56	79	e43	e44	210	174	234	80	35	51	36
21	39	50	83	e43	e45	237	162	215	78	55	47	34
22	38	53	79	e43	e46	235	155	198	74	72	50	45
23	37	52	e72	e42	e45	217	146	181	70	68	48	51
24	36	54	66	e42	e44	202	140	168	66	60	44	57
25	36	55	51	e42	e43	195	135	158	63	52	41	76
26	39	53	e54	e42	e43	182	130	150	61	46	40	81
27	39	50	e56	e42	e42	167	130	146	59	42	38	96
28	38	49	e59	e42	e42	160	129	141	58	41	34	102
29	36	47	e62	e42	---	170	120	136	59	37	34	107
30	35	51	65	e42	---	175	122	131	62	33	32	108
31	34	---	78	e43	---	174	---	135	---	31	32	---
TOTAL	1022	1395	1672	1559	1362	3866	6655	6285	2677	1615	2208	1771
MEAN	33.0	46.5	53.9	50.3	48.6	125	222	203	89.2	52.1	71.2	59.0
MAX	42	63	83	75	65	237	362	297	132	73	134	108
MIN	26	31	41	42	42	41	120	131	58	31	32	34
CFSM	0.16	0.23	0.26	0.24	0.24	0.61	1.08	0.98	0.43	0.25	0.35	0.29
IN.	0.18	0.25	0.30	0.28	0.25	0.70	1.20	1.13	0.48	0.29	0.40	0.32

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

MEAN	103	136	175	181	212	303	305	233	190	112	85.0	83.8
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1963 - 2003	
ANNUAL TOTAL	58010		32087			
ANNUAL MEAN	159		87.9		176	
HIGHEST ANNUAL MEAN					270	1993
LOWEST ANNUAL MEAN					47.6	1964
HIGHEST DAILY MEAN	554	May 18	362	Apr 11	1330	(a)
LOWEST DAILY MEAN	24	Sep 13	26	Oct 1	8.0	Aug 9 1964
ANNUAL SEVEN-DAY MINIMUM	25	Sep 11	27	Oct 11	9.4	Aug 5 1964
MAXIMUM PEAK FLOW			372	Apr 5	(b)1390	Jun 5 1989
MAXIMUM PEAK STAGE			4.80	Apr 5	(c)6.64	Feb 11 2001
INSTANTANEOUS LOW FLOW			25	Oct 1	8.0	(d)
ANNUAL RUNOFF (CFSM)	0.77		0.43		0.86	
ANNUAL RUNOFF (INCHES)	10.48		5.79		11.63	
10 PERCENT EXCEEDS	349		195		351	
50 PERCENT EXCEEDS	85		55		142	
90 PERCENT EXCEEDS	32		36		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) Aug. 9, 10, 11, 1964.
(e) Estimated.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.9	e3.0	e4.2	e12	e5.3	e5.0	44	27	28	6.0	7.1	29
2	1.9	e3.0	e3.9	e11	e5.9	e5.0	39	32	24	5.6	45	53
3	2.2	e2.9	e4.2	e10	e6.5	e5.0	35	30	22	5.1	66	54
4	2.7	e2.9	e4.5	e9.5	e7.1	e5.0	43	27	21	5.0	72	45
5	2.9	e3.2	e4.7	e9.0	e7.7	e4.9	84	36	20	6.1	74	36
6	2.7	e3.5	e4.8	e8.6	e7.9	e4.9	117	42	19	6.5	84	30
7	2.5	3.8	e4.9	e8.2	e7.4	e4.9	122	39	18	10	78	26
8	2.1	3.9	e5.0	e7.8	e6.9	e5.0	108	37	17	16	65	24
9	2.3	4.1	e5.0	e7.4	e6.5	e5.0	91	48	17	15	53	21
10	2.0	7.0	e5.0	e7.0	e6.3	e5.0	79	72	16	14	43	19
11	1.8	9.3	e4.9	e6.7	e6.0	e5.1	69	91	16	13	37	18
12	1.8	7.0	e4.9	e6.5	e5.8	e15	61	103	17	12	36	16
13	1.9	6.0	e5.0	e6.3	e5.6	e45	53	111	20	9.6	35	15
14	1.8	5.4	e5.1	e6.1	e5.4	e70	47	106	18	8.1	35	15
15	2.0	7.0	e5.2	e6.0	e5.2	e90	42	97	16	7.2	33	19
16	1.9	6.7	e5.4	e5.8	e5.1	e90	38	89	15	6.4	31	16
17	2.1	6.1	e6.0	e5.6	e5.0	e81	34	80	15	5.2	27	13
18	2.3	5.4	e8.1	e5.4	e4.9	70	32	70	16	5.0	25	12
19	3.2	6.0	14	e5.3	e4.9	60	30	61	22	4.4	22	11
20	3.0	6.4	17	e5.2	e5.0	55	29	55	19	6.5	19	9.7
21	2.6	6.6	13	e5.0	e5.1	56	30	51	16	18	17	8.8
22	2.4	10	e9.0	e4.9	e5.2	53	29	44	14	13	17	16
23	2.3	9.7	e8.0	e4.9	e5.3	48	27	39	12	9.9	15	31
24	2.2	9.3	e8.0	e4.8	e5.4	43	25	35	11	7.4	13	27
25	2.6	8.6	e10	e4.8	e5.3	41	23	33	9.5	6.4	12	41
26	3.2	7.9	e13	e4.8	e5.2	39	22	30	8.9	5.5	11	46
27	2.8	e7.4	e11	e4.8	e5.2	34	20	28	7.9	5.2	18	52
28	2.7	e6.0	e10	e4.9	e5.1	34	19	28	6.9	4.7	16	59
29	2.7	e5.4	e9.8	e4.9	---	56	18	26	7.6	4.3	16	59
30	2.9	e4.8	e9.8	e4.9	---	58	19	25	6.7	3.7	20	53
31	3.0	---	e10	e5.0	---	50	---	28	---	3.2	15	---
TOTAL	74.4	178.3	233.4	203.1	162.2	1142.8	1429	1620	476.5	248.0	1057.1	874.5
MEAN	2.40	5.94	7.53	6.55	5.79	36.9	47.6	52.3	15.9	8.00	34.1	29.1
MAX	3.2	10	17	12	7.9	90	122	111	28	18	84	59
MIN	1.8	2.9	3.9	4.8	4.9	4.9	18	25	6.7	3.2	7.1	8.8
CFSM	0.05	0.12	0.15	0.13	0.12	0.76	0.98	1.07	0.33	0.16	0.70	0.60
IN.	0.06	0.14	0.18	0.16	0.12	0.87	1.09	1.24	0.36	0.19	0.81	0.67

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2003, BY WATER YEAR (WY)

MEAN	21.8	32.1	41.8	46.4	56.2	84.0	79.7	55.7	46.6	20.8	18.0	17.4
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1970 - 2003	
ANNUAL TOTAL	14236.7		7699.3			
ANNUAL MEAN	39.0		21.1		43.3	
HIGHEST ANNUAL MEAN					67.4	1993
LOWEST ANNUAL MEAN					21.1	2003
HIGHEST DAILY MEAN	250	Feb 3	122	Apr 7	629	Feb 25 1985
LOWEST DAILY MEAN	1.8	Oct 11	1.8	Oct 11	0.58	Aug 4 1988
ANNUAL SEVEN-DAY MINIMUM	1.9	Oct 10	1.9	Oct 10	0.84	Aug 3 1988
MAXIMUM PEAK FLOW			(a)123	Apr 6	(b)664	Feb 25 1985
MAXIMUM PEAK STAGE			(c)3.84	Mar 16	6.20	Jun 1 1989
INSTANTANEOUS LOW FLOW			1.4	Oct 11	0.48	Aug 5 1988
ANNUAL RUNOFF (CFSM)	0.80		0.43		0.89	
ANNUAL RUNOFF (INCHES)	10.87		5.88		12.08	
10 PERCENT EXCEEDS	96		55		93	
50 PERCENT EXCEEDS	15		10		30	
90 PERCENT EXCEEDS	2.7		3.2		6.6	

(a) Gage height 3.65 ft.
(b) Gage height 6.0 ft, from floodmark.
(c) Backwater from ice.
(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, 8.76 ft, May 16, 2002; minimum, 2.63 ft, Apr. 7, 2000.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 8.02 ft, May 31; minimum, 6.19 ft, Sept. 21.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.28	6.86	6.61	6.48	---	6.70	7.00	7.48	7.99	7.63	6.95	6.53
2	7.27	6.84	6.60	6.47	---	6.70	7.01	7.51	7.99	7.61	6.99	6.54
3	7.26	6.87	6.59	6.46	---	6.70	7.01	7.50	7.97	7.57	6.97	6.52
4	7.28	6.81	6.58	6.45	---	6.70	7.13	7.50	7.96	7.56	6.96	6.51
5	7.31	6.83	6.57	6.44	6.60	6.74	7.23	7.57	7.95	7.55	6.94	6.49
6	7.29	6.80	6.57	6.44	6.61	6.75	7.24	7.58	7.94	7.54	6.91	6.48
7	7.27	6.78	---	6.45	6.61	6.75	7.27	7.60	7.94	7.55	6.89	6.46
8	7.24	6.77	---	6.43	6.62	6.75	7.29	7.67	7.94	7.55	6.88	6.45
9	7.22	6.76	---	6.42	6.63	6.76	7.30	7.73	7.95	7.55	6.86	6.43
10	7.21	6.80	6.52	6.41	6.64	6.77	7.31	7.77	7.94	7.55	6.83	6.41
11	7.19	6.80	6.50	6.43	6.65	6.76	7.33	7.79	7.94	7.54	6.83	6.39
12	7.18	6.77	6.48	6.41	6.65	6.77	7.33	7.86	7.98	7.51	6.84	6.37
13	7.18	6.76	6.47	6.38	6.66	6.78	7.34	7.87	7.99	7.48	6.82	6.35
14	7.15	6.73	6.46	6.40	6.66	6.78	7.35	7.88	7.98	7.45	6.80	6.34
15	7.12	6.74	6.50	6.42	6.66	6.79	7.36	7.92	7.96	7.42	6.78	6.34
16	7.10	6.73	6.44	---	6.66	6.79	7.36	7.94	7.95	7.39	6.76	6.32
17	7.08	6.71	6.44	---	6.66	6.80	7.36	7.95	7.93	7.36	6.73	6.30
18	7.08	6.69	6.47	---	6.66	6.81	7.37	7.97	7.92	7.33	6.70	6.28
19	7.06	6.70	6.52	---	6.67	6.82	7.38	7.97	7.90	7.29	6.68	6.25
20	7.04	6.68	6.54	---	6.67	6.86	7.39	7.99	7.87	7.26	6.66	6.23
21	7.03	6.70	6.54	---	6.67	6.90	7.41	7.99	7.84	7.25	6.64	6.21
22	7.00	---	6.53	---	6.68	6.91	7.41	7.98	7.82	7.23	6.65	6.26
23	6.98	---	6.51	---	6.68	6.92	7.42	7.98	7.80	7.19	6.62	6.29
24	6.96	---	6.50	---	6.69	6.93	7.42	7.98	7.77	7.16	6.60	6.30
25	6.97	---	6.54	---	6.69	6.95	7.42	7.99	7.74	7.13	6.57	6.36
26	6.97	---	6.53	---	6.70	6.96	7.42	7.99	7.73	7.09	6.55	6.35
27	6.95	---	6.56	---	6.70	6.97	7.42	7.99	7.72	7.06	6.58	6.36
28	6.93	---	6.51	---	6.70	6.98	7.42	7.99	7.70	7.03	6.57	6.36
29	6.92	---	6.50	---	---	7.00	7.42	7.99	7.68	7.00	6.55	6.36
30	6.90	---	6.49	---	---	6.99	7.44	7.99	7.66	6.97	6.52	6.35
31	6.89	---	6.49	---	---	6.99	---	8.00	---	6.94	6.50	---
MEAN	7.11	---	---	---	---	6.83	7.32	7.84	7.88	7.35	6.75	6.37
MAX	7.31	---	---	---	---	7.00	7.44	8.00	7.99	7.63	6.99	6.54
MIN	6.89	---	---	---	---	6.70	7.00	7.48	7.66	6.94	6.50	6.21

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, 6.03 ft, May 11; minimum, 5.37 ft, Nov. 1, 4, 5, 9, 17.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.50	5.40	5.49	5.68	5.70	5.68	5.77	5.84	5.79	5.62	5.47	5.48
2	5.48	5.40	5.50	5.68	5.70	5.68	5.76	5.83	5.78	5.60	5.53	5.51
3	5.47	5.39	5.51	5.68	5.71	5.67	5.75	5.82	5.76	5.57	5.52	5.51
4	5.54	5.38	5.51	5.68	5.76	5.68	5.89	5.81	5.74	5.56	5.53	5.51
5	5.56	5.38	5.51	5.69	5.75	5.71	5.96	5.87	5.74	5.55	5.53	5.50
6	5.57	5.39	5.52	5.70	5.74	5.71	5.95	5.86	5.74	5.55	5.52	5.50
7	5.53	5.40	5.52	5.70	5.73	5.71	5.94	5.86	5.74	5.55	5.51	5.49
8	5.53	5.41	5.52	5.71	5.73	5.71	5.95	5.89	5.76	5.57	5.51	5.49
9	5.51	5.40	5.52	5.70	5.72	5.71	5.95	5.92	5.76	5.58	5.51	5.48
10	5.50	5.43	5.53	5.71	5.72	5.72	5.95	5.93	5.77	5.60	5.50	5.47
11	5.49	5.43	5.53	5.71	5.71	5.71	5.95	5.97	5.77	5.59	5.53	5.47
12	5.49	5.41	5.53	5.71	5.71	5.71	5.94	5.98	5.79	5.57	5.61	5.47
13	5.50	5.41	5.53	5.72	5.72	5.72	5.94	5.97	5.80	5.56	5.60	5.46
14	5.50	5.41	5.54	5.71	5.72	5.72	5.94	5.96	5.79	5.56	5.60	5.46
15	5.48	5.40	5.54	5.71	5.71	5.72	5.95	5.97	5.78	5.56	5.59	5.47
16	5.46	5.40	5.54	5.71	5.70	5.72	5.90	5.98	5.77	5.53	5.58	5.46
17	5.47	5.39	5.53	5.70	5.70	5.73	5.89	5.97	5.76	5.53	5.56	5.46
18	5.48	5.40	5.57	5.70	5.70	5.74	5.89	5.96	5.75	5.51	5.54	5.45
19	5.46	5.42	5.62	5.71	5.70	5.74	5.89	5.95	5.73	5.50	5.52	5.43
20	5.46	5.42	5.66	5.71	5.69	5.77	5.92	5.94	5.70	5.50	5.51	5.43
21	5.45	5.41	5.67	5.71	5.69	5.81	5.91	5.92	5.69	5.51	5.50	5.42
22	5.44	5.44	5.66	5.70	5.70	5.80	5.89	5.89	5.68	5.50	5.50	5.48
23	5.42	5.46	5.66	5.69	5.70	5.81	5.88	5.88	5.67	5.49	5.48	5.52
24	5.42	5.45	5.65	5.69	5.69	5.81	5.87	5.86	5.66	5.49	5.47	5.54
25	5.43	5.45	5.69	5.69	5.70	5.81	5.86	5.86	5.65	5.49	5.45	5.58
26	5.45	5.45	5.68	5.69	5.69	5.80	5.84	5.85	5.64	5.48	5.45	5.59
27	5.45	5.45	5.67	5.69	5.68	5.80	5.84	5.84	5.65	5.45	5.50	5.60
28	5.44	5.45	5.68	5.69	5.68	5.82	5.84	5.83	5.65	5.45	5.50	5.59
29	5.42	5.47	5.67	5.70	---	5.79	5.80	5.82	5.64	5.44	5.49	5.60
30	5.42	5.46	5.68	5.70	---	5.78	5.80	5.81	5.63	5.43	5.46	5.59
31	5.41	---	5.68	5.70	---	5.77	---	5.80	---	5.42	5.46	---
MEAN	5.48	5.42	5.58	5.70	5.71	5.74	5.89	5.89	5.73	5.53	5.52	5.50
MAX	5.57	5.47	5.69	5.72	5.76	5.82	5.96	5.98	5.80	5.62	5.61	5.60
MIN	5.41	5.38	5.49	5.68	5.68	5.67	5.75	5.80	5.63	5.42	5.45	5.42

WTR YR 2003 MEAN 5.64 MAX 5.98 MIN 5.38

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 mi^2.

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 ft^3/s, Apr. 27, 1950.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	378	407	384	628	455	457	968	1050	945	456	252	404
2	376	389	481	659	456	453	967	1070	927	491	362	524
3	374	366	469	673	474	442	952	1030	867	410	582	503
4	403	365	397	662	555	473	1060	1010	826	299	697	482
5	415	362	371	653	547	479	1590	1200	823	310	701	472
6	412	393	396	594	580	483	1850	1330	821	517	707	466
7	411	415	459	575	599	481	2210	1330	813	559	744	448
8	410	412	445	560	558	488	2340	1350	734	703	862	430
9	425	411	397	553	567	495	2130	1760	709	570	841	430
10	494	426	418	576	529	449	2050	1740	776	588	501	431
11	479	429	413	579	534	455	1980	1930	789	630	622	426
12	435	419	411	555	500	507	1820	2000	805	586	832	386
13	397	426	414	516	488	556	1640	2160	821	567	414	339
14	389	420	405	489	484	705	1450	2170	836	464	445	315
15	380	407	422	493	485	813	1460	2200	808	450	436	356
16	373	406	421	450	456	854	1370	2140	713	443	501	359
17	377	408	e424	458	479	933	1260	2050	689	414	515	285
18	386	443	e420	492	479	1160	1230	2010	659	384	485	339
19	401	463	e510	503	474	1170	1160	1860	659	342	328	385
20	394	462	e630	468	478	1200	1080	1850	635	227	293	328
21	432	475	650	436	483	1230	1070	1540	577	256	214	303
22	486	494	632	512	490	1210	1080	1510	464	401	377	343
23	488	501	696	475	498	1190	1070	1430	468	414	473	460
24	455	479	692	458	501	1160	1020	1360	436	371	332	469
25	428	532	641	439	485	1130	998	1350	440	319	275	562
26	438	499	587	439	491	1060	804	1240	489	222	363	672
27	440	487	580	441	454	1010	802	1160	509	212	327	629
28	400	479	588	458	449	1050	799	1120	504	240	355	480
29	377	445	578	502	---	1030	794	1070	503	302	345	522
30	378	370	585	515	---	1010	820	1020	461	300	334	695
31	388	---	610	489	---	997	---	949	---	297	335	---
TOTAL	12819	12990	15526	16300	14028	25130	39824	46989	20506	12744	14850	13243
MEAN	414	433	501	526	501	811	1327	1516	684	411	479	441
MAX	494	532	696	673	599	1230	2340	2200	945	703	862	695
MIN	373	362	371	436	449	442	794	949	436	212	214	285
CFSM	0.31	0.32	0.37	0.39	0.37	0.60	0.98	1.12	0.51	0.30	0.35	0.33
IN.	0.35	0.36	0.43	0.45	0.39	0.69	1.10	1.29	0.57	0.35	0.41	0.36

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2003, BY WATER YEAR (WY)

MEAN	749	927	1105	1195	1370	1940	2012	1633	1186	785	643	630
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1953 - 2003	
ANNUAL TOTAL	428394		244949			
ANNUAL MEAN	1174		671		1183	
HIGHEST ANNUAL MEAN					1850	1993
LOWEST ANNUAL MEAN					365	1964
HIGHEST DAILY MEAN	3840	May 15	2340	Apr 8	7810	Mar 21 1982
LOWEST DAILY MEAN	250	Sep 17	212	Jul 27	78	Sep 12 1964
ANNUAL SEVEN-DAY MINIMUM	329	Sep 12	261	Jul 26	126	Sep 2 1964
MAXIMUM PEAK FLOW			2700	Apr 7	8180	Mar 21 1982
MAXIMUM PEAK STAGE			5.95	Apr 7	10.69	Mar 21 1982
INSTANTANEOUS LOW FLOW			194	Sep 17		
ANNUAL RUNOFF (CFSM)	0.87		0.50		0.88	
ANNUAL RUNOFF (INCHES)	11.80		6.75		11.91	
10 PERCENT EXCEEDS	2410		1220		2300	
50 PERCENT EXCEEDS	703		491		967	
90 PERCENT EXCEEDS	377		366		407	

(e) Estimated.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	33	39	55	e44	42	76	76	94	41	26	40
2	37	34	38	54	e46	41	73	81	91	38	54	60
3	37	36	e38	53	e47	e41	70	79	89	35	65	68
4	39	36	e39	51	e48	41	81	75	87	34	68	65
5	43	37	39	50	e49	e41	125	96	85	36	67	59
6	42	38	39	49	e49	e42	146	106	82	38	64	54
7	40	38	39	49	e49	e41	150	103	79	45	60	49
8	38	37	39	48	e48	e41	139	98	77	56	56	46
9	36	36	e39	48	e48	e42	129	114	78	60	52	44
10	35	39	39	48	e48	e41	121	149	77	59	49	41
11	34	40	39	e47	e47	e42	119	179	75	58	47	40
12	34	40	39	e47	e47	e48	122	207	80	55	47	38
13	35	40	38	e47	e47	63	114	214	84	53	44	40
14	33	39	38	e46	e46	82	106	212	82	49	38	44
15	32	39	39	e46	e46	92	100	202	78	46	35	46
16	31	37	39	e46	e46	92	95	190	74	41	33	45
17	31	36	39	e45	e45	91	91	177	73	37	29	43
18	32	36	42	e45	45	88	87	165	69	34	27	41
19	34	37	52	e45	44	85	84	153	67	32	23	40
20	33	37	64	e44	44	83	83	148	64	30	20	40
21	33	37	67	e44	43	84	86	141	61	34	18	41
22	32	39	64	e44	44	88	87	132	58	38	26	48
23	31	39	60	e43	e45	88	83	125	55	45	28	57
24	30	38	57	e43	45	84	78	119	52	45	28	59
25	31	38	e55	e43	e44	82	74	115	50	43	29	65
26	34	38	53	e43	e43	81	72	110	49	41	31	66
27	34	38	51	e43	e43	78	71	106	47	39	30	73
28	34	38	50	e42	e43	76	69	102	45	36	27	74
29	33	38	49	e42	---	82	67	99	45	32	23	74
30	32	38	49	e42	---	80	69	95	44	27	22	69
31	32	---	54	e42	---	78	---	95	---	23	24	---
TOTAL	1070	1126	1426	1434	1283	2080	2867	4063	2091	1280	1190	1569
MEAN	34.5	37.5	46.0	46.3	45.8	67.1	95.6	131	69.7	41.3	38.4	52.3
MAX	43	40	67	55	49	92	150	214	94	60	68	74
MIN	30	33	38	42	43	41	67	75	44	23	18	38
CFSM	0.33	0.35	0.43	0.44	0.43	0.63	0.90	1.24	0.66	0.39	0.36	0.49
IN.	0.38	0.40	0.50	0.50	0.45	0.73	1.01	1.43	0.73	0.45	0.42	0.55

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

MEAN	64.9	82.2	104	106	117	151	155	123	99.6	64.0	53.1	54.2
MAX	150	222	177	258	240	336	259	226	254	144	148	135
(WY)	1987	1993	1983	1993	2001	1982	1978	1983	1989	1986	1981	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
(WY)	1965	1965	1964	1963	1963	1964	1964	1963	1964	1988	1964	1964

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1963 - 2003	
ANNUAL TOTAL	34056		21479			
ANNUAL MEAN	93.3		58.8		97.7	
HIGHEST ANNUAL MEAN					153	1993
LOWEST ANNUAL MEAN					33.5	1964
HIGHEST DAILY MEAN	394	May 14	214	May 13	782	Feb 26 1985
LOWEST DAILY MEAN	20	Aug 10	18	Aug 21	5.7	Aug 5 1988
ANNUAL SEVEN-DAY MINIMUM	22	Aug 8	24	Aug 18	7.9	Jul 31 1988
MAXIMUM PEAK FLOW			217	May 13	797	Feb 26 1985
MAXIMUM PEAK STAGE			4.45	May 13	6.30	Feb 26 1985
INSTANTANEOUS LOW FLOW			16	Aug 21	5.4	(a)
ANNUAL RUNOFF (CFSM)	0.88		0.56		0.92	
ANNUAL RUNOFF (INCHES)	11.95		7.54		12.52	
10 PERCENT EXCEEDS	174		95		174	
50 PERCENT EXCEEDS	67		46		84	
90 PERCENT EXCEEDS	32		33		35	

(a) Aug. 4, 5, 1988.
(e) 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 Indiana Michigan Power Co. hydroelectric plant, 4 mi upstream from Pigeon River, and at mile 96.

DRAINAGE AREA.--1,866 mi^2.

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 (Indiana Michigan 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	625	670	669	972	731	807	1500	1570	1460	782	575	784
2	601	647	815	977	756	819	1470	1610	1450	799	678	1040
3	625	649	706	1020	820	765	1440	1540	1370	704	1170	998
4	714	650	686	974	966	815	1700	1470	1280	586	1170	847
5	708	687	659	990	904	835	2180	1900	1300	600	1190	846
6	686	703	687	921	942	823	2560	2070	1270	696	1140	806
7	667	713	755	882	956	824	2800	1960	1220	938	1170	838
8	655	711	774	879	889	871	3140	2020	1130	1140	1300	762
9	697	704	685	878	894	856	2900	2430	1120	1080	1320	773
10	774	763	749	894	876	835	2800	2640	1180	1010	864	740
11	746	749	753	846	862	805	2730	2710	1230	1060	897	737
12	719	748	736	829	805	900	2580	2890	1250	1150	1540	683
13	649	779	744	802	816	990	2450	2990	1230	980	808	662
14	722	781	721	784	782	1170	2150	3070	1290	909	778	641
15	674	776	760	771	818	1290	2080	3130	1240	815	783	968
16	635	751	837	742	761	1350	2030	3050	1290	776	821	671
17	670	736	752	733	788	1400	1880	2960	1340	718	831	582
18	665	784	818	790	785	1640	1800	2870	1030	716	811	639
19	680	805	1020	794	787	1720	1720	2760	852	675	631	669
20	692	809	1050	784	794	1710	1610	2700	1060	614	508	616
21	714	895	1090	737	813	1790	1610	2540	966	555	511	570
22	759	837	977	815	868	1740	1570	2230	825	789	534	676
23	753	906	1070	825	849	1710	1560	2190	793	794	818	826
24	704	831	1030	762	854	1630	1550	2060	789	694	705	930
25	705	892	934	800	826	1680	1450	2030	740	623	509	987
26	714	839	947	730	809	1610	1260	1940	845	543	589	834
27	717	792	844	749	794	1470	1200	1760	831	528	603	1030
28	681	787	880	792	808	1550	1240	1730	875	479	592	912
29	649	775	868	797	---	1560	1210	1680	852	530	582	915
30	651	699	880	834	---	1530	1240	1560	813	546	573	1080
31	619	---	977	787	---	1470	---	1540	---	525	615	---
TOTAL	21270	22868	25873	25890	23353	38965	57410	69600	32921	23354	25616	24062
MEAN	686	762	835	835	834	1257	1914	2245	1097	753	826	802
MAX	774	906	1090	1020	966	1790	3140	3130	1460	1150	1540	1080
MIN	601	647	659	730	731	765	1200	1470	740	479	508	570
CFSM	0.37	0.41	0.45	0.45	0.45	0.67	1.03	1.20	0.59	0.40	0.44	0.43
IN.	0.42	0.46	0.52	0.52	0.47	0.78	1.14	1.39	0.66	0.47	0.51	0.48

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 2003, BY WATER YEAR (WY)

MEAN	1114	1344	1563	1731	1892	2549	2673	2152	1690	1161	953	957
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1924 - 2003	
ANNUAL TOTAL	615248		391182			
ANNUAL MEAN	1686		1072		(a)1649	
HIGHEST ANNUAL MEAN					2856	1950
LOWEST ANNUAL MEAN					580	1964
HIGHEST DAILY MEAN	4760	May 17	3140	Apr 8	10700	Jun 4 1989
LOWEST DAILY MEAN	441	Aug 13	479	Jul 28	39	Oct 19 1963
ANNUAL SEVEN-DAY MINIMUM	547	Sep 11	532	Jul 26	278	Aug 1 1964
MAXIMUM PEAK FLOW			3250	Apr 8	(b)11400	Jun 4 1989
MAXIMUM PEAK STAGE			5.02	Apr 8	(c)10.76	Apr 27 1950
INSTANTANEOUS LOW FLOW			182	Jul 20		
ANNUAL RUNOFF (CFSM)	0.90		0.57		0.88	
ANNUAL RUNOFF (INCHES)	12.27		7.80		12.01	
10 PERCENT EXCEEDS	3120		1790		3020	
50 PERCENT EXCEEDS	1120		831		1390	
90 PERCENT EXCEEDS	621		649		640	

(a) Does not include water year 1924.
(b) Gage height 10.41 ft.
(c) Present datum.

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 mi^2.

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. Flow regulated by Elkhart Hydroelectric Plant.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1090	1110	1270	1690	1200	1190	2190	2470	2820	1410	1500	1740
2	1100	1140	1320	1650	1190	1190	2140	2670	2700	1390	1800	2300
3	1080	1110	1280	1660	1270	1060	2120	2560	2490	1300	2090	2370
4	1200	1150	1120	1630	1560	1170	2520	2490	2530	1190	2270	2290
5	1250	1160	1240	1590	1530	1230	3400	3190	2480	1170	2210	2080
6	1150	1170	1240	1580	1460	1200	3820	3690	2360	1400	2120	2010
7	1160	1230	1280	1460	1470	1200	3980	3420	2340	1610	2130	2010
8	1100	1210	1360	1500	1220	1240	4250	3280	2250	1950	2170	2000
9	1130	1220	1230	1450	1430	1590	4130	4510	2160	2090	2340	1960
10	1220	1290	1250	1440	1400	1500	4010	5630	2160	2050	1960	1910
11	1210	1320	1300	1420	1210	1380	3940	5120	2230	2040	1890	1850
12	1170	1260	1280	1310	1200	1490	3770	5230	2230	2120	2210	1770
13	1170	1330	1280	1240	1200	1690	3590	5360	2240	1900	2010	1700
14	1100	1350	1290	1320	1230	2060	3350	5220	2260	1830	1690	1650
15	1150	1360	1270	1160	1270	2200	3190	5460	2220	1720	1640	1740
16	1130	1310	1490	1160	1080	2230	3110	5520	2200	1680	1600	1790
17	1100	1280	1430	1120	1140	2330	2920	5330	2250	1570	1620	1580
18	1130	1280	1500	1020	1220	2470	2850	5120	2070	1530	1520	1470
19	1210	1380	1760	1120	1170	2690	2750	4910	1870	1460	1420	1520
20	1220	1380	1810	1180	1180	2610	2640	4840	1840	1410	1220	1470
21	1190	1460	1800	1200	1200	2740	2630	4590	1840	1530	1150	1370
22	1280	1530	1740	1190	1250	2700	2570	4140	1690	1750	1180	1580
23	1270	1520	1680	1150	1250	2660	2530	4010	1620	1780	1420	1740
24	1250	1500	1720	1170	1240	2530	2450	3760	1600	1680	1380	1860
25	1210	1490	1610	1200	1190	2600	2390	3600	1470	1540	1220	1980
26	1240	1480	1520	1190	1150	2540	2260	3470	1570	1470	1230	2000
27	1240	1440	1510	1110	1170	2390	2150	3250	1570	1560	1300	1940
28	1230	1380	1520	1150	1190	2330	2140	3130	1500	1580	1250	2100
29	1160	1360	1570	1180	---	2450	2090	3060	1560	1620	1270	2080
30	1110	1350	1530	1190	---	2410	2190	2950	1490	1590	1350	2120
31	1150	---	1620	1220	---	2230	---	2950	---	1540	1350	---
TOTAL	36400	39550	44820	40650	35270	61300	88070	124930	61610	50460	51510	55980
MEAN	1174	1318	1446	1311	1260	1977	2936	4030	2054	1628	1662	1866
MAX	1280	1530	1810	1690	1560	2740	4250	5630	2820	2120	2340	2370
MIN	1080	1110	1120	1020	1080	1060	2090	2470	1470	1170	1150	1370
CFSM	0.35	0.39	0.43	0.39	0.37	0.59	0.87	1.20	0.61	0.48	0.49	0.55
IN.	0.40	0.44	0.49	0.45	0.39	0.68	0.97	1.38	0.68	0.56	0.57	0.62

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2003, BY WATER YEAR (WY)

MEAN	2197	2614	3164	3544	3885	5029	5153	4135	3259	2350	1955	1885
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1948 - 2003	
ANNUAL TOTAL	1103603		690550			
ANNUAL MEAN	3024		1892		3260	
HIGHEST ANNUAL MEAN					5264	1950
LOWEST ANNUAL MEAN					1283	1964
HIGHEST DAILY MEAN	10200	May 13	5630	May 10	18500	Mar 21 1982
LOWEST DAILY MEAN	900	Sep 18	1020	Jan 18	336	Aug 5 1964
ANNUAL SEVEN-DAY MINIMUM	962	Sep 12	1130	Oct 29	561	Aug 2 1964
MAXIMUM PEAK FLOW			5960	May 15	18800	Feb 27 1985
MAXIMUM PEAK STAGE			21.28	May 15	27.91	Mar 21 1982
ANNUAL RUNOFF (CFSM)	0.90		0.56		0.97	
ANNUAL RUNOFF (INCHES)	12.18		7.62		13.14	
10 PERCENT EXCEEDS	5690		3080		5790	
50 PERCENT EXCEEDS	2220		1560		2780	
90 PERCENT EXCEEDS	1130		1170		1370	

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 mi^2.

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. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1430	1300	1580	1910	1660	1570	2590	2760	3210	1790	1600	2130
2	1330	1370	1540	1910	1620	1630	2520	2940	3180	1640	1870	2620
3	1220	1340	1670	1920	1670	1560	2560	2900	3080	1680	2180	2910
4	1300	1400	1500	1840	2120	1510	2940	2780	2950	1660	2660	2740
5	1560	1430	1360	1860	2080	1670	3860	3860	2750	1800	2540	2510
6	1480	1410	1570	1880	1930	1620	4310	4390	2830	1760	2570	2400
7	1630	1470	1540	1730	1920	1610	4410	4090	2690	2100	2530	2370
8	1300	1400	1620	1770	1640	1700	4660	3690	2640	2430	2510	2410
9	1280	1410	1550	1750	1770	2000	4690	5390	2550	2610	2710	2320
10	1410	1600	1600	1770	1950	2030	4560	7470	2460	2410	2500	2310
11	1530	1560	1710	1740	1680	1840	4320	6260	2480	2400	2090	2200
12	1460	1540	1600	1720	1560	1830	4280	6410	2560	2540	2440	2050
13	1400	1500	1570	1670	1600	2110	4040	6060	2530	2310	2620	1960
14	1410	1530	1490	1580	1650	2480	3770	5990	2620	2210	2030	2000
15	1590	1540	1390	1740	1750	2650	3460	6280	2510	1990	1920	2050
16	1300	1560	1590	1430	1540	2630	3500	6470	2470	1950	1890	2190
17	1270	1550	1750	1500	1540	2800	3290	6090	2450	1880	1840	1950
18	1360	1560	1910	1510	1640	2780	3180	5850	2510	1660	1830	1940
19	1460	1700	1970	1400	1590	3110	3090	5530	2140	1640	1580	1680
20	1430	1640	2070	1590	1580	3190	2970	5460	2140	1660	1570	1960
21	1480	1780	2010	1610	1650	3090	2860	5360	2100	2620	1520	e1900
22	1480	1890	1960	1590	1690	3120	2850	4820	2040	2130	1240	e2000
23	1530	1790	1940	1570	1750	3010	2810	4480	1860	2230	1690	2050
24	1510	1750	1970	1510	1740	3000	2730	4260	1830	1960	1700	2250
25	1500	1890	1880	1490	1700	2900	2620	4120	1800	1880	1650	2440
26	1450	1790	1560	1640	1650	2990	2500	3850	1620	1640	1460	2400
27	1500	1620	1700	1510	1410	2860	2270	3720	1920	1780	1540	2210
28	1470	1610	1770	1470	1590	2710	2330	3570	1670	2020	1570	2590
29	1430	1660	1770	1600	---	2830	2330	3440	1880	1850	1510	2550
30	1370	1720	1890	1570	---	2810	2390	3380	1830	1850	1580	2460
31	1330	---	1930	1630	---	2570	---	3570	---	1840	1630	---
TOTAL	44200	47310	52960	51410	47670	74210	98690	145240	71300	61920	60570	67550
MEAN	1426	1577	1708	1658	1702	2394	3290	4685	2377	1997	1954	2252
MAX	1630	1890	2070	1920	2120	3190	4690	7470	3210	2620	2710	2910
MIN	1220	1300	1360	1400	1410	1510	2270	2760	1620	1640	1240	1680
CFSM	0.39	0.43	0.47	0.45	0.46	0.65	0.90	1.28	0.65	0.54	0.53	0.61
IN.	0.45	0.48	0.54	0.52	0.48	0.75	1.00	1.47	0.72	0.63	0.61	0.69

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	2362	2749	3166	3582	3989	5228	5445	4461	3515	2534	2126	2058
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	1306409		823030			
ANNUAL MEAN	3579		2255		3430	
HIGHEST ANNUAL MEAN					5718	1950
LOWEST ANNUAL MEAN					1464	1964
HIGHEST DAILY MEAN	12600	May 13	7470	May 10	19800	Mar 21 1982
LOWEST DAILY MEAN	989	Sep 13	1220	Oct 3	420	Aug 30 1931
ANNUAL SEVEN-DAY MINIMUM	1140	Sep 13	1360	Oct 29	728	Aug 26 1941
MAXIMUM PEAK FLOW			7970	May 10	20200	Apr 5 1950
MAXIMUM PEAK STAGE			8.98	May 10	(a)15.10	Apr 5 1950
ANNUAL RUNOFF (CFSM)	0.98		0.62		0.94	
ANNUAL RUNOFF (INCHES)	13.26		8.35		12.71	
10 PERCENT EXCEEDS	6770		3480		6140	
50 PERCENT EXCEEDS	2700		1880		2840	
90 PERCENT EXCEEDS	1360		1470		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 mi^2.

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. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	155	162	183	267	196	187	209	308	260	175	122	124
2	158	160	182	249	199	187	208	371	246	165	226	156
3	160	163	172	234	213	171	204	305	244	156	187	144
4	168	164	169	224	289	188	343	272	242	154	181	139
5	192	167	176	219	284	189	737	496	235	170	188	133
6	182	176	174	215	268	e185	622	468	228	176	172	128
7	178	171	171	209	254	e180	497	366	227	279	163	123
8	172	170	171	210	225	e185	428	379	224	278	157	118
9	168	170	165	216	234	e190	388	583	231	261	153	113
10	165	199	165	213	226	e190	369	668	223	230	149	109
11	163	202	166	204	213	e190	336	600	222	228	141	109
12	160	191	165	204	197	e195	310	793	215	215	138	107
13	168	185	166	202	199	e220	291	700	212	196	131	106
14	166	182	171	200	199	e260	280	550	209	183	129	110
15	165	192	177	194	209	e280	269	514	203	175	128	123
16	162	189	179	187	182	e300	257	475	197	168	125	120
17	159	183	174	191	197	e320	250	423	191	160	123	116
18	166	179	219	167	198	e350	247	385	188	155	119	112
19	181	183	319	189	194	321	241	355	184	145	112	110
20	174	182	344	188	192	322	249	373	178	138	107	112
21	169	186	314	185	198	341	260	360	172	171	106	112
22	166	213	284	185	203	302	248	328	171	185	106	134
23	162	205	259	167	203	277	239	307	165	174	105	163
24	161	199	243	189	198	261	234	294	160	166	104	160
25	163	196	239	183	190	259	229	283	156	157	101	171
26	176	191	233	186	191	250	223	275	165	146	99	163
27	177	185	227	170	185	236	216	263	185	143	103	175
28	174	181	222	191	187	231	214	253	182	139	100	173
29	170	180	220	189	---	222	209	248	196	134	101	211
30	168	183	225	178	---	214	227	242	181	129	101	196
31	165	---	275	189	---	208	---	272	---	124	100	---
TOTAL	5213	5489	6549	6194	5923	7411	9034	12509	6092	5475	4077	4070
MEAN	168	183	211	200	212	239	301	404	203	177	132	136
MAX	192	213	344	267	289	350	737	793	260	279	226	211
MIN	155	160	165	167	182	171	204	242	156	124	99	106
CFSM	0.66	0.72	0.83	0.78	0.83	0.94	1.18	1.58	0.80	0.69	0.52	0.53
IN.	0.76	0.80	0.96	0.90	0.86	1.08	1.32	1.82	0.89	0.80	0.59	0.59

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2003, BY WATER YEAR (WY)

MEAN	255	302	324	313	336	400	396	331	270	217	193	206
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	259	205	142	133	101	112
(WY)	1964	2000	1964	1963	1963	2000	2000	1964	1964	1988	1964	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1961 - 2003	
ANNUAL TOTAL	96268		78036			
ANNUAL MEAN	264		214		295	
HIGHEST ANNUAL MEAN					401	1993
LOWEST ANNUAL MEAN					177	1964
HIGHEST DAILY MEAN	895	Mar 10	793	May 12	1550	Feb 25 1985
LOWEST DAILY MEAN	134	Jul 19	99	Aug 26	87	Sep 8 1964
ANNUAL SEVEN-DAY MINIMUM	138	Jul 17	101	Aug 25	89	Aug 3 1964
MAXIMUM PEAK FLOW			833	May 12	1590	Feb 24 1985
MAXIMUM PEAK STAGE			6.85	May 12	9.26	Feb 24 1985
INSTANTANEOUS LOW FLOW			98	(a)	(b)70	Jan 2 1999
ANNUAL RUNOFF (CFSM)	1.03		0.84		1.16	
ANNUAL RUNOFF (INCHES)	14.04		11.38		15.71	
10 PERCENT EXCEEDS	388		309		451	
50 PERCENT EXCEEDS	240		189		273	
90 PERCENT EXCEEDS	155		129		161	

(a) Aug. 26, 31.
(b) Result of regulation.
(e) Estimated.

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 mi^2.

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. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	233	238	288	349	e290	286	319	330	339	218	177	176
2	233	238	287	367	e300	279	318	376	335	212	205	189
3	228	239	294	372	e310	267	316	414	327	209	218	195
4	237	244	267	355	e330	267	402	421	312	208	239	216
5	273	243	279	340	e350	267	581	471	295	207	313	202
6	247	243	279	320	e380	272	808	570	292	204	323	187
7	259	242	286	316	e375	270	791	573	293	218	317	191
8	277	267	290	329	e370	270	807	533	289	246	252	177
9	260	288	274	323	e360	274	921	562	282	277	225	187
10	240	333	258	309	e350	273	888	656	285	294	244	188
11	238	331	267	322	e330	279	761	659	293	294	224	202
12	244	327	255	321	e300	277	642	670	297	282	215	172
13	248	321	279	308	e290	293	546	799	278	257	212	166
14	236	323	267	e305	e290	316	485	766	277	249	215	176
15	231	324	261	e300	e300	366	444	753	273	237	221	181
16	254	313	284	e295	e295	440	411	798	266	228	200	186
17	239	310	288	e290	e290	492	387	806	253	218	191	191
18	253	310	281	e285	e290	530	373	720	249	208	190	194
19	260	307	331	e280	e295	545	358	620	247	204	187	188
20	258	299	372	e280	e295	554	359	549	243	201	184	178
21	269	299	393	e280	e290	566	376	498	239	217	177	174
22	264	316	404	e280	290	554	370	451	236	211	176	182
23	239	317	414	e280	280	505	361	418	234	218	183	194
24	224	308	410	e280	293	469	355	388	222	215	178	215
25	221	314	396	e275	293	445	330	366	214	213	180	276
26	237	318	359	e275	272	418	330	353	214	202	187	281
27	263	305	338	e275	238	386	321	343	219	192	175	306
28	264	297	348	e270	237	361	300	333	221	184	167	302
29	254	294	336	e270	---	351	297	322	234	182	187	323
30	241	291	331	e275	---	334	311	310	226	181	214	307
31	233	---	351	e280	---	322	---	328	---	182	180	---
TOTAL	7657	8799	9767	9406	8583	11528	14268	16156	7984	6868	6556	6302
MEAN	247	293	315	303	307	372	476	521	266	222	211	210
MAX	277	333	414	372	380	566	921	806	339	294	323	323
MIN	221	238	255	270	237	267	297	310	214	181	167	166
CFSM	0.63	0.75	0.81	0.78	0.79	0.95	1.22	1.34	0.68	0.57	0.54	0.54
IN.	0.73	0.84	0.93	0.90	0.82	1.10	1.36	1.54	0.76	0.66	0.63	0.60

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	376	438	498	503	540	663	636	506	399	314	281	297
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	148455		113874			
ANNUAL MEAN	407		312		454	
HIGHEST ANNUAL MEAN					606	1991
LOWEST ANNUAL MEAN					273	1964
HIGHEST DAILY MEAN	1300	Mar 13	921	Apr 9	3460	Oct 4 1986
LOWEST DAILY MEAN	209	Sep 13	166	Sep 13	120	Sep 8 1964
ANNUAL SEVEN-DAY MINIMUM	214	Sep 12	178	Aug 22	134	Sep 7 1964
MAXIMUM PEAK FLOW			945	Apr 9	3580	Oct 4 1986
MAXIMUM PEAK STAGE			8.12	Apr 9	10.90	Oct 4 1986
INSTANTANEOUS LOW FLOW			164	Sep 13	99	Jul 5 1964
ANNUAL RUNOFF (CFSM)	1.04		0.80		1.16	
ANNUAL RUNOFF (INCHES)	14.16		10.86		15.80	
10 PERCENT EXCEEDS	639		447		746	
50 PERCENT EXCEEDS	348		285		400	
90 PERCENT EXCEEDS	231		192		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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	30	48	60	e42	e40	65	80	58	26	23	22
2	22	37	48	57	e46	38	64	130	55	25	24	25
3	25	31	e48	53	e54	e42	63	120	52	25	27	24
4	29	31	e48	50	e64	44	191	94	46	25	50	23
5	37	31	e47	48	e60	43	466	163	44	25	36	23
6	32	27	45	47	e58	38	417	210	45	26	34	22
7	45	28	42	46	e54	38	297	146	45	33	31	21
8	42	32	39	46	e52	37	235	112	44	33	28	21
9	38	35	e37	47	e50	39	198	146	45	35	28	21
10	34	67	e35	47	e48	e39	168	176	44	34	27	20
11	30	67	35	47	e47	e39	140	207	43	34	25	20
12	29	57	35	e46	e46	39	119	326	41	32	26	20
13	30	51	36	e45	e45	46	104	337	40	30	25	19
14	29	48	37	e45	e44	55	94	254	40	29	25	21
15	28	47	38	e44	e43	88	87	213	39	28	23	24
16	28	46	38	e43	e43	161	80	193	37	26	23	23
17	26	45	37	e42	e43	220	74	159	35	25	21	23
18	39	44	46	e42	e43	217	70	127	34	25	21	22
19	42	42	82	e41	e43	176	68	104	33	23	21	20
20	40	42	84	e41	e43	162	72	99	31	23	21	20
21	37	43	77	e40	e44	156	84	109	30	24	21	20
22	34	54	70	e40	e45	139	78	94	30	25	22	22
23	32	53	64	e39	44	118	72	77	28	32	20	32
24	31	49	60	e38	42	102	67	77	28	27	20	33
25	31	47	58	e38	e42	92	64	73	28	24	20	61
26	33	45	55	e38	e41	86	60	68	28	23	21	43
27	34	44	53	e38	e41	80	57	64	29	23	23	39
28	33	42	51	e38	e41	74	55	57	28	23	24	37
29	31	42	50	e38	---	71	52	56	27	22	23	46
30	32	46	50	e39	---	67	52	54	27	22	22	46
31	30	---	57	e40	---	65	---	60	---	22	22	---
TOTAL	1000	1303	1550	1363	1308	2651	3713	4185	1134	829	777	813
MEAN	32.3	43.4	50.0	44.0	46.7	85.5	124	135	37.8	26.7	25.1	27.1
MAX	45	67	84	60	64	220	466	337	58	35	50	61
MIN	17	27	35	38	41	37	52	54	27	22	20	19
CFSM	0.39	0.52	0.60	0.53	0.56	1.02	1.48	1.61	0.45	0.32	0.30	0.32
IN.	0.44	0.58	0.69	0.61	0.58	1.18	1.65	1.86	0.50	0.37	0.35	0.36

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2003, BY WATER YEAR (WY)

MEAN	68.2	92.8	123	120	142	179	161	107	85.3	56.4	43.8	56.1
MAX	362	282	272	244	377	389	327	206	261	181	141	329
(WY)	1987	1991	1983	1973	1997	1979	1975	2000	1997	1986	1980	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
(WY)	2000	2000	2000	2000	2003	2000	1971	1971	1971	2003	1999	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1966 - 2003	
ANNUAL TOTAL	33193		20626			
ANNUAL MEAN	90.9		56.5		103	
HIGHEST ANNUAL MEAN					134	1997
LOWEST ANNUAL MEAN					56.5	2003
HIGHEST DAILY MEAN	778	Mar 10	466	Apr 5	1810	Feb 22 1997
LOWEST DAILY MEAN	17	Oct 1	17	Oct 1	17	Oct 1 2002
ANNUAL SEVEN-DAY MINIMUM	23	Sep 26	20	Sep 7	19	Sep 15 1999
MAXIMUM PEAK FLOW			499	Apr 5	(a)2390	Feb 21 1997
MAXIMUM PEAK STAGE			8.53	Apr 5	14.90	Feb 21 1997
INSTANTANEOUS LOW FLOW			16	Oct 1	16	(b)
ANNUAL RUNOFF (CFSM)	1.09		0.68		1.23	
ANNUAL RUNOFF (INCHES)	14.77		9.18		16.70	
10 PERCENT EXCEEDS	185		103		200	
50 PERCENT EXCEEDS	54		42		72	
90 PERCENT EXCEEDS	27		23		33	

(a) From rating curve extended above 1,800 ft^3/s.
(b) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	26	46	60	e47	e44	65	114	72	33	24	25
2	23	25	44	57	e50	e43	64	157	67	32	27	26
3	25	25	41	54	e56	e41	61	129	65	30	28	25
4	28	25	e46	52	e68	e39	141	110	63	31	42	24
5	34	26	e44	51	e68	e38	379	135	61	40	50	23
6	32	28	e42	50	e64	e38	319	163	60	38	41	22
7	30	29	e40	50	e61	e39	274	134	59	43	37	21
8	28	28	e37	50	e58	e40	257	125	62	54	35	21
9	27	28	e35	50	e56	e42	194	139	67	52	42	20
10	26	53	e34	50	e54	e43	152	166	62	47	40	20
11	25	74	e34	48	e52	e43	130	155	59	45	36	20
12	25	59	e34	e52	e50	e45	115	205	60	43	37	19
13	26	53	35	e50	e50	e48	104	256	64	39	35	19
14	27	49	36	e49	e49	e53	96	216	60	36	31	20
15	26	49	37	e48	e48	66	90	212	56	35	28	23
16	26	49	37	e47	e48	95	83	203	53	34	27	24
17	25	45	36	e47	e48	122	78	158	50	32	25	22
18	30	43	46	e46	e48	132	75	130	48	31	23	21
19	34	42	82	e45	e48	134	72	114	45	29	22	20
20	31	42	82	e45	e48	133	76	119	43	28	22	22
21	30	43	78	e44	e49	132	86	119	42	29	21	20
22	29	51	72	e43	e50	118	82	105	40	29	20	25
23	28	51	67	e43	e50	107	79	97	38	31	20	38
24	27	48	63	e42	e48	97	76	93	37	30	19	35
25	28	46	61	e42	e47	91	73	89	35	28	18	32
26	29	45	59	e42	e46	86	69	86	35	27	20	33
27	29	43	57	e42	e46	79	66	81	37	26	23	32
28	28	43	55	e42	e45	75	63	76	36	26	25	35
29	27	43	55	e43	---	71	60	73	36	25	24	51
30	26	46	55	e44	---	67	60	70	34	23	25	48
31	26	---	60	e45	---	64	---	74	---	22	24	---
TOTAL	859	1257	1550	1473	1452	2265	3539	4103	1546	1048	891	786
MEAN	27.7	41.9	50.0	47.5	51.9	73.1	118	132	51.5	33.8	28.7	26.2
MAX	34	74	82	60	68	134	379	256	72	54	50	51
MIN	23	25	34	42	45	38	60	70	34	22	18	19
CFSM	0.33	0.50	0.60	0.57	0.62	0.88	1.42	1.59	0.62	0.41	0.35	0.32
IN.	0.38	0.56	0.69	0.66	0.65	1.02	1.59	1.84	0.69	0.47	0.40	0.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 2003, BY WATER YEAR (WY)

MEAN	58.5	83.5	85.2	111	136	129	126	125	120	47.9	38.1	41.4
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1995 - 2003	
ANNUAL TOTAL	33600		20769			
ANNUAL MEAN	92.1		56.9		91.6	
HIGHEST ANNUAL MEAN					145	1997
LOWEST ANNUAL MEAN					56.9	2003
HIGHEST DAILY MEAN	543	Mar 10	379	Apr 5	2980	Jun 22 1997
LOWEST DAILY MEAN	22	Sep 10	18	Aug 25	16	Sep 4 1999
ANNUAL SEVEN-DAY MINIMUM	22	Sep 10	20	Sep 8	16	Sep 6 1999
MAXIMUM PEAK FLOW			427	Apr 5	(a)4340	Jun 21 1997
MAXIMUM PEAK STAGE			7.23	Apr 5	12.85	Jun 21 1997
INSTANTANEOUS LOW FLOW			18	(b)	15	Sep 11 1999
ANNUAL RUNOFF (CFSM)	1.11		0.69		1.10	
ANNUAL RUNOFF (INCHES)	15.06		9.31		14.99	
10 PERCENT EXCEEDS	169		108		158	
50 PERCENT EXCEEDS	60		45		73	
90 PERCENT EXCEEDS	26		25		28	

(a) From rating curve extended above 1,400 ft^3/s.
(b) Aug. 24, 25, Sept. 12, 13.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	130	136	139	173	e130	127	233	265	178	114	104	109
2	133	135	138	166	e130	125	211	253	171	112	130	119
3	132	134	e130	158	135	e115	199	257	168	114	128	120
4	143	134	e120	156	162	122	256	237	166	110	156	126
5	145	135	e140	152	e140	123	455	246	168	117	127	115
6	139	141	e145	151	e140	121	484	240	163	120	122	111
7	140	140	e140	141	e135	118	447	224	160	160	119	107
8	135	141	e140	155	e125	129	374	218	165	138	115	105
9	138	141	e125	149	e140	128	312	244	166	139	113	104
10	135	156	e135	149	e120	126	297	272	162	134	109	101
11	132	154	144	139	e120	132	286	282	163	129	104	98
12	131	158	141	142	e125	142	263	318	163	123	105	97
13	134	158	142	137	e130	164	242	314	162	119	106	95
14	131	154	143	153	e130	171	225	280	160	114	108	95
15	131	159	145	139	e130	191	214	262	154	111	112	106
16	130	153	145	e130	e115	231	201	260	149	108	123	105
17	131	149	142	e130	e120	254	197	247	147	106	125	102
18	132	146	146	e125	e125	252	191	230	148	104	121	98
19	140	149	162	e130	123	234	187	215	148	102	113	97
20	141	146	191	e135	120	234	186	207	141	105	107	94
21	143	149	200	e130	127	244	191	198	136	117	105	93
22	145	156	191	e130	127	236	195	192	133	119	112	116
23	139	156	175	e135	114	222	188	184	127	112	100	132
24	136	156	164	e125	127	209	182	180	117	107	97	135
25	138	153	156	e130	e125	209	177	177	112	104	97	164
26	143	150	168	e130	e125	202	173	174	114	101	116	158
27	141	147	147	e130	e125	194	169	171	115	100	119	170
28	140	144	155	e125	124	193	164	175	112	99	104	161
29	138	141	154	e135	---	259	161	173	113	99	102	151
30	136	140	153	e125	---	282	163	169	116	100	99	140
31	135	---	174	e130	---	263	---	182	---	101	98	---
TOTAL	4237	4411	4690	4335	3589	5752	7223	7046	4397	3538	3496	3524
MEAN	137	147	151	140	128	186	241	227	147	114	113	117
MAX	145	159	200	173	162	282	484	318	178	160	156	170
MIN	130	134	120	125	114	115	161	169	112	99	97	93
CFSM	0.51	0.55	0.57	0.52	0.48	0.69	0.90	0.85	0.55	0.43	0.42	0.44
IN.	0.59	0.61	0.65	0.60	0.50	0.80	1.01	0.98	0.61	0.49	0.49	0.49

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 2003, BY WATER YEAR (WY)

MEAN	211	232	225	247	259	299	311	267	243	182	169	169
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	225	177	126	111	113	111
(WY)	2000	2000	2003	2003	2003	2000	1987	1987	1988	1988	2003	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1987 - 2003	
ANNUAL TOTAL	80915		56238			
ANNUAL MEAN	222		154		234	
HIGHEST ANNUAL MEAN					332	1993
LOWEST ANNUAL MEAN					154	2003
HIGHEST DAILY MEAN	562	May 14	484	Apr 6	1140	Jun 3 1989
LOWEST DAILY MEAN	120	Dec 4	93	Sep 21	93	Sep 21 2003
ANNUAL SEVEN-DAY MINIMUM	125	Sep 11	99	Sep 8	98	Jul 4 1988
MAXIMUM PEAK FLOW			492	Apr 6	1160	Jun 3 1989
MAXIMUM PEAK STAGE			7.96	Apr 6	10.18	Jun 3 1989
INSTANTANEOUS LOW FLOW			(a)73	Mar 10	(a)73	Mar 10 2003
ANNUAL RUNOFF (CFSM)	0.83		0.58		0.88	
ANNUAL RUNOFF (INCHES)	11.27		7.84		11.92	
10 PERCENT EXCEEDS	345		230		361	
50 PERCENT EXCEEDS	184		140		210	
90 PERCENT EXCEEDS	134		106		131	

(a) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	194	200	219	280	200	202	365	405	277	175	151	188
2	208	196	216	260	201	201	332	406	264	160	197	179
3	199	207	185	246	217	175	321	404	250	175	180	162
4	201	201	182	239	249	193	423	376	248	156	208	217
5	223	203	224	239	229	204	634	373	245	182	183	180
6	201	208	225	235	217	197	727	391	255	175	163	147
7	202	213	212	230	216	194	689	372	247	262	192	157
8	199	212	211	231	187	207	614	357	239	218	167	157
9	196	217	189	234	216	212	520	396	250	218	150	153
10	199	241	200	230	218	191	479	443	243	207	160	153
11	198	234	217	228	183	203	464	449	231	204	161	147
12	191	236	212	215	185	229	418	500	234	195	160	143
13	198	234	212	203	200	273	385	506	230	186	163	133
14	198	234	212	224	195	297	352	452	230	152	159	131
15	193	244	215	217	203	331	331	427	220	170	173	149
16	196	235	221	197	174	386	330	418	213	171	169	154
17	196	230	213	200	188	422	308	391	210	152	209	149
18	196	236	223	190	199	425	300	371	207	152	159	141
19	198	233	257	197	200	404	292	337	214	149	167	132
20	205	230	277	207	192	382	293	326	204	187	160	137
21	208	228	287	204	199	433	314	316	198	166	160	134
22	207	233	276	199	202	419	301	307	190	193	166	175
23	208	237	258	204	188	368	291	271	185	165	150	208
24	207	235	251	192	194	353	285	278	181	165	139	222
25	210	235	241	197	189	349	277	284	145	155	146	246
26	218	231	246	196	189	343	271	268	179	150	193	235
27	210	225	243	199	188	335	261	269	178	149	167	239
28	217	222	225	193	194	320	254	259	165	149	164	233
29	209	212	240	203	---	387	250	260	178	146	153	210
30	202	216	235	188	---	444	263	261	175	144	149	179
31	201	---	269	198	---	403	---	278	---	145	146	---
TOTAL	6288	6718	7093	6675	5612	9482	11344	11151	6485	5373	5164	5190
MEAN	203	224	229	215	200	306	378	360	216	173	167	173
MAX	223	244	287	280	249	444	727	506	277	262	209	246
MIN	191	196	182	188	174	175	250	259	145	144	139	131
CFSM	0.45	0.50	0.51	0.48	0.45	0.68	0.84	0.80	0.48	0.39	0.37	0.39
IN.	0.52	0.56	0.59	0.55	0.46	0.79	0.94	0.92	0.54	0.45	0.43	0.43

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 2003, BY WATER YEAR (WY)

MEAN	243	263	302	305	345	476	483	387	311	262	223	214
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1949 - 2003	
ANNUAL TOTAL	126003		86575			
ANNUAL MEAN	345		237		316	
HIGHEST ANNUAL MEAN					498	1950
LOWEST ANNUAL MEAN					122	1964
HIGHEST DAILY MEAN	857	May 14	727	Apr 6	2050	Mar 29 1950
LOWEST DAILY MEAN	182	Dec 4	131	Sep 14	31	Aug 16 1964
ANNUAL SEVEN-DAY MINIMUM	185	Sep 12	141	Sep 13	59	Aug 2 1964
MAXIMUM PEAK FLOW			750	Apr 6	2130	Mar 29 1950
MAXIMUM PEAK STAGE			5.43	Apr 6	8.20	Mar 29 1950
INSTANTANEOUS LOW FLOW			72	Jul 4	12	Aug 2 1967
ANNUAL RUNOFF (CFSM)	0.77		0.53		0.70	
ANNUAL RUNOFF (INCHES)	10.44		7.17		9.55	
10 PERCENT EXCEEDS	543		371		548	
50 PERCENT EXCEEDS	287		211		270	
90 PERCENT EXCEEDS	199		157		146	

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	17	18	33	17	15	42	46	29	13	10	11
2	13	17	16	27	17	16	38	66	29	12	12	15
3	13	18	16	23	17	14	38	65	23	12	15	13
4	17	18	16	23	24	16	67	58	22	12	16	11
5	23	18	16	22	21	16	146	56	24	12	20	10
6	18	20	16	21	20	18	243	55	21	13	20	10
7	15	21	16	19	17	17	222	51	21	14	16	9.8
8	13	19	16	20	16	18	160	48	22	14	15	8.9
9	12	19	16	22	16	19	119	51	30	16	14	8.8
10	12	26	16	21	15	19	96	57	29	14	12	8.3
11	13	28	16	20	15	19	79	65	29	14	11	7.7
12	12	26	16	20	15	21	66	104	26	13	11	7.7
13	14	23	17	18	15	25	56	132	25	12	10	7.5
14	14	22	18	17	15	27	49	138	25	12	11	7.9
15	14	25	19	16	15	37	45	119	21	11	9.9	11
16	12	24	19	16	14	54	41	96	19	12	14	11
17	11	22	17	15	14	83	38	76	17	11	15	9.8
18	17	20	20	14	15	106	37	62	18	12	12	9.1
19	17	22	32	15	15	105	36	52	45	11	11	8.7
20	15	23	41	15	14	91	35	45	32	15	9.3	9.2
21	13	23	39	15	15	80	35	39	20	25	8.7	9.0
22	12	28	33	15	15	68	35	34	16	24	12	15
23	12	27	29	15	15	58	33	30	15	21	15	24
24	12	24	25	15	15	51	31	29	14	16	12	24
25	13	22	24	15	15	47	31	29	13	14	10	35
26	18	20	25	16	16	44	32	28	15	12	10	31
27	17	19	22	16	15	40	29	27	20	11	16	26
28	16	17	23	16	14	38	28	27	17	11	13	21
29	16	17	22	16	---	49	27	26	18	9.6	11	17
30	16	18	23	16	---	51	28	23	14	9.3	10	14
31	17	---	33	16	---	47	---	29	---	9.1	9.8	---
TOTAL	451	643	675	568	447	1309	1962	1763	669	417.0	391.7	411.4
MEAN	14.5	21.4	21.8	18.3	16.0	42.2	65.4	56.9	22.3	13.5	12.6	13.7
MAX	23	28	41	33	24	106	243	138	45	25	20	35
MIN	11	17	16	14	14	14	27	23	13	9.1	8.7	7.5
CFSM	0.30	0.44	0.45	0.38	0.33	0.87	1.35	1.18	0.46	0.28	0.26	0.28
IN.	0.35	0.50	0.52	0.44	0.34	1.01	1.51	1.36	0.52	0.32	0.30	0.32

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 2003, BY WATER YEAR (WY)

MEAN	27.2	35.6	35.8	40.9	56.3	56.6	60.7	57.0	31.1	18.8	16.8	17.3
MAX	77.9	69.0	60.0	66.1	125	86.8	86.6	90.9	45.8	25.2	24.4	27.6
(WY)	2002	1995	1995	1998	2001	1998	1998	2001	1997	1998	1995	1997
MIN	13.0	16.0	20.7	18.3	16.0	24.9	44.3	26.7	18.4	12.1	10.5	9.45
(WY)	2000	2000	2000	2003	2003	2000	2000	1999	1999	1996	1999	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1995 - 2003	
ANNUAL TOTAL	12792		9707.1			
ANNUAL MEAN	35.0		26.6		37.7	
HIGHEST ANNUAL MEAN					46.6	2001
LOWEST ANNUAL MEAN					26.6	2003
HIGHEST DAILY MEAN	242	Mar 11	243	Apr 6	(e)520	Feb 11 2001
LOWEST DAILY MEAN	11	Jul 18	7.5	Sep 13	7.5	Sep 13 2003
ANNUAL SEVEN-DAY MINIMUM	12	Jul 16	8.1	Sep 8	8.1	Sep 8 2003
MAXIMUM PEAK FLOW			259	Apr 6	(e)550	Feb 11 2001
MAXIMUM PEAK STAGE			6.08	Apr 6	(a)8.17	Feb 11 2001
ANNUAL RUNOFF (CFSM)	0.73		0.55		0.78	
ANNUAL RUNOFF (INCHES)	9.85		7.48		10.61	
10 PERCENT EXCEEDS	64		51		72	
50 PERCENT EXCEEDS	24		17		28	
90 PERCENT EXCEEDS	13		11		13	

(a) Backwater from ice.
(e) Estimated.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	64	79	132	74	76	237	165	156	108	55	60
2	53	62	80	135	78	73	223	231	156	95	60	64
3	49	64	60	109	90	74	204	281	147	86	65	65
4	58	66	74	118	107	71	240	314	136	82	80	65
5	66	67	70	110	111	66	358	318	129	76	79	60
6	67	69	71	106	115	74	574	288	120	78	85	56
7	64	70	71	89	108	70	923	264	116	76	74	55
8	61	72	77	109	100	78	898	252	114	81	67	52
9	58	69	67	106	91	83	731	255	131	86	69	51
10	57	77	72	106	e84	81	582	262	150	76	64	51
11	59	82	65	83	e81	75	470	267	152	79	60	50
12	56	85	68	99	e78	82	400	316	144	79	61	47
13	57	92	71	85	e75	100	353	388	134	79	60	46
14	59	80	74	99	e69	113	310	440	129	67	55	47
15	63	83	78	88	e66	154	271	471	120	66	58	48
16	58	85	81	88	e63	206	238	441	110	61	58	49
17	58	90	72	81	63	274	212	388	100	59	63	46
18	62	81	88	82	74	366	191	346	94	61	75	44
19	65	87	97	71	71	452	178	316	128	59	86	48
20	68	85	124	77	71	448	174	289	179	61	81	47
21	66	93	130	81	75	401	169	254	193	74	66	45
22	66	92	128	73	75	356	155	226	194	81	68	55
23	64	103	117	74	77	320	160	205	166	84	67	74
24	64	100	106	71	77	295	154	183	131	81	63	86
25	69	90	84	71	69	272	135	180	112	70	58	109
26	69	95	106	73	78	247	137	172	116	64	58	121
27	70	86	90	73	69	226	136	164	139	62	67	118
28	66	88	100	74	73	213	130	169	145	59	68	110
29	73	78	95	74	---	224	127	157	143	57	60	97
30	74	86	105	75	---	233	129	148	122	56	56	85
31	62	---	120	75	---	237	---	152	---	51	59	---
TOTAL	1934	2441	2720	2787	2262	6040	9199	8302	4106	2254	2045	1951
MEAN	62.4	81.4	87.7	89.9	80.8	195	307	268	137	72.7	66.0	65.0
MAX	74	103	130	135	115	452	923	471	194	108	86	121
MIN	49	62	60	71	63	66	127	148	94	51	55	44
CFSM	0.26	0.34	0.36	0.37	0.34	0.81	1.27	1.11	0.57	0.30	0.27	0.27
IN.	0.30	0.38	0.42	0.43	0.35	0.93	1.42	1.28	0.63	0.35	0.32	0.30

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	124	162	193	208	250	407	390	268	190	109	87.6	96.6
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	67691		46041			
ANNUAL MEAN	185		126		(a)210	
HIGHEST ANNUAL MEAN					394	1943
LOWEST ANNUAL MEAN					64.1	1964
HIGHEST DAILY MEAN	1030	Mar 11	923	Apr 7	3560	Apr 7 1947
LOWEST DAILY MEAN	46	Sep 15	44	Sep 18	22	Aug 14 1934
ANNUAL SEVEN-DAY MINIMUM	50	Sep 10	47	Sep 12	25	Aug 10 1936
MAXIMUM PEAK FLOW			973	Apr 7	3640	Apr 7 1947
MAXIMUM PEAK STAGE			2.07	Apr 7	(b)4.48	Apr 7 1947
INSTANTANEOUS LOW FLOW			43	(c)	22	Aug 14 1934
ANNUAL RUNOFF (CFSM)	0.77		0.52		0.87	
ANNUAL RUNOFF (INCHES)	10.45		7.11		11.83	
10 PERCENT EXCEEDS	375		258		423	
50 PERCENT EXCEEDS	109		82		138	
90 PERCENT EXCEEDS	59		58		60	

(a) Does not include water year 1931.
(b) From floodmark.
(c) Sept. 13, 14, 17, 18, 21.
(e) Estimated.

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 mi^2.

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 except for estimated daily discharges, which are fair. Diurnal fluctuation below 1,500 ft^3/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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	316	337	387	533	341	e350	e710	e640	518	328	306	294
2	325	337	379	498	348	e350	e660	e740	493	346	359	340
3	324	341	306	450	402	e320	e640	e800	503	289	335	288
4	384	350	325	442	475	e330	e900	e820	453	335	372	e360
5	389	354	375	431	441	e340	e1200	e810	442	281	378	e320
6	372	363	396	423	417	e340	e1500	e780	454	347	328	e260
7	349	368	382	395	398	e340	e1850	e750	434	413	328	e270
8	341	360	382	417	394	e360	e1550	e740	470	437	336	e265
9	330	363	324	427	367	e370	e1350	e780	470	410	285	263
10	330	417	356	422	376	e360	e1150	e840	481	379	291	258
11	331	412	370	361	345	e350	e1050	e920	470	379	282	256
12	325	407	372	392	319	e370	e980	e1050	496	355	284	247
13	334	413	373	343	344	e460	e860	e1050	461	341	285	236
14	347	406	378	394	344	e540	e800	e1050	442	308	275	234
15	338	427	374	363	344	e600	e750	e1050	422	292	295	250
16	337	420	387	340	e330	e720	e710	e1000	395	284	299	254
17	335	413	369	338	319	e850	e660	e900	378	282	316	252
18	344	e415	413	337	337	e920	e620	e820	370	262	322	237
19	337	436	458	327	344	e1000	e600	e780	416	260	319	234
20	348	423	537	344	345	e1000	e580	e740	459	294	317	226
21	358	443	545	356	e350	e960	e550	e710	465	390	296	222
22	356	446	534	339	e350	e900	e540	e670	453	366	312	e300
23	361	e440	495	e330	e340	e850	e520	615	417	347	289	e360
24	355	e430	460	319	e340	e740	e510	561	371	328	264	e390
25	375	e420	413	335	e330	e720	e500	547	330	307	272	e460
26	376	418	458	337	e340	e690	e490	526	404	289	350	470
27	370	410	430	334	e330	e660	e480	503	377	281	318	456
28	363	408	425	315	e340	e640	e470	501	422	275	302	440
29	373	389	423	338	---	e700	e460	478	377	271	276	406
30	364	396	437	330	---	e800	e470	471	376	264	258	342
31	341	---	492	331	---	e760	---	524	---	257	256	---
TOTAL	10828	11962	12755	11641	10050	18690	24110	23166	13019	9997	9505	9190
MEAN	349	399	411	376	359	603	804	747	434	322	307	306
MAX	389	446	545	533	475	1000	1850	1050	518	437	378	470
MIN	316	337	306	315	319	320	460	471	330	257	256	222
CFSM	0.42	0.48	0.50	0.46	0.44	0.73	0.98	0.91	0.53	0.39	0.37	0.37
IN.	0.49	0.54	0.58	0.53	0.45	0.84	1.09	1.05	0.59	0.45	0.43	0.41

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2003, BY WATER YEAR (WY)

MEAN	498	588	651	677	782	1107	1095	859	680	489	423	431
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1937 - 2003	
ANNUAL TOTAL	264676		164913			
ANNUAL MEAN	725		452		689	
HIGHEST ANNUAL MEAN					1081	1943
LOWEST ANNUAL MEAN					250	1964
HIGHEST DAILY MEAN	2200	Mar 11	(e)1850	Apr 7	7130	Apr 7 1947
LOWEST DAILY MEAN	301	Sep 13	222	Sep 21	86	Aug 5 1964
ANNUAL SEVEN-DAY MINIMUM	306	Sep 12	239	Sep 15	106	Aug 4 1964
MAXIMUM PEAK FLOW			(e)1950	Apr 7	(a)7290	Apr 7 1947
MAXIMUM PEAK STAGE			(b)5.11	Sep 24	(c)7.95	Feb 26 1985
INSTANTANEOUS LOW FLOW			213	(d)	50	Sep 22 1939
ANNUAL RUNOFF (CFSM)	0.88		0.55		0.84	
ANNUAL RUNOFF (INCHES)	11.95		7.45		11.36	
10 PERCENT EXCEEDS	1320		750		1230	
50 PERCENT EXCEEDS	528		376		553	
90 PERCENT EXCEEDS	337		287		300	

(a) Gage height 9.13 ft, site and datum then in use.
(b) Backwater from construction.
(c) Present site and datum.
(d) Sept. 14, 21.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	27	30	46	15	23	39	61	34	24	20	e24
2	23	27	30	40	17	22	37	74	32	23	26	e23
3	23	27	26	36	23	20	36	65	28	22	26	e22
4	33	27	28	33	38	22	72	55	25	21	27	e22
5	41	27	27	32	33	22	107	58	26	22	25	21
6	38	30	27	31	33	24	103	56	27	23	23	20
7	34	29	26	30	29	23	85	51	31	27	25	19
8	32	29	26	31	28	24	68	47	29	33	28	19
9	29	28	24	32	29	23	59	53	31	32	27	19
10	27	41	26	31	28	22	55	55	30	34	25	19
11	26	44	25	29	27	22	50	62	30	32	25	19
12	26	41	25	30	26	24	46	79	33	30	23	18
13	27	38	26	27	26	29	43	75	33	28	22	18
14	26	37	26	28	22	30	39	66	32	27	22	19
15	25	41	27	26	21	37	37	63	30	27	27	23
16	24	40	27	25	17	55	35	58	28	25	26	21
17	24	37	25	24	17	65	34	53	26	23	24	20
18	35	35	34	24	16	70	35	49	25	23	22	19
19	36	36	55	25	17	64	35	45	32	21	20	19
20	33	36	63	25	17	64	36	43	26	21	19	19
21	31	36	58	24	20	73	35	42	24	24	19	19
22	29	40	49	24	24	66	34	38	23	26	20	31
23	28	40	43	e23	25	59	33	36	23	25	19	42
24	26	39	38	e22	24	52	33	35	22	23	18	44
25	29	37	35	e21	23	49	32	36	22	21	18	59
26	32	35	36	e20	23	46	30	34	24	20	25	49
27	31	32	34	19	22	43	32	33	26	20	e22	42
28	28	31	32	17	22	40	29	31	26	20	21	37
29	27	31	32	15	---	43	27	31	26	19	22	35
30	29	32	35	14	---	43	28	30	25	18	22	31
31	29	---	47	14	---	41	---	34	---	18	22	---
TOTAL	906	1030	1042	818	662	1240	1364	1548	829	752	710	792
MEAN	29.2	34.3	33.6	26.4	23.6	40.0	45.5	49.9	27.6	24.3	22.9	26.4
MAX	41	44	63	46	38	73	107	79	34	34	28	59
MIN	23	27	24	14	15	20	27	30	22	18	18	18
CFSM	0.75	0.88	0.86	0.68	0.61	1.03	1.17	1.28	0.71	0.62	0.59	0.68
IN.	0.87	0.98	1.00	0.78	0.63	1.19	1.30	1.48	0.79	0.72	0.68	0.76

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2003, BY WATER YEAR (WY)

MEAN	39.9	45.3	46.7	43.2	46.1	55.9	58.1	47.6	41.9	34.7	33.4	35.4
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	38.5	30.0	23.9	17.4	17.9	17.5
(WY)	1965	1965	1965	2003	2003	2000	2000	1965	1988	1965	1984	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1965 - 2003	
ANNUAL TOTAL	14755		11693			
ANNUAL MEAN	40.4		32.0		44.0	
HIGHEST ANNUAL MEAN					57.5	1975
LOWEST ANNUAL MEAN					30.3	1965
HIGHEST DAILY MEAN	112	Mar 10	107	Apr 5	454	Jun 27 1978
LOWEST DAILY MEAN	19	Jul 6	14	(a)	14	(b)
ANNUAL SEVEN-DAY MINIMUM	20	Jul 2	16	Jan 27	14	Aug 21 1984
MAXIMUM PEAK FLOW			111	Apr 5	560	Jun 27 1978
MAXIMUM PEAK STAGE			2.04	Apr 5	3.41	Jun 27 1978
INSTANTANEOUS LOW FLOW			(c)5.6	Feb 16	(c)5.6	Feb 16 2003
ANNUAL RUNOFF (CFSM)	1.04		0.82		1.13	
ANNUAL RUNOFF (INCHES)	14.11		11.18		15.36	
10 PERCENT EXCEEDS	58		50		66	
50 PERCENT EXCEEDS	39		28		41	
90 PERCENT EXCEEDS	25		20		26	

(a) Jan. 30, 31.
(b) Aug. 24-27, 1984, Jan. 30, 31, 2003.
(c) Result of freezeup.
(e) 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 mi^2, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	536	539	618	691	493	534	1000	782	754	502	389	421
2	527	537	659	773	493	539	1010	982	754	498	432	334
3	486	533	503	759	497	530	994	1080	742	493	597	536
4	521	528	419	687	692	524	1050	1090	640	349	467	544
5	846	532	478	536	772	534	1530	1130	533	455	446	426
6	612	655	682	704	731	537	1850	1160	705	507	515	306
7	453	588	675	690	541	539	1820	1160	743	465	391	408
8	483	492	507	541	471	537	2070	1130	656	672	524	503
9	518	511	516	681	560	544	2170	1130	530	655	546	480
10	521	685	512	676	698	545	1900	1230	715	516	518	395
11	521	661	522	534	596	541	1730	1220	758	524	418	349
12	521	528	530	543	491	546	1450	1420	741	469	351	350
13	521	677	535	568	508	568	1350	1560	730	475	477	340
14	521	663	539	538	519	736	1220	1460	717	549	442	343
15	521	665	545	605	531	804	1110	1480	577	471	346	387
16	521	688	547	587	484	868	1080	1460	530	519	486	395
17	521	692	666	418	456	1070	1040	1400	677	361	444	391
18	526	656	718	495	553	1180	993	1290	585	450	346	303
19	606	527	716	376	545	1340	903	1210	518	454	474	312
20	509	695	722	544	542	1400	891	1090	548	269	441	330
21	519	750	749	547	542	1380	784	1070	708	493	335	304
22	523	657	762	540	545	1380	760	1040	739	569	463	321
23	671	582	771	532	547	1300	773	990	576	543	507	573
24	560	747	762	508	546	1120	776	881	512	521	374	621
25	494	721	702	482	542	1080	775	820	513	372	327	796
26	505	641	538	418	528	1070	764	794	515	318	411	819
27	524	587	703	519	531	1050	755	739	530	482	525	571
28	536	653	706	509	530	1020	663	746	669	516	502	656
29	541	427	538	504	---	988	551	757	569	349	421	726
30	545	437	693	499	---	978	715	756	494	293	411	567
31	545	---	692	494	---	989	---	754	---	436	344	---
TOTAL	16754	18254	19225	17498	15484	26771	34477	33811	18978	14545	13670	13807
MEAN	540	608	620	564	553	864	1149	1091	633	469	441	460
MAX	846	750	771	773	772	1400	2170	1560	758	672	597	819
MIN	453	427	419	376	456	524	551	739	494	269	327	303
CFSM	0.54	0.60	0.61	0.56	0.55	0.86	1.14	1.08	0.63	0.46	0.44	0.46
IN.	0.62	0.67	0.71	0.64	0.57	0.99	1.27	1.25	0.70	0.54	0.50	0.51

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	690	801	861	916	998	1362	1348	1078	877	675	579	583
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	358459		243274			
ANNUAL MEAN	982		667		898	
HIGHEST ANNUAL MEAN					1387	1943
LOWEST ANNUAL MEAN					368	1964
HIGHEST DAILY MEAN	2520	Mar 13	2170	Apr 9	6830	Apr 8 1947
LOWEST DAILY MEAN	419	Dec 4	269	Jul 20	185	Aug 7 1934
ANNUAL SEVEN-DAY MINIMUM	505	Oct 7	337	Sep 16	217	Aug 1 1934
MAXIMUM PEAK FLOW			2240	Apr 8	6910	Apr 8 1947
MAXIMUM PEAK STAGE			6.07	Apr 8	(a)10.94	Apr 8 1947
INSTANTANEOUS LOW FLOW			168	Sep 5	106	Dec 24 1999
ANNUAL RUNOFF (CFSM)	0.97		0.66		0.89	
ANNUAL RUNOFF (INCHES)	13.20		8.96		12.08	
10 PERCENT EXCEEDS	1650		1080		1540	
50 PERCENT EXCEEDS	819		545		751	
90 PERCENT EXCEEDS	523		418		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, 3.03 ft, Apr. 5; minimum, 1.96 ft, Mar. 11.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.20	2.17	2.19	2.17	2.03	2.00	2.08	2.14	2.21	2.12	2.17	2.28
2	2.19	2.16	2.18	2.14	2.03	2.00	2.07	2.14	2.20	2.12	2.21	2.31
3	2.19	2.17	2.17	2.12	2.06	1.99	2.06	2.08	2.20	2.11	2.20	2.28
4	2.26	2.18	2.15	2.11	2.24	1.99	2.63	2.06	2.20	2.14	2.23	2.27
5	2.34	2.19	2.13	2.10	2.15	2.01	2.86	2.25	2.21	2.17	2.22	2.25
6	2.26	2.21	2.12	2.10	2.10	2.00	2.50	2.19	2.21	2.16	2.21	2.24
7	2.23	2.20	2.12	2.10	2.07	1.99	2.34	2.16	2.21	2.19	2.20	2.24
8	2.21	2.19	2.11	2.10	2.05	1.99	2.26	2.45	2.21	2.20	2.20	2.23
9	2.20	2.19	2.10	2.11	2.04	2.01	2.22	2.46	2.22	2.23	2.21	2.23
10	2.19	2.30	2.09	2.10	2.04	1.99	2.21	2.35	2.20	2.20	2.20	2.22
11	2.18	2.26	2.09	2.09	2.04	1.98	2.18	2.30	2.21	2.20	2.28	2.22
12	2.18	2.22	2.09	2.09	2.02	1.98	2.15	2.56	2.21	2.18	2.37	2.22
13	2.21	2.20	2.09	2.08	2.02	2.03	2.14	2.38	2.20	2.16	2.30	2.21
14	2.19	2.19	2.10	2.07	2.01	2.04	2.12	2.26	2.19	2.16	2.27	2.21
15	2.19	2.23	2.10	2.07	2.01	2.09	2.11	2.27	2.18	2.15	2.25	2.22
16	2.18	2.21	2.10	2.06	2.00	2.23	2.10	2.26	2.16	2.15	2.24	2.20
17	2.18	2.19	2.09	2.05	1.99	2.34	2.09	2.22	2.15	2.14	2.22	2.19
18	2.22	2.18	2.20	2.05	1.99	2.33	2.09	2.20	2.15	2.17	2.21	2.17
19	2.22	2.22	2.43	2.06	2.00	2.26	2.09	2.19	2.14	2.16	2.20	2.16
20	2.20	2.21	2.42	2.06	2.00	2.30	2.09	2.19	2.13	2.15	2.20	2.15
21	2.18	2.23	2.30	2.05	2.01	2.32	2.08	2.18	2.12	2.17	2.20	2.14
22	2.18	2.28	2.21	2.04	2.02	2.21	2.06	2.16	2.12	2.17	2.21	2.21
23	2.17	2.23	2.16	2.04	2.02	2.16	2.05	2.16	2.12	2.16	2.19	2.24
24	2.16	2.21	2.14	2.03	2.01	2.12	2.05	2.17	2.11	2.16	2.19	2.29
25	2.19	2.20	2.17	2.03	2.01	2.13	2.05	2.18	2.11	2.15	2.19	2.49
26	2.22	2.19	2.14	2.03	2.01	2.12	2.04	2.18	2.13	2.14	2.20	2.31
27	2.20	2.18	2.12	2.03	2.00	2.09	2.03	2.18	2.15	2.15	2.28	2.27
28	2.18	2.17	2.12	2.02	2.00	2.10	2.03	2.18	2.14	2.15	2.26	2.24
29	2.17	2.17	2.11	2.02	---	2.11	2.02	2.19	2.14	2.14	2.24	2.22
30	2.17	2.19	2.13	2.02	---	2.08	2.05	2.19	2.12	2.14	2.23	2.19
31	2.17	---	2.21	2.02	---	2.07	---	2.22	---	2.14	2.22	---
MEAN	2.20	2.20	2.16	2.07	2.03	2.10	2.16	2.23	2.17	2.16	2.23	2.24
MAX	2.34	2.30	2.43	2.17	2.24	2.34	2.86	2.56	2.22	2.23	2.37	2.49
MIN	2.16	2.16	2.09	2.02	1.99	1.98	2.02	2.06	2.11	2.11	2.17	2.14

CAL YR 2002 MEAN 2.31 MAX 2.82 MIN 2.09
WTR YR 2003 MEAN 2.16 MAX 2.86 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	13	14	15	12	12	17	18	14	12	11	12
2	13	13	14	14	12	12	16	17	14	12	11	12
3	13	14	14	14	15	e11	16	16	14	12	11	11
4	17	14	13	14	19	11	45	15	14	13	11	11
5	17	15	13	13	15	12	48	23	14	14	11	10
6	15	15	13	13	14	12	28	18	14	14	11	10
7	14	15	13	13	13	11	22	18	14	14	10	9.9
8	14	15	13	13	13	12	20	25	14	15	11	9.9
9	14	15	13	14	13	12	19	28	14	14	11	9.7
10	14	17	13	14	13	12	19	23	14	14	10	9.7
11	13	15	13	13	12	11	18	22	14	14	e15	9.6
12	14	14	13	13	12	12	17	32	14	13	15	9.5
13	14	14	13	13	12	13	17	23	14	12	12	9.4
14	13	14	14	13	12	14	16	19	14	12	12	9.7
15	13	15	14	13	12	17	16	20	13	11	11	9.9
16	13	14	14	12	12	22	16	20	13	11	11	9.7
17	13	14	13	12	12	26	16	18	13	11	10	9.4
18	14	14	19	12	12	24	16	17	13	11	10	9.2
19	14	15	26	12	12	21	15	16	13	11	10	9.2
20	13	15	24	12	12	24	16	16	13	11	9.9	9.2
21	14	16	19	12	12	24	16	16	12	11	9.9	9.2
22	13	17	16	12	12	19	15	15	12	11	9.9	13
23	13	15	15	e12	12	17	15	15	12	11	9.6	12
24	13	15	14	12	12	16	15	15	12	11	9.6	e15
25	14	14	15	12	12	17	15	15	12	10	9.5	18
26	14	14	14	12	12	16	15	15	13	10	9.6	14
27	14	14	14	e12	12	16	14	14	13	10	12	13
28	14	14	14	12	11	16	14	14	13	10	10	12
29	13	14	14	12	---	16	14	14	13	10	10	12
30	13	14	15	12	---	15	15	14	13	10	9.9	11
31	13	---	17	12	---	16	---	15	---	9.8	9.8	---
TOTAL	426	437	463	394	354	489	561	566	399	364.8	333.7	329.2
MEAN	13.7	14.6	14.9	12.7	12.6	15.8	18.7	18.3	13.3	11.8	10.8	11.0
MAX	17	17	26	15	19	26	48	32	14	15	15	18
MIN	13	13	13	12	11	11	14	14	12	9.8	9.5	9.2
CFSM	0.83	0.88	0.91	0.77	0.77	0.96	1.13	1.11	0.81	0.71	0.65	0.67
IN.	0.96	0.99	1.04	0.89	0.80	1.10	1.26	1.28	0.90	0.82	0.75	0.74

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 2003, BY WATER YEAR (WY)

MEAN	17.3	18.9	18.2	17.6	18.1	19.9	20.6	19.2	17.3	15.6	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	14.7	15.5	13.3	11.8	10.8	10.7
(WY)	2000	2000	2000	2000	2000	2000	2000	1999	2000	2003	2003	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1983 - 2003	
ANNUAL TOTAL	6241		5116.7			
ANNUAL MEAN	17.1		14.0		17.8	
HIGHEST ANNUAL MEAN					21.2	1991
LOWEST ANNUAL MEAN					12.7	2000
HIGHEST DAILY MEAN	47	Mar 9	48	Apr 5	87	Jun 21 1997
LOWEST DAILY MEAN	12	Jul 18	9.2	(a)	9.2	(a)
ANNUAL SEVEN-DAY MINIMUM	12	Jul 18	9.4	Sep 15	9.4	Sep 15 2003
MAXIMUM PEAK FLOW			62	Apr 4	(b)118	May 31 1989
MAXIMUM PEAK STAGE			3.25	Apr 4	4.11	Jun 21 1997
ANNUAL RUNOFF (CFSM)	1.04		0.85		1.08	
ANNUAL RUNOFF (INCHES)	14.07		11.54		14.64	
10 PERCENT EXCEEDS	22		17		23	
50 PERCENT EXCEEDS	16		13		17	
90 PERCENT EXCEEDS	13		10		13	

(a) Sept. 18-21, 2003.
(b) Gage height 3.87 ft.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	22	27	26	24	21	21	43	32	19	23	30
2	31	21	26	25	24	21	21	39	30	18	25	28
3	31	22	24	24	27	21	21	34	30	18	24	26
4	41	22	23	23	35	21	71	35	31	20	24	24
5	36	23	23	23	28	22	77	48	27	21	23	24
6	34	23	23	23	26	21	45	37	24	21	24	23
7	33	23	23	23	25	21	37	34	24	31	22	23
8	31	23	23	23	23	23	33	49	25	37	27	22
9	32	22	21	23	23	23	31	51	25	34	26	21
10	31	30	21	23	23	22	31	37	24	36	25	21
11	29	26	21	22	22	21	29	43	23	29	52	21
12	30	23	21	22	22	23	28	51	26	24	37	21
13	31	22	21	21	21	25	27	36	23	23	30	21
14	29	22	22	21	21	24	27	36	22	21	28	23
15	29	25	22	21	21	27	26	40	22	22	27	22
16	27	21	22	21	21	31	26	38	22	23	26	21
17	22	21	22	21	21	34	26	36	20	20	25	20
18	21	21	30	21	21	33	26	32	21	21	25	21
19	20	24	38	20	21	30	26	34	21	20	25	21
20	20	23	37	20	21	34	27	32	20	21	24	21
21	19	28	31	20	22	33	27	33	20	24	25	20
22	18	32	28	20	23	28	26	30	20	24	24	34
23	18	29	26	e20	22	25	25	31	19	23	22	28
24	20	28	25	21	21	24	25	31	18	22	23	44
25	22	28	25	21	21	26	25	30	18	21	23	41
26	23	28	24	20	21	24	25	31	25	22	22	30
27	23	27	23	e20	21	23	25	32	21	22	33	28
28	22	27	23	21	21	24	30	31	21	21	24	27
29	23	27	22	21	---	24	28	30	20	20	23	26
30	26	28	24	21	---	21	35	35	19	19	22	24
31	23	---	28	21	---	21	---	32	---	18	23	---
TOTAL	820	741	769	672	642	771	927	1131	693	715	806	756
MEAN	26.5	24.7	24.8	21.7	22.9	24.9	30.9	36.5	23.1	23.1	26.0	25.2
MAX	41	32	38	26	35	34	77	51	32	37	52	44
MIN	18	21	21	20	21	21	21	30	18	18	22	20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2003, BY WATER YEAR (WY)

MEAN	36.9	38.5	38.7	38.1	40.5	45.3	47.8	44.1	40.9	37.9	37.0	36.2
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	21.6	24.7	24.8	20.6	22.9	24.9	30.9	30.4	23.1	23.1	26.0	23.0
(WY)	2000	2003	2003	2001	2003	2003	2003	1977	2003	2003	2003	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1965 - 2003	
ANNUAL TOTAL	12510		9443			
ANNUAL MEAN	34.3		25.9		40.1	
HIGHEST ANNUAL MEAN					51.5	1991
LOWEST ANNUAL MEAN					25.9	2003
HIGHEST DAILY MEAN	79	Mar 9	77	Apr 5	257	May 31 1989
LOWEST DAILY MEAN	18	Oct 22	18	Oct 22	15	Sep 24 1999
ANNUAL SEVEN-DAY MINIMUM	19	Oct 18	19	Jun 28	17	Sep 21 1999
MAXIMUM PEAK FLOW			122	(a)	(b)407	May 30 1989
MAXIMUM PEAK STAGE			1.84	(a)	4.49	Jun 26 1978
INSTANTANEOUS LOW FLOW			17	(c)	(d)8.0	Jan 19 1965
10 PERCENT EXCEEDS	46		34		53	
50 PERCENT EXCEEDS	32		24		39	
90 PERCENT EXCEEDS	23		21		28	

(a) Apr. 4, Aug. 11.
(b) Gage height 3.09 ft.
(c) Feb. 16, Mar. 3.
(d) Result of bridge construction upstream.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106320 WEST FORK PORTAGE CREEK NEAR OSHTEMO, 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 Oshtemo.

DRAINAGE AREA.--13.0 mi^2.

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 except for estimated daily discharges, which are fair. 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	3.0	4.1	4.0	e3.3	e3.4	3.0	3.4	2.1	1.5	0.71	0.76
2	2.3	2.9	4.2	3.9	e3.4	e3.4	2.9	3.7	2.1	1.4	0.78	0.82
3	2.3	2.9	3.9	3.8	3.6	e3.4	2.9	3.7	2.2	1.3	0.82	0.81
4	2.7	2.9	3.6	3.8	4.4	e3.5	5.4	3.6	2.2	1.2	0.92	0.82
5	3.1	2.9	3.6	3.8	4.5	e3.5	8.5	4.4	2.2	1.2	0.92	0.78
6	3.2	3.2	3.6	3.7	4.3	e3.5	8.5	4.1	2.0	1.2	0.89	0.76
7	3.1	3.2	3.6	3.5	4.1	e3.5	7.8	3.9	1.9	1.4	0.88	0.72
8	2.9	3.2	3.6	3.5	4.1	e3.7	7.0	3.9	2.0	1.6	0.85	0.70
9	2.7	3.2	3.4	3.5	3.9	e3.8	6.2	4.1	2.2	1.7	0.84	0.64
10	2.5	4.3	3.1	3.5	e3.8	e3.7	5.5	4.1	2.1	1.7	0.81	0.59
11	2.4	4.6	3.1	3.4	e3.7	e3.5	4.6	4.9	2.0	1.8	0.99	0.55
12	2.3	4.4	3.1	3.4	e3.7	e3.5	3.9	6.5	2.0	1.7	1.1	0.52
13	2.5	4.1	3.1	3.3	e3.6	e3.9	3.7	6.0	2.0	1.6	1.1	0.47
14	2.4	3.9	3.1	3.3	e3.6	e4.3	3.4	5.2	1.9	1.5	1.1	0.46
15	2.4	4.0	3.1	3.2	e3.5	e4.7	3.1	4.9	1.8	1.5	1.1	0.49
16	2.3	3.8	3.1	3.2	e3.5	e5.6	2.9	4.5	1.7	1.4	1.1	0.45
17	2.3	3.8	3.0	3.2	e3.5	e6.8	2.8	4.0	1.6	1.3	1.0	0.43
18	2.7	3.6	3.8	3.2	e3.5	e6.8	2.8	3.6	1.5	1.2	0.96	0.40
19	2.7	3.9	5.5	e3.2	e3.5	e6.5	2.8	3.2	1.7	1.1	0.86	0.40
20	2.7	3.8	6.7	e3.2	e3.5	e6.4	2.9	3.1	1.6	1.0	0.77	0.39
21	2.7	4.1	6.6	e3.2	e3.6	6.6	3.0	2.9	1.5	1.0	0.71	0.34
22	2.7	4.6	5.7	e3.2	e3.7	6.2	2.9	2.6	1.5	0.99	0.68	0.67
23	2.7	4.5	4.8	e3.2	e3.6	5.2	2.7	2.4	1.4	1.0	0.60	0.78
24	2.7	4.2	4.4	e3.2	e3.5	4.7	2.6	2.4	1.3	1.0	0.54	1.1
25	2.9	4.1	5.1	e3.2	e3.5	4.3	2.5	2.2	1.2	0.96	0.49	1.5
26	3.2	3.9	4.9	e3.2	e3.5	3.9	2.5	2.1	1.4	0.91	0.48	1.6
27	3.2	3.7	4.3	e3.2	e3.5	3.7	2.4	2.1	1.4	0.86	0.71	1.8
28	3.2	3.5	4.0	e3.2	e3.5	3.4	2.3	2.0	1.5	0.82	0.58	1.8
29	3.1	3.4	3.8	e3.2	---	3.3	2.2	2.0	1.6	0.76	0.60	1.9
30	3.1	3.6	3.8	e3.2	---	3.2	2.3	1.9	1.6	0.68	0.57	1.8
31	3.1	---	4.0	e3.2	---	3.0	---	2.1	---	0.61	0.56	---
TOTAL	84.4	111.2	125.7	104.8	103.4	134.9	116.0	109.5	53.2	37.89	25.02	25.25
MEAN	2.72	3.71	4.05	3.38	3.69	4.35	3.87	3.53	1.77	1.22	0.81	0.84
MAX	3.2	4.6	6.7	4.0	4.5	6.8	8.5	6.5	2.2	1.8	1.1	1.9
MIN	2.3	2.9	3.0	3.2	3.3	3.0	2.2	1.9	1.2	0.61	0.48	0.34

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 2003, BY WATER YEAR (WY)

MEAN	5.78	6.60	6.66	6.44	6.38	6.87	6.88	5.73	4.86	4.30	4.62	5.08
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	2.93	2.91	3.17	3.32	2.16	1.13	1.20	0.81	0.84
(WY)	2000	2000	2001	2001	2000	2000	2001	2001	1988	1988	2003	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1972 - 2003	
ANNUAL TOTAL	1431.5		1031.26			
ANNUAL MEAN	3.92		2.83		5.81	
HIGHEST ANNUAL MEAN					10.0	1975
LOWEST ANNUAL MEAN					2.82	2000
HIGHEST DAILY MEAN	10	Mar 10	8.5	Apr 5	35	(a)
LOWEST DAILY MEAN	1.5	Jul 8	0.34	Sep 21	0.34	(b)
ANNUAL SEVEN-DAY MINIMUM	1.6	Jul 19	0.41	Sep 15	0.41	Sep 15 2003
MAXIMUM PEAK FLOW			8.8	Apr 5	36	(c)
MAXIMUM PEAK STAGE			1.50	Apr 5	2.47	Dec 5 1992
INSTANTANEOUS LOW FLOW			0.31	(d)	0.20	Jul 27 1996
10 PERCENT EXCEEDS	6.0		4.4		9.4	
50 PERCENT EXCEEDS	3.9		3.1		5.5	
90 PERCENT EXCEEDS	1.9		0.78		2.5	

(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) Sept. 21, 22.
(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, 4.95 ft, Apr. 4, 5; minimum, 4.33 ft, Sept. 21.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.67	4.65	4.71	4.71	4.68	---	4.67	4.68	4.64	4.56	4.44	4.44
2	4.67	4.65	4.71	4.70	4.68	---	4.65	4.71	4.63	4.55	4.46	4.47
3	4.66	4.64	4.71	4.70	4.69	---	4.65	4.68	4.62	4.54	4.45	4.46
4	4.72	4.64	4.70	4.69	4.75	---	4.82	4.67	4.62	4.54	4.47	4.45
5	4.76	4.65	4.70	4.68	4.75	---	4.93	4.74	4.62	4.55	4.46	4.43
6	4.75	4.67	4.69	4.69	4.74	---	4.88	4.73	4.61	4.55	4.46	4.42
7	4.73	4.66	4.68	4.68	4.73	---	4.86	4.72	4.61	4.59	4.45	4.41
8	4.71	4.66	4.68	4.68	4.72	---	4.83	4.72	4.61	4.61	4.45	4.41
9	4.70	4.66	4.67	4.68	4.72	---	4.80	4.77	4.63	4.63	4.46	4.40
10	4.69	4.74	4.67	4.68	---	---	4.78	4.77	4.62	4.62	4.45	4.39
11	4.68	4.74	4.67	4.68	---	---	4.75	4.83	4.62	4.61	4.50	4.39
12	4.68	4.73	4.67	4.68	---	---	4.73	4.91	4.62	4.59	4.57	4.38
13	4.69	4.72	4.67	4.67	---	---	4.71	4.86	4.61	4.58	4.56	4.37
14	4.68	4.71	4.67	4.67	---	---	4.70	4.82	4.61	4.56	4.54	4.37
15	4.67	4.73	4.67	4.67	---	---	4.69	4.83	4.60	4.55	4.54	4.41
16	4.65	4.71	4.67	4.67	---	---	4.67	4.81	4.58	4.54	4.53	4.40
17	4.65	4.70	4.66	4.66	---	---	4.66	4.79	4.58	4.53	4.51	4.39
18	4.70	4.70	4.72	4.66	---	4.66	4.65	4.76	4.57	4.51	4.49	4.38
19	4.69	4.71	4.78	4.67	---	4.68	4.65	4.74	4.59	4.50	4.48	4.37
20	4.68	4.71	4.81	4.67	4.69	4.71	4.65	4.74	4.57	4.48	4.45	4.35
21	4.67	4.72	4.81	4.67	4.68	4.73	4.65	4.71	4.56	4.50	4.44	4.34
22	4.67	4.74	4.78	4.67	4.66	4.72	4.64	4.69	4.54	4.50	4.44	4.42
23	4.66	4.73	4.76	4.67	---	4.71	4.63	4.68	4.53	4.49	4.42	4.48
24	4.65	4.72	4.74	4.67	---	4.70	4.62	4.67	4.52	4.51	4.41	4.50
25	4.67	4.72	4.76	4.67	---	4.71	4.61	4.66	4.51	4.50	4.39	4.58
26	4.69	4.71	4.75	4.66	---	4.70	4.60	4.65	4.54	4.48	4.39	4.57
27	4.68	4.70	4.73	4.66	---	4.69	4.60	4.64	4.56	4.47	4.46	4.56
28	4.68	4.69	4.72	4.66	---	4.69	4.59	4.63	4.57	4.47	4.45	4.56
29	4.66	4.69	4.72	4.67	---	4.68	4.58	4.63	4.59	4.46	4.44	4.55
30	4.66	4.70	4.71	4.67	---	4.67	4.60	4.62	4.58	4.45	4.43	4.53
31	4.66	---	4.72	4.67	---	4.66	---	4.65	---	4.44	4.41	---
MEAN	4.68	4.70	4.71	4.68	---	---	4.70	4.73	4.59	4.53	4.46	4.44
MAX	4.76	4.74	4.81	4.71	---	---	4.93	4.91	4.64	4.63	4.57	4.58
MIN	4.65	4.64	4.66	4.66	---	---	4.58	4.62	4.51	4.44	4.39	4.34

CAL YR 2002 MEAN 4.88 MAX 5.47 MIN 4.59

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 mi^2.

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 good except for estimated daily discharges, which are 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.8	5.1	5.5	6.4	e5.2	e5.3	5.0	6.8	3.7	2.6	1.0	2.1
2	3.8	5.0	5.8	6.1	6.0	e5.2	4.8	6.9	3.5	2.4	1.6	2.1
3	3.8	4.7	5.9	6.0	6.8	e5.2	4.7	6.3	3.6	2.2	1.6	1.6
4	4.8	4.6	5.5	5.7	8.8	e5.3	9.9	6.0	3.6	2.1	1.7	1.4
5	5.8	4.7	5.5	5.5	8.8	e5.3	15	8.1	3.7	2.2	1.5	1.2
6	5.5	5.1	5.3	5.6	e8.0	e5.3	13	7.4	3.6	2.3	1.3	1.1
7	5.2	5.1	5.3	e5.6	e7.0	e5.3	12	6.6	3.5	3.1	1.3	1.1
8	5.1	5.0	5.4	5.5	e6.3	e5.4	11	6.4	3.5	3.5	1.4	1.1
9	4.9	5.0	5.4	5.5	e6.0	e5.6	9.2	7.6	3.6	3.7	1.3	1.0
10	4.7	5.9	5.1	5.3	e5.8	e5.5	8.5	7.7	3.6	3.4	1.2	1.0
11	4.6	6.0	5.1	5.4	e5.7	e5.4	7.6	9.5	3.5	3.3	1.9	0.91
12	4.5	5.7	4.9	5.3	e5.6	e5.6	6.9	13	3.6	2.9	2.2	0.75
13	4.7	5.5	4.9	5.2	e5.5	5.9	6.4	11	3.4	2.5	1.9	0.73
14	4.6	5.6	5.0	5.1	e5.4	6.4	6.0	9.4	3.3	2.2	1.8	1.00
15	4.5	5.6	5.1	e5.0	e5.4	7.2	5.8	9.5	3.1	2.2	1.8	1.2
16	4.4	5.5	5.0	e5.0	e5.3	9.0	5.4	8.9	3.0	2.0	1.7	1.1
17	4.5	5.5	4.9	e4.9	e5.3	10	5.4	7.6	2.7	1.9	1.6	0.87
18	5.0	5.4	6.3	e4.9	e5.3	10	5.4	6.6	2.6	2.0	1.4	0.72
19	5.0	5.5	8.9	e4.9	e5.3	9.1	5.1	6.2	2.5	1.8	1.2	0.75
20	4.8	5.5	11	e4.9	e5.3	9.4	5.3	6.0	2.2	1.6	1.0	0.59
21	4.6	5.8	11	e4.9	e5.4	9.4	5.5	5.5	2.1	1.8	e0.73	0.47
22	4.6	6.3	9.4	e4.9	e5.6	8.6	5.2	5.0	1.8	1.8	e0.90	1.4
23	4.6	6.3	8.1	e4.9	e5.5	7.8	4.9	4.7	1.6	1.6	e1.2	1.7
24	4.6	6.0	7.0	e4.9	e5.4	7.3	4.8	4.6	1.5	1.7	e1.2	2.0
25	5.0	5.9	7.6	e4.9	e5.4	7.0	4.7	4.5	1.4	1.5	e1.1	2.4
26	5.5	5.6	e7.6	e4.9	e5.4	6.4	4.6	4.3	2.0	1.4	e1.5	2.0
27	5.4	5.5	e6.8	e4.9	e5.4	6.1	4.4	4.0	2.2	1.4	e2.0	2.1
28	5.3	5.5	6.5	e4.9	e5.4	5.9	4.3	3.8	2.5	1.3	1.5	2.3
29	5.2	5.5	6.2	e4.9	---	5.8	4.1	3.7	3.0	1.0	1.2	2.6
30	5.1	5.5	6.1	e4.9	---	5.1	4.6	3.6	2.9	0.89	1.2	2.6
31	5.1	---	6.6	e4.9	---	4.8	---	3.8	---	0.68	1.3	---
TOTAL	149.0	163.9	198.7	161.7	166.3	205.6	199.5	205.0	86.8	64.97	44.23	41.89
MEAN	4.81	5.46	6.41	5.22	5.94	6.63	6.65	6.61	2.89	2.10	1.43	1.40
MAX	5.8	6.3	11	6.4	8.8	10	15	13	3.7	3.7	2.2	2.6
MIN	3.8	4.6	4.9	4.9	5.2	4.8	4.1	3.6	1.4	0.68	0.73	0.47

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2003, BY WATER YEAR (WY)

MEAN	8.97	9.77	9.95	9.47	9.82	11.0	11.1	9.40	8.24	7.13	7.07	7.88
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	3.08	3.30	3.78	4.71	2.94	2.36	1.74	1.43	1.31
(WY)	2000	2000	2001	2001	2000	2000	2001	2001	1988	2000	2003	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1959 - 2003	
ANNUAL TOTAL	2278.5		1687.59			
ANNUAL MEAN	6.24		4.62		9.14	
HIGHEST ANNUAL MEAN					14.1	1975
LOWEST ANNUAL MEAN					3.33	2000
HIGHEST DAILY MEAN	17	Mar 10	15	Apr 5	40	(a)
LOWEST DAILY MEAN	1.9	Sep 14	0.47	Sep 21	0.34	Sep 27 1999
ANNUAL SEVEN-DAY MINIMUM	2.0	Sep 11	0.81	Sep 15	0.57	Sep 21 1999
MAXIMUM PEAK FLOW			16	Apr 5	46	Jun 21 1997
MAXIMUM PEAK STAGE			2.68	Apr 5	3.33	Jun 21 1997
INSTANTANEOUS LOW FLOW			0.23	Sep 21	0.23	Sep 21 2003
10 PERCENT EXCEEDS	9.7		7.5		14	
50 PERCENT EXCEEDS	6.3		5.0		8.9	
90 PERCENT EXCEEDS	2.6		1.4		4.2	

(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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	655	706	765	806	655	635	1200	1120	888	648	557	637
2	655	700	960	959	662	644	1180	1160	883	648	423	547
3	660	696	757	947	687	e630	1160	1270	887	639	665	e640
4	621	696	653	921	879	626	1590	1260	881	585	695	e740
5	977	704	e580	735	936	648	1900	1490	696	451	360	659
6	1080	760	769	781	895	644	2220	1390	757	682	660	429
7	692	896	945	944	823	646	2140	1380	913	735	428	436
8	688	674	726	729	e600	649	2230	1370	903	816	546	630
9	680	679	679	767	681	671	2550	1500	736	995	653	e650
10	681	878	675	931	743	655	2420	1520	779	748	588	e570
11	676	983	678	706	834	647	2070	1660	949	721	689	e470
12	675	747	685	694	635	656	1800	1870	963	686	613	e460
13	699	770	695	718	623	715	1580	1920	917	499	476	e450
14	685	953	704	709	636	783	1450	1740	891	700	618	e470
15	682	840	711	735	634	980	1310	1800	811	628	447	e520
16	679	958	714	835	641	1040	1240	1760	634	627	489	540
17	674	857	742	e560	e560	1250	1210	1710	701	615	645	491
18	752	962	980	e620	656	1340	1150	1530	827	373	452	458
19	767	781	1050	e540	660	1460	1110	1470	637	645	503	396
20	698	806	1030	e700	659	1690	972	1330	642	373	679	419
21	674	1010	980	691	661	1690	999	1250	732	465	508	429
22	679	1030	976	676	664	1630	872	1220	921	754	491	541
23	736	778	975	719	668	1590	872	1170	842	694	629	663
24	842	e860	972	751	661	1410	877	1120	633	669	580	942
25	672	e960	963	735	658	1310	877	894	645	581	396	1010
26	686	e880	765	e600	644	1280	869	1010	717	336	451	1090
27	684	738	781	e680	635	1250	854	865	732	424	714	860
28	701	916	954	742	636	1220	854	860	783	626	696	714
29	707	718	761	646	---	1190	673	872	918	537	667	891
30	712	725	781	639	---	1160	782	880	651	293	510	816
31	715	---	1010	645	---	1170	---	925	---	355	506	---
TOTAL	22184	24661	25416	22861	19326	31909	41011	41316	23869	18548	17334	18568
MEAN	716	822	820	737	690	1029	1367	1333	796	598	559	619
MAX	1080	1030	1050	959	936	1690	2550	1920	963	995	714	1090
MIN	621	674	580	540	560	626	673	860	633	293	360	396
CFSM	0.57	0.65	0.65	0.59	0.55	0.82	1.08	1.06	0.63	0.47	0.44	0.49
IN.	0.65	0.73	0.75	0.67	0.57	0.94	1.21	1.22	0.70	0.55	0.51	0.55

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

MEAN	1157	1178	1172	1031	1587	1657	1555	1704	1223	782	881	775
MAX	1811	1592	1581	1355	2466	2003	1748	2086	1749	924	1087	1059
(WY)	2002	2002	2002	2002	2001	2001	2002	2001	2001	2001	2001	2001
MIN	716	822	820	737	690	1029	1367	1333	796	598	559	619
(WY)	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 2001 - 2003	
ANNUAL TOTAL	433896		307003			
ANNUAL MEAN	1189		841		1223	
HIGHEST ANNUAL MEAN					1417	2001
LOWEST ANNUAL MEAN					841	2003
HIGHEST DAILY MEAN	2890	Mar 14	2550	Apr 9	4510	Feb 15 2001
LOWEST DAILY MEAN	547	Sep 19	293	Jul 30	293	Jul 30 2003
ANNUAL SEVEN-DAY MINIMUM	598	Sep 13	447	Jul 26	447	Jul 26 2003
MAXIMUM PEAK FLOW			2580	Apr 9	4580	Feb 15 2001
MAXIMUM PEAK STAGE			2.69	Apr 9	4.17	Feb 15 2001
ANNUAL RUNOFF (CFSM)	0.94		0.67		0.97	
ANNUAL RUNOFF (INCHES)	12.81		9.06		13.18	
10 PERCENT EXCEEDS	1840		1290		2000	
50 PERCENT EXCEEDS	1080		719		1120	
90 PERCENT EXCEEDS	657		539		642	

(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 2002 TO SEPTEMBER 2003

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 2002					
07...	1215	733	15.3	72	19
29...	0810	743	8.0	68	33
NOV					
19...	1315	725	6.6	80	11
DEC					
12...	1050	803	2.2	63	16
JAN 2003					
06...	1145	744	2.3	47	39
23...	1015	838	.1	72	40
FEB					
10...	1100	820	.3	29	57
MAR					
06...	1050	845	1.0	59	29
17...	1000	755	6.1	65	24
24...	1040	627	7.3	80	11
APR					
09...	0740	558	3.1	53	31
11...	0840	574	6.7	75	15
11...	0845	574	6.7	79	14
29...	0930	762	15.9	90	14
MAY					
12...	0855	--	13.0	80	32
JUN					
24...	0755	783	22.8	80	30
JUL					
15...	1205	711	23.2	80	27
AUG					
08...	0710	728	22.9	92	22
21...	1100	719	25.0	83	24
SEP					
23...	1010	673	16.9	96	16

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	863	921	982	1160	e890	e860	1560	1530	1270	845	764	711
2	854	915	1150	1250	e900	e870	1540	1790	1240	838	735	768
3	860	909	1020	1240	e1000	e860	1530	1810	1230	827	831	685
4	790	905	e880	1210	e1200	e850	2460	1750	1220	819	949	882
5	1070	910	e800	1080	e1280	e880	3380	2050	1080	705	769	808
6	1260	943	e1050	1020	e1200	e870	3130	2040	1040	866	846	701
7	910	1080	e1200	1220	e1100	e880	2910	1930	1210	944	782	632
8	892	926	1010	1070	e850	e890	2750	1870	1200	941	773	728
9	887	892	918	1010	e930	e900	2940	2030	1090	1190	905	780
10	886	1060	919	e1200	e1000	e890	2970	2120	1030	1020	857	753
11	886	1240	920	e990	e1100	e880	2640	2360	1230	943	857	662
12	885	1070	929	e970	e860	e900	2390	3010	1250	914	973	655
13	905	990	937	985	e840	e980	2100	2910	1230	805	758	640
14	898	1160	e940	998	e860	1020	1980	2540	1200	883	854	646
15	897	1100	955	976	e860	1300	1820	2460	1150	886	759	690
16	897	1170	959	1120	e850	1570	1680	2400	966	809	711	723
17	893	1090	e960	e760	e830	1910	1660	2290	968	832	826	694
18	968	1160	1180	e840	e890	1990	1610	2070	1130	667	724	685
19	959	1050	1370	e780	e890	1970	1560	1950	949	811	671	620
20	1000	991	1380	e860	e890	2150	1420	1880	928	723	788	627
21	929	1190	1320	e960	e900	2240	1480	1760	947	664	707	634
22	928	1270	1290	e910	e900	2130	1290	1700	1120	924	684	675
23	931	1080	1270	e980	e900	2050	1280	1630	1080	911	780	830
24	1080	1110	1260	e1020	e900	1840	1270	1570	888	879	771	992
25	917	1190	1250	e1000	e890	1760	1260	1370	870	834	649	1170
26	927	1170	1110	e850	e880	1720	1240	1420	872	667	651	1260
27	914	1030	1020	e940	e870	1660	1230	1270	944	e680	779	1100
28	923	1090	1210	e1000	e860	1620	1200	1260	907	e820	826	912
29	926	1010	1120	e880	---	1580	1060	1250	1100	797	803	1060
30	928	955	1020	e860	---	1540	1060	1250	872	636	705	1040
31	930	---	1340	e870	---	1530	---	1310	---	617	710	---
TOTAL	28793	31577	33669	31009	26320	43090	56400	58580	32211	25697	24197	23763
MEAN	929	1053	1086	1000	940	1390	1880	1890	1074	829	781	792
MAX	1260	1270	1380	1250	1280	2240	3380	3010	1270	1190	973	1260
MIN	790	892	800	760	830	850	1060	1250	870	617	649	620
CFSM	0.61	0.69	0.71	0.65	0.61	0.91	1.23	1.24	0.70	0.54	0.51	0.52
IN.	0.70	0.77	0.82	0.75	0.64	1.05	1.37	1.42	0.78	0.62	0.59	0.58

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

MEAN	1580	1579	1591	1467	2100	2182	2057	2292	1590	998	1098	1026
MAX	2532	2062	2100	1935	3097	2710	2307	2532	2176	1170	1286	1407
(WY)	2002	2002	2002	2002	2001	2002	2002	2001	2001	2001	2001	2001
MIN	929	1053	1086	1000	940	1390	1880	1890	1074	829	781	792
(WY)	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 2001 - 2003	
ANNUAL TOTAL	587520		415306			
ANNUAL MEAN	1610		1138		1627	
HIGHEST ANNUAL MEAN					1915	2002
LOWEST ANNUAL MEAN					1138	2003
HIGHEST DAILY MEAN	4400	Mar 10	3380	Apr 5	5050	Feb 15 2001
LOWEST DAILY MEAN	702	Sep 15	617	Jul 31	617	Jul 31 2003
ANNUAL SEVEN-DAY MINIMUM	820	Sep 13	665	Sep 16	665	Sep 16 2003
MAXIMUM PEAK FLOW			3530	Apr 5	5150	Feb 15 2001
MAXIMUM PEAK STAGE			9.87	Apr 5	11.07	Feb 15 2001
ANNUAL RUNOFF (CFSM)	1.05		0.74		1.06	
ANNUAL RUNOFF (INCHES)	14.28		10.10		14.45	
10 PERCENT EXCEEDS	2630		1810		2640	
50 PERCENT EXCEEDS	1370		966		1500	
90 PERCENT EXCEEDS	880		756		866	

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--June 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. 25-29, Nov. 10-19, Dec. 10-30, May 30 to June 9 rated good. 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, 891 microsiemens, Feb. 3; minimum, 472 microsiemens, Apr. 5.
WATER TEMPERATURE: Maximum, 27.5°C, July 4, Aug. 16, 21; minimum, 0.0°C, on many days during winter period.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	679	651	663	703	677	692	714	673	692	742	720	727
2	693	659	675	700	681	691	716	701	710	739	715	724
3	694	665	678	700	677	689	717	687	702	723	704	714
4	679	636	657	703	677	690	738	717	727	734	716	726
5	680	569	632	707	685	698	741	703	720	734	713	724
6	647	599	629	703	686	695	772	726	749	748	723	736
7	695	626	658	703	691	696	726	713	719	784	748	769
8	705	676	690	713	683	694	748	704	720	772	731	744
9	701	669	683	724	706	716	760	728	746	768	736	751
10	698	662	679	712	660	687	760	728	743	772	745	757
11	698	672	686	685	631	655	760	727	740	777	740	752
12	693	663	677	675	661	666	768	739	755	794	753	773
13	686	652	670	692	673	681	769	747	759	792	762	777
14	694	665	680	695	673	685	767	750	758	779	759	767
15	701	668	685	679	658	666	759	736	747	772	753	763
16	715	680	697	680	665	671	749	731	739	772	763	768
17	715	685	699	669	655	661	746	728	737	781	756	764
18	706	675	691	678	667	672	742	721	735	834	781	809
19	696	648	675	677	661	668	742	685	710	801	756	776
20	696	662	674	683	663	674	700	674	686	819	767	792
21	700	665	681	677	653	665	702	667	684	833	769	798
22	702	676	691	654	634	645	789	699	747	841	784	813
23	713	682	697	669	642	650	757	682	713	865	806	832
24	716	682	696	678	662	669	705	679	691	844	784	805
25	713	665	688	662	641	652	707	679	691	810	778	790
26	717	691	706	662	647	656	692	670	683	811	760	777
27	714	684	698	681	650	664	733	692	710	825	776	801
28	715	687	700	694	676	686	724	691	713	829	789	806
29	712	685	697	676	658	668	697	679	688	816	758	784
30	700	683	693	697	673	685	737	692	714	869	795	824
31	699	677	690	---	---	---	750	722	735	860	803	830
MONTH	717	569	681	724	631	676	789	667	721	869	704	773

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	860	776	805	806	758	787	646	629	639	686	613	659
2	886	832	857	808	764	786	652	635	643	630	575	605
3	891	777	814	798	759	779	649	629	640	640	628	636
4	825	764	796	790	743	763	629	478	558	628	614	619
5	826	772	792	760	723	741	535	472	501	616	560	595
6	838	775	801	794	725	748	579	535	564	596	560	583
7	798	758	777	817	750	784	590	562	578	614	588	603
8	805	760	775	810	763	779	580	562	571	619	602	611
9	871	779	818	888	737	784	566	550	557	620	600	614
10	797	749	769	886	773	807	560	550	557	605	585	595
11	797	754	779	793	748	763	569	553	566	605	543	581
12	817	759	786	775	750	761	582	569	578	543	503	515
13	808	755	781	789	752	770	605	578	596	553	515	541
14	819	772	796	832	768	800	617	591	608	586	553	574
15	821	760	786	803	674	746	633	608	625	602	584	595
16	829	783	804	674	615	654	644	621	637	612	599	605
17	812	739	778	689	615	654	641	624	633	629	610	620
18	806	761	781	651	614	634	651	638	646	638	617	630
19	777	750	765	614	573	600	651	634	643	627	605	619
20	804	755	774	573	531	558	653	632	642	623	618	620
21	806	757	781	549	530	540	655	641	649	638	608	623
22	801	748	774	542	530	536	661	637	651	656	636	645
23	777	742	760	552	530	543	668	646	658	671	653	662
24	771	727	751	576	547	564	668	649	660	657	647	653
25	783	746	760	583	568	577	665	651	660	659	646	652
26	821	733	776	607	577	589	670	653	662	675	657	665
27	809	758	778	629	602	617	674	651	663	675	660	668
28	806	762	779	640	613	627	678	658	668	675	666	671
29	---	---	---	660	634	647	687	661	672	675	664	669
30	---	---	---	647	634	640	693	678	687	673	661	667
31	---	---	---	650	635	642	---	---	---	669	656	664
MONTH	891	727	785	888	530	685	693	472	620	686	503	621

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	668	655	662	702	678	691	595	537	565	680	657	667
2	676	664	669	703	685	695	567	532	551	694	635	659
3	683	663	673	703	677	689	623	565	591	689	643	664
4	702	682	695	693	668	681	614	575	583	711	689	705
5	702	677	688	693	648	670	587	559	570	699	665	684
6	691	674	684	711	664	692	669	580	631	707	688	698
7	696	686	690	682	637	660	646	609	622	745	703	722
8	696	682	690	663	625	646	669	625	654	759	724	742
9	697	672	686	670	632	652	657	618	644	742	681	711
10	705	684	695	668	650	657	676	617	644	711	670	689
11	708	700	704	660	626	646	676	648	661	690	662	675
12	701	677	690	673	643	657	670	539	608	755	677	724
13	719	683	700	675	647	663	676	539	605	756	702	729
14	728	705	717	697	668	685	693	676	687	757	698	728
15	724	698	707	674	647	661	699	666	679	747	671	709
16	716	691	702	698	634	661	736	697	707	722	687	706
17	730	705	716	---	---	---	737	685	711	729	703	713
18	730	708	719	---	---	---	698	659	677	742	711	726
19	721	704	711	---	---	---	725	670	696	737	718	724
20	727	712	720	---	---	---	755	702	731	791	737	764
21	727	684	704	---	---	---	707	678	692	776	717	749
22	703	696	700	---	---	---	729	698	718	755	705	735
23	706	693	699	---	---	---	735	699	713	740	628	688
24	735	704	718	---	---	---	707	669	687	689	637	675
25	750	732	739	---	---	---	690	643	669	684	584	645
26	751	738	746	---	---	---	717	652	696	654	585	634
27	738	669	700	---	---	---	730	692	708	668	642	654
28	706	669	688	---	---	---	729	652	682	668	627	647
29	696	663	680	558	533	547	677	653	665	657	644	650
30	678	658	664	557	493	529	673	643	659	666	638	650
31	---	---	---	594	512	560	706	665	688	---	---	---
MONTH	751	655	699	---	---	---	755	532	658	791	584	696

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

TEMPERATURE, WATER, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	21.5	19.0	20.5	7.5	6.5	7.0	3.0	2.0	2.0	3.0	1.5	2.0
2	21.5	20.5	21.0	6.5	6.0	6.0	2.0	1.0	1.5	2.0	1.5	1.5
3	20.5	18.0	19.0	7.0	5.5	6.5	1.0	0.0	0.0	2.0	1.5	2.0
4	18.5	17.5	18.5	7.5	6.5	7.0	1.0	0.0	0.5	2.5	1.5	2.0
5	18.0	17.0	17.5	7.0	6.0	6.0	1.5	0.5	1.0	2.5	2.0	2.5
6	17.0	15.5	16.5	6.0	5.5	6.0	1.5	1.0	1.5	2.5	2.0	2.5
7	15.5	14.0	15.0	7.0	6.0	6.5	2.0	1.0	1.5	2.0	1.5	1.5
8	15.0	13.0	14.0	8.5	6.5	7.5	2.0	1.0	1.5	3.5	2.0	2.5
9	15.0	13.0	14.0	10.0	8.0	9.0	1.0	0.0	0.5	3.5	3.0	3.0
10	15.5	13.0	14.5	11.5	10.0	11.0	2.0	0.0	1.0	3.0	1.0	2.0
11	16.0	13.5	15.0	11.5	9.5	10.5	2.5	1.0	2.0	1.0	0.5	1.0
12	16.0	14.5	15.5	9.5	8.0	9.0	3.0	1.5	2.5	1.5	0.5	1.0
13	15.5	13.0	14.5	8.5	7.5	8.0	3.5	3.0	3.5	1.0	0.5	0.5
14	13.0	11.5	12.5	9.5	8.5	9.0	3.5	3.5	3.5	1.0	0.5	0.5
15	13.0	11.0	12.0	9.0	7.0	8.0	3.5	2.5	3.0	0.5	0.0	0.5
16	12.5	11.0	12.0	7.0	5.0	6.0	3.5	2.0	2.5	0.5	0.0	0.0
17	11.5	9.5	10.0	5.0	4.0	5.0	2.5	1.5	2.0	0.5	0.0	0.0
18	10.5	9.5	10.0	5.0	4.5	4.5	4.5	2.5	3.5	0.0	0.0	0.0
19	10.5	10.0	10.0	6.5	5.0	6.0	5.5	4.5	5.5	0.0	0.0	0.0
20	10.5	9.5	10.0	7.0	6.0	6.5	5.5	3.0	4.0	0.0	0.0	0.0
21	9.5	8.5	9.0	7.0	5.5	6.5	3.0	2.0	2.5	0.0	0.0	0.0
22	9.5	9.0	9.5	5.5	5.0	5.5	2.5	2.5	2.5	0.5	0.0	0.0
23	9.5	9.0	9.0	5.5	5.0	5.0	2.5	2.0	2.5	0.0	0.0	0.0
24	9.0	8.5	9.0	5.5	5.0	5.5	2.5	2.0	2.0	0.0	0.0	0.0
25	8.5	8.0	8.0	5.0	4.5	4.5	2.0	1.0	1.5	0.0	0.0	0.0
26	9.0	8.0	8.5	4.5	3.5	4.0	2.0	1.5	1.5	0.0	0.0	0.0
27	9.5	8.5	9.0	3.5	2.5	3.0	2.0	1.0	1.5	0.0	0.0	0.0
28	9.5	8.5	9.0	3.0	2.5	3.0	2.0	1.0	1.5	0.0	0.0	0.0
29	9.0	7.5	8.0	4.0	2.5	3.0	2.5	1.5	2.0	0.0	0.0	0.0
30	8.5	7.0	7.5	4.0	3.0	3.5	4.0	2.5	3.0	0.0	0.0	0.0
31	8.0	7.0	7.5	---	---	---	4.0	3.0	3.5	1.0	0.0	0.5
MONTH	21.5	7.0	12.5	11.5	2.5	6.3	5.5	0.0	2.2	3.5	0.0	0.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	2.5	1.0	2.0	3.5	2.0	3.0	11.5	8.0	9.5	16.5	15.5	16.0
2	3.0	2.0	2.5	3.5	2.0	3.0	13.0	10.0	11.0	17.0	15.0	16.0
3	3.0	2.5	2.5	2.0	0.0	0.5	11.5	10.0	11.0	17.0	14.5	15.5
4	3.0	1.0	2.0	2.0	0.5	1.0	10.0	6.5	8.5	16.5	14.5	15.5
5	1.0	0.5	0.5	2.5	0.5	1.5	6.5	5.5	6.0	16.5	15.0	15.5
6	1.0	0.0	0.5	3.5	1.0	2.5	7.0	5.0	6.0	17.5	15.5	16.0
7	1.5	0.5	1.0	3.0	1.5	2.0	6.5	4.5	5.0	16.5	15.5	16.0
8	0.5	0.0	0.0	3.5	2.5	3.0	4.5	3.5	4.0	16.0	15.5	16.0
9	1.0	0.0	0.5	3.0	1.0	1.5	6.0	3.5	4.5	18.0	15.0	16.5
10	1.0	0.5	0.5	1.5	0.0	0.5	7.5	5.0	6.0	18.5	17.0	17.5
11	0.5	0.0	0.0	3.5	0.5	1.5	10.0	7.0	8.5	18.0	14.5	16.5
12	0.0	0.0	0.0	6.0	3.0	4.5	11.0	9.0	10.0	14.5	12.0	13.0
13	0.0	0.0	0.0	6.0	4.0	5.0	12.5	9.5	11.0	14.5	11.5	13.0
14	1.0	0.0	0.5	5.5	3.0	4.5	15.0	11.0	13.0	14.0	13.0	13.5
15	1.5	0.5	0.5	7.0	4.0	5.5	17.0	14.0	15.5	14.0	13.5	13.5
16	0.5	0.0	0.0	8.0	5.0	6.5	16.0	13.5	15.5	14.5	13.0	13.5
17	1.0	0.0	0.5	8.5	6.0	7.0	13.5	12.0	12.5	16.5	14.0	15.0
18	2.0	1.0	1.5	7.0	6.0	7.0	13.0	11.5	12.5	18.5	15.0	16.5
19	3.0	1.5	2.0	6.5	5.5	6.0	15.5	12.0	14.0	18.5	17.0	18.0
20	4.0	2.0	3.0	7.0	6.0	6.5	16.0	15.0	15.5	18.0	17.0	17.5
21	4.0	2.5	3.0	7.0	6.0	6.5	15.0	12.5	14.0	18.0	15.5	16.5
22	3.5	3.0	3.0	6.0	5.5	6.0	13.5	11.0	12.0	18.5	15.5	17.0
23	3.0	1.0	2.0	8.0	6.0	6.5	14.0	11.0	12.5	17.0	15.0	16.0
24	2.0	1.0	1.5	9.5	7.0	8.5	14.0	11.5	13.0	15.0	14.5	15.0
25	2.0	0.5	1.0	11.0	9.5	10.0	15.5	12.5	14.0	15.5	14.0	15.0
26	2.5	0.5	1.5	10.5	9.0	10.0	16.0	12.5	14.0	16.5	14.5	15.5
27	3.0	0.5	1.5	11.0	9.0	10.0	16.5	13.0	14.5	18.0	14.5	16.0
28	3.5	1.0	2.0	11.5	10.5	11.0	18.0	15.0	16.0	17.5	15.5	16.5
29	---	---	---	11.0	8.0	9.5	18.0	15.5	16.5	19.5	16.0	17.5
30	---	---	---	9.0	7.0	8.0	17.0	15.5	16.0	18.5	16.5	17.0
31	---	---	---	9.0	7.0	8.0	---	---	---	17.0	16.0	16.5
MONTH	4.0	0.0	1.3	11.5	0.0	5.4	18.0	3.5	11.4	19.5	11.5	15.8

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

TEMPERATURE, WATER, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	18.0	15.0	16.5	26.0	21.0	23.0	24.5	22.5	23.5	20.5	19.0	19.5
2	18.5	15.0	17.0	26.0	22.0	24.0	25.0	22.0	23.5	22.0	18.5	20.0
3	18.0	17.0	17.0	26.0	22.5	24.5	24.0	22.0	23.5	22.0	19.5	20.5
4	17.0	15.0	16.0	27.5	24.0	25.5	23.5	21.5	22.5	21.0	19.0	20.0
5	17.0	14.5	15.5	26.5	24.0	25.5	24.5	21.5	23.0	20.5	17.5	19.0
6	17.5	15.0	16.5	26.5	23.5	25.0	25.0	22.0	23.5	21.5	17.5	19.5
7	20.0	16.5	18.0	26.0	24.0	25.0	25.5	22.5	24.0	22.0	19.0	20.5
8	19.5	18.0	18.5	25.5	24.0	24.5	24.5	22.5	23.5	22.5	19.5	21.0
9	20.5	16.5	18.5	25.5	23.5	24.5	25.0	22.5	23.5	23.5	20.5	21.5
10	19.5	18.0	19.0	25.0	23.5	24.5	25.5	22.5	24.0	23.0	20.0	21.5
11	22.0	18.5	20.0	24.0	21.5	22.0	24.0	22.0	23.0	23.5	20.5	22.0
12	20.5	19.0	19.5	23.5	20.0	21.5	23.0	21.5	22.5	23.0	20.5	22.0
13	20.5	18.5	19.5	25.0	20.5	22.5	25.0	21.0	23.0	23.5	21.0	22.0
14	22.5	19.0	20.5	25.0	21.5	23.0	26.5	22.5	24.5	22.5	21.0	21.5
15	23.5	20.0	21.5	24.0	22.0	23.0	27.0	24.5	25.5	22.0	20.0	20.5
16	23.5	20.5	22.0	25.0	21.0	23.0	27.5	24.5	26.0	21.5	18.5	20.0
17	24.0	21.0	22.5	---	---	---	26.5	23.5	25.0	22.0	18.5	20.0
18	24.5	21.0	22.5	---	---	---	26.0	22.5	24.5	22.0	19.0	20.5
19	24.0	21.5	23.0	---	---	---	26.0	22.5	24.5	21.0	18.5	19.5
20	23.5	20.0	22.0	---	---	---	26.5	22.5	24.5	20.0	17.0	18.0
21	24.0	20.0	22.0	---	---	---	27.5	23.5	25.5	19.0	16.5	18.0
22	25.0	21.0	23.0	---	---	---	27.0	24.5	26.0	18.5	17.5	18.0
23	25.5	21.5	23.5	---	---	---	26.0	22.5	24.5	18.0	16.5	17.0
24	26.0	22.5	24.0	---	---	---	25.0	22.5	24.0	17.0	16.0	16.5
25	27.0	23.5	25.0	---	---	---	25.0	23.0	24.0	16.5	15.0	16.0
26	26.0	23.0	24.5	---	---	---	26.0	23.5	24.5	15.5	14.5	15.0
27	24.5	21.0	22.5	---	---	---	26.0	23.5	24.5	16.0	15.0	15.5
28	23.0	21.5	22.5	---	---	---	25.5	22.0	24.0	15.5	14.0	14.5
29	24.0	21.0	22.5	25.5	21.5	23.5	25.0	23.5	24.5	14.5	13.0	13.5
30	24.5	21.0	22.5	24.5	22.0	23.5	24.0	22.0	23.0	13.5	12.5	13.0
31	---	---	---	25.0	21.5	23.5	22.5	20.5	21.5	---	---	---
MONTH	27.0	14.5	20.6	---	---	---	27.5	20.5	24.0	23.5	12.5	18.9

STREAMS TRIBUTARY TO LAKE MICHIGAN

04107850 KALAMAZOO RIVER NEAR ALLEGAN, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Suspnd. sedi-ment, sieve diametr percent <.063mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)
OCT 2002			
07...	0940	73	29
07...	1005	75	31
29...	1300	83	56
29...	1330	63	26
NOV			
19...	1020	80	20
DEC			
12...	1300	91	15
12...	1435	75	18
JAN 2003			
06...	1255	37	55
06...	1300	77	70
23...	1400	55	39
FEB			
11...	0945	37	62
11...	1000	41	44
MAR			
06...	1350	45	25
06...	1410	70	26
17...	0720	73	67
17...	1230	71	20
17...	1255	78	30
17...	1300	55	86
17...	1320	66	36
25...	1005	65	41
25...	1010	66	65
25...	1300	70	37
APR			
03...	1300	79	149
04...	0730	90	74
04...	1300	81	223
04...	1330	90	84
04...	1930	91	101
05...	0130	90	82
05...	1300	66	211
09...	0920	61	22
09...	0945	64	43
30...	0640	59	33
MAY			
12...	1055	78	67
12...	1130	78	67
JUN			
24...	0910	82	30
24...	0915	69	60
JUL			
09...	1300	97	35
15...	1320	78	48
15...	1325	90	33
22...	1300	89	41
AUG			
08...	0830	83	32
08...	0835	82	23
11...	1300	96	16
12...	1300	98	24
21...	0840	85	22
21...	0845	92	30
27...	1300	83	31
SEP			
04...	1300	82	79
23...	0900	88	19
23...	0905	100	6
24...	1300	82	22
25...	1300	96	29

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 mi^2.

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. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	19	25	49	e20	e22	41	172	38	20	13	15
2	16	19	e23	39	e21	e22	39	262	35	19	23	16
3	17	19	e20	e38	e23	e21	39	146	33	18	17	15
4	19	19	e21	36	e24	e21	223	80	33	21	19	15
5	24	19	e21	34	e25	e21	432	119	34	24	17	14
6	20	22	e21	33	e25	e21	278	142	33	23	16	13
7	19	22	e21	32	e25	e21	145	87	32	23	16	13
8	18	21	e21	34	e24	e21	98	78	31	21	23	12
9	18	22	e21	34	e24	e21	86	116	37	24	22	13
10	17	43	e21	32	e23	e21	87	130	33	23	18	12
11	17	51	e21	e30	e23	e21	74	198	31	24	34	12
12	16	38	e22	e28	e22	e22	65	381	36	22	107	12
13	18	32	e22	e27	e22	e25	58	284	39	20	44	12
14	19	30	e23	e26	e21	e30	53	147	35	19	30	12
15	18	31	e23	e25	e21	e55	50	98	31	18	24	16
16	17	31	e24	e24	e21	e145	47	92	29	18	22	17
17	17	29	e26	e23	e21	216	44	77	27	17	20	14
18	27	28	38	e23	e21	203	44	68	26	17	18	13
19	27	27	66	e22	e21	145	43	61	25	16	17	12
20	23	28	61	e22	e21	104	45	66	24	15	16	13
21	21	28	51	e21	e22	125	62	64	23	21	15	12
22	20	42	45	e21	e22	102	53	54	22	27	15	14
23	20	37	42	e21	e22	86	46	48	22	21	14	23
24	19	33	39	e20	e22	71	43	47	21	19	13	19
25	19	30	38	e20	e21	67	42	47	20	17	13	17
26	20	29	e37	e20	e21	63	40	44	20	16	16	16
27	20	27	36	e20	e21	54	37	42	21	16	17	17
28	19	26	e35	e20	e21	51	35	40	21	15	14	19
29	19	26	35	e20	---	49	34	39	25	14	21	22
30	19	26	36	e20	---	44	34	38	22	13	21	18
31	19	---	57	e20	---	41	---	40	---	13	16	---
TOTAL	597	854	992	834	620	1931	2417	3307	859	594	691	448
MEAN	19.3	28.5	32.0	26.9	22.1	62.3	80.6	107	28.6	19.2	22.3	14.9
MAX	27	51	66	49	25	216	432	381	39	27	107	23
MIN	15	19	20	20	20	21	34	38	20	13	13	12
CFSM	0.27	0.40	0.45	0.38	0.31	0.87	1.13	1.49	0.40	0.27	0.31	0.21
IN.	0.31	0.44	0.52	0.43	0.32	1.01	1.26	1.72	0.45	0.31	0.36	0.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2003, BY WATER YEAR (WY)

MEAN	40.7	56.7	68.8	66.3	77.6	104	94.5	67.7	56.9	33.0	28.0	32.8
MAX	119	171	131	146	192	227	152	152	183	99.0	86.8	123
(WY)	1987	1991	1976	1993	1997	1979	1993	2000	1997	1986	1994	1978
MIN	15.0	14.5	21.7	19.8	22.1	32.0	49.4	25.1	16.4	13.6	12.5	10.1
(WY)	1969	2000	1999	1970	2003	2000	1968	1977	1987	1987	1970	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1966 - 2003	
ANNUAL TOTAL	19812		14144			
ANNUAL MEAN	54.3		38.8		60.5	
HIGHEST ANNUAL MEAN					89.3	1993
LOWEST ANNUAL MEAN					32.5	1977
HIGHEST DAILY MEAN	462	Mar 9	432	Apr 5	2320	Jun 21 1997
LOWEST DAILY MEAN	13	Sep 13	12	Sep 8	7.9	Sep 12 1999
ANNUAL SEVEN-DAY MINIMUM	13	Sep 12	12	Sep 8	8.5	Sep 9 1999
MAXIMUM PEAK FLOW			504	Apr 5	(a)3740	Jun 21 1997
MAXIMUM PEAK STAGE			7.67	Apr 5	11.11	Jun 21 1997
INSTANTANEOUS LOW FLOW			11	(b)		
ANNUAL RUNOFF (CFSM)	0.76		0.54		0.85	
ANNUAL RUNOFF (INCHES)	10.32		7.37		11.50	
10 PERCENT EXCEEDS	98		67		113	
50 PERCENT EXCEEDS	38		23		42	
90 PERCENT EXCEEDS	18		16		19	

(a) From rating curve extended above 1,200 ft^3/s.
(b) Sept. 11, 12, 13, 14, 22.
(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 mi^2.

PERIOD OF RECORD.--April 1994 to October 1995, October 2002 to September 2003. 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	951	957	1220	1380	e1080	e1070	1650	1620	1510	1030	779	873
2	1030	946	1170	1530	e1100	e1060	1940	2140	1460	1010	870	792
3	1050	938	1260	1480	e1130	e1070	1890	2190	1470	926	893	786
4	1100	968	1830	1500	e1200	e1060	2110	2300	1490	939	918	781
5	1200	979	1080	1470	e1380	e1050	3390	2580	1530	1030	1000	777
6	1130	1020	924	1510	e1580	e1050	4330	2760	1490	1020	1060	819
7	1240	1030	1040	1310	e1470	e1060	5010	2680	1350	1000	876	816
8	1160	1100	1220	1360	e1380	e1080	5130	2630	1350	1070	921	736
9	1060	1100	1500	1430	e1200	e1090	4440	2460	1460	1100	940	697
10	993	1200	1430	1310	e1050	e1100	3860	2490	1400	1260	1020	700
11	1010	1330	1140	1330	e1200	e1100	3780	2960	1250	1320	1110	781
12	1010	1670	1110	1490	e1350	e1090	3570	3390	1260	1230	1010	826
13	1040	1310	1120	e1250	e1380	e1150	3190	4080	1410	1110	1030	760
14	948	1180	1130	e1220	e1050	1280	2760	4640	1430	1070	1060	719
15	1030	1240	1170	e1230	e1070	1330	2240	4620	1420	964	1010	729
16	1020	1320	1180	e1230	e1090	1840	2140	4140	1290	924	940	696
17	1010	1270	1200	e1380	e1070	2190	2080	3560	1220	920	875	684
18	1120	1260	1310	e950	e1040	2630	1960	3170	1170	926	851	701
19	1220	1160	1760	e1000	e1090	2830	1860	2890	1190	954	834	714
20	1170	1350	1600	e1050	e1100	2970	1790	2590	1190	873	802	691
21	1120	1230	1860	e1000	e1100	3130	1800	2290	1070	893	771	665
22	1110	1360	1630	e1100	e1090	3000	1780	2090	1030	900	813	719
23	1030	1450	1780	e1150	e1090	2920	1600	1980	1060	932	761	794
24	1050	1500	1480	e1200	e1090	2770	1550	1920	1120	990	717	801
25	1110	1290	1450	e1280	e1090	2600	1490	1890	1150	967	740	981
26	1180	1320	1740	e1220	e1100	2330	1470	1850	1020	915	766	1160
27	1160	1340	1440	e1080	e1090	2120	1490	1600	998	880	770	1250
28	1090	1310	1280	e1150	e1080	2040	1640	1540	1030	818	751	1380
29	1060	1230	1320	e1250	---	1950	1370	1520	1270	779	820	1300
30	1060	1240	1380	e1150	---	1890	1320	1580	1100	797	913	979
31	996	---	1410	e1100	---	1860	---	1570	---	815	917	---
TOTAL	33458	36598	42164	39090	32740	55710	74630	79720	38188	30362	27538	25107
MEAN	1079	1220	1360	1261	1169	1797	2488	2572	1273	979	888	837
MAX	1240	1670	1860	1530	1580	3130	5130	4640	1530	1320	1110	1380
MIN	948	938	924	950	1040	1050	1320	1520	998	779	717	665
CFSM	0.54	0.61	0.68	0.63	0.59	0.90	1.25	1.29	0.64	0.49	0.45	0.42
IN.	0.62	0.68	0.79	0.73	0.61	1.04	1.39	1.49	0.71	0.57	0.51	0.47

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 2003, BY WATER YEAR (WY)

MEAN	1264	1962	1904	1878	1554	2178	2448	2277	1578	1527	1635	1124
MAX	1528	2704	2448	2495	1938	2558	2488	2572	1918	2193	2544	1444
(WY)	1995	1995	1995	1995	1995	1995	2003	2003	1994	1994	1994	1994
MIN	1079	1220	1360	1261	1169	1797	2404	1995	1273	979	888	837
(WY)	2003	2003	2003	2003	2003	2003	1995	1994	2003	2003	2003	2003

SUMMARY STATISTICS	FOR 2003 WATER YEAR		WATER YEARS 1994 - 2003	
ANNUAL TOTAL	515305			
ANNUAL MEAN	1412		1700	
HIGHEST ANNUAL MEAN			1989	1995
LOWEST ANNUAL MEAN			1412	2003
HIGHEST DAILY MEAN	5130	Apr 8	5190	Aug 16 1994
LOWEST DAILY MEAN	665	Sep 21	665	Sep 21 2003
ANNUAL SEVEN-DAY MINIMUM	696	Sep 16	696	Sep 16 2003
MAXIMUM PEAK FLOW	5250	Apr 8	(a)5300	Aug 16 1994
MAXIMUM PEAK STAGE	8.92	Apr 8	(b)8.92	Apr 8 2003
ANNUAL RUNOFF (CFSM)	0.71		0.85	
ANNUAL RUNOFF (INCHES)	9.61		11.59	
10 PERCENT EXCEEDS	2290		2730	
50 PERCENT EXCEEDS	1170		1480	
90 PERCENT EXCEEDS	820		969	

(a) Gage height 10.75 ft, site and datum then in use.
(b) Present site and datum.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04108800 MACATAWA RIVER NEAR ZEELAND, MI

LOCATION.--Lat 42°46'45" (revised), long 86°01'06", in NW1/4 sec.31, T.5 N., R.14 W., Ottawa County, Hydrologic Unit 04050002, on left bank 20 ft upstream from bridge on State Road, 0.2 mi downstream from South Branch, and 2.5 mi south of Zeeland.

DRAINAGE AREA.--65.8 mi^2.

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 585.7 ft above sea level (levels by Gove Associates, Inc.).

REMARKS.--Records poor. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.4	e4.1	e13	36	e9.0	e9.5	39	38	17	8.7	4.2	3.5
2	3.9	e4.1	e12	24	e9.2	e9.0	36	96	16	7.6	4.8	3.8
3	4.6	e4.1	e10	19	e10	e9.0	30	125	16	6.5	7.8	3.3
4	7.3	e4.2	e9.5	e17	e11	e9.0	174	94	16	6.4	24	3.0
5	11	e4.5	e8.8	e16	e14	e9.0	862	88	16	13	13	2.9
6	7.0	e5.0	e8.4	e15	e18	e9.0	502	121	15	9.5	7.7	2.9
7	e4.5	e6.5	e8.3	e14	e15	e9.0	233	80	15	15	6.6	2.8
8	e3.8	e15	e8.3	e15	e14	e9.0	109	62	15	11	9.7	2.8
9	e3.7	40	e8.3	e16	e13	e9.0	91	60	15	11	15	2.8
10	e3.6	139	e8.3	e15	e12	e9.0	93	81	14	16	7.0	2.7
11	e3.5	84	e8.4	e14	e11	e9.0	64	120	14	18	6.7	2.7
12	e3.5	36	e8.6	e12	e10	e9.5	50	299	14	13	7.6	2.5
13	e4.5	23	e8.8	e11	e10	e11	41	425	14	11	5.9	2.5
14	e5.5	19	e9.2	e10	e10	e14	36	225	13	9.6	4.7	2.5
15	e4.0	20	e9.6	e9.8	e10	e50	34	113	12	8.5	4.2	4.5
16	e3.7	17	e10	e9.6	e10	447	31	120	11	7.7	4.0	3.4
17	e9.0	16	e20	e9.0	e10	834	29	83	11	7.4	3.7	2.7
18	24	16	95	e8.6	e10	818	30	62	10	10	3.5	2.6
19	17	16	299	e8.5	e10	489	30	48	10	7.3	3.3	2.5
20	e8.0	16	121	e8.4	e11	357	45	43	9.3	6.3	3.2	2.6
21	e4.5	27	65	e8.4	e13	303	61	45	8.8	10	3.1	2.6
22	e4.4	84	44	e8.4	e15	214	47	36	8.7	13	3.0	4.5
23	e4.3	55	34	e8.4	e18	149	35	31	8.5	12	2.9	5.4
24	e4.2	37	28	e8.4	e15	84	30	29	7.8	7.8	2.8	3.1
25	e4.1	30	25	e8.4	e14	139	28	27	7.3	6.4	2.8	2.9
26	e5.0	26	23	e8.4	e12	89	27	25	7.2	5.7	9.0	3.0
27	e4.5	22	20	e8.4	e11	55	25	23	6.8	5.5	5.3	3.6
28	e4.2	19	19	e8.4	e10	72	23	19	9.5	5.2	3.4	7.0
29	e4.1	e17	19	e8.4	---	87	21	18	13	4.6	3.6	7.1
30	e4.1	e15	21	e8.4	---	51	21	17	10	4.1	3.4	3.7
31	e4.1	---	46	e8.6	---	39	---	17	---	4.1	3.3	---
TOTAL	183.0	821.5	1028.5	380.5	335.2	4411.0	2877	2670	360.9	281.9	189.2	101.9
MEAN	5.90	27.4	33.2	12.3	12.0	142	95.9	86.1	12.0	9.09	6.10	3.40
MAX	24	139	299	36	18	834	862	425	17	18	24	7.1
MIN	3.4	4.1	8.3	8.4	9.0	9.0	21	17	6.8	4.1	2.8	2.5
CFSM	0.09	0.42	0.50	0.19	0.18	2.16	1.46	1.31	0.18	0.14	0.09	0.05
IN.	0.10	0.46	0.58	0.22	0.19	2.49	1.63	1.51	0.20	0.16	0.11	0.06

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2003, BY WATER YEAR (WY)

MEAN	33.8	73.7	92.5	86.3	115	162	104	66.8	47.1	22.5	16.6	31.6
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1961 - 2003	
ANNUAL TOTAL	23133.4		13640.6			
ANNUAL MEAN	63.4		37.4		70.8	
HIGHEST ANNUAL MEAN					115	1993
LOWEST ANNUAL MEAN					24.6	1977
HIGHEST DAILY MEAN	1460	Mar 9	862	Apr 5	5540	Jun 21 1997
LOWEST DAILY MEAN	3.3	Sep 14	2.5	Sep 12	1.2	Aug 2 1987
ANNUAL SEVEN-DAY MINIMUM	3.4	Sep 12	2.6	Sep 8	1.2	Aug 1 1987
MAXIMUM PEAK FLOW			1040	Apr 5	(a)8810	Jun 21 1997
MAXIMUM PEAK STAGE			10.22	Apr 5	(b)16.72	Jun 21 1997
INSTANTANEOUS LOW FLOW			2.4	(c)	0.83	Aug 3 1988
ANNUAL RUNOFF (CFSM)	0.96		0.57		1.08	
ANNUAL RUNOFF (INCHES)	13.08		7.71		14.62	
10 PERCENT EXCEEDS	129		83		149	
50 PERCENT EXCEEDS	17		11		20	
90 PERCENT EXCEEDS	3.8		3.6		3.4	

(a) From rating curve extended above 2,000 ft^3/s.
(b) From floodmark.
(c) Sept. 13, 14.
(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 mi^2.

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 ft^3/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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	45	54	80	53	59	189	229	138	49	74	67
2	51	44	55	80	53	59	185	161	118	46	72	50
3	49	47	52	75	82	57	180	165	88	46	99	44
4	67	49	58	86	82	63	315	210	93	50	71	63
5	52	50	60	80	63	61	337	263	89	48	53	43
6	45	48	59	82	63	62	337	276	83	47	52	40
7	47	47	58	74	60	62	346	293	78	95	49	42
8	45	48	58	88	57	85	347	272	172	65	49	44
9	43	49	56	80	59	70	346	263	181	55	45	43
10	41	76	58	77	59	70	340	202	85	51	44	42
11	43	59	56	65	57	104	333	251	73	49	74	41
12	40	70	57	79	56	124	301	265	75	58	60	40
13	44	116	58	82	56	125	205	248	73	47	58	38
14	41	118	57	123	55	123	184	237	70	46	57	54
15	43	109	58	120	53	135	171	261	66	46	83	54
16	43	61	59	112	52	145	163	244	65	46	82	43
17	43	58	58	60	56	166	203	235	67	43	58	41
18	42	59	64	57	56	181	226	225	67	42	56	40
19	52	64	91	57	56	187	213	213	82	41	54	41
20	45	69	101	57	59	199	194	202	63	42	52	37
21	48	126	85	64	58	241	204	186	58	150	50	35
22	50	138	84	105	58	252	174	167	55	57	49	148
23	48	118	85	98	54	245	159	154	57	47	45	67
24	50	64	83	56	62	238	130	142	56	45	43	118
25	58	64	77	51	60	221	127	135	57	46	44	93
26	56	64	85	53	60	209	120	119	58	44	43	91
27	51	65	75	50	60	197	115	92	50	42	58	114
28	52	60	77	52	60	204	114	88	54	42	43	86
29	52	58	76	53	---	218	112	84	51	42	40	84
30	51	58	82	54	---	187	116	82	50	42	37	86
31	47	---	86	54	---	185	---	129	---	42	35	---
TOTAL	1486	2101	2122	2304	1659	4534	6486	6093	2372	1611	1729	1829
MEAN	47.9	70.0	68.5	74.3	59.2	146	216	197	79.1	52.0	55.8	61.0
MAX	67	138	101	123	82	252	347	293	181	150	99	148
MIN	40	44	52	50	52	57	112	82	50	41	35	35
CFSM	0.28	0.40	0.39	0.43	0.34	0.84	1.24	1.13	0.45	0.30	0.32	0.35
IN.	0.32	0.45	0.45	0.49	0.35	0.97	1.39	1.30	0.51	0.34	0.37	0.39

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 2003, BY WATER YEAR (WY)

MEAN	81.3	106	116	125	148	222	225	168	130	84.4	67.9	66.5
MAX	222	305	211	343	308	501	589	484	433	349	193	222
(WY)	2002	1993	2002	1993	2001	1976	1950	1943	1943	1968	1995	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
(WY)	1964	1964	1964	1964	1964	1964	1935	1936	1936	1936	1936	1963

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1935 - 2003	
ANNUAL TOTAL	46114		34326			
ANNUAL MEAN	126		94.0		128	
HIGHEST ANNUAL MEAN					216	1993
LOWEST ANNUAL MEAN					44.3	1964
HIGHEST DAILY MEAN	352	May 17	347	Apr 8	971	Jun 3 1943
LOWEST DAILY MEAN	37	Sep 12	35	Aug 31	12	Aug 23 1936
ANNUAL SEVEN-DAY MINIMUM	38	Sep 11	41	Sep 7	14	Aug 4 1936
MAXIMUM PEAK FLOW			618	May 1	(a)1070	Jun 25 1937
MAXIMUM PEAK STAGE			13.10	May 1	15.44	Jun 25 1968
INSTANTANEOUS LOW FLOW			29	Feb 23	9.2	Aug 22 1936
ANNUAL RUNOFF (CFSM)	0.73		0.54		0.74	
ANNUAL RUNOFF (INCHES)	9.86		7.34		10.03	
10 PERCENT EXCEEDS	262		204		259	
50 PERCENT EXCEEDS	90		61		97	
90 PERCENT EXCEEDS	45		43		40	

(a) Gage height 13.50 ft.

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 mi^2.

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 ft^3/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	111	146	190	e260	e155	e175	710	439	391	165	96	93
2	113	154	166	e255	e160	e170	658	574	423	130	136	99
3	129	148	159	e250	e170	e165	600	685	383	134	191	145
4	137	144	133	252	e185	e165	727	739	365	161	212	143
5	140	151	166	252	e195	e160	1030	757	367	177	244	119
6	182	172	206	e245	e200	e160	1080	729	352	170	207	122
7	185	163	179	e230	e195	e160	1140	715	340	149	162	120
8	137	156	158	244	e185	e165	1150	725	327	168	138	110
9	119	156	164	258	e180	e165	1080	780	342	212	143	94
10	110	182	161	246	e175	e170	1030	824	356	193	143	91
11	114	190	160	e230	e170	e175	997	876	370	173	139	99
12	122	206	165	e210	e170	e205	980	922	344	174	133	101
13	132	205	167	e180	e165	e250	942	920	334	165	145	98
14	133	190	169	e170	e165	e300	886	904	322	149	144	96
15	131	280	172	e180	e160	e420	814	890	316	145	144	93
16	129	252	e170	e190	e160	780	766	868	280	131	162	91
17	129	253	e175	e200	e160	754	677	838	252	130	194	113
18	138	196	195	e190	e160	711	663	810	245	128	171	111
19	150	196	227	e180	e160	689	635	776	308	133	140	87
20	149	180	264	e175	e165	670	617	805	343	120	126	79
21	154	206	309	e170	e165	662	622	632	328	152	124	84
22	152	e230	320	e165	e170	640	581	611	272	202	132	136
23	144	266	285	e160	e175	624	573	582	226	246	116	160
24	135	269	e230	e160	e170	627	572	578	210	197	109	206
25	142	271	e220	e155	e165	609	517	531	193	143	106	277
26	e145	216	e215	e155	e160	593	496	471	201	123	105	259
27	e150	170	e210	e155	e165	622	462	468	194	121	102	270
28	e155	178	e205	e150	e180	615	433	448	188	119	102	258
29	e150	212	e230	e150	---	660	407	386	191	113	107	268
30	149	223	251	e150	---	715	372	354	182	105	107	254
31	145	---	271	e155	---	732	---	366	---	100	98	---
TOTAL	4311	5961	6292	6122	4785	13708	22217	21003	8945	4728	4378	4276
MEAN	139	199	203	197	171	442	741	678	298	153	141	143
MAX	185	280	320	260	200	780	1150	922	423	246	244	277
MIN	110	144	133	150	155	160	372	354	182	100	96	79
CFSM	0.21	0.30	0.31	0.30	0.26	0.67	1.12	1.02	0.45	0.23	0.21	0.22
IN.	0.24	0.34	0.35	0.34	0.27	0.77	1.25	1.18	0.50	0.27	0.25	0.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)

MEAN	255	345	428	467	591	920	925	665	417	271	199	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1951 - 2003	
ANNUAL TOTAL	158837		106726			
ANNUAL MEAN	435		292		472	
HIGHEST ANNUAL MEAN					769	1974
LOWEST ANNUAL MEAN					147	1964
HIGHEST DAILY MEAN	1460	Mar 11	1150	Apr 8	3400	Feb 22 1971
LOWEST DAILY MEAN	93	Sep 18	79	Sep 20	21	Oct 12 1963
ANNUAL SEVEN-DAY MINIMUM	101	Sep 13	94	Sep 15	52	Oct 10 1963
MAXIMUM PEAK FLOW			1170	Apr 7	(a)3500	Feb 21 1971
MAXIMUM PEAK STAGE			4.03	Apr 7	8.19	Jun 28 1968
INSTANTANEOUS LOW FLOW			68	Sep 20	14	(b)
ANNUAL RUNOFF (CFSM)	0.66		0.44		0.71	
ANNUAL RUNOFF (INCHES)	8.94		6.01		9.70	
10 PERCENT EXCEEDS	966		697		1010	
50 PERCENT EXCEEDS	266		182		332	
90 PERCENT EXCEEDS	127		120		120	

(a) Gage height 7.52 ft.
(b) Dec. 20, 1962, Oct. 14, 1966.
(e) 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 mi^2.

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 ft^3/s.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	18	25	45	e16	e20	120	99	140	31	15	18
2	13	19	e23	e40	e18	e20	105	223	128	30	16	19
3	14	20	e22	e37	e20	e19	95	256	100	28	17	19
4	15	21	e21	e35	e30	e19	274	213	81	27	18	18
5	17	29	e20	e33	e29	e18	555	181	80	34	17	17
6	16	32	e20	e31	e28	e18	564	180	75	36	16	15
7	15	30	e19	e30	e27	e18	473	147	67	35	16	15
8	14	30	e19	e29	e25	e19	402	122	74	38	17	15
9	14	31	e19	e28	e23	e20	354	120	218	40	15	15
10	14	31	e18	e27	e21	e20	335	131	225	36	14	13
11	13	38	e18	e26	e20	e20	299	127	141	34	16	12
12	12	35	e18	e25	e19	e20	244	143	115	32	20	13
13	13	25	e18	e24	e19	e22	183	158	157	29	19	13
14	13	21	e19	e23	e18	e24	141	140	146	26	18	13
15	14	22	e20	e22	e18	e60	120	120	111	24	16	15
16	13	22	e19	e21	e17	e195	108	118	86	24	18	14
17	14	21	e19	e20	e17	e400	106	110	73	22	19	14
18	17	20	19	e19	e17	384	106	99	67	21	16	13
19	19	21	25	e18	e18	290	103	89	81	19	15	13
20	19	22	45	e17	e19	231	99	83	105	20	13	12
21	20	23	52	e16	e20	183	96	84	84	22	14	12
22	19	27	48	e16	e21	138	94	80	66	21	36	15
23	17	34	40	e16	e21	115	89	72	56	21	54	21
24	16	36	31	e16	e21	101	82	67	47	20	38	22
25	16	34	e28	e16	e20	96	79	65	42	18	28	32
26	18	33	e27	e16	e20	95	75	61	41	17	25	37
27	19	29	e26	e15	e20	89	71	61	47	18	26	38
28	19	31	e26	e15	e20	88	67	59	42	16	24	35
29	18	29	e26	e15	---	154	62	57	38	17	21	30
30	18	30	27	e15	---	170	59	72	35	16	18	26
31	18	---	37	e15	---	142	---	98	---	15	18	---
TOTAL	488	814	794	721	582	3208	5560	3635	2768	787	633	564
MEAN	15.7	27.1	25.6	23.3	20.8	103	185	117	92.3	25.4	20.4	18.8
MAX	20	38	52	45	30	400	564	256	225	40	54	38
MIN	11	18	18	15	16	18	59	57	35	15	13	12
CFSM	0.10	0.17	0.16	0.14	0.13	0.63	1.14	0.72	0.57	0.16	0.13	0.12
IN.	0.11	0.19	0.18	0.16	0.13	0.73	1.27	0.83	0.63	0.18	0.14	0.13

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2003, BY WATER YEAR (WY)

MEAN	77.1	77.8	106	73.8	133	255	227	111	86.0	33.0	22.1	40.3
MAX	329	265	248	155	411	504	354	268	306	63.4	49.1	133
(WY)	1982	1989	1976	1985	1976	1982	1985	1983	1989	1989	1980	1975
MIN	15.7	26.9	25.6	22.3	20.8	103	108	40.8	16.6	10.8	9.27	11.3
(WY)	2003	1977	2003	1977	2003	2003	1987	1987	1988	1988	1984	1978

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1975 - 2003	
ANNUAL TOTAL	30839		20554			
ANNUAL MEAN	84.5		56.3		103	
HIGHEST ANNUAL MEAN					157	1976
LOWEST ANNUAL MEAN					56.3	2003
HIGHEST DAILY MEAN	490	Mar 10	564	Apr 6	1700	Feb 26 1985
LOWEST DAILY MEAN	10	Sep 12	11	Oct 1	4.4	Jul 14 1988
ANNUAL SEVEN-DAY MINIMUM	11	Sep 8	13	Oct 10	5.7	Jul 9 1988
MAXIMUM PEAK FLOW			597	Apr 5	1790	Feb 26 1985
MAXIMUM PEAK STAGE			6.49	Apr 5	9.07	Feb 26 1985
INSTANTANEOUS LOW FLOW			10	(a)	2.2	(b)
ANNUAL RUNOFF (CFSM)	0.52		0.35		0.63	
ANNUAL RUNOFF (INCHES)	7.04		4.69		8.57	
10 PERCENT EXCEEDS	216		134		254	
50 PERCENT EXCEEDS	38		25		54	
90 PERCENT EXCEEDS	14		15		17	

(a) Oct. 1, 12, Sept. 10.
(b) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.13	0.72	0.85	3.6	e0.85	e0.98	14	20	10	1.8	0.45	0.43
2	0.13	0.74	0.71	2.3	e1.0	e0.97	12	29	7.7	1.7	0.69	0.54
3	0.27	0.79	0.63	2.0	e1.2	e0.96	10	19	6.5	1.5	0.58	0.38
4	0.38	0.81	0.58	2.4	e2.0	e0.95	72	15	6.3	1.5	0.57	0.33
5	0.63	0.83	0.56	2.1	e3.5	e0.94	148	15	6.9	1.9	0.55	0.32
6	0.50	1.1	e0.54	1.9	e2.5	e1.0	82	14	5.7	2.8	0.48	0.28
7	0.37	1.1	e0.52	1.6	e1.8	e1.1	43	12	5.1	3.4	0.43	0.24
8	0.37	1.2	e0.50	2.0	e1.4	e1.1	28	11	8.9	2.3	0.34	0.20
9	0.35	1.4	0.48	2.2	e1.2	e1.1	26	14	41	2.3	0.33	0.18
10	0.36	1.6	0.48	1.9	e1.1	e1.1	32	15	20	1.9	0.27	0.19
11	0.34	1.4	0.58	1.7	e1.0	e1.2	24	13	15	2.0	0.98	0.20
12	0.41	1.2	0.69	1.8	e0.96	e1.3	19	19	12	1.7	0.93	0.18
13	0.50	1.0	0.82	e1.7	e0.94	e1.4	16	17	11	1.4	0.57	0.10
14	0.40	1.0	0.95	e1.6	e0.92	e1.7	14	14	8.9	1.3	0.43	0.09
15	0.37	1.2	1.1	e1.5	e0.90	e12	13	12	7.1	1.2	0.45	0.31
16	0.31	1.1	1.1	e1.3	e0.89	91	11	13	5.8	1.1	0.60	0.21
17	0.30	1.0	0.94	e1.2	e0.88	63	10	11	5.1	1.00	0.61	0.16
18	0.52	0.96	1.2	e1.1	e0.95	31	10	9.7	4.6	0.96	0.44	0.14
19	0.71	1.0	2.6	e1.1	e1.1	18	9.6	8.5	17	0.88	0.35	0.25
20	0.74	0.99	4.4	e1.0	e1.2	15	9.3	7.9	9.0	0.86	0.36	0.37
21	0.73	1.0	3.9	e0.90	e1.3	15	9.3	7.0	6.4	0.95	0.37	0.32
22	0.65	1.5	2.8	e0.85	e1.3	13	8.4	6.3	5.1	0.96	0.52	0.77
23	0.64	1.3	2.2	e0.80	e1.3	11	7.6	5.9	4.1	0.77	0.32	0.89
24	0.60	1.2	1.9	0.75	e1.2	10	7.1	5.8	3.6	0.65	0.29	0.63
25	0.64	1.1	1.4	0.74	e1.2	10	6.8	5.6	3.0	0.62	0.30	2.1
26	0.96	1.0	2.0	e0.73	e1.1	10	6.3	5.0	3.0	0.58	0.77	1.2
27	0.87	0.90	1.5	e0.72	e1.1	8.2	5.8	4.9	3.5	0.59	0.56	1.5
28	0.81	0.92	1.5	e0.71	e1.0	9.1	5.5	5.1	2.6	0.56	0.41	1.3
29	0.76	0.97	1.6	e0.70	---	45	5.2	4.6	2.4	0.52	0.31	1.1
30	0.72	1.0	1.7	e0.72	---	22	5.2	4.3	2.1	0.47	0.33	0.97
31	0.71	---	4.1	e0.76	---	16	---	10	---	0.44	0.30	---
TOTAL	16.18	32.03	44.83	44.38	35.79	415.10	670.1	353.6	249.4	40.61	14.89	15.88
MEAN	0.52	1.07	1.45	1.43	1.28	13.4	22.3	11.4	8.31	1.31	0.48	0.53
MAX	0.96	1.6	4.4	3.6	3.5	91	148	29	41	3.4	0.98	2.1
MIN	0.13	0.72	0.48	0.70	0.85	0.94	5.2	4.3	2.1	0.44	0.27	0.09
CFSM	0.03	0.07	0.09	0.09	0.08	0.82	1.37	0.70	0.51	0.08	0.03	0.03
IN.	0.04	0.07	0.10	0.10	0.08	0.95	1.53	0.81	0.57	0.09	0.03	0.04

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2003, BY WATER YEAR (WY)

MEAN	5.73	9.03	11.7	11.5	17.5	28.5	23.8	13.2	8.59	3.91	2.39	2.92
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1954 - 2003	
ANNUAL TOTAL	2837.03		1932.79			
ANNUAL MEAN	7.77		5.30		11.5	
HIGHEST ANNUAL MEAN					22.8	1993
LOWEST ANNUAL MEAN					1.86	1964
HIGHEST DAILY MEAN	82	Feb 21	148	Apr 5	720	Apr 19 1975
LOWEST DAILY MEAN	0.06	Sep 13	0.09	Sep 14	0.05	Sep 9 1978
ANNUAL SEVEN-DAY MINIMUM	0.08	Sep 9	0.16	Sep 8	0.08	Sep 9 2002
MAXIMUM PEAK FLOW			167	Apr 5	(a)962	Apr 19 1975
MAXIMUM PEAK STAGE			6.09	Apr 5	(b)12.18	Apr 19 1975
INSTANTANEOUS LOW FLOW			0.03	Sep 13	0.03	Sep 13 2003
ANNUAL RUNOFF (CFSM)	0.48		0.32		0.71	
ANNUAL RUNOFF (INCHES)	6.47		4.41		9.59	
10 PERCENT EXCEEDS	20		13		25	
50 PERCENT EXCEEDS	1.7		1.2		4.7	
90 PERCENT EXCEEDS	0.35		0.37		0.70	

(a) From rating curve extended above 610 ft^3/s.
(b) From floodmark.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.06	0.15	0.16	0.46	0.16	0.21	2.9	8.3	3.5	0.31	e0.06	0.04
2	0.05	0.15	0.16	0.35	0.18	0.21	2.4	16	2.6	0.28	e0.08	0.05
3	0.08	0.15	0.13	0.32	0.21	0.20	2.2	8.6	2.3	0.25	e0.07	0.04
4	0.11	0.15	0.13	0.31	0.73	0.20	54	5.9	e2.2	0.25	e0.06	0.04
5	0.10	0.16	0.14	0.28	0.37	0.21	72	7.0	e1.9	0.42	e0.05	0.04
6	0.08	0.17	0.14	0.28	0.25	0.21	31	11	1.7	0.42	e0.05	0.03
7	0.09	0.16	0.14	0.25	0.23	0.21	20	6.7	1.5	0.39	e0.05	0.03
8	0.08	0.16	0.15	0.30	0.21	0.23	14	5.4	1.9	0.32	e0.05	0.03
9	0.08	0.16	0.13	0.38	0.21	0.23	13	6.8	4.6	0.32	e0.05	0.03
10	0.09	0.21	0.13	0.35	0.20	0.21	15	6.9	3.0	0.31	e0.04	0.03
11	0.09	0.18	0.14	0.28	0.18	0.21	10	6.3	2.5	0.31	e0.05	0.04
12	0.09	0.17	0.14	0.25	0.18	0.28	7.5	8.2	2.2	0.28	e0.06	0.06
13	0.10	0.16	0.15	0.23	0.17	0.46	5.9	6.8	2.1	0.23	e0.05	0.06
14	0.10	0.17	0.17	0.22	0.17	0.64	4.9	e5.1	1.8	0.21	0.05	0.09
15	0.10	0.19	0.20	0.20	0.17	9.9	4.2	4.5	1.6	e0.20	0.05	0.14
16	0.09	0.17	0.19	0.17	0.17	38	3.5	4.2	1.3	e0.19	e0.07	0.12
17	0.11	0.17	0.17	0.15	0.16	25	3.0	3.6	1.2	e0.18	0.06	e0.10
18	0.14	0.17	0.20	0.12	0.17	e13	2.8	3.1	1.1	e0.16	e0.05	e0.09
19	0.13	0.18	0.37	0.14	0.18	6.4	2.6	2.8	1.0	e0.14	0.04	e0.08
20	0.13	0.17	0.67	0.15	e0.20	4.9	2.5	2.6	0.87	e0.13	0.03	0.09
21	0.14	0.18	0.48	e0.14	e0.23	5.3	2.5	2.2	0.76	e0.14	0.05	0.08
22	0.14	0.19	0.37	e0.14	e0.25	3.9	2.3	2.0	0.69	e0.14	e0.07	0.17
23	0.14	0.17	0.30	e0.13	e0.24	3.1	2.0	1.9	0.65	e0.12	e0.05	0.24
24	0.14	0.18	0.27	0.13	0.24	2.7	1.9	1.8	0.57	e0.10	0.04	0.13
25	0.17	0.18	0.28	0.13	0.23	2.5	1.8	1.7	0.49	e0.08	0.04	0.14
26	0.18	0.17	0.28	0.13	0.22	2.1	1.7	1.5	0.56	e0.07	0.09	0.10
27	0.16	0.16	0.27	0.12	0.21	1.8	1.5	1.4	0.58	e0.06	0.06	0.10
28	0.15	0.17	0.26	0.12	0.21	2.1	1.4	1.5	0.45	e0.05	0.06	0.07
29	0.15	0.18	0.27	0.13	---	9.0	1.3	1.4	0.43	e0.06	0.06	0.07
30	0.15	0.18	0.27	0.13	---	5.1	1.4	1.3	0.36	e0.05	0.03	0.06
31	0.15	---	0.56	0.14	---	3.5	---	3.8	---	e0.05	0.03	---
TOTAL	3.57	5.11	7.42	6.63	6.33	142.01	291.2	150.3	46.41	6.22	1.65	2.39
MEAN	0.12	0.17	0.24	0.21	0.23	4.58	9.71	4.85	1.55	0.20	0.053	0.080
MAX	0.18	0.21	0.67	0.46	0.73	38	72	16	4.6	0.42	0.09	0.24
MIN	0.05	0.15	0.13	0.12	0.16	0.20	1.3	1.3	0.36	0.05	0.03	0.03
CFSM	0.01	0.02	0.03	0.02	0.02	0.49	1.04	0.52	0.17	0.02	0.01	0.01
IN.	0.01	0.02	0.03	0.03	0.03	0.57	1.16	0.60	0.18	0.02	0.01	0.01

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2003, BY WATER YEAR (WY)

MEAN	2.74	4.07	5.59	5.30	8.74	15.6	12.6	6.24	4.45	1.82	1.05	1.40
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	0.082	0.13	0.11	0.11	0.12	0.78	1.45	0.94	0.25	0.074	0.053	0.046
(WY)	2000	2000	1964	1963	1963	1964	1963	1955	1988	1988	2003	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1954 - 2003	
ANNUAL TOTAL	1574.70		669.24			
ANNUAL MEAN	4.31		1.83		5.78	
HIGHEST ANNUAL MEAN					10.5	(a)
LOWEST ANNUAL MEAN					0.72	1964
HIGHEST DAILY MEAN	56	Mar 9	72	Apr 5	536	Apr 19 1975
LOWEST DAILY MEAN	0.05	Sep 8	0.03	Aug 20	0.02	Aug 3 1988
ANNUAL SEVEN-DAY MINIMUM	0.06	Sep 7	0.03	Sep 4	0.03	Jul 29 1988
MAXIMUM PEAK FLOW			144	Apr 5	(b)1290	Apr 18 1975
MAXIMUM PEAK STAGE			4.03	Apr 5	9.99	Apr 18 1975
INSTANTANEOUS LOW FLOW			0.02	(c)	0.01	(d)
ANNUAL RUNOFF (CFSM)	0.46		0.20		0.62	
ANNUAL RUNOFF (INCHES)	6.27		2.67		8.41	
10 PERCENT EXCEEDS	11		4.3		13	
50 PERCENT EXCEEDS	0.80		0.20		1.7	
90 PERCENT EXCEEDS	0.10		0.06		0.18	

(a) 1973, 1993.
(b) From rating curve extended above 660 ft^3/s on basis of computation of peak flow through culvert and over road embankment.
(c) Aug. 30, Sept. 7, 8, 9, 10, 11.
(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 mi^2.

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 ft^3/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	34	47	63	31	37	247	224	235	57	31	27
2	26	33	43	69	31	37	215	405	243	52	25	29
3	29	e33	35	45	38	38	201	443	208	48	24	29
4	42	e32	45	58	57	36	516	389	173	47	26	28
5	43	37	41	66	55	34	1110	353	154	63	26	26
6	36	42	39	60	56	33	1270	384	147	72	28	26
7	32	52	37	44	54	33	1090	340	134	75	29	24
8	27	51	37	55	47	36	807	286	127	63	25	21
9	e27	49	36	60	42	38	615	277	219	65	25	21
10	e26	68	35	55	41	38	556	287	391	62	24	19
11	e26	54	35	41	40	37	527	297	323	60	25	19
12	e28	51	35	45	38	38	451	305	237	55	25	18
13	e31	50	36	53	37	40	372	324	207	51	30	17
14	29	47	38	45	36	42	306	313	226	45	28	19
15	29	48	40	41	35	57	257	285	208	42	27	22
16	29	44	41	38	35	173	225	271	169	40	37	21
17	28	41	40	36	33	534	201	258	139	38	30	21
18	30	40	44	33	33	795	199	239	123	35	26	19
19	33	40	53	31	34	814	193	220	113	34	24	16
20	31	39	76	30	35	513	188	208	152	34	22	15
21	32	40	78	30	37	371	187	196	155	38	22	15
22	31	43	76	30	41	304	178	191	126	36	27	47
23	31	43	67	30	41	246	169	184	101	34	42	34
24	31	44	55	30	39	208	157	173	86	32	58	37
25	33	49	47	30	40	189	148	165	74	30	46	43
26	35	49	55	30	39	180	142	156	88	29	47	42
27	34	48	49	30	38	170	134	146	81	26	37	52
28	35	47	48	30	37	168	128	141	77	26	34	51
29	35	47	54	30	---	265	122	140	69	25	36	47
30	35	47	55	30	---	356	121	138	62	24	30	41
31	36	---	59	30	---	300	---	192	---	23	26	---
TOTAL	978	1342	1476	1298	1120	6160	11032	7930	4847	1361	942	846
MEAN	31.5	44.7	47.6	41.9	40.0	199	368	256	162	43.9	30.4	28.2
MAX	43	68	78	69	57	814	1270	443	391	75	58	52
MIN	26	32	35	30	31	33	121	138	62	23	22	15
CFSM	0.09	0.13	0.13	0.12	0.11	0.56	1.04	0.72	0.46	0.12	0.09	0.08
IN.	0.10	0.14	0.15	0.14	0.12	0.65	1.16	0.83	0.51	0.14	0.10	0.09

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1902 - 2003, BY WATER YEAR (WY)

MEAN	105	144	180	210	294	491	464	288	180	89.1	60.4	74.4
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1902 - 2003	
ANNUAL TOTAL	66095		39332			
ANNUAL MEAN	181		108		216	
HIGHEST ANNUAL MEAN					431	1993
LOWEST ANNUAL MEAN					43.3	1964
HIGHEST DAILY MEAN	1010	Mar 11	1270	Apr 6	5720	Apr 20 1975
LOWEST DAILY MEAN	20	Sep 9	15	Sep 20	3.0	Jul 31 1931
ANNUAL SEVEN-DAY MINIMUM	20	Sep 9	18	Sep 15	3.9	Jul 15 1934
MAXIMUM PEAK FLOW			1290	Apr 6	5940	Apr 20 1975
MAXIMUM PEAK STAGE			6.02	Apr 6	11.95	Apr 20 1975
INSTANTANEOUS LOW FLOW			15	(a)	3.0	Jul 31 1931
ANNUAL RUNOFF (CFSM)	0.51		0.30		0.61	
ANNUAL RUNOFF (INCHES)	6.93		4.12		8.26	
10 PERCENT EXCEEDS	462		267		506	
50 PERCENT EXCEEDS	76		43		106	
90 PERCENT EXCEEDS	31		26		30	

(a) Sept. 19, 20, 21, 22.
(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 mi^2, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	153	269	335	401	233	280	1150	1070	756	259	168	165
2	159	203	263	406	249	252	990	1280	786	249	152	182
3	203	223	213	363	275	253	1020	1340	812	239	147	175
4	238	254	205	347	431	252	2050	1360	666	242	334	217
5	235	213	293	406	262	251	2890	1460	661	345	304	221
6	200	223	244	390	388	249	3120	1370	626	329	285	176
7	212	261	287	277	353	248	2770	1310	609	541	279	178
8	246	309	289	364	289	258	2480	1230	616	255	191	177
9	188	279	217	437	303	288	2090	1330	735	255	187	175
10	150	456	221	342	235	262	1910	1280	942	373	181	175
11	152	344	258	275	279	268	1860	1480	895	352	345	172
12	207	290	257	262	287	323	1700	1500	819	235	105	161
13	194	290	255	315	259	335	1600	1560	683	283	164	154
14	175	294	258	324	253	395	1400	1510	699	219	185	174
15	175	311	256	266	251	543	1310	1430	690	213	197	193
16	172	393	258	325	249	1030	1120	1400	593	209	372	155
17	177	330	262	386	248	1740	1100	1240	530	202	379	151
18	202	321	280	263	248	2040	974	1270	430	194	217	152
19	206	347	382	292	246	1900	947	1170	414	178	175	155
20	206	246	426	276	250	1500	969	1100	654	179	171	148
21	208	314	409	224	256	1320	983	1040	636	210	175	141
22	262	353	432	216	296	1160	868	777	614	202	178	346
23	215	343	428	250	266	1010	833	902	436	281	185	221
24	211	359	382	247	258	993	835	834	382	326	212	378
25	226	376	329	245	261	953	762	834	335	234	203	469
26	248	379	337	282	256	843	717	712	555	169	263	419
27	269	268	341	245	252	871	722	703	380	160	197	423
28	227	258	320	207	254	987	627	673	307	160	178	434
29	284	336	373	220	---	1080	624	666	349	158	215	333
30	225	293	369	251	---	1280	636	623	310	152	187	387
31	231	---	415	210	---	1180	---	819	---	142	163	---
TOTAL	6456	9135	9594	9314	7687	24344	41057	35273	17920	7545	6694	7007
MEAN	208	304	309	300	275	785	1369	1138	597	243	216	234
MAX	284	456	432	437	431	2040	3120	1560	942	541	379	469
MIN	150	203	205	207	233	248	624	623	307	142	105	141
CFSM	0.17	0.25	0.25	0.24	0.22	0.64	1.11	0.93	0.49	0.20	0.18	0.19
IN.	0.20	0.28	0.29	0.28	0.23	0.74	1.24	1.07	0.54	0.23	0.20	0.21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1901 - 2003, BY WATER YEAR (WY)

MEAN	470	625	736	822	1051	1887	1762	1144	831	483	357	359
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1901 - 2003	
ANNUAL TOTAL	281859		182026			
ANNUAL MEAN	772		499		875	
HIGHEST ANNUAL MEAN					1638	1993
LOWEST ANNUAL MEAN					232	1964
HIGHEST DAILY MEAN	3060	Mar 11	3120	Apr 6	22700	Mar 26 1904
LOWEST DAILY MEAN	136	Sep 12	105	Aug 12	20	Aug 25 1941
ANNUAL SEVEN-DAY MINIMUM	141	Sep 8	154	Jul 28	44	Aug 15 1936
MAXIMUM PEAK FLOW			3240	Apr 6	(a)24500	Mar 26 1904
MAXIMUM PEAK STAGE			7.60	Apr 6	(b)15.43	Apr 20 1975
INSTANTANEOUS LOW FLOW			12	Aug 12	2.8	Sep 9 1963
ANNUAL RUNOFF (CFSM)	0.63		0.41		0.71	
ANNUAL RUNOFF (INCHES)	8.52		5.51		9.66	
10 PERCENT EXCEEDS	1850		1170		1910	
50 PERCENT EXCEEDS	436		290		552	
90 PERCENT EXCEEDS	177		176		185	

(a) From rating curve extended above 15,000 ft^3/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 mi^2.

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. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e246	226	295	467	e230	e280	1290	989	938	354	194	241
2	e210	264	357	441	e260	e310	1220	1420	835	330	200	227
3	191	225	297	449	e270	e280	1100	1410	873	314	237	242
4	242	210	e235	408	e300	e280	1750	1440	841	311	212	242
5	315	259	e225	380	e480	e280	3700	1480	754	341	290	e250
6	337	220	e320	445	e290	e280	3570	1620	723	428	371	278
7	260	221	e270	430	e430	e275	3290	1420	679	422	304	254
8	263	230	e310	326	e380	e275	2940	1380	e650	581	341	229
9	304	286	e310	396	e320	e290	2510	1340	751	387	262	227
10	e250	302	e240	474	e330	e320	2230	1500	835	338	238	228
11	e200	493	e240	377	e260	e290	2050	1480	937	408	233	225
12	e190	403	e280	331	e305	e300	1940	1790	899	449	e330	221
13	e240	320	e280	348	e320	e355	1790	1670	819	317	319	215
14	e220	316	e280	e340	e290	448	1650	1680	701	337	174	213
15	e200	333	e285	e360	e280	533	1500	1550	718	298	185	212
16	e200	351	e280	e290	e275	1120	1370	1550	680	e280	241	257
17	220	397	e285	e370	e270	1850	1210	1430	598	e270	375	232
18	229	365	e300	e430	e270	e2100	1210	1320	547	e260	391	207
19	249	339	347	e290	e270	e2200	1080	1310	498	253	323	201
20	225	378	463	e320	e270	1950	1070	1210	462	240	253	201
21	222	295	509	e300	e275	1640	1100	1170	638	257	217	200
22	225	313	466	e250	e290	1370	1070	1080	615	301	236	212
23	255	e390	489	e240	e330	1330	978	863	590	e260	236	378
24	253	353	475	e280	e300	1140	949	983	459	e350	230	341
25	229	377	445	e270	e285	1140	939	918	402	e430	248	361
26	247	387	368	e270	e290	1070	863	897	395	e320	272	491
27	256	401	361	e310	e285	992	802	798	631	e220	278	425
28	280	310	387	e270	e280	1030	843	797	432	e210	303	425
29	234	252	346	e230	---	1310	696	752	373	e210	243	425
30	269	345	410	e250	---	1220	731	802	394	e205	223	378
31	250	---	428	e280	---	1410	---	774	---	e200	236	---
TOTAL	7511	9561	10583	10622	8435	27668	47441	38823	19667	9881	8195	8238
MEAN	242	319	341	343	301	893	1581	1252	656	319	264	275
MAX	337	493	509	474	480	2200	3700	1790	938	581	391	491
MIN	190	210	225	230	230	275	696	752	373	200	174	200
CFSM	0.17	0.23	0.25	0.25	0.22	0.64	1.14	0.90	0.47	0.23	0.19	0.20
IN.	0.20	0.26	0.28	0.29	0.23	0.74	1.27	1.04	0.53	0.27	0.22	0.22

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	563	781	903	957	1193	1994	1928	1329	860	565	442	432
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	321380		206625			
ANNUAL MEAN	880		566		992	
HIGHEST ANNUAL MEAN					1830	1993
LOWEST ANNUAL MEAN					282	1964
HIGHEST DAILY MEAN	3820	Mar 10	3700	Apr 5	12200	Apr 21 1975
LOWEST DAILY MEAN	190	Oct 12	174	Aug 14	58	Oct 9 1963
ANNUAL SEVEN-DAY MINIMUM	202	Sep 13	206	Jul 27	85	Aug 18 1963
MAXIMUM PEAK FLOW			3980	Apr 5	12400	Apr 21 1975
MAXIMUM PEAK STAGE			8.75	Apr 5	12.98	Apr 21 1975
INSTANTANEOUS LOW FLOW					38	Oct 10 1963
ANNUAL RUNOFF (CFSM)	0.64		0.41		0.72	
ANNUAL RUNOFF (INCHES)	8.63		5.55		9.73	
10 PERCENT EXCEEDS	1950		1330		2130	
50 PERCENT EXCEEDS	527		330		651	
90 PERCENT EXCEEDS	230		225		240	

(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 mi^2.

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 ft^3/s. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	36	42	66	e34	e38	174	170	110	46	27	20
2	25	36	e41	63	e38	e38	171	202	107	43	33	20
3	26	36	e40	59	e44	e38	171	195	105	39	31	20
4	29	36	e39	e57	e49	e39	370	175	105	36	33	19
5	38	38	e38	56	e51	e39	704	191	108	39	34	18
6	36	38	e37	55	e50	e39	448	209	103	39	34	17
7	35	37	e36	e55	e47	e39	304	216	98	45	34	16
8	33	36	e35	54	e44	e40	272	216	96	45	34	16
9	32	36	e27	51	e42	e41	275	228	100	44	33	16
10	31	46	e36	e50	e39	e43	288	231	93	44	32	15
11	29	53	e39	e48	e37	e47	299	238	90	43	31	14
12	28	86	e40	e47	e35	e50	304	255	94	40	31	14
13	30	59	e41	e45	e34	e54	305	245	100	38	30	14
14	29	51	e41	e44	e34	e64	305	233	101	38	28	14
15	29	52	e41	e42	e34	e100	298	226	98	36	27	17
16	28	50	e41	e41	e34	e500	285	227	91	34	27	16
17	28	48	e42	e40	e34	e350	271	225	86	33	28	14
18	32	45	e46	e39	e34	203	259	219	80	32	25	15
19	32	47	e53	e38	e35	153	243	214	74	30	25	15
20	31	44	63	e37	e37	155	228	206	67	30	24	14
21	31	45	70	e37	e40	200	215	193	62	34	22	13
22	31	45	68	e36	e41	211	205	179	58	33	21	19
23	31	44	66	e35	e41	215	189	166	54	31	20	28
24	32	46	63	e35	e40	219	174	155	51	31	18	24
25	33	47	e59	e34	e39	223	162	142	46	29	20	30
26	35	47	e56	e34	e38	218	151	128	47	28	23	28
27	35	45	e54	e33	e37	208	141	118	52	27	23	34
28	35	44	e52	e33	e37	206	131	109	48	26	19	30
29	36	43	50	e33	---	234	121	102	53	26	20	27
30	36	44	49	e32	---	211	116	102	50	25	19	26
31	37	---	62	e32	---	185	---	111	---	24	20	---
TOTAL	979	1360	1467	1361	1099	4400	7579	5826	2427	1088	826	583
MEAN	31.6	45.3	47.3	43.9	39.2	142	253	188	80.9	35.1	26.6	19.4
MAX	38	86	70	66	51	500	704	255	110	46	34	34
MIN	25	36	27	32	34	38	116	102	46	24	18	13
CFSM	0.11	0.16	0.17	0.16	0.14	0.51	0.90	0.67	0.29	0.13	0.10	0.07
IN.	0.13	0.18	0.19	0.18	0.15	0.58	1.01	0.77	0.32	0.14	0.11	0.08

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2003, BY WATER YEAR (WY)

MEAN	94.0	129	160	169	213	431	409	253	140	85.2	55.7	70.8
MAX	614	414	445	505	673	1058	1131	910	518	405	206	532
(WY)	1987	1991	1976	1993	1976	1985	1947	1956	1986	1994	1994	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
(WY)	1964	1964	1964	1963	1963	1964	1964	1958	1964	1965	1965	1963

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1944 - 2003	
ANNUAL TOTAL	55264		28995			
ANNUAL MEAN	151		79.4		184	
HIGHEST ANNUAL MEAN					321	1993
LOWEST ANNUAL MEAN					35.7	1964
HIGHEST DAILY MEAN	784	Mar 9	704	Apr 5	2400	Apr 5 1947
LOWEST DAILY MEAN	16	Sep 15	13	Sep 21	11	Jul 21 1965
ANNUAL SEVEN-DAY MINIMUM	17	Sep 12	15	Sep 8	11	Jul 25 1965
MAXIMUM PEAK FLOW			(a)875	Apr 5	(b)2860	Apr 5 1947
MAXIMUM PEAK STAGE			(c)6.28	Dec 27	(d)6.28	Dec 27 2002
INSTANTANEOUS LOW FLOW			13	(f)	10	Jul 28 1965
ANNUAL RUNOFF (CFSM)	0.54		0.28		0.66	
ANNUAL RUNOFF (INCHES)	7.34		3.85		8.93	
10 PERCENT EXCEEDS	348		215		430	
50 PERCENT EXCEEDS	79		41		100	
90 PERCENT EXCEEDS	31		25		32	

(a) Gage height 5.06 ft.
(b) From rating curve extended above 1,900 ft^3/s; gage height 7.70 ft, from graph based on gage readings, site and datum then in use.
(c) Backwater from ice.
(d) Present site and datum, backwater from ice; maximum peak stage at previous site and datum, 9.9 ft, Mar. 7, 1956, from floodmark, backwater from ice.
(e) Estimated.
(f) Sept. 13, 14, 21, 22.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	65	34	49	26	26	197	132	87	48	10	14
2	11	61	36	49	27	26	188	235	79	42	11	13
3	14	52	35	49	28	27	174	285	75	36	14	11
4	14	45	32	47	29	27	172	328	71	32	18	11
5	19	52	31	46	29	26	203	359	75	30	23	11
6	18	58	32	47	30	27	223	371	74	28	24	10
7	19	51	33	44	31	26	253	370	71	27	26	11
8	18	48	34	42	30	27	275	358	69	27	23	10
9	18	63	34	44	31	27	287	343	100	27	21	8.4
10	19	62	33	45	29	27	291	325	122	25	19	6.3
11	19	62	33	41	29	27	290	396	113	30	19	5.2
12	21	74	32	37	29	26	285	521	101	36	18	4.5
13	23	63	33	37	28	28	274	579	88	35	17	3.9
14	26	55	33	37	28	29	256	562	80	31	18	3.8
15	25	51	34	35	28	30	237	522	73	26	17	3.9
16	26	46	35	33	27	71	228	484	64	24	15	4.4
17	22	42	34	30	27	234	206	449	58	22	13	4.8
18	22	40	36	27	27	228	186	414	54	21	11	4.8
19	23	40	40	25	28	234	168	378	52	18	9.6	3.3
20	25	40	46	24	29	257	139	345	46	17	8.7	3.4
21	26	42	50	23	31	286	121	314	43	18	7.3	4.5
22	26	41	51	23	31	299	110	281	41	19	8.3	7.7
23	26	39	51	22	31	293	99	251	38	19	8.2	9.5
24	24	39	50	22	31	274	90	234	35	17	6.7	12
25	25	40	46	22	29	258	84	217	32	16	6.3	13
26	25	40	44	22	28	243	77	198	29	15	12	13
27	26	37	44	22	26	226	72	179	27	15	18	11
28	28	37	44	23	26	205	67	158	32	15	19	11
29	28	36	43	24	---	203	65	131	40	14	18	11
30	26	37	43	24	---	207	61	108	47	12	18	9.9
31	31	---	46	25	---	204	---	99	---	10	16	---
TOTAL	684	1458	1202	1040	803	4128	5378	9926	1916	752	473.1	250.3
MEAN	22.1	48.6	38.8	33.5	28.7	133	179	320	63.9	24.3	15.3	8.34
MAX	31	74	51	49	31	299	291	579	122	48	26	14
MIN	11	36	31	22	26	26	61	99	27	10	6.3	3.3
CFSM	0.05	0.11	0.09	0.08	0.07	0.31	0.41	0.74	0.15	0.06	0.04	0.02
IN.	0.06	0.12	0.10	0.09	0.07	0.35	0.46	0.85	0.16	0.06	0.04	0.02

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2003, BY WATER YEAR (WY)

MEAN	146	183	246	252	318	692	611	381	199	108	58.4	122
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1944 - 2003	
ANNUAL TOTAL	82769		28010.4			
ANNUAL MEAN	227		76.7		276	
HIGHEST ANNUAL MEAN					501	1976
LOWEST ANNUAL MEAN					65.1	1963
HIGHEST DAILY MEAN	1710	Mar 11	579	May 13	6500	Mar 20 1948
LOWEST DAILY MEAN	11	Oct 1	3.3	Sep 19	3.3	Sep 19 2003
ANNUAL SEVEN-DAY MINIMUM	13	Sep 27	4.1	Sep 14	4.1	Sep 14 2003
MAXIMUM PEAK FLOW			580	May 13	(a)8770	Sep 12 1986
MAXIMUM PEAK STAGE			6.49	May 13	(b)12.33	Sep 12 1986
ANNUAL RUNOFF (CFSM)	0.52		0.18		0.64	
ANNUAL RUNOFF (INCHES)	7.09		2.40		8.65	
10 PERCENT EXCEEDS	591		239		660	
50 PERCENT EXCEEDS	65		32		120	
90 PERCENT EXCEEDS	21		11		23	

(a) Result of dam failure on Rainbow Lake (Pine Creek).
(b) From floodmark.

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 mi^2.

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 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	19	20	24	e18	e14	27	71	18	11	11	10
2	16	19	20	21	e19	15	27	70	17	11	11	9.7
3	20	19	e19	20	e21	e15	26	43	17	10	11	11
4	28	19	e20	19	e25	e15	30	32	18	11	13	10
5	41	19	20	19	e23	15	31	39	22	11	15	9.3
6	25	23	19	19	e21	e15	29	45	19	10	11	9.4
7	24	23	18	19	e20	e15	29	35	18	10	11	8.5
8	21	22	18	19	e19	15	26	39	17	9.8	10	8.9
9	20	21	e18	19	e18	e15	26	32	18	11	9.3	11
10	20	42	e18	19	e17	e16	34	31	17	14	10	8.1
11	19	34	18	e18	e15	e15	34	37	17	21	9.6	7.5
12	18	28	18	e17	e14	15	31	45	17	16	9.2	7.9
13	22	25	19	e17	e14	15	28	33	17	14	8.3	7.7
14	20	23	20	e17	e14	15	26	27	16	13	8.3	8.4
15	20	22	20	e16	e14	16	26	26	15	12	8.3	9.6
16	19	21	20	e16	e14	28	26	26	14	11	11	9.1
17	18	20	19	e16	e14	71	24	25	14	9.7	14	7.9
18	20	19	26	e16	e14	100	26	23	14	10	11	8.2
19	28	22	53	e15	e15	54	26	22	13	8.9	10	8.1
20	24	23	43	e15	e16	48	26	25	13	10	9.7	8.3
21	21	24	32	e15	16	66	29	23	13	16	9.0	8.1
22	21	28	28	e15	16	46	26	21	11	19	9.1	12
23	21	26	25	e14	16	39	23	20	12	16	8.1	13
24	20	25	24	e14	e16	36	22	29	11	14	7.8	11
25	20	25	23	e14	e16	47	21	28	10	12	9.0	11
26	24	23	22	e14	e15	43	21	24	10	10	21	11
27	22	20	22	e14	e15	34	20	22	11	11	15	11
28	21	20	22	e15	e15	33	19	21	11	9.7	12	11
29	20	21	21	e16	---	36	19	19	14	9.8	11	12
30	19	23	21	e17	---	29	19	19	13	8.6	10	11
31	19	---	28	e17	---	27	---	18	---	8.4	10	---
TOTAL	667	698	714	526	470	963	777	970	447	368.9	333.7	289.7
MEAN	21.5	23.3	23.0	17.0	16.8	31.1	25.9	31.3	14.9	11.9	10.8	9.66
MAX	41	42	53	24	25	100	34	71	22	21	21	13
MIN	16	19	18	14	14	14	19	18	10	8.4	7.8	7.5
CFSM	0.54	0.59	0.58	0.43	0.42	0.78	0.65	0.79	0.38	0.30	0.27	0.24
IN.	0.62	0.65	0.67	0.49	0.44	0.90	0.73	0.91	0.42	0.35	0.31	0.27

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 2003, BY WATER YEAR (WY)

MEAN	28.3	35.4	31.0	30.7	35.5	47.5	42.6	37.0	29.3	21.0	21.7	21.0
MAX	39.2	59.5	46.1	48.9	61.2	75.9	66.6	45.9	44.3	50.9	41.7	33.8
(WY)	1992	1995	1992	1993	1997	1990	1991	1997	1994	1994	1994	1993
MIN	18.7	17.7	19.8	17.0	16.8	25.3	25.9	26.5	14.9	11.6	10.8	9.66
(WY)	2000	2000	1990	2003	2003	2000	2003	1999	2003	1998	2003	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1988 - 2003	
ANNUAL TOTAL	9854		7224.3			
ANNUAL MEAN	27.0		19.8		31.7	
HIGHEST ANNUAL MEAN					40.7	1993
LOWEST ANNUAL MEAN					19.8	2003
HIGHEST DAILY MEAN	163	Mar 10	100	Mar 18	450	Mar 12 1990
LOWEST DAILY MEAN	11	Jul 24	7.5	Sep 11	5.6	Aug 2 1999
ANNUAL SEVEN-DAY MINIMUM	12	Jul 19	8.3	Sep 11	7.7	Jul 28 1998
MAXIMUM PEAK FLOW			120	Mar 18	558	Mar 12 1990
MAXIMUM PEAK STAGE			4.09	Mar 18	5.53	Mar 12 1990
ANNUAL RUNOFF (CFSM)	0.68		0.50		0.80	
ANNUAL RUNOFF (INCHES)	9.23		6.77		10.85	
10 PERCENT EXCEEDS	42		30		50	
50 PERCENT EXCEEDS	24		18		27	
90 PERCENT EXCEEDS	14		9.9		16	

(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 mi^2, 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 ft^3/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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	404	514	501	688	e400	e490	2300	1790	1430	617	334	344
2	413	454	638	778	e420	e520	2090	2700	1370	566	347	415
3	352	552	638	761	e450	e500	1990	2810	1200	539	361	316
4	439	512	410	723	e500	e490	2260	2680	1310	526	450	350
5	509	536	580	687	e680	e480	4240	2800	1290	533	435	351
6	586	506	665	657	e720	e480	4960	2800	1150	550	461	314
7	516	536	608	698	e720	e480	4730	2780	1120	664	533	319
8	447	523	602	694	e680	e480	4250	2680	1100	661	525	344
9	527	518	599	612	e580	e500	3730	2650	1150	658	439	339
10	449	678	573	622	e560	e540	3400	2750	1470	556	443	335
11	465	718	568	e770	e470	e510	3290	2970	1470	567	394	337
12	440	826	569	e600	e510	e500	3150	3380	1410	608	416	321
13	418	706	553	e500	e540	e600	2960	3560	1390	635	439	319
14	439	675	527	e560	e500	e800	2820	3360	1260	532	412	298
15	506	664	535	e600	e490	e1100	2640	3250	1000	516	367	307
16	427	620	525	e540	e480	2240	2540	3150	1090	476	318	327
17	469	665	510	e500	e470	4020	2300	3000	1050	365	423	329
18	440	627	566	e650	e470	3520	2210	2820	912	439	575	322
19	517	664	687	e720	e470	3310	2100	2660	826	434	490	307
20	429	615	759	e560	e470	3230	1950	2590	773	436	431	315
21	431	660	869	e530	e480	3150	1960	2380	748	505	331	250
22	453	612	848	e500	e490	2830	1870	2320	852	478	353	360
23	498	654	802	e430	e560	2550	1700	1950	840	473	330	469
24	536	644	766	e410	e520	2460	1660	1890	807	448	324	446
25	528	659	728	e470	e500	2300	1550	1900	636	460	341	540
26	419	656	712	e460	e500	2290	1440	1750	528	503	383	536
27	536	656	627	e520	e490	2120	1360	1630	678	487	416	618
28	517	678	628	e480	e480	2010	1290	1480	788	342	382	556
29	443	618	626	e430	---	2210	1230	1410	677	366	449	552
30	559	537	700	e400	---	2390	1160	1300	617	389	399	547
31	503	---	743	e470	---	2260	---	1340	---	348	270	---
TOTAL	14615	18483	19662	18020	14600	51360	75130	76530	30942	15677	12571	11483
MEAN	471	616	634	581	521	1657	2504	2469	1031	506	406	383
MAX	586	826	869	778	720	4020	4960	3560	1470	664	575	618
MIN	352	454	410	400	400	480	1160	1300	528	342	270	250
CFSM	0.17	0.22	0.22	0.20	0.18	0.58	0.88	0.87	0.36	0.18	0.14	0.13
IN.	0.19	0.24	0.26	0.24	0.19	0.67	0.98	1.00	0.41	0.21	0.16	0.15

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	1217	1588	1899	1973	2459	4276	3994	2649	1630	1050	772	907
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	634575		359073			
ANNUAL MEAN	1739		984		2042	
HIGHEST ANNUAL MEAN					3482	1993
LOWEST ANNUAL MEAN					631	1964
HIGHEST DAILY MEAN	8420	Mar 11	4960	Apr 6	21300	Apr 1 1960
LOWEST DAILY MEAN	314	Sep 17	250	Sep 21	109	Jul 16 1977
ANNUAL SEVEN-DAY MINIMUM	351	Sep 12	308	Sep 15	118	Jul 14 1977
MAXIMUM PEAK FLOW			5050	Apr 6	21500	Apr 1 1960
MAXIMUM PEAK STAGE			14.57	Apr 6	23.43	Apr 1 1960
INSTANTANEOUS LOW FLOW			241	Sep 21	40	May 13 1968
ANNUAL RUNOFF (CFSM)	0.61		0.35		0.72	
ANNUAL RUNOFF (INCHES)	8.31		4.70		9.77	
10 PERCENT EXCEEDS	4050		2570		4410	
50 PERCENT EXCEEDS	948		566		1300	
90 PERCENT EXCEEDS	436		367		455	

(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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	3.2	3.6	5.5	3.3	3.1	5.8	21	6.1	2.4	2.5	2.6
2	2.5	3.2	3.3	4.3	3.4	3.1	5.4	20	4.8	2.4	3.2	3.0
3	3.3	3.2	3.2	4.1	3.7	2.8	5.6	9.9	4.5	2.3	3.5	2.5
4	4.1	3.2	3.0	4.0	5.5	3.0	40	6.8	4.5	2.4	6.4	2.4
5	5.6	3.3	3.2	4.0	4.6	3.1	63	13	4.9	2.9	5.6	2.3
6	3.5	4.0	3.4	4.0	3.9	3.1	24	10	4.4	2.9	3.7	2.2
7	3.3	3.6	3.5	4.0	3.5	3.0	15	7.3	4.3	3.9	5.8	2.1
8	3.0	3.5	3.5	4.1	3.3	3.3	11	6.8	5.1	3.1	3.5	2.1
9	2.9	3.4	2.9	4.7	3.4	3.5	11	13	7.4	3.1	3.1	2.1
10	2.8	6.9	3.1	3.9	3.2	3.2	10	26	4.9	2.9	2.8	2.1
11	2.7	5.8	3.1	4.0	3.1	3.1	8.3	29	4.6	3.0	4.2	2.0
12	2.8	4.4	3.2	3.8	3.2	3.4	7.2	36	7.6	2.8	4.5	1.9
13	3.5	4.0	3.4	3.6	2.9	4.1	6.5	22	6.2	2.5	3.2	1.9
14	3.1	3.9	3.6	3.5	2.7	4.3	6.2	13	4.8	2.4	2.8	2.1
15	3.0	5.3	3.7	3.3	2.6	11	5.7	13	4.0	2.4	3.8	2.6
16	2.9	4.3	3.6	3.0	2.2	23	5.4	13	3.6	2.4	3.5	2.3
17	2.9	3.9	3.3	2.8	2.3	25	5.1	9.7	3.4	2.3	3.5	2.0
18	3.7	3.7	5.2	2.4	3.2	19	5.2	7.9	3.3	2.3	2.8	1.9
19	3.5	4.5	9.4	2.7	3.2	12	5.1	6.8	3.6	2.2	2.6	1.9
20	3.3	4.2	10	2.9	3.2	12	5.2	7.2	3.1	3.1	2.4	2.0
21	3.2	4.5	6.0	3.0	3.5	13	5.2	6.3	2.9	5.2	2.4	1.9
22	3.1	5.8	4.9	2.8	3.6	9.5	4.9	5.5	2.7	5.5	3.4	4.8
23	3.1	4.9	4.4	2.5	3.8	7.9	4.6	5.2	2.6	3.4	2.6	5.8
24	3.1	4.7	4.1	2.6	3.6	7.1	4.5	6.0	2.6	2.8	2.4	3.5
25	3.5	4.4	3.9	2.8	3.2	7.8	4.4	6.0	2.5	2.5	2.4	4.6
26	4.1	4.1	4.3	2.9	3.0	6.7	4.3	5.4	2.9	2.4	2.9	3.2
27	3.6	3.7	3.9	2.7	2.9	5.8	4.2	5.0	3.1	2.5	2.9	3.2
28	3.4	3.6	4.1	2.8	3.0	7.0	4.1	4.8	2.7	2.3	2.6	3.0
29	3.2	3.8	3.9	3.0	---	13	3.9	4.6	2.7	2.2	2.5	2.8
30	3.2	4.0	4.9	3.0	---	7.2	4.7	4.5	2.5	2.2	2.4	2.7
31	3.2	---	9.9	3.1	---	5.9	---	8.2	---	2.1	2.2	---
TOTAL	101.5	125.0	135.5	105.8	93.0	239.0	295.5	352.9	122.3	86.8	102.1	79.5
MEAN	3.27	4.17	4.37	3.41	3.32	7.71	9.85	11.4	4.08	2.80	3.29	2.65
MAX	5.6	6.9	10	5.5	5.5	25	63	36	7.6	5.5	6.4	5.8
MIN	2.4	3.2	2.9	2.4	2.2	2.8	3.9	4.5	2.5	2.1	2.2	1.9
CFSM	0.43	0.55	0.58	0.45	0.44	1.01	1.30	1.50	0.54	0.37	0.43	0.35
IN.	0.50	0.61	0.66	0.52	0.46	1.17	1.45	1.73	0.60	0.42	0.50	0.39

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2003, BY WATER YEAR (WY)

MEAN	5.00	6.35	6.75	6.62	8.37	11.1	10.2	8.45	5.76	3.69	3.57	3.48
MAX	14.2	14.3	14.9	15.6	19.0	25.0	23.7	15.3	12.8	7.78	13.5	8.17
(WY)	1955	1995	1973	1974	2001	1974	1975	1973	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1954 - 2003	
ANNUAL TOTAL	2216.8		1838.9			
ANNUAL MEAN	6.07		5.04		6.56	
HIGHEST ANNUAL MEAN					11.1	1974
LOWEST ANNUAL MEAN					2.73	1964
HIGHEST DAILY MEAN	45	Mar 9	63	Apr 5	211	Apr 19 1975
LOWEST DAILY MEAN	1.9	Sep 11	1.9	Sep 12	0.70	Jul 29 1964
ANNUAL SEVEN-DAY MINIMUM	2.0	Sep 7	2.0	Sep 7	0.73	Aug 4 1964
MAXIMUM PEAK FLOW			104	Apr 5	470	Apr 19 1975
MAXIMUM PEAK STAGE			3.97	Apr 5	9.45	Apr 19 1975
INSTANTANEOUS LOW FLOW			(a)1.3	Feb 17	(a)0.44	Nov 3 1966
ANNUAL RUNOFF (CFSM)	0.80		0.66		0.86	
ANNUAL RUNOFF (INCHES)	10.85		9.00		11.73	
10 PERCENT EXCEEDS	11		7.9		12	
50 PERCENT EXCEEDS	4.4		3.5		4.5	
90 PERCENT EXCEEDS	2.5		2.4		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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	89	97	123	196	104	111	317	248	207	97	73	89
2	88	96	121	194	109	115	297	368	206	92	84	91
3	88	97	101	177	116	103	276	438	196	87	88	89
4	90	97	106	166	128	105	416	448	184	88	107	88
5	105	100	e105	161	133	108	815	445	178	94	115	85
6	112	106	e100	158	129	109	1150	443	174	100	113	81
7	109	109	e105	148	129	108	1280	429	168	105	111	78
8	105	109	e110	148	123	113	1290	402	165	106	111	76
9	100	110	e105	153	123	111	1190	397	176	111	105	74
10	98	128	104	156	122	105	1050	430	215	110	99	71
11	96	145	107	142	117	107	892	512	228	106	98	71
12	94	145	107	138	117	116	755	664	227	105	101	70
13	95	137	110	132	115	120	638	790	229	101	100	70
14	97	131	112	136	113	122	537	813	210	97	95	71
15	96	135	116	132	110	137	450	775	189	92	90	77
16	94	135	120	122	e105	253	395	703	173	91	94	77
17	93	130	116	119	105	512	345	621	158	87	120	75
18	100	126	125	118	106	682	313	546	146	85	147	73
19	104	125	166	116	107	732	290	469	138	81	141	71
20	105	128	213	114	108	714	273	400	130	83	127	70
21	103	132	232	112	112	662	263	350	122	100	113	70
22	101	143	216	110	114	606	255	309	118	116	107	80
23	100	148	196	109	115	544	242	278	111	126	98	98
24	99	149	183	105	117	472	228	260	106	116	91	105
25	101	146	167	104	110	413	219	252	102	104	88	112
26	105	142	162	105	106	372	209	240	99	94	88	112
27	108	135	159	e105	106	339	200	226	103	88	90	105
28	108	126	151	103	106	307	190	210	104	86	88	103
29	107	122	151	101	---	309	186	197	105	80	91	99
30	101	123	149	102	---	327	184	188	103	76	92	94
31	99	---	171	102	---	333	---	196	---	72	89	---
TOTAL	3090	3752	4309	4084	3205	9267	15145	13047	4770	2976	3154	2525
MEAN	99.7	125	139	132	114	299	505	421	159	96.0	102	84.2
MAX	112	149	232	196	133	732	1290	813	229	126	147	112
MIN	88	96	100	101	104	103	184	188	99	72	73	70
CFSM	0.26	0.32	0.36	0.34	0.30	0.78	1.31	1.09	0.41	0.25	0.26	0.22
IN.	0.30	0.36	0.42	0.39	0.31	0.90	1.46	1.26	0.46	0.29	0.30	0.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2003, BY WATER YEAR (WY)

MEAN	202	262	318	344	407	671	630	407	272	160	129	145
MAX	1072	939	895	1049	1140	1506	1914	1391	1011	410	385	358
(WY)	1987	1991	1991	1973	2001	1948	1947	1956	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1945 - 2003	
ANNUAL TOTAL	102777		69324			
ANNUAL MEAN	282		190		329	
HIGHEST ANNUAL MEAN					534	1993
LOWEST ANNUAL MEAN					99.2	1964
HIGHEST DAILY MEAN	1620	Mar 12	1290	Apr 8	6590	Apr 7 1947
LOWEST DAILY MEAN	71	Sep 14	70	Sep 12	35	Jul 31 1964
ANNUAL SEVEN-DAY MINIMUM	72	Sep 11	72	Sep 8	36	Aug 7 1964
MAXIMUM PEAK FLOW			1300	Apr 7	6810	Apr 7 1947
MAXIMUM PEAK STAGE			5.53	Apr 7	(a)10.20	Apr 7 1947
INSTANTANEOUS LOW FLOW			70	(b)	33	Aug 10 1964
ANNUAL RUNOFF (CFSM)	0.73		0.49		0.85	
ANNUAL RUNOFF (INCHES)	9.93		6.70		11.59	
10 PERCENT EXCEEDS	628		406		684	
50 PERCENT EXCEEDS	161		115		200	
90 PERCENT EXCEEDS	95		88		92	

(a) From graph based on gage readings.
(b) July 31, Aug. 1, Sept. 10-14, 19-22.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04118500 ROGUE RIVER NEAR ROCKFORD, MI

LOCATION.--Lat 43°04'56", long 85°35'27", in NE1/4 sec.15, T.8 N., R.11 W., Kent County, Hydrologic Unit 04050006, on left bank at downstream side of bridge on Packer Drive, 2.2 mi upstream from mouth, and 3.0 mi southwest of Rockford.

DRAINAGE AREA.--234 mi^2.

PERIOD OF RECORD.--February 1952 to September 1982, October 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 624.80 ft above sea level (levels by Johnson and Anderson, Inc.). Prior to Aug. 30, 1952, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Some regulation caused by dam 2 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 Sept. 12, 1986, reached a stage of 11.35 ft, from floodmark, and discharge of approximately 6,000 ft^3/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	118	133	170	180	e140	e120	291	336	177	146	107	74
2	118	134	170	175	e150	e120	265	462	167	127	107	76
3	121	133	137	164	e160	e120	242	517	161	116	119	77
4	158	133	181	162	e160	e120	254	467	161	111	120	75
5	176	137	172	157	e160	e120	266	459	179	112	115	74
6	177	143	e160	158	e155	e120	273	406	184	117	112	72
7	178	143	e155	155	e150	e120	282	368	184	117	107	70
8	164	142	e150	154	e145	e120	277	349	177	113	107	70
9	151	140	e150	159	e140	e125	265	359	185	109	108	70
10	144	238	e150	159	e135	e125	256	349	209	136	108	69
11	142	234	148	148	e135	e125	240	407	191	167	105	67
12	140	260	151	144	e130	126	229	476	175	164	103	67
13	145	270	149	e140	e130	128	216	555	170	145	99	67
14	142	261	154	e140	e125	129	204	557	162	128	97	67
15	140	234	159	e135	e125	140	192	523	152	120	94	72
16	136	199	157	e135	e125	178	183	415	144	110	92	78
17	134	181	159	e130	e120	253	178	351	135	107	90	85
18	138	170	182	e125	e120	394	187	303	131	104	90	78
19	149	173	232	e125	e120	544	197	267	128	100	88	73
20	151	168	256	e125	e125	602	250	259	124	97	84	73
21	153	175	267	e120	e130	544	257	249	117	137	83	72
22	145	188	258	e120	e130	476	265	232	115	165	80	85
23	140	200	241	e115	e130	407	259	215	115	157	80	95
24	138	209	212	e115	e130	364	241	213	113	142	79	105
25	139	213	195	e115	e125	355	214	211	109	127	79	98
26	141	196	183	e115	e125	329	195	209	110	115	88	94
27	144	185	175	e115	e125	317	181	200	113	110	84	103
28	145	177	172	e120	e125	331	174	189	138	107	83	110
29	143	172	170	e125	---	340	167	181	161	105	78	108
30	135	173	172	e130	---	323	166	177	165	101	74	102
31	134	---	180	e135	---	306	---	179	---	98	73	---
TOTAL	4479	5514	5567	4295	3770	7921	6866	10440	4552	3810	2933	2426
MEAN	144	184	180	139	135	256	229	337	152	123	94.6	80.9
MAX	178	270	267	180	160	602	291	557	209	167	120	110
MIN	118	133	137	115	120	120	166	177	109	97	73	67
CFSM	0.62	0.79	0.77	0.59	0.58	1.09	0.98	1.44	0.65	0.53	0.40	0.35
IN.	0.71	0.88	0.89	0.68	0.60	1.26	1.09	1.66	0.72	0.61	0.47	0.39

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	188	237	244	232	255	390	382	299	215	154	152	156
MAX	528	525	557	512	567	944	836	620	457	362	317	556
(WY)	1982	1991	1992	1973	1976	1976	1967	1956	1989	1994	1994	1975
MIN	100	118	126	116	107	222	175	122	108	83.8	83.2	80.9
(WY)	1965	1965	1963	1970	1963	2000	1958	1958	1964	1964	1971	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	87216		62573			
ANNUAL MEAN	239		171		241	
HIGHEST ANNUAL MEAN					360	(a)
LOWEST ANNUAL MEAN					155	1964
HIGHEST DAILY MEAN	1170	Mar 11	602	Mar 20	3290	Mar 6 1976
LOWEST DAILY MEAN	105	Jul 20	67	Sep 11	49	Aug 27 1955
ANNUAL SEVEN-DAY MINIMUM	111	Sep 11	68	Sep 8	58	Aug 13 1958
MAXIMUM PEAK FLOW			(b)653	May 14	3540	Mar 6 1976
MAXIMUM PEAK STAGE			(b)5.87	May 14	9.29	Mar 6 1976
INSTANTANEOUS LOW FLOW			66	(c)	28	Jan 22 1967
ANNUAL RUNOFF (CFSM)	1.02		0.73		1.03	
ANNUAL RUNOFF (INCHES)	13.87		9.95		14.02	
10 PERCENT EXCEEDS	356		271		415	
50 PERCENT EXCEEDS	217		144		192	
90 PERCENT EXCEEDS	123		90		110	

(a) 1976, 1991.
(b) Result of regulation.
(c) Sept. 13, 14.
(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 mi^2, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1140	1530	1720	2080	e1250	e1350	3810	3600	2540	1700	1120	926
2	1290	1440	1680	1990	e1300	e1400	3750	4780	2640	1650	1090	927
3	1290	1420	1590	2000	e1350	e1400	3500	5370	2590	1510	1290	1040
4	1400	1550	1460	2010	e1400	e1200	3820	4960	2460	1490	1460	918
5	1620	1520	1500	1990	e1600	e1250	5050	5290	2550	1460	1450	926
6	1680	1580	1430	1920	e1900	e1350	6800	5420	2530	1480	1440	987
7	1750	1610	e1650	1850	e1900	e1350	7570	5110	2440	1620	1370	889
8	1660	1620	e1700	1870	e1800	e1350	7630	4920	2430	1620	1520	865
9	1540	1590	e1650	1910	e1600	e1400	7180	4890	2480	1600	1520	903
10	1750	2100	e1600	1820	e1550	e1500	6660	4820	2540	1880	1360	869
11	2000	2160	1620	1340	e1400	e1400	6430	5540	2770	1700	1290	862
12	1520	2160	1600	1350	e1450	1320	5740	6880	2840	1580	1290	845
13	1390	2230	1590	e1550	e1500	1350	5290	7350	2770	1720	1250	824
14	1260	2130	1580	e1500	e1450	e1500	4200	7110	2750	1670	1220	827
15	1050	2100	1650	e1450	e1400	1660	4310	6700	2490	1610	1190	891
16	1150	1920	e1650	e1600	e1350	2040	4150	6330	2350	1420	1120	880
17	1370	1870	1600	e1500	e1300	3790	3830	5870	2310	1320	1130	847
18	1490	1890	1910	e1700	1240	6220	3610	5370	2220	1230	1110	859
19	1510	1890	2080	e1800	e1300	6560	3570	4910	2160	1120	1340	826
20	1590	1840	2230	e1550	e1350	6270	3640	4590	2040	1230	1350	820
21	1490	1840	2400	e1450	1420	6420	3520	4300	1900	1700	1220	828
22	1480	2010	2430	e1350	1450	6250	3470	3960	1800	2090	1080	888
23	1500	1940	2380	e1250	e1550	5610	3370	3720	1950	1930	949	1020
24	1520	1960	2300	e1200	e1500	5080	3210	3300	1920	1580	926	1300
25	1570	1960	2050	e1300	e1450	4720	3390	3420	1860	1480	943	1130
26	1630	1970	2010	e1350	e1400	4440	2830	3260	1670	1390	1030	1350
27	1500	2010	2010	e1400	e1400	4260	2630	3220	1520	1370	1020	1370
28	1610	1900	1940	e1350	e1350	4050	2230	3000	1750	1320	1160	1500
29	1550	1870	1900	e1250	---	3860	2230	2660	1930	1180	1070	1390
30	1440	1800	1850	e1200	---	3990	2350	2750	1840	1070	1220	1390
31	1580	---	1990	e1350	---	3920	---	2600	---	1030	1120	---
TOTAL	46320	55410	56750	49230	40910	98260	129770	146000	68040	46750	37648	29897
MEAN	1494	1847	1831	1588	1461	3170	4326	4710	2268	1508	1214	997
MAX	2000	2230	2430	2080	1900	6560	7630	7350	2840	2090	1520	1500
MIN	1050	1420	1430	1200	1240	1200	2230	2600	1520	1030	926	820
CFSM	0.30	0.38	0.37	0.32	0.30	0.65	0.88	0.96	0.46	0.31	0.25	0.20
IN.	0.35	0.42	0.43	0.37	0.31	0.75	0.99	1.11	0.52	0.35	0.29	0.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1901 - 2003, BY WATER YEAR (WY)

MEAN	2417	2921	3360	3687	4372	7542	6942	4822	3383	2171	1729	1950
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1901 - 2003	
ANNUAL TOTAL	1261285		804985			
ANNUAL MEAN	3456		2205		3769	
HIGHEST ANNUAL MEAN					6314	1943
LOWEST ANNUAL MEAN					1264	1931
HIGHEST DAILY MEAN	14300	Mar 13	7630	Apr 8	53300	Mar 27 1904
LOWEST DAILY MEAN	926	Sep 16	820	Sep 20	381	Aug 9 1936
ANNUAL SEVEN-DAY MINIMUM	986	Sep 12	850	Sep 16	438	Aug 8 1936
MAXIMUM PEAK FLOW			7690	Apr 7	54000	Mar 28 1904
MAXIMUM PEAK STAGE			8.23	Apr 7	(a)22.49	Mar 28 1904
INSTANTANEOUS LOW FLOW			727	Sep 14		
ANNUAL RUNOFF (CFSM)	0.71		0.45		0.77	
ANNUAL RUNOFF (INCHES)	9.58		6.11		10.45	
10 PERCENT EXCEEDS	6950		4500		7610	
50 PERCENT EXCEEDS	2330		1620		2570	
90 PERCENT EXCEEDS	1320		1120		1200	

(a) Present datum; from graph based on gage readings.
(e) Estimated.

.STREAMS TRIBUTARY TO LAKE MICHIGAN

442805084411001 HIGGINS LAKE NEAR ROSCOMMON, MI

LOCATION.--Lat 44°25'35", long 84°40'55", in NW1/4 SW1/4 sec.33, T.24 N., R.3 W., Roscommon County, Hydrologic Unit 04060102, at South Higgins Lake State Park, 6.7 mi southwest of Roscommon.

DRAINAGE AREA.--58 mi^2, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is 1,148.74 ft above sea level. Sept. 1, 1942 to Nov. 27, 1942, nonrecording gage at different datum. Nov. 27, 1942 to June 9, 1988, water-stage recorder at same datum. June 9, 1988 to Nov. 6, 1998, nonrecording gage at same datum.

REMARKS.--Inlets are Big Creek and Little Creek. The outlet is "The Cut". Lake elevation controlled by dam. Established legal level; summer, 1,154.11 ft, winter, 1,153.61 ft, above sea level. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 6.23 ft, June 26, 1954; minimum 4.32 ft, Oct. 3, 4, 1955.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 5.82 ft, July 5; minimum, 4.71 ft, Nov. 5.

OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.97	4.81	4.78	4.81	4.95	4.92	5.05	5.24	5.45	5.38	5.30	5.24
2	5.01	4.80	4.79	4.81	4.95	4.92	5.04	5.32	5.41	5.38	5.31	5.23
3	4.96	4.77	4.78	4.81	4.95	4.91	5.05	5.28	5.39	5.37	5.32	5.23
4	4.98	4.78	4.78	4.81	4.97	4.92	5.14	5.26	5.41	5.38	5.33	5.24
5	5.02	4.76	4.77	4.81	4.97	4.93	5.24	5.27	5.43	5.43	5.35	5.20
6	4.99	4.79	4.77	4.81	4.91	4.93	5.23	5.30	5.41	5.47	5.35	5.18
7	5.01	4.76	4.77	4.81	4.91	4.93	5.23	5.29	5.41	5.41	5.35	5.17
8	4.95	4.76	4.77	4.81	4.91	4.94	5.22	5.35	5.42	5.45	5.34	5.17
9	4.95	4.76	4.75	4.82	4.92	4.95	5.21	5.35	5.48	5.41	5.34	5.16
10	4.93	4.81	4.75	4.83	4.92	4.95	5.21	5.35	5.45	5.40	5.34	5.15
11	4.93	4.83	4.75	4.83	4.92	4.95	5.21	5.40	5.51	5.48	5.34	5.14
12	4.93	4.80	4.75	4.83	4.93	4.95	5.19	5.47	5.47	5.45	5.33	5.12
13	4.96	4.80	4.76	4.84	4.93	4.95	5.18	5.43	5.47	5.41	5.33	5.12
14	4.91	4.83	4.76	4.84	4.93	4.95	5.19	5.39	5.48	5.40	5.32	5.12
15	4.91	4.83	4.78	4.84	4.93	4.94	5.19	5.40	5.46	5.41	5.33	5.16
16	4.90	4.82	4.76	4.85	4.93	4.95	5.22	5.37	5.43	5.40	5.33	5.14
17	4.86	4.82	4.75	4.85	4.93	4.95	5.24	5.36	5.43	5.38	5.32	5.12
18	4.86	4.80	4.76	4.85	4.93	4.95	5.27	5.35	5.44	5.36	5.31	5.11
19	4.88	4.81	4.78	4.85	4.93	4.95	5.27	5.35	5.47	5.34	5.31	5.13
20	4.87	4.81	4.80	4.83	4.92	4.96	5.29	5.42	5.45	5.34	5.30	5.11
21	4.85	4.82	4.81	4.86	4.92	5.00	5.30	5.37	5.43	5.35	5.35	5.09
22	4.88	4.83	4.81	4.87	4.93	5.01	5.32	5.35	5.43	5.36	5.38	5.13
23	4.85	4.81	4.81	4.88	4.92	5.01	5.29	5.39	5.42	5.35	5.35	5.17
24	4.84	4.81	4.80	4.88	4.92	5.00	5.29	5.46	5.41	5.33	5.33	5.13
25	4.83	4.80	4.81	4.89	4.92	5.01	5.28	5.43	5.40	5.32	5.33	5.12
26	4.84	4.80	4.80	4.90	4.92	5.00	5.28	5.43	5.40	5.32	5.35	5.10
27	4.84	4.79	4.79	4.91	4.92	5.00	5.27	5.43	5.39	5.34	5.34	5.13
28	4.82	4.79	4.80	4.92	4.92	5.03	5.26	5.44	5.38	5.32	5.31	5.14
29	4.82	4.78	4.80	4.92	---	5.04	5.24	5.46	5.41	5.31	5.28	5.12
30	4.81	4.84	4.80	4.92	---	5.04	5.20	5.43	5.39	5.30	5.27	5.13
31	4.81	---	4.82	4.93	---	5.04	---	5.48	---	5.29	5.25	---
MEAN	4.90	4.80	4.78	4.85	4.93	4.97	5.22	5.37	5.43	5.38	5.33	5.15
MAX	5.02	4.84	4.82	4.93	4.97	5.04	5.32	5.48	5.51	5.48	5.38	5.24
MIN	4.81	4.76	4.75	4.81	4.91	4.91	5.04	5.24	5.38	5.29	5.25	5.09

CAL YR 2002	MEAN 5.11	MAX 5.57	MIN 4.75
WTR YR 2003	MEAN 5.09	MAX 5.51	MIN 4.75

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 mi^2.

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, 9.00 ft, June 12; minimum, 7.45 ft, Oct. 4.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.77	7.69	7.83	7.94	8.05	8.16	8.46	8.68	8.77	8.70	8.58	8.32
2	7.72	7.70	7.84	7.94	8.05	8.16	8.47	8.65	8.79	8.69	8.54	8.32
3	7.76	7.76	7.84	7.94	8.06	8.17	8.49	8.65	8.79	8.68	8.54	8.30
4	7.81	7.71	7.85	7.95	8.08	8.17	8.58	8.66	8.75	8.66	8.51	8.22
5	7.71	7.76	7.85	7.95	8.08	8.19	8.58	8.70	8.75	8.63	8.49	8.27
6	7.84	7.71	7.85	7.95	8.09	8.19	8.62	8.63	8.78	8.66	8.47	8.27
7	7.65	7.77	7.85	7.96	8.09	8.20	8.63	8.71	8.79	8.65	8.46	8.27
8	7.80	7.77	7.85	7.96	8.10	8.21	8.62	8.71	8.79	8.60	8.45	8.28
9	7.74	7.79	7.85	7.96	8.10	8.23	8.63	8.80	8.77	8.62	8.45	8.27
10	7.74	7.81	7.85	7.97	8.11	8.23	8.64	8.70	8.86	8.69	8.43	8.26
11	7.75	7.77	7.85	7.97	8.11	8.23	8.63	8.82	8.85	8.59	8.41	8.27
12	7.76	7.82	7.85	7.97	8.12	8.23	8.63	8.59	8.91	8.61	8.42	8.30
13	7.66	7.82	7.86	7.97	8.13	8.23	8.67	8.67	8.85	8.68	8.42	8.25
14	7.78	7.80	7.86	7.97	8.13	8.24	8.72	8.77	8.83	8.72	8.41	8.23
15	7.71	7.77	7.86	7.97	8.13	8.24	8.69	8.78	8.86	8.68	8.38	8.18
16	7.66	7.79	7.86	7.97	8.13	8.24	8.79	8.77	8.86	8.61	8.38	8.19
17	7.72	7.75	7.86	7.97	8.13	8.25	8.83	8.79	8.84	8.65	8.39	8.21
18	7.78	7.79	7.87	7.98	8.14	8.26	8.72	8.80	8.80	8.63	8.37	8.24
19	7.67	7.82	7.89	7.98	8.14	8.26	8.75	8.81	8.77	8.64	8.35	8.14
20	7.69	7.82	7.91	7.98	8.14	8.29	8.82	8.64	8.76	8.64	8.35	8.13
21	7.73	7.80	7.92	7.98	8.14	8.32	8.77	8.77	8.77	8.64	8.38	8.17
22	7.74	7.72	7.92	7.99	8.14	8.34	8.69	8.77	8.77	8.63	8.34	8.20
23	7.73	7.82	7.92	7.99	8.14	8.35	8.76	8.72	8.76	8.62	8.37	8.16
24	7.75	7.80	7.92	8.00	8.15	8.36	8.77	8.72	8.75	8.61	8.37	8.21
25	7.78	7.79	7.92	8.00	8.15	8.36	8.75	8.77	8.75	8.63	8.35	8.14
26	7.74	7.81	7.92	8.01	8.15	8.37	8.71	8.78	8.70	8.62	8.33	8.23
27	7.72	7.82	7.92	8.02	8.16	8.37	8.73	8.78	8.65	8.54	8.30	8.19
28	7.76	7.82	7.93	8.02	8.16	8.41	8.65	8.79	8.71	8.58	8.37	8.14
29	7.76	7.81	7.93	8.03	---	8.43	8.65	8.75	8.70	8.57	8.28	8.13
30	7.73	7.69	7.93	8.03	---	8.44	8.68	8.80	8.70	8.58	8.32	8.14
31	7.72	---	7.94	8.04	---	8.44	---	8.75	---	8.57	8.33	---
MEAN	7.74	7.78	7.88	7.98	8.12	8.28	8.67	8.73	8.78	8.63	8.40	8.22
MAX	7.84	7.82	7.94	8.04	8.16	8.44	8.83	8.82	8.91	8.72	8.58	8.32
MIN	7.65	7.69	7.83	7.94	8.05	8.16	8.46	8.59	8.65	8.54	8.28	8.13

CAL YR 2002	MEAN 8.16	MAX 8.81	MIN 7.65
WTR YR 2003	MEAN 8.27	MAX 8.91	MIN 7.65

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 mi^2.

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, 6.96 ft, May 12; minimum observed, 5.72 ft, Jan. 4 to Feb. 2, and Feb. 4 to Mar. 17.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.19	6.03	5.83	5.75	5.72	5.72	6.02	6.76	6.56	6.46	6.36	6.18
2	6.17	6.01	5.83	5.75	5.72	5.72	6.06	6.76	6.62	6.44	6.38	6.14
3	6.19	6.01	5.83	5.75	5.74	5.72	6.10	6.76	6.66	6.44	6.40	6.12
4	6.19	5.99	5.83	5.72	5.72	5.72	6.12	6.76	6.70	6.44	6.40	6.10
5	6.29	5.97	5.83	5.72	5.72	5.72	6.12	6.76	6.72	6.44	6.40	6.08
6	6.29	5.97	5.83	5.72	5.72	5.72	6.14	6.80	6.74	6.44	6.38	6.06
7	6.29	5.95	5.83	5.72	5.72	5.72	6.18	6.84	6.74	6.44	6.36	6.06
8	6.27	5.95	5.81	5.72	5.72	5.72	6.19	6.88	6.74	6.42	6.34	6.06
9	6.25	5.95	5.81	5.72	5.72	5.72	6.18	6.92	6.72	6.42	6.32	6.04
10	6.25	5.95	5.79	5.72	5.72	5.72	6.20	6.94	6.72	6.42	6.30	6.04
11	6.23	5.95	5.79	5.72	5.72	5.72	6.22	6.94	6.70	6.42	6.28	6.02
12	6.23	5.95	5.77	5.72	5.72	5.72	6.24	6.96	6.68	6.42	6.28	6.00
13	6.23	5.95	5.75	5.72	5.72	5.72	6.28	6.92	6.68	6.42	6.26	5.98
14	6.21	5.93	5.75	5.72	5.72	5.72	6.32	6.90	6.68	6.42	6.26	5.98
15	6.19	5.93	5.75	5.72	5.72	5.72	6.36	6.88	6.66	6.40	6.24	5.98
16	6.19	5.93	5.75	5.72	5.72	5.72	6.40	6.86	6.66	6.40	6.24	6.00
17	6.17	5.93	5.75	5.72	5.72	5.72	6.44	6.86	6.64	6.40	6.24	6.00
18	6.17	5.91	5.75	5.72	5.72	5.74	6.50	6.84	6.64	6.38	6.22	6.00
19	6.15	5.91	5.75	5.72	5.72	5.74	6.54	6.82	6.62	6.38	6.22	6.00
20	6.13	5.91	5.75	5.72	5.72	5.76	6.60	6.80	6.60	6.38	6.20	6.00
21	6.13	5.91	5.75	5.72	5.72	5.76	6.64	6.78	6.58	6.38	6.20	6.00
22	6.13	5.91	5.75	5.72	5.72	5.80	6.68	6.74	6.56	6.42	6.18	6.00
23	6.13	5.89	5.75	5.72	5.72	5.82	6.68	6.72	6.54	6.40	6.18	6.00
24	6.11	5.89	5.75	5.72	5.72	5.84	6.70	6.70	6.52	6.38	6.18	6.00
25	6.09	5.87	5.75	5.72	5.72	5.86	6.72	6.66	6.50	6.36	6.16	6.00
26	6.09	5.85	5.75	5.72	5.72	5.90	6.74	6.64	6.50	6.34	6.16	6.00
27	6.07	5.85	5.75	5.72	5.72	5.92	6.76	6.62	6.48	6.34	6.20	6.00
28	6.05	5.85	5.75	5.72	5.72	5.96	6.76	6.58	6.48	6.34	6.16	6.00
29	6.05	5.85	5.75	5.72	---	5.96	6.76	6.56	6.48	6.34	6.20	6.00
30	6.05	5.85	5.75	5.72	---	5.98	6.76	6.54	6.46	6.32	6.20	6.00
31	6.03	---	5.75	5.72	---	6.00	---	6.52	---	6.32	6.18	---
MEAN	6.17	5.93	5.78	5.72	5.72	5.78	6.41	6.77	6.62	6.40	6.26	6.03
MAX	6.29	6.03	5.83	5.75	5.74	6.00	6.76	6.96	6.74	6.46	6.40	6.18
MIN	6.03	5.85	5.75	5.72	5.72	5.72	6.02	6.52	6.46	6.32	6.16	5.98

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121300 CLAM RIVER AT VOGEL CENTER, MI

LOCATION.--Lat 44°12'02", long 85°03'10", in SW1/4 NW1/4 sec.21, T.21 N., R.6 W., Missaukee County, Hydrologic Unit 04060102, on left bank 10 ft downstream from bridge on 8 Mile Road, 0.5 mi north of Vogel Center, and 3.5 mi southeast of Falmouth.

DRAINAGE AREA.--243 mi^2.

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

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

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	60	85	71	72	e62	e58	93	109	79	59	52	51
2	60	85	74	63	e64	e58	94	117	76	57	52	50
3	62	85	66	74	e66	57	92	102	74	56	53	52
4	68	84	e70	72	e66	e57	79	94	73	55	118	50
5	81	84	e70	70	66	e57	83	94	75	55	120	49
6	77	84	e70	69	e65	e57	99	114	74	57	84	49
7	71	84	e70	64	e64	e58	91	111	74	62	66	48
8	68	84	e70	74	e62	e58	85	104	74	62	62	48
9	67	88	71	71	e62	59	88	99	89	57	58	52
10	66	102	72	64	e62	e58	98	94	95	66	56	49
11	65	99	76	61	e62	e60	123	110	115	89	54	47
12	66	92	75	e62	e62	e62	141	150	105	84	52	47
13	68	87	77	e62	e60	67	131	155	89	70	51	46
14	68	85	79	e62	e60	66	118	142	79	62	51	47
15	66	83	80	e62	e58	68	117	130	73	58	50	48
16	71	81	74	e62	e58	86	161	124	69	57	50	48
17	77	79	70	e62	e58	118	175	121	67	65	50	47
18	81	78	78	e62	e60	146	169	120	66	86	51	46
19	88	82	86	e62	e60	139	170	117	65	72	50	46
20	89	82	94	e62	e60	139	162	116	67	62	49	45
21	86	83	86	e62	e66	136	153	111	65	71	58	45
22	88	83	82	e62	72	125	133	104	68	89	62	50
23	90	82	76	e62	e65	113	117	111	64	80	55	61
24	88	81	75	e60	e63	107	107	121	61	67	53	57
25	86	81	78	e60	e61	103	101	122	61	60	53	52
26	88	78	75	e60	e60	99	96	104	59	61	55	51
27	87	78	72	e60	e58	93	92	89	57	66	57	54
28	87	78	76	e60	e58	98	89	83	62	61	54	56
29	85	78	74	e62	---	113	87	80	69	56	53	54
30	84	80	73	e62	---	103	88	78	65	53	54	54
31	85	---	74	e62	---	94	---	81	---	52	53	---
TOTAL	2373	2515	2334	1984	1740	2712	3432	3407	2209	2007	1836	1499
MEAN	76.5	83.8	75.3	64.0	62.1	87.5	114	110	73.6	64.7	59.2	50.0
MAX	90	102	94	74	72	146	175	155	115	89	120	61
MIN	60	78	66	60	58	57	79	78	57	52	49	45
CFSM	0.32	0.34	0.31	0.26	0.26	0.36	0.47	0.45	0.30	0.27	0.24	0.21
IN.	0.36	0.39	0.36	0.30	0.27	0.42	0.53	0.52	0.34	0.31	0.28	0.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2003, BY WATER YEAR (WY)

MEAN	113	131	132	119	121	186	230	153	113	88.8	82.5	95.0
MAX	275	248	259	187	194	389	396	245	218	238	185	281
(WY)	1987	1986	1992	1993	1988	1976	1976	1976	1996	1969	1969	1985
MIN	60.6	70.3	64.5	62.7	62.1	87.5	104	67.9	57.0	53.0	58.1	50.0
(WY)	2001	1977	1977	1977	2003	2003	2000	1977	1977	1977	1978	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1966 - 2003	
ANNUAL TOTAL	40975		28048			
ANNUAL MEAN	112		76.8		131	
HIGHEST ANNUAL MEAN					185	1992
LOWEST ANNUAL MEAN					76.8	2003
HIGHEST DAILY MEAN	411	Mar 11	175	Apr 17	1680	Mar 29 1989
LOWEST DAILY MEAN	59	Sep 17	45	Sep 20	45	Sep 20 2003
ANNUAL SEVEN-DAY MINIMUM	60	Sep 12	46	Sep 15	46	Sep 15 2003
MAXIMUM PEAK FLOW			184	Apr 16	1710	Mar 29 1989
MAXIMUM PEAK STAGE			3.38	Apr 16	7.31	Mar 29 1989
INSTANTANEOUS LOW FLOW			44	(a)	(b)29	Nov 3 1969
ANNUAL RUNOFF (CFSM)	0.46		0.32		0.54	
ANNUAL RUNOFF (INCHES)	6.27		4.29		7.30	
10 PERCENT EXCEEDS	188		113		218	
50 PERCENT EXCEEDS	88		70		108	
90 PERCENT EXCEEDS	64		53		66	

(a) Part of each day Sept. 19, 21, 22.
(b) Result of freezeup.
(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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	339	497	478	573	e430	e420	834	1290	690	486	440	341
2	338	491	463	477	e430	420	817	1330	665	457	428	348
3	342	486	303	443	e430	e330	790	1260	641	434	456	340
4	367	482	346	497	e440	361	783	1180	616	416	540	336
5	417	475	e420	507	e450	407	736	1180	604	404	535	329
6	421	476	e450	514	e450	e400	736	1310	598	401	549	321
7	414	478	e450	444	e450	e400	736	1310	591	521	499	318
8	403	485	e450	487	e450	402	735	1280	581	534	471	311
9	397	484	e450	540	e440	e400	722	1230	586	480	447	306
10	388	582	457	480	e440	409	843	1170	635	524	428	304
11	386	627	483	341	e440	e400	1060	1220	765	682	418	300
12	379	600	482	341	e440	394	1150	1340	822	731	412	294
13	386	580	487	429	e440	400	974	1300	795	705	403	291
14	383	573	497	416	e440	437	899	1210	744	658	389	290
15	381	565	506	e390	e440	411	877	1140	689	599	377	304
16	377	548	545	e390	e440	500	916	1080	646	598	364	314
17	378	526	447	e380	e440	e800	985	1020	597	600	357	310
18	403	505	455	e380	e440	1110	1160	966	559	697	349	304
19	461	519	580	e380	e450	1160	1290	923	533	701	343	293
20	460	513	634	e390	e450	1230	1570	886	508	628	334	289
21	451	544	635	e390	e440	1270	1630	842	494	609	342	290
22	459	540	611	e380	e440	1180	1500	794	474	663	352	322
23	466	527	586	e390	e440	1080	1370	756	458	693	361	344
24	460	524	540	e390	e440	995	1270	779	444	633	362	355
25	460	517	522	e390	e440	979	1210	833	424	576	366	350
26	471	506	545	e400	e440	941	1150	837	421	548	376	340
27	475	480	551	e400	e430	880	e1110	805	420	542	373	371
28	469	489	538	e400	e430	880	e1110	760	464	521	358	379
29	468	495	535	e410	---	958	e1110	732	552	498	346	372
30	491	498	519	e410	---	927	e1140	696	521	477	333	376
31	499	---	543	e420	---	865	---	699	---	458	328	---
TOTAL	12989	15612	15508	13179	12330	21746	31213	32158	17537	17474	12436	9742
MEAN	419	520	500	425	440	701	1040	1037	585	564	401	325
MAX	499	627	635	573	450	1270	1630	1340	822	731	549	379
MIN	338	475	303	341	430	330	722	696	420	401	328	289
CFSM	0.29	0.36	0.35	0.30	0.31	0.49	0.73	0.72	0.41	0.39	0.28	0.23
IN.	0.34	0.41	0.40	0.34	0.32	0.56	0.81	0.83	0.46	0.45	0.32	0.25

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	773	991	968	866	906	1570	2189	1359	977	675	546	623
MAX	2402	2656	2270	1700	2353	4115	3869	2709	2945	2901	1243	2269
(WY)	1987	1992	1992	1973	1938	1976	1971	1947	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	340788		211924			
ANNUAL MEAN	934		581		(a)1044	
HIGHEST ANNUAL MEAN					1532	1992
LOWEST ANNUAL MEAN					581	2003
HIGHEST DAILY MEAN	3000	Mar 13	1630	Apr 21	8770	Mar 31 1989
LOWEST DAILY MEAN	303	Dec 3	289	Sep 20	252	Aug 28 1941
ANNUAL SEVEN-DAY MINIMUM	330	Sep 12	298	Sep 9	274	Aug 27 1941
MAXIMUM PEAK FLOW			1670	Apr 20	9040	Mar 31 1989
MAXIMUM PEAK STAGE			8.48	Apr 20	14.99	Mar 31 1989
INSTANTANEOUS LOW FLOW			(b)200	Dec 3	(b)164	Dec 20 1947
ANNUAL RUNOFF (CFSM)	0.65		0.41		0.73	
ANNUAL RUNOFF (INCHES)	8.85		5.50		9.90	
10 PERCENT EXCEEDS	1960		1070		1960	
50 PERCENT EXCEEDS	655		480		802	
90 PERCENT EXCEEDS	388		346		443	

(a) Does not include water years 1931, 1934.
(b) 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 mi^2.

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 except the following period: Apr. 24-30 rated good. Dissolved oxygen records rated excellent except the following periods: Nov. 6-14, 29, Dec. 12-14, Jan. 8 to Feb. 3, Feb. 19-22, Mar. 12, Apr. 9-16, 27, May 20-27, June 26 to July 1, July 28 to Aug. 6 rated good; Nov. 15-26, Nov. 30 to Dec. 1, Dec. 15-19, Mar. 15-20, Apr. 28-30, May 28, 29, July 2-9, Aug. 7-22 rated fair; and Oct. 1-22, Dec. 2-11, Dec. 20 to Jan. 7, Mar. 21-24, May 1-7, Aug. 23-26 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, 27.0°C, Aug. 21; minimum, -0.5°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 16.1 mg/L, Jan. 6; minimum, 5.9 mg/L, Aug. 22.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	19.5	16.5	18.0	5.0	3.5	4.0	0.0	0.0	0.0	0.5	0.0	0.0
2	18.5	16.5	17.5	3.5	3.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
3	16.5	15.0	15.5	4.5	3.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
4	16.5	14.5	15.0	5.0	4.0	4.5	0.0	0.0	0.0	1.0	0.0	0.5
5	15.0	13.0	14.0	4.0	3.5	3.5	0.0	0.0	0.0	1.5	0.5	1.0
6	13.5	12.0	12.5	4.0	3.5	3.5	0.0	0.0	0.0	1.0	0.0	0.5
7	13.0	10.5	11.5	4.0	2.5	3.5	0.0	0.0	0.0	0.0	-0.5	0.0
8	11.5	10.0	11.0	7.0	4.0	5.0	0.0	0.0	0.0	2.0	0.0	0.5
9	13.5	10.5	11.5	8.0	5.5	6.5	0.0	0.0	0.0	2.0	0.5	1.5
10	12.5	10.5	11.5	9.5	8.0	8.5	0.0	0.0	0.0	0.5	-0.5	0.0
11	14.5	10.5	12.5	9.0	7.0	8.0	0.0	0.0	0.0	-0.5	-0.5	-0.5
12	13.0	11.5	12.0	7.0	5.5	6.5	0.0	0.0	0.0	-0.5	-0.5	-0.5
13	12.0	9.5	11.0	6.5	5.0	5.5	0.5	0.0	0.0	-0.5	-0.5	-0.5
14	11.0	7.5	9.0	6.0	5.0	5.5	0.5	0.0	0.5	-0.5	-0.5	-0.5
15	10.5	7.5	9.0	5.5	3.5	4.5	1.0	0.0	0.5	-0.5	-0.5	-0.5
16	9.5	7.5	8.5	3.5	2.0	2.5	0.0	0.0	0.0	-0.5	-0.5	-0.5
17	7.5	6.0	6.5	2.5	1.0	1.5	0.5	0.0	0.0	0.0	-0.5	-0.5
18	6.5	6.0	6.5	2.0	0.5	1.5	1.5	0.0	0.5	0.0	-0.5	-0.5
19	8.5	6.5	7.5	4.5	2.0	3.0	3.5	1.5	3.0	0.0	-0.5	-0.5
20	7.5	6.0	7.0	4.0	2.5	3.5	3.0	1.5	2.0	0.0	-0.5	-0.5
21	6.0	5.0	5.5	4.5	3.5	4.0	1.5	0.5	1.0	-0.5	-0.5	-0.5
22	6.5	5.5	6.0	3.5	3.0	3.5	0.5	0.0	0.5	-0.5	-0.5	-0.5
23	7.0	5.0	6.0	3.0	2.5	3.0	0.5	0.0	0.0	-0.5	-0.5	-0.5
24	7.0	5.0	6.0	3.5	3.0	3.0	0.0	0.0	0.0	0.0	-0.5	-0.5
25	5.5	5.0	5.0	3.0	2.0	3.0	0.5	0.0	0.0	0.0	-0.5	-0.5
26	6.0	5.0	5.5	2.0	1.0	1.5	1.5	0.0	0.5	0.0	-0.5	-0.5
27	7.0	5.5	6.0	1.0	0.0	0.5	1.0	0.0	0.5	0.0	-0.5	-0.5
28	7.5	5.5	6.0	0.5	0.0	0.5	1.5	0.5	1.0	0.0	-0.5	0.0
29	5.5	4.5	5.0	3.0	0.5	1.5	2.0	1.0	1.5	0.0	-0.5	-0.5
30	6.5	4.0	5.0	2.5	0.0	1.5	2.5	1.0	1.5	0.0	-0.5	0.0
31	6.0	4.5	5.0	---	---	---	2.5	0.5	1.5	0.0	-0.5	0.0
MONTH	19.5	4.0	9.3	9.5	0.0	3.7	3.5	0.0	0.5	2.0	-0.5	-0.2

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121650 MUSKEGON RIVER AT BIG RAPIDS, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	0.0	0.0	0.0	0.5	-0.5	0.0	7.5	5.0	6.5	12.0	11.0	11.5
2	0.0	-0.5	0.0	0.5	-0.5	0.0	7.5	6.5	7.0	12.0	10.5	11.5
3	0.0	-0.5	0.0	0.0	-0.5	-0.5	6.5	3.5	5.0	13.0	9.5	11.5
4	0.0	-0.5	0.0	0.5	-0.5	0.0	3.5	0.0	1.5	13.5	10.5	12.0
5	0.0	-0.5	-0.5	0.5	-0.5	0.0	2.0	-0.5	0.5	12.5	11.5	11.5
6	0.0	-0.5	0.0	0.5	-0.5	0.0	4.5	0.5	2.5	12.5	11.0	11.5
7	0.0	-0.5	0.0	0.0	-0.5	0.0	3.0	1.0	2.0	11.5	10.5	11.0
8	0.0	-0.5	0.0	0.0	-0.5	0.0	4.5	1.0	2.5	13.5	11.0	12.0
9	0.0	-0.5	0.0	0.5	-0.5	0.0	7.0	2.0	4.5	15.5	11.5	13.5
10	0.0	-0.5	0.0	0.5	-0.5	0.0	8.5	4.0	6.5	16.5	14.0	15.5
11	0.0	-0.5	-0.5	0.5	-0.5	0.0	10.0	6.0	8.0	16.0	12.5	14.5
12	0.0	-0.5	-0.5	0.0	0.0	0.0	10.5	7.0	8.5	12.5	10.5	11.5
13	0.0	-0.5	-0.5	1.0	-0.5	0.0	11.0	7.0	9.0	14.0	10.0	12.0
14	0.0	-0.5	0.0	1.0	-0.5	0.0	12.5	8.5	10.5	15.0	11.5	13.5
15	0.0	-0.5	0.0	1.5	-0.5	0.5	15.0	11.0	13.0	14.0	13.0	13.5
16	0.0	-0.5	-0.5	2.5	0.0	1.0	14.5	9.0	12.0	14.0	13.5	14.0
17	0.0	-0.5	0.0	5.5	2.5	3.5	9.0	7.5	8.0	15.0	13.0	14.0
18	0.0	0.0	0.0	3.5	2.0	3.0	8.0	7.0	7.5	17.5	13.5	15.5
19	0.5	-0.5	0.0	3.5	0.5	2.0	10.0	7.0	8.5	17.5	15.5	16.5
20	0.5	-0.5	0.0	3.0	2.0	2.5	11.5	9.5	10.5	17.0	14.5	16.5
21	0.5	0.0	0.0	2.5	2.0	2.0	10.5	9.0	10.0	17.5	13.0	15.0
22	0.5	-0.5	0.0	3.5	2.5	3.0	10.0	8.0	9.0	17.5	13.0	15.5
23	0.5	-0.5	0.0	5.0	3.5	4.0	10.5	7.0	9.0	15.5	14.0	15.0
24	0.5	-0.5	0.0	6.5	4.0	5.0	11.5	8.0	9.5	14.0	13.0	13.5
25	0.5	-0.5	0.0	8.5	5.5	7.0	12.5	9.0	11.0	14.5	12.5	13.5
26	0.5	-0.5	0.0	7.5	5.5	6.5	13.0	9.5	11.5	16.0	12.5	14.5
27	0.5	-0.5	0.0	6.5	5.0	5.5	13.5	10.0	12.0	17.0	13.5	15.5
28	0.5	-0.5	0.0	6.5	5.0	5.5	15.5	11.5	13.5	19.0	14.5	16.5
29	---	---	---	6.0	4.5	5.0	15.0	12.0	13.5	19.5	16.0	17.5
30	---	---	---	6.0	3.0	4.5	14.0	11.5	12.5	17.0	14.5	15.5
31	---	---	---	6.5	3.5	5.0	---	---	---	16.0	14.0	14.5
MONTH	0.5	-0.5	-0.1	8.5	-0.5	2.1	15.5	-0.5	8.2	19.5	9.5	13.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	17.0	12.0	14.5	23.5	18.5	21.0	23.5	20.5	22.0	18.5	17.0	18.0
2	18.0	13.5	15.5	24.5	19.5	22.0	22.5	20.5	21.5	20.5	15.0	17.5
3	18.0	15.0	16.5	25.5	20.5	23.0	21.0	19.5	20.5	19.5	16.5	18.0
4	16.5	13.5	15.0	26.5	22.0	24.0	23.0	18.5	20.5	17.5	15.0	16.5
5	16.5	13.0	14.5	25.5	22.0	23.5	23.5	20.5	21.5	18.5	13.0	15.5
6	16.0	13.5	15.0	25.5	20.5	22.5	24.0	20.0	22.0	20.0	14.0	17.0
7	18.5	14.5	16.0	25.5	21.0	23.0	24.0	20.5	22.0	21.5	16.0	18.5
8	17.5	15.0	16.0	23.5	21.5	23.0	23.0	20.5	22.0	22.0	17.5	19.5
9	18.0	15.5	16.5	24.5	20.0	22.0	22.0	20.0	21.0	22.0	18.0	19.5
10	16.5	14.5	15.0	22.0	19.5	20.5	23.5	19.0	21.0	22.0	17.0	19.5
11	17.0	14.5	15.5	19.5	17.0	18.0	23.0	20.5	21.5	21.5	17.5	19.5
12	18.5	15.0	16.5	21.0	16.0	18.5	22.5	20.0	21.0	21.5	17.5	19.5
13	19.5	16.5	18.0	21.0	18.0	19.5	25.5	20.0	22.5	21.0	18.5	19.5
14	21.5	17.0	19.5	23.0	18.0	20.5	26.5	21.5	23.5	19.5	18.0	19.0
15	23.0	18.5	20.5	23.0	20.0	21.0	26.0	22.5	24.0	19.0	17.0	18.0
16	22.0	18.0	20.0	23.5	18.5	21.0	25.0	22.5	23.5	19.5	15.0	17.5
17	23.5	18.5	21.0	22.5	20.0	21.5	25.5	21.0	23.0	20.5	15.5	17.5
18	23.5	19.5	21.0	23.5	19.0	21.0	25.5	20.5	23.0	20.5	16.0	18.5
19	23.0	19.0	21.0	23.0	18.5	20.5	25.5	20.5	23.0	18.5	15.5	17.0
20	23.0	17.5	20.0	21.5	19.5	20.5	25.5	20.0	22.5	18.0	13.5	15.5
21	23.5	18.0	20.5	21.5	18.5	20.0	27.0	21.5	24.0	17.0	13.0	15.0
22	24.0	18.5	21.0	21.5	18.5	20.0	25.5	21.5	23.5	15.5	14.5	15.0
23	24.5	19.0	21.5	22.5	18.0	20.5	24.0	20.0	22.0	15.5	13.0	14.0
24	25.0	20.5	22.5	23.5	19.0	21.0	22.0	19.5	20.5	14.0	12.5	13.5
25	26.5	21.5	24.0	23.5	19.5	21.5	22.5	19.5	21.0	13.0	11.5	12.0
26	24.0	20.5	22.5	21.5	20.0	20.5	24.5	20.0	22.0	12.5	10.0	11.5
27	22.5	18.5	20.5	24.5	20.0	22.0	24.0	20.0	22.0	13.0	11.5	12.0
28	20.0	18.0	19.0	23.5	19.5	21.5	23.0	18.0	20.5	13.0	11.0	11.5
29	21.5	17.0	19.0	24.0	19.0	21.5	23.5	20.5	22.0	12.5	10.0	11.0
30	22.5	18.0	20.0	24.0	19.5	22.0	22.0	18.0	20.0	11.5	9.0	10.0
31	---	---	---	24.5	20.5	22.0	20.5	17.0	19.0	---	---	---
MONTH	26.5	12.0	18.6	26.5	16.0	21.3	27.0	17.0	21.9	22.0	9.0	16.2

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121650 MUSKEGON RIVER AT BIG RAPIDS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	9.0	7.2	8.0	12.2	11.4	11.8	14.0	12.8	13.3	13.8	11.5	12.8
2	8.5	7.1	7.7	12.5	11.7	12.1	13.8	12.8	13.3	12.6	10.2	11.3
3	9.5	7.4	8.6	12.5	11.6	12.1	13.9	12.7	13.2	13.3	11.1	12.1
4	8.7	7.8	8.3	12.2	11.4	11.7	14.2	12.6	13.2	13.8	12.4	13.0
5	9.4	7.9	8.7	12.0	11.5	11.7	13.9	12.3	13.2	15.9	13.0	14.4
6	9.2	8.3	8.6	12.0	11.4	11.6	14.3	13.1	13.7	16.1	13.9	15.3
7	9.4	8.3	8.8	12.6	11.5	12.0	13.9	13.2	13.6	15.4	13.6	14.5
8	9.5	8.4	8.9	11.7	10.6	11.3	14.3	12.6	13.5	15.9	14.0	14.7
9	9.8	8.7	9.1	11.4	10.1	10.7	14.6	12.4	13.5	15.2	14.3	14.7
10	9.9	8.7	9.3	10.4	9.7	10.0	14.4	13.5	14.0	14.8	12.6	13.8
11	10.1	8.7	9.4	10.9	9.6	10.3	14.7	13.6	14.1	14.7	11.6	13.3
12	9.8	8.7	9.2	11.4	10.4	10.9	14.7	13.8	14.2	14.2	13.1	13.7
13	10.2	8.9	9.5	12.1	11.0	11.4	15.1	14.2	14.5	14.1	12.0	13.3
14	10.6	9.5	10.0	11.7	10.9	11.3	15.4	14.1	14.6	14.0	12.5	13.3
15	10.6	9.6	10.1	12.6	11.2	11.8	15.5	13.7	14.6	13.8	11.2	12.6
16	10.6	9.5	10.1	13.2	12.1	12.6	15.1	12.6	14.0	14.0	10.7	12.4
17	11.0	10.0	10.6	13.4	12.6	13.0	15.6	14.0	14.7	13.7	11.6	12.7
18	10.8	10.4	10.6	13.7	12.8	13.2	14.9	14.1	14.4	13.6	10.6	12.1
19	10.8	10.1	10.4	13.0	12.1	12.6	14.2	12.9	13.5	13.3	11.8	12.8
20	11.1	10.2	10.6	13.1	12.1	12.5	14.3	12.7	13.5	---	---	---
21	11.7	10.5	11.1	12.5	11.7	12.0	14.9	13.4	14.1	---	---	---
22	11.8	11.0	11.3	13.1	11.7	12.3	14.3	13.2	13.6	---	---	---
23	11.8	10.9	11.3	12.9	12.1	12.4	14.1	12.1	13.1	---	---	---
24	12.1	11.1	11.6	13.3	12.0	12.6	13.9	11.3	12.4	11.7	11.0	11.3
25	12.0	11.3	11.7	13.4	12.3	12.8	13.6	12.1	12.8	11.3	10.7	11.0
26	11.7	11.1	11.4	14.3	12.7	13.4	14.1	12.1	12.8	---	---	---
27	12.0	10.8	11.4	14.4	12.7	13.6	14.6	11.6	12.9	---	---	---
28	12.0	11.1	11.4	14.3	13.0	13.6	13.8	12.3	13.1	10.9	10.5	10.7
29	12.3	11.2	11.7	14.1	13.0	13.4	14.0	12.4	12.9	11.1	10.4	10.6
30	12.4	11.4	11.8	14.2	12.8	13.4	13.7	12.1	13.0	11.1	10.1	10.7
31	12.1	11.3	11.6	---	---	---	14.1	11.6	12.8	11.1	10.4	10.7
MONTH	12.4	7.1	10.1	14.4	9.6	12.1	15.6	11.3	13.6	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	11.2	10.4	10.8	---	---	---	12.0	11.0	11.6	9.0	8.5	8.9
2	11.8	10.9	11.3	---	---	---	11.8	10.8	11.2	10.3	8.6	9.6
3	12.0	11.3	11.6	---	---	---	11.8	11.0	11.4	10.5	9.1	10.0
4	12.4	10.7	11.8	---	---	---	13.0	11.7	12.3	10.2	8.8	9.5
5	13.2	10.4	11.8	---	---	---	13.7	12.0	12.9	9.4	8.5	9.0
6	13.0	10.6	11.9	---	---	---	13.7	12.6	13.1	10.0	8.8	9.4
7	13.1	9.9	11.6	13.4	10.4	12.1	13.3	12.5	12.9	10.2	9.2	9.7
8	12.9	10.9	12.1	13.2	11.7	12.7	13.6	12.5	13.1	10.3	9.3	9.7
9	13.0	10.7	11.9	14.1	11.5	12.5	13.0	11.8	12.5	10.2	8.8	9.5
10	12.8	11.0	11.8	14.3	11.5	12.7	12.5	11.1	11.9	9.8	8.4	9.1
11	12.7	10.3	11.6	14.2	11.5	12.9	11.9	10.6	11.3	9.4	8.1	8.8
12	12.5	10.4	11.5	14.0	12.8	13.4	11.6	10.5	11.0	9.8	8.9	9.4
13	---	---	---	---	---	---	11.7	10.3	10.9	10.7	9.4	10.0
14	---	---	---	---	---	---	11.4	9.8	10.7	10.5	9.2	9.8
15	---	---	---	14.9	13.2	14.0	10.8	9.1	10.0	10.2	8.6	9.4
16	---	---	---	14.6	13.4	13.9	10.7	8.8	9.9	10.1	8.8	9.4
17	---	---	---	13.6	12.9	13.3	11.8	10.4	11.2	10.3	8.9	9.6
18	12.1	11.6	11.8	13.4	12.7	13.1	11.5	10.5	11.0	10.5	8.8	9.6
19	12.7	11.4	12.0	13.8	12.4	13.2	11.3	10.2	10.8	10.2	8.5	9.3
20	13.2	11.7	12.3	13.2	12.2	12.7	---	---	---	10.3	8.2	9.2
21	13.5	11.9	12.4	12.8	12.2	12.6	---	---	---	11.0	9.0	9.9
22	13.1	10.9	12.3	12.6	11.7	12.2	---	---	---	11.1	9.0	10.0
23	---	---	---	12.4	11.6	12.2	---	---	---	10.9	8.7	9.7
24	---	---	---	11.8	10.7	11.4	---	---	---	10.6	9.0	9.8
25	---	---	---	12.0	10.3	11.2	10.2	9.1	9.7	10.8	9.2	10.1
26	---	---	---	12.0	11.2	11.6	10.3	9.2	9.7	11.1	9.2	10.1
27	---	---	---	12.0	10.8	11.4	10.4	9.3	9.8	11.0	8.9	9.9
28	---	---	---	11.7	11.2	11.5	10.3	9.0	9.6	10.7	8.7	9.7
29	---	---	---	12.2	11.1	11.7	10.2	8.7	9.4	10.9	8.3	9.5
30	---	---	---	12.5	11.8	12.2	9.3	8.5	8.9	9.9	8.3	9.2
31	---	---	---	12.4	11.5	12.0	---	---	---	11.1	8.5	9.8
MONTH	---	---	---	---	---	---	---	---	---	11.1	8.1	9.6

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121650 MUSKEGON RIVER AT BIG RAPIDS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	11.4	9.4	10.3	9.5	7.2	8.3	8.9	6.5	7.6	9.4	7.4	8.4
2	11.0	9.1	10.0	9.6	7.2	8.3	8.8	6.8	7.8	9.5	7.4	8.4
3	10.5	8.5	9.5	9.4	6.9	8.1	8.2	7.0	7.5	8.6	6.9	7.7
4	9.9	8.5	9.2	9.3	6.7	7.8	9.3	7.4	8.3	8.8	6.4	7.4
5	10.7	8.9	9.8	8.8	6.7	7.7	9.1	7.0	7.9	8.1	6.6	7.3
6	10.4	9.0	9.6	9.3	6.8	7.8	9.0	7.1	8.0	8.0	6.3	7.0
7	10.1	8.6	9.3	8.6	6.7	7.5	8.9	6.8	7.8	8.6	6.1	7.0
8	9.6	8.4	9.0	8.7	6.7	7.8	8.6	6.8	7.6	8.2	6.1	7.1
9	9.8	8.2	8.9	9.7	7.2	8.3	9.2	6.8	8.0	8.1	6.3	7.1
10	9.3	8.4	8.7	8.3	7.2	7.7	9.3	7.3	8.2	8.8	6.6	7.5
11	9.7	8.3	9.0	8.7	7.4	8.0	8.8	6.7	7.5	8.2	6.6	7.4
12	9.6	8.3	8.9	9.4	7.7	8.4	8.5	6.6	7.4	8.2	6.4	7.2
13	9.6	7.9	8.7	8.7	7.3	7.9	8.5	6.2	7.4	8.3	6.2	7.2
14	9.8	7.7	8.7	8.4	6.7	7.6	8.5	6.1	7.2	7.9	6.3	7.0
15	9.6	7.5	8.4	8.0	6.3	7.0	8.2	6.0	6.8	8.3	6.5	7.4
16	9.8	7.2	8.5	8.4	6.4	7.4	7.6	6.1	6.7	9.1	6.9	7.9
17	10.0	7.6	8.7	8.2	6.4	7.2	8.5	6.2	7.2	9.0	7.1	8.0
18	9.9	7.4	8.4	9.0	7.0	7.8	8.7	6.6	7.6	9.5	7.4	8.3
19	10.1	7.4	8.7	9.3	7.2	8.0	9.3	6.8	7.8	9.5	7.6	8.4
20	10.1	7.7	8.8	8.3	6.8	7.4	8.4	6.4	7.3	10.1	8.1	8.9
21	10.1	7.6	8.8	8.7	6.8	7.6	7.9	6.1	6.9	10.5	8.4	9.4
22	10.0	7.5	8.6	8.8	7.2	8.0	8.2	5.9	7.0	9.6	8.4	8.9
23	9.6	7.1	8.2	9.4	7.6	8.3	8.3	6.1	7.3	10.4	8.8	9.5
24	9.3	6.8	7.9	9.2	7.2	8.1	8.7	6.6	7.6	10.6	8.9	9.6
25	9.4	6.7	7.9	9.0	7.3	8.1	9.6	6.8	7.9	11.5	9.1	10.2
26	8.8	6.4	7.4	8.3	6.7	7.5	10.1	7.2	8.5	11.4	9.6	10.5
27	9.9	7.3	8.4	9.5	7.2	8.2	9.6	7.5	8.4	10.9	9.4	10.0
28	8.7	7.1	7.8	8.9	7.0	7.8	9.5	7.2	8.2	11.3	9.6	10.3
29	9.3	7.5	8.3	9.1	7.1	7.9	9.2	6.8	7.8	11.3	9.9	10.5
30	9.7	7.3	8.4	9.4	6.9	8.0	9.6	7.0	8.3	11.4	9.9	10.6
31	---	---	---	8.6	6.6	7.5	9.6	7.2	8.4	---	---	---
MONTH	11.4	6.4	8.8	9.7	6.3	7.8	10.1	5.9	7.7	11.5	6.1	8.4

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 mi^2.

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: Oct. 1-17 rated good. Dissolved oxygen records rated excellent except the following periods: Oct. 20-25, Nov. 11-17, Dec. 24-31, Jan. 31 to Feb. 3, Apr. 4-8, Apr. 27 to May 2, May 23-29, June 3-5, 22-25, July 17-21, Aug. 12-17, Sept. 3-6 rated good; Oct. 26-30, Nov. 18-26, Jan. 1-6, Apr. 9-16, May 3-7, June 6-9, 26-30, July 22-28, Aug. 18-25, Sept. 7-15 rated fair; and June 10-16, July 1-9, July 29 to Aug. 1, Sept. 16-23 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, 25.0°C, Aug. 16, 22; minimum, 0.0°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 14.4 mg/L, Jan. 20; minimum, 5.6 mg/L, July 11.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	17.5	16.5	17.0	5.0	5.0	5.0	1.5	1.5	1.5	1.5	1.0	1.5
2	18.0	17.5	18.0	5.0	4.5	4.5	1.5	0.5	1.0	1.5	0.5	1.0
3	18.0	17.0	17.5	4.5	3.5	4.0	0.5	0.5	0.5	1.0	0.0	0.5
4	17.0	16.0	16.5	4.0	3.5	4.0	0.5	0.5	0.5	0.5	0.5	0.5
5	16.5	15.5	16.0	3.5	3.5	3.5	0.5	0.5	0.5	0.5	0.0	0.0
6	16.0	14.5	15.0	4.0	3.5	4.0	0.5	0.0	0.0	0.0	0.0	0.0
7	14.5	13.5	14.0	4.0	3.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0
8	13.5	12.5	13.0	4.0	3.5	4.0	0.0	0.0	0.0	0.0	0.0	0.0
9	12.5	12.0	12.5	4.5	4.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0
10	13.0	12.0	12.5	7.0	4.5	6.0	0.0	0.0	0.0	0.5	0.0	0.5
11	13.5	12.0	12.5	8.0	7.0	7.5	0.0	0.0	0.0	0.5	0.5	0.5
12	13.0	12.5	12.5	8.0	7.0	7.5	0.0	0.0	0.0	0.5	0.0	0.5
13	13.0	12.5	12.5	7.0	6.5	7.0	0.0	0.0	0.0	0.0	0.0	0.0
14	12.5	11.0	12.0	6.5	6.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0
15	11.0	10.5	11.0	6.0	5.5	6.0	0.0	0.0	0.0	0.0	0.0	0.0
16	11.0	10.0	10.5	5.5	4.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0
17	10.0	9.0	9.5	4.5	3.5	4.0	0.0	0.0	0.0	0.0	0.0	0.0
18	9.0	7.5	8.0	3.5	2.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0
19	7.5	7.0	7.5	2.5	1.5	2.0	0.0	0.0	0.0	0.0	0.0	0.0
20	7.5	7.0	7.0	2.5	2.0	2.0	1.5	0.0	0.5	0.0	0.0	0.0
21	7.0	7.0	7.0	3.0	2.5	2.5	1.5	1.0	1.5	0.0	0.0	0.0
22	7.0	6.5	7.0	3.5	2.5	3.0	1.0	0.5	1.0	0.0	0.0	0.0
23	6.5	6.0	6.5	3.5	3.0	3.0	0.5	0.5	0.5	0.0	0.0	0.0
24	6.0	6.0	6.0	3.0	3.0	3.0	0.5	0.0	0.0	0.0	0.0	0.0
25	6.0	6.0	6.0	3.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0
26	6.0	5.5	6.0	3.0	2.5	3.0	0.0	0.0	0.0	0.0	0.0	0.0
27	6.0	5.5	5.5	3.0	2.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
28	6.0	5.5	5.5	2.0	1.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
29	6.0	6.0	6.0	1.0	0.5	1.0	0.5	0.0	0.5	0.0	0.0	0.0
30	6.0	5.5	6.0	1.5	1.0	1.0	1.0	0.5	0.5	0.0	0.0	0.0
31	6.0	5.0	5.5	---	---	---	1.0	1.0	1.0	0.0	0.0	0.0
MONTH	18.0	5.0	10.4	8.0	0.5	3.9	1.5	0.0	0.3	1.5	0.0	0.2

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121660 MUSKEGON RIVER NEAR STANWOOD, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	0.0	0.0	0.0	---	---	---	6.0	5.0	5.5	13.5	12.0	13.0
2	0.0	0.0	0.0	---	---	---	7.0	6.0	6.5	12.5	12.0	12.0
3	0.0	0.0	0.0	---	---	---	7.0	6.0	6.5	12.5	11.5	12.0
4	0.0	0.0	0.0	---	---	---	6.0	3.5	5.0	12.5	11.5	12.0
5	0.0	0.0	0.0	---	---	---	3.5	2.5	3.0	12.5	12.0	12.0
6	0.0	0.0	0.0	---	---	---	2.5	1.5	2.0	12.0	11.5	12.0
7	0.0	0.0	0.0	---	---	---	2.0	1.5	2.0	11.5	11.5	11.5
8	0.0	0.0	0.0	---	---	---	2.0	2.0	2.0	11.5	11.0	11.0
9	0.0	0.0	0.0	---	---	---	3.0	2.0	2.5	13.0	11.5	12.0
10	0.0	0.0	0.0	---	---	---	5.0	3.0	4.0	15.0	13.0	14.0
11	0.0	0.0	0.0	---	---	---	9.0	5.0	7.0	15.5	14.5	15.0
12	0.0	0.0	0.0	---	---	---	9.5	7.5	8.5	14.5	12.0	13.0
13	0.0	0.0	0.0	---	---	---	10.0	8.5	9.0	12.0	11.5	11.5
14	0.0	0.0	0.0	---	---	---	11.0	9.5	10.0	13.5	12.0	12.5
15	0.0	0.0	0.0	---	---	---	13.0	11.0	12.0	14.0	13.5	13.5
16	---	---	---	---	---	---	13.5	12.5	13.0	14.0	13.5	13.5
17	---	---	---	---	---	---	12.5	10.0	11.0	14.5	13.5	14.0
18	---	---	---	---	---	---	10.0	8.0	8.5	15.5	14.0	14.5
19	---	---	---	---	---	---	9.0	8.0	8.5	16.0	15.0	15.5
20	---	---	---	---	---	---	10.5	9.0	10.0	17.0	16.0	16.5
21	---	---	---	---	---	---	11.0	10.0	10.5	16.5	15.5	16.0
22	---	---	---	---	---	---	10.0	9.0	9.5	16.5	15.5	15.5
23	---	---	---	---	---	---	9.5	9.0	9.0	16.0	15.5	15.5
24	---	---	---	---	---	---	10.5	9.0	9.5	15.5	14.5	15.0
25	---	---	---	---	---	---	12.0	10.0	11.0	14.5	13.5	14.0
26	---	---	---	6.5	5.0	6.0	12.0	11.0	11.5	15.0	13.5	14.5
27	---	---	---	6.5	6.0	6.5	12.5	11.5	12.0	15.5	14.5	15.0
28	---	---	---	6.0	5.5	6.0	13.5	12.5	13.0	16.5	15.0	15.5
29	---	---	---	5.5	5.0	5.5	14.5	13.5	14.0	18.0	16.5	17.0
30	---	---	---	5.5	5.0	5.0	14.5	13.5	14.0	17.5	17.0	17.0
31	---	---	---	5.0	4.5	4.5	---	---	---	17.0	15.5	16.5
MONTH	---	---	---	---	---	---	14.5	1.5	8.3	18.0	11.0	14.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	14.5	15.0	22.0	21.0	21.0	23.0	22.5	22.5	21.0	20.5	21.0
2	16.0	14.5	15.0	22.5	21.5	22.0	23.0	22.0	22.5	20.5	19.5	20.0
3	17.0	16.0	16.5	23.5	22.0	22.5	23.0	21.5	22.5	19.5	19.0	19.5
4	16.5	16.0	16.0	24.0	23.0	23.5	22.0	21.0	21.5	19.5	18.5	19.5
5	16.0	14.5	15.5	24.5	23.5	24.0	22.0	21.0	21.5	18.5	17.5	18.0
6	15.5	15.0	15.0	24.5	23.5	24.0	22.5	22.0	22.5	18.0	17.0	17.5
7	16.5	15.0	15.5	24.5	23.5	24.0	23.5	22.5	23.0	18.5	18.0	18.0
8	16.5	16.0	16.5	24.5	24.0	24.0	23.0	22.5	23.0	19.5	18.5	19.0
9	17.0	16.0	17.0	24.0	23.5	24.0	22.5	22.0	22.5	20.0	19.5	19.5
10	17.0	16.0	17.0	24.0	22.0	23.0	22.5	21.5	22.0	20.5	20.0	20.0
11	16.5	16.0	16.5	22.0	20.0	21.0	23.0	22.0	22.5	20.5	20.0	20.0
12	17.0	16.0	16.5	20.0	19.0	19.5	23.0	22.0	22.5	20.5	20.0	20.5
13	18.0	16.5	17.0	20.5	19.5	20.0	23.0	22.0	22.5	20.5	20.5	20.5
14	19.0	18.0	18.5	21.0	19.5	20.0	23.5	22.5	23.0	20.5	20.0	20.5
15	20.5	19.0	19.5	21.5	21.0	21.0	24.0	23.5	23.5	20.5	19.5	20.0
16	21.0	20.0	20.5	22.0	21.0	21.5	25.0	24.0	24.0	20.0	19.0	19.5
17	21.0	20.5	20.5	22.5	21.5	22.0	24.5	24.0	24.5	19.0	18.5	19.0
18	22.0	21.0	21.5	22.5	21.5	22.0	24.5	23.5	24.0	19.5	19.0	19.0
19	22.5	21.5	21.5	22.0	21.0	21.5	24.0	23.5	24.0	19.5	19.0	19.0
20	22.0	21.0	21.5	22.0	21.5	21.5	24.0	23.5	24.0	19.0	17.5	18.5
21	22.0	21.0	21.5	21.5	21.0	21.5	24.5	23.5	24.0	17.5	17.0	17.5
22	22.0	21.0	21.5	21.5	20.5	21.0	25.0	24.0	24.5	17.5	16.5	17.0
23	22.5	21.5	22.0	21.5	20.5	21.0	24.5	24.0	24.5	16.5	16.0	16.5
24	23.0	22.0	22.5	21.5	20.5	21.0	24.0	22.5	23.5	16.0	15.5	15.5
25	24.0	22.5	23.0	22.0	21.0	21.5	23.0	22.0	22.5	15.5	14.5	15.0
26	24.0	23.0	23.5	22.0	21.5	22.0	22.5	22.0	22.5	14.5	13.0	13.5
27	23.5	22.0	22.5	22.5	21.5	22.0	23.0	22.5	23.0	13.5	13.0	13.0
28	22.5	21.0	22.0	22.5	22.0	22.0	23.0	22.0	22.5	13.5	13.0	13.0
29	21.0	20.5	20.5	22.5	21.5	22.0	23.0	22.0	22.5	13.0	12.5	12.5
30	21.0	20.0	20.5	22.5	22.0	22.5	23.0	22.0	22.5	12.5	11.5	12.0
31	---	---	---	22.5	22.0	22.5	22.0	21.0	21.5	---	---	---
MONTH	24.0	14.5	19.1	24.5	19.0	22.0	25.0	21.0	23.0	21.0	11.5	17.8

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121660 MUSKEGON RIVER NEAR STANWOOD, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	12.3	11.9	12.1	12.9	12.5	12.7	13.3	12.8	13.0
2	---	---	---	12.2	11.8	12.0	13.5	12.6	13.2	13.5	13.1	13.4
3	---	---	---	12.4	12.0	12.2	13.4	13.2	13.4	13.4	12.6	13.0
4	---	---	---	12.5	12.2	12.4	13.4	13.3	13.3	13.4	12.5	13.0
5	---	---	---	12.8	12.4	12.6	13.6	13.3	13.5	13.3	12.8	13.0
6	---	---	---	12.8	12.1	12.5	13.6	13.4	13.5	13.4	12.9	13.1
7	---	---	---	12.3	11.8	12.1	13.5	13.3	13.4	13.7	12.9	13.3
8	---	---	---	12.4	11.7	12.1	13.3	13.2	13.2	13.4	13.0	13.2
9	---	---	---	12.4	11.7	12.2	13.3	13.0	13.2	13.4	12.9	13.2
10	---	---	---	12.3	11.4	11.9	13.4	13.0	13.2	13.2	12.5	12.8
11	10.5	9.5	10.1	11.6	9.9	10.7	13.5	12.9	13.3	13.4	12.6	13.1
12	10.3	9.6	9.9	10.8	9.8	10.2	13.5	12.9	13.3	13.5	12.8	13.2
13	10.1	9.1	9.7	10.5	9.6	10.0	13.5	13.2	13.4	13.5	13.2	13.4
14	9.9	9.0	9.4	10.8	10.1	10.4	13.3	13.0	13.2	13.4	12.9	13.1
15	10.3	9.7	10.0	11.1	10.5	10.8	13.1	12.9	13.0	13.5	13.0	13.3
16	10.5	10.0	10.3	11.8	10.7	11.2	13.1	12.9	13.0	13.5	13.2	13.4
17	10.8	10.3	10.5	12.1	11.1	11.7	13.3	12.9	13.2	13.4	12.3	13.0
18	10.9	10.1	10.6	12.6	11.7	12.2	13.6	13.0	13.4	13.5	12.8	13.1
19	11.1	10.6	10.9	13.4	12.2	12.6	13.6	13.3	13.5	13.5	12.6	13.1
20	11.2	10.7	11.0	13.1	12.6	12.8	13.3	11.0	12.6	14.4	12.8	13.7
21	11.1	10.7	10.9	13.5	12.3	12.7	12.5	11.0	12.2	14.3	11.9	12.9
22	11.0	10.5	10.8	12.9	12.1	12.5	13.0	12.5	12.7	12.7	11.9	12.2
23	11.4	10.8	11.1	13.0	11.6	12.4	13.1	12.3	12.9	13.6	11.7	12.5
24	11.4	11.1	11.2	12.4	11.6	12.0	13.2	12.3	12.7	13.9	11.3	12.3
25	11.5	11.2	11.4	12.4	12.0	12.1	13.6	12.4	13.3	12.3	11.3	12.0
26	11.8	11.3	11.6	12.6	11.9	12.3	13.7	13.6	13.6	12.1	11.3	11.8
27	11.6	11.0	11.5	13.1	11.8	12.4	13.7	13.5	13.6	12.3	11.0	11.6
28	11.6	10.6	11.3	13.6	13.1	13.4	13.8	13.0	13.6	11.6	11.2	11.4
29	11.7	10.7	11.3	13.7	12.6	13.4	13.7	12.6	13.6	13.7	11.3	11.8
30	12.0	10.8	11.6	13.0	12.5	12.8	13.3	12.3	13.2	11.5	10.9	11.2
31	12.2	11.8	12.0	---	---	---	13.3	12.9	13.2	11.5	11.0	11.3
MONTH	---	---	---	13.7	9.6	12.0	13.8	11.0	13.2	14.4	10.9	12.7

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	11.7	11.4	11.5	11.8	10.3	11.2	11.9	11.4	11.6	9.1	8.6	8.9
2	11.5	11.2	11.3	11.8	10.8	11.2	11.5	11.2	11.3	9.5	9.0	9.2
3	11.4	11.1	11.3	14.1	11.2	12.7	11.2	10.8	10.9	9.9	9.3	9.6
4	11.6	11.1	11.4	13.9	11.7	12.7	11.5	10.9	11.1	10.3	9.8	10.0
5	12.1	11.4	11.8	13.2	11.8	12.6	11.9	11.4	11.7	10.0	9.1	9.5
6	12.5	12.0	12.2	13.2	12.4	12.8	12.8	11.9	12.4	9.3	8.8	9.0
7	12.9	12.4	12.7	12.8	11.8	12.5	13.1	12.7	12.9	9.6	8.8	9.3
8	12.8	12.7	12.8	12.0	11.3	11.7	13.0	12.8	12.9	9.7	9.4	9.5
9	12.9	12.7	12.8	12.4	11.5	12.0	13.0	12.8	12.9	9.8	9.4	9.6
10	12.9	12.4	12.7	12.8	11.7	12.2	13.0	12.1	12.7	9.6	9.1	9.4
11	12.9	12.6	12.8	12.6	12.2	12.4	12.1	11.1	11.7	9.2	8.5	8.9
12	12.8	12.6	12.7	12.4	11.4	11.9	11.4	10.7	11.0	8.7	8.4	8.6
13	12.8	12.4	12.7	12.1	11.3	11.7	10.9	10.2	10.6	9.4	8.6	9.1
14	12.7	12.3	12.5	11.8	11.0	11.5	10.6	9.9	10.2	9.8	9.3	9.6
15	12.6	11.9	12.3	11.8	10.9	11.4	10.3	9.2	9.8	9.7	9.1	9.4
16	12.4	12.1	12.2	---	---	---	10.1	9.1	9.7	9.2	8.6	8.9
17	12.3	11.9	12.1	---	---	---	10.1	9.4	9.6	9.2	8.7	8.9
18	12.1	11.6	11.7	---	---	---	10.7	10.1	10.4	9.4	8.5	9.0
19	11.7	11.4	11.6	---	---	---	10.8	10.5	10.7	9.2	8.7	9.0
20	11.4	11.0	11.3	---	---	---	10.7	10.0	10.4	8.9	8.1	8.6
21	11.1	10.8	11.0	---	---	---	10.1	9.4	9.7	8.3	7.8	8.0
22	11.0	10.7	10.8	---	---	---	9.9	9.4	9.6	9.3	8.0	8.6
23	11.3	10.8	11.0	---	---	---	10.5	9.9	10.1	9.3	8.7	9.0
24	11.2	10.9	11.1	---	---	---	10.6	9.9	10.3	8.8	7.9	8.4
25	11.7	11.0	11.3	---	---	---	10.6	9.9	10.3	8.7	7.5	8.2
26	12.0	11.4	11.7	10.8	10.4	10.6	10.1	9.6	9.9	9.7	8.2	9.1
27	12.1	11.3	11.7	10.5	10.2	10.3	10.0	9.4	9.8	9.6	9.1	9.4
28	13.0	11.0	12.0	10.7	10.2	10.4	10.0	9.4	9.8	9.4	8.2	8.8
29	---	---	---	10.9	10.6	10.7	10.0	9.2	9.7	9.6	8.5	9.1
30	---	---	---	11.3	10.7	11.0	9.7	8.9	9.5	8.6	8.0	8.4
31	---	---	---	11.7	11.2	11.5	---	---	---	8.8	7.9	8.3
MONTH	13.0	10.7	11.9	---	---	---	13.1	8.9	10.8	10.3	7.5	9.0

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121660 MUSKEGON RIVER NEAR STANWOOD, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.8	7.3	8.1	8.2	7.6	7.8	8.4	6.9	7.6	8.9	8.1	8.4
2	9.8	8.3	9.0	8.3	7.8	7.9	7.5	6.2	7.1	8.8	8.0	8.3
3	9.8	8.5	9.2	8.3	7.3	7.8	8.2	5.7	7.0	9.1	7.8	8.3
4	8.9	7.7	8.3	8.0	7.5	7.7	7.4	6.0	6.9	9.7	8.1	8.9
5	7.9	6.7	7.3	7.9	6.9	7.5	8.3	7.1	7.6	8.3	7.0	7.7
6	8.0	7.2	7.5	7.7	6.5	7.2	8.3	7.5	8.0	8.9	7.2	7.9
7	8.1	7.3	7.8	8.0	6.2	6.9	8.5	7.8	8.1	9.5	8.0	8.8
8	8.2	7.1	7.7	8.0	5.9	6.8	8.2	6.8	7.8	10.4	8.7	9.7
9	7.9	7.0	7.5	7.2	5.8	6.5	7.1	6.5	6.9	10.3	9.2	9.9
10	8.1	6.1	7.5	7.1	5.8	6.3	7.4	6.1	6.8	10.1	9.2	9.6
11	8.5	6.1	7.5	6.5	5.6	6.1	8.2	7.1	7.6	9.7	8.5	9.1
12	9.3	8.3	8.8	7.7	6.2	7.0	8.0	7.0	7.5	9.5	8.2	8.8
13	9.1	8.5	8.8	8.2	7.3	7.7	7.9	6.3	7.2	9.3	8.4	8.9
14	8.8	8.1	8.5	8.2	6.9	7.7	8.4	6.8	7.8	9.4	7.7	8.7
15	8.8	7.7	8.4	8.1	7.5	7.7	8.4	7.2	7.7	8.5	7.7	8.0
16	9.4	8.1	8.7	7.6	6.5	7.3	7.6	6.8	7.3	9.1	7.7	8.2
17	9.0	7.8	8.6	7.9	7.0	7.3	7.1	6.1	6.6	9.8	8.6	9.2
18	9.5	8.5	9.0	7.7	6.6	7.3	6.9	6.1	6.6	10.2	9.4	9.7
19	9.4	8.2	9.0	7.8	6.0	7.1	7.5	6.5	6.9	10.0	9.0	9.5
20	8.7	7.0	8.0	7.8	6.9	7.3	7.5	6.5	7.1	9.7	7.8	8.6
21	8.6	7.4	8.1	7.4	6.3	6.9	8.1	7.0	7.4	9.4	7.7	8.4
22	9.1	7.7	8.5	7.1	6.4	6.9	8.5	7.2	7.8	10.5	8.6	9.5
23	9.1	7.8	8.3	7.3	6.7	7.0	8.3	7.0	7.7	10.3	9.4	9.9
24	8.5	7.2	7.9	8.1	7.2	7.5	7.6	6.8	7.3	10.4	8.7	9.8
25	8.1	7.0	7.5	8.1	7.0	7.7	7.6	6.8	7.2	10.4	10.1	10.2
26	7.7	6.2	7.0	7.8	6.6	7.4	8.4	6.9	7.6	10.9	9.9	10.4
27	7.0	5.7	6.2	7.6	6.7	7.2	8.8	8.0	8.3	11.4	10.7	11.0
28	7.1	6.2	6.6	7.6	7.2	7.3	8.6	6.6	8.0	11.6	11.0	11.3
29	7.1	6.3	6.7	8.0	6.3	7.3	9.5	6.7	8.1	11.4	10.6	11.1
30	7.9	6.9	7.3	8.4	7.7	8.0	9.1	7.9	8.6	11.4	10.9	11.2
31	---	---	---	8.4	7.3	7.9	8.4	7.3	8.0	---	---	---
MONTH	9.8	5.7	8.0	8.4	5.6	7.3	9.5	5.7	7.5	11.6	7.0	9.3

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 mi^2.

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. Dissolved oxygen records rated excellent except the following periods: Oct. 24-30, Nov. 15-23, Dec. 26 to Jan. 3, Jan. 22-31, Feb. 14-19, Apr. 4-8, May 5, 6, Sept. 4-8 rated good; Oct. 1-3, Nov. 24-26, Jan. 4-6, Feb. 1-3, 20-28, Apr. 9-16, Sept. 9-16 rated fair; and Oct. 4-9, Mar. 1-5, May 10-29, Sept. 17-23 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, 20.0°C, on many days during summer period; minimum, 0.5°C, on several days during winter period.
DISSOLVED OXYGEN: Maximum, 15.1 mg/L, Apr. 21; minimum, 0.7 mg/L, Sept. 8, 14, 27, 28.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	19.5	18.5	19.0	11.0	10.0	10.5	6.0	5.5	6.0	2.0	1.5	1.5
2	19.5	18.0	19.0	10.5	9.5	10.5	6.0	5.0	5.5	1.5	1.0	1.5
3	19.5	18.0	19.0	10.5	9.5	10.0	5.0	5.0	5.0	1.5	1.0	1.5
4	19.0	18.0	18.5	10.0	9.5	10.0	5.0	5.0	5.0	1.5	1.0	1.5
5	19.0	17.5	18.5	10.0	9.5	9.5	5.0	5.0	5.0	1.5	1.5	1.5
6	18.5	17.5	18.5	9.5	9.0	9.5	5.0	4.5	4.5	1.5	1.0	1.0
7	18.5	17.5	18.0	9.5	9.0	9.5	4.5	4.5	4.5	1.5	1.0	1.5
8	18.5	17.5	18.0	9.5	9.0	9.0	4.5	4.0	4.5	1.5	1.5	1.5
9	18.5	17.5	18.0	9.0	9.0	9.0	4.0	4.0	4.0	1.5	1.0	1.5
10	18.5	17.5	18.0	9.5	9.0	9.0	4.0	4.0	4.0	1.5	1.0	1.0
11	18.5	17.5	18.0	9.5	9.0	9.0	4.0	3.5	4.0	1.5	1.0	1.0
12	18.0	17.5	18.0	9.0	8.5	9.0	4.0	3.5	4.0	1.5	1.0	1.0
13	17.5	17.0	17.5	9.0	8.5	8.5	4.0	3.5	4.0	1.0	0.5	1.0
14	17.5	16.5	17.0	8.5	8.5	8.5	4.0	3.5	3.5	1.0	0.5	1.0
15	17.0	16.0	16.5	8.5	8.0	8.5	4.0	3.5	3.5	1.0	0.5	1.0
16	16.5	16.0	16.5	8.5	8.0	8.0	3.5	3.0	3.0	1.0	0.5	1.0
17	16.5	15.5	16.0	8.0	8.0	8.0	3.5	3.0	3.0	1.0	0.5	1.0
18	16.0	15.5	16.0	8.0	7.5	7.5	3.0	3.0	3.0	1.0	0.5	1.0
19	15.5	15.5	15.5	8.0	7.5	7.5	3.0	3.0	3.0	1.5	0.5	1.0
20	15.5	15.0	15.5	7.5	7.5	7.5	3.0	3.0	3.0	1.0	1.0	1.0
21	15.5	15.0	15.0	7.5	7.5	7.5	3.0	3.0	3.0	1.5	1.0	1.0
22	15.0	14.5	14.5	7.5	7.5	7.5	3.0	2.5	3.0	1.5	1.0	1.0
23	14.5	14.0	14.5	7.5	7.0	7.5	3.0	2.5	2.5	1.5	1.0	1.0
24	14.0	13.5	14.0	7.5	7.0	7.0	2.5	2.0	2.5	1.5	1.0	1.0
25	13.5	13.0	13.5	7.0	7.0	7.0	2.5	2.0	2.0	1.5	1.0	1.0
26	13.0	12.5	13.0	7.0	6.5	7.0	2.5	2.0	2.0	1.5	1.0	1.0
27	13.0	12.0	12.5	6.5	6.5	6.5	2.5	2.0	2.5	1.5	1.0	1.0
28	12.5	11.5	12.0	6.5	6.5	6.5	2.5	2.0	2.0	1.5	1.0	1.0
29	12.0	11.0	12.0	6.5	6.5	6.5	2.5	2.0	2.0	1.5	1.0	1.0
30	11.5	10.5	11.5	6.5	6.0	6.0	2.0	2.0	2.0	1.5	1.0	1.0
31	11.5	10.5	11.0	---	---	---	2.0	1.5	2.0	1.5	1.0	1.5
MONTH	19.5	10.5	16.0	11.0	6.0	8.2	6.0	1.5	3.5	2.0	0.5	1.1

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121680 MUSKEGON RIVER NEAR OXBOW, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	2.0	1.0	1.5	2.0	1.0	1.5	2.5	2.0	2.0	8.5	6.5	8.0
2	2.0	1.0	1.5	2.0	1.0	1.5	2.5	2.0	2.5	9.0	6.5	8.5
3	2.0	1.0	1.5	2.0	1.0	1.5	2.5	2.0	2.0	9.0	6.5	8.5
4	1.5	1.0	1.5	2.0	1.0	1.5	2.5	1.5	1.5	9.0	6.5	8.5
5	2.0	1.0	1.5	2.5	1.0	1.5	2.0	1.5	1.5	9.5	6.5	8.5
6	2.0	1.0	1.5	2.0	1.0	1.5	2.0	1.5	2.0	9.0	7.0	8.5
7	2.0	1.0	1.5	2.0	1.0	1.5	2.0	1.5	1.5	9.5	6.5	8.5
8	2.0	1.0	1.5	2.0	1.0	1.5	2.0	1.5	1.5	9.5	7.0	9.0
9	2.0	1.0	1.5	2.0	1.0	1.5	2.0	1.5	2.0	9.5	7.0	9.0
10	2.0	1.0	1.5	2.0	1.0	1.5	2.0	2.0	2.0	9.5	6.5	8.5
11	2.0	1.0	1.5	2.5	1.5	1.5	2.5	2.0	2.5	8.5	6.5	7.5
12	2.0	1.0	1.5	2.5	1.0	1.5	3.0	2.5	2.5	9.0	6.5	8.5
13	2.5	1.0	1.5	2.5	1.0	1.5	3.0	2.5	3.0	9.5	9.0	9.5
14	2.0	1.0	1.5	2.5	1.0	1.5	3.0	3.0	3.0	10.0	7.5	9.0
15	2.0	1.0	1.5	2.5	1.0	1.5	3.5	3.0	3.5	10.5	7.0	9.5
16	2.0	1.0	1.5	2.5	1.5	1.5	4.0	3.5	4.0	10.5	7.0	9.5
17	2.5	1.0	1.5	2.5	1.0	1.5	4.5	4.0	4.0	10.5	7.0	9.5
18	2.0	1.0	1.5	2.5	1.5	1.5	4.5	4.0	4.5	11.0	7.0	9.5
19	2.0	1.0	1.5	2.0	1.5	1.5	4.5	4.5	4.5	11.0	7.5	9.5
20	2.0	1.0	1.5	2.5	1.5	1.5	5.0	4.5	4.5	11.5	7.5	10.0
21	2.0	1.0	1.5	2.5	1.5	1.5	5.0	4.5	5.0	11.5	7.0	10.0
22	2.5	1.0	1.5	2.5	1.5	1.5	6.0	5.0	5.5	11.5	7.5	10.0
23	2.5	1.0	1.5	2.5	1.5	1.5	6.0	5.5	6.0	11.5	8.0	10.5
24	2.5	1.0	1.5	2.5	1.5	1.5	7.0	5.5	6.5	11.5	8.0	10.5
25	2.0	1.0	1.5	2.5	1.5	2.0	8.0	5.5	7.0	12.0	7.5	10.5
26	2.0	1.0	1.5	2.5	1.5	2.0	8.0	6.0	7.5	12.0	7.5	10.5
27	2.0	1.0	1.5	2.5	1.5	2.0	7.5	5.5	6.5	12.5	8.0	10.5
28	2.0	1.0	1.5	2.5	1.5	2.0	7.5	5.5	6.5	12.0	7.5	10.5
29	---	---	---	2.5	1.5	2.0	8.5	6.0	7.5	13.0	8.0	11.0
30	---	---	---	2.5	2.0	2.0	8.5	6.0	8.0	12.5	8.5	10.5
31	---	---	---	2.5	2.0	2.0	---	---	---	13.0	8.0	11.0
MONTH	2.5	1.0	1.5	2.5	1.0	1.6	8.5	1.5	4.0	13.0	6.5	9.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	13.0	8.5	11.5	16.5	11.0	15.0	18.5	12.5	16.5	20.0	14.5	17.5
2	12.5	9.0	11.5	16.5	11.5	14.5	18.5	12.5	16.5	20.0	14.5	17.5
3	13.0	8.5	11.5	16.0	10.5	14.5	19.0	13.0	16.5	19.5	14.5	17.5
4	13.0	9.0	12.0	17.0	10.5	14.5	19.0	13.0	17.0	20.0	14.5	17.5
5	13.0	8.5	11.5	17.0	10.5	14.5	19.0	12.5	17.5	20.0	15.0	17.5
6	13.0	8.5	11.5	17.0	11.0	14.5	19.5	13.0	17.5	19.5	15.0	17.5
7	13.0	9.0	11.5	17.0	10.5	15.0	19.5	13.0	17.5	19.5	15.0	17.5
8	13.0	8.5	11.5	17.5	11.0	15.5	19.5	13.0	17.5	20.0	15.0	17.5
9	13.0	9.0	11.5	17.5	11.0	15.5	19.0	13.5	17.5	20.0	15.0	17.5
10	13.5	9.0	12.0	17.0	11.0	15.0	19.5	13.5	17.5	20.0	15.0	17.5
11	13.5	9.0	12.0	17.0	11.0	15.5	20.0	13.5	18.0	20.0	15.5	18.0
12	14.0	9.5	12.5	17.0	11.5	15.5	19.5	13.5	17.5	19.5	15.0	17.5
13	14.0	9.5	12.5	17.5	11.5	15.5	19.5	13.5	17.0	20.0	15.5	17.5
14	14.5	9.5	13.0	17.5	11.5	15.5	19.5	14.0	18.0	20.0	15.5	18.0
15	14.5	9.5	13.0	17.0	11.5	15.5	19.5	14.5	17.5	19.5	15.5	18.0
16	15.0	9.5	13.5	17.5	11.5	16.0	19.5	14.0	17.0	19.5	15.5	18.0
17	14.5	10.0	13.5	17.5	11.5	16.0	20.0	14.0	17.5	20.0	16.0	18.0
18	14.5	10.0	13.0	18.0	12.0	16.5	20.0	14.0	17.5	20.0	16.0	18.0
19	15.5	10.5	13.5	18.0	12.0	16.0	19.5	13.5	17.0	19.5	16.0	18.5
20	15.0	10.0	13.5	18.0	11.5	16.0	19.5	13.5	17.0	20.0	16.0	18.0
21	15.5	10.0	13.0	18.5	12.0	16.5	19.5	13.5	17.0	19.5	16.0	18.0
22	15.0	10.0	13.0	18.5	12.0	16.5	20.0	14.0	17.0	19.5	16.5	18.0
23	15.0	10.0	13.0	18.5	12.0	16.5	20.0	14.0	17.0	19.5	16.5	18.0
24	15.5	10.0	13.0	18.5	12.0	16.5	20.0	14.0	17.0	19.0	16.5	18.0
25	15.0	10.5	13.0	18.0	12.5	16.5	19.5	14.0	17.0	19.0	16.5	18.0
26	15.0	11.0	13.5	18.0	12.5	16.0	20.0	14.0	18.5	19.0	16.5	18.0
27	15.0	10.5	13.0	18.5	12.5	16.5	20.0	14.0	18.0	19.0	17.0	18.0
28	16.0	10.5	14.0	18.5	12.5	16.5	20.0	14.5	18.0	19.0	17.0	18.0
29	15.5	10.5	14.5	18.5	12.0	16.5	20.0	14.5	17.5	18.5	17.0	18.0
30	16.0	11.0	15.0	18.5	12.5	16.5	20.0	14.5	17.5	18.5	17.0	18.0
31	---	---	---	18.5	12.5	16.5	20.0	14.5	17.5	---	---	---
MONTH	16.0	8.5	12.7	18.5	10.5	15.7	20.0	12.5	17.3	20.0	14.5	17.8

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121680 MUSKEGON RIVER NEAR OXBOW, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	3.9	2.2	3.3	8.4	5.8	7.5	11.0	10.7	10.8	12.6	12.1	12.5
2	4.7	2.5	3.8	8.6	6.1	7.7	11.2	10.8	11.0	12.7	12.0	12.6
3	6.7	3.4	4.9	8.5	6.3	7.8	11.2	11.0	11.1	12.7	12.5	12.6
4	5.3	4.7	5.1	8.6	6.1	7.7	11.2	11.1	11.1	12.6	12.3	12.5
5	5.3	4.6	5.0	8.9	6.0	8.0	11.2	11.0	11.2	12.5	12.1	12.4
6	5.4	4.5	5.2	8.8	6.8	8.3	11.3	11.1	11.2	12.9	12.0	12.7
7	5.8	4.5	5.3	8.9	7.3	8.5	11.4	11.1	11.3	12.8	12.1	12.6
8	5.9	4.7	5.6	9.0	8.1	8.6	11.7	11.1	11.5	12.7	12.1	12.5
9	6.1	4.8	5.6	9.1	7.0	8.5	11.7	11.5	11.6	12.8	12.3	12.6
10	6.3	4.2	5.6	9.1	7.0	8.6	12.0	11.5	11.7	12.9	12.2	12.7
11	6.5	3.9	5.7	9.5	7.5	8.9	12.1	11.9	12.0	12.8	12.0	12.6
12	6.4	4.4	5.8	9.6	7.3	9.0	12.1	11.8	12.0	12.9	12.6	12.7
13	6.5	4.3	5.9	9.5	7.1	8.8	12.0	11.7	11.9	13.0	12.5	12.8
14	7.1	5.7	6.3	9.6	7.0	8.7	12.0	11.7	11.9	13.1	12.6	12.9
15	6.7	5.8	6.4	10.2	7.1	8.9	12.2	11.5	11.9	13.0	12.6	12.9
16	7.4	6.2	6.8	10.6	7.7	9.6	12.3	12.0	12.2	13.0	12.7	12.9
17	7.2	5.9	6.7	10.2	8.4	9.8	12.4	12.0	12.2	13.0	12.5	12.8
18	7.3	6.0	6.9	10.4	8.6	9.9	12.3	12.0	12.2	13.0	12.4	12.9
19	7.4	6.3	7.0	10.2	8.5	9.7	12.3	12.0	12.2	13.0	9.8	12.5
20	7.5	6.5	7.2	10.3	8.5	9.8	12.3	11.8	12.2	12.9	9.9	12.0
21	7.4	6.7	7.2	10.5	8.5	10.0	12.3	12.0	12.2	12.9	12.1	12.7
22	7.6	6.9	7.3	10.4	8.7	10.1	12.3	12.0	12.2	12.9	12.2	12.7
23	7.7	7.3	7.6	10.6	8.7	10.1	12.4	12.1	12.3	12.9	11.9	12.6
24	7.9	7.3	7.7	10.5	7.9	9.8	12.5	12.1	12.3	12.9	12.3	12.7
25	7.9	7.3	7.7	10.5	8.0	9.7	12.7	12.3	12.5	12.9	11.8	12.5
26	7.8	7.6	7.7	10.6	8.1	9.9	12.6	12.2	12.4	12.8	11.5	12.4
27	8.0	7.5	7.8	10.6	10.3	10.5	12.4	12.1	12.3	12.8	11.8	12.5
28	8.3	7.8	8.1	10.6	10.4	10.5	12.5	12.2	12.4	12.8	11.3	12.4
29	8.5	8.0	8.3	10.7	10.4	10.6	12.5	12.3	12.4	12.9	10.6	12.4
30	8.7	8.1	8.5	10.9	10.5	10.7	12.5	12.2	12.4	12.8	11.5	12.4
31	8.6	6.3	8.1	---	---	---	12.5	12.2	12.4	12.7	11.4	12.2
MONTH	8.7	2.2	6.5	10.9	5.8	9.2	12.7	10.7	11.9	13.1	9.8	12.6

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	12.8	11.2	12.2	12.8	9.6	11.8	11.3	6.6	9.5	11.8	7.3	10.1
2	12.8	10.9	12.1	12.7	8.4	11.1	11.2	6.1	9.5	14.7	5.5	10.2
3	13.0	10.5	12.1	11.9	8.0	10.3	11.5	5.9	9.4	11.3	7.8	10.2
4	13.0	11.4	12.4	12.6	8.1	10.6	11.6	5.6	10.1	11.1	6.3	9.4
5	13.1	10.7	12.3	12.2	7.5	10.5	11.8	8.2	10.7	11.9	7.9	9.9
6	13.1	10.6	12.2	14.1	7.3	10.3	11.6	8.0	10.4	10.7	7.8	9.5
7	13.1	10.5	12.1	11.5	6.3	9.8	12.1	9.1	11.0	---	---	---
8	13.0	10.3	12.1	11.5	6.5	9.5	12.1	9.5	11.0	---	---	---
9	13.1	10.0	12.2	11.6	6.7	9.6	12.3	9.1	11.1	---	---	---
10	13.0	10.4	12.1	11.6	6.2	9.6	12.3	9.4	11.3	10.1	7.9	9.9
11	13.1	10.3	12.0	10.8	6.0	8.7	12.3	9.1	11.0	11.1	9.4	9.8
12	13.1	9.9	12.0	11.5	6.2	9.1	12.3	9.1	11.1	9.7	6.6	9.5
13	12.7	8.3	11.2	11.4	5.5	9.0	13.1	6.8	11.2	9.7	9.5	9.6
14	12.6	7.5	10.1	10.5	5.6	8.8	12.3	9.2	11.3	9.7	9.1	9.5
15	12.6	7.9	10.6	11.6	5.9	9.6	12.7	9.7	11.5	9.6	9.2	9.4
16	12.6	7.7	10.2	11.6	5.6	9.3	12.5	9.5	11.8	9.4	8.7	9.3
17	12.4	7.3	10.6	11.4	6.0	9.2	12.5	11.6	12.3	9.3	8.9	9.2
18	12.5	8.1	10.3	11.6	5.7	9.8	15.0	11.4	12.3	9.4	8.9	9.2
19	12.4	8.0	10.6	11.6	6.3	10.1	14.9	11.5	12.5	9.3	8.4	9.1
20	12.8	8.1	10.8	11.4	6.1	9.6	12.5	11.7	12.2	9.3	8.7	9.1
21	12.6	6.5	10.4	14.8	5.7	9.3	15.1	7.5	12.3	9.2	8.1	8.9
22	12.4	7.1	10.4	11.3	6.1	10.0	13.6	10.3	12.0	9.0	6.0	8.2
23	12.5	7.4	10.4	11.0	6.5	9.5	12.4	9.5	11.8	9.6	5.5	7.5
24	12.7	7.0	10.5	11.4	5.6	9.7	12.4	8.8	11.3	8.5	5.9	7.4
25	12.7	8.1	10.9	11.4	6.3	9.6	11.8	8.9	10.9	8.5	5.8	7.3
26	12.8	8.0	11.0	11.1	5.8	9.4	11.9	8.4	10.8	8.7	5.6	7.2
27	13.3	7.9	11.5	11.3	6.7	9.7	11.6	8.2	10.3	8.7	4.4	7.0
28	13.9	10.2	12.4	11.1	5.8	9.2	13.2	7.7	10.5	8.2	5.4	7.0
29	---	---	---	11.2	6.0	9.4	11.5	5.6	10.0	8.9	5.3	8.0
30	---	---	---	11.2	5.9	9.3	12.8	4.9	10.0	8.7	7.7	8.3
31	---	---	---	11.0	6.0	9.1	---	---	---	8.8	7.5	8.3
MONTH	13.9	6.5	11.3	14.8	5.5	9.7	15.1	4.9	11.0	---	---	---

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121680 MUSKEGON RIVER NEAR OXBOW, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.7	7.6	8.3	7.2	5.0	6.5	4.9	1.5	3.6	4.1	1.0	2.6
2	8.6	7.5	8.2	7.0	4.8	6.2	4.9	1.5	3.8	4.3	0.9	2.8
3	8.6	7.3	8.1	6.7	4.3	5.9	5.0	1.7	3.7	3.7	0.9	2.2
4	8.5	7.2	8.1	7.0	4.1	5.8	4.8	1.4	3.6	4.1	0.9	2.5
5	8.4	6.7	8.0	6.8	4.1	5.9	4.7	1.0	3.9	4.2	1.0	2.7
6	8.3	6.7	7.7	6.6	4.2	5.7	4.8	1.4	3.8	3.7	0.9	2.3
7	8.2	6.6	7.7	6.5	4.1	5.7	4.8	1.5	3.6	3.7	0.8	2.4
8	8.2	6.7	7.7	6.6	4.1	5.8	4.9	1.4	3.8	4.3	0.7	2.5
9	8.2	6.5	7.5	6.9	4.0	5.8	4.5	1.4	3.5	3.7	0.9	2.3
10	8.2	6.4	7.5	6.5	3.8	5.5	4.5	1.5	3.4	3.9	0.8	2.2
11	8.2	6.4	7.7	5.8	3.6	5.3	5.1	1.4	3.7	4.2	0.9	2.4
12	8.3	6.3	7.7	6.4	3.8	5.5	4.7	1.4	3.5	3.2	0.8	1.8
13	8.2	6.2	7.5	6.3	3.9	5.5	4.5	1.4	3.1	3.4	0.8	2.0
14	8.0	6.0	7.5	6.5	3.7	5.5	4.0	1.3	3.1	3.5	0.7	2.0
15	8.2	5.8	7.4	6.1	3.6	5.2	3.8	1.3	2.8	3.1	0.9	2.0
16	8.0	5.8	7.4	6.2	3.4	5.2	4.1	1.2	2.7	3.2	0.9	2.0
17	8.0	6.0	7.4	5.7	3.3	4.9	4.0	1.2	2.9	3.8	1.0	2.3
18	7.9	5.9	7.2	6.4	3.3	5.5	3.7	1.2	2.7	3.6	1.0	2.3
19	8.1	5.9	7.2	6.0	3.3	4.9	3.5	1.1	2.4	3.9	1.0	2.3
20	8.0	5.4	7.1	5.4	2.8	4.5	3.4	1.0	2.2	3.9	1.0	2.2
21	8.0	5.4	6.9	6.0	2.8	4.7	2.8	0.8	1.6	3.2	1.0	1.8
22	8.0	5.2	6.8	6.1	2.5	5.0	4.1	0.8	2.5	3.3	1.0	2.0
23	7.8	5.1	6.8	5.8	2.3	4.7	4.0	0.9	2.4	3.9	0.9	2.5
24	7.6	5.1	6.6	5.3	2.3	4.4	3.4	0.9	1.9	3.6	1.0	2.5
25	7.6	5.3	6.5	5.1	2.3	3.9	3.4	0.8	2.1	4.3	1.0	2.7
26	7.1	5.3	6.4	4.3	2.2	3.4	4.1	1.1	3.0	4.5	0.8	3.0
27	6.9	5.0	6.1	5.3	2.0	3.9	4.5	1.1	3.2	4.1	0.7	2.6
28	7.3	4.9	6.4	5.3	1.9	4.0	4.3	1.3	3.0	5.1	0.7	3.1
29	7.0	4.9	6.4	5.1	1.7	3.9	3.7	1.0	2.5	5.4	0.9	3.5
30	7.0	4.9	6.5	5.1	1.7	3.9	4.4	1.2	3.0	5.5	0.8	3.4
31	---	---	---	4.6	1.7	3.5	4.4	1.1	2.8	---	---	---
MONTH	8.7	4.9	7.3	7.2	1.7	5.0	5.1	0.8	3.0	5.5	0.7	2.4

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	179	196	251	240	e200	e200	366	376	259	214	149	142
2	201	197	245	223	e200	e200	354	542	247	192	166	141
3	222	200	e160	219	e200	e160	344	485	245	185	172	138
4	246	205	e180	212	e200	e200	348	416	246	182	175	136
5	291	207	e230	210	e200	e200	368	378	271	184	192	137
6	265	213	e220	210	e200	e200	351	423	272	191	188	137
7	250	215	e220	208	e200	e200	364	432	257	193	171	137
8	231	211	e220	210	e200	e200	348	447	270	200	161	136
9	209	212	e220	212	e200	e200	339	428	307	192	164	131
10	204	353	e220	214	e200	e200	363	390	286	202	163	129
11	202	463	e220	212	e200	e200	365	463	297	258	159	129
12	200	388	209	214	e200	e200	356	732	298	e300	154	129
13	204	343	208	208	e200	e200	326	723	277	e270	150	130
14	202	279	213	e195	e200	e200	311	661	260	e230	147	133
15	200	255	217	e185	e195	205	297	504	249	197	143	137
16	200	243	215	e185	e195	232	287	419	237	185	143	138
17	197	227	208	e185	e195	361	285	378	228	176	150	136
18	199	227	219	e185	e195	677	291	356	226	163	156	133
19	231	227	300	e185	e195	671	308	333	216	157	148	131
20	253	233	357	e185	e195	588	359	333	206	164	140	131
21	234	270	323	e185	e195	535	413	324	207	198	140	131
22	213	328	282	e185	e195	514	401	304	204	223	140	145
23	205	312	259	e185	e195	475	359	284	199	292	136	158
24	201	288	243	e185	e195	419	325	307	193	270	134	160
25	202	271	235	e185	e195	448	307	338	191	204	139	158
26	205	259	229	e190	e195	476	288	329	187	186	164	154
27	208	243	225	e195	e200	427	273	310	178	187	179	164
28	207	234	222	e200	e200	403	260	296	e205	178	160	172
29	202	246	224	e200	---	478	245	281	e260	164	153	165
30	196	255	225	e200	---	457	242	273	e240	151	148	159
31	196	---	237	e200	---	397	---	268	---	147	142	---
TOTAL	6655	7800	7236	6207	5540	10523	9843	12533	7218	6235	4826	4257
MEAN	215	260	233	200	198	339	328	404	241	201	156	142
MAX	291	463	357	240	200	677	413	732	307	300	192	172
MIN	179	196	160	185	195	160	242	268	178	147	134	129
CFSM	0.62	0.75	0.68	0.58	0.57	0.98	0.95	1.17	0.70	0.58	0.45	0.41
IN.	0.72	0.84	0.78	0.67	0.60	1.13	1.06	1.35	0.78	0.67	0.52	0.46

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2003, BY WATER YEAR (WY)

MEAN	244	287	280	294	364	417	400	388	297	198	202	193
MAX	426	393	410	443	491	628	480	453	411	288	272	247
(WY)	2002	1996	2002	1997	1997	1997	2002	2002	1996	1999	1996	2001
MIN	190	195	204	200	198	270	328	256	183	131	133	142
(WY)	1998	2000	1998	2003	2003	1999	2003	1998	1998	1998	1998	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1996 - 2003	
ANNUAL TOTAL	114275		88873			
ANNUAL MEAN	313		243		296	
HIGHEST ANNUAL MEAN					357	2002
LOWEST ANNUAL MEAN					243	2003
HIGHEST DAILY MEAN	1110	Mar 10	732	May 12	1110	Mar 10 2002
LOWEST DAILY MEAN	145	Aug 11	129	Sep 10	113	Aug 1 1998
ANNUAL SEVEN-DAY MINIMUM	152	Jul 15	131	Sep 8	116	Jul 28 1998
MAXIMUM PEAK FLOW			785	May 12	1240	Mar 10 2002
MAXIMUM PEAK STAGE			5.13	May 12	6.52	Mar 10 2002
INSTANTANEOUS LOW FLOW			123	Sep 14	105	Jul 19 1998
ANNUAL RUNOFF (CFSM)	0.91		0.71		0.86	
ANNUAL RUNOFF (INCHES)	12.32		9.58		11.68	
10 PERCENT EXCEEDS	483		367		467	
50 PERCENT EXCEEDS	293		208		255	
90 PERCENT EXCEEDS	178		150		172	

(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: Nov. 26 to May 7 rated fair. Dissolved oxygen records rated excellent except the following periods: Oct. 24, Dec. 16-21, Mar. 22-24, Apr. 27, 28, May 26-28, June 4-7, July 6-8, Aug. 15-22, Sept. 9-16 rated good; Oct. 25-27, Dec. 1, 2, 22-29, Mar. 30 to Apr. 14, Apr. 29 to May 1, June 8-13, July 9, Aug. 23-25, Sept. 17-23 rated fair; and Oct. 1-21, Oct. 28 to Nov. 30, Dec. 30 to Jan. 17, Mar. 25-29, May 2-7, June 14-17 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, 23.5°C, July 4, 7; minimum, 0.0°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum 16.2 mg/L, Dec. 5; minimum, 5.6 mg/L, July 6.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	17.5	16.0	16.5	4.5	4.0	4.0	1.5	0.5	1.0	2.0	1.0	1.0
2	17.5	16.0	17.0	4.0	3.5	4.0	1.0	0.0	0.5	1.0	0.5	0.5
3	16.0	14.5	15.0	4.5	3.5	4.0	0.0	0.0	0.0	1.0	0.5	1.0
4	15.5	14.5	15.0	5.0	4.5	5.0	0.0	0.0	0.0	1.5	1.0	1.0
5	15.0	13.0	14.0	4.5	3.5	4.0	0.0	0.0	0.0	2.0	1.5	1.5
6	13.0	12.5	13.0	4.5	4.0	4.5	0.0	0.0	0.0	1.5	0.5	1.5
7	13.0	11.0	12.0	4.5	3.5	4.0	0.5	0.0	0.0	1.0	0.5	1.0
8	11.5	10.5	11.0	6.5	4.5	5.5	0.5	0.0	0.0	2.0	1.0	1.5
9	12.0	11.0	11.5	7.5	6.0	6.5	0.0	0.0	0.0	2.0	1.5	2.0
10	12.0	10.5	11.5	9.5	7.5	9.0	0.0	0.0	0.0	1.5	0.0	0.5
11	13.0	11.5	12.0	9.5	8.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0
12	12.5	12.0	12.0	8.0	6.0	7.5	1.0	0.0	0.5	0.0	0.0	0.0
13	12.5	10.0	11.5	6.0	5.5	6.0	2.0	1.0	1.5	0.0	0.0	0.0
14	10.0	8.5	9.0	6.5	6.0	6.5	2.0	2.0	2.0	0.0	0.0	0.0
15	9.5	8.0	8.5	6.0	4.0	5.0	2.0	2.0	2.0	0.0	0.0	0.0
16	9.0	7.5	8.5	4.0	2.5	3.0	1.9	0.3	0.9	0.0	0.0	0.0
17	7.5	6.5	6.5	2.5	2.0	2.0	1.1	0.1	0.6	0.0	0.0	0.0
18	7.0	6.5	6.5	2.5	1.0	1.5	2.8	1.1	1.8	0.0	0.0	0.0
19	8.0	7.0	7.5	4.0	2.5	3.5	3.9	2.8	3.5	0.0	0.0	0.0
20	7.5	6.5	7.5	4.0	3.0	3.5	3.5	2.5	3.0	0.0	0.0	0.0
21	6.5	6.0	6.5	4.5	3.5	4.0	2.5	1.9	2.2	0.0	0.0	0.0
22	7.0	6.5	7.0	4.0	3.5	3.5	2.0	1.4	1.8	0.0	0.0	0.0
23	7.0	6.5	6.5	3.5	3.5	3.5	1.4	1.0	1.2	0.0	0.0	0.0
24	6.5	6.0	6.0	3.5	3.5	3.5	1.0	0.6	0.8	0.0	0.0	0.0
25	6.0	5.5	5.5	3.5	2.5	3.0	1.2	0.6	0.9	0.0	0.0	0.0
26	6.5	5.5	6.0	2.5	1.5	2.0	1.5	1.0	1.0	0.0	0.0	0.0
27	7.0	6.0	6.5	1.5	1.0	1.5	1.5	1.0	1.5	0.0	0.0	0.0
28	6.5	6.0	6.5	1.5	1.5	1.5	2.0	1.5	2.0	0.0	0.0	0.0
29	6.0	5.5	5.5	3.0	1.5	2.5	2.5	2.0	2.0	0.0	0.0	0.0
30	5.5	5.0	5.5	3.0	1.5	2.5	3.5	2.0	2.5	0.0	0.0	0.0
31	5.5	4.5	5.0	---	---	---	3.5	2.0	3.0	0.0	0.0	0.0
MONTH	17.5	4.5	9.4	9.5	1.0	4.2	3.9	0.0	1.2	2.0	0.0	0.4

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121944 LITTLE MUSKEGON RIVER NEAR OAK GROVE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

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	8.0	5.5	6.5	12.0	11.0	11.5
2	0.0	0.0	0.0	0.0	0.0	0.0	8.5	7.0	8.0	12.0	10.5	11.0
3	0.0	0.0	0.0	0.0	0.0	0.0	8.0	5.0	6.5	12.5	9.5	11.0
4	0.0	0.0	0.0	0.0	0.0	0.0	5.0	2.0	4.0	13.0	10.5	12.0
5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.5	2.0	13.0	12.0	12.0
6	0.0	0.0	0.0	0.0	0.0	0.0	3.5	1.5	2.5	13.0	11.5	12.5
7	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.0	3.0	12.5	11.0	11.5
8	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.0	2.5	12.0	10.5	11.5
9	0.0	0.0	0.0	0.0	0.0	0.0	5.5	2.0	4.0	14.5	11.0	13.0
10	0.0	0.0	0.0	0.0	0.0	0.0	7.5	4.0	6.0	16.0	14.0	15.0
11	0.0	0.0	0.0	0.0	0.0	0.0	9.5	6.0	8.0	16.0	12.5	14.5
12	0.0	0.0	0.0	0.0	0.0	0.0	10.5	8.0	9.5	12.5	10.0	11.0
13	0.0	0.0	0.0	0.5	0.0	0.0	11.0	8.5	10.0	12.0	9.0	10.5
14	0.0	0.0	0.0	1.0	0.0	0.5	13.0	9.5	11.0	13.5	11.0	12.5
15	0.0	0.0	0.0	3.5	0.5	2.0	15.0	12.5	14.0	13.5	12.5	13.0
16	0.0	0.0	0.0	4.5	1.5	3.0	15.0	10.0	13.0	13.0	12.0	12.5
17	0.0	0.0	0.0	3.5	2.0	2.5	10.0	8.0	8.5	14.5	12.5	13.5
18	0.0	0.0	0.0	3.0	2.0	2.5	8.5	7.5	8.0	16.0	13.5	15.0
19	0.0	0.0	0.0	3.0	1.5	2.5	11.5	8.5	10.0	16.5	15.5	16.0
20	0.0	0.0	0.0	4.0	2.5	3.5	13.0	11.5	12.0	16.5	14.5	15.5
21	0.0	0.0	0.0	4.5	4.0	4.0	12.5	10.0	11.5	15.5	12.5	14.0
22	0.0	0.0	0.0	4.0	3.5	3.5	10.5	9.0	10.0	15.5	12.5	14.0
23	0.0	0.0	0.0	4.5	3.5	4.0	11.0	8.0	9.5	14.5	13.0	13.5
24	0.0	0.0	0.0	7.0	4.0	5.0	11.5	9.0	10.5	13.0	12.5	12.5
25	0.0	0.0	0.0	8.0	6.0	7.0	12.5	10.5	11.5	13.5	12.0	13.0
26	0.0	0.0	0.0	7.5	5.5	6.5	13.0	10.0	11.5	14.0	12.0	13.0
27	0.0	0.0	0.0	6.5	5.0	5.5	13.5	10.5	12.5	15.0	13.0	14.0
28	0.0	0.0	0.0	6.5	5.5	6.0	15.5	13.0	14.0	16.5	14.0	15.0
29	---	---	---	6.5	4.5	5.5	15.0	13.0	14.0	17.0	15.0	16.0
30	---	---	---	4.5	3.0	4.0	14.0	12.0	13.0	16.0	14.5	15.0
31	---	---	---	5.5	3.5	4.5	---	---	---	15.5	14.0	14.5
MONTH	0.0	0.0	0.0	8.0	0.0	2.3	15.5	1.5	8.9	17.0	9.0	13.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	15.0	12.5	14.0	---	---	---	21.0	19.0	20.0	17.0	16.0	16.5
2	15.5	12.5	14.5	---	---	---	20.5	19.0	19.5	17.5	14.5	16.0
3	15.5	14.5	15.0	22.0	18.5	20.5	20.0	18.5	19.5	17.0	15.0	16.0
4	14.5	13.0	14.0	23.5	20.5	21.5	20.5	18.0	19.0	16.5	15.0	15.5
5	14.0	12.5	13.5	22.5	20.0	21.0	20.5	18.0	19.5	15.5	12.5	14.0
6	14.0	13.0	13.5	22.0	19.0	21.0	21.5	19.0	20.0	16.0	13.0	14.5
7	16.5	14.0	15.0	23.5	20.5	22.0	22.0	19.5	20.5	17.5	15.0	16.0
8	16.0	15.0	15.5	22.0	20.5	21.5	20.5	19.5	20.0	18.5	16.0	17.5
9	17.0	15.0	15.5	22.0	19.5	20.5	19.5	18.5	19.0	19.0	16.5	17.5
10	15.5	14.5	14.5	20.5	18.5	19.5	21.0	18.0	19.5	18.5	16.0	17.0
11	15.5	14.5	15.0	18.5	17.5	18.0	21.0	18.5	19.5	18.5	16.0	17.0
12	15.5	14.5	15.0	---	---	---	20.0	19.0	19.5	18.5	16.0	17.5
13	16.5	15.0	15.5	---	---	---	21.5	18.0	20.0	19.0	17.5	18.0
14	18.0	15.5	17.0	---	---	---	22.5	19.5	21.0	18.5	17.5	18.0
15	19.5	17.0	18.5	20.5	19.0	19.5	22.0	20.0	21.0	18.0	16.0	17.0
16	19.5	17.0	18.0	21.0	18.0	19.5	22.5	20.5	21.0	16.5	14.5	15.5
17	19.5	17.0	18.5	21.0	18.5	20.0	22.0	19.5	20.5	17.0	14.5	16.0
18	19.5	17.5	18.5	21.5	18.5	20.0	21.5	19.0	20.0	17.5	15.0	16.5
19	20.5	18.0	19.0	21.0	17.0	19.0	21.5	18.5	20.0	16.5	15.0	16.0
20	19.5	16.0	18.0	19.5	18.0	19.0	21.5	18.0	20.0	15.5	13.5	14.5
21	20.0	16.5	18.0	19.5	18.0	19.0	23.0	19.5	21.5	14.0	12.0	13.0
22	20.5	16.5	18.5	20.0	18.0	19.0	22.5	20.0	21.0	14.5	13.5	14.0
23	21.0	17.0	19.0	20.0	17.5	19.0	20.5	18.0	19.5	14.5	13.0	13.5
24	20.5	18.0	19.5	20.0	17.5	19.0	19.5	18.0	18.5	13.5	12.5	13.0
25	23.0	19.0	20.5	20.5	18.0	19.0	20.0	18.5	19.0	13.0	11.0	12.0
26	21.0	18.5	20.5	19.5	19.0	19.0	21.5	19.0	20.0	11.5	10.0	11.0
27	20.0	17.0	18.5	22.0	19.0	20.0	21.0	19.5	20.0	13.0	11.5	12.0
28	---	---	---	21.0	18.5	19.5	20.0	17.0	18.5	---	---	---
29	---	---	---	21.0	17.5	19.0	21.0	19.5	20.0	11.5	10.0	11.0
30	---	---	---	20.5	18.0	19.5	20.0	17.0	18.5	10.5	9.0	10.0
31	---	---	---	21.0	18.5	19.5	17.5	16.0	17.0	---	---	---
MONTH	---	---	---	---	---	---	23.0	16.0	19.8	---	---	---

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121944 LITTLE MUSKEGON RIVER NEAR OAK GROVE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.5	8.5	9.3	11.9	11.1	11.4	12.7	11.9	12.2	14.2	13.0	13.5
2	9.1	8.3	8.7	11.7	10.9	11.2	12.8	11.4	12.3	14.2	13.3	13.6
3	9.5	8.4	8.9	11.9	11.0	11.4	---	---	---	14.1	13.2	13.6
4	8.9	8.2	8.6	11.9	10.5	11.3	---	---	---	14.1	13.1	13.5
5	9.3	8.3	8.8	11.5	10.6	11.2	16.2	---	---	13.6	12.8	13.1
6	9.7	8.9	9.2	11.4	10.8	11.2	15.3	14.8	15.0	13.7	12.2	13.1
7	10.1	9.0	9.5	12.0	11.1	11.4	15.2	14.5	14.8	13.5	12.8	13.2
8	10.1	9.2	9.5	11.8	9.9	11.0	15.8	12.8	14.9	13.2	12.4	12.8
9	9.9	9.1	9.4	10.5	9.7	10.1	15.4	12.4	13.6	12.9	12.4	12.6
10	10.2	9.2	9.6	10.0	8.9	9.5	15.2	14.3	14.9	13.8	12.7	13.2
11	10.6	9.2	9.7	10.3	8.8	9.2	15.4	14.6	14.9	13.3	12.3	12.8
12	10.5	9.5	9.9	10.8	8.8	10.3	15.3	14.4	14.8	14.1	12.4	13.1
13	10.6	9.6	10.1	10.6	9.7	9.9	14.6	13.9	14.2	14.1	12.5	13.3
14	11.2	10.0	10.5	9.9	9.6	9.8	14.5	13.8	14.0	14.0	13.5	13.7
15	11.2	9.9	10.4	10.4	9.5	10.0	14.1	13.2	13.7	14.1	13.6	13.8
16	11.2	10.0	10.5	10.8	10.1	10.4	15.2	13.8	14.4	14.1	13.7	13.9
17	11.0	10.0	10.4	10.9	10.6	10.9	15.3	14.3	14.8	14.0	13.7	13.8
18	10.7	10.0	10.4	11.9	10.8	11.4	14.3	13.2	13.9	---	---	---
19	11.0	10.0	10.6	11.3	11.1	11.2	13.5	12.7	13.1	---	---	---
20	11.3	10.3	10.7	11.9	11.1	11.5	13.3	12.7	12.9	---	---	---
21	11.6	10.3	10.9	11.5	10.9	11.2	13.5	12.5	13.1	---	---	---
22	11.3	10.4	10.8	12.7	11.0	11.4	13.7	12.7	13.2	---	---	---
23	11.5	10.6	11.0	12.9	12.5	12.7	14.4	13.4	13.9	---	---	---
24	11.9	10.6	11.2	13.0	11.8	12.4	14.5	13.7	14.1	---	---	---
25	11.6	10.9	11.2	13.4	12.0	12.9	14.1	13.4	13.7	---	---	---
26	11.5	10.8	11.1	13.4	12.8	13.1	14.5	13.6	14.0	---	---	---
27	11.9	11.0	11.3	13.2	12.5	12.8	14.6	13.3	14.0	---	---	---
28	11.9	10.6	11.2	12.7	12.2	12.5	13.7	13.0	13.3	---	---	---
29	12.1	10.7	11.5	12.4	11.6	12.0	14.1	12.9	13.4	---	---	---
30	11.9	11.0	11.4	12.3	11.3	11.8	13.2	12.3	12.9	---	---	---
31	12.0	11.0	11.4	---	---	---	13.4	12.2	12.8	---	---	---
MONTH	12.1	8.2	10.2	13.4	8.8	11.2	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	13.8	13.2	13.5	10.9	9.7	10.5	9.7	9.2	9.5
2	---	---	---	13.6	13.0	13.3	10.6	9.6	10.0	10.2	9.3	9.7
3	---	---	---	14.0	13.5	13.7	10.7	9.6	10.2	10.5	9.5	10.1
4	13.9	13.1	13.6	13.6	13.1	13.4	12.2	10.7	11.5	10.6	9.5	10.0
5	14.5	13.9	14.2	13.7	13.3	13.5	13.2	12.1	12.8	10.2	9.1	9.7
6	14.3	14.1	14.2	14.0	13.5	13.8	13.5	12.0	12.9	10.9	9.7	10.1
7	14.4	14.0	14.2	13.8	13.4	13.7	12.7	11.8	12.3	10.8	9.8	10.2
8	14.1	13.8	14.0	13.4	13.1	13.2	13.2	12.1	12.7	11.3	10.0	10.6
9	14.2	13.8	14.0	13.8	13.3	13.5	12.9	10.9	12.1	11.3	9.2	10.4
10	14.0	13.7	13.8	13.8	13.3	13.5	11.9	9.9	11.0	10.3	8.5	9.4
11	13.9	13.6	13.8	13.6	13.1	13.4	11.2	9.3	10.2	9.2	8.3	8.8
12	13.9	13.5	13.6	13.3	12.8	13.1	11.0	9.2	9.9	9.9	8.9	9.3
13	13.9	13.6	13.7	13.5	12.6	13.1	11.1	9.0	9.9	10.3	9.3	9.9
14	13.8	13.4	13.6	13.5	12.6	13.0	10.9	8.3	9.6	9.8	9.0	9.4
15	13.9	13.4	13.6	12.9	11.8	12.5	---	---	---	9.9	9.0	9.5
16	13.8	13.6	13.7	12.6	11.8	12.2	---	---	---	10.1	9.3	9.7
17	13.7	13.3	13.6	12.4	11.4	11.9	---	---	---	10.3	9.4	9.8
18	13.3	13.1	13.2	11.7	10.9	11.3	---	---	---	10.2	8.7	9.5
19	13.6	13.1	13.3	11.7	10.9	11.4	---	---	---	9.9	8.6	9.2
20	13.8	13.3	13.5	11.3	10.4	11.0	---	---	---	10.1	8.6	9.3
21	13.8	13.2	13.6	11.2	10.5	10.8	---	---	---	10.8	9.3	9.9
22	13.8	13.1	13.5	11.2	10.6	10.8	---	---	---	10.9	9.1	9.9
23	14.2	13.5	13.8	11.4	10.7	11.2	---	---	---	11.0	9.0	9.9
24	14.3	13.6	14.1	11.6	10.3	11.0	---	---	---	10.6	9.4	9.9
25	14.2	13.7	14.1	10.7	9.9	10.3	11.4	9.3	10.1	10.7	9.3	10.0
26	13.9	13.6	13.7	10.7	9.8	10.4	11.1	9.3	10.0	11.2	9.4	10.3
27	14.0	13.5	13.8	11.0	10.2	10.6	11.3	9.2	10.2	11.1	9.3	10.1
28	13.8	13.5	13.6	10.6	10.1	10.4	11.0	8.8	9.9	11.2	8.6	9.8
29	---	---	---	11.1	10.1	10.7	10.9	8.8	9.7	10.9	8.4	9.3
30	---	---	---	12.1	11.1	11.7	10.5	8.8	9.5	9.9	8.4	9.1
31	---	---	---	11.8	10.7	11.4	---	---	---	10.9	8.6	9.6
MONTH	---	---	---	14.0	9.8	12.2	---	---	---	11.3	8.3	9.7

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121944 LITTLE MUSKEGON RIVER NEAR OAK GROVE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	11.4	9.0	10.0	---	---	---	10.1	7.8	8.6	10.7	8.7	9.5
2	11.5	8.9	9.9	---	---	---	9.6	7.9	8.6	11.2	8.9	9.7
3	10.9	8.6	9.5	9.8	7.3	8.4	9.8	8.1	8.6	11.3	8.8	9.7
4	9.7	8.7	9.2	8.9	6.6	7.5	10.1	8.2	8.8	11.4	8.7	9.8
5	10.7	9.1	9.8	8.4	6.5	7.2	10.0	8.0	8.8	11.5	9.3	10.0
6	10.7	8.9	9.6	7.2	5.6	6.3	9.3	7.6	8.3	11.5	9.0	10.0
7	10.6	8.5	9.4	7.5	6.0	6.6	9.4	7.6	8.3	11.5	8.7	9.8
8	10.0	8.4	9.0	8.8	6.4	7.8	9.2	7.5	8.2	11.5	8.5	9.6
9	9.8	8.4	8.9	9.8	7.7	8.4	9.2	7.7	8.4	11.5	8.4	9.6
10	9.5	8.5	8.9	8.4	7.7	8.0	9.8	7.8	8.6	11.3	8.5	9.5
11	9.7	8.6	9.1	8.8	8.0	8.4	9.9	7.8	8.5	11.5	8.5	9.6
12	10.0	8.7	9.2	---	---	---	9.8	7.8	8.6	11.2	8.4	9.4
13	10.2	8.6	9.2	---	---	---	10.1	7.8	8.7	10.9	8.3	9.3
14	10.4	8.3	9.2	---	---	---	10.0	7.5	8.5	10.3	8.3	9.0
15	10.3	8.0	8.9	9.2	8.0	8.5	9.8	7.5	8.4	10.6	8.4	9.3
16	10.6	8.0	9.0	9.8	8.1	8.8	9.8	7.6	8.4	11.0	8.8	9.6
17	10.1	7.7	8.7	9.8	8.1	8.7	9.7	7.5	8.4	11.0	8.9	9.6
18	10.0	7.4	8.5	9.9	7.9	8.7	10.1	7.8	8.7	11.1	8.8	9.5
19	10.2	7.4	8.4	10.3	7.9	8.9	10.5	8.0	8.9	10.5	8.8	9.5
20	10.5	7.6	8.6	9.2	8.2	8.6	10.7	7.9	9.0	11.3	9.2	10.0
21	10.7	7.5	8.7	9.5	8.3	8.7	10.6	7.6	8.8	11.9	9.7	10.6
22	10.6	7.4	8.5	9.5	8.3	8.7	10.2	7.5	8.5	10.3	9.4	9.8
23	10.5	7.1	8.4	9.0	7.9	8.5	10.8	7.9	9.1	11.4	9.4	10.3
24	9.8	7.0	8.1	9.1	7.8	8.4	10.6	8.3	9.1	11.1	10.0	10.4
25	10.2	6.5	7.9	9.7	8.0	8.7	10.2	8.1	8.9	11.7	10.0	10.8
26	8.4	6.3	7.2	8.9	8.1	8.5	9.8	7.8	8.7	12.2	10.4	11.1
27	10.0	6.8	8.0	9.6	8.0	8.6	9.9	7.7	8.5	11.3	10.1	10.6
28	---	---	---	9.6	7.9	8.6	10.6	8.2	9.1	---	---	---
29	---	---	---	9.9	8.1	8.8	10.2	7.9	8.8	12.0	10.4	11.0
30	---	---	---	10.2	8.0	8.8	10.8	8.1	9.1	12.0	10.8	11.3
31	---	---	---	9.9	7.9	8.7	11.1	8.6	9.6	---	---	---
MONTH	---	---	---	---	---	---	11.1	7.5	8.7	---	---	---

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 mi^2.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 690 ft above sea level, from topographic map.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1010	1100	1170	1340	1180	953	1310	2320	1460	1290	1030	812
2	1140	1100	1160	1300	1180	982	1300	2630	1350	1010	1020	811
3	1150	1100	1150	1260	1180	983	1360	2490	1370	1030	1020	816
4	1140	1100	1150	1250	1180	915	1420	2310	1290	1060	1090	824
5	1150	1100	1150	1280	1180	921	1420	2100	1380	1010	1370	837
6	1140	1100	1150	1290	1180	995	1420	2220	1390	992	1400	849
7	1100	1100	1150	1410	1180	1030	1400	2300	1340	1030	1190	834
8	1120	1100	1150	1420	1180	1040	1300	2470	1350	1070	1100	811
9	1060	1100	1160	1340	1170	1020	1170	2430	1340	1080	1100	810
10	1040	1420	1160	1360	1180	974	1270	2280	1330	1100	1090	797
11	1050	1810	1160	1270	1180	924	1500	2190	1510	1370	1070	748
12	1050	1840	1160	1210	1180	916	1730	3020	1570	1430	1070	754
13	1030	1500	1160	1190	1170	974	1760	3160	1570	1530	983	776
14	996	1250	1160	1090	1170	1160	1760	2580	1530	1400	937	788
15	980	1170	1160	1070	1170	1250	1910	2270	1510	1150	959	862
16	984	1160	1150	1070	1170	1180	2090	2140	1500	1090	975	880
17	986	1170	1150	1060	1170	1180	2150	1910	1340	1090	953	850
18	999	1170	1160	1070	1170	2030	2060	1820	1120	1080	942	847
19	1070	1170	1200	1080	1180	2230	2140	1850	1030	1090	942	845
20	1110	1170	1370	1090	1180	1830	2830	1800	1010	1270	853	808
21	1120	1290	1380	1090	1180	1910	3190	1720	984	1670	771	789
22	1120	1330	1330	1160	1180	2010	2900	1680	968	1780	753	878
23	1110	1300	1310	1240	1180	1890	2710	1640	962	1780	773	1060
24	1110	1210	1250	1230	1180	1690	2360	1620	954	1540	786	995
25	1100	1170	1230	1220	1180	1620	2270	1620	952	1320	809	935
26	1110	1170	1220	1230	1180	1580	2220	1660	962	1090	977	950
27	1110	1170	1200	1200	1090	1550	2090	1660	981	988	1020	956
28	1110	1170	1210	1180	1040	1480	2020	1720	1020	1010	1010	957
29	1100	1170	1210	1180	---	1420	2020	1710	1100	1020	864	996
30	1100	1160	1210	1180	---	1430	2120	1720	1640	1020	810	943
31	1100	---	1300	1180	---	1410	---	1700	---	1030	810	---
TOTAL	33495	36870	37230	37540	32740	41477	57200	64740	37813	37420	30477	25818
MEAN	1080	1229	1201	1211	1169	1338	1907	2088	1260	1207	983	861
MAX	1150	1840	1380	1420	1180	2230	3190	3160	1640	1780	1400	1060
MIN	980	1100	1150	1060	1040	915	1170	1620	952	988	753	748
CFSM	0.47	0.53	0.52	0.52	0.51	0.58	0.82	0.90	0.54	0.52	0.43	0.37
IN.	0.54	0.59	0.60	0.60	0.53	0.67	0.92	1.04	0.61	0.60	0.49	0.42

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2003, BY WATER YEAR (WY)

MEAN	1424	1675	1659	1954	2236	2600	2597	2490	1879	1212	1174	1080
MAX	2239	2227	2520	2919	3046	3864	3322	3343	2946	1650	1382	1301
(WY)	2002	2002	2002	1997	1997	1997	1998	2001	1996	1999	1996	1997
MIN	1080	1229	1201	1211	1169	1338	1900	1373	1060	848	836	817
(WY)	2003	2003	2003	2003	2003	2003	2000	1999	1998	1998	1998	1998

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1996 - 2003	
ANNUAL TOTAL	676470		472820			
ANNUAL MEAN	1853		1295		1829	
HIGHEST ANNUAL MEAN					2288	1997
LOWEST ANNUAL MEAN					1295	2003
HIGHEST DAILY MEAN	5850	Mar 10	3190	Apr 21	7010	Apr 3 1998
LOWEST DAILY MEAN	894	Jul 15	748	Sep 11	720	Sep 11 1998
ANNUAL SEVEN-DAY MINIMUM	906	Jul 13	783	Sep 8	723	Sep 7 1998
MAXIMUM PEAK FLOW			3420	May 12	7130	Apr 2 1998
MAXIMUM PEAK STAGE			6.84	May 12	9.12	Apr 2 1998
INSTANTANEOUS LOW FLOW			684	Aug 22	684	(a)
ANNUAL RUNOFF (CFSM)	0.80		0.56		0.79	
ANNUAL RUNOFF (INCHES)	10.88		7.60		10.74	
10 PERCENT EXCEEDS	3250		1910		3050	
50 PERCENT EXCEEDS	1590		1170		1590	
90 PERCENT EXCEEDS	998		936		988	

(a) July 6, 2000, Aug. 22, 2003.

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: Oct. 26-29, Dec. 19-23, Feb. 9-11, Apr. 21, 22, May 26-29, June 30 to July 6, July 17-21, Sept. 7-13 rated good; Dec. 24-30, Feb. 12-16, Mar. 6-9, Apr. 23-27, July 7-9, 22-28, Sept. 14-23 rated fair; and Dec. 31 to Jan. 6, Feb. 17 to Mar. 5, Mar. 10-25, Apr. 28 to May 7, July 29 to Aug. 1 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, 14.4 mg/L, Mar. 12, 1998, Mar. 10, 2002; minimum, 2.3 mg/L, Aug. 24, Sept. 3, 2003.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 23.5°C, Aug. 22, 27; minimum, 0.5°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 14.3 mg/L, Jan. 10; minimum, 2.3 mg/L, Aug. 24, Sept. 3.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	9.5	9.0	9.0	4.0	3.5	3.5	1.5	1.5	1.5
2	---	---	---	9.0	8.5	9.0	4.0	3.0	3.5	1.5	1.0	1.5
3	19.5	19.0	19.0	8.5	8.5	8.5	3.5	2.5	3.0	1.5	1.0	1.0
4	19.0	18.5	18.5	8.5	8.0	8.5	3.0	2.5	3.0	1.5	1.0	1.5
5	18.5	18.0	18.5	8.0	8.0	8.0	3.0	2.5	2.5	1.5	1.0	1.5
6	18.0	17.5	17.5	8.0	8.0	8.0	3.0	2.5	2.5	1.5	1.0	1.0
7	17.5	17.0	17.0	8.0	7.0	7.5	3.0	2.5	2.5	1.5	1.0	1.0
8	17.0	16.5	16.5	8.0	7.0	7.5	2.5	2.0	2.5	1.5	1.0	1.5
9	17.0	16.5	16.5	8.0	7.5	7.5	2.5	2.0	2.0	1.5	1.0	1.5
10	17.0	16.0	16.5	8.5	7.5	8.0	2.5	2.0	2.0	1.0	1.0	1.0
11	17.0	16.5	17.0	8.5	8.5	8.5	2.5	2.0	2.5	1.0	1.0	1.0
12	17.0	16.5	17.0	8.5	8.0	8.0	2.5	2.0	2.5	1.0	0.5	1.0
13	16.5	15.5	16.0	8.5	8.0	8.0	2.5	2.0	2.5	0.5	0.5	0.5
14	15.5	15.0	15.5	8.0	7.5	8.0	2.5	2.0	2.5	0.5	0.5	0.5
15	15.5	15.0	15.0	8.0	7.5	7.5	2.5	2.0	2.5	0.5	0.5	0.5
16	15.0	14.0	14.5	7.5	7.0	7.0	2.5	2.0	2.5	0.5	0.5	0.5
17	14.0	13.5	14.0	7.0	6.5	7.0	2.5	2.5	2.5	1.0	0.5	0.5
18	13.5	13.5	13.5	6.5	6.5	6.5	2.5	2.0	2.5	0.5	0.5	0.5
19	13.5	13.0	13.0	6.5	6.5	6.5	2.5	2.5	2.5	0.5	0.5	0.5
20	13.0	12.5	13.0	6.5	6.0	6.5	2.5	2.5	2.5	0.5	0.5	0.5
21	12.5	12.0	12.5	6.5	6.0	6.5	2.5	2.5	2.5	0.5	0.5	0.5
22	12.5	12.0	12.0	6.0	5.5	6.0	2.5	2.5	2.5	0.5	0.5	0.5
23	12.5	12.0	12.0	6.0	5.5	5.5	2.5	2.0	2.0	0.5	0.5	0.5
24	12.0	11.5	12.0	6.0	5.5	5.5	2.0	1.5	2.0	0.5	0.5	0.5
25	11.5	11.0	11.5	5.5	5.5	5.5	2.0	1.5	1.5	0.5	0.5	0.5
26	11.5	11.0	11.0	5.5	5.0	5.0	1.5	1.5	1.5	0.5	0.5	0.5
27	11.0	11.0	11.0	5.0	4.5	4.5	2.0	1.5	2.0	0.5	0.5	0.5
28	11.0	10.5	10.5	5.0	4.5	4.5	2.0	1.5	1.5	0.5	0.5	0.5
29	10.5	10.0	10.5	4.5	4.0	4.5	1.5	1.5	1.5	0.5	0.5	0.5
30	10.5	10.0	10.0	4.5	4.0	4.0	1.5	1.5	1.5	0.5	0.5	0.5
31	10.0	9.5	10.0	---	---	---	1.5	1.5	1.5	0.5	0.5	0.5
MONTH	---	---	---	9.5	4.0	6.9	4.0	1.5	2.3	1.5	0.5	0.8

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121970 MUSKEGON RIVER NEAR CROTON, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	0.5	0.5	0.5	1.0	0.5	1.0	4.0	3.5	4.0	10.5	9.5	10.0
2	0.5	0.5	0.5	1.0	0.5	1.0	4.0	3.5	4.0	10.5	9.5	10.0
3	0.5	0.5	0.5	1.0	0.5	1.0	4.5	4.0	4.0	10.5	9.5	10.0
4	0.5	0.5	0.5	1.0	0.5	1.0	4.0	3.0	3.5	10.5	10.0	10.0
5	1.0	0.5	0.5	1.0	0.5	1.0	3.5	3.0	3.0	11.0	10.5	10.5
6	1.0	0.5	1.0	1.0	0.5	1.0	3.5	3.0	3.0	11.0	10.5	10.5
7	1.0	0.5	1.0	1.0	0.5	1.0	3.0	2.5	3.0	10.5	10.5	10.5
8	1.0	0.5	0.5	1.0	0.5	1.0	2.5	2.0	2.5	10.5	10.5	10.5
9	1.0	0.5	0.5	1.0	0.5	1.0	3.0	2.5	2.5	11.0	10.5	10.5
10	1.0	0.5	0.5	1.0	0.5	1.0	3.5	2.5	3.0	11.0	10.5	11.0
11	1.0	0.5	0.5	1.0	0.5	1.0	4.5	3.0	3.5	11.5	10.0	10.5
12	1.0	0.5	0.5	1.0	0.5	1.0	5.0	4.0	4.5	11.5	11.0	11.5
13	1.0	0.5	0.5	1.0	0.5	1.0	5.5	4.5	5.0	11.5	10.5	11.0
14	1.0	0.5	0.5	1.0	0.5	1.0	5.5	5.0	5.0	10.5	10.0	10.0
15	1.0	0.5	0.5	1.0	0.5	1.0	7.0	5.5	6.0	11.5	10.0	11.0
16	1.0	0.5	0.5	1.5	1.0	1.0	7.5	7.0	7.0	11.5	10.5	11.0
17	1.0	0.5	0.5	1.5	1.0	1.0	7.0	6.0	6.5	11.5	11.0	11.5
18	1.0	0.5	0.5	1.5	1.0	1.0	6.5	6.0	6.5	12.0	11.5	12.0
19	1.0	0.5	0.5	2.0	1.5	1.5	6.5	6.0	6.5	12.5	12.0	12.5
20	1.0	0.5	0.5	2.0	2.0	2.0	7.0	6.0	6.5	13.5	12.5	13.0
21	1.0	0.5	0.5	2.0	2.0	2.0	7.5	7.0	7.0	13.0	12.5	13.0
22	1.0	0.5	0.5	2.5	2.0	2.0	7.5	6.5	7.0	13.5	13.0	13.0
23	1.0	0.5	1.0	2.5	2.0	2.5	7.0	6.0	6.5	14.0	13.0	13.5
24	1.0	0.5	1.0	3.0	2.5	2.5	7.5	6.5	7.0	13.5	13.0	13.5
25	1.0	0.5	1.0	3.0	2.5	3.0	8.5	7.5	8.0	13.0	12.5	13.0
26	1.0	0.5	1.0	3.0	3.0	3.0	9.0	8.0	8.5	14.0	12.5	13.0
27	1.0	0.5	1.0	3.5	3.0	3.5	8.5	7.5	8.0	14.5	12.5	13.5
28	1.0	0.5	1.0	4.0	3.0	3.5	10.0	8.0	9.0	13.5	12.5	13.0
29	---	---	---	4.0	3.0	3.5	10.5	9.5	10.0	15.5	13.0	14.5
30	---	---	---	4.0	3.5	3.5	10.0	9.0	9.5	14.5	13.0	13.5
31	---	---	---	4.0	3.0	3.5	---	---	---	14.5	13.5	14.5
MONTH	1.0	0.5	0.6	4.0	0.5	1.7	10.5	2.0	5.7	15.5	9.5	11.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.5	13.5	14.0	19.5	18.0	19.0	21.0	20.5	21.0	21.5	21.0	21.0
2	14.5	13.5	14.0	20.0	18.0	19.0	21.5	20.5	21.0	21.0	20.5	21.0
3	15.5	14.0	14.5	19.0	17.5	18.5	21.5	21.0	21.0	21.0	20.0	20.5
4	15.5	14.5	15.0	20.5	19.0	19.5	21.5	20.5	21.0	20.5	20.0	20.5
5	14.5	13.5	14.5	20.0	19.0	20.0	21.5	20.5	21.0	20.5	19.5	20.0
6	14.0	13.5	14.0	20.5	19.5	20.0	22.0	20.5	21.0	20.0	19.5	19.5
7	14.5	14.0	14.0	20.5	19.5	20.0	22.5	20.5	21.5	20.5	19.5	20.0
8	15.0	13.5	14.5	21.0	20.0	20.5	22.5	21.0	21.5	21.5	20.0	20.5
9	15.5	14.0	14.5	21.5	20.0	21.0	22.0	20.5	21.5	21.0	20.5	21.0
10	15.5	14.5	15.0	21.0	19.0	20.0	22.0	20.5	21.0	21.0	20.5	20.5
11	15.5	15.0	15.5	19.5	19.0	19.0	23.0	20.5	21.5	21.0	20.0	20.5
12	16.0	15.5	15.5	20.0	19.0	19.5	22.5	21.5	22.0	21.0	19.5	20.5
13	15.5	14.5	15.5	19.5	18.5	19.0	22.0	21.0	21.5	20.5	20.0	20.5
14	17.5	14.5	16.0	19.5	18.5	19.0	22.0	21.0	21.5	20.5	20.0	20.0
15	18.0	15.5	17.0	20.5	18.0	19.5	22.5	21.0	21.5	20.5	20.0	20.0
16	18.0	16.5	17.0	21.0	19.0	20.0	23.0	21.0	22.0	20.5	19.5	20.0
17	18.0	16.5	17.0	20.5	19.0	20.0	22.5	21.5	22.0	20.5	19.5	20.0
18	18.5	16.0	17.0	21.5	20.5	21.0	22.0	21.5	22.0	20.5	19.5	20.0
19	19.5	18.0	19.0	21.0	19.0	20.0	22.0	21.0	21.5	20.5	19.5	20.0
20	19.0	17.0	18.0	20.5	19.5	19.5	22.0	21.0	21.5	20.0	19.0	19.5
21	18.5	17.0	17.5	21.5	20.0	20.5	22.0	20.5	21.5	19.5	18.5	19.0
22	18.0	17.0	17.5	21.5	20.0	21.0	23.5	22.0	22.5	19.0	18.5	19.0
23	18.5	17.0	17.5	21.5	20.0	20.5	23.0	21.5	22.0	19.0	18.0	18.5
24	18.5	17.5	18.0	21.0	19.0	20.0	22.5	20.5	21.5	18.0	18.0	18.0
25	18.5	17.0	18.0	20.0	18.5	19.5	22.0	21.5	21.5	18.0	17.0	17.5
26	19.5	17.5	18.5	20.0	18.5	19.5	22.5	21.5	22.0	17.5	17.0	17.0
27	19.0	16.5	18.0	22.0	19.0	20.5	23.5	21.5	22.5	17.0	16.5	17.0
28	19.5	18.5	19.0	21.5	20.5	21.0	22.0	21.0	21.5	17.0	16.5	16.5
29	19.5	18.5	18.5	21.0	20.0	20.5	23.0	21.0	22.0	16.5	16.0	16.0
30	19.0	18.0	19.0	21.0	20.0	20.5	22.5	21.5	22.0	16.0	15.5	15.5
31	---	---	---	21.0	20.0	20.5	21.5	21.0	21.5	---	---	---
MONTH	19.5	13.5	16.4	22.0	17.5	19.9	23.5	20.5	21.6	21.5	15.5	19.3

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121970 MUSKEGON RIVER NEAR CROTON, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	9.1	8.8	9.0	11.1	10.7	10.9	13.3	12.9	13.1
2	---	---	---	9.1	8.9	9.0	11.3	10.4	11.0	13.3	12.9	13.1
3	6.5	6.3	6.4	9.4	9.0	9.1	11.4	10.8	11.1	13.4	13.0	13.2
4	6.6	5.9	6.3	9.3	9.1	9.2	11.4	10.8	11.1	13.7	13.1	13.3
5	6.2	5.9	6.1	9.4	9.1	9.3	11.4	10.9	11.1	13.8	13.3	13.5
6	6.2	5.8	6.0	9.4	9.2	9.3	11.4	10.8	11.1	14.0	13.3	13.6
7	6.3	5.8	6.1	9.7	9.2	9.5	11.5	10.7	11.1	14.2	13.4	13.8
8	6.4	5.9	6.2	9.9	9.5	9.7	11.5	11.0	11.2	14.2	12.1	13.7
9	6.3	6.0	6.2	9.8	9.4	9.6	11.7	11.0	11.4	13.5	12.1	12.5
10	6.6	6.1	6.4	9.9	9.5	9.6	11.8	11.0	11.4	14.3	12.8	13.6
11	6.9	6.6	6.7	9.8	9.5	9.7	12.1	11.3	11.7	14.1	13.1	13.7
12	7.0	6.7	6.9	9.8	9.4	9.6	12.1	11.7	11.9	13.7	13.0	13.4
13	7.3	6.8	7.0	9.7	9.3	9.4	12.2	11.7	12.0	13.9	13.1	13.5
14	7.3	6.8	7.1	9.7	9.3	9.5	12.2	11.7	11.9	14.2	12.8	13.5
15	7.3	6.7	7.0	9.7	9.3	9.5	12.4	11.7	12.0	13.7	12.8	13.3
16	7.7	7.3	7.5	9.8	9.5	9.6	12.3	11.7	12.0	13.7	12.6	13.2
17	7.6	7.4	7.5	9.9	9.6	9.7	12.4	11.7	12.1	13.9	12.4	13.4
18	7.6	7.4	7.4	9.9	9.6	9.7	12.3	12.0	12.1	13.8	13.2	13.5
19	7.8	7.4	7.6	10.0	9.6	9.8	12.5	12.0	12.3	13.9	13.3	13.6
20	7.9	7.7	7.8	10.0	9.7	9.8	12.7	12.2	12.4	14.0	13.0	13.5
21	7.9	7.7	7.8	10.0	9.7	9.9	12.6	12.2	12.4	13.8	12.9	13.4
22	8.0	7.8	7.9	10.3	9.9	10.1	12.6	12.3	12.5	13.7	12.8	13.3
23	8.2	7.9	8.1	10.3	10.0	10.1	12.7	12.3	12.5	13.7	13.1	13.4
24	8.3	8.0	8.2	10.3	10.0	10.1	12.8	12.3	12.6	13.7	13.0	13.3
25	8.4	8.2	8.2	10.4	10.0	10.2	12.9	12.6	12.7	13.6	12.8	13.2
26	8.4	8.2	8.3	10.5	10.2	10.3	13.0	12.5	12.7	13.6	12.5	13.2
27	8.5	8.3	8.4	10.7	10.2	10.4	13.0	12.6	12.7	13.5	12.7	13.0
28	8.7	8.4	8.5	10.6	10.3	10.5	12.9	12.5	12.7	13.4	12.5	12.9
29	8.7	8.4	8.6	10.7	10.4	10.5	13.2	12.5	12.9	13.1	12.3	12.7
30	8.9	8.6	8.7	10.8	10.4	10.6	13.2	12.5	12.8	12.9	11.8	12.4
31	8.9	8.6	8.8	---	---	---	13.2	12.6	13.0	---	---	---
MONTH	---	---	---	10.8	8.8	9.7	13.2	10.4	12.0	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	12.6	11.9	12.2	11.4	10.7	11.0	11.2	10.1	10.8
2	---	---	---	12.8	12.0	12.4	11.4	10.8	11.1	11.3	10.3	10.8
3	---	---	---	13.2	12.0	12.6	11.4	11.0	11.2	11.0	10.1	10.6
4	---	---	---	13.1	12.0	12.6	11.4	11.1	11.2	10.8	9.6	10.3
5	11.9	11.0	11.5	13.0	12.1	12.5	11.6	11.1	11.4	10.5	9.7	10.0
6	11.9	11.0	11.4	13.0	11.9	12.5	11.9	11.2	11.6	10.6	9.4	9.9
7	12.0	10.9	11.4	13.1	11.9	12.4	12.0	11.3	11.7	10.5	9.6	10.1
8	11.8	11.1	11.6	13.0	12.1	12.6	12.1	11.7	11.9	10.4	9.8	10.1
9	12.0	11.4	11.7	13.2	12.1	12.5	12.1	11.7	11.9	10.3	9.7	10.0
10	12.1	11.2	11.7	12.8	11.3	12.2	12.4	11.7	12.0	10.4	9.7	10.1
11	12.0	11.5	11.7	12.3	11.1	11.7	12.3	11.7	12.1	10.3	9.4	10.0
12	12.3	11.3	11.7	12.3	11.4	11.8	12.4	11.8	12.1	9.9	9.4	9.6
13	11.8	11.3	11.6	12.1	11.2	11.7	12.5	11.8	12.1	9.9	9.5	9.7
14	12.0	11.0	11.6	12.6	11.7	12.1	12.6	11.7	12.1	9.9	9.5	9.7
15	12.1	11.1	11.6	12.9	11.7	12.4	12.8	11.5	12.1	10.1	9.5	9.8
16	12.3	11.4	11.8	12.7	11.5	12.0	12.5	11.1	11.9	10.1	9.4	9.7
17	12.6	11.4	12.0	12.3	11.6	12.0	12.2	11.5	11.8	10.0	9.2	9.6
18	12.2	11.6	12.0	13.0	11.7	12.4	12.2	11.2	11.7	10.0	9.0	9.5
19	12.6	11.5	12.1	13.2	12.1	12.5	12.4	11.2	11.9	10.0	9.0	9.4
20	12.7	11.7	12.2	12.3	11.1	11.8	12.7	11.2	12.2	9.9	8.9	9.4
21	12.7	11.5	12.1	12.3	11.1	11.9	12.4	11.6	12.0	10.0	9.1	9.5
22	12.3	11.5	12.0	12.5	11.4	11.9	12.3	11.2	11.9	10.0	9.1	9.5
23	12.4	11.5	12.0	12.6	11.2	11.8	12.4	11.4	11.8	10.0	8.9	9.4
24	13.0	11.7	12.5	12.4	11.2	11.8	12.4	11.1	11.8	9.9	8.8	9.3
25	12.8	12.2	12.6	11.9	10.9	11.3	12.5	11.4	12.0	9.7	8.5	9.1
26	13.3	12.5	12.9	11.2	10.6	10.9	12.6	11.5	11.9	9.9	8.5	9.2
27	13.4	11.8	12.7	11.0	10.5	10.8	12.4	11.3	11.9	9.9	8.5	9.3
28	14.1	11.8	12.6	10.9	10.5	10.7	11.8	10.8	11.5	9.5	8.5	8.9
29	---	---	---	11.0	10.2	10.6	11.5	10.5	11.1	9.9	8.5	9.3
30	---	---	---	11.1	10.3	10.7	11.8	10.5	11.1	9.2	8.4	8.7
31	---	---	---	11.2	10.4	10.8	---	---	---	9.6	8.6	9.2
MONTH	---	---	---	13.2	10.2	11.9	12.8	10.5	11.7	11.3	8.4	9.7

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121970 MUSKEGON RIVER NEAR CROTON, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.0	8.1	8.7	6.9	6.4	6.6	6.8	5.5	6.1	5.8	4.5	5.1
2	8.9	8.0	8.6	6.9	6.2	6.5	6.8	5.4	6.0	5.6	4.4	5.1
3	9.5	8.3	8.9	6.7	6.0	6.4	6.5	5.6	6.0	5.3	2.3	4.1
4	9.0	8.4	8.7	7.2	6.2	6.6	6.2	4.6	5.6	6.0	4.3	5.3
5	8.7	7.5	8.4	6.6	6.1	6.4	7.0	4.9	6.2	6.2	5.4	5.8
6	8.4	7.4	7.9	6.5	6.0	6.2	6.8	5.5	6.1	6.0	4.1	5.3
7	8.3	7.6	8.0	6.4	5.7	6.0	6.7	5.0	5.8	6.2	4.5	5.7
8	8.6	7.3	8.0	6.3	5.8	6.0	6.5	4.7	5.6	7.2	5.9	6.7
9	8.4	7.3	7.8	6.8	5.7	6.2	6.3	4.4	5.3	7.9	6.4	6.8
10	8.3	7.4	7.8	6.0	5.0	5.5	5.8	3.9	4.8	7.5	5.9	6.9
11	8.0	7.2	7.7	7.2	4.5	5.8	6.7	3.9	5.2	7.5	4.3	6.5
12	8.2	7.5	7.9	6.0	4.8	5.5	6.5	4.5	5.4	7.6	3.1	5.8
13	7.7	6.7	7.4	6.1	4.7	5.5	5.4	4.6	5.0	6.5	4.6	5.7
14	7.9	6.7	7.3	7.0	5.2	6.1	5.1	4.2	4.7	6.5	3.6	5.2
15	8.1	6.7	7.5	7.2	4.6	6.0	5.5	4.0	4.8	6.0	4.9	5.5
16	8.2	7.0	7.6	6.3	5.0	5.7	5.7	4.1	4.9	6.3	4.9	5.6
17	8.3	7.3	7.9	6.5	5.1	5.8	5.8	4.2	4.8	6.8	4.5	5.7
18	8.1	7.5	7.8	7.2	6.1	6.8	6.3	4.2	4.8	7.3	4.9	6.6
19	8.6	7.5	8.2	6.7	5.2	6.0	7.1	3.6	4.5	7.9	5.6	7.3
20	8.3	7.2	7.7	7.3	5.3	6.3	7.0	3.6	4.6	6.4	4.5	5.6
21	8.0	7.1	7.5	7.9	6.9	7.3	6.5	3.2	4.0	6.5	4.9	5.8
22	8.1	7.1	7.5	7.8	7.2	7.5	6.9	3.1	4.7	6.6	5.1	6.0
23	7.8	7.2	7.5	8.1	7.3	7.6	6.7	3.0	4.6	7.0	5.7	6.3
24	7.6	7.2	7.4	7.7	6.7	7.2	5.3	2.3	4.0	5.7	5.1	5.3
25	7.4	6.9	7.2	7.0	5.3	6.2	5.2	3.8	4.6	5.9	5.3	5.6
26	7.4	6.5	6.9	6.3	4.1	5.4	5.2	3.7	4.5	6.1	5.6	5.8
27	8.4	6.5	7.3	7.0	4.5	5.9	6.6	3.7	5.5	6.2	5.7	6.0
28	7.1	6.4	6.8	6.6	5.5	6.1	5.7	3.6	4.9	6.4	6.0	6.2
29	6.6	6.3	6.5	6.2	5.5	5.9	6.2	3.4	4.9	6.9	6.3	6.6
30	7.0	6.1	6.6	6.4	5.6	6.0	6.5	5.0	5.6	6.8	6.4	6.6
31	—	—	—	6.6	5.6	6.0	5.4	4.6	5.0	—	—	—
MONTH	9.5	6.1	7.7	8.1	4.1	6.2	7.1	2.3	5.1	7.9	2.3	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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e3.8	6.7	7.4	8.0	e6.2	e5.7	12	24	7.0	4.2	e3.4	2.5
2	e5.1	6.7	7.5	8.5	e6.2	e5.5	11	19	6.2	3.4	e3.8	2.1
3	5.9	7.0	e7.0	7.7	e6.2	e5.2	11	14	6.1	3.5	e4.4	1.7
4	9.2	7.6	e5.8	7.5	e6.2	e5.2	15	12	6.1	3.6	e5.2	2.4
5	8.1	8.0	e5.2	7.5	e6.1	e5.2	16	16	6.6	4.0	e4.4	2.3
6	5.7	9.0	e6.4	7.5	e6.1	e5.2	15	15	6.1	3.8	e3.9	1.9
7	5.6	8.1	7.2	7.3	e6.1	e5.2	14	15	5.9	4.4	e3.5	1.4
8	5.0	8.0	7.2	7.6	e6.1	e5.2	13	18	7.1	4.2	e3.7	1.4
9	4.7	8.0	e6.0	7.9	e6.1	e5.2	13	17	6.8	4.0	e3.8	1.8
10	4.5	11	e5.3	8.1	e6.1	e5.2	12	15	6.7	4.7	e4.9	1.8
11	4.4	8.8	e6.5	e7.4	e6.0	e5.2	11	19	6.6	5.4	e4.5	1.4
12	4.5	8.2	e7.3	e7.0	e6.0	e5.4	11	28	5.9	4.4	e4.1	1.9
13	5.6	8.4	8.3	e6.6	e6.1	e5.4	10	19	5.3	3.9	3.9	1.8
14	4.7	8.1	8.5	e6.1	e6.1	e5.8	9.9	16	5.4	3.3	3.5	1.7
15	4.7	7.8	8.2	e5.6	e6.1	e7.5	9.6	14	5.0	2.8	3.2	3.4
16	4.7	7.6	7.6	e6.0	e6.1	11	9.7	13	5.0	3.0	3.2	2.8
17	4.8	7.6	8.3	e6.5	e6.1	16	11	12	4.4	2.5	3.1	2.5
18	7.1	7.6	11	e6.4	e6.1	22	11	12	4.4	2.9	2.5	2.1
19	8.4	7.9	12	e6.4	e6.1	18	10	11	4.0	1.9	1.9	1.6
20	6.6	8.0	10	e6.1	e6.1	16	12	11	3.7	2.9	1.8	2.4
21	5.9	12	9.7	e6.1	e6.1	14	12	10	4.1	9.0	1.9	2.2
22	5.6	11	9.2	e6.1	e6.1	16	12	9.3	3.8	8.2	2.2	5.0
23	5.3	8.8	8.8	e6.2	e6.1	14	10	9.0	3.3	7.0	1.5	4.4
24	5.1	8.3	8.4	e6.5	e6.0	13	9.7	9.0	3.5	5.1	1.9	3.6
25	5.8	8.0	8.2	e6.6	e5.7	15	9.3	8.8	3.2	4.4	2.6	3.3
26	6.5	7.7	8.0	e6.8	e5.7	13	8.9	8.0	4.7	3.8	3.7	3.6
27	6.0	7.6	8.0	e6.8	e5.7	12	8.5	7.5	4.1	3.5	2.1	4.6
28	5.7	7.5	9.0	e6.6	e5.7	14	7.7	7.5	5.7	3.9	1.9	4.6
29	5.8	7.7	9.5	e6.4	---	16	7.3	7.2	5.8	3.3	2.0	4.1
30	6.2	7.8	9.1	e6.3	---	13	8.6	7.0	4.3	2.6	1.5	3.7
31	6.4	---	8.8	e6.2	---	12	---	7.2	---	3.0	1.8	---
TOTAL	177.4	246.5	249.4	212.3	169.3	317.1	331.2	410.5	156.8	126.6	95.8	80.0
MEAN	5.72	8.22	8.05	6.85	6.05	10.2	11.0	13.2	5.23	4.08	3.09	2.67
MAX	9.2	12	12	8.5	6.2	22	16	28	7.1	9.0	5.2	5.0
MIN	3.8	6.7	5.2	5.6	5.7	5.2	7.3	7.0	3.2	1.9	1.5	1.4
CFSM	0.34	0.49	0.48	0.41	0.36	0.61	0.66	0.79	0.31	0.24	0.19	0.16
IN.	0.40	0.55	0.56	0.47	0.38	0.71	0.74	0.91	0.35	0.28	0.21	0.18

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2003, BY WATER YEAR (WY)

MEAN	12.9	17.3	19.1	17.7	20.4	28.6	26.9	18.9	11.9	6.79	7.71	8.16
MAX	45.2	55.2	40.5	31.3	47.8	87.9	50.6	45.2	23.6	17.6	30.2	43.0
(WY)	1987	1986	1992	1986	1976	1976	1982	1974	1993	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1966 - 2003	
ANNUAL TOTAL	4378.5		2572.9			
ANNUAL MEAN	12.0		7.05		16.3	
HIGHEST ANNUAL MEAN					27.4	1976
LOWEST ANNUAL MEAN					7.05	2003
HIGHEST DAILY MEAN	74	Mar 10	28	May 12	720	Mar 5 1976
LOWEST DAILY MEAN	2.8	Aug 10	1.4	Sep 7	1.4	Sep 7 2003
ANNUAL SEVEN-DAY MINIMUM	3.1	Sep 8	1.6	Sep 7	1.6	Sep 7 2003
MAXIMUM PEAK FLOW			33	May 12	(a)930	Mar 5 1976
MAXIMUM PEAK STAGE			11.82	May 12	(b)16.61	Feb 20 1994
INSTANTANEOUS LOW FLOW			1.1	Sep 11	1.0	(c)
ANNUAL RUNOFF (CFSM)	0.72		0.42		0.98	
ANNUAL RUNOFF (INCHES)	9.75		5.73		13.29	
10 PERCENT EXCEEDS	21		12		31	
50 PERCENT EXCEEDS	9.2		6.1		12	
90 PERCENT EXCEEDS	3.9		2.8		4.5	

(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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	250	284	298	331	e320	e320	429	371	284	279	200	186
2	246	284	297	317	e340	e320	411	447	280	253	212	186
3	263	284	288	313	e360	e270	391	423	275	234	225	183
4	293	282	e240	302	e350	e280	407	384	270	232	257	180
5	346	285	e280	298	e340	e300	487	378	272	228	266	180
6	336	296	e290	298	e330	e320	493	415	272	227	231	178
7	315	303	e285	297	e320	e320	480	414	272	232	217	173
8	e296	298	e285	299	e320	e310	463	413	273	227	213	172
9	e285	294	e280	302	e320	e290	436	409	284	224	215	171
10	e271	305	e260	307	e320	e270	426	388	284	225	212	169
11	265	326	e290	304	e320	e310	417	391	299	261	206	167
12	262	325	e290	e300	e320	e320	406	500	296	279	208	164
13	279	316	e290	e300	e310	e330	393	627	282	256	212	162
14	e283	308	300	e290	e320	e340	378	581	267	237	201	166
15	e271	303	302	e260	e320	e360	366	491	260	225	194	181
16	e268	297	299	e250	e320	e380	356	427	250	217	190	185
17	e262	293	293	e270	e330	415	354	396	242	211	186	182
18	e273	290	315	e290	e330	485	356	376	239	206	184	177
19	e314	291	364	e290	e330	593	361	361	234	200	181	174
20	e332	293	390	e280	e340	669	381	358	227	200	177	174
21	e309	304	372	e260	e340	670	412	351	223	e220	177	174
22	e297	318	353	e250	e350	644	413	337	220	e270	176	212
23	e293	319	336	e250	e350	608	396	321	216	e255	172	233
24	285	311	324	e260	e340	553	372	311	213	241	172	219
25	284	305	316	e280	e310	499	353	310	210	229	176	208
26	e294	301	310	e300	e300	466	339	310	219	218	193	202
27	e299	297	306	e310	e310	437	329	304	241	220	210	212
28	298	294	306	e320	e320	430	319	295	e255	214	202	219
29	293	293	312	e320	---	489	310	289	e270	208	191	219
30	286	296	314	e310	---	525	310	285	e280	200	183	217
31	284	---	324	e320	---	463	---	286	---	198	181	---
TOTAL	8932	8995	9509	9078	9180	12986	11744	11949	7709	7126	6220	5625
MEAN	288	300	307	293	328	419	391	385	257	230	201	188
MAX	346	326	390	331	360	670	493	627	299	279	266	233
MIN	246	282	240	250	300	270	310	285	210	198	172	162
CFSM	0.71	0.74	0.76	0.72	0.81	1.03	0.96	0.95	0.63	0.57	0.49	0.46
IN.	0.82	0.82	0.87	0.83	0.84	1.19	1.08	1.09	0.71	0.65	0.57	0.52

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 2003, BY WATER YEAR (WY)

MEAN	380	452	470	446	465	629	650	499	407	307	299	338
MAX	912	906	896	641	760	1449	1224	936	747	523	484	1071
(WY)	1987	1986	1992	1973	1985	1976	1967	1974	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1957 - 2003	
ANNUAL TOTAL	149165		109053			
ANNUAL MEAN	409		299		445	
HIGHEST ANNUAL MEAN					635	1976
LOWEST ANNUAL MEAN					288	1958
HIGHEST DAILY MEAN	1460	Mar 11	670	Mar 21	4650	Sep 1 1975
LOWEST DAILY MEAN	219	Sep 14	162	Sep 13	162	Sep 13 2003
ANNUAL SEVEN-DAY MINIMUM	221	Sep 12	167	Sep 8	167	Sep 8 2003
MAXIMUM PEAK FLOW			677	Mar 20	5400	Sep 1 1975
MAXIMUM PEAK STAGE			3.35	Mar 20	7.46	Sep 1 1975
INSTANTANEOUS LOW FLOW			161	(a)	161	(a)
ANNUAL RUNOFF (CFSM)	1.01		0.74		1.10	
ANNUAL RUNOFF (INCHES)	13.67		9.99		14.90	
10 PERCENT EXCEEDS	623		410		690	
50 PERCENT EXCEEDS	364		294		390	
90 PERCENT EXCEEDS	254		196		251	

(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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	397	484	484	523	e480	e500	897	621	514	519	399	366
2	400	485	486	522	e500	e500	841	701	507	472	414	364
3	410	486	455	484	e550	e420	798	767	497	443	487	363
4	442	482	457	485	e550	e420	794	717	492	431	478	362
5	496	483	e460	486	e500	e500	814	671	496	418	475	362
6	526	486	e460	481	e480	e460	817	663	504	414	443	359
7	518	488	e460	478	e460	e480	823	689	506	428	429	356
8	491	492	e460	475	e400	e520	830	694	504	468	415	352
9	473	486	e460	478	e420	e440	821	675	520	461	405	348
10	459	500	e460	e480	e480	e400	812	666	557	444	401	345
11	449	511	e460	e480	e420	e500	818	818	581	482	395	341
12	444	527	e460	e460	e380	e500	809	906	605	517	390	338
13	455	519	481	e440	e400	e500	776	986	577	527	390	336
14	462	506	479	e400	e420	e520	729	1060	527	476	388	335
15	464	494	484	e360	e440	e550	689	1040	497	445	378	346
16	456	482	486	e400	e460	588	667	911	478	433	371	357
17	454	476	465	e450	e480	652	655	787	466	422	367	363
18	472	471	482	e430	e480	784	669	700	457	413	363	361
19	500	476	536	e400	e500	976	676	651	450	403	361	356
20	530	476	594	e380	e500	1140	735	635	443	418	358	351
21	539	481	631	e380	e500	1240	766	615	435	477	358	349
22	517	480	601	e360	e500	1290	782	603	431	478	357	363
23	500	484	561	e380	e500	1280	761	579	423	477	354	393
24	492	482	537	e420	e460	1210	719	564	417	447	351	405
25	486	477	520	e450	e420	1120	673	557	412	431	351	408
26	493	473	509	e460	e380	1020	638	551	408	414	390	402
27	492	470	496	e480	e420	941	613	542	407	417	416	406
28	493	468	494	e480	e500	894	593	532	425	418	434	419
29	488	469	498	e450	---	926	576	523	480	410	411	440
30	485	474	506	e460	---	952	569	518	533	396	385	442
31	483	---	514	e480	---	953	---	517	---	392	370	---
TOTAL	14766	14568	15436	13892	12980	23176	22160	21459	14549	13791	12284	11088
MEAN	476	486	498	448	464	748	739	692	485	445	396	370
MAX	539	527	631	523	550	1290	897	1060	605	527	487	442
MIN	397	468	455	360	380	400	569	517	407	392	351	335
CFSM	0.70	0.71	0.73	0.66	0.68	1.10	1.08	1.02	0.71	0.65	0.58	0.54
IN	0.81	0.80	0.84	0.76	0.71	1.27	1.21	1.17	0.79	0.75	0.67	0.61

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 2003, BY WATER YEAR (WY)

MEAN	604	705	728	704	725	971	1030	792	677	530	493	542
MAX	1507	1523	1311	1129	1301	1779	1732	1167	1296	1232	826	1880
(WY)	1987	1986	1992	1985	1984	1976	1993	2001	1993	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1939 - 2003	
ANNUAL TOTAL	263305		190149			
ANNUAL MEAN	721		521		708	
HIGHEST ANNUAL MEAN					1087	1986
LOWEST ANNUAL MEAN					472	1958
HIGHEST DAILY MEAN	2060	Mar 13	1290	Mar 22	6020	Sep 13 1986
LOWEST DAILY MEAN	386	Sep 18	335	Sep 14	310	Aug 9 1941
ANNUAL SEVEN-DAY MINIMUM	389	Sep 13	341	Sep 9	322	Aug 5 1941
MAXIMUM PEAK FLOW			1300	Mar 22	6440	Sep 13 1986
MAXIMUM PEAK STAGE			3.66	Mar 22	8.07	Sep 13 1986
INSTANTANEOUS LOW FLOW			334	(a)	(b)209	Dec 11 1962
ANNUAL RUNOFF (CFSM)	1.06		0.76		1.04	
ANNUAL RUNOFF (INCHES)	14.38		10.39		14.12	
10 PERCENT EXCEEDS	1120		766		1070	
50 PERCENT EXCEEDS	610		480		630	
90 PERCENT EXCEEDS	426		379		426	

(a) Sept. 13, 14.
(b) Discharge measurement.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

444351084561801 BEAR LAKE NEAR KALKASKA, MI

LOCATION.--Lat 44°43'22", long 84°56'51", 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, 2.66 ft, Oct. 2, 3; minimum observed, 1.89 ft, Sept. 21.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.57	2.51	2.46	---	---	---	---	---	2.55	---	2.37	2.20
2	2.66	2.52	2.53	---	---	---	---	---	2.56	---	2.36	2.19
3	2.66	2.53	---	---	---	---	---	---	2.54	---	2.36	2.17
4	2.64	2.55	---	---	---	---	---	---	2.52	---	2.35	2.15
5	2.62	2.54	---	---	---	---	---	---	2.56	---	2.35	2.12
6	2.62	2.55	---	---	---	---	---	---	2.57	---	2.34	2.11
7	2.63	2.56	---	---	---	---	---	---	2.56	---	2.35	2.10
8	2.63	2.55	---	---	---	---	---	---	2.56	---	2.36	2.09
9	2.59	2.53	---	---	---	---	---	---	2.60	---	2.35	2.07
10	2.58	2.52	---	---	---	---	---	---	2.62	---	2.35	2.06
11	2.56	2.52	---	---	---	---	---	---	2.65	---	2.34	2.04
12	2.54	2.49	---	---	---	---	---	---	2.64	---	2.33	2.03
13	2.57	2.49	---	---	---	---	---	---	2.65	---	2.31	2.01
14	2.57	2.51	---	---	---	---	---	---	2.63	---	2.29	2.01
15	2.56	2.51	---	---	---	---	---	---	2.62	---	2.26	1.98
16	2.55	2.47	---	---	---	---	---	---	2.60	---	2.32	1.98
17	2.55	2.46	---	---	---	---	---	---	2.58	2.44	2.35	1.96
18	2.54	2.45	---	---	---	---	---	2.58	2.58	2.45	2.34	1.95
19	2.57	2.45	---	---	---	---	---	2.60	2.57	2.44	2.34	1.95
20	2.56	2.44	---	---	---	---	---	2.62	2.56	2.40	2.28	1.91
21	2.57	2.44	---	---	---	---	---	2.56	2.56	2.39	2.24	1.89
22	2.57	2.44	---	---	---	---	---	2.56	2.54	2.37	2.20	1.95
23	2.55	2.43	---	---	---	---	---	2.56	2.50	2.36	2.16	1.95
24	2.55	2.43	---	---	---	---	---	2.57	2.48	2.36	2.14	1.94
25	2.55	2.42	---	---	---	---	---	2.57	2.46	2.34	2.13	1.93
26	2.54	2.42	---	---	---	---	---	2.58	2.46	---	2.15	1.94
27	2.52	2.42	---	---	---	---	---	2.57	2.45	2.31	2.14	1.94
28	2.53	2.43	---	---	---	---	---	2.56	2.43	2.29	2.26	1.94
29	2.51	2.42	---	---	---	---	---	2.56	---	2.27	2.24	1.94
30	2.52	2.43	---	---	---	---	---	2.56	---	2.26	2.23	1.95
31	2.51	---	---	---	---	---	---	2.57	---	2.36	2.22	---
MEAN	2.57	2.48	---	---	---	---	---	---	---	---	2.28	2.02
MAX	2.66	2.56	---	---	---	---	---	---	---	---	2.37	2.20
MIN	2.51	2.42	---	---	---	---	---	---	---	---	2.13	1.89

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	744	820	830	808	e800	e800	1080	1020	868	779	713	894
2	750	821	822	797	e850	e800	1060	1030	867	755	e775	822
3	754	821	757	782	e900	e670	1030	1000	858	737	e1000	769
4	794	818	e600	786	915	e700	1020	965	844	726	e900	744
5	848	816	e700	785	858	e800	998	955	845	720	853	727
6	848	818	e900	786	820	e800	963	988	843	714	805	714
7	857	818	e850	782	806	e800	964	1010	844	719	792	702
8	838	821	e800	780	e680	e800	978	1010	856	715	761	694
9	826	820	e750	789	e700	e720	982	969	1100	704	768	686
10	814	844	e700	802	803	e650	1030	945	1130	768	761	678
11	799	864	e800	789	e750	795	1120	1070	1270	899	745	674
12	802	861	e820	770	e650	837	1180	1340	1250	1040	732	664
13	815	855	e820	780	e700	861	1190	1410	1170	1030	719	660
14	818	842	824	e750	e700	869	1190	1360	1090	958	710	667
15	817	833	823	e650	e750	877	1180	1270	987	886	703	699
16	806	822	816	e650	e800	929	1270	1150	908	843	702	709
17	801	809	798	e700	e800	1030	1420	1070	863	840	693	688
18	803	800	790	e750	e800	1140	1660	1020	834	855	684	673
19	820	813	843	e750	e850	1190	e1730	987	815	789	674	664
20	826	825	870	e700	e850	1230	e1700	968	799	760	668	661
21	818	826	881	e680	e850	1300	e1600	940	786	e825	757	656
22	838	829	862	e660	e850	1320	1500	912	776	900	777	689
23	850	829	842	e650	899	1320	1360	888	769	823	733	732
24	842	825	825	e650	e800	1300	1250	892	763	783	704	747
25	837	821	812	e720	e750	1270	1170	926	756	767	699	750
26	835	815	812	e780	e650	1220	1110	960	750	774	719	738
27	828	813	803	e800	e700	1180	1060	938	744	792	720	746
28	823	812	794	e800	e800	1180	1020	906	752	757	703	758
29	817	809	800	e800	---	1230	992	881	808	734	878	763
30	814	817	803	e800	---	1170	974	866	799	717	966	807
31	814	---	808	e800	---	1120	---	872	---	709	920	---
TOTAL	25296	24737	24955	23326	22081	30908	35781	31518	26744	24818	23734	21575
MEAN	816	825	805	752	789	997	1193	1017	891	801	766	719
MAX	857	864	900	808	915	1320	1730	1410	1270	1040	1000	894
MIN	744	800	600	650	650	650	963	866	744	704	668	656
CFSM	0.95	0.96	0.94	0.88	0.92	1.16	1.39	1.19	1.04	0.93	0.89	0.84
IN.	1.10	1.07	1.08	1.01	0.96	1.34	1.55	1.37	1.16	1.08	1.03	0.94

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 2003, BY WATER YEAR (WY)

MEAN	972	1047	1032	996	985	1197	1526	1203	1053	934	881	908
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1903 - 2003	
ANNUAL TOTAL	367719		315473			
ANNUAL MEAN	1007		864		(a)1060	
HIGHEST ANNUAL MEAN					1261	1912
LOWEST ANNUAL MEAN					864	2003
HIGHEST DAILY MEAN	2030	Mar 10	1730	Apr 19	3500	Mar 25 1913
LOWEST DAILY MEAN	600	Dec 4	600	Dec 4	540	Feb 21 1936
ANNUAL SEVEN-DAY MINIMUM	734	Sep 13	675	Sep 8	549	Feb 19 1936
MAXIMUM PEAK FLOW			(b)1760	Apr 19	(c)3570	Mar 25 1913
MAXIMUM PEAK STAGE			(d)13.68	Dec 5	(f)15.30	Apr 15 2001
ANNUAL RUNOFF (CFSM)	1.18		1.01		1.24	
ANNUAL RUNOFF (INCHES)	15.96		13.69		16.80	
10 PERCENT EXCEEDS	1400		1120		1410	
50 PERCENT EXCEEDS	906		816		978	
90 PERCENT EXCEEDS	776		700		813	

(a) Does not include water years 1931, 1934.
(b) Gage height 13.49 ft.
(c) Gage height 7.1 ft, from graph based on gage readings, datum then in use.
(d) Backwater from ice.
(e) Estimated.
(f) Does not include water years 1903-90.

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: Oct. 25 to Nov. 2, Nov. 12-15, 28, Dec. 18-21, Jan. 9, 10, Feb. 14-18, Mar. 11-13, June 19-22, July 17-21, Sept. 10-16, 25-27 rated good; Nov. 3-5, 16-21, Nov. 29 to Dec. 1, Dec. 22-27, Feb. 19-27, Mar. 14-19, June 23-29, July 22-27, Sept. 17-19, 28-30 rated fair; and Oct. 1-9, Nov. 22-25, Dec. 2-12, Dec. 28 to Jan. 7, Feb. 28 to Mar. 3, Mar. 20 to Apr. 7, June 30 to July 10, July 28, 29 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, 23.0°C, June 25; minimum, -0.5°C, on several days during winter period.
DISSOLVED OXYGEN: Maximum, 15.2 mg/L, Dec. 16; minimum, 7.3 mg/L, June 26, Aug. 22.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	16.5	14.0	15.5	4.5	4.0	4.0	1.5	0.5	0.5	2.0	1.0	1.5
2	16.0	14.5	15.5	4.0	3.5	4.0	0.5	0.0	0.0	1.0	0.0	0.5
3	14.5	13.5	14.0	4.5	3.5	4.0	0.0	0.0	0.0	0.5	0.5	0.5
4	14.0	13.0	13.5	4.5	4.0	4.5	0.0	0.0	0.0	1.0	0.5	1.0
5	13.5	12.0	12.5	4.5	4.0	4.0	0.0	0.0	0.0	1.5	1.0	1.5
6	12.0	11.0	11.0	4.5	4.0	4.0	0.0	0.0	0.0	1.5	0.5	1.0
7	11.0	10.0	10.5	4.0	3.0	3.5	0.0	0.0	0.0	1.0	0.5	0.5
8	10.0	9.0	9.5	5.5	4.0	4.5	0.0	0.0	0.0	1.5	0.5	1.0
9	10.0	9.0	9.5	6.5	5.0	5.5	0.0	0.0	0.0	2.0	1.5	2.0
10	9.5	8.0	8.5	7.5	6.5	7.0	0.0	0.0	0.0	1.5	0.0	1.0
11	10.0	8.0	9.0	7.5	7.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0
12	11.0	9.5	10.0	7.0	6.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0
13	11.0	9.5	10.0	6.0	5.5	5.5	2.0	0.0	1.0	0.0	0.0	0.0
14	9.5	8.0	9.0	5.5	5.0	5.5	2.5	2.0	2.5	0.0	0.0	0.0
15	9.0	7.5	8.0	5.0	3.5	4.5	2.5	2.0	2.0	0.0	0.0	0.0
16	8.0	7.0	7.5	3.5	2.0	2.5	2.0	0.5	1.0	0.0	0.0	0.0
17	7.0	6.0	6.5	2.0	1.0	1.0	0.5	0.0	0.5	0.0	0.0	0.0
18	6.0	5.5	6.0	1.5	0.5	1.0	2.0	0.0	0.5	0.0	0.0	0.0
19	7.0	6.0	6.5	3.0	1.5	2.0	3.0	2.0	2.5	0.0	0.0	0.0
20	6.5	6.0	6.5	3.5	2.0	2.5	3.0	3.0	3.0	0.0	0.0	0.0
21	6.0	5.5	5.5	4.0	3.5	3.5	3.0	2.0	2.5	0.0	0.0	0.0
22	5.5	5.5	5.5	3.5	3.5	3.5	2.0	1.5	2.0	0.0	0.0	0.0
23	5.5	4.5	5.0	3.5	3.5	3.5	1.5	1.0	1.0	0.0	0.0	0.0
24	5.5	4.5	5.0	3.5	3.5	3.5	1.0	0.5	1.0	0.0	0.0	0.0
25	5.0	4.5	5.0	3.5	3.0	3.0	1.5	1.0	1.0	0.0	0.0	0.0
26	5.5	5.0	5.5	3.0	2.5	2.5	1.5	1.0	1.5	0.0	0.0	0.0
27	6.0	5.5	5.5	2.5	2.0	2.0	1.0	0.5	1.0	0.0	0.0	0.0
28	6.5	5.5	6.0	2.0	1.5	1.5	2.0	1.0	1.5	0.0	0.0	0.0
29	5.5	4.5	5.0	3.0	1.5	2.0	2.5	2.0	2.0	0.0	0.0	0.0
30	5.0	4.0	4.5	3.0	1.5	2.0	3.0	2.0	2.5	0.0	0.0	0.0
31	5.0	4.5	4.5	---	---	---	3.0	2.0	2.5	0.0	0.0	0.0
MONTH	16.5	4.0	8.3	7.5	0.5	3.7	3.0	0.0	1.0	2.0	0.0	0.3

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124000 MANISTEE RIVER NEAR SHERMAN, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

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	-0.5	0.0	6.5	4.5	5.5	12.5	10.5	11.5
2	0.0	0.0	0.0	0.0	-0.5	0.0	6.0	5.5	6.0	11.5	10.0	11.0
3	0.0	0.0	0.0	0.0	-0.5	0.0	5.5	3.5	4.5	12.0	9.0	10.5
4	0.0	0.0	0.0	0.0	0.0	0.0	3.5	1.0	2.5	12.5	9.5	11.0
5	0.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	1.0	12.0	10.5	11.0
6	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	1.5	10.5	10.0	10.5
7	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.5	2.0	12.0	9.5	10.5
8	0.0	0.0	0.0	0.0	-0.5	0.0	4.5	1.5	3.0	14.0	11.0	12.5
9	0.0	0.0	0.0	0.0	0.0	0.0	6.0	2.5	4.5	14.0	12.0	13.0
10	0.0	0.0	0.0	0.0	0.0	0.0	7.5	4.5	6.0	15.5	12.5	14.0
11	0.0	0.0	0.0	0.0	0.0	0.0	8.5	6.0	7.5	15.0	13.0	14.0
12	0.0	0.0	0.0	0.0	0.0	0.0	9.0	7.0	8.0	13.0	10.5	11.5
13	0.0	0.0	0.0	0.0	0.0	0.0	9.5	7.0	8.5	12.5	9.5	11.0
14	0.0	0.0	0.0	0.5	0.0	0.0	11.5	8.0	10.0	12.5	10.0	11.5
15	0.0	0.0	0.0	3.0	0.0	1.5	13.5	10.5	12.0	14.0	11.5	12.5
16	0.0	0.0	0.0	4.0	0.5	2.5	12.5	9.0	11.0	13.5	12.5	13.0
17	0.0	0.0	0.0	6.0	3.5	5.0	9.0	7.0	8.0	14.5	12.5	13.5
18	0.0	0.0	0.0	5.5	5.0	5.5	7.0	6.0	6.5	15.5	12.5	14.0
19	0.0	0.0	0.0	6.5	4.5	5.5	8.0	6.0	7.0	17.0	14.0	15.5
20	0.0	0.0	0.0	7.0	5.5	6.5	10.0	8.0	9.0	17.0	14.5	16.0
21	0.0	0.0	0.0	6.5	5.5	6.0	10.0	9.0	9.5	15.5	13.0	14.5
22	0.0	0.0	0.0	5.5	5.0	5.5	9.5	8.0	8.5	15.5	12.5	14.0
23	0.0	0.0	0.0	6.5	5.0	6.0	9.5	7.0	8.0	15.0	13.0	13.5
24	0.0	0.0	0.0	7.0	5.5	6.0	10.0	7.0	8.5	13.5	12.5	13.0
25	0.0	0.0	0.0	7.5	6.0	7.0	11.5	8.5	10.0	13.5	11.5	12.5
26	0.0	-0.5	0.0	7.0	6.0	6.5	11.5	9.0	10.5	14.5	12.0	13.5
27	0.0	-0.5	0.0	6.5	5.5	5.5	12.5	9.5	11.0	16.0	12.5	14.0
28	0.0	-0.5	0.0	6.0	5.0	5.5	14.0	11.0	12.5	16.5	14.0	15.5
29	---	---	---	5.5	4.5	5.0	13.5	11.0	12.5	16.0	14.5	15.5
30	---	---	---	5.0	3.5	4.0	13.0	11.5	12.0	15.0	13.0	13.5
31	---	---	---	5.0	3.5	4.5	---	---	---	13.5	12.5	13.0
MONTH	0.0	-0.5	0.0	7.5	-0.5	2.8	14.0	0.0	7.6	17.0	9.0	12.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.5	11.0	12.5	19.5	16.0	18.0	20.0	18.5	19.5	16.5	14.5	15.5
2	15.0	11.5	13.5	20.0	17.0	18.5	20.0	18.5	19.5	17.0	14.5	15.5
3	15.0	13.0	14.0	21.0	18.0	19.5	19.5	18.0	19.0	16.5	15.0	16.0
4	14.0	12.5	13.5	21.5	19.0	20.0	19.5	17.5	18.5	16.0	14.0	15.0
5	15.5	12.5	14.0	21.5	19.0	20.5	19.5	17.5	18.5	15.0	12.5	14.0
6	15.0	13.0	14.0	20.5	18.5	19.5	20.5	17.5	19.0	16.0	13.0	14.5
7	16.0	13.5	14.5	22.0	19.0	20.0	20.5	18.5	19.5	16.5	14.0	15.5
8	15.5	14.0	14.5	21.0	19.5	20.0	21.0	19.0	19.5	17.5	15.0	16.5
9	14.5	13.5	14.0	20.0	17.5	19.0	19.5	18.5	19.0	17.5	15.5	16.5
10	14.0	13.0	13.0	19.5	17.0	18.0	20.5	17.5	19.0	17.5	15.0	16.5
11	14.5	12.5	13.5	17.0	16.0	16.5	19.5	18.5	19.0	18.0	15.5	16.5
12	16.5	13.5	15.0	17.5	15.0	16.5	19.5	18.0	18.5	18.0	15.5	17.0
13	18.0	15.5	16.5	19.0	15.5	17.0	21.0	17.5	19.5	17.5	16.5	17.0
14	19.0	16.0	17.5	19.5	16.5	18.0	21.5	18.5	20.0	17.5	16.5	16.5
15	19.5	16.5	18.0	19.5	18.0	18.5	21.5	19.0	20.5	16.5	15.5	16.0
16	20.0	16.5	18.5	20.0	16.5	18.5	22.0	20.0	21.0	16.0	14.0	15.0
17	20.0	17.0	18.5	19.0	17.5	18.5	21.0	19.0	20.0	16.5	14.0	15.0
18	20.5	17.5	19.0	19.0	16.0	17.5	21.0	18.5	20.0	16.5	14.5	15.5
19	19.5	17.0	18.5	19.0	16.0	17.5	21.0	18.5	20.0	16.0	14.5	15.0
20	19.0	16.0	17.5	20.0	17.0	18.5	21.0	18.5	20.0	15.0	13.0	14.0
21	19.5	16.0	18.0	19.5	17.5	18.5	22.0	19.5	20.5	14.0	12.0	13.5
22	20.0	16.5	18.0	20.0	17.5	18.5	21.5	19.5	20.5	13.5	13.0	13.0
23	20.5	17.0	19.0	20.0	17.0	18.5	20.5	18.0	19.5	13.0	12.0	12.5
24	21.5	18.5	20.0	20.0	17.0	18.5	19.0	17.0	18.0	12.5	11.5	12.0
25	23.0	19.5	21.5	20.0	17.0	18.5	19.0	17.5	18.0	12.0	11.0	11.5
26	22.0	19.5	21.0	19.5	18.0	18.5	20.0	18.0	19.0	11.0	10.0	10.5
27	20.0	18.0	19.0	21.0	18.5	19.5	19.5	17.5	18.5	11.5	10.5	11.0
28	19.0	16.5	17.0	19.5	17.5	18.5	18.5	16.0	17.5	11.0	10.5	11.0
29	16.5	16.0	16.0	20.0	17.0	18.5	19.0	18.0	18.5	10.5	9.5	10.0
30	18.5	15.0	16.5	20.0	17.5	19.0	18.0	16.0	17.0	10.0	9.0	9.5
31	---	---	---	21.0	18.0	19.5	17.0	15.0	16.0	---	---	---
MONTH	23.0	11.0	16.5	22.0	15.0	18.6	22.0	15.0	19.1	18.0	9.0	14.2

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124000 MANISTEE RIVER NEAR SHERMAN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.0	9.5	9.8	12.6	12.1	12.3	14.6	14.3	14.5	13.3	12.7	13.0
2	9.6	9.3	9.4	12.7	12.3	12.5	14.7	13.6	14.3	13.1	12.2	12.7
3	10.2	9.2	9.9	12.7	12.1	12.5	14.5	11.9	13.4	13.4	12.4	12.8
4	10.2	9.4	9.9	12.2	11.8	12.1	14.3	12.2	13.6	12.8	12.2	12.4
5	10.2	9.6	9.9	12.6	12.1	12.3	13.9	13.7	13.8	12.6	12.1	12.3
6	10.9	9.7	10.1	12.5	12.2	12.3	13.9	13.6	13.7	12.9	12.2	12.6
7	11.2	10.6	10.9	13.0	12.3	12.6	14.2	13.3	13.5	12.9	12.1	12.6
8	11.2	10.7	11.1	12.7	12.0	12.3	14.3	13.6	13.9	12.9	12.4	12.7
9	11.2	10.5	10.9	12.0	11.5	11.8	14.5	13.9	14.2	12.6	12.1	12.4
10	11.5	10.7	11.2	11.5	10.8	11.1	14.1	13.6	13.8	13.2	12.6	12.9
11	11.0	10.3	10.7	11.6	10.8	11.1	14.4	13.6	14.2	---	---	---
12	11.1	10.4	10.8	12.1	11.3	11.7	14.5	13.8	14.1	---	---	---
13	11.1	10.5	10.8	12.3	11.8	12.1	15.1	14.5	14.9	---	---	---
14	11.4	10.9	11.1	12.1	11.6	11.8	14.7	14.3	14.5	---	---	---
15	11.5	10.8	11.1	12.7	12.0	12.4	14.5	13.8	14.1	---	---	---
16	11.7	11.0	11.4	13.6	12.7	13.3	15.2	14.2	14.8	---	---	---
17	11.8	11.4	11.6	13.8	13.3	13.6	14.9	14.1	14.5	---	---	---
18	11.8	11.3	11.6	14.0	12.9	13.4	15.0	14.2	14.6	---	---	---
19	11.4	11.1	11.3	13.4	12.8	13.2	14.6	13.6	14.1	---	---	---
20	11.5	11.1	11.3	13.1	12.7	12.9	13.7	13.2	13.5	---	---	---
21	12.1	11.4	11.8	12.7	12.3	12.5	13.7	13.3	13.5	---	---	---
22	11.9	11.6	11.7	12.9	12.5	12.7	14.0	13.5	13.7	---	---	---
23	12.0	11.6	11.8	12.9	12.6	12.7	14.6	14.0	14.3	---	---	---
24	12.0	11.0	11.6	13.0	12.5	12.7	14.6	14.1	14.4	---	---	---
25	12.0	11.7	11.9	13.7	12.8	13.3	14.5	14.0	14.3	---	---	---
26	11.7	11.4	11.6	14.2	13.6	13.9	14.3	14.2	14.3	---	---	---
27	12.1	11.3	11.8	14.3	13.8	14.0	14.5	13.8	14.1	---	---	---
28	12.0	11.6	11.8	14.4	13.9	14.1	14.0	13.3	13.6	---	---	---
29	12.6	11.6	12.2	14.2	13.5	13.9	13.5	13.0	13.3	---	---	---
30	12.5	12.2	12.3	14.5	13.5	13.9	13.0	12.2	12.5	---	---	---
31	12.3	12.1	12.2	---	---	---	12.9	12.0	12.5	---	---	---
MONTH	12.6	9.2	11.1	14.5	10.8	12.7	15.2	11.9	14.0	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	13.7	12.7	13.2	11.7	10.9	11.3	10.4	10.0	10.2
2	---	---	---	13.6	12.1	13.0	11.0	10.5	10.7	10.6	10.1	10.4
3	---	---	---	13.8	11.9	12.9	11.5	10.6	11.0	10.9	10.2	10.5
4	---	---	---	13.5	13.0	13.2	13.1	11.5	12.3	10.4	9.7	10.1
5	---	---	---	13.8	12.7	13.3	13.5	12.1	12.9	10.0	9.6	9.8
6	13.3	12.9	13.1	14.1	12.6	13.5	13.8	12.7	13.2	10.9	9.7	10.3
7	13.3	13.1	13.2	13.6	13.0	13.4	13.0	12.6	12.9	11.1	10.5	10.8
8	13.2	12.7	13.0	13.6	12.5	13.4	12.9	12.3	12.7	10.8	10.3	10.6
9	13.0	12.5	12.8	13.5	11.2	12.6	12.4	11.7	12.2	10.6	10.1	10.3
10	13.0	12.3	12.6	13.6	11.9	13.1	11.7	11.2	11.6	10.5	9.8	10.1
11	12.4	11.7	12.2	13.4	12.1	12.9	11.2	10.7	11.1	9.8	9.4	9.5
12	12.2	11.5	11.7	13.4	12.7	13.0	11.1	10.5	10.8	10.2	9.5	9.8
13	12.1	11.7	11.9	13.5	12.7	13.1	11.1	10.6	10.8	10.7	10.2	10.5
14	12.3	11.7	11.9	13.9	12.8	13.3	10.8	10.0	10.5	10.7	10.2	10.5
15	12.4	11.9	12.1	14.9	13.3	13.9	10.1	9.5	9.8	10.3	9.8	10.2
16	12.4	11.8	12.2	14.6	13.0	14.0	10.1	9.4	9.7	---	---	---
17	12.6	12.2	12.3	13.4	12.0	12.7	10.6	10.0	10.3	---	---	---
18	12.3	11.7	12.0	12.8	12.0	12.4	11.2	10.5	10.8	---	---	---
19	12.3	11.7	12.1	12.5	11.6	12.2	11.4	10.9	11.2	---	---	---
20	12.5	12.1	12.3	12.1	11.4	11.8	10.9	10.0	10.5	---	---	---
21	12.7	12.1	12.4	11.7	11.2	11.5	10.1	9.6	9.9	---	---	---
22	13.0	12.4	12.8	12.0	11.2	11.7	10.5	10.1	10.3	---	---	---
23	13.4	12.8	13.0	11.7	10.9	11.5	11.2	10.5	10.8	---	---	---
24	13.3	12.7	13.0	11.6	11.0	11.3	11.1	10.5	10.9	---	---	---
25	13.5	12.9	13.2	11.3	10.4	10.9	10.6	10.0	10.4	---	---	---
26	13.5	12.1	12.9	11.1	10.4	10.7	10.3	9.8	10.1	---	---	---
27	13.7	12.0	13.0	11.2	10.7	10.9	10.3	9.7	10.0	---	---	---
28	13.9	12.4	13.2	10.9	10.1	10.5	9.7	9.2	9.5	---	---	---
29	---	---	---	11.6	10.1	10.9	9.9	9.2	9.5	---	---	---
30	---	---	---	12.1	11.3	11.7	10.2	9.7	10.0	---	---	---
31	---	---	---	12.1	11.3	11.8	---	---	---	---	---	---
MONTH	---	---	---	14.9	10.1	12.4	13.8	9.2	10.9	---	---	---

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124000 MANISTEE RIVER NEAR SHERMAN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	8.9	8.2	8.5	9.0	8.1	8.5	9.9	9.2	9.5
2	---	---	---	9.1	8.0	8.4	8.6	8.1	8.4	10.0	9.3	9.6
3	---	---	---	8.8	8.0	8.4	8.7	8.1	8.4	9.8	9.3	9.6
4	---	---	---	8.6	7.8	8.2	8.9	8.2	8.5	10.0	9.4	9.7
5	---	---	---	8.7	7.9	8.2	8.9	8.3	8.5	10.5	9.8	10.1
6	---	---	---	8.7	7.9	8.2	9.0	8.2	8.5	10.5	9.8	10.1
7	---	---	---	8.8	7.8	8.3	8.7	8.0	8.3	10.3	9.6	9.9
8	---	---	---	8.5	7.8	8.1	8.6	7.9	8.2	10.0	9.3	9.6
9	---	---	---	8.9	8.0	8.4	8.6	7.9	8.2	9.9	9.2	9.5
10	---	---	---	8.5	8.0	8.3	8.8	8.0	8.3	10.1	9.3	9.7
11	---	---	---	8.7	8.3	8.5	8.6	7.8	8.2	10.1	9.3	9.6
12	8.6	8.1	8.4	8.9	8.6	8.7	8.9	8.2	8.5	9.7	9.1	9.4
13	8.3	7.8	8.0	9.0	8.4	8.7	8.9	8.1	8.5	9.7	8.9	9.3
14	8.4	7.8	8.1	8.9	8.3	8.6	8.8	7.9	8.3	9.5	9.0	9.3
15	8.4	7.8	8.0	8.9	8.2	8.5	8.9	7.7	8.3	9.5	9.0	9.3
16	8.6	7.8	8.2	9.3	8.5	8.9	8.5	7.8	8.1	9.5	8.8	9.1
17	8.7	7.9	8.2	8.9	8.4	8.6	8.6	7.8	8.2	9.5	8.6	8.9
18	8.6	7.7	8.1	9.3	8.6	8.9	8.8	7.9	8.3	9.8	9.0	9.4
19	8.6	7.7	8.2	9.2	8.5	8.8	8.8	7.9	8.3	9.4	9.1	9.3
20	8.9	8.0	8.5	8.9	8.2	8.6	8.8	7.8	8.2	10.1	9.1	9.6
21	9.0	8.0	8.5	8.6	8.0	8.2	8.1	7.5	7.8	10.2	9.5	9.8
22	8.7	8.0	8.3	8.7	8.3	8.5	8.3	7.3	7.8	9.7	9.4	9.5
23	8.7	7.9	8.2	9.1	8.2	8.7	8.7	7.7	8.2	10.1	9.4	9.7
24	8.4	7.5	8.0	9.4	8.5	8.9	8.3	7.8	8.1	10.2	9.8	9.9
25	8.3	7.5	7.8	9.2	8.4	8.8	8.9	8.0	8.5	10.7	9.9	10.2
26	8.1	7.3	7.7	8.7	8.2	8.5	8.7	8.1	8.4	10.4	9.8	10.1
27	8.6	7.8	8.2	8.8	8.1	8.4	9.1	8.0	8.5	10.0	9.6	9.8
28	8.6	8.0	8.3	9.1	8.0	8.5	9.8	8.4	9.1	10.8	9.3	10.3
29	8.9	8.3	8.5	9.3	8.2	8.8	9.1	8.3	8.7	11.2	10.4	10.8
30	9.3	8.5	8.8	9.3	8.4	8.8	9.3	8.4	9.0	11.0	10.6	10.8
31	---	---	---	9.1	8.3	8.7	9.7	9.1	9.4	---	---	---
MONTH	---	---	---	9.4	7.8	8.5	9.8	7.3	8.4	11.2	8.6	9.7

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	854	1050	978	915	980	996	1210	1310	918	923	914	1030
2	883	961	e970	975	1030	987	1180	1270	1020	944	964	996
3	916	945	873	924	1100	777	1160	1140	1040	923	1290	959
4	969	935	648	912	1090	794	1180	1110	1040	892	1130	930
5	1030	971	758	909	988	971	1190	1260	1020	842	944	843
6	1030	936	1080	915	933	878	1040	1130	964	832	912	843
7	1030	913	1030	917	934	895	1040	1110	980	844	916	844
8	999	938	997	921	787	1010	1070	1260	1020	857	930	845
9	917	1000	926	936	828	796	1090	1220	1210	850	928	828
10	952	1030	818	959	987	730	1110	1160	1450	1030	933	815
11	992	1030	967	944	836	961	1220	1250	1430	1120	920	819
12	965	968	1040	913	755	968	1300	1500	1300	1120	857	820
13	951	921	1050	875	798	969	1300	1530	1220	1130	824	825
14	970	1010	1040	805	832	969	1230	1450	1220	1110	869	825
15	982	1020	890	708	871	1070	1250	1430	1220	1080	883	825
16	964	955	951	785	962	1110	1490	1390	1080	1010	888	823
17	916	906	962	896	970	1090	1500	1280	965	981	862	822
18	948	919	932	862	967	1270	1620	1180	1020	985	832	820
19	1000	952	1010	813	991	1310	1870	1130	952	963	828	837
20	956	1040	992	771	990	1270	1870	1140	923	938	830	838
21	930	1000	994	772	991	1430	1840	1110	915	1140	963	811
22	1010	896	996	736	1050	1440	1640	1090	874	1130	889	937
23	1030	937	997	750	1030	1380	1470	1040	864	981	836	855
24	972	1030	986	841	939	1400	1450	1060	864	877	837	823
25	977	996	979	902	875	1350	1350	1050	879	871	837	854
26	1020	e920	971	917	767	1310	1300	1050	907	1040	864	872
27	971	e920	963	983	832	1340	1250	1080	885	1020	864	926
28	940	895	893	951	996	1350	1180	1110	887	778	836	943
29	942	951	920	888	---	1350	1150	1120	977	798	887	916
30	878	1010	971	931	---	1290	1180	1070	905	912	1070	885
31	995	---	946	978	---	1220	---	975	---	931	1070	---
TOTAL	29889	28955	29528	27304	26109	34681	39730	37005	30949	29852	28407	26009
MEAN	964	965	953	881	932	1119	1324	1194	1032	963	916	867
MAX	1030	1050	1080	983	1100	1440	1870	1530	1450	1140	1290	1030
MIN	854	895	648	708	755	730	1040	975	864	778	824	811
CFSM	0.95	0.95	0.94	0.87	0.92	1.10	1.30	1.17	1.01	0.95	0.90	0.85
IN.	1.09	1.06	1.08	1.00	0.95	1.27	1.45	1.35	1.13	1.09	1.04	0.95

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2003, BY WATER YEAR (WY)

MEAN	1042	1062	1076	1081	1149	1265	1530	1318	1127	987	935	920
MAX	1204	1166	1266	1359	1328	1436	1954	1761	1248	1155	1042	1006
(WY)	2002	2002	1997	1997	1997	2002	1997	1997	2002	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1997 - 2003	
ANNUAL TOTAL	414796		368418			
ANNUAL MEAN	1136		1009		1097	
HIGHEST ANNUAL MEAN					1193	2002
LOWEST ANNUAL MEAN					1009	2003
HIGHEST DAILY MEAN	2230	Mar 10	1870	Apr 19	2950	Apr 15 2001
LOWEST DAILY MEAN	648	Dec 4	648	Dec 4	648	Dec 4 2002
ANNUAL SEVEN-DAY MINIMUM	858	Sep 12	792	Jan 18	792	Jan 18 2003
MAXIMUM PEAK FLOW			1890	Apr 19	(a)3060	Apr 15 2001
MAXIMUM PEAK STAGE			4.96	Apr 19	6.46	Mar 31 1998
INSTANTANEOUS LOW FLOW			577	(b)	449	Aug 31 2001
ANNUAL RUNOFF (CFSM)	1.12		0.99		1.08	
ANNUAL RUNOFF (INCHES)	15.16		13.46		14.64	
10 PERCENT EXCEEDS	1530		1270		1380	
50 PERCENT EXCEEDS	1040		968		1040	
90 PERCENT EXCEEDS	900		829		867	

(a) Gage height 6.37 ft.
(b) Dec. 4, 5.
(e) Estimated.

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. 19-23, Oct. 30 to Nov. 2, Jan. 3-7, 16-20, Mar. 17-23, Apr. 19-24, July 19-25, Sept. 28-30 rated good; Nov. 3-7, Jan. 21-28, Mar. 24 to Apr. 5, Apr. 10-18, July 26-29, Aug. 28-30 rated fair; and Nov. 8-25, Jan. 29 to Feb. 5, Apr. 6-9, Aug. 31 to Sept. 14 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.
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, 22.5°C, Aug. 22, 23, 24; minimum, 0.5°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 14.0 mg/L, Feb. 26; minimum, 6.3 mg/L, July 11.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	16.0	15.5	16.0	7.0	7.0	7.0	---	---	---	2.0	2.0	2.0
2	16.0	15.5	16.0	7.0	6.5	6.5	---	---	---	2.0	2.0	2.0
3	15.5	15.5	15.5	6.5	6.0	6.5	2.0	1.5	1.5	2.0	2.0	2.0
4	15.5	15.0	15.5	6.0	6.0	6.0	1.5	1.5	1.5	2.0	2.0	2.0
5	15.5	15.5	15.5	6.0	5.5	6.0	1.5	1.5	1.5	2.0	2.0	2.0
6	15.5	15.0	15.5	5.5	5.5	5.5	1.5	1.5	1.5	2.0	2.0	2.0
7	15.5	15.0	15.5	5.5	5.5	5.5	1.5	1.5	1.5	2.0	2.0	2.0
8	15.0	15.0	15.0	5.5	5.0	5.0	1.5	1.5	1.5	2.0	2.0	2.0
9	15.0	15.0	15.0	5.0	5.0	5.0	1.5	1.5	1.5	2.0	2.0	2.0
10	15.0	14.5	15.0	5.5	5.0	5.0	1.5	1.5	1.5	2.0	2.0	2.0
11	14.5	14.5	14.5	5.5	5.5	5.5	1.5	1.5	1.5	2.0	2.0	2.0
12	14.5	14.0	14.0	5.5	5.5	5.5	1.5	1.5	1.5	2.0	2.0	2.0
13	14.0	13.0	13.5	5.5	5.0	5.0	1.5	1.5	1.5	2.0	2.0	2.0
14	13.0	12.5	12.5	5.0	5.0	5.0	1.5	1.5	1.5	2.0	2.0	2.0
15	12.5	12.5	12.5	5.0	4.5	5.0	1.5	1.5	1.5	2.0	2.0	2.0
16	12.5	12.0	12.5	4.5	4.5	4.5	1.5	1.5	1.5	2.0	2.0	2.0
17	12.0	12.0	12.0	4.5	4.0	4.0	1.5	1.5	1.5	2.0	1.5	2.0
18	12.0	11.5	11.5	4.0	4.0	4.0	1.5	1.5	1.5	2.0	1.5	1.5
19	11.5	11.5	11.5	4.5	4.0	4.0	1.5	1.5	1.5	1.5	1.5	1.5
20	11.5	11.0	11.0	4.0	4.0	4.0	1.5	1.5	1.5	1.5	1.5	1.5
21	11.0	10.5	10.5	4.0	4.0	4.0	1.5	1.5	1.5	1.5	1.5	1.5
22	10.5	10.0	10.0	4.0	4.0	4.0	1.5	1.5	1.5	1.5	1.5	1.5
23	10.0	9.5	10.0	4.0	4.0	4.0	1.5	1.5	1.5	1.5	1.5	1.5
24	9.5	9.0	9.5	4.0	4.0	4.0	1.5	1.5	1.5	1.5	1.5	1.5
25	9.0	9.0	9.0	4.0	4.0	4.0	1.5	1.5	1.5	1.5	1.5	1.5
26	9.0	8.5	8.5	---	---	---	1.5	1.5	1.5	1.5	1.5	1.5
27	8.5	8.0	8.5	---	---	---	1.5	1.5	1.5	1.5	1.5	1.5
28	8.0	8.0	8.0	---	---	---	2.0	1.5	1.5	1.5	1.5	1.5
29	8.0	7.5	8.0	---	---	---	2.0	1.5	2.0	1.5	1.0	1.0
30	7.5	7.5	7.5	---	---	---	2.0	2.0	2.0	1.0	1.0	1.0
31	7.5	7.0	7.5	---	---	---	2.0	2.0	2.0	1.0	1.0	1.0
MONTH	16.0	7.0	12.2	---	---	---	---	---	---	2.0	1.0	1.7

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124200 MANISTEE RIVER NEAR MESICK, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	1.0	1.0	1.0	0.5	0.5	0.5	4.0	4.0	4.0	11.5	10.5	11.0
2	1.0	1.0	1.0	0.5	0.5	0.5	4.0	4.0	4.0	12.0	11.0	11.5
3	1.0	1.0	1.0	0.5	0.5	0.5	4.0	4.0	4.0	12.0	11.0	11.5
4	1.0	1.0	1.0	0.5	0.5	0.5	4.0	3.5	3.5	12.0	11.5	11.5
5	1.0	1.0	1.0	0.5	0.5	0.5	3.5	3.0	3.5	12.0	11.5	12.0
6	1.0	1.0	1.0	0.5	0.5	0.5	3.5	3.0	3.5	12.0	11.5	12.0
7	1.0	1.0	1.0	0.5	0.5	0.5	3.0	3.0	3.0	12.0	11.5	12.0
8	1.0	1.0	1.0	0.5	0.5	0.5	3.0	3.0	3.0	12.5	12.0	12.0
9	1.0	0.5	1.0	0.5	0.5	0.5	3.5	3.0	3.0	12.5	12.0	12.0
10	1.0	0.5	0.5	0.5	0.5	0.5	3.5	3.0	3.5	12.5	12.5	12.5
11	0.5	0.5	0.5	0.5	0.5	0.5	4.5	3.5	4.0	12.5	12.0	12.0
12	0.5	0.5	0.5	0.5	0.5	0.5	4.5	4.0	4.0	12.5	12.5	12.5
13	0.5	0.5	0.5	0.5	0.5	0.5	4.5	4.0	4.5	12.5	12.0	12.5
14	0.5	0.5	0.5	0.5	0.5	0.5	5.0	4.5	4.5	13.0	12.0	12.5
15	0.5	0.5	0.5	0.5	0.5	0.5	6.0	5.0	5.5	13.0	12.5	13.0
16	0.5	0.5	0.5	0.5	0.5	0.5	7.0	6.0	6.5	13.5	13.0	13.0
17	0.5	0.5	0.5	0.5	0.5	0.5	6.5	6.5	6.5	13.5	13.0	13.5
18	0.5	0.5	0.5	0.5	0.5	0.5	7.0	6.5	7.0	14.0	13.5	14.0
19	0.5	0.5	0.5	0.5	0.5	0.5	8.0	7.0	7.5	14.0	14.0	14.0
20	0.5	0.5	0.5	1.0	0.5	0.5	8.0	7.5	8.0	14.5	13.5	14.0
21	0.5	0.5	0.5	1.0	1.0	1.0	8.5	8.0	8.5	14.5	13.5	14.0
22	0.5	0.5	0.5	1.0	1.0	1.0	9.0	8.5	8.5	15.0	14.0	14.5
23	0.5	0.5	0.5	1.5	1.0	1.0	9.0	8.5	8.5	15.0	14.5	14.5
24	0.5	0.5	0.5	1.5	1.5	1.5	9.5	8.5	9.0	15.0	14.5	15.0
25	0.5	0.5	0.5	2.0	1.5	2.0	10.0	9.0	9.5	15.0	14.5	15.0
26	0.5	0.5	0.5	2.5	2.0	2.5	10.0	9.5	9.5	15.5	15.0	15.0
27	0.5	0.5	0.5	3.5	2.5	3.0	9.5	9.5	9.5	16.0	15.0	15.5
28	0.5	0.5	0.5	3.5	3.5	3.5	10.5	9.5	10.0	15.5	15.0	15.0
29	---	---	---	3.5	3.5	3.5	11.0	10.0	10.0	16.0	15.0	15.5
30	---	---	---	4.0	3.5	3.5	11.0	10.0	10.5	15.5	15.5	15.5
31	---	---	---	4.0	4.0	4.0	---	---	---	16.0	15.5	15.5
MONTH	1.0	0.5	0.7	4.0	0.5	1.2	11.0	3.0	6.2	16.0	10.5	13.4

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	15.5	15.5	19.5	19.0	19.0	21.0	20.5	20.5	21.0	21.0	21.0
2	15.5	15.0	15.5	19.5	19.0	19.0	21.0	20.5	21.0	21.0	20.5	20.5
3	15.5	15.5	15.5	19.0	19.0	19.0	21.0	20.5	21.0	20.5	20.0	20.5
4	15.5	15.5	15.5	20.0	19.0	19.5	21.5	21.0	21.0	20.0	19.5	20.0
5	16.0	15.5	15.5	20.0	19.5	20.0	21.0	21.0	21.0	19.5	19.5	19.5
6	15.5	15.5	15.5	20.5	20.0	20.0	21.0	21.0	21.0	19.5	19.0	19.0
7	15.5	15.5	15.5	20.5	20.0	20.0	21.5	21.0	21.0	19.5	19.0	19.0
8	15.5	15.0	15.5	20.5	20.0	20.0	22.0	21.0	21.5	19.5	19.0	19.5
9	15.5	15.0	15.0	21.0	20.5	20.5	21.5	21.0	21.5	19.5	19.0	19.0
10	15.5	15.0	15.5	21.0	20.0	20.5	21.0	21.0	21.0	19.0	19.0	19.0
11	16.0	15.5	15.5	20.0	19.5	20.0	22.0	21.0	21.5	19.0	18.5	19.0
12	16.5	16.0	16.0	20.0	19.5	20.0	21.5	21.5	21.5	19.0	18.5	18.5
13	16.5	16.0	16.5	20.0	20.0	20.0	21.5	21.0	21.5	18.5	18.0	18.5
14	17.0	16.0	16.5	20.0	20.0	20.0	21.5	21.0	21.0	18.5	18.5	18.5
15	17.5	16.5	17.0	20.5	19.5	20.0	21.0	21.0	21.0	18.5	18.0	18.5
16	18.0	17.0	17.5	20.0	19.5	20.0	22.0	21.0	21.0	18.5	18.0	18.0
17	18.0	17.5	17.5	20.0	20.0	20.0	21.5	21.0	21.5	18.5	18.0	18.0
18	18.0	17.5	17.5	20.5	20.0	20.0	21.5	21.0	21.0	18.5	18.0	18.5
19	18.5	17.5	18.0	20.0	20.0	20.0	21.5	21.0	21.0	18.5	18.0	18.5
20	19.0	17.5	18.0	20.0	19.5	20.0	21.0	21.0	21.0	18.0	18.0	18.0
21	18.5	18.0	18.0	20.5	19.5	20.0	21.5	21.0	21.5	18.0	17.5	18.0
22	18.5	18.0	18.0	20.5	20.0	20.5	22.5	21.5	22.0	18.0	17.5	17.5
23	18.0	18.0	18.0	21.0	20.5	20.5	22.5	22.0	22.0	17.5	17.5	17.5
24	18.5	18.0	18.5	20.5	20.5	20.5	22.5	21.5	22.0	17.5	17.0	17.0
25	19.0	18.0	18.5	20.5	19.5	20.0	22.0	21.5	22.0	17.0	16.5	17.0
26	19.0	18.0	18.5	20.0	19.5	20.0	22.0	21.5	21.5	16.5	16.5	16.5
27	19.5	18.5	18.5	21.0	20.0	20.5	22.0	21.5	22.0	16.5	16.0	16.0
28	19.5	19.0	19.5	21.0	20.5	21.0	22.0	21.5	21.5	16.0	15.5	16.0
29	19.5	19.0	19.0	20.5	20.5	20.5	22.0	21.5	21.5	15.5	15.0	15.5
30	19.5	19.0	19.0	20.5	20.5	20.5	21.5	21.0	21.5	15.0	14.5	14.5
31	---	---	---	20.5	20.5	20.5	21.0	21.0	21.0	---	---	---
MONTH	19.5	15.0	17.0	21.0	19.0	20.1	22.5	20.5	21.3	21.0	14.5	18.2

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124200 MANISTEE RIVER NEAR MESICK, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.4	8.2	8.3	11.5	11.1	11.3	---	---	---	13.2	12.5	12.9
2	8.5	8.3	8.4	11.8	11.4	11.6	---	---	---	12.7	12.2	12.4
3	8.4	8.3	8.4	12.0	11.8	11.9	13.9	13.2	13.6	12.3	12.1	12.2
4	8.4	8.0	8.2	12.0	11.8	11.9	13.9	13.7	13.8	12.4	12.1	12.2
5	8.3	8.2	8.3	11.9	11.7	11.8	13.8	13.7	13.7	12.3	12.2	12.2
6	8.3	8.1	8.2	11.8	11.7	11.8	13.7	12.9	13.2	12.4	12.2	12.3
7	8.4	8.3	8.3	12.0	11.8	11.9	13.3	13.1	13.2	12.2	11.7	12.0
8	8.4	8.3	8.4	11.9	11.8	11.9	13.4	13.2	13.3	11.8	11.5	11.7
9	9.5	8.3	8.8	12.0	11.6	11.7	13.8	13.3	13.5	11.8	11.6	11.7
10	8.9	8.7	8.8	11.8	11.5	11.6	13.8	13.7	13.8	11.8	11.6	11.7
11	8.8	8.7	8.8	11.9	11.7	11.8	13.8	13.2	13.4	11.9	11.7	11.8
12	8.9	8.7	8.8	12.2	11.8	12.0	13.4	13.2	13.3	12.0	11.8	11.9
13	9.3	8.9	9.0	12.3	12.1	12.2	13.4	13.1	13.2	12.1	11.9	12.0
14	9.5	8.9	9.3	12.2	11.7	11.9	13.3	13.2	13.2	12.6	11.9	12.3
15	9.4	9.1	9.2	12.5	11.9	12.2	13.7	13.1	13.5	12.6	12.5	12.5
16	9.6	9.2	9.4	12.8	12.3	12.5	13.7	13.0	13.3	12.6	12.0	12.3
17	9.6	9.5	9.5	12.8	12.7	12.8	13.6	13.1	13.3	12.3	12.1	12.2
18	9.6	9.3	9.5	12.9	12.7	12.8	13.6	13.0	13.3	12.2	12.0	12.1
19	9.7	9.4	9.5	12.8	12.8	12.8	13.1	12.9	13.0	12.7	12.1	12.3
20	9.9	9.4	9.8	12.9	12.5	12.7	13.0	12.8	12.9	12.8	12.6	12.7
21	10.0	9.8	9.9	13.0	12.6	12.7	13.0	12.9	13.0	12.9	12.7	12.8
22	10.0	9.6	9.7	13.2	12.9	13.0	13.1	12.9	12.9	13.0	12.8	12.9
23	9.8	9.6	9.7	13.1	12.9	13.1	13.0	12.8	12.9	13.1	12.8	12.9
24	10.2	9.6	10.0	13.2	12.8	13.0	13.0	12.8	12.9	12.9	12.4	12.7
25	10.3	9.8	10.1	13.6	12.9	13.2	12.9	12.7	12.7	12.6	12.4	12.4
26	10.1	9.8	10.0	---	---	---	12.8	12.7	12.7	12.6	12.4	12.5
27	10.6	10.1	10.4	---	---	---	12.8	12.7	12.8	12.6	12.1	12.4
28	10.8	10.6	10.7	---	---	---	13.2	12.6	13.0	12.6	12.1	12.4
29	10.8	10.7	10.8	---	---	---	13.3	12.6	12.9	12.6	12.4	12.5
30	11.0	10.8	10.9	---	---	---	12.7	12.5	12.6	12.5	12.4	12.4
31	11.2	10.9	11.0	---	---	---	13.1	12.5	12.7	12.4	12.2	12.3
MONTH	11.2	8.0	9.4	---	---	---	---	---	---	13.2	11.5	12.3

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	12.4	12.2	12.3	13.0	12.8	12.9	11.5	11.2	11.4	10.3	10.0	10.2
2	12.4	12.1	12.3	13.1	12.7	12.9	11.6	11.2	11.4	10.3	10.1	10.2
3	12.1	11.9	12.0	13.8	12.7	13.3	11.6	11.3	11.5	10.4	10.2	10.3
4	12.4	11.9	12.2	13.8	12.7	13.2	11.8	11.5	11.6	10.3	10.1	10.2
5	12.9	12.3	12.6	13.0	12.7	12.9	11.9	11.5	11.8	10.2	10.0	10.1
6	12.9	12.7	12.8	13.6	12.8	13.1	12.6	11.8	12.2	10.5	9.9	10.2
7	13.0	12.7	12.8	13.3	12.9	13.1	12.5	11.8	12.2	10.5	10.3	10.4
8	13.7	12.7	13.3	13.1	12.6	12.8	11.9	11.7	11.8	10.3	10.1	10.2
9	13.7	12.7	13.2	13.7	12.5	13.2	11.9	11.7	11.8	10.3	10.1	10.2
10	12.9	12.3	12.6	13.8	13.4	13.6	11.8	11.5	11.7	10.2	10.0	10.2
11	13.6	12.5	13.1	13.5	12.6	12.8	11.6	11.3	11.5	10.1	9.8	9.9
12	13.6	13.4	13.5	13.0	12.6	12.8	11.7	11.3	11.5	10.0	9.8	9.9
13	13.6	13.0	13.3	13.0	12.7	12.8	11.7	11.6	11.6	10.0	9.8	9.9
14	13.6	13.0	13.2	13.1	12.7	12.9	11.7	11.5	11.6	10.0	9.8	9.9
15	13.8	12.9	13.2	13.0	12.5	12.8	11.7	11.5	11.6	9.9	9.8	9.9
16	13.1	12.8	12.9	12.9	12.5	12.7	11.6	11.2	11.4	9.9	9.8	9.8
17	13.0	12.7	12.8	12.8	12.5	12.7	11.3	11.1	11.2	10.0	9.8	9.9
18	13.0	12.6	12.8	12.8	12.4	12.6	11.2	11.0	11.1	10.0	9.8	9.9
19	13.1	12.6	12.9	12.7	12.5	12.6	11.1	10.9	11.0	9.9	9.6	9.8
20	13.0	12.8	12.9	12.8	12.4	12.6	11.0	10.7	10.8	9.8	9.5	9.7
21	13.0	12.7	12.9	12.8	12.3	12.5	10.8	10.6	10.7	9.8	9.5	9.6
22	12.8	12.4	12.5	12.7	12.3	12.5	10.7	10.5	10.6	9.7	9.4	9.6
23	12.9	12.4	12.7	12.5	12.2	12.4	10.7	10.5	10.6	9.6	9.4	9.5
24	13.3	12.7	13.0	12.4	11.9	12.2	10.6	10.4	10.5	9.4	9.1	9.2
25	13.4	13.0	13.2	12.1	11.8	12.0	10.7	10.4	10.5	9.5	9.1	9.3
26	14.0	13.2	13.7	12.2	11.8	12.0	10.6	10.4	10.5	9.4	9.2	9.3
27	13.9	13.0	13.5	12.0	11.4	11.7	10.5	10.3	10.4	9.4	9.1	9.3
28	13.0	12.8	12.9	11.6	11.2	11.4	10.6	10.3	10.4	9.2	8.9	9.1
29	---	---	---	11.5	11.1	11.3	10.6	10.4	10.5	9.0	8.8	8.9
30	---	---	---	11.6	11.4	11.5	10.4	10.2	10.3	9.0	8.9	8.9
31	---	---	---	12.3	11.4	11.5	---	---	---	9.3	8.8	9.1
MONTH	14.0	11.9	12.9	13.8	11.1	12.6	12.6	10.2	11.2	10.5	8.8	9.8

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124200 MANISTEE RIVER NEAR MESICK, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.4	9.2	9.3	7.9	7.5	7.6	8.0	7.9	8.0	7.7	7.5	7.6
2	9.3	8.9	9.0	7.6	7.5	7.5	8.0	7.7	7.9	8.0	7.5	7.7
3	9.0	8.9	9.0	7.5	7.3	7.5	7.8	7.4	7.6	8.2	7.5	7.8
4	9.2	8.9	9.0	7.6	6.5	7.5	7.9	7.4	7.7	8.5	7.6	8.0
5	9.3	9.2	9.3	7.7	7.5	7.6	7.9	7.7	7.8	8.5	8.4	8.5
6	9.7	9.2	9.4	7.6	7.5	7.6	7.8	7.7	7.8	8.6	8.4	8.5
7	9.6	9.1	9.4	7.6	7.4	7.5	7.8	7.7	7.7	8.7	8.5	8.6
8	9.3	9.1	9.2	7.6	7.5	7.5	7.8	7.6	7.7	8.7	8.6	8.6
9	9.3	8.7	9.0	7.6	7.5	7.6	7.7	7.6	7.6	8.8	8.6	8.7
10	8.9	8.7	8.8	7.6	6.6	7.2	7.7	7.5	7.6	8.8	8.7	8.7
11	8.9	8.6	8.7	7.5	6.3	6.8	7.8	7.5	7.6	8.8	8.6	8.7
12	8.8	8.5	8.7	7.5	6.7	7.4	8.0	7.6	7.8	8.7	8.3	8.7
13	8.9	8.7	8.8	7.5	7.4	7.4	7.9	7.7	7.8	8.8	8.6	8.7
14	8.8	8.7	8.7	7.5	7.3	7.4	7.9	7.5	7.7	9.0	8.7	8.8
15	8.8	8.7	8.7	7.5	7.3	7.4	7.7	7.4	7.6	---	---	---
16	9.1	8.6	8.9	7.8	7.4	7.6	7.5	7.3	7.4	---	---	---
17	9.2	9.0	9.1	7.9	7.7	7.8	7.5	7.3	7.4	9.3	9.1	9.2
18	9.2	8.5	8.9	8.0	7.9	8.0	7.8	7.5	7.7	9.4	9.1	9.2
19	8.9	8.5	8.6	8.1	7.9	8.0	7.8	7.7	7.7	9.2	9.1	9.2
20	8.6	8.3	8.5	8.1	7.9	8.0	7.8	7.6	7.7	9.3	9.2	9.3
21	8.5	8.3	8.4	8.1	7.6	7.8	7.7	7.2	7.6	9.4	9.2	9.3
22	8.5	8.3	8.4	8.1	7.6	7.9	8.3	7.6	8.0	9.3	8.3	8.7
23	8.4	8.2	8.3	8.2	7.9	8.1	8.4	8.1	8.2	9.3	8.3	8.9
24	8.3	8.2	8.3	8.5	8.1	8.2	8.5	8.2	8.3	9.4	9.1	9.3
25	8.2	8.0	8.1	8.2	8.0	8.1	8.3	8.1	8.2	9.5	9.4	9.5
26	8.0	7.9	8.0	8.1	7.5	7.8	8.3	8.1	8.2	9.6	9.4	9.5
27	8.0	7.8	7.9	8.0	7.5	7.8	8.3	8.1	8.2	9.6	8.9	9.3
28	8.0	7.7	7.9	8.6	8.0	8.3	8.4	7.9	8.1	9.7	9.2	9.4
29	7.8	7.6	7.7	8.6	8.2	8.4	8.3	7.5	7.9	10.0	8.9	9.6
30	8.0	7.6	7.8	8.3	8.1	8.1	7.6	7.0	7.3	10.1	9.4	9.7
31	---	---	---	8.1	7.9	8.0	7.6	7.2	7.4	---	---	---
MONTH	9.7	7.6	8.7	8.6	6.3	7.7	8.5	7.0	7.8	---	---	---

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.9	13	11	14	9.7	9.1	30	42	12	7.7	6.4	5.8
2	8.7	13	12	12	10	9.0	29	35	12	7.3	6.4	5.8
3	9.0	13	11	11	10	8.6	27	28	10	7.1	7.0	5.7
4	14	13	10	11	10	8.8	25	24	9.3	7.0	9.7	5.7
5	19	12	11	11	10	8.8	24	29	9.6	7.1	8.0	5.7
6	15	13	18	11	10	8.8	24	39	9.0	9.3	7.1	6.1
7	17	14	19	11	10	8.9	24	35	9.3	27	6.5	8.0
8	14	13	13	11	10	9.0	22	33	12	16	6.2	9.3
9	14	13	11	11	10	9.2	28	30	33	13	6.2	7.2
10	12	20	11	11	9.9	9.1	39	26	44	17	8.9	6.6
11	12	21	11	11	10	9.1	45	56	62	29	7.5	5.4
12	11	18	11	11	9.8	9.4	44	70	44	24	6.9	5.4
13	13	16	12	11	9.6	9.4	40	53	33	18	6.7	5.5
14	13	14	12	10	9.4	9.5	35	41	26	14	6.3	5.7
15	12	14	13	10	9.3	11	36	35	20	12	6.2	9.5
16	12	13	12	9.5	9.1	15	64	31	15	11	6.8	7.5
17	11	12	11	9.4	9.0	25	56	29	13	10	6.6	7.3
18	12	12	12	9.3	9.4	53	69	27	11	8.9	6.2	10
19	18	12	25	9.4	9.4	64	62	23	10	8.0	6.0	8.8
20	17	13	26	9.4	9.6	83	75	27	8.5	8.0	5.7	8.4
21	15	14	21	9.1	10	74	69	23	7.6	13	7.3	8.4
22	16	14	19	8.8	11	62	58	19	7.4	17	6.1	13
23	16	13	15	8.8	10	54	48	17	7.2	12	5.7	11
24	14	13	14	8.8	10	48	41	18	6.9	9.4	6.0	8.7
25	14	13	14	9.1	9.7	44	34	18	6.7	12	6.1	8.7
26	15	13	13	9.1	9.4	38	27	17	6.8	11	7.6	8.4
27	14	11	12	9.1	9.1	32	24	16	6.9	11	6.9	12
28	14	12	13	9.2	9.0	40	22	21	8.4	8.9	6.1	11
29	13	12	13	9.4	---	46	22	16	9.6	7.3	6.8	10
30	13	13	13	9.3	---	37	22	13	8.3	6.4	5.9	11
31	13	---	16	9.4	---	33	---	14	---	5.8	5.8	---
TOTAL	419.6	410	435	314.1	272.4	885.7	1165	905	478.5	375.2	207.6	241.6
MEAN	13.5	13.7	14.0	10.1	9.73	28.6	38.8	29.2	15.9	12.1	6.70	8.05
MAX	19	21	26	14	11	83	75	70	62	29	9.7	13
MIN	8.7	11	10	8.8	9.0	8.6	22	13	6.7	5.8	5.7	5.4
CFSM	0.23	0.23	0.23	0.17	0.16	0.48	0.65	0.49	0.27	0.20	0.11	0.13
IN.	0.26	0.25	0.27	0.19	0.17	0.55	0.72	0.56	0.30	0.23	0.13	0.15

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	25.5	31.6	25.4	22.6	27.3	54.3	78.3	39.1	24.3	16.9	17.6	14.9
MAX	99.9	90.8	83.8	48.4	54.4	93.6	190	75.4	70.4	45.1	68.5	44.2
(WY)	1992	1993	1992	1997	1994	1992	1959	1960	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	10972.5		6109.7			
ANNUAL MEAN	30.1		16.7		31.4	
HIGHEST ANNUAL MEAN					54.5	1992
LOWEST ANNUAL MEAN					16.0	1958
HIGHEST DAILY MEAN	199	Mar 9	83	Mar 20	753	Aug 4 1956
LOWEST DAILY MEAN	7.6	Jul 20	5.4	Sep 11	5.3	Aug 4 1958
ANNUAL SEVEN-DAY MINIMUM	7.8	Jul 14	5.8	Aug 30	5.5	Aug 1 1959
MAXIMUM PEAK FLOW			86	Mar 19	(a)1410	Aug 4 1956
MAXIMUM PEAK STAGE			2.81	Mar 19	6.23	Aug 4 1956
INSTANTANEOUS LOW FLOW			5.1	(b)	(c)4.1	Mar 13 1958
ANNUAL RUNOFF (CFSM)	0.50		0.28		0.52	
ANNUAL RUNOFF (INCHES)	6.80		3.79		7.12	
10 PERCENT EXCEEDS	67		35		66	
50 PERCENT EXCEEDS	19		12		19	
90 PERCENT EXCEEDS	8.6		6.9		8.5	

(a) From rating curve extended above 450 ft^3/s.
(b) Part of each day Sept. 11-14.
(c) Result of freezeup.

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 mi^2.

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 except for estimated daily discharges, which are fair. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	196	211	211	210	199	201	257	261	220	195	190	184
2	196	210	207	202	198	200	254	288	215	192	191	183
3	197	211	196	200	199	194	250	261	213	191	190	183
4	213	210	199	200	201	204	253	246	212	190	227	184
5	234	209	215	200	199	205	245	245	213	191	239	184
6	228	209	207	199	197	199	239	268	212	192	204	183
7	218	210	e200	198	195	200	240	273	211	210	194	183
8	215	212	e200	199	196	202	240	266	251	216	190	184
9	208	210	e200	202	e195	195	251	258	265	200	189	184
10	205	219	e200	202	e190	204	272	248	284	201	188	182
11	203	235	e200	198	192	e204	288	370	320	236	188	181
12	203	228	202	197	e190	204	290	495	301	239	187	180
13	209	221	202	200	e190	202	279	420	261	216	187	181
14	209	216	204	197	e200	202	266	330	232	205	185	183
15	207	212	205	196	e200	206	268	283	221	200	185	193
16	206	210	204	189	e200	218	317	264	213	196	185	196
17	205	207	199	200	e200	243	354	254	206	192	186	190
18	208	206	204	200	206	285	346	247	201	191	185	186
19	220	208	221	200	201	341	358	241	200	188	183	186
20	227	209	246	192	199	368	357	238	197	198	181	186
21	219	211	232	192	202	384	370	237	194	228	188	184
22	217	212	218	195	206	354	338	230	192	221	188	195
23	218	211	212	192	203	319	307	225	191	214	183	212
24	215	209	207	201	198	303	282	226	191	196	184	203
25	213	209	206	200	195	292	266	229	189	189	187	193
26	214	208	204	197	199	281	254	226	189	194	195	192
27	215	207	203	198	205	265	245	223	191	197	194	201
28	213	205	203	207	204	267	238	220	198	195	188	211
29	210	207	203	203	---	302	233	221	207	188	188	206
30	209	211	204	195	---	293	234	219	201	186	187	205
31	210	---	208	203	---	266	---	221	---	184	184	---
TOTAL	6560	6353	6422	6164	5559	7803	8391	8233	6591	6231	5920	5698
MEAN	212	212	207	199	199	252	280	266	220	201	191	190
MAX	234	235	246	210	206	384	370	495	320	239	239	212
MIN	196	205	196	189	190	194	233	219	189	184	181	180
CFSM	0.86	0.86	0.85	0.81	0.81	1.03	1.14	1.08	0.90	0.82	0.78	0.78
IN.	1.00	0.96	0.98	0.94	0.84	1.18	1.27	1.25	1.00	0.95	0.90	0.87

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	261	275	271	255	266	344	429	314	274	245	240	243
MAX	373	339	408	350	361	629	670	436	391	427	393	504
(WY)	1955	1976	1966	1973	1976	1976	1959	1960	1974	1969	1956	1975
MIN	212	212	207	199	199	252	258	222	206	196	191	190
(WY)	2003	2003	2003	2003	2003	2003	2000	1958	1964	1966	2003	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	97707		79925			
ANNUAL MEAN	268		219		284	
HIGHEST ANNUAL MEAN					356	1976
LOWEST ANNUAL MEAN					219	2003
HIGHEST DAILY MEAN	767	Mar 10	495	May 12	1830	Aug 5 1956
LOWEST DAILY MEAN	195	Sep 13	180	Sep 12	170	Oct 3 1996
ANNUAL SEVEN-DAY MINIMUM	196	Sep 12	182	Sep 7	180	Jan 21 1961
MAXIMUM PEAK FLOW			516	May 12	(a)2440	Aug 6 1956
MAXIMUM PEAK STAGE			5.22	May 12	7.45	Apr 13 2001
INSTANTANEOUS LOW FLOW	168		168	Mar 9	161	Feb 2 1961
ANNUAL RUNOFF (CFSM)	1.09		0.89		1.16	
ANNUAL RUNOFF (INCHES)	14.84		12.14		15.77	
10 PERCENT EXCEEDS	364		267		385	
50 PERCENT EXCEEDS	246		205		252	
90 PERCENT EXCEEDS	203		188		212	

(a) From rating curve extended above 1,000 ft ^{3}/s; gage height 6.82 ft, site and datum then in use.
(e) Estimated.

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 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. 2-9, 16-19, Nov. 27, 28, Dec. 25-31, Mar. 6, 7, Apr. 7 to May 7, July 17-21, Aug. 11-17, Sept. 12-19, 28-30 rated good; Oct. 20-24, Nov. 29, Jan. 1-7, Feb. 4 to Mar. 5, June 16-22, July 22-27, Aug. 18-27 rated fair; and Oct. 25 to Nov. 5, Nov. 30 to Dec. 2, July 28, 29 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, 19.0°C, June 25; minimum, -0.5°C, Dec. 3, 4.
DISSOLVED OXYGEN: Maximum, 14.5 mg/L, Dec. 3; minimum, 7.9 mg/L, July 21.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	14.0	12.5	13.5	5.0	4.5	5.0	2.5	1.5	2.0	3.5	2.0	2.5
2	14.0	12.5	13.0	4.5	4.0	4.5	2.0	0.5	1.5	2.0	1.5	2.0
3	12.5	11.5	11.5	5.5	4.5	5.0	0.5	-0.5	0.0	2.5	2.0	2.5
4	12.0	11.5	12.0	6.0	5.5	5.5	1.0	-0.5	0.0	3.0	2.5	2.5
5	12.0	10.5	11.5	5.5	5.0	5.0	1.0	0.5	1.0	3.5	3.0	3.0
6	10.5	10.0	10.0	5.5	5.0	5.0	1.5	1.0	1.5	3.5	2.5	3.0
7	10.0	9.0	9.5	5.0	4.0	4.5	---	---	---	3.0	2.0	2.5
8	9.0	8.5	9.0	6.5	5.0	6.0	---	---	---	3.5	2.5	3.0
9	10.0	9.0	9.5	8.0	6.5	7.0	---	---	---	4.0	3.0	3.5
10	9.5	8.5	9.0	9.0	8.0	8.5	---	---	---	3.0	1.5	2.5
11	10.0	8.5	9.5	8.5	7.0	8.0	---	---	---	1.5	1.0	1.5
12	10.5	9.5	10.0	7.0	6.0	6.5	3.5	2.0	2.5	1.5	1.0	1.5
13	10.0	8.5	9.5	6.0	5.5	6.0	4.5	3.5	4.0	1.5	1.0	1.5
14	8.5	7.0	7.5	6.0	5.5	6.0	4.5	4.0	4.5	1.0	0.5	1.0
15	7.5	7.0	7.5	5.5	4.0	5.0	4.0	3.5	4.0	1.0	0.5	0.5
16	7.5	6.5	7.0	4.0	3.0	3.5	3.5	2.0	2.5	0.5	0.0	0.0
17	6.5	5.5	5.5	3.0	2.0	2.5	2.0	1.5	2.0	1.0	0.0	0.5
18	6.5	5.5	6.0	3.5	2.0	3.0	4.0	2.0	3.0	0.5	0.0	0.0
19	7.5	6.5	7.0	5.0	3.5	4.0	5.0	4.0	4.5	0.5	0.0	0.5
20	7.0	6.5	7.0	5.0	4.0	4.5	5.0	3.5	4.5	0.0	0.0	0.0
21	6.5	5.5	6.0	5.5	5.0	5.0	3.5	3.0	3.0	0.5	0.0	0.0
22	6.0	6.0	6.0	5.0	4.5	5.0	3.0	2.5	3.0	0.0	0.0	0.0
23	6.0	5.5	6.0	4.5	4.5	4.5	2.5	2.0	2.5	0.0	0.0	0.0
24	6.0	5.5	6.0	5.0	4.5	4.5	2.5	2.0	2.5	1.0	0.0	0.5
25	5.5	5.0	5.5	4.5	4.0	4.5	3.0	2.5	2.5	0.5	0.5	0.5
26	6.5	5.5	6.0	4.0	3.0	3.5	3.0	2.5	3.0	0.5	0.0	0.0
27	6.5	6.0	6.5	3.0	2.5	2.5	2.5	2.0	2.5	0.0	0.0	0.0
28	6.5	6.0	6.0	3.0	2.5	3.0	4.0	2.5	3.5	1.0	0.0	0.0
29	6.0	5.0	5.5	4.5	3.0	4.0	4.5	4.0	4.0	1.0	0.0	0.5
30	5.5	4.5	5.0	4.5	2.5	3.5	4.5	4.0	4.0	1.5	0.0	0.5
31	5.5	5.0	5.0	---	---	---	4.5	3.5	4.0	2.0	1.0	1.5
MONTH	14.0	4.5	8.0	9.0	2.0	4.8	---	---	---	4.0	0.0	1.2

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125460 PINE RIVER NEAR HOXEYVILLE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	3.0	2.0	2.5	3.0	1.5	2.5	7.0	5.0	6.0	11.0	9.5	10.5
2	3.5	3.0	3.5	3.0	0.5	2.5	7.0	6.5	6.5	11.5	9.0	10.0
3	3.5	3.5	3.5	0.5	0.0	0.0	6.5	4.0	5.5	11.5	8.0	10.0
4	3.5	1.5	2.5	1.5	0.0	1.0	4.0	2.0	3.0	11.5	8.5	10.5
5	1.5	1.0	1.0	1.5	0.0	1.0	3.0	1.5	2.0	11.0	10.0	10.0
6	1.5	0.5	1.0	2.0	0.5	1.0	4.5	2.0	3.5	10.0	9.5	9.5
7	1.0	0.0	0.5	2.0	1.0	1.5	4.5	3.0	3.5	11.0	9.0	10.0
8	1.0	0.0	0.5	2.5	1.0	2.0	5.5	2.5	4.0	13.0	10.5	11.5
9	0.5	0.0	0.5	1.0	0.0	0.5	6.5	4.0	5.5	14.0	11.0	12.5
10	0.5	0.0	0.0	1.0	0.0	0.5	8.0	4.5	6.5	15.0	12.0	13.5
11	0.0	0.0	0.0	2.0	0.0	0.5	8.5	5.5	7.0	14.5	11.0	13.0
12	0.0	0.0	0.0	3.0	1.5	2.5	8.5	6.5	7.5	11.0	9.5	10.5
13	0.0	0.0	0.0	4.0	2.5	3.0	9.0	6.5	8.0	11.5	8.5	10.0
14	0.5	0.0	0.0	5.0	2.5	3.5	11.0	7.5	9.5	12.0	9.5	11.0
15	0.5	0.0	0.0	6.0	3.5	5.0	13.0	10.0	11.5	13.5	11.0	12.5
16	0.5	0.0	0.0	7.0	5.0	6.0	12.0	8.0	10.5	13.0	12.0	12.5
17	1.5	0.0	0.5	7.0	5.5	6.5	8.0	6.0	7.0	14.0	11.5	12.5
18	1.5	1.0	1.5	6.0	5.0	5.5	6.5	5.5	6.0	15.0	12.0	13.5
19	2.5	1.5	2.0	5.0	3.5	4.5	9.5	6.5	8.0	15.5	13.0	14.5
20	3.5	1.0	2.0	5.5	4.5	5.0	10.5	9.5	10.0	14.5	12.5	14.0
21	4.5	3.5	4.0	5.0	4.0	4.5	10.5	8.5	9.5	13.5	10.5	12.5
22	4.0	3.0	4.0	4.5	3.5	4.0	8.5	7.5	8.0	13.5	10.5	12.0
23	3.0	1.5	2.0	6.0	4.0	5.0	9.0	6.0	7.5	12.5	11.5	12.0
24	1.5	0.5	1.0	6.5	5.0	5.5	10.0	7.0	8.5	12.0	11.0	11.5
25	0.5	0.0	0.0	7.5	6.0	6.5	12.0	9.0	10.0	12.0	10.5	11.5
26	1.5	0.0	0.5	7.0	5.5	6.5	11.5	8.5	10.0	13.0	10.5	12.0
27	2.0	0.0	0.5	6.0	5.0	5.0	12.0	8.5	10.5	14.5	11.0	13.0
28	2.5	0.0	1.0	6.0	5.0	5.5	13.5	10.5	12.0	14.5	12.0	13.5
29	---	---	---	6.0	4.5	5.0	12.5	10.5	11.5	14.5	12.5	13.5
30	---	---	---	5.0	3.0	4.0	11.5	10.0	10.5	13.0	11.5	12.0
31	---	---	---	6.0	3.5	5.0	---	---	---	12.0	10.5	11.0
MONTH	4.5	0.0	1.2	7.5	0.0	3.6	13.5	1.5	7.6	15.5	8.0	11.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	12.5	9.0	11.0	16.5	14.0	15.0	16.5	15.0	15.5	13.0	12.0	13.0
2	13.0	10.0	12.0	16.5	14.0	15.5	16.5	15.0	15.5	13.5	11.5	12.5
3	13.0	11.5	12.5	17.5	15.0	16.0	15.5	15.0	15.0	13.5	12.5	13.0
4	12.0	11.0	11.5	18.0	15.5	17.0	16.0	14.0	15.0	13.0	11.5	12.0
5	13.0	10.5	12.0	18.0	15.5	17.0	16.5	15.0	15.5	12.0	10.0	11.0
6	12.5	11.0	12.0	16.5	15.0	16.0	17.5	15.0	16.0	13.0	10.5	12.0
7	13.5	11.5	12.5	17.5	15.0	16.0	17.0	15.5	16.5	14.0	12.0	13.0
8	13.5	12.0	13.0	17.0	15.5	16.5	17.0	15.0	16.0	14.5	13.0	13.5
9	13.0	12.0	12.5	16.5	14.5	15.5	16.0	15.0	15.5	14.5	13.0	14.0
10	12.5	11.5	12.0	15.5	14.5	15.0	16.5	14.0	15.5	14.5	13.0	14.0
11	13.0	11.5	12.5	14.5	13.5	13.5	16.0	15.0	15.5	15.0	13.0	14.0
12	15.0	12.5	14.0	15.5	13.0	14.0	16.5	15.0	15.5	15.0	13.0	14.0
13	16.0	13.5	15.0	15.5	13.5	14.5	17.0	14.5	16.0	15.0	14.0	14.5
14	17.0	14.0	15.5	16.5	13.5	15.0	17.0	15.5	16.0	14.5	13.5	14.0
15	17.0	14.5	16.0	16.5	15.0	15.5	17.5	15.5	16.5	13.5	12.5	13.5
16	17.0	14.0	15.5	16.5	13.5	15.0	17.0	15.5	16.5	13.0	11.5	12.5
17	17.0	14.0	15.5	16.0	14.5	15.5	17.0	15.0	16.0	13.5	11.5	12.5
18	17.0	14.5	16.0	16.0	13.0	14.5	16.5	14.5	15.5	14.0	12.0	13.0
19	16.5	14.0	15.0	16.0	13.0	14.5	17.0	14.5	15.5	13.5	12.0	12.5
20	16.0	13.0	14.5	15.5	14.0	15.0	17.0	14.5	16.0	12.0	11.0	11.5
21	16.0	13.0	15.0	15.5	14.5	15.0	18.0	15.5	16.5	11.5	10.0	11.0
22	16.5	13.0	15.0	16.0	14.0	15.0	17.5	16.0	16.5	11.5	11.0	11.5
23	17.0	13.5	15.5	16.5	14.0	15.5	16.5	14.5	15.5	11.5	10.5	11.0
24	17.0	15.0	16.0	16.5	14.0	15.0	15.5	14.0	15.0	11.0	10.5	10.5
25	19.0	15.5	17.0	16.5	14.0	15.5	15.0	14.0	14.5	10.5	9.5	10.0
26	18.0	15.5	16.5	16.0	15.0	15.5	16.5	14.5	15.0	10.0	9.0	9.5
27	15.5	14.0	15.0	17.5	15.0	16.0	16.0	14.5	15.5	10.5	10.0	10.0
28	14.5	13.0	14.0	16.5	15.0	16.0	15.5	13.0	14.5	10.0	9.5	10.0
29	14.5	13.0	13.5	16.5	14.0	15.5	16.5	15.0	15.5	10.0	9.0	9.0
30	15.5	13.0	14.5	16.5	14.5	15.5	15.0	13.0	14.0	9.0	8.5	8.5
31	---	---	---	16.5	15.0	16.0	13.5	12.5	13.0	---	---	---
MONTH	19.0	9.0	14.1	18.0	13.0	15.4	18.0	12.5	15.5	15.0	8.5	12.0

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125460 PINE RIVER NEAR HOXEYVILLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.0	8.6	9.1	11.6	10.8	11.1	13.7	12.9	13.3	12.7	11.8	12.3
2	9.4	8.5	8.9	11.6	10.9	11.2	13.9	13.3	13.6	12.8	12.2	12.5
3	10.2	8.8	9.4	11.8	10.8	11.2	14.5	13.7	14.1	12.5	12.1	12.2
4	9.2	8.7	9.0	11.4	10.7	11.0	14.3	13.8	14.1	12.4	11.8	12.1
5	9.9	8.7	9.3	11.8	10.9	11.3	14.1	13.5	13.8	12.0	11.6	11.8
6	9.9	9.3	9.6	11.5	11.2	11.3	13.7	13.2	13.5	12.2	11.5	11.9
7	10.6	9.4	9.9	12.3	11.3	11.7	---	---	---	12.2	11.7	12.0
8	10.7	9.8	10.1	11.5	10.7	11.2	---	---	---	12.0	11.4	11.7
9	11.0	9.0	9.9	11.1	10.3	10.8	---	---	---	11.6	11.3	11.4
10	10.0	9.0	9.4	10.3	9.9	10.0	---	---	---	12.4	11.5	12.0
11	9.8	8.8	9.3	10.9	9.8	10.4	---	---	---	12.9	12.3	12.6
12	9.8	8.8	9.1	11.1	10.5	10.8	13.0	12.3	12.8	12.9	12.4	12.6
13	9.9	8.7	9.3	11.6	10.9	11.2	12.3	11.7	12.1	12.9	12.3	12.6
14	10.3	9.2	9.7	11.2	10.8	11.0	12.1	11.6	11.8	13.2	12.5	12.8
15	10.2	9.4	9.7	11.9	11.0	11.5	12.1	11.7	11.9	13.2	12.4	12.7
16	10.5	9.4	9.9	12.6	11.7	12.1	13.1	11.9	12.6	12.7	11.8	12.2
17	10.7	9.8	10.2	12.7	12.0	12.3	13.1	12.5	12.8	13.1	11.9	12.4
18	10.4	9.7	10.1	12.6	11.7	12.2	12.5	11.8	12.3	12.7	11.8	12.2
19	10.2	9.6	9.8	12.0	11.2	11.7	11.8	11.1	11.5	12.6	11.9	12.2
20	10.3	9.5	9.9	12.0	11.2	11.5	11.7	11.1	11.4	12.3	11.7	12.0
21	10.5	9.9	10.2	11.7	11.0	11.2	12.2	11.6	11.9	12.5	11.8	12.1
22	10.5	10.0	10.2	11.7	11.0	11.3	12.2	11.9	12.0	12.6	11.8	12.1
23	11.1	10.1	10.5	11.6	11.2	11.4	12.7	12.1	12.3	12.0	11.7	11.8
24	11.2	10.3	10.7	11.8	11.1	11.4	12.8	12.3	12.5	13.2	12.0	12.6
25	11.0	10.3	10.6	12.1	11.2	11.6	12.4	12.0	12.2	13.0	12.3	12.5
26	10.6	10.2	10.4	12.9	11.8	12.3	12.5	12.0	12.2	12.4	11.8	12.1
27	10.9	10.1	10.4	13.1	12.2	12.7	12.9	12.2	12.5	12.0	11.6	11.8
28	11.0	10.2	10.6	13.0	12.4	12.7	12.2	11.6	11.9	12.8	11.6	12.0
29	11.3	10.4	10.8	12.6	11.9	12.3	12.1	11.5	11.7	13.2	12.0	12.7
30	11.3	10.7	10.9	13.0	11.8	12.4	11.6	11.2	11.5	13.0	11.9	12.3
31	11.3	10.6	10.8	---	---	---	12.0	11.2	11.6	12.8	12.3	12.7
MONTH	11.3	8.5	9.9	13.1	9.8	11.5	---	---	---	13.2	11.3	12.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	12.3	11.9	12.2	12.6	11.7	12.3	11.5	10.8	11.3	10.6	10.0	10.2
2	12.0	11.7	11.9	12.5	11.6	12.0	11.2	10.8	11.0	10.7	10.0	10.4
3	11.8	11.5	11.7	12.3	11.4	11.7	11.7	11.0	11.4	11.1	10.1	10.6
4	12.2	11.5	11.9	12.8	11.6	12.3	12.5	11.7	12.3	11.0	9.8	10.4
5	13.0	12.2	12.7	12.8	11.6	12.3	13.1	12.5	12.8	10.4	9.8	10.1
6	13.0	12.4	12.7	13.1	12.1	12.6	13.1	12.1	12.7	10.7	10.0	10.4
7	12.9	11.6	12.4	12.8	12.3	12.6	12.7	12.1	12.5	11.0	10.3	10.6
8	12.7	11.6	12.0	12.7	12.2	12.4	13.1	12.0	12.6	---	---	---
9	13.0	11.7	12.3	13.1	11.7	12.4	12.5	11.5	12.1	---	---	---
10	12.7	11.6	12.1	13.2	11.7	12.4	12.0	11.1	11.6	---	---	---
11	11.8	11.5	11.6	13.0	11.7	12.2	11.6	10.8	11.2	---	---	---
12	11.8	11.4	11.6	12.4	12.1	12.3	11.4	10.8	11.1	---	---	---
13	11.8	11.4	11.6	12.5	11.9	12.2	11.5	10.6	11.1	---	---	---
14	12.1	11.4	11.8	12.3	11.4	12.0	11.0	9.9	10.6	---	---	---
15	12.8	11.7	12.1	11.9	11.0	11.5	10.2	9.4	9.9	---	---	---
16	12.3	11.9	12.0	11.4	10.6	11.1	10.6	9.3	9.9	---	---	---
17	12.9	11.7	12.2	11.3	10.6	11.0	11.4	10.6	11.1	---	---	---
18	12.6	12.3	12.5	11.4	10.9	11.2	11.6	11.2	11.5	---	---	---
19	12.6	12.2	12.4	11.8	11.3	11.5	11.3	10.3	11.0	---	---	---
20	12.7	11.7	12.3	11.4	11.1	11.3	10.3	9.8	10.1	---	---	---
21	11.7	11.2	11.5	14.0	11.1	11.6	10.3	9.8	10.0	---	---	---
22	11.8	11.2	11.5	13.1	11.6	11.9	11.0	10.3	10.7	---	---	---
23	12.6	11.5	12.2	11.6	11.2	11.5	11.3	10.2	10.9	---	---	---
24	12.9	12.2	12.6	11.4	10.9	11.2	11.0	10.0	10.6	---	---	---
25	12.7	11.5	12.1	11.1	10.7	10.9	10.5	9.7	10.1	---	---	---
26	12.7	11.5	12.1	11.2	10.7	11.0	10.7	9.8	10.2	---	---	---
27	12.9	11.5	12.1	11.6	11.1	11.4	10.7	9.5	10.1	---	---	---
28	12.9	11.6	12.3	11.4	11.0	11.2	10.0	9.2	9.7	---	---	---
29	---	---	---	11.7	11.0	11.4	10.4	9.3	9.9	---	---	---
30	---	---	---	12.3	11.7	12.0	10.4	9.5	10.0	---	---	---
31	---	---	---	12.1	11.4	11.8	---	---	---	---	---	---
MONTH	13.0	11.2	12.1	14.0	10.6	11.8	13.1	9.2	11.0	---	---	---

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125460 PINE RIVER NEAR HOXEYVILLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	---	---	---	9.5	8.2	8.8	11.0	9.1	9.9
2	---	---	---	---	---	---	9.4	8.3	8.7	10.9	9.1	9.8
3	---	---	---	---	---	---	9.5	8.3	8.8	10.6	8.9	9.6
4	---	---	---	---	---	---	9.5	8.2	8.8	10.7	9.1	9.8
5	---	---	---	---	---	---	8.9	8.2	8.5	11.2	9.5	10.1
6	---	---	---	---	---	---	9.4	8.1	8.6	11.2	9.3	10.0
7	---	---	---	---	---	---	9.3	8.0	8.6	11.1	9.1	9.9
8	---	---	---	---	---	---	9.5	8.2	8.8	10.9	8.9	9.7
9	---	---	---	---	---	---	9.5	8.3	8.8	10.8	8.8	9.6
10	---	---	---	8.9	8.2	8.5	9.8	8.4	9.0	10.7	8.8	9.5
11	---	---	---	9.0	8.3	8.6	9.6	8.2	8.9	10.7	8.7	9.5
12	9.4	8.5	9.1	9.5	8.4	8.9	9.8	8.4	9.0	10.6	8.6	9.4
13	9.3	8.5	8.9	9.4	8.3	8.8	9.9	8.3	8.9	10.2	8.6	9.2
14	9.5	8.4	8.9	9.5	8.1	8.8	9.6	8.2	8.8	9.8	8.6	9.1
15	9.6	8.4	8.9	9.1	8.0	8.5	9.9	8.2	8.9	10.1	8.8	9.3
16	9.7	8.4	9.0	9.7	8.1	8.8	9.7	8.1	8.7	10.8	9.0	9.7
17	9.7	8.6	9.0	9.1	8.0	8.6	9.8	8.1	8.8	10.8	9.1	9.8
18	9.7	8.5	9.0	9.8	8.4	8.9	9.8	8.2	8.9	10.7	9.0	9.6
19	9.9	8.6	9.2	9.8	8.3	8.9	9.9	8.3	8.9	10.3	8.9	9.5
20	10.2	8.9	9.4	9.3	8.1	8.6	9.9	8.1	8.8	11.3	9.4	10.1
21	10.2	8.8	9.4	8.8	7.9	8.3	9.3	8.0	8.5	11.5	9.5	10.3
22	10.2	8.8	9.4	9.1	8.1	8.5	9.7	8.0	8.7	10.0	9.4	9.6
23	---	---	---	9.2	8.1	8.5	10.1	8.2	9.0	10.8	9.2	9.8
24	---	---	---	9.6	8.1	8.7	9.9	8.4	8.9	10.4	9.3	9.7
25	---	---	---	9.5	8.1	8.7	10.4	8.4	9.2	11.2	9.4	10.1
26	---	---	---	9.1	8.1	8.6	10.2	8.6	9.2	11.4	9.7	10.3
27	---	---	---	9.7	8.2	8.9	10.6	8.5	9.3	10.8	9.4	9.9
28	---	---	---	9.9	8.2	9.0	10.8	8.8	9.6	10.9	9.4	10.0
29	---	---	---	10.1	8.4	9.1	10.5	8.4	9.2	11.3	9.5	10.2
30	---	---	---	9.9	8.3	9.0	11.0	8.8	9.7	11.1	9.7	10.3
31	---	---	---	9.9	8.2	8.9	11.0	9.1	9.9	---	---	---
MONTH	---	---	---	---	---	---	11.0	8.0	8.9	11.5	8.6	9.8

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1220	1490	1470	1310	1390	1460	1620	1620	1330	1300	1420	1510
2	1220	1410	1390	1360	1460	1390	1590	1620	1440	1290	1400	1460
3	1300	1410	1290	1400	1540	1150	1590	1560	1470	1310	1740	1400
4	1510	1380	1100	1380	1500	1160	1620	1540	1440	1330	1590	1400
5	1350	1390	1110	1310	1420	1410	1620	1590	1440	1220	1410	1350
6	1440	1380	1440	1290	1350	1300	1540	1520	1400	1150	1410	1280
7	1430	1380	1520	1310	1360	1330	1520	1530	1410	1290	1360	1270
8	1430	1340	1470	1350	1240	1420	1500	1610	1470	1290	1350	1340
9	1410	1350	1330	1340	1200	1310	1520	1560	1600	1300	1380	1290
10	1290	1540	1230	1400	1430	1060	1590	1540	1700	1450	1380	1290
11	1330	1460	1380	1400	1300	1310	1640	1710	1730	1570	1360	1270
12	1390	1430	1490	1350	1090	1440	1640	2030	1640	1510	1310	1240
13	1400	1400	1450	1300	1210	1380	1640	1960	1580	1520	1260	1260
14	1390	1450	1470	1230	1240	1360	1640	1900	1570	1500	1260	1290
15	1370	1450	1350	1110	1270	1500	1650	1730	1570	1490	1260	1350
16	1380	1400	1300	1130	1340	1550	2110	1620	1570	1420	1330	1290
17	1370	1380	1440	1260	1400	1560	1830	1620	1180	1360	1330	1260
18	1380	1310	1410	1260	1430	1640	2040	1550	1430	1390	1270	1260
19	1460	1350	1470	1240	1410	1700	2350	1560	1450	1380	1210	1240
20	1440	1430	1480	1190	1440	1700	2320	1570	1310	1340	1220	1220
21	1340	1470	1490	1120	1420	2070	2250	1490	1250	1500	1390	1240
22	1430	1370	1470	1100	1460	2000	2040	1480	1250	1580	1360	1410
23	1500	1350	1450	1090	1440	1740	1770	1510	1270	1420	1300	1400
24	1420	1490	1430	1230	1380	1710	1670	1530	1270	1380	1290	1250
25	1380	1440	1410	1350	1280	1680	1630	1460	1270	1320	1290	1270
26	1430	1400	1410	1340	1150	1670	1600	1450	1270	1420	1350	1340
27	1440	1370	1420	1310	1190	1670	1590	1520	1280	1470	1320	1390
28	1370	1330	1380	1380	1440	1700	1560	1530	1330	1290	1280	1430
29	1350	1360	1320	1360	---	1690	1550	1530	1350	1190	1300	1440
30	1340	1440	1450	1350	---	1680	1560	1520	1320	1250	1450	1330
31	1320	---	1390	1370	---	1630	---	1460	---	1360	1490	---
TOTAL	42830	42150	43210	39920	37780	47370	51790	49420	42590	42590	42070	39770
MEAN	1382	1405	1394	1288	1349	1528	1726	1594	1420	1374	1357	1326
MAX	1510	1540	1520	1400	1540	2070	2350	2030	1730	1580	1740	1510
MIN	1220	1310	1100	1090	1090	1060	1500	1450	1180	1150	1210	1220
CFSM	0.95	0.97	0.96	0.89	0.93	1.05	1.19	1.10	0.98	0.95	0.94	0.91
IN.	1.10	1.08	1.11	1.02	0.97	1.21	1.33	1.27	1.09	1.09	1.08	1.02

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2003, BY WATER YEAR (WY)

MEAN	1488	1533	1530	1518	1622	1742	2059	1797	1571	1404	1349	1335
MAX	1645	1691	1722	1823	1856	1999	2512	2150	1770	1675	1453	1409
(WY)	2002	1997	1997	1997	1997	1997	1997	1997	2001	1999	1997	1997
MIN	1316	1405	1361	1288	1349	1528	1508	1504	1420	1332	1287	1268
(WY)	2001	2003	2001	2003	2003	2003	2000	1999	2003	2001	2001	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1997 - 2003	
ANNUAL TOTAL	575540		521490			
ANNUAL MEAN	1577		1429		1578	
HIGHEST ANNUAL MEAN					1758	1997
LOWEST ANNUAL MEAN					1429	2003
HIGHEST DAILY MEAN	3190	Mar 10	2350	Apr 19	4240	Apr 2 1998
LOWEST DAILY MEAN	1100	Dec 4	1060	Mar 10	1060	Aug 9 2001
ANNUAL SEVEN-DAY MINIMUM	1240	Sep 8	1180	Jan 18	1180	Jan 18 2003
MAXIMUM PEAK FLOW			3200	Jul 22	6130	Mar 31 1998
MAXIMUM PEAK STAGE			9.59	Jul 22	10.91	Mar 31 1998
INSTANTANEOUS LOW FLOW			859	Mar 10	83	Mar 31 1998
ANNUAL RUNOFF (CFSM)	1.09		0.98		1.09	
ANNUAL RUNOFF (INCHES)	14.76		13.37		14.78	
10 PERCENT EXCEEDS	1980		1630		1970	
50 PERCENT EXCEEDS	1490		1400		1510	
90 PERCENT EXCEEDS	1300		1250		1270	

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. Dissolved oxygen records rated excellent except the following periods: Oct. 14-16, Nov. 17-22, Dec. 1-4, 18-21, Feb. 22-28, Mar. 4 to Apr. 11, Apr. 29 to May 5, June 29 to July 7 rated good; Oct. 17-21, Nov. 23-25, Dec. 5-9, 22-26, Mar. 1-3, May 6, July 8-14 rated fair; and Oct. 22 to Nov. 5, Dec. 10, 11, Dec. 27 to Jan. 7, July 15-23 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, 22.5°C, Aug. 16-24; minimum, 0.0°C, on several days during winter period.
DISSOLVED OXYGEN: Maximum, 15.1 mg/L, Mar. 7; minimum, 6.9 mg/L, Aug. 16, 17.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	17.0	17.0	17.0	7.5	7.0	7.5	3.0	3.0	3.0	2.0	1.5	2.0
2	17.0	16.5	17.0	7.0	7.0	7.0	3.0	2.0	2.5	2.0	1.5	1.5
3	17.0	16.5	16.5	7.0	6.5	7.0	2.0	2.0	2.0	2.0	1.5	2.0
4	17.0	16.0	16.5	6.5	6.5	6.5	2.5	2.0	2.0	2.0	1.5	2.0
5	16.0	15.5	15.5	6.5	6.0	6.5	2.0	2.0	2.0	2.0	1.5	1.5
6	15.5	15.0	15.5	6.0	6.0	6.0	2.0	2.0	2.0	2.0	1.5	1.5
7	15.0	14.5	15.0	6.0	5.5	6.0	2.0	1.5	2.0	2.0	1.5	1.5
8	14.5	14.5	14.5	6.0	5.5	6.0	1.5	1.5	1.5	2.0	1.5	1.5
9	14.5	14.0	14.5	6.0	6.0	6.0	1.5	1.5	1.5	2.0	1.5	2.0
10	14.0	14.0	14.0	6.0	6.0	6.0	1.5	1.5	1.5	2.0	2.0	2.0
11	14.0	13.5	14.0	6.0	6.0	6.0	1.5	1.5	1.5	2.0	2.0	2.0
12	14.0	13.5	14.0	6.0	5.5	6.0	1.5	1.5	1.5	2.0	1.5	1.5
13	13.5	13.0	13.0	5.5	5.5	5.5	1.5	1.5	1.5	1.5	1.5	1.5
14	13.0	13.0	13.0	5.5	5.5	5.5	1.5	1.5	1.5	1.5	1.0	1.5
15	13.0	12.5	13.0	5.5	5.5	5.5	1.5	1.5	1.5	1.0	1.0	1.0
16	12.5	12.0	12.5	5.5	5.5	5.5	1.5	1.5	1.5	1.0	1.0	1.0
17	12.0	12.0	12.0	5.5	5.0	5.0	1.5	1.5	1.5	1.0	1.0	1.0
18	12.0	11.5	11.5	5.0	5.0	5.0	1.5	1.5	1.5	1.0	1.0	1.0
19	11.5	11.0	11.0	5.0	4.5	5.0	1.5	1.5	1.5	1.0	1.0	1.0
20	11.0	10.5	10.5	4.5	4.5	4.5	1.5	1.5	1.5	1.0	1.0	1.0
21	10.5	10.0	10.0	4.5	4.5	4.5	2.0	1.5	2.0	1.0	1.0	1.0
22	10.0	9.5	10.0	4.5	4.0	4.0	2.0	2.0	2.0	1.0	0.5	1.0
23	9.5	9.5	9.5	4.0	4.0	4.0	2.0	2.0	2.0	0.5	0.5	0.5
24	9.5	9.0	9.0	4.0	4.0	4.0	2.0	1.5	1.5	0.5	0.5	0.5
25	9.0	9.0	9.0	4.0	3.5	4.0	1.5	1.5	1.5	0.5	0.5	0.5
26	9.0	8.5	8.5	4.0	3.5	3.5	1.5	1.5	1.5	0.5	0.5	0.5
27	8.5	8.5	8.5	3.5	3.0	3.5	1.5	1.5	1.5	0.5	0.5	0.5
28	8.5	8.0	8.5	3.5	3.5	3.5	1.5	1.5	1.5	0.5	0.5	0.5
29	8.0	8.0	8.0	3.5	3.5	3.5	1.5	1.5	1.5	0.5	0.5	0.5
30	8.0	7.5	8.0	3.5	3.0	3.0	1.5	1.5	1.5	0.5	0.5	0.5
31	8.0	7.5	7.5	---	---	---	2.0	1.5	1.5	0.5	0.5	0.5
MONTH	17.0	7.5	12.2	7.5	3.0	5.2	3.0	1.5	1.7	2.0	0.5	1.2

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125550 MANISTEE RIVER NEAR WELLSTON, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

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	3.5	3.5	3.5	11.5	11.0	11.5
2	0.5	0.5	0.5	0.5	0.5	0.5	4.0	3.5	4.0	11.5	11.0	11.0
3	0.5	0.5	0.5	0.5	0.5	0.5	3.5	3.5	3.5	12.0	11.0	11.5
4	0.5	0.5	0.5	0.5	0.5	0.5	3.5	3.5	3.5	12.0	11.0	11.5
5	1.0	0.5	1.0	0.5	0.5	0.5	3.5	3.5	3.5	12.0	11.5	12.0
6	1.0	1.0	1.0	0.5	0.5	0.5	4.0	3.5	3.5	11.5	11.0	11.5
7	1.0	1.0	1.0	0.5	0.5	0.5	3.5	3.0	3.5	12.0	11.0	11.5
8	1.0	1.0	1.0	0.5	0.5	0.5	3.5	3.0	3.5	12.5	11.5	12.0
9	1.0	0.5	0.5	0.5	0.5	0.5	4.0	3.5	3.5	12.5	12.0	12.5
10	0.5	0.5	0.5	0.5	0.0	0.5	4.0	3.5	3.5	12.5	12.0	12.5
11	0.5	0.5	0.5	0.5	0.5	0.5	5.0	4.0	4.5	13.0	12.0	12.5
12	0.5	0.5	0.5	0.5	0.5	0.5	5.5	4.0	4.5	12.5	11.5	12.0
13	0.5	0.5	0.5	0.5	0.5	0.5	5.5	4.5	5.0	12.5	11.5	12.0
14	0.5	0.0	0.5	0.5	0.5	0.5	7.0	5.5	6.0	12.5	12.0	12.0
15	0.5	0.0	0.0	0.5	0.5	0.5	7.5	6.5	7.0	13.5	12.0	13.0
16	0.5	0.0	0.0	1.0	0.5	0.5	8.0	7.0	7.5	13.5	12.5	13.0
17	0.5	0.0	0.0	1.0	0.5	1.0	7.0	7.0	7.0	14.0	13.0	13.5
18	0.0	0.0	0.0	1.5	1.0	1.0	7.5	7.0	7.0	14.5	13.5	14.0
19	0.0	0.0	0.0	2.0	1.5	1.5	7.5	7.0	7.5	15.0	14.5	14.5
20	0.5	0.0	0.0	2.0	2.0	2.0	8.0	7.5	7.5	14.5	13.0	13.5
21	0.5	0.0	0.0	2.5	2.0	2.0	8.0	8.0	8.0	15.5	13.5	14.5
22	0.5	0.0	0.5	2.5	2.5	2.5	8.0	7.5	8.0	15.5	14.5	14.5
23	0.5	0.5	0.5	2.5	2.5	2.5	8.0	7.5	8.0	15.5	14.0	15.0
24	0.5	0.5	0.5	2.5	2.5	2.5	8.5	8.0	8.5	15.0	14.5	14.5
25	1.0	0.5	0.5	3.0	2.5	2.5	9.5	8.5	9.0	15.0	14.5	15.0
26	1.0	0.5	0.5	3.0	2.5	3.0	10.0	9.0	9.0	15.5	14.5	15.0
27	1.0	0.5	0.5	3.0	3.0	3.0	10.5	9.0	9.5	15.5	14.5	15.0
28	1.0	0.5	0.5	3.0	3.0	3.0	10.5	10.0	10.5	15.5	14.5	15.0
29	---	---	---	3.5	3.0	3.0	11.0	10.5	11.0	15.5	15.0	15.5
30	---	---	---	3.5	3.0	3.5	11.5	10.5	11.5	16.5	15.5	16.0
31	---	---	---	3.5	3.0	3.5	---	---	---	16.5	15.0	15.5
MONTH	1.0	0.0	0.4	3.5	0.0	1.4	11.5	3.0	6.4	16.5	11.0	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	20.0	19.0	19.5	21.5	21.0	21.5	21.0	21.0	21.0
2	15.5	15.0	15.5	20.0	19.5	19.5	21.5	21.0	21.5	21.0	20.5	20.5
3	15.5	15.0	15.5	20.5	19.5	20.0	21.5	21.0	21.5	20.5	20.0	20.5
4	16.0	15.0	15.5	20.5	19.5	20.0	21.0	20.5	21.0	20.0	19.5	20.0
5	15.5	15.0	15.0	20.5	20.0	20.5	21.0	21.0	21.0	20.0	19.5	19.5
6	16.0	15.0	15.5	21.0	20.5	21.0	21.5	21.0	21.0	19.5	19.5	19.5
7	15.5	15.0	15.5	21.0	20.5	21.0	21.5	21.0	21.0	20.0	19.5	19.5
8	16.0	15.0	15.5	21.0	20.5	20.5	22.0	21.0	21.5	20.0	19.5	20.0
9	15.5	15.0	15.5	21.5	20.5	21.0	21.5	21.5	21.5	20.0	19.5	19.5
10	16.0	15.5	16.0	21.5	20.5	21.0	22.0	21.5	21.5	20.0	19.5	19.5
11	16.0	15.5	15.5	20.5	19.0	19.5	22.0	21.5	21.5	20.0	19.5	20.0
12	17.5	15.5	16.5	20.0	19.5	20.0	22.0	21.5	21.5	20.5	19.5	20.0
13	16.5	15.5	16.0	20.5	20.0	20.0	22.0	21.5	21.5	20.0	19.5	19.5
14	17.0	15.0	16.5	20.5	20.0	20.5	22.0	21.5	21.5	19.5	19.0	19.5
15	18.0	16.5	17.5	20.5	19.5	20.0	22.0	21.5	22.0	19.0	19.0	19.0
16	18.0	17.5	17.5	20.5	20.0	20.0	22.5	22.0	22.0	19.0	19.0	19.0
17	18.5	17.5	18.0	20.5	20.5	20.5	22.5	22.0	22.0	19.0	19.0	19.0
18	18.5	17.5	18.0	21.0	20.0	20.5	22.5	22.0	22.0	19.5	18.5	19.0
19	19.0	18.0	18.5	20.5	20.0	20.5	22.5	22.0	22.0	19.0	18.0	18.5
20	19.0	18.0	18.5	20.5	20.5	20.5	22.5	22.0	22.5	18.5	18.0	18.0
21	19.0	18.0	18.5	21.0	20.0	20.5	22.5	22.0	22.5	18.5	18.0	18.5
22	19.0	18.5	19.0	20.5	20.0	20.5	22.5	21.5	22.0	18.5	17.5	18.0
23	19.5	19.0	19.0	21.0	20.0	20.5	22.5	22.0	22.5	17.5	17.0	17.5
24	20.0	19.5	19.5	21.0	20.5	20.5	22.5	22.0	22.0	17.5	17.0	17.0
25	21.0	20.0	20.0	21.0	20.5	21.0	22.0	22.0	22.0	17.0	16.0	16.5
26	20.5	18.5	19.5	21.5	20.5	21.0	22.0	21.5	22.0	16.0	16.0	16.0
27	20.0	19.0	19.5	21.0	20.5	21.0	22.0	21.5	21.5	16.0	15.5	15.5
28	20.0	19.5	20.0	21.5	20.5	21.0	22.0	21.5	22.0	15.5	15.0	15.5
29	19.5	19.0	19.5	21.0	21.0	21.0	22.0	21.0	21.5	15.0	14.5	15.0
30	19.5	19.0	19.5	21.5	21.0	21.0	21.5	21.0	21.5	14.5	14.0	14.5
31	---	---	---	21.5	21.0	21.5	21.5	21.0	21.0	---	---	---
MONTH	21.0	15.0	17.4	21.5	19.0	20.5	22.5	20.5	21.7	21.0	14.0	18.5

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125550 MANISTEE RIVER NEAR WELLSTON, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.1	7.9	8.0	10.9	10.5	10.7	11.9	11.8	11.9	12.5	12.2	12.4
2	8.2	8.0	8.1	10.9	10.6	10.7	12.3	11.9	12.1	12.7	12.4	12.6
3	8.3	8.1	8.2	11.4	10.7	11.0	12.4	12.2	12.3	12.8	12.6	12.7
4	8.2	7.7	7.9	11.3	11.0	11.1	12.5	12.3	12.4	13.0	12.7	12.8
5	8.0	7.6	7.8	11.6	11.0	11.3	12.5	12.3	12.4	12.8	12.7	12.8
6	8.0	7.7	7.9	11.4	11.2	11.3	12.5	12.4	12.4	12.9	12.7	12.8
7	7.9	7.7	7.8	11.5	11.3	11.4	12.6	12.4	12.5	13.0	12.7	12.8
8	8.0	7.8	7.9	11.4	11.2	11.3	12.8	12.6	12.7	---	---	---
9	8.1	7.7	7.9	11.4	11.2	11.3	12.9	12.7	12.8	---	---	---
10	8.1	7.8	8.0	11.4	11.0	11.3	12.9	12.8	12.8	---	---	---
11	8.2	7.9	8.0	11.4	11.1	11.2	13.1	12.8	12.9	---	---	---
12	8.3	7.7	8.1	11.5	11.2	11.3	13.1	12.9	12.9	---	---	---
13	8.5	7.7	8.2	11.5	11.2	11.4	13.0	12.8	12.9	---	---	---
14	8.7	8.4	8.6	11.4	11.2	11.3	13.2	12.9	13.0	---	---	---
15	8.8	8.6	8.7	11.4	11.2	11.3	13.1	12.9	13.0	13.1	12.6	12.9
16	8.9	8.5	8.7	11.4	11.1	11.3	13.2	12.9	13.0	13.2	12.7	12.9
17	8.8	8.5	8.7	11.4	11.1	11.2	13.2	12.9	13.1	13.1	12.8	13.0
18	8.9	8.4	8.6	11.4	11.1	11.2	13.0	12.8	12.9	13.1	12.9	13.0
19	8.9	8.4	8.6	11.3	11.0	11.2	12.9	12.7	12.8	13.2	12.9	13.0
20	9.1	8.5	8.8	11.5	11.2	11.3	12.8	12.6	12.7	13.2	12.9	13.1
21	9.3	8.6	8.9	11.5	11.2	11.3	12.8	12.6	12.7	13.2	12.9	13.1
22	9.5	8.6	9.0	11.3	11.0	11.2	12.7	12.5	12.6	13.3	12.9	13.1
23	9.6	8.8	9.2	11.3	11.0	11.2	12.6	12.4	12.5	13.3	12.8	13.0
24	9.7	9.1	9.4	11.3	10.9	11.1	12.8	12.5	12.6	13.3	12.9	13.1
25	9.9	9.0	9.5	11.6	10.9	11.3	12.8	12.5	12.6	13.2	12.9	13.0
26	10.1	9.2	9.7	11.7	11.5	11.6	12.7	12.4	12.5	13.2	12.9	13.1
27	10.1	9.7	9.9	11.8	11.6	11.7	12.7	12.5	12.6	13.2	12.9	13.1
28	10.2	9.8	10.0	11.8	11.5	11.6	12.7	12.4	12.6	13.1	12.9	13.0
29	10.4	9.9	10.2	11.7	11.5	11.6	12.6	12.3	12.5	13.3	12.9	13.1
30	10.6	10.1	10.3	11.9	11.6	11.8	12.6	12.3	12.4	13.2	12.8	13.0
31	10.6	10.2	10.4	---	---	---	12.4	12.2	12.3	13.2	12.9	13.0
MONTH	10.6	7.6	8.7	11.9	10.5	11.3	13.2	11.8	12.6	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	13.2	12.9	13.1	13.6	13.2	13.4	12.4	11.9	12.2	10.8	10.4	10.6
2	13.6	12.8	13.0	14.6	13.3	13.6	12.3	11.7	12.1	10.7	10.2	10.5
3	13.1	12.6	12.8	13.6	12.8	13.2	12.3	11.6	12.0	10.4	9.5	10.2
4	13.1	12.6	12.9	14.0	12.6	13.3	12.3	11.8	12.1	10.4	10.0	10.2
5	13.1	12.7	12.9	13.8	13.4	13.6	12.3	11.9	12.1	10.3	9.9	10.1
6	13.0	12.7	12.9	14.0	13.4	13.6	12.4	11.7	12.2	11.0	9.7	10.3
7	13.1	12.8	12.9	15.1	13.4	13.7	12.4	11.9	12.2	11.0	10.8	10.9
8	13.0	12.6	12.9	13.8	13.1	13.4	12.5	12.2	12.3	10.9	10.6	10.7
9	13.1	12.7	12.9	13.6	13.2	13.4	12.5	12.2	12.3	10.8	10.4	10.6
10	13.2	12.8	13.0	13.5	13.0	13.3	12.4	12.2	12.3	10.5	10.2	10.4
11	13.3	12.9	13.1	13.6	12.9	13.2	12.4	12.1	12.3	10.3	10.1	10.2
12	13.3	12.9	13.1	13.5	13.2	13.3	12.6	12.2	12.4	10.7	10.1	10.2
13	13.3	13.0	13.2	13.6	13.2	13.4	12.5	12.3	12.4	10.3	9.9	10.1
14	13.4	13.0	13.3	13.9	13.3	13.4	12.4	11.9	12.2	10.2	9.9	10.0
15	13.5	13.2	13.4	13.7	13.1	13.3	12.3	11.8	12.0	10.4	10.0	10.1
16	13.5	13.3	13.4	13.4	13.0	13.2	12.0	11.0	11.5	10.2	10.0	10.1
17	13.9	13.2	13.4	13.3	12.6	13.0	11.6	11.4	11.5	10.1	9.9	10.0
18	13.6	13.3	13.4	13.1	12.2	12.8	11.5	11.3	11.4	10.3	9.9	10.1
19	13.6	13.4	13.5	13.2	12.7	12.9	11.5	11.3	11.4	11.1	10.0	10.2
20	14.0	13.4	13.5	13.6	12.7	12.9	11.4	11.1	11.2	10.1	9.8	9.9
21	13.6	13.3	13.4	12.8	12.1	12.5	11.5	10.9	11.1	10.2	10.0	10.1
22	13.5	13.2	13.4	12.8	12.4	12.6	11.1	10.8	11.0	10.2	9.8	10.0
23	13.5	13.1	13.3	12.7	12.3	12.4	11.2	10.9	11.1	10.2	9.8	10.0
24	13.4	13.1	13.3	12.9	12.0	12.4	11.1	10.8	11.0	10.0	9.7	9.8
25	13.5	13.2	13.3	12.7	12.1	12.4	11.0	10.4	10.8	9.9	9.6	9.7
26	13.6	12.6	13.2	12.6	12.2	12.4	12.0	10.8	11.0	10.0	9.6	9.8
27	13.5	12.5	13.2	12.6	12.2	12.4	11.1	10.7	10.9	10.0	9.6	9.8
28	13.5	13.2	13.3	12.4	11.4	11.9	11.2	10.6	10.8	10.1	9.6	9.8
29	---	---	---	13.1	11.9	12.1	11.0	10.6	10.8	9.8	9.4	9.6
30	---	---	---	12.4	11.7	12.1	10.9	10.5	10.8	9.9	9.7	9.8
31	---	---	---	12.4	12.0	12.2	---	---	---	9.8	9.5	9.6
MONTH	14.0	12.5	13.2	15.1	11.4	12.9	12.6	10.4	11.6	11.1	9.4	10.1

STREAMS TRIBUTARY TO LAKE MICHIGAN

04125550 MANISTEE RIVER NEAR WELLSTON, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.9	9.4	9.6	8.0	7.6	7.8	7.6	7.4	7.5	8.2	8.0	8.1
2	9.9	9.4	9.6	7.9	7.7	7.8	7.6	7.3	7.4	8.3	8.0	8.1
3	9.6	9.3	9.4	7.9	7.6	7.8	7.5	7.2	7.3	8.2	7.8	8.0
4	9.7	9.4	9.5	7.9	7.7	7.8	7.5	7.2	7.3	8.2	7.9	8.1
5	9.7	9.2	9.4	7.9	7.7	7.7	7.3	7.2	7.2	8.4	8.1	8.3
6	9.6	9.3	9.5	8.0	7.5	7.7	7.4	7.1	7.3	8.5	8.0	8.2
7	9.6	9.3	9.4	7.8	7.6	7.7	7.3	7.1	7.2	8.4	8.1	8.2
8	9.7	9.2	9.4	8.0	7.6	7.8	7.5	7.1	7.2	8.5	8.2	8.3
9	9.3	9.1	9.2	8.1	7.7	7.8	7.2	7.0	7.2	8.5	8.2	8.3
10	---	---	---	7.8	7.4	7.6	7.6	7.1	7.4	8.6	8.2	8.5
11	---	---	---	7.6	7.2	7.4	7.5	7.2	7.3	8.7	8.3	8.5
12	---	---	---	7.9	7.5	7.6	7.7	7.3	7.5	8.8	8.3	8.5
13	8.8	8.5	8.7	8.0	7.5	7.8	7.8	7.4	7.6	8.6	8.2	8.4
14	8.7	8.5	8.6	8.1	7.6	7.9	7.8	7.4	7.6	8.4	8.2	8.3
15	8.8	8.6	8.7	8.1	7.6	7.9	7.7	7.3	7.5	8.4	8.2	8.2
16	8.8	8.5	8.7	8.1	7.6	7.8	7.6	6.9	7.4	8.5	8.2	8.4
17	8.7	8.5	8.6	8.1	7.6	7.8	7.6	6.9	7.4	---	---	---
18	8.7	8.4	8.6	8.1	7.6	7.9	7.5	7.2	7.4	---	---	---
19	8.7	8.5	8.6	8.0	7.6	7.8	7.5	7.2	7.4	---	---	---
20	8.7	8.4	8.6	7.9	7.5	7.7	7.4	7.1	7.3	8.4	7.9	8.2
21	8.6	8.4	8.5	8.1	7.5	7.9	7.3	7.1	7.2	8.7	8.3	8.5
22	8.5	8.3	8.4	8.4	7.6	8.0	7.4	7.1	7.2	---	---	---
23	8.5	8.2	8.4	8.1	7.6	7.9	7.5	7.2	7.3	---	---	---
24	8.5	8.2	8.3	7.9	7.7	7.8	7.4	7.2	7.3	---	---	---
25	8.3	8.0	8.2	7.8	7.6	7.7	7.3	7.1	7.2	---	---	---
26	8.2	7.9	8.0	7.7	7.4	7.6	7.2	7.0	7.1	8.5	8.2	8.3
27	8.1	7.9	8.0	7.5	7.3	7.4	7.8	7.0	7.4	8.2	8.0	8.1
28	7.9	7.8	7.9	7.7	7.3	7.5	8.1	7.8	7.9	8.3	8.1	8.2
29	7.9	7.7	7.8	7.8	7.4	7.6	7.8	7.6	7.7	8.3	8.1	8.2
30	8.0	7.7	7.8	7.8	7.5	7.6	8.1	7.7	7.9	8.5	8.2	8.4
31	---	---	---	7.7	7.4	7.6	8.2	7.9	8.1	---	---	---
MONTH	---	---	---	8.4	7.2	7.7	8.2	6.9	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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	122	130	130	123	119	138	151	141	123	107	119	109
2	122	129	130	123	118	137	147	137	122	107	112	108
3	123	128	129	122	120	e140	146	135	121	106	170	108
4	157	128	128	122	120	140	149	134	121	105	123	106
5	138	128	129	123	118	137	148	140	121	107	114	105
6	137	128	128	123	118	136	146	140	120	104	111	104
7	139	128	129	123	118	135	145	137	122	105	109	104
8	133	128	128	123	118	136	146	134	126	102	108	104
9	131	128	126	123	117	e137	147	132	123	102	108	103
10	129	130	127	123	120	138	150	131	147	148	107	104
11	129	130	127	122	126	136	150	218	138	149	107	103
12	132	129	127	123	131	135	146	160	127	122	106	103
13	135	129	128	122	134	133	142	145	124	115	105	103
14	130	129	128	121	138	134	140	140	122	112	105	105
15	128	128	128	122	137	138	142	138	120	114	101	112
16	128	126	126	121	e140	149	190	136	118	112	108	107
17	128	127	124	121	e140	158	161	135	117	119	109	104
18	132	127	128	121	142	161	168	148	116	113	104	103
19	134	132	134	121	140	157	158	149	114	109	103	103
20	131	130	131	121	140	171	180	138	113	109	103	102
21	132	129	128	121	144	171	166	133	111	115	127	102
22	134	128	128	121	144	160	161	130	112	111	109	114
23	131	128	127	e121	141	155	152	129	112	109	106	113
24	131	128	125	122	140	154	149	129	112	115	107	110
25	131	128	125	121	140	150	146	128	109	106	105	107
26	132	128	125	121	140	146	143	126	110	117	107	107
27	131	127	124	122	139	146	141	126	109	110	105	113
28	130	127	124	120	138	160	139	125	112	107	107	119
29	129	129	124	120	---	159	138	124	112	106	136	115
30	128	130	125	119	---	150	139	126	109	104	113	115
31	131	---	125	120	---	148	---	125	---	105	110	---
TOTAL	4078	3854	3945	3771	3680	4545	4526	4269	3563	3472	3464	3215
MEAN	132	128	127	122	131	147	151	138	119	112	112	107
MAX	157	132	134	123	144	171	190	218	147	149	170	119
MIN	122	126	124	119	117	133	138	124	109	102	101	102
CFSM	1.11	1.09	1.08	1.03	1.11	1.24	1.28	1.17	1.01	0.95	0.95	0.91
IN.	1.29	1.21	1.24	1.19	1.16	1.43	1.43	1.35	1.12	1.09	1.09	1.01

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 2003, BY WATER YEAR (WY)

MEAN	123	125	123	124	124	132	140	132	128	120	118	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1990 - 2003	
ANNUAL TOTAL	48047		46382			
ANNUAL MEAN	132		127		125	
HIGHEST ANNUAL MEAN					147	1993
LOWEST ANNUAL MEAN					101	2000
HIGHEST DAILY MEAN	313	Aug 22	218	May 11	386	Oct 25 1991
LOWEST DAILY MEAN	107	Jul 27	101	Aug 15	87	Jul 17 2000
ANNUAL SEVEN-DAY MINIMUM	110	Jul 21	103	Sep 7	88	Jul 14 2000
MAXIMUM PEAK FLOW			396	Aug 3	545	Aug 22 2002
MAXIMUM PEAK STAGE			3.04	Aug 3	4.37	Aug 22 2002
INSTANTANEOUS LOW FLOW			84	Aug 15	75	Aug 13 2001
ANNUAL RUNOFF (CFSM)	1.12		1.08		1.06	
ANNUAL RUNOFF (INCHES)	15.15		14.62		14.44	
10 PERCENT EXCEEDS	146		147		151	
50 PERCENT EXCEEDS	129		127		124	
90 PERCENT EXCEEDS	119		107		99	

(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 mi^2.

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, 0.88 ft, June 11; minimum observed, 0.39 ft, Nov. 7, 9.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.58	0.44	---	0.44	---	---	0.72	0.66	0.76	0.75	0.80	0.71
2	0.56	0.43	---	0.44	---	---	0.70	0.66	0.75	0.74	0.83	0.70
3	0.56	0.40	0.48	---	---	---	0.69	---	0.73	0.73	0.84	0.69
4	0.55	0.40	0.48	---	---	---	---	0.66	0.73	0.73	0.84	0.67
5	0.60	0.40	0.48	---	---	---	---	0.68	0.76	0.71	0.83	0.65
6	0.61	0.40	0.48	---	---	---	---	0.72	0.73	0.72	0.83	0.64
7	0.60	0.39	---	0.44	---	---	---	0.72	0.74	0.74	0.82	0.63
8	0.59	---	0.47	0.43	---	---	---	---	0.70	0.74	0.82	0.62
9	0.58	0.39	0.48	0.43	---	---	0.72	0.71	0.75	0.72	0.80	0.62
10	0.58	---	0.46	0.44	---	---	0.68	0.72	0.83	0.82	0.80	0.63
11	0.57	0.41	0.47	---	---	---	0.67	0.78	0.88	0.85	0.79	0.62
12	0.54	---	0.46	---	---	---	---	0.80	0.87	0.83	0.78	0.62
13	0.54	0.43	0.46	---	---	---	0.63	0.82	0.86	0.83	0.77	0.60
14	0.54	---	0.45	---	---	---	0.63	0.81	0.85	0.82	0.76	0.60
15	---	0.43	---	---	---	---	0.64	0.81	0.84	0.81	0.75	0.60
16	0.52	0.43	0.45	---	---	---	0.70	0.79	0.84	0.79	0.75	0.60
17	0.50	0.41	---	---	---	---	0.70	0.79	0.83	0.77	0.75	0.60
18	0.50	0.41	---	---	---	---	0.76	0.81	0.81	0.76	0.75	0.59
19	0.51	0.44	0.46	---	---	---	0.74	0.80	0.80	0.75	0.74	0.58
20	0.51	0.45	---	---	---	---	0.81	0.82	0.77	0.75	0.73	0.55
21	0.49	0.45	0.46	---	---	---	0.80	0.82	0.76	0.75	0.70	---
22	0.53	0.46	---	---	---	---	0.80	0.81	0.75	0.73	0.71	0.54
23	0.52	---	0.46	---	---	---	0.79	0.78	0.74	0.74	0.71	0.55
24	0.51	0.45	---	---	---	---	0.76	0.78	0.74	0.73	0.67	0.53
25	0.49	0.46	0.46	---	---	---	---	0.76	0.74	0.70	0.69	0.53
26	0.49	0.46	---	---	---	0.64	---	0.76	0.71	0.71	0.69	0.51
27	0.49	---	0.46	---	---	0.64	---	---	0.70	0.72	0.70	0.52
28	0.48	---	0.46	---	---	0.67	---	0.76	0.71	0.70	0.70	0.55
29	0.46	---	0.45	0.40	---	0.71	0.68	0.75	0.77	0.69	0.77	0.55
30	0.46	---	0.45	---	---	0.71	0.67	0.75	0.74	0.69	0.75	0.56
31	0.46	---	---	---	---	0.70	---	0.76	---	0.68	0.72	---
MEAN	---	---	---	---	---	---	---	---	0.77	0.75	0.76	---
MAX	---	---	---	---	---	---	---	---	0.88	0.85	0.84	---
MIN	---	---	---	---	---	---	---	---	0.70	0.68	0.67	---

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 mi^2.

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 except for estimated daily discharges, which are fair. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	93	90	90	86	81	129	122	111	91	79	76
2	86	93	90	87	85	79	126	120	109	89	80	74
3	88	93	88	86	86	81	123	117	106	87	79	74
4	94	92	89	88	86	e80	121	115	105	86	78	73
5	98	92	90	88	85	80	115	119	106	85	77	72
6	96	93	90	88	85	78	113	131	105	84	77	72
7	100	93	89	87	82	79	117	129	104	83	76	71
8	97	93	89	87	e80	78	116	124	107	82	76	70
9	96	93	87	91	e80	e80	118	118	116	81	75	70
10	94	97	88	90	e80	e80	123	116	125	101	74	70
11	93	97	88	88	e80	79	131	140	135	108	74	70
12	94	96	88	87	e80	79	137	164	136	109	74	69
13	98	95	89	87	e80	78	140	186	127	103	74	69
14	96	94	90	88	e80	79	137	171	115	96	73	70
15	95	93	91	86	e80	81	138	151	110	92	73	73
16	95	91	89	87	e80	87	179	138	106	89	74	72
17	93	90	89	85	e80	98	193	130	104	89	72	71
18	94	91	89	84	e80	111	214	124	102	88	69	71
19	96	93	97	86	82	119	200	120	99	86	69	70
20	96	93	99	84	82	143	196	119	99	85	69	70
21	96	94	98	84	84	157	180	116	98	84	73	69
22	102	93	96	84	84	162	171	114	97	85	70	77
23	99	92	94	e84	82	162	158	112	96	83	69	79
24	98	92	90	86	81	159	148	116	96	82	69	78
25	96	91	91	86	81	157	140	117	94	80	69	76
26	95	91	91	84	e80	149	133	118	92	81	72	74
27	94	89	89	e86	82	143	128	115	91	81	71	79
28	94	90	90	87	81	141	124	112	93	79	70	80
29	93	90	91	86	---	145	120	110	95	78	e90	90
30	93	93	91	88	---	143	119	110	94	78	84	91
31	93	---	92	87	---	137	---	113	---	77	79	---
TOTAL	2939	2780	2812	2686	2294	3405	4287	3907	3173	2702	2308	2220
MEAN	94.8	92.7	90.7	86.6	81.9	110	143	126	106	87.2	74.5	74.0
MAX	102	97	99	91	86	162	214	186	136	109	90	91
MIN	86	89	87	84	80	78	113	110	91	77	69	69
CFSM	0.67	0.66	0.64	0.61	0.58	0.78	1.01	0.89	0.75	0.62	0.53	0.52
IN.	0.78	0.73	0.74	0.71	0.61	0.90	1.13	1.03	0.84	0.71	0.61	0.59

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2003, BY WATER YEAR (WY)

MEAN	98.7	100	101	97.2	103	118	155	130	117	100	87.9	86.2
MAX	125	122	125	113	119	150	200	167	152	122	111	97.4
(WY)	2002	2002	2002	2002	2002	2002	2001	2002	2002	2002	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1998 - 2003	
ANNUAL TOTAL	45193		35513			
ANNUAL MEAN	124		97.3		108	
HIGHEST ANNUAL MEAN					132	2002
LOWEST ANNUAL MEAN					90.4	2000
HIGHEST DAILY MEAN	255	Apr 11	214	Apr 18	423	Apr 2 1998
LOWEST DAILY MEAN	86	Oct 2	69	Aug 18	69	Aug 18 2003
ANNUAL SEVEN-DAY MINIMUM	88	Sep 27	70	Aug 18	70	Aug 18 2003
MAXIMUM PEAK FLOW			220	Apr 18	449	Apr 2 1998
MAXIMUM PEAK STAGE			3.90	Apr 18	5.44	Apr 2 1998
INSTANTANEOUS LOW FLOW			(a)62	Mar 3	(a)62	Mar 3 2003
ANNUAL RUNOFF (CFSM)	0.88		0.69		0.76	
ANNUAL RUNOFF (INCHES)	11.92		9.37		10.39	
10 PERCENT EXCEEDS	169		131		146	
50 PERCENT EXCEEDS	112		90		100	
90 PERCENT EXCEEDS	90		74		80	

(a) Result of freezeup.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

443903085312101 ARBUTUS LAKE NEAR MAYFIELD, MI

LOCATION.--Lat 44°39'03", long 85°31'21", in SW1/4 NE1/4 sec.16, T.26 N., R.10 W., Grand Traverse County, Hydrologic Unit 04060105, on south side of lake at Pine Hurst Trail, 1.8 mi north of Mayfield.

DRAINAGE AREA.--Not determined.

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

GAGE.--Nonrecording gage. Elevation of gage is 794 ft above sea level, from topographic map.

REMARKS.--Staff gage read by observer. No inlets or outlets.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 5.07 ft, Feb. 13, 1995; minimum observed, 2.60 ft, Sept. 27, 2003.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 3.46 ft, Nov. 25, 26; minimum observed, 2.60 ft, Sept. 27.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.28	3.39	---	---	---	---	---	---	---	3.12	3.02	---
2	3.29	3.40	---	---	---	---	---	---	---	3.11	3.01	---
3	3.27	3.41	---	---	---	---	---	---	---	3.10	3.00	---
4	3.38	3.40	---	---	---	---	---	---	---	3.08	2.98	---
5	3.36	3.40	---	---	---	---	---	---	---	3.06	2.96	2.64
6	3.36	3.40	---	---	---	---	---	---	---	3.04	2.94	2.64
7	3.36	3.42	---	---	---	---	---	---	---	3.02	2.94	2.63
8	3.36	3.42	---	---	---	---	---	---	---	3.00	2.92	2.62
9	3.36	3.42	---	---	---	---	---	---	---	2.99	2.90	2.62
10	3.36	3.41	---	---	---	---	---	---	3.27	3.06	2.88	2.64
11	3.36	3.42	---	---	---	---	---	---	---	3.10	2.87	2.64
12	3.36	3.42	---	---	---	---	---	---	---	3.08	2.86	2.64
13	3.36	3.42	---	---	---	---	---	---	---	3.07	2.84	2.66
14	3.36	3.42	---	---	---	---	---	3.32	---	3.07	2.82	2.64
15	3.36	3.40	---	---	---	---	---	3.32	---	3.06	2.80	2.68
16	3.36	3.40	---	---	---	---	---	3.31	---	3.04	2.78	2.66
17	3.36	3.40	---	---	---	---	---	3.30	---	3.02	2.76	2.66
18	3.36	3.40	---	---	---	---	---	---	---	3.00	2.74	2.68
19	3.36	3.42	---	---	---	---	---	---	---	2.98	---	2.66
20	3.36	3.42	---	---	---	---	---	---	---	2.98	---	2.64
21	3.36	3.42	---	---	---	---	---	---	---	2.96	---	2.66
22	3.36	3.42	---	---	---	---	---	---	---	2.96	---	2.66
23	3.36	3.44	---	---	---	---	---	---	---	2.94	---	2.64
24	3.36	3.44	---	---	---	---	---	---	---	2.96	---	2.64
25	3.36	3.46	---	---	---	---	---	---	---	2.96	---	2.62
26	3.36	3.46	---	---	---	---	---	---	---	2.95	---	2.62
27	3.37	---	---	---	---	---	---	---	---	2.96	---	2.60
28	3.38	---	---	---	---	---	---	---	---	2.96	---	2.62
29	3.40	---	---	---	---	---	---	---	---	2.96	---	2.64
30	3.38	---	---	---	---	---	---	---	---	2.96	---	2.66
31	3.39	---	---	---	---	---	---	---	---	3.00	---	---
MEAN	3.36	---	---	---	---	---	---	---	---	3.02	---	---
MAX	3.40	---	---	---	---	---	---	---	---	3.12	---	---
MIN	3.27	---	---	---	---	---	---	---	---	2.94	---	---

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 mi^2.

PERIOD OF RECORD.--November 1945 to February 1975, October 2001 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 608 ft above sea level, from topographic map. 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, 7.61 ft, Oct. 15, 2001, present datum, maximum gage height observed, 3.20 ft, Apr. 6, 1963, datum then in use; minimum, 6.39 ft, Mar. 12, 14, 15, 2003, present datum, minimum observed, -0.30 ft, Sept. 12-15, 1973, datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 7.54 ft, Apr. 20, 21; minimum, 6.39 ft, Mar. 12, 14, 15.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.18	6.90	6.52	6.49	6.50	6.46	7.28	7.06	7.23	7.10	7.26	7.05
2	7.17	6.86	6.52	6.48	6.49	6.45	7.24	7.03	7.18	7.10	7.33	7.05
3	7.17	6.84	6.51	6.46	6.50	6.44	7.19	7.02	7.14	7.10	7.36	7.06
4	7.22	6.81	6.51	6.45	6.52	6.44	7.17	7.00	7.12	7.11	7.34	7.06
5	7.29	6.79	6.51	6.44	6.52	6.45	7.16	6.98	7.10	7.12	7.28	7.07
6	7.32	6.77	6.50	6.44	6.53	6.44	7.09	6.99	7.08	7.12	7.22	7.07
7	7.27	6.76	6.48	6.45	6.52	6.43	7.01	6.98	7.07	7.12	7.21	7.08
8	7.22	6.74	6.47	6.46	6.52	6.44	6.95	6.99	7.08	7.12	7.24	7.09
9	7.16	6.73	6.47	6.47	6.53	6.44	6.90	7.04	7.08	7.12	7.27	7.10
10	7.11	6.73	6.46	6.48	6.55	6.42	6.87	7.09	7.13	7.23	7.29	7.10
11	7.10	6.72	6.45	6.49	6.53	6.42	6.88	7.26	7.22	7.43	7.31	7.10
12	7.12	6.70	6.44	6.49	6.52	6.42	6.90	7.42	7.21	7.46	7.33	7.10
13	7.16	6.68	6.44	6.49	6.52	6.41	6.92	7.40	7.18	7.40	7.35	7.09
14	7.17	6.65	6.45	6.49	6.50	6.41	6.93	7.36	7.14	7.34	7.36	7.10
15	7.16	6.63	6.44	6.49	6.50	6.41	6.93	7.31	7.14	7.26	7.38	7.13
16	7.16	6.60	6.44	6.48	6.48	6.42	7.06	7.26	7.13	7.20	7.34	7.14
17	7.16	6.58	6.43	6.48	6.47	6.47	7.15	7.21	7.11	7.18	7.29	7.15
18	7.15	6.56	6.43	6.47	6.47	6.52	7.29	7.16	7.08	7.20	7.24	7.15
19	7.15	6.57	6.46	6.47	6.48	6.58	7.39	7.12	7.05	7.22	7.19	7.14
20	7.16	6.56	6.48	6.46	6.48	6.70	7.50	7.14	7.04	7.23	7.15	7.13
21	7.16	6.55	6.50	6.45	6.48	6.86	7.51	7.20	7.05	7.24	7.11	7.13
22	7.17	6.54	6.51	6.45	6.48	7.01	7.50	7.17	7.05	7.22	7.06	7.19
23	7.16	6.54	6.52	6.46	6.48	7.12	7.46	7.14	7.06	7.15	7.03	7.25
24	7.15	6.53	6.52	6.45	6.48	7.20	7.41	7.13	7.07	7.11	7.04	7.19
25	7.12	6.53	6.52	6.46	6.47	7.27	7.36	7.11	7.07	7.14	7.04	7.13
26	7.11	6.53	6.51	6.48	6.46	7.31	7.30	7.05	7.06	7.20	7.10	7.14
27	7.08	6.52	6.51	6.49	6.46	7.32	7.23	7.08	7.04	7.18	7.13	7.19
28	7.04	6.51	6.50	6.48	6.46	7.35	7.17	7.12	7.06	7.12	7.16	7.26
29	7.00	6.49	6.50	6.48	---	7.37	7.13	7.14	7.09	7.11	7.28	7.24
30	6.96	6.50	6.50	6.48	---	7.36	7.10	7.17	7.10	7.14	7.21	7.24
31	6.93	---	6.50	6.48	---	7.32	---	7.21	---	7.16	7.11	---
MEAN	7.14	6.65	6.48	6.47	6.50	6.73	7.17	7.14	7.11	7.19	7.23	7.13
MAX	7.32	6.90	6.52	6.49	6.55	7.37	7.51	7.42	7.23	7.46	7.38	7.26
MIN	6.93	6.49	6.43	6.44	6.46	6.41	6.87	6.98	7.04	7.10	7.03	7.05

WTR YR 2003 MEAN 6.91 MAX 7.51 MIN 6.41

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	157	175	173	173	e160	e160	188	184	174	161	191	164
2	157	175	170	166	e165	e160	189	177	170	159	178	164
3	162	173	160	167	e168	e160	184	177	168	159	182	165
4	183	172	e170	166	e168	e160	184	177	168	160	190	165
5	191	173	169	165	e170	e160	182	182	168	159	175	164
6	174	179	169	167	e170	e160	183	193	167	159	168	163
7	193	173	169	167	e170	e160	182	186	171	158	165	162
8	171	174	169	170	e170	e160	180	179	179	155	165	162
9	168	174	166	175	e168	e160	187	176	188	156	163	161
10	165	e196	166	172	e168	e160	209	176	228	243	162	161
11	166	e196	166	169	e168	e160	238	257	233	252	161	160
12	170	e180	166	170	e168	e160	228	233	180	223	162	160
13	189	173	172	169	e168	e160	203	199	172	173	160	160
14	170	172	174	168	e168	e160	199	186	169	165	159	169
15	169	171	173	169	e168	e160	199	181	166	166	158	179
16	169	166	166	169	e168	167	e264	179	164	164	159	174
17	168	166	e170	169	e165	184	e222	179	163	161	158	166
18	180	164	e170	e170	e165	208	e242	177	163	160	158	164
19	185	174	e195	169	e170	208	e212	175	162	159	157	164
20	188	175	e210	e170	e180	251	e232	180	162	160	157	163
21	178	175	e190	e170	e180	290	e214	176	161	226	161	163
22	188	173	e180	e170	e160	261	204	173	161	214	160	186
23	175	172	e175	e170	e160	231	193	173	160	169	157	253
24	172	171	e170	e170	e160	235	188	188	159	163	160	185
25	171	171	e170	e170	e160	232	187	180	159	161	161	179
26	173	170	e170	e160	e160	207	186	175	161	176	178	172
27	175	168	e170	e158	e160	194	182	173	161	168	166	199
28	172	168	171	e150	e160	209	181	170	166	163	163	208
29	170	172	172	e135	---	225	179	170	183	162	232	199
30	170	180	173	e158	---	193	181	173	166	158	172	217
31	172	---	e170	e158	---	188	---	186	---	159	166	---
TOTAL	5391	5221	5354	5149	4665	5883	6002	5690	5152	5371	5204	5251
MEAN	174	174	173	166	167	190	200	184	172	173	168	175
MAX	193	196	210	175	180	290	264	257	233	252	232	253
MIN	157	164	160	135	160	160	179	170	159	155	157	160
CFSM	2.56	2.56	2.54	2.45	2.45	2.79	2.95	2.70	2.53	2.55	2.47	2.58
IN.	2.95	2.86	2.93	2.82	2.56	3.22	3.29	3.12	2.82	2.94	2.85	2.88

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2003, BY WATER YEAR (WY)

MEAN	185	189	186	180	181	207	220	193	182	172	171	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1967 - 2003	
ANNUAL TOTAL	66865		64333			
ANNUAL MEAN	183		176		187	
HIGHEST ANNUAL MEAN					204	1979
LOWEST ANNUAL MEAN					170	2000
HIGHEST DAILY MEAN	503	Aug 22	290	Mar 21	840	Sep 29 1972
LOWEST DAILY MEAN	152	Jul 16	135	Jan 29	130	Jan 19 1971
ANNUAL SEVEN-DAY MINIMUM	153	Jul 11	154	Jan 26	136	Dec 28 1968
MAXIMUM PEAK FLOW			388	Jul 21	1360	Jul 19 1975
MAXIMUM PEAK STAGE			4.53	Jul 21	6.51	Jul 19 1975
INSTANTANEOUS LOW FLOW					(a)91	Mar 8 1982
ANNUAL RUNOFF (CFSM)	2.70		2.60		2.76	
ANNUAL RUNOFF (INCHES)	36.63		35.25		37.44	
10 PERCENT EXCEEDS	209		201		220	
50 PERCENT EXCEEDS	173		170		178	
90 PERCENT EXCEEDS	158		160		159	

(a) Result of freezeup.
(e) 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, 3.02 ft, Apr. 18; minimum observed, 2.25 ft, Sept. 13, 24.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	2.68	---	2.85	---	---	2.56	---	2.33
2	---	---	---	---	---	---	---	---	2.74	---	---	---
3	2.44	2.53	2.60	---	2.68	---	---	2.83	2.72	---	2.62	---
4	---	---	---	2.62	---	---	---	---	---	2.57	---	---
5	---	---	---	---	---	---	2.93	---	---	---	---	---
6	2.56	---	---	---	2.64	2.65	---	2.86	2.68	---	---	2.30
7	---	2.53	2.63	---	---	---	---	---	---	2.56	---	---
8	2.60	---	---	2.59	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	2.85	2.79	---	---	2.65	2.30
10	---	---	2.60	---	2.69	2.69	---	---	2.68	---	---	---
11	2.54	---	---	2.59	---	---	2.86	---	---	---	---	---
12	---	2.55	---	---	---	---	---	---	---	2.74	2.60	---
13	---	---	---	---	---	---	---	2.92	2.82	2.75	---	2.25
14	2.60	---	2.59	---	---	---	---	---	---	---	---	2.30
15	---	2.52	---	2.60	---	---	2.87	---	---	---	---	---
16	---	---	---	---	---	---	---	2.83	---	---	2.56	---
17	---	---	2.55	---	2.70	---	---	---	---	---	---	---
18	2.59	2.51	---	2.62	---	---	3.02	---	2.73	2.72	2.52	2.28
19	---	---	---	2.63	---	2.73	---	2.82	---	---	---	---
20	---	---	---	---	---	---	---	---	2.69	---	---	---
21	2.59	2.54	---	---	2.71	2.73	---	2.79	---	---	---	2.28
22	---	---	---	---	---	---	---	---	---	2.65	2.47	---
23	---	---	---	---	---	---	---	---	2.66	---	---	---
24	2.59	---	2.64	2.65	---	2.80	3.00	---	2.59	2.65	2.41	2.25
25	---	---	---	---	2.69	---	---	---	---	---	---	---
26	---	2.56	---	---	---	---	---	---	---	---	---	---
27	---	---	2.61	2.63	---	2.80	---	2.77	---	---	---	---
28	2.59	---	---	---	2.66	---	2.98	2.74	2.55	2.58	---	---
29	---	---	---	---	---	---	2.92	---	---	---	---	---
30	---	---	---	---	---	---	---	2.73	2.53	---	2.40	---
31	---	---	2.65	---	---	---	---	---	---	2.55	---	---

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	98	114	103	108	e55	e58	e590	169	116	70	59	60
2	102	113	146	84	e55	e58	e550	166	106	65	64	57
3	91	111	143	e76	e56	e58	e520	164	98	63	62	55
4	129	111	120	e68	e56	e58	e500	163	92	64	85	54
5	256	114	99	e64	e56	e58	e470	163	88	65	90	53
6	211	121	89	e62	e58	e58	e450	163	84	61	79	52
7	241	129	90	e60	e58	e58	e430	162	84	59	71	52
8	208	132	86	e58	e58	e58	e420	162	87	56	69	52
9	235	134	78	e58	e58	e58	e400	161	87	56	63	51
10	219	137	83	e58	e58	e58	e450	161	93	61	60	50
11	187	177	90	e58	e58	e58	e580	457	284	90	57	50
12	168	156	86	e58	e58	e58	e700	499	241	121	55	50
13	259	152	87	e58	e58	e58	e980	268	184	99	53	50
14	225	144	88	e58	e58	e58	e1200	e250	149	83	51	53
15	195	134	90	e58	e58	e60	1300	e240	125	79	51	74
16	171	119	73	e58	e58	e72	1170	e230	107	97	51	81
17	153	146	65	e58	e58	e75	804	218	94	85	50	71
18	144	112	88	e58	e58	e90	631	198	87	75	49	62
19	176	110	381	e59	e58	e105	608	181	80	68	48	58
20	180	114	399	e59	e58	e130	1700	179	75	64	48	55
21	162	119	257	e58	e58	e160	1660	174	72	63	49	55
22	154	120	197	e58	e58	e190	1170	157	69	63	52	58
23	147	116	163	e58	e58	e220	804	143	67	61	52	85
24	145	113	138	e57	e58	e280	581	131	65	59	49	85
25	132	111	130	e57	e58	e350	354	123	65	56	51	87
26	130	122	117	e56	e58	e420	220	117	65	62	55	84
27	141	140	106	e56	e58	e500	203	109	66	79	62	102
28	134	176	105	e56	e58	e600	179	104	66	70	58	120
29	125	116	100	e56	---	e700	171	98	70	63	81	116
30	118	111	99	e56	---	e680	169	96	74	60	78	107
31	115	---	123	e55	---	e640	---	121	---	58	66	---
TOTAL	5151	3824	4019	1901	1612	6084	19964	5727	3040	2175	1868	2039
MEAN	166	127	130	61.3	57.6	196	665	185	101	70.2	60.3	68.0
MAX	259	177	399	108	58	700	1700	499	284	121	90	120
MIN	91	110	65	55	55	58	169	96	65	56	48	50
CFSM	0.90	0.69	0.70	0.33	0.31	1.07	3.62	1.00	0.55	0.38	0.33	0.37
IN.	1.04	0.77	0.81	0.38	0.33	1.23	4.04	1.16	0.61	0.44	0.38	0.41

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 2003, BY WATER YEAR (WY)

MEAN	220	269	178	116	109	263	791	260	168	107	101	143
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1972 - 2003	
ANNUAL TOTAL	79956		57404			
ANNUAL MEAN	219		157		225	
HIGHEST ANNUAL MEAN					344	1985
LOWEST ANNUAL MEAN					138	1998
HIGHEST DAILY MEAN	2210	Apr 16	1700	Apr 20	4050	Apr 21 1985
LOWEST DAILY MEAN	59	Sep 13	48	Aug 19	42	Aug 29 2000
ANNUAL SEVEN-DAY MINIMUM	61	Sep 8	49	Aug 15	43	Aug 25 2000
MAXIMUM PEAK FLOW			(a)1950	Apr 20	4500	Mar 30 1986
MAXIMUM PEAK STAGE			(b)11.65	Mar 29	18.44	Mar 30 1986
INSTANTANEOUS LOW FLOW			48	(c)	(d)33	Nov 16 1989
ANNUAL RUNOFF (CFSM)	1.19		0.85		1.22	
ANNUAL RUNOFF (INCHES)	16.17		11.61		16.64	
10 PERCENT EXCEEDS	405		310		453	
50 PERCENT EXCEEDS	129		88		121	
90 PERCENT EXCEEDS	81		56		66	

(a) Gage height 9.91 ft.
(b) Backwater from ice.
(c) Aug. 19, 20, 21.
(d) Result of freezeup.
(e) Estimated.

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 mi^2.

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, 3.18 ft, Sept. 5-7, 2001.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 4.38 ft, Apr. 24, 25; minimum observed, 3.20 ft, Sept. 13.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.88	4.14	---	---	---	---	---	4.24	3.94	3.60	3.48	---
2	4.00	4.14	---	---	---	---	---	4.22	3.92	3.60	3.50	3.30
3	4.00	4.14	---	---	---	---	---	---	3.90	3.60	3.50	3.28
4	4.02	4.14	---	---	---	---	---	4.18	3.90	3.58	3.46	3.28
5	4.10	4.14	---	---	---	---	---	4.16	3.88	3.58	3.46	---
6	4.10	---	---	---	4.10	---	---	4.20	3.88	3.56	3.46	3.26
7	4.10	---	---	---	---	---	---	4.18	3.88	3.56	3.46	3.26
8	4.10	---	---	---	---	---	---	4.18	3.90	3.48	3.46	3.26
9	4.10	---	---	---	---	---	---	4.18	3.90	3.56	3.44	3.26
10	4.10	---	---	---	---	---	---	4.14	3.84	3.56	3.44	3.24
11	4.10	---	---	---	---	---	---	4.28	3.92	3.60	3.44	3.22
12	4.10	---	---	---	---	---	---	4.28	3.92	3.60	3.40	3.22
13	4.10	---	---	---	---	---	---	4.28	3.90	3.56	3.40	3.20
14	4.10	4.17	---	---	---	---	---	4.20	3.90	3.56	---	3.30
15	4.10	---	---	---	---	---	---	4.20	3.88	3.52	---	3.30
16	4.10	---	---	---	---	---	---	4.18	3.86	3.52	---	3.28
17	4.10	---	---	---	---	---	---	4.16	3.84	3.50	---	3.26
18	4.12	---	---	---	---	---	---	4.14	3.80	3.50	---	3.26
19	4.12	---	---	---	---	---	---	4.12	3.78	3.50	---	3.24
20	4.12	---	---	---	---	---	---	---	3.76	3.46	---	3.24
21	4.10	---	---	---	---	---	---	4.12	3.72	3.46	---	3.30
22	4.10	---	---	---	---	---	---	4.08	3.72	3.46	---	3.32
23	4.12	---	---	---	---	---	---	4.08	3.70	3.44	---	3.32
24	4.12	---	---	---	---	---	4.38	4.04	3.68	3.42	---	---
25	4.12	---	---	---	---	3.97	4.38	4.04	3.68	3.42	3.24	3.34
26	4.14	---	---	---	---	---	4.36	4.00	3.66	---	3.30	3.36
27	4.14	---	---	---	---	---	---	3.96	3.66	3.50	3.30	3.36
28	4.14	---	---	---	---	---	4.30	3.96	3.60	3.50	3.30	3.40
29	4.14	---	4.14	---	---	---	4.28	3.96	3.60	3.48	3.30	3.40
30	4.14	---	---	---	---	---	4.26	3.94	3.60	3.48	---	3.42
31	4.14	---	---	---	---	---	---	3.94	---	3.48	3.30	---

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 mi^2.

PERIOD OF RECORD.--June 1942 to July 1945 (summer months only), August 1945 to current year.

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, 2.59 ft, July 12, 13; minimum, 1.30 ft, Nov. 24.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.32	1.71	1.62	1.64	1.70	---	2.02	2.27	2.34	2.17	2.27	2.12
2	2.31	1.67	1.67	1.63	1.70	---	1.99	2.28	2.32	2.15	2.29	2.12
3	2.29	1.63	1.71	1.62	1.70	---	1.97	2.28	2.33	2.19	2.29	2.12
4	2.35	1.60	1.72	1.61	1.73	---	1.98	2.29	2.32	2.24	2.32	2.12
5	2.40	1.57	1.72	1.60	1.73	---	1.97	2.32	2.29	2.23	2.32	2.11
6	2.43	1.55	1.72	1.59	1.74	---	1.97	2.40	2.29	2.22	2.31	2.10
7	2.47	1.52	1.71	1.58	1.73	---	1.96	2.42	2.30	2.20	---	2.11
8	2.48	1.49	1.69	1.57	1.74	---	1.96	2.42	2.32	2.18	---	2.12
9	2.47	1.48	1.69	1.56	1.74	---	1.93	2.42	2.32	2.18	---	2.12
10	2.46	1.48	1.68	1.56	1.75	---	1.88	2.40	2.38	2.27	---	2.12
11	2.45	1.47	1.67	1.55	---	---	1.82	2.48	2.53	2.48	---	2.11
12	2.45	1.44	1.66	1.54	---	---	1.84	2.53	2.55	2.58	---	2.10
13	2.45	1.42	1.65	1.52	---	---	1.86	2.52	2.51	2.57	---	2.09
14	2.44	1.41	1.65	1.52	---	---	1.86	2.51	2.47	2.53	---	2.11
15	2.43	1.39	1.65	1.51	---	---	1.86	2.50	2.44	2.50	---	2.15
16	2.42	1.37	1.65	1.52	---	---	1.97	2.48	2.41	2.45	---	2.16
17	2.41	1.35	1.64	1.52	---	1.75	2.03	2.47	2.37	2.42	---	2.17
18	2.42	1.33	1.64	1.54	---	1.79	2.08	2.45	2.34	2.38	---	2.18
19	2.44	1.33	1.65	1.55	---	1.84	2.12	2.43	2.31	2.34	---	2.16
20	2.46	1.32	1.67	1.57	1.75	1.93	2.17	2.41	2.28	2.34	---	2.14
21	2.44	1.33	1.70	1.58	1.77	2.03	2.19	2.40	2.26	2.35	---	2.15
22	2.37	1.32	1.70	1.58	1.77	2.12	2.19	2.38	2.23	2.34	2.12	2.19
23	2.27	1.32	1.71	1.58	---	2.17	2.16	2.36	2.21	2.32	2.10	2.24
24	2.18	1.31	1.70	1.58	---	2.22	2.14	2.36	2.20	2.28	2.10	2.26
25	2.10	1.32	1.69	1.60	---	2.22	2.16	2.36	2.19	2.25	2.11	2.28
26	2.03	1.35	1.68	1.62	---	2.18	2.17	2.35	2.17	2.29	2.15	2.29
27	1.97	1.40	1.67	1.62	---	2.14	2.19	2.33	2.14	2.31	2.16	2.31
28	1.91	1.45	1.67	1.62	---	2.13	2.21	2.32	2.16	2.28	2.15	2.35
29	1.86	1.51	1.65	1.62	---	2.14	2.23	2.31	2.18	2.26	2.16	2.35
30	1.80	1.57	1.65	1.63	---	2.10	2.25	2.32	2.18	2.25	2.14	2.40
31	1.75	---	1.65	1.68	---	2.06	---	2.36	---	2.24	2.13	---
MEAN	2.29	1.45	1.68	1.58	---	---	2.04	2.39	2.31	2.32	---	2.18
MAX	2.48	1.71	1.72	1.68	---	---	2.25	2.53	2.55	2.58	---	2.40
MIN	1.75	1.31	1.62	1.51	---	---	1.82	2.27	2.14	2.15	---	2.09

STREAMS TRIBUTARY TO LAKE HURON

453345084401501 DOUGLAS LAKE NEAR PELLSTON, MI

LOCATION.--Lat 45°33'45", long 84°40'15", in NW1/4 NE1/4 sec.33, T.37 N., R.3 W., Cheboygan County, Hydrologic Unit 04070004, in boat well in Laboratory building at University of Michigan Biological Station.

DRAINAGE AREA.--26.5 mi^2 at outlet.

PERIOD OF RECORD.--June 1942 to December 1959, October 1994 to current year.

GAGE.--Nonrecording gage. Datum of gage is 710.00 ft above sea level (Doyle Civil Engineers bench mark). June 1942 to December 1959 at same site at datum 2.34 ft higher.

REMARKS.--Staff gage read by observer. Beavertail Creek flows into the lake from the northeast and Lancaster Creek flows into the lake from the northwest. East Branch Maple River flows from the southwest side of lake into Maple River, then into Burt Lake.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 4.68 ft, May 7, 1959, from floodmark, present datum; minimum observed, 0.78 ft, Oct. 15, 1955, present datum.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 4.40 ft, Apr. 24; minimum observed, 2.92 ft, Sept. 23.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	4.28	---	---	3.50	---
2	---	---	---	---	---	---	3.60	---	3.86	---	---	3.14
3	3.25	---	3.38	---	3.28	3.10	---	---	---	3.34	---	---
4	---	---	---	---	---	---	---	---	---	---	3.52	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	3.44	---	---	---	---	3.74	---	---	3.34	---	---
8	---	---	---	---	---	---	---	---	---	---	---	3.02
9	---	---	3.36	3.28	---	---	---	4.14	---	---	---	---
10	3.40	---	---	---	3.30	3.10	---	---	3.70	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	2.98
12	---	3.44	---	---	---	---	---	---	---	---	---	---
13	---	---	---	3.26	---	---	---	---	3.76	---	3.40	---
14	---	---	---	---	---	---	---	4.16	---	3.52	---	---
15	3.42	---	---	---	---	---	3.88	---	---	---	---	---
16	---	---	3.34	---	---	---	---	---	3.72	---	---	---
17	3.40	---	---	3.26	3.21	3.08	4.04	---	---	---	---	2.96
18	---	---	---	---	---	---	---	---	---	---	3.32	---
19	---	3.42	---	---	---	---	---	4.08	---	---	---	---
20	---	---	---	3.24	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	4.34	---	3.60	---	---	---
22	---	---	---	---	---	---	---	4.02	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	2.92
24	3.46	---	---	---	3.16	3.16	4.40	---	---	---	---	---
25	---	---	---	---	---	---	---	---	3.50	---	3.20	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	3.24	---	---	---	3.94	---	---	---	---
28	---	3.38	---	---	---	3.34	---	---	---	---	---	---
29	3.46	---	---	---	---	---	---	---	---	3.45	---	---
30	---	---	---	---	---	---	---	---	3.39	---	---	2.98
31	---	---	---	---	---	---	---	---	---	---	---	---

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 mi^2.

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 fair. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	160	184	187	181	e170	162	199	190	189	143	211	148
2	159	187	e185	168	e170	e160	201	183	172	139	188	147
3	159	185	e170	e165	e170	e160	195	176	168	157	206	149
4	169	186	e185	166	e170	e155	196	172	163	156	271	151
5	199	188	190	168	e170	e155	186	183	163	149	217	148
6	184	193	184	166	e170	e155	e195	232	161	139	178	143
7	230	189	185	173	e170	e155	195	210	164	136	163	142
8	210	189	182	172	e170	e155	187	192	181	133	188	142
9	193	187	174	178	e170	e155	193	182	211	131	168	139
10	181	232	182	176	e170	e155	221	178	242	214	163	136
11	179	234	180	174	e170	e150	269	279	365	427	158	135
12	177	204	179	e170	e170	154	294	287	235	380	158	137
13	196	198	184	e170	e170	151	261	237	191	232	154	137
14	187	194	188	e170	e170	153	265	207	182	197	150	136
15	181	186	188	e170	e170	161	304	190	173	180	147	148
16	178	178	181	e170	e170	198	371	185	167	176	145	146
17	176	178	196	e170	e170	258	310	187	165	165	142	140
18	184	178	182	e170	e170	271	337	185	161	159	143	135
19	202	186	207	e170	e170	255	297	175	154	153	143	134
20	197	193	220	e170	e170	295	318	175	157	157	145	135
21	191	193	201	e170	e170	337	283	174	152	172	146	134
22	199	191	191	e170	e165	344	254	170	147	164	145	151
23	196	187	189	e170	e165	272	222	166	144	156	140	205
24	186	186	185	e170	e165	274	209	193	141	150	142	174
25	183	188	185	e170	e160	291	197	216	138	143	148	166
26	186	183	183	e170	e160	257	195	196	138	160	e220	156
27	191	177	181	e160	e160	228	192	186	142	160	e160	175
28	186	181	182	e155	e160	240	191	172	140	147	e160	179
29	181	185	180	e140	---	250	185	173	162	148	e180	170
30	182	196	180	e160	---	213	183	177	148	141	e170	181
31	182	---	e180	e170	---	200	---	212	---	143	157	---
TOTAL	5764	5716	5766	5222	4705	6519	7105	6040	5216	5407	5206	4519
MEAN	186	191	186	168	168	210	237	195	174	174	168	151
MAX	230	234	220	181	170	344	371	287	365	427	271	205
MIN	159	177	170	140	160	150	183	166	138	131	140	134
CFSM	0.97	0.99	0.97	0.88	0.88	1.10	1.23	1.01	0.91	0.91	0.87	0.78
IN.	1.12	1.11	1.12	1.01	0.91	1.26	1.38	1.17	1.01	1.05	1.01	0.88

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2003, BY WATER YEAR (WY)

MEAN	212	223	211	200	198	243	306	237	208	184	181	200
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1942 - 2003	
ANNUAL TOTAL	73545		67185			
ANNUAL MEAN	201		184		217	
HIGHEST ANNUAL MEAN					268	1972
LOWEST ANNUAL MEAN					167	1958
HIGHEST DAILY MEAN	525	May 31	427	Jul 11	1080	Sep 29 1972
LOWEST DAILY MEAN	151	Jul 17	131	Jul 9	113	Aug 6 1958
ANNUAL SEVEN-DAY MINIMUM	152	Sep 8	137	Sep 8	118	Aug 3 1958
MAXIMUM PEAK FLOW			(a)487	Jul 11	(b)1290	Sep 29 1972
MAXIMUM PEAK STAGE			(c)6.99	Feb 14	(d)6.99	Feb 14 2003
INSTANTANEOUS LOW FLOW			131	(f)	(g)93	Mar 18 1993
ANNUAL RUNOFF (CFSM)	1.05		0.96		1.13	
ANNUAL RUNOFF (INCHES)	14.25		13.02		15.33	
10 PERCENT EXCEEDS	257		232		290	
50 PERCENT EXCEEDS	186		176		200	
90 PERCENT EXCEEDS	160		145		158	

(a) Gage height 4.02 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) Part of each day July 7-9, Sept. 21.
(g) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	56	67	e60	e57	e50	e56	72	71	69	49	72	48
2	48	57	59	55	e49	e56	79	76	64	43	48	47
3	55	69	58	e50	e49	23	68	68	62	48	57	47
4	59	67	e60	e50	e48	e54	73	63	53	49	71	45
5	79	67	61	e50	e48	e54	66	70	60	41	115	47
6	62	66	61	e50	e48	e54	92	106	50	47	60	49
7	81	74	60	e50	e47	e52	71	86	56	40	53	46
8	67	63	e58	e52	46	e52	70	70	63	40	69	44
9	62	70	e57	e50	e46	e52	64	67	81	40	65	41
10	55	105	e58	e50	e47	e52	89	68	82	93	40	43
11	61	100	e58	e50	49	e52	115	143	206	153	49	46
12	60	77	e57	e50	e48	51	149	121	87	142	49	45
13	67	70	e58	e50	e42	56	116	106	65	67	48	45
14	64	69	e58	e50	e47	57	120	77	61	59	47	49
15	63	74	e58	e50	e48	55	189	68	57	55	54	52
16	56	56	e55	e50	e48	77	167	68	51	56	47	39
17	63	62	53	e50	e48	100	127	67	54	52	44	26
18	61	60	61	e50	e48	117	113	64	48	51	43	53
19	73	64	78	e50	e48	105	121	63	49	44	41	49
20	72	73	73	e50	e54	121	125	58	47	48	43	48
21	69	67	e66	e52	e56	144	128	66	47	89	43	46
22	72	67	e62	e52	e56	140	94	56	46	62	42	43
23	69	68	61	e52	56	116	91	59	49	52	40	70
24	66	65	e60	e52	e55	110	83	97	41	42	42	80
25	66	65	e59	51	e55	116	72	102	43	52	43	53
26	58	63	e58	51	e55	90	69	71	43	46	67	56
27	67	e60	57	e50	e56	82	71	67	42	56	51	59
28	67	60	61	51	e56	97	80	65	46	45	51	64
29	56	61	e58	e50	---	91	71	60	56	51	57	60
30	63	e60	61	e50	---	81	69	64	46	42	56	60
31	67	---	e58	e50	---	75	---	79	---	43	51	---
TOTAL	1984	2046	1862	1575	1403	2438	2914	2366	1824	1797	1658	1500
MEAN	64.0	68.2	60.1	50.8	50.1	78.6	97.1	76.3	60.8	58.0	53.5	50.0
MAX	81	105	78	57	56	144	189	143	206	153	115	80
MIN	48	56	53	50	42	23	64	56	41	40	40	26
CFSM	1.11	1.18	1.04	0.88	0.87	1.36	1.68	1.32	1.05	1.00	0.93	0.87
IN.	1.28	1.32	1.20	1.02	0.90	1.57	1.88	1.53	1.18	1.16	1.07	0.97

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 2003, BY WATER YEAR (WY)

MEAN	77.8	81.6	75.7	70.4	70.4	88.0	118	86.3	70.6	64.6	63.9	72.1
MAX	112	112	105	94.9	90.1	136	164	142	94.5	106	116	120
(WY)	1987	1989	1972	1973	1984	1976	1960	1983	1993	1994	1995	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
(WY)	1964	2000	2003	2003	2003	2001	2000	1958	1958	2000	1958	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1951 - 2003	
ANNUAL TOTAL	25873		23367			
ANNUAL MEAN	70.9		64.0		78.3	
HIGHEST ANNUAL MEAN					90.7	1985
LOWEST ANNUAL MEAN					62.3	1958
HIGHEST DAILY MEAN	271	Aug 22	206	Jun 11	829	Aug 18 1995
LOWEST DAILY MEAN	40	Jul 3	23	Mar 3	23	Mar 3 2003
ANNUAL SEVEN-DAY MINIMUM	43	Jul 12	42	Aug 18	38	Aug 2 1958
MAXIMUM PEAK FLOW			342	Apr 15	(a)1500	May 15 1957
MAXIMUM PEAK STAGE			3.76	Apr 15	6.49	Aug 18 1995
INSTANTANEOUS LOW FLOW			6.6	Sep 16	6.6	Sep 16 2003
ANNUAL RUNOFF (CFSM)	1.23		1.11		1.36	
ANNUAL RUNOFF (INCHES)	16.68		15.07		18.43	
10 PERCENT EXCEEDS	100		91		109	
50 PERCENT EXCEEDS	61		58		70	
90 PERCENT EXCEEDS	49		46		54	

(a) From rating curve extended above 500 ft^3/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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	217	264	e340	e300	e250	e220	327	432	317	239	222	268
2	209	273	e330	e278	e250	e220	285	482	356	220	219	234
3	208	286	e300	e280	e250	e225	280	521	308	205	220	228
4	222	278	e310	e275	e250	e220	e270	476	321	214	229	218
5	255	316	e330	e270	e250	e220	e265	444	261	240	356	211
6	291	341	e330	e280	e250	e220	e265	454	239	271	434	203
7	260	360	e325	e280	e250	e215	e270	492	243	250	402	196
8	224	448	e320	e290	e250	e215	e270	446	267	240	352	199
9	202	500	e310	e290	e250	e215	e275	400	367	225	245	202
10	204	551	e315	e295	e250	e215	286	372	525	234	233	186
11	205	555	e320	e295	e250	e215	417	387	603	282	220	197
12	207	568	e320	e285	e250	e215	660	414	680	435	234	208
13	212	560	e325	e285	e250	e215	744	552	658	492	243	209
14	228	531	e330	e285	e245	e220	795	557	574	394	248	210
15	240	416	e330	e285	e245	e245	741	490	452	414	238	208
16	248	430	e320	e285	e245	e300	750	401	340	379	259	203
17	249	407	e335	e285	e245	e350	763	330	245	273	240	207
18	249	372	e330	e285	e245	e400	734	312	275	243	231	212
19	243	377	e355	e285	e245	e400	679	334	286	233	217	206
20	249	377	e370	e285	e250	e450	699	307	270	223	203	225
21	272	390	e350	e285	e245	e500	714	267	246	236	204	234
22	261	393	e335	e280	e240	e500	730	250	233	306	199	251
23	254	419	e330	e280	e235	e430	680	241	243	e375	198	241
24	279	401	e320	e285	e235	e400	626	294	243	e350	199	261
25	275	381	e315	e285	e235	e425	574	535	223	e325	205	273
26	266	363	e315	e280	e230	388	511	632	196	e290	250	264
27	257	e350	e315	e240	e220	320	460	600	207	202	279	258
28	248	e355	e315	e250	e220	306	325	494	203	214	308	239
29	237	e365	e310	e255	---	313	365	389	217	220	311	238
30	252	e350	e310	e255	---	338	402	332	243	223	310	237
31	264	---	e310	e250	---	341	---	322	---	221	315	---
TOTAL	7487	11977	10070	8643	6830	9456	15162	12959	9841	8668	8023	6726
MEAN	242	399	325	279	244	305	505	418	328	280	259	224
MAX	291	568	370	300	250	500	795	632	680	492	434	273
MIN	202	264	300	240	220	215	265	241	196	202	198	186
CFSM	0.41	0.68	0.55	0.48	0.42	0.52	0.86	0.71	0.56	0.48	0.44	0.38
IN.	0.48	0.76	0.64	0.55	0.43	0.60	0.96	0.82	0.62	0.55	0.51	0.43

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2003, BY WATER YEAR (WY)

MEAN	362	408	433	413	396	617	864	535	442	379	341	334
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	200
(WY)	2003	1950	1949	1959	1950	2003	1945	1977	1964	1966	1966	1966

SUMMARY STATISTICS	FOR 2003 WATER YEAR		WATER YEARS 1945 - 2003	
ANNUAL TOTAL	115842			
ANNUAL MEAN	317		462	
HIGHEST ANNUAL MEAN			650	1974
LOWEST ANNUAL MEAN			315	1964
HIGHEST DAILY MEAN	795	Apr 14	4190	Mar 26 1976
LOWEST DAILY MEAN	186	Sep 10	140	Nov 27 1949
ANNUAL SEVEN-DAY MINIMUM	199	Sep 6	156	Jun 26 1964
MAXIMUM PEAK FLOW	814	Apr 14	(a)4290	Mar 26 1976
MAXIMUM PEAK STAGE	12.63	Apr 14	(b)12.63	Apr 14 2003
INSTANTANEOUS LOW FLOW	169	Jun 26	92	(c)
ANNUAL RUNOFF (CFSM)	0.54		0.79	
ANNUAL RUNOFF (INCHES)	7.35		10.72	
10 PERCENT EXCEEDS	492		700	
50 PERCENT EXCEEDS	279		380	
90 PERCENT EXCEEDS	215		251	

(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) 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 mi^2 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 observed, 7.26 ft, Apr. 1, 1949, May 24, 2000; minimum observed, 4.64 ft, Jan. 21, 1954.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 6.99 ft, May 11; minimum, 5.74 ft, Oct. 3.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.79	6.04	6.10	5.90	5.92	5.96	6.29	6.75	6.85	6.59	6.67	6.43
2	5.78	6.04	6.10	5.90	5.92	5.96	6.28	6.74	---	6.59	6.67	6.42
3	5.76	6.02	6.09	5.89	5.92	5.96	6.27	6.74	---	6.59	6.66	6.43
4	5.84	6.03	6.08	5.88	5.95	5.96	6.36	6.73	---	6.57	6.68	6.41
5	5.89	6.03	6.07	5.88	5.95	5.98	6.43	6.72	---	6.56	6.70	6.38
6	5.88	6.06	6.06	5.88	5.95	5.98	6.43	6.81	6.75	6.54	6.69	6.38
7	5.91	6.06	---	5.87	5.96	5.98	6.42	6.80	6.73	6.56	6.68	6.35
8	5.87	6.09	---	5.86	5.96	5.99	6.43	6.80	6.72	6.55	6.66	6.33
9	5.87	6.08	---	5.86	5.97	6.00	6.43	6.77	6.75	6.51	6.66	6.32
10	5.87	6.15	---	5.86	5.97	6.00	6.43	6.80	6.73	6.60	6.65	6.30
11	5.87	6.17	---	5.85	5.97	6.00	6.44	6.86	6.75	6.77	6.62	6.28
12	5.89	6.17	---	5.85	5.98	5.99	6.45	6.90	6.71	6.75	6.61	6.25
13	5.94	6.18	5.98	5.84	5.97	5.99	6.46	6.87	6.73	6.73	6.61	6.24
14	5.90	6.18	5.97	5.84	5.97	5.99	6.52	6.85	6.72	6.74	6.60	6.23
15	5.90	6.17	5.96	5.84	5.97	5.99	6.54	6.84	6.69	6.75	6.59	6.25
16	5.89	6.16	5.96	5.85	5.97	6.00	6.53	6.85	6.68	6.74	6.57	6.23
17	5.90	6.18	5.95	5.85	5.97	6.02	6.59	6.86	6.68	6.72	6.55	6.19
18	5.90	6.18	5.94	5.85	5.97	6.04	6.69	6.85	6.67	6.71	6.54	6.16
19	5.95	6.20	5.96	5.86	5.97	6.05	6.72	6.86	6.64	6.70	6.52	6.17
20	5.95	6.20	5.98	5.86	5.97	6.08	6.79	6.89	6.63	6.70	6.50	6.13
21	5.93	6.20	5.99	5.86	5.96	6.11	6.82	6.84	6.63	6.70	6.55	6.08
22	5.95	6.20	5.97	5.87	5.96	6.13	6.83	6.82	6.61	6.71	6.55	6.12
23	5.96	6.20	5.97	5.87	5.97	6.15	6.82	6.83	6.59	6.71	6.52	6.16
24	5.96	6.19	5.95	5.87	5.96	6.16	6.81	6.90	6.57	6.70	6.51	6.12
25	5.96	6.19	5.95	5.87	5.97	6.18	6.78	6.94	6.56	6.70	6.50	6.11
26	5.99	6.16	5.94	5.88	5.96	6.19	6.78	6.93	6.57	6.71	6.51	6.06
27	6.00	6.14	5.93	5.89	5.96	6.20	6.78	6.93	6.57	6.69	6.48	6.11
28	5.99	6.13	5.92	5.89	5.96	---	6.76	6.93	6.55	6.66	6.46	6.08
29	5.98	6.12	5.91	5.90	---	---	6.72	6.93	6.62	6.65	6.48	6.07
30	6.00	6.11	5.91	5.89	---	---	6.70	6.89	6.60	6.63	6.45	6.08
31	6.02	---	5.91	5.90	---	---	---	6.87	---	6.64	6.44	---
MEAN	5.91	6.13	---	5.87	5.96	---	6.58	6.84	---	6.66	6.58	6.23
MAX	6.02	6.20	---	5.90	5.98	---	6.83	6.94	---	6.77	6.70	6.43
MIN	5.76	6.02	---	5.84	5.92	---	6.27	6.72	---	6.51	6.44	6.06

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	96	110	135	128	e105	e105	144	220	188	117	96	116
2	96	110	133	129	e105	e105	143	224	194	115	99	109
3	98	111	e130	125	e105	e100	142	218	198	107	104	106
4	106	110	e130	129	e105	e100	135	206	196	102	121	104
5	116	112	e130	128	e105	e100	126	195	196	100	126	101
6	120	111	134	128	e105	94	151	205	191	97	118	99
7	116	112	134	128	e105	100	144	213	187	96	113	97
8	114	114	134	125	e105	105	146	213	184	96	112	96
9	107	113	e130	127	e105	e105	144	202	187	95	111	96
10	104	127	e130	125	e105	e105	159	192	192	111	109	98
11	104	139	129	123	104	e105	169	206	215	148	106	98
12	104	135	130	125	e105	e105	186	232	213	160	104	98
13	109	125	132	123	e105	e105	196	236	207	159	103	98
14	111	118	133	123	e105	e105	198	234	196	142	101	98
15	115	116	135	120	e105	109	209	220	186	133	99	103
16	105	115	133	123	e105	118	251	207	173	130	97	105
17	104	113	e133	121	e105	142	266	194	157	121	97	106
18	106	112	133	124	e105	172	280	187	142	116	96	106
19	111	113	137	112	e105	162	282	184	132	112	95	107
20	114	116	149	113	e105	176	289	176	125	109	94	108
21	113	118	145	113	e105	170	294	168	120	113	e94	115
22	116	121	140	114	e105	171	297	162	116	115	e110	124
23	116	132	136	115	e105	157	295	160	112	116	110	128
24	119	132	129	110	e105	148	284	189	114	112	106	127
25	113	134	132	104	e105	146	266	211	114	107	100	126
26	111	134	136	104	e105	147	247	217	107	104	100	123
27	115	127	126	104	e105	142	234	208	105	105	98	132
28	116	127	132	104	e105	146	226	188	108	105	96	132
29	110	138	134	104	---	163	218	176	115	102	122	128
30	109	142	134	106	---	163	210	173	118	99	126	129
31	110	---	135	e104	---	151	---	184	---	97	125	---
TOTAL	3404	3637	4143	3661	2939	4022	6331	6200	4788	3541	3288	3313
MEAN	110	121	134	118	105	130	211	200	160	114	106	110
MAX	120	142	149	129	105	176	297	236	215	160	126	132
MIN	96	110	126	104	104	94	126	160	105	95	94	96
CFSM	0.27	0.30	0.33	0.29	0.26	0.32	0.53	0.50	0.40	0.28	0.26	0.28
IN.	0.32	0.34	0.38	0.34	0.27	0.37	0.59	0.58	0.44	0.33	0.31	0.31

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 2003, BY WATER YEAR (WY)

MEAN	205	230	227	192	183	253	385	279	206	161	145	166
MAX	456	444	373	275	251	508	596	398	307	251	255	379
(WY)	1987	1992	1992	1973	1984	1976	1985	1983	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1967 - 2003	
ANNUAL TOTAL	62966		49267			
ANNUAL MEAN	173		135		219	
HIGHEST ANNUAL MEAN					280	1992
LOWEST ANNUAL MEAN					135	2003
HIGHEST DAILY MEAN	432	Apr 12	297	Apr 22	1110	Mar 29 1976
LOWEST DAILY MEAN	87	Sep 14	94	Mar 6	87	Sep 14 2002
ANNUAL SEVEN-DAY MINIMUM	88	Sep 12	96	Aug 15	88	Sep 12 2002
MAXIMUM PEAK FLOW			299	Apr 22	(a)1120	Mar 28 1976
MAXIMUM PEAK STAGE			5.11	Apr 22	(b)7.75	Jan 28 1986
INSTANTANEOUS LOW FLOW					(c)78	Feb 12 1981
ANNUAL RUNOFF (CFSM)	0.43		0.34		0.55	
ANNUAL RUNOFF (INCHES)	5.84		4.57		7.43	
10 PERCENT EXCEEDS	305		200		345	
50 PERCENT EXCEEDS	141		118		194	
90 PERCENT EXCEEDS	98		100		128	

(a) Gage height 7.30 ft.
(b) Backwater from ice.
(c) 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, 2.15 ft, Apr. 23-30; minimum, 0.99 ft, Sept. 29,30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.69	1.63	1.66	1.69	1.74	1.81	1.95	2.14	2.01	1.71	1.47	1.21
2	1.69	1.63	1.66	1.69	1.75	1.81	1.96	2.14	2.00	1.68	1.48	1.20
3	1.68	1.63	1.66	1.69	1.75	1.81	1.96	2.13	1.99	1.66	1.48	1.19
4	1.68	1.62	1.66	1.69	1.76	1.82	1.98	2.13	1.99	1.64	1.48	1.18
5	1.69	1.62	1.66	1.69	1.77	1.83	2.01	2.12	1.98	1.63	1.48	1.17
6	1.69	1.62	1.66	1.69	1.77	1.84	2.02	2.11	1.97	1.61	1.48	1.16
7	1.69	1.62	1.66	1.69	1.78	1.84	2.03	2.11	1.95	1.59	1.48	1.15
8	1.69	1.62	1.66	1.68	1.78	1.84	2.03	2.11	1.95	1.58	1.47	1.14
9	1.68	1.62	1.66	1.68	1.78	1.84	2.04	2.10	1.94	1.57	1.47	1.13
10	1.68	1.63	1.66	1.68	1.79	1.84	2.04	2.10	1.93	1.56	1.46	1.12
11	1.68	1.67	1.66	1.68	1.79	1.84	2.05	2.09	1.93	1.60	1.46	1.11
12	1.67	1.69	1.66	1.68	1.79	1.85	2.05	2.09	1.94	1.64	1.45	1.10
13	1.67	1.69	1.66	1.69	1.80	1.85	2.06	2.09	1.94	1.65	1.43	1.08
14	1.67	1.69	1.66	1.69	1.81	1.85	2.06	2.09	1.94	1.65	1.43	1.07
15	1.66	1.70	1.66	1.69	1.81	1.85	2.07	2.09	1.94	1.65	1.42	1.07
16	1.65	1.69	1.66	1.70	1.81	1.85	2.08	2.09	1.94	1.65	1.41	1.07
17	1.65	1.69	1.66	1.70	1.81	1.85	2.09	2.09	1.93	1.63	1.40	1.06
18	1.64	1.69	1.65	1.70	1.81	1.85	2.10	2.09	1.93	1.62	1.39	1.05
19	1.64	1.68	1.66	1.70	1.81	1.87	2.11	2.08	1.92	1.60	1.38	1.04
20	1.63	1.68	1.66	1.70	1.81	1.88	2.11	2.07	1.91	1.58	1.36	1.03
21	1.63	1.68	1.67	1.71	1.81	1.91	2.13	2.07	1.89	1.57	1.29	1.03
22	1.64	1.68	1.67	1.71	1.81	1.92	2.14	2.06	1.88	1.57	1.27	1.02
23	1.64	1.68	1.67	1.72	1.81	1.93	2.15	2.05	1.84	1.57	1.25	1.02
24	1.64	1.68	1.67	1.73	1.81	1.93	2.15	2.05	1.81	1.56	1.22	1.01
25	1.64	1.67	1.68	1.73	1.81	1.94	2.15	2.05	1.79	1.54	1.20	1.01
26	1.63	1.67	1.69	1.73	1.81	1.94	2.15	2.04	1.77	1.52	1.21	1.01
27	1.63	1.67	1.69	1.73	1.81	1.95	2.15	2.03	1.75	1.51	1.22	1.01
28	1.63	1.67	1.69	1.73	1.81	1.95	2.15	2.03	1.74	1.51	1.21	1.00
29	1.63	1.66	1.69	1.74	---	1.95	2.15	2.02	1.73	1.50	1.22	1.00
30	1.63	1.66	1.69	1.74	---	1.95	2.15	2.01	1.72	1.49	1.22	0.99
31	1.63	---	1.69	1.74	---	1.95	---	2.01	---	1.47	1.21	---
MEAN	1.66	1.66	1.67	1.70	1.79	1.88	2.08	2.08	1.90	1.59	1.37	1.08
MAX	1.69	1.70	1.69	1.74	1.81	1.95	2.15	2.14	2.01	1.71	1.48	1.21
MIN	1.63	1.62	1.65	1.68	1.74	1.81	1.95	2.01	1.72	1.47	1.20	0.99

CAL YR 2002 MEAN 1.96 MAX 2.48 MIN 1.62
WTR YR 2003 MEAN 1.70 MAX 2.15 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 mi^2.

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 good except for estimated daily discharges, which are fair. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	520	568	585	580	e550	e550	656	776	685	522	524	552
2	512	568	e520	546	e550	e550	654	790	667	511	539	525
3	515	567	e410	561	e580	e400	647	759	657	498	562	514
4	542	567	e570	553	e600	e530	641	720	646	504	564	513
5	616	574	e600	554	e540	e550	617	708	659	512	605	503
6	595	581	e600	561	e530	e500	635	753	645	496	575	494
7	599	581	e570	562	e500	e530	669	764	634	495	548	486
8	577	579	576	571	e500	e530	644	746	636	484	610	480
9	571	576	e570	567	e600	e420	641	721	672	483	610	477
10	551	635	e570	562	e520	e500	671	706	697	579	557	475
11	545	670	573	538	e450	e520	743	780	838	889	531	471
12	547	655	569	e530	e520	e580	801	889	800	849	518	469
13	580	620	571	e530	e500	e530	808	861	733	756	508	467
14	571	600	573	e530	e500	e530	803	804	690	695	498	468
15	573	586	577	e529	e550	e550	852	758	653	648	489	483
16	560	574	571	e530	e500	579	1030	723	617	648	489	489
17	547	570	570	e500	e530	641	1060	712	602	608	480	486
18	553	566	e580	e450	e560	745	1040	691	579	570	475	478
19	580	571	599	e530	e560	764	1030	673	561	544	471	477
20	579	582	626	e500	e540	773	1070	661	545	558	466	477
21	574	592	617	e500	e580	807	1050	644	533	582	475	477
22	591	591	598	e500	e600	817	1010	635	522	599	487	508
23	598	594	588	e500	e540	771	e954	627	513	569	477	593
24	589	595	574	e530	e500	737	903	779	504	539	474	573
25	580	591	572	e560	e480	726	851	827	510	515	470	557
26	602	586	577	e540	e480	714	808	793	503	513	498	539
27	598	563	560	e450	e550	683	776	743	501	523	551	575
28	582	574	570	e500	e550	690	754	695	513	509	518	576
29	568	590	576	e580	---	731	735	663	548	497	626	559
30	562	599	576	e500	---	710	723	645	536	488	649	559
31	562	---	583	e550	---	671	---	689	---	480	598	---
TOTAL	17639	17665	17771	16494	14960	19329	24276	22735	18399	17663	16442	15300
MEAN	569	589	573	532	534	624	809	733	613	570	530	510
MAX	616	670	626	580	600	817	1070	889	838	889	649	593
MIN	512	563	410	450	450	400	617	627	501	480	466	467
CFSM	0.51	0.53	0.52	0.48	0.48	0.56	0.73	0.66	0.55	0.51	0.48	0.46
IN.	0.59	0.59	0.60	0.55	0.50	0.65	0.82	0.76	0.62	0.59	0.55	0.51

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 2003, BY WATER YEAR (WY)

MEAN	749	807	804	729	724	864	1250	1048	856	694	668	677
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1909 - 2003	
ANNUAL TOTAL	256321		218673			
ANNUAL MEAN	702		599		822	
HIGHEST ANNUAL MEAN					1207	1912
LOWEST ANNUAL MEAN					599	2003
HIGHEST DAILY MEAN	1420	Apr 12	1070	Apr 20	3220	Apr 1 1998
LOWEST DAILY MEAN	410	Dec 3	400	Mar 3	400	Mar 3 2003
ANNUAL SEVEN-DAY MINIMUM	493	Sep 12	472	Sep 8	472	Sep 8 2003
MAXIMUM PEAK FLOW			(a)1110	Apr 16	(b)3300	Apr 1 1998
MAXIMUM PEAK STAGE			(c)4.44	Jan 18	(d)6.85	Jan 26 1996
INSTANTANEOUS LOW FLOW			(f)400	Mar 3	(f)400	Mar 3 2003
ANNUAL RUNOFF (CFSM)	0.63		0.54		0.74	
ANNUAL RUNOFF (INCHES)	8.61		7.34		10.08	
10 PERCENT EXCEEDS	998		758		1200	
50 PERCENT EXCEEDS	620		571		728	
90 PERCENT EXCEEDS	520		489		556	

(a) Gage height 3.58 ft.
(b) Gage height 6.66 ft; does not include water years 1909-16, 1931.
(c) Backwater from ice.
(d) Backwater from ice; does not include water years 1909-16, 1931.
(e) Estimated.
(f) Result of freezeup.

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 except the following period: Dec. 13 to Jan. 9 rated good. Dissolved oxygen records rated excellent except the following periods: Oct. 18-27, Nov. 22-25, Jan. 23-25, Feb. 2, 3, 10-12, 22-24, May 6-15, May 29 to June 4, July 15-18, Sept. 7-13 rated good; Oct. 28-30, Feb. 4-9, 25-28, June 5-11, July 19-23, Sept. 14-16 rated fair; and Mar. 1-13, July 24-29 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, 23.0°C, June 25; minimum, -0.5°C, on several days during winter period.
DISSOLVED OXYGEN: Maximum, 14.4 mg/L, Nov. 27, Dec. 2, 3; minimum, 7.0 mg/L, June 26, July 8.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	17.0	15.0	16.0	5.0	4.0	4.5	1.5	0.0	0.5	2.0	0.0	1.0
2	17.0	14.5	15.5	4.0	4.0	4.0	0.0	0.0	0.0	0.0	-0.5	0.0
3	14.5	12.5	13.0	4.5	3.5	4.0	0.0	0.0	0.0	0.5	0.0	0.0
4	13.5	12.0	12.5	4.5	4.5	4.5	0.0	0.0	0.0	0.5	0.0	0.0
5	13.0	11.5	12.5	4.5	3.5	4.0	0.0	0.0	0.0	0.5	0.0	0.5
6	11.5	10.0	10.5	4.5	3.5	4.0	0.0	0.0	0.0	0.5	-0.5	0.5
7	10.0	9.0	10.0	4.0	2.5	3.0	0.5	0.0	0.0	0.0	-0.5	0.0
8	9.0	8.0	8.5	5.5	2.5	4.0	0.5	-0.5	0.0	2.0	0.0	1.0
9	10.0	8.5	9.5	7.0	5.5	6.0	0.0	0.0	0.0	3.0	2.0	2.5
10	9.5	8.5	9.0	9.0	7.0	8.5	0.0	0.0	0.0	2.0	0.0	0.5
11	11.0	8.5	10.0	9.0	7.0	8.0	0.5	0.0	0.0	0.0	0.0	0.0
12	12.0	10.5	11.5	7.0	5.0	6.0	1.0	0.0	0.5	0.0	0.0	0.0
13	12.0	9.0	10.5	5.0	4.5	5.0	2.5	1.0	2.0	0.0	0.0	0.0
14	9.0	7.0	8.0	5.0	4.5	5.0	3.0	2.5	3.0	0.0	0.0	0.0
15	8.0	6.5	7.5	4.5	2.0	3.5	2.5	2.0	2.5	0.0	0.0	0.0
16	7.5	6.5	7.0	2.0	0.5	1.0	2.0	-0.5	0.5	0.0	0.0	0.0
17	6.5	5.5	6.0	2.0	1.0	1.0	0.0	-0.5	-0.5	0.0	0.0	0.0
18	6.0	5.5	6.0	2.0	1.0	1.5	1.5	-0.5	0.5	0.0	0.0	0.0
19	7.0	6.0	6.5	4.0	2.0	3.0	4.5	1.5	3.5	0.0	0.0	0.0
20	6.5	5.5	6.0	4.0	3.0	3.5	4.5	3.0	3.5	0.0	0.0	0.0
21	5.5	5.0	5.5	4.5	4.0	4.5	3.0	1.5	2.0	0.0	0.0	0.0
22	5.5	5.0	5.5	4.5	3.5	4.0	1.5	1.0	1.0	0.0	0.0	0.0
23	5.5	4.5	5.0	3.5	3.0	3.0	1.0	0.0	0.5	0.0	0.0	0.0
24	6.0	5.0	5.5	3.5	3.0	3.5	0.5	0.0	0.5	0.0	0.0	0.0
25	5.5	5.0	5.0	3.0	2.5	3.0	1.0	0.5	1.0	0.0	0.0	0.0
26	6.0	5.0	5.5	2.5	1.0	2.0	1.5	1.0	1.0	0.0	0.0	0.0
27	6.0	6.0	6.0	1.0	0.0	0.5	1.0	0.0	0.5	0.0	0.0	0.0
28	6.0	5.5	5.5	1.5	0.5	1.0	2.0	0.0	1.0	0.0	0.0	0.0
29	5.5	4.0	4.5	3.0	1.5	2.0	2.0	1.5	2.0	0.0	0.0	0.0
30	5.5	4.0	4.5	3.0	1.5	2.5	3.0	2.0	2.0	0.0	0.0	0.0
31	5.5	5.0	5.0	---	---	---	3.0	2.0	3.0	0.0	0.0	0.0
MONTH	17.0	4.0	8.2	9.0	0.0	3.7	4.5	-0.5	1.0	3.0	-0.5	0.2

STREAMS TRIBUTARY TO LAKE HURON

04136000 AU SABLE RIVER NEAR RED OAK, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

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	7.0	5.0	6.0	11.5	9.5	10.5
2	0.0	0.0	0.0	0.0	0.0	0.0	7.0	5.0	6.5	11.5	10.0	10.5
3	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.5	3.5	11.5	9.0	10.5
4	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	12.0	10.0	11.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	12.0	9.5	10.5
6	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	1.5	9.5	9.0	9.0
7	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.0	2.5	12.5	9.0	10.5
8	0.0	0.0	0.0	0.0	0.0	0.0	5.0	1.5	3.0	14.5	11.5	13.0
9	0.0	0.0	0.0	0.0	0.0	0.0	6.5	3.5	5.5	13.5	12.0	12.5
10	0.0	0.0	0.0	0.0	0.0	0.0	8.5	5.5	7.0	16.0	12.5	14.0
11	0.0	0.0	0.0	0.0	0.0	0.0	9.5	7.0	8.5	16.0	12.5	14.5
12	0.0	0.0	0.0	0.0	0.0	0.0	9.5	7.5	8.5	12.5	9.5	11.0
13	0.0	0.0	0.0	0.0	0.0	0.0	9.0	7.0	8.0	12.0	8.5	10.0
14	0.0	0.0	0.0	0.0	0.0	0.0	11.5	8.0	10.0	13.5	10.5	12.0
15	0.0	0.0	0.0	3.5	0.0	1.5	13.5	11.0	12.5	14.5	12.0	13.0
16	0.0	0.0	0.0	5.5	3.0	4.0	13.5	6.0	9.5	14.5	12.5	13.5
17	0.0	0.0	0.0	6.5	4.5	6.0	6.0	4.5	5.5	13.5	12.0	12.5
18	0.0	0.0	0.0	6.5	5.0	6.0	5.5	5.0	5.5	16.0	12.0	14.0
19	0.0	0.0	0.0	5.0	3.5	4.5	9.0	5.5	7.0	17.5	14.5	16.0
20	0.0	0.0	0.0	6.5	5.0	5.5	11.0	9.0	10.0	17.5	14.0	16.0
21	0.0	0.0	0.0	7.0	6.0	6.5	11.0	8.5	10.0	14.5	11.5	13.0
22	0.0	0.0	0.0	6.5	5.5	5.5	8.5	7.0	8.0	15.0	12.5	13.5
23	0.0	0.0	0.0	6.5	5.0	6.0	---	---	---	14.5	11.5	13.0
24	0.0	0.0	0.0	7.0	6.0	6.5	10.0	7.5	9.0	11.5	10.5	11.0
25	0.0	0.0	0.0	8.5	7.0	8.0	11.0	9.0	10.0	12.5	10.5	11.5
26	0.0	0.0	0.0	8.0	6.5	7.0	11.0	8.5	10.0	14.5	12.5	13.5
27	0.0	0.0	0.0	6.5	5.0	5.5	12.0	9.0	10.5	15.0	13.0	14.0
28	0.0	0.0	0.0	6.5	5.0	5.5	14.0	11.5	13.0	16.0	13.5	15.0
29	---	---	---	6.5	4.5	5.5	13.5	11.5	12.5	16.5	14.5	15.5
30	---	---	---	4.5	3.0	4.0	12.5	9.5	10.5	15.5	13.0	14.0
31	---	---	---	5.5	3.5	4.5	---	---	---	13.0	12.0	12.5
MONTH	0.0	0.0	0.0	8.5	0.0	3.0	---	---	---	17.5	8.5	12.6

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.0	11.0	12.5	19.5	17.0	18.0	20.5	18.5	19.0	15.5	14.5	15.0
2	15.0	12.5	14.0	20.5	17.5	19.0	20.0	18.5	19.0	16.5	14.0	15.0
3	15.0	14.0	14.5	21.0	19.0	20.0	19.0	18.0	18.5	16.0	15.5	15.5
4	14.5	11.5	12.5	21.5	20.0	20.5	19.5	18.0	18.5	15.5	13.5	14.5
5	14.0	11.5	12.5	20.5	19.0	20.0	19.0	17.5	18.0	14.5	12.0	13.5
6	14.5	13.5	14.0	20.5	18.0	19.5	20.0	17.5	18.5	16.0	13.0	14.5
7	15.0	14.0	14.5	22.0	19.5	20.5	19.5	18.5	19.0	17.0	15.0	16.0
8	15.0	14.5	15.0	21.5	20.0	21.0	19.0	17.5	18.5	17.0	15.5	16.5
9	15.5	14.0	14.5	20.0	17.5	18.5	18.5	17.5	18.0	17.0	15.5	16.5
10	14.5	12.5	13.5	18.0	15.0	16.5	20.0	16.5	18.5	16.5	15.0	16.0
11	16.5	12.5	14.5	15.0	14.5	15.0	19.5	19.0	19.0	17.0	15.0	16.0
12	17.5	15.0	16.5	18.0	14.0	16.0	19.5	18.0	18.5	17.5	15.5	17.0
13	17.5	16.5	17.0	18.5	16.5	17.5	21.0	18.0	19.5	18.0	16.5	17.5
14	19.0	16.0	17.5	20.0	16.5	18.0	21.5	19.0	20.5	17.5	16.5	17.0
15	19.5	17.5	18.5	19.5	18.0	18.5	22.0	19.5	21.0	16.5	15.0	16.0
16	19.5	17.0	18.5	19.5	16.5	18.0	22.5	20.5	21.5	15.5	13.0	14.5
17	20.0	17.0	18.5	19.5	18.5	19.0	21.5	19.5	20.0	16.0	13.5	15.0
18	19.5	18.0	19.0	19.0	16.5	18.0	20.0	18.0	19.0	16.5	14.5	15.5
19	19.0	17.5	18.5	19.0	16.5	18.0	20.5	17.5	19.0	16.0	14.5	15.5
20	18.5	16.0	17.5	19.0	18.0	18.5	21.0	18.5	20.0	14.5	13.0	14.0
21	19.5	16.5	18.0	18.5	17.5	18.0	21.5	19.5	20.5	13.5	12.0	13.0
22	20.5	17.5	19.0	19.0	16.0	17.5	21.0	19.5	20.5	13.0	12.5	13.0
23	21.0	18.0	20.0	19.0	16.5	18.0	19.5	17.5	18.5	13.0	12.0	12.5
24	22.0	19.5	21.0	19.5	17.0	18.5	18.0	16.0	16.5	12.0	11.0	11.5
25	23.0	21.0	22.0	20.0	17.5	19.0	18.5	16.0	17.5	11.5	11.0	11.5
26	22.5	19.0	21.0	20.0	18.5	19.5	20.0	18.0	19.0	11.0	10.0	10.5
27	19.0	17.0	17.5	22.0	19.0	20.5	19.5	18.0	18.5	11.5	10.5	11.0
28	17.0	14.5	16.0	21.0	18.5	19.5	18.0	15.5	17.0	11.0	10.5	10.5
29	18.0	14.5	16.0	19.5	17.0	18.5	19.0	17.0	18.0	10.5	9.5	10.0
30	19.0	15.5	17.0	20.0	17.5	19.0	18.0	15.5	16.5	9.5	9.0	9.5
31	---	---	---	21.0	19.0	20.0	16.0	14.0	15.0	---	---	---
MONTH	23.0	11.0	16.7	22.0	14.0	18.6	22.5	14.0	18.7	18.0	9.0	14.1

STREAMS TRIBUTARY TO LAKE HURON

04136000 AU SABLE RIVER NEAR RED OAK, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	9.5	7.8	8.6	13.0	11.8	12.3	14.0	13.0	13.5	13.3	12.4	12.8
2	9.0	7.5	8.2	12.9	12.0	12.4	14.4	13.5	13.9	13.6	13.2	13.4
3	9.9	8.3	9.1	13.3	12.2	12.7	14.4	14.0	14.2	13.4	12.9	13.1
4	9.3	8.6	8.9	12.6	11.9	12.3	14.1	13.8	13.9	13.5	12.9	13.2
5	10.1	8.4	9.2	12.8	12.0	12.4	13.9	13.5	13.7	13.4	13.0	13.2
6	10.3	9.2	9.7	12.6	12.0	12.3	13.9	13.3	13.5	13.6	12.8	13.1
7	10.7	9.3	10	13.5	12.1	12.8	13.6	13.1	13.3	13.5	13.0	13.3
8	10.8	9.8	10.3	13.0	11.9	12.6	14.1	13.0	13.5	13.0	12.2	12.7
9	10.9	9.7	10.3	12.5	11.4	11.9	14.2	13.8	14.0	12.2	11.7	12.0
10	11.1	9.7	10.4	11.6	10.4	10.9	13.9	13.5	13.6	13.6	12.1	12.8
11	10.8	9.5	10.2	11.8	10.2	11.0	13.8	13.2	13.5	13.7	13.4	13.5
12	10.4	9.1	9.6	12.1	11.2	11.6	13.7	13.2	13.4	13.8	13.3	13.5
13	10.5	8.9	9.7	12.8	11.7	12.2	13.2	12.4	12.8	13.7	13.2	13.5
14	11.5	10.0	10.7	12.1	11.5	11.8	12.7	12.1	12.4	13.7	13.4	13.5
15	11.3	10.3	10.7	13.4	11.8	12.6	12.7	12.3	12.5	---	---	---
16	11.5	10.1	10.8	14.2	13.1	13.6	13.9	12.6	13.3	---	---	---
17	11.7	10.6	11.1	13.9	13.2	13.6	14.1	13.6	13.8	13.4	13.0	13.2
18	11.4	10.7	11.0	13.9	13.0	13.4	13.8	12.8	13.4	13.4	13.0	13.2
19	11.4	10.5	10.9	13.4	12.4	12.9	12.8	11.7	12.2	13.0	12.7	12.8
20	11.4	10.6	11.0	13.2	12.1	12.6	12.2	11.3	11.7	12.8	12.4	12.5
21	12.0	11.0	11.4	12.8	11.8	12.3	12.8	11.9	12.3	12.6	12.3	12.5
22	11.6	10.8	11.2	13.2	11.9	12.5	12.9	12.4	12.6	12.6	12.2	12.4
23	12.1	11.0	11.6	12.8	12.3	12.5	13.3	12.7	13.0	12.4	11.9	12.2
24	12.2	11.1	11.6	12.8	12.2	12.5	13.5	13.1	13.2	12.0	11.6	11.8
25	12.0	11.1	11.5	13.6	12.4	12.9	13.1	12.6	12.8	11.9	11.6	11.7
26	11.5	11.0	11.2	14.0	12.8	13.4	13.2	12.6	12.9	12.1	11.7	11.8
27	11.6	10.8	11.2	14.4	13.4	13.9	13.6	12.9	13.2	12.3	12.1	12.2
28	12.2	11.0	11.5	13.9	13.2	13.6	13.3	12.6	12.9	12.2	11.7	11.9
29	12.5	11.2	11.8	13.2	12.4	12.9	13.0	12.4	12.6	12.1	11.6	11.7
30	12.9	11.3	12.2	13.3	12.0	12.6	12.6	12.0	12.3	12.5	12.1	12.2
31	12.5	11.6	12.1	---	---	---	12.5	11.7	12.1	12.5	11.9	12.1
MONTH	12.9	7.5	10.6	14.4	10.2	12.6	14.4	11.3	13.1	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	12.1	11.9	12.0	12.8	12.2	12.6	12.0	11.1	11.6	11.0	10.1	10.5
2	12.4	12.1	12.2	12.8	11.9	12.3	11.8	10.5	11.2	11.3	9.9	10.5
3	12.2	11.9	12.1	13.0	11.7	12.3	13.0	11.6	12.2	11.4	10.1	10.7
4	12.7	11.9	12.2	13.0	12.6	12.8	13.9	13.0	13.5	11.1	9.7	10.4
5	13.0	12.5	12.8	13.5	12.8	13.0	13.8	13.0	13.5	10.3	9.2	9.8
6	13.0	12.7	12.9	13.4	12.7	13.1	13.8	13.2	13.5	11.0	10.0	10.5
7	13.2	12.7	12.9	13.3	12.8	13.1	13.3	12.7	13.0	11.3	10.1	10.7
8	13.1	12.6	12.8	13.2	12.7	12.9	13.3	12.1	13.0	10.6	9.3	9.9
9	12.9	12.5	12.7	13.4	12.2	12.7	12.8	11.6	12.2	10.4	8.8	9.7
10	12.9	12.6	12.8	13.4	12.5	12.9	12.1	11.0	11.5	10.4	8.8	9.6
11	12.9	12.6	12.7	12.9	12.4	12.7	11.9	10.7	11.2	9.4	8.2	8.8
12	12.8	12.2	12.5	13.6	12.9	13.3	11.7	10.5	11.0	10.5	9.2	9.9
13	12.7	12.4	12.5	13.2	12.5	12.9	11.9	10.6	11.3	11.4	10.2	10.7
14	12.7	12.4	12.6	13.3	12.8	13.0	11.4	10.0	10.8	10.7	9.5	10.1
15	13.0	12.4	12.6	13.0	12.1	12.6	10.4	9.3	9.9	10.9	9.0	9.9
16	13.2	12.6	12.9	12.2	11.7	11.9	11.4	9.2	10.2	9.8	8.8	9.3
17	13.1	12.5	12.8	11.9	11.2	11.6	12.3	11.4	11.9	10.6	9.4	10.0
18	12.9	12.2	12.5	12.2	11.3	11.7	12.0	11.6	11.8	10.7	9.4	10.0
19	12.8	12.2	12.4	12.8	11.9	12.4	11.9	10.9	11.6	10.2	8.6	9.4
20	13.2	12.7	12.9	11.9	11.2	11.5	10.9	10.0	10.5	9.7	8.0	8.8
21	13.1	12.4	12.7	11.3	10.7	11.0	10.5	9.8	10.2	11.1	9.3	10.2
22	13.1	12.3	12.6	11.7	10.8	11.3	11.6	10.5	11.0	10.9	9.2	10.0
23	13.3	12.4	12.8	12.0	11.3	11.6	---	---	---	10.4	9.0	9.7
24	13.4	12.9	13.1	11.9	11.2	11.5	11.6	10.4	10.9	10.2	9.6	9.9
25	13.1	12.1	12.6	11.6	10.8	11.2	11.3	10.0	10.6	10.6	9.9	10.1
26	13.5	12.4	12.9	11.9	10.7	11.3	11.3	10.0	10.6	10.3	9.3	9.8
27	13.5	12.6	13.1	12.2	11.1	11.6	11.1	9.9	10.4	10.3	9.1	9.6
28	13.2	12.6	12.9	11.8	11.2	11.5	10.5	9.3	9.8	10.1	8.8	9.4
29	---	---	---	12.2	10.9	11.5	10.7	9.0	9.8	10.2	8.5	9.3
30	---	---	---	12.9	11.9	12.4	11.0	9.2	10.1	10.2	8.8	9.5
31	---	---	---	12.7	11.8	12.2	---	---	---	10.4	9.0	9.7
MONTH	13.5	11.9	12.7	13.6	10.7	12.2	---	---	---	11.4	8.0	9.9

STREAMS TRIBUTARY TO LAKE HURON

04136000 AU SABLE RIVER NEAR RED OAK, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	11.2	9.7	10.4	10.1	8.0	9.0	10.3	7.9	9.0	10.4	8.5	9.4
2	10.9	9.2	10.0	10.3	7.9	9.0	9.8	7.9	8.8	10.3	8.6	9.4
3	10.7	9.0	9.8	9.7	7.5	8.6	9.9	7.9	8.9	9.9	8.3	9.1
4	10.5	9.2	9.9	9.4	7.3	8.3	9.9	7.9	8.9	10.4	8.7	9.5
5	10.9	9.6	10.2	9.7	7.3	8.4	9.8	8.0	8.8	11.1	9.3	10.1
6	10.5	9.2	9.8	9.9	7.5	8.6	10.1	8.0	9.0	10.7	9.0	9.7
7	10.0	8.9	9.5	9.8	7.3	8.4	9.5	7.6	8.5	10.7	8.5	9.5
8	9.9	8.8	9.3	10.2	7.0	8.6	9.4	7.8	8.6	10.7	8.6	9.5
9	10.2	8.7	9.4	10.7	8.0	9.3	9.2	7.7	8.5	10.7	8.5	9.5
10	10.0	9.1	9.5	9.3	8.3	8.8	9.9	8.0	8.9	10.7	8.6	9.5
11	10.5	9.1	9.8	9.3	8.5	8.9	9.8	7.6	8.7	10.5	8.7	9.5
12	10.6	8.8	9.7	10.3	9.0	9.5	10.0	7.9	8.8	10.3	8.3	9.2
13	10.1	8.5	9.3	10.2	8.6	9.4	10.3	7.9	9.0	10.0	8.2	9.0
14	10.4	8.6	9.4	10.4	8.5	9.4	9.9	7.5	8.7	9.6	8.0	8.8
15	10.4	8.2	9.2	9.8	8.1	8.9	9.7	7.4	8.5	9.7	8.2	8.9
16	10.5	8.2	9.3	10.8	8.6	9.6	9.3	7.1	8.1	10.8	8.8	9.7
17	10.4	8.2	9.2	10.4	8.3	9.3	9.5	7.1	8.2	10.7	8.8	9.7
18	9.8	7.8	8.8	11.1	8.6	9.8	9.5	7.3	8.4	10.6	8.6	9.5
19	10.3	7.8	9.0	11.1	8.6	9.8	9.6	7.3	8.4	10.0	8.4	9.1
20	10.5	8.2	9.3	10.3	8.3	9.2	10.1	7.4	8.6	10.7	8.8	9.7
21	10.5	8.0	9.2	10.1	8.3	9.3	9.2	7.3	8.2	11.1	9.1	10.0
22	10.3	7.8	9.0	10.9	8.8	9.8	9.9	7.2	8.5	9.8	9.0	9.4
23	10.1	7.5	8.9	11.0	8.8	9.8	10.3	7.7	8.9	10.2	9.0	9.6
24	9.8	7.3	8.5	11.4	8.7	9.9	10.2	8.1	9.1	10.7	9.4	9.9
25	9.7	7.1	8.3	11.2	8.6	9.8	10.0	8.2	9.0	11.0	9.4	10.1
26	9.0	7.0	8.0	10.2	8.3	9.2	9.4	7.4	8.3	11.1	9.7	10.3
27	9.8	7.6	8.7	10.6	8.4	9.4	9.3	7.3	8.2	10.7	9.4	10.1
28	9.4	8.0	8.7	10.9	8.2	9.6	9.8	7.8	8.7	10.9	9.5	10.2
29	10.3	8.6	9.3	10.8	8.7	9.7	8.5	7.5	8.0	11.3	9.9	10.5
30	10.5	8.2	9.3	10.8	8.2	9.4	9.5	7.6	8.5	11.5	10.1	10.8
31	---	---	---	10.3	7.9	9.1	10.0	8.1	9.0	---	---	---
MONTH	11.2	7.0	9.3	11.4	7.0	9.2	10.3	7.1	8.6	11.5	8.0	9.6

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	660	699	716	717	703	684	860	939	878	680	659	713
2	628	697	643	682	703	660	853	970	859	667	733	696
3	638	644	527	684	715	513	854	913	859	697	817	665
4	731	689	716	702	721	661	868	868	810	642	749	686
5	730	e698	749	684	657	675	775	878	844	644	785	654
6	743	e715	754	698	651	623	848	916	832	658	796	659
7	713	714	742	639	620	657	883	923	818	648	740	636
8	708	716	730	722	612	654	838	930	853	632	819	641
9	702	708	624	710	719	539	828	884	840	623	835	637
10	685	793	737	705	640	628	847	857	905	775	748	643
11	676	803	737	632	569	645	973	995	1120	1090	704	636
12	691	790	713	666	640	704	1040	1100	902	1000	728	628
13	694	754	713	682	614	656	1020	1080	896	908	675	624
14	700	737	713	651	625	655	1020	1020	845	881	678	631
15	705	715	717	643	676	732	1070	978	812	837	662	651
16	686	698	720	640	625	733	1290	973	775	816	682	644
17	679	698	659	617	648	861	1290	978	748	788	636	631
18	683	689	730	562	689	933	1250	940	746	735	630	634
19	723	703	752	647	678	941	1260	933	709	707	614	643
20	724	698	799	615	661	924	1330	905	690	739	618	634
21	718	733	766	621	712	994	1300	893	666	793	645	634
22	734	724	735	617	738	994	1220	878	653	779	651	690
23	738	704	716	601	664	957	1130	863	673	759	650	780
24	725	719	716	660	627	911	1080	1090	642	706	643	731
25	726	724	708	691	600	896	1030	1130	645	685	643	728
26	739	719	712	666	593	878	985	1050	666	682	647	702
27	740	679	690	573	677	866	939	951	643	700	701	753
28	723	699	695	627	670	876	895	886	687	671	688	748
29	704	706	721	702	---	933	871	861	721	666	809	727
30	695	742	720	624	---	897	857	845	693	643	839	723
31	701	---	717	692	---	862	---	966	---	655	764	---
TOTAL	21842	21507	22087	20372	18447	24142	30304	29393	23430	22906	21988	20202
MEAN	705	717	712	657	659	779	1010	948	781	739	709	673
MAX	743	803	799	722	738	994	1330	1130	1120	1090	839	780
MIN	628	644	527	562	569	513	775	845	642	623	614	624
CFSM	0.52	0.53	0.52	0.48	0.48	0.57	0.74	0.70	0.57	0.54	0.52	0.49
IN.	0.60	0.59	0.60	0.56	0.50	0.66	0.83	0.80	0.64	0.63	0.60	0.55

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	933	985	959	891	881	1082	1447	1153	985	864	817	863
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	320095		276620			
ANNUAL MEAN	877		758		988	
HIGHEST ANNUAL MEAN					1213	1986
LOWEST ANNUAL MEAN					746	1958
HIGHEST DAILY MEAN	1750	Mar 10	1330	Apr 20	4230	Apr 1 1998
LOWEST DAILY MEAN	527	Dec 3	513	Mar 3	21	Aug 9 1977
ANNUAL SEVEN-DAY MINIMUM	620	Sep 7	611	Jan 17	420	Aug 8 1977
MAXIMUM PEAK FLOW			1460	Apr 16	4380	(a)
MAXIMUM PEAK STAGE			3.64	Apr 16	6.37	Apr 1 1998
INSTANTANEOUS LOW FLOW			455	Dec 3	7.0	Aug 4 1977
ANNUAL RUNOFF (CFSM)	0.64		0.56		0.73	
ANNUAL RUNOFF (INCHES)	8.75		7.56		9.86	
10 PERCENT EXCEEDS	1230		940		1340	
50 PERCENT EXCEEDS	773		715		918	
90 PERCENT EXCEEDS	668		634		708	

(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.--Water temperature records rated excellent except the following period: Oct. 10 to Nov. 16 rated good. Dissolved oxygen records rated excellent except the following periods: Oct. 10-14, Nov. 17-23, Dec. 9-16, Jan. 8-15, Apr. 24-27, May 23-26, July 27-29, Aug. 7-11, Sept. 6-10 rated good; Oct. 15-21, Nov. 24, 25, Dec. 17-23, Apr. 28 to May 3, May 27 to June 2, Aug. 12-19, Sept. 11-18 rated fair; and Oct. 1, 2, 22-30, May 4-15, June 3-11, Aug. 20-26 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 7, 8, Aug. 19-22; minimum, 0.0°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 13.3 mg/L, Dec. 6, Jan. 6, Apr. 8, 9; minimum, 6.7 mg/L, June 29.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	15.5	14.5	15.0	5.0	5.0	5.0	1.5	1.0	1.0	1.5	1.0	1.5
2	15.5	15.0	15.0	5.0	4.5	4.5	1.5	1.0	1.5	2.0	1.5	1.5
3	15.5	15.0	15.0	4.5	4.5	4.5	1.5	1.5	1.5	2.0	1.5	2.0
4	15.5	15.0	15.5	4.5	4.0	4.0	1.5	1.0	1.5	1.5	1.0	1.5
5	15.5	14.5	15.0	4.0	4.0	4.0	1.0	1.0	1.0	1.0	1.0	1.0
6	14.5	14.0	14.5	4.0	3.5	4.0	1.0	0.5	0.5	1.0	0.5	0.5
7	14.0	13.0	13.5	3.5	3.5	3.5	0.5	0.5	0.5	0.5	0.5	0.5
8	13.0	12.0	12.5	4.0	3.5	3.5	0.5	0.5	0.5	0.5	0.5	0.5
9	12.0	11.0	11.5	4.5	4.0	4.0	0.5	0.5	0.5	0.5	0.5	0.5
10	11.0	10.5	11.0	5.0	4.5	5.0	0.5	0.5	0.5	0.5	0.5	0.5
11	10.5	10.0	10.0	5.5	5.0	5.0	0.5	0.0	0.5	1.0	0.5	0.5
12	12.0	10.0	11.0	6.0	5.5	5.5	0.5	0.5	0.5	1.0	1.0	1.0
13	11.5	10.5	11.0	6.5	6.0	6.0	0.5	0.5	0.5	1.0	1.0	1.0
14	10.5	10.0	10.5	6.5	6.0	6.5	0.5	0.5	0.5	1.0	0.5	0.5
15	10.5	10.0	10.5	6.0	5.5	6.0	0.5	0.5	0.5	0.5	0.5	0.5
16	10.5	10.0	10.0	5.5	4.0	4.5	1.0	0.5	0.5	0.5	0.5	0.5
17	10.0	9.0	9.5	4.0	3.0	3.5	1.5	1.0	1.0	0.5	0.0	0.5
18	9.0	8.0	8.5	3.0	2.5	2.5	1.5	1.5	1.5	0.5	0.0	0.5
19	8.0	7.0	7.5	2.5	2.0	2.0	1.5	1.0	1.5	0.5	0.0	0.0
20	7.0	6.5	6.5	2.0	2.0	2.0	1.0	1.0	1.0	0.5	0.0	0.0
21	6.5	6.0	6.0	2.0	2.0	2.0	1.5	1.0	1.0	0.0	0.0	0.0
22	6.0	5.5	6.0	2.0	2.0	2.0	2.0	1.5	2.0	0.0	0.0	0.0
23	6.0	5.5	5.5	2.5	2.0	2.5	2.0	2.0	2.0	0.0	0.0	0.0
24	6.0	5.5	5.5	2.5	2.5	2.5	2.0	1.5	1.5	0.0	0.0	0.0
25	5.5	5.5	5.5	2.5	2.5	2.5	1.5	1.0	1.0	0.0	0.0	0.0
26	5.5	5.5	5.5	2.5	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0
27	5.5	5.5	5.5	2.5	2.0	2.5	1.0	1.0	1.0	0.0	0.0	0.0
28	5.5	5.5	5.5	2.5	2.0	2.5	1.0	1.0	1.0	0.0	0.0	0.0
29	5.5	5.0	5.0	2.5	2.0	2.0	1.0	1.0	1.0	0.0	0.0	0.0
30	5.5	5.0	5.5	2.0	1.0	1.5	1.0	1.0	1.0	0.0	0.0	0.0
31	5.5	5.0	5.5	---	---	---	1.0	1.0	1.0	0.0	0.0	0.0
MONTH	15.5	5.0	9.5	6.5	1.0	3.6	2.0	0.0	1.0	2.0	0.0	0.5

STREAMS TRIBUTARY TO LAKE HURON

04136500 AU SABLE RIVER AT MIO, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

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	5.0	4.5	5.0	12.0	12.0	12.0
2	0.0	0.0	0.0	0.0	0.0	0.0	5.0	4.5	4.5	12.0	11.5	12.0
3	0.0	0.0	0.0	0.5	0.0	0.0	4.5	3.5	4.0	11.5	11.0	11.5
4	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.0	3.0	11.5	11.0	11.5
5	0.0	0.0	0.0	0.5	0.0	0.0	2.0	1.5	2.0	11.5	11.0	11.5
6	0.0	0.0	0.0	0.5	0.0	0.0	1.5	1.0	1.5	11.5	11.0	11.0
7	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5	11.0	11.0	11.0
8	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5	1.5	11.0	10.5	11.0
9	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5	2.0	12.0	11.0	11.5
10	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.0	2.5	14.5	12.0	13.0
11	0.0	0.0	0.0	0.0	0.0	0.0	4.5	3.0	4.0	13.5	12.5	13.0
12	0.0	0.0	0.0	0.0	0.0	0.0	6.5	4.5	6.0	13.5	13.0	13.0
13	0.0	0.0	0.0	0.0	0.0	0.0	8.0	6.5	7.5	13.5	12.5	13.0
14	0.0	0.0	0.0	0.0	0.0	0.0	9.5	8.0	9.0	13.0	11.5	12.5
15	0.0	0.0	0.0	0.0	0.0	0.0	11.0	9.5	10.0	13.0	11.5	12.0
16	0.0	0.0	0.0	0.5	0.0	0.0	10.5	10.0	10.5	13.5	13.0	13.0
17	0.0	0.0	0.0	0.5	0.5	0.5	10.0	9.0	9.5	13.5	13.0	13.5
18	0.0	0.0	0.0	1.5	0.5	1.0	9.0	7.0	8.0	14.5	13.5	14.0
19	0.0	0.0	0.0	3.0	1.5	2.0	7.0	6.0	6.5	15.5	14.5	15.0
20	0.0	0.0	0.0	3.5	3.0	3.0	8.5	6.5	7.5	17.0	15.5	16.0
21	0.0	0.0	0.0	3.5	3.5	3.5	9.0	8.0	8.5	16.0	15.0	15.5
22	0.0	0.0	0.0	4.0	3.5	3.5	9.5	9.0	9.0	16.0	15.5	15.5
23	0.0	0.0	0.0	4.0	3.5	4.0	9.5	9.0	9.0	16.0	15.5	15.5
24	0.0	0.0	0.0	4.5	4.0	4.0	9.5	8.5	9.0	15.5	14.5	15.0
25	0.5	0.0	0.0	4.5	4.5	4.5	9.0	8.5	8.5	14.5	13.5	14.0
26	0.5	0.0	0.0	5.0	4.5	5.0	10.5	9.0	9.5	13.5	13.0	13.0
27	0.0	0.0	0.0	5.0	5.0	5.0	11.0	10.0	10.5	14.0	13.0	13.5
28	0.0	0.0	0.0	5.0	5.0	5.0	11.5	10.5	11.0	15.5	14.0	14.5
29	---	---	---	5.0	5.0	5.0	13.0	11.5	12.0	16.5	15.0	16.0
30	---	---	---	5.0	4.5	4.5	12.5	12.0	12.0	16.0	15.5	16.0
31	---	---	---	5.0	4.5	4.5	---	---	---	15.5	15.0	15.5
MONTH	0.5	0.0	0.0	5.0	0.0	1.8	13.0	1.0	6.8	17.0	10.5	13.4

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	15.0	15.5	20.0	19.0	19.5	21.5	21.0	21.0	19.0	18.0	18.5
2	15.5	14.0	15.0	21.0	18.5	19.5	21.5	21.0	21.0	18.5	17.5	18.0
3	14.5	13.5	14.0	21.5	19.0	20.5	21.0	20.5	20.5	18.5	17.5	18.0
4	15.0	14.0	14.5	21.0	20.0	20.5	21.0	20.5	21.0	17.5	17.0	17.5
5	15.0	14.5	15.0	22.0	20.5	21.5	21.5	20.5	21.0	17.0	16.5	16.5
6	16.0	14.5	15.0	22.0	21.0	21.5	21.0	20.5	21.0	18.0	16.0	17.0
7	15.0	14.0	14.5	23.0	21.0	22.0	21.0	20.5	20.5	16.5	16.0	16.5
8	15.5	14.5	15.0	23.0	21.5	22.0	20.5	20.0	20.5	16.5	16.0	16.0
9	16.0	15.5	16.0	22.0	21.5	21.5	20.5	20.5	20.5	17.0	16.0	16.5
10	16.0	15.5	15.5	21.5	21.0	21.0	21.0	20.5	20.5	17.5	16.5	17.0
11	16.0	15.0	15.5	21.0	19.5	20.5	20.5	19.5	20.0	18.0	17.0	17.5
12	16.0	15.0	15.5	19.5	18.0	19.0	20.5	20.0	20.5	18.0	17.0	17.5
13	17.0	15.5	16.5	18.0	17.0	17.5	21.0	20.5	20.5	18.5	17.5	18.0
14	17.5	16.0	17.0	19.0	17.0	18.0	22.0	20.5	21.0	19.0	18.0	18.5
15	18.0	17.5	17.5	19.5	17.5	18.5	22.5	21.0	22.0	19.5	18.5	19.0
16	18.5	17.5	18.0	19.5	18.5	19.0	22.0	21.5	22.0	19.0	18.0	18.5
17	20.5	18.5	19.0	20.0	19.0	19.5	22.0	21.5	22.0	18.5	18.0	18.0
18	20.0	19.0	19.5	20.0	19.0	19.5	22.5	21.5	22.0	18.0	16.5	17.0
19	19.5	19.0	19.5	21.0	19.5	20.0	23.0	21.5	22.5	18.5	17.0	17.5
20	20.0	19.0	19.5	20.5	19.5	20.0	23.0	21.5	22.0	17.5	17.0	17.5
21	20.5	19.0	20.0	19.5	19.0	19.5	23.0	22.0	22.5	17.0	16.5	17.0
22	20.5	19.5	20.0	20.0	19.5	19.5	23.0	22.0	22.5	16.5	16.0	16.5
23	21.5	19.5	20.5	20.0	19.5	20.0	22.0	22.0	22.0	16.5	15.5	16.0
24	22.5	20.0	21.0	20.5	20.0	20.5	22.0	21.5	22.0	15.5	15.0	15.0
25	22.5	20.5	21.5	21.5	20.0	20.5	21.5	21.0	21.5	15.0	13.5	14.0
26	22.5	21.0	22.0	21.0	20.0	20.5	22.0	20.5	21.0	13.5	13.0	13.0
27	22.0	21.0	21.5	21.5	20.0	20.5	21.0	20.5	20.5	13.0	12.5	13.0
28	21.5	20.5	21.0	21.5	20.5	21.0	20.5	20.0	20.5	12.5	12.0	12.5
29	21.0	20.0	20.5	22.0	20.5	21.5	21.5	20.0	21.0	12.0	11.5	12.0
30	20.5	19.5	20.0	22.0	21.0	21.5	20.5	19.5	20.0	11.5	11.0	11.5
31	---	---	---	22.0	21.0	21.5	20.0	19.0	19.5	---	---	---
MONTH	22.5	13.5	17.9	23.0	17.0	20.2	23.0	19.0	21.1	19.5	11.0	16.4

STREAMS TRIBUTARY TO LAKE HURON

04136500 AU SABLE RIVER AT MIO, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	9.2	8.9	9.1	11.7	11.4	11.6	13.0	12.7	12.9	12.9	12.7	12.8
2	9.4	8.7	9.1	11.9	11.7	11.8	13.0	12.8	12.9	12.7	12.4	12.6
3	9.3	8.9	9.0	11.8	11.7	11.8	12.9	12.5	12.7	12.7	12.4	12.5
4	9.3	8.6	9.0	11.8	11.7	11.7	12.9	12.5	12.7	13.0	12.6	12.8
5	9.2	8.8	9.0	11.9	11.7	11.8	13.2	12.7	12.9	13.2	12.9	13.1
6	9.1	8.7	8.9	11.9	11.7	11.8	13.3	13.0	13.1	13.3	13.0	13.1
7	9.6	8.9	9.3	12.0	11.2	11.8	13.1	12.7	12.9	13.1	12.9	13.0
8	9.8	9.4	9.6	12.1	11.2	11.9	12.8	12.4	12.6	13.1	12.9	13.0
9	9.9	9.6	9.7	12.0	11.8	11.9	12.6	12.3	12.4	13.2	13.0	13.1
10	10.3	9.9	10.1	11.9	11.7	11.8	12.5	12.2	12.4	13.1	12.9	13.0
11	10.5	10.2	10.4	11.9	11.7	11.8	12.4	12.1	12.3	13.2	12.8	13.0
12	10.6	10.2	10.4	11.7	10.7	11.4	12.6	12.3	12.5	12.8	12.6	12.7
13	10.7	10.3	10.5	11.4	10.7	11.1	12.7	12.4	12.6	13.1	12.6	12.9
14	10.6	10.2	10.5	10.9	10.6	10.7	12.7	12.3	12.6	13.0	12.7	12.9
15	10.6	10.3	10.4	11.0	10.3	10.8	12.4	12.0	12.2	13.1	12.7	12.9
16	10.3	9.9	10.1	11.5	10.6	11.2	12.3	12.0	12.2	13.2	13.0	13.0
17	10.3	9.9	10.1	11.9	11.1	11.6	12.1	11.7	11.9	13.2	12.9	13.0
18	10.9	10.1	10.5	12.3	11.1	12.0	12.0	11.7	11.9	13.2	12.9	13.0
19	11.2	10.7	11.0	12.5	11.5	12.0	12.4	11.8	12.1	13.1	12.9	13.0
20	11.4	11.0	11.2	12.7	11.9	12.2	12.6	12.3	12.5	13.1	12.9	13.0
21	11.5	11.2	11.3	13.1	12.3	12.7	12.7	12.1	12.5	13.0	12.7	12.8
22	11.4	11.2	11.3	12.9	12.1	12.5	12.3	11.5	11.9	12.7	12.5	12.6
23	11.4	11.2	11.3	12.6	11.5	12.3	12.0	11.4	11.7	12.6	12.3	12.4
24	11.5	11.3	11.4	12.5	12.0	12.4	12.2	11.9	12.0	12.4	12.1	12.3
25	11.6	11.5	11.5	12.4	11.7	12.1	12.4	12.0	12.2	12.2	12.0	12.1
26	11.8	11.5	11.6	12.2	11.9	12.1	12.6	12.3	12.5	12.1	11.8	12.0
27	11.8	11.6	11.7	12.3	11.9	12.1	12.8	12.5	12.7	12.0	11.7	11.8
28	11.6	11.3	11.5	12.4	12.1	12.3	12.8	12.6	12.7	11.8	11.6	11.7
29	11.5	11.3	11.4	12.6	12.1	12.4	12.9	12.6	12.8	11.6	11.4	11.5
30	11.5	11.3	11.4	12.9	12.5	12.8	13.1	12.7	12.9	11.7	11.4	11.5
31	11.5	11.3	11.4	---	---	---	13.1	12.8	13.0	11.5	11.4	11.5
MONTH	11.8	8.6	10.4	13.1	10.3	11.9	13.3	11.4	12.5	13.3	11.4	12.6

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	11.4	11.2	11.3	12.7	12.4	12.5	11.9	11.6	11.8	10.1	9.6	9.9
2	11.4	11.2	11.3	12.5	12.3	12.4	12.2	11.9	12.1	9.8	9.6	9.7
3	11.3	11.2	11.3	12.7	12.3	12.4	12.2	12.0	12.1	10.1	9.8	10.0
4	11.3	11.1	11.2	12.4	12.2	12.3	12.4	12.0	12.2	10.3	10.1	10.2
5	11.4	11.1	11.2	12.5	12.1	12.3	12.6	12.3	12.4	10.2	9.9	10.1
6	11.4	11.2	11.2	12.4	12.1	12.2	12.9	12.6	12.8	10.0	9.7	9.9
7	11.5	11.2	11.3	12.2	11.9	12.1	13.2	12.8	13.0	9.7	9.2	9.5
8	11.6	11.3	11.5	12.1	11.8	11.9	13.3	13.2	13.3	9.6	9.2	9.4
9	11.9	11.6	11.8	12.3	11.8	12.0	13.3	13.2	13.3	9.6	9.5	9.6
10	12.0	11.8	11.9	12.2	11.8	11.9	13.2	13.0	13.1	9.7	9.4	9.5
11	12.1	11.8	11.9	12.1	11.7	11.9	13.1	12.7	13.0	9.4	8.7	9.1
12	12.0	11.7	11.8	11.9	11.7	11.8	12.7	12.1	12.5	8.8	8.5	8.7
13	11.9	11.7	11.8	12.1	11.7	11.9	12.1	11.5	11.9	8.7	8.4	8.6
14	12.0	11.7	11.8	12.0	11.7	11.8	11.5	11.0	11.2	8.9	8.4	8.7
15	11.9	11.6	11.7	12.0	11.6	11.8	11.0	10.8	10.9	9.9	8.8	9.4
16	11.8	11.6	11.7	12.2	11.7	12.0	10.8	10.4	10.6	10.0	9.7	9.9
17	11.8	11.5	11.6	12.6	12.0	12.4	10.4	10.1	10.2	9.9	9.1	9.6
18	11.7	11.5	11.6	12.6	12.1	12.5	10.6	10.1	10.4	9.5	9.0	9.2
19	11.9	11.6	11.7	12.1	11.3	11.7	11.1	10.6	10.9	10.0	9.3	9.5
20	11.9	11.5	11.7	11.3	10.9	11.1	11.2	11.1	11.2	9.8	9.3	9.6
21	11.8	11.4	11.6	11.4	11.0	11.2	11.1	10.8	11.0	9.5	8.8	9.2
22	11.5	11.4	11.4	11.5	11.2	11.4	10.8	10.3	10.5	9.4	8.9	9.2
23	11.8	11.4	11.6	11.3	10.8	11.0	10.3	10.1	10.2	9.4	8.5	9.0
24	12.0	11.7	11.8	10.9	10.7	10.8	10.5	10.2	10.4	9.3	8.8	9.0
25	12.0	11.7	11.8	11.0	10.8	10.9	10.9	10.5	10.7	9.1	8.5	8.7
26	12.1	11.8	12.0	11.1	11.0	11.1	11.1	10.9	11.0	8.8	7.8	8.5
27	12.3	12.0	12.2	11.2	11.0	11.1	11.0	10.6	10.9	8.8	7.8	8.6
28	12.6	12.2	12.4	11.0	10.9	11.0	10.8	10.5	10.6	8.9	8.3	8.6
29	---	---	---	11.3	10.9	11.1	10.6	10.4	10.5	9.0	8.2	8.6
30	---	---	---	11.5	11.3	11.4	10.5	10.1	10.3	8.6	8.1	8.4
31	---	---	---	11.6	11.4	11.5	---	---	---	8.4	7.5	8.0
MONTH	12.6	11.1	11.6	12.7	10.7	11.7	13.3	10.1	11.5	10.3	7.5	9.2

STREAMS TRIBUTARY TO LAKE HURON

04136500 AU SABLE RIVER AT MIO, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.0	7.7	7.8	7.9	7.5	7.8	7.8	7.2	7.5	8.7	8.0	8.5
2	8.4	7.8	8.1	8.4	7.9	8.2	7.9	7.4	7.7	8.9	8.4	8.7
3	9.1	8.3	8.7	8.6	8.1	8.4	7.5	6.8	7.2	9.3	8.8	9.1
4	9.4	8.7	9.0	8.4	8.2	8.3	7.4	7.2	7.3	9.3	8.9	9.1
5	9.1	8.6	8.9	8.3	7.9	8.1	7.8	7.3	7.6	9.4	9.0	9.2
6	9.1	8.5	8.8	8.1	7.7	7.9	7.9	7.4	7.7	9.8	9.1	9.4
7	9.2	8.4	8.7	7.8	7.4	7.6	7.8	7.5	7.7	9.4	9.0	9.2
8	9.0	8.4	8.7	7.8	7.3	7.6	7.8	7.3	7.6	9.6	9.3	9.4
9	8.8	8.5	8.7	7.8	7.3	7.5	7.8	7.5	7.7	9.8	9.5	9.7
10	8.8	8.2	8.4	7.6	6.9	7.2	7.9	7.5	7.7	9.8	9.5	9.6
11	8.8	8.2	8.4	7.4	7.1	7.3	7.8	7.2	7.6	9.7	9.3	9.5
12	8.9	8.2	8.6	7.5	7.3	7.4	8.1	7.5	7.8	9.4	9.1	9.3
13	9.6	8.9	9.2	7.8	7.4	7.6	8.1	7.8	8.0	9.4	9.1	9.2
14	9.4	8.6	9.2	8.2	7.6	7.9	7.9	7.5	7.8	9.3	8.3	8.9
15	9.0	8.3	8.8	8.2	7.8	7.9	8.2	7.7	8.0	9.4	8.4	9.1
16	9.0	8.3	8.6	8.2	7.1	8.0	8.3	7.9	8.1	9.2	8.8	9.0
17	8.8	8.5	8.7	7.9	7.1	7.7	8.0	7.6	7.8	8.8	7.3	8.2
18	8.8	8.1	8.5	8.1	7.6	7.9	7.8	7.5	7.7	9.0	7.3	7.7
19	8.7	7.8	8.3	8.6	7.8	8.1	7.9	7.3	7.5	8.9	8.1	8.4
20	8.8	7.9	8.5	8.0	7.3	7.7	7.9	7.2	7.5	9.2	8.6	8.9
21	8.5	7.7	8.1	7.7	7.1	7.4	7.9	7.0	7.5	9.0	8.4	8.6
22	8.3	7.8	8.0	8.0	7.4	7.6	7.7	7.1	7.4	8.6	8.2	8.4
23	8.7	8.0	8.3	8.0	7.5	7.7	7.5	7.3	7.4	8.7	8.4	8.6
24	8.7	8.0	8.3	8.0	7.5	7.8	8.2	7.4	7.8	8.9	8.4	8.6
25	8.6	7.9	8.2	8.6	7.6	8.1	7.8	7.1	7.4	8.9	8.6	8.8
26	8.2	7.7	8.1	8.1	7.7	7.9	8.0	7.0	7.6	9.0	8.8	8.9
27	8.0	7.4	7.7	8.1	7.7	7.9	8.7	7.7	8.3	9.1	8.8	9.0
28	7.4	6.8	7.1	8.1	7.6	7.9	9.0	8.4	8.7	9.4	9.1	9.3
29	7.6	6.7	7.1	8.1	7.5	7.8	9.1	8.6	8.8	9.5	9.3	9.4
30	7.7	7.3	7.5	7.8	7.0	7.5	8.8	8.4	8.6	9.7	9.4	9.6
31	---	---	---	7.6	6.9	7.3	8.9	8.4	8.6	---	---	---
MONTH	9.6	6.7	8.4	8.6	6.9	7.8	9.1	6.8	7.8	9.8	7.3	9.0

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	774	852	879	889	e874	e832	1020	1130	1010	809	755	836
2	757	841	e820	866	e864	e839	1020	1160	984	797	795	806
3	765	833	e677	851	e877	e660	1010	1110	991	784	874	781
4	801	833	e790	866	e886	e723	1060	1080	988	819	954	780
5	938	847	e953	861	e825	e867	954	1080	998	780	858	769
6	873	870	933	851	e794	e775	992	1120	989	795	889	756
7	880	867	928	e809	e766	e790	1080	1120	937	785	821	747
8	841	872	913	880	e735	e823	1020	1110	994	784	850	731
9	842	867	e787	895	e847	e673	1010	1070	986	751	911	729
10	822	934	e837	892	e822	e701	1040	1050	1020	833	856	736
11	809	998	e933	e794	e693	659	1150	1140	1160	1170	798	728
12	806	963	886	e794	e734	732	1260	1240	1130	1170	792	712
13	865	919	885	869	e761	e832	1190	1230	1080	1050	764	719
14	825	895	883	e807	e738	e797	1180	1170	1000	1000	758	717
15	838	871	883	e779	e805	e867	1210	1100	952	934	759	744
16	833	856	889	e774	e787	895	1400	1070	920	937	757	741
17	815	851	841	e750	e768	1130	1480	1040	885	891	752	726
18	809	844	881	e682	e838	1140	1450	1020	878	846	724	735
19	854	857	923	e745	e841	1150	1470	1000	843	821	721	763
20	862	859	980	e753	e809	1100	1530	1010	819	822	715	744
21	849	882	949	e703	e846	1190	1540	961	811	918	740	744
22	869	893	921	e733	e899	1180	1430	991	786	887	763	780
23	879	857	894	e705	e849	1180	1330	997	805	878	755	867
24	869	879	890	e778	e773	1110	1260	1180	784	813	757	867
25	866	880	885	e843	e748	1100	1240	1290	763	785	745	858
26	875	878	887	e827	e726	1060	1170	1190	793	768	762	813
27	887	846	880	e711	e797	1050	1140	1110	781	798	787	856
28	862	843	849	e729	e834	1050	1110	1050	789	773	794	866
29	847	859	897	e848	---	1080	1060	1000	884	764	873	865
30	843	892	904	e800	---	1080	1050	963	821	748	958	867
31	848	---	894	e814	---	1040	---	1020	---	742	889	---
TOTAL	26103	26238	27351	24898	22536	29105	35856	33802	27581	26452	24926	23383
MEAN	842	875	882	803	805	939	1195	1090	919	853	804	779
MAX	938	998	980	895	899	1190	1540	1290	1160	1170	958	867
MIN	757	833	677	682	693	659	954	961	763	742	715	712
CFSM	0.56	0.58	0.58	0.53	0.53	0.62	0.79	0.72	0.61	0.56	0.53	0.52
IN.	0.64	0.65	0.67	0.61	0.55	0.72	0.88	0.83	0.68	0.65	0.61	0.57

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2003, BY WATER YEAR (WY)

MEAN	963	996	1005	958	1002	1130	1485	1218	1063	903	860	844
MAX	1074	1098	1229	1179	1162	1380	2300	1662	1121	1020	1020	1022
(WY)	1997	1997	1997	1997	1997	1998	1997	1997	2002	1999	1997	1997
MIN	809	875	839	803	805	939	979	967	919	795	781	777
(WY)	2001	2003	2001	2003	2003	2003	2000	1999	2003	2001	2001	2002

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1997 - 2003	
ANNUAL TOTAL	367466		328231			
ANNUAL MEAN	1007		899		1035	
HIGHEST ANNUAL MEAN					1260	1997
LOWEST ANNUAL MEAN					899	2003
HIGHEST DAILY MEAN	2180	Mar 10	1540	Apr 21	4790	Apr 1 1998
LOWEST DAILY MEAN	677	Dec 3	659	Mar 11	659	Mar 11 2003
ANNUAL SEVEN-DAY MINIMUM	750	Sep 12	724	Jan 17	724	Jan 17 2003
MAXIMUM PEAK FLOW			(a)1600	Apr 20	(b)4990	Apr 1 1998
MAXIMUM PEAK STAGE			(c)12.91	Jan 17	(c)14.40	Jan 1 1999
INSTANTANEOUS LOW FLOW			(d)363	Mar 11	(d)363	Mar 11 2003
ANNUAL RUNOFF (CFSM)	0.67		0.59		0.68	
ANNUAL RUNOFF (INCHES)	9.03		8.07		9.30	
10 PERCENT EXCEEDS	1330		1120		1290	
50 PERCENT EXCEEDS	918		862		980	
90 PERCENT EXCEEDS	791		745		795	

(a) Gage height 8.20 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. 1, 2, Nov. 15-23, Feb. 19-24, May 27 to June 1, June 19-21, Aug. 9-12 rated good; Nov. 24, 25, Feb. 25 to Mar. 7, June 2-11, 22-26, Aug. 13-19 rated fair; and Mar. 8-13, June 12, 13, June 27 to July 8, Aug. 20-26 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, June 25, July 7, Aug. 15, 16, 21; minimum, -0.5°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 14.1 mg/L, Nov. 27, Dec. 4; minimum, 6.4 mg/L, July 30.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	17.5	14.5	16.0	5.0	3.5	4.5	1.0	-0.5	0.5	1.0	0.5	0.5
2	16.5	14.5	15.5	4.5	4.0	4.0	0.5	-0.5	0.0	1.0	0.0	0.5
3	14.5	13.0	13.5	4.5	3.5	4.0	0.0	-0.5	-0.5	1.5	1.0	1.5
4	15.5	13.5	14.5	4.5	4.0	4.5	0.5	-0.5	0.0	1.5	0.0	1.0
5	15.0	13.0	14.0	4.0	3.5	3.5	1.0	0.0	0.5	1.5	0.5	1.0
6	13.5	12.0	13.0	4.0	3.5	4.0	1.0	0.5	0.5	1.5	-0.5	0.5
7	13.5	11.5	12.0	3.5	2.0	2.5	1.0	0.0	0.5	1.0	-0.5	0.0
8	11.5	10.0	10.5	5.5	3.0	4.0	1.0	-0.5	0.0	2.0	1.0	1.0
9	12.0	10.5	11.5	6.0	4.0	5.0	0.0	-0.5	0.0	2.0	0.5	1.5
10	11.5	9.5	10.5	7.0	6.0	6.5	0.5	-0.5	0.0	0.5	-0.5	0.0
11	12.0	10.0	11.0	6.5	5.0	5.5	1.0	-0.5	0.5	0.0	-0.5	0.0
12	12.0	10.0	11.0	5.0	4.5	5.0	1.5	-0.5	0.5	0.5	-0.5	0.0
13	11.5	9.5	10.5	5.5	4.5	5.0	1.5	1.5	1.5	0.5	-0.5	0.0
14	9.5	7.5	9.0	6.0	5.0	5.5	1.5	1.5	1.5	0.5	-0.5	0.0
15	10.0	8.0	9.5	5.0	3.5	4.0	1.5	0.5	1.0	0.0	-0.5	-0.5
16	9.5	8.0	8.5	3.5	2.5	3.0	0.5	-0.5	0.0	0.0	-0.5	-0.5
17	8.5	6.5	7.5	3.5	3.0	3.0	0.5	-0.5	0.0	0.0	-0.5	-0.5
18	8.0	7.0	7.5	3.5	2.0	2.5	2.5	0.5	1.5	-0.5	-0.5	-0.5
19	8.0	7.0	7.5	3.5	2.5	3.0	4.0	2.5	3.5	-0.5	-0.5	-0.5
20	7.0	6.0	6.5	3.5	1.5	2.5	3.5	1.5	2.0	-0.5	-0.5	-0.5
21	6.5	5.0	6.0	3.5	2.5	3.0	1.5	1.0	1.0	-0.5	-0.5	-0.5
22	6.5	5.5	6.0	3.0	2.0	2.5	1.0	1.0	1.0	-0.5	-0.5	-0.5
23	6.0	4.5	5.5	2.5	2.0	2.5	1.5	1.0	1.5	0.0	-0.5	-0.5
24	6.0	4.5	5.5	3.0	2.5	2.5	2.0	0.5	1.0	-0.5	-0.5	-0.5
25	5.5	4.5	5.0	3.0	2.0	2.5	2.0	1.0	1.5	-0.5	-0.5	-0.5
26	6.0	5.0	5.5	2.0	1.0	1.5	1.5	1.0	1.0	0.0	-0.5	-0.5
27	6.0	5.5	5.5	2.0	0.0	1.0	1.0	0.0	0.5	0.0	-0.5	-0.5
28	5.5	5.0	5.0	2.0	1.5	2.0	2.0	1.0	1.5	0.0	-0.5	-0.5
29	5.0	3.5	4.0	3.5	2.0	3.0	1.5	0.5	1.5	-0.5	-0.5	-0.5
30	6.0	4.5	5.0	3.5	0.5	2.0	2.5	1.5	1.5	-0.5	-0.5	-0.5
31	5.5	4.5	5.0	---	---	---	2.5	1.0	2.0	-0.5	-0.5	-0.5
MONTH	17.5	3.5	9.0	7.0	0.0	3.5	4.0	-0.5	0.9	2.0	-0.5	0.0

STREAMS TRIBUTARY TO LAKE HURON

04136900 AU SABLE RIVER NEAR MC KINLEY, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	0.0	-0.5	0.0	0.0	0.0	0.0	6.5	4.0	5.5	13.0	10.5	11.5
2	-0.5	-0.5	-0.5	0.0	-0.5	0.0	6.5	4.0	5.0	13.0	10.5	12.0
3	-0.5	-0.5	-0.5	0.0	-0.5	0.0	4.0	1.0	3.0	13.5	9.0	11.5
4	-0.5	-0.5	-0.5	0.0	0.0	0.0	1.5	0.5	1.0	13.5	9.0	11.5
5	-0.5	-0.5	-0.5	0.0	0.0	0.0	2.5	0.5	1.5	13.0	10.0	10.5
6	0.0	-0.5	-0.5	0.0	0.0	0.0	4.0	0.0	2.5	11.5	10.0	10.5
7	0.0	-0.5	-0.5	0.0	-0.5	0.0	3.5	1.0	2.0	13.5	10.0	12.0
8	0.0	-0.5	-0.5	0.0	-0.5	0.0	4.5	1.0	2.5	14.0	10.0	12.5
9	0.0	-0.5	-0.5	0.0	0.0	0.0	5.5	1.0	3.5	13.0	9.5	11.5
10	0.0	-0.5	0.0	0.0	0.0	0.0	6.5	2.0	4.5	16.0	11.0	13.5
11	0.0	-0.5	0.0	0.0	0.0	0.0	7.5	3.0	5.5	15.5	12.5	13.5
12	0.0	-0.5	-0.5	0.0	-0.5	0.0	8.0	4.0	6.5	12.5	11.5	12.0
13	-0.5	-0.5	-0.5	0.0	0.0	0.0	9.0	4.5	7.0	15.0	10.5	12.5
14	0.0	-0.5	-0.5	1.0	0.0	0.0	12.0	7.0	9.5	15.0	11.0	13.5
15	0.0	-0.5	0.0	3.0	0.0	1.0	13.5	9.5	11.5	14.5	10.5	13.0
16	-0.5	-0.5	-0.5	5.0	1.0	3.0	12.5	8.0	9.0	14.5	11.5	12.5
17	0.0	-0.5	-0.5	4.5	1.0	3.0	9.0	7.5	8.0	15.0	12.0	13.5
18	0.0	-0.5	-0.5	3.5	2.0	2.5	8.5	8.0	8.0	17.0	12.5	14.5
19	0.0	-0.5	0.0	4.5	0.5	2.5	9.5	7.0	8.0	17.5	13.0	15.5
20	0.0	-0.5	-0.5	5.5	3.0	4.0	9.5	7.5	8.5	17.0	14.0	15.0
21	0.0	-0.5	0.0	5.5	4.0	5.0	9.0	8.5	8.5	16.5	12.5	14.5
22	0.0	-0.5	0.0	5.0	3.5	4.5	9.5	7.5	8.5	16.5	12.0	14.5
23	0.0	-0.5	0.0	5.0	4.0	4.5	11.0	7.0	9.0	16.0	12.5	14.0
24	0.0	0.0	0.0	6.5	4.0	5.0	11.0	7.5	9.5	13.5	12.5	13.0
25	0.0	-0.5	0.0	7.5	5.0	6.5	11.0	8.0	9.5	15.0	13.0	14.0
26	0.0	-0.5	0.0	7.0	3.5	5.5	11.5	7.0	9.5	15.5	12.5	14.0
27	0.0	-0.5	0.0	6.0	3.5	5.0	13.0	8.0	11.0	16.0	11.5	14.0
28	0.0	0.0	0.0	7.0	4.5	6.0	14.0	10.5	12.5	16.0	12.0	14.5
29	---	---	---	7.0	4.5	5.0	13.5	9.5	12.0	17.0	13.5	15.5
30	---	---	---	5.5	3.0	4.5	13.0	9.5	11.0	16.0	13.5	14.5
31	---	---	---	6.0	3.5	5.0	---	---	---	14.5	13.5	14.0
MONTH	0.0	-0.5	-0.3	7.5	-0.5	2.3	14.0	0.0	7.1	17.5	9.0	13.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.5	12.0	14.5	21.5	18.0	20.0	21.5	19.5	20.5	19.0	16.5	17.5
2	17.0	13.0	15.0	22.0	18.0	20.5	21.0	19.0	20.0	19.0	16.0	17.5
3	16.5	13.0	14.5	22.0	19.0	21.0	20.5	19.0	19.5	18.5	16.0	17.5
4	15.0	11.5	13.0	22.5	19.5	21.5	21.0	18.5	20.0	17.0	15.5	16.0
5	17.0	12.5	14.5	22.0	19.5	21.0	21.5	19.0	20.5	17.5	14.0	16.0
6	16.5	13.5	15.5	23.0	19.0	21.0	22.0	19.0	20.5	18.0	14.5	16.5
7	16.0	14.5	15.5	23.5	20.5	22.0	21.5	19.0	20.0	18.0	16.0	17.0
8	15.5	13.5	14.5	23.0	21.0	22.0	20.5	18.5	19.5	17.5	15.0	16.5
9	17.0	13.5	15.5	21.0	19.0	20.0	20.0	18.5	19.5	17.5	14.5	16.5
10	16.0	14.0	14.5	20.5	18.0	18.5	22.5	18.0	20.0	17.5	14.5	16.5
11	18.0	14.0	16.0	19.0	18.0	18.5	22.0	18.5	20.0	18.5	15.0	17.0
12	17.5	13.5	16.0	21.0	17.5	19.0	21.0	18.0	19.5	18.5	16.0	17.5
13	17.5	14.5	16.5	20.0	17.0	19.0	22.5	18.5	20.5	19.0	16.5	18.0
14	20.0	15.0	17.5	21.0	16.0	19.0	23.0	19.5	21.0	19.0	16.5	18.0
15	20.0	16.0	18.5	20.0	17.5	18.5	23.5	20.0	22.0	18.5	16.5	17.5
16	20.5	15.5	18.0	21.5	17.0	19.0	23.5	21.0	22.0	18.0	15.0	16.5
17	21.0	15.5	18.5	20.5	18.0	19.5	22.5	19.0	21.0	18.5	15.5	17.5
18	21.0	17.5	19.5	21.0	16.5	19.0	22.5	18.0	20.5	18.5	16.0	17.5
19	20.5	17.0	19.0	21.0	17.0	19.5	22.5	19.0	21.0	18.0	15.5	16.5
20	21.0	16.0	18.5	20.5	18.5	20.0	23.0	20.0	21.5	17.0	14.5	15.5
21	21.5	17.0	19.5	20.0	18.5	19.5	23.5	20.5	22.0	16.5	13.5	15.5
22	22.5	18.0	20.0	20.5	17.5	19.0	22.5	20.0	21.5	16.0	14.5	15.0
23	23.0	18.5	21.0	21.5	17.5	19.5	21.5	18.5	20.0	15.5	14.0	15.0
24	23.0	19.5	21.5	21.5	17.5	20.0	20.5	17.5	19.0	15.0	13.0	14.0
25	23.5	21.0	22.0	22.0	18.0	20.5	22.0	19.0	20.5	14.5	12.5	13.5
26	22.5	20.0	21.0	21.5	19.0	20.5	22.0	19.5	21.0	13.0	11.5	12.5
27	21.0	18.5	20.0	23.0	20.0	21.5	21.0	19.0	20.0	13.5	12.0	13.0
28	20.0	17.5	18.5	22.0	18.5	20.0	20.5	16.5	19.0	12.5	11.0	12.0
29	21.5	17.5	19.5	21.5	18.5	20.0	21.5	19.0	20.5	12.0	10.5	11.5
30	21.5	17.5	20.0	22.5	19.0	21.0	20.0	17.0	18.5	11.5	10.0	10.5
31	---	---	---	23.0	19.5	21.5	19.0	16.5	18.0	---	---	---
MONTH	23.5	11.5	17.6	23.5	16.0	20.0	23.5	16.5	20.3	19.0	10.0	15.7

STREAMS TRIBUTARY TO LAKE HURON

04136900 AU SABLE RIVER NEAR MC KINLEY, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.1	8.1	9.0	12.4	11.3	11.9	14.0	12.5	13.3	13.5	12.6	13.0
2	9.7	7.9	8.8	12.3	11.2	11.8	13.5	12.4	13.0	13.3	12.5	12.9
3	10.3	8.7	9.4	12.7	11.6	12.1	13.6	12.8	13.2	13.0	12.3	12.6
4	9.5	8.5	8.9	12.4	11.4	11.9	14.1	12.6	13.4	13.3	12.3	12.7
5	10.4	8.4	9.3	12.4	11.7	12.0	13.9	12.7	13.4	13.1	12.3	12.6
6	10.3	8.9	9.5	12.3	11.5	11.8	13.9	13.1	13.5	13.5	12.4	12.7
7	10.7	8.7	9.6	12.9	11.8	12.3	13.7	13.1	13.3	12.9	12.0	12.3
8	10.4	9.4	9.8	12.4	11.5	11.9	13.7	12.8	13.3	12.4	10.9	11.5
9	10.5	9.1	9.8	12.3	11.3	11.7	13.4	12.6	13.1	12.3	10.7	11.1
10	10.8	9.4	10.0	11.3	10.7	11.0	13.8	12.6	13.2	12.6	11.8	12.3
11	10.8	9.4	10.0	12.4	10.8	11.6	13.8	12.4	13.2	12.6	11.9	12.2
12	11.0	9.4	10.0	12.1	11.4	11.7	13.9	12.4	13.2	13.2	11.9	12.4
13	10.9	9.3	10.1	12.3	11.3	11.7	13.1	12.6	12.8	12.7	11.8	12.3
14	11.2	9.9	10.5	11.6	10.9	11.2	13.2	12.5	12.8	13.3	11.9	12.4
15	10.9	9.4	10.1	12.5	11.2	11.9	13.2	12.6	12.9	13.2	12.0	12.4
16	11.0	9.5	10.2	13.0	12.0	12.4	13.7	12.4	13.1	12.9	12.3	12.6
17	11.2	9.8	10.4	12.9	11.9	12.4	13.9	12.4	13.2	13.2	12.4	12.7
18	10.9	9.8	10.3	13.0	12.0	12.5	13.3	12.1	12.9	13.0	12.3	12.6
19	11.0	9.8	10.4	13.0	12.1	12.5	12.7	11.8	12.2	12.8	12.0	12.3
20	11.2	10.2	10.7	13.2	12.2	12.7	13.0	11.9	12.5	12.5	12.0	12.2
21	11.6	10.6	11.0	12.7	12.0	12.3	13.3	12.3	12.8	12.5	12.1	12.3
22	11.3	10.4	10.9	13.2	12.0	12.6	13.1	12.5	12.8	12.3	11.6	12.0
23	11.9	10.6	11.3	12.8	12.3	12.5	13.0	12.1	12.6	12.0	11.2	11.8
24	12.1	11.0	11.5	12.8	12.1	12.5	13.1	12.4	12.7	11.9	11.3	11.6
25	11.9	10.7	11.2	13.4	12.3	12.9	12.9	12.1	12.5	11.7	11.0	11.4
26	11.6	10.7	11.1	13.9	13.0	13.4	13.1	12.3	12.8	11.6	11.0	11.3
27	11.5	10.3	10.9	14.1	13.0	13.5	13.6	12.1	12.9	11.7	11.0	11.3
28	11.8	10.6	11.2	13.5	12.8	13.1	13.2	12.5	12.8	11.3	10.5	10.9
29	12.2	11.1	11.5	13.0	12.2	12.6	13.3	12.4	12.8	11.2	10.6	11.0
30	12.4	10.8	11.6	13.4	12.1	12.9	12.6	12.1	12.4	11.4	10.9	11.1
31	12.2	11.3	11.7	---	---	---	13.0	11.9	12.5	11.2	10.7	10.9
MONTH	12.4	7.9	10.3	14.1	10.7	12.2	14.1	11.8	12.9	13.5	10.5	12.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	11.1	10.5	10.8	12.5	11.9	12.2	12.0	10.2	11.5	---	---	---
2	11.2	10.7	10.9	12.5	11.8	12.2	11.7	10.8	11.3	---	---	---
3	11.3	10.8	11.0	12.4	12.0	12.1	12.2	11.4	11.8	11.3	9.8	10.6
4	11.4	10.6	10.9	12.2	11.8	12.0	12.6	12.1	12.4	11.3	9.7	10.6
5	11.5	11.0	11.2	12.5	11.8	12.3	12.9	12.2	12.5	10.7	9.6	10.2
6	11.5	11.1	11.3	12.5	12.0	12.3	13.0	11.8	12.5	10.7	9.8	10.3
7	11.5	11.1	11.3	12.4	11.9	12.2	13.0	11.8	12.5	11.1	9.7	10.4
8	11.5	11.0	11.2	12.4	12.1	12.2	12.7	11.8	12.4	10.9	9.5	10.2
9	11.6	11.1	11.3	12.3	12.1	12.2	12.7	11.3	12.2	10.9	9.4	10.1
10	11.6	11.1	11.3	12.5	12.2	12.3	12.4	10.8	11.7	10.6	8.8	9.8
11	11.6	11.2	11.4	12.7	12.0	12.3	11.9	10.4	11.3	10.2	8.6	9.3
12	11.4	11.0	11.2	12.6	12.1	12.3	11.6	9.9	11.0	10.2	8.9	9.5
13	11.5	11.2	11.4	12.9	12.4	12.6	11.5	10.1	10.9	10.8	9.3	10.0
14	11.4	11.0	11.2	13.3	12.4	12.7	10.8	9.3	10.2	10.4	8.8	9.7
15	12.0	11.2	11.4	13.1	12.2	12.6	10.3	9.0	9.6	11.2	8.8	10.0
16	11.7	11.4	11.5	13.0	11.9	12.5	10.3	8.8	9.7	10.5	9.5	10.0
17	11.7	11.2	11.4	12.8	11.9	12.5	10.7	9.6	10.0	11.1	9.5	10.3
18	11.6	11.0	11.3	13.0	12.3	12.7	10.2	9.6	9.9	11.0	9.1	10.1
19	11.6	11.1	11.3	13.0	12.0	12.7	---	---	---	11.0	8.9	9.9
20	11.9	11.3	11.6	12.2	11.5	11.9	---	---	---	10.5	8.6	9.4
21	11.9	11.3	11.6	12.0	11.3	11.7	---	---	---	10.9	9.0	9.9
22	12.0	11.3	11.8	12.4	11.5	11.9	---	---	---	10.8	8.8	9.8
23	12.2	11.8	11.9	12.2	11.5	11.8	---	---	---	10.6	8.6	9.5
24	12.2	11.7	12.0	12.2	11.4	11.8	---	---	---	9.6	8.9	9.2
25	12.4	12.0	12.1	12.2	11.1	11.6	---	---	---	10.0	8.6	9.2
26	12.5	12.0	12.2	12.4	11.3	11.9	---	---	---	10.1	8.5	9.2
27	12.3	12.0	12.1	12.5	11.4	11.9	---	---	---	10.2	8.5	9.4
28	12.3	11.8	12.1	12.0	10.3	11.5	---	---	---	10.4	8.4	9.4
29	---	---	---	12.5	10.3	11.7	---	---	---	10.3	8.2	9.3
30	---	---	---	12.7	11.6	12.1	---	---	---	9.9	8.1	9.0
31	---	---	---	12.5	11.4	12.0	---	---	---	10.4	8.2	9.2
MONTH	12.5	10.5	11.5	13.3	10.3	12.2	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE HURON

04136900 AU SABLE RIVER NEAR MC KINLEY, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.5	8.6	9.6	9.4	7.4	8.4	9.2	6.8	8.0	10.2	7.9	9.0
2	10.3	8.4	9.3	9.7	7.5	8.6	8.9	7.0	7.8	10.1	8.2	9.1
3	10.3	8.1	9.2	9.6	7.5	8.5	9.0	7.0	7.8	10.0	8.0	9.0
4	10.1	8.5	9.3	9.7	7.4	8.4	9.0	7.1	7.9	10.2	8.1	9.2
5	10.0	8.3	9.2	9.4	7.4	8.4	9.3	7.1	8.1	10.3	8.6	9.4
6	9.9	7.9	8.8	9.8	7.6	8.6	9.3	7.0	8.1	10.4	8.3	9.3
7	9.6	7.7	8.6	9.5	7.4	8.4	9.1	7.0	8.0	10.5	8.1	9.2
8	9.8	7.9	8.8	9.7	7.3	8.4	9.1	7.2	8.1	10.4	8.1	9.2
9	9.8	7.7	8.8	9.9	7.3	8.6	9.0	7.3	8.2	10.4	8.2	9.3
10	9.4	7.8	8.5	8.4	7.4	8.0	9.4	7.4	8.4	10.4	8.3	9.3
11	9.4	7.7	8.5	8.6	7.5	8.0	9.1	7.1	8.1	10.2	8.1	9.1
12	9.5	7.8	8.5	9.9	7.7	8.7	9.1	7.2	8.1	9.9	7.9	8.8
13	9.0	7.6	8.3	9.8	7.7	8.7	9.5	7.1	8.2	9.9	7.8	8.8
14	9.4	7.5	8.5	10.3	7.7	9.0	9.7	7.2	8.4	9.7	7.6	8.5
15	9.3	7.3	8.3	9.7	7.5	8.5	9.6	7.0	8.3	9.5	7.7	8.6
16	9.3	7.5	8.3	10.1	7.8	8.9	9.3	7.0	8.1	10.0	8.2	9.0
17	9.2	7.3	8.2	9.5	7.4	8.5	9.6	7.3	8.4	10.0	8.1	9.0
18	8.8	6.9	7.8	9.8	7.6	8.7	9.7	7.5	8.5	10.0	7.9	8.9
19	9.2	7.1	8.2	9.7	7.3	8.5	9.6	7.3	8.4	9.9	8.0	8.8
20	9.2	7.4	8.2	9.3	7.1	8.1	9.5	7.1	8.3	10.2	8.4	9.3
21	9.1	7.1	8.1	9.4	7.4	8.4	9.4	7.1	8.1	10.4	8.4	9.3
22	9.1	7.0	8.1	9.6	7.6	8.6	9.4	7.1	8.3	9.4	8.3	8.8
23	9.1	6.9	8.0	9.7	7.5	8.6	9.8	7.6	8.7	10.0	8.3	9.1
24	9.1	6.8	7.9	9.6	7.4	8.5	9.8	7.7	8.6	10.1	8.7	9.2
25	8.9	6.7	7.8	9.6	7.2	8.4	9.7	7.6	8.6	10.5	8.6	9.5
26	8.5	6.7	7.7	9.0	6.9	7.8	9.7	7.4	8.4	10.4	8.9	9.6
27	9.0	7.3	8.0	9.0	6.8	7.9	10.0	7.5	8.7	10.4	8.8	9.6
28	8.9	7.1	8.0	9.3	6.9	8.2	10.2	7.9	9.0	10.6	9.2	9.8
29	9.2	7.6	8.4	9.4	7.0	8.2	9.8	7.5	8.6	10.9	9.4	10.1
30	9.4	7.5	8.4	9.4	6.4	8.1	10.1	7.9	8.9	11.0	9.5	10.2
31	---	---	---	9.3	6.9	8.1	10.3	8.0	9.1	---	---	---
MONTH	10.5	6.7	8.4	10.3	6.4	8.4	10.3	6.8	8.3	11.0	7.6	9.2

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	859	908	936	907	909	860	1000	1230	1110	896	823	919
2	841	903	858	889	915	885	1010	1250	1070	894	871	893
3	826	884	722	861	917	679	1000	1210	1080	887	930	854
4	948	899	822	883	924	720	1090	1140	1050	904	1060	859
5	1000	907	1010	882	851	908	959	1160	1100	847	931	851
6	940	948	954	844	827	834	951	1210	1090	856	962	835
7	937	912	951	854	790	816	1030	1190	1020	867	908	833
8	906	934	919	893	742	868	1000	1200	1160	848	924	810
9	910	924	818	910	883	687	979	1160	1110	807	983	807
10	889	996	866	884	858	693	989	1140	1140	981	945	810
11	876	1060	1010	819	712	868	1110	1250	1280	1270	874	824
12	875	1010	905	831	719	902	1240	1360	1260	1260	860	806
13	934	978	912	868	775	879	1240	1330	1170	1130	849	802
14	896	960	905	838	774	868	1220	1270	1120	1100	843	795
15	898	917	908	796	819	922	1260	1190	1040	1040	840	848
16	887	913	899	784	818	937	1460	1160	1020	1010	828	838
17	876	903	875	761	791	1150	1560	1130	989	979	842	814
18	886	895	894	682	860	1150	1540	1120	1010	925	786	808
19	925	921	972	756	889	1180	1540	1090	932	896	805	835
20	928	909	1020	763	850	1130	1600	1120	918	916	784	810
21	914	940	990	671	878	1190	1660	1040	912	1000	831	792
22	927	964	945	723	924	1200	1530	1050	876	964	831	994
23	933	911	921	704	889	1190	1420	1080	892	947	818	843
24	925	929	913	818	806	1110	1350	1420	879	902	820	904
25	934	931	906	898	775	1100	1330	1430	860	876	813	891
26	940	931	906	870	754	1070	1240	1310	882	863	820	876
27	946	906	896	711	821	1030	1220	1220	884	895	864	929
28	924	887	858	740	864	1050	1190	1150	900	849	863	926
29	903	913	914	884	---	1090	1140	1110	1010	839	978	891
30	895	956	930	848	---	1070	1150	1080	896	815	1010	889
31	898	---	920	854	---	1030	---	1120	---	855	962	---
TOTAL	28176	27949	28255	25426	23334	30066	37008	36920	30660	29118	27258	25586
MEAN	909	932	911	820	833	970	1234	1191	1022	939	879	853
MAX	1000	1060	1020	910	924	1200	1660	1430	1280	1270	1060	994
MIN	826	884	722	671	712	679	951	1040	860	807	784	792
CFSM	0.57	0.58	0.57	0.51	0.52	0.61	0.77	0.75	0.64	0.59	0.55	0.53
IN.	0.66	0.65	0.66	0.59	0.54	0.70	0.86	0.86	0.71	0.68	0.63	0.60

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1997 - 2003, BY WATER YEAR (WY)

MEAN	1019	1045	1052	1024	1077	1203	1558	1299	1126	950	902	897
MAX	1132	1153	1227	1236	1235	1474	2390	1786	1225	1083	1054	1098
(WY)	2002	1998	1997	1997	1997	1998	1997	1997	1997	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1997 - 2003	
ANNUAL TOTAL	397627		349756			
ANNUAL MEAN	1089		958		1095	
HIGHEST ANNUAL MEAN					1320	1997
LOWEST ANNUAL MEAN					958	2003
HIGHEST DAILY MEAN	2340	Mar 10	1660	Apr 21	5410	Apr 1 1998
LOWEST DAILY MEAN	722	Dec 3	671	Jan 21	671	Jan 21 2003
ANNUAL SEVEN-DAY MINIMUM	813	Sep 12	723	Jan 17	723	Jan 17 2003
MAXIMUM PEAK FLOW			1700	Apr 21	5520	Apr 1 1998
MAXIMUM PEAK STAGE			9.28	Apr 21	13.56	Apr 1 1998
INSTANTANEOUS LOW FLOW			551	Mar 3	525	Jan 31 2000
ANNUAL RUNOFF (CFSM)	0.68		0.60		0.69	
ANNUAL RUNOFF (INCHES)	9.26		8.14		9.31	
10 PERCENT EXCEEDS	1470		1190		1370	
50 PERCENT EXCEEDS	980		910		1030	
90 PERCENT EXCEEDS	856		809		835	

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 good. Dissolved oxygen records rated excellent except the following periods: Oct. 28, 29, Nov. 1, 2, Jan. 14-27, Feb. 24 to Mar. 5, Mar. 16, 17, 23-28 rated good; Oct. 1-3, Nov. 3-6, Mar. 6-15, Mar. 29 to Apr. 6, May 15-22 rated fair; and Oct. 9, 10, 12-19, 23, 30, 31, Apr. 7-15, May 23 to June 12 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, 24.0°C, Aug. 22; minimum, 0.0°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 13.1 mg/L, Nov. 30, Dec. 6-9; minimum, 5.6 mg/L, Aug. 10.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	17.0	15.5	16.0	5.5	5.0	5.0	2.0	1.5	2.0	1.5	1.5	1.5
2	17.0	16.0	16.5	5.0	4.5	4.5	2.0	1.5	2.0	1.5	1.5	1.5
3	16.5	16.0	16.0	4.5	4.5	4.5	2.0	1.5	1.5	1.5	1.5	1.5
4	16.5	15.5	16.0	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.0	1.5
5	16.5	15.5	16.0	4.5	4.0	4.5	1.5	1.5	1.5	1.5	1.0	1.5
6	15.5	15.0	15.5	4.5	4.0	4.0	1.5	1.0	1.5	1.5	1.0	1.5
7	15.0	14.0	14.5	4.0	3.5	4.0	1.0	1.0	1.0	1.5	1.0	1.5
8	14.0	13.5	14.0	4.0	3.5	4.0	1.0	1.0	1.0	1.5	1.5	1.5
9	14.0	13.5	13.5	4.0	4.0	4.0	1.0	1.0	1.0	1.5	1.0	1.0
10	13.5	12.5	13.0	5.0	4.0	4.5	1.0	1.0	1.0	1.0	1.0	1.0
11	12.5	12.0	12.5	5.0	4.5	5.0	1.0	1.0	1.0	1.5	1.0	1.0
12	13.0	11.5	12.0	5.0	4.5	5.0	1.0	1.0	1.0	1.5	1.0	1.5
13	13.0	12.0	12.5	5.0	4.5	5.0	1.0	1.0	1.0	1.0	1.0	1.0
14	12.0	11.5	12.0	5.0	5.0	5.0	1.0	0.5	1.0	1.0	1.0	1.0
15	12.0	11.5	11.5	5.0	4.0	4.5	1.0	0.5	1.0	1.0	1.0	1.0
16	11.5	11.0	11.0	4.0	3.5	4.0	1.0	1.0	1.0	1.0	1.0	1.0
17	11.0	10.0	10.5	4.0	3.0	3.5	1.0	1.0	1.0	1.0	1.0	1.0
18	10.0	9.5	10.0	3.5	3.0	3.0	1.0	1.0	1.0	1.0	0.5	1.0
19	---	---	---	3.5	3.0	3.0	1.0	1.0	1.0	1.0	0.5	1.0
20	9.0	8.5	9.0	3.0	3.0	3.0	1.0	1.0	1.0	1.0	0.5	0.5
21	8.5	8.0	8.0	3.0	3.0	3.0	1.0	1.0	1.0	0.5	0.5	0.5
22	8.0	7.5	8.0	3.0	2.5	3.0	1.5	1.0	1.5	0.5	0.5	0.5
23	7.5	7.5	7.5	2.5	2.5	2.5	1.5	1.5	1.5	0.5	0.5	0.5
24	7.5	7.0	7.0	2.5	2.5	2.5	1.5	1.5	1.5	0.5	0.5	0.5
25	7.0	6.5	7.0	2.5	2.0	2.0	1.5	1.5	1.5	0.5	0.5	0.5
26	6.5	6.5	6.5	2.0	2.0	2.0	1.5	1.5	1.5	0.5	0.5	0.5
27	6.5	6.0	6.5	2.0	2.0	2.0	1.5	1.5	1.5	0.5	0.5	0.5
28	6.0	6.0	6.0	2.5	2.0	2.5	1.5	1.5	1.5	0.5	0.5	0.5
29	6.0	5.5	5.5	2.0	2.0	2.0	1.5	1.5	1.5	0.5	0.5	0.5
30	6.0	5.5	5.5	2.0	2.0	2.0	1.5	1.5	1.5	0.5	0.5	0.5
31	6.0	5.5	5.5	---	---	---	1.5	1.5	1.5	0.5	0.5	0.5
MONTH	---	---	---	5.5	2.0	3.6	2.0	0.5	1.3	1.5	0.5	1.0

STREAMS TRIBUTARY TO LAKE HURON

04137005 AU SABLE RIVER NEAR CURTISVILLE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

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	0.0	0.0	4.5	4.5	4.5	12.0	11.5	11.5
2	0.5	0.0	0.5	0.5	0.0	0.0	4.5	4.5	4.5	12.0	11.5	11.5
3	0.0	0.0	0.0	0.5	0.0	0.5	4.5	4.5	4.5	11.5	11.0	11.5
4	0.0	0.0	0.0	0.5	0.5	0.5	4.5	4.5	4.5	12.0	11.0	11.5
5	0.0	0.0	0.0	0.5	0.5	0.5	4.5	2.5	4.0	12.0	11.5	11.5
6	0.0	0.0	0.0	0.5	0.0	0.5	2.5	2.5	2.5	12.0	11.5	11.5
7	0.0	0.0	0.0	0.5	0.0	0.0	2.5	2.5	2.5	11.5	11.5	11.5
8	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	2.5	12.0	11.5	12.0
9	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	2.5	12.0	11.5	12.0
10	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	2.5	14.0	12.0	12.5
11	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.5	2.5	13.5	12.0	12.5
12	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.0	3.0	13.5	12.5	13.0
13	0.0	0.0	0.0	0.0	0.0	0.0	4.5	3.5	4.0	13.5	12.5	13.0
14	0.0	0.0	0.0	0.0	0.0	0.0	5.0	4.5	4.5	13.0	12.5	13.0
15	0.0	0.0	0.0	0.0	0.0	0.0	6.5	5.0	5.5	13.5	12.5	13.0
16	0.0	0.0	0.0	0.5	0.0	0.5	6.5	5.5	6.0	13.5	13.0	13.5
17	0.0	0.0	0.0	0.5	0.5	0.5	6.5	5.5	6.0	13.5	13.0	13.5
18	0.0	0.0	0.0	0.5	0.5	0.5	7.5	6.5	7.5	14.0	13.5	13.5
19	0.0	0.0	0.0	1.0	0.5	1.0	7.5	6.0	7.0	14.5	13.5	14.0
20	0.0	0.0	0.0	1.5	1.0	1.5	9.0	7.5	8.0	16.0	14.5	15.0
21	0.0	0.0	0.0	2.0	1.5	2.0	9.0	8.5	9.0	15.0	15.0	15.0
22	0.0	0.0	0.0	2.5	2.0	2.0	9.0	8.5	9.0	15.0	15.0	15.0
23	0.0	0.0	0.0	3.0	2.5	3.0	9.5	8.5	9.0	15.5	15.0	15.0
24	0.5	0.0	0.0	3.5	3.0	3.5	9.0	8.5	8.5	15.0	14.5	14.5
25	0.5	0.0	0.0	4.0	3.5	4.0	10.5	8.5	9.5	15.0	14.0	14.5
26	0.5	0.0	0.0	4.0	4.0	4.0	10.5	9.0	9.5	14.5	14.0	14.5
27	0.5	0.0	0.0	4.5	4.0	4.5	10.5	9.0	9.5	15.5	14.0	14.5
28	0.5	0.0	0.0	4.5	4.5	4.5	12.0	10.5	11.0	15.0	14.5	15.0
29	---	---	---	4.5	4.5	4.5	12.0	11.0	11.5	16.5	15.0	16.0
30	---	---	---	4.5	4.5	4.5	11.5	11.0	11.0	16.0	15.5	15.5
31	---	---	---	5.0	4.5	4.5	---	---	---	15.5	15.0	15.5
MONTH	0.5	0.0	0.0	5.0	0.0	1.5	12.0	2.5	6.2	16.5	11.0	13.4

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	14.5	15.0	21.0	20.0	20.5	21.9	20.9	21.4	20.5	19.5	20.0
2	15.5	14.5	15.0	21.5	20.0	21.0	21.9	21.2	21.5	20.0	19.0	19.5
3	15.0	15.0	15.0	22.0	20.5	21.0	21.8	21.4	21.5	19.5	19.0	19.0
4	15.5	15.0	15.0	22.0	21.0	21.5	21.8	21.2	21.5	19.5	18.0	19.0
5	15.5	15.0	15.0	23.0	21.0	22.0	21.8	21.1	21.4	19.5	18.0	18.5
6	15.5	14.5	15.0	22.0	21.5	22.0	22.0	21.0	21.5	18.5	17.5	18.0
7	16.0	15.0	15.0	22.5	21.5	22.0	21.5	21.0	21.5	19.0	17.5	18.0
8	15.5	15.0	15.5	23.0	22.0	22.5	21.5	21.0	21.5	18.5	17.5	18.0
9	17.0	15.5	16.0	23.0	22.0	22.0	21.5	20.5	21.0	18.5	17.5	18.0
10	16.0	15.5	16.0	22.0	21.0	21.5	22.0	20.5	21.0	18.5	17.5	18.0
11	17.0	15.5	16.0	21.5	21.0	21.5	21.5	20.5	21.0	18.5	17.5	18.0
12	16.5	16.0	16.0	21.0	20.0	20.5	21.5	20.5	21.0	19.0	17.5	18.0
13	17.5	16.5	17.0	20.5	19.5	20.0	21.5	20.5	21.0	19.0	18.0	18.5
14	18.5	17.0	17.5	20.0	19.5	20.0	21.5	20.5	21.0	19.0	18.0	18.5
15	18.5	17.5	18.0	21.0	19.5	20.0	22.5	21.0	21.5	19.5	18.5	19.0
16	18.5	17.5	18.0	21.0	20.0	20.5	22.5	21.5	22.0	19.5	18.0	19.0
17	18.5	17.5	18.5	21.0	20.0	20.5	22.5	21.5	22.0	19.0	18.0	18.5
18	20.0	18.0	19.0	21.5	20.0	20.5	23.0	21.5	22.0	19.0	18.0	18.5
19	20.5	19.0	19.5	21.0	20.0	20.5	22.5	21.0	21.5	19.0	18.0	18.5
20	21.0	19.0	19.5	21.0	20.0	20.5	22.5	21.0	22.0	19.0	18.0	18.5
21	20.5	19.0	20.0	20.5	20.0	20.5	23.0	21.5	22.0	18.5	17.5	18.0
22	21.0	19.5	20.0	21.5	20.0	20.5	24.0	22.0	23.0	17.5	17.0	17.5
23	21.0	20.0	20.5	21.5	20.0	20.5	23.0	21.5	22.5	17.0	16.5	17.0
24	22.0	20.5	21.0	21.5	20.0	20.5	22.0	21.5	22.0	16.5	16.5	16.5
25	22.0	20.5	21.5	21.0	20.5	20.5	22.0	21.0	21.5	16.5	15.5	16.0
26	22.5	21.0	21.5	21.0	20.5	21.0	22.5	21.0	21.5	15.5	15.0	15.5
27	22.0	21.0	21.5	23.1	20.7	21.8	23.0	21.0	21.5	15.0	14.5	15.0
28	21.0	20.5	21.0	22.0	20.9	21.4	21.5	21.0	21.0	15.0	14.5	14.5
29	22.0	20.5	21.0	21.9	20.8	21.4	22.5	21.0	21.5	14.5	13.5	14.0
30	21.0	20.5	20.5	21.8	20.8	21.3	21.5	20.5	21.0	13.5	13.0	13.5
31	---	---	---	21.7	20.7	21.4	21.0	20.5	20.5	---	---	---
MONTH	22.5	14.5	18.0	23.1	19.5	21.0	24.0	20.5	21.5	20.5	13.0	17.6

STREAMS TRIBUTARY TO LAKE HURON

04137005 AU SABLE RIVER NEAR CURTISVILLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.5	7.9	8.2	11.6	11.2	11.4	13.0	12.6	12.9	12.3	12.2	12.2
2	8.6	8.2	8.4	11.7	11.5	11.6	12.8	12.6	12.7	12.4	12.2	12.3
3	8.8	8.3	8.5	11.7	11.3	11.5	12.8	12.6	12.7	12.4	12.2	12.3
4	8.8	8.3	8.6	11.6	11.3	11.4	12.9	12.6	12.8	12.4	12.3	12.3
5	8.9	8.6	8.7	11.5	11.3	11.4	12.9	12.7	12.8	12.4	12.3	12.3
6	8.7	7.6	8.3	11.5	11.2	11.3	13.1	12.9	13.0	12.4	12.2	12.3
7	9.0	8.4	8.8	11.6	11.5	11.5	13.1	13.0	13.0	12.3	12.2	12.3
8	9.0	8.7	8.8	11.7	11.5	11.6	13.1	12.9	13.0	12.4	12.3	12.3
9	9.6	8.3	8.9	11.7	11.6	11.6	13.1	12.9	13.0	12.5	12.3	12.4
10	9.5	8.5	8.9	11.7	11.6	11.7	13.0	12.7	12.9	12.5	12.3	12.4
11	9.2	9.0	9.1	11.7	11.5	11.6	12.9	12.8	12.8	12.4	12.3	12.3
12	9.6	8.8	9.2	11.6	11.5	11.5	13.0	12.8	12.9	12.4	12.3	12.3
13	9.8	8.3	9.3	11.5	11.3	11.4	13.0	12.9	13.0	12.5	12.3	12.4
14	10.0	8.5	9.2	11.3	11.3	11.3	13.0	12.8	12.9	12.6	12.4	12.5
15	9.9	8.8	9.3	11.7	11.2	11.4	12.9	12.7	12.8	12.7	12.5	12.6
16	10.1	8.8	9.6	12.0	11.5	11.7	12.8	12.7	12.8	12.7	12.5	12.6
17	10.0	8.8	9.4	11.9	11.6	11.7	12.7	12.5	12.6	12.7	12.5	12.7
18	10.1	8.8	9.5	11.9	11.8	11.9	12.6	12.4	12.6	12.7	12.5	12.6
19	---	---	---	11.9	11.8	11.9	12.6	12.5	12.6	12.7	12.6	12.6
20	10.4	10.1	10.2	12.1	11.9	12.0	12.6	12.4	12.6	12.8	12.6	12.7
21	10.4	10.2	10.3	12.3	11.9	12.1	12.5	12.2	12.4	12.8	12.6	12.7
22	10.6	10.3	10.4	12.3	12.0	12.2	12.3	12.1	12.2	12.7	12.6	12.7
23	10.8	9.8	10.5	12.4	12.2	12.3	12.3	12.0	12.2	12.7	12.6	12.7
24	10.7	10.5	10.6	12.4	12.2	12.3	12.3	12.2	12.2	12.6	12.5	12.6
25	10.7	10.5	10.6	12.6	12.3	12.4	12.3	12.1	12.2	12.5	12.3	12.4
26	10.7	10.5	10.6	12.7	12.4	12.5	12.3	12.1	12.2	12.4	12.2	12.3
27	10.8	10.5	10.7	12.8	12.6	12.7	12.3	12.2	12.3	12.3	12.0	12.2
28	10.9	10.8	10.8	12.9	12.6	12.8	12.3	12.2	12.3	12.1	12.0	12.1
29	10.9	10.7	10.8	13.0	12.8	12.9	12.3	12.2	12.3	12.0	11.9	11.9
30	11.0	10.7	10.8	13.1	13.0	13.0	12.4	12.3	12.4	12.0	11.7	11.9
31	11.5	11.0	11.3	---	---	---	12.4	12.2	12.3	11.7	11.5	11.6
MONTH	---	---	---	13.1	11.2	11.9	13.1	12.0	12.6	12.8	11.5	12.4

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	11.5	11.3	11.4	11.8	11.5	11.7	10.8	10.6	10.7	9.3	9.0	9.2
2	11.3	11.1	11.2	11.9	11.7	11.8	11.0	10.0	10.7	9.3	8.7	9.0
3	11.2	11.0	11.1	12.1	11.7	11.9	11.0	10.6	10.7	9.3	8.8	9.0
4	11.0	10.9	11.0	12.0	11.7	11.9	10.7	10.4	10.6	9.3	8.8	9.0
5	11.0	10.8	10.9	11.9	11.7	11.8	10.8	10.3	10.5	9.6	8.7	9.2
6	11.0	10.8	10.9	12.0	11.7	11.9	11.2	10.6	10.8	9.9	9.4	9.6
7	10.9	10.8	10.8	12.1	11.9	12.0	11.1	10.8	10.9	9.7	9.2	9.5
8	11.0	10.7	10.8	12.0	11.9	11.9	11.1	10.7	10.9	9.6	9.2	9.4
9	11.1	10.8	10.9	12.1	11.9	12.0	11.2	10.7	11.0	9.6	9.2	9.4
10	11.1	10.9	11.0	12.0	11.9	11.9	11.4	11.1	11.3	9.6	9.1	9.4
11	11.1	10.9	11.0	12.1	11.8	11.9	11.5	11.2	11.3	9.4	8.8	9.1
12	11.1	11.0	11.0	12.0	11.9	12.0	11.7	11.2	11.4	9.3	8.9	9.1
13	11.1	10.9	11.0	12.0	11.9	12.0	11.6	11.0	11.4	9.8	8.8	9.2
14	11.2	11.0	11.1	12.1	11.8	11.9	11.4	10.6	11.0	9.4	8.6	8.9
15	11.2	11.0	11.1	11.9	11.7	11.8	10.8	9.5	10.4	9.4	8.7	9.0
16	11.2	11.0	11.1	11.8	11.6	11.7	10.4	9.8	10.1	9.4	8.9	9.2
17	11.2	11.0	11.1	11.8	11.5	11.7	10.2	9.9	10.1	9.8	9.0	9.3
18	11.1	11.0	11.1	11.7	11.3	11.6	9.9	9.7	9.8	9.6	8.7	9.1
19	11.2	11.0	11.1	11.4	11.1	11.3	10.2	9.7	9.8	9.7	8.9	9.3
20	11.3	11.1	11.2	11.3	11.0	11.2	9.8	9.6	9.7	9.8	9.0	9.3
21	11.2	11.0	11.2	11.2	11.1	11.2	9.7	9.4	9.5	9.7	8.6	9.0
22	11.1	11.0	11.0	11.3	11.0	11.2	9.8	9.4	9.5	9.8	8.6	9.0
23	11.2	10.9	11.0	11.1	10.8	11.0	9.6	9.5	9.6	9.8	8.6	9.2
24	11.4	11.1	11.3	10.9	10.5	10.7	9.7	9.4	9.5	9.5	8.7	9.2
25	11.5	11.3	11.4	10.7	10.5	10.6	10.0	9.6	9.8	9.5	8.3	8.8
26	11.5	11.3	11.4	10.8	10.5	10.7	9.8	9.5	9.7	8.8	8.1	8.6
27	11.5	11.4	11.4	10.8	10.5	10.7	9.7	9.5	9.6	9.7	8.3	8.9
28	11.7	11.4	11.5	10.7	10.5	10.6	9.8	9.4	9.6	9.1	8.6	8.8
29	---	---	---	10.7	10.5	10.6	9.9	9.5	9.7	9.0	8.2	8.8
30	---	---	---	10.8	10.6	10.7	9.8	9.1	9.5	8.7	7.8	8.4
31	---	---	---	10.8	10.6	10.7	---	---	---	9.1	7.8	8.4
MONTH	11.7	10.7	11.1	12.1	10.5	11.4	11.7	9.1	10.3	9.9	7.8	9.1

STREAMS TRIBUTARY TO LAKE HURON

04137005 AU SABLE RIVER NEAR CURTISVILLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.9	8.0	8.5	6.3	5.9	6.1	7.3	6.7	7.0	7.7	7.3	7.4
2	8.5	7.6	8.1	6.7	6.2	6.5	7.2	6.7	7.0	7.7	7.4	7.6
3	8.4	7.6	8.1	7.0	6.2	6.7	6.9	6.5	6.7	7.9	7.6	7.8
4	8.7	7.9	8.3	6.9	6.0	6.6	7.0	6.5	6.8	8.3	7.6	7.9
5	8.4	7.5	8.1	6.8	6.1	6.6	6.9	6.6	6.7	8.1	7.7	7.8
6	8.0	7.3	7.8	6.7	6.1	6.4	7.0	6.6	6.8	7.8	7.4	7.6
7	8.4	7.3	7.7	6.5	5.9	6.2	6.8	6.5	6.7	7.7	7.4	7.6
8	8.9	7.3	7.7	6.5	5.9	6.2	6.9	6.6	6.7	8.2	7.6	7.9
9	8.9	7.8	8.1	6.4	6.0	6.2	6.9	6.6	6.8	8.3	8.0	8.1
10	7.8	7.2	7.5	6.4	5.9	6.1	6.7	5.6	6.5	8.4	8.0	8.2
11	8.3	7.0	7.7	7.0	6.2	6.5	7.1	6.6	6.9	8.2	7.8	8.0
12	8.1	6.8	7.5	7.4	6.8	7.0	7.1	6.8	6.9	8.2	7.7	8.0
13	8.5	7.0	8.0	6.9	6.7	6.8	7.1	6.7	6.9	8.2	7.8	7.9
14	8.7	8.2	8.4	7.3	6.7	7.0	7.4	7.0	7.2	8.2	7.9	8.0
15	8.4	8.0	8.3	7.9	7.0	7.4	7.5	7.0	7.2	8.3	7.8	8.1
16	8.4	8.0	8.2	8.2	7.4	7.8	7.4	6.5	7.2	8.2	7.9	8.1
17	8.4	7.9	8.2	7.7	7.2	7.5	7.5	6.5	7.4	8.1	7.1	7.7
18	8.5	7.8	8.1	8.2	7.3	7.7	7.3	6.8	7.1	7.7	7.0	7.3
19	8.1	7.4	7.8	7.6	7.3	7.5	7.2	6.5	6.8	7.9	7.3	7.6
20	8.0	7.3	7.6	7.6	6.9	7.2	6.9	6.5	6.7	8.1	7.6	7.9
21	7.5	6.3	7.2	7.5	7.1	7.3	7.0	6.5	6.8	8.0	7.4	7.8
22	7.3	6.9	7.1	8.0	7.3	7.6	7.5	6.6	7.0	8.3	7.4	7.7
23	7.1	6.8	7.0	7.8	7.0	7.5	7.5	6.9	7.2	7.8	7.5	7.7
24	7.2	6.6	6.9	7.8	6.9	7.2	7.3	6.9	7.1	8.0	7.2	7.6
25	7.3	6.7	7.0	7.3	6.7	7.0	7.1	6.5	6.8	8.1	7.5	7.8
26	7.0	5.9	6.7	7.2	6.8	6.9	7.1	6.5	6.8	8.0	7.6	7.8
27	6.7	6.2	6.5	7.8	6.9	7.3	7.9	6.9	7.3	8.3	7.8	8.0
28	6.4	5.8	6.1	7.4	6.7	7.2	7.6	7.1	7.4	8.7	8.0	8.3
29	6.8	5.9	6.3	7.4	7.0	7.2	8.0	7.2	7.5	8.8	8.4	8.6
30	6.3	5.8	5.9	7.2	6.5	6.9	7.7	7.3	7.6	9.1	8.6	8.8
31	---	---	---	7.2	6.6	6.9	7.7	7.3	7.5	---	---	---
MONTH	8.9	5.8	7.5	8.2	5.9	6.9	8.0	5.6	7.0	9.1	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 mi^2.

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: Dec. 20-23, Mar. 28 to Apr. 5, Apr. 7 to May 1, June 1-10, July 6-9, Aug. 7-10 rated good; Oct. 1-3, Apr. 6-16, May 2-11, June 11, 12, Aug. 11-16 rated fair; and May 12-16, Aug. 17-27 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 7, 8; minimum, 0.0°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 14.5 mg/L, Dec. 5; minimum, 3.3 mg/L, Aug. 1.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	18.0	17.0	17.5	5.0	5.0	5.0	1.0	1.0	1.0	1.5	1.5	1.5
2	17.5	17.5	17.5	5.0	4.5	4.5	1.0	0.5	1.0	1.5	1.0	1.5
3	17.5	17.0	17.0	4.5	4.0	4.0	1.0	1.0	1.0	1.0	1.0	1.0
4	17.0	16.5	17.0	4.0	4.0	4.0	1.0	1.0	1.0	1.0	0.5	1.0
5	16.5	16.0	16.0	4.0	4.0	4.0	1.0	1.0	1.0	1.0	1.0	1.0
6	16.0	15.0	15.5	4.0	3.5	4.0	1.0	1.0	1.0	1.0	1.0	1.0
7	15.0	14.5	14.5	3.5	3.5	3.5	1.0	0.5	1.0	1.0	1.0	1.0
8	14.5	13.5	14.0	4.0	3.5	3.5	1.0	0.5	0.5	1.0	0.5	0.5
9	14.0	13.0	13.5	4.0	3.5	4.0	0.5	0.5	0.5	0.5	0.5	0.5
10	13.0	13.0	13.0	5.5	4.0	4.5	1.0	0.5	0.5	1.0	0.5	0.5
11	13.0	13.0	13.0	5.5	5.5	5.5	0.5	0.5	0.5	1.0	0.5	1.0
12	13.5	13.0	13.5	5.5	5.0	5.5	0.5	0.5	0.5	1.0	0.5	0.5
13	13.5	13.0	13.5	5.0	5.0	5.0	0.5	0.5	0.5	0.5	0.5	0.5
14	13.0	12.0	12.5	5.0	4.5	4.5	0.5	0.5	0.5	0.5	0.5	0.5
15	12.0	12.0	12.0	4.5	4.0	4.0	1.0	0.5	1.0	0.5	0.5	0.5
16	12.0	10.5	11.0	4.0	3.5	3.5	1.0	1.0	1.0	0.5	0.5	0.5
17	10.5	10.0	10.5	3.5	2.5	3.0	1.0	1.0	1.0	0.5	0.5	0.5
18	10.0	9.5	9.5	2.5	2.0	2.5	1.0	0.5	0.5	0.5	0.5	0.5
19	9.5	8.5	9.0	2.5	2.5	2.5	0.5	0.5	0.5	0.5	0.5	0.5
20	8.5	8.5	8.5	3.0	2.5	2.5	1.0	0.5	0.5	0.5	0.0	0.5
21	8.5	8.0	8.0	3.0	3.0	3.0	1.5	1.0	1.0	0.0	0.0	0.0
22	8.0	8.0	8.0	3.0	3.0	3.0	1.5	1.0	1.0	0.0	0.0	0.0
23	8.0	7.5	7.5	3.0	2.5	2.5	1.0	1.0	1.0	0.0	0.0	0.0
24	7.5	7.0	7.0	2.5	2.0	2.5	1.0	1.0	1.0	0.0	0.0	0.0
25	7.0	6.5	7.0	2.0	2.0	2.0	1.0	0.5	1.0	0.0	0.0	0.0
26	7.0	6.5	6.5	2.0	2.0	2.0	1.0	0.5	1.0	0.0	0.0	0.0
27	6.5	6.5	6.5	2.0	1.5	2.0	1.0	1.0	1.0	0.0	0.0	0.0
28	6.5	6.0	6.5	1.5	1.5	1.5	1.0	1.0	1.0	0.0	0.0	0.0
29	6.0	6.0	6.0	1.5	1.0	1.5	1.0	1.0	1.0	0.0	0.0	0.0
30	6.0	5.5	5.5	1.5	1.0	1.5	1.0	1.0	1.0	0.0	0.0	0.0
31	5.5	5.0	5.5	---	---	---	1.5	1.0	1.0	0.0	0.0	0.0
MONTH	18.0	5.0	11.0	5.5	1.0	3.4	1.5	0.5	0.8	1.5	0.0	0.5

STREAMS TRIBUTARY TO LAKE HURON

04137020 AU SABLE RIVER NEAR SOUTH BRANCH, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

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	4.0	4.0	4.0	12.0	11.0	11.5
2	0.0	0.0	0.0	0.0	0.0	0.0	4.0	4.0	4.0	11.5	11.0	11.5
3	0.0	0.0	0.0	0.5	0.0	0.0	4.0	3.5	4.0	12.0	11.0	11.5
4	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5	3.0	12.5	11.5	12.0
5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.0	1.5	12.5	11.5	12.0
6	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.0	1.0	12.0	11.5	11.5
7	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.5	2.0	11.5	11.0	11.0
8	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	2.5	12.5	11.5	11.5
9	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.0	2.5	13.0	12.0	12.5
10	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.5	3.0	14.0	12.5	13.0
11	0.0	0.0	0.0	0.0	0.0	0.0	4.5	3.0	4.0	14.0	13.0	13.5
12	0.0	0.0	0.0	0.0	0.0	0.0	5.0	4.5	5.0	13.5	13.0	13.5
13	0.0	0.0	0.0	0.0	0.0	0.0	5.5	5.0	5.0	13.0	12.5	13.0
14	0.0	0.0	0.0	0.0	0.0	0.0	6.0	5.5	5.5	13.5	12.0	12.5
15	0.0	0.0	0.0	0.0	0.0	0.0	8.0	6.0	7.0	14.0	13.0	13.5
16	0.0	0.0	0.0	0.5	0.0	0.0	8.0	7.5	7.5	14.0	13.5	13.5
17	0.0	0.0	0.0	0.5	0.5	0.5	7.5	6.0	6.5	14.0	13.5	13.5
18	0.0	0.0	0.0	0.5	0.5	0.5	6.0	5.5	5.5	14.5	13.5	14.0
19	0.0	0.0	0.0	1.0	0.5	0.5	6.5	5.5	5.5	16.0	14.5	15.0
20	0.0	0.0	0.0	1.0	0.5	0.5	8.5	6.5	7.5	16.5	15.5	16.0
21	0.0	0.0	0.0	1.0	1.0	1.0	8.5	8.5	8.5	16.0	15.0	15.0
22	0.0	0.0	0.0	1.5	1.0	1.0	8.5	8.0	8.5	15.5	15.0	15.0
23	0.0	0.0	0.0	1.5	1.5	1.5	9.0	8.0	8.5	15.5	15.0	15.0
24	0.0	0.0	0.0	2.0	1.5	2.0	10.0	8.5	9.0	15.0	14.5	14.5
25	0.0	0.0	0.0	3.0	2.0	2.5	10.0	9.5	9.5	14.5	14.0	14.0
26	0.0	0.0	0.0	3.5	3.0	3.5	10.5	9.5	10.0	15.0	14.0	14.5
27	0.0	0.0	0.0	4.0	3.5	4.0	11.0	9.5	10.5	15.5	14.5	15.0
28	0.0	0.0	0.0	4.0	3.5	4.0	12.0	10.5	11.0	17.0	15.0	16.0
29	---	---	---	4.0	3.5	4.0	12.0	11.5	11.5	17.5	16.0	16.5
30	---	---	---	4.0	4.0	4.0	12.0	11.5	12.0	16.5	16.0	16.5
31	---	---	---	4.0	3.5	4.0	---	---	---	16.0	15.5	16.0
MONTH	0.0	0.0	0.0	4.0	0.0	1.1	12.0	1.0	6.2	17.5	11.0	13.7

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	15.0	15.5	22.0	20.5	21.0	23.5	22.5	23.0	21.5	21.0	21.0
2	16.0	15.0	15.5	23.0	21.0	22.0	23.5	22.5	23.0	21.0	20.5	21.0
3	16.0	15.5	16.0	23.5	21.0	22.5	23.0	22.5	22.5	21.0	20.5	20.5
4	16.0	15.5	15.5	24.0	22.0	23.0	23.0	22.5	22.5	20.5	20.0	20.0
5	15.5	15.0	15.5	24.0	22.5	23.0	23.5	22.5	22.5	20.0	19.0	19.5
6	16.5	15.0	15.5	23.5	22.5	23.0	23.5	22.5	23.0	19.5	18.5	19.0
7	16.5	15.5	16.0	24.5	22.5	23.5	23.0	22.5	23.0	19.5	19.0	19.5
8	17.0	16.0	16.5	24.5	23.0	24.0	23.0	22.5	22.5	19.5	19.0	19.0
9	17.0	16.0	16.5	24.0	23.0	23.5	22.5	22.0	22.5	19.5	19.5	19.5
10	16.5	16.0	16.0	23.0	22.5	23.0	22.5	22.0	22.0	19.5	19.0	19.5
11	17.0	16.5	16.5	22.5	21.0	22.0	22.5	22.0	22.0	19.5	19.0	19.5
12	17.5	16.5	17.0	21.0	20.5	20.5	22.5	22.0	22.0	20.0	19.0	19.5
13	17.5	17.0	17.0	21.0	20.0	20.5	23.0	22.0	22.5	20.0	19.5	20.0
14	18.5	17.0	17.5	22.0	20.5	21.5	23.5	22.0	22.5	20.0	19.5	20.0
15	19.0	17.5	18.0	22.0	21.5	21.5	24.0	22.5	23.0	20.0	19.5	20.0
16	19.5	18.0	19.0	21.5	21.0	21.5	24.0	22.5	23.5	19.5	19.0	19.5
17	20.0	18.5	19.5	21.5	21.0	21.0	24.0	23.0	23.5	19.5	19.0	19.0
18	21.0	18.5	19.5	22.0	21.0	21.5	24.0	23.0	23.5	19.0	19.0	19.0
19	20.5	19.0	20.0	22.0	21.0	21.5	24.0	23.0	23.5	19.5	19.0	19.5
20	20.0	19.5	20.0	22.0	21.5	21.5	24.0	23.0	23.5	19.5	18.5	19.0
21	21.0	19.5	20.0	22.0	21.5	21.5	24.0	23.5	24.0	18.5	18.0	18.5
22	22.0	20.0	20.5	22.0	21.5	21.5	24.0	23.5	24.0	18.5	18.0	18.0
23	22.5	20.0	21.0	22.0	21.0	21.5	23.5	23.5	23.5	18.0	17.0	17.5
24	23.0	20.5	22.0	22.0	21.5	21.5	23.5	23.0	23.0	17.0	16.5	17.0
25	23.5	21.0	22.5	22.5	21.5	22.0	23.0	22.5	22.5	16.5	16.0	16.0
26	24.0	22.0	23.0	22.5	22.0	22.5	23.5	22.5	23.0	16.0	15.5	15.5
27	23.0	22.0	22.5	23.0	22.0	22.5	23.5	22.5	23.0	15.5	15.0	15.0
28	22.0	21.0	21.5	22.5	22.0	22.0	22.5	22.5	22.5	15.0	14.5	14.5
29	21.5	20.5	21.0	23.0	22.0	22.5	23.0	22.5	22.5	14.5	14.0	14.0
30	21.5	20.5	20.5	23.0	22.5	23.0	22.5	22.0	22.0	14.0	13.5	13.5
31	---	---	---	23.5	22.5	23.0	22.0	21.5	21.5	---	---	---
MONTH	24.0	15.0	18.6	24.5	20.0	22.1	24.0	21.5	22.8	21.5	13.5	18.4

STREAMS TRIBUTARY TO LAKE HURON

04137020 AU SABLE RIVER NEAR SOUTH BRANCH, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.9	7.3	8.3	12.2	9.4	11.5	14.1	13.8	13.9	12.9	12.6	12.7
2	8.7	8.0	8.5	12.9	9.9	11.7	14.1	11.3	13.8	12.8	12.4	12.7
3	8.7	8.4	8.5	12.4	10.7	11.8	13.7	12.5	13.3	13.0	12.8	12.9
4	8.5	8.2	8.3	12.6	11.1	12.0	14.1	12.8	13.6	13.0	12.9	13.0
5	8.6	8.2	8.4	12.7	11.2	12.3	14.5	13.0	13.7	13.0	12.9	12.9
6	9.9	8.3	8.5	12.4	10.5	11.8	13.0	12.9	13.0	12.9	12.6	12.8
7	9.4	8.5	8.9	12.6	11.0	11.9	13.0	12.6	12.8	13.3	12.6	12.8
8	9.1	8.9	9.0	12.7	11.2	11.9	12.8	12.6	12.7	12.9	12.4	12.8
9	9.3	9.0	9.2	12.7	11.0	11.9	12.7	12.4	12.5	13.0	12.4	12.7
10	9.7	9.1	9.3	12.6	10.8	11.8	12.7	12.4	12.6	12.8	12.5	12.7
11	9.5	9.3	9.4	12.4	10.8	11.7	13.0	12.7	12.9	12.8	12.5	12.6
12	9.7	9.3	9.4	12.1	9.4	11.5	13.0	12.8	12.9	13.0	12.7	12.8
13	9.8	8.7	9.6	12.1	9.7	11.5	12.9	12.7	12.8	13.2	12.7	13.0
14	9.9	9.2	9.6	12.6	9.7	11.6	12.9	12.7	12.8	13.3	13.0	13.1
15	9.9	7.9	9.3	12.7	10.3	11.8	12.8	12.6	12.7	13.3	13.0	13.1
16	10.0	7.8	9.1	13.2	9.3	11.9	12.6	12.5	12.6	13.5	11.7	13.0
17	10.2	8.0	9.2	13.1	10.3	12.1	12.6	12.2	12.5	13.6	12.0	12.9
18	10.5	8.5	9.3	12.9	10.2	12.3	12.8	12.5	12.7	13.5	12.5	13.2
19	10.2	8.4	9.5	13.0	10.9	12.4	12.8	12.7	12.8	13.8	13.0	13.5
20	10.3	8.8	9.6	13.2	11.0	12.5	12.8	12.6	12.7	13.8	13.7	13.8
21	10.5	8.8	9.6	13.0	11.1	12.4	12.7	12.5	12.6	13.8	13.6	13.7
22	10.5	8.7	9.7	12.9	10.9	12.3	12.6	12.5	12.6	13.7	13.6	13.6
23	10.6	8.7	9.8	13.0	10.8	12.4	12.8	12.5	12.7	13.7	13.6	13.7
24	10.8	9.3	10.0	12.9	10.8	12.3	12.8	12.7	12.8	13.7	13.7	13.7
25	10.9	9.2	10.1	13.0	10.6	12.4	12.9	12.8	12.8	13.7	13.6	13.7
26	11.1	9.4	10.2	13.6	11.4	12.7	12.8	12.7	12.8	13.6	13.4	13.5
27	11.2	9.2	10.3	13.8	11.4	13.1	13.0	12.8	12.9	13.4	13.3	13.3
28	11.2	9.0	10.2	13.9	12.9	13.6	13.0	12.9	13.0	13.3	13.2	13.2
29	11.1	9.4	10.2	14.0	13.7	13.9	13.1	13.0	13.0	13.3	13.1	13.2
30	11.3	9.4	10.4	14.0	13.7	13.9	13.1	13.0	13.0	13.1	12.8	12.9
31	11.9	9.5	10.8	---	---	---	13.0	12.8	12.9	12.9	12.7	12.8
MONTH	11.9	7.3	9.4	14.0	9.3	12.2	14.5	11.3	12.9	13.8	11.7	13.1

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	12.9	12.5	12.7	12.9	12.5	12.7	12.2	11.0	12.0	10.4	9.8	10.2
2	12.6	12.2	12.4	12.8	12.5	12.7	12.2	11.1	12.0	10.2	9.9	10.0
3	12.5	12.2	12.3	12.8	12.3	12.5	11.9	10.8	11.7	10.3	10.0	10.1
4	12.4	12.0	12.2	12.8	12.2	12.5	11.9	10.8	11.7	10.6	10.2	10.3
5	12.3	12.1	12.3	13.1	12.6	12.9	12.3	11.8	12.1	10.6	10.2	10.4
6	12.3	12.0	12.1	13.1	12.7	12.9	12.3	12.0	12.2	10.4	10.0	10.3
7	12.5	12.1	12.3	12.8	12.1	12.6	12.5	12.2	12.4	10.0	9.7	9.8
8	12.5	12.2	12.3	12.7	12.3	12.5	12.6	12.3	12.5	10.3	9.8	10.0
9	12.5	12.3	12.4	12.7	12.1	12.4	12.8	11.9	12.7	10.5	10.1	10.3
10	12.4	12.0	12.3	12.6	12.2	12.4	12.9	11.7	12.6	10.5	10.2	10.3
11	12.3	12.0	12.1	12.6	12.3	12.5	12.9	11.5	12.6	10.5	9.8	10.1
12	12.2	12.0	12.1	12.7	12.5	12.6	12.9	12.1	12.5	10.1	9.4	9.8
13	12.4	11.9	12.1	12.7	12.5	12.7	12.5	12.4	12.4	9.8	9.3	9.6
14	12.2	11.7	12.0	12.8	12.6	12.7	12.7	10.9	12.3	10.0	9.4	9.6
15	12.2	11.8	12.1	12.8	12.6	12.8	12.4	10.5	12.0	10.0	9.8	9.9
16	12.2	12.0	12.1	12.8	12.7	12.8	12.0	11.0	11.8	10.5	8.7	10.0
17	12.2	11.9	12.1	12.9	12.8	12.8	11.6	10.5	11.4	10.4	8.8	9.8
18	12.3	12.1	12.2	13.1	12.6	12.8	11.6	10.3	11.4	9.6	8.5	9.2
19	12.2	12.0	12.1	13.1	12.5	12.8	11.5	11.0	11.2	10.0	8.4	9.3
20	12.1	11.8	11.9	12.8	12.4	12.7	11.2	10.8	11.1	10.0	8.5	9.3
21	12.0	11.8	11.9	13.0	11.9	12.5	11.2	10.4	11.0	9.4	7.9	8.8
22	12.2	12.0	12.1	12.6	12.0	12.3	10.9	9.6	10.6	9.9	8.2	9.2
23	12.3	12.1	12.2	12.5	12.0	12.2	10.9	9.8	10.6	10.1	9.3	9.8
24	12.3	11.8	12.0	12.3	12.0	12.1	11.3	10.0	10.8	10.2	9.6	9.9
25	12.3	11.7	12.0	12.1	11.9	12.0	11.2	10.1	11.0	9.8	9.0	9.2
26	12.3	11.7	12.2	12.1	11.2	11.9	11.1	10.1	10.9	9.5	9.1	9.2
27	12.7	12.1	12.5	11.9	10.8	11.7	11.2	11.0	11.1	10.0	8.6	9.5
28	12.8	12.7	12.8	11.8	10.7	11.7	11.0	10.8	10.9	10.3	8.3	9.4
29	---	---	---	12.2	10.7	11.7	10.8	10.5	10.7	10.2	8.5	9.3
30	---	---	---	11.9	10.7	11.7	10.8	10.3	10.6	9.9	8.1	9.1
31	---	---	---	12.2	10.9	11.9	---	---	---	9.5	8.5	9.0
MONTH	12.9	11.7	12.2	13.1	10.7	12.4	12.9	9.6	11.6	10.6	7.9	9.7

STREAMS TRIBUTARY TO LAKE HURON

04137020 AU SABLE RIVER NEAR SOUTH BRANCH, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.0	8.1	8.5	8.7	5.5	6.9	7.9	3.3	5.3	7.9	6.5	7.0
2	9.4	8.1	8.8	9.2	5.5	7.4	7.7	4.1	5.6	8.0	6.2	7.0
3	9.8	8.4	9.1	9.4	6.0	7.4	7.7	3.6	5.7	7.8	6.3	7.0
4	9.7	8.4	8.9	9.3	6.1	7.6	7.7	4.1	6.2	7.9	6.5	7.3
5	9.4	8.1	8.8	9.2	4.7	7.2	7.5	3.7	5.4	7.8	6.9	7.3
6	9.2	7.8	8.6	9.1	4.8	6.9	7.9	3.6	5.7	8.1	6.9	7.3
7	9.3	7.5	8.5	9.0	4.5	7.0	8.0	3.6	5.6	8.6	6.9	7.6
8	9.4	7.5	8.5	8.9	5.0	6.6	7.9	3.8	5.8	8.5	7.1	7.7
9	9.3	7.5	8.5	9.1	4.5	6.7	7.8	4.1	6.0	8.4	7.1	7.7
10	8.4	7.3	7.9	7.8	4.1	6.1	7.5	3.8	5.8	8.3	6.8	7.5
11	8.7	7.1	8.1	7.2	4.8	6.5	8.1	3.9	6.0	8.3	6.9	7.5
12	9.1	6.9	8.1	7.0	5.8	6.4	8.0	4.5	6.0	8.4	6.7	7.5
13	9.0	6.5	8.0	7.2	4.8	6.3	7.9	4.3	6.2	8.5	6.6	7.6
14	9.3	6.5	8.0	7.5	6.3	7.0	8.3	4.2	5.9	8.4	6.7	7.5
15	9.3	5.8	7.9	7.1	5.7	6.5	8.6	4.2	6.5	8.2	6.8	7.4
16	9.7	5.7	7.9	7.0	5.5	6.3	8.7	4.7	6.7	7.6	6.7	7.1
17	9.5	5.5	7.8	6.5	5.4	6.1	8.9	4.8	6.8	8.1	6.6	7.5
18	9.7	5.2	7.4	6.7	5.2	6.0	8.5	4.7	6.2	8.2	7.4	7.8
19	9.1	4.7	7.1	6.4	5.2	5.8	8.6	4.8	6.7	8.6	7.8	8.1
20	9.0	4.6	6.7	6.1	5.4	5.8	8.8	4.7	6.5	8.2	7.6	8.0
21	9.1	4.3	6.5	7.9	4.4	6.2	8.8	5.0	6.7	8.1	7.7	7.9
22	9.0	4.2	6.5	7.5	4.1	5.8	8.7	5.0	6.7	8.2	7.7	8.0
23	9.1	4.0	6.4	7.5	4.1	5.5	8.4	5.1	6.8	8.3	7.9	8.1
24	8.9	4.3	6.6	7.8	4.4	6.1	8.1	5.1	6.5	8.2	7.8	8.1
25	8.9	3.8	6.7	8.0	4.8	6.8	8.1	4.9	6.7	8.3	8.0	8.2
26	8.8	4.5	6.7	7.5	6.7	7.2	8.3	4.7	6.5	8.4	7.9	8.2
27	8.4	4.5	6.5	7.2	6.5	6.8	8.5	4.8	7.4	8.6	8.1	8.4
28	7.8	5.0	6.4	7.1	4.6	6.0	7.9	6.5	7.4	8.8	8.6	8.7
29	7.8	4.4	6.6	7.5	4.5	5.8	8.2	6.5	7.2	8.9	8.6	8.8
30	8.1	5.4	6.7	8.1	4.5	6.3	7.8	6.5	7.2	9.1	8.7	8.9
31	---	---	---	7.9	4.2	6.1	7.8	6.5	7.1	---	---	---
MONTH	9.8	3.8	7.6	9.4	4.1	6.5	8.9	3.3	6.3	9.1	6.2	7.8

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 mi^2.

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 except the period: Apr. 5-15 rated good. Dissolved oxygen records rated excellent except the following periods: Apr. 7-14, July 18-21, Sept. 1-3 rated good; July 22-29, Sept. 4-7 rated fair; and Oct. 1-3, 30, 31, Mar. 4-18, Apr. 15 to May 15, July 30, 31, Sept. 8-17 rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum, 27.0°C, Aug. 8-10, 2001, July 4, 2002; minimum, 0.0°C, on many days during winter periods.
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, 24.5°C, July 8, Aug. 21; minimum, 0.0°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 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	18.0	17.0	17.5	5.5	5.0	5.5	1.0	1.0	1.0	1.0	1.0	1.0
2	17.5	17.5	17.5	5.0	4.5	5.0	1.0	0.5	1.0	1.0	1.0	1.0
3	17.5	17.0	17.5	4.5	4.5	4.5	1.0	0.5	1.0	1.0	1.0	1.0
4	17.0	17.0	17.0	4.5	4.5	4.5	1.0	1.0	1.0	1.0	0.5	1.0
5	17.0	16.5	17.0	4.5	4.0	4.0	1.0	1.0	1.0	0.5	0.5	0.5
6	16.5	16.0	16.0	4.0	3.5	4.0	1.0	0.5	0.5	0.5	0.5	0.5
7	16.0	15.0	15.5	3.5	3.5	3.5	0.5	0.5	0.5	0.5	0.5	0.5
8	15.0	14.0	14.5	4.0	3.5	3.5	0.5	0.5	0.5	0.5	0.5	0.5
9	14.5	14.0	14.0	4.0	3.5	4.0	0.5	0.5	0.5	0.5	0.5	0.5
10	14.0	13.5	13.5	4.5	4.0	4.5	0.5	0.5	0.5	0.5	0.0	0.5
11	13.5	13.0	13.5	5.0	4.5	4.5	0.5	0.5	0.5	0.5	0.0	0.5
12	13.5	13.0	13.5	5.0	5.0	5.0	0.5	0.5	0.5	0.5	0.0	0.5
13	13.5	13.0	13.5	5.0	5.0	5.0	0.5	0.5	0.5	0.5	0.0	0.5
14	13.0	12.5	12.5	5.0	5.0	5.0	0.5	0.5	0.5	0.5	0.0	0.5
15	12.5	12.0	12.5	5.0	4.0	4.5	0.5	0.5	0.5	0.5	0.0	0.0
16	12.0	11.5	12.0	4.0	3.5	4.0	0.5	0.5	0.5	0.5	0.0	0.0
17	11.5	11.0	11.0	3.5	3.5	3.5	0.5	0.5	0.5	0.5	0.0	0.0
18	11.0	10.0	10.5	3.5	3.0	3.0	0.5	0.5	0.5	0.5	0.0	0.0
19	10.0	9.5	10.0	3.0	2.5	3.0	0.5	0.5	0.5	0.5	0.0	0.0
20	9.5	9.0	9.0	2.5	2.5	2.5	0.5	0.5	0.5	0.0	0.0	0.0
21	9.0	8.5	8.5	2.5	2.5	2.5	0.5	0.5	0.5	0.0	0.0	0.0
22	8.5	8.0	8.0	2.5	2.5	2.5	0.5	0.5	0.5	0.0	0.0	0.0
23	8.0	7.5	8.0	2.5	2.5	2.5	1.0	0.5	1.0	0.0	0.0	0.0
24	7.5	7.5	7.5	2.5	2.5	2.5	1.0	0.5	0.5	0.0	0.0	0.0
25	7.5	7.0	7.5	2.5	2.0	2.5	0.5	0.5	0.5	0.0	0.0	0.0
26	7.0	7.0	7.0	2.5	2.0	2.0	0.5	0.5	0.5	0.0	0.0	0.0
27	7.0	6.5	7.0	2.0	1.5	1.5	0.5	0.5	0.5	0.0	0.0	0.0
28	6.5	6.5	6.5	2.0	1.5	1.5	0.5	0.5	0.5	0.0	0.0	0.0
29	6.5	6.0	6.0	1.5	1.5	1.5	1.0	0.5	1.0	0.0	0.0	0.0
30	6.0	6.0	6.0	1.5	1.0	1.5	1.0	1.0	1.0	0.0	0.0	0.0
31	6.0	5.5	6.0	---	---	---	1.0	1.0	1.0	0.0	0.0	0.0
MONTH	18.0	5.5	11.5	5.5	1.0	3.5	1.0	0.5	0.6	1.0	0.0	0.3

STREAMS TRIBUTARY TO LAKE HURON

04137025 AU SABLE RIVER NEAR GLENNIE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

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	4.0	4.0	4.0	11.5	11.5	11.5
2	0.0	0.0	0.0	0.0	0.0	0.0	4.0	4.0	4.0	12.0	11.5	11.5
3	0.0	0.0	0.0	0.0	0.0	0.0	4.0	3.5	3.5	11.5	11.5	11.5
4	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5	3.0	11.5	11.5	11.5
5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.0	2.5	12.0	11.5	11.5
6	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.0	2.5	11.5	11.5	11.5
7	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.5	2.0	11.5	11.5	11.5
8	0.0	0.0	0.0	0.0	0.0	0.0	2.0	1.5	1.5	12.0	11.5	11.5
9	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.0	2.5	12.0	12.0	12.0
10	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.5	3.0	13.0	12.0	12.5
11	0.0	0.0	0.0	0.0	0.0	0.0	4.0	3.0	3.5	14.0	13.0	13.5
12	0.0	0.0	0.0	0.0	0.0	0.0	5.0	3.5	4.5	13.5	13.0	13.0
13	0.0	0.0	0.0	0.0	0.0	0.0	5.5	5.0	5.5	13.5	13.0	13.0
14	0.0	0.0	0.0	0.0	0.0	0.0	6.5	5.5	6.0	13.0	12.5	13.0
15	0.0	0.0	0.0	0.0	0.0	0.0	7.5	6.5	7.0	13.0	13.0	13.0
16	0.0	0.0	0.0	0.0	0.0	0.0	7.5	6.5	7.0	13.5	13.0	13.5
17	0.0	0.0	0.0	0.5	0.0	0.0	7.0	6.5	7.0	13.5	13.5	13.5
18	0.0	0.0	0.0	0.5	0.0	0.5	6.5	5.5	6.5	14.0	13.5	14.0
19	0.0	0.0	0.0	0.5	0.5	0.5	6.0	5.5	5.5	15.0	14.0	14.5
20	0.0	0.0	0.0	0.5	0.5	0.5	7.0	5.5	6.0	15.5	15.0	15.5
21	0.0	0.0	0.0	0.5	0.5	0.5	8.0	6.5	7.5	15.5	15.0	15.0
22	0.0	0.0	0.0	1.0	0.5	1.0	8.5	8.0	8.0	15.5	15.0	15.5
23	0.0	0.0	0.0	1.0	1.0	1.0	8.5	8.0	8.0	15.5	15.0	15.5
24	0.0	0.0	0.0	1.5	1.0	1.5	9.0	8.0	8.5	15.0	14.5	15.0
25	0.0	0.0	0.0	2.0	1.5	2.0	9.0	8.5	9.0	14.5	14.5	14.5
26	0.0	0.0	0.0	2.5	2.0	2.5	10.0	9.0	9.5	14.5	14.0	14.5
27	0.0	0.0	0.0	3.0	2.5	3.0	11.0	9.5	10.0	15.0	14.5	14.5
28	0.0	0.0	0.0	3.5	3.0	3.5	11.5	10.5	11.0	15.5	14.5	15.5
29	---	---	---	4.0	3.5	3.5	11.5	11.0	11.0	16.5	15.5	16.0
30	---	---	---	4.0	3.5	3.5	11.5	11.5	11.5	16.5	16.0	16.5
31	---	---	---	4.0	3.0	3.5	---	---	---	16.5	15.5	16.0
MONTH	0.0	0.0	0.0	4.0	0.0	0.9	11.5	1.5	6.0	16.5	11.5	13.6

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	15.0	15.5	22.0	20.5	21.0	23.5	22.5	23.0	22.0	21.0	21.5
2	16.0	15.5	15.5	22.5	21.0	21.5	23.0	23.0	23.0	21.5	21.0	21.0
3	16.0	15.0	15.5	23.0	21.5	22.0	23.0	23.0	23.0	21.0	20.5	21.0
4	15.5	15.0	15.5	23.0	22.0	22.5	23.0	23.0	23.0	21.0	20.0	20.5
5	15.5	15.0	15.5	23.5	22.5	23.0	23.5	22.5	23.0	20.0	19.5	20.0
6	16.0	15.0	15.5	23.5	22.5	23.0	23.5	22.5	23.0	20.5	19.5	20.0
7	16.0	15.5	16.0	24.0	23.0	23.5	23.0	22.5	23.0	20.0	19.5	19.5
8	16.5	15.5	16.0	24.5	23.5	24.0	23.0	23.0	23.0	20.0	19.0	19.5
9	16.5	16.0	16.5	24.0	23.5	23.5	23.0	22.5	22.5	20.0	19.5	19.5
10	16.5	16.5	16.5	23.5	23.0	23.5	22.5	22.5	22.5	19.5	19.0	19.5
11	16.5	16.0	16.5	23.0	21.5	22.5	22.5	22.0	22.5	20.0	19.0	19.5
12	17.0	16.0	16.5	21.5	21.0	21.5	22.5	22.0	22.5	19.5	19.0	19.5
13	17.0	16.5	17.0	---	---	---	22.5	22.0	22.5	20.0	19.5	19.5
14	18.0	17.0	17.5	---	---	---	23.5	22.0	22.5	20.0	19.5	20.0
15	18.0	17.5	18.0	21.5	21.0	21.5	24.0	22.5	23.0	20.0	19.5	20.0
16	18.5	17.5	18.5	22.0	21.0	21.5	24.0	23.0	23.5	20.0	19.5	20.0
17	19.5	18.5	19.0	22.0	21.5	21.5	24.0	23.5	23.5	19.5	19.5	19.5
18	20.0	19.0	19.5	21.5	21.0	21.5	24.0	23.0	23.5	19.5	19.0	19.5
19	20.5	19.5	20.0	22.0	21.5	21.5	24.0	23.0	23.5	20.0	19.5	19.5
20	20.5	19.5	20.0	22.0	21.5	21.5	24.0	23.0	23.5	19.5	18.5	19.0
21	21.0	19.5	20.0	21.5	21.5	21.5	24.5	23.5	24.0	19.0	18.5	18.5
22	21.0	20.0	20.5	22.0	21.5	21.5	24.0	23.5	24.0	18.5	18.5	18.5
23	21.5	20.0	21.0	22.0	21.5	21.5	24.0	23.5	23.5	18.5	17.5	18.0
24	22.0	21.0	21.5	22.0	21.5	22.0	23.5	23.0	23.5	17.5	17.0	17.5
25	23.0	21.5	22.5	22.5	21.5	22.0	23.0	23.0	23.0	17.0	16.5	17.0
26	23.0	22.5	23.0	22.5	22.0	22.0	23.5	22.5	23.0	16.5	16.0	16.0
27	23.0	22.5	22.5	23.0	22.0	22.5	23.5	23.0	23.0	16.0	15.5	15.5
28	22.5	21.5	22.0	23.0	22.0	22.5	23.0	22.5	23.0	15.5	15.0	15.0
29	22.0	21.0	21.5	23.0	22.0	22.5	23.0	22.5	22.5	15.0	14.5	14.5
30	21.5	20.5	21.0	23.0	22.0	22.5	22.5	22.0	22.5	14.5	13.5	14.0
31	---	---	---	23.5	22.5	23.0	22.5	22.0	22.0	---	---	---
MONTH	23.0	15.0	18.5	---	---	---	24.5	22.0	23.0	22.0	13.5	18.8

STREAMS TRIBUTARY TO LAKE HURON

04137025 AU SABLE RIVER NEAR GLENNIE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.9	6.0	8.0	11.9	11.0	11.7	13.2	13.0	13.1	13.0	12.9	13.0
2	8.8	8.5	8.6	12.1	11.0	11.8	13.2	12.8	13.1	13.0	12.9	12.9
3	8.7	7.9	8.2	12.2	11.5	12.1	13.1	12.5	13.0	12.9	12.8	12.8
4	8.7	7.9	8.5	12.4	11.4	12.1	13.2	13.1	13.1	12.9	12.8	12.8
5	8.7	8.0	8.3	12.4	11.5	12.2	13.3	13.1	13.2	13.0	12.8	12.9
6	8.6	7.9	8.1	12.5	11.6	12.2	13.3	13.2	13.3	13.1	12.4	12.9
7	8.4	8.0	8.2	12.3	11.6	12.1	13.5	13.3	13.4	13.1	12.4	12.9
8	8.6	8.3	8.4	12.3	11.6	12.1	13.5	13.3	13.4	13.1	12.3	12.8
9	8.7	8.3	8.5	12.3	11.5	12.1	13.3	13.2	13.3	13.0	12.3	12.7
10	8.6	8.4	8.5	12.2	11.5	12.0	13.3	13.3	13.3	13.0	12.5	12.9
11	8.9	8.4	8.7	12.2	11.5	12.0	13.3	13.2	13.2	13.1	12.4	12.9
12	9.1	8.7	8.9	12.1	11.1	11.8	13.4	13.2	13.3	13.1	12.5	12.9
13	9.3	8.8	9.1	11.9	11.1	11.7	13.4	13.3	13.4	13.0	12.4	12.8
14	9.5	7.0	8.7	11.8	11.0	11.6	13.4	13.3	13.4	13.2	12.6	12.9
15	9.7	6.4	8.4	11.8	11.0	11.6	13.4	13.2	13.3	13.2	12.7	13.0
16	9.7	6.5	8.5	12.0	11.3	11.8	13.3	13.1	13.2	13.4	12.7	13.1
17	9.9	7.1	8.6	12.2	11.4	11.9	13.2	12.5	13.0	13.4	13.0	13.2
18	10.1	7.2	8.8	12.3	11.6	12.1	13.2	12.9	13.0	13.3	13.1	13.3
19	10.3	7.7	9.2	12.4	11.6	12.2	13.1	13.0	13.0	13.3	13.1	13.3
20	10.5	7.9	9.4	12.6	11.8	12.4	13.2	13.0	13.1	13.3	13.2	13.3
21	10.7	7.9	9.5	12.7	11.8	12.4	13.2	13.1	13.2	13.4	13.2	13.3
22	10.7	8.1	9.6	12.7	12.0	12.5	13.1	12.9	13.0	13.4	13.2	13.3
23	10.8	8.1	9.7	12.8	12.0	12.5	13.0	12.8	12.9	13.4	13.2	13.3
24	10.8	8.1	9.7	12.7	12.0	12.5	13.0	12.8	12.9	13.3	13.1	13.2
25	11.0	8.4	9.9	12.7	12.0	12.5	13.0	12.9	12.9	13.3	13.2	13.3
26	11.2	8.4	10.0	12.7	12.0	12.5	13.0	12.9	12.9	13.3	13.2	13.3
27	11.3	8.6	10.1	12.9	12.1	12.6	13.1	12.9	13.0	13.3	13.1	13.2
28	11.3	8.8	10.2	12.7	12.5	12.6	13.1	12.9	13.0	13.2	13.0	13.1
29	11.5	8.7	10.3	12.9	12.7	12.8	13.1	12.9	13.0	13.1	12.9	13.0
30	11.4	8.8	10.5	13.1	12.9	13.0	13.1	13.0	13.0	12.9	12.8	12.9
31	11.7	10.7	11.3	---	---	---	13.1	12.9	13.0	12.9	12.7	12.8
MONTH	11.7	6.0	9.1	13.1	11.0	12.2	13.5	12.5	13.1	13.4	12.3	13.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	12.7	12.6	12.7	12.4	12.2	12.3	12.0	11.1	11.7	10.3	10.0	10.2
2	12.6	12.5	12.6	12.5	12.3	12.4	12.2	11.2	11.9	10.1	9.9	10.0
3	12.6	12.4	12.5	12.5	12.3	12.4	12.3	12.0	12.2	10.0	9.9	9.9
4	12.5	12.3	12.4	12.5	12.3	12.4	12.2	11.4	12.0	10.0	9.9	10.0
5	12.3	12.2	12.2	12.5	12.3	12.4	12.3	12.2	12.2	10.0	9.9	9.9
6	12.2	12.1	12.2	12.5	12.3	12.4	12.5	12.2	12.4	10.0	9.9	9.9
7	12.2	12.1	12.1	12.5	12.3	12.4	13.0	12.5	12.8	9.9	9.8	9.9
8	12.2	12.0	12.1	12.5	12.3	12.4	13.1	13.0	13.1	9.9	9.7	9.8
9	12.2	12.1	12.2	12.4	12.0	12.2	13.1	12.1	12.9	9.8	9.7	9.8
10	12.2	12.2	12.2	12.3	12.0	12.2	13.1	12.1	12.8	9.9	9.8	9.8
11	12.3	12.2	12.2	12.4	12.2	12.3	13.2	12.2	12.9	9.9	9.7	9.8
12	12.3	12.1	12.2	12.4	12.3	12.4	13.2	12.2	13.0	9.7	9.5	9.6
13	12.2	12.0	12.1	12.6	12.4	12.4	13.2	12.9	13.1	9.6	9.5	9.6
14	12.1	12.0	12.1	12.5	12.4	12.5	13.0	11.6	12.8	9.6	9.5	9.5
15	12.2	12.1	12.1	12.5	12.4	12.4	12.8	11.6	12.4	10.2	9.5	9.8
16	12.2	12.0	12.1	12.5	12.4	12.4	12.3	11.3	11.9	10.2	10.1	10.1
17	12.2	12.0	12.1	12.6	12.4	12.5	11.7	11.2	11.6	10.1	9.8	10.0
18	12.1	11.9	12.0	12.7	12.4	12.6	11.6	10.9	11.4	10.0	9.7	9.9
19	12.0	11.9	12.0	12.8	11.8	12.5	11.6	11.5	11.5	9.9	9.6	9.8
20	12.0	11.9	12.0	12.7	12.0	12.5	11.5	11.3	11.4	9.9	9.7	9.8
21	12.0	11.9	11.9	12.6	11.8	12.5	11.3	10.9	11.1	9.8	9.5	9.6
22	11.9	11.8	11.9	12.7	11.9	12.5	11.0	10.2	10.7	9.7	9.3	9.5
23	11.9	11.8	11.9	12.6	12.0	12.4	10.9	9.9	10.6	9.7	9.3	9.5
24	12.0	11.8	12.0	12.3	11.7	12.1	10.8	9.7	10.6	9.6	9.4	9.5
25	12.1	12.0	12.0	12.2	11.4	12.0	10.9	9.7	10.7	9.5	9.1	9.3
26	12.2	12.0	12.1	12.1	11.5	11.9	10.9	10.2	10.7	9.2	9.0	9.1
27	12.3	12.1	12.2	12.0	11.4	11.8	10.9	10.7	10.8	9.3	8.6	9.2
28	12.3	12.2	12.2	11.9	11.1	11.7	10.8	10.6	10.7	9.6	7.9	9.1
29	---	---	---	11.8	11.1	11.7	10.6	10.5	10.6	9.6	7.7	8.9
30	---	---	---	11.9	11.2	11.8	10.5	10.3	10.4	9.4	6.3	8.7
31	---	---	---	11.9	11.3	11.8	---	---	---	9.2	7.7	8.8
MONTH	12.7	11.8	12.2	12.8	11.1	12.3	13.2	9.7	11.8	10.3	6.3	9.6

STREAMS TRIBUTARY TO LAKE HURON

04137025 AU SABLE RIVER NEAR GLENNIE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.1	7.3	8.6	7.5	5.4	6.6	8.2	5.9	7.4	7.3	6.0	6.8
2	9.1	7.9	8.7	7.8	4.8	6.7	8.0	5.9	7.4	7.2	6.1	6.8
3	9.0	7.5	8.6	7.9	4.6	6.9	7.9	5.8	7.1	7.4	6.1	6.9
4	9.2	7.7	8.8	8.0	4.4	7.0	7.6	6.3	7.2	7.5	6.3	7.0
5	9.2	8.2	8.9	8.0	4.6	7.1	7.5	5.8	6.9	7.5	6.3	7.0
6	9.2	7.6	8.8	8.2	4.9	7.0	7.4	5.4	6.9	7.7	6.5	7.2
7	9.0	8.3	8.7	8.2	4.9	7.2	7.3	5.3	6.7	7.7	6.7	7.3
8	9.2	7.6	8.7	8.0	4.4	7.0	7.3	6.3	6.9	7.9	6.7	7.4
9	9.2	7.4	8.7	7.7	4.5	6.5	7.2	5.9	6.8	8.0	6.7	7.5
10	9.0	6.8	8.3	7.6	4.6	6.8	7.0	5.9	6.7	8.2	7.0	7.7
11	8.7	7.2	8.4	7.4	6.5	7.1	7.1	5.6	6.6	8.3	7.0	7.8
12	8.8	6.4	8.2	7.5	7.0	7.3	7.2	5.7	6.7	8.2	7.0	7.7
13	8.9	7.7	8.4	---	---	---	8.6	5.8	6.9	8.2	7.1	7.7
14	8.9	7.1	8.3	---	---	---	7.7	5.3	6.9	8.3	7.2	7.8
15	8.9	6.7	8.2	8.3	7.9	8.0	7.7	6.5	7.1	8.2	7.1	7.8
16	9.0	6.5	8.2	8.2	7.9	8.0	7.8	5.9	7.2	8.1	7.2	7.7
17	9.2	6.5	8.3	8.1	7.8	8.0	7.8	5.4	7.0	8.3	7.6	7.9
18	9.3	6.6	8.3	8.3	8.0	8.2	7.7	5.4	6.9	8.2	7.2	7.8
19	9.0	5.8	8.0	8.5	8.1	8.3	7.6	5.8	7.0	8.3	7.0	7.8
20	8.8	6.2	8.0	8.4	8.1	8.3	7.5	6.1	6.8	8.1	7.1	7.7
21	8.8	5.9	7.6	8.5	6.5	8.1	7.4	5.7	6.8	8.0	7.1	7.6
22	8.7	5.9	7.7	8.4	6.0	7.7	7.4	5.3	6.6	8.1	7.1	7.7
23	8.6	5.7	7.6	8.4	5.9	7.4	7.3	5.6	6.7	7.8	7.2	7.6
24	8.5	5.8	7.6	8.3	6.0	7.6	7.2	5.9	6.7	7.9	6.9	7.5
25	8.3	5.9	7.6	8.5	5.7	7.8	7.0	5.8	6.6	7.9	7.3	7.7
26	8.2	4.8	7.0	8.3	8.0	8.2	7.0	5.7	6.6	8.0	7.3	7.7
27	7.8	4.4	6.6	8.0	7.8	7.9	7.0	6.1	6.7	8.0	7.4	7.8
28	7.4	4.7	6.6	8.1	6.9	7.6	7.1	6.3	6.8	8.2	7.5	7.9
29	7.2	5.5	6.9	7.9	5.8	7.1	7.3	6.0	6.8	8.3	7.6	8.0
30	7.3	5.1	6.5	8.0	5.4	7.1	7.2	5.8	6.7	8.6	8.0	8.3
31	---	---	---	8.2	5.6	7.3	7.2	6.1	6.8	---	---	---
MONTH	9.3	4.4	8.0	---	---	---	8.6	5.3	6.9	8.6	6.0	7.6

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 mi^2.

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: Nov. 13-19, Jan. 31 to Feb. 3, Mar. 21-30, June 3-6, Sept. 26-30 rated good; Nov. 20-26, Feb. 4, 5, Mar. 14-20, June 7-12 rated fair; and Feb. 6 to Mar. 13, May 23-27 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, 3.5 mg/L, July 7, 16, 17, 24, 2002.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum, 25.0°C, Aug. 15, 19-22; minimum, 0.5°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 13.6 mg/L, Dec. 12, 13; minimum, 3.8 mg/L, July 2.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	19.5	19.0	19.5	7.5	7.5	7.5	2.0	1.5	2.0	1.5	1.0	1.0
2	19.5	19.0	19.0	7.5	7.0	7.0	1.5	1.5	1.5	1.0	1.0	1.0
3	19.0	18.5	18.5	7.0	6.5	7.0	1.5	1.5	1.5	1.0	1.0	1.0
4	18.5	18.5	18.5	6.5	6.5	6.5	1.5	1.5	1.5	1.5	1.0	1.0
5	18.5	18.0	18.0	6.5	6.0	6.5	1.5	1.5	1.5	1.0	1.0	1.0
6	18.0	17.5	18.0	6.0	6.0	6.0	1.5	1.5	1.5	1.5	1.0	1.0
7	17.5	17.0	17.5	6.0	5.5	5.5	1.5	1.5	1.5	1.5	1.0	1.0
8	17.0	16.5	17.0	5.5	5.5	5.5	1.5	1.5	1.5	1.5	1.0	1.0
9	17.0	16.5	16.5	5.5	5.5	5.5	1.5	1.5	1.5	1.5	1.0	1.0
10	16.5	16.0	16.0	6.0	5.5	5.5	1.5	1.5	1.5	1.5	1.0	1.0
11	16.0	16.0	16.0	6.0	5.5	6.0	1.5	1.5	1.5	1.5	1.0	1.0
12	16.0	15.5	15.5	5.5	5.5	5.5	1.5	1.5	1.5	1.5	1.0	1.0
13	16.0	15.0	15.5	5.5	5.5	5.5	1.5	1.5	1.5	1.5	1.0	1.0
14	15.0	14.5	15.0	5.5	5.0	5.5	1.5	1.5	1.5	1.5	1.0	1.0
15	15.0	14.5	14.5	5.0	5.0	5.0	1.5	1.5	1.5	1.5	1.0	1.0
16	14.5	14.0	14.0	5.0	4.5	4.5	1.5	1.5	1.5	2.0	1.0	1.5
17	14.0	13.5	13.5	4.5	4.5	4.5	1.5	1.5	1.5	1.5	1.0	1.0
18	13.5	13.0	13.0	4.5	4.0	4.5	1.5	1.5	1.5	1.0	1.0	1.0
19	13.0	12.5	12.5	4.5	4.0	4.5	1.5	1.5	1.5	1.0	1.0	1.0
20	12.5	12.0	12.0	4.0	4.0	4.0	1.5	1.0	1.5	1.0	1.0	1.0
21	12.0	11.5	11.5	4.0	4.0	4.0	1.5	1.0	1.0	1.0	1.0	1.0
22	11.5	11.0	11.0	4.0	4.0	4.0	1.0	1.0	1.0	1.0	1.0	1.0
23	11.0	10.5	10.5	4.0	3.5	3.5	1.0	1.0	1.0	1.0	1.0	1.0
24	10.5	10.0	10.5	3.5	3.5	3.5	1.5	1.0	1.0	1.5	1.0	1.0
25	10.0	9.5	10.0	3.5	3.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0
26	9.5	9.5	9.5	3.0	2.5	3.0	1.0	1.0	1.0	1.0	1.0	1.0
27	9.5	9.0	9.5	2.5	2.0	2.5	1.0	1.0	1.0	1.0	1.0	1.0
28	9.0	8.5	9.0	2.5	2.0	2.5	1.0	1.0	1.0	1.0	1.0	1.0
29	8.5	8.0	8.5	2.5	2.5	2.5	1.0	1.0	1.0	1.0	0.5	1.0
30	8.0	8.0	8.0	2.5	2.0	2.5	1.0	1.0	1.0	1.0	0.5	0.5
31	8.0	7.5	8.0	---	---	---	1.0	1.0	1.0	1.0	0.5	0.5
MONTH	19.5	7.5	13.7	7.5	2.0	4.8	2.0	1.0	1.3	2.0	0.5	1.0

STREAMS TRIBUTARY TO LAKE HURON

04137030 AU SABLE RIVER NEAR SIDTOWN, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

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	2.5	2.5	2.5	11.0	10.0	10.5
2	0.5	0.5	0.5	0.5	0.5	0.5	2.5	2.5	2.5	11.0	10.5	11.0
3	0.5	0.5	0.5	0.5	0.5	0.5	3.0	2.5	3.0	11.0	11.0	11.0
4	0.5	0.5	0.5	1.0	0.5	0.5	3.0	2.5	3.0	11.5	11.0	11.0
5	0.5	0.5	0.5	1.0	0.5	0.5	2.5	2.5	2.5	11.5	11.0	11.0
6	0.5	0.5	0.5	1.0	0.5	0.5	2.5	2.5	2.5	12.0	11.5	11.5
7	0.5	0.5	0.5	0.5	0.5	0.5	2.5	2.5	2.5	12.0	11.5	11.5
8	0.5	0.5	0.5	1.0	0.5	0.5	2.5	2.0	2.5	12.0	11.5	12.0
9	0.5	0.5	0.5	0.5	0.5	0.5	2.0	2.0	2.0	12.0	12.0	12.0
10	0.5	0.5	0.5	1.0	0.5	0.5	2.0	2.0	2.0	13.5	12.0	12.5
11	0.5	0.5	0.5	1.0	0.5	0.5	2.5	2.0	2.5	13.0	12.0	13.0
12	0.5	0.5	0.5	0.5	0.5	0.5	3.0	2.5	2.5	13.0	13.0	13.0
13	0.5	0.5	0.5	0.5	0.5	0.5	3.0	2.5	3.0	13.5	12.5	13.0
14	0.5	0.5	0.5	0.5	0.5	0.5	3.5	3.0	3.0	13.0	13.0	13.0
15	0.5	0.5	0.5	0.5	0.5	0.5	4.0	3.0	3.5	13.5	13.0	13.0
16	0.5	0.5	0.5	0.5	0.5	0.5	4.0	4.0	4.0	13.5	13.5	13.5
17	0.5	0.5	0.5	1.0	0.5	0.5	4.0	4.0	4.0	13.5	13.5	13.5
18	0.5	0.5	0.5	1.0	0.5	1.0	4.5	4.0	4.0	14.5	13.5	14.0
19	0.5	0.5	0.5	1.0	1.0	1.0	5.5	4.5	5.0	15.0	14.0	14.5
20	0.5	0.5	0.5	1.5	1.0	1.0	7.0	5.5	6.5	16.0	15.0	15.5
21	0.5	0.5	0.5	1.5	1.0	1.0	7.0	7.0	7.0	15.0	14.5	15.0
22	0.5	0.5	0.5	1.5	1.0	1.5	7.0	7.0	7.0	15.0	14.5	15.0
23	0.5	0.5	0.5	1.5	1.5	1.5	7.5	7.0	7.0	15.0	15.0	15.0
24	0.5	0.5	0.5	1.5	1.5	1.5	8.0	7.0	7.5	15.0	14.5	14.5
25	0.5	0.5	0.5	1.5	1.5	1.5	8.0	7.5	8.0	15.0	14.5	15.0
26	0.5	0.5	0.5	1.5	1.5	1.5	8.5	8.0	8.0	15.0	15.0	15.0
27	0.5	0.5	0.5	2.0	1.5	1.5	9.5	8.5	9.0	15.5	15.0	15.5
28	0.5	0.5	0.5	2.0	2.0	2.0	10.5	9.5	10.0	16.5	15.5	15.5
29	---	---	---	2.0	2.0	2.0	10.5	10.0	10.0	16.5	15.5	16.0
30	---	---	---	2.5	2.0	2.0	10.5	10.0	10.0	17.0	15.5	16.0
31	---	---	---	2.5	2.0	2.5	---	---	---	16.0	15.5	16.0
MONTH	0.5	0.5	0.5	2.5	0.5	1.0	10.5	2.0	4.9	17.0	10.0	13.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	15.5	16.0	22.5	21.5	21.5	23.5	23.0	23.5	23.5	23.0	23.0
2	16.5	16.0	16.0	23.0	21.5	22.0	23.5	23.0	23.5	23.0	22.5	23.0
3	16.5	16.0	16.0	23.0	21.5	22.0	23.5	23.0	23.5	23.0	22.5	23.0
4	16.0	16.0	16.0	24.0	21.5	22.5	23.5	23.0	23.5	23.0	22.0	22.5
5	16.0	16.0	16.0	23.5	22.0	22.5	24.0	23.5	23.5	22.0	21.5	22.0
6	17.0	16.0	16.5	23.0	22.0	22.5	24.0	23.5	23.5	22.5	21.5	22.0
7	16.5	16.0	16.5	24.0	22.5	23.0	24.0	23.5	23.5	22.0	21.5	22.0
8	17.0	16.5	16.5	24.5	22.0	23.5	23.5	23.5	23.5	21.5	21.5	21.5
9	17.5	16.5	17.0	23.5	22.5	23.0	23.5	23.5	23.5	21.5	21.0	21.5
10	17.0	16.5	16.5	23.5	22.5	23.0	23.5	23.5	23.5	21.5	21.0	21.0
11	17.0	16.5	17.0	23.5	23.0	23.0	23.5	23.5	23.5	21.5	21.0	21.0
12	17.0	17.0	17.0	23.0	22.5	22.5	23.5	23.5	23.5	21.0	21.0	21.0
13	17.5	17.0	17.5	23.0	22.5	22.5	23.5	23.0	23.5	21.5	21.0	21.5
14	18.0	17.0	17.5	23.0	22.5	22.5	24.5	23.5	23.5	21.5	21.0	21.5
15	18.0	17.5	17.5	23.5	22.5	22.5	25.0	23.5	24.0	21.5	21.5	21.5
16	18.0	17.5	18.0	23.0	22.5	22.5	24.5	23.5	24.0	21.5	21.0	21.0
17	18.5	18.0	18.0	22.5	22.0	22.5	24.0	23.5	24.0	21.0	21.0	21.0
18	20.0	18.0	19.0	22.5	22.0	22.0	24.0	23.5	24.0	21.0	21.0	21.0
19	20.0	18.5	19.0	23.0	22.0	22.5	25.0	24.0	24.0	21.0	20.5	21.0
20	20.0	18.5	19.0	22.5	22.0	22.5	25.0	24.0	24.5	21.0	20.5	20.5
21	20.5	19.0	19.5	22.5	22.0	22.0	25.0	24.0	24.5	20.5	20.0	20.5
22	20.5	19.0	20.0	22.5	22.0	22.0	25.0	24.5	24.5	20.0	20.0	20.0
23	21.5	19.5	20.5	22.5	22.0	22.0	24.5	24.0	24.5	20.0	19.5	20.0
24	22.0	19.5	21.0	23.0	22.0	22.5	24.0	24.0	24.0	19.5	19.0	19.5
25	23.0	19.5	21.5	23.0	22.0	22.5	24.0	24.0	24.0	19.0	18.5	19.0
26	23.0	20.5	22.0	23.0	22.5	22.5	24.5	24.0	24.0	18.5	18.5	18.5
27	23.5	20.5	22.0	23.5	22.5	23.0	24.5	24.0	24.0	18.5	18.0	18.0
28	22.0	21.0	21.5	23.5	22.5	23.0	24.0	23.5	24.0	18.0	17.5	17.5
29	22.5	21.0	21.5	23.5	22.5	23.0	24.0	23.5	24.0	17.5	17.0	17.0
30	22.0	21.0	21.5	23.5	22.5	23.0	24.0	23.5	23.5	17.0	16.5	16.5
31	---	---	---	23.5	23.0	23.0	23.5	23.0	23.5	---	---	---
MONTH	23.5	15.5	18.4	24.5	21.5	22.5	25.0	23.0	23.8	23.5	16.5	20.6

STREAMS TRIBUTARY TO LAKE HURON

04137030 AU SABLE RIVER NEAR SIDTOWN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.8	7.1	8.1	10.3	9.4	9.9	13.1	13.0	13.0	13.2	13.1	13.2
2	8.4	8.0	8.2	10.4	9.6	10.0	13.2	13.0	13.1	13.2	13.1	13.2
3	8.3	7.9	8.1	10.4	9.7	10.2	13.2	12.8	13.0	13.3	13.2	13.2
4	8.1	7.9	8.0	10.6	9.8	10.3	13.3	13.1	13.3	13.3	13.0	13.2
5	8.1	7.9	8.0	10.6	9.9	10.3	13.3	13.3	13.3	13.2	13.1	13.2
6	8.1	7.9	8.0	10.8	10.1	10.5	13.4	13.3	13.3	13.3	12.8	13.2
7	8.3	8.0	8.2	10.8	10.2	10.6	13.5	13.3	13.4	13.2	12.9	13.1
8	8.3	8.2	8.2	11.0	10.2	10.6	13.5	13.4	13.4	13.2	12.8	13.1
9	8.3	8.1	8.2	11.2	10.4	10.8	13.5	13.4	13.5	13.2	12.8	13.1
10	8.3	8.2	8.2	11.2	10.6	11.0	13.5	13.4	13.5	13.2	12.8	13.0
11	8.4	8.3	8.3	11.3	10.6	11.1	13.5	13.4	13.5	13.1	12.7	12.9
12	8.7	8.3	8.4	11.3	10.7	11.1	13.6	13.5	13.5	13.1	12.5	12.9
13	8.9	8.0	8.6	11.5	10.8	11.2	13.6	13.5	13.5	13.1	12.5	12.9
14	8.8	7.8	8.6	11.6	11.0	11.4	13.5	13.5	13.5	13.1	12.5	12.9
15	9.1	7.9	8.6	11.7	11.0	11.5	13.5	13.5	13.5	13.0	12.6	12.9
16	9.2	8.0	8.7	11.7	11.0	11.5	13.5	13.4	13.5	13.0	12.2	12.7
17	9.2	8.1	8.8	11.8	11.3	11.6	13.5	13.1	13.4	12.9	12.5	12.7
18	9.2	8.2	8.8	11.8	11.4	11.7	13.4	13.4	13.4	13.0	12.8	12.9
19	9.4	8.4	9.0	11.8	11.4	11.7	13.4	13.3	13.3	12.9	12.8	12.9
20	9.5	8.5	9.0	11.9	11.4	11.7	13.4	13.3	13.3	12.9	12.7	12.8
21	9.4	8.6	9.1	12.0	11.5	11.8	13.4	13.3	13.4	12.9	12.8	12.9
22	9.6	8.6	9.2	12.1	11.6	11.9	13.4	13.3	13.4	13.0	12.8	12.9
23	9.7	8.9	9.4	12.1	11.6	11.9	13.3	13.2	13.3	13.0	12.8	12.9
24	9.8	8.7	9.5	12.3	11.7	12.0	13.3	13.2	13.3	13.1	12.8	13.0
25	9.9	8.9	9.6	12.4	11.8	12.2	13.3	13.2	13.3	13.0	12.9	13.0
26	9.9	8.9	9.6	12.8	12.0	12.4	13.3	13.2	13.2	13.1	12.8	13.0
27	10.0	8.9	9.7	12.9	12.4	12.7	13.3	13.2	13.2	13.1	12.9	13.0
28	10.1	9.0	9.7	12.9	12.4	12.8	13.2	13.1	13.2	13.1	12.8	13.0
29	10.1	9.1	9.8	13.0	12.8	12.9	13.3	13.1	13.2	13.1	12.9	13.0
30	10.1	9.2	9.8	13.0	12.9	13.0	13.2	13.2	13.2	13.1	12.9	13.0
31	10.2	9.5	9.8	---	---	---	13.2	13.1	13.2	13.1	12.9	13.0
MONTH	10.2	7.1	8.8	13.0	9.4	11.4	13.6	12.8	13.3	13.3	12.2	13.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	13.0	12.8	12.9	12.3	12.2	12.2	12.9	12.4	12.8	11.4	11.2	11.4
2	12.9	12.7	12.8	12.3	12.1	12.2	12.9	12.4	12.7	11.2	11.1	11.2
3	12.8	12.6	12.7	12.4	12.2	12.3	12.8	12.6	12.8	11.2	11.0	11.0
4	12.7	12.5	12.6	12.4	12.3	12.3	12.8	12.4	12.5	11.0	10.7	10.8
5	12.7	12.5	12.6	12.4	12.3	12.3	12.6	12.5	12.5	10.7	10.5	10.6
6	12.8	12.4	12.6	12.5	12.3	12.4	12.6	12.5	12.5	10.5	10.1	10.2
7	12.9	12.6	12.8	12.5	12.3	12.4	12.6	12.4	12.5	10.2	10.0	10.1
8	12.7	12.5	12.6	12.5	12.4	12.5	12.4	12.3	12.4	10.2	9.8	10.0
9	12.6	12.4	12.5	12.6	12.4	12.5	12.4	12.2	12.4	9.9	9.6	9.8
10	12.5	12.3	12.4	12.6	12.4	12.5	12.5	12.0	12.3	10.0	9.7	9.8
11	12.4	12.1	12.3	12.5	12.4	12.4	12.5	12.2	12.4	9.9	9.6	9.7
12	12.3	12.1	12.2	12.4	12.3	12.4	12.6	12.2	12.4	9.7	9.5	9.6
13	12.3	12.1	12.2	12.3	12.2	12.3	12.7	11.9	12.6	9.6	9.4	9.5
14	12.3	12.0	12.2	12.3	12.1	12.2	12.7	12.2	12.5	9.6	9.3	9.4
15	12.0	11.9	12.0	12.3	12.1	12.1	12.8	12.0	12.6	9.3	9.1	9.3
16	12.1	12.0	12.0	12.2	12.0	12.1	12.8	12.2	12.6	9.3	9.1	9.2
17	12.1	11.9	12.0	12.4	12.1	12.3	12.7	12.3	12.6	9.2	9.0	9.1
18	12.0	11.8	11.9	12.6	12.3	12.4	12.6	11.9	12.5	9.2	9.0	9.1
19	12.0	11.8	11.9	12.8	12.3	12.6	12.6	12.2	12.4	9.3	9.0	9.1
20	11.9	11.7	11.8	13.0	12.3	12.8	12.3	12.0	12.1	9.5	9.1	9.3
21	11.9	11.7	11.8	13.1	12.4	12.8	12.0	11.7	11.9	9.2	8.7	9.0
22	12.0	11.8	11.9	13.1	12.6	13.0	11.9	11.3	11.7	---	---	---
23	11.9	11.8	11.8	13.2	12.8	13.1	11.9	11.1	11.7	---	---	---
24	11.9	11.8	11.9	13.3	12.7	13.1	11.8	10.6	11.6	9.1	8.8	9.0
25	12.0	11.9	11.9	13.3	12.8	13.1	11.8	10.6	11.6	9.0	8.7	8.9
26	12.0	11.9	11.9	13.2	12.7	13.0	11.8	11.1	11.6	8.8	8.7	8.8
27	12.2	12.0	12.1	13.2	12.7	13.0	11.8	11.6	11.7	9.0	7.8	8.7
28	12.2	12.0	12.1	13.1	12.8	13.0	11.7	11.5	11.6	8.9	7.6	8.5
29	---	---	---	13.1	12.7	13.0	11.6	11.5	11.5	9.1	7.3	8.4
30	---	---	---	13.1	12.6	12.9	11.6	11.4	11.5	9.2	7.5	8.4
31	---	---	---	13.0	12.5	12.8	---	---	---	9.0	7.2	8.3
MONTH	13.0	11.7	12.2	13.3	12.0	12.6	12.9	10.6	12.2	---	---	---

STREAMS TRIBUTARY TO LAKE HURON

04137030 AU SABLE RIVER NEAR SIDTOWN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.9	7.5	8.3	8.1	5.8	7.0	7.5	6.2	6.9	7.0	5.8	6.5
2	8.9	7.5	8.3	7.2	3.8	6.5	7.4	6.1	6.9	7.1	5.7	6.5
3	8.9	7.1	8.2	7.7	5.8	6.7	7.4	6.3	7.0	7.1	6.1	6.5
4	8.7	7.3	8.1	7.6	5.7	6.7	7.5	5.6	7.0	7.0	5.9	6.6
5	9.0	7.4	8.4	7.8	5.7	6.9	7.4	5.6	6.7	7.0	6.0	6.6
6	9.3	7.2	8.5	7.6	6.1	6.9	7.4	5.2	6.8	7.4	6.0	6.6
7	9.0	7.0	8.1	7.6	5.6	6.8	7.3	5.3	6.6	7.3	5.9	6.6
8	8.9	6.9	8.1	7.7	4.7	6.6	7.1	5.9	6.6	7.3	6.0	6.7
9	9.5	6.6	8.4	7.2	4.7	6.3	7.3	6.1	6.6	7.5	6.2	6.9
10	8.7	6.6	7.8	6.7	5.4	6.1	7.0	6.0	6.6	7.4	6.2	6.9
11	8.8	6.9	8.2	7.1	5.8	6.7	7.1	5.7	6.4	7.4	6.1	6.9
12	9.1	6.9	8.2	7.1	6.7	6.9	6.9	5.7	6.3	7.4	6.2	6.9
13	9.4	6.6	8.4	6.9	6.1	6.8	7.1	5.7	6.5	7.4	6.3	6.9
14	9.5	6.6	8.4	7.0	6.5	6.8	7.1	5.8	6.5	7.5	6.3	7.0
15	9.2	6.7	8.2	7.5	6.4	6.9	7.1	5.3	6.3	7.7	6.6	7.2
16	9.3	6.6	8.3	7.3	6.7	7.0	6.8	5.5	6.3	7.6	6.5	7.1
17	9.3	6.6	8.3	7.1	6.5	6.8	7.0	5.4	6.3	7.4	6.5	7.0
18	9.5	5.6	8.0	7.2	6.6	6.9	7.2	5.5	6.5	7.4	6.7	7.1
19	9.6	6.1	8.0	7.7	6.9	7.2	7.6	5.8	6.6	7.7	6.7	7.2
20	9.3	6.2	7.9	7.4	6.8	7.1	7.6	5.5	6.5	7.6	6.5	7.2
21	9.1	6.2	7.6	7.3	5.9	7.0	7.7	5.8	6.7	7.6	5.2	7.1
22	9.1	4.9	7.7	7.3	6.1	6.7	7.6	6.3	6.9	7.3	4.6	6.0
23	9.1	4.6	7.4	7.5	5.8	6.9	7.4	5.6	6.7	7.5	4.7	6.4
24	9.0	5.6	7.5	7.6	5.8	7.0	7.2	6.1	6.7	7.7	5.1	6.6
25	9.0	5.4	7.5	7.8	6.0	7.2	7.2	6.1	6.7	7.8	7.0	7.5
26	8.3	5.8	7.2	7.6	7.1	7.3	7.4	5.8	6.7	7.8	7.0	7.5
27	8.2	5.5	7.2	7.5	7.0	7.2	7.4	6.0	6.9	8.0	7.0	7.6
28	8.0	6.0	7.2	7.3	6.1	6.9	7.2	6.0	6.8	8.2	7.0	7.7
29	8.0	6.3	7.5	7.6	6.0	6.8	7.4	5.9	6.7	8.3	7.1	7.8
30	7.8	5.7	7.1	7.6	4.8	6.7	7.1	6.2	6.7	8.2	7.2	7.8
31	---	---	---	7.5	6.0	6.9	7.2	5.8	6.7	---	---	---
MONTH	9.6	4.6	7.9	8.1	3.8	6.8	7.7	5.2	6.6	8.3	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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	964	898	970	1060	1050	982	1040	1430	1290	959	812	1030
2	968	968	890	964	1140	933	1100	1380	1110	982	790	1030
3	983	965	820	916	1040	817	1120	1270	1030	906	1050	1010
4	1110	961	832	920	1010	747	1370	1210	1030	956	1260	1010
5	1340	960	1040	959	1000	907	1470	1230	1120	1020	1340	974
6	1290	959	1140	964	920	1050	1230	1390	1170	992	1180	869
7	1100	985	994	909	841	953	1230	1400	1170	1010	1060	897
8	864	965	893	847	758	853	1040	1270	1110	932	1250	865
9	823	962	711	875	814	774	998	1210	1310	818	1190	866
10	874	1070	725	959	948	742	1000	1220	1340	828	1160	862
11	922	1320	1030	949	791	815	1250	1330	1360	1630	1130	818
12	1010	1320	1020	871	648	928	1450	1540	1440	1910	994	795
13	1070	1130	981	863	830	1050	1370	1540	1340	1690	994	795
14	1080	1030	1010	902	893	1100	1370	1370	1270	1510	855	790
15	956	926	985	910	857	1100	1500	1310	1130	1490	841	788
16	801	862	966	871	888	1040	1760	1280	1040	1140	1010	847
17	844	905	970	843	888	1080	1930	1180	998	905	994	885
18	906	944	928	731	892	1270	1980	1100	955	935	845	881
19	966	976	932	762	972	1350	1910	1080	985	1030	839	978
20	1020	992	1070	888	956	1350	1910	1270	936	1030	805	963
21	1000	985	1150	795	993	1300	2030	1180	833	1070	846	834
22	1010	1000	1130	623	1050	1270	1890	1040	813	1050	899	911
23	1030	1010	1090	680	977	1310	1630	1120	834	1020	901	1210
24	1030	1010	1070	842	861	1300	1470	2180	835	988	899	1230
25	992	1010	1060	903	734	1280	1390	2040	795	1010	897	1090
26	1010	1000	969	923	700	1280	1330	1590	798	1060	898	960
27	1040	957	923	852	839	1110	1300	1360	815	1060	1010	930
28	1040	943	904	802	995	1070	1340	1270	853	947	988	1050
29	971	970	904	882	---	1350	1330	1150	1110	820	1030	1070
30	919	967	977	867	---	1470	1230	1080	1040	787	1210	1010
31	867	---	1060	875	---	1220	---	1280	---	834	1130	---
TOTAL	30800	29950	30144	27007	25285	33801	42968	41300	31860	33319	31107	28248
MEAN	994	998	972	871	903	1090	1432	1332	1062	1075	1003	942
MAX	1340	1320	1150	1060	1140	1470	2030	2180	1440	1910	1340	1230
MIN	801	862	711	623	648	742	998	1040	795	787	790	788
CFSM	0.57	0.57	0.56	0.50	0.52	0.63	0.82	0.77	0.61	0.62	0.58	0.54
IN.	0.66	0.64	0.64	0.58	0.54	0.72	0.92	0.88	0.68	0.71	0.67	0.60

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 2003, BY WATER YEAR (WY)

MEAN	1338	1448	1378	1306	1301	1594	1982	1579	1380	1255	1232	1196
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1987 - 2003	
ANNUAL TOTAL	445626		385789			
ANNUAL MEAN	1221		1057		1413	
HIGHEST ANNUAL MEAN					1640	1994
LOWEST ANNUAL MEAN					1057	2003
HIGHEST DAILY MEAN	2650	Mar 10	2180	May 24	5740	Apr 1 1998
LOWEST DAILY MEAN	711	Dec 9	623	Jan 22	455	Oct 29 1993
ANNUAL SEVEN-DAY MINIMUM	830	Sep 13	760	Jan 18	656	Jun 7 1988
MAXIMUM PEAK FLOW			2800	Aug 13	5850	Mar 28 1991
MAXIMUM PEAK STAGE			11.71	Aug 13	16.27	Mar 28 1991
INSTANTANEOUS LOW FLOW			545	(a)	135	Aug 27 1993
ANNUAL RUNOFF (CFSM)	0.70		0.61		0.81	
ANNUAL RUNOFF (INCHES)	9.53		8.25		11.04	
10 PERCENT EXCEEDS	1680		1350		1940	
50 PERCENT EXCEEDS	1120		998		1310	
90 PERCENT EXCEEDS	892		822		966	

(a) Jan. 22, 23.

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.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent except the following periods: June 21-30, July 27-30, Aug. 23-26 rated good; July 1-9 rated fair. Dissolved oxygen records rated excellent except the following periods: Nov. 2-5, 14-17, Dec. 24 to Jan. 18, Jan. 31 to Feb. 4, July 25-29, Aug. 16-24, Sept. 12-17 rated good; Oct. 31 to Nov. 1, Nov. 18-24, Feb. 5, 6, Aug. 25-27 rated fair; and Nov. 25-26 rated poor.

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, 1996-2003): Maximum measured, 28.0°C, Aug. 8, 1979; minimum, 0.0°C, on many days during winter periods.
DISSOLVED OXYGEN: Maximum, 13.6 mg/L, on several days during December and January, water year 1998; 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, on several days during summer period; minimum, 0.5°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum, 13.5 mg/L, Dec. 9; minimum recorded, 5.9 mg/L, July 10, but may have been lower during instrument malfunction June 29 to July 9.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	20.5	19.5	20.0	8.5	8.5	8.5	2.0	2.0	2.0	1.0	1.0	1.0
2	20.0	19.5	20.0	8.5	8.0	8.0	2.0	1.0	1.5	1.0	1.0	1.0
3	19.5	19.0	19.5	8.0	7.5	8.0	1.0	0.5	1.0	1.0	1.0	1.0
4	19.0	19.0	19.0	8.0	7.5	7.5	1.0	1.0	1.0	1.5	1.0	1.0
5	19.0	18.5	18.5	7.5	7.5	7.5	1.0	1.0	1.0	1.5	1.0	1.0
6	18.5	18.0	18.5	7.5	7.0	7.0	1.0	1.0	1.0	1.5	1.0	1.0
7	18.0	17.5	17.5	7.0	6.5	7.0	1.0	1.0	1.0	1.0	1.0	1.0
8	17.5	17.0	17.0	7.0	6.5	6.5	1.0	1.0	1.0	1.5	1.0	1.0
9	17.0	16.5	17.0	7.0	6.5	7.0	1.5	1.0	1.0	1.5	1.0	1.0
10	17.0	16.5	16.5	7.0	7.0	7.0	1.5	1.0	1.5	1.5	1.0	1.0
11	17.0	16.0	16.5	7.0	7.0	7.0	1.5	1.5	1.5	1.5	1.0	1.0
12	16.5	16.5	16.5	7.0	6.5	6.5	1.5	1.5	1.5	1.5	1.0	1.0
13	16.5	15.5	16.0	6.5	6.5	6.5	1.5	1.5	1.5	1.5	1.0	1.0
14	16.0	15.5	15.5	6.5	6.5	6.5	1.5	1.5	1.5	1.5	1.0	1.0
15	15.5	15.0	15.5	6.5	5.5	6.0	1.5	1.5	1.5	1.5	1.0	1.0
16	15.0	14.0	14.5	6.0	5.5	5.5	1.5	1.5	1.5	1.5	1.0	1.5
17	14.0	14.0	14.0	5.5	5.0	5.0	1.5	1.5	1.5	1.5	1.0	1.0
18	14.0	13.5	13.5	5.0	5.0	5.0	1.5	1.5	1.5	1.5	1.0	1.0
19	13.5	13.0	13.0	5.0	4.5	5.0	1.5	1.5	1.5	1.5	1.0	1.0
20	13.0	12.5	12.5	5.0	4.5	5.0	1.5	1.5	1.5	1.5	1.0	1.0
21	12.5	12.0	12.5	5.0	4.5	5.0	1.5	1.5	1.5	1.5	1.0	1.0
22	12.0	11.5	12.0	4.5	4.5	4.5	1.5	1.5	1.5	1.0	1.0	1.0
23	11.5	11.0	11.5	4.5	4.0	4.5	1.5	1.5	1.5	1.0	1.0	1.0
24	11.0	11.0	11.0	4.0	4.0	4.0	1.5	1.5	1.5	1.0	1.0	1.0
25	11.0	10.5	11.0	4.0	3.5	4.0	1.5	1.5	1.5	1.0	1.0	1.0
26	10.5	10.5	10.5	3.5	3.0	3.5	1.5	1.5	1.5	1.0	1.0	1.0
27	10.5	10.0	10.5	3.0	3.0	3.0	1.5	1.5	1.5	1.0	1.0	1.0
28	10.0	9.5	10.0	3.0	2.5	2.5	1.5	1.5	1.5	1.0	1.0	1.0
29	9.5	9.5	9.5	3.0	2.5	2.5	1.5	1.5	1.5	1.0	1.0	1.0
30	9.5	9.0	9.5	2.5	2.0	2.5	1.5	1.5	1.5	1.0	1.0	1.0
31	9.0	8.5	9.0	---	---	---	1.5	1.0	1.0	1.0	1.0	1.0
MONTH	20.5	8.5	14.5	8.5	2.0	5.6	2.0	0.5	1.4	1.5	1.0	1.0

STREAMS TRIBUTARY TO LAKE HURON

04137500 AU SABLE RIVER NEAR AU SABLE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	1.0	1.0	1.0	1.0	0.5	0.5	3.0	2.5	3.0	9.0	8.5	9.0
2	1.0	1.0	1.0	1.0	0.5	0.5	3.0	3.0	3.0	9.0	9.0	9.0
3	1.0	0.5	0.5	1.0	0.5	0.5	3.0	2.5	2.5	9.5	9.0	9.0
4	1.0	0.5	0.5	1.0	0.5	0.5	2.5	2.5	2.5	10.0	9.5	9.5
5	0.5	0.5	0.5	1.0	0.5	0.5	3.0	2.5	2.5	10.0	9.0	9.5
6	0.5	0.5	0.5	1.0	0.5	0.5	3.0	2.5	3.0	10.0	9.5	10.0
7	0.5	0.5	0.5	0.5	0.5	0.5	3.0	2.5	2.5	10.5	10.0	10.0
8	0.5	0.5	0.5	0.5	0.5	0.5	3.0	2.5	2.5	11.0	10.5	10.5
9	0.5	0.5	0.5	1.0	0.5	0.5	2.5	2.0	2.5	11.0	10.5	11.0
10	0.5	0.5	0.5	1.0	0.5	0.5	2.5	2.0	2.0	12.0	11.0	11.0
11	0.5	0.5	0.5	0.5	0.5	0.5	2.5	2.0	2.5	12.0	11.0	11.5
12	0.5	0.5	0.5	0.5	0.5	0.5	2.5	2.0	2.5	12.0	11.5	11.5
13	0.5	0.5	0.5	1.0	0.5	0.5	3.0	2.5	2.5	12.0	11.5	12.0
14	0.5	0.5	0.5	1.0	0.5	0.5	3.0	2.5	3.0	12.5	12.0	12.0
15	0.5	0.5	0.5	1.0	0.5	0.5	3.5	3.0	3.5	12.5	12.0	12.5
16	0.5	0.5	0.5	1.0	0.5	0.5	3.5	3.5	3.5	12.5	12.5	12.5
17	0.5	0.5	0.5	1.0	0.5	1.0	3.5	3.5	3.5	13.0	12.5	12.5
18	0.5	0.5	0.5	1.0	1.0	1.0	3.5	3.5	3.5	13.5	13.0	13.0
19	0.5	0.5	0.5	1.0	1.0	1.0	4.0	3.5	4.0	14.0	13.0	13.5
20	0.5	0.5	0.5	1.0	1.0	1.0	4.5	4.0	4.0	14.5	13.5	14.0
21	0.5	0.5	0.5	1.5	1.0	1.0	4.5	4.0	4.5	14.5	14.0	14.0
22	0.5	0.5	0.5	1.5	1.0	1.5	4.5	4.5	4.5	14.5	14.0	14.5
23	0.5	0.5	0.5	1.5	1.5	1.5	5.0	4.0	4.5	14.5	14.0	14.0
24	0.5	0.5	0.5	1.5	1.5	1.5	5.5	4.5	5.0	14.0	14.0	14.0
25	1.0	0.5	0.5	2.0	1.5	2.0	6.0	5.0	5.5	14.5	14.0	14.0
26	1.0	0.5	0.5	2.0	1.5	2.0	6.5	6.0	6.0	15.0	14.0	14.5
27	1.0	0.5	0.5	2.0	2.0	2.0	7.5	6.0	7.0	15.5	14.5	15.0
28	1.0	0.5	0.5	2.5	2.0	2.0	8.5	7.0	7.5	15.5	15.0	15.5
29	---	---	---	2.5	2.0	2.0	9.0	8.0	8.5	16.5	15.5	16.0
30	---	---	---	2.5	2.0	2.5	9.0	8.5	8.5	16.5	16.0	16.0
31	---	---	---	3.0	2.5	2.5	---	---	---	16.0	15.5	15.5
MONTH	1.0	0.5	0.5	3.0	0.5	1.0	9.0	2.0	4.0	16.5	8.5	12.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	15.5	15.5	22.0	21.0	21.5	23.5	23.0	23.0	23.0	22.5	23.0
2	16.0	15.5	15.5	23.0	21.5	22.0	23.5	23.0	23.0	23.0	22.5	22.5
3	16.0	15.5	15.5	23.5	22.0	23.0	23.5	23.0	23.0	23.0	22.5	22.5
4	15.5	15.0	15.5	23.5	22.5	23.0	23.5	23.0	23.5	22.5	22.0	22.0
5	16.0	15.0	15.5	23.5	23.0	23.5	24.0	23.0	23.5	22.0	21.5	22.0
6	16.0	15.5	15.5	23.5	23.0	23.5	24.0	23.5	24.0	22.5	21.5	22.0
7	16.0	15.5	16.0	24.0	23.0	23.5	24.5	24.0	24.0	22.0	21.5	22.0
8	16.5	15.5	16.0	25.0	23.5	24.5	24.0	23.5	24.0	22.0	21.5	21.5
9	17.0	16.0	16.5	24.0	22.5	23.0	24.0	23.5	23.5	22.0	21.5	21.5
10	17.0	16.5	16.5	22.5	21.0	22.0	24.0	23.5	23.5	22.0	21.5	21.5
11	17.0	16.5	17.0	22.0	21.0	21.5	23.5	23.5	23.5	22.0	21.5	21.5
12	17.0	16.5	16.5	21.5	21.0	21.5	24.0	23.5	23.5	22.0	21.5	21.5
13	17.0	16.5	16.5	22.0	21.0	21.5	24.0	23.0	23.5	22.0	21.5	21.5
14	18.0	16.5	17.5	22.0	21.5	21.5	24.5	23.5	24.0	22.0	21.5	21.5
15	18.0	17.5	17.5	22.0	21.5	21.5	25.0	24.0	24.5	22.0	21.0	21.5
16	18.5	17.5	18.0	22.5	21.5	22.0	25.0	24.0	24.5	21.5	21.0	21.5
17	18.5	17.5	18.0	22.5	21.5	22.0	24.5	24.0	24.5	21.5	21.0	21.5
18	19.5	18.0	19.0	22.0	21.0	21.5	24.5	24.0	24.0	21.5	21.0	21.5
19	19.5	19.0	19.0	22.5	21.5	22.0	25.0	24.0	24.5	21.5	21.0	21.0
20	20.0	19.0	19.5	22.5	22.0	22.0	25.0	24.0	24.5	21.0	20.5	20.5
21	20.5	19.0	19.5	22.0	21.5	22.0	25.0	24.0	24.5	21.0	20.5	20.5
22	20.5	19.5	20.0	22.5	21.5	22.0	25.0	24.0	24.5	20.5	20.0	20.5
23	21.0	19.5	20.5	22.5	21.5	22.0	25.0	24.0	24.5	20.0	19.5	20.0
24	22.0	20.0	21.0	23.0	21.5	22.5	24.5	24.0	24.0	20.0	19.5	19.5
25	23.0	21.0	21.5	23.0	22.0	22.5	24.5	24.0	24.0	19.5	19.0	19.0
26	23.0	21.5	22.0	23.0	22.5	22.5	25.0	24.0	24.5	19.0	18.5	18.5
27	22.5	21.5	22.0	23.5	22.5	23.0	24.5	23.5	24.0	18.5	18.0	18.5
28	21.5	20.5	21.0	23.5	22.5	23.0	24.0	23.5	23.5	18.0	17.5	18.0
29	21.5	20.5	21.0	23.5	22.0	23.0	24.5	23.5	24.0	17.5	17.0	17.5
30	22.0	21.0	21.5	24.0	22.5	23.0	23.5	23.0	23.5	17.0	16.5	17.0
31	---	---	---	24.0	23.0	23.5	23.5	23.0	23.0	---	---	---
MONTH	23.0	15.0	18.2	25.0	21.0	22.4	25.0	23.0	23.9	23.0	16.5	20.8

STREAMS TRIBUTARY TO LAKE HURON

04137500 AU SABLE RIVER NEAR AU SABLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	7.9	7.2	7.6	9.9	9.6	9.8	12.9	12.5	12.7	13.0	12.7	12.8
2	8.2	7.3	7.7	10.0	9.8	9.9	13.0	12.7	12.8	13.0	12.7	12.8
3	8.4	7.8	8.1	10.3	9.9	10.1	13.3	13.0	13.2	12.9	12.7	12.8
4	8.2	7.8	7.9	10.3	10.1	10.2	13.3	13.0	13.2	13.0	12.6	12.8
5	8.2	7.7	8.0	10.4	10.2	10.3	13.2	13.0	13.1	13.0	12.6	12.8
6	8.2	7.8	8.0	10.5	10.2	10.4	13.2	12.9	13.1	13.0	12.6	12.8
7	8.5	7.9	8.2	10.5	10.2	10.4	13.4	13.0	13.2	13.0	12.7	12.8
8	8.6	8.0	8.4	10.4	10.2	10.3	13.4	13.2	13.3	13.0	12.6	12.8
9	8.8	8.3	8.5	10.5	10.3	10.4	13.5	13.1	13.3	12.8	12.6	12.8
10	8.9	8.4	8.6	10.5	10.3	10.4	13.4	13.0	13.2	13.0	12.7	12.9
11	8.9	8.5	8.7	10.6	10.2	10.4	13.3	13.0	13.1	13.1	12.6	12.8
12	8.9	8.5	8.7	10.8	10.5	10.6	13.4	13.0	13.2	13.0	12.6	12.7
13	8.8	8.5	8.7	10.9	10.5	10.7	13.2	13.0	13.1	12.9	12.6	12.7
14	8.9	8.6	8.7	10.9	10.6	10.8	13.2	13.0	13.1	12.9	12.6	12.7
15	8.8	8.4	8.6	11.1	10.8	10.9	13.2	12.9	13.1	13.0	12.6	12.8
16	9.0	8.6	8.7	11.3	11.1	11.2	13.4	13.1	13.2	12.9	12.4	12.7
17	9.2	8.7	9.0	11.4	11.1	11.2	13.4	13.0	13.2	12.9	12.5	12.7
18	9.1	8.9	9.0	11.5	11.2	11.4	13.4	13.0	13.2	13.0	12.5	12.7
19	9.1	8.9	9.0	11.6	11.4	11.5	13.3	12.9	13.1	13.0	12.6	12.8
20	9.3	8.9	9.1	11.7	11.4	11.5	13.2	12.9	13.0	13.1	12.6	12.9
21	9.4	8.9	9.2	11.7	11.4	11.5	13.3	12.9	13.1	13.3	12.8	13.0
22	9.2	8.9	9.1	11.9	11.4	11.7	13.1	12.8	13.0	13.3	12.8	13.0
23	9.5	9.1	9.3	11.9	11.6	11.7	13.1	12.9	13.0	13.3	13.0	13.1
24	9.5	9.3	9.4	11.8	11.6	11.7	13.1	12.7	12.9	13.3	12.9	13.1
25	9.4	9.3	9.3	12.1	11.7	11.9	12.9	12.7	12.8	13.2	12.9	13.0
26	9.5	9.3	9.4	12.5	12.0	12.2	13.1	12.7	12.8	13.1	12.8	13.0
27	9.7	9.4	9.5	12.6	12.2	12.4	13.1	12.7	12.9	13.1	12.8	12.9
28	9.7	9.4	9.5	12.7	12.3	12.5	13.1	12.7	12.8	12.9	12.7	12.8
29	9.8	9.5	9.6	12.7	12.3	12.5	13.1	12.8	12.9	12.9	12.6	12.8
30	9.9	9.6	9.7	12.7	12.3	12.5	13.0	12.7	12.8	12.9	12.6	12.7
31	9.8	9.6	9.7	---	---	---	13.0	12.7	12.8	12.8	12.5	12.6
MONTH	9.9	7.2	8.8	12.7	9.6	11.1	13.5	12.5	13.0	13.3	12.4	12.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	12.6	12.4	12.5	12.0	11.7	11.8	12.3	12.1	12.2	11.1	10.6	10.9
2	12.5	12.4	12.4	12.0	11.7	11.8	12.3	12.1	12.2	11.1	10.8	10.9
3	12.5	12.3	12.4	12.2	11.7	11.9	12.3	12.2	12.3	11.0	10.7	10.8
4	12.5	12.3	12.3	12.1	11.8	11.9	12.3	12.1	12.2	10.9	10.5	10.7
5	12.7	12.2	12.4	12.0	11.7	11.9	12.3	12.1	12.3	10.8	10.4	10.6
6	12.5	12.2	12.4	11.9	11.7	11.8	12.4	12.2	12.3	10.6	10.3	10.4
7	12.7	12.4	12.5	11.9	11.7	11.8	12.4	12.2	12.3	10.6	10.2	10.4
8	12.7	12.4	12.5	12.0	11.7	11.8	12.6	12.3	12.4	10.6	10.2	10.4
9	12.8	12.4	12.5	12.1	11.7	11.9	12.5	12.3	12.4	10.5	10.0	10.3
10	12.6	12.3	12.5	12.1	11.8	11.9	12.5	12.3	12.4	10.3	9.9	10.2
11	12.8	12.3	12.5	11.9	11.7	11.9	12.5	12.1	12.3	10.1	9.7	10.0
12	12.8	12.4	12.5	12.0	11.7	11.8	12.4	12.1	12.3	10.0	9.5	9.8
13	12.6	12.4	12.5	12.2	11.7	11.9	12.4	12.1	12.3	9.9	9.6	9.8
14	12.7	12.3	12.4	12.2	12.0	12.1	12.3	12.1	12.2	9.9	9.5	9.7
15	12.7	12.3	12.5	12.2	11.9	12.0	12.2	12.0	12.1	9.8	9.5	9.6
16	12.7	12.3	12.5	12.2	11.9	12.0	12.3	12.1	12.2	9.6	9.2	9.5
17	12.7	12.3	12.4	12.2	11.9	12.1	12.3	12.1	12.2	9.6	9.1	9.4
18	12.5	12.2	12.3	12.1	11.9	12.0	12.2	12.1	12.2	9.4	9.0	9.3
19	12.4	12.1	12.3	12.1	11.9	12.0	12.2	12.0	12.1	9.3	8.8	9.1
20	12.4	12.1	12.2	12.1	11.9	12.0	12.1	11.9	12.0	9.2	8.8	9.0
21	12.4	12.1	12.2	12.0	11.8	11.9	12.1	11.9	12.0	9.1	8.8	8.9
22	12.3	12.0	12.1	12.1	11.9	12.0	12.0	11.7	11.9	9.0	8.7	8.9
23	12.2	11.9	12.1	12.2	11.9	12.1	12.1	11.8	11.9	8.9	8.7	8.8
24	12.2	11.9	12.1	12.2	12.0	12.1	12.0	11.8	11.9	8.9	8.7	8.8
25	12.3	12.0	12.1	12.3	12.0	12.1	11.9	11.5	11.8	8.8	8.5	8.7
26	12.4	12.0	12.1	12.2	12.0	12.1	11.9	11.5	11.7	8.7	8.5	8.6
27	12.1	11.8	12.0	12.3	12.0	12.2	11.7	11.2	11.5	8.7	8.4	8.6
28	12.0	11.7	11.8	12.3	12.1	12.2	11.5	11.1	11.3	8.8	8.3	8.5
29	---	---	---	12.2	12.0	12.1	11.3	10.9	11.1	8.9	8.4	8.6
30	---	---	---	12.2	12.0	12.1	11.1	10.8	11.0	8.9	8.4	8.6
31	---	---	---	12.3	12.0	12.2	---	---	---	8.8	8.2	8.6
MONTH	12.8	11.7	12.3	12.3	11.7	12.0	12.6	10.8	12.0	11.1	8.2	9.6

STREAMS TRIBUTARY TO LAKE HURON

04137500 AU SABLE RIVER NEAR AU SABLE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.0	8.3	8.7	---	---	---	7.8	7.0	7.3	7.7	7.2	7.4
2	9.0	8.3	8.7	---	---	---	7.8	7.0	7.3	7.8	7.1	7.4
3	8.8	8.5	8.7	---	---	---	7.8	6.9	7.3	8.0	7.2	7.5
4	8.8	8.4	8.6	---	---	---	7.7	7.0	7.4	7.8	7.3	7.5
5	8.9	8.3	8.7	---	---	---	7.7	7.1	7.4	7.9	7.2	7.5
6	8.8	8.3	8.6	---	---	---	7.9	7.0	7.4	8.0	7.1	7.4
7	8.7	8.3	8.5	---	---	---	7.9	7.1	7.5	7.9	7.2	7.5
8	8.8	8.3	8.5	---	---	---	7.7	7.0	7.3	8.1	7.3	7.6
9	8.9	8.4	8.6	---	---	---	7.6	7.0	7.3	8.0	7.3	7.6
10	8.8	8.1	8.5	6.7	5.9	6.3	7.7	6.9	7.2	8.2	7.4	7.6
11	8.6	7.9	8.4	7.2	6.1	6.8	7.6	6.8	7.3	8.3	7.4	7.8
12	8.2	8.0	8.1	7.2	6.9	7.0	7.7	6.8	7.2	8.4	7.5	7.8
13	8.1	7.8	7.9	7.3	6.9	7.0	7.9	6.9	7.3	8.3	7.4	7.7
14	8.2	7.9	8.0	7.4	6.9	7.1	7.6	6.9	7.2	8.2	7.5	7.7
15	8.2	7.7	8.0	7.5	6.8	7.1	7.7	7.1	7.4	8.2	7.4	7.7
16	8.2	7.7	8.0	7.6	7.1	7.3	7.9	6.9	7.4	8.3	7.5	7.8
17	8.3	7.8	8.1	7.5	7.2	7.3	7.7	6.9	7.2	8.1	7.2	7.6
18	8.2	7.8	8.0	7.7	7.1	7.4	7.7	6.8	7.2	8.0	7.3	7.6
19	8.3	7.8	8.1	7.5	7.0	7.2	7.6	6.8	7.1	7.8	7.3	7.6
20	8.3	7.7	8.0	7.5	7.0	7.2	7.6	6.6	7.1	8.0	7.4	7.6
21	8.2	7.7	7.9	7.3	6.9	7.1	7.3	6.5	6.8	8.1	7.4	7.7
22	8.1	7.6	7.9	7.6	7.1	7.3	7.8	6.7	7.2	7.7	7.5	7.6
23	8.0	7.5	7.8	7.5	7.1	7.3	8.0	7.1	7.5	8.0	7.4	7.7
24	7.9	7.4	7.6	7.8	7.2	7.4	7.8	7.0	7.4	8.1	7.6	7.8
25	7.7	7.0	7.4	7.7	7.2	7.4	8.2	7.1	7.5	8.3	7.8	8.0
26	7.5	7.0	7.2	7.7	7.2	7.4	8.0	7.2	7.5	8.3	7.8	8.1
27	7.3	7.0	7.1	7.7	7.2	7.4	8.0	7.3	7.6	8.4	7.9	8.1
28	7.2	6.8	7.0	7.9	7.2	7.5	8.0	7.2	7.5	8.4	7.9	8.2
29	---	---	---	7.8	7.2	7.5	8.1	7.2	7.6	8.4	7.9	8.2
30	---	---	---	8.0	7.1	7.5	7.9	7.2	7.6	8.6	8.1	8.4
31	---	---	---	8.0	6.9	7.3	7.9	7.2	7.5	---	---	---
MONTH	---	---	---	---	---	---	8.2	6.5	7.3	8.6	7.1	7.7

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 mi^2, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	145	200	e160	e165	e140	e128	224	359	380	182	137	129
2	144	215	e150	e162	e140	e126	232	421	300	169	143	129
3	149	201	e168	e160	e140	e125	230	317	271	162	143	128
4	170	248	e175	e160	e140	e125	217	267	253	157	181	127
5	248	247	e190	e158	e140	e122	e215	293	279	157	191	127
6	210	230	e190	e158	e140	e121	e210	480	298	155	162	126
7	178	220	e180	e158	e140	e120	e210	408	248	160	151	125
8	168	260	e175	e158	e140	e120	206	336	248	159	207	125
9	164	261	e175	e155	e140	e120	203	297	351	148	253	124
10	163	252	e180	e155	e140	e118	239	277	349	179	188	124
11	161	290	e170	e155	e140	e120	398	409	685	505	165	130
12	162	229	e165	e155	e140	e125	591	590	585	418	154	125
13	179	207	e160	e155	e140	e127	512	450	414	253	149	124
14	188	202	e155	e155	e140	e135	431	326	311	203	142	127
15	173	195	e150	e150	e140	e145	450	282	270	185	139	136
16	168	185	e150	e150	e140	e160	e550	266	241	178	139	145
17	167	e175	e155	e150	e140	e190	e540	262	222	166	138	137
18	195	e172	e165	e148	e140	e219	470	251	214	165	133	130
19	226	e173	e180	e147	e140	e250	486	266	209	156	131	132
20	209	196	e250	e145	e140	e300	506	316	196	159	129	135
21	182	224	e235	e143	e138	e450	568	325	187	217	144	130
22	188	228	e220	e141	e138	e500	468	256	180	192	158	153
23	202	209	e210	e142	e135	e429	386	245	173	169	140	200
24	188	198	e200	e141	e135	e330	322	881	170	156	131	170
25	181	193	e190	e140	e135	287	291	1250	165	147	132	154
26	182	e180	e185	e140	e130	282	268	825	162	146	133	146
27	183	e155	e175	e140	e130	250	256	576	174	152	131	152
28	178	e155	e174	e140	e130	257	243	419	185	144	126	161
29	177	e162	e170	e140	---	297	233	354	250	139	128	151
30	175	182	e169	e140	---	263	225	343	216	137	136	147
31	173	---	e168	e140	---	229	---	396	---	135	130	---
TOTAL	5576	6244	5539	4646	3871	6570	10380	12743	8186	5750	4664	4149
MEAN	180	208	179	150	138	212	346	411	273	185	150	138
MAX	248	290	250	165	140	500	591	1250	685	505	253	200
MIN	144	155	150	140	130	118	203	245	162	135	126	124
CFSM	0.56	0.65	0.56	0.47	0.43	0.66	1.08	1.28	0.85	0.58	0.47	0.43
IN.	0.65	0.73	0.64	0.54	0.45	0.76	1.21	1.48	0.95	0.67	0.54	0.48

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2003, BY WATER YEAR (WY)

MEAN	238	290	283	250	289	551	625	393	289	194	180	203
MAX	741	826	579	538	741	1035	1160	859	842	335	339	712
(WY)	1987	1993	1992	1973	1938	1991	1959	1983	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1937 - 2003	
ANNUAL TOTAL	103325		78318			
ANNUAL MEAN	283		215		(a)316	
HIGHEST ANNUAL MEAN					501	1991
LOWEST ANNUAL MEAN					166	1964
HIGHEST DAILY MEAN	1630	Mar 10	1250	May 25	4500	Mar 28 1950
LOWEST DAILY MEAN	131	Jul 18	118	Mar 10	98	Jul 30 1964
ANNUAL SEVEN-DAY MINIMUM	133	Jul 14	120	Mar 5	105	Jul 26 1964
MAXIMUM PEAK FLOW			1450	May 24	(b)5340	Mar 28 1950
MAXIMUM PEAK STAGE			5.53	May 24	13.74	Mar 28 1950
INSTANTANEOUS LOW FLOW			(c)114	Dec 10	(d)75	Nov 22 1964
ANNUAL RUNOFF (CFSM)	0.88		0.67		0.99	
ANNUAL RUNOFF (INCHES)	12.01		9.10		13.41	
10 PERCENT EXCEEDS	509		352		558	
50 PERCENT EXCEEDS	210		172		230	
90 PERCENT EXCEEDS	142		131		150	

(a) Does not include water year 1937.
(b) From rating curve extended above 3,800 ft^3/s.
(c) Discharge measurement, result of ice jam upstream.
(d) Result of freezeup.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04143830 SHIAWASSEE RIVER AT HOLLY, MI

LOCATION.--Lat 42°47'52", long 83°38'55", in SW1/4 SW1/4 sec.28, T.5 N., R.7 E., Oakland County, Hydrologic Unit 04080203, on right bank upstream of culvert-road crossing on Fish Lake Road, 0.8 mi east of Holly.

DRAINAGE AREA.--49.2 mi^2.

PERIOD OF RECORD.--Water years 2001 to 2003 (discontinued).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: June 2001 to September 2003.
WATER TEMPERATURE: June 2001 to September 2003.

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 for the following periods: Dec. 9 to Jan. 10, Mar. 15-20, 23-24, Apr. 1-3, Apr. 7 to May 14, Sept. 20-30, rated good; Mar. 21-22, 25-31, Apr. 4-6, May 16-28, rated fair; Jan. 11 to Mar. 14, rated poor. Water temperature records rated excellent except for the following periods: July 24 to Sept. 11, rated good; Jan. 11 to Mar. 14, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 1,000 microsiemens, Feb. 3, 2003; minimum, 304 microsiemens, Dec. 4, 2003.
WATER TEMPERATURE: Maximum, 30.5°C, July 2, 4, 2002; minimum, 0.0°C, on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 1,000 microsiemens, Feb. 3; minimum, 304 microsiemens, Dec. 4.
WATER TEMPERATURE: Maximum, 29.5°C, June 25; minimum, 0.0°C, on many days during winter period.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	587	539	566	628	314	588	645	606	631
2	---	---	---	587	521	566	629	308	583	658	616	636
3	---	---	---	591	541	566	635	334	468	673	628	651
4	---	---	---	588	538	564	653	304	548	672	629	657
5	---	---	---	582	537	563	661	619	638	688	626	657
6	---	---	---	589	536	561	658	625	642	701	638	667
7	---	---	---	584	542	563	658	610	641	685	628	660
8	---	---	---	575	542	562	666	571	635	739	649	679
9	---	---	---	581	529	561	673	467	560	687	649	669
10	---	---	---	573	498	545	686	639	657	677	472	636
11	---	---	---	571	537	551	682	645	665	701	463	580
12	---	---	---	568	534	549	682	639	657	713	586	661
13	---	---	---	561	538	551	669	628	649	721	431	672
14	---	---	---	562	530	550	662	609	643	732	658	703
15	---	---	---	563	538	550	657	604	638	740	380	691
16	---	---	---	568	536	555	676	555	639	738	702	719
17	---	---	---	566	537	553	674	630	652	756	699	730
18	---	---	---	589	507	561	755	632	668	762	728	747
19	---	---	---	593	549	569	756	622	651	761	726	747
20	---	---	---	608	559	576	635	591	606	765	729	745
21	---	---	---	600	559	579	640	589	609	779	734	753
22	---	---	---	593	560	577	629	585	610	788	741	763
23	---	---	---	596	549	579	635	599	618	783	751	766
24	---	---	---	604	551	580	645	601	629	782	738	759
25	---	---	---	600	561	580	645	570	629	785	723	764
26	---	---	---	617	565	587	682	614	645	781	718	752
27	---	---	---	626	579	602	653	617	641	776	744	757
28	---	---	---	631	561	601	701	612	646	785	734	756
29	---	---	---	616	572	597	685	619	652	790	740	764
30	---	---	---	614	564	596	672	618	648	781	733	755
31	---	---	---	---	---	---	655	615	638	775	718	747
MONTH	---	---	---	631	498	569	756	304	626	790	380	706

STREAMS TRIBUTARY TO LAKE HURON

04143830 SHIAWASSEE RIVER AT HOLLY, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	899	700	770	743	690	726	523	488	504	631	511	562
2	789	688	742	735	637	699	546	508	523	550	495	543
3	1000	700	743	753	364	670	554	500	531	560	482	516
4	920	666	716	785	711	742	508	427	461	581	537	560
5	704	621	662	785	637	723	459	421	438	616	544	585
6	716	680	699	810	585	693	532	448	493	649	588	604
7	718	596	690	745	568	659	543	529	536	602	568	590
8	718	679	704	806	575	733	555	538	546	618	578	596
9	733	468	674	751	494	627	554	544	549	640	573	597
10	727	683	708	738	450	618	569	543	555	584	540	564
11	749	630	719	760	403	603	564	549	555	583	530	551
12	748	673	722	851	710	745	560	538	550	540	526	534
13	745	633	712	781	642	709	567	541	554	576	523	542
14	752	715	736	796	581	717	575	548	560	529	507	514
15	773	702	744	847	679	724	594	549	574	518	503	511
16	810	691	744	713	473	630	599	569	582	522	502	514
17	752	705	734	582	475	542	624	562	590	532	510	522
18	756	707	734	563	527	546	604	571	590	536	510	523
19	761	702	730	565	540	555	609	572	592	548	512	525
20	808	706	742	553	526	539	602	568	589	541	518	531
21	748	698	721	528	508	516	610	576	589	559	524	544
22	741	672	712	516	501	511	604	575	590	580	532	551
23	744	438	629	524	505	514	649	576	604	578	539	561
24	738	603	707	550	502	520	637	594	616	644	524	563
25	737	626	675	540	458	505	631	588	610	672	584	646
26	---	---	---	484	448	460	622	576	604	671	604	639
27	---	---	---	479	448	460	619	564	594	665	582	607
28	763	556	690	500	452	469	628	577	598	604	536	559
29	---	---	---	488	456	472	640	581	604	558	510	537
30	---	---	---	494	459	477	633	580	604	553	510	535
31	---	---	---	506	474	489	---	---	---	540	453	501
MONTH	---	---	---	851	364	600	649	421	563	672	453	556

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	493	443	475	561	486	531	605	517	567	564	475	523
2	470	425	446	558	485	529	588	501	561	562	492	525
3	463	434	450	551	472	524	587	497	556	561	479	514
4	481	444	465	550	474	521	580	492	538	554	481	519
5	501	461	478	551	476	520	602	507	555	558	481	523
6	494	473	484	551	477	522	603	487	561	582	472	539
7	505	464	484	541	479	512	600	501	560	571	467	532
8	498	441	473	541	481	516	579	493	548	669	488	545
9	495	453	476	548	490	522	581	490	550	695	561	618
10	493	474	483	560	490	529	577	476	543	652	543	602
11	512	465	487	558	476	525	595	486	549	699	547	618
12	507	426	468	557	477	530	579	498	544	700	565	631
13	483	456	469	556	505	525	579	500	545	659	554	611
14	501	467	484	671	477	546	600	489	541	653	557	609
15	494	464	483	665	532	601	584	502	540	634	503	567
16	501	472	488	659	508	597	559	476	527	648	542	606
17	502	475	491	631	515	593	565	496	530	634	547	599
18	528	477	504	627	516	572	570	490	531	645	544	594
19	526	494	513	575	483	543	590	491	540	652	572	613
20	515	476	496	557	480	536	592	498	549	598	530	569
21	508	458	489	599	425	535	587	497	550	597	524	564
22	507	460	492	631	503	572	615	488	545	597	481	530
23	518	466	497	632	518	589	604	493	560	570	493	526
24	514	467	491	631	518	588	583	481	549	561	497	536
25	505	461	488	604	508	573	584	506	547	550	490	527
26	566	474	502	600	496	568	585	446	522	539	509	522
27	538	480	513	580	484	550	574	508	544	554	502	527
28	542	477	515	590	492	552	567	498	531	560	523	542
29	530	468	508	590	509	560	565	499	535	562	526	546
30	555	480	517	611	512	565	553	483	526	574	532	553
31	---	---	---	609	518	574	622	482	533	---	---	---
MONTH	566	425	487	671	425	549	622	446	544	700	467	561

STREAMS TRIBUTARY TO LAKE HURON

04143830 SHIAWASSEE RIVER AT HOLLY, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	—	—	—	6.5	4.5	5.5	1.5	0.0	0.5	2.0	0.5	1.0
2	—	—	—	5.5	4.0	4.5	1.0	0.0	0.5	1.0	0.0	0.5
3	—	—	—	6.5	3.5	5.0	0.0	0.0	0.0	0.5	0.0	0.5
4	—	—	—	6.5	4.5	5.5	0.5	0.0	0.0	1.0	0.0	0.5
5	—	—	—	5.0	3.5	4.5	1.0	0.0	0.5	2.0	0.0	0.5
6	—	—	—	5.0	4.0	4.5	1.0	0.0	0.5	1.0	0.0	0.5
7	—	—	—	6.0	3.0	4.5	1.5	0.0	0.5	0.5	0.0	0.0
8	—	—	—	8.0	4.5	6.0	1.0	0.0	0.5	2.0	0.0	1.0
9	—	—	—	9.0	5.5	7.5	0.0	0.0	0.0	2.0	0.5	1.0
10	—	—	—	11.0	9.0	10.0	1.0	0.0	0.5	1.0	0.0	0.0
11	—	—	—	10.5	9.0	10.0	1.5	0.0	0.5	0.0	0.0	0.0
12	—	—	—	9.0	8.5	8.5	2.0	0.0	1.0	0.5	0.0	0.0
13	—	—	—	8.5	7.0	7.5	2.0	1.0	1.5	0.5	0.0	0.0
14	—	—	—	8.0	7.0	7.5	2.0	1.0	1.5	0.5	0.0	0.0
15	—	—	—	7.0	4.5	6.0	2.0	0.5	1.0	0.0	0.0	0.0
16	—	—	—	4.5	3.5	4.0	1.5	0.0	0.5	0.0	0.0	0.0
17	—	—	—	4.0	2.5	3.5	1.5	0.0	0.5	0.0	0.0	0.0
18	—	—	—	3.5	1.0	2.5	2.5	0.5	1.5	0.0	0.0	0.0
19	—	—	—	4.5	2.5	3.5	3.0	2.0	2.5	0.0	0.0	0.0
20	—	—	—	5.5	3.5	4.5	2.5	1.5	1.5	0.0	0.0	0.0
21	—	—	—	5.5	4.5	5.0	2.0	1.0	1.5	0.0	0.0	0.0
22	—	—	—	5.0	3.0	4.0	1.5	0.5	1.0	0.0	0.0	0.0
23	—	—	—	3.5	2.5	3.0	1.0	0.0	0.5	0.0	0.0	0.0
24	—	—	—	4.0	2.5	3.0	1.5	0.0	0.5	0.0	0.0	0.0
25	—	—	—	3.5	2.0	2.5	1.0	0.0	0.5	0.0	0.0	0.0
26	—	—	—	3.0	1.0	2.0	1.5	0.0	0.5	0.0	0.0	0.0
27	—	—	—	3.0	0.5	1.5	1.5	0.0	0.5	0.0	0.0	0.0
28	—	—	—	2.5	1.5	2.0	1.0	0.0	0.5	0.0	0.0	0.0
29	—	—	—	3.5	1.0	2.0	2.0	0.5	1.0	0.5	0.0	0.0
30	—	—	—	2.5	0.5	2.0	2.5	0.5	1.5	0.0	0.0	0.0
31	—	—	—	—	—	—	2.5	1.0	2.0	0.5	0.0	0.0
MONTH	—	—	—	11.0	0.5	4.7	3.0	0.0	0.8	2.0	0.0	0.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	0.5	0.0	0.5	1.5	0.0	0.5	10.0	5.5	7.5	17.0	14.0	15.5
2	1.0	0.0	0.5	1.0	0.0	0.5	13.0	8.5	10.5	15.5	13.0	14.0
3	0.5	0.0	0.5	0.0	0.0	0.0	10.5	6.0	9.0	16.5	11.0	13.5
4	0.5	0.0	0.5	1.0	0.0	0.0	6.0	2.5	4.5	17.0	11.5	14.0
5	0.5	0.0	0.0	1.0	0.0	0.0	3.0	2.5	2.5	16.0	13.0	14.5
6	0.5	0.0	0.0	1.5	0.0	0.5	3.5	1.5	2.5	18.5	13.0	15.5
7	0.5	0.0	0.0	1.0	0.0	0.5	2.5	1.0	1.5	15.5	14.0	14.5
8	0.5	0.0	0.0	1.0	0.0	0.5	2.5	1.0	1.5	16.5	13.5	14.5
9	1.0	0.0	0.0	0.5	0.0	0.0	6.5	1.5	3.5	19.0	13.0	16.0
10	0.5	0.0	0.0	1.0	0.0	0.0	9.5	4.0	6.5	19.0	15.5	17.5
11	0.0	0.0	0.0	1.0	0.0	0.5	12.0	6.0	8.5	18.5	15.5	17.5
12	0.0	0.0	0.0	2.0	0.0	0.5	13.0	8.0	10.0	15.5	11.5	13.5
13	0.0	0.0	0.0	2.0	0.0	0.5	13.0	8.0	10.5	16.5	10.5	13.0
14	0.0	0.0	0.0	2.0	0.0	0.5	14.5	9.0	11.5	18.5	12.0	15.0
15	0.5	0.0	0.0	3.5	0.0	1.5	18.0	12.5	14.5	16.5	15.0	15.5
16	0.0	0.0	0.0	3.5	0.5	1.5	16.0	12.0	14.5	17.0	14.5	15.5
17	0.5	0.0	0.0	4.5	0.5	2.5	12.5	9.5	11.0	20.5	15.0	17.5
18	0.5	0.0	0.5	2.5	1.0	2.0	11.0	9.5	10.5	22.0	16.5	19.0
19	1.5	0.0	0.5	3.0	1.0	2.0	15.5	10.5	12.5	23.5	18.0	20.5
20	2.0	0.0	0.5	5.5	1.5	3.5	16.5	13.0	15.0	21.0	18.0	20.0
21	1.5	0.0	0.5	4.5	3.0	4.0	15.0	12.5	14.0	20.5	15.5	18.0
22	0.5	0.0	0.0	3.5	2.5	3.0	12.5	9.5	10.5	20.5	14.0	17.5
23	0.5	0.0	0.0	4.5	2.0	3.0	13.5	7.5	10.0	17.5	14.5	16.0
24	0.5	0.0	0.0	7.5	3.0	5.0	15.0	7.5	11.5	17.0	14.5	15.5
25	0.5	0.0	0.0	9.5	5.5	7.0	16.0	11.0	13.5	18.0	13.5	16.0
26	0.5	0.0	0.0	8.0	5.0	6.5	17.0	10.5	13.5	18.0	15.5	16.5
27	1.0	0.0	0.0	8.5	5.5	7.0	18.5	11.0	14.5	18.5	14.0	16.5
28	1.5	0.0	0.5	11.0	7.0	8.5	19.5	13.5	16.5	21.0	14.5	17.5
29	—	—	—	9.5	5.5	8.0	20.0	13.5	16.5	22.5	17.0	19.5
30	—	—	—	6.5	4.0	5.0	17.0	15.0	15.5	20.5	18.0	19.5
31	—	—	—	7.5	3.5	5.0	—	—	—	19.5	15.5	17.0
MONTH	2.0	0.0	0.2	11.0	0.0	2.6	20.0	1.0	10.1	23.5	10.5	16.3

STREAMS TRIBUTARY TO LAKE HURON

04143830 SHIAWASSEE RIVER AT HOLLY, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	19.5	14.0	16.5	27.5	22.0	25.0	25.5	22.0	23.5	22.0	20.0	20.5
2	20.5	14.5	17.5	28.0	22.5	25.5	25.5	21.0	23.5	23.5	19.0	21.0
3	18.5	17.0	17.5	29.0	23.0	26.0	24.5	22.5	23.5	24.0	19.0	21.5
4	17.0	15.5	16.0	28.5	25.5	27.0	25.0	21.0	23.0	22.5	19.0	20.5
5	16.5	14.5	15.5	28.0	25.5	26.0	25.5	21.5	24.0	22.0	18.0	20.0
6	19.5	14.0	17.0	28.5	23.5	26.0	26.0	22.5	24.5	22.5	17.5	20.0
7	21.5	17.0	19.0	27.5	24.5	26.0	25.5	22.0	24.0	23.5	18.5	21.0
8	20.0	18.0	19.0	27.5	25.0	26.5	25.5	22.5	24.0	23.5	20.0	21.5
9	20.5	17.5	19.0	28.0	24.0	26.0	25.0	22.0	23.5	22.5	19.0	21.0
10	20.0	17.0	19.0	26.5	24.0	25.0	24.5	21.5	23.0	22.5	18.0	21.0
11	22.0	18.5	20.0	25.0	21.5	23.0	24.5	22.0	23.0	23.5	19.0	21.5
12	20.5	17.5	18.5	24.5	20.0	22.0	25.0	22.5	23.5	23.0	20.0	21.5
13	19.5	17.5	18.5	25.5	20.0	23.0	26.0	21.5	24.0	23.5	19.5	21.5
14	22.5	17.5	20.0	26.0	21.5	24.0	27.0	23.0	25.5	23.0	20.5	22.0
15	25.0	19.5	22.0	24.0	22.5	23.0	27.0	24.0	25.5	22.5	20.5	21.5
16	25.5	19.5	22.5	25.0	20.5	23.0	27.5	24.0	25.5	22.0	18.0	20.0
17	23.0	21.0	22.0	25.5	21.5	23.5	25.5	22.0	24.0	23.0	18.5	21.0
18	26.0	21.0	23.5	26.0	21.5	24.0	25.5	20.5	23.0	22.0	19.0	21.0
19	25.0	21.5	23.0	26.0	21.0	23.5	26.0	21.0	24.0	21.5	19.0	20.0
20	25.0	19.5	22.0	25.5	22.0	23.5	26.5	21.5	24.0	20.5	16.5	18.5
21	25.5	19.5	22.5	25.5	23.0	23.5	27.5	23.0	25.5	20.0	16.0	18.5
22	26.5	20.5	23.5	24.5	21.5	23.0	26.0	23.0	25.0	19.5	18.0	18.5
23	27.5	21.0	24.5	24.5	20.5	22.5	25.0	21.0	23.0	19.0	16.5	17.5
24	28.5	23.0	25.5	25.0	20.5	22.5	23.0	20.5	22.0	17.5	15.0	16.5
25	29.5	24.5	27.0	25.5	20.0	23.0	25.5	21.5	23.5	17.0	14.5	16.0
26	27.5	24.0	26.0	24.0	22.0	23.0	26.0	22.5	24.5	17.0	13.5	15.5
27	26.0	21.5	24.0	25.0	22.0	23.0	25.5	22.5	24.0	17.0	15.0	16.0
28	25.5	21.5	24.0	25.0	21.0	23.0	25.0	20.5	23.0	16.0	14.0	15.0
29	26.0	22.0	24.0	25.0	20.0	22.5	25.0	23.0	24.0	15.5	13.0	14.0
30	26.5	21.0	24.0	25.0	20.5	23.0	23.0	20.0	22.0	14.0	12.5	13.0
31	---	---	---	25.5	21.0	23.5	22.5	19.5	21.5	---	---	---
MONTH	29.5	14.0	21.1	29.0	20.0	24.0	27.5	19.5	23.8	24.0	12.5	19.2

STREAMS TRIBUTARY TO LAKE HURON

04143900 SHIAWASSEE RIVER AT LINDEN, MI

LOCATION.--Lat 42°48'56", long 83°48'08", in SW1/4 sec.19, T.5 N., R.6 E., Genesee County, Hydrologic Unit 04080203, on right bank at upstream side of bridge on Hogan Road, 1.0 mi west of Linden.

DRAINAGE AREA.--83.7 mi^2.

PERIOD OF RECORD.--October 1967 to September 1994, March 2001 to September 2003 (discontinued).

REVISED RECORDS--WDR MI-87-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 844.96 ft above sea level.

REMARKS--Records good except for estimated daily discharges, which are poor. Flow regulated by dam at Linden since 1967.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.6	21	52	37	28	24	120	66	7.8	24	6.8	6.2
2	9.0	22	49	37	26	23	108	68	12	24	8.0	6.9
3	10	21	e41	e35	21	e18	104	65	20	23	8.3	7.4
4	12	19	e38	e35	23	e20	135	66	33	23	13	7.1
5	13	9.3	37	e36	e29	e20	171	74	38	24	12	7.0
6	12	9.3	37	e36	e29	e21	183	107	40	24	12	6.9
7	12	10	37	e34	e28	e21	184	111	45	25	11	6.7
8	11	12	36	34	e27	23	200	106	51	24	12	6.7
9	11	14	e35	34	e26	e20	185	78	67	24	19	6.7
10	11	22	33	34	e26	e20	200	72	95	24	18	6.5
11	12	25	33	e35	e26	e22	194	73	94	24	17	6.4
12	12	26	31	e36	e26	22	165	74	96	23	11	6.4
13	12	27	27	e33	e26	e24	107	72	97	22	10	6.3
14	12	30	27	e31	e25	e27	127	71	95	22	9.7	6.5
15	12	45	27	e31	e24	28	143	72	94	22	9.6	7.0
16	11	53	27	e31	e23	40	138	72	93	19	9.6	5.7
17	11	54	27	e28	25	50	113	71	90	12	9.0	2.2
18	12	53	27	e27	21	55	87	70	66	11	8.0	0.86
19	12	58	28	e28	e19	64	93	70	59	9.9	7.4	1.1
20	12	60	32	e28	22	76	92	70	57	9.5	6.9	0.69
21	13	59	35	e26	20	87	91	68	56	9.2	7.3	0.67
22	12	55	35	e24	21	105	84	66	55	7.4	8.1	3.3
23	11	48	35	e22	e22	111	77	64	49	7.2	7.0	4.2
24	11	46	40	e26	e20	112	44	53	24	6.7	6.2	5.6
25	16	48	40	e26	e21	128	20	49	22	6.3	5.7	11
26	30	54	40	e25	e22	133	14	48	23	6.0	7.2	11
27	29	55	42	e25	e24	99	12	43	24	6.0	7.3	13
28	28	54	45	e27	e24	105	25	20	25	6.5	7.1	15
29	27	54	45	e25	---	115	50	6.0	25	6.3	6.9	16
30	27	53	44	e23	---	112	60	5.4	24	6.2	6.6	17
31	26	---	38	29	---	111	---	10	---	5.8	6.0	---
TOTAL	457.6	1116.6	1120	938	674	1836	3326	1960.4	1576.8	487.0	293.7	208.02
MEAN	14.8	37.2	36.1	30.3	24.1	59.2	111	63.2	52.6	15.7	9.47	6.93
MAX	30	60	52	37	29	133	200	111	97	25	19	17
MIN	8.6	9.3	27	22	19	18	12	5.4	7.8	5.8	5.7	0.67
CFSM	0.18	0.44	0.43	0.36	0.29	0.71	1.32	0.76	0.63	0.19	0.11	0.08
IN.	0.20	0.50	0.50	0.42	0.30	0.82	1.48	0.87	0.70	0.22	0.13	0.09

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 2003, BY WATER YEAR (WY)

MEAN	50.1	61.9	67.8	62.9	65.7	108	116	70.5	51.1	33.8	24.3	34.1
MAX	158	118	121	135	140	208	234	149	117	89.6	77.6	144
(WY)	1982	1989	1976	1973	1976	1976	1975	1974	1989	1994	1992	1975
MIN	14.8	23.1	36.1	26.4	24.1	55.8	76.2	28.9	12.0	7.70	3.28	5.91
(WY)	2003	1979	2003	1984	2003	1969	1968	1977	1971	1988	1971	1969

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1968 - 2003	
ANNUAL TOTAL	18091.14		13994.12			
ANNUAL MEAN	49.6		38.3		62.3	
HIGHEST ANNUAL MEAN					89.7	1976
LOWEST ANNUAL MEAN					38.3	2003
HIGHEST DAILY MEAN	143	Mar 14	200	Apr 8	472	Apr 22 1975
LOWEST DAILY MEAN	0.47	Sep 7	0.67	Sep 21	0.47	Sep 7 2002
ANNUAL SEVEN-DAY MINIMUM	1.7	Sep 5	1.9	Sep 17	1.4	Jul 26 1971
MAXIMUM PEAK FLOW			205	Apr 8	476	Apr 22 1975
MAXIMUM PEAK STAGE			5.86	Apr 8	7.43	Apr 22 1975
INSTANTANEOUS LOW FLOW			0.57	Sep 18	0.45	(a)
ANNUAL RUNOFF (CFSM)	0.59		0.46		0.74	
ANNUAL RUNOFF (INCHES)	8.04		6.22		10.11	
10 PERCENT EXCEEDS	109		93		121	
50 PERCENT EXCEEDS	41		26		51	
90 PERCENT EXCEEDS	9.3		6.9		16	

(a) Sept. 7, 8, 2002.
(e) Estimated.

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 mi^2.

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 ft^3/s by powerplant at Shiawasseetown prior to February 1953; occasional regulation at low stages since. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48	111	119	e120	e65	e80	478	413	205	114	51	47
2	54	103	e110	e120	e65	e80	370	671	254	107	45	46
3	47	100	e85	e120	e80	e80	345	661	278	100	73	46
4	61	98	e90	e120	e100	e85	566	675	299	97	60	49
5	59	101	e85	e110	e110	e85	1050	680	286	101	55	53
6	55	123	e85	e100	e100	e90	1110	751	282	123	51	51
7	57	138	e85	e90	e100	e90	1220	740	283	127	48	49
8	66	134	e80	e95	e95	e90	1320	600	289	133	48	44
9	92	125	e80	e95	e85	e90	1300	537	380	127	46	43
10	105	149	e80	e80	e80	e100	1220	488	447	127	46	41
11	99	144	e80	e65	e80	e100	989	513	467	142	46	39
12	88	146	e80	e65	e80	e110	854	529	416	128	45	37
13	70	162	e80	e70	e80	e110	703	508	373	118	47	36
14	58	161	e85	e70	e80	e110	555	438	454	108	52	36
15	53	165	e90	e65	e80	e110	490	462	501	99	59	38
16	48	153	e90	e60	e80	e250	445	415	421	92	51	37
17	43	150	e90	e60	e80	e550	428	399	312	86	47	36
18	44	155	e90	e60	e80	e700	456	389	241	76	45	35
19	46	155	e105	e60	e80	e700	463	377	268	63	45	34
20	51	130	e120	e60	e80	e700	449	383	313	68	42	34
21	55	125	e130	e60	e80	e750	431	408	315	65	46	35
22	58	130	e130	e60	e80	731	420	295	303	64	58	58
23	66	139	e120	e60	e80	594	410	228	268	64	64	37
24	89	147	e115	e60	e80	498	388	215	225	62	82	55
25	95	151	e110	e60	e80	424	315	198	163	57	89	140
26	97	142	e115	e60	e80	456	280	183	152	54	146	166
27	94	134	e110	e60	e80	443	249	176	131	52	78	175
28	100	135	e110	e60	e80	454	213	175	138	49	63	159
29	111	133	e110	e60	---	562	161	149	129	48	72	144
30	121	136	e110	e60	---	524	183	134	121	47	57	133
31	117	---	e110	e60	---	534	---	179	---	46	51	---
TOTAL	2247	4075	3079	2345	2320	10280	17861	12969	8714	2744	1808	1933
MEAN	72.5	136	99.3	75.6	82.9	332	595	418	290	88.5	58.3	64.4
MAX	121	165	130	120	110	750	1320	751	501	142	146	175
MIN	43	98	80	60	65	80	161	134	121	46	42	34
CFSM	0.13	0.25	0.18	0.14	0.15	0.62	1.11	0.78	0.54	0.16	0.11	0.12
IN.	0.16	0.28	0.21	0.16	0.16	0.71	1.23	0.90	0.60	0.19	0.13	0.13

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	200	262	316	349	463	750	713	460	280	164	123	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	109626		70375			
ANNUAL MEAN	300		193		354	
HIGHEST ANNUAL MEAN					629	1993
LOWEST ANNUAL MEAN					97.7	1964
HIGHEST DAILY MEAN	1460	Mar 10	1320	Apr 8	5920	Apr 6 1947
LOWEST DAILY MEAN	27	Jul 24	34	Sep 19	2.0	Jul 28 1934
ANNUAL SEVEN-DAY MINIMUM	37	Jul 18	36	Sep 15	7.7	Aug 11 1936
MAXIMUM PEAK FLOW			(a)1320	Apr 8	6240	Apr 6 1947
MAXIMUM PEAK STAGE			(b)5.51	Mar 17	10.35	Apr 6 1947
INSTANTANEOUS LOW FLOW			34	(c)	0.20	Jul 27 1934
ANNUAL RUNOFF (CFSM)	0.56		0.36		0.66	
ANNUAL RUNOFF (INCHES)	7.58		4.87		8.93	
10 PERCENT EXCEEDS	699		482		796	
50 PERCENT EXCEEDS	164		101		204	
90 PERCENT EXCEEDS	53		48		65	

(a) Gage height 5.23 ft.
(b) Backwater from ice.
(c) Sept. 19, 20.
(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 mi^2.

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 Shiawasseetown prior to February 1953; occasional regulation at low stages since. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e59	200	e170	e180	e90	e110	538	387	200	138	51	53
2	e65	202	e140	e180	e90	e110	443	865	219	126	52	51
3	79	202	e130	e170	e90	e110	338	844	267	117	55	49
4	70	202	e130	e160	e110	e110	402	765	284	110	54	48
5	83	194	e130	e160	e130	e110	1070	762	315	106	78	48
6	84	189	e130	e150	e130	e120	1440	837	293	111	59	49
7	79	195	e130	e140	e130	e120	1480	901	288	125	58	50
8	76	194	e120	e130	e120	e125	1610	771	287	136	54	50
9	81	188	e120	e120	e100	e130	1580	642	308	124	52	49
10	104	e194	e120	e100	e100	e130	1530	563	419	133	51	47
11	116	e205	e120	e90	e100	e130	1350	614	466	143	51	46
12	114	e215	e120	e80	e100	e140	1120	647	480	145	50	45
13	111	231	e120	e80	e100	e140	920	625	410	133	50	45
14	97	248	e130	e80	e100	e140	701	545	389	123	49	44
15	88	262	e120	e90	e100	e150	535	486	499	115	49	44
16	87	260	e120	e90	e100	e300	483	508	505	108	51	44
17	80	251	e120	e90	e100	e600	439	439	394	104	54	44
18	74	243	e120	e90	e100	e900	443	425	298	98	51	44
19	74	248	e130	e90	e100	e1000	475	402	242	89	49	44
20	74	232	e140	e90	e100	e1000	462	396	267	78	49	43
21	79	206	e150	e90	e100	e1200	440	409	308	78	49	43
22	88	203	e160	e90	e100	e1000	424	403	302	80	48	45
23	94	192	e150	e90	e100	e800	411	286	285	75	48	50
24	102	197	e140	e90	e100	590	393	252	251	79	52	56
25	130	203	e140	e90	e100	491	364	236	214	71	55	48
26	143	201	e130	e90	e100	428	292	219	173	64	75	101
27	148	205	e130	e90	e100	451	267	202	170	63	112	141
28	154	190	e140	e90	e100	431	236	195	152	59	76	155
29	165	182	e150	e90	---	528	202	190	186	55	62	151
30	182	185	e170	e90	---	580	164	168	154	54	60	143
31	196	---	e180	e90	---	541	---	168	---	52	59	---
TOTAL	3176	6319	4200	3350	2890	12715	20552	15152	9025	3092	1763	1870
MEAN	102	211	135	108	103	410	685	489	301	99.7	56.9	62.3
MAX	196	262	180	180	130	1200	1610	901	505	145	112	155
MIN	59	182	120	80	90	110	164	168	152	52	48	43
CFSM	0.16	0.33	0.21	0.17	0.16	0.64	1.08	0.77	0.47	0.16	0.09	0.10
IN.	0.19	0.37	0.25	0.20	0.17	0.74	1.20	0.88	0.53	0.18	0.10	0.11

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 2003, BY WATER YEAR (WY)

MEAN	248	324	397	423	549	993	932	595	344	218	147	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1940 - 2003	
ANNUAL TOTAL	143018		84104			
ANNUAL MEAN	392		230		(a)448	
HIGHEST ANNUAL MEAN					797	1993
LOWEST ANNUAL MEAN					118	1964
HIGHEST DAILY MEAN	2510	Mar 9	1610	Apr 8	7290	Apr 6 1947
LOWEST DAILY MEAN	48	Sep 18	43	Sep 20	29	Aug 8 1966
ANNUAL SEVEN-DAY MINIMUM	52	Sep 14	44	Sep 15	35	Aug 4 1966
MAXIMUM PEAK FLOW			(b)1630	Apr 8	(c)7500	Apr 6 1947
MAXIMUM PEAK STAGE			(d)7.77	Mar 21	(f)15.44	Mar 29 1960
INSTANTANEOUS LOW FLOW			43	(g)	27	Aug 8 1966
ANNUAL RUNOFF (CFSM)	0.62		0.36		0.70	
ANNUAL RUNOFF (INCHES)	8.35		4.91		9.55	
10 PERCENT EXCEEDS	852		516		1040	
50 PERCENT EXCEEDS	232		130		241	
90 PERCENT EXCEEDS	71		51		78	

(a) Does not include water year 1940.
(b) Gage height 6.42 ft.
(c) Including overflow by-passing gage.
(d) Backwater from ice.
(e) Estimated.
(f) Present datum.
(g) Sept. 19-22.

STREAMS TRIBUTARY TO LAKE HURON

04146000 FARMERS CREEK NEAR LAPEER, MI

LOCATION.--Lat 43°02'41", long 83°20'14", in sec.6, T.7 N., R.10 E., Lapeer County, Hydrologic Unit 04080204, on left bank on grounds of Oakdale Regional Center for Developmental Disabilities, 2.0 mi west of Lapeer.

DRAINAGE AREA.--55.3 mi^2.

PERIOD OF RECORD.--October 1932 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 924: 1940. WSP 1084: 1942(M), 1943. WSP 1337: 1934-38, 1940(M), 1944(M), 1945, 1946(M), 1948-51(M). WSP 1727: 1952(M). WDR MI-78-1: Drainage area.

GAGE.--Water-stage recorder. Concrete control since Oct. 12, 1938. Datum of gage is 805.79 ft above sea level. Prior to May 25, 1954, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Prior to 1941, occasional regulation caused by dam upstream from station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.7	e3.0	e8.0	e10	6.4	e9.0	37	13	15	2.9	3.7	2.6
2	4.2	e3.0	e8.0	e10	6.7	e9.0	26	19	16	2.7	3.6	2.7
3	3.2	e3.0	e8.0	e10	7.1	e9.0	23	17	17	2.5	3.7	2.4
4	3.5	e4.0	e8.0	e10	e8.0	e9.0	41	16	17	2.4	4.3	2.3
5	3.4	e4.0	e8.0	e10	e8.0	10	56	20	18	3.0	5.9	2.2
6	3.0	e5.0	e8.0	e9.0	e7.0	10	68	29	18	3.6	7.0	2.1
7	2.8	e6.0	e9.0	e9.0	e7.0	10	78	39	18	5.0	7.1	1.9
8	2.7	e6.0	e9.0	e9.0	e7.0	11	83	51	19	5.0	7.5	1.9
9	2.8	e8.0	e9.0	e8.0	e7.0	11	78	61	21	5.1	7.3	1.8
10	2.9	e9.0	e9.0	e7.0	e7.0	11	71	64	22	5.5	6.6	1.6
11	3.3	e9.0	e10	e7.0	e8.0	11	66	62	23	5.9	6.5	1.5
12	3.3	e10	e10	e7.0	e8.0	11	63	58	26	5.3	6.0	1.5
13	3.3	e10	e10	e7.0	e8.0	11	60	56	27	5.4	5.5	1.4
14	2.9	e10	e10	e7.0	e8.0	11	56	57	29	5.2	5.4	1.5
15	3.1	e10	e10	e7.0	e8.0	e12	51	66	31	5.0	6.6	2.0
16	3.8	e10	e10	e6.0	e8.0	e25	47	66	29	4.6	8.3	1.7
17	e3.0	e10	e10	e6.0	e8.0	e50	42	58	26	4.4	6.6	1.7
18	e3.0	e10	e10	e6.0	e8.0	e80	38	50	21	5.3	4.2	1.7
19	e3.0	e10	e11	6.3	e7.0	e130	35	41	17	4.0	3.6	2.4
20	e3.0	e10	e13	5.7	e7.0	102	33	25	14	3.7	3.1	2.0
21	e3.0	e9.0	e15	5.0	e7.0	94	32	16	11	3.8	3.1	2.0
22	e3.0	e9.0	e16	5.1	e7.0	86	27	13	9.2	4.4	3.3	4.7
23	e3.0	e9.0	e15	5.6	e8.0	80	23	13	7.6	5.8	2.4	4.6
24	e3.0	e8.0	e11	6.3	e8.0	73	21	15	6.3	8.1	2.1	6.0
25	e3.0	e8.0	e12	5.8	e8.0	67	17	15	5.3	8.1	2.0	8.0
26	e3.0	e8.0	e12	5.6	e8.0	60	14	15	5.0	7.8	2.2	8.5
27	e3.0	e8.0	e11	4.8	e9.0	54	13	15	4.5	7.1	2.1	9.3
28	e3.0	e7.0	e10	5.3	e9.0	50	11	15	4.1	6.0	2.2	9.0
29	e3.0	e7.0	e10	5.8	---	50	8.9	15	3.6	5.3	2.4	9.0
30	e3.0	e8.0	e10	3.2	---	45	8.1	14	3.3	4.7	2.4	8.3
31	e3.0	---	e10	5.2	---	42	---	15	---	4.2	2.5	---
TOTAL	95.9	231.0	320.0	214.7	213.2	1243.0	1227.0	1029	483.9	151.8	139.2	108.3
MEAN	3.09	7.70	10.3	6.93	7.61	40.1	40.9	33.2	16.1	4.90	4.49	3.61
MAX	4.2	10	16	10	9.0	130	83	66	31	8.1	8.3	9.3
MIN	2.7	3.0	8.0	3.2	6.4	9.0	8.1	13	3.3	2.4	2.0	1.4
CFSM	0.06	0.14	0.19	0.13	0.14	0.73	0.74	0.60	0.29	0.09	0.08	0.07
IN.	0.06	0.16	0.22	0.14	0.14	0.84	0.83	0.69	0.33	0.10	0.09	0.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1933 - 2003, BY WATER YEAR (WY)

MEAN	19.3	25.3	29.0	31.9	43.7	72.6	68.0	39.0	22.9	10.8	9.33	15.2
MAX	134	101	93.3	132	174	154	226	188	127	48.8	49.8	226
(WY)	1987	1986	1951	1973	1938	1948	1947	1956	1943	1994	1937	1985
MIN	2.36	3.84	3.99	3.58	5.62	14.2	19.2	7.49	2.12	1.60	1.48	0.89
(WY)	1939	1939	1964	1940	1940	1964	1946	1988	1988	1941	1944	1941

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1933 - 2003	
ANNUAL TOTAL	8893.09		5457.0			
ANNUAL MEAN	24.4		15.0		(a)32.2	
HIGHEST ANNUAL MEAN					71.7	1985
LOWEST ANNUAL MEAN					9.05	1964
HIGHEST DAILY MEAN	146	Mar 12	130	Mar 19	1300	Sep 9 1985
LOWEST DAILY MEAN	0.83	Sep 16	1.4	Sep 13	0.26	Sep 16 1970
ANNUAL SEVEN-DAY MINIMUM	0.93	Sep 12	1.6	Sep 8	0.50	Jul 3 1988
MAXIMUM PEAK FLOW			(b)		1380	Sep 9 1985
MAXIMUM PEAK STAGE			(c)16.90	Mar 19	(d)20.95	Sep 9 1985
INSTANTANEOUS LOW FLOW			1.1	Sep 14	0.14	(f)
ANNUAL RUNOFF (CFSM)	0.44		0.27		0.58	
ANNUAL RUNOFF (INCHES)	5.98		3.67		7.90	
10 PERCENT EXCEEDS	66		46		73	
50 PERCENT EXCEEDS	11		8.0		17	
90 PERCENT EXCEEDS	2.4		2.8		3.8	

(a) Does not include water year 1933.
(b) Not determined.
(c) Backwater from ice.
(d) From floodmark.
(e) Estimated.
(f) Sept. 16, 18, 1970.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	46	48	73	e30	e40	212	106	88	37	29	21
2	45	41	51	e60	e35	e40	179	214	93	35	30	21
3	34	39	e50	e60	e35	e40	157	252	88	33	32	20
4	28	39	e50	e55	e30	e40	213	218	79	30	37	20
5	37	42	e50	e55	e35	e40	354	200	88	30	40	21
6	32	47	e50	e50	e40	e40	367	265	95	48	42	20
7	30	47	e50	e50	e40	e40	369	272	93	70	44	20
8	28	47	e50	e60	e40	e40	377	246	92	66	42	19
9	26	46	e50	e55	e40	e40	351	235	123	55	50	19
10	28	57	65	e45	e40	e40	328	208	140	51	38	19
11	26	77	e55	e40	e40	e40	318	238	142	61	37	19
12	26	66	e50	e35	e40	e40	298	273	138	59	38	18
13	31	61	63	e35	e40	e40	274	254	140	53	34	18
14	30	57	61	e35	e40	e40	247	227	141	48	32	18
15	26	82	60	e35	e40	e45	222	197	133	44	31	22
16	25	99	e55	e35	e35	e100	201	182	115	41	31	22
17	25	63	e50	e35	e35	e260	179	170	100	40	33	21
18	33	53	62	e35	e30	e490	164	155	87	54	33	21
19	38	53	62	e35	e30	e525	159	139	80	44	31	23
20	37	53	76	e35	e30	475	154	127	63	37	29	29
21	37	51	84	e30	e30	442	171	109	60	36	28	24
22	43	51	81	e30	e35	380	190	94	57	43	44	29
23	44	63	72	e30	e40	326	179	85	52	86	24	58
24	45	58	e60	e30	e40	289	160	73	49	74	20	50
25	44	55	e50	e30	e40	263	143	82	50	60	19	69
26	50	53	e50	e30	e40	254	122	81	41	49	20	60
27	45	51	e50	e30	e40	234	107	77	46	43	22	52
28	44	49	e55	e30	e40	218	96	76	42	39	20	47
29	50	49	68	e30	---	248	86	74	43	36	23	44
30	51	49	56	e30	---	247	70	70	40	33	24	41
31	49	---	65	e30	---	230	---	76	---	30	22	---
TOTAL	1112	1644	1799	1248	1030	5586	6447	5075	2598	1465	979	885
MEAN	35.9	54.8	58.0	40.3	36.8	180	215	164	86.6	47.3	31.6	29.5
MAX	51	99	84	73	40	525	377	273	142	86	50	69
MIN	25	39	48	30	30	40	70	70	40	30	19	18
CFSM	0.16	0.25	0.26	0.18	0.17	0.82	0.97	0.74	0.39	0.21	0.14	0.13
IN.	0.19	0.28	0.30	0.21	0.17	0.94	1.09	0.85	0.44	0.25	0.16	0.15

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 2003, BY WATER YEAR (WY)

MEAN	141	167	169	167	225	321	301	171	127	74.8	65.2	116
MAX	583	474	349	354	577	712	630	327	325	206	166	635
(WY)	1987	1986	1988	1993	2001	1985	1985	1996	1996	1994	1992	1985
MIN	35.9	50.8	58.0	40.3	36.8	99.5	151	82.4	31.2	38.2	26.8	24.2
(WY)	2003	1999	2003	2003	2003	2000	2000	1999	1988	2002	1999	2002

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1980 - 2003	
ANNUAL TOTAL	42080		29868			
ANNUAL MEAN	115		81.8		169	
HIGHEST ANNUAL MEAN					295	1985
LOWEST ANNUAL MEAN					81.8	2003
HIGHEST DAILY MEAN	546	Mar 11	525	Mar 19	2950	Sep 10 1985
LOWEST DAILY MEAN	19	Sep 6	18	Sep 12	14	Aug 27 1984
ANNUAL SEVEN-DAY MINIMUM	20	Sep 4	19	Sep 8	16	Jul 10 1988
MAXIMUM PEAK FLOW			(e)600	Mar 19	(a)3090	Sep 9 1985
MAXIMUM PEAK STAGE			(b)5.17	Mar 19	(b)9.61	Feb 26 1985
INSTANTANEOUS LOW FLOW			17	(c)	12	Jul 11 1988
ANNUAL RUNOFF (CFSM)	0.52		0.37		0.76	
ANNUAL RUNOFF (INCHES)	7.08		5.03		10.39	
10 PERCENT EXCEEDS	246		216		343	
50 PERCENT EXCEEDS	65		49		114	
90 PERCENT EXCEEDS	25		27		41	

(a) Gage height 9.60 ft.
(b) Backwater from ice.
(c) Sept. 12, 13.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	63	68	101	135	71	86	470	223	164	101	91	62
2	63	69	104	141	71	87	447	403	162	99	92	63
3	63	69	108	132	72	86	415	573	175	95	97	64
4	63	70	94	131	76	86	428	698	172	92	97	63
5	63	540	93	132	80	91	483	751	173	91	90	62
6	64	495	92	133	87	88	589	786	176	93	90	63
7	64	262	91	118	91	86	882	785	187	94	90	63
8	64	168	90	114	94	86	777	725	209	94	90	64
9	64	132	89	121	93	88	731	667	246	98	89	66
10	63	134	86	121	92	87	571	607	295	102	89	64
11	63	142	85	109	91	87	390	557	349	98	89	64
12	63	136	85	100	90	86	472	599	399	105	89	63
13	64	132	85	104	87	88	510	639	385	123	87	62
14	64	125	87	104	85	88	267	663	368	132	88	63
15	63	133	89	100	83	89	92	653	343	127	88	65
16	63	138	91	95	81	124	92	604	298	117	88	64
17	63	132	92	91	79	351	91	548	249	110	88	62
18	63	122	92	88	78	672	93	480	215	138	87	62
19	63	121	100	84	77	915	93	416	197	121	87	62
20	64	118	117	81	77	1130	93	356	165	104	88	64
21	64	119	131	79	78	1100	94	334	145	101	87	64
22	65	113	141	77	82	998	95	279	134	98	85	64
23	65	107	144	76	87	885	96	238	123	98	85	63
24	65	112	135	75	87	620	97	221	116	99	86	64
25	65	114	134	75	88	492	99	206	110	97	87	62
26	66	113	131	74	88	506	102	200	106	94	88	61
27	66	109	122	74	88	490	108	192	105	94	92	62
28	66	106	118	74	87	458	123	183	104	93	92	62
29	66	101	120	73	---	487	144	177	105	92	82	64
30	66	103	123	71	---	493	157	173	103	92	64	64
31	67	---	128	71	---	480	---	181	---	91	63	---
TOTAL	1988	4403	3298	3053	2340	11510	9101	14117	6078	3183	2705	1895
MEAN	64.1	147	106	98.5	83.6	371	303	455	203	103	87.3	63.2
MAX	67	540	144	141	94	1130	882	786	399	138	97	66
MIN	63	68	85	71	71	86	91	173	103	91	63	61

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 2003, BY WATER YEAR (WY)

MEAN	214	278	303	297	404	780	629	382	260	163	132	207
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1953 - 2003	
ANNUAL TOTAL	113788		63671			
ANNUAL MEAN	312		174		337	
HIGHEST ANNUAL MEAN					638	1985
LOWEST ANNUAL MEAN					82.7	1964
HIGHEST DAILY MEAN	1620	Mar 12	1130	Mar 20	7240	Jun 24 1996
LOWEST DAILY MEAN	63	Sep 18	61	Sep 26	2.1	Oct 11 1971
ANNUAL SEVEN-DAY MINIMUM	63	Sep 25	63	Sep 22	3.6	Dec 1 1971
MAXIMUM PEAK FLOW			1150	Mar 20	7470	Jun 24 1996
MAXIMUM PEAK STAGE			7.85	Mar 20	15.73	Jun 24 1996
INSTANTANEOUS LOW FLOW					2.1	(a)
10 PERCENT EXCEEDS	759		481		773	
50 PERCENT EXCEEDS	199		94		179	
90 PERCENT EXCEEDS	66		64		66	

(a) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.4	8.9	e18	e17	e8.0	e11	78	e40	30	8.9	2.8	4.6
2	14	8.6	e19	e16	e8.0	e11	66	e100	38	7.9	2.2	e5.0
3	7.2	8.4	e17	e16	e8.0	e12	54	e120	40	6.8	22	e3.5
4	9.1	8.6	e18	e15	e12	e12	134	e125	38	6.9	50	e3.5
5	11	11	e16	e15	e13	e12	180	e130	46	8.9	14	e3.5
6	8.1	19	e14	e14	e13	e11	195	136	42	9.3	13	e3.5
7	8.7	14	e13	e13	e13	e12	239	145	43	24	11	e3.5
8	8.5	14	e13	e12	e13	e12	e236	147	52	14	18	e3.2
9	7.8	15	e12	e12	e12	e12	195	119	76	11	17	e3.0
10	7.4	30	e12	e11	e11	e13	157	93	66	7.8	8.8	e3.0
11	8.0	27	e12	e11	e11	e13	127	99	61	16	7.3	e3.0
12	8.4	27	e13	e11	e10	e14	111	105	71	14	7.1	e3.0
13	9.7	32	e12	e10	e10	e14	107	115	82	12	6.1	e3.0
14	8.7	27	e12	e10	e11	e14	96	e132	85	10	5.3	e3.0
15	8.7	28	e12	e10	e11	e15	82	125	80	14	7.0	e4.0
16	8.7	26	e12	e10	e10	e25	69	88	65	24	5.3	e3.5
17	8.7	26	e12	e10	e10	e125	66	68	52	9.9	4.6	3.5
18	8.7	26	e12	e10	e9.5	e170	73	58	45	6.3	3.6	3.9
19	8.6	26	e13	e9.5	e9.0	e180	74	54	34	6.8	3.1	6.2
20	8.6	25	e14	e9.0	e9.0	e170	71	50	28	6.9	2.8	4.8
21	7.4	23	e16	e9.0	e9.0	e150	69	47	24	12	2.6	4.3
22	7.4	22	e17	e9.0	e9.5	e131	66	e40	20	15	4.3	23
23	7.4	19	e18	e9.0	e10	111	66	36	e16	7.9	2.7	19
24	7.4	18	e19	e9.0	e10	90	75	32	e15	24	2.8	20
25	7.5	19	e19	e9.0	e11	76	82	28	e12	15	3.2	51
26	9.9	17	e19	e8.5	e11	64	51	e27	17	6.4	8.3	24
27	8.7	15	e19	e8.5	e11	62	50	e24	17	3.7	7.0	23
28	9.2	17	e19	e8.5	e12	61	47	e24	12	2.5	8.4	22
29	9.6	16	e18	e8.5	---	98	e44	24	12	1.9	8.4	25
30	9.5	18	e18	e8.0	---	75	e35	23	10	6.8	6.8	21
31	9.2	---	e16	e8.0	---	78	---	31	---	5.0	5.1	---
TOTAL	266.2	591.5	474	336.5	295.0	1854	2995	2385	1229	325.6	270.6	306.5
MEAN	8.59	19.7	15.3	10.9	10.5	59.8	99.8	76.9	41.0	10.5	8.73	10.2
MAX	14	32	19	17	13	180	239	147	85	24	50	51
MIN	4.4	8.4	12	8.0	8.0	11	35	23	10	1.9	2.2	3.0
CFSM	0.09	0.20	0.15	0.11	0.11	0.60	1.00	0.77	0.41	0.11	0.09	0.10
IN.	0.10	0.22	0.18	0.13	0.11	0.69	1.12	0.89	0.46	0.12	0.10	0.11

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 2003, BY WATER YEAR (WY)

MEAN	42.1	59.2	71.9	69.3	97.0	159	151	79.1	48.7	26.7	21.1	41.7
MAX	236	181	213	192	307	317	350	200	159	93.2	107	314
(WY)	1982	1986	1976	1973	2001	1973	1975	1974	1996	1994	1975	1985
MIN	8.01	13.8	15.3	10.9	10.5	41.2	71.4	24.7	7.39	5.48	4.63	3.31
(WY)	1999	1999	2003	2003	2003	2000	2000	1977	1988	1966	2001	2002

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1966 - 2003	
ANNUAL TOTAL	18210.16		11328.9			
ANNUAL MEAN	49.9		31.0		72.0	
HIGHEST ANNUAL MEAN					122	1985
LOWEST ANNUAL MEAN					31.0	2003
HIGHEST DAILY MEAN	361	Apr 9	239	Apr 7	1370	Sep 9 1985
LOWEST DAILY MEAN	0.96	Jul 19	1.9	Jul 29	0.96	Jul 19 2002
ANNUAL SEVEN-DAY MINIMUM	1.2	Sep 8	3.0	Sep 8	1.2	Sep 8 2002
MAXIMUM PEAK FLOW			(a)251	Apr 7	1500	Sep 9 1985
MAXIMUM PEAK STAGE			(b)8.62	Mar 17	(c)11.85	Sep 9 1985
INSTANTANEOUS LOW FLOW			1.1	Jul 29	0.62	Jul 19 2002
ANNUAL RUNOFF (CFSM)	0.50		0.31		0.72	
ANNUAL RUNOFF (INCHES)	6.82		4.24		9.84	
10 PERCENT EXCEEDS	121		83		165	
50 PERCENT EXCEEDS	24		13		40	
90 PERCENT EXCEEDS	4.0		5.1		10	

(a) Gage height 7.01 ft.
(b) Backwater from ice.
(c) 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 mi^2.

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. 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 ft^3/s as sewage effluent which originates outside the basin. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	110	114	177	258	138	181	772	935	311	172	168	128
2	255	116	196	245	134	187	723	1410	289	165	151	125
3	166	114	178	244	151	175	629	1070	289	160	265	102
4	230	116	164	242	422	161	1380	1080	344	156	394	101
5	224	188	169	230	186	177	1540	1280	378	190	265	99
6	159	730	172	237	168	171	1460	1580	336	232	170	93
7	143	389	166	227	170	160	1530	1360	314	484	150	95
8	117	263	164	208	175	188	1420	1250	584	193	226	100
9	133	225	156	218	171	193	1320	1130	774	180	292	98
10	114	438	160	227	172	184	1250	1060	589	207	212	99
11	117	370	155	211	175	185	786	1160	557	341	203	100
12	107	300	156	185	173	189	819	1120	803	209	185	99
13	131	221	160	179	164	197	819	1060	814	189	152	97
14	116	202	163	188	166	213	752	902	705	204	143	97
15	115	259	158	181	162	329	432	958	638	206	164	147
16	119	207	167	170	155	823	404	905	518	190	148	117
17	105	201	172	156	154	1720	298	849	460	177	139	113
18	114	221	179	153	156	1330	361	759	420	191	137	111
19	117	252	264	142	162	1270	318	594	370	193	135	122
20	118	228	385	135	163	1460	329	559	286	237	137	111
21	122	243	286	133	165	1590	412	504	254	217	146	107
22	122	249	268	129	170	1580	383	446	239	194	209	615
23	123	196	262	126	173	1200	342	351	222	165	145	281
24	125	183	254	127	174	983	288	340	206	163	131	280
25	138	203	254	124	195	769	288	322	191	176	142	543
26	177	186	238	126	182	709	272	308	259	170	348	203
27	148	184	229	122	185	688	257	301	255	169	201	233
28	149	182	218	126	188	717	269	292	224	170	174	169
29	152	178	220	135	---	1180	302	289	227	159	175	148
30	139	190	258	129	---	839	342	277	183	137	155	139
31	111	---	302	136	---	782	---	508	---	135	130	---
TOTAL	4316	7148	6450	5449	4949	20530	20497	24959	12039	6131	5792	4872
MEAN	139	238	208	176	177	662	683	805	401	198	187	162
MAX	255	730	385	258	422	1720	1540	1580	814	484	394	615
MIN	105	114	155	122	134	160	257	277	183	135	130	93
CFSM	0.15	0.25	0.22	0.18	0.18	0.69	0.71	0.84	0.42	0.21	0.20	0.17
IN.	0.17	0.28	0.25	0.21	0.19	0.80	0.80	0.97	0.47	0.24	0.23	0.19

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 2003, BY WATER YEAR (WY)

MEAN	348	468	545	589	810	1479	1289	768	486	273	236	342
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1932 - 2003	
ANNUAL TOTAL	214387		123132			
ANNUAL MEAN	587		337		634	
HIGHEST ANNUAL MEAN					1258	1985
LOWEST ANNUAL MEAN					153	1964
HIGHEST DAILY MEAN	2860	Mar 10	1720	Mar 17	14500	Apr 6 1947
LOWEST DAILY MEAN	105	Sep 29	93	Sep 6	14	Aug 7 1934
ANNUAL SEVEN-DAY MINIMUM	110	Sep 25	98	Sep 5	23	Aug 14 1936
MAXIMUM PEAK FLOW			2450	Mar 17	(a)14900	Apr 6 1947
MAXIMUM PEAK STAGE			7.46	Mar 17	16.95	Sep 6 1985
INSTANTANEOUS LOW FLOW			88	Sep 7	9.0	Aug 7 1934
ANNUAL RUNOFF (CFSM)	0.61		0.35		0.66	
ANNUAL RUNOFF (INCHES)	8.34		4.79		9.01	
10 PERCENT EXCEEDS	1410		819		1470	
50 PERCENT EXCEEDS	345		194		338	
90 PERCENT EXCEEDS	134		122		103	

(a) Gage height 16.35 ft.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	152	159	229	363	e160	e210	938	1160	611	264	161	159
2	157	153	e218	306	e160	e210	908	2580	409	244	198	152
3	311	156	e240	284	e160	e220	837	1870	383	213	194	152
4	221	154	e220	286	e200	e210	1020	1350	391	207	429	140
5	296	156	e210	277	e425	e190	2110	1340	504	195	419	132
6	278	351	e200	267	e230	e200	1800	1910	504	228	298	132
7	211	627	e200	262	e200	e200	1700	1860	450	566	218	128
8	190	409	e200	265	e200	e190	1680	1530	427	447	194	126
9	163	299	e200	243	e200	e210	1520	1380	979	261	283	128
10	170	284	e180	e260	e190	e230	1570	1280	913	242	321	127
11	159	542	e190	e280	e190	e210	1350	1410	748	335	244	127
12	155	422	e180	e270	e200	e210	973	1550	734	407	256	132
13	157	337	e180	e250	e200	e210	996	1370	1040	264	238	128
14	166	262	e180	e230	e180	e220	988	1220	926	233	183	127
15	158	255	e190	e230	e180	e250	828	1110	837	236	172	128
16	161	299	e180	e220	e180	e600	568	1140	756	233	183	152
17	159	256	e190	e210	e180	e2300	508	1090	624	219	175	151
18	151	244	e200	e190	e170	1750	414	1010	582	215	155	133
19	155	265	243	e180	e180	1360	510	889	522	211	154	141
20	156	290	392	e170	e180	1460	440	782	446	213	154	138
21	155	274	464	e160	e180	e1610	492	729	367	265	154	137
22	160	296	350	e160	e190	e1650	539	656	329	245	157	147
23	163	291	320	e160	e200	1540	492	590	307	216	201	589
24	161	243	299	e160	e200	1180	426	473	292	187	160	313
25	164	232	302	e160	e200	e1050	374	460	273	182	151	454
26	178	245	293	e160	e220	878	362	431	259	194	151	423
27	217	231	273	e160	e200	821	339	410	424	190	339	243
28	193	228	266	e160	e210	804	322	397	339	191	219	256
29	188	226	257	e170	---	1430	324	377	375	199	196	208
30	192	223	255	e170	---	1250	347	368	320	192	190	182
31	185	---	329	e160	---	1010	---	423	---	167	179	---
TOTAL	5682	8409	7630	6823	5565	23863	25675	33145	16071	7661	6726	5685
MEAN	183	280	246	220	199	770	856	1069	536	247	217	190
MAX	311	627	464	363	425	2300	2110	2580	1040	566	429	589
MIN	151	153	180	160	160	190	322	368	259	167	151	126
CFSM	0.16	0.24	0.21	0.19	0.17	0.67	0.74	0.93	0.46	0.21	0.19	0.16
IN.	0.18	0.27	0.25	0.22	0.18	0.77	0.83	1.07	0.52	0.25	0.22	0.18

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 2003, BY WATER YEAR (WY)

MEAN	365	486	662	677	906	1833	1611	978	586	331	286	343
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1940 - 2003	
ANNUAL TOTAL	273171		152935			
ANNUAL MEAN	748		419		754	
HIGHEST ANNUAL MEAN					1460	1976
LOWEST ANNUAL MEAN					180	1964
HIGHEST DAILY MEAN	4380	Mar 10	2580	May 2	18200	Apr 7 1947
LOWEST DAILY MEAN	142	Sep 30	126	Sep 8	28	Aug 6 1941
ANNUAL SEVEN-DAY MINIMUM	150	Sep 25	128	Sep 8	35	Aug 1 1941
MAXIMUM PEAK FLOW			(e)3000	Mar 17	(a)19000	Apr 7 1947
MAXIMUM PEAK STAGE			(b)		(c)15.86	Mar 10 2002
INSTANTANEOUS LOW FLOW			107	Sep 10	(d)27	Aug 6 1941
ANNUAL RUNOFF (CFSM)	0.65		0.36		0.65	
ANNUAL RUNOFF (INCHES)	8.81		4.93		8.89	
10 PERCENT EXCEEDS	1710		1030		1730	
50 PERCENT EXCEEDS	440		242		396	
90 PERCENT EXCEEDS	166		156		124	

(a) Including flow by-passing gage.
(b) Not determined.
(c) Present site and datum; peak stage at previous site and datum, 18.60 ft, Feb. 2, 1968.
(d) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.6	10	e15	e27	e7.3	e9.3	158	119	225	73	12	4.7
2	14	10	e13	e21	e7.3	e9.3	135	515	198	55	12	4.8
3	20	10	e11	e19	e8.8	e9.0	124	453	165	43	12	4.9
4	15	10	e15	e22	e9.8	e8.6	128	282	143	35	35	4.6
5	13	10	e15	e21	e11	e8.2	181	226	152	36	89	4.8
6	16	9.8	e14	e19	e15	e8.1	206	333	196	43	43	4.8
7	16	9.5	e13	e14	e13	e8.3	167	364	182	85	27	4.5
8	13	11	e13	e19	e12	e8.8	150	286	159	200	20	4.3
9	11	11	e12	e20	e11	e9.0	139	232	515	102	17	3.8
10	10	16	e13	e18	e10	e9.1	239	202	562	72	16	3.7
11	9.2	30	e13	e14	e9.7	e9.1	443	877	338	101	14	3.7
12	9.0	38	e13	e18	e9.4	e9.2	379	1260	240	191	14	3.7
13	9.6	28	e14	e14	e9.0	e9.6	293	803	195	130	13	3.7
14	9.0	22	e14	e12	e8.8	e10	226	583	174	83	12	3.7
15	8.1	21	e15	e10	e8.6	e20	183	419	145	61	11	4.1
16	8.6	20	e14	e9.0	e8.4	e100	156	314	121	49	11	4.4
17	8.9	19	e14	e8.6	e8.4	e1200	133	261	101	40	9.7	4.4
18	8.9	18	e16	e8.0	e8.4	1040	124	225	89	37	8.6	4.1
19	10	18	e19	e7.6	e8.4	541	131	198	86	32	8.0	5.0
20	9.6	20	e25	e7.4	e8.6	400	134	178	80	29	7.6	5.7
21	10	22	e28	e7.2	e9.0	328	147	163	73	29	7.6	7.3
22	11	22	e27	e7.2	e9.6	231	210	144	63	36	7.0	11
23	11	19	e25	e7.1	e9.4	170	181	131	53	34	6.3	19
24	10	19	e19	e7.2	e9.3	137	150	207	46	31	6.7	29
25	10	19	e18	e7.2	e9.3	127	131	337	41	26	6.5	25
26	11	17	e20	e7.2	e9.3	130	116	356	39	22	6.0	23
27	11	e16	e17	e7.2	e9.3	119	108	298	41	18	5.9	26
28	11	16	e16	e7.2	e9.3	114	96	234	46	17	5.9	20
29	11	16	e20	e7.2	---	175	88	197	79	16	5.9	16
30	11	17	e18	e7.2	---	227	88	172	86	14	5.8	12
31	10	---	e22	e7.2	---	190	---	179	---	13	5.4	---
TOTAL	342.5	524.3	521	387.7	267.4	5374.6	5144	10548	4633	1753	460.9	275.7
MEAN	11.0	17.5	16.8	12.5	9.55	173	171	340	154	56.5	14.9	9.19
MAX	20	38	28	27	15	1200	443	1260	562	200	89	29
MIN	6.6	9.5	11	7.1	7.3	8.1	88	119	39	13	5.4	3.7
CFSM	0.03	0.05	0.05	0.03	0.03	0.48	0.48	0.95	0.43	0.16	0.04	0.03
IN.	0.04	0.05	0.05	0.04	0.03	0.56	0.53	1.09	0.48	0.18	0.05	0.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2003, BY WATER YEAR (WY)

MEAN	91.1	146	197	184	287	741	516	244	138	69.9	34.7	99.8
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1948 - 2003	
ANNUAL TOTAL	77242.8		30232.1			
ANNUAL MEAN	212		82.8		(a)228	
HIGHEST ANNUAL MEAN					471	1985
LOWEST ANNUAL MEAN					27.6	1964
HIGHEST DAILY MEAN	3810	Feb 21	1260	May 12	11800	Sep 12 1986
LOWEST DAILY MEAN	5.8	Sep 30	3.7	Sep 10	0.50	Sep 26 1948
ANNUAL SEVEN-DAY MINIMUM	6.0	Sep 12	3.8	Sep 9	0.76	Sep 21 1948
MAXIMUM PEAK FLOW			(b)1600	May 11	12500	Sep 12 1986
MAXIMUM PEAK STAGE			(c)10.43	Mar 17	(d)19.82	Sep 12 1986
INSTANTANEOUS LOW FLOW			3.7	(f)	0.50	Sep 26 1948
ANNUAL RUNOFF (CFSM)	0.59		0.23		0.64	
ANNUAL RUNOFF (INCHES)	8.00		3.13		8.65	
10 PERCENT EXCEEDS	460		225		549	
50 PERCENT EXCEEDS	90		18		65	
90 PERCENT EXCEEDS	9.6		7.2		8.0	

(a) Does not include water year 1948.
(b) Gage height 8.64 ft.
(c) Backwater from ice.
(d) From floodmark.
(e) Estimated.
(f) Part of each day Sept. 9-14.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	62	e70	147	e47	e62	546	495	e450	224	62	32
2	60	62	e70	e108	e47	e62	459	1120	e520	181	62	33
3	72	62	e58	e98	e56	e60	395	1340	e430	147	62	37
4	69	61	e78	e116	e70	e57	507	1070	e340	120	63	47
5	73	64	e74	e112	97	e54	688	826	e350	103	64	36
6	68	67	76	e104	82	e54	623	858	453	110	72	31
7	63	67	73	e74	e76	e55	609	991	511	279	108	30
8	58	68	e70	e102	e70	e58	494	911	453	380	87	29
9	58	68	e64	e104	e66	e60	449	750	809	438	70	28
10	58	81	e68	e84	e63	e61	630	621	1370	314	62	28
11	57	104	70	e72	e61	e61	893	930	1120	385	59	34
12	56	115	74	e98	e59	e61	1070	2180	828	384	58	33
13	58	109	74	e86	e57	e64	909	1980	638	378	56	30
14	55	108	75	e74	e56	e66	724	1440	543	302	54	28
15	53	105	78	e66	e55	e70	570	1120	461	213	57	31
16	53	102	e76	e60	e54	e250	467	938	368	169	54	32
17	52	95	e74	e56	e54	1370	380	811	300	151	50	28
18	58	89	e80	e50	e54	2230	378	685	e270	149	46	26
19	59	91	97	e48	e54	1940	452	571	e260	129	59	26
20	56	95	130	e48	e56	1220	438	493	e240	112	43	27
21	55	96	148	e48	e60	930	444	452	e220	114	42	26
22	56	94	142	e47	e64	764	457	386	e190	118	42	35
23	56	93	e126	e47	e63	566	509	332	e170	105	39	42
24	56	89	e98	e47	e62	430	435	348	e140	98	36	41
25	58	88	e98	e47	e62	407	373	534	e120	85	37	44
26	61	87	e108	e47	e62	419	322	671	109	75	39	46
27	62	81	e88	e47	e62	383	280	635	138	73	39	47
28	62	80	e88	e47	e62	384	253	527	153	69	e35	48
29	61	79	e102	e47	---	809	231	446	283	64	34	50
30	61	80	e100	e47	---	818	214	377	265	47	33	52
31	62	---	128	e47	---	701	---	e350	---	58	32	---
TOTAL	1830	2542	2755	2225	1731	14526	15199	25188	12502	5574	1656	1057
MEAN	59.0	84.7	88.9	71.8	61.8	469	507	813	417	180	53.4	35.2
MAX	73	115	148	147	97	2230	1070	2180	1370	438	108	52
MIN	44	61	58	47	47	54	214	332	109	47	32	26
CFSM	0.07	0.10	0.11	0.09	0.07	0.56	0.60	0.97	0.50	0.21	0.06	0.04
IN.	0.08	0.11	0.12	0.10	0.08	0.64	0.67	1.11	0.55	0.25	0.07	0.05

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1908 - 2003, BY WATER YEAR (WY)

MEAN	228	325	419	447	684	1613	1142	656	390	189	106	223
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1908 - 2003	
ANNUAL TOTAL	200524		86785			
ANNUAL MEAN	549		238		531	
HIGHEST ANNUAL MEAN					1063	1985
LOWEST ANNUAL MEAN					96.6	1964
HIGHEST DAILY MEAN	6760	Mar 10	2230	Mar 18	21700	Sep 12 1986
LOWEST DAILY MEAN	36	Sep 30	26	Sep 18	(a)1.5	Aug 6 1944
ANNUAL SEVEN-DAY MINIMUM	38	Sep 24	28	Sep 15	4.4	Jul 6 1936
MAXIMUM PEAK FLOW			2550	Mar 18	22200	Sep 12 1986
MAXIMUM PEAK STAGE			12.43	Mar 18	27.52	Sep 12 1986
INSTANTANEOUS LOW FLOW			25	(b)		
ANNUAL RUNOFF (CFSM)	0.65		0.28		0.63	
ANNUAL RUNOFF (INCHES)	8.87		3.84		8.58	
10 PERCENT EXCEEDS	1220		636		1230	
50 PERCENT EXCEEDS	270		78		192	
90 PERCENT EXCEEDS	56		44		50	

(a) Approximately.
(b) Part of each day Sept. 19, 21, 22.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	62	68	e84	e54	e46	e41	119	122	89	69	52	34
2	63	68	e70	e54	e46	e41	120	216	81	66	53	35
3	66	68	e76	e54	e46	e41	119	149	76	61	58	34
4	70	67	e73	e54	e46	e41	117	124	73	60	83	34
5	89	68	e86	e53	e46	e41	120	117	72	54	112	34
6	91	70	e70	e52	e46	e40	110	189	72	54	104	34
7	79	75	e74	e52	e46	e40	107	178	71	61	77	33
8	75	76	e68	e51	e45	e40	104	151	68	67	70	33
9	71	75	e62	e51	e45	e40	103	141	69	61	65	33
10	68	82	e57	e51	e45	e40	138	125	73	65	65	33
11	66	133	e56	e51	e44	e40	178	132	98	124	60	33
12	65	114	e54	e51	e44	e40	177	192	109	112	58	33
13	68	95	e52	e51	e44	e45	153	171	92	84	56	33
14	71	89	e51	e51	e43	e45	137	135	80	73	53	33
15	69	e82	e50	e50	e44	e45	129	114	74	60	49	37
16	67	e78	e50	e50	e43	e50	125	105	69	59	47	42
17	65	79	e50	e49	e43	e60	120	102	64	59	46	41
18	64	79	e54	e49	e43	e70	113	99	61	167	44	38
19	79	81	e64	e48	e43	e80	134	94	59	144	39	37
20	93	89	e82	e48	e43	e100	157	95	57	85	41	37
21	80	103	e78	e48	e42	e130	227	100	55	81	41	37
22	75	128	e72	e48	e42	e200	189	91	54	106	40	42
23	77	115	e70	e48	e42	e170	154	84	50	98	39	68
24	76	103	e66	e48	e42	e150	125	114	50	81	38	62
25	e72	97	e62	e48	e42	e150	113	181	54	68	39	53
26	e71	93	e50	e48	e42	180	107	146	49	62	41	54
27	e71	e87	e58	e48	e42	150	100	117	50	64	44	54
28	e70	e82	e58	e47	e41	138	95	103	55	65	41	63
29	69	85	e56	e47	---	155	92	91	113	57	38	58
30	68	e84	e55	e46	---	150	89	82	117	54	36	54
31	68	---	e54	e46	---	127	---	85	---	53	34	---
TOTAL	2238	2613	1962	1546	1226	2680	3871	3945	2154	2374	1663	1246
MEAN	72.2	87.1	63.3	49.9	43.8	86.5	129	127	71.8	76.6	53.6	41.5
MAX	93	133	86	54	46	200	227	216	117	167	112	68
MIN	62	67	50	46	41	40	89	82	49	53	34	33
CFSM	0.45	0.54	0.40	0.31	0.27	0.54	0.81	0.80	0.45	0.48	0.34	0.26
IN.	0.52	0.61	0.46	0.36	0.29	0.62	0.90	0.92	0.50	0.55	0.39	0.29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 2003, BY WATER YEAR (WY)

MEAN	102	139	119	104	129	207	213	148	119	70.1	71.6	70.8
MAX	202	364	253	176	213	296	478	240	282	92.3	86.6	127
(WY)	1991	1993	1992	1993	2000	1991	1991	2000	1996	1992	1996	1992
MIN	58.1	62.7	61.2	49.9	43.8	86.5	115	77.6	57.2	47.9	52.2	41.5
(WY)	2001	2000	1990	2003	2003	2003	1987	1999	1988	2001	1999	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1987 - 2003	
ANNUAL TOTAL	44761		27518			
ANNUAL MEAN	123		75.4		125	
HIGHEST ANNUAL MEAN					184	1991
LOWEST ANNUAL MEAN					75.4	2003
HIGHEST DAILY MEAN	1000	Mar 11	227	Apr 21	1340	Apr 16 1991
LOWEST DAILY MEAN	46	Jul 18	33	Sep 7	33	Sep 7 2003
ANNUAL SEVEN-DAY MINIMUM	48	Sep 9	33	Sep 7	33	Sep 7 2003
MAXIMUM PEAK FLOW			(a)		(b)1450	Apr 16 1991
MAXIMUM PEAK STAGE			(c)7.42	Mar 22	(c)11.06	Mar 12 1990
INSTANTANEOUS LOW FLOW			32	(d)	32	(d)
ANNUAL RUNOFF (CFSM)	0.77		0.47		0.78	
ANNUAL RUNOFF (INCHES)	10.41		6.40		10.64	
10 PERCENT EXCEEDS	205		128		223	
50 PERCENT EXCEEDS	93		66		90	
90 PERCENT EXCEEDS	54		41		55	

(a) Not determined.
(b) Gage height 10.74 ft.
(c) Backwater from ice.
(d) Part of each day Sept. 11-14, 2003.
(e) 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 mi^2.

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 ft^3/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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	156	205	215	204	e135	e135	418	409	253	260	119	102
2	167	203	e210	201	e135	e135	401	501	240	225	118	103
3	207	198	e185	198	e135	e135	382	452	229	199	118	103
4	209	197	e210	196	e135	e135	379	404	219	181	148	102
5	233	198	e225	191	e135	e135	392	385	237	168	223	99
6	215	204	e230	188	e134	e135	374	422	229	178	236	96
7	215	205	e215	182	e134	e135	344	403	219	230	208	94
8	205	207	e210	187	e134	e135	326	399	212	179	190	94
9	195	209	e210	185	e134	e135	330	385	211	172	183	92
10	190	240	e213	e184	e135	e135	404	365	221	224	181	91
11	184	272	e210	e180	e135	e135	483	491	245	247	173	89
12	180	295	e210	e179	e135	e140	467	564	262	252	164	87
13	190	294	e200	e178	e135	e150	450	520	273	234	160	87
14	187	275	e180	e174	e135	e170	431	476	263	218	153	86
15	179	259	e170	e172	e135	e200	414	438	241	199	146	96
16	178	241	e165	e170	e134	e230	389	407	220	184	142	100
17	176	229	e165	e162	e134	e250	354	377	202	171	137	97
18	179	222	e168	e155	e133	e300	357	355	191	163	131	93
19	199	223	e240	e145	e133	e350	383	339	181	151	127	92
20	210	222	276	e142	e133	e400	442	338	169	148	123	90
21	213	235	288	e140	e134	587	552	321	158	153	118	87
22	215	269	281	e138	e134	594	566	296	154	154	117	121
23	218	278	261	e138	e134	571	531	274	145	170	111	123
24	218	276	237	e138	e134	516	477	304	141	173	110	123
25	213	267	228	e138	e135	521	430	345	135	158	111	123
26	214	256	217	e136	e135	535	388	347	133	146	117	121
27	215	241	209	e135	e135	488	349	334	135	145	120	123
28	212	230	205	e135	e135	467	309	312	157	136	115	131
29	206	221	205	e135	---	468	280	290	285	130	112	129
30	205	221	203	e135	---	467	276	271	304	124	105	127
31	205	---	203	e135	---	444	---	269	---	119	100	---
TOTAL	6188	7092	6644	5076	3764	9333	12078	11793	6264	5591	4416	3101
MEAN	200	236	214	164	134	301	403	380	209	180	142	103
MAX	233	295	288	204	135	594	566	564	304	260	236	131
MIN	156	197	165	135	133	135	276	269	133	119	100	86
CFSM	0.48	0.57	0.52	0.39	0.32	0.72	0.97	0.91	0.50	0.43	0.34	0.25
IN.	0.55	0.63	0.59	0.45	0.34	0.83	1.08	1.05	0.56	0.50	0.39	0.28

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	252	303	302	278	333	564	579	392	286	194	174	222
MAX	1058	836	627	655	1401	1709	1204	934	711	694	585	1682
(WY)	1987	1986	1992	1973	1938	1976	1967	1974	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	119792		81340			
ANNUAL MEAN	328		223		323	
HIGHEST ANNUAL MEAN					585	1976
LOWEST ANNUAL MEAN					163	1931
HIGHEST DAILY MEAN	1440	Mar 10	594	Mar 22	6210	Sep 12 1986
LOWEST DAILY MEAN	132	Sep 15	86	Sep 14	19	Aug 16 1936
ANNUAL SEVEN-DAY MINIMUM	135	Sep 12	89	Sep 8	49	Aug 10 1936
MAXIMUM PEAK FLOW			(a)624	Mar 21	6660	Sep 12 1986
MAXIMUM PEAK STAGE			(b)5.76	Mar 17	(c)15.58	Sep 12 1986
INSTANTANEOUS LOW FLOW			83	(d)	12	Aug 18 1945
ANNUAL RUNOFF (CFSM)	0.79		0.54		0.78	
ANNUAL RUNOFF (INCHES)	10.71		7.27		10.55	
10 PERCENT EXCEEDS	573		402		581	
50 PERCENT EXCEEDS	269		199		244	
90 PERCENT EXCEEDS	175		121		134	

(a) Gage height 4.29 ft.
(b) Backwater from ice.
(c) From floodmark.
(d) Part of each day Sept. 13, 14.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04155000 PINE RIVER AT ALMA, MI

LOCATION.--Lat 43°22'46", long 84°39'20", in SW1/4 SE1/4 sec.34, T.12 N., R.3 W., Gratiot County, Hydrologic Unit 04080202, on right bank 270 ft downstream from Superior Street Bridge in Alma, 0.6 mi downstream from municipal reservoir, and 38 mi upstream from mouth.

DRAINAGE AREA.--288 mi^2.

PERIOD OF RECORD.--October 1930 to current year. Gage-height records for flood seasons collected in this vicinity 1910-28 are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 744: Drainage area. WSP 1307: 1945(M). WSP 1337: 1931, 1932-34(M), 1936, 1939, 1945, 1949.

GAGE.--Water-stage recorder. Datum of gage is 718.37 ft above sea level. Prior to Dec. 10, 1930, nonrecording gage at Superior Street Bridge at different datum. Dec. 10, 1930 to June 15, 1938, nonrecording gage at site 70 ft downstream from bridge, and June 16 to Oct. 25, 1938, nonrecording gage at bridge at present datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated by dam 0.6 mi upstream from station, and by variable backwater from powerplant at St. Louis, 5.2 mi downstream. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	78	124	163	181	e98	e87	273	306	162	136	60	49
2	90	126	168	177	e97	e85	254	431	185	93	65	56
3	97	120	125	138	e101	e93	255	451	171	73	76	49
4	122	115	92	149	e114	e81	263	464	164	65	89	43
5	138	114	118	185	e116	e85	269	431	188	61	71	43
6	152	117	161	180	e97	e79	247	365	208	65	68	42
7	152	120	174	143	e89	e76	275	364	200	73	59	42
8	127	127	139	146	e82	e98	275	398	194	83	50	42
9	109	134	116	156	e88	e113	256	346	196	93	48	42
10	101	162	126	151	e101	e108	301	335	145	107	47	41
11	93	167	151	99	e110	e94	296	427	130	92	46	40
12	96	193	164	69	e115	e93	285	391	150	132	47	39
13	105	201	e154	94	e103	e103	273	401	158	138	47	37
14	108	184	154	e120	e88	e104	282	445	121	69	45	36
15	118	159	e152	e140	e79	e105	234	459	107	67	44	38
16	106	165	e155	e98	e73	e175	210	389	104	84	42	38
17	95	142	e155	e85	e71	333	210	297	126	80	40	39
18	101	132	e160	e91	e90	387	215	267	124	66	40	39
19	101	164	168	e95	e100	324	215	247	108	69	41	40
20	107	149	218	e105	e116	555	226	245	91	75	41	39
21	129	164	273	e102	e122	796	238	218	85	84	39	39
22	133	165	291	e94	e120	505	261	210	81	91	38	54
23	107	171	229	e87	e121	431	270	206	78	106	40	74
24	124	179	173	e81	e125	421	249	234	73	94	43	87
25	126	181	127	e80	e110	389	215	251	69	83	47	72
26	97	174	132	e93	e90	337	196	251	76	66	62	56
27	107	165	130	e107	e87	334	181	255	82	52	79	50
28	141	153	143	e114	e85	365	172	213	84	53	86	46
29	129	146	161	e107	---	324	165	182	90	55	74	43
30	116	139	184	e101	---	283	194	172	113	56	56	45
31	121	---	181	e100	---	292	---	181	---	55	45	---
TOTAL	3526	4552	5037	3668	2788	7655	7255	9832	3863	2516	1675	1400
MEAN	114	152	162	118	99.6	247	242	317	129	81.2	54.0	46.7
MAX	152	201	291	185	125	796	301	464	208	138	89	87
MIN	78	114	92	69	71	76	165	172	69	52	38	36
CFSM	0.39	0.53	0.56	0.41	0.35	0.86	0.84	1.10	0.45	0.28	0.19	0.16
IN.	0.46	0.59	0.65	0.47	0.36	0.99	0.94	1.27	0.50	0.32	0.22	0.18

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	163	209	213	196	245	465	429	287	190	110	97.3	137
MAX	894	574	488	680	997	1214	1054	677	575	420	276	1364
(WY)	1987	1993	1983	1973	1938	1976	1967	1956	1989	1994	1994	1986
MIN	66.4	82.6	78.4	66.6	72.6	161	159	109	50.8	35.6	34.7	46.7
(WY)	1939	1931	1940	1945	1940	1937	1945	1949	1934	1934	1936	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	85489		53767			
ANNUAL MEAN	234		147		228	
HIGHEST ANNUAL MEAN					398	1986
LOWEST ANNUAL MEAN					97.8	1931
HIGHEST DAILY MEAN	1200	Mar 10	796	Mar 21	4960	Sep 12 1986
LOWEST DAILY MEAN	62	Sep 27	36	Sep 14	0.40	Sep 6 1964
ANNUAL SEVEN-DAY MINIMUM	66	Sep 11	38	Sep 12	10	Jul 6 1988
MAXIMUM PEAK FLOW			885	Mar 21	5160	Sep 12 1986
MAXIMUM PEAK STAGE			5.19	Mar 21	(a)12.82	Sep 12 1986
INSTANTANEOUS LOW FLOW			36	(b)	(c)0.40	Sep 6 1964
ANNUAL RUNOFF (CFSM)	0.81		0.51		0.79	
ANNUAL RUNOFF (INCHES)	11.04		6.94		10.76	
10 PERCENT EXCEEDS	437		282		468	
50 PERCENT EXCEEDS	174		116		153	
90 PERCENT EXCEEDS	82		47		69	

(a) From floodmark.
(b) Part of each day Sept. 13, 14.
(c) Caused by closing dam during construction of waterworks.
(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 mi^2, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	107	134	e165	e93	e77	348	279	231	102	112	100
2	66	107	122	e165	e92	e78	311	581	140	178	124	26
3	116	118	e110	e152	e92	e80	299	590	168	140	128	24
4	125	121	e100	e135	e94	e86	327	547	182	108	179	118
5	194	120	e90	e140	e105	e76	336	617	167	97	260	78
6	205	121	e100	e168	e105	e79	363	574	170	78	245	36
7	201	118	e150	e152	e94	e73	285	419	210	76	243	32
8	206	117	e160	e135	e84	e70	329	441	216	64	262	31
9	187	117	e130	e135	e75	e90	357	557	256	60	231	39
10	144	131	e110	e145	e78	e105	337	441	298	82	200	39
11	137	149	e120	e140	e86	e97	452	509	232	160	199	37
12	110	153	e140	e120	e92	e90	454	733	155	140	178	35
13	100	184	e150	e66	e94	e85	400	529	152	120	150	36
14	98	187	e145	e79	e84	e92	265	510	232	275	140	38
15	102	185	e142	e100	e74	e100	382	532	170	155	133	36
16	117	138	e140	e128	e66	e100	298	523	155	76	127	36
17	124	164	e142	e100	e60	e150	272	477	72	75	129	34
18	100	174	e145	e80	e55	e250	246	327	105	148	127	38
19	113	75	e147	e82	e54	e350	246	330	140	134	84	42
20	113	161	e150	e86	e56	e300	264	264	138	80	71	41
21	106	129	e180	e97	e90	e500	264	305	117	134	81	43
22	111	166	e250	e95	e110	e700	262	279	101	178	94	48
23	183	168	e260	e86	e113	e570	281	240	94	171	81	52
24	95	169	e220	e82	e113	e500	291	266	88	176	42	48
25	98	171	e160	e75	e113	e460	284	273	96	203	28	84
26	194	e170	e120	e75	e105	e420	244	344	74	177	33	118
27	118	e165	e120	e80	e84	389	222	282	67	182	27	96
28	78	e160	e120	e94	e80	390	196	310	86	152	27	88
29	124	159	e132	e105	---	474	194	276	105	101	110	88
30	146	158	e142	e99	---	433	134	234	101	92	161	75
31	111	---	e170	e94	---	308	---	158	---	92	148	---
TOTAL	4009	4362	4501	3455	2441	7572	8943	12747	4518	4006	4154	1636
MEAN	129	145	145	111	87.2	244	298	411	151	129	134	54.5
MAX	206	187	260	168	113	700	454	733	298	275	262	118
MIN	66	75	90	66	54	70	134	158	67	60	27	24
CFSM	0.33	0.37	0.37	0.29	0.22	0.63	0.76	1.05	0.39	0.33	0.34	0.14
IN.	0.38	0.42	0.43	0.33	0.23	0.72	0.85	1.22	0.43	0.38	0.40	0.16

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 2003, BY WATER YEAR (WY)

MEAN	227	273	297	262	351	679	610	373	253	148	136	196
MAX	1238	784	647	865	1356	1725	1549	980	900	655	421	2034
(WY)	1987	1993	1983	1973	1938	1976	1967	1956	1989	1994	1972	1986
MIN	72.0	94.8	96.9	70.5	87.2	207	212	106	43.9	35.5	37.4	54.5
(WY)	1949	1950	1963	1977	2003	1964	1963	1958	1934	1934	1936	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1934 - 2003	
ANNUAL TOTAL	110244		62344			
ANNUAL MEAN	302		171		317	
HIGHEST ANNUAL MEAN					541	1986
LOWEST ANNUAL MEAN					150	1963
HIGHEST DAILY MEAN	2350	Mar 10	733	May 12	8750	Sep 12 1986
LOWEST DAILY MEAN	57	Jul 24	24	Sep 3	7.8	Jul 2 1988
ANNUAL SEVEN-DAY MINIMUM	66	Aug 7	36	Sep 6	17	Aug 13 1936
MAXIMUM PEAK FLOW			(a)		(b)9360	Sep 12 1986
MAXIMUM PEAK STAGE			(c)5.42	Mar 17	(c)13.81	Feb 22 1997
INSTANTANEOUS LOW FLOW					(d)7.6	(f)
ANNUAL RUNOFF (CFSM)	0.77		0.44		0.81	
ANNUAL RUNOFF (INCHES)	10.52		5.95		11.04	
10 PERCENT EXCEEDS	622		336		658	
50 PERCENT EXCEEDS	220		132		200	
90 PERCENT EXCEEDS	93		69		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 mi^2, 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 ft^3/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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	529	705	e330	635	e440	e450	1470	1760	950	580	525	261
2	687	634	e510	855	e350	e400	1420	2650	936	756	387	364
3	630	388	e640	884	e510	e380	1300	2820	1060	666	426	476
4	729	560	e580	606	e610	e350	1330	2150	927	461	666	359
5	869	859	e670	528	e560	e420	1050	1970	939	398	615	267
6	643	621	e770	816	e560	e390	977	2890	914	413	745	235
7	664	756	e460	813	e560	e540	1100	2920	870	719	713	218
8	758	772	e320	899	e420	e420	1310	2500	796	878	876	211
9	729	527	e640	912	e350	e350	1360	2170	1150	811	582	346
10	611	499	e640	877	e500	e560	1410	1910	1300	855	518	365
11	582	893	e530	448	e560	e600	1810	2080	1190	1240	627	233
12	478	1210	e490	e400	e560	e660	1860	3460	1270	1170	619	337
13	445	1360	e800	e870	e550	e680	1840	3820	1480	640	586	242
14	576	1240	477	e920	e550	e580	1460	2880	1150	762	434	208
15	762	1050	379	e960	e460	e400	1570	2140	702	844	397	349
16	615	573	712	e920	e420	e330	1620	2220	840	508	386	243
17	592	427	680	e920	e410	e790	1980	1530	795	581	379	336
18	588	780	843	e620	e540	e1750	2000	1120	655	967	373	356
19	471	847	976	e400	e610	e1750	1300	1330	691	991	368	397
20	475	837	1110	e770	e610	e1860	1440	1500	820	768	342	280
21	614	873	699	e960	e660	2060	1950	1840	547	679	373	247
22	870	891	654	e900	e470	2470	2050	1080	437	783	429	424
23	925	595	1080	e850	e360	1980	2080	973	480	813	291	498
24	722	512	1140	e880	e500	1640	1860	1330	533	731	240	509
25	645	828	728	e460	e610	1730	1720	2430	421	772	392	392
26	545	1040	978	e340	e810	1680	1370	2640	418	566	631	577
27	530	1070	1020	e480	e880	1650	904	2230	423	525	447	427
28	753	599	593	e570	e650	1810	1010	1740	375	494	288	367
29	861	759	478	e610	---	1580	1090	1610	658	506	332	476
30	712	522	883	e600	---	1200	1160	1360	855	497	297	469
31	617	---	1110	e590	---	1410	---	1250	---	479	267	---
TOTAL	20227	23227	21920	22293	15070	32870	44801	64303	24582	21853	14551	10469
MEAN	652	774	707	719	538	1060	1493	2074	819	705	469	349
MAX	925	1360	1140	960	880	2470	2080	3820	1480	1240	876	577
MIN	445	388	320	340	350	330	904	973	375	398	240	208
CFSM	0.27	0.32	0.29	0.30	0.22	0.44	0.62	0.86	0.34	0.29	0.20	0.15
IN.	0.31	0.36	0.34	0.35	0.23	0.51	0.69	1.00	0.38	0.34	0.23	0.16

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1936 - 2003, BY WATER YEAR (WY)

MEAN	1054	1446	1515	1404	1788	3829	3608	2185	1415	728	602	888
MAX	6318	6097	3907	5564	6455	10660	8096	5573	5270	4492	2236	10300
(WY)	1987	1986	1992	1973	1938	1976	1967	1956	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1936 - 2003	
ANNUAL TOTAL	627698		316166			
ANNUAL MEAN	1720		866		1710	
HIGHEST ANNUAL MEAN					3318	1986
LOWEST ANNUAL MEAN					699	1964
HIGHEST DAILY MEAN	14300	Mar 11	3820	May 13	36200	Sep 13 1986
LOWEST DAILY MEAN	267	Jul 17	208	Sep 14	111	Aug 21 1949
ANNUAL SEVEN-DAY MINIMUM	381	Sep 11	268	Sep 5	126	Aug 11 1936
MAXIMUM PEAK FLOW			3900	May 12	38700	Sep 13 1986
MAXIMUM PEAK STAGE			14.22	May 12	(a)33.89	Sep 13 1986
INSTANTANEOUS LOW FLOW			200	(b)	39	Oct 1 1942
ANNUAL RUNOFF (CFSM)	0.72		0.36		0.71	
ANNUAL RUNOFF (INCHES)	9.73		4.90		9.68	
10 PERCENT EXCEEDS	3620		1740		3920	
50 PERCENT EXCEEDS	1070		666		960	
90 PERCENT EXCEEDS	478		368		380	

(a) From floodmark.
(b) Sept. 11, 13, 16.
(e) 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 mi^2, 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 ft^3/s only; no daily discharges greater than 10,000 ft^3/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 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	945	1360	e963	1590	e888	e1000	4220	4590	2660	1460	963	608
2	1170	1260	e1130	1750	e779	e942	3890	8700	2510	1580	842	723
3	1310	973	e1290	1730	e983	e928	3470	8280	2580	1390	888	860
4	1310	1180	e1220	1410	e1190	e876	3930	6430	2340	1080	1460	716
5	1580	1530	e1300	1300	e1460	e932	5930	5900	2530	966	1410	582
6	1290	1480	e1420	1600	e1200	e920	5830	7830	2600	1040	1410	538
7	1230	1980	e1040	1550	e1160	e1100	5890	8040	2550	2020	1330	513
8	1310	1730	e855	1670	e976	e955	6130	6880	2360	2220	1460	501
9	1240	1300	e1230	1660	e863	e904	5920	5950	3920	1960	1190	664
10	1140	1280	e1220	1590	e1030	e1180	6190	5260	4820	1860	1150	683
11	1100	2100	e1100	1070	e1100	e1200	6510	6060	4250	2530	1180	530
12	967	2360	1040	1020	e1110	e1290	6050	9450	3990	2530	1180	659
13	929	2460	1410	1550	e1090	e1310	5630	9400	4300	1700	1120	536
14	1080	2240	1040	e1570	e1070	e1220	4660	7320	3630	1710	867	490
15	1280	2000	924	e1630	e958	e1050	4220	5850	3010	1690	813	665
16	1100	1480	1310	e1550	e908	e1780	3780	5790	2990	1230	812	567
17	1060	1240	1280	e1540	e896	e6100	3990	4660	2540	1280	793	673
18	1050	1630	1490	e1140	e1040	e7990	3890	3900	2180	1720	753	673
19	914	1750	1750	e865	e1140	e7290	3300	3840	2060	1710	759	732
20	917	1750	2130	e1300	e1140	6670	3350	3820	2140	1410	708	588
21	1090	1760	1760	e1520	e1200	6990	4000	4130	1730	1370	745	546
22	1420	1780	1570	e1450	e993	7080	4180	3050	1520	1480	814	784
23	1490	1410	2020	e1390	e871	5890	4200	2630	1490	1470	698	1420
24	1250	1250	2020	e1420	e1040	4630	3750	2890	1470	1330	588	1110
25	1200	1630	1530	e912	e1170	4430	3400	4410	1240	1340	765	1130
26	1120	1890	1820	e767	e1430	4110	2820	4770	1160	1080	1080	1390
27	1150	1900	1820	e936	e1490	3980	2160	4190	1400	1030	1130	1030
28	1400	1330	1310	e1040	e1230	4120	2190	3450	1230	979	745	995
29	1540	1490	1190	e1100	---	5240	2220	3170	1810	993	752	1070
30	1390	1220	1700	e1090	---	4640	2260	2750	1920	952	699	1020
31	1280	---	2110	e1070	---	4410	---	2640	---	911	647	---
TOTAL	37252	48743	43992	41780	30405	101157	127960	166030	74930	46021	29751	22996
MEAN	1202	1625	1419	1348	1086	3263	4265	5356	2498	1485	960	767
MAX	1580	2460	2130	1750	1490	7990	6510	9450	4820	2530	1460	1420
MIN	914	973	855	767	779	876	2160	2630	1160	911	588	490
CFSM	0.20	0.27	0.23	0.22	0.18	0.54	0.70	0.88	0.41	0.24	0.16	0.13
IN.	0.23	0.30	0.27	0.26	0.19	0.62	0.79	1.02	0.46	0.28	0.18	0.14

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 2003, BY WATER YEAR (WY)

MEAN	2773	3806	3883	4630	6402	8541	8110	5611	3515	2533	1957	2108
MAX	4471	11430	7638	10950	12550	14310	16440	8214	5792	7758	4133	5202
(WY)	1994	1993	1992	1993	1997	1997	1993	2000	1993	1994	1992	1992
MIN	1202	1210	1419	1348	1086	3263	3631	2595	1998	1039	960	767
(WY)	2003	2000	2003	2003	2003	2003	2000	1999	1999	2001	2003	2003

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1992 - 2003	
ANNUAL TOTAL	1541065		771017			
ANNUAL MEAN	4222		2112		(a)4437	
HIGHEST ANNUAL MEAN					6769	1993
LOWEST ANNUAL MEAN					2112	2003
HIGHEST DAILY MEAN	30000	Mar 10	9450	May 12	(b)67800	Mar 29 1904
LOWEST DAILY MEAN	580	Sep 7	490	Sep 14	-1980	Jun 19 1992
ANNUAL SEVEN-DAY MINIMUM	817	Sep 10	573	Sep 5	557	Aug 7 2001
MAXIMUM PEAK FLOW					(b)68000	Mar 29 1904
MAXIMUM PEAK STAGE			14.02	Apr 16	24.90	Mar 29 1904
ANNUAL RUNOFF (CFSM)	0.70		0.35		0.73	
ANNUAL RUNOFF (INCHES)	9.46		4.73		9.95	
10 PERCENT EXCEEDS	9000		4650		9190	
50 PERCENT EXCEEDS	2360		1400		3200	
90 PERCENT EXCEEDS	958		813		1000	

(a) Does not include water years 1995, 1996.
(b) Includes water years 1904-1991.
(e) 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 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Noncarb hardness, wat flt field, mg/L as CaCO3 (00904)	Calcium water, fltrd, mg/L (00915)
OCT 2002										
16...	1030	-1390	11.3	104	8.2	692	11.5	270	110	73.8
APR 2003										
11...	1200	6720	11.3	91	8.2	719	6.0	280	84	75.6
JUN										
25...	1200	1320	6.9	86	8.3	757	26.5	270	79	71.8
AUG										
05...	1200	1900	9.0	114	8.3	891	27.0	250	86	66.5

Date	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)	Bicarbonate, wat flt incrm. titr., field, mg/L (00453)	Chloride, water, fltrd, mg/L (00940)	Fluoride, water, fltrd, mg/L (00950)	Silica, water, fltrd, mg/L (00955)	Sulfate water, fltrd, mg/L (00945)	Ammonia + org-N, water, unfltrd mg/L as N (00625)
OCT 2002										
16...	19.9	3.04	55.5	159	194	106	.27	3.26	42.5	.53
APR 2003										
11...	20.9	3.72	38.8	191	233	81.1	.19	5.48	55.9	.98
JUN										
25...	22.6	3.65	46.1	194	236	92.2	.3	3.02	50.4	1.2
AUG										
05...	21.4	4.67	85.3	168	205	154	.4	3.35	45.6	.85

Date	Turbidity, wat unf 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)	Phosphorus, water, unfltrd mg/L (00665)
OCT 2002										
16...	10	--	--	419	.12	.88	.024	E.01	E.02	E.03
APR 2003										
11...	28	.57	7650	422	.08	3.44	.026	E.01	E.03	.07
JUN										
25...	25	.60	1570	440	<.04	1.21	.039	<.02	E.02	.11
AUG										
05...	33	.78	2920	570	<.04	1.60	.034	.03	.04	.11

STREAMS TRIBUTARY TO LAKE HURON

04157000 SAGINAW RIVER AT SAGINAW, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	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)
OCT 2002									
16...	100	44	E10	37.6	<8	19	E3	9.7	<30
APR 2003									
11...	E25	67	M	45.7	<8	36	E3	19.0	<30
JUN									
25...	E29	E24	<50	48.6	<3	16	5	3.4	E3
AUG									
05...	47	E12	6	45.6	<3	10	7	4.5	4

Date	Nickel, water, fltrd, ug/L (01065)	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 <.062mm (70331)	Sus-pended sedi-ment concen-tration mg/L (80154)	Sus-pended sedi-ment load, tons/d (80155)
OCT 2002								
16...	<2.0	<3	<.3	326	<8	95	11	--
APR 2003								
11...	<2.0	<3	<.3	254	<8	94	57	1030
JUN								
25...	E1.9	<3	<.3	313	<6	99	31	110
AUG								
05...	<2.0	<3	<.3	361	<6	99	30	154

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 mi^2.

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.--Records good except for estimated daily discharges, which are poor. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	27	27	66	18	24	166	259	286	64	23	18
2	33	28	26	54	18	23	147	1200	212	54	27	15
3	42	29	25	58	19	26	139	925	160	47	34	15
4	48	26	24	51	e50	22	518	490	138	43	36	15
5	45	26	22	41	e80	20	995	366	182	39	51	16
6	40	30	20	25	e70	22	545	1080	254	36	41	16
7	37	46	19	7.3	e55	21	437	886	219	52	40	15
8	31	50	20	30	e50	22	329	503	190	97	59	15
9	25	51	21	37	e45	22	308	357	1290	77	45	13
10	24	48	22	34	35	22	820	334	938	60	33	12
11	23	47	22	31	30	21	1080	1260	497	79	25	13
12	23	64	22	37	27	21	725	1620	393	214	26	13
13	24	48	22	30	26	21	461	854	512	144	28	12
14	22	38	24	26	24	22	318	534	388	95	26	12
15	21	40	26	23	23	23	250	374	291	72	24	12
16	22	38	28	22	22	199	200	308	209	62	24	11
17	22	36	29	20	22	e1700	158	284	161	52	22	11
18	23	30	30	19	21	2370	137	244	133	44	18	12
19	26	28	36	18	21	816	134	203	194	39	18	27
20	26	27	54	18	22	612	148	178	180	36	17	28
21	26	31	74	17	24	564	286	157	140	41	18	36
22	25	38	65	16	26	370	371	135	103	48	23	34
23	24	36	50	16	27	259	299	123	82	46	22	47
24	26	32	38	15	27	192	229	240	70	37	20	74
25	26	31	36	16	23	179	185	423	62	30	18	72
26	32	30	38	16	24	197	155	320	56	29	18	92
27	31	30	32	16	24	160	125	244	55	28	18	78
28	27	27	31	17	24	126	107	215	55	24	18	54
29	30	26	33	17	---	276	97	186	55	23	17	37
30	28	27	31	17	---	343	90	159	64	22	15	31
31	26	---	37	17	---	231	---	231	---	21	19	---
TOTAL	878	1065	984	827.3	877	8926	9959	14692	7569	1755	823	856
MEAN	28.3	35.5	31.7	26.7	31.3	288	332	474	252	56.6	26.5	28.5
MAX	48	64	74	66	80	2370	1080	1620	1290	214	59	92
MIN	20	26	19	7.3	18	20	90	123	55	21	15	11
CFSM	0.06	0.08	0.07	0.06	0.07	0.62	0.72	1.02	0.54	0.12	0.06	0.06
IN.	0.07	0.09	0.08	0.07	0.07	0.72	0.80	1.18	0.61	0.14	0.07	0.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 2003, BY WATER YEAR (WY)

MEAN	125	168	249	258	454	968	630	305	192	80.2	59.0	111
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1944 - 2003	
ANNUAL TOTAL	100059		49211.3			
ANNUAL MEAN	274		135		300	
HIGHEST ANNUAL MEAN					705	1985
LOWEST ANNUAL MEAN					28.7	1964
HIGHEST DAILY MEAN	5930	Feb 21	2370	Mar 18	10100	Apr 6 1947
LOWEST DAILY MEAN	18	Sep 11	7.3	Jan 7	2.0	Aug 17 1948
ANNUAL SEVEN-DAY MINIMUM	18	Sep 11	12	Sep 12	2.7	Sep 13 1946
MAXIMUM PEAK FLOW			3270	Mar 17	(a)14400	Apr 5 1947
MAXIMUM PEAK STAGE			(b)11.27	Mar 17	(c)16.72	Feb 22 1997
INSTANTANEOUS LOW FLOW			5.3	Jan 7	(d)1.8	(f)
ANNUAL RUNOFF (CFSM)	0.59		0.29		0.65	
ANNUAL RUNOFF (INCHES)	8.02		3.95		8.79	
10 PERCENT EXCEEDS	649		338		662	
50 PERCENT EXCEEDS	81		36		66	
90 PERCENT EXCEEDS	22		18		16	

(a) From rating curve extended above 9,500 ft^3/s.
(b) Backwater from ice.
(c) Present site and datum; peak stage observed at previous site and datum, 18.05 ft, Feb. 20, 1951, backwater from ice.
(d) Observed; site then in use.
(e) Estimated.
(f) Sept. 18, 19, 1946.

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 mi^2.

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 poor. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.2	15	e9.4	e9.6	e3.0	e10	64	43	51	14	6.8	2.8
2	5.9	16	e8.9	e9.6	e2.9	e10	56	142	49	13	8.9	2.9
3	6.2	14	e8.1	e9.4	e3.6	e9.8	51	194	44	12	7.4	2.9
4	6.2	11	e7.8	e9.2	e65	e9.5	165	174	40	12	8.8	3.1
5	8.2	10	e7.4	e8.9	e52	e9.5	256	136	44	12	11	3.1
6	7.9	11	e7.0	e8.8	e25	e9.3	270	217	52	11	13	2.9
7	8.9	12	e6.8	e8.8	e18	e9.0	239	221	54	13	15	2.9
8	13	12	e6.4	e8.7	e15	e9.0	195	151	63	14	11	2.8
9	13	14	e6.2	e9.1	e13	e9.0	175	110	260	13	8.1	2.8
10	12	17	e6.1	e8.8	e12	e8.8	217	96	211	15	6.9	2.7
11	12	19	e6.0	e8.0	e10	e8.6	217	241	159	16	6.3	2.8
12	12	24	e6.2	e7.1	e9.8	e8.8	181	351	186	15	6.5	3.1
13	12	20	e6.8	e6.4	e9.0	e8.8	142	246	314	14	6.8	3.1
14	12	17	e6.9	e5.8	e8.5	e8.8	109	152	246	14	6.2	3.1
15	8.2	18	e7.0	e5.2	e7.9	e8.8	86	104	183	13	5.3	3.2
16	8.9	16	e7.2	e4.7	e7.2	e9.5	71	80	130	12	4.7	3.1
17	7.6	15	e7.2	e4.4	e7.2	e197	61	68	93	11	4.4	3.0
18	7.5	16	e7.5	e4.0	e7.1	e600	54	60	65	10	4.5	3.1
19	8.3	16	e8.8	e3.8	e7.1	e550	50	52	52	9.0	4.6	5.4
20	9.1	16	e11	e3.6	e7.3	e360	49	46	38	8.5	5.3	5.0
21	9.2	16	e11	e3.5	e8.2	298	59	43	31	8.2	5.3	3.4
22	9.3	18	e11	e3.2	e9.9	222	78	41	25	8.7	5.1	7.0
23	9.9	18	e10	e3.2	e10	134	79	40	22	8.9	4.6	9.6
24	10	17	e10	e3.1	e10	97	67	93	19	8.4	4.0	6.3
25	9.8	17	e9.2	e3.0	e10	82	58	74	17	8.2	4.0	11
26	12	18	e9.0	e3.0	e10	77	50	55	16	8.6	5.8	8.6
27	11	17	e9.0	e3.0	e9.5	70	44	47	15	7.9	5.3	8.1
28	12	16	e9.0	e3.0	e9.5	61	40	45	14	7.1	4.4	7.6
29	16	16	e9.4	e3.0	---	81	36	40	14	6.6	4.0	6.5
30	16	17	e9.6	e3.0	---	90	33	36	14	6.5	3.5	5.5
31	15	---	e9.7	e3.0	---	78	---	40	---	6.8	3.0	---
TOTAL	314.3	479	255.6	177.9	367.7	3144.2	3252	3438	2521	337.4	200.5	137.4
MEAN	10.1	16.0	8.25	5.74	13.1	101	108	111	84.0	10.9	6.47	4.58
MAX	16	24	11	9.6	65	600	270	351	314	16	15	11
MIN	5.2	10	6.0	3.0	2.9	8.6	33	36	14	6.5	3.0	2.7
CFSM	0.06	0.09	0.05	0.03	0.08	0.60	0.64	0.66	0.50	0.06	0.04	0.03
IN.	0.07	0.11	0.06	0.04	0.08	0.69	0.72	0.76	0.55	0.07	0.04	0.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

MEAN	28.6	55.7	84.8	105	158	261	218	101	75.4	22.2	14.8	15.3
MAX	269	261	266	404	586	664	715	328	659	78.1	57.3	95.9
(WY)	2002	1993	1988	1974	2001	1973	1975	1974	1996	1996	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1963 - 2003	
ANNUAL TOTAL	29474.3		14625.0			
ANNUAL MEAN	80.8		40.1		95.6	
HIGHEST ANNUAL MEAN					174	1974
LOWEST ANNUAL MEAN					7.84	1964
HIGHEST DAILY MEAN	1010	Feb 21	600	Mar 18	3940	Apr 19 1975
LOWEST DAILY MEAN	2.8	Sep 9	2.7	Sep 10	0.90	Aug 9 1964
ANNUAL SEVEN-DAY MINIMUM	3.2	Sep 8	2.9	Sep 5	1.2	Jul 6 1963
MAXIMUM PEAK FLOW			(a)		(b)4570	Apr 19 1975
MAXIMUM PEAK STAGE			(c)6.06	Mar 17	(c)9.33	Feb 10 2001
INSTANTANEOUS LOW FLOW					0.80	(d)
ANNUAL RUNOFF (CFSM)	0.48		0.24		0.57	
ANNUAL RUNOFF (INCHES)	6.49		3.22		7.68	
10 PERCENT EXCEEDS	217		118		233	
50 PERCENT EXCEEDS	24		10		28	
90 PERCENT EXCEEDS	6.2		3.7		5.6	

(a) Ice jam, discharge not determined.
(b) Gage height 8.87 ft.
(c) Backwater from ice.
(d) Part of each day Aug. 9-11, 1964.
(e) Estimated.

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 at Memphis.

DRAINAGE AREA.--151 mi^2.

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 poor.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10	12	15	e25	e7.0	e12	71	43	67	21	13	8.3
2	9.9	13	14	e22	e7.0	e12	62	205	62	27	21	7.9
3	12	13	e11	e20	e7.0	e12	58	307	48	22	40	7.9
4	13	13	e12	e20	e20	e12	295	213	41	16	26	8.7
5	13	14	e13	e20	e19	e12	651	148	44	16	19	8.7
6	18	14	e13	e18	e40	e12	538	329	60	22	38	8.1
7	16	17	e12	e17	e40	e12	329	319	56	20	38	7.7
8	15	19	e11	e16	e25	e12	224	216	50	23	28	7.7
9	14	20	e11	e16	e18	e12	183	148	199	22	22	7.4
10	13	22	e10	e16	e16	e12	287	159	274	17	20	7.4
11	12	22	e10	e15	e15	e12	315	363	188	18	20	8.0
12	12	25	e10	e14	e14	e12	224	388	266	21	17	7.6
13	12	23	e11	e13	e13	e12	156	239	498	19	15	7.5
14	12	22	e13	e12	e13	e12	115	151	419	18	13	8.0
15	12	25	e13	e11	e12	e12	93	108	232	16	13	8.1
16	12	25	e12	e10	e12	e40	79	90	124	16	13	7.8
17	12	25	e12	e10	e12	e350	68	77	80	14	12	8.9
18	12	23	e15	e9.0	e12	e475	58	66	60	14	12	8.1
19	12	23	22	e9.0	e12	e460	52	59	47	14	10	14
20	12	23	27	e8.0	e12	275	60	54	39	14	9.9	13
21	11	24	36	e7.0	e12	186	66	46	33	15	9.5	15
22	11	25	34	e7.0	e13	147	76	41	29	20	9.6	18
23	11	24	28	e7.0	e13	111	73	42	26	68	17	24
24	13	22	e22	e7.0	e12	89	62	63	23	41	13	37
25	13	19	e18	e7.0	e12	73	53	58	23	27	10	29
26	14	18	e17	e7.0	e12	75	47	49	24	21	10	29
27	16	17	e16	e7.0	e12	72	42	45	23	17	9.9	25
28	15	15	e16	e7.0	e12	64	38	42	22	15	11	19
29	14	17	e18	e7.0	---	85	35	37	23	14	10	15
30	14	17	e20	e7.0	---	125	33	35	24	13	8.9	13
31	13	---	22	e7.0	---	92	---	49	---	12	8.5	---
TOTAL	398.9	591	514	378.0	424.0	2899	4443	4189	3104	633	517.3	394.8
MEAN	12.9	19.7	16.6	12.2	15.1	93.5	148	135	103	20.4	16.7	13.2
MAX	18	25	36	25	40	475	651	388	498	68	40	37
MIN	9.9	12	10	7.0	7.0	12	33	35	22	12	8.5	7.4
CFSM	0.09	0.13	0.11	0.08	0.10	0.62	0.98	0.89	0.69	0.14	0.11	0.09
IN.	0.10	0.15	0.13	0.09	0.10	0.71	1.09	1.03	0.76	0.16	0.13	0.10

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 2003, BY WATER YEAR (WY)

MEAN	44.2	66.6	90.3	85.1	147	246	196	93.4	60.0	27.5	20.3	33.2
MAX	330	375	247	315	567	595	617	270	300	82.3	91.3	256
(WY)	1982	1986	1988	1973	2001	1973	1975	1974	1996	1967	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1963 - 2003	
ANNUAL TOTAL	25197.3				18486.0	
ANNUAL MEAN	69.0		50.6		92.1	
HIGHEST ANNUAL MEAN					168	1985
LOWEST ANNUAL MEAN					11.3	1964
HIGHEST DAILY MEAN	723	Mar 10	651	Apr 5	3320	Apr 19 1975
LOWEST DAILY MEAN	7.4	Sep 10	7.0	Jan 21	2.4	Sep 6 1978
ANNUAL SEVEN-DAY MINIMUM	8.7	Sep 8	7.0	Jan 21	2.6	Sep 5 1978
MAXIMUM PEAK FLOW			(a)749	Apr 5	(b)4520	Apr 19 1975
MAXIMUM PEAK STAGE			(c)6.09	Mar 17	8.98	Feb 10 2001
INSTANTANEOUS LOW FLOW			(d)6.9	Jan 22	2.3	(f)
ANNUAL RUNOFF (CFSM)	0.46		0.34		0.61	
ANNUAL RUNOFF (INCHES)	6.21		4.55		8.29	
10 PERCENT EXCEEDS	171		134		217	
50 PERCENT EXCEEDS	29		17		32	
90 PERCENT EXCEEDS	11		9.0		9.5	

(a) Gage height 4.73 ft.
(b) Gage height 8.96 ft.
(c) Backwater from ice.
(d) Discharge measurement.
(e) Estimated.
(f) Sept. 6, 10, 1978.

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 mi^2.

WATER-DISCHARGE RECORDS

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.--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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.56	1.5	1.6	3.5	e1.5	e1.5	11	14	13	2.3	0.97	0.56
2	0.66	1.6	1.5	3.3	e1.5	e1.5	10	17	10	2.0	1.2	0.58
3	0.86	1.6	1.4	3.2	e1.7	e1.4	9.7	15	8.6	1.9	1.2	0.51
4	1.2	1.6	1.4	3.1	e2.8	e1.4	36	13	8.3	1.9	1.9	0.48
5	1.6	1.7	1.4	3.0	e2.5	e1.6	44	15	9.0	2.0	1.6	0.44
6	1.3	2.1	1.5	3.2	e2.3	e1.6	37	16	8.3	2.2	1.3	0.37
7	1.1	2.0	1.5	3.2	e1.9	e1.7	30	14	7.3	2.5	1.2	0.36
8	1.0	2.1	1.5	3.2	e1.9	e2.3	25	13	8.3	2.4	1.2	0.35
9	0.95	2.1	1.4	3.5	e1.8	e3.1	23	13	16	2.6	1.0	0.34
10	0.94	4.0	1.4	e3.6	e1.8	e2.5	26	14	12	2.6	0.93	0.32
11	0.90	4.1	1.4	3.5	e1.7	e2.3	25	18	10	2.7	0.90	0.33
12	0.88	2.8	1.4	3.4	e2.0	e2.4	23	18	16	2.4	0.89	0.31
13	0.98	2.0	1.5	3.3	e1.7	e2.8	21	16	20	2.0	0.86	0.31
14	0.97	1.7	1.7	e3.2	e1.5	e3.0	19	13	16	1.9	0.81	0.35
15	1.0	2.0	1.7	e3.0	e1.4	e4.3	18	12	12	1.7	0.78	0.51
16	1.1	1.9	1.8	e2.7	e1.4	11	18	12	9.8	1.6	0.90	0.45
17	1.1	1.7	1.7	e2.7	e1.4	22	16	11	8.4	1.5	0.84	0.40
18	1.2	1.6	1.8	e2.5	e1.4	25	15	11	6.9	1.4	0.75	0.38
19	1.4	1.9	3.5	e2.4	e1.5	24	15	9.9	6.5	1.3	0.70	0.55
20	1.4	1.9	5.5	e2.3	e1.5	23	15	9.4	5.4	1.3	0.61	0.53
21	1.4	1.9	4.2	e2.2	e1.5	23	18	8.8	4.6	1.5	0.58	0.49
22	1.4	2.4	3.2	e1.9	e1.5	20	15	7.8	4.1	2.0	0.56	1.1
23	1.4	2.4	2.7	e1.8	e1.5	17	13	7.3	3.7	1.8	0.53	1.9
24	1.4	2.1	e2.6	e1.6	e1.5	13	12	7.2	3.4	1.4	0.52	1.3
25	1.6	2.0	2.5	e1.6	e1.5	13	11	7.2	3.7	1.3	0.50	2.2
26	1.9	1.8	2.3	e1.5	e1.4	12	11	7.1	3.9	1.2	0.76	1.6
27	1.8	1.7	2.4	e1.5	e1.4	10	11	6.3	3.3	1.2	0.72	1.4
28	1.7	1.7	2.4	e1.5	e1.4	11	11	5.9	2.9	1.1	0.62	1.3
29	1.6	1.7	2.4	e1.5	---	18	11	5.8	2.7	1.0	0.60	1.1
30	1.5	1.8	2.5	e1.4	---	14	10	6.5	2.4	0.93	0.56	0.99
31	1.6	---	3.6	e1.4	---	12	---	15	---	0.88	0.51	---
TOTAL	38.40	61.4	67.4	79.7	46.9	301.4	559.7	359.2	246.5	54.51	27.00	21.81
MEAN	1.24	2.05	2.17	2.57	1.68	9.72	18.7	11.6	8.22	1.76	0.87	0.73
MAX	1.9	4.1	5.5	3.6	2.8	25	44	18	20	2.7	1.9	2.2
MIN	0.56	1.5	1.4	1.4	1.4	1.4	9.7	5.8	2.4	0.88	0.50	0.31
CFSM	0.06	0.10	0.10	0.12	0.08	0.47	0.89	0.55	0.39	0.08	0.04	0.03
IN.	0.07	0.11	0.12	0.14	0.08	0.54	1.00	0.64	0.44	0.10	0.05	0.04

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2003, BY WATER YEAR (WY)

MEAN	7.21	10.5	12.6	12.4	15.1	25.7	27.8	18.0	11.4	5.92	4.48	5.93
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	11.7	8.03	1.58	0.74	0.30	0.35
(WY)	1964	1965	1964	1961	2003	1964	2000	1988	1988	1965	1984	2002

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1960 - 2003	
ANNUAL TOTAL	3475.91		1863.92			
ANNUAL MEAN	9.52		5.11		13.1	
HIGHEST ANNUAL MEAN					21.5	1975
LOWEST ANNUAL MEAN					4.12	1964
HIGHEST DAILY MEAN	37	Mar 10	44	Apr 5	146	Oct 1 1981
LOWEST DAILY MEAN	0.06	Sep 18	0.31	Sep 12	0.04	Jul 9 1988
ANNUAL SEVEN-DAY MINIMUM	0.08	Sep 12	0.33	Sep 8	0.04	Jul 9 1988
MAXIMUM PEAK FLOW			50	Apr 4	181	Oct 1 1981
MAXIMUM PEAK STAGE			3.30	Apr 4	4.53	Oct 1 1981
INSTANTANEOUS LOW FLOW					0.03	(a)
ANNUAL RUNOFF (CFSM)	0.46		0.24		0.63	
ANNUAL RUNOFF (INCHES)	6.19		3.32		8.49	
10 PERCENT EXCEEDS	22		15		30	
50 PERCENT EXCEEDS	5.2		1.9		9.3	
90 PERCENT EXCEEDS	0.87		0.76		1.6	

(a) July 9, 16, 1988.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160800 SASHABAW CREEK NEAR DRAYTON PLAINS, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 2001 to 2003 (discontinued).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: July 2001 to September 2003.
WATER TEMPERATURE: June 2001 to September 2003.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval.

REMARKS.--Specific conductance records rated excellent except for the following periods: Apr. 1-12, Aug. 20 to Sept. 8, rated good; Apr. 13-21, rated fair. Water temperature records rated excellent.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 4,860 microsiemens, Feb. 3, 2003; minimum, 365 microsiemens, Sept. 22, 2003.
WATER TEMPERATURE: Maximum, 30.5°C, Aug. 8, 2001; minimum, 0.0°C, on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 4,860 microsiemens, Feb. 3; minimum, 365 microsiemens, Sept. 22.
WATER TEMPERATURE: Maximum, 28.0°C, Aug. 21, 22; minimum, 0.0°C, on many days during winter period.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	728	711	718	814	803	809	903	797	848	822	801	811
2	734	714	724	804	798	801	904	853	879	815	788	797
3	733	720	729	805	792	799	937	861	907	822	772	789
4	733	471	704	803	793	798	975	927	950	795	756	778
5	729	707	717	809	788	797	928	894	914	793	768	777
6	742	717	731	818	795	808	894	866	880	804	757	768
7	728	712	719	847	770	786	908	861	884	837	775	793
8	946	712	743	797	761	779	888	837	865	793	759	775
9	723	703	713	809	758	792	951	872	927	786	763	771
10	733	713	724	850	687	792	973	886	924	819	767	779
11	753	733	744	830	803	816	907	801	837	837	769	792
12	771	749	759	840	798	830	824	786	805	799	764	786
13	776	753	767	835	820	827	793	766	778	807	784	795
14	772	755	764	820	801	809	774	761	768	813	769	795
15	781	760	770	814	793	808	796	770	781	791	772	782
16	790	768	777	824	808	812	816	776	805	813	777	795
17	782	770	775	830	798	808	826	808	818	825	775	805
18	786	772	779	816	802	810	826	779	801	851	823	840
19	791	772	785	832	797	805	994	776	824	833	787	812
20	792	778	785	804	781	792	850	764	808	788	768	778
21	793	776	783	799	724	780	831	788	815	797	771	790
22	790	781	785	815	746	783	825	770	796	828	793	805
23	795	783	789	816	795	801	817	770	790	842	812	830
24	802	782	790	812	791	802	809	766	782	825	785	805
25	803	748	785	824	791	803	798	750	772	794	761	782
26	809	781	795	827	783	806	822	777	792	764	748	756
27	791	775	787	822	797	809	802	762	789	778	750	765
28	792	781	787	808	801	804	835	766	787	773	747	758
29	802	792	796	807	793	800	821	734	765	751	738	745
30	810	800	806	814	775	798	790	724	748	771	750	763
31	807	797	802	---	---	---	813	772	800	771	753	763
MONTH	946	471	762	850	687	802	994	724	827	851	738	786

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160800 SASHABAW CREEK NEAR DRAYTON PLAINS, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	754	740	746	795	779	788	708	688	698	729	683	712
2	747	730	737	798	759	779	704	697	701	722	695	709
3	4860	734	892	833	789	816	746	697	708	710	661	697
4	1020	720	797	823	777	801	699	558	606	710	675	697
5	865	845	853	802	761	782	564	540	553	720	674	698
6	849	800	823	784	760	774	570	551	563	717	687	702
7	805	778	795	801	767	783	581	557	568	705	676	693
8	815	788	802	1300	754	789	589	577	582	702	662	689
9	795	773	784	1400	787	938	625	587	601	706	670	688
10	787	773	781	843	805	827	618	599	610	706	679	697
11	806	781	796	855	777	809	626	605	618	713	657	695
12	797	786	792	1570	750	904	639	616	627	746	662	706
13	796	784	791	1740	744	992	654	633	640	719	690	706
14	812	781	799	1820	775	1020	658	638	649	710	695	704
15	798	781	789	1930	770	882	670	655	660	711	666	699
16	819	788	810	901	567	732	682	669	675	714	679	703
17	827	793	812	682	510	605	702	682	694	715	673	705
18	797	759	776	550	513	537	714	698	706	715	686	707
19	838	744	770	585	545	564	728	713	718	726	625	713
20	1540	753	944	598	546	572	752	726	735	727	706	722
21	1000	797	846	604	559	569	764	738	751	725	672	714
22	839	777	802	622	570	589	767	749	757	722	689	712
23	821	767	794	615	601	608	768	755	761	724	703	713
24	806	782	796	611	599	605	766	754	760	719	678	706
25	806	787	798	617	581	597	763	749	757	711	691	699
26	831	799	817	621	615	619	764	754	760	710	692	702
27	833	798	817	634	620	625	760	723	739	704	686	700
28	825	780	808	726	633	642	742	660	713	709	681	699
29	---	---	---	709	663	696	724	710	718	741	686	704
30	---	---	---	718	693	705	725	706	717	738	688	718
31	---	---	---	705	692	698	---	---	---	804	621	712
MONTH	4860	720	806	1930	510	731	768	540	678	804	621	704

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	799	686	714	689	626	668	707	504	660	734	693	712
2	710	633	689	676	583	635	660	557	617	724	665	698
3	722	672	712	666	602	635	670	606	636	733	672	699
4	719	703	713	651	579	615	678	586	643	742	680	721
5	731	694	722	657	598	626	653	582	619	742	697	726
6	729	703	723	666	628	647	662	588	633	749	692	730
7	741	709	732	656	618	635	674	602	641	729	672	712
8	757	632	737	640	610	629	672	599	635	721	676	706
9	740	661	719	637	615	628	687	609	655	728	689	710
10	744	735	740	655	635	646	692	612	660	725	671	705
11	752	743	748	664	642	652	686	625	654	724	666	703
12	756	666	718	667	634	658	678	604	648	729	660	702
13	710	687	701	674	639	657	691	592	652	731	668	708
14	709	662	700	673	629	655	712	577	655	731	649	692
15	716	692	708	672	646	659	700	597	652	692	535	658
16	708	676	697	677	640	661	702	588	641	713	670	692
17	717	687	702	683	644	665	715	615	676	728	658	702
18	730	712	723	695	641	668	728	628	686	711	659	692
19	732	718	727	714	652	682	726	641	690	700	523	656
20	744	729	736	699	653	677	728	646	690	722	659	700
21	747	726	739	681	398	648	725	638	679	741	684	709
22	748	721	737	664	612	638	724	658	694	695	365	610
23	748	706	733	684	650	669	820	685	713	718	632	671
24	739	696	719	685	641	669	736	694	712	728	471	678
25	732	668	705	680	630	661	721	636	685	723	593	688
26	695	665	678	680	639	660	714	416	624	704	663	681
27	727	684	699	678	625	650	712	639	665	719	632	696
28	705	679	694	699	630	671	711	663	683	726	691	708
29	704	665	691	704	635	674	728	648	693	740	694	716
30	705	655	682	701	627	672	742	686	717	746	676	724
31	---	---	---	704	627	670	746	688	713	---	---	---
MONTH	799	632	715	714	398	654	820	416	665	749	365	697
YEAR	4860	365	735									

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160800 SASHABAW CREEK NEAR DRAYTON PLAINS, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	22.5	17.5	19.5	5.5	3.0	4.5	0.5	0.0	0.5	1.5	0.5	1.0
2	21.0	19.0	20.0	4.5	3.0	4.0	0.5	0.0	0.0	0.5	0.0	0.0
3	19.0	16.5	17.0	7.0	2.5	4.5	0.5	0.0	0.0	0.5	0.0	0.0
4	20.0	16.5	18.0	7.0	4.0	5.0	0.5	0.0	0.0	1.0	0.0	0.5
5	17.5	13.0	15.5	4.5	3.0	4.0	0.5	0.0	0.0	2.0	0.0	1.0
6	15.5	11.5	13.5	5.0	4.0	4.5	0.5	0.0	0.0	1.5	0.0	1.0
7	14.5	10.0	12.5	6.0	3.0	4.5	0.5	0.0	0.0	0.5	0.0	0.0
8	13.5	9.5	11.0	8.5	4.0	6.0	0.5	0.0	0.0	2.0	0.0	1.0
9	13.5	9.0	11.5	10.0	6.5	8.5	0.5	0.0	0.0	3.0	1.0	2.0
10	16.0	10.5	13.0	12.0	10.0	11.0	0.5	0.0	0.0	1.5	0.0	0.5
11	16.5	11.0	13.5	11.0	8.5	10.0	0.5	0.0	0.0	0.0	0.0	0.0
12	16.0	12.0	14.0	8.5	6.5	7.5	0.5	0.0	0.0	0.5	0.0	0.0
13	14.5	8.5	12.5	7.5	5.0	6.0	0.5	0.0	0.0	0.5	0.0	0.0
14	12.0	6.5	8.5	8.5	5.5	7.0	0.5	0.0	0.5	0.5	0.0	0.0
15	12.0	6.5	9.0	7.5	3.5	5.5	1.0	0.0	0.5	0.0	0.0	0.0
16	11.0	6.5	9.0	3.5	2.5	3.0	0.5	0.0	0.0	0.0	0.0	0.0
17	8.0	5.0	6.5	3.5	1.5	2.5	0.5	0.0	0.0	0.0	0.0	0.0
18	9.0	6.5	7.5	3.5	0.5	2.0	1.5	0.0	1.0	0.0	0.0	0.0
19	10.0	8.5	9.0	5.5	3.5	4.5	4.0	1.5	3.0	0.0	0.0	0.0
20	10.5	6.5	8.0	6.5	3.5	5.0	3.5	1.5	2.5	0.0	0.0	0.0
21	9.0	5.0	7.0	6.5	4.5	6.0	2.0	1.0	1.5	0.0	0.0	0.0
22	10.0	7.0	8.5	4.5	2.5	3.5	1.5	0.5	1.0	0.0	0.0	0.0
23	9.0	5.5	7.5	3.5	2.0	3.0	1.5	0.5	1.0	0.0	0.0	0.0
24	7.5	4.5	5.5	4.5	3.0	4.0	1.0	0.0	0.5	0.0	0.0	0.0
25	6.5	4.0	5.5	4.0	1.5	3.0	0.5	0.0	0.5	0.0	0.0	0.0
26	8.0	6.5	7.5	2.0	0.5	1.5	2.0	0.0	1.0	0.0	0.0	0.0
27	9.0	6.5	7.5	1.5	0.0	1.0	1.0	0.0	0.5	0.0	0.0	0.0
28	8.5	6.0	7.0	1.5	0.5	1.0	1.0	0.0	0.5	0.0	0.0	0.0
29	6.0	4.0	4.5	3.5	0.5	2.0	3.0	1.0	2.0	0.0	0.0	0.0
30	7.5	3.5	5.0	2.5	0.0	2.0	4.0	1.5	2.5	0.0	0.0	0.0
31	6.5	2.5	4.5	---	---	---	4.5	1.5	3.5	0.0	0.0	0.0
MONTH	22.5	2.5	10.3	12.0	0.0	4.5	4.5	0.0	0.7	3.0	0.0	0.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	0.0	0.0	0.0	0.5	0.0	0.0	11.5	5.0	8.0	19.0	12.5	15.5
2	0.0	0.0	0.0	0.0	0.0	0.0	13.0	7.0	10.0	15.0	12.0	13.5
3	0.5	0.0	0.0	0.5	0.0	0.0	10.0	5.0	7.0	17.0	9.5	13.0
4	0.5	0.0	0.0	0.0	0.0	0.0	5.0	1.5	3.5	17.5	10.0	14.0
5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.5	2.0	15.5	12.0	13.5
6	0.0	0.0	0.0	0.0	0.0	0.0	4.0	1.0	2.5	19.0	12.0	15.5
7	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.5	1.5	16.0	12.5	13.5
8	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.5	2.0	15.5	12.0	13.5
9	0.0	0.0	0.0	0.5	0.0	0.0	8.0	1.0	4.0	19.0	11.5	15.0
10	0.0	0.0	0.0	0.5	0.0	0.0	10.0	2.0	6.0	18.5	14.5	16.5
11	0.0	0.0	0.0	0.5	0.0	0.0	12.0	4.0	8.0	17.5	13.5	16.5
12	0.0	0.0	0.0	0.5	0.0	0.0	12.5	6.5	9.0	13.5	11.0	12.0
13	0.0	0.0	0.0	0.0	0.0	0.0	12.5	5.5	9.0	18.0	10.0	13.5
14	0.0	0.0	0.0	0.5	0.0	0.0	15.0	7.0	11.0	19.0	11.0	15.0
15	0.0	0.0	0.0	2.5	0.0	1.0	17.0	10.0	13.5	16.0	13.5	14.0
16	0.0	0.0	0.0	4.5	1.0	2.0	13.5	9.5	12.0	15.0	13.0	14.0
17	0.0	0.0	0.0	3.5	1.0	2.0	11.0	7.0	9.0	19.5	13.0	16.0
18	0.0	0.0	0.0	3.0	1.5	2.0	10.0	8.5	9.0	19.5	14.0	16.5
19	0.5	0.0	0.0	4.5	0.5	2.5	15.0	9.5	12.5	21.5	15.0	18.0
20	0.5	0.0	0.0	7.5	2.0	4.5	15.0	11.5	13.5	19.0	14.5	17.0
21	0.5	0.0	0.0	5.0	2.5	3.5	13.0	10.0	12.0	18.5	12.0	15.0
22	0.5	0.0	0.0	3.5	1.5	2.5	10.0	7.5	9.0	18.5	11.5	15.0
23	0.0	0.0	0.0	5.0	1.5	3.5	14.0	6.0	10.0	15.5	12.5	14.0
24	0.0	0.0	0.0	9.0	2.0	5.5	14.5	7.0	11.0	14.0	12.5	13.0
25	0.0	0.0	0.0	10.5	6.0	8.0	15.0	9.0	12.0	17.5	11.5	14.0
26	0.5	0.0	0.0	8.0	4.5	6.5	16.5	8.5	12.5	17.0	14.0	15.5
27	0.5	0.0	0.0	8.5	4.0	6.5	17.5	8.5	13.0	16.5	13.0	15.0
28	0.5	0.0	0.0	11.5	6.0	9.0	18.5	11.0	15.0	19.0	13.0	16.0
29	---	---	---	9.5	4.0	6.5	18.0	10.5	14.5	21.0	15.5	18.0
30	---	---	---	6.0	2.5	4.0	15.0	12.5	13.5	18.5	16.0	17.5
31	---	---	---	8.0	2.5	5.0	---	---	---	17.0	12.5	14.5
MONTH	0.5	0.0	0.0	11.5	0.0	2.4	18.5	0.5	9.2	21.5	9.5	15.0

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160800 SASHABAW CREEK NEAR DRAYTON PLAINS, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	17.5	11.0	14.0	26.0	18.5	22.0	25.5	19.0	22.0	19.0	17.0	18.0
2	18.5	12.5	16.0	26.0	18.0	22.0	25.5	18.5	22.0	23.5	16.5	19.0
3	17.5	14.5	15.5	27.5	19.5	23.0	24.0	20.5	22.0	22.5	16.0	19.0
4	14.5	13.5	13.5	27.0	21.5	24.0	24.5	19.0	21.5	19.5	16.5	18.0
5	15.0	13.0	13.5	25.0	21.5	23.0	23.5	20.0	22.0	20.5	15.0	17.5
6	17.5	12.5	15.5	27.5	19.5	23.0	25.0	19.0	22.0	23.0	13.0	17.0
7	19.0	16.0	17.5	25.0	21.5	23.0	25.5	19.0	22.0	23.5	15.0	18.5
8	18.0	16.0	17.0	26.5	21.5	23.5	26.5	20.0	22.5	25.5	17.5	20.0
9	18.5	15.0	16.5	26.0	20.5	23.0	24.5	19.5	21.5	25.0	16.0	19.5
10	17.5	15.0	16.5	22.5	20.0	21.0	23.5	18.0	21.0	25.5	15.0	19.0
11	20.5	17.0	18.5	21.0	17.5	19.5	23.5	19.0	21.0	26.0	16.0	19.5
12	18.5	16.0	17.0	22.0	16.5	19.0	24.0	20.0	21.5	25.0	16.0	19.5
13	18.5	15.5	17.0	24.0	16.0	20.0	27.0	19.0	23.0	26.0	15.0	19.5
14	21.0	16.0	18.5	26.0	17.5	21.5	27.0	20.0	23.5	25.5	16.5	20.0
15	23.0	18.0	20.5	22.5	18.5	20.5	26.5	21.5	24.0	23.0	17.0	19.5
16	22.5	17.5	20.0	25.0	17.5	21.0	27.0	21.0	23.5	22.5	14.0	17.5
17	20.5	18.5	19.0	25.5	18.0	21.5	25.5	19.0	22.0	24.5	14.5	18.5
18	22.5	18.0	20.5	25.5	19.0	22.0	24.5	17.0	20.5	22.5	15.0	18.5
19	22.0	18.0	20.0	24.5	16.0	20.5	25.5	17.0	21.0	20.5	16.5	18.0
20	21.0	15.5	18.5	22.5	17.5	20.0	26.5	18.0	22.0	20.5	13.5	16.0
21	22.0	16.0	19.0	24.5	19.0	21.0	28.0	19.5	23.5	20.0	12.5	15.5
22	24.0	17.0	20.5	24.0	18.0	20.5	28.0	20.5	23.5	17.0	15.0	16.0
23	25.0	17.5	21.0	23.5	17.5	20.5	26.0	18.0	21.0	16.5	13.5	15.0
24	25.5	19.0	22.0	24.0	17.0	20.5	21.5	16.5	19.0	16.0	11.5	13.5
25	27.5	20.5	23.5	25.0	17.0	21.0	26.0	18.0	21.5	15.5	12.0	13.5
26	25.5	20.5	23.5	22.0	19.0	20.5	26.0	20.0	23.0	15.0	11.0	13.0
27	24.0	18.5	21.0	25.0	20.0	22.0	26.5	20.0	23.0	17.0	12.5	14.5
28	23.5	18.0	20.5	25.0	18.5	21.5	24.5	17.0	20.5	14.0	11.0	12.5
29	24.0	18.0	20.5	24.0	17.0	20.5	23.5	20.5	22.0	13.0	9.5	11.5
30	24.5	17.5	21.0	25.5	17.0	21.5	24.0	17.5	20.0	11.5	8.5	10.0
31	---	---	---	25.0	18.0	22.0	22.5	16.5	19.0	---	---	---
MONTH	27.5	11.0	18.6	27.5	16.0	21.4	28.0	16.5	21.8	26.0	8.5	16.9
YEAR	28.0	0.0	10.1									

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 mi^2.

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.--Records good. Some regulation and occasional diversion for lake-level control at many 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.0	16	21	31	9.1	30	62	72	62	3.0	4.3	4.1
2	3.1	23	21	31	7.5	30	60	67	55	3.1	3.9	3.9
3	3.3	22	25	31	8.4	31	58	65	50	3.2	3.8	3.7
4	3.8	25	20	31	8.8	28	75	64	50	3.7	3.8	3.5
5	3.1	21	20	31	12	28	78	65	48	3.3	4.1	3.8
6	3.0	21	20	31	10	28	83	39	27	3.2	4.0	3.8
7	2.9	21	19	31	26	27	94	16	6.3	3.3	4.0	3.8
8	2.8	11	19	31	26	28	105	22	11	3.3	4.0	3.7
9	2.8	11	21	30	25	27	107	37	37	3.4	4.1	3.7
10	2.8	13	20	30	21	27	110	64	71	3.7	4.1	3.8
11	2.8	12	24	30	14	26	114	73	74	3.7	4.3	3.7
12	2.8	11	24	29	14	26	112	74	83	3.4	4.3	3.7
13	3.0	10	24	29	14	26	100	73	82	3.4	4.3	3.7
14	2.8	11	24	29	18	25	83	73	80	4.2	4.3	4.0
15	2.8	20	24	29	25	26	90	72	78	5.1	4.9	4.2
16	2.8	43	24	31	16	30	84	71	77	6.1	3.8	3.8
17	2.8	41	24	28	16	29	82	65	76	6.7	3.8	3.8
18	3.0	39	23	29	15	27	86	60	74	6.4	3.8	3.8
19	3.2	38	26	27	15	30	63	58	73	5.3	3.9	4.4
20	3.0	36	28	27	15	32	36	57	40	4.6	4.1	3.9
21	2.8	34	27	25	21	35	38	55	3.7	5.5	4.1	4.0
22	2.8	34	27	24	35	54	47	53	3.4	5.4	3.8	5.8
23	2.8	30	27	27	35	77	53	30	3.3	4.0	3.6	4.0
24	2.7	28	28	18	35	77	59	4.3	3.2	3.6	3.5	4.4
25	3.2	26	29	2.1	35	78	59	5.8	3.1	3.6	3.5	4.2
26	7.1	24	29	2.1	35	75	56	7.8	3.2	3.5	4.0	3.8
27	10	23	29	2.1	34	68	56	9.1	3.0	3.6	3.6	4.0
28	10	22	30	2.2	30	69	55	10	3.1	3.6	3.5	3.8
29	10	21	30	2.3	---	69	67	10	3.0	3.7	3.6	3.8
30	10	21	31	2.3	---	66	68	12	3.0	3.7	3.6	3.9
31	13	---	31	6.3	---	64	---	39	---	3.9	3.8	---
TOTAL	134.0	708	769	709.4	575.8	1293	2240	1423.0	1186.3	126.2	122.2	118.5
MEAN	4.32	23.6	24.8	22.9	20.6	41.7	74.7	45.9	39.5	4.07	3.94	3.95
MAX	13	43	31	31	35	78	114	74	83	6.7	4.9	5.8
MIN	2.7	10	19	2.1	7.5	25	36	4.3	3.0	3.0	3.5	3.5
CFSM	0.05	0.30	0.31	0.29	0.26	0.53	0.94	0.58	0.50	0.05	0.05	0.05
IN.	0.06	0.33	0.36	0.33	0.27	0.61	1.05	0.67	0.56	0.06	0.06	0.06

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2003, BY WATER YEAR (WY)

MEAN	38.0	51.7	59.9	56.1	59.0	83.0	89.2	61.7	45.4	28.6	24.4	29.3
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1960 - 2003	
ANNUAL TOTAL	13926.2		9405.4			
ANNUAL MEAN	38.2		25.8		52.1	
HIGHEST ANNUAL MEAN					87.9	1974
LOWEST ANNUAL MEAN					20.0	1964
HIGHEST DAILY MEAN	117	Mar 16	114	Apr 11	274	Mar 12 1974
LOWEST DAILY MEAN	2.7	Oct 24	2.1	(a)	2.1	(a)
ANNUAL SEVEN-DAY MINIMUM	2.8	Oct 8	2.8	Jan 25	2.8	Jan 25 2003
MAXIMUM PEAK FLOW			114	Apr 10	276	Mar 12 1974
MAXIMUM PEAK STAGE			3.53	Apr 10	4.95	Mar 12 1974
INSTANTANEOUS LOW FLOW			2.1	(a)	2.1	(a)
ANNUAL RUNOFF (CFSM)	0.48		0.33		0.66	
ANNUAL RUNOFF (INCHES)	6.54		4.42		8.94	
10 PERCENT EXCEEDS	89		70		103	
50 PERCENT EXCEEDS	25		21		46	
90 PERCENT EXCEEDS	3.2		3.2		10	

(a) Jan. 25-27, 2003.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33	19	12	23	e15	e21	48	56	56	17	8.8	14
2	33	17	14	19	e16	e20	47	47	41	16	11	14
3	32	17	e13	19	e19	e19	47	34	36	15	11	13
4	36	17	14	19	e37	e21	264	28	37	15	19	13
5	39	18	12	18	e23	e24	220	51	39	17	44	11
6	33	20	11	19	e20	e23	152	54	35	16	43	8.6
7	32	18	11	e19	e18	e26	135	46	34	16	35	7.9
8	32	18	10	20	e16	e41	126	47	44	15	46	7.9
9	29	19	e10	21	e17	e54	122	51	60	17	22	7.6
10	27	39	11	23	e16	e32	127	71	45	17	19	7.5
11	25	30	9.2	e20	e15	e31	111	89	40	18	17	7.4
12	24	21	9.0	e19	e17	e32	92	87	49	16	16	7.4
13	24	21	9.5	e20	e16	34	78	71	55	15	16	7.1
14	23	18	10	e19	e15	35	68	67	45	14	14	7.5
15	23	22	10	e18	e15	52	63	64	41	12	18	12
16	22	20	11	e16	e15	165	57	59	36	11	19	11
17	26	18	9.6	e17	e16	188	50	53	33	9.9	16	12
18	26	17	10	e16	e17	114	47	47	33	9.8	14	13
19	27	16	28	e16	e18	73	46	44	34	9.5	13	21
20	26	17	38	e16	e18	70	50	43	27	9.7	13	15
21	27	19	25	e15	e18	78	52	41	23	16	13	12
22	26	31	18	e14	e18	68	47	38	21	23	13	79
23	24	23	16	e13	e19	62	47	35	20	14	13	53
24	26	20	14	e13	e18	59	47	35	19	12	12	27
25	30	18	15	e13	e18	60	46	33	20	11	12	43
26	32	15	15	e13	e18	55	42	32	19	9.8	21	24
27	28	13	14	e13	e18	48	38	31	20	9.9	19	23
28	27	12	15	e13	e19	50	34	31	19	9.4	15	18
29	22	12	15	e14	---	87	28	41	19	9.2	13	15
30	22	13	17	e14	---	60	28	37	17	8.9	13	14
31	19	---	28	e14	---	50	---	84	---	8.5	12	---
TOTAL	855	578	454.3	526	505	1752	2359	1547	1017	417.6	570.8	525.9
MEAN	27.6	19.3	14.7	17.0	18.0	56.5	78.6	49.9	33.9	13.5	18.4	17.5
MAX	39	39	38	23	37	188	264	89	60	23	46	79
MIN	19	12	9.0	13	15	19	28	28	17	8.5	8.8	7.1
CFSM	0.39	0.27	0.21	0.24	0.25	0.80	1.11	0.70	0.48	0.19	0.26	0.25
IN.	0.45	0.30	0.24	0.28	0.26	0.92	1.24	0.81	0.53	0.22	0.30	0.28

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 2003, BY WATER YEAR (WY)

MEAN	39.8	45.7	50.7	50.3	61.7	94.0	95.9	63.7	47.3	29.0	25.4	34.4
MAX	123	120	103	127	166	204	194	146	125	58.0	66.7	104
(WY)	1982	1986	1976	1973	2001	1976	1975	1974	1996	1992	1975	1975
MIN	8.50	11.0	14.5	14.9	15.4	25.9	37.2	28.5	13.5	11.7	12.0	12.2
(WY)	1964	1964	1965	1964	1963	1964	1964	1977	1988	1963	1965	1963

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1960 - 2003	
ANNUAL TOTAL	15682.4		11107.6			
ANNUAL MEAN	43.0		30.4		53.1	
HIGHEST ANNUAL MEAN					86.7	1976
LOWEST ANNUAL MEAN					20.4	1964
HIGHEST DAILY MEAN	186	Mar 3	264	Apr 4	660	Feb 2 1968
LOWEST DAILY MEAN	8.8	Jul 18	7.1	Sep 13	6.8	Aug 15 1988
ANNUAL SEVEN-DAY MINIMUM	9.8	Jul 12	7.5	Sep 8	7.5	Sep 8 2003
MAXIMUM PEAK FLOW			357	Mar 16	(a)1200	Feb 9 2001
MAXIMUM PEAK STAGE			3.47	Mar 16	(b)5.95	Feb 10 1965
INSTANTANEOUS LOW FLOW			6.6	(c)	(d)1.2	Aug 19 1974
ANNUAL RUNOFF (CFSM)	0.61		0.43		0.75	
ANNUAL RUNOFF (INCHES)	8.23		5.83		10.17	
10 PERCENT EXCEEDS	88		56		103	
50 PERCENT EXCEEDS	33		20		40	
90 PERCENT EXCEEDS	12		11		16	

(a) From rating curve extended above 500 ft^3/s; gage height 5.27 ft.
(b) Backwater from ice.
(c) Sept. 9, 12, 13, 14.
(d) 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 (discontinued).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: June 2001 to September 2003.
WATER TEMPERATURE: June 2001 to September 2003.

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 for the following periods: Oct. 31 to Nov. 2, Feb. 22 to Mar. 6, Mar. 30 to Apr. 3, June 18 to July 24, Aug. 21 to Sept. 11, rated good; Oct. 1-10, Mar. 7-15, Apr. 4-11, rated fair; Mar. 16, 19-21, Apr. 12-21, rated poor. Water temperature records rated excellent.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 3,910 microsiemens, Aug. 12, 2001; minimum, 216 microsiemens, Sept. 8, 2001.
WATER TEMPERATURE: Maximum, 26.0°C, July 29, 2002; minimum, 0.0°C, on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 2,990 microsiemens, July 31; minimum, 310 microsiemens, Sept. 22.
WATER TEMPERATURE: Maximum, 25.0°C, Aug. 15; minimum, 0.0°C, on many days during winter period.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	611	586	600	718	700	711	805	782	795	1070	1040	1050
2	615	587	601	723	711	716	855	789	817	1050	939	1010
3	621	597	606	737	719	727	1380	847	1010	979	916	948
4	626	544	609	730	720	724	1040	883	934	975	921	952
5	641	604	625	732	699	722	933	853	881	1040	918	968
6	639	619	626	743	722	732	897	851	876	1040	901	960
7	650	621	630	746	727	737	892	850	867	949	878	918
8	649	620	636	742	727	735	858	842	850	1100	885	1030
9	668	645	658	748	725	735	920	846	873	1000	954	972
10	690	660	674	744	545	672	890	863	876	961	939	949
11	692	683	687	707	647	684	881	851	865	957	914	943
12	701	684	689	752	690	714	870	843	854	917	824	877
13	703	671	689	757	727	742	859	829	848	825	795	810
14	704	693	700	753	715	728	857	828	842	806	793	800
15	743	697	707	753	694	734	855	824	837	815	787	801
16	707	691	700	776	740	760	854	824	838	816	791	804
17	700	665	680	767	748	760	855	832	840	824	802	812
18	712	611	674	785	749	760	1250	841	945	853	821	838
19	696	613	682	770	691	750	1170	984	1050	869	850	861
20	697	675	687	787	761	771	1010	930	975	880	866	871
21	675	658	669	891	656	761	966	926	946	889	870	879
22	689	671	675	741	674	718	970	938	951	889	840	852
23	684	671	676	770	721	743	951	919	938	851	833	839
24	700	669	681	797	733	762	947	916	932	835	815	828
25	685	586	658	797	741	755	953	924	936	826	811	819
26	677	659	667	777	745	758	976	944	963	828	809	820
27	678	666	671	828	765	778	972	911	939	836	815	827
28	674	664	670	790	777	783	1030	912	952	874	836	856
29	696	669	684	796	776	785	1040	926	1000	912	867	885
30	702	690	698	957	777	821	1030	925	965	918	897	903
31	711	695	701	---	---	---	1120	1020	1080	927	818	860
MONTH	743	544	665	957	545	743	1380	782	912	1100	787	888

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161540 PAINT CREEK AT ROCHESTER, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	967	857	911	880	833	857	801	731	744	909	653	820
2	930	802	891	1080	879	962	787	752	770	988	774	882
3	1130	827	923	997	944	967	796	751	782	1010	904	965
4	1750	1040	1280	1210	949	1030	845	489	600	951	864	898
5	1210	990	1090	1250	975	1090	619	508	573	917	835	884
6	996	883	929	1200	964	1050	634	589	604	903	829	867
7	919	817	868	1130	995	1070	627	594	606	864	801	822
8	873	803	846	1340	959	1070	721	619	676	845	720	774
9	828	780	814	1340	1170	1270	740	668	710	786	748	767
10	867	779	822	1250	1040	1140	745	672	702	789	733	769
11	918	816	874	1100	1000	1060	683	660	668	765	709	745
12	975	834	898	1040	994	1020	672	657	664	765	711	747
13	870	829	854	1340	1020	1130	675	659	668	774	718	751
14	938	841	887	1690	1160	1270	695	655	676	783	717	751
15	869	815	842	2030	1300	1580	709	666	682	811	754	788
16	841	815	832	1660	632	1080	715	671	694	823	743	778
17	1020	832	878	---	---	---	713	691	704	852	753	781
18	1390	851	1010	---	---	---	731	708	717	827	722	744
19	1190	846	977	777	684	717	767	721	735	787	744	758
20	1030	872	966	795	735	752	815	727	765	850	757	797
21	1040	947	998	782	738	762	811	774	793	855	792	822
22	1170	951	998	---	---	---	984	753	775	851	786	818
23	1060	951	989	---	---	---	754	720	738	850	795	822
24	1010	887	946	---	---	---	883	688	718	864	787	823
25	1000	920	964	---	---	---	723	690	704	892	744	828
26	980	892	940	745	698	720	919	692	719	857	751	797
27	943	866	901	732	676	703	781	719	737	781	742	757
28	893	854	876	805	671	726	842	710	759	860	740	763
29	---	---	---	860	754	793	1030	746	768	891	470	787
30	---	---	---	781	734	751	828	675	776	809	730	756
31	---	---	---	742	729	735	---	---	---	774	612	680
MONTH	1750	779	929	---	---	---	1030	489	708	1010	470	798

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	760	716	746	846	812	830	875	834	859	795	754	775
2	778	740	756	828	803	818	2250	834	878	791	757	772
3	769	758	764	843	813	823	884	831	859	805	770	782
4	767	744	760	865	730	825	844	364	777	811	777	788
5	775	755	767	864	815	835	739	412	639	827	780	790
6	779	754	767	855	789	832	655	483	597	824	794	808
7	778	749	762	859	784	832	736	466	661	843	815	826
8	769	679	751	841	798	827	615	439	538	851	828	837
9	764	735	748	821	778	805	682	613	652	855	828	842
10	763	722	746	889	778	842	700	675	690	871	827	846
11	754	735	745	841	769	817	720	649	709	876	822	846
12	754	702	736	850	821	831	800	716	729	941	811	837
13	763	732	748	845	805	827	746	655	732	1150	825	854
14	754	731	741	835	811	822	754	737	746	879	801	833
15	744	731	738	869	811	834	767	475	714	836	539	759
16	751	731	738	882	849	863	743	651	711	928	791	819
17	748	726	740	902	873	887	778	703	724	853	797	837
18	771	707	752	910	884	898	754	736	745	934	771	867
19	794	661	770	917	888	903	764	741	751	928	424	720
20	801	770	787	913	876	898	779	750	758	967	752	800
21	815	789	803	918	698	855	776	750	761	869	809	837
22	824	804	813	856	741	798	815	756	770	893	310	577
23	835	813	823	819	768	795	786	751	760	637	551	583
24	845	814	825	849	805	834	800	760	770	689	463	634
25	820	797	807	873	829	847	782	766	774	653	554	608
26	815	793	800	869	817	851	786	625	730	695	507	649
27	834	787	805	868	825	847	785	726	750	694	507	655
28	824	771	794	859	827	842	794	750	778	756	692	724
29	823	801	813	2410	842	887	801	779	788	770	704	746
30	833	799	818	875	844	857	796	774	785	777	755	760
31	---	---	---	2990	848	914	802	769	783	---	---	---
MONTH	845	661	772	2990	698	844	2250	364	739	1150	310	767

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161540 PAINT CREEK AT ROCHESTER, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	19.0	17.5	18.0	6.0	5.0	5.5	1.5	0.5	1.0	3.5	2.5	3.0
2	19.5	18.5	19.0	5.5	4.5	5.0	1.0	0.0	0.5	2.5	1.0	2.0
3	18.5	16.5	17.5	6.0	4.5	5.0	0.0	0.0	0.0	1.5	1.0	1.0
4	18.5	16.5	17.5	6.5	5.5	6.0	0.0	0.0	0.0	1.5	1.5	1.5
5	17.5	15.0	16.5	5.5	4.5	5.0	0.5	0.0	0.0	2.0	1.5	1.5
6	15.0	14.0	14.5	6.0	5.0	5.5	0.5	0.0	0.0	2.0	1.0	1.5
7	14.5	12.5	14.0	6.0	4.5	5.5	0.5	0.0	0.0	1.0	0.5	0.5
8	13.0	12.0	12.5	8.0	5.5	6.5	1.0	0.5	0.5	2.5	1.0	2.0
9	13.0	11.5	12.5	9.5	7.0	8.0	0.5	0.0	0.0	3.0	2.5	2.5
10	14.0	12.5	13.0	12.0	9.5	10.5	0.5	0.0	0.0	3.0	1.0	2.0
11	14.0	12.5	13.5	11.0	9.5	10.5	0.5	0.0	0.5	1.0	0.5	1.0
12	14.5	12.5	13.5	9.5	7.5	8.5	2.0	0.0	1.0	0.5	0.0	0.5
13	14.0	10.5	13.0	7.5	6.5	7.0	2.5	1.5	2.0	0.5	0.5	0.5
14	10.5	9.0	10.0	8.0	6.5	7.5	3.0	2.5	3.0	0.5	0.5	0.5
15	10.0	8.0	9.0	8.0	5.0	6.5	3.0	2.5	2.5	0.5	0.5	0.5
16	10.0	8.5	9.5	5.0	4.0	4.5	3.0	1.5	2.0	0.5	0.5	0.5
17	8.5	7.5	8.0	4.0	3.5	4.0	2.0	1.5	1.5	0.5	0.5	0.5
18	10.0	8.0	8.5	4.0	2.5	3.5	3.5	1.5	2.5	0.5	0.5	0.5
19	10.0	9.5	10.0	5.5	4.0	5.0	5.0	3.5	4.0	0.5	0.5	0.5
20	9.5	8.0	9.0	6.5	4.5	5.5	5.0	3.5	4.0	0.5	0.5	0.5
21	8.5	7.0	8.0	7.0	5.5	6.5	3.5	0.0	3.0	0.5	0.5	0.5
22	9.5	8.0	8.5	5.5	4.0	5.0	3.0	2.5	2.5	0.5	0.5	0.5
23	9.0	7.5	8.5	4.0	3.5	4.0	2.5	2.0	2.5	0.5	0.5	0.5
24	7.5	6.5	7.0	5.0	4.0	4.5	2.0	1.5	2.0	0.5	0.5	0.5
25	7.5	6.0	6.5	5.0	3.0	4.0	2.0	1.0	1.5	0.5	0.5	0.5
26	8.5	7.5	8.0	3.0	2.5	3.0	2.5	1.5	2.0	0.5	0.5	0.5
27	9.0	8.0	8.5	2.5	1.0	2.0	1.5	1.0	1.5	0.5	0.5	0.5
28	8.5	7.5	8.0	2.5	1.5	2.0	2.0	1.0	1.5	0.5	0.5	0.5
29	7.5	6.0	6.5	3.5	1.5	2.5	3.0	2.0	2.5	0.5	0.5	0.5
30	7.0	5.5	6.0	3.5	1.5	3.0	4.0	2.5	3.0	0.5	0.5	0.5
31	6.5	5.0	5.5	---	---	---	4.0	3.5	4.0	0.5	0.5	0.5
MONTH	19.5	5.0	11.0	12.0	1.0	5.4	5.0	0.0	1.6	3.5	0.0	0.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	0.5	0.5	0.5	0.0	0.0	0.0	8.5	5.0	7.0	16.0	12.0	14.0
2	0.5	0.5	0.5	0.0	0.0	0.0	10.0	7.5	8.5	14.0	10.5	12.5
3	0.5	0.0	0.5	0.0	0.0	0.0	8.5	5.0	7.0	13.5	9.0	11.5
4	0.0	0.0	0.0	0.0	0.0	0.0	5.5	2.5	3.5	14.5	9.0	12.0
5	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.0	2.5	13.0	11.5	12.5
6	0.0	0.0	0.0	0.0	0.0	0.0	3.5	1.5	2.5	16.0	11.5	13.5
7	0.0	0.0	0.0	0.0	0.0	0.0	3.5	1.5	2.0	14.5	12.0	13.0
8	0.0	0.0	0.0	0.0	0.0	0.0	3.5	2.0	3.0	13.5	11.5	12.5
9	0.0	0.0	0.0	0.5	0.0	0.0	6.0	2.5	4.0	15.5	12.0	13.5
10	0.0	0.0	0.0	0.0	0.0	0.0	7.0	3.0	5.0	16.0	14.0	15.0
11	0.5	0.0	0.0	0.5	0.0	0.0	8.5	4.5	6.5	16.5	14.0	15.5
12	0.0	0.0	0.0	1.5	0.0	0.5	9.0	6.5	8.0	14.5	11.0	12.5
13	0.0	0.0	0.0	2.0	0.5	1.5	9.0	6.0	7.5	14.5	10.5	12.5
14	0.0	0.0	0.0	2.5	0.5	1.5	11.0	7.0	9.5	15.0	12.0	13.5
15	0.0	0.0	0.0	3.0	2.0	2.5	14.0	10.5	12.5	14.5	12.5	13.5
16	0.0	0.0	0.0	3.0	0.5	2.0	13.0	9.0	11.5	13.0	12.5	13.0
17	0.0	0.0	0.0	3.0	0.5	1.5	9.0	7.0	8.5	16.0	12.5	14.5
18	0.0	0.0	0.0	3.5	2.0	2.5	9.0	8.0	8.5	15.5	14.0	14.5
19	0.0	0.0	0.0	4.5	2.0	3.5	12.5	8.5	10.5	17.5	14.5	16.0
20	0.0	0.0	0.0	7.0	4.0	5.5	13.5	11.5	12.5	16.5	14.0	16.0
21	0.0	0.0	0.0	6.5	4.5	5.5	12.0	10.0	11.5	15.0	12.5	13.5
22	0.0	0.0	0.0	4.5	4.0	4.5	10.0	7.5	8.5	15.0	12.0	13.5
23	0.0	0.0	0.0	5.5	4.0	4.5	11.0	6.5	8.5	13.5	12.5	13.0
24	0.0	0.0	0.0	8.0	4.0	6.0	11.5	8.0	10.0	13.0	12.0	12.5
25	0.0	0.0	0.0	10.5	7.5	8.5	12.5	9.5	11.0	13.5	11.0	12.5
26	0.0	0.0	0.0	8.5	6.5	7.5	13.0	9.0	11.0	14.5	12.5	13.5
27	0.0	0.0	0.0	8.0	5.5	6.5	13.5	9.0	11.5	14.5	12.5	13.5
28	0.0	0.0	0.0	11.0	7.0	8.5	16.0	11.0	13.5	15.5	12.5	14.0
29	---	---	---	10.0	5.0	7.5	16.0	11.5	13.5	18.5	14.0	16.0
30	---	---	---	5.0	4.0	4.5	13.0	11.5	12.5	16.5	15.0	16.0
31	---	---	---	6.0	3.5	4.5	---	---	---	15.5	12.0	14.0
MONTH	0.5	0.0	0.1	11.0	0.0	2.9	16.0	1.5	8.4	18.5	9.0	13.7

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161540 PAINT CREEK AT ROCHESTER, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.0	11.0	12.5	20.0	17.0	18.5	20.5	17.5	19.0	16.5	15.5	16.0
2	15.5	12.5	14.0	20.0	17.0	18.5	20.0	17.5	19.0	17.5	15.5	16.5
3	15.0	13.5	14.0	21.0	17.5	19.5	19.5	18.5	19.0	17.5	15.5	16.5
4	13.5	12.5	13.0	22.5	19.0	20.5	22.0	18.0	19.5	17.0	16.0	16.5
5	13.5	12.5	13.0	21.0	19.5	20.0	23.0	19.0	20.5	16.5	15.0	16.0
6	15.5	12.5	14.0	21.5	18.5	20.0	21.0	19.0	20.0	16.5	14.0	15.5
7	16.5	15.0	15.5	20.5	19.5	20.0	23.0	18.5	20.0	17.5	14.5	16.0
8	16.5	15.5	16.0	21.5	19.5	20.0	22.5	20.0	21.0	18.0	16.0	17.0
9	16.5	15.0	15.5	20.5	18.5	19.5	20.5	19.0	20.0	17.5	15.5	16.5
10	16.5	15.0	15.5	20.0	18.5	19.0	19.0	18.0	18.5	17.0	15.0	16.0
11	18.0	15.5	17.0	18.5	16.5	17.5	19.0	17.5	18.5	18.5	15.5	17.0
12	17.0	15.0	16.0	18.0	16.0	17.0	19.5	18.0	18.5	18.0	15.0	16.5
13	16.5	15.0	15.5	19.0	15.5	17.0	21.0	18.0	19.0	18.0	15.0	16.5
14	18.0	15.5	17.0	19.0	16.5	17.5	21.0	18.5	19.5	19.0	16.0	17.5
15	19.0	17.0	18.0	18.5	16.5	17.5	25.0	19.5	20.5	18.5	16.0	17.0
16	19.0	16.0	17.5	19.5	16.5	18.0	24.5	19.0	20.5	17.5	14.5	16.0
17	17.5	16.5	17.0	20.0	16.5	18.5	20.5	18.0	19.0	18.0	14.5	16.0
18	19.5	16.5	18.0	20.0	17.0	18.5	19.0	16.5	18.0	17.0	15.0	16.0
19	19.5	17.0	18.5	19.0	15.5	17.5	19.5	16.5	18.0	18.0	16.0	17.0
20	18.0	15.0	16.5	19.0	16.5	17.5	20.0	16.5	18.0	16.0	14.0	15.0
21	18.5	14.5	16.5	20.5	17.5	18.5	21.0	17.5	19.5	15.5	13.0	14.5
22	19.5	15.5	17.5	19.5	17.5	18.5	21.0	18.5	20.0	17.0	14.0	16.0
23	20.0	16.5	18.5	19.0	17.0	18.0	19.0	17.0	18.0	15.5	14.0	15.0
24	21.0	17.5	19.0	19.5	16.5	18.0	17.5	16.0	17.0	15.5	13.0	14.0
25	22.0	18.5	20.5	20.0	16.5	18.5	19.0	16.5	18.0	15.0	13.0	14.0
26	21.0	19.5	20.5	19.0	17.5	18.5	21.0	18.0	19.5	14.5	11.5	12.5
27	19.5	17.5	18.5	21.0	18.5	19.5	21.0	19.0	20.0	14.5	13.0	14.0
28	19.0	17.0	18.0	20.0	17.5	19.0	19.0	17.0	18.0	13.0	12.0	12.5
29	19.5	17.0	18.0	19.0	16.5	17.5	19.5	18.0	18.5	12.0	10.0	11.5
30	19.0	16.5	18.0	20.0	16.0	18.0	18.5	16.5	17.5	10.5	9.5	10.0
31	---	---	---	20.0	17.0	18.5	17.5	15.5	16.5	---	---	---
MONTH	22.0	11.0	16.6	22.5	15.5	18.5	25.0	15.5	19.0	19.0	9.5	15.4
YEAR	25.0	0.0	9.5									

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.9	3.9	7.8	9.9	e1.8	e4.4	14	11	17	5.8	1.9	2.3
2	2.3	12	6.2	8.8	e1.8	e4.3	14	18	11	2.5	2.4	2.6
3	3.7	7.6	7.1	8.9	e1.9	e4.1	13	14	8.1	2.2	2.7	2.3
4	3.6	5.6	6.6	8.1	e4.0	e4.2	64	12	9.4	2.1	2.9	2.3
5	5.2	4.8	6.3	7.7	e3.7	e4.4	82	15	16	3.5	3.3	2.1
6	3.7	5.8	6.3	8.2	e3.5	e4.5	74	22	13	2.8	3.1	1.9
7	4.0	4.7	5.9	8.3	e3.3	e4.6	57	20	7.3	2.8	2.7	1.9
8	6.1	4.9	6.0	7.5	e3.1	e4.7	47	19	8.1	2.4	2.5	1.9
9	5.4	7.3	4.6	7.3	e3.2	e4.8	43	18	15	2.7	3.1	1.8
10	5.4	10	5.1	6.3	e3.3	e5.0	43	24	16	2.6	2.8	1.8
11	5.5	11	5.0	2.7	e3.3	e5.1	41	36	15	3.7	2.5	1.8
12	3.7	8.9	5.0	2.2	e3.4	e5.1	30	36	16	3.1	2.4	1.8
13	3.8	7.8	5.1	1.9	e3.5	e4.9	19	39	19	2.7	2.3	1.4
14	4.2	8.4	5.5	1.8	e3.6	e5.0	19	35	17	2.4	2.2	1.7
15	7.8	9.4	5.5	1.7	e3.5	e5.8	27	31	11	2.3	7.0	2.5
16	6.0	6.5	5.2	1.6	e3.5	e25	25	26	8.8	2.3	8.6	2.1
17	4.4	4.9	4.8	1.6	e3.6	46	18	13	7.9	2.0	4.6	1.7
18	4.0	4.5	5.0	1.5	e3.6	45	15	11	7.4	2.0	3.5	1.6
19	6.8	8.1	9.7	e1.6	e3.7	29	9.8	9.9	8.6	1.4	2.8	3.7
20	6.6	9.6	14	e1.7	e3.8	28	9.6	9.2	5.8	2.0	2.5	3.0
21	5.4	9.0	16	e1.6	e3.9	30	9.9	8.4	3.3	5.9	2.3	3.2
22	5.2	9.6	14	e1.6	e4.0	25	9.5	6.8	2.7	7.7	2.3	9.8
23	4.2	5.8	13	e1.6	e4.1	21	7.5	6.2	3.4	3.9	2.4	13
24	4.8	5.1	13	e1.5	e4.3	19	6.1	6.4	3.3	3.2	3.3	11
25	4.5	6.1	11	e1.5	e4.1	21	5.2	6.1	2.8	3.0	2.6	16
26	7.4	9.5	11	e1.5	e4.0	19	6.9	5.3	2.4	2.1	5.3	12
27	6.5	8.2	10	e1.6	e4.1	17	10	5.0	2.6	2.3	4.3	11
28	4.8	8.4	10	e1.6	e4.3	17	6.4	5.0	2.4	2.3	3.0	9.3
29	4.1	7.9	9.6	e1.7	---	30	5.5	4.8	2.3	1.9	2.6	8.4
30	3.8	8.2	9.7	e1.7	---	19	5.3	5.8	3.4	1.9	2.4	7.3
31	3.6	---	12	e1.8	---	15	---	16	---	2.0	2.1	---
TOTAL	148.4	223.5	256.0	117.0	97.9	476.9	736.7	494.9	266.0	89.5	98.4	143.2
MEAN	4.79	7.45	8.26	3.77	3.50	15.4	24.6	16.0	8.87	2.89	3.17	4.77
MAX	7.8	12	16	9.9	4.3	46	82	39	19	7.7	8.6	16
MIN	1.9	3.9	4.6	1.5	1.8	4.1	5.2	4.8	2.3	1.4	1.9	1.4
CFSM	0.19	0.29	0.32	0.15	0.14	0.60	0.96	0.62	0.35	0.11	0.12	0.19
IN.	0.22	0.32	0.37	0.17	0.14	0.69	1.07	0.72	0.39	0.13	0.14	0.21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2003, BY WATER YEAR (WY)

MEAN	10.6	15.4	17.1	16.0	21.1	33.8	33.1	18.8	13.8	7.85	6.62	8.83
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	9.57	5.82	2.67	1.47	1.63	1.52
(WY)	1967	1965	1965	2003	2003	2000	2000	1977	1988	1965	1965	1966

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1965 - 2003	
ANNUAL TOTAL	4361.4		3148.4			
ANNUAL MEAN	11.9		8.63		16.9	
HIGHEST ANNUAL MEAN					31.5	1975
LOWEST ANNUAL MEAN					8.63	2003
HIGHEST DAILY MEAN	48	Mar 10	82	Apr 5	245	Apr 20 1975
LOWEST DAILY MEAN	1.6	Sep 8	1.4	Jul 19	0.92	Oct 9 1966
ANNUAL SEVEN-DAY MINIMUM	1.8	Sep 3	1.6	Jan 21	1.2	Sep 13 1966
MAXIMUM PEAK FLOW			(a)84	Apr 5	290	Apr 19 1975
MAXIMUM PEAK STAGE			(b)3.28	Mar 16	5.19	Apr 19 1975
INSTANTANEOUS LOW FLOW			(c)0.60	(d)	(c)0.60	(d)
ANNUAL RUNOFF (CFSM)	0.47		0.34		0.66	
ANNUAL RUNOFF (INCHES)	6.34		4.58		8.96	
10 PERCENT EXCEEDS	28		19		36	
50 PERCENT EXCEEDS	9.0		5.1		11	
90 PERCENT EXCEEDS	2.3		1.9		3.2	

(a) Gage height 3.08 ft.
(b) Backwater from ice.
(c) Result of regulation from unknown source.
(d) July 19, 20, Sept. 13.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161790 STONY LAKE NEAR WASHINGTON, MI

LOCATION.--Lat 42°42'58", long 83°05'58", in SE1/4 sec.31, T.4 N., R.12 E., Macomb County, Hydrologic Unit 04090003, on left bank 1,000 ft east of bridge over dam on Stony Creek, 2.7 mi west of Washington.

DRAINAGE AREA.--68.0 mi^2.

PERIOD OF RECORD.--February 1963 to current year. Prior to October 1996 monthend elevations and contents only.

REVISED RECORDS.--WDR MI-77-1: 1976.

GAGE.--Water-stage recorder. Datum of gage is 790.00 ft above sea level (levels by Huron-Clinton Metropolitan Authority).

REMARKS.--Records good. Lake is formed by an earthfill dam with concrete spillway completed in 1962. The spillway section includes a drum gate and 2 sluices, one on each side, with valve controls capable of draining lake. The lake began filling February 1963 and is used for recreational purposes.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 13.65 ft, Apr. 20, 1975; minimum recorded, 4.71 ft, Nov. 21, 1967.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 12.72 ft, Apr. 7; minimum, 9.99 ft, Jan. 24, 25, 26, 27, 28, Mar. 25, 26.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12.11	12.11	10.10	10.16	10.02	10.08	11.12	12.31	12.33	12.08	12.06	12.08
2	12.12	12.11	10.11	10.15	10.03	10.09	11.26	12.34	12.32	12.08	12.06	12.08
3	12.12	12.11	10.10	10.15	10.04	10.08	11.39	12.33	12.30	12.07	12.06	12.08
4	12.13	12.13	10.09	10.14	10.08	10.08	11.85	12.30	12.29	12.07	12.07	12.07
5	12.14	12.14	10.09	10.13	10.08	10.11	12.45	12.32	12.29	12.08	12.08	12.06
6	12.13	12.13	10.08	10.13	10.08	10.10	12.66	12.34	12.30	12.08	12.09	12.05
7	12.12	12.04	10.08	10.12	10.08	10.09	12.70	12.35	12.30	12.07	12.08	12.05
8	12.11	11.94	10.08	10.11	10.08	10.10	12.67	12.35	12.30	12.08	12.07	12.05
9	12.11	11.77	10.07	10.12	10.08	10.10	12.62	12.34	12.31	12.09	12.06	12.04
10	12.12	11.75	10.07	10.12	10.07	10.10	12.61	12.36	12.32	12.08	12.05	12.04
11	12.12	11.76	10.07	10.11	10.07	10.09	12.61	12.38	12.32	12.08	12.05	12.04
12	12.13	11.70	10.07	10.09	10.08	10.09	12.58	12.42	12.33	12.08	12.04	12.04
13	12.13	11.54	10.07	10.08	10.07	10.11	12.52	12.42	12.36	12.07	12.04	12.03
14	12.12	11.47	10.08	10.06	10.07	10.10	12.45	12.41	12.36	12.07	12.04	12.03
15	12.12	11.45	10.08	10.06	10.06	10.10	12.42	12.41	12.33	12.07	12.06	12.05
16	12.11	11.30	10.09	10.05	10.06	10.17	12.41	12.42	12.28	12.07	12.07	12.05
17	12.10	11.23	10.08	10.04	10.06	10.29	12.37	12.41	12.25	12.06	12.07	12.05
18	12.11	11.17	10.08	10.03	10.07	10.29	12.35	12.36	12.23	12.05	12.06	12.05
19	12.12	11.02	10.13	10.02	10.06	10.19	12.34	12.31	12.21	12.04	12.06	12.10
20	12.12	10.91	10.18	10.02	10.06	10.14	12.33	12.29	12.18	12.03	12.06	12.10
21	12.12	10.74	10.19	10.01	10.07	10.12	12.35	12.27	12.16	12.07	12.07	12.09
22	12.12	10.67	10.19	10.01	10.08	10.08	12.34	12.24	12.13	12.14	12.07	12.16
23	12.12	10.54	10.18	10.00	10.12	10.04	12.30	12.23	12.12	12.12	12.05	12.23
24	12.12	10.48	10.17	10.0	10.10	10.01	12.27	12.22	12.11	12.11	12.03	12.23
25	12.12	10.42	10.18	9.99	10.09	9.99	12.25	12.22	12.10	12.10	12.03	12.26
26	12.14	10.27	10.16	10.0	10.09	10.02	12.23	12.21	12.09	12.09	12.09	12.24
27	12.14	10.19	10.15	10.0	10.09	10.18	12.22	12.20	12.08	12.08	12.11	12.24
28	12.14	10.14	10.14	10.00	10.08	10.34	12.23	12.20	12.08	12.08	12.10	12.22
29	12.14	10.12	10.14	10.01	---	10.58	12.23	12.23	12.09	12.07	12.10	12.20
30	12.12	10.13	10.14	10.01	---	10.79	12.23	12.26	12.08	12.07	12.08	12.18
31	12.12	---	10.16	10.01	---	10.97	---	12.32	---	12.06	12.07	---
MEAN	12.12	11.25	10.12	10.06	10.07	10.18	12.28	12.32	12.23	12.08	12.07	12.11
MAX	12.14	12.14	10.19	10.16	10.12	10.97	12.70	12.42	12.36	12.14	12.11	12.26
MIN	12.10	10.12	10.07	9.99	10.02	9.99	11.12	12.20	12.08	12.03	12.03	12.03

CAL YR 2002 MEAN 11.58 MAX 12.76 MIN 10.07
WTR YR 2003 MEAN 11.41 MAX 12.70 MIN 9.99

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.9	10	18	27	9.1	14	3.6	35	44	6.6	4.1	5.5
2	9.8	10	19	26	9.6	15	3.7	43	41	6.3	4.4	5.2
3	9.8	11	18	25	10	14	3.6	41	40	5.8	4.4	4.5
4	11	13	16	24	15	14	6.5	38	38	6.0	4.6	5.2
5	12	14	16	23	16	17	58	39	38	6.4	5.7	3.6
6	11	35	16	23	16	17	113	43	37	6.4	6.7	3.2
7	10	25	16	21	16	15	132	44	37	6.0	6.4	3.6
8	8.0	57	15	21	16	16	118	44	36	5.8	7.3	3.6
9	8.0	38	15	21	15	16	99	42	39	8.0	5.5	3.3
10	8.7	32	14	21	14	15	88	45	39	6.3	4.1	2.8
11	9.4	31	14	20	14	15	84	49	41	6.0	4.9	2.7
12	9.8	52	14	18	15	14	83	55	45	5.8	5.4	2.7
13	11	43	14	16	14	15	66	55	49	5.2	3.4	2.7
14	9.0	27	15	14	13	16	55	54	50	5.1	3.1	2.6
15	9.0	46	16	13	13	16	50	54	46	4.8	4.1	3.7
16	13	41	16	12	13	24	53	52	36	5.2	6.5	3.2
17	7.0	26	16	11	13	67	45	52	29	4.5	7.2	3.1
18	8.4	42	16	10	13	100	42	44	26	5.6	4.2	3.3
19	11	45	23	9.7	13	89	40	37	28	3.4	4.2	7.2
20	10	51	29	9.2	12	69	39	35	23	3.0	4.1	6.4
21	10	51	31	8.6	13	66	41	34	19	6.2	4.6	5.7
22	11	49	31	8.3	14	61	40	28	15	14	6.3	15
23	11	38	30	8.0	18	55	37	26	11	12	5.1	24
24	9.4	29	28	7.5	17	50	31	26	9.5	9.5	2.8	24
25	10	41	29	7.2	16	48	28	24	8.5	7.9	2.6	28
26	13	42	27	7.2	15	23	24	24	7.5	6.6	7.0	25
27	13	29	26	7.3	15	5.6	20	24	6.6	7.1	9.0	25
28	14	23	25	7.5	14	5.3	22	24	6.4	6.0	7.2	22
29	15	20	25	8.1	---	5.7	22	27	6.9	5.1	6.9	19
30	13	21	25	8.0	---	5.1	21	31	6.7	4.6	6.6	16
31	9.9	---	27	8.3	---	4.0	---	44	---	4.1	4.6	---
TOTAL	323.1	992	640	450.9	391.7	906.7	1468.4	1213	859.1	195.3	163.0	281.8
MEAN	10.4	33.1	20.6	14.5	14.0	29.2	48.9	39.1	28.6	6.30	5.26	9.39
MAX	15	57	31	27	18	100	132	55	50	14	9.0	28
MIN	7.0	10	14	7.2	9.1	4.0	3.6	24	6.4	3.0	2.6	2.6

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2003, BY WATER YEAR (WY)

MEAN	31.8	42.9	44.8	40.5	49.7	74.5	74.7	50.3	36.6	20.8	18.4	24.4
MAX	85.8	105	94.0	115	144	199	142	132	120	50.7	76.0	97.7
(WY)	1982	1986	1976	1973	1976	1976	1975	1974	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1958 - 2003	
ANNUAL TOTAL	12103.6		7885.0			
ANNUAL MEAN	33.2		21.6		42.4	
HIGHEST ANNUAL MEAN					79.1	1976
LOWEST ANNUAL MEAN					12.0	1963
HIGHEST DAILY MEAN	158	Apr 13	132	Apr 7	407	Feb 2 1968
LOWEST DAILY MEAN	2.9	Aug 9	2.6	Aug 25	1.3	Jul 31 1964
ANNUAL SEVEN-DAY MINIMUM	3.1	Aug 9	2.9	Sep 8	2.2	Jul 31 1964
MAXIMUM PEAK FLOW			140	Apr 7	(a)552	Jun 10 1988
MAXIMUM PEAK STAGE			3.93	Apr 7	(b)6.71	Mar 6 1959
INSTANTANEOUS LOW FLOW					0.90	Jul 10 1963
10 PERCENT EXCEEDS	70		46		86	
50 PERCENT EXCEEDS	29		15		31	
90 PERCENT EXCEEDS	5.4		4.6		9.2	

(a) From rating curve extended above 380 ft^3/s; result of momentary release of water from Stony Lake; gage height 6.44 ft.
(b) Backwater from ice.

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 mi^2.

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, set for 15 minute measurement interval.

REMARKS.--Instrument not in operation Oct. 1, 2002 to Mar. 21, 2003. Specific conductance records rated excellent except for the following periods: May 17-29, July 21, Sept. 11-21, 23-30, rated good; Sept. 22, rated fair. Water temperature records rated excellent except for the following periods: May 11-26, rated good; May 27 to Aug. 2, rated fair; Aug. 3 to Sept. 30, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum recorded, 3,130 microsiemens, Feb. 1, 2002; 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 2002.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum recorded, 1,780 microsiemens, Apr. 8; minimum, 328 microsiemens, Sept. 22.
WATER TEMPERATURE: Maximum recorded, 25.5°C, June 25; minimum, 1.0°C, Apr. 7.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	1430	1250	1290	1140	763	961
2	---	---	---	---	---	---	1480	1220	1310	1130	956	1070
3	---	---	---	---	---	---	1230	1150	1210	1070	983	1010
4	---	---	---	---	---	---	1150	670	866	990	936	965
5	---	---	---	---	---	---	1470	984	1260	986	792	914
6	---	---	---	---	---	---	1220	972	1060	1050	945	1010
7	---	---	---	---	---	---	1040	911	947	984	935	955
8	---	---	---	---	---	---	1780	1040	1270	948	901	927
9	---	---	---	---	---	---	1760	1100	1260	1060	893	977
10	---	---	---	---	---	---	1300	1020	1100	1060	823	973
11	---	---	---	---	---	---	1040	943	983	1060	932	990
12	---	---	---	---	---	---	953	912	933	1080	896	993
13	---	---	---	---	---	---	934	890	914	1010	910	933
14	---	---	---	---	---	---	906	886	898	933	865	913
15	---	---	---	---	---	---	974	892	929	969	848	919
16	---	---	---	---	---	---	920	847	879	1000	934	956
17	---	---	---	---	---	---	968	870	889	951	918	935
18	---	---	---	---	---	---	994	888	969	964	910	927
19	---	---	---	---	---	---	994	871	934	925	880	892
20	---	---	---	---	---	---	1230	941	1010	945	853	914
21	---	---	---	---	---	---	1320	1060	1170	948	880	913
22	---	---	---	1250	1080	1160	1060	979	1030	900	874	888
23	---	---	---	1160	1050	1090	988	902	945	892	878	886
24	---	---	---	1050	990	1020	944	894	919	922	882	895
25	---	---	---	1060	991	1020	994	900	946	913	867	895
26	---	---	---	1180	999	1070	946	900	926	940	866	904
27	---	---	---	1150	1090	1120	964	918	941	973	923	948
28	---	---	---	1320	1090	1190	980	914	943	982	915	942
29	---	---	---	1440	1100	1270	959	909	934	1030	528	947
30	---	---	---	1420	1320	1370	987	907	944	1050	816	981
31	---	---	---	1320	1270	1310	---	---	---	1060	597	816
MONTH	---	---	---	---	---	---	1780	670	1020	1140	528	940

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161810 CLINTON RIVER AT YATES, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	1030	921	976	1090	1030	1060	1070	1030	1060	899	844	867
2	994	868	972	1090	1040	1070	1130	1020	1080	890	845	863
3	964	915	943	1130	1080	1110	1060	1010	1040	858	821	838
4	946	880	914	1190	996	1090	1060	628	980	877	842	867
5	941	900	912	1070	886	959	878	459	743	930	872	910
6	918	880	900	1120	1070	1090	708	451	581	937	913	927
7	924	875	895	1110	1040	1070	782	688	751	943	911	929
8	973	715	884	1080	1040	1070	723	476	607	946	858	909
9	1000	691	854	1090	1030	1060	771	723	748	953	913	930
10	1000	864	910	1130	969	1070	814	771	802	944	902	926
11	894	859	877	1090	753	919	853	805	833	961	934	945
12	867	742	820	1020	925	967	854	826	840	1030	957	984
13	870	810	851	1060	1010	1050	888	841	865	1040	988	1010
14	867	829	854	1100	1060	1080	892	840	879	1010	978	991
15	873	830	859	1100	1080	1100	887	453	778	1000	788	906
16	881	845	858	1130	1090	1120	882	792	844	946	795	849
17	867	849	857	1160	1080	1130	874	813	854	1010	840	960
18	888	821	860	1200	1090	1150	917	826	877	998	941	963
19	842	553	706	1150	1090	1130	939	893	919	1010	558	760
20	864	825	846	1150	1110	1130	910	878	899	890	587	739
21	959	840	911	1150	620	1030	903	882	889	973	890	953
22	972	939	956	1030	806	946	938	880	899	996	328	638
23	1010	944	967	1030	917	993	951	883	915	849	462	725
24	999	952	969	1050	957	1040	920	899	910	852	708	838
25	1040	989	1020	1060	1040	1050	924	908	918	799	525	639
26	1060	1030	1040	1080	1050	1070	924	734	855	874	766	828
27	1100	1050	1070	1060	1040	1050	855	745	791	890	678	782
28	1100	1030	1070	1070	1030	1040	891	782	842	900	686	805
29	1200	1040	1120	1050	961	1020	901	856	886	932	873	890
30	1090	991	1030	1090	1020	1050	871	846	859	943	902	917
31	---	---	---	1090	1030	1060	870	853	860	---	---	---
MONTH	1200	553	923	1200	620	1060	1130	451	858	1040	328	870

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	9.0	4.5	7.0	15.5	12.0	13.5
2	---	---	---	---	---	---	10.5	7.5	8.5	14.5	11.5	13.0
3	---	---	---	---	---	---	9.0	5.0	7.0	14.0	10.0	12.0
4	---	---	---	---	---	---	5.0	2.0	3.0	15.0	10.0	12.5
5	---	---	---	---	---	---	3.0	2.0	2.5	13.5	11.5	12.5
6	---	---	---	---	---	---	3.5	1.5	2.5	16.0	12.0	14.0
7	---	---	---	---	---	---	2.5	1.0	1.5	15.0	12.5	13.5
8	---	---	---	---	---	---	2.5	1.5	2.0	14.0	12.0	13.0
9	---	---	---	---	---	---	5.5	1.0	3.5	16.0	12.0	14.0
10	---	---	---	---	---	---	7.0	2.5	4.5	16.0	13.5	15.0
11	---	---	---	---	---	---	8.5	4.0	6.0	17.0	14.5	16.0
12	---	---	---	---	---	---	9.5	6.0	7.5	14.5	11.5	12.5
13	---	---	---	---	---	---	10.0	5.5	7.5	15.0	10.5	12.5
14	---	---	---	---	---	---	11.5	6.0	9.0	16.0	12.0	14.0
15	---	---	---	---	---	---	14.5	9.0	11.5	15.0	13.0	13.5
16	---	---	---	---	---	---	13.5	9.5	11.5	13.5	12.5	13.0
17	---	---	---	---	---	---	9.5	7.5	8.5	17.0	13.0	15.0
18	---	---	---	---	---	---	9.0	8.0	8.5	16.5	14.5	15.5
19	---	---	---	---	---	---	13.0	8.5	10.5	19.0	14.5	16.5
20	---	---	---	---	---	---	13.5	11.0	12.0	17.0	15.0	16.5
21	---	---	---	---	---	---	12.5	10.0	11.5	16.5	13.0	14.5
22	---	---	---	4.5	3.5	4.0	10.0	7.5	9.0	17.0	12.5	14.5
23	---	---	---	5.5	3.0	4.5	11.5	6.5	8.5	15.0	13.0	14.0
24	---	---	---	8.0	3.5	5.5	12.0	7.5	10.0	14.0	13.0	13.5
25	---	---	---	10.0	6.5	8.0	13.0	9.0	11.0	15.0	11.5	13.5
26	---	---	---	7.5	5.5	6.5	13.5	8.5	11.0	15.5	13.0	14.5
27	---	---	---	8.0	4.5	6.5	14.5	8.5	11.5	15.5	13.0	14.5
28	---	---	---	10.5	6.5	8.0	16.5	11.0	13.5	17.5	13.5	15.5
29	---	---	---	10.0	4.5	7.5	16.5	11.5	14.0	19.0	15.0	16.5
30	---	---	---	4.5	3.5	4.0	13.5	12.0	12.5	18.0	15.5	16.5
31	---	---	---	6.5	2.5	4.5	---	---	---	16.5	13.5	14.5
MONTH	---	---	---	---	---	---	16.5	1.0	8.2	19.0	10.0	14.2

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161810 CLINTON RIVER AT YATES, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	12.5	14.0	22.5	19.0	20.5	23.0	20.0	21.5	19.0	17.0	17.5
2	17.5	13.5	15.5	24.0	19.0	21.0	23.0	20.0	21.5	20.0	17.0	18.0
3	16.5	15.0	15.5	24.5	20.0	22.0	22.0	20.5	21.5	20.0	17.0	18.5
4	15.0	13.5	14.0	24.5	21.5	23.0	23.0	19.5	21.0	19.0	17.5	18.0
5	14.5	13.5	14.0	23.5	22.0	22.5	23.0	20.0	21.0	19.0	16.0	17.5
6	17.0	13.5	15.5	24.5	21.0	22.5	23.0	20.5	21.5	18.5	15.0	17.0
7	18.5	16.0	17.0	24.0	21.5	22.5	23.0	20.0	21.5	20.0	16.0	18.0
8	17.0	16.5	16.5	24.5	21.5	23.0	23.5	21.0	22.0	20.5	17.5	19.0
9	18.0	15.5	16.5	24.0	21.0	22.5	22.5	20.5	21.5	20.5	17.5	19.0
10	17.5	15.5	17.0	22.0	20.0	21.0	21.0	19.5	20.0	19.5	17.0	18.5
11	19.5	17.0	18.0	21.0	18.5	20.0	21.5	19.0	20.0	20.5	17.0	19.0
12	18.5	16.5	17.0	20.5	17.0	19.0	22.0	19.5	20.5	19.5	17.5	18.5
13	18.0	16.5	17.0	22.0	17.0	19.5	23.5	19.5	21.5	20.0	17.0	18.5
14	20.5	17.0	18.5	23.0	18.0	20.5	24.0	20.5	22.0	20.5	18.0	19.5
15	22.0	18.0	20.0	21.0	18.5	20.0	24.5	21.0	22.5	20.0	18.0	19.0
16	22.0	18.0	20.0	22.5	18.0	20.5	23.5	21.5	22.5	18.5	15.5	17.5
17	20.0	18.5	19.5	22.5	19.0	21.0	23.5	20.5	21.5	19.0	16.0	17.5
18	22.0	19.0	20.0	23.5	19.5	21.0	22.0	18.5	20.5	18.5	16.5	17.5
19	21.5	19.0	20.5	22.5	18.0	20.5	22.0	18.0	20.5	19.0	17.5	18.0
20	21.0	17.0	19.0	21.0	18.5	20.0	23.0	18.5	21.0	17.5	15.5	16.5
21	21.0	17.0	19.0	21.5	19.5	20.5	24.0	19.5	22.0	17.0	14.5	16.0
22	22.5	18.0	20.0	22.0	18.5	20.5	24.0	21.5	22.5	17.5	15.5	16.5
23	23.5	18.5	21.0	22.0	18.5	20.5	22.0	19.5	21.0	17.0	15.5	16.5
24	24.0	19.5	21.5	23.0	18.0	20.5	20.0	18.0	19.0	15.5	14.0	15.0
25	25.5	20.5	22.5	23.0	18.5	21.0	21.5	18.0	20.0	15.5	14.0	15.0
26	24.0	21.0	22.5	21.5	19.5	20.5	23.5	20.0	21.5	15.0	13.0	14.0
27	22.5	19.0	20.5	23.0	20.0	21.5	24.0	21.0	22.0	16.0	15.0	15.5
28	21.0	18.5	19.5	23.0	19.5	21.5	22.0	18.5	20.5	15.0	13.5	14.0
29	21.5	18.5	20.0	22.0	18.0	20.5	22.0	20.0	21.0	13.5	12.0	13.0
30	22.0	18.0	20.0	23.0	18.0	20.5	21.0	18.5	20.0	12.0	10.5	11.5
31	---	---	---	23.0	19.0	21.0	20.0	17.5	18.5	---	---	---
MONTH	25.5	12.5	18.4	24.5	17.0	21.0	24.5	17.5	21.1	20.5	10.5	17.0

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 mi^2.

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 625 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	73	61	116	139	e60	e82	144	346	346	65	48	48
2	76	60	e95	124	e64	e76	134	332	220	63	60	63
3	80	59	e81	e119	e66	e73	129	288	193	62	51	48
4	85	60	e81	119	e146	e75	755	242	202	68	54	44
5	162	65	e87	118	e109	e85	948	335	214	93	106	45
6	91	96	e92	122	e78	e85	639	326	192	67	215	39
7	83	95	e97	122	e79	e87	582	272	164	67	82	38
8	76	90	e99	106	e66	e130	553	262	194	61	120	37
9	69	113	e94	112	e72	e204	535	240	294	65	73	36
10	66	172	e104	e98	e66	e113	546	257	248	71	60	34
11	65	204	e123	e86	e61	e93	483	283	243	106	54	34
12	65	123	e140	e79	e72	e110	424	337	303	72	54	34
13	72	135	141	e80	e64	e136	374	340	342	60	51	35
14	69	113	137	e80	e58	e161	337	294	276	55	49	34
15	64	137	126	e73	e59	247	296	224	211	54	67	63
16	63	159	104	e67	e58	406	299	209	192	51	74	50
17	63	132	109	e69	e61	715	277	203	177	48	66	41
18	64	124	112	e64	e66	511	211	201	176	46	52	42
19	89	177	192	e65	e69	358	174	211	410	46	48	121
20	71	143	245	e66	e71	308	203	222	228	44	47	80
21	68	171	174	e64	e71	336	243	204	137	54	43	55
22	67	247	144	e60	e72	283	212	186	114	103	46	285
23	67	182	133	e56	e74	250	213	174	105	66	46	304
24	65	156	130	e55	e73	227	208	170	88	56	42	134
25	71	162	132	e56	e73	233	201	157	79	52	40	236
26	111	156	130	e56	e71	214	184	126	76	49	65	125
27	82	135	126	e62	e72	160	161	122	72	46	71	148
28	74	121	122	e59	e77	148	155	113	72	48	54	99
29	71	115	127	e59	---	311	147	121	84	45	47	82
30	69	116	131	e58	---	187	146	185	69	42	46	71
31	64	---	171	e56	---	149	---	431	---	41	43	---
TOTAL	2355	3879	3895	2549	2028	6553	9913	7413	5721	1866	1974	2505
MEAN	76.0	129	126	82.2	72.4	211	330	239	191	60.2	63.7	83.5
MAX	162	247	245	139	146	715	948	431	410	106	215	304
MIN	63	59	81	55	58	73	129	113	69	41	40	34
CFSM	0.25	0.42	0.41	0.27	0.23	0.68	1.07	0.77	0.62	0.19	0.21	0.27
IN.	0.28	0.47	0.47	0.31	0.24	0.79	1.19	0.89	0.69	0.22	0.24	0.30

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 2003, BY WATER YEAR (WY)

MEAN	243	243	264	222	289	417	453	307	254	137	121	169
MAX	574	396	391	315	514	672	619	444	511	243	268	317
(WY)	1982	2002	2002	1997	1997	1982	1982	1996	1996	1997	1980	1981
MIN	76.0	129	126	82.2	72.4	211	330	216	164	60.2	54.2	74.6
(WY)	2003	2003	2003	2003	2003	2003	2003	1998	1981	2003	2002	2002

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1979 - 2003	
ANNUAL TOTAL	70037		50651			
ANNUAL MEAN	192		139		257	
HIGHEST ANNUAL MEAN					342	1997
LOWEST ANNUAL MEAN					139	2003
HIGHEST DAILY MEAN	715	Apr 13	948	Apr 5	2000	Feb 21 1997
LOWEST DAILY MEAN	36	Sep 8	34	(a)	34	(a)
ANNUAL SEVEN-DAY MINIMUM	38	Sep 3	35	Sep 8	35	Sep 8 2003
MAXIMUM PEAK FLOW			1200	Apr 4	(b)	
MAXIMUM PEAK STAGE			12.93	Apr 4	(b)	
INSTANTANEOUS LOW FLOW			26	Sep 9	26	Sep 9 2003
ANNUAL RUNOFF (CFSM)	0.62		0.45		0.83	
ANNUAL RUNOFF (INCHES)	8.43		6.10		11.31	
10 PERCENT EXCEEDS	364		284		470	
50 PERCENT EXCEEDS	161		95		213	
90 PERCENT EXCEEDS	52		49		81	

(a) Sept. 10-12, 14, 2003.
(b) Not determined.
(e) 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, October 2001 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: June 1996 to May 1998.

INSTRUMENTATION.--Water temperature recorder from June 6 to Aug. 22, 1996, water quality monitor Aug. 22, 1996 to May 31, 1998.

REMARKS.--Samples were collected at or near bridge on Riverland Road.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded (water year 1996), 26.0°C, June 30, July 1, 1996; minimum recorded (water years 1997-98), -0.5°C on several days during the winter periods.

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Specif. conductance, wat unf uS/cm 25 degC (00095)	pH, water, unfltrd 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 29...	1045	67	871	8.3	2.0	6.7	746	11.1	93
NOV 12...	1115	113	739	7.2	5.5	9.1	747	9.1	81
DEC 10...	1100	216	674	8.2	.5	.1	746	13.9	97
JAN 30...	1130	126	1710	8.0	-7.0	.0	750	13.8	97
FEB 12...	1000	162	1450	8.3	-13.0	.0	742	13.7	97
APR 16...	0930	283	968	8.1	7.0	13.0	740	9.7	95
MAY 14...	0945	292	942	8.1	10.0	12.9	746	9.7	94
JUN 10...	1045	249	1010	8.0	22.5	16.3	746	9.0	94
JUL 24...	0930	57	1050	8.1	22.0	19.5	750	8.9	99
AUG 27...	0830	71	941	7.8	16.5	22.4	744	6.6	78

Date	Bicarbonate, wat flt incrm. titr., field, mg/L (00453)	Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086)	Sulfate water, fltrd, mg/L (00945)	Chloride, water, fltrd, mg/L (00940)	Nitrite water, fltrd, mg/L as N (00613)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Phosphorus, water, unfltrd mg/L (00665)
OCT 29...	245	201	42	120	.021	2.0	.1	.6	.05
NOV 12...	209	171	38	110	.013	1.1	.1	.5	.07
DEC 10...	232	190	35	140	.010	1.7	.1	.6	.08
JAN 30...	259	212	45	390	.041	3.2	.4	1.0	.07
FEB 12...	260	213	50	290	.023	3.2	.3	.8	.07
APR 16...	211	173	41	170	.011	1.0	<.04	.7	.05
MAY 14...	212	174	43	160	.022	1.3	<.04	.7	.06
JUN 10...	214	175	44	170	.042	1.7	<.04	1.0	.13
JUL 24...	234	192	46	180	.039	2.2	.1	.7	.09
AUG 27...	188	154	42	160	.039	4.7	<.04	1.0	.20

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Ortho-phos-phate, water, fltrd, mg/L as P (00671)	Sus-pended sedi-ment concen-tration mg/L (80154)	Aceto-chlor, water, fltrd, ug/L (49260)	Ala-chlor, water, fltrd, ug/L (46342)	Atra-zine, water, fltrd, ug/L (39632)	CIAT, water, fltrd, ug/L (04040)	Azin-phos-methyl, water, fltrd 0.7u GF ug/L (82686)	Ben-flur-alin, water, fltrd 0.7u GF ug/L (82673)	Butyl-ate, water, fltrd, ug/L (04028)
OCT 29...	.03	3	<.006	<.004	.03	E.010	<.050	<.010	<.002
NOV 12...	.03	103	--	--	--	--	--	--	--
DEC 10...	.05	5	<.006	<.004	.03	E.011	<.050	<.010	<.002
JAN 30...	.03	4	--	--	--	--	--	--	--
FEB 12...	.03	5	<.006	<.004	.02	E.010	<.050	<.010	<.002
APR 16...	<.02	15	.012	<.004	.07	E.010	<.050	<.010	<.002
MAY 14...	<.02	31	.020	<.004	.03	E.017	<.050	<.010	<.002
JUN 10...	E.01	49	.065	.01	.10	E.032	<.050	<.010	<.002
JUL 24...	.04	10	<.006	<.004	.03	<.006	<.050	<.010	<.002
AUG 27...	.10	17	<.006	<.004	.02	E.007	<.050	<.010	<.002

Date	Car-baryl, water, fltrd 0.7u GF ug/L (82680)	Carbo-furan, water, fltrd 0.7u GF ug/L (82674)	Chlor-pyrifos water, fltrd, ug/L (38933)	Cyana-zine, water, fltrd, ug/L (04041)	DCPA, water fltrd 0.7u GF ug/L (82682)	p,p'-DDE, water, fltrd, ug/L (34653)	Diazi-non, water, fltrd, ug/L (39572)	Diel-drin, water, fltrd, ug/L (39381)	2,6-Di-ethyl-aniline water fltrd 0.7u GF ug/L (82660)
OCT 29...	E.005	<.020	<.005	<.018	<.003	<.003	.006	<.005	<.006
NOV 12...	--	--	--	--	--	--	--	--	--
DEC 10...	<.041	<.020	<.005	<.018	<.003	<.003	E.009	<.005	<.006
JAN 30...	--	--	--	--	--	--	--	--	--
FEB 12...	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005	<.006
APR 16...	E.013	<.020	<.005	<.018	<.003	<.003	.005	<.005	<.006
MAY 14...	E.038	<.020	<.005	<.018	<.003	<.003	.010	<.005	<.006
JUN 10...	E.015	<.020	<.005	<.018	<.003	<.003	.016	<.005	<.006
JUL 24...	E.007	<.020	<.005	<.018	<.003	<.003	.011	<.005	<.006
AUG 27...	E.083	<.020	<.005	<.018	<.003	<.003	.012	<.005	<.006

Date	Disul-foton, water, fltrd 0.7u GF ug/L (82677)	EPTC, water, fltrd 0.7u GF ug/L (82668)	Ethal-flur-alin, water, fltrd 0.7u GF ug/L (82663)	Etho-prop, water, fltrd 0.7u GF ug/L (82672)	Fonofos water, fltrd, ug/L (04095)	alpha-HCH, water, fltrd, ug/L (34253)	Lindane water, fltrd, ug/L (39341)	Linuron water fltrd 0.7u GF ug/L (82666)	Mala-thion, water, fltrd, ug/L (39532)
OCT 29...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.031
NOV 12...	--	--	--	--	--	--	--	--	--
DEC 10...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
JAN 30...	--	--	--	--	--	--	--	--	--
FEB 12...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
APR 16...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
MAY 14...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
JUN 10...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
JUL 24...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
AUG 27...	<.02	<.030	<.009	<.005	<.003	<.005	<.004	<.035	<.027

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161820 CLINTON RIVER AT STERLING HEIGHTS, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Metolachlor, water, fltrd, ug/L (39415)	Metribuzin, water, fltrd, ug/L (82630)	Molinate, water, fltrd 0.7u GF ug/L (82671)	Napropamide, water, fltrd 0.7u GF ug/L (82684)	Parathion, water, fltrd, ug/L (39542)	Methyl parathion, water, fltrd 0.7u GF ug/L (82667)	Pebulate, water, fltrd 0.7u GF ug/L (82669)	Pendimethalin, water, fltrd 0.7u GF ug/L (82683)	cis-Permethrin water fltrd 0.7u GF ug/L (82687)
OCT 29...	E.009	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
NOV 12...	--	--	--	--	--	--	--	--	--
DEC 10...	E.003	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
JAN 30...	--	--	--	--	--	--	--	--	--
FEB 12...	<.013	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
APR 16...	.13	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
MAY 14...	.02	<.006	<.002	<.007	<.010	<.006	<.004	E.017	<.006
JUN 10...	.04	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
JUL 24...	E.008	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
AUG 27...	E.006	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006

Date	Phorate water fltrd 0.7u GF ug/L (82664)	Prometon, water, fltrd, ug/L (04037)	Pronamide, water, fltrd 0.7u GF ug/L (82676)	Propachlor, water, fltrd, ug/L (04024)	Propanil, water, fltrd 0.7u GF ug/L (82679)	Propargite, water, fltrd 0.7u GF ug/L (82685)	Simazine, water, fltrd, ug/L (04035)	Tebuthiuron water fltrd 0.7u GF ug/L (82670)	Terbacil, water, fltrd 0.7u GF ug/L (82665)
OCT 29...	<.011	E.01	<.004	<.010	<.011	<.02	.01	<.02	<.034
NOV 12...	--	--	--	--	--	--	--	--	--
DEC 10...	<.011	E.01	<.004	<.010	<.011	<.02	.01	<.02	<.034
JAN 30...	--	--	--	--	--	--	--	--	--
FEB 12...	<.011	<.01	<.004	<.010	<.011	<.02	<.005	<.02	<.034
APR 16...	<.011	E.01	<.004	<.010	<.011	<.02	.01	<.02	<.034
MAY 14...	<.011	E.01	<.004	<.010	<.011	<.02	.01	<.02	<.034
JUN 10...	<.011	E.01	<.004	<.010	<.011	<.02	.05	<.02	<.034
JUL 24...	<.011	.02	<.004	<.010	<.011	<.02	<.005	.02	<.034
AUG 27...	<.011	.21	<.004	<.010	<.011	<.02	E.003	<.02	<.050

Date	Terbufos, water, fltrd 0.7u GF ug/L (82675)	Thiobencarb water fltrd 0.7u GF ug/L (82681)	Triallate, water, fltrd 0.7u GF ug/L (82678)	Trifluralin, water, fltrd 0.7u GF ug/L (82661)
OCT 29...	<.02	<.005	<.002	<.009
NOV 12...	--	--	--	--
DEC 10...	<.02	<.005	<.002	<.009
JAN 30...	--	--	--	--
FEB 12...	<.02	<.005	<.002	<.009
APR 16...	<.02	<.005	<.002	<.009
MAY 14...	<.02	<.005	<.002	<.009
JUN 10...	<.02	<.005	<.002	<.009
JUL 24...	<.02	<.005	<.002	<.009
AUG 27...	<.02	<.005	<.002	<.009

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.1	4.1	3.4	7.7	e3.5	e4.1	9.8	56	44	3.6	3.5	6.4
2	4.2	2.0	2.7	5.1	e3.9	e3.9	8.0	48	19	3.1	4.7	8.4
3	4.7	1.6	2.7	4.8	e4.5	e3.6	6.7	18	13	2.9	3.3	5.2
4	8.0	1.7	3.2	4.6	e21	e4.0	211	12	12	4.0	5.5	3.8
5	15	3.1	3.6	4.0	e6.5	e5.0	125	44	13	5.3	20	e3.1
6	6.5	6.5	3.2	3.9	e4.0	e4.6	42	32	11	4.0	38	e2.5
7	3.8	4.0	2.8	3.7	e3.1	e4.8	30	16	9.3	3.5	10	1.9
8	4.5	2.6	2.8	4.4	e2.8	e11	26	13	12	3.4	7.4	1.7
9	2.8	2.1	2.5	6.5	e3.1	e20	31	16	24	7.5	4.0	1.7
10	2.6	19	3.6	5.5	e2.5	e4.5	34	16	12	5.6	3.2	1.5
11	2.0	26	4.2	4.5	e2.6	e4.3	23	16	11	9.0	2.9	1.1
12	1.9	7.5	3.3	3.3	e3.0	e4.7	17	21	22	6.2	2.5	1.1
13	3.0	3.9	3.1	3.0	e2.8	e7.1	13	12	28	3.6	2.2	1.1
14	2.4	3.2	2.9	2.5	e2.8	e7.3	11	8.8	14	2.7	2.1	1.3
15	2.4	9.3	2.9	2.5	e2.9	e15	10	8.9	8.8	2.5	5.3	6.9
16	2.6	5.9	2.5	3.1	e3.0	e36	9.0	10	6.8	2.2	9.4	4.7
17	2.4	3.9	2.3	2.8	e3.3	e41	8.6	7.5	5.6	2.0	8.6	2.4
18	2.3	3.2	2.8	2.9	e3.9	23	7.1	6.0	e7.1	1.6	6.6	1.5
19	3.3	5.1	22	2.8	e4.3	13	6.8	5.4	e62	1.4	4.3	26
20	3.2	4.7	29	2.9	e4.2	13	31	18	e14	1.5	6.0	10
21	2.4	5.7	12	3.2	e4.0	20	46	11	e7.6	2.6	6.5	4.2
22	2.2	28	7.3	e2.8	e4.1	13	18	9.3	e4.2	7.0	3.4	78
23	1.9	12	5.1	e2.6	e4.1	10	12	6.2	e4.3	4.1	2.5	42
24	1.4	6.7	4.0	e2.6	e3.8	8.2	8.8	6.8	e4.0	2.6	2.4	12
25	7.9	5.1	3.7	e2.7	e3.7	8.7	8.0	5.5	e3.0	2.5	2.5	30
26	10	4.2	4.3	e2.8	e3.4	7.4	8.9	4.6	e4.2	2.2	5.4	10
27	4.7	3.4	3.8	e2.9	e3.6	5.6	8.0	5.1	5.5	2.0	5.1	23
28	3.1	2.8	3.4	e2.8	e3.8	9.1	7.3	5.4	5.3	1.9	3.5	9.7
29	2.6	2.7	3.8	e3.1	—	38	5.7	28	6.3	2.2	3.0	6.0
30	2.2	3.1	5.6	e3.0	—	14	7.9	56	4.6	3.4	2.8	3.9
31	2.3	—	13	e3.0	—	11	—	137	—	2.3	2.3	—
TOTAL	122.4	193.1	171.5	112.0	118.2	374.9	790.6	659.5	397.6	108.4	188.9	311.1
MEAN	3.95	6.44	5.53	3.61	4.22	12.1	26.4	21.3	13.3	3.50	6.09	10.4
MAX	15	28	29	7.7	21	41	211	137	62	9.0	38	78
MIN	1.4	1.6	2.3	2.5	2.5	3.6	5.7	4.6	3.0	1.4	2.1	1.1
CFSM	0.24	0.39	0.34	0.22	0.26	0.73	1.60	1.29	0.80	0.21	0.37	0.63
IN.	0.28	0.44	0.39	0.25	0.27	0.85	1.78	1.49	0.90	0.24	0.43	0.70

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 2003, BY WATER YEAR (WY)

MEAN	8.23	11.8	14.8	12.3	19.5	29.3	24.6	15.7	11.4	8.07	6.15	6.89
MAX	40.0	39.8	37.7	40.7	60.3	83.6	47.4	39.9	51.9	53.6	30.4	26.8
(WY)	2002	1986	1973	1993	1976	1982	1979	1968	1996	2000	2000	2000
MIN	0.82	1.45	1.99	1.23	2.62	7.24	8.30	3.46	1.51	0.29	0.43	0.44
(WY)	1967	1966	1977	1977	1980	2000	1971	1971	1988	1965	1965	1969

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1965 - 2003	
ANNUAL TOTAL	4146.7		3548.2			
ANNUAL MEAN	11.4		9.72		14.0	
HIGHEST ANNUAL MEAN					20.5	1968
LOWEST ANNUAL MEAN					6.67	1970
HIGHEST DAILY MEAN	130	Apr 9	211	Apr 4	707	Jun 26 1968
LOWEST DAILY MEAN	1.1	Sep 12	1.1	Sep 11	0.04	Jul 19 1966
ANNUAL SEVEN-DAY MINIMUM	1.5	Sep 8	1.4	Sep 8	0.09	Aug 22 1969
MAXIMUM PEAK FLOW			314	Apr 4	(a)1290	Jun 18 1996
MAXIMUM PEAK STAGE			5.57	Apr 4	10.62	Jun 18 1996
INSTANTANEOUS LOW FLOW			0.78	(b)	0.00	(c)
ANNUAL RUNOFF (CFSM)	0.69		0.59		0.85	
ANNUAL RUNOFF (INCHES)	9.35		8.00		11.56	
10 PERCENT EXCEEDS	24		21		30	
50 PERCENT EXCEEDS	7.6		4.5		6.2	
90 PERCENT EXCEEDS	2.3		2.4		1.5	

(a) From rating curve extended above 800 ft^3/s.
(b) Sept. 10, 11.
(c) Part of each day July 19, 28, 1966, Aug. 22-28, Sept. 3, 11, 1969.
(e) 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 mi^2.

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.--Records good. 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 ft, from floodmark, and discharge of approximately 9,000 ft^3/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	121	101	156	226	127	150	248	1170	919	137	109	197
2	123	103	149	187	138	147	220	978	484	128	202	154
3	200	98	128	181	141	138	194	554	392	124	108	109
4	192	99	143	178	473	146	1300	427	379	123	150	91
5	384	111	162	169	235	172	2030	817	431	168	421	87
6	161	204	183	185	155	166	1270	837	335	196	651	79
7	138	154	197	173	141	163	896	499	289	176	236	75
8	127	128	201	180	121	282	870	447	286	129	369	76
9	117	165	172	197	125	505	862	516	510	159	145	77
10	111	508	188	179	119	185	876	463	390	155	113	73
11	107	673	193	150	112	167	740	482	416	255	103	74
12	107	224	186	140	119	186	650	545	626	152	106	72
13	125	199	191	148	114	235	574	501	696	116	113	72
14	118	164	191	150	109	248	505	442	456	106	95	71
15	109	314	172	136	114	445	454	394	351	104	190	172
16	114	228	150	123	115	847	411	339	305	98	360	117
17	108	187	149	129	122	1040	413	307	285	93	218	84
18	107	171	168	115	138	799	325	300	287	89	117	83
19	168	295	516	128	149	548	269	305	1470	88	111	602
20	121	218	583	130	149	469	450	554	598	84	103	243
21	110	225	308	125	146	585	675	398	334	98	104	111
22	107	700	218	114	148	437	363	297	235	200	98	917
23	108	321	189	107	150	373	324	273	210	121	92	918
24	103	216	180	105	145	327	305	312	186	103	81	304
25	131	223	179	107	142	347	294	246	165	92	80	617
26	276	203	186	111	135	316	270	205	190	93	158	262
27	139	188	186	112	136	248	246	260	235	85	141	462
28	116	164	171	108	143	235	231	243	152	87	100	208
29	112	152	183	116	---	769	222	304	236	87	111	151
30	110	151	213	114	---	365	247	672	175	83	93	133
31	107	---	321	114	---	256	---	1510	---	82	81	---
TOTAL	4277	6887	6512	4437	4161	11296	16734	15597	12023	3811	5159	6691
MEAN	138	230	210	143	149	364	558	503	401	123	166	223
MAX	384	700	583	226	473	1040	2030	1510	1470	255	651	918
MIN	103	98	128	105	109	138	194	205	152	82	80	71
CFSM	0.31	0.52	0.47	0.32	0.33	0.82	1.26	1.13	0.90	0.28	0.37	0.50
IN.	0.36	0.58	0.55	0.37	0.35	0.95	1.40	1.31	1.01	0.32	0.43	0.56

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2003, BY WATER YEAR (WY)

MEAN	278	335	385	379	464	652	644	464	362	266	227	247
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	259	127	120	87.1	69.5	73.3
(WY)	1954	1954	1959	1961	1963	1964	1958	1958	1949	1955	1954	1954

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1947 - 2003	
ANNUAL TOTAL	117477		97585			
ANNUAL MEAN	322		267		391	
HIGHEST ANNUAL MEAN					595	1976
LOWEST ANNUAL MEAN					189	1964
HIGHEST DAILY MEAN	1660	Apr 9	2030	Apr 5	6930	May 11 1948
LOWEST DAILY MEAN	72	Sep 9	71	Sep 14	49	Sep 6 1955
ANNUAL SEVEN-DAY MINIMUM	75	Sep 3	74	Sep 8	59	Sep 3 1954
MAXIMUM PEAK FLOW			2280	Apr 5	8840	Oct 1 1981
MAXIMUM PEAK STAGE			14.20	Apr 5	19.56	Oct 1 1981
INSTANTANEOUS LOW FLOW			63	Sep 14	47	Sep 6 1955
ANNUAL RUNOFF (CFSM)	0.72		0.60		0.88	
ANNUAL RUNOFF (INCHES)	9.84		8.18		11.96	
10 PERCENT EXCEEDS	620		554		750	
50 PERCENT EXCEEDS	277		178		281	
90 PERCENT EXCEEDS	93		101		116	

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.6	5.2	e7.1	8.3	e3.8	e4.6	12	13	13	5.7	e2.5	e3.5
2	3.6	5.1	7.2	7.3	e4.0	e4.5	12	17	9.8	5.0	e2.8	e3.7
3	4.2	5.1	e6.5	e6.8	e4.5	e4.3	18	14	8.5	4.8	e2.8	e3.7
4	4.7	5.1	6.1	6.8	e6.8	e4.4	91	12	8.5	4.8	e3.9	e3.7
5	6.0	5.1	5.9	6.6	e6.1	e4.8	80	17	10	4.9	e7.2	e3.2
6	5.4	6.1	5.8	7.7	e5.4	e4.7	52	25	8.8	4.7	e9.0	e2.7
7	5.1	6.0	5.6	e6.9	e4.8	e4.9	44	25	8.0	4.5	e8.5	e2.4
8	4.6	6.0	5.5	6.6	e4.5	e6.4	39	22	9.8	4.5	e9.8	e2.3
9	4.2	5.7	5.8	6.7	e4.4	e8.3	37	21	13	5.0	e7.1	e2.3
10	3.8	7.3	5.4	7.7	e4.2	e6.4	40	26	11	5.0	e5.7	e2.2
11	3.6	8.3	5.3	e7.3	e4.0	e5.5	37	41	11	4.8	e4.8	e2.1
12	3.7	8.1	5.3	7.0	e4.4	e5.0	32	41	26	4.5	e4.8	e2.1
13	4.4	7.2	5.1	6.8	e4.2	e8.8	27	35	40	5.3	e4.6	e2.0
14	4.4	6.4	5.2	6.5	e4.0	e14	24	29	30	5.6	e4.2	e2.0
15	4.2	7.1	5.4	e6.0	e3.8	e28	21	27	20	5.2	e4.7	e2.6
16	4.1	6.6	5.3	e5.4	e3.8	e40	19	25	15	4.6	e5.1	e2.8
17	4.1	6.3	5.1	e5.3	e4.0	e60	16	23	12	4.1	e4.5	e2.9
18	4.4	6.0	5.1	e5.1	e4.1	e50	14	20	10	3.6	e3.9	e3.0
19	5.0	6.3	8.3	e4.8	e4.3	45	12	18	9.7	3.3	e3.7	4.2
20	4.8	6.1	12	e4.7	e4.4	38	13	15	9.4	3.4	e3.6	4.5
21	4.6	6.2	11	e4.5	e4.4	40	19	14	9.1	6.2	e3.5	4.1
22	4.6	8.4	9.5	e4.2	e4.4	33	20	12	8.6	9.4	e3.4	13
23	4.8	7.6	8.6	e3.8	e4.5	28	17	10	8.1	8.2	e3.4	15
24	4.8	6.7	8.1	e3.7	e4.4	24	15	9.9	7.5	6.5	e3.3	9.9
25	4.8	6.5	8.1	e3.6	e4.3	24	14	9.2	7.1	5.3	e3.3	17
26	6.4	7.0	7.8	e3.6	e4.3	21	12	8.7	6.9	4.5	e4.4	10
27	5.9	8.7	e7.7	e3.5	e4.3	18	11	9.2	7.0	3.9	e4.7	9.7
28	5.6	8.8	e7.6	e3.5	e4.3	18	10	9.4	6.8	3.3	e4.1	7.6
29	5.4	8.5	7.5	e3.6	--	31	9.5	9.3	6.5	2.9	e3.7	6.7
30	5.3	8.2	7.6	e3.6	--	20	9.3	9.1	6.3	2.7	e3.6	5.5
31	5.2	--	9.1	e3.6	--	14	--	15	--	2.5	e3.4	--
TOTAL	145.3	201.7	215.6	171.5	124.4	618.6	776.8	581.8	357.4	148.7	144.0	156.4
MEAN	4.69	6.72	6.95	5.53	4.44	20.0	25.9	18.8	11.9	4.80	4.65	5.21
MAX	6.4	8.8	12	8.3	6.8	60	91	41	40	9.4	9.8	17
MIN	3.6	5.1	5.1	3.5	3.8	4.3	9.3	8.7	6.3	2.5	2.5	2.0
CFSM	0.22	0.31	0.32	0.25	0.20	0.92	1.19	0.86	0.55	0.22	0.21	0.24
IN.	0.25	0.34	0.37	0.29	0.21	1.06	1.33	0.99	0.61	0.25	0.25	0.27

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2003, BY WATER YEAR (WY)

MEAN	10.4	13.6	15.0	14.6	19.3	31.3	30.4	19.2	13.9	8.81	6.99	8.86
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1958 - 2003	
ANNUAL TOTAL	4540.8		3642.2			
ANNUAL MEAN	12.4		9.98		16.0	
HIGHEST ANNUAL MEAN					29.0	1975
LOWEST ANNUAL MEAN					4.99	1964
HIGHEST DAILY MEAN	47	Apr 14	91	Apr 4	302	Feb 1 1968
LOWEST DAILY MEAN	2.3	Sep 8	2.0	Sep 13	0.90	Jul 29 1964
ANNUAL SEVEN-DAY MINIMUM	2.5	Sep 4	2.1	Sep 8	0.99	Jul 27 1964
MAXIMUM PEAK FLOW			(a)118	Apr 4	(b)358	Feb 10 1965
MAXIMUM PEAK STAGE			(c)3.61	Mar 17	(c)4.56	Mar 12 1962
INSTANTANEOUS LOW FLOW					0.80	(d)
ANNUAL RUNOFF (CFSM)	0.57		0.46		0.73	
ANNUAL RUNOFF (INCHES)	7.75		6.22		9.97	
10 PERCENT EXCEEDS	26		22		32	
50 PERCENT EXCEEDS	8.5		6.1		11	
90 PERCENT EXCEEDS	3.2		3.6		3.4	

(a) Gage height 3.18 ft.
(b) Gage height 4.48 ft.
(c) Backwater from ice.
(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 mi^2.

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 ft^3/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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.08	0.16	0.22	0.36	e0.09	e0.12	3.0	3.6	5.9	1.0	0.35	0.18
2	0.20	0.16	0.21	0.28	e0.10	e0.12	2.6	25	4.0	0.93	0.17	0.11
3	0.29	0.19	0.26	0.23	e0.12	e0.12	e5.0	20	2.9	0.78	0.13	0.08
4	0.40	0.53	0.18	0.23	e0.15	e0.12	e69	9.1	3.9	0.65	0.20	0.06
5	0.27	0.63	0.17	0.23	e0.14	e0.12	122	8.4	8.8	0.36	0.26	0.06
6	0.14	0.36	0.13	0.23	e0.14	e0.12	39	61	12	0.36	0.41	0.06
7	0.26	0.41	0.13	0.27	e0.13	e0.12	24	28	6.6	0.26	0.40	0.05
8	0.25	0.18	0.13	0.25	e0.13	e0.12	13	13	7.7	0.28	0.36	0.06
9	0.21	0.11	0.13	0.24	e0.12	e0.12	21	8.8	71	0.37	0.35	0.10
10	0.20	1.2	0.13	0.23	e0.12	e0.12	47	40	35	0.26	0.36	0.16
11	0.20	0.30	0.13	0.23	e0.12	e0.13	24	68	15	0.40	0.36	0.21
12	0.23	0.25	0.13	0.20	e0.12	e0.14	12	54	65	0.24	0.36	0.13
13	0.38	0.23	0.15	0.18	e0.11	e0.16	7.4	21	158	0.27	0.36	0.14
14	0.29	0.28	0.20	0.14	e0.11	e0.18	5.6	12	42	0.24	0.41	0.19
15	0.12	0.30	0.22	0.13	e0.11	e0.20	4.7	7.6	17	0.27	0.35	0.25
16	0.10	0.26	0.19	e0.11	e0.13	0.23	4.0	5.8	9.1	0.36	0.13	0.12
17	0.32	0.23	0.15	e0.09	e0.14	0.27	3.4	5.0	6.0	0.36	0.13	0.08
18	0.33	0.29	0.19	e0.09	e0.16	0.43	2.8	4.1	4.7	0.43	0.13	0.08
19	0.48	0.29	0.69	e0.09	e0.18	0.76	2.6	3.6	3.5	0.38	0.13	1.6
20	0.54	0.13	0.69	e0.09	e0.20	4.0	4.1	3.3	2.7	0.36	0.10	0.16
21	0.54	0.19	0.40	e0.08	e0.19	9.6	5.0	2.9	2.0	2.3	0.20	0.13
22	0.54	0.46	0.36	e0.08	e0.18	5.6	4.0	2.4	1.7	4.5	0.23	1.6
23	0.48	0.16	0.26	e0.08	e0.17	3.9	3.3	2.9	1.5	0.86	0.18	0.26
24	0.31	0.17	0.27	e0.08	e0.15	3.0	2.6	3.6	1.3	0.45	0.13	0.85
25	0.43	0.24	0.23	e0.08	e0.12	3.0	2.3	2.9	1.0	0.34	0.13	1.1
26	0.29	0.24	0.23	e0.08	e0.12	2.9	2.3	2.5	1.0	0.23	0.54	0.97
27	0.23	0.23	0.23	e0.08	e0.12	2.5	1.9	2.2	1.0	0.23	0.16	0.64
28	0.26	0.23	0.21	e0.08	e0.12	3.1	1.7	2.0	1.0	0.22	0.13	0.40
29	0.07	0.23	0.23	e0.08	---	7.6	1.6	2.5	1.0	0.20	0.13	0.28
30	0.06	0.25	0.36	e0.08	---	6.0	1.5	2.6	1.0	0.18	0.15	0.15
31	0.06	---	0.51	e0.09	---	3.9	---	5.5	---	0.13	0.15	---
TOTAL	8.56	8.89	7.72	4.79	3.79	58.80	442.4	433.3	493.3	18.20	7.58	10.26
MEAN	0.28	0.30	0.25	0.15	0.14	1.90	14.7	14.0	16.4	0.59	0.24	0.34
MAX	0.54	1.2	0.69	0.36	0.20	9.6	122	68	158	4.5	0.54	1.6
MIN	0.06	0.11	0.13	0.08	0.09	0.12	1.5	2.0	1.0	0.13	0.10	0.05
CFSM	0.02	0.02	0.02	0.01	0.01	0.15	1.13	1.08	1.26	0.05	0.02	0.03
IN.	0.02	0.03	0.02	0.01	0.01	0.17	1.27	1.24	1.41	0.05	0.02	0.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 2003, BY WATER YEAR (WY)

MEAN	2.71	5.12	7.84	6.44	11.9	23.0	15.3	5.95	4.70	1.80	1.37	2.34
MAX	25.6	43.3	35.7	37.6	60.3	75.2	47.1	23.5	21.9	19.7	12.3	33.9
(WY)	2002	1986	1973	1974	1976	1982	1967	1974	1989	1967	1975	1985
MIN	0.047	0.088	0.074	0.078	0.087	0.23	0.83	0.61	0.059	0.047	0.055	0.056
(WY)	1964	1964	1964	1961	1964	1964	1964	1977	1964	1964	1963	1964

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1959 - 2003	
ANNUAL TOTAL	1830.28		1497.59			
ANNUAL MEAN	5.01		4.10		7.34	
HIGHEST ANNUAL MEAN					14.9	1985
LOWEST ANNUAL MEAN					0.36	1964
HIGHEST DAILY MEAN	130	Mar 3	158	Jun 13	497	Apr 19 1975
LOWEST DAILY MEAN	0.05	Aug 29	0.05	Sep 7	0.00	(a)
ANNUAL SEVEN-DAY MINIMUM	0.07	Aug 27	0.07	Sep 3	0.00	Jan 25 1961
MAXIMUM PEAK FLOW			231	Jun 13	910	Apr 19 1975
MAXIMUM PEAK STAGE			3.93	Jun 13	6.69	Apr 19 1975
ANNUAL RUNOFF (CFSM)	0.39		0.32		0.56	
ANNUAL RUNOFF (INCHES)	5.24		4.29		7.67	
10 PERCENT EXCEEDS	12		7.5		15	
50 PERCENT EXCEEDS	0.87		0.27		1.1	
90 PERCENT EXCEEDS	0.15		0.11		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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.0	7.5	17	34	7.5	e7.2	112	72	347	16	e4.6	4.9
2	8.2	7.8	16	45	7.9	e7.5	100	251	241	14	6.8	5.0
3	8.2	7.2	15	28	8.6	e7.4	89	371	126	12	9.2	4.9
4	9.4	7.7	13	26	17	e7.2	267	287	88	15	13	4.5
5	13	6.8	13	28	13	e7.6	1570	167	111	14	13	3.4
6	14	7.2	13	24	20	e8.6	1650	238	168	13	17	e2.7
7	12	7.3	13	21	20	e9.2	883	354	131	14	21	e2.5
8	10	8.6	13	18	19	e10	497	337	93	14	17	e2.5
9	8.3	8.6	12	26	17	e13	332	200	114	9.9	12	e2.5
10	7.4	12	11	25	e14	14	338	149	265	13	8.1	e2.5
11	6.9	16	11	21	e12	14	423	233	228	15	5.5	e2.8
12	7.3	25	12	17	e10	14	369	377	155	16	5.9	e3.0
13	7.1	24	12	20	e10	14	235	423	432	15	4.9	e3.3
14	6.7	19	13	19	e8.6	14	156	286	907	12	4.2	e4.0
15	7.0	17	14	16	e7.8	18	124	154	641	9.2	5.2	e5.5
16	5.9	15	15	14	e7.1	80	106	117	244	7.4	15	e7.0
17	6.5	17	15	13	e7.2	415	91	104	122	6.7	18	e8.1
18	5.2	16	16	12	e7.2	746	82	92	89	e6.9	12	e8.9
19	6.5	16	20	11	e7.4	1270	75	82	90	e7.4	8.3	15
20	6.3	15	32	10	e7.4	722	72	79	66	e8.2	5.0	16
21	6.1	16	52	8.5	e7.5	359	231	89	53	e10	e4.4	15
22	5.5	21	50	7.1	e7.8	240	293	79	43	15	e4.1	27
23	6.6	23	36	6.0	e8.0	171	164	65	36	59	e4.7	67
24	7.1	25	33	5.5	e7.7	135	112	66	31	47	e4.7	74
25	7.8	21	23	5.4	e7.5	119	89	74	26	23	e4.0	50
26	9.6	19	22	5.7	e7.3	114	78	66	22	13	e6.0	49
27	11	17	21	5.0	e7.0	109	69	57	22	10	9.1	46
28	11	17	18	5.9	e7.0	101	60	54	20	9.4	12	37
29	11	18	19	6.5	---	120	53	59	23	5.8	6.3	28
30	8.6	18	24	6.4	---	196	49	111	20	e5.0	4.8	22
31	7.9	---	27	6.9	---	157	---	228	---	e4.4	3.8	---
TOTAL	257.1	455.7	621	496.9	288.5	5219.7	8769	5321	4954	440.3	269.6	524.0
MEAN	8.29	15.2	20.0	16.0	10.3	168	292	172	165	14.2	8.70	17.5
MAX	14	25	52	45	20	1270	1650	423	907	59	21	74
MIN	5.2	6.8	11	5.0	7.0	7.2	49	54	20	4.4	3.8	2.5
CFSM	0.04	0.08	0.10	0.08	0.05	0.85	1.47	0.86	0.83	0.07	0.04	0.09
IN.	0.05	0.09	0.12	0.09	0.05	0.98	1.64	0.99	0.93	0.08	0.05	0.10

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2003, BY WATER YEAR (WY)

MEAN	54.3	88.6	133	128	208	344	265	139	82.1	34.4	26.2	41.5
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1947 - 2003	
ANNUAL TOTAL	34763.24		27616.8			
ANNUAL MEAN	95.2		75.7		128	
HIGHEST ANNUAL MEAN					230	1986
LOWEST ANNUAL MEAN					25.4	1964
HIGHEST DAILY MEAN	1220	Apr 14	1650	Apr 6	5040	Apr 20 1975
LOWEST DAILY MEAN	0.16	Sep 12	(e)2.5	Sep 7	0.09	Jul 7 1988
ANNUAL SEVEN-DAY MINIMUM	0.20	Sep 7	2.6	Sep 6	0.10	Jul 3 1988
MAXIMUM PEAK FLOW			2060	Apr 5	6700	Feb 2 1968
MAXIMUM PEAK STAGE			13.89	Apr 5	18.62	Feb 2 1968
INSTANTANEOUS LOW FLOW					0.08	(a)
ANNUAL RUNOFF (CFSM)	0.48		0.38		0.64	
ANNUAL RUNOFF (INCHES)	6.50		5.16		8.73	
10 PERCENT EXCEEDS	228		228		305	
50 PERCENT EXCEEDS	35		15		42	
90 PERCENT EXCEEDS	6.2		5.8		7.3	

(a) Part of each day July 4-10, 14, 15, 1988.
(e) Estimated.

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 mi^2.

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 good except for estimated daily discharges, which are fair. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	140	108	e195	364	146	134	474	1460	1370	172	157	238
2	148	105	e189	298	205	199	422	1430	759	159	313	e206
3	235	107	e165	285	198	e192	353	1000	578	145	161	145
4	185	102	e177	264	615	e211	2070	797	542	156	244	113
5	492	118	e201	255	359	267	4810	1100	600	214	464	101
6	206	258	e230	280	253	225	3600	1230	554	198	723	77
7	156	147	e252	259	231	213	1960	914	474	228	283	76
8	137	129	e261	264	e184	290	1440	846	430	160	440	72
9	132	156	e229	316	e178	687	1280	814	656	195	205	77
10	123	427	e243	281	e165	310	1340	743	644	180	159	70
11	122	938	e254	230	e155	263	1210	806	650	323	143	68
12	124	366	e248	207	e162	273	1060	948	777	215	138	65
13	135	297	248	217	e157	345	887	934	1180	154	151	58
14	131	232	260	208	e152	348	774	775	1190	134	125	60
15	119	419	248	212	159	550	706	629	944	129	207	204
16	117	324	217	141	177	1140	648	548	609	127	380	149
17	119	262	203	173	203	1720	640	485	458	121	339	84
18	120	199	233	e153	244	1430	574	457	405	111	167	85
19	203	336	623	e163	227	1440	467	442	1670	111	151	768
20	138	262	754	e165	234	1150	610	676	711	109	133	419
21	114	259	498	e160	227	948	1150	625	438	121	133	179
22	113	765	356	e146	242	716	791	461	315	304	123	1090
23	112	435	293	e135	246	617	639	400	275	221	114	1410
24	115	e294	271	e131	227	549	558	438	243	183	104	478
25	127	e276	292	e132	173	552	514	380	210	138	100	761
26	385	e256	277	e135	185	528	462	314	216	127	211	422
27	176	e240	273	e140	172	454	391	328	306	114	226	594
28	128	e208	259	e134	194	433	354	363	197	118	146	353
29	119	e192	261	e140	---	973	320	318	282	111	139	251
30	114	e190	300	e138	---	681	359	696	231	99	130	203
31	115	---	489	e137	---	542	---	1910	---	97	110	---
TOTAL	4900	8407	8999	6263	6070	18380	30863	23267	17914	4974	6619	8876
MEAN	158	280	290	202	217	593	1029	751	597	160	214	296
MAX	492	938	754	364	615	1720	4810	1910	1670	323	723	1410
MIN	112	102	165	131	146	134	320	314	197	97	100	58
CFSM	0.22	0.38	0.40	0.28	0.30	0.81	1.40	1.02	0.81	0.22	0.29	0.40
IN.	0.25	0.43	0.46	0.32	0.31	0.93	1.56	1.18	0.91	0.25	0.34	0.45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 2003, BY WATER YEAR (WY)

MEAN	327	423	534	549	765	1116	1046	691	488	302	256	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1934 - 2003	
ANNUAL TOTAL	168432		145532			
ANNUAL MEAN	461		399		566	
HIGHEST ANNUAL MEAN					929	1974
LOWEST ANNUAL MEAN					230	1964
HIGHEST DAILY MEAN	2960	Apr 9	4810	Apr 5	19200	Apr 6 1947
LOWEST DAILY MEAN	102	Nov 4	58	Sep 13	25	Aug 24 1934
ANNUAL SEVEN-DAY MINIMUM	110	Oct 30	67	Sep 8	28	Aug 22 1934
MAXIMUM PEAK FLOW			5170	Apr 5	21200	Apr 6 1947
MAXIMUM PEAK STAGE			11.25	Apr 5	(a)23.55	Apr 6 1947
ANNUAL RUNOFF (CFSM)	0.63		0.54		0.77	
ANNUAL RUNOFF (INCHES)	8.54		7.38		10.47	
10 PERCENT EXCEEDS	923		827		1200	
50 PERCENT EXCEEDS	389		244		334	
90 PERCENT EXCEEDS	123		118		120	

(a) From floodmark.
(e) Estimated.

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 mi^2. Prior to water year 1971, drainage area was 36.9 mi^2. An area of 3.6 mi^2 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 except for estimated daily discharges, which are fair. 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.4	5.8	8.9	14	e7.1	e6.4	18	69	42	12	4.5	7.0
2	7.0	6.0	9.1	11	e7.7	e6.4	15	50	24	10	6.5	9.6
3	8.0	5.9	8.7	10	8.5	e6.4	14	25	20	9.5	6.0	7.4
4	14	6.3	8.0	9.8	32	e6.5	244	19	19	10	6.2	5.6
5	26	6.7	8.2	9.4	14	e6.6	152	53	22	12	22	5.6
6	9.7	10	8.0	9.4	10	e6.6	54	35	19	11	36	4.4
7	7.3	8.6	7.8	9.2	8.6	e6.7	39	24	15	10	16	3.6
8	7.1	6.4	7.7	9.7	7.9	11	35	22	22	9.2	35	3.4
9	6.3	6.8	7.4	12	7.6	21	39	27	41	14	16	3.3
10	6.0	36	e7.2	10	e7.0	12	42	27	23	12	10	3.2
11	5.9	39	e6.9	9.1	e6.9	9.3	32	27	19	22	7.5	3.3
12	5.7	17	e7.0	8.1	e6.7	10	26	29	30	14	6.3	3.0
13	6.9	13	e7.4	7.6	e6.6	14	23	21	31	9.7	7.1	3.0
14	6.1	9.8	8.5	7.3	e6.3	13	21	18	20	8.8	5.9	3.7
15	5.6	18	8.9	7.1	e6.1	36	20	18	16	8.8	8.2	11
16	5.6	13	8.3	6.8	e6.2	109	19	18	14	5.2	9.3	8.3
17	5.2	10	7.7	6.5	e6.4	90	17	16	13	6.9	7.7	5.6
18	5.3	9.2	9.0	6.4	e6.8	51	16	15	22	5.8	6.2	4.4
19	7.4	12	28	e6.2	e7.0	30	16	14	201	4.8	4.7	21
20	6.5	11	37	e6.2	e7.3	28	25	22	44	4.5	4.3	12
21	5.6	12	20	e6.2	e7.1	35	26	17	26	4.8	4.1	6.9
22	5.5	36	13	e6.2	e7.0	27	19	14	21	6.2	3.9	96
23	5.2	18	11	e6.2	e6.9	22	16	14	18	6.1	3.7	50
24	5.1	12	9.9	e6.2	e6.8	20	15	14	16	5.2	3.5	20
25	6.2	11	e9.8	e6.2	e6.6	21	15	14	14	4.2	3.4	42
26	12	11	e9.5	e6.3	e6.5	19	14	13	13	3.9	5.9	17
27	8.1	9.2	e9.2	e6.3	e6.5	16	13	13	13	4.1	6.5	30
28	6.0	8.9	e9.2	e6.3	e6.4	20	13	14	13	3.5	4.8	15
29	7.4	9.0	e9.3	e6.4	---	45	12	14	17	3.6	4.3	11
30	6.2	9.7	11	e6.6	---	24	16	20	14	3.2	3.9	9.2
31	6.0	---	19	e6.7	---	19	---	122	---	3.6	3.6	---
TOTAL	231.3	387.3	340.6	245.4	230.5	747.9	1026	818	822	248.6	273.0	425.5
MEAN	7.46	12.9	11.0	7.92	8.23	24.1	34.2	26.4	27.4	8.02	8.81	14.2
MAX	26	39	37	14	32	109	244	122	201	22	36	96
MIN	5.1	5.8	6.9	6.2	6.1	6.4	12	13	13	3.2	3.4	3.0
CFSM	0.22	0.39	0.33	0.24	0.25	0.72	1.03	0.79	0.82	0.24	0.26	0.43
IN.	0.26	0.43	0.38	0.27	0.26	0.84	1.15	0.91	0.92	0.28	0.30	0.48

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 2003, BY WATER YEAR (WY)

MEAN	13.1	16.8	20.1	19.8	25.8	38.7	36.2	26.9	20.5	13.4	11.2	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1950 - 2003	
ANNUAL TOTAL	7320.0		5796.1			
ANNUAL MEAN	20.1		15.9		(a)21.2	
HIGHEST ANNUAL MEAN					35.6	1968
LOWEST ANNUAL MEAN					4.55	1964
HIGHEST DAILY MEAN	159	Mar 3	244	Apr 4	902	Jun 26 1968
LOWEST DAILY MEAN	2.8	Jul 17	3.0	Sep 12	0.20	Jul 31 1964
ANNUAL SEVEN-DAY MINIMUM	3.3	Sep 7	3.3	Sep 7	0.34	Jul 27 1964
MAXIMUM PEAK FLOW			400	Jun 19	1390	Jun 26 1968
MAXIMUM PEAK STAGE			4.32	Jun 19	8.70	Jun 26 1968
INSTANTANEOUS LOW FLOW			2.6	(b)	0.10	(c)
ANNUAL RUNOFF (CFSM)	0.60		0.48		0.64	
ANNUAL RUNOFF (INCHES)	8.18		6.47		8.65	
10 PERCENT EXCEEDS	39		30		43	
50 PERCENT EXCEEDS	14		9.7		13	
90 PERCENT EXCEEDS	4.8		5.2		3.4	

(a) Annual mean, water years 1951-70, 15.3 ft^3/s, 5.63 in/yr; water years 1971-03, 24.8 ft^3/s, 10.11 in/yr.
(b) July 30, Sept. 13.
(c) Aug. 8, 9, 1963.
(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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	20	32	e43	e21	e19	64	314	154	33	12	46
2	19	21	28	e31	e22	e19	52	255	88	25	49	47
3	31	22	e26	e30	e24	e20	43	115	70	21	18	25
4	40	23	e24	e29	e93	e22	489	85	62	21	37	18
5	104	27	e23	e27	e48	e21	724	237	78	45	30	15
6	33	60	e23	e27	e29	e20	210	190	64	36	91	13
7	20	40	e22	e26	e25	e20	145	101	51	26	33	11
8	16	32	e21	e27	e23	e32	130	90	78	22	49	10
9	15	28	e20	e34	e21	e64	136	135	120	43	35	9.8
10	13	138	e18	e30	e20	e40	148	100	87	31	19	9.3
11	13	162	e15	e26	e20	e29	113	104	76	54	14	9.5
12	13	55	e18	e23	e18	e32	92	111	130	43	142	9.5
13	19	24	e20	e22	e18	e44	78	85	135	31	216	9.2
14	16	16	e25	e21	e18	e40	69	67	84	27	50	11
15	13	69	e29	e20	e18	e110	62	72	64	19	179	56
16	13	36	e30	e19	e18	e400	55	66	50	16	158	28
17	12	20	31	e18	e18	e380	52	56	43	13	81	17
18	12	14	46	e18	e19	247	46	48	51	13	40	12
19	25	33	140	e17	e20	120	43	43	513	11	28	75
20	20	26	192	e17	e21	111	97	81	171	11	21	54
21	15	25	104	e16	e21	164	120	70	108	22	17	25
22	14	181	66	e15	e20	106	73	44	85	18	19	285
23	13	96	46	e16	e20	88	56	37	70	14	13	184
24	13	59	e34	e17	e20	73	46	51	58	12	11	63
25	18	44	e30	e18	e19	81	44	43	47	10	11	168
26	62	38	e29	e18	e19	70	40	35	44	9.4	47	46
27	30	34	e26	e18	e19	56	35	37	47	9.5	26	124
28	21	30	e25	e18	e19	70	32	37	48	8.9	16	e57
29	18	29	e26	e19	---	180	29	39	79	8.4	21	e35
30	19	32	e30	e20	---	96	41	57	50	8.3	15	e25
31	18	---	e56	e20	---	70	---	324	---	8.2	11	---
TOTAL	709	1434	1255	700	671	2844	3364	3129	2805	669.7	1509	1497.3
MEAN	22.9	47.8	40.5	22.6	24.0	91.7	112	101	93.5	21.6	48.7	49.9
MAX	104	181	192	43	93	400	724	324	513	54	216	285
MIN	12	14	15	15	18	19	29	35	43	8.2	11	9.2
CFSM	0.26	0.54	0.46	0.26	0.27	1.04	1.28	1.15	1.06	0.25	0.55	0.57
IN.	0.30	0.61	0.53	0.30	0.28	1.20	1.42	1.32	1.19	0.28	0.64	0.63

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2003, BY WATER YEAR (WY)

MEAN	46.1	57.9	67.5	64.1	84.8	129	118	81.4	67.8	41.6	38.6	41.3
MAX	211	164	178	203	254	327	225	191	241	118	142	147
(WY)	2002	1993	1988	1993	1976	1982	1977	1983	1989	1968	1995	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
(WY)	1964	1964	1964	1961	1963	1964	1963	1958	1971	1964	1963	1963

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1958 - 2003	
ANNUAL TOTAL	25220.3		20587.0			
ANNUAL MEAN	69.1		56.4		70.1	
HIGHEST ANNUAL MEAN					105	1993
LOWEST ANNUAL MEAN					20.4	1964
HIGHEST DAILY MEAN	611	Apr 13	724	Apr 5	3210	Jun 26 1968
LOWEST DAILY MEAN	9.4	Sep 10	8.2	Jul 31	0.30	Jul 31 1964
ANNUAL SEVEN-DAY MINIMUM	10	Sep 8	9.0	Jul 25	0.66	Jul 26 1964
MAXIMUM PEAK FLOW			965	Apr 5	4900	Jun 26 1968
MAXIMUM PEAK STAGE			10.93	Apr 5	19.04	Jun 26 1968
INSTANTANEOUS LOW FLOW			7.8	Jul 31	0.10	Aug 2 1964
ANNUAL RUNOFF (CFSM)	0.79		0.64		0.80	
ANNUAL RUNOFF (INCHES)	10.67		8.71		10.84	
10 PERCENT EXCEEDS	155		122		137	
50 PERCENT EXCEEDS	46		31		40	
90 PERCENT EXCEEDS	13		14		12	

(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 current year.
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. 3, 15-28, Nov. 4-12, 23-25, Dec. 3-30, Jan. 5 to Mar. 20, Mar. 29 to Apr. 3, Apr. 10-16, 19-25, May 3, 4, 7-11, 13, 15-20, 22, 25-29, June 2-5, 9-11, 15-19, 21, 22, June 26 to July 2, July 4-8, 10, 14-18, 21-24, July 28 to Aug. 1, Aug. 3, 11, 12, 18-28, Aug. 31 to Sept. 4, Sept. 8, 12-17, 22-24, 28-30, rated good; May 21, rated fair; Oct. 1, 2, rated poor. Water temperature records rated excellent. Dissolved oxygen records rated excellent except for the following periods: Oct. 31 to Nov. 1, Mar. 23, Apr. 6, 7, 26, May 1, 7, 8, June 4-6, Sept. 18, rated good; Nov. 2-4, Apr. 8-12, May 2-5, 9, 10, Sept. 19, rated fair; Nov. 5-12, Mar. 26 to Apr. 3, Apr. 13-16, 27, 28, May 11-13, Sept. 20-25, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 7,270 microsiemens, Mar. 6, 2003; 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; minimum, 4.4 mg/L, July 4, 1999, July 21, 2001.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 7,270 microsiemens, Mar. 6; minimum, 454 microsiemens, Aug. 15.
WATER TEMPERATURE: Maximum, 25.0°C, Aug. 16; minimum, -0.5°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum recorded, 15.3 mg/L, Apr. 19; minimum, 5.3 mg/L, Aug. 12.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	1100	1050	1070	1290	1070	1190	1460	1220	1340	2940	2160	2510
2	1180	1080	1100	1270	1180	1220	1460	1270	1340	2160	1950	2050
3	1140	983	1080	1320	1200	1250	6310	1440	2240	2610	1950	2130
4	1160	670	981	1260	1190	1230	3740	2070	2590	3200	2560	2780
5	777	646	721	1370	1180	1220	2900	2200	2460	3110	2570	2770
6	899	763	847	1310	1180	1240	2870	2360	2490	5100	2770	3310
7	978	884	919	1190	1130	1160	2380	2020	2230	5150	3360	4020
8	1050	950	987	1220	1150	1190	2080	1860	1960	3770	2980	3390
9	1050	999	1020	1320	1190	1240	2140	1840	1950	4330	3350	3850
10	1090	1020	1050	1280	605	991	1960	1750	1850	3350	3030	3170
11	1060	1040	1050	868	573	749	1920	1710	1780	3830	2970	3230
12	1110	1040	1060	1000	868	933	3100	1560	1730	3060	2610	2810
13	1120	1040	1080	1040	988	1010	1660	1540	1580	2860	2510	2680
14	1170	1040	1090	1160	982	1040	1660	1550	1580	2530	2390	2480
15	1060	1040	1050	1150	893	995	1630	1530	1560	2410	2330	2360
16	1100	1050	1070	982	915	938	2050	1560	1760	2350	2200	2280
17	1100	1060	1070	1050	937	985	2100	1780	1860	2250	2180	2210
18	1150	1070	1110	1150	1030	1080	3420	1730	2220	2250	2160	2190
19	1190	1030	1110	1180	998	1100	4450	2160	2840	2200	2110	2140
20	1140	1080	1100	1120	1050	1070	2700	1360	1700	2120	2050	2080
21	1090	1070	1080	1140	916	1050	1470	1350	1390	2080	2040	2060
22	1110	1050	1090	1130	738	840	1680	1470	1600	2040	1980	2010
23	1120	1100	1100	1090	841	981	1700	1590	1650	2010	1970	1990
24	1150	1100	1120	1120	1080	1100	1650	1540	1580	1980	1870	1920
25	1150	978	1100	1180	1100	1120	2130	1510	1610	1880	1830	1850
26	1160	917	1010	1200	1150	1170	2330	2010	2130	2040	1790	1850
27	1020	888	979	1290	1150	1180	3140	2080	2760	2480	2040	2280
28	1140	1010	1050	1290	1200	1230	2620	2340	2470	2440	2080	2170
29	1220	838	1100	1280	1180	1220	3130	2410	2710	3760	2270	2920
30	1220	1110	1150	1310	1180	1220	3400	2630	2920	4230	3220	3810
31	1260	1140	1180	---	---	---	4060	2760	3380	3540	2990	3220
MONTH	1260	646	1050	1370	573	1100	6310	1220	2040	5150	1790	2600

STREAMS TRIBUTARY TO DETROIT RIVER

04166100 RIVER ROUGE AT SOUTHFIELD, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	4450	2980	3450	3150	2920	3030	1900	1670	1800	1690	993	1130
2	7140	4130	5920	3400	2860	3010	1960	1810	1850	1210	1120	1160
3	4550	3120	4140	3770	3350	3600	1900	1810	1830	1350	1210	1280
4	6450	2770	4030	3640	3000	3190	2580	878	1420	1430	1350	1390
5	2770	2610	2660	6580	3640	5100	1590	973	1300	1460	990	1260
6	2760	2680	2710	7270	5150	6450	1580	1460	1510	1300	997	1170
7	2690	2440	2600	6140	5170	5760	2030	1510	1630	1430	1300	1370
8	2440	2290	2340	5170	3870	4500	3110	1970	2530	1520	1420	1440
9	2290	2090	2170	5660	3840	4570	3060	2260	2670	1550	1260	1390
10	2120	2020	2070	5560	3280	3930	2260	1810	1940	1430	1280	1370
11	2200	2020	2100	3330	3090	3220	1940	1830	1860	1590	1430	1490
12	2340	2030	2130	3090	2600	2870	1930	1840	1860	1600	1440	1500
13	2760	2340	2620	3910	2600	2820	1920	1810	1840	1500	1440	1460
14	2480	2280	2350	6710	3910	5640	1910	1800	1830	1550	1470	1500
15	2470	2200	2370	5840	2910	4650	1810	1750	1770	1660	1380	1520
16	2200	2050	2100	2910	1760	2340	1850	1800	1830	1670	1500	1550
17	2210	2010	2060	1760	1300	1460	1880	1780	1810	1530	1480	1500
18	3700	1680	2570	1530	1380	1440	1940	1420	1810	1570	1490	1520
19	5620	3700	4690	1670	1530	1590	1850	1750	1790	1620	1520	1540
20	5070	3470	4230	1940	1670	1830	2140	1400	1740	1820	1300	1530
21	3850	3150	3560	2250	1870	1980	1740	1500	1630	1460	1410	1440
22	3190	2860	3040	2070	1870	1960	1740	1630	1680	1480	1420	1450
23	3590	2860	3290	2010	1880	1940	1690	1650	1670	1560	1480	1510
24	4280	3230	4010	2020	1840	1890	1740	1650	1670	1760	1480	1560
25	4380	3910	4080	2260	1800	1940	1750	1660	1670	1660	1460	1530
26	4150	3840	3940	1980	1730	1820	1770	1660	1680	1510	1450	1470
27	3840	3390	3540	1900	1720	1770	1770	1450	1650	1560	1360	1470
28	3570	3020	3240	2210	1770	1920	1680	1640	1660	1560	1490	1530
29	---	---	---	2100	1470	1670	1760	1640	1670	1600	1430	1480
30	---	---	---	1660	1490	1590	1730	1200	1620	1680	1300	1450
31	---	---	---	1910	1640	1710	---	---	---	1340	772	947
MONTH	7140	1680	3140	7270	1300	2940	3110	878	1770	1820	772	1420

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	1080	846	990	1370	1290	1320	1680	912	1390	1290	929	1160
2	1200	1080	1160	1450	1320	1380	1780	1160	1280	1150	1050	1110
3	1300	1200	1240	1490	1360	1390	1180	888	1130	1160	1080	1110
4	1390	1300	1320	1500	1060	1380	1200	1030	1130	1240	1040	1150
5	1460	1370	1420	1640	1300	1390	1420	875	1140	1290	1190	1230
6	1410	1350	1360	1330	1160	1230	1160	842	927	1270	1170	1210
7	1440	1380	1400	1360	1210	1310	993	808	931	1350	1180	1270
8	1570	1250	1410	1420	1140	1340	1070	931	1000	1350	1270	1290
9	1340	1070	1170	1460	1220	1350	1140	1030	1100	1440	1300	1340
10	1290	1160	1210	1280	1150	1190	1240	1130	1160	1420	1310	1350
11	1370	1290	1330	1440	1190	1270	1220	1180	1190	1410	1320	1350
12	1550	998	1270	1220	1140	1160	1230	468	1020	1510	1320	1380
13	1130	973	1060	1220	700	1140	810	483	647	1430	1330	1360
14	1260	1130	1190	1290	738	1180	1010	810	924	1470	1210	1340
15	1290	1250	1270	1300	1260	1280	1090	454	861	1540	1040	1260
16	1370	1280	1310	1380	1280	1300	865	496	691	1140	1010	1080
17	1420	1330	1350	1380	1340	1360	941	593	807	1190	1070	1110
18	1490	1040	1390	1490	1350	1390	1070	941	1010	1290	1100	1150
19	1470	614	814	1470	1360	1380	1170	1070	1120	1360	744	986
20	1010	830	924	1450	1380	1400	1260	1170	1230	991	875	938
21	1120	1010	1060	1660	1370	1480	1330	1260	1270	1090	991	1040
22	1190	1120	1160	1480	1330	1390	1370	1270	1330	1140	467	731
23	1240	1170	1200	1450	1330	1360	1420	1360	1380	841	515	763
24	1290	1050	1230	1380	1320	1340	1360	1330	1340	967	677	874
25	1360	1240	1270	1400	1330	1360	1380	1330	1350	803	605	679
26	1320	1160	1280	1450	1340	1380	1460	1180	1310	1050	758	869
27	1680	1280	1460	1400	1350	1370	1220	1150	1180	1000	741	828
28	1610	1290	1370	1480	1380	1420	1200	1090	1140	999	802	902
29	1610	1060	1220	1440	1380	1400	1190	835	1080	1100	996	1050
30	1300	1120	1230	1520	1400	1440	1360	1020	1250	1220	1100	1140
31	---	---	---	1460	1370	1410	1340	1230	1270	---	---	---
MONTH	1680	614	1240	1660	700	1340	1780	454	1120	1540	467	1100
YEAR	7270	454	1730									

STREAMS TRIBUTARY TO DETROIT RIVER

04166100 RIVER ROUGE AT SOUTHFIELD, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	19.0	17.0	18.0	6.5	4.5	5.0	1.5	0.0	0.5	2.0	1.0	1.5
2	19.5	18.5	19.0	5.0	4.0	4.5	0.0	0.0	0.0	1.0	0.0	0.0
3	19.0	17.0	17.5	5.0	3.5	4.0	0.5	0.0	0.0	0.0	0.0	0.0
4	19.0	17.0	17.5	5.5	4.0	5.0	1.0	0.0	0.0	0.0	0.0	0.0
5	18.5	15.5	17.0	6.0	4.0	4.5	0.5	0.0	0.0	0.5	0.0	0.0
6	15.5	14.0	14.5	5.5	4.5	5.0	0.5	0.0	0.0	0.5	-0.5	0.0
7	14.5	11.5	13.5	5.5	4.5	5.0	0.0	0.0	0.0	0.5	0.0	0.0
8	12.5	11.0	11.5	7.0	5.0	6.0	0.0	0.0	0.0	0.5	0.0	0.0
9	12.0	10.5	11.5	8.5	6.0	7.0	0.5	0.0	0.0	1.0	0.0	0.5
10	13.0	11.0	12.0	12.0	8.5	10.0	0.5	0.0	0.0	1.0	-0.5	0.0
11	13.5	12.0	13.0	12.0	10.0	11.0	0.0	0.0	0.0	0.0	-0.5	0.0
12	14.5	12.5	13.5	10.0	8.0	9.0	1.0	0.0	0.0	0.0	0.0	0.0
13	14.0	11.0	13.0	8.0	6.5	7.0	0.5	0.0	0.0	0.0	0.0	0.0
14	11.0	9.0	10.0	8.0	6.5	7.0	0.0	0.0	0.0	0.0	0.0	0.0
15	10.0	8.0	9.0	8.5	6.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0
16	10.0	8.0	9.0	6.0	4.0	4.5	0.0	0.0	0.0	0.5	0.0	0.0
17	8.0	7.0	7.5	4.0	3.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
18	9.5	7.0	8.0	3.5	2.0	3.0	1.0	0.0	0.0	0.0	0.0	0.0
19	10.0	8.5	9.0	5.0	3.0	4.0	3.5	0.0	1.0	0.0	0.0	0.0
20	9.0	7.5	8.0	5.5	4.5	5.0	4.0	3.0	3.5	0.0	0.0	0.0
21	8.0	6.5	7.0	7.0	5.5	6.0	3.0	1.5	2.0	0.0	0.0	0.0
22	8.5	7.0	8.0	6.5	4.0	5.0	1.5	1.0	1.0	0.0	0.0	0.0
23	8.5	7.0	8.0	4.0	3.5	3.5	1.0	0.5	0.5	0.0	0.0	0.0
24	7.0	6.0	6.5	4.0	3.0	3.5	0.5	0.0	0.0	0.0	0.0	0.0
25	8.0	5.5	6.5	4.0	3.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
26	8.0	6.5	7.5	3.0	1.5	2.0	0.5	-0.5	0.0	0.0	0.0	0.0
27	8.5	7.5	8.0	1.5	0.5	1.0	0.0	-0.5	0.0	0.0	0.0	0.0
28	8.0	7.0	7.5	1.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0
29	7.5	5.5	6.0	2.5	0.5	1.5	0.5	0.0	0.0	0.0	0.0	0.0
30	6.0	5.0	5.5	2.5	1.5	2.0	1.5	0.0	0.5	0.0	0.0	0.0
31	6.0	4.5	5.0	—	—	—	3.0	1.5	2.5	0.0	0.0	0.0
MONTH	19.5	4.5	10.6	12.0	0.5	4.8	4.0	-0.5	0.4	2.0	-0.5	0.1

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	9.5	5.5	7.5	15.5	12.5	13.5
2	0.0	-0.5	-0.5	0.0	-0.5	0.0	11.5	8.0	10.0	15.0	12.0	13.0
3	1.0	-0.5	0.0	0.0	-0.5	-0.5	10.5	7.5	9.0	13.0	10.5	12.0
4	0.5	-0.5	0.0	0.0	-0.5	0.0	7.5	4.0	5.0	14.0	10.5	12.5
5	0.0	0.0	0.0	0.0	-0.5	-0.5	4.0	3.0	3.0	14.5	12.0	13.0
6	0.0	0.0	0.0	-0.5	-0.5	-0.5	4.0	2.0	3.0	16.0	13.0	14.5
7	0.0	0.0	0.0	-0.5	-0.5	-0.5	3.5	1.5	2.0	15.5	13.0	14.0
8	0.0	0.0	0.0	1.5	-0.5	0.0	3.0	1.5	2.0	14.0	12.0	13.0
9	0.0	0.0	0.0	-0.5	-0.5	-0.5	6.0	2.0	4.0	15.5	12.5	14.0
10	0.0	0.0	0.0	0.0	-0.5	-0.5	7.5	4.0	6.0	16.5	14.5	15.5
11	0.0	0.0	0.0	0.0	-0.5	0.0	10.0	6.0	8.0	17.0	14.5	16.0
12	0.0	0.0	0.0	0.5	-0.5	0.0	11.0	8.0	9.5	14.5	11.5	12.5
13	0.0	0.0	0.0	0.0	-0.5	0.0	11.0	7.5	9.5	14.5	10.5	12.5
14	0.0	0.0	0.0	0.0	-0.5	-0.5	12.5	8.0	10.5	16.0	12.0	14.0
15	0.0	0.0	0.0	0.0	-0.5	-0.5	16.0	11.5	13.5	15.0	13.5	14.0
16	0.0	0.0	0.0	0.0	-0.5	0.0	15.0	12.0	14.0	14.0	13.0	13.5
17	0.0	0.0	0.0	0.0	0.0	0.0	12.0	9.5	10.0	17.0	13.5	15.0
18	1.5	0.0	0.0	3.5	0.0	2.0	10.0	8.5	9.5	16.0	14.5	15.5
19	0.0	-0.5	0.0	4.0	2.5	3.5	14.0	10.0	12.0	18.0	15.0	16.5
20	0.0	-0.5	0.0	8.0	4.0	5.5	15.0	13.0	14.0	17.5	15.5	16.5
21	0.0	-0.5	0.0	7.0	5.5	6.0	14.5	12.0	13.0	16.0	13.5	15.0
22	0.0	-0.5	0.0	5.5	4.5	5.0	12.0	8.5	10.0	15.5	12.5	14.0
23	0.0	-0.5	0.0	5.5	4.0	5.0	11.0	7.0	9.0	14.5	13.0	13.5
24	0.0	-0.5	-0.5	8.0	4.0	6.0	12.5	8.5	10.5	13.0	12.0	12.5
25	0.0	-0.5	-0.5	10.5	7.5	9.0	12.5	10.0	11.5	13.5	11.0	12.5
26	0.0	-0.5	-0.5	9.5	7.5	8.5	14.0	9.5	11.5	14.0	13.0	13.5
27	0.0	-0.5	-0.5	9.5	6.5	8.0	14.5	10.0	12.5	14.0	12.5	13.5
28	0.0	-0.5	0.0	11.5	7.5	9.5	16.5	12.0	14.5	16.0	13.0	14.5
29	—	—	—	11.0	6.5	9.0	16.5	13.0	15.0	17.5	15.0	16.0
30	—	—	—	6.5	5.0	5.5	15.0	13.0	14.0	17.0	16.0	16.5
31	—	—	—	6.5	4.0	5.0	—	—	—	16.5	14.0	15.0
MONTH	1.5	-0.5	-0.1	11.5	-0.5	2.7	16.5	1.5	9.4	18.0	10.5	14.1

STREAMS TRIBUTARY TO DETROIT RIVER

04166100 RIVER ROUGE AT SOUTHFIELD, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.5	12.5	13.5	22.0	19.0	20.5	22.5	19.5	20.5	18.5	17.5	18.0
2	15.5	13.0	14.5	22.5	19.5	21.0	22.0	20.0	21.0	19.0	17.0	18.0
3	15.5	14.5	14.5	23.5	20.0	21.5	21.5	20.5	21.0	19.5	17.0	18.5
4	14.5	13.0	13.5	23.5	21.5	22.5	22.0	20.0	21.0	18.5	18.0	18.5
5	13.5	13.0	13.0	23.0	22.0	22.5	22.0	20.0	21.0	18.0	16.5	17.5
6	15.5	13.0	14.0	23.0	21.0	22.0	22.5	21.0	21.5	18.0	15.5	17.0
7	17.0	15.0	16.0	22.5	21.5	22.0	23.0	21.0	22.0	19.0	16.0	17.5
8	16.5	15.5	16.0	24.0	21.5	22.5	23.0	21.5	22.0	19.5	17.5	18.5
9	17.0	15.5	16.5	23.0	21.5	22.0	23.0	21.0	22.0	19.5	17.5	18.5
10	16.5	16.0	16.5	22.0	21.0	21.5	21.5	20.5	21.0	19.5	17.0	18.0
11	18.5	16.5	17.5	21.5	19.0	20.5	21.5	20.0	21.0	19.5	17.0	18.5
12	18.0	16.0	17.0	20.5	18.0	19.0	22.0	20.5	21.0	19.5	17.5	18.5
13	17.5	16.0	16.5	21.0	18.0	19.5	22.0	21.0	21.5	19.5	17.0	18.5
14	19.0	16.5	17.5	22.0	19.0	20.0	23.0	21.0	22.0	21.0	18.0	19.0
15	20.0	17.0	18.5	20.5	19.5	20.0	24.5	21.5	23.0	19.5	18.0	19.0
16	20.0	17.5	18.5	22.0	19.0	20.0	25.0	23.0	23.5	18.5	16.5	17.5
17	19.0	17.5	18.0	22.5	19.0	20.5	24.0	21.0	22.5	18.5	16.5	17.5
18	20.5	17.5	19.0	22.5	20.0	21.0	21.5	19.5	20.5	18.5	16.5	17.5
19	20.0	19.0	19.5	21.5	18.0	20.0	21.5	19.0	20.5	18.5	17.5	18.0
20	19.5	17.5	18.5	20.5	18.5	19.5	22.0	19.0	20.5	17.5	16.0	16.5
21	19.0	17.0	18.0	20.5	19.5	20.0	23.0	20.0	21.5	16.5	14.5	15.5
22	20.5	17.5	19.0	20.5	19.0	20.0	23.5	21.5	22.5	18.0	15.5	16.5
23	21.5	18.0	20.0	20.5	18.5	19.5	21.5	19.5	20.5	17.5	15.5	16.5
24	22.0	19.0	20.5	21.0	18.0	19.5	20.0	18.5	19.5	16.0	14.0	15.0
25	23.5	20.5	22.0	21.5	18.5	20.0	21.5	18.5	20.0	16.0	14.0	15.0
26	23.0	21.5	22.0	20.5	19.0	20.0	22.5	20.0	21.5	14.5	13.0	13.5
27	21.5	19.5	21.0	22.5	20.0	21.0	23.5	21.5	22.0	15.5	14.5	15.0
28	20.5	19.0	19.5	22.0	19.5	21.0	21.5	19.5	20.5	14.5	13.0	14.0
29	20.0	18.5	19.5	21.5	18.5	20.0	21.5	20.0	21.0	13.0	11.5	12.5
30	20.5	18.5	19.5	22.0	18.5	20.0	21.0	19.0	20.0	11.5	10.5	11.0
31	---	---	---	21.5	19.0	20.5	19.0	17.5	18.5	---	---	---
MONTH	23.5	12.5	17.6	24.0	18.0	20.6	25.0	17.5	21.2	21.0	10.5	16.8
YEAR	25.0	-0.5	9.9									

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.6	7.0	8.1	12.6	10.5	11.4	---	---	---	---	---	---
2	8.1	7.1	7.5	12.8	10.8	11.6	---	---	---	---	---	---
3	8.0	7.2	7.5	13.3	11.0	11.9	---	---	---	---	---	---
4	8.1	7.2	7.7	13.0	10.8	11.7	---	---	---	---	---	---
5	8.2	7.2	7.8	12.1	10.6	11.2	---	---	---	---	---	---
6	9.3	8.2	8.7	10.7	9.7	10.1	---	---	---	---	---	---
7	9.6	8.4	9.0	11.7	9.7	10.5	---	---	---	---	---	---
8	10.1	9.2	9.6	11.6	9.8	10.5	---	---	---	---	---	---
9	10.2	9.5	9.7	11.0	8.9	9.9	---	---	---	---	---	---
10	10.1	9.2	9.6	8.9	7.8	8.3	---	---	---	---	---	---
11	9.8	8.9	9.3	8.6	7.8	8.2	---	---	---	---	---	---
12	9.8	8.6	9.1	9.4	8.6	9.1	---	---	---	---	---	---
13	9.5	8.3	8.8	---	---	---	---	---	---	---	---	---
14	10.4	8.8	9.7	---	---	---	---	---	---	---	---	---
15	11.1	9.9	10.4	---	---	---	---	---	---	---	---	---
16	11.0	9.8	10.3	---	---	---	---	---	---	---	---	---
17	11.9	10.2	11.0	---	---	---	---	---	---	---	---	---
18	11.7	10.4	10.9	---	---	---	---	---	---	---	---	---
19	10.7	9.5	10.1	---	---	---	---	---	---	---	---	---
20	11.6	9.5	10.5	---	---	---	---	---	---	---	---	---
21	12.2	10.4	11.1	---	---	---	---	---	---	---	---	---
22	12.4	10.2	11.1	---	---	---	---	---	---	---	---	---
23	12.5	10.2	11.1	---	---	---	---	---	---	---	---	---
24	13.2	10.7	11.8	---	---	---	---	---	---	---	---	---
25	12.8	10.6	11.5	---	---	---	---	---	---	---	---	---
26	11.0	9.8	10.2	---	---	---	---	---	---	---	---	---
27	11.4	9.8	10.4	---	---	---	---	---	---	---	---	---
28	11.8	9.9	10.6	---	---	---	---	---	---	---	---	---
29	11.6	10.1	10.7	---	---	---	---	---	---	---	---	---
30	12.5	10.5	11.3	---	---	---	---	---	---	---	---	---
31	13.1	10.8	11.6	---	---	---	---	---	---	---	---	---
MONTH	13.2	7.0	9.9	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04166100 RIVER ROUGE AT SOUTHFIELD, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	14.1	11.5	12.7	8.9	8.1	8.4
2	---	---	---	---	---	---	---	---	---	9.3	8.1	8.9
3	---	---	---	---	---	---	---	---	---	10.9	9.0	9.9
4	---	---	---	---	---	---	12.0	10.1	11.2	11.5	9.2	10.2
5	---	---	---	---	---	---	12.8	11.7	12.4	9.3	8.0	8.7
6	---	---	---	---	---	---	13.7	12.8	13.2	9.4	7.9	8.6
7	---	---	---	---	---	---	14.0	12.9	13.4	9.4	7.9	8.6
8	---	---	---	---	---	---	14.4	13.7	14.0	10.7	8.7	9.5
9	---	---	---	---	---	---	14.2	12.4	13.6	9.8	8.5	9.2
10	---	---	---	---	---	---	13.8	11.6	12.8	10.0	8.2	9.0
11	---	---	---	---	---	---	13.3	10.8	12.1	9.2	8.0	8.6
12	---	---	---	---	---	---	13.3	10.5	11.7	10.5	8.4	9.4
13	---	---	---	---	---	---	14.1	10.6	12.1	11.3	8.9	10.2
14	---	---	---	---	---	---	14.5	10.5	12.2	11.1	8.4	9.5
15	---	---	---	---	---	---	14.5	9.3	11.4	9.5	8.1	8.7
16	---	---	---	---	---	---	13.1	8.3	10.6	10.5	8.4	9.3
17	---	---	---	---	---	---	14.5	9.8	12.0	11.4	8.5	9.7
18	---	---	---	---	---	---	13.2	10.6	11.8	11.2	8.0	9.4
19	---	---	---	---	---	---	15.3	10.5	12.5	11.3	8.7	9.7
20	---	---	---	---	---	---	12.6	8.5	10.3	8.8	7.9	8.2
21	---	---	---	---	---	---	10.0	8.5	9.3	11.1	8.1	9.6
22	---	---	---	13.3	11.9	12.6	12.6	9.6	11.2	11.2	9.0	9.9
23	---	---	---	13.9	12.5	13.1	14.5	11.4	12.7	10.4	8.5	9.4
24	---	---	---	14.2	11.9	13.1	14.5	10.7	12.3	10.6	8.8	9.5
25	---	---	---	13.0	11.1	11.9	13.6	9.7	11.4	11.6	8.8	10.0
26	---	---	---	14.0	10.9	12.3	11.8	7.9	9.9	10.7	8.7	9.6
27	---	---	---	15.0	11.4	13.0	---	---	---	11.3	8.8	9.8
28	---	---	---	13.6	10.8	12.1	---	---	---	11.9	8.6	9.9
29	---	---	---	11.8	10.3	11.0	12.9	7.9	10.0	11.2	8.0	9.2
30	---	---	---	14.1	11.6	12.8	10.9	8.0	9.1	9.2	6.8	8.1
31	---	---	---	14.4	12.3	13.3	---	---	---	8.8	7.8	8.4
MONTH	---	---	---	---	---	---	---	---	---	11.9	6.8	9.3

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.9	8.8	9.4	8.1	7.4	7.7	10.4	6.5	8.3	8.5	7.9	8.1
2	9.9	9.0	9.4	7.9	7.2	7.5	7.5	5.8	6.6	8.7	8.0	8.3
3	9.5	8.8	9.1	7.8	7.0	7.4	7.5	6.1	6.7	8.9	7.8	8.3
4	9.6	9.1	9.3	7.5	5.9	6.8	7.8	6.5	7.0	8.9	7.8	8.2
5	10.0	9.2	9.5	7.3	6.0	6.6	8.4	6.7	7.3	9.3	8.1	8.6
6	9.9	8.9	9.6	7.3	6.0	6.7	7.9	6.7	7.3	9.7	8.4	8.9
7	9.1	8.4	8.8	7.1	6.4	6.8	8.6	7.0	7.6	10.0	8.3	9.0
8	8.7	7.7	8.3	7.7	6.6	7.1	8.6	6.7	7.6	10.1	8.1	8.8
9	8.7	8.0	8.4	7.3	6.8	7.1	9.2	7.3	8.0	10.0	7.9	8.7
10	8.9	7.8	8.5	7.5	7.1	7.2	9.2	7.3	8.1	10.7	7.8	8.9
11	8.4	7.8	8.1	7.6	7.1	7.3	9.3	7.4	8.2	10.6	7.8	8.8
12	8.5	7.7	8.1	8.6	7.4	8.1	9.2	5.3	7.6	10.5	7.7	8.7
13	8.7	8.3	8.5	8.7	5.8	8.1	7.2	6.5	7.0	10.4	7.7	8.7
14	8.6	8.0	8.3	8.2	7.1	7.8	7.7	6.9	7.2	10.0	7.5	8.3
15	8.3	7.6	8.0	8.2	7.5	7.8	7.7	6.2	6.8	7.8	6.4	7.2
16	8.4	7.6	8.0	8.5	7.5	7.9	7.0	6.2	6.6	8.8	7.3	8.1
17	8.2	7.5	8.0	8.3	7.4	7.8	7.3	6.3	7.0	9.3	7.7	8.3
18	8.2	7.3	7.9	8.6	7.3	7.8	7.9	7.1	7.5	10.0	8.0	8.8
19	7.4	6.8	7.1	9.0	7.5	8.1	8.0	7.4	7.6	9.0	8.1	8.4
20	8.4	7.3	8.1	8.9	7.6	8.2	8.1	7.3	7.6	10.0	8.6	9.3
21	8.6	8.0	8.3	7.7	7.0	7.4	8.1	7.0	7.6	10.9	9.4	10.1
22	8.2	7.7	8.0	8.5	6.7	7.4	7.7	6.8	7.1	10.1	8.9	9.5
23	8.3	7.6	7.9	9.2	7.5	8.2	8.4	6.7	7.5	9.7	9.0	9.4
24	8.2	7.5	7.8	9.5	7.7	8.4	9.2	7.5	8.2	---	---	---
25	7.8	7.1	7.5	9.9	7.7	8.5	9.4	7.7	8.3	---	---	---
26	7.7	6.9	7.3	9.8	7.5	8.4	7.9	6.1	7.1	9.4	8.0	8.9
27	7.5	5.5	6.7	10.2	7.3	8.4	7.7	6.1	6.8	---	---	---
28	7.9	7.2	7.5	10.7	7.2	8.4	8.4	6.7	7.5	---	---	---
29	8.2	7.1	7.5	11.0	7.5	8.8	7.5	6.2	7.1	---	---	---
30	8.1	7.0	7.6	11.2	7.6	8.9	8.5	6.4	7.5	---	---	---
31	---	---	---	11.6	7.5	9.0	9.1	7.6	8.2	---	---	---
MONTH	10.0	5.5	8.2	11.6	5.8	7.8	10.4	5.3	7.4	---	---	---

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 Nine Mile Road in Southfield, 1.6 mi upstream from mouth.

DRAINAGE AREA.--9.49 mi^2.

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 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.77	e0.96	1.6	2.3	e1.3	e1.5	4.5	75	8.0	2.2	3.2	10
2	1.1	e0.98	1.5	1.8	e1.6	e1.6	3.8	33	5.2	2.0	4.8	4.4
3	3.9	e1.1	1.6	2.2	e2.5	e1.6	3.3	7.9	4.1	1.9	4.1	2.0
4	16	4.7	1.7	2.0	e5.0	e1.6	61	6.8	5.8	2.4	23	1.7
5	2.9	6.5	1.7	1.7	e1.3	e1.7	43	49	6.0	3.8	29	1.6
6	0.82	2.7	1.6	2.4	e1.2	e1.7	13	13	3.7	2.9	7.7	1.4
7	0.90	0.65	1.4	1.8	e1.2	e1.7	11	7.2	3.4	2.8	44	1.3
8	0.85	0.88	1.3	e1.7	e1.2	e4.0	12	8.4	8.8	1.8	15	1.3
9	0.77	1.4	1.2	e1.6	e1.1	e3.5	14	16	3.9	3.7	2.7	1.4
10	0.78	38	1.3	e1.5	e1.1	e3.0	11	6.9	5.7	4.6	2.1	1.5
11	0.78	5.5	1.4	e1.4	e1.1	e2.8	7.5	7.7	4.5	6.8	2.0	1.3
12	0.81	1.7	1.4	e1.3	e1.1	e3.5	5.8	8.0	19	2.0	6.1	1.4
13	1.7	1.3	1.6	e1.2	e1.1	e5.0	4.8	4.3	5.9	1.7	2.8	1.4
14	0.74	1.4	1.8	e1.2	1.1	9.3	4.4	3.8	3.6	1.7	2.0	2.5
15	0.75	8.4	1.6	e1.1	1.1	27	4.2	6.3	3.0	1.5	33	10
16	0.80	1.5	1.9	e1.1	1.1	32	3.9	3.8	2.7	1.5	35	1.5
17	0.75	1.3	1.4	e1.1	e1.1	16	3.7	3.4	3.5	1.5	5.1	1.5
18	0.95	1.4	4.4	1.1	e1.2	9.5	3.5	3.1	10	1.5	2.4	1.2
19	2.9	4.7	22	e1.0	e1.2	5.9	3.3	3.2	54	1.5	2.0	20
20	0.60	1.4	15	e1.0	e1.2	13	47	20	4.6	2.1	1.8	1.9
21	0.66	9.1	2.9	e1.0	e1.2	14	11	4.6	3.5	2.6	2.0	1.5
22	0.71	16	2.1	e1.0	e1.2	6.9	5.8	3.6	3.0	2.1	3.3	88
23	0.87	2.3	1.8	e1.0	e1.3	4.9	4.4	3.0	2.7	1.5	1.7	7.1
24	0.90	1.6	e1.7	e1.0	e1.3	4.3	4.0	5.8	2.6	1.3	1.7	28
25	4.6	1.6	e1.6	e1.0	e1.3	7.3	3.7	3.2	2.4	1.4	1.9	16
26	2.6	1.4	e1.6	e1.0	e1.4	4.4	3.3	2.7	7.1	1.3	7.4	3.5
27	0.69	1.4	e1.7	e1.0	e1.4	4.7	3.0	2.8	3.5	1.4	2.0	e14
28	e0.72	1.3	1.7	e1.1	e1.4	11	3.0	2.8	8.0	1.4	1.5	e1.7
29	e0.82	1.4	2.2	e1.1	—	27	2.9	e2.6	11	1.2	6.4	e1.4
30	e0.94	1.6	3.9	e1.1	—	5.6	11	e11	3.4	1.3	1.6	e1.4
31	e0.95	—	6.9	e1.2	—	4.4	—	82	—	1.3	1.3	—
TOTAL	54.03	124.17	95.5	42.0	39.3	240.4	316.8	410.9	212.6	66.7	258.6	231.9
MEAN	1.74	4.14	3.08	1.35	1.40	7.75	10.6	13.3	7.09	2.15	8.34	7.73
MAX	16	38	22	2.4	5.0	32	61	82	54	6.8	44	88
MIN	0.60	0.65	1.2	1.0	1.1	1.5	2.9	2.6	2.4	1.2	1.3	1.2
CFSM	0.18	0.44	0.32	0.14	0.15	0.82	1.11	1.40	0.75	0.23	0.88	0.81
IN.	0.21	0.49	0.37	0.16	0.15	0.94	1.24	1.61	0.83	0.26	1.01	0.91

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2003, BY WATER YEAR (WY)

MEAN	6.11	7.49	8.41	7.23	9.82	13.6	13.5	9.62	9.61	7.21	7.08	6.61
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1958 - 2003	
ANNUAL TOTAL	2315.67		2092.90			
ANNUAL MEAN	6.34		5.73		8.85	
HIGHEST ANNUAL MEAN					16.9	1968
LOWEST ANNUAL MEAN					3.12	1963
HIGHEST DAILY MEAN	115	Apr 13	88	Sep 22	442	Oct 1 1981
LOWEST DAILY MEAN	0.51	Sep 1	0.60	Oct 20	0.00	(a)
ANNUAL SEVEN-DAY MINIMUM	0.57	Aug 27	0.82	Oct 6	0.27	Dec 15 1963
MAXIMUM PEAK FLOW			355	Aug 7	(b)1200	Oct 1 1981
MAXIMUM PEAK STAGE			10.39	Aug 7	(c)15.03	Oct 1 1981
ANNUAL RUNOFF (CFSM)	0.67		0.60		0.93	
ANNUAL RUNOFF (INCHES)	9.08		8.20		12.67	
10 PERCENT EXCEEDS	12		12		18	
50 PERCENT EXCEEDS	3.0		2.1		3.4	
90 PERCENT EXCEEDS	0.82		1.1		1.2	

(a) June 13-15, 1986, result of regulation from unknown source.
(b) From rating curve extended above 500 ft^3/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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.3	5.2	6.8	11	e3.8	e4.8	14	77	29	5.9	11	7.9
2	5.6	5.2	e5.7	8.1	e3.8	e5.0	12	76	15	5.7	12	9.2
3	7.4	5.0	e5.3	8.3	e7.2	e5.3	11	37	12	5.1	6.7	6.7
4	13	5.2	e6.0	7.7	e19	e5.9	112	23	11	5.4	7.2	5.5
5	15	5.8	e5.5	7.2	e12	e5.8	128	59	12	11	8.9	4.7
6	8.8	8.5	e5.1	6.8	e7.9	e5.8	56	46	10	8.5	11	4.3
7	6.8	6.2	e5.1	e6.4	e6.0	e5.6	35	27	8.7	7.1	6.4	3.8
8	6.1	5.8	e4.8	e6.8	e3.0	e8.7	29	23	17	6.6	5.0	3.9
9	5.7	5.7	e4.8	e7.9	e2.7	e14	29	36	19	8.5	4.2	4.1
10	5.3	32	e4.5	e7.2	e2.6	e10	30	26	13	6.6	4.0	4.0
11	5.1	28	e4.7	e6.1	e2.8	e7.5	23	21	11	9.7	4.2	3.9
12	5.1	15	e4.7	e5.5	e3.1	e8.5	18	23	34	6.9	33	3.8
13	5.7	11	e5.2	e5.1	e3.5	e10	15	18	30	8.6	27	3.5
14	5.1	9.3	e5.4	e4.8	e3.8	e11	13	15	18	5.5	11	4.7
15	5.2	15	e5.4	e4.5	e3.9	e28	12	16	12	5.4	21	9.1
16	5.4	11	e5.5	e4.2	e3.9	e58	11	16	9.1	5.2	11	6.0
17	5.3	9.3	e5.1	e4.0	e4.0	75	9.9	13	8.2	4.8	7.6	4.2
18	5.0	8.2	7.8	e3.7	e4.1	48	9.6	11	13	4.4	5.9	3.4
19	6.1	9.9	21	e3.5	e4.2	29	9.5	10	96	4.1	5.4	6.4
20	5.2	9.0	37	e3.4	e4.5	26	16	12	39	4.1	4.9	4.9
21	4.6	11	21	e3.2	e4.3	41	19	11	21	6.5	4.7	4.0
22	4.8	27	14	e3.2	e4.4	26	13	9.2	13	6.8	4.7	57
23	5.0	15	11	e3.1	e4.4	20	11	8.3	9.6	5.6	4.2	41
24	5.0	11	8.4	e3.1	e4.4	16	9.6	11	8.5	5.4	3.8	26
25	6.1	10	e7.3	e3.2	e4.5	17	9.6	9.5	6.9	4.6	3.7	41
26	8.7	8.8	e6.6	e3.3	e4.5	16	9.0	7.8	6.6	4.1	11	20
27	5.8	7.9	e6.0	e3.3	e4.6	12	8.6	7.4	6.5	4.1	7.6	26
28	5.4	7.6	e5.9	e3.3	e4.7	15	8.2	7.8	6.8	3.9	5.5	14
29	5.2	7.3	e6.1	e3.4	—	41	8.4	7.2	8.5	3.9	5.3	9.6
30	5.2	7.3	8.0	e3.6	—	23	11	6.9	6.3	3.8	4.5	7.7
31	5.2	—	14	e3.7	—	16	—	49	—	3.8	3.9	—
TOTAL	193.2	323.2	263.7	158.6	141.6	614.9	700.4	720.1	510.7	181.6	266.3	350.3
MEAN	6.23	10.8	8.51	5.12	5.06	19.8	23.3	23.2	17.0	5.86	8.59	11.7
MAX	15	32	37	11	19	75	128	77	96	11	33	57
MIN	4.6	5.0	4.5	3.1	2.6	4.8	8.2	6.9	6.3	3.8	3.7	3.4
CFSM	0.36	0.62	0.49	0.29	0.29	1.13	1.33	1.33	0.97	0.33	0.49	0.67
IN.	0.41	0.69	0.56	0.34	0.30	1.31	1.49	1.53	1.09	0.39	0.57	0.74

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 2003, BY WATER YEAR (WY)

MEAN	8.98	11.4	12.7	13.0	17.9	26.4	24.1	17.0	13.8	8.20	7.74	8.47
MAX	44.1	31.3	29.0	39.8	56.8	63.6	42.3	38.7	63.9	24.8	32.2	42.3
(WY)	2002	1993	1991	1974	2001	1982	1977	1983	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1958 - 2003	
ANNUAL TOTAL	5156.9		4424.6			
ANNUAL MEAN	14.1		12.1		14.2	
HIGHEST ANNUAL MEAN					22.6	1997
LOWEST ANNUAL MEAN					4.54	1964
HIGHEST DAILY MEAN	99	Mar 3	128	Apr 5	653	Jun 26 1968
LOWEST DAILY MEAN	3.1	Sep 9	2.6	Feb 10	0.32	Aug 10 1964
ANNUAL SEVEN-DAY MINIMUM	3.4	Sep 8	3.1	Feb 8	0.61	Sep 12 1964
MAXIMUM PEAK FLOW			188	Apr 5	1500	Jun 25 1968
MAXIMUM PEAK STAGE			4.34	Apr 5	8.70	Jun 25 1968
INSTANTANEOUS LOW FLOW					(a)0.07	Aug 30 1966
ANNUAL RUNOFF (CFSM)	0.81		0.69		0.81	
ANNUAL RUNOFF (INCHES)	10.96		9.41		11.02	
10 PERCENT EXCEEDS	28		26		30	
50 PERCENT EXCEEDS	9.9		7.2		7.9	
90 PERCENT EXCEEDS	4.6		3.9		2.4	

(a) Result of regulation.
(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166315 UPPER RIVER ROUGE AT CLARENCEVILLE, MI

LOCATION.--Lat 42°26'48", long 83°20'12", in NW1/4 SW1/4 sec.36, T.1 N., R.9 E., Oakland County, Hydrologic Unit 04090004, on left bank at downstream side of bridge on Middlebelt Road, in Clarenceville.

DRAINAGE AREA.--19.8 mi^2.

PERIOD OF RECORD.--Water years 2001 to 2003 (discontinued).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: June 2001 to September 2003.
WATER TEMPERATURE: June 2001 to September 2003.

INSTRUMENTATION.--Water-quality monitor, set for 15 minute measurement interval, specific conductance range 0-7,000 microsiemens.

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. 23-28, Nov. 10-26, Jan. 2-16, Apr. 4-14, May 31 to June 19, Sept. 20-30, rated good. Water temperature records rated excellent except for the following periods: Oct. 1-5, Apr. 15, 28, 29, May 1, 5-7, 9-11, 14, 17-21, 27-31, June 2-3, June 6 to Sept. 27, rated good; Sept. 28-30, rated fair.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum recorded, 7,000 microsiemens, Feb. 1, 18, 23, 24, Mar. 4, 5, 6, 8, 2003, but was probably higher due to instrumentation limitations; minimum recorded, 156 microsiemens, Aug. 5, 2003.
WATER TEMPERATURE: Maximum recorded, 27.5°C, July 4, 2003; minimum, 0.0°C, on many days during winter periods.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum recorded, 7,000 microsiemens, Feb. 1, 18, 23, 24, Mar. 4, 5, 6, 8, but was probably higher due to instrumentation limitations; minimum recorded, 156 microsiemens, Aug. 5.
WATER TEMPERATURE: Maximum recorded, 27.5°C, July 4; minimum, 0.0°C, on many days during winter period.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	1320	1210	1240	1430	1270	1330	2450	2070	2250
2	---	---	---	1270	1220	1250	3050	1420	1710	2520	1970	2080
3	---	---	---	1270	1230	1240	4300	2080	2820	3750	2060	2830
4	1390	348	1030	1290	1230	1260	3140	1950	2350	3540	2360	2640
5	1070	702	904	2180	909	1250	2440	1900	2140	2660	2450	2550
6	1170	971	1010	1340	1090	1200	2350	1830	2060	6060	2520	4140
7	1200	1070	1090	1260	1190	1220	2030	1760	1870	5110	2980	3730
8	1170	1100	1130	1260	1220	1240	1790	1600	1700	4020	2960	3350
9	1200	1160	1180	1270	1230	1250	1720	1580	1640	3300	2700	2890
10	1220	1180	1200	1350	314	733	1670	1540	1600	2810	2510	2610
11	1260	1200	1220	851	679	778	1610	1480	1530	2910	2420	2720
12	1250	1220	1240	988	848	924	2100	1420	1530	2680	2460	2560
13	1770	1150	1230	1090	970	1040	1610	1420	1490	2480	2160	2300
14	1260	1040	1170	1880	867	1160	1500	1400	1450	2160	1930	2040
15	1290	1250	1270	1170	780	961	2170	1350	1440	1940	1840	1890
16	1300	1250	1270	1100	993	1070	1910	1500	1650	1910	1820	1860
17	1290	1260	1280	1190	1100	1140	1610	1470	1530	1890	1830	1850
18	1420	528	1300	1220	1140	1180	6710	1520	2720	1890	1810	1860
19	1290	816	1180	1670	935	1120	3160	1120	2190	1820	1700	1750
20	1310	1220	1260	1250	1140	1170	1930	1510	1650	1750	1700	1730
21	1290	1240	1270	1940	491	1090	1630	1530	1580	1770	1680	1720
22	1300	1250	1280	1020	594	903	1700	1560	1640	1710	1660	1680
23	1310	1240	1270	1090	933	1020	1650	1580	1610	1670	1630	1650
24	1280	1240	1260	1160	1060	1120	1660	1440	1590	1630	1550	1590
25	1490	471	1190	1230	1160	1200	3280	1410	2010	1570	1530	1550
26	1260	844	1100	1240	1190	1210	3340	2030	2590	2600	1540	1830
27	1180	1120	1150	1270	1190	1230	3150	2200	2540	2610	1580	2040
28	1210	1170	1190	1280	1210	1250	2800	2300	2480	2360	1820	2050
29	1240	1190	1210	1290	1230	1260	2630	2180	2440	4900	1990	3210
30	1260	1210	1230	1680	1250	1360	3480	2330	2740	4780	2890	3290
31	1260	1220	1240	---	---	---	2770	2380	2490	3180	2210	2510
MONTH	---	---	---	2180	314	1140	6710	1120	1940	6060	1530	2350

STREAMS TRIBUTARY TO DETROIT RIVER

04166315 UPPER RIVER ROUGE AT CLARENCEVILLE, MI

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	7000	2220	4720	2940	2200	2400	2310	2130	2190	1630	464	1260
2	5900	4000	4730	3680	2480	3020	2230	2080	2140	1630	1040	1430
3	5240	2970	3460	2940	2380	2640	2140	2080	2110	1730	1580	1650
4	5240	2400	3210	7000	2740	4480	2420	732	1520	1820	1680	1750
5	2770	2390	2500	7000	3730	5510	1950	1350	1670	1860	483	1320
6	2470	2170	2360	7000	4310	5920	1790	1470	1640	1620	1420	1520
7	2170	1900	2050	6990	4640	4990	5130	1700	2620	1900	1540	1630
8	1910	1790	1850	7000	1730	3950	3710	2580	3190	1770	1630	1690
9	1880	1760	1800	4860	2980	3880	3120	2310	2740	2160	909	1450
10	1990	1730	1830	4240	1240	3170	2520	2290	2410	1770	1540	1610
11	1990	1780	1890	1240	956	1050	2350	2200	2280	1930	1200	1620
12	3260	1850	2250	980	830	914	2260	2130	2210	1710	1530	1620
13	3240	2050	2350	3500	835	1950	2220	2090	2160	1710	1600	1650
14	2480	1940	2080	2330	1440	2040	2240	2050	2120	1900	1620	1670
15	1960	1700	1800	2610	998	1590	2150	1950	2050	2100	1430	1630
16	1710	1580	1650	2690	1380	1990	2070	1940	2000	1700	1570	1630
17	1860	1570	1650	1760	1450	1630	2100	1960	2010	1720	1600	1650
18	7000	1760	4080	1900	1690	1790	---	---	---	1720	1600	1640
19	6090	2570	3980	2880	1900	2060	---	---	---	1720	1600	1640
20	4510	2710	3110	3140	1160	2310	---	---	---	1830	894	1490
21	3610	1720	2880	2980	1990	2230	---	---	---	1770	1600	1660
22	5390	2390	2930	2330	2080	2170	---	---	---	1760	1630	1680
23	7000	2620	4140	2200	2110	2150	---	---	---	1770	1620	1680
24	7000	3280	4510	2130	2100	2120	---	---	---	2190	1500	1670
25	5280	3260	3820	2820	1990	2160	---	---	---	1780	1540	1660
26	4290	2840	3210	2280	2040	2100	1890	1800	1850	1790	1640	1690
27	3680	2600	2960	2120	2060	2090	1860	1710	1810	2430	1270	1710
28	3050	2320	2580	3580	1130	2000	1870	1700	1800	1730	1640	1670
29	---	---	---	2310	1240	1950	1900	1730	1810	1700	1640	1660
30	---	---	---	2090	2020	2050	2300	490	1910	2370	758	1670
31	---	---	---	2230	2060	2120	---	---	---	1370	311	1030
MONTH	7000	1570	2870	7000	830	2590	---	---	---	2430	311	1590

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	1390	1300	1340	2660	1440	1490	1440	656	1230	1600	594	1030
2	1570	1350	1410	1470	1420	1440	1340	851	1140	1310	1080	1190
3	2950	1460	1570	3510	1360	1530	2500	344	1490	1460	1240	1290
4	1830	1550	1630	1530	389	1280	1550	867	1250	1500	1260	1300
5	1700	1570	1620	1510	1020	1280	1720	156	1060	1560	1280	1320
6	1750	1600	1650	2380	1170	1350	1500	1020	1280	1610	1290	1340
7	1820	1620	1660	2380	1160	1400	1770	1260	1370	1700	1300	1360
8	2060	1090	1510	1770	775	1410	1760	1260	1350	1610	1310	1370
9	1470	1290	1380	1520	1240	1370	2300	1350	1430	1640	1300	1350
10	1950	1360	1480	1470	1360	1430	2130	1360	1420	1590	1280	1340
11	1560	1430	1480	2890	1020	1480	2650	1380	1450	1650	1280	1330
12	1670	472	1090	2100	1300	1390	2510	211	1110	1580	1270	1320
13	1380	1070	1270	3100	224	1240	1000	430	792	1620	1250	1330
14	1450	1370	1410	1410	525	915	1290	1000	1080	1630	857	1330
15	4230	1440	1580	2150	1410	1480	1200	271	971	1310	628	1050
16	2350	1520	1590	1870	1410	1470	1240	520	816	1340	1130	1220
17	2180	1410	1650	2030	1440	1490	1240	951	1080	1490	1260	1300
18	1880	366	1470	3190	1420	1480	1390	1180	1240	1480	1260	1310
19	982	543	847	3940	1430	1550	1460	1260	1310	1490	431	1070
20	1320	969	1090	3380	1440	1500	1500	1290	1330	1460	1140	1220
21	1290	1160	1230	3140	1210	1430	1760	1150	1360	1480	1230	1290
22	2200	1280	1340	2580	1190	1400	1600	1290	1340	1480	166	679
23	2850	1360	1440	3050	1370	1430	1450	1300	1350	925	628	775
24	1460	1410	1440	1490	1330	1370	1540	1310	1360	1240	225	813
25	3700	1450	1550	1400	1340	1380	1570	1020	1380	975	573	777
26	2720	893	1550	1430	1370	1390	1400	631	1080	1580	248	929
27	1680	1440	1490	1420	1400	1410	1250	1100	1200	1030	488	824
28	2850	1040	1540	1420	1380	1400	1280	1200	1240	1110	927	1010
29	1500	539	1200	1440	1370	1390	2010	345	1080	1160	1040	1100
30	1460	991	1330	1430	1370	1400	1420	1230	1310	1220	1120	1170
31	---	---	---	1410	1370	1390	1850	1310	1370	---	---	---
MONTH	4230	366	1430	3940	224	1400	2650	156	1230	1700	166	1160

STREAMS TRIBUTARY TO DETROIT RIVER

04166315 UPPER RIVER ROUGE AT CLARENCEVILLE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	19.0	17.0	18.0	6.0	5.0	5.5	2.0	0.5	1.0	2.5	1.0	2.0
2	19.5	18.5	19.0	5.0	4.5	5.0	1.0	0.0	0.5	1.5	0.0	0.5
3	18.5	17.0	17.5	5.5	4.0	5.0	1.0	0.0	0.5	0.5	0.0	0.0
4	21.5	17.0	18.5	6.0	5.0	5.5	1.0	0.0	0.5	0.5	0.5	0.5
5	18.5	15.0	17.0	8.0	4.5	5.5	1.0	0.5	0.5	1.0	0.5	0.5
6	15.5	13.5	14.5	6.0	5.5	6.0	0.5	0.5	0.5	1.0	0.0	0.5
7	14.5	12.0	13.5	6.0	5.0	5.5	1.0	0.0	0.5	0.5	0.0	0.5
8	12.0	11.0	11.5	7.5	5.5	6.5	0.5	0.5	0.5	1.5	0.5	1.0
9	12.0	10.5	11.5	9.0	6.5	8.0	1.0	0.0	0.5	2.5	1.0	1.5
10	13.0	11.5	12.0	14.5	9.0	12.0	0.5	0.0	0.5	2.0	0.5	1.0
11	13.5	12.0	13.0	12.0	10.0	11.5	0.5	0.0	0.5	1.0	0.0	0.5
12	14.5	13.0	13.5	10.0	8.0	9.0	1.0	0.0	0.5	0.5	0.0	0.5
13	15.0	11.0	13.5	8.0	7.0	7.5	0.5	0.0	0.5	0.5	0.0	0.5
14	11.0	9.5	10.0	10.0	7.0	8.0	0.5	0.5	0.5	0.5	0.0	0.5
15	10.0	8.0	9.0	9.0	6.0	7.5	1.0	0.5	0.5	0.5	0.0	0.5
16	10.0	8.5	9.5	6.0	4.0	5.0	1.0	0.5	0.5	0.5	0.0	0.0
17	8.5	7.5	7.5	4.5	3.5	4.0	0.5	0.5	0.5	0.0	0.0	0.0
18	12.5	7.5	8.0	4.0	2.5	3.5	2.0	0.5	1.0	0.0	0.0	0.0
19	12.5	9.0	10.0	7.5	4.0	5.5	6.5	0.5	3.0	0.0	0.0	0.0
20	9.0	8.0	8.5	6.5	5.0	5.5	6.0	2.5	4.0	0.0	0.0	0.0
21	8.0	7.0	7.5	9.0	6.0	6.5	2.5	1.5	2.0	0.0	0.0	0.0
22	9.0	7.5	8.5	6.5	4.0	5.5	1.5	1.0	1.5	0.0	0.0	0.0
23	9.0	7.5	8.5	4.0	3.5	4.0	1.5	1.0	1.0	0.0	0.0	0.0
24	7.5	6.5	7.0	5.0	4.0	4.5	1.0	0.5	0.5	0.0	0.0	0.0
25	10.0	6.0	7.5	5.0	3.0	4.0	1.0	0.0	0.5	0.0	0.0	0.0
26	8.5	8.0	8.5	3.5	2.0	2.5	1.0	0.5	0.5	0.0	0.0	0.0
27	8.5	8.0	8.0	2.5	1.0	1.5	1.0	0.0	0.5	0.0	0.0	0.0
28	8.0	7.5	8.0	1.5	1.0	1.0	1.0	0.5	0.5	0.0	0.0	0.0
29	7.5	6.0	6.5	3.5	1.0	2.0	1.0	0.5	1.0	0.0	0.0	0.0
30	6.5	5.5	6.0	4.0	2.0	3.0	3.5	0.5	1.5	0.0	0.0	0.0
31	6.5	5.0	6.0	---	---	---	3.5	2.5	3.5	0.0	0.0	0.0
MONTH	21.5	5.0	10.9	14.5	1.0	5.5	6.5	0.0	1.0	2.5	0.0	0.3

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	9.5	5.0	7.0	15.5	12.5	14.0
2	0.0	0.0	0.0	0.0	0.0	0.0	11.5	8.0	9.5	14.5	12.0	13.0
3	0.5	0.0	0.0	0.0	0.0	0.0	10.0	6.5	8.5	13.0	10.0	12.0
4	0.0	0.0	0.0	0.0	0.0	0.0	6.5	2.5	4.5	13.5	10.0	12.0
5	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5	2.5	15.5	12.0	13.0
6	0.0	0.0	0.0	0.0	0.0	0.0	3.5	1.5	2.5	16.0	12.5	14.5
7	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.0	1.5	15.5	12.5	13.5
8	0.0	0.0	0.0	2.0	0.0	0.0	2.5	1.5	2.0	14.0	12.0	13.0
9	0.0	0.0	0.0	0.0	0.0	0.0	6.0	1.5	4.0	15.5	12.0	13.5
10	0.0	0.0	0.0	0.5	0.0	0.0	7.5	3.5	6.0	16.5	14.5	15.5
11	0.0	0.0	0.0	0.5	0.0	0.0	10.0	5.5	8.0	16.5	14.0	16.0
12	0.0	0.0	0.0	2.5	0.0	0.5	11.5	7.5	9.5	14.0	11.0	12.5
13	0.0	0.0	0.0	0.5	0.0	0.0	11.0	7.0	9.0	14.0	10.0	12.0
14	0.0	0.0	0.0	1.5	0.0	0.0	12.5	8.0	10.0	15.0	11.5	13.5
15	0.0	0.0	0.0	2.5	0.0	0.5	16.0	11.0	13.5	14.5	13.0	13.5
16	0.0	0.0	0.0	0.5	0.0	0.0	14.5	11.0	13.5	14.0	12.5	13.5
17	0.0	0.0	0.0	3.0	0.0	0.5	11.0	8.5	9.5	16.5	13.5	15.0
18	0.0	0.0	0.0	3.5	2.0	3.0	---	---	---	16.0	14.5	15.0
19	0.5	0.0	0.0	4.5	2.0	3.5	---	---	---	17.5	14.5	16.0
20	0.0	0.0	0.0	10.0	4.0	6.0	---	---	---	18.5	15.0	16.5
21	2.0	0.0	0.0	8.0	4.5	5.5	---	---	---	15.0	13.0	14.0
22	0.5	0.0	0.0	4.5	3.5	4.0	---	---	---	14.5	12.0	13.5
23	0.0	0.0	0.0	5.5	3.0	4.5	---	---	---	13.5	12.0	13.0
24	0.0	0.0	0.0	8.0	3.5	5.5	---	---	---	13.0	12.0	12.5
25	0.0	0.0	0.0	10.0	7.0	8.5	---	---	---	13.5	11.5	12.5
26	0.0	0.0	0.0	9.0	7.0	8.0	14.0	9.0	11.5	14.0	12.5	13.5
27	0.0	0.0	0.0	9.5	6.0	7.5	14.5	9.0	12.0	16.0	12.5	13.5
28	0.5	0.0	0.0	12.0	7.0	9.0	16.5	11.5	14.0	15.0	12.5	14.0
29	---	---	---	10.5	6.0	8.0	16.5	12.0	14.5	17.0	14.5	16.0
30	---	---	---	6.0	4.0	5.0	14.5	12.5	13.5	16.5	15.0	16.0
31	---	---	---	6.0	3.0	4.5	---	---	---	16.5	13.0	14.5
MONTH	2.0	0.0	0.0	12.0	0.0	2.7	---	---	---	18.5	10.0	13.9

STREAMS TRIBUTARY TO DETROIT RIVER

04166315 UPPER RIVER ROUGE AT CLARENCEVILLE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.0	12.0	13.0	21.5	18.5	20.0	23.5	19.5	21.0	19.0	17.5	18.0
2	16.5	12.5	14.0	21.5	19.0	20.5	21.5	20.5	21.0	18.5	17.0	18.0
3	15.5	14.0	15.0	23.0	19.5	21.0	22.5	20.5	21.5	18.5	17.0	18.0
4	14.0	13.0	13.5	27.5	21.5	23.0	23.5	20.5	21.5	18.5	17.5	18.0
5	13.5	12.5	13.0	23.0	21.5	22.0	26.0	20.0	21.5	18.0	16.5	17.0
6	15.5	12.5	14.0	22.5	21.0	21.5	23.0	20.5	21.5	18.0	15.0	16.5
7	16.5	15.0	16.0	22.5	21.0	22.0	22.5	20.5	21.5	18.5	16.0	17.5
8	17.5	15.5	16.5	24.0	21.0	22.5	22.5	20.5	21.5	19.5	17.5	18.0
9	17.0	15.5	16.5	22.5	21.0	22.0	22.0	20.5	21.0	19.5	17.5	18.0
10	17.0	15.5	16.0	21.5	20.5	21.0	21.0	19.5	20.5	19.0	17.0	18.0
11	18.5	16.5	17.5	21.5	19.0	20.0	21.0	20.0	20.5	19.0	17.0	18.0
12	18.5	16.5	17.0	19.5	18.0	19.0	25.0	20.0	21.0	19.0	17.5	18.0
13	17.0	16.5	16.5	24.5	18.0	19.5	23.0	20.5	22.0	19.0	17.0	18.0
14	18.5	16.5	17.5	23.5	19.0	21.0	23.0	21.5	22.5	23.0	17.5	19.0
15	22.5	17.5	19.0	20.5	19.0	19.5	26.0	22.0	23.0	20.0	17.5	18.5
16	19.5	17.0	18.5	21.0	18.5	19.5	24.5	23.0	23.5	17.5	16.0	17.0
17	18.5	17.0	17.5	21.5	19.0	20.0	23.0	21.0	21.5	18.5	16.0	17.0
18	22.5	17.0	18.5	21.5	19.5	20.0	21.0	19.0	20.0	18.0	16.5	17.5
19	20.5	19.5	19.5	20.5	18.0	19.5	21.0	19.0	20.0	19.5	16.5	18.0
20	19.5	17.0	18.0	20.0	18.5	19.5	21.5	19.0	20.5	16.5	15.0	16.0
21	19.0	16.5	18.0	21.0	19.5	20.0	24.5	20.0	21.5	16.0	14.0	15.0
22	20.0	17.0	18.5	20.5	18.5	19.5	23.0	21.0	22.0	18.5	15.0	17.0
23	20.5	17.5	19.5	20.5	18.5	19.5	21.5	19.5	20.5	17.0	15.0	16.0
24	21.5	19.0	20.0	20.5	18.0	19.0	19.5	18.5	19.0	17.0	13.5	14.5
25	23.0	19.0	21.5	21.5	18.0	19.5	23.0	19.0	20.0	15.5	13.5	14.5
26	25.5	20.5	21.5	20.5	19.0	20.0	24.0	21.0	22.0	16.5	12.0	13.0
27	21.5	19.0	20.0	22.0	20.5	21.0	23.0	21.0	22.0	15.5	14.0	14.5
28	20.5	18.5	19.5	21.5	19.5	20.5	21.0	19.0	20.0	14.0	12.5	13.0
29	24.0	18.0	19.5	21.0	18.5	19.5	24.0	20.0	21.5	12.5	11.0	12.0
30	20.5	18.0	19.5	21.5	18.5	19.5	21.0	19.0	19.5	11.0	10.0	10.5
31	—	—	—	21.5	19.0	20.0	19.0	17.5	18.5	—	—	—
MONTH	25.5	12.0	17.5	27.5	18.0	20.4	26.0	17.5	21.1	23.0	10.0	16.5

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	9.4	15	31	e14	e13	36	301	90	25	14	49
2	12	9.6	15	21	e14	e13	31	227	42	19	59	34
3	29	9.8	e14	e19	e19	e14	27	88	31	16	22	19
4	33	9.6	e14	e18	e73	e17	206	57	38	53	52	14
5	64	13	e13	e17	e39	e16	544	189	35	37	50	14
6	22	28	e13	e17	e20	e14	180	158	28	29	79	11
7	17	16	e13	17	e17	e14	91	73	24	31	24	8.9
8	13	12	e13	22	e14	e25	86	57	44	26	19	8.5
9	12	11	e12	25	e12	e49	85	109	51	43	13	10
10	11	150	e12	22	e12	e29	91	81	37	21	11	9.7
11	11	139	e12	e17	e11	e19	61	63	30	21	10	9.0
12	11	36	e12	e16	e10	e23	47	64	115	20	30	7.1
13	15	24	e13	e14	e10	e32	39	47	101	23	93	8.1
14	14	20	e13	e13	e11	e50	34	39	46	64	24	11
15	11	51	e13	e13	e11	100	33	45	32	20	67	48
16	10	30	e13	12	e12	212	29	42	24	15	57	24
17	11	20	14	e11	e12	240	27	34	24	13	26	12
18	10	17	23	e10	e13	124	27	29	35	11	15	9.1
19	25	28	91	e9.8	e14	65	26	27	338	10	12	36
20	15	23	128	e9.6	e15	65	95	68	106	9.4	10	18
21	11	33	52	e9.2	e14	128	90	35	48	31	9.2	11
22	10	114	32	e8.9	e14	67	39	26	33	26	16	267
23	10	42	25	e9.2	e14	49	31	24	25	15	11	221
24	9.9	27	20	e9.8	e14	40	27	25	22	15	8.8	86
25	17	22	e19	e11	e14	48	26	26	19	11	8.1	185
26	37	19	e17	e12	e13	42	25	22	21	9.7	41	52
27	17	17	e16	e12	e13	35	23	22	25	9.1	24	116
28	12	16	18	e12	e13	47	22	21	17	8.8	14	43
29	9.7	16	20	e12	---	147	21	20	90	7.8	16	29
30	8.4	16	23	e13	---	60	38	19	80	7.6	14	23
31	8.7	---	51	e13	---	40	---	249	---	7.3	12	---
TOTAL	508.7	978.4	759	456.5	462	1837	2137	2287	1651	654.7	861.1	1393.4
MEAN	16.4	32.6	24.5	14.7	16.5	59.3	71.2	73.8	55.0	21.1	27.8	46.4
MAX	64	150	128	31	73	240	544	301	338	64	93	267
MIN	8.4	9.4	12	8.9	10	13	21	19	17	7.3	8.1	7.1
CFSM	0.24	0.48	0.36	0.22	0.25	0.88	1.06	1.10	0.82	0.31	0.41	0.69
IN.	0.28	0.54	0.42	0.25	0.26	1.02	1.18	1.26	0.91	0.36	0.48	0.77

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2003, BY WATER YEAR (WY)

MEAN	50.9	33.2	39.7	44.8	80.7	64.6	87.3	67.2	54.6	43.1	48.3	47.3
MAX	154	57.0	66.5	83.8	171	132	113	93.7	91.6	85.6	118	107
(WY)	2002	2002	2002	1999	2001	1998	1999	2000	2000	2000	1998	2000
MIN	16.4	19.4	24.5	14.7	16.5	30.2	66.6	45.8	25.3	14.3	19.0	15.8
(WY)	2003	2000	2003	2003	2003	2000	2000	1998	2002	2001	2002	1998

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1998 - 2003	
ANNUAL TOTAL	17073.2		13985.8			
ANNUAL MEAN	46.8		38.3		54.9	
HIGHEST ANNUAL MEAN					64.1	2002
LOWEST ANNUAL MEAN					38.3	2003
HIGHEST DAILY MEAN	613	Apr 13	544	Apr 5	1180	Feb 18 1998
LOWEST DAILY MEAN	6.1	Sep 5	7.1	Sep 12	6.1	Sep 5 2002
ANNUAL SEVEN-DAY MINIMUM	6.4	Sep 4	8.8	Jul 25	6.4	Sep 4 2002
MAXIMUM PEAK FLOW			602	Apr 5	1490	Aug 6 1998
MAXIMUM PEAK STAGE			7.79	Apr 5	13.08	Aug 6 1998
INSTANTANEOUS LOW FLOW			6.2	(a)	5.4	(b)
ANNUAL RUNOFF (CFSM)	0.70		0.57		0.82	
ANNUAL RUNOFF (INCHES)	9.44		7.73		11.09	
10 PERCENT EXCEEDS	101		87		111	
50 PERCENT EXCEEDS	27		21		28	
90 PERCENT EXCEEDS	9.8		10		12	

(a) Sept. 13, 14.
(b) Aug. 7, 8, 9, 15, 2001, Sept. 6, 2002.
(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166470 UPPER RIVER ROUGE AT DETROIT, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1999 to current year.

PERIOD OF DAILY RECORD.--
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, not operated during winter months.

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 for the following periods: Oct. 1-3, Apr. 8, 17, 18, May 3-5, 7, 14, June 10, July 9, 17-22, Aug. 11-13, Sept. 30, rated good; Oct. 4-7, Apr. 9, 19-22, May 8, 9, 15, 16, July 10, 11, 23-25, Sept. 25, rated fair; Oct. 8-24, Apr. 10-14, 23-25, May 10-13, 17-22, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded during period of operation, 27.5°C, July 24, Aug. 8, 2001; minimum recorded, 1.5°C, Apr. 7, 8, 2003.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 15.9 mg/L, Mar. 28, 2001; minimum recorded, 0.4 mg/L, July 3, 9, 2000.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum recorded during period of operation, 25.0°C, Aug. 21; minimum recorded, 1.5°C, Apr. 7, 8.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 15.6 mg/L, Apr. 13; minimum recorded, 3.6 mg/L, July 6.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	20.0	17.5	18.5	6.0	4.5	5.0	---	---	---	---	---	---
2	20.0	19.0	19.5	5.0	4.0	4.5	---	---	---	---	---	---
3	19.5	17.5	18.0	5.0	3.5	4.5	---	---	---	---	---	---
4	19.5	17.5	18.5	5.5	4.5	5.0	---	---	---	---	---	---
5	18.5	16.0	17.5	5.0	4.0	4.5	---	---	---	---	---	---
6	16.0	14.5	15.5	---	---	---	---	---	---	---	---	---
7	15.0	12.5	13.5	---	---	---	---	---	---	---	---	---
8	13.0	12.0	12.5	---	---	---	---	---	---	---	---	---
9	13.0	11.0	12.0	---	---	---	---	---	---	---	---	---
10	13.5	11.0	12.5	---	---	---	---	---	---	---	---	---
11	14.0	12.0	13.0	---	---	---	---	---	---	---	---	---
12	14.5	12.5	13.5	---	---	---	---	---	---	---	---	---
13	14.5	11.5	13.5	---	---	---	---	---	---	---	---	---
14	11.5	10.0	10.5	---	---	---	---	---	---	---	---	---
15	10.5	8.5	10.0	---	---	---	---	---	---	---	---	---
16	10.5	8.5	9.5	---	---	---	---	---	---	---	---	---
17	8.5	7.5	8.0	---	---	---	---	---	---	---	---	---
18	8.5	7.5	8.0	---	---	---	---	---	---	---	---	---
19	11.0	8.5	9.5	---	---	---	---	---	---	---	---	---
20	9.5	8.0	9.0	---	---	---	---	---	---	---	---	---
21	8.5	7.0	8.0	---	---	---	---	---	---	---	---	---
22	9.0	7.5	8.5	---	---	---	---	---	---	---	---	---
23	8.5	7.5	8.0	---	---	---	---	---	---	---	---	---
24	7.5	6.5	7.0	---	---	---	---	---	---	---	---	---
25	9.0	6.0	6.5	---	---	---	---	---	---	---	---	---
26	10.0	8.0	8.5	---	---	---	---	---	---	---	---	---
27	8.5	8.0	8.0	---	---	---	---	---	---	---	---	---
28	8.5	7.5	8.0	---	---	---	---	---	---	---	---	---
29	7.5	6.0	6.5	---	---	---	---	---	---	---	---	---
30	6.5	5.5	6.0	---	---	---	---	---	---	---	---	---
31	6.0	4.5	5.5	---	---	---	---	---	---	---	---	---
MONTH	20.0	4.5	11.1	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04166470 UPPER RIVER ROUGE AT DETROIT, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	9.0	5.0	7.0	14.5	12.5	13.5
2	---	---	---	---	---	---	12.0	8.0	9.5	13.5	12.0	13.0
3	---	---	---	---	---	---	10.0	7.5	9.0	13.0	11.0	12.0
4	---	---	---	---	---	---	7.5	3.5	5.5	14.0	10.5	12.0
5	---	---	---	---	---	---	3.5	2.5	2.5	14.0	11.5	12.5
6	---	---	---	---	---	---	3.5	2.0	3.0	15.5	13.0	14.5
7	---	---	---	---	---	---	3.0	1.5	2.0	14.5	12.5	13.5
8	---	---	---	---	---	---	3.0	1.5	2.5	14.0	12.0	13.0
9	---	---	---	---	---	---	6.0	2.0	4.0	14.0	11.5	13.0
10	---	---	---	---	---	---	8.0	4.5	6.0	16.0	13.5	15.0
11	---	---	---	---	---	---	10.0	6.0	8.0	16.5	14.0	15.5
12	---	---	---	---	---	---	11.5	7.5	9.5	14.0	11.0	12.5
13	---	---	---	---	---	---	11.5	7.5	9.5	14.0	10.5	12.5
14	---	---	---	---	---	---	13.0	8.0	10.5	15.5	11.5	13.5
15	---	---	---	---	---	---	16.0	11.0	13.5	14.0	13.0	13.5
16	---	---	---	---	---	---	15.0	11.5	13.5	14.5	12.5	13.5
17	---	---	---	---	---	---	11.5	9.0	10.0	17.0	13.0	15.0
18	---	---	---	---	---	---	10.0	9.0	9.5	16.0	14.0	15.0
19	---	---	---	---	---	---	14.0	9.5	12.0	18.0	14.5	16.0
20	---	---	---	---	---	---	15.0	12.0	13.5	17.0	15.5	16.5
21	---	---	---	---	---	---	14.5	12.0	13.5	16.5	13.5	15.0
22	---	---	---	---	---	---	12.0	8.5	10.5	16.0	12.0	14.0
23	---	---	---	---	---	---	11.5	7.5	9.5	14.0	12.5	13.5
24	---	---	---	---	---	---	13.0	8.0	10.5	13.5	12.0	12.5
25	---	---	---	---	---	---	13.0	9.5	11.5	14.5	11.0	13.0
26	---	---	---	---	---	---	14.0	9.0	11.5	14.5	12.5	13.5
27	---	---	---	10.0	7.0	8.5	15.5	9.5	12.5	15.0	12.5	13.5
28	---	---	---	11.5	8.0	9.5	17.5	11.5	14.5	17.0	12.5	14.5
29	---	---	---	11.0	7.0	9.0	17.0	12.5	15.0	18.0	14.5	16.0
30	---	---	---	7.0	5.0	5.5	15.0	12.5	13.5	17.5	15.0	16.5
31	---	---	---	6.5	4.0	5.0	---	---	---	16.5	13.5	14.5
MONTH	---	---	---	---	---	---	17.5	1.5	9.4	18.0	10.5	13.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.5	12.5	13.5	22.5	19.0	21.0	23.5	20.0	21.5	19.5	17.5	18.0
2	16.0	12.5	14.0	23.5	19.5	21.5	22.5	20.0	21.5	19.5	17.5	18.5
3	14.5	14.0	14.5	24.5	20.5	22.5	22.0	21.0	21.5	20.5	17.5	19.0
4	14.0	13.0	13.5	24.0	22.0	23.0	22.0	19.5	21.0	19.5	18.0	19.0
5	14.0	12.5	13.0	23.5	22.5	23.0	22.5	20.0	21.5	19.5	17.0	18.0
6	16.0	12.5	14.5	23.0	21.5	22.5	23.0	21.0	22.0	20.0	16.5	18.0
7	17.5	15.0	16.0	22.5	21.0	22.0	23.5	20.5	22.0	20.5	17.0	18.5
8	16.5	15.5	16.0	24.0	21.5	22.5	23.5	21.0	22.0	20.5	18.5	19.5
9	17.5	15.5	16.5	23.5	21.0	22.0	23.0	21.0	22.0	20.5	18.0	19.5
10	17.0	15.5	16.5	22.5	21.0	22.0	22.0	20.5	21.5	20.5	18.0	19.0
11	19.0	16.0	17.5	22.0	19.5	20.5	22.0	20.5	21.5	20.5	18.0	19.5
12	17.5	16.0	16.5	21.0	18.0	19.5	22.5	20.5	21.5	20.5	18.5	19.5
13	17.5	16.5	17.0	22.0	18.5	20.0	22.5	21.0	22.0	21.0	18.0	19.5
14	19.0	16.5	17.5	22.0	19.0	20.5	24.0	21.5	22.5	22.0	19.0	20.0
15	20.5	17.0	19.0	21.0	19.5	20.5	24.0	22.0	23.0	20.0	18.5	19.5
16	20.5	17.0	19.0	22.5	19.0	20.5	24.5	22.5	23.5	19.5	17.0	18.0
17	19.0	17.0	18.0	23.5	19.5	21.5	23.5	21.5	22.5	20.0	17.0	18.5
18	20.5	17.0	18.5	22.5	20.0	21.5	23.0	19.5	21.0	19.0	17.0	18.5
19	20.0	18.5	19.5	22.5	18.5	20.5	23.0	19.5	21.0	19.0	17.5	18.5
20	19.0	17.5	18.0	21.5	19.5	20.5	23.5	19.5	21.5	18.5	16.0	17.0
21	19.0	16.5	18.0	21.5	19.0	20.5	25.0	21.0	22.5	17.5	15.0	16.5
22	20.5	17.5	19.0	21.0	19.0	20.0	24.0	22.0	23.0	18.5	16.5	17.5
23	22.0	18.0	20.0	21.0	18.5	20.0	22.5	20.0	21.5	17.5	15.5	16.5
24	22.5	19.0	21.0	21.5	18.5	20.0	21.0	19.0	20.0	17.0	14.5	15.5
25	24.0	20.0	22.0	22.5	19.0	20.5	23.5	19.5	21.5	16.5	14.5	15.5
26	23.5	20.5	22.5	21.5	20.0	21.0	23.0	20.5	22.0	14.5	13.0	14.0
27	22.0	19.0	20.5	23.0	20.5	21.5	24.0	22.0	22.5	16.0	14.5	15.5
28	21.0	19.5	20.0	22.5	20.0	21.0	23.0	20.0	21.5	15.0	13.5	14.0
29	21.0	18.5	19.5	22.5	19.0	21.0	22.0	21.5	21.5	13.5	12.0	13.0
30	21.5	19.5	20.5	22.5	19.5	21.0	21.5	19.5	20.5	12.0	11.0	11.5
31	---	---	---	23.0	20.0	21.5	21.5	18.5	20.0	---	---	---
MONTH	24.0	12.5	17.7	24.5	18.0	21.1	25.0	18.5	21.7	22.0	11.0	17.5

STREAMS TRIBUTARY TO DETROIT RIVER

04166470 UPPER RIVER ROUGE AT DETROIT, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	6.4	5.2	5.9	10.9	9.9	10.4	---	---	---	---	---	---
2	5.8	4.7	5.3	11.1	10.3	10.6	---	---	---	---	---	---
3	7.2	5.4	6.6	11.3	10.3	10.7	---	---	---	---	---	---
4	7.3	5.7	6.3	10.7	9.9	10.2	---	---	---	---	---	---
5	8.1	7.3	7.7	10.6	9.5	10.2	---	---	---	---	---	---
6	8.3	7.3	8.0	---	---	---	---	---	---	---	---	---
7	8.4	7.4	8.1	---	---	---	---	---	---	---	---	---
8	8.6	7.9	8.3	---	---	---	---	---	---	---	---	---
9	8.8	8.1	8.4	---	---	---	---	---	---	---	---	---
10	8.8	8.1	8.5	---	---	---	---	---	---	---	---	---
11	8.6	7.7	8.1	---	---	---	---	---	---	---	---	---
12	8.2	7.1	7.8	---	---	---	---	---	---	---	---	---
13	8.2	7.0	7.6	---	---	---	---	---	---	---	---	---
14	8.7	7.6	8.3	---	---	---	---	---	---	---	---	---
15	8.6	7.8	8.3	---	---	---	---	---	---	---	---	---
16	8.6	8.0	8.3	---	---	---	---	---	---	---	---	---
17	10.4	8.1	9.4	---	---	---	---	---	---	---	---	---
18	10.2	9.8	10.1	---	---	---	---	---	---	---	---	---
19	10.0	6.5	8.8	---	---	---	---	---	---	---	---	---
20	8.8	7.6	8.2	---	---	---	---	---	---	---	---	---
21	9.2	8.1	8.7	---	---	---	---	---	---	---	---	---
22	8.8	7.2	8.2	---	---	---	---	---	---	---	---	---
23	9.1	7.4	8.5	---	---	---	---	---	---	---	---	---
24	10.0	8.6	9.5	---	---	---	---	---	---	---	---	---
25	10.5	8.5	9.8	---	---	---	---	---	---	---	---	---
26	10.2	7.9	9.6	---	---	---	---	---	---	---	---	---
27	9.8	9.1	9.4	---	---	---	---	---	---	---	---	---
28	10.1	9.1	9.6	---	---	---	---	---	---	---	---	---
29	10.5	9.5	10.0	---	---	---	---	---	---	---	---	---
30	10.7	10.0	10.3	---	---	---	---	---	---	---	---	---
31	10.9	10.1	10.5	---	---	---	---	---	---	---	---	---
MONTH	10.9	4.7	8.5	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	15.0	11.8	13.2	9.2	8.0	8.4
2	---	---	---	---	---	---	15.5	10.8	12.8	9.9	8.6	9.3
3	---	---	---	---	---	---	12.5	10.4	11.3	11.8	9.8	10.7
4	---	---	---	---	---	---	12.6	10.6	11.6	13.0	9.8	11.1
5	---	---	---	---	---	---	---	---	---	9.8	9.0	9.3
6	---	---	---	---	---	---	---	---	---	10.4	8.6	9.5
7	---	---	---	---	---	---	---	---	---	10.6	9.1	9.7
8	---	---	---	---	---	---	13.8	13.3	13.5	12.2	9.6	10.7
9	---	---	---	---	---	---	14.2	12.9	13.6	10.9	9.6	10.1
10	---	---	---	---	---	---	14.0	12.3	13.1	10.6	9.0	9.8
11	---	---	---	---	---	---	14.3	12.0	13.0	10.7	8.5	9.4
12	---	---	---	---	---	---	15.0	10.9	12.8	10.9	8.5	9.7
13	---	---	---	---	---	---	15.7	9.1	12.8	12.3	9.4	10.7
14	---	---	---	---	---	---	15.0	9.1	12.4	11.9	9.0	10.2
15	---	---	---	---	---	---	14.6	9.6	11.7	9.6	8.3	8.9
16	---	---	---	---	---	---	14.3	9.0	11.2	10.7	8.3	9.4
17	---	---	---	---	---	---	14.3	10	11.9	11.9	8.5	9.9
18	---	---	---	---	---	---	12.4	10.3	11.2	11.3	8.5	9.6
19	---	---	---	---	---	---	15.1	9.9	12.1	11.9	8.8	10.0
20	---	---	---	---	---	---	12.7	8.3	10.0	9.1	7.3	8.2
21	---	---	---	---	---	---	8.8	7.8	8.3	10.4	7.5	9.0
22	---	---	---	---	---	---	11.4	8.7	10.1	11.3	8.7	9.8
23	---	---	---	---	---	---	14.1	10.6	12.1	10.6	8.4	9.5
24	---	---	---	---	---	---	15.0	9.8	12.3	11.5	8.9	10.0
25	---	---	---	---	---	---	14.2	9.8	11.6	12.1	9.4	10.6
26	---	---	---	---	---	---	14.8	9.5	11.6	11.1	9.2	10.1
27	---	---	---	14.3	10.8	12.2	14.6	9.0	11.3	11.5	8.2	9.9
28	---	---	---	13.8	9.9	12.0	13.7	8.0	10.3	11.8	8.4	9.9
29	---	---	---	11.2	9.5	10.3	13.4	7.7	10.0	10.7	7.9	9.0
30	---	---	---	14.0	11.2	12.6	10.7	7.4	8.6	9.6	7.4	8.4
31	---	---	---	15.0	12.3	13.4	---	---	---	9.3	7.7	8.5
MONTH	---	---	---	---	---	---	---	---	---	13.0	7.3	9.7

STREAMS TRIBUTARY TO DETROIT RIVER

04166470 UPPER RIVER ROUGE AT DETROIT, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.2	9.3	9.8	6.4	5.5	6.0	6.7	4.6	6.0	—	—	—
2	10.6	9.3	10.0	6.2	5.3	5.6	6.4	4.5	5.7	—	—	—
3	9.9	8.9	9.3	5.8	4.9	5.4	—	—	—	—	—	—
4	9.5	8.6	9.1	5.8	4.6	5.2	—	—	—	—	—	—
5	9.3	8.5	8.9	5.0	4.2	4.6	7.5	6.5	6.7	7.5	6.9	7.1
6	9.9	8.6	9.2	5.4	3.6	4.8	7.2	5.7	6.9	7.5	6.8	7.2
7	9.1	7.8	8.5	5.8	4.0	5.3	7.1	6.4	6.8	7.4	6.6	7.0
8	8.2	7.2	7.7	6.1	5.0	5.3	6.5	6.0	6.3	7.3	6.1	6.8
9	7.8	7.0	7.4	6.5	5.5	6.0	6.5	6.0	6.2	—	—	—
10	7.7	6.5	7.2	5.7	5.5	5.6	6.7	6.1	6.4	7.3	6.6	7.0
11	—	—	—	6.6	5.5	5.9	6.9	6.2	6.6	7.4	6.6	6.9
12	—	—	—	6.7	6.2	6.5	7.4	6.2	6.7	7.1	6.1	6.7
13	8.1	7.8	8.0	6.7	5.5	6.1	7.1	6.1	6.7	—	—	—
14	7.8	7.2	7.7	6.7	5.7	6.3	6.7	6.0	6.4	—	—	—
15	7.5	6.6	7.2	6.0	5.4	5.7	6.7	4.3	6.1	—	—	—
16	7.5	7.0	7.3	5.9	5.2	5.6	6.4	5.4	5.9	—	—	—
17	7.5	7.0	7.2	5.6	4.9	5.3	6.2	5.9	6.1	—	—	—
18	7.8	6.4	7.0	5.4	4.8	5.0	6.7	5.4	6.2	7.2	6.4	6.7
19	7.9	6.3	7.0	5.4	4.5	5.0	6.6	4.5	6.0	7.4	6.3	7.0
20	—	—	—	5.3	4.7	5.0	6.5	5.8	6.1	7.4	6.4	7.0
21	—	—	—	5.6	4.6	5.1	6.3	4.2	5.8	—	—	—
22	—	—	—	5.7	5.0	5.5	5.8	4.0	5.2	—	—	—
23	—	—	—	6.0	5.4	5.7	5.8	3.8	5.1	—	—	—
24	6.5	5.9	6.3	6.6	5.6	6.2	—	—	—	—	—	—
25	6.0	5.4	5.8	6.5	5.6	6.1	—	—	—	9.3	8.1	8.8
26	5.8	5.1	5.4	6.1	5.4	5.7	6.9	5.0	6.2	9.7	9.3	9.5
27	5.7	4.2	4.9	5.9	5.3	5.6	6.3	5.1	6.0	9.5	8.7	9.1
28	5.7	4.3	5.0	6.2	5.5	5.8	—	—	—	9.6	9.2	9.4
29	7.2	5.7	6.3	6.5	5.8	6.1	—	—	—	10.0	9.5	9.8
30	7.0	6.0	6.6	6.7	5.8	6.1	—	—	—	10.4	10.0	10.3
31	—	—	—	6.5	5.6	6.0	—	—	—	—	—	—
MONTH	—	—	—	6.7	3.6	5.6	—	—	—	—	—	—

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 mi^2.

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. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33	32	41	93	e41	e37	88	621	354	60	23	91
2	32	34	39	60	e43	e37	78	611	133	47	111	89
3	71	35	35	52	e45	e38	67	261	93	42	54	50
4	59	37	43	59	e170	e43	371	150	88	74	96	36
5	203	40	42	48	e125	e42	1350	361	107	82	100	37
6	75	84	37	50	e61	e39	655	490	84	93	204	29
7	47	66	38	e49	e48	e38	283	204	71	69	86	25
8	37	50	35	e51	e45	e58	248	153	83	54	130	22
9	35	46	36	61	e40	e125	225	250	164	85	54	23
10	33	260	33	59	e38	e90	288	223	119	62	36	23
11	31	490	36	46	e37	e56	198	160	101	59	30	22
12	30	141	35	e45	e34	e59	e160	181	200	69	e210	22
13	35	74	39	e43	e34	e85	e135	136	298	48	e450	21
14	38	53	41	e42	e34	e80	e115	104	129	115	77	22
15	32	116	40	e39	e35	210	95	103	88	44	140	94
16	30	97	42	e37	e35	525	87	113	69	38	281	65
17	29	58	39	e35	e35	677	80	89	63	30	177	34
18	29	47	49	e35	e37	414	75	78	68	29	53	26
19	56	62	203	e33	e39	206	71	72	713	27	39	102
20	44	69	332	e33	e42	151	155	158	401	25	33	76
21	34	58	172	e31	e42	328	349	124	156	55	30	38
22	31	284	87	e29	e40	179	128	75	103	54	36	441
23	29	150	64	e30	e40	130	94	65	78	35	30	673
24	30	76	52	e33	e41	100	81	65	65	32	24	160
25	33	57	e49	e35	e42	106	74	79	57	26	24	466
26	100	50	e49	e36	e39	107	74	61	55	24	76	126
27	57	45	e46	e35	e38	84	67	62	77	23	66	256
28	40	41	e44	e35	e37	88	61	65	52	23	36	105
29	34	39	e46	e36	---	368	60	58	170	21	38	57
30	34	39	52	e39	---	182	73	91	199	22	39	41
31	35	---	116	e39	---	103	---	543	---	20	26	---
TOTAL	1436	2730	2012	1348	1337	4785	5885	5806	4438	1487	2809	3272
MEAN	46.3	91.0	64.9	43.5	47.8	154	196	187	148	48.0	90.6	109
MAX	203	490	332	93	170	677	1350	621	713	115	450	673
MIN	29	32	33	29	34	37	60	58	52	20	23	21
CFSM	0.25	0.49	0.35	0.23	0.26	0.83	1.05	1.00	0.79	0.26	0.48	0.58
IN.	0.29	0.54	0.40	0.27	0.27	0.95	1.17	1.15	0.88	0.30	0.56	0.65

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	73.0	91.8	114	120	171	232	231	170	116	72.9	63.7	64.5
MAX	450	322	321	456	519	488	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	46289		37345			
ANNUAL MEAN	127		102		126	
HIGHEST ANNUAL MEAN					222	1968
LOWEST ANNUAL MEAN					25.7	1931
HIGHEST DAILY MEAN	1380	Apr 13	1350	Apr 5	7380	Apr 6 1947
LOWEST DAILY MEAN	16	Sep 13	20	Jul 31	1.8	Aug 1 1964
ANNUAL SEVEN-DAY MINIMUM	18	Sep 9	22	Sep 8	2.7	Aug 2 1963
MAXIMUM PEAK FLOW			1500	Apr 5	13000	Apr 5 1947
MAXIMUM PEAK STAGE			13.39	Apr 5	21.40	Jun 26 1968
INSTANTANEOUS LOW FLOW			19	(a)	1.8	(b)
ANNUAL RUNOFF (CFSM)	0.68		0.55		0.68	
ANNUAL RUNOFF (INCHES)	9.21		7.43		9.19	
10 PERCENT EXCEEDS	265		210		270	
50 PERCENT EXCEEDS	80		57		65	
90 PERCENT EXCEEDS	26		31		17	

(a) July 30, 31, Aug. 1, Sept. 12, 13, 14.
(b) Aug. 1, 2, 1964.
(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166500 RIVER ROUGE AT DETROIT, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1999 to current year.

PERIOD OF DAILY RECORD.--
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, not operated during winter months.

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 for the following periods: Oct. 9-14, Nov. 12-20, Mar. 31 to Apr. 1, May 10-11, 19-23, June 28-30, July 6-8, 14-16, 21-22, 27-28, Aug. 23-27, Sept. 7-9, 14-16, 20-21, rated good; Oct. 15-22, May 12-13, July 1-2, 9-10, 17-18, 23-24, 29-30, Sept. 10-11, 17-18, 22-23, rated fair; Oct. 1, 23-29, June 20-22, Sept. 24-25, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded during period of operation, 27.0°C, Aug. 9, 2001; minimum recorded, 2.0°C, Mar. 28, 2001, Apr. 8, 2003.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 16.9 mg/L, Mar. 28, 2001; minimum recorded, 0.7 mg/L, Aug. 15, 2002, Aug. 8, 2003.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum recorded during period of operation, 24.0°C, Aug. 16, 17; minimum recorded, 2.0°C, Apr. 8.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 15.4 mg/L, Apr. 19; minimum recorded, 0.7 mg/L, Aug. 8.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	19.0	17.5	18.5	7.5	5.0	5.5	---	---	---	---	---	---
2	20.0	19.0	19.5	6.5	4.5	5.0	---	---	---	---	---	---
3	20.0	18.0	18.5	5.0	4.5	4.5	---	---	---	---	---	---
4	19.0	18.0	18.5	6.5	4.5	5.0	---	---	---	---	---	---
5	19.0	17.0	18.0	6.5	4.5	5.0	---	---	---	---	---	---
6	17.0	15.5	16.0	6.5	5.0	5.5	---	---	---	---	---	---
7	15.5	13.0	14.5	7.0	5.0	5.5	---	---	---	---	---	---
8	13.0	12.5	12.5	8.0	5.5	6.0	---	---	---	---	---	---
9	13.5	12.0	12.5	8.0	7.0	7.5	---	---	---	---	---	---
10	13.5	12.0	12.5	13.0	8.0	10.5	---	---	---	---	---	---
11	14.0	12.5	13.0	13.0	11.0	12.0	---	---	---	---	---	---
12	14.0	13.0	13.5	11.0	9.0	10.0	---	---	---	---	---	---
13	14.0	12.0	13.5	9.0	8.0	8.5	---	---	---	---	---	---
14	12.5	10.5	11.0	8.0	7.5	8.0	---	---	---	---	---	---
15	11.0	10.0	10.5	10.0	7.0	8.0	---	---	---	---	---	---
16	10.5	9.0	10.0	7.5	5.0	6.0	---	---	---	---	---	---
17	9.0	8.0	8.5	6.0	4.0	4.5	---	---	---	---	---	---
18	9.0	8.0	8.5	4.0	3.0	3.5	---	---	---	---	---	---
19	12.5	8.5	10.0	6.0	4.0	4.5	---	---	---	---	---	---
20	10.0	8.5	9.0	7.0	5.0	5.5	---	---	---	---	---	---
21	9.5	7.5	8.0	---	---	---	---	---	---	---	---	---
22	9.5	8.0	8.5	---	---	---	---	---	---	---	---	---
23	9.5	8.0	8.5	---	---	---	---	---	---	---	---	---
24	8.5	7.0	7.5	---	---	---	---	---	---	---	---	---
25	8.5	6.5	7.0	---	---	---	---	---	---	---	---	---
26	9.0	7.5	8.0	---	---	---	---	---	---	---	---	---
27	9.0	8.0	8.0	---	---	---	---	---	---	---	---	---
28	9.0	7.5	8.0	---	---	---	---	---	---	---	---	---
29	8.0	6.5	7.0	---	---	---	---	---	---	---	---	---
30	7.5	6.0	6.5	---	---	---	---	---	---	---	---	---
31	8.5	5.5	6.0	---	---	---	---	---	---	---	---	---
MONTH	20.0	5.5	11.3	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04166500 RIVER ROUGE AT DETROIT, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	8.5	5.5	7.0	14.0	12.5	13.5
2	---	---	---	---	---	---	11.0	8.0	9.0	14.0	12.5	13.5
3	---	---	---	---	---	---	10.5	8.5	9.5	13.0	11.5	12.0
4	---	---	---	---	---	---	8.5	4.0	6.5	13.5	11.0	12.5
5	---	---	---	---	---	---	4.0	3.0	3.0	13.5	12.0	12.5
6	---	---	---	---	---	---	3.5	2.5	3.0	15.5	13.0	14.0
7	---	---	---	---	---	---	3.0	2.0	2.5	15.0	13.5	14.0
8	---	---	---	---	---	---	3.0	2.0	2.0	13.5	12.5	13.0
9	---	---	---	---	---	---	5.0	2.5	3.5	14.5	12.5	13.5
10	---	---	---	---	---	---	7.0	4.5	6.0	16.0	13.5	15.0
11	---	---	---	---	---	---	9.0	6.0	7.5	16.5	15.0	16.0
12	---	---	---	---	---	---	---	---	---	15.0	12.0	13.5
13	---	---	---	---	---	---	---	---	---	13.5	11.0	12.5
14	---	---	---	---	---	---	---	---	---	15.0	12.0	13.5
15	---	---	---	---	---	---	15.0	11.0	13.0	15.0	13.5	14.0
16	---	---	---	---	---	---	15.0	13.0	14.0	14.0	13.0	13.5
17	---	---	---	---	---	---	13.0	10.5	11.0	16.0	13.5	14.5
18	---	---	---	---	---	---	10.5	9.5	10.0	16.0	14.5	15.5
19	---	---	---	---	---	---	13.0	10.0	11.5	17.5	15.0	16.0
20	---	---	---	---	---	---	14.5	12.0	13.5	17.5	16.0	17.0
21	---	---	---	---	---	---	14.5	13.0	14.0	16.0	15.0	15.5
22	---	---	---	---	---	---	13.0	10.0	11.0	15.5	13.0	14.5
23	---	---	---	---	---	---	11.0	8.0	9.5	15.0	13.0	14.0
24	---	---	---	---	---	---	12.0	8.5	10.5	13.5	12.5	13.0
25	---	---	---	---	---	---	12.5	10.0	11.5	13.5	12.0	13.0
26	---	---	---	---	---	---	13.0	10.0	11.5	14.0	13.0	13.5
27	---	---	---	9.5	7.5	8.5	14.0	10.5	12.5	14.0	13.0	13.5
28	---	---	---	11.0	8.0	9.5	16.0	12.5	14.0	15.5	13.0	14.0
29	---	---	---	11.0	8.0	9.5	16.0	13.5	15.0	17.0	15.0	16.0
30	---	---	---	8.0	5.5	6.5	15.5	13.0	14.5	17.0	15.5	16.5
31	---	---	---	6.0	4.5	5.5	---	---	---	17.0	14.0	15.0
MONTH	---	---	---	---	---	---	---	---	---	17.5	11.0	14.1

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.5	13.5	14.0	21.5	20.0	20.5	22.5	20.0	21.5	19.0	17.5	18.5
2	15.5	13.0	14.0	22.0	20.5	21.5	22.0	20.0	21.0	19.0	17.5	18.0
3	15.0	14.5	14.5	23.0	21.5	22.0	22.0	19.0	21.0	19.0	18.0	18.5
4	14.5	13.5	14.0	23.5	22.0	23.0	21.5	20.0	21.0	19.5	18.0	19.0
5	13.5	13.0	13.5	23.5	22.0	23.0	22.5	20.5	21.5	20.0	18.0	18.5
6	15.5	13.0	14.0	23.5	21.0	22.5	22.5	21.0	22.0	18.5	17.0	17.5
7	17.0	15.0	15.5	23.0	21.5	22.0	23.5	21.0	22.0	19.0	17.5	18.0
8	17.0	15.5	16.5	23.0	21.0	22.5	23.0	21.5	22.5	20.0	18.5	19.0
9	17.0	15.5	16.5	23.0	21.5	22.5	22.5	20.5	22.0	20.0	18.0	19.0
10	17.0	15.5	16.5	22.5	21.0	22.0	22.0	20.5	21.5	19.5	18.5	19.0
11	18.5	16.5	17.5	22.0	19.5	21.0	21.5	20.5	21.5	20.0	18.5	19.0
12	18.0	16.0	17.0	20.0	19.0	19.5	---	---	---	20.0	18.0	19.0
13	17.0	16.5	16.5	20.5	19.0	20.0	---	---	---	20.0	18.5	19.5
14	18.5	16.5	17.5	21.5	19.5	20.5	23.0	21.5	22.0	20.5	18.5	19.5
15	20.0	17.5	18.5	21.5	20.0	20.5	24.0	22.0	23.0	20.5	19.0	19.5
16	20.0	18.0	19.0	21.5	20.0	20.5	24.0	23.0	24.0	19.0	17.5	18.0
17	19.5	17.5	18.5	22.0	19.5	21.0	24.0	22.5	23.5	18.5	17.5	18.0
18	19.5	17.0	18.5	22.0	20.0	21.5	22.5	20.0	21.5	18.5	18.0	18.5
19	20.0	18.0	19.5	21.5	19.5	20.5	21.5	20.5	21.0	19.0	17.0	18.5
20	19.5	18.0	18.5	21.0	20.0	20.5	22.0	20.5	21.0	18.0	17.0	17.0
21	19.0	17.5	18.0	21.0	18.0	20.5	23.0	21.0	22.0	17.0	16.0	16.5
22	20.0	18.0	19.0	20.5	19.5	20.0	23.5	21.5	23.0	18.0	16.5	17.5
23	21.0	18.5	20.0	20.0	19.0	20.0	22.5	21.0	21.5	18.0	16.5	17.0
24	22.0	19.5	21.0	20.5	19.5	20.0	21.0	19.5	20.5	16.5	15.0	15.5
25	23.0	20.0	22.0	21.5	19.0	20.5	21.5	20.0	20.5	17.0	14.5	15.5
26	23.0	21.0	22.5	21.0	20.0	21.0	22.5	19.5	21.5	14.5	13.5	14.0
27	22.0	20.0	21.0	22.0	21.0	21.5	23.0	21.5	22.5	15.5	14.5	15.0
28	21.5	19.5	20.5	22.0	20.5	21.5	22.5	20.0	21.0	15.0	14.0	14.5
29	20.5	18.5	19.5	21.5	20.0	21.0	22.0	21.0	21.5	14.0	12.5	13.0
30	21.0	19.5	20.5	21.5	19.0	20.5	21.5	19.0	20.5	12.5	11.5	11.5
31	---	---	---	22.0	20.5	21.0	19.5	19.0	19.5	---	---	---
MONTH	23.0	13.0	17.8	23.5	18.0	21.1	---	---	---	20.5	11.5	17.4

STREAMS TRIBUTARY TO DETROIT RIVER

04166500 RIVER ROUGE AT DETROIT, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	6.8	5.3	6.0	9.9	9.3	9.7	---	---	---	---	---	---
2	5.7	5.0	5.2	10.1	9.7	9.9	---	---	---	---	---	---
3	6.0	4.5	5.1	10.4	9.9	10.1	---	---	---	---	---	---
4	5.7	4.7	5.2	10.2	9.2	9.8	---	---	---	---	---	---
5	5.9	4.2	5.4	9.6	8.9	9.4	---	---	---	---	---	---
6	6.8	5.9	6.4	9.4	6.9	8.5	---	---	---	---	---	---
7	7.3	6.1	6.7	7.9	6.8	7.5	---	---	---	---	---	---
8	7.9	6.9	7.3	7.4	6.6	6.9	---	---	---	---	---	---
9	7.9	6.8	7.3	6.9	6.1	6.5	---	---	---	---	---	---
10	7.8	7.0	7.4	6.7	3.2	5.4	---	---	---	---	---	---
11	7.2	6.8	7.1	5.6	4.3	5.0	---	---	---	---	---	---
12	7.1	6.5	6.7	6.8	5.6	6.3	---	---	---	---	---	---
13	7.3	6.3	6.6	7.8	6.8	7.4	---	---	---	---	---	---
14	7.8	7.1	7.4	7.9	7.6	7.8	---	---	---	---	---	---
15	8.0	7.4	7.7	7.8	6.4	7.3	---	---	---	---	---	---
16	8.3	7.6	7.9	8.4	7.4	7.8	---	---	---	---	---	---
17	9.0	8.2	8.6	9.6	8.4	9.0	---	---	---	---	---	---
18	9.2	8.3	8.9	10.7	9.6	10.2	---	---	---	---	---	---
19	9.2	6.3	7.9	10.6	8.7	9.8	---	---	---	---	---	---
20	8.1	6.3	7.5	9.4	7.9	8.8	---	---	---	---	---	---
21	8.5	7.7	8.1	---	---	---	---	---	---	---	---	---
22	8.4	7.7	8.2	---	---	---	---	---	---	---	---	---
23	8.4	7.5	7.9	---	---	---	---	---	---	---	---	---
24	9.1	7.9	8.5	---	---	---	---	---	---	---	---	---
25	9.3	8.4	8.9	---	---	---	---	---	---	---	---	---
26	9.2	6.9	8.2	---	---	---	---	---	---	---	---	---
27	8.3	6.8	7.6	---	---	---	---	---	---	---	---	---
28	8.9	7.6	8.2	---	---	---	---	---	---	---	---	---
29	9.4	8.5	9.0	---	---	---	---	---	---	---	---	---
30	9.8	9.1	9.5	---	---	---	---	---	---	---	---	---
31	10.2	8.8	9.7	---	---	---	---	---	---	---	---	---
MONTH	10.2	4.2	7.5	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	14.7	12.4	13.5	8.8	7.2	7.7
2	---	---	---	---	---	---	15.1	11.1	12.9	8.6	7.8	8.2
3	---	---	---	---	---	---	12.7	10.5	11.5	10.0	8.6	9.2
4	---	---	---	---	---	---	11.9	10.4	11.1	11.2	9.0	9.9
5	---	---	---	---	---	---	12.3	11.8	12.1	9.7	8.2	8.7
6	---	---	---	---	---	---	13.0	12.3	12.7	8.7	7.9	8.3
7	---	---	---	---	---	---	13.4	12.9	13.1	9.0	8.1	8.4
8	---	---	---	---	---	---	13.8	13.2	13.6	9.9	8.4	9.1
9	---	---	---	---	---	---	13.9	13.1	13.5	9.4	8.6	9.0
10	---	---	---	---	---	---	13.1	11.6	12.3	8.9	8.2	8.5
11	---	---	---	---	---	---	12.4	11.0	11.6	9.1	7.8	8.4
12	---	---	---	---	---	---	---	---	---	8.9	7.9	8.4
13	---	---	---	---	---	---	---	---	---	10.6	8.8	9.6
14	---	---	---	---	---	---	---	---	---	10.5	8.9	9.6
15	---	---	---	---	---	---	14.7	9.9	11.9	9.1	8.3	8.6
16	---	---	---	---	---	---	14.2	8.7	11.2	9.2	7.9	8.6
17	---	---	---	---	---	---	13.5	9.2	11.2	10.3	7.2	9.1
18	---	---	---	---	---	---	12.0	10.0	10.8	9.7	8.1	8.8
19	---	---	---	---	---	---	15.4	9.7	12.2	10.0	8.0	8.9
20	---	---	---	---	---	---	13.1	6.7	10.5	8.5	6.4	7.2
21	---	---	---	---	---	---	7.5	5.9	6.9	8.2	6.4	7.3
22	---	---	---	---	---	---	9.7	7.4	8.6	9.7	7.9	8.7
23	---	---	---	---	---	---	13.5	9.3	11.1	9.2	8.0	8.7
24	---	---	---	---	---	---	13.9	10.0	11.8	9.7	8.3	9.0
25	---	---	---	---	---	---	13.3	9.4	11.4	10.2	8.6	9.4
26	---	---	---	---	---	---	14.5	9.1	11.5	9.4	8.3	8.9
27	---	---	---	13.6	10.7	12.0	14.8	9.3	11.8	9.5	8.2	8.8
28	---	---	---	13.2	11.0	12.0	13.8	8.8	11.2	9.3	7.7	8.6
29	---	---	---	11.0	9.3	10.0	14.0	8.1	10.9	9.1	6.8	8.1
30	---	---	---	13.1	10.4	11.8	11.0	7.9	9.2	7.7	5.3	6.6
31	---	---	---	14.6	12.4	13.3	---	---	---	8.0	6.0	7.2
MONTH	---	---	---	---	---	---	---	---	---	11.2	5.3	8.6

STREAMS TRIBUTARY TO DETROIT RIVER

04166500 RIVER ROUGE AT DETROIT, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.0	7.7	8.3	6.5	5.3	5.6	6.6	5.7	6.2	7.8	5.7	6.7
2	8.8	8.0	8.4	6.5	5.5	5.7	6.7	3.0	5.0	7.6	6.7	7.1
3	8.5	7.7	7.9	6.3	5.3	5.5	6.8	4.5	5.1	7.5	6.6	6.8
4	8.4	7.4	7.9	6.2	3.4	5.0	6.5	5.3	5.9	7.3	6.3	6.6
5	8.8	7.5	8.1	4.6	3.7	4.1	6.3	4.4	5.3	8.2	6.4	7.0
6	8.6	8.0	8.3	6.2	4.0	5.1	6.5	5.1	5.9	7.4	6.8	7.0
7	8.4	7.6	8.0	6.1	4.6	5.1	6.8	5.1	6.2	7.2	6.8	7.0
8	7.8	6.1	7.1	5.8	4.8	5.0	6.7	0.7	4.4	7.2	6.6	6.8
9	7.8	6.6	7.3	5.8	4.4	5.3	6.5	5.2	6.0	7.2	6.5	6.8
10	8.2	7.0	7.4	5.8	5.0	5.4	7.1	5.7	6.2	7.7	6.4	6.9
11	7.2	6.6	6.9	6.5	4.6	5.2	7.2	5.6	6.1	7.2	6.6	6.8
12	8.3	6.7	7.3	6.6	5.5	5.9	---	---	---	7.4	6.4	6.8
13	7.8	7.4	7.6	6.8	5.8	6.2	---	---	---	6.9	6.4	6.6
14	8.0	7.5	7.6	6.6	5.5	5.9	6.6	5.6	5.9	7.0	6.4	6.6
15	8.2	6.8	7.7	6.4	5.3	5.7	6.9	3.1	5.3	6.8	5.5	6.2
16	7.5	6.3	6.7	6.3	5.7	6.0	5.8	3.8	5.0	6.8	5.9	6.3
17	7.4	6.3	6.5	6.7	5.8	6.1	5.2	3.3	4.8	7.2	6.2	6.6
18	7.3	6.1	6.5	6.5	5.8	6.1	6.2	5.0	5.6	7.1	6.2	6.6
19	7.4	5.8	6.7	7.0	5.9	6.3	6.7	5.5	5.8	7.9	6.4	6.8
20	8.4	7.4	7.8	7.2	5.9	6.3	6.5	5.5	5.8	7.3	6.8	7.0
21	8.8	8.1	8.3	7.3	5.9	6.2	5.8	5.3	5.5	8.0	7.1	7.4
22	8.1	6.8	7.6	6.8	5.6	6.1	6.1	4.6	5.3	7.9	6.8	7.3
23	---	---	---	6.7	5.8	6.1	5.6	4.7	5.2	7.8	7.0	7.4
24	---	---	---	6.7	5.8	6.2	6.0	5.2	5.6	8.5	7.8	8.1
25	6.9	5.5	6.0	7.1	6.0	6.5	6.7	5.5	5.8	8.2	7.5	8.0
26	6.5	4.2	5.5	6.8	5.7	6.2	6.7	4.6	5.6	8.6	8.2	8.4
27	5.5	3.9	4.8	6.8	5.5	5.9	5.5	4.7	5.2	8.6	7.9	8.2
28	6.1	4.2	4.9	6.9	5.3	5.9	6.2	4.8	5.3	8.5	8.2	8.3
29	7.4	5.4	6.2	6.5	5.5	5.9	6.4	4.9	5.3	9.0	8.4	8.7
30	6.8	5.5	6.3	6.8	5.6	6.2	6.2	4.5	5.3	9.4	8.8	9.2
31	---	---	---	6.7	5.7	6.1	5.9	5.2	5.5	---	---	---
MONTH	---	---	---	7.3	3.4	5.8	---	---	---	9.4	5.5	7.2

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 10 ft upstream from bridge on Haggerty Road in Plymouth.

DRAINAGE AREA.--60.7 mi^2.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 2002 to September 2003.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	15	18	33	e16	e15	44	196	91	22	19	22
2	16	15	19	25	e17	e15	39	102	45	19	39	26
3	21	15	18	23	e24	e15	34	63	33	18	28	18
4	28	15	e17	22	e50	e16	124	115	37	25	29	14
5	43	17	e16	22	e22	e18	312	e150	39	23	27	12
6	25	21	e15	22	e17	e18	153	135	32	26	77	12
7	19	19	e15	21	e15	e17	98	79	28	24	34	11
8	17	17	e15	22	e16	e22	79	60	36	26	23	11
9	17	16	e15	24	e15	e40	75	85	51	29	19	11
10	16	88	15	24	e14	e31	90	88	33	21	18	11
11	16	93	15	21	e14	e23	73	75	e30	21	18	11
12	16	36	15	20	e14	e23	58	69	e45	22	19	11
13	17	24	15	e19	e14	e26	49	55	58	18	20	11
14	17	20	16	e18	e14	e29	43	44	38	17	17	12
15	16	34	16	e17	e14	e40	41	42	29	17	26	23
16	16	30	16	e16	e14	175	38	44	24	16	19	19
17	15	22	15	e15	e14	211	35	38	24	15	17	13
18	16	19	18	e15	e14	119	33	33	32	15	15	12
19	21	22	48	e15	e15	72	32	30	211	14	14	14
20	18	21	88	e14	e15	67	44	32	91	14	13	14
21	17	24	51	e14	e16	119	62	29	47	23	14	13
22	16	60	32	e14	e16	78	42	26	33	20	20	88
23	16	38	26	e14	e16	57	33	24	27	17	15	98
24	16	25	23	e14	e16	47	29	24	23	15	13	48
25	19	22	e22	e14	e16	47	26	24	21	14	12	114
26	25	20	e21	e14	e16	44	24	23	20	14	28	48
27	20	19	e21	e14	e15	37	24	23	20	14	23	62
28	16	18	21	e14	e15	44	23	22	19	14	14	36
29	15	18	21	e14	---	128	28	22	35	13	13	23
30	15	19	24	e15	---	80	163	22	34	13	13	19
31	15	---	38	e15	---	53	---	143	---	14	11	---
TOTAL	576	822	725	564	474	1726	1948	1917	1286	573	667	837
MEAN	18.6	27.4	23.4	18.2	16.9	55.7	64.9	61.8	42.9	18.5	21.5	27.9
MAX	43	93	88	33	50	211	312	196	211	29	77	114
MIN	15	15	15	14	14	15	23	22	19	13	11	11
CFSM	0.31	0.45	0.39	0.30	0.28	0.92	1.07	1.02	0.71	0.30	0.35	0.46
IN.	0.35	0.50	0.44	0.35	0.29	1.06	1.19	1.17	0.79	0.35	0.41	0.51

SUMMARY STATISTICS FOR 2003 WATER YEAR

ANNUAL TOTAL	12115	
ANNUAL MEAN	33.2	
HIGHEST DAILY MEAN	312	Apr 5
LOWEST DAILY MEAN	11	Aug 31
ANNUAL SEVEN-DAY MINIMUM	11	Sep 7
MAXIMUM PEAK FLOW	354	Apr 5
MAXIMUM PEAK STAGE	7.71	Apr 5
INSTANTANEOUS LOW FLOW	10	(a)
ANNUAL RUNOFF (CFSM)	0.55	
ANNUAL RUNOFF (INCHES)	7.42	
10 PERCENT EXCEEDS	72	
50 PERCENT EXCEEDS	21	
90 PERCENT EXCEEDS	14	

(a) Sept. 12, 13, 14.
(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04166750 MIDDLE RIVER ROUGE AT PLYMOUTH, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 2002 to September 2003.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: October 2002 to September 2003.
DISSOLVED OXYGEN: October 2002 to September 2003.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval, not operated during winter months.

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 for the following periods: Oct. 5, Nov. 3-5, Apr. 9, 25, May 14, June 21, 25, June 30 to July 3, July 20, 21, July 30 to Aug. 1, Aug. 6-8, 10, Sept. 7-9, 14-17, 20, 28-30, rated good; Oct. 6, 7, Apr. 10, May 15, June 22, 23, 26, 27, July 22, 23, Aug. 11-13, Sept. 21-23, rated fair; Oct. 8-12, Apr. 11, 12, 26, May 16-20, July 24, 25, Sept. 24, 25, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded during period of operation, 27.0°C, June 25, July 4, 2003; minimum recorded, 2.0°C, Apr. 7, 8, 9, 2003.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 16.7 mg/L, Apr. 9, 2003; minimum recorded, 4.9 mg/L, July 2, 3, 2003.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	21.5	19.5	20.0	7.0	5.5	6.0	---	---	---	---	---	---
2	21.5	20.5	21.0	5.5	5.0	5.5	---	---	---	---	---	---
3	21.0	19.0	19.5	6.0	4.5	5.0	---	---	---	---	---	---
4	20.5	19.0	19.5	6.5	5.5	6.0	---	---	---	---	---	---
5	19.5	17.5	18.0	6.0	5.0	5.5	---	---	---	---	---	---
6	17.5	15.5	16.5	---	---	---	---	---	---	---	---	---
7	17.0	14.0	15.0	---	---	---	---	---	---	---	---	---
8	14.5	13.5	14.0	---	---	---	---	---	---	---	---	---
9	15.0	13.0	14.0	---	---	---	---	---	---	---	---	---
10	15.0	13.0	14.0	---	---	---	---	---	---	---	---	---
11	15.5	14.0	15.0	---	---	---	---	---	---	---	---	---
12	16.5	14.5	15.5	---	---	---	---	---	---	---	---	---
13	16.5	13.0	14.5	---	---	---	---	---	---	---	---	---
14	13.0	11.5	12.0	---	---	---	---	---	---	---	---	---
15	13.0	11.0	12.0	---	---	---	---	---	---	---	---	---
16	12.5	10.5	11.5	---	---	---	---	---	---	---	---	---
17	10.5	9.5	10.0	---	---	---	---	---	---	---	---	---
18	10.5	9.0	9.5	---	---	---	---	---	---	---	---	---
19	11.0	10.0	10.5	---	---	---	---	---	---	---	---	---
20	10.0	9.0	9.5	---	---	---	---	---	---	---	---	---
21	9.5	8.0	9.0	---	---	---	---	---	---	---	---	---
22	10.5	9.0	10.0	---	---	---	---	---	---	---	---	---
23	10.0	8.5	9.5	---	---	---	---	---	---	---	---	---
24	8.5	7.5	8.0	---	---	---	---	---	---	---	---	---
25	8.5	7.0	7.5	---	---	---	---	---	---	---	---	---
26	9.0	8.0	8.5	---	---	---	---	---	---	---	---	---
27	8.5	8.0	8.5	---	---	---	---	---	---	---	---	---
28	9.0	8.0	8.5	---	---	---	---	---	---	---	---	---
29	8.0	6.5	7.0	---	---	---	---	---	---	---	---	---
30	7.0	6.0	6.5	---	---	---	---	---	---	---	---	---
31	7.0	5.5	6.5	---	---	---	---	---	---	---	---	---
MONTH	21.5	5.5	12.3	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04166750 MIDDLE RIVER ROUGE AT PLYMOUTH, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	10.5	6.5	8.0	16.0	14.0	15.0
2	---	---	---	---	---	---	11.5	8.5	10.0	14.5	13.0	14.0
3	---	---	---	---	---	---	11.0	8.5	10.0	14.5	12.0	13.0
4	---	---	---	---	---	---	8.5	5.0	7.0	15.0	11.5	13.5
5	---	---	---	---	---	---	5.0	3.0	4.0	15.0	13.0	14.0
6	---	---	---	---	---	---	4.5	2.5	3.5	17.0	13.5	15.0
7	---	---	---	---	---	---	3.5	2.0	2.5	15.0	14.5	14.5
8	---	---	---	---	---	---	3.0	2.0	2.5	15.5	14.0	14.5
9	---	---	---	---	---	---	6.0	2.0	4.0	16.5	12.5	15.0
10	---	---	---	---	---	---	8.0	3.5	6.0	17.5	15.0	16.5
11	---	---	---	---	---	---	11.0	6.0	8.5	17.5	15.5	16.5
12	---	---	---	---	---	---	12.0	8.0	10.0	15.5	13.0	14.0
13	---	---	---	---	---	---	12.5	8.5	10.5	15.5	12.0	13.5
14	---	---	---	---	---	---	14.0	9.5	12.0	17.5	12.5	15.0
15	---	---	---	---	---	---	16.0	11.5	14.0	15.5	14.5	14.5
16	---	---	---	---	---	---	15.5	13.5	14.5	15.5	14.0	15.0
17	---	---	---	---	---	---	13.5	10.5	11.5	18.0	15.0	16.5
18	---	---	---	---	---	---	12.5	11.5	12.0	18.0	16.0	17.0
19	---	---	---	---	---	---	15.0	11.5	13.5	19.5	17.0	18.5
20	---	---	---	---	---	---	16.0	13.5	15.0	19.5	17.0	19.0
21	---	---	---	---	---	---	15.0	12.5	14.0	17.5	15.5	16.5
22	---	---	---	---	---	---	12.5	10.5	11.5	17.5	15.0	16.5
23	---	---	---	---	---	---	13.5	9.0	11.0	17.0	15.5	16.5
24	---	---	---	---	---	---	14.5	10.0	12.0	16.0	14.5	15.0
25	---	---	---	---	---	---	13.5	11.0	12.5	18.0	14.0	15.5
26	---	---	---	---	---	---	15.5	11.0	13.0	16.5	15.0	16.0
27	---	---	---	---	---	---	16.5	11.5	14.0	17.0	15.0	16.0
28	---	---	---	---	---	---	17.5	13.0	15.5	19.5	15.0	17.0
29	---	---	---	10.5	7.5	9.0	17.5	13.5	16.0	20.5	16.5	18.5
30	---	---	---	7.5	6.5	7.0	16.5	14.5	15.0	19.5	17.5	18.5
31	---	---	---	7.5	5.0	6.5	---	---	---	18.5	14.5	16.5
MONTH	---	---	---	---	---	---	17.5	2.0	10.4	20.5	11.5	15.7

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	17.0	13.5	15.0	24.0	21.0	22.5	24.5	23.0	23.5	21.0	19.5	20.0
2	19.0	14.0	16.0	26.0	22.0	24.0	25.5	22.5	24.0	21.0	19.5	20.0
3	17.0	16.0	16.5	26.5	23.5	25.0	24.0	21.5	23.5	22.5	20.0	21.0
4	16.0	14.5	15.0	27.0	24.5	25.5	24.5	21.5	23.0	22.0	19.5	20.5
5	15.5	14.0	14.5	26.0	24.0	24.5	24.5	22.0	23.0	20.5	18.5	19.5
6	18.0	14.5	16.0	26.0	23.5	25.0	24.5	22.0	23.0	21.0	18.0	19.5
7	20.0	16.0	17.5	25.5	23.5	24.5	25.5	22.5	24.0	22.0	19.0	20.5
8	18.5	17.5	17.5	26.0	24.0	25.0	25.0	23.0	24.0	22.0	20.0	21.0
9	19.0	16.5	18.0	25.5	23.0	24.5	25.0	22.5	23.5	21.5	20.0	21.0
10	19.0	17.5	18.0	25.0	24.0	24.5	24.0	22.0	23.0	22.0	20.0	21.0
11	---	---	---	24.5	21.0	22.5	23.5	22.5	23.0	22.0	20.5	21.0
12	---	---	---	22.5	20.0	21.5	24.0	22.5	23.0	22.0	20.5	21.0
13	19.5	17.5	18.5	24.5	21.0	22.5	25.0	22.0	23.5	22.0	20.0	21.0
14	22.0	18.0	19.5	24.0	21.5	23.0	26.5	23.5	25.0	22.5	21.0	21.5
15	23.0	20.0	21.5	24.0	22.5	23.0	26.5	24.5	25.0	22.0	20.5	21.0
16	22.5	20.0	21.5	23.5	21.0	22.5	26.0	24.5	25.0	21.5	19.0	20.0
17	22.0	20.5	21.0	25.0	22.0	23.5	25.0	23.0	24.0	21.5	19.0	20.0
18	24.0	20.0	21.5	24.5	22.0	23.5	24.0	22.0	23.0	20.5	19.5	20.0
19	22.0	20.0	21.0	24.0	21.0	22.5	24.5	22.0	23.5	20.5	19.0	20.0
20	22.0	18.5	20.0	23.5	22.0	23.0	25.0	22.5	24.0	19.5	17.5	18.5
21	22.5	18.5	20.5	23.5	22.0	23.0	26.0	23.0	24.5	19.0	17.0	18.0
22	24.5	19.5	22.0	23.5	21.5	22.5	26.0	24.0	25.0	18.5	17.5	18.0
23	25.5	20.5	23.0	23.5	21.0	22.0	25.0	22.5	23.5	17.5	16.5	17.0
24	26.0	22.0	24.0	23.5	21.0	22.5	23.0	21.5	22.5	17.0	15.5	16.0
25	27.0	23.0	25.0	24.0	21.5	23.0	25.5	22.0	23.5	16.5	15.0	15.5
26	26.0	23.5	24.5	23.5	22.0	23.0	26.0	23.0	24.5	16.0	14.0	15.0
27	24.0	21.5	23.0	24.0	22.5	23.0	26.0	23.5	24.5	16.5	15.0	16.0
28	23.5	22.0	22.5	23.5	21.5	22.5	24.5	22.0	23.0	15.5	14.5	15.0
29	22.5	21.0	22.0	24.0	21.0	22.5	24.0	23.5	23.5	14.5	13.5	14.0
30	24.5	20.5	22.0	24.0	21.5	23.0	23.5	21.5	22.0	13.5	12.5	12.5
31	---	---	---	24.5	22.5	23.5	22.0	20.5	21.0	---	---	---
MONTH	---	---	---	27.0	20.0	23.3	26.5	20.5	23.6	22.5	12.5	18.8

STREAMS TRIBUTARY TO DETROIT RIVER

04166750 MIDDLE RIVER ROUGE AT PLYMOUTH, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	12.3	9.9	10.9	---	---	---	---	---	---
2	---	---	---	12.7	10.4	11.2	---	---	---	---	---	---
3	---	---	---	13.0	10.1	11.3	---	---	---	---	---	---
4	---	---	---	12.6	9.9	10.8	---	---	---	---	---	---
5	10.5	8.9	9.8	12.2	9.7	10.9	---	---	---	---	---	---
6	10.9	9.4	10.1	---	---	---	---	---	---	---	---	---
7	11.2	9.3	10.2	---	---	---	---	---	---	---	---	---
8	11.6	9.9	10.6	---	---	---	---	---	---	---	---	---
9	11.9	10.1	10.8	---	---	---	---	---	---	---	---	---
10	11.8	9.5	10.7	---	---	---	---	---	---	---	---	---
11	11.4	9.2	10.3	---	---	---	---	---	---	---	---	---
12	11.2	8.4	9.7	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	11.2	9.7	10.2	---	---	---	---	---	---	---	---	---
26	10.9	9.9	10.2	---	---	---	---	---	---	---	---	---
27	11.5	9.8	10.4	---	---	---	---	---	---	---	---	---
28	11.7	9.7	10.3	---	---	---	---	---	---	---	---	---
29	11.2	9.8	10.4	---	---	---	---	---	---	---	---	---
30	12.1	10.1	10.8	---	---	---	---	---	---	---	---	---
31	12.5	10.0	10.9	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	10.1	8.9	9.6
7	---	---	---	---	---	---	---	---	---	9.6	9.0	9.2
8	---	---	---	---	---	---	15.3	13.9	14.6	10.5	8.6	9.4
9	---	---	---	---	---	---	16.7	12.8	14.5	10.5	8.7	9.4
10	---	---	---	---	---	---	15.6	12.4	13.9	9.7	8.3	8.9
11	---	---	---	---	---	---	15.5	11.7	13.5	9.2	7.8	8.4
12	---	---	---	---	---	---	16.5	11.4	13.5	9.7	8.4	9.1
13	---	---	---	---	---	---	---	---	---	11.1	8.3	9.5
14	---	---	---	---	---	---	---	---	---	10.4	7.8	9.1
15	---	---	---	---	---	---	---	---	---	9.2	8.1	8.6
16	---	---	---	---	---	---	14.1	7.8	10.2	9.7	8.4	8.9
17	---	---	---	---	---	---	14.6	8.2	10.8	10.0	7.6	8.8
18	---	---	---	---	---	---	12.0	8.8	9.8	9.3	7.5	8.3
19	---	---	---	---	---	---	14.8	7.8	10.6	9.2	7.2	8.1
20	---	---	---	---	---	---	11.7	7.8	8.9	8.0	7.2	7.6
21	---	---	---	---	---	---	10.6	8.3	9.0	---	---	---
22	---	---	---	---	---	---	11.4	8.7	9.9	---	---	---
23	---	---	---	---	---	---	14.3	8.3	10.9	9.2	7.4	8.1
24	---	---	---	---	---	---	14.3	7.8	10.5	9.2	7.6	8.3
25	---	---	---	---	---	---	14.0	7.8	9.9	9.7	7.5	8.5
26	---	---	---	---	---	---	14.8	8.0	10.5	9.0	7.6	8.3
27	---	---	---	---	---	---	---	---	---	9.3	7.4	8.2
28	---	---	---	---	---	---	---	---	---	9.8	7.4	8.5
29	---	---	---	---	---	---	---	---	---	9.4	7.0	8.1
30	---	---	---	---	---	---	---	---	---	8.8	6.9	7.8
31	---	---	---	---	---	---	---	---	---	9.6	7.3	8.9
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04166750 MIDDLE RIVER ROUGE AT PLYMOUTH, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	10.1	9.1	9.6	7.3	5.3	6.4	8.5	5.7	6.7	8.3	7.0	7.7
2	10.0	8.3	9.2	6.8	4.9	5.9	7.8	6.5	7.1	8.8	7.5	8.2
3	9.1	8.4	8.7	6.9	4.9	5.8	7.5	6.6	7.0	8.7	6.9	7.8
4	9.3	8.5	9.0	6.7	5.0	5.8	8.0	6.6	7.2	8.2	6.9	7.5
5	9.6	8.6	9.3	---	---	---	8.1	6.6	7.3	8.4	6.7	7.4
6	9.4	8.1	8.8	---	---	---	8.2	7.3	7.7	8.5	6.4	7.5
7	9.0	7.1	8.2	---	---	---	8.1	6.7	7.4	8.7	6.4	7.4
8	8.3	7.4	7.9	6.6	5.4	5.9	8.0	6.2	7.0	8.7	6.5	7.4
9	9.0	7.9	8.5	6.8	5.7	6.3	7.9	6.0	6.8	8.3	6.8	7.4
10	8.7	7.7	8.1	6.8	5.7	6.1	7.8	6.2	6.9	8.3	6.5	7.2
11	---	---	---	7.2	5.7	6.6	7.7	6.3	6.9	8.4	6.7	7.4
12	---	---	---	8.4	6.8	7.5	8.1	6.2	7.1	8.3	6.8	7.3
13	9.1	8.2	8.6	8.3	6.4	7.3	8.3	6.0	7.0	8.3	6.8	7.4
14	8.8	7.2	8.2	8.3	5.8	7.2	7.4	5.2	6.4	8.2	6.3	7.1
15	8.5	6.7	7.6	7.8	5.7	6.8	7.2	5.3	6.1	8.3	6.5	7.5
16	8.3	6.5	7.4	8.6	6.0	7.3	7.2	5.5	6.1	8.7	7.3	7.9
17	7.7	6.5	7.1	8.6	6.2	7.3	7.5	5.6	6.4	8.7	7.2	7.9
18	8.6	6.4	7.5	8.7	6.2	7.3	8.4	5.4	6.7	8.8	7.2	7.9
19	9.0	7.6	8.6	8.8	6.7	7.6	8.6	5.4	6.6	8.4	6.9	7.5
20	9.0	8.1	8.6	8.7	6.7	7.5	9.1	5.3	6.8	8.8	7.2	7.9
21	8.8	7.3	8.1	8.0	6.8	7.3	9.0	5.1	6.4	9.1	7.3	8.0
22	8.5	6.5	7.6	8.4	6.8	7.5	8.1	5.5	6.6	9.0	7.2	8.0
23	7.6	5.4	6.8	8.4	6.5	7.4	8.4	5.7	6.8	9.2	8.6	8.9
24	7.4	5.3	6.3	8.4	6.1	7.3	9.1	5.9	7.2	9.0	8.2	8.7
25	7.2	5.0	6.1	8.2	5.8	6.9	9.6	5.8	7.0	9.6	8.8	9.3
26	7.0	5.0	5.8	7.8	5.8	6.7	8.3	5.5	6.9	9.3	8.4	9.0
27	7.1	5.2	6.1	7.8	6.0	6.8	7.8	5.9	6.8	9.1	8.5	8.8
28	7.2	5.4	6.2	8.2	5.9	6.9	7.9	6.0	6.9	9.2	8.4	8.8
29	7.4	5.9	6.7	8.3	5.9	6.9	7.1	6.0	6.4	9.2	8.4	8.8
30	7.8	5.9	7.1	8.3	5.9	6.9	8.1	6.3	7.0	9.5	8.5	9.0
31	---	---	---	8.2	5.9	6.9	8.3	6.3	7.3	---	---	---
MONTH	---	---	---	---	---	---	9.6	5.1	6.9	9.6	6.3	8.0

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	21	29	66	e28	26	80	360	222	43	e30	104
2	32	21	29	49	e30	26	67	436	104	32	e65	63
3	68	20	32	42	e35	e27	59	228	69	27	e35	41
4	60	21	30	39	e95	26	223	129	85	39	e80	29
5	108	26	27	36	e70	e28	557	254	84	58	53	23
6	51	40	27	38	e43	e27	347	282	62	36	109	21
7	36	31	26	35	35	28	193	167	52	74	74	19
8	27	28	26	40	e31	e41	160	125	73	45	45	18
9	24	26	e26	46	28	e72	145	212	86	105	32	18
10	23	214	24	44	26	e54	158	206	75	47	27	17
11	22	339	24	37	e26	e40	133	e143	57	37	25	17
12	21	109	25	e35	e24	e41	106	e142	168	34	31	17
13	27	54	27	e33	24	e52	84	105	126	35	41	16
14	23	37	28	31	23	e54	72	83	81	29	28	22
15	22	77	28	e30	23	121	66	86	58	25	227	66
16	21	59	28	30	e24	256	61	81	46	24	148	39
17	20	42	27	29	e24	327	55	69	44	22	50	27
18	19	33	38	27	e26	238	52	60	60	21	32	21
19	67	50	143	26	e27	145	49	54	314	20	26	46
20	30	40	206	e25	e29	128	155	128	e190	19	23	26
21	24	58	125	e23	e29	254	199	64	e100	80	21	22
22	22	189	e69	e21	e28	167	91	50	e68	46	38	347
23	22	96	e49	e22	e28	112	65	43	e50	31	27	294
24	20	59	40	e23	e28	85	55	40	40	25	22	147
25	31	44	e37	e24	e29	94	50	40	35	21	19	281
26	59	37	e35	e25	e27	82	46	39	38	19	65	129
27	35	34	e34	e24	e26	66	43	37	43	19	49	210
28	27	31	34	e24	26	79	40	39	34	18	32	96
29	23	29	35	e25	---	265	38	38	50	17	30	59
30	22	29	42	e27	---	169	74	36	71	17	25	43
31	21	---	92	e27	---	106	---	420	---	16	20	---
TOTAL	1033	1894	1442	1003	892	3236	3523	4196	2585	1081	1529	2278
MEAN	33.3	63.1	46.5	32.4	31.9	104	117	135	86.2	34.9	49.3	75.9
MAX	108	339	206	66	95	327	557	436	314	105	227	347
MIN	19	20	24	21	23	26	38	36	34	16	19	16
CFSM	0.33	0.63	0.47	0.32	0.32	1.04	1.18	1.35	0.86	0.35	0.49	0.76
IN.	0.38	0.71	0.54	0.37	0.33	1.20	1.31	1.56	0.96	0.40	0.57	0.85

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2003, BY WATER YEAR (WY)

MEAN	45.5	58.5	74.4	80.7	110	146	135	96.9	69.5	46.8	40.4	46.7
MAX	250	178	177	269	324	313	313	310	225	179	144	199
(WY)	2002	1993	1988	1952	1976	1976	1950	1956	1968	1957	1998	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
(WY)	1932	1965	1964	1961	1963	1931	1931	1958	1959	1931	1931	1931

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1931 - 2003	
ANNUAL TOTAL	31264		24692			
ANNUAL MEAN	85.7		67.6		78.8	
HIGHEST ANNUAL MEAN					133	1976
LOWEST ANNUAL MEAN					20.8	1931
HIGHEST DAILY MEAN	550	Apr 9	557	Apr 5	2060	Jun 26 1968
LOWEST DAILY MEAN	15	Sep 7	16	Jul 31	1.4	Aug 21 1931
ANNUAL SEVEN-DAY MINIMUM	15	Sep 7	17	Sep 7	3.0	Aug 30 1933
MAXIMUM PEAK FLOW			600	Apr 5	(a)2330	Jun 26 1968
MAXIMUM PEAK STAGE			7.55	Apr 5	(b)10.50	May 10 1948
INSTANTANEOUS LOW FLOW					0.90	Aug 16 1956
ANNUAL RUNOFF (CFSM)	0.86		0.68		0.79	
ANNUAL RUNOFF (INCHES)	11.64		9.19		10.72	
10 PERCENT EXCEEDS	206		156		168	
50 PERCENT EXCEEDS	51		39		45	
90 PERCENT EXCEEDS	21		22		14	

(a) Gage height 9.96 ft.
(b) From floodmark.
(e) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	25	26	71	e29	e27	78	379	282	51	20	89
2	29	27	26	49	e31	e27	67	453	112	36	75	88
3	74	26	35	39	e34	e28	55	216	76	32	53	54
4	46	26	35	38	e90	e28	187	122	76	43	82	36
5	120	29	30	33	e84	e29	708	224	89	82	59	28
6	65	49	30	35	e47	e28	501	316	68	70	112	25
7	39	44	29	32	e36	e29	192	154	55	96	78	22
8	32	36	27	34	e33	e40	158	118	59	77	65	21
9	29	33	25	43	e29	e73	140	173	96	114	34	20
10	28	146	25	40	e28	e62	161	185	81	54	26	21
11	27	370	25	37	e27	e43	128	129	69	43	22	24
12	25	117	25	e35	e26	e42	103	132	138	38	34	24
13	30	60	27	32	e25	e54	85	104	174	33	120	24
14	31	39	27	28	e24	e58	75	85	95	50	e50	27
15	27	70	27	28	e24	131	67	83	69	26	e210	77
16	27	68	26	24	e25	269	61	87	51	23	216	56
17	26	43	26	e30	e25	387	57	74	44	22	89	31
18	26	31	36	e29	e27	272	52	65	58	21	40	22
19	70	41	120	e28	e28	149	46	58	364	20	29	57
20	36	42	190	e26	e30	109	95	110	285	20	25	41
21	23	38	128	e24	e30	220	231	83	113	62	27	24
22	21	170	75	e22	e29	151	97	54	77	52	38	264
23	21	106	50	e23	e28	107	71	44	57	31	31	472
24	20	63	38	e24	e26	84	57	40	45	24	26	133
25	24	43	36	e25	e23	84	50	42	37	20	22	321
26	75	35	e34	e26	e26	85	47	38	37	19	64	135
27	48	31	e32	e25	e26	68	42	37	52	19	66	193
28	31	28	31	e25	e27	63	39	39	34	17	40	107
29	20	26	32	e26	---	236	37	39	58	17	33	67
30	20	26	36	e28	---	155	57	42	113	17	34	47
31	24	---	81	e28	---	99	---	376	---	16	25	---
TOTAL	1138	1888	1390	987	917	3237	3744	4101	2964	1245	1845	2550
MEAN	36.7	62.9	44.8	31.8	32.8	104	125	132	98.8	40.2	59.5	85.0
MAX	120	370	190	71	90	387	708	453	364	114	216	472
MIN	20	25	25	22	23	27	37	37	34	16	20	20
CFSM	0.33	0.57	0.41	0.29	0.30	0.95	1.13	1.20	0.90	0.37	0.54	0.77
IN.	0.38	0.64	0.47	0.33	0.31	1.09	1.27	1.39	1.00	0.42	0.62	0.86

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2003, BY WATER YEAR (WY)

MEAN	89.5	60.6	77.2	81.9	152	125	152	120	100	73.7	82.3	87.6
MAX	269	91.8	136	141	324	242	199	154	171	141	160	220
(WY)	2002	2002	2002	1998	2001	1998	2002	2000	2000	2000	1998	2000
MIN	36.7	32.1	44.8	31.8	32.8	55.7	113	84.3	50.7	33.0	30.3	35.1
(WY)	2003	2000	2003	2003	2003	2000	2000	1999	2002	2001	2002	1998

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1998 - 2003	
ANNUAL TOTAL	32051		26006			
ANNUAL MEAN	87.8		71.2		99.8	
HIGHEST ANNUAL MEAN					118	2002
LOWEST ANNUAL MEAN					71.2	2003
HIGHEST DAILY MEAN	697	Apr 13	708	Apr 5	1540	Feb 10 2001
LOWEST DAILY MEAN	13	Sep 14	16	Jul 31	13	Sep 14 2002
ANNUAL SEVEN-DAY MINIMUM	14	Sep 9	18	Jul 25	14	Sep 9 2002
MAXIMUM PEAK FLOW			804	Apr 5	(a)1810	Feb 10 2001
MAXIMUM PEAK STAGE			8.23	Apr 5	12.24	Feb 18 1998
INSTANTANEOUS LOW FLOW					12	(b)
ANNUAL RUNOFF (CFSM)	0.80		0.65		0.91	
ANNUAL RUNOFF (INCHES)	10.84		8.79		12.33	
10 PERCENT EXCEEDS	179		150		203	
50 PERCENT EXCEEDS	54		40		60	
90 PERCENT EXCEEDS	22		24		25	

(a) Gage height 12.10 ft.
(b) Sept. 14, 15, 2002.
(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04167150 MIDDLE RIVER ROUGE AT DEARBORN HEIGHTS, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1999 to current year.

PERIOD OF DAILY RECORD.--
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, not operated during winter months.

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 for the following periods: Oct. 22-29, Mar. 29, Apr. 5-7, 24, June 30 to July 2, Aug. 16-18, Sept. 5, 12-13, 22-25, rated good; Mar. 30, Apr. 8-10, 25, July 3-9, Sept. 6-7, 14-15, rated fair; Nov. 20, Mar. 31 to Apr. 1, Apr. 20, 21, 26-29, Sept. 8-11, 16-18, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded during period of operation, 28.0°C, July 24, Aug. 9, 2001, July 3, Aug. 1, 2002; minimum recorded, 2.5°C, Mar. 28, 2001.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 18.8 mg/L, Mar. 30, 2001; minimum recorded, 1.1 mg/L, May 11, 2000.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum recorded during period of operation, 25.5°C, Aug. 15; minimum recorded, 3.0°C, Apr. 7-9.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 15.3 mg/L, Apr. 27; minimum recorded, 2.4 mg/L, Nov. 10.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	20.5	19.0	19.5	6.5	5.5	6.0	---	---	---	---	---	---
2	21.5	20.5	21.0	5.5	5.0	5.5	---	---	---	---	---	---
3	21.0	19.0	20.0	5.5	4.5	5.0	---	---	---	---	---	---
4	20.0	19.0	19.5	6.5	5.0	5.5	---	---	---	---	---	---
5	19.5	17.0	18.5	6.5	5.0	5.5	---	---	---	---	---	---
6	17.0	16.0	16.5	7.0	5.5	6.0	---	---	---	---	---	---
7	16.0	14.0	15.0	6.5	6.0	6.0	---	---	---	---	---	---
8	14.0	13.0	13.5	7.5	6.0	6.5	---	---	---	---	---	---
9	13.5	12.5	13.0	9.0	7.0	8.0	---	---	---	---	---	---
10	14.0	13.0	13.5	14.0	9.0	11.0	---	---	---	---	---	---
11	14.5	13.5	14.0	13.5	10.5	12.0	---	---	---	---	---	---
12	15.5	14.5	15.0	10.5	9.0	9.5	---	---	---	---	---	---
13	15.5	12.5	14.5	9.0	8.0	8.5	---	---	---	---	---	---
14	12.5	11.0	11.5	9.0	8.0	8.0	---	---	---	---	---	---
15	11.0	10.0	10.5	9.0	7.5	8.5	---	---	---	---	---	---
16	10.5	9.5	10.5	7.5	5.5	6.0	---	---	---	---	---	---
17	9.5	9.0	9.0	5.5	4.5	5.0	---	---	---	---	---	---
18	9.5	8.5	9.0	4.5	3.5	4.0	---	---	---	---	---	---
19	12.0	9.5	11.0	6.5	4.5	5.5	---	---	---	---	---	---
20	10.5	9.5	10.0	7.0	6.0	6.5	---	---	---	---	---	---
21	9.5	8.5	8.5	---	---	---	---	---	---	---	---	---
22	10.0	9.0	9.5	---	---	---	---	---	---	---	---	---
23	9.5	8.5	9.0	---	---	---	---	---	---	---	---	---
24	8.5	7.5	8.0	---	---	---	---	---	---	---	---	---
25	9.5	7.0	8.0	---	---	---	---	---	---	---	---	---
26	10.0	8.0	9.5	---	---	---	---	---	---	---	---	---
27	9.5	9.0	9.0	---	---	---	---	---	---	---	---	---
28	9.0	8.5	8.5	---	---	---	---	---	---	---	---	---
29	8.5	6.5	7.5	---	---	---	---	---	---	---	---	---
30	7.0	6.0	6.5	---	---	---	---	---	---	---	---	---
31	6.5	5.5	6.0	---	---	---	---	---	---	---	---	---
MONTH	21.5	5.5	12.1	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04167150 MIDDLE RIVER ROUGE AT DEARBORN HEIGHTS, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	9.5	6.0	8.0	14.5	13.0	14.0
2	---	---	---	---	---	---	11.5	8.0	10.0	14.5	13.5	13.5
3	---	---	---	---	---	---	10.5	8.0	9.5	14.0	12.5	13.5
4	---	---	---	---	---	---	8.0	4.5	6.0	14.0	13.0	13.5
5	---	---	---	---	---	---	5.0	4.0	4.5	14.0	12.5	13.5
6	---	---	---	---	---	---	5.0	4.5	5.0	16.0	13.0	14.5
7	---	---	---	---	---	---	5.0	3.0	3.5	16.0	14.0	15.0
8	---	---	---	---	---	---	3.5	3.0	3.0	14.0	13.5	14.0
9	---	---	---	---	---	---	5.5	3.0	4.0	14.0	12.5	13.5
10	---	---	---	---	---	---	7.0	5.0	6.0	16.0	14.0	15.0
11	---	---	---	---	---	---	7.5	6.0	7.0	16.5	15.0	16.0
12	---	---	---	---	---	---	9.0	7.5	8.5	15.0	12.5	13.5
13	---	---	---	---	---	---	10.0	7.5	9.0	14.5	12.0	13.0
14	---	---	---	---	---	---	12.0	8.0	10.5	16.0	13.5	14.5
15	---	---	---	---	---	---	15.5	10.5	13.0	15.0	14.0	14.5
16	---	---	---	---	---	---	15.0	12.0	14.0	14.5	13.5	14.0
17	---	---	---	---	---	---	12.0	9.5	10.5	17.0	14.0	15.5
18	---	---	---	---	---	---	10.5	9.0	10.0	17.0	15.0	16.0
19	---	---	---	---	---	---	13.5	10.0	12.0	18.0	15.0	16.5
20	---	---	---	---	---	---	15.5	12.5	14.0	18.0	16.5	17.0
21	---	---	---	8.0	5.0	7.0	15.0	12.5	14.0	16.5	14.5	15.5
22	---	---	---	5.0	4.5	4.5	12.5	9.5	11.0	17.0	13.0	15.0
23	---	---	---	5.5	4.5	5.0	12.0	8.5	10.0	15.5	13.5	14.5
24	---	---	---	7.5	5.0	6.0	13.5	9.0	11.5	14.5	13.0	13.5
25	---	---	---	9.5	7.0	8.0	13.5	10.0	12.0	15.0	12.5	14.0
26	---	---	---	9.0	7.5	8.5	14.0	10.0	12.0	16.0	13.5	15.0
27	---	---	---	9.0	6.5	8.0	15.0	10.0	12.5	15.5	14.0	15.0
28	---	---	---	11.0	7.5	9.0	17.0	12.0	14.5	17.5	14.0	15.5
29	---	---	---	10.5	7.5	9.5	16.5	13.0	15.0	18.5	15.5	17.0
30	---	---	---	7.5	6.0	6.5	15.5	13.0	14.0	18.5	16.5	17.5
31	---	---	---	6.5	6.0	6.0	---	---	---	17.5	14.0	15.5
MONTH	---	---	---	---	---	---	17.0	3.0	9.8	18.5	12.0	14.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	16.0	14.0	15.0	24.0	20.5	22.0	23.5	21.5	22.0	19.5	18.5	19.0
2	17.0	15.5	16.0	24.0	21.0	22.5	23.0	21.0	22.0	19.5	18.0	19.0
3	17.0	15.5	16.5	24.5	22.0	23.5	23.5	22.0	23.0	21.0	18.5	20.0
4	15.5	13.5	14.5	25.0	23.5	24.0	22.5	21.0	22.0	20.5	19.0	19.5
5	14.0	13.5	13.5	24.5	23.5	24.0	23.5	21.5	22.5	19.5	18.0	19.0
6	16.5	13.5	15.0	24.5	22.5	23.5	23.0	22.0	22.5	19.0	17.5	18.5
7	18.5	15.5	17.0	24.0	21.5	23.0	24.0	22.5	23.5	20.0	18.0	19.0
8	18.0	16.5	17.0	24.5	22.5	23.5	---	---	---	21.0	19.5	20.0
9	18.0	16.5	17.0	24.0	22.0	23.0	---	---	---	20.5	19.0	20.0
10	18.5	17.0	17.5	24.0	22.5	23.0	---	---	---	20.5	19.0	19.5
11	19.5	17.0	18.5	23.0	20.5	21.5	---	---	---	21.0	19.0	20.0
12	18.5	17.0	17.5	21.0	19.5	20.5	22.5	21.5	22.0	21.0	19.5	20.0
13	17.5	16.5	17.0	22.0	19.0	20.5	23.5	21.0	22.5	21.0	19.0	20.0
14	20.0	17.5	19.0	23.0	20.0	21.5	---	---	---	21.5	19.5	20.5
15	21.5	19.0	20.0	22.5	21.0	21.5	---	---	---	21.0	19.0	20.5
16	21.5	18.0	20.0	22.5	20.5	21.5	24.5	23.5	24.5	20.0	18.0	19.0
17	20.0	18.0	19.0	23.0	20.5	22.0	24.0	22.5	23.0	20.0	18.0	19.0
18	20.5	17.5	19.0	23.0	21.0	22.0	22.5	20.5	21.5	20.0	18.5	19.5
19	21.0	19.5	20.5	22.5	20.0	21.0	22.5	20.5	21.5	19.5	18.5	19.5
20	20.0	18.5	19.5	21.5	20.0	21.0	23.0	21.0	22.0	18.5	17.0	17.5
21	20.5	19.5	20.0	21.5	20.5	21.0	24.0	22.0	23.0	17.5	16.0	16.5
22	22.5	19.5	21.0	21.5	20.0	21.0	24.0	23.0	23.5	19.0	17.0	18.0
23	23.5	19.5	21.5	21.5	19.5	20.5	23.0	21.0	22.0	18.5	17.5	18.0
24	24.5	21.0	22.5	21.5	19.5	20.5	22.0	20.0	21.0	17.5	16.5	17.0
25	25.0	22.0	23.5	22.5	20.0	21.5	23.0	20.5	21.5	17.5	16.0	16.5
26	24.5	23.0	23.5	22.0	21.0	21.5	24.0	22.0	23.0	16.5	15.5	16.0
27	23.0	20.5	22.0	23.0	21.5	22.0	25.0	23.0	23.5	17.0	16.0	16.5
28	22.0	20.0	21.0	22.5	21.0	21.5	23.5	21.5	22.5	16.0	14.5	15.5
29	21.0	19.5	20.5	22.0	20.0	21.0	23.0	22.0	22.5	14.5	13.0	14.0
30	22.0	19.5	21.0	22.5	20.0	21.0	23.0	20.5	21.5	13.0	12.0	12.5
31	---	---	---	23.0	20.5	21.5	20.5	19.5	20.0	---	---	---
MONTH	25.0	13.5	18.9	25.0	19.0	21.9	---	---	---	21.5	12.0	18.3

STREAMS TRIBUTARY TO DETROIT RIVER

04167150 MIDDLE RIVER ROUGE AT DEARBORN HEIGHTS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.3	6.3	7.3	11.7	10.8	11.2	---	---	---	---	---	---
2	7.8	5.9	6.8	11.8	10.8	11.2	---	---	---	---	---	---
3	6.5	5.4	6.0	11.9	10.8	11.2	---	---	---	---	---	---
4	6.9	6.0	6.4	11.4	10.3	10.8	---	---	---	---	---	---
5	7.3	5.9	6.6	10.8	8.4	10.1	---	---	---	---	---	---
6	8.4	7.1	7.9	9.7	6.8	8.6	---	---	---	---	---	---
7	8.8	7.9	8.3	9.2	7.5	8.4	---	---	---	---	---	---
8	9.2	8.3	8.8	9.4	8.2	8.8	---	---	---	---	---	---
9	9.5	8.4	8.9	9.3	7.9	8.6	---	---	---	---	---	---
10	9.2	8.2	8.7	8.1	2.5	6.3	---	---	---	---	---	---
11	8.7	7.7	8.3	7.1	5.8	6.6	---	---	---	---	---	---
12	8.4	7.2	7.8	9.0	7.0	8.3	---	---	---	---	---	---
13	8.2	6.5	7.5	9.8	8.9	9.4	---	---	---	---	---	---
14	8.7	7.2	8.2	9.8	8.8	9.4	---	---	---	---	---	---
15	10.0	8.2	9.2	9.1	6.2	7.7	---	---	---	---	---	---
16	10.1	9.1	9.6	9.8	6.1	8.2	---	---	---	---	---	---
17	10.5	9.5	10.0	10.7	9.7	10.2	---	---	---	---	---	---
18	11.0	9.5	10.2	11.7	10.4	11.2	---	---	---	---	---	---
19	10.3	8.3	9.2	11.4	7.0	9.6	---	---	---	---	---	---
20	9.3	8.7	9.0	10.2	7.5	9.2	---	---	---	---	---	---
21	10.6	8.8	9.9	---	---	---	---	---	---	---	---	---
22	10.1	8.8	9.7	---	---	---	---	---	---	---	---	---
23	10.9	9.9	10.4	---	---	---	---	---	---	---	---	---
24	11.3	10.3	10.7	---	---	---	---	---	---	---	---	---
25	11.0	9.0	10.4	---	---	---	---	---	---	---	---	---
26	10.3	8.3	9.2	---	---	---	---	---	---	---	---	---
27	9.9	8.9	9.5	---	---	---	---	---	---	---	---	---
28	11.2	9.7	10.4	---	---	---	---	---	---	---	---	---
29	11.6	10.1	10.7	---	---	---	---	---	---	---	---	---
30	11.7	10.9	11.2	---	---	---	---	---	---	---	---	---
31	12.2	11.0	11.5	---	---	---	---	---	---	---	---	---
MONTH	12.2	5.4	9.0	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	13.8	10.9	12.1	8.5	7.1	7.5
2	---	---	---	---	---	---	14.3	9.7	11.7	8.5	7.8	8.2
3	---	---	---	---	---	---	12.1	9.5	10.7	9.9	8.3	9.1
4	---	---	---	---	---	---	11.8	10.5	11.0	10.8	8.4	9.5
5	---	---	---	---	---	---	12.1	11.6	11.8	8.9	8.0	8.3
6	---	---	---	---	---	---	12.3	11.7	11.9	9.0	8.0	8.5
7	---	---	---	---	---	---	13.0	11.9	12.4	9.1	8.0	8.6
8	---	---	---	---	---	---	13.2	12.7	12.9	9.8	8.4	9.0
9	---	---	---	---	---	---	13.6	12.4	13.0	9.6	8.5	8.8
10	---	---	---	---	---	---	12.5	11.4	12.1	8.8	8.1	8.5
11	---	---	---	---	---	---	12.8	10.7	11.7	8.9	7.8	8.4
12	---	---	---	---	---	---	12.8	10.2	11.4	9.1	8.0	8.6
13	---	---	---	---	---	---	13.5	10.1	11.7	10.6	8.9	9.6
14	---	---	---	---	---	---	13.9	10.2	11.8	10.3	8.4	9.2
15	---	---	---	---	---	---	13.8	9.3	11.1	8.9	7.9	8.3
16	---	---	---	---	---	---	13.1	8.3	10.5	9.3	8.0	8.6
17	---	---	---	---	---	---	12.8	9.0	10.6	10.7	8.4	9.3
18	---	---	---	---	---	---	10.9	9.6	10.1	10.3	8.2	9.0
19	---	---	---	---	---	---	13.0	9.3	10.9	10.9	8.2	9.3
20	---	---	---	---	---	---	11.3	6.6	9.2	8.3	5.5	6.7
21	---	---	---	11.1	9.6	10.2	6.8	5.3	6.1	9.1	6.2	7.7
22	---	---	---	11.6	10.9	11.3	---	---	---	10.4	7.8	9.0
23	---	---	---	11.9	10.9	11.4	---	---	---	9.6	8.2	8.8
24	---	---	---	12.3	10.8	11.5	13.6	9.6	11.2	10.5	8.2	9.0
25	---	---	---	11.3	9.9	10.6	13.5	9.4	11.2	10.9	8.4	9.5
26	---	---	---	11.4	9.4	10.4	15.0	9.4	11.8	10.1	8.1	9.0
27	---	---	---	13.1	10.2	11.4	15.3	9.9	12.0	10.4	7.8	8.8
28	---	---	---	12.6	9.8	11.0	15.0	9.3	11.5	10.5	7.7	8.8
29	---	---	---	9.9	8.0	8.8	14.1	8.6	10.9	9.2	5.8	7.6
30	---	---	---	12.6	9.9	11.4	11.0	7.1	8.9	8.6	5.0	6.9
31	---	---	---	13.0	11.1	12.1	---	---	---	7.8	6.5	7.3
MONTH	---	---	---	---	---	---	---	---	---	10.9	5.0	8.6

STREAMS TRIBUTARY TO DETROIT RIVER

04167150 MIDDLE RIVER ROUGE AT DEARBORN HEIGHTS, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.6	7.5	8.1	6.6	6.0	6.4	8.2	4.7	6.7	7.3	6.6	6.9
2	8.8	7.7	8.2	6.6	5.7	6.3	5.4	3.9	4.6	7.6	7.1	7.3
3	8.2	7.2	7.7	6.8	5.7	6.3	6.7	4.5	6.0	7.6	7.0	7.3
4	7.9	7.3	7.7	6.3	4.1	5.9	6.5	5.9	6.3	8.0	7.0	7.4
5	8.2	7.3	7.8	5.3	3.4	4.6	7.6	6.3	6.8	8.6	7.3	7.9
6	8.7	8.0	8.3	5.7	4.8	5.3	6.6	5.4	6.2	9.0	7.6	8.2
7	8.1	7.3	7.8	5.6	4.4	5.0	7.3	6.5	6.8	9.5	7.7	8.4
8	7.4	6.0	7.2	5.6	4.6	5.2	---	---	---	9.8	7.5	8.3
9	7.1	5.6	6.6	5.8	4.6	5.4	---	---	---	10.5	7.2	8.6
10	7.7	6.7	7.2	6.3	5.8	6.1	---	---	---	11.3	6.8	8.8
11	6.9	6.1	6.6	6.6	5.4	6.2	---	---	---	9.8	6.9	8.1
12	6.8	5.8	6.5	7.6	6.3	7.0	7.8	5.2	6.9	9.2	6.7	7.6
13	7.4	6.5	7.0	7.8	6.4	7.1	7.6	3.8	6.0	8.9	6.5	7.5
14	7.7	7.0	7.3	7.2	5.3	6.4	---	---	---	9.1	6.1	7.1
15	7.4	6.8	7.0	7.3	6.0	6.7	---	---	---	6.4	4.3	5.8
16	7.2	6.6	6.9	7.9	6.6	7.1	5.7	4.7	5.1	7.5	6.3	7.0
17	7.1	6.2	6.7	8.1	6.8	7.3	6.3	5.6	6.0	8.6	7.0	7.9
18	7.0	6.0	6.4	8.1	6.7	7.2	6.9	5.9	6.5	9.0	7.0	7.9
19	6.8	5.2	5.9	8.0	6.6	7.2	7.1	6.0	6.5	7.0	5.5	6.4
20	7.1	6.8	6.9	8.2	6.7	7.3	7.2	6.0	6.5	7.6	5.7	6.8
21	7.3	6.7	7.0	6.7	4.4	5.6	7.1	5.5	6.3	8.8	7.0	7.7
22	7.2	6.5	6.8	6.4	4.8	5.9	6.5	5.1	5.7	7.5	6.6	7.0
23	7.0	6.3	6.6	7.8	6.2	7.0	6.5	5.1	6.0	7.3	6.6	6.9
24	7.1	6.1	6.5	8.2	6.8	7.4	7.5	5.8	6.7	8.3	7.2	7.7
25	7.2	5.8	6.3	8.2	6.7	7.2	7.1	5.7	6.4	7.7	6.9	7.4
26	6.6	3.9	5.8	7.8	6.6	7.1	5.9	2.8	4.8	8.4	7.6	8.0
27	5.3	3.5	4.6	7.6	6.2	6.8	5.9	4.8	5.4	7.9	7.2	7.6
28	5.8	4.8	5.3	7.6	5.9	6.8	7.0	5.9	6.5	8.4	7.7	8.1
29	5.8	5.3	5.6	7.8	6.3	6.9	7.0	5.7	6.4	9.2	8.2	8.7
30	6.2	5.1	5.7	8.3	6.0	7.1	7.2	4.3	6.2	9.7	8.9	9.3
31	---	---	---	8.4	6.5	7.1	7.8	6.4	7.0	---	---	---
MONTH	8.8	3.5	6.8	8.4	3.4	6.5	---	---	---	11.3	4.3	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, 0.25 mi north of Michigan Avenue, and 11.3 mi upstream from mouth.

DRAINAGE AREA.--54.5 mi^2.

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 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	33	37	76	35	36	67	144	106	40	40	93
2	41	33	39	55	36	37	64	232	66	38	59	73
3	63	35	39	48	39	37	60	131	55	38	45	47
4	61	38	39	47	100	36	155	90	56	44	65	42
5	74	37	37	45	46	36	459	164	59	47	57	38
6	45	40	36	46	42	38	188	164	55	42	124	38
7	39	37	36	43	38	40	127	97	51	63	62	36
8	38	39	37	46	36	60	114	97	57	49	52	36
9	36	37	34	57	35	90	128	173	57	53	61	35
10	36	148	35	55	37	59	153	173	51	49	42	35
11	33	191	35	48	34	48	110	127	49	45	39	35
12	34	78	38	43	35	62	90	126	80	42	40	37
13	37	56	36	41	34	88	75	97	96	39	40	35
14	36	51	37	40	35	86	69	80	70	37	36	36
15	34	66	39	36	35	164	66	79	57	37	42	49
16	35	58	39	38	34	297	64	73	49	37	51	42
17	34	50	37	36	36	251	58	68	48	38	44	40
18	35	42	40	35	35	159	57	61	55	36	36	39
19	62	51	109	35	36	108	57	57	107	36	35	43
20	43	44	162	36	38	109	93	79	68	35	34	40
21	39	53	89	35	38	208	136	63	53	135	35	39
22	35	134	61	34	38	129	96	55	47	79	45	176
23	34	81	50	35	37	97	76	52	45	51	38	125
24	34	55	48	33	37	82	67	48	45	42	35	73
25	39	52	43	33	37	90	61	48	43	40	35	131
26	43	43	42	36	39	84	58	47	44	40	75	68
27	33	40	42	35	36	71	55	46	43	38	54	124
28	31	40	41	33	36	69	51	48	42	37	43	69
29	32	35	40	36	--	180	50	46	43	38	41	53
30	34	36	50	37	--	107	59	45	42	38	38	47
31	33	--	116	34	--	80	--	179	--	37	36	--
TOTAL	1238	1733	1563	1287	1094	3038	2963	2989	1739	1420	1479	1774
MEAN	39.9	57.8	50.4	41.5	39.1	98.0	98.8	96.4	58.0	45.8	47.7	59.1
MAX	74	191	162	76	100	297	459	232	107	135	124	176
MIN	31	33	34	33	34	36	50	45	42	35	34	35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2002 - 2003, BY WATER YEAR (WY)

MEAN	87.8	62.2	70.7	53.6	98.6	98.9	114	89.8	51.5	51.2	43.1	53.8
MAX	136	66.6	90.9	65.8	158	99.7	129	96.4	58.0	56.6	47.7	59.1
(WY)	2002	2002	2002	2002	2002	2002	2002	2003	2003	2002	2003	2003
MIN	39.9	57.8	50.4	41.5	39.1	98.0	98.8	83.2	45.1	45.8	38.5	48.4
(WY)	2003	2003	2003	2003	2003	2003	2003	2002	2002	2003	2002	2002

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 2002 - 2003	
ANNUAL TOTAL	26277		22317			
ANNUAL MEAN	72.0		61.1		72.7	
HIGHEST ANNUAL MEAN					84.3	2002
LOWEST ANNUAL MEAN					61.1	2003
HIGHEST DAILY MEAN	490	Apr 9	459	Apr 5	537	Oct 17 2001
LOWEST DAILY MEAN	30	Aug 8	31	Oct 28	30	Aug 8 2002
ANNUAL SEVEN-DAY MINIMUM	31	Aug 29	33	Oct 27	31	Aug 29 2002
MAXIMUM PEAK FLOW			529	Apr 5	666	Oct 17 2001
MAXIMUM PEAK STAGE			9.48	Apr 5	10.54	Oct 17 2001
INSTANTANEOUS LOW FLOW			12	Aug 15	12	Aug 15 2003
10 PERCENT EXCEEDS	134		112		134	
50 PERCENT EXCEEDS	50		44		51	
90 PERCENT EXCEEDS	34		35		35	

STREAMS TRIBUTARY TO DETROIT RIVER

04167625 LOWER RIVER ROUGE AT WAYNE, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 2002 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: October 2001 to current year.
DISSOLVED OXYGEN: October 2001 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval, not operated during winter months.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Temperature records rated excellent. Dissolved oxygen records rated excellent except for the following periods: Oct. 24-29, Apr. 26-27, rated good; Apr. 28-29, rated fair.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded during period of operation, 25.5°C, Aug. 1, 2002; minimum recorded, 3.0°C, Apr. 5, 2003.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 16.8 mg/L, Apr. 17, 2003; minimum recorded, 2.3 mg/L, May 13, 2002.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum recorded during period of operation, 24.5°C, Aug. 15, 16, 21; minimum recorded, 3.0°C, Apr. 5.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 16.8 mg/L, Apr. 17; minimum recorded, 3.7 mg/L, Apr. 21.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	22.0	20.5	21.0	14.5	12.0	13.5	---	---	---	---	---	---
2	22.0	21.0	21.5	13.5	12.0	13.0	---	---	---	---	---	---
3	21.0	19.5	20.0	13.5	13.0	13.0	---	---	---	---	---	---
4	21.0	19.5	20.5	14.5	13.5	14.0	---	---	---	---	---	---
5	20.0	18.0	18.5	13.5	12.5	13.0	---	---	---	---	---	---
6	18.5	17.0	18.0	13.0	12.0	13.0	---	---	---	---	---	---
7	18.5	16.5	17.0	13.5	13.0	13.0	---	---	---	---	---	---
8	17.5	16.0	16.5	14.5	13.0	13.5	---	---	---	---	---	---
9	18.0	16.5	17.0	15.5	14.5	15.0	---	---	---	---	---	---
10	19.0	17.0	18.0	16.0	13.5	15.0	---	---	---	---	---	---
11	19.0	18.0	18.5	14.0	12.5	13.5	---	---	---	---	---	---
12	20.0	18.5	19.0	12.5	12.0	12.5	---	---	---	---	---	---
13	19.5	16.5	18.0	13.0	11.5	12.0	---	---	---	---	---	---
14	16.5	15.5	16.0	14.0	12.5	13.0	---	---	---	---	---	---
15	17.0	15.5	16.0	14.0	11.5	12.0	---	---	---	---	---	---
16	17.0	15.5	16.0	11.5	10.5	11.0	---	---	---	---	---	---
17	15.5	14.5	15.0	11.0	10.5	11.0	---	---	---	---	---	---
18	16.5	15.0	15.5	10.5	10.0	10.5	---	---	---	---	---	---
19	16.0	12.5	14.5	12.0	10.0	11.0	---	---	---	---	---	---
20	14.5	13.5	14.0	13.0	11.0	12.0	---	---	---	---	---	---
21	15.0	13.5	14.0	---	---	---	---	---	---	---	---	---
22	15.5	14.5	15.0	---	---	---	---	---	---	---	---	---
23	15.5	14.5	14.5	---	---	---	---	---	---	---	---	---
24	14.5	13.5	14.0	---	---	---	---	---	---	---	---	---
25	14.0	12.5	14.0	---	---	---	---	---	---	---	---	---
26	14.5	13.0	14.0	---	---	---	---	---	---	---	---	---
27	14.5	14.0	14.5	---	---	---	---	---	---	---	---	---
28	14.5	14.0	14.5	---	---	---	---	---	---	---	---	---
29	14.5	13.0	13.5	---	---	---	---	---	---	---	---	---
30	14.0	13.5	13.5	---	---	---	---	---	---	---	---	---
31	14.5	13.0	13.5	---	---	---	---	---	---	---	---	---
MONTH	22.0	12.5	16.3	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04167625 LOWER RIVER ROUGE AT WAYNE, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	11.5	8.0	9.5	16.0	13.5	14.5
2	---	---	---	---	---	---	14.0	10.5	12.0	15.0	13.0	13.5
3	---	---	---	---	---	---	13.0	10.5	11.5	14.0	11.5	12.5
4	---	---	---	---	---	---	10.5	4.5	7.5	15.0	12.0	13.5
5	---	---	---	---	---	---	4.5	3.0	4.0	14.5	12.5	13.5
6	---	---	---	---	---	---	6.0	3.5	5.0	16.5	14.0	15.0
7	---	---	---	---	---	---	6.0	4.0	4.5	16.0	13.0	14.5
8	---	---	---	---	---	---	5.5	4.0	5.0	14.5	13.0	13.5
9	---	---	---	---	---	---	9.0	5.0	6.5	15.5	12.0	14.0
10	---	---	---	---	---	---	9.5	6.0	8.0	16.5	15.0	16.0
11	---	---	---	---	---	---	12.0	8.0	10.0	16.5	14.5	16.0
12	---	---	---	---	---	---	13.0	10.0	11.5	14.5	12.0	12.5
13	---	---	---	---	---	---	13.0	9.5	11.5	14.5	11.5	13.0
14	---	---	---	---	---	---	14.5	10.0	12.5	16.0	13.0	14.5
15	---	---	---	---	---	---	16.5	12.5	14.5	15.5	14.0	14.5
16	---	---	---	---	---	---	15.5	13.0	14.5	15.0	14.0	14.5
17	---	---	---	---	---	---	13.0	11.0	12.0	17.5	14.5	15.5
18	---	---	---	---	---	---	13.0	11.5	12.0	17.0	15.5	16.0
19	---	---	---	---	---	---	15.5	12.5	14.0	18.0	15.5	16.5
20	---	---	---	10.0	6.0	7.5	16.0	13.5	14.5	17.5	16.0	17.0
21	---	---	---	8.5	5.5	6.5	14.5	12.5	13.5	16.5	14.5	15.5
22	---	---	---	7.5	6.0	6.5	12.5	10.0	11.0	17.0	14.0	15.0
23	---	---	---	7.5	6.0	7.0	13.0	9.0	11.0	16.0	14.0	15.0
24	---	---	---	10.5	6.5	8.5	14.0	10.5	12.5	15.0	14.0	14.5
25	---	---	---	12.0	9.5	10.5	14.5	11.5	13.0	16.5	14.0	15.0
26	---	---	---	11.0	9.5	10.5	15.5	11.5	13.5	16.0	15.0	15.5
27	---	---	---	11.5	9.0	10.5	16.0	12.0	14.0	16.5	14.5	15.5
28	---	---	---	13.5	10.0	11.5	17.5	13.0	15.0	17.5	14.5	16.0
29	---	---	---	12.0	7.5	9.5	16.5	13.5	15.0	19.0	16.0	17.5
30	---	---	---	7.5	6.0	7.0	15.5	14.0	14.5	18.0	16.5	17.0
31	---	---	---	8.5	6.5	7.5	---	---	---	17.5	14.5	15.5
MONTH	---	---	---	---	---	---	17.5	3.0	11.1	19.0	11.5	14.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	15.5	13.0	14.5	21.5	18.5	20.0	23.0	21.0	22.0	21.0	19.0	19.5
2	17.0	14.5	15.5	22.5	19.0	20.5	22.5	20.5	21.5	20.5	19.0	19.5
3	16.5	15.5	16.0	22.5	19.5	21.0	---	---	---	21.5	19.5	20.5
4	15.5	14.0	14.5	23.0	20.5	21.5	22.5	20.5	21.5	21.0	20.0	20.5
5	15.5	14.5	15.0	22.5	21.0	22.0	---	---	---	21.0	19.5	20.0
6	17.5	15.0	16.0	22.5	20.5	21.5	---	---	---	21.5	19.0	20.0
7	19.0	16.5	17.5	22.0	20.5	21.0	---	---	---	22.0	19.5	21.0
8	18.0	17.0	17.5	22.5	21.0	21.5	23.0	22.0	22.5	22.0	20.5	21.0
9	18.5	16.5	17.5	22.5	21.0	21.5	---	---	---	21.5	20.0	21.0
10	18.0	16.5	17.0	22.5	21.0	21.5	---	---	---	22.0	20.0	21.0
11	19.5	17.5	18.5	21.5	19.5	20.5	---	---	---	22.5	20.5	21.5
12	18.5	17.0	17.5	21.5	19.0	20.0	---	---	---	22.0	20.5	21.5
13	18.0	17.0	17.5	22.0	19.0	20.5	23.5	21.0	22.0	22.0	20.0	21.0
14	19.5	17.5	18.5	22.0	19.5	20.5	24.0	21.5	22.5	22.5	21.0	21.5
15	20.5	18.0	19.5	21.0	19.5	20.5	24.5	22.5	23.5	22.0	20.0	21.0
16	20.5	18.0	19.0	21.5	19.0	20.5	24.5	22.5	23.5	21.5	19.0	20.0
17	19.0	18.0	18.0	22.5	19.5	21.0	23.0	21.5	22.0	22.0	19.5	20.5
18	20.5	18.0	19.0	22.0	20.0	21.0	22.5	20.0	21.0	21.5	20.0	21.0
19	20.5	19.0	19.5	21.5	19.0	20.0	22.5	20.0	21.5	21.0	20.0	21.0
20	19.5	17.5	18.5	21.5	19.0	20.5	23.5	20.5	22.0	20.0	19.0	19.5
21	20.5	17.5	19.0	21.5	20.5	21.0	24.5	21.5	23.0	20.0	18.5	19.5
22	21.5	18.0	19.5	21.0	20.0	20.5	24.0	22.5	23.0	20.0	18.0	19.0
23	21.5	18.5	20.0	21.5	19.5	20.5	23.0	21.0	22.0	18.0	17.0	18.0
24	21.5	19.0	20.0	22.0	19.0	20.5	22.0	20.5	21.5	18.0	16.5	17.0
25	23.0	19.5	21.0	22.0	19.5	21.0	23.5	21.0	22.0	17.5	16.5	17.0
26	22.0	20.5	21.0	21.5	20.0	21.0	23.5	22.0	23.0	18.0	16.0	17.0
27	21.5	19.0	20.5	22.5	21.0	21.5	24.0	22.5	23.0	18.0	16.5	17.0
28	20.5	19.0	20.0	22.0	20.0	21.0	23.0	21.0	22.0	17.0	16.0	16.5
29	20.5	19.0	20.0	22.0	19.0	20.5	23.0	22.0	22.5	16.5	16.0	16.0
30	21.0	18.5	19.5	22.5	19.5	21.0	22.5	21.0	21.5	16.0	15.0	15.5
31	---	---	---	23.0	20.0	21.5	21.5	20.5	21.0	---	---	---
MONTH	23.0	13.0	18.2	23.0	18.5	20.9	---	---	---	22.5	15.0	19.5

STREAMS TRIBUTARY TO DETROIT RIVER

04167625 LOWER RIVER ROUGE AT WAYNE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	7.7	7.2	7.4	---	---	---	---	---	---
2	7.3	6.8	7.1	7.8	7.2	7.5	---	---	---	---	---	---
3	7.3	6.7	7.1	7.8	7.2	7.5	---	---	---	---	---	---
4	7.2	7.0	7.1	7.2	6.8	7.0	---	---	---	---	---	---
5	7.8	7.1	7.5	7.3	6.3	7.0	---	---	---	---	---	---
6	8.0	7.4	7.7	6.7	6.3	6.5	---	---	---	---	---	---
7	8.2	7.4	7.8	7.3	6.0	6.7	---	---	---	---	---	---
8	8.3	7.6	8.0	6.9	6.3	6.5	---	---	---	---	---	---
9	8.1	7.5	7.8	6.4	5.3	6.0	---	---	---	---	---	---
10	7.8	7.2	7.5	---	---	---	---	---	---	---	---	---
11	7.6	7.0	7.3	---	---	---	---	---	---	---	---	---
12	7.6	7.0	7.3	---	---	---	---	---	---	---	---	---
13	7.7	6.9	7.3	---	---	---	---	---	---	---	---	---
14	8.4	7.6	7.9	---	---	---	---	---	---	---	---	---
15	8.3	7.5	8.0	---	---	---	---	---	---	---	---	---
16	8.2	7.5	7.8	---	---	---	---	---	---	---	---	---
17	8.8	7.7	8.2	---	---	---	---	---	---	---	---	---
18	8.4	7.8	8.1	9.5	8.4	9.0	---	---	---	---	---	---
19	9.0	7.8	8.3	8.9	8.0	8.4	---	---	---	---	---	---
20	8.7	8.0	8.4	8.8	7.8	8.3	---	---	---	---	---	---
21	8.9	8.2	8.5	---	---	---	---	---	---	---	---	---
22	8.4	7.7	8.1	---	---	---	---	---	---	---	---	---
23	8.8	7.7	8.2	---	---	---	---	---	---	---	---	---
24	9.2	8.3	8.6	---	---	---	---	---	---	---	---	---
25	9.1	8.3	8.6	---	---	---	---	---	---	---	---	---
26	8.7	8.1	8.4	---	---	---	---	---	---	---	---	---
27	8.7	8.1	8.3	---	---	---	---	---	---	---	---	---
28	8.9	7.9	8.3	---	---	---	---	---	---	---	---	---
29	8.4	7.9	8.1	---	---	---	---	---	---	---	---	---
30	8.2	7.8	7.9	---	---	---	---	---	---	---	---	---
31	8.2	7.4	7.9	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	13.9	10.3	11.8	9.3	7.8	8.3
2	---	---	---	---	---	---	14.5	9.3	11.4	9.2	7.9	8.6
3	---	---	---	---	---	---	11.5	8.8	10.1	11.5	9.1	10.1
4	---	---	---	---	---	---	---	---	---	13.0	8.9	10.5
5	---	---	---	---	---	---	12.2	12.0	12.2	9.4	8.3	8.6
6	---	---	---	---	---	---	13.0	12.1	12.6	10.1	8.2	9.0
7	---	---	---	---	---	---	13.1	11.8	12.4	9.6	8.2	8.7
8	---	---	---	---	---	---	13.3	12.3	12.7	10.3	8.5	9.3
9	---	---	---	---	---	---	13.5	11.4	12.5	9.2	8.3	8.8
10	---	---	---	---	---	---	13.2	11.0	12.0	8.7	8.0	8.3
11	---	---	---	---	---	---	13.5	10.4	11.7	8.7	7.7	8.2
12	---	---	---	---	---	---	13.9	9.8	11.5	9.7	8.3	9.0
13	---	---	---	---	---	---	14.7	9.8	12.0	10.4	9.2	9.8
14	---	---	---	---	---	---	15.4	9.7	12.1	9.7	8.6	9.1
15	---	---	---	---	---	---	15.3	8.8	11.6	8.7	7.9	8.3
16	---	---	---	---	---	---	15.3	8.2	11.3	8.9	8.3	8.6
17	---	---	---	---	---	---	16.8	8.7	12.1	9.2	8.3	8.7
18	---	---	---	---	---	---	12.7	8.6	10.2	8.7	7.9	8.3
19	---	---	---	---	---	---	15.5	7.7	11.0	8.7	8.0	8.3
20	---	---	---	---	---	---	8.9	4.2	6.1	8.3	7.4	7.7
21	---	---	---	---	---	---	5.2	3.7	4.4	9.0	7.8	8.5
22	---	---	---	---	---	---	11.2	5.1	8.1	9.1	8.4	8.7
23	---	---	---	---	---	---	14.2	10.2	11.8	8.7	8.2	8.4
24	---	---	---	---	---	---	14.8	9.2	11.6	8.6	8.3	8.4
25	---	---	---	---	---	---	14.3	8.7	11.1	8.8	8.3	8.5
26	---	---	---	---	---	---	15.9	8.6	11.6	8.4	8.2	8.3
27	---	---	---	12.6	9.6	10.8	16.2	8.3	11.6	8.7	8.3	8.4
28	---	---	---	12.3	9.2	10.5	16.1	7.9	11.3	8.5	7.8	8.2
29	---	---	---	10.9	9.1	9.9	16.1	7.7	11.2	8.3	7.6	7.9
30	---	---	---	13.2	10.8	11.9	11.7	7.0	9.1	8.0	7.5	7.8
31	---	---	---	13.8	10.9	12.1	---	---	---	8.6	7.3	7.8
MONTH	---	---	---	---	---	---	---	---	---	13.0	7.3	8.6

STREAMS TRIBUTARY TO DETROIT RIVER

04167625 LOWER RIVER ROUGE AT WAYNE, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.2	8.6	9.0	7.9	7.5	7.7	8.0	7.0	7.5	8.1	7.6	7.9
2	9.1	8.4	8.7	7.7	7.4	7.6	7.8	6.7	7.2	8.4	8.0	8.2
3	8.5	8.1	8.3	7.9	7.4	7.6	---	---	---	8.2	7.5	7.9
4	8.5	8.3	8.4	7.5	6.1	7.0	7.5	7.0	7.3	8.0	7.5	7.7
5	8.7	8.4	8.5	7.1	6.4	6.9	---	---	---	8.2	7.6	7.8
6	8.6	8.2	8.5	7.4	7.1	7.3	---	---	---	8.1	7.5	7.8
7	8.2	7.8	7.9	7.3	6.8	7.1	---	---	---	8.3	7.5	7.7
8	7.9	7.4	7.6	7.3	7.2	7.3	7.5	7.0	7.2	8.3	7.5	7.7
9	8.1	7.5	7.8	7.3	6.8	7.1	---	---	---	8.0	7.4	7.7
10	8.1	7.7	7.9	7.5	7.1	7.3	---	---	---	8.1	7.4	7.7
11	7.7	7.5	7.6	7.7	7.1	7.4	---	---	---	8.1	7.4	7.6
12	7.7	7.2	7.5	8.0	7.6	7.8	---	---	---	8.0	7.4	7.6
13	8.2	7.7	8.0	8.0	7.7	7.8	7.8	7.2	7.5	7.9	7.2	7.5
14	8.0	7.8	7.9	8.1	7.7	7.9	7.7	7.0	7.4	7.8	7.1	7.4
15	7.8	7.6	7.7	7.8	7.5	7.7	7.0	5.6	6.2	7.6	7.0	7.3
16	7.9	7.6	7.7	8.0	7.5	7.8	6.8	5.9	6.5	8.0	7.3	7.6
17	7.9	7.5	7.8	8.0	7.5	7.7	7.7	6.5	7.1	7.9	7.2	7.5
18	7.8	7.0	7.5	8.0	7.4	7.7	8.6	7.0	7.8	8.0	7.2	7.5
19	7.5	6.6	7.1	8.2	7.5	7.8	8.2	7.6	7.9	7.6	7.0	7.3
20	8.0	7.5	7.8	8.2	7.6	7.8	8.2	7.4	7.7	8.1	7.3	7.7
21	7.8	7.6	7.7	7.7	6.2	6.8	7.9	7.1	7.5	8.4	7.5	7.9
22	7.6	7.3	7.5	7.5	7.0	7.3	7.6	6.7	7.1	7.8	7.4	7.5
23	7.7	7.5	7.6	7.9	7.4	7.6	7.9	7.1	7.5	8.3	7.5	8.0
24	7.8	7.4	7.6	7.9	7.4	7.7	8.2	7.4	7.7	8.6	7.9	8.3
25	7.6	7.2	7.4	8.0	7.4	7.6	8.2	7.4	7.6	8.3	7.9	8.2
26	7.3	6.8	7.1	7.9	7.5	7.6	7.4	6.7	7.0	8.6	8.0	8.3
27	7.5	6.9	7.2	7.7	7.3	7.5	7.6	6.9	7.2	8.3	8.0	8.1
28	7.4	7.0	7.2	8.1	7.5	7.7	8.0	7.3	7.5	8.4	8.0	8.2
29	7.7	7.0	7.3	8.3	7.7	7.9	7.5	7.2	7.3	8.7	8.1	8.4
30	7.9	7.4	7.7	8.0	7.4	7.8	8.0	7.2	7.5	8.6	8.3	8.5
31	---	---	---	8.1	7.4	7.6	8.2	7.5	7.8	---	---	---
MONTH	9.2	6.6	7.8	8.3	6.1	7.5	---	---	---	8.7	7.0	7.8

STREAMS TRIBUTARY TO DETROIT RIVER

04168000 LOWER RIVER ROUGE AT INKSTER, MI

LOCATION.--Lat 42°18'00", long 83°18'00", in SW1/4 SE1/ ec.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 . rtheast of Inkster, and 4.8 mi upstream from mouth.

DRAINAGE AREA.--83.2 mi^2.

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 good. 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39	37	e37	e97	30	38	78	232	165	42	57	135
2	51	34	e39	e66	30	39	69	324	91	41	80	115
3	85	35	e39	e58	35	38	66	189	68	40	57	67
4	67	38	38	e55	98	40	177	120	70	62	73	53
5	91	40	37	e53	51	43	586	213	73	51	76	47
6	55	45	36	e53	39	39	297	233	65	44	134	47
7	45	39	33	46	34	40	149	141	58	78	83	44
8	41	38	35	49	32	81	133	118	66	61	93	42
9	39	38	34	57	31	130	134	210	70	56	93	40
10	38	154	30	62	32	70	177	262	59	52	59	40
11	37	238	34	51	32	55	126	183	59	54	48	39
12	34	89	34	46	31	65	101	167	113	45	e80	38
13	39	58	38	42	31	100	83	130	124	41	e54	39
14	37	49	37	41	33	93	75	101	89	37	47	42
15	36	63	39	36	34	156	70	102	70	38	176	66
16	34	55	41	41	40	341	69	92	58	36	89	50
17	35	49	31	36	38	327	63	82	53	37	67	46
18	35	43	38	41	38	196	63	74	63	37	45	46
19	77	48	103	35	40	127	63	67	148	35	42	58
20	49	42	161	35	39	110	104	101	90	35	39	46
21	42	58	96	36	40	240	174	79	64	189	38	43
22	39	142	59	e34	43	152	119	65	55	110	50	289
23	33	e95	e54	32	41	109	92	60	49	62	45	218
24	37	e63	e51	28	38	88	79	56	48	48	39	107
25	44	e53	e53	26	36	98	72	53	46	43	39	182
26	56	e50	e50	27	38	95	69	54	52	41	119	93
27	43	e42	e49	e27	39	80	65	51	47	39	78	163
28	40	38	e49	25	38	77	63	55	48	38	56	93
29	37	37	e48	27	---	208	62	55	49	36	50	67
30	38	36	e51	28	---	134	83	52	45	37	49	56
31	38	---	e109	28	---	91	---	288	---	36	44	---
TOTAL	1411	1846	1583	1318	1081	3500	3561	4009	2155	1601	2099	2411
MEAN	45.5	61.5	51.1	42.5	38.6	113	119	129	71.8	51.6	67.7	80.4
MAX	91	238	161	97	98	341	586	324	165	189	176	289
MIN	33	34	30	25	30	38	62	51	45	35	38	38

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 2003, BY WATER YEAR (WY)

MEAN	27.0	40.2	62.4	61.9	95.8	133	117	64.8	42.3	25.5	21.3	26.8
MAX	164	176	179	294	307	301	280	183	221	95.8	104	160
(WY)	2002	1986	1968	1952	1976	1982	1950	1983	1968	1969	1998	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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1947 - 2003	
ANNUAL TOTAL	32658		26575			
ANNUAL MEAN	89.5		72.8		(a)59.6	
HIGHEST ANNUAL MEAN					107	1998
LOWEST ANNUAL MEAN					15.9	1964
HIGHEST DAILY MEAN	809	Feb 1	586	Apr 5	2520	Jun 26 1968
LOWEST DAILY MEAN	30	Sep 4	25	Jan 28	0.30	Sep 13 1955
ANNUAL SEVEN-DAY MINIMUM	32	Sep 2	27	Jan 24	0.53	Aug 2 1950
MAXIMUM PEAK FLOW			648	Apr 5	3600	Jun 26 1968
MAXIMUM PEAK STAGE			7.85	Apr 5	13.62	Jun 26 1968
INSTANTANEOUS LOW FLOW			18	Dec 10	0.20	(b)
10 PERCENT EXCEEDS	167		137		130	
50 PERCENT EXCEEDS	56		51		23	
90 PERCENT EXCEEDS	35		35		3.0	

(a) Annual mean, water years 1948-95, 54.1 ft^3/s, 8.83 in/yr; water years 1996-03, 92.8 ft^3/s.
(b) Sept. 13, 1955, Jan. 23, 1961.
(e) 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 mi^2, 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 except for estimated daily discharges, which are 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	36	40	104	30	43	90	282	189	49	51	153
2	65	34	41	69	30	43	79	333	105	48	103	125
3	94	35	41	61	35	42	76	219	78	46	66	72
4	70	37	43	57	97	43	192	147	79	67	74	56
5	100	39	42	55	55	48	511	223	83	56	72	50
6	62	45	41	57	42	43	328	240	74	48	140	49
7	47	39	39	54	37	44	170	158	67	80	89	47
8	41	38	40	55	35	94	150	126	72	66	83	45
9	39	38	40	64	35	148	146	211	80	59	108	44
10	38	182	36	68	35	76	194	265	68	56	63	43
11	38	251	40	59	35	59	140	196	67	58	52	43
12	35	99	39	53	34	64	108	176	137	49	87	41
13	39	64	43	48	35	101	87	137	139	45	58	41
14	39	53	42	46	35	93	76	102	102	41	e50	43
15	37	68	44	39	37	148	71	100	79	42	e180	70
16	35	60	46	42	40	314	71	94	66	40	e100	52
17	37	54	42	35	39	315	65	82	60	40	82	46
18	36	47	48	41	40	209	65	75	67	40	52	47
19	81	51	124	34	40	140	65	67	164	39	48	64
20	52	47	198	32	41	112	103	100	98	38	46	48
21	43	62	126	31	41	242	185	83	70	199	45	44
22	42	156	77	29	44	175	128	70	59	121	56	304
23	36	102	62	e28	45	126	97	65	52	66	52	248
24	39	66	55	e28	43	100	83	63	52	51	45	120
25	45	55	55	e28	41	111	77	60	52	47	44	204
26	63	52	51	e29	44	109	74	63	58	44	125	100
27	46	46	50	e28	45	91	71	60	57	43	86	185
28	43	44	49	e27	42	86	70	64	54	41	61	101
29	38	42	49	e27	---	220	69	68	62	39	54	70
30	39	41	53	27	---	156	96	63	54	40	54	60
31	39	---	117	28	---	102	---	332	---	34	49	---
TOTAL	1502	1983	1813	1383	1152	3697	3737	4324	2444	1732	2275	2615
MEAN	48.5	66.1	58.5	44.6	41.1	119	125	139	81.5	55.9	73.4	87.2
MAX	100	251	198	104	97	315	511	333	189	199	180	304
MIN	35	34	36	27	30	42	65	60	52	34	44	41

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1998 - 2003, BY WATER YEAR (WY)

MEAN	83.1	57.4	73.1	94.0	162	130	162	107	90.4	67.5	73.2	83.2
MAX	205	77.4	122	163	301	285	201	150	133	88.2	117	175
(WY)	2002	2002	2002	1999	2001	1998	1999	2000	2000	1999	2000	2000
MIN	46.7	40.9	43.2	44.6	41.1	62.1	125	66.7	47.5	45.1	45.4	43.0
(WY)	1998	1999	1999	2003	2003	2000	2003	1999	2002	2001	2002	1998

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1998 - 2003	
ANNUAL TOTAL	33906		28657			
ANNUAL MEAN	92.9		78.5		98.1	
HIGHEST ANNUAL MEAN					116	1998
LOWEST ANNUAL MEAN					78.5	2003
HIGHEST DAILY MEAN	651	Feb 2	511	Apr 5	1620	Feb 18 1998
LOWEST DAILY MEAN	30	Jul 8	27	Jan 28	23	(a)
ANNUAL SEVEN-DAY MINIMUM	31	Sep 2	28	Jan 24	27	Dec 26 1998
MAXIMUM PEAK FLOW			643	Nov 10	1980	Feb 10 2001
MAXIMUM PEAK STAGE			6.34	Nov 10	10.30	Feb 10 2001
10 PERCENT EXCEEDS	188		154		193	
50 PERCENT EXCEEDS	62		56		61	
90 PERCENT EXCEEDS	35		37		36	

(a) Jan. 1, Oct. 10, 1999.
(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04168400 LOWER RIVER ROUGE AT DEARBORN, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1999 to current year.

PERIOD OF DAILY RECORD.--
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, not operated during winter months.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent. Dissolved oxygen records rated good except for the following periods: Oct. 8-11, Apr. 22-23, 26-27, May 2-3, 16-17, June 4-5, July 23-24, 27-28, Aug. 2-4, 8-11, Sept. 1-3, 10-11, rated fair; Oct. 12-29, Apr. 28-29, May 4-6, 12, 18-22, July 29-30, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded during period of operation, 26.0°C, on several days in 1999, 2001 and 2002; minimum recorded, 3.5°C, Apr. 5, 6, 7, 8, 2003.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 21.0 mg/L, Mar. 28, 2001; minimum recorded, 1.1 mg/L, Aug. 10, 2001.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum recorded during period of operation, 24.5°C, Aug. 16; minimum recorded, 3.5°C, Apr. 5, 6, 7, 8.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 15.0 mg/L, Apr. 19; minimum recorded, 2.1 mg/L, July 4.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	21.0	19.5	20.0	9.5	8.5	9.0	---	---	---	---	---	---
2	22.0	20.5	21.0	8.5	8.0	8.5	---	---	---	---	---	---
3	21.5	19.5	20.0	8.5	7.5	8.0	---	---	---	---	---	---
4	20.0	19.0	19.5	9.5	8.5	9.0	---	---	---	---	---	---
5	19.5	17.5	18.5	9.0	8.5	8.5	---	---	---	---	---	---
6	17.5	16.0	16.5	---	---	---	---	---	---	---	---	---
7	17.0	14.5	15.5	---	---	---	---	---	---	---	---	---
8	14.5	13.5	14.0	---	---	---	---	---	---	---	---	---
9	15.0	13.5	14.0	---	---	---	---	---	---	---	---	---
10	15.5	14.0	15.0	---	---	---	---	---	---	---	---	---
11	16.5	15.0	15.5	---	---	---	---	---	---	---	---	---
12	17.0	16.0	16.5	---	---	---	---	---	---	---	---	---
13	17.0	14.0	16.0	---	---	---	---	---	---	---	---	---
14	14.0	12.5	13.0	---	---	---	---	---	---	---	---	---
15	13.0	11.5	12.5	---	---	---	---	---	---	---	---	---
16	13.0	11.5	12.5	---	---	---	---	---	---	---	---	---
17	11.5	10.5	11.0	---	---	---	---	---	---	---	---	---
18	12.0	10.5	11.0	---	---	---	---	---	---	---	---	---
19	13.0	12.0	13.0	---	---	---	---	---	---	---	---	---
20	12.5	11.5	11.5	---	---	---	---	---	---	---	---	---
21	11.5	10.0	10.5	---	---	---	---	---	---	---	---	---
22	12.0	11.0	11.5	---	---	---	---	---	---	---	---	---
23	12.0	10.5	11.5	---	---	---	---	---	---	---	---	---
24	10.5	9.5	10.0	---	---	---	---	---	---	---	---	---
25	11.0	9.5	10.0	---	---	---	---	---	---	---	---	---
26	12.0	11.0	11.5	---	---	---	---	---	---	---	---	---
27	11.5	11.0	11.0	---	---	---	---	---	---	---	---	---
28	11.0	10.5	11.0	---	---	---	---	---	---	---	---	---
29	11.0	9.0	10.0	---	---	---	---	---	---	---	---	---
30	9.5	9.0	9.0	---	---	---	---	---	---	---	---	---
31	9.5	8.5	9.0	---	---	---	---	---	---	---	---	---
MONTH	22.0	8.5	13.6	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04168400 LOWER RIVER ROUGE AT DEARBORN, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	10.5	6.5	8.5	15.0	13.0	14.0
2	---	---	---	---	---	---	13.0	9.0	11.0	14.5	12.5	14.0
3	---	---	---	---	---	---	12.0	9.5	10.5	13.5	12.0	12.5
4	---	---	---	---	---	---	9.5	5.0	7.5	14.5	11.5	13.0
5	---	---	---	---	---	---	5.0	3.5	4.0	14.0	12.5	13.0
6	---	---	---	---	---	---	5.0	3.5	4.0	16.0	13.5	14.5
7	---	---	---	---	---	---	4.5	3.5	4.0	15.0	13.5	14.5
8	---	---	---	---	---	---	4.5	3.5	4.0	14.0	13.0	13.5
9	---	---	---	---	---	---	7.5	4.0	5.5	14.0	12.0	13.5
10	---	---	---	---	---	---	9.0	6.0	7.5	16.0	14.0	15.0
11	---	---	---	---	---	---	10.5	7.0	9.0	17.0	15.0	16.0
12	---	---	---	---	---	---	12.5	9.0	10.5	15.0	12.0	13.5
13	---	---	---	---	---	---	12.5	9.0	10.5	14.0	11.5	12.5
14	---	---	---	---	---	---	14.0	9.0	11.5	15.5	12.0	14.0
15	---	---	---	---	---	---	16.5	12.0	14.0	15.0	14.0	14.0
16	---	---	---	---	---	---	15.5	13.0	14.5	15.0	13.5	14.0
17	---	---	---	---	---	---	13.0	10.5	11.5	17.0	14.0	15.0
18	---	---	---	---	---	---	12.0	10.5	11.0	16.5	15.0	15.5
19	---	---	---	---	---	---	15.0	11.5	13.0	18.0	15.0	16.5
20	---	---	---	---	---	---	15.5	13.5	14.5	17.5	16.0	16.5
21	---	---	---	8.5	6.0	7.5	14.5	13.0	14.0	16.5	14.5	15.5
22	---	---	---	6.0	5.5	6.0	13.0	10.0	11.5	16.0	13.0	14.5
23	---	---	---	7.5	5.0	6.5	12.0	8.5	10.5	15.0	13.5	14.0
24	---	---	---	9.0	5.5	7.0	13.0	9.0	11.5	14.0	13.0	13.5
25	---	---	---	11.0	8.5	9.5	13.5	10.5	12.0	15.0	12.5	14.0
26	---	---	---	10.5	9.0	10.0	14.5	10.5	12.5	15.5	13.5	14.5
27	---	---	---	11.0	8.5	9.5	15.0	11.0	13.0	15.5	13.5	14.5
28	---	---	---	12.5	9.0	10.5	17.0	13.0	15.0	17.0	14.0	15.5
29	---	---	---	12.0	8.0	10.0	16.5	13.5	15.5	18.5	15.5	16.5
30	---	---	---	8.0	6.0	7.0	16.0	13.5	14.5	17.5	16.0	17.0
31	---	---	---	7.5	5.5	6.5	---	---	---	17.0	14.5	15.5
MONTH	---	---	---	---	---	---	17.0	3.5	10.6	18.5	11.5	14.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	15.0	13.5	14.5	22.0	19.5	20.5	22.5	21.0	21.5	20.0	18.5	19.0
2	16.5	13.5	15.0	22.5	20.0	21.0	22.5	20.5	21.5	19.5	18.5	19.0
3	16.0	15.0	15.5	23.0	20.5	22.0	22.0	21.0	21.5	20.5	18.5	19.5
4	15.0	14.0	14.5	23.5	22.0	22.5	22.0	20.5	21.0	20.0	19.0	19.5
5	14.5	13.5	14.0	23.0	21.5	22.5	22.0	20.5	21.5	19.5	18.0	19.0
6	16.5	13.5	15.0	23.0	21.5	22.5	22.5	21.0	22.0	19.5	17.5	18.5
7	18.0	15.5	17.0	23.0	20.5	21.5	23.0	21.5	22.0	20.5	18.0	19.0
8	18.0	16.5	17.0	23.0	21.5	22.0	23.0	21.5	22.5	21.0	19.5	20.0
9	18.0	16.0	17.0	23.0	21.0	22.0	23.0	22.0	22.5	21.0	19.5	20.0
10	17.5	16.5	17.0	22.5	21.0	21.5	22.0	21.0	21.5	20.0	19.0	19.5
11	19.0	17.0	18.0	22.0	20.0	21.0	22.0	21.0	21.5	20.5	19.0	20.0
12	18.5	16.5	17.0	20.5	18.5	19.5	23.5	21.0	21.5	20.5	19.5	20.0
13	17.5	16.5	17.0	21.0	19.0	20.0	23.0	21.0	22.0	20.5	19.5	20.0
14	19.0	17.0	18.0	22.0	20.0	21.0	---	---	---	21.0	20.0	20.5
15	20.5	17.5	19.0	22.0	20.5	21.0	---	---	---	21.0	19.5	20.5
16	20.5	17.5	19.0	21.5	19.5	20.5	---	---	---	19.5	18.0	19.0
17	19.5	18.0	18.5	22.5	20.0	21.0	23.5	22.0	23.0	20.0	18.0	19.0
18	20.0	17.5	18.5	22.0	20.5	21.0	22.0	20.0	21.0	20.0	19.0	19.5
19	20.5	18.5	19.5	21.0	19.0	20.5	22.0	20.0	21.0	20.0	19.0	19.5
20	19.5	18.0	18.5	21.0	19.5	20.5	22.5	20.0	21.5	19.0	17.5	18.0
21	20.0	17.0	18.5	21.0	20.0	20.5	24.0	21.5	22.5	18.0	16.5	17.0
22	21.0	17.5	19.5	21.0	20.5	20.5	23.5	22.5	23.0	19.0	17.5	18.5
23	22.0	18.5	20.0	21.0	19.5	20.0	23.0	21.0	21.5	18.5	17.0	17.5
24	22.5	19.5	21.0	21.0	19.0	20.0	21.5	19.5	20.5	17.5	16.0	16.5
25	23.0	20.5	21.5	22.0	19.5	20.5	22.5	20.0	21.0	17.0	15.5	16.5
26	23.0	21.5	22.0	22.0	20.0	21.0	23.0	22.0	22.5	16.5	15.0	15.5
27	21.5	19.5	20.5	22.5	21.0	21.5	24.0	22.5	23.0	17.0	16.5	16.5
28	21.0	19.0	20.0	22.0	20.5	21.0	23.0	21.0	21.5	16.5	15.5	16.0
29	20.0	19.0	19.5	21.5	19.5	20.5	22.5	21.5	22.0	15.5	14.0	14.5
30	21.0	18.5	20.0	21.5	19.5	20.5	22.0	20.5	21.0	14.0	13.0	13.5
31	---	---	---	22.0	20.0	21.0	21.0	19.0	20.0	---	---	---
MONTH	23.0	13.5	18.1	23.5	18.5	21.0	---	---	---	21.0	13.0	18.4

STREAMS TRIBUTARY TO DETROIT RIVER

04168400 LOWER RIVER ROUGE AT DEARBORN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	6.2	5.3	5.8	9.4	8.3	8.9	---	---	---	---	---	---
2	6.3	4.4	5.6	9.3	8.3	8.8	---	---	---	---	---	---
3	6.4	4.2	5.8	9.1	8.3	8.7	---	---	---	---	---	---
4	6.6	4.7	6.2	8.6	7.6	8.0	---	---	---	---	---	---
5	7.2	6.2	6.9	---	---	---	---	---	---	---	---	---
6	8.0	6.7	7.5	---	---	---	---	---	---	---	---	---
7	7.4	6.5	7.0	---	---	---	---	---	---	---	---	---
8	7.8	6.9	7.4	---	---	---	---	---	---	---	---	---
9	7.8	6.4	7.4	---	---	---	---	---	---	---	---	---
10	7.4	6.0	6.8	---	---	---	---	---	---	---	---	---
11	6.7	5.3	6.1	---	---	---	---	---	---	---	---	---
12	5.9	4.5	5.2	---	---	---	---	---	---	---	---	---
13	5.9	3.7	4.9	---	---	---	---	---	---	---	---	---
14	7.5	5.1	6.6	---	---	---	---	---	---	---	---	---
15	7.5	6.0	6.9	---	---	---	---	---	---	---	---	---
16	7.5	5.7	6.8	---	---	---	---	---	---	---	---	---
17	8.7	6.7	7.8	---	---	---	---	---	---	---	---	---
18	9.2	7.4	8.5	---	---	---	---	---	---	---	---	---
19	9.2	6.7	8.6	---	---	---	---	---	---	---	---	---
20	9.7	8.8	9.3	---	---	---	---	---	---	---	---	---
21	10.0	8.8	9.4	---	---	---	---	---	---	---	---	---
22	9.1	8.2	8.8	---	---	---	---	---	---	---	---	---
23	9.0	7.7	8.2	---	---	---	---	---	---	---	---	---
24	10.0	5.6	9.1	---	---	---	---	---	---	---	---	---
25	9.7	8.3	9.1	---	---	---	---	---	---	---	---	---
26	9.6	8.8	9.2	---	---	---	---	---	---	---	---	---
27	9.6	8.6	9.0	---	---	---	---	---	---	---	---	---
28	9.8	8.0	8.8	---	---	---	---	---	---	---	---	---
29	9.8	8.3	9.1	---	---	---	---	---	---	---	---	---
30	9.4	8.7	9.1	---	---	---	---	---	---	---	---	---
31	9.5	8.9	9.3	---	---	---	---	---	---	---	---	---
MONTH	10.0	3.7	7.6	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	12.7	11.0	11.9	7.6	4.2	6.7
2	---	---	---	---	---	---	12.2	9.8	11.0	8.6	3.9	7.4
3	---	---	---	---	---	---	10.7	9.0	9.9	9.6	8.6	9.1
4	---	---	---	---	---	---	11.8	9.5	10.5	10.8	9.1	9.7
5	---	---	---	---	---	---	12.7	11.8	12.3	9.4	8.1	8.4
6	---	---	---	---	---	---	12.8	12.6	12.6	8.6	8.2	8.4
7	---	---	---	---	---	---	12.8	12.4	12.6	8.5	8.1	8.3
8	---	---	---	---	---	---	13.1	12.7	12.9	9.2	8.1	8.6
9	---	---	---	---	---	---	13.1	11.8	12.6	8.7	8.0	8.5
10	---	---	---	---	---	---	11.8	11.2	11.5	8.6	7.7	8.0
11	---	---	---	---	---	---	11.9	10.6	11.3	7.8	7.4	7.6
12	---	---	---	---	---	---	11.8	10.2	10.9	9.3	7.2	8.2
13	---	---	---	---	---	---	12.5	10.0	11.2	---	---	---
14	---	---	---	---	---	---	12.7	10.0	11.2	9.6	8.9	9.4
15	---	---	---	---	---	---	12.2	8.8	10.5	8.9	8.1	8.4
16	---	---	---	---	---	---	12.2	8.0	10.1	8.8	8.3	8.5
17	---	---	---	---	---	---	14.0	8.8	11.2	9.1	8.5	8.8
18	---	---	---	---	---	---	12.5	9.1	10.4	8.7	8.0	8.4
19	---	---	---	---	---	---	15.0	8.9	11.7	8.6	7.8	8.2
20	---	---	---	---	---	---	12.0	6.4	9.3	8.2	6.7	7.4
21	---	---	---	11.2	9.8	10.4	8.5	6.8	7.8	8.5	7.4	8.0
22	---	---	---	11.6	11.2	11.4	10.3	8.5	9.5	8.6	8.1	8.3
23	---	---	---	12.1	11.4	11.7	13.1	10.0	11.4	8.4	7.7	8.0
24	---	---	---	12.6	10.9	11.8	13.8	9.5	11.5	8.6	7.8	8.2
25	---	---	---	10.9	9.6	10.2	13.0	8.9	10.9	9.1	8.0	8.5
26	---	---	---	10.9	9.5	10.2	14.0	8.7	11.3	8.6	7.9	8.3
27	---	---	---	11.8	10.0	10.8	14.2	8.8	11.5	8.9	7.9	8.3
28	---	---	---	11.1	8.7	10.3	12.9	8.2	10.5	8.7	7.8	8.3
29	---	---	---	10.7	8.8	9.6	11.9	7.6	9.7	8.2	5.6	7.5
30	---	---	---	12.3	10.7	11.7	10.1	6.9	8.0	7.3	4.0	6.5
31	---	---	---	13.2	12.0	12.5	---	---	---	8.1	6.0	7.5
MONTH	---	---	---	---	---	---	15.0	6.4	10.9	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04168400 LOWER RIVER ROUGE AT DEARBORN, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.7	8.1	8.5	6.3	5.5	5.9	6.7	3.5	6.1	7.5	6.0	6.9
2	8.6	7.9	8.5	6.2	5.4	5.8	6.2	5.0	5.7	7.7	7.2	7.5
3	8.1	7.8	7.9	6.3	5.2	5.8	6.5	5.9	6.2	7.5	6.8	7.2
4	8.0	7.4	7.8	5.9	2.1	4.8	6.8	6.0	6.4	7.4	6.5	7.0
5	8.3	7.6	8.0	5.2	2.2	4.3	6.8	5.7	6.5	7.5	6.8	7.2
6	8.4	7.7	8.2	6.0	5.0	5.5	6.7	6.0	6.4	7.8	6.8	7.3
7	7.7	7.0	7.5	5.9	5.1	5.5	6.8	6.3	6.6	7.5	6.2	7.0
8	7.2	6.6	7.0	6.1	5.8	6.0	6.7	5.1	6.4	7.2	6.0	6.7
9	7.2	6.6	7.0	6.5	5.7	6.2	6.4	5.4	6.0	7.2	6.1	6.8
10	7.4	6.6	7.1	6.5	6.2	6.3	6.6	6.2	6.5	7.3	6.2	6.8
11	7.2	6.6	6.9	6.5	5.9	6.3	6.4	5.7	6.2	7.1	6.1	6.7
12	7.0	6.2	6.7	7.0	6.4	6.8	—	—	—	7.1	6.2	6.6
13	7.6	7.0	7.4	7.1	6.5	6.8	5.5	4.3	5.0	7.2	6.2	6.7
14	7.8	7.3	7.6	7.0	6.3	6.6	—	—	—	7.0	4.0	6.2
15	7.4	6.9	7.2	6.8	6.3	6.6	—	—	—	6.0	4.6	5.6
16	7.1	6.6	7.0	6.9	6.3	6.6	—	—	—	7.0	5.4	6.5
17	7.0	6.5	6.7	6.7	6.2	6.5	—	—	—	7.2	6.3	6.8
18	7.3	5.0	6.9	6.8	6.1	6.5	—	—	—	7.0	6.3	6.7
19	6.9	5.0	6.4	7.0	6.3	6.7	6.0	4.3	5.3	6.4	5.5	6.0
20	7.4	6.9	7.3	7.0	6.3	6.7	6.0	4.7	5.3	7.1	6.0	6.6
21	7.5	6.5	7.1	6.8	3.3	5.6	—	—	—	7.5	6.3	6.9
22	7.0	6.0	6.6	6.8	5.0	6.6	5.6	3.7	4.9	7.5	6.0	6.8
23	6.4	5.4	6.0	7.1	6.6	6.9	6.7	5.1	6.1	7.6	7.0	7.4
24	6.3	5.3	5.9	7.1	6.4	6.8	7.0	5.7	6.5	8.1	6.3	7.7
25	6.3	5.5	5.9	7.0	6.2	6.6	—	—	—	8.1	7.4	7.8
26	5.8	3.0	5.3	6.9	6.1	6.5	—	—	—	8.4	7.5	8.2
27	5.2	3.3	4.7	6.6	6.1	6.4	6.0	5.5	5.7	7.9	6.9	7.7
28	5.8	4.5	5.4	6.8	5.9	6.4	6.6	5.6	6.1	8.1	7.2	7.9
29	5.6	5.2	5.3	7.0	6.1	6.6	6.1	5.3	5.7	8.5	7.7	8.2
30	6.2	5.2	5.9	7.0	6.2	6.7	6.5	5.4	6.1	8.9	8.2	8.6
31	—	—	—	6.8	6.1	6.5	7.1	5.9	6.5	—	—	—
MONTH	8.7	3.0	6.9	7.1	2.1	6.3	—	—	—	8.9	4.0	7.1

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 mi^2, approximately.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder and acoustic doppler current meter. Elevation of gage is 611 ft above sea level, from topographic map.

REMARKS.--Water-discharge records fair except for estimated daily discharges, which are poor. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e120	e95	e105	241	e100	e108	263	1230	926	181	e130	368
2	166	e96	e105	155	e105	e110	217	1360	384	146	e300	268
3	296	e100	e115	e150	e150	e110	192	748	244	112	e180	159
4	240	e105	e125	e140	328	e115	701	412	248	168	e210	96
5	424	e110	e115	e135	215	e120	2120	738	278	230	245	86
6	259	e180	e110	e140	e150	e115	1460	1030	233	213	480	83
7	134	e140	e107	e135	e130	e120	623	540	198	257	353	72
8	138	e120	e105	e150	e120	235	516	410	203	187	272	82
9	117	e110	e102	e170	e110	578	476	608	327	245	226	76
10	102	621	e100	e170	e105	e260	593	730	277	188	149	62
11	114	1100	e100	e150	e100	157	463	498	238	164	115	80
12	108	393	e105	e130	e98	153	364	461	467	164	180	91
13	107	195	e110	e125	e97	290	294	374	615	155	472	90
14	118	e150	e115	e115	e97	276	251	299	341	211	194	98
15	112	e240	e117	e110	e99	385	229	281	238	131	535	242
16	92	e220	e120	e100	e100	901	188	296	186	95	648	188
17	79	e180	e125	e100	e102	1180	212	245	173	79	347	121
18	89	e140	132	e105	e105	848	209	212	202	94	152	109
19	225	e155	403	e100	e108	499	190	208	1050	81	117	214
20	141	e165	632	e96	e112	376	286	358	832	77	101	180
21	109	e170	401	e93	e115	742	770	301	344	365	98	102
22	90	e640	220	e91	e115	527	353	202	236	265	109	1220
23	85	e370	e170	e92	e114	370	241	174	180	132	108	1340
24	86	e225	e150	e94	e112	282	212	157	162	107	90	479
25	113	e170	e140	e95	e110	299	186	179	142	93	79	955
26	e240	e140	e135	e96	e110	300	163	159	160	95	256	423
27	e160	e130	e130	e95	e110	246	157	175	182	70	240	e600
28	e120	e120	e125	e96	e109	257	146	180	147	91	156	e450
29	e100	e110	e130	e97	---	770	141	183	226	80	123	e250
30	94	e105	e160	e98	---	539	204	200	394	84	127	e170
31	94	---	272	e99	---	321	---	1430	---	87	105	---
TOTAL	4472	6795	5081	3763	3426	11589	12420	14378	9833	4647	6897	8754
MEAN	144	226	164	121	122	374	414	464	328	150	222	292
MAX	424	1100	632	241	328	1180	2120	1430	1050	365	648	1340
MIN	79	95	100	91	97	108	141	157	142	70	79	62

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 2001 - 2003, BY WATER YEAR (WY)

MEAN	519	279	313	181	381	428	553	450	282	179	168	289
MAX	893	332	463	240	640	482	692	464	352	254	222	382
(WY)	2002	2002	2002	2002	2002	2002	2002	2003	2001	2002	2003	2001
MIN	144	226	164	121	122	374	414	424	167	133	114	192
(WY)	2003	2003	2003	2003	2003	2003	2003	2002	2002	2001	2002	2002

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 2001 - 2003	
ANNUAL TOTAL	112753		92055			
ANNUAL MEAN	309		252		329	
HIGHEST ANNUAL MEAN					407	2002
LOWEST ANNUAL MEAN					252	2003
HIGHEST DAILY MEAN	2690	Apr 13	2120	Apr 5	4470	Oct 17 2001
LOWEST DAILY MEAN	61	Sep 14	62	Sep 10	61	Sep 14 2002
ANNUAL SEVEN-DAY MINIMUM	65	Sep 9	77	Sep 5	65	Sep 9 2002
MAXIMUM PEAK STAGE			12.10	Sep 22	13.48	Oct 17 2001
10 PERCENT EXCEEDS	640		530		670	
50 PERCENT EXCEEDS	200		160		210	
90 PERCENT EXCEEDS	84		95		93	

(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04168530 RIVER ROUGE AT ALLEN PARK, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 2001 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: April 2001 to current year.
DISSOLVED OXYGEN: April 2001 to current year.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval, not operated during winter months.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Water temperature records rated excellent. Dissolved oxygen records rated good except for the following periods: Apr. 4, 5, 17-19, May 12, 13, July 17, 18, 20, 21, Aug. 25, 26, Sept. 17, 18, rated fair; Apr. 6-9, 20-23, July 22-24, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: Maximum recorded during period of operation, 28.0°C, Aug. 9, 2001; minimum recorded, 2.5°C, Apr. 8, 2003.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 13.6 mg/L, Apr. 8, 2003; minimum recorded, 0.6 mg/L, Aug. 10, 2001.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURE: Maximum recorded during period of operation, 25.5°C, Aug. 15; minimum recorded, 2.5°C, Apr. 8.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 13.6 mg/L, Apr. 8; minimum recorded, 1.5 mg/L, July 4.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	---	---	---	---	---	---	---	---	---
2	22.0	19.5	20.0	---	---	---	---	---	---	---	---	---
3	21.0	19.5	20.0	---	---	---	---	---	---	---	---	---
4	20.0	19.0	19.5	---	---	---	---	---	---	---	---	---
5	19.0	17.5	18.5	---	---	---	---	---	---	---	---	---
6	17.5	16.5	17.0	---	---	---	---	---	---	---	---	---
7	17.0	14.5	16.0	---	---	---	---	---	---	---	---	---
8	15.0	13.5	14.5	---	---	---	---	---	---	---	---	---
9	15.0	13.0	14.0	---	---	---	---	---	---	---	---	---
10	15.0	13.0	14.0	---	---	---	---	---	---	---	---	---
11	16.0	13.5	14.5	---	---	---	---	---	---	---	---	---
12	15.5	14.0	15.0	---	---	---	---	---	---	---	---	---
13	15.5	13.5	15.0	---	---	---	---	---	---	---	---	---
14	14.5	12.0	13.5	---	---	---	---	---	---	---	---	---
15	13.0	11.5	12.0	---	---	---	---	---	---	---	---	---
16	12.0	10.5	11.5	---	---	---	---	---	---	---	---	---
17	10.5	10.0	10.0	---	---	---	---	---	---	---	---	---
18	10.0	9.5	10.0	---	---	---	---	---	---	---	---	---
19	11.5	10.0	11.0	---	---	---	---	---	---	---	---	---
20	11.5	10.0	10.5	---	---	---	---	---	---	---	---	---
21	10.5	9.5	10.0	---	---	---	---	---	---	---	---	---
22	11.0	9.0	10.0	---	---	---	---	---	---	---	---	---
23	10.0	9.5	9.5	---	---	---	---	---	---	---	---	---
24	9.5	8.5	9.0	---	---	---	---	---	---	---	---	---
25	9.5	8.0	8.5	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	9.0	7.5	8.0	---	---	---	---	---	---	---	---	---
31	8.0	7.0	7.5	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO DETROIT RIVER

04168530 RIVER ROUGE AT ALLEN PARK, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	9.0	6.0	7.5	14.0	13.0	13.5
2	---	---	---	---	---	---	10.5	8.5	9.5	14.0	13.0	13.5
3	---	---	---	---	---	---	11.0	9.0	10.0	13.5	12.5	13.0
4	---	---	---	---	---	---	9.0	6.0	7.5	14.0	12.0	13.0
5	---	---	---	---	---	---	6.0	3.5	4.0	13.5	12.5	13.0
6	---	---	---	---	---	---	4.5	3.5	4.0	15.5	13.0	14.0
7	---	---	---	---	---	---	4.0	3.0	3.5	15.0	14.0	14.5
8	---	---	---	---	---	---	3.0	2.5	3.0	14.0	13.5	14.0
9	---	---	---	---	---	---	5.5	3.0	4.0	14.5	12.5	13.5
10	---	---	---	---	---	---	7.5	5.0	6.0	15.5	13.5	15.0
11	---	---	---	---	---	---	8.5	6.5	7.5	16.5	15.5	16.0
12	---	---	---	---	---	---	10.5	8.0	9.0	15.5	12.5	14.0
13	---	---	---	---	---	---	11.0	8.5	10.0	14.0	12.0	13.0
14	---	---	---	---	---	---	12.0	9.0	10.5	15.0	12.5	14.0
15	---	---	---	---	---	---	14.5	11.5	13.0	15.0	14.0	14.5
16	---	---	---	---	---	---	14.5	13.5	14.0	14.5	14.0	14.0
17	---	---	---	---	---	---	13.5	11.0	12.0	16.0	14.0	15.0
18	---	---	---	---	---	---	11.5	10.5	11.0	16.0	15.5	16.0
19	---	---	---	---	---	---	13.0	10.5	11.5	17.5	15.5	16.5
20	---	---	---	7.0	4.5	5.5	14.5	12.5	13.5	17.5	16.5	17.0
21	---	---	---	7.5	6.5	7.0	14.5	13.5	14.5	17.0	15.5	16.0
22	---	---	---	6.5	5.5	6.0	13.5	10.5	12.0	16.5	14.5	15.5
23	---	---	---	6.0	5.0	5.5	11.5	9.5	10.5	15.5	14.0	15.0
24	---	---	---	8.0	5.0	6.5	12.0	10.0	11.0	14.5	13.5	14.0
25	---	---	---	---	---	---	12.5	11.5	12.0	15.5	13.0	14.0
26	---	---	---	---	---	---	13.5	11.5	12.5	15.0	13.5	14.5
27	---	---	---	9.5	8.0	9.0	14.5	12.0	13.0	15.5	14.0	14.5
28	---	---	---	11.0	9.0	10.0	16.0	12.5	14.5	16.5	14.0	15.0
29	---	---	---	11.0	8.5	10.0	17.0	14.0	15.5	18.0	15.0	16.5
30	---	---	---	8.5	6.5	7.0	15.5	14.0	15.0	18.0	16.5	17.0
31	---	---	---	7.0	5.5	6.0	---	---	---	16.5	14.5	15.5
MONTH	---	---	---	---	---	---	17.0	2.5	10.1	18.0	12.0	14.7

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	15.0	13.5	14.5	23.0	20.5	21.5	---	---	---	20.5	18.5	19.0
2	16.0	14.0	15.0	24.0	21.0	22.0	---	---	---	19.5	18.0	19.0
3	16.0	15.5	15.5	24.0	21.5	22.5	---	---	---	20.5	18.5	19.5
4	15.5	14.0	14.5	25.0	22.5	23.5	---	---	---	20.5	19.0	19.5
5	14.0	13.5	14.0	24.0	23.0	23.5	22.5	21.5	22.0	20.0	18.5	19.0
6	15.5	13.5	14.5	24.0	23.0	23.5	22.5	21.5	22.0	20.0	18.0	19.0
7	17.5	15.5	16.5	23.0	22.0	23.0	23.5	21.5	22.5	20.5	18.0	19.0
8	17.5	16.5	17.0	24.0	22.5	23.0	23.0	22.0	22.5	21.5	19.0	20.0
9	18.0	16.5	17.0	24.0	22.5	23.0	23.5	22.0	23.0	21.5	19.5	20.0
10	17.5	16.5	17.0	23.5	22.5	23.0	23.0	21.5	22.5	20.5	19.5	19.5
11	18.5	17.0	18.0	22.5	20.5	22.0	22.5	21.5	22.0	21.5	19.5	20.0
12	18.0	17.0	17.5	22.0	20.0	21.0	22.5	21.5	22.0	22.0	19.5	20.5
13	17.5	16.5	17.0	22.0	20.0	20.5	22.5	21.5	22.0	22.0	19.5	20.5
14	19.0	17.0	18.0	22.0	20.0	21.0	23.5	22.0	22.5	22.0	19.5	20.5
15	20.0	18.0	19.0	22.0	21.0	21.5	25.5	22.0	23.5	21.0	20.0	20.5
16	21.0	19.0	20.0	23.5	20.0	21.5	24.5	23.5	24.0	20.0	19.0	19.5
17	20.0	18.5	19.5	23.0	21.0	21.5	24.0	23.0	23.5	20.5	18.5	19.5
18	20.5	18.0	19.0	23.0	21.0	22.0	23.5	21.5	22.5	20.5	18.5	19.5
19	20.5	19.0	19.5	23.0	21.0	22.0	23.5	21.0	22.0	20.0	18.5	19.0
20	20.0	19.0	19.5	22.5	21.0	21.5	23.5	21.0	22.0	19.0	17.5	18.0
21	20.0	18.5	19.5	22.0	20.5	21.0	24.5	21.5	22.5	19.0	17.0	17.5
22	21.0	19.0	20.0	21.5	20.0	21.0	25.0	22.5	23.5	19.0	17.0	18.0
23	22.0	20.0	21.0	21.5	20.0	20.5	24.0	22.0	23.0	18.0	17.0	17.5
24	23.0	21.0	22.0	22.5	19.5	21.0	22.5	21.0	21.5	17.5	16.5	16.5
25	24.0	21.5	22.5	22.5	20.0	21.0	22.0	20.5	21.0	17.0	15.5	16.5
26	24.5	22.0	23.0	22.0	21.0	21.5	23.5	21.5	22.5	15.5	15.0	15.5
27	23.0	21.5	22.0	23.0	21.0	22.0	24.0	22.5	23.0	16.5	15.5	16.0
28	22.0	20.5	21.5	23.0	21.0	22.0	23.5	22.0	22.5	15.5	15.0	15.5
29	21.5	20.0	20.5	22.5	21.0	21.5	23.0	22.0	22.5	15.0	13.5	14.0
30	21.5	19.0	20.5	22.5	20.5	21.5	23.0	21.0	22.0	13.5	12.0	13.0
31	---	---	---	23.0	21.0	22.0	21.5	20.5	21.0	---	---	---
MONTH	24.5	13.5	18.5	25.0	19.5	21.9	---	---	---	22.0	12.0	18.4

STREAMS TRIBUTARY TO DETROIT RIVER

04168530 RIVER ROUGE AT ALLEN PARK, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	---	---	---	---	---	---	---	---	---
2	7.3	5.3	6.1	---	---	---	---	---	---	---	---	---
3	6.3	3.9	5.6	---	---	---	---	---	---	---	---	---
4	6.6	5.4	6.2	---	---	---	---	---	---	---	---	---
5	7.8	5.8	7.3	---	---	---	---	---	---	---	---	---
6	8.0	7.5	7.7	---	---	---	---	---	---	---	---	---
7	8.1	7.1	7.6	---	---	---	---	---	---	---	---	---
8	8.9	7.3	8.2	---	---	---	---	---	---	---	---	---
9	9.1	7.8	8.3	---	---	---	---	---	---	---	---	---
10	9.0	7.8	8.3	---	---	---	---	---	---	---	---	---
11	9.0	7.6	8.1	---	---	---	---	---	---	---	---	---
12	8.5	7.0	7.7	---	---	---	---	---	---	---	---	---
13	8.2	7.0	7.5	---	---	---	---	---	---	---	---	---
14	9.2	7.0	8.2	---	---	---	---	---	---	---	---	---
15	9.1	7.8	8.5	---	---	---	---	---	---	---	---	---
16	9.4	8.3	8.7	---	---	---	---	---	---	---	---	---
17	9.5	8.2	8.8	---	---	---	---	---	---	---	---	---
18	10.0	8.4	9.1	---	---	---	---	---	---	---	---	---
19	9.8	8.1	8.9	---	---	---	---	---	---	---	---	---
20	8.8	7.7	8.3	---	---	---	---	---	---	---	---	---
21	8.7	7.9	8.3	---	---	---	---	---	---	---	---	---
22	9.2	7.7	8.4	---	---	---	---	---	---	---	---	---
23	9.2	7.9	8.5	---	---	---	---	---	---	---	---	---
24	9.7	7.9	8.7	---	---	---	---	---	---	---	---	---
25	9.8	8.4	9.0	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	9.8	8.5	9.0	---	---	---	---	---	---	---	---	---
31	10.4	9.3	9.7	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	13.1	11.7	12.3	9.2	7.3	8.4
2	---	---	---	---	---	---	12.5	11.2	11.7	9.5	8.5	9.1
3	---	---	---	---	---	---	11.4	10.8	11.1	10.4	9.5	10.0
4	---	---	---	---	---	---	12.0	10.8	11.3	11.0	9.9	10.4
5	---	---	---	---	---	---	13.1	11.4	12.7	10.2	8.8	9.4
6	---	---	---	---	---	---	13.2	12.9	13.0	9.5	9.0	9.2
7	---	---	---	---	---	---	13.4	13.1	13.3	9.4	8.9	9.1
8	---	---	---	---	---	---	13.6	13.3	13.5	9.9	9.0	9.4
9	---	---	---	---	---	---	13.5	12.2	13.0	9.5	8.8	9.2
10	---	---	---	---	---	---	12.2	11.6	11.9	9.0	8.3	8.7
11	---	---	---	---	---	---	12.0	11.3	11.7	8.5	8.1	8.3
12	---	---	---	---	---	---	11.9	11.0	11.4	9.0	8.2	8.7
13	---	---	---	---	---	---	12.2	10.6	11.3	10.2	9.0	9.6
14	---	---	---	---	---	---	12.0	10.8	11.3	9.9	9.0	9.5
15	---	---	---	---	---	---	11.3	10.0	10.6	9.0	8.4	8.8
16	---	---	---	---	---	---	10.7	9.2	9.9	9.1	8.5	8.8
17	---	---	---	---	---	---	10.8	9.4	10.1	9.5	8.6	9.0
18	---	---	---	---	---	---	10.4	9.8	10.2	9.2	8.2	8.7
19	---	---	---	---	---	---	11.2	9.7	10.4	9.4	8.0	8.6
20	---	---	---	11.2	9.5	10.3	10.8	8.1	9.9	8.5	7.0	7.9
21	---	---	---	10.0	9.1	9.4	8.7	7.0	7.7	8.7	7.4	8.0
22	---	---	---	9.4	8.9	9.3	9.8	8.2	9.2	9.4	7.9	8.6
23	---	---	---	9.2	8.3	8.8	11.5	9.8	10.7	9.0	8.1	8.6
24	---	---	---	8.5	7.8	8.2	11.8	10.5	11.1	9.0	8.0	8.5
25	---	---	---	---	---	---	11.2	10.4	10.9	9.6	8.3	8.9
26	---	---	---	---	---	---	11.5	10.3	10.9	9.0	8.1	8.7
27	---	---	---	10.4	8.9	9.7	11.3	10.5	11.0	8.9	7.2	8.3
28	---	---	---	11.9	10.1	11.0	11.3	9.6	10.7	8.8	7.3	8.1
29	---	---	---	11.5	10.5	10.9	11.6	9.4	10.5	8.4	6.3	7.6
30	---	---	---	12.5	11.5	12.2	10.3	8.3	9.8	7.3	5.2	6.4
31	---	---	---	12.8	12.3	12.6	---	---	---	7.8	5.6	7.0
MONTH	---	---	---	---	---	---	13.6	7.0	11.1	11.0	5.2	8.7

STREAMS TRIBUTARY TO DETROIT RIVER

04168530 RIVER ROUGE AT ALLEN PARK, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.7	7.8	8.4	6.4	5.8	6.1	---	---	---	7.2	4.5	5.9
2	9.1	8.3	8.7	6.1	4.8	5.6	---	---	---	7.5	6.8	7.3
3	8.5	7.8	8.1	5.1	4.0	4.4	---	---	---	6.9	6.1	6.7
4	8.1	7.6	7.8	5.2	1.5	4.1	---	---	---	6.4	5.5	5.9
5	8.4	7.8	8.1	5.3	3.4	4.7	---	---	---	6.3	5.1	5.5
6	8.2	7.2	7.9	4.8	2.8	3.9	6.5	4.8	6.1	6.5	5.4	5.8
7	7.4	6.6	7.1	4.7	3.0	4.2	6.5	3.8	6.2	6.5	5.2	5.7
8	6.8	6.2	6.5	5.0	3.5	4.3	6.7	4.6	5.8	6.8	5.0	5.6
9	7.5	6.8	7.2	6.1	2.8	4.7	5.1	4.3	4.8	7.4	5.0	5.7
10	7.5	6.5	7.1	5.2	4.6	4.9	5.7	4.5	5.0	8.2	5.3	5.9
11	7.2	6.5	6.9	5.5	4.4	5.0	6.2	4.3	5.1	10.0	5.7	7.3
12	7.0	5.6	6.6	6.2	4.5	5.6	6.2	3.6	5.0	10.4	6.1	7.9
13	7.7	7.0	7.5	6.2	5.3	5.7	6.4	4.2	5.7	10.0	6.1	7.7
14	7.8	7.3	7.6	7.0	4.0	6.1	6.3	4.7	5.4	8.9	6.2	7.2
15	7.6	6.9	7.3	5.7	4.7	5.1	6.3	1.6	4.9	7.0	5.4	6.3
16	7.6	6.5	7.0	6.3	4.6	5.2	6.0	4.9	5.7	6.9	5.7	6.4
17	6.8	5.9	6.5	5.5	3.9	4.6	6.1	4.6	5.5	6.5	5.4	5.9
18	6.8	5.9	6.2	5.8	3.8	4.4	5.0	4.1	4.4	6.5	5.4	5.9
19	6.8	4.4	6.0	6.8	3.9	4.9	5.1	3.9	4.4	6.7	4.8	5.9
20	7.3	6.8	7.2	6.3	4.2	5.1	5.1	3.9	4.3	6.7	5.2	6.4
21	7.5	7.0	7.4	6.5	1.7	4.8	6.4	3.7	4.6	6.6	6.0	6.3
22	7.2	5.7	7.0	6.3	5.4	6.0	6.6	4.3	5.4	6.8	4.7	6.2
23	7.0	6.1	6.6	6.1	5.1	5.5	6.7	4.3	5.0	8.0	6.8	7.5
24	6.1	4.7	5.6	5.8	4.6	5.1	6.5	4.2	5.0	8.6	7.0	8.2
25	6.1	4.2	5.1	5.7	4.0	4.5	5.5	4.2	4.7	8.3	7.0	8.0
26	5.6	4.1	4.8	5.5	3.6	4.3	5.1	2.0	4.5	8.8	8.3	8.6
27	5.0	2.4	4.3	5.4	3.6	4.4	5.6	4.4	5.2	8.6	7.6	8.3
28	4.7	1.6	4.0	5.4	2.9	4.1	6.1	4.3	5.1	8.7	8.5	8.6
29	6.3	2.9	4.8	6.0	3.6	4.3	5.3	3.8	4.6	9.2	8.5	8.8
30	6.8	5.8	6.3	6.2	3.6	4.5	6.0	3.7	5.0	9.7	8.8	9.2
31	---	---	---	6.5	4.0	4.8	6.2	3.7	4.8	---	---	---
MONTH	9.1	1.6	6.7	7.0	1.5	4.9	---	---	---	10.4	4.5	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 mi^2, approximately.

PERIOD OF RECORD.--July 2002 to September 2003.

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. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	e0.14	1.7	0.15
2	---	---	---	---	---	---	---	---	---	e0.13	0.61	0.16
3	---	---	---	---	---	---	---	---	---	0.12	0.44	0.24
4	---	---	---	---	---	---	---	---	---	0.33	27	0.41
5	---	---	---	---	---	---	---	---	---	0.12	51	0.16
6	---	---	---	---	---	---	---	---	---	0.09	5.0	0.67
7	---	---	---	---	---	---	---	---	---	0.08	1.3	0.14
8	---	---	---	---	---	---	---	---	---	0.09	0.62	0.13
9	---	---	---	---	---	---	---	---	---	1.2	0.44	0.13
10	---	---	---	---	---	---	---	---	---	0.60	0.39	0.13
11	---	---	---	---	---	---	---	---	---	0.14	0.32	0.42
12	---	---	---	---	---	---	---	---	---	0.10	0.40	0.26
13	---	---	---	---	---	---	---	---	---	0.11	1.9	0.14
14	---	---	---	---	---	---	---	---	---	0.10	0.48	0.12
15	---	---	---	---	---	---	---	---	---	0.08	0.70	0.24
16	---	---	---	---	---	---	---	---	---	0.08	0.31	0.25
17	---	---	---	---	---	---	---	---	---	0.08	0.26	0.16
18	---	---	---	---	---	---	---	---	---	3.1	0.25	0.20
19	---	---	---	---	---	---	---	---	---	3.3	1.7	15
20	---	---	---	---	---	---	---	---	---	1.2	0.83	35
21	---	---	---	---	---	---	---	---	---	15	0.40	10
22	---	---	---	---	---	---	---	---	---	15	0.30	1.4
23	---	---	---	---	---	---	---	---	---	10	3.8	1.3
24	---	---	---	---	---	---	---	---	---	1.4	4.7	1.7
25	---	---	---	---	---	---	---	---	---	0.66	1.0	0.37
26	---	---	---	---	---	---	---	---	---	1.9	0.71	0.30
27	---	---	---	---	---	---	---	---	---	1.3	0.49	13
28	---	---	---	---	---	---	---	---	---	8.2	0.48	3.1
29	---	---	---	---	---	---	---	---	---	6.3	0.37	0.70
30	---	---	---	---	---	---	---	---	---	3.6	0.20	0.47
31	---	---	---	---	---	---	---	---	---	1.0	0.18	---
TOTAL	---	---	---	---	---	---	---	---	---	75.55	108.28	86.45
MEAN	---	---	---	---	---	---	---	---	---	2.44	3.49	2.88
MAX	---	---	---	---	---	---	---	---	---	15	51	35
MIN	---	---	---	---	---	---	---	---	---	0.08	0.18	0.12
CFSM	---	---	---	---	---	---	---	---	---	0.21	0.30	0.25
IN.	---	---	---	---	---	---	---	---	---	0.24	0.35	0.28

(e) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04168580 ECORSE RIVER AT DEARBORN HEIGHTS, MI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.55	0.37	0.54	2.8	e0.56	e0.94	3.2	29	11	0.62	5.5	30
2	1.2	0.51	0.90	1.7	e0.80	e0.94	2.9	36	5.3	0.47	12	9.8
3	2.4	0.58	0.69	6.4	e2.0	e0.95	4.5	8.7	3.5	0.39	3.1	3.7
4	5.1	0.70	e0.58	2.1	e6.0	e0.96	34	7.3	6.7	2.0	7.6	1.9
5	4.8	1.3	e0.56	1.1	e1.3	e0.98	40	30	6.3	2.3	9.9	1.1
6	0.53	3.9	e0.54	e1.0	e0.96	e1.0	8.7	15	3.4	5.1	11	0.86
7	0.30	1.6	0.51	e0.90	e0.88	e1.6	7.8	7.9	2.4	19	7.8	1.9
8	0.22	1.3	1.3	e0.80	e0.88	e2.7	12	6.2	2.7	3.7	4.0	0.39
9	0.18	1.4	0.53	e0.74	e0.90	e4.0	11	22	2.5	1.2	8.4	0.35
10	0.17	51	0.55	e0.68	e0.92	e3.0	12	58	2.3	0.63	1.3	0.51
11	0.17	24	0.32	e0.62	e0.94	e2.0	7.5	20	2.5	2.2	0.68	0.39
12	0.18	5.7	0.45	e0.58	e0.96	e3.3	6.0	16	22	0.80	59	0.35
13	0.58	1.5	1.1	e0.56	e0.98	e6.0	3.8	8.8	12	0.32	11	0.52
14	0.41	0.88	1.6	e0.54	e1.0	12	3.1	6.0	4.6	0.22	2.2	2.1
15	0.25	5.7	1.1	e0.53	e1.0	22	2.9	6.7	2.2	0.31	48	8.0
16	0.20	2.0	0.84	e0.52	e1.1	23	2.6	5.4	1.3	0.77	12	1.3
17	0.20	0.85	0.72	e0.50	e1.1	16	2.6	4.2	3.0	0.20	6.6	0.47
18	0.21	0.68	4.4	e0.48	e1.1	10	2.2	2.8	2.8	0.23	2.1	0.28
19	5.4	3.7	19	e0.47	e1.1	6.7	1.9	2.4	19	0.15	1.9	5.4
20	0.85	2.0	15	e0.46	e1.1	8.6	5.3	4.0	3.5	0.20	0.94	4.7
21	0.36	5.2	3.8	e0.46	e1.1	12	6.6	2.7	1.2	24	0.70	0.92
22	0.31	18	1.6	e0.45	e1.1	7.8	2.6	1.9	0.90	5.5	4.0	75
23	0.31	4.0	1.1	e0.45	e1.0	5.4	1.8	1.4	0.74	1.4	0.76	15
24	0.26	e0.82	0.86	e0.45	e1.0	4.3	1.6	1.2	0.76	0.52	0.40	15
25	2.5	e0.76	1.1	e0.45	e1.0	8.3	1.6	1.0	0.64	0.31	0.37	21
26	4.3	e0.74	1.7	e0.45	e1.0	5.3	2.4	0.94	3.6	0.25	24	6.0
27	0.68	0.55	1.4	e0.46	e0.98	3.7	1.4	1.5	4.1	0.22	7.8	20
28	0.35	0.46	0.73	e0.47	e0.96	5.9	1.2	1.1	2.8	0.20	1.5	4.6
29	1.4	0.50	0.71	e0.48	---	18	1.2	2.6	5.0	0.18	8.8	2.1
30	0.34	0.60	3.5	e0.49	---	5.6	6.3	3.7	1.4	0.32	3.3	1.4
31	0.31	---	9.7	e0.50	---	3.9	---	92	---	0.22	1.1	---
TOTAL	35.02	141.30	77.43	28.59	33.72	206.87	200.7	406.44	140.14	73.93	267.75	235.04
MEAN	1.13	4.71	2.50	0.92	1.20	6.67	6.69	13.1	4.67	2.38	8.64	7.83
MAX	5.4	51	19	6.4	6.0	23	40	92	22	24	59	75
MIN	0.17	0.37	0.32	0.45	0.56	0.94	1.2	0.94	0.64	0.15	0.37	0.28
CFSM	0.10	0.41	0.22	0.08	0.10	0.58	0.58	1.14	0.41	0.21	0.75	0.68
IN.	0.11	0.46	0.25	0.09	0.11	0.67	0.65	1.31	0.45	0.24	0.87	0.76

SUMMARY STATISTICS	FOR 2003 WATER YEAR		WATER YEARS 2002 - 2003	
ANNUAL TOTAL	1846.93			
ANNUAL MEAN	5.06			
HIGHEST DAILY MEAN	92	May 31	92	May 31 2003
LOWEST DAILY MEAN	0.15	Jul 19	0.08	Jul 7 2002
ANNUAL SEVEN-DAY MINIMUM	0.24	Jul 25	0.10	Jul 11 2002
MAXIMUM PEAK FLOW	(a)361	Aug 12	(a)361	Aug 12 2003
MAXIMUM PEAK STAGE	5.48	Aug 12	5.48	Aug 12 2003
INSTANTANEOUS LOW FLOW	0.13	(b)	0.05	Jul 18 2002
ANNUAL RUNOFF (CFSM)	0.44		0.44	
ANNUAL RUNOFF (INCHES)	5.97		5.98	
10 PERCENT EXCEEDS	12		12	
50 PERCENT EXCEEDS	1.5		1.5	
90 PERCENT EXCEEDS	0.37		0.37	

(a) From rating curve extended above 50 ft^3/s on basis of step-backwater analysis.
(b) July 19, 20.
(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 mi^2.

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 ft^3/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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	47	62	72	44	49	93	88	70	43	28	20
2	27	49	63	66	45	49	89	117	57	39	30	27
3	31	50	61	64	47	49	87	104	55	33	28	25
4	37	49	59	63	74	52	161	80	56	33	29	22
5	48	50	59	61	64	57	219	88	64	32	29	21
6	42	48	59	60	59	59	221	102	65	33	26	20
7	37	45	58	59	57	60	198	93	62	31	24	19
8	36	43	57	60	54	62	170	87	66	30	24	20
9	34	42	55	62	53	66	161	95	71	35	24	19
10	33	68	54	62	51	62	164	99	68	35	22	19
11	32	84	54	58	50	60	159	103	71	37	22	19
12	31	74	53	55	50	60	152	106	85	35	23	19
13	31	67	53	51	49	62	140	107	92	31	27	19
14	32	65	53	50	48	60	128	106	84	28	28	17
15	36	75	53	50	46	68	118	105	78	27	38	20
16	36	74	52	49	43	102	110	107	70	26	40	21
17	38	68	52	48	42	130	101	101	66	26	35	19
18	42	66	54	46	44	131	94	95	68	25	31	20
19	46	69	74	44	44	118	90	89	143	24	30	20
20	47	81	100	42	44	120	91	84	142	25	28	24
21	51	81	91	42	45	146	99	82	106	28	27	24
22	58	90	77	42	46	136	89	76	82	30	28	39
23	57	93	73	41	49	119	84	69	71	30	24	56
24	51	85	70	41	48	107	80	65	64	30	20	50
25	49	80	69	40	47	108	78	61	58	33	18	59
26	60	74	68	41	46	106	73	57	54	32	24	57
27	57	70	65	41	46	100	71	54	51	31	28	50
28	53	67	65	40	48	97	68	48	48	31	23	44
29	51	65	e66	41	---	135	64	42	49	30	20	37
30	51	64	66	41	---	128	64	41	46	29	19	34
31	49	---	76	42	---	104	---	62	---	28	17	---
TOTAL	1309	1983	1971	1574	1383	2762	3516	2613	2162	960	814	860
MEAN	42.2	66.1	63.6	50.8	49.4	89.1	117	84.3	72.1	31.0	26.3	28.7
MAX	60	93	100	72	74	146	221	117	143	43	40	59
MIN	26	42	52	40	42	49	64	41	46	24	17	17
CFSM	0.32	0.50	0.48	0.38	0.37	0.67	0.89	0.64	0.55	0.23	0.20	0.22
IN.	0.37	0.56	0.56	0.44	0.39	0.78	0.99	0.74	0.61	0.27	0.23	0.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2003, BY WATER YEAR (WY)

MEAN	82.4	98.0	109	105	114	154	159	116	88.3	65.7	54.7	65.5
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	66.3	51.8	28.8	19.3	26.3	27.2
(WY)	1965	1964	1964	1964	1963	1964	2000	1988	1988	1988	2003	1964

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1948 - 2003	
ANNUAL TOTAL	29465		21907			
ANNUAL MEAN	80.7		60.0		101	
HIGHEST ANNUAL MEAN					157	1974
LOWEST ANNUAL MEAN					44.6	1964
HIGHEST DAILY MEAN	221	Mar 10	221	Apr 6	632	Oct 3 1981
LOWEST DAILY MEAN	18	Sep 12	17	Aug 31	5.2	Oct 21 1971
ANNUAL SEVEN-DAY MINIMUM	19	Sep 11	19	Sep 8	11	Jul 9 1988
MAXIMUM PEAK FLOW			227	Apr 6	(a)648	Oct 3 1981
MAXIMUM PEAK STAGE			6.12	Apr 6	8.26	Jun 28 1968
ANNUAL RUNOFF (CFSM)	0.61		0.45		0.76	
ANNUAL RUNOFF (INCHES)	8.30		6.17		10.39	
10 PERCENT EXCEEDS	157		103		184	
50 PERCENT EXCEEDS	68		53		86	
90 PERCENT EXCEEDS	26		25		37	

(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 current year.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 2000 to current year.
pH: March 2000 to current year.
WATER TEMPERATURE: March 2000 to current year.
DISSOLVED OXYGEN: March 2000 to current year.

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. 4-17, Apr. 2-3, 10-17, 23-28, May 8-11, 18-23, June 8-12, 18-19, 22-23, July 11, 14-19, Aug. 5-8, 22-25, Sept. 3-9, 20-25, rated good; May 12, July 20-21, rated fair; May 13, rated poor. pH records rated excellent. Water temperature records rated excellent. Dissolved oxygen records rated excellent except for the following periods: Apr. 23-26, May 17-19, June 7, 17-19, June 30 to July 4, July 20-21, 25-26, Aug. 3, 12-13, Sept. 15-16, rated good; Apr. 27-28, May 20-23, June 1, 8-9, July 5, 27-29, Aug. 4-5, 14-17, rated fair; June 2-4, 10-12, July 30 to Aug. 1, Aug. 6-8, 18-25, rated poor.

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, 1,370 microsiemens, Mar. 16, 17; minimum, 599 microsiemens, Aug. 15.
pH: Maximum recorded, 8.3 std. units, July 14, 17, 18; minimum, 7.3 std. units, on many days.
WATER TEMPERATURE: Maximum recorded, 27.5°C, July 2, 3, 6, Aug. 14; minimum, 0.0°C, on many days during winter period.
DISSOLVED OXYGEN: Maximum recorded, 14.1 mg/L, Apr. 8, 9; minimum, 4.3 mg/L, Aug. 9.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	831	776	795	805	787	797	820	792	804	931	888	901
2	821	787	802	805	782	797	826	796	807	961	926	945
3	820	786	801	803	781	794	826	798	813	958	929	943
4	829	701	801	804	786	794	882	798	846	941	918	929
5	830	789	808	802	784	794	886	839	865	926	895	909
6	829	783	804	804	777	797	886	851	871	920	892	904
7	824	797	810	799	781	790	882	848	866	938	897	915
8	825	779	802	813	774	787	895	842	867	929	916	922
9	821	780	803	788	767	780	897	865	879	989	920	952
10	825	791	810	783	735	759	---	---	---	986	960	971
11	827	785	808	763	744	753	914	870	889	1030	962	992
12	830	798	816	758	731	747	905	854	877	1020	986	1000
13	834	797	815	753	726	737	891	855	874	1000	968	985
14	829	806	820	745	727	734	882	856	869	986	944	962
15	830	805	818	744	733	738	885	850	866	963	935	946
16	829	800	815	754	736	744	898	858	869	946	915	929
17	830	801	814	759	742	749	891	857	869	950	911	933
18	821	798	809	757	745	752	898	854	868	948	921	935
19	819	799	809	756	733	744	892	845	866	940	914	928
20	816	794	806	751	731	742	981	851	898	942	916	927
21	816	784	798	764	745	754	1030	958	992	939	918	928
22	796	774	787	763	749	756	1020	945	977	934	913	924
23	798	784	789	768	754	761	959	906	931	932	910	920
24	809	786	796	767	753	760	934	880	908	925	906	916
25	809	783	796	783	753	764	908	865	885	933	903	918
26	799	781	789	794	754	771	908	866	881	930	901	916
27	802	782	793	800	778	791	887	844	864	941	909	918
28	802	788	795	810	784	794	---	---	---	927	890	911
29	810	790	797	803	782	794	---	---	---	927	899	911
30	794	779	786	816	781	792	---	---	---	925	900	914
31	803	774	793	---	---	---	898	876	884	925	898	908
MONTH	834	701	803	816	726	769	---	---	---	1030	888	933

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	928	888	909	920	888	904	803	790	795	790	731	753
2	941	896	923	908	883	896	803	788	795	781	714	751
3	937	887	916	912	895	903	854	795	827	832	755	798
4	952	890	922	901	879	889	834	755	806	857	818	837
5	1000	920	949	911	881	898	802	755	780	859	822	841
6	1070	990	1040	911	890	900	856	799	822	843	774	802
7	1050	1040	1050	909	893	902	856	824	833	812	751	777
8	1040	1000	1020	927	902	913	837	819	826	782	732	753
9	1000	960	978	938	915	925	913	834	862	757	710	736
10	966	941	953	982	922	941	954	913	937	745	710	732
11	958	929	939	1050	966	994	952	887	916	739	695	722
12	935	911	927	1050	1040	1040	887	837	859	793	691	731
13	930	903	919	1050	1010	1030	861	806	831	845	793	831
14	923	899	912	1060	1020	1040	850	829	838	842	813	829
15	930	895	912	1120	1030	1060	842	815	827	825	800	812
16	920	892	909	1370	1120	1240	858	817	836	842	800	821
17	917	883	903	1370	1220	1290	850	801	831	842	800	822
18	913	890	902	1220	1040	1120	840	820	830	825	790	812
19	922	884	903	1040	940	984	845	817	827	837	791	808
20	905	881	890	941	869	907	837	802	820	823	794	809
21	892	865	881	877	823	850	829	800	815	835	792	815
22	886	861	876	900	834	876	866	792	828	845	800	820
23	887	859	874	859	826	842	869	845	861	839	816	825
24	889	859	874	828	796	814	865	840	854	842	814	828
25	897	851	877	797	766	783	867	824	845	835	811	822
26	898	867	883	768	741	754	866	824	842	822	802	813
27	899	865	885	754	726	742	866	831	841	828	798	812
28	909	859	891	753	715	733	858	818	836	831	797	813
29	---	---	---	726	716	720	832	793	809	829	797	812
30	---	---	---	798	722	764	815	755	789	836	794	812
31	---	---	---	809	792	800	---	---	---	818	785	805
MONTH	1070	851	922	1370	715	918	954	755	834	859	691	799

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	823	793	809	774	748	761	827	622	805	831	791	811
2	843	794	821	785	756	774	811	799	805	831	800	813
3	859	826	847	811	764	782	813	794	804	828	801	813
4	867	840	852	793	740	781	823	799	810	827	800	813
5	884	842	864	792	758	778	---	---	---	825	804	814
6	871	833	856	784	750	769	846	776	815	820	800	810
7	867	837	853	788	743	763	845	623	776	842	797	816
8	859	832	845	788	754	774	837	724	824	843	807	819
9	845	823	830	807	740	772	837	802	819	857	807	829
10	848	813	831	825	756	802	835	797	818	842	816	828
11	867	828	847	832	794	822	834	803	820	843	810	823
12	841	790	822	834	815	824	832	800	815	847	809	827
13	835	792	813	828	812	819	831	802	819	846	816	833
14	820	784	807	841	808	819	840	798	814	864	802	830
15	804	789	796	842	809	826	806	599	789	846	803	823
16	807	775	787	846	823	832	831	799	817	847	808	827
17	810	790	800	851	821	836	815	794	801	862	822	839
18	802	728	790	853	807	834	815	790	801	847	820	834
19	779	739	757	850	819	836	841	804	821	849	817	836
20	743	703	717	874	777	848	823	799	808	853	826	841
21	767	717	753	878	823	851	814	773	800	858	824	841
22	773	745	761	856	809	832	812	783	797	858	800	835
23	787	762	778	858	814	831	817	788	802	843	818	829
24	788	769	778	835	806	821	833	791	807	844	809	823
25	796	771	782	836	812	822	839	780	812	823	797	809
26	792	771	780	832	804	819	834	767	810	799	787	794
27	787	763	777	827	799	813	823	791	803	792	771	779
28	778	735	751	817	795	807	826	791	806	781	762	771
29	773	726	751	824	794	810	842	795	817	789	763	774
30	771	742	760	819	791	805	840	800	821	791	771	782
31	---	---	---	835	798	817	833	794	816	---	---	---
MONTH	884	703	800	878	740	809	---	---	---	864	762	817

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.0	7.7	7.9	8.1	7.9	8.0	---	---	---	---	---	---
2	8.0	7.7	7.9	8.1	8.0	8.0	---	---	---	---	---	---
3	8.0	7.8	7.8	8.1	7.9	8.0	---	---	---	---	---	---
4	8.0	7.7	7.8	8.1	7.9	8.0	---	---	---	---	---	---
5	7.9	7.7	7.8	8.0	7.9	7.9	---	---	---	---	---	---
6	8.0	7.8	7.8	8.1	7.9	8.0	---	---	---	---	---	---
7	8.0	7.8	7.9	8.1	7.9	8.0	---	---	---	---	---	---
8	8.0	7.8	7.9	8.1	7.9	7.9	---	---	---	---	---	---
9	8.0	7.8	7.9	8.1	7.9	8.0	---	---	---	---	---	---
10	8.1	7.8	7.9	8.0	7.9	7.9	---	---	---	---	---	---
11	8.1	7.8	7.9	8.0	7.8	7.9	---	---	---	---	---	---
12	8.1	7.8	7.9	7.9	7.9	7.9	---	---	---	---	---	---
13	8.0	7.8	7.9	7.9	7.8	7.9	---	---	---	---	---	---
14	8.0	7.8	7.9	7.9	7.8	7.9	---	---	---	---	---	---
15	8.0	7.8	7.9	8.0	7.9	7.9	---	---	---	---	---	---
16	8.1	7.8	7.9	8.0	7.9	8.0	---	---	---	---	---	---
17	8.0	7.9	7.9	8.0	8.0	8.0	---	---	---	---	---	---
18	8.0	7.8	7.9	8.0	8.0	8.0	---	---	---	---	---	---
19	8.0	7.8	7.9	8.1	8.0	8.0	---	---	---	---	---	---
20	8.1	7.9	7.9	8.1	8.0	8.0	---	---	---	---	---	---
21	8.1	7.9	7.9	8.1	8.0	8.0	---	---	---	---	---	---
22	8.0	7.9	7.9	8.1	8.0	8.0	---	---	---	---	---	---
23	8.1	7.9	8.0	8.0	8.0	8.0	---	---	---	---	---	---
24	8.1	7.9	8.0	8.0	8.0	8.0	---	---	---	---	---	---
25	8.0	7.9	7.9	8.1	8.0	8.0	---	---	---	---	---	---
26	8.0	7.9	7.9	8.1	8.0	8.0	---	---	---	---	---	---
27	8.0	7.9	7.9	8.1	8.0	8.0	---	---	---	---	---	---
28	8.0	7.9	7.9	8.1	8.0	8.0	---	---	---	---	---	---
29	8.0	7.8	7.9	8.1	8.0	8.0	---	---	---	---	---	---
30	8.0	7.8	7.9	8.1	8.0	8.0	---	---	---	---	---	---
31	8.1	7.8	7.9	---	---	---	---	---	---	---	---	---
MONTH	8.1	7.7	7.9	8.1	7.8	8.0	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	8.1	8.0	8.0	8.0	7.9	8.0
2	---	---	---	---	---	---	8.1	8.0	8.0	8.0	7.8	7.9
3	---	---	---	---	---	---	8.0	8.0	8.0	7.9	7.8	7.8
4	---	---	---	---	---	---	8.0	7.9	8.0	8.0	7.8	7.9
5	---	---	---	---	---	---	7.9	7.9	7.9	7.9	7.8	7.9
6	---	---	---	---	---	---	7.9	7.9	7.9	7.9	7.8	7.8
7	---	---	---	---	---	---	8.0	7.9	8.0	7.9	7.8	7.9
8	---	---	---	---	---	---	8.0	8.0	8.0	7.8	7.8	7.8
9	---	---	---	---	---	---	8.1	8.0	8.1	7.8	7.7	7.8
10	---	---	---	---	---	---	8.1	8.0	8.1	7.8	7.7	7.7
11	---	---	---	---	---	---	8.1	8.0	8.0	7.7	7.6	7.6
12	---	---	---	---	---	---	8.0	8.0	8.0	7.9	7.6	7.8
13	---	---	---	---	---	---	8.1	8.0	8.0	8.2	7.8	8.1
14	---	---	---	---	---	---	8.1	8.0	8.0	8.2	8.1	8.2
15	---	---	---	---	---	---	8.1	8.0	8.0	8.2	7.9	8.0
16	---	---	---	---	---	---	8.1	8.0	8.0	7.9	7.7	7.8
17	---	---	---	---	---	---	8.1	8.0	8.1	8.0	7.8	7.9
18	---	---	---	---	---	---	8.1	8.0	8.1	8.0	8.0	8.0
19	---	---	---	---	---	---	8.1	8.0	8.0	8.1	8.0	8.0
20	---	---	---	---	---	---	8.1	8.0	8.0	8.1	8.0	8.1
21	---	---	---	---	---	---	8.1	7.9	8.0	8.1	8.0	8.0
22	---	---	---	8.0	7.9	7.9	8.0	7.9	8.0	8.2	8.0	8.1
23	---	---	---	8.0	7.9	8.0	8.1	8.0	8.0	8.2	8.1	8.1
24	---	---	---	8.0	7.9	8.0	8.1	8.0	8.1	8.1	8.0	8.0
25	---	---	---	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.0	8.0
26	---	---	---	8.1	8.0	8.0	8.2	8.0	8.1	8.1	8.0	8.0
27	---	---	---	8.1	8.0	8.0	8.1	7.9	8.0	8.1	7.9	8.0
28	---	---	---	8.1	8.0	8.0	8.1	8.0	8.0	8.0	7.9	8.0
29	---	---	---	8.1	8.0	8.0	8.1	8.0	8.0	8.0	7.8	7.9
30	---	---	---	8.1	8.0	8.0	8.1	7.9	8.0	7.9	7.7	7.8
31	---	---	---	8.1	8.0	8.0	---	---	---	7.8	7.6	7.7
MONTH	---	---	---	---	---	---	8.2	7.9	8.0	8.2	7.6	7.9

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.8	7.6	7.7	8.1	7.9	8.0	8.1	7.5	7.8	7.7	7.4	7.5
2	7.8	7.6	7.7	8.0	7.8	7.9	7.9	7.5	7.7	7.9	7.5	7.6
3	7.8	7.6	7.7	8.0	7.7	7.8	7.9	7.5	7.7	7.9	7.5	7.6
4	7.7	7.6	7.6	8.0	7.7	7.8	7.9	7.5	7.6	7.8	7.5	7.6
5	7.8	7.5	7.7	7.9	7.6	7.7	---	---	---	8.0	7.5	7.7
6	7.8	7.7	7.8	8.1	7.6	7.8	8.0	7.5	7.7	8.0	7.6	7.7
7	7.9	7.8	7.8	8.0	7.6	7.8	7.9	7.5	7.7	8.0	7.6	7.8
8	7.9	7.8	7.8	8.0	7.6	7.8	8.0	7.5	7.7	8.1	7.6	7.8
9	7.8	7.8	7.8	8.1	7.7	7.9	7.9	7.4	7.6	7.9	7.5	7.7
10	7.9	7.8	7.8	---	---	---	7.8	7.3	7.5	7.9	7.4	7.6
11	8.0	7.8	7.9	---	---	---	7.7	7.3	7.5	7.9	7.4	7.6
12	7.9	7.8	7.9	8.1	7.6	7.9	7.8	7.3	7.5	7.9	7.4	7.6
13	7.8	7.8	7.8	8.2	7.7	7.9	7.8	7.3	7.5	7.8	7.4	7.5
14	7.9	7.8	7.8	8.3	7.9	8.1	7.8	7.4	7.6	7.8	7.3	7.5
15	8.0	7.8	7.9	8.2	7.9	8.0	7.9	7.4	7.6	7.8	7.3	7.5
16	8.0	7.9	7.9	8.2	7.8	8.0	7.8	7.5	7.6	7.9	7.4	7.6
17	8.0	7.8	7.9	8.3	7.8	8.0	7.7	7.4	7.5	8.0	7.4	7.6
18	7.9	7.8	7.9	8.3	7.8	8.0	7.8	7.4	7.5	8.0	7.4	7.6
19	8.0	7.8	7.9	8.2	7.8	8.0	7.8	7.4	7.5	7.9	7.4	7.5
20	7.9	7.7	7.8	8.2	7.7	7.9	7.8	7.4	7.6	7.9	7.4	7.6
21	7.8	7.7	7.7	8.1	7.7	7.9	7.8	7.4	7.5	7.9	7.4	7.6
22	7.8	7.7	7.8	8.2	7.7	7.9	7.7	7.3	7.5	7.6	7.4	7.5
23	7.9	7.7	7.8	8.1	7.7	7.8	7.7	7.4	7.5	7.7	7.5	7.6
24	7.9	7.8	7.8	8.1	7.7	7.9	7.7	7.3	7.5	7.7	7.5	7.6
25	7.8	7.8	7.8	8.1	7.7	7.9	7.8	7.3	7.5	7.7	7.5	7.6
26	7.9	7.8	7.8	8.1	7.6	7.8	7.8	7.3	7.5	7.8	7.5	7.6
27	7.9	7.8	7.8	8.0	7.6	7.8	7.9	7.4	7.6	7.7	7.5	7.6
28	8.0	7.8	7.9	8.1	7.7	7.9	7.8	7.4	7.6	7.8	7.5	7.6
29	8.0	7.8	7.9	8.1	7.8	7.9	7.8	7.4	7.6	7.8	7.5	7.6
30	8.0	7.8	7.9	8.2	7.8	7.9	7.9	7.5	7.6	7.8	7.5	7.7
31	---	---	---	8.2	7.8	7.9	7.9	7.4	7.6	---	---	---
MONTH	8.0	7.5	7.8	---	---	---	---	---	---	8.1	7.3	7.6

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	21.5	18.0	19.5	7.5	6.5	7.0	3.0	1.5	2.0	2.5	2.0	2.5
2	21.0	19.5	20.0	7.0	6.0	6.5	2.0	1.0	1.5	2.5	1.5	2.0
3	20.0	19.0	19.0	7.0	5.5	6.0	2.0	1.0	1.0	2.5	2.0	2.0
4	20.5	18.0	19.0	7.0	5.5	6.0	2.0	1.0	1.5	2.5	1.5	2.0
5	19.5	17.0	18.0	6.0	5.5	6.0	2.0	1.5	1.5	2.5	1.5	2.0
6	18.5	16.5	17.5	6.5	6.0	6.0	2.0	1.0	1.5	2.0	1.0	1.5
7	17.5	15.0	16.0	7.0	5.0	6.0	2.0	1.0	1.5	2.5	1.0	1.5
8	17.0	14.5	15.5	8.0	5.5	6.5	2.0	1.0	1.5	3.0	1.5	2.0
9	17.0	14.0	15.0	8.5	6.5	7.5	2.0	1.0	1.5	2.5	1.5	2.0
10	17.5	14.0	15.5	9.0	8.0	8.5	---	---	---	2.5	1.0	1.5
11	17.5	14.5	15.5	10.0	8.5	9.0	2.5	1.5	2.0	2.0	1.0	1.5
12	17.5	14.5	16.0	9.5	8.5	9.0	3.0	1.5	2.0	2.0	1.0	1.0
13	16.5	13.5	15.0	9.0	8.0	8.5	2.5	2.0	2.0	2.0	0.5	1.0
14	16.0	13.0	14.0	8.5	8.0	8.0	3.0	2.0	2.5	2.0	1.0	1.0
15	15.5	12.5	13.5	8.0	6.5	7.5	3.0	2.0	2.5	1.5	0.5	1.0
16	14.5	12.0	13.0	6.5	5.5	6.5	3.0	2.0	2.0	2.0	0.5	1.0
17	13.0	11.5	12.0	5.5	4.5	5.5	3.0	2.0	2.5	1.5	0.5	0.5
18	12.5	11.5	11.5	5.0	4.0	4.5	3.0	2.5	2.5	1.5	0.5	0.5
19	11.5	11.0	11.0	5.5	4.5	5.0	3.0	2.5	3.0	1.5	0.5	1.0
20	12.0	10.0	10.5	5.0	4.5	5.0	3.0	2.5	3.0	1.5	0.5	1.0
21	11.5	9.5	10.5	6.0	5.0	5.5	3.0	2.5	2.5	1.5	0.5	0.5
22	11.5	10.0	10.5	5.0	4.5	4.5	2.5	2.0	2.5	1.5	0.0	0.5
23	11.0	9.5	10.0	4.5	4.0	4.0	2.5	1.5	2.0	1.0	0.0	0.5
24	10.5	9.0	9.5	4.5	4.0	4.0	2.5	1.5	2.0	1.5	0.5	1.0
25	9.5	9.0	9.0	4.5	3.5	4.0	2.0	1.5	2.0	1.5	0.5	1.0
26	9.5	9.0	9.0	4.0	3.0	3.5	2.5	1.5	2.0	1.5	0.0	0.5
27	10.0	8.5	9.0	4.0	2.5	3.5	2.0	1.0	1.5	1.5	0.0	0.5
28	10.0	8.5	9.0	3.5	3.0	3.0	---	---	---	1.5	0.5	1.0
29	8.5	7.5	8.0	4.0	3.0	3.0	---	---	---	2.0	0.0	1.0
30	9.0	7.0	8.0	3.0	2.0	2.5	---	---	---	2.0	0.0	0.5
31	8.5	7.0	7.5	---	---	---	2.5	2.0	2.5	1.5	0.5	1.0
MONTH	21.5	7.0	13.1	10.0	2.0	5.7	---	---	---	3.0	0.0	1.2

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	1.5	1.0	1.5	3.0	0.5	1.5	8.0	6.0	7.0	17.5	15.0	16.0
2	2.0	1.0	1.5	2.5	0.5	1.5	10.5	7.5	9.0	16.5	14.5	15.5
3	1.5	1.0	1.0	3.0	0.5	1.0	10.0	8.5	9.5	16.0	13.5	14.5
4	1.5	0.5	1.0	3.0	1.0	1.5	8.5	5.0	7.0	16.0	13.0	14.5
5	2.0	0.5	1.0	2.5	0.5	1.0	5.5	4.0	4.5	15.5	14.0	14.5
6	1.5	1.0	1.0	3.0	0.5	1.5	4.0	3.5	3.5	16.5	14.5	15.0
7	1.5	0.5	1.0	2.5	0.5	1.5	3.5	2.5	3.0	16.0	15.0	15.5
8	2.0	0.0	1.0	2.5	1.0	1.5	3.0	2.5	2.5	15.5	14.5	15.0
9	2.0	0.5	1.0	2.5	1.0	1.5	5.0	2.5	3.5	16.5	14.0	15.5
10	1.5	0.5	1.0	3.0	0.5	1.5	7.0	4.5	6.0	17.5	15.5	16.5
11	2.0	0.0	0.5	3.0	0.5	1.5	9.0	6.5	8.0	17.0	16.0	16.5
12	1.5	0.0	0.5	3.5	1.5	2.0	10.5	8.0	9.0	16.0	13.5	14.5
13	1.5	0.5	0.5	4.0	1.0	2.0	10.5	8.5	9.5	15.0	12.5	13.5
14	2.0	0.0	1.0	4.5	1.5	2.5	11.0	9.5	10.5	16.5	13.5	14.5
15	2.0	0.0	1.0	5.0	2.0	3.0	14.0	11.0	12.5	15.5	15.0	15.0
16	1.5	0.0	0.5	5.0	2.5	3.5	15.0	13.0	14.0	15.5	14.5	15.0
17	2.0	0.5	1.0	5.5	3.5	4.0	13.0	11.5	12.0	17.5	14.5	16.0
18	1.5	1.0	1.0	4.5	3.5	4.0	11.5	11.0	11.5	19.5	16.0	17.5
19	3.0	0.5	1.5	4.5	3.5	4.0	13.5	11.0	12.0	20.5	17.5	19.0
20	3.5	0.5	1.5	6.5	4.0	5.0	14.0	12.5	13.0	19.5	18.0	19.0
21	3.0	1.0	1.5	6.0	5.0	5.5	14.0	12.5	13.5	19.5	17.0	18.0
22	2.5	1.0	1.5	5.5	4.5	5.0	12.5	10.5	12.0	19.0	16.0	17.5
23	3.0	1.0	1.5	5.0	4.0	4.5	13.0	10.0	11.0	17.5	16.0	17.0
24	3.0	0.5	1.5	6.5	4.5	5.5	13.0	10.0	11.5	17.0	15.5	16.0
25	2.5	0.5	1.0	7.5	5.5	6.5	14.0	11.0	12.5	18.0	15.0	16.0
26	3.0	0.5	1.0	8.0	6.5	7.0	15.0	11.5	13.0	18.0	15.5	16.5
27	3.0	0.5	1.0	8.5	6.5	7.5	15.0	12.0	13.5	18.5	15.5	17.0
28	3.0	0.5	1.5	8.5	7.0	8.0	16.0	13.5	15.0	19.5	16.0	17.0
29	---	---	---	8.5	7.5	8.0	18.0	14.5	16.0	21.0	16.5	18.5
30	---	---	---	7.5	6.0	7.0	16.5	15.0	16.0	20.0	17.5	18.5
31	---	---	---	7.0	5.5	6.0	---	---	---	18.5	16.0	17.5
MONTH	3.5	0.0	1.1	8.5	0.5	3.7	18.0	2.5	10.1	21.0	12.5	16.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	19.0	15.5	17.0	26.0	22.0	24.0	26.0	21.5	23.0	21.0	20.0	20.5
2	19.5	15.5	17.0	27.5	22.5	24.5	26.5	21.0	23.0	24.0	20.0	21.5
3	18.0	16.5	17.5	27.5	23.0	25.0	24.5	22.0	23.0	24.0	19.5	21.0
4	16.5	15.5	16.0	27.0	24.0	25.0	26.0	21.5	23.0	21.5	19.5	20.5
5	17.0	15.5	16.0	26.0	23.5	24.5	---	---	---	23.5	18.5	20.5
6	18.0	15.0	16.5	27.5	23.0	25.0	26.5	21.5	23.5	23.5	17.5	20.0
7	19.0	16.5	17.5	26.0	23.5	24.5	26.5	21.5	23.5	24.0	18.5	20.5
8	19.0	17.5	18.0	27.0	23.5	24.5	26.5	22.5	24.0	24.0	19.5	21.0
9	19.0	17.0	18.0	27.0	23.5	25.0	25.5	22.0	23.5	24.0	19.0	21.0
10	19.0	17.5	18.5	26.0	23.0	24.0	24.0	21.0	22.5	23.5	19.0	21.0
11	21.5	18.0	19.5	23.0	21.0	22.5	24.0	21.5	22.5	24.0	19.5	21.0
12	20.0	18.5	19.0	24.0	20.5	22.0	25.0	21.5	22.5	24.0	19.5	21.0
13	19.5	18.0	18.5	26.0	20.0	22.5	26.5	21.0	23.5	24.0	19.0	21.0
14	22.0	18.5	20.0	26.0	20.5	23.0	27.5	22.0	24.0	23.5	19.5	21.0
15	24.0	19.5	22.0	23.5	21.5	22.0	26.0	23.0	24.0	23.0	19.0	20.5
16	24.5	20.5	22.0	26.0	20.0	22.5	27.0	23.5	24.5	23.5	18.5	20.0
17	23.0	21.0	21.5	26.0	20.5	22.5	26.5	22.5	24.0	23.5	18.5	20.5
18	24.0	21.0	22.0	26.5	21.0	23.0	26.5	21.5	23.5	22.5	18.5	20.0
19	23.5	21.5	22.5	26.5	20.0	22.5	26.5	21.5	23.5	22.0	18.5	20.0
20	23.0	21.0	22.0	24.0	20.5	22.0	26.5	21.5	23.5	22.0	18.0	19.5
21	23.0	20.5	21.5	23.5	21.5	22.0	27.0	22.0	24.0	21.5	17.5	19.0
22	24.0	20.5	22.0	25.5	21.0	22.5	27.0	22.5	24.0	19.0	18.5	18.5
23	25.0	21.5	23.5	24.5	20.5	22.0	26.5	21.5	23.0	19.0	17.0	18.0
24	26.0	22.5	24.0	25.5	20.0	22.5	23.5	20.5	22.0	18.0	16.5	17.0
25	27.0	23.5	25.0	25.5	20.5	22.5	26.0	20.5	22.5	17.5	15.5	16.5
26	26.5	23.5	25.0	23.5	21.0	22.0	26.5	21.5	23.0	17.0	15.5	16.0
27	25.5	22.5	24.0	24.5	21.0	22.5	27.0	22.5	24.0	17.0	15.0	16.0
28	25.0	22.5	23.0	25.5	21.0	22.5	26.0	21.0	23.0	16.5	15.0	15.5
29	24.5	22.0	23.0	25.0	20.5	22.5	24.0	21.5	22.5	16.0	14.0	15.0
30	25.0	21.5	23.0	26.0	20.5	22.5	25.0	20.0	22.0	15.0	13.5	14.0
31	---	---	---	25.5	21.0	23.0	24.0	19.5	21.5	---	---	---
MONTH	27.0	15.0	20.5	27.5	20.0	23.1	---	---	---	24.0	13.5	19.2

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	10.5	6.7	8.1	12.7	10.8	11.5	---	---	---	---	---	---
2	9.9	6.5	7.7	12.9	11.0	11.6	---	---	---	---	---	---
3	8.8	6.8	7.5	13.4	11.0	11.8	---	---	---	---	---	---
4	9.6	7.1	7.8	13.1	10.9	11.6	---	---	---	---	---	---
5	9.3	7.3	8.1	12.5	10.9	11.4	---	---	---	---	---	---
6	9.8	7.4	8.4	12.7	10.8	11.5	---	---	---	---	---	---
7	10.2	7.7	8.7	13.0	10.9	11.8	---	---	---	---	---	---
8	10.6	8.1	8.8	12.6	10.8	11.5	---	---	---	---	---	---
9	10.9	8.2	9.1	12.4	10.2	11.1	---	---	---	---	---	---
10	10.8	8.1	9.1	11.1	9.8	10.3	---	---	---	---	---	---
11	10.9	8.1	9.0	10.7	9.8	10.2	---	---	---	---	---	---
12	11.0	7.9	8.9	10.9	10.1	10.4	---	---	---	---	---	---
13	10.9	7.8	8.9	11.2	10.2	10.6	---	---	---	---	---	---
14	11.0	8.3	9.2	11.4	10.2	10.6	---	---	---	---	---	---
15	11.1	8.5	9.4	11.8	10.5	11.0	---	---	---	---	---	---
16	11.1	8.5	9.5	12.1	11.0	11.4	---	---	---	---	---	---
17	---	---	---	12.4	11.3	11.7	---	---	---	---	---	---
18	11.3	9.4	10.0	13.0	11.7	12.2	---	---	---	---	---	---
19	11.3	9.4	10.1	12.9	11.8	12.1	---	---	---	---	---	---
20	11.7	9.7	10.4	13.0	11.9	12.3	---	---	---	---	---	---
21	11.8	9.9	10.5	12.6	11.7	12.0	---	---	---	---	---	---
22	11.5	9.8	10.4	12.9	11.8	12.2	---	---	---	---	---	---
23	11.9	10.0	10.7	13.1	12.1	12.5	---	---	---	---	---	---
24	12.2	10.2	10.8	13.3	12.2	12.5	---	---	---	---	---	---
25	11.8	10.3	10.8	13.4	12.2	12.6	---	---	---	---	---	---
26	12.1	10.4	10.9	13.6	12.4	12.8	---	---	---	---	---	---
27	12.4	10.4	11.1	13.7	12.6	12.9	---	---	---	---	---	---
28	12.6	10.4	11.1	13.5	12.5	12.8	---	---	---	---	---	---
29	12.1	10.5	11.1	13.5	12.3	12.7	---	---	---	---	---	---
30	12.8	10.8	11.5	13.6	12.0	12.8	---	---	---	---	---	---
31	12.7	10.8	11.4	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	13.7	9.8	11.7	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	13.0	11.4	12.3	---	---	---
2	---	---	---	---	---	---	12.4	10.7	11.7	10.0	9.3	9.7
3	---	---	---	---	---	---	12.0	10.8	11.4	10.4	9.6	9.9
4	---	---	---	---	---	---	12.5	11.4	11.9	10.9	9.5	10.1
5	---	---	---	---	---	---	13.1	12.4	12.8	10.4	9.4	9.8
6	---	---	---	---	---	---	13.6	13.1	13.4	10.3	9.3	9.9
7	---	---	---	---	---	---	13.9	13.4	13.7	10.0	9.3	9.6
8	---	---	---	---	---	---	14.1	13.7	13.9	10.3	9.4	9.8
9	---	---	---	---	---	---	14.1	13.2	13.7	10.5	9.3	9.9
10	---	---	---	---	---	---	13.4	12.5	13.0	10.1	8.9	9.6
11	---	---	---	---	---	---	12.8	11.9	12.4	10.0	8.9	9.4
12	---	---	---	---	---	---	12.2	11.4	11.9	9.8	9.0	9.5
13	---	---	---	---	---	---	12.3	11.5	11.8	11.2	9.6	10.4
14	---	---	---	---	---	---	12.2	10.9	11.7	10.9	9.8	10.4
15	---	---	---	---	---	---	11.7	9.9	11.0	10.3	9.9	10.1
16	---	---	---	---	---	---	10.7	9.9	10.2	10.7	9.7	10.2
17	---	---	---	---	---	---	11.6	10.1	10.9	10.7	9.6	10.2
18	---	---	---	---	---	---	11.6	10.7	11.0	10.7	9.7	10.2
19	---	---	---	---	---	---	11.8	10.3	11.1	10.6	9.3	10.1
20	---	---	---	---	---	---	11.0	9.9	10.4	10.3	9.5	9.8
21	---	---	---	---	---	---	10.8	9.8	10.1	10.9	9.6	10.2
22	---	---	---	13.0	11.8	12.4	10.9	9.8	10.4	11.2	9.9	10.5
23	---	---	---	13.5	11.8	12.5	11.6	10.4	10.9	11.5	9.5	10.3
24	---	---	---	13.6	12.2	12.9	11.8	10.2	11.0	11.4	9.6	10.3
25	---	---	---	13.3	11.9	12.6	11.2	9.7	10.4	12.2	10.2	11.0
26	---	---	---	13.1	11.7	12.4	10.9	9.4	10.2	12.3	10.3	11.2
27	---	---	---	13.1	11.8	12.4	10.9	9.2	10.1	12.7	10.3	11.3
28	---	---	---	12.9	11.5	12.1	---	---	---	12.9	9.6	11.4
29	---	---	---	11.8	10.8	11.3	10.6	8.7	9.6	12.6	9.1	10.7
30	---	---	---	12.7	11.0	12.2	---	---	---	12.1	9.0	10.5
31	---	---	---	13.1	12.0	12.5	---	---	---	12.2	8.9	10.9
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	12.8	11.0	11.9	11.6	8.4	9.8	10.7	5.2	7.0	9.6	5.0	6.7
2	12.4	9.7	11.3	11.6	7.8	9.6	10.5	5.6	7.5	11.4	5.9	7.9
3	11.1	9.2	10.2	12.2	7.6	9.7	9.8	5.5	7.2	11.3	5.6	7.8
4	9.7	8.5	9.2	11.8	7.6	9.3	10.5	5.6	7.3	10.5	5.5	7.5
5	---	---	---	---	---	---	---	---	---	11.6	5.9	7.9
6	11.0	9.6	10.3	---	---	---	10.4	5.5	7.6	11.7	5.8	7.9
7	10.7	8.8	9.8	---	---	---	10.3	5.4	7.4	11.9	5.5	7.9
8	10.2	8.8	9.3	---	---	---	11.0	4.4	7.4	12.1	5.2	7.7
9	10.1	8.5	9.3	---	---	---	10.1	4.3	6.7	11.0	5.2	7.3
10	9.7	8.3	9.0	---	---	---	9.7	4.5	6.7	11.0	5.2	7.3
11	9.7	7.8	8.7	---	---	---	10.1	4.6	6.7	11.4	5.2	7.3
12	8.9	7.8	8.4	10.9	5.9	7.9	11.3	4.8	6.9	11.6	5.2	7.5
13	9.3	8.2	8.7	11.3	5.6	7.8	11.4	5.0	7.4	11.5	5.2	7.5
14	9.2	8.1	8.7	11.2	5.3	7.8	11.4	5.2	7.6	11.4	5.2	7.1
15	9.1	7.3	8.4	10.3	5.3	7.3	10.6	5.5	7.3	11.5	5.1	7.5
16	8.9	7.0	8.1	11.8	5.0	7.7	10.4	6.0	7.5	11.5	5.4	7.7
17	9.0	7.1	8.1	11.8	4.9	7.5	10.5	5.8	7.7	11.9	5.3	7.5
18	9.0	7.2	8.1	12.5	4.7	7.5	11.0	5.8	7.8	12.3	5.3	7.7
19	9.8	8.0	8.7	11.6	4.5	7.3	11.3	5.7	7.9	11.2	5.3	7.1
20	11.3	9.7	10.5	10.7	4.9	7.1	11.2	5.7	7.8	11.5	5.8	7.8
21	---	---	---	10.1	5.0	6.9	11.5	5.7	7.8	11.7	6.0	8.0
22	---	---	---	11.0	5.4	7.6	11.4	5.2	7.8	8.4	6.0	7.0
23	---	---	---	10.7	5.6	7.7	11.3	5.8	7.9	9.8	7.2	8.2
24	8.5	6.8	7.6	11.0	5.5	7.7	11.2	5.6	7.8	10.4	7.6	8.4
25	8.9	6.7	7.7	11.0	5.6	7.9	11.2	4.8	7.3	10.1	7.7	8.7
26	9.1	6.6	8.0	10.4	5.9	7.6	11.2	4.6	6.9	10.4	7.8	8.8
27	10.0	7.6	8.7	10.2	5.7	7.5	11.2	5.2	7.4	10.3	7.8	8.7
28	10.3	7.9	8.8	11.0	5.8	7.8	11.4	5.0	7.5	10.8	7.9	9.0
29	10.6	8.2	9.2	9.8	5.5	7.3	10.5	4.9	6.9	11.2	7.9	9.1
30	11.2	8.4	9.7	10.8	5.3	7.5	11.5	5.1	7.5	11.0	8.1	9.2
31	---	---	---	10.8	5.7	7.8	11.3	5.0	7.2	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	12.3	5.0	7.9

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 mi^2.

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, 15.59 ft, June 20; minimum, 12.39 ft, Jan. 23.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.41	15.27	12.54	12.53	12.43	12.45	13.12	15.40	15.35	15.34	15.31	15.36
2	15.43	15.18	12.55	12.52	12.43	12.46	13.14	15.46	15.35	15.32	15.33	15.37
3	15.45	15.13	12.54	12.52	12.44	12.45	13.20	15.47	15.34	15.31	15.34	15.35
4	15.44	15.06	12.52	12.51	12.49	12.46	13.38	15.46	15.33	15.29	15.35	15.36
5	15.48	14.90	12.52	12.50	12.52	12.49	13.55	15.46	15.34	15.32	15.35	15.35
6	15.46	14.76	12.51	12.50	12.51	12.49	13.63	15.47	15.35	15.33	15.35	15.34
7	15.46	14.49	12.51	12.49	12.50	12.49	13.76	15.48	15.35	15.33	15.34	15.34
8	15.44	14.35	12.50	12.48	12.49	12.50	14.02	15.47	15.36	15.33	15.34	15.35
9	15.43	14.29	12.49	12.48	---	12.51	14.22	15.47	15.37	15.35	15.32	15.34
10	15.44	14.33	12.49	12.48	---	12.51	14.45	15.47	15.38	15.33	15.31	15.34
11	15.44	14.29	12.49	12.48	---	12.51	14.63	15.46	15.38	15.32	15.31	15.34
12	15.43	14.10	12.49	12.47	12.48	12.51	14.73	15.50	15.40	15.33	15.31	15.33
13	15.42	13.96	12.49	12.46	12.47	12.52	14.76	15.51	15.41	15.32	15.32	15.33
14	15.42	13.81	12.49	12.45	12.46	12.51	14.78	15.50	15.42	15.31	15.32	15.33
15	15.42	13.77	12.49	12.44	12.46	12.52	14.86	15.50	15.41	15.30	15.34	15.34
16	15.42	13.72	12.50	12.44	12.45	12.58	14.95	15.50	15.39	15.30	15.37	15.34
17	15.41	13.69	12.49	12.43	12.45	12.69	15.05	15.49	15.38	15.29	15.38	15.34
18	15.42	13.62	12.49	12.42	12.45	12.74	15.11	15.47	15.41	15.29	15.37	15.34
19	15.45	13.46	12.52	12.42	12.45	12.73	15.16	15.44	15.54	15.28	15.36	15.33
20	15.45	13.34	12.58	12.42	12.45	12.72	15.19	15.43	15.57	15.28	15.36	15.33
21	15.46	13.18	12.60	12.41	12.46	12.76	15.23	15.42	15.56	15.29	15.35	15.34
22	15.47	13.08	12.58	12.40	12.46	12.77	15.24	15.39	15.51	15.31	15.40	15.40
23	15.48	12.92	12.56	12.40	12.48	12.75	15.23	15.37	15.46	15.31	15.38	15.45
24	15.48	12.84	12.54	12.41	12.48	12.69	15.23	15.36	15.43	15.29	15.35	15.46
25	15.48	12.79	12.55	12.41	12.47	12.64	15.26	15.35	15.39	15.29	15.34	15.51
26	15.49	12.76	12.53	12.42	12.46	12.66	15.30	15.35	15.37	15.29	15.38	15.50
27	15.50	12.67	12.52	12.41	12.46	12.75	15.31	15.33	15.36	15.30	15.39	15.50
28	15.49	12.61	12.51	12.41	12.45	12.78	15.33	15.32	15.35	15.30	15.37	15.48
29	15.48	12.57	12.51	12.42	---	12.98	15.34	15.31	15.35	15.30	15.36	15.46
30	15.46	12.57	12.51	12.41	---	13.10	15.35	15.30	15.34	15.30	15.35	15.43
31	15.42	---	12.52	12.41	---	13.12	---	15.36	---	15.30	15.34	---
MEAN	15.45	13.78	12.52	12.45	---	12.64	14.62	15.43	15.40	15.31	15.35	15.38
MAX	15.50	15.27	12.60	12.53	---	13.12	15.35	15.51	15.57	15.35	15.40	15.51
MIN	15.41	12.57	12.49	12.40	---	12.45	13.12	15.30	15.33	15.28	15.31	15.33

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	110	75	84	55	61	115	79	72	59	26	28
2	41	81	76	82	56	63	89	93	72	55	29	29
3	43	69	73	80	59	63	78	96	73	49	29	27
4	41	119	71	78	74	64	130	92	70	e45	31	27
5	47	125	69	76	76	71	188	94	74	e42	31	24
6	44	161	68	76	74	71	216	97	75	e39	30	22
7	43	163	67	73	72	71	111	99	77	e38	28	22
8	40	100	67	72	70	74	71	98	81	35	28	23
9	39	74	65	73	67	78	54	101	85	40	26	23
10	38	81	64	74	65	78	57	100	87	38	23	23
11	38	160	64	72	62	76	92	96	93	36	24	22
12	36	154	64	71	62	74	120	108	102	34	24	22
13	36	142	64	68	61	79	129	111	109	32	24	22
14	35	126	64	66	59	78	93	109	112	29	24	21
15	36	109	65	64	59	79	88	109	109	27	27	23
16	37	90	65	62	57	97	69	111	101	26	33	23
17	36	74	65	62	56	127	51	107	97	24	35	24
18	36	135	66	61	56	143	65	102	103	25	32	25
19	41	137	75	61	55	144	75	100	151	22	30	24
20	43	152	90	62	55	141	81	92	158	20	29	24
21	44	153	96	60	57	155	88	92	156	e23	28	25
22	49	163	92	57	60	159	88	86	140	e35	37	38
23	52	146	86	54	63	149	85	78	124	30	32	47
24	51	121	83	54	62	138	81	76	110	25	26	51
25	52	106	84	54	62	132	57	74	97	23	24	62
26	56	116	81	55	62	93	53	70	85	22	32	60
27	56	107	78	54	61	80	55	67	78	25	34	60
28	56	90	e76	53	61	66	58	65	73	27	30	55
29	55	81	e78	55	—	85	64	61	70	26	27	49
30	51	81	e81	54	—	115	65	56	62	26	25	44
31	98	—	e83	54	—	120	--	72	—	26	23	—
TOTAL	1406	3526	2295	2021	1738	3024	2666	2791	2896	1003	881	969
MEAN	45.4	118	74.0	65.2	62.1	97.5	88.9	90.0	96.5	32.4	28.4	32.3
MAX	98	163	96	84	76	159	216	111	158	59	37	62
MIN	35	69	64	53	55	61	51	56	62	20	23	21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2003, BY WATER YEAR (WY)

MEAN	97.4	153	134	122	131	162	139	123	103	74.1	64.3	75.5
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1948 - 2003	
ANNUAL TOTAL	33389		25216			
ANNUAL MEAN	91.5		69.1		115	
HIGHEST ANNUAL MEAN					181	1974
LOWEST ANNUAL MEAN					52.3	1964
HIGHEST DAILY MEAN	241	Mar 11	216	Apr 6	582	Apr 6 1950
LOWEST DAILY MEAN	16	Sep 14	20	Jul 20	6.4	May 7 1963
ANNUAL SEVEN-DAY MINIMUM	17	Sep 12	22	Sep 8	12	Jul 10 1988
MAXIMUM PEAK FLOW			251	Nov 6	(a)1080	Dec 29 1950
MAXIMUM PEAK STAGE			2.28	Nov 6	5.05	Dec 29 1950
INSTANTANEOUS LOW FLOW					2.6	May 27 1963
10 PERCENT EXCEEDS	153		115		204	
50 PERCENT EXCEEDS	81		65		102	
90 PERCENT EXCEEDS	31		26		43	

(a) From rating curve extended above 600 ft^3/s.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04172000 HURON RIVER NEAR HAMBURG, MI

LOCATION.--Lat 42°27'55", long 83°48'00", in sec.24, T.1 N., R.5 E., Livingston County, Hydrologic Unit 04090005, on right bank at downstream side of bridge on Hamburg Road, 1.1 mi north of Hamburg, and 3 mi upstream from Strawberry Lake.

DRAINAGE AREA.--308 mi^2.

PERIOD OF RECORD.--October 1951 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 850.00 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Aug. 12, 1953, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Occasional regulation by Kent Lake (station 04170490) 11 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	60	98	118	111	e96	e105	258	156	187	162	39	50
2	62	120	116	111	e98	e106	254	187	196	149	43	53
3	63	114	e111	112	e102	e108	229	207	197	138	47	56
4	65	104	e108	108	e108	e110	258	213	197	126	49	55
5	69	116	e105	104	e117	e112	348	216	201	113	50	52
6	70	137	e103	103	e124	e115	400	223	202	105	50	50
7	70	149	e101	102	e123	113	434	221	203	100	49	49
8	67	172	e99	100	e122	115	407	218	207	95	48	48
9	65	153	e97	99	e120	117	339	217	213	93	46	48
10	64	137	e96	98	e116	e121	297	222	219	89	44	48
11	64	140	e95	101	e114	e123	278	221	224	86	41	47
12	64	163	e93	e100	e112	126	284	221	234	81	41	47
13	65	191	e92	e100	e110	122	292	222	253	75	41	45
14	67	187	e91	e100	e109	123	292	217	263	69	40	45
15	68	184	e90	e99	e106	125	264	216	261	62	42	47
16	69	167	e90	e99	e104	144	245	215	250	57	46	47
17	67	149	89	e98	e102	200	215	210	238	52	49	46
18	67	131	89	e99	e100	259	196	202	232	48	51	44
19	69	147	96	e100	e99	284	195	195	258	44	49	45
20	71	169	112	e101	e98	293	198	189	298	41	47	43
21	73	178	126	e102	e98	308	204	179	322	40	45	42
22	74	197	130	e101	e100	318	210	171	324	42	57	50
23	77	197	127	e99	e103	316	205	162	306	42	62	65
24	78	197	120	e98	e106	303	195	154	283	41	59	78
25	80	181	118	e97	e106	292	184	151	261	40	55	98
26	83	161	114	e96	e106	285	161	146	239	39	56	110
27	85	154	110	e96	e106	252	146	143	219	38	61	114
28	86	147	107	e96	e105	234	139	144	201	38	61	112
29	86	134	104	e96	---	245	135	147	189	38	58	104
30	85	125	102	e96	---	249	135	148	176	38	54	95
31	83	---	107	e96	---	257	---	165	---	38	50	---
TOTAL	2216	4599	3256	3118	3010	5980	7397	5898	7053	2219	1530	1833
MEAN	71.5	153	105	101	108	193	247	190	235	71.6	49.4	61.1
MAX	86	197	130	112	124	318	434	223	324	162	62	114
MIN	60	98	89	96	96	105	135	143	176	38	39	42
CFSM	0.23	0.50	0.34	0.33	0.35	0.63	0.80	0.62	0.76	0.23	0.16	0.20
IN.	0.27	0.56	0.39	0.38	0.36	0.72	0.89	0.71	0.85	0.27	0.18	0.22

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	164	241	230	223	243	345	326	265	206	150	128	133
MAX	490	425	374	499	500	705	626	895	406	534	343	424
(WY)	1982	1993	2002	1993	2001	1974	1974	1956	1989	1968	2000	1975
MIN	52.0	100	102	84.5	89.5	122	144	92.3	82.0	41.9	49.4	50.5
(WY)	1965	1964	1961	1961	1964	1964	1964	1958	1965	1965	2003	2002

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	66794		48109			
ANNUAL MEAN	183		132		221	
HIGHEST ANNUAL MEAN					337	1974
LOWEST ANNUAL MEAN					97.2	1964
HIGHEST DAILY MEAN	501	Mar 13	434	Apr 7	1560	May 15 1956
LOWEST DAILY MEAN	38	Sep 17	38	Jul 27	27	Jul 15 1988
ANNUAL SEVEN-DAY MINIMUM	39	Sep 13	38	Jul 26	28	Jul 10 1988
MAXIMUM PEAK FLOW			(a)445	Apr 7	(b)1560	May 15 1956
MAXIMUM PEAK STAGE			5.41	Jun 21	8.46	Jun 30 1968
INSTANTANEOUS LOW FLOW					26	(c)
ANNUAL RUNOFF (CFSM)	0.59		0.43		0.72	
ANNUAL RUNOFF (INCHES)	8.07		5.81		9.75	
10 PERCENT EXCEEDS	342		249		392	
50 PERCENT EXCEEDS	155		108		193	
90 PERCENT EXCEEDS	60		47		83	

(a) Gage height 5.11 ft.
(b) Gage height 8.35 ft.
(c) 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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20	26	27	47	e23	e29	111	80	95	24	20	21
2	20	27	e28	39	e24	e28	102	154	69	23	29	23
3	21	27	e29	e39	e25	e26	94	141	55	23	24	21
4	22	27	29	38	e29	e25	146	112	52	22	25	21
5	27	27	29	35	e38	e25	451	123	55	23	27	20
6	24	30	29	35	e41	e25	366	154	50	23	24	19
7	22	30	29	e36	e34	e25	245	134	45	26	22	19
8	22	29	29	36	e30	e25	174	133	43	26	22	18
9	21	29	30	39	e28	e25	157	168	44	27	21	18
10	21	46	28	39	e27	e26	190	270	40	25	20	18
11	21	60	27	e35	e27	e27	161	267	39	24	22	18
12	21	41	28	e32	e26	e28	133	235	42	24	22	18
13	21	34	28	e30	e26	e34	114	186	47	23	21	18
14	21	32	29	e28	e26	e43	103	139	42	22	20	18
15	21	34	30	e27	e26	109	95	132	37	22	21	21
16	21	33	30	e26	e25	265	87	144	34	21	21	20
17	21	31	29	e24	e25	294	79	124	33	20	21	18
18	21	30	29	e23	e25	222	82	105	32	20	20	18
19	25	31	42	e22	e25	161	85	93	56	19	19	18
20	25	32	71	e22	e25	137	79	84	44	19	18	18
21	23	31	62	e21	e26	173	89	74	37	28	19	18
22	23	43	47	e21	e26	144	83	63	32	30	23	24
23	23	41	40	e21	e26	123	73	56	30	25	20	34
24	23	36	35	e21	e27	109	64	53	29	22	19	26
25	23	34	e34	e22	e29	108	60	51	27	21	19	51
26	27	32	e33	e22	e30	108	55	47	26	20	20	35
27	26	29	e32	e23	e31	96	51	45	26	20	19	34
28	25	29	e32	e23	e30	92	48	43	24	20	18	31
29	25	28	32	e23	---	190	45	42	26	19	18	27
30	25	29	32	e23	---	160	44	42	26	19	18	25
31	26	---	47	e23	---	125	---	79	---	19	18	---
TOTAL	707	988	1056	895	780	3007	3666	3573	1237	699	650	688
MEAN	22.8	32.9	34.1	28.9	27.9	97.0	122	115	41.2	22.5	21.0	22.9
MAX	27	60	71	47	41	294	451	270	95	30	29	51
MIN	20	26	27	21	23	25	44	42	24	19	18	18
CFSM	0.18	0.26	0.27	0.23	0.22	0.76	0.95	0.90	0.32	0.18	0.16	0.18
IN.	0.21	0.29	0.31	0.26	0.23	0.87	1.07	1.04	0.36	0.20	0.19	0.20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 2003, BY WATER YEAR (WY)

MEAN	44.3	59.5	80.7	75.4	110	175	155	102	67.1	40.5	35.6	33.8
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	73.8	29.7	20.9	16.0	12.9	11.0
(WY)	1964	1964	1964	1964	1964	1964	1963	1958	1965	1965	1963	1963

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1952 - 2003	
ANNUAL TOTAL	28093		17946			
ANNUAL MEAN	77.0		49.2		81.2	
HIGHEST ANNUAL MEAN					142	1974
LOWEST ANNUAL MEAN					29.9	1964
HIGHEST DAILY MEAN	391	Apr 9	451	Apr 5	1380	Jun 27 1968
LOWEST DAILY MEAN	18	Sep 9	18	Aug 20	9.5	Oct 7 1963
ANNUAL SEVEN-DAY MINIMUM	18	Sep 9	18	Sep 8	9.9	Oct 5 1963
MAXIMUM PEAK FLOW			494	Apr 5	1500	Jun 26 1968
MAXIMUM PEAK STAGE			9.58	Apr 5	12.95	Jun 26 1968
INSTANTANEOUS LOW FLOW					7.3	Dec 13 1963
ANNUAL RUNOFF (CFSM)	0.60		0.38		0.63	
ANNUAL RUNOFF (INCHES)	8.16		5.22		8.62	
10 PERCENT EXCEEDS	186		113		171	
50 PERCENT EXCEEDS	37		29		48	
90 PERCENT EXCEEDS	21		20		20	

(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 Wall Street in Ann Arbor, 0.7 mi downstream from Argo Dam, and 4.2 mi upstream from Geddes Dam.

DRAINAGE AREA.--729 mi^2.

WATER-DISCHARGE RECORDS

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.--Water-discharge 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. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	117	131	250	274	152	217	447	317	518	138	54	207
2	133	132	251	265	150	237	341	541	443	141	77	173
3	134	151	262	250	146	264	316	566	400	136	73	152
4	171	166	266	264	174	198	539	518	403	158	108	142
5	154	185	277	258	152	143	906	573	397	148	88	145
6	153	187	262	255	162	129	1120	637	379	179	75	133
7	138	219	248	236	156	144	978	620	359	178	63	127
8	143	270	161	258	145	185	882	634	362	157	75	120
9	141	358	93	256	164	177	845	684	348	159	48	120
10	142	498	63	223	152	171	865	777	339	141	58	94
11	133	411	124	195	146	191	740	803	322	143	59	102
12	141	370	133	198	152	207	685	766	361	129	104	91
13	138	355	160	161	152	265	619	724	363	129	63	95
14	129	349	161	161	144	233	527	657	353	127	71	96
15	122	336	164	148	159	317	516	665	341	83	172	117
16	115	289	170	144	140	555	507	650	336	83	115	123
17	112	279	191	149	153	606	455	616	332	85	90	102
18	117	271	203	148	147	558	306	577	333	76	89	83
19	135	275	243	155	150	539	180	497	391	70	77	99
20	117	226	286	148	154	562	210	493	353	65	70	85
21	116	241	262	148	162	671	318	466	331	132	193	81
22	115	254	246	150	165	634	436	430	320	104	152	220
23	113	256	232	149	153	596	428	332	319	94	138	165
24	120	259	231	147	163	562	378	339	307	75	127	217
25	134	273	236	149	157	569	344	203	295	68	124	241
26	138	302	229	152	163	557	342	284	280	59	171	249
27	150	292	258	156	213	534	326	379	261	71	138	249
28	136	279	265	150	218	562	309	401	239	54	137	241
29	136	271	268	149	---	624	299	385	245	53	135	229
30	141	264	268	148	---	606	203	384	137	44	128	281
31	135	---	274	145	---	540	---	546	---	38	133	---
TOTAL	4119	8149	6737	5789	4444	12353	15367	16464	10167	3317	3205	4579
MEAN	133	272	217	187	159	398	512	531	339	107	103	153
MAX	171	498	286	274	218	671	1120	803	518	179	193	281
MIN	112	131	63	144	140	129	180	203	137	38	48	81

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1915 - 2003, BY WATER YEAR (WY)

MEAN	275	390	426	449	553	857	852	604	403	242	187	216
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1915 - 2003	
ANNUAL TOTAL	144378		94690			
ANNUAL MEAN	396		259		(a)454	
HIGHEST ANNUAL MEAN					824	1974
LOWEST ANNUAL MEAN					171	1931
HIGHEST DAILY MEAN	1300	Mar 4	1120	Apr 6	5840	Mar 14 1918
LOWEST DAILY MEAN	48	Jul 16	38	Jul 31	(b)4.0	(c)
ANNUAL SEVEN-DAY MINIMUM	54	Sep 12	53	Jul 26	13	Jul 28 1934
MAXIMUM PEAK FLOW			2160	Aug 21		
MAXIMUM PEAK STAGE			15.12	Aug 21	(d)17.50	Jun 26 1968
10 PERCENT EXCEEDS	866		556		929	
50 PERCENT EXCEEDS	286		191		335	
90 PERCENT EXCEEDS	92		94		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

04174500 HURON RIVER AT ANN ARBOR, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 2000 to 2003 (discontinued).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 2000 to September 2003.
pH: April 2000 to September 2003.
WATER TEMPERATURE: April 2000 to September 2003.
DISSOLVED OXYGEN: April 2000 to September 2003.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval, not operated 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. 8-16, Apr. 11-14, May 6-15, 18-23, June 22-26, July 2-6, 8-10, Aug. 4-5, 12, 21, 24-27, Sept. 16-23, rated good; July 7, rated fair. pH records rated excellent except for the following period: July 15-18, rated good. Water temperature records rated excellent. Dissolved oxygen records rated excellent except for the following periods: Mar. 26, June 11, July 8-11, 24-26, Aug. 19-21, Sept. 13-14, rated good; Mar. 27, Apr. 4 to June 2, June 12, July 27-30, Aug. 22-25, Sept. 15-16, rated fair; Mar. 28 to Apr. 1, June 13-16, July 12-13, July 31 to Aug. 6, Aug. 26-28, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum recorded during period of operation, 893 microsiemens, Oct. 16, 2002; minimum recorded, 223 microsiemens, Aug. 15, 2003.
pH: Maximum recorded during period of operation, 9.1 std. units, Sept. 3, 2002; minimum recorded, 7.5 std. units, July 29, 30, 31, 2001, July 12, 2003.
WATER TEMPERATURE: Maximum recorded during period of operation, 31.0°C, July 24, 2001, and several days during July 2002; minimum recorded, 3.0°C, Apr. 7, 8, 9, 2003.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 13.9 mg/L, Apr. 13, 2000, and Apr. 30, 2002; minimum recorded, 3.8 mg/L, Aug. 23, 2002.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum recorded during period of operation, 893 microsiemens, Oct. 16; minimum recorded, 223 microsiemens, Aug. 15.
pH: Maximum recorded during period of operation, 8.8 std. units, Oct. 15, 17; minimum recorded, 7.5 std. units, July 12.
WATER TEMPERATURE: Maximum recorded during period of operation, 29.0°C, July 31, Aug. 1; minimum recorded, 3.0°C, Apr. 7, 8, 9.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 13.7 mg/L, Sept. 10; minimum recorded, 4.6 mg/L, July 20, 31.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	835	818	827	---	---	---	---	---	---	---	---	---
2	828	761	819	---	---	---	---	---	---	---	---	---
3	834	807	821	---	---	---	---	---	---	---	---	---
4	875	721	822	---	---	---	---	---	---	---	---	---
5	838	817	830	---	---	---	---	---	---	---	---	---
6	847	833	840	---	---	---	---	---	---	---	---	---
7	851	835	842	---	---	---	---	---	---	---	---	---
8	849	836	842	---	---	---	---	---	---	---	---	---
9	853	834	846	---	---	---	---	---	---	---	---	---
10	851	839	845	---	---	---	---	---	---	---	---	---
11	854	846	850	---	---	---	---	---	---	---	---	---
12	859	847	852	---	---	---	---	---	---	---	---	---
13	875	847	859	---	---	---	---	---	---	---	---	---
14	880	860	869	---	---	---	---	---	---	---	---	---
15	889	870	876	---	---	---	---	---	---	---	---	---
16	893	868	882	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174500 HURON RIVER AT ANN ARBOR, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	780	760	770	702	529	684
2	---	---	---	---	---	---	772	756	763	690	677	686
3	---	---	---	---	---	---	781	758	769	697	676	688
4	---	---	---	---	---	---	783	687	768	680	667	671
5	---	---	---	---	---	---	787	763	778	670	644	661
6	---	---	---	---	---	---	763	704	724	671	652	661
7	---	---	---	---	---	---	725	706	716	700	650	668
8	---	---	---	---	---	---	738	715	728	696	685	690
9	---	---	---	---	---	---	749	734	741	697	657	686
10	---	---	---	---	---	---	751	740	746	688	669	679
11	---	---	---	---	---	---	746	730	735	670	654	663
12	---	---	---	---	---	---	735	728	732	660	642	650
13	---	---	---	---	---	---	734	725	730	660	645	652
14	---	---	---	---	---	---	761	718	726	670	657	663
15	---	---	---	---	---	---	721	706	716	675	660	667
16	---	---	---	---	---	---	721	709	714	683	667	676
17	---	---	---	---	---	---	723	713	717	695	681	687
18	---	---	---	---	---	---	735	717	726	699	687	694
19	---	---	---	---	---	---	736	716	725	704	695	700
20	---	---	---	---	---	---	750	681	720	714	701	708
21	---	---	---	---	---	---	735	719	727	724	707	717
22	---	---	---	---	---	---	758	731	738	745	711	726
23	---	---	---	---	---	---	749	742	745	750	727	734
24	---	---	---	---	---	---	744	712	725	744	724	734
25	---	---	---	---	---	---	719	712	716	754	737	742
26	---	---	---	---	---	---	717	708	714	751	730	741
27	---	---	---	---	---	---	715	707	710	754	715	742
28	---	---	---	768	733	757	715	701	708	762	742	754
29	---	---	---	766	725	752	716	696	705	762	747	756
30	---	---	---	771	751	762	714	639	701	754	740	748
31	---	---	---	777	765	772	---	---	---	740	703	728
MONTH	---	---	---	---	---	---	787	639	731	762	529	699

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	734	729	731	738	723	732	801	691	765	733	630	703
2	732	721	726	735	703	720	774	586	756	736	711	725
3	728	722	726	720	699	709	775	727	768	748	733	739
4	730	720	726	706	632	694	783	546	761	749	739	743
5	737	723	732	697	685	693	775	490	753	753	740	744
6	741	732	736	708	640	690	779	756	763	751	739	743
7	740	734	738	694	404	667	769	754	762	750	738	742
8	741	722	735	694	670	684	773	756	765	746	733	743
9	737	731	734	684	668	675	772	756	764	750	739	744
10	737	728	732	---	---	---	762	751	756	771	745	751
11	746	723	735	---	---	---	762	747	755	774	741	751
12	738	712	732	768	765	766	758	421	719	782	745	757
13	745	716	734	770	765	768	748	735	742	771	747	757
14	745	723	734	773	768	771	754	732	745	777	751	759
15	742	721	736	794	771	782	752	223	703	779	703	753
16	749	725	739	791	776	783	741	723	732	781	754	767
17	741	724	735	788	779	782	746	735	740	803	775	784
18	744	702	734	793	772	782	745	733	739	800	773	782
19	731	694	722	796	779	784	750	737	741	789	763	781
20	720	711	714	790	778	783	748	734	738	791	772	779
21	712	700	706	783	513	729	743	391	721	786	773	778
22	707	692	702	767	760	764	735	650	707	784	412	696
23	711	702	705	777	764	770	737	710	716	767	749	757
24	710	702	706	777	768	772	726	715	718	---	---	---
25	713	698	706	779	766	771	737	627	723	765	741	752
26	738	699	715	778	767	772	725	484	699	759	655	753
27	752	735	746	779	638	762	725	718	721	751	655	740
28	752	737	743	785	774	777	723	711	718	738	732	735
29	744	702	738	780	771	775	725	626	713	734	726	729
30	746	729	738	785	771	778	730	716	721	727	717	722
31	---	---	---	822	771	792	735	723	727	---	---	---
MONTH	752	692	728	---	---	---	801	223	737	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174500 HURON RIVER AT ANN ARBOR, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	8.6	8.3	8.4	---	---	---	---	---	---	---	---	---
2	8.6	8.3	8.5	---	---	---	---	---	---	---	---	---
3	8.5	8.3	8.4	---	---	---	---	---	---	---	---	---
4	8.5	8.3	8.4	---	---	---	---	---	---	---	---	---
5	8.5	8.4	8.4	---	---	---	---	---	---	---	---	---
6	8.6	8.4	8.4	---	---	---	---	---	---	---	---	---
7	8.6	8.4	8.5	---	---	---	---	---	---	---	---	---
8	8.6	8.4	8.5	---	---	---	---	---	---	---	---	---
9	8.7	8.4	8.5	---	---	---	---	---	---	---	---	---
10	8.7	8.4	8.5	---	---	---	---	---	---	---	---	---
11	8.7	8.4	8.5	---	---	---	---	---	---	---	---	---
12	8.7	8.4	8.5	---	---	---	---	---	---	---	---	---
13	8.7	8.4	8.5	---	---	---	---	---	---	---	---	---
14	8.7	8.4	8.5	---	---	---	---	---	---	---	---	---
15	8.8	8.4	8.5	---	---	---	---	---	---	---	---	---
16	8.7	8.4	8.6	---	---	---	---	---	---	---	---	---
17	8.8	8.5	8.6	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
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25	---	---	---	---	---	---	---	---	---	---	---	---
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28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	8.2	8.2	8.2	8.3	8.1	8.2
2	---	---	---	---	---	---	8.2	8.2	8.2	8.2	8.1	8.2
3	---	---	---	---	---	---	8.2	8.2	8.2	8.2	8.1	8.2
4	---	---	---	---	---	---	8.2	8.2	8.2	8.3	8.1	8.2
5	---	---	---	---	---	---	8.3	8.2	8.2	8.3	8.2	8.2
6	---	---	---	---	---	---	8.2	8.2	8.2	8.3	8.2	8.2
7	---	---	---	---	---	---	8.2	8.2	8.2	8.2	8.1	8.2
8	---	---	---	---	---	---	8.2	8.2	8.2	8.2	8.2	8.2
9	---	---	---	---	---	---	8.3	8.2	8.2	8.3	8.2	8.2
10	---	---	---	---	---	---	8.3	8.2	8.2	8.3	8.2	8.2
11	---	---	---	---	---	---	8.3	8.2	8.2	8.3	8.2	8.2
12	---	---	---	---	---	---	8.3	8.2	8.2	8.3	8.2	8.2
13	---	---	---	---	---	---	8.3	8.2	8.2	8.3	8.2	8.3
14	---	---	---	---	---	---	8.3	8.2	8.2	8.4	8.3	8.3
15	---	---	---	---	---	---	8.3	8.2	8.2	8.3	8.2	8.3
16	---	---	---	---	---	---	8.3	8.2	8.2	8.3	8.2	8.3
17	---	---	---	---	---	---	8.3	8.2	8.2	8.3	8.2	8.3
18	---	---	---	---	---	---	8.2	8.1	8.2	8.4	8.2	8.3
19	---	---	---	---	---	---	8.3	8.1	8.2	8.4	8.2	8.3
20	---	---	---	---	---	---	8.3	8.1	8.2	8.3	8.3	8.3
21	---	---	---	---	---	---	8.3	8.2	8.2	8.4	8.3	8.3
22	---	---	---	---	---	---	8.3	8.2	8.2	8.6	8.2	8.3
23	---	---	---	---	---	---	8.2	8.2	8.2	8.7	8.3	8.4
24	---	---	---	---	---	---	8.3	8.2	8.3	8.4	8.3	8.3
25	---	---	---	---	---	---	8.4	8.3	8.3	8.6	8.2	8.4
26	---	---	---	8.2	8.1	8.2	8.4	8.2	8.3	8.3	8.2	8.2
27	---	---	---	8.2	8.1	8.2	8.3	8.2	8.3	8.4	8.2	8.2
28	---	---	---	8.2	8.2	8.2	8.4	8.2	8.3	8.4	8.2	8.2
29	---	---	---	8.2	8.2	8.2	8.4	8.2	8.3	8.4	8.2	8.2
30	---	---	---	8.2	8.2	8.2	8.4	8.1	8.2	8.3	8.0	8.2
31	---	---	---	8.2	8.2	8.2	---	---	---	8.1	8.0	8.1
MONTH	---	---	---	---	---	---	8.4	8.1	8.2	8.7	8.0	8.2

STREAMS TRIBUTARY TO LAKE ERIE

04174500 HURON RIVER AT ANN ARBOR, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.2	8.0	8.1	8.2	7.9	8.0	8.3	7.8	8.0	8.0	7.8	7.9
2	8.3	8.0	8.1	8.2	7.9	8.0	8.2	7.9	8.0	8.1	7.8	7.9
3	8.2	8.1	8.1	8.2	8.0	8.1	8.2	7.9	8.0	8.2	7.8	7.9
4	8.1	8.1	8.1	8.1	7.9	8.0	8.2	7.9	8.0	8.2	7.8	8.0
5	8.2	8.0	8.1	8.1	7.9	8.0	8.2	7.9	8.0	8.2	7.8	8.0
6	8.1	8.0	8.1	8.1	7.9	7.9	8.2	7.9	8.0	8.3	7.8	8.0
7	8.1	8.0	8.1	8.0	7.8	7.9	8.3	7.9	8.1	8.3	7.9	8.0
8	8.1	8.0	8.1	8.0	7.8	7.9	8.2	7.9	8.0	8.3	7.9	8.0
9	8.1	8.0	8.1	8.0	7.9	7.9	8.3	7.9	8.1	8.3	7.9	8.0
10	8.1	8.0	8.0	---	---	---	8.2	7.9	8.1	8.6	7.8	8.1
11	8.1	8.0	8.0	---	---	---	8.2	7.9	8.0	8.6	7.8	8.0
12	8.0	8.0	8.0	7.8	7.5	7.7	8.2	7.8	8.0	8.4	7.8	8.0
13	8.1	8.0	8.0	7.9	7.7	7.8	8.1	7.8	8.0	8.5	7.9	8.1
14	8.1	8.0	8.0	8.0	7.8	7.8	8.2	7.8	8.0	8.4	7.8	8.0
15	8.1	7.9	8.0	8.1	7.8	7.9	8.1	7.9	8.0	8.3	7.8	8.0
16	8.1	8.0	8.0	8.1	7.8	7.9	8.1	7.9	8.0	8.3	7.9	8.0
17	8.1	8.0	8.0	8.2	7.8	8.0	8.2	7.8	8.0	8.2	7.7	8.0
18	8.1	7.9	8.0	8.2	8.0	8.1	8.2	7.9	8.0	8.4	7.8	8.0
19	8.1	7.9	8.0	8.2	8.0	8.1	8.3	7.8	8.0	8.4	7.8	8.0
20	8.1	8.0	8.0	8.2	8.0	8.1	8.3	7.9	8.0	8.4	7.8	8.0
21	8.1	8.0	8.0	8.3	8.0	8.2	8.3	7.9	8.1	8.4	7.8	8.0
22	8.1	8.0	8.0	8.1	8.0	8.0	8.1	7.7	8.0	8.0	7.9	7.9
23	8.1	8.0	8.0	8.2	7.9	8.0	8.2	7.8	8.0	8.1	7.9	7.9
24	8.1	8.0	8.0	8.2	8.0	8.1	8.1	7.9	8.0	---	---	---
25	8.1	8.0	8.0	8.2	7.9	8.1	8.2	7.8	8.0	8.2	8.0	8.0
26	8.1	8.0	8.0	8.2	8.0	8.1	8.1	7.8	7.9	8.2	8.0	8.0
27	8.2	8.0	8.0	8.2	8.0	8.1	8.2	7.8	7.9	8.2	8.0	8.1
28	8.1	7.9	8.0	8.2	7.9	8.0	8.2	7.8	7.9	8.2	8.0	8.1
29	8.0	7.9	8.0	8.2	7.9	8.0	8.1	7.8	7.9	8.3	8.0	8.1
30	8.1	7.9	8.0	8.2	7.9	8.0	8.2	7.8	7.9	8.2	8.1	8.1
31	---	---	---	8.4	7.8	8.1	8.2	7.8	8.0	---	---	---
MONTH	8.3	7.9	8.0	---	---	---	8.3	7.7	8.0	---	---	---

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	22.5	19.0	20.0	8.0	7.0	7.0	---	---	---	---	---	---
2	21.0	20.0	20.5	7.0	6.5	6.5	---	---	---	---	---	---
3	20.5	19.5	20.0	7.5	5.5	6.5	---	---	---	---	---	---
4	21.0	19.5	20.0	7.5	6.0	6.5	---	---	---	---	---	---
5	20.5	18.0	19.0	6.5	6.0	6.0	---	---	---	---	---	---
6	19.5	17.5	18.0	6.0	6.0	6.0	---	---	---	---	---	---
7	18.5	16.0	17.0	6.5	5.5	6.0	---	---	---	---	---	---
8	17.5	15.5	16.5	9.0	5.5	6.5	---	---	---	---	---	---
9	17.0	15.0	16.0	7.5	6.5	7.0	---	---	---	---	---	---
10	18.0	15.0	16.0	9.0	7.5	8.5	---	---	---	---	---	---
11	18.0	15.0	16.0	9.5	8.5	9.0	---	---	---	---	---	---
12	17.0	15.5	16.0	9.5	9.0	9.0	---	---	---	---	---	---
13	16.5	13.5	15.5	9.0	8.5	9.0	---	---	---	---	---	---
14	16.5	13.5	14.5	9.0	8.5	8.5	---	---	---	---	---	---
15	15.5	12.5	14.0	8.5	7.0	7.5	---	---	---	---	---	---
16	14.0	12.0	13.0	7.0	6.0	6.5	---	---	---	---	---	---
17	12.5	11.5	12.0	6.0	5.5	6.0	---	---	---	---	---	---
18	12.5	11.0	11.5	5.5	5.0	5.0	---	---	---	---	---	---
19	11.5	11.0	11.5	6.0	5.0	5.0	---	---	---	---	---	---
20	12.5	10.0	11.0	5.5	5.0	5.0	---	---	---	---	---	---
21	11.5	9.5	10.5	---	---	---	---	---	---	---	---	---
22	12.0	10.0	11.0	---	---	---	---	---	---	---	---	---
23	11.0	9.5	10.0	---	---	---	---	---	---	---	---	---
24	10.0	9.0	9.5	---	---	---	---	---	---	---	---	---
25	9.0	8.5	9.0	---	---	---	---	---	---	---	---	---
26	9.5	9.0	9.0	---	---	---	---	---	---	---	---	---
27	10.5	8.5	9.0	---	---	---	---	---	---	---	---	---
28	10.5	8.5	9.0	---	---	---	---	---	---	---	---	---
29	8.5	7.5	8.0	---	---	---	---	---	---	---	---	---
30	9.0	7.0	7.5	---	---	---	---	---	---	---	---	---
31	9.0	7.0	7.5	---	---	---	---	---	---	---	---	---
MONTH	22.5	7.0	13.5	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174500 HURON RIVER AT ANN ARBOR, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	7.0	5.0	6.0	17.0	14.5	16.0
2	---	---	---	---	---	---	8.5	6.0	7.5	16.0	15.0	15.5
3	---	---	---	---	---	---	8.5	7.5	8.0	16.0	14.5	15.0
4	---	---	---	---	---	---	7.5	6.5	7.5	15.5	13.5	14.5
5	---	---	---	---	---	---	7.5	5.0	6.5	15.5	14.0	14.5
6	---	---	---	---	---	---	5.0	4.0	4.5	17.0	14.5	15.5
7	---	---	---	---	---	---	4.0	3.0	3.5	16.0	15.0	15.5
8	---	---	---	---	---	---	3.5	3.0	3.0	15.5	15.0	15.0
9	---	---	---	---	---	---	5.5	3.0	4.0	16.5	14.0	15.0
10	---	---	---	---	---	---	7.5	4.5	6.0	17.0	15.0	16.0
11	---	---	---	---	---	---	9.5	6.0	7.5	17.0	16.0	16.5
12	---	---	---	---	---	---	10.0	7.5	9.0	16.0	14.0	15.0
13	---	---	---	---	---	---	11.0	8.5	9.5	15.0	13.0	14.0
14	---	---	---	---	---	---	12.0	8.5	10.5	15.5	12.5	14.0
15	---	---	---	---	---	---	13.5	10.5	12.0	14.5	14.0	14.0
16	---	---	---	---	---	---	13.5	12.0	13.0	15.0	14.5	14.5
17	---	---	---	---	---	---	12.5	11.5	12.0	16.5	14.0	15.5
18	---	---	---	---	---	---	11.5	11.0	11.0	17.5	15.0	16.5
19	---	---	---	---	---	---	14.0	11.0	12.0	19.0	16.5	17.5
20	---	---	---	---	---	---	14.0	12.0	12.5	18.5	18.0	18.5
21	---	---	---	---	---	---	13.5	12.0	12.5	19.0	17.0	18.0
22	---	---	---	---	---	---	12.5	11.5	12.0	18.0	16.0	17.5
23	---	---	---	---	---	---	13.0	11.0	12.0	17.5	16.0	16.5
24	---	---	---	---	---	---	12.0	10.5	11.5	16.5	16.0	16.5
25	---	---	---	---	---	---	12.0	10.5	11.5	17.5	15.5	16.5
26	---	---	---	7.0	5.5	6.5	14.0	11.0	12.5	16.5	16.0	16.0
27	---	---	---	7.5	6.0	7.0	14.5	12.5	13.5	16.5	15.5	16.0
28	---	---	---	8.0	6.5	7.0	15.5	13.0	14.5	17.5	16.0	16.5
29	---	---	---	7.0	6.5	7.0	16.5	14.0	15.5	19.0	16.5	17.5
30	---	---	---	7.5	6.0	6.5	16.0	14.5	15.0	18.5	17.5	18.0
31	---	---	---	6.0	5.0	5.5	---	---	---	18.5	17.5	17.5
MONTH	---	---	---	---	---	---	16.5	3.0	9.9	19.0	12.5	16.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	19.0	16.5	17.5	26.5	23.5	24.5	29.0	23.5	25.0	23.0	21.5	22.0
2	18.0	16.5	17.5	28.0	23.5	25.5	27.5	23.0	24.5	23.5	21.5	22.0
3	18.0	16.5	17.0	28.0	24.0	25.5	26.5	24.0	24.5	24.0	21.5	22.5
4	16.5	16.5	16.5	27.5	25.5	26.0	26.5	23.5	24.5	23.5	21.5	22.0
5	17.5	16.0	16.5	27.0	25.0	26.0	26.5	23.0	24.5	23.5	20.5	22.0
6	17.5	16.5	17.0	28.0	25.0	26.0	27.5	23.5	25.5	24.5	20.0	21.5
7	18.0	16.5	17.0	26.5	24.0	25.5	28.0	24.0	25.5	24.0	20.5	22.0
8	18.0	17.0	17.5	28.5	25.0	26.0	28.5	24.5	26.0	24.5	21.5	22.5
9	19.5	17.0	18.0	27.5	25.0	26.0	28.0	24.0	25.5	24.5	21.5	22.5
10	19.0	18.5	18.5	---	---	---	26.5	24.0	25.0	25.5	21.5	22.5
11	21.0	18.5	19.5	---	---	---	26.0	24.0	24.5	26.0	21.5	22.5
12	20.0	18.5	19.0	25.0	22.5	23.5	26.0	23.5	24.5	24.5	21.0	22.5
13	20.0	18.5	19.5	25.5	22.5	24.0	27.5	23.5	25.0	25.0	21.0	22.5
14	21.5	19.5	20.5	26.5	23.0	24.5	28.0	24.0	25.5	24.5	21.5	22.5
15	22.5	20.0	21.0	25.5	23.0	24.0	27.5	25.0	26.0	24.5	21.0	22.0
16	23.0	20.5	21.5	27.0	21.5	24.0	28.5	25.5	26.5	24.5	20.5	22.0
17	22.0	21.0	21.5	27.5	22.5	24.5	28.5	24.5	26.0	24.0	20.5	22.0
18	23.5	21.5	22.5	27.5	23.5	25.0	28.5	23.5	25.5	23.5	20.5	21.5
19	23.5	22.0	23.0	28.0	22.5	25.0	28.5	23.0	25.0	23.5	20.0	21.5
20	23.5	22.0	22.5	26.5	23.0	24.5	28.0	23.5	25.5	23.0	19.5	20.5
21	24.0	22.0	23.0	25.0	22.5	24.0	28.5	24.0	26.0	22.0	19.0	20.0
22	24.5	22.5	23.5	25.5	23.0	24.0	28.0	25.0	26.0	20.0	19.0	19.5
23	25.0	22.5	23.5	25.5	22.5	24.0	27.5	24.0	25.5	20.0	18.5	19.0
24	25.0	23.0	24.0	27.5	22.0	24.5	26.0	24.0	24.5	---	---	---
25	26.0	24.5	25.0	27.0	22.5	24.5	27.0	23.5	25.0	18.5	17.0	17.5
26	26.0	24.5	25.5	25.5	23.0	24.0	27.0	24.0	25.0	18.0	16.5	17.0
27	26.5	24.0	25.0	26.0	23.5	24.5	28.0	24.5	26.0	18.0	16.5	17.0
28	25.0	24.0	24.5	27.5	23.0	24.5	27.0	24.0	25.0	16.5	16.0	16.0
29	24.5	23.5	24.0	26.5	22.5	24.5	25.5	24.5	25.0	16.5	15.0	15.5
30	26.0	22.5	24.0	28.5	22.0	24.5	26.0	23.5	24.5	15.0	14.0	14.5
31	---	---	---	29.0	23.5	25.0	25.0	22.5	23.5	---	---	---
MONTH	26.5	16.0	20.9	---	---	---	29.0	22.5	25.2	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174500 HURON RIVER AT ANN ARBOR, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	12.4	9.3	10.7	---	---	---	---	---	---	---	---	---
2	12.3	9.4	10.8	---	---	---	---	---	---	---	---	---
3	13.3	9.4	10.9	---	---	---	---	---	---	---	---	---
4	12.1	9.3	10.4	---	---	---	---	---	---	---	---	---
5	11.4	9.3	10.2	---	---	---	---	---	---	---	---	---
6	11.6	9.4	10.4	---	---	---	---	---	---	---	---	---
7	12.8	9.6	11.0	---	---	---	---	---	---	---	---	---
8	13.5	9.9	11.3	---	---	---	---	---	---	---	---	---
9	12.2	9.6	10.6	---	---	---	---	---	---	---	---	---
10	12.3	9.6	10.5	---	---	---	---	---	---	---	---	---
11	12.8	9.7	10.7	---	---	---	---	---	---	---	---	---
12	13.0	8.9	10.4	---	---	---	---	---	---	---	---	---
13	11.9	9.1	10.2	---	---	---	---	---	---	---	---	---
14	12.4	9.1	10.1	---	---	---	---	---	---	---	---	---
15	12.9	9.2	10.4	---	---	---	---	---	---	---	---	---
16	12.5	9.6	10.6	---	---	---	---	---	---	---	---	---
17	13.0	9.7	11.1	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	12.1	11.3	11.8	12.2	8.8	10.3
2	---	---	---	---	---	---	---	---	---	10.9	9.8	10.4
3	---	---	---	---	---	---	---	---	---	11.1	10.2	10.6
4	---	---	---	---	---	---	11.7	10.4	11.2	12.2	10.2	11.0
5	---	---	---	---	---	---	12.1	11.0	11.6	11.8	10.2	11.1
6	---	---	---	---	---	---	12.5	11.9	12.3	11.9	10.4	11.1
7	---	---	---	---	---	---	12.6	11.9	12.4	11.1	10.3	10.7
8	---	---	---	---	---	---	13.2	12.3	12.8	11.5	10.6	11.0
9	---	---	---	---	---	---	13.0	12.2	12.6	11.7	9.9	11.1
10	---	---	---	---	---	---	12.7	11.6	12.3	11.2	9.9	10.8
11	---	---	---	---	---	---	12.5	10.9	11.6	10.7	10.2	10.5
12	---	---	---	---	---	---	12.0	10.7	11.2	11.2	10.1	10.6
13	---	---	---	---	---	---	12.2	10.6	11.2	11.9	10.9	11.4
14	---	---	---	---	---	---	12.1	10.7	11.1	12.5	11.4	11.8
15	---	---	---	---	---	---	11.3	10.5	10.8	11.7	11.0	11.3
16	---	---	---	---	---	---	11.3	10.3	10.7	11.6	11.0	11.3
17	---	---	---	---	---	---	11.4	10.0	10.8	11.9	10.8	11.3
18	---	---	---	---	---	---	11.7	10.1	10.8	12.1	10.7	11.3
19	---	---	---	---	---	---	13.3	10.2	11.3	12.1	10.5	11.2
20	---	---	---	---	---	---	12.3	9.8	10.8	11.1	10.3	10.6
21	---	---	---	---	---	---	12.3	10.1	10.8	12.4	10.2	10.9
22	---	---	---	---	---	---	11.9	10.5	11.1	---	---	---
23	---	---	---	---	---	---	11.9	10.6	11.2	---	---	---
24	---	---	---	---	---	---	12.7	10.9	11.8	9.9	8.4	9.1
25	---	---	---	---	---	---	12.7	11.4	11.9	12.2	8.3	9.4
26	---	---	---	12.0	11.5	11.8	12.8	10.9	11.7	10.6	8.6	9.3
27	---	---	---	12.2	11.2	11.7	12.5	10.7	11.4	11.0	8.8	9.4
28	---	---	---	11.8	11.0	11.4	12.5	10.1	11.2	11.5	8.4	9.5
29	---	---	---	11.3	10.8	11.1	12.3	10.1	11.0	11.2	8.1	9.2
30	---	---	---	11.4	10.4	10.9	12.4	8.3	10.4	10.2	7.7	8.7
31	---	---	---	12.1	10.9	11.4	---	---	---	9.1	8.0	8.6
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174500 HURON RIVER AT ANN ARBOR, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	9.8	8.2	8.8	9.3	6.9	7.9	10.4	4.9	6.7	8.0	6.4	7.2
2	9.9	8.3	8.8	9.5	6.9	7.9	9.4	5.3	6.7	9.5	6.7	7.7
3	9.5	8.5	8.9	9.5	6.6	7.9	9.4	5.2	6.7	11.0	6.5	8.0
4	9.4	8.7	9.1	9.2	6.5	7.4	9.7	5.3	6.6	10.6	6.4	7.9
5	10.0	8.8	9.2	8.7	6.7	7.3	8.7	5.3	6.6	11.2	6.7	8.1
6	10.1	8.7	9.3	8.6	6.4	7.3	9.8	5.2	7.0	11.7	6.6	8.3
7	10.1	8.9	9.4	7.9	6.0	7.0	10.3	5.8	7.4	11.3	6.6	8.2
8	10.0	8.1	9.2	8.2	6.1	6.9	9.7	5.5	7.2	11.3	6.6	8.2
9	10.4	8.3	9.1	8.5	6.4	7.1	10.7	5.6	7.4	10.5	6.6	8.1
10	9.5	8.1	8.6	---	---	---	9.8	5.6	7.1	13.7	6.2	8.5
11	9.4	7.6	8.4	---	---	---	10.0	5.6	6.8	12.7	5.7	7.9
12	8.4	7.6	7.9	6.8	5.0	6.0	9.9	5.5	7.0	11.7	5.6	7.7
13	8.8	7.6	8.0	5.8	5.0	5.3	9.1	5.5	6.9	12.0	5.8	7.7
14	9.2	7.6	8.3	---	---	---	11.0	5.4	7.4	11.1	5.5	7.2
15	10.3	8.2	9.0	---	---	---	9.0	6.0	7.1	10.3	5.6	7.2
16	10.0	7.8	8.7	---	---	---	8.9	6.0	6.9	10.9	6.0	7.8
17	8.9	7.6	8.0	---	---	---	9.1	6.1	7.1	10.2	5.7	7.8
18	8.9	7.0	7.9	---	---	---	9.6	6.1	7.4	12.0	6.0	8.1
19	8.8	7.2	7.8	8.8	5.1	7.0	9.8	6.0	7.4	11.0	6.3	7.4
20	9.1	7.6	8.2	8.5	4.6	6.6	9.9	5.9	7.5	12.0	6.5	8.2
21	9.6	7.9	8.4	---	---	---	10.2	5.7	7.6	11.1	6.7	8.2
22	9.2	7.7	8.2	---	---	---	8.2	5.0	6.9	8.1	6.8	7.4
23	9.2	7.6	8.2	8.8	6.1	7.3	8.9	6.2	7.3	9.2	7.3	8.0
24	9.2	7.5	8.2	9.2	5.9	7.2	8.7	6.6	7.4	---	---	---
25	9.1	7.2	8.1	9.1	5.6	7.2	9.9	6.2	7.6	10.2	7.8	8.6
26	9.0	7.0	7.6	9.4	5.8	7.1	9.3	6.2	7.3	9.7	8.3	8.8
27	10.0	7.0	7.8	8.9	5.3	6.8	9.6	6.2	7.5	9.8	8.3	8.9
28	9.0	7.0	7.7	9.0	5.3	6.8	9.5	6.2	7.5	9.8	8.6	9.0
29	8.8	7.1	7.8	9.4	5.5	7.0	8.5	6.1	7.0	10.4	8.7	9.2
30	9.4	7.0	8.1	10.3	5.6	7.4	10.0	6.4	7.6	10.1	9.0	9.5
31	---	---	---	11.7	4.6	7.7	10.3	6.4	7.7	---	---	---
MONTH	10.4	7.0	8.4	---	---	---	11.0	4.9	7.2	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174518 MALLETTS 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 mi^2.

WATER-DISCHARGE RECORDS

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.--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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	2.6	1.8	4.7	e2.1	1.6	4.7	38	7.0	2.2	9.2	34
2	3.7	2.8	1.8	3.4	e2.4	1.6	3.9	36	4.2	2.0	21	11
3	4.6	2.8	1.9	3.5	e3.0	1.3	3.2	8.4	3.3	1.9	4.4	4.7
4	17	3.1	1.8	3.3	e8.7	1.8	66	5.6	8.0	8.8	12	3.2
5	13	3.7	1.8	3.1	e5.2	2.4	66	44	5.1	4.6	16	2.6
6	4.0	4.5	1.8	3.3	4.3	2.2	8.8	13	3.4	3.2	15	2.4
7	3.3	3.2	1.8	3.1	2.4	1.8	6.8	14	3.0	33	3.4	2.3
8	2.7	2.8	1.7	4.1	1.9	21	7.6	8.3	17	5.4	2.5	2.3
9	2.7	2.7	1.6	5.4	1.9	16	8.3	43	6.5	5.6	2.1	2.2
10	2.6	61	1.7	4.0	1.9	4.6	8.4	47	3.6	3.2	1.9	2.3
11	2.5	18	1.8	2.8	1.8	3.4	5.5	13	3.6	2.9	2.9	2.2
12	2.5	4.8	1.9	e2.3	1.7	8.8	4.4	18	17	2.2	35	2.1
13	3.2	3.4	2.1	e2.2	1.7	12	3.7	6.5	7.7	1.9	20	2.0
14	2.4	3.0	2.3	e2.1	2.0	9.5	3.3	4.4	3.7	1.9	4.4	2.0
15	2.4	6.2	2.2	e2.0	1.7	32	3.3	14	2.7	1.9	51	5.6
16	2.7	3.1	2.1	e1.9	1.6	45	2.8	5.4	2.2	1.8	20	2.5
17	2.3	2.3	2.2	e1.8	1.9	26	3.7	3.7	3.2	1.8	4.9	1.8
18	2.3	2.0	4.9	e1.7	2.1	12	8.0	3.0	3.1	1.8	e3.9	1.6
19	21	4.2	22	e1.7	2.7	7.6	4.6	2.5	28	1.7	e3.2	2.6
20	3.9	3.2	28	e1.7	2.8	22	20	3.6	3.9	1.7	e2.5	1.7
21	2.7	7.1	6.4	e1.7	2.6	26	14	2.3	2.7	58	25	1.6
22	2.5	19	4.1	e1.7	2.5	8.7	5.3	2.1	2.3	12	44	68
23	2.4	4.5	3.4	e1.7	2.5	6.1	4.0	2.0	2.1	3.4	5.4	13
24	2.2	3.1	2.8	e1.7	1.9	5.0	3.5	2.0	2.0	2.3	3.0	27
25	4.5	2.6	e2.7	e1.8	1.6	7.6	3.4	1.9	2.0	1.9	2.5	30
26	6.1	2.3	e2.6	e1.8	1.5	5.0	3.1	1.8	2.0	1.9	38	6.9
27	3.1	2.2	2.6	e1.8	1.5	3.6	2.8	4.8	1.9	5.7	6.4	27
28	2.5	2.0	2.5	e1.8	1.6	20	2.8	8.0	3.4	2.2	3.3	5.1
29	2.2	2.0	2.5	e1.8	---	43	2.6	9.4	3.9	1.9	5.7	3.4
30	2.4	2.0	4.1	e1.8	---	7.5	9.8	4.1	2.8	1.8	4.1	2.6
31	2.3	---	10	e1.9	---	5.4	---	50	---	1.8	2.5	---
TOTAL	134.1	186.2	130.9	77.6	69.5	370.5	294.3	419.8	161.3	182.4	375.2	275.7
MEAN	4.33	6.21	4.22	2.50	2.48	12.0	9.81	13.5	5.38	5.88	12.1	9.19
MAX	21	61	28	5.4	8.7	45	66	50	28	58	51	68
MIN	2.2	2.0	1.6	1.7	1.5	1.3	2.6	1.8	1.9	1.7	1.9	1.6
CFSM	0.40	0.57	0.39	0.23	0.23	1.10	0.90	1.24	0.49	0.54	1.11	0.84
IN.	0.46	0.64	0.45	0.26	0.24	1.26	1.00	1.43	0.55	0.62	1.28	0.94

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1999 - 2003, BY WATER YEAR (WY)

MEAN	9.74	5.24	6.57	4.74	12.4	7.92	12.8	12.8	11.6	7.49	9.25	8.26
MAX	21.9	6.92	9.19	6.61	24.6	12.0	18.3	15.9	27.6	13.1	15.6	10.9
(WY)	2002	2002	2000	2002	2001	2003	1999	2000	2000	2000	2000	2000
MIN	4.33	3.64	4.22	2.50	2.48	3.84	9.81	8.25	3.44	4.53	5.21	5.42
(WY)	2003	2000	2003	2003	2003	2000	2003	1999	2002	2001	1999	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1999 - 2003	
ANNUAL TOTAL	2805.3		2677.5			
ANNUAL MEAN	7.69		7.34		9.17	
HIGHEST ANNUAL MEAN					10.3	2000
LOWEST ANNUAL MEAN					7.34	2003
HIGHEST DAILY MEAN	119	May 12	68	Sep 22	410	Jun 25 2000
LOWEST DAILY MEAN	1.6	Sep 13	1.3	Mar 3	1.3	Sep 27 1999
ANNUAL SEVEN-DAY MINIMUM	1.7	Dec 4	1.5	Feb 25	1.5	Jan 25 2000
MAXIMUM PEAK FLOW			421	Aug 21	(a)1560	Jun 25 2000
MAXIMUM PEAK STAGE			5.96	Aug 21	9.32	Jun 25 2000
INSTANTANEOUS LOW FLOW			1.1	Mar 3	1.1	(b)
ANNUAL RUNOFF (CFSM)	0.71		0.67		0.84	
ANNUAL RUNOFF (INCHES)	9.57		9.14		11.43	
10 PERCENT EXCEEDS	16		20		21	
50 PERCENT EXCEEDS	3.8		3.1		3.7	
90 PERCENT EXCEEDS	2.0		1.8		2.0	

(a) From rating curve extended above 300 ft^3/s on basis of contracted-opening measurement of peak flow.
(b) Sept. 26, 27, 1999, Mar. 3, 2003.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04174518 MALLETTS CREEK AT ANN ARBOR, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 2000 to 2003 (discontinued).

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: April 2000 to September 2003.
pH: March 2000 to September 2003.
WATER TEMPERATURE: March 2000 to September 2003.
DISSOLVED OXYGEN: March 2000 to September 2003.

INSTRUMENTATION.--Water-quality monitor telemeter, set for 15 minute measurement interval, not operated during winter months.

REMARKS.--Interruptions in the water-quality record were due to malfunction of the instrument. Specific conductance records rated good except the following periods: June 1-2, rated fair; May 30-31, July 7, Sept. 22, rated poor. pH records rated good. Water temperature records rated good. Dissolved oxygen records rated good except for the following periods: Oct. 19, May 6-13, 16, 25, Aug. 9-10, rated fair; Oct. 20-25, May 14-15, 17-18, 26-28, Aug. 11, 17-18, rated poor.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum recorded during period of operation, 2,680 microsiemens, Apr. 10, 2000; minimum recorded, 201 microsiemens, Sept. 11, 2000.
pH: Maximum recorded during period of operation, 8.7 std. units, Apr. 15, 2002; minimum recorded, 7.3 std. units, Nov. 7, 8, 2002, July 4, 5, 2003.
WATER TEMPERATURE: Maximum recorded during period of operation, 27.0°C, Aug. 8, 2001, Aug. 4, 2002; minimum recorded, 1.5°C, Apr. 7, 2003.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 17.1 mg/L, Oct. 17, 2002; minimum recorded, 0.8 mg/L, May 15, 16, 2000.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum recorded during period of operation, 2,600 microsiemens, Apr. 17; minimum recorded, 239 microsiemens, Sept. 22.
pH: Maximum recorded during period of operation, 8.5 std. units, Apr. 19, 24, May 3, 4; minimum recorded, 7.3 std. units, Nov. 7, 8, July 4, 5.
WATER TEMPERATURE: Maximum recorded during period of operation, 25.5°C, July 4; minimum recorded, 1.5°C, Apr. 7.
DISSOLVED OXYGEN: Maximum recorded during period of operation, 17.1 mg/L, Oct. 17; minimum recorded, 3.0 mg/L, July 5.

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	1210	1110	1160	1310	1290	1300	---	---	---	---	---	---
2	1430	1010	1290	1310	1280	1290	---	---	---	---	---	---
3	1380	1060	1270	1330	1310	1320	---	---	---	---	---	---
4	1170	455	1010	1360	1320	1340	---	---	---	---	---	---
5	957	633	868	1360	1110	1340	---	---	---	---	---	---
6	1060	957	1000	1390	1110	1300	---	---	---	---	---	---
7	1160	1060	1130	1380	1130	1200	---	---	---	---	---	---
8	1270	1160	1230	1180	1120	1150	---	---	---	---	---	---
9	1300	1260	1280	1220	1180	1200	---	---	---	---	---	---
10	1380	1290	1340	1220	345	661	---	---	---	---	---	---
11	1420	1380	1410	763	551	699	---	---	---	---	---	---
12	1450	1420	1430	882	763	830	---	---	---	---	---	---
13	1450	1330	1420	980	882	936	---	---	---	---	---	---
14	1450	1360	1430	1030	838	964	---	---	---	---	---	---
15	1360	1310	1320	1030	833	937	---	---	---	---	---	---
16	1360	1310	1350	933	829	873	---	---	---	---	---	---
17	1450	1290	1380	1040	933	993	---	---	---	---	---	---
18	1450	1380	1430	1100	1040	1070	---	---	---	---	---	---
19	1380	406	740	1160	933	1080	---	---	---	---	---	---
20	989	820	915	1130	1020	1030	---	---	---	---	---	---
21	1120	989	1050	---	---	---	---	---	---	---	---	---
22	1170	1100	1130	---	---	---	---	---	---	---	---	---
23	1210	1170	1190	---	---	---	---	---	---	---	---	---
24	1270	1160	1220	---	---	---	---	---	---	---	---	---
25	1300	810	1230	---	---	---	---	---	---	---	---	---
26	1250	785	937	---	---	---	---	---	---	---	---	---
27	1020	901	974	---	---	---	---	---	---	---	---	---
28	1140	1020	1080	---	---	---	---	---	---	---	---	---
29	1190	1140	1160	---	---	---	---	---	---	---	---	---
30	1280	1190	1230	---	---	---	---	---	---	---	---	---
31	1320	1280	1310	---	---	---	---	---	---	---	---	---
MONTH	1450	406	1190	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174518 MALLETTS CREEK AT ANN ARBOR, MI--Continued

SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	---	---	---	1690	551	1380
2	---	---	---	---	---	---	---	---	---	1570	545	1400
3	---	---	---	---	---	---	---	---	---	1570	1520	1540
4	---	---	---	---	---	---	2220	606	1640	1600	1550	1570
5	---	---	---	---	---	---	1630	514	1060	1600	601	1240
6	---	---	---	---	---	---	1190	1150	1170	1420	1310	1360
7	---	---	---	---	---	---	2210	1180	1460	1440	858	1240
8	---	---	---	---	---	---	2260	1660	1960	1400	1020	1320
9	---	---	---	---	---	---	2120	1460	1820	1410	429	1120
10	---	---	---	---	---	---	---	---	---	1230	543	1010
11	---	---	---	---	---	---	---	---	---	1240	1120	1170
12	---	---	---	---	---	---	---	---	---	1220	753	1060
13	---	---	---	---	---	---	---	---	---	1360	1220	1300
14	---	---	---	---	---	---	---	---	---	1420	1360	1380
15	---	---	---	---	---	---	2280	2210	2250	1440	871	1190
16	---	---	---	---	---	---	2260	2100	2210	1410	1270	1350
17	---	---	---	---	---	---	2600	2120	2260	1480	1410	1440
18	---	---	---	---	---	---	2390	1890	2130	1490	1460	1480
19	---	---	---	---	---	---	2370	1980	2260	1510	1470	1500
20	---	---	---	---	---	---	2370	552	1870	1610	1410	1500
21	---	---	---	---	---	---	---	---	---	1530	1440	1460
22	---	---	---	---	---	---	---	---	---	1520	1450	1500
23	---	---	---	---	---	---	2040	1910	1990	1570	1510	1540
24	---	---	---	---	---	---	1980	1880	1930	1580	1540	1570
25	---	---	---	---	---	---	1900	1810	1870	1600	1570	1590
26	---	---	---	---	---	---	1870	1780	1830	1600	1580	1600
27	---	---	---	---	---	---	1840	1740	1800	1610	1270	1550
28	---	---	---	---	---	---	1810	1720	1770	1660	972	1420
29	---	---	---	---	---	---	1780	1680	1740	1630	1200	1460
30	---	---	---	---	---	---	1760	903	1590	1560	1480	1550
31	---	---	---	---	---	---	---	---	---	1520	552	1100
MONTH	---	---	---	---	---	---	---	---	---	1690	429	1380

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	1390	1340	1360	1460	1340	1390	1410	683	1260	1120	425	754
2	1450	1390	1420	1520	1440	1480	1110	429	924	967	763	842
3	1480	1300	1420	1590	1500	1550	1180	829	1140	1070	967	1020
4	1480	1050	1340	1610	740	1360	1140	794	928	1150	1070	1120
5	1440	1130	1360	1490	783	1240	1070	459	918	1250	1140	1210
6	1500	1440	1480	1560	1480	1510	1000	496	890	1300	1230	1270
7	1560	1490	1530	1550	414	1090	1090	1000	1050	1340	1280	1310
8	1570	641	1250	1330	1280	1310	1200	1090	1160	1380	1310	1350
9	1420	1170	1340	1330	1210	1280	1270	1190	1230	1390	1360	1380
10	1500	1400	1460	1330	1220	1290	1330	1260	1290	1480	1370	1400
11	1570	1480	1530	1380	1320	1350	1430	1330	1350	1480	1400	1430
12	1560	646	1180	1420	1380	1410	---	---	---	1400	1370	1380
13	1390	1120	1320	1410	1390	1400	---	---	---	1380	1360	1370
14	1470	1390	1440	1450	1390	1420	---	---	---	1390	1340	1370
15	1550	1450	1510	1490	1400	1450	---	---	---	1360	855	1180
16	1610	1530	1580	1500	1460	1480	722	599	665	1120	880	939
17	1600	1360	1500	1530	1470	1500	860	722	789	1100	907	1000
18	1530	1350	1490	1520	1500	1510	---	---	---	1200	1090	1160
19	1360	578	1130	1520	1480	1500	---	---	---	1260	1100	1220
20	1410	1360	1390	1510	1490	1500	---	---	---	1380	1250	1340
21	1480	1410	1450	1500	343	735	---	---	---	1380	1230	1300
22	1530	1470	1500	1080	904	998	---	---	---	1250	239	783
23	1560	1520	1540	1160	1080	1110	944	793	873	892	790	840
24	1590	1520	1550	1240	1150	1200	1040	944	997	994	257	823
25	1610	1580	1600	1290	1220	1260	1150	1040	1100	736	423	644
26	1640	1600	1620	1350	1270	1320	1080	322	601	892	488	815
27	1650	1560	1640	1380	741	1300	967	800	886	778	330	604
28	1650	1140	1560	1230	916	995	1060	967	1000	937	750	853
29	1610	1240	1490	998	898	928	1200	843	1080	1060	937	1000
30	1470	1240	1390	1240	998	1130	1040	810	926	1150	1060	1110
31	---	---	---	1360	1240	1310	1120	1030	1080	---	---	---
MONTH	1650	578	1450	1610	343	1300	---	---	---	1480	239	1090

STREAMS TRIBUTARY TO LAKE ERIE

04174518 MALLETTS CREEK AT ANN ARBOR, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	7.9	7.8	7.9	8.0	7.8	7.9	---	---	---	---	---	---
2	7.9	7.7	7.9	7.9	7.8	7.9	---	---	---	---	---	---
3	7.9	7.7	7.8	8.0	7.8	7.9	---	---	---	---	---	---
4	7.8	7.5	7.6	8.0	7.8	7.9	---	---	---	---	---	---
5	7.7	7.5	7.7	7.9	7.7	7.8	---	---	---	---	---	---
6	7.8	7.7	7.7	7.9	7.5	7.7	---	---	---	---	---	---
7	8.0	7.7	7.9	7.8	7.3	7.5	---	---	---	---	---	---
8	8.0	7.8	7.9	7.4	7.3	7.4	---	---	---	---	---	---
9	8.1	7.9	8.0	7.5	7.4	7.5	---	---	---	---	---	---
10	8.0	7.9	7.9	7.8	7.4	7.6	---	---	---	---	---	---
11	8.1	7.9	8.0	7.7	7.6	7.7	---	---	---	---	---	---
12	8.1	7.9	8.0	7.9	7.7	7.8	---	---	---	---	---	---
13	8.0	7.8	7.9	7.9	7.7	7.8	---	---	---	---	---	---
14	8.0	7.9	7.9	8.0	7.7	7.8	---	---	---	---	---	---
15	8.1	7.9	7.9	7.9	7.6	7.8	---	---	---	---	---	---
16	8.1	7.9	8.0	7.9	7.6	7.7	---	---	---	---	---	---
17	8.1	8.0	8.0	7.9	7.7	7.8	---	---	---	---	---	---
18	8.1	8.0	8.0	8.1	7.8	7.9	---	---	---	---	---	---
19	8.0	7.6	7.8	8.0	7.8	7.9	---	---	---	---	---	---
20	7.8	7.6	7.8	7.8	7.7	7.8	---	---	---	---	---	---
21	7.9	7.7	7.8	---	---	---	---	---	---	---	---	---
22	8.1	7.8	7.9	---	---	---	---	---	---	---	---	---
23	8.1	7.9	8.0	---	---	---	---	---	---	---	---	---
24	8.0	7.9	8.0	---	---	---	---	---	---	---	---	---
25	8.0	7.9	8.0	---	---	---	---	---	---	---	---	---
26	8.0	7.6	7.7	---	---	---	---	---	---	---	---	---
27	7.8	7.6	7.7	---	---	---	---	---	---	---	---	---
28	7.9	7.7	7.8	---	---	---	---	---	---	---	---	---
29	7.9	7.8	7.8	---	---	---	---	---	---	---	---	---
30	8.0	7.8	7.9	---	---	---	---	---	---	---	---	---
31	8.1	7.9	8.0	---	---	---	---	---	---	---	---	---
MONTH	8.1	7.5	7.9	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	---	---	---	8.2	7.5	7.9
2	---	---	---	---	---	---	---	---	---	8.2	7.5	8.0
3	---	---	---	---	---	---	---	---	---	8.5	8.0	8.2
4	---	---	---	---	---	---	8.2	7.9	8.1	8.5	8.0	8.2
5	---	---	---	---	---	---	8.1	7.4	7.9	8.1	7.8	8.0
6	---	---	---	---	---	---	8.2	8.1	8.2	8.4	7.9	8.1
7	---	---	---	---	---	---	8.2	8.1	8.2	8.1	7.8	8.0
8	---	---	---	---	---	---	8.2	8.1	8.2	8.3	7.8	8.1
9	---	---	---	---	---	---	8.3	8.1	8.2	8.1	7.8	8.0
10	---	---	---	---	---	---	8.4	8.1	8.2	8.0	7.8	7.9
11	---	---	---	---	---	---	8.4	8.2	8.3	8.1	7.9	8.0
12	---	---	---	---	---	---	8.4	8.1	8.3	8.1	7.8	8.0
13	---	---	---	---	---	---	8.4	8.1	8.3	8.2	8.0	8.1
14	---	---	---	---	---	---	8.4	8.1	8.2	8.2	8.0	8.1
15	---	---	---	---	---	---	8.4	8.0	8.1	8.0	7.9	8.0
16	---	---	---	---	---	---	8.4	7.9	8.1	8.2	8.0	8.1
17	---	---	---	---	---	---	8.2	7.9	8.1	8.3	8.0	8.2
18	---	---	---	---	---	---	8.1	7.8	8.0	8.2	8.0	8.1
19	---	---	---	---	---	---	8.5	7.8	8.1	8.2	8.0	8.1
20	---	---	---	---	---	---	---	---	---	8.0	7.9	8.0
21	---	---	---	---	---	---	---	---	---	8.0	7.9	7.9
22	---	---	---	---	---	---	---	---	---	8.0	7.9	7.9
23	---	---	---	---	---	---	8.4	8.0	8.2	8.2	7.9	8.1
24	---	---	---	---	---	---	8.5	8.0	8.2	8.2	8.1	8.1
25	---	---	---	---	---	---	8.4	8.0	8.2	8.2	8.1	8.1
26	---	---	---	---	---	---	8.4	8.0	8.2	8.2	8.1	8.2
27	---	---	---	---	---	---	8.4	7.8	8.1	8.2	8.0	8.1
28	---	---	---	---	---	---	8.4	7.8	8.1	8.2	7.8	8.0
29	---	---	---	---	---	---	8.4	7.8	8.1	8.2	7.9	8.0
30	---	---	---	---	---	---	8.2	7.8	8.0	8.1	7.9	8.0
31	---	---	---	---	---	---	---	---	---	8.0	7.8	7.9
MONTH	---	---	---	---	---	---	---	---	---	8.5	7.5	8.0

STREAMS TRIBUTARY TO LAKE ERIE

04174518 MALLETTS CREEK AT ANN ARBOR, MI--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	8.1	8.0	8.0	7.9	7.8	7.8	8.0	7.5	7.9	---	---	---
2	8.1	8.0	8.0	8.0	7.8	7.9	7.8	7.5	7.7	---	---	---
3	8.1	7.9	8.0	8.0	7.9	7.9	7.8	7.7	7.8	8.0	7.8	7.9
4	8.0	7.9	8.0	8.0	7.3	7.8	7.8	7.6	7.7	8.0	7.9	7.9
5	8.0	7.9	8.0	7.7	7.3	7.5	7.8	7.6	7.7	8.0	7.9	8.0
6	8.0	7.9	8.0	7.8	7.7	7.7	7.9	7.6	7.7	8.0	7.9	8.0
7	8.0	7.9	8.0	7.8	7.5	7.8	7.8	7.7	7.8	8.0	7.9	8.0
8	8.0	7.7	7.9	7.8	7.7	7.8	7.9	7.8	7.9	8.1	7.9	8.0
9	8.0	7.8	7.9	7.8	7.7	7.8	8.0	7.8	7.9	8.1	8.0	8.0
10	8.0	7.8	7.9	7.9	7.7	7.8	8.0	7.9	8.0	8.1	8.0	8.0
11	8.0	7.9	8.0	7.9	7.8	7.8	8.0	7.9	8.0	8.1	8.0	8.0
12	8.0	7.7	7.9	8.0	7.8	7.9	---	---	---	8.1	8.0	8.0
13	8.0	7.8	7.9	8.0	7.9	7.9	---	---	---	8.1	8.0	8.0
14	8.0	7.8	7.9	8.0	7.9	7.9	---	---	---	8.0	7.9	8.0
15	8.0	7.7	7.9	8.0	7.9	7.9	---	---	---	8.0	7.7	7.8
16	8.0	7.8	8.0	8.0	7.9	8.0	7.8	7.7	7.8	7.8	7.6	7.7
17	8.0	7.8	8.0	8.1	8.0	8.0	7.9	7.8	7.8	7.9	7.7	7.8
18	8.1	7.9	8.0	8.1	8.0	8.0	---	---	---	7.9	7.7	7.8
19	8.0	7.7	7.9	8.1	8.0	8.0	---	---	---	7.9	7.8	7.8
20	8.0	7.9	7.9	8.1	8.0	8.0	---	---	---	8.0	7.8	7.9
21	8.0	7.9	7.9	8.0	7.6	7.7	---	---	---	8.0	7.8	7.9
22	8.0	7.9	7.9	7.9	7.7	7.8	---	---	---	7.9	7.5	7.7
23	8.1	7.9	8.0	7.9	7.8	7.8	7.9	7.8	7.9	7.8	7.7	7.8
24	8.1	7.9	8.0	8.0	7.8	7.9	8.0	7.9	7.9	8.0	7.6	7.9
25	8.1	8.0	8.0	8.0	7.8	7.9	8.0	7.9	7.9	7.9	7.7	7.8
26	8.1	8.0	8.0	8.0	7.9	8.0	7.9	7.6	7.7	8.0	7.8	7.9
27	8.1	8.0	8.0	8.0	7.7	7.9	7.9	7.7	7.8	7.9	7.7	7.8
28	8.1	7.7	8.0	7.8	7.6	7.6	7.9	7.8	7.8	8.0	7.8	7.9
29	8.0	7.8	7.9	7.8	7.6	7.7	7.9	7.7	7.8	8.0	7.9	8.0
30	7.9	7.8	7.8	7.9	7.7	7.8	7.9	7.7	7.8	8.1	8.0	8.0
31	---	---	---	8.0	7.9	7.9	7.9	7.8	7.9	---	---	---
MONTH	8.1	7.7	8.0	8.1	7.3	7.8	---	---	---	---	---	---

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	20.0	17.5	19.0	6.5	5.0	6.0	---	---	---	---	---	---
2	20.5	19.5	20.0	5.5	4.5	5.0	---	---	---	---	---	---
3	20.5	17.5	18.5	6.0	4.0	5.0	---	---	---	---	---	---
4	20.0	17.5	18.5	7.0	5.0	6.0	---	---	---	---	---	---
5	19.0	15.5	17.0	6.5	4.5	5.0	---	---	---	---	---	---
6	16.0	14.0	15.0	6.5	6.0	6.5	---	---	---	---	---	---
7	15.5	12.0	13.5	7.5	6.0	6.5	---	---	---	---	---	---
8	13.0	11.0	12.0	8.5	6.5	7.5	---	---	---	---	---	---
9	13.0	11.0	12.0	10.0	7.5	8.5	---	---	---	---	---	---
10	13.5	11.5	12.5	13.0	10.0	11.5	---	---	---	---	---	---
11	14.0	12.0	13.0	12.0	10.0	11.0	---	---	---	---	---	---
12	15.0	13.0	14.0	10.0	8.0	9.0	---	---	---	---	---	---
13	15.0	11.0	13.5	8.0	6.5	7.5	---	---	---	---	---	---
14	11.0	9.0	10.0	9.5	7.0	8.5	---	---	---	---	---	---
15	10.5	8.5	9.5	9.0	6.0	7.5	---	---	---	---	---	---
16	10.5	8.5	10.0	6.0	4.5	5.5	---	---	---	---	---	---
17	8.5	7.0	8.0	4.5	3.5	4.5	---	---	---	---	---	---
18	9.0	7.5	8.0	4.5	2.5	3.5	---	---	---	---	---	---
19	11.5	9.0	10.5	6.5	4.5	5.5	---	---	---	---	---	---
20	10.0	8.5	9.0	8.0	6.0	7.0	---	---	---	---	---	---
21	8.5	6.5	7.5	---	---	---	---	---	---	---	---	---
22	10.0	8.0	9.0	---	---	---	---	---	---	---	---	---
23	9.5	8.0	8.5	---	---	---	---	---	---	---	---	---
24	8.0	7.0	7.5	---	---	---	---	---	---	---	---	---
25	9.0	6.5	7.5	---	---	---	---	---	---	---	---	---
26	10.0	8.5	9.5	---	---	---	---	---	---	---	---	---
27	9.0	8.5	8.5	---	---	---	---	---	---	---	---	---
28	9.0	7.5	8.5	---	---	---	---	---	---	---	---	---
29	8.0	6.5	6.5	---	---	---	---	---	---	---	---	---
30	7.5	6.0	6.5	---	---	---	---	---	---	---	---	---
31	6.5	5.0	6.0	---	---	---	---	---	---	---	---	---
MONTH	20.5	5.0	11.3	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174518 MALLETTS CREEK AT ANN ARBOR, MI--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	---	---	---	17.0	13.0	15.0
2	---	---	---	---	---	---	---	---	---	14.5	12.5	13.5
3	---	---	---	---	---	---	---	---	---	14.5	10.5	12.5
4	---	---	---	---	---	---	8.0	3.0	5.5	16.0	10.5	13.0
5	---	---	---	---	---	---	5.5	3.0	4.0	15.5	12.0	13.5
6	---	---	---	---	---	---	6.0	2.5	4.0	17.5	13.0	15.0
7	---	---	---	---	---	---	5.0	1.5	3.0	16.0	13.0	14.0
8	---	---	---	---	---	---	3.5	2.5	3.0	14.5	12.5	13.5
9	---	---	---	---	---	---	8.0	2.5	5.0	16.5	11.5	14.0
10	---	---	---	---	---	---	9.5	4.0	7.0	16.5	14.0	15.5
11	---	---	---	---	---	---	12.5	6.5	9.0	16.0	13.0	15.0
12	---	---	---	---	---	---	13.5	8.5	10.5	13.0	11.0	11.5
13	---	---	---	---	---	---	13.5	7.0	10.0	14.5	10.5	12.5
14	---	---	---	---	---	---	15.5	7.5	11.5	16.5	12.0	14.0
15	---	---	---	---	---	---	18.0	11.0	14.5	14.0	13.0	13.5
16	---	---	---	---	---	---	15.5	11.5	13.5	14.0	12.5	13.5
17	---	---	---	---	---	---	11.5	8.0	10.0	17.5	13.5	15.0
18	---	---	---	---	---	---	10.5	9.0	10.0	18.0	14.5	16.0
19	---	---	---	---	---	---	16.0	10.0	12.5	18.5	15.0	16.5
20	---	---	---	---	---	---	16.0	12.0	13.5	17.5	14.5	16.5
21	---	---	---	---	---	---	13.0	10.0	11.5	16.0	12.5	14.0
22	---	---	---	---	---	---	10.0	8.0	9.5	16.0	11.0	13.5
23	---	---	---	---	---	---	13.0	6.5	9.5	14.0	11.5	13.0
24	---	---	---	---	---	---	14.0	7.5	10.5	13.0	12.0	12.5
25	---	---	---	---	---	---	13.5	8.5	11.5	14.5	11.5	13.0
26	---	---	---	---	---	---	15.0	8.5	11.5	14.5	12.0	13.0
27	---	---	---	---	---	---	16.0	8.5	12.5	16.0	12.0	13.5
28	---	---	---	---	---	---	17.5	11.0	14.5	19.0	14.0	15.5
29	---	---	---	---	---	---	17.0	12.0	14.5	18.5	16.0	17.0
30	---	---	---	---	---	---	14.5	12.5	13.5	18.0	16.0	17.0
31	---	---	---	---	---	---	---	---	---	17.0	14.5	15.5
MONTH	---	---	---	---	---	---	---	---	---	19.0	10.5	14.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	15.0	12.5	14.0	21.5	17.5	19.5	22.5	19.0	20.5	19.0	17.5	18.5
2	17.5	13.5	15.0	21.5	18.0	20.0	22.5	20.5	21.5	19.5	18.0	18.5
3	15.5	14.5	15.0	22.5	19.0	21.0	22.0	21.0	21.5	20.0	18.0	19.0
4	14.5	13.5	13.5	25.5	21.0	22.5	22.0	20.0	21.0	19.0	17.5	18.5
5	14.5	13.0	13.5	23.5	21.5	22.5	22.5	20.5	21.5	18.0	16.0	17.0
6	16.5	13.0	14.5	23.0	20.0	21.5	22.5	21.5	22.0	18.0	15.0	16.5
7	17.5	14.5	16.0	23.0	20.5	22.0	22.5	21.0	22.0	19.0	16.0	17.5
8	18.0	15.0	16.5	23.5	22.0	22.5	22.5	20.0	21.0	19.5	17.0	18.5
9	17.5	15.5	16.5	22.5	21.0	22.0	21.5	19.5	20.5	19.5	17.0	18.5
10	17.0	14.5	16.0	22.5	20.5	21.5	20.5	19.0	20.0	19.0	17.0	18.0
11	19.5	16.5	17.5	21.5	18.5	20.0	20.5	19.5	20.0	20.0	17.5	19.0
12	17.5	16.5	17.0	20.0	17.0	18.5	---	---	---	19.5	17.0	18.5
13	17.5	16.5	17.0	20.0	17.0	19.0	---	---	---	19.0	17.0	18.0
14	19.5	17.0	18.5	21.5	18.0	19.5	---	---	---	19.5	17.5	19.0
15	20.5	16.5	18.5	20.5	19.0	19.5	---	---	---	19.5	16.5	18.5
16	20.0	16.0	18.5	21.0	18.0	19.5	25.0	23.5	24.5	---	---	---
17	18.5	16.5	17.5	21.5	18.0	20.0	24.0	20.0	22.0	18.5	15.5	17.0
18	20.5	17.5	19.0	21.0	19.0	20.0	---	---	---	18.0	16.0	17.0
19	22.0	19.5	20.5	20.5	17.0	18.5	---	---	---	18.5	16.0	17.5
20	19.5	17.5	18.5	20.0	17.5	19.0	---	---	---	16.5	14.5	15.5
21	20.0	15.5	17.5	22.5	19.5	21.0	---	---	---	16.0	13.5	14.5
22	20.5	16.5	18.5	22.0	20.0	20.5	---	---	---	18.5	15.0	17.0
23	21.5	17.0	19.0	21.0	19.0	20.0	23.5	20.0	21.5	17.5	15.5	16.5
24	22.0	18.0	20.0	21.0	17.5	19.5	20.5	19.0	20.0	17.0	14.5	15.5
25	23.0	19.0	21.0	21.0	17.5	19.5	22.0	19.0	20.5	16.5	15.0	15.5
26	22.0	20.0	21.0	20.5	18.5	19.5	25.0	21.5	23.0	15.5	13.0	14.0
27	20.5	18.0	19.5	24.0	19.5	21.0	24.0	21.0	22.5	16.0	15.0	15.5
28	19.5	17.5	18.5	21.5	19.5	20.5	22.0	19.5	21.0	15.5	13.0	14.0
29	20.5	18.5	19.0	20.5	17.5	19.0	22.5	20.5	21.5	13.0	11.5	12.5
30	21.0	17.5	19.0	21.0	17.5	19.0	21.5	18.5	20.0	11.5	10.5	11.0
31	---	---	---	21.5	18.5	20.0	19.0	17.5	18.5	---	---	---
MONTH	23.0	12.5	17.5	25.5	17.0	20.3	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174518 MALLETTS CREEK AT ANN ARBOR, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	11.9	10.3	11.1	---	---	---	---	---	---	---	---	---
2	11.5	9.8	10.7	11.1	9.4	10.3	---	---	---	---	---	---
3	11.1	9.6	10.4	11.4	9.7	10.4	---	---	---	---	---	---
4	11.2	10.0	10.5	10.9	9.0	10.0	---	---	---	---	---	---
5	12.3	11.2	11.8	10.6	8.8	9.9	---	---	---	---	---	---
6	12.8	11.5	12.1	9.6	7.2	8.8	---	---	---	---	---	---
7	13.3	11.4	12.5	9.1	5.4	7.2	---	---	---	---	---	---
8	14.4	12.9	13.5	8.3	5.3	7.3	---	---	---	---	---	---
9	14.6	12.9	13.5	8.3	6.1	7.2	---	---	---	---	---	---
10	14.2	12.6	13.4	8.9	5.5	8.1	---	---	---	---	---	---
11	14.0	12.4	13.1	9.0	8.4	8.8	---	---	---	---	---	---
12	13.9	11.8	12.8	9.8	9.0	9.4	---	---	---	---	---	---
13	12.6	11.2	12.0	10.6	9.5	10.0	---	---	---	---	---	---
14	15.3	12.6	14.2	9.9	9.0	9.5	---	---	---	---	---	---
15	15.5	13.5	14.3	10.0	8.7	9.2	---	---	---	---	---	---
16	15.5	13.4	14.3	10.4	8.9	9.8	---	---	---	---	---	---
17	17.1	14.4	15.7	11.3	10.3	10.8	---	---	---	---	---	---
18	16.4	14.3	15.5	12.1	10.6	11.3	---	---	---	---	---	---
19	14.7	13.8	14.2	10.8	9.6	10.1	---	---	---	---	---	---
20	15.1	13.7	14.2	9.9	9.0	9.3	---	---	---	---	---	---
21	15.8	13.7	14.7	---	---	---	---	---	---	---	---	---
22	14.8	12.6	13.8	---	---	---	---	---	---	---	---	---
23	14.6	12.3	13.4	---	---	---	---	---	---	---	---	---
24	15.2	13.2	13.9	---	---	---	---	---	---	---	---	---
25	14.5	12.0	13.4	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	---	---	---	---	---	---	10.6	4.2	9.2
2	---	---	---	---	---	---	---	---	---	11.8	9.9	10.8
3	---	---	---	---	---	---	---	---	---	14.8	10.2	12.2
4	---	---	---	---	---	---	---	---	---	15.8	9.8	12.2
5	---	---	---	---	---	---	---	---	---	11.6	9.4	10.5
6	---	---	---	---	---	---	---	---	---	13.9	9.3	11.2
7	---	---	---	---	---	---	---	---	---	11.2	9.3	10.1
8	---	---	---	---	---	---	---	---	---	13.9	10.0	11.4
9	---	---	---	---	---	---	---	---	---	12.0	9.5	10.9
10	---	---	---	---	---	---	---	---	---	10.9	9.8	10.5
11	---	---	---	---	---	---	---	---	---	11.9	10.3	10.8
12	---	---	---	---	---	---	---	---	---	12.6	10.7	11.6
13	---	---	---	---	---	---	---	---	---	14.0	10.5	12.1
14	---	---	---	---	---	---	---	---	---	14.2	10.1	11.6
15	---	---	---	---	---	---	---	---	---	11.1	9.9	10.6
16	---	---	---	---	---	---	---	---	---	13.1	11.1	11.9
17	---	---	---	---	---	---	---	---	---	13.9	10.5	11.9
18	---	---	---	---	---	---	---	---	---	13.8	10.2	11.6
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	14.1	9.4	11.4	---	---	---
24	---	---	---	---	---	---	15.5	9.2	11.8	12.1	10.4	11.2
25	---	---	---	---	---	---	16.0	8.9	11.6	12.7	9.7	11.2
26	---	---	---	---	---	---	16.9	8.5	11.9	11.7	8.8	10.5
27	---	---	---	---	---	---	16.6	8.2	11.7	11.5	8.8	10.2
28	---	---	---	---	---	---	16.5	7.2	11.1	10.0	8.2	9.1
29	---	---	---	---	---	---	15.9	7.4	11.0	---	---	---
30	---	---	---	---	---	---	12.1	5.2	9.4	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04174518 MALLETTS CREEK AT ANN ARBOR, MI--Continued

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	8.0	6.6	7.2	8.9	7.1	7.8	8.8	7.7	8.5
2	---	---	---	8.2	6.5	7.3	8.8	7.7	8.3	---	---	---
3	8.9	8.2	8.6	8.2	6.3	7.1	8.1	7.3	7.8	8.6	7.9	8.2
4	9.4	8.4	8.9	7.4	3.3	6.1	8.8	7.4	8.1	8.6	7.9	8.2
5	9.6	9.0	9.3	6.3	3.0	5.0	8.6	6.9	8.0	8.9	8.0	8.5
6	9.4	7.8	8.8	6.7	5.3	6.2	8.7	7.5	8.3	9.2	8.1	8.6
7	8.8	7.5	8.2	7.9	6.0	7.4	8.1	7.0	7.6	9.0	7.5	8.4
8	8.7	7.5	8.1	7.2	5.7	6.8	8.3	6.9	7.5	8.9	7.3	8.2
9	9.1	8.0	8.5	7.5	6.5	6.9	8.3	7.1	7.7	8.8	7.5	8.3
10	8.8	7.8	8.2	7.1	5.8	6.5	8.4	7.0	7.7	9.1	7.7	8.4
11	8.5	7.3	7.9	7.6	6.4	7.0	8.3	6.7	7.5	8.8	7.1	8.0
12	8.6	7.3	8.2	8.3	6.6	7.6	---	---	---	8.7	7.0	8.1
13	9.1	8.0	8.6	8.2	6.8	7.6	---	---	---	8.8	7.3	8.0
14	8.5	7.2	7.9	8.2	6.4	7.4	---	---	---	8.4	6.8	7.6
15	8.4	7.1	7.7	7.8	6.7	7.2	---	---	---	---	---	---
16	8.8	7.2	7.9	8.3	5.4	7.2	---	---	---	---	---	---
17	8.8	7.0	7.9	8.1	5.4	7.1	7.5	6.4	7.0	8.5	7.1	7.8
18	8.6	6.8	7.8	---	---	---	---	---	---	8.7	7.0	7.9
19	8.7	7.5	8.2	---	---	---	---	---	---	8.0	7.1	7.5
20	9.1	7.5	8.3	---	---	---	---	---	---	9.0	7.4	8.2
21	---	---	---	---	---	---	---	---	---	9.0	7.5	8.2
22	---	---	---	8.6	7.7	8.1	---	---	---	8.4	6.8	8.0
23	---	---	---	8.5	7.7	8.1	7.8	7.0	7.5	8.6	8.2	8.4
24	8.3	6.6	7.4	8.9	7.6	8.3	8.1	7.2	7.7	9.0	8.2	8.5
25	8.0	6.4	7.1	8.9	7.6	8.2	7.8	6.8	7.4	8.7	7.8	8.4
26	7.8	6.5	7.1	8.8	7.6	8.2	7.6	6.8	7.1	8.6	7.9	8.3
27	8.5	7.0	7.6	8.5	6.8	7.8	7.3	6.9	7.0	8.6	7.9	8.3
28	8.3	6.3	7.4	7.1	5.6	6.4	8.0	7.0	7.4	8.7	7.8	8.4
29	7.8	6.6	7.2	7.6	6.1	6.9	7.6	7.0	7.2	9.0	8.5	8.7
30	7.9	6.6	7.2	8.6	7.0	7.6	8.1	7.2	7.6	9.7	8.8	9.3
31	---	---	---	8.7	6.9	7.8	8.4	7.4	8.0	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE ERIE

04175340 STONY CREEK AT OAKVILLE, MI

LOCATION (REVISED).--Lat 42°05'05", long 83°34'43", in NE1/4 NE1/4 sec.3, T.5 S., R.7 E., Monroe County, Hydrologic Unit 04100001, on right bank at upstream side of bridge on Tuttle Hill Road, 300 ft downstream from Paint Creek, and 0.2 mi northeast of Oakville.

DRAINAGE AREA.--68.0 mi^2.

PERIOD OF RECORD.--January 1970 to September 1981, October 2002 to September 2003 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 645 ft above sea level, from topographic map. Prior to July 31, 1970, nonrecording gage, and from August 1970 to September 1981 water-stage recorder at same site at different datum.

REMARKS.--Records fair except for estimated daily discharges, 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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	12	16	86	e18	e11	69	65	71	14	7.3	38
2	18	13	e17	58	e18	e11	59	173	41	13	41	73
3	24	14	e18	e50	e19	e11	51	108	29	12	25	43
4	24	13	e17	e44	e19	e11	80	66	26	12	16	28
5	40	14	e16	e38	e20	e11	324	121	29	15	23	21
6	31	16	e17	e34	e20	e12	252	146	23	14	102	18
7	22	17	e17	e31	e20	e13	120	75	19	51	53	16
8	19	15	e17	e29	e19	e14	88	77	19	44	27	14
9	18	14	e16	e40	e18	e17	93	155	25	46	89	14
10	17	24	e16	e49	e17	e21	137	312	19	29	41	13
11	16	96	e16	e38	e16	e26	86	292	30	24	30	12
12	16	64	e16	e27	e15	e40	67	164	154	20	67	12
13	16	35	e16	e21	e15	e50	54	99	282	15	49	12
14	16	24	e16	e17	e14	e76	46	67	150	13	28	12
15	17	23	e17	e16	e14	e150	41	60	89	12	86	14
16	17	27	e18	e16	e13	e270	36	65	64	13	168	15
17	17	22	e21	e16	e13	e350	31	52	52	11	76	12
18	18	18	e24	e15	e12	e320	34	41	55	9.6	41	12
19	23	17	65	e15	e12	e220	35	35	69	8.7	28	13
20	29	20	127	e14	e12	e150	34	38	60	8.2	21	14
21	21	18	96	e14	e11	e270	117	41	39	17	18	13
22	19	40	65	e14	e11	179	71	31	29	52	78	46
23	15	46	51	e14	e11	113	50	25	24	28	55	117
24	12	32	41	e15	e11	86	39	23	21	15	29	56
25	11	24	e35	e15	e11	106	34	22	18	11	20	142
26	15	21	e32	e15	e11	121	29	20	17	9.2	36	87
27	16	18	e31	e16	e11	80	25	20	16	9.0	39	134
28	13	17	e30	e16	e11	69	22	21	14	9.2	22	96
29	11	17	e29	e17	---	199	20	20	18	8.6	19	58
30	11	17	31	e17	---	138	21	17	17	7.6	21	43
31	12	---	89	e17	---	80	---	57	---	7.1	17	---
TOTAL	573	748	1033	824	412	3225	2165	2508	1519	558.2	1372.3	1198
MEAN	18.5	24.9	33.3	26.6	14.7	104	72.2	80.9	50.6	18.0	44.3	39.9
MAX	40	96	127	86	20	350	324	312	282	52	168	142
MIN	11	12	16	14	11	11	20	17	14	7.1	7.3	12
CFSM	0.27	0.37	0.49	0.39	0.22	1.53	1.06	1.19	0.74	0.26	0.65	0.59
IN.	0.31	0.41	0.57	0.45	0.23	1.76	1.18	1.37	0.83	0.31	0.75	0.66

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2003, BY WATER YEAR (WY)

MEAN	14.9	26.3	45.1	38.4	65.0	116	92.8	52.9	35.8	20.7	15.9	24.0
MAX	22.8	82.0	89.9	136	209	212	162	80.9	96.1	60.7	44.3	114
(WY)	1973	1973	1973	1974	1976	1978	1980	2003	1980	1981	2003	1981
MIN	9.07	7.89	12.5	9.95	10.8	51.5	33.7	16.0	15.8	5.27	4.01	7.32
(WY)	1972	1972	1977	1971	1972	1981	1971	1971	1971	1971	1971	1978

SUMMARY STATISTICS	FOR 2003 WATER YEAR		WATER YEARS 1970 - 2003	
ANNUAL TOTAL	16135.5			
ANNUAL MEAN	44.2		46.8	
HIGHEST ANNUAL MEAN			62.7	1974
LOWEST ANNUAL MEAN			24.8	1971
HIGHEST DAILY MEAN	350	Mar 17	805	Feb 19 1981
LOWEST DAILY MEAN	7.1	Jul 31	3.2	Aug 23 1971
ANNUAL SEVEN-DAY MINIMUM	8.3	Jul 26	3.4	Aug 20 1971
MAXIMUM PEAK FLOW	412	Mar 17	(a)865	Feb 19 1981
MAXIMUM PEAK STAGE	9.57	Mar 17	(b)9.57	Mar 17 2003
INSTANTANEOUS LOW FLOW	6.6	(c)	2.7	Aug 24 1971
ANNUAL RUNOFF (CFSM)	0.65		0.69	
ANNUAL RUNOFF (INCHES)	8.83		9.35	
10 PERCENT EXCEEDS	97		100	
50 PERCENT EXCEEDS	22		21	
90 PERCENT EXCEEDS	12		8.6	

(a) Gage height 8.25 ft, datum then in use.
(b) Present datum; peak stage at previous datum, 8.31 ft, Feb. 20, 1971, backwater from ice.
(c) July 30, 31.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04175352 NORTH BRANCH AMOS PALMER DRAIN NEAR OAKVILLE, MI

LOCATION.--Lat 42°03'27", long 83°32'59", in SE1/4 SW1/4 sec.12, T.5 S., R.7 E., Monroe County, Hydrologic Unit 04100001, at left upstream side of culvert on Grames Road, 2.5 mi southeast of Oakville.

DRAINAGE AREA.--Not determined.

PERIOD OF RECORD.--May 2002 to January 2003 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 640 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Prior to Dec. 23, 2002, flow regulated by London Aggregates located 2 mi upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 63 ft^3/s, May 12, 2002, gage height, 3.73 ft; minimum daily, 0.30 ft^3/s, Jan. 21-31, 2003.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	12	12	2.8	---	---	---	---	---	---	---	---
2	13	12	e12	e2.1	---	---	---	---	---	---	---	---
3	13	12	e13	2.2	---	---	---	---	---	---	---	---
4	13	12	e13	1.6	---	---	---	---	---	---	---	---
5	13	12	13	1.4	---	---	---	---	---	---	---	---
6	13	12	13	e1.3	---	---	---	---	---	---	---	---
7	12	12	13	e1.2	---	---	---	---	---	---	---	---
8	12	12	13	1.1	---	---	---	---	---	---	---	---
9	12	13	13	1.2	---	---	---	---	---	---	---	---
10	12	13	13	1.3	---	---	---	---	---	---	---	---
11	12	13	13	0.93	---	---	---	---	---	---	---	---
12	12	13	13	e0.65	---	---	---	---	---	---	---	---
13	12	13	13	e0.98	---	---	---	---	---	---	---	---
14	12	13	13	e0.39	---	---	---	---	---	---	---	---
15	12	13	13	0.31	---	---	---	---	---	---	---	---
16	12	12	13	0.31	---	---	---	---	---	---	---	---
17	12	12	13	e0.31	---	---	---	---	---	---	---	---
18	12	12	13	e0.31	---	---	---	---	---	---	---	---
19	12	13	14	e0.31	---	---	---	---	---	---	---	---
20	12	13	14	e0.31	---	---	---	---	---	---	---	---
21	12	13	14	e0.30	---	---	---	---	---	---	---	---
22	12	13	14	e0.30	---	---	---	---	---	---	---	---
23	12	13	13	e0.30	---	---	---	---	---	---	---	---
24	12	13	13	e0.30	---	---	---	---	---	---	---	---
25	12	13	12	e0.30	---	---	---	---	---	---	---	---
26	12	13	9.9	e0.30	---	---	---	---	---	---	---	---
27	12	13	8.0	e0.30	---	---	---	---	---	---	---	---
28	12	12	6.4	e0.30	---	---	---	---	---	---	---	---
29	12	12	5.0	e0.30	---	---	---	---	---	---	---	---
30	12	12	4.1	e0.30	---	---	---	---	---	---	---	---
31	12	---	3.9	e0.30	---	---	---	---	---	---	---	---
TOTAL	378	376	363.3	24.31	---	---	---	---	---	---	---	---
MEAN	12.2	12.5	11.7	0.78	---	---	---	---	---	---	---	---
MAX	13	13	14	2.8	---	---	---	---	---	---	---	---
MIN	12	12	3.9	0.30	---	---	---	---	---	---	---	---

(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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	19	36	65	e35	e24	147	87	82	20	12	18
2	22	20	35	56	e37	e24	134	135	72	18	16	23
3	23	19	48	55	e40	e24	122	131	65	17	19	24
4	24	18	46	e54	e41	e24	156	111	62	16	25	24
5	30	22	40	53	e44	e25	295	116	62	16	27	22
6	28	21	35	53	e43	e26	300	126	55	17	26	20
7	26	23	34	55	e42	e26	264	118	51	25	25	19
8	23	23	34	56	e40	e27	242	132	50	25	25	19
9	22	24	39	55	e37	e28	222	146	53	25	24	18
10	24	40	41	53	e36	e28	218	189	49	19	23	18
11	21	67	32	47	e36	e28	200	199	48	19	23	17
12	20	57	32	e44	e35	34	179	209	49	18	25	16
13	21	45	31	e41	e34	48	159	191	58	16	27	15
14	21	41	34	e38	e32	53	147	170	55	14	27	15
15	19	43	34	e37	e31	70	137	166	50	13	26	20
16	17	41	34	e35	31	125	123	166	44	13	26	18
17	15	38	32	e34	34	155	107	154	40	11	25	17
18	15	34	33	e33	35	146	109	142	38	10	23	15
19	22	36	54	e31	32	126	105	131	41	9.2	21	15
20	24	40	83	e30	29	131	102	126	36	8.8	19	15
21	19	38	81	e29	25	164	110	116	31	e18	18	13
22	18	49	68	e29	27	153	103	106	28	25	18	25
23	18	53	59	e28	e26	143	93	97	26	25	16	47
24	17	50	e52	e28	e25	133	85	92	25	20	15	41
25	17	47	e50	e29	e24	135	79	84	23	17	14	73
26	22	44	e50	e29	e24	134	74	78	21	16	14	68
27	22	39	e49	e30	e24	124	68	75	21	16	14	70
28	20	37	e50	e30	e24	121	64	73	19	15	14	67
29	19	36	51	e30	---	184	58	68	20	14	14	58
30	19	41	50	e31	---	180	56	63	22	13	14	48
31	19	---	67	e32	---	161	---	76	---	12	14	---
TOTAL	648	1105	1414	1250	923	2804	4258	3873	1296	521.0	629	878
MEAN	20.9	36.8	45.6	40.3	33.0	90.5	142	125	43.2	16.8	20.3	29.3
MAX	30	67	83	65	44	184	300	209	82	25	27	73
MIN	15	18	31	28	24	24	56	63	19	8.8	12	13
CFSM	0.16	0.28	0.35	0.31	0.25	0.69	1.08	0.95	0.33	0.13	0.15	0.22
IN.	0.18	0.31	0.40	0.35	0.26	0.79	1.20	1.09	0.37	0.15	0.18	0.25

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 2003, BY WATER YEAR (WY)

MEAN	65.4	89.1	106	109	128	193	185	127	91.9	52.3	46.2	51.5
MAX	169	212	160	280	241	356	275	191	249	114	116	142
(WY)	1987	1993	1991	1993	1976	1976	1978	1974	1989	1981	1981	1981
MIN	20.9	25.1	30.7	27.6	33.0	84.3	116	52.7	13.9	10.4	12.4	12.6
(WY)	2003	1972	1977	1977	2003	2000	1987	1971	1988	1988	1971	1999

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1970 - 2003	
ANNUAL TOTAL	32285.6		19599.0			
ANNUAL MEAN	88.5		53.7		104	
HIGHEST ANNUAL MEAN					155	1993
LOWEST ANNUAL MEAN					53.7	2003
HIGHEST DAILY MEAN	308	May 13	300	Apr 6	690	Feb 24 1985
LOWEST DAILY MEAN	8.6	Sep 13	8.8	Jul 20	5.7	(a)
ANNUAL SEVEN-DAY MINIMUM	12	Sep 9	11	Jul 14	6.1	Jul 3 1988
MAXIMUM PEAK FLOW			313	Apr 5	869	Feb 24 1985
MAXIMUM PEAK STAGE			4.92	Apr 5	7.21	Feb 24 1985
INSTANTANEOUS LOW FLOW			8.7	Jul 20	(b)4.0	(c)
ANNUAL RUNOFF (CFSM)	0.67		0.41		0.79	
ANNUAL RUNOFF (INCHES)	9.10		5.52		10.68	
10 PERCENT EXCEEDS	213		132		209	
50 PERCENT EXCEEDS	50		34		85	
90 PERCENT EXCEEDS	17		17		24	

(a) July 9, 15, 1988.
(b) Observed; but may have been less during periods of no gage-height record July 3-11, 14-16, 1988.
(c) 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 2002 TO SEPTEMBER 2003

Date	Time	Instantaneous discharge, cfs (00061)	Specif. conductance, wat unf uS/cm 25 deg C (00095)	pH, water, unfltrd 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									
29...	1545	19	558	8.2	4.0	6.4	734	10.2	86
DEC									
10...	1400	36	581	8.3	6.0	.5	738	13.0	93
FEB									
12...	1400	27	586	8.2	-8.0	2.5	742	12.7	96
APR									
16...	1330	119	503	8.1	18.0	15.7	734	9.5	99
MAY									
13...	1615	187	483	8.2	12.5	14.7	744	11.3	114
JUN									
10...	1430	47	522	8.0	22.5	17.8	746	8.8	95
JUL									
23...	1500	24	530	8.0	24.5	22.1	746	8.4	99
AUG									
27...	1130	14	520	7.8	17.5	21.8	744	6.8	80

Date	Bicarbonate, wat flt incrm. titr., field, mg/L (00453)	Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086)	Sulfate water, fltrd, mg/L (00945)	Chloride, water, fltrd, mg/L (00940)	Nitrite water, fltrd, mg/L as N (00613)	Nitrite + nitrate water fltrd, mg/L as N (00631)	Ammonia water, fltrd, mg/L as N (00608)	Ammonia + org-N, water, unfltrd mg/L as N (00625)	Phosphorus, water, unfltrd mg/L (00665)
OCT									
29...	250	205	29	26	E.004	.58	<.04	.4	.02
DEC									
10...	288	236	35	28	E.006	.87	.04	.4	.01
FEB									
12...	272	223	34	28	E.006	.87	.06	.4	.01
APR									
16...	220	180	34	26	<.008	.30	<.04	.7	.03
MAY									
13...	216	177	30	23	.008	.33	<.04	.6	.03
JUN									
10...	238	195	28	26	.010	.40	.04	.6	.03
JUL									
23...	239	196	28	26	.010	.43	<.04	.6	.02
AUG									
27...	232	190	28	26	.009	.36	<.04	.5	.02

STREAMS TRIBUTARY TO LAKE ERIE

04175600 RIVER RAISIN NEAR MANCHESTER, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Ortho-phos-phate, water, fltrd, mg/L as P (00671)	Sus-pended sedi-ment concen-tration mg/L (80154)	Aceto-chlor, water, fltrd, ug/L (49260)	Ala-chlor, water, fltrd, ug/L (46342)	Atra-zine, water, fltrd, ug/L (39632)	CIAT, water, fltrd, ug/L (04040)	Azin-phos-methyl, water, fltrd 0.7u GF ug/L (82686)	Ben-flur-alin, water, fltrd 0.7u GF ug/L (82673)	Butyl-ate, water, fltrd, ug/L (04028)
OCT									
29...	<.02	15	<.006	<.004	.01	<.006	<.050	<.010	<.002
DEC									
10...	<.02	3	<.006	<.004	.02	E.007	<.050	<.010	<.002
FEB									
12...	<.02	10	<.006	<.004	.02	E.007	<.050	<.010	<.002
APR									
16...	<.02	10	<.006	<.004	.03	E.011	<.050	<.010	<.002
MAY									
13...	<.02	8	.02	<.004	.06	E.026	<.050	<.010	<.002
JUN									
10...	<.02	9	.03	<.004	.05	E.013	<.050	<.010	<.002
JUL									
23...	<.02	9	<.006	<.004	.03	E.008	<.050	<.010	<.002
AUG									
27...	<.02	2	<.006	<.004	.05	E.007	<.050	<.010	<.002

Date	Car-baryl, water, fltrd 0.7u GF ug/L (82680)	Carbo-furan, water, fltrd 0.7u GF ug/L (82674)	Chlor-pyrifos water, fltrd, ug/L (38933)	Cyana-zine, water, fltrd, ug/L (04041)	DCPA, water fltrd 0.7u GF ug/L (82682)	p,p'-DDE, water, fltrd, ug/L (34653)	Diazi-non, water, fltrd, ug/L (39572)	Diel-drin, water, fltrd, ug/L (39381)	2,6-Di-ethyl-aniline water fltrd 0.7u GF ug/L (82660)
OCT									
29...	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005	<.006
DEC									
10...	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005	<.006
FEB									
12...	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005	<.006
APR									
16...	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005	<.006
MAY									
13...	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005	<.006
JUN									
10...	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005	<.006
JUL									
23...	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005	<.006
AUG									
27...	<.041	<.020	<.005	<.018	<.003	<.003	<.005	<.005	<.006

Date	Disul-foton, water, fltrd 0.7u GF ug/L (82677)	EPTC, water, fltrd 0.7u GF ug/L (82668)	Ethal-flur-alin, water, fltrd 0.7u GF ug/L (82663)	Etho-prop, water, fltrd 0.7u GF ug/L (82672)	Fonofos water, fltrd, ug/L (04095)	alpha-HCH, water, fltrd, ug/L (34253)	Lindane water, fltrd, ug/L (39341)	Linuron water fltrd 0.7u GF ug/L (82666)	Mala-thion, water, fltrd, ug/L (39532)
OCT									
29...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
DEC									
10...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
FEB									
12...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
APR									
16...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
MAY									
13...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
JUN									
10...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
JUL									
23...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.027
AUG									
27...	<.02	<.002	<.009	<.005	<.003	<.005	<.004	<.035	<.100

STREAMS TRIBUTARY TO LAKE ERIE

04175600 RIVER RAISIN NEAR MANCHESTER, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

Date	Metolachlor, water, fltrd, ug/L (39415)	Metribuzin, water, fltrd, ug/L (82630)	Molinate, water, fltrd 0.7u GF ug/L (82671)	Napropamide, water, fltrd 0.7u GF ug/L (82684)	Parathion, water, fltrd, ug/L (39542)	Methyl parathion, water, fltrd 0.7u GF ug/L (82667)	Pebulate, water, fltrd 0.7u GF ug/L (82669)	Pendimethalin, water, fltrd 0.7u GF ug/L (82683)	cis-Permethrin water fltrd 0.7u GF ug/L (82687)
OCT									
29...	<.013	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
DEC									
10...	E.007	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
FEB									
12...	E.008	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
APR									
16...	E.004	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
MAY									
13...	E.012	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
JUN									
10...	.013	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
JUL									
23...	<.013	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006
AUG									
27...	<.013	<.006	<.002	<.007	<.010	<.006	<.004	<.022	<.006

Date	Phorate water fltrd 0.7u GF ug/L (82664)	Prometon, water, fltrd, ug/L (04037)	Pronamide, water, fltrd 0.7u GF ug/L (82676)	Propachlor, water, fltrd, ug/L (04024)	Propanil, water, fltrd 0.7u GF ug/L (82679)	Propargite, water, fltrd 0.7u GF ug/L (82685)	Simazine, water, fltrd, ug/L (04035)	Tebuthiuron water fltrd 0.7u GF ug/L (82670)	Terbacil, water, fltrd 0.7u GF ug/L (82665)
OCT									
29...	<.011	<.01	<.004	<.010	<.011	<.02	.020	<.02	<.034
DEC									
10...	<.011	<.01	<.004	<.010	<.011	<.02	.032	<.02	<.034
FEB									
12...	<.011	<.01	<.004	<.010	<.011	<.02	.027	<.02	<.034
APR									
16...	<.011	M	<.004	<.010	<.011	<.02	.022	<.02	<.034
MAY									
13...	<.011	<.01	<.004	<.010	<.011	<.02	.014	<.02	<.034
JUN									
10...	<.011	<.01	<.004	<.010	<.011	<.02	.013	<.02	<.034
JUL									
23...	<.011	<.01	<.004	<.010	<.011	<.02	<.005	<.02	<.034
AUG									
27...	<.011	M	<.004	<.010	<.011	<.02	.013	<.02	<.034

Date	Terbufos, water, fltrd 0.7u GF ug/L (82675)	Thiobencarb water fltrd 0.7u GF ug/L (82681)	Triallate, water, fltrd 0.7u GF ug/L (82678)	Trifluralin, water, fltrd 0.7u GF ug/L (82661)
OCT				
29...	<.02	<.005	<.002	<.009
DEC				
10...	<.02	<.005	<.002	<.009
FEB				
12...	<.02	<.005	<.002	<.009
APR				
16...	<.02	<.005	<.002	<.009
MAY				
13...	<.02	<.005	<.002	<.009
JUN				
10...	<.02	<.005	<.002	<.009
JUL				
23...	<.02	<.005	<.002	<.009
AUG				
27...	<.02	<.005	<.002	<.009

STREAMS TRIBUTARY TO LAKE ERIE

04176000 RIVER RAISIN NEAR ADRIAN, MI

LOCATION.--Lat 41°54'15", long 83°58'50", in NW1/4 sec.5, T.7 S., R.4 E., Lenawee County, Hydrologic Unit 04100002, on right bank at downstream side of bridge on Academy Road, 1.7 mi east of Adrian, and 2.6 mi downstream from South Branch.

DRAINAGE AREA.--463 mi^2.

PERIOD OF RECORD.--October 1953 to September 1978, October 1978 to September 1984 (operated as a crest-stage partial-record station), October 1984 to current year. Records for October 1930 to August 1931 and October 1932 to April 1938, published as "Raisin River" in WSP 714, 744, 759, 784, 804, 824, and 854, have been found to be unreliable and should not be used.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 693.2 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Diurnal fluctuation caused by powerplant at Tecumseh, 11 mi upstream from station, prior to June 27, 1968; occasional regulation since. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	100	149	289	e140	e105	775	267	301	90	e62	143
2	82	103	147	295	e138	e107	653	424	283	87	e76	205
3	84	104	152	251	e136	e110	564	448	269	81	e97	152
4	93	105	188	228	e157	e115	551	484	252	81	e122	125
5	114	106	e175	223	e169	e112	996	610	245	81	e139	108
6	97	117	e161	213	e176	e115	1390	764	206	80	e138	98
7	95	113	e152	192	e175	e116	1440	725	196	96	135	89
8	93	116	150	190	e165	e114	1180	613	211	107	124	84
9	136	117	191	212	e155	e163	977	822	213	135	202	78
10	110	175	180	e200	e140	e175	881	1260	196	134	138	78
11	79	310	155	e182	e131	e195	814	1620	196	139	e122	74
12	78	256	149	e167	e130	217	726	1510	307	112	e115	71
13	80	232	135	e155	e130	415	645	1200	431	109	111	68
14	76	205	145	e145	e126	509	565	988	366	93	100	66
15	93	200	153	e139	e125	689	502	830	296	87	94	79
16	104	189	160	e134	e115	1170	464	748	245	85	e99	76
17	85	179	145	e130	e114	1580	427	704	218	77	e101	76
18	93	169	147	e127	e113	1600	417	622	196	73	e98	74
19	90	167	214	e122	e108	1340	394	560	158	66	96	71
20	89	160	245	e118	e102	1100	385	519	144	62	87	67
21	90	157	259	e116	e94	1130	379	479	143	e93	80	64
22	93	232	277	e115	e94	1190	400	434	137	e133	73	177
23	94	219	280	e114	e97	1070	454	398	126	e135	68	206
24	88	213	e226	e115	e95	822	365	365	117	e114	64	171
25	90	201	e203	e118	e95	729	297	343	108	e89	63	359
26	114	186	e185	e122	e96	714	241	321	101	76	69	290
27	99	176	e171	e126	e99	666	266	268	105	70	72	449
28	99	166	167	e129	e103	597	241	255	92	69	65	413
29	99	157	169	e130	---	799	209	264	100	65	64	318
30	100	154	186	e130	---	1030	211	250	93	62	66	244
31	98	---	239	e135	---	991	---	319	---	60	63	---
TOTAL	2922	5084	5655	5062	3518	19785	17809	19414	6051	2841	3003	4573
MEAN	94.3	169	182	163	126	638	594	626	202	91.6	96.9	152
MAX	136	310	280	295	176	1600	1440	1620	431	139	202	449
MIN	76	100	135	114	94	105	209	250	92	60	62	64
CFSM	0.20	0.37	0.39	0.35	0.27	1.38	1.28	1.35	0.44	0.20	0.21	0.33
IN.	0.23	0.41	0.45	0.41	0.28	1.59	1.43	1.56	0.49	0.23	0.24	0.37

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 2003, BY WATER YEAR (WY)

MEAN	189	276	359	383	500	709	625	414	294	174	140	135
MAX	614	941	871	1271	1181	1517	1115	939	1025	609	520	420
(WY)	2002	1993	1988	1993	2001	1986	1978	1956	1989	1968	1995	1992
MIN	52.1	57.9	66.6	65.6	74.1	179	239	144	69.7	46.1	47.5	46.0
(WY)	1964	1965	1964	1963	1964	1964	1963	1964	1988	1988	1963	1955

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1954 - 2003	
ANNUAL TOTAL	144333		95717			
ANNUAL MEAN	395		262		349	
HIGHEST ANNUAL MEAN					605	1993
LOWEST ANNUAL MEAN					99.8	1964
HIGHEST DAILY MEAN	2580	May 14	1620	May 11	5350	Feb 25 1985
LOWEST DAILY MEAN	36	Jul 18	60	Jul 31	25	Oct 26 1964
ANNUAL SEVEN-DAY MINIMUM	51	Sep 8	66	Aug 25	27	Oct 25 1964
MAXIMUM PEAK FLOW			1700	May 11	6660	Mar 15 1982
MAXIMUM PEAK STAGE			11.05	May 11	15.77	Mar 15 1982
INSTANTANEOUS LOW FLOW			56	Aug 1	18	Aug 10 1964
ANNUAL RUNOFF (CFSM)	0.85		0.57		0.75	
ANNUAL RUNOFF (INCHES)	11.60		7.69		10.24	
10 PERCENT EXCEEDS	965		658		744	
50 PERCENT EXCEEDS	221		147		224	
90 PERCENT EXCEEDS	77		79		79	

(e) Estimated.

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 mi^2.

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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	137	122	190	e333	e192	e165	1550	481	576	126	68	103
2	118	117	180	e368	e195	e163	1360	891	647	133	90	182
3	114	114	189	e356	e200	e162	1090	1260	541	122	138	293
4	116	112	e207	e326	e220	e163	960	1260	471	111	214	322
5	110	113	199	e289	e238	e153	1990	e1620	433	104	246	272
6	120	113	188	e247	e257	e151	2320	e1960	394	108	374	218
7	121	123	e191	e202	e269	e147	2580	e1600	362	120	425	173
8	122	128	194	e212	e265	e143	2590	2090	329	138	272	139
9	114	127	e204	e229	e251	e175	2310	2420	311	163	292	121
10	113	151	e187	e230	e229	e195	2050	3810	319	206	284	112
11	115	222	155	e232	e211	e235	1690	3920	325	245	226	105
12	141	249	160	e226	e199	e300	1410	3340	e680	247	291	93
13	123	292	150	e210	e193	e486	1190	3080	e1310	222	229	88
14	101	290	154	e195	e188	e675	1020	2690	e1220	183	208	85
15	94	261	175	e186	e185	1060	891	2190	e875	154	195	82
16	93	239	183	e177	e178	2450	793	1750	e710	132	203	76
17	94	224	167	e169	e177	2870	721	1460	545	112	199	79
18	102	216	180	e164	e176	2850	672	1250	455	106	231	79
19	125	205	230	e159	e172	3410	629	1080	393	91	213	78
20	123	194	e280	e155	e167	3580	615	940	353	80	170	74
21	125	191	e340	e152	e160	3110	647	834	307	135	135	72
22	110	203	e401	e150	e162	2570	666	743	272	240	120	110
23	110	238	e411	e148	e169	2210	636	664	238	212	115	187
24	112	236	e362	e149	e178	1960	611	601	214	183	111	238
25	117	253	e315	e153	e182	1710	594	545	194	145	94	378
26	124	252	e290	e158	e181	1550	525	499	178	124	82	442
27	124	237	e245	e164	e173	1320	464	462	160	107	82	557
28	128	223	e224	e170	e171	1180	415	427	148	99	81	681
29	134	212	e217	e174	---	1380	409	387	146	89	81	674
30	128	203	e230	e178	---	1470	402	363	134	78	78	596
31	122	---	e278	e185	---	1540	---	416	---	69	78	---
TOTAL	3630	5860	7076	6446	5538	39533	33800	45033	13240	4384	5625	6709
MEAN	117	195	228	208	198	1275	1127	1453	441	141	181	224
MAX	141	292	411	368	269	3580	2590	3920	1310	247	425	681
MIN	93	112	150	148	160	143	402	363	134	69	68	72
CFSM	0.11	0.19	0.22	0.20	0.19	1.22	1.08	1.39	0.42	0.14	0.17	0.21
IN.	0.13	0.21	0.25	0.23	0.20	1.41	1.21	1.61	0.47	0.16	0.20	0.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 2003, BY WATER YEAR (WY)

MEAN	310	480	726	801	1120	1653	1471	963	649	343	231	241
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1937 - 2003	
ANNUAL TOTAL	278246		176874			
ANNUAL MEAN	762		485		747	
HIGHEST ANNUAL MEAN					1374	1943
LOWEST ANNUAL MEAN					178	1964
HIGHEST DAILY MEAN	6440	May 15	3920	May 11	14600	Mar 16 1982
LOWEST DAILY MEAN	50	Sep 14	68	Aug 1	9.0	Sep 30 1941
ANNUAL SEVEN-DAY MINIMUM	52	Sep 11	77	Sep 15	18	Sep 26 1941
MAXIMUM PEAK FLOW			4400	May 10	(a)15300	Mar 16 1982
MAXIMUM PEAK STAGE			6.73	May 10	(b)11.16	Mar 15 1982
INSTANTANEOUS LOW FLOW			64	Aug 1	(c)2.0	(d)
ANNUAL RUNOFF (CFSM)	0.73		0.47		0.72	
ANNUAL RUNOFF (INCHES)	9.93		6.31		9.74	
10 PERCENT EXCEEDS	2120		1370		1850	
50 PERCENT EXCEEDS	315		208		363	
90 PERCENT EXCEEDS	97		109		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 mi^2.

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 ft^3/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 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.56	1.4	1.9	e4.1	e0.78	2.0	35	e34	51	3.4	1.8	4.7
2	0.51	1.5	1.8	e4.5	e0.79	2.0	29	e92	32	3.0	3.9	20
3	0.56	1.4	1.6	e4.8	e0.83	e1.8	24	e85	24	2.7	6.5	28
4	0.56	1.4	1.4	e5.4	e1.8	e1.7	40	e78	20	2.4	6.8	19
5	0.61	1.4	1.4	5.3	e1.4	e1.7	e290	e110	17	2.5	8.2	12
6	0.56	1.4	1.3	4.5	e1.4	e1.7	e170	e97	13	2.9	6.6	8.6
7	0.56	1.4	1.3	3.4	e1.2	1.8	e120	e75	11	3.4	4.9	6.6
8	0.52	1.6	1.3	4.0	e1.1	2.2	e82	e77	10	3.4	4.3	5.5
9	0.51	1.7	1.3	5.0	e1.0	5.5	e66	e170	9.6	4.1	11	4.8
10	0.47	2.0	1.3	e5.1	e1.0	9.9	e56	e330	8.6	4.4	9.5	4.3
11	0.45	3.1	1.3	e4.0	e1.0	6.2	e44	e250	7.4	4.0	5.9	3.9
12	0.42	3.3	1.3	e3.6	e1.0	11	e34	e130	60	3.4	7.3	3.6
13	0.45	2.0	1.5	3.5	e1.0	46	e33	e95	154	2.8	8.6	3.2
14	0.43	1.5	1.6	2.9	e1.0	38	e30	67	86	2.3	6.5	2.9
15	0.41	1.4	1.7	2.5	e1.0	130	e26	56	46	2.2	5.8	3.2
16	0.44	1.5	2.6	2.2	e1.0	359	e24	55	28	2.2	4.9	3.1
17	0.45	1.4	2.7	1.8	e1.0	324	e22	43	21	2.1	6.4	2.9
18	0.47	1.3	2.9	1.4	e1.0	155	e20	35	18	1.9	7.8	2.5
19	0.56	1.3	5.4	1.3	e1.0	90	e18	29	16	1.7	6.0	2.5
20	0.56	4.5	11	1.2	e1.0	84	e17	26	14	1.6	4.7	2.4
21	0.57	6.3	8.6	1.1	e1.1	98	e18	22	11	19	3.8	2.3
22	0.62	6.7	6.3	0.93	e1.3	82	e17	19	9.0	30	3.3	3.4
23	0.62	6.2	4.2	e0.86	e1.4	61	e16	16	7.7	14	2.7	12
24	0.62	5.3	e3.4	e0.83	1.6	50	e15	15	6.7	8.1	2.3	14
25	0.70	4.7	e2.4	e0.82	1.7	45	e13	14	6.0	5.4	2.1	11
26	0.75	4.1	e2.4	e0.82	1.7	46	e11	12	5.5	3.8	2.4	9.0
27	0.75	3.6	e2.5	e0.81	1.7	38	e12	12	5.0	2.9	2.6	10
28	0.77	2.7	e2.6	e0.79	1.8	32	e12	11	4.6	2.6	2.5	13
29	1.1	2.2	e2.7	e0.79	---	48	e10	11	4.4	2.4	2.3	13
30	1.3	2.1	e2.8	e0.78	---	53	e14	10	4.0	2.1	2.1	9.5
31	1.3	---	e3.4	e0.78	---	40	---	33	---	1.8	1.9	---
TOTAL	19.16	80.4	87.9	79.81	33.60	1866.5	1318	2109	710.5	148.5	155.4	240.9
MEAN	0.62	2.68	2.84	2.57	1.20	60.2	43.9	68.0	23.7	4.79	5.01	8.03
MAX	1.3	6.7	11	5.4	1.8	359	290	330	154	30	11	28
MIN	0.41	1.3	1.3	0.78	0.78	1.7	10	10	4.0	1.6	1.8	2.3
CFSM	0.01	0.05	0.06	0.05	0.02	1.18	0.86	1.33	0.46	0.09	0.10	0.16
IN.	0.01	0.06	0.06	0.06	0.02	1.36	0.96	1.54	0.52	0.11	0.11	0.18

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 2003, BY WATER YEAR (WY)

MEAN	20.0	28.9	45.1	55.9	78.3	86.6	98.7	64.5	50.8	9.40	6.77	7.01
MAX	138	144	168	181	217	199	228	149	234	55.1	26.1	46.2
(WY)	2002	1993	1991	1993	1998	1993	2002	2000	1997	1989	1998	1992
MIN	0.33	1.93	1.37	1.83	1.20	12.9	35.4	9.47	0.58	0.17	0.15	0.14
(WY)	1995	2000	2000	2000	2003	2000	1997	1988	1988	1988	1988	1991

SUMMARY STATISTICS	FOR 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1988 - 2003	
ANNUAL TOTAL	19310.95		6849.67			
ANNUAL MEAN	52.9		18.8		45.7	
HIGHEST ANNUAL MEAN					75.0	2002
LOWEST ANNUAL MEAN					18.8	2003
HIGHEST DAILY MEAN	1210	Feb 1	359	Mar 16	2330	Jun 3 1997
LOWEST DAILY MEAN	0.41	Oct 15	0.41	Oct 15	0.00	(a)
ANNUAL SEVEN-DAY MINIMUM	0.44	Oct 11	0.44	Oct 11	0.00	Jun 21 1988
MAXIMUM PEAK FLOW			508	Mar 16	(b)3010	Jun 2 1997
MAXIMUM PEAK STAGE			8.75	Mar 16	11.60	Jun 2 1997
ANNUAL RUNOFF (CFSM)	1.04		0.37		0.90	
ANNUAL RUNOFF (INCHES)	14.09		5.00		12.19	
10 PERCENT EXCEEDS	96		49		104	
50 PERCENT EXCEEDS	5.4		3.8		15	
90 PERCENT EXCEEDS	0.62		0.82		0.80	

(a) On several days in water years 1988, 1991, 1992, 1994, 1996.
(b) From rating curve extended above 1,000 ft^3/s.
(e) 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 mi^2.

WATER-LEVEL RECORDS

PERIOD OF RECORD.--September 1973 to September 1992, (gage height record available in files of the U.S. Geological Survey); July 2002 to September 2003.

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 JULY 1, 2002 TO SEPT. 30, 2003.--Maximum daily gage height, 81.50 ft, Oct. 7; minimum daily, 79.53 ft, Mar. 13.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	81.31	81.37	81.17
2	---	---	---	---	---	---	---	---	---	81.30	81.38	81.22
3	---	---	---	---	---	---	---	---	---	81.32	81.36	81.19
4	---	---	---	---	---	---	---	---	---	81.29	81.38	81.18
5	---	---	---	---	---	---	---	---	---	81.26	81.38	81.19
6	---	---	---	---	---	---	---	---	---	81.23	81.34	81.25
7	---	---	---	---	---	---	---	---	---	81.22	81.32	81.25
8	---	---	---	---	---	---	---	---	---	81.24	81.31	81.24
9	---	---	---	---	---	---	---	---	---	81.26	81.29	---
10	---	---	---	---	---	---	---	---	---	81.22	81.27	---
11	---	---	---	---	---	---	---	---	---	81.20	81.25	---
12	---	---	---	---	---	---	---	---	---	81.18	81.24	81.28
13	---	---	---	---	---	---	---	---	---	81.16	81.24	81.25
14	---	---	---	---	---	---	---	---	---	81.14	81.22	81.24
15	---	---	---	---	---	---	---	---	---	81.13	81.20	81.24
16	---	---	---	---	---	---	---	---	---	81.11	81.19	81.21
17	---	---	---	---	---	---	---	---	---	81.14	81.18	81.21
18	---	---	---	---	---	---	---	---	---	81.26	81.19	81.21
19	---	---	---	---	---	---	---	---	---	81.23	81.18	81.21
20	---	---	---	---	---	---	---	---	---	81.20	81.16	81.23
21	---	---	---	---	---	---	---	---	---	81.31	81.23	81.22
22	---	---	---	---	---	---	---	---	---	81.37	81.28	81.21
23	---	---	---	---	---	---	---	---	---	81.36	81.28	81.22
24	---	---	---	---	---	---	---	---	---	81.35	81.28	81.21
25	---	---	---	---	---	---	---	---	---	81.33	81.26	81.20
26	---	---	---	---	---	---	---	---	---	81.34	81.26	81.26
27	---	---	---	---	---	---	---	---	---	81.34	81.24	81.27
28	---	---	---	---	---	---	---	---	---	81.35	81.23	81.26
29	---	---	---	---	---	---	---	---	---	81.34	81.22	81.27
30	---	---	---	---	---	---	---	---	---	81.33	81.21	81.27
31	---	---	---	---	---	---	---	---	---	81.33	81.19	---
MEAN	---	---	---	---	---	---	---	---	---	81.26	81.26	---
MAX	---	---	---	---	---	---	---	---	---	81.37	81.38	---
MIN	---	---	---	---	---	---	---	---	---	81.11	81.16	---

STREAMS TRIBUTARY TO WISCONSIN RIVER

05390100 LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	81.30	81.25	80.65	80.08	79.76	79.58	79.87	80.58	80.78	80.51	80.41	80.22
2	81.29	81.25	80.63	80.07	79.75	---	79.90	80.58	80.76	80.51	80.44	80.21
3	81.28	81.24	80.60	80.05	79.77	---	79.93	80.57	80.74	80.52	80.46	80.19
4	81.34	81.24	80.58	80.04	79.78	79.57	79.94	80.57	80.71	80.50	80.47	80.19
5	81.38	81.24	80.56	80.03	79.78	79.56	79.96	80.62	80.70	80.50	80.45	80.17
6	81.47	81.24	80.54	80.01	79.77	---	79.96	80.61	80.71	80.49	80.44	80.16
7	81.50	81.24	80.52	80.00	79.76	79.56	79.96	80.61	80.73	80.47	80.45	80.16
8	81.49	81.25	80.49	79.99	79.75	79.56	79.97	80.63	80.73	80.45	80.43	80.16
9	81.47	81.21	80.47	79.97	79.75	79.56	79.97	80.65	80.73	80.43	80.41	80.15
10	81.45	81.19	80.45	79.97	79.74	79.55	79.98	80.67	80.77	80.42	80.40	80.14
11	81.42	81.17	80.43	79.95	79.73	79.55	79.98	80.84	80.77	80.45	80.40	80.12
12	81.41	81.12	80.41	79.94	79.72	79.54	79.99	80.99	80.75	80.44	80.36	80.15
13	81.37	81.10	80.39	79.93	79.71	79.53	80.01	81.05	80.73	80.42	80.35	80.20
14	81.35	81.07	80.37	79.92	79.69	79.54	80.04	81.07	80.72	80.40	80.33	80.25
15	81.33	81.03	80.35	79.91	---	79.58	80.12	81.08	80.69	80.42	80.31	80.23
16	81.30	81.01	80.33	79.89	---	79.59	80.16	81.06	80.68	80.40	80.33	80.23
17	81.27	80.98	80.31	79.88	79.67	79.60	80.20	81.05	80.67	80.41	80.31	80.21
18	81.26	80.95	80.32	79.88	79.66	79.60	80.25	81.04	80.67	80.38	80.28	80.19
19	81.25	80.92	80.31	79.87	79.65	79.61	80.27	81.03	80.64	80.36	80.29	80.18
20	81.23	80.89	80.30	79.86	79.65	79.63	80.36	81.04	80.61	80.38	80.31	80.18
21	81.27	80.87	80.28	79.85	79.64	79.66	80.43	81.02	80.60	80.44	80.31	80.17
22	81.28	80.85	80.26	79.84	79.63	79.68	80.46	81.00	80.58	80.43	80.30	80.19
23	81.28	80.83	80.23	79.83	79.62	79.69	80.48	80.98	80.57	80.41	80.28	80.17
24	81.27	80.80	80.22	79.82	79.61	79.71	80.50	80.96	80.58	80.39	80.26	80.14
25	81.27	80.78	80.20	79.81	79.60	79.71	80.52	80.93	80.58	80.36	80.28	80.15
26	81.28	80.75	80.19	79.80	79.60	79.72	80.52	80.91	80.55	80.36	80.30	80.15
27	81.27	80.73	80.17	79.79	79.59	79.74	80.53	80.88	80.54	80.37	80.30	80.16
28	81.28	80.70	80.15	79.79	79.59	79.80	80.54	80.86	80.53	80.35	80.28	80.18
29	81.27	80.69	80.14	79.78	---	79.83	80.56	80.84	80.52	80.34	80.27	80.17
30	81.27	80.67	80.12	79.77	---	79.84	80.57	80.84	80.51	80.35	80.25	80.18
31	81.25	---	80.10	79.76	---	79.85	---	80.83	---	80.38	80.23	---
MEAN	81.33	81.01	80.36	79.91	---	---	80.20	80.85	80.66	80.42	80.34	80.18
MAX	81.50	81.25	80.65	80.08	---	---	80.57	81.08	80.78	80.52	80.47	80.25
MIN	81.23	80.67	80.10	79.76	---	---	79.87	80.57	80.51	80.34	80.23	80.12

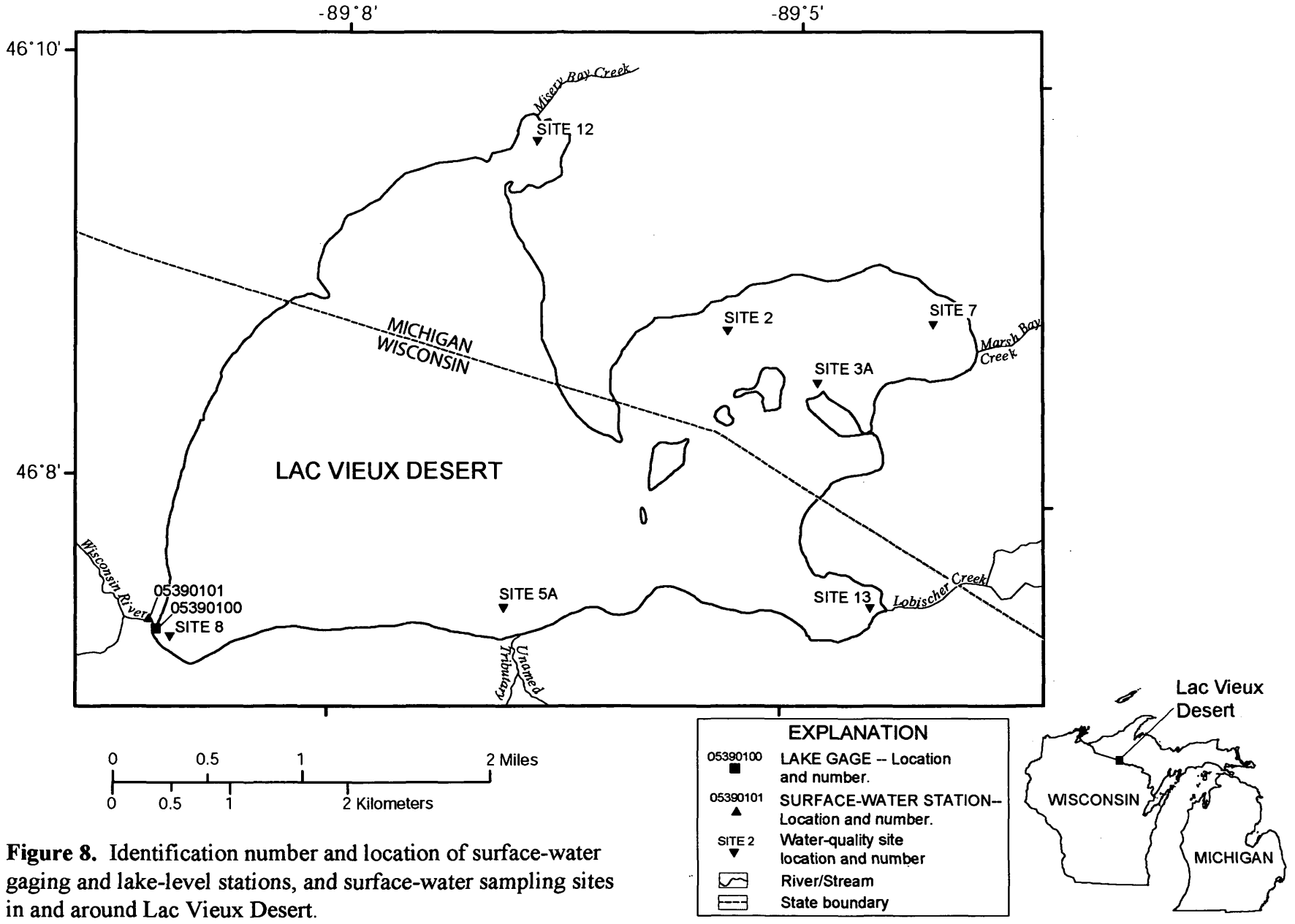


Figure 8. Identification number and location of surface-water gaging and lake-level stations, and surface-water sampling sites in and around Lac Vieux Desert.

STREAMS TRIBUTARY TO WISCONSIN RIVER

LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--May 2002 to September 2003.

REMARKS.--Samples were collected at mid-depth except for chlorophyll, which was collected as a composite through the photic zone. A lakewide algal bloom was present during the Sept. 8-10, 2003, sampling. Water quality data collected in 1996 is published in U.S. Geological Survey Report WRIR 98-405.

WATER-QUALITY DATA

Date	Time	Sampling depth, feet (00003)	Transparency Secchi disc, meters (00078)	Turbidity, wat unf lab, Hach 2100AN NTU (99872)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)
460847089052506 LAC VIEUX DESERT NR LAND O'LAKES, WI (SITE 2) (LAT 46 08 47N LONG 089 05 25W)											
MAY 2002											
14...	1600	3.50	1.30	3.4	12.4	111	8.2	80	8.0	35	9.08
SEP											
24...	1500	3.50	1.50	3.9	8.4	85	8.2	80	13.5	38	9.86
MAY 2003											
14...	0900	4.00	1.00	2.9	12.2	120	8.1	74	11.5	34	9.11
SEP											
09...	1400	3.00	1.20	7.5	10.1	125	9.0	78	23.0	41	10.9
460833089044906 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 3A) (LAT 46 08 33N LONG 089 04 49W)											
MAY 2002											
15...	0945	14.0	1.40	7.9	11.8	106	8.6	75	8.0	34	8.89
SEP											
25...	1115	13.5	1.60	4.1	8.9	89	8.5	78	13.0	37	9.50
MAY 2003											
14...	1200	14.0	1.40	7.8	11.2	106	7.7	74	10.0	36	9.58
SEP											
08...	1320	12.0	1.20	7.5	8.6	97	9.1	78	18.5	35	9.00
460726089065006 LAC VIEUX DESERT NEAR PHELPS, WI (SITE 5A) (LAT 46 07 26N LONG 089 06 50W)											
MAY 2002											
15...	1020	22.0	1.30	4.3	11.3	101	8.2	79	7.5	36	9.56
SEP											
25...	1530	19.0	1.30	6.4	8.4	87	8.2	78	14.0	37	9.55
MAY 2003											
15...	0915	19.0	1.40	5.2	9.0	85	7.4	78	10.0	35	9.36
SEP											
09...	0930	20.0	1.20	4.7	5.6	64	7.1	77	19.0	35	9.06

STREAMS TRIBUTARY TO WISCONSIN RIVER

LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

WATER-QUALITY DATA

Date	Magnesium, water, fltrd, mg/L (00925)	Sodium, water, fltrd, mg/L (00930)	Sodium, percent (00932)	Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086)	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)	Sulfate water, fltrd, mg/L (00945)	Residue on evap. at 105degC wat unf mg/L (00500)	Residue water, fltrd, sum of constituents mg/L (70301)
460847089052506 LAC VIEUX DESERT NR LAND O'LAKES, WI (SITE 2) (LAT 46 08 47N LONG 089 05 25W)												
MAY 2002												
14...	2.89	1.39	8	35	43	--	1.34	<.10	1.57	2.4	58	41
SEP												
24...	3.28	1.60	--	37	45	--	1.0	<.10	4.07	2.0	58	--
MAY 2003												
14...	2.78	1.38	8	34	41	--	.76	<.17	3.62	2.0	49	41
SEP												
09...	3.21	1.46	7	36	39	2	.77	<.2	13.2	1.8	69	53
460833089044906 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 3A) (LAT 46 08 33N LONG 089 04 49W)												
MAY 2002												
15...	2.82	1.35	8	34	42	--	1.01	<.10	1.31	2.4	54	39
SEP												
25...	3.28	1.51	8	35	42	--	.88	<.10	4.01	2.0	55	42
MAY 2003												
14...	2.98	1.43	8	34	42	--	.81	<.17	4.03	2.1	53	42
SEP												
08...	3.03	1.53	9	37	39	3	.71	<.2	13.2	1.9	68	52
460726089065006 LAC VIEUX DESERT NEAR PHELPS, WI (SITE 5A) (LAT 46 07 26N LONG 089 06 50W)												
MAY 2002												
15...	3.05	1.45	8	36	44	--	1.19	<.10	1.56	2.4	57	42
SEP												
25...	3.28	1.52	8	35	43	--	.76	<.10	4.18	2.1	50	43
MAY 2003												
15...	2.94	1.41	8	36	44	--	1.47	<.17	3.98	2.0	62	44
SEP												
09...	3.02	1.58	9	37	45	--	.81	<.2	13.6	1.9	70	53

STREAMS TRIBUTARY TO WISCONSIN RIVER

LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

WATER-QUALITY DATA

Date	Residue on evap. at 180degC wat flt mg/L (70300)	Ammonia + org-N, water, fltrd, mg/L as N (00623)	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)	Ortho-phos-phate, water, fltrd, mg/L as P (00671)	Phos-phorus, water, fltrd, mg/L (00666)	Phos-phorus, water, unfltrd mg/L (00665)	Boron, water, fltrd, ug/L (01020)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, fltrd, ug/L (01056)
460847089052506 LAC VIEUX DESERT NR LAND O'LAKES, WI (SITE 2) (LAT 46 08 47N LONG 089 05 25W)											
MAY 2002 14...	53	.37	<.015	.015	.003	<.007	.010	.038	<13	160	E1.7
SEP 24...	50	.42	.028	E.009	E.002	<.007	.007	.030	M	30	M
MAY 2003 14...	51	.33	<.015	<.022	<.002	<.007	.010	.035	<13	166	6.3
SEP 09...	62	.47	<.015	<.022	<.002	<.007	.009	.042	8.9	24	.9
460833089044906 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 3A) (LAT 46 08 33N LONG 089 04 49W)											
MAY 2002 15...	71	.37	<.015	<.013	E.002	<.007	.008	.036	<13	150	E2.2
SEP 25...	51	.42	E.011	<.013	<.002	<.007	.006	.031	E8.2	34	E.9
MAY 2003 14...	52	.38	.021	<.022	<.002	E.004	.017	.046	<13	141	3.5
SEP 08...	62	.51	<.015	<.022	<.002	<.007	.013	.044	9.4	27	1.3
460726089065006 LAC VIEUX DESERT NEAR PHELPS, WI (SITE 5A) (LAT 46 07 26N LONG 089 06 50W)											
MAY 2002 15...	56	.41	<.015	.051	.004	<.007	.007	.035	<13	188	E1.1
SEP 25...	55	.41	E.009	<.013	<.002	<.007	.005	.044	E7.3	22	E1.4
MAY 2003 15...	61	.37	<.015	<.022	<.002	<.007	.009	.038	<13	110	5.4
SEP 09...	66	.41	E.014	<.022	<.002	<.007	.010	.046	11	30	10.2

STREAMS TRIBUTARY TO WISCONSIN RIVER

LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

WATER-QUALITY DATA

Date	Time	Sampling depth, feet (00003)	Transparency Secchi disc, meters (00078)	Turbidity, wat unf lab, Hach 2100AN NTU (99872)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)	Hardness, water, unfltrd mg/L as CaCO3 (00900)	Calcium water, fltrd, mg/L (00915)
460851089040406 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 7) (LAT 46 08 51N LONG 089 04 04W)											
MAY 2002											
15...	1415	1.50	--	3.3	11.8	109	8.3	70	9.0	32	8.47
SEP											
25...	1035	2.00	--	7.0	8.7	86	8.5	77	12.5	37	9.58
MAY 2003											
14...	0830	2.00	1.10	2.8	10.6	104	8.0	62	11.5	29	7.72
SEP											
08...	1245	1.50	--	5.6	12.6	151	9.5	82	21.5	37	9.53
460714089090406 LAC VIEUX DESERT NR LAND O'LAKES, WI (SITE 8) (LAT 46 07 14N LONG 089 09 04W)											
MAY 2002											
16...	1045	2.50	1.20	5.8	11.1	100	8.3	79	8.0	35	9.29
SEP											
26...	0915	2.50	1.20	13	8.0	81	8.1	77	13.0	37	9.44
MAY 2003											
13...	1540	2.00	1.00	8.9	11.2	112	8.2	74	12.5	34	8.95
SEP											
09...	1000	1.50	--	4.6	10.9	130	9.1	76	21.5	34	8.90
460939089064406 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 12) (LAT 46 09 39N LONG 089 06 44W)											
MAY 2002											
14...	1445	3.00	1.40	2.6	11.4	101	7.7	80	7.5	35	9.20
SEP											
24...	1315	3.00	1.30	4.7	8.3	86	8.2	81	14.5	39	10.0
MAY 2003											
15...	1015	3.00	1.30	3.7	9.8	97	8.0	71	12.0	32	8.54
SEP											
10...	0930	2.00	.60	17	8.1	99	8.8	82	22.5	43	11.6
460730089042506 LAC VIEUX DESERT NEAR PHELPS, WI (SITE 13) (LAT 46 07 30N LONG 089 04 25W)											
MAY 2002											
15...	1445	2.00	--	4.6	11.9	112	8.2	75	9.5	34	8.96
SEP											
25...	1350	2.00	--	9.0	9.2	91	8.2	82	12.0	39	9.86
MAY 2003											
14...	1500	2.00	--	3.7	12.0	122	8.0	71	13.5	34	8.91
SEP											
09...	1430	1.50	--	3.4	9.2	108	8.1	95	20.5	49	12.7

STREAMS TRIBUTARY TO WISCONSIN RIVER

LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

WATER-QUALITY DATA

Date	Magnesium, water, fltrd, mg/L (00925)	Sodium, water, fltrd, mg/L (00930)	Sodium, percent (00932)	Alkalinity, wat flt inc tit field, mg/L as CaCO3 (39086)	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)	Sulfate water, fltrd, mg/L (00945)	Residue on evap. at 105degC wat unf mg/L (00500)	Residue water, fltrd, sum of constituents mg/L (70301)
460851089040406 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 7) (LAT 46 08 51N LONG 089 04 04W)												
MAY 2002												
15...	2.73	1.31	8	32	39	--	.73	<.10	1.36	2.4	55	37
SEP												
25...	3.29	1.54	8	35	43	--	.83	<.10	3.85	2.1	57	43
MAY 2003												
14...	2.37	1.22	8	27	33	--	.58	<.17	3.72	1.9	50	35
SEP												
08...	3.20	1.59	8	36	33	5	.59	<.2	12.6	1.8	63	51
460714089090406 LAC VIEUX DESERT NR LAND O'LAKES, WI (SITE 8) (LAT 46 07 14N LONG 089 09 04W)												
MAY 2002												
16...	2.98	1.40	8	35	42	--	.95	<.10	1.33	2.4	84	40
SEP												
26...	3.22	1.52	8	34	42	--	.81	<.10	4.09	2.0	61	42
MAY 2003												
13...	2.82	1.37	8	33	40	--	.87	<.17	3.44	1.9	50	40
SEP												
09...	2.97	1.50	8	35	37	2	.71	<.2	13.4	1.9	70	51
460939089064406 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 12) (LAT 46 09 39N LONG 089 06 44W)												
MAY 2002												
14...	2.92	1.37	8	33	40	--	1.43	<.10	1.79	2.4	59	40
SEP												
24...	3.30	1.55	8	37	45	--	1.25	<.10	3.93	1.9	53	45
MAY 2003												
15...	2.66	1.27	8	29	36	--	.72	<.17	3.90	2.0	64	38
SEP												
10...	3.40	1.50	7	38	43	1	.68	<.2	13.6	2.0	67	56
460730089042506 LAC VIEUX DESERT NEAR PHELPS, WI (SITE 13) (LAT 46 07 30N LONG 089 04 25W)												
MAY 2002												
15...	2.88	1.38	8	36	44	--	.79	<.10	1.78	2.5	54	41
SEP												
25...	3.54	1.63	8	37	45	--	.81	<.10	6.04	2.4	58	47
MAY 2003												
14...	2.76	1.35	8	31	38	--	.73	<.17	4.21	2.2	53	40
SEP												
09...	4.31	1.85	7	43	53	--	.80	<.2	14.0	2.8	72	63

STREAMS TRIBUTARY TO WISCONSIN RIVER

LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

WATER-QUALITY DATA

Date	Residue on evap. at 180degC wat flt mg/L (70300)	Ammonia + org-N, water, fltrd, mg/L as N (00623)	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)	Ortho-phos-phate, water, fltrd, mg/L as P (00671)	Phos-phorus, water, fltrd, mg/L (00666)	Phos-phorus, water, unfltrd mg/L (00665)	Boron, water, fltrd, ug/L (01020)	Iron, water, fltrd, ug/L (01046)	Mangan-ese, water, fltrd, ug/L (01056)
460851089040406 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 7) (LAT 46 08 51N LONG 089 04 04W)											
MAY 2002											
15...	53	.42	<.015	<.013	<.002	<.007	.009	.059	<13	146	8.1
SEP											
25...	57	.45	E.012	<.013	E.002	<.007	.008	.021	<13	28	E1.4
MAY 2003											
14...	53	.41	<.015	<.022	<.002	<.007	.010	.030	E11	152	14.8
SEP											
08...	63	.52	<.015	<.022	<.002	<.007	.010	.029	9.8	63	3.2
460714089090406 LAC VIEUX DESERT NR LAND O'LAKES, WI (SITE 8) (LAT 46 07 14N LONG 089 09 04W)											
MAY 2002											
16...	56	.42	<.015	.036	.003	<.007	.008	.049	<13	157	3.3
SEP											
26...	56	.45	.023	<.013	<.002	<.007	.006	.021	E6.4	28	13.3
MAY 2003											
13...	47	.41	<.015	<.022	<.002	<.007	.010	.030	<13	153	9.9
SEP											
09...	68	.43	<.015	<.022	<.002	<.007	.011	.049	10	54	2.9
460939089064406 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 12) (LAT 46 09 39N LONG 089 06 44W)											
MAY 2002											
14...	55	.47	<.015	.052	.003	<.007	.010	.035	<13	173	3.9
SEP											
24...	59	.39	<.015	<.013	<.002	<.007	.005	.034	E8.5	18	4.0
MAY 2003											
15...	67	.43	E.014	<.022	<.002	<.007	.011	.037	<13	159	19.9
SEP											
10...	77	.49	<.015	<.022	<.002	<.007	.009	.064	9.3	59	12.8
460730089042506 LAC VIEUX DESERT NEAR PHELPS, WI (SITE 13) (LAT 46 07 30N LONG 089 04 25W)											
MAY 2002											
15...	50	.42	<.015	.021	.003	<.007	.009	.039	<13	152	6.7
SEP											
25...	61	.41	<.015	<.013	E.002	<.007	.007	.025	<13	37	E1.9
MAY 2003											
14...	51	.40	<.015	<.022	<.002	<.007	.010	.034	E9.1	134	10.0
SEP											
09...	74	.38	<.015	<.022	<.002	<.007	.009	.038	8.6	39	5.9

STREAMS TRIBUTARY TO WISCONSIN RIVER

LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

WATER-QUALITY DATA

460833089044903 LAC VIEUX DESERT NR INDIAN VILLAGE, MI (SITE 3A) (LAT 46 08 33N LONG 089 04 49W)

PHOTIC ZONE

Date	Time	Chlorophyll a phytoplankton, fluoro, ug/L (70953)	Chlorophyll b phytoplankton, fluoro, ug/L (70954)
MAY 2002			
15...	0945	1.5	<.1
SEP			
25...	1115	4.4	<.1
MAY 2003			
14...	1200	6.5	<.1
SEP			
08...	1320	3.7	<.1

460726089065003 LAC VIEUX DESERT NEAR PHELPS, WI (SITE 5A) (LAT 46 07 26N LONG 089 06 50W)

PHOTIC ZONE

Date	Time	Chlorophyll a phytoplankton, fluoro, ug/L (70953)	Chlorophyll b phytoplankton, fluoro, ug/L (70954)
MAY 2002			
15...	1020	10.7	1.1
SEP			
25...	1530	8.9	<.1
MAY 2003			
15...	0915	5.9	<.1
SEP			
09...	0930	5.9	.7

STREAMS TRIBUTARY TO WISCONSIN RIVER

LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

WATER-QUALITY DATA

460833089044901 LAC VIEUX DESERT NEAR INDIAN VILLAGE, MI (SITE 3A) (LAT 46 08 33N LONG 089 04 49W)

Date	Sampling depth, feet (00003)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)
MAY 2002						
15...	3.00	12.1	110	8.5	74	8.5
15...	5.00	11.8	108	8.6	75	8.5
15...	7.00	11.9	107	8.6	75	8.0
15...	10.0	11.9	107	8.6	75	8.0
15...	13.0	11.8	106	8.6	75	8.0
15...	16.0	11.8	106	8.6	75	8.0
15...	19.0	11.8	106	8.5	75	8.0
15...	22.0	11.7	105	8.4	77	8.0
15...	25.0	11.6	105	8.4	76	8.0
15...	27.0	11.6	105	8.4	76	8.0
SEP						
25...	3.00	9.1	91	8.4	78	13.0
25...	6.00	8.9	89	8.4	78	13.0
25...	9.00	8.9	89	8.5	78	13.0
25...	12.0	8.9	89	8.5	78	13.0
25...	15.0	8.9	89	8.5	78	13.0
25...	18.0	9.0	90	8.6	78	13.0
25...	21.0	9.3	92	8.7	78	12.5
25...	24.0	9.4	93	8.7	78	12.5

460726089065001 LAC VIEUX DESERT NEAR PHELPS, WI (SITE 5A) (LAT 46 07 26N LONG 089 06 50W)

Date	Sampling depth, feet (00003)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)
MAY 2002						
15...	3.00	11.6	105	8.4	79	8.0
15...	7.00	11.4	103	8.4	79	8.0
15...	11.0	11.4	103	8.3	78	8.0
15...	15.0	11.5	104	8.3	79	8.0
15...	19.0	11.4	102	8.2	79	7.5
15...	23.0	11.2	100	8.1	79	7.5
15...	27.0	11.2	100	8.1	79	7.5
15...	31.0	11.1	99	8.1	79	7.5
15...	35.0	11.1	99	8.0	79	7.5
15...	39.0	10.8	96	7.9	79	7.5
SEP						
25...	3.00	8.6	89	8.1	77	14.0
25...	6.00	8.6	89	8.2	78	14.0
25...	9.00	8.6	89	8.2	78	14.0
25...	13.0	8.4	86	8.2	78	14.0
25...	17.0	8.5	87	8.2	78	14.0
25...	21.0	8.4	86	8.2	78	14.0
25...	25.0	8.4	86	8.2	78	14.0
25...	29.0	8.3	85	8.2	77	14.0
25...	33.0	7.2	74	8.2	78	14.0
25...	37.0	8.2	84	8.1	77	14.0

STREAMS TRIBUTARY TO WISCONSIN RIVER

LAC VIEUX DESERT NEAR LAND O'LAKES, WI--Continued

WATER-QUALITY DATA

460833089044901 LAC VIEUX DESERT NEAR INDIAN VILLAGE, MI (SITE 3A) (LAT 46 08 33N LONG 089 04 49W)

Date	Sampling depth, feet (00003)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)
MAY 2003						
14...	3.00	12.4	123	8.2	74	12.0
14...	6.00	12.2	120	8.1	74	11.5
14...	9.00	11.8	114	8.0	74	11.0
14...	12.0	11.2	106	7.8	77	10.0
14...	15.0	11.2	106	7.7	74	10.0
14...	18.0	10.6	100	7.6	72	10.0
14...	21.0	9.8	92	7.5	66	9.5
14...	24.0	9.7	91	7.5	65	9.5
SEP						
08...	3.00	9.9	119	9.1	78	21.5
08...	5.00	9.8	116	9.1	78	21.0
08...	7.00	9.7	113	9.2	79	20.0
08...	10.0	9.2	105	9.0	78	19.0
08...	12.0	8.6	97	9.1	78	18.5
08...	14.0	8.6	97	9.0	78	18.5
08...	16.0	8.6	96	9.0	79	18.0
08...	18.0	8.3	93	9.0	78	18.0
08...	21.0	7.7	85	8.9	78	17.5

460726089065001 LAC VIEUX DESERT NEAR PHELPS, WI (SITE 5A) (LAT 46 07 26N LONG 089 06 50W)

Date	Sampling depth, feet (00003)	Dissolved oxygen, mg/L (00300)	Dissolved oxygen, percent of saturation (00301)	pH, water, unfltrd field, std units (00400)	Specif. conductance, wat unf uS/cm 25 degC (00095)	Temperature, water, deg C (00010)
MAY 2003						
15...	3.00	10.7	103	8.0	78	11.0
15...	7.00	10.6	102	7.9	78	11.0
15...	11.0	9.9	94	7.7	78	10.5
15...	15.0	9.5	91	7.6	78	10.5
15...	19.0	9.0	86	7.4	78	10.5
15...	23.0	8.9	85	7.4	78	10.5
15...	27.0	8.7	82	7.3	78	10.0
15...	31.0	8.6	81	7.3	77	10.0
15...	35.0	8.4	79	7.2	76	10.0
15...	38.0	8.4	78	7.2	76	9.5
SEP						
09...	3.00	8.0	92	8.2	76	19.5
09...	7.00	6.1	69	7.3	76	19.0
09...	11.0	5.8	66	7.2	77	19.0
09...	15.0	5.9	66	7.2	77	18.5
09...	19.0	5.6	63	7.1	77	18.5
09...	23.0	5.4	61	7.1	77	18.5
09...	27.0	5.3	60	7.1	77	18.5
09...	31.0	4.9	55	7.0	78	18.5
09...	35.0	4.3	48	6.9	79	18.5

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 mi^2.

PERIOD OF RECORD.--July 2002 to September 2003.

GAGE.--Water-stage recorder and crest stage gage. Datum of gage is 1,600.00 ft above sea level.

REMARKS.--Records fair. Several measurements of water temperature were made during the year. Flow regulated by dam immediately upstream. Satellite telemetry at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2001 TO SEPTEMBER 2002
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	16	18	15
2	---	---	---	---	---	---	---	---	---	16	18	16
3	---	---	---	---	---	---	---	---	---	16	17	15
4	---	---	---	---	---	---	---	---	---	15	17	14
5	---	---	---	---	---	---	---	---	---	15	17	15
6	---	---	---	---	---	---	---	---	---	14	17	16
7	---	---	---	---	---	---	---	---	---	14	16	16
8	---	---	---	---	---	---	---	---	---	15	14	16
9	---	---	---	---	---	---	---	---	---	14	15	e16
10	---	---	---	---	---	---	---	---	---	14	15	e15
11	---	---	---	---	---	---	---	---	---	13	14	e16
12	---	---	---	---	---	---	---	---	---	13	15	16
13	---	---	---	---	---	---	---	---	---	13	15	15
14	---	---	---	---	---	---	---	---	---	12	15	16
15	---	---	---	---	---	---	---	---	---	12	14	16
16	---	---	---	---	---	---	---	---	---	12	14	15
17	---	---	---	---	---	---	---	---	---	12	14	15
18	---	---	---	---	---	---	---	---	---	14	13	14
19	---	---	---	---	---	---	---	---	---	14	13	15
20	---	---	---	---	---	---	---	---	---	13	13	15
21	---	---	---	---	---	---	---	---	---	14	15	15
22	---	---	---	---	---	---	---	---	---	14	16	14
23	---	---	---	---	---	---	---	---	---	12	16	15
24	---	---	---	---	---	---	---	---	---	12	17	15
25	---	---	---	---	---	---	---	---	---	13	17	14
26	---	---	---	---	---	---	---	---	---	13	17	15
27	---	---	---	---	---	---	---	---	---	12	17	15
28	---	---	---	---	---	---	---	---	---	12	17	15
29	---	---	---	---	---	---	---	---	---	14	16	15
30	---	---	---	---	---	---	---	---	---	15	17	16
31	---	---	---	---	---	---	---	---	---	16	16	---
TOTAL	---	---	---	---	---	---	---	---	---	424	485	456
MEAN	---	---	---	---	---	---	---	---	---	13.7	15.6	15.2
MAX	---	---	---	---	---	---	---	---	---	16	18	16
MIN	---	---	---	---	---	---	---	---	---	12	13	14
CFSM	---	---	---	---	---	---	---	---	---	0.40	0.45	0.44
IN.	---	---	---	---	---	---	---	---	---	0.46	0.52	0.49

STREAMS TRIBUTARY TO WISCONSIN RIVER

05390101 WISCONSIN RIVER NEAR LAND O'LAKES, WI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	23	84	49	35	29	11	5.3	55	13	13	11
2	21	23	82	47	34	29	11	5.5	54	13	13	9.7
3	21	23	79	46	e34	29	11	5.4	53	13	13	9.7
4	22	24	77	46	e34	29	11	5.5	52	13	14	9.2
5	21	e22	74	45	e33	29	11	6.4	27	13	14	8.0
6	23	e22	73	45	e33	28	11	6.4	11	13	14	8.0
7	59	e22	71	44	e33	28	11	6.5	10	12	13	8.1
8	94	e22	69	43	e33	28	11	6.8	9.9	12	13	9.2
9	94	e35	67	43	e32	28	11	7.2	17	12	13	10
10	93	e50	66	43	e32	28	11	7.4	22	12	13	10
11	92	e90	68	43	e32	28	11	19	28	13	12	9.5
12	93	e133	68	42	e32	27	11	39	32	13	12	9.1
13	92	e130	66	42	e32	27	11	46	32	13	12	9.2
14	91	e125	65	42	e31	22	11	58	32	13	12	9.7
15	93	e125	64	41	e31	12	11	65	32	13	12	9.8
16	91	e120	63	40	e31	12	10	64	25	12	11	9.8
17	88	e115	61	40	e31	12	10	64	19	12	11	9.9
18	90	e115	62	40	e31	12	10	63	17	12	11	9.9
19	88	e110	62	40	31	12	10	62	16	12	11	10
20	57	e107	61	39	31	12	11	65	14	12	11	10
21	22	105	60	39	31	11	11	64	12	12	11	9.5
22	22	103	59	38	31	12	11	63	12	11	11	10
23	21	101	57	38	30	12	12	63	12	11	11	10
24	22	97	56	37	30	11	13	62	12	12	11	10
25	22	96	55	37	30	11	11	62	12	13	11	10
26	22	92	54	37	30	11	6.4	60	12	13	11	11
27	22	90	54	36	29	11	5.5	59	12	13	11	11
28	22	88	52	36	29	11	5.0	59	12	13	11	11
29	22	87	51	36	---	11	4.9	58	12	13	11	11
30	23	85	51	35	---	11	5.1	58	13	13	11	10
31	23	---	49	35	---	11	---	58	---	13	11	---
TOTAL	1583	2380	1980	1264	886	584	300.9	1273.4	678.9	388	369	293.3
MEAN	51.1	79.3	63.9	40.8	31.6	18.8	10.0	41.1	22.6	12.5	11.9	9.78
MAX	94	133	84	49	35	29	13	65	55	13	14	11
MIN	17	22	49	35	29	11	4.9	5.3	9.9	11	11	8.0
CFSM	1.48	2.31	1.86	1.19	0.92	0.55	0.29	1.19	0.66	0.36	0.35	0.28
IN.	1.71	2.57	2.14	1.37	0.96	0.63	0.33	1.38	0.73	0.42	0.40	0.32

SUMMARY STATISTICS	FOR 2003 WATER YEAR		WATER YEARS 2002 - 2003	
ANNUAL TOTAL	11980.5			
ANNUAL MEAN	32.8		32.8	
HIGHEST ANNUAL MEAN			32.8	2003
LOWEST ANNUAL MEAN			32.8	2003
HIGHEST DAILY MEAN	133	Nov 12	133	Nov 12 2002
LOWEST DAILY MEAN	4.9	Apr 29	4.9	Apr 29 2003
ANNUAL SEVEN-DAY MINIMUM	5.2	Apr 27	5.2	Apr 27 2003
MAXIMUM PEAK FLOW	(e)133	Nov 12	(e)133	Nov 12 2002
MAXIMUM PEAK STAGE	(a)80.65	Nov 12	(a)80.65	Nov 12 2002
INSTANTANEOUS LOW FLOW	4.8	Apr 29	4.8	Apr 29 2003
ANNUAL RUNOFF (CFSM)	0.95		0.95	
ANNUAL RUNOFF (INCHES)	12.96		12.96	
10 PERCENT EXCEEDS	75		75	
50 PERCENT EXCEEDS	22		22	
90 PERCENT EXCEEDS	10		10	

(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 floodflow 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	Water year 2003 maximum			Period of record maximum		
			Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (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 downstream from end of two-track road, 3.2 mi upstream from mouth, and 20 mi northwest of Paradise. Drainage area is 200 mi^2.	1973-03	04-21-03	10.68	1260	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.	1973-03	04-20-03	8.04	599	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 Perronville, and 11.5 mi upstream from Ford River. Drainage area is 38.4 mi^2.	1971-77‡, 1978-03	04-20-03	b4.56	358	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	Water year 2003 maximum			Period of record maximum		
			Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (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‡, 1980-03	04-05-03	<4.02	<78	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, Hydrologic Unit 04050003, at State Highway 40 in Hamilton. Drainage area is 274 mi^2.	1979-03	04-05-03	13.93	1,340	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. Drainage area is 39.5 mi^2.	1975-03	04-05-03	g9.72	312	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‡, 1993-03	03-22-03	h4.80	897	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 downstream from Coldwater River. Datum of gage is 676.31 ft above sea level. Drainage area is 773 mi^2.	1931-38‡, 1952-82‡, 1984-94‡, 1995-03	04-07-03	6.37	2,130	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	Water year 2003 maximum			Period of record maximum		
			Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (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.	1999-03	04-07-03	12.05	7,720	05-21-00	18.84	20,300
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.	1974-03	05-13-03	7.01	467	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.	1974-03	05-13-03	7.45	471	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.	1975-03	07-22-03	2.69	159	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.	1975-03	05-12-03	i2.55	414	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‡, 1983-03	05-25-03	j3.02	617	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	Water year 2003 maximum			Period of record maximum		
			Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (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, Hydrologic Unit 04080204, at Barnes Lake Road, 2.9 mi northeast of Columbiaville. Drainage area is 223 mi^2.	1987-03	03-19-03	k12.52	e380	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, Hydrologic 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‡, 1991-03	03-16-03	k6.42	e620	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‡, 1991-03	04-04-03	m5.14	229	04-19-75	f7.65	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, Hydrologic Unit 04090001, at Gratiot Road, 1.9 mi northeast of Rattle Run. Drainage area is 135 mi^2.	1974-03	04-05-03	n14.85	1,210	06-22-96	24.24	5,730
STREAMS TRIBUTARY TO LAKE ST. CLAIR								
Clinton River at Auburn Hills, MI (04161000)	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. Datum of gage is 846.50 ft above sea level. Drainage area is 123 mi^2.	1935-39‡, 1940‡, 1957-82‡, 1983-91, 2001-02‡, 2003	04-04-03	3.30	721	09-30-81	5.41	1,780

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	Water year 2003 maximum			Period of record maximum		
			Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
STREAMS TRIBUTARY TO LAKE ST. CLAIR--Continued								
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, Hydrologic Unit 04090003, at Huron-Clinton Metropolitan Park Road, 3.4 mi west of Washington. Drainage area is 22.5 mi^2.	1965-03	04-06-03	o2.45	93	04-19-75	p4.42	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, Hydrologic Unit 04090003, at State Highway 53 in Almont. Drainage area is 9.56 mi^2.	1959-62, 1963-68‡, 1969-03	04-04-03	4.71	248	09-06-85	q8.60	818
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, Hydrologic Unit 04090003, at 33 Mile Road, 2.2 mi northeast of Romeo. Drainage area is 49.7 mi^2.	1959-64, 1965-69‡, 1970-03	04-04-03	3.85	771	04-19-75	r5.44	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, Hydrologic Unit 04090003, at 27 Mile Road, 1.9 mi northwest of Meade. Drainage area is 89.6 mi^2.	1959-67, 1968-72‡, 1973-03	04-05-03	6.85	1,070	04-19-75	s7.76	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, Hydrologic Unit 04090003, at North Road, 3.4 mi south of Armada. Drainage area is 10.0 mi^2.	1959-65, 1966-70‡, 1971-03	04-04-03	4.12	129	04-19-75	t6.25	480
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, Hydrologic Unit 04090003, at 32 Mile Road, 3.0 mi southeast of Armada. Drainage area is 14.9 mi^2.	1959-65, 1965-70‡, 1971-03	04-04-03	16.10	943	09-06-85	u16.77	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, Hydrologic Unit 04090003, at 29 Mile Road, 3.4 mi northwest of New Haven. Drainage area is 36.1 mi^2.	1959-67, 1968-72‡, 1973-03	04-04-03	7.94	659	04-19-75	v8.95	2,700

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	Water year 2003 maximum			Period of record maximum		
			Date	Gage height (ft)	Discharge (ft^3/s)	Date	Gage height (ft)	Discharge (ft^3/s)
STREAMS TRIBUTARY TO LAKE ST. CLAIR--Continued								
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, Hydrologic Unit 04090003, at 25 1/2 Mile Road, 0.9 mi southeast of Meade. Drainage area is 12.7 mi^2.	1959-60, 1960-65‡, 1966-03	04-05-03	7.42	467	02-09-01	9.09	721
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‡, 1965-03	04-05-03	6.03	69.1	02-10-65	w8.82	220
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, Hydrologic Unit 04090003, at Schoenherr Road, 2.0 mi west of Macomb. Drainage area is 22.2 mi^2.	1959-64, 1965-69‡, 1971-03	03-17-03	10.47	554	06-26-68	12.17	1,400
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, Hydrologic Unit 04090004, at King Road in Trenton. Drainage area is 19.3 mi^2.	1972-03	04-05-03	x	e170	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‡, 1978-03	04-06-03	10.86	680	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, 5.58 ft, Mar. 22, 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, 9.97 ft, Mar. 16, backwater from ice.
h Maximum gage height, 6.24 ft, Jan. 23, backwater from ice.
i Maximum gage height, 3.16 ft, backwater from ice, date not determined.
j Maximum gage height, 3.15 ft, Mar. 23, backwater from ice.
k Backwater from ice.
m Maximum gage height, 5.41 ft, Mar. 16, backwater from ice.
n Maximum gage height, 14.86 ft, Mar. 17, backwater from ice.
o Maximum gage height, 3.47 ft, Mar. 17, backwater from ice.
p Maximum gage height, 5.93 ft, Jan. 27, 1974, backwater from ice.
q Maximum gage height, 8.62 ft, Apr. 19, 1975.
r Maximum gage height, 7.1 ft, Mar. 12 or 13, 1962, backwater from ice; site and datum then in use.
s Maximum gage height, 8.28 ft, Feb. 10, 2001.
t Maximum gage height, 6.95 ft, Sept. 6, 1985.
u Maximum gage height, 16.89 ft, Apr. 12, 2002.
v Maximum gage height, 9.87 ft, Feb. 9, 2001.
w Maximum gage height, 9.55 ft, June 26, 1968.
x Not determined.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2003

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (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	09-17-03	a29.9
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†, 1993-02	05-28-03 07-16-03 08-05-03 08-28-03	a95.5 a41.3 a34.5 a13.8
			STREAMS TRIBUTARY TO LAKE MICHIGAN				
04048000	Fox River	Manistique River	Lat 46°20'41", long 85°57'00", in NE1/4 NE1/4 sec.32, T.46 N., R.13 W., Schoolcraft County, Hydrologic Unit 04060106, at State Highway 28 in Seney.	107	1942-44‡, 1945, 1968-69, 2002	11-07-02 01-02-03 04-01-03 05-15-03 07-02-03 08-26-03 09-26-03	160 139 193 224 138 124 161
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‡, 1943-45, 1947-48, 1950, 2000, 2002	11-07-02 01-02-03 02-12-03 04-02-03 04-15-03 04-22-03 05-14-03 07-01-03 08-27-03	75.8 64.9 52.3 105 190 314 111 63.4 50.6
04052510	Walsh Creek	Driggs River	Lat 46°19'08", long 86°07'06", in SE1/4 SE1/4 sec.1, T.45 N., R.15 W., Schoolcraft County, Hydrologic Unit 04060106, downstream from control structure upstream from Driggs River, 8.5 mi southwest of Seney.	--	--	04-02-03 04-03-03 08-08-03 08-27-03 09-26-03	a54.4 a44.9 a8.14 a1.16 a14.5
04052730	Driggs River	Manistique River	Lat 46°13'56", long 86°02'12", in SE1/4 SE1/4 sec.3, T.44 N., R.14 W., Schoolcraft County, Hydrologic Unit 04060106, 0.8 mi southwest of M Pool at Seney National Wildlife Refuge, 5.5 mi west of Germfask. Previously published as station number 04052040.	--	2000, 2002	11-07-02 01-02-03 02-12-03 04-22-03 05-14-03 07-01-03 08-27-03	a102 a64.2 a64.5 a500 a167 a77.1 a73.0

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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued				
04053500	Marsh Creek	Manistique River	Lat 46°20'45", long 86°14'09", in NW1/4 NW1/4 sec.31, T.46 N., R.15 W., Schoolcraft County, Hydrologic Unit 04060106, at State Highway 28, 14.0 mi west of Seney.	b20	1938-42‡, 1943-45, 1947-48, 1950, 1998-00, 2002	11-07-02 04-15-03 04-22-03 05-15-03	2.12 14.1 17.3 4.84
04053600	Marsh Creek	Manistique River	Lat 46°17'22", long 86°08'38", in SW1/4 SE1/4 sec.14, T.45 N., R.15 W., Schoolcraft County, Hydrologic Unit 04060106, at outlet of C3 Pool at Seney National Wildlife Refuge, 10.3 mi southwest of Seney.	--	1999-00, 2002	01-02-03 04-03-03 07-01-03 08-08-03 08-27-03 09-26-03	a10.2 a90.5 a0.42 a15.1 a2.11 a12.3
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, 1970-92†, 1993-02	10-15-02 04-14-03 05-27-03 07-15-03	a6.4 a15.0 a20.2 a3.61
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†, 1993-02	07-02-03 07-31-03 09-03-03 09-18-03	a400 a284 a318 a555
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, 1999-02	04-03-03 06-18-03 07-29-03 09-17-03	a638 a486 a223 a308
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 Highway 95, 2.0 mi south of Witch Lake.	316	1964-80‡, 1997-98c, 1999-02	04-03-03 06-11-03 09-03-03 09-16-03	a660 a364 a65.7 a96.9

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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued				
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	11-19-02 06-18-03 07-31-03 09-18-03	a278 a318 a94.4 a159
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	1969-02	11-13-02 12-26-02 03-18-03 06-10-03	0.90 0.35 1.30 1.24
04096890	Pine Creek	Nottawa Creek	Lat 42°08'02", long 85°13'50", in NE1/4 SW1/4 sec.10, T.4 S., R.8 W., Calhoun County, Hydrologic Unit 04050001, at 0 Drive South, 3.0 mi north of Athens.	--	2000-02	10-01-02 11-13-02 04-29-03 05-28-03 06-09-03 06-17-03 07-17-03 07-30-03 08-20-03 09-10-03	8.38 14.7 16.2 18.5 23.9 14.5 7.24 5.38 7.25 6.59
04096894	Athens & Indian Creek Drain	Pine Creek	Lat 42°06'25", long 85°15'45", in NW1/4 SE1/4 sec.20, T.4 S., R.8 W., Calhoun County, Hydrologic Unit 04050001, at lane west from X Avenue, 2.0 mi northwest of Athens.	--	2001-02	10-01-02 11-13-02 04-29-03 05-28-03 06-09-03 07-30-03	e0.04 e0.31 0.50 0.62 0.49 0.05
04096900	Nottawa Creek	St. Joseph River	Lat 42°03'20", long 85°18'30", in NW1/4 sec.12, T.5 S., R.9 W., St. Joseph County, Hydrologic Unit 04050001, at Shorts Road, 4.2 mi southwest of Athens.	162	1967-97‡, 2002	10-01-02 11-12-02 04-29-03 06-09-03 07-30-03	41.0 53.4 80.2 76.2 33.7
04107300	Kalamazoo River	Lake Michigan	Lat 42°27'45", long 85°42'07", in NE1/4 NE1/4 sec.22, T.1 N., R.12 W., Allegan County, Hydrologic Unit 04050003, at North Street, at Otsego.	--	1983, 2002	10-29-02 01-07-03 02-10-03 03-24-03 04-30-03	797 1,050 844 1,410 909
04108530	Tollenbar Drain	Green Lake Creek	Lat 42°44'22", long 85°35'06", in SW1/4 SW1/4 sec.11, T.4 N., R.11 W., Allegan County, Hydrologic Unit 04050003, at 4th Street, 0.8 mi southeast of Green Lake.	--	--	06-03-03 07-17-03 08-28-03	d1.00 d0.75 d0.71
04108540	Green Lake Creek	Rabbit River	Lat 42°43'29", long 85°38'38", in NE1/4 NE1/4 sec.19, T.4 N. R.11 W., Allegan County, Hydrologic Unit 04050003, at 142nd Avenue, 1.4 mi southeast of Moline.	--	--	06-03-03	d5.86

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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued				
041124002	Red Cedar River	Grand River	Lat 42°42'50", long 84°26'01", in SE1/4 SW1/4 sec.21, T.4 N., R.1 W., Ingham County, Hydrologic Unit 04050004, 800 feet downstream from Okemos Road, in Okemos.	--	--	10-18-02	22.8
04115012	St. Johns Drain	Hayworth Drain	Lat 43°00'58", long 84°33'04", in NW1/4 NE1/4 sec.9, T.7 N., R.2 W., Clinton County, Hydrologic Unit 04050005, at Walker Street, in St. Johns.	--	2002	10-08-02	d0.82
04115600	Fish Creek	Maple River	Lat 43°07'34", long 84°50'43", in NE1/4 sec.36, T. 9 N., R.5 W., Montcalm County, Hydrologic Unit 04050005, at Jenks Road, 2.5 mi north of Hubbardston.	157	1963-65, 1981	08-12-03	d23.9
04115606	Fifield Creek	Fish Creek	Lat 43°06'34", long 84°50'13", in NW1/4 SW1/4 sec.6, T.8 N., R.4 W., Clinton County, Hydrologic Unit 04050005, at Hubbardston Road, 1.1 mi north of Hubbardston.	--	--	08-12-03	d0.09
04115613	Stoughton Creek	Fish Creek	Lat 43°06'08", long 84°51'23", in NE1/4 NE1/4 sec.11, T.8 N., R.5 W., Ionia County, Hydrologic Unit 04050005, at Cowman Road, 1.0 mi northwest of Hubbardston.	--	--	08-12-03	d0.33
04116340	Unnamed Tributary	Dickerson Creek	Lat 43°06'09", long 85°07'30", in NE1/4 NW1/4 sec.10, T.8 N., R.7 W., Ionia County, Hydrologic Unit 04050006, at Flannigan Road, 2.4 mi north of Orleans.	--	--	06-12-03 07-18-03	d0.35 d0.00
04116517	Flat River	Grand River	Lat 42°57'57", long 85°21'03", in SW1/4 NW1/4 sec.26, T.7 N., R.9 W., Kent County, Hydrologic Unit 04050006, at Burroughs Drive, 1.5 mi north of Lowell.	--	2002	11-07-02 11-07-02	a85.2 a109
04116648	Butternut Creek	Thornapple River	Lat 42°34'56", long 84°49'20", in NW1/4 NE1/4 sec.7, T.2 N., R.4 W., Eaton County, Hydrologic Unit 04050007, at Packard Highway, 1.5 mi northeast of Charlotte.	--	--	06-12-03 07-17-03 08-28-03	d3.55 d1.80 d1.61

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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued				
04116670	Thornapple and Extension Drain	Thornapple Drain	Lat 42°40'58", long 84°42'06", in SE1/4 SE1/4 sec.31, T.4 N., R.3 W., Eaton County, Hydrologic Unit 04050007, at Davis Highway, 4.2 mi northeast of Potterville.	--	--	06-12-03 08-28-03	d0.08 d0.00
04117040	Mud Creek	Thornapple Lake	Lat 42°45'32", long 85°00'53", in SE1/4 SE1/4 sec.4, T.4 N., R.6 W., Eaton County, Hydrologic Unit 04050007, at Round Lake Road, 1.0 mi west of Sunfield.	--	--	06-12-03 07-17-03	d0.49 d0.04
04117944	Clarke and Bunker Drain	Coldwater River	Lat 42°49'51", long 85°22'50", in NE1/4 SW1/4 sec.9, T.5 N., R.9 W., Kent County, Hydrologic Unit 04050007, at 74th Avenue, 1.8 mi south of Alto.	--	--	06-11-03 08-27-03	d0.42 d0.16
04118015	Unnamed Tributary	Thornapple River	Lat 42°50'34", long 85°30'11", in SW1/4 SW1/4 sec.4, T.5 N., R.10 W., Kent County, Hydrologic Unit 04050007, at Egan Avenue, 1.0 mi west of Alaska.	--	--	06-11-03	d0.00
04118030	Unnamed Tributary	Thornapple River	Lat 42°51'39", long 85°29'54", in NW1/4 SE1/4 sec.33, T.6 N., R.10 W., Kent County, Hydrologic Unit 04050007, at Thornapple River Drive, 1.7 mi northwest of Alaska.	--	--	06-11-03 07-18-03	d1.09 d0.38
04118070	Unnamed Tributary	Thornapple River	Lat 42°54'02", long 85°30'34", in SE1/4 SE1/4 sec.17, T.6 N., R.10 W., Kent County, Hydrologic Unit 04050007, at Thornapple River Drive, 1.0 mi southwest from Cascade.	--	--	06-11-03 07-18-03	d1.11 d0.74
04118375	Ball Creek	Rogue River	Lat 43°13'11", long 85°45'17", in NE1/4 NE1/4 sec.32, T.10 N., R.12 W., Muskegon County, Hydrologic Unit 04050006, at 17 Mile Road, in Kent City.	--	--	06-11-03 07-18-03 08-27-03	d0.62 d0.18 d0.09
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.	--	1953-54, 1956, 1960, 1971	05-27-03	d30.6

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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued				
04120900	Muskegon River	Lake Michigan	Lat 44°24'28", long 84°47'33", in NW1/4 NW1/4 sec.10, T.23 N., R.4 W., Roscommon County, Hydrologic Unit 04060102 at old U.S. Highway 27, 5.4 mi north of Houghton Lake Heights.	222	1953, 1971-73, 1993, 2002	10-07-02	26.2
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†, 1993-02	12-02-02 01-21-03 06-12-03 08-27-03	a20.2 a13.2 a12.4 a5.18
04121310	Clam River	Muskegon River	Lat 44°07'03", long 85°00'56", in SW1/4 SE1/4 sec.15, T.20 N., R.6 W., Clare County, Hydrologic Unit 04060102, at Haskell Lake Road, 6.5 mi east of Marion.	--	2002	10-07-02	82.2
04121365	Muskegon River	Lake Michigan	Lat 43°59'10", long 85°05'25", in NE1/4 NE1/4 sec.1, T.18 N., R.7 W., Osceola County, Hydrologic Unit 04060102, at State Highway 115, 14 mi northwest from Farwell.	--	2002	10-07-02	293
04121621	Muskegon River	Lake Michigan	Lat 43°50'50", long 85°25'56", in NW1/4 SE1/4 sec.19, T.17 N., R.9 W., Osceola County, Hydrologic Unit 04060102, at Hersey Road, in Hersey.	1,642	2002	10-08-02 06-24-03	535 580
04121855	Little Muskegon River	Muskegon River	Lat 43°32'23", long 85°18'33", in NW1/4 NE1/4 sec.7, T.13 N., R.8 W., Mecosta County, Hydrologic Unit 04060102, adjacent to 5-Mile Road, in Altona.	--	2002	10-10-02	65.5
04122074	Markle Drain	Cedar Creek	Lat 43°25'28", long 86°03'33", in NE1/4 NE1/4 sec.23, T.12 N., R.15 W., Muskegon County, Hydrologic Unit 04060102, at Brickyard Road, 1.0 mi southeast of Brunswick.	--	--	04-28-03	d1.88
04122075	Folsom Drain	Cedar Creek	Lat 43°24'43", long 86°03'33", in SE1/4 SE1/4 sec.23, T.12 N., R.15 W., Muskegon County, Hydrologic Unit 04060102, at Brickyard Road, 1.0 mi east of Holton.	--	--	04-30-03	d0.04

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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued				
04122076	Cedar Creek	Muskegon River	Lat 43°23'45", long 86°06'16", in NE1/4 NE1/4 sec.33, T.12 N., R.15 W., Muskegon County, Hydrologic Unit 04060102, at Crystal Lake Road, 1.7 mi southwest of Holton.	--	--	04-28-03	d15.0
04122077	Cedar Creek	Muskegon River	Lat 43°19'58", long 86°08'01", in SW1/4 NW1/4 sec.20, T.11 N., R.15 W., Muskegon County, Hydrologic Unit 04060102, at Sweeter Road, 2.5 mi southeast of Twin Lake.	--	--	04-28-03	d64.3
04122255	Middle Branch Pere Marquette River	Pere Marquette River	Lat 43°52'25", long 85°43'27", in SE1/4 SE1/4 sec.10, T.17 N., R.12 W., Lake County, Hydrologic Unit 04060101, at Rosa Road, 4.5 mi southwest of Chase.	30.0	1966, 1971, 2002	10-08-02	14.3
04122280	Little South Branch Pere Marquette River	Pere Marquette River	Lat 43°48'05", long 85°46'15", in SE1/4 SW1/4 sec.5, T.16 N. R.12 W., Newaygo County, Hydrologic Unit 04060101 at 17 Mile Road, 6.0 mi south of Idlewild.	--	1970, 1993, 2002	10-08-02 06-26-03	42.0 29.8
04122327	Baldwin River	Pere Marquette River	Lat 43°52'06", long 85°51'43", in NW1/4 NW1/4 sec.15, T.17 N., R.13 W., Lake County, Hydrologic Unit 04060101, downstream from Sanborn Creek, in Baldwin.	--	2002	10-08-02 06-24-03	66.7 60.7
04122330	Pere Marquette River	Lake Michigan	Lat 43°51'43", long 85°52'53", in NW1/4 SW1/4 sec.16, T.17 N., R.13 W., Lake County, Hydrologic Unit 04060101, at North Peacock Trail, 2.8 mi southwest of Baldwin.	--	1971, 2002	10-08-02	191
04122390	Pere Marquette River	Lake Michigan	Lat 43°55'45", long 86°01'09", in NE1/4 NE1/4 sec.30, T.18 N., R.14 W., Lake County, Hydrologic Unit 04060101, at South Branch Road, 5 mi southeast of Walhalla.	--	2002	10-09-02 06-26-03	269 228
04122402	Weldon Creek	Pere Marquette River	Lat 43°58'16", long 86°07'13", in NE1/4 sec.8, T.18 N., R.15 W., Mason County, Hydrologic Unit 04060101, at Benson Road, 1.2 mi north of Walhalla.	--	2002	10-09-02 06-25-03 07-10-03	3.19 8.06 7.64

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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued				
04122435	Big South Branch Pere Marquette River	Pere Marquette River	Lat 43°47'03", long 86°01'07", in NE1/4 NE1/4 sec.18, T.16 N., R.14 W., Newaygo County, Hydrologic Unit 04060101, at Dickinson Road, 3.0 mi southwest from Pine Grove Beach.	--	2002	10-09-02	76.1
04122450	Big South Branch Pere Marquette River	Pere Marquette River	Lat 43°52'33", long 86°06'49", in SW1/4 SW1/4 sec.9, T.17 N., R.15 W., Mason County, Hydrologic Unit 04060101, at Walhalla Road, 5.5 mi south of Walhalla.	--	2002	10-09-02 06-25-03	116 243
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.	--	--	05-21-03	a54.0
04126802	Crystal River	Lake Michigan	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, at County Highway 675, 1.4 mi northeast of Glen Arbor.	42.0	1979-82, 1988-89	05-21-03 05-21-03	a48.1 a50.8
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.	--	--	05-21-03	a53.6
04127200	Boardman River	Lake Michigan	Lat 44°40'30", long 85°37'49", in SW1/4 sec.3, T.26 N., R.11 W., Grand Traverse County, Hydrologic Unit 04060105, at Beitner Road, 6.0 mi south of Traverse City.	--	2001	06-25-03 07-09-03	184 189
04127515	Vandarli Creek	Mitchell Creek	Lat 44°43'22", long 85°33'11", in NW1/4 SW1/4 sec.20, T.27 N., R.10 W., Grand Traverse County, Hydrologic Unit 04060105, at Vanderlip Road, 1.3 mi southeast of Traverse City.	--	1995	08-20-03	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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE HURON				
04143830	Shiawassee River	Saginaw River	Lat 42°47'57", long 83°38'52", in SW1/4 SW1/4 sec.28, T.5 N., R.7 E., Oakland County, Hydrologic Unit 04080203, at Fish Lake Road, 0.5 mi west of Holly.	49.2	1955, 1963, 1966-68, 1980-81, 2002	11-11-02 12-11-02 01-28-03 04-22-03 05-20-03 06-12-03 07-23-03 08-05-03 09-09-03	25.2 15.4 20.0 40.7 40.0 43.8 7.19 9.70 4.53
04145928	Pine Creek	South Branch Flint River	Lat 43°02'28", long 83°14'43", in NE1/4 sec.11, T.7 N., R.10 E., Lapeer County, Hydrologic Unit 04080204, at Wilder Road, 3.5 mi east of Lapeer.	--	1972	07-23-03 09-11-03	d4.11 d2.09
04145936	Kintz Creek	Hunters Creek	Lat 42°58'16", long 83°18'16", in NW1/4 NW1/4 sec.4, T.6 N., R.10 E., Lapeer County, Hydrologic Unit 04080204, at Sutton Road, 2.0 mi north of Metamora.	--	--	07-23-03 09-04-03	d1.55 d0.36
04146023	Gibbons Drain	Mayfield and Oregon Drain	Lat 43°03'26", long 83°21'05", in NW1/4 NE1/4 sec.1, T.7 N., R.9 E., Lapeer County, Hydrologic Unit 04080204, at Oregon Road, 1.8 mi west of Lapeer.	--	--	07-23-03 09-11-03	d<0.01 d0.00
04146037	Plum Creek Drain	South Branch Flint River	Lat 43°05'30", long 83°18'28", in NE1/4 SE1/4 sec.20, T.8 N., R.10 E., Lapeer County, Hydrologic Unit 04080204, at Lapeer Road, 2.5 mi north of Lapeer.	--	--	07-23-03 09-11-03	d2.13 d0.38
04146150	North Branch Drain	North Branch Flint River	Lat 43°14'06", long 83°10'35", in NE1/4 NE1/4 sec.4, T.9 N., R.11 E., Lapeer County, Hydrologic Unit 04080204, at Lake Pleasant Road, 1.0 mi northeast of North Branch.	--	--	07-23-03	d1.02
04146430	Crystal Creek	North Branch Flint River	Lat 43°08'48", long 83°18'04", in SE1/4 SW1/4 sec.33, T.9 N., R.10 E., Lapeer County, Hydrologic Unit 04080204, at Norway Lake Road, 5.3 mi southeast of Columbiaville.	--	--	09-11-03	d0.00
04146435	Crystal Creek	North Branch Flint River	Lat 43°11'24", long 83°19'01", in SE1/4 SE1/4 sec.17, T.9 N., R.10 E., Lapeer County, Hydrologic Unit 04080204, at Barnes Lake Road, 5.0 mi northeast of Columbiaville.	--	--	07-23-03 09-11-03	d1.07 d0.21

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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE HURON--Continued				
04147980	Coe Drain	Butternut Creek	Lat 43°09'58", long 83°31'55", in NE1/4 NW1/4 sec.28, T.9 N., R.8 E., Genesee County, Hydrologic Unit 04080204, at Wilson Road, 0.4 mi west of Otisville.	--	--	09-11-03	d0.00
04147981	Unnamed Tributary	Coe Drain	Lat 43°09'51", long 83°32'07", in NW1/4 NW1/4 sec.28, T.9 N., R.8 E., Genesee County, Hydrologic Unit 04080204, at Wilson Road, 0.6 mi west of Otisville.	--	--	07-23-03	d0.06
04148035	Kearsley Creek	Flint River	Lat 42°51'08", long 83°26'47", in SE1/4 SW1/4 sec.7, T.5 N., R.9 E., Oakland County, Hydrologic Unit 04080204, at Mill Street, in Ortonville.	--	2002	12-11-02 04-22-03 06-12-03 07-23-03 08-05-03 09-09-03	6.76 37.8 32.2 6.19 6.11 4.17
04152182	South Branch Tobacco River	Tobacco River	Lat 43°49'45", long 84°44'53", in NW1/4 NW1/4 sec.36, T.17 N., R.4 W., Clare County, Hydrologic Unit 04080201, at Eberhart Avenue, in Clare.	58.0	1964, 1979, 2002	10-08-02	d51.5
04152185	Little Tobacco Joint Drain	South Branch Tobacco River	Lat 43°49'19", long 84°44'54", in SW1/4 NW1/4 sec.36, T.17 N., R.4 W., Clare County, Hydrologic Unit 04080201, at Eberhart Avenue, 1.0 mi east of Clare.	10.5	1958, 2002	10-08-02	d1.50
04154115	Onion Creek	Salt Creek	Lat 43°35'19", long 84°42'01", in NE1/4 SW1/4 sec.20, T.14 N., R.3 W., Isabella County, Hydrologic Unit 04080202, at Tomah Road, 4.0 mi southeast of Mt. Pleasant.	--	2002	10-08-02	d0.03
04155002	Horse Creek	Pine River	Lat 42°22'43", long 84°37'22", in NW1/4 NW1/4 sec.1, T.11 N., R.3 W., Gratiot County, Hydrologic Unit 04080202, at Business Highway U.S. 27, in Alma.	--	2002	10-08-02	d0.32
04159003	Gorke Drain	Pigeon River	Lat 43°49'51", long 83°13'51", in SE1/4 SW1/4 sec.6, T.16 N., R.11 E., Huron County, Hydrologic Unit 04080103, at Richardson Road, 2.6 mi northwest of Elkton.	--	--	07-15-03 08-26-03	d0.09 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 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE HURON--Continued				
04159018	Bad Axe Drain	Bad Axe Creek	Lat 43°48'38", long 82°59'41", in SE1/4 SW1/4 sec.18, T.16 N., R.13 E., Huron County, Hydrologic Unit 04080103, at Whitelam Street, in Bad Axe.	--	--	07-15-03	d4.05
04159065	Baranski Drain	Lake Huron	Lat 44°02'56", long 82°58'12", in SE1/4 NE1/4 sec.29, T.19 N., R.13 E., Huron County, Hydrologic Unit 04080103, at Hellems Road, 1.0 mi east of Port Austin.	--	--	07-15-03 08-26-03	d2.80 d0.01
			STREAMS TRIBUTARY TO LAKE ST. CLAIR				
04160668	Marsac Creek	Lake St. Clair	Lat 42°44'10", long 82°43'12", in NW1/4 NE1/4 sec.31, T.4 N., R.15 E., St. Clair County, Hydrologic Unit 04090002, at Springborn Road, 4.0 mi northeast of New Baltimore.	--	--	07-03-03	d0.12
04160677	Fistler Drain	Salt River	Lat 42°47'40", long 82°45'53", in NE1/4 NW1/4 sec.11, T.4 N., R.14 E., Macomb County, Hydrologic Unit 04090002, at 31 Mile Road, 1.2 mi southwest of Richmond.	--	--	07-03-03 09-04-03	d0.82 d1.03
041606885	Kirkham Drain	Salt River	Lat 42°43'12", long 82°46'05", in SW1/4 SW1/4 sec.35, T.4 N., R.14 E., Macomb County, Hydrologic Unit 04090002, at 26 Mile Road, 1.8 mi southeast of New Haven.	--	--	07-03-03	d0.09
041606887	Unnamed Tributary	Salt River	Lat 42°45'00", long 82°44'50", in SW1/4 SW1/4 sec.24, T.4 N., R.14 E., Macomb County, Hydrologic Unit 04090002, at 28 Mile Road, 3.0 mi northeast of New Haven.	--	--	07-03-03	d0.00
04161810	Clinton River	Lake St. Clair	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, at Avon Road, at Yates. Previously published as station number 04161830.	299	1966-69, 2002	11-11-02 12-11-02 01-28-03 05-01-03 06-11-03 07-23-03 08-05-03 09-09-03	139 125 49.2 456 235 59.4 62.8 33.6

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO DETROIT RIVER				
04166315	Upper River Rouge	River Rouge	Lat 42°26'48", long 83°20'12", in NW1/4 SW1/4 sec.36, T.1 N., R.9 E., Oakland County, Hydrologic Unit 04090004, at Middlebelt Road, in Clarenceville.	19.8	2002	11-11-02 01-28-03 02-02-03 04-30-03 05-20-03 07-22-03 08-05-03 09-08-03	20.5 3.04 3.28 10.8 12.7 7.26 5.89 3.71
04168581	Ecorse River	Detroit River	Lat 42°16'17", long 83°16'14", in SE1/4 SE1/4 sec.32, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, at Telegraph Road, in Dearborn Heights.	--	2002	11-20-02 03-18-03	d2.01 d9.12
04168590	Ecorse River	Detroit River	Lat 42°15'23", long 83°09'59", in private claim 118, T.3 S., R.11 E., Wayne County, Hydrologic Unit 04090004, at Austin Avenue, in Lincoln Park.	--	1986, 2002	11-20-02 03-18-03	d3.35 d20.0
04168592	Sexton and Kilfoil Drain	Ecorse River	Lat 42°13'39", long 83°16'10", in SE1/4 SE1/4 sec.17, T.3 S., R.10 E., Wayne County, Hydrologic Unit 04090004, at Telegraph Road, in Taylor.	--	2002	11-20-02 03-18-03	d0.85 d5.09
04168596	South Branch Ecorse River	Ecorse River	Lat 42°13'32", long 83°11'11", in NW1/4 sec.19, T.3 S., R.11 E., Wayne County, Hydrologic Unit 04090004, at Howard Avenue, in Lincoln Park.	--	--	11-20-02 03-18-03	d2.73 d10.9
04170550	Mann Creek	Woodruff Creek	Lat 42°33'50", long 83°42'40", in SW1/4 SW1/4 sec.14, T.2 N., R.6 E., Livingston County, Hydrologic Unit 04090005, at Pleasant Valley Road, 3.0 mi northeast of Brighton.	--	2002	10-10-02	d3.33
04170639	Woodruff Creek	Huron River	Lat 42°31'12", long 83°43'15", in NE1/4 SW1/4 sec.34, T.2 N., R.6 E., Livingston County, Hydrologic Unit 04090005, at Ford Road, in Brighton.	--	2002	10-10-02	d5.43
04171500	South Ore Creek	Huron River	Lat 42°29'52", long 83°48'09", in NW1/4 sec.12, T.1 N., R.5 E., Livingston County, Hydrologic Unit 04090005, at Hamburg Road, 2.5 mi southwest of Brighton.	33.7	1951-68‡, 1970-71, 1976-78, 2002	10-10-02	d5.59

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO DETROIT RIVER--Continued				
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.	--	--	06-18-03	1.55
						07-16-03	0.97
						07-29-03	2.67
						08-20-03	2.06
						09-10-03	1.69
041742907	University of Michigan Lake Drain	Honey Creek	Lat 42°16'17", long 83°49'28", in SW1/4 SE1/4 sec.27, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Dornoch Drive, 3.4 mi west of Ann Arbor.	--	--	06-18-03	0.07
						07-29-03	0.00
						08-20-03	0.00
						09-10-03	<0.02
04174291	Wagner Drain	Huron River	Lat 42°16'11", long 83°49'36", in SW1/4 SE1/4 sec.27, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Liberty Road, 3.5 mi west of Ann Arbor.	--	--	06-18-03	0.00
						07-29-03	0.00
						08-20-03	0.00
						09-10-03	0.00
041742912	University of Michigan Lake Drain	Honey Creek	Lat 42°16'32", long 83°49'59", in NE1/4 SW1/4 sec.27, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Polo Fields Drive, 3.75 mi west of Ann Arbor.	--	--	06-18-03	0.07
						07-29-03	0.00
						08-20-03	0.00
						09-10-03	0.00
041742914	University of Michigan Lake Drain	Honey Creek	Lat 42°17'04", long 83°49'35", in NW1/4 NE1/4 sec.27, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Park Road, 3.8 mi west of Ann Arbor.	--	--	06-18-03	0.19
						07-16-03	0.03
						07-29-03	0.02
						08-20-03	0.06
						09-10-03	0.04
041742916	Sister's Lake Drain	Honey Creek	Lat 42°16'45", long 83°47'56", in SW1/4 NW1/4 sec.25, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Dolph Park, 1.7 mi west of Ann Arbor.	--	--	06-18-03	0.11
						07-16-03	0.08
						07-29-03	0.04
						08-20-03	0.79
						09-10-03	0.18
04174292	Unnamed Tributary	Honey Creek	Lat 42°16'54", long 83°48'25", in NW1/4 NE1/4 sec.26, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at April Road, 2.25 mi west of Ann Arbor.	--	--	06-18-03	2.28
						06-18-03	2.31
						07-16-03	0.08
						07-29-03	0.69
						08-20-03	3.02
						09-10-03	2.76
041742922	Unnamed Tributary	Honey Creek	Lat 42°16'52", long 83°48'45", in SE1/4 NW1/4 sec.26, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Parkland Plaza Road, 2.75 mi west of Ann Arbor.	--	--	06-18-03	2.39
						07-16-03	0.11
						07-29-03	0.52
						08-20-03	3.65
						09-10-03	2.79

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO DETROIT RIVER--Continued				
041742924	Unnamed Tributary	Honey Creek	Lat 42°16'49", long 83°49'01", in SW1/4 NW1/4 sec.26, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Little Lake Road, 2.6 mi west of Ann Arbor.	--	--	06-18-03 07-16-03 07-29-03 08-20-03 09-10-03	2.56 0.43 2.63 4.34 3.05
041742926	Unnamed Tributary	Honey Creek	Lat 42°17'05", long 83°49'16", in NE1/4 NE1/4 sec.27, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Park Road, 3.0 mi west of Ann Arbor.	--	--	06-18-03 07-16-03 08-20-03 09-10-03	2.80 0.98 3.12 2.48
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.	--	--	06-18-03 06-18-03 07-16-03 09-10-03	3.53 3.32 1.11 3.10
04174294	Unnamed Tributary	Honey Creek	Lat 42°17'47", long 83°50'11", in NW1/4 NW1/4 sec.22, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Stonegate Road, 4.0 mi northwest of Ann Arbor.	--	--	07-29-03 08-20-03 09-10-03	<0.01 <0.10 <0.03
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	06-18-03 06-18-03 07-16-03 07-29-03 08-20-03 09-10-03	7.34 7.34 3.51 6.36 7.12 5.49
041742955	Honey Creek	Huron River	Lat 42°17'58", long 83°49'05", in SW1/4 SW1/4 sec.14, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Pratt Road, 2.8 mi northwest of Ann Arbor.	--	--	06-18-03 06-18-03 06-18-03 07-29-03 08-20-03 09-10-03	6.47 6.86 6.39 5.65 7.01 5.60
041742965	Wing Drain	Honey Creek	Lat 42°18'20", long 83°49'14", in NE1/4 SE1/4 sec.15, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at West Delhi Road, 3.5 mi northwest of Ann Arbor.	--	--	06-18-03 07-29-03 08-20-03 09-10-03	0.05 0.00 0.00 0.00
04174299	Unnamed Tributary	Honey Creek	Lat 42°18'34", long 83°48'28", in SW1/4 NE1/4 sec.14, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Miller Road, 3.0 mi northwest of Ann Arbor.	--	--	06-18-03 07-29-03 08-20-03 09-10-03	0.05 0.02 0.04 <0.02

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO DETROIT RIVER--Continued				
04174300	Honey Creek	Huron River	Lat 42°18'34", long 83°48'28", in NE1/4 sec.14, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Miller Road, 1.4 mi west of Foster.	22.4	1970-72	06-18-03 07-29-03 08-20-03 09-10-03	7.33 6.66 7.72 5.83
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.	--	--	06-18-03 06-18-03 08-20-03 09-10-03	7.18 7.40 7.27 5.85
04174513	Malletts Creek	Huron River	Lat 42°13'46", long 83°43'32", in NW1/4 NE1/4 sec.16, T.3 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Ellsworth Road, in Ann Arbor.	--	--	05-12-03 05-14-03	d0.43 d0.23
041745135	Unnamed Tributary	Malletts Creek	Lat 42°13'57", long 83°43'33", in SW1/4 SE1/4 sec.9, T.3 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Varsity Drive, in Ann Arbor.	--	--	05-12-03 05-14-03	d3.39 d0.73
04174515	Malletts Creek	Huron River	Lat 42°14'42", long 83°42'17", in SE1/4 SE1/4 sec.3, T.3 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Packard Road, in Ann Arbor.	9.14	1949-50	05-12-03 05-14-03	d19.4 d3.78
041745189	Swift Run Drain	Huron River	Lat 42°14'40", long 83°41'32", in NE1/4 NW1/4 sec.11, T.3 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Fernwood Avenue, in Ann Arbor.	--	--	04-22-03 05-14-03	d0.52 d0.99
04174520	Swift Run Drain	Huron River	Lat 42°15'22", long 83°40'51", in NE1/4 sec.2, T.3 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Hogback Road, in Ann Arbor.	3.65	1949-50	04-22-03	d0.67
04174523	Swift Run Drain	Huron River	Lat 42°16'00", long 83°40'39", in NW1/4 SW1/4 sec.36, T.2 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Thornoaks Drive, in Ann Arbor.	--	--	04-22-03 05-14-03	d0.90 d1.68

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE ERIE				
04175131	Lauden-schlager Drain	Lake Erie	Lat 42°03'16", long 83°15'46", SW1/4 SW1/4 sec.16, T.5 S., R.10 E., Monroe County, Hydrologic Unit 04100001, at Dixie Highway, 0.8 mi south of South Rockwood.	--	--	07-09-03	0.48
04175378	Unnamed Tributary	Ross Drain	Lat 42°01'12", long 83°29'56", in NE1/4 SE1/4 sec.29, T.5 S., R.8 E., Monroe County, Hydrologic Unit 04100001, adjacent to Doty Road, 1.0 mi east of Scofield.	--	--	07-09-03	0.81
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.	--	--	07-30-03	d0.00
04175905	Wolf Creek	South Branch River Raisin	Lat 41°59'13", long 84°08'39", in SE1/4 SW1/4 sec.36, T.5 S., R.2 E., Lenawee County, Hydrologic Unit 04100002, at Teachout Road, 2.0 mi south-west of Onstead.	--	1988	07-30-03	d0.85
04176215	Macon Creek	River Raisin	Lat 42°04'00", long 83°51'23", in NE1/4 NE1/4 sec.8, T.5 S., R.5 E., Lenawee County, Hydrologic Unit 04100002, at Clinton Macon Road, 0.6 mi east of Macon.	--	--	07-30-03	d0.46
04176242	Coats Drain	Schreeder Brook	Lat 41°58'49", long 83°49'19", in SE1/4 SW1/4 sec.3, T.6 S., R.5 E., Lenawee County, Hydrologic Unit 04100002, at Centennial Road, 0.6 mi southeast of Britton.	--	--	07-30-03	d0.22
04176264	Unnamed Tributary	Macon Creek	Lat 41°59'49", long 83°40'40", in NE1/4 NE1/4 sec.2, T.6 S., R.6 E., Monroe County, Hydrologic Unit 04100002, at Day Road, 2.9 mi north of Dundee.	--	--	07-30-03	d0.00
04176378	Unnamed Tributary	Wood Outlet Drain	Lat 42°12'49", long 83°46'41", in NE1/4 NE1/4 sec.24, T.3 S., R.5 E., Washtenaw County, Hydrologic Unit 04100002, at Maple Road, 3.0 mi north of Saline.	--	--	07-31-03	d0.00

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
			STREAMS TRIBUTARY TO LAKE ERIE--Continued				
04176570	Davis Swale	La Plaisance Creek	Lat 41°53'40", long 83°26'00", in private claim 509, T.7 S., R.8 E., Monroe County, Hydrologic Unit 04100001, at Telegraph Road, 2.4 mi southwest of Monroe.	--	--	07-09-03	1.13
04176632	Great Sulphur Spring Outflow	Lake Erie	Lat 41°46'07", long 83°27'22", in SE1/4 SE1/4 sec.22, T.8 S., R.8 E., Monroe County, Hydrologic Unit 04100001, 2.8 mi southeast of Erie.	--	--	07-25-03 07-25-03 08-11-03 09-12-03	5.19 5.28 3.76 5.16
04176670	Halfway Creek	Lake Erie	Lat 41°44'55", long 83°39'02", in SE1/4 SE1/4 sec.25, T.8 S., R.6 E., Monroe County, Hydrologic Unit 04100001, at Sterns Road, 1.4 mi southwest of Lambertville.	--	--	07-09-03	3.64
04176696	Unnamed Tributary	Indian Creek	Lat 41°44'06", long 83°32'41", in NW1/4 NW1/4 sec.1, T.9 S., R.8 E., Monroe County, Hydrologic Unit 04100001, about 600 ft downstream from Smith Road, 3.2 mi southeast of Temperance.	--	--	09-11-03	d0.00
			STREAMS TRIBUTARY TO WISCONSIN RIVER				
05390062	Misery Creek	Lac Vieux Desert	Lat 46°10'31", long 89°05'50", in SE1/4 SE1/4 sec.30, T.44 N., R.38 W., Gogebic County, Hydrologic Unit 07070001, at Indian Village Road, 7.6 mi north of Phelps, WI.	--	--	09-10-03	e0.10
05390064	Misery Creek	Lac Vieux Desert	Lat 46°09'52", long 89°06'38", in NE1/4 SW1/4 sec.31, T.44 N., R.38 W., Gogebic County, Hydrologic Unit 07070001, 6.8 mi northwest of Phelps, WI.	--	--	09-08-03	1.97
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	09-08-03	0.18
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	09-08-03 09-09-03	0.22 1.19

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at special study and miscellaneous sites during water year 2003--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi^2)	Measured previously (water years)	Measurements	
						Date	Discharge (ft^3/s)
STREAMS TRIBUTARY TO WISCONSIN RIVER--Continued							
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.	--	--	09-08-03	0.87

† 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.
e Estimated.



Figure 9. Number of ground-water wells by county published in this report.

GROUND-WATER LEVELS

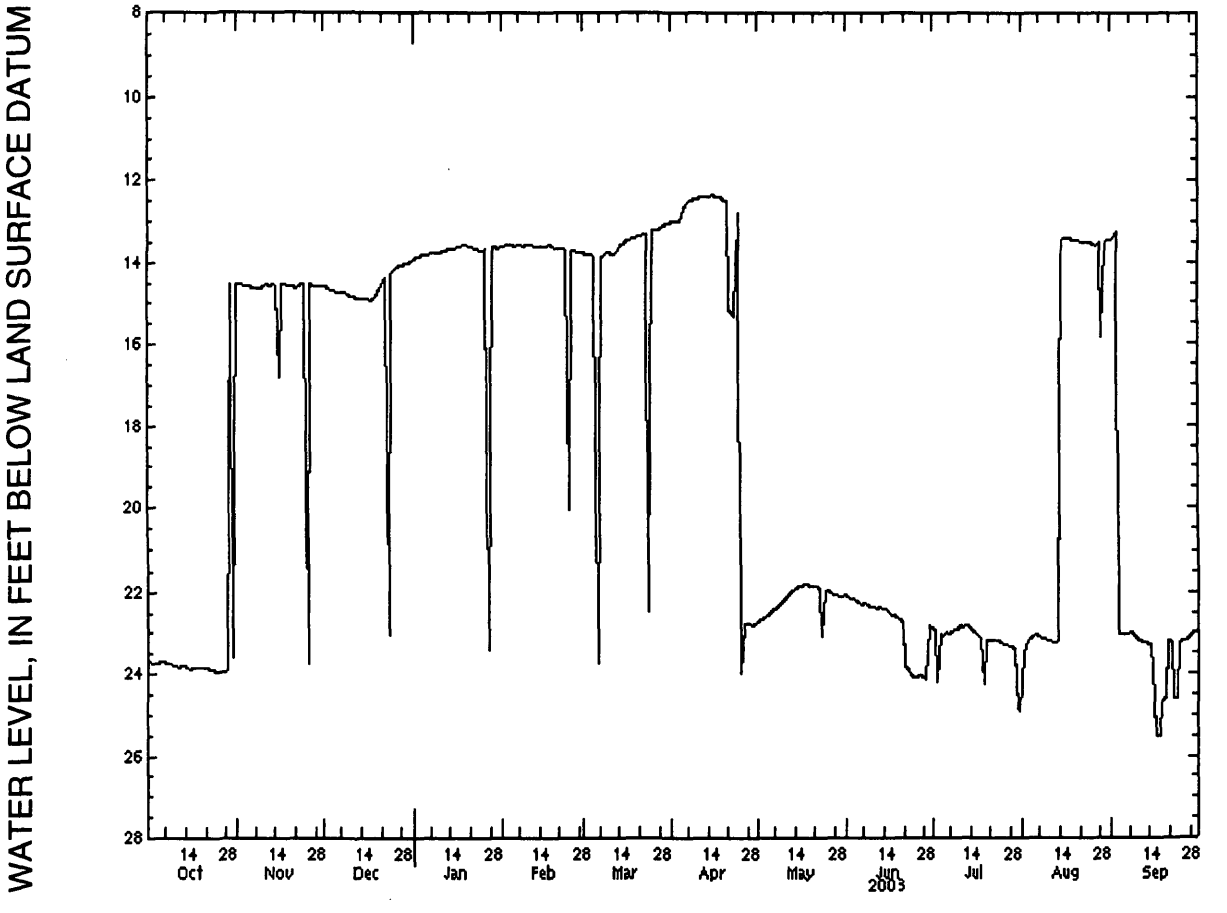
BRANCH COUNTY

415602084593701. Local number, 6S 6W 22CABA.
LOCATION.--Lat 41°56'02", long 84°59'37", Hydrologic Unit 04050001, at North Waterworks Drive (revised) 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, 25.9 ft below land-surface datum, May 25, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	23.71	14.58	14.70	13.80	13.59	13.84	12.72	22.50	22.28	23.00	23.05	23.02
10	23.78	14.59	14.81	13.77	13.58	13.78	12.42	22.17	22.37	22.85	23.20	23.17
15	23.87	16.81	14.87	13.66	13.61	13.54	12.36	21.88	22.45	22.99	13.42	24.60
20	23.82	14.58	14.64	13.62	13.65	13.37	12.50	21.85	22.71	23.20	13.48	23.20
25	23.93	23.73	14.16	13.70	13.73	13.22	24.01	21.99	24.07	23.28	13.56	23.19
EOM	14.52	14.59	13.94	13.61	13.76	13.07	22.78	22.08	22.86	24.89	13.45	22.96

WTR YR 2003 HIGHEST 11.34 MAY 19 LOWEST 25.53 SEP 16



GROUND-WATER LEVELS

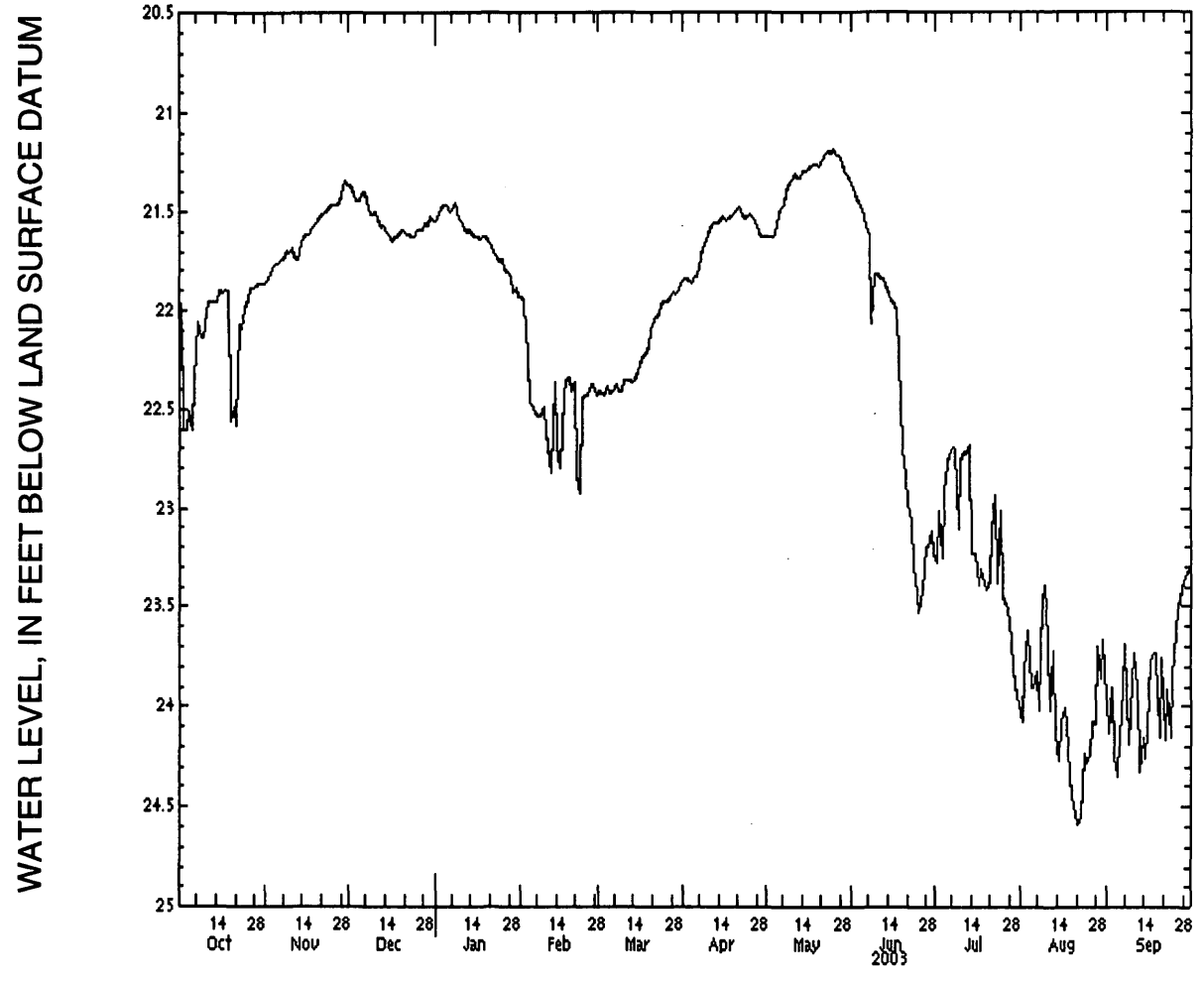
CALHOUN COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	22.61	21.76	21.41	21.46	22.49	22.42	21.83	21.51	21.52	22.78	23.91	24.16
10	22.01	21.68	21.50	21.54	22.62	22.36	21.61	21.34	21.82	22.76	23.65	23.73
15	21.90	21.61	21.61	21.62	22.80	22.31	21.52	21.29	21.96	23.23	24.08	23.95
20	22.49	21.52	21.59	21.65	22.37	22.10	21.49	21.27	22.84	23.37	24.53	23.76
25	21.94	21.47	21.59	21.74	22.44	21.96	21.51	21.18	23.53	23.45	24.25	23.63
EOM	21.86	21.36	21.55	21.93	22.43	21.86	21.63	21.34	23.23	23.98	23.96	23.29

WTR YR 2003 HIGHEST 21.16 MAY 22, 23, 25 LOWEST 24.59 AUG 21



GROUND-WATER LEVELS

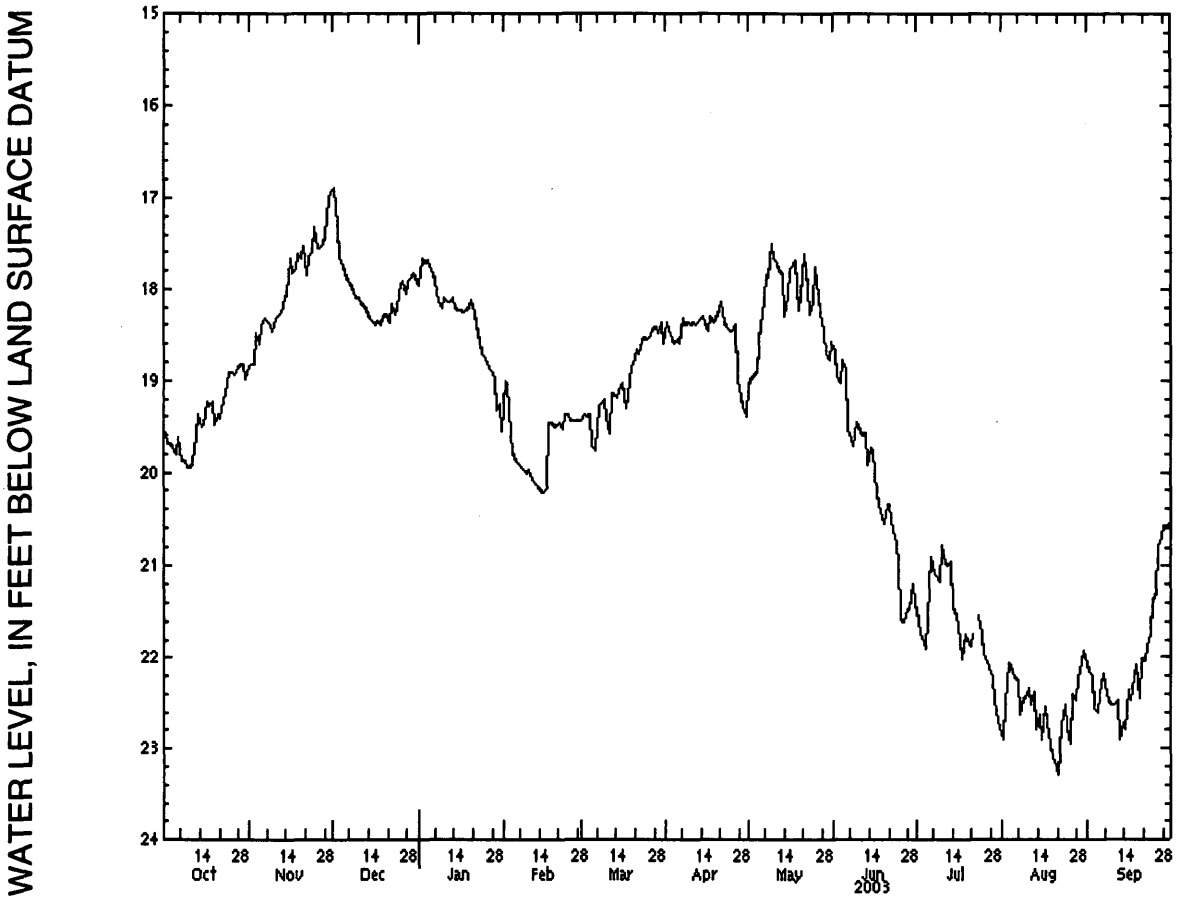
CALHOUN COUNTY

422033085082602. Local number, 1S 7W 33BCBC2.
LOCATION.--Lat 42°20'33", long 85°08'26", Hydrologic Unit 04050003, at Verona Well Field in Battle Creek. Owner: City of Battle Creek.
AQUIFER.--Marshall Formation.
WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in, depth 51 ft, screened 46 ft to 51 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 835.7 ft above sea level. Measuring point: Top of casing, 2.6 ft above land-surface datum.
REMARKS--Water levels affected by nearby pumping.
PERIOD OF RECORD.--July 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 16.63 ft below land-surface datum, Dec. 1, 2002; lowest recorded, 23.28 ft below land-surface datum, Aug. 21, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	19.80	18.40	17.82	17.75	19.87	19.72	18.56	18.34	18.90	21.21	22.21	22.41
10	19.95	18.33	18.10	18.09	19.96	19.41	18.40	17.67	19.56	20.78	22.34	22.51
15	19.48	17.67	18.34	18.24	20.22	19.04	18.37	18.08	19.77	21.53	22.90	22.36
20	19.36	17.52	18.27	18.11	19.48	18.83	18.24	18.08	20.34	21.87	23.19	22.01
25	18.92	17.54	17.93	18.76	19.44	18.56	18.45	17.75	21.58	21.96	22.96	21.29
EOM	18.84	16.94	17.90	19.56	19.44	18.60	19.39	18.57	21.41	22.77	22.05	20.56

WTR YR 2003 HIGHEST 16.63 DEC 1 LOWEST 23.28 AUG 21



GROUND-WATER LEVELS

CHEBOYGAN COUNTY

454427084424001. Local number, 39N 3W 29CBCB1.
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.--Dundee Formation.
WELL CHARACTERISTICS.--Drilled artesian well, diameter 6 in, depth 121 ft, cased to 104 ft.
INSTRUMENTATION.--Periodic measurements.
DATUM.--Elevation of land-surface datum is 705 ft above sea level, from topographic map. Measuring point: Top of casing, 1.9 ft above land-surface datum.
PERIOD OF RECORD.--January 1979 to May 1992, December 1997 to current year. 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 measured, 3.70 ft below land-surface datum, Apr. 18, 2002; lowest measured, 11.68 ft below land-surface datum, Feb. 11, 1981.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 3	5.51	DEC 23	5.55	APR 2	4.49	APR 28	3.86	JUN 25	5.53	JUL 29	6.41
NOV 13	5.16	FEB 13	6.36								

GROUND-WATER LEVELS

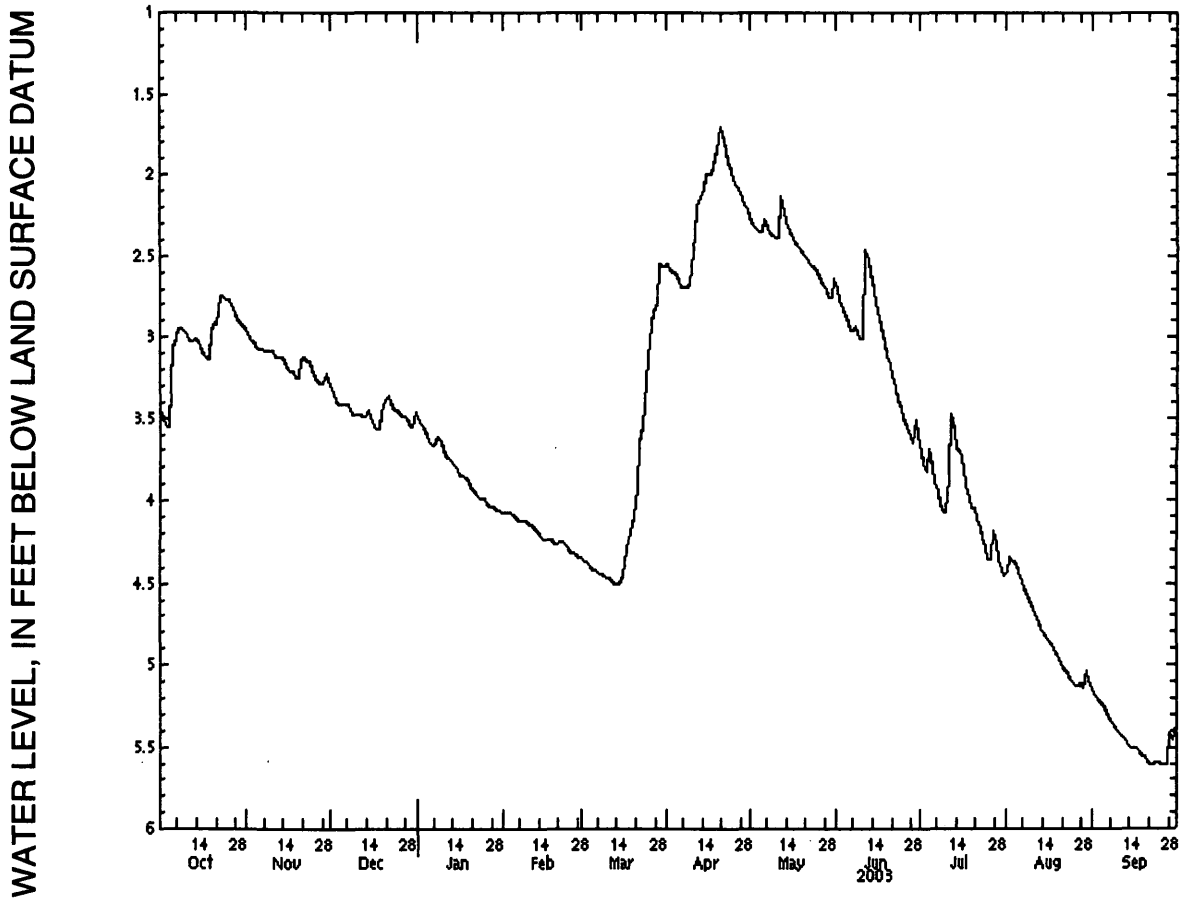
CHEBOYGAN COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	3.05	3.07	3.41	3.64	4.10	4.41	2.66	2.35	2.91	3.80	4.43	5.27
10	2.99	3.08	3.48	3.69	4.15	4.46	2.57	2.39	3.01	4.07	4.66	5.42
15	3.06	3.20	3.49	3.81	4.24	4.49	2.00	2.35	2.80	3.71	4.83	5.50
20	2.91	3.14	3.39	3.92	4.26	4.10	1.70	2.49	3.18	4.05	4.98	5.59
25	2.77	3.25	3.47	3.99	4.31	3.14	2.03	2.61	3.50	4.35	5.13	5.60
EOM	2.95	3.28	3.46	4.07	4.34	2.57	2.21	2.64	3.62	4.45	5.14	5.37

WTR YR 2003 HIGHEST 1.61 APR 20 LOWEST 5.60 SEP 21, 22, 25, 26



GROUND-WATER LEVELS

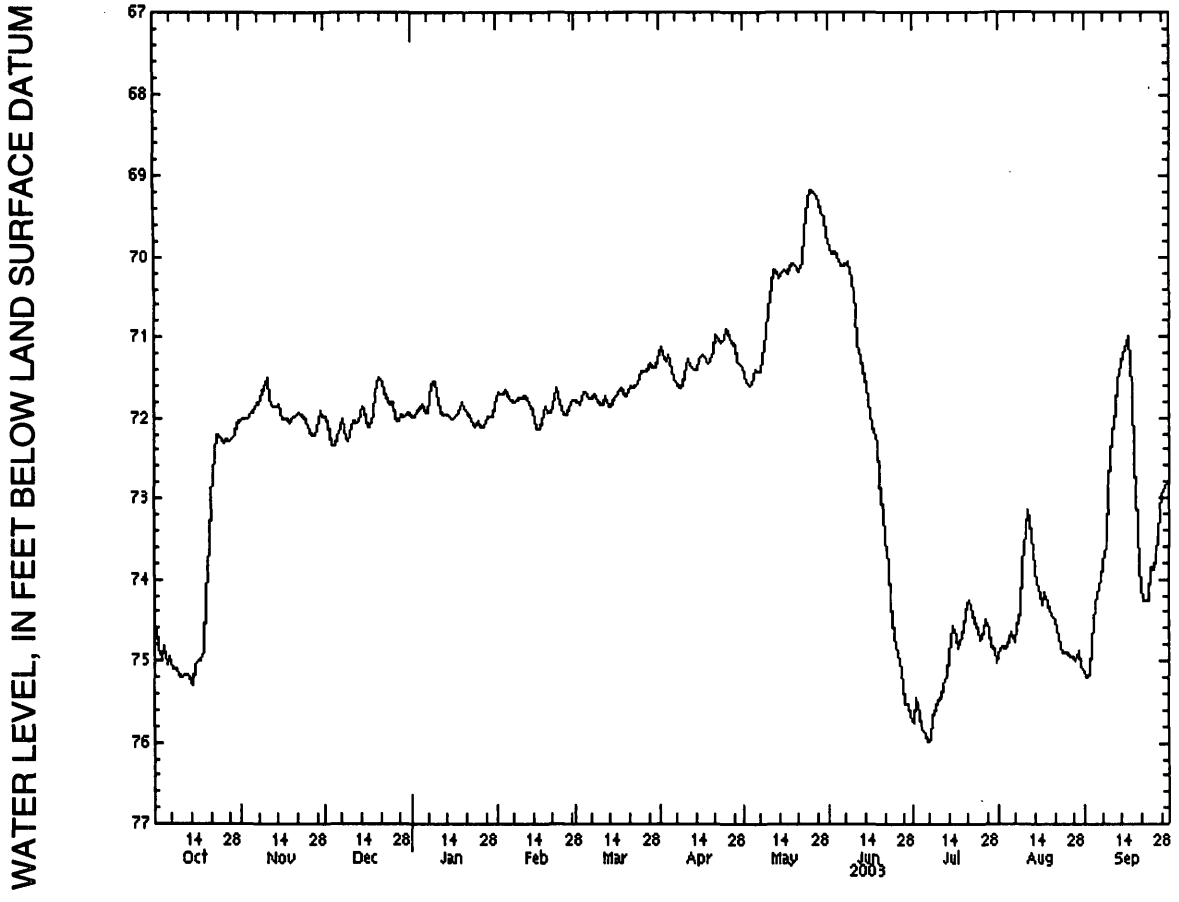
EATON COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	75.04	71.92	72.23	71.83	71.76	71.67	71.39	71.40	70.10	75.89	74.63	74.19
10	75.19	71.49	72.12	71.69	71.75	71.84	71.44	70.64	70.66	75.47	73.40	72.21
15	75.04	72.01	71.91	72.02	72.13	71.75	71.27	70.19	71.78	74.56	74.08	71.07
20	73.55	71.99	71.49	71.88	71.94	71.74	71.18	70.11	73.17	74.28	74.47	73.88
25	72.31	72.17	71.81	72.04	71.96	71.43	70.90	69.16	74.83	74.74	74.89	73.89
EOM	72.04	71.97	71.93	71.84	71.78	71.28	71.35	69.73	75.69	75.01	75.12	72.75

WTR YR 2003 HIGHEST 69.12 MAY 25 LOWEST 75.99 JUL 6



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 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	26.47	APR 9	28.14	JUN 10	27.20	JUL 28	27.40	AUG 29	27.68

GROUND-WATER LEVELS

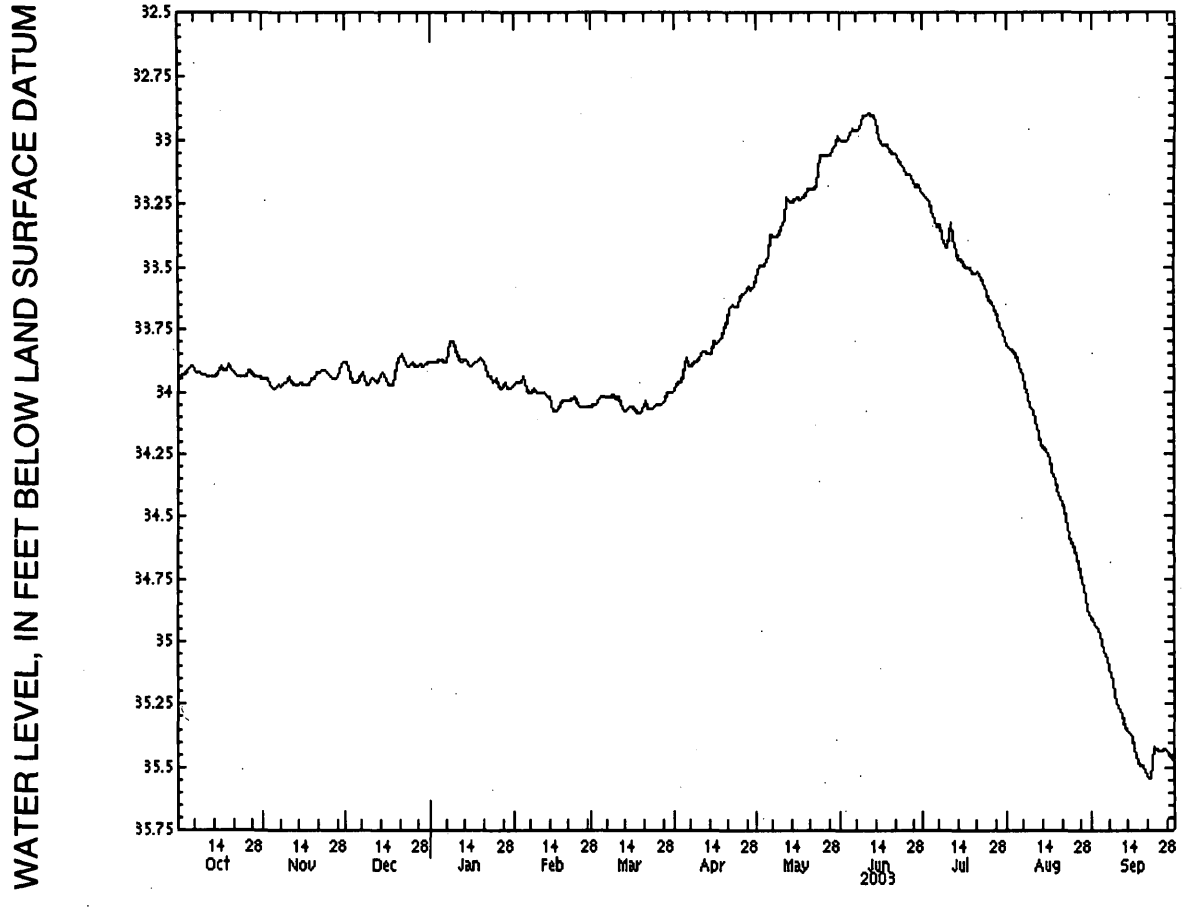
HURON COUNTY

434103083130301. Local number, 15N 11E 32BBCB.
LOCATION (REVISED).--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.--Water-level recorder.
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.
PERIOD OF RECORD.--June 1988 to March 1990 (periodic measurements), February 1991 to current year (water-level recorder).
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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	33.90	33.99	33.96	33.87	33.99	34.02	33.86	33.45	32.95	33.31	33.90	35.04
10	33.93	33.94	33.95	33.83	34.00	34.03	33.86	33.34	32.90	33.42	34.08	35.26
15	33.92	33.97	33.93	33.90	34.08	34.06	33.80	33.23	32.99	33.47	34.24	35.38
20	33.91	33.92	33.86	33.87	34.04	34.08	33.72	33.19	33.05	33.53	34.43	35.52
25	33.94	33.94	33.88	33.95	34.06	34.05	33.62	33.06	33.13	33.63	34.63	35.44
EOM	33.95	33.88	33.88	33.98	34.06	34.00	33.58	32.98	33.20	33.80	34.90	35.47

WTR YR 2003 HIGHEST 32.86 JUN 8, 9 LOWEST 35.54 SEP 21, 22



GROUND-WATER LEVELS

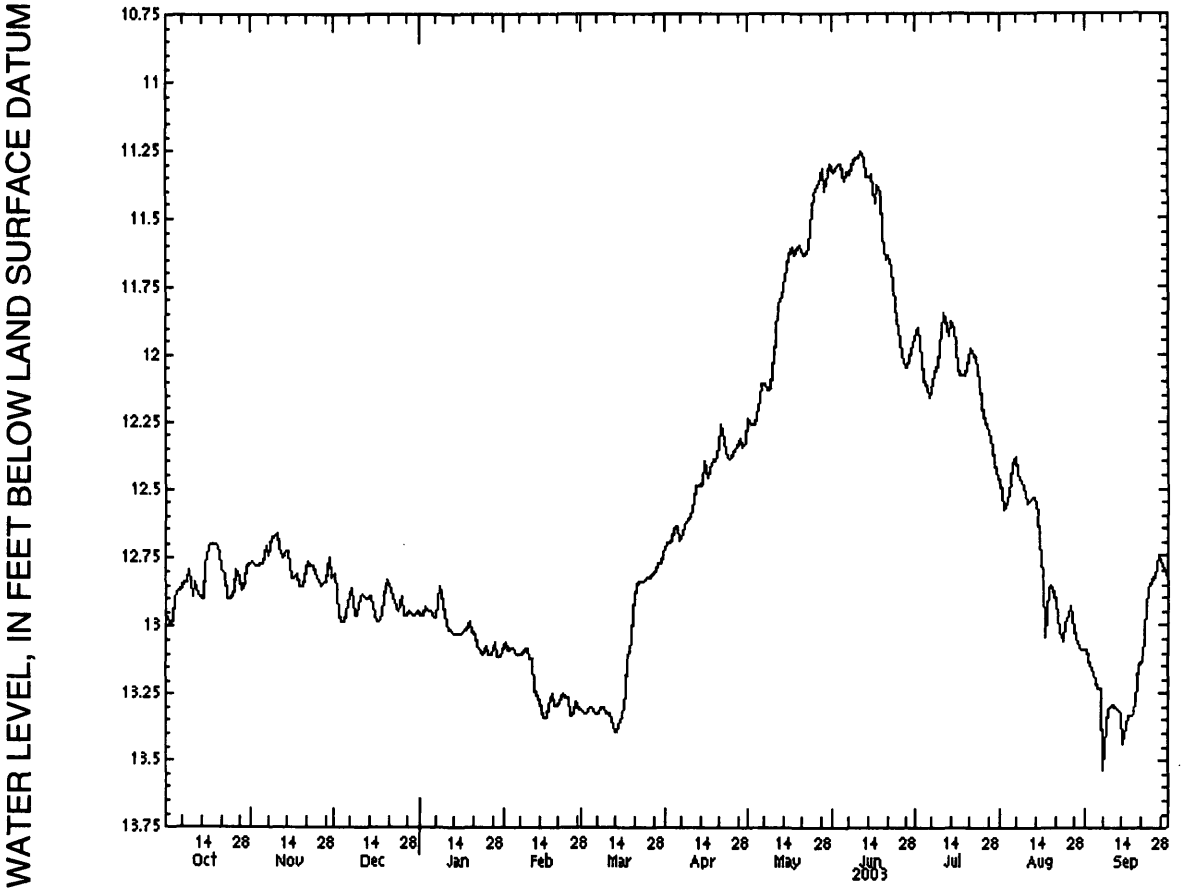
HURON COUNTY

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 Ubly. 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.--Water-level recorder.
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.
PERIOD OF RECORD.--May 1988 to September 1989 (periodic measurements), December 1992 to current year (water-level recorder).
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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	12.87	12.77	12.95	12.94	13.10	13.30	12.64	12.16	11.36	12.12	12.41	13.23
10	12.89	12.66	12.89	12.96	13.12	13.32	12.60	12.06	11.28	11.98	12.56	13.29
15	12.78	12.82	12.93	13.03	13.34	13.35	12.40	11.68	11.34	11.90	12.69	13.37
20	12.72	12.82	12.83	13.02	13.29	12.94	12.34	11.60	11.65	12.02	12.88	13.14
25	12.87	12.83	12.89	13.07	13.33	12.82	12.38	11.42	11.90	12.19	12.97	12.82
EOM	12.77	12.82	12.94	13.09	13.31	12.74	12.33	11.30	11.96	12.45	13.09	12.82

WTR YR 2003 HIGHEST 11.21 JUN 11 LOWEST 13.54 SEP 7



GROUND-WATER LEVELS

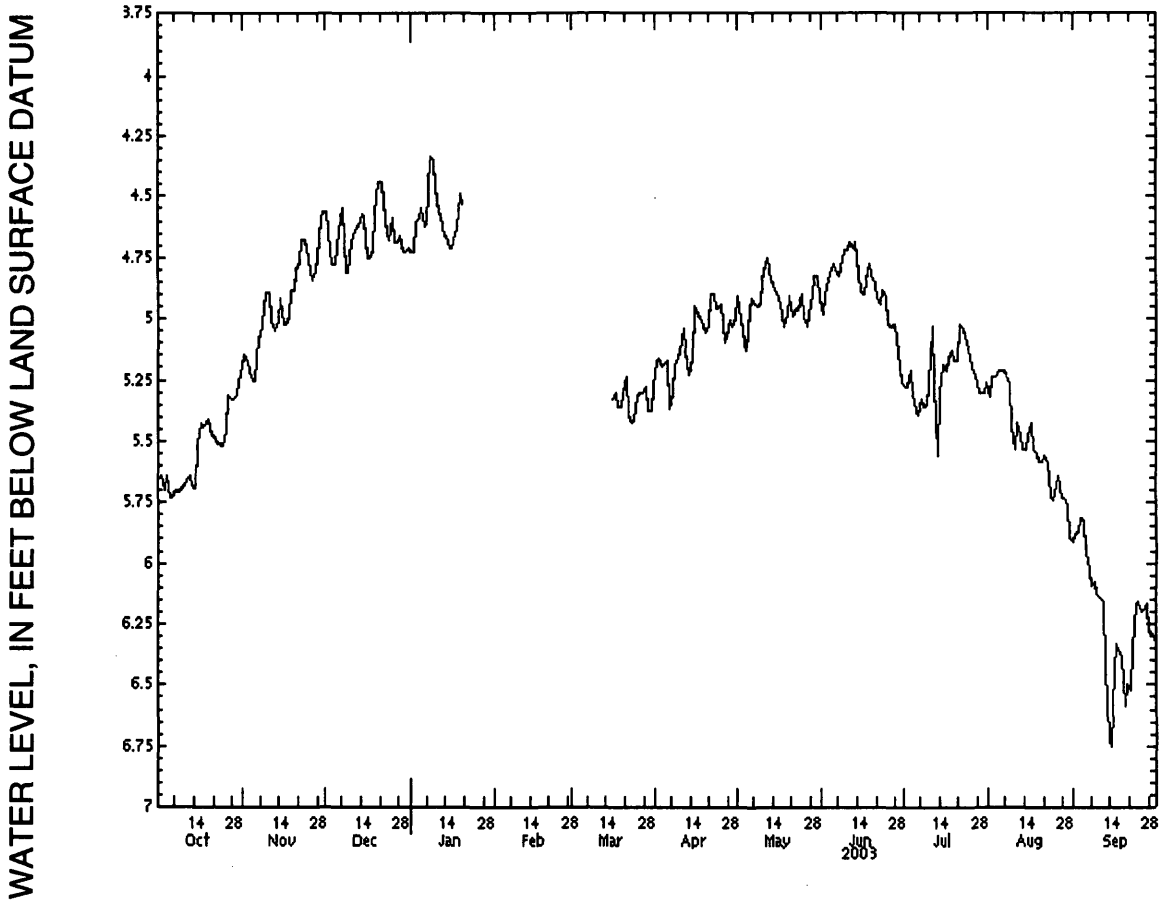
HURON COUNTY

434947083233301. Local number, 16N 9E 2CDCA.
LOCATION (REVISED).--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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	5.73	5.25	4.70	4.55	---	---	5.17	4.97	4.78	5.38	5.21	5.95
10	5.68	4.89	4.69	4.46	---	---	5.13	4.84	4.72	5.27	5.53	6.14
15	5.51	5.02	4.59	4.71	---	---	4.95	4.90	4.89	5.19	5.48	6.44
20	5.48	4.80	4.44	4.54	---	5.30	5.03	4.91	4.86	5.17	5.58	6.50
25	5.46	4.80	4.59	---	---	5.31	4.94	4.99	5.02	5.16	5.68	6.20
EOM	5.20	4.56	4.71	---	---	5.28	5.00	4.92	5.26	5.26	5.91	6.33

WTR YR 2003 HIGHEST 4.18 JAN 8, 9 LOWEST 6.75 SEP 14



GROUND-WATER LEVELS

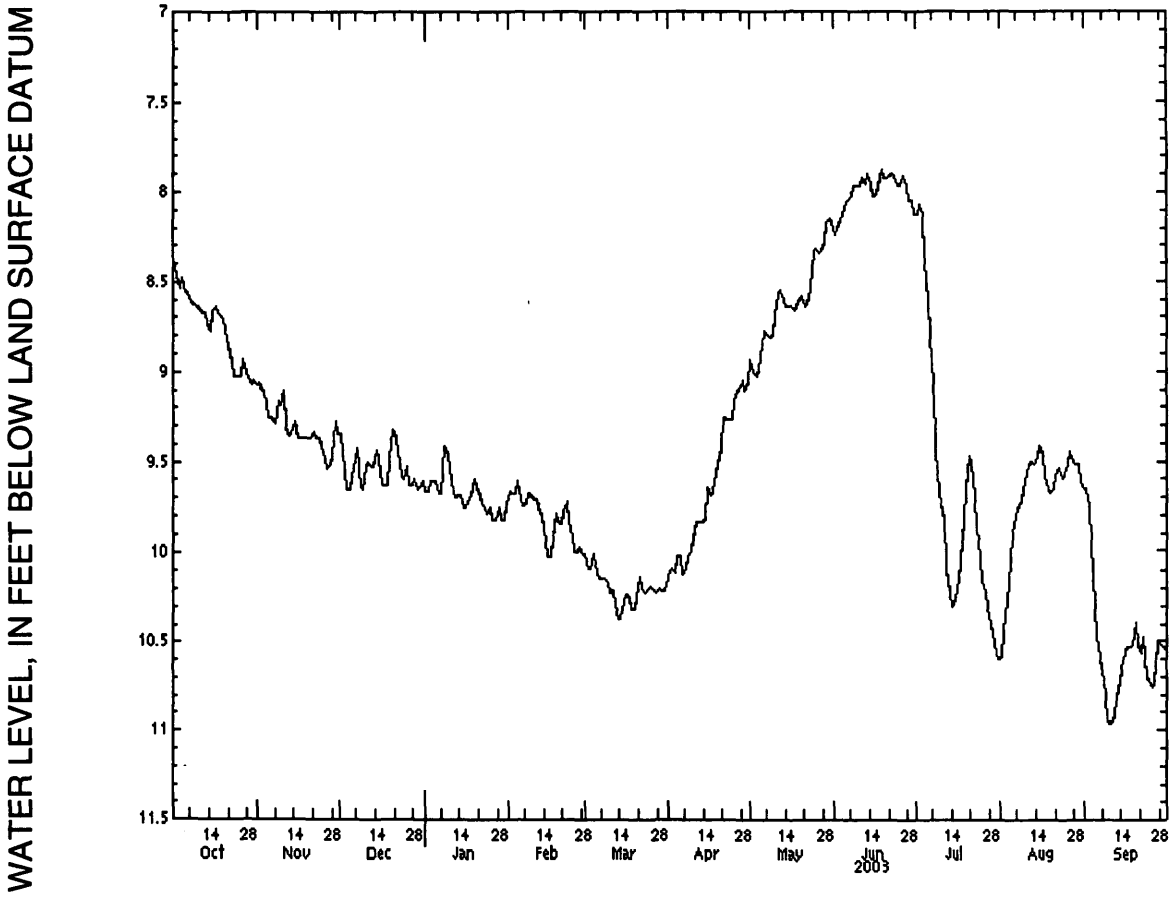
HURON COUNTY

435736083094801. Local number, 18N 11E 27AADD.
LOCATION.--Lat 43°57'36", long 83°09'55" (revised), 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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	8.56	9.25	9.58	9.61	9.71	10.06	10.02	8.86	8.06	8.62	9.90	10.47
10	8.65	9.10	9.53	9.54	9.71	10.22	9.93	8.68	7.96	9.73	9.57	10.96
15	8.66	9.37	9.48	9.75	10.02	10.27	9.64	8.64	8.02	10.26	9.41	10.55
20	8.82	9.37	9.32	9.64	9.85	10.25	9.42	8.58	7.92	9.47	9.65	10.52
25	9.02	9.48	9.53	9.75	10.00	10.19	9.16	8.32	7.97	10.15	9.51	10.76
EOM	9.07	9.35	9.61	9.73	10.01	10.18	9.06	8.17	8.12	10.60	9.65	10.54

WTR YR 2003 HIGHEST 7.82 JUN 9, 18, 19 LOWEST 10.96 SEP 10



GROUND-WATER LEVELS

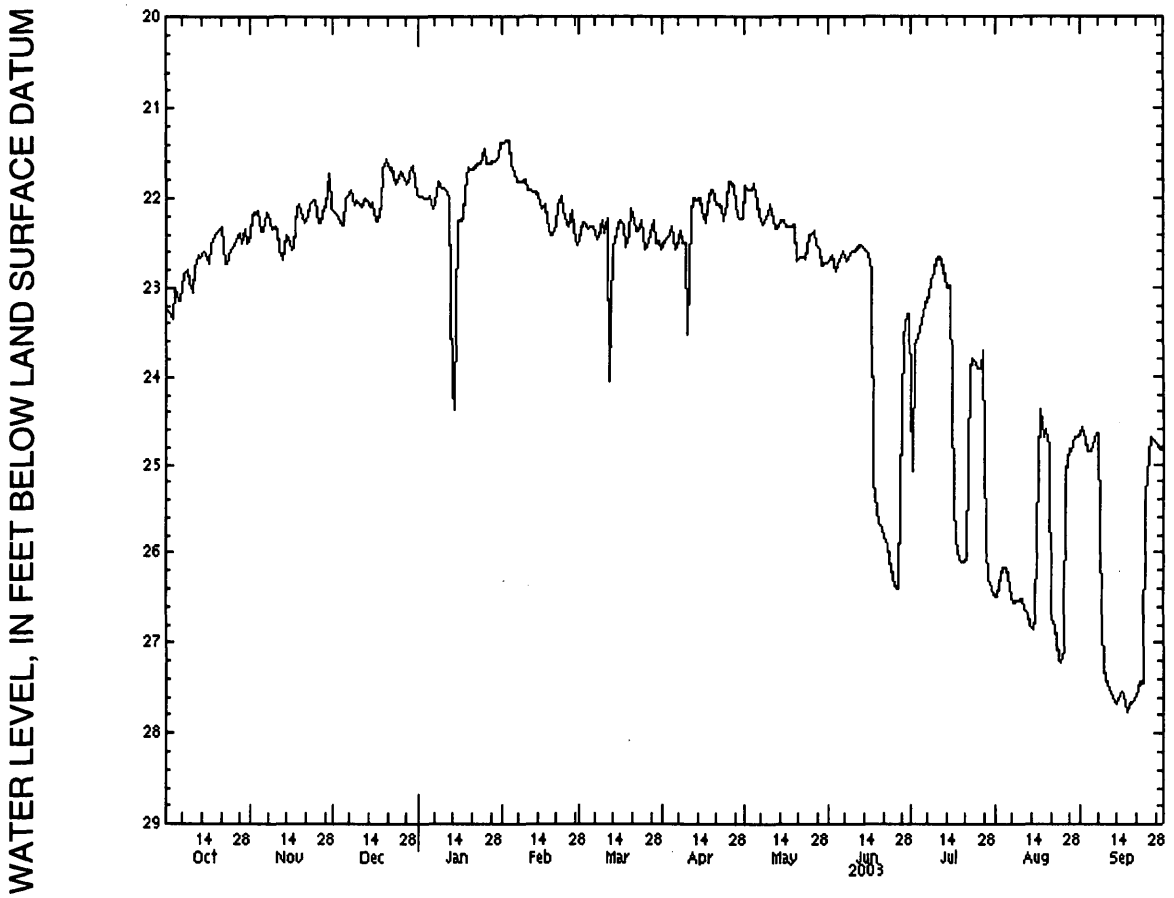
INGHAM COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	23.15	22.36	22.00	21.97	21.71	22.32	22.56	22.04	22.66	23.29	26.26	24.78
10	23.04	22.34	22.07	21.88	21.91	22.38	23.53	22.07	22.60	22.68	26.52	27.48
15	22.61	22.57	22.04	22.24	22.11	22.30	22.14	22.24	22.62	22.98	26.72	27.54
20	22.34	22.27	21.57	21.67	22.29	22.11	22.07	22.70	25.71	26.10	24.81	27.64
25	22.52	22.27	21.71	21.46	22.31	22.57	21.81	22.40	26.37	23.91	27.09	24.90
EOM	22.41	22.12	21.96	21.39	22.53	22.57	22.22	22.72	23.30	26.46	24.66	24.82

WTR YR 2003 HIGHEST 21.06 FEB 3 LOWEST 27.76 SEP 17



GROUND-WATER LEVELS

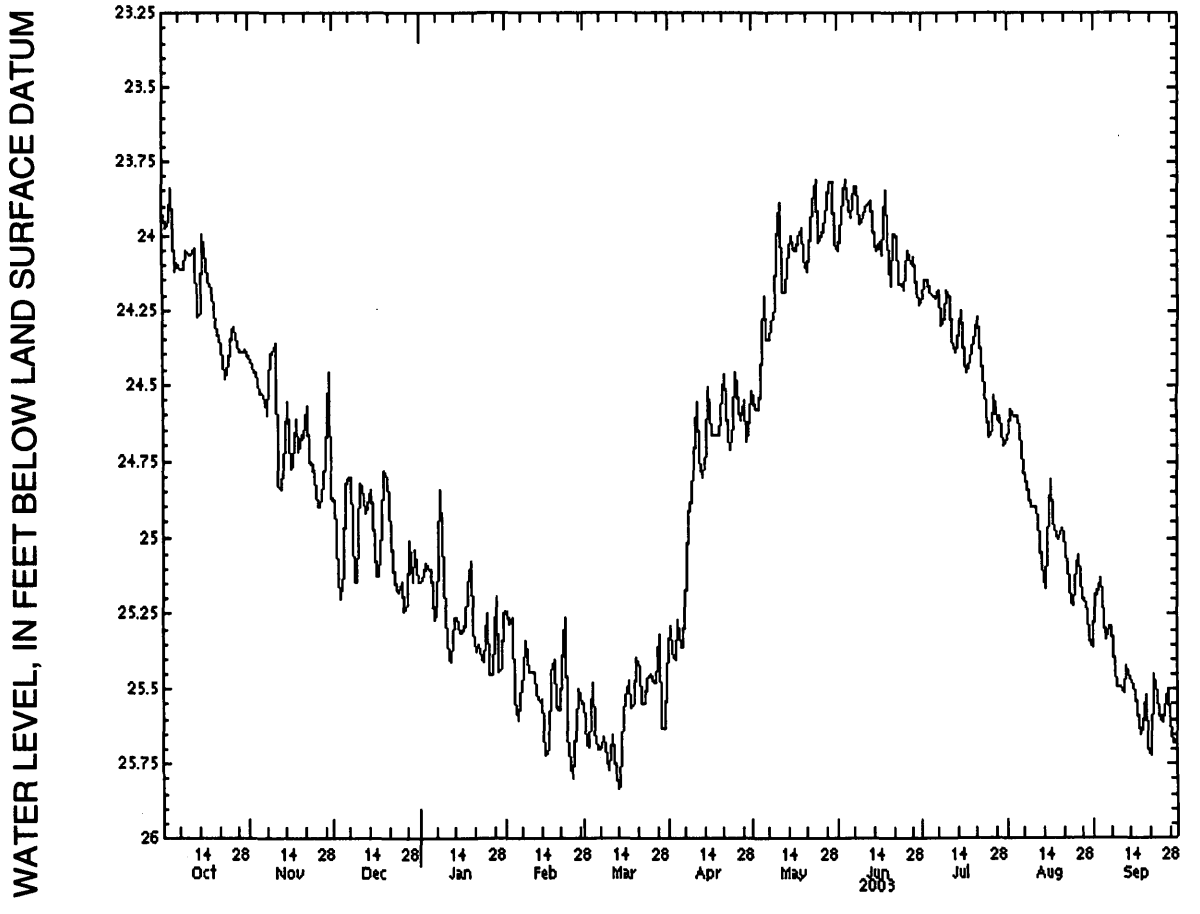
INGHAM COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	24.12	24.53	24.83	25.10	25.60	25.64	25.36	24.20	23.90	24.20	24.65	25.33
10	24.06	24.36	24.82	25.26	25.44	25.77	24.75	24.03	23.94	24.18	24.90	25.49
15	23.99	24.77	24.93	25.31	25.72	25.58	24.51	24.00	24.05	24.25	25.02	25.51
20	24.33	24.67	24.80	25.30	25.57	25.39	24.53	24.08	24.17	24.32	24.97	25.69
25	24.32	24.90	25.14	25.25	25.80	25.45	24.46	24.02	24.18	24.67	25.09	25.61
EOM	24.41	24.87	25.14	25.25	25.55	25.45	24.60	24.03	24.23	24.69	25.36	25.67

WTR YR 2003 HIGHEST 23.46 OCT 4 LOWEST 25.83 MAR 13



GROUND-WATER LEVELS

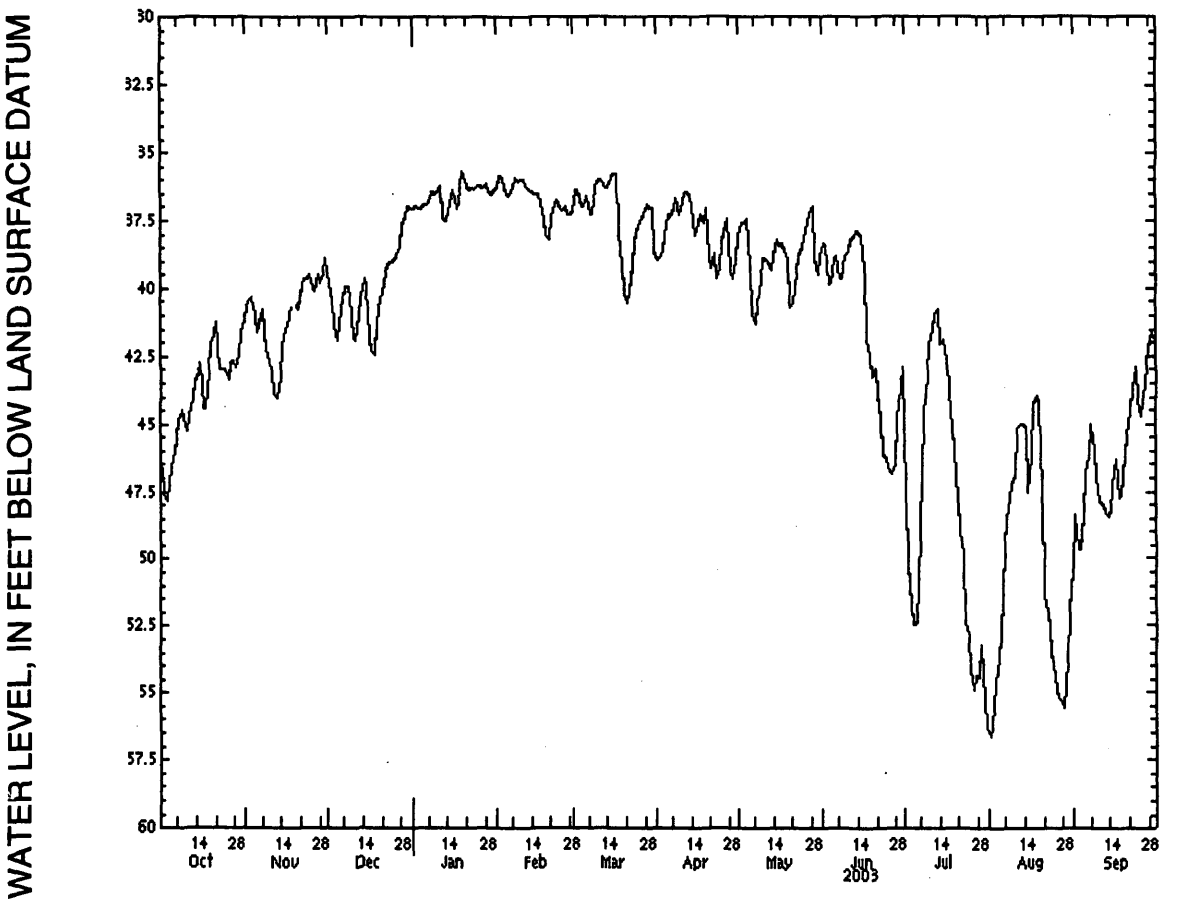
INGHAM COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	46.13	41.57	41.24	36.91	36.57	36.96	37.29	39.16	38.96	52.37	52.94	46.78
10	45.23	43.08	41.73	36.42	35.98	36.09	37.07	38.86	38.65	42.08	46.93	47.93
15	42.71	41.48	39.94	36.57	36.50	35.94	38.07	38.22	38.08	41.90	47.54	46.69
20	41.65	40.80	40.38	35.85	38.22	40.17	38.82	40.69	42.94	47.83	47.42	45.38
25	43.32	39.97	38.93	36.20	37.11	37.69	38.23	38.09	46.61	54.17	54.90	44.70
EOM	41.17	38.89	37.01	36.38	37.26	38.61	38.92	38.77	42.91	56.28	50.45	42.01

WTR YR 2003 HIGHEST 35.13 FEB 3 LOWEST 56.68 AUG 1



GROUND-WATER LEVELS

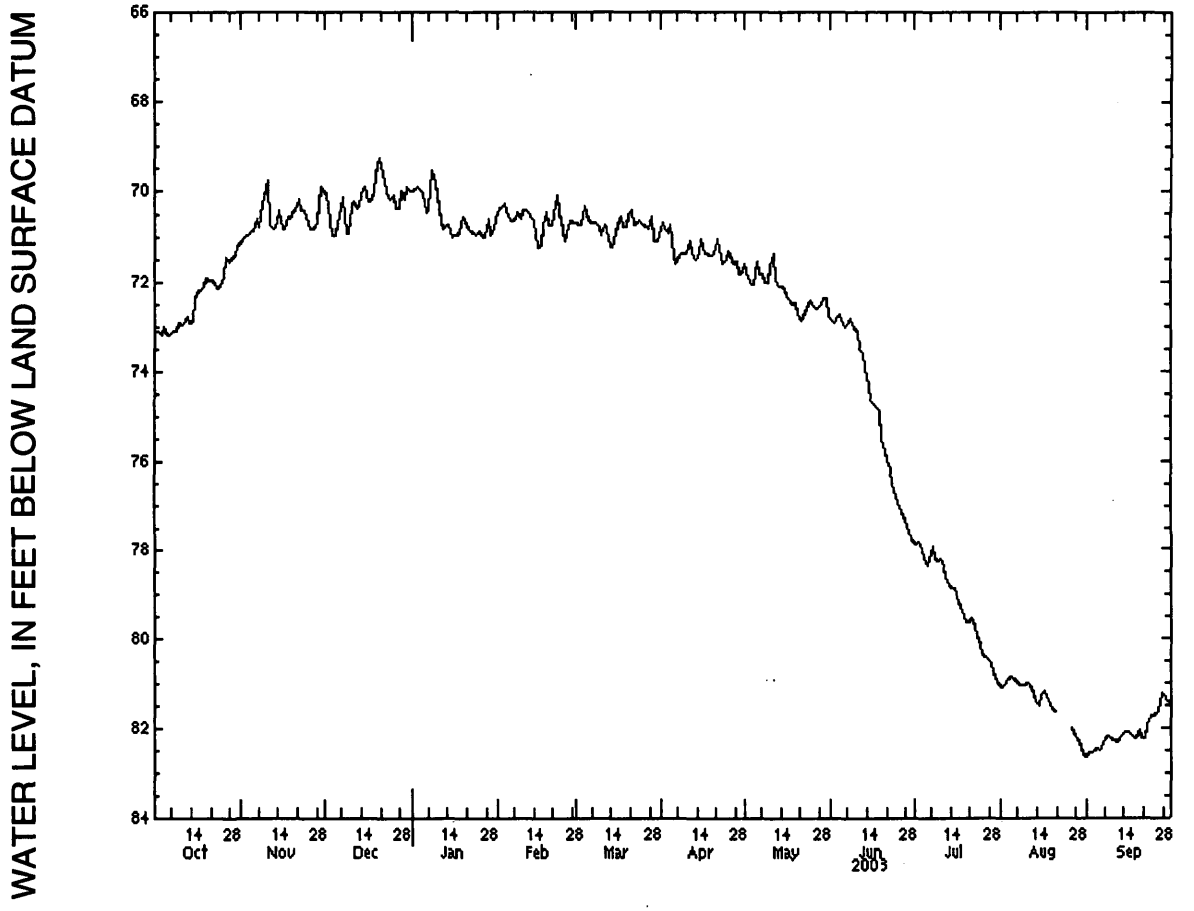
INGHAM COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	73.21	70.88	70.67	70.05	70.66	70.52	71.43	71.54	72.95	78.36	80.89	82.47
10	72.97	69.79	70.33	70.09	70.42	70.94	71.38	71.66	73.10	78.22	80.99	82.26
15	72.37	70.80	69.89	70.98	71.23	70.89	71.06	72.13	74.63	78.84	81.26	82.09
20	71.97	70.42	69.26	70.65	70.74	70.52	71.28	72.73	75.77	79.61	81.62	82.22
25	71.89	70.80	70.08	70.87	71.09	70.71	71.31	72.52	76.95	80.35	---	81.69
EOM	71.16	69.98	69.98	70.59	70.69	70.96	71.78	72.77	77.83	81.02	82.62	81.42

WTR YR 2003 HIGHEST 69.00 JAN 8 LOWEST 82.62 AUG 31



GROUND-WATER LEVELS

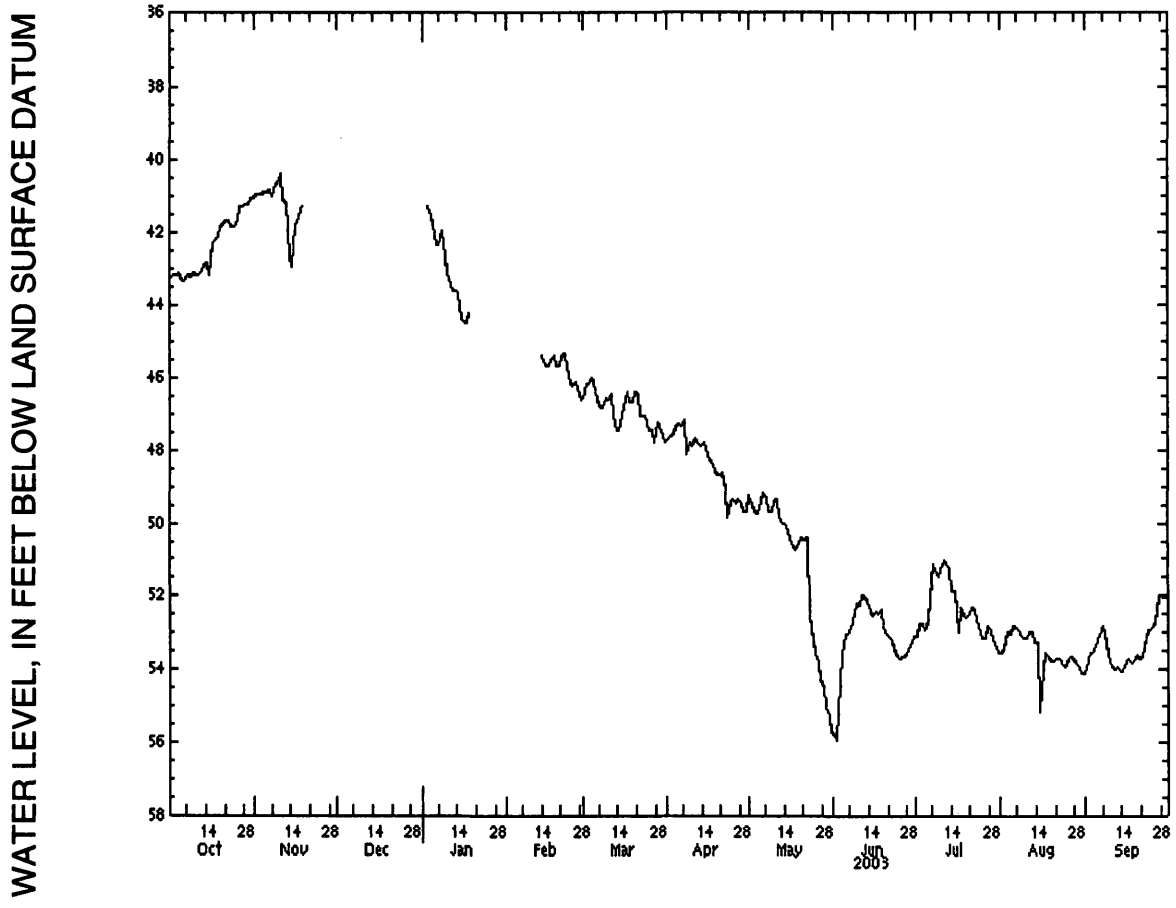
INGHAM COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	43.36	40.90	---	41.78	---	46.15	47.30	49.42	53.03	52.68	52.83	53.20
10	43.18	40.41	---	43.13	---	46.62	47.93	49.43	52.25	51.28	53.15	53.93
15	43.15	41.77	---	44.38	45.68	47.05	47.97	50.21	52.51	51.89	55.18	53.78
20	41.79	---	---	---	45.68	46.40	48.69	50.41	53.02	52.48	53.75	53.69
25	41.64	---	---	---	46.24	47.46	49.36	53.55	53.70	53.14	53.68	52.82
EOM	41.05	---	---	---	46.61	47.77	49.69	55.72	53.07	53.52	54.07	51.97

WTR YR 2003 HIGHEST 40.23 NOV 10 LOWEST 55.92 JUN 2



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 to September 2003 (water-level recorder).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 14.65 ft below land-surface datum, June 5, 2003; lowest recorded, 28.18 ft below land-surface datum, Aug. 21, 2003.

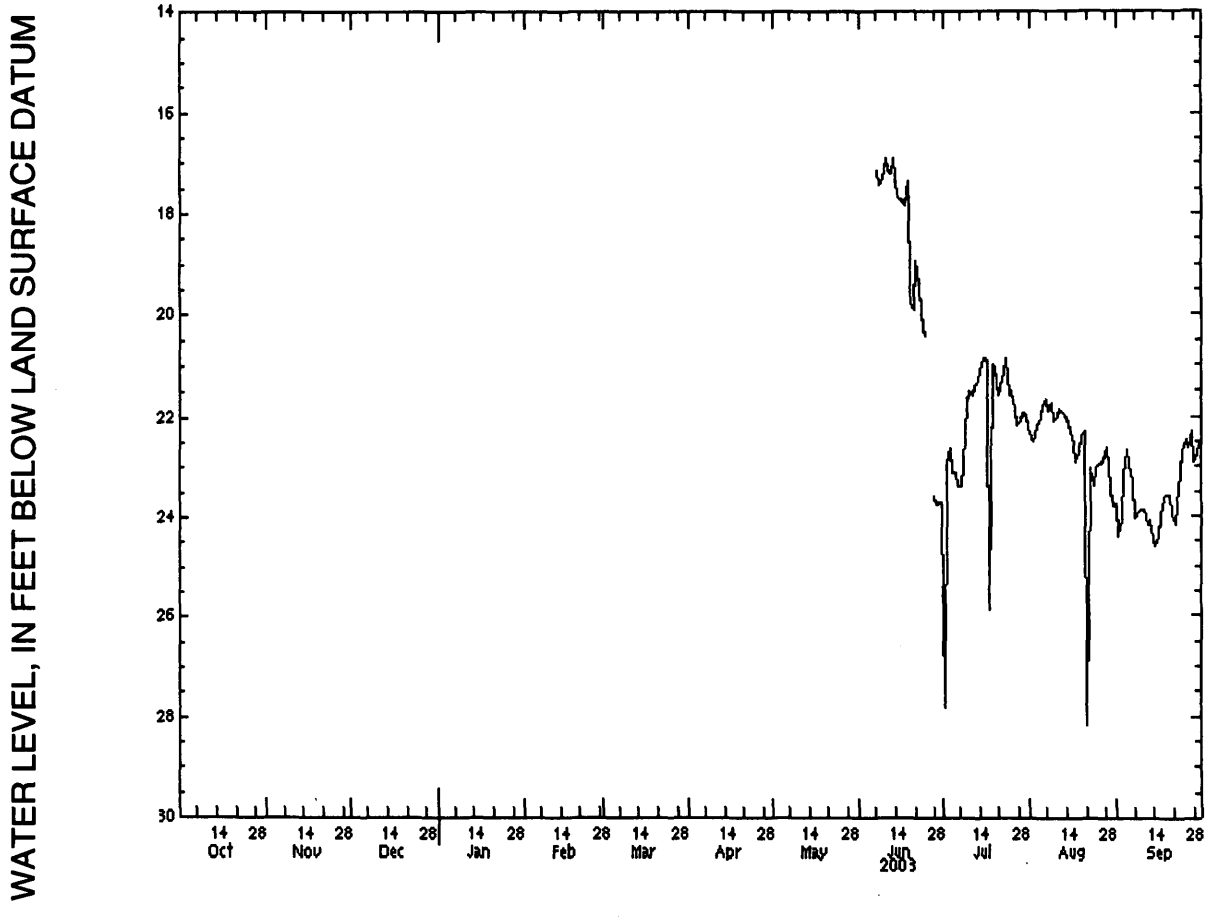
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 10	17.23	APR 17	16.32	JUN 2	16.33	JUN 5	14.65

LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	---	---	---	---	---	---	---	---	23.10	21.77	22.96
10	---	---	---	---	---	---	---	---	16.91	21.48	22.00	23.89
15	---	---	---	---	---	---	---	---	17.70	20.87	22.29	24.40
20	---	---	---	---	---	---	---	---	19.90	21.56	22.29	23.96
25	---	---	---	---	---	---	---	---	---	21.48	22.94	22.45
EOM	---	---	---	---	---	---	---	---	23.70	22.20	23.76	22.38

WTR YR 2003 HIGHEST 14.65 JUN 5 LOWEST 28.18 AUG 21



GROUND-WATER LEVELS

ISABELLA COUNTY

433554084415601. Local number, 14N 3W 17CD02.
LOCATION.--Lat 43°35'54", long 84°41'56", 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 275 ft, screened 271 ft to 275 ft.
INSTRUMENTATION.--Periodic measurements.
DATUM.--Elevation of land-surface datum is 753 ft above sea level, from topographic map. Measuring point: Top of casing, 0.7 ft above land-surface datum.
REMARKS.--Water levels affected by pumping.
PERIOD OF RECORD.--February to September 2003.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.27 ft below land-surface datum, June 5, 2003; lowest measured, 22.75 ft below land-surface datum, Sept. 3, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 11	17.59	JUN 2	17.11	JUN 6	15.42	JUN 16	17.42	JUL 17	20.33	SEP 3	22.75
APR 17	16.92	JUN 5	15.27	JUN 12	16.50	JUN 27	22.57				

GROUND-WATER LEVELS

ISABELLA COUNTY

433555084412101. 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 to September 2003.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.88 ft below land-surface datum, June 6, 2003; lowest measured, 10.52 ft below land-surface datum, Sept. 3, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 10	10.26	JUN 5	8.98	JUN 12	8.95	JUN 27	9.44	JUL 17	9.70	SEP 3	10.52
JUN 2	8.97	JUN 6	8.88	JUN 16	9.08						

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 to September 2003 (water-level recorder).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.04 ft below land-surface datum, June 6, 2003; lowest recorded, 12.10 ft below land-surface datum, Sept. 28, 29, 2003.

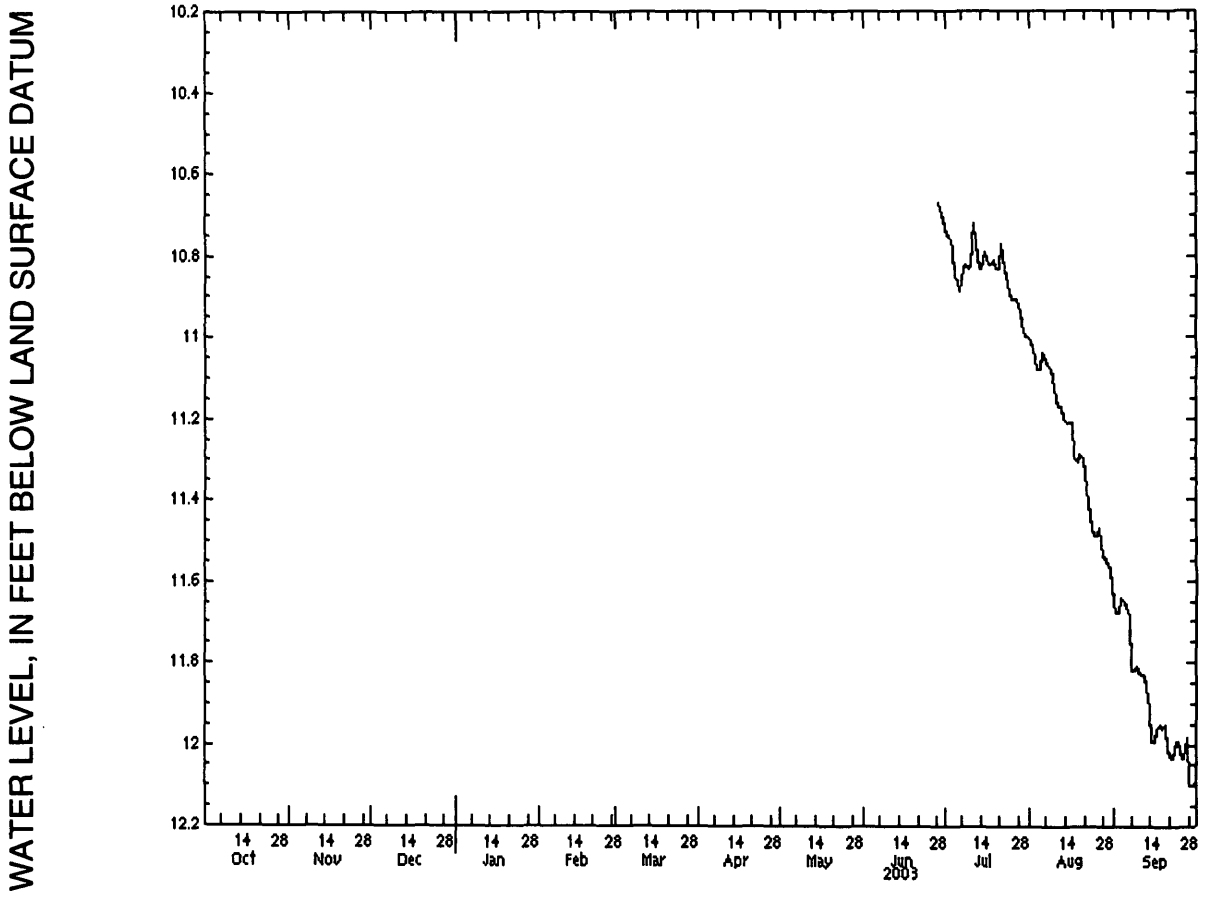
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
FEB 10	11.44	JUN 2	10.17	JUN 5	10.19	JUN 6	10.04	JUN 12	10.09	JUN 16	10.23

LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	---	---	---	---	---	---	---	---	10.86	11.04	11.66
10	---	---	---	---	---	---	---	---	---	10.82	11.15	11.83
15	---	---	---	---	---	---	---	---	---	10.79	11.21	11.99
20	---	---	---	---	---	---	---	---	---	10.83	11.30	12.01
25	---	---	---	---	---	---	---	---	---	10.91	11.49	12.03
EOM	---	---	---	---	---	---	---	---	10.71	11.00	11.65	12.09

WTR YR 2003 HIGHEST 10.04 JUN 6 LOWEST 12.10 SEP 28, 29



GROUND-WATER LEVELS

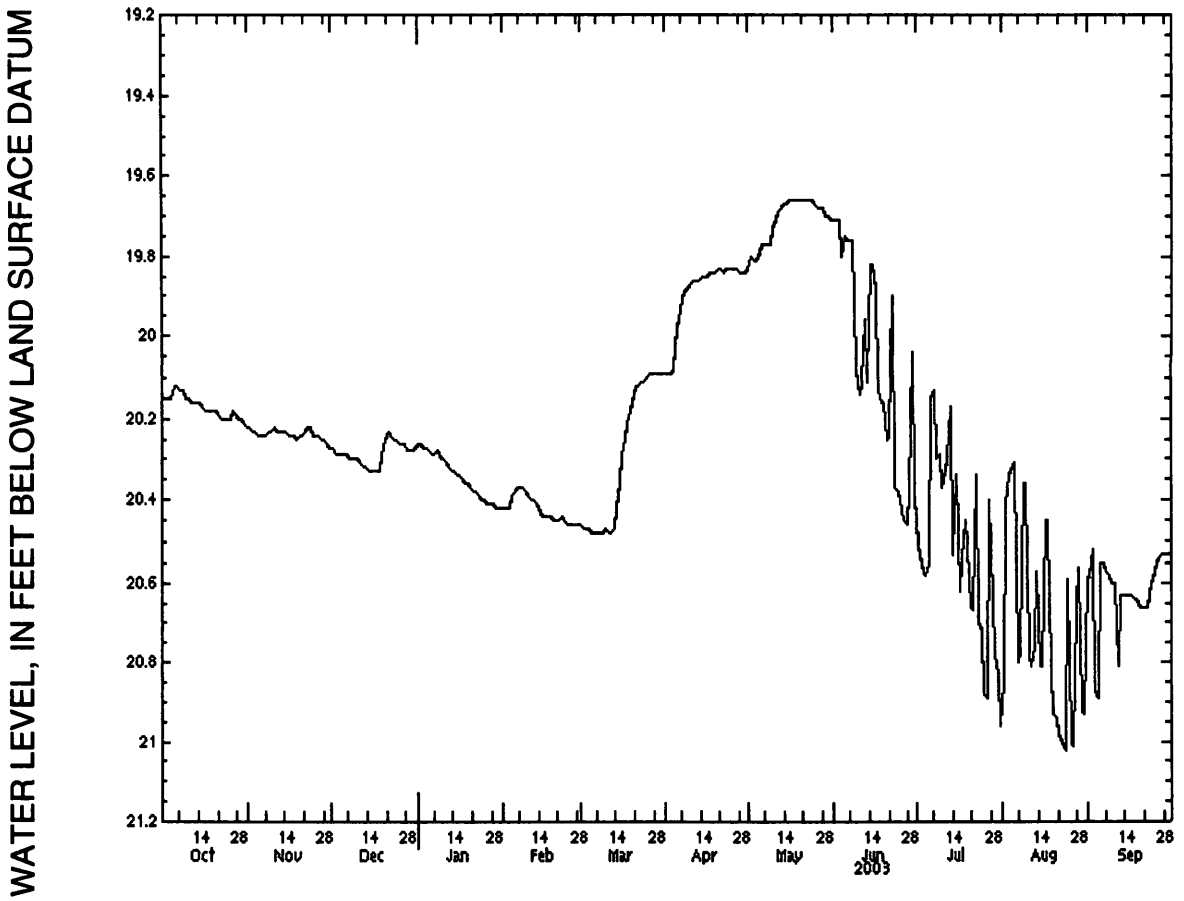
KALAMAZOO COUNTY

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 current year.
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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	20.12	20.24	20.29	20.28	20.38	20.48	19.98	19.79	19.75	20.55	20.31	20.55
10	20.15	20.22	20.30	20.30	20.39	20.47	19.87	19.73	20.14	20.37	20.78	20.60
15	20.17	20.24	20.33	20.34	20.44	20.36	19.85	19.67	19.82	20.34	20.81	20.63
20	20.18	20.24	20.25	20.37	20.45	20.16	19.83	19.66	20.25	20.66	20.94	20.66
25	20.20	20.24	20.26	20.40	20.46	20.10	19.83	19.67	20.40	20.88	21.00	20.55
EOM	20.22	20.27	20.27	20.42	20.46	20.09	19.84	19.71	20.39	20.96	20.59	20.53

WTR YR 2003 HIGHEST 19.66 MAY 14-25 LOWEST 21.02 AUG 23



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 level measurements provided by City of Portage.
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; lowest measured, 15.87 ft below land-surface datum, May 8, 2000.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 4	12.88	NOV 15	13.98	JAN 3	13.87	FEB 28	13.74	APR 17	12.20	JUN 4	12.20
OCT 10	14.05	NOV 21	14.00	JAN 17	13.90	MAR 4	13.68	APR 25	12.20	JUN 10	11.16
OCT 11	14.23	NOV 26	14.00	JAN 22	13.95	MAR 7	13.65	MAY 1	12.21	JUN 13	11.20
OCT 15	14.24	DEC 8	14.01	FEB 1	13.93	MAR 11	13.66	MAY 8	11.86	JUL 11	11.69
OCT 24	14.30	DEC 12	13.99	FEB 3	13.88	MAR 20	12.75	MAY 9	12.05	JUL 24	12.10
OCT 30	14.14	DEC 18	14.00	FEB 12	13.78	MAR 26	12.52	MAY 14	11.95	JUL 30	12.22
NOV 9	14.07	DEC 27	13.88	FEB 14	13.80	MAR 29	12.51	MAY 23	11.95	SEP 17	14.43
NOV 12	13.97	JAN 2	13.84	FEB 18	13.80	APR 2	12.49	MAY 29	11.98		

WTR YR 2003	HIGHEST	11.16	JUN 10		LOWEST	14.43	SEP 17	

GROUND-WATER LEVELS

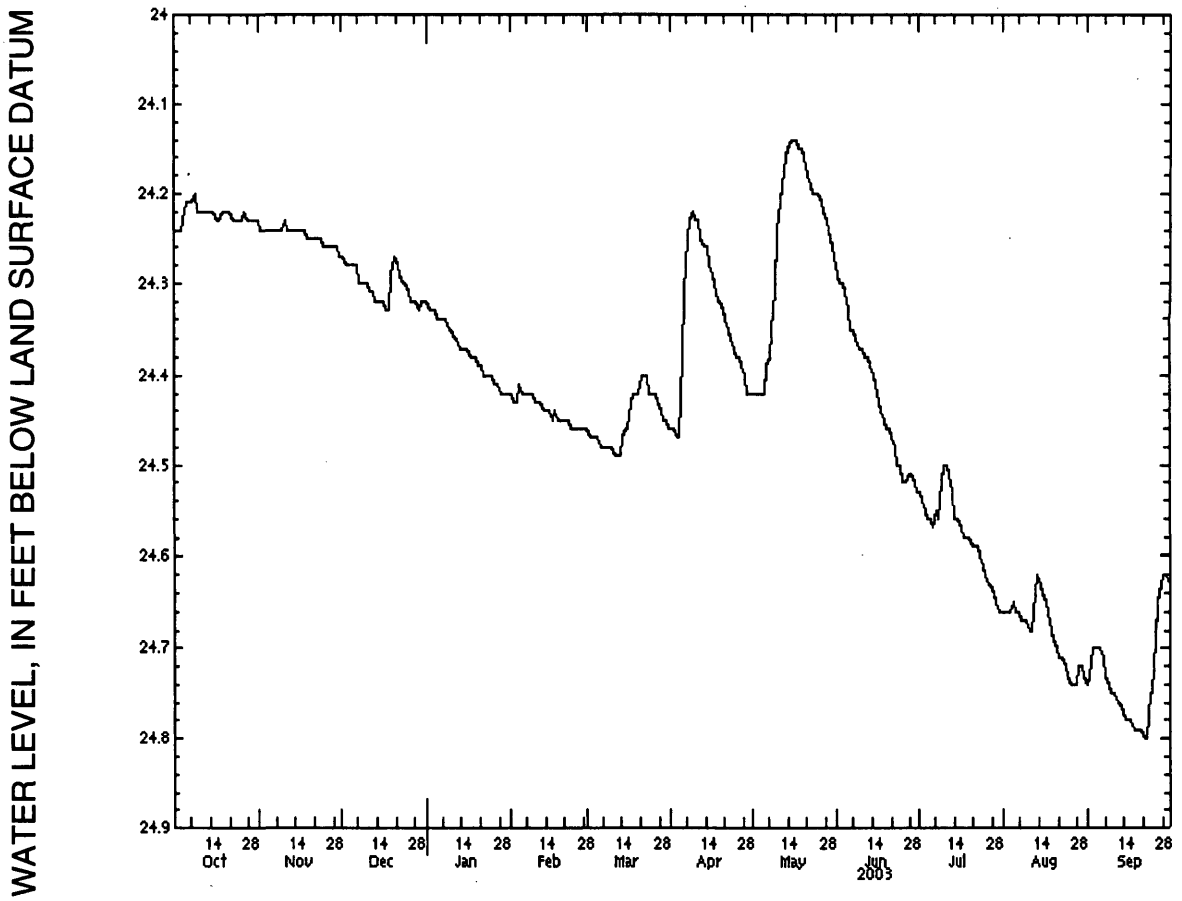
KALAMAZOO COUNTY

421150085383901. Local number, 3S 11W 19BBDD1.
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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	24.21	24.24	24.28	24.34	24.42	24.47	24.38	24.42	24.33	24.56	24.66	24.70
10	24.22	24.23	24.30	24.35	24.43	24.48	24.23	24.24	24.37	24.50	24.68	24.75
15	24.22	24.24	24.32	24.37	24.44	24.46	24.28	24.14	24.41	24.56	24.64	24.78
20	24.22	24.25	24.27	24.39	24.45	24.42	24.33	24.16	24.46	24.59	24.70	24.79
25	24.23	24.26	24.31	24.40	24.46	24.42	24.38	24.20	24.52	24.62	24.74	24.69
EOM	24.23	24.27	24.32	24.42	24.46	24.46	24.42	24.27	24.53	24.66	24.74	24.63

WTR YR 2003 HIGHEST 24.14 MAY 14-18 LOWEST 24.80 SEP 21, 22



GROUND-WATER LEVELS

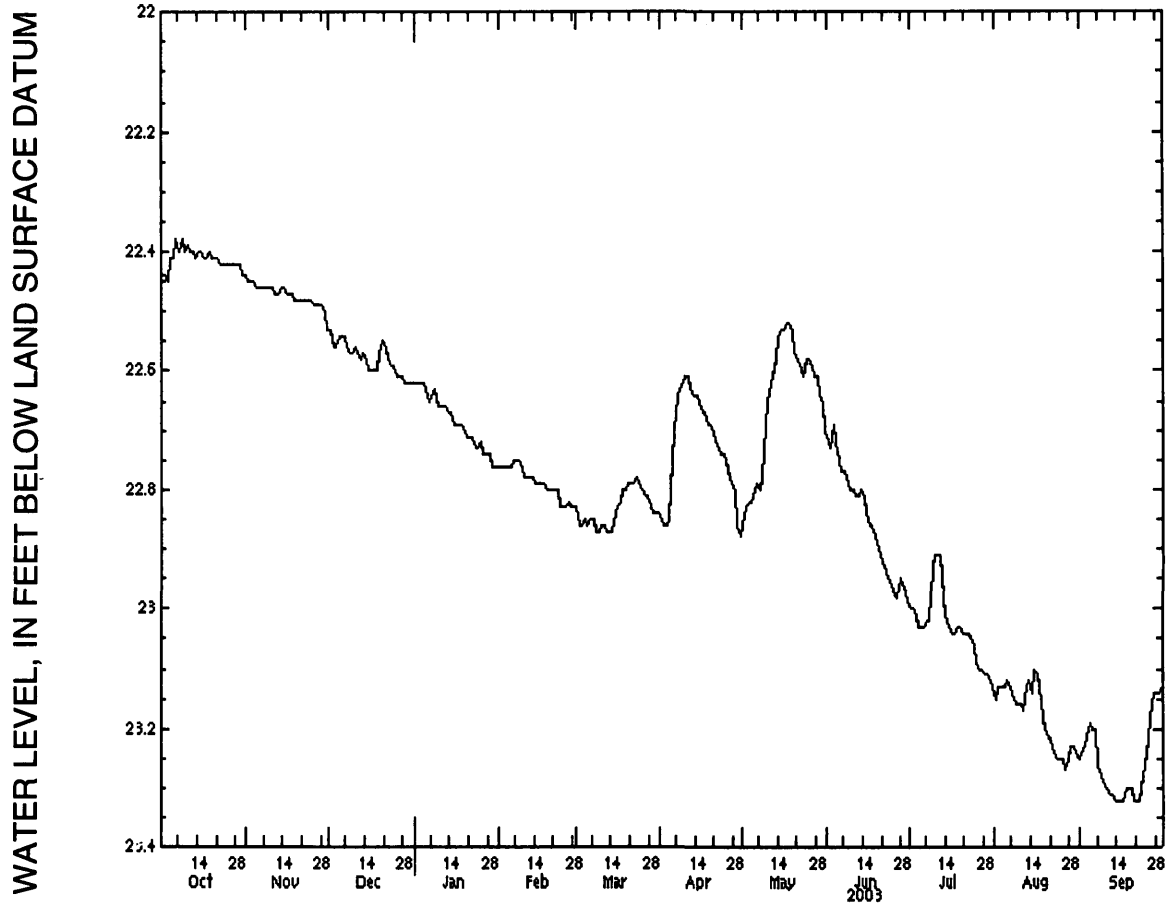
KALAMAZOO COUNTY

421150085383902. Local number, 3S 11W 19BBDD2.
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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	22.41	22.46	22.54	22.63	22.76	22.86	22.75	22.80	22.75	23.03	23.12	23.20
10	22.39	22.46	22.56	22.66	22.78	22.86	22.61	22.65	22.80	22.91	23.16	23.30
15	22.40	22.47	22.60	22.69	22.79	22.84	22.65	22.53	22.84	23.03	23.10	23.32
20	22.41	22.48	22.55	22.71	22.80	22.79	22.70	22.57	22.91	23.04	23.21	23.32
25	22.42	22.49	22.61	22.72	22.83	22.80	22.75	22.58	22.97	23.09	23.25	23.22
EOM	22.44	22.53	22.62	22.76	22.83	22.84	22.88	22.70	22.99	23.13	23.25	23.13

WTR YR 2003 HIGHEST 22.33 OCT 4 LOWEST 23.32 SEP 13-16, 20-22



GROUND-WATER LEVELS

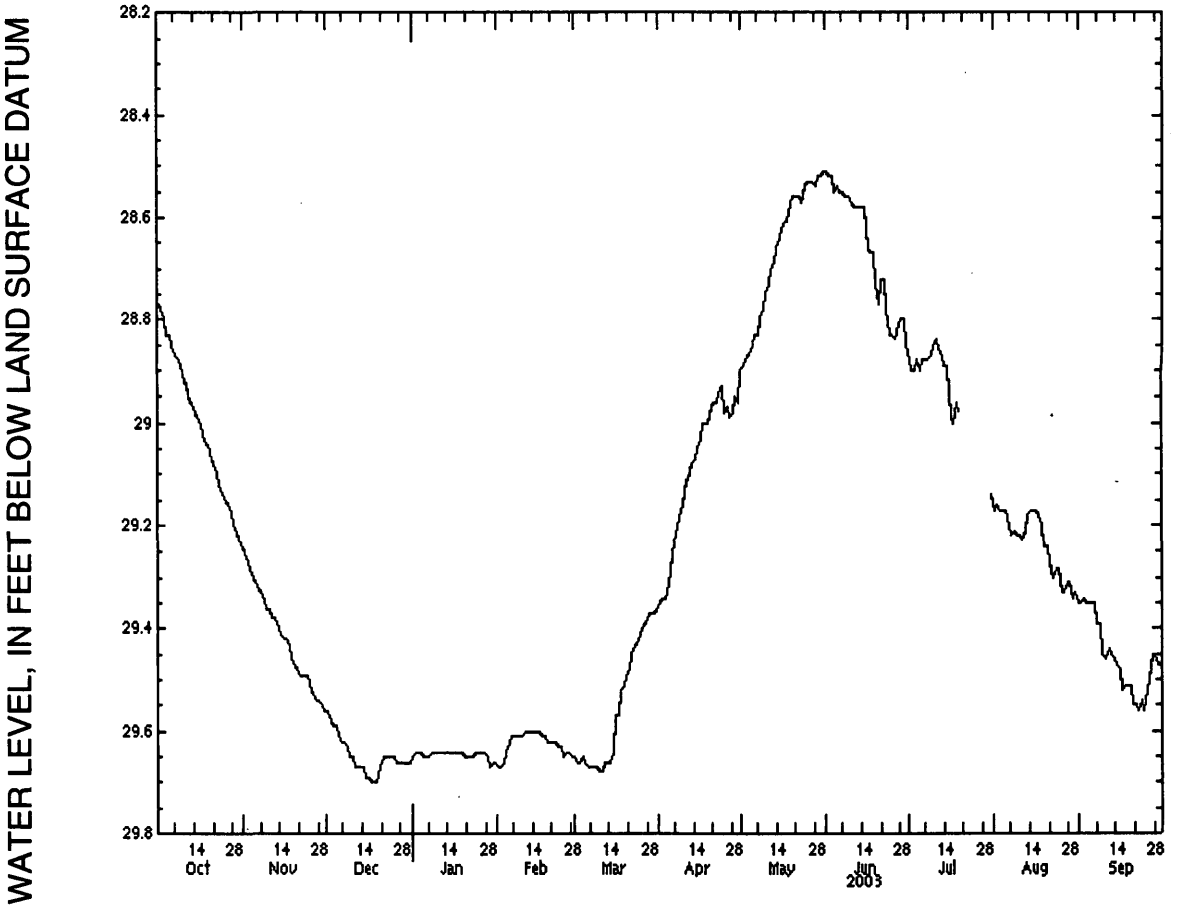
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	28.83	29.31	29.61	29.65	29.62	29.66	29.29	28.85	28.54	28.90	29.17	29.35
10	28.92	29.36	29.65	29.64	29.61	29.68	29.16	28.75	28.57	28.85	29.22	29.46
15	28.99	29.42	29.69	29.64	29.60	29.64	29.05	28.64	28.58	28.89	29.17	29.48
20	29.07	29.48	29.67	29.65	29.62	29.49	28.97	28.56	28.77	---	29.24	29.55
25	29.15	29.52	29.65	29.64	29.65	29.41	28.98	28.53	28.83	---	29.33	29.52
EOM	29.24	29.56	29.66	29.66	29.65	29.36	28.96	28.51	28.85	29.14	29.35	29.47

WTR YR 2003 HIGHEST 28.51 MAY 27-31, JUN 1-4 LOWEST 29.70 DEC 17-19



GROUND-WATER LEVELS

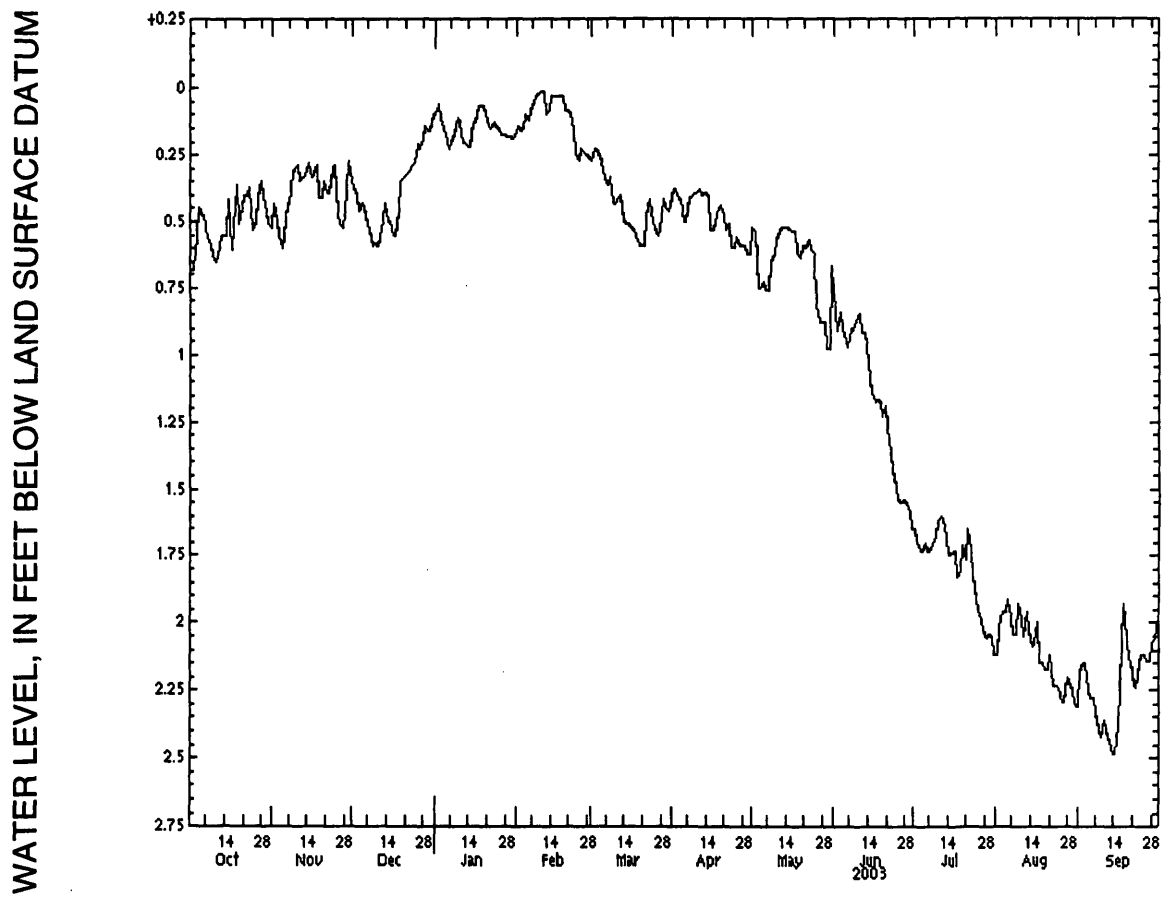
KALAMAZOO COUNTY

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 ABOVE (+) AND BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	0.48	0.55	0.45	0.17	0.12	0.27	0.50	0.73	0.95	1.70	1.91	2.28
10	0.65	0.29	0.59	0.13	0.01	0.43	0.39	0.57	0.85	1.62	1.98	2.36
15	0.42	0.33	0.50	0.13	0.03	0.51	0.53	0.53	1.14	1.74	2.07	2.38
20	0.45	0.35	0.33	0.10	0.08	0.59	0.48	0.59	1.19	1.76	2.17	2.14
25	0.50	0.47	0.21	0.15	0.23	0.52	0.56	0.81	1.54	1.95	2.29	2.12
EOM	0.52	0.32	0.10	0.18	0.26	0.44	0.62	0.67	1.65	2.12	2.31	1.98

WTR YR 2003 HIGHEST +0.05 FEB 10, 11 LOWEST 2.48 SEP 13, 14



GROUND-WATER LEVELS

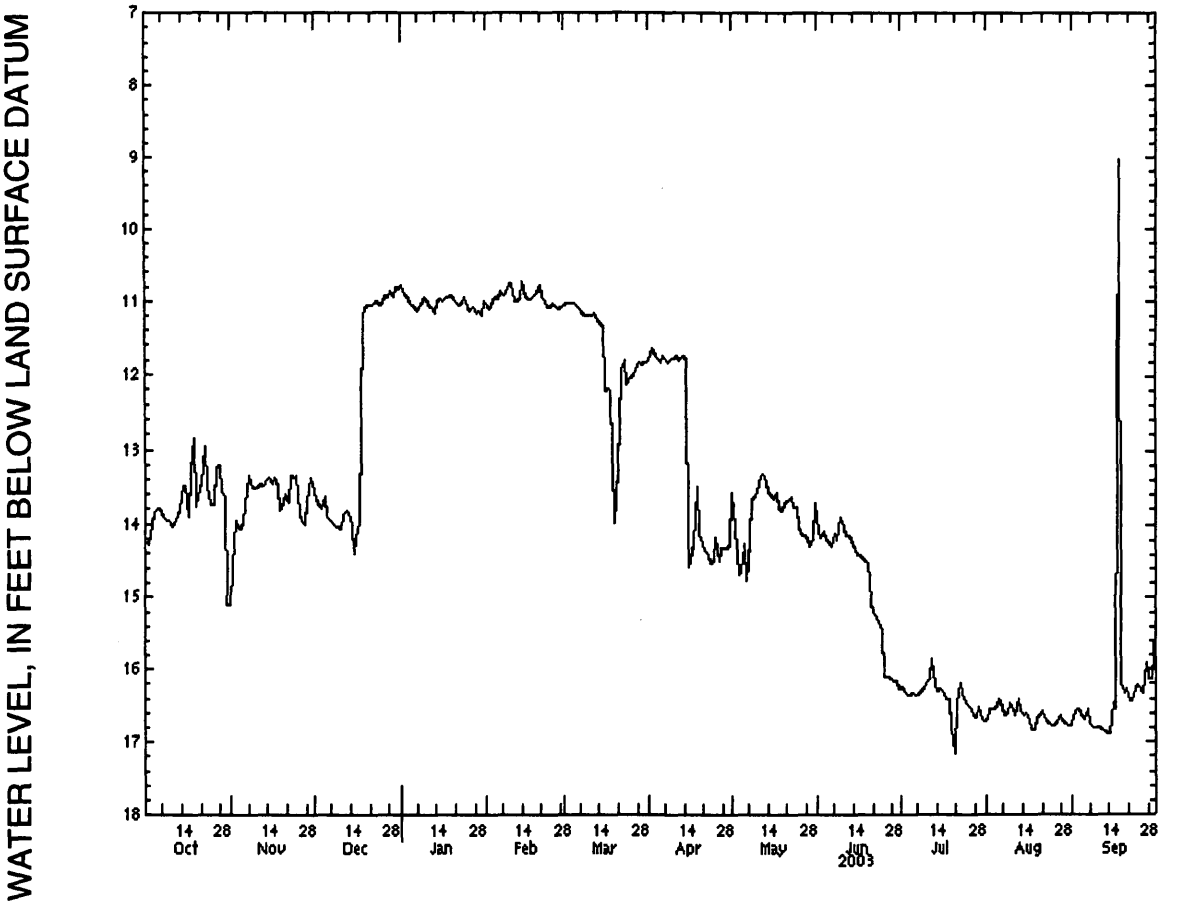
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	13.80	13.96	13.89	11.05	10.97	11.02	11.85	14.27	14.23	16.33	16.42	16.68
10	14.04	13.50	14.08	10.97	10.76	11.20	11.79	13.54	14.05	16.20	16.56	16.80
15	13.49	13.46	14.39	10.99	10.95	11.34	14.56	13.60	14.39	16.27	16.60	16.47
20	13.50	13.60	11.06	10.98	10.79	13.68	14.26	13.70	15.03	17.17	16.64	16.27
25	13.74	13.84	11.03	11.10	11.04	12.04	14.18	14.04	16.11	16.49	16.78	16.26
EOM	15.10	13.45	10.85	11.01	11.10	11.85	14.30	13.71	16.26	16.72	16.77	15.45

WTR YR 2003 HIGHEST 6.77 JAN 1, 2 LOWEST 17.17 JUL 20



GROUND-WATER LEVELS

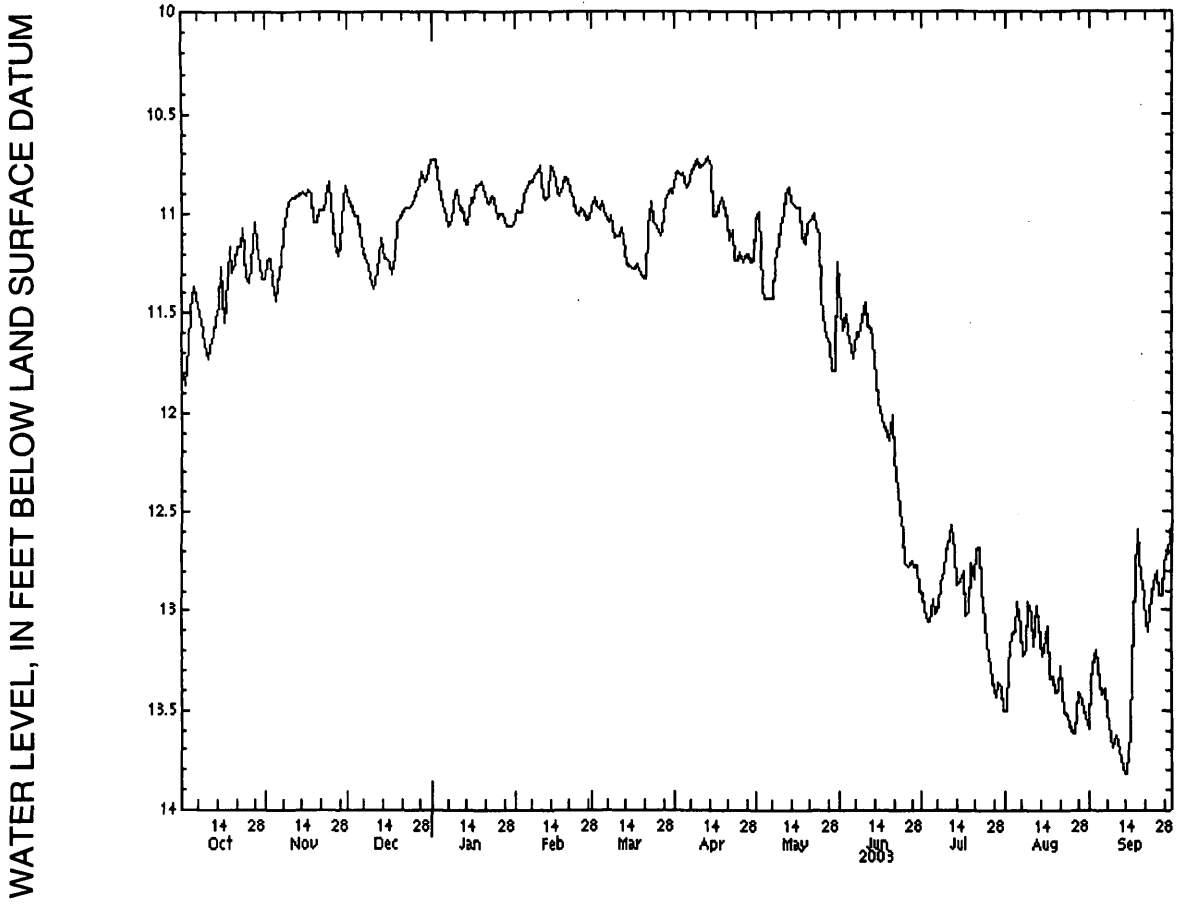
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	11.36	11.35	11.09	10.95	10.87	10.94	10.87	11.43	11.67	12.95	12.96	13.42
10	11.73	10.92	11.37	10.88	10.76	11.11	10.77	11.06	11.45	12.71	13.02	13.62
15	11.26	10.91	11.22	10.92	10.79	11.26	11.01	10.96	11.94	12.85	13.19	13.60
20	11.24	10.98	11.02	10.87	10.83	11.31	11.03	11.05	12.01	12.84	13.40	12.85
25	11.34	11.05	10.93	11.02	10.97	11.06	11.19	11.43	12.76	13.17	13.61	12.80
EOM	11.32	10.86	10.73	11.05	11.02	10.90	11.23	11.24	12.90	13.50	13.59	12.55

WTR YR 2003 HIGHEST 10.57 JAN 2 LOWEST 13.82 SEP 13, 14



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 level measurements provided by City of Portage.
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 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	15.92	NOV 21	16.70	JAN 17	17.20	FEB 27	17.62	APR 19	17.15	JUN 4	17.10
OCT 10	15.50	NOV 26	16.78	JAN 24	17.28	MAR 4	17.69	APR 25	17.18	JUN 10	17.12
OCT 11	16.02	DEC 8	16.95	FEB 1	17.38	MAR 12	17.80	MAY 1	17.31	JUN 13	17.22
OCT 15	16.08	DEC 12	17.01	FEB 3	17.35	MAR 20	17.60	MAY 8	17.27	JUL 11	17.55
OCT 30	16.37	DEC 18	17.00	FEB 12	17.40	MAR 26	17.50	MAY 9	17.17	JUL 24	17.72
NOV 9	16.53	DEC 27	17.04	FEB 14	17.50	MAR 29	17.60	MAY 23	17.02	JUL 30	17.65
NOV 12	16.59	JAN 2	17.02	FEB 20	17.57	APR 2	17.64	MAY 29	17.08	SEP 17	18.19
NOV 15	16.60	JAN 3	17.07								

WTR YR 2003 HIGHEST 15.50 OCT 10 LOWEST 18.19 SEP 17

GROUND-WATER LEVELS

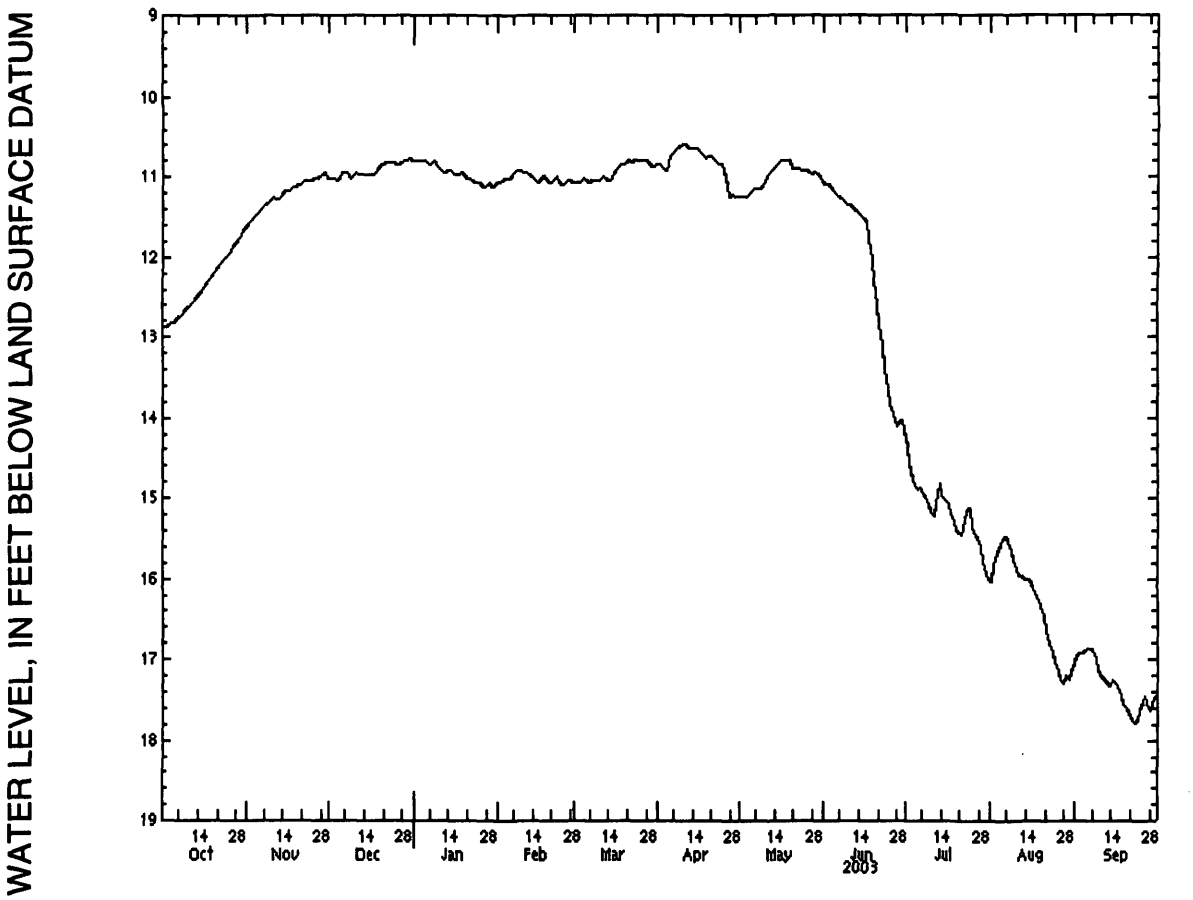
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	12.82	11.42	10.95	10.79	11.02	11.05	10.74	11.16	11.21	14.89	15.50	16.87
10	12.62	11.25	10.94	10.90	10.94	11.05	10.60	11.04	11.36	15.17	15.87	17.22
15	12.40	11.17	10.96	10.96	11.06	10.98	10.64	10.82	11.52	15.02	16.02	17.31
20	12.17	11.09	10.83	11.01	11.08	10.81	10.73	10.88	12.58	15.42	16.47	17.66
25	11.93	11.03	10.83	11.06	11.10	10.79	10.93	10.93	13.84	15.34	17.14	17.54
EOM	11.62	11.01	10.79	11.06	11.07	10.84	11.25	11.07	14.16	16.01	17.04	17.44

WTR YR 2003 HIGHEST 10.58 APR 10, 11 LOWEST 17.78 SEP 22



GROUND-WATER LEVELS

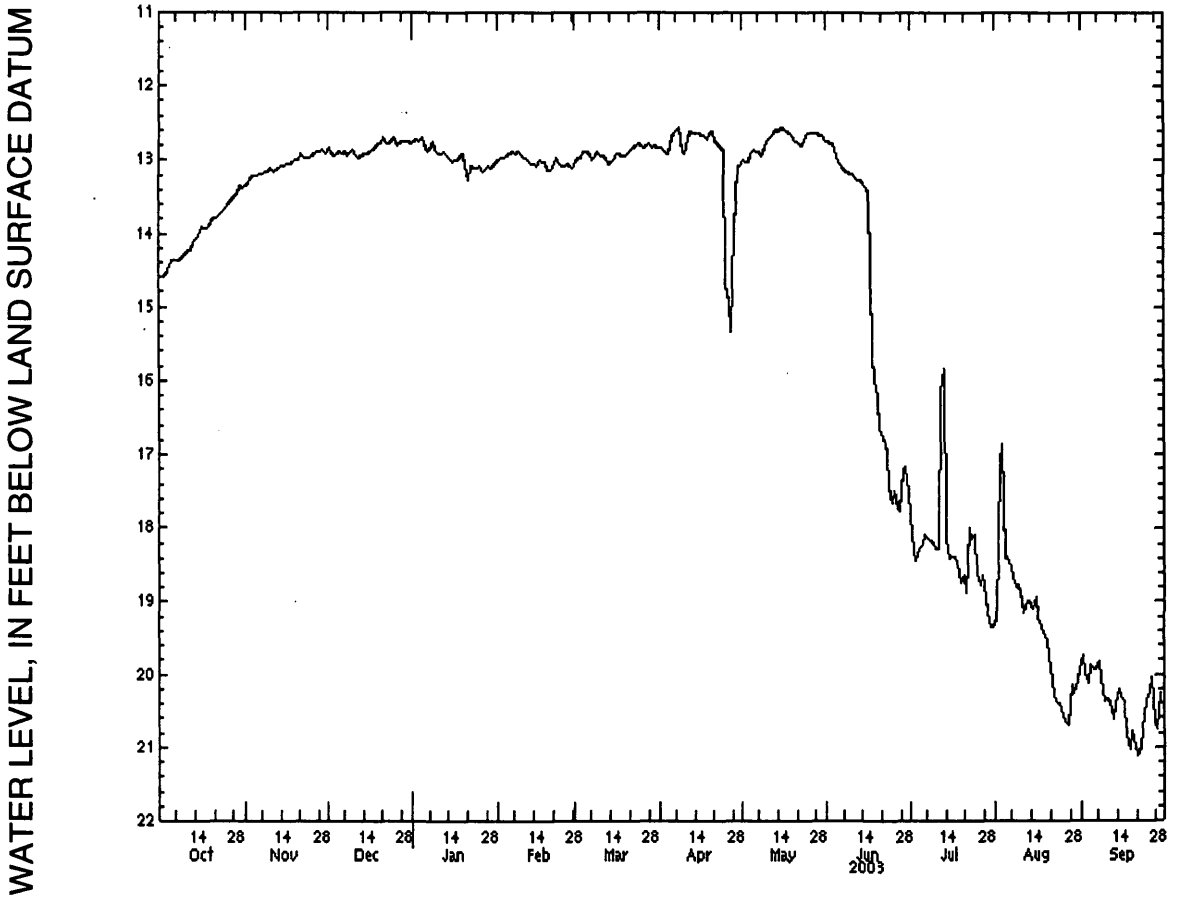
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	14.37	13.20	12.88	12.78	12.92	12.89	12.68	12.86	13.03	18.21	18.37	19.92
10	14.30	13.10	12.85	12.91	12.97	12.94	12.90	12.74	13.18	18.26	18.98	20.35
15	14.03	13.07	12.91	13.01	13.06	13.00	12.62	12.56	13.38	18.42	18.92	20.31
20	13.80	12.98	12.76	13.07	13.13	12.90	12.59	12.73	16.66	18.64	19.77	20.99
25	13.62	12.94	12.69	13.08	13.06	12.80	14.69	12.63	17.50	18.59	20.56	20.22
EOM	13.38	12.91	12.78	13.02	13.10	12.82	13.08	12.74	17.51	19.35	19.93	20.22

WTR YR 2003 HIGHEST 12.44 MAY 16 LOWEST 21.11 SEP 21



GROUND-WATER LEVELS

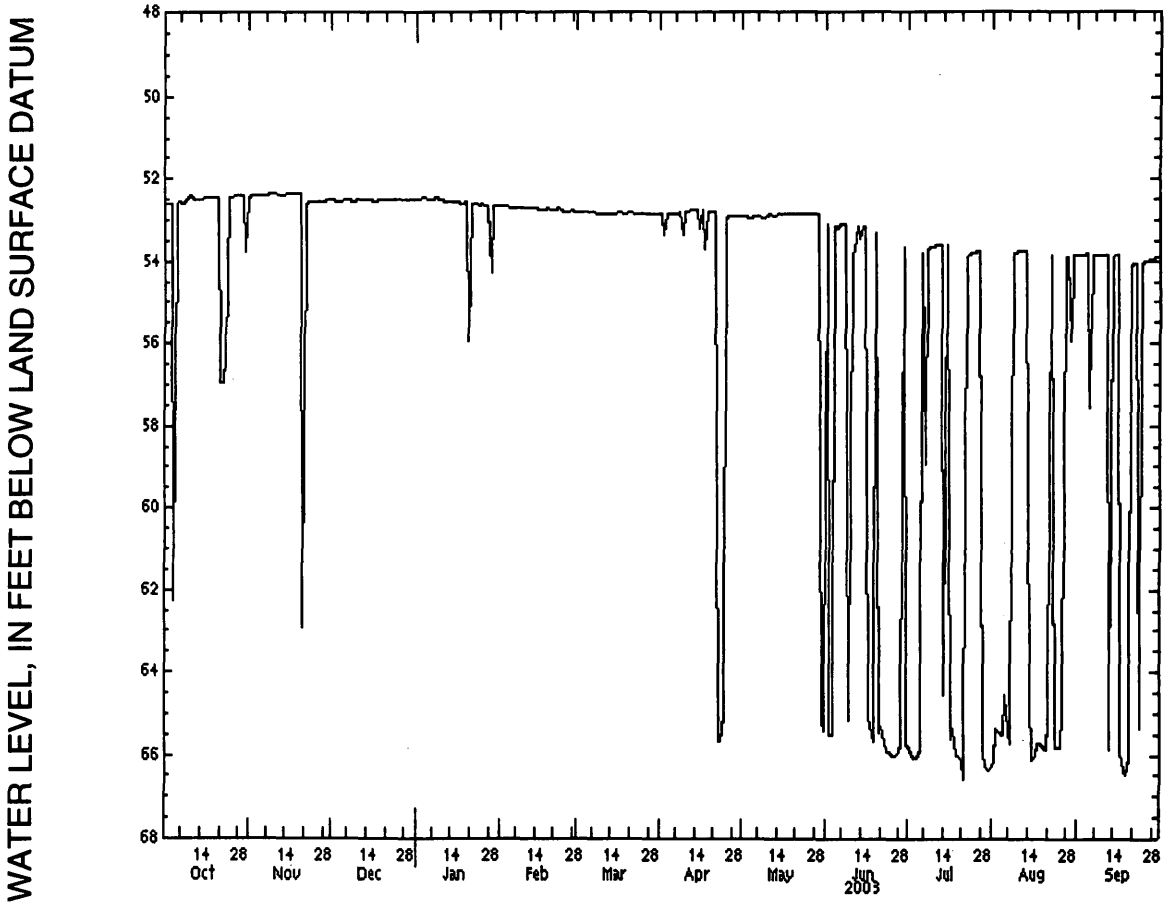
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	52.59	52.38	52.51	52.48	52.68	52.81	52.87	52.90	53.21	65.87	64.54	57.54
10	52.41	52.35	52.51	52.51	52.69	52.84	52.82	52.90	53.87	53.64	53.77	53.85
15	52.46	52.36	52.51	52.55	52.74	52.83	53.22	52.84	53.13	53.62	66.14	53.85
20	52.44	62.94	52.48	55.94	52.74	52.82	52.82	52.85	65.46	66.11	65.86	54.14
25	52.42	52.52	52.50	52.62	52.79	52.83	52.93	52.86	66.00	53.80	65.84	54.01
EOM	52.47	52.51	52.47	52.64	52.78	52.84	52.92	65.42	65.75	66.30	53.87	53.92

WTR YR 2003 HIGHEST 52.30 NOV 10 LOWEST 66.60 JUL 21



GROUND-WATER LEVELS

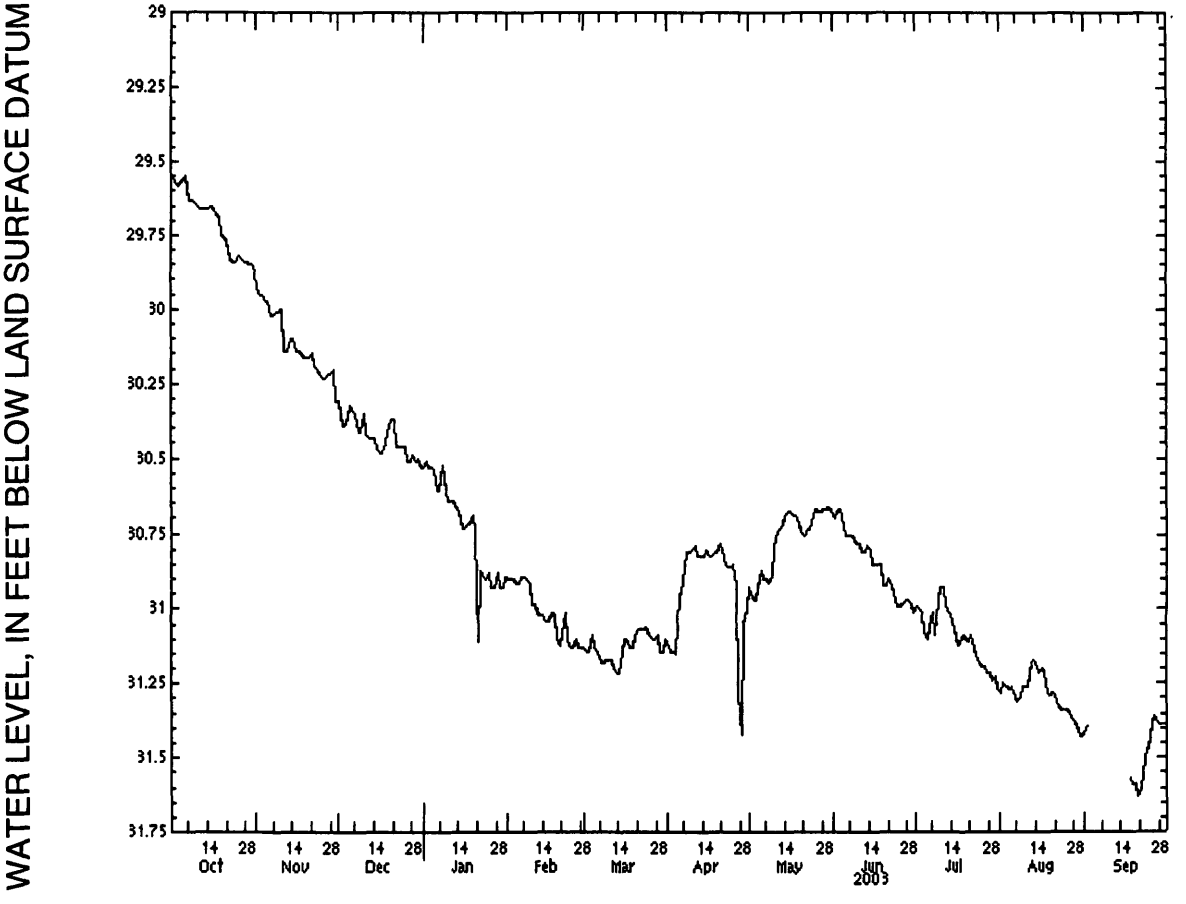
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	29.56	29.97	30.32	30.54	30.91	31.13	30.95	30.87	30.75	31.10	31.26	---
10	29.65	30.00	30.35	30.64	30.98	31.17	30.80	30.79	30.78	30.93	31.26	---
15	29.65	30.14	30.47	30.73	31.04	31.14	30.80	30.68	30.85	31.07	31.21	---
20	29.76	30.16	30.37	30.74	31.12	31.09	30.78	30.74	30.92	31.11	31.28	31.63
25	29.82	30.23	30.46	30.88	31.13	31.09	30.85	30.67	30.99	31.19	31.34	31.39
EOM	29.87	30.31	30.53	30.89	31.13	31.10	31.00	30.68	31.01	31.27	31.42	31.39

WTR YR 2003 HIGHEST 29.47 OCT 4 LOWEST 31.63 SEP 20



GROUND-WATER LEVELS

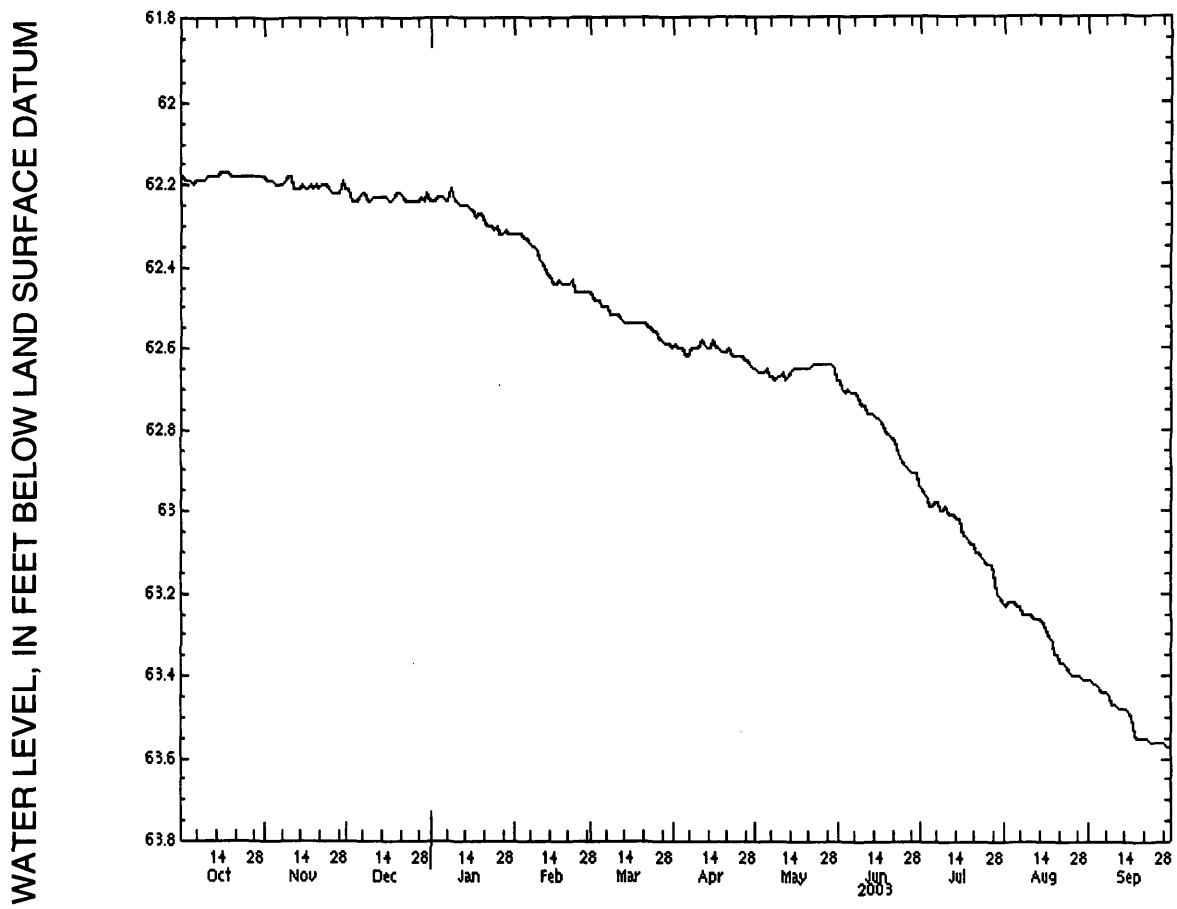
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	62.20	62.20	62.23	62.23	62.33	62.50	62.62	62.65	62.71	62.99	63.23	63.44
10	62.18	62.18	62.23	62.24	62.38	62.52	62.60	62.67	62.74	62.99	63.25	63.47
15	62.17	62.21	62.23	62.26	62.44	62.54	62.58	62.65	62.77	63.02	63.28	63.49
20	62.18	62.21	62.22	62.28	62.44	62.54	62.61	62.65	62.82	63.08	63.35	63.55
25	62.18	62.22	62.24	62.30	62.46	62.56	62.62	62.64	62.89	63.13	63.40	63.56
EOM	62.18	62.21	62.24	62.32	62.46	62.60	62.65	62.68	62.94	63.22	63.41	63.57

WTR YR 2003 HIGHEST 62.12 OCT 4 LOWEST 63.57 SEP 29, 30



GROUND-WATER LEVELS

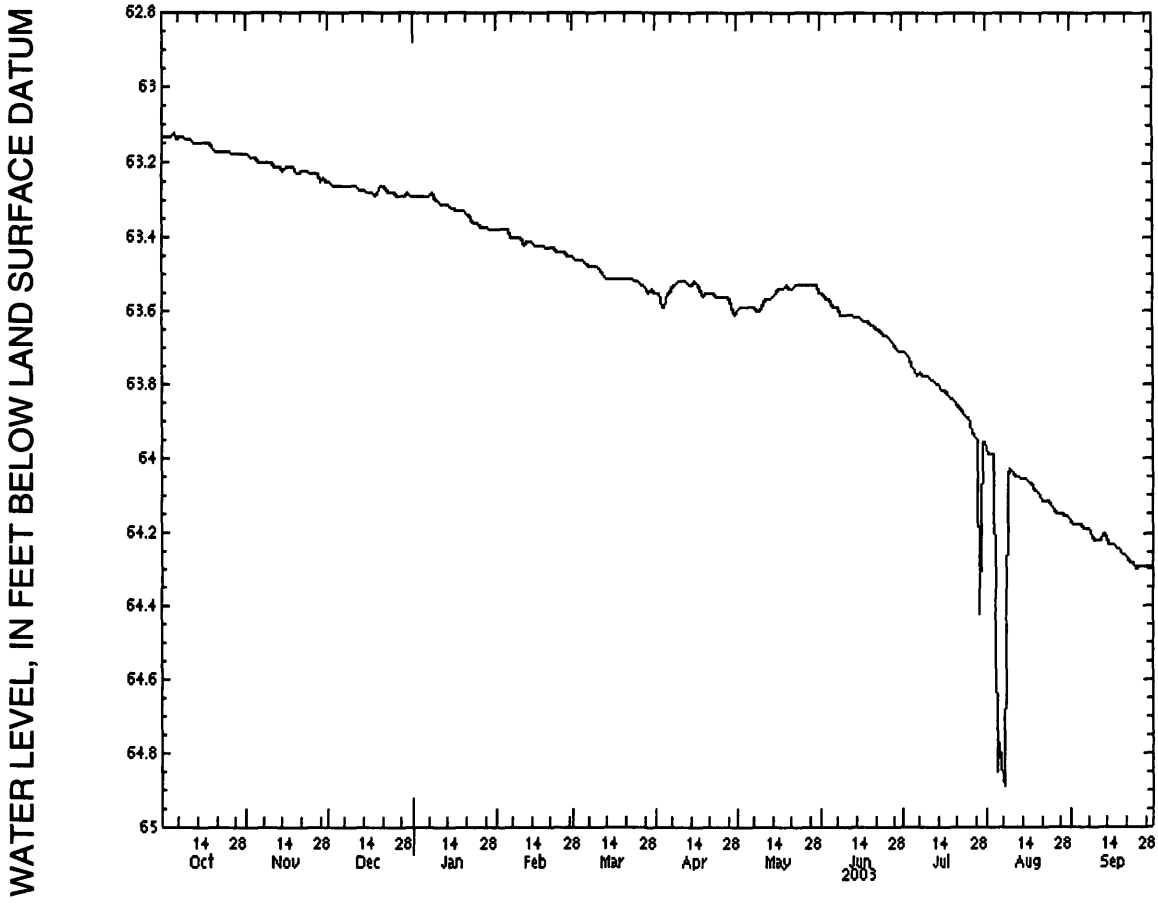
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	63.12	63.20	63.26	63.29	63.38	63.46	63.55	63.59	63.59	63.76	64.77	64.19
10	63.14	63.20	63.26	63.30	63.40	63.48	63.52	63.59	63.61	63.78	64.04	64.22
15	63.15	63.21	63.28	63.32	63.42	63.51	63.52	63.55	63.62	63.82	64.06	64.23
20	63.17	63.23	63.26	63.33	63.43	63.51	63.55	63.54	63.64	63.85	64.10	64.26
25	63.17	63.23	63.28	63.36	63.44	63.52	63.56	63.53	63.67	63.89	64.14	64.29
EOM	63.18	63.25	63.29	63.38	63.45	63.55	63.61	63.55	63.71	63.96	64.17	64.30

WTR YR 2003 HIGHEST 63.09 OCT 14 LOWEST 64.89 AUG 7



GROUND-WATER LEVELS

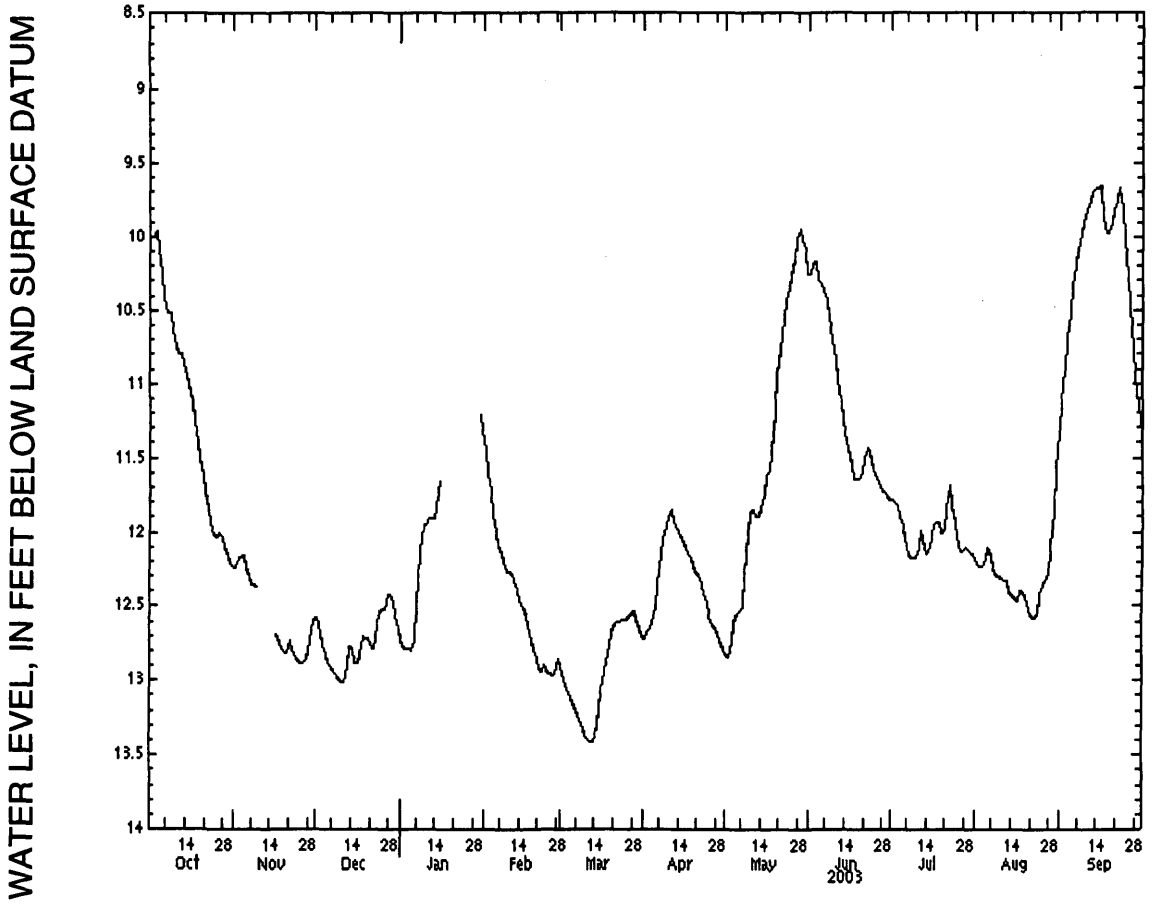
KALAMAZOO COUNTY

421614085270801. Local number, 2S 10W 26BBCC.
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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	10.24	12.25	12.89	12.80	12.01	13.12	12.51	12.55	10.32	11.96	12.11	10.33
10	10.74	---	13.01	11.95	12.27	13.37	11.90	11.87	10.84	12.17	12.31	9.82
15	11.00	---	12.88	11.65	12.51	13.21	12.05	11.75	11.44	12.11	12.45	9.65
20	11.62	12.82	12.72	11.70	12.85	12.68	12.28	10.94	11.60	11.99	12.52	9.82
25	12.04	12.88	12.52	---	12.95	12.59	12.57	10.26	11.61	12.04	12.35	10.26
EOM	12.24	12.59	12.65	11.31	12.86	12.70	12.79	10.25	11.78	12.15	11.33	11.34

WTR YR 2003 HIGHEST 9.58 SEP 15, 22 LOWEST 13.42 MAR 12, 13



GROUND-WATER LEVELS

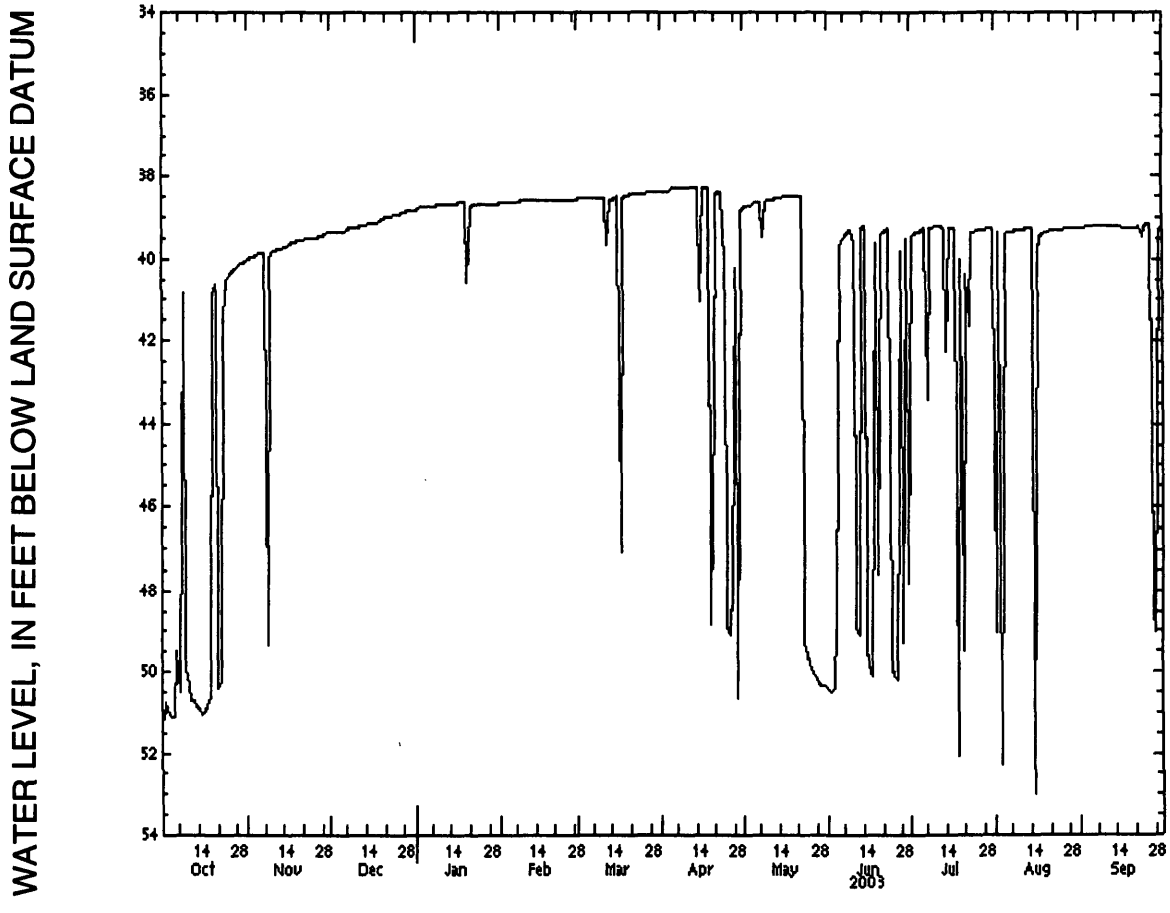
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	51.11	39.88	39.35	38.77	38.63	38.55	38.31	38.66	39.69	39.31	39.37	39.21
10	50.34	39.80	39.24	38.69	38.61	38.52	38.30	38.61	39.60	39.22	39.31	39.21
15	51.08	39.69	39.17	38.69	38.62	38.53	41.02	38.53	49.42	39.25	52.99	39.21
20	40.63	39.58	39.05	40.57	38.59	38.48	43.43	38.51	39.41	49.49	39.35	39.23
25	40.42	39.50	38.93	38.71	38.57	38.43	48.90	49.79	50.07	39.31	39.28	39.17
EOM	40.05	39.37	38.84	38.68	38.57	38.41	38.91	50.37	47.81	39.27	39.26	39.26

WTR YR 2003 HIGHEST 38.26 APR 14, 15 LOWEST 52.99 AUG 15



GROUND-WATER LEVELS

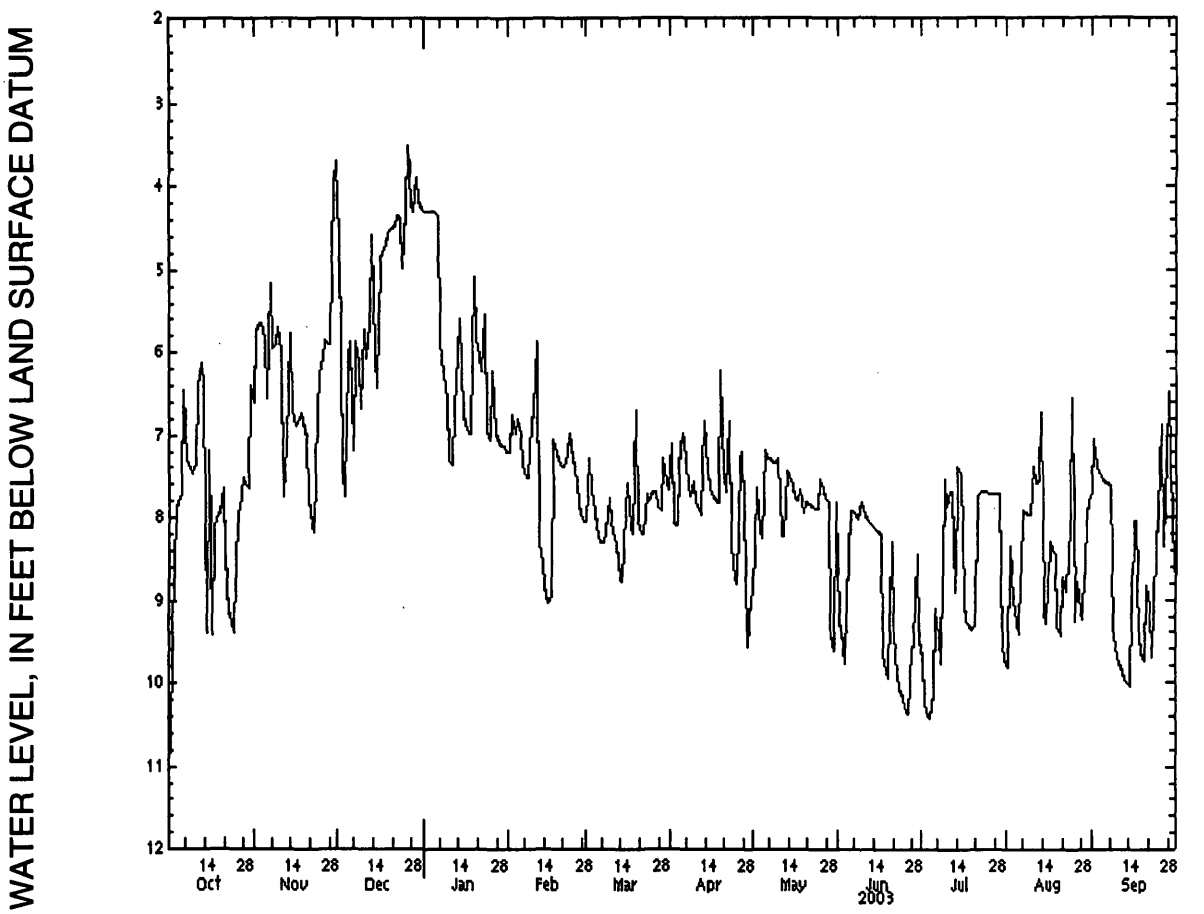
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	7.71	6.56	5.86	4.31	6.97	8.12	6.98	7.19	7.92	10.12	9.41	7.58
10	7.34	5.97	5.71	7.30	6.70	8.07	7.81	7.28	7.96	7.88	7.38	9.78
15	7.18	6.88	6.42	6.75	9.04	7.92	7.67	7.61	8.18	7.46	9.29	8.05
20	7.64	7.78	4.49	5.85	7.38	8.04	7.50	7.82	8.30	9.31	9.43	8.83
25	7.93	6.08	4.27	7.06	7.39	7.70	8.80	7.55	10.29	7.71	9.26	6.89
EOM	6.61	3.70	4.26	7.22	8.04	7.67	8.97	7.82	9.48	9.73	7.71	8.84

WTR YR 2003 HIGHEST 3.49 DEC 29 LOWEST 10.82 OCT



GROUND-WATER LEVELS

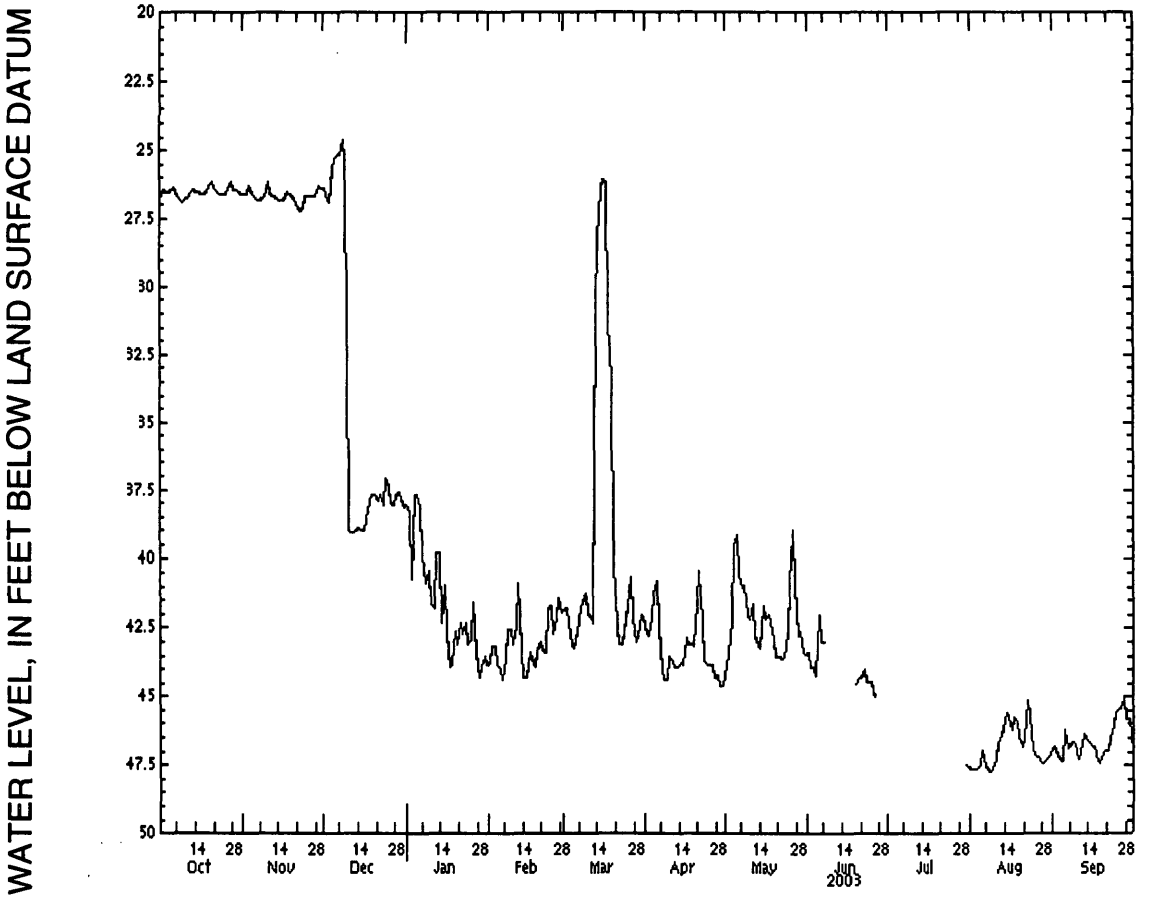
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	26.40	26.67	25.26	37.65	44.02	43.20	40.78	39.12	42.02	---	46.96	46.18
10	26.75	26.15	38.96	41.64	43.07	42.03	43.56	42.18	---	---	47.29	47.26
15	26.55	26.85	38.96	40.93	44.32	26.38	43.83	41.74	---	---	45.76	46.79
20	26.10	26.85	37.66	43.09	43.03	40.15	41.57	43.55	44.31	---	46.82	46.95
25	26.57	26.63	37.35	42.89	42.66	41.74	43.83	40.91	44.43	---	47.21	45.45
EOM	26.58	26.39	38.14	43.86	41.91	42.06	44.62	43.48	---	47.57	46.94	46.98

WTR YR 2003 HIGHEST 24.38 OCT 29 LOWEST 47.71 AUG 8



GROUND-WATER LEVELS

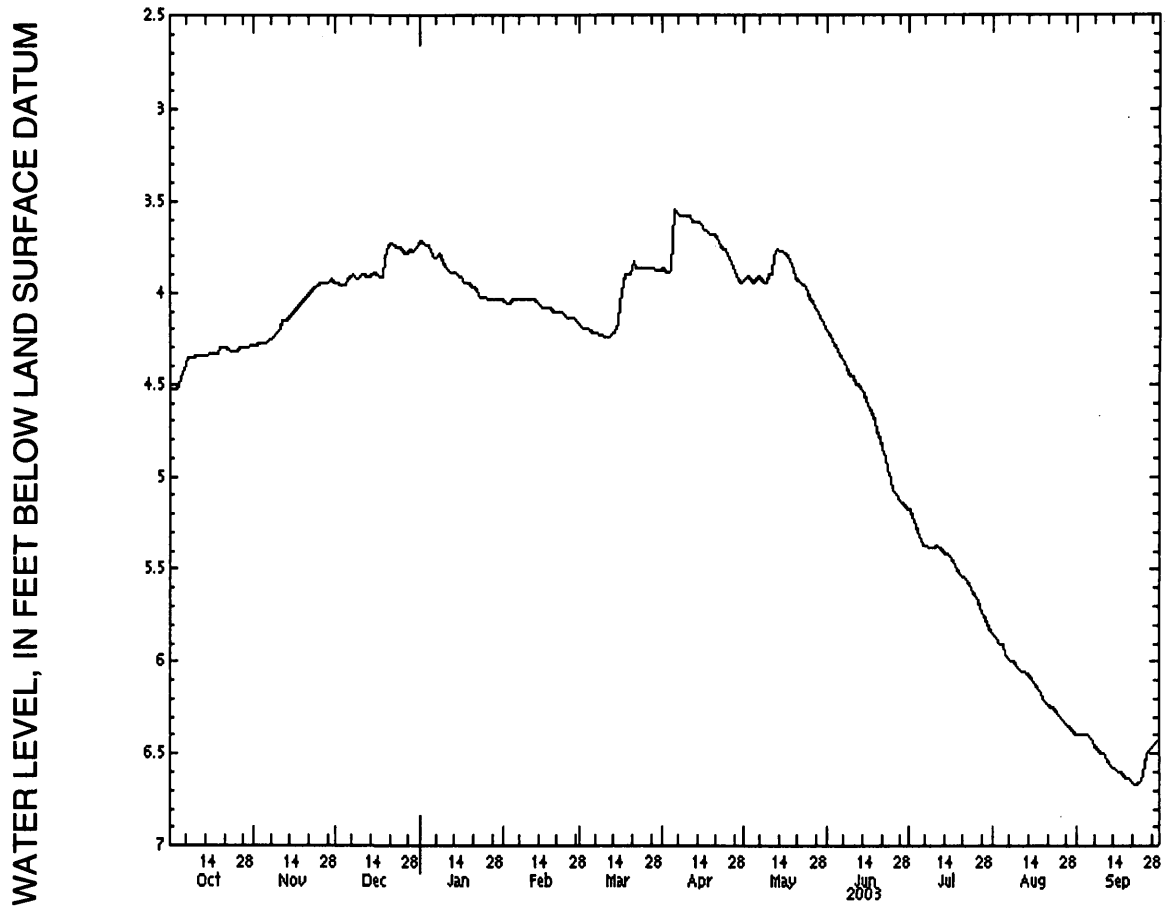
KALAMAZOO COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	4.44	4.28	3.92	3.77	4.03	4.21	3.54	3.93	4.33	5.33	5.96	6.41
10	4.34	4.19	3.90	3.85	4.04	4.24	3.58	3.90	4.46	5.38	6.04	6.50
15	4.33	4.10	3.89	3.91	4.08	4.16	3.62	3.77	4.59	5.42	6.10	6.60
20	4.30	4.01	3.74	3.97	4.10	3.90	3.68	3.92	4.80	5.54	6.22	6.65
25	4.32	3.94	3.76	4.02	4.14	3.86	3.80	4.03	5.07	5.64	6.30	6.57
EOM	4.29	3.94	3.74	4.04	4.16	3.88	3.94	4.20	5.17	5.84	6.39	6.42

WTR YR 2003 HIGHEST 3.47 APR 4, 5 LOWEST 6.67 SEP 21, 22



GROUND-WATER LEVELS

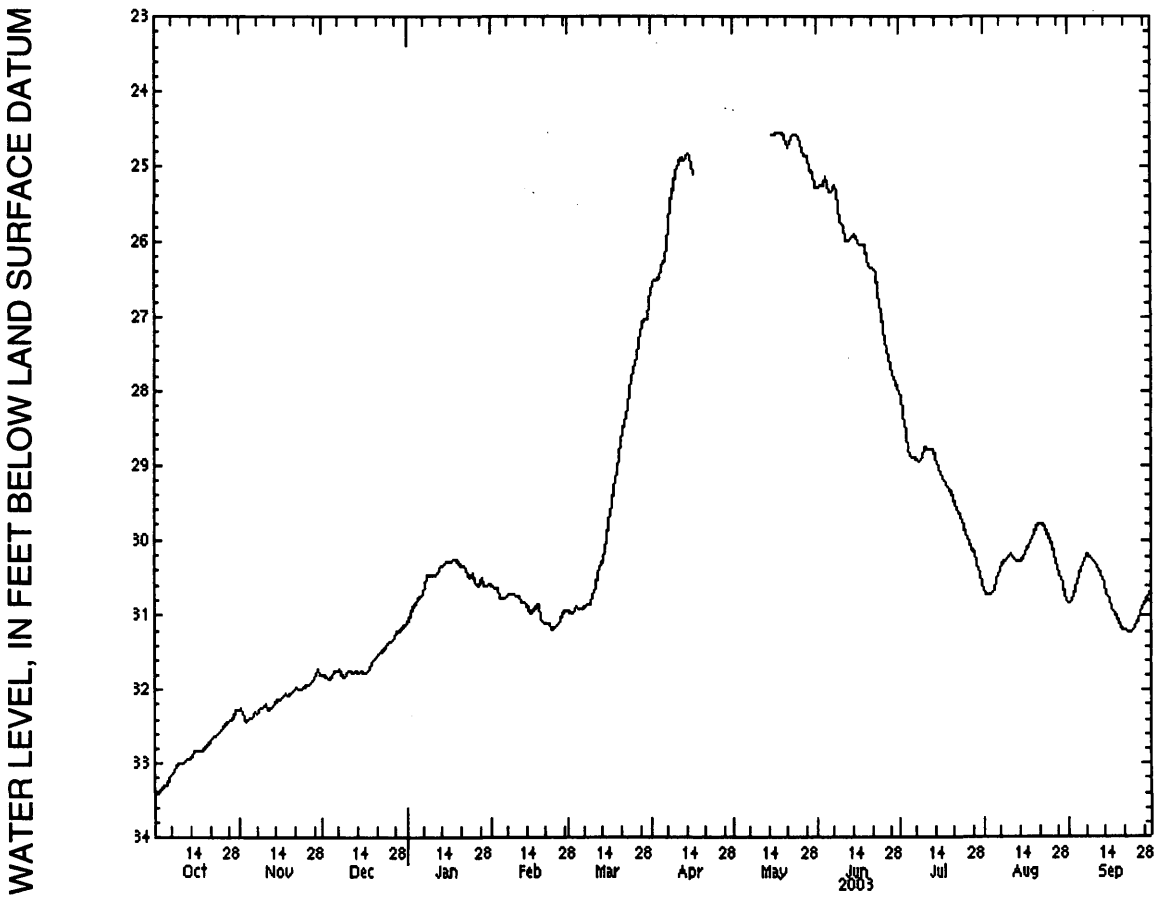
MONROE COUNTY

414452083385201. Local number, 8S 7E 31BBB.
LOCATION.--Lat 41°44'49", long 83°38'48", Hydrologic Unit 04100001, at Whiteford Union Cemetery. Owner: U.S. Geological Survey.
AQUIFER.--Bass Islands Dolomite.
WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 71 ft, cased to 38 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 662 ft above sea level, from topographic map. Measuring point: Plywood shelter base, 2.4 ft above land-surface datum.
PERIOD OF RECORD.--December 1990 to May 2002 (periodic measurements), June 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.79 ft below land-surface datum, Mar. 30, 1993; lowest recorded, 33.60 ft below land-surface datum, Sept. 19, 2002.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	33.29	32.38	31.75	30.77	30.77	30.91	26.26	---	25.33	28.90	30.52	30.36
10	33.00	32.19	31.73	30.47	30.74	30.71	25.09	---	25.77	28.76	30.18	30.29
15	32.83	32.12	31.74	30.29	30.95	29.98	24.87	24.58	25.95	29.05	30.20	30.77
20	32.73	32.03	31.58	30.32	31.11	28.83	---	24.61	26.33	29.43	29.78	31.18
25	32.52	31.94	31.34	30.44	31.14	27.70	---	24.61	27.17	29.94	30.08	31.11
EOM	32.26	31.80	31.12	30.58	30.93	26.78	---	25.27	27.97	30.57	30.81	30.66

WTR YR 2003 HIGHEST 24.51 MAY 20 LOWEST 33.38 OCT 1, 2



GROUND-WATER LEVELS

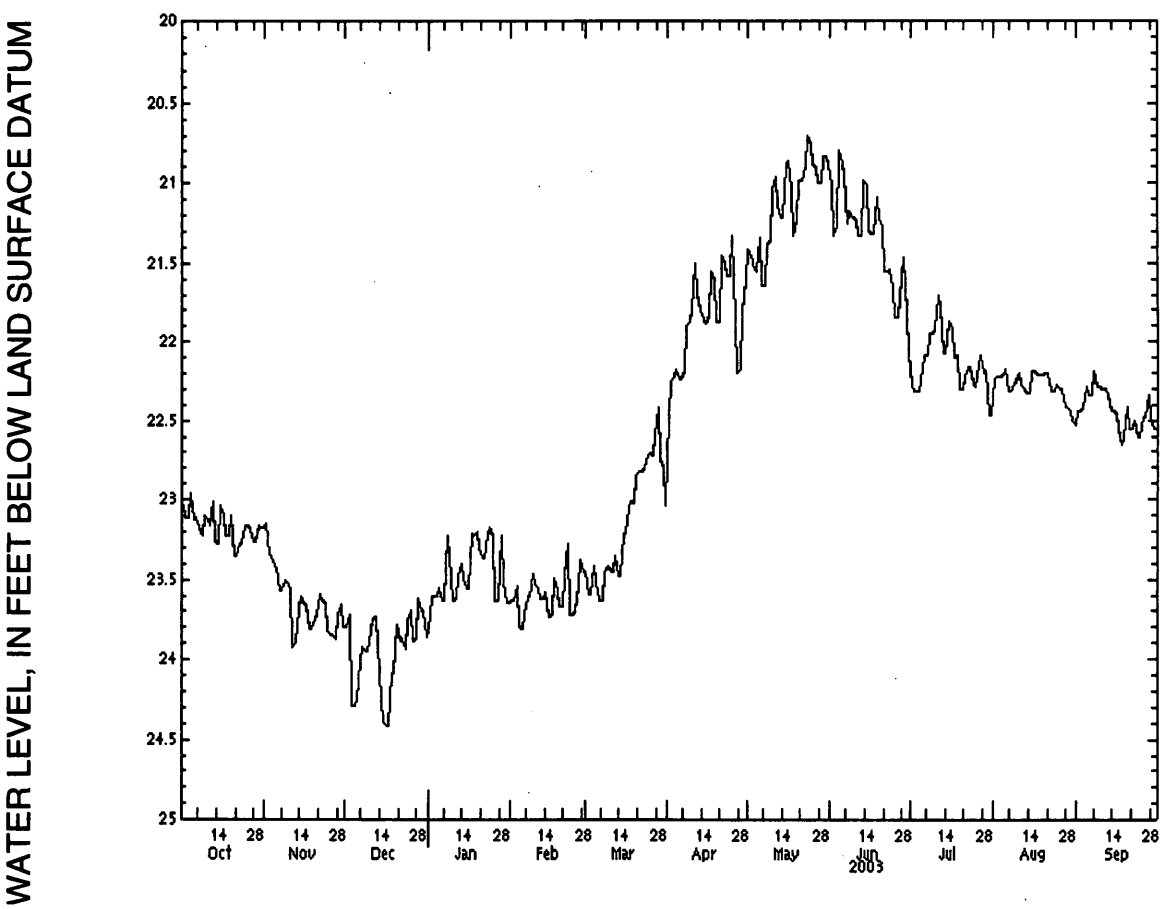
MONROE COUNTY

414601083375801. Local number, 8S 7E 19DCA.
LOCATION.--Lat 41°46'01", long 83°37'58", Hydrologic Unit 04100001, at Parmalee Park. Owner: U.S. Geological Survey.
AQUIFER.--Bass Islands Dolomite.
WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 155 ft, cased to 36 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 670 ft above sea level, from topographic map. Measuring point: Plywood shelter base, 2.4 ft above land-surface datum.
PERIOD OF RECORD.--December 1990 to November 2001 (periodic measurements), March 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.00 ft below land-surface datum, Mar. 30, 1993; lowest measured, 24.76 ft below land-surface datum, Feb. 24, 2000 (made by employees of Monroe County).

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	23.12	23.43	24.25	23.55	23.81	23.52	22.24	21.34	20.87	22.18	22.18	22.34
10	23.12	23.55	23.82	23.63	23.53	23.44	21.80	21.04	21.22	21.92	22.20	22.30
15	23.04	23.66	24.39	23.55	23.73	23.21	21.88	20.88	21.30	21.87	22.19	22.45
20	23.35	23.72	23.78	23.30	23.67	22.85	21.87	20.99	21.26	22.30	22.20	22.55
25	23.16	23.84	23.69	23.22	23.70	22.71	21.33	20.88	21.84	22.29	22.30	22.48
EOM	23.17	23.79	23.86	23.64	23.45	23.03	21.61	20.88	22.07	22.47	22.53	22.56

WTR YR 2003 HIGHEST 20.53 MAY 24 LOWEST 24.42 DEC 16



GROUND-WATER LEVELS

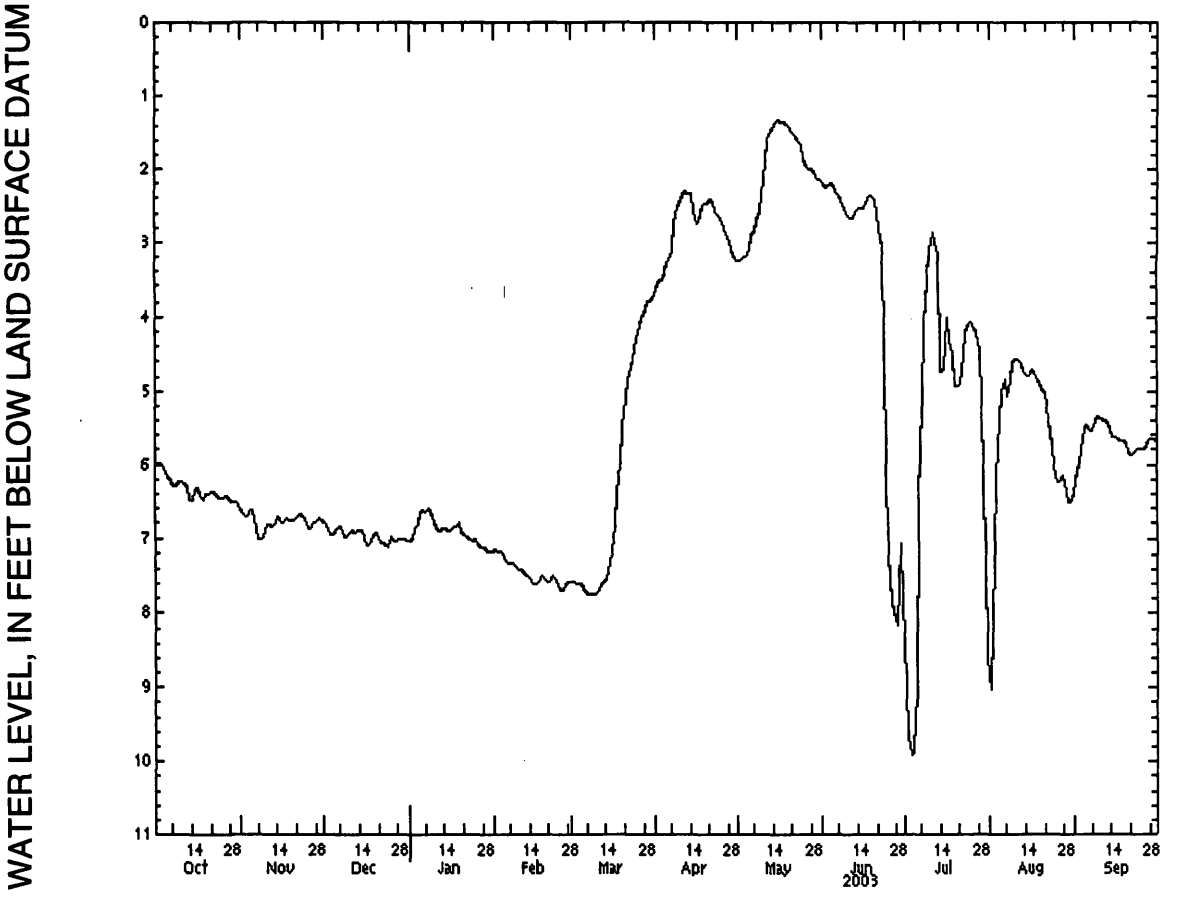
MONROE COUNTY

414748083305501. Local number, 8S 8E 08CCAD.
LOCATION.--Lat 41°47'49", long 83°30'24", Hydrologic Unit 04100001, at west side of US-24, 1,100 ft north of Erie Road. Owner: U.S. Geological Survey.
AQUIFER.--Salina Group.
WELL CHARACTERISTICS.--Drilled artesian well, diameter 5 in, depth 75 ft, cased to 50 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 600 ft above sea level, from topographic map. Measuring point: Plywood shelter base, 2.57 ft above land-surface datum.
PERIOD OF RECORD.--December 1990 to May 2002 (periodic measurements), July 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +2.00 ft above land-surface datum, May 7, 1992 (made by employees of Monroe County); lowest recorded, 9.90 ft below land-surface datum, July 3, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	6.19	6.62	6.89	6.66	7.30	7.60	3.29	3.12	2.23	9.05	5.01	5.44
10	6.22	6.82	6.93	6.80	7.39	7.73	2.47	2.32	2.63	3.12	4.56	5.36
15	6.35	6.78	6.90	6.90	7.59	7.33	2.59	1.36	2.54	4.69	4.78	5.62
20	6.40	6.75	6.94	6.93	7.57	5.48	2.46	1.41	2.41	4.92	5.01	5.83
25	6.45	6.88	6.99	7.02	7.67	4.29	2.67	1.85	7.18	4.06	6.24	5.79
EOM	6.60	6.75	7.04	7.18	7.57	3.72	3.22	2.13	7.79	8.61	6.40	5.67

WTR YR 2003 HIGHEST 1.25 MAY 16 LOWEST 9.90 JUL 3



GROUND-WATER LEVELS

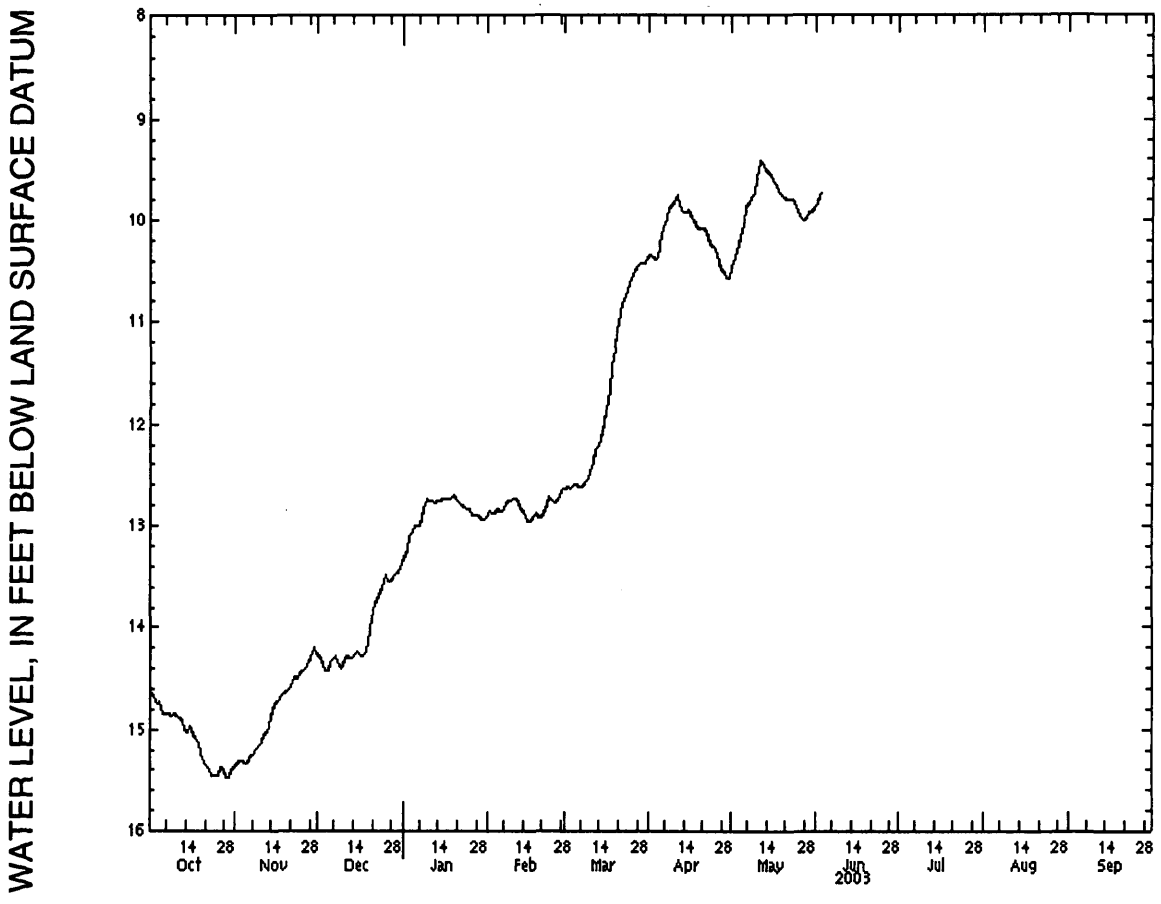
MONROE COUNTY

415133083274801. Local number, 7S 8E 22DBCB.
LOCATION.--Lat 41°51'33", long 83°27'48", Hydrologic Unit 04100001, at LaSalle Township Cemetery. Owner: U.S. Geological Survey.
AQUIFER.--Bass Islands Dolomite.
WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 50 ft, cased to 32 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 605 ft above sea level, from topographic map. Measuring point: Top of casing, 1.65 ft above land-surface datum.
PERIOD OF RECORD.--December 1990 to May 2002 (periodic measurements), June 2002 to June 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.40 ft below land-surface datum, Dec. 1, 1990; lowest measured, 15.95 ft below land-surface datum, Nov. 19, 1999 (made by employees of Monroe County).

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	14.85	15.32	14.34	13.00	12.85	12.59	10.15	10.04	---	---	---	---
10	14.87	15.13	14.31	12.75	12.74	12.47	9.81	9.59	---	---	---	---
15	14.96	14.73	14.23	12.74	12.96	11.99	9.90	9.55	---	---	---	---
20	15.32	14.60	13.91	12.74	12.92	11.09	10.08	9.77	---	---	---	---
25	15.45	14.41	13.48	12.83	12.77	10.56	10.29	9.91	---	---	---	---
EOM	15.37	14.25	13.37	12.92	12.64	10.36	10.57	9.88	---	---	---	---

WTR YR 2003 HIGHEST 9.33 MAY 11, 12 LOWEST 15.47 OCT 28



GROUND-WATER LEVELS

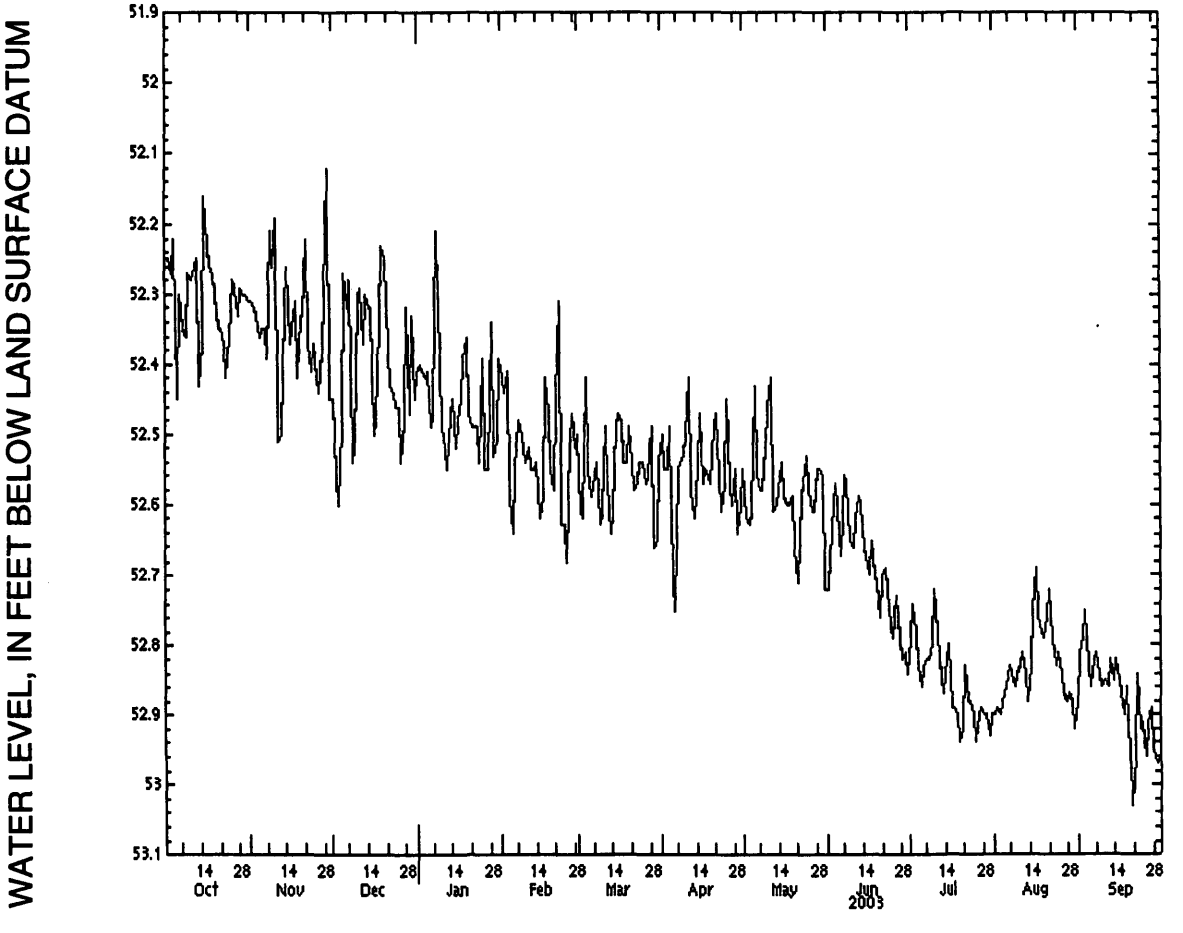
MONROE COUNTY

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, 53.03 ft below land-surface datum, Sept. 20, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	52.45	52.35	52.27	52.41	52.64	52.55	52.71	52.43	52.64	52.86	52.86	52.86
10	52.28	52.19	52.30	52.49	52.54	52.61	52.50	52.46	52.66	52.72	52.83	52.85
15	52.16	52.37	52.32	52.52	52.62	52.49	52.47	52.54	52.67	52.80	52.75	52.85
20	52.35	52.33	52.25	52.47	52.58	52.49	52.49	52.66	52.76	52.92	52.76	53.03
25	52.28	52.42	52.46	52.39	52.68	52.54	52.45	52.58	52.79	52.94	52.84	52.96
EOM	52.31	52.45	52.45	52.39	52.52	52.54	52.60	52.72	52.84	52.90	52.88	52.96

WTR YR 2003 HIGHEST 51.91 OCT 4 LOWEST 53.03 SEP 20



GROUND-WATER LEVELS

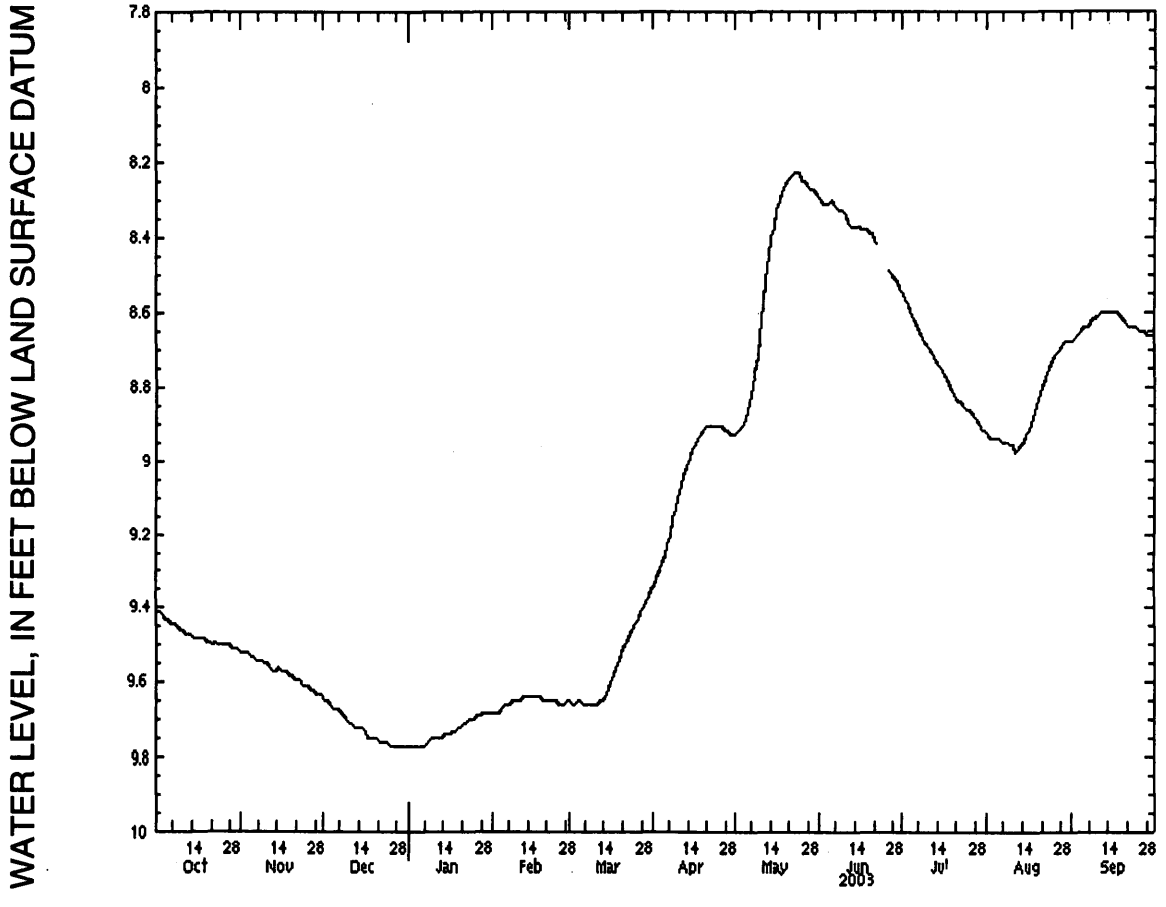
MONROE COUNTY

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.--Water-level recorder.
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 (discontinued).
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 2002 TO SEPTEMBER 2003

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	9.43	9.53	9.67	9.77	9.66	9.65	9.26	8.87	8.30	8.62	8.94	8.64
10	9.46	9.55	9.71	9.75	9.65	9.66	9.10	8.66	8.34	8.69	8.96	8.61
15	9.48	9.57	9.72	9.74	9.64	9.62	8.97	8.37	8.37	8.75	8.93	8.60
20	9.49	9.59	9.75	9.72	9.65	9.52	8.91	8.25	8.39	8.83	8.82	8.63
25	9.50	9.61	9.77	9.70	9.66	9.44	8.91	8.25	---	8.86	8.72	8.65
EOM	9.52	9.63	9.77	9.68	9.65	9.35	8.93	8.29	8.54	8.92	8.68	8.66

WTR YR 2003 HIGHEST 8.23 MAY 21-25 LOWEST 9.77 DEC 25 - JAN 7



GROUND-WATER LEVELS

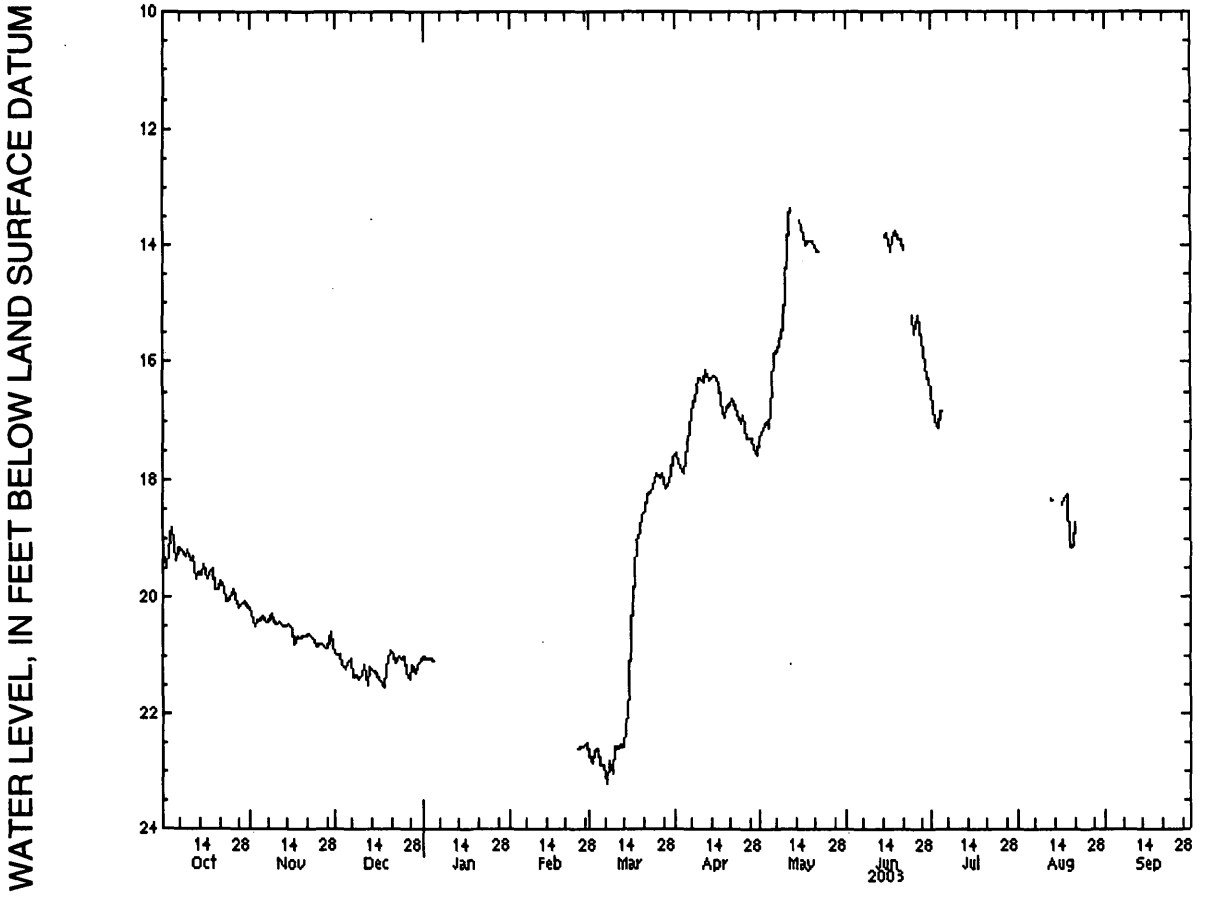
MONROE COUNTY

415431083343201. Local number, 7S 7E 03AAD.
LOCATION.--Lat 41°54'31", long 83°34'32", Hydrologic Unit 04100001, at Ida Township Hall. Owner: U.S. Geological Survey.
AQUIFER.--Sylvania Sandstone.
WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 80 ft, cased to 55 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 640 ft above sea level, from topographic map. Measuring point: Plywood shelter base, 2.41 ft above land-surface datum.
PERIOD OF RECORD.--December 1990 to June 2002 (periodic measurements), July 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.56 ft below land-surface datum, May 1, 1991; lowest recorded, 23.21 ft below land-surface datum, Mar. 7, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	19.34	20.30	21.12	21.13	---	22.89	17.40	16.44	---	16.85	---	---
10	19.35	20.46	21.33	---	---	22.58	16.25	14.68	---	---	---	---
15	19.42	20.52	21.26	---	---	21.63	16.23	13.57	13.80	---	---	---
20	19.83	20.67	20.92	---	---	18.60	16.73	13.92	13.89	---	19.09	---
25	19.85	20.81	21.00	---	22.62	17.89	16.90	---	15.51	---	---	---
EOM	20.15	20.88	21.10	---	22.52	17.63	17.58	---	16.27	---	---	---

WTR YR 2003 HIGHEST 13.15 MAY 12 LOWEST 23.21 MAR 7



GROUND-WATER LEVELS

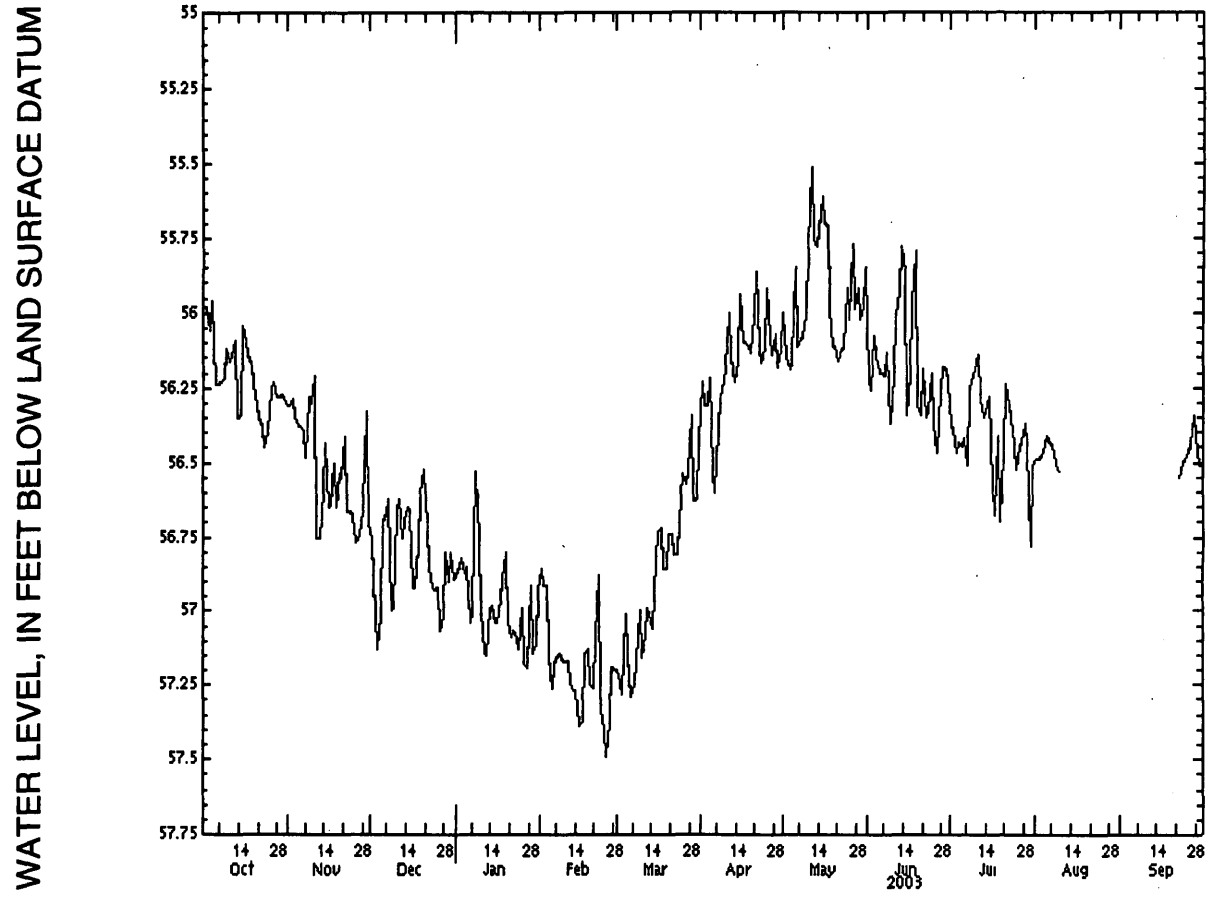
MONROE COUNTY

415527083402001. Local number, 6S 6E 35AAAA.
LOCATION.--Lat 41°55'28", long 83°40'19", Hydrologic Unit 04100002, at Oakgrove Cemetery near Dixon & Summerfield Roads. Owner: U.S. Geological Survey.
AQUIFER.--Detroit River Group.
WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 100 ft, cased to 51 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 676 ft above sea level, from topographic map. Measuring point: Plywood shelter base, 2.37 ft above land-surface datum.
PERIOD OF RECORD.--December 1990 to August 2000 and November to December 2001 (periodic measurements), March 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.62 ft below land-surface datum, Apr. 30, 1993; lowest recorded, 57.49 ft below land-surface datum, Feb. 25, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	56.24	56.38	56.70	56.85	57.26	57.15	56.53	55.85	56.20	56.45	56.41	---
10	56.16	56.21	56.66	57.00	57.17	57.16	56.18	55.78	56.21	56.19	56.54	---
15	56.04	56.65	56.66	57.04	57.39	56.82	55.94	55.61	56.34	56.28	---	---
20	56.31	56.55	56.52	57.04	57.26	56.74	56.01	56.11	56.34	56.47	---	---
25	56.25	56.77	56.92	56.99	57.49	56.54	55.92	56.02	56.37	56.52	---	56.47
EOM	56.31	56.70	56.89	56.93	57.20	56.43	56.12	55.85	56.23	56.51	---	56.51

WTR YR 2003 HIGHEST 55.30 MAY 11 LOWEST 57.49 FEB 25



GROUND-WATER LEVELS

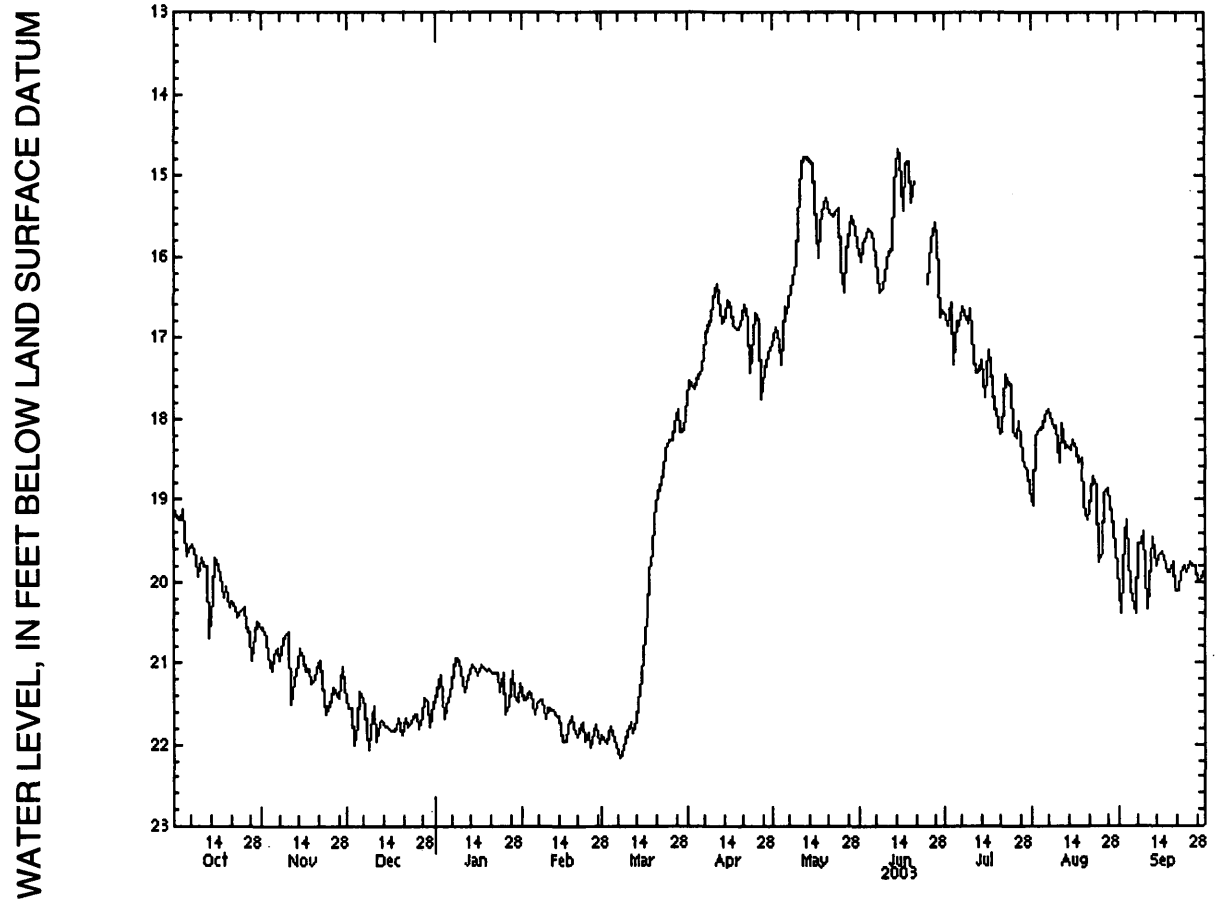
MONROE COUNTY

415721083331601. Local number, 6S 7E 13CCC.
LOCATION.--Lat 41°57'20", long 83°33'16", Hydrologic Unit 04100002, at Rath Cemetery, 0.7 mi north of M-50 on Ida-Maybee Road. Owner: U.S. Geological Survey.
AQUIFER.--Detroit River Group.
WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 110 ft, cased to 26 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 644 ft above sea level, from topographic map. Measuring point: Plywood shelter base, 2.55 ft above land-surface datum.
PERIOD OF RECORD.--December 1990 to April 1993 (periodic measurements), July 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.25 ft below land-surface datum, Mar. 29, 1993; lowest recorded, 22.17 ft below land-surface datum, Mar. 7, 2003

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	19.69	20.89	21.36	21.53	21.62	21.87	17.43	16.61	15.71	16.79	17.95	20.21
10	19.71	20.61	21.53	21.09	21.56	21.85	16.55	15.55	16.06	16.64	18.53	20.33
15	19.71	20.95	21.78	21.06	21.97	21.17	16.53	14.84	14.76	17.72	18.27	19.62
20	20.30	21.06	21.88	21.06	21.90	19.24	16.73	15.26	15.04	18.18	19.26	20.10
25	20.30	21.45	21.63	21.13	22.03	18.26	16.68	16.12	16.34	18.17	19.63	19.76
EOM	20.57	21.31	21.50	21.26	21.98	17.95	17.12	15.83	16.66	18.90	20.10	19.85

WTR YR 2003 HIGHEST 14.39 JUN 15 LOWEST 22.17 MAR 7



GROUND-WATER LEVELS

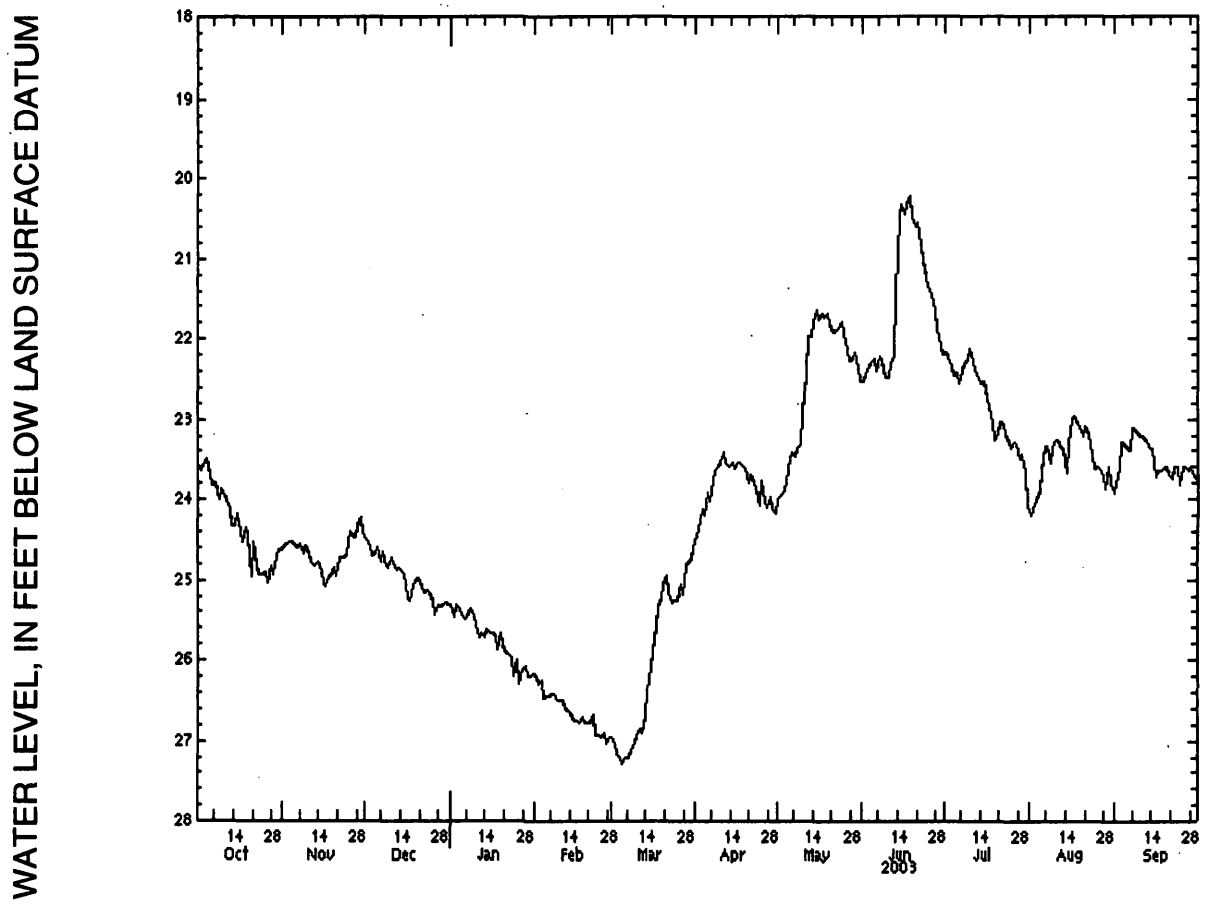
MONROE COUNTY

415923083272101. Local number, 6S 8E 02CBD.
LOCATION.--Lat 41°59'24", long 83°27'22", Hydrologic Unit 04100001, at McIntyre Cemetery on Blue Bush Road. Owner: U.S. Geological Survey.
AQUIFER.--Sylvania Sandstone.
WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 65 ft, cased to 25 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 627 ft above sea level, from topographic map. Measuring point: Plywood shelter base, 2.4 ft above land-surface datum.
PERIOD OF RECORD.--December 1990 to May 2002 (periodic measurements), June 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.43 ft below land-surface datum, Apr. 28, 1993; lowest recorded, 27.30 ft below land-surface datum, Mar. 5, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	23.69	24.57	24.60	25.45	26.46	27.30	23.93	23.50	22.25	22.43	23.65	23.37
10	23.94	24.69	24.73	25.56	26.51	26.93	23.54	22.94	22.47	22.13	23.25	23.22
15	24.17	25.04	24.94	25.66	26.76	26.10	23.61	21.64	20.32	22.52	23.29	23.72
20	24.97	24.97	24.98	25.83	26.79	25.07	23.79	21.82	20.59	23.19	23.21	23.70
25	24.90	24.39	25.26	26.00	26.97	25.27	23.76	21.92	21.36	23.36	23.58	23.60
EOM	24.64	24.43	25.31	26.17	26.96	24.60	24.17	22.52	22.19	24.07	23.92	23.74

WTR YR 2003 HIGHEST 20.15 JUN 18 LOWEST 27.30 MAR 5



GROUND-WATER LEVELS

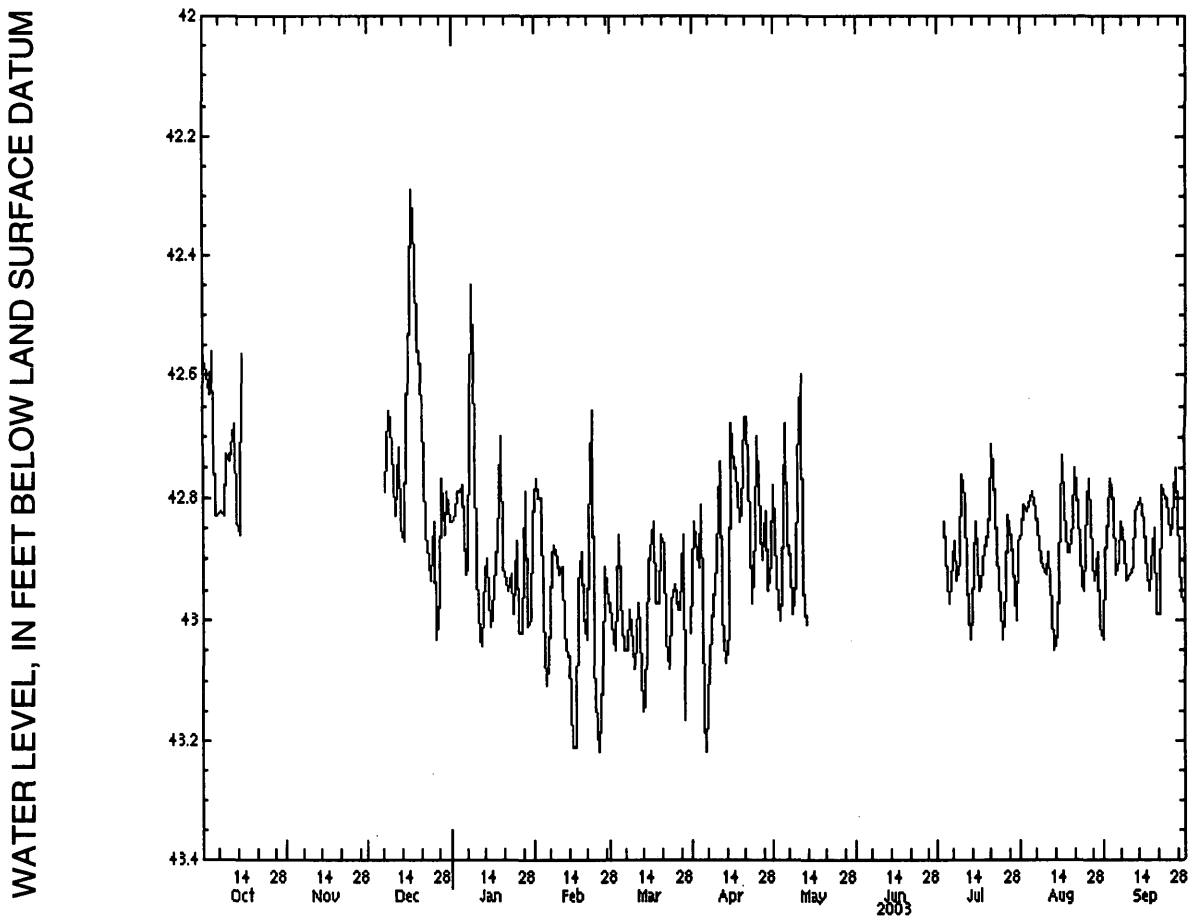
MONROE COUNTY

420123083300001. Local number, 5S 8E 29ADA.
LOCATION.--Lat 42°01'23", long 83°30'00", Hydrologic Unit 04100001, at Sweeney Farm, west of Doty Road and north of Scofield Road. Owner: U.S. Geological Survey.
AQUIFER.--Detroit River Group.
WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 185 ft, cased to 30 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 635 ft above sea level, from topographic map. Measuring point: Plywood shelter base, 2.2 ft above land-surface datum.
PERIOD OF RECORD.--December 1990 to May 2002 (periodic measurements), June 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 24.00 ft below land-surface datum, Feb. 24, 1993; lowest recorded, 43.22 ft below land-surface datum, Feb. 25, Apr. 6, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	42.83	---	---	42.78	43.11	42.96	43.16	42.68	---	42.97	42.79	42.92
10	42.74	---	42.77	42.92	42.92	43.08	42.90	42.75	---	42.76	42.92	42.92
15	42.56	---	42.68	43.01	43.21	42.91	42.68	---	---	42.84	42.92	42.84
20	---	---	42.59	42.91	43.03	42.86	42.67	---	---	42.82	42.84	42.99
25	---	---	42.84	42.87	43.22	42.94	42.70	---	---	43.03	42.81	42.86
EOM	---	---	42.84	42.84	42.97	43.02	42.90	---	---	42.87	43.03	42.97

WTR YR 2003 HIGHEST 42.13 DEC 16 LOWEST 43.22 FEB 25, APR 6



GROUND-WATER LEVELS

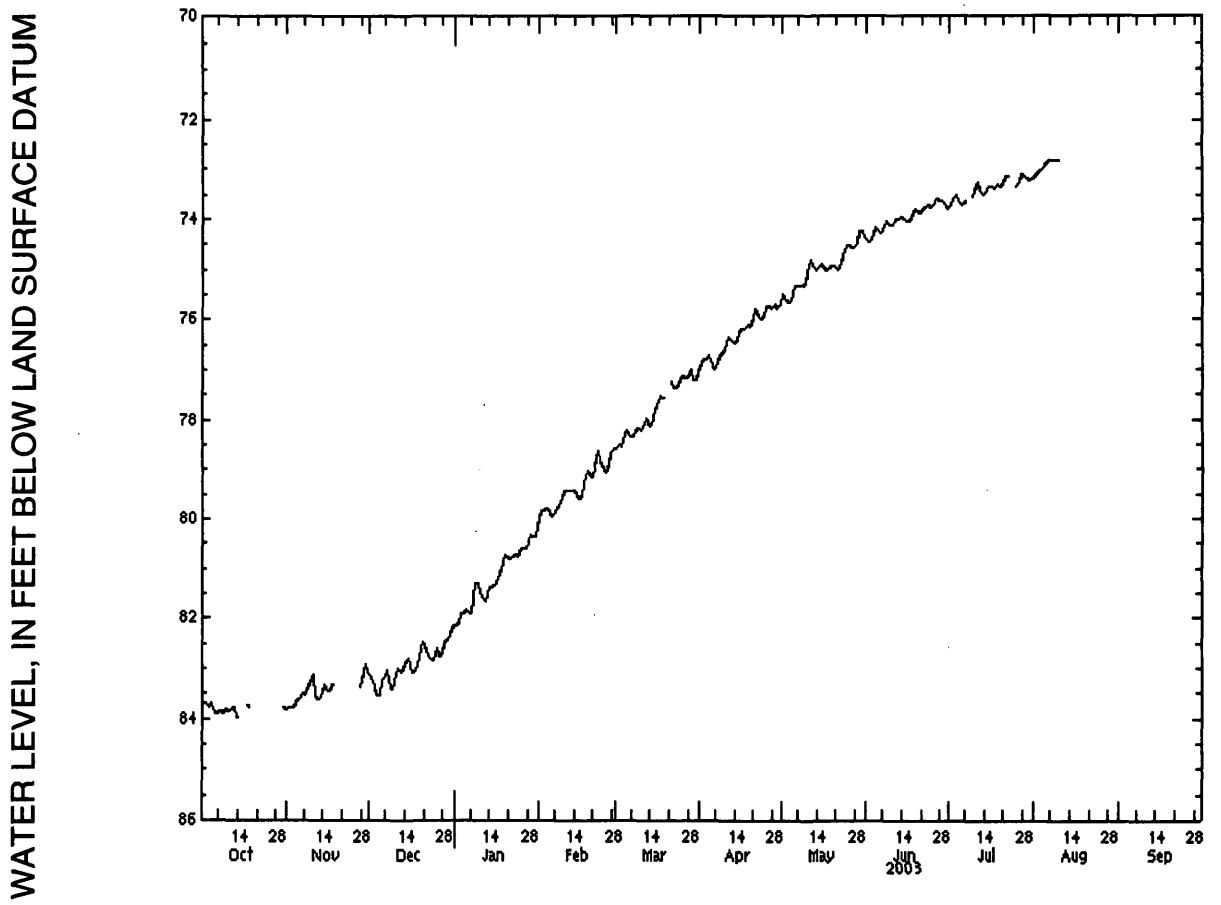
MONROE COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	83.87	83.62	83.26	81.84	79.94	78.23	76.90	75.34	74.23	73.70	72.86	---
10	83.83	83.11	83.13	81.49	79.45	78.22	76.58	75.07	74.13	73.44	72.82	---
15	---	83.44	82.80	81.32	79.59	77.83	76.21	74.90	74.03	73.36	---	---
20	---	---	82.48	80.76	79.13	---	76.00	74.93	73.88	73.31	---	---
25	---	---	82.60	80.60	79.07	77.14	75.74	74.53	73.73	73.34	---	---
EOM	83.79	83.07	82.16	80.15	78.58	77.06	75.72	74.36	73.78	73.20	---	---

WTR YR 2003 HIGHEST 72.69 AUG 11 LOWEST 83.96 OCT 13, 14



GROUND-WATER LEVELS

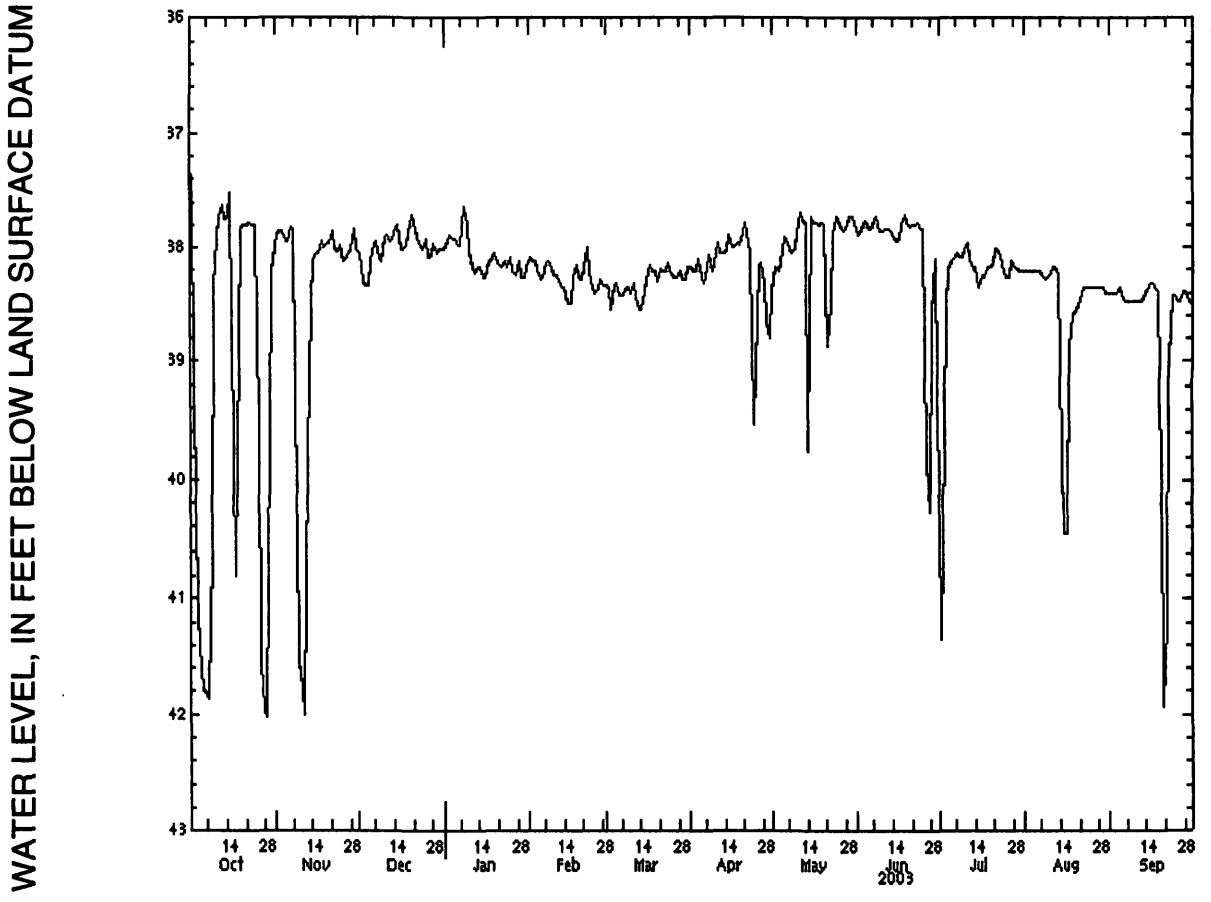
MONROE COUNTY

420503083192101. Local number, 5S 9E 01CBCC.
LOCATION.--Lat 42°05'03", long 83°19'21", Hydrologic Unit 04090005, at Evergreen Cemetery, northeast from Port Creek Road. Owner: U.S. Geological Survey.
AQUIFER.--Detroit River Group.
WELL CHARACTERISTICS.--Drilled observation well, diameter 5 in, depth 85 ft, cased to 36 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 605 ft above sea level, from topographic map. Measuring point: Plywood shelter base, 2.38 ft above land-surface datum.
REMARKS.--Water levels affected by pumping.
PERIOD OF RECORD.--December 1990 to May 2002 (periodic measurements), August 2002 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.52 ft below land-surface datum, Dec. 30, 1992; lowest recorded, 42.03 ft below land-surface datum, Oct. 28, 2002.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	41.80	37.94	38.12	37.93	38.28	38.31	38.26	37.91	37.84	38.13	38.22	38.42
10	37.91	41.76	37.91	38.04	38.24	38.40	38.14	37.87	37.86	38.01	38.23	38.47
15	37.52	38.06	37.81	38.27	38.49	38.38	37.90	37.73	37.94	38.36	40.45	38.32
20	37.80	37.97	7.72	38.11	38.29	38.30	37.88	37.81	37.82	38.16	38.51	41.94
25	39.59	38.12	37.93	38.08	38.41	38.25	39.08	37.77	37.83	38.27	38.36	38.48
EOM	37.99	38.01	38.02	38.18	38.34	38.17	38.79	37.79	39.21	38.21	38.41	38.50

WTR YR 2003 HIGHEST 37.32 OCT 1, 2 LOWEST 42.03 OCT 28



GROUND-WATER LEVELS

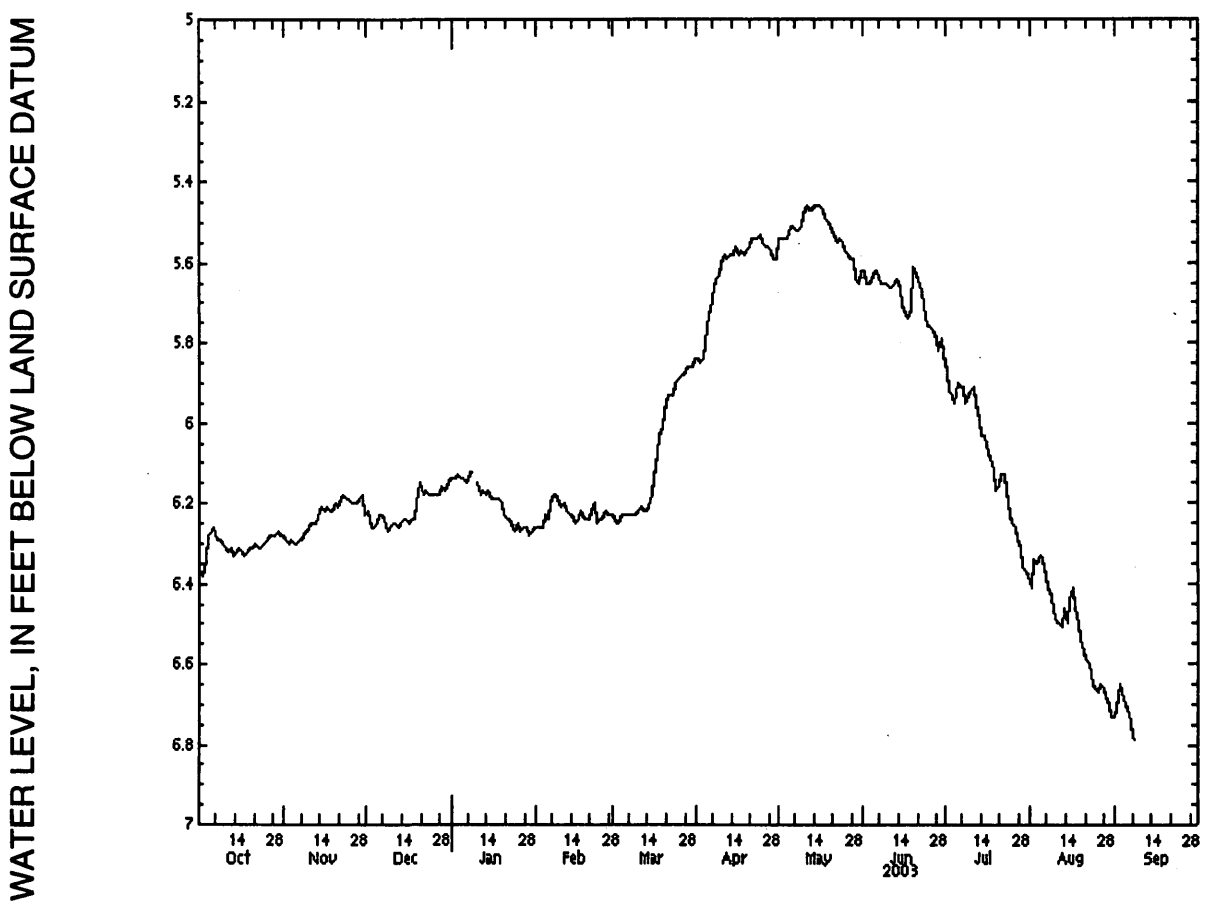
OAKLAND COUNTY

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 910 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 current year (water-level recorder).
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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	6.27	6.30	6.23	6.14	6.24	6.23	5.73	5.51	5.62	5.90	6.34	6.71
10	6.31	6.25	6.25	6.15	6.21	6.22	5.60	5.48	5.66	5.92	6.50	---
15	6.31	6.22	6.24	6.19	6.25	6.18	5.56	5.46	5.71	6.03	6.44	---
20	6.31	6.21	6.15	6.23	6.24	5.97	5.56	5.51	5.63	6.16	6.57	---
25	6.29	6.20	6.18	6.25	6.24	5.89	5.55	5.57	5.76	6.25	6.67	---
EOM	6.28	6.23	6.14	6.26	6.23	5.84	5.59	5.62	5.83	6.38	6.73	---

WTR YR 2003 HIGHEST 5.42 MAY 11, 12, 15, 16 LOWEST 6.79 SEP 8, 9



GROUND-WATER LEVELS

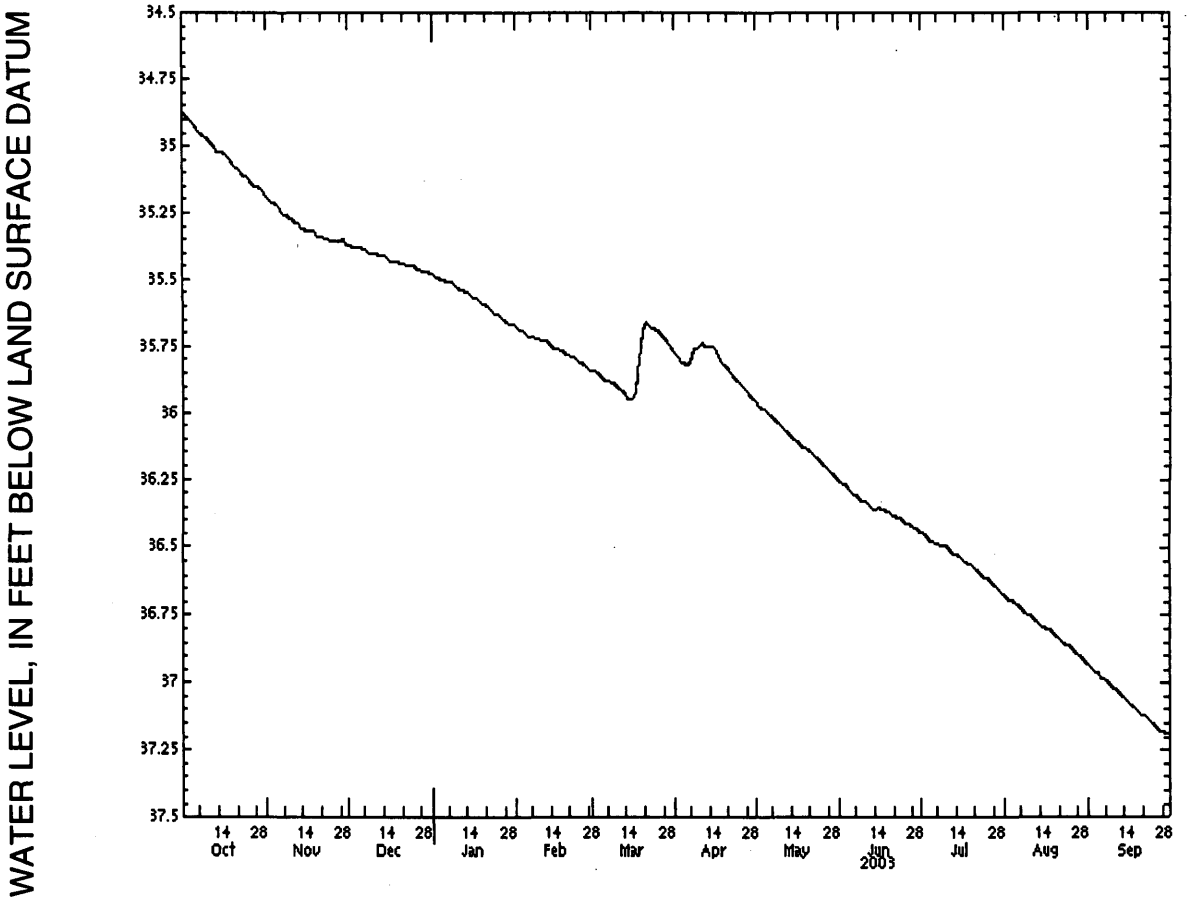
OAKLAND COUNTY

424109083384301. Local number, 3N 7E 5BA.
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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	34.92	35.23	35.38	35.50	35.71	35.87	35.82	36.00	36.30	36.47	36.71	36.98
10	34.98	35.27	35.40	35.53	35.73	35.90	35.75	36.05	36.33	36.49	36.75	37.02
15	35.02	35.32	35.42	35.56	35.76	35.95	35.75	36.10	36.35	36.53	36.79	37.07
20	35.08	35.34	35.44	35.59	35.78	35.69	35.83	36.14	36.38	36.57	36.83	37.12
25	35.13	35.36	35.45	35.63	35.81	35.69	35.89	36.19	36.41	36.61	36.87	37.16
EOM	35.19	35.37	35.48	35.67	35.84	35.77	35.95	36.25	36.44	36.67	36.93	37.19

WTR YR 2003 HIGHEST 34.87 OCT 1 LOWEST 37.19 SEP 29, 30



GROUND-WATER LEVELS

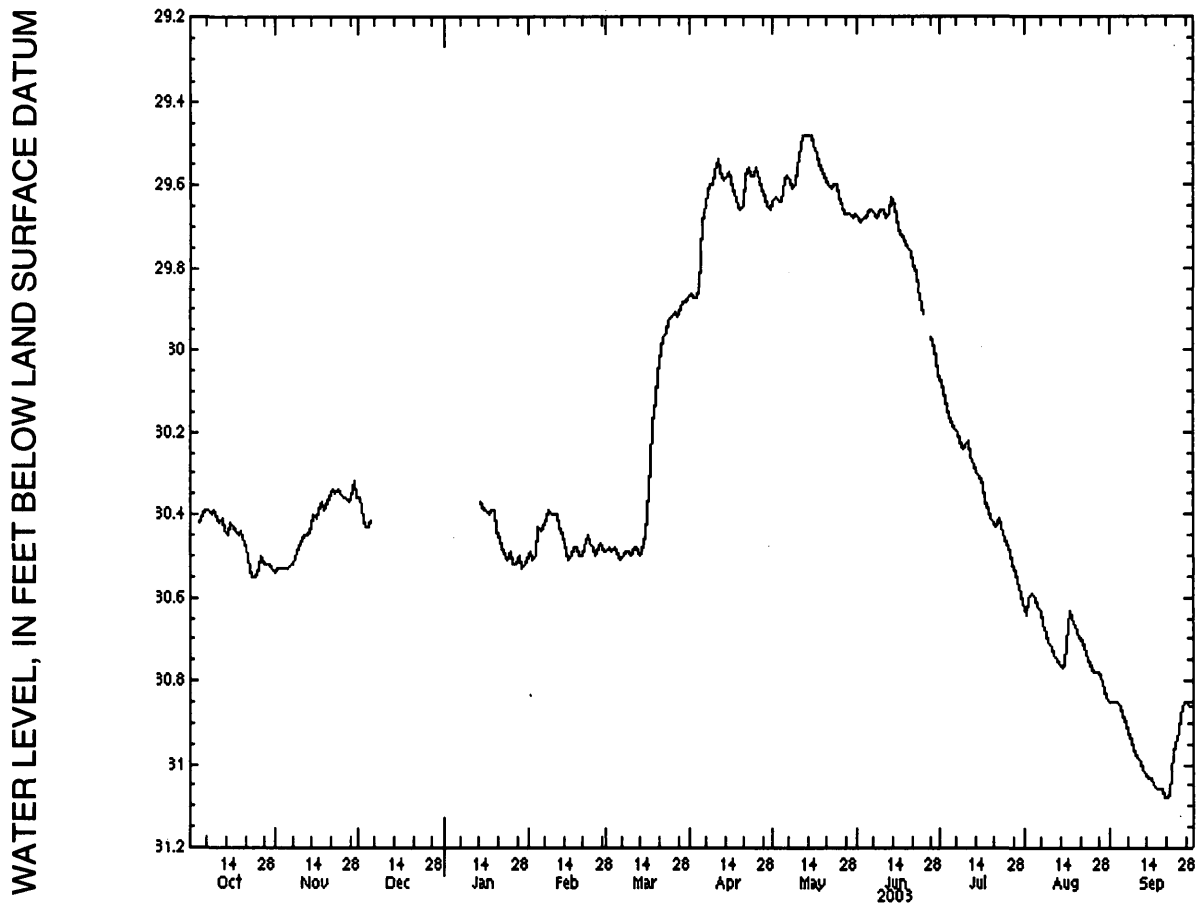
OAKLAND COUNTY

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 current year.
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 2002 TO SEPTEMBER 2003

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	30.40	30.53	30.41	---	30.44	30.49	29.69	29.59	29.66	30.18	30.62	30.88
10	30.41	30.46	---	---	30.40	30.50	29.57	29.56	29.66	30.23	30.72	30.98
15	30.42	30.41	---	30.39	30.51	30.45	29.57	29.48	29.68	30.31	30.76	31.03
20	30.47	30.36	---	30.44	30.50	30.06	29.65	29.58	29.76	30.42	30.70	31.08
25	30.53	30.36	---	30.49	30.50	29.92	29.56	29.63	29.92	30.47	30.78	30.92
EOM	30.54	30.36	---	30.51	30.49	29.87	29.66	29.67	30.06	30.61	30.85	30.86

WTR YR 2003 HIGHEST 29.46 MAY 11, 12, 13, 14 LOWEST 31.08 SEP 20, 21



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 flange, 3.5 ft above land-surface datum.
PERIOD OF RECORD.--July 1972 to October 1981 (water-level recorder), April 2001 to current year (periodic measurements).
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 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 31	11.33	JAN 13	10.57	MAR 25	10.05	JUN 2	10.30	AUG 15	11.65	SEP 8	12.36
DEC 6	10.63	FEB 21	10.55	APR 21	9.53	JUN 26	10.98				

GROUND-WATER LEVELS

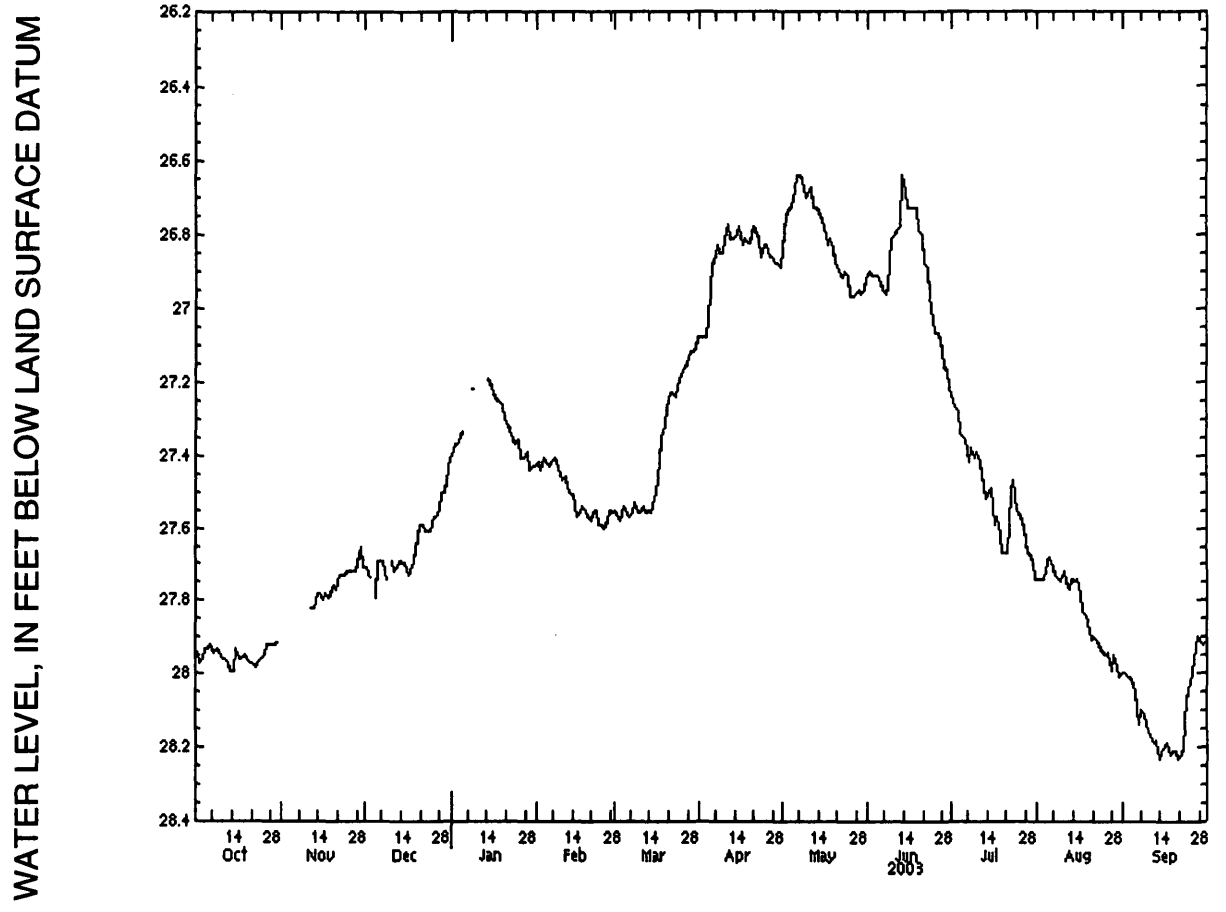
OAKLAND COUNTY

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.--Nov. 1965 to Mar. 1995 (periodic measurements), June 2001 to current year (water-level recorder).
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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	27.93	---	27.69	27.33	27.43	27.55	26.88	26.68	26.93	27.35	27.68	28.05
10	27.96	---	27.69	---	27.47	27.56	26.81	26.69	26.80	27.39	27.72	28.17
15	27.93	27.80	27.70	27.21	27.57	27.52	26.78	26.76	26.73	27.49	27.74	28.20
20	27.97	27.77	27.59	27.30	27.58	27.27	26.78	26.87	26.80	27.67	27.91	28.23
25	27.95	27.72	27.57	27.36	27.60	27.18	26.83	26.97	27.07	27.56	27.95	28.00
EOM	---	27.71	27.41	27.43	27.56	27.08	26.89	26.92	27.22	27.74	28.00	27.91

WTR YR 2003 HIGHEST 26.60 MAY 7 LOWEST 28.23 SEP 13, 20



GROUND-WATER LEVELS

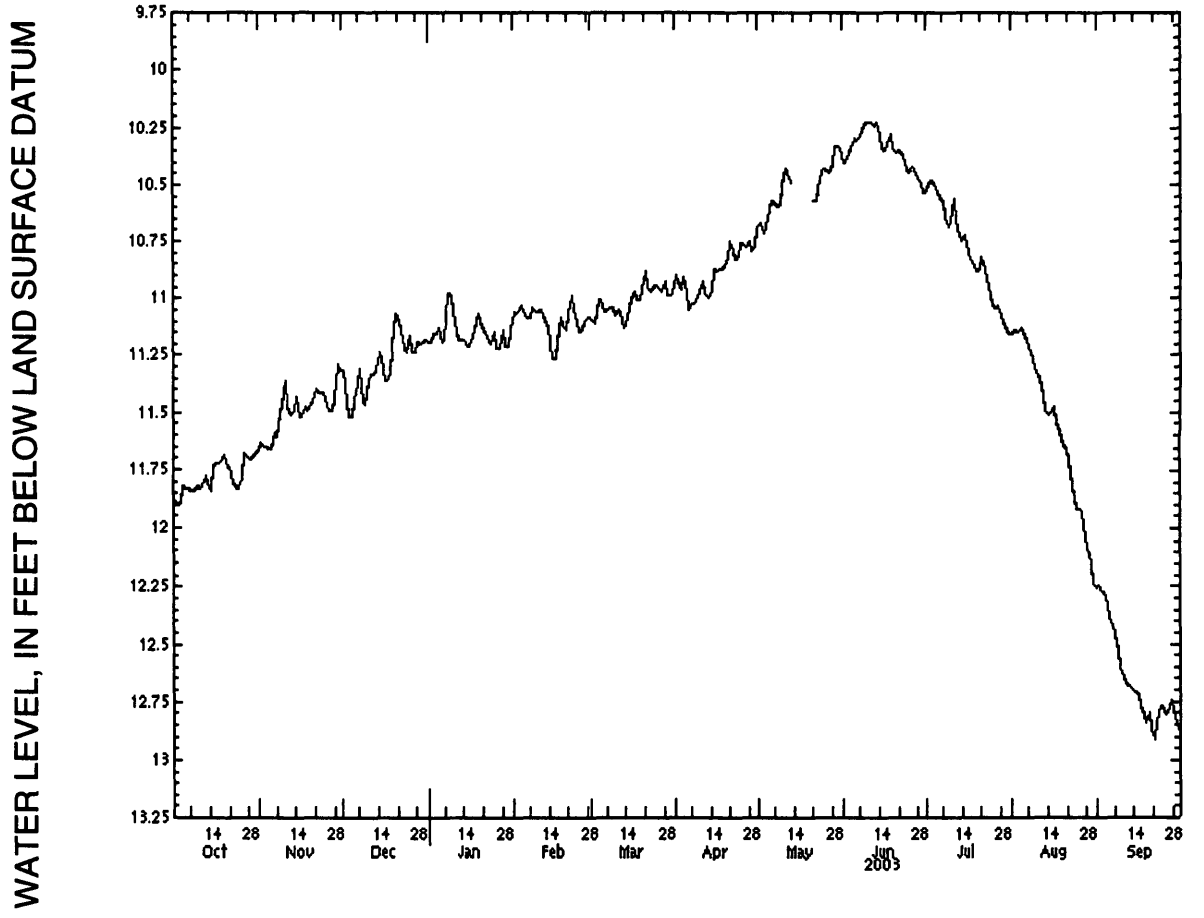
SAGINAW COUNTY

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.
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, 12.91 ft below land-surface datum, Sept. 21, 2003.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	11.83	11.66	11.45	11.13	11.08	11.01	10.97	10.61	10.30	10.53	11.15	12.39
10	11.83	11.36	11.36	11.06	11.06	11.08	10.97	10.50	10.23	10.66	11.33	12.65
15	11.73	11.52	11.26	11.21	11.26	11.04	10.87	---	10.34	10.72	11.50	12.72
20	11.74	11.45	11.07	11.10	11.14	10.96	10.83	---	10.36	10.87	11.65	12.87
25	11.79	11.47	11.17	11.15	11.15	10.94	10.76	10.43	10.45	11.03	11.92	12.81
EOM	11.67	11.32	11.18	11.14	11.09	10.98	10.78	10.34	10.54	11.16	12.26	12.88

WTR YR 2003 HIGHEST 10.14 JUN 9 LOWEST 12.91 SEP 21



GROUND-WATER LEVELS

SCHOOLCRAFT COUNTY

462044086073601. Local number, 46N 15W 25CD.
LOCATION.--Lat 46°20'44", long 86°07'36", Hydrologic Unit 04060106, near State Highway 28 at Driggs River, 8.5 mi west of Seney. Owner: U.S. Geological Survey.
AQUIFER.--Glaciofluvial and fluvial deposits.
WELL CHARACTERISTICS.--Hand augered observation well, diameter 2 in, depth 10 ft, screened 8.5 ft to 10 ft.
INSTRUMENTATION.--Periodic measurements.
DATUM.--Elevation of land-surface datum is 758 ft above sea level, from topographic map. Measuring point: Top of flange, 3.1 ft above land-surface datum.
PERIOD OF RECORD.--September 2000 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.13 ft below land-surface datum, Apr. 16, 2002; lowest measured, 5.58 ft below land-surface datum, Mar. 28, 2001.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	4.72	JAN 2	5.28	APR 15	3.01	APR 22	2.99	MAY 14	4.27	JUL 1	5.12

462114085574401. Local number, 46N 13W 29BD.
LOCATION.--Lat 46°21'14", long 85°57'44", Hydrologic Unit 04060106, in Seney Township Park, 0.9 mi northwest of Seney. Owner: U.S. Geological Survey.
AQUIFER.--Glaciofluvial and fluvial deposits.
WELL CHARACTERISTICS.--Hand augered observation well, diameter 2 in, depth 10 ft, screened 5 ft to 9 ft.
INSTRUMENTATION.--Periodic measurements.
DATUM.--Elevation of land-surface datum is 740 ft above sea level, from topographic map. Measuring point: Top of flange, 2.8 ft above land-surface datum.
PERIOD OF RECORD.--September 2000 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.48 ft below land-surface datum, Apr. 24, 2002; lowest measured, 5.96 ft below land-surface datum, Oct. 4, 2000.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	4.93	JAN 2	5.43	APR 2	4.28	MAY 14	4.33	JUL 2	5.69	AUG 26	5.92

GROUND-WATER LEVELS

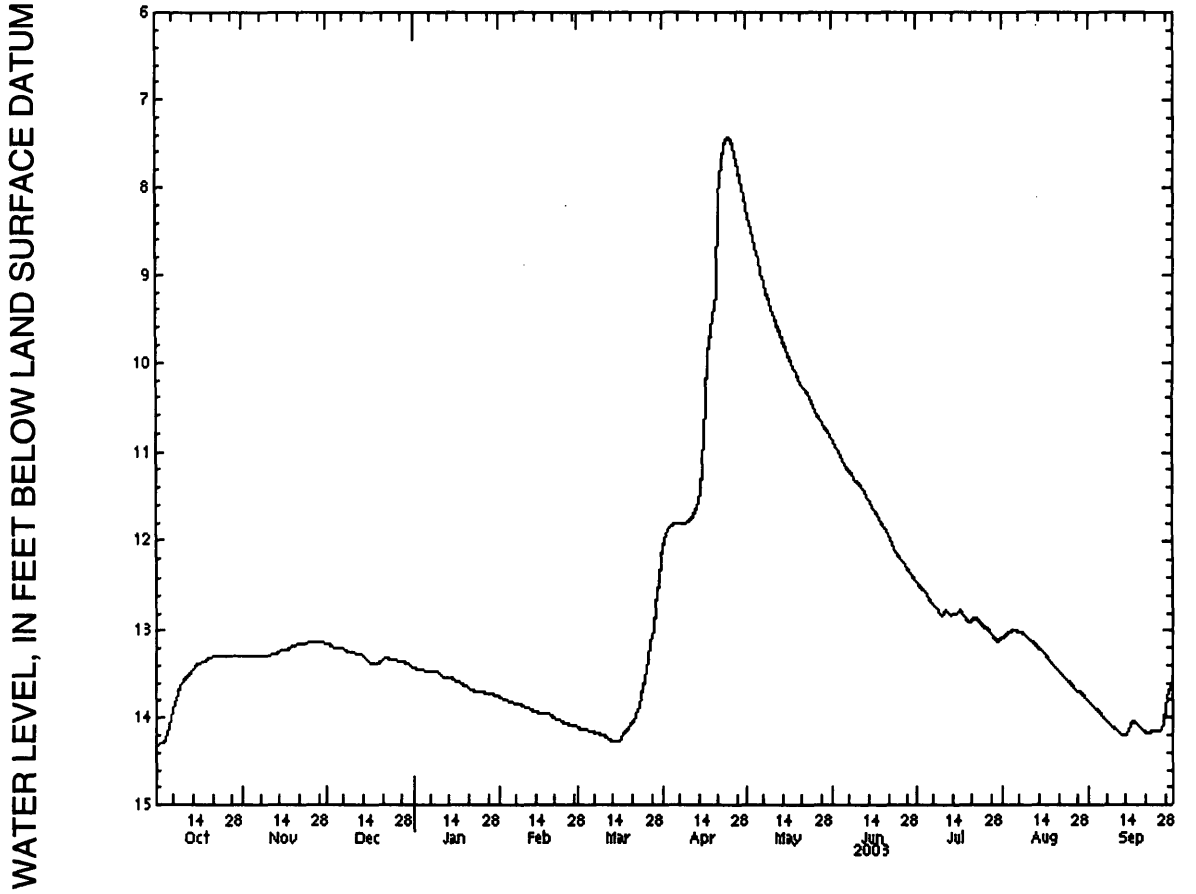
SCHOOLCRAFT COUNTY

462651086214601. Local number, 47N 16W 30BBBB01.
LOCATION.--Lat 46°26'51", long 86°21'46", Hydrologic Unit 04060106, at Cusino CCC site, 3.4 mi southeast of Melstrand.
AQUIFER.--Prairie du Chien Group.
WELL CHARACTERISTICS.--Drilled observation well, diameter 6 in, depth 56.5 ft. Well was found filled with debris July 1957 and was cleaned out to about 22 ft.
INSTRUMENTATION.--Water-level recorder.
DATUM.--Elevation of land-surface datum is 900 ft above sea level, from topographic map. Measuring point: Top edge of metal flange, 2.8 ft above land surface datum.
PERIOD OF RECORD.--January 1957 to June 1992 (water-level recorder), June 1999 to October 2000 (periodic measurements), October 2000 to September 2003 (discontinued).
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 5.60 ft below land-surface datum, April 1985; lowest recorded, 16.40 ft below land-surface datum, Feb. 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	14.11	13.28	13.19	13.48	13.82	14.15	11.80	8.82	11.12	12.63	13.00	13.97
10	13.58	13.29	13.25	13.50	13.87	14.21	11.79	9.41	11.34	12.83	13.10	14.14
15	13.39	13.23	13.34	13.57	13.96	14.27	11.15	9.84	11.62	12.81	13.25	14.09
20	13.30	13.16	13.35	13.63	14.00	14.06	9.24	10.21	11.88	12.91	13.44	14.15
25	13.28	13.13	13.34	13.69	14.07	13.56	7.43	10.50	12.17	12.96	13.61	14.15
EOM	13.28	13.15	13.43	13.75	14.09	12.17	8.08	10.82	12.42	13.09	13.81	13.60

WTR YR 2003 HIGHEST 7.40 APR 24, 25 LOWEST 14.32 OCT 1



GROUND-WATER LEVELS

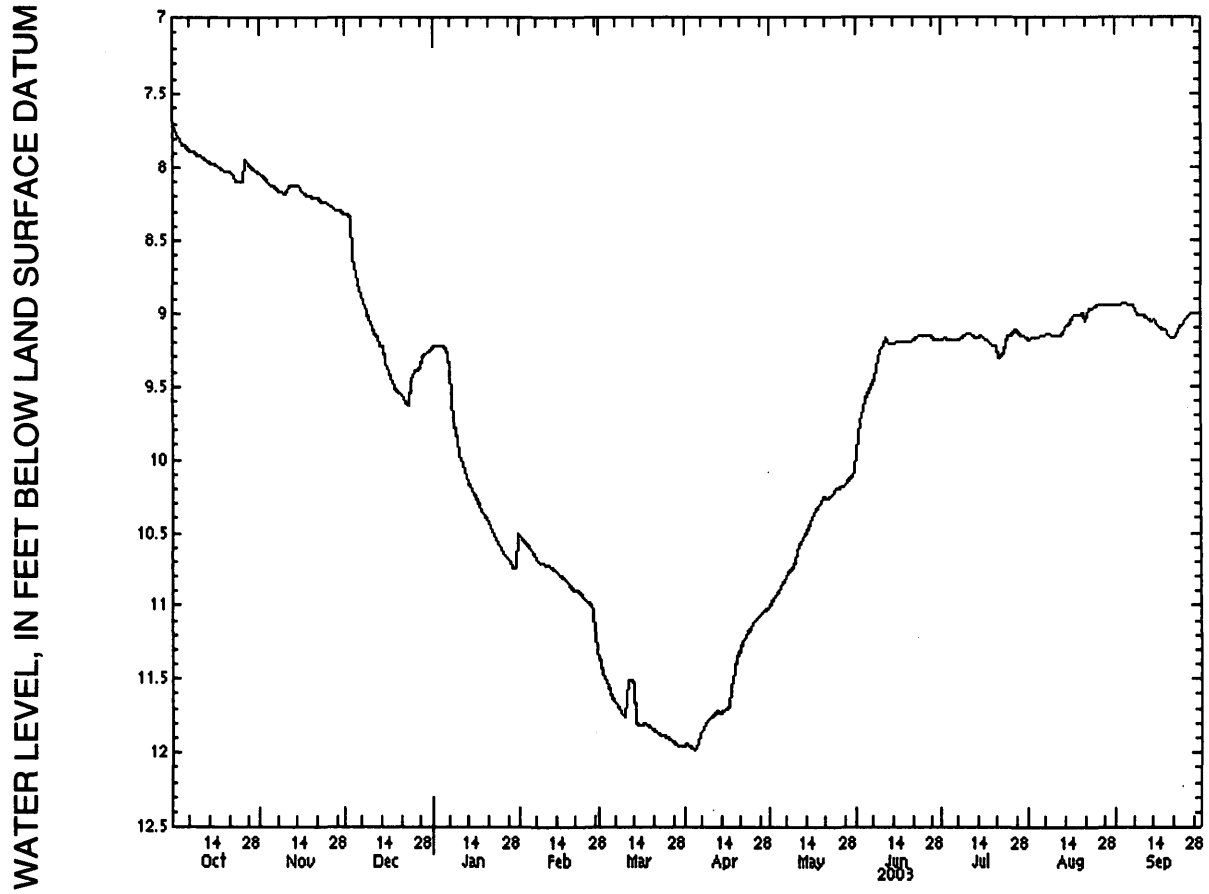
WASHTENAW COUNTY

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 2002 TO SEPTEMBER 2003
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	7.85	8.12	8.80	9.22	10.63	11.59	11.94	10.86	9.53	9.19	9.16	8.94
10	7.92	8.17	9.09	9.97	10.73	11.76	11.76	10.69	9.22	9.14	9.15	9.02
15	7.97	8.17	9.34	10.23	10.80	11.81	11.70	10.43	9.20	9.16	9.08	9.08
20	8.03	8.21	9.55	10.41	10.89	11.85	11.30	10.26	9.20	9.22	9.00	9.17
25	8.10	8.26	9.39	10.60	10.98	11.90	11.12	10.20	9.15	9.15	8.95	9.05
EOM	8.04	8.32	9.25	10.51	11.33	11.95	11.02	10.08	9.19	9.17	8.95	9.00

WTR YR 2003 HIGHEST 7.72 OCT 1 LOWEST 11.98 APR 4



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Conversion Factors

Multiply	By	To obtain
	Length	
inch (in.)	2.54×10^{1}	millimeter (mm)
	2.54×10^{-2}	meter
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-per-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)	1.223×10^{3}	cubic meter (m^3)
	1.223×10^{-3}	cubic hectometer (hm^3)
	1.223×10^{-6}	cubic kilometer (km^3)
	Flow rate	
cubic foot per second (ft^3/s)	2.832×10^{1}	liter (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
	4.381×10^{1}	cubic decimeter per second (dm^3/s)
	Mass	
ton, short (2,000 lb)	9.072×10^{-1}	megagram (Mg) or metric ton

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$°F = (1.8 \times °C) + 32$$

U.S. DEPARTMENT OF THE INTERIOR
U.S. Geological Survey
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