



Water Resources Data Michigan Water Year 1995



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MI-95-1
Prepared in cooperation with the State of Michigan
and with other agencies

CALENDAR FOR WATER YEAR 1995

1994

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1995

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APRIL							MAY							JUNE						
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9	10	11	12	13	14	15	14	15	16	17	18	19	20	11	12	13	14	15	16	17
16	17	18	19	20	21	22	21	22	23	24	25	26	27	18	19	20	21	22	23	24
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Water Resources Data Michigan Water Year 1995

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



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Prepared in cooperation with the State of Michigan
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U.S. DEPARTMENT OF THE INTERIOR

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1996

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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13. ABSTRACT (Maximum 200 words) Water resources data for the 1995 water year for Michigan consists of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and ground water levels. This report contains discharge records for 148 streamflow-gaging stations; stage only records for 2 stream-gaging stations and 19 lake-gaging stations; stage and contents for 4 lakes and reservoirs; water-quality records for 16 streamflow-gaging stations and 1 lake-gaging station; water-level records for 42 ground-water wells. Also included are 29 crest-stage partial-record stations and 2 low-flow partial-record stations. Additional water data were collected at various sites not involved in the systematic data-collection program. Miscellaneous data were collected at 74 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.				
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SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

Letters after station name designate type of data collected: (d) discharge, (b) biological, (c) chemical, (e) elevation, gage heights, or contents, (m) microbiological, (p) pesticide, (r) radio-chemical, (s) sediment

	Station number	Page
ST. LAWRENCE RIVER BASIN		
STREAMS TRIBUTARY TO LAKE SUPERIOR		
Washington Creek at Windigo (d,c,m,r,s)	04001000	30
Clark Lake near Watersmeet (e)	461420089195001	33
Middle Branch Ontonagon River near Paulding (d)	04033000	34
Bond Falls Reservoir:		
Bond Falls Canal near Paulding (d)	04033500	35
Bond Falls Reservoir near Paulding (e)	04034000	36
Middle Branch Ontonagon River near Trout Creek (d)	04034500	37
Middle Branch Ontonagon River near Rockland (d)	04035500	38
Lake Gogebic near Bergland (e)	04035995	39
West Branch Ontonagon River near Bergland (d)	04036000	40
South Branch Ontonagon River:		
Cisco Lake near Watersmeet (e)	04037400	41
Cisco Branch Ontonagon River at Cisco Lake Outlet (d)	04037500	42
Ontonagon River near Rockland (d,c,m,s)	04040000	43
Portage River (Portage Lake):		
Sturgeon River near Sidnaw (d)	04040500	46
Sturgeon River near Alston (d)	04041500	47
Trap Rock River near Lake Linden (d)	04043050	48
Dead River:		
McClure Storage Basin Release near Marquette (d)	04043800	49
Sand River Wildlife Flooding at Sand River (e)	04044609	50
Au Train River at Forest Lake (d)	04044724	51
Grand Sable Lake near Grand Marais (e)	463910086014201	52
Muskallonge Lake near Deer Park (e)	04044796	53
Tahquamenon River near Paradise (d)	04045500	54
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Black River near Garnet (d)	04046000	55
Manistique River near Manistique (d)	04056500	56
Indian Lake near Manistique (e)	04057000	57
Manistique River above Manistique (d)	04057004	58
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Greenwood Diversion near Greenwood (d)	04057813	67
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Schweitzer Reservoir near Palmer (e)	04058190	70
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Peshekee River near Michigamme (d)	04062100	81
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St. Joseph River at Burlington (d)	04096405	91
Coldwater River:		
South Branch Hog Creek near Allen (d)	04096515	92
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Black River:		
South Branch Black River near Bangor (d)	04102700	110
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Kalamazoo River near Marengo (d)	04103010	112
Battle Creek:		
Wanadoga Creek near Battle Creek (d)	04104945	113
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Grand River at Jackson (d)	04109000	128
Red Cedar River:		
Deer Creek near Dansville (d)	04111500	129
Sloan Creek near Williamston (d)	04112000	130
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Lake Mitchell-Lake Cadillac at Cadillac (e)	441508085244001	160
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Bear Creek near Muskegon (d)	04122100	164
Muskegon River at Muskegon (d,c)	04122150	165
White River near Whitehall (d)	04122200	170
Pere Marquette River at Scottville (d,c)	04122500	171
Bear Lake near Kalkaska (e)	444351084561801	174
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Pine River:		
East Branch Pine River near Tustin (d)	04124500	176
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Glen Lake near Glen Arbor (e)	445331085564501	178
Arbutus Lake near Mayfield (e)	443903085312101	179
Elk Lake near Elk Rapids (e)	445256085240001	180
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Burt Lake (head of Cheboygan River):		
Crooked Lake near Conway (e)	452600084472001	184
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Black River near Tower (d)	04130500	188
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South Branch Au Sable River:		
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South Branch Tobacco River near Beaverton (d)	04152238	203
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Belle River:		
North Branch Belle River at Imlay City (d)	04160570	215
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STREAMS TRIBUTARY TO LAKE ST. CLAIR		
Clinton River:		
Sashabaw Creek near Drayton Plains (d)	04160800	217
Clinton River near Drayton Plains (d)	04160900	218
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Stony Creek near Romeo (d)	04161580	220
Stony Lake near Washington (e)	04161790	221
Stony Creek near Washington (d)	04161800	222
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Plum Brook at Utica (d)	04163400	223
Clinton River near Fraser (d)	04164000	224
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East Pond Creek at Romeo (d)	04164100	225
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North Branch Clinton River near Mount Clemens (d)	04164500	227
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Middle River Rouge near Garden City (d)	04167000	236
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River Raisin near Adrian (d)	04176000	248
River Raisin near Monroe (d,c,m,s)	04176500	249
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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
Black River near Bessemer, MI (d)	04031000	200	1955-82
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
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
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
Walsh Creek near Seney, MI (d)	04052500	a12	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

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

Station name	Station number	Drainage area (mi ²)	Period of record
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued			
West Branch Manistique River near Manistique, MI (d)	04056000	322	1938-56
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
Peshekee River near Champion, MI (d)	04062200*	133	1961-78
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
Menominee River below Koss, MI (d)	04067000	3,720	1907-09, 1913-81
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
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
South Branch Kalamazoo River near Albion, MI (d)	04102850	146	1972-76
Reed's Springs near Albion, MI (d)	04103000	--	1905-06
Kalamazoo River at Marshall, MI (d)	04103500	449	1949-82

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			
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
Grand River near Eaton Rapids, MI (d)	04111000	661	1951-82
Red Cedar River near Williamston, MI (d)	04111379	163	1975-89
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
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 Nawaygo, MI (d)	04122000	a2,350	1908, 1909-20, 1931-93
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
Pine River near Hoxeyville, MI (d)	04125500	251	1952-82
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
STREAMS TRIBUTARY TO LAKE HURON			
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
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

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			
Thunder Bay River near Bolton, MI (d)	04133500	588	1945-80
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 near Red Oak, MI (d)	04136000	a1,000	1909-16, 1931
Au Sable River at Bamfield, MI (d)	04137000	a1,420	1902-14
East Branch Au Gres River at McIvor, MI (d)	04138000*	a84	1951-74
Au Gres River near National City, MI (d)	04138500	154	1951-81
Houghton Creek near Lupton, MI (d)	04139000*	29.7	1950-73
Rifle River at "The Ranch" near Lupton, MI (d)	04139500	56.8	1950-71
Prior Creek near Selkirk, MI (d)	04140000*	21.4	1950-73
Rifle River at Selkirk, MI (d)	04140500*	117	1950-82
South Branch Shepards Creek near Selkirk, MI (d)	04141000*	1.15	1952-78
West Branch Rifle River near Selkirk, MI (d)	04141500*	a52	1952-63
Rifle River at Omer, MI (d)	04143000	364	1902-04
North Branch Kawkawlin River near Kawkawlin, MI (d)	04143500	101	1951-82
Shiawassee River at Linden, MI (d)	04143900	83.7	1968-94
Shiawassee River at Byron, MI (d)	04144000	365	1948-83
Shiawassee River near Fergus, MI (d)	04145000	637	1940-84, 1989-94
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 Fosters, MI (d)	04149000	1,188	1940-84, 1988-92
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 Sebawaing, MI (d)	04157500	67.3	1940-54
Columbia Drain near Sebawaing, 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
Clinton River at Auburn Heights, MI (d)	04161000*	123	1935-40, 1957-82
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
Clinton River at Sterling Heights, MI (d)	04161820	309	1979-83
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
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
Stony Creek at Oakville, MI (d)	04175340	68.0	1970-81
Huron River at Flat Rock, MI (d)	04175500	851	1904-11
Huron River at Flat Rock, MI (e)	04175500	851	1912-22
River Raisin near Tecumseh, MI (d)	04175700	267	1956-80
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				
Black River near Bessemer, MI	04031000	200	Temp.	1955-71
Sturgeon River near Chassell, MI	04043004	723	Temp., S.C.	1978-81
Trap Rock River near Lake Linden, MI	04043050	28.0	Temp.	1972-83
Salmon Trout River near Big Bay, MI	04043250	37.8	Temp.	1971-73
Tahquamenon River near Paradise, MI	04045500	790	Temp., S.C.	1975-81
STREAMS TRIBUTARY TO ST. MARYS RIVER				
St. Marys River above Sault Ste. Marie, MI	04045580	a80,900	Temp., S.C.	1974-81
STREAMS TRIBUTARY TO LAKE MICHIGAN				
Black River near Garnet, MI	04046000	a28	Temp.	1952-75 1977-78
Manistique River above Manistique, MI	04057004	a1,445	Temp., S.C.	1976-81
Manistique River at Manistique, MI	04057005	a1,450	Temp., S.C.	1975
Middle Branch Escanaba River at Humboldt, MI	04057800	46.0	Temp.	1973-78
Greenwood Afterbay near Greenwood, MI	04057812	67.4	Temp.	1973-86
Greenwood Diverson near Greenwood, MI	04057813	--	Temp.	1973-82
Greenwood Release near Greenwood, MI	04057814	67.4	Temp.	1973-82
Middle Branch Escanaba River near Greenwood, MI	04057820	73.3	Temp.	1973-78
Black River near Republic, MI	04057900	34.4	Sed.	1962-63, 1965,
Middle Branch Escanaba River near Ishpeming, MI	04058000	128	Temp. Temp.	1962-68 1962-75, 1977-82
Green Creek near Palmer, MI	04058120	8.42	Temp., Sed.	1965, 1979-80
Green Creek near Princeton, MI	04058130	13.8	Temp.	1977-81
Schweitzer Creek near Palmer, MI	04058200	23.6	Temp.	1962-71
Goose Lake Outlet near Sands Station, MI	04058400	37.5	Temp.	1977-81
East Branch Escanaba River at Gwinn, MI	04058500	124	Temp. Sed.	1955-64 1962-63
Escanaba River at Cornell	04059000	870	Temp., S.C.	1975-81
Ford River near Hyde, MI	04059500	450	Temp. S.C.	1956-81 1975-81
Paint River near Alpha, MI	04062000	631	Temp.	1953-54, 1956-57
Peshekee River near Champion, MI	04062200	133	Temp.	1962, 1964-78
Michigamme River near Witch Lake, MI	04062400	316	Temp., Sed.	1965-69
East Branch Sturgeon River at Hardwood, MI	04065397	90.8	Temp.	1978-83
Sturgeon River near Foster City, MI	04065500	237	Temp.	1957-80
Pine Creek near Iron Mountain, MI	04065600	16.8	Temp.	1972-81
Beebe Creek near Hillsdale, MI	04096272	42.4	Sed.	1975,
Sand Creek at Litchfield, MI	04096312	20.6	Temp., Sed. Temp., Sed. Sed.	1976-77 1975-76, 1977
Soap Creek near Litchfield, MI	04096325	10.9	Temp., Sed. Sed.	1975-76, 1977

DISCONTINUED SURFACE-WATER-QUALITY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Type of record	Period of record
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued				
St. Joseph River at Clarendon, MI	04096340	144	Temp., Sed.	1975-76, 1977
Paw Paw River near Paw Paw, MI	04102320	195	Temp., Sed.	1981-82
Paw Paw River near Hartford, MI	04102420	311	Sed.	1981-82
Black River near Bangor, MI	04102700	83.6	Temp., Sed.	1981-82
Kalamazoo River at Comstock, MI	04106000	a1,010	Temp.	1969-75
Portage Creek near Kalamazoo, MI	04106300	22.4	Temp., S.C.	1968-71
West Fork Portage Creek at Kalamazoo, MI	04106400	18.7	Temp., S.C.	1971, 1972-73
Portage Creek at Kalamazoo, MI	04106500	46.8	S.C.	1968, 1972-75, 1976-86
Kalamazoo River near Cooper Center, MI	04106770	1,248	Temp.	1968, 1970, 1969, 1971-75
Kalamazoo River at Saugatuck, MI	04108690	a2,020	S.C.	1974, 1975-81
Grand River near Eaton Rapids, MI	04111000	661	Temp., S.C.	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 Ewart, 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 near Mayfield, MI	04127000	182	Temp.	1962-77
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
Au Sable River at Grayling, MI	04135500	110	Temp.	1953-80
South Branch Au Sable River near Luzerne, MI	04135700	401	Temp.	1967-83
Au Sable River at Mio, MI	04136500	a1,100	Temp.	1952-66
Au Sable River near Au Sable, MI	04137500	a1,540	Temp., S.C.	1978-81
East Branch Au Gres River at McIvor, MI	04138000	a84	Temp.	1952-66

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 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, 1970-72, 1975-81
Shiawassee River at Byron, MI	04144000	365	Temp., S.C.	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 at Fargo, MI	04159500	480	Sed.	1966, 1979-82
STREAMS TRIBUTARY TO LAKE ST. CLAIR				
Clinton River near Drayton Plains, MI	04160900	79.2	Temp.	1962-74
Clinton River near Fraser, MI	04164000	444	Sed.	1966
STREAMS TRIBUTARY TO DETROIT RIVER				
Detroit River at Detroit, MI	04165700	a228,800	Temp., S.C.	1974-81

WATER RESOURCES DATA - MICHIGAN, 1995

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 148 streamflow-gaging stations, 29 crest-stage partial-record stations, 2 low-flow partial-record stations, and 74 miscellaneous sites; (2) stage only records for 2 stream-gaging stations and 19 lake-gaging stations; (3) stage and content records for 4 lakes and reservoirs; (4) water-quality records for 16 streamflow-gaging stations and 1 lake-gaging station; and (5) water-level records for 42 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-95-1." 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, Russell Harding, Director, through Land and Water Management Division, Lawrence N. Witte, Chief.

Michigan Department of Natural Resources, K. L. Cool, Director.

Michigan Department of Transportation, Robert A. Welke, Director.

Assistance with funds or services was given by the U.S. Army Corps of Engineers in collecting records for 7 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; Delta Township (Eaton County); Huron County; Kalamazoo County; Otsego County; Wayne County; Huron-Clinton Metropolitan Authority; Cities of Adrian, Ann Arbor, Battle Creek, Cadillac, Clare, Coldwater, Flint, Imlay City, Kalamazoo, Lansing, Norway, Portage, Portland, Sturgis, and Ypsilanti; American Aggregates Co.; Consumers Power Co.; Cleveland Cliffs Iron Co.; Dow Chemical Co.; French Paper Co.; Mead Corporation; Indiana Michigan Power Co.; STS Hydropower, Ltd; Swift-Eckrich, Inc.; Upper Peninsula Power Co.; White's Bridge Hydro Co.; Wisconsin-Electric Power Co.; and Wolverine Power Supply Cooperative, Inc.

Organizations that supplied data are acknowledged in the station descriptions.

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SUMMARY OF HYDROLOGIC CONDITIONS

Surface Water

In the Upper Peninsula, streamflow at Sturgeon River near Sidnaw (fig. 1) began the year below normal and remained slightly deficient through February. An early March thaw reversed this trend and streamflow became excessive, with the monthly mean discharge exceeding the median March flow by 125 percent. Subsequently, April streamflow was slightly deficient, falling below the twenty-fifth percentile due in part to the March thaw. Remaining monthly means were near normal with the greatest departure occurring at the end of the water year. September had a monthly mean flow of 42.7 ft³/s (cubic feet per second) which ranked it below the twenty-fifth percentile. The 1995 annual mean discharge of 162 ft³/s was slightly below the 1961-1990 yearly mean discharge of 218 ft³/s.

In the Lower Peninsula, streamflow at Muskegon River at Evart began the year in the slightly excessive range and remained so through January. For the remainder of the year there were no significant departures from normal with the exception of April which recorded a deficiency of 57 percent. This monthly mean, the seventh lowest for the period of record, was partially attributed to the early March thaw. Annual streamflow was near normal, being deficient by only 12 percent. Streamflow at Red Cedar River at East Lansing was in the excessive range at the end of the 1994 water year and remained excessive for most of the 1995 water year. There were only four months, February, April, June, and September when the monthly mean flow was exceeded by the median, and these means were never exceeded by more than 15 percent. However, the first four months of excessive flow were quite noteworthy. All four monthly means exceeded the seventy-fifth percentile with the mean for November being the second highest and the mean for December being the highest for the period of record. While many monthly means were significantly above normal the annual mean was only slightly above the seventy-fifth percentile.

Neither maximum nor minimum discharges were established during the 1995 water year and the annual means at most stations were in the normal range. As indicated from the index stations, streamflow in the Upper Peninsula was slightly below normal. In the northern Lower Peninsula streamflow was close to normal, and in the southern lower Lower Peninsula streamflow was slightly above normal.

Water levels of Lake Superior and Lakes Michigan-Huron were slightly below the average at the end of the 1995 water year and followed normal seasonal patterns during the year. Water levels for Lake St. Clair and Lake Erie were only slightly above average levels at the end of the year and also followed seasonal patterns during the year. No new record high or low water levels were experienced during the year. Water levels for Lake Superior were slightly below the long-term average during the water year and ended the year about 0.4 ft below average. Water levels for Lakes Michigan-Huron, for most of the year, were above the long-term average and ended the year within 0.1 ft of the average. For Lake St. Clair and Lake Erie water levels began the year approximately 1.0 ft above the long-term average. They moved closer to average throughout the year, and by years end were both only about 0.4 ft above average. Water levels during the 1995 water year were slightly lower than those experienced during the 1994 water year.

Water Quality

Surface-water-quality data were collected at 5 National Stream Quality Accounting Network stations and 1 Hydrologic Bench-Mark Network station, and 11 other sampling stations during the 1995 water year. Concentrations of dissolved solids and suspended sediments, analyzed from samples collected bimonthly or quarterly at the stations, generally fall within the range of concentrations in all previous samples.

Ground Water

Glacial deposits cover most of the State. The outwash sand and gravel in these deposits form the most productive aquifers in the State. Lacustrine sand also is very productive. Poorly sorted, relatively impermeable mixtures of clay, silt, sand, and gravel, that form some till deposits tend to be poor aquifers; clay deposits generally yield little or no water. In most areas of the State, glacial deposits are less than 200 ft thick. In some areas in the northern part of the Lower Peninsula, however, the deposits are greater than 800 ft thick. Sandstone, limestone, and dolomite are the principal bedrock aquifers. Where near enough to land surface to be recharged by precipitation, they yield freshwater. Where deeply buried, however, these rocks commonly yield brackish or salty water.

Annual recharge to aquifers in Michigan ranges from 3 to 18 in. (inches) and is derived from precipitation, which averages 31 in. annually.

Ground-water levels were measured at 42 wells during the 1995 water year. This statewide network of ground-water wells (fig. 10) is designed to provide statewide areal coverage and to define ground-water conditions in the important aquifers in the State.

Ground-water levels for the 1995 water year generally followed seasonal patterns. Lower Peninsula ground-water levels in Roscommon County were very near the long term average. At the end of the year the ground-water level was 0.19 ft below the 60 year average. Ground-water levels in the southwestern Lower Peninsula (Kalamazoo County) were near normal for much of the year. However, at years end three wells had established new lows for the period of record. It is noteworthy that two of these wells have been in operation for less than 10 years, but the other well has been in operation since June 1982. Also noteworthy is the fact that these three wells are affected by pumpage and these extremes may be artificially influenced.

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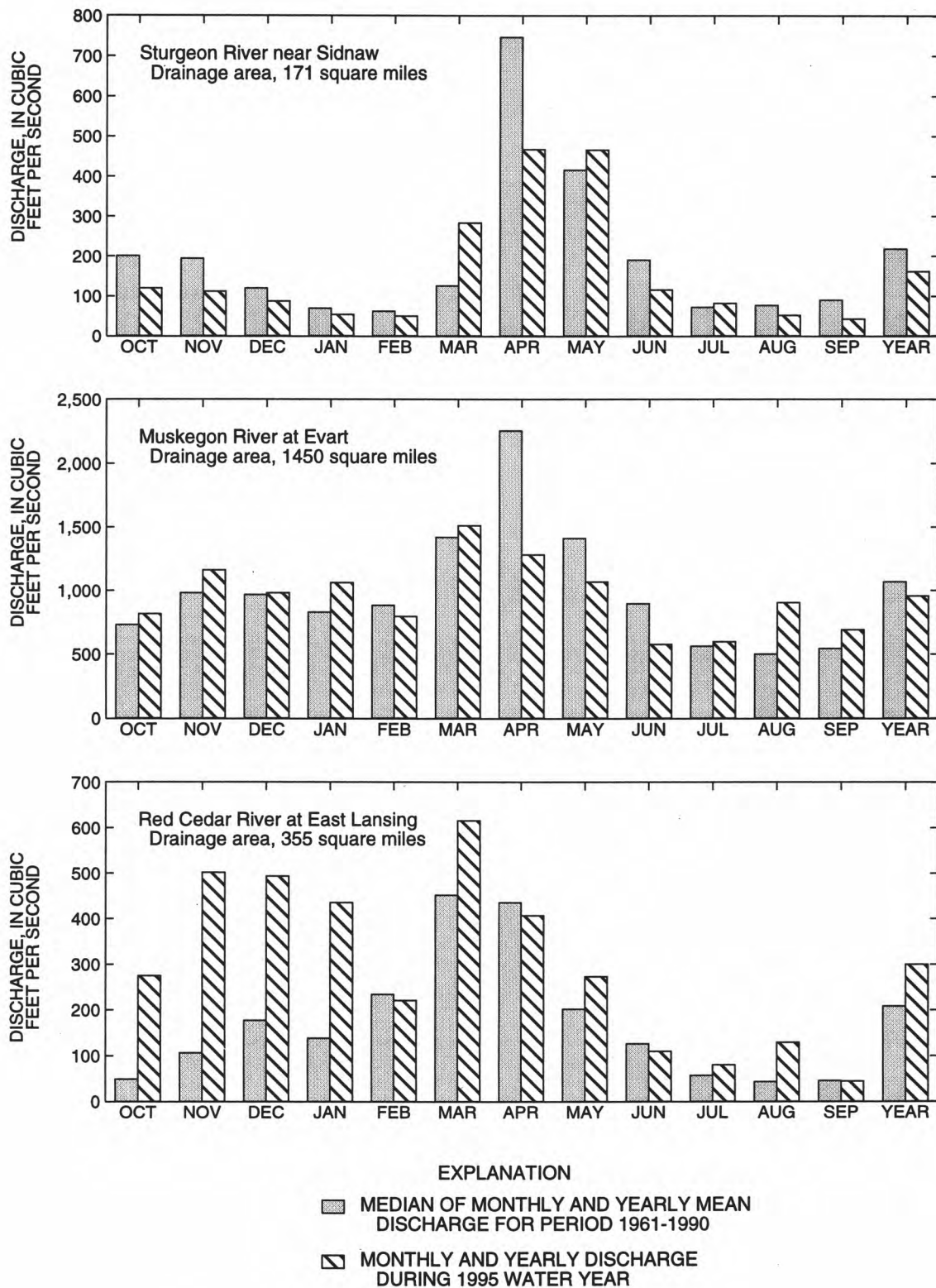


Figure 1.--Discharge during 1995 water year compared with median discharge for period 1961-90 for three representative stations.

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

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

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

REFERENCES CITED

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

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SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 53 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 the activities of man.

National Stream Quality Accounting Network (NASQAN) is a nation-wide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in national or regional water-quality planning and management. The 142 sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water quality assessment and hydrologic research.

NASQAN was redesigned in 1995 and will be known as NASQAN II beginning in 1996. NASQAN II will focus on four of the largest river basins in the Nation-- the Mississippi, the Columbia, the Colorado, and the Rio Grande. The objective of NASQAN II 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 Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of wet atmospheric deposition, which includes snow, rain, sleet and hail. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

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, diverse, and geographically distributed part of the Nation's ground- and surface-water resources, and to identify, describe, and explain the major natural and human factors that affect these observed conditions and trends.

Assessment activities have begun in about two-thirds of the study units and ultimately will be conducted in 60 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.

Radiochemical Program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1995 water year that began October 1, 1994, and ended September 30, 1995. 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 4-10. 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 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.

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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 indentation in the "List of Stations" in the front of this report. Each indentation represents one rank. This downstream order and system of indentation 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.)

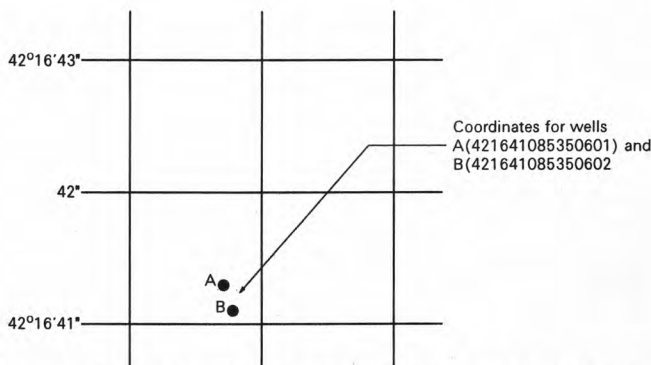


Figure 2.--System for numbering wells (latitude and longitude).

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.

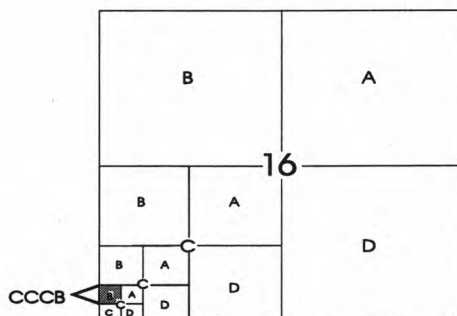


Figure 3.--Local well numbering system in Michigan.

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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 with analog recorders that trace continuous graphs of stage, with digital recorders that punch stage values on paper tapes at selected time intervals, or 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 cross section 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 lapsed time since the last survey increases. Discharges over lake or reservoir spillways are computed from stage-discharge relationships much as other stream discharges are computed.

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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.

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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 continuous 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.

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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.)

INSTANTANEOUS 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.)

INSTANTANEOUS 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.

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

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

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 ft³/s; to the nearest tenth between 1.0 and 10 ft³/s; to whole numbers between 10 and 1,000 ft³/s; and to 3 significant figures for more than 1,000 ft³/s. The number of significant figures used is based solely on the magnitude of the discharge value.

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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 figures 6 and 7.

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. C2; Book 5, Chap. A1, A3, and A4. 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.

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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 hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly 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 Geological Survey laboratory in Lemoyne, Pennsylvania. All other samples were analyzed in the Geological Survey laboratories in Arvada, Colorado. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the Geological Survey laboratories are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4. In March 1989 the National Water-Quality Laboratory discovered a bias in the turbidimetric method for sulfate analysis, indicating that values below 75 mg/L have a median positive bias of 2 mg/L above the true value for the period between 1982 and 1989.

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.

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REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. 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 the appropriate computer file to insure the most recent updates.

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:

<u>PRINTED OUTPUT</u>	<u>REMARK</u>
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.
K	Results based on colony count outside the acceptance range (non-ideal colony count).
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted).
D	Biological organism count equal to or greater than 15 percent (dominant).
&	Biological organism estimated as dominant.

Dissolved Trace-Element Concentrations

NOTE: Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter ($\mu\text{g/L}$) 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 $\mu\text{g/L}$ 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/NTN Coordination Office, Colorado State University, Fort Collins, Colorado, 80523 (Telephone: 303-491-5643).

Records of Ground-Water Levels

Only water-level data from a national 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. Locations of the observation wells in this network in Michigan are shown in figure 10.

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.

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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, from the graph or punched tape of a water-level recorder, 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 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 top of collar, notch in top of casing, plug in pump 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; generally, 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 WATSTORE DATA

The U.S. Geological Survey is the principal Federal water-data agency and, as such, collects and disseminates about 70 percent of the water data currently being used by numerous State, local, private, and other Federal agencies to develop and manage our water resources. As part of the Geological Survey's program of releasing water data to the public, a large-scale computerized system has been developed for the storage and retrieval of water data collected through its activities.

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The National Water Data STorage and Retrieval System (WATSTORE) was established in 1972 to provide an effective and efficient means for the processing and maintenance of water data collected through the activities of the U.S. Geological Survey and to facilitate release of the data to the public. A variety of useful products, ranging from data tables to complex statistical analyses such as Log Pearson Type III, can be produced using WATSTORE. The system resides on the central computer facilities of the U.S. Geological Survey at its National Center in Reston, Virginia, and consists of related files and data bases.

- * Station Header File - Contains descriptive information on more than 440,000 sites throughout the United States and its territories where the U.S. Geological Survey collects or has collected data.
- * Daily Values File - Contains more than 220 million daily values of stream flows, stages, reservoir contents, water temperatures, specific conductances, sediment concentrations, sediment discharges, and ground-water levels.
- * Peak Flow File - Contains approximately 500,000 maximum (peak) streamflow and gage-height values at surface-water sites.
- * Water Quality File - Contains approximately 2 million analyses of water samples that describe the chemical, physical, biological, and radio-chemical characteristics of both surface and ground water.
- * Ground-Water Site Inventory Data Base - Contains inventory data for more than 900,000 wells, springs, and other sources of ground water. The data includes site location, geohydrologic characteristics, well-construction history, and one-time field measurements such as water temperature.

In 1976, the U.S. Geological Survey opened WATSTORE to the public for direct access. The signing of a Memorandum of Agreement with the Survey is required to obtain direct access to WATSTORE. The system can be accessed either synchronously or asynchronously. The requestor will be expected to pay all computer costs he/she incurs. Direct access may be obtained by contacting:

U.S. Geological Survey
National Water Data Exchange
421 USGS National Center
Reston, Virginia 22092

DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See also table for converting English units to International System (SI) Units on the inside of the back cover.

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

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

Algae are mostly aquatic single-celled, colonial, or multi-celled plants, containing chlorophyll and lacking roots, stems, and leaves.

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.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while 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.

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which 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 mL of sample.

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Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They are often 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.

Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as Gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which 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.

Bed material is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

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 micro-organisms, such as bacteria.

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

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

Dry mass refers to the mass of residue present after drying in an oven at 105°C for zooplankton and periphyton, 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.

Organic mass or volatile mass of the living substance is the difference between the dry mass and ash mass and represents the actual mass of the living matter. The organic mass is expressed in the same units as for ash mass and dry mass.

Wet mass is the mass of living matter plus contained water.

Bottom material: See Bed material.

Cells/volume refers to the number of cells of any organism which 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, usually milliliters (mL) or liters (L).

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 natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

Chlorophyll refers to the green pigments of plants. Chlorophyll *a* and *b* are the two most common green pigments in plants.

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

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.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, 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 salt water.

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 that the runoff is distributed uniformly in time and area.

Cubic foot per second (ft^3/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Cubic foot per second-day [$(\text{ft}^3/\text{s})/\text{d}$] is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, about 646,000 gallons, or 2,445 cubic meters.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

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

Instantaneous discharge is the discharge at a particular instant of time.

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

Dissolved refers to that material in a representative water sample which passes through a 0.45 um membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved-solids concentration of water 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 of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise specified.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

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

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

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

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

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

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.

Methylene blue active substances (MBAS) are apparent detergents. 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) 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 liter (UG/L, ug/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

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

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National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

Organism is any living entity.

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.

Total organism count is the total number of organisms collected and enumerated in any particular sample.

Parameter Code is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

Partial-record station is a particular site where limited streamflow and/or water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) 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 used in this report agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

<u>Classification</u>	<u>Size (mm)</u>	<u>Method of analysis</u>
Clay.....	0.00024 - 0.004	Sedimentation
Silt.....	.004 - .062	Sedimentation
Sand.....	.062 - 2.0	Sedimentation or sieve
Gravel.....	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. 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.

Percent composition 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, mass, or volume.

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

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

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{10} radioactive disintegrations per second. A picocurie yields 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.

Phytoplankton is the plant part of the plankton. They are usually 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 are commonly known as algae.

Blue-green algae are a group of phytoplankton organisms having a blue pigment, in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water.

Diatoms are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

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Green algae have chlorophyll pigments similar in color to those of higher green plants. Some forms produce algae mats or floating "moss" in lakes. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and are often 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.

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.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photosynthetic 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.

Milligrams of carbon per area or volume per unit time $[mg (C/m^2) / \text{time}]$ for periphyton and macrophytes and $[mg (C/m^3) / \text{time}]$ for phytoplankton are units for expressing primary productivity. They define 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 in unenriched waters. Unit time may be either the hour or day, depending on the incubation period.

Milligrams of oxygen per area or volume per unit time $[mg (O_2/m^2) / \text{time}]$ for periphyton and macrophytes and $[mg (O_2/m^3) / \text{time}]$ for phytoplankton are the units for expressing primary productivity. They define 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.

Recoverable from 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.

Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed in years. May also be called recurrence interval.

Runoff in inches (IN., in.) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sea level in this report refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it 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 influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Bed load is the sediment that is transported in a stream by rolling, sliding, or skipping along the bed and very close to it. In this report, bed load is considered to consist of particles in transit within 0.25 ft of the streambed.

Bed load discharge (tons per day) is the quantity of bed load measured by dry weight that moves past a section as bed load in a given time.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

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 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Suspended-sediment discharge (tons/day) is the rate at which dry mass of sediment passes a section of a stream or is the quantity of sediment, as measured by dry mass or volume, that passes a 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.

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Suspended-sediment load is a general term that refers to material in suspension. It is not synonymous with either discharge or concentration.

Total-sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry mass or volume, that passes a section during a given time.

Total-sediment load or total load is a term which refers to the total sediment (bed load plus suspended-sediment load) that is in transport. It is not synonymous with total-sediment discharge.

7-day 10-year low flow (7 Q 10) is the discharge at the 10-year recurrence interval taken from a frequency curve of annual values of the lowest mean discharge for 7 consecutive days (the 7-day low flow).

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. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 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.

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

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.

Artificial substrate is a device which is purposely 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 taken. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multiple samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton collection.

Natural substrate refers to any naturally occurring emersed or submersed solid surface, such as a rock or tree, upon which an organism lives.

Surface area of a lake is that area outlined on the latest U.S.G.S. topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimetered. All areas shown are those for the stage when the planimetered map was made.

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

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with 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 water-suspended sediment sample that is retained on a 0.45 um 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 analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter. 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 determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

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

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

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings 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 that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 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) is the quantity of a substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount of a given constituent in a representative water-suspended sediment 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 all of the constituent in the sample.)

Total discharge is the total quantity of any individual constituent, as measured by dry mass or volume, that passes through a stream cross-section per unit of time. This term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment 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, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Water year in Geological Survey 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, 1994, is called the "1994 water year."

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.

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

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals 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.

The reports listed below are for sale by the U.S. Geological Survey, Branch of Information Services, Box 25286, Federal Center, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

- 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, Chapter D1. 1975. 65 pages.
- 1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.
- 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, Chapter D1. 1974. 116 pages.
- 2-D2. *Application of seismic-refraction techniques to hydrologic studies*, by F. P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 pages.
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- 2-E2. *Borehole geophysics applied to ground-water investigations*, by W. S. Keys: USGS--TWRI Book 2, Chapter E2. 1990. 150 pages.
- 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, Chapter F1. 1989. 97 pages.
- 3-A1. *General field and office procedures for indirect discharge measurements*, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.
- 3-A2. *Measurement of peak discharge by the slope-area method*, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.
- 3-A3. *Measurement of peak discharge at culverts by indirect methods*, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.
- 3-A4. *Measurement of peak discharge at width contractions by indirect methods*, by H. F. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.
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- 3-A6. *General procedure for gaging streams*, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.
- 3-A7. *Stage measurement at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.
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PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

- 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, Chapter A9. 1989. 27 pages.
- 3-A10. *Discharge ratings at gaging stations*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.
- 3-A11. *Measurement of discharge by the moving-boat method*, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.
- 3-A12. *Fluorometric procedures for dye tracing*, Revised, by J. F. Wilson, Jr., E. D. Cobb, and F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A12. 1986. 34 pages.
- 3-A13. *Computation of continuous records of streamflow*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.
- 3-A14. *Use of flumes in measuring discharge*, by F. A. Kilpatrick and V. R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.
- 3-A15. *Computation of water-surface profiles in open channels*, by Jacob Davidian: USGS--TWRI Book 3, Chapter A15. 1984. 48 pages.
- 3-A16. *Measurement of discharge using tracers*, by F. A. Kilpatrick and E. D. Cobb: USGS--TWRI Book 3, Chapter A16. 1985. 52 pages.
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- 3-A19. *Levels at streamflow gaging stations*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A19. 1990. 31 pages.
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- 3-B2. *Introduction to ground-water hydraulics, a programmed text for self-instruction*, by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.
- 3-B3. *Type curves for selected problems of flow to wells in confined aquifers*, by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.
- 3-B4. *Regression modeling of ground-water flow*, by R. L. Cooley and R. L. Naff: USGS--TWRI Book 3, Chapter B4. 1990. 232 pages.
- 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, Chapter B4. 1993. 8 pages.
- 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, Chapter B5. 1987. 15 pages.
- 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, Chapter B6. 1987. 28 pages.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

- 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, Chapter B7. 1992. 190 pages.
- 3-C1. *Fluvial sediment concepts*, by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.
- 3-C2. *Field methods for measurement of fluvial sediment*, by H. P. Guy and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.
- 3-C3. *Computation of fluvial-sediment discharge*, by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.
- 4-A1. *Some statistical tools in hydrology*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.
- 4-A2. *Frequency curves*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
- 4-B1. *Low-flow investigations*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.
- 4-B2. *Storage analyses for water supply*, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.
- 4-B3. *Regional analyses of streamflow characteristics*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.
- 4-D1. *Computation of rate and volume of stream depletion by wells*, by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.
- 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, Chapter A1. 1989. 545 pages.
- 5-A2. *Determination of minor elements in water by emission spectroscopy*, by P. R. Barnett and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.
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Figure 4.--Identification number and location of active surface-water gaging stations in the Upper Peninsula of Michigan.

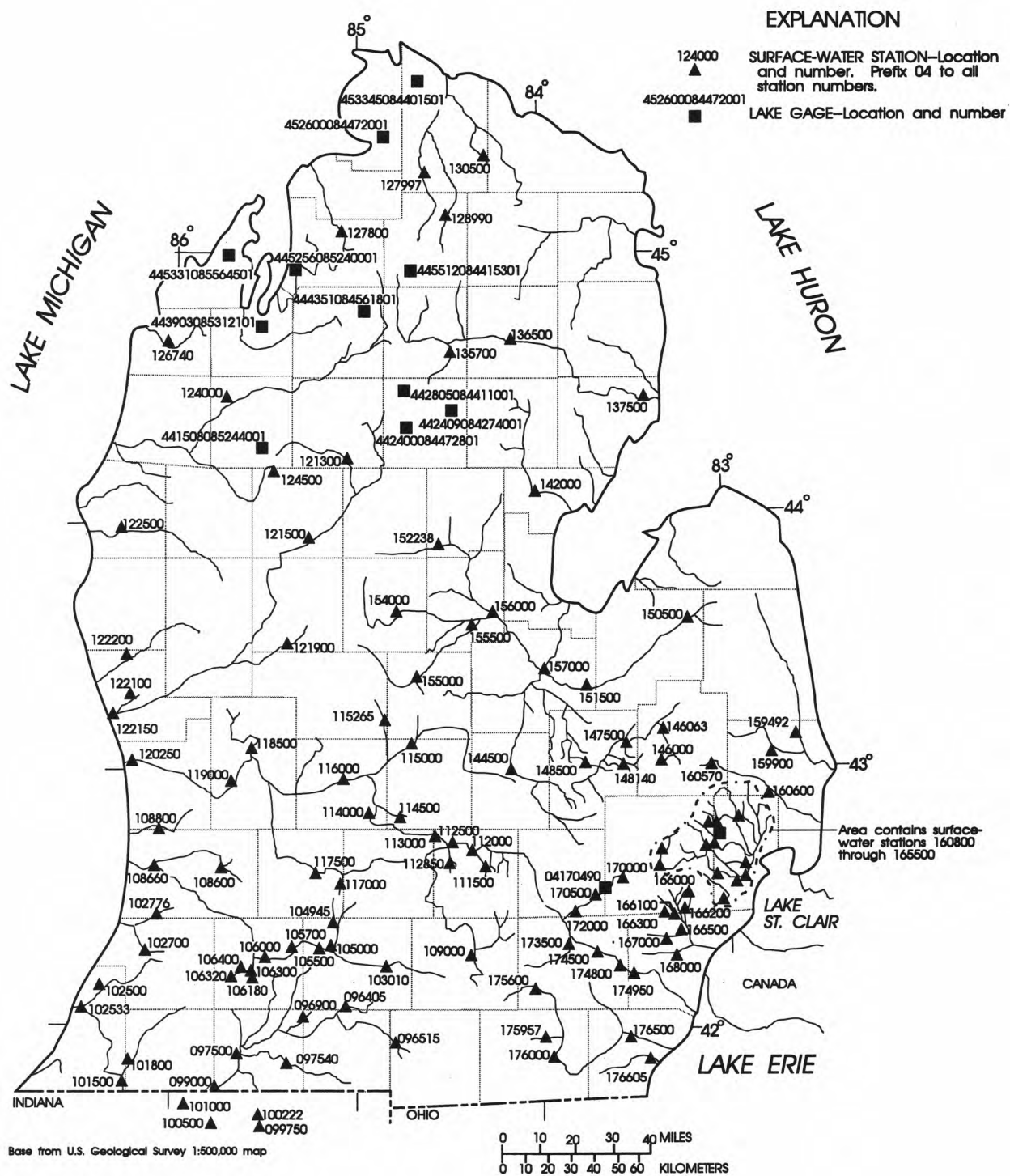


Figure 5.--Identification number and location of active surface-water gaging stations in the Lower Peninsula of Michigan.

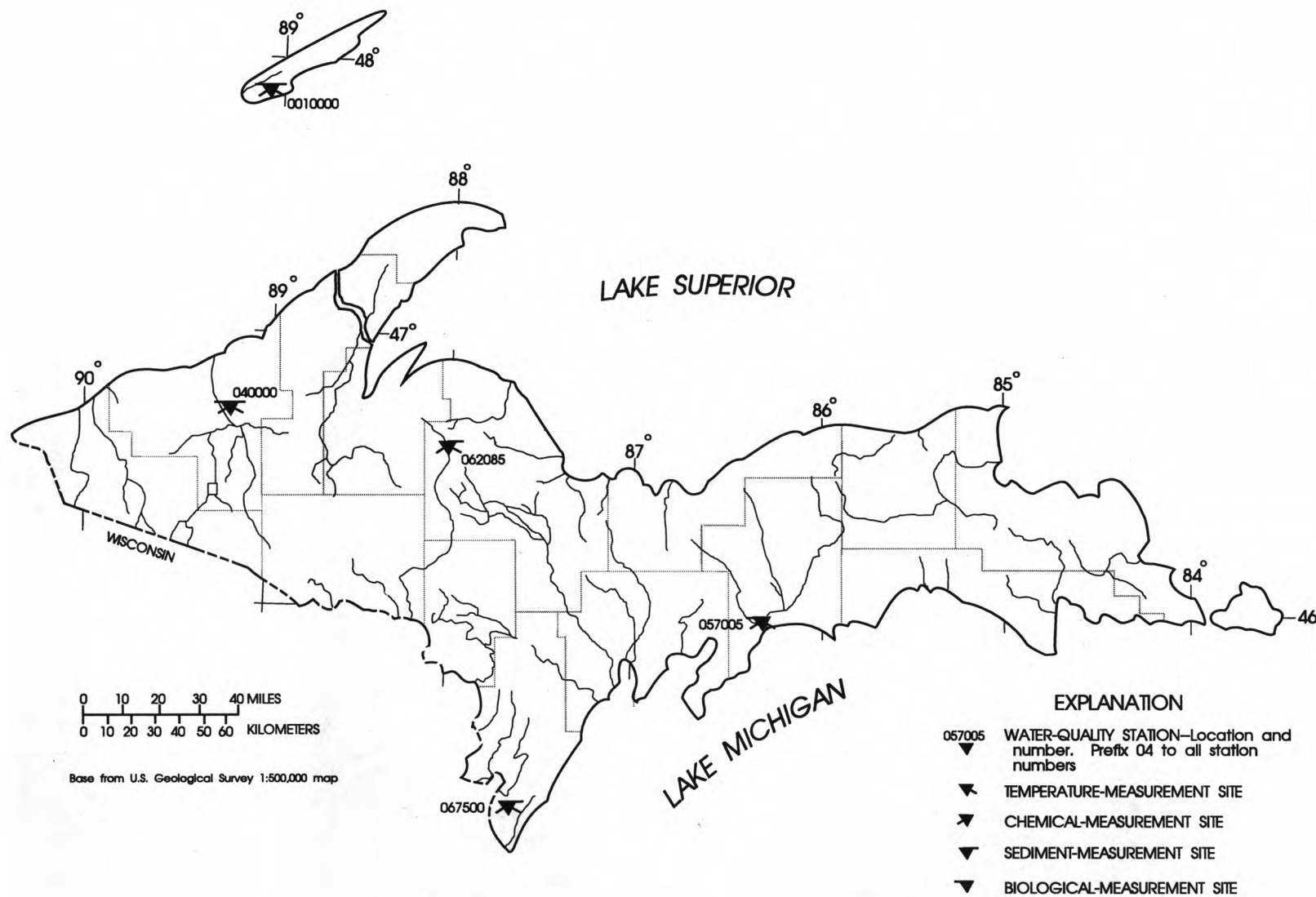


Figure 6.--Identification number and location of active surface-water-quality stations in the Upper Peninsula of Michigan.

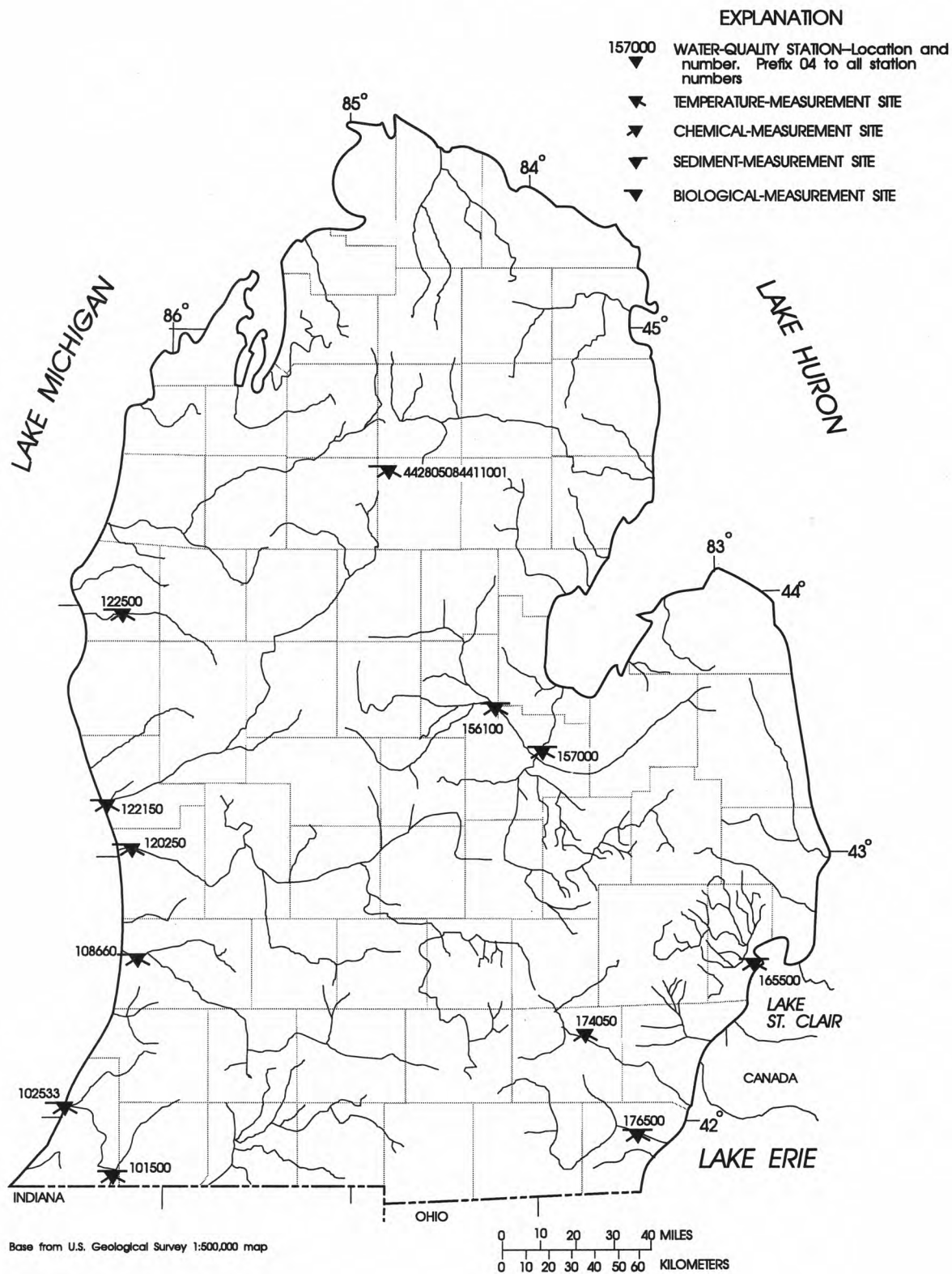


Figure 7.-- Identification number and location of active surface-water-quality stations in the Lower Peninsula of Michigan.

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 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1964 to current year.

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

REMARKS.--Water-discharge records good except for estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e13	4.1	6.1	4.1	e2.0	e1.3	e16	27	17	e.86	e.88	.84
2	e13	4.0	e6.2	4.0	e2.0	e1.3	e16	26	15	e.82	e.88	.66
3	e13	4.0	e6.4	3.7	e2.0	e1.3	15	26	13	e1.1	e.86	.72
4	e12	3.8	e6.6	3.0	e1.9	e1.3	e15	26	11	e1.6	e.86	.70
5	e11	3.8	e6.8	2.6	e1.9	e1.3	13	37	9.3	e1.5	e.86	.75
6	e10	3.8	e6.6	e2.5	e1.6	e1.3	10	33	8.5	e1.7	e.86	1.1
7	e11	3.6	e6.0	2.4	e1.5	e1.3	10	27	7.9	e2.0	e.85	1.2
8	e13	3.7	e5.6	2.3	e1.4	e1.3	e10	23	7.0	e1.9	e.85	.91
9	e13	3.6	e5.4	2.1	e1.4	e1.3	e10	32	6.1	e1.5	e.84	.83
10	e12	3.4	e5.4	1.9	e1.5	e1.3	e9.8	45	5.6	e1.4	.82	.79
11	e12	3.4	5.3	2.0	e1.4	e1.3	9.6	37	5.2	e1.3	.71	.74
12	e11	3.5	5.0	e2.0	e1.3	e1.5	15	30	4.7	e1.3	.64	.86
13	e10	3.5	4.8	e2.1	e1.3	e36	23	31	4.0	e1.3	.72	.88
14	e10	3.6	4.5	e2.1	1.3	e120	31	173	3.9	e1.4	.74	1.0
15	e10	3.5	4.4	e2.1	1.3	e110	27	113	3.7	e1.5	.67	1.0
16	e10	3.3	e4.5	2.2	e1.3	e78	25	76	3.4	e1.4	.62	2.8
17	e10	3.3	e4.6	2.3	e1.3	e54	21	57	3.2	e1.4	.64	1.9
18	e10	4.4	e4.5	2.4	e1.3	e46	21	43	3.0	e1.3	.58	1.5
19	e11	4.8	4.5	2.5	e1.3	32	23	33	2.5	e1.4	.63	1.4
20	e10	4.2	4.4	2.5	e1.3	24	29	29	2.3	e1.5	.57	1.4
21	e9.8	13	4.5	2.5	e1.3	e23	32	30	2.1	e1.4	.55	1.4
22	e9.8	15	e5.0	2.5	e1.3	e22	34	32	1.8	e1.4	.50	2.0
23	e15	20	e5.2	2.5	e1.3	22	33	31	1.7	e1.3	.51	1.9
24	e13	8.6	e5.2	2.6	e1.3	e21	31	28	1.5	e1.2	.53	1.6
25	e6.4	7.2	e5.2	2.5	e1.3	e21	29	24	1.4	e1.1	1.0	1.6
26	6.1	6.1	5.2	2.3	e1.3	e20	29	21	e1.4	e1.0	1.1	1.6
27	5.4	5.3	e5.2	2.2	e1.3	e20	30	18	e1.5	e1.0	.78	1.4
28	5.1	e6.0	e5.4	2.1	e1.3	e19	31	26	e1.5	e1.0	.68	1.3
29	5.0	e6.2	e5.2	2.1	---	e19	30	30	e1.1	e.96	.68	1.3
30	4.7	6.1	5.3	e2.1	---	e18	28	24	e.98	e.94	1.2	4.4
31	4.4	---	5.1	e2.0	---	e17	---	20	---	e.90	1.0	---
TOTAL	309.7	168.8	164.1	76.2	40.7	737.8	656.4	1208	151.28	40.38	23.61	40.48
MEAN	9.99	5.63	5.29	2.46	1.45	23.8	21.9	39.0	5.04	1.30	.76	1.35
MAX	15	20	6.8	4.1	2.0	120	34	173	17	2.0	1.2	4.4
MIN	4.4	3.3	4.4	1.9	1.3	1.3	9.6	18	.98	.82	.50	.66
CFSM	.76	.43	.40	.19	.11	1.80	1.66	2.95	.38	.10	.06	.10
IN.	.87	.48	.46	.21	.11	2.08	1.85	3.40	.43	.11	.07	.11

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1995, BY WATER YEAR (WY)

	12.0	14.7	7.32	4.29	3.74	12.6	69.3	38.9	13.7	6.51	4.30	7.67
MEAN	12.0	14.7	7.32	4.29	3.74	12.6	69.3	38.9	13.7	6.51	4.30	7.67
MAX	33.8	47.2	18.3	18.1	13.0	58.7	154	103	34.2	18.4	14.0	55.1
(WY)	1986	1992	1966	1966	1966	1966	1967	1972	1968	1968	1966	1977
MIN	.76	.88	.63	.60	.61	1.10	20.3	5.13	2.87	1.04	.71	.57
(WY)	1977	1977	1977	1977	1977	1965	1987	1977	1988	1988	1976	1976

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1965 - 1995

ANNUAL TOTAL	5820.98	3617.45	16.2
ANNUAL MEAN	15.9	9.91	33.1
HIGHEST ANNUAL MEAN			8.42
LOWEST ANNUAL MEAN			1966
HIGHEST DAILY MEAN	187	173	412
LOWEST DAILY MEAN	.98	.50	.44
ANNUAL SEVEN-DAY MINIMUM	1.0	.55	.47
INSTANTANEOUS PEAK FLOW		199	(a)480
INSTANTANEOUS PEAK STAGE		4.92	(b)6.88
INSTANTANEOUS LOW FLOW		.43	.43
ANNUAL RUNOFF (CFSM)	1.21	.75	1.23
ANNUAL RUNOFF (INCHES)	16.40	10.19	16.71
10 PERCENT EXCEEDS	37	28	38
50 PERCENT EXCEEDS	6.0	3.6	5.9
90 PERCENT EXCEEDS	1.5	.87	1.4

(a) From rating curve extended above 160 ft³/s based on runoff characteristics of nearby stations.

(b) Backwater from ice.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04001000 WASHINGTON CREEK AT WINDIGO, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1965 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1964 to September 30, 1991.

INSTRUMENTATION.--Water-temperature recorder from Oct. 20, 1964 to Sept. 30, 1991.

REMARKS.--Quarterly samples were collected at or near gage.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE (water years 1966-72, 1974-91): Maximum, 24.5°C, July 8, 1987; minimum, 0.0°C on many days during winter.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS/100 ML) (31625)
OCT 25...	1515	6.4	128	7.4	6.0	1.3	11.9	98	K220
JAN 24...	1515	2.6	158	7.6	0.0	1.4	14.2	99	K4
MAY 10...	1400	44	71	7.5	5.0	2.4	12.3	99	25
AUG 09...	1445	0.83	213	7.9	20.0	3.3	6.9	79	K330

DATE	STREP-TOCOCCEI, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS TOTAL (MG/L AS CaCO3) (00900)	HARD-NESS NONCARB DISSOLV FLD AS CaCO3 (MG/L) (00904)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS Mg) (00925)	SODIUM, DIS-SOLVED (MG/L AS Na) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CaCO3) (39086)
OCT 25...	K10	57	4	15	4.7	2.6	0.50	65	53
JAN 24...	--	73	9	20	5.7	3.7	0.30	79	65
MAY 10...	--	35	6	9.3	2.8	1.7	0.30	35	29
AUG 09...	K460	100	--	28	7.3	5.2	0.80	--	--

DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG C DIS-SOLVED (MG/L) (70300)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2-NO3 DIS-SOLVED (MG/L AS N) (00631)
OCT 25...	6.4	2.1	<0.10	12	--	0.10	1.31	<0.010	<0.050
JAN 24...	2.8	3.7	<0.10	15	112	0.15	0.79	0.010	0.100
MAY 10...	3.1	0.50	<0.10	7.8	72	0.10	8.55	<0.010	0.070
AUG 09...	2.4	6.4	<0.10	15	147	0.20	0.33	<0.010	0.070

STREAMS TRIBUTARY TO LAKE SUPERIOR

04001000 WASHINGTON CREEK AT WINDIGO, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)
OCT 25...	0.020	0.50	0.020	<0.010	0.020	30	6	<3
JAN 24...	0.040	<0.20	<0.010	<0.010	<0.010	20	6	<3
MAY 10...	0.030	0.40	<0.010	0.010	<0.010	50	4	<3
AUG 09...	0.030	0.40	<0.010	<0.010	<0.010	20	11	<3

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
OCT 25...	420	<4	13	<10	2	<1	<1.0	32
JAN 24...	400	<4	22	<10	<1	<1	<1.0	36
MAY 10...	150	<4	8	<10	<1	<1	<1.0	16
AUG 09...	450	<4	53	<10	1	<1	<1.0	58

DATE	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)	URANIUM NATURAL 2 SIGMA WATER, DISS, (UG/L) (75990)	RA-226 2 SIGMA WATER, DISS, (PCI/L) (76001)	SEDI- MENT, SUS- PENDEd (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDEd (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 25...	<6	<0.02	0.01	<1.0	0.010	4	0.07	79
JAN 24...	<6	--	--	--	--	3	0.02	71
MAY 10...	<6	<0.02	0.01	<1.0	--	15	1.8	73
AUG 09...	<6	--	--	--	--	14	0.03	85

STREAMS TRIBUTARY TO LAKE SUPERIOR

461420089195001 CLARK LAKE NEAR WATERSMEET, MI

LOCATION.--Lat 46°14'20", long 89°19'50", in NW1/4 SE1/4 sec.5, T.44 461420089195001 CLARK LAKE NEAR WATERSMEET, MIN., R.40 W., Gogebic County, Hydrologic Unit 04020102, at U.S. Forest Service Public Access Site, 7.8 mi southwest of Watersmeet.

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

GAGE.--Nonrecording gage. Elevation of gage is 1,712 ft above sea level, from topographic map.

REMARKS.--Staff gage read by observer.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 3.19 ft, June 21, 23, 24, 1993; minimum observed, 1.60 ft, Apr. 7, 1994.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 2.44 ft, on several days during May, June and July; minimum observed, 1.68 ft, Sept. 27.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.08	---	---	---	---	---	---	2.03	---	---	2.24	---
2	2.07	2.00	---	---	---	---	---	---	2.44	2.24	---	1.94
3	2.06	---	---	---	---	---	---	---	2.43	---	---	1.92
4	2.06	---	---	---	---	---	---	2.03	2.43	2.20	2.00	1.90
5	---	1.98	---	---	---	---	---	---	2.42	---	2.00	---
6	---	---	---	---	---	---	---	---	---	2.18	2.00	1.96
7	---	---	---	---	---	---	---	---	2.44	2.18	---	---
8	2.00	---	---	---	---	---	---	---	2.43	2.18	2.00	1.90
9	1.99	1.95	---	---	---	---	---	2.14	2.40	2.16	---	1.89
10	---	---	---	---	---	---	1.82	---	2.44	---	2.18	1.87
11	1.98	---	---	---	---	---	---	---	2.44	2.14	2.18	---
12	---	---	---	---	---	---	---	---	2.44	---	2.16	1.85
13	---	---	---	---	---	---	---	2.24	2.40	2.10	---	---
14	1.95	---	---	---	---	---	---	2.30	---	---	2.20	1.78
15	---	---	---	---	---	---	---	---	---	2.38	---	---
16	---	---	---	---	---	---	---	---	2.40	2.40	2.10	1.80
17	2.04	---	---	---	---	---	---	---	2.38	2.42	2.10	1.79
18	---	---	---	---	---	---	---	---	2.36	2.44	2.10	---
19	1.98	---	---	---	---	---	---	2.34	---	2.42	2.14	1.78
20	---	---	---	---	---	---	---	2.34	2.32	2.40	2.10	---
21	2.00	---	---	---	---	---	1.96	---	2.28	---	2.08	1.76
22	---	---	---	---	---	---	---	---	---	---	---	1.75
23	---	---	---	---	---	---	1.98	2.34	2.30	2.40	2.06	1.74
24	---	---	---	---	---	---	---	2.34	---	2.40	---	---
25	2.08	---	---	---	---	---	2.02	2.34	2.26	2.38	2.04	---
26	---	---	---	---	---	---	---	2.34	2.24	2.35	2.06	1.69
27	---	---	---	---	---	---	2.04	2.33	---	2.34	---	1.68
28	---	---	---	---	---	---	2.04	2.44	2.30	---	---	---
29	---	---	1.77	---	---	---	2.04	2.44	2.30	2.28	---	---
30	2.04	---	---	---	---	---	---	2.44	---	2.25	1.98	---
31	---	---	---	---	---	---	---	2.44	---	2.24	---	---

STREAMS TRIBUTARY TO LAKE SUPERIOR

04033000 MIDDLE BRANCH ONTONAGON RIVER NEAR PAULDING, MI

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

DRAINAGE AREA.--164 mi².

PERIOD OF RECORD.--June 1942 to September 1995 (discontinued).

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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	239	147	e140	e88	e88	e92	164	193	242	131	86	86
2	209	148	e145	e88	e88	e92	160	185	213	115	84	80
3	184	139	e150	e88	e88	e92	e160	179	224	107	85	76
4	171	140	e140	e88	e88	e92	e160	176	206	101	104	75
5	160	141	e140	e88	e88	e92	e158	180	187	100	109	82
6	152	140	e140	e88	e88	e92	e155	175	170	106	100	113
7	149	135	e135	e88	e88	e92	e155	166	172	114	97	122
8	140	130	e130	e88	e88	e92	152	162	172	109	108	121
9	134	125	e130	e88	e88	e92	147	283	162	103	104	107
10	129	121	e130	e88	e88	e94	142	373	162	97	99	96
11	125	128	e130	e88	e88	e120	139	346	188	89	93	87
12	135	126	e130	e88	e88	e170	185	290	171	88	86	84
13	134	127	e130	e88	e88	e220	226	263	153	98	101	80
14	127	126	e125	e88	e88	e320	215	369	143	107	116	83
15	124	122	e120	e88	e88	e260	211	424	131	171	113	84
16	121	117	e115	e88	e88	e210	202	412	122	208	102	94
17	141	116	e110	e88	e88	e190	195	396	117	198	96	111
18	215	122	e110	e88	e88	e170	212	344	113	195	93	106
19	220	121	e105	e88	e90	e160	289	306	107	175	93	98
20	197	117	e100	e88	e90	e190	314	257	102	179	96	99
21	175	147	e100	e88	e92	e255	295	234	97	165	90	100
22	175	170	e96	e88	e92	252	268	221	90	146	83	99
23	209	159	e95	e88	e92	230	250	227	88	132	82	101
24	218	e165	e92	e88	e92	226	255	219	91	121	81	98
25	213	e165	e90	e88	e92	218	263	199	108	114	104	99
26	204	e150	e90	e88	e92	209	258	186	111	110	124	98
27	193	e140	e90	e88	e92	203	248	171	114	105	124	95
28	181	e145	e90	e88	e92	199	234	296	105	105	118	93
29	175	e140	e88	e88	---	197	220	413	146	99	107	92
30	166	e140	e88	e88	---	183	207	363	165	90	101	107
31	157	---	e88	e88	---	173	---	294	---	85	93	---
TOTAL	5272	4109	3562	2728	2500	5277	6239	8302	4372	3863	3072	2866
MEAN	170	137	115	88.0	89.3	170	208	268	146	125	99.1	95.5
MAX	239	170	150	88	92	320	314	424	242	208	124	122
MIN	121	116	88	88	88	92	139	162	88	85	81	75
CFSM	1.04	.84	.70	.54	.54	1.04	1.27	1.63	.89	.76	.60	.58
IN.	1.20	.93	.81	.62	.57	1.20	1.42	1.88	.99	.88	.70	.65

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1995, BY WATER YEAR (WY)

	MEAN	159	162	128	110	106	143	353	269	198	148	124	141
MAX	377	293	186	168	176	352	578	591	438	414	267	308	
(WY)	1955	1989	1952	1969	1984	1973	1967	1965	1944	1953	1978	1951	
MIN	76.5	92.2	81.9	81.7	74.2	82.7	152	114	89.4	80.7	69.8	76.4	
(WY)	1949	1949	1964	1964	1959	1965	1987	1977	1948	1990	1990	1948	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1942 - 1995

ANNUAL TOTAL	48995	52162	
ANNUAL MEAN	134	143	170
HIGHEST ANNUAL MEAN			226
LOWEST ANNUAL MEAN			107
HIGHEST DAILY MEAN	432	424	2000
LOWEST DAILY MEAN	74	75	57
ANNUAL SEVEN-DAY MINIMUM	77	85	61
INSTANTANEOUS PEAK FLOW		(a)425	2050
INSTANTANEOUS PEAK STAGE		(b)6.27	(c)10.0
INSTANTANEOUS LOW FLOW		(d)68	(f)27
ANNUAL RUNOFF (CFSM)	.82	.87	1.04
ANNUAL RUNOFF (INCHES)	11.11	11.83	14.09
10 PERCENT EXCEEDS	212	226	293
50 PERCENT EXCEEDS	118	121	130
90 PERCENT EXCEEDS	82	88	90

- (a) Gage height 5.58.
 (b) Backwater from ice.
 (c) From floodmark.
 (d) From discharge measurement.
 (e) Estimated.
 (f) Result of freezeup.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04033500 BOND FALLS CANAL NEAR PAULDING, MI

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

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

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

REMARKS.--Records good except for daily discharges below 5.0 ft³/s, which are poor. Canal diverts water from Bond Falls Reservoir (station 04034000) to South Branch Ontonagon River; water is used for power production at Victoria Dam near Rockland. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.8	164	14	323	283	7.9	9.0	56	10	62	314	111
2	9.8	113	14	321	280	7.6	8.9	46	49	112	311	111
3	79	13	14	320	278	7.6	9.0	46	117	112	309	111
4	152	13	14	319	e275	7.6	9.2	46	117	112	308	111
5	152	12	14	316	e270	7.9	9.1	46	226	141	307	111
6	152	12	14	315	e265	7.6	9.0	46	319	187	305	111
7	152	12	14	312	e260	7.6	9.0	46	155	185	303	110
8	152	13	73	310	e255	7.6	9.3	91	12	185	300	111
9	152	13	133	305	e255	7.6	9.3	77	11	185	299	110
10	152	13	133	298	e250	7.6	7.8	9.6	36	252	299	110
11	151	13	132	302	e250	7.6	4.3	9.4	12	310	297	110
12	151	13	133	305	e250	8.1	3.8	35	11	297	294	110
13	151	13	170	267	e245	7.9	2.6	68	87	296	292	110
14	151	13	208	215	e240	8.1	1.4	40	176	294	207	110
15	151	13	208	214	e240	8.2	1.4	9.8	176	292	126	110
16	151	13	208	257	e235	8.4	1.7	9.8	227	291	162	110
17	151	13	208	310	e230	8.5	1.7	9.8	297	171	197	110
18	151	13	208	308	175	8.5	2.0	9.8	296	11	203	110
19	80	13	207	307	121	8.5	2.8	28	296	11	203	110
20	11	14	206	306	120	8.8	2.9	57	294	99	202	109
21	11	14	206	304	e120	8.5	2.9	58	293	220	202	109
22	11	14	114	302	e120	8.5	2.9	58	293	220	201	109
23	11	14	14	300	120	8.5	2.9	133	293	220	200	109
24	11	14	14	298	120	8.6	3.3	219	294	220	161	109
25	11	14	13	297	120	8.9	3.2	218	293	219	69	109
26	11	14	107	294	120	8.9	1.9	218	296	253	8.8	109
27	11	14	204	291	70	8.9	.7	217	301	321	8.5	109
28	11	14	204	289	8.2	8.9	22	219	261	320	8.3	109
29	11	14	203	287	---	8.9	72	103	116	319	44	109
30	11	14	203	285	---	9.0	64	11	11	317	111	109
31	88	---	265	285	---	8.9	---	11	---	316	111	---
TOTAL	2659.6	649	3872	9162	5575.2	255.7	290.0	2251.2	5375	6550	6362.6	3296
MEAN	85.8	21.6	125	296	199	8.25	9.67	72.6	179	211	205	110
MAX	152	164	265	323	283	9.0	72	219	319	321	314	111
MIN	9.8	12	13	214	8.2	7.6	.70	9.4	10	11	8.3	109

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1995, BY WATER YEAR (WY)

MEAN	105	99.8	144	188	210	141	31.2	117	165	170	161	135
MAX	257	253	292	303	305	287	194	310	312	284	320	275
(WY)	1959	1972	1972	1986	1969	1984	1973	1986	1966	1993	1947	1944
MIN	.000	6.24	10.2	55.2	88.7	2.21	.33	.92	3.37	14.5	2.98	1.37
(WY)	1965	1944	1948	1990	1991	1959	1962	1962	1943	1949	1966	1959

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR		FOR 1995 WATER YEAR		WATER YEARS 1942 - 1995	
ANNUAL TOTAL	37289.70		46298.3		139	
ANNUAL MEAN	102		127		206	
HIGHEST ANNUAL MEAN					55.9	
LOWEST ANNUAL MEAN					1977	
HIGHEST DAILY MEAN	325	Aug 3	323	Jan 1	368	May 5 1960
LOWEST DAILY MEAN	.00	Apr 27	.70	Apr 27	(a)	
ANNUAL SEVEN-DAY MINIMUM	.29	Apr 22	1.9	Apr 13	(b)	
10 PERCENT EXCEEDS	221		298		296	
50 PERCENT EXCEEDS	88		110		138	
90 PERCENT EXCEEDS	9.8		8.5		4.8	

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

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

(c) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04034000 BOND FALLS RESERVOIR NEAR PAULDING, MI

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

DRAINAGE AREA.--190 mi².

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

REVISED RECORDS.--WSP 1911: Drainage area.

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

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

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

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

EXTREMES FOR CURRENT YEAR.--Maximum contents observed, 38,900 acre-ft, May 30, gage height, 140.0 ft; minimum observed, 9,820 acre-ft, Feb. 27, gage height, 125.9 ft.

MONTHEND GAGE HEIGHT AND CONTENTS AT 1030, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)	(equivalent in ft ³ /s)
Sept. 30	133.5	24,500	--	--
Oct. 31	135.4	28,480	+3,980	+64.7
Nov. 30	137.7	33,610	+5,130	+86.2
Dec. 31	136.0	29,800	-3,810	-62.0
CAL YR 1994			+6,300	+8.7
Jan. 31	129.9	17,410	-12,390	-201.5
Feb. 28	126.0	10,000	-7,410	-133.4
Mar. 31	131.4	20,300	+10,300	+167.5
Apr. 30	137.0	32,000	+11,700	+196.6
May 31	139.9	38,670	+6,670	+108.5
June 30	137.1	32,230	-6,440	-108.2
July 31	134.0	25,500	-6,730	-109.4
Aug. 31	129.8	17,220	-8,280	-134.7
Sept. 30	128.8	15,320	-1,900	-31.9
WTR YR 1995			-9,180	-12.7

STREAMS TRIBUTARY TO LAKE SUPERIOR

04034500 MIDDLE BRANCH ONTONAGON RIVER NEAR TROUT CREEK, MI

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

DRAINAGE AREA.--203 mi².

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

REVISED RECORDS.--WSP 1911: Drainage area.

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

REMARKS.--Records excellent except for estimated daily discharges, which are good. 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50	45	46	41	e40	40	48	46	459	51	49	50
2	49	45	45	40	e40	e40	47	46	281	51	49	51
3	48	45	45	e41	e40	e40	e47	46	54	51	49	51
4	48	46	47	e41	40	40	e47	46	52	51	49	51
5	48	45	48	e41	e40	40	48	46	52	52	49	51
6	47	46	45	e41	e40	39	48	45	52	54	49	52
7	45	45	45	e42	e40	40	47	45	58	53	49	47
8	44	45	44	42	e40	39	48	46	53	52	49	43
9	45	44	e44	42	e40	e40	48	64	52	51	52	42
10	45	44	45	42	e40	40	48	56	55	50	50	42
11	44	45	42	42	e40	41	49	51	53	50	51	42
12	44	45	e43	e42	e40	45	63	48	140	51	50	42
13	43	45	e43	e42	e40	53	59	51	180	54	51	42
14	43	45	e43	e42	e40	60	55	66	52	52	51	42
15	43	44	e43	42	e40	61	53	56	51	52	50	43
16	44	44	e43	42	40	59	52	132	51	53	50	45
17	52	45	e43	42	40	55	51	251	51	51	50	43
18	53	45	43	41	40	52	57	299	50	51	49	42
19	48	45	43	41	40	52	64	405	50	53	53	43
20	46	45	43	e41	40	58	62	344	50	56	50	43
21	47	52	43	e41	39	58	57	220	50	52	49	43
22	57	49	44	e41	40	54	54	221	50	52	49	43
23	59	48	44	41	39	52	53	159	51	51	49	43
24	53	46	44	40	39	51	59	48	50	51	51	42
25	50	45	43	40	39	51	57	46	50	52	66	42
26	49	44	43	e40	39	50	55	46	50	51	55	42
27	48	46	43	e40	39	51	53	46	50	51	53	42
28	46	46	43	e40	39	51	52	72	52	50	52	42
29	47	45	43	e40	---	51	47	59	51	50	52	43
30	45	44	43	e40	---	49	46	229	52	50	51	49
31	45	---	42	e40	---	48	---	467	---	49	49	---
TOTAL	1475	1363	1358	1273	1113	1500	1574	3802	2402	1598	1575	1338
MEAN	47.6	45.4	43.8	41.1	39.7	48.4	52.5	123	80.1	51.5	50.8	44.6
MAX	59	52	48	42	40	61	64	467	459	56	66	52
MIN	43	44	42	40	39	39	46	45	50	49	49	42

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1995, BY WATER YEAR (WY)

MEAN	55.2	56.5	48.4	47.0	46.4	50.7	81.7	107	98.4	71.1	58.0	53.8
MAX	221	239	102	84.7	76.7	118	297	422	461	253	105	216
(WY)	1943	1943	1943	1943	1943	1943	1943	1943	1943	1953	1952	1942
MIN	43.5	33.1	32.0	31.7	31.0	32.4	36.5	38.8	50.7	50.2	42.6	43.2
(WY)	1944	1949	1949	1949	1949	1949	1949	1949	1992	1989	1944	1967

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1942 - 1995

ANNUAL TOTAL	17949	20371	64.1	
ANNUAL MEAN	49.2	55.8	187	1943
HIGHEST ANNUAL MEAN			42.4	1949
LOWEST ANNUAL MEAN				
HIGHEST DAILY MEAN	109	Sep 16	1550	May 2 1951
LOWEST DAILY MEAN	42	Mar 19	30	Dec 1 1948
ANNUAL SEVEN-DAY MINIMUM	42	May 22	31	Mar 6 1949
INSTANTANEOUS PEAK FLOW			1750	Nov 7 1951
INSTANTANEOUS PEAK STAGE			5.05	Nov 7 1951
INSTANTANEOUS LOW FLOW			14	(c)
10 PERCENT EXCEEDS	56	56	66	
50 PERCENT EXCEEDS	46	47	50	
90 PERCENT EXCEEDS	43	40	44	

(a) Feb. 21, 23-28, Mar. 6, 8.

(b) May 30, 31.

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

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04035500 MIDDLE BRANCH ONTONAGON RIVER NEAR ROCKLAND, MI

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

DRAINAGE AREA.--671 mi².

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

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

REMARKS.--Records good except for estimated daily discharges, which are fair. Regulation by Bond Falls Reservoir (station 04034000) 30.0 mi upstream. Diversion to South Branch Ontonagon River by Bond Falls Canal (station 04033500) 31.0 mi upstream. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	415	290	296	e210	e195	e210	495	410	816	241	205	e210
2	343	273	338	e198	e195	e210	448	388	745	227	205	e200
3	296	262	337	e195	e195	e210	e440	363	346	222	200	e190
4	271	262	392	e190	e195	e210	e430	344	292	219	202	e195
5	259	276	619	e190	e195	e210	e420	339	267	217	208	e205
6	247	276	561	e190	e195	e210	e410	331	258	228	207	e250
7	235	276	390	e190	e195	e210	405	302	428	249	204	e290
8	234	268	316	e190	e195	e210	456	285	447	245	202	e280
9	246	255	320	e190	e195	e210	521	1250	340	230	227	e260
10	251	247	336	e190	e195	e210	486	1370	297	219	262	e230
11	240	241	312	e190	e195	e240	579	794	328	213	241	e210
12	230	237	e305	e190	e195	e280	1700	543	312	214	226	e200
13	225	240	e300	e190	e195	e1200	1440	562	439	230	237	e195
14	223	240	e290	e195	e195	4160	1080	2060	271	263	249	e205
15	220	244	e280	e200	e195	3350	939	1150	239	246	247	e210
16	219	242	e275	e195	e195	2800	814	801	231	264	230	e230
17	277	234	e270	e195	e195	1910	658	955	225	278	222	e270
18	589	240	e260	e190	e200	1250	870	740	220	268	215	e255
19	572	243	e260	e190	e200	1000	1660	760	216	265	229	e240
20	426	235	e255	e190	e205	1280	1710	705	209	503	228	e240
21	348	801	248	e190	e205	1660	1100	555	205	383	215	e245
22	369	1070	269	e190	e210	1210	913	560	202	296	208	e245
23	718	581	296	e195	e210	963	826	762	210	262	202	e240
24	726	420	289	e195	e210	935	1610	529	313	243	203	e240
25	832	395	251	e195	e210	964	1280	395	252	238	523	e240
26	765	301	255	e195	e210	796	937	335	220	237	784	e230
27	546	309	257	e195	e210	737	757	299	211	227	485	e230
28	416	351	270	e195	e210	828	633	1580	240	221	371	e225
29	380	334	267	e195	---	903	525	1570	342	214	316	e230
30	354	297	236	e195	---	649	454	832	273	209	282	e250
31	314	---	e230	e195	---	570	---	924	---	204	e220	---
TOTAL	11786	9940	9580	5993	5595	29785	24996	22793	9394	7775	8255	6940
MEAN	380	331	309	193	200	961	833	735	313	251	266	231
MAX	832	1070	619	210	210	4160	1710	2060	816	503	784	290
MIN	219	234	230	190	195	210	405	285	202	204	200	190

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1995, BY WATER YEAR (WY)

MEAN	436	462	326	266	266	578	1541	752	551	366	332	356
MAX	1026	1145	618	378	634	1652	2919	1672	1396	1181	1091	1224
(WY) 1986	1989	1983	1946	1984	1973	1971	1973	1944	1949	1953	1942	1942
MIN	191	214	209	193	187	183	385	245	189	182	173	175
(WY) 1949	1949	1990	1995	1949	1965	1987	1977	1992	1988	1976	1948	1948

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1942 - 1995

ANNUAL TOTAL	150091	152832	516
ANNUAL MEAN	411	419	756
HIGHEST ANNUAL MEAN			331
LOWEST ANNUAL MEAN			1987
HIGHEST DAILY MEAN	2850	4160	16300
LOWEST DAILY MEAN	185	(a)190	145
ANNUAL SEVEN-DAY MINIMUM	190	190	163
INSTANTANEOUS PEAK FLOW		5240	(b)27000
INSTANTANEOUS PEAK STAGE		9.50	(c)21.2
INSTANTANEOUS LOW FLOW			(d)142
10 PERCENT EXCEEDS	776	832	1010
50 PERCENT EXCEEDS	280	255	290
90 PERCENT EXCEEDS	200	195	210

(a) Jan. 4-13, 18-22, Sept. 3.

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

(c) From floodmark.

(d) Discharge measurement.

(e) Estimated.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.84	2.73	2.75	2.22	1.71	1.55	2.11	2.49	3.39	2.85	2.74	2.78
2	2.82	2.74	2.72	2.23	1.71	1.55	2.09	2.52	3.37	2.85	2.75	2.77
3	2.79	2.69	2.69	2.24	1.70	1.51	2.09	2.54	3.37	2.86	2.73	2.77
4	2.80	2.70	2.67	2.24	1.70	1.44	2.10	2.56	3.39	2.83	2.71	2.83
5	2.82	2.72	2.65	2.22	1.70	1.42	2.08	2.60	3.41	2.84	2.70	2.84
6	2.83	2.71	2.63	2.16	1.71	1.39	2.08	2.60	3.42	2.86	2.71	2.87
7	2.89	2.74	2.62	2.13	1.77	1.39	2.05	2.61	3.40	2.81	2.72	2.83
8	2.84	2.69	2.59	2.12	1.78	1.39	2.01	2.64	3.40	2.81	2.71	2.90
9	2.81	2.69	2.59	2.08	1.77	1.39	1.99	2.72	3.39	2.80	2.71	2.87
10	2.80	2.68	2.57	2.08	1.77	1.36	1.97	2.82	3.36	2.81	2.73	2.89
11	2.83	2.72	2.55	2.03	1.77	1.33	1.96	2.91	3.36	2.81	2.72	2.90
12	2.79	2.66	2.54	2.00	1.77	1.32	2.01	2.96	3.36	2.83	2.70	2.90
13	2.77	2.69	2.52	2.00	1.77	1.32	2.03	3.00	3.33	2.86	2.71	2.87
14	2.78	2.73	2.48	2.01	1.75	1.40	2.03	3.17	3.27	2.86	2.80	2.84
15	2.78	2.65	2.47	2.00	1.74	1.49	2.03	3.21	3.25	2.84	2.76	2.88
16	2.80	2.66	2.46	1.98	1.74	1.61	2.03	3.30	3.22	2.84	2.72	2.93
17	2.82	2.67	2.44	1.96	1.73	1.70	2.05	3.32	3.18	2.84	2.70	2.86
18	2.89	2.78	2.42	1.97	1.73	1.78	2.06	3.36	3.14	2.83	2.72	2.88
19	2.94	2.62	2.41	1.91	1.71	1.83	2.14	3.38	3.10	2.84	2.72	2.84
20	2.91	2.59	2.38	1.88	1.72	1.91	2.18	3.42	3.05	2.92	2.72	2.85
21	2.91	2.71	2.38	1.88	1.70	2.02	2.20	3.41	3.01	2.93	2.67	2.83
22	2.96	2.80	2.36	1.88	1.66	2.03	2.22	3.41	2.99	2.90	2.64	2.84
23	3.03	2.69	2.35	1.88	1.60	2.07	2.23	3.43	2.94	2.87	2.64	2.85
24	2.97	2.73	2.33	1.87	1.56	2.09	2.30	3.39	2.94	2.88	2.61	2.84
25	2.89	2.71	2.32	1.85	1.56	2.11	2.34	3.40	2.90	2.84	2.76	2.83
26	2.91	2.71	2.30	1.85	1.55	2.12	2.35	3.39	2.92	2.84	2.77	2.80
27	2.94	2.72	2.29	1.85	1.55	2.12	2.33	3.40	2.96	2.85	2.80	2.80
28	2.88	2.74	2.28	1.84	1.55	2.13	2.38	3.43	2.99	2.84	2.80	2.82
29	2.85	2.77	2.25	1.81	---	2.14	2.43	3.51	2.98	2.81	2.80	2.84
30	2.83	2.77	2.25	1.75	---	2.13	2.47	3.49	2.94	2.83	2.86	2.88
31	2.72	---	2.24	1.72	---	2.13	---	3.44	---	2.79	2.81	---
MEAN	2.85	2.71	2.47	1.99	1.70	1.72	2.14	3.09	3.19	2.84	2.73	2.85
MAX	3.03	2.80	2.75	2.24	1.78	2.14	2.47	3.51	3.42	2.93	2.86	2.93
MIN	2.72	2.59	2.24	1.72	1.55	1.32	1.96					

STREAMS TRIBUTARY TO LAKE SUPERIOR

04036000 WEST BRANCH ONTONAGON RIVER NEAR BERGLAND, MI

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

DRAINAGE AREA.--162 mi².

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

REVISED RECORDS.--WSP 1911: Drainage area.

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

REMARKS.--Records good except for daily discharges below 5.0 ft³/s, which are fair. Flow regulated by Lake Gogebic (station 04035995). Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	232	118	207	132	117	191	346	39	483	346	13	2.9
2	226	149	259	133	115	185	342	38	308	217	9.4	2.6
3	218	161	253	133	115	181	342	35	132	147	8.6	2.2
4	127	123	248	130	116	174	347	31	34	142	7.8	2.6
5	87	124	243	156	117	176	338	29	32	74	6.5	2.5
6	87	122	238	196	116	176	335	28	32	30	5.5	2.4
7	94	124	234	192	115	175	329	27	158	29	4.7	2.0
8	88	120	229	190	114	173	320	27	231	28	4.4	1.7
9	84	73	228	182	112	169	311	39	229	25	4.3	1.8
10	83	119	223	177	e110	165	305	41	316	22	4.0	1.7
11	86	122	218	173	e110	162	304	31	269	21	4.1	1.7
12	61	117	213	169	e110	161	317	33	221	17	3.7	1.8
13	20	69	208	167	e110	164	324	46	262	16	3.5	1.9
14	19	79	202	163	111	178	323	46	325	16	3.8	2.0
15	16	114	198	160	107	196	322	31	314	16	3.3	1.9
16	13	115	194	155	107	219	324	27	298	15	3.3	2.0
17	13	118	189	152	105	240	328	26	283	13	2.8	1.7
18	15	130	183	150	104	258	331	26	267	13	3.0	1.5
19	18	108	179	143	102	271	355	27	252	13	3.4	1.4
20	15	105	174	140	102	292	363	31	234	14	3.3	2.6
21	14	58	171	139	101	320	370	152	218	14	3.4	51
22	19	43	166	139	168	325	377	200	213	65	3.1	53
23	162	130	161	139	217	333	380	203	204	93	3.5	54
24	358	121	158	136	211	340	399	151	197	94	3.3	53
25	378	119	154	133	204	346	412	125	186	44	4.1	52
26	382	119	151	130	200	349	415	99	134	19	3.8	49
27	393	119	147	127	196	349	409	86	106	17	3.8	49
28	373	122	143	125	191	353	204	134	166	15	3.8	50
29	358	125	139	124	---	354	43	302	350	14	3.5	52
30	350	125	137	123	---	353	40	472	376	14	3.5	58
31	308	---	135	121	---	350	---	509	---	14	3.0	---
TOTAL	4697	3391	5982	4629	3703	7678	9655	3091	6830	1617	141.2	585.3
MEAN	152	113	193	149	132	248	322	99.7	228	52.2	4.55	19.5
MAX	393	161	259	196	217	354	415	509	483	346	13	58
MIN	13	43	135	121	101	161	40	26	32	13	2.8	1.4

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1995, BY WATER YEAR (WY)

	MEAN	129	153	171	169	156	145	327	286	219	137	83.7	84.3
MAX	698	489	346	360	257	327	742	826	550	578	550	408	
(WY)	1986	1989	1968	1966	1969	1973	1943	1950	1954	1952	1972	1980	
MIN	.65	3.68	18.5	23.3	35.8	55.8	10.7	3.09	21.5	7.09	1.25	.88	
(WY)	1990	1990	1949	1949	1949	1949	1949	1987	1986	1988	1963	1963	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1942 - 1995

ANNUAL TOTAL	51271	51999.5	171
ANNUAL MEAN	140	142	288
HIGHEST ANNUAL MEAN			70.1
LOWEST ANNUAL MEAN			1952
HIGHEST DAILY MEAN	474	509	1380
LOWEST DAILY MEAN	13	1.4	38
ANNUAL SEVEN-DAY MINIMUM	15	1.8	39
INSTANTANEOUS PEAK FLOW		538	1400
INSTANTANEOUS PEAK STAGE		3.90	5.98
ANNUAL RUNOFF (CFSM)	.87	.88	1.06
ANNUAL RUNOFF (INCHES)	11.77	11.94	14.34
10 PERCENT EXCEEDS	306	334	362
50 PERCENT EXCEEDS	123	125	127
90 PERCENT EXCEEDS	26	3.8	8.2

(a) Nov. 16, 17, 1989.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04037400 CISCO LAKE NEAR WATERSMEET. MI

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

DRAINAGE AREA.--50.6 mi².

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

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

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

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

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 4.32 ft, July 14; minimum, 3.37 ft, Mar. 12.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.00	3.70	3.58	3.48	3.48	3.51	3.50	3.54	3.99	3.98	3.97	3.99
2	4.00	3.71	3.56	3.49	3.48	3.50	3.51	3.57	3.96	3.98	3.98	3.99
3	3.99	3.67	3.53	3.50	3.48	3.49	3.50	3.58	3.97	3.96	3.98	4.00
4	4.00	3.67	3.51	3.50	3.50	3.47	3.50	3.60	3.98	3.94	3.98	3.99
5	4.02	3.67	3.49	3.52	3.50	3.50	3.52	3.60	4.00	3.94	3.98	4.00
6	4.07	3.65	3.47	3.52	3.50	3.50	3.52	3.63	4.02	3.93	3.99	4.01
7	4.08	3.67	3.44	3.53	3.50	3.50	3.52	3.65	4.04	3.91	4.01	3.99
8	4.03	3.64	3.43	3.54	3.51	3.47	3.51	3.68	4.02	3.95	4.01	4.00
9	4.00	3.63	3.46	3.54	3.51	3.44	3.50	3.80	4.01	3.95	4.00	3.98
10	4.00	3.63	3.47	3.54	3.53	3.41	3.51	3.82	4.02	3.95	3.98	3.99
11	4.00	3.65	3.48	3.54	3.53	3.38	3.52	3.85	4.01	3.96	3.97	3.99
12	3.98	3.62	3.50	3.53	3.53	3.38	3.55	3.89	4.00	3.99	3.97	3.99
13	3.97	3.64	3.51	3.53	3.53	3.41	3.53	3.95	3.99	3.98	4.00	3.97
14	3.98	3.60	3.52	3.52	3.53	3.45	3.53	4.03	3.98	4.04	4.01	3.98
15	4.00	3.59	3.53	3.52	3.53	3.48	3.52	4.06	3.98	4.17	4.00	4.01
16	4.00	3.62	3.55	3.51	3.52	3.51	3.52	4.12	3.99	4.13	3.99	4.02
17	4.07	3.63	3.55	3.51	3.50	3.52	3.51	4.06	3.99	4.10	3.98	4.02
18	4.13	3.60	3.57	3.50	3.47	3.51	3.53	4.05	3.98	4.05	3.99	4.02
19	4.08	3.57	3.58	3.49	3.45	3.50	3.56	4.02	3.98	4.03	3.97	4.01
20	4.02	3.58	3.57	3.49	3.45	3.52	3.56	3.97	3.98	4.00	3.96	4.01
21	3.98	3.58	3.55	3.49	3.47	3.53	3.54	3.95	3.98	4.02	3.92	4.00
22	3.95	3.59	3.54	3.50	3.48	3.51	3.53	3.96	3.99	4.00	3.94	4.00
23	3.92	3.60	3.53	3.49	3.48	3.48	3.53	3.95	3.98	3.99	3.92	4.01
24	3.87	3.60	3.51	3.49	3.49	3.46	3.53	3.97	3.98	3.98	3.94	4.00
25	3.82	3.59	3.49	3.48	3.50	3.47	3.53	3.99	3.98	3.99	3.98	3.99
26	3.80	3.59	3.48	3.48	3.50	3.49	3.52	4.01	3.97	4.00	3.98	4.00
27	3.78	3.59	3.46	3.47	3.50	3.49	3.49	4.04	3.99	4.01	4.01	4.01
28	3.74	3.61	3.45	3.47	3.51	3.49	3.48	4.13	4.04	3.98	4.01	4.04
29	3.73	3.60	3.45	3.47	---	3.49	3.51	4.10	4.07	3.97	4.02	4.07
30	3.71	3.59	3.45	3.48	---	3.49	3.52	4.08	4.04	3.99	4.04	4.11
31	3.70	---	3.46	3.48	---	3.49	---	4.04	---	3.96	3.98	---
MEAN	3.95	3.62	3.51	3.50	3.50	3.48	3.52	3.89	4.00	3.99	3.98	4.01
MAX	4.13	3.71	3.58	3.54	3.53	3.53	3.56	4.13	4.07	4.17	4.04	4.11
MIN	3.70	3.57	3.43	3.47	3.45	3.38	3.48	3.54	3.96	3.91	3.92	3.97
WTR YR 1995	MEAN 3.75	MAX 4.17	MIN 3.38									

STREAMS TRIBUTARY TO LAKE SUPERIOR

04037500 CISCO BRANCH ONTONAGON RIVER AT CISCO LAKE OUTLET, MI

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

DRAINAGE AREA.--50.7 mi².

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

REVISED RECORDS.--WSP 1911: Drainage area.

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

REMARKS.--Records excellent except those below 3.0 ft³/s, which are poor. Flow regulated by Cisco Lake (station 04037400). Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	44	61	5.8	20	23	35	3.7	161	66	.62	.85
2	38	45	70	6.0	20	36	36	3.2	89	65	.44	.70
3	24	43	80	6.2	21	35	35	2.3	15	64	.42	.52
4	4.6	43	79	6.4	21	34	35	1.5	4.7	62	.40	.43
5	4.2	43	77	6.4	21	36	36	1.3	4.3	42	.38	.39
6	3.5	42	76	6.3	22	58	37	1.3	3.2	23	.37	.38
7	38	43	74	6.1	22	80	37	1.2	27	21	.12	.37
8	67	41	32	6.1	22	78	36	1.2	48	11	.23	.37
9	65	41	5.5	21	22	76	36	2.3	47	1.4	.22	.37
10	65	40	5.5	35	23	74	36	2.3	48	1.0	.21	.37
11	47	42	5.8	36	23	72	46	2.0	47	.87	.21	.39
12	34	40	5.8	35	23	71	58	1.7	47	.86	.21	.41
13	13	41	5.9	36	23	37	55	1.8	46	12	.23	.42
14	.60	39	6.1	35	23	5.8	54	16	45	27	.24	.43
15	.45	39	6.2	35	38	5.7	51	29	23	87	.23	.45
16	.48	40	6.6	35	55	5.3	48	74	1.2	168	.22	.53
17	46	41	6.7	35	54	50	48	124	.77	165	.22	.54
18	74	39	7.2	35	54	78	69	123	.62	159	.22	.13
19	128	37	22	34	51	77	89	121	.61	139	.21	.24
20	153	38	49	34	25	78	86	116	.61	86	.21	.24
21	149	39	59	34	5.8	101	82	113	.61	46	.13	.23
22	147	39	58	34	6.4	117	81	94	.61	45	.83	.23
23	146	39	57	34	6.6	115	77	37	.59	45	.54	.24
24	141	40	56	34	6.7	72	75	4.6	.53	23	.45	.23
25	136	39	55	33	6.9	35	83	4.4	.58	1.9	.43	.12
26	134	39	54	33	7.1	35	100	3.8	.59	1.3	.43	.97
27	132	39	53	27	7.4	36	93	3.2	.61	1.2	.41	.95
28	80	52	37	21	7.5	35	45	44	.86	.98	.41	.87
29	46	63	5.2	20	---	35	4.3	131	32	.88	.41	.87
30	45	62	5.5	20	---	35	3.9	149	71	.77	9.0	.84
31	44	---	5.5	20	---	35	---	166	---	.76	.11	---
TOTAL	2043.83	1272	1126.5	765.3	637.4	1660.8	1607.2	1378.8	766.99	1367.92	337.54	261.58
MEAN	65.9	42.4	36.3	24.7	22.8	53.6	53.6	44.5	25.6	44.1	10.9	8.72
MAX	153	63	80	36	55	117	100	166	161	168	24	84
MIN	.45	37	5.2	5.8	5.8	5.3	3.9	1.2	.53	.76	.37	.37

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1995, BY WATER YEAR (WY)

	MEAN	69.2	67.4	48.9	38.8	35.0	43.6	59.7	45.1	46.1	31.7	25.8	38.5
MAX	151	116	84.1	62.6	81.0	92.1	111	137	123	113	99.7	104	104
(WY)	1986	1968	1961	1983	1945	1973	1985	1960	1953	1953	1978	1977	1977
MIN	13.1	14.5	23.5	23.1	20.6	24.1	2.02	.17	.11	.25	.15	.23	.23
(WY)	1958	1945	1990	1959	1950	1956	1948	1977	1977	1977	1970	1976	1976

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1945 - 1995

ANNUAL TOTAL	13443.02	13225.86	
ANNUAL MEAN	36.8	36.2	
HIGHEST ANNUAL MEAN			45.8
LOWEST ANNUAL MEAN			65.9
HIGHEST DAILY MEAN	175	168	25.2
LOWEST DAILY MEAN	.30	.37	288
ANNUAL SEVEN-DAY MINIMUM	.32	.38	.08
INSTANTANEOUS PEAK FLOW		176	.09
INSTANTANEOUS PEAK STAGE		5.58	288
ANNUAL RUNOFF (CFSM)	.73	.71	(d)6.10
ANNUAL RUNOFF (INCHES)	9.86	9.70	.90
10 PERCENT EXCEEDS	79	81	12.28
50 PERCENT EXCEEDS	34	33	102
90 PERCENT EXCEEDS	.68	.61	37
			1.0

(a) May 1-4, 1951.

(b) Aug. 6, Sep. 7-10.

(c) July 21, Aug. 2, 3, 1988.

(d) Present datum.

STREAMS TRIBUTARY TO LAKE SUPERIOR
04040000 ONTONAGON RIVER NEAR ROCKLAND, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967, 1972 to August 1995 (discontinued).

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1974 to September 1981.

WATER TEMPERATURE: October 1974 to September 1981.

INSTRUMENTATION.--Water-quality monitor from Oct. 15, 1975, to Sept. 30, 1977.

REMARKS.--Quarterly samples were collected at or near Victoria Road bridge.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1975-80): Maximum recorded (more than 20 percent missing record), 192 microsiemens, Mar. 26, 1977, May 28, 1978; minimum recorded, 45 microsiemens, Dec. 2, 1975.

WATER TEMPERATURE (water years 1975-77, 1979-80): Maximum, 28.0°C, July 19, 1977; minimum, 0.0°C on many days during winter.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLL- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
NOV 29...	1600	1130	110	7.9	0.0	21	14.7	103	100
JAN 26...	1245	714	142	7.6	0.0	25	14.0	97	K3
MAY 12...	1015	2010	87	7.6	11.0	53	10.4	98	72
AUG 29...	1230	335	159	7.8	19.0	37	8.8	96	110

DATE	STREP- TOCOCCE- FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	HARD- NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L) (00904)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)
NOV 29...	140	54	8	15	4.1	2.3	1.2	57	47
JAN 26...	K4	68	3	19	5.0	2.6	0.80	79	65
MAY 12...	71	42	5	12	2.9	1.8	1.0	45	37
AUG 29...	190	74	5	21	5.1	2.6	0.90	83	68

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG C DIS- SOLVED (MG/L) (70300)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
NOV 29...	3.2	2.4	<0.10	9.9	93	0.13	284	<0.010	0.090
JAN 26...	3.2	2.5	<0.10	11	97	0.13	187	<0.010	0.100
MAY 12...	2.9	1.6	<0.10	7.9	82	0.11	445	<0.010	<0.050
AUG 29...	4.3	2.2	<0.10	11	110	0.15	99.5	<0.010	<0.050

STREAMS TRIBUTARY TO LAKE SUPERIOR

04040000 ONTONAGON RIVER NEAR ROCKLAND, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)
NOV 29...	<0.015	0.40	0.040	0.020	0.010	200	22	4	370	<4
JAN 26...	0.020	<0.20	<0.010	<0.010	<0.010	30	24	<3	160	<4
MAY 12...	<0.015	0.60	0.090	0.030	0.020	--	22	<3	560	<4
AUG 29...	<0.015	0.40	0.020	<0.010	<0.010	20	30	<3	170	<4

DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	SEDI- MENT, SUS- PENDEED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDEED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 29...	18	10	<1	<1	<1.0	34	<6	27	82	95
JAN 26...	6	<10	<1	<1	<1.0	39	<6	17	33	88
MAY 12...	16	<10	<1	<1	<1.0	28	<6	75	407	93
AUG 29...	16	<10	<1	<1	<1.0	51	<6	50	45	98

STREAMS TRIBUTARY TO LAKE SUPERIOR

04040500 STURGEON RIVER NEAR SIDNAW, MI

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

DRAINAGE AREA.--171 mi².

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

REVISED RECORDS.--WSP 1507: Drainage area.

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

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	140	129	e122	e54	e52	e50	270	612	386	39	43	51
2	118	117	e120	e54	e52	e50	266	567	306	37	40	44
3	102	109	e120	e54	e52	e50	265	539	253	35	42	38
4	89	104	e118	e54	e52	e50	284	534	215	32	48	33
5	82	108	e118	e54	e52	e50	281	537	187	31	55	34
6	77	106	e115	e54	e50	e50	261	510	164	43	50	33
7	75	106	e112	e54	e50	e50	229	466	167	71	45	36
8	69	103	e110	e54	e50	e50	232	412	164	90	41	46
9	67	97	e105	e54	e50	e50	217	501	150	82	44	53
10	67	91	e100	e54	e50	e50	211	563	137	68	61	48
11	66	86	e98	e54	e50	e54	231	532	141	56	69	42
12	67	83	e96	e54	e50	e60	425	459	139	49	61	37
13	60	81	e92	e54	e50	e190	528	388	124	51	56	33
14	52	84	e88	e54	e48	e550	473	553	108	58	53	30
15	48	82	e85	e54	e48	634	479	571	95	56	55	28
16	46	79	e82	e54	e48	641	487	570	84	54	52	33
17	58	78	e80	e54	e48	570	461	537	74	69	48	37
18	128	78	e78	e54	e48	506	539	443	66	97	43	42
19	176	73	e76	e54	e48	455	632	368	59	132	40	43
20	160	69	e74	e54	e48	474	624	306	52	250	37	45
21	139	114	e72	e54	e48	494	579	281	46	227	32	44
22	140	202	e70	e54	e48	447	545	278	42	189	27	45
23	204	176	e68	e54	e48	411	552	368	41	143	25	52
24	222	184	e68	e54	e48	392	714	369	48	103	23	59
25	216	e170	e66	e54	e48	391	789	334	45	93	40	56
26	212	e150	e64	e54	e50	375	739	288	41	86	81	49
27	197	e130	e61	e53	e50	345	703	246	38	83	100	46
28	177	e130	e60	e52	e50	349	687	513	39	71	99	42
29	168	e125	e60	e52	---	357	672	687	41	61	83	39
30	162	e125	e58	e52	---	309	656	615	39	53	69	63
31	142	---	e56	e52	---	298	---	504	---	48	60	---
TOTAL	3726	3369	2692	1665	1386	8802	14021	14451	3491	2557	1622	1281
MEAN	120	112	86.8	53.7	49.5	284	467	466	116	82.5	52.3	42.7
MAX	222	202	122	54	52	641	789	687	386	250	100	63
MIN	46	69	56	52	48	50	211	246	38	31	23	28
CFSM	.70	.66	.51	.31	.29	1.66	2.73	2.73	.68	.48	.31	.25
IN.	.81	.73	.59	.36	.30	1.91	3.05	3.14	.76	.56	.35	.28

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1913 - 1995, BY WATER YEAR (WY)

	MEAN	180	195	117	70.4	62.0	160	759	455	212	127	81.4	128
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	111	24.4	8.00	7.86	4.63	
(WY)	1977	1977	1977	1977	1977	1956	1946	1977	1988	1988	1976	1976	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1913 - 1995

ANNUAL TOTAL	53502	59063	211
ANNUAL MEAN	147	162	311
HIGHEST ANNUAL MEAN			1968
LOWEST ANNUAL MEAN			104
HIGHEST DAILY MEAN	1290	789	4450
LOWEST DAILY MEAN	29	23	2.7
ANNUAL SEVEN-DAY MINIMUM	33	32	3.2
INSTANTANEOUS PEAK FLOW		808	4630
INSTANTANEOUS PEAK STAGE		6.37	11.63
INSTANTANEOUS LOW FLOW		22	2.7
ANNUAL RUNOFF (CFSM)	.86	.95	1.23
ANNUAL RUNOFF (INCHES)	11.64	12.85	16.78
10 PERCENT EXCEEDS	283	497	519
50 PERCENT EXCEEDS	83	73	100
90 PERCENT EXCEEDS	42	42	31

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04041500 STURGEON RIVER NEAR ALSTON, MI

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

DRAINAGE AREA.--346 mi².

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

GAGE.--Water-stage recorder. 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. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	461	303	277	174	180	206	548	861	699	175	151	148
2	361	303	293	165	179	253	525	779	667	170	172	149
3	271	301	293	165	182	247	501	779	644	166	161	149
4	227	236	293	176	179	248	520	701	545	162	178	150
5	227	180	293	172	179	226	547	817	606	160	154	159
6	226	202	301	162	174	224	546	737	696	138	150	159
7	226	246	315	163	169	246	511	673	692	155	149	160
8	226	255	301	178	168	245	473	629	684	177	149	160
9	226	246	245	189	168	243	474	772	647	200	151	162
10	226	246	220	179	168	243	466	696	591	203	159	161
11	225	246	244	157	168	242	481	840	551	197	172	161
12	225	221	228	151	168	240	580	732	322	188	176	161
13	201	215	194	173	168	261	801	831	224	186	174	160
14	183	217	186	189	158	910	952	829	381	192	206	160
15	183	215	195	189	152	1290	877	747	408	166	200	159
16	183	200	224	187	161	1290	811	941	379	207	160	158
17	183	192	234	183	165	1140	759	920	404	218	148	157
18	175	180	229	183	165	953	712	1010	257	248	148	100
19	247	212	239	172	165	876	895	787	236	285	148	30
20	308	212	237	173	165	726	1130	776	340	380	148	47
21	307	238	212	183	165	642	1120	582	269	459	148	59
22	303	482	230	183	165	740	973	481	287	454	148	48
23	558	522	224	174	165	837	812	540	449	411	143	54
24	663	432	202	165	165	740	916	614	400	356	137	41
25	636	317	202	165	165	644	1150	663	327	325	135	51
26	548	285	202	165	165	643	1240	656	228	281	135	46
27	395	248	202	165	165	596	1090	653	183	250	158	48
28	298	249	192	165	165	612	957	655	177	104	395	45
29	315	238	185	178	---	635	957	1150	192	78	464	43
30	315	246	185	187	---	634	956	1150	183	130	287	48
31	309	---	185	186	---	584	---	748	---	141	178	---
TOTAL	9437	7885	7262	5396	4701	17616	23280	23749	12668	6962	5582	3333
MEAN	304	263	234	174	168	568	776	766	422	225	180	111
MAX	663	522	315	189	182	1290	1240	1150	699	459	464	162
MIN	175	180	185	151	152	206	466	481	177	78	135	30
CFSM	.88	.76	.68	.50	.49	1.64	2.24	2.21	1.22	.65	.52	.32
IN.	1.01	.85	.78	.58	.51	1.89	2.50	2.55	1.36	.75	.60	.36

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1995, BY WATER YEAR (WY)

	346	384	269	211	199	368	1156	791	439	304	228	277
MEAN	346	384	269	211	199	368	1156	791	439	304	228	277
MAX	973	1001	433	380	412	1255	2093	1750	973	894	595	1056
(WY)	1986	1989	1988	1969	1984	1973	1960	1965	1944	1968	1978	1968
MIN	99.4	120	101	111	133	164	420	265	138	94.2	100	70.9
(WY)	1949	1949	1977	1977	1964	1940	1987	1988	1988	1988	1976	1976

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1932 - 1995

ANNUAL TOTAL	119914	127871	416
ANNUAL MEAN	329	350	582
HIGHEST ANNUAL MEAN			247
LOWEST ANNUAL MEAN			1960
HIGHEST DAILY MEAN	1970	Apr 27	1290
LOWEST DAILY MEAN	118	Aug 16	30
ANNUAL SEVEN-DAY MINIMUM	134	Aug 15	46
INSTANTANEOUS PEAK FLOW			1760
INSTANTANEOUS PEAK STAGE			6.51
ANNUAL RUNOFF (CFSM)	.95		1.01
ANNUAL RUNOFF (INCHES)	12.89		13.75
10 PERCENT EXCEEDS	641		777
50 PERCENT EXCEEDS	224		226
90 PERCENT EXCEEDS	167		151
			138
			841
			265
			16.34
			1.20
			(c)13.75
			7360
			(a)1.0
			6820
			Mar 15
			Sep 19
			Sep 24
			May 29
			May 29
			Apr 25 1960
			(b)
			Aug 14 1960
			Apr 24 1960
			Apr 24 1960

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

(b) Aug. 14-19, 1960.

(c) Present datum.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04043050 TRAP ROCK RIVER NEAR LAKE LINDEN, MI

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

DRAINAGE AREA.--28.0 mi².

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

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

REMARKS.--Records excellent 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	18	22	16	e15	14	51	114	37	12	10	17
2	16	17	22	16	e15	14	48	103	31	12	10	13
3	17	17	e22	15	15	14	e48	96	27	16	10	12
4	15	16	e22	e15	14	14	e49	87	24	23	10	13
5	14	16	e22	e15	e14	14	e48	78	23	17	10	15
6	13	16	e21	e15	15	14	e47	69	22	22	10	16
7	13	16	e21	e15	15	e14	47	56	25	25	9.8	21
8	17	15	e21	e15	15	e14	e47	47	26	21	9.7	16
9	17	15	e20	e15	15	14	e46	57	23	18	9.7	13
10	16	15	e20	15	15	14	46	81	21	16	9.7	12
11	15	14	e19	e15	15	15	52	59	20	16	9.3	12
12	14	14	e19	e15	15	17	101	47	18	15	9.0	12
13	13	15	19	e16	15	34	136	53	17	15	13	12
14	13	17	19	e16	15	91	129	338	16	16	12	12
15	13	16	19	e16	e15	152	130	146	16	18	11	11
16	13	15	19	e16	e15	161	117	110	15	17	9.8	50
17	14	14	19	e16	e15	117	88	114	15	16	9.7	43
18	16	15	19	e16	15	85	104	73	15	16	9.7	26
19	18	15	19	e16	15	68	103	62	14	15	9.4	20
20	16	16	19	16	15	74	114	51	13	19	9.1	19
21	15	52	e19	e16	15	87	119	61	13	16	8.6	18
22	16	66	19	e16	15	86	134	63	13	16	8.5	19
23	29	53	e20	16	15	69	161	117	12	16	8.3	21
24	41	28	e20	16	15	66	150	73	12	14	8.8	20
25	43	26	e20	16	15	e65	142	55	12	13	10	19
26	36	e25	e19	16	15	64	162	44	12	13	12	17
27	28	21	19	16	15	63	186	38	13	12	11	16
28	24	e21	18	15	15	e62	160	85	13	12	9.9	15
29	23	e21	e17	15	---	e60	149	111	13	11	9.6	15
30	20	e22	17	15	---	60	144	67	12	11	14	26
31	18	---	17	15	---	54	---	47	---	11	33	---
TOTAL	593	647	608	482	418	1690	3058	2602	543	490	334.6	551
MEAN	19.1	21.6	19.6	15.5	14.9	54.5	102	83.9	18.1	15.8	10.8	18.4
MAX	43	66	22	16	15	161	186	338	37	25	33	50
MIN	13	14	17	15	14	14	46	38	12	11	8.3	11
CFSM	.68	.77	.70	.56	.53	1.95	3.64	3.00	.65	.56	.39	.66
IN.	.79	.86	.81	.64	.56	2.25	4.06	3.46	.72	.65	.44	.73

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1995, BY WATER YEAR (WY)

MEAN	32.3	40.5	26.8	20.8	20.2	42.6	180	75.9	37.4	21.6	17.8	23.4
MAX	94.6	134	43.9	33.2	42.8	112	283	223	117	63.5	70.2	92.5
(WY)	1986	1989	1988	1969	1984	1973	1976	1972	1968	1968	1988	1968
MIN	8.71	9.66	9.28	9.03	9.00	16.1	70.3	22.0	11.7	11.4	9.78	9.57
(WY)	1977	1977	1977	1977	1977	1972	1987	1977	1977	1967	1970	1976

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1967 - 1995

ANNUAL TOTAL	13042.0	12016.6	
ANNUAL MEAN	35.7	32.9	
HIGHEST ANNUAL MEAN			44.8
LOWEST ANNUAL MEAN			62.6
HIGHEST DAILY MEAN	426	338	1120
LOWEST DAILY MEAN	9.7	8.3	6.8
ANNUAL SEVEN-DAY MINIMUM	9.9	8.9	7.1
INSTANTANEOUS PEAK FLOW		451	1590
INSTANTANEOUS LOW FLOW		7.55	10.72
ANNUAL RUNOFF (CFSM)	1.28	6.6	(a)1.7
ANNUAL RUNOFF (INCHES)	17.33	1.18	1.60
10 PERCENT EXCEEDS	59	15.96	21.75
50 PERCENT EXCEEDS	18	85	91
90 PERCENT EXCEEDS	13	16	22
		12	12

(a) Result of ice jam upstream.

(e) Estimated.

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 power house 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. Elevation of gage is 785 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges and discharges below 1.0 ft³/s, which are poor. Flow completely regulated by powerplant at station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68	123	120	169	108	113	197	206	240	149	123	e80
2	68	122	119	168	108	113	194	205	251	142	130	e78
3	95	121	118	167	108	113	192	212	212	137	133	e70
4	115	122	118	158	109	112	191	216	203	127	135	e62
5	116	121	118	142	109	112	196	212	224	119	134	e56
6	115	120	118	130	109	146	188	212	227	111	135	e50
7	137	121	119	132	111	164	186	209	232	92	133	e54
8	115	126	120	132	111	165	188	207	238	102	134	e56
9	116	128	119	132	110	185	190	216	243	82	134	e63
10	117	127	120	132	110	184	188	246	209	40	133	e64
11	118	126	120	127	111	179	189	258	209	.40	132	e64
12	118	125	120	122	112	188	188	245	221	.37	135	e64
13	119	125	118	123	111	197	189	210	220	.39	135	e64
14	117	125	117	122	108	202	188	209	224	.50	134	e64
15	117	125	117	123	95	203	189	242	230	.91	133	e64
16	116	126	117	123	110	203	189	244	232	.62	133	e64
17	116	126	117	120	112	202	195	242	211	.47	135	e64
18	116	126	117	116	112	200	205	209	199	.99	134	e64
19	116	127	145	116	111	199	204	237	190	.69	134	e64
20	117	127	169	111	113	198	190	217	201	180	133	e64
21	117	127	170	108	114	198	195	217	205	179	133	e64
22	116	129	170	108	112	202	202	218	204	178	132	e64
23	117	129	170	108	112	205	201	241	204	179	128	e64
24	117	129	170	108	113	201	203	238	180	70	127	e64
25	117	129	170	108	113	194	203	237	181	.21	73	e64
26	117	129	168	109	114	191	203	236	186	.07	66	e64
27	117	129	169	109	113	183	203	204	181	.01	66	e64
28	120	131	169	108	113	183	204	229	172	71	e120	e64
29	122	132	169	109	---	192	205	238	163	166	e115	64
30	122	123	169	109	---	192	206	246	154	151	e100	64
31	123	---	169	108	---	195	---	227	---	112	e85	---
TOTAL	3537	3776	4309	3857	3092	5514	5861	6985	6246	2507.47	3807	1913
MEAN	114	126	139	124	110	178	195	225	208	80.9	123	63.8
MAX	137	132	170	169	114	205	206	258	251	180	135	80
MIN	68	120	117	108	95	112	186	204	154	.01	66	50

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 1995, BY WATER YEAR (WY)

	1990	1991	1992	1993	1994	1995	1990	1991	1992	1993	1994	1995
MEAN	129	187	203	156	153	215	263	242	182	142	81.3	80.5
MAX	213	295	304	190	181	256	323	347	262	235	123	109
(WY)	1991	1991	1992	1992	1993	1992	1991	1993	1990	1992	1995	1992
MIN	83.3	126	139	124	110	178	195	189	73.7	80.9	35.9	57.3
(WY)	1992	1995	1995	1995	1995	1995	1995	1994	1991	1995	1990	1993

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1990 - 1995

ANNUAL TOTAL	55413.00	51404.47	
ANNUAL MEAN	152	141	170
HIGHEST ANNUAL MEAN			194
LOWEST ANNUAL MEAN			141
HIGHEST DAILY MEAN	319	258	360
LOWEST DAILY MEAN	.00	.01	.00
ANNUAL SEVEN-DAY MINIMUM	48	6.2	.11
10 PERCENT EXCEEDS	212	211	338
50 PERCENT EXCEEDS	134	127	169
90 PERCENT EXCEEDS	116	64	58

(a) June 13-18, 1992, Aug. 23-25, 1994.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE SUPERIOR

04044609 SAND RIVER WILDLIFE FLOODING AT SAND RIVER, MI

LOCATION.--Lat 46°29'14", long 87°07'30", in SW1/4 NE1/4 sec.12, T.47 N., R.23 W., Marquette County, Hydrologic Unit 04020201, on right bank at dam at Sand River. 1.2 mi upstream from mouth.

DRAINAGE AREA.--28.6 mi². Area of Sand River Wildlife Flooding is 0.6 mi².

PERIOD OF RECORD.--October 1983 to current year (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is 600.0 ft above sea level (Michigan Department of Natural Resources bench mark).

REMARKS.--Pond level regulated by concrete dam with two 20-foot stop-log bays and a 20-foot radial gate. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 11.84 ft, Nov. 6, 1988; minimum, 4.78 ft, Feb. 10, 11, 1994.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 9.94 ft, May 30, 31; minimum, 4.93 ft, Feb. 14, 15.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.54	9.21	5.07	5.03	4.98	4.95	5.42	5.35	9.80	8.22	9.13	8.50
2	8.57	9.22	5.07	5.03	4.98	4.94	5.40	5.32	9.26	8.22	9.10	8.48
3	8.58	9.18	5.08	5.01	4.98	4.94	5.41	5.28	8.73	8.24	9.09	8.46
4	8.57	9.16	5.12	4.98	4.98	4.94	5.42	5.59	8.18	8.24	9.13	8.43
5	8.57	9.15	5.21	4.97	4.97	4.94	5.37	6.54	7.68	8.22	9.11	8.41
6	8.58	9.14	5.24	4.97	4.97	4.95	5.36	7.05	7.74	8.21	9.08	8.44
7	8.58	9.15	5.23	4.97	4.97	4.96	5.35	7.38	7.83	8.17	9.05	8.68
8	8.53	9.15	5.19	4.96	4.97	4.96	5.39	7.65	7.91	8.17	9.01	8.77
9	8.49	9.14	5.19	4.95	4.97	4.96	5.35	7.93	7.97	8.15	9.02	8.81
10	8.46	9.12	5.15	4.95	4.97	4.96	5.29	8.26	8.04	8.13	8.99	8.84
11	8.47	9.14	5.10	4.95	4.96	4.97	5.32	8.55	8.16	8.12	8.96	8.85
12	8.43	9.11	5.10	4.95	4.95	5.08	5.53	8.77	8.24	8.13	8.92	8.85
13	8.40	9.11	5.09	4.96	4.95	5.45	5.70	8.92	8.31	8.16	8.94	8.83
14	8.38	9.11	5.08	4.97	4.94	5.87	5.70	9.06	8.34	8.19	8.95	8.82
15	8.36	9.08	5.08	4.98	4.94	6.32	5.60	9.16	8.37	8.30	8.92	8.84
16	8.34	8.61	5.07	4.98	4.94	6.58	5.52	9.27	8.38	8.39	8.89	8.87
17	8.35	5.73	5.07	4.98	4.94	6.45	5.48	9.33	8.37	8.50	8.87	8.87
18	8.41	5.02	5.09	4.99	4.94	6.14	5.58	9.38	8.36	8.64	8.85	8.89
19	8.44	4.97	5.09	4.98	4.95	6.00	6.29	9.43	8.34	8.77	8.81	8.91
20	8.45	5.00	5.09	4.98	4.95	6.03	6.34	9.46	8.32	9.01	8.78	8.97
21	8.48	5.07	5.09	4.99	4.95	6.60	6.04	9.48	8.30	9.29	8.73	9.03
22	8.51	5.06	5.09	5.00	4.95	6.75	5.91	9.49	8.28	9.44	8.70	9.17
23	8.61	5.05	5.12	5.00	4.96	6.38	5.77	9.49	8.26	9.46	8.67	9.36
24	8.68	5.04	5.13	5.00	4.96	6.05	5.67	9.48	8.23	9.47	8.62	9.48
25	8.76	5.03	5.12	4.99	4.96	5.87	5.63	9.47	8.20	9.46	8.65	9.53
26	8.89	5.03	5.11	4.99	4.95	5.78	5.58	9.46	8.18	9.42	8.63	9.52
27	9.06	5.03	5.10	4.97	4.95	5.70	5.54	9.46	8.17	9.37	8.63	9.51
28	9.17	5.07	5.11	4.97	4.95	5.65	5.51	9.56	8.19	9.31	8.60	9.49
29	9.20	5.09	5.08	4.96	---	5.61	5.47	9.79	8.19	9.26	8.58	9.45
30	9.23	5.07	5.07	4.96	---	5.55	5.41	9.92	8.20	9.21	8.57	9.44
31	9.22	---	5.06	4.97	---	5.47	---	9.92	---	9.15	8.53	---
MEAN	8.62	7.23	5.11	4.98	4.96	5.61	5.58	8.49	8.28	8.68	8.86	8.95
MAX	9.23	9.22	5.24	5.03	4.98	6.75	6.34	9.92	9.80	9.47	9.13	9.53
MIN	8.34	4.97	5.06	4.95	4.94	4.94	5.29	5.28	7.68	8.12	8.53	8.41
CAL YR 1994	MEAN 7.09	MAX 9.69	MIN 4.78									
WTR YR 1995	MEAN 7.13	MAX 9.92	MIN 4.94									

STREAMS TRIBUTARY TO LAKE SUPERIOR

04044724 AU TRAIN RIVER AT FOREST LAKE, MI

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

DRAINAGE AREA.--81 mi², approximately.

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

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	50	26	26	71	58	57	130	147	145	31	72	66
2	50	26	26	70	58	57	131	146	144	30	72	67
3	50	26	27	70	58	57	132	146	131	30	72	66
4	50	26	40	70	58	57	128	141	98	30	73	66
5	50	26	60	70	58	57	133	106	79	30	73	63
6	50	26	55	70	58	57	133	84	78	29	72	59
7	50	26	47	70	58	57	132	83	65	29	72	58
8	50	26	74	70	58	57	133	82	56	29	72	57
9	50	25	73	70	58	57	133	82	56	29	72	57
10	50	25	73	70	58	57	133	81	56	29	73	57
11	50	25	72	70	58	57	134	81	55	29	73	57
12	39	25	96	70	58	57	135	82	55	29	73	58
13	28	26	113	70	58	65	134	81	51	29	73	57
14	28	26	112	64	58	71	123	82	47	29	72	57
15	28	25	100	58	58	72	114	82	46	29	73	57
16	28	25	90	58	58	72	114	84	46	29	72	57
17	27	25	90	58	58	72	114	84	46	41	72	57
18	26	26	90	58	58	72	115	84	46	49	69	57
19	25	25	79	58	58	72	134	84	40	50	66	49
20	25	25	71	58	58	73	145	83	36	50	66	43
21	25	25	71	58	58	92	145	83	36	50	66	43
22	26	25	71	58	57	110	145	82	33	51	66	44
23	26	25	71	58	57	120	145	82	31	50	66	43
24	25	25	71	58	57	129	144	81	31	55	66	43
25	26	25	71	58	57	129	144	80	31	64	66	43
26	26	25	71	58	57	130	144	79	30	64	66	42
27	25	25	71	58	57	130	145	79	31	64	66	42
28	25	26	71	58	57	131	146	79	31	67	66	42
29	26	25	71	58	---	131	147	112	30	71	66	42
30	26	25	71	58	---	131	147	134	30	72	66	42
31	26	---	71	58	---	130	---	146	---	72	66	---
TOTAL	1086	762	2195	1961	1617	2616	4032	2962	1690	1340	2158	1591
MEAN	35.0	25.4	70.8	63.3	57.7	84.4	134	95.5	56.3	43.2	69.6	53.0
MAX	50	26	113	71	58	131	147	147	145	72	73	67
MIN	25	25	26	58	57	57	114	79	30	29	66	42
CFSM	43	31	87	78	71	104	166	1.18	70	53	86	65
IN.	50	35	1.01	90	74	1.20	1.85	1.36	78	62	99	73

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1995, BY WATER YEAR (WY)

	MEAN	74.5	80.7	73.2	67.4	64.0	92.5	108	75.5	53.8	49.4	57.5	58.2
MAX	114	136	75.7	71.5	70.2	101	134	95.5	56.3	55.5	69.6	63.4	
(WY)	1994	1994	1994	1994	1994	1994	1995	1995	1995	1994	1995	1994	
MIN	35.0	25.4	70.8	63.3	57.7	84.4	82.6	55.4	51.3	43.2	45.5	53.0	
(WY)	1995	1995	1995	1995	1995	1995	1994	1994	1994	1995	1994	1995	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1994 - 1995

ANNUAL TOTAL	22111		24010									
ANNUAL MEAN	60.6		65.8							71.3		
HIGHEST ANNUAL MEAN										76.8		1994
LOWEST ANNUAL MEAN										65.8		1995
HIGHEST DAILY MEAN	134	Mar 23	147	Apr 29						147	Apr 29 1995	
LOWEST DAILY MEAN	25	Oct 19	25	(a)						25	(a)	
ANNUAL SEVEN-DAY MINIMUM	25	Nov 19	25	Nov 19						25	Nov 19 1994	
INSTANTANEOUS PEAK FLOW			150	May 31						150	May 31 1995	
INSTANTANEOUS PEAK STAGE			3.82	May 31						3.86	Oct 21 1993	
ANNUAL RUNOFF (CFSM)	.75		.81							.88		
ANNUAL RUNOFF (INCHES)	10.15		11.03							11.96		
10 PERCENT EXCEEDS	78		130							133		
50 PERCENT EXCEEDS	65		58							67		
90 PERCENT EXCEEDS	26		26							31		

(a) On several days in October and November, 1994.

[illegible]

STREAMS TRIBUTARY TO LAKE SUPERIOR

04044796 MUSKALLONGE LAKE NEAR DEER PARK, MI

LOCATION.--Lat 46°40'34", long 85°37'35", in SE1/4 NW1/4 sec.1, T.49 N., R.11 W., Luce County, Hydrologic Unit 04020201, at Muskallonge Lake State Park, 0.5 mi west of Deer Park.

DRAINAGE AREA.--11 mi², approximately.

PERIOD OF RECORD.--October 1958 to September 1964, May 1971 to September 1982, October 1992 to current year.

GAGE.--Nonrecording gage. Datum of gage is 612.98 ft above sea level.

REMARKS.--Staff gage read by observer. The inlet to Muskallonge Lake is Trout Creek. There is no continuous outlet, however during periods of high lake level, water flows through an intermittent stream channel to Cranberry Lake. Surface area of lake is 786 acres.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 22.32 ft, May 23, 1979, Feb. 16, 1994; minimum observed, 18.65 ft, Aug. 4, 1964.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 21.64 ft, May 1; minimum observed, 20.88 ft, Aug. 23, 28.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21.28	---	---	---	---	---	---	21.64	---	21.12	---	---
2	---	---	---	---	---	---	---	---	21.40	---	---	---
3	---	---	---	---	---	---	---	---	---	---	21.16	---
4	21.24	21.32	---	---	---	---	---	---	---	21.12	---	---
5	---	---	---	---	---	---	---	21.60	---	---	---	20.98
6	---	---	---	---	---	---	---	---	21.31	21.12	---	---
7	21.24	---	---	---	---	---	---	---	---	---	21.12	---
8	---	21.32	21.47	---	---	---	---	21.54	---	---	---	20.98
9	---	---	---	---	---	---	---	---	---	---	---	---
10	---	21.32	---	---	---	---	21.60	---	---	---	---	---
11	21.26	---	---	---	---	---	---	21.52	---	21.12	21.08	---
12	---	---	---	---	---	---	---	---	21.24	---	---	20.96
13	---	---	---	---	---	---	21.60	---	---	---	---	---
14	21.26	21.34	---	---	---	---	---	---	---	21.14	---	---
15	---	---	---	---	---	---	---	21.50	---	---	---	20.94
16	---	---	---	---	---	21.72	---	---	21.20	---	21.04	---
17	21.28	---	---	---	---	---	---	---	---	21.20	---	---
18	---	21.34	---	---	---	---	21.58	---	---	---	---	20.98
19	21.28	---	---	---	---	---	---	21.48	21.14	21.24	20.98	---
20	21.32	---	---	---	---	---	---	---	---	---	---	---
21	21.28	21.34	---	---	---	---	21.58	---	---	---	20.96	---
22	---	---	---	---	---	---	---	21.46	21.08	---	---	20.98
23	---	21.34	---	---	---	---	---	---	---	---	20.88	---
24	21.28	---	---	21.28	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	21.42	---	21.26	---	---
26	---	---	---	---	---	---	21.60	---	21.02	---	---	20.98
27	21.28	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	21.62	---	---	21.18	20.88	20.98
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	21.42	21.00	---	---	---
31	21.32	---	---	---	---	---	---	---	---	21.16	20.98	---

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 (Big) Falls, 11.5 mi west of Paradise, and 19 mi northeast of Newberry.

DRAINAGE AREA.--790 mi².

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

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	476	755	901	525	373	365	2180	2520	919	364	285	235
2	468	730	913	490	375	367	2080	2480	887	386	291	239
3	448	689	941	452	371	366	1990	2400	814	394	296	240
4	431	659	964	425	363	360	1890	2280	709	373	300	243
5	417	639	1010	405	364	361	1830	2130	635	359	320	237
6	405	642	1040	397	357	365	1730	1980	564	352	350	251
7	395	712	999	394	347	367	1640	1850	493	324	365	298
8	385	731	989	394	341	363	1530	1710	464	321	364	389
9	415	741	973	387	336	361	1440	1570	447	301	353	439
10	468	732	903	378	337	361	1400	1440	420	292	332	465
11	517	718	813	372	339	362	1340	1310	441	275	309	454
12	523	684	753	369	341	375	1370	1220	480	264	299	420
13	513	664	688	369	339	439	1420	1120	483	245	299	377
14	505	674	647	380	339	591	1460	1030	466	236	318	351
15	491	685	620	390	343	788	1510	999	430	240	325	343
16	476	703	600	397	344	993	1530	985	387	254	322	341
17	472	701	583	409	341	1140	1510	997	352	284	310	345
18	548	709	570	419	341	1280	1490	1020	319	305	296	371
19	679	661	561	419	339	1430	1680	1020	290	321	279	382
20	769	649	550	423	344	1550	1870	1000	279	344	268	423
21	826	663	551	426	346	1730	1970	968	263	390	247	475
22	843	779	566	424	352	1880	2090	923	248	428	239	506
23	863	867	599	422	355	2010	2140	884	235	486	230	547
24	884	919	622	422	358	2140	2130	867	226	523	220	573
25	895	946	631	422	362	2240	2110	857	214	499	219	584
26	913	912	645	421	367	2290	2070	831	213	472	219	575
27	930	896	636	417	365	2320	2010	790	226	440	225	558
28	917	863	628	413	362	2340	2300	745	246	397	230	539
29	866	882	608	400	---	2330	2430	767	292	353	228	507
30	841	901	560	386	---	2320	2500	841	328	331	232	474
31	798	---	541	377	---	2260	---	904	---	293	234	---
TOTAL	19377	22496	22605	12724	9841	36444	54640	40438	12770	10846	8804	12181
MEAN	625	750	729	410	351	1176	1821	1304	426	350	284	406
MAX	930	946	1040	525	375	2340	2500	2520	919	523	365	584
MIN	385	639	541	369	336	360	1340	745	213	236	219	235
CFSM	.79	.95	.92	.52	.44	1.49	2.31	1.65	.54	.44	.36	.51
IN.	.91	1.06	1.06	.60	.46	1.72	2.57	1.90	.60	.51	.41	.57

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1995, BY WATER YEAR (WY)

MEAN	852	1024	789	491	460	724	2743	1675	698	502	425	628
MAX	1768	2284	1756	983	809	1710	4575	4511	1736	1081	1126	1623
(WY)	1979	1989	1967	1983	1984	1973	1976	1960	1974	1956	1973	1970
MIN	256	420	339	303	279	335	1537	511	243	209	217	249
(WY)	1964	1977	1977	1963	1963	1956	1987	1986	1988	1963	1991	1955

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1953 - 1995

ANNUAL TOTAL	289818	263166	918
ANNUAL MEAN	794	721	1294
HIGHEST ANNUAL MEAN			1971
LOWEST ANNUAL MEAN			1963
HIGHEST DAILY MEAN	4070	2520	May 10 1960
LOWEST DAILY MEAN	305	213	Jun 26 1988
ANNUAL SEVEN-DAY MINIMUM	309	224	Aug 23 1988
INSTANTANEOUS PEAK FLOW		2530	May 1 1960
INSTANTANEOUS PEAK STAGE		6.99	May 1 1960
INSTANTANEOUS LOW FLOW		205	Jun 25 (a)
ANNUAL RUNOFF (CFSM)	1.01	.91	1.16
ANNUAL RUNOFF (INCHES)	13.65	12.39	15.78
10 PERCENT EXCEEDS	1270	1690	1900
50 PERCENT EXCEEDS	582	476	578
90 PERCENT EXCEEDS	364	288	302

(a) July 26, 1955, July 8, 1988.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04046000 BLACK RIVER NEAR GARNET, MI

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

DRAINAGE AREA.--28 mi², approximately.

PERIOD OF RECORD.--September 1951 to September 1978, October 1978 to September 1994 (operated as a crest-stage partial-record station), October 1994 to September 1995.

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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	15	25	13	e7.0	e6.8	43	59	30	9.4	9.4	5.2
2	12	14	e25	12	e7.0	e6.8	42	52	26	8.3	8.7	5.2
3	12	14	26	11	e7.0	6.8	e40	46	23	7.9	8.2	5.3
4	12	13	27	e10	e7.0	6.8	e38	42	20	7.7	7.8	5.9
5	11	13	30	e10	e7.0	6.8	e36	40	19	7.6	7.5	7.5
6	11	18	28	9.7	e7.0	e6.8	36	38	17	7.7	7.3	8.9
7	11	20	24	9.4	e7.0	e6.8	34	35	16	7.5	7.0	14
8	11	19	22	9.3	e7.0	e7.0	34	33	15	7.4	6.8	8.3
9	12	18	21	8.9	e7.0	e7.0	33	32	14	7.1	6.7	7.4
10	12	16	20	8.5	e7.0	7.0	32	30	14	6.8	6.6	7.0
11	12	16	18	8.5	e7.0	7.0	31	29	17	6.7	6.6	6.7
12	12	15	18	8.9	e7.0	7.8	45	28	14	6.6	6.5	6.6
13	11	15	17	9.2	7.1	10	48	26	13	6.9	8.0	6.8
14	11	24	16	9.7	7.2	16	43	32	12	6.9	7.9	7.3
15	10	23	16	9.7	7.2	21	39	31	12	10	7.1	6.8
16	10	21	16	9.3	7.2	25	37	29	11	10	6.6	7.6
17	11	20	16	8.9	7.2	23	35	30	11	11	6.4	8.0
18	20	19	15	8.9	7.2	22	40	27	10	9.9	6.1	7.4
19	22	18	15	8.9	7.2	23	77	25	9.8	9.1	6.0	7.6
20	20	17	16	8.9	7.4	29	65	23	9.5	19	5.8	10
21	18	25	17	8.9	7.3	45	57	23	9.3	16	5.5	8.9
22	18	35	17	8.9	7.3	48	57	22	9.0	16	5.4	8.6
23	21	29	17	8.7	7.3	50	50	25	8.9	17	5.4	10
24	20	25	17	8.5	7.2	54	46	25	8.7	14	5.5	9.9
25	19	24	16	8.5	7.1	56	43	23	8.5	12	5.5	10
26	19	22	15	8.5	e7.0	56	41	21	8.5	11	5.9	11
27	18	20	15	e7.2	6.9	57	53	19	8.9	9.4	5.8	9.8
28	17	e23	e14	e7.2	6.8	55	87	29	9.0	8.9	5.6	9.3
29	17	e26	14	e7.2	---	54	80	45	9.1	8.2	5.4	8.8
30	16	27	14	e7.2	---	51	67	42	10	7.6	5.3	8.4
31	15	---	13	e7.2	---	46	---	35	---	7.4	5.5	---
TOTAL	455	604	580	280.7	198.6	824.4	1409	996	403.2	301.0	203.8	244.2
MEAN	14.7	20.1	18.7	9.05	7.09	26.6	47.0	32.1	13.4	9.71	6.57	8.14
MAX	22	35	30	13	7.4	57	87	59	30	19	9.4	14
MIN	10	13	13	7.2	6.8	31	19	8.5	6.6	5.3	5.2	5.2
CFSM	.52	.72	.67	.32	.25	.95	1.68	1.15	.48	.35	.23	.29
IN.	.60	.80	.77	.37	.26	1.10	1.87	1.32	.54	.40	.27	.32

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1995, BY WATER YEAR (WY)

	MEAN	23.9	31.4	25.1	15.6	13.3	21.9	91.1	48.0	25.4	18.4	14.3	20.1
MAX	68.0	69.9	60.0	26.0	24.7	61.7	168	141	75.3	38.6	38.7	65.5	65.5
(WY)	1960	1978	1971	1967	1966	1953	1971	1960	1974	1952	1973	1970	1970
MIN	6.06	7.12	7.75	7.09	7.09	7.43	46.0	19.4	12.0	7.65	6.57	6.44	6.44
(WY)	1964	1977	1977	1977	1995	1956	1961	1955	1964	1955	1955	1955	1955

SUMMARY STATISTICS

FOR 1995 WATER YEAR

WATER YEARS 1952 - 1995

ANNUAL TOTAL	6499.9												
ANNUAL MEAN	17.8						29.0						
HIGHEST ANNUAL MEAN							49.9		1971				
LOWEST ANNUAL MEAN							15.6		1963				
HIGHEST DAILY MEAN	87						752		May 7 1960				
LOWEST DAILY MEAN	5.2					Apr 28	5.2		Sep 1 1995				
ANNUAL SEVEN-DAY MINIMUM	5.4					Sep 1	5.4		Aug 28 1995				
INSTANTANEOUS PEAK FLOW	90					Apr 28	(a)860		May 7 1960				
INSTANTANEOUS PEAK STAGE	3.92					Apr 28	8.55		May 7 1960				
INSTANTANEOUS LOW FLOW	5.1					(b)	4.9		Mar 11 1956				
ANNUAL RUNOFF (CFSM)	.64						1.04						
ANNUAL RUNOFF (INCHES)	8.64						14.08						
10 PERCENT EXCEEDS	40						58						
50 PERCENT EXCEEDS	12						17						
90 PERCENT EXCEEDS	6.8						8.7						

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

(b) Aug. 22, 31, Sept. 1, 2, 4.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04056500 MANISTIQUE RIVER NEAR MANISTIQUE, MI

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

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

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

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

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	695	868	1180	e610	e630	e590	2480	2710	1470	614	654	454
2	667	838	1250	e600	e620	e590	2380	2660	1350	609	719	443
3	630	814	1330	e600	e610	e590	2280	2550	1240	595	800	446
4	602	801	1280	e600	e600	e600	2230	2400	1150	579	839	437
5	577	797	1320	e600	e590	e600	2130	2250	1080	566	828	441
6	555	802	1290	e590	e580	e600	2030	2110	1020	564	805	480
7	538	820	1290	e590	e580	e600	1990	1970	983	586	763	605
8	524	843	1240	e590	e580	e600	1970	1860	960	611	705	746
9	522	840	1200	e590	e580	e600	1920	1760	948	602	654	824
10	542	817	1080	e590	e580	e600	1880	1690	909	585	620	814
11	582	790	944	e600	e580	e610	1820	1640	921	556	593	741
12	614	773	e850	e600	e580	e620	1770	1560	984	523	578	682
13	607	761	e780	e610	e580	e640	1800	1490	1010	517	589	635
14	587	780	e740	e620	e580	e740	1870	1450	949	522	603	599
15	566	826	e700	e620	e590	e1000	1920	1480	879	567	627	576
16	548	875	e680	e620	e600	e2200	1930	1520	824	603	629	583
17	540	884	e660	e620	e600	e2600	1900	1540	777	640	603	617
18	590	859	e640	e620	e600	e2800	1880	1540	739	684	580	626
19	737	839	e620	e620	e600	e2900	2100	1490	711	724	563	643
20	949	812	e620	e620	e600	e2730	2510	1400	683	745	540	670
21	1010	832	e610	e620	e590	e2610	2790	1330	657	778	520	698
22	992	979	e620	e620	e590	e2670	2970	1280	634	842	497	719
23	966	1130	e640	e620	e590	e2760	3080	1270	617	880	478	739
24	950	1170	e660	e620	e590	e2790	3060	1290	606	879	465	788
25	949	1160	e660	e620	e590	e2800	2930	1310	591	872	463	839
26	960	1090	e680	e620	e590	e2780	2720	1290	581	836	508	844
27	971	1040	e670	e620	e590	e2770	2550	1230	577	782	519	803
28	980	1040	e660	e620	e590	e2760	2560	1220	587	726	516	751
29	959	1150	e650	e620	---	e2710	2660	1370	600	684	503	702
30	913	1200	e640	e620	---	e2630	2710	1490	603	663	480	663
31	889	---	e620	e620	---	e2560	---	1510	---	642	468	---
TOTAL	22711	27230	26804	18930	16580	52650	68820	51660	25640	20576	18709	19608
MEAN	733	908	865	611	592	1698	2294	1666	855	664	604	654
MAX	1010	1200	1330	620	630	2900	3080	2710	1470	880	839	844
MIN	522	761	610	590	580	590	1770	1220	577	517	463	437
CFSM	.67	.83	.79	.56	.54	1.54	2.09	1.51	.78	.60	.55	.59
IN.	.77	.92	.91	.64	.56	1.78	2.33	1.75	.87	.70	.63	.66

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1995, BY WATER YEAR (WY)

	MEAN	1143	1519	1266	948	849	1310	4006	2336	1313	895	683	818
MAX	2720	3777	2569	1777	1516	3358	6401	6963	4531	1783	1670	2657	
(WY)	1979	1989	1966	1966	1966	1946	1976	1960	1943	1993	1973	1978	
MIN	386	606	480	469	480	547	1962	907	602	402	384	350	
(WY)	1949	1977	1977	1977	1977	1963	1946	1987	1988	1955	1963	1948	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1938 - 1995

ANNUAL TOTAL	390097						369918						
ANNUAL MEAN	1069						1013				1423		
HIGHEST ANNUAL MEAN											2229		1960
LOWEST ANNUAL MEAN											806		1948
HIGHEST DAILY MEAN	5690					Apr 19	3080		Apr 23	16500		May 11	1960
LOWEST DAILY MEAN	437					Aug 27	437		Sep 4	290		Oct 4	1948
ANNUAL SEVEN-DAY MINIMUM	446					Aug 24	453		Aug 30	294		Sep 30	1948
INSTANTANEOUS PEAK FLOW							3100		Apr 23	16900		May 11	1960
INSTANTANEOUS PEAK STAGE							7.93		Apr 23	12.85		May 11	1960
INSTANTANEOUS LOW FLOW							432		Sep 4	288		Oct 4	1948
ANNUAL RUNOFF (CFSM)	.97						.92			1.29			
ANNUAL RUNOFF (INCHES)	13.19						12.51			17.57			
10 PERCENT EXCEEDS	1790						2160			2740			
50 PERCENT EXCEEDS	813						705			1000			
90 PERCENT EXCEEDS	527						577			560			

(e) Estimated.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.53	4.25	3.74	3.39	3.35	3.38	3.84	4.28	4.64	4.70	4.77	4.60
2	4.52	4.22	3.73	3.38	3.36	3.37	3.82	4.26	4.69	4.67	4.73	4.57
3	4.50	4.20	3.71	3.36	3.35	3.37	3.81	4.23	4.72	4.66	4.73	4.56
4	4.49	4.19	3.69	3.31	3.36	3.36	3.75	4.21	4.72	4.63	4.75	4.58
5	4.48	4.17	3.69	3.27	3.36	3.37	3.78	4.19	4.71	4.64	4.71	4.61
6	4.46	4.17	3.68	3.23	3.35	3.39	3.78	4.15	4.70	4.64	4.67	4.64
7	4.46	4.15	3.64	3.21	3.35	3.42	3.77	4.12	4.70	4.65	4.62	4.70
8	4.48	4.14	3.62	3.21	3.35	3.42	3.75	4.11	4.67	4.61	4.59	4.72
9	4.50	4.13	3.60	3.19	3.34	3.41	3.71	4.17	4.66	4.63	4.60	4.73
10	4.47	4.11	3.58	3.18	3.36	3.40	3.67	4.23	4.67	4.64	4.64	4.73
11	4.45	4.09	3.56	3.18	3.38	3.40	3.63	4.26	4.70	4.64	4.67	4.76
12	4.43	4.08	3.52	3.18	3.36	3.40	3.68	4.28	4.71	4.66	4.67	4.76
13	4.43	4.07	3.49	3.19	3.36	3.42	3.68	4.28	4.69	4.68	4.75	4.78
14	4.41	4.12	3.46	3.27	3.35	3.45	3.65	4.36	4.68	4.72	4.80	4.78
15	4.41	4.09	3.44	3.31	3.37	3.50	3.64	4.37	4.68	4.75	4.79	4.78
16	4.40	4.07	3.44	3.32	3.38	3.56	3.64	4.38	4.68	4.77	4.73	4.84
17	4.41	4.06	3.44	3.32	3.37	3.60	3.62	4.45	4.68	4.78	4.69	4.81
18	4.48	4.12	3.43	3.33	3.37	3.64	3.62	4.43	4.67	4.77	4.67	4.78
19	4.55	4.01	3.41	3.34	3.38	3.68	3.81	4.48	4.68	4.77	4.64	4.75
20	4.56	3.90	3.41	3.35	3.38	3.73	3.86	4.51	4.67	4.78	4.62	4.74
21	4.54	3.96	3.47	3.37	3.39	3.80	3.99	4.59	4.66	4.73	4.60	4.70
22	4.51	4.00	3.49	3.38	3.39	3.82	4.07	4.60	4.65	4.73	4.56	4.71
23	4.51	3.87	3.51	3.38	3.40	3.85	4.11	4.66	4.65	4.73	4.59	4.64
24	4.50	3.83	3.53	3.39	3.40	3.88	4.15	4.71	4.66	4.69	4.58	4.61
25	4.46	3.81	3.55	3.39	3.40	3.89	4.19	4.73	4.66	4.66	4.60	4.59
26	4.41	3.75	3.54	3.38	3.39	3.90	4.21	4.73	4.64	4.61	4.71	4.56
27	4.38	3.64	3.49	3.38	3.38	3.89	4.26	4.68	4.65	4.60	4.73	4.55
28	4.38	3.79	3.48	3.37	3.38	3.90	4.32	4.72	4.68	4.66	4.72	4.53
29	4.37	3.80	3.45	3.35	---	3.90	4.29	4.74	4.70	4.71	4.70	4.55
30	4.34	3.79	3.42	3.34	---	3.88	4.29	4.69	4.71	4.71	4.68	4.60
31	4.30	---	3.41	3.34	---	3.86	---	4.65	---	4.73	4.66	---
MEAN	4.46	4.02	3.54	3.31	3.37	3.61	3.88	4.43	4.68	4.69	4.68	4.68
MAX	4.56	4.25	3.74	3.39	3.40	3.90	4.32	4.74	4.72	4.78	4.80	4.84
MIN	4.30	3.64	3.41	3.18	3.34	3.36	3.62	4.11	4.64	4.60	4.56	4.53
CAL YR 1994	MEAN	4.10	MAX	5.25	MIN	3.23						
WTR YR 1995	MEAN	4.11	MAX	4.84	MIN	3.18						

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057004 MANISTIQUE RIVER ABOVE MANISTIQUE, MI

LOCATION.--Lat 45°58'18", long 86°14'35", in SE1/4 SE1/4 sec.1, T.41 N., R.16 W., Schoolcraft County, Hydrologic Unit 04060106, on right bank at Wyman State Nursery in Manistique, 0.8 mi upstream from bridge on U.S. Highway 2, 0.4 mi upstream from Manistique Paper Company Dam, 0.7 mi downstream from Indian River, and 1.8 mi upstream from mouth.

DRAINAGE AREA.--1,445 mi², approximately.

PERIOD OF RECORD.--April 1994 to October 1996 (discontinued).

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

REMARKS.--Water-discharge records fair. Slight regulation by dam on Indian River and by dam on outlet of Manistique Lake.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 6,700 ft³/s, Apr. 19, 1994; minimum daily, 553 ft³/s, Sept. 5, 1995.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	1310	e4800	1450	1190	e680	800
2	---	---	---	---	---	---	1370	e4700	1690	1170	e680	896
3	---	---	---	---	---	---	1450	e4400	1680	1120	e700	936
4	---	---	---	---	---	---	e1480	e4260	1590	1070	e720	916
5	---	---	---	---	---	---	e1500	e3800	1490	980	e720	867
6	---	---	---	---	---	---	e1580	e3200	1440	776	e700	842
7	---	---	---	---	---	---	e1650	e3000	1400	769	e650	818
8	---	---	---	---	---	---	e1680	e2800	1370	780	e650	791
9	---	---	---	---	---	---	e1700	e2600	1330	801	e680	774
10	---	---	---	---	---	---	e1800	e2500	1280	828	e680	750
11	---	---	---	---	---	---	e2080	e2400	1200	835	e680	724
12	---	---	---	---	---	---	e2550	e2300	1080	818	e650	707
13	---	---	---	---	---	---	e2950	e2250	1070	780	e640	696
14	---	---	---	---	---	---	e3400	e2200	1120	746	e620	701
15	---	---	---	---	---	---	e3800	e2150	1210	714	e610	713
16	---	---	---	---	---	---	e4200	e2100	1170	698	e600	734
17	---	---	---	---	---	---	e4780	2080	1160	699	e600	746
18	---	---	---	---	---	---	e5200	2040	1120	728	e590	746
19	---	---	---	---	---	---	e6700	1980	1060	785	e590	757
20	---	---	---	---	---	---	e6600	1830	1030	863	e590	768
21	---	---	---	---	---	---	e6500	1700	1020	886	e590	762
22	---	---	---	---	---	---	e6300	1600	1010	873	e590	824
23	---	---	---	---	---	---	e6000	1510	989	897	e580	829
24	---	---	---	---	---	---	e5500	1400	980	922	e570	811
25	---	---	---	---	---	---	e5100	1310	954	954	e560	797
26	---	---	---	---	---	---	e4800	1290	926	e940	e560	811
27	---	---	---	---	---	---	e4700	1320	956	e860	e560	848
28	---	---	---	---	---	---	e4790	1350	1050	e820	e560	915
29	---	---	---	---	---	---	e4800	1340	1090	e780	e560	991
30	---	---	---	---	---	---	e4900	1310	1180	e740	e600	1030
31	---	---	---	---	---	---	---	1340	---	e700	e650	---
TOTAL	---	---	---	---	---	---	111170	72860	36095	26522	19410	24300
MEAN	---	---	---	---	---	---	3706	2350	1203	856	626	810
MAX	---	---	---	---	---	---	6700	4800	1690	1190	720	1030
MIN	---	---	---	---	---	---	1310	1290	926	698	560	696
CFSM	---	---	---	---	---	---	2.56	1.63	.83	.59	.43	.56
IN.	---	---	---	---	---	---	2.86	1.88	.93	.68	.50	.63

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057004 MANISTIQUE RIVER ABOVE MANISTIQUE, MI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1050	1320	1730	e880	e860	e800	e3200	3740	1880	843	970	793
2	1040	1280	1770	e850	e850	e800	e3150	3680	1580	853	1070	774
3	1000	1250	1880	e840	e840	e800	e3000	3480	1450	849	1150	670
4	967	1240	1900	e820	e820	e800	e2900	3130	1390	832	1250	562
5	962	1220	1880	e820	e810	e800	e2800	e2900	1370	814	1280	553
6	949	1220	1910	e820	e800	e820	e2700	e2700	1300	819	1260	572
7	886	1220	1860	e820	e800	e820	e2600	e2600	1250	822	1220	685
8	887	1240	1820	e820	e800	e820	e2550	e2500	1210	811	1110	815
9	878	1260	1770	e820	e800	e840	e2500	e2300	1170	774	899	935
10	873	1250	1750	e820	e800	e850	e2370	e2200	1130	759	770	980
11	881	1220	1490	e820	e800	e860	2350	e2150	1120	738	740	951
12	919	1190	e1400	e820	e800	e880	2320	e2050	1140	707	721	879
13	940	1170	e1200	e840	e800	e900	2320	e2000	1200	688	749	827
14	928	1190	e1100	e850	e800	e1000	2370	e1980	1200	684	760	783
15	904	1220	e1000	e850	e800	e1200	2420	e1950	1130	795	868	753
16	884	1260	e980	e860	e800	e2000	2430	e2000	1070	855	984	822
17	874	1280	e960	e860	e800	e3000	2410	e2100	1020	920	964	1020
18	931	1300	e940	e860	e800	e3800	2370	e2100	973	973	930	1040
19	1030	1370	e900	e860	e800	e4020	2460	e2000	926	1030	909	1040
20	1230	1430	e900	e860	e800	e3990	2680	e1900	897	1140	887	1070
21	1420	1430	e900	e860	e800	e3800	3100	e1750	876	1180	815	1090
22	1520	1550	e900	e860	e800	e3870	3680	e1700	815	1230	681	1110
23	1530	1680	e920	e860	e800	e3700	4070	e1650	762	1300	604	1120
24	1490	1780	e920	e860	e800	e3700	4280	e1650	748	1320	583	1140
25	1470	1790	e940	e860	e800	e3700	4210	e1700	743	1320	576	1170
26	1450	1720	e950	e860	e800	e3700	3750	e1650	731	1300	629	1210
27	1440	1540	e950	e860	e800	e3700	3290	1630	719	1080	790	1160
28	1440	1590	e940	e860	e800	e3600	3230	1610	740	891	890	1050
29	1440	1570	e940	e860	---	e3600	3480	1790	755	854	888	933
30	1400	1750	e920	e860	---	e3500	3670	2020	799	815	856	818
31	1350	---	e900	e860	---	e3300	---	2100	---	832	819	---
TOTAL	34963	41530	39320	26250	22580	69970	88660	68710	32094	28828	27622	27325
MEAN	1128	1384	1268	847	806	2257	2955	2216	1070	930	891	911
MAX	1530	1790	1910	880	860	4020	4280	3740	1880	1320	1280	1210
MIN	873	1170	900	820	800	800	2320	1610	719	684	576	553
CFSM	.78	.96	.88	.59	.56	1.56	2.05	1.53	.74	.64	.62	.63
IN.	.90	1.07	1.01	.68	.58	1.80	2.28	1.77	.83	.74	.71	.70

WTR YR 1995 TOTAL 507852 MEAN 1391 MAX 4280 MIN 553 CFSM .96 IN. 13.07

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057004 MANISTIQUE RIVER ABOVE MANISTIQUE, MI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

[illegible]

STREAMS TRIBUTARY TO LAKE MICHIGAN
04057005 MANISTIQUE RIVER AT MANISTIQUE, MI

WATER-QUALITY RECORDS

LOCATION.--Lat 45°57'06", long 86°14'54", in NE1/4 sec.13, T.41 N., R.16 W., Schoolcraft County, Hydrologic Unit 04060106, on left bank approximately 1,400 ft upstream from mouth, at Manistique.

DRAINAGE AREA.--1,450 mi², approximately.

PERIOD OF RECORD.--December 1974 to September 1975, October 1993 to October 1995 (discontinued).

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March to September 1975.

WATER TEMPERATURE: March to September 1975.

REMARKS.--Cross-sectional samples were collected in the vicinity of the gage except for May 17 at 1430 hrs. and Sept. 1 at 1400 hrs., 1994, which were collected at the mouth. Unpublished records of selected herbicides, metals and organics will be available upon release by the cooperating agencies.

COOPERATION.--All published data were collected by the U.S. Geological Survey and analyzed by the Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CaCO ₃) (00900)	CALCIUM DIS- SOLVED (MG/L AS Ca) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS Mg) (00925)	SODIUM, DIS- SOLVED (MG/L AS Na) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO ₄) (00945)
OCT 1993												
07...	1230	--	--	--	--	--	--	--	--	--	--	--
APR 1994												
11...	1800	160	7.4	5.5	12.6	101	78	23	5.0	2.0	0.87	14
18...	1400	76	6.9	4.0	11.9	--	40	11	3.0	1.0	0.69	10
28...	1400	93	7.4	7.5	10.9	92	47	14	3.0	1.0	0.46	12
MAY												
05...	0900	97	7.2	10.0	10.5	94	56	16	4.0	1.0	0.57	12
12...	0930	130	7.4	11.0	10.3	94	71	20	5.0	2.0	0.52	15
17...	1000	143	7.7	11.0	11.1	99	76	22	5.0	2.0	0.51	15
17...	1430	145	7.7	11.0	10.8	98	--	--	--	--	--	--
JUN												
16...	1400	202	7.5	18.0	8.8	94	110	31	8.0	4.0	1.2	18
JUL												
06...	1000	223	7.7	18.0	8.1	87	100	30	7.0	3.0	0.61	18
26...	0930	212	7.6	19.5	8.7	97	110	32	8.0	3.0	0.84	21
SEP												
01...	1000	208	7.8	15.5	8.9	--	110	32	7.0	2.0	0.70	26
01...	1400	208	7.7	16.0	8.7	--	--	--	--	--	--	--
23...	1000	203	7.5	18.5	7.9	86	100	30	6.0	2.0	0.77	22
28...	1000	--	--	--	--	--	110	31	7.0	2.0	0.72	26
OCT												
19...	1000	197	7.6	12.5	9.5	91	98	29	6.3	2.0	0.80	24
NOV												
02...	1100	197	7.9	6.0	12.2	100	100	30	6.4	2.0	0.60	28
DEC												
09...	1000	170	7.6	0.0	14.4	100	91	27	5.7	1.8	0.60	24
JAN 1995												
18...	1000	211	7.3	0.5	9.1	65	110	32	6.9	2.4	0.60	30
FEB												
28...	1200	224	7.3	0.0	14.1	97	120	35	7.4	2.4	0.60	31
MAR												
23...	1030	123	7.4	1.5	13.8	100	63	18	4.3	1.7	0.60	13
23...	1600	121	7.4	2.5	13.6	101	--	--	--	--	--	--
23...	1800	121	7.4	3.0	13.6	103	--	--	--	--	--	--
24...	1100	118	7.3	2.0	12.8	94	59	17	4.1	1.6	0.60	13
28...	1200	113	7.4	4.0	12.5	96	56	16	4.0	1.4	0.50	13
29...	0900	114	7.5	4.0	12.6	97	59	17	4.0	1.5	0.60	13
APR												
11...	1000	135	7.4	4.0	13.1	101	69	20	4.7	1.5	0.40	18
20...	1200	120	7.6	5.0	12.3	97	62	18	4.2	1.5	0.70	14
MAY												
04...	1500	109	7.3	11.0	9.9	91	58	17	3.8	1.5	0.40	12
17...	1000	142	7.7	11.5	10.0	95	--	--	--	--	--	--
JUL												
06...	1400	209	7.8	21.0	8.3	96	--	--	--	--	--	23
SEP												
12...	1500	182	7.8	16.0	9.0	93	--	--	--	--	--	17
OCT												
26...	1000	146	7.3	7.0	11.6	--	--	--	--	--	--	16

STREAMS TRIBUTARY TO LAKE MICHIGAN
04057005 MANISTIQUE RIVER AT MANISTIQUE, MI--Continued

WATER-QUALITY DATA

DATE	TIME	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLORO- PHYLL A TRICHR. UNCORR. WHOLE TOTAL (UG/L) (32210)
OCT 1993											
07...	1230	2.9	6.3	5	4	--	--	--	<0.020	0.024	2.14
APR 1994											
11...	1800	2.1	6.3	10	4	0.133	0.074	0.40	<0.020	0.004	2.44
18...	1400	1.6	4.2	61	8	0.049	0.051	0.60	0.050	0.002	--
28...	1400	2.0	4.0	13	8	0.013	0.031	0.50	0.020	<0.002	2.18
MAY											
05...	0900	1.8	3.8	8	5	0.037	0.015	0.40	<0.020	<0.002	2.10
12...	0930	2.0	4.0	8	4	0.041	0.024	0.40	<0.020	<0.002	3.51
17...	1000	2.2	4.0	6	4	0.055	0.022	0.40	<0.020	<0.002	3.28
17...	1430	--	--	8	6	--	--	--	--	--	--
JUN											
16...	1400	5.7	2.8	6	4	0.101	0.024	0.30	<0.020	0.002	5.03
JUL											
06...	1000	4.8	4.5	6	4	0.097	0.029	0.30	0.020	--	2.81
26...	0930	4.8	4.6	8	5	0.115	0.023	0.30	0.030	0.003	3.03
SEP											
01...	1000	2.4	6.5	6	5	0.031	0.020	0.33	--	<0.002	1.89
01...	1400	--	--	--	--	--	--	--	--	--	--
23...	1000	2.8	7.0	5	3	0.058	<0.027	0.43	0.026	<0.002	1.29
28...	1000	2.5	7.0	6	4	0.068	<0.027	0.33	0.019	<0.002	1.84
OCT											
19...	1000	2.8	6.8	4	4	0.061	<0.027	0.30	0.016	--	3.57
NOV											
02...	1100	2.8	6.3	5	2	0.060	<0.027	0.50	0.026	--	2.16
DEC											
09...	1000	2.6	6.0	5	6	0.083	0.035	0.40	0.010	--	1.66
JAN 1995											
18...	1000	2.9	6.9	3	3	0.087	0.057	0.30	0.010	<0.002	0.511
FEB											
28...	1200	2.8	7.6	2	2	0.124	0.064	0.40	0.020	<0.002	0.306
MAR											
23...	1030	2.5	5.1	14	5	0.208	0.042	0.50	0.020	0.003	1.34
23...	1600	--	--	--	--	--	--	--	--	--	--
23...	1800	--	--	--	--	--	--	--	--	--	--
24...	1100	2.3	4.9	22	6	0.190	0.035	0.60	0.030	0.003	1.49
28...	1200	2.1	5.3	12	6	0.133	<0.027	0.40	0.020	<0.002	1.09
29...	0900	1.9	5.3	11	6	0.127	<0.027	0.40	0.020	<0.002	1.18
APR											
11...	1000	2.2	5.3	6	4	0.087	0.027	0.40	0.020	0.002	1.02
20...	1200	2.2	4.4	8	4	0.077	<0.027	0.40	0.014	<0.002	0.810
MAY											
04...	1500	2.2	3.8	5	4	0.036	<0.027	0.40	0.015	<0.002	1.06
17...	1000	--	--	--	--	--	--	--	--	--	--
JUL											
06...	1400	2.1	6.3	5	5	<0.010	<0.027	0.30	0.014	<0.002	0.680
SEP											
12...	1500	2.9	6.9	5	4	0.090	<0.027	0.40	0.017	<0.002	1.30
OCT											
26...	1000	2.7	6.2	10	6	0.055	<0.027	0.60	0.020	<0.002	2.74

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 mi².

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

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

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	104	104	e155	e62	e54	e56	262	276	163	51	382	91
2	94	100	e150	e60	e54	e56	246	258	148	49	342	84
3	86	96	e150	e60	e54	e56	243	240	142	47	239	79
4	78	93	145	e59	e54	e56	255	224	130	45	266	74
5	75	92	157	e58	e54	e57	228	209	119	44	269	71
6	86	94	165	e58	e54	e58	224	199	109	44	219	84
7	78	100	e150	e57	e54	e58	201	187	106	44	180	157
8	73	97	e140	e56	e54	e59	206	174	99	43	153	147
9	72	93	e130	e54	e55	e60	204	184	90	43	135	118
10	70	90	e125	e54	e55	e62	193	210	86	41	128	103
11	67	87	e110	e54	e55	e65	187	199	103	40	119	91
12	64	85	e105	e54	e55	e70	223	184	103	40	110	84
13	63	85	e100	e54	e55	e80	260	169	95	45	135	78
14	67	129	e94	e54	e55	e200	260	190	86	52	187	74
15	64	139	e90	e54	e55	e350	245	199	79	63	166	73
16	63	129	e86	e54	e56	e400	229	189	74	76	140	81
17	68	123	e84	e54	e56	e360	219	193	70	83	127	111
18	146	119	e82	e54	e56	e340	249	177	67	96	121	96
19	166	112	e80	e54	e56	e330	568	165	63	96	112	90
20	149	105	e79	e54	e56	e340	562	156	60	113	103	121
21	135	138	e78	e54	e56	e380	464	151	56	105	93	113
22	125	193	e76	e54	e56	e370	407	147	53	109	84	112
23	135	177	e74	e54	e56	e360	363	151	51	226	77	119
24	133	178	e72	e54	e56	e350	327	166	49	185	71	113
25	124	146	e70	e54	e56	e350	305	163	47	180	75	106
26	129	136	e68	e54	e56	e350	284	152	49	152	155	100
27	132	137	e67	e54	e56	e340	288	143	48	123	264	95
28	128	e140	e66	e54	e56	347	351	160	53	125	187	88
29	122	e150	e65	e54	---	342	329	217	52	110	143	82
30	116	e160	e64	e54	---	314	296	210	52	92	116	80
31	109	---	e63	e54	---	283	---	186	---	91	103	---
TOTAL	3121	3627	3140	1712	1545	6899	8678	5828	2502	2653	5001	2915
MEAN	101	121	101	55.2	55.2	223	289	188	83.4	85.6	161	97.2
MAX	166	193	165	62	56	400	568	276	163	226	382	157
MIN	63	85	63	54	54	56	187	143	47	40	71	71
CFSM	.55	.66	.55	.30	.30	1.22	1.58	1.03	.46	.47	.88	.53
IN.	.63	.74	.64	.35	.31	1.40	1.76	1.18	.51	.54	1.02	.59

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1995, BY WATER YEAR (WY)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	177	228	171	108	95.9	176	546	286	183	119	109	131																	
MAX	337	532	369	182	181	378	847	524	411	254	330	354																	
(WY)	1983	1978	1971	1969	1984	1973	1979	1972	1979	1968	1978	1978																	
MIN	55.5	64.4	49.8	50.0	54.2	72.6	271	91.6	50.3	45.7	48.1	40.7																	
(WY)	1977	1977	1977	1977	1977	1994	1987	1987	1988	1988	1976	1976																	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1967 - 1995

ANNUAL TOTAL	41786	47621	194
ANNUAL MEAN	114	130	289
HIGHEST ANNUAL MEAN			121
LOWEST ANNUAL MEAN			1987
HIGHEST DAILY MEAN	635	Apr 16	2030
LOWEST DAILY MEAN	43	Aug 23	33
ANNUAL SEVEN-DAY MINIMUM	45	Aug 21	35
INSTANTANEOUS PEAK FLOW			2120
INSTANTANEOUS PEAK STAGE		6.34	11.50
INSTANTANEOUS LOW FLOW		40	32
ANNUAL RUNOFF (CFSM)	.63	.71	1.06
ANNUAL RUNOFF (INCHES)	8.49	9.68	14.41
10 PERCENT EXCEEDS	205	261	396
50 PERCENT EXCEEDS	85	100	129
90 PERCENT EXCEEDS	57	54	66

(a) July 11-13.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057800 MIDDLE BRANCH ESCANABA RIVER AT HUMBOLDT, MI

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

DRAINAGE AREA.--46.0 mi².

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

REVISED RECORDS.--WSP 1911: Drainage area.

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

REMARKS.--Records good 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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	51	e41	e38	e15	e15	e15	e64	e165	99	23	16	15
2	45	e38	e37	e15	e15	e15	e63	e155	81	20	15	16
3	37	e35	e37	e15	e15	e15	e62	e148	68	18	16	13
4	35	e33	e36	e15	e15	e15	e62	e144	59	17	61	12
5	e32	e33	e35	e15	e15	e15	e60	e143	51	16	63	12
6	e30	e34	e34	e15	e15	e15	e60	e134	48	16	46	20
7	e28	e34	e35	e15	e15	e15	e60	e120	45	16	35	29
8	e26	e33	e31	e15	e15	e15	e59	e109	41	16	28	22
9	e25	e32	e30	e15	e15	e15	e58	e151	36	15	46	17
10	e24	e33	e27	e15	e15	e15	e58	e171	37	14	68	15
11	e23	e31	e26	e15	e15	e15	e68	e149	44	13	42	14
12	e22	e31	e24	e15	e15	e18	e112	e122	39	12	34	13
13	e21	e29	e22	e15	e15	e31	e123	e114	34	13	44	13
14	e20	e28	e22	e15	e15	e60	e125	e172	30	19	41	12
15	e18	e27	e21	e15	e15	e88	e128	e169	28	82	33	12
16	e17	e26	e20	e15	e15	e103	e125	e150	25	59	26	15
17	e29	e25	e20	e15	e15	e95	e126	e144	22	55	23	16
18	e50	e25	e19	e15	e15	e93	e146	e125	20	71	20	14
19	e50	e24	e18	e15	e15	e80	e162	e102	18	61	18	15
20	e52	e23	e18	e15	e15	e78	e153	e86	17	80	16	18
21	e47	e33	e17	e15	e15	e76	e148	e76	17	60	14	15
22	e45	e45	e17	e15	e15	e78	e143	e71	22	48	13	18
23	e60	e42	e16	e15	e15	e76	e148	e89	26	40	12	21
24	e72	e43	e16	e15	e15	e76	e179	e80	22	32	12	16
25	e70	e40	e16	e15	e15	e73	e185	e71	28	32	28	14
26	e68	e38	e16	e15	e15	e72	e183	e62	25	31	44	13
27	e65	e36	e15	e15	e15	e71	e187	e58	29	25	32	13
28	e60	e36	e15	e15	e15	e70	e184	e129	28	22	25	12
29	e56	e37	e15	e15	---	e70	e184	222	27	19	22	12
30	e52	e38	e15	e15	---	e68	e179	194	26	16	19	17
31	e45	---	e15	e15	---	e66	---	133	---	15	17	---
TOTAL	1275	1003	723	465	420	1607	3594	3958	1092	976	929	464
MEAN	41.1	33.4	23.3	15.0	15.0	51.8	120	128	36.4	31.5	30.0	15.5
MAX	72	45	38	15	15	103	187	222	99	82	68	29
MIN	17	23	15	15	15	15	58	58	17	12	12	12
CFSM	.89	.73	.51	.33	.33	1.13	2.60	2.78	.79	.68	.65	.34
IN.	1.03	.81	.58	.38	.34	1.30	2.91	3.20	.88	.79	.75	.38

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1995, BY WATER YEAR (WY)

MEAN	56.2	59.5	38.9	24.2	20.8	39.3	200	122	60.0	31.5	26.1	38.3
MAX	191	197	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	35.4	13.3	7.57	5.80	4.91
(WY)	1977	1977	1977	1977	1977	1964	1987	1977	1988	1988	1976	1976

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1959 - 1995

ANNUAL TOTAL	15986	16506	
ANNUAL MEAN	43.8	45.2	59.6
HIGHEST ANNUAL MEAN			95.3
LOWEST ANNUAL MEAN			33.8
HIGHEST DAILY MEAN	423	222	1830
LOWEST DAILY MEAN	11	12	4.2
ANNUAL SEVEN-DAY MINIMUM	12	13	4.5
INSTANTANEOUS PEAK FLOW		235	1930
INSTANTANEOUS PEAK STAGE		4.14	9.21
INSTANTANEOUS LOW FLOW		11	4.0
ANNUAL RUNOFF (CFSM)	.95	.98	1.29
ANNUAL RUNOFF (INCHES)	12.93	13.35	17.59
10 PERCENT EXCEEDS	80	122	129
50 PERCENT EXCEEDS	28	27	32
90 PERCENT EXCEEDS	13	15	12

(a) Aug. 24, Sept. 15, 28, 29.

(e) Estimated.

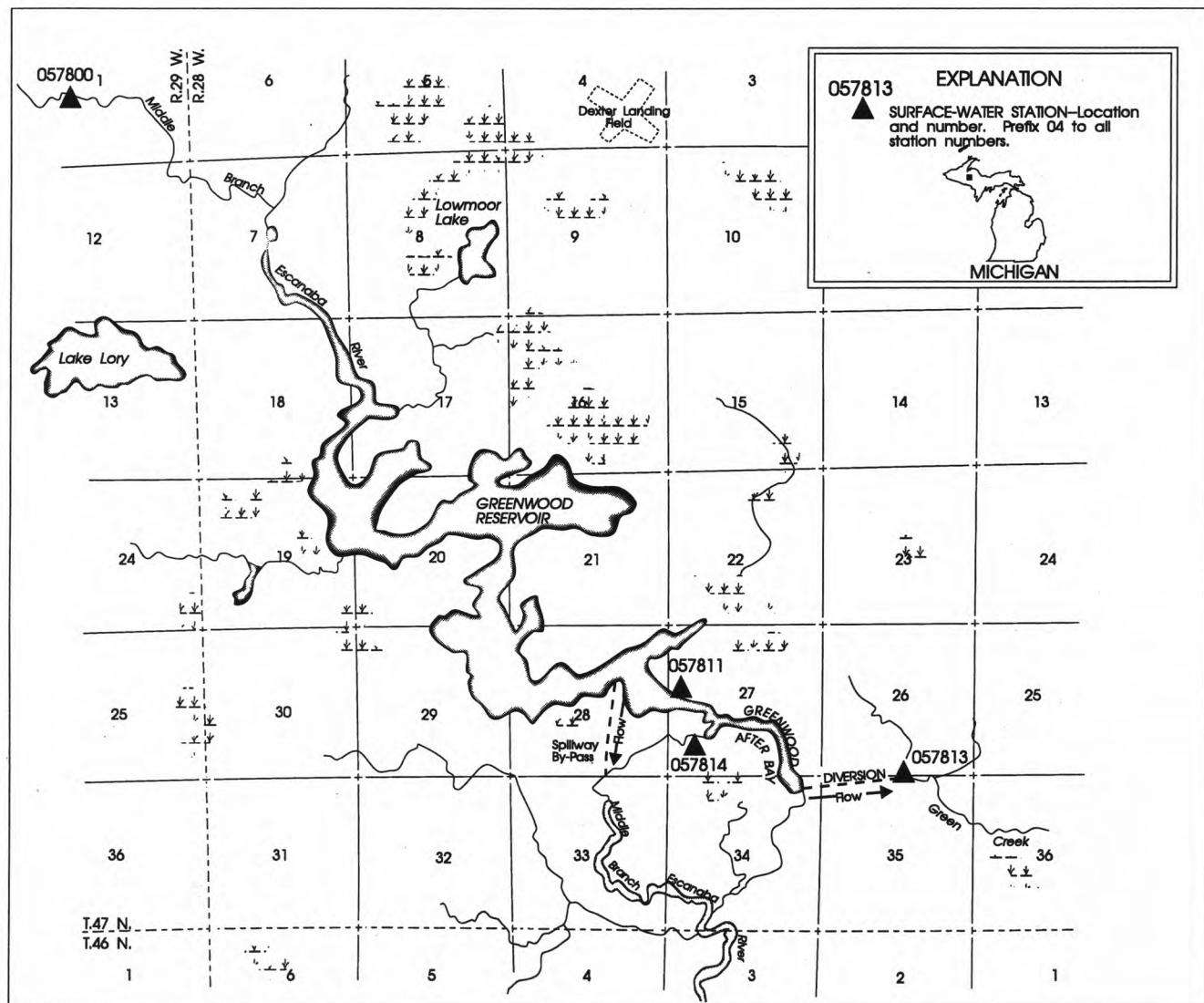


Figure 8.--Identification number and location of active surface-water gaging stations in and around the Greenwood Reservoir Complex.

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 mi².

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

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft above sea level (levels by Cleveland-Cliffs Iron Co.); gage readings 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 about 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 afterbay (conservation pool) 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 contents, 26,520 acre-ft, Apr. 21, 22, 23, 1985, elevation, 1,517.3 ft; minimum since first filling, 3,240 acre-ft, Mar. 12, 1977, elevation, 1,491.1 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 23,990 acre-ft, May 30, elevation, 1,515.49 ft; minimum, 12,600 acre-ft, Mar. 12, elevation, 1,505.55 ft.

MONTHEND ELEVATION, IN FEET ABOVE SEA LEVEL, AND CONTENTS AT 2400, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

Date	Elevation (feet)	Contents (acre-feet)	Change in contents	
			(acre- feet)	(equivalent in ft ³ /s)
Sept. 30	1,512.6	20,220	--	--
Oct. 31	1,511.9	19,380	-840	-13.7
Nov. 30	1,511.1	18,420	-960	-16.1
Dec. 31	1,510.1	17,220	-1200	-19.5
CAL YR 1994			-3000	-4.1
Jan. 31	1,508.2	15,200	-2,020	-32.8
Feb. 28	1,506.3	13,300	-1,900	-34.2
Mar. 31	1,508.1	15,100	+1,800	+29.3
Apr. 30	1,513.6	21,480	+6,380	+107
May 31	1,515.4	23,860	+2,380	+38.7
June 30	1,514.7	22,910	-950	-16.0
July 31	1,514.6	22,780	-130	-2.1
Aug. 31	1,513.8	21,740	-1,040	-16.9
Sept. 30	1,512.3	19,860	-1,880	-35.6
WTR YR 1995			-360	-0.5

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.--December 1972 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 excellent. Flow completely regulated. A pipeline, 0.7 mi long, diverts water 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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	27	26	26	26	26	21	3.6	14	27	27	26
2	27	27	26	26	26	26	21	4.9	10	27	27	26
3	27	27	26	26	26	26	21	7.0	10	27	26	26
4	26	27	26	26	26	26	21	9.5	11	27	26	26
5	26	27	26	26	26	26	21	9.4	11	27	26	26
6	26	27	25	26	26	26	20	9.3	11	27	26	26
7	26	27	25	26	26	26	15	9.2	10	27	26	26
8	25	27	25	26	26	26	9.1	13	10	27	26	26
9	25	27	26	26	26	26	9.1	17	10	27	26	26
10	26	26	26	26	26	26	10	18	10	27	26	26
11	26	26	26	26	26	26	13	18	10	27	26	26
12	26	26	26	26	26	26	14	18	10	27	26	26
13	26	26	26	26	26	22	11	18	10	27	26	26
14	26	26	26	26	26	16	9.2	18	10	26	26	26
15	26	27	26	26	26	14	9.2	13	10	26	23	26
16	26	27	26	26	26	18	9.2	10	10	26	20	26
17	27	26	26	26	26	21	9.3	10	9.9	26	20	26
18	27	26	26	26	26	20	9.3	15	9.9	26	20	26
19	27	26	26	26	26	20	9.4	18	14	26	20	26
20	27	26	24	26	26	21	9.4	18	17	26	20	26
21	27	26	24	26	26	21	7.4	18	20	26	20	26
22	27	26	25	26	26	21	5.5	17	26	26	20	26
23	27	26	25	26	26	18	5.5	17	27	26	20	26
24	27	26	25	26	26	17	5.5	17	27	26	20	26
25	27	26	25	26	26	17	5.5	17	27	23	22	26
26	27	26	25	26	26	17	4.3	17	27	18	26	26
27	27	26	25	26	26	17	2.6	18	27	20	26	26
28	27	26	25	26	26	17	2.6	18	27	25	26	26
29	27	26	26	26	---	15	2.6	18	27	27	26	26
30	27	26	26	26	---	14	2.6	19	27	27	26	26
31	27	---	26	26	---	16	---	18	---	27	26	---
TOTAL	822	791	792	806	728	654	315.3	450.9	479.8	804	747	780
MEAN	26.5	26.4	25.5	26.0	26.0	21.1	10.5	14.5	16.0	25.9	24.1	26.0
MAX	27	27	26	26	26	26	21	19	27	27	27	26
MIN	25	26	24	26	26	14	2.6	3.6	9.9	18	20	26

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1973 - 1995, BY WATER YEAR (WY)

MEAN	14.2	11.8	13.5	17.9	17.9	13.5	7.27	9.68	13.0	17.7	17.3	16.3
MAX	26.5	26.4	25.5	26.0	26.0	25.8	17.2	22.7	26.0	26.1	28.5	28.1
(WY)	1995	1995	1995	1994	1995	1982	1980	1980	1977	1988	1994	1994
MIN	.046	.37	.19	.19	.28	.31	.11	.22	.28	1.63	1.20	.39
(WY)	1978	1974	1974	1974	1974	1974	1977	1973	1974	1982	1977	1977

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1973 - 1995

ANNUAL TOTAL	7666.62	8170.0		
ANNUAL MEAN	21.0	22.4		
HIGHEST ANNUAL MEAN			14.3	
LOWEST ANNUAL MEAN			22.4	1995
HIGHEST DAILY MEAN	29	Jul 27	4.06	1974
LOWEST DAILY MEAN	.03	Apr 16	30	(b)
ANNUAL SEVEN-DAY MINIMUM	.03	Apr 16	(d).01	(f)
10 PERCENT EXCEEDS	28		.02	Apr 11 1987
50 PERCENT EXCEEDS	26		26	
90 PERCENT EXCEEDS	5.9		14	
			.86	

(a) On several days during the year.

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

(c) Apr. 27-30.

(d) Minimum daily discharge since diversion began Jan. 7, 1973. No flow Dec. 27, 1972 to Jan. 6, 1973.

(f) Apr. 16, 17, 1987.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04057814 GREENWOOD RELEASE NEAR GREENWOOD, MI

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

DRAINAGE AREA.--67.4 mi².

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

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

REMARKS.--Records fair. Since December 1972, flow from Greenwood Reservoir (station 04057811) below spillway elevation 1,515 ft is completely regulated by the afterbay release structure 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	25	25	25	24	24	26	23	22	21	22	22
2	25	25	25	25	24	24	26	23	22	21	22	22
3	25	25	25	25	24	24	26	22	23	21	22	22
4	25	25	25	25	24	24	26	22	23	21	22	22
5	24	25	25	25	24	24	25	22	23	21	22	22
6	24	25	25	25	24	24	25	21	22	21	21	22
7	24	25	25	25	24	24	25	21	22	21	21	22
8	24	25	25	24	24	24	25	21	22	22	21	22
9	24	25	25	24	24	24	25	22	22	22	21	22
10	24	25	25	24	24	24	25	23	22	22	21	22
11	24	25	25	25	24	23	25	23	22	23	21	22
12	24	25	25	25	24	24	25	22	22	22	21	22
13	25	25	25	25	24	24	24	22	22	22	21	22
14	25	25	25	25	24	24	24	22	21	22	21	22
15	25	25	25	24	24	24	23	22	21	22	22	22
16	25	25	25	24	24	23	23	22	21	21	22	22
17	25	25	25	24	24	25	23	23	21	21	22	22
18	25	25	25	24	24	25	23	23	21	21	22	22
19	25	25	24	24	24	25	22	22	21	21	22	22
20	25	25	22	24	24	25	22	22	21	22	22	22
21	25	25	22	24	24	25	22	22	21	22	22	22
22	25	25	24	24	24	25	22	21	22	22	22	22
23	25	25	23	25	24	25	22	21	22	22	22	22
24	25	25	22	24	24	25	22	21	22	22	22	22
25	25	25	22	24	24	25	22	21	22	22	23	22
26	25	25	23	24	24	25	22	21	22	22	23	22
27	25	25	23	24	24	25	22	22	22	22	22	22
28	25	25	23	24	24	25	23	22	21	22	22	22
29	25	25	24	24	---	25	23	23	21	22	22	22
30	25	25	24	24	---	25	23	23	21	22	22	22
31	25	---	24	24	---	25	---	23	---	22	22	---
TOTAL	767	750	750	756	672	757	711	683	652	672	675	660
MEAN	24.7	25.0	24.2	24.4	24.0	24.4	23.7	22.0	21.7	21.7	21.8	22.0
MAX	25	25	25	25	24	25	26	23	23	23	23	22
MIN	24	25	22	24	24	23	22	21	21	21	21	22

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1973 - 1995, BY WATER YEAR (WY)

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	31.0	30.3	26.3	25.5	26.2	28.9	29.0	27.3	27.3	26.6	25.6	25.9											
MAX	141	122	35.6	32.6	35.9	56.3	44.9	40.3	42.2	42.2	29.1	30.2											
(WY)	1973	1973	1974	1974	1986	1989	1989	1976	1975	1974	1982	1984											
MIN	23.6	23.3	24.2	18.9	22.0	22.0	23.2	22.0	21.7	20.3	21.8	22.0											
(WY)	1988	1988	1995	1973	1973	1973	1987	1995	1995	1973	1995	1995											

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1973 - 1995

ANNUAL TOTAL	9139	8505	
ANNUAL MEAN	25.0	23.3	
HIGHEST ANNUAL MEAN			27.5
LOWEST ANNUAL MEAN			44.8
HIGHEST DAILY MEAN	28	Jul 4	26
LOWEST DAILY MEAN	22	Aug 20	21
ANNUAL SEVEN-DAY MINIMUM	23	Dec 20	21
10 PERCENT EXCEEDS	26		25
50 PERCENT EXCEEDS	25		24
90 PERCENT EXCEEDS	24		21

(a) Apr. 1-4.

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

(c) On several days from May through Aug.

(d) Release structure closed for trash rack cleaning and flume inspection.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04058100 MIDDLE BRANCH ESCANABA RIVER NEAR PRINCETON, MI

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

DRAINAGE AREA.--210 mi².

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

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

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	158	117	107	96	95	93	173	213	416	92	110	116
2	149	108	67	96	92	94	173	197	356	92	110	112
3	124	108	86	96	91	93	171	189	316	92	110	108
4	112	108	148	95	90	92	170	187	285	92	110	106
5	113	108	120	95	90	94	169	185	207	92	111	105
6	108	108	114	94	90	94	150	185	147	91	112	105
7	107	108	115	92	90	94	149	179	148	90	112	105
8	107	108	116	92	90	94	149	169	190	90	112	105
9	107	103	116	92	89	94	149	171	196	90	112	105
10	107	97	116	91	89	94	143	201	148	91	105	105
11	107	97	116	91	90	94	136	262	147	e90	97	105
12	100	97	112	88	91	94	145	325	147	e88	97	97
13	96	97	108	80	91	99	172	349	147	e88	98	87
14	89	97	108	76	92	167	199	349	147	e88	99	88
15	82	97	102	76	91	207	222	375	136	e90	114	89
16	82	98	96	76	91	180	236	425	117	e170	129	89
17	84	98	96	77	91	202	230	446	101	e220	120	88
18	120	98	96	77	90	202	230	428	101	e180	113	89
19	149	99	96	77	90	202	266	399	100	e190	106	89
20	148	101	96	77	90	210	300	377	99	e240	97	89
21	170	111	96	79	90	252	303	301	95	e300	97	89
22	171	116	96	79	90	257	306	249	90	e370	94	89
23	148	117	96	79	90	232	291	258	90	e250	92	89
24	177	122	96	79	91	220	266	231	90	e210	91	89
25	169	122	96	79	92	212	265	223	90	e152	92	51
26	143	122	96	79	93	205	260	227	91	139	97	27
27	133	122	96	79	92	191	260	227	92	117	104	41
28	124	121	96	79	92	175	259	229	92	110	118	77
29	124	120	97	88	---	175	241	306	92	110	132	83
30	124	113	97	97	---	175	221	423	92	111	132	92
31	124	---	96	97	---	175	---	451	---	110	126	---
TOTAL	3856	3238	3189	2648	2543	4862	6404	8736	4565	4335	3349	2709
MEAN	124	108	103	85.4	90.8	157	213	282	152	140	108	90.3
MAX	177	122	148	97	95	257	306	451	416	370	132	116
MIN	82	97	67	76	89	92	136	169	90	88	91	27

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1995, BY WATER YEAR (WY)

	MEAN	177	183	141	107	98.3	147	519	432	243	153	121	156
MAX	376	349	235	196	162	348	917	1056	518	318	216	566	
(WY)	1973	1973	1992	1969	1969	1973	1976	1972	1968	1968	1978	1978	
MIN	54.4	70.0	79.4	61.0	56.1	71.0	179	111	101	63.5	53.0	60.4	
(WY)	1964	1977	1977	1964	1963	1964	1990	1977	1977	1965	1963	1963	

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR	FOR 1995 WATER YEAR	WATER YEARS 1961 - 1995
ANNUAL TOTAL	53619	50434	
ANNUAL MEAN	147	138	207
HIGHEST ANNUAL MEAN			296
LOWEST ANNUAL MEAN			122
HIGHEST DAILY MEAN	726	451	2550
LOWEST DAILY MEAN	67	27	4.1
ANNUAL SEVEN-DAY MINIMUM	86	65	28
INSTANTANEOUS PEAK FLOW		456	(a)2580
INSTANTANEOUS PEAK STAGE		3.19	8.37
INSTANTANEOUS LOW FLOW		8.0	(b)2.2
10 PERCENT EXCEEDS	271	240	406
50 PERCENT EXCEEDS	108	107	130
90 PERCENT EXCEEDS	89	89	76

(a) Gage height 7.85 ft.

(b) Recorded.

(c) 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 mi².

PERIOD OF RECORD.--January 1963 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,300.00 ft above sea level (Cleveland-Cliffs Iron Co. reference mark); gage readings 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 29 ft³/s was diverted from reservoir for iron ore processing (furnished by Cleveland Cliffs Iron Co.), some returned to Middle Branch Escanaba River basin via Green Creek and some returned to the East Branch Escanaba River basin 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 22.4 ft³/s for the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents recorded, 5,900 acre-ft, May 31, 1970, Apr. 20, 1985, elevation, 1,339.5 ft; minimum recorded since first filling, 2,920 acre-ft, Apr. 10, 1974, elevation, 1,329.7 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 5,380 acre-ft, July 20, 21, elevation, 1,338.18 ft; minimum, 4,050 acre-ft, March 12, elevation, 1,333.95 ft.

MONTHEND ELEVATION, IN FEET ABOVE SEA LEVEL, AND CONTENTS AT 2400, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)	(equivalent in ft ³ /s)
Sept. 30	1,335.3	4,440	--	--
Oct. 31	1,335.0	4,350	-90	-1.5
Nov. 30	1,336.3	4,740	+390	+6.6
Dec. 31	1,335.7	4,560	-180	-2.9
CAL YR 1994			-630	-0.9
Jan. 31	1,334.8	4,290	-270	-4.4
Feb. 28	1,334.7	4,260	-30	-0.5
Mar. 31	1,336.2	4,710	+450	+7.3
Apr. 30	1,336.2	4,710	0	0.0
May 31	1,338.1	5,340	+630	+10.2
June 30	1,336.9	4,920	-420	-7.1
July 31	1,337.6	5,160	+240	+3.9
Aug. 31	1,336.8	4,890	-270	-4.4
Sept. 30	1,337.4	5,090	+200	+3.4
WTR YR 1995			+650	+0.9

(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) about 40 mi upstream and Greenwood Reservoir (station 04057811) about 50 mi upstream. Gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height recorded, 5.53 ft, Apr. 22, 1992, but may have been higher during period of no gage-height record, Apr. 8-14, 1988; minimum daily, 1.89 ft, Sept. 2, 1991.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 3.72 ft., Apr. 20; minimum daily, 1.92 ft., Jan. 3.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.36	2.36	2.24	1.99	2.04	2.03	2.72	2.95	3.08	2.10	2.16	2.17
2	2.32	2.64	2.33	1.99	2.04	2.03	2.64	2.88	2.94	2.15	2.20	2.07
3	2.26	2.78	2.25	1.92	2.03	2.02	2.66	2.90	2.76	2.17	2.19	2.06
4	2.20	2.31	2.29	1.94	2.04	2.02	2.73	2.86	2.66	2.16	2.27	2.04
5	2.18	2.32	2.36	2.00	2.02	2.02	2.55	2.78	2.60	2.16	2.25	2.03
6	2.18	2.30	2.24	2.03	2.00	2.01	2.60	2.77	2.44	2.13	2.24	2.08
7	2.15	2.29	2.20	2.05	2.02	2.01	2.47	2.74	2.42	2.13	2.19	2.34
8	2.15	2.30	2.21	2.02	2.01	2.00	2.54	2.68	2.34	2.12	2.17	2.33
9	2.12	2.28	2.24	2.01	2.01	2.01	2.47	2.83	2.41	2.12	2.15	2.31
10	2.11	2.24	2.13	1.99	2.00	2.02	2.45	3.18	2.36	2.10	2.15	2.23
11	2.11	2.20	2.15	2.01	2.03	2.03	2.44	3.18	2.42	2.10	2.17	2.18
12	2.10	2.21	2.03	2.04	2.01	2.07	2.57	3.11	2.45	2.11	2.13	2.15
13	2.09	2.22	2.11	2.04	1.99	2.19	2.82	3.06	2.39	2.12	2.23	2.12
14	2.10	2.24	2.17	2.02	1.99	2.33	2.87	3.14	2.36	2.14	2.26	2.07
15	2.07	2.25	2.16	2.02	1.99	2.65	2.85	3.28	2.28	2.19	2.29	2.08
16	2.07	2.23	2.17	2.02	1.99	2.78	2.84	3.31	2.24	2.47	2.27	2.12
17	2.11	2.22	2.17	2.03	1.99	2.82	2.82	3.28	2.17	2.65	2.22	2.16
18	2.45	2.23	2.15	2.03	2.01	2.81	2.88	3.33	2.16	2.65	2.17	2.15
19	2.71	2.22	2.10	2.03	2.02	2.80	3.33	3.23	2.15	2.66	2.13	2.13
20	2.67	2.19	2.13	2.03	2.01	2.79	3.64	3.04	2.17	2.69	2.10	2.27
21	2.58	2.25	2.12	2.02	2.02	3.02	3.59	2.91	2.10	2.78	2.06	2.23
22	2.58	2.36	2.16	2.03	2.02	3.26	3.48	2.75	2.10	2.77	2.04	2.27
23	2.74	2.31	2.16	2.03	2.03	3.23	3.37	2.75	2.11	2.70	2.04	2.26
24	2.77	2.32	2.11	2.03	2.04	3.08	3.25	2.79	2.12	2.49	2.02	2.22
25	2.77	2.30	2.15	2.02	2.03	3.06	3.24	2.69	2.11	2.48	2.05	2.19
26	2.66	2.24	2.16	2.01	2.04	2.98	3.15	2.66	2.14	2.41	2.18	2.14
27	2.55	2.23	2.14	2.01	2.03	2.90	3.14	2.61	2.20	2.31	2.29	2.07
28	2.48	2.26	2.14	2.02	2.04	2.85	3.14	2.75	2.20	2.21	2.26	2.07
29	2.43	2.29	2.08	2.01	---	2.85	3.09	3.15	2.12	2.17	2.20	2.09
30	2.41	2.19	2.10	2.03	---	2.77	2.98	3.36	2.07	2.12	2.18	2.11
31	2.39	---	2.14	2.04	---	2.71	---	3.25	---	2.15	2.16	---
MEAN	2.35	2.29	2.17	2.01	2.02	2.52	2.91	2.97	2.34	2.31	2.17	2.16
MAX	2.77	2.78	2.36	2.05	2.04	3.26	3.64	3.36	3.08	2.78	2.29	2.34
MIN	2.07	2.19	2.03	1.92	1.99	2.00	2.44	2.61	2.07	2.10	2.02	2.03
CAL YR 1994	MEAN	2.39	MAX	3.86	MIN	1.93						
WTR YR 1995	MEAN	2.35	MAX	3.64	MIN	1.92						

STREAMS TRIBUTARY TO LAKE MICHIGAN

04059000 ESCANABA RIVER AT CORNELL, MI

LOCATION.--Lat 45°54'31", long 87°12'49", in NW1/4 sec.32, T.41 N., R.23 W., Delta County, Hydrologic Unit 04030110, on right bank 50 ft downstream from bridge on County Road 519, 0.4 mi downstream from Bobs Creek, 0.7 mi northeast of Cornell, and 16 mi upstream from mouth.
DRAINAGE AREA.--870 mi².

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) about 50 mi upstream. Since December 1972, some regulation by Greenwood Reservoir (station 04057811) about 60 mi upstream. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	454	477	e380	e210	e210	e210	826	1100	1250	277	310	306
2	421	446	e380	e200	e210	e210	771	1040	1070	310	340	286
3	384	404	e380	e190	e210	e210	787	981	891	304	347	269
4	341	e410	e380	e190	e210	e210	805	935	779	284	387	261
5	328	e430	e370	e200	e210	e210	683	894	688	281	388	255
6	323	e420	e360	e220	e210	e210	696	874	557	270	371	273
7	314	e410	e340	e220	e210	e210	603	843	506	259	332	467
8	301	e410	e330	e210	e210	e210	641	782	475	261	318	521
9	293	e400	e330	e210	e210	e220	597	923	515	255	313	491
10	286	e370	e310	e210	e210	e220	565	1240	485	242	319	423
11	288	e350	e290	e210	e200	e220	567	1290	555	253	312	370
12	276	e330	e280	e220	e200	e240	703	1210	574	254	294	341
13	268	e340	e290	e220	e200	e350	952	1160	515	262	477	308
14	279	e340	e300	e210	e200	e500	1010	1280	459	282	484	286
15	260	e350	e300	e210	e200	e760	977	1400	419	302	473	283
16	258	e340	e300	e210	e200	e860	961	1470	382	489	430	323
17	291	e340	e290	e220	e200	e900	928	1580	333	666	383	362
18	569	e340	e290	e220	e200	e900	1020	1520	317	688	347	361
19	803	e330	e290	e220	e210	e900	1790	1370	308	691	319	346
20	768	e330	e290	e220	e210	e950	2080	1180	312	755	291	392
21	678	e350	e290	e220	e210	e1300	1970	1040	285	813	265	401
22	667	e400	e290	e220	e210	1550	1790	861	282	795	246	436
23	858	e420	e280	e220	e220	1440	1640	929	280	727	245	429
24	907	e410	e280	e220	e220	1420	1470	940	277	550	246	411
25	878	e390	e280	e220	e220	1360	1450	846	277	542	255	380
26	761	e360	e275	e210	e220	1180	1360	787	276	471	392	328
27	668	e350	e270	e210	e210	1070	1340	733	264	398	471	289
28	599	e360	e260	e210	e210	1010	1360	891	247	339	434	276
29	559	e360	e260	e210	---	1010	1270	1370	251	309	393	288
30	538	e360	e250	e210	---	920	1170	1580	262	284	373	312
31	504	---	e230	e210	---	877	---	1440	---	303	335	---
TOTAL	15122	11327	9445	6580	5840	21837	32782	34489	14091	12916	10890	10474
MEAN	488	378	305	212	209	704	1093	1113	470	417	351	349
MAX	907	477	380	220	220	1550	2080	1580	1250	813	484	521
MIN	258	330	230	190	200	210	565	733	247	242	245	255
CFSM	.56	.43	.35	.24	.24	.81	1.26	1.28	.54	.48	.40	.40
IN.	.65	.48	.40	.28	.25	.93	1.40	1.47	.60	.55	.47	.45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 1995, BY WATER YEAR (WY)

	MEAN	719	794	551	373	343	572	2568	1687	951	611	496	630
MAX	1690	2230	945	720	959	1663	4329	4388	2172	1859	2014	1874	
(WY)	1986	1989	1907	1969	1984	1973	1951	1907	1968	1951	1911	1978	
MIN	196	218	230	190	185	227	830	481	255	222	194	194	
(WY)	1964	1977	1977	1964	1959	1964	1990	1977	1988	1988	1963	1976	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1903 - 1995

ANNUAL TOTAL	183665						185793					
ANNUAL MEAN	503						509			(a)831		
HIGHEST ANNUAL MEAN										1385		1960
LOWEST ANNUAL MEAN										506		1963
HIGHEST DAILY MEAN	2220						2080	Apr 20		10400	Apr 22	1985
LOWEST DAILY MEAN	150				Feb 14		(e)190	(b)		(c)90	Jul 5	1910
ANNUAL SEVEN-DAY MINIMUM	195				Feb 10		200	Feb 11		159	Feb 23	1959
INSTANTANEOUS PEAK FLOW							(d)2560	May 17		10700	Apr 26	1979
INSTANTANEOUS PEAK STAGE							(f)3.31	Mar 17		(f)6.40	Apr 9	1971
INSTANTANEOUS LOW FLOW										(c)90	Jul 5	1910
ANNUAL RUNOFF (CFSM)	.58						.59			.95		
ANNUAL RUNOFF (INCHES)	7.85						7.94			12.97		
10 PERCENT EXCEEDS	979						1050			1880		
50 PERCENT EXCEEDS	370						341			520		
90 PERCENT EXCEEDS	250						210			254		

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

(b) Jan. 3, 4.

(c) 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.

(d) Gage height 2.92 ft.

(e) Estimated.

(f) Backwater from ice.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04059500 FORD RIVER NEAR HYDE, MI

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

DRAINAGE AREA.--450 mi².

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

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

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	250	294	244	e53	e38	e37	413	709	628	80	88	144
2	224	266	259	e52	e37	e37	376	652	521	94	83	120
3	192	242	255	e50	e37	e37	370	605	429	87	85	106
4	169	231	229	e48	e37	e37	367	570	360	80	139	98
5	154	219	e220	e47	e37	e38	280	539	312	76	129	131
6	146	209	e200	e45	e37	e38	265	504	275	74	118	117
7	135	202	e185	e43	e37	e39	276	473	255	70	107	172
8	126	192	e175	e43	e37	e39	271	449	232	67	98	262
9	122	182	e170	e42	e37	e40	267	562	207	65	92	284
10	112	172	e160	e42	e36	e42	248	744	198	61	87	281
11	103	164	e150	e42	e36	e45	239	786	232	58	82	257
12	97	155	e140	e42	e36	e48	316	782	254	56	80	223
13	97	153	e130	e42	e36	e54	422	745	251	58	142	192
14	96	177	e124	e42	e36	e100	476	800	224	60	244	170
15	91	181	e120	e45	e36	e271	499	832	192	66	244	151
16	90	176	e110	e41	e36	e700	484	857	164	96	206	146
17	99	173	e100	e40	e36	e640	461	982	142	140	182	168
18	202	166	e98	e40	e36	e560	533	949	127	192	157	191
19	337	161	e92	e40	e36	e520	1210	861	114	246	132	194
20	407	158	e90	e40	e36	e500	1400	780	103	293	113	206
21	423	177	e86	e40	e37	e560	1350	689	92	326	97	212
22	407	204	e80	e40	e37	e620	1270	585	87	306	85	223
23	549	196	e78	e38	e37	e600	1170	568	88	279	77	251
24	609	168	e76	e38	e37	e580	1040	580	82	238	72	256
25	589	199	e70	e38	e37	e570	931	548	76	198	75	255
26	546	183	e69	e38	e37	e560	887	514	70	160	98	240
27	492	191	e68	e38	e37	e550	900	465	68	136	168	219
28	430	196	e64	e38	e37	e550	943	520	68	119	230	195
29	383	246	e62	e38	---	608	864	724	66	102	235	173
30	343	252	e57	e38	---	518	780	756	71	89	210	164
31	320	---	e55	e38	---	451	---	707	---	81	175	---
TOTAL	8340	5885	4016	1301	1026	9989	19308	20837	5988	4053	4130	5801
MEAN	269	196	130	42.0	36.6	322	644	672	200	131	133	193
MAX	609	294	259	53	38	700	1400	982	628	326	244	284
MIN	90	153	55	38	36	37	239	449	66	56	72	98
CFSM	.60	.44	.29	.09	.08	.72	1.43	1.49	.44	.29	.30	.43
IN.	.69	.49	.33	.11	.08	.83	1.60	1.72	.50	.34	.34	.48

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1955 - 1995, BY WATER YEAR (WY)

MEAN	306	394	213	117	101	255	1289	799	407	206	164	260
MAX	819	1246	589	346	493	1078	2353	2483	1006	793	713	1013
(WY)	1960	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	204	52.4	34.7	38.8	26.2
(WY)	1977	1977	1977	1977	1977	1964	1990	1986	1988	1988	1970	1976

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1955 - 1995

ANNUAL TOTAL	76144	90674	
ANNUAL MEAN	209	248	
HIGHEST ANNUAL MEAN			376
LOWEST ANNUAL MEAN			640
HIGHEST DAILY MEAN			183
LOWEST DAILY MEAN	1120	Apr 30	1960
ANNUAL SEVEN-DAY MINIMUM	37	Feb 8	1963
INSTANTANEOUS PEAK FLOW	38	Feb 7	6850
INSTANTANEOUS PEAK STAGE			19
INSTANTANEOUS LOW FLOW			22
ANNUAL RUNOFF (CFSM)	.46		7590
ANNUAL RUNOFF (INCHES)	6.29		8.27
10 PERCENT EXCEEDS	492		18
50 PERCENT EXCEEDS	140		.83
90 PERCENT EXCEEDS	49		11.34
			929
			180
			53

(a) Feb. 10-20.

(b) Gage height 4.22 ft.

(c) Backwater from ice.

(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 mi², approximately.

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

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

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

REMARKS.--Records good except for estimated daily discharges, which are fair. Discharge includes some mine pumpage prior to August 1977. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	280	249	278	e145	e190	e150	288	315	413	244	304	222
2	272	246	324	e140	e180	e150	282	309	377	227	268	217
3	276	242	288	e140	e180	e150	282	304	359	219	247	212
4	271	243	287	e139	e175	e150	279	302	330	214	266	208
5	254	250	272	e140	e175	e155	257	305	304	213	303	206
6	246	245	265	e140	e170	e155	265	295	291	249	276	211
7	239	241	268	e140	e170	e155	281	287	301	253	237	318
8	240	237	249	e140	e170	e160	278	286	300	234	232	340
9	239	236	e240	e145	e170	e160	266	494	277	223	271	282
10	234	233	e225	e145	e170	e165	260	670	290	211	256	250
11	227	229	e210	e145	e165	e220	268	562	334	203	235	235
12	221	229	e200	e150	e165	e300	367	468	324	204	237	232
13	225	233	e190	e150	e160	e350	408	423	284	220	465	224
14	220	248	e185	e150	e160	e550	369	575	268	219	540	219
15	217	246	e180	e155	e155	e450	337	703	253	295	428	223
16	216	236	e180	e155	e150	e400	325	650	245	410	320	252
17	278	232	e175	e155	e160	e350	314	726	236	498	289	268
18	499	236	e170	e155	e165	e300	345	613	230	607	267	240
19	494	233	e170	e160	e165	e270	498	506	229	529	287	238
20	399	236	e170	e160	e160	e250	492	446	221	427	252	268
21	344	275	e170	e160	e160	558	451	406	215	356	229	256
22	316	324	e170	e165	e160	508	421	384	250	307	215	260
23	336	298	e170	e165	e150	453	396	462	243	279	212	265
24	360	296	e170	e170	e150	415	390	474	239	257	208	250
25	326	303	e175	e170	e150	384	380	418	227	244	230	241
26	302	250	e170	e170	e150	359	374	394	217	242	312	230
27	288	262	e165	e170	e150	341	371	379	214	233	372	223
28	278	257	e160	e175	e150	328	358	502	227	227	324	217
29	276	273	e155	e175	---	321	336	749	266	221	285	216
30	275	260	e150	e180	---	307	322	637	276	216	256	249
31	260	---	e145	e180	---	296	---	483	---	241	237	---
TOTAL	8908	7578	6326	4829	4575	9260	10260	14527	8240	8722	8860	7272
MEAN	287	253	204	156	163	299	342	469	275	281	286	242
MAX	499	324	324	180	190	558	498	749	413	607	540	340
MIN	216	229	145	139	150	150	257	286	214	203	208	206
CFSM	.79	.69	.56	.43	.45	.82	.93	1.28	.75	.77	.78	.66
IN.	.91	.77	.64	.49	.46	.94	1.04	1.48	.84	.89	.90	.74

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1995, BY WATER YEAR (WY)

	MEAN	325	337	277	251	244	321	641	499	396	335	290	314
MAX	612	600	424	369	406	833	1235	1104	712	983	983	604	582
(WY)	1986	1916	1986	1986	1984	1973	1967	1965	1981	1953	1972	1959	1959
MIN	179	202	175	156	163	178	235	251	194	185	186	182	182
(WY)	1949	1990	1990	1995	1995	1965	1990	1988	1988	1989	1948	1948	1948

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1914 - 1995

ANNUAL TOTAL	98703	99357	351	1973
ANNUAL MEAN	270	272	512	1990
HIGHEST ANNUAL MEAN			221	1990
LOWEST ANNUAL MEAN				Jul 2 1953
HIGHEST DAILY MEAN	774	Apr 27	4420	Dec 2 1963
LOWEST DAILY MEAN	145	Dec 31	130	Jan 4 1995
ANNUAL SEVEN-DAY MINIMUM	160	Dec 25	140	Jan 2 1995
INSTANTANEOUS PEAK FLOW			(a)788	May 10 1953
INSTANTANEOUS PEAK STAGE			(b)6.18	Mar 14 1995
INSTANTANEOUS LOW FLOW			(c)6.18	Dec 2 1963
ANNUAL RUNOFF (CFSM)	.74	.74	(d)118	
ANNUAL RUNOFF (INCHES)	10.03	10.10	.96	
10 PERCENT EXCEEDS	360	419	553	
50 PERCENT EXCEEDS	249	249	290	
90 PERCENT EXCEEDS	195	158	205	

(a) Gage height 4.69 ft.

(b) Backwater from ice.

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

(d) Discharge measurement.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04061500 PAINT RIVER AT CRYSTAL FALLS, MI

LOCATION.--Lat 46°06'21", long 88°20'05", in SE1/4 sec.20, T.43 N., R.32 W., Iron County, Hydrologic Unit 04030106, on right bank 150 ft downstream from municipal powerplant at Crystal Falls, 14.5 mi upstream from mouth.

DRAINAGE AREA.--597 mi².

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

REVISED RECORDS.--WSP 1174: 1947-48(m). WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,306.1 ft above sea level (Wisconsin Electric Power Co. bench mark).

REMARKS.--Records fair. Diurnal fluctuation caused by powerplant immediately upstream; since storage capacity is small, daily flows are not affected appreciably. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	601	450	420	284	e270	e290	704	792	1060	e340	319	389
2	504	432	449	275	e275	e275	629	748	900	e315	284	348
3	466	415	439	259	e270	e270	618	694	783	e270	302	307
4	432	405	433	247	e270	e265	618	651	720	e240	333	281
5	413	397	447	226	e265	e275	551	616	651	e270	326	309
6	387	394	415	275	e260	e275	566	612	579	e290	321	377
7	370	393	385	282	e270	e270	611	590	e540	e325	302	623
8	371	387	317	280	e270	e270	564	554	e570	e315	337	601
9	363	377	363	266	e260	e275	535	631	e515	e285	406	519
10	346	369	373	263	e260	e275	524	1020	e540	e280	377	428
11	346	373	355	265	e270	281	524	1050	e550	e260	355	381
12	320	366	311	e270	e255	551	613	966	e520	e325	346	354
13	314	377	346	e270	e260	616	791	885	e470	e275	461	318
14	324	385	359	e275	e260	661	909	1230	e420	e310	500	313
15	309	388	350	e280	e250	789	896	1700	e390	e490	486	286
16	298	375	356	e275	e250	839	869	1600	e340	e600	446	316
17	360	367	365	e270	e260	893	853	1650	e315	e760	398	299
18	622	366	345	e270	e270	892	854	1430	e290	e800	354	302
19	838	357	342	e270	e275	807	1110	1190	e250	e760	287	377
20	771	351	342	e270	e275	848	1340	1020	e250	e750	293	308
21	708	407	339	e270	e270	998	1330	880	e290	746	308	310
22	632	529	350	e270	e270	1100	1240	813	e250	684	273	358
23	613	505	352	e270	e275	1010	1130	857	e240	610	258	347
24	659	483	343	e270	e320	948	1070	899	e250	540	246	345
25	580	470	335	e270	e300	914	1050	843	e220	483	308	340
26	575	399	317	e270	e290	869	1030	766	e290	432	489	312
27	556	404	330	e270	e290	841	989	708	e280	403	569	320
28	517	429	332	e270	e295	813	932	846	e280	387	583	294
29	504	467	311	e270	---	810	879	1470	e270	337	545	300
30	482	406	305	e270	---	798	835	1470	e300	323	486	307
31	465	---	300	e270	---	756	---	1240	---	325	441	---
TOTAL	15046	12223	11126	8342	7605	19774	25164	30421	13323	13530	11739	10669
MEAN	485	407	359	269	272	638	839	981	444	436	379	356
MAX	838	529	449	284	320	1100	1340	1700	1060	800	583	623
MIN	298	351	300	226	250	265	524	554	220	240	246	281
CFSM	.81	.68	.60	.45	.45	1.07	1.41	1.64	.74	.73	.63	.60
IN.	.94	.76	.69	.52	.47	1.23	1.57	1.90	.83	.84	.73	.66

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1995, BY WATER YEAR (WY)

MEAN	514	534	384	316	302	464	1543	1016	676	473	368	444
MAX	1516	1201	603	487	616	1818	2732	2549	1414	1657	811	1211
(WY)	1986	1986	1984	1983	1984	1973	1967	1965	1983	1953	1972	1959
MIN	172	230	222	208	202	210	521	371	220	185	181	163
(WY)	1949	1977	1977	1964	1964	1964	1990	1988	1988	1988	1976	1948

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1944 - 1995

ANNUAL TOTAL	159549	178962	586	
ANNUAL MEAN	437	490	882	1973
HIGHEST ANNUAL MEAN			344	1948
LOWEST ANNUAL MEAN			10500	Apr 25 1960
HIGHEST DAILY MEAN	2090	1700	81	Nov 1 1947
LOWEST DAILY MEAN	217	(e)220	145	Sep 28 1948
ANNUAL SEVEN-DAY MINIMUM	231	250	10900	Apr 25 1960
INSTANTANEOUS PEAK FLOW		1780	9.82	Apr 25 1960
INSTANTANEOUS PEAK STAGE		4.13	7.7	Sep 17 1950
INSTANTANEOUS LOW FLOW			.98	
ANNUAL RUNOFF (CFSM)	.73	.82	13.34	
ANNUAL RUNOFF (INCHES)	9.94	11.15		
10 PERCENT EXCEEDS	689	882	1110	
50 PERCENT EXCEEDS	361	373	388	
90 PERCENT EXCEEDS	254	270	238	

(e) Estimated.

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 mi².

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

REVISED RECORDS.--WSP 1727: Drainage area.

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

REMARKS.--Records good. 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	91	85	97	e84	e87	e86	e83	85	87	94	97	95
2	92	83	89	e83	e87	e86	e83	85	87	93	98	94
3	91	83	87	e83	e87	e86	e83	87	86	92	98	94
4	90	83	85	e83	e86	e86	e83	85	85	94	98	95
5	92	83	85	e83	e86	e86	e83	84	85	94	98	96
6	92	83	e86	e83	e86	e86	e83	81	89	148	98	102
7	92	83	87	e83	e86	e86	e83	81	92	224	98	99
8	91	83	e88	e83	e86	e86	e83	83	90	222	96	96
9	89	83	87	e83	e86	e86	e83	86	89	94	109	97
10	89	84	e86	e84	e86	e86	e83	87	90	94	96	96
11	87	87	e86	e84	e86	e86	e83	85	89	95	96	96
12	87	85	e86	e84	e86	e86	e83	83	89	96	96	96
13	87	85	e86	e84	e86	e86	e83	83	89	94	114	99
14	87	85	e85	e84	e86	85	e83	83	89	101	98	96
15	87	85	e85	e84	e86	85	e84	409	89	140	98	98
16	87	85	e85	e85	e86	85	e84	733	89	142	96	99
17	88	85	e85	e85	e86	83	e84	727	88	124	98	98
18	93	85	e86	e85	e86	e83	e84	720	89	97	96	97
19	88	85	e86	e85	e86	e83	e89	707	89	94	96	98
20	87	85	e86	e85	e86	e83	e88	529	89	94	96	98
21	90	85	e86	e85	e86	e83	e86	414	89	97	96	98
22	88	85	e85	e85	e86	e83	e84	288	89	98	96	98
23	87	85	e87	e85	e86	e83	e84	85	89	98	96	100
24	87	85	e87	e85	e86	e83	e84	83	89	98	96	100
25	87	85	87	e85	e86	e83	e84	83	89	97	96	94
26	85	89	87	e86	e86	e83	e84	86	92	96	96	95
27	85	93	86	e86	e86	e83	83	87	92	97	96	97
28	85	89	85	e86	e86	e83	86	88	92	98	96	100
29	84	93	e86	e86	---	e83	85	87	92	94	95	99
30	85	134	e85	e87	---	e83	85	82	94	94	94	100
31	84	---	e85	e87	---	e83	---	85	---	94	96	---
TOTAL	2734	2608	2679	2620	2411	2618	2520	6471	2676	3387	3023	2920
MEAN	88.2	86.9	86.4	84.5	86.1	84.5	84.0	209	89.2	109	97.5	97.3
MAX	93	134	97	87	87	86	89	733	94	224	114	102
MIN	84	83	85	83	86	83	83	81	85	92	94	94

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1995, BY WATER YEAR (WY)

MEAN	128	120	92.6	89.8	92.7	104	438	354	206	143	102	116
MAX	554	383	145	102	225	487	1389	1602	937	969	215	305
(WY)	1986	1989	1983	1965	1984	1973	1954	1972	1983	1953	1978	1980
MIN	85.0	82.0	84.5	71.4	85.1	84.0	81.4	83.5	85.4	86.9	87.0	66.8
(WY)	1971	1992	1993	1955	1991	1956	1990	1992	1975	1983	1958	1962

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1952 - 1995

ANNUAL TOTAL	35802	36667	165
ANNUAL MEAN	98.1	100	321
HIGHEST ANNUAL MEAN			91.4
LOWEST ANNUAL MEAN			1954
HIGHEST DAILY MEAN	937	733	7380
LOWEST DAILY MEAN	80	81	62
ANNUAL SEVEN-DAY MINIMUM	82	83	65
INSTANTANEOUS PEAK FLOW		744	8050
INSTANTANEOUS PEAK STAGE		4.37	10.50
10 PERCENT EXCEEDS	96	98	113
50 PERCENT EXCEEDS	87	86	91
90 PERCENT EXCEEDS	83	83	86

(a) May 6, 7.

(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 mi².

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

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

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

REMARKS.--Records good except for estimated daily discharges, which are fair. 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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	341	355	258	250	e290	276	e520	448	e550	374	476	343
2	361	346	444	259	302	247	e490	424	e470	335	350	295
3	371	361	330	265	300	296	e540	423	e430	297	352	317
4	404	345	398	255	332	306	e490	404	e440	324	368	314
5	295	332	397	242	300	306	e440	381	e420	289	369	303
6	343	343	312	283	234	293	e450	404	e370	395	404	307
7	367	343	297	309	297	286	e480	401	365	496	348	463
8	330	345	263	277	296	270	e515	401	344	440	290	425
9	324	341	257	301	268	297	e480	651	395	347	406	414
10	312	285	329	228	313	269	e480	777	389	314	427	299
11	332	283	297	267	292	284	e430	707	450	295	353	331
12	291	388	254	325	274	340	e580	582	471	289	355	389
13	291	386	267	315	276	502	e625	529	357	344	557	302
14	291	353	360	e300	290	739	e590	667	402	358	801	349
15	314	320	340	e320	284	e720	e595	1110	338	383	566	278
16	318	310	335	e290	271	e710	e550	1400	349	557	440	388
17	406	372	359	e280	284	e540	e550	1480	344	738	434	354
18	730	333	319	e310	301	e525	1380	333	796	375	332	332
19	534	338	306	e310	270	e440	e620	1210	293	676	408	330
20	520	322	323	e310	282	e695	e640	987	318	533	397	352
21	439	422	342	e300	329	e520	e610	856	325	470	340	375
22	401	389	338	e300	293	e615	e520	700	343	443	311	348
23	441	358	341	e320	290	e590	e470	579	326	372	344	343
24	448	349	351	e360	304	e435	e490	602	306	371	311	339
25	472	345	290	e400	306	e530	e480	509	345	438	313	318
26	394	315	302	e350	299	e440	495	493	303	405	506	326
27	387	285	344	e300	297	e500	496	507	296	326	525	290
28	381	347	347	e300	312	e550	484	645	335	327	418	335
29	395	370	316	e300	---	e520	418	896	371	313	430	254
30	380	326	339	e285	---	e560	429	812	385	261	374	360
31	353	---	286	e280	---	e480	---	565	---	319	341	---
TOTAL	11966	10307	10041	9191	8186	14101	15497	21930	11163	12625	12689	10173
MEAN	386	344	324	296	292	455	517	707	372	407	409	339
MAX	730	422	444	400	332	739	640	1480	550	796	801	463
MIN	291	283	254	228	234	247	418	381	293	261	290	254

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 1995, BY WATER YEAR (WY)

	1990	1991	1992	1993	1994	1995
MEAN	411	388	335	307	311	415
MAX	712	571	416	345	344	506
(WY)	1991	1993	1992	1993	1990	1991
MIN	276	307	270	259	270	359
(WY)	1990	1990	1990	1991	1991	1994

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1990 - 1995

ANNUAL TOTAL	140225	147869	419
ANNUAL MEAN	384	405	491
HIGHEST ANNUAL MEAN			325
LOWEST ANNUAL MEAN			3060
HIGHEST DAILY MEAN	1580	1480	182
LOWEST DAILY MEAN	182	228	182
ANNUAL SEVEN-DAY MINIMUM	254	263	202
INSTANTANEOUS PEAK FLOW		1720	3430
INSTANTANEOUS PEAK STAGE		8.42	10.22
10 PERCENT EXCEEDS	482	571	593
50 PERCENT EXCEEDS	347	349	347
90 PERCENT EXCEEDS	286	285	264

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04062085 PESHEKEE RIVER NEAR MARTINS LANDING, MI
(National water quality assessment program station)

LOCATION.--Lat 46°36'35", long 88°01'20", in SW1/4 SE1/4 sec. 26, T.49 N., R.30 W., Marquette County, Hydrologic Unit 04030107, at bridge on Huron Bay Peshekee Grade Road, 0.8 mi upstream from Van Riper Lakes outlet, 5.4 mi northwest of Martins Landing, and 6.4 mi northeast of Michigamme.

DRAINAGE AREA.--43.9 mi².

PERIOD OF RECORD.--Water years 1993 to current year.

REMARKS.--Cross-sectional samples were collected at or near bridge.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	HARD-NESS TOTAL (MG/L AS CaCO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)
NOV									
01...	1115	44	37	6.9	3.5	12.5	95	18	5.1
28...	1500	49	38	7.1	0.0	12.4	93	17	4.9
JAN									
05...	1245	17	48	6.8	0.0	11.8	87	23	6.6
FEB									
02...	1245	18	48	7.0	0.0	12.8	93	23	6.7
MAR									
23...	1415	147	24	6.4	0.0	12.6	91	12	3.5
APR									
25...	1145	239	22	6.4	1.0	12.8	97	10	2.9
MAY									
03...	1130	407	25	6.4	4.0	11.4	93	8	2.2
25...	1145	121	26	7.0	10.0	10.4	97	12	3.6
JUL									
13...	1320	19	60	7.6	20.0	8.2	90	26	7.5

DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CaCO3) (39086)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)
NOV									
01...	1.2	0.70	0.40	14	11	1.7	0.50	<0.10	5.4
28...	1.1	0.60	0.30	15	12	1.5	0.40	<0.10	6.2
JAN									
05...	1.5	0.80	0.40	21	17	2.4	0.30	<0.10	8.8
FEB									
02...	1.5	0.80	0.40	20	17	2.1	0.30	<0.10	9.4
MAR									
23...	0.84	0.50	0.40	8	7	2.2	0.10	<0.10	6.4
APR									
25...	0.71	0.50	0.40	5	4	1.7	0.20	<0.10	5.3
MAY									
03...	0.51	0.40	0.30	4	3	1.7	0.10	<0.10	3.9
25...	0.82	0.50	0.30	9	8	1.7	0.20	<0.10	2.1
JUL									
13...	1.7	0.80	0.40	26	21	2.2	0.20	<0.10	5.3

STREAMS TRIBUTARY TO LAKE MICHIGAN

04062085 PESHEKEE RIVER NEAR MARTINS LANDING, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)
NOV								
01...	36	<0.010	<0.050	<0.015	0.60	0.40	0.020	<0.010
28...	45	<0.010	0.090	<0.015	0.40	0.40	0.010	<0.010
JAN								
05...	52	<0.010	0.110	0.040	0.40	0.30	0.030	0.010
FEB								
02...	57	0.010	0.110	0.040	0.30	0.30	<0.010	<0.010
MAR								
23...	43	<0.010	0.140	<0.015	0.40	0.40	<0.010	<0.010
APR								
25...	35	<0.010	0.130	<0.015	0.40	0.30	0.040	<0.010
MAY								
03...	30	<0.010	0.060	0.020	0.20	0.30	<0.010	<0.010
25...	41	<0.010	0.060	0.020	0.40	0.20	0.010	0.020
JUL								
13...	52	<0.010	0.110	0.030	0.40	0.40	<0.010	<0.010

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV							
01...	<0.010	390	10	15	0.10	2	61
28...	<0.010	310	9	12	0.30	3	80
JAN							
05...	<0.010	400	11	9.9	0.10	2	93
FEB							
02...	<0.010	360	9	9.0	--	1	95
MAR							
23...	<0.010	270	11	12	0.40	6	68
APR							
25...	<0.010	190	11	9.6	0.20	3	69
MAY							
03...	<0.010	140	7	9.2	0.20	2	75
25...	<0.010	250	12	12	0.20	2	79
JUL							
13...	<0.010	500	17	--	--	2	78

STREAMS TRIBUTARY TO LAKE MICHIGAN

04062100 PESHEKEE RIVER NEAR MICHIGAMME, MI

LOCATION.--Lat 46°34'55", long 87°59'51", in SW1/4 SE1/4 sec.1, T.48 N., R.30 W., Marquette County, Hydrologic Unit 04030107, on right bank 10 ft downstream from bridge on county highway, 0.2 mi downstream from Dishno Creek, 5 mi north of Champion, and 6 mi northeast of Michigamme.

DRAINAGE AREA.--66.5 mi².

PERIOD OF RECORD.--July 1961 to September 1968, May 1993 to September 1995 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 1,598.01 ft above sea level. Prior to Aug. 11, 1961, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, Nov. 30 to Mar. 25, Apr. 5-10, which are fair and Apr. 29 to May 11, which are poor. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	105	63	e94	e27	e25	e24	117	e600	193	20	15	11
2	79	56	e84	e27	e25	e24	103	e580	151	19	13	11
3	63	52	e74	e27	e25	e24	99	e550	123	18	18	9.9
4	53	49	e68	e27	e25	e24	99	e530	103	17	29	9.7
5	46	49	e66	e26	e25	e24	e95	e510	85	16	26	9.5
6	41	51	e62	e26	e24	e24	e92	e480	73	16	21	14
7	37	53	e58	e26	e24	e24	e90	e470	70	20	17	36
8	34	53	e56	e26	e24	e25	e88	e450	70	23	15	38
9	33	51	e52	e25	e24	e26	e85	e460	67	24	28	30
10	35	47	e50	e25	e24	e30	e84	e500	64	23	41	25
11	36	44	e46	e25	e24	e31	84	e440	69	20	31	22
12	35	42	e44	e26	e24	e31	124	325	65	17	26	19
13	32	41	e40	e27	e24	e40	176	261	56	19	25	17
14	29	43	e38	e26	e24	e70	188	363	50	24	25	16
15	28	44	e37	e26	e24	e110	197	384	44	25	21	15
16	26	42	e36	e26	e25	e200	203	319	39	26	18	19
17	32	40	e36	e25	e25	e350	187	276	35	30	16	23
18	71	39	e35	e25	e25	e390	212	232	31	34	14	21
19	91	38	e34	e25	e25	e350	242	191	28	37	13	19
20	87	36	e34	e25	e24	e300	231	154	25	74	12	20
21	76	49	e32	e25	e24	e250	233	144	24	86	11	21
22	69	76	e32	e25	e24	e220	210	139	23	79	9.8	21
23	75	94	e31	e25	e24	e194	229	180	34	57	9.3	26
24	85	120	e30	e25	e24	e190	321	195	36	41	8.8	25
25	93	116	e30	e25	e24	e175	360	175	34	44	16	25
26	106	115	e29	e25	e24	164	371	143	29	38	24	23
27	105	119	e28	e25	e24	147	412	119	26	30	23	21
28	94	117	e28	e25	e24	147	435	216	23	25	18	19
29	90	115	e28	e25	---	131	e480	386	22	21	15	17
30	82	e110	e28	e25	---	129	e530	407	22	19	13	28
31	71	---	e27	e25	---	125	---	285	---	16	12	---
TOTAL	1939	1964	1367	793	681	3993	6377	10464	1714	958	583.9	611.1
MEAN	62.5	65.5	44.1	25.6	24.3	129	213	338	57.1	30.9	18.8	20.4
MAX	106	120	94	27	25	390	530	600	193	86	41	38
MIN	26	36	27	25	24	24	84	119	22	16	8.8	9.5
CFSM	.94	.98	.66	.38	.37	1.94	3.20	5.08	.86	.46	.28	.31
IN.	1.08	1.10	.76	.44	.38	2.23	3.57	5.85	.96	.54	.33	.34

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1995, BY WATER YEAR (WY)

	MEAN	81.7	89.3	59.9	32.6	26.3	68.7	399	273	113	51.8	26.5	56.0
MAX	173	160	92.8	56.5	44.6	212	622	695	233	184	68.7	26.6	266
(WY)	1968	1968	1963	1966	1966	1968	1967	1965	1967	1968	1964	1968	1968
MIN	9.01	65.5	35.9	18.8	16.2	22.3	213	120	54.8	7.82	7.47	8.87	8.87
(WY)	1964	1995	1994	1994	1994	1994	1995	1968	1965	1966	1961	1967	1967

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1961 - 1995

ANNUAL TOTAL	30924					31445.0						
ANNUAL MEAN	84.7					86.2				108		
HIGHEST ANNUAL MEAN										145		1968
LOWEST ANNUAL MEAN										83.3		1962
HIGHEST DAILY MEAN	1210				Apr 27	(e)600		May 1	2710		May 8	1965
LOWEST DAILY MEAN	10				Aug 25	8.8		Aug 24	3.9		Sep 9	1961
ANNUAL SEVEN-DAY MINIMUM	12				Feb 4	11		Aug 30	4.3		Sep 4	1961
INSTANTANEOUS PEAK FLOW						(a)			3060		May 8	1965
INSTANTANEOUS PEAK STAGE						(a)			11.46		May 8	1965
INSTANTANEOUS LOW FLOW						8.4		Aug 24	3.6		Sep 1	1961
ANNUAL RUNOFF (CFSM)	1.27					1.30			1.63			
ANNUAL RUNOFF (INCHES)	17.30					17.59			22.09			
10 PERCENT EXCEEDS	160					230			235			
50 PERCENT EXCEEDS	40					34			45			
90 PERCENT EXCEEDS	14					19			12			

(a) Not determined.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04062500 MICHIGAMME RIVER NEAR CRYSTAL FALLS, MI

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

DRAINAGE AREA.--656 mi².

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

REVISED RECORDS.--WSP 1911: Drainage area.

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

REMARKS.--Records good. 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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	742	183	188	785	469	507	233	512	1100	439	541	684
2	391	183	188	783	469	431	232	684	1160	439	532	683
3	215	184	189	438	469	319	227	842	1150	439	545	681
4	215	183	190	671	467	230	210	908	1110	438	496	680
5	215	183	208	634	466	234	210	1060	1020	439	556	683
6	440	183	222	610	466	233	212	1100	1020	441	537	688
7	447	181	221	609	498	235	209	1030	1020	438	531	689
8	216	183	220	608	553	233	211	917	965	438	524	685
9	215	183	221	606	605	233	210	529	815	437	522	679
10	552	182	221	574	697	233	210	741	700	438	482	676
11	723	182	220	569	761	233	430	1050	698	440	480	674
12	579	184	464	568	760	236	506	1140	698	436	481	673
13	202	183	713	610	757	243	373	1250	694	420	513	672
14	202	187	710	598	754	234	231	1390	693	423	511	672
15	201	184	710	598	728	220	223	1650	691	427	490	669
16	201	184	709	597	594	221	223	2020	690	448	393	569
17	215	184	707	597	593	218	212	2340	847	375	197	218
18	224	185	706	595	593	216	210	2210	974	274	396	533
19	221	184	747	594	591	215	229	1640	1010	261	525	678
20	216	183	804	456	593	230	227	1320	1170	270	522	675
21	213	191	804	193	588	233	194	1310	1160	442	521	676
22	215	192	803	192	593	233	156	1320	888	472	600	679
23	216	190	801	318	592	231	152	1320	598	460	630	568
24	219	188	798	530	574	233	152	1320	454	485	506	211
25	219	188	796	613	541	233	148	1300	416	520	622	559
26	217	187	795	611	539	233	470	1150	410	525	707	621
27	215	188	794	610	539	233	685	996	392	525	700	546
28	210	193	792	610	538	234	475	1020	394	511	420	489
29	186	192	789	609	---	234	216	1020	395	505	217	502
30	183	190	789	607	---	232	212	1020	418	505	551	506
31	183	---	786	574	---	232	---	1100	---	524	686	---
TOTAL	8908	5567	17305	17567	16387	7715	7888	37209	23750	13634	15934	18218
MEAN	287	186	558	567	585	249	263	1200	792	440	514	607
MAX	742	193	804	785	761	507	685	2340	1170	525	707	689
MIN	183	181	188	192	466	215	148	512	392	261	197	211

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1995, BY WATER YEAR (WY)

MEAN	513	564	799	868	810	529	647	1069	814	674	596	522
MAX	1220	1432	1427	1274	1252	819	1662	2865	1650	1461	1035	1325
(WY)	1952	1989	1989	1983	1983	1971	1973	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1944 - 1995

ANNUAL TOTAL	203503	190082	700
ANNUAL MEAN	558	521	1049
HIGHEST ANNUAL MEAN			382
LOWEST ANNUAL MEAN			1960
HIGHEST DAILY MEAN	1950	2340	6940
LOWEST DAILY MEAN	174	148	71
ANNUAL SEVEN-DAY MINIMUM	178	180	83
INSTANTANEOUS PEAK FLOW		2350	7260
INSTANTANEOUS PEAK STAGE		6.50	10.73
10 PERCENT EXCEEDS	976	936	1180
50 PERCENT EXCEEDS	508	498	650
90 PERCENT EXCEEDS	188	190	165

STREAMS TRIBUTARY TO LAKE MICHIGAN

04063000 MENOMINEE RIVER NEAR FLORENCE, WI

LOCATION.--Lat 45°57'04", long 88°11'13", in NE1/4 sec.16, T.41 N., R.31 W., Michigan Meridian, Iron County, Hydrologic Unit 04030108, on left bank 0.5 mi downstream from confluence of Brule and Michigamme Rivers, 3.5 mi northeast of Florence, WI, and at mile 117.

DRAINAGE AREA.--1,760 mi².

PERIOD OF RECORD.--January 1914 to current year. Published as "at Twin Falls near Iron Mountain, MI" January 1914 to June 1950.

REVISED RECORDS.--WSP 1707: 1953(M). WDR MI-92-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,119.23 ft above sea level (levels by Owen Ayres Associates). Prior to July 1950, headwater and tailwater gages and generation data entered hourly in daily log sheets by company employees at the Twin Falls Powerplant of Wisconsin Electric Power Co., 10.4 mi downstream.

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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1320	1070	897	1310	1140	1170	1570	1940	2930	1240	1210	1450
2	970	1150	1060	1380	1050	1290	1560	1980	2970	920	1270	1170
3	993	1170	990	1290	e1110	e1380	1530	2050	2700	1090	1220	1150
4	906	1070	1100	1050	e1100	e1400	1160	1390	1720	993	1240	951
5	963	809	1150	e1130	1110	1560	1140	1370	1940	1170	1120	1110
6	1160	750	1040	e1140	1090	1340	1280	2010	2180	1330	1190	1140
7	970	920	1060	1220	1060	1470	1310	1720	2140	969	1610	1970
8	978	775	1080	1170	e1100	1440	1250	1830	2040	1220	1160	1910
9	928	917	903	1220	1190	1470	1090	1870	1870	1050	1490	1830
10	1060	847	931	1150	1200	1490	1210	2380	1560	1140	1330	1700
11	1120	775	767	1180	1160	1530	856	3010	1620	1120	1280	1440
12	1050	689	1020	e1120	1180	1580	743	3020	1900	1190	906	1370
13	785	808	984	e1120	e1100	1730	746	3090	1940	1110	1500	1300
14	845	1020	1140	1210	e1100	1930	1120	3230	1510	1210	2030	1370
15	838	828	1380	1100	1200	1640	958	3880	1460	1070	1950	1310
16	766	928	1350	1040	1160	1730	1030	4840	1480	1700	1820	1210
17	746	1170	1660	1160	e1180	1640	1180	5100	1680	1850	1640	1480
18	1370	725	1580	1100	1280	1700	1320	4600	1810	2110	1170	1160
19	1600	752	1560	1150	1150	1620	1390	3910	1750	1990	895	e980
20	1570	737	1500	1050	1110	1680	1460	3230	1630	1790	847	e1050
21	1520	704	1460	1050	1200	1640	1520	2820	1730	1690	1260	1170
22	1340	917	1420	1080	1180	1650	1810	2820	923	1740	1310	1290
23	1260	1030	1460	1240	1180	2130	1830	2380	938	1660	1100	1310
24	1340	862	1430	1110	1190	2160	1850	2650	1100	1660	1220	1200
25	1140	949	1350	1180	1110	1990	1830	2540	1220	1470	1190	1140
26	1120	1120	1360	1080	1180	2160	1840	2620	880	1170	1480	1220
27	1410	740	1440	1130	1150	2010	1840	2170	1080	1340	1620	1070
28	1260	1030	1480	1090	1110	1810	1950	2240	1040	1250	1530	1330
29	1170	1350	1460	1100	---	1420	2020	3360	1200	1280	1710	1260
30	865	769	1430	1010	---	1480	1820	3110	1270	1140	1850	1130
31	1040	---	1340	1190	---	1150	---	3100	---	1040	1700	---
TOTAL	34403	27381	38782	35550	32070	50380	42213	86260	50211	41702	42848	39171
MEAN	1110	913	1251	1147	1145	1625	1407	2783	1674	1345	1382	1306
MAX	1600	1350	1660	1380	1280	2160	2020	5100	2970	2110	2030	1970
MIN	746	689	767	1010	1050	1150	743	1370	880	920	847	951

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1995, BY WATER YEAR (WY)

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
MEAN	1474	1603	1453	1388	1358	1582	3167	3033	2135	1591	1293	1407
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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1914 - 1995

ANNUAL TOTAL	487772	520971	1790
ANNUAL MEAN	1336	1427	3069
HIGHEST ANNUAL MEAN			1916
LOWEST ANNUAL MEAN			922
HIGHEST DAILY MEAN	3180	5100	18800
LOWEST DAILY MEAN	486	689	57
ANNUAL SEVEN-DAY MINIMUM	717	810	277
INSTANTANEOUS PEAK FLOW		5440	19500
INSTANTANEOUS PEAK STAGE		7.21	(a)14.15
INSTANTANEOUS LOW FLOW			(a)38
10 PERCENT EXCEEDS	1800	2010	3040
50 PERCENT EXCEEDS	1340	1240	1460
90 PERCENT EXCEEDS	823	922	841

(a) Since July 1950.

(b) Aug. 21, 1962, Sept. 26, 1975.

(c) 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 Wisconsin Electric Power Company powerhouse at Twin Falls Dam, 3.6 mi north of Iron Mountain, and at mile 106.6.

DRAINAGE AREA.--1,800 mi².

PERIOD OF RECORD.--January 1914 to current year. Published as "near Florence, WI" October 1957 to September 1989.

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 Wisconsin Electric Power Co.). Prior to September 1957, headwater and tailwater gages and generation data entered hourly in daily log sheets by company employees. Oct. 1957 to Sept. 1989, water-stage recorder at site 10.4 mi upstream at different datum. Nov. 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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1270	1160	932	1290	1090	1150	1690	2120	3120	1380	1340	1560
2	1120	1140	1050	1340	1080	1170	1640	2050	3040	1070	1430	1200
3	1050	1150	1030	1030	1110	1460	1470	2090	2790	1060	1280	1180
4	1070	1150	1060	1170	1130	1400	1230	1430	2010	905	1430	1010
5	1060	842	1100	1100	1130	1470	1230	1370	2070	1310	1180	1160
6	1160	831	1060	1170	1050	1540	1300	2130	2240	1250	1280	1380
7	1050	938	1140	1060	1080	1370	1370	1870	2310	1110	1610	1930
8	1090	828	924	1190	1190	1340	1280	1890	2140	1200	1320	2090
9	1070	931	903	1150	1140	1520	1190	2050	1960	1110	1570	1960
10	1120	871	859	1110	1090	1320	1210	2360	1740	1280	1470	1770
11	1110	790	755	1150	1170	1380	969	3150	1760	1190	1330	1580
12	1040	820	1050	1130	1150	1460	743	3230	2000	1100	1040	1460
13	819	811	1050	1110	1160	1640	908	3160	2010	1140	1630	1420
14	812	1150	1160	1130	1110	1850	1100	3500	1580	1320	2340	1400
15	852	777	1260	1100	1110	1780	1010	3990	1550	1340	2370	1350
16	860	1050	1360	1070	1150	1770	1120	4870	1670	1690	1780	1430
17	942	999	1510	1100	1150	1750	1150	5160	1660	1970	1810	1470
18	1370	830	1580	1090	1090	1810	1490	4750	1880	2230	1210	1310
19	1730	806	1520	1160	1110	1670	1640	4120	1790	2180	997	1090
20	1730	810	1500	1060	1160	1580	1330	3400	1760	1980	872	1170
21	1550	783	1410	1050	1140	1840	1620	3060	1800	1820	1380	1210
22	1320	928	1310	1160	1110	1810	1900	2930	940	1820	1290	1370
23	1410	1060	1430	1100	1130	2270	1850	2760	1040	1730	1240	1420
24	1280	914	1340	1040	1160	2140	2010	2650	1090	1730	1280	1220
25	1330	1030	1380	1170	1050	2150	1930	2750	1300	1610	1160	1220
26	1160	981	1250	1060	1080	2200	1940	2700	1030	1190	1580	1210
27	1310	850	1340	1030	1190	2160	1960	2250	1090	1430	1790	1170
28	1380	1010	1470	1050	1130	1860	2100	2530	1130	1350	1760	1340
29	1160	1310	1420	1020	---	1660	2100	3290	1210	1420	1750	1370
30	904	816	1360	1080	---	1440	1850	3420	1450	1060	1880	1190
31	1140	---	1380	1140	---	1370	---	3240	---	1040	1850	---
TOTAL	36269	28366	37893	34610	31440	51330	44330	90270	53160	44015	46249	41640
MEAN	1170	946	1222	1116	1123	1656	1478	2912	1772	1420	1492	1388
MAX	1730	1310	1580	1340	1190	2270	2100	5160	3120	2230	2370	2090
MIN	812	777	755	1020	1050	1150	743	1370	940	905	872	1010

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1914 - 1995, BY WATER YEAR (WY)

MEAN	1481	1614	1462	1397	1365	1594	3183	3044	2150	1603	1306	1418
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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1914 - 1995

ANNUAL TOTAL	515381		539572			
ANNUAL MEAN	1412		1478		1802	
HIGHEST ANNUAL MEAN					3069	1916
LOWEST ANNUAL MEAN					922	1925
HIGHEST DAILY MEAN	3380	Jul 14	5160	May 17	18100	Apr 26 1960
LOWEST DAILY MEAN	635	May 8	743	Apr 12	57	Sep 26 1975
ANNUAL SEVEN-DAY MINIMUM	856	Nov 7	856	Nov 7	277	Oct 18 1975
INSTANTANEOUS PEAK FLOW			5480	May 16	19500	Apr 26 1960
INSTANTANEOUS PEAK STAGE			9.62	May 16	(a)9.91	May 5 1993
INSTANTANEOUS LOW FLOW			420	Apr 12	(a)399	Aug 30 1992
10 PERCENT EXCEEDS	1880		2140		3050	
50 PERCENT EXCEEDS	1380		1290		1470	
90 PERCENT EXCEEDS	879		991		850	

(a) Since October 1989.

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 Quinnebec Falls Dam, at Niagara, WI.

DRAINAGE AREA.--2,470 mi².

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

GAGE.--Water-stage recorder. Elevation of gage is 880 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by powerplants, by Michigamme Reservoir, capacity, 119,950 acre-ft, by Peavy Pond, capacity, 33,860 acre-ft, on Michigamme River, and by smaller reservoirs upstream of gage. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1890	1480	1290	1560	1350	e1500	2000	2620	4270	1620	1510	2000
2	1660	1490	1490	1660	1360	e1600	1880	2530	3930	1380	1710	1660
3	1570	1530	1450	1420	1350	e1800	1780	2600	3470	1350	1600	1490
4	1560	1480	1440	1390	1360	e1700	1480	1880	2430	1110	1980	1270
5	1380	1270	1510	1380	1430	e1800	1530	1930	2690	1470	1560	1560
6	1560	1130	1510	1370	1380	e1800	1590	2430	2580	1510	1560	1640
7	1470	1170	1490	1360	1370	e1800	1550	2350	2670	1340	2090	2070
8	1490	1220	1100	1370	1380	1730	1650	2210	2630	1450	1720	2360
9	1470	1150	1100	1390	1380	1720	1470	2860	2210	1390	1780	2300
10	1430	1180	1130	1390	1410	1660	1470	3490	2050	1520	2150	2060
11	1380	1150	1100	1380	1490	1650	1220	4340	2170	1460	1680	1940
12	1390	1090	1250	1350	1430	1740	1290	4400	2390	1380	1380	1550
13	1150	1040	1410	1350	1390	1990	1560	4220	2390	1330	2290	1740
14	1120	1430	1440	1380	1440	2590	1780	4660	1940	1550	3600	1550
15	1060	1260	1530	1340	1340	2750	1590	5190	1830	1670	3250	1710
16	1120	1460	1630	1340	1390	2880	1640	6040	1830	2000	2310	1670
17	1310	1160	1840	1330	1420	2650	1550	6740	1880	2220	2300	1740
18	1910	1150	1910	1340	1350	2500	1930	6180	2050	3210	1750	1680
19	2680	1030	1820	1350	1340	2350	2590	5440	2070	2690	1530	1530
20	2740	1140	1830	1340	e1400	1980	2300	4320	1970	2420	1290	1590
21	2220	1110	1840	1390	e1400	2700	2560	3820	1940	2290	1660	1580
22	1980	1380	1600	1360	e1400	2800	2570	3740	1160	2020	1530	1670
23	2000	1460	1710	1370	e1400	3160	2600	3490	1210	2140	1520	1680
24	2030	1380	1710	1340	e1400	2940	2620	3470	1370	2030	1560	1620
25	1820	1460	1720	1360	e1400	2690	2720	3530	1370	1850	1540	1510
26	1780	1310	1640	1370	e1400	2650	2360	3470	1270	1480	1820	1510
27	1770	1150	1610	1330	e1400	2460	2600	2860	1290	1650	2480	1470
28	1860	1380	1660	1260	e1400	2350	2670	3280	1340	1650	2460	1510
29	1700	1760	1730	1250	---	1950	2680	4360	1480	1490	2380	1510
30	1140	1080	1700	1290	---	1780	2390	4730	1930	1260	2300	1430
31	1060	---	1610	1330	---	1790	---	4400	---	1330	2270	---
TOTAL	50700	38480	47800	42440	38960	67460	59620	117580	63810	53260	60560	50600
MEAN	1635	1283	1542	1369	1391	2176	1987	3793	2127	1718	1954	1687
MAX	2740	1760	1910	1660	1490	3160	2720	6740	4270	3210	3600	2360
MIN	1060	1030	1100	1250	1340	1500	1220	1880	1160	1110	1290	1270

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1993 - 1995, BY WATER YEAR (WY)

MEAN	1678	1804	1943	1774	1786	1906	2445	3316	2737	2068	1605	1942
MAX	1767	2531	2458	2258	2082	2176	3395	4083	4184	2579	1954	2225
(WY)	1994	1993	1993	1993	1993	1995	1993	1993	1993	1994	1995	1994
MIN	1632	1283	1542	1369	1391	1764	1953	2074	1899	1718	1368	1687
(WY)	1993	1995	1995	1995	1995	1994	1994	1994	1994	1995	1993	1995

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR	FOR 1995 WATER YEAR	WATER YEARS 1993 - 1995
ANNUAL TOTAL	669830	691270	
ANNUAL MEAN	1835	1894	2085
HIGHEST ANNUAL MEAN			2463
LOWEST ANNUAL MEAN			1894
HIGHEST DAILY MEAN	4330	Sep 16	7770
LOWEST DAILY MEAN	1030	Nov 19	1030
ANNUAL SEVEN-DAY MINIMUM	1110	Aug 14	1110
INSTANTANEOUS PEAK FLOW			8070
INSTANTANEOUS PEAK STAGE			11.02
10 PERCENT EXCEEDS	2530		3350
50 PERCENT EXCEEDS	1720		1800
90 PERCENT EXCEEDS	1160		1310

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04065722 MENOMINEE RIVER NEAR VULCAN, MI

LOCATION.--Lat 45°44'12", long 87°51'48", sec.34, T.39 N., R.29 W., Michigan Meridian, Dickinson County, Hydrologic Unit 04030108, on left bank 0.35 mi downstream from Sturgeon Falls Dam, 3.0 mi south of Vulcan, and at mile 78.7.

DRAINAGE AREA.--2,900 mi².

PERIOD OF RECORD.--December 1987 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 820 ft above sea level, from topographic map.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2250	1870	1520	1750	1500	e1250	2430	3060	4600	1970	1600	2190
2	1830	1780	1870	1790	1520	e1250	2230	3070	4300	1700	1720	1850
3	1980	1830	1760	1530	1510	e1300	2240	3060	3960	1580	1710	1600
4	1850	1790	1750	1450	1450	e1500	1880	2440	2870	1340	2130	1320
5	1570	1580	1770	1430	1660	e1600	1830	2290	3090	1660	1760	1560
6	1760	1430	1810	1440	1500	e1650	1930	2880	2870	1730	1740	1700
7	1740	1430	1820	1460	1480	e1700	1870	2750	2940	1510	2290	e2400
8	1710	1490	1400	1470	1490	e1900	1920	2610	3000	1570	1870	e2500
9	1620	1450	1320	1430	1500	e1950	1820	3160	2540	1530	1880	e2400
10	1630	1420	1340	1480	1520	e1950	1770	4070	2360	1660	2340	e2250
11	1590	1420	1360	1480	1490	e1900	1580	4800	2400	1580	1750	e2000
12	1580	1310	1470	1470	1500	e1950	1660	4890	2760	1560	1530	e1850
13	1400	1300	1640	1440	1500	e2100	1920	4670	2770	1440	2180	e1750
14	1320	1640	1630	1460	1500	e2500	2300	4990	2350	1610	3920	e1750
15	1220	1540	1690	1480	1420	3240	2080	5500	2150	1920	3610	e1800
16	1310	1730	1820	1490	1480	3470	2070	6340	2120	2430	2610	e1900
17	1490	1490	2040	1470	1480	3250	2000	7200	2030	2560	2610	e1900
18	2170	1430	2070	1470	1490	3090	2190	6780	2270	3530	2150	e1800
19	3080	1250	2110	1500	e1450	2910	3370	6060	2350	3140	1630	e1700
20	3190	1360	2030	1490	e1400	2620	3260	4800	2190	2920	1590	e1800
21	2670	1400	2040	1490	e1350	3350	3520	4260	2170	2640	1810	e1800
22	2470	1630	1790	1500	e1400	3560	3470	4150	1430	2370	1740	e1800
23	2540	1720	1890	1500	e1400	3990	3370	3960	1320	2490	1610	e1900
24	2570	1750	1750	1500	e1320	3640	3360	3960	1560	2290	1540	e1850
25	2390	1670	1950	1490	e1300	3310	3370	3960	1530	2230	1740	e1850
26	2370	1640	1870	1510	e1250	3280	3060	3860	1450	1590	1900	2000
27	2160	1410	1820	1480	e1280	2910	3140	3470	1420	1870	2780	1750
28	2240	1600	1810	1440	e1250	2890	3310	3580	1490	1750	2830	1700
29	2090	2110	1890	1400	---	2410	3280	4670	1640	1610	2660	1760
30	1770	1450	1900	1400	---	2220	3020	5170	2100	1400	2600	1680
31	1720	---	1800	1460	---	2190	---	4930	---	1450	2470	---
TOTAL	61280	46920	54730	46150	40390	76830	75250	131390	72030	60630	66300	56110
MEAN	1977	1564	1765	1489	1442	2478	2508	4238	2401	1956	2139	1870
MAX	3190	2110	2110	1790	1660	3990	3520	7200	4600	3530	3920	2500
MIN	1220	1250	1320	1400	1250	1250	1580	2290	1320	1340	1530	1320

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1995, BY WATER YEAR (WY)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
MEAN	1854	2382	2293	1989	1887	2410	3581	3319	2810	2012	1579	1945
MAX	2510	4412	3008	2533	2378	2849	5756	4917	4832	2735	2139	2456
(WY)	1991	1989	1989	1993	1993	1991	1992	1993	1993	1992	1995	1994
MIN	1081	1382	1555	1489	1442	2028	1356	1720	1062	1100	1256	1223
(WY)	1990	1990	1990	1995	1995	1994	1990	1988	1988	1988	1989	1989

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1988 - 1995

ANNUAL TOTAL	780900		788010		2395	
ANNUAL MEAN	2139		2159		2920	1993
HIGHEST ANNUAL MEAN					1864	1990
LOWEST ANNUAL MEAN					10300	May 31 1991
HIGHEST DAILY MEAN	5140	Apr 28	7200	May 17	846	Aug 3 1988
LOWEST DAILY MEAN	1180	Aug 17	1220	Oct 15	932	Oct 1 1989
ANNUAL SEVEN-DAY MINIMUM	1220	Aug 14	1270	Feb 25	10700	May 31 1991
INSTANTANEOUS PEAK FLOW			7310	May 17	12.82	May 31 1991
INSTANTANEOUS PEAK STAGE			10.51	May 17	603	Aug 1 1992
INSTANTANEOUS LOW FLOW			749	Nov 18	3860	
10 PERCENT EXCEEDS	2950		3370		1810	
50 PERCENT EXCEEDS	2000		1810		1290	
90 PERCENT EXCEEDS	1450		1430			

(e) Estimated.

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, MI, Hydrologic Unit 04030108, on left bank 40 ft downstream from County Trunk Z bridge, 0.9 mi downstream from Pemene Creek, 3.9 mi west of Nathan, 10.6 mi southeast of Pembine, WI, and at mile 64.3.

DRAINAGE AREA.--3,140 mi².

PERIOD OF RECORD.--October 1949 to current year. Published as "near Pembine, WI" (04066000) prior to August 1982. Monthly discharges for some periods published in WSP 1307.

GAGE.--Water-stage recorder. Elevation of gage is 740 ft above sea level, from topographic map. October 1949 to Oct. 27, 1972, water-stage recorder at site 1.0 mi upstream at elevation 745, from river-profile map, and Oct. 28, 1972, to August 1982, water-stage recorder at site 1.5 mi upstream at elevation 770, from river-profile map.

REMARKS.--Records good except those for ice-affected periods, which are fair. Flow regulated by powerplants and by Michigamme Reservoir, capacity, 119,950 acre-ft, and by Peavy Pond, capacity, 33,860 acre-ft, on Michigamme River, and by many smaller reservoirs above station. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2600	1900	1440	1800	e1700	e1600	2470	3180	4840	2110	1570	2470
2	1890	1810	1780	e2100	e1700	e1600	2250	3250	4500	1780	1670	2010
3	2170	1810	1850	e1800	e1700	e1800	2270	3180	4170	1560	1840	1860
4	1880	1880	1760	e1800	e1700	e2000	1900	2800	3210	1510	2090	1590
5	1670	1710	1810	e1800	e1800	e2000	1790	2360	3020	1400	1990	1550
6	1650	1530	1830	e1800	e1800	e2000	1900	2900	3000	1690	1780	1880
7	1710	1430	1880	e1800	e1800	e2000	1890	2830	2980	1610	2190	2470
8	1690	1460	1700	e1800	e1800	e2000	1880	2810	3060	1470	2080	2760
9	1600	1560	1380	e1800	e1800	e2000	1930	3160	2670	1560	2020	2730
10	1640	1380	e1400	e1800	e1900	e2000	1710	4330	2440	1540	2490	2670
11	1560	1430	e1500	e1800	e1900	e2000	1720	4900	2450	1630	2000	2300
12	1570	1350	e1600	e1700	e1800	e2400	1660	5110	2790	1540	1880	1940
13	1530	1340	e1800	e1700	e1800	e3200	1980	4920	2770	1380	1920	2120
14	1370	1450	e1800	e1800	e1900	e3000	2530	5080	2490	1450	3980	1850
15	1310	1680	e1900	e1700	e1800	3400	2140	5800	2180	1870	3970	1930
16	1320	1620	e2000	e1700	e1800	3640	2200	6490	2110	2400	3090	2000
17	1370	1660	e2100	e1700	e1800	3490	2100	7560	2030	2540	2850	2260
18	2070	1420	e2200	e1700	e1700	3360	2170	7270	2230	3520	2400	1890
19	3220	1350	2220	e1700	e1800	2990	3650	6430	2320	3360	1960	1860
20	3280	1340	2090	e1700	e1800	2870	3610	5160	2170	3110	1860	2020
21	2930	1420	2060	e1800	e1900	3480	3900	4480	2140	2690	1770	2010
22	2670	1550	1830	e1700	e2000	3850	3800	4290	1660	2470	1900	1990
23	2690	1760	1880	e1800	e1900	4080	3610	4090	1300	2480	1750	2090
24	2890	1840	1740	e1700	e1900	3810	3530	4180	1430	2320	1660	2110
25	2690	1640	1990	e1800	e1800	3540	3510	4090	1530	2260	1890	1920
26	2570	1710	1880	e1800	e1700	3340	3420	4010	1460	1720	1880	1850
27	2360	1490	1840	e1700	e1800	3070	3240	3780	1430	1780	2890	1860
28	2370	1570	1840	e1600	e1700	2880	3530	3570	1390	1820	3000	1810
29	2200	2090	1920	e1600	---	2560	3480	4840	1530	1670	2840	1840
30	1980	1740	1910	e1700	---	2220	3230	5520	2000	1560	2780	1710
31	1800	---	1840	e1700	---	2180	---	5330	---	1320	2700	---
TOTAL	64250	47920	56770	54400	50500	84360	79000	137700	73300	61120	70690	61350
MEAN	2073	1597	1831	1755	1804	2721	2633	4442	2443	1972	2280	2045
MAX	3280	2090	2220	2100	2000	4080	3900	7560	4840	3520	3980	2760
MIN	1310	1340	1380	1600	1700	1600	1660	2360	1300	1320	1570	1550

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1995, BY WATER YEAR (WY)

	MEAN	2497	2653	2324	2119	2069	2605	5532	4787	3405	2530	2100	2356
MAX	5659	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1950 - 1995

ANNUAL TOTAL	818590						841360						
ANNUAL MEAN	2243						2305						
HIGHEST ANNUAL MEAN										2915			
LOWEST ANNUAL MEAN										4318			1960
HIGHEST DAILY MEAN										1778			1977
LOWEST DAILY MEAN	5760				Apr 28		7560		May 17	26700		May 8	1960
ANNUAL SEVEN-DAY MINIMUM	1260				Aug 15		1300		Jun 23	840		Aug 14	1977
INSTANTANEOUS PEAK FLOW	1290				Aug 15		1420		Nov 7	914		Aug 8	1977
INSTANTANEOUS PEAK STAGE							7740		May 17	26900		May 8	1960
10 PERCENT EXCEEDS	3200						11.00		May 17	(a)13.90		May 8	1960
50 PERCENT EXCEEDS	2040						1900			4960			
90 PERCENT EXCEEDS	1500						1540			2300			

(a) Site and datum then in use.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04067500 MENOMINEE RIVER NEAR McALLISTER, WI
(National water quality assessment program station)

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 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1945 to September 1961, October 1961 to September 1979 (miscellaneous measurements and annual maximums 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 (discontinued).

GAGE.--Water-stage recorder. 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, 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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3610	2790	2410	2310	e1900	e1950	2980	4270	6140	2390	1580	2780
2	3300	2530	2280	1890	e1950	e1850	3000	4270	5600	2180	1500	2610
3	2450	2380	2410	e1850	e1950	e1700	2980	4100	5180	2020	1870	2130
4	2980	2410	2420	e1750	e1950	e1900	2560	4140	4680	1830	2110	2000
5	2830	2350	2390	e1550	e1750	e2200	2400	3350	3570	1720	2280	1860
6	2300	2140	2360	e1900	e1550	e2050	2420	3220	3660	1750	2350	1650
7	2270	1940	2340	e2200	e1700	e2100	2370	3780	3640	1960	2040	2120
8	2290	2060	2350	e1950	e1800	e2200	2360	3590	3560	1850	2460	2640
9	2100	1930	2010	e1950	e1900	e2100	2360	3920	3570	1830	2260	2990
10	2080	2040	2080	e1900	e1850	e2200	2410	4980	3110	1820	2410	2950
11	2180	1830	1600	e2050	e1700	e2300	2310	5800	3050	1800	2790	2750
12	1920	1890	1630	e2100	e1680	e2400	2280	6350	3150	1820	2400	2370
13	1950	1850	1980	e2100	e1700	e2450	2790	6320	3340	1800	2360	2140
14	1670	1850	2270	e2000	e1800	e2780	3200	6230	3190	1770	2470	2340
15	1630	2030	2350	e1950	e1850	e3900	3210	6440	2860	1870	4360	1780
16	1550	2180	2240	e2000	e1820	e4450	2990	7260	2540	2420	4310	2120
17	1820	2170	2490	e2000	e1750	e4800	3090	7620	2480	2830	3280	2390
18	2420	2270	2580	e1950	e1800	e4750	2980	8420	2460	3180	3310	2110
19	3480	1790	2600	e1950	e1900	e4400	4030	8050	2710	4140	2470	2140
20	4410	1770	2750	e1900	e1800	e4350	6000	7130	2550	3810	2200	2180
21	4130	1990	2560	e1900	e1850	e4400	5630	5740	2470	3580	2250	2250
22	3760	2130	2480	e1950	e1950	e5900	5720	5300	2300	2920	2040	2090
23	3500	2310	2250	e1950	e2000	e5400	5160	5170	1920	2850	2070	2090
24	3990	2400	2460	e1900	e2000	e5300	4950	4930	1590	2790	1940	2290
25	4100	2310	2260	e1980	e2050	e4850	4740	5150	1660	2660	1870	2300
26	3590	2160	2380	e1750	e1950	e4300	4720	4750	1740	2450	2020	2030
27	3300	2160	2270	e1800	e2000	e4000	4690	4670	1700	2010	2450	1960
28	3230	2230	2320	e1900	e2000	e3700	4510	4460	1680	2110	3260	2040
29	2850	2480	2440	e1800	---	e3600	4780	5010	1810	1970	3070	1870
30	2850	2580	2370	e1800	---	e3600	4700	6190	1960	1980	3100	2200
31	2480	---	2310	e1790	---	e2900	---	6520	---	1930	3060	---
TOTAL	87020	64950	71640	59770	51900	104780	108320	167130	89870	72040	78140	67170
MEAN	2807	2165	2311	1928	1854	3380	3611	5391	2996	2324	2521	2239
MAX	4410	2790	2750	2310	2050	5900	6000	8420	6140	4140	4360	2990
MIN	1550	1770	1600	1550	1550	1700	2280	3220	1590	1720	1500	1650

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1995, BY WATER YEAR (WY)

	MEAN	3021	3349	2653	2413	2380	3011	6608	5429	4012	3204	2403	2727
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	2257	1296	1374	1377	1390	
(WY)	1949	1990	1990	1949	1948	1956	1990	1988	1988	1988	1957	1989	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1945 - 1995

ANNUAL TOTAL	1004490						1022730						
ANNUAL MEAN	2752						2802						
HIGHEST ANNUAL MEAN										3451			1960
LOWEST ANNUAL MEAN										5496			1948
HIGHEST DAILY MEAN	7190				Sep 17		8420		May 18	31800		May 9	1960
LOWEST DAILY MEAN	1370				Aug 17		1500		Aug 2	810		Oct 26	1948
ANNUAL SEVEN-DAY MINIMUM	1450				Aug 13		1730		Jun 23	952		Oct 24	1948
INSTANTANEOUS PEAK FLOW							8980		May 18	32500		May 9	1960
INSTANTANEOUS PEAK STAGE							13.34		May 18	(a)20.00		May 9	1960
INSTANTANEOUS LOW FLOW							1330		Jul 14	(b)538		Oct 6	1946
10 PERCENT EXCEEDS	4130						4730			6180			
50 PERCENT EXCEEDS	2440						2340			2670			
90 PERCENT EXCEEDS	1900						1800			1670			

(a) From graph based on gage readings:

(b) Observed.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN
04067500 MENOMINEE RIVER NEAR McALLISTER, WI--Continued
WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978-86, 1993 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 1979 to September 1980.

WATER TEMPERATURE: June 1979 to September 1980.

REMARKS.--Cross-sectional samples collected at bridge.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 250 microsiemens, Mar. 12, 16, 1980; minimum daily, 105 microsiemens, June 4, 1980.

WATER TEMPERATURE: Maximum daily, 26.0°C, July 11, 1980; minimum daily, 0.0°C, on many days during winter periods.

EXTREMES OUTSIDE PERIOD OF DAILY RECORD.--A specific conductance of 320 microsiemens was measured Mar. 24, 1978.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CaCO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS Ca) (00915)
NOV									
03...	0900	2460	255	8.1	5.0	11.9	96	120	28
DEC									
01...	1240	2090	309	8.2	0.0	13.8	97	120	28
JAN									
04...	1230	1750	286	7.8	0.0	14.0	98	120	28
31...	1130	1790	304	7.9	0.0	13.2	94	130	29
MAR									
30...	1245	3190	230	7.8	4.0	12.8	100	110	24
APR									
20...	1100	6120	233	7.9	6.0	13.2	109	110	25
MAY									
04...	1030	4210	211	7.9	10.0	12.3	112	99	23
23...	1030	4460	175	8.0	15.5	10.0	103	82	19
JUL									
12...	1245	1760	259	8.3	24.0	7.3	--	150	41

DATE	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CaCO3 (39086)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)
NOV									
03...	13	6.7	1.4	127	104	13	5.4	<0.10	8.9
DEC									
01...	13	9.6	1.3	138	113	17	6.7	<0.10	8.6
JAN									
04...	13	8.4	1.5	121	99	16	6.7	<0.10	10
31...	13	12	1.7	146	120	21	7.7	<0.10	11
MAR									
30...	11	5.4	1.6	106	87	11	4.5	<0.10	8.2
APR									
20...	11	6.0	1.6	116	95	9.6	5.6	<0.10	6.0
MAY									
04...	10	5.0	1.2	106	87	10	4.6	0.10	4.7
23...	8.3	4.0	1.0	90	74	8.3	3.4	<0.10	5.2
JUL									
12...	12	9.9	1.5	129	106	16	7.0	<0.10	6.2

STREAMS TRIBUTARY TO LAKE MICHIGAN
04067500 MENOMINEE RIVER NEAR McALLISTER, WI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)
NOV 03...	164	<0.010	0.120	<0.015	0.50	0.40	0.040	0.020
DEC 01...	181	<0.010	0.120	<0.015	0.30	0.30	0.020	<0.010
JAN 04...	171	<0.010	0.210	0.030	0.30	0.30	0.040	0.030
31...	189	<0.010	0.220	0.050	0.30	0.20	0.030	0.020
MAR 30...	137	<0.010	0.200	0.020	0.30	0.30	0.020	<0.010
APR 20...	143	0.010	0.110	<0.015	0.50	0.30	0.020	0.010
MAY 04...	138	0.010	<0.050	0.020	0.30	0.30	<0.010	<0.010
23...	126	<0.010	0.080	<0.015	0.40	0.30	<0.010	<0.010
JUL 12...	153	<0.010	0.060	<0.015	0.40	0.30	0.040	0.020

DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 03...	0.010	130	18	10	0.40	5	79
DEC 01...	<0.010	120	26	8.6	0.40	4	83
JAN 04...	0.010	110	15	7.2	0.20	--	--
31...	<0.010	100	12	6.1	0.20	2	89
MAR 30...	<0.010	140	15	6.7	0.30	6	63
APR 20...	<0.010	100	13	7.4	0.80	11	82
MAY 04...	<0.010	87	15	7.6	0.40	5	76
23...	<0.010	84	14	9.2	0.60	9	91
JUL 12...	0.010	57	24	--	--	6	96

STREAMS TRIBUTARY TO LAKE MICHIGAN

04096405 ST. JOSEPH RIVER AT BURLINGTON, MI

LOCATION.--Lat 42°06'11", long 85°04'48", in SE1/4 SE1/4 sec.23, T.4 S., R.7 W., Calhoun County, Hydrologic Unit 04050001, on right bank 10 ft downstream from bridge on Elevenmile Road in Burlington, 4.1 mi upstream from Burnett Creek, 6.7 mi downstream from Tekonsha Creek, and at mile 161.

DRAINAGE AREA.--206 mi².

PERIOD OF RECORD.--October 1962 to current year. Published as "near Burlington" prior to October 1991.

GAGE.--Water-stage recorder. Elevation of gage is 905 ft above sea level, from topographic map. October 1962 to September 1990 water-stage recorder and October 1990 to September 1991 nonrecording gage at site 2.7 mi upstream at different datum (station 04096400).

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68	79	134	146	e180	147	146	164	156	137	35	44
2	66	77	127	e140	e170	e140	142	160	146	124	34	40
3	62	85	121	e130	e160	e130	140	155	143	111	68	43
4	60	86	114	e110	e140	e125	138	151	137	101	82	46
5	63	85	113	e120	e130	e130	134	154	130	99	84	42
6	57	102	114	e115	e125	134	134	152	122	95	77	39
7	50	104	134	e110	e125	186	132	149	116	87	67	43
8	49	106	140	e110	e125	286	139	144	110	81	71	52
9	64	113	154	e115	e130	279	178	144	106	75	69	51
10	61	119	167	e120	e130	284	237	146	108	71	64	51
11	64	121	168	127	e130	286	244	148	115	66	60	46
12	59	123	161	135	e130	296	255	151	111	63	54	42
13	54	119	146	161	e130	300	250	147	102	62	49	39
14	50	116	140	194	e130	296	240	143	96	56	48	37
15	48	113	139	204	e130	284	225	138	91	51	57	34
16	55	106	137	201	e130	269	210	132	85	52	66	32
17	56	100	177	197	e130	253	197	129	80	54	135	32
18	52	96	210	195	e130	237	191	126	76	50	174	31
19	60	94	220	198	131	219	188	124	73	42	146	30
20	57	93	222	223	140	209	184	121	69	42	125	32
21	57	95	219	257	145	202	190	117	64	47	111	37
22	58	91	213	260	143	197	191	117	60	45	94	46
23	56	89	204	254	147	193	187	115	58	65	82	45
24	54	88	195	252	151	183	181	129	56	59	73	45
25	54	89	186	251	149	173	179	160	65	54	67	42
26	54	83	176	247	145	164	175	190	91	51	62	40
27	53	86	168	e220	144	159	177	189	93	59	58	38
28	52	129	161	e205	148	160	176	192	115	54	56	35
29	51	143	155	e195	---	157	171	189	132	50	55	33
30	49	142	147	e190	---	154	167	182	141	42	52	31
31	52	---	144	e185	---	150	---	169	---	36	48	---
TOTAL	1745	3072	5006	5567	3898	6382	5498	4627	3047	2081	2323	1198
MEAN	56.3	102	161	180	139	206	183	149	102	67.1	74.9	39.9
MAX	68	143	222	260	180	300	255	192	156	137	174	52
MIN	48	77	113	110	125	125	132	115	56	36	34	30
CFSM	.27	.50	.78	.87	.68	1.00	.89	.72	.49	.33	.36	.19
IN.	.32	.55	.90	1.01	.70	1.15	.99	.84	.55	.38	.42	.22

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1995, BY WATER YEAR (WY)

MEAN	103	139	183	183	203	311	311	222	187	116	87.5	85.3
MAX	357	378	308	508	428	668	567	426	640	308	270	237
(WY)	1987	1993	1983	1993	1968	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1963 - 1995

	1994	1995	1963-1995
ANNUAL TOTAL	53324	44444	
ANNUAL MEAN	146	122	177
HIGHEST ANNUAL MEAN			270
LOWEST ANNUAL MEAN			47.6
HIGHEST DAILY MEAN	380	Mar 8	1330
LOWEST DAILY MEAN	36	Sep 23	8.0
ANNUAL SEVEN-DAY MINIMUM	40	Sep 18	9.4
INSTANTANEOUS PEAK FLOW			302
INSTANTANEOUS PEAK STAGE			4.53
INSTANTANEOUS LOW FLOW			29
ANNUAL RUNOFF (CFSM)	.71	.59	(c)
ANNUAL RUNOFF (INCHES)	9.63	8.03	11.69
10 PERCENT EXCEEDS	260	203	349
50 PERCENT EXCEEDS	127	124	144
90 PERCENT EXCEEDS	57	48	45

(a) Gage height 5.82 ft, site and datum then in use.

(b) Present site and datum.

(c) Sept. 19, 20, 30.

(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 mi².

PERIOD OF RECORD.--October 1969 to current year. Prior to October 1987, published as Hog Creek near Allen.

GAGE.--Water-stage recorder. Elevation of gage is 1,010 ft above sea level, from topographic map. Prior to May 23, 1970, nonrecording gage at same site and datum.

REMARKS.--Records good except those for the winter period, which are fair, and those for the period Oct. 9-30, which are poor. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.3	9.4	22	e25	e38	27	37	43	54	80	7.5	7.2
2	8.4	13	22	e24	e35	e24	36	41	47	72	14	6.5
3	7.2	9.2	21	e23	e32	e21	34	38	44	62	29	7.3
4	5.7	7.9	20	e22	e29	e19	36	36	41	52	46	8.3
5	5.6	8.6	27	e22	e26	18	34	40	36	45	48	6.9
6	5.6	18	29	e21	e24	23	34	40	32	39	41	6.2
7	5.5	32	36	e21	e22	52	33	36	29	32	32	6.3
8	6.0	22	41	e20	e20	97	35	32	27	26	27	10
9	e9.0	23	41	e20	e19	e97	52	33	25	22	25	11
10	e11	32	44	e20	e18	e90	78	39	25	19	22	8.3
11	e9.5	30	44	e22	e18	81	83	48	29	17	18	7.1
12	e9.0	28	41	e28	e17	81	85	46	26	15	15	6.6
13	e8.5	25	e38	48	e17	80	84	40	22	13	13	6.3
14	e8.1	23	36	55	e17	79	80	37	20	12	12	5.7
15	e7.7	22	33	55	e17	76	75	34	18	11	12	5.2
16	e7.5	21	34	55	e17	73	70	30	15	11	16	5.0
17	e8.0	20	47	52	e17	69	64	30	15	10	28	4.8
18	e10	19	54	50	e18	65	61	29	14	9.1	43	4.5
19	e13	14	53	48	e20	61	61	28	12	7.7	43	4.1
20	e11	15	50	53	e22	59	58	24	12	7.2	37	4.1
21	e10	15	47	67	24	65	59	21	10	7.8	31	4.6
22	e9.0	16	44	e68	24	65	60	18	9.3	7.6	24	6.5
23	e8.5	12	42	e73	27	62	57	16	8.6	8.7	19	5.8
24	e8.2	12	40	e72	31	57	53	41	11	8.6	16	5.1
25	e8.0	12	37	e69	28	53	49	74	12	8.3	13	4.7
26	e7.7	14	35	67	26	48	47	78	13	10	12	4.4
27	e7.3	15	33	e60	26	45	48	73	36	10	11	4.2
28	e6.8	27	32	e53	31	45	48	71	64	10	9.8	3.8
29	e6.5	28	30	e49	---	45	43	74	80	9.8	9.3	3.7
30	e6.1	25	e28	e45	---	42	42	71	84	8.5	8.7	3.6
31	5.8	---	e26	e41	---	40	---	63	---	7.7	8.1	---
TOTAL	248.5	568.1	1127	1348	660	1759	1636	1324	870.9	659.0	690.4	177.8
MEAN	8.02	18.9	36.4	43.5	23.6	56.7	54.5	42.7	29.0	21.3	22.3	5.93
MAX	13	32	54	73	38	97	85	78	84	80	48	11
MIN	5.5	7.9	20	20	17	18	33	16	8.6	7.2	7.5	3.6
CFSM	.16	.39	.75	.89	.48	1.17	1.12	.88	.60	.44	.46	.12
IN.	.19	.43	.86	1.03	.50	1.34	1.25	1.01	.67	.50	.53	.14

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 1995, BY WATER YEAR (WY)

	MEAN	21.8	33.7	44.6	45.9	51.9	87.9	81.5	52.1	45.4	22.3	17.5	16.6
MAX	75.0	110	80.2	159	112	220	163	163	114	159	62.4	67.9	60.3
(WY)	1987	1993	1991	1993	1976	1982	1978	1983	1989	1981	1981	1981	1981
MIN	5.97	6.20	8.77	7.11	13.5	47.3	34.3	20.1	4.18	1.55	1.86	3.08	3.08
(WY)	1972	1972	1977	1977	1972	1983	1971	1971	1988	1988	1988	1991	1991

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1970 - 1995

ANNUAL TOTAL	11633.5	11068.7	
ANNUAL MEAN	31.9	30.3	
HIGHEST ANNUAL MEAN			43.4
LOWEST ANNUAL MEAN			67.4
HIGHEST DAILY MEAN	250	97	23.8
LOWEST DAILY MEAN	3.3	3.6	629
ANNUAL SEVEN-DAY MINIMUM	3.4	4.2	.58
INSTANTANEOUS PEAK FLOW		(a)125	.84
INSTANTANEOUS PEAK STAGE		(c)4.49	(b)664
INSTANTANEOUS LOW FLOW		3.3	6.20
ANNUAL RUNOFF (CFSM)	.65	.62	.48
ANNUAL RUNOFF (INCHES)	8.89	8.45	.89
10 PERCENT EXCEEDS	68	64	12.09
50 PERCENT EXCEEDS	21	25	93
90 PERCENT EXCEEDS	6.0	7.3	30
			6.9

(a) Gage height 3.71 ft; result of momentary release of water after freezeup.

(b) Gage height 6.0 ft, from floodmark.

(c) Backwater from ice.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04096900 NOTTAWA CREEK NEAR ATHENS, MI

LOCATION.--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, on right bank at downstream side of bridge on Shorts Road, 4.2 mi southwest of Athens, and 5.0 mi downstream from Pine Creek.

DRAINAGE AREA.--162 mi².

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

GAGE.--Water-stage recorder. Elevation of gage is 850 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	84	128	196	141	149	145	154	179	150	114	85	135
2	83	180	173	138	147	127	149	171	137	107	79	130
3	79	198	155	e130	145	116	147	154	132	99	112	127
4	74	193	149	e125	142	115	149	147	130	93	167	127
5	71	187	148	e120	131	119	147	156	126	94	191	124
6	69	225	148	e120	e125	124	144	162	121	95	191	121
7	67	258	157	e120	e120	165	145	154	115	91	199	124
8	67	254	164	e115	e110	263	149	142	109	85	199	145
9	76	246	175	e115	e115	e300	206	138	104	81	197	150
10	81	244	186	e120	e115	287	285	153	106	78	191	151
11	82	237	192	e125	e115	273	327	175	111	76	175	149
12	78	211	184	e130	e115	280	322	185	112	71	157	142
13	74	188	164	165	e115	298	306	179	107	68	141	130
14	72	172	154	212	e110	306	279	165	102	65	128	119
15	69	161	151	236	e110	297	247	150	97	65	129	110
16	68	152	149	230	e110	276	217	136	93	71	142	103
17	67	143	185	208	e110	249	196	129	90	96	309	96
18	68	135	245	189	111	221	188	123	88	105	495	99
19	81	129	264	180	116	201	191	121	86	105	580	93
20	89	124	254	200	129	190	188	117	84	96	589	92
21	91	123	234	252	135	186	189	112	81	90	542	92
22	86	126	213	265	134	180	203	107	77	87	466	98
23	83	123	195	233	137	172	199	105	75	98	385	100
24	80	117	186	219	149	169	184	128	74	104	312	99
25	79	114	182	222	149	164	173	173	76	112	254	96
26	77	110	175	216	137	158	175	206	81	113	212	94
27	76	115	165	198	134	153	188	208	92	116	184	90
28	75	160	158	181	143	157	209	195	115	138	166	86
29	75	213	151	167	---	166	206	195	123	129	154	83
30	74	214	142	154	---	167	190	187	120	110	148	80
31	76	---	138	149	---	161	---	169	---	96	140	---
TOTAL	2371	5180	5532	5375	3558	6185	6052	4821	3114	2948	7419	3385
MEAN	76.5	173	178	173	127	200	202	156	104	95.1	239	113
MAX	91	258	264	265	149	306	327	208	150	138	589	151
MIN	67	110	138	115	110	115	144	105	74	65	79	80
CFSM	.47	1.07	1.10	1.07	.78	1.23	1.25	.96	.64	.59	1.48	.70
IN.	.54	1.19	1.27	1.23	.82	1.42	1.39	1.11	.72	.68	1.70	.78

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1995, BY WATER YEAR (WY)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	101	133	159	154	170	250	243	179	163	110	92.6	85.1																	
MAX	344	290	273	366	302	475	385	332	625	279	239	163																	
(WY)	1987	1989	1991	1993	1985	1982	1985	1983	1989	1986	1995	1980																	
MIN	41.9	43.9	56.7	49.3	71.3	135	119	91.1	55.9	41.7	37.5	35.0																	
(WY)	1967	1972	1977	1977	1977	1970	1971	1971	1977	1977	1977	1976																	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1967 - 1995

ANNUAL TOTAL	50596		55940																										
ANNUAL MEAN	139		153																										
HIGHEST ANNUAL MEAN																													
LOWEST ANNUAL MEAN																													
HIGHEST DAILY MEAN	400		589		Feb 22			Aug 20		2170		1989																	
LOWEST DAILY MEAN	66		65		Jun 12			(a)		21		Jul 29 1977																	
ANNUAL SEVEN-DAY MINIMUM	71		71		Jun 6			Jul 10		23		Jul 29 1977																	
INSTANTANEOUS PEAK FLOW			598					Aug 20		2190		Jun 2 1989																	
INSTANTANEOUS PEAK STAGE			5.12					Aug 20		7.85		Jun 2 1989																	
INSTANTANEOUS LOW FLOW										21		(b)																	
ANNUAL RUNOFF (CFSM)	.86		.95							.94																			
ANNUAL RUNOFF (INCHES)	11.62		12.85							12.84																			
10 PERCENT EXCEEDS	233		235							281																			
50 PERCENT EXCEEDS	123		141							122																			
90 PERCENT EXCEEDS	77		81							59																			

(a) July 14, 15.

(b) July 28, 29, 30, Aug. 4, 6, 1977, Aug. 4, 1988.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04097500 ST. JOSEPH RIVER AT THREE RIVERS, MI

LOCATION.--Lat 41°56'25", long 85°37'58", in SW1/4 SE1/4 sec.18, T.6 S., R.11 W., St. Joseph County, Hydrologic Unit 04050001, on right bank in Scidmore Park at Three Rivers, 250 ft downstream from Rocky River, and at mile 112.

DRAINAGE AREA.--1,350 mi².

PERIOD OF RECORD.--May 1953 to September 1983, October 1992 to current year.

REVISED RECORDS.--WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 781.34 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records good. Flow regulated by powerplant upstream from station. Several measurements of water temperature were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge since at least 1918, 8,260 ft³/s, Apr. 27, 1950.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	489	959	1190	1230	1350	1240	1220	1340	1420	1140	504	789
2	482	1050	1170	1210	1350	1220	1200	1330	1340	1130	486	735
3	538	1210	1160	1020	1400	1210	1190	1320	1280	1120	855	662
4	538	1090	1030	1020	1370	1150	1160	1280	1270	830	1230	542
5	492	1160	1090	1090	1260	898	1120	1320	1220	1000	996	650
6	537	1200	1150	990	1200	1140	1110	1330	1240	966	972	647
7	548	1260	1050	911	1160	1280	1110	1320	1150	891	1090	676
8	451	1320	1180	882	1120	1470	1090	1300	947	633	861	877
9	480	1350	1220	971	1130	1800	1150	1310	1040	784	975	805
10	658	1370	1250	937	1120	1880	1350	1280	1000	609	1180	551
11	507	1370	1210	902	1070	1990	1720	1390	685	644	826	818
12	564	1310	1240	1180	1040	2010	1820	1380	1050	623	795	660
13	563	1250	1250	1260	888	2030	1970	1340	1000	459	519	652
14	588	1200	1220	1440	1090	2030	1880	1320	643	590	727	647
15	446	1060	1170	1510	1170	1980	1850	1300	770	462	588	748
16	431	1170	1160	1590	1150	1880	1740	1240	830	466	663	506
17	551	1120	1200	1560	1020	1860	1610	1180	639	643	884	564
18	558	952	1270	1510	807	1740	1600	1160	483	703	1480	600
19	547	741	1500	1480	1150	1660	1550	1140	733	576	1710	562
20	562	850	1560	1570	1150	1550	1490	1080	627	613	1970	537
21	591	837	1570	1680	1150	1470	1500	795	546	624	1880	659
22	483	1070	1540	1890	1160	1520	1510	1010	470	521	1700	630
23	478	797	1500	1920	1160	1430	1450	1010	514	685	1570	526
24	589	820	1520	1890	1180	1370	1420	1130	448	804	1360	510
25	591	922	1320	1790	1180	1360	1400	1340	439	564	1300	632
26	568	568	1300	1780	1200	1300	1400	1460	700	706	1170	633
27	568	798	1310	1780	1220	1230	1430	1620	806	691	763	485
28	593	1110	1290	1640	1250	1270	1460	1580	1010	700	896	506
29	475	1100	1250	1590	---	1270	1460	1540	1130	598	907	592
30	522	1210	1260	1490	---	1240	1440	1490	1190	637	970	478
31	692	---	1220	1350	---	1230	---	1490	---	558	784	---
TOTAL	16680	32224	39350	43063	32495	46708	43390	40125	26620	21970	32611	18879
MEAN	538	1074	1269	1389	1161	1507	1446	1294	887	709	1052	629
MAX	692	1370	1570	1920	1400	2030	1970	1620	1420	1140	1970	877
MIN	431	568	1030	882	807	898	1090	795	439	459	486	478
CFSM	.40	.80	.94	1.03	.86	1.12	1.07	.96	.66	.52	.78	.47
IN.	.46	.89	1.08	1.19	.90	1.29	1.20	1.11	.73	.61	.90	.52

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1995, BY WATER YEAR (WY)

	MEAN	736	914	1119	1185	1297	1961	2041	1592	1148	804	656	624
MAX	1865	2582	2053	3493	2716	3969	3320	2870	2587	1780	1639	1625	
(WY)	1994	1993	1983	1993	1968	1982	1982	1983	1980	1978	1981	1980	
MIN	218	293	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1953 - 1995

ANNUAL TOTAL	412931	394115	1177
ANNUAL MEAN	1131	1080	1850
HIGHEST ANNUAL MEAN			365
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	3000	2030	7810
LOWEST DAILY MEAN	408	431	78
ANNUAL SEVEN-DAY MINIMUM	486	512	126
INSTANTANEOUS PEAK FLOW		2040	8180
INSTANTANEOUS PEAK STAGE		5.20	10.69
INSTANTANEOUS LOW FLOW		333	(a)
ANNUAL RUNOFF (CFSM)	.84	.80	.87
ANNUAL RUNOFF (INCHES)	11.38	10.86	11.84
10 PERCENT EXCEEDS	1810	570	2280
50 PERCENT EXCEEDS	1140	1140	950
90 PERCENT EXCEEDS	518	547	398

(a) July 19, Aug. 15.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04097540 PRAIRIE RIVER NEAR NOTTAWA, MI

LOCATION.--Lat 41°53'18", long 85°24'34", in NW1/4 SW1/4 sec.6, T.7 S., R.9 W., St. Joseph County, Hydrologic Unit 04050001, on left bank 10 ft upstream from bridge on State Highway 66, 3.0 mi upstream from unnamed tributary, and 3.0 mi southeast of Nottawa.

DRAINAGE AREA.--106 mi².

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

GAGE.--Water-stage recorder. Elevation of gage is 850 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Since 1987, some diversion by pumping for sprinkler irrigation. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	46	59	89	86	106	89	113	108	96	79	35	52
2	44	65	84	85	105	86	118	106	94	75	32	49
3	42	64	81	80	103	82	114	103	92	71	56	47
4	40	63	80	e75	101	80	112	102	88	69	85	47
5	38	63	81	e72	e97	80	110	105	84	71	95	46
6	38	75	81	e72	90	82	108	104	81	70	89	46
7	37	79	93	e71	92	102	107	100	79	66	82	48
8	38	76	102	e71	91	142	106	96	79	63	75	55
9	43	78	110	e73	e89	174	119	95	78	59	69	56
10	44	82	112	e76	e85	175	143	96	82	56	65	55
11	43	80	110	e80	e84	167	163	102	88	52	60	53
12	42	76	105	e85	e82	163	173	101	87	47	56	51
13	41	74	100	93	e80	162	170	98	84	43	55	49
14	40	74	95	106	81	159	163	95	80	40	52	48
15	40	70	93	115	81	155	154	91	75	37	50	46
16	41	66	93	115	80	151	147	87	69	40	52	50
17	43	63	102	111	79	147	144	83	66	43	66	52
18	45	60	111	107	78	141	139	82	65	42	89	50
19	47	58	114	109	80	135	136	80	61	37	108	47
20	48	56	111	120	82	133	133	78	58	34	112	47
21	47	57	106	135	84	133	132	76	55	33	104	48
22	47	56	101	145	85	130	130	73	53	34	94	52
23	48	55	98	144	85	128	126	71	52	37	86	52
24	47	54	95	138	85	124	121	90	51	40	79	51
25	46	54	93	132	85	120	119	107	51	40	74	50
26	45	52	91	127	84	117	116	113	56	40	69	49
27	45	56	89	122	86	115	115	111	63	37	65	48
28	45	78	87	118	89	118	113	111	70	39	62	47
29	43	93	85	114	---	118	110	113	79	40	60	46
30	42	93	83	110	---	116	109	109	80	40	59	46
31	43	---	83	107	---	114	---	103	---	38	56	---
TOTAL	1338	2029	2958	3194	2449	3938	3863	2989	2196	1512	2191	1483
MEAN	43.2	67.6	95.4	103	87.5	127	129	96.4	73.2	48.8	70.7	49.4
MAX	48	93	114	145	106	175	173	113	96	79	112	56
MIN	37	52	80	71	78	80	106	71	51	33	32	46
CFSM	.41	.64	.90	.97	.83	1.20	1.21	.91	.69	.46	.67	.47
IN.	.47	.71	1.04	1.12	.86	1.38	1.36	1.05	.77	.53	.77	.52

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1995, BY WATER YEAR (WY)

	MEAN	63.5	82.9	107	107	113	153	157	118	96.2	64.6	53.5	53.0
MAX	150	222	177	258	218	336	259	226	254	144	148	120	120
(WY)	1987	1993	1983	1993	1968	1982	1978	1983	1989	1986	1981	1980	1980
MIN	17.2	22.9	25.2	29.7	29.1	47.2	75.6	58.7	32.9	13.3	15.8	14.1	14.1
(WY)	1965	1965	1964	1963	1963	1964	1964	1963	1964	1988	1964	1964	1964

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1963 - 1995

ANNUAL TOTAL	29607	30140	97.3
ANNUAL MEAN	81.1	82.6	153
HIGHEST ANNUAL MEAN			33.5
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	220	Feb 21	782
LOWEST DAILY MEAN	31	Aug 3	5.7
ANNUAL SEVEN-DAY MINIMUM	34	Aug 2	7.9
INSTANTANEOUS PEAK FLOW		175	Mar 10
INSTANTANEOUS PEAK STAGE		32	Aug 2
INSTANTANEOUS LOW FLOW		36	Jul 19
ANNUAL RUNOFF (CFSM)	.77	(a)179	Mar 9
ANNUAL RUNOFF (INCHES)	10.39	(b)4.29	Feb 9
10 PERCENT EXCEEDS	134	31	Aug 2
50 PERCENT EXCEEDS	74	.78	6.30
90 PERCENT EXCEEDS	40	10.58	5.4
		12.47	.92
		174	174
		81	84
		43	35

(a) Gage height 3.83 ft.

(b) Backwater from ice.

(c) 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 mi².

PERIOD OF RECORD.--October 1923 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 1387: 1930, 1932, 1938, 1940-42, 1945. WSP 1911: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 755.3 ft above sea level (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. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	812	1370	1600	1610	1840	1660	1630	1840	1960	1600	816	1160
2	792	1420	1580	1590	1800	1640	1630	1690	1920	1550	824	1130
3	866	1600	1590	1380	1840	1600	1590	1680	1800	1520	1460	1040
4	848	1470	1450	1350	1850	1600	1570	1710	1800	1340	1990	904
5	739	1620	1480	1430	1710	1300	1490	1730	1520	1320	1820	1020
6	859	1720	1580	1320	1570	1530	1520	1760	1650	1400	1620	980
7	832	1690	1550	1280	1570	1780	1490	1770	1670	1260	1580	1030
8	756	1770	1660	1280	1530	1900	1460	1710	1520	1020	1540	1210
9	776	1840	1720	1330	1550	2180	1640	1780	1440	1130	1420	1220
10	945	1860	1750	1260	1550	2340	1780	1750	1510	953	1530	909
11	804	1830	1710	1300	1460	2520	2050	1960	1190	982	1390	1100
12	848	1990	1690	1490	1280	2590	2290	1960	1460	937	1340	1070
13	851	1900	1730	1750	1290	2600	2500	1860	1500	761	1020	992
14	884	1670	1690	1870	1440	2620	2440	1820	1110	847	1050	1010
15	750	1460	1590	1970	1550	2590	2400	1800	1220	708	1190	1090
16	695	1600	1640	2030	1550	2460	2290	1690	1240	868	1240	834
17	829	1390	1710	2010	1510	2440	2180	1670	1030	941	1330	913
18	855	1180	1760	2000	1220	2300	2130	1600	902	998	1810	956
19	854	1100	1900	1980	1560	2190	2120	1590	975	920	2100	864
20	863	1250	2010	2080	1550	2080	2010	1530	943	917	2380	831
21	862	1100	2030	2180	1560	1970	2000	1260	887	885	2340	1090
22	793	1500	2020	2360	1540	1980	2040	1370	820	890	2200	907
23	808	1120	1970	2460	1560	1940	1970	1410	802	1140	2020	922
24	903	1160	1980	2450	1580	1850	1900	1570	737	1210	1830	821
25	905	1230	1870	2350	1570	1800	1880	1800	751	897	1720	959
26	893	937	1750	2230	1570	1770	1850	1960	1070	1040	1620	964
27	878	1170	1740	2350	1640	1670	1870	2100	1280	1010	1280	787
28	870	1440	1750	2220	1690	1700	1890	2120	1440	1040	1270	843
29	785	1520	1690	2100	---	1720	1890	2100	1590	922	1340	926
30	805	1610	1670	2010	---	1670	1900	2000	1670	941	1350	740
31	1030	---	1620	1880	---	1650	---	2040	---	792	1220	---
TOTAL	25990	44517	53480	56900	43930	61640	57400	54610	39407	32739	47640	29222
MEAN	838	1484	1725	1835	1569	1988	1913	1762	1314	1056	1537	974
MAX	1030	1990	2030	2460	1850	2620	2500	2120	1960	1600	2380	1220
MIN	695	937	1450	1260	1220	1300	1460	1260	737	708	816	740
CFSM	.45	.80	.92	.98	.84	1.07	1.03	.94	.70	.57	.82	.52
IN.	.52	.89	1.07	1.13	.88	1.23	1.14	1.09	.79	.65	.95	.58

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 1995, BY WATER YEAR (WY)

MEAN	1107	1334	1571	1734	1856	2557	2686	2117	1664	1171	956	952
MAX	3290	3378	4065	4589	3451	5335	7646	5009	5004	2953	2413	2286
(WY)	1987	1993	1928	1993	1968	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1924 - 1995

ANNUAL TOTAL	575555	547475	(a)1643
ANNUAL MEAN	1577	1500	2856
HIGHEST ANNUAL MEAN			580
LOWEST ANNUAL MEAN			1950
HIGHEST DAILY MEAN	3800	2620	10700
LOWEST DAILY MEAN	695	695	39
ANNUAL SEVEN-DAY MINIMUM	784	809	278
INSTANTANEOUS PEAK FLOW		3990	(b)11400
INSTANTANEOUS PEAK STAGE		5.72	(c)10.76
INSTANTANEOUS LOW FLOW		418	
ANNUAL RUNOFF (CFSM)	.85	.80	.88
ANNUAL RUNOFF (INCHES)	11.47	10.91	11.96
10 PERCENT EXCEEDS	2440	2080	3000
50 PERCENT EXCEEDS	1550	1550	1390
90 PERCENT EXCEEDS	830	861	628

(a) Does not include water year 1924.

(b) Gage height 10.41 ft.

(c) Present datum.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04099750 PIGEON RIVER NEAR SCOTT, IN

LOCATION.--Lat 41°44'56", long 85°34'35", in SE1/4 NW1/4 sec.14, T.38 N., R.8 E., Lagrange County, Hydrologic Unit 04050001, on right bank 20 ft downstream from bridge on County Road 750 North, 1,200 ft downstream from Page Ditch, 0.7 mi south of Indiana-Michigan State line, and 1.2 mi northwest of Scott, IN.

DRAINAGE AREA.--361 mi², of which 53.9 mi² does not contribute directly to surface runoff.

PERIOD OF RECORD.--June 1968 to current year.

REVISED RECORDS.--WSP 2111: Drainage area. WDR IN-92-1: 1991.

GAGE.--Water-stage recorder. Datum of gage is 815.00 ft above sea level.

REMARKS.--Records good except for May 24 to Sept. 14, which are fair, and estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	101	145	182	212	313	272	267	347	512	417	138	200
2	102	160	175	210	303	258	262	337	490	408	158	194
3	98	144	171	e210	293	254	262	324	467	389	253	183
4	96	144	171	e206	285	248	260	320	434	373	389	178
5	95	156	177	e202	e280	245	252	336	398	370	385	173
6	95	212	182	e200	e275	248	247	331	364	336	308	168
7	94	207	260	e200	e270	306	243	318	326	301	279	165
8	93	174	353	e199	e260	486	249	306	306	272	272	175
9	114	180	315	e199	e257	476	320	304	302	254	265	180
10	115	213	306	e198	e250	469	487	308	308	225	254	175
11	107	210	299	e197	e246	489	556	327	316	184	241	169
12	103	177	292	e200	e240	518	607	320	295	203	225	165
13	102	174	283	287	e233	540	674	317	274	191	210	162
14	102	172	271	306	e229	508	698	326	242	182	200	158
15	101	171	257	321	e222	482	693	323	236	181	196	154
16	100	167	248	306	e219	457	681	311	232	209	247	152
17	99	165	267	296	e218	432	623	302	222	215	326	150
18	97	162	274	296	e216	398	580	301	216	201	343	148
19	102	157	263	317	216	386	567	303	209	183	384	145
20	106	155	252	395	219	374	519	281	200	173	392	147
21	108	158	246	450	222	364	490	262	194	173	433	154
22	108	154	244	457	221	349	451	248	185	166	420	164
23	103	152	241	e440	224	326	432	240	175	169	396	158
24	101	150	235	e420	231	304	411	316	177	172	368	153
25	103	147	229	e400	235	302	380	514	193	163	326	150
26	104	144	223	e385	233	298	374	509	206	154	304	148
27	104	152	219	e370	248	291	370	494	260	162	283	146
28	105	230	214	e360	271	295	361	521	290	159	258	142
29	104	229	209	e350	---	291	336	591	312	158	238	142
30	103	200	203	348	---	283	332	538	361	145	206	138
31	105	---	200	325	---	274	---	528	---	144	198	---
TOTAL	3170	5161	7461	9262	6929	11223	12984	11103	8702	7032	8895	4836
MEAN	102	172	241	299	247	362	433	358	290	227	287	161
MAX	115	230	353	457	313	540	698	591	512	417	433	200
MIN	93	144	171	197	216	245	243	240	175	144	138	138
CFSM	.28	.48	.67	.83	.69	1.00	1.20	.99	.80	.63	.79	.45
IN.	.33	.53	.77	.95	.71	1.16	1.34	1.14	.90	.72	.92	.50

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1995, BY WATER YEAR (WY)

MEAN	227	304	377	397	428	602	603	442	369	264	213	203
MAX	575	684	719	1169	836	1389	1089	811	1103	654	516	538
(WY)	1987	1993	1983	1993	1969	1982	1978	1983	1981	1981	1981	1981
MIN	96.3	96.7	157	173	143	311	324	233	132	104	92.5	85.8
(WY)	1972	1972	1972	1977	1972	1970	1971	1971	1988	1988	1988	1971

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR	FOR 1995 WATER YEAR	WATER YEARS 1968 - 1995
ANNUAL TOTAL	94164	96758	
ANNUAL MEAN	258	265	367
HIGHEST ANNUAL MEAN			545
LOWEST ANNUAL MEAN			207
HIGHEST DAILY MEAN	793	698	2340
LOWEST DAILY MEAN	93	93	42
ANNUAL SEVEN-DAY MINIMUM	96	96	69
INSTANTANEOUS PEAK FLOW		703	2370
INSTANTANEOUS PEAK STAGE		(a)4.77	7.85
ANNUAL RUNOFF (CFSM)	.71	.73	1.02
ANNUAL RUNOFF (INCHES)	9.70	9.97	13.82
10 PERCENT EXCEEDS	511	433	680
50 PERCENT EXCEEDS	200	246	296
90 PERCENT EXCEEDS	103	144	146

(a) Backwater from ice.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04100222 NORTH BRANCH ELKHART RIVER AT COSPERVILLE, IN

LOCATION.--Lat 41°28'54", long 85°28'32", in NE1/4 NW1/4 sec.22, T.35 N., R.9 E., Noble County, Hydrologic Unit 04050001, on right bank at downstream side of bridge on County Road 900 North at Cosperville, IN, 1,300 ft downstream from Boyd Ditch, 1.7 mi upstream from Hustin Ditch, and 3.1 mi downstream from Waldron Lake.

DRAINAGE AREA.--142 mi².

PERIOD OF RECORD.--October 1971 to current year.

GAGE.--Water-stage recorder. Datum of gage is 880.12 ft above sea level (levels by Indiana Department of Natural Resources).

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated at times by dam at Waldron Lake.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	30	46	59	129	86	102	187	236	219	66	60
2	13	36	44	e53	124	86	98	180	222	225	72	55
3	12	38	43	e51	119	85	93	172	208	223	101	52
4	10	41	42	e50	112	82	87	166	195	216	142	50
5	9.7	44	44	e49	e104	82	92	161	184	207	149	47
6	9.9	54	46	e48	e96	82	100	156	172	194	147	44
7	8.7	63	74	e48	e90	126	106	149	160	183	141	44
8	31	67	95	e47	e84	178	111	142	153	172	134	58
9	77	75	103	e46	e78	194	148	137	145	161	128	60
10	60	80	106	e45	e74	198	220	134	140	149	123	56
11	46	81	103	e46	e70	198	269	137	135	137	118	52
12	37	78	101	e50	e66	200	300	140	129	122	112	42
13	30	74	96	72	e64	201	313	140	122	107	107	32
14	26	71	91	97	e60	200	320	136	116	96	101	26
15	23	67	86	108	e58	197	320	134	111	100	101	23
16	21	63	84	110	e58	192	313	129	101	141	113	21
17	20	59	87	109	e59	188	303	126	68	132	111	19
18	19	52	88	109	60	183	298	125	68	113	142	17
19	20	48	88	118	61	177	290	122	67	96	140	17
20	21	46	86	147	62	171	285	118	64	83	138	19
21	22	44	82	174	63	165	275	113	59	77	134	20
22	22	40	78	182	65	160	266	109	54	71	123	22
23	26	37	75	186	65	153	256	104	49	69	110	21
24	30	37	73	185	67	144	243	149	47	73	101	20
25	27	35	70	179	69	135	231	195	45	86	94	19
26	25	34	68	e170	69	128	221	215	53	91	86	18
27	24	38	65	e162	74	122	211	223	112	119	80	16
28	22	44	62	e153	83	119	201	239	158	108	75	16
29	20	47	61	e148	---	116	193	251	184	93	71	17
30	19	47	58	e140	---	111	190	255	204	81	69	17
31	21	---	57	134	---	107	---	248	---	72	65	---
TOTAL	766.3	1570	2302	3275	2183	4566	6455	4992	3761	4016	3394	980
MEAN	24.7	52.3	74.3	106	78.0	147	215	161	125	130	109	32.7
MAX	77	81	106	186	129	201	320	255	236	225	149	60
MIN	8.7	30	42	45	58	82	87	104	45	69	65	16
CFSM	.17	.37	.52	.74	.55	1.04	1.52	1.13	.88	.91	.77	.23
IN.	.20	.41	.60	.86	.57	1.20	1.69	1.31	.99	1.05	.89	.26

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 1995, BY WATER YEAR (WY)

	MEAN	86.5	122	149	160	154	260	247	166	138	85.7	60.6	65.4
MAX	272	314	341	542	272	553	530	324	400	211	130	161	
(WY)	1987	1973	1986	1993	1990	1985	1985	1981	1981	1981	1981	1972	
MIN	17.8	17.8	46.5	42.2	43.2	118	133	67.2	18.1	16.4	18.3	13.9	
(WY)	1975	1972	1972	1977	1972	1989	1987	1988	1988	1988	1978	1994	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1972 - 1995

ANNUAL TOTAL	30396.4		38260.3		141	
ANNUAL MEAN	83.3		105		222	1993
HIGHEST ANNUAL MEAN					85.7	1972
LOWEST ANNUAL MEAN					916	Mar 22 1982
HIGHEST DAILY MEAN	323	Apr 15	320	Apr 14	(a)2.2	Jul 7 1988
LOWEST DAILY MEAN	8.7	Oct 7	8.7	Oct 1	2.8	Jul 3 1988
ANNUAL SEVEN-DAY MINIMUM	10	Sep 18	11	Oct 1	919	Mar 23 1982
INSTANTANEOUS PEAK FLOW			5.31	Apr 14	8.12	Mar 23 1982
INSTANTANEOUS PEAK STAGE			.74		.99	
ANNUAL RUNOFF (CFSM)	.59		10.02		13.49	
ANNUAL RUNOFF (INCHES)	7.96				297	
10 PERCENT EXCEEDS	209		200		111	
50 PERCENT EXCEEDS	47		90		31	
90 PERCENT EXCEEDS	16		25			

(a) Caused by regulation.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04100500 ELKHART RIVER AT GOSHEN, IN

LOCATION.--Lat 41°35'36", long 85°50'55", in NE1/4 NE1/4 sec.8, T.36 N., R.6 E., Elkhart County, Hydrologic Unit 04050001, on right bank 20 ft downstream from River Avenue bridge at Goshen, IN, 0.4 mi upstream from Rock Run, and at mile 16.1.

DRAINAGE AREA.--594 mi².

PERIOD OF RECORD.--April 1931 to current year.

REVISED RECORDS.--WSP 1337: 1939(M). WSP 1557: 1954. WSP 2111: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 769.43 ft above sea level. Prior to Nov. 20, 1931, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Occasional low-flow regulation at Goshen Dam, 3.4 mi upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	130	203	286	307	e520	592	513	709	980	1020	208	198
2	128	201	262	303	e500	510	511	680	951	876	209	191
3	123	182	251	283	e470	474	497	646	914	832	442	186
4	131	188	242	e270	e445	455	479	626	867	811	647	181
5	131	203	240	e250	e420	449	458	623	820	805	503	176
6	122	263	246	e240	e400	451	450	598	777	767	478	167
7	118	275	587	e240	e385	709	448	575	753	713	458	169
8	123	241	1040	e240	e375	1480	474	555	734	649	437	225
9	141	260	806	e240	e365	1330	735	572	728	606	425	231
10	193	342	753	e240	e350	1000	1440	579	749	573	418	218
11	188	329	643	e240	e335	955	1800	694	711	512	398	209
12	177	291	548	e245	e320	952	1640	637	675	452	378	194
13	171	271	495	339	e310	931	1420	573	693	406	353	183
14	160	262	456	783	e305	898	1230	534	561	343	337	168
15	151	254	428	898	e320	870	1170	505	492	319	314	155
16	143	244	419	726	e330	838	1150	474	475	494	318	149
17	142	237	495	621	e350	812	1130	466	450	569	328	144
18	144	228	538	582	377	783	1100	474	401	509	344	142
19	141	220	483	646	413	769	1080	467	378	458	382	136
20	149	212	442	1030	444	756	1020	443	357	408	360	141
21	149	216	419	1190	444	735	985	415	322	343	344	156
22	144	214	392	976	421	696	942	393	303	320	325	173
23	142	201	412	815	421	653	890	381	293	309	302	159
24	142	196	367	793	429	630	853	738	259	319	273	153
25	154	191	350	750	419	602	827	1570	267	290	259	150
26	148	187	338	e700	410	571	789	1530	318	266	238	145
27	161	216	328	e660	450	556	764	1160	786	259	227	138
28	156	425	318	e640	669	566	733	1050	1030	282	225	133
29	145	429	314	e600	---	546	698	1110	1190	270	219	129
30	141	324	302	e565	---	535	700	1070	1310	240	214	125
31	154	---	295	e540	---	526	---	990	---	226	205	---
TOTAL	4542	7505	13495	16952	11397	22630	26926	21837	19544	15246	10568	5024
MEAN	147	250	435	547	407	730	898	704	651	492	341	167
MAX	193	429	1040	1190	669	1480	1800	1570	1310	1020	647	231
MIN	118	182	240	240	305	449	448	381	259	226	205	125
CFSM	.25	.42	.73	.92	.69	1.23	1.51	1.19	1.10	.83	.57	.28
IN.	.28	.47	.85	1.06	.71	1.42	1.69	1.37	1.22	.95	.66	.31

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1995, BY WATER YEAR (WY)

	MEAN	318	395	502	593	692	942	945	701	493	355	268	251
MAX	1652	1132	1276	2058	1657	2497	2424	2354	1516	1079	712	784	
(WY)	1955	1973	1983	1993	1959	1982	1950	1943	1981	1951	1958	1958	
MIN	75.9	95.9	122	122	108	301	363	222	101	94.0	73.0	58.5	
(WY)	1965	1965	1964	1963	1963	1964	1946	1958	1934	1934	1941	1941	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1932 - 1995

ANNUAL TOTAL	154706		175666									
ANNUAL MEAN	424		481									
HIGHEST ANNUAL MEAN										537		
LOWEST ANNUAL MEAN										1005		1950
HIGHEST DAILY MEAN										197		1964
LOWEST DAILY MEAN	1760						1800		Apr 11	6010		Feb 24 1985
ANNUAL SEVEN-DAY MINIMUM	67						118		Oct 7	(a)7.0		Aug 11 1964
INSTANTANEOUS PEAK FLOW	110						125		Oct 2	50		Sep 21 1941
INSTANTANEOUS PEAK STAGE							1880		Apr 11	6360		Feb 24 1985
ANNUAL RUNOFF (CFSM)	.71						5.49		Apr 11	11.94		Mar 14 1982
ANNUAL RUNOFF (INCHES)	9.69						.81			.90		
10 PERCENT EXCEEDS	875						11.00			12.28		
50 PERCENT EXCEEDS	302						921			1100		
90 PERCENT EXCEEDS	144						415			388		
							155			155		

(a) Caused by regulation.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04101000 ST. JOSEPH RIVER AT ELKHART, IN

LOCATION.--Lat 41°41'30", long 85°58'30", in SW1/4 NE1/4 sec.5, T.37 N., R.5 E., Elkhart County, Hydrologic Unit 04050001, on left bank 200 ft downstream from Elkhart River, 200 ft upstream from Main Street bridge in Elkhart, IN, 2,000 ft downstream from Christiana Creek, 0.5 mi downstream from Elkhart Hydroelectric Plant, and at mile 76.5.

DRAINAGE AREA.--3,370 mi².

PERIOD OF RECORD.--August 1947 to current year. Gage heights at site 0.8 mi downstream at different datum from September 1924 to March 1926 are available from the Indiana District Office.

REVISED RECORDS.--WSP 2111: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 700.00 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by Elkhart Hydroelectric Plant.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1550	2050	2560	2680	3430	3180	2960	3580	3970	3600	1640	1950
2	1420	2140	2510	2620	3320	3060	2990	3400	3920	3290	1550	1960
3	1430	2280	2520	2410	3310	2930	2900	3250	3720	3130	3220	1940
4	1460	2080	2320	1990	3290	2890	2880	3300	3690	3110	4230	1620
5	1460	2010	2350	e2000	3160	2660	2840	3290	3230	2740	3680	1700
6	1400	2410	2490	e2050	2720	2730	2760	3310	3240	2990	3230	1730
7	1400	2560	3000	e2100	e2600	3590	2750	3250	3330	2730	3010	1770
8	1460	2550	3640	e2200	e2400	4760	2770	3140	2980	2450	2950	1970
9	1490	2680	3580	e2250	e2300	4830	3400	3220	2880	2420	2750	2020
10	1490	2770	3420	e2300	e2200	4660	4640	3240	3160	2190	2830	1840
11	1570	2780	3310	2440	e2100	4640	5330	3540	2710	2150	2580	1620
12	1470	2800	3060	2570	e2050	4800	5470	3630	2620	1990	2570	1930
13	1480	2900	3100	3200	e2000	4740	5440	3370	2890	1880	2230	1750
14	1480	2640	2990	3550	e1900	4800	5210	3270	2330	1700	2030	1740
15	1440	2440	2830	3920	e2000	4660	5020	3210	2390	1750	2300	1690
16	1280	2510	2850	3720	e2100	4500	4870	3070	2320	2210	2500	1720
17	1280	2350	3050	3600	e2200	4340	4730	3050	2150	2220	2560	1570
18	1430	2070	3130	3500	2440	4160	4630	2910	2010	2240	2870	1540
19	1460	1920	3330	3590	2780	3990	4600	2960	1800	2050	3160	1560
20	1450	2120	3440	4190	2860	3700	4370	2830	2090	1980	3460	1550
21	1450	1900	3360	4640	2890	3430	4260	2600	1730	1910	3620	1650
22	1490	2300	3270	4550	2790	3490	4250	2470	1710	1980	3420	1700
23	1380	1890	3180	4460	2830	3560	4060	2550	1620	2030	3180	1720
24	1390	2280	3130	4330	2820	3380	3880	3190	1600	2380	2990	1560
25	1490	1880	3070	4230	2840	3270	3800	4360	1520	2030	2780	1550
26	1460	1790	2850	4050	2800	3180	3680	4640	1850	1910	2670	1650
27	1270	1840	2830	e3850	2940	3120	3670	4430	2920	1960	2420	1580
28	1350	2430	2830	e3700	3260	3140	3680	4320	3260	1970	2020	1510
29	1430	2670	2770	e3600	---	3120	3580	4320	3700	1890	2310	1510
30	1430	2710	2720	e3500	---	3090	3610	4220	3870	1750	2220	1490
31	1500	---	2670	3450	---	3020	---	4140	---	1660	2090	---
TOTAL	44540	69750	92160	101240	74330	115420	119030	106060	81210	70290	85070	51090
MEAN	1437	2325	2973	3266	2655	3723	3968	3421	2707	2267	2744	1703
MAX	1570	2900	3640	4640	3430	4830	5470	4640	3970	3600	4230	2020
MIN	1270	1790	2320	1990	1900	2660	2750	2470	1520	1660	1550	1490
CFSM	.43	.69	.88	.97	.79	1.10	1.18	1.02	.80	.67	.81	.51
IN.	.49	.77	1.02	1.12	.82	1.27	1.31	1.17	.90	.78	.94	.56

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 1995, BY WATER YEAR (WY)

	MEAN	2214	2637	3233	3603	3851	5130	5241	4079	3203	2385	1962	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1948 - 1995

ANNUAL TOTAL	1043160	1010190	
ANNUAL MEAN	2858	2768	
HIGHEST ANNUAL MEAN			3282
LOWEST ANNUAL MEAN			5264
HIGHEST DAILY MEAN	6560	Feb 22	1283
LOWEST DAILY MEAN	1270	Oct 27	18500
ANNUAL SEVEN-DAY MINIMUM	1400	Oct 23	336
INSTANTANEOUS PEAK FLOW			561
INSTANTANEOUS PEAK STAGE			18800
ANNUAL RUNOFF (CFSM)	.85		27.91
ANNUAL RUNOFF (INCHES)	11.51		.97
10 PERCENT EXCEEDS	4710		13.23
50 PERCENT EXCEEDS	2540		5820
90 PERCENT EXCEEDS	1470		2800
			1380

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04101500 ST. JOSEPH RIVER AT NILES, MI
(National stream quality accounting network station)

LOCATION.--Lat 41°49'45", long 86°15'35", in SW1/4 sec.26, T.7 S., R.17 W., Berrien County, Hydrologic Unit 04050001, on right bank 100 ft upstream from Main Street Bridge in Niles, 0.6 mi downstream from dam at French Paper Co., 1.3 mi upstream from Dowagiac River, and at mile 44.

DRAINAGE AREA.--3,666 mi².

WATER-DISCHARGE RECORDS

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.--Water-discharge records good except for estimated daily discharges, which are fair. Flow regulated by powerplants upstream from station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DAILY MEAN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1680	2660	2850	3120	3840	3910	3400	4150	4570	4290	e1950	2360
2	1710	2550	2790	2960	3830	3540	3330	3960	4400	3740	1900	2260
3	1390	2700	2870	2830	3710	3390	3410	3720	4500	3630	3900	2250
4	1750	2620	2760	2430	3750	3320	3250	3880	4060	3420	5570	2180
5	1710	2380	2640	2290	3730	3220	3240	3690	4000	3200	5120	1980
6	1440	3200	2830	2470	3100	2970	3230	3640	3550	3470	4100	2040
7	1580	3250	3730	2470	2940	4010	3220	3790	3800	3060	3630	2150
8	1720	2790	4570	2750	3260	5940	3130	3700	3680	3100	3450	2350
9	1780	2850	4180	2490	2880	5800	3770	3520	3330	2590	3280	2510
10	1560	3030	4180	2800	3450	5320	6060	4080	3250	2800	3300	2290
11	2220	2960	3810	2560	3040	5240	6760	3780	3300	2460	3310	1990
12	2140	2600	3510	2890	2530	5310	6780	4200	2990	2420	2990	2220
13	2280	2910	3450	3540	2880	5440	6480	4100	3130	2150	2920	1980
14	2110	3100	3470	4320	2780	5180	6180	3620	3090	2110	2480	1980
15	2060	2780	3240	4970	3160	5310	5670	3800	2600	2070	2650	2100
16	1830	2680	3270	4420	3260	4910	5550	3500	2780	2710	2980	2090
17	1810	2740	3430	4180	3390	5040	5350	3500	2500	e2750	3770	1940
18	1600	2350	3670	3980	3000	4730	5410	3510	2290	e2700	3470	1800
19	1780	2210	3630	4220	2920	4400	5110	3280	2110	e2400	3720	1720
20	1730	2310	3920	4960	3290	4400	5070	3250	2400	e2350	4120	1800
21	1710	2270	3930	5180	3320	3790	4970	3240	2020	e2300	4300	1900
22	1680	2180	3740	5330	3300	3830	5010	2840	2030	e2400	4000	2030
23	1600	2570	3540	4910	3160	3940	4720	2980	1880	e2500	3700	1970
24	1640	2090	3610	4840	3400	3900	4490	3540	1900	e2800	3550	1850
25	1740	2440	3500	4800	3200	3720	4450	5020	1850	e2400	3320	1800
26	1760	1990	3260	4500	3280	3590	4170	5240	1940	e2350	3080	1790
27	1610	2070	3250	4470	3390	3510	4230	5230	3410	e2400	2980	1870
28	1490	2530	3280	4560	3810	3630	4140	5070	4020	e2350	2590	1670
29	1700	3060	3200	4410	---	3440	4140	4940	4490	e2250	2740	1650
30	1570	2920	3070	3990	---	3570	4190	4870	4550	e2100	2410	1650
31	1760	---	3070	3930	---	3370	---	4660	---	e2000	2680	---
TOTAL	54140	78790	106250	117570	91600	131670	138910	122300	94420	83270	103960	60170
MEAN	1746	2626	3427	3793	3271	4247	4630	3945	3147	2686	3354	2006
MAX	2280	3250	4570	5330	3840	5940	6780	5240	4570	4290	5570	2510
MIN	1390	1990	2640	2290	2530	2970	3130	2840	1850	2000	1900	1650
CFSM	.48	.72	.93	1.03	.89	1.16	1.26	1.08	.86	.73	.91	.55
IN.	.55	.80	1.08	1.19	.93	1.34	1.41	1.24	.96	.84	1.05	.61

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1995, BY WATER YEAR (WY)

	MEAN	2347	2731	3168	3572	3898	5245	5459	4362	3421	2528	2108	2037
MAX	6217	6564	6689	9810	7371	11560	13590	10760	8176	4989	4497	4103	
(WY)	1987	1993	1991	1993	1968	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1931 - 1995

ANNUAL TOTAL	1158320	1183050	
ANNUAL MEAN	3173	3241	
HIGHEST ANNUAL MEAN			3403
LOWEST ANNUAL MEAN			5718
HIGHEST DAILY MEAN	7350	Feb 21	19800
LOWEST DAILY MEAN	1380	Sep 15	420
ANNUAL SEVEN-DAY MINIMUM	1610	Oct 1	728
INSTANTANEOUS PEAK FLOW			20200
INSTANTANEOUS PEAK STAGE			(a)15.10
ANNUAL RUNOFF (CFSM)	.87		.93
ANNUAL RUNOFF (INCHES)	11.75		12.61
10 PERCENT EXCEEDS	5220	4850	6110
50 PERCENT EXCEEDS	2810	3220	2810
90 PERCENT EXCEEDS	1730	1860	1470

(a) Present datum.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN
04101500 ST. JOSEPH RIVER AT NILES, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967, 1972-75, 1979 to September 1995 (discontinued).

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: February 1979 to September 1984.

WATER TEMPERATURE: February 1979 to September 1984.

INSTRUMENTATION.--Water-quality monitor from Oct. 9, 1980 to Sept. 30, 1984.

REMARKS.--Cross-sectional samples were collected at Grant Street bridge 0.2 mi upstream from gage.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1982, 1984): Maximum, 678 microsiemens, Feb. 16, 1982; minimum, 278 microsiemens, Mar. 19, 1982.

WATER TEMPERATURE (water years 1980, 1982-84): Maximum daily recorded (more than 20 percent missing record), 29.0°C, July 20, 21, 1980; minimum, 0.0°C on many days during winter.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS/100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT 05...	1738	1740	569	8.2	15.0	1.1	10.0	101	K86	K31
DEC 21...	1315	4070	565	8.3	3.0	1.7	13.8	104	520	490
APR 05...	1407	3250	575	8.4	6.0	1.0	12.6	103	K51	55
JUL 12...	1130	2260	556	8.3	23.5	3.6	7.7	93	130	800
SEP 22...	1332	2120	597	8.2	16.5	0.60	11.7	122	--	K620

DATE	HARD-NESS TOTAL (MG/L AS CaCO3) (00900)	HARD-NESS NONCARB DISSOLV FLD AS CaCO3 (MG/L) (00904)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS Mg) (00925)	SODIUM, DIS-SOLVED (MG/L AS Na) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3 CO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CaCO3) (00452)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CaCO3) (39086)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
OCT 05...	270	72	70	24	20	2.3	246	--	202	44
DEC 21...	280	56	76	22	15	2.2	274	--	224	49
APR 05...	280	57	76	21	16	2.1	264	2	220	49
JUL 12...	260	50	70	21	17	2.4	258	--	211	48
SEP 22...	260	39	67	23	19	2.4	272	--	223	47

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG C DIS-SOLVED (MG/L) (70300)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
OCT 05...	33	0.20	8.8	347	0.47	1630	0.020	1.90	0.050	0.40
DEC 21...	26	0.10	8.3	349	0.47	3840	0.040	1.90	0.080	0.40
APR 05...	28	<0.10	6.1	350	0.48	3070	0.020	1.90	0.050	0.40
JUL 12...	33	0.20	6.4	356	0.48	2170	0.020	1.80	<0.015	0.70
SEP 22...	36	0.20	9.5	353	0.48	2020	0.030	2.10	0.130	0.50

STREAMS TRIBUTARY TO LAKE MICHIGAN

04101500 ST. JOSEPH RIVER AT NILES, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BAR- IUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
OCT 05...	0.060	0.050	0.040	--	--	--	--	--	--
DEC 21...	0.030	0.030	0.030	10	53	<3	44	<4	14
APR 05...	<0.010	<0.010	<0.010	<10	53	<3	29	<4	12
JUL 12...	0.040	0.030	<0.010	<10	60	<3	7	<4	<1
SEP 22...	0.060	0.040	0.040	20	56	5	22	<4	17
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 05...	--	--	--	--	--	--	7	33	82
DEC 21...	10	1	<1	<1.0	130	<6	9	99	63
APR 05...	<10	1	<1	<1.0	130	<6	6	53	87
JUL 12...	<10	<1	<1	<1.0	140	<6	10	61	81
SEP 22...	<10	<1	<1	<1.0	120	<6	7	40	83

STREAMS TRIBUTARY TO LAKE MICHIGAN

04101800 DOWAGIAC RIVER AT SUMNERVILLE, MI

LOCATION.--Lat 41°54'48", long 86°12'47", in SE1/4 sec.30, T.6 S., R.16 W., Cass County, Hydrologic Unit 04050001, on right bank 30 ft upstream from bridge on Indian Lake Road, 0.3 mi west of Sumnerville.

DRAINAGE AREA.--255 mi².

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

GAGE.--Water-stage recorder. Datum of gage is 692.62 ft above sea level.

REMARKS.--Records good. Flow regulated by millpond and lake-level control dam upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	246	431	340	297	339	419	323	401	310	351	206	168
2	240	405	327	291	343	374	324	369	297	313	201	169
3	233	349	332	290	337	346	329	345	372	289	265	169
4	229	359	331	275	333	333	331	352	346	274	315	168
5	227	412	320	266	329	342	313	401	318	278	311	169
6	225	746	316	285	338	369	314	363	299	275	295	168
7	222	602	386	284	330	520	304	340	293	255	275	171
8	222	484	386	277	327	609	305	324	310	242	269	225
9	292	485	377	276	320	514	429	338	292	230	261	212
10	271	513	387	276	334	464	526	446	290	226	267	203
11	261	455	363	276	305	493	475	445	286	220	255	199
12	258	411	340	324	289	536	569	390	272	213	244	194
13	251	383	322	456	318	501	484	358	256	207	234	188
14	241	386	310	693	308	451	416	348	247	202	228	182
15	235	376	304	660	312	420	382	332	238	195	239	179
16	233	356	315	524	319	399	363	318	231	257	364	180
17	230	344	430	455	314	379	368	313	222	266	307	176
18	231	333	454	418	312	366	390	310	218	252	296	176
19	265	317	424	436	327	360	392	311	213	228	282	175
20	270	311	386	516	356	357	376	292	210	225	273	178
21	266	322	370	476	388	357	415	278	203	263	276	183
22	262	317	353	447	384	347	419	270	196	240	254	196
23	258	302	342	433	399	338	385	273	205	284	245	190
24	255	295	333	422	428	329	368	389	210	283	231	189
25	253	290	323	407	399	321	358	470	223	246	233	191
26	255	283	316	394	385	316	353	444	247	239	212	191
27	253	336	311	379	428	325	407	383	372	230	151	191
28	250	496	306	370	468	368	434	391	447	239	149	195
29	245	415	299	354	---	361	393	380	473	239	150	201
30	244	367	289	341	---	346	390	354	419	220	151	193
31	258	---	288	339	---	333	---	327	---	212	160	---
TOTAL	7681	11881	10680	11937	9773	12293	11635	11055	8515	7693	7599	5569
MEAN	248	396	345	385	349	397	388	357	284	248	245	186
MAX	292	746	454	693	468	609	569	470	473	351	364	225
MIN	222	283	288	266	289	316	304	270	196	195	149	168
CFSM	.97	1.55	1.35	1.51	1.37	1.56	1.52	1.40	1.11	.97	.96	.73
IN.	1.12	1.73	1.56	1.74	1.43	1.79	1.70	1.61	1.24	1.12	1.11	.81

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1995, BY WATER YEAR (WY)

	MEAN	261	309	335	315	333	412	406	332	268	221	197	212
MAX	530	490	513	548	508	629	552	490	404	333	326	401	
(WY)	1987	1991	1992	1993	1985	1985	1993	1981	1981	1978	1992	1993	
MIN	132	179	179	166	177	251	297	205	142	133	101	112	
(WY)	64	1965	1964	1963	1963	1964	1971	1964	1964	1988	1964	1964	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1961 - 1995

ANNUAL TOTAL	114794	116311	300
ANNUAL MEAN	315	319	401
HIGHEST ANNUAL MEAN			1993
LOWEST ANNUAL MEAN			177
HIGHEST DAILY MEAN	780	Feb 21	1550
LOWEST DAILY MEAN	181	Jun 11	87
ANNUAL SEVEN-DAY MINIMUM	187	Jun 6	89
INSTANTANEOUS PEAK FLOW			1590
INSTANTANEOUS PEAK STAGE			9.26
INSTANTANEOUS LOW FLOW			86
ANNUAL RUNOFF (CFSM)	1.23	1.25	1.18
ANNUAL RUNOFF (INCHES)	16.75	16.97	15.98
10 PERCENT EXCEEDS	434	435	458
50 PERCENT EXCEEDS	292	314	278
90 PERCENT EXCEEDS	217	203	164

(a) Aug. 28, 30.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04102500 PAW PAW RIVER AT RIVERSIDE, MI

LOCATION.--Lat 42°11'10", long 86°22'06", in SW1/4 SE1/4 sec.23, T.3 S., R.18 W., Berrien County, Hydrologic Unit 04050001, on left bank 40 ft upstream from bridge on Coloma Road, 0.8 mi east of Riverside.

DRAINAGE AREA.--390 mi².

PERIOD OF RECORD.--October 1951 to current year.

REVISED RECORDS.--WSP 1337: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 588.80 ft above sea level. May 10, 1966, to July 11, 1967, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Diurnal fluctuation, principally during low flow, caused by paper mill upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	324	411	545	441	480	664	495	763	506	451	313	260
2	301	469	557	439	469	622	481	775	460	411	308	264
3	297	478	575	435	465	592	465	744	503	369	301	255
4	286	487	562	419	463	567	451	680	589	339	305	245
5	273	541	537	416	459	535	441	643	541	327	316	245
6	268	684	517	e420	e455	508	438	634	478	334	352	244
7	268	1060	522	e415	e450	552	435	610	439	344	437	246
8	267	944	537	e410	e445	729	445	595	420	345	438	268
9	293	827	552	e410	e440	831	505	591	406	317	436	279
10	305	801	555	e410	e435	780	656	589	400	298	421	280
11	318	807	563	e420	e430	785	778	580	408	295	385	282
12	331	775	560	e460	e430	842	802	571	402	293	340	268
13	321	704	550	517	e425	e850	914	565	390	287	314	262
14	296	652	537	644	e425	837	934	555	380	279	310	261
15	288	624	521	878	e420	790	905	535	361	267	296	253
16	293	593	505	885	e420	760	795	505	339	302	316	245
17	302	551	523	842	e420	718	711	483	325	299	396	244
18	299	523	595	887	e420	658	669	461	323	277	406	252
19	303	503	633	906	e425	602	646	448	325	271	405	273
20	303	478	626	855	450	561	648	432	312	277	382	285
21	312	463	625	793	488	536	667	412	297	296	342	263
22	329	455	637	734	517	520	710	401	292	313	309	268
23	344	448	634	704	528	506	702	400	288	335	295	272
24	337	435	600	709	558	492	664	443	288	340	288	298
25	325	426	564	705	586	474	638	514	288	347	273	299
26	324	416	539	672	587	459	615	577	296	345	265	270
27	324	420	515	623	602	447	626	594	333	357	265	260
28	322	475	497	587	646	464	707	593	367	398	264	253
29	322	531	483	558	---	484	774	596	409	378	266	251
30	323	543	462	529	---	496	757	584	446	351	267	255
31	331	---	445	500	---	500	---	551	---	328	260	---
TOTAL	9529	17524	17073	18623	13338	19161	19474	17424	11611	10170	10271	7900
MEAN	307	584	551	601	476	618	649	562	387	328	331	263
MAX	344	1060	637	906	646	850	934	775	589	451	438	299
MIN	267	411	445	410	420	447	435	400	288	267	260	244
CFSM	.79	1.50	1.41	1.54	1.22	1.58	1.66	1.44	.99	.84	.85	.68
IN.	.91	1.67	1.63	1.78	1.27	1.83	1.86	1.66	1.11	.97	.98	.75

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1995, BY WATER YEAR (WY)

	MEAN	385	449	516	510	536	684	653	508	397	322	287	304
MAX	1217	826	906	1038	842	1234	961	799	686	581	557	569	
(WY)	1987	1989	1991	1952	1981	1979	1985	1974	1969	1982	1980	1975	
MIN	178	223	232	226	256	390	361	287	200	180	163	158	
(WY)	1964	1954	1959	1959	1963	1957	1958	1958	1964	1963	1964	1963	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1952 - 1995

ANNUAL TOTAL	169089	172098	
ANNUAL MEAN	463	472	462
HIGHEST ANNUAL MEAN			606
LOWEST ANNUAL MEAN			273
HIGHEST DAILY MEAN	1700	1060	3460
LOWEST DAILY MEAN	252	244	120
ANNUAL SEVEN-DAY MINIMUM	257	251	134
INSTANTANEOUS PEAK FLOW		1120	3580
INSTANTANEOUS PEAK STAGE		8.61	10.90
INSTANTANEOUS LOW FLOW		241	99
ANNUAL RUNOFF (CFSM)	1.19	1.21	1.19
ANNUAL RUNOFF (INCHES)	16.13	16.42	16.11
10 PERCENT EXCEEDS	648	710	760
50 PERCENT EXCEEDS	430	445	406
90 PERCENT EXCEEDS	286	273	231

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04102533 ST. JOSEPH RIVER AT ST. JOSEPH, MI

LOCATION.--Lat 42°06'48", long 86°29'07", in NE1/4 NW1/4 sec.23, T.4 S., R.19 W., Berrien County, Hydrologic Unit 04050001, on right bank at U.S. Coast Guard Station in St. Joseph, 0.1 mi upstream from mouth.

DRAINAGE AREA.--4,670 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1994 to October 1995 (discontinued).

GAGE.--Acoustical velocity meter system. Single-path transducer installation. Datum of gage 580.00 ft, International Great Lakes datum.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 8,820 ft³/s, Apr. 12, 1995; minimum daily, 1,920 ft³/s, Oct. 3, 1995.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2590	4200	e4000	4030	e4900	e5200	3910	5850	4980	5260	3430	2880
2	2510	3930	e3950	4180	e4850	e4800	4030	e5700	4780	4260	4850	3410
3	2190	3700	e4000	4140	e4800	e4600	4220	e5400	5190	3930	4530	2630
4	2320	3900	e3900	e3300	e4900	e4500	4450	e5200	4760	3790	5210	2640
5	2440	3850	e3800	e3200	e4600	e4300	4110	e5000	4900	3770	5500	2440
6	2160	5620	e4100	e3350	e4200	e4100	4390	5340	4100	3790	5020	2460
7	2050	5790	e5000	e3400	e4000	e5900	3920	6550	3980	3980	5660	2650
8	2170	4960	e5800	e3700	e4300	e7600	3600	4190	4540	3390	5090	3450
9	2880	4610	5550	e3400	e3900	e7400	4520	4420	3980	3120	5180	3630
10	2500	4900	4970	e3700	e4500	e7000	6560	5160	3830	3770	4040	3540
11	2270	4470	5190	e3500	e4000	e6900	7620	5180	4100	3160	4160	3290
12	2790	4240	4570	e4100	e3500	e6800	8820	5000	3550	3320	3750	2590
13	2650	3940	4070	e5000	e3800	e6600	7890	4660	3400	2850	3650	2710
14	2580	4400	4310	e6200	e3700	e6400	7080	4870	3730	2740	3090	2470
15	2520	4270	3910	e6800	e4100	6270	6300	4630	3130	e2700	3040	2460
16	2640	3760	3870	e6000	e4200	5960	6220	5450	3570	2910	3450	2490
17	2350	3850	4450	e5800	e4400	5710	6170	4690	3240	3720	3920	2690
18	2190	4040	4910	e5600	e4000	5580	6300	5430	e3000	3320	4460	2540
19	2420	3480	4670	e6000	e3900	5360	6420	5900	e2800	3050	5000	2230
20	2470	3210	4610	e6700	e4300	5380	e6300	4360	e3100	2790	5640	2490
21	2120	e3200	4580	e6800	e4400	5270	6220	4360	e2700	2900	5120	2550
22	2210	e3100	4600	e6900	e4500	4690	6280	4100	e2600	2670	4450	2870
23	2650	e3500	4400	e6400	e4400	4780	5780	3880	e2500	3550	e4300	2690
24	2640	e3000	4470	e6300	e4600	4870	5290	3510	e2500	2990	e4200	2440
25	2520	e3400	4290	e6200	e4500	4360	5340	5300	e2500	3290	e4000	2320
26	2440	e2900	4280	e6000	e4600	4440	5660	5980	e2700	2870	e3800	2400
27	2500	e3000	3790	e5900	e4800	3900	6210	5550	e4200	2960	e3600	2490
28	2480	e3800	4350	e5800	e5200	4490	5560	5620	e5200	3200	e3200	2290
29	2400	e4300	3840	e5600	---	4430	5420	5770	e5700	3140	e3400	2270
30	2330	e4100	3750	e5300	---	4210	5900	5380	e5800	2870	3460	2280
31	2300	---	3840	e5000	---	4230	---	5220	---	2940	3120	---
TOTAL	75280	119420	135820	158300	121850	165930	170480	157650	115040	103000	131320	80290
MEAN	2428	3981	4381	5106	4352	5353	5683	5085	3835	3323	4236	2676
MAX	2880	5790	5800	6900	5200	7600	8820	6550	5800	5260	5660	3630
MIN	2050	2900	3750	3200	3500	3900	3600	3510	2500	2670	3040	2230
CFSM	.52	.85	.94	1.09	.93	1.15	1.22	1.09	.82	.71	.91	.57
IN.	.60	.95	1.08	1.26	.97	1.32	1.36	1.26	.92	.82	1.05	.64

WTR YR 1995 TOTAL 1534380 MEAN 4204 MAX 8820 MIN 2050 CFSM .90 IN. 12.22

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04102533 ST. JOSEPH RIVER AT ST. JOSEPH, MI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2550	---	---	---	---	---	---	---	---	---	---	---
2	2220	---	---	---	---	---	---	---	---	---	---	---
3	1920	---	---	---	---	---	---	---	---	---	---	---
4	2130	---	---	---	---	---	---	---	---	---	---	---
5	2210	---	---	---	---	---	---	---	---	---	---	---
6	2520	---	---	---	---	---	---	---	---	---	---	---
7	2600	---	---	---	---	---	---	---	---	---	---	---
8	2440	---	---	---	---	---	---	---	---	---	---	---
9	2060	---	---	---	---	---	---	---	---	---	---	---
10	2310	---	---	---	---	---	---	---	---	---	---	---
11	2310	---	---	---	---	---	---	---	---	---	---	---
12	2170	---	---	---	---	---	---	---	---	---	---	---
13	2020	---	---	---	---	---	---	---	---	---	---	---
14	e2000	---	---	---	---	---	---	---	---	---	---	---
15	e2400	---	---	---	---	---	---	---	---	---	---	---
16	e2200	---	---	---	---	---	---	---	---	---	---	---
17	e2500	---	---	---	---	---	---	---	---	---	---	---
18	e2300	---	---	---	---	---	---	---	---	---	---	---
19	e2300	---	---	---	---	---	---	---	---	---	---	---
20	e2500	---	---	---	---	---	---	---	---	---	---	---
21	e3100	---	---	---	---	---	---	---	---	---	---	---
22	e2800	---	---	---	---	---	---	---	---	---	---	---
23	e2700	---	---	---	---	---	---	---	---	---	---	---
24	e2750	---	---	---	---	---	---	---	---	---	---	---
25	e2800	---	---	---	---	---	---	---	---	---	---	---
26	e2700	---	---	---	---	---	---	---	---	---	---	---
27	e3000	---	---	---	---	---	---	---	---	---	---	---
28	e3400	---	---	---	---	---	---	---	---	---	---	---
29	e3100	---	---	---	---	---	---	---	---	---	---	---
30	e3200	---	---	---	---	---	---	---	---	---	---	---
31	e3300	---	---	---	---	---	---	---	---	---	---	---
TOTAL	78510	---	---	---	---	---	---	---	---	---	---	---
MEAN	2533	---	---	---	---	---	---	---	---	---	---	---
MAX	3400	---	---	---	---	---	---	---	---	---	---	---
MIN	1920	---	---	---	---	---	---	---	---	---	---	---
CFSM	.54	---	---	---	---	---	---	---	---	---	---	---
IN.	.63	---	---	---	---	---	---	---	---	---	---	---

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04102533 ST. JOSEPH RIVER AT ST. JOSEPH, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1994 to October 1995 (discontinued).

REMARKS.--Cross-sectional samples were collected in the vicinity of the gage. Unpublished records of selected herbicides, metals and organics will be available upon release by cooperating agencies.

COOPERATION.--All published data were collected by the U.S. Geological Survey and the Michigan Department of Natural Resources and analyzed by the Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA

DATE	TIME	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATURATION) (00301)	HARDNESS TOTAL (MG/L AS CaCO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNESIUM, DIS-SOLVED (MG/L AS Mg) (00925)	SODIUM, DIS-SOLVED (MG/L AS Na) (00930)	POTASSIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
APR 1994												
06...	1300	538	8.3	8.0	11.9	103	270	73	21	12	2.0	41
13...	0950	543	8.3	10.0	10.3	93	270	72	21	13	1.8	41
25...	1225	547	8.6	16.0	10.0	104	280	74	22	13	2.2	42
MAY												
11...	0935	516	8.4	15.0	9.6	97	270	72	22	12	1.9	40
20...	1030	526	8.6	16.5	9.6	100	280	73	23	14	2.0	42
JUN												
02...	1100	543	8.3	19.5	10.8	120	270	68	24	16	2.1	44
28...	1105	518	8.0	22.0	8.1	96	250	66	21	14	2.4	43
JUL												
01...	0945	478	8.1	22.0	9.1	107	240	64	20	12	2.0	43
06...	1100	521	8.3	24.0	9.4	114	250	66	21	13	2.0	43
19...	1010	496	8.4	22.5	9.7	115	250	65	22	14	2.1	39
19...	1230	493	8.4	24.0	9.7	118	250	64	22	14	2.0	39
AUG												
09...	1030	535	8.4	20.5	8.0	90	250	63	23	17	1.8	42
30...	1050	542	8.4	21.5	9.6	112	260	67	23	15	1.9	40
SEP												
27...	1030	544	8.0	18.0	8.1	88	250	62	23	17	2.3	41
OCT												
19...	1015	586	8.1	15.5	9.8	101	270	--	24	17	2.2	42
NOV												
08...	0930	474	7.9	10.5	9.5	87	230	59	20	12	2.8	36
14...	1030	536	7.9	10.5	10.2	93	260	66	22	13	2.5	42
DEC												
02...	1015	509	8.0	3.5	12.8	98	270	71	22	13	2.2	42
JAN 1995												
27...	0930	527	8.0	0.5	12.9	90	260	70	21	14	2.2	45
FEB												
22...	1030	--	--	--	--	--	290	77	23	16	2.0	47
MAR												
14...	0900	503	7.6	7.5	10.5	90	270	72	21	12	2.2	44
18...	0900	536	7.8	10.0	9.5	86	270	72	21	13	2.0	47
22...	0900	547	8.3	9.5	9.6	86	270	72	21	13	1.8	46
APR												
12...	0900	481	--	8.5	12.2	107	230	61	19	12	2.3	40
14...	0845	468	--	7.5	10.2	87	220	58	18	10	2.7	39
21...	0900	519	7.7	11.0	10.1	94	270	72	21	13	2.1	47
25...	0945	546	8.2	11.5	9.1	86	270	73	21	13	1.9	46
MAY												
03...	0830	544	8.3	12.0	9.2	86	270	72	22	13	1.7	44
03...	1130	539	8.3	12.0	9.4	88	270	71	22	13	1.7	42
16...	1015	549	8.3	17.0	9.0	95	--	--	--	--	--	--
31...	1100	549	8.3	17.0	9.0	94	--	--	--	--	--	--
JUN												
22...	0900	525	8.0	25.5	8.4	106	--	--	--	--	--	--
AUG												
23...	0830	518	7.9	25.0	6.8	84	--	--	--	--	--	--
SEP												
26...	0900	583	8.0	15.5	8.7	90	--	--	--	--	--	--
OCT												
27...	1000	576	8.1	11.0	9.6	93	--	--	--	--	--	--

STREAMS TRIBUTARY TO LAKE MICHIGAN

04102533 ST. JOSEPH RIVER AT ST. JOSEPH, MI--Continued

WATER-QUALITY DATA

DATE	TIME	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLORO- PHYLL A TRICHR. UNCORR. TOTAL (UG/L) (32210)
APR 1994											
06...	1300	24	5.0	16	6	1.51	0.038	0.70	0.050	0.002	26.9
13...	0950	25	4.7	20	8	1.70	0.036	0.60	0.060	0.002	--
25...	1225	24	3.4	24	8	1.18	0.052	0.90	0.070	0.003	47.7
MAY											
11...	0935	24	3.5	33	10	1.24	0.047	0.80	0.090	0.002	38.9
20...	1030	26	2.8	24	10	1.24	0.037	0.80	0.070	<0.002	47.6
JUN											
02...	1100	31	2.2	25	10	1.15	0.034	0.90	0.080	--	53.7
28...	1105	27	9.2	30	11	1.76	0.078	0.50	0.100	0.017	18.4
JUL											
01...	0945	24	8.3	20	6	2.38	0.024	0.70	0.080	0.006	31.9
06...	1100	25	7.3	28	8	1.75	0.019	0.80	0.090	0.002	43.4
19...	1010	27	7.3	18	10	1.04	0.016	0.70	0.060	<0.002	48.4
19...	1230	26	7.4	17	9	1.03	0.015	0.70	0.060	<0.002	55.0
AUG											
09...	1030	31	4.0	32	10	1.04	0.030	0.96	0.083	<0.002	61.0
30...	1050	28	4.7	24	11	0.892	0.009	0.91	0.075	<0.002	53.1
SEP											
27...	1030	31	7.5	26	7	1.47	0.079	0.66	0.093	0.018	15.9
OCT											
19...	1015	31	7.9	14	7	1.71	0.033	0.70	0.073	0.016	16.2
NOV											
08...	0930	23	8.7	24	7	1.31	0.070	0.70	0.097	0.031	5.00
14...	1030	25	9.5	22	8	1.61	0.111	0.80	0.083	0.032	5.01
DEC											
02...	1015	25	8.8	--	--	1.56	0.064	0.70	0.040	0.003	5.05
JAN 1995											
27...	0930	28	8.0	11	5	2.29	0.148	0.80	0.050	0.020	2.66
FEB											
22...	1030	31	7.1	8	4	2.00	0.065	0.70	0.040	0.004	5.78
MAR											
14...	0900	24	6.8	18	7	2.39	0.052	0.80	0.080	0.013	10.2
18...	0900	25	6.0	22	8	1.92	0.030	1.2	0.070	0.007	31.3
22...	0900	25	6.1	22	8	1.61	0.039	0.80	0.070	0.008	35.4
APR											
12...	0900	25	5.6	61	11	1.95	0.096	1.2	0.140	0.022	12.6
14...	0845	21	6.1	42	10	2.72	0.109	1.2	0.140	0.037	10.9
21...	0900	25	5.8	24	8	1.74	0.082	0.80	0.072	0.009	17.2
25...	0945	25	5.4	20	7	1.65	0.028	0.80	0.063	0.004	20.0
MAY											
03...	0830	25	4.5	19	7	1.45	0.034	0.80	0.062	0.002	22.3
03...	1130	25	4.4	18	6	1.40	0.027	0.90	0.062	0.003	28.9
16...	1015	24	2.9	26	--	1.32	0.00	0.90	0.073	0.002	47.6
31...	1100	--	5.8	22	8	2.25	<0.027	0.70	0.018	0.007	14.0
JUN											
22...	0900	25	2.0	30	--	0.847	<0.027	1.1	0.079	<0.002	49.5
AUG											
23...	0830	26	9.2	32	--	1.46	<0.027	0.60	0.095	0.030	13.1
SEP											
26...	0900	33	9.6	12	--	1.88	0.064	0.50	0.046	0.020	4.82
OCT											
27...	1000	31	8.8	8	--	1.79	0.053	0.50	0.050	0.021	2.17

STREAMS TRIBUTARY TO LAKE MICHIGAN

04102700 SOUTH BRANCH BLACK RIVER NEAR BANGOR, MI

LOCATION.--Lat 42°21'15", long 86°11'15", in NW1/4 sec.28, T.1 S., R.16 W., Van Buren County, Hydrologic Unit 04050002, on left bank 50 ft upstream from bridge on 66th Street, 4.9 mi northwest of Bangor.

DRAINAGE AREA.--83.6 mi².

PERIOD OF RECORD.--June 1966 to current year. Prior to October 1981, published as Black River near Bangor.

REVISED RECORDS.--WDR MI-81-1: 1973-75(M), 1979(M).

GAGE.--Water-stage recorder. Elevation of gage is 610 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Occasional regulation caused by mills upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	43	97	110	81	99	155	96	199	71	54	38	30
2	43	101	100	81	100	127	91	167	66	48	38	30
3	54	81	97	79	99	109	89	142	87	44	40	32
4	51	78	102	e77	97	99	92	127	97	44	43	35
5	46	114	99	e76	e94	97	87	148	83	48	42	31
6	43	365	94	e74	e93	105	84	154	71	47	42	30
7	41	426	102	e73	e92	166	82	130	64	43	53	32
8	40	271	117	e73	e91	342	100	114	63	42	48	40
9	51	218	122	e72	e90	292	161	106	62	39	46	35
10	49	207	135	e73	e89	221	291	120	67	39	44	34
11	46	172	134	e78	e88	228	267	125	72	38	42	33
12	43	142	120	e85	e87	289	320	108	64	37	41	32
13	42	124	109	164	e86	291	339	96	59	36	38	31
14	41	120	99	330	e85	245	260	89	55	35	37	31
15	41	123	93	508	e84	196	189	84	51	35	35	30
16	41	111	92	395	e84	160	154	79	49	36	37	30
17	40	101	159	286	e84	139	139	78	47	35	50	32
18	40	95	221	222	85	124	142	76	45	34	43	32
19	43	89	200	187	90	117	163	72	44	33	47	31
20	45	84	164	240	107	113	156	68	43	34	39	30
21	45	84	143	248	135	109	187	65	41	40	37	32
22	45	86	132	219	140	104	227	61	40	38	35	36
23	45	81	121	193	143	98	176	64	39	48	34	35
24	45	76	115	178	170	93	145	94	37	45	32	34
25	45	73	109	164	156	88	130	121	37	43	31	33
26	46	74	101	152	137	85	123	120	40	42	30	33
27	46	77	96	139	136	84	248	99	46	41	30	33
28	46	149	92	129	170	109	383	91	54	53	31	32
29	45	158	88	118	---	122	346	92	59	49	32	32
30	44	128	84	117	---	114	253	86	67	45	32	31
31	46	---	80	101	---	104	---	78	---	40	31	---
TOTAL	1381	4105	3630	5012	3011	4725	5520	3253	1720	1285	1198	972
MEAN	44.5	137	117	162	108	152	184	105	57.3	41.5	38.6	32.4
MAX	54	426	221	508	170	342	383	199	97	54	53	40
MIN	40	73	80	72	84	84	82	61	37	33	30	30
CFSM	.53	1.64	1.40	1.93	1.29	1.82	2.20	1.26	.69	.50	.46	.39
IN.	.61	1.83	1.62	2.23	1.34	2.10	2.46	1.45	.77	.57	.53	.43

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1995, BY WATER YEAR (WY)

	70.5	98.5	136	124	139	192	171	104	82.4	61.1	46.5	60.9
MEAN	70.5	98.5	136	124	139	192	171	104	82.4	61.1	46.5	60.9
MAX	362	282	272	244	263	389	327	182	248	181	141	329
(WY)	1987	1991	1983	1973	1976	1979	1975	1975	1980	1986	1980	1986
MIN	33.8	46.7	44.5	42.8	74.4	104	68.9	44.4	31.7	28.4	27.9	29.7
(WY)	1975	1972	1977	1977	1987	1981	1971	1971	1971	1988	1988	1969

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR	FOR 1995 WATER YEAR	WATER YEARS 1966 - 1995
ANNUAL TOTAL	36579	35812	
ANNUAL MEAN	100	98.1	107
HIGHEST ANNUAL MEAN			133
LOWEST ANNUAL MEAN			72.8
HIGHEST DAILY MEAN	1020	508	1740
LOWEST DAILY MEAN	30	30	21
ANNUAL SEVEN-DAY MINIMUM	31	31	24
INSTANTANEOUS PEAK FLOW		528	(a)1860
INSTANTANEOUS PEAK STAGE		8.74	13.63
INSTANTANEOUS LOW FLOW		29	20
ANNUAL RUNOFF (CFSM)	1.20	1.17	1.28
ANNUAL RUNOFF (INCHES)	16.28	15.94	17.42
10 PERCENT EXCEEDS	186	188	208
50 PERCENT EXCEEDS	74	84	75
90 PERCENT EXCEEDS	40	34	34

(a) From rating curve extended above 1,200 ft³/s.

(b) Aug. 27 and several days in September.

(c) Sept. 28 1966, Aug. 18, 19, 1984.

(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.--Not determined.

PERIOD OF RECORD.--October 1994 to September 1995.

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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e45	e100	121	90	e110	134	103	262	84	53	38	27
2	e45	e105	113	90	e105	121	98	196	79	49	38	26
3	e56	e85	109	88	e105	109	96	152	90	46	43	26
4	e53	e100	108	e85	e100	107	98	136	94	43	51	29
5	e49	132	103	e83	e100	105	93	144	85	54	47	28
6	e46	269	100	e81	e100	109	92	140	78	52	44	26
7	e43	432	108	e80	e99	132	90	131	73	48	42	26
8	43	334	116	e79	e98	225	95	122	71	44	38	31
9	e52	325	120	e78	e97	183	112	116	69	42	39	31
10	e50	305	127	e78	e95	167	151	127	71	40	40	29
11	e48	233	126	e84	e94	201	149	160	85	39	37	28
12	e46	170	118	e95	93	231	212	131	76	37	36	28
13	e44	145	112	134	e93	241	253	116	69	37	33	27
14	e43	138	106	226	e92	236	210	108	64	34	32	26
15	e43	138	101	406	e92	216	170	101	60	33	30	26
16	e43	126	101	357	e92	173	143	95	55	37	31	25
17	e42	118	137	351	e92	144	127	97	53	39	48	31
18	e42	112	165	283	e95	128	123	99	50	35	49	34
19	e44	105	158	210	101	121	133	93	48	33	43	31
20	e46	101	153	228	116	118	123	88	46	35	40	31
21	e47	102	144	236	130	115	144	83	43	40	37	31
22	e46	105	134	218	128	110	179	78	41	37	34	35
23	e46	99	125	202	132	105	149	84	39	42	31	37
24	e46	95	120	201	143	100	135	130	37	42	30	34
25	e47	92	114	175	135	96	123	141	38	40	29	33
26	e47	90	108	157	128	93	124	135	40	38	27	32
27	e48	94	104	145	129	94	252	118	46	36	27	31
28	e48	140	101	140	142	117	387	109	55	51	28	31
29	e47	135	97	126	---	122	342	105	57	54	29	30
30	e46	126	92	e120	---	115	304	100	54	46	28	28
31	e50	---	90	e115	---	109	---	92	---	42	28	---
TOTAL	1441	4651	3631	5041	3036	4377	4810	3789	1850	1298	1127	888
MEAN	46.5	155	117	163	108	141	160	122	61.7	41.9	36.4	29.6
MAX	56	432	165	406	143	241	387	262	94	54	51	37
MIN	42	85	90	78	92	93	90	78	37	33	27	25

SUMMARY STATISTICS

FOR 1995 WATER YEAR

ANNUAL TOTAL	35939	
ANNUAL MEAN	98.5	
HIGHEST DAILY MEAN	432	Nov 7
LOWEST DAILY MEAN	25	Sep 16
ANNUAL SEVEN-DAY MINIMUM	27	Sep 1
INSTANTANEOUS PEAK FLOW	(a)470	Nov 7
INSTANTANEOUS PEAK STAGE	7.24	Nov 7
INSTANTANEOUS LOW FLOW	25	(b)
10 PERCENT EXCEEDS	171	
50 PERCENT EXCEEDS	93	
90 PERCENT EXCEEDS	32	

(a) From rating curve extended above 250 ft³/s.

(b) Part of each day Sep. 2, 3, 6, 7, 14-17.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04103010 KALAMAZOO RIVER NEAR MARENGO, MI

LOCATION.--Lat 42°15'42", long 84°51'21", in SW1/4 SE1/4 sec.26, T.2 S., R.5 W., Calhoun County, Hydrologic Unit 04050003, on right bank at upstream side of bridge on B Drive North, 0.8 mi south of Marengo, and 5.0 mi west of Albion.

DRAINAGE AREA.--267 mi².

PERIOD OF RECORD.--October 1986 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 910 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Some diversion by pumping for irrigation. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	169	200	223	213	207	197	201	214	210	311	129	127
2	165	211	205	211	206	185	197	207	200	269	126	124
3	159	209	201	197	203	180	205	201	198	224	214	123
4	155	204	194	e160	200	176	200	200	195	201	216	122
5	149	198	197	e160	e180	179	193	213	189	194	222	120
6	147	230	216	e170	e175	187	193	210	181	184	218	118
7	145	232	246	e185	e170	292	188	203	180	170	201	119
8	146	224	244	e190	e170	409	229	195	173	163	179	131
9	173	226	251	e185	e170	385	285	195	171	157	168	130
10	167	243	256	e185	e170	320	370	198	177	166	162	129
11	170	233	252	187	e165	300	378	207	186	184	156	127
12	162	217	239	201	e165	320	345	206	183	166	149	125
13	156	201	222	255	e170	339	309	202	175	152	151	124
14	152	196	211	297	e170	334	283	197	166	143	152	120
15	149	188	204	303	e170	316	258	188	161	143	154	114
16	147	180	207	287	e170	296	240	185	158	153	154	108
17	145	177	283	262	169	275	229	182	154	152	185	127
18	145	176	341	245	175	257	229	179	150	141	197	115
19	164	169	345	243	175	245	234	178	147	134	230	118
20	157	169	309	278	185	242	232	172	145	144	228	123
21	155	176	287	332	190	249	248	166	142	155	223	129
22	154	166	271	343	189	253	250	163	138	141	201	143
23	152	163	259	315	190	246	245	163	134	215	185	136
24	148	162	253	295	194	229	234	199	134	159	169	133
25	146	159	246	270	190	218	228	249	158	145	156	132
26	145	156	236	251	187	204	225	275	165	147	146	131
27	144	178	226	239	193	202	245	260	216	151	141	128
28	142	287	215	233	197	210	239	251	256	147	128	124
29	139	266	213	221	---	210	231	246	283	141	128	122
30	135	247	207	208	---	208	220	238	306	136	130	121
31	138	---	204	220	---	206	---	226	---	134	131	---
TOTAL	4720	6043	7463	7341	5095	7869	7363	6368	5431	5222	5329	3743
MEAN	152	201	241	237	182	254	245	205	181	168	172	125
MAX	173	287	345	343	207	409	378	275	306	311	230	143
MIN	135	156	194	160	165	176	188	163	134	134	126	108
CFSM	.57	.75	.90	.89	.68	.95	.92	.77	.68	.63	.64	.47
IN.	.66	.84	1.04	1.02	.71	1.10	1.03	.89	.76	.73	.74	.52

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1995, BY WATER YEAR (WY)

	MEAN	237	270	257	281	259	316	326	250	248	191	182	188
MAX	349	383	356	466	340	445	468	386	530	274	226	272	
(WY)	1987	1989	1991	1993	1991	1990	1993	1990	1989	1993	1989	1993	
MIN	152	167	184	198	182	225	225	177	126	111	123	125	
(WY)	1995	1988	1990	1994	1995	1987	1987	1987	1988	1988	1988	1995	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1987 - 1995

ANNUAL TOTAL	82464	71987	250
ANNUAL MEAN	226	197	332
HIGHEST ANNUAL MEAN			1993
LOWEST ANNUAL MEAN			197
HIGHEST DAILY MEAN	584	Feb 21	1140
LOWEST DAILY MEAN	135	Oct 30	95
ANNUAL SEVEN-DAY MINIMUM	140	Sep 10	98
INSTANTANEOUS PEAK FLOW		(a)422	1160
INSTANTANEOUS PEAK STAGE		(b)8.37	10.18
INSTANTANEOUS LOW FLOW		106	88
ANNUAL RUNOFF (CFSM)	.85	.74	.94
ANNUAL RUNOFF (INCHES)	11.49	10.03	12.74
10 PERCENT EXCEEDS	321	270	378
50 PERCENT EXCEEDS	204	190	229
90 PERCENT EXCEEDS	148	134	145

(a) Gage height 7.68 ft.

(b) Backwater from ice.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04104945 WANADOGA CREEK NEAR BATTLE CREEK, MI

LOCATION.--Lat 42°23'47", long 85°07'54", in NW1/4 SE1/4 sec.9, T.1 S., R.7 W., Calhoun County, Hydrologic Unit 04050003, on right bank 30 ft upstream from bridge on State Highway 66, 5.0 mi north of Battle Creek.

DRAINAGE AREA.--48.3 mi².

PERIOD OF RECORD.--October 1994 to September 1995.

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. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	59	73	e38	40	44	41	61	43	28	14	15
2	41	78	66	e37	39	41	38	53	35	23	14	14
3	40	86	60	e36	38	e40	37	46	33	20	19	14
4	34	91	58	e35	e36	e38	37	42	34	20	24	14
5	29	89	57	e34	e34	36	35	48	32	26	22	14
6	27	94	56	34	33	36	36	52	29	24	26	13
7	27	104	57	35	30	45	38	52	27	21	24	14
8	28	119	56	35	29	58	42	46	28	19	21	18
9	37	113	57	35	29	62	53	42	26	18	20	17
10	39	102	61	34	29	e67	67	48	26	17	19	15
11	36	93	63	34	29	72	72	68	28	16	17	14
12	34	86	63	38	29	82	75	77	27	15	15	14
13	33	78	e60	51	29	103	73	78	25	15	15	14
14	32	70	56	63	30	111	69	74	23	14	14	14
15	32	65	50	73	30	104	67	63	22	14	13	14
16	33	59	48	77	30	94	61	52	21	15	17	14
17	33	54	59	75	29	83	53	43	20	16	42	20
18	34	51	69	69	30	73	49	38	19	15	50	20
19	39	47	78	64	32	64	49	35	18	13	52	16
20	42	44	84	69	37	59	49	32	17	15	53	15
21	40	44	80	76	41	56	54	30	16	22	50	17
22	38	45	72	82	41	52	58	28	16	19	43	24
23	37	43	66	84	43	48	58	29	15	23	31	23
24	37	41	63	78	46	44	55	47	15	22	23	19
25	36	40	60	71	46	40	50	62	15	18	19	e17
26	36	39	57	66	40	38	47	69	17	18	17	e16
27	35	39	53	e60	43	37	63	65	28	30	16	e15
28	35	57	50	e53	46	42	72	61	40	24	16	e15
29	35	68	47	e49	---	46	76	62	36	21	17	e15
30	34	72	43	e46	---	46	70	57	31	17	16	e14
31	36	---	e39	43	---	44	---	52	---	15	16	---
TOTAL	1085	2070	1861	1674	988	1805	1644	1612	762	593	755	478
MEAN	35.0	69.0	60.0	54.0	35.3	58.2	54.8	52.0	25.4	19.1	24.4	15.9
MAX	42	119	84	84	46	111	76	78	43	30	53	24
MIN	27	39	39	34	29	36	35	28	15	13	13	13
CFSM.	72	1.43	1.24	1.12	.73	1.21	1.13	1.08	.53	.40	.50	.33
IN.	.84	1.59	1.43	1.29	.76	1.39	1.27	1.24	.59	.46	.58	.37

SUMMARY STATISTICS

FOR 1995 WATER YEAR

ANNUAL TOTAL	15327	
ANNUAL MEAN	42.0	
HIGHEST DAILY MEAN	119	Nov 8
LOWEST DAILY MEAN	13	(a)
ANNUAL SEVEN-DAY MINIMUM	14	Sep 1
INSTANTANEOUS PEAK FLOW	121	Nov 8
INSTANTANEOUS PEAK STAGE	5.83	Nov 8
ANNUAL RUNOFF (CFSM)	.87	
ANNUAL RUNOFF (INCHES)	11.80	
10 PERCENT EXCEEDS	72	
50 PERCENT EXCEEDS	38	
90 PERCENT EXCEEDS	15	

(a) July 19, Aug. 15, Sept. 6.

(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 mi².

PERIOD OF RECORD.--October 1930 to September 1931, October 1932 to July 1933, January 1934 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 1387: 1931, 1944. WSP 1507: 1956.

GAGE.--Water-stage recorder. Datum of gage is 823.24 ft above sea level (levels by Michigan Department of Natural Resources). Prior to May 14, 1951, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Occasional slight regulation prior to November 1943. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	114	165	344	e230	272	232	241	393	257	134	92	81
2	139	225	354	e220	248	235	232	345	234	125	78	69
3	159	265	330	e200	232	212	226	281	215	116	89	69
4	167	328	302	173	221	212	215	266	212	111	104	66
5	154	394	284	160	162	206	210	281	209	116	104	73
6	135	432	275	175	178	219	208	287	197	118	112	63
7	121	468	278	161	177	210	218	281	183	118	115	69
8	112	580	274	160	166	250	242	273	179	116	125	69
9	118	652	281	172	161	287	279	312	171	107	133	67
10	126	587	286	175	158	301	319	404	167	102	119	68
11	130	513	300	171	155	398	369	483	166	100	107	66
12	125	458	313	175	153	583	417	507	170	96	97	68
13	123	416	275	206	147	569	437	458	162	94	92	68
14	117	378	319	249	146	682	435	393	154	90	89	66
15	111	343	298	298	149	880	409	333	148	96	75	63
16	109	309	272	353	150	886	375	292	140	99	81	62
17	104	284	273	383	153	793	338	263	125	94	129	62
18	101	264	292	379	155	639	308	243	121	92	161	72
19	109	248	350	353	162	527	290	228	117	86	179	69
20	117	233	466	337	178	436	284	207	113	82	201	70
21	126	221	496	353	195	383	287	201	103	86	212	69
22	136	210	454	390	213	343	289	201	98	84	197	75
23	137	204	408	438	220	309	295	222	95	102	168	90
24	136	198	372	517	221	283	300	267	96	114	135	78
25	134	191	343	457	232	259	292	291	96	108	113	73
26	131	184	e310	416	235	247	285	312	98	100	98	78
27	127	189	e290	351	235	241	298	331	117	109	94	76
28	124	217	e275	362	232	242	325	337	141	124	92	73
29	126	247	e260	270	---	248	376	331	149	124	84	67
30	124	283	e250	256	---	252	412	307	141	115	88	69
31	125	---	e240	276	---	251	---	285	---	103	80	---
TOTAL	3917	9686	9864	8816	5306	11815	9211	9615	4574	3261	3643	2108
MEAN	126	323	318	284	189	381	307	310	152	105	118	70.3
MAX	167	652	496	517	272	886	437	507	257	134	212	90
MIN	101	165	240	160	146	206	208	201	95	82	75	62
CFSM	.52	1.34	1.32	1.18	.79	1.58	1.27	1.29	.63	.44	.49	.29
IN.	.60	1.50	1.52	1.36	.82	1.82	1.42	1.48	.71	.50	.56	.33

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1995, BY WATER YEAR (WY)

	MEAN	126	164	197	208	241	416	396	262	191	110	88.9	98.3
MAX	673	474	468	591	593	936	1162	825	678	281	313	276	
(WY)	1987	1993	1991	1952	1943	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1931 - 1995

ANNUAL TOTAL	87630		81816		(a)211	
ANNUAL MEAN	240		224		394	1943
HIGHEST ANNUAL MEAN					64.1	1964
LOWEST ANNUAL MEAN						
HIGHEST DAILY MEAN	1160	Feb 22	886	Mar 16	3560	Apr 7 1947
LOWEST DAILY MEAN	70	Sep 22	62	(b)	22	Aug 14 1934
ANNUAL SEVEN-DAY MINIMUM	75	Sep 18	65	Sep 11	25	Aug 10 1936
INSTANTANEOUS PEAK FLOW			910	Mar 15	3640	Apr 7 1947
INSTANTANEOUS PEAK STAGE			2.05	Mar 15	(c)4.48	Apr 7 1947
INSTANTANEOUS LOW FLOW					22	Aug 14 1934
ANNUAL RUNOFF (CFSM)	1.00		.93		.88	
ANNUAL RUNOFF (INCHES)	13.53		12.63		11.92	
10 PERCENT EXCEEDS	434		393		422	
50 PERCENT EXCEEDS	184		206		137	
90 PERCENT EXCEEDS	99		85		60	

(a) Does not include water year 1931.

(b) Sept. 16, 17.

(c) From floodmark.

(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 mi².

PERIOD OF RECORD.--July 1937 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 924: 1938-39. WSP 1387: 1938, 1945-46, 1948.

GAGE.--Water-stage recorder. Elevation of gage is 815 ft above sea level, from topographic map. Prior to Oct. 1, 1957, water-stage recorder at site 4.7 mi downstream at different datum. Oct. 1, 1957, to June 15, 1959, nonrecording gage at bridge 1,800 ft upstream at different datum. June 16, 1959, to Oct. 13, 1960, nonrecording gage at same site and datum.

REMARKS.--Records good. Diurnal fluctuation below 1,500 ft³/s caused by powerplants upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	542	783	935	720	790	733	739	910	766	673	425	444
2	555	817	913	719	758	691	723	862	708	638	411	419
3	582	848	889	661	711	660	705	800	675	579	482	435
4	583	912	836	526	690	647	704	779	657	549	628	417
5	560	980	810	507	585	675	693	767	639	579	675	405
6	537	1170	786	560	567	681	679	776	618	546	706	362
7	511	1170	869	637	612	899	670	765	594	511	610	384
8	502	1190	854	648	583	1130	751	758	586	502	638	433
9	555	1310	872	637	536	1130	930	754	564	476	600	402
10	553	1260	886	630	626	1140	1080	807	570	470	547	391
11	549	1170	901	624	569	1310	1120	908	588	472	507	384
12	539	1070	886	687	562	1400	1170	977	563	485	481	376
13	512	968	817	801	550	1510	1160	970	548	459	455	372
14	502	931	829	931	584	1720	1120	947	584	435	465	365
15	483	871	803	1020	587	1750	1040	881	500	429	455	363
16	472	820	775	1030	595	1620	969	799	469	529	452	346
17	467	763	924	1020	589	1450	908	743	444	522	629	343
18	459	740	1020	973	590	1270	873	692	445	472	680	389
19	535	699	1090	955	608	1130	832	656	440	448	842	364
20	556	685	1190	1050	641	1040	841	627	428	454	849	373
21	536	676	e1170	1120	680	969	860	603	414	504	794	396
22	522	651	e1120	1190	689	957	860	575	397	547	747	422
23	521	631	1020	1210	694	904	860	576	366	614	673	434
24	519	620	986	1230	717	842	843	766	409	625	601	407
25	522	612	932	1140	727	795	809	890	437	566	549	397
26	523	598	888	1050	711	754	863	955	603	538	509	411
27	490	662	839	960	731	742	912	922	669	598	480	401
28	521	856	812	942	734	751	932	945	787	598	482	392
29	486	909	767	833	---	762	915	909	725	588	462	376
30	480	918	742	792	---	763	944	914	702	541	463	364
31	515	---	718	780	---	747	---	817	---	478	451	---
TOTAL	16189	26290	27879	26583	18016	31572	26505	25050	16895	16425	17928	11767
MEAN	522	876	899	858	643	1018	883	808	563	530	578	392
MAX	583	1310	1190	1230	790	1750	1170	977	787	673	860	444
MIN	459	598	718	507	536	647	670	575	366	429	411	343
CFSM	.63	1.06	1.09	1.04	.78	1.24	1.07	.98	.68	.64	.70	.48
IN.	.73	1.19	1.26	1.20	.81	1.43	1.20	1.13	.76	.74	.81	.53

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1995, BY WATER YEAR (WY)

	MEAN	495	588	658	676	765	1126	1107	843	677	489	423	432
MAX	1446	1284	1248	1557	1500	2183	2834	1998	1703	1000	899	855	
(WY)	1987	1993	1991	1993	1976	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1937 - 1995

ANNUAL TOTAL	280439												
ANNUAL MEAN	768												
HIGHEST ANNUAL MEAN										689			
LOWEST ANNUAL MEAN										1081		1943	
HIGHEST DAILY MEAN	2350									250		1964	
LOWEST DAILY MEAN	380									7130		Apr 7 1947	
ANNUAL SEVEN-DAY MINIMUM	399									86		Aug 5 1964	
INSTANTANEOUS PEAK FLOW										106		Aug 4 1964	
INSTANTANEOUS PEAK STAGE										(a)7290		Apr 7 1947	
INSTANTANEOUS LOW FLOW										(b)7.95		Feb 26 1985	
ANNUAL RUNOFF (CFSM)	.93									50		Sep 22 1939	
ANNUAL RUNOFF (INCHES)	12.66									.84			
10 PERCENT EXCEEDS	1190									11.36			
50 PERCENT EXCEEDS	680									1230			
90 PERCENT EXCEEDS	456									550			
										293			

(a) Gage height 9.13 ft, site and datum then in use.
(b) Present site and datum.
(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04105700 AUGUSTA CREEK NEAR AUGUSTA, MI

LOCATION.--Lat 42°21'12", long 85°21'14", in SW1/4 sec.27, T.1 S., R.9 W., Kalamazoo County, Hydrologic Unit 04050003, on left bank 15 ft downstream from bridge on EF Road, 1.3 mi north of Augusta.

DRAINAGE AREA.--38.9 mi².

PERIOD OF RECORD.--October 1964 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 815 ft above sea level, from topographic map. Prior to June 15, 1965, nonrecording gage at same site and datum.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	43	73	50	43	43	42	40	48	41	41	30	30
2	43	79	47	43	43	37	39	46	38	37	30	29
3	40	73	51	42	41	36	39	43	35	35	35	32
4	37	65	52	37	41	35	39	44	35	35	41	32
5	35	64	50	41	34	36	36	51	35	51	55	30
6	35	90	49	41	40	37	38	48	40	52	56	30
7	33	90	53	40	37	51	37	44	39	40	45	34
8	35	79	53	40	35	61	43	41	39	34	42	40
9	49	76	55	39	34	51	60	44	37	31	39	36
10	45	71	56	39	37	47	72	57	39	32	37	33
11	41	64	54	40	32	50	66	62	39	33	34	32
12	38	58	51	44	35	59	65	58	37	30	32	31
13	37	55	47	56	37	62	62	53	35	28	30	30
14	36	55	46	65	35	61	57	49	33	27	29	29
15	35	53	44	70	35	59	52	46	32	29	28	28
16	34	51	46	64	35	56	50	43	31	31	35	28
17	34	49	60	57	35	52	50	43	31	33	68	34
18	33	48	61	53	36	48	50	43	30	30	101	33
19	42	46	58	54	38	47	50	41	29	28	110	31
20	43	45	55	63	41	47	49	39	29	29	85	31
21	41	46	53	66	41	46	58	37	29	36	64	32
22	39	45	52	63	40	43	60	35	29	34	53	38
23	38	43	52	60	41	41	54	39	27	45	46	35
24	37	42	52	57	43	39	49	59	25	48	41	33
25	37	41	51	55	41	37	46	62	28	41	37	31
26	37	40	49	52	39	35	50	59	36	37	35	30
27	37	48	47	49	41	36	63	52	44	38	33	30
28	36	67	46	49	44	46	63	51	41	41	33	29
29	35	63	45	45	---	46	56	49	50	42	33	28
30	35	56	43	43	---	44	51	47	51	36	32	27
31	38	---	42	45	---	42	---	43	---	32	31	---
TOTAL	1178	1775	1570	1555	1074	1429	1544	1476	1064	1116	1400	946
MEAN	38.0	59.2	50.6	50.2	38.4	46.1	51.5	47.6	35.5	36.0	45.2	31.5
MAX	49	90	61	70	44	62	72	62	51	52	110	40
MIN	33	40	42	37	32	35	36	35	25	27	28	27
CFSM	.98	1.52	1.30	1.29	.99	1.19	1.32	1.22	.91	.93	1.16	.81
IN.	1.13	1.70	1.50	1.49	1.03	1.37	1.48	1.41	1.02	1.07	1.34	.90

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1995, BY WATER YEAR (WY)

	MEAN	41.2	46.7	48.7	44.1	46.2	57.8	60.0	47.9	43.3	36.4	34.6	37.1
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	26.9	30.1	39.5	41.2	30.0	23.9	17.4	17.9	18.0	
(WY)	1965	1965	1965	1971	1970	1966	1971	1965	1988	1965	1984	1966	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1965 - 1995

ANNUAL TOTAL	17111	16127	
ANNUAL MEAN	46.9	44.2	45.3
HIGHEST ANNUAL MEAN			57.5
LOWEST ANNUAL MEAN			30.3
HIGHEST DAILY MEAN	121	110	454
LOWEST DAILY MEAN	23	25	14
ANNUAL SEVEN-DAY MINIMUM	24	28	14
INSTANTANEOUS PEAK FLOW		118	560
INSTANTANEOUS PEAK STAGE		2.07	3.41
INSTANTANEOUS LOW FLOW		(a)18	(a)8.9
ANNUAL RUNOFF (CFSM)	1.21	1.14	1.16
ANNUAL RUNOFF (INCHES)	16.36	15.42	15.82
10 PERCENT EXCEEDS	69	60	67
50 PERCENT EXCEEDS	43	41	42
90 PERCENT EXCEEDS	29	31	27

(a) Result of freezeup.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106000 KALAMAZOO RIVER AT COMSTOCK, MI

LOCATION.--Lat 42°17'08", long 85°30'50", in NE1/4 sec.19, T.2 S., R.10 W., Kalamazoo County, Hydrologic Unit 04050003, on left bank at downstream side of bridge on River Street in Comstock, 0.2 mi downstream from Comstock Creek.

DRAINAGE AREA.--1,010 mi², approximately.

PERIOD OF RECORD.--April to August 1931, October 1932 to December 1979, October 1984 to current year. Monthly discharge only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 824: 1933-36. WSP 1387: 1933, 1934(M), 1935, 1936(M), 1938(M), 1940(M), 1941.

GAGE.--Water-stage recorder. Datum of gage is 756.12 ft above sea level. Prior to Oct. 1, 1987, at datum 3.00 ft higher. Prior to November 1945, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by powerplant 1.2 mi upstream from station. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	785	852	1180	994	1080	997	1040	1250	1140	1000	707	650
2	719	1120	1220	993	1030	1000	999	1220	1040	917	644	615
3	719	1290	1320	990	1030	985	954	1220	950	909	509	522
4	802	1210	1230	929	1010	965	940	1170	922	767	573	523
5	784	1350	1130	908	978	952	938	1160	916	753	799	524
6	705	1620	1100	811	922	945	941	1140	742	907	826	524
7	705	1630	1160	701	846	972	937	1110	687	818	970	524
8	640	1690	1210	709	744	1190	948	1030	755	703	820	640
9	687	1660	1270	853	712	1530	992	975	759	581	731	709
10	900	1690	1280	942	717	1600	1290	1080	755	494	795	596
11	896	1620	1260	934	845	1500	1590	1440	756	523	896	513
12	699	1550	1220	930	796	1610	1570	1490	757	647	914	516
13	692	1440	1230	943	639	1760	1540	1350	736	709	913	521
14	691	1360	1080	1100	632	1810	1530	1230	723	700	787	620
15	743	1320	1060	1390	820	1890	1450	1230	737	629	543	632
16	683	1210	1120	1370	949	1960	1270	1230	725	487	493	518
17	632	1170	1200	e1350	934	1950	1230	1180	720	492	631	520
18	601	1070	1400	e1300	928	1870	1260	1120	628	643	854	516
19	692	989	1420	e1350	803	1710	1230	1060	592	701	1050	516
20	822	1020	1410	e1450	848	1570	1120	966	510	697	1310	512
21	805	1020	1560	e1500	932	1490	1140	925	592	594	1220	523
22	692	953	1520	e1600	932	1290	1190	826	567	492	1130	522
23	692	962	1420	e1650	934	1020	1260	843	512	620	993	523
24	688	943	1380	e1650	936	1060	1140	939	504	828	953	531
25	735	924	1280	e1550	942	1080	1110	973	505	904	925	646
26	700	912	1260	e1400	955	1070	1120	1110	642	893	900	591
27	698	922	1150	e1350	970	1060	1230	1340	860	771	698	521
28	697	915	1140	e1300	988	1040	1360	1290	927	615	581	521
29	635	1140	1120	e1250	---	1110	1310	1220	971	514	577	521
30	621	1300	1070	e1200	---	1150	1230	1220	1060	638	523	521
31	690	---	1000	1140	---	1060	---	1200	---	682	562	---
TOTAL	22250	36852	38400	36537	24852	41196	35859	35537	22690	21628	24827	16631
MEAN	718	1228	1239	1179	888	1329	1195	1146	756	698	801	554
MAX	900	1690	1560	1650	1080	1960	1590	1490	1140	1000	1310	709
MIN	601	852	1000	701	632	945	937	826	504	487	493	512
CFSM	.71	1.22	1.23	1.17	.88	1.32	1.18	1.14	.75	.69	.79	.55
IN.	.82	1.36	1.41	1.35	.92	1.52	1.32	1.31	.84	.80	.91	.61

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1995, BY WATER YEAR (WY)

	MEAN	685	796	866	917	975	1375	1357	1055	869	676	577	582
MAX	1990	1652	1674	1958	1758	2802	3018	2484	2063	1446	1217	1170	
(WY)	1987	1993	1991	1993	1976	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1931 - 1995

ANNUAL TOTAL	383186	357259	895
ANNUAL MEAN	1050	979	1387
HIGHEST ANNUAL MEAN			368
LOWEST ANNUAL MEAN			1964
HIGHEST DAILY MEAN	2570	Feb 23	1960
LOWEST DAILY MEAN	431	Jun 11	487
ANNUAL SEVEN-DAY MINIMUM	515	Jun 6	518
INSTANTANEOUS PEAK FLOW			1980
INSTANTANEOUS PEAK STAGE			5.82
INSTANTANEOUS LOW FLOW			Mar 16
ANNUAL RUNOFF (CFSM)	1.04	.97	(a)10.94
ANNUAL RUNOFF (INCHES)	14.11	13.16	119
10 PERCENT EXCEEDS	1620	1430	.89
50 PERCENT EXCEEDS	962	943	12.04
90 PERCENT EXCEEDS	627	565	405

(a) Present datum.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106180 PORTAGE CREEK AT PORTAGE, MI

LOCATION.--Lat 42°12'21", long 85°35'23", in SE1/4 sec.16, T.3 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, on right bank 750 ft upstream from bridge on Westnedge Avenue in Portage.

DRAINAGE AREA.--16.5 mi².

PERIOD OF RECORD.--October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 850 ft above sea level, from topographic map.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e16	34	18	18	17	18	16	19	17	16	13	14
2	e16	25	18	17	17	16	16	18	17	15	13	14
3	e15	21	20	17	17	16	16	17	17	15	22	15
4	15	21	20	17	17	15	16	18	17	17	19	14
5	15	24	19	16	16	16	15	21	17	18	17	14
6	15	38	19	17	16	16	16	19	16	17	16	13
7	14	27	21	17	16	27	15	18	16	16	15	16
8	16	22	20	17	16	24	25	17	16	15	14	17
9	18	24	21	16	16	20	35	22	16	15	14	15
10	16	25	21	16	16	19	28	23	17	14	15	14
11	15	22	19	16	16	21	22	21	16	14	15	14
12	15	20	18	18	16	23	21	20	16	14	15	13
13	15	19	17	22	15	22	19	19	16	14	15	12
14	15	21	17	30	15	21	18	19	16	13	17	11
15	15	20	17	25	16	19	17	18	15	15	25	11
16	15	19	19	21	16	18	17	18	15	17	24	11
17	15	18	25	19	15	18	17	18	15	15	22	14
18	15	18	23	19	16	17	18	17	15	14	20	12
19	18	18	21	23	16	17	18	17	14	14	18	12
20	17	17	20	26	17	17	18	17	14	15	17	12
21	16	18	20	24	17	17	23	16	14	16	16	13
22	16	18	19	22	17	17	20	16	14	18	15	13
23	16	17	19	20	18	16	18	18	14	23	15	12
24	16	17	20	19	18	16	17	25	13	18	15	12
25	16	17	19	18	17	16	18	27	15	17	14	12
26	16	17	18	18	17	16	19	23	21	16	14	11
27	16	24	18	18	19	16	22	20	20	15	14	11
28	16	28	18	17	19	17	21	22	18	18	15	11
29	16	22	17	17	---	17	19	20	17	15	14	11
30	16	20	17	17	---	16	20	19	18	14	15	10
31	19	---	17	17	---	16	---	18	---	14	14	---
TOTAL	490	651	595	594	464	560	580	600	482	487	507	384
MEAN	15.8	21.7	19.2	19.2	16.6	18.1	19.3	19.4	16.1	15.7	16.4	12.8
MAX	19	38	25	30	19	27	35	27	21	23	25	17
MIN	14	17	17	16	15	15	15	16	13	13	13	10
CFSM	.96	1.32	1.16	1.16	1.00	1.09	1.17	1.17	.97	.95	.99	.78
IN.	1.10	1.47	1.34	1.34	1.05	1.26	1.31	1.35	1.09	1.10	1.14	.87

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1995, BY WATER YEAR (WY)

	MEAN	18.9	20.7	19.8	18.8	18.8	21.1	21.3	19.9	17.9	17.0	16.6	16.6
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	1985	1985	1985	1983	1989	1986	1994	1993	
MIN	15.3	16.2	15.6	15.3	16.2	17.8	18.2	16.2	13.8	14.3	13.9	12.8	
(WY)	1983	1988	1990	1984	1987	1984	1990	1994	1987	1987	1988	1995	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1983 - 1995

ANNUAL TOTAL	6630	6394	
ANNUAL MEAN	18.2	17.5	18.9
HIGHEST ANNUAL MEAN			21.2
LOWEST ANNUAL MEAN			17.3
HIGHEST DAILY MEAN	54	Jun 24	83
LOWEST DAILY MEAN	13	Jun 2	10
ANNUAL SEVEN-DAY MINIMUM	13	Jun 2	11
INSTANTANEOUS PEAK FLOW			64
INSTANTANEOUS PEAK STAGE			(b)3.10
ANNUAL RUNOFF (CFSM)	1.10	1.06	1.15
ANNUAL RUNOFF (INCHES)	14.95	14.42	15.60
10 PERCENT EXCEEDS	23	22	23
50 PERCENT EXCEEDS	17	17	18
90 PERCENT EXCEEDS	15	14	15

(a) Sept. 15, 1988, Sept. 30, 1995.

(b) From graph based on gage readings.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106300 PORTAGE CREEK NEAR KALAMAZOO, MI

LOCATION.--Lat 42°14'46", long 85°34'33", in SE1/4 sec.34, T.2 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, on left bank 5 ft upstream from bridge on Lovers Lane, 3.0 mi south of Kalamazoo.

DRAINAGE AREA.--22.4 mi².

PERIOD OF RECORD.--October 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is 814.88 ft above sea level.

REMARKS.--Records good. Flow includes water which is pumped from ground-water sources by industry and discharged into stream 2.0 mi upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	65	30	39	40	37	37	36	37	37	39	33
2	33	40	30	39	39	35	37	38	38	35	36	33
3	34	36	39	41	39	35	38	37	39	36	58	39
4	33	37	34	38	38	35	37	41	39	44	45	35
5	34	46	33	35	38	37	35	47	38	46	42	35
6	31	74	32	34	37	37	37	39	39	43	39	33
7	29	43	34	37	36	63	36	39	40	36	36	41
8	32	38	31	37	36	46	59	39	43	36	38	41
9	41	46	32	37	36	40	79	51	41	35	34	35
10	32	41	31	38	37	38	56	61	42	35	36	31
11	32	31	32	38	38	41	46	47	42	37	35	30
12	32	29	31	43	38	44	50	41	41	35	35	31
13	29	25	34	46	38	44	45	39	40	35	35	32
14	27	30	41	61	37	41	42	39	39	35	36	32
15	27	27	33	48	37	40	40	39	39	38	60	30
16	32	26	40	46	35	39	41	39	38	46	51	32
17	34	25	57	43	36	38	43	40	38	40	48	37
18	34	24	50	43	36	38	45	38	38	35	42	34
19	43	23	48	48	38	39	43	34	38	32	41	33
20	36	23	46	47	39	39	42	33	32	42	41	32
21	34	27	46	53	40	39	56	29	35	40	38	33
22	31	25	43	50	39	38	44	24	34	44	35	36
23	33	25	42	48	38	36	41	37	34	62	34	30
24	32	24	42	47	39	36	39	53	35	43	36	31
25	34	25	39	44	39	37	39	53	42	40	35	31
26	33	24	39	42	38	38	41	43	56	36	37	31
27	34	43	42	42	44	40	45	38	48	39	38	31
28	30	41	44	40	39	42	40	40	44	48	37	30
29	27	32	42	40	---	38	36	39	44	39	36	31
30	26	30	39	40	---	38	37	38	41	38	34	31
31	29	---	39	38	---	39	---	38	---	39	33	---
TOTAL	1003	1025	1195	1322	1064	1227	1306	1249	1194	1226	1220	994
MEAN	32.4	34.2	38.5	42.6	38.0	39.6	43.5	40.3	39.8	39.5	39.4	33.1
MAX	43	74	57	61	44	63	79	61	56	62	60	41
MIN	26	23	30	34	35	35	35	24	32	32	33	30

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1995, BY WATER YEAR (WY)

	MEAN	37.6	39.6	40.4	39.9	41.8	47.5	49.2	44.6	41.8	39.4	37.6	37.4
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	51.9
(WY)	1992	1991	1992	1988	1971	1985	1991	1991	1989	1991	1980	1992	1992
MIN	25.3	26.5	27.1	29.3	25.7	34.6	35.5	30.4	24.7	26.1	26.8	27.2	27.2
(WY)	1965	1972	1977	1978	1972	1978	1977	1977	1988	1977	1977	1971	1971

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1965 - 1995

ANNUAL TOTAL	14375	14025	41.4	
ANNUAL MEAN	39.4	38.4	51.5	1991
HIGHEST ANNUAL MEAN			32.0	1977
LOWEST ANNUAL MEAN				
HIGHEST DAILY MEAN	137	79	257	May 31 1989
LOWEST DAILY MEAN	17	23	17	Sep 23 1994
ANNUAL SEVEN-DAY MINIMUM	24	24	22	Jul 22 1977
INSTANTANEOUS PEAK FLOW		127	(a)407	May 30 1989
INSTANTANEOUS PEAK STAGE		1.89	4.49	Jun 26 1978
INSTANTANEOUS LOW FLOW		18	(b)8.0	Jan 19 1965
10 PERCENT EXCEEDS	51	46	54	
50 PERCENT EXCEEDS	38	38	40	
90 PERCENT EXCEEDS	29	31	30	

(a) Gage height 3.09 ft.

(b) Result of bridge construction upstream.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106320 WEST FORK PORTAGE CREEK NEAR OSHTIMO, MI

LOCATION.--Lat 42°14'07", long 85°38'54", in SE1/4 sec.1, T.3 S., R.12 W., Kalamazoo County, Hydrologic Unit 04050003, on right bank at upstream side of culvert on 12th Street, 2.1 mi southeast of Oshtimo.

DRAINAGE AREA.--13.0 mi².

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

GAGE.--Water-stage recorder. Datum of gage is 868.86 ft above sea level (Kalamazoo County Road Commission bench mark).

REMARKS.--Records fair except those for the winter period, which are poor. 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	19	5.1	3.9	6.5	3.8	2.9	5.7	7.7	15	2.1	1.9
2	2.4	14	4.8	3.8	e6.0	3.7	2.5	4.8	8.1	16	1.9	3.1
3	2.3	10	4.8	3.8	e5.7	3.7	2.4	4.1	7.8	14	2.7	5.7
4	2.2	8.0	4.8	3.8	e5.4	3.8	2.2	3.8	7.0	11	3.1	6.5
5	2.1	7.2	5.0	3.8	e5.2	4.0	2.0	4.7	6.0	8.7	3.4	6.0
6	2.0	7.8	5.9	3.8	e5.0	4.5	1.9	10	5.3	6.8	3.5	5.2
7	1.9	6.4	7.8	3.8	e4.8	6.3	1.7	12	4.7	5.8	3.5	4.4
8	1.9	5.6	8.3	3.8	e4.6	7.4	2.3	11	4.1	4.9	9.9	4.2
9	2.4	5.1	8.8	3.8	e4.5	7.2	3.5	9.9	3.8	4.3	14	3.7
10	2.4	4.9	9.0	3.8	e4.4	6.9	3.8	12	5.0	3.8	14	3.2
11	2.3	4.5	8.7	3.9	e4.3	6.8	3.3	12	5.9	3.4	12	3.0
12	2.2	4.0	8.2	4.1	e4.2	6.8	3.3	11	5.8	2.9	9.7	2.8
13	2.0	3.7	7.9	5.2	e4.2	6.6	2.9	9.6	5.4	2.6	8.4	2.5
14	1.9	4.5	7.5	7.1	e4.1	6.2	4.2	9.0	4.9	2.4	7.3	2.8
15	1.9	19	6.8	7.8	e4.1	5.0	27	7.9	4.3	2.2	6.7	3.5
16	1.9	24	6.0	7.8	e4.1	5.1	34	7.1	4.0	2.2	6.5	4.3
17	1.9	19	6.5	7.3	e4.1	6.2	28	6.5	3.7	2.0	6.5	5.1
18	1.9	14	6.6	7.1	e4.2	6.4	21	6.0	3.1	2.1	6.5	5.2
19	2.2	12	6.5	7.1	e4.3	6.4	16	5.2	2.6	2.6	6.3	4.5
20	2.2	9.7	6.1	7.8	e4.4	5.8	13	5.0	2.2	4.1	5.9	3.7
21	2.2	8.0	5.5	12	e4.5	5.1	13	4.9	1.8	5.8	5.3	3.1
22	2.1	6.4	5.0	14	e4.5	4.6	11	4.5	1.4	6.3	4.4	3.0
23	2.2	5.6	5.3	14	e4.4	4.6	8.7	5.2	1.2	7.2	3.6	3.6
24	2.2	5.2	6.0	13	e4.3	4.7	6.8	6.4	2.0	6.5	3.1	4.4
25	2.2	4.9	6.3	12	e4.2	4.0	6.2	12	3.4	5.7	2.5	4.4
26	2.8	4.5	6.3	10	e4.1	3.8	8.2	14	4.0	4.7	2.2	4.2
27	2.3	4.5	6.3	9.1	4.0	3.4	9.9	13	4.1	3.9	2.0	4.0
28	3.5	6.1	6.1	8.3	4.0	3.4	9.5	11	3.8	3.5	1.8	3.8
29	3.4	5.7	5.5	7.8	---	3.1	8.1	8.7	3.9	3.0	1.6	3.9
30	2.9	5.3	4.6	7.3	---	2.8	6.5	7.3	6.1	2.6	1.7	6.8
31	2.3	---	4.1	6.8	---	3.0	---	6.5	---	2.3	1.8	---
TOTAL	200.2	258.6	196.1	217.6	128.1	155.1	265.8	250.8	133.1	168.3	163.9	122.5
MEAN	6.46	8.62	6.33	7.02	4.57	5.00	8.86	8.09	4.44	5.43	5.29	4.08
MAX	35	24	9.0	14	6.5	7.4	34	14	8.1	16	14	6.8
MIN	1.9	3.7	4.1	3.8	4.0	2.8	1.7	3.8	1.2	2.0	1.6	1.9
CFSM	.50	.66	.49	.54	.35	.38	.68	.62	.34	.42	.41	.31
IN.	.57	.74	.56	.62	.37	.44	.76	.72	.38	.48	.47	.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 1995, BY WATER YEAR (WY)

	6.38	7.08	7.23	6.79	6.73	7.47	7.41	6.19	5.23	4.92	5.33	5.87
MEAN	6.38	7.08	7.23	6.79	6.73	7.47	7.41	6.19	5.23	4.92	5.33	5.87
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	2.28	3.92	5.11	4.96	4.57	4.71	5.00	2.62	1.13	1.20	1.96	2.30
(WY)	1993	1993	1982	1981	1995	1988	1988	1988	1988	1988	1988	1994

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1972 - 1995

ANNUAL TOTAL	1976.94	2260.1	6.35
ANNUAL MEAN	5.42	6.19	10.0
HIGHEST ANNUAL MEAN			3.87
LOWEST ANNUAL MEAN			1975
HIGHEST DAILY MEAN	35	Oct 28	35
LOWEST DAILY MEAN	.81	Jun 2	.50
ANNUAL SEVEN-DAY MINIMUM	1.1	May 28	.63
INSTANTANEOUS PEAK FLOW			36
INSTANTANEOUS PEAK STAGE			2.42
INSTANTANEOUS LOW FLOW			1.0
ANNUAL RUNOFF (CFSM)	.42		.48
ANNUAL RUNOFF (INCHES)	5.66		6.47
10 PERCENT EXCEEDS	9.0		11
50 PERCENT EXCEEDS	5.0		4.9
90 PERCENT EXCEEDS	1.9		2.2

(a) Dec. 6, 1992, Oct. 28, 1994.

(b) Oct. 28, Apr. 16.

(c) Dec. 5, 1992, Oct. 28, 1994, Apr. 16, 1995.

(d) July 14, 15, 1988.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04106400 WEST FORK PORTAGE CREEK AT KALAMAZOO, MI

LOCATION.--Lat 42°14'40", long 85°36'50", in NE1/4 sec.5, T.3 S., R.11 W., Kalamazoo County, Hydrologic Unit 04050003, on right bank 30 ft upstream from culvert on Oakland Drive, 2.5 mi upstream from mouth, and 3.7 mi southwest of main business district of Kalamazoo.

DRAINAGE AREA.--18.7 mi².

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

GAGE.--Water-stage recorder and V-notch sharp-crested weir. Datum of gage is 858.09 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records fair. At times, flow is affected by ground-water withdrawals. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.8	35	7.8	e7.6	10	7.6	6.5	11	9.5	8.9	4.7	2.8
2	6.4	26	7.7	e7.3	9.4	7.4	6.6	9.7	10	14	4.7	2.7
3	6.1	19	8.2	e7.2	e8.7	7.2	6.4	7.8	11	16	6.3	3.1
4	5.9	15	8.3	e7.1	e8.4	7.2	6.2	7.3	11	16	6.4	3.9
5	5.6	14	7.9	e7.0	e8.2	7.4	5.6	8.6	11	16	5.9	4.9
6	5.5	17	7.8	e6.9	e7.9	7.5	5.6	8.7	9.6	15	5.6	5.4
7	5.0	11	12	e6.8	e7.8	12	5.5	12	9.2	12	5.4	5.7
8	5.2	14	11	6.8	e7.7	13	6.6	14	8.7	9.4	5.5	6.2
9	6.4	11	13	6.7	e7.6	13	11	15	8.2	8.2	7.7	5.5
10	6.5	11	14	6.7	e7.5	12	12	16	8.4	7.5	12	4.9
11	6.2	9.4	13	6.7	e7.5	11	9.5	16	9.0	6.8	13	4.6
12	5.9	8.1	12	7.3	e7.4	12	8.7	15	9.0	6.2	12	4.3
13	5.6	7.6	12	8.0	e7.3	12	7.9	14	8.9	5.8	11	4.1
14	5.6	7.5	12	12	e7.2	11	6.8	13	8.6	5.4	9.5	4.0
15	5.6	8.6	11	13	e7.3	9.6	9.4	12	8.3	5.2	8.9	4.0
16	5.5	19	11	12	e7.4	8.3	31	11	7.8	5.5	9.0	4.3
17	5.4	24	13	11	e7.5	8.0	39	9.7	7.1	5.3	9.3	5.3
18	5.3	22	12	11	e7.7	9.3	35	8.6	6.9	5.1	9.3	5.7
19	5.9	17	11	11	e8.0	10	28	8.0	6.5	5.1	8.1	5.9
20	6.0	15	11	13	8.6	10	21	7.4	6.0	5.0	7.6	5.8
21	5.6	14	10	13	8.6	9.3	20	6.9	5.9	5.4	7.2	5.8
22	5.5	12	9.2	17	8.4	8.5	17	6.6	5.7	6.5	6.6	5.7
23	5.6	9.5	8.5	19	8.3	7.7	15	6.9	5.3	10	5.8	5.1
24	5.6	8.2	8.7	19	8.3	7.5	13	10	5.1	9.7	5.1	4.7
25	5.6	7.7	9.1	17	8.1	7.5	11	13	4.9	8.7	4.6	5.1
26	5.5	7.3	e9.7	15	7.8	7.5	10	16	6.6	7.7	4.1	5.1
27	6.5	8.5	e9.9	14	8.1	7.3	14	16	7.7	7.0	4.0	5.1
28	23	12	e11	13	8.0	7.5	15	17	7.8	6.6	3.8	5.0
29	36	10	11	12	---	7.2	13	15	7.9	5.9	3.5	4.9
30	38	8.5	10	11	---	6.8	12	13	8.5	5.4	3.2	5.0
31	34	---	e8.2	11	---	6.5	---	11	---	4.8	2.9	---
TOTAL	287.3	409.9	321.0	336.1	224.7	278.8	408.3	356.2	240.1	256.1	212.7	144.6
MEAN	9.27	13.7	10.4	10.8	8.02	8.99	13.6	11.5	8.00	8.26	6.86	4.82
MAX	38	35	14	19	10	13	39	17	11	16	13	6.2
MIN	5.0	7.3	7.7	6.7	7.2	6.5	5.5	6.6	4.9	4.8	2.9	2.7
CFSM	.50	.73	.55	.58	.43	.48	.73	.61	.43	.44	.37	.26
IN.	.57	.82	.64	.67	.45	.55	.81	.71	.48	.51	.42	.29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1995, BY WATER YEAR (WY)

MEAN	9.76	10.4	10.6	9.86	10.2	11.8	11.7	9.98	8.79	7.97	7.88	8.83
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	3.39	3.54	5.04	5.16	6.25	7.43	7.32	4.18	2.36	2.35	2.49	3.17
(WY)	1965	1965	1965	1965	1965	1965	1963	1965	1988	1964	1964	1964

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1959 - 1995

ANNUAL TOTAL	3677.2		3475.8		9.80	
ANNUAL MEAN	10.1		9.52		14.1	1975
HIGHEST ANNUAL MEAN					4.85	1965
LOWEST ANNUAL MEAN					40	Dec 7 1992
HIGHEST DAILY MEAN	38	Oct 30	39	Apr 17	1.1	Jun 19 1988
LOWEST DAILY MEAN	4.1	Jun 10	2.7	Sep 2	1.3	Jul 30 1964
ANNUAL SEVEN-DAY MINIMUM	4.2	Jun 6	3.1	Aug 28	41	(a)
INSTANTANEOUS PEAK FLOW			40	Apr 17	3.32	Apr 19 1975
INSTANTANEOUS PEAK STAGE			3.22	Apr 17	.91	(c)
INSTANTANEOUS LOW FLOW			2.6	(b)	.52	
ANNUAL RUNOFF (CFSM)	.54		.51		7.12	
ANNUAL RUNOFF (INCHES)	7.32		6.91		14	
10 PERCENT EXCEEDS	15		15		9.5	
50 PERCENT EXCEEDS	9.2		8.1		5.3	
90 PERCENT EXCEEDS	5.4		5.1			

(a) Apr. 19, 1975, Dec. 7, 1992.

(b) Sept. 2, 3.

(c) June 19, 20, 1988.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04108600 RABBIT RIVER NEAR HOPKINS, MI

LOCATION.--Lat 42°38'32", long 85°43'19", in SE1/4 sec.16, T.3 N., R.12 W., Allegan County, Hydrologic Unit 04050003, on left bank at downstream side of bridge on 18th Street, 2.5 mi northeast of Hopkins.

DRAINAGE AREA.--71.4 mi².

PERIOD OF RECORD.--October 1965 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 700 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	95	168	88	e56	e58	e67	57	82	47	39	28	21
2	82	151	79	e55	e55	e59	54	75	46	35	27	21
3	62	106	74	e54	e52	e56	53	68	185	32	34	20
4	53	112	71	e53	e50	e54	59	64	126	59	39	20
5	49	174	68	e52	e48	e53	54	95	78	67	35	20
6	47	426	66	e51	e46	e58	54	85	62	51	38	19
7	44	356	73	e50	e45	100	52	70	55	42	39	20
8	43	228	82	e49	e45	148	58	62	50	39	33	22
9	65	168	87	e48	e44	104	66	60	46	36	31	20
10	60	147	94	e49	e44	95	76	63	45	34	30	19
11	52	116	89	e55	e44	149	68	78	46	32	29	19
12	48	98	76	e85	e44	217	76	76	43	29	28	19
13	47	88	70	179	e43	200	79	65	41	28	26	19
14	45	90	65	287	e43	151	69	59	39	27	25	19
15	44	89	63	300	e44	118	61	55	36	34	24	19
16	44	79	67	189	e44	99	56	52	35	64	25	19
17	44	74	144	122	e44	86	54	141	33	37	33	26
18	45	71	158	100	e45	77	57	139	32	32	44	24
19	53	66	119	109	e55	75	69	84	32	29	39	22
20	58	64	97	177	e70	75	62	67	31	36	33	23
21	55	69	91	159	e74	76	80	58	29	44	30	24
22	53	74	84	124	e70	71	86	52	28	35	27	28
23	52	66	80	111	88	66	70	52	27	42	26	27
24	54	62	78	105	90	63	62	76	26	35	25	25
25	53	60	74	99	70	59	57	75	27	33	23	24
26	53	57	69	92	61	56	79	68	39	31	23	24
27	52	74	66	83	e62	54	263	59	38	32	22	23
28	51	187	66	80	e70	67	244	57	38	53	22	23
29	51	138	63	69	---	71	143	56	42	43	22	23
30	50	101	58	e66	---	67	97	53	51	34	23	23
31	55	---	e57	e62	---	62	---	50	---	30	22	---
TOTAL	1659	3759	2516	3170	1548	2753	2415	2196	1453	1194	905	655
MEAN	53.5	125	81.2	102	55.3	88.8	80.5	70.8	48.4	38.5	29.2	21.8
MAX	95	426	158	300	90	217	263	141	185	67	44	28
MIN	43	57	57	48	43	53	52	50	26	27	22	19
CFSM	7.5	1.75	1.14	1.43	.77	1.24	1.13	.99	.68	.54	.41	.31
IN.	.86	1.96	1.31	1.65	.81	1.43	1.26	1.14	.76	.62	.47	.34

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1995, BY WATER YEAR (WY)

	MEAN	42.1	60.2	74.6	66.1	74.8	111	96.4	61.4	52.7	33.6	29.2	34.3
MAX	119	171	131	146	152	227	152	124	138	99.0	86.8	123	
(WY)	1987	1991	1976	1993	1976	1979	1993	1981	1986	1986	1994	1978	
MIN	15.0	19.1	21.7	19.8	25.7	46.1	49.4	25.1	16.4	13.6	12.5	11.9	
(WY)	1969	1972	1977	1970	1970	1969	1968	1977	1987	1987	1970	1969	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1966 - 1995

ANNUAL TOTAL	28772		24223	
ANNUAL MEAN	78.8		66.4	
HIGHEST ANNUAL MEAN				61.2
LOWEST ANNUAL MEAN				89.3
HIGHEST DAILY MEAN				32.5
LOWEST DAILY MEAN	520	Feb 21	426	Nov 6
ANNUAL SEVEN-DAY MINIMUM	24	Jun 12	19	Sep 6
INSTANTANEOUS PEAK FLOW	27	Jun 6	19	Sep 10
INSTANTANEOUS PEAK STAGE			498	Nov 6
INSTANTANEOUS LOW FLOW			7.50	Nov 6
ANNUAL RUNOFF (CFSM)	1.10		.93	Sep 12
ANNUAL RUNOFF (INCHES)	14.99		12.62	
10 PERCENT EXCEEDS	145		111	116
50 PERCENT EXCEEDS	57		55	43
90 PERCENT EXCEEDS	33		25	19

(a) Aug. 27, 28, 1970, Sept. 18, 1971, Aug. 7, 1987.

(b) From floodmark.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04108660 KALAMAZOO RIVER AT NEW RICHMOND, MI

LOCATION.--Lat 42°39'06", long 86°06'28", in NE1/4 NW1/4 sec.17, T.3 N., R.15 W., Allegan County, Hydrologic Unit 04050003, on right bank 150 ft downstream from railroad bridge, and 300 ft downstream from bridge on Old Allegan Road in New Richmond.

DRAINAGE AREA.--1,980 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1994 to October 1995 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 590 ft above sea level, from topographic map.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. Flow regulated by powerplants upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 5,190 ft³/s, Aug. 16, 1994; minimum daily, 926 ft³/s, Oct. 2, 1995.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1700	1900	2430	2060	2290	2170	2090	3100	2020	1760	1220	1070
2	1740	2100	2430	2050	2330	2160	2090	2710	2050	1550	1250	1050
3	1860	2140	2380	2040	2320	2130	2030	2460	2110	1680	1390	1100
4	1680	2530	2320	e1950	2190	1970	2010	2440	2090	1460	1490	1210
5	1540	2700	2320	e1800	e2000	1950	1860	2420	2010	1720	1360	1090
6	1550	3290	2480	e1650	e1900	2030	1850	2420	1730	1840	1290	1050
7	1560	4000	2420	e1500	e1700	2100	1860	2410	1900	1390	1390	1070
8	1500	4620	2320	e1550	e1600	2320	1860	2320	1690	1330	1770	1210
9	1610	4590	2320	e1800	e1500	2700	1950	2290	1500	1560	1710	1080
10	1550	4070	2370	e2000	e1600	2580	2190	2160	1590	e1600	1620	1080
11	1510	3600	2480	e2000	e1800	2890	2510	2090	1630	e1200	1320	1190
12	1620	3310	2490	e1950	e1600	3190	2570	2240	1560	1090	1360	1180
13	1810	3180	2440	e2000	e1450	3300	2750	2580	1430	1120	1430	1070
14	1490	3080	2360	e2500	e1450	3430	2910	2600	1460	1140	1480	1010
15	1420	2740	2310	e2900	e1800	3440	2690	2240	1620	1140	1510	1010
16	1440	2600	2200	e2900	e2000	3430	2550	2140	1380	1300	1330	1030
17	1470	2440	2230	e2850	e1950	3280	2560	2320	1330	1450	1510	1090
18	1470	2470	2390	e2800	e1900	3150	2310	2430	1340	1190	1260	1140
19	1410	2320	2690	e2900	e1700	3130	2360	2300	1340	1090	1550	1070
20	1410	2140	2900	3120	e1900	3010	2270	2110	1180	1200	1740	1110
21	1460	2130	2950	3250	2040	2920	2370	1990	1390	1350	1670	1100
22	1450	2130	2840	3340	2060	2680	2450	1860	1170	1300	1870	1090
23	1500	2080	2730	3400	2180	2410	2440	1610	1090	1420	1720	1080
24	1580	2050	2750	3350	2200	2440	2450	2020	1090	1360	1640	1080
25	1430	1990	2590	3140	2190	1910	2330	2030	1110	1390	1620	1060
26	1470	1600	2510	3090	2210	2010	2190	2050	1190	1610	1580	991
27	1410	1900	2430	3010	2220	2080	2600	2130	1230	1640	1400	1010
28	1490	2320	2340	2910	2190	2140	3130	2150	1650	1510	1580	1150
29	1450	2530	2280	2740	---	2140	3520	2200	1850	1530	1280	1150
30	1460	2580	2110	2440	---	2140	3360	2260	1580	1470	1190	1080
31	1330	---	2090	2340	---	2070	---	2090	---	1290	1150	---
TOTAL	47370	81130	75900	77330	54270	79300	72110	70170	46310	43680	45680	32701
MEAN	1528	2704	2448	2495	1938	2558	2404	2264	1544	1409	1474	1090
MAX	1860	4620	2950	3400	2330	3440	3520	3100	2110	1840	1870	1210
MIN	1330	1600	2090	1500	1450	1910	1850	1610	1090	1090	1150	991
CFSM	.77	1.37	1.24	1.26	.98	1.29	1.21	1.14	.78	.71	.74	.55
IN.	.89	1.52	1.43	1.45	1.02	1.49	1.35	1.32	.87	.82	.86	.61

WTR YR 1995 TOTAL 725951 MEAN 1989 MAX 4620 MIN 991 CFSM 1.00 IN. 13.64

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04108660 KALAMAZOO RIVER AT NEW RICHMOND, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1994 to October 1995 (discontinued).

REMARKS.--Cross-sectional samples were collected in the vicinity of the gage. Unpublished records of selected herbicides, metals, and organics will be available upon release by cooperating agencies.

COOPERATION.--All published data were collected by the U.S. Geological Survey and the Michigan Department of Natural Resources and analyzed by the Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA

DATE	TIME	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATURATION) (00301)	HARDNESS TOTAL (MG/L AS CAC03) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNESIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTASSIUM, DIS-SOLVED (MG/L AS K) (00935)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
APR 1994												
12...	0955	567	8.4	9.0	10.7	94	260	70	21	19	2.0	39
26...	0940	545	8.5	16.0	8.5	88	260	69	21	3.0	2.2	36
29...	0930	549	8.5	13.0	8.5	82	240	63	19	18	2.0	35
MAY												
04...	0915	534	8.5	12.0	10.1	95	260	70	21	18	2.2	35
04...	1145	536	8.4	11.5	9.6	90	260	70	21	18	2.3	35
10...	0920	563	8.3	14.0	8.4	83	260	71	21	18	1.9	35
19...	0945	553	8.5	15.0	8.6	86	270	72	22	21	2.2	39
JUN												
03...	0815	529	8.3	18.0	5.9	63	250	61	23	24	2.2	44
16...	1030	685	7.6	24.5	5.4	66	270	71	23	24	2.4	47
29...	0955	529	8.3	18.0	5.9	65	220	60	17	14	3.5	38
JUL												
02...	1355	488	8.0	21.5	8.1	94	240	65	18	15	2.3	39
07...	1010	497	7.9	24.0	7.4	90	230	63	18	15	2.6	37
12...	1000	515	8.0	22.5	7.5	88	240	66	19	16	2.2	35
20...	0915	479	8.1	24.5	9.3	115	240	62	20	19	2.4	37
AUG												
11...	0900	532	8.1	19.0	8.2	90	240	61	21	22	2.4	38
25...	1100	491	7.9	21.5	7.2	83	230	63	18	15	2.3	30
31...	0945	542	8.1	20.5	6.9	79	260	71	20	18	2.5	34
31...	1130	541	8.1	20.5	6.9	79	260	71	20	19	2.4	34
SEP												
28...	0845	578	8.1	16.5	7.9	84	250	63	22	26	2.8	44
OCT												
20...	0930	590	8.3	14.5	9.4	95	260	67	23	24	2.3	42
NOV												
02...	1010	602	8.1	8.0	11.1	96	270	70	22	23	3.2	40
10...	0900	478	7.9	8.0	9.4	80	220	59	18	15	3.9	34
15...	1010	533	7.9	9.0	9.2	80	250	67	20	16	2.8	37
DEC												
15...	1020	550	8.0	1.0	13.1	94	270	72	22	22	2.4	39
JAN 1995												
26...	1000	529	8.1	1.0	12.1	86	250	68	19	18	2.2	36
FEB												
23...	0930	594	--	2.0	13.6	100	280	74	23	24	2.7	43
MAR												
13...	1030	510	7.5	5.0	10.5	85	250	67	19	21	2.7	36
16...	0915	513	7.5	8.0	8.7	75	240	65	19	18	2.4	34
21...	1000	505	8.1	9.0	8.9	80	240	65	19	16	2.3	35
APR												
11...	0915	586	8.3	5.5	13.0	106	270	70	22	21	2.1	42
17...	1000	541	7.8	9.5	10.0	89	240	65	20	18	1.9	38
27...	1030	509	8.2	11.0	9.2	87	240	64	19	17	2.4	33
MAY												
02...	0900	522	8.2	11.0	8.8	82	250	67	20	17	2.4	34
19...	1000	536	8.1	15.5	8.1	83	--	--	--	--	--	--
JUN												
01...	0930	552	8.2	18.0	8.8	95	--	--	--	--	--	--
21...	0930	552	7.9	24.5	7.8	96	--	--	--	--	--	--
AUG												
22...	1045	566	7.7	24.5	7.7	95	--	--	--	--	--	--
SEP												
25...	1030	559	8.2	14.0	9.0	90	--	--	--	--	--	--
25...	1300	589	8.2	14.5	9.5	95	--	--	--	--	--	--
OCT												
17...	1015	634	8.3	11.0	9.2	86	--	--	--	--	--	--
30...	1100	620	8.1	9.5	9.6	86	--	--	--	--	--	--

STREAMS TRIBUTARY TO LAKE MICHIGAN

04108660 KALAMAZOO RIVER AT NEW RICHMOND, MI--Continued

WATER-QUALITY DATA

DATE	TIME	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLORO- PHYLL A TRICHR. UNCORR. WHOLE TOTAL (UG/L) (32210)
APR 1994											
12...	0955	33	4.1	21	9	1.02	<0.005	0.40	<0.020	0.007	37.2
26...	0940	32	3.7	44	12	0.717	0.009	0.90	0.100	<0.002	57.3
29...	0930	32	4.0	30	13	0.686	0.070	1.1	0.110	0.005	50.2
MAY											
04...	0915	32	4.0	20	7	0.932	0.011	0.90	0.080	0.002	41.5
04...	1145	31	4.0	18	7	0.901	0.012	0.90	0.080	<0.002	40.8
10...	0920	32	4.5	29	11	0.782	0.020	1.0	0.090	0.008	38.9
19...	0945	35	3.4	28	11	0.816	0.025	1.0	0.080	0.002	39.1
JUN											
03...	0815	40	1.9	40	14	0.475	0.016	1.0	0.110	<0.002	70.0
16...	1030	43	5.9	24	8	0.834	0.151	1.0	0.410	0.011	25.7
29...	0955	28	8.9	19	9	3.56	0.052	1.1	0.110	0.021	33.8
JUL											
02...	1355	28	9.6	23	8	1.63	0.042	0.80	0.110	0.014	42.8
07...	1010	27	9.1	24	8	1.36	0.023	1.0	0.110	0.013	35.2
12...	1000	29	9.3	26	8	0.923	0.063	1.0	0.120	0.021	25.5
20...	0915	32	7.3	31	11	0.701	0.021	1.1	0.100	0.004	--
AUG											
11...	0900	38	2.6	27	13	0.632	0.067	0.93	0.100	0.005	44.5
25...	1100	26	9.2	22	8	0.716	0.032	1.0	0.093	0.011	22.5
31...	0945	31	8.1	31	14	0.781	0.039	1.1	0.109	0.007	46.7
31...	1130	32	8.2	31	14	0.767	0.031	1.0	0.111	0.010	41.8
SEP											
28...	0845	42	2.4	33	10	0.616	0.041	1.0	0.106	<0.002	52.7
OCT											
20...	0930	40	2.5	23	8	0.830	0.027	0.80	0.084	0.002	43.0
NOV											
02...	1010	38	8.5	26	11	1.28	0.066	0.80	0.100	0.028	20.3
10...	0900	28	9.1	16	6	1.12	0.106	0.80	0.098	0.050	6.48
15...	1010	29	10	16	6	0.972	0.088	0.70	0.070	0.021	8.32
DEC											
15...	1020	38	9.0	6	3	1.34	0.079	0.50	0.040	0.015	2.48
JAN 1995											
26...	1000	33	8.2	10	7	1.26	0.065	0.90	0.046	0.013	2.30
FEB											
23...	0930	41	7.6	13	7	1.80	0.076	0.70	0.060	0.009	4.38
MAR											
13...	1030	37	6.2	100	8	1.35	0.081	0.80	0.088	0.020	6.06
16...	0915	32	5.9	16	6	1.30	0.040	0.80	0.081	0.011	16.1
21...	1000	29	5.9	22	7	1.03	<0.027	0.90	0.080	0.005	32.3
APR											
11...	0915	36	5.7	17	6	1.23	<0.027	0.80	0.060	0.008	23.5
17...	1000	33	5.6	59	8	1.15	<0.027	0.90	0.080	0.004	30.0
27...	1030	29	4.8	64	12	1.10	0.054	1.0	0.169	0.035	42.4
MAY											
02...	0900	29	5.3	22	8	1.15	<0.027	0.80	0.088	0.010	12.1
19...	1000	30	4.2	40	--	0.897	0.027	0.90	0.123	0.002	38.3
JUN											
01...	0930	33	3.0	44	14	0.694	<0.027	0.80	0.022	0.005	67.9
21...	0930	38	5.9	46	--	0.457	0.053	1.2	0.131	<0.002	29.7
AUG											
22...	1045	39	--	41	--	0.666	0.059	1.3	0.145	0.007	57.1
SEP											
25...	1030	45	1.9	15	--	0.653	0.076	0.80	0.071	0.002	34.7
25...	1300	45	2.0	14	--	0.654	0.068	0.80	0.065	0.003	31.6
OCT											
17...	1015	46	4.3	14	--	0.012	0.119	0.90	0.067	0.005	48.6
30...	1100	43	8.2	13	--	1.11	0.112	0.70	0.063	0.012	7.90

STREAMS TRIBUTARY TO LAKE MICHIGAN

04108800 MACATAWA RIVER NEAR ZEELAND, MI

LOCATION.--Lat 42°46'40", 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 mi².

PERIOD OF RECORD.--October 1960 to current year. Prior to October 1978, published as Black River near Zeeland.

GAGE.--Water-stage recorder. Datum of gage is 585.7 ft above sea level (levels by Gove Associates, Inc.).

REMARKS.--Records good except those for the winter period, which are fair, and estimated daily discharges, Aug. 22 to Sept. 14, which are poor. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	252	550	53	29	e42	e50	33	77	15	11	6.0	e3.9
2	69	314	47	26	e40	e43	30	65	15	8.3	5.3	e3.7
3	34	88	40	e25	e38	e38	30	54	58	7.4	8.9	e3.6
4	25	162	36	e24	e36	e35	32	51	42	19	9.2	e3.5
5	22	493	34	e24	e36	e37	25	69	24	64	7.3	e3.4
6	19	1550	34	e24	e35	e40	26	52	19	61	6.4	e3.3
7	17	864	41	e23	e33	e80	24	42	16	26	5.8	e3.2
8	17	365	59	e23	e31	184	31	36	15	16	6.0	e3.1
9	110	259	78	e23	e29	107	36	35	14	12	6.4	e3.0
10	40	157	98	e23	e28	102	39	67	13	11	6.4	e2.9
11	26	101	89	e23	e27	442	49	69	13	9.2	5.8	e2.8
12	21	73	68	121	e27	669	195	38	11	7.8	5.4	e2.7
13	19	59	56	471	e26	319	110	31	10	7.1	4.9	e2.7
14	17	93	47	1030	e26	144	55	27	9.6	6.1	4.9	e2.6
15	15	83	41	885	e27	91	38	22	8.7	6.0	4.8	2.6
16	15	58	65	337	e29	65	32	20	8.4	48	5.4	2.5
17	14	48	417	146	e32	51	29	305	7.7	23	28	3.0
18	14	42	335	106	e35	43	36	67	6.9	11	18	3.0
19	17	36	152	198	e50	50	67	39	7.0	8.7	9.2	3.0
20	17	33	92	396	166	51	41	30	6.6	12	7.0	3.5
21	17	51	80	179	249	45	350	25	6.0	22	6.2	4.0
22	16	57	66	110	179	37	205	21	5.6	12	e5.8	5.8
23	16	36	60	e90	232	32	75	23	5.4	11	e5.3	5.2
24	17	31	53	e80	256	28	54	41	5.7	9.1	e4.9	4.4
25	17	29	43	e73	95	26	45	34	6.3	7.3	e4.6	4.1
26	17	26	38	e66	e67	25	155	28	7.2	6.9	e4.4	4.2
27	17	117	36	e60	e60	26	1070	23	22	6.7	e4.2	4.2
28	16	462	35	e56	e55	65	638	22	20	20	e4.0	3.9
29	17	150	31	e52	---	100	218	20	35	16	e4.2	3.8
30	16	72	26	e48	---	60	95	19	15	8.5	e4.2	4.1
31	28	---	28	e45	---	40	---	17	---	7.0	e4.0	---
TOTAL	974	6459	2378	4816	1986	3125	3863	1469	448.1	501.1	212.9	105.7
MEAN	31.4	215	76.7	155	70.9	101	129	47.4	14.9	16.2	6.87	3.52
MAX	252	1550	417	1030	256	669	1070	305	58	64	28	5.8
MIN	14	26	26	23	26	25	24	17	5.4	6.0	4.0	2.5
CFSM	.48	3.27	1.17	2.36	1.08	1.53	1.96	.72	.23	.25	.10	.05
IN.	.55	3.65	1.34	2.72	1.12	1.77	2.18	.83	.25	.28	.12	.06

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1995, BY WATER YEAR (WY)

	MEAN	32.0	79.4	102	80.6	109	176	109	56.5	38.7	23.3	18.1	33.9
MAX	152	333	328	278	398	499	206	288	217	185	122	252	
(WY)	1987	1991	1983	1974	1985	1979	1993	1981	1980	1982	1994	1986	
MIN	2.56	2.98	3.99	2.89	6.71	37.6	21.2	8.89	3.10	1.94	2.03	2.09	
(WY)	1964	1977	1977	1977	1963	1981	1986	1968	1987	1965	1962	1963	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1961 - 1995

ANNUAL TOTAL	33028.9	26337.8	71.3
ANNUAL MEAN	90.5	72.2	115
HIGHEST ANNUAL MEAN			24.6
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	2000	1550	4600
LOWEST DAILY MEAN	4.3	2.5	1.2
ANNUAL SEVEN-DAY MINIMUM	4.4	2.7	1.2
INSTANTANEOUS PEAK FLOW		2210	7220
INSTANTANEOUS PEAK STAGE		12.22	15.81
INSTANTANEOUS LOW FLOW			.83
ANNUAL RUNOFF (CFSM)	1.38	1.10	1.08
ANNUAL RUNOFF (INCHES)	18.67	14.89	14.71
10 PERCENT EXCEEDS	206	156	150
50 PERCENT EXCEEDS	28	29	20
90 PERCENT EXCEEDS	6.4	4.9	3.3

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04109000 GRAND RIVER AT JACKSON, MI

LOCATION.--Lat 42°17'05", long 84°24'30", in sec.22, T.2 S., R.1 W., Jackson County, Hydrologic Unit 04050004, on left bank on grounds of sewage-treatment plant, 1 mi north of Jackson, 2.2 mi upstream from Portage River, and at mile 216.

DRAINAGE AREA.--174 mi².

PERIOD OF RECORD.--April 1935 to current year.

REVISED RECORDS.--WSP 974: 1937(M). WSP 1387: 1936. WSP 1727: 1950(M).

GAGE.--Water-stage recorder. Datum of gage is 900.00 ft above sea level (Fargo Engineering Co. bench mark). Prior to Sept. 24, 1935, nonrecording gage at same site and datum.

REMARKS.--Records good. Slight regulation by mills upstream from station. Flow includes about 20 ft³/s as sewage effluent, which originates from ground-water sources, from the City of Jackson. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	106	127	149	175	163	163	117	174	173	199	64	87
2	76	100	152	159	146	154	128	157	166	162	175	72
3	74	99	149	155	114	128	140	119	136	147	256	68
4	71	123	145	97	112	137	160	123	109	152	258	65
5	69	161	172	99	84	146	138	123	96	156	266	68
6	68	184	159	97	104	138	139	167	105	142	263	92
7	67	166	175	91	99	217	121	170	125	110	258	100
8	103	164	178	88	98	239	177	174	99	83	216	103
9	120	197	192	88	122	240	245	195	76	77	228	72
10	102	191	207	98	126	246	258	199	84	77	236	61
11	100	184	206	102	95	257	276	184	74	74	212	63
12	100	179	202	118	89	272	248	130	78	74	161	64
13	98	171	201	154	89	291	222	108	71	73	152	59
14	96	169	196	208	89	299	264	123	70	71	142	58
15	92	163	185	221	106	310	280	164	67	77	141	56
16	90	155	174	224	126	323	272	164	64	102	177	57
17	88	145	191	224	124	307	245	148	60	94	426	69
18	90	145	190	225	123	280	247	103	57	92	289	61
19	99	133	191	228	118	268	248	105	59	65	253	56
20	94	125	192	269	120	276	205	88	57	88	238	63
21	94	127	192	280	122	253	210	107	56	73	202	69
22	93	119	191	287	120	216	214	83	54	63	188	71
23	92	113	210	288	124	195	207	81	59	147	183	61
24	94	96	209	291	127	184	191	161	62	77	171	57
25	96	93	203	282	123	177	185	182	109	70	165	72
26	96	92	197	274	124	186	189	176	187	62	122	97
27	94	127	193	262	148	184	201	170	200	99	108	62
28	74	135	189	263	165	187	200	204	204	98	102	58
29	68	122	181	257	---	176	193	205	214	72	95	61
30	65	121	171	246	---	164	178	179	214	59	122	100
31	81	---	175	175	---	130	---	166	---	72	122	---
TOTAL	2750	4226	5717	6025	3900	6743	6098	4632	3185	3007	5991	2102
MEAN	88.7	141	184	194	118	218	203	149	106	97.0	193	70.1
MAX	120	197	210	291	165	323	280	205	214	199	426	103
MIN	65	92	145	88	84	128	117	81	54	59	64	56
CFSM	.51	.81	1.06	1.12	.68	1.25	1.17	.86	.61	.56	1.11	.40
IN.	.59	.90	1.22	1.29	.71	1.44	1.30	.99	.68	.64	1.28	.45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 1995, BY WATER YEAR (WY)

	MEAN	79.2	105	115	123	143	222	164	129	85.2	67.0	66.1
MAX	214	305	210	343	301	501	589	484	433	349	193	222
(WY)	1991	1993	1993	1993	1976	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1935 - 1995

ANNUAL TOTAL	53426	53776	127
ANNUAL MEAN	146	147	216
HIGHEST ANNUAL MEAN			44.3
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	334	Mar 23	426
LOWEST DAILY MEAN	52	Sep 25	54
ANNUAL SEVEN-DAY MINIMUM	55	Sep 19	57
INSTANTANEOUS PEAK FLOW			(a)921
INSTANTANEOUS PEAK STAGE			15.20
INSTANTANEOUS LOW FLOW			46
ANNUAL RUNOFF (CFSM)	.84		.85
ANNUAL RUNOFF (INCHES)	11.42		11.50
10 PERCENT EXCEEDS	233		247
50 PERCENT EXCEEDS	132		138
90 PERCENT EXCEEDS	67		68
			38

(a) From rating curve extended above 500 ft³/s.

(b) Gage height 13.50 ft.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04111500 DEER CREEK NEAR DANSVILLE, MI

LOCATION.--Lat 42°36'30", long 84°19'15", in SE1/4 NE1/4 sec.33, T.3 N., R.1 E., Ingham County, Hydrologic Unit 04050004, on right bank 15 ft upstream from bridge on Clark Road, 3.5 mi north of Dansville, and 7.2 mi upstream from mouth.

DRAINAGE AREA.--16.3 mi².

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

REVISED RECORDS.--WSP 1727: 1954(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 889.08 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	63	77	20	13	12	13	13	16	7.6	4.1	1.3	1.2
2	32	61	17	12	12	e12	12	14	7.2	3.2	1.7	1.1
3	18	30	21	11	12	e10	12	13	7.7	2.8	9.9	1.1
4	13	25	21	9.4	10	9.1	12	13	7.0	2.8	9.1	1.1
5	11	27	22	8.0	9.0	9.8	9.9	17	6.2	3.6	5.2	.97
6	9.3	79	21	8.7	7.6	14	11	14	5.5	2.9	3.7	.95
7	7.9	45	22	8.7	7.4	58	11	12	5.0	2.5	2.8	.96
8	7.2	27	23	8.4	6.7	76	17	11	4.3	2.4	2.4	1.0
9	20	44	25	8.0	6.8	45	20	11	4.1	2.3	2.3	.96
10	15	37	31	8.1	e7.0	31	26	12	4.3	3.7	2.1	.79
11	11	24	24	8.4	e6.6	84	29	31	4.2	2.4	1.9	.74
12	9.4	20	18	16	e6.4	131	47	20	3.9	2.1	1.7	.73
13	8.4	18	16	32	e6.3	91	35	15	3.5	1.8	1.5	.71
14	7.4	17	14	31	e6.2	61	25	13	3.2	1.8	1.8	.70
15	6.8	15	13	33	e6.1	42	20	12	2.9	1.6	3.6	.70
16	6.3	14	17	21	e6.2	31	17	10	2.8	1.5	2.7	.72
17	6.0	13	109	17	e6.4	24	16	10	2.7	1.6	16	.87
18	5.6	12	84	16	e7.0	20	17	9.3	2.5	1.3	19	.86
19	9.4	11	47	17	e13	20	18	8.8	2.4	1.2	8.9	.79
20	11	10	32	67	15	21	15	7.8	2.1	1.3	5.7	.91
21	9.0	11	25	90	13	28	21	7.2	2.0	1.7	4.4	1.1
22	8.0	10	22	54	12	21	22	6.6	1.9	1.4	3.2	1.3
23	7.3	9.1	20	38	14	17	18	6.5	1.8	1.5	2.8	1.1
24	6.9	8.6	19	30	15	15	15	17	3.1	1.5	2.4	1.0
25	6.5	8.5	17	26	11	14	14	20	5.7	1.6	2.1	1.0
26	6.2	7.7	15	23	10	13	18	16	3.6	1.7	1.9	.97
27	6.0	17	14	20	13	12	54	12	4.7	5.2	1.6	.90
28	5.7	100	14	17	14	16	31	12	4.6	2.5	1.7	.84
29	5.4	48	12	16	---	19	23	11	5.0	1.8	1.7	.82
30	5.2	27	11	e14	---	17	19	10	5.3	1.5	1.6	.75
31	6.2	---	11	12	---	15	---	8.7	---	1.4	1.5	---
TOTAL	350.1	852.9	777	693.7	271.7	989.9	617.9	396.9	126.8	68.7	128.2	27.64
MEAN	11.3	28.4	25.1	22.4	9.70	31.9	20.6	12.8	4.23	2.22	4.14	.92
MAX	63	100	109	90	15	131	54	31	7.7	5.2	19	1.3
MIN	5.2	7.7	11	8.0	6.1	9.1	9.9	6.5	1.8	1.2	1.3	.70
CFSM	.69	1.74	1.54	1.37	.60	1.96	1.26	.79	.26	.14	.25	.06
IN.	.80	1.95	1.77	1.58	.62	2.26	1.41	.91	.29	.16	.29	.06

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 1995, BY WATER YEAR (WY)

	MEAN	5.74	9.55	12.4	11.0	16.3	30.1	24.5	12.2	8.55	4.06	2.58	3.06
MAX	33.8	45.1	32.7	40.1	52.3	70.6	64.8	57.2	43.3	30.5	17.1	20.6	
(WY) 1960	1960	1993	1973	1974	1985	1982	1975	1956	1968	1957	1992	1992	
MIN	.35	.65	.48	.88	1.65	3.00	5.93	2.58	1.03	.39	.19	.25	
(WY) 1964	1964	1964	1964	1977	1963	1964	1963	1958	1988	1965	1971	1979	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1954 - 1995

ANNUAL TOTAL	6408.1						5301.44					
ANNUAL MEAN	17.6						14.5			11.6		
HIGHEST ANNUAL MEAN										22.8		1993
LOWEST ANNUAL MEAN										1.86		1964
HIGHEST DAILY MEAN	184						131		Mar 12	720		Apr 19 1975
LOWEST DAILY MEAN	1.8					Feb 20	.70		Sep 14	.05		Sep 9 1978
ANNUAL SEVEN-DAY MINIMUM	2.2					Sep 13	.73		Sep 10	.09		Sep 9 1978
INSTANTANEOUS PEAK FLOW						Sep 7	174		Mar 11	(a)962		Apr 19 1975
INSTANTANEOUS PEAK STAGE							5.91		Mar 11	(b)12.18		Apr 19 1975
INSTANTANEOUS LOW FLOW							.65		(c)	.04		(d)
ANNUAL RUNOFF (CFSM)	1.08						.89			.71		
ANNUAL RUNOFF (INCHES)	14.62						12.10			9.68		
10 PERCENT EXCEEDS	38						31			26		
50 PERCENT EXCEEDS	10						10			4.6		
90 PERCENT EXCEEDS	3.4						1.5			.70		

(a) From rating curve extended above 610 ft³/s.

(b) From floodmark.

(c) Part of each day Sept. 12-16, 30.

(d) Sept. 8, 9, 12, 1978.

(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 mi².

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

GAGE.--Water-stage recorder and concrete control with V-notch sharp-crested weir. Datum of gage is 862.12 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--Records good except for estimated daily discharges, which are fair. At times, low flow is affected by pumpage for irrigation. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	37	e33	8.1	4.8	5.5	6.2	5.0	7.6	2.4	8.7	.86	.31
2	22	e25	7.1	4.4	5.0	5.2	4.7	6.4	2.3	3.6	1.2	.28
3	13	e16	7.9	4.1	4.7	4.7	4.6	5.5	2.5	2.5	1.9	.27
4	e7.5	e14	8.1	3.8	4.4	4.3	4.4	5.2	2.2	2.2	e1.6	e.27
5	e5.1	e16	9.1	3.4	3.9	4.4	3.9	6.2	2.0	2.2	e1.4	e.26
6	4.0	e33	8.9	3.5	3.6	5.4	4.2	5.3	1.9	1.8	1.3	e.26
7	3.3	e19	9.6	3.5	3.5	3.3	3.9	4.7	1.8	1.5	.99	e.25
8	2.9	e14	13	3.3	3.1	3.6	5.3	4.2	1.6	1.3	.93	e.25
9	7.8	e19	16	3.1	3.0	2.2	6.7	4.1	1.5	1.2	1.1	e.24
10	6.2	e15	19	3.0	3.1	1.7	10	4.1	1.6	1.1	1.2	e.23
11	4.6	e12	13	3.1	2.8	6.3	11	4.5	1.5	.94	1.1	e.22
12	3.8	9.7	8.4	12	2.6	7.1	23	4.0	1.4	.82	e.90	e.21
13	3.3	8.2	7.2	21	2.5	4.9	15	3.6	1.3	.76	e.80	e.20
14	2.9	7.8	6.4	18	2.4	3.5	9.9	3.4	1.1	.73	e.70	.20
15	2.6	7.2	5.8	17	2.6	2.6	7.6	3.1	1.0	.70	e.85	.19
16	2.4	6.4	8.3	11	2.5	1.9	6.6	2.9	.98	.93	e1.0	e.19
17	2.3	5.8	5.7	8.1	2.4	1.4	5.9	2.9	.91	.81	8.6	e.23
18	2.2	5.3	3.7	7.8	2.6	1.1	6.1	2.7	.86	.63	4.9	e.22
19	6.7	4.7	2.4	8.6	4.2	9.5	6.3	2.5	.83	.58	2.5	e.21
20	6.6	4.4	1.7	4.4	7.2	1.0	5.3	2.4	.77	.89	e1.7	e.25
21	5.0	4.6	1.4	3.9	e7.3	1.4	7.8	2.2	.69	1.2	e1.2	e.30
22	4.2	4.2	1.1	2.7	5.9	9.0	7.7	2.1	.63	.72	e.90	e.35
23	3.6	3.8	9.2	2.1	8.9	7.5	6.2	2.1	.60	.72	.70	e.30
24	3.2	3.5	8.4	1.7	8.5	6.5	5.5	3.3	1.4	.60	.65	e.27
25	e3.0	3.4	7.5	1.5	5.6	5.8	5.0	4.1	1.3	.53	.58	e.26
26	e2.8	3.1	6.6	1.3	5.0	5.3	1.1	4.1	.98	.49	.55	e.24
27	2.6	8.5	6.2	9.9	6.0	5.1	4.8	3.3	1.3	.49	e.50	e.21
28	2.4	3.8	5.9	8.2	7.3	6.0	2.1	3.3	1.7	.51	e.45	.20
29	e2.3	1.8	5.1	7.0	---	6.8	1.3	3.0	3.1	.55	e.42	.18
30	e2.2	1.1	4.6	6.2	---	6.3	9.1	2.8	1.1	.68	e.40	.18
31	e3.5	---	4.6	5.8	---	5.5	---	2.5	---	.74	e.36	---
TOTAL	181.0	373.6	374.0	356.6	126.1	523.5	283.6	118.1	53.15	41.12	42.24	7.23
MEAN	5.84	12.5	12.1	11.5	4.50	16.9	9.45	3.81	1.77	1.33	1.36	.24
MAX	37	38	57	44	8.9	7.1	48	7.6	11	8.7	8.6	.35
MIN	2.2	3.1	4.6	3.0	2.4	4.3	3.9	2.1	.60	.49	.36	.18
CFSM	.63	1.33	1.29	1.23	.48	1.81	1.01	.41	.19	.14	.15	.03
IN.	.72	1.49	1.49	1.42	.50	2.09	1.13	.47	.21	.16	.17	.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 1995, BY WATER YEAR (WY)

	MEAN	2.88	4.43	6.11	5.22	8.08	16.9	13.2	5.85	4.36	2.00	1.18	1.43
MAX	20.9	21.9	24.9	21.4	28.4	39.9	47.2	37.6	35.3	26.5	8.15	7.19	
(WY)	1960	1993	1973	1974	1985	1982	1975	1956	1968	1957	1980	1993	
MIN	.087	.13	.11	.11	.12	.78	1.45	.94	.25	.074	.10	.086	
(WY)	1964	1964	1964	1963	1963	1964	1963	1955	1988	1988	1987	1955	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1954 - 1995

ANNUAL TOTAL	3427.19	2480.24	5.96	
ANNUAL MEAN	9.39	6.80	10.5	(a)
HIGHEST ANNUAL MEAN			.72	1964
LOWEST ANNUAL MEAN				
HIGHEST DAILY MEAN	117	71	536	Apr 19 1975
LOWEST DAILY MEAN	.60	.18	.02	Aug 3 1988
ANNUAL SEVEN-DAY MINIMUM	.72	.21	.03	Jul 29 1988
INSTANTANEOUS PEAK FLOW		169	(c)1290	Apr 18 1975
INSTANTANEOUS PEAK STAGE		4.19	9.99	Apr 18 1975
INSTANTANEOUS LOW FLOW			.01	(d)
ANNUAL RUNOFF (CFSM)	1.01	.73	.64	
ANNUAL RUNOFF (INCHES)	13.65	9.88	8.67	
10 PERCENT EXCEEDS	22	16	14	
50 PERCENT EXCEEDS	4.5	4.0	1.7	
90 PERCENT EXCEEDS	1.3	.50	.19	

(a) 1973, 1993.

(b) Sept. 29, 30.

(c) From rating curve extended above 660 ft³/s on basis of computation of peak flow through culvert and over road embankment.

(d) Sept. 11, 1954, Jan. 18, 1957, Aug. 3, 1988.

(e) Estimated.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	470	403	607	275	328	316	314	463	182	196	48	55
2	680	777	503	275	291	278	290	395	165	133	63	52
3	675	853	452	244	268	237	268	342	177	105	105	51
4	563	746	437	166	256	243	268	308	165	109	187	49
5	465	666	425	175	184	250	249	317	152	113	246	48
6	393	780	428	200	187	247	241	316	142	100	191	46
7	328	907	448	222	225	377	243	291	133	89	147	46
8	262	850	466	214	193	728	262	268	122	81	112	46
9	256	757	483	201	183	829	314	247	112	78	94	47
10	302	746	525	194	184	772	379	244	112	76	83	45
11	300	689	534	190	174	755	429	272	113	73	77	43
12	273	595	479	207	157	1160	524	333	111	69	71	42
13	243	514	411	369	156	1510	630	322	105	64	65	41
14	216	460	361	522	150	1530	614	293	97	60	60	39
15	193	413	321	561	148	1350	529	268	91	62	68	38
16	178	364	307	567	153	1130	446	253	86	74	84	38
17	168	325	517	510	156	939	385	242	81	75	269	42
18	160	295	876	449	161	778	347	229	77	68	432	40
19	203	269	976	419	181	673	346	220	74	63	360	40
20	227	249	877	513	228	604	341	208	72	64	277	43
21	222	243	746	820	267	588	363	195	69	80	186	50
22	208	238	638	953	258	554	401	184	66	72	129	61
23	199	224	558	902	265	481	387	191	61	75	101	54
24	187	212	501	806	309	426	354	232	62	70	85	e47
25	182	202	453	714	306	378	323	295	74	68	76	e45
26	176	195	405	639	252	336	337	317	79	70	71	e41
27	168	219	369	561	267	308	634	289	103	69	65	e39
28	162	470	344	505	310	312	762	255	113	70	63	e37
29	155	695	319	e430	---	334	673	236	126	61	62	e35
30	148	709	288	e360	---	347	553	224	182	55	62	e33
31	157	---	268	e355	---	336	---	203	---	50	59	---
TOTAL	8519	15065	15322	13518	6197	19106	12206	8452	3304	2492	3998	1333
MEAN	275	502	494	436	221	616	407	273	110	80.4	129	44.4
MAX	680	907	976	953	328	1530	762	463	182	196	432	61
MIN	148	195	268	166	148	237	241	184	61	50	48	33
CFSM	.77	1.41	1.39	1.23	.62	1.74	1.15	.77	.31	.23	.36	.13
IN.	.89	1.58	1.61	1.42	.65	2.00	1.28	.89	.35	.26	.42	.18

MEAN	105	146	184	209	283	506	475	282	177	90.5	60.9	75.2
MAX	571	735	494	739	1024	1162	1494	1310	627	578	366	426
(WY)	1982	1993	1995	1993	1938	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	1936

ANNUAL TOTAL	137329		109512			
ANNUAL MEAN	376		300		217	
HIGHEST ANNUAL MEAN					431	1993
LOWEST ANNUAL MEAN					43.3	1964
HIGHEST DAILY MEAN	1960	Jul 9	1530	Mar 14	5720	Apr 20 1975
LOWEST DAILY MEAN	65	Jun 12	(e)33	Sep 30	3.0	Jul 31 1931
ANNUAL SEVEN-DAY MINIMUM	77	Jun 6	40	Sep 24	3.9	Jul 15 1934
INSTANTANEOUS PEAK FLOW			1560	Mar 13	5940	Apr 20 1975
INSTANTANEOUS PEAK STAGE			6.46	Mar 13	11.95	Apr 20 1975
INSTANTANEOUS LOW FLOW					3.0	Jul 31 1931
ANNUAL RUNOFF (CFSM)	1.06		.85		.61	
ANNUAL RUNOFF (INCHES)	14.39		11.48		8.31	
10 PERCENT EXCEEDS	764		669		510	
50 PERCENT EXCEEDS	268		243		104	
90 PERCENT EXCEEDS	101		61		28	

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04112850 SYCAMORE CREEK NEAR HOLT, MI

LOCATION.--Lat 42°38'25", long 84°28'58", in SW1/4 SW1/4 sec.18, T.3 N., R.1 W., Ingham County, Hydrologic Unit 04050004, on left bank 15 ft downstream from bridge on Holt Road, 1.6 mi east of Holt.

DRAINAGE AREA.--80.6 mi².

PERIOD OF RECORD.--April 1975 to September 1980, May 1989 to September 1990, October 1994 to September 1995.

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. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	179	160	104	68	e58	66	76	88	43	71	20	18
2	183	269	88	64	e55	59	71	80	40	50	21	17
3	110	172	89	e58	e51	59	68	76	42	39	47	15
4	72	123	95	e54	e49	55	68	72	41	37	52	14
5	57	125	93	e50	e47	53	61	81	38	53	46	17
6	48	237	94	e48	e45	61	64	73	36	43	38	17
7	43	247	97	e47	e44	162	64	66	34	38	30	17
8	39	156	103	e46	e43	458	79	62	34	36	29	18
9	62	149	106	e45	e41	e255	96	59	33	32	27	18
10	60	180	131	e44	e39	e150	124	60	33	33	25	15
11	49	135	124	e45	e37	249	132	116	33	30	25	15
12	43	107	98	65	e36	516	151	100	31	27	24	16
13	39	93	85	124	e35	463	162	79	30	26	22	16
14	36	87	78	133	e34	347	126	69	29	25	22	15
15	34	83	73	133	e33	242	101	61	28	24	34	15
16	32	74	73	107	e34	179	88	57	27	21	27	15
17	31	69	235	87	e36	142	80	54	26	27	79	15
18	30	66	352	81	e40	117	79	51	23	24	108	16
19	56	63	245	83	52	107	86	48	22	23	61	16
20	62	61	168	145	67	102	77	44	23	23	41	15
21	51	61	135	309	66	126	86	41	22	28	35	16
22	44	59	117	241	60	111	103	38	22	27	33	21
23	42	54	105	171	63	94	86	38	20	27	29	17
24	39	51	99	141	71	84	76	62	20	23	28	16
25	37	50	92	124	63	76	71	85	19	27	27	18
26	35	47	83	110	52	72	74	77	19	27	25	18
27	33	55	78	97	64	69	221	62	33	28	22	16
28	33	220	75	89	72	82	200	57	30	26	23	15
29	33	238	70	78	---	99	130	57	41	23	24	13
30	31	144	64	e68	---	95	101	54	90	21	25	12
31	31	---	63	e62	---	84	---	49	---	20	22	---
TOTAL	1674	3635	3512	3017	1387	4834	3001	2016	962	959	1071	482
MEAN	54.0	121	113	97.3	49.5	156	100	65.0	32.1	30.9	34.5	16.1
MAX	183	269	352	309	72	516	221	116	90	71	108	21
MIN	30	47	63	44	33	53	61	38	19	20	20	12
CFSM	.67	1.50	1.41	1.21	.61	1.93	1.24	.81	.40	.38	.43	.20
IN.	.77	1.68	1.62	1.39	.64	2.23	1.39	.93	.44	.44	.49	.22

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1995, BY WATER YEAR (WY)

	MEAN	20.8	41.8	54.4	49.0	63.7	152	138	61.2	42.7	20.9	26.3	29.5
MAX	54.0	121	119	114	188	222	324	99.8	135	45.2	90.1	88.0	
WY)	1995	1995	1976	1990	1976	1976	1975	1976	1989	1976	1980	1980	
MIN	8.20	13.0	10.9	10.1	19.0	88.6	91.7	26.5	17.1	8.76	6.85	5.90	
(WY)	1980	1977	1977	1977	1979	1977	1977	1977	1978	1977	1977	1979	

SUMMARY STATISTICS

FOR 1995 WATER YEAR

WATER YEARS 1975 - 1995

ANNUAL TOTAL	26550		
ANNUAL MEAN	72.7	54.1	
HIGHEST ANNUAL MEAN		76.4	1976
LOWEST ANNUAL MEAN		26.4	1977
HIGHEST DAILY MEAN	516	1990	Apr 19 1975
LOWEST DAILY MEAN	12	Sep 30	Sep 29 1979
ANNUAL SEVEN-DAY MINIMUM	15	Sep 10	Sep 24 1979
INSTANTANEOUS PEAK FLOW	522	Mar 12	Apr 19 1975
INSTANTANEOUS PEAK STAGE	6.97	Mar 12	Apr 19 1975
INSTANTANEOUS LOW FLOW	11	Sep 30	(a)
ANNUAL RUNOFF (CFSM)	.90		.67
ANNUAL RUNOFF (INCHES)	12.25		9.12
10 PERCENT EXCEEDS	141		126
50 PERCENT EXCEEDS	56		27
90 PERCENT EXCEEDS	21		9.8

(a) Sept. 29, Oct. 1, 1979.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04113000 GRAND RIVER AT LANSING, MI

LOCATION.--Lat 42°45'02", long 84°33'19", in NW1/4 sec.9, T.4 N., R.2 W., Ingham County, Hydrologic Unit 04050004, on right bank 30 ft upstream from bridge on North Grand River Avenue in Lansing, 2.0 mi downstream from Red Cedar River, and at mile 152.

DRAINAGE AREA.--1,230 mi², approximately.

PERIOD OF RECORD.--March 1901 to September 1906, October 1934 to current year. Monthly discharge only for some periods, published in WSP 1307. Published as "at North Lansing" 1901-6. Gage-height records collected in this vicinity 1907-10 (flood seasons only), 1911-19, 1920-28 (flood seasons only), and since 1931 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 1174: 1949. WSP 1387: 1901, 1903-4, 1935, 1937, 1942.

GAGE.--Water-stage recorder. Datum of gage is 805.53 ft above sea level (levels by Michigan Department of Natural Resources). Prior to August 1906, nonrecording gage at same site at different datum. November 1934 to June 1949 water-stage recorder at site 1.8 mi downstream at datum 2.42 ft lower.

REMARKS.--Records good. Large diurnal fluctuation at low and medium flow caused by powerplants upstream from station. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1430	1340	1810	1180	1560	1140	1380	1660	857	870	299	305
2	1470	1760	1500	1180	1450	1040	1290	1470	870	833	353	446
3	1620	1990	1460	1010	1250	968	1230	1400	843	618	458	306
4	1240	1770	1460	850	1250	953	1130	1360	787	764	694	314
5	981	1780	1410	591	855	965	1120	1400	739	600	1020	289
6	902	2190	1370	705	921	988	1090	1290	723	563	952	273
7	716	2270	1430	766	778	1270	1080	1240	573	545	841	254
8	697	2070	1500	796	800	2180	1120	1180	545	457	747	281
9	782	1930	1580	867	798	2320	1250	1110	568	459	649	362
10	703	2020	1650	892	743	2250	1520	1010	580	479	655	270
11	803	1800	1640	787	810	2380	1620	1180	515	353	652	330
12	769	1810	1650	899	641	3450	1820	1390	455	286	560	276
13	674	1640	1490	1130	615	4100	2080	1340	521	383	539	252
14	613	1560	1430	1640	611	3980	2030	1160	480	313	533	231
15	582	1440	1220	1790	607	3720	1960	1070	409	315	515	240
16	557	1320	1250	1700	616	3170	1740	1040	389	449	509	278
17	541	1220	1770	1710	648	2770	1610	913	406	254	1420	213
18	498	1190	2340	1550	678	2430	1590	895	392	395	1940	280
19	670	1090	2570	1580	689	2260	1570	830	366	378	1790	226
20	750	1020	2450	1760	871	2110	1540	811	293	367	1620	e296
21	568	1120	2220	2310	942	2040	1620	756	324	328	1610	257
22	700	877	1990	2560	970	1960	1690	650	306	384	1380	391
23	560	924	1800	2630	1020	1920	1630	696	300	428	1160	386
24	602	849	1730	2420	974	1680	1520	917	358	291	979	229
25	520	823	1570	2260	1150	1670	1480	955	298	501	764	262
26	522	748	1600	2030	1020	1480	1570	1190	429	396	776	334
27	516	1020	1420	1840	1040	1400	2080	1150	453	395	618	284
28	506	1330	1370	1820	1090	1500	2210	1120	639	538	611	245
29	486	1900	1380	1590	---	1490	2040	1030	655	384	491	300
30	484	1840	1270	1430	---	1520	1840	1020	883	497	470	241
31	561	---	1160	1460	---	1500	---	988	---	336	410	---
MEAN	743	1488	1629	1475	907	2019	1582	1104	532	455	839	288
MAX	1620	2270	2570	2630	1560	4100	2210	1660	883	870	1940	446
MIN	484	748	1160	591	607	953	1080	650	293	254	299	213
CFSM	.60	1.21	1.32	1.20	.74	1.64	1.29	.90	.43	.37	.68	.23
IN.	.70	1.35	1.53	1.38	.77	1.89	1.44	1.03	.48	.43	.79	.26

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1901 - 1995, BY WATER YEAR (WY)

MEAN	467	622	741	816	1014	1933	1792	1113	827	487	357	359
MAX	1880	2559	1666	2669	2550	7242	5113	3815	2800	2204	1178	1277
(WY) 1987	1993	1976	1993	1976	1904	1947	1956	1905	1902	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	1936	1963

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1901 - 1995

ANNUAL TOTAL	454267	398290	875
ANNUAL MEAN	1245	1091	1638
HIGHEST ANNUAL MEAN			232
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	4460	Feb 21	4100
LOWEST DAILY MEAN	221	Sep 21	213
ANNUAL SEVEN-DAY MINIMUM	326	Sep 19	246
INSTANTANEOUS PEAK FLOW			4190
INSTANTANEOUS PEAK STAGE			8.86
INSTANTANEOUS LOW FLOW			110
ANNUAL RUNOFF (CFSM)	1.01		.89
ANNUAL RUNOFF (INCHES)	13.74		12.05
10 PERCENT EXCEEDS	2320	1960	1920
50 PERCENT EXCEEDS	1150	970	544
90 PERCENT EXCEEDS	451	329	181

(a) From rating curve extended above 15,000 ft³/s; gage height, 18.60 ft, datum then in use.

(b) Present site and datum.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04114000 GRAND RIVER AT PORTLAND, MI

LOCATION.--Lat 42°51'23", long 84°54'44", in NW1/4 sec.4, T.5 N., R.5 W., Ionia County, Hydrologic Unit 04050004, on left bank at downstream side of bridge on Kent Street, 1.0 mi south of Portland, 1.9 mi upstream from Looking Glass River, and at mile 115.

DRAINAGE AREA.--1,385 mi².

PERIOD OF RECORD.--August 1952 to March 1982, June 1988 to current year. Gage-height records collected in this vicinity 1907-28 (flood seasons only) are contained in reports of the National Weather Service.

GAGE.--Water-stage recorder. Datum of gage is 705.00 ft above sea level (levels by Michigan Department of Natural Resources). Prior to July 6, 1953, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Slight diurnal fluctuation caused by powerplants upstream from station. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1170	1270	1900	1220	1510	1130	1510	1870	1000	922	408	490
2	1420	2600	1760	1230	1540	1140	1370	1610	903	894	392	382
3	1540	2460	1520	1240	1410	1010	1310	1530	926	809	426	505
4	1430	2280	1510	1020	1250	1010	1270	1400	897	733	557	405
5	1160	2260	1460	e650	e1050	981	1150	1510	842	916	1210	352
6	962	3440	1410	e750	e950	1020	1160	1400	815	663	1090	387
7	916	3050	1460	e800	e870	1080	1130	1320	798	656	979	314
8	793	2840	1530	e850	e850	1800	1150	1260	663	616	880	336
9	874	2460	1530	e920	e830	2490	1190	1210	654	544	789	320
10	855	2330	1720	e930	e820	2330	1420	1170	670	552	724	428
11	808	2210	1740	e850	e800	2490	1620	1160	682	518	710	328
12	879	2030	1740	e1000	e700	3810	1760	1340	609	440	700	398
13	828	1820	1580	e1300	e660	4840	2030	1400	561	394	618	332
14	755	1760	1510	e1750	e640	4790	2210	1310	613	445	594	331
15	716	1590	1390	2000	e630	4380	2110	1140	584	421	594	284
16	690	1480	1250	1860	e650	3800	1910	1100	517	406	574	281
17	667	1350	1610	1800	e700	3270	1730	1190	492	528	644	359
18	654	1280	2390	1720	e750	2830	1580	962	506	360	1890	270
19	681	1180	2870	1640	e850	2630	1690	959	491	449	1930	310
20	810	1160	2750	1770	e950	2400	1570	903	474	470	1680	320
21	833	1060	2580	2380	e1000	2280	1640	835	403	482	1610	349
22	714	1150	2300	2800	1030	2140	1800	841	427	423	1470	378
23	762	952	2070	2860	1030	2050	1760	750	395	512	1310	470
24	684	969	1890	2740	1080	1960	1600	1020	420	514	1050	430
25	768	902	1710	2560	1050	1720	1520	1020	473	389	939	286
26	599	885	1650	2350	1220	1630	1550	1140	414	554	814	343
27	651	881	1580	2110	1030	1480	2260	1230	568	479	769	353
28	642	1550	1430	1880	1130	1540	2620	1170	578	489	675	372
29	631	1640	1390	1850	---	1550	2400	1170	758	597	655	301
30	613	2100	1390	1720	---	1570	2140	1080	775	455	560	368
31	623	---	1250	1600	---	1560	---	1060	---	549	573	---
TOTAL	26128	52939	53870	50150	26980	68711	50160	37060	18908	17179	27814	10782
MEAN	843	1765	1738	1618	964	2216	1672	1195	630	554	897	359
MAX	1540	3440	2870	2860	1540	4840	2620	1870	1000	922	1930	505
CFSM	.61	1.27	1.25	1.17	.70	1.60	1.21	.86	.46	.40	.65	.26
IN.	.70	1.42	1.45	1.35	.72	1.85	1.35	1.00	.51	.46	.75	.29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1995, BY WATER YEAR (WY)

	564	794	930	954	1116	2065	1987	1277	830	570	445	432
MEAN	564	794	930	954	1116	2065	1987	1277	830	570	445	432
MAX	1766	2743	1975	2989	2947	4202	3936	4676	2587	2268	1297	1433
(WY)	1982	1993	1976	1993	1976	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1952 - 1995

ANNUAL TOTAL	500226	440681	993
ANNUAL MEAN	1370	1207	1830
HIGHEST ANNUAL MEAN			282
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	5070	Feb 22	12200
LOWEST DAILY MEAN	319	Sep 24	58
ANNUAL SEVEN-DAY MINIMUM	429	Sep 20	85
INSTANTANEOUS PEAK FLOW			12400
INSTANTANEOUS PEAK STAGE			12.98
INSTANTANEOUS LOW FLOW			38
ANNUAL RUNOFF (CFSM)	.99	.87	.72
ANNUAL RUNOFF (INCHES)	13.44	11.84	9.74
10 PERCENT EXCEEDS	2510	2230	2160
50 PERCENT EXCEEDS	1220	1030	630
90 PERCENT EXCEEDS	520	422	230

(a) Sept. 26, 27.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04114500 LOOKING GLASS RIVER NEAR EAGLE, MI

LOCATION.--Lat 42°49'45", long 84°46'40", in sec.10, T.5 N., R.4 W., Clinton County, Hydrologic Unit 04050004, on right bank at upstream side of former bridge site on Hinman Road, 1.5 mi northeast of Eagle, and 10 mi upstream from mouth.

DRAINAGE AREA.--281 mi².

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

REVISED RECORDS.--WSP 1387: 1946-47.

GAGE.--Water-stage recorder. Datum of gage is 747.09 ft above sea level (levels by Michigan Department of Natural Resources). Prior to June 2, 1962, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Small intermittent diversion at times into Lake Geneva when discharge is above 50 ft³/s. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	215	369	257	275	352	208	334	353	193	91	54	56
2	251	438	269	e250	329	208	315	365	178	94	53	53
3	191	311	289	e225	e290	e210	299	369	167	93	58	49
4	171	287	306	e205	e240	e210	288	363	156	92	66	49
5	176	381	314	e190	e210	208	270	372	147	89	83	47
6	187	860	315	e180	e190	197	259	346	137	87	85	45
7	192	667	323	e175	e180	213	246	315	133	82	77	44
8	192	564	322	e170	e175	259	251	293	127	79	76	45
9	203	559	323	e165	e170	240	252	285	121	76	73	44
10	193	557	328	e155	e165	e230	260	287	115	75	67	55
11	170	546	319	e150	e160	348	256	302	111	69	64	53
12	155	539	e305	e150	e160	726	267	280	119	66	60	48
13	149	531	e290	e175	e155	811	279	259	107	62	57	44
14	145	521	e280	e220	e155	714	281	247	100	60	54	43
15	140	496	268	e250	e150	683	282	236	95	58	52	43
16	133	464	266	254	e150	689	287	224	91	62	51	43
17	125	431	355	260	e155	713	292	302	86	66	61	44
18	115	396	405	276	e160	737	298	248	82	68	100	44
19	125	360	363	292	e160	785	311	219	80	73	114	42
20	131	332	340	374	e165	810	298	198	75	79	109	44
21	124	311	343	468	e170	791	330	181	70	81	120	48
22	121	285	360	434	e175	751	331	166	69	77	130	57
23	124	261	379	404	179	696	306	162	66	88	135	61
24	128	240	396	397	191	634	293	214	64	76	127	57
25	130	225	395	407	198	578	287	217	63	71	110	55
26	129	209	383	e410	177	527	301	210	68	70	93	51
27	127	229	368	e405	201	482	465	209	79	76	79	50
28	124	338	353	e400	217	462	423	217	92	71	71	49
29	120	289	332	e395	---	433	360	225	96	65	65	48
30	116	258	308	e385	---	397	347	222	92	61	60	46
31	118	---	289	e370	---	361	---	208	---	58	59	---
TOTAL	4720	12254	10143	8866	5379	15311	9068	8094	3179	2315	2463	1457
MEAN	152	408	327	286	192	494	302	261	106	74.7	79.5	48.6
MAX	251	860	405	468	352	811	465	372	193	94	135	61
MIN	115	209	257	150	150	197	246	162	63	58	51	42
CFSM	.54	1.45	1.16	1.02	.68	1.76	1.08	.93	.38	.27	.28	.17
IN.	.62	1.62	1.34	1.17	.71	2.03	1.20	1.07	.42	.31	.33	.19

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1995, BY WATER YEAR (WY)

	MEAN	94.6	129	161	173	217	441	417	251	135	85.6	56.1	73.0
MAX	614	414	445	505	673	1058	1131	910	518	405	206	532	532
(WY)	1987	1991	1976	1993	1976	1985	1947	1956	1986	1994	1994	1975	1975
MIN	15.3	25.0	21.6	24.0	24.3	47.0	85.9	64.8	31.3	13.6	16.9	15.3	15.3
(WY)	1964	1964	1964	1963	1963	1964	1964	1958	1964	1965	1965	1963	1963

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1944 - 1995

ANNUAL TOTAL	106837		83249										
ANNUAL MEAN	293		228										
HIGHEST ANNUAL MEAN													
LOWEST ANNUAL MEAN													
HIGHEST DAILY MEAN	1700	Feb 20	860	Nov 6	2400	Apr 5 1947							
LOWEST DAILY MEAN	65	Sep 25	42	Sep 19	11	Jul 21 1965							
ANNUAL SEVEN-DAY MINIMUM	70	Sep 19	43	Sep 13	11	Jul 25 1965							
INSTANTANEOUS PEAK FLOW			(a)1000	Mar 12	(b)2860	Apr 5 1947							
INSTANTANEOUS PEAK STAGE			4.81	Nov 6	(c)9.90	Mar 7 1956							
INSTANTANEOUS LOW FLOW			41	Sep 19	10	Jul 28 1965							
ANNUAL RUNOFF (CFSM)	1.04		.81		.66								
ANNUAL RUNOFF (INCHES)	14.14		11.02		8.99								
10 PERCENT EXCEEDS	534		408		435								
50 PERCENT EXCEEDS	254		197		100								
90 PERCENT EXCEEDS	90		58		32								

(a) Gage height 4.77 ft.

(b) From rating curve extended above 1,900 ft³/s; gage height 7.70 ft, from graph based on gage readings.

(c) From floodmark, backwater from ice.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04115000 MAPLE RIVER AT MAPLE RAPIDS, MI

LOCATION.--Lat 43°06'35", long 84°41'35", in sec.5, T.8 N., R.3 W., Clinton County, Hydrologic Unit 04050005, on right bank at downstream side of bridge on Maple Road in Maple Rapids, 50 ft upstream from Pine Creek, and 0.8 mi upstream from Hayworth Creek. Records include flow of Pine Creek.

DRAINAGE AREA.--434 mi².

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

REVISED RECORDS.--WSP 1707: 1956.

GAGE.--Water-stage recorder. Datum of gage is 642.58 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Oct. 4, 1968, nonrecording gage at same site and datum.

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

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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	119	204	475	365	e475	244	398	713	216	143	47	35
2	171	322	471	344	443	235	379	647	202	140	43	32
3	179	408	458	322	408	218	358	583	246	123	46	31
4	181	483	440	296	e370	200	342	525	294	109	56	30
5	175	585	418	272	e340	192	329	481	285	115	59	28
6	160	874	401	248	e310	189	316	454	265	125	60	26
7	139	1350	395	232	284	189	308	426	245	121	62	28
8	120	1560	383	219	265	220	303	393	226	104	70	25
9	129	1550	379	207	246	253	302	364	202	88	64	22
10	141	1430	381	196	e230	268	300	348	185	75	57	22
11	142	1260	387	188	e210	290	292	357	167	68	52	22
12	137	1100	383	186	e195	439	288	367	149	60	50	22
13	128	965	370	222	e180	866	296	370	130	55	48	21
14	116	841	355	279	168	1400	309	361	117	51	44	22
15	109	746	340	372	154	1740	316	353	104	54	42	22
16	105	664	332	442	149	1750	315	338	92	78	39	19
17	101	598	346	467	147	1590	309	341	84	81	48	24
18	109	529	410	461	144	1380	302	346	77	90	117	22
19	154	487	500	450	153	1200	296	356	72	93	137	24
20	158	450	578	455	183	1120	309	350	70	86	123	29
21	158	410	610	523	199	1050	318	333	62	79	104	30
22	154	383	617	614	207	987	341	313	56	71	78	32
23	152	363	608	680	218	886	367	291	54	80	56	33
24	169	341	590	712	240	781	377	278	51	83	51	33
25	160	322	568	e715	256	689	368	269	51	73	42	33
26	147	304	536	e700	250	616	e340	267	53	64	41	30
27	139	293	499	e675	252	562	e320	266	78	61	42	30
28	156	336	468	e630	249	509	e550	259	84	62	38	28
29	145	403	443	e590	---	471	729	253	89	65	38	27
30	135	457	412	e555	---	442	755	243	89	60	36	25
31	143	---	385	e510	---	420	---	230	---	51	35	---
TOTAL	4431	20018	13938	13127	6925	21396	10832	11475	4095	2608	1825	807
MEAN	143	667	450	423	247	690	361	370	136	84.1	58.9	26.9
MAX	181	1560	617	715	475	1750	755	713	294	143	137	35
MIN	101	204	332	186	144	189	288	230	51	51	35	19
CFSM	.33	1.54	1.04	.98	.57	1.59	.83	.85	.31	.19	.14	.06
IN.	.38	1.72	1.19	1.13	.59	1.83	.93	.98	.35	.22	.16	.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1995, BY WATER YEAR (WY)

MEAN	157	192	263	258	288	720	644	358	189	116	61.3	135
MAX	1461	837	813	1035	980	2049	1582	1812	874	1243	361	1634
(WY)	1987	1991	1991	1973	1976	1985	1947	1956	1989	1994	1994	1986
MIN	9.77	21.8	20.9	17.3	16.9	103	139	74.1	24.6	10.6	8.47	11.4
(WY)	1967	1963	1963	1963	1963	1964	1945	1977	1977	1965	1965	1962

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1944 - 1995

ANNUAL TOTAL	185507						11477					
ANNUAL MEAN	508						305					
HIGHEST ANNUAL MEAN										282		
LOWEST ANNUAL MEAN										501		1976
HIGHEST DAILY MEAN										65.1		1963
LOWEST DAILY MEAN										6500		Mar 20 1948
ANNUAL SEVEN-DAY MINIMUM	4870				Jul 9		1750		Mar 16			
INSTANTANEOUS PEAK FLOW	44				Sep 25		19		Sep 16			Sep 10 1963
INSTANTANEOUS PEAK STAGE	52				Sep 21		21		Sep 10			Sep 20 1979
ANNUAL RUNOFF (CFSM)							1790		Mar 15	(a)8770		Sep 12 1986
ANNUAL RUNOFF (INCHES)							8.67		Mar 15	(b)12.33		Sep 12 1986
10 PERCENT EXCEEDS	1.17						16		Sep 13	4.4		Aug 13 1965
50 PERCENT EXCEEDS	15.90						.70			.65		
90 PERCENT EXCEEDS	1000						9.56			8.82		
	358						615			675		
	88						246			121		
							42			23		

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

STREAMS TRIBUTARY TO LAKE MICHIGAN

04115265 FISH CREEK NEAR CRYSTAL, MI

LOCATION.--Lat 43°14'59", long 84°58'52", in NW1/4 NE1/4 sec.23, T.10 N., R.6 W., Montcalm County, Hydrologic Unit 04050005, on left bank 10 ft downstream from bridge on Sidney Road, 3.5 mi southwest of Crystal.

DRAINAGE AREA.--39.7 mi².

PERIOD OF RECORD.--October 1987 to current year.

REVISED RECORDS.--WDR MI-92-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 795 ft above sea level, from topographic map.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995 DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	57	82	45	36	33	32	34	42	27	27	18	16
2	50	110	46	35	33	e32	33	38	28	25	18	17
3	34	53	44	34	31	e32	33	36	88	23	42	16
4	30	60	43	e33	32	e31	35	38	60	23	72	16
5	30	79	42	33	e32	31	32	47	37	26	36	15
6	27	151	43	32	32	30	34	42	31	26	29	15
7	27	129	47	34	31	34	33	36	31	24	26	15
8	28	72	47	32	30	37	39	34	30	23	24	16
9	48	72	45	31	30	33	42	34	30	21	23	15
10	36	62	43	30	30	33	35	41	29	19	23	15
11	32	52	42	31	31	39	33	45	28	17	22	15
12	28	48	e40	33	31	73	36	37	28	16	28	15
13	27	45	38	46	30	96	38	34	27	16	27	15
14	26	46	36	80	29	92	35	33	25	16	23	15
15	27	44	36	86	31	76	33	32	24	19	20	15
16	25	40	37	51	30	63	32	30	23	34	20	15
17	27	40	42	43	30	54	32	46	22	26	37	23
18	26	41	46	41	30	46	36	36	21	22	70	20
19	35	40	45	43	32	62	58	33	20	19	43	17
20	32	38	41	54	36	65	43	30	18	19	27	20
21	29	43	40	49	34	65	53	30	17	19	24	21
22	27	43	39	45	33	49	48	29	16	17	24	31
23	29	39	41	43	34	45	38	32	17	23	21	24
24	29	36	46	42	36	40	36	39	17	19	19	21
25	29	38	45	40	33	37	35	38	17	16	18	20
26	27	35	40	38	33	36	37	34	21	18	18	19
27	26	42	38	36	33	35	104	31	49	18	17	18
28	26	91	41	35	32	36	91	30	33	34	17	18
29	26	64	41	33	---	38	51	30	30	27	18	17
30	26	51	34	e33	---	37	48	30	27	21	18	16
31	28	---	34	33	---	35	---	28	---	19	17	---
TOTAL	954	1786	1287	1265	892	1444	1267	1095	871	672	839	531
MEAN	30.8	59.5	41.5	40.8	31.9	46.6	42.2	35.3	29.0	21.7	27.1	17.7
MAX	57	151	47	86	36	96	104	47	88	34	72	31
MIN	25	35	34	30	29	30	32	28	16	16	17	15
CFSM	.78	1.50	1.05	1.03	.80	1.17	1.06	.89	.73	.55	.68	.45
IN.	.89	1.67	1.21	1.19	.84	1.35	1.19	1.03	.82	.63	.79	.50

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1995, BY WATER YEAR (WY)

	MEAN	32.1	43.5	36.1	34.3	34.9	52.6	48.7	35.1	31.1	25.0	25.5	24.4
MAX	39.2	59.5	46.1	48.9	57.7	58.8	66.6	66.6	44.7	44.3	50.9	41.7	33.8
(WY)	1992	1995	1992	1993	1994	1994	1991	1991	1991	1994	1994	1994	1993
MIN	20.1	33.0	19.8	24.5	25.7	42.6	36.4	26.9	15.3	12.9	15.6	17.7	17.7
(WY)	1990	1988	1990	1994	1989	1988	1990	1988	1988	1988	1988	1988	1995

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1988 - 1995

ANNUAL TOTAL	15733	12903	
ANNUAL MEAN	43.1	35.4	35.3
HIGHEST ANNUAL MEAN			40.7
LOWEST ANNUAL MEAN			28.6
HIGHEST DAILY MEAN	271	151	271
LOWEST DAILY MEAN	15	15	8.1
ANNUAL SEVEN-DAY MINIMUM	18	15	9.6
INSTANTANEOUS PEAK FLOW		199	(a)
INSTANTANEOUS PEAK STAGE		4.62	5.53
INSTANTANEOUS LOW FLOW		14	7.0
ANNUAL RUNOFF (CFSM)	1.09	.89	.89
ANNUAL RUNOFF (INCHES)	14.74	12.09	12.07
10 PERCENT EXCEEDS	70	51	54
50 PERCENT EXCEEDS	35	33	31
90 PERCENT EXCEEDS	23	18	18

(a) Not determined.

(b) Part of each day July 15, Sept. 8, 9, 11-16.

(c) July 10, 14, 1988.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04116000 GRAND RIVER AT IONIA, MI

LOCATION.--Lat 42°58'20", long 85°04'13", in NW1/4 sec.30, T.7 N., R.6 W., Ionia County, Hydrologic Unit 04050006, on left bank 15 ft downstream from bridge on State Highway 66 in Ionia, 2.7 mi downstream from Prairie Creek, and at mile 87.

DRAINAGE AREA.--2,840 mi², approximately.

PERIOD OF RECORD.--March to June 1931, July 1951 to current year. Gage-height records collected in this vicinity 1907-28 (flood seasons only) are contained in reports of the National Weather Service.

GAGE.--Water-stage recorder. Datum of gage is 615.38 ft above sea level. Mar. 19 to Sept. 24, 1931, nonrecording gage at site 1.5 mi upstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Diurnal fluctuation below approximately 5,000 ft³/s caused by powerplants upstream from station. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1790	2280	3620	2670	3010	2130	3120	4130	1980	1380	829	773
2	2710	5080	3360	2620	3160	2070	2940	3740	1840	1440	727	737
3	2390	5120	3210	2320	2940	2020	2750	3430	1890	1410	767	645
4	2430	4540	3070	e1900	2720	1930	2680	3270	1930	1240	868	749
5	2120	4550	3150	e1400	2370	1970	2500	3200	2100	1380	1360	684
6	1910	6300	3180	e1500	1990	1970	2470	3210	1920	1580	2160	592
7	1730	8350	3060	e1800	1650	2000	2290	2950	1830	1090	1510	602
8	1660	8250	3000	e2000	e1750	2390	2380	2760	1780	1140	1400	576
9	1590	7520	3050	e2200	e1700	3240	2370	2640	1430	1030	1170	451
10	1760	6680	3100	e2250	e1700	3360	2600	2680	1410	963	1130	501
11	1640	6190	3190	e2200	e1700	3440	2410	3110	1400	937	1200	736
12	1550	5660	3060	e2250	e1600	5100	2810	2990	1390	842	1030	542
13	1570	5040	2730	e2700	e1450	7290	3050	3030	1210	731	896	525
14	1490	4600	2750	e3200	e1400	8560	3300	2850	1200	759	954	546
15	1320	4270	2790	3930	e1350	8720	3310	2580	1130	787	918	553
16	1320	3790	2650	3880	e1350	8260	3110	2370	1040	881	846	512
17	1220	3490	2730	3540	e1400	7500	2860	2720	991	946	952	549
18	1270	3300	4060	3450	e1450	6900	2750	2860	833	938	1740	577
19	1290	3060	4630	3360	e1500	6210	2850	2400	889	748	2480	537
20	1480	2770	4610	3500	e1700	5920	2810	2180	837	830	2360	537
21	1520	2700	4430	4380	e1900	5670	2820	2130	842	876	1980	549
22	1420	2650	4220	4850	2070	5320	3170	1980	750	856	2090	633
23	1410	2400	4040	4940	2090	5000	3150	1880	749	900	1820	702
24	1360	2300	3820	4940	2150	4580	2990	1910	690	970	1690	759
25	1310	2260	3670	4710	2060	4230	2860	2360	756	929	1350	686
26	1360	2140	3470	4500	2110	3750	2870	2120	808	792	1250	555
27	1170	2170	3370	4130	2140	3520	4060	2240	948	949	1190	565
28	1270	3100	3200	3940	2060	3420	5060	2270	1130	946	1070	616
29	1290	3690	3020	3680	---	3450	4930	2210	1180	854	933	593
30	1200	3510	2860	3420	---	3310	4550	2100	1300	848	944	555
31	1250	---	2810	3190	---	3220	---	2030	---	820	785	---
TOTAL	48800	127760	103910	99350	54470	136350	91820	82330	38183	30792	40399	18127
MEAN	1574	4259	3352	3205	1945	4398	3061	2656	1273	993	1303	604
MAX	2710	8350	4630	4940	3160	8720	5060	4130	2100	1580	2480	773
MIN	1170	2140	2650	1400	1350	1930	2290	1880	690	731	727	451
CFSM	.55	1.50	1.18	1.13	.68	1.55	1.08	.94	.45	.35	.46	.21
IN.	.64	1.67	1.36	1.30	.71	1.79	1.20	1.08	.50	.40	.53	.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1995, BY WATER YEAR (WY)

	MEAN	1267	1644	1989	2002	2342	4431	4145	2525	1569	1080	786	944
MAX	7613	4931	4672	5715	6170	9398	7492	9715	4963	4468	2416	4613	
(WY)	1987	1993	1991	1993	1976	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1931 - 1995

ANNUAL TOTAL	1127664		872291										
ANNUAL MEAN	3089		2390										
HIGHEST ANNUAL MEAN													
LOWEST ANNUAL MEAN													
HIGHEST DAILY MEAN	11000		Feb 22		8720		Mar 15		21300		Apr 1 1960		
LOWEST DAILY MEAN	726		Sep 25		451		Sep 9		109		Jul 16 1977		
ANNUAL SEVEN-DAY MINIMUM	807		Sep 20		541		Sep 13		118		Jul 14 1977		
INSTANTANEOUS PEAK FLOW					8840		Mar 15		21500		Apr 1 1960		
INSTANTANEOUS PEAK STAGE					18.06		Mar 15		23.43		Apr 1 1960		
INSTANTANEOUS LOW FLOW					362		Sep 9		40		May 13 1968		
ANNUAL RUNOFF (CFSM)	1.09				.84				.73				
ANNUAL RUNOFF (INCHES)	14.77				11.43				9.91				
10 PERCENT EXCEEDS	5880				4460				4500				
50 PERCENT EXCEEDS	2680				2110				1300				
90 PERCENT EXCEEDS	1020				759				450				

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04117000 QUAKER BROOK NEAR NASHVILLE, MI

LOCATION.--Lat 42°33'57", long 85°05'37", in NW1/4 sec.13, T.2 N., R.7 W., Barry County, Hydrologic Unit 04050007, on left bank 150 ft upstream from culvert on Clark Road, 500 ft upstream from unnamed tributary, and 2.5 mi south of Nashville.

DRAINAGE AREA.--7.60 mi².

PERIOD OF RECORD.--August 1954 to September 1975, October 1975 to September 1994 (operated as a crest-stage partial-record station), October 1994 to September 1995.

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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	43	8.2	7.5	7.3	8.6	8.0	8.5	6.8	6.3	3.4	3.6
2	13	32	7.9	6.9	7.6	8.0	7.7	8.1	6.6	5.0	3.5	3.5
3	7.4	16	11	6.7	7.2	7.9	7.7	7.7	7.4	4.6	6.1	3.5
4	5.8	13	10	6.4	7.0	8.0	8.6	10	8.0	6.1	5.9	3.4
5	5.4	16	8.8	6.5	6.5	7.3	7.3	20	6.5	8.4	4.8	3.2
6	5.1	60	8.5	6.0	5.2	7.7	8.6	11	6.1	6.2	4.6	3.2
7	4.8	22	10	6.7	5.6	15	7.9	9.2	5.9	5.0	4.2	3.9
8	5.0	15	9.9	6.5	5.7	18	13	7.7	5.7	4.8	4.3	4.5
9	10	16	11	6.2	5.6	12	15	10	5.7	4.7	4.1	3.9
10	6.8	15	12	6.2	5.9	11	19	15	6.6	4.6	4.0	3.6
11	5.6	11	10	6.3	5.8	24	13	38	6.7	4.2	3.9	3.5
12	5.2	9.3	8.2	11	5.6	30	15	18	6.1	4.1	3.8	3.4
13	5.1	8.7	7.5	16	5.7	24	15	11	5.5	4.0	3.6	3.4
14	4.9	9.4	6.9	18	5.7	19	11	9.6	5.2	3.7	3.4	3.3
15	4.8	8.7	7.0	17	6.0	15	8.9	9.0	5.2	3.7	3.3	3.3
16	4.8	7.8	8.5	10	6.1	13	8.4	8.5	4.8	4.0	8.0	3.3
17	4.7	7.6	18	8.6	6.2	11	8.3	9.5	4.6	3.8	4.4	5.1
18	4.7	7.4	17	9.2	6.6	9.4	10	8.4	4.4	3.5	2.4	4.1
19	7.1	6.9	12	11	8.5	11	11	7.6	4.3	3.3	1.1	3.8
20	6.6	6.9	10	18	10	11	9.3	7.3	4.1	4.4	7.0	4.1
21	5.7	7.9	11	18	9.5	11	16	6.9	4.0	5.9	6.1	4.7
22	5.3	7.3	9.7	12	8.7	9.1	12	6.4	3.9	4.3	5.0	6.5
23	5.3	6.5	9.9	11	11	8.4	9.3	8.5	3.8	5.9	4.5	4.5
24	5.2	6.3	11	10	10	7.9	8.6	19	3.9	4.5	4.2	4.1
25	5.2	6.5	9.5	9.8	7.9	7.6	8.2	16	4.1	4.0	4.1	4.2
26	5.1	6.0	8.2	9.2	7.8	7.4	11	12	5.0	3.9	4.0	3.9
27	5.1	11	7.9	8.8	9.4	7.8	21	9.0	7.2	4.2	4.0	3.8
28	5.0	23	8.1	8.2	9.9	12	14	10	9.3	5.0	4.1	3.7
29	4.9	14	7.7	8.0	---	12	9.9	9.8	8.4	4.2	3.9	3.5
30	4.9	9.4	6.5	7.9	---	9.4	8.6	9.0	7.8	3.6	3.9	3.5
31	6.8	---	6.9	7.0	---	8.3	---	7.5	---	3.4	3.9	---
TOTAL	196.3	429.6	298.8	300.6	204.0	371.8	331.3	348.2	173.6	143.3	204.6	116.0
MEAN	6.33	14.3	9.64	9.70	7.29	12.0	11.0	11.2	5.79	4.62	6.60	3.87
MAX	21	60	18	18	11	30	21	38	9.3	8.4	44	6.5
MIN	4.7	6.0	6.5	6.0	5.2	7.3	7.3	6.4	3.8	3.3	3.3	3.2
CFSM	.83	1.88	1.27	1.28	.96	1.58	1.45	1.48	.76	.61	.87	.51
IN.	.96	2.10	1.46	1.47	1.00	1.82	1.62	1.70	.85	.70	1.00	.57

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 1995, BY WATER YEAR (WY)

MEAN	4.92	6.44	7.09	6.64	7.85	11.9	10.3	8.00	5.69	3.66	3.63	3.43
MAX	14.2	14.3	14.9	15.6	17.2	25.0	23.7	15.3	12.8	7.78	13.5	8.17
(WY)	1955	1995	1973	1974	1971	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 1995 WATER YEAR

WATER YEARS 1954 - 1995

ANNUAL TOTAL	3118.1		
ANNUAL MEAN	8.54	6.58	
HIGHEST ANNUAL MEAN		11.1	1974
LOWEST ANNUAL MEAN		2.73	1964
HIGHEST DAILY MEAN	60	211	Apr 19 1975
LOWEST DAILY MEAN	3.2	.70	Jul 29 1964
ANNUAL SEVEN-DAY MINIMUM	3.4	.73	Aug 4 1964
INSTANTANEOUS PEAK FLOW	87	470	Apr 19 1975
INSTANTANEOUS PEAK STAGE	4.22	9.45	Apr 19 1975
INSTANTANEOUS LOW FLOW	3.0	(b).44	Nov 3 1966
ANNUAL RUNOFF (CFSM)	1.12	.87	
ANNUAL RUNOFF (INCHES)	15.26	11.76	
10 PERCENT EXCEEDS	15	12	
50 PERCENT EXCEEDS	7.3	4.4	
90 PERCENT EXCEEDS	3.9	2.2	

(a) Part of each day July 19, 20, 31, Aug. 14, 15, Sep. 4-6, 14-17.

(b) 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 at downstream side of bridge on McKeown Road, 0.6 mi downstream from Cedar Creek, 2.0 mi downstream from Thornapple Lake, and 3.2 mi southeast of Hastings.

DRAINAGE AREA.--385 mi².

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

GAGE.--Water-stage recorder. Datum of gage is 786.71 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Oct. 1, 1965, nonrecording gage at same site and datum.

REMARKS.--Records good. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	234	290	565	330	358	332	376	630	300	181	116	128
2	302	533	509	323	345	314	358	534	273	165	112	120
3	318	759	460	314	330	293	339	459	267	148	116	114
4	279	858	431	270	315	283	334	413	262	143	131	112
5	237	921	413	241	266	291	327	431	247	183	176	110
6	209	1180	403	236	242	290	316	456	229	219	274	105
7	191	1480	409	254	255	304	315	440	219	212	294	106
8	177	1540	410	278	246	397	323	403	210	183	248	113
9	198	1510	419	278	238	483	358	373	194	163	224	112
10	220	1400	445	271	240	529	423	386	189	152	203	108
11	217	1240	471	263	231	545	478	447	192	150	176	103
12	201	1040	484	269	210	754	517	538	190	145	156	102
13	188	856	458	341	218	1100	544	547	182	138	139	102
14	182	708	418	475	221	1360	553	494	174	129	130	100
15	173	606	381	620	219	1490	534	439	165	124	122	98
16	165	530	361	686	222	1430	488	387	158	136	127	94
17	160	473	394	652	225	1260	435	361	152	146	253	112
18	160	423	501	576	229	1050	400	354	148	140	413	115
19	168	395	624	520	243	851	390	334	143	129	476	113
20	178	367	693	530	278	690	393	310	138	127	459	113
21	185	342	710	621	314	598	411	286	131	140	384	117
22	185	330	690	714	323	544	470	269	126	143	295	128
23	180	318	632	750	324	490	500	262	121	157	231	134
24	177	305	576	743	345	441	478	319	119	168	194	129
25	173	292	532	699	348	400	437	386	121	161	166	124
26	171	281	490	620	329	369	414	425	124	147	147	119
27	167	287	452	555	319	350	486	419	136	138	141	114
28	164	383	417	504	328	356	630	388	155	148	135	112
29	161	511	396	442	---	372	712	362	168	151	131	111
30	162	579	366	381	---	389	702	350	183	137	129	106
31	167	---	341	366	---	391	---	327	---	123	130	---
TOTAL	6049	20737	14851	14122	7761	18746	13441	12529	5416	4726	6428	3374
MEAN	195	691	479	456	277	605	448	404	181	152	207	112
MAX	318	1540	710	750	358	1490	712	630	300	219	476	134
MIN	160	281	341	236	210	283	315	262	119	123	112	94
CFSM	.51	1.80	1.24	1.18	.72	1.57	1.16	1.05	.47	.40	.54	.29
IN.	.58	2.00	1.43	1.36	.75	1.81	1.30	1.21	.52	.46	.62	.33

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1995, BY WATER YEAR (WY)

	MEAN	207	269	332	353	391	699	652	396	269	163	131	148
MAX	1072	939	895	1049	959	1506	1914	1391	1011	410	385	357	
(WY)	1987	1991	1991	1973	1976	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	1954	1964	1963	1964	1946	1958	1964	1964	1946	1963	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1945 - 1995

ANNUAL TOTAL	142736						128180					
ANNUAL MEAN	391						351					
HIGHEST ANNUAL MEAN										334		1993
LOWEST ANNUAL MEAN										534		1964
HIGHEST DAILY MEAN										99.2		
LOWEST DAILY MEAN												
ANNUAL SEVEN-DAY MINIMUM	2130				Feb 23		1540		Nov 8	6590		Apr 7 1947
INSTANTANEOUS PEAK FLOW	111				Sep 24		94		Sep 16	35		Jul 31 1964
INSTANTANEOUS PEAK STAGE	117				Sep 19		101		Sep 10	36		Aug 7 1964
ANNUAL RUNOFF (CFSM)							1550		Nov 8	6810		Apr 7 1947
ANNUAL RUNOFF (INCHES)							5.89		Nov 8	(a)10.20		Apr 7 1947
10 PERCENT EXCEEDS							93		Sep 16	33		Aug 10 1964
50 PERCENT EXCEEDS							.91			.87		
90 PERCENT EXCEEDS							12.39			11.78		
	733						622			695		
	289						300			200		
	153						125			90		

(a) From graph based on gage readings.

(a) 1976, 1991.
(b) Sept. 11, 16.
(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04119000 GRAND RIVER AT GRAND RAPIDS, MI

LOCATION.--Lat 42°57'52", long 85°40'35", in NE1/4 sec.25, T.7 N., R.12 W., Kent County, Hydrologic Unit 04050006, on right bank 500 ft upstream from bridge on Fulton Street in Grand Rapids, 1.7 mi upstream from Plaster Creek, and at mile 41.

DRAINAGE AREA.--4,900 mi², approximately.

PERIOD OF RECORD.--March 1901 to December 1905, January 1906 to August 1918 (gage heights only), October 1930 to current year. Monthly discharge only for some periods, published in WSP 1307. Gage-height records collected in this vicinity since 1907 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 924: 1938(M). WSP 1387: 1901-5, 1940.

GAGE.--Water-stage recorder. Datum of gage is 585.70 ft above sea level (levels by City of Grand Rapids). March 1901 to August 1918, nonrecording gage at Fulton Street Bridge and Oct. 1, 1930 to Oct. 26, 1953, water-stage recorder at sewage pumping station 1 mi downstream at datum 2.99 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are fair. Moderate diurnal fluctuation at low and medium flow caused by powerplants upstream from station. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3500	3540	6590	4990	5520	4080	5820	8270	3990	3020	2070	1770
2	4130	5360	6550	4810	5380	3930	5580	7730	3900	2940	1960	1740
3	4610	7480	6210	4650	5320	3840	5350	7050	4380	2840	2000	1690
4	4410	8080	5810	4090	5100	3830	5150	6630	4510	2930	2140	1520
5	4290	8560	5650	2570	4300	3750	5000	6590	4360	3080	2460	1580
6	3950	10600	5650	2780	3460	3790	4820	6350	4210	3220	3450	1540
7	4010	11800	5760	3340	3280	3940	5000	6070	3970	3260	4220	1480
8	3500	12500	5640	3870	3300	4150	4760	5650	3740	2710	3430	1430
9	3500	13000	5580	4260	e3400	4610	4630	5380	3530	2680	2950	1410
10	3180	12900	5660	4380	e3350	5470	4310	5430	3190	2580	2620	1240
11	3220	12300	5730	4280	e3400	5930	4600	6800	3250	2410	2490	1330
12	3290	11400	5720	4230	e3200	7160	5050	7180	3160	2430	2390	1510
13	3210	10400	5440	4980	e2800	9020	5460	6590	3100	2170	2160	1430
14	3210	9350	5130	6980	e2750	10500	5710	6170	2950	1950	2000	1350
15	3010	8310	5050	8490	e2700	11600	5890	5790	2830	2010	1960	1360
16	2960	7570	5080	8370	e2750	12300	5760	5220	2790	2020	2050	1410
17	2910	6840	5100	8020	e2800	12600	5430	5570	2720	2170	3400	1560
18	2800	6330	5630	7360	e2900	12200	5200	5710	2650	2300	3720	1560
19	2930	5880	6830	7110	e3000	11600	5290	5310	2500	2260	4190	1580
20	2960	5510	7380	7150	e3300	10800	5310	4790	2490	2070	5080	1510
21	3070	5210	7420	7400	e3800	10100	5710	4420	2360	2050	4950	1540
22	3030	4990	7300	7810	e4000	9380	5910	4190	2290	2090	4420	1640
23	3080	4920	7100	8170	4380	8820	6080	4040	2200	2150	4240	1690
24	3020	4640	6860	8270	4310	8190	5960	4060	2140	2240	3680	1770
25	2960	4450	6590	8190	4210	7530	5690	4190	2070	2290	3030	1810
26	2930	4270	6320	7930	4050	7000	5690	4540	2300	2290	2660	1720
27	2940	4280	6060	7510	4130	6380	7790	4330	2390	2040	2400	1610
28	2860	5390	5830	6990	4100	6110	9360	4420	2560	2480	2240	1550
29	2890	6400	5540	6650	---	6140	9430	4440	2970	2380	2140	1610
30	2850	6650	5300	6140	---	6160	9100	4260	3210	2210	1970	1630
31	2890	---	5110	5780	---	6010	---	4140	---	2240	1930	---
TOTAL	102100	228910	185620	187450	104990	226920	174840	171310	92710	75490	90400	46570
MEAN	3294	7630	5988	6047	3760	7320	5828	5526	3090	2435	2916	1552
MAX	4610	13000	7420	8490	5520	12600	9430	8270	4510	3280	5080	1810
MIN	2800	3540	5050	2570	2700	3750	4310	4040	2070	1950	1930	1240
CFSM	.67	1.56	1.22	1.23	.77	1.49	1.19	1.13	.63	.50	.60	.32
IN.	.78	1.74	1.41	1.42	.80	1.72	1.33	1.30	.70	.57	.69	.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1901 - 1995, BY WATER YEAR (WY)

	MEAN	2444	2935	3411	3701	4243	7695	7088	4663	3319	2186	1731	1984
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 1994 CALENDAR YEAR FOR 1995 WATER YEAR WATER YEARS 1901 - 1995

ANNUAL TOTAL	2052250	1687310	
ANNUAL MEAN	5623	4623	
HIGHEST ANNUAL MEAN			3779
LOWEST ANNUAL MEAN			6314
HIGHEST DAILY MEAN	14200	Feb 24	1264
LOWEST DAILY MEAN	2170	Sep 23	381
ANNUAL SEVEN-DAY MINIMUM	2240	Sep 21	438
INSTANTANEOUS PEAK FLOW			54000
INSTANTANEOUS PEAK STAGE			(b)22.49
INSTANTANEOUS LOW FLOW			1200
ANNUAL RUNOFF (CFSM)	1.15		.94
ANNUAL RUNOFF (INCHES)	15.58		12.81
10 PERCENT EXCEEDS	9970		7800
50 PERCENT EXCEEDS	5050		4220
90 PERCENT EXCEEDS	2500		2000
			1180

(a) Aug. 9, 17, 1936.

(b) Present datum; from graph based on gage readings.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04120250 GRAND RIVER AT GRAND HAVEN, MI

LOCATION.--Lat 43°03'37", long 86°14'25", in SE1/4 SW1/4 sec.20, T.8 N., R.16 W., Ottawa County, Hydrologic Unit 04050006, on left bank at U.S. Coast Guard Station in Grand Haven, 0.55 mi upstream from mouth.

DRAINAGE AREA.--5,518 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1994 to October 1995 (discontinued).

GAGE.--Acoustical velocity meter system. Single-path transducer installation. Datum of gage is 578.00 ft, International Great Lakes datum.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 15,700 ft³/s, Nov. 10, 1994; minimum daily, 1,500 ft³/s, Sept. 10, 14, 15, Oct. 17, 1995.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4630	5260	e7050	e5800	e6000	e4400	6540	e9100	5520	e3500	e2300	1830
2	5010	e6500	e7300	e5400	e5800	e4300	6600	e8200	6020	e3200	e2200	2100
3	4410	e8500	7220	e5200	e5700	e4200	5250	e7500	5730	e3100	e2150	1520
4	5350	e9500	7240	e4000	e5400	e4200	7430	7060	5590	e3200	2150	2050
5	4400	e10000	6380	e3000	e4500	e4100	6370	7490	6090	e3300	2380	1880
6	4240	e11500	7290	e3200	e3800	e4200	4630	6770	5850	3050	3260	1810
7	3940	e14000	7050	e3800	e3600	e4400	6190	6890	5000	3670	4200	1610
8	4260	14800	7070	e4400	e3700	e4700	5020	6130	e4500	2580	3900	e1600
9	4890	15300	7090	e4700	e3800	e5200	6100	6060	e4100	2930	3240	e1550
10	3770	15700	6830	e4800	e3700	e6000	4810	5770	e3800	2900	2790	e1500
11	2630	15200	e6600	e4700	e3600	e7000	4200	7220	e3600	2910	3050	e1600
12	3000	15000	6450	e5000	e3400	e8000	6730	6850	e3500	e2600	2790	e1750
13	3030	13200	e6300	e6000	e3100	e10000	6480	7220	e3400	e2400	1660	e1600
14	3350	12600	e6100	e8000	e3000	e11000	7110	6670	e3300	e2200	2540	e1500
15	3640	11400	5820	e9400	e3000	e12000	6520	6990	e3200	e2200	2760	e1500
16	2960	9350	6300	e9200	e3000	12700	7230	5660	e3100	e2300	2940	1630
17	3060	9070	e5500	e8500	e3100	13800	6000	6530	e3000	e2400	4110	e1700
18	2980	7310	e6100	e8000	e3200	13800	4960	6310	e2900	e2500	4700	e1750
19	2840	8050	e7500	e7800	e3400	12700	7080	5450	e2850	e2400	3960	e1750
20	3170	5930	e8100	e8000	e3700	12500	5880	e5200	e2800	e2300	4500	e1700
21	e3200	4850	e8200	e8200	e4100	e11500	6420	5110	e2700	e2300	e5600	e1750
22	e3250	e4800	e8100	e8700	e4500	e10700	7870	4710	e2650	e2350	e5400	e1800
23	3310	e4700	e8000	e9000	e4700	10300	7120	3760	e2600	e2400	e5000	e1900
24	2990	4600	e7700	e9000	e4600	10200	5940	5000	e2550	e2450	e4600	e2000
25	2850	6190	e7400	e8800	e4500	8640	7100	4630	e2500	2440	e4100	e2000
26	2680	4940	e7100	e8500	e4400	8140	5750	4940	e2800	e2450	3460	e1900
27	2750	e5000	e6800	e8000	e4400	7230	8340	4550	e3200	e2300	e2900	e1800
28	2900	e5800	e6500	e7500	e4400	7700	e10000	4130	3650	e2600	e2600	e1750
29	e3100	e6700	e6300	e7000	---	6980	e10200	e4600	3860	e2600	e2300	e1800
30	e3100	e7100	6130	e6500	---	7670	e9500	4140	4000	e2500	e2100	e1800
31	e3150	---	e6000	e6200	---	6900	---	3860	---	e2450	e2000	---
TOTAL	108840	272850	213520	206300	114100	255160	199370	184500	114360	82480	101640	52430
MEAN	3511	9095	6888	6655	4075	8231	6646	5952	3812	2661	3279	1748
MAX	5350	15700	8200	9400	6000	13800	10200	9100	6090	3670	5600	2100
MIN	2630	4600	5500	3000	3000	4100	4200	3760	2500	2200	1660	1500
CFSM	.64	1.65	1.25	1.21	.74	1.49	1.20	1.08	.69	.48	.59	.32
IN.	.73	1.84	1.44	1.39	.77	1.72	1.34	1.24	.77	.56	.69	.35

WTR YR 1995 TOTAL 1905550 MEAN 5221 MAX 15700 MIN 1500 CFSM .95 IN. 12.85

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04120250 GRAND RIVER AT GRAND HAVEN, MI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1700	---	---	---	---	---	---	---	---	---	---	---
2	1540	---	---	---	---	---	---	---	---	---	---	---
3	e1700	---	---	---	---	---	---	---	---	---	---	---
4	1850	---	---	---	---	---	---	---	---	---	---	---
5	e1800	---	---	---	---	---	---	---	---	---	---	---
6	e1900	---	---	---	---	---	---	---	---	---	---	---
7	e1900	---	---	---	---	---	---	---	---	---	---	---
8	e1850	---	---	---	---	---	---	---	---	---	---	---
9	e2000	---	---	---	---	---	---	---	---	---	---	---
10	e1900	---	---	---	---	---	---	---	---	---	---	---
11	e2200	---	---	---	---	---	---	---	---	---	---	---
12	e2000	---	---	---	---	---	---	---	---	---	---	---
13	e2400	---	---	---	---	---	---	---	---	---	---	---
14	1870	---	---	---	---	---	---	---	---	---	---	---
15	e1900	---	---	---	---	---	---	---	---	---	---	---
16	e1600	---	---	---	---	---	---	---	---	---	---	---
17	e1500	---	---	---	---	---	---	---	---	---	---	---
18	e1700	---	---	---	---	---	---	---	---	---	---	---
19	e1900	---	---	---	---	---	---	---	---	---	---	---
20	e2200	---	---	---	---	---	---	---	---	---	---	---
21	e2600	---	---	---	---	---	---	---	---	---	---	---
22	e2900	---	---	---	---	---	---	---	---	---	---	---
23	e2700	---	---	---	---	---	---	---	---	---	---	---
24	e2600	---	---	---	---	---	---	---	---	---	---	---
25	e2550	---	---	---	---	---	---	---	---	---	---	---
26	e2500	---	---	---	---	---	---	---	---	---	---	---
27	e2500	---	---	---	---	---	---	---	---	---	---	---
28	e2700	---	---	---	---	---	---	---	---	---	---	---
29	e2800	---	---	---	---	---	---	---	---	---	---	---
30	e2900	---	---	---	---	---	---	---	---	---	---	---
31	e2800	---	---	---	---	---	---	---	---	---	---	---
TOTAL	66960	---	---	---	---	---	---	---	---	---	---	---
MEAN	2160	---	---	---	---	---	---	---	---	---	---	---
MAX	2900	---	---	---	---	---	---	---	---	---	---	---
MIN	1500	---	---	---	---	---	---	---	---	---	---	---
CFSM	.39	---	---	---	---	---	---	---	---	---	---	---
IN.	.45	---	---	---	---	---	---	---	---	---	---	---

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04120250 GRAND RIVER AT GRAND HAVEN, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1994 to October 1995 (discontinued).

REMARKS.--Cross-sectional samples were collected in the vicinity of the gage. Unpublished records of selected herbicides, metals and organics will be available upon release by cooperating agencies.

COOPERATION.--All published data were collected by the U.S. Geological Survey and the Michigan Department of Natural Resources and analyzed by the Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
APR 1994												
11...	1330	595	8.6	9.5	13.0	117	280	75	22	20	2.5	44
20...	1100	584	8.4	11.5	11.4	104	280	74	22	20	2.8	40
20...	1505	582	7.3	11.5	11.8	109	280	74	22	20	2.8	39
22...	1030	564	8.4	11.5	11.4	104	280	74	22	20	2.8	38
28...	1115	593	8.6	15.0	9.2	93	280	74	22	3.0	2.6	40
MAY												
03...	1220	524	8.2	11.5	9.5	89	250	67	20	15	3.2	31
09...	1140	570	8.2	14.0	8.8	87	270	75	21	17	2.9	36
12...	0935	579	8.3	14.0	8.7	86	280	76	22	18	2.7	38
18...	1110	590	8.2	16.0	10.4	107	280	76	22	19	2.3	37
JUN												
08...	1010	451	8.6	18.0	7.7	82	220	57	20	21	2.4	42
17...	0930	461	7.7	21.5	8.0	93	220	55	19	19	2.2	40
30...	1020	441	7.7	20.5	5.8	66	210	57	16	11	4.4	30
JUL												
02...	0830	456	7.7	21.0	7.3	84	220	61	16	11	4.2	31
05...	1120	500	7.8	23.0	8.3	99	230	65	17	13	3.9	34
11...	1500	459	7.8	22.5	7.8	92	210	58	16	12	3.8	28
18...	1050	492	7.9	23.5	8.1	97	240	65	18	15	3.7	31
AUG												
10...	1020	472	8.2	16.5	7.7	80	400	60	60	16	2.8	29
SEP												
01...	0945	540	8.3	20.0	8.6	95	260	70	20	19	3.1	32
20...	1000	625	8.2	21.5	10.4	119	270	67	24	30	2.9	47
20...	1145	638	8.3	21.5	10.2	118	270	67	24	30	3.0	47
OCT												
05...	0930	599	8.1	14.0	8.9	88	270	70	22	23	1.8	44
24...	1045	669	8.2	13.0	8.8	86	300	81	24	25	3.3	47
NOV												
05...	1050	552	7.9	9.5	10.2	92	250	66	21	18	4.5	37
07...	1015	439	7.8	10.0	10.4	93	200	54	16	12	4.8	28
09...	0940	450	7.7	10.0	8.3	75	200	54	16	11	5.1	27
12...	0930	502	7.9	8.0	9.1	78	240	63	19	11	4.7	31
16...	0900	537	8.0	8.5	9.6	83	260	70	20	14	4.1	37
DEC												
12...	1020	--	--	--	--	--	290	77	23	22	3.0	43
JAN 1995												
25...	1000	488	8.1	1.5	11.9	86	270	73	21	22	2.7	37
FEB												
21...	1030	661	8.1	0.5	13.9	98	310	84	24	27	2.7	48
MAR												
15...	1030	469	7.5	5.5	10.4	85	220	59	17	18	3.3	28
17...	1030	446	7.4	6.5	10.1	84	210	57	16	14	3.2	25
20...	1040	469	7.9	8.0	9.9	87	220	61	17	15	3.0	28
24...	0915	510	8.3	7.0	10.5	88	240	65	18	15	2.7	33
29...	1000	559	8.1	6.5	10.4	86	260	68	21	19	2.4	38
APR												
10...	1030	600	8.4	6.5	11.1	92	280	74	23	20	2.4	44
19...	1030	780	7.9	10.5	10.2	94	290	78	23	22	2.8	42
24...	1030	584	8.2	10.5	9.8	90	280	75	22	20	2.7	39
28...	0845	477	8.2	9.5	9.0	80	220	59	17	16	3.0	29
MAY												
01...	1045	514	8.0	11.0	9.0	83	240	66	19	16	2.8	30
04...	0845	570	8.2	12.5	9.2	88	270	73	21	18	2.7	36
09...	1100	589	8.4	12.5	8.6	83	280	76	22	19	2.6	37
15...	1045	561	8.2	15.5	8.4	85	--	--	--	--	--	--
JUN												
02...	0900	520	8.3	17.5	10.3	111	--	--	--	--	--	--
20...	1045	502	8.2	22.5	10.3	123	--	--	--	--	--	--
AUG												
16...	1030	459	7.6	27.5	7.2	94	--	--	--	--	--	--
SEP												
19...	1030	648	8.3	18.5	9.3	102	--	--	--	--	--	--
19...	1200	642	8.2	18.0	9.1	99	--	--	--	--	--	--
OCT												
19...	0900	681	8.3	12.5	9.0	87	--	--	--	--	--	--
31...	0900	635	8.1	9.0	9.5	84	--	--	--	--	--	--

STREAMS TRIBUTARY TO LAKE MICHIGAN

04120250 GRAND RIVER AT GRAND HAVEN, MI--Continued

WATER-QUALITY DATA

DATE	TIME	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLORO- PHYLLA TRICHR. UNCORR. TOTAL (UG/L) (32210)
APR 1994											
11...	1330	37	2.1	36	7	1.12	0.108	1.2	0.080	0.002	53.1
20...	1100	37	3.4	22	8	1.21	0.109	1.2	0.090	<0.002	49.1
20...	1505	37	3.4	19	6	1.20	0.107	0.80	0.020	0.002	48.7
22...	1030	37	3.1	22	8	1.10	0.076	1.2	0.100	0.006	53.6
28...	1115	36	1.6	36	16	0.545	0.111	1.3	0.120	<0.002	74.7
MAY											
03...	1220	31	4.6	35	10	1.23	0.144	1.2	0.100	0.021	27.1
09...	1140	34	3.8	25	10	1.76	0.175	1.1	0.090	0.012	28.0
12...	0935	35	3.2	38	8	0.988	0.212	1.2	0.110	0.010	41.0
18...	1110	37	2.9	24	10	0.970	0.068	1.1	0.090	0.004	44.7
JUN											
08...	1010	39	0.30	36	13	0.324	0.045	1.0	0.110	0.002	65.5
17...	0930	36	0.40	20	10	0.283	0.045	1.0	0.090	0.003	65.6
30...	1020	27	8.1	54	13	5.30	0.151	1.6	0.160	0.048	22.2
JUL											
02...	0830	27	8.3	52	12	5.04	0.158	1.3	0.160	0.044	27.1
05...	1120	30	8.5	34	10	4.26	0.077	1.1	0.130	0.033	29.3
11...	1500	26	8.5	43	14	1.92	0.090	1.3	0.160	0.064	17.2
18...	1050	30	8.7	25	11	1.23	0.028	1.0	0.120	0.051	30.6
AUG											
10...	1020	30	5.8	28	8	0.797	0.024	1.1	0.113	0.016	37.0
SEP											
01...	0945	36	7.5	25	9	0.757	0.043	1.2	0.109	0.016	37.7
20...	1000	53	4.6	33	16	0.482	0.027	1.2	0.100	<0.002	73.4
20...	1145	53	4.6	29	14	0.513	0.047	1.2	0.096	<0.002	71.4
OCT											
05...	0930	42	7.0	26	8	1.11	0.190	0.97	0.094	0.013	30.6
24...	1045	47	8.4	22	8	1.07	0.246	1.1	0.087	0.010	37.7
NOV											
05...	1050	34	8.0	36	9	1.68	0.160	1.1	0.160	0.064	13.1
07...	1015	26	7.2	79	16	1.40	0.133	1.3	0.230	0.081	13.9
09...	0940	24	7.9	55	10	1.44	0.237	1.3	0.210	0.072	10.2
12...	0930	27	8.8	29	9	1.47	0.124	1.1	0.133	0.064	5.22
16...	0900	31	9.3	20	8	1.45	0.146	1.0	0.110	0.048	5.95
DEC											
12...	1020	41	8.6	6	4	1.68	0.280	1.0	0.070	0.033	2.52
JAN 1995											
25...	1000	44	7.2	14	7	1.77	0.219	1.0	0.074	0.024	3.87
FEB											
21...	1030	49	7.3	4	4	1.59	0.322	1.0	0.040	0.011	1.52
MAR											
15...	1030	35	5.5	26	8	1.58	0.322	1.4	0.120	0.041	12.7
17...	1030	28	5.5	26	8	1.64	0.235	1.4	0.120	0.034	12.9
20...	1040	30	5.2	27	8	1.50	0.125	1.1	0.090	0.021	15.6
24...	0915	30	5.1	18	6	1.28	0.195	0.90	0.070	0.016	13.2
29...	1000	36	4.5	11	5	1.25	0.266	1.1	0.060	0.012	16.8
APR											
10...	1030	39	3.4	28	8	1.02	0.143	1.2	0.090	0.003	33.7
19...	1030	40	3.5	28	9	1.04	0.220	1.2	0.075	0.003	30.5
24...	1030	36	3.8	22	8	1.01	0.173	1.2	0.077	0.006	22.7
28...	0845	30	3.4	56	12	0.875	0.179	1.2	0.164	0.041	15.5
MAY											
01...	1045	30	4.2	26	9	1.18	0.111	1.0	0.101	0.017	19.4
04...	0845	35	4.0	21	8	1.11	0.130	1.0	0.081	0.008	27.7
09...	1100	34	3.0	26	10	0.956	0.069	1.2	0.085	<0.002	52.0
15...	1045	32	3.9	30	--	1.10	0.102	1.1	0.101	0.010	38.8
JUN											
02...	0900	31	3.2	16	--	0.769	<0.027	0.77	0.061	0.008	36.4
20...	1045	36	1.1	20	--	0.303	<0.027	0.90	0.069	<0.002	50.5
AUG											
16...	1030	46	0.10	26	--	0.226	0.138	1.3	0.094	0.003	104
SEP											
19...	1030	58	4.7	28	--	0.536	0.066	1.3	0.124	0.002	92.3
19...	1200	54	4.6	26	--	0.539	0.111	1.2	0.118	0.002	89.0
OCT											
19...	0900	54	4.7	18	--	0.957	0.269	1.2	0.078	0.005	44.0
31...	0900	46	7.4	14	--	1.01	0.338	1.1	0.058	0.009	27.7

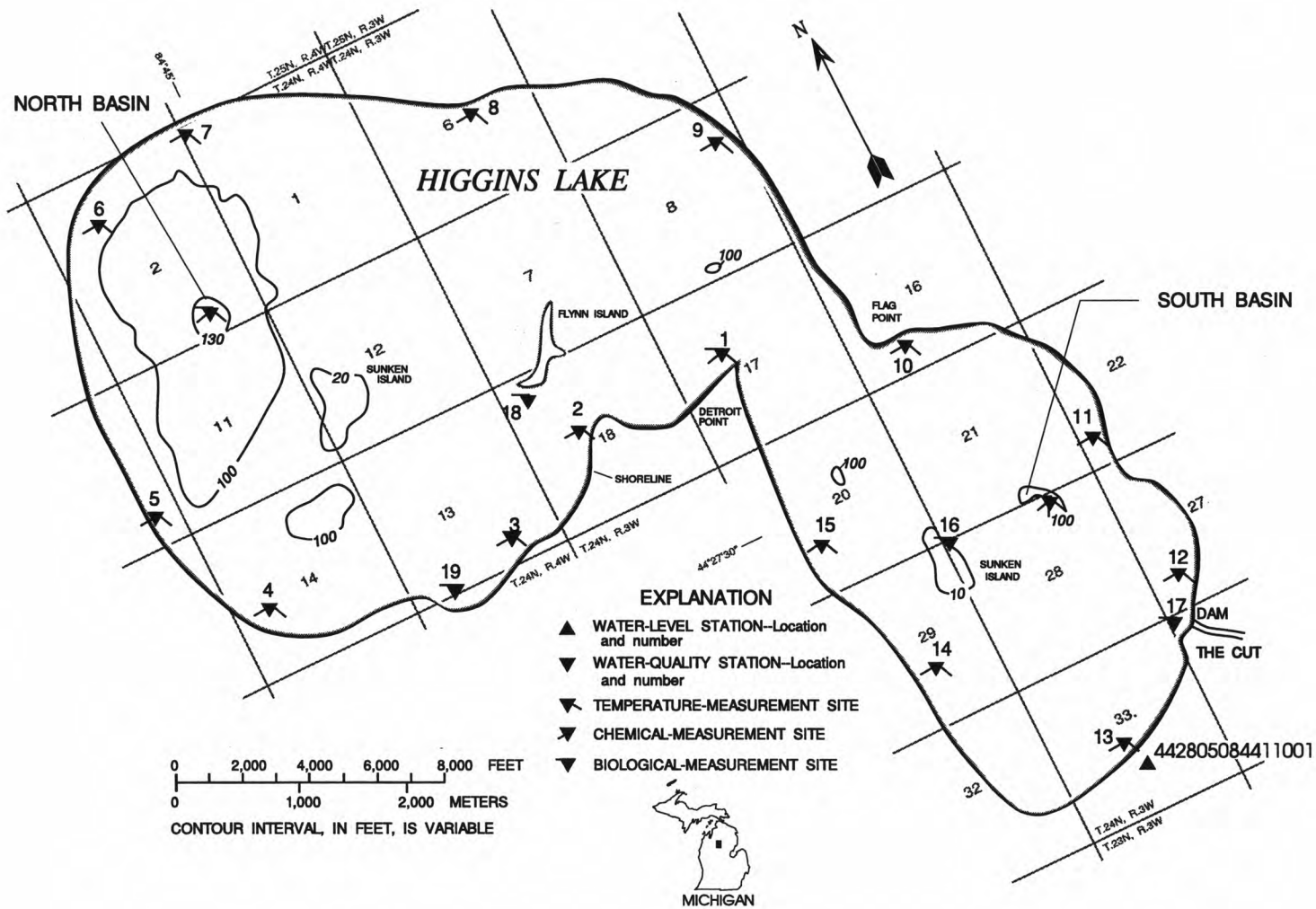


Figure 9.--Identification number and location of water-level station and surface-water-quality sampling sites in Higgins Lake.

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 mi², approximately.

WATER-LEVEL RECORDS

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

GAGE.--Nonrecording gage. Once daily reading by observer. 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.

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.

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 observed, 5.89 ft, Aug. 17; minimum observed, 4.89 ft, Jan. 12, 13.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.28	4.98	---	4.90	---	4.97	4.95	5.26	5.27	5.41	---	---
2	5.28	4.95	4.95	4.90	---	4.97	4.95	5.25	5.27	5.41	5.37	5.45
3	5.26	4.97	4.95	---	---	4.97	4.95	5.26	5.29	5.41	5.36	5.44
4	5.25	4.98	4.97	4.90	5.00	4.97	4.99	5.26	5.29	5.41	5.36	5.41
5	5.23	5.00	4.98	4.90	5.00	4.97	4.99	---	5.31	5.37	5.39	5.39
6	5.20	5.10	4.98	4.90	5.00	4.97	4.99	---	5.31	5.37	---	5.37
7	5.18	5.14	4.98	4.90	5.00	4.97	4.99	---	5.33	5.38	5.36	5.33
8	5.20	5.15	4.97	4.90	---	4.97	4.99	---	5.31	---	5.35	5.31
9	5.22	5.12	4.95	---	5.00	4.97	4.99	---	5.29	5.36	5.35	5.27
10	5.22	5.10	4.94	---	4.98	4.97	4.99	---	5.29	5.33	5.35	---
11	5.20	5.10	4.95	4.90	4.98	4.99	4.99	---	5.29	5.34	5.35	5.23
12	5.18	5.10	4.95	4.89	4.98	4.99	4.99	---	5.29	5.33	5.37	5.22
13	5.15	5.10	4.95	4.89	4.98	4.99	4.99	---	5.27	5.32	---	5.21
14	5.14	5.09	4.95	4.92	4.98	5.01	4.99	5.27	5.27	5.37	5.87	5.20
15	---	5.08	4.95	4.96	4.98	5.03	4.99	5.27	5.25	5.41	5.85	5.19
16	---	5.08	4.93	5.01	4.98	---	4.99	5.27	5.25	5.41	5.85	---
17	5.10	5.07	4.93	4.98	4.98	4.95	4.99	5.27	5.25	5.42	5.89	5.21
18	5.14	5.05	4.93	4.96	4.98	4.95	4.96	5.27	5.25	5.42	5.85	5.21
19	5.15	5.05	4.93	4.94	4.98	4.99	5.01	5.28	5.25	5.40	5.84	5.21
20	5.13	5.05	4.92	4.94	---	5.00	5.04	5.27	5.25	5.38	5.83	5.22
21	5.11	5.04	4.93	4.97	---	5.02	5.13	5.27	5.23	5.39	5.79	5.21
22	5.10	5.04	4.93	5.02	---	5.02	5.16	5.26	5.23	5.39	5.76	5.19
23	5.09	5.02	4.92	5.07	4.97	5.02	5.16	5.27	5.22	5.39	5.70	---
24	5.07	5.00	4.92	5.04	4.97	5.02	5.14	5.28	5.22	5.38	---	---
25	5.09	4.98	---	5.04	4.97	5.02	5.16	5.28	5.22	5.37	---	5.17
26	5.10	4.98	---	5.04	4.97	5.02	5.17	5.28	---	---	---	5.16
27	5.07	4.98	4.90	5.00	4.97	---	5.23	5.28	5.31	5.36	---	5.17
28	5.02	4.98	4.90	5.02	4.97	5.00	5.26	5.29	5.39	5.39	---	5.15
29	5.02	4.98	4.90	5.02	---	4.99	5.26	5.29	5.43	5.40	---	5.17
30	5.01	4.97	4.90	5.00	---	4.97	5.26	5.29	5.41	5.42	5.53	5.11
31	5.02	---	4.90	5.00	---	4.97	---	5.28	---	5.41	---	---
MEAN	---	5.04	---	---	---	---	5.05	---	---	---	---	---
MAX	---	5.15	---	---	---	---	5.26	---	---	---	---	---
MIN	---	4.95	---	---	---	---	4.95	---	---	---	---	---

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L) (00500)	BORON, DIS- SOLVED (UG/L AS B) (01020)
442813084422601		HIGGINS LAKE, SITE 1, NEAR ROSCOMMON, MI (LAT 44 28 13N LONG 084 42 26W)							
MAY 1995 03...	1915	236	8.1	9.5	0.20	12.1	7.5	153	10
442818084433301		HIGGINS LAKE, SITE 2, NEAR ROSCOMMON, MI (LAT 44 28 18N LONG 084 43 33W)							
MAY 1995 03...	1854	236	8.1	8.5	0.10	12.1	7.4	154	20
442748084444501		HIGGINS LAKE, SITE 3, NEAR ROSCOMMON, MI (LAT 44 27 48N LONG 084 44 45W)							
MAY 1995 03...	1845	245	8.1	9.5	0.20	11.6	7.7	148	10
442803084461201		HIGGINS LAKE, SITE 4, NEAR ROSCOMMON, MI (LAT 44 28 03N LONG 084 46 12W)							
MAY 1995 03...	1620	243	8.0	9.5	0.50	12.0	8.4	160	10
442903084464101		HIGGINS LAKE, SITE 5, NEAR ROSCOMMON, MI (LAT 44 29 03N LONG 084 46 41W)							
MAY 1995 03...	1605	236	8.1	9.0	0.60	11.8	7.3	150	10
443011084462001		HIGGINS LAKE, SITE 6, NEAR ROSCOMMON, MI (LAT 44 30 11N LONG 084 46 20W)							
MAY 1995 03...	1553	242	8.0	9.5	0.40	12.2	8.9	156	20
443043084450601		HIGGINS LAKE, SITE 7, NEAR ROSCOMMON, MI (LAT 44 30 43N LONG 084 45 06W)							
MAY 1995 03...	1045	242	8.0	6.5	0.20	11.4	7.6	156	<10
442927084414401		HIGGINS LAKE, SITE 8, NEAR ROSCOMMON, MI (LAT 44 29 27N LONG 084 41 44W)							
MAY 1995 03...	0955	234	8.1	7.5	0.30	11.8	6.9	150	<10
442903084413401		HIGGINS LAKE, SITE 9, NEAR ROSCOMMON, MI (LAT 44 29 03N LONG 084 41 34W)							
MAY 1995 03...	0902	234	8.1	7.0	0.30	11.8	6.9	148	<10
442803084411601		HIGGINS LAKE, SITE 10, NEAR ROSCOMMON, MI (LAT 44 28 03N LONG 084 41 16W)							
MAY 1995 02...	1400	240	8.3	5.5	0.20	12.0	7.0	150	<10

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L) (00500)	BORON, DIS- SOLVED (UG/L AS B) (01020)
442717084401501		HIGGINS LAKE, SITE 11, NEAR ROSCOMMON, MI (LAT 44 27 17N LONG 084 40 15W)							
MAY 1995 03...	1952	234	8.1	9.0	0.20	12.2	7.3	151	20
442617084400601		HIGGINS LAKE, SITE 12, NEAR ROSCOMMON, MI (LAT 44 26 17N LONG 084 40 06W)							
MAY 1995 03...	2005	235	8.1	10.0	0.40	12.1	7.2	146	<10
442533084411301		HIGGINS LAKE, SITE 13, NEAR ROSCOMMON, MI (LAT 44 25 33N LONG 084 41 13W)							
MAY 1995 02...	1100	241	8.2	7.0	0.10	11.2	7.2	148	<10
442603084421401		HIGGINS LAKE, SITE 14, NEAR ROSCOMMON, MI (LAT 44 26 03N LONG 084 42 14W)							
MAY 1995 02...	1119	242	8.3	5.5	0.20	12.3	7.3	154	<10
442710084423601		HIGGINS LAKE, SITE 15, NEAR ROSCOMMON, MI (LAT 44 27 10N LONG 084 42 36W)							
MAY 1995 02...	1155	240	8.2	6.0	0.40	11.1	7.3	148	<10
442813084422601		HIGGINS LAKE, SITE 1, NEAR ROSCOMMON, MI (LAT 44 28 13N LONG 084 42 26W)							
JUN 1995 21...	1300	253	8.0	21.5	0.30	--	7.4	136	20
442803084461201		HIGGINS LAKE, SITE 4, NEAR ROSCOMMON, MI (LAT 44 28 03N LONG 084 46 12W)							
JUN 1995 20...	1810	256	8.0	26.5	0.80	8.8	7.7	140	10
443043084450601		HIGGINS LAKE, SITE 7, NEAR ROSCOMMON, MI (LAT 44 30 43N LONG 084 45 06W)							
JUN 1995 20...	1745	255	7.9	22.5	0.70	9.5	7.6	140	20
442803084411601		HIGGINS LAKE, SITE 10, NEAR ROSCOMMON, MI (LAT 44 28 03N LONG 084 41 16W)							
JUN 1995 21...	1412	252	8.0	23.0	0.20	--	7.4	140	10
442533084411301		HIGGINS LAKE, SITE 13, NEAR ROSCOMMON, MI (LAT 44 25 33N LONG 084 41 13W)							
JUN 1995 21...	1650	254	7.9	27.5	0.50	--	7.3	140	20

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SOLIDS, RESIDUE AT 105 DEG. C, TOTAL (MG/L) (00500)	BORON, DIS- SOLVED (UG/L AS B) (01020)
442813084422601		HIGGINS LAKE, SITE 1, NEAR ROSCOMMON, MI (LAT 44 28 13N LONG 084 42 26W)							
JUL 1995 24...	1430	239	8.0	24.0	0.30	8.3	6.7	150	20
442803084461201		HIGGINS LAKE, SITE 4, NEAR ROSCOMMON, MI (LAT 44 28 03N LONG 084 46 12W)							
JUL 1995 26...	1440	225	8.3	23.0	0.30	8.1	6.1	142	<10
443043084450601		HIGGINS LAKE, SITE 7, NEAR ROSCOMMON, MI (LAT 44 30 43N LONG 084 45 06W)							
JUL 1995 26...	1345	226	8.3	23.0	0.30	8.1	6.4	134	<10
442803084411601		HIGGINS LAKE, SITE 10, NEAR ROSCOMMON, MI (LAT 44 28 03N LONG 084 41 16W)							
JUL 1995 24...	1530	240	8.0	23.5	0.20	8.4	7.1	148	10
442533084411301		HIGGINS LAKE, SITE 13, NEAR ROSCOMMON, MI (LAT 44 25 33N LONG 084 41 13W)							
JUL 1995 25...	0905	225	8.1	23.0	0.30	7.8	6.7	142	20
442813084422601		HIGGINS LAKE, SITE 1, NEAR ROSCOMMON, MI (LAT 44 28 13N LONG 084 42 26W)							
SEP 1995 13...	1015	235	8.3	19.5	0.20	8.3	6.9	130	30
442803084411601		HIGGINS LAKE, SITE 10, NEAR ROSCOMMON, MI (LAT 44 28 03N LONG 084 41 16W)							
SEP 1995 12...	1255	--	--	20.5	0.20	9.1	6.9	126	30
	13...	234	8.2	19.5	--	8.5	--	--	--
442533084411301		HIGGINS LAKE, SITE 13, NEAR ROSCOMMON, MI (LAT 44 25 33N LONG 084 41 13W)							
SEP 1995 12...	1445	--	--	21.0	0.20	8.5	6.6	132	20
442803084461201		HIGGINS LAKE, SITE 4, NEAR ROSCOMMON, MI (LAT 44 28 03N LONG 084 46 12W)							
OCT 1995 12...	1400	220	8.2	14.0	0.20	9.6	6.7	130	30
443043084450601		HIGGINS LAKE, SITE 7, NEAR ROSCOMMON, MI (LAT 44 30 43N LONG 084 45 06W)							
OCT 1995 12...	1330	222	8.2	15.0	0.20	9.8	7.0	136	20

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

DATE	TIME	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
442955084453001 HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI (LAT 44 29 55N LONG 084 45 30W)									
MAY 1995									
03...	1335	7.4	0.002	<0.005	0.005	<0.20	0.003	0.002	<0.001
JUN 20...	1505	7.2	<0.001	<0.005	<0.002	0.20	0.002	0.001	<0.001
442955084453002 HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI (LAT 44 29 55N LONG 084 45 30W)									
JUN 1995									
20...	1435	7.5	<0.001	<0.005	<0.002	<0.20	0.003	0.001	<0.001
442955084453001 HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI (LAT 44 29 55N LONG 084 45 30W)									
JUL 1995									
26...	1145	6.8	<0.001	<0.005	<0.002	<0.20	0.001	<0.001	<0.001
442955084453002 HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI (LAT 44 29 55N LONG 084 45 30W)									
JUL 1995									
26...	1120	7.0	<0.001	<0.005	<0.002	<0.20	0.004	0.002	<0.001
442955084453001 HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI (LAT 44 29 55N LONG 084 45 30W)									
OCT 1995									
31...	1230	7.6	0.003	0.008	<0.002	<0.20	0.019	0.003	0.001
DATE	TIME	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
442658084404401 HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI (LAT 44 26 58N LONG 084 40 44W)									
MAY 1995									
02...	1845	7.1	0.004	<0.005	0.003	<0.20	0.003	0.001	<0.001
JUN 21...	1040	7.4	<0.001	<0.005	<0.002	<0.20	0.009	0.002	<0.001
442658084404402 HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI (LAT 44 26 58N LONG 084 40 44W)									
JUN 1995									
21...	1015	7.7	<0.001	<0.005	<0.002	<0.20	0.003	0.001	<0.001
442658084404401 HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI (LAT 44 26 58N LONG 084 40 44W)									
JUL 1995									
25...	1240	7.0	<0.001	<0.005	<0.002	<0.20	0.003	0.001	0.001
442658084404402 HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI (LAT 44 26 58N LONG 084 40 44W)									
JUL 1995									
25...	1220	6.8	<0.001	<0.005	<0.002	<0.20	0.006	0.002	<0.001
442658084404401 HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI (LAT 44 26 58N LONG 084 40 44W)									
OCT 1995									
30...	1640	7.3	0.003	<0.005	<0.002	<0.20	0.003	0.003	<0.001

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

STATION NUMBER	STATION NAME	DATE	TIME	PERI- PHYTON BIOMASS ASH WEIGHT G/SQ M (00572)	PERI- PHYTON BIOMASS TOTAL DRY WEIGHT G/SQ M (00573)	CHLOR-A PERI- PHYTON CHROMO- GRAPHIC FLUOROM (MG/M2) (70957)
442813084422601	HIGGINS LAKE, SITE 1, NEAR ROSCOMMON, MI	07-24-95	1430	3213	3230	3.4
442700084414701	HIGGINS LAKE, SITE 16, NEAR ROSCOMMON, MI	07-24-95	1605	1422	1509	51.0
442604084402601	HIGGINS LAKE, SITE 17, NEAR ROSCOMMON, MI	07-25-95	1410	804.7	895.6	19.0
442840084435401	HIGGINS LAKE, SITE 18, NEAR ROSCOMMON, MI	07-26-95	1520	560.5	581.8	11.0
442756084451201	HIGGINS LAKE, SITE 19, NEAR ROSCOMMON, MI	07-26-95	1405	1135	1229	48.0

STATION NUMBER	STATION NAME	DATE	TIME	PERI- PHYTON BIOMASS ASH WEIGHT G/SQ M (00572)	PERI- PHYTON BIOMASS TOTAL DRY WEIGHT G/SQ M (00573)	CHLOR-A PERI- PHYTON CHROMO- GRAPHIC FLUOROM (MG/M2) (70957)
442813084422601	HIGGINS LAKE, SITE 1, NEAR ROSCOMMON, MI	08-27-95	1420	666.3	683.0	13.0
442840084435401	HIGGINS LAKE, SITE 18, NEAR ROSCOMMON, MI	08-27-95	1350	880.2	922.6	25.0
442756084451201	HIGGINS LAKE, SITE 19, NEAR ROSCOMMON, MI	08-27-95	1440	712.9	738.5	13.0

STATION NUMBER	STATION NAME	DATE	TIME	PERI- PHYTON BIOMASS ASH WEIGHT G/SQ M (00572)	PERI- PHYTON BIOMASS TOTAL DRY WEIGHT G/SQ M (00573)	CHLOR-A PERI- PHYTON CHROMO- GRAPHIC FLUOROM (MG/M2) (70957)
442813084422601	HIGGINS LAKE, SITE 1, NEAR ROSCOMMON, MI	09-13-95	1015	803.5	829.8	24.0
442700084414701	HIGGINS LAKE, SITE 16, NEAR ROSCOMMON, MI	09-12-95	1335	1093	1180	28.0
442604084402601	HIGGINS LAKE, SITE 17, NEAR ROSCOMMON, MI	09-13-95	0940	1580	1671	32.0
442840084435401	HIGGINS LAKE, SITE 18, NEAR ROSCOMMON, MI	09-13-95	1445	729.9	765.0	24.0
442756084451201	HIGGINS LAKE, SITE 19, NEAR ROSCOMMON, MI	09-13-95	1515	835.9	897.3	89.0

STATION NUMBER	STATION NAME	DATE	TIME	PERI- PHYTON BIOMASS ASH WEIGHT G/SQ M (00572)	PERI- PHYTON BIOMASS TOTAL DRY WEIGHT G/SQ M (00573)	CHLOR-A PERI- PHYTON CHROMO- GRAPHIC FLUOROM (MG/M2) (70957)
442700084414701	HIGGINS LAKE, SITE 16, NEAR ROSCOMMON, MI	10-12-95	0925	3175	3353	36.0
442604084402601	HIGGINS LAKE, SITE 17, NEAR ROSCOMMON, MI	10-12-95	1000	1609	1731	57.0

STATION NUMBER	STATION NAME	DATE	TIME	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)
442955084453001	HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI	05-03-95	1335	0.7
442955084453003	HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI	06-20-95	1450	0.2
	HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI	07-26-95	1135	0.3
442955084453001	HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI	10-31-95	1230	0.4

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

STATION NUMBER	STATION NAME	DATE	TIME	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)
442658084404401	HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI	05-02-95	1845	1.2
442658084404403	HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI	06-21-95	1030	0.2
	HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI	07-25-95	1230	0.3
442658084404401	HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI	10-30-95	1640	0.7

STATION NUMBER	STATION NAME	DATE	TIME	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
442955084453001	HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI	05-03-95	1740	6.7
	HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI	06-20-95	1240	9.0
	HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI	07-26-95	1020	7.5
	HIGGINS LAKE, NORTH BASIN, NEAR ROSCOMMON, MI	10-31-95	1140	5.7

STATION NUMBER	STATION NAME	DATE	TIME	TRANS- PAR- ENCY (SECCHI DISK) (M) (00078)
442658084404401	HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI	05-02-95	1748	5.8
	HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI	06-21-95	0930	8.9
	HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI	07-25-95	1152	6.0
	HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI	09-14-95	1115	6.1
	HIGGINS LAKE, SOUTH BASIN, NEAR ROSCOMMON, MI	10-30-95	1540	4.7

STATION NUMBER	DATE	TIME	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
442955084453001	05-03-95	1815	5.00	211	8.1	6.0	12.1
	05-03-95	1812	10.0	211	8.1	6.0	12.0
	05-03-95	1810	15.0	211	8.1	6.0	12.1
	05-03-95	1807	20.0	211	8.1	6.0	12.0
	05-03-95	1804	25.0	211	8.1	5.5	12.0
	05-03-95	1800	30.0	211	8.1	6.0	12.0
	05-03-95	1756	35.0	211	8.1	5.5	12.0
	05-03-95	1753	40.0	211	8.1	5.5	12.0
	05-03-95	1750	45.0	212	8.1	5.5	12.1
	05-03-95	1745	50.0	214	8.1	5.5	12.2
	05-03-95	1743	55.0	214	8.1	5.5	12.2
	05-03-95	1741	60.0	214	8.1	5.5	12.2
	05-03-95	1738	65.0	213	8.1	5.5	12.2
	05-03-95	1735	70.0	214	8.1	5.5	12.2
	05-03-95	1732	75.0	214	8.1	5.5	12.2
	05-03-95	1728	80.0	214	8.1	5.5	12.2
	05-03-95	1724	85.0	214	8.1	5.0	12.2
	05-03-95	1721	90.0	214	8.1	5.0	12.2
	05-03-95	1717	95.0	213	8.1	5.5	12.0
	05-03-95	1714	100.0	213	8.1	5.5	12.0
	05-03-95	1710	105.0	212	8.1	5.5	12.0
	05-03-95	1707	110.0	213	8.1	5.5	11.9
	05-03-95	1702	118.0	213	8.0	5.5	11.9

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

STATION NUMBER	DATE	TIME	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
442955084453001	06-20-95	1150	2.00	240	8.1	19.5	8.9
	06-20-95	1153	5.00	240	8.1	19.0	9.0
	06-20-95	1155	10.0	237	8.1	18.5	9.1
	06-20-95	1157	15.0	236	8.1	18.0	9.3
	06-20-95	1202	20.0	236	8.2	16.5	9.6
	06-20-95	1207	25.0	234	8.2	15.5	9.8
	06-20-95	1210	30.0	233	8.2	14.0	10.5
	06-20-95	1214	35.0	233	8.2	13.0	11.0
	06-20-95	1217	40.0	233	8.2	12.5	11.2
	06-20-95	1220	45.0	231	8.2	12.0	11.2
	06-20-95	1224	50.0	231	8.2	11.0	11.3
	06-20-95	1230	55.0	231	8.2	10.5	11.4
	06-20-95	1234	60.0	231	8.2	10.5	11.4
	06-20-95	1237	65.0	231	8.2	10.5	11.4
	06-20-95	1241	70.0	231	8.2	10.0	11.2
	06-20-95	1245	75.0	233	8.2	9.5	11.2
	06-20-95	1253	80.0	233	8.1	9.5	11.0
	06-20-95	1257	85.0	233	8.1	9.0	10.8
	06-20-95	1306	90.0	233	8.1	9.0	10.8
	06-20-95	1314	95.0	241	8.0	9.0	10.6
	06-20-95	1321	100.0	234	8.0	9.0	10.3
	06-20-95	1331	105.0	229	8.0	9.0	10.1
	06-20-95	1335	110.0	229	8.0	9.0	10.0
	06-20-95	1344	115.0	230	7.9	9.0	9.5
	06-20-95	1349	120.0	231	7.9	8.5	9.1
	06-20-95	1352	125.0	232	7.8	8.5	8.5
STATION NUMBER	DATE	TIME	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
442955084453001	07-26-95	0906	5.00	225	8.2	21.5	8.4
	07-26-95	0910	10.0	225	8.2	21.5	8.4
	07-26-95	0914	15.0	225	8.2	21.0	8.4
	07-26-95	0916	20.0	224	8.2	21.0	8.5
	07-26-95	0920	25.0	225	8.2	20.0	8.8
	07-26-95	0922	30.0	222	8.2	19.0	9.4
	07-26-95	0925	35.0	221	8.2	16.5	10.3
	07-26-95	0927	40.0	220	8.2	15.5	10.7
	07-26-95	0930	45.0	219	8.2	13.5	11.0
	07-26-95	0932	50.0	219	8.1	13.0	11.0
	07-26-95	0935	55.0	219	8.1	12.5	10.9
	07-26-95	0938	60.0	219	8.1	12.0	10.8
	07-26-95	0941	65.0	219	8.0	11.5	10.6
	07-26-95	0943	70.0	220	8.0	11.0	10.4
	07-26-95	0946	75.0	219	8.0	10.5	10.2
	07-26-95	0952	80.0	219	7.9	10.5	9.9
	07-26-95	0954	85.0	219	7.9	10.0	9.8
	07-26-95	0957	90.0	220	7.8	10.0	9.4
	07-26-95	1000	95.0	221	7.8	10.0	9.2
	07-26-95	1003	100.0	221	7.7	9.5	8.9
	07-26-95	1005	105.0	222	7.7	9.5	8.6
	07-26-95	1007	110.0	222	7.7	9.5	8.4
	07-26-95	1009	115.0	225	7.6	9.5	7.6
	07-26-95	1011	119.0	226	7.6	9.5	6.9

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

STATION NUMBER	DATE	TIME	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
442955084453001	10-31-95	1103	2.00	215	8.0	10.0	9.5
	10-31-95	1106	5.00	215	8.1	10.0	9.5
	10-31-95	1109	10.0	215	8.1	10.0	9.5
	10-31-95	1112	15.0	216	8.1	10.5	9.5
	10-31-95	1115	20.0	216	8.1	10.0	9.4
	10-31-95	1117	25.0	216	8.1	10.5	9.4
	10-31-95	1120	30.0	216	8.1	10.0	9.4
	10-31-95	1122	35.0	216	8.1	10.0	9.4
	10-31-95	1125	40.0	216	8.1	10.0	9.4
	10-31-95	1127	45.0	216	8.1	10.0	9.4
	10-31-95	1130	50.0	216	8.1	10.0	9.4
	10-31-95	1133	55.0	216	8.1	10.0	9.4
	10-31-95	1136	60.0	216	8.1	10.0	9.4
	10-31-95	1141	65.0	217	8.1	10.0	9.4
	10-31-95	1143	70.0	216	8.1	10.0	9.4
	10-31-95	1147	75.0	216	8.1	10.0	9.4
	10-31-95	1149	80.0	216	8.1	10.0	9.4
	10-31-95	1152	85.0	216	8.1	10.0	9.4
	10-31-95	1155	90.0	222	7.9	10.0	8.0
	10-31-95	1158	95.0	232	7.6	8.5	5.0
	10-31-95	1201	100.0	234	7.6	8.5	4.2
	10-31-95	1203	105.0	236	7.6	8.5	3.7
	10-31-95	1206	110.0	237	7.5	8.0	3.3
	10-31-95	1209	115.0	238	7.5	8.0	2.9

STATION NUMBER	DATE	TIME	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
442658084404401	05-02-95	1713	5.00	213	8.2	7.0	11.3
	05-02-95	1718	10.0	219	8.2	6.0	11.8
	05-02-95	1724	15.0	227	8.2	5.5	12.1
	05-02-95	1729	20.0	225	8.2	5.5	12.1
	05-02-95	1732	25.0	227	8.2	5.5	12.2
	05-02-95	1735	30.0	228	8.2	5.5	12.2
	05-02-95	1739	35.0	227	8.2	5.0	12.2
	05-02-95	1742	40.0	226	8.2	5.0	12.2
	05-02-95	1747	45.0	225	8.2	5.0	12.1
	05-02-95	1750	50.0	225	8.2	5.0	12.1
	05-02-95	1754	55.0	226	8.2	5.0	12.2
	05-02-95	1759	60.0	225	8.2	5.0	12.2
	05-02-95	1802	65.0	226	8.2	5.0	12.1
	05-02-95	1805	70.0	224	8.2	5.0	12.1
	05-02-95	1808	75.0	223	8.2	5.0	12.1
	05-02-95	1813	80.0	222	8.2	5.0	12.0
	05-02-95	1817	85.0	221	8.2	5.0	11.9

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

STATION NUMBER	DATE	TIME	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
442658084404401	06-21-95	0842	2.00	252	8.0	20.0	8.5
	06-21-95	0845	5.00	252	8.0	20.0	8.5
	06-21-95	0849	10.0	251	8.0	18.5	9.0
	06-21-95	0852	15.0	252	8.1	17.5	9.3
	06-21-95	0856	20.0	251	8.1	16.5	9.6
	06-21-95	0901	25.0	249	8.1	15.0	10.0
	06-21-95	0905	30.0	247	8.1	13.0	10.8
	06-21-95	0908	35.0	247	8.1	12.5	10.9
	06-21-95	0912	40.0	246	8.1	12.0	11.1
	06-21-95	0915	45.0	246	8.1	11.0	11.1
	06-21-95	0918	50.0	245	8.1	11.0	11.2
	06-21-95	0922	55.0	246	8.1	10.5	11.2
	06-21-95	0925	60.0	246	8.1	10.5	11.2
	06-21-95	0929	65.0	246	8.1	10.5	11.0
	06-21-95	0933	70.0	245	8.1	10.0	10.8
	06-21-95	0940	75.0	246	8.0	10.0	10.7
	06-21-95	0944	80.0	248	8.0	10.0	9.0
	06-21-95	0950	85.0	249	7.9	10.0	9.4
	06-21-95	0953	90.0	249	7.9	10.0	9.4
STATION NUMBER	DATE	TIME	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
442658084404401	07-25-95	1040	5.00	228	8.1	23.0	8.3
	07-25-95	1045	10.0	229	8.2	23.0	8.3
	07-25-95	1049	15.0	228	8.2	23.0	8.2
	07-25-95	1056	20.0	228	8.2	23.0	8.3
	07-25-95	1100	25.0	227	8.2	22.5	8.4
	07-25-95	1104	30.0	227	8.2	21.0	9.4
	07-25-95	1110	35.0	226	8.2	19.5	9.9
	07-25-95	1114	40.0	223	8.1	18.0	10.2
	07-25-95	1120	45.0	222	8.1	16.5	10.2
	07-25-95	1125	50.0	222	8.0	15.5	10.1
	07-25-95	1131	55.0	222	8.0	15.0	10.0
	07-25-95	1137	60.0	221	8.0	14.5	9.9
	07-25-95	1141	65.0	222	7.9	14.5	9.7
	07-25-95	1145	70.0	222	7.9	14.0	9.6
	07-25-95	1152	75.0	221	7.9	14.0	9.4
	07-25-95	1156	80.0	221	7.9	13.5	9.3
	07-25-95	1159	85.0	220	7.8	13.5	9.0
	07-25-95	1203	90.0	222	7.7	13.5	8.1

STREAMS TRIBUTARY TO LAKE MICHIGAN
HIGGINS LAKE NEAR ROSCOMMON, MI--Continued

WATER-QUALITY DATA

STATION NUMBER	DATE	TIME	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
442658084404401	09-14-95	1040	2.00	240	8.1	19.0	8.7
	09-14-95	1046	5.00	240	8.2	19.0	8.5
	09-14-95	1049	10.0	240	8.2	18.5	8.5
	09-14-95	1051	15.0	240	8.2	18.5	8.5
	09-14-95	1053	20.0	240	8.2	18.5	8.4
	09-14-95	1057	25.0	240	8.1	18.5	8.4
	09-14-95	1100	30.0	240	8.1	18.5	8.5
	09-14-95	1102	35.0	240	8.1	18.0	8.5
	09-14-95	1105	40.0	242	8.1	18.0	8.5
	09-14-95	1106	45.0	249	8.0	16.5	9.3
	09-14-95	1107	50.0	258	7.9	13.5	9.4
	09-14-95	1113	55.0	260	7.7	12.5	8.4
	09-14-95	1115	60.0	260	7.6	12.5	8.0
	09-14-95	1119	65.0	260	7.6	12.0	7.4
	09-14-95	1122	70.0	261	7.6	12.0	7.1
	09-14-95	1125	75.0	262	7.5	11.5	6.5
	09-14-95	1129	80.0	262	7.4	11.5	6.3
	09-14-95	1132	85.0	263	7.4	11.5	6.0
	09-14-95	1135	90.0	267	7.3	11.0	4.4
	09-14-95	1137	93.0	278	7.2	11.0	0.5

STATION NUMBER	DATE	TIME	DEPTH AT SAMPLE LOC- ATION, TOTAL (FEET) (81903)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
442658084404401	10-30-95	1524	2.00	216	8.2	10.5	11.7
	10-30-95	1527	5.00	216	8.2	10.5	11.5
	10-30-95	1529	10.0	216	8.2	10.5	11.2
	10-30-95	1532	15.0	217	8.2	10.5	11.1
	10-30-95	1534	20.0	216	8.2	10.5	11.0
	10-30-95	1539	25.0	216	8.2	10.5	10.9
	10-30-95	1542	30.0	216	8.2	10.5	10.9
	10-30-95	1545	35.0	216	8.2	10.5	10.8
	10-30-95	1547	40.0	215	8.2	10.5	10.8
	10-30-95	1550	45.0	216	8.2	10.5	10.7
	10-30-95	1552	50.0	215	8.2	10.5	10.7
	10-30-95	1555	55.0	216	8.2	10.5	10.7
	10-30-95	1558	60.0	216	8.2	10.5	10.6
	10-30-95	1600	65.0	215	8.2	10.5	10.6
	10-30-95	1603	70.0	216	8.2	10.5	10.5
	10-30-95	1605	75.0	215	8.2	10.5	10.6
	10-30-95	1608	80.0	215	8.2	10.5	10.6
	10-30-95	1613	82.0	215	8.2	10.5	10.6

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.

PERIOD OF RECORD.--June 1942 to September 1991, September 1993 to current year, except winter period of 1942-43.

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.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 9.18 ft, Aug. 17; minimum observed, 7.74 ft, Mar. 2, 4.

[illegible]

STREAMS TRIBUTARY TO LAKE MICHIGAN

441508085244001 LAKE MITCHELL-CADILLAC AT CADILLAC, MI

LOCATION.--Lat 44°14'21", long 85°27'17", in SW1/4 SW1/4 sec.6, T.21 N., R.9 W., Wexford County, Hydrologic Unit 04060102, on right bank of channel between lakes, at William Mitchell State Park, at Cadillac.

DRAINAGE AREA.--46.6 mi².

PERIOD OF RECORD.--August 1942 to December 1959, July 1960 to current year.

GAGE.--Nonrecording gage. Once daily reading by observer. Datum of gage is 1,283.41 ft above sea level (levels by Michigan Department of Natural Resources).

REMARKS.--The major inlet is Mitchell Creek. The outlet is Clam River. Lake elevation controlled by dam. Established legal levels; annual maximum level, 1,290.0 ft, minimum winter level, 1,288.9 ft, summer minimum level, 1,289.7 ft above sea level..

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 7.86 ft, Sept. 6, 1975; minimum observed, 4.62 ft, Oct. 4, 1955.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 6.72 ft, Apr. 28; minimum observed, 5.70 ft, Mar. 11, 12.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.32	5.88	5.96	5.76	5.86	---	6.26	6.62	6.60	6.46	---	6.36
2	6.32	5.86	5.96	5.76	5.84	---	6.26	6.60	6.60	6.48	---	6.36
3	6.32	5.84	5.98	5.76	5.84	---	6.26	6.62	6.64	6.46	---	6.34
4	6.32	5.84	5.98	---	5.84	---	6.26	6.58	6.64	6.46	---	6.34
5	6.32	5.90	5.96	---	---	---	6.28	6.56	6.62	6.44	---	6.34
6	6.32	5.94	5.96	---	---	---	6.28	6.56	6.62	6.46	6.34	6.30
7	6.32	5.96	5.96	---	5.82	---	6.30	6.56	6.58	6.46	6.32	6.30
8	6.34	5.98	5.96	5.72	5.82	---	6.32	6.56	6.56	6.44	6.30	6.30
9	6.38	6.00	5.94	5.72	5.82	---	6.32	6.54	6.56	6.44	6.28	6.30
10	6.36	6.04	5.94	5.72	5.82	---	6.32	6.54	6.54	6.42	6.26	6.30
11	6.30	6.04	5.92	5.72	5.82	5.70	6.34	6.54	6.50	6.40	6.26	6.30
12	6.28	6.02	5.92	5.72	5.82	5.70	6.34	6.52	6.48	6.36	6.38	6.28
13	6.28	6.02	5.92	5.72	---	5.74	6.36	6.50	6.44	6.40	6.42	6.28
14	6.22	6.02	5.90	5.74	---	5.76	6.36	6.50	6.42	6.42	6.48	6.26
15	6.20	6.00	5.88	5.80	---	5.76	6.38	6.50	6.42	6.44	6.56	6.24
16	6.16	6.00	5.88	5.84	---	5.76	6.38	6.48	6.40	6.46	6.60	6.22
17	6.12	6.00	5.88	5.86	---	5.78	6.40	6.50	6.40	6.42	6.64	6.22
18	6.12	---	5.88	5.88	---	5.78	6.42	6.54	6.38	6.40	6.64	6.20
19	6.12	5.98	5.86	5.88	---	5.80	6.46	6.54	6.38	6.38	6.60	6.20
20	6.10	5.98	5.86	5.88	---	5.86	6.50	6.52	6.36	6.36	6.56	6.20
21	6.10	5.98	5.86	5.90	---	5.90	6.54	6.52	6.36	6.36	6.54	6.20
22	6.08	5.98	5.84	5.92	5.78	5.94	6.58	6.50	6.34	6.34	6.54	6.20
23	6.08	5.96	5.84	5.94	5.75	6.00	6.58	6.50	6.34	6.34	6.50	6.20
24	6.06	5.96	5.84	5.94	---	6.08	6.60	6.54	6.32	6.32	6.50	6.18
25	6.06	5.96	---	5.94	---	6.20	6.60	6.52	6.32	6.30	6.46	6.18
26	6.02	5.94	---	5.92	5.76	6.20	6.62	6.52	6.30	6.30	6.46	6.20
27	6.00	5.94	5.82	5.92	---	6.22	6.68	6.50	6.30	6.30	6.44	6.20
28	6.00	5.94	5.82	5.92	---	6.22	6.72	6.50	6.38	6.34	6.42	6.20
29	5.96	5.94	5.80	5.90	---	6.24	6.66	6.54	6.40	---	6.40	6.20
30	5.94	5.94	5.78	5.90	---	6.24	6.66	6.60	6.42	---	6.38	6.20
31	5.92	---	5.76	5.86	---	6.26	---	6.60	---	---	6.38	---
MEAN	6.18	---	---	---	---	---	6.43	6.54	6.45	---	---	6.25
MAX	6.38	---	---	---	---	---	6.72	6.62	6.64	---	---	6.36
MIN	5.92	---	---	---	---	---	6.26	6.48	6.30	---	---	6.18

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 mi².

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 fair. Some regulation at low flow by dams upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	120	113	136	e98	e110	e102	140	231	104	109	70	74
2	124	111	138	95	e108	98	123	204	94	94	71	73
3	121	110	146	e93	e106	100	123	196	116	85	72	77
4	119	122	157	91	e105	e102	122	190	146	79	75	75
5	110	159	163	e94	85	e104	114	190	148	80	115	73
6	91	207	161	e96	e104	105	110	187	145	80	174	71
7	86	260	152	e98	e105	107	117	184	144	83	149	70
8	87	237	140	e100	e105	105	116	178	143	80	98	72
9	101	196	132	e102	e105	107	114	184	140	78	83	71
10	105	168	117	e104	e105	106	108	195	137	75	78	70
11	98	152	e117	e108	e105	107	103	200	135	73	79	70
12	119	145	117	110	106	121	107	199	112	72	112	69
13	126	145	e117	117	e105	190	105	190	88	71	159	69
14	127	141	e117	173	e105	274	105	190	81	71	174	69
15	127	138	118	263	e105	395	111	184	78	72	156	69
16	128	134	122	272	e105	439	123	173	75	72	138	70
17	126	132	123	216	e105	389	125	151	73	74	160	78
18	125	135	124	180	e105	312	130	133	73	74	153	76
19	125	129	122	163	e105	264	187	124	70	72	136	73
20	124	127	121	155	e105	282	215	120	68	75	113	76
21	123	132	121	150	e105	295	195	115	68	76	97	79
22	122	139	120	146	e105	267	243	112	66	74	88	81
23	126	135	121	143	e105	233	227	112	65	72	83	83
24	122	129	124	140	e106	204	197	124	65	71	79	82
25	123	128	125	138	e107	184	171	120	65	69	78	78
26	125	124	121	134	108	176	160	114	67	68	78	78
27	123	120	119	121	113	175	199	111	83	69	78	76
28	119	133	119	e118	e106	168	325	113	145	83	78	74
29	117	139	118	e115	---	163	367	123	170	87	77	74
30	115	139	105	e113	---	159	298	116	139	78	76	73
31	114	---	e102	e111	---	153	---	110	---	72	75	---
TOTAL	3618	4379	3935	4157	2944	5986	4880	4873	3103	2388	3252	2223
MEAN	117	146	127	134	105	193	163	157	103	77.0	105	74.1
MAX	128	260	163	272	113	439	367	231	170	109	174	83
MIN	86	110	102	91	85	98	103	110	65	68	70	69
CFSM	.48	.60	.52	.55	.43	.79	.67	.65	.43	.32	.43	.30
IN.	.55	.67	.60	.64	.45	.92	.75	.75	.48	.37	.50	.34

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1995, BY WATER YEAR (WY)

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	118	137	140	123	120	195	242	153	112	91.1	84.6	102																		
MAX	275	248	259	187	194	389	396	245	195	238	185	281																		
(WY)	1987	1986	1992	1993	1988	1976	1976	1976	1967	1969	1969	1985																		
MIN	62.3	70.3	64.5	62.7	63.5	100	109	67.9	57.0	53.0	58.1	59.9																		
(WY)	1967	1977	1977	1977	1977	1978	1987	1977	1977	1977	1978	1981																		

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1966 - 1995

ANNUAL TOTAL	52351	45738	
ANNUAL MEAN	143	125	135
HIGHEST ANNUAL MEAN			185
LOWEST ANNUAL MEAN			81.2
HIGHEST DAILY MEAN	398	439	1680
LOWEST DAILY MEAN	70	65	47
ANNUAL SEVEN-DAY MINIMUM	74	66	50
INSTANTANEOUS PEAK FLOW		450	1710
INSTANTANEOUS PEAK STAGE		4.49	7.31
INSTANTANEOUS LOW FLOW		64	(b)29
ANNUAL RUNOFF (CFSM)	.59	.52	.56
ANNUAL RUNOFF (INCHES)	8.01	7.00	7.56
10 PERCENT EXCEEDS	216	190	224
50 PERCENT EXCEEDS	127	115	110
90 PERCENT EXCEEDS	90	73	66

(a) June 22-25.

(b) Result of freezeup.

(c) 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 Evert, 0.4 mi upstream from Twin Creek, and at mile 123.9.

DRAINAGE AREA.--1,450 mi², approximately.

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).

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 fair. Some regulation at low flow by dams upstream from station. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	814	889	1040	e780	e870	e770	1260	1960	656	978	551	778
2	832	901	1050	e750	e860	e760	1190	1800	635	856	538	758
3	828	876	1090	e720	e850	e750	1130	1700	632	777	546	738
4	825	953	1140	577	e840	e740	1100	1620	640	722	561	724
5	824	1090	1170	438	707	740	1060	1550	663	698	710	708
6	814	1470	1200	e540	602	739	1030	1450	656	666	839	692
7	794	1630	1190	e600	754	733	1030	1320	653	638	849	681
8	781	1550	1150	e640	e800	e733	1040	1210	651	619	787	668
9	832	1510	1120	e720	e800	733	1040	1140	621	596	692	662
10	843	1440	1060	e800	e800	e750	1010	1140	605	575	640	658
11	831	1380	e980	869	e800	793	979	1140	589	555	614	655
12	819	1340	e930	888	e800	970	970	1100	571	530	839	651
13	842	1320	917	950	e810	1410	968	1060	542	517	1010	646
14	843	1320	891	1290	e820	1990	949	1110	503	510	1110	641
15	840	1290	857	1770	e820	2230	915	1110	482	494	1130	632
16	829	1230	903	1750	e820	2340	886	1040	468	505	1100	638
17	829	1170	933	1770	e820	2310	872	991	455	621	1160	740
18	819	1130	952	1670	e820	2220	867	931	446	628	1260	710
19	818	1080	956	1560	819	2180	1080	873	441	584	1230	689
20	816	1050	931	1510	e820	2280	1320	826	432	581	1190	702
21	811	1060	920	1460	e810	2380	1430	793	421	547	1150	705
22	805	1080	910	1400	e800	2370	1600	756	409	527	1120	733
23	806	1050	905	1340	e800	2280	1680	745	401	515	1090	732
24	808	1020	919	1300	e800	2140	1610	762	393	502	1070	721
25	812	995	930	e1150	e790	1990	1530	764	396	486	1020	709
26	807	970	926	e1050	780	1860	1490	742	418	475	971	698
27	805	953	917	e1000	e770	1750	1800	720	575	475	927	688
28	805	1020	925	e940	e770	1650	2210	703	586	584	885	678
29	807	1070	925	e920	---	1540	2250	697	1020	621	858	669
30	799	1050	874	e900	---	1430	2180	698	1120	617	827	658
31	794	---	e830	e880	---	1340	---	682	---	579	802	---
TOTAL	25332	34887	30441	32932	22352	46901	38476	33133	17350	18578	28076	20762
MEAN	817	1163	982	1062	798	1513	1283	1069	578	599	906	692
MAX	843	1630	1200	1770	870	2380	2250	1960	1120	978	1260	778
MIN	781	876	830	438	602	733	867	682	393	475	538	632
CFSM	.56	.80	.68	.73	.55	1.04	.88	.74	.40	.41	.62	.48
IN.	.65	.90	.78	.84	.57	1.20	.99	.85	.45	.48	.72	.53

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1995, BY WATER YEAR (WY)

	MEAN	780	1003	980	863	882	1581	2239	1350	968	684	552	645
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	934	548	409	327	316	326	
(WY)	1949	1950	1977	1936	1936	1940	1945	1977	1988	1934	1941	1948	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1931 - 1995

ANNUAL TOTAL	418029		349220									
ANNUAL MEAN	1145		957							(a)1052		
HIGHEST ANNUAL MEAN										1532		1992
LOWEST ANNUAL MEAN										(b)613		1936
HIGHEST DAILY MEAN	2700		Feb 22	2380		Mar 21				8770		Mar 31 1989
LOWEST DAILY MEAN	504		Jun 23	393		Jun 24				252		Aug 28 1941
ANNUAL SEVEN-DAY MINIMUM	538		Jun 17	410		Jun 20				274		Aug 27 1941
INSTANTANEOUS PEAK FLOW				2400		Mar 21				9040		Mar 31 1989
INSTANTANEOUS PEAK STAGE				9.41		Mar 21				14.99		Mar 31 1989
INSTANTANEOUS LOW FLOW				392		(c)				(d)164		Dec 20 1947
ANNUAL RUNOFF (CFSM)	.79			.66						.73		
ANNUAL RUNOFF (INCHES)	10.72			8.96						9.86		
10 PERCENT EXCEEDS	2050			1520						1960		
50 PERCENT EXCEEDS	939			839						800		
90 PERCENT EXCEEDS	650			576						445		

(a) Does not include water years 1931, 1934.

(b) Estimated 584 ft³/s, water year 1931.

(c) June 24, 25.

(d) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04121900 LITTLE MUSKEGON RIVER NEAR MORLEY, MI

LOCATION.--Lat 43°30'09", long 85°20'33", in SW1/4 SW1/4 sec.24, T.13 N., R.9 W., Mecosta County, Hydrologic Unit 04060102, on right bank at upstream side of highway bridge on 130th Avenue, 0.5 mi downstream from the remains of Rustford Dam, and 5.2 mi east of Morley.

DRAINAGE AREA.--138 mi².

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

GAGE.--Water-stage recorder. Elevation of gage is 920 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	146	184	160	e119	e130	114	123	177	84	69	63	61
2	149	232	163	119	e124	112	120	164	82	61	62	62
3	121	193	165	e115	e121	e112	126	156	149	63	77	60
4	107	223	161	e113	e119	112	136	154	152	62	92	59
5	100	302	157	e110	e114	109	118	172	113	69	101	58
6	98	407	157	e110	e113	108	99	163	99	71	93	59
7	93	384	161	e108	e112	114	97	151	106	69	78	59
8	102	328	157	e106	e111	116	112	143	130	66	69	58
9	142	270	153	e106	e110	113	142	141	108	62	68	57
10	128	225	147	e110	e110	113	132	168	98	60	66	56
11	115	199	145	e113	e110	125	121	169	97	59	65	56
12	105	185	145	116	e110	182	120	153	91	57	83	55
13	100	178	135	137	e110	261	131	146	86	57	96	55
14	98	176	129	280	e110	281	123	179	83	56	85	56
15	97	171	126	319	e110	285	113	164	79	63	75	55
16	96	163	127	267	e110	270	121	147	77	86	72	55
17	95	157	136	205	e112	238	118	143	73	73	123	68
18	95	151	146	178	e114	201	129	131	71	65	232	68
19	102	145	146	172	119	215	190	127	70	61	216	62
20	104	141	143	184	122	233	173	118	68	61	161	70
21	100	149	142	179	120	234	206	112	65	59	122	72
22	96	155	141	173	119	205	217	108	64	57	104	85
23	98	145	140	169	e119	179	177	106	63	70	95	80
24	99	136	146	166	e118	164	154	122	60	67	76	74
25	99	136	144	160	118	154	144	116	60	61	76	71
26	99	129	134	153	116	148	142	108	63	59	70	69
27	99	134	131	151	118	143	334	101	77	60	68	68
28	98	209	136	145	116	137	359	101	80	104	66	66
29	95	195	135	e139	---	140	296	103	80	98	66	64
30	95	172	120	e136	---	136	207	105	75	75	65	64
31	99	---	119	135	---	127	---	95	---	65	63	---
TOTAL	3270	5974	4447	4793	3235	5181	4780	4243	2603	2065	2861	1902
MEAN	105	199	143	155	116	167	159	137	86.8	66.6	92.3	63.4
MAX	149	407	165	319	130	285	359	179	152	104	232	85
MIN	93	129	119	106	110	108	97	95	60	56	62	55
CFSM	.76	1.44	1.04	1.12	.84	1.21	1.15	.99	.63	.48	.67	.46
IN.	.88	1.61	1.20	1.29	.87	1.40	1.29	1.14	.70	.56	.77	.51

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1995, BY WATER YEAR (WY)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	120	142	142	124	124	199	207	148	118	83.7	83.0	105																	
MAX	363	274	265	206	200	438	344	286	198	212	170	455																	
(WY)	1987	1986	1983	1973	1976	1976	1967	1974	1989	1982	1972	1986																	
MIN	57.3	66.2	82.7	78.0	64.0	116	131	75.4	53.9	44.3	42.3	50.6																	
(WY)	1972	1972	1975	1994	1982	1978	1977	1977	1988	1988	1971	1971																	

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR	FOR 1995 WATER YEAR	WATER YEARS 1967 - 1995
ANNUAL TOTAL	49387	45354	
ANNUAL MEAN	135	124	133
HIGHEST ANNUAL MEAN			196
LOWEST ANNUAL MEAN			96.5
HIGHEST DAILY MEAN	586	407	2190
LOWEST DAILY MEAN	59	55	36
ANNUAL SEVEN-DAY MINIMUM	62	55	37
INSTANTANEOUS PEAK FLOW		453	2300
INSTANTANEOUS PEAK STAGE		3.78	8.57
INSTANTANEOUS LOW FLOW		38	22
ANNUAL RUNOFF (CFSM)	.98	.90	.96
ANNUAL RUNOFF (INCHES)	13.31	12.23	13.09
10 PERCENT EXCEEDS	211	184	227
50 PERCENT EXCEEDS	113	114	110
90 PERCENT EXCEEDS	76	63	64

(e) Estimated.

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.--14.8 mi².

PERIOD OF RECORD.--October 1965 to current year.

REVISED RECORDS.--WDR MI-80-1: 1976(M), 1978(M), 1979(P).

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. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	30	21	e13	18	15	19	26	10	6.1	9.0	5.7
2	13	21	20	e13	18	e15	17	24	10	5.5	8.4	5.4
3	11	17	19	e12	17	e14	18	22	16	5.2	20	5.3
4	10	35	18	e12	17	e14	18	21	13	6.5	26	5.1
5	9.8	51	18	e12	e16	14	16	22	11	7.8	15	5.1
6	9.3	60	18	e12	e16	14	16	20	10	7.1	13	4.8
7	8.8	46	19	e12	e15	15	15	18	9.7	7.2	11	4.9
8	11	31	19	e12	e15	16	17	17	9.2	6.6	9.7	4.9
9	17	34	19	e12	e15	e16	16	18	9.2	6.2	10	4.7
10	14	30	19	12	e15	e18	14	29	9.3	5.9	10	4.5
11	12	25	18	12	e14	20	15	25	9.0	5.3	9.6	4.8
12	11	23	17	15	e14	37	20	20	8.6	4.7	9.1	4.5
13	10	22	16	25	e14	44	19	18	8.2	4.4	8.7	4.5
14	9.9	24	16	76	e14	35	17	24	7.6	4.3	7.8	4.5
15	9.7	23	16	87	e14	29	15	20	7.3	4.4	7.3	4.2
16	9.5	20	16	43	e14	25	14	18	7.2	8.4	12	4.7
17	9.6	19	21	34	14	23	14	17	6.8	5.9	16	6.6
18	9.9	19	24	30	14	21	15	15	6.6	5.1	15	5.2
19	11	18	22	30	17	23	21	15	6.6	4.7	11	5.5
20	11	17	20	39	20	26	18	14	6.1	5.6	9.8	6.2
21	11	22	20	33	19	29	21	13	5.7	4.7	8.4	6.3
22	11	23	18	29	19	24	19	13	5.4	5.3	7.6	7.4
23	12	19	18	27	18	21	17	13	5.2	7.3	7.1	6.3
24	12	18	17	26	e17	19	15	14	5.0	5.6	6.7	5.9
25	12	17	16	25	e17	18	15	14	5.4	4.8	6.3	5.7
26	11	16	15	23	e16	17	16	12	7.1	5.6	6.2	5.8
27	11	21	15	22	e15	17	70	11	7.2	5.7	6.1	5.5
28	11	35	15	20	e15	20	64	14	7.7	33	6.3	5.4
29	11	26	14	e19	---	26	37	13	7.6	15	8.1	5.4
30	11	23	13	e18	---	24	29	12	6.8	10	7.5	5.2
31	12	---	e13	18	---	20	---	11	---	8.9	6.5	---
TOTAL	353.5	785	550	773	447	669	637	543	244.5	222.8	315.2	160.0
MEAN	11.4	26.2	17.7	24.9	16.0	21.6	21.2	17.5	8.15	7.19	10.2	5.33
MAX	21	60	24	87	20	44	70	29	16	33	26	7.4
MIN	8.8	16	13	12	14	14	14	11	5.0	4.3	6.1	4.2
CFSM	.77	1.77	1.20	1.68	1.08	1.46	1.43	1.18	.55	.49	.69	.36
IN.	.89	1.97	1.38	1.94	1.12	1.68	1.60	1.36	.61	.56	.79	.40

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1995, BY WATER YEAR (WY)

	MEAN	14.4	19.1	21.3	18.6	20.7	31.3	28.5	18.7	11.8	7.05	8.50	9.14
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	7.43	12.2	14.5	6.84	4.32	3.17	2.29	3.09	
(WY)	1972	1972	1977	1977	1977	1980	1968	1977	1977	1971	1971	1971	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1966 - 1995

ANNUAL TOTAL	6084.5	5700.0	
ANNUAL MEAN	16.7	15.6	
HIGHEST ANNUAL MEAN			17.4
LOWEST ANNUAL MEAN			27.4
HIGHEST DAILY MEAN	75	87	8.36
LOWEST DAILY MEAN	5.7	4.2	7.20
ANNUAL SEVEN-DAY MINIMUM	6.0	4.5	1.6
INSTANTANEOUS PEAK FLOW		145	2.0
INSTANTANEOUS PEAK STAGE		14.26	(a)930
INSTANTANEOUS LOW FLOW		3.8	(b)16.61
ANNUAL RUNOFF (CFSM)	1.13	1.06	1.0
ANNUAL RUNOFF (INCHES)	15.29	14.33	1.18
10 PERCENT EXCEEDS	30	25	15.98
50 PERCENT EXCEEDS	13	14	33
90 PERCENT EXCEEDS	7.5	5.5	13
			4.6

(a) Gage height 11.00 ft, datum then in use.

(b) Present datum; backwater from ice.

(c) July 14, 15, Sept. 14, 15.

(d) Aug. 5, 17, 22, 1971.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122150 MUSKEGON RIVER AT MUSKEGON, MI

LOCATION.--Lat 43°13'52", long 86°19'47", in SW1/4 NE1/4 sec. 28, T.10N., R.17W., Muskegon County, Hydrologic Unit 04060102, on left bank .57 mi upstream from mouth.

DRAINAGE AREA.--2,680 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1994 to October 1996 (discontinued).

GAGE.--Acoustical velocity meter system. Single-path transducer installation. Datum of gage is 573.84 ft, International Great Lakes datum.

REMARKS.--Water-discharge records good except for estimated daily discharges which are fair. Flows affected by wind and seiche.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 6,450 ft³/s, Aug. 21, 1995; minimum daily, 476 ft³/s, July 18, 1995.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	e4940	e4930	e2390	e1980	e1920	e2670
2	---	---	---	---	---	---	e4730	e4610	e2390	e1860	e2380	e2910
3	---	---	---	---	---	---	e4480	e4080	e2340	e1800	e2480	e3030
4	---	---	---	---	---	---	e4420	e3970	e2200	e2110	e2610	e2760
5	---	---	---	---	---	---	e4460	e3710	e2060	e2560	e4750	e2640
6	---	---	---	---	---	---	e4480	e3360	e2100	e2670	e4730	e2590
7	---	---	---	---	---	---	e4320	e3390	e2140	e2710	e5220	e2380
8	---	---	---	---	---	---	e4100	e3470	e2120	e3520	e3850	e2400
9	---	---	---	---	---	---	e3960	e3450	e2100	e4460	e3010	e2530
10	---	---	---	---	---	---	e3770	e3400	e1950	e4140	e2870	e2570
11	---	---	---	---	---	---	e3670	e3410	e1660	e3650	e2880	e2470
12	---	---	---	---	---	---	e3720	e3570	e1710	e3370	e2690	e2310
13	---	---	---	---	---	---	e3900	e3550	e1840	e3270	e2880	e2190
14	---	---	---	---	---	---	e3980	e3470	e2030	e3330	e3010	e2230
15	---	---	---	---	---	---	e4000	e3330	e1990	e3710	e2720	e2340
16	---	---	---	---	---	---	e4040	e3210	e1840	e3680	e2670	e2520
17	---	---	---	---	---	---	e4090	e2910	e1700	e3610	e2470	e2310
18	---	---	---	---	---	---	e3980	e2640	e1790	e3470	e2400	e2110
19	---	---	---	---	---	---	e3650	e2650	e1900	e3310	e2490	e2070
20	---	---	---	---	---	---	e3040	e2650	e1840	e3400	e2770	e2200
21	---	---	---	---	---	---	e2680	e2610	e1720	e3470	e2890	e2190
22	---	---	---	---	---	---	e2530	e2570	e1550	e3310	e2680	e2190
23	---	---	---	---	---	---	e2520	e2550	e1490	e3080	e2380	e2180
24	---	---	---	---	---	---	e2550	e2550	e2930	e2890	e1950	e2490
25	---	---	---	---	---	---	e2570	e2510	e4500	e2680	e2120	e2280
26	---	---	---	---	---	---	e2760	e2510	e3940	e2510	e3870	e2220
27	---	---	---	---	---	---	e3050	e2760	e3000	e2470	e5610	e2320
28	---	---	---	---	---	---	e4060	e3160	e2720	e2340	e5490	e2420
29	---	---	---	---	---	---	e5120	e3090	e2680	e2150	e5080	e2510
30	---	---	---	---	---	---	e5010	e2830	e2300	e2110	e4770	e2450
31	---	---	---	---	---	---	---	e2570	---	e1880	e3480	---
TOTAL	---	---	---	---	---	---	114580	99470	66920	91500	101120	72480
MEAN	---	---	---	---	---	---	3819	3209	2231	2952	3262	2416
MAX	---	---	---	---	---	---	5120	4930	4500	4460	5610	3030
MIN	---	---	---	---	---	---	2520	2510	1490	1800	1920	2070
CFSM	---	---	---	---	---	---	1.43	1.20	.83	1.10	1.22	.90
IN.	---	---	---	---	---	---	1.59	1.38	.93	1.27	1.40	1.01

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122150 MUSKEGON RIVER AT MUSKEGON, MI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e3360	2950	e3590	2130	2650	e2430	e3280	4380	2570	3810	2000	2340
2	e3420	3290	e3330	2590	3550	e2470	e3160	4300	3030	4670	2370	2860
3	e2750	3070	e3080	1860	3520	e2480	e2880	3990	2940	3990	3030	1950
4	e3540	3520	e3170	1590	2990	e2320	e2640	3940	e2490	3530	2300	2880
5	e3170	3320	e3250	3030	3190	e2360	e2590	4720	3650	3020	2110	1930
6	e2570	4560	e3350	e2530	2800	e2390	1600	3560	3170	2560	3050	1750
7	e2230	5130	e3630	e2390	2220	e2420	2740	3850	2280	2660	3420	1180
8	e2770	4810	e3710	e2470	2270	e2450	2060	3850	4120	1990	3090	2920
9	e2850	4940	e3510	e2830	e2250	e2550	2140	3330	3150	2080	2840	2950
10	e2290	5020	e3360	e3300	e2200	e2760	3140	3090	2480	4230	2570	4290
11	e2940	5400	e3050	3280	e2200	e2920	1860	3400	3290	3690	2040	3780
12	e2970	4590	e2730	3850	e2100	e2910	4700	2760	2690	2250	3070	3140
13	e2780	4280	e2650	3850	e2000	e3280	2090	2590	2720	1150	1910	1400
14	e2880	4390	e2590	4020	e1900	e4540	1290	2970	2690	1970	2820	1510
15	e2650	3490	e2600	4710	e1900	e5130	2020	3040	e1700	2460	3060	3400
16	e3140	3390	e2770	5140	e2000	3970	1940	2080	e1680	1490	3380	2350
17	e2300	4730	e3000	5860	e2100	4320	1690	2980	e1640	2140	2750	2470
18	e2880	4010	e3040	5480	e2300	4740	898	2550	e1510	476	3660	2010
19	e2510	2810	e2950	3540	e2500	4500	3330	2250	1520	2400	3660	1960
20	e2240	e2960	e2920	4820	e2800	4870	2190	2220	e1590	1350	5740	2050
21	e2200	e3150	e2970	4590	e3200	4770	2170	2130	e1590	2110	6450	2390
22	e2160	e3280	e2920	4290	e3150	3560	2660	1850	e1560	2390	6010	2470
23	e2730	e3090	2650	4450	e3050	3570	2890	2170	e1520	2190	4570	2190
24	e1850	e3070	2660	4430	e2800	4250	2390	2580	e1520	2460	4240	2820
25	e2040	e3030	2330	4300	e2720	e4460	3550	1900	e1500	1990	3710	2450
26	e2120	e2990	3030	4260	e2730	e4020	2690	2680	e1480	2610	2930	1800
27	e2350	e3110	2800	3630	e2610	e4040	2900	3060	e1590	2330	3670	2110
28	e3120	e3410	2930	4570	e2440	e4020	4690	2290	2860	e2150	3460	2400
29	e2060	e3430	2490	4190	---	e3890	3690	2770	2280	e2200	2460	2310
30	e2750	e3650	2310	4050	---	e3610	4320	2170	2610	e2030	2200	1760
31	e1600	---	2940	3660	---	e3370	---	1780	---	1340	2470	---
TOTAL	81220	112870	92310	115690	72140	109370	80188	91230	69420	75716	101040	71820
MEAN	2620	3762	2978	3732	2576	3528	2673	2943	2314	2442	3259	2394
MAX	3540	5400	3710	5860	3550	5130	4700	4720	4120	4670	6450	4290
MIN	1600	2810	2310	1590	1900	2320	898	1780	1480	476	1910	1180
CFSM	.98	1.40	1.11	1.39	.96	1.32	1.00	1.10	.86	.91	1.22	.89
IN.	1.13	1.57	1.28	1.61	1.00	1.52	1.11	1.27	.96	1.05	1.40	1.00

WTR YR 1995 TOTAL 1073014 MEAN 2940 MAX 6450 MIN 476 CFSM 1.10 IN. 14.89

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122150 MUSKEGON RIVER AT MUSKEGON, MI--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
DAILY MEAN VALUES

[illegible]

STREAMS TRIBUTARY TO LAKE MICHIGAN
04122150 MUSKEGON RIVER AT MUSKEGON, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1994 to October 1995 (discontinued).

REMARKS.--Cross-sectional samples were collected in the vicinity of the gage. Unpublished records of selected herbicides, metals and organics will be available upon release by the cooperating agencies.

COOPERATION.--All published data were collected by the U.S. Geological Survey and the Michigan Department of Natural Resources and analyzed by the Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (0010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CaCO ₃) (00900)	CALCIUM DIS- SOLVED (MG/L AS Ca) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS Mg) (00925)	SODIUM, DIS- SOLVED (MG/L AS Na) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO ₄) (00945)
APR 1994												
14...	1100	327	8.0	6.5	12.0	101	150	41	12	11	1.9	16
21...	1100	330	8.3	8.5	11.5	98	150	40	12	11	1.7	16
21...	1300	333	8.2	8.5	11.7	100	150	40	12	11	1.8	16
26...	1000	324	7.9	11.0	--	--	150	40	12	11	1.7	15
MAY												
02...	1400	326	8.0	11.0	9.1	--	160	43	13	12	1.6	16
09...	1400	329	8.1	12.0	9.4	88	150	41	12	11	1.5	16
JUN												
07...	1030	327	8.0	16.5	8.6	91	160	41	13	12	1.7	18
29...	1000	352	7.7	19.0	7.0	78	150	41	12	13	1.5	19
JUL												
13...	1300	367	7.8	22.5	7.1	83	160	42	13	14	1.7	20
18...	1400	369	7.6	22.0	6.1	71	160	42	13	14	1.6	20
AUG												
24...	1100	--	--	--	--	--	170	43	14	16	1.4	20
SEP												
14...	1100	372	7.8	20.0	7.3	82	170	43	14	15	1.5	19
OCT												
06...	1000	376	7.7	16.5	7.3	75	170	43	14	15	1.6	20
26...	1000	388	7.9	13.0	8.8	84	170	45	14	16	1.6	21
NOV												
07...	1400	397	7.9	11.0	9.5	86	180	46	15	16	1.6	21
11...	1200	392	8.1	10.0	9.3	82	170	46	14	16	1.8	21
DEC												
05...	1300	374	8.2	4.0	11.9	96	180	48	14	14	1.6	20
JAN 1995												
24...	1400	354	7.8	1.5	7.9	57	180	47	14	12	1.4	16
FEB												
17...	1100	379	7.8	1.0	12.3	86	180	48	14	12	1.5	15
MAR												
15...	1130	389	8.1	2.5	--	--	190	50	15	14	1.5	19
20...	1500	367	8.2	5.5	11.6	97	170	46	14	13	1.3	17
25...	1400	377	8.3	5.0	11.6	91	170	45	14	13	1.2	17
APR												
13...	1330	370	8.3	6.0	11.8	96	170	43	14	13	1.4	19
MAY												
10...	1000	347	8.0	12.0	10.1	97	160	42	13	12	1.5	16
JUN												
07...	1400	358	7.8	18.0	7.5	82	--	--	--	--	--	18
JUL												
17...	1400	381	8.4	25.0	8.7	108	--	--	--	--	--	22
AUG												
16...	1000	392	8.2	26.5	8.1	--	--	--	--	--	--	22
20...	1200	389	8.2	27.0	8.2	104	--	--	--	--	--	22
OCT												
17...	1400	407	8.2	13.5	8.8	85	--	--	--	--	--	25

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122150 MUSKEGON RIVER AT MUSKEGON, MI--Continued.

WATER-QUALITY DATA

DATE	TIME	CHLORIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L SIO ₂) (00955)	RESIDUE TOTAL AT 105 DEG C, SUS- PENDE (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDE (MG/L) (00535)	NITRO- GEN, NO ₂ +NO ₃ DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLORO- PHYLL A TRICHR. UNCORR. WHOLE TOTAL (UG/L) (32210)
APR 1994											
14...	1100	18	5.1	<2	4	0.414	0.020	0.40	<0.020	--	5.94
21...	1100	18	4.8	<2	<2	0.565	0.010	0.40	<0.020	<0.002	6.21
21...	1300	18	4.8	<2	2	0.453	0.016	0.40	<0.020	<0.002	5.21
26...	1000	18	4.4	2	4	0.300	0.007	0.30	<0.020	<0.002	4.28
MAY											
02...	1400	19	4.5	4	2	0.321	0.031	0.40	<0.020	0.002	3.90
09...	1400	19	4.4	2	2	0.281	0.033	0.50	<0.020	0.002	3.33
JUN											
07...	1030	19	2.4	4	4	0.249	0.033	0.40	<0.020	<0.002	6.75
29...	1000	20	4.5	2	4	0.325	0.031	0.30	0.030	0.012	3.23
JUL											
13...	1300	22	5.3	3	4	0.332	0.037	0.40	0.040	0.007	6.07
18...	1400	21	5.5	2	3	0.301	0.020	0.40	0.030	0.011	5.52
AUG											
24...	1100	23	4.0	2	2	0.086	0.013	0.56	0.025	<0.002	9.72
SEP											
14...	1100	22	6.4	2	3	0.202	0.027	0.52	0.028	<0.002	6.78
OCT											
06...	1000	23	6.9	2	3	0.255	0.052	0.42	0.030	0.018	4.26
26...	1000	25	7.8	<2	<2	0.323	0.044	0.40	0.046	0.021	1.72
NOV											
07...	1400	24	7.8	2	<2	0.398	0.136	0.50	0.034	0.018	1.25
11...	1200	24	7.9	2	2	0.378	0.076	0.40	0.035	0.018	0.194
DEC											
05...	1300	22	7.8	4	4	0.452	0.049	0.40	0.020	0.011	1.05
JAN 1995											
24...	1400	20	7.4	2	5	0.525	<0.027	0.50	0.010	0.005	1.30
FEB											
17...	1100	20	7.4	2	2	0.498	<0.027	0.40	0.010	0.004	0.653
MAR											
15...	1130	23	7.8	4	4	0.572	0.033	0.30	0.010	0.003	3.54
20...	1500	20	6.8	3	2	0.488	0.027	0.40	0.020	0.005	3.21
25...	1400	21	7.1	4	3	0.500	<0.027	0.40	0.020	0.003	4.38
APR											
13...	1330	22	6.2	2	4	0.312	<0.027	0.40	0.020	<0.002	2.86
MAY											
10...	1000	19	4.2	2	4	0.261	<0.027	0.40	0.016	<0.002	2.04
JUN											
07...	1400	20	3.9	3	3	0.123	<0.027	0.30	0.022	0.00	2.32
JUL											
17...	1400	22	2.6	4	5	<0.010	<0.027	0.40	0.016	<0.002	1.24
AUG											
16...	1000	25	3.6	3	6	0.028	<0.027	0.50	0.022	<0.002	15.0
20...	1200	25	4.9	4	4	0.112	<0.027	0.50	0.025	0.003	10.1
OCT											
17...	1400	25	4.6	4	3	0.204	0.060	0.40	0.025	0.013	2.99

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122200 WHITE RIVER NEAR WHITEHALL, MI

LOCATION.--Lat 43°27'51", long 86°13'57", in SE1/4 NW1/4 sec.4, T.12 N., R.16 W., Muskegon County, Hydrologic Unit 04060101, on right bank 30 ft downstream from bridge on Fruitvale Road, 6.3 mi downstream from North Branch, and 6.9 mi northeast of Whitehall.

DRAINAGE AREA.--406 mi².

PERIOD OF RECORD.--August 1957 to current year.

REVISED RECORDS.--WDR MI-83-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 594.10 ft above sea level. Nov. 18, 1957 to Oct. 22, 1958, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	368	360	546	366	e420	387	444	801	388	353	307	297
2	423	418	513	366	e410	379	428	709	375	346	292	287
3	409	426	488	365	405	352	417	586	377	320	287	289
4	377	463	473	e360	398	e355	412	528	408	303	305	279
5	348	559	460	e360	e400	e360	405	508	423	321	297	270
6	330	677	449	e360	e400	e365	398	506	410	346	291	267
7	317	768	446	e360	e400	374	396	496	384	343	284	267
8	310	874	447	e360	e400	378	405	479	404	332	276	267
9	347	823	443	e360	e400	375	442	468	418	319	273	266
10	386	769	437	e360	e400	389	447	484	404	304	271	263
11	375	732	426	e360	e405	385	434	526	389	292	270	260
12	360	635	414	e400	e405	452	433	542	375	283	277	257
13	344	535	390	e500	e410	620	462	503	361	279	378	254
14	332	490	390	588	e410	783	469	478	347	276	363	253
15	323	477	379	773	e410	868	449	497	336	273	333	251
16	318	470	374	1130	e415	888	423	505	331	271	304	248
17	313	453	381	1020	e420	871	404	484	324	270	443	256
18	309	437	400	887	e425	819	392	454	313	271	598	288
19	313	421	426	818	e435	763	456	433	305	271	704	282
20	313	406	432	746	e440	701	600	418	298	269	720	277
21	311	403	428	696	e450	664	632	405	290	268	646	276
22	308	422	420	680	e455	672	595	394	285	267	703	289
23	309	452	412	635	e435	646	577	388	282	277	629	302
24	308	442	407	587	418	579	545	409	279	288	416	298
25	309	423	405	551	412	519	496	437	277	272	353	288
26	314	407	401	524	408	483	456	430	277	270	335	279
27	317	398	396	491	398	462	513	413	298	271	321	272
28	315	449	390	479	397	453	751	402	340	328	313	267
29	308	547	386	452	---	458	1020	401	391	387	314	262
30	303	570	380	447	---	474	907	401	389	382	320	257
31	302	---	370	e430	---	464	---	398	---	345	313	---
TOTAL	10319	15706	13109	16811	11581	16738	15208	14883	10478	9397	11936	8168
MEAN	333	524	423	542	414	540	507	480	349	303	385	272
MAX	423	874	546	1130	455	888	1020	801	423	387	720	302
MIN	302	360	370	360	397	352	392	388	277	267	270	248
CFSM	.82	1.29	1.04	1.34	1.02	1.33	1.25	1.18	.86	.75	.95	.87
IN.	.95	1.44	1.20	1.54	1.06	1.53	1.39	1.36	.96	.86	1.09	.75

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 1995, BY WATER YEAR (WY)

MEAN	390	466	489	454	460	649	677	498	408	314	306	354
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	269	286	252	240	382	315	259	230	202	186	212
(WY)	1972	1972	1959	1959	1959	1964	1958	1958	1958	1964	1958	1957

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1957 - 1995

ANNUAL TOTAL	171439	154334	
ANNUAL MEAN	470	423	
HIGHEST ANNUAL MEAN			456
LOWEST ANNUAL MEAN			635
HIGHEST DAILY MEAN	1200	1130	1976
LOWEST DAILY MEAN	277	248	1958
ANNUAL SEVEN-DAY MINIMUM	279	254	Sep 1 1975
INSTANTANEOUS PEAK FLOW		1150	Aug 18 1958
INSTANTANEOUS LOW FLOW		4.82	Aug 14 1958
ANNUAL RUNOFF (CFSM)	1.16	1.04	Sep 1 1975
ANNUAL RUNOFF (INCHES)	15.71	14.14	Sep 1 1975
10 PERCENT EXCEEDS	722	630	(b)
50 PERCENT EXCEEDS	414	400	
90 PERCENT EXCEEDS	317	277	

(a) Sept. 16, 17.

(b) Aug. 18, 19, 1958.

(c) 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 highway bridge at south edge of Scottville, 1.4 mi upstream from India Creek, and 5.6 mi downstream from Big South Branch.

DRAINAGE AREA.--681 mi².

WATER-DISCHARGE RECORDS

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.--Water-discharge records good except for estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	687	605	954	688	e815	e700	831	1470	685	790	549	493
2	701	622	903	696	812	e680	811	1280	660	687	526	483
3	729	674	878	686	778	666	799	1120	701	625	520	477
4	692	705	881	e680	759	e680	791	994	732	598	522	472
5	647	731	875	e680	e750	e700	784	929	779	604	521	467
6	613	921	860	e680	e750	e720	769	903	740	628	523	469
7	593	1090	843	e680	e750	731	761	890	696	633	539	477
8	597	1200	834	e680	e750	731	782	852	682	614	497	476
9	631	1290	815	e680	e750	716	794	826	693	595	488	475
10	662	1220	792	e680	e750	705	816	848	679	570	484	468
11	692	1070	767	e680	e750	720	805	882	659	555	484	463
12	662	968	742	e700	e760	801	797	893	645	542	570	461
13	629	886	701	e900	e760	1050	819	858	625	530	635	458
14	610	860	694	1260	e760	1360	848	848	607	520	731	454
15	592	838	711	1340	e770	1580	839	830	592	523	661	452
16	584	828	695	1600	e780	1720	801	840	586	610	623	453
17	585	803	705	1750	e780	1870	764	805	575	614	780	511
18	583	774	719	1740	e780	1810	762	773	561	601	881	535
19	585	748	737	1510	e790	1660	859	749	551	560	925	556
20	581	733	749	1370	e800	1550	999	725	540	548	979	529
21	578	742	748	1320	e810	1540	1130	703	530	559	832	521
22	573	751	745	1290	e820	1500	1160	688	519	565	680	554
23	572	796	747	1220	e820	1420	1120	696	508	558	614	566
24	567	806	742	1130	786	1300	1070	730	500	558	578	577
25	592	768	743	1050	772	1170	973	756	499	552	558	558
26	631	739	746	996	754	1060	887	756	545	523	544	543
27	629	741	733	907	734	974	1010	719	632	510	531	530
28	627	844	721	892	724	918	1220	707	690	536	523	516
29	617	930	716	e860	---	886	1390	711	784	574	519	506
30	610	978	712	e840	---	864	1520	720	825	630	514	494
31	605	---	696	e820	---	854	---	708	---	585	505	---
TOTAL	19256	25661	23904	31005	21614	33636	27711	26209	19020	18097	18836	14994
MEAN	621	855	771	1000	772	1085	924	845	634	584	608	500
MAX	729	1290	954	1750	820	1870	1520	1470	825	790	979	577
MIN	567	605	694	680	724	666	761	688	499	510	484	452
CFSM	.91	1.26	1.13	1.47	1.13	1.59	1.36	1.24	.93	.86	.89	.73
IN.	1.05	1.40	1.31	1.69	1.18	1.84	1.51	1.43	1.04	.99	1.03	.82

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1995, BY WATER YEAR (WY)

MEAN	607	710	737	701	707	972	1044	785	672	535	494	554
MAX	1507	1523	1311	1129	1301	1779	1732	1161	1296	1232	826	1880
(WY)	1987	1986	1992	1985	1984	1976	1993	1974	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1939 - 1995

ANNUAL TOTAL	290915	279943	709
ANNUAL MEAN	797	767	1087
HIGHEST ANNUAL MEAN			472
LOWEST ANNUAL MEAN			1958
HIGHEST DAILY MEAN	1900	Feb 22	6020
LOWEST DAILY MEAN	496	Jun 23	310
ANNUAL SEVEN-DAY MINIMUM	513	Jun 17	322
INSTANTANEOUS PEAK FLOW			6440
INSTANTANEOUS PEAK STAGE			8.07
INSTANTANEOUS LOW FLOW			209
ANNUAL RUNOFF (CFSM)	1.17	1.13	1.04
ANNUAL RUNOFF (INCHES)	15.89	15.29	14.16
10 PERCENT EXCEEDS	1160	1080	1070
50 PERCENT EXCEEDS	721	721	630
90 PERCENT EXCEEDS	568	522	427

(a) Sept. 15, 16.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122500 PERE MARQUETTE RIVER AT SCOTTVILLE, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1993 to October 1995 (discontinued).

REMARKS.--Cross-sectional samples were collected in the vicinity of the gage. Unpublished records of selected herbicides, metals and organics will be available upon release by the cooperating agencies.

COOPERATION.--All published data were collected by the U.S. Geological Survey and the Michigan Department of Natural Resources and analyzed by the Wisconsin State Laboratory of Hygiene.

WATER-QUALITY DATA

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
OCT 1993												
13...	1145	--	--	--	--	--	170	43	15	--	--	--
APR 1994												
05...	1200	307	8.0	5.5	10.9	89	150	39	12	6.0	0.74	14
13...	1200	318	7.9	7.5	10.3	89	160	41	13	7.0	0.71	16
25...	1230	306	7.8	13.0	8.8	85	150	39	13	8.0	1.1	14
MAY												
03...	1030	285	8.0	9.0	9.4	--	150	40	13	6.0	0.85	13
10...	0930	324	8.0	12.5	7.2	69	170	43	14	7.0	0.62	16
JUN												
06...	1300	351	7.9	17.0	7.6	80	180	46	15	9.0	0.65	28
28...	1300	341	7.9	18.5	7.7	85	170	43	14	7.0	0.77	17
JUL												
09...	0930	273	7.2	20.5	5.2	59	130	35	11	4.0	1.4	14
AUG												
23...	1200	--	--	--	--	--	170	43	14	7.0	0.73	15
SEP												
13...	1300	343	8.0	17.5	8.0	85	170	45	15	9.0	0.67	17
OCT												
05...	1330	338	8.0	10.5	10.1	91	170	44	14	7.5	0.90	17
25...	1200	354	8.0	8.0	10.0	86	170	44	15	8.0	0.90	18
NOV												
08...	1030	264	7.6	7.5	10.1	86	140	35	12	4.7	1.5	13
DEC												
06...	1030	305	7.9	5.0	11.0	--	160	42	14	6.2	0.80	16
JAN 1995												
25...	1030	286	7.9	1.0	8.8	--	150	40	13	6.1	0.80	13
FEB												
16...	1400	325	7.8	0.0	11.1	76	170	45	15	7.5	0.80	18
MAR												
14...	1400	243	7.6	3.0	--	--	120	31	10	5.1	1.4	11
16...	1130	210	7.7	3.5	--	--	110	28	9.5	3.6	1.1	10
16...	1330	210	7.7	4.5	--	--	110	29	9.6	3.6	1.1	10
18...	1300	196	8.1	5.5	11.1	89	110	29	9.6	3.5	0.90	10
21...	1000	241	7.7	6.0	10.2	85	130	32	11	4.6	1.0	12
26...	1030	294	7.9	6.0	11.0	89	150	38	13	6.0	0.60	13
APR												
14...	1000	308	8.0	5.5	10.8	87	160	39	14	6.8	0.60	15
MAY												
09...	1130	322	8.0	9.5	9.9	89	160	42	14	7.6	0.90	14
JUN												
08...	1030	347	7.8	17.0	8.9	93	--	--	--	--	--	16
JUL												
18...	1115	343	7.9	20.0	7.5	85	--	--	--	--	--	18
AUG												
15...	1215	339	7.8	21.0	7.5	86	--	--	--	--	--	16
19...	1200	318	7.6	21.5	6.8	78	--	--	--	--	--	14
OCT												
18...	1300	355	8.2	9.5	9.6	85	--	--	--	--	--	19

STREAMS TRIBUTARY TO LAKE MICHIGAN

04122500 PERE MARQUETTE RIVER AT SCOTTVILLE, MI--Continued.

WATER-QUALITY DATA

DATE	TIME	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLA- TILE, SUS- PENDED (MG/L) (00535)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CHLORO- PHYLL A TRICHR. UNCORR. WHOLE TOTAL (UG/L) (32210)
OCT 1993											
13...	1145	13	8.1	4	<2	--	--	--	<0.020	0.005	1.65
APR 1994											
05...	1200	9.6	6.6	11	4	0.126	0.030	0.40	0.020	0.006	2.70
13...	1200	11	6.3	8	6	0.095	0.027	0.20	0.020	0.005	4.63
25...	1230	12	5.9	50	13	0.143	0.081	0.60	0.090	0.012	11.0
MAY											
03...	1030	9.5	6.4	12	4	0.066	0.015	0.40	0.030	0.007	4.45
10...	0930	12	5.9	18	8	0.053	0.022	0.50	0.040	0.007	7.46
JUN											
06...	1300	14	5.7	22	10	0.057	0.032	<0.20	<0.020	0.006	6.96
28...	1300	11	8.2	23	12	0.091	0.022	0.40	0.040	0.006	5.76
JUL											
09...	0930	6.9	9.0	14	5	0.194	0.049	0.70	0.080	0.029	2.98
AUG											
23...	1200	11	7.6	13	6	0.071	0.019	0.53	0.039	0.005	3.23
SEP											
13...	1300	13	6.4	9	5	0.058	0.016	0.26	0.030	0.00	2.15
OCT											
05...	1330	12	8.3	4	4	0.108	<0.027	0.19	0.017	0.003	2.51
25...	1200	14	8.4	4	2	0.058	0.027	0.21	0.031	0.002	3.14
NOV											
08...	1030	7.8	8.7	12	3	0.111	0.065	0.60	0.042	0.009	3.61
DEC											
06...	1030	10	8.4	6	3	0.136	0.027	0.30	0.020	0.003	2.12
JAN 1995											
25...	1030	9.7	7.9	5	3	0.174	<0.027	0.40	0.010	0.005	1.30
FEB											
16...	1400	12	8.9	4	3	0.140	<0.027	<0.21	0.010	0.003	0.339
MAR											
14...	1400	8.5	6.6	44	11	0.354	0.038	0.50	0.090	0.017	3.97
16...	1130	5.8	6.7	14	4	0.255	<0.027	0.50	0.040	0.010	2.04
16...	1330	5.8	6.7	12	4	0.273	<0.027	0.60	0.050	0.010	2.05
18...	1300	5.5	6.8	9	5	0.134	<0.027	0.50	0.030	0.007	2.08
21...	1000	7.2	6.8	14	4	0.187	<0.027	0.60	0.050	0.015	2.79
26...	1030	9.3	7.0	14	6	0.115	<0.027	0.40	0.040	0.006	3.54
APR											
14...	1000	11	6.6	8	6	0.085	<0.027	0.40	0.030	<0.002	3.63
MAY											
09...	1130	12	6.4	10	7	0.088	<0.027	0.40	0.027	0.004	3.39
JUN											
08...	1030	12	6.5	24	10	0.094	<0.027	0.40	0.046	0.003	6.22
JUL											
18...	1115	12	7.5	15	8	0.073	<0.027	0.40	0.036	0.009	2.85
AUG											
15...	1215	11	8.6	16	9	0.118	<0.027	0.40	0.036	<0.002	--
19...	1200	9.1	9.2	22	12	0.152	<0.027	0.50	0.048	0.013	6.88
OCT											
18...	1300	13	8.2	5	4	0.041	<0.027	0.30	0.014	0.002	2.25

STREAMS TRIBUTARY TO LAKE MICHIGAN

444351084561801 BEAR LAKE NEAR KALKASKA, MI

LOCATION.--Lat 44°43'51", long 84°56'18", in NW1/4 SE1/4 sec. 17, T.27 N., R.5 W., Kalkaska County, Hydrologic Unit 04060103, on east 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. Once daily reading by observer. Elevation of gage is 1,183 ft above sea level, from topographic map.

REMARKS.--Top of ice readings: Feb. 18, 25, Mar. 4, 11, 18, 24. No inlets or outlets.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 1.68 ft, Aug. 26, 28, 1994; minimum observed, 0.76 ft, Sept. 30, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 1.60 ft, Oct. 1; minimum observed, 0.76 ft, Sept. 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.60	1.30	1.42	---	---	---	---	---	1.38	1.33	1.28	1.14
2	1.54	1.28	1.40	---	---	---	---	---	1.40	---	1.31	1.12
3	1.52	1.28	1.38	---	---	---	---	---	1.39	---	1.31	1.10
4	1.54	1.34	1.42	---	---	1.28	---	---	1.41	---	1.28	1.06
5	1.50	1.40	1.38	---	---	---	---	---	1.40	---	1.26	1.02
6	1.52	1.45	1.34	---	---	---	---	1.34	1.39	---	1.22	---
7	1.50	1.48	1.34	---	---	---	---	---	1.40	---	1.21	1.00
8	1.48	1.45	1.30	---	---	---	1.30	---	1.36	1.30	1.20	---
9	1.55	1.42	1.30	---	---	---	---	---	1.36	1.29	1.21	1.00
10	1.48	1.40	1.30	---	---	---	---	---	1.38	1.30	1.20	.92
11	1.50	1.42	1.28	---	---	1.22	---	1.40	1.36	1.28	1.20	.89
12	1.46	1.40	1.28	---	---	---	---	1.40	1.38	1.28	1.22	.88
13	1.43	1.42	1.28	---	---	---	---	1.40	1.34	1.27	1.20	.89
14	1.41	1.46	1.28	---	---	---	---	1.50	1.30	1.40	1.22	.94
15	1.40	1.40	1.28	---	---	---	1.15	1.45	1.29	1.39	1.20	---
16	1.38	1.38	1.30	---	---	---	---	1.42	1.28	1.40	1.22	.90
17	1.40	1.35	1.30	---	---	---	---	1.41	1.27	1.39	1.24	.90
18	1.41	1.38	1.30	---	1.30	1.30	---	1.40	1.26	1.39	1.24	.92
19	1.42	1.35	1.30	---	---	---	---	1.39	1.23	1.40	1.26	.90
20	1.42	1.38	1.28	---	---	---	---	1.39	1.20	1.38	1.24	.89
21	1.38	---	1.28	---	---	---	---	1.38	1.19	1.36	1.26	.87
22	1.40	1.42	1.29	---	---	---	1.22	1.38	1.18	1.39	1.28	.89
23	1.40	1.42	1.28	---	---	---	---	1.40	1.18	1.38	1.28	---
24	1.42	1.42	1.26	---	---	1.30	---	1.37	1.17	1.36	1.28	.88
25	1.42	1.40	---	---	1.32	---	---	1.38	1.17	1.35	1.24	.84
26	1.40	1.37	---	---	---	---	---	1.38	1.30	1.34	1.20	.84
27	1.40	1.40	---	---	---	---	---	1.40	1.42	1.35	1.18	.82
28	1.41	1.40	1.28	---	---	---	---	1.40	1.41	---	1.18	.78
29	1.37	1.38	1.27	---	---	---	1.40	1.38	1.40	---	1.14	.76
30	1.30	1.41	1.24	---	---	---	---	1.40	1.39	---	1.14	.76
31	1.29	---	---	---	---	1.13	---	1.37	---	1.28	1.12	---
MEAN	1.44	---	---	---	---	---	---	---	1.32	---	1.23	---
MAX	1.60	---	---	---	---	---	---	---	1.42	---	1.31	---
MIN	1.29	---	---	---	---	---	---	---	1.17	---	1.12	---

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124000 MANISTEE RIVER NEAR SHERMAN, MI

LOCATION.--Lat 44°26'11", long 85°41'55", in NE1/4 NE1/4 sec.36, T.24 N., R.12 W., Wexford County, Hydrologic Unit 04060103, on right bank 50 ft downstream from bridge on State Highway 37, 200 ft upstream from Wheeler Creek, 0.9 mi north of Sherman, and at mile 60.8.

DRAINAGE AREA.--857 mi².

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. Elevation of gage is 804 ft above sea level, from river-profile map. Prior to Apr. 13, 1934, at various datums. Apr. 14, 1934 to Oct. 25, 1990, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1140	939	1100	956	992	e890	1160	1570	1070	1230	819	e750
2	1140	924	1120	968	e960	e870	1140	1410	1010	1150	795	e740
3	1110	915	1180	952	e950	868	1130	1290	979	1070	e788	e730
4	1060	980	1190	e930	e950	e880	1120	1230	984	979	e780	e720
5	1010	1160	1200	e920	e940	e900	1100	1190	957	929	e780	e720
6	970	1560	1200	e920	e940	947	1090	1170	936	910	e780	e720
7	946	e1650	1180	e920	e940	947	1110	1150	916	910	e770	e720
8	961	e1700	1140	e920	e950	945	1120	1130	896	905	e760	e720
9	1040	e1680	1090	e920	e950	932	1120	1140	879	898	e750	e720
10	1040	e1550	1040	e910	e960	920	1100	1170	874	879	e750	e710
11	1030	1420	997	e910	e960	941	1080	1180	875	854	e780	e700
12	1020	1260	957	e910	e960	1040	1080	1150	867	837	e880	e700
13	984	1190	977	1100	e960	1320	1100	1110	858	828	e1000	e700
14	956	1160	981	1360	e960	1730	1100	1160	850	826	e1000	e700
15	935	1140	968	1940	e970	1870	1080	1160	844	847	e980	e700
16	926	1110	967	1710	e980	1900	1060	1120	835	856	e960	e720
17	917	1080	986	1520	e990	1890	1040	1100	825	839	e1200	e780
18	917	1060	996	1420	e1000	1850	1040	1070	821	846	e1300	e830
19	932	1040	994	1360	e1010	1870	1200	1050	821	855	e1400	e850
20	931	1030	991	1320	e1020	1980	1280	1020	811	848	e1400	e820
21	931	1050	989	1270	e1030	2010	1260	1000	801	843	e1300	e800
22	923	1080	989	1230	e1040	1930	1390	994	790	824	e1100	e840
23	916	1080	996	1190	1050	1810	1460	993	778	834	e950	e870
24	914	1050	1010	1150	991	1660	1440	1040	771	818	e900	e870
25	936	1040	1020	1130	969	1510	1350	1050	772	807	e850	e840
26	959	1030	1020	1100	954	1400	1240	1020	787	833	e820	e820
27	986	1020	1000	1080	939	1340	1400	1000	876	818	e810	e800
28	1010	1090	994	1070	e910	1290	1860	1010	967	823	e790	e780
29	998	1120	993	1020	---	1250	1810	1050	1220	866	e780	e770
30	969	1120	982	e1000	---	1230	1690	1090	1240	857	e770	e760
31	947	---	954	995	---	1190	---	1100	---	822	e760	---
TOTAL	30454	35228	32201	35101	27225	42110	37158	34917	26910	27441	28502	22900
MEAN	982	1174	1039	1132	972	1358	1238	1126	897	885	919	763
MAX	1140	1700	1200	1940	1050	2010	1860	1570	1240	1230	1400	870
MIN	914	915	954	910	910	868	1040	993	771	807	750	700
CFSM	1.15	1.37	1.21	1.32	1.13	1.59	1.44	1.31	1.05	1.03	1.07	.89
IN.	1.32	1.53	1.40	1.52	1.18	1.83	1.61	1.52	1.17	1.19	1.24	.99

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 1995, BY WATER YEAR (WY)

MEAN	980	1057	1042	1001	983	1205	1538	1206	1054	942	889	921
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	773	780	848	754	604	808	1058	834	802	740	722	717
(WY)	1965	1982	1979	1936	1936	1940	1987	1958	1958	1936	1964	1966

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1903 - 1995

ANNUAL TOTAL	416990	380139	
ANNUAL MEAN	1142	1041	(a)1067
HIGHEST ANNUAL MEAN			1261
LOWEST ANNUAL MEAN			888
HIGHEST DAILY MEAN	2210	2010	3500
LOWEST DAILY MEAN	780	(e)700	540
ANNUAL SEVEN-DAY MINIMUM	793	704	549
INSTANTANEOUS PEAK FLOW		2220	(b)3570
INSTANTANEOUS PEAK STAGE		14.15	(c)15.01
INSTANTANEOUS LOW FLOW			
ANNUAL RUNOFF (CFSM)	1.33	1.22	1.25
ANNUAL RUNOFF (INCHES)	18.10	16.50	16.92
10 PERCENT EXCEEDS	1560	1350	1430
50 PERCENT EXCEEDS	1060	989	984
90 PERCENT EXCEEDS	891	789	823

(a) Does not include water years 1931, 1934.

(b) Determined from graph based on gage readings.

(c) Backwater from ice, does not include water years 1903-1990.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04124500 EAST BRANCH PINE RIVER NEAR TUSTIN, MI

LOCATION.--Lat 44°06'09", long 85°31'02", in NE1/4 NW1/4 sec. 28, T.20 N., R.10 W., Osceola County, Hydrologic Unit 04060103, on left bank 75 ft downstream from bridge on Marion Road, 3.0 mi west of Tustin.

DRAINAGE AREA.--60.0 mi².

PERIOD OF RECORD.--July 1952 to September 1963, October 1963 to September 1991 (operated as a crest-stage partial-record station), October 1991 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,077.65 ft above sea level (levels by Michigan Department of Natural Resources).

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	22	37	26	27	22	37	69	24	29	16	14
2	27	21	43	24	27	21	34	64	22	22	14	14
3	24	19	50	e24	25	21	35	61	39	18	14	14
4	22	38	62	24	25	21	38	53	34	17	15	13
5	21	53	67	24	24	21	34	54	27	20	31	12
6	20	128	67	24	24	21	36	51	23	33	26	12
7	20	99	56	24	24	22	38	45	27	26	20	12
8	22	78	46	24	24	23	40	41	26	22	17	12
9	30	67	41	23	24	23	42	42	22	19	15	12
10	27	55	35	23	e24	23	35	47	21	17	14	11
11	25	47	33	24	24	25	34	45	20	16	16	11
12	23	41	28	35	24	34	34	41	19	14	102	11
13	22	38	e27	37	24	63	35	37	17	15	78	11
14	21	38	e26	128	23	115	34	42	16	17	71	11
15	21	36	25	142	23	154	31	40	15	16	53	11
16	21	33	26	105	23	161	30	36	14	73	60	11
17	20	31	28	87	23	144	29	34	13	60	87	19
18	20	29	29	74	24	117	35	30	12	39	87	16
19	21	28	30	65	24	132	120	28	12	29	55	14
20	21	27	29	59	25	137	86	26	11	25	44	18
21	21	33	30	52	24	140	103	24	11	20	36	18
22	21	37	30	49	25	117	110	23	10	18	30	23
23	22	33	31	44	25	101	83	26	10	20	26	22
24	22	30	33	40	24	84	74	39	9.8	16	23	20
25	24	28	33	37	24	73	64	33	10	14	19	18
26	24	27	31	34	23	64	55	28	12	13	18	18
27	24	27	30	33	24	57	141	25	30	13	18	17
28	23	37	31	31	23	58	141	28	27	33	17	16
29	23	38	29	30	---	49	106	34	33	30	16	15
30	23	37	e28	29	---	44	82	31	40	24	15	14
31	22	---	27	28	---	40	---	27	---	19	14	---
TOTAL	705	1255	1118	1403	677	2127	1796	1204	606.8	747	1067	440
MEAN	22.7	41.8	36.1	45.3	24.2	68.6	59.9	38.8	20.2	24.1	34.4	14.7
MAX	30	128	67	142	27	161	141	69	40	73	102	23
MIN	20	19	25	23	23	21	29	23	9.8	13	14	11
CFSM	.38	.70	.60	.75	.40	1.14	1.00	.65	.34	.40	.57	.24
IN.	.44	.78	.69	.87	.42	1.32	1.11	.75	.38	.46	.66	.27

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1995, BY WATER YEAR (WY)

MEAN	26.5	33.9	26.1	20.2	21.5	53.5	84.3	36.3	22.7	17.2	18.1	15.0
MAX	99.9	90.8	83.8	45.3	54.4	93.6	190	75.4	70.4	45.1	68.5	44.2
(WY)	1992	1993	1992	1995	1994	1992	1959	1960	1993	1994	1956	1993
MIN	9.54	12.3	12.4	10.1	9.39	18.7	41.7	10.7	8.90	7.22	6.29	6.82
(WY)	1956	1954	1956	1956	1963	1956	1958	1958	1959	1959	1957	1955

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1952 - 1995

ANNUAL TOTAL	14493.4	13145.8	
ANNUAL MEAN	39.7	36.0	
HIGHEST ANNUAL MEAN			31.2
LOWEST ANNUAL MEAN			54.5
HIGHEST DAILY MEAN	212	Feb 21	1992
LOWEST DAILY MEAN	9.0	Jun 22	1958
ANNUAL SEVEN-DAY MINIMUM	9.6	Jun 17	Aug 4 1956
INSTANTANEOUS PEAK FLOW		161	Aug 4 1958
INSTANTANEOUS PEAK STAGE		9.8	Aug 1 1959
INSTANTANEOUS LOW FLOW		11	Aug 4 1956
ANNUAL RUNOFF (CFSM)		204	Aug 4 1956
ANNUAL RUNOFF (INCHES)		3.68	Aug 4 1956
10 PERCENT EXCEEDS		9.4	Mar 13 1958
50 PERCENT EXCEEDS		.60	
90 PERCENT EXCEEDS		8.15	
	.66		
	8.99		
	77		
	29		
	17		

(a) From rating curve extended above 450 ft³/s.

(b) June 24, 25.

(c) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

04126740 PLATTE RIVER AT HONOR, MI

LOCATION.--Lat 44°40'05", long 86°02'05", in SW1/4 NW1/4 sec.8, T.26 N., R.14 W., Benzie County, Hydrologic Unit 04060104, on right bank 20 ft downstream from bridge on U.S. Highway 31, 1.0 mi west of Honor.

DRAINAGE AREA.--118 mi².

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

GAGE.--Water-stage recorder. Datum of gage is 589.73 ft above sea level (Michigan Department of Transportation bench mark).

REMARKS.--Records good except for estimated daily discharges, which are fair. Some diversion for fish hatchery 6 mi upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	161	131	135	125	123	119	132	133	116	111	111	109
2	148	129	141	126	122	118	131	131	115	108	104	108
3	143	129	137	126	122	e118	129	129	114	107	105	109
4	140	130	134	e125	123	118	127	128	113	105	108	108
5	137	131	134	e125	e123	119	125	129	113	104	128	103
6	134	175	132	e125	e123	119	129	127	112	105	114	105
7	132	144	129	e125	e123	123	129	126	111	112	110	109
8	141	139	129	125	e123	121	130	125	109	106	108	107
9	149	136	129	124	e123	121	128	134	108	105	107	106
10	136	133	128	124	e123	121	125	131	109	104	107	105
11	133	131	127	124	e123	127	126	127	109	103	110	104
12	131	131	125	127	e123	144	130	125	108	103	151	104
13	131	130	125	132	e123	169	129	124	106	103	118	103
14	129	141	125	171	e123	165	127	129	104	102	129	105
15	129	133	125	154	e123	159	125	124	103	105	116	106
16	128	131	127	138	123	153	124	122	103	105	120	111
17	127	131	130	134	123	145	124	121	103	105	257	115
18	135	129	130	133	123	142	133	119	102	104	147	108
19	132	126	129	132	126	166	145	118	102	102	130	111
20	129	126	128	132	124	174	133	117	102	103	124	117
21	129	138	127	133	123	173	132	116	101	102	120	111
22	127	135	127	132	121	155	130	115	101	100	116	138
23	131	130	127	131	121	148	128	126	101	105	115	124
24	128	129	127	130	120	144	126	126	101	102	113	116
25	137	128	125	129	120	141	126	120	108	100	112	114
26	141	127	125	127	119	140	125	118	110	102	111	113
27	134	130	125	125	119	138	166	116	118	101	111	110
28	131	146	126	124	118	136	152	126	136	102	110	109
29	132	139	123	125	---	135	139	126	120	101	109	108
30	131	135	122	123	---	135	135	122	112	98	109	106
31	130	---	123	124	---	133	---	119	---	98	109	---
TOTAL	4176	4023	3976	4030	3423	4319	3940	3849	3270	3213	3739	3302
MEAN	135	134	128	130	122	139	131	124	109	104	121	110
MAX	161	175	141	171	126	174	166	134	136	112	257	138
MIN	127	126	122	123	118	118	124	115	101	98	104	103
CFSM	1.14	1.14	1.09	1.10	1.04	1.18	1.11	1.05	.92	.88	1.02	.93
IN.	1.32	1.27	1.25	1.27	1.08	1.36	1.24	1.21	1.03	1.01	1.18	1.04

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 1995, BY WATER YEAR (WY)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
MEAN	134	139	139	137	134	148	154	141	137	133	127	134
MAX	148	150	151	147	144	164	169	150	165	152	135	158
(WY)	1992	1993	1992	1992	1992	1992	1992	1993	1993	1993	1991	1993
MIN	123	129	128	130	122	139	131	124	109	104	117	110
(WY)	1993	1991	1995	1991	1995	1993	1995	1995	1995	1995	1992	1995

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1990 - 1995

ANNUAL TOTAL	50447	45260	138
ANNUAL MEAN	138	124	147
HIGHEST ANNUAL MEAN			1993
LOWEST ANNUAL MEAN			124
HIGHEST DAILY MEAN	257	Feb 20	386
LOWEST DAILY MEAN	120	Jul 3	98
ANNUAL SEVEN-DAY MINIMUM	123	Jun 27	100
INSTANTANEOUS PEAK FLOW			394
INSTANTANEOUS PEAK STAGE			2.94
INSTANTANEOUS LOW FLOW			86
ANNUAL RUNOFF (CFSM)	1.17	1.05	1.17
ANNUAL RUNOFF (INCHES)	15.90	14.27	15.87
10 PERCENT EXCEEDS	156	139	159
50 PERCENT EXCEEDS	133	125	135
90 PERCENT EXCEEDS	125	105	119

(a) Backwater from ice.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE MICHIGAN

445331085564501 GLEN LAKE NEAR GLEN ARBOR, MI

LOCATION.--Lat 44°51'31", long 85°59'46", in SW1/4 NW1/4 sec. 3, T.28 N., R.14 W., Leelanau County, Hydrologic Unit 04060104, at bridge on State Highway 22, 2.6 mi south of Glen Arbor.

DRAINAGE AREA.--30.8 mi².

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

GAGE.--Non recording gage. Once daily reading by observer. Datum of gage is 596.00 ft above sea level.

REMARKS.--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, 0.38 ft, Sept. 30, Oct. 1-4, 23-25, 29-31, 1976, Jan. 1, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 1.06 ft, May 15; minimum observed, 0.38 ft, Jan. 1.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

[illegible]

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. Once daily reading by observer. Elevation of gage is 794 ft above sea level, from topographic map.

REMARKS.--Top of ice readings: Dec. 11-17, 19, 26, Jan. 2, 9, 16, 23, 30, Feb. 6, 13, 20, 27. No inlets or outlets.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 5.07 ft, Feb. 13, 1995, but may have been greater during period of missing record; minimum observed, 4.01 ft, Sept. 30, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 5.07 ft, Feb. 13, but may have been greater during period of missing record; minimum observed, 4.01 ft, Sept. 30.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.90	4.71	4.78	---	---	---	4.86	4.96	4.88	4.42	4.22	4.17
2	4.90	4.70	4.78	4.92	---	---	4.86	4.97	4.87	4.41	4.22	4.16
3	4.88	4.72	4.78	---	---	---	4.86	4.98	4.86	4.40	4.22	4.18
4	4.86	4.74	4.80	---	---	---	4.86	4.98	4.85	4.40	4.21	4.16
5	4.84	4.76	4.80	---	---	---	4.86	4.97	4.84	4.42	4.23	4.14
6	4.83	4.76	4.82	---	5.01	5.01	4.86	4.97	4.82	4.44	4.22	4.12
7	4.83	4.76	4.82	---	---	---	4.85	4.96	4.80	4.43	4.21	4.12
8	4.85	4.78	4.83	---	---	---	4.85	4.96	4.78	4.42	4.20	4.10
9	4.85	4.80	4.83	4.90	---	---	4.85	4.97	4.76	4.40	4.18	4.09
10	4.84	4.80	4.84	---	---	---	4.84	4.98	4.74	4.40	4.17	4.08
11	4.82	4.80	4.84	---	---	---	4.83	4.98	4.74	4.40	4.16	4.06
12	4.82	4.80	4.86	---	---	---	4.85	4.96	4.74	4.39	4.15	4.05
13	4.82	4.80	4.86	---	5.07	4.94	4.85	4.96	4.73	4.38	4.20	4.04
14	4.80	4.80	4.86	---	---	---	4.84	4.97	4.72	4.38	4.24	4.04
15	4.80	4.78	4.87	---	---	---	4.85	4.97	4.72	4.37	4.26	4.04
16	4.80	4.77	4.87	4.97	---	---	4.85	4.96	4.71	4.36	4.30	4.03
17	4.78	4.76	4.88	---	---	---	4.86	4.96	4.70	4.38	4.36	4.06
18	4.78	4.74	---	---	---	---	4.86	4.95	4.64	4.36	4.44	4.05
19	4.78	4.74	4.88	---	---	---	4.88	4.94	4.62	4.34	4.42	4.04
20	4.78	4.74	---	---	5.02	4.98	4.88	4.94	4.60	4.32	4.40	4.05
21	4.77	4.74	---	---	---	---	4.89	4.92	4.57	4.30	4.38	4.06
22	4.77	4.74	---	---	---	---	4.90	4.90	4.55	4.30	4.36	4.07
23	4.76	4.76	---	4.97	---	---	4.90	4.89	4.53	4.29	4.34	4.08
24	4.76	4.75	---	---	---	---	4.92	4.90	4.50	4.28	4.32	4.07
25	4.76	4.74	---	---	---	---	4.92	4.89	4.48	4.30	4.30	4.06
26	4.76	4.74	4.86	---	---	---	4.92	4.88	4.48	4.32	4.28	4.05
27	4.76	4.74	---	---	5.01	4.98	4.93	4.88	4.46	4.28	4.26	4.04
28	4.74	4.75	---	---	---	---	4.94	4.89	4.44	4.25	4.24	4.03
29	4.73	4.75	---	---	---	4.88	4.94	4.90	4.44	4.26	4.22	4.02
30	4.72	4.76	---	4.99	---	4.96	4.95	4.89	4.42	4.26	4.20	4.01
31	4.72	---	---	---	---	4.86	---	4.89	---	4.24	4.18	---
MEAN	4.80	4.76	---	---	---	---	4.88	4.94	4.67	4.35	4.26	4.08
MAX	4.90	4.80	---	---	---	---	4.95	4.98	4.88	4.44	4.44	4.18
MIN	4.72	4.70	---	---	---	---	4.83	4.88	4.42	4.24	4.15	4.01

STREAMS TRIBUTARY TO LAKE MICHIGAN

445256085240001 ELK LAKE NEAR ELK RAPIDS, MI

LOCATION.--Lat 44°50'43", long 85°23'33", in SW1/4 SW1/4 sec.3, T.28 N., R.9 W., Antrim and Grand Traverse Counties, Hydrologic Unit 04060105, at Gay Road, 3.5 mi south of Elk Rapids.

DRAINAGE AREA.--410 mi², approximately.

PERIOD OF RECORD.--October 1951 to September 1995 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 586.25 ft above sea level (levels by Michigan Department of Natural Resources). Prior to June 20, 1952, nonrecording gage at same datum.

REMARKS.--Elk Lake is at the end of a long chain of interconnected lakes and is contiguous with Lake Skegemog. The major inlet to these lakes is Torch River. Smaller inlets include Williamsburg, Battle, Barker, and Desmond Creeks. The outlet of Elk Lake is Elk River. Lake elevation controlled by dam at Elk Rapids. Established legal level; summer, 589.50 ft, winter, 588.90 ft, above sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 3.88 ft, Oct. 6, 1986; minimum, 2.08 ft, Dec. 30, 31, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 3.47 ft, July 14; minimum recorded, 2.66 ft, Jan. 11-13, may have been less during period of no gage height record, Dec. 18 to Jan. 10.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.27	2.84	2.79	---	2.73	2.74	2.89	3.38	3.38	3.37	3.33	3.28
2	3.25	2.82	2.77	---	2.73	2.74	2.92	3.36	3.37	3.33	3.31	3.28
3	3.23	2.79	2.77	---	2.73	2.73	2.94	3.36	3.37	3.29	3.29	3.29
4	3.23	2.78	2.77	---	2.75	2.72	2.95	3.35	3.37	3.26	3.30	3.29
5	3.22	2.79	2.78	---	2.72	2.73	2.98	3.36	3.36	3.26	3.33	3.29
6	3.19	2.90	2.78	---	2.71	2.73	3.02	3.36	3.36	3.27	3.33	3.26
7	3.18	2.92	2.78	---	2.71	2.76	3.05	3.36	3.35	3.30	3.32	3.24
8	3.19	2.89	2.78	---	2.71	2.78	3.07	3.35	3.34	3.33	3.30	3.22
9	3.24	2.88	2.77	---	2.71	2.77	3.10	3.36	3.32	3.35	3.29	3.21
10	3.25	2.87	2.77	---	2.71	2.77	3.12	3.37	3.31	3.35	3.28	3.21
11	3.24	2.86	2.76	2.68	2.73	2.76	3.15	3.38	3.31	3.35	3.27	3.21
12	3.21	2.84	2.76	2.67	2.73	2.76	3.17	3.36	3.30	3.36	3.33	3.21
13	3.20	2.84	2.75	2.67	2.73	2.78	3.19	3.35	3.29	3.38	3.35	3.19
14	3.22	2.84	2.75	2.76	2.73	2.80	3.21	3.34	3.28	3.40	3.36	3.22
15	3.23	2.82	2.75	2.80	2.74	2.82	3.22	3.33	3.28	3.39	3.35	3.22
16	3.24	2.82	2.76	2.79	2.74	2.82	3.23	3.33	3.29	3.38	3.34	3.20
17	3.23	2.82	2.77	2.77	2.74	2.82	3.24	3.33	3.30	3.35	3.40	3.23
18	3.23	2.78	---	2.75	2.73	2.82	3.27	3.34	3.31	3.33	3.43	3.23
19	3.22	2.77	---	2.75	2.73	2.84	3.27	3.34	3.33	3.32	3.43	3.23
20	3.19	2.78	---	2.76	2.74	2.86	3.30	3.35	3.35	3.30	3.42	3.26
21	3.17	2.76	---	2.78	2.75	2.85	3.32	3.33	3.35	3.28	3.39	3.25
22	3.14	2.73	---	2.80	2.75	2.85	3.34	3.34	3.35	3.26	3.36	3.28
23	3.10	2.72	---	2.79	2.75	2.85	3.32	3.35	3.34	3.31	3.32	3.29
24	3.05	2.73	---	2.78	2.75	2.84	3.30	3.37	3.34	3.31	3.33	3.27
25	3.03	2.74	---	2.78	2.75	2.83	3.30	3.37	3.33	3.30	3.31	3.27
26	3.03	2.78	---	2.77	2.75	2.82	3.31	3.36	3.35	3.29	3.29	3.26
27	3.01	2.83	---	2.77	2.75	2.81	3.36	3.37	3.42	3.28	3.28	3.27
28	2.96	2.85	---	2.76	2.74	2.80	3.41	3.40	3.42	3.28	3.26	3.27
29	2.92	2.83	---	2.75	---	2.78	3.40	3.40	3.39	3.27	3.26	3.26
30	2.89	2.81	---	2.74	---	2.81	3.39	3.40	3.40	3.25	3.27	3.25
31	2.86	---	---	2.73	---	2.85	---	3.38	---	3.24	3.27	---
MEAN	3.15	2.81	---	---	2.73	2.79	3.19	3.36	3.34	3.31	3.33	3.25
MAX	3.27	2.92	---	---	2.75	2.86	3.41	3.40	3.42	3.40	3.43	3.29
MIN	2.86	2.72	---	---	2.71	2.72	2.89	3.33	3.28	3.24	3.26	3.19

STREAMS TRIBUTARY TO LAKE MICHIGAN

04127800 JORDAN RIVER NEAR EAST JORDAN, MI

LOCATION.--Lat 45°06'09", long 85°05'53", in NW1/4 NW1/4 sec.7, T.31 N., R.6 W., Antrim County, Hydrologic Unit 04060105, on right bank 300 ft downstream from Webster Bridge, 4.2 mi south of East Jordan, and 4.5 mi upstream from mouth.

DRAINAGE AREA.--67.9 mi².

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1960-65. October 1966 to current year.

REVISED RECORDS.--WDR MI-83-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 596.43 ft above sea level (Antrim County Road Commission bench mark). Nov. 19, 1959 to Sept. 30, 1966, nonrecording gage at site 600 ft upstream at same datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Some regulation at low flow by fish hatchery upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	193	180	188	185	192	185	201	202	184	190	211	161
2	179	178	204	188	187	184	196	199	183	178	181	161
3	175	178	203	189	185	e184	197	195	182	174	176	165
4	173	182	217	e188	190	184	203	192	180	171	199	161
5	173	186	218	e188	164	186	194	196	179	171	185	160
6	172	411	199	e188	e182	185	205	198	178	172	174	159
7	171	241	186	187	e182	191	206	191	179	184	171	166
8	191	200	182	188	e183	186	202	186	179	177	170	162
9	256	191	184	187	e184	187	196	195	175	173	169	161
10	198	185	184	186	e185	185	192	207	183	170	169	159
11	182	183	179	187	186	193	191	205	201	169	171	158
12	177	183	175	192	e186	222	199	194	180	168	178	158
13	175	183	178	208	e186	291	203	189	176	170	238	158
14	176	187	181	313	e186	356	202	199	174	171	301	171
15	179	181	180	309	e186	353	192	193	172	174	201	164
16	175	178	182	221	e186	309	189	187	171	214	178	164
17	174	180	189	204	187	265	187	202	170	184	456	196
18	212	179	191	203	189	244	196	189	169	182	306	164
19	193	176	189	201	195	305	245	186	169	177	186	162
20	181	177	188	200	191	288	204	185	167	174	180	183
21	183	189	187	202	190	301	263	185	165	171	171	167
22	178	199	186	199	187	254	238	186	164	187	168	193
23	183	186	191	196	188	228	203	200	164	351	168	209
24	192	183	191	195	187	216	196	217	165	196	168	168
25	267	186	186	194	186	211	198	194	168	176	167	165
26	223	182	184	193	185	212	205	189	170	173	169	164
27	192	179	186	191	185	208	298	184	186	172	170	160
28	184	206	187	188	185	203	337	257	243	181	166	158
29	182	201	182	e190	---	202	223	235	217	173	165	158
30	182	193	178	193	---	200	208	201	272	168	163	155
31	178	---	183	191	---	199	---	188	---	167	163	---
TOTAL	5849	5843	5838	6244	5205	7117	6371	6126	5465	5658	6038	4990
MEAN	189	195	188	201	186	230	212	198	182	183	195	166
MAX	267	411	218	313	195	356	337	257	272	351	456	209
MIN	171	176	175	185	164	184	187	184	164	167	163	155
CFSM	2.78	2.87	2.77	2.97	2.74	3.38	3.13	2.91	2.68	2.69	2.87	2.45
IN.	3.20	3.20	3.20	3.42	2.85	3.90	3.49	3.36	2.99	3.10	3.31	2.73

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1995, BY WATER YEAR (WY)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
MEAN	188	191	188	180	180	211	224	195	183	174	173	182
MAX	235	226	217	201	209	281	273	237	230	210	203	223
(WY)	1987	1993	1983	1995	1984	1979	1979	1983	1969	1975	1972	1986
MIN	167	163	163	157	157	174	181	164	160	151	150	150
(WY)	1967	1982	1982	1971	1982	1972	1987	1982	1982	1981	1981	1981

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1967 - 1995

ANNUAL TOTAL	71802	70744	189
ANNUAL MEAN	197	194	204
HIGHEST ANNUAL MEAN			171
LOWEST ANNUAL MEAN			171
HIGHEST DAILY MEAN	494	456	840
LOWEST DAILY MEAN	165	155	130
ANNUAL SEVEN-DAY MINIMUM	165	160	136
INSTANTANEOUS PEAK FLOW		713	1360
INSTANTANEOUS PEAK STAGE		5.50	6.51
INSTANTANEOUS LOW FLOW		(a)148	(a)91
ANNUAL RUNOFF (CFSM)	2.90	2.85	2.78
ANNUAL RUNOFF (INCHES)	39.34	38.76	37.83
10 PERCENT EXCEEDS	240	217	223
50 PERCENT EXCEEDS	183	186	180
90 PERCENT EXCEEDS	170	168	160

(a) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04127918 PINE RIVER NEAR RUDYARD, MI

LOCATION.--Lat 46°11'09", long 84°35'52", in NW1/4 NE1/4 sec.30, T.44 N., R.2 W., Chippewa County, Hydrologic Unit 04070002, on right bank 15 ft upstream from bridge on Mackinac Trail, 3.2 mi south of Rudyard.

DRAINAGE AREA.--184 mi².

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

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 601.50 ft above sea level. Prior to Aug. 4, 1972, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	88	97	e205	e100	e78	e78	270	490	197	96	64	111
2	81	94	e203	e98	e78	e78	245	402	164	96	70	88
3	77	91	e205	e95	e78	e78	e225	331	142	84	66	76
4	74	90	e280	e94	e78	e78	e220	288	125	79	65	70
5	73	91	e270	e92	e78	e78	e210	261	114	86	106	66
6	72	126	e275	e91	e78	e78	e205	236	105	94	150	71
7	69	187	256	e90	e78	e78	e200	205	100	82	121	189
8	69	166	239	e90	e78	e78	e205	183	108	77	98	224
9	80	148	e220	e88	e78	e78	e205	168	98	75	87	173
10	92	132	e205	e88	e78	e78	e210	169	93	70	80	139
11	91	119	e190	e88	e78	e78	219	185	142	68	76	120
12	83	113	e180	e88	e78	e120	430	183	130	67	76	105
13	81	110	e170	e87	e78	e200	456	161	109	66	83	95
14	78	120	e165	e96	e78	e300	375	243	94	66	106	91
15	80	138	e150	e100	e78	e550	307	244	84	76	99	86
16	75	130	e135	e100	e78	e850	265	210	78	89	84	82
17	75	121	e125	e100	e78	e780	243	309	74	105	75	94
18	104	116	e115	e100	e78	e680	282	291	71	109	70	94
19	164	114	e115	e100	e78	e620	1160	235	68	102	66	89
20	157	111	e110	e100	e78	e600	708	197	66	222	64	140
21	135	120	e115	e100	e78	e750	607	203	64	243	63	157
22	120	204	e120	e100	e78	e710	746	213	62	184	59	141
23	120	193	e125	e100	e78	e660	517	249	60	150	58	155
24	132	165	e130	e100	e78	e620	413	298	60	122	58	147
25	127	e170	e130	e100	e78	e560	349	242	60	103	58	133
26	126	e180	e130	e95	e78	e500	310	197	65	87	60	221
27	121	e190	e125	e87	e78	448	465	182	99	75	62	332
28	113	e195	e120	e78	e78	411	1510	248	109	70	60	266
29	108	e195	e120	e78	---	383	1020	439	94	68	59	210
30	105	e200	e115	e78	---	349	665	358	90	64	58	176
31	101	---	e110	e78	---	303	---	257	---	63	92	---
TOTAL	3071	4226	5153	2879	2184	11252	13242	7877	2925	3038	2393	4141
MEAN	99.1	141	166	92.9	78.0	363	441	254	97.5	98.0	77.2	138
MAX	164	204	280	100	78	850	1510	490	197	243	150	332
MIN	69	90	110	78	78	78	200	161	60	63	58	66
CFSM	.54	.77	.90	.50	.42	1.97	2.40	1.38	.53	.53	.42	.75
IN.	.62	.85	1.04	.58	.44	2.27	2.68	1.59	.59	.61	.48	.84

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 1995, BY WATER YEAR (WY)

	MEAN	213	287	182	118	105	273	829	264	178	105	104	148
MAX	347	807	328	248	217	544	1589	633	432	261	349	318	
(WY)	1979	1989	1983	1980	1984	1973	1985	1972	1974	1979	1973	1978	
MIN	71.8	72.7	63.0	60.3	65.9	90.7	281	123	76.8	60.3	58.5	65.3	
(WY)	1977	1977	1977	1977	1979	1978	1987	1987	1988	1988	1991	1976	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1972 - 1995

ANNUAL TOTAL	65254		62381									
ANNUAL MEAN	179		171									
HIGHEST ANNUAL MEAN										232		
LOWEST ANNUAL MEAN										344		1985
HIGHEST DAILY MEAN	2110	Apr 13	1510	Apr 28	4050	Apr 21	1985			149		1987
LOWEST DAILY MEAN	63	Aug 13	58	(a)	45	Aug 13	1991			50		Aug 28 1991
ANNUAL SEVEN-DAY MINIMUM	64	Feb 6	59	Aug 22	4500	Mar 30	1986			18.44		Mar 30 1986
INSTANTANEOUS PEAK FLOW			(b)1700	Apr 28						(f)33		Nov 16 1989
INSTANTANEOUS PEAK STAGE			(c)10.97	Mar 15						1.26		
INSTANTANEOUS LOW FLOW			57	(d)						17.11		
ANNUAL RUNOFF (CFSM)	.97		.93									
ANNUAL RUNOFF (INCHES)	13.19		12.61									
10 PERCENT EXCEEDS	275		318		463							
50 PERCENT EXCEEDS	113		108		125							
90 PERCENT EXCEEDS	67		70		71							

(a) Aug. 23-25, 30.

(b) Gage height 8.92 ft.

(c) Backwater from ice.

(d) Aug. 25, 30, 31.

(e) Estimated.

(f) Result of freezeup.

STREAMS TRIBUTARY TO LAKE HURON

04127937 EAST LAKE NEAR FIBRE, MI

LOCATION.--Lat 46°07'56", long 84°47'31", in SE1/4 SW1/4 sec.10, T.43 N., R.4 W., Mackinac County, Hydrologic Unit 04070002, 5.9 mi southwest of Fibre.

DRAINAGE AREA.--5.87 mi².

PERIOD OF RECORD.--July 1967 to September 1971, June 1990 to current year.

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, 5.68 ft, Oct. 9, 1990 (result of wind affect); minimum observed, 3.46 ft, datum then in use, Sept. 14-16, 1969.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 5.10 ft, April 28; minimum observed, 3.94 ft, Sept. 1-5.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.70	4.66	---	---	---	---	---	5.08	4.82	4.42	4.26	3.94
2	4.68	4.66	---	---	---	---	---	5.06	4.80	4.42	4.26	3.94
3	4.68	4.66	---	---	---	---	---	5.06	4.80	4.42	4.24	3.94
4	4.68	4.66	---	---	---	---	---	5.06	4.76	4.44	4.22	3.94
5	4.68	4.66	---	---	---	---	---	5.02	4.74	4.44	4.20	3.94
6	4.66	4.68	---	---	---	---	---	5.02	4.72	4.44	4.20	3.96
7	4.66	4.70	---	---	---	---	---	5.00	4.71	4.44	4.20	4.00
8	4.66	4.70	4.80	---	---	---	---	5.00	4.68	4.46	4.20	4.00
9	4.66	4.70	---	---	---	---	---	4.98	4.66	4.46	4.18	4.00
10	4.67	4.70	---	---	---	---	4.90	4.98	4.66	4.46	4.16	4.00
11	4.67	4.70	---	---	---	---	4.90	4.94	4.68	4.44	4.16	3.98
12	4.70	4.70	---	---	---	---	4.90	4.94	4.70	4.44	4.16	3.98
13	4.70	4.70	---	---	---	---	4.90	4.90	4.70	4.40	4.10	3.96
14	4.70	4.70	---	---	---	---	4.90	4.90	4.68	4.40	4.10	3.96
15	4.70	4.70	---	---	---	---	4.98	---	4.66	4.40	4.10	3.95
16	4.70	4.70	---	---	---	---	4.94	4.92	4.66	4.42	4.06	3.96
17	4.70	4.70	---	---	---	---	4.94	4.90	4.64	4.42	4.06	3.96
18	4.70	4.70	---	---	---	---	4.94	4.92	4.62	4.42	4.06	3.96
19	4.74	4.70	---	---	---	---	5.00	4.88	4.60	4.44	4.06	4.00
20	4.70	4.70	---	---	---	---	5.00	4.88	4.56	4.44	4.02	4.00
21	4.70	4.70	---	---	---	---	5.00	4.86	4.54	4.46	4.00	4.00
22	4.70	4.70	---	---	---	---	4.98	4.86	4.50	4.46	4.00	4.00
23	4.70	4.70	---	---	---	---	4.98	4.88	4.48	4.42	4.00	4.00
24	4.70	4.70	---	---	---	---	4.98	4.86	4.48	4.42	4.00	4.00
25	4.70	4.70	---	---	---	---	4.98	4.86	4.46	4.40	4.00	4.00
26	4.70	4.70	---	---	---	---	4.98	4.88	4.44	4.36	4.00	4.00
27	4.70	---	---	---	---	---	4.98	4.84	4.44	4.34	3.98	4.00
28	4.68	---	---	---	---	---	5.10	4.84	4.40	4.32	3.98	4.00
29	4.68	---	---	---	---	---	5.08	4.84	4.42	4.30	3.98	4.00
30	4.68	---	4.80	---	---	---	5.08	4.82	4.42	4.30	3.98	4.00
31	4.68	---	---	---	---	---	---	4.82	---	4.30	3.96	---

STREAMS TRIBUTARY TO LAKE HURON

452600084472001 CROOKED LAKE NEAR CONWAY, MI

LOCATION.--Lat 45°23'52", long 84°49'22", in NE1/4 SW1/4 sec.29, T.35 N., R.4 W., Emmet County, Hydrologic Unit 04070004, at Minnehaha Creek Inlet on Channel Road, 2.5 mi southeast of Conway.

DRAINAGE AREA.--101 mi².

PERIOD OF RECORD.--June 1942 to July 1945 (summer months only), August 1945 to 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.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 3.60 ft, Apr. 12, 1948, present datum; minimum, 0.54 ft, Mar. 30, 1982.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 2.56 ft, May 29, 30; minimum, 0.98 ft, Mar. 5, 11, 12.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.42	1.61	1.37	1.12	1.28	1.08	1.45	2.49	2.51	2.22	2.17	2.23
2	2.40	1.59	1.36	1.13	1.27	1.24	1.43	2.48	2.49	2.20	2.17	2.22
3	2.38	1.57	1.37	1.22	1.26	1.12	1.41	2.47	2.47	2.18	2.17	2.25
4	2.37	1.57	1.37	1.21	1.27	1.00	1.43	2.46	2.43	2.17	2.18	2.23
5	2.35	1.58	1.38	1.20	1.28	.99	1.38	2.45	2.40	2.17	2.18	2.24
6	2.34	1.68	1.39	1.21	1.28	1.00	1.37	2.44	2.39	2.16	2.16	2.24
7	2.33	1.74	1.37	1.22	1.27	1.13	1.36	2.44	2.39	2.17	2.14	2.25
8	2.34	1.75	1.35	1.23	1.26	1.12	1.36	2.43	2.39	2.16	2.13	2.25
9	2.41	1.75	1.34	1.24	1.25	1.16	1.35	2.42	2.36	2.15	2.12	2.24
10	2.41	1.75	1.32	1.24	1.25	1.04	1.34	2.43	2.37	2.14	2.11	2.23
11	2.40	1.74	1.32	1.25	1.25	.99	1.34	2.44	2.41	2.15	2.10	2.22
12	2.39	1.69	1.29	1.24	1.25	.99	1.33	2.43	2.40	2.14	2.10	2.22
13	2.39	1.66	1.26	1.26	1.25	1.02	1.36	2.43	2.37	2.15	2.14	2.21
14	2.38	1.61	1.25	1.32	1.25	1.11	1.38	2.48	2.36	2.16	2.17	2.24
15	2.31	1.59	1.23	1.42	1.28	1.23	1.40	2.49	2.34	2.18	2.17	2.24
16	2.25	1.56	1.22	1.45	1.32	1.33	1.41	2.49	2.32	2.20	2.17	2.24
17	2.17	1.54	1.23	1.45	1.27	1.38	1.41	2.46	2.31	2.23	2.40	2.26
18	2.12	1.45	1.23	1.44	1.20	1.39	1.45	2.44	2.28	2.25	2.49	2.24
19	2.05	1.39	1.22	1.43	1.16	1.44	1.55	2.42	2.26	2.25	2.46	2.26
20	1.99	1.41	1.21	1.43	1.16	1.50	1.64	2.41	2.24	2.24	2.42	2.29
21	1.94	1.40	1.20	1.44	1.14	1.60	1.73	2.39	2.23	2.23	2.38	2.29
22	1.88	1.37	1.19	1.45	1.13	1.64	1.83	2.38	2.21	2.22	2.34	2.31
23	1.82	1.36	1.19	1.44	1.12	1.65	1.89	2.39	2.19	2.25	2.30	2.36
24	1.77	1.33	1.18	1.42	1.12	1.64	1.95	2.40	2.19	2.24	2.30	2.36
25	1.83	1.32	1.17	1.41	1.10	1.62	1.99	2.40	2.17	2.23	2.29	2.35
26	1.83	1.30	1.17	1.39	1.24	1.60	2.05	2.39	2.17	2.22	2.30	2.35
27	1.79	1.31	1.16	1.37	1.09	1.59	2.21	2.38	2.18	2.21	2.30	2.34
28	1.73	1.34	1.17	1.36	1.05	1.57	2.39	2.45	2.19	2.19	2.28	2.34
29	1.68	1.38	1.14	1.34	---	1.55	2.45	2.54	2.19	2.18	2.28	2.33
30	1.65	1.38	1.13	1.32	---	1.50	2.48	2.55	2.21	2.16	2.26	2.30
31	1.63	---	1.12	1.30	---	1.48	---	2.53	---	2.14	2.25	---
MEAN	2.12	1.52	1.25	1.32	1.22	1.31	1.64	2.45	2.31	2.19	2.24	2.27
MAX	2.42	1.75	1.39	1.45	1.32	1.65	2.48	2.55	2.51	2.25	2.49	2.36
MIN	1.63	1.30	1.12	1.12	1.05	.99	1.33	2.38	2.17	2.14	2.10	2.21

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.37N., R.3W., Cheboygan County, Hydrologic Unit 04070004, in boat well in Laboratory building at University of Michigan Biological Station.

DRAINAGE AREA.--26.5 mi² at outlet.

PERIOD OF RECORD.--June 1942 to December 1959, October 1994 to September 1995.

GAGE.--Nonrecording gage. Once daily reading by observer. 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.--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 observed, 4.73 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, 4.04 ft, May 1; minimum observed, 2.78 ft, Sept. 12-14.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.96	---	3.24	---	3.34	---	---	4.04	---	---	---	---
2	2.94	---	3.24	---	3.36	---	---	---	3.88	---	3.04	---
3	2.92	3.02	3.26	3.28	3.34	3.24	3.70	4.02	---	3.30	3.02	---
4	2.92	3.02	3.30	---	---	---	---	4.02	3.84	---	3.00	---
5	2.90	3.04	3.30	---	---	---	---	---	3.80	3.26	2.98	---
6	2.88	---	---	---	3.34	---	---	---	3.78	3.30	2.98	2.84
7	2.88	---	---	---	3.34	---	3.68	---	3.78	---	2.94	---
8	2.90	3.12	3.32	---	3.34	3.30	3.68	3.94	---	3.26	2.92	2.82
9	2.90	3.12	3.30	---	---	---	---	---	---	---	2.90	2.82
10	---	---	3.32	---	3.34	---	---	3.94	3.68	---	2.90	---
11	---	3.14	---	---	---	---	3.64	---	---	---	2.88	2.80
12	2.90	3.14	3.30	---	---	---	3.66	---	3.66	3.18	---	2.78
13	2.90	3.12	3.30	---	3.34	3.24	---	---	3.62	3.18	2.86	2.78
14	2.90	3.14	3.30	---	3.34	3.24	---	---	3.58	3.18	2.88	2.78
15	2.88	3.14	3.30	---	3.34	---	---	---	---	3.20	2.86	---
16	2.90	3.16	3.30	---	---	---	---	3.99	---	3.18	2.84	---
17	2.86	3.14	3.30	---	---	---	3.62	---	---	3.20	---	2.82
18	2.92	3.14	3.30	---	---	---	---	---	---	3.18	---	2.82
19	2.94	3.14	3.30	---	---	---	---	3.96	---	---	2.98	2.84
20	---	3.14	3.28	---	3.34	---	3.70	3.94	---	---	---	---
21	2.94	---	3.28	---	3.32	3.54	---	---	3.44	3.14	2.96	2.86
22	2.94	---	3.26	---	3.30	---	---	3.88	3.40	3.18	---	---
23	2.94	---	---	---	3.30	3.64	---	---	3.38	3.18	---	---
24	3.00	3.14	---	---	---	---	---	3.90	3.36	---	---	---
25	---	3.16	---	---	---	---	3.74	3.86	---	3.14	---	2.92
26	3.04	3.14	---	---	---	---	---	3.86	---	---	---	2.94
27	3.02	---	---	3.38	3.28	3.60	---	---	3.26	3.12	2.84	2.94
28	3.06	3.16	---	---	---	---	---	---	3.26	3.10	2.84	---
29	3.04	3.24	---	---	---	---	3.98	3.90	3.26	3.10	2.84	2.94
30	3.02	3.26	---	3.36	---	---	4.02	3.90	---	---	2.80	---
31	3.02	---	---	3.40	---	3.70	---	3.88	---	---	---	---

STREAMS TRIBUTARY TO LAKE HURON

04127997 STURGEON RIVER AT WOLVERINE, MI

LOCATION.--Lat 45°16'28", long 84°36'00", in SE1/4 SW1/4 sec.6, T.33 N., R.2 W., Cheboygan County, Hydrologic Unit 04070004, on right bank at Cedar Street in Wolverine, 0.2 mi downstream from West Branch and 11.7 mi upstream from mouth.

DRAINAGE AREA.--192 mi².

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

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, non recording gage 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. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	208	209	223	203	211	190	214	256	221	223	184	171
2	201	211	234	203	210	177	214	241	209	193	186	173
3	198	210	244	199	e210	e190	221	234	205	181	178	179
4	197	206	253	e200	e210	e195	254	227	198	179	179	173
5	195	215	267	e200	160	197	221	223	193	174	201	176
6	196	397	250	e200	e200	196	222	226	192	188	231	175
7	192	393	227	e200	e200	200	225	218	194	190	187	197
8	200	270	214	202	e200	e200	229	211	194	180	177	197
9	264	242	212	198	e200	e200	221	211	190	174	175	177
10	250	230	208	195	e200	e200	212	217	192	170	173	173
11	220	228	204	199	201	207	211	227	240	168	175	172
12	210	221	198	217	e200	229	226	222	205	167	177	170
13	209	220	206	228	e200	302	228	211	192	169	209	171
14	204	223	203	323	e200	373	225	237	190	176	334	211
15	203	221	201	407	e200	397	215	232	181	184	376	196
16	200	213	204	292	e200	366	212	211	178	239	230	182
17	197	210	212	254	e200	328	206	212	178	220	530	229
18	233	212	214	243	e200	281	217	213	176	200	619	200
19	240	209	211	237	e200	316	345	202	175	188	431	188
20	217	207	211	235	e200	333	286	198	174	180	262	214
21	215	223	214	235	203	363	332	199	168	174	222	204
22	215	244	216	235	201	329	370	201	166	178	202	205
23	209	230	224	229	201	279	275	205	164	358	196	261
24	217	218	224	226	197	258	244	230	163	254	193	216
25	268	219	219	223	197	247	247	217	165	202	190	199
26	284	210	215	221	200	245	254	204	166	191	190	198
27	240	207	212	217	e200	243	385	206	178	185	189	195
28	226	228	213	204	195	235	503	320	193	192	181	189
29	218	236	207	206	---	230	345	405	238	194	178	188
30	215	227	198	e206	---	226	279	265	240	178	178	184
31	207	---	200	e208	---	219	---	226	---	171	175	---
TOTAL	6748	6989	6738	7045	5596	7951	7838	7107	5718	6020	7308	5763
MEAN	218	233	217	227	200	256	261	229	191	194	236	192
MAX	284	397	267	407	211	397	503	405	240	358	619	261
MIN	192	206	198	195	160	177	206	198	163	167	173	170
CFSM	1.13	1.21	1.13	1.18	1.04	1.34	1.36	1.19	.99	1.01	1.23	1.00
IN.	1.31	1.35	1.31	1.36	1.08	1.54	1.52	1.38	1.11	1.17	1.42	1.12

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1995, BY WATER YEAR (WY)

	MEAN	213	225	213	200	197	247	312	239	208	185	182	203
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	198	154	149	130	134	141	
(WY)	1957	1950	1949	1957	1957	1954	1958	1958	1958	1981	1944	1948	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1942 - 1995

ANNUAL TOTAL	86932						80821				219		
ANNUAL MEAN	238						221				268		1972
HIGHEST ANNUAL MEAN											167		1958
LOWEST ANNUAL MEAN											1080		Sep 29 1972
HIGHEST DAILY MEAN	509				Jul 6		619		Aug 18		113		Aug 6 1958
LOWEST DAILY MEAN	171				Jun 22		160		Feb 5		118		Aug 3 1958
ANNUAL SEVEN-DAY MINIMUM	177				Jun 18		167		Jun 20		118		Sep 29 1972
INSTANTANEOUS PEAK FLOW							765		Aug 17	(a)1290			Aug 17 1995
INSTANTANEOUS PEAK STAGE							5.13		Aug 17	(b)5.13			Mar 18 1993
INSTANTANEOUS LOW FLOW							(c)			(d)93			
ANNUAL RUNOFF (CFSM)	1.24						1.15			1.14			
ANNUAL RUNOFF (INCHES)	16.84						15.66			15.47			
10 PERCENT EXCEEDS	324						267			294			
50 PERCENT EXCEEDS	216						209			202			
90 PERCENT EXCEEDS	194						178			159			

(a) Site then in use.

(b) Present site and datum; peak stage at previous site and datum, 4.48 ft, Sept. 14, 1961.

(c) Not determined.

(d) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04128990 PIGEON RIVER NEAR VANDERBILT, MI

LOCATION.--Lat 45°09'24", long 84°28'00", in NW1/4 NW1/4 sec.20, T.32 N., R.1 W., Otsego County, Hydrologic Unit 04070004, on left bank at Sturgeon Valley Road, 9.7 mi east of Vanderbilt, 1.0 mi downstream from Lansing Club Dam, and 28.5 mi upstream from Mullett Lake.

DRAINAGE AREA.--57.7 mi².

PERIOD OF RECORD.--September 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 909.03 ft above sea level (Wade-Trim Inc. bench mark). September 1950 to October 1990, water-stage recorder at site 2.5 mi downstream at different datum (Station 04129000).

REMARKS.--Records good except for estimated daily discharges, which are fair. Prior to May 16, 1957, and since Apr. 22, 1958, occasional regulation by Lansing Club Dam 1.0 mi upstream. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	76	74	80	71	73	68	81	89	79	103	68	62
2	74	77	83	71	68	69	78	86	71	74	58	61
3	73	73	94	70	69	e69	86	83	71	69	58	65
4	75	80	97	61	e66	69	98	81	68	62	65	63
5	70	83	107	62	55	67	83	77	67	63	88	61
6	72	184	102	e69	e67	68	84	81	74	66	107	63
7	75	247	91	72	e68	e68	85	77	64	63	72	72
8	71	99	72	70	69	e68	85	76	68	62	62	68
9	116	90	76	70	e69	e68	85	75	60	62	65	67
10	105	82	84	69	e69	e68	78	79	67	58	63	64
11	75	82	59	70	69	69	78	83	83	60	62	64
12	78	78	71	74	64	85	86	77	66	57	63	63
13	74	85	71	79	e66	113	91	77	64	58	74	64
14	75	80	68	142	69	157	83	86	63	60	184	80
15	77	85	72	182	71	178	80	81	63	60	184	78
16	70	70	71	113	70	164	72	75	56	127	87	79
17	73	81	78	93	71	138	77	87	64	99	319	106
18	100	80	76	86	71	109	89	82	61	84	829	77
19	92	76	78	83	73	127	211	74	58	70	224	74
20	74	69	70	81	71	143	128	73	57	66	99	84
21	80	85	78	83	72	147	173	71	56	63	82	81
22	77	98	81	82	71	125	219	72	54	66	72	76
23	82	111	76	75	71	105	115	76	55	112	71	99
24	89	61	84	81	70	97	93	93	53	86	70	78
25	81	81	100	76	69	92	97	81	55	65	68	76
26	105	81	73	76	66	89	104	77	54	64	68	71
27	81	72	76	73	e67	98	155	71	58	60	69	70
28	84	81	81	65	68	84	241	133	70	74	65	69
29	80	91	76	71	---	86	131	231	95	66	66	66
30	75	81	70	e72	---	81	101	119	83	63	66	65
31	75	---	72	72	---	81	---	87	---	60	64	---
TOTAL	2504	2717	2467	2514	1922	3050	3267	2710	1957	2202	3592	2166
MEAN	80.8	90.6	79.6	81.1	68.6	98.4	109	87.4	65.2	71.0	116	72.2
MAX	116	247	107	182	73	178	241	231	95	127	829	106
MIN	70	61	59	61	55	67	72	71	53	57	58	61
CFSM	1.40	1.57	1.38	1.41	1.19	1.71	1.89	1.52	1.13	1.23	2.01	1.25
IN.	1.61	1.75	1.59	1.62	1.24	1.97	2.11	1.75	1.26	1.42	2.32	1.40

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1995, BY WATER YEAR (WY)

MEAN	78.0	82.6	76.6	70.7	70.3	88.7	120	87.4	71.3	65.6	64.3	73.4
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	64.9	61.1	55.1	55.7	65.0	81.3	54.4	50.7	47.5	42.6	53.2
(WY)	1964	1963	1959	1959	1957	1958	1987	1958	1958	1965	1958	1966

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1951 - 1995

ANNUAL TOTAL	31723	31068	79.0
ANNUAL MEAN	86.9	85.1	90.7
HIGHEST ANNUAL MEAN			1985
LOWEST ANNUAL MEAN			62.3
HIGHEST DAILY MEAN	486	829	Aug 18 1995
LOWEST DAILY MEAN	49	53	Jun 24
ANNUAL SEVEN-DAY MINIMUM	51	55	Jun 20
INSTANTANEOUS PEAK FLOW		889	Aug 18
INSTANTANEOUS PEAK STAGE		6.49	Aug 18
INSTANTANEOUS LOW FLOW		33	Jun 15
ANNUAL RUNOFF (CFSM)	1.51	1.48	1.37
ANNUAL RUNOFF (INCHES)	20.45	20.03	18.61
10 PERCENT EXCEEDS	120	107	110
50 PERCENT EXCEEDS	75	75	71
90 PERCENT EXCEEDS	61	63	55

(a) From rating curve extended above 500 ft³/s, result of failure of Lansing Club Dam; gage height 6.80 ft, from floodmark, site and datum then in use.

(b) Present site and datum.

(c) Result of freezeup.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04130500 BLACK RIVER NEAR TOWER, MI

LOCATION.--Lat 45°23'33", long 84°20'00", in SE1/4 NE1/4 sec.29, T.35 N., R.1 E., Cheboygan County, Hydrologic Unit 04070005, on right bank 400 ft downstream from Kleber Dam, 1,000 ft upstream from Milligan Creek, 3.0 mi northwest of Tower, and 10.8 mi upstream from Black Lake.

DRAINAGE AREA.--311 mi².

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

REVISED RECORDS.--WSP 1307: 1942. WDR MI-83-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 658.00 ft above sea level (Stanley Engineering Co. bench mark). Prior to Aug. 1, 1949, at site 1 mi upstream at different datum.

REMARKS.--Records good. Flow completely regulated by Kleber Dam 400 ft upstream. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	274	248	367	248	319	219	261	689	465	272	163	222
2	251	248	246	247	188	195	288	561	347	308	172	209
3	251	228	310	223	198	180	293	483	255	293	157	185
4	251	214	336	158	226	214	323	396	216	217	167	219
5	237	235	354	126	209	206	318	370	231	193	181	225
6	207	349	351	124	191	219	327	355	238	191	171	191
7	244	469	337	202	177	200	284	344	223	199	237	214
8	174	470	336	245	201	216	340	327	199	151	224	236
9	292	554	327	245	227	178	319	245	169	123	183	204
10	251	511	179	213	206	199	286	326	187	161	184	175
11	313	385	226	214	205	226	321	302	242	171	186	190
12	296	344	187	246	209	267	261	282	237	170	164	168
13	256	364	188	316	179	312	279	327	194	164	182	195
14	254	321	305	244	221	450	338	290	191	155	320	198
15	219	275	241	345	222	671	264	329	188	154	215	188
16	236	275	241	467	219	831	265	261	178	159	347	203
17	219	315	241	445	200	741	317	318	168	241	531	209
18	250	249	292	462	223	661	256	256	166	306	645	279
19	254	250	244	458	219	600	405	256	161	241	769	245
20	370	315	246	359	233	575	442	254	151	242	996	244
21	314	249	246	292	230	579	514	254	153	242	1080	238
22	215	249	318	337	254	606	683	254	146	193	790	243
23	280	325	243	324	213	586	652	251	136	390	558	243
24	218	248	244	311	217	531	611	215	137	307	375	293
25	311	248	331	307	233	479	604	229	137	353	291	243
26	251	248	244	279	207	397	503	306	138	293	241	243
27	323	249	290	248	176	398	532	255	144	246	241	229
28	285	380	222	201	228	377	775	277	161	191	239	180
29	248	246	251	174	---	332	851	456	216	192	240	185
30	248	306	239	212	---	332	810	502	311	196	196	218
31	248	---	214	310	---	330	---	498	---	175	171	---
TOTAL	8040	9367	8396	8582	6030	12307	12722	10468	6085	6889	10616	6514
MEAN	259	312	271	277	215	397	424	338	203	222	342	217
MAX	370	554	367	467	319	831	851	689	465	390	1080	293
MIN	174	214	179	124	176	178	256	215	136	123	157	168
CFSM	.83	1.00	.87	.89	.69	1.28	1.36	1.09	.65	.71	1.10	.70
IN.	.96	1.12	1.00	1.03	.72	1.47	1.52	1.25	.73	.82	1.27	.78

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1995, BY WATER YEAR (WY)

	MEAN	243	269	248	219	216	339	541	348	250	204	184	218
MAX	459	489	409	433	398	594	882	638	405	408	351	367	
(WY)	1984	1946	1972	1973	1984	1976	1960	1983	1976	1974	1972	1984	
MIN	138	130	163	150	138	188	297	185	140	112	86.1	116	
(WY)	1957	1950	1990	1948	1948	1956	1987	1987	1958	1966	1949	1949	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1943 - 1995

ANNUAL TOTAL	109130	106016	273
ANNUAL MEAN	299	290	350
HIGHEST ANNUAL MEAN			1885
LOWEST ANNUAL MEAN			188
HIGHEST DAILY MEAN	889	1080	1860
LOWEST DAILY MEAN	105	123	4.0
ANNUAL SEVEN-DAY MINIMUM	128	142	50
INSTANTANEOUS PEAK FLOW		1110	2340
INSTANTANEOUS PEAK STAGE		5.09	7.13
INSTANTANEOUS LOW FLOW		90	.60
ANNUAL RUNOFF (CFSM)	.96	.93	.88
ANNUAL RUNOFF (INCHES)	13.05	12.68	11.93
10 PERCENT EXCEEDS	479	469	470
50 PERCENT EXCEEDS	253	248	228
90 PERCENT EXCEEDS	174	175	144

(a) Jan. 5, 6.

STREAMS TRIBUTARY TO LAKE HURON

442409084274001 LAKE ST. HELEN NEAR ST. HELEN, MI

LOCATION.--Lat 44°24'09", long 84°27'40", in SW1/4 NE1/4 sec.8, T.23 N., R.1 W., Roscommon County, Hydrologic Unit 04070007, at bridge 300 ft upstream from dam.

DRAINAGE AREA.--72.2 mi² at outlet.

PERIOD OF RECORD.--June 1942 to December 1959, August 1993 to current year.

GAGE.--Nonrecording gage. Once daily reading by observer. Datum of gage is 1,149.01 ft above sea level.

REMARKS.--Inlets are Marsh Creek, Russell Creek and Cameron Creek. The outlet is South Branch of the Au Sable River. Lake elevation controlled by dam. Established legal level; 1,154.15 ft, minimum winter level, 1,153.65 ft, above sea level.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 7.26 ft, Apr. 1, 1949; minimum observed, 4.64 ft, Jan. 21, 1954.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed is estimated by observer, 6.70 ft, Apr. 27, 29, 30, May 1; minimum observed, 5.18 ft, Mar. 3-5.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.98	5.54	5.52	5.36	5.43	5.20	6.12	6.70	6.36	6.14	6.22	6.38
2	5.96	5.54	5.52	5.36	5.43	5.20	6.16	6.68	6.36	6.12	6.24	6.38
3	5.94	5.53	5.53	5.38	5.43	5.18	6.18	6.66	6.38	6.14	6.27	6.32
4	5.92	5.53	5.52	5.36	5.29	5.18	6.12	6.66	6.40	6.11	6.26	6.32
5	5.90	5.54	5.53	5.34	5.37	5.18	6.20	6.64	6.40	6.16	6.32	6.32
6	5.90	5.55	5.53	5.32	5.39	5.20	6.20	6.62	6.40	6.12	6.30	6.30
7	5.88	5.70	5.50	5.32	5.39	5.22	6.22	6.60	6.38	6.04	6.30	6.24
8	5.86	5.70	5.50	5.32	5.39	5.22	6.22	6.60	6.28	6.04	6.29	6.24
9	5.84	5.65	---	5.32	5.39	5.22	6.22	6.58	6.30	6.06	6.28	6.24
10	5.82	5.65	5.50	5.32	5.39	5.20	6.24	6.54	6.30	6.04	6.26	6.22
11	5.84	5.70	5.50	5.32	5.35	5.20	6.24	6.52	6.24	6.04	6.26	6.20
12	5.84	5.68	5.50	5.32	5.35	5.22	6.28	6.54	6.24	6.04	6.38	6.20
13	5.84	5.70	5.47	5.30	5.31	5.22	6.28	6.57	6.24	6.04	6.40	6.18
14	5.82	5.70	5.50	5.32	5.32	5.24	6.30	6.60	6.24	6.12	6.58	6.18
15	5.82	5.60	5.47	5.36	5.30	5.28	6.30	6.58	6.22	6.14	6.58	6.16
16	5.78	5.60	5.47	5.41	5.30	5.32	6.32	6.58	6.20	6.16	6.62	6.16
17	5.76	5.60	5.46	5.47	5.28	5.40	6.32	6.56	6.20	6.15	6.64	6.16
18	5.76	5.74	5.46	5.47	5.26	5.50	6.34	6.54	6.18	6.10	6.66	6.16
19	5.76	5.58	5.50	5.45	5.24	5.60	6.38	6.52	6.14	6.14	6.65	6.15
20	5.74	5.58	5.46	5.45	5.24	5.66	6.42	6.50	6.12	6.12	6.65	6.14
21	5.70	5.65	5.44	5.49	5.24	5.70	6.60	6.48	6.12	6.12	6.60	6.14
22	5.68	5.60	5.42	5.51	5.26	5.80	6.54	6.46	6.10	6.10	6.60	6.18
23	5.66	5.60	5.40	5.51	5.24	5.84	6.58	6.46	6.08	6.09	6.20	6.15
24	5.64	5.50	5.39	5.51	5.22	5.90	6.62	6.44	6.06	6.08	6.55	6.16
25	5.64	5.50	5.40	5.51	5.22	5.96	6.60	6.44	6.06	6.08	6.20	6.16
26	5.62	5.50	5.40	5.49	5.22	5.98	6.62	6.46	6.04	6.08	6.54	6.16
27	5.62	5.52	5.39	5.49	5.22	6.00	6.70	6.44	6.12	6.06	6.52	6.14
28	5.62	5.56	5.32	5.49	5.20	6.06	6.64	6.42	6.10	6.28	6.50	6.14
29	5.58	5.54	5.36	5.49	---	6.06	6.70	6.40	6.14	6.28	6.46	6.14
30	5.56	5.50	5.40	5.47	---	6.08	6.70	6.38	6.15	6.27	6.46	6.14
31	5.54	---	5.36	5.45	---	6.10	---	6.38	---	6.28	6.40	---
MEAN	5.77	5.60	---	5.41	5.31	5.52	6.38	6.53	6.22	6.12	6.43	6.21
MAX	5.98	5.74	---	5.51	5.43	6.10	6.70	6.70	6.40	6.28	6.66	6.38
MIN	5.54	5.50	---	5.30	5.20	5.18	6.12	6.38	6.04	6.04	6.20	6.14

STREAMS TRIBUTARY TO LAKE HURON

04135700 SOUTH BRANCH AU SABLE RIVER NEAR LUZERNE, MI

LOCATION.--Lat 44°36'53", long 84°27'20", in SE1/4 SE1/4 sec.29, T.26 N., R.1 W., Crawford County, Hydrologic Unit 04070007, on right bank 10 ft upstream from Smith Bridge, 400 ft downstream from bridge on State Highway 72, 4.6 mi upstream from mouth, and 9.1 mi west of Luzerne.

DRAINAGE AREA.--401 mi².

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1951-66. October 1966 to September 1989, October 1990 to current year.

REVISED RECORDS.--WSP 2111: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,070 ft above sea level, from topographic map. Apr. 19, 1951 to Nov. 14, 1966, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Occasional regulation by dams upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	214	189	226	e165	e180	e155	198	376	190	174	140	152
2	212	189	227	e165	e175	154	197	347	180	158	131	152
3	213	190	232	e165	e175	152	195	325	180	145	129	152
4	212	207	237	167	e175	e150	200	307	176	137	130	149
5	207	234	248	e165	175	e150	199	296	173	136	137	147
6	201	312	255	e165	e170	e150	197	291	168	133	142	145
7	198	332	255	e165	e165	e150	200	290	164	136	137	143
8	197	338	244	e165	e165	e150	206	282	157	128	131	144
9	215	340	232	e165	e165	e150	202	274	153	124	129	143
10	213	317	207	e165	e165	155	196	274	150	121	128	139
11	215	289	e195	172	e165	160	193	274	149	119	129	137
12	212	271	e190	174	e165	176	198	269	146	116	162	136
13	206	261	e188	181	e165	218	205	262	143	121	180	136
14	198	248	e185	226	e165	281	212	266	139	137	240	140
15	194	239	183	276	e165	336	215	256	136	145	304	143
16	192	236	189	271	164	372	214	243	131	140	319	144
17	189	232	192	261	164	373	201	233	129	144	340	157
18	190	229	193	256	165	353	202	219	128	150	343	151
19	194	222	194	248	167	346	245	209	127	142	321	147
20	195	218	195	244	171	357	265	199	125	136	296	152
21	194	224	195	240	171	371	313	191	122	129	270	150
22	193	233	197	228	169	377	357	186	119	124	241	155
23	197	228	193	223	166	352	351	186	117	122	215	154
24	197	224	193	e215	164	320	346	194	116	120	198	154
25	196	221	193	e210	163	279	328	196	120	121	185	151
26	197	215	192	e200	157	244	306	192	127	118	175	152
27	196	211	190	195	e155	230	346	184	132	118	168	146
28	195	215	190	e190	e155	221	405	185	139	139	163	142
29	195	230	188	e185	---	214	404	198	167	150	158	141
30	191	231	179	e185	---	208	398	208	182	158	155	138
31	188	---	e170	e180	---	203	---	202	---	152	154	---
TOTAL	6206	7325	6347	6212	4666	7507	7694	7614	4385	4193	6050	4392
MEAN	200	244	205	200	167	242	256	246	146	135	195	146
MAX	215	340	255	276	180	377	405	376	190	174	343	157
MIN	188	189	170	165	155	150	193	184	116	116	128	136
CFSM	.50	.61	.51	.50	.42	.60	.64	.61	.36	.34	.49	.37
IN.	.58	.68	.59	.58	.43	.70	.71	.71	.41	.39	.56	.41

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1995, BY WATER YEAR (WY)

	MEAN	216	243	238	199	185	262	401	286	208	167	152	178
MAX	456	444	373	275	251	508	596	398	307	251	255	379	379
(WY)	1987	1992	1992	1973	1984	1976	1985	1983	1993	1969	1994	1975	1975
MIN	120	163	148	132	141	159	209	152	124	107	119	119	119
(WY)	1967	1977	1977	1977	1978	1978	1987	1987	1977	1977	1989	1989	1989

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR	FOR 1995 WATER YEAR	WATER YEARS 1967 - 1995
ANNUAL TOTAL	87646	72591	
ANNUAL MEAN	240	199	228
HIGHEST ANNUAL MEAN			280
LOWEST ANNUAL MEAN			158
HIGHEST DAILY MEAN	546	405	1110
LOWEST DAILY MEAN	146	116	100
ANNUAL SEVEN-DAY MINIMUM	153	121	102
INSTANTANEOUS PEAK FLOW		408	1120
INSTANTANEOUS PEAK STAGE		5.36	(a)7.75
INSTANTANEOUS LOW FLOW		114	(b)
ANNUAL RUNOFF (CFSM)	.60	.50	(c)7.57
ANNUAL RUNOFF (INCHES)	8.13	6.73	7.72
10 PERCENT EXCEEDS	359	293	357
50 PERCENT EXCEEDS	215	190	201
90 PERCENT EXCEEDS	172	136	135

- (a) Backwater from ice.
(b) June 23-25, July 12, 13.
(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 2.0 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, 3.65 ft, Jan. 15, 17, 21-23; minimum, 2.91 ft, July 12.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.45	3.40	3.51	3.48	3.57	---	3.37	3.58	3.39	3.08	3.06	3.19
2	3.44	3.37	3.51	3.50	3.56	---	3.36	3.57	3.40	3.05	3.04	3.17
3	3.43	3.36	3.51	3.51	3.55	---	3.35	3.55	3.39	3.01	3.03	3.18
4	3.41	3.38	3.50	3.52	3.55	---	3.38	3.54	3.38	3.00	3.05	3.16
5	3.39	3.39	3.50	3.52	3.54	---	3.35	3.54	3.37	2.97	3.05	3.15
6	3.38	3.49	3.50	3.52	3.54	---	3.36	3.53	3.35	3.00	3.04	3.12
7	3.35	3.48	3.50	3.53	3.54	---	3.35	3.51	3.36	3.02	3.01	3.16
8	3.38	3.49	3.49	3.53	3.53	---	3.35	3.49	3.34	2.99	3.01	3.13
9	3.43	3.49	3.49	3.53	---	---	3.36	3.48	3.31	2.98	3.00	3.12
10	3.44	3.48	3.49	3.53	---	3.43	3.34	3.48	3.30	2.96	2.99	3.09
11	3.42	3.46	3.49	3.54	---	3.42	3.32	3.47	3.31	2.95	2.99	3.08
12	3.41	3.45	3.49	3.54	---	3.42	3.32	3.46	3.29	2.93	2.99	3.06
13	3.41	3.45	3.49	3.55	---	3.41	3.34	3.42	3.27	2.96	3.02	3.06
14	3.41	3.46	3.49	3.60	---	3.41	3.34	3.45	3.26	2.97	3.15	3.08
15	3.39	3.47	3.49	3.63	---	3.41	3.33	3.44	3.24	2.97	3.18	3.07
16	3.38	3.45	3.49	3.63	---	3.41	3.32	3.42	3.22	3.09	3.17	3.05
17	3.37	3.44	3.51	3.63	---	3.40	3.31	3.43	3.21	3.11	3.31	3.09
18	3.39	3.39	3.51	3.63	---	3.40	3.32	3.41	3.20	3.13	3.37	3.06
19	3.40	3.43	3.51	3.62	---	3.42	3.40	3.38	3.20	3.11	3.36	3.05
20	3.41	3.42	3.50	3.63	---	3.43	3.40	3.36	3.19	3.10	3.36	3.08
21	3.41	3.42	3.50	3.64	---	3.45	3.45	3.35	3.16	3.08	3.34	3.07
22	3.39	3.46	3.50	3.65	---	3.46	3.48	3.34	3.14	3.09	3.32	3.07
23	3.39	3.48	3.50	3.64	---	3.45	3.47	3.34	3.12	3.16	3.29	3.08
24	3.39	3.45	3.50	3.64	---	3.44	3.45	3.37	3.10	3.15	3.28	3.08
25	3.41	3.47	3.50	3.63	---	3.43	3.47	3.36	3.08	3.14	3.25	3.07
26	3.43	3.46	3.49	3.62	---	3.43	3.48	3.35	3.07	3.13	3.25	3.06
27	3.41	3.46	3.49	3.61	---	3.42	3.55	3.34	3.05	3.11	3.24	3.06
28	3.37	3.48	3.49	3.61	---	3.41	3.59	3.38	3.06	3.11	3.23	3.06
29	3.38	3.50	3.49	3.60	---	3.40	3.58	3.41	3.09	3.10	3.24	3.05
30	3.39	3.51	3.48	3.59	---	3.39	3.58	3.41	3.09	3.07	3.20	3.03
31	3.39	---	3.48	3.57	---	3.38	---	3.39	---	3.05	3.21	---
MEAN	3.40	3.45	3.50	3.58	---	---	3.40	3.44	3.23	3.05	3.16	3.09
MAX	3.45	3.51	3.51	3.65	---	---	3.59	3.58	3.40	3.16	3.37	3.19
MIN	3.35	3.36	3.48	3.48	---	---	3.31	3.34	3.05	2.93	2.99	3.03

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 hydroelectric plant, 9.5 mi downstream from Big Creek, and 73.0 mi upstream from mouth.

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

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

GAGE.--Water-stage recorder. Datum of gage is 929.60 ft above sea level.

REMARKS.--Records good. Flow regulated by Mio Dam 500 ft upstream. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1060	980	1080	932	1000	885	1020	1300	979	1080	759	755
2	1080	980	1070	961	959	803	1010	1370	931	965	756	720
3	1070	969	1060	931	870	774	1000	1320	917	843	754	715
4	1020	1040	1070	795	984	919	1010	1200	912	801	754	737
5	993	1220	1160	716	785	928	1010	1150	904	793	773	741
6	987	1650	1210	808	676	899	1030	1160	883	811	857	736
7	977	1770	1190	952	798	914	1040	1160	846	808	833	732
8	974	1580	1110	989	946	889	1040	1180	831	788	741	721
9	1050	1390	1060	948	959	837	1040	1120	823	784	749	716
10	1110	1380	1010	851	910	867	1020	1110	819	773	755	716
11	1110	1250	964	885	910	904	986	1090	799	756	908	716
12	1080	1170	854	1010	806	932	980	1080	782	748	669	716
13	1020	1170	991	1090	866	1160	1010	1070	782	760	780	704
14	998	1160	1050	1190	930	1290	1030	1070	781	866	980	705
15	993	1100	967	1440	930	1510	1030	1120	778	940	795	765
16	989	1060	955	1360	930	1570	1000	1130	769	750	1140	786
17	982	1080	996	1220	930	1500	978	1080	753	734	907	864
18	980	1090	1000	1160	966	1410	977	1010	737	837	1300	839
19	990	1070	980	1160	984	1390	1280	979	737	866	1330	798
20	993	1050	980	1120	980	1570	1310	945	725	824	1220	815
21	987	1070	980	1090	948	1540	1490	922	711	788	1040	808
22	999	1080	980	1080	916	1480	1760	909	706	781	943	846
23	1010	1070	980	1050	901	1390	1540	899	699	772	890	852
24	992	1070	980	1020	894	1300	1390	929	701	779	860	843
25	987	1070	985	1020	886	1210	1270	973	725	776	822	821
26	994	1060	987	1030	881	1180	1200	969	737	750	813	781
27	1000	1040	987	1010	881	1100	1430	959	776	767	809	756
28	989	1110	984	985	893	1070	1870	956	858	823	774	765
29	981	1100	970	923	---	1070	1790	1040	936	852	754	765
30	980	1070	932	944	---	1050	1440	1060	1040	820	754	750
31	980	---	912	1000	---	1040	---	1040	---	772	767	---
TOTAL	31355	34899	31434	31670	25319	35381	35981	33280	24377	25187	26986	22984
MEAN	1011	1163	1014	1022	804	1141	1199	1074	813	812	871	766
MAX	1110	1770	1210	1440	1000	1570	1870	1370	1040	1080	1330	864
MIN	974	969	854	716	676	774	977	899	699	734	669	704
CFSM	.92	1.06	.92	.93	.82	1.04	1.09	.98	.74	.74	.79	.70
IN.	1.06	1.18	1.06	1.07	.86	1.20	1.22	1.13	.82	.85	.91	.78

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1995, BY WATER YEAR (WY)

	MEAN	953	1007	977	899	884	1098	1470	1165	994	881	834	887
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	685	738	711	697	660	733	977	723	683	655	578	661	
(WY)	1965	1964	1964	1965	1958	1956	1958	1958	1958	1958	1958	1958	

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR	FOR 1995 WATER YEAR	WATER YEARS 1952 - 1995
ANNUAL TOTAL	416515	358853	
ANNUAL MEAN	1141	983	1004
HIGHEST ANNUAL MEAN			1213
LOWEST ANNUAL MEAN			746
HIGHEST DAILY MEAN	2990	1870	4110
LOWEST DAILY MEAN	740	669	21
ANNUAL SEVEN-DAY MINIMUM	803	713	420
INSTANTANEOUS PEAK FLOW		4250	4380
INSTANTANEOUS PEAK STAGE		6.20	6.20
INSTANTANEOUS LOW FLOW		511	7.0
ANNUAL RUNOFF (CFSM)	1.04	.89	.91
ANNUAL RUNOFF (INCHES)	14.09	12.14	12.40
10 PERCENT EXCEEDS	1470	1220	1360
50 PERCENT EXCEEDS	1050	979	931
90 PERCENT EXCEEDS	864	754	720

(e) Estimated.

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.--1,540 mi², approximately.

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.

GAGE.--Water-stage recorder. Datum of gage is 583.93 ft above sea level.

REMARKS.--Records good. Flow regulated by Foote Dam 0.6 mi upstream. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1370	2810	1590	1270	1510	1250	1560	2040	1560	1720	1050	1130
2	1450	2220	1540	1280	1380	1200	1530	1830	1500	1560	1050	1120
3	1560	974	1560	1370	1230	1190	1440	1860	1630	1300	1090	1040
4	1480	816	1560	1300	1370	1410	1400	1650	1600	1110	1180	1030
5	1400	1010	1580	1120	1350	1600	1350	1520	1430	1280	1300	1110
6	1190	1970	1650	1180	1020	1510	1270	1500	1290	1360	1340	1180
7	1160	2440	1670	1430	981	1470	1460	1490	1200	1160	1270	1220
8	1350	2140	1680	1650	1130	1320	1610	1500	1240	991	1180	1180
9	1650	1980	1440	1490	1270	1120	1590	1520	1260	1010	1080	1120
10	1710	1830	1250	1180	1570	1160	1510	1750	1220	1110	1030	1000
11	1550	1690	1260	1200	1590	1430	1520	1890	1240	997	1210	919
12	1570	1710	1270	1450	1190	1580	1570	1620	1280	1040	1120	1240
13	1520	1790	1460	1790	957	1690	1540	1470	1230	1290	1090	1280
14	1440	1760	1600	1850	1020	1860	1510	1610	1190	1580	1370	1030
15	1400	1690	1510	1820	1340	1990	1480	1740	1160	1570	1170	1060
16	1390	1510	1470	1800	1590	2090	1360	1740	1130	1350	1420	1180
17	1380	1460	1570	1810	1550	1970	1260	1750	1130	1190	1760	1320
18	1370	1510	1630	1750	1310	1920	1370	1520	1130	1150	1960	1350
19	1430	1460	1550	1610	1460	1930	1940	1150	1150	1150	1850	1220
20	1550	1420	1430	1680	1630	2080	2040	1150	1180	1160	1940	1230
21	1430	1500	1340	1750	1420	2310	2010	1220	1180	1180	1620	1250
22	1190	1590	1270	1670	1220	2250	2370	1250	1150	1140	1420	1250
23	1490	1550	1340	1610	1260	2080	2330	1390	1100	1120	1360	1250
24	1470	1530	1470	1530	1220	1810	2080	1500	1050	1170	1460	1240
25	1090	1550	1470	1490	1390	1650	1800	1440	1080	1230	1280	1240
26	1410	1520	1470	1490	1330	1600	1700	1340	1180	1380	1130	1240
27	1220	1480	1470	1460	1230	1580	2160	1280	1370	1350	1200	1220
28	1640	1640	1470	1500	1270	1560	2760	1290	1170	1400	1210	1170
29	1600	1740	1470	1380	---	1650	2530	1530	1210	1600	1150	1180
30	1600	1680	1350	1240	---	1660	2170	1630	1670	1390	1030	1230
31	1820	---	1240	1440	---	1570	---	1620	---	1120	1070	---
TOTAL	44880	49970	45630	46590	36788	51490	52220	47790	37910	39158	40390	35229
MEAN	1448	1666	1472	1503	1314	1661	1741	1542	1264	1263	1303	1174
MAX	1820	2810	1680	1850	1630	2310	2760	2040	1670	1720	1960	1350
MIN	1090	816	1240	1120	957	1120	1260	1150	1050	991	1030	919
CFSM	.94	1.08	.96	.98	.85	1.08	1.13	1.00	.82	.82	.85	.76
IN.	1.08	1.21	1.10	1.13	.89	1.24	1.26	1.15	.92	.95	.98	.85

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1995, BY WATER YEAR (WY)

	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	1438	1640	1509	1409	1322	1749	2109	1625	1420
MAX	1770	1944	1870	1527	1440	2097	2441	1773	1952
(WY)	1992	1992	1992	1992	1994	1990	1992	1991	1993
MIN	1152	1100	1132	1259	1224	1533	1684	1456	1104
(WY)	1990	1990	1990	1991	1989	1993	1990	1989	1988

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1987 - 1995

ANNUAL TOTAL	607172	528045	1518
ANNUAL MEAN	1663	1447	1640
HIGHEST ANNUAL MEAN			1994
LOWEST ANNUAL MEAN			1990
HIGHEST DAILY MEAN	4710	2810	5430
LOWEST DAILY MEAN	801	816	455
ANNUAL SEVEN-DAY MINIMUM	1080	1080	656
INSTANTANEOUS PEAK FLOW		3440	5850
INSTANTANEOUS PEAK STAGE		12.92	16.27
INSTANTANEOUS LOW FLOW		435	135
ANNUAL RUNOFF (CFSM)	1.08	.94	.99
ANNUAL RUNOFF (INCHES)	14.67	12.76	13.39
10 PERCENT EXCEEDS	2170	1820	2050
50 PERCENT EXCEEDS	1590	1430	1440
90 PERCENT EXCEEDS	1210	1120	1060

STREAMS TRIBUTARY TO LAKE HURON

04142000 RIFLE RIVER NEAR STERLING, MI

LOCATION.--Lat 44°04'21", long 84°01'12", in NE1/4 SW1/4 sec.5, T.19 N., R.4 E., Arenac County, Hydrologic Unit 04080101, on left bank 30 ft downstream from bridge on Melita Road, 2.8 mi north of Sterling, and 20 mi upstream from mouth.

DRAINAGE AREA.--320 mi², approximately.

PERIOD OF RECORD.--November 1905 to December 1908 (gage heights and discharge measurements only), October 1936 to current year.

Monthly discharge only for some periods, published in WSP 1307. Published as Rifle River at Michigan Highway 70 near Sterling 1936-61.

REVISED RECORDS.--WSP 1437: 1937(M), 1939-40(M).

GAGE.--Water-stage recorder. Datum of gage is 649.48 ft above sea level. November 1905 to December 1908, nonrecording gage at site 400 ft downstream at different datum. Jan. 13, 1937 to Jan. 10, 1939, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Occasional regulation by dams upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	190	276	314	e190	e210	e180	277	487	204	307	187	167
2	208	302	299	e185	e200	e180	259	438	192	232	177	161
3	187	261	309	e185	e200	e180	259	405	251	197	184	161
4	178	320	323	e150	e200	e180	267	361	275	183	224	159
5	175	493	333	e180	e200	e180	245	328	231	187	238	156
6	174	805	333	e180	e200	e185	252	323	207	189	245	171
7	171	850	307	e180	e200	e190	288	308	210	181	195	190
8	173	597	271	e180	e200	e195	290	287	219	173	176	175
9	234	465	253	e180	e200	e190	284	286	203	165	169	165
10	241	396	e240	e180	e200	e180	268	314	193	161	167	158
11	202	348	e210	e180	e200	e190	272	336	191	159	167	153
12	188	318	e180	e190	e200	e450	278	311	187	154	385	152
13	183	299	e210	e200	e200	e900	301	287	179	165	424	151
14	181	294	e240	e350	e195	e1000	295	303	173	183	531	156
15	180	304	e250	e1000	e195	843	272	390	168	175	709	173
16	185	290	e260	e1100	e195	747	252	313	164	181	397	167
17	201	268	259	e700	e195	642	240	293	163	212	922	204
18	200	254	261	e470	e195	518	247	276	159	182	1400	208
19	228	242	260	397	e195	508	490	254	157	169	755	178
20	231	232	256	351	e195	674	483	235	153	163	451	203
21	212	266	241	368	e195	731	501	227	147	157	343	212
22	200	289	236	343	e195	627	805	233	144	150	276	241
23	198	265	235	324	e195	530	631	219	143	153	239	244
24	204	244	243	308	e190	460	477	241	142	153	220	208
25	198	239	248	296	e190	409	428	241	143	145	205	189
26	222	239	236	276	e185	378	387	221	145	147	198	183
27	237	245	229	256	e185	383	667	211	233	152	199	180
28	224	353	231	e250	e180	352	1090	216	272	426	190	173
29	212	440	e210	e240	---	323	814	254	562	621	182	168
30	205	366	e200	e230	---	306	575	236	492	312	175	166
31	202	---	e190	e220	---	294	---	227	---	218	173	---
TOTAL	6224	10560	7867	9839	5490	13105	12194	9061	6302	6352	10503	5372
MEAN	201	352	254	317	196	423	406	292	210	205	339	179
MAX	241	850	333	1100	210	1000	1090	487	562	621	1400	244
MIN	171	232	180	150	180	180	240	211	142	145	167	151
CFSM	.63	1.10	.79	.99	.61	1.32	1.27	.91	.66	.64	1.06	.56
IN.	.72	1.23	.91	1.14	.64	1.52	1.42	1.05	.73	.74	1.22	.62

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1995, BY WATER YEAR (WY)

	MEAN	242	294	288	249	277	564	643	393	285	195	181	206
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	152	150	206	262	175	124	126	122	124	
(WY)	1964	1964	1964	1956	1956	1964	1945	1977	1964	1966	1964	1948	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1937 - 1995

ANNUAL TOTAL	110389						102869						
ANNUAL MEAN	302						282			(a)319			
HIGHEST ANNUAL MEAN										501		1991	
LOWEST ANNUAL MEAN										166		1964	
HIGHEST DAILY MEAN	1290				Mar 24		1400		Aug 18	4500		Mar 28 1950	
LOWEST DAILY MEAN	141				Jun 23		142		Jun 24	98		Jul 30 1964	
ANNUAL SEVEN-DAY MINIMUM	148				Jun 17		145		Jun 20	105		Jul 26 1964	
INSTANTANEOUS PEAK FLOW							(b)1730		Aug 17	(c)5340		Mar 28 1950	
INSTANTANEOUS PEAK STAGE							(d)7.54		Jan 16	13.74		Mar 28 1950	
INSTANTANEOUS LOW FLOW							124		Jan 4	(f)75		Nov 22 1964	
ANNUAL RUNOFF (CFSM)	.95						.88			1.00			
ANNUAL RUNOFF (INCHES)	12.83						11.96			13.53			
10 PERCENT EXCEEDS	542						479			560			
50 PERCENT EXCEEDS	236						224			230			
90 PERCENT EXCEEDS	167						167			150			

(a) Does not include water year 1937.

(b) Gage height, 6.60 ft.

(c) From rating curve extended above 3,800 ft³/s.

(d) Backwater from ice.

(e) Estimated.

(f) Result of freezeup.

STREAMS TRIBUTARY TO LAKE HURON

04144500 SHIAWASSEE RIVER AT OWOSSO, MI

LOCATION.--Lat 43°00'54", long 84°10'52", in SW1/4 sec.12, T.7 N., R.2 E., Shiawassee County, Hydrologic Unit 04080203, on right bank on grounds of sewage-treatment plant, 1.5 mi north of Owosso.

DRAINAGE AREA.--538 mi².

PERIOD OF RECORD.--March 1931 to current year. Gage-height records for flood seasons collected in this vicinity 1904, 1910-30 are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 1307: 1949(M). WSP 1337: 1932, 1934, 1936-38, 1944.

GAGE.--Water-stage recorder. Datum of gage is 707.25 ft above sea level. Prior to Oct. 15, 1933, at site 1.5 mi upstream at datum 5.46 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated below approximately 800 ft³/s by powerplant at Shiawassee town prior to February 1953; occasional regulation at low stages since. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	609	637	689	556	689	472	554	873	318	294	112	175
2	667	940	676	544	557	620	526	635	304	238	126	164
3	626	809	723	424	e360	741	493	560	309	202	182	160
4	736	962	978	274	e270	594	484	526	284	193	208	150
5	881	1110	832	150	e210	508	453	569	276	191	291	137
6	830	1650	668	182	e180	455	438	526	276	194	416	125
7	614	1240	623	e280	e220	580	427	511	288	186	324	108
8	462	974	672	e270	e260	1070	459	488	286	178	307	97
9	470	1130	700	e260	e290	1040	491	446	274	171	269	85
10	466	1160	746	e250	e290	1050	549	474	261	165	261	75
11	451	987	699	e260	e270	1320	611	588	231	159	246	72
12	498	789	744	298	e260	2170	731	486	206	158	223	68
13	458	688	886	477	e250	2160	888	487	168	161	191	66
14	411	623	840	610	e250	1990	894	465	144	143	173	65
15	369	609	665	909	e250	1870	846	424	138	171	158	64
16	312	631	476	880	e250	1890	706	390	120	155	171	65
17	255	624	856	820	e260	1870	566	428	110	173	497	73
18	238	607	1220	703	e280	1520	448	378	106	222	1030	75
19	271	586	998	526	e340	1360	542	364	103	240	817	67
20	289	559	885	789	e390	1240	615	350	103	236	874	70
21	301	482	880	1360	e430	1250	731	336	100	241	778	92
22	303	384	1000	1330	e470	1100	617	324	98	291	659	143
23	289	339	987	1280	507	936	563	334	95	329	407	146
24	272	317	918	1230	520	776	572	429	88	287	313	150
25	260	301	841	1020	486	680	536	401	99	245	284	170
26	249	279	688	806	408	619	592	419	96	287	244	168
27	233	314	534	676	428	576	1230	411	143	272	237	168
28	259	766	476	712	454	552	1170	388	157	247	210	152
29	314	747	362	730	---	537	1060	359	220	177	170	125
30	256	689	552	652	---	546	1030	337	244	119	166	101
31	253	---	546	661	---	565	---	326	---	121	183	---
TOTAL	12902	21933	23360	19919	9829	32857	19822	14032	5645	6446	10527	3376
MEAN	416	731	754	643	351	1053	661	453	188	208	340	113
MAX	881	1650	1220	1360	689	2170	1230	873	318	329	1030	175
MIN	233	279	362	150	180	455	427	324	88	119	112	64
CFSM	.77	1.36	1.40	1.19	.65	1.96	1.23	.84	.35	.39	.63	.21
IN.	.89	1.52	1.62	1.38	.68	2.26	1.37	.97	.39	.45	.73	.23

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1995, BY WATER YEAR (WY)

	1999	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
MEAN	199	261	322	348	447	768	727	452	274	168	123	145
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 1994 CALENDAR YEAR	FOR 1995 WATER YEAR	WATER YEARS 1931 - 1995
ANNUAL TOTAL	214023	180448	
ANNUAL MEAN	586	494	355
HIGHEST ANNUAL MEAN			629
LOWEST ANNUAL MEAN			97.7
HIGHEST DAILY MEAN	2950	2170	5920
LOWEST DAILY MEAN	93	64	2.0
ANNUAL SEVEN-DAY MINIMUM	110	68	7.7
INSTANTANEOUS PEAK FLOW		2410	6240
INSTANTANEOUS PEAK STAGE		6.64	10.35
INSTANTANEOUS LOW FLOW		63	.20
ANNUAL RUNOFF (CFSM)	1.09	.92	.66
ANNUAL RUNOFF (INCHES)	14.80	12.48	8.96
10 PERCENT EXCEEDS	1180	976	800
50 PERCENT EXCEEDS	472	419	200
90 PERCENT EXCEEDS	171	143	64

(a) Sept. 14, 15.

(e) Estimated.

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 mi².

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. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	89	48	58	e35	48	43	37	70	26	22	8.7	6.8
2	92	58	56	e33	e40	43	34	61	25	24	7.2	6.2
3	100	81	55	e30	e33	41	32	49	24	23	8.8	5.4
4	88	98	54	e28	e28	39	31	37	23	20	14	5.0
5	71	108	58	e28	e25	38	31	28	21	17	20	4.7
6	57	138	61	e28	e24	39	31	26	20	16	23	4.5
7	47	132	69	e27	e22	54	30	26	18	14	22	4.2
8	39	140	71	e27	e20	66	30	26	16	11	19	4.0
9	39	140	73	e26	e18	93	32	27	13	10	19	3.4
10	38	120	72	e26	e17	90	33	43	12	8.9	20	2.9
11	40	103	e66	e27	e17	85	33	58	11	7.9	21	2.8
12	40	89	e60	36	e17	103	35	58	11	6.9	20	2.7
13	37	77	e54	46	e17	134	39	71	11	6.8	18	2.7
14	33	68	e49	56	17	168	44	76	11	8.0	30	2.9
15	29	62	e47	71	e18	188	45	73	11	8.4	27	2.6
16	22	57	52	81	e20	186	46	61	11	9.2	26	2.5
17	21	53	67	87	21	170	44	52	11	10	27	2.4
18	41	49	75	84	25	148	44	47	9.7	11	30	2.2
19	50	45	94	77	28	129	47	43	8.8	11	39	2.1
20	45	42	101	76	29	110	48	39	8.2	10	43	2.2
21	42	40	95	81	31	96	55	35	7.5	9.9	39	2.5
22	42	37	85	85	31	86	55	32	6.2	9.0	29	4.0
23	44	37	75	94	32	77	49	29	5.5	10	18	4.9
24	63	35	68	93	35	68	35	30	5.1	11	14	6.2
25	57	34	63	88	37	61	30	31	5.0	9.4	12	6.2
26	50	32	e58	81	37	55	34	31	5.0	10	9.8	6.2
27	60	36	e54	81	40	51	54	27	6.2	15	8.7	5.9
28	58	47	e48	82	42	47	62	27	8.6	17	8.1	5.7
29	48	50	e44	79	---	43	76	28	14	17	7.5	5.0
30	40	56	e41	69	---	41	76	29	19	14	7.1	4.4
31	35	---	e38	e54	---	39	---	28	---	11	6.5	---
TOTAL		1557	2112	1961	1816	769	2631	1272	1298	383.8	388.4	602.4123.2
MEAN	50.2	70.4	63.3	58.6	27.5	84.9	42.4	41.9	12.8	12.5	19.4	4.11
MAX	100	140	101	94	48	188	76	76	26	24	43	6.8
MIN	21	32	38	26	17	38	30	26	5.0	6.8	6.5	2.1
CFSM	.91	1.27	1.14	1.06	.50	1.53	.77	.76	.23	.23	.35	.07
IN.	1.05	1.42	1.32	1.22	.52	1.77	.86	.87	.26	.26	.41	.08

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1933 - 1995, BY WATER YEAR (WY)

	MEAN	18.8	25.2	28.9	31.4	42.1	74.3	70.6	39.1	22.7	11.0	9.2815.4
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	.89
(WY)	1939	1939	1964	1940	1940	1964	1946	1988	1988	1941	1944	1941

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1933 - 1995

ANNUAL TOTAL	19077.9	14913.8	
ANNUAL MEAN	52.3	40.9	(a)32.3
HIGHEST ANNUAL MEAN			71.7
LOWEST ANNUAL MEAN			9.05
HIGHEST DAILY MEAN	360	Feb 21	1300
LOWEST DAILY MEAN	5.9	Jun 12	.26
ANNUAL SEVEN-DAY MINIMUM	7.5	Jun 7	.50
INSTANTANEOUS PEAK FLOW			1380
INSTANTANEOUS PEAK STAGE			(b)20.95
INSTANTANEOUS LOW FLOW			.14
ANNUAL RUNOFF (CFSM)	.95		.58
ANNUAL RUNOFF (INCHES)	12.83		7.94
10 PERCENT EXCEEDS	105		73
50 PERCENT EXCEEDS	41		17
90 PERCENT EXCEEDS	9.7		3.8

(a) Does not include water year 1933.

(b) From floodmark.

(c) Sept. 16, 18, 1970.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04146063 SOUTH BRANCH FLINT RIVER NEAR COLUMBIAVILLE, MI

LOCATION.--Lat 43°09'34", long 83°21'03", in NE1/4 NE1/4 sec.36, T.9 N., R.9 E., Lapeer County, Hydrologic Unit 04080204, on right bank at upstream side of bridge on Columbiaville Road, 3.0 mi east of Columbiaville, and 3.2 mi upstream from confluence of North and South Branches.

DRAINAGE AREA.--221 mi².

PERIOD OF RECORD.--March 1980 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 765 ft above sea level, from topographic map.

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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	256	171	240	e120	e180	168	164	315	122	122	49	e46
2	456	318	219	e115	e160	156	155	268	109	101	47	e42
3	376	312	203	e110	e140	163	154	234	102	86	57	e37
4	280	321	210	e105	e125	177	152	203	103	73	97	e33
5	223	368	230	e100	e110	143	144	180	97	68	e116	e32
6	180	476	263	e100	e100	138	145	181	89	62	e130	e30
7	152	643	282	e98	e84	174	153	163	84	61	e139	e28
8	133	599	296	e96	e82	354	157	147	80	57	e103	e27
9	150	490	280	e98	e80	331	168	143	74	54	e104	e24
10	163	466	e260	e110	e81	315	168	176	71	56	e127	e21
11	148	383	e240	e170	e80	292	165	513	67	52	e128	e19
12	138	311	e225	260	e76	535	177	532	65	50	e122	e18
13	127	271	e205	324	e75	705	209	329	66	48	e98	e18
14	118	244	e190	409	e74	816	233	267	66	50	e176	e19
15	112	225	e180	370	e73	819	222	231	65	54	e182	e18
16	106	207	176	418	e74	793	204	201	65	57	e170	e17
17	97	200	278	364	e76	714	186	185	61	57	e170	e16
18	97	184	428	320	e78	605	176	181	57	53	e211	e15
19	128	175	411	291	e84	510	217	172	55	58	e183	e15
20	143	161	378	279	e92	455	217	156	54	56	e162	e15
21	136	157	342	367	e96	411	229	137	51	54	e144	e20
22	128	156	296	397	e105	377	292	126	50	53	e111	e45
23	124	153	261	368	e140	338	260	117	46	64	e101	e43
24	128	146	240	357	175	297	221	160	44	59	e84	e41
25	141	141	e220	339	156	262	190	175	45	56	e68	e39
26	136	141	e200	309	e120	230	195	182	45	58	e67	e40
27	128	136	e180	261	e150	206	402	162	48	85	e58	e41
28	133	270	e165	268	e190	199	554	137	60	97	e54	e38
29	126	290	e155	259	---	184	442	143	101	76	e50	e34
30	117	254	e140	244	---	176	373	141	110	62	e47	e31
31	110	---	e130	e210	---	171	---	144	---	54	e44	---
TOTAL	4990	8369	7523	7636	3056	11214	6724	6401	2152	1993	3399	862
MEAN	161	279	243	246	109	362	224	206	71.7	64.3	110	28.7
MAX	456	643	428	418	190	819	554	532	122	122	211	46
MIN	97	136	130	96	73	138	144	117	44	48	44	15
CFM	.73	1.26	1.10	1.11	.49	1.64	1.01	.93	.32	.29	.50	.13
IN.	.84	1.41	1.27	1.29	.51	1.89	1.13	1.08	.36	.34	.57	.15

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1995, BY WATER YEAR (WY)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	170	200	193	174	218	360	337	161	125	78.4	72.4	141				
MAX	583	474	349	354	485	712	630	274	251	206	166	635				
(WY)	1987	1986	1988	1993	1985	1985	1985	1983	1989	1994	1992	1985				
MIN	52.7	91.8	84.1	73.1	89.4	157	198	82.4	31.2	39.1	34.6	28.7				
(WY)	1983	1981	1990	1981	1982	1989	1989	1988	1988	1988	1981	1995				

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1980 - 1995

ANNUAL TOTAL	81201	64319	185
ANNUAL MEAN	222	176	295
HIGHEST ANNUAL MEAN			126
LOWEST ANNUAL MEAN			1989
HIGHEST DAILY MEAN	1620	819	2950
LOWEST DAILY MEAN	52	(e)15	14
ANNUAL SEVEN-DAY MINIMUM	57	16	16
INSTANTANEOUS PEAK FLOW		830	3090
INSTANTANEOUS PEAK STAGE		4.66	(a)9.61
INSTANTANEOUS LOW FLOW		(b)	12
ANNUAL RUNOFF (CFM)	1.01	.80	.84
ANNUAL RUNOFF (INCHES)	13.67	10.83	11.35
10 PERCENT EXCEEDS	471	360	370
50 PERCENT EXCEEDS	152	144	125
90 PERCENT EXCEEDS	62	47	50

(a) Backwater from ice.

(b) Not determined.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04147500 FLINT RIVER NEAR OTISVILLE, MI

LOCATION.--Lat 43°06'40", long 83°31'10", in SE1/4 sec.9, T.8 N., R.8 E., Genesee County, Hydrologic Unit 04080204, on left bank 20 ft downstream from bridge on State Highway 15, 1.5 mi downstream from Holloway Reservoir, 3.5 mi upstream from Powers-Cullen Drain, and 3.8 mi south of Otisville.

DRAINAGE AREA.--530 mi².

PERIOD OF RECORD.--October 1952 to September 1989, October 1990 to current year.

REVISED RECORDS.--WDR MI-78-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 721.39 ft above sea level.

REMARKS.--Records good. Flow regulated by Holloway Reservoir, 1.5 mi upstream from station. From 1954 to 1991 annual mean discharge and runoff figures adjusted for change in contents in Holloway Reservoir. Several measurements of water temperature were made during the year. City of Flint gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	682	413	750	302	467	348	330	963	308	225	136	152
2	827	599	734	321	449	336	341	826	277	217	131	152
3	903	632	693	321	395	306	335	701	281	200	129	152
4	852	675	643	304	362	289	331	616	266	186	131	152
5	777	786	628	274	343	299	335	534	243	176	136	146
6	675	952	647	270	279	298	333	487	220	166	141	134
7	568	1190	703	279	188	390	345	453	199	156	141	133
8	471	1540	735	278	196	639	356	397	194	146	137	127
9	472	1640	755	274	212	655	379	370	175	148	138	107
10	461	1410	735	268	219	635	385	395	167	145	135	100
11	436	1270	699	264	223	689	366	842	160	138	134	100
12	429	1370	635	262	214	958	362	1160	155	130	135	100
13	384	1340	586	282	206	1360	295	1230	143	129	134	100
14	353	1290	533	365	199	1800	223	1060	151	170	138	100
15	318	1220	496	561	195	2020	290	922	144	177	169	100
16	289	1140	462	865	191	2000	341	781	138	161	185	100
17	265	799	546	1020	190	1880	338	698	133	153	197	100
18	248	501	735	961	191	1730	254	599	130	140	208	100
19	264	529	816	872	195	1500	235	511	125	135	216	100
20	274	528	871	880	209	1360	206	437	123	128	212	100
21	287	417	986	863	235	1210	133	391	118	126	201	100
22	292	384	993	891	253	1000	133	350	109	124	188	100
23	281	374	869	928	270	993	134	315	104	124	172	110
24	274	349	782	936	296	985	181	363	103	123	169	119
25	271	333	710	917	323	976	305	401	105	122	161	108
26	273	327	652	880	326	711	424	418	115	121	155	108
27	268	363	598	666	320	253	660	422	116	122	155	108
28	257	408	553	412	335	253	908	378	126	124	154	108
29	251	621	518	474	---	254	1100	345	172	135	154	109
30	252	710	482	460	---	258	1090	339	207	145	154	109
31	252	---	384	456	---	296	---	324	---	142	153	---
TOTAL	12906	24110	20929	17106	7481	26681	11448	18028	5007	4634	4899	3434
MEAN	416	804	675	552	267	861	382	582	167	149	158	114
MAX	903	1640	993	1020	467	2020	1100	1230	308	225	216	152
MIN	248	327	384	262	188	253	133	315	103	121	129	100

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1953 - 1995, BY WATER YEAR (WY)

	MEAN	222	268	308	286	368	804	664	366	231	165	134	211
MAX	1688	911	900	1153	1123	1984	1549	1789	697	839	369	1507	
(WY)	1987	1993	1988	1973	1968	1976	1960	1956	1989	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1953 - 1995

ANNUAL TOTAL	183407	156663	335
ANNUAL MEAN	502	429	638
HIGHEST ANNUAL MEAN			82.7
LOWEST ANNUAL MEAN			5940
HIGHEST DAILY MEAN	2580	Jul 10	2020
LOWEST DAILY MEAN	115	Jun 21	100
ANNUAL SEVEN-DAY MINIMUM	120	Jan 20	100
INSTANTANEOUS PEAK FLOW			2030
INSTANTANEOUS PEAK STAGE			10.86
INSTANTANEOUS LOW FLOW			77
10 PERCENT EXCEEDS	1070		931
50 PERCENT EXCEEDS	381		299
90 PERCENT EXCEEDS	133		124
			770
			176
			64

(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 mi².

PERIOD OF RECORD.--October 1965 to current year.

REVISED RECORDS.--WDR MI-78-1: Drainage area. WDR MI-85-1: 1968(M), 1973(M), 1975, 1982(P).

GAGE.--Water-stage recorder. Datum of gage is 747.39 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are poor. Some diurnal fluctuation caused by small dams, and occasional diversion for irrigation upstream from station. Several measurements of water temperature were made during the year. Gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	227	115	130	e52	106	e90	71	151	54	47	10	8.9
2	218	175	112	e49	81	e70	67	124	56	44	9.6	10
3	160	177	110	e47	e68	e66	65	105	102	40	17	8.6
4	136	235	108	e47	e62	e64	67	85	55	31	16	7.2
5	110	240	140	e52	e56	e78	61	77	45	24	30	7.0
6	86	375	152	e50	e50	131	65	72	36	21	41	6.6
7	67	329	167	e46	e41	209	65	67	28	20	33	7.4
8	56	247	195	e43	e38	307	69	60	28	18	24	7.1
9	100	253	181	e42	e39	264	71	60	28	15	29	6.6
10	85	227	161	e42	e39	225	72	71	29	14	23	5.9
11	75	171	138	e43	e38	240	77	138	28	13	27	6.1
12	65	134	115	77	e37	401	97	140	26	11	24	6.1
13	55	112	110	143	e36	474	116	180	25	e13	21	6.1
14	49	104	81	155	e35	464	120	173	26	15	51	6.2
15	47	97	85	212	e34	427	111	121	24	12	28	5.9
16	62	91	80	177	e34	370	100	80	22	14	24	5.6
17	50	85	274	158	e34	309	88	77	22	17	82	5.7
18	36	81	272	152	e36	258	91	68	20	22	54	5.9
19	32	72	232	125	e39	215	114	64	18	24	62	6.1
20	27	62	204	140	e43	182	105	60	16	19	67	6.9
21	24	62	169	214	e46	180	123	55	13	16	56	9.7
22	31	58	158	209	e47	157	130	49	12	15	36	16
23	36	49	129	201	e56	140	116	49	11	28	16	11
24	36	49	98	183	e84	125	107	77	10	16	15	14
25	34	50	93	167	e71	113	99	65	12	15	12	12
26	32	47	91	150	e56	100	121	68	14	18	11	11
27	31	63	87	123	e74	83	350	75	12	20	11	9.1
28	31	267	83	126	e98	77	267	74	18	15	10	7.9
29	35	196	78	124	---	76	224	68	25	13	11	7.1
30	32	153	73	124	---	78	192	60	38	11	10	6.1
31	30	---	e60	117	---	75	---	59	---	9.9	9.3	---
TOTAL	2095	4376	4166	3590	1478	6048	3421	2672	853	610.9	869.9	239.8
MEAN	67.6	146	134	116	52.8	195	114	86.2	28.4	19.7	28.1	7.99
MAX	227	375	274	214	106	474	350	180	102	47	82	16
MIN	24	47	60	42	34	64	61	49	10	9.9	9.3	5.6
CFSM	.68	1.47	1.35	1.17	.53	1.96	1.15	.87	.29	.20	.28	.08
IN.	.78	1.64	1.56	1.34	.55	2.26	1.28	1.00	.32	.23	.33	.09

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1995, BY WATER YEAR (WY)

MEAN	45.3	63.4	78.0	71.3	92.4	171	162	75.8	47.5	28.4	22.2	45.3
MAX	236	181	213	192	294	317	350	200	146	93.2	107	314
(WY)	1982	1986	1976	1973	1976	1973	1975	1974	1989	1994	1975	1985
MIN	10.7	16.2	22.2	15.6	24.3	57.9	80.9	24.7	7.39	5.48	5.83	7.06
(WY)	1967	1966	1970	1970	1970	1969	1966	1977	1988	1966	1966	1966

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1966 - 1995

ANNUAL TOTAL	35712	30419.6	75.1
ANNUAL MEAN	97.8	83.3	122
HIGHEST ANNUAL MEAN			35.3
LOWEST ANNUAL MEAN			1985
HIGHEST DAILY MEAN	663	Feb 20	474
LOWEST DAILY MEAN	12	Jun 5	5.6
ANNUAL SEVEN-DAY MINIMUM	14	Sep 10	5.9
INSTANTANEOUS PEAK FLOW			497
INSTANTANEOUS PEAK STAGE			8.52
INSTANTANEOUS LOW FLOW			4.3
ANNUAL RUNOFF (CFSM)	.98		.84
ANNUAL RUNOFF (INCHES)	13.37		11.38
10 PERCENT EXCEEDS	231		193
50 PERCENT EXCEEDS	68		61
90 PERCENT EXCEEDS	20		11

(a) From floodmark.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04148500 FLINT RIVER NEAR FLINT, MI

LOCATION.--Lat 43°02'20", long 83°46'18", in SW1/4 sec.4, T.7 N., R.6 E., Genesee County, Hydrologic Unit 04080204, on left bank on grounds of sewage-treatment plant, 1.2 mi upstream from Pirnie Creek, and 5.0 mi downstream from Swartz Creek.

DRAINAGE AREA.--956 mi².

PERIOD OF RECORD.--September 1903 to March 1904 (gage heights only), August 1932 to current year. Gage-height records for flood seasons collected in this vicinity 1911-32, are contained in reports of the National Weather Service.

REVISED RECORDS.--WSP 954: 1941. WSP 1337: 1933-34(M), 1935-37. WDR MI-78-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 678.80 ft above sea level (levels by the National Weather Service and City of Flint).

REMARKS.--Records good. Some regulation by small reservoirs upstream from station and by Holloway Reservoir. From 1954 to 1991 annual mean discharge and runoff figures adjusted for change in contents in Holloway Reservoir. Occasional diversion for industrial use. Since Dec. 17, 1967, flow contains up to 50 ft³/s as sewage effluent which originates outside the basin. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1540	1280	1210	647	846	758	640	1720	665	365	221	246
2	1730	1460	1160	609	824	693	636	1400	547	358	211	230
3	1470	1230	1190	602	710	612	629	1230	671	339	437	232
4	1240	1570	1150	522	695	599	650	1110	610	375	283	225
5	1100	1920	1300	489	605	636	612	1010	537	367	254	229
6	996	2800	1280	515	552	688	650	907	463	313	250	212
7	852	2760	1430	507	432	1230	641	829	366	294	260	228
8	709	2400	1460	489	390	1940	746	739	302	258	301	206
9	1010	2620	1530	482	400	1430	754	732	350	242	389	180
10	848	2530	1490	473	410	1310	762	848	336	243	250	163
11	747	2000	1350	461	400	1610	738	1670	319	229	246	157
12	692	1960	1170	508	384	3190	909	1720	321	224	257	156
13	629	1920	1060	679	380	3580	979	1880	296	227	232	154
14	559	1880	966	858	363	3540	778	1770	284	262	353	159
15	513	1790	891	1130	358	3650	754	1540	251	323	303	158
16	469	1650	872	1430	357	3510	750	1290	251	392	305	148
17	447	1380	1340	1530	359	3230	745	1220	248	325	1550	159
18	419	800	1810	1610	366	2850	761	959	234	253	630	173
19	575	820	1910	1460	394	2630	701	881	256	233	440	152
20	466	850	1720	1700	442	2310	687	762	236	225	410	168
21	453	724	1630	2110	474	2180	684	691	214	232	382	194
22	449	656	1670	1940	482	1760	696	614	201	220	368	287
23	439	590	1530	1840	535	1680	598	625	188	318	317	178
24	431	577	1350	1770	664	1600	557	1060	180	236	322	176
25	420	559	1210	1720	658	1520	639	828	184	221	276	177
26	423	544	1100	1640	630	1430	907	800	255	254	256	168
27	414	794	1030	1490	684	669	2800	768	242	242	256	172
28	404	1700	964	837	747	623	2210	775	248	219	247	174
29	388	1630	858	903	---	607	2040	697	301	213	254	167
30	388	1480	785	863	---	598	1970	646	332	214	243	163
31	440	---	781	870	---	614	---	608	---	222	242	---
TOTAL	21660	44874	39197	32684	14541	53277	27623	32329	9888	8438	10745	5591
MEAN	699	1496	1264	1054	519	1719	921	1043	330	272	347	186
MAX	1730	2800	1910	2110	846	3650	2800	1880	671	392	1550	287
MIN	388	544	781	461	357	598	557	608	180	213	211	148

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1995, BY WATER YEAR (WY)

	353	465	551	581	764	1520	1333	748	462	271	237	341
MEAN	353	465	551	581	764	1520	1333	748	462	271	237	341
MAX	2764	1734	1739	2008	2867	3514	4209	3575	1613	1294	868	2635
(WY)	1987	1993	1976	1973	1938	1985	1947	1956	1943	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1932 - 1995

ANNUAL TOTAL	346107											
ANNUAL MEAN	948											
HIGHEST ANNUAL MEAN												1985
LOWEST ANNUAL MEAN												1964
HIGHEST DAILY MEAN	3620				Apr 26	3650		Mar 15	14500		Apr 6	1947
LOWEST DAILY MEAN	192				Jun 12	148		Sep 16	14		Aug 7	1934
ANNUAL SEVEN-DAY MINIMUM	221				Jan 21	156		Sep 11	23		Aug 14	1936
INSTANTANEOUS PEAK FLOW						3770		Mar 15	14900		Apr 6	1947
INSTANTANEOUS PEAK STAGE						9.24		Mar 15	16.95		Sep 6	1985
INSTANTANEOUS LOW FLOW						126		Jul 14	9.0		Aug 7	1934
10 PERCENT EXCEEDS	2000					1720			1470			
50 PERCENT EXCEEDS	721					629			334			
90 PERCENT EXCEEDS	241					223			99			

STREAMS TRIBUTARY TO LAKE HURON

04150500 CASS RIVER AT CASS CITY, MI

LOCATION.--Lat 43°35'03", long 83°10'34", in NE1/4 NE1/4 sec.4, T.13 N., R.11 E., Tuscola County, Hydrologic Unit 04080205, on left bank 600 ft downstream from bridge on Cemetery Road, 0.3 mi downstream from confluence of North and South Branches, and 1.1 mi south of Cass City.

DRAINAGE AREA.--359 mi².

PERIOD OF RECORD.--October 1947 to 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. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	150	63	361	e130	e170	e120	156	335	81	35	9.8	6.7
2	521	244	288	e120	e150	e115	151	268	70	26	8.5	5.8
3	337	290	252	e115	e140	e110	147	226	85	22	16	5.7
4	177	207	227	e105	e130	e105	146	197	146	19	42	5.5
5	116	279	223	e100	e120	e105	135	177	125	19	56	5.3
6	91	1030	337	e98	e110	e110	145	160	121	22	51	5.0
7	76	1510	425	e96	e105	e140	164	145	102	21	37	5.0
8	68	755	410	e94	e100	e250	172	129	86	21	26	4.8
9	74	521	e340	e92	e98	e600	193	123	77	19	21	4.7
10	94	511	e280	e94	e96	e500	186	146	61	17	19	4.7
11	90	381	e240	e105	e94	e400	165	263	53	15	16	5.9
12	81	284	e210	e120	e92	e1200	190	273	47	14	22	6.1
13	73	236	e190	e150	e90	2080	259	186	42	13	32	5.5
14	67	209	e180	e400	e90	1860	278	149	37	12	42	4.8
15	59	188	e170	1280	e90	1550	248	130	34	20	58	4.4
16	57	166	179	1150	e90	1180	210	111	32	18	41	3.9
17	54	148	570	671	e90	864	181	106	30	14	31	5.4
18	51	138	1370	489	e92	618	165	108	29	12	26	6.6
19	61	128	842	433	e96	600	217	100	27	12	22	5.2
20	73	116	604	475	e110	998	244	90	26	14	19	6.4
21	77	117	471	1330	e125	778	266	79	23	91	16	7.4
22	72	122	376	1000	e140	600	596	73	21	49	13	12
23	69	111	328	681	e160	454	402	69	20	23	12	13
24	64	97	293	e560	e170	359	311	89	19	17	13	13
25	61	105	270	e500	e165	299	256	103	18	15	11	11
26	58	96	241	e420	e155	261	230	105	16	14	11	8.3
27	56	93	220	e350	e140	234	865	92	18	38	11	7.2
28	52	628	210	e300	e130	214	1230	84	31	25	10	6.6
29	50	843	194	e260	---	199	636	100	37	18	8.2	6.1
30	49	480	158	e220	---	185	448	103	37	13	7.8	5.9
31	48	---	e140	e190	---	170	---	95	---	11	7.4	---
TOTAL	3026	10096	10599	12128	3338	17258	8992	4414	1551	679	715.7	197.9
MEAN	97.6	337	342	391	119	557	300	142	51.7	23.1	23.1	6.60
MAX	521	1510	1370	1330	170	2080	1230	335	146	91	58	13
MIN	48	63	140	92	90	105	135	69	16	11	7.4	3.9
CFSM	.27	.94	.95	1.09	.33	1.55	.83	.40	.14	.06	.06	.02
IN.	.31	1.05	1.10	1.26	.35	1.79	.93	.46	.16	.07	.07	.02

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 1995, BY WATER YEAR (WY)

MEAN	86.6	143	195	181	268	758	528	219	113	69.2	35.5	98.6
MAX	952	683	653	840	982	2260	1296	1131	591	629	201	2239
(WY)	1987	1993	1985	1952	1954	1985	1960	1956	1984	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1948 - 1995

ANNUAL TOTAL	101503	72994.6	(a)224
ANNUAL MEAN	278	200	471
HIGHEST ANNUAL MEAN			27.6
LOWEST ANNUAL MEAN			11800
HIGHEST DAILY MEAN	3510	2080	11800
LOWEST DAILY MEAN	18	3.9	.50
ANNUAL SEVEN-DAY MINIMUM	20	5.0	.76
INSTANTANEOUS PEAK FLOW		2210	12500
INSTANTANEOUS PEAK STAGE		9.60	(b)19.82
INSTANTANEOUS LOW FLOW		3.7	.50
ANNUAL RUNOFF (CFSM)	.77	.56	.62
ANNUAL RUNOFF (INCHES)	10.52	7.56	8.48
10 PERCENT EXCEEDS	630	500	540
50 PERCENT EXCEEDS	124	105	61
90 PERCENT EXCEEDS	28	11	7.8

(a) Does not include water year 1948.

(b) From floodmark.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04151500 CASS RIVER AT FRANKENMUTH, MI

LOCATION.--Lat 43°19'40", long 83°44'53", in NW1/4 SE1/4 sec.27, T.11 N., R.6 E., Saginaw County, Hydrologic Unit 04080205, on right bank 2,000 ft downstream from dam in Frankenmuth, 3,600 ft upstream from highway bridge on Dehmel Road, 3.4 mi upstream from Dead Creek, and 17 mi upstream from mouth.

DRAINAGE AREA.--841 mi².

PERIOD OF RECORD.--February 1908 to March 1909, July 1935 to September 1936, June 1939 to current year.

REVISED RECORDS.--WSP 1307: 1936(M), 1940(M). WSP 1727: 1952. WSP 1911: 1952. WDR MI-78-1: Drainage area.

GAGE--Water-stage recorder. Datum of gage is 583.96 ft above sea level (levels by Michigan Department of Natural Resources). February 1908 to March 1909, nonrecording gage at site 2,000 ft upstream at datum 1.81 ft lower. July 18 to Sept. 11, 1935, nonrecording gage, Sept. 12, 1935 to Sept. 30, 1936, and June 20, 1939 to Sept. 30, 1949, water-stage recorder, at site 3,600 ft downstream at datum 0.04 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor. Occasional regulation by dams upstream from station. Prior to 1950, regulation at low and medium flows by mill upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	600	292	1040	e350	e400	e290	456	1060	276	171	79	45
2	744	582	859	e320	e360	e270	431	873	244	150	64	42
3	943	697	740	e290	e330	e260	432	719	235	126	98	42
4	671	778	660	e280	e300	e250	444	602	237	110	110	41
5	467	845	615	e270	e280	e250	408	539	298	107	157	40
6	360	1420	637	e260	e260	e260	401	511	272	109	175	39
7	294	2380	845	e260	e250	345	464	458	263	106	154	38
8	253	2190	977	e250	e240	645	518	407	241	104	133	36
9	333	1500	955	e250	e230	1150	578	386	211	104	115	35
10	368	1250	886	e250	e230	1280	581	464	201	101	100	34
11	348	1100	e800	e270	e220	1080	519	1320	185	94	89	33
12	319	893	e540	297	e220	1840	559	1380	169	84	84	33
13	282	738	e500	496	e210	4340	742	1040	155	79	84	33
14	258	653	e450	818	e210	5100	854	734	145	77	102	33
15	236	599	e440	1420	e210	3890	797	574	134	83	128	33
16	213	528	487	2260	e210	2890	665	468	124	79	151	33
17	198	473	862	1820	e210	2210	564	432	114	80	153	36
18	196	436	1900	1270	e210	1720	505	432	108	77	136	34
19	215	409	2240	1050	e220	1450	583	399	104	75	112	33
20	265	381	1630	1030	e240	1770	671	357	101	74	96	38
21	268	365	1270	1470	e280	2180	743	314	93	143	85	44
22	269	376	1060	2260	340	1810	1070	277	84	156	76	73
23	255	372	908	1770	361	1400	1230	257	79	186	67	70
24	241	342	811	1460	405	1130	934	327	75	132	63	62
25	225	319	734	e1200	e390	928	753	384	74	100	55	58
26	216	312	664	e1000	e360	792	652	378	82	84	52	57
27	207	316	603	e860	e330	700	1230	338	106	101	51	58
28	197	690	567	e720	e310	632	2500	301	105	124	49	56
29	188	1580	531	e600	---	576	2040	301	140	145	50	52
30	185	1460	469	e520	---	533	1380	328	178	116	49	50
31	186	---	e380	e440	---	494	---	312	---	92	48	---
TOTAL	10000	24276	26060	25811	7816	42465	23704	16672	4833	3369	2965	1311
MEAN	323	809	841	833	279	1370	790	538	161	109	96.6	43.7
MAX	943	2380	2240	2260	405	5100	2500	1380	298	186	175	73
MIN	185	292	380	250	210	250	401	257	74	74	48	33
CFSM	.38	.96	1.00	.99	.33	1.63	.94	.64	.19	.13	.11	.05
IN.	.44	1.07	1.15	1.14	.35	1.88	1.05	.74	.21	.15	.13	.06

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1908 - 1995, BY WATER YEAR (WY)

	MEAN	229	330	425	434	604	1675	1187	625	340	190	105	225
MAX	2637	1374	1335	2185	2225	4943	3121	2650	1499	1884	523	5000	
(WY)	1987	1993	1985	1973	1976	1976	1947	1956	1945	1994	1953	1986	
MIN	31.7	43.1	50.7	45.1	55.6	179	201	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 1994 CALENDAR YEAR FOR 1995 WATER YEAR WATER YEARS 1908 - 1995

ANNUAL TOTAL	267507	189282	
ANNUAL MEAN	733	519	
HIGHEST ANNUAL MEAN			526
LOWEST ANNUAL MEAN			1063
HIGHEST DAILY MEAN	11500	5100	21700
LOWEST DAILY MEAN	62	33	(a)1.5
ANNUAL SEVEN-DAY MINIMUM	71	33	4.4
INSTANTANEOUS PEAK FLOW		5440	22200
INSTANTANEOUS PEAK STAGE		16.38	27.52
INSTANTANEOUS LOW FLOW		32	1.5
ANNUAL RUNOFF (CFSM)	.87	.62	.63
ANNUAL RUNOFF (INCHES)	11.83	8.37	8.51
10 PERCENT EXCEEDS	1480	1260	1230
50 PERCENT EXCEEDS	395	310	181
90 PERCENT EXCEEDS	110	64	48

(a) Approximate.

(b) Sept. 11, 12, 16, 19.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04152238 SOUTH BRANCH TOBACCO RIVER NEAR BEAVERTON, MI

LOCATION.--Lat 43°52'01", long 84°32'43", in SE1/4 NE1/4 sec.16, T.17 N., R.2 W., Gladwin County, Hydrologic Unit 04080201, on left bank 40 ft upstream from bridge on Grout Road, 3.0 mi upstream from Ross Lake, and 3.2 mi southwest of Beaverton.

DRAINAGE AREA.--160 mi².

PERIOD OF RECORD.--January 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 709.92 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are poor. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68	89	121	e82	e90	e69	97	192	68	106	52	45
2	80	151	113	e82	e88	e69	96	196	65	85	50	41
3	73	109	117	e82	e86	e69	95	146	70	75	52	42
4	65	114	118	e81	e84	e69	102	136	76	66	60	42
5	60	245	116	e80	e82	e69	97	130	70	73	84	42
6	62	318	114	e80	e81	e68	96	127	64	88	112	40
7	58	395	114	e80	e80	e70	103	122	61	79	82	40
8	58	256	109	e79	e79	e74	107	111	61	76	68	41
9	70	171	106	e79	e78	e76	110	108	60	69	65	41
10	82	160	105	e79	e77	e79	106	117	60	68	63	40
11	74	134	e100	e79	e76	e86	99	128	60	66	61	40
12	74	121	e98	e78	e76	e200	102	118	60	61	67	39
13	66	113	e96	e80	e75	e420	108	107	57	68	109	39
14	64	109	e94	265	e75	e390	108	103	56	50	147	40
15	64	107	e92	499	e75	311	104	115	54	57	127	40
16	66	100	e91	441	e75	264	96	106	55	66	90	40
17	64	94	e90	288	e75	228	95	98	53	79	94	49
18	67	91	e91	237	e75	191	94	98	53	67	110	72
19	73	89	e92	221	e74	188	160	92	52	60	92	64
20	76	87	e93	177	e74	283	177	85	50	60	75	61
21	71	86	e92	170	e74	282	186	80	49	74	64	65
22	68	88	e93	153	e74	223	263	78	48	63	62	72
23	70	87	e94	143	e74	183	201	77	48	61	59	77
24	69	83	e96	134	e73	158	147	79	49	65	56	70
25	67	80	e96	127	e72	139	135	81	49	59	52	62
26	67	80	e94	120	e71	128	127	77	50	55	49	59
27	68	81	e92	e110	e70	122	298	74	53	54	47	57
28	66	114	e90	e105	e70	116	600	73	70	62	46	54
29	63	170	e88	e100	---	111	453	79	122	84	47	51
30	63	142	e86	e96	---	108	232	84	122	67	46	52
31	61	---	e84	e92	---	101	---	75	---	56	46	---
TOTAL	2097	4064	3075	4519	2153	4944	4794	3262	1865	2119	2234	1517
MEAN	67.6	135	99.2	146	76.9	159	160	105	62.2	68.4	72.1	50.6
MAX	82	395	121	499	90	420	600	192	122	106	147	77
MIN	58	80	84	78	70	68	94	73	48	50	46	39
CFSM	.42	.85	.62	.91	.48	1.00	1.00	.66	.39	.43	.45	.32
IN.	.49	.94	.71	1.05	.50	1.15	1.11	.76	.43	.49	.52	.35

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1995, BY WATER YEAR (WY)

	MEAN	120	180	142	108	105	226	244	130	113	73.9	75.4	78.5
MAX	202	364	253	176	172	296	478	211	279	92.3	92.3	85.8	127
(WY)	1991	1993	1992	1993	1991	1991	1991	1991	1989	1992	1991	1991	1992
MIN	67.6	82.3	61.2	67.6	74.4	152	115	87.2	57.2	49.5	55.3	50.6	50.6
(WY)	1995	1990	1990	1994	1993	1987	1987	1988	1988	1988	1988	1995	1995

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1987 - 1995

ANNUAL TOTAL	40571	36643	136
ANNUAL MEAN	111	100	184
HIGHEST ANNUAL MEAN			1991
LOWEST ANNUAL MEAN			1995
HIGHEST DAILY MEAN	600	600	1340
LOWEST DAILY MEAN	47	39	39
ANNUAL SEVEN-DAY MINIMUM	50	40	40
INSTANTANEOUS PEAK FLOW		(a)642	(b)1450
INSTANTANEOUS PEAK STAGE		(c)8.54	(c)11.06
INSTANTANEOUS LOW FLOW		39	39
ANNUAL RUNOFF (CFSM)	.69	.63	.85
ANNUAL RUNOFF (INCHES)	9.43	8.52	11.51
10 PERCENT EXCEEDS	210	162	236
50 PERCENT EXCEEDS	83	80	94
90 PERCENT EXCEEDS	58	52	62

(a) Gage height 8.36 ft.

(b) Gage height 10.74 ft.

(c) Backwater from ice.

(d) Sept. 12, 13.

(e) Estimated.

(f) July 6, Sept. 9, 1988, Sept. 12, 13, 1995.

STREAMS TRIBUTARY TO LAKE HURON

04154000 CHIPPEWA RIVER NEAR MOUNT PLEASANT, MI

LOCATION.--Lat 43°37'32", long 84°42'28", in NW1/4 NW1/4 sec.8, T.14 N., R.3 W., Isabella County, Hydrologic Unit 04080202, on right bank 12 ft downstream from bridge on South Leaton Road, 3.8 mi northeast of Mount Pleasant, and 36 mi upstream from mouth.

DRAINAGE AREA.--416 mi².

PERIOD OF RECORD.--October 1930 to September 1931, October 1932 to current year. Gage-height records for flood seasons collected in this vicinity 1910-27, are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 744: Drainage area. WSP 1337: 1931, 1933-40, 1945, 1948-49.

GAGE.--Water-stage recorder. Datum of gage is 710.38 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Oct. 21, 1938, nonrecording gage at site 30 ft upstream at present datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Diurnal fluctuation below 750 ft³/s caused by powerplant at Mount Pleasant prior to 1962, occasional regulation at low flow since. Since July 30, 1968, occasional regulation by control structures on lake outlets. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	256	429	402	300	e310	e230	304	614	214	288	197	189
2	275	435	398	290	e300	e230	294	523	206	243	182	182
3	268	375	393	295	e290	e230	289	466	274	211	200	180
4	249	415	390	e300	e280	e230	296	428	294	194	201	176
5	231	551	387	e300	e270	e230	288	402	276	198	488	173
6	222	854	394	e300	e270	e230	287	386	255	201	379	171
7	213	898	404	e290	e270	e240	286	369	241	207	336	170
8	210	629	392	e290	e260	259	304	351	230	191	291	161
9	246	553	386	e280	e260	252	329	329	211	182	254	155
10	246	514	372	e280	e260	254	324	333	200	177	234	154
11	241	473	367	e280	e250	280	310	334	194	173	217	150
12	234	448	e360	e280	e250	492	307	331	190	167	244	147
13	224	433	e350	e280	e250	556	307	319	181	168	270	146
14	217	426	e340	475	e250	502	300	315	174	171	273	146
15	211	414	e330	665	e250	492	292	315	169	167	296	141
16	209	400	325	512	e250	485	284	314	165	187	312	138
17	205	393	331	445	e250	465	273	316	160	214	359	183
18	244	386	336	422	e250	423	276	295	157	232	412	171
19	295	372	339	413	e250	427	379	276	157	207	423	178
20	338	369	338	439	e250	485	390	267	151	191	373	188
21	350	379	337	445	e250	485	427	254	146	183	317	192
22	343	374	341	423	e250	439	510	238	141	179	274	218
23	341	364	340	411	e240	337	464	226	138	194	245	213
24	331	355	348	401	e240	254	428	244	136	188	265	205
25	323	353	345	392	e240	288	392	243	135	187	230	200
26	317	343	332	381	e240	348	367	240	142	177	220	191
27	312	354	324	e350	e240	351	604	231	241	166	214	182
28	304	450	320	e340	e240	344	977	226	308	207	207	169
29	300	449	319	e330	---	331	829	233	373	212	203	160
30	297	419	304	e320	---	321	729	236	327	242	198	154
31	295	---	298	e320	---	315	---	227	---	225	195	---
TOTAL	8347	13607	10942	11249	7210	10805	11846	9881	6186	6129	8509	5183
MEAN	269	454	353	363	257	349	395	319	206	198	274	173
MAX	350	898	404	665	310	556	977	614	373	288	488	218
MIN	205	343	298	280	240	230	273	226	135	166	182	138
CFSM	.65	1.09	.85	.87	.62	.84	.95	.77	.50	.48	.66	.42
IN.	.75	1.22	.98	1.01	.64	.97	1.06	.88	.55	.55	.76	.46

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1995, BY WATER YEAR (WY)

	MEAN	252	305	304	279	329	577	592	382	280	194	173	228
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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1931 - 1995

ANNUAL TOTAL	128707												
ANNUAL MEAN	353												
HIGHEST ANNUAL MEAN													
LOWEST ANNUAL MEAN													
HIGHEST DAILY MEAN	1500				Feb 21		977		Apr 28	6210		Sep 12 1986	
LOWEST DAILY MEAN	140				Jun 22		135		Jun 25	19		Aug 16 1936	
ANNUAL SEVEN-DAY MINIMUM	148				Jun 17		141		Jun 20	49		Aug 10 1936	
INSTANTANEOUS PEAK FLOW							1080		Nov 6	6660		Sep 12 1986	
INSTANTANEOUS PEAK STAGE							6.17		Nov 6	(a)15.58		Sep 12 1986	
INSTANTANEOUS LOW FLOW							130		(b)	12		Aug 18 1945	
ANNUAL RUNOFF (CFSM)	.85						.72			.78			
ANNUAL RUNOFF (INCHES)	11.51						9.83			10.59			
10 PERCENT EXCEEDS	557						434			592			
50 PERCENT EXCEEDS	319						286			240			
90 PERCENT EXCEEDS	205						177			132			

- (a) From floodmark.
(b) June 25, 26.
(c) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04155500 PINE RIVER NEAR MIDLAND, MI

LOCATION.--Lat 43°33'52", long 84°22'09", in SW1/4 NW1/4 sec.4, T.13 N., R.1 E., Midland County, Hydrologic Unit 04080202, on left bank at downstream side of bridge on Meridian Road, 7.2 mi southwest of Midland, and 7.8 mi upstream from Chippewa River.

DRAINAGE AREA.--390 mi², approximately.

PERIOD OF RECORD.--May 1934 to September 1938, February 1948 to 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. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	231	248	635	357	e250	e190	223	829	178	368	135	129
2	368	538	629	e320	e230	e180	304	657	179	247	127	128
3	227	474	547	e250	e220	e170	303	548	221	215	120	129
4	269	503	481	e200	e210	e180	302	430	372	82	138	102
5	245	754	451	e160	e200	e200	292	370	342	243	263	86
6	260	1370	451	e210	e190	e230	263	447	337	101	302	82
7	259	1520	461	e250	e185	e240	270	325	374	270	271	80
8	190	1160	454	e270	e180	e250	283	319	289	223	271	79
9	198	1220	459	e290	e175	e270	314	322	221	102	227	78
10	198	1220	e450	e290	e170	e290	310	320	217	112	121	75
11	213	987	e440	e280	e170	e350	311	332	191	113	131	73
12	234	734	e390	e270	e170	e700	357	315	189	130	166	73
13	232	710	e350	e290	e170	e900	334	311	187	130	173	73
14	223	539	e310	e500	e165	1030	322	307	184	130	166	83
15	200	570	e350	e620	e165	1080	315	277	121	121	166	94
16	172	465	394	e700	e180	1010	311	247	115	118	169	94
17	168	439	462	e760	e200	985	278	251	225	110	199	106
18	165	422	364	e700	e220	781	248	248	95	107	350	128
19	171	388	608	e660	e230	855	340	246	104	130	329	141
20	197	338	403	e660	e240	877	395	218	112	137	439	141
21	213	366	547	771	e250	882	376	205	116	124	384	102
22	181	358	420	826	e260	760	467	204	116	107	382	82
23	168	340	513	569	e270	712	447	205	107	110	289	86
24	192	325	501	544	e280	659	426	213	101	100	157	173
25	194	325	468	e500	e280	548	390	211	101	96	144	217
26	195	322	446	e450	e250	519	402	209	101	97	159	152
27	167	310	439	e390	e220	398	650	208	113	119	159	127
28	168	562	436	e350	e200	383	1060	209	197	121	139	127
29	167	614	406	e320	---	376	734	206	166	190	132	125
30	174	512	e400	e290	---	369	718	189	235	110	131	115
31	175	---	276	e270	---	396	---	178	---	131	131	---
TOTAL	6414	18633	13941	13317	5930	16770	11745	9556	5606	4494	6470	3280
MEAN	207	621	450	430	212	541	391	308	187	145	209	109
MAX	368	1520	635	826	280	1080	1060	829	374	368	439	217
MIN	165	248	276	160	165	170	223	178	95	82	120	73
CFSM	.53	1.59	1.15	1.10	.54	1.39	1.00	.79	.48	.37	.54	.28
IN.	.61	1.78	1.33	1.27	.57	1.60	1.12	.91	.53	.43	.62	.31

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 1995, BY WATER YEAR (WY)

	MEAN	230	275	299	262	341	690	628	357	243	150	133	200
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	91.3	207	211	106	43.9	35.5	37.4	58.0	
(WY)	1949	1950	1963	1977	1963	1964	1963	1958	1934	1934	1936	1948	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1934 - 1995

ANNUAL TOTAL	169923	116156	317
ANNUAL MEAN	466	318	541
HIGHEST ANNUAL MEAN			1986
LOWEST ANNUAL MEAN			150
HIGHEST DAILY MEAN	2570	1520	8750
LOWEST DAILY MEAN	116	73	7.8
ANNUAL SEVEN-DAY MINIMUM	126	76	17
INSTANTANEOUS PEAK FLOW		(a)1680	(b)9360
INSTANTANEOUS PEAK STAGE		(c)6.45	(c)12.08
INSTANTANEOUS LOW FLOW		62	(d)7.6
ANNUAL RUNOFF (CFSM)	1.19	.82	.81
ANNUAL RUNOFF (INCHES)	16.21	11.08	11.05
10 PERCENT EXCEEDS	893	631	660
50 PERCENT EXCEEDS	350	250	200
90 PERCENT EXCEEDS	150	113	82

(a) Gage height 5.42 ft.

(b) Gage height 11.74 ft.

(c) Backwater from ice.

(d) Does not include water years 1934 to 1952.

(e) Estimated.

(f) July 1, 2, 1988.

STREAMS TRIBUTARY TO LAKE HURON

04156000 TITTABAWASSEE RIVER AT MIDLAND, MI

LOCATION.--Lat 43°35'43", long 84°14'08", in NW1/4 NE1/4 sec.28, T.14 N., R.2 E., Midland County, Hydrologic Unit 04080201, on right bank 2,000 ft downstream from dam at Dow Chemical Co. in Midland, 0.7 mi upstream from Bullock Creek, 1.4 mi downstream from Chippewa River, and 23 mi upstream from mouth.

DRAINAGE AREA.--2,400 mi², approximately.

PERIOD OF RECORD.--March 1936 to current year. Gage-height records for flood seasons collected in this vicinity 1910-26, 1928, are contained in reports of National Weather Service.

REVISED RECORDS.--WSP 1045: 1945. WSP 1144: 1948.

GAGE.--Water-stage recorder. Datum of gage is 580.08 ft above sea level (levels by Wade-Trim Assoc.). Prior to Sept. 30, 1955, at datum 10.20 ft higher, Oct. 1, 1955 to Sept. 30, 1993, at datum 0.20 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor. Approximately 5.5 ft³/s diverted above station for industrial use, flow partially returned to river 0.25 mi downstream from station, remainder returned 1 mi downstream. Prior to 1992 water year, diversion was used in computing annual mean discharge and runoff figures, extremes and daily discharge were not adjusted for diversion. Prior to May 20, 1970, discharge below 4,000 ft³/s regulated by dam 2,000 ft upstream from station; fixed crest dam since. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	545	1150	2930	900	e1800	e740	966	4230	1150	1120	968	565
2	695	1860	2350	713	e1600	e720	976	3590	977	723	1090	381
3	962	2080	1620	e1350	e1300	e1050	1340	2580	1350	1180	1090	340
4	964	2140	1660	e1400	e900	e610	1510	2450	1350	618	725	337
5	963	3160	2010	e1300	e720	e620	1350	2370	1810	970	666	640
6	771	4960	2180	e840	e930	e780	1480	1690	1170	1100	1140	549
7	912	7840	2500	e730	e1100	e1300	1290	1220	1220	1030	1380	673
8	553	6550	e2200	e790	e1250	e1300	1200	1840	1540	710	1310	526
9	514	5160	e1900	e1250	e950	e1050	1160	2090	1050	462	884	331
10	853	4510	e1000	e1500	e1100	1230	1910	2190	629	539	792	284
11	1100	3680	e940	e1350	e830	946	1860	2230	561	781	866	444
12	973	2600	e1300	e1350	e670	1370	1670	1870	886	633	590	311
13	937	2370	e1400	e1700	e890	4990	1670	1280	933	626	596	393
14	1030	2050	e1400	e1500	e1050	6980	1910	1020	1070	604	1730	410
15	551	2200	e1300	3980	e1150	6020	1340	1680	532	582	1400	454
16	462	2030	e1300	4890	e860	5200	983	1910	396	604	1510	314
17	779	1990	e1000	4130	e1400	4730	914	1880	452	771	1590	389
18	888	1900	e910	3790	e1000	4220	1390	1460	410	807	1560	697
19	762	1320	e1850	2950	e680	4180	2350	1210	679	824	1650	764
20	918	1050	2020	3120	e630	4630	3440	815	787	675	1170	797
21	1150	2050	2390	e3100	e1150	5120	3180	690	716	612	1260	812
22	663	1860	2310	e2750	e1700	4660	3500	1150	390	402	1210	929
23	564	1450	2060	e2600	e1750	4110	3570	1200	524	378	764	453
24	913	1070	1480	e2700	e1350	3540	3060	1560	376	708	767	400
25	1010	1300	1330	e2650	e780	2910	2640	1320	330	581	589	808
26	1100	1630	1220	e2450	e690	2220	1880	1020	484	561	435	661
27	975	1190	1880	e2150	e870	2320	3460	827	619	565	406	585
28	932	2000	2190	e1350	e1250	2230	8600	650	915	783	567	733
29	581	2890	1940	e870	---	2070	6950	637	1170	495	772	586
30	530	3080	1980	e1650	---	1350	4710	1370	1350	439	616	378
31	874	---	1290	e1750	---	1130	---	1330	---	756	574	---
TOTAL	25424	79120	53840	63553	30350	84226	72259	51359	25826	21639	30667	15944
MEAN	820	2637	1737	2050	1084	2717	2409	1657	861	698	989	531
MAX	1150	7840	2930	4890	1800	6980	8600	4230	1810	1180	1730	929
MIN	462	1050	910	713	630	520	914	637	330	378	406	284
CFSM	.34	1.10	.72	.85	.45	1.13	1.00	.69	.36	.29	.41	.22
IN.	.39	1.23	.83	.99	.47	1.31	1.12	.80	.40	.34	.48	.25

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1936 - 1995, BY WATER YEAR (WY)

MEAN	1085	1488	1542	1382	1686	3929	3745	2116	1353	736	594	929
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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1936 - 1995

ANNUAL TOTAL	712119	554207	1721
ANNUAL MEAN	1951	1518	3318
HIGHEST ANNUAL MEAN			699
LOWEST ANNUAL MEAN			1964
HIGHEST DAILY MEAN	12900	Feb 22	8600
LOWEST DAILY MEAN	314	Jun 19	284
ANNUAL SEVEN-DAY MINIMUM	528	Jun 17	373
INSTANTANEOUS PEAK FLOW			9320
INSTANTANEOUS PEAK STAGE			18.90
INSTANTANEOUS LOW FLOW			271
ANNUAL RUNOFF (CFSM)	.81	.63	.72
ANNUAL RUNOFF (INCHES)	11.04	8.59	9.75
10 PERCENT EXCEEDS	4020	3070	3960
50 PERCENT EXCEEDS	1390	1150	940
90 PERCENT EXCEEDS	654	536	372

(a) From floodmark.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE HURON

04156100 TITTABAWASSEE RIVER NEAR MIDLAND, MI
(National stream quality accounting network station)

LOCATION.--Lat 43°34'07", long 84°11'37", in SW1/4 SE1/4 sec.35, T.14 N., R.2 E., Midland County, Hydrologic Unit 04080201; at bridge on Gordonville Road, 3.0 mi downstream from gaging station 04156000, and 20 mi upstream from mouth.

DRAINAGE AREA.--2,450 mi².

PERIOD OF RECORD.--Water years 1987 to August 1995 (discontinued).

REMARKS.--Cross-sectional samples were collected at or near bridge. All flow except for high-water is regulated by powerplants upstream.

WATER QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS/100 ML) (31625)	STREP-TOCOCCI, KF AGAR, PER 100 ML) (31673)
NOV 08...	1100	7100	489	8.0	8.5	29	10.0	91	1500	K5400
APR 05...	1600	2100	480	8.0	5.0	3.4	12.0	109	K5	K9
JUN 13...	1330	910	825	8.0	21.0	6.4	9.2	105	K58	K15
AUG 09...	1345	818	885	8.2	25.0	7.8	10.4	130	K58	K22
DATE	HARD-NESS TOTAL (MG/L AS CaCO3) (00900)	HARD-NESS NONCARB DISSOLV FLD. AS CaCO3 (MG/L) (00904)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS Mg) (00925)	SODIUM, DIS-SOLVED (MG/L AS Na) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CaCO3 (39086)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS Cl) (00940)
NOV 08...	210	59	58	15	14	4.0	180	148	29	32
APR 05...	200	49	56	15	16	1.9	186	153	30	32
JUN 13...	270	84	75	19	70	2.6	222	182	31	140
AUG 09...	240	79	67	18	80	2.6	198	162	31	150
DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
NOV 08...	0.10	7.9	290	0.39	5560	0.020	2.30	0.050	0.70	0.110
APR 05...	0.10	4.3	272	0.37	1540	0.010	0.570	0.040	0.50	0.020
JUN 13...	0.30	5.6	524	0.71	1290	0.050	0.700	0.130	0.80	0.080
AUG 09...	0.30	7.9	542	0.74	1200	0.030	0.630	0.020	0.80	0.100

STREAMS TRIBUTARY TO LAKE HURON

04156100 TITTABAWASSEE RIVER NEAR MIDLAND, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)
NOV 08...	0.090	0.040	100	37	<3	140	<4	12	<10
APR 05...	<0.010	<0.010	10	30	<3	110	5	13	<10
JUN 13...	0.030	0.030	10	38	<3	28	9	19	10
AUG 09...	0.030	0.040	30	40	3	18	6	8	30

DATE	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 08...	<1	<1	<1.0	200	<6	64	1230	83
APR 05...	<1	<1	<1.0	240	<6	15	85	74
JUN 13...	1	<1	<1.0	320	<6	--	--	--
AUG 09...	2	<1	<1.0	300	<6	21	46	91

STREAMS TRIBUTARY TO LAKE HURON

04157000 SAGINAW RIVER AT SAGINAW, MI

LOCATION.--Lat 43°24'46", long 83°57'47", in NW1/4 SE1/4 sec.26, T.12 N., R.4 E., Saginaw County, Hydrologic Unit 04080206, on right bank 1,000 ft downstream from bridge on Rust Avenue in Saginaw, 1.9 mi downstream from Tittabawassee River, and 20.3 mi upstream from mouth.

DRAINAGE AREA.--6,060 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.—1904, 1908-9, 1912-13, 1916, 1918-19, 1929-30, and 1942 (flood discharge for certain periods only) in WSP 1084; December 1942 to September 1991 and October 1994 to September 1995, daily discharges greater than 10,000 ft³/s only; no daily discharges greater than 10,000 ft³/s water years 1944, 1949, 1953, 1955, 1958, 1961, 1963, 1964, 1966. Continuous-record station October 1991 to July 1994. 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 on right bank at Essexville.

REMARKS.—No estimated daily discharges. Water-discharge records are fair. Minimum flows affected by wind direction and seiche on Saginaw Bay, 20.3 mi downstream. Considerable diversion through metropolitan area of Saginaw. National Weather Service gage-height telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 68,000 ft³/s, Mar. 30, 1904, gage height, 24.9 ft, site then in use.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 22,400 ft³/s, Mar. 15; maximum daily gage height, 16.18 ft, Mar. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

[illegible]

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.--Quarterly cross-sectional samples were collected at Rust Ave. 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.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)
NOV 07...	1330	17600	521	7.9	10.0	64	8.7	78	1700	K5200
APR 06...	1200	5280	583	8.1	4.5	4.6	12.4	99	K10	K12
JUN 14...	1230	1390	772	8.2	21.0	14	11.8	136	K31	K19
AUG 10...	0930	1340	631	8.3	24.0	23	6.6	81	K25	K36

DATE	HARD-NESS TOTAL (MG/L AS CaCO3) (00900)	HARD-NESS NONCARB DISSOLV FLD. AS CaCO3 (MG/L) (00904)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS Mg) (00925)	SODIUM, DIS-SOLVED (MG/L AS Na) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CaCO3) (39086)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS Cl) (00940)
NOV 07...	230	62	62	17	14	4.7	199	163	32	35
APR 06...	260	56	70	21	24	2.6	251	206	38	49
JUN 14...	280	75	77	21	55	2.8	249	204	39	100
AUG 10...	220	43	58	19	36	2.8	220	180	32	67

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)
NOV 07...	0.20	7.9	315	0.43	15000	0.020	2.10	0.060	1.3	0.290
APR 06...	0.20	2.3	356	0.48	5080	0.020	1.20	0.040	0.50	0.040
JUN 14...	0.30	2.7	488	0.66	--	0.030	0.560	0.030	0.80	0.040
AUG 10...	0.30	6.2	384	0.52	1390	0.020	0.820	<0.015	0.50	0.040

STREAMS TRIBUTARY TO LAKE HURON

04157000 SAGINAW RIVER AT SAGINAW, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)
NOV 07...	0.040	0.030	90	43	<3	150	<4	26	10
APR 06...	<0.010	0.010	<10	39	<3	53	<4	22	<10
JUN 14...	<0.010	<0.010	<10	47	<3	21	8	3	<10
AUG 10...	0.010	0.010	30	45	<3	8	6	<1	30

DATE	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDEDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 07...	<1	<1	<1.0	200	<6	184	8740	86
APR 06...	2	<1	<1.0	220	<6	16	228	94
JUN 14...	1	<1	<1.0	320	<6	--	--	--
AUG 10...	3	<1	<1.0	250	<6	52	188	98

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04159492 BLACK RIVER NEAR JEDDO, MI

LOCATION.--Lat 43°09'09", long 82°37'27", in SE1/4 SE1/4 sec.6, T.8 N., R.16 E., St. Clair County, Hydrologic Unit 04090001, on right bank 650 ft upstream from bridge on Jeddo Road, 0.4 mi downstream from Silver Creek, and 2.2 mi west of Jeddo.

DRAINAGE AREA.--464 mi².

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. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87	46	237	e90	e150	156	137	387	67	34	28	22
2	136	95	182	e82	e130	173	131	304	60	33	26	22
3	241	272	179	e79	e110	148	125	252	66	30	27	20
4	141	185	153	e76	e98	124	125	208	88	27	29	20
5	89	178	235	e71	e88	116	116	184	78	26	35	19
6	67	928	505	e68	e82	128	109	167	76	25	35	20
7	55	1910	593	e68	e78	458	132	149	66	25	32	20
8	51	1010	e520	e67	e74	1870	154	131	58	26	29	19
9	49	581	e440	e66	e72	1320	166	123	57	26	28	19
10	47	569	e370	e68	e70	701	161	131	52	25	26	19
11	49	452	e280	70	e68	558	141	148	48	25	25	19
12	46	307	e220	75	e66	2110	159	155	46	24	27	18
13	45	233	e200	181	e65	2890	222	149	43	24	57	19
14	43	191	e180	769	e64	2060	278	119	40	24	111	19
15	40	166	168	2090	e64	1600	246	107	38	25	207	20
16	40	140	177	1840	e64	1280	183	94	35	28	119	20
17	37	122	1230	832	e64	946	148	88	34	27	75	20
18	40	111	2180	497	e66	646	137	90	32	25	51	19
19	48	104	1220	433	e68	556	174	89	31	24	38	19
20	50	94	738	719	e72	1100	244	82	30	24	32	20
21	53	86	529	3130	e80	904	407	79	29	23	28	21
22	50	87	406	2090	e96	639	946	71	28	114	27	23
23	47	83	320	980	105	454	590	63	28	73	25	23
24	43	74	267	717	e120	354	361	78	26	52	24	25
25	39	71	234	633	e120	284	286	99	26	37	22	25
26	45	73	201	594	e110	236	306	103	25	53	23	23
27	46	68	170	475	e98	209	1860	88	26	61	23	22
28	42	136	158	395	112	191	2150	89	27	130	23	21
29	40	569	144	269	---	174	911	93	29	88	23	20
30	39	396	110	e220	---	158	528	80	33	46	22	21
31	37	---	101	e185	---	150	---	75	---	32	22	---
TOTAL	1882	9337	12647	17929	2454	22693	11633	4075	1322	1236	1299	617
MEAN	60.7	311	408	578	87.6	732	388	131	44.1	39.9	41.9	20.6
MAX	241	1910	2180	3130	150	2890	2150	387	88	130	207	25
MIN	37	46	101	66	64	116	109	63	25	23	22	18
CFSM	.13	.67	.88	1.25	.19	1.58	.84	.28	.09	.09	.09	.04
IN.	.15	.75	1.01	1.44	.20	1.82	.93	.33	.11	.10	.10	.05

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1995, BY WATER YEAR (WY)

	MEAN	116	170	256	254	415	1024	666	288	162	78.9	59.7	112
MAX	1316	972	1031	1315	1855	3218	2102	1511	796	517	559	2237	
(WY)	1987	1993	1951	1952	1954	1985	1947	1956	1967	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1944 - 1995

ANNUAL TOTAL	131860	87124	301
ANNUAL MEAN	361	239	705
HIGHEST ANNUAL MEAN			1985
LOWEST ANNUAL MEAN			28.6
HIGHEST DAILY MEAN	4650	Feb 20	3130
LOWEST DAILY MEAN	29	Jun 22	18
ANNUAL SEVEN-DAY MINIMUM	33	Jun 17	19
INSTANTANEOUS PEAK FLOW			3580
INSTANTANEOUS PEAK STAGE			10.63
INSTANTANEOUS LOW FLOW			17
ANNUAL RUNOFF (CFSM)	.78		.51
ANNUAL RUNOFF (INCHES)	10.57		6.98
10 PERCENT EXCEEDS	897		591
50 PERCENT EXCEEDS	111		87
90 PERCENT EXCEEDS	38		24

(a) From rating curve extended above 9,500 ft³/s.

(b) Present site and datum; peak stage observed at previous site and datum, 18.05 ft, Feb. 20, 1951, backwater from ice.

(c) Sept. 12, 14, 18.

(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 mi².

PERIOD OF RECORD.--April 1963 to September 1975, October 1975 to September 1979 (operated as a crest-stage partial-record station), October 1987 to current year. Also operated as a low-flow partial-record station in water year 1979.

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. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	42	25	78	e46	e78	e62	61	226	34	34	10	8.6
2	52	53	67	e40	e70	e74	56	172	30	24	9.6	8.1
3	e76	95	64	e36	e58	e63	53	137	72	21	10	7.6
4	e54	78	64	e33	e48	e54	58	112	45	19	11	7.0
5	e39	80	97	e31	e42	e51	56	95	28	18	12	6.9
6	e30	194	163	e30	e38	112	49	81	26	17	15	6.6
7	e26	393	187	e29	e34	298	55	71	23	15	12	6.2
8	e23	310	e170	e29	e32	676	69	60	19	15	10	6.1
9	e22	203	e140	e29	e31	745	71	55	17	15	9.8	6.4
10	e22	177	e120	e30	e30	386	71	58	17	14	9.5	5.9
11	e22	153	e100	e32	e29	327	66	69	16	15	10	6.0
12	e21	126	e90	61	e29	605	69	89	17	14	10	5.9
13	e20	106	e81	108	e28	841	97	87	17	13	11	5.8
14	e19	92	e77	248	e28	739	122	78	16	12	29	5.8
15	e18	83	e76	552	e27	631	108	68	14	11	61	5.5
16	e18	71	78	517	e27	544	88	57	12	11	30	4.8
17	e17	58	347	358	e27	444	75	52	12	12	25	4.6
18	e19	53	550	260	e28	335	67	52	12	12	20	5.3
19	e22	49	438	210	e30	263	87	51	11	12	20	4.0
20	e23	43	316	247	e32	260	112	46	11	11	22	4.5
21	e24	40	246	559	e36	244	155	39	11	11	18	5.0
22	e23	38	197	525	e42	206	283	36	9.6	11	14	5.6
23	e21	37	159	384	e48	170	222	33	9.1	10	13	5.2
24	e19	33	134	307	e58	142	156	37	9.9	9.5	11	5.5
25	e18	30	118	259	e64	119	126	48	10	10	11	6.4
26	e21	32	102	221	e48	99	128	54	11	12	10	6.1
27	20	33	89	191	e42	87	622	46	12	17	11	5.4
28	19	50	e80	165	e52	79	720	42	14	31	10	4.9
29	18	110	e72	128	---	76	470	42	24	20	9.7	4.6
30	18	97	e60	114	---	74	320	42	42	14	9.3	5.0
31	17	---	e52	e92	---	68	---	37	---	11	9.3	---
TOTAL	803	2942	4612	5871	1136	8874	4692	2172	601.6	471.5	473.2	175.3
MEAN	25.9	98.1	149	189	40.6	286	156	70.1	20.1	15.2	15.3	5.84
MAX	76	393	550	559	78	841	720	226	72	34	61	8.6
MIN	17	25	52	29	27	51	49	33	9.1	9.5	9.3	4.0
CFSM	.15	.58	.88	1.12	.24	1.69	.93	.41	.12	.09	.09	.03
IN.	.18	.65	1.02	1.29	.25	1.95	1.03	.48	.13	.10	.10	.04

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1995, BY WATER YEAR (WY)

MEAN	19.6	57.4	89.3	109	131	286	245	89.6	55.0	19.9	14.8	12.7
MAX	67.4	261	266	404	382	664	715	328	274	62.6	57.3	95.9
(WY)	1991	1993	1988	1974	1968	1973	1975	1974	1989	1967	1973	1992
MIN	2.76	5.25	3.72	6.03	6.21	11.2	26.1	16.2	5.91	2.36	3.17	2.39
(WY)	1964	1965	1964	1964	1964	1964	1964	1964	1964	1963	1964	1963

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1963 - 1995

ANNUAL TOTAL	35898	32823.6	95.4
ANNUAL MEAN	98.4	89.9	174
HIGHEST ANNUAL MEAN			7.84
LOWEST ANNUAL MEAN			3940
HIGHEST DAILY MEAN	932	Feb 21	841
LOWEST DAILY MEAN	11	Jun 11	4.0
ANNUAL SEVEN-DAY MINIMUM	12	Jun 9	4.8
INSTANTANEOUS PEAK FLOW			904
INSTANTANEOUS PEAK STAGE			5.69
INSTANTANEOUS LOW FLOW			3.9
ANNUAL RUNOFF (CFSM)	.58	.53	.87
ANNUAL RUNOFF (INCHES)	7.90	7.23	.80
10 PERCENT EXCEEDS	252	246	.56
50 PERCENT EXCEEDS	37	40	.67
90 PERCENT EXCEEDS	14	9.6	5.0

(a) Aug. 9-11, 1964.

(e) Estimated.

STREAMS TRIBUTARY TO ST. CLAIR RIVER

04160570 NORTH BRANCH BELLE RIVER AT IMLAY CITY, MI

LOCATION.--Lat 43°01'49", long 83°04'02", in SW1/4 NW1/4 sec.16, T.7 N., R.12 E., Lapeer County, Hydrologic Unit 04090001, on left bank 12 ft upstream from bridge on State Highway 21, 0.6 mi northeast of Imlay City.

DRAINAGE AREA.--18.0 mi².

PERIOD OF RECORD.--August 1965 to current year.

GAGE.--Water-stage recorder. Concrete control Aug. 20, 1965 to Nov. 2, 1981. Datum of gage is 789.69 ft above sea level (levels by Boldt, McLeod, and Johnson, Inc.). Prior to Feb. 24, 1985, at datum 2.00 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are poor. 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	21	7.9	e5.4	e7.4	e10	10	17	24	16	3.4	8.8
2	12	21	7.5	e5.0	e6.6	e9.0	9.9	15	23	11	3.1	7.1
3	13	17	9.0	e4.7	e6.0	e8.0	10	14	24	7.7	11	7.1
4	13	19	11	e4.5	e5.6	e7.4	11	13	22	6.6	16	7.0
5	7.6	21	17	e4.3	e5.0	e8.2	9.2	12	20	6.4	9.2	6.7
6	6.3	46	19	e4.2	e4.8	10	11	12	19	5.5	14	7.0
7	6.3	34	18	e4.1	e4.6	46	11	11	18	4.8	6.3	7.1
8	4.5	25	17	e4.0	e4.4	47	12	10	16	4.9	5.7	7.1
9	7.7	23	16	e4.0	e4.3	32	12	11	15	4.9	6.4	7.1
10	5.9	20	e12	e4.2	e4.2	24	11	13	16	4.8	5.4	6.6
11	5.1	14	e10	e4.8	e4.0	46	10	21	14	4.0	4.9	6.4
12	4.7	11	e9.0	8.6	e3.9	64	15	17	14	3.8	5.0	5.4
13	4.8	9.4	e8.0	17	e3.8	53	17	14	14	4.1	4.3	3.5
14	4.6	8.3	e7.5	27	e3.8	47	15	12	11	4.7	28	2.5
15	3.4	7.9	7.0	46	e3.8	41	13	11	7.8	4.2	17	2.0
16	3.6	7.0	8.0	29	e3.9	35	11	11	7.8	4.1	11	1.8
17	4.9	6.5	44	23	e4.0	29	10	14	6.4	4.0	13	1.8
18	3.8	6.3	35	19	e4.1	25	12	13	5.1	3.8	16	2.4
19	5.6	5.6	26	19	e4.4	24	16	14	5.4	3.2	12	2.1
20	5.3	5.3	23	28	e5.0	23	12	13	5.6	3.0	8.9	2.1
21	5.2	5.6	21	43	e5.6	23	20	14	5.3	3.0	8.7	2.6
22	4.0	5.3	18	29	e6.8	21	20	15	4.6	2.8	9.2	4.4
23	4.4	5.0	14	25	e8.9	17	14	18	4.3	2.9	8.3	3.2
24	3.2	4.9	e12	23	e8.0	14	14	29	4.2	4.0	9.7	2.8
25	4.1	5.4	e10	21	e7.0	13	13	30	4.2	8.0	8.3	2.7
26	5.0	4.7	e9.5	18	e6.6	13	20	30	4.2	11	7.9	2.7
27	4.2	6.4	e8.5	16	e6.2	12	62	28	11	14	7.5	2.6
28	4.3	17	e7.8	14	e9.0	11	34	29	26	11	7.2	2.4
29	4.0	12	e7.2	12	---	11	25	30	26	8.2	8.7	2.3
30	3.6	9.6	e6.6	e10	---	10	20	29	21	5.5	11	2.3
31	5.1	---	e6.0	e8.6	---	10	---	27	---	4.2	11	---
TOTAL	184.2	404.2	432.5	485.4	151.7	743.6	480.1	547	398.9	186.1	298.1	129.6
MEAN	5.94	13.5	14.0	15.7	5.42	24.0	16.0	17.6	13.3	6.00	9.62	4.32
MAX	15	46	44	46	9.0	64	62	30	26	16	28	8.8
MIN	3.2	4.7	6.0	4.0	3.8	7.4	9.2	10	4.2	2.8	3.1	1.8
CFSM	.33	.75	.78	.87	.30	1.33	.89	.98	.74	.33	.53	.24
IN.	.38	.84	.89	1.00	.31	1.54	.99	1.13	.82	.38	.62	.27

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1995, BY WATER YEAR (WY)

	MEAN	7.76	10.6	12.1	11.0	15.9	29.9	23.9	11.0	9.31	4.94	3.60	6.06
MAX	36.8	31.0	28.2	32.9	46.6	60.5	59.6	32.3	32.6	12.5	10.1	38.4	
(WY)	1987	1986	1988	1973	1976	1973	1975	1974	1989	1980	1980	1986	
MIN	.82	2.49	2.71	2.64	3.24	8.92	9.15	2.76	1.21	.41	.57	.64	
(WY)	1967	1966	1977	1977	1980	1989	1966	1977	1988	1966	1966	1965	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1965 - 1995

ANNUAL TOTAL	4700.51	4441.4	
ANNUAL MEAN	12.9	12.2	12.2
HIGHEST ANNUAL MEAN			20.6
LOWEST ANNUAL MEAN			5.13
HIGHEST DAILY MEAN	173	64	307
LOWEST DAILY MEAN	.81	1.8	.01
ANNUAL SEVEN-DAY MINIMUM	1.6	2.1	.14
INSTANTANEOUS PEAK FLOW		124	(a)354
INSTANTANEOUS PEAK STAGE		4.60	(b)7.33
INSTANTANEOUS LOW FLOW		1.7	.00
ANNUAL RUNOFF (CFSM)	.72	.68	.68
ANNUAL RUNOFF (INCHES)	9.71	9.18	9.18
10 PERCENT EXCEEDS	28	25	27
50 PERCENT EXCEEDS	7.4	9.0	6.2
90 PERCENT EXCEEDS	2.8	4.0	1.8

(a) From rating curve extended above 100 ft³/s.

(b) Present datum.

(c) Sept. 17, 18.

(d) Part of each day June 27, 28, 1977, June 26-28, 1979, June 30, 1988, caused by irrigation pumpage.

(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 downstream side of bridge on State Highway 19 at Memphis.

DRAINAGE AREA.--151 mi².

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

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 705.41 ft above sea level (Michigan Department of Transportation bench mark).

REMARKS.--Records good except for estimated daily discharges which are poor. Several measurements of water temperature were made during the year.

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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	25	49	e42	e54	e76	56	132	50	96	19	15
2	48	69	40	e38	e48	e68	53	108	42	54	16	14
3	50	81	37	e35	e43	e60	52	92	39	42	18	13
4	35	63	63	e33	e40	e52	52	85	38	34	40	13
5	32	65	120	e32	e36	e57	53	80	34	30	46	13
6	26	123	246	e31	e34	81	53	74	31	27	33	12
7	20	298	180	e30	e33	317	57	69	27	24	36	12
8	18	219	140	e30	e32	646	62	63	26	21	28	13
9	18	129	e110	e29	e31	515	74	62	23	20	25	12
10	22	122	e98	e31	e30	296	80	68	22	20	24	10
11	22	99	e80	e37	e29	269	75	90	22	19	22	10
12	21	69	e68	60	e29	646	80	110	22	18	20	9.8
13	18	57	e60	121	e28	710	128	89	20	16	19	10
14	18	50	e52	296	e28	552	140	76	20	18	21	11
15	17	45	e50	545	e28	453	117	68	18	23	113	11
16	17	43	53	517	e28	381	89	60	17	21	88	12
17	15	39	426	282	e28	310	73	60	15	20	53	11
18	17	35	631	179	e29	237	71	65	16	19	54	12
19	19	33	411	150	e31	188	114	63	15	18	82	11
20	20	30	240	228	e35	187	139	58	15	17	62	12
21	23	29	166	532	e40	178	167	53	15	16	46	13
22	22	28	128	494	e46	164	330	48	14	15	35	15
23	21	26	105	298	53	132	204	44	13	15	28	18
24	20	22	89	230	60	109	132	51	14	16	25	18
25	20	22	82	192	e52	92	105	74	14	33	23	15
26	20	21	72	170	e47	81	104	78	16	40	21	14
27	26	21	64	142	e45	75	399	65	20	32	19	14
28	24	41	61	127	e54	70	521	57	48	47	18	13
29	23	100	57	89	---	66	276	86	170	51	16	11
30	22	69	51	e74	---	62	175	80	156	32	16	11
31	22	---	48	e62	---	59	---	62	---	22	16	---
TOTAL	720	2073	4077	5156	1071	7189	4031	2270	992	876	1082	378.8
MEAN	23.2	69.1	132	166	38.2	232	134	73.2	33.1	28.3	34.9	12.6
MAX	50	298	631	545	60	710	521	132	170	96	113	18
MIN	15	21	37	29	28	52	52	44	13	15	16	9.8
CFSM	.15	.46	.87	1.10	.25	1.54	.89	.48	.22	.19	.23	.08
IN.	.18	.51	1.00	1.27	.26	1.77	.99	.56	.24	.22	.27	.09

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1995, BY WATER YEAR (WY)

	MEAN	43.3	69.6	94.5	85.7	134	264	209	85.9	52.3	26.1	19.5	31.8
MAX	330	375	247	315	528	595	617	270	206	82.3	91.3	256	
(WY)	1982	1986	1988	1973	1976	1973	1975	1974	1989	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1963 - 1995

ANNUAL TOTAL	39035		29915.8									
ANNUAL MEAN	107		82.0									
HIGHEST ANNUAL MEAN										92.7		
LOWEST ANNUAL MEAN										168		1985
HIGHEST DAILY MEAN										11.3		1964
LOWEST DAILY MEAN										3320		Apr 19 1975
ANNUAL SEVEN-DAY MINIMUM										2.4		Sep 6 1978
INSTANTANEOUS PEAK FLOW										2.6		Sep 5 1978
INSTANTANEOUS PEAK STAGE										4520		Apr 19 1975
INSTANTANEOUS LOW FLOW										8.96		Apr 19 1975
ANNUAL RUNOFF (CFSM)										2.3		(a)
ANNUAL RUNOFF (INCHES)	.71									.61		
10 PERCENT EXCEEDS	9.62									8.34		
50 PERCENT EXCEEDS	292									220		
90 PERCENT EXCEEDS	35									31		
	15									8.9		

(a) Sept. 6, 10, 1978.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160800 SASHABAW CREEK NEAR DRAYTON PLAINS, MI

LOCATION.--Lat 42°43'12", long 83°21'13", in SE1/4 sec.26, T.4 N., R.9 E., Oakland County, Hydrologic Unit 04090003, on right bank at upstream side of culverts on Maybee Road, 1.1 mi upstream from mouth, and 2.5 mi northeast of Drayton Plains.

DRAINAGE AREA.--20.9 mi².

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

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Metal V-notch weir Aug. 30, 1961, to Mar. 6, 1968. Elevation of gage is 970 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	10	11	15	14	12	17	19	13	15	5.9	3.3
2	11	12	11	15	13	e12	16	18	12	14	6.7	3.2
3	7.8	10	12	e14	e12	e11	16	16	11	13	9.4	3.3
4	6.2	10	12	e13	12	e10	15	15	11	12	11	3.2
5	5.2	10	15	12	e12	9.9	15	15	11	13	8.8	3.3
6	4.4	25	16	11	12	11	15	15	10	11	7.6	5.2
7	4.1	22	18	12	11	18	15	14	9.5	9.5	6.6	5.9
8	3.6	18	16	11	11	e23	17	14	9.3	9.4	6.6	5.7
9	5.0	19	16	10	10	e21	18	14	9.1	9.0	9.3	5.1
10	4.6	17	16	10	9.6	e18	19	16	12	8.6	8.7	4.4
11	4.3	15	16	10	8.9	20	19	27	12	7.9	7.4	4.3
12	3.9	14	e14	11	e8.4	33	25	21	12	6.4	6.7	3.9
13	3.4	13	13	17	e7.8	42	25	17	11	5.9	6.1	2.7
14	3.2	12	13	21	e7.5	45	23	16	12	7.8	6.9	2.2
15	3.1	12	12	29	e7.2	45	20	17	12	7.9	5.9	2.1
16	3.2	12	13	25	e7.1	43	18	16	11	12	5.3	2.0
17	3.2	11	21	21	e7.0	39	17	17	12	22	7.3	2.1
18	3.3	11	22	19	e7.0	34	18	16	11	14	9.2	7.2
19	4.2	10	20	17	e7.1	32	21	15	11	13	5.3	4.8
20	5.1	9.3	18	21	e7.5	31	17	14	10	13	7.1	4.9
21	5.3	9.8	16	29	e8.0	32	19	13	7.5	13	6.7	5.2
22	5.3	9.1	16	28	8.7	30	20	12	4.6	12	6.4	8.8
23	4.6	8.1	16	27	9.3	29	18	11	7.1	12	5.8	8.0
24	4.0	7.3	16	27	10	26	16	16	6.6	12	4.4	6.5
25	3.9	7.2	16	25	9.3	23	14	20	8.2	11	5.6	7.8
26	3.9	6.9	16	23	e9.6	22	16	18	12	9.4	4.8	7.8
27	3.5	8.9	15	e21	10	22	25	16	8.2	8.9	5.1	7.0
28	3.5	15	15	e19	12	22	23	16	11	8.6	4.9	4.2
29	3.3	14	14	e17	---	21	22	21	12	7.3	3.7	3.2
30	3.2	13	14	e16	---	19	20	17	13	6.8	3.9	3.1
31	3.6	---	14	e15	---	18	---	14	---	6.0	3.4	---
TOTAL	143.9	371.6	473	561	269.0	773.9	559	506	312.1	331.4	202.5	69.55
MEAN	4.64	12.4	15.3	18.1	9.61	25.0	18.6	16.3	10.4	10.7	6.53	2.32
MAX	11	25	22	29	14	45	25	27	13	22	11	5.9
MIN	3.1	6.9	11	10	7.0	9.9	14	11	4.6	5.9	3.4	3.1
CFSM	22	59	73	87	46	1.19	89	78	50	51	31	11
IN.	26	66	84	100	48	1.38	99	90	56	59	36	12

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1995, BY WATER YEAR (WY)

	MEAN	7.06	10.9	13.2	12.8	14.5	26.5	28.8	18.1	11.1	5.83	4.56	5.75
MAX	38.4	38.2	28.2	36.5	39.1	61.2	45.5	41.6	25.2	14.8	19.5	31.9	31.9
(WY)	1982	1986	1988	1993	1976	1976	1975	1974	1989	1989	1975	1975	1975
MIN	37	1.02	.95	1.46	2.15	6.28	13.0	8.03	1.58	.74	.30	.41	.41
(WY)	1964	1965	1964	1961	1964	1964	1964	1988	1988	1965	1984	1963	1963

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1960 - 1995

ANNUAL TOTAL	4772.2	4572.95	13.2
ANNUAL MEAN	13.1	12.5	21.5
HIGHEST ANNUAL MEAN			4.12
LOWEST ANNUAL MEAN			1975
HIGHEST DAILY MEAN	50	Feb 20	146
LOWEST DAILY MEAN	1.9	Sep 22	Oct 1 1981
ANNUAL SEVEN-DAY MINIMUM	2.1	Sep 18	Jul 9 1988
INSTANTANEOUS PEAK FLOW			Jul 9 1988
INSTANTANEOUS PEAK STAGE			Oct 1 1981
INSTANTANEOUS LOW FLOW			Oct 1 1981
ANNUAL RUNOFF (CFSM)	.63		(a)
ANNUAL RUNOFF (INCHES)	8.49		
10 PERCENT EXCEEDS	28		
50 PERCENT EXCEEDS	10		
90 PERCENT EXCEEDS	3.4		

(a) July 9, 16, 1988.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04160900 CLINTON RIVER NEAR DRAYTON PLAINS, MI

LOCATION.--Lat 42°39'37", long 83°23'25", in NE1/4 sec.21, T.3 N., R.9 E., Oakland County, Hydrologic Unit 04090003, on left bank at downstream side of bridge on State Highway 59, and 2.0 mi south of Drayton Plains.

DRAINAGE AREA.--79.2 mi².

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 except those for Oct. 1 to Nov. 29, which are fair. 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.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	35	51	68	82	55	85	56	50	63	19	9.6
2	44	43	53	66	79	55	83	34	44	63	14	9.1
3	57	56	57	64	77	55	80	26	45	53	30	8.6
4	70	62	58	e62	75	55	71	22	44	38	75	8.4
5	70	68	64	e61	e72	57	47	17	39	38	66	8.5
6	67	76	63	60	e69	58	29	19	35	36	50	8.1
7	61	85	69	59	67	69	28	20	38	36	49	8.4
8	57	89	70	57	63	70	31	27	36	34	40	8.5
9	57	92	71	55	60	71	39	40	35	26	30	7.5
10	49	89	72	53	58	74	53	75	34	16	32	7.2
11	41	86	73	52	e55	78	63	92	35	15	38	7.0
12	42	84	75	52	e53	80	68	91	33	15	35	6.7
13	38	81	75	52	52	83	84	93	32	21	35	6.7
14	27	79	75	54	50	87	91	93	36	21	36	6.6
15	17	78	74	59	48	92	92	94	32	25	36	6.3
16	17	78	74	61	47	96	91	94	30	34	36	6.5
17	17	76	78	63	45	101	89	92	31	85	48	6.3
18	16	67	77	65	45	104	86	68	28	88	63	8.2
19	20	63	78	67	45	105	82	41	28	68	50	8.4
20	24	61	78	74	45	107	80	39	31	56	34	6.0
21	28	58	79	79	45	109	82	40	24	57	30	6.0
22	32	55	78	84	45	108	84	39	17	58	18	8.5
23	31	53	78	88	45	107	85	30	14	60	12	10
24	31	52	78	89	45	103	83	64	12	60	12	8.7
25	30	50	77	90	46	100	79	93	12	60	12	7.7
26	31	49	76	90	49	98	77	78	11	59	11	7.0
27	37	53	75	89	53	96	75	55	15	56	11	6.6
28	33	52	72	89	55	93	65	68	47	52	11	6.6
29	30	51	71	87	---	91	63	90	86	42	12	6.5
30	29	51	69	86	---	88	62	76	79	22	11	6.3
31	29	---	68	84	---	87	---	57	---	20	9.4	---
TOTAL	1179	1972	2206	2159	1570	2632	2127	1823	1033	1377	965.4	226.5
MEAN	38.0	65.7	71.2	69.6	56.1	84.9	70.9	58.8	34.4	44.4	31.1	7.55
MAX	70	92	79	90	82	109	92	94	86	88	75	10
MIN	16	35	51	52	45	55	28	17	11	15	9.4	6.0
CFSM	.48	.83	.90	.88	.71	1.07	.90	.74	.43	.56	.39	.10
IN.	.55	.93	1.04	1.01	.74	1.24	1.00	.86	.49	.65	.45	.11

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1995, BY WATER YEAR (WY)

	MEAN	38.7	51.1	61.7	57.0	57.7	82.5	92.6	60.9	44.1	29.8	25.6	29.9
MAX	114	107	109	114	115	188	168	137	94.5	82.0	68.5	129	
(WY)	1982	1986	1986	1973	1974	1976	1974	1974	1989	1968	1968	1975	
MIN	4.83	7.90	15.6	15.5	16.6	28.8	52.5	22.9	6.47	5.79	6.39	4.80	
(WY)	1965	1965	1964	1964	1964	1964	1987	1988	1988	1988	1963	1963	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1960 - 1995

ANNUAL TOTAL	19912.6	19269.9	52.6	1974
ANNUAL MEAN	54.6	52.8	87.9	1964
HIGHEST ANNUAL MEAN			20.0	
LOWEST ANNUAL MEAN				
HIGHEST DAILY MEAN	144	109	274	Mar 12 1974
LOWEST DAILY MEAN	7.1	6.0	3.1	Sep 18 1963
ANNUAL SEVEN-DAY MINIMUM	7.4	6.6	3.5	Sep 16 1963
INSTANTANEOUS PEAK FLOW		110	276	Mar 12 1974
INSTANTANEOUS PEAK STAGE		3.42	4.95	Mar 12 1974
INSTANTANEOUS LOW FLOW		5.7	2.4	May 31 1961
ANNUAL RUNOFF (CFSM)	.69	.67	.66	
ANNUAL RUNOFF (INCHES)	9.35	9.05	9.02	
10 PERCENT EXCEEDS	96	88	102	
50 PERCENT EXCEEDS	49	55	46	
90 PERCENT EXCEEDS	11	12	11	

(a) Sept. 20, 21.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161540 PAINT CREEK AT ROCHESTER, MI

LOCATION.--Lat 42°41'18", long 83°08'35", in NW1/4 SE1/4 sec.10, T.3 N., R.11 E., Oakland County, Hydrologic Unit 04090003, on right bank at upstream side of bridge on Ludlow Street in Rochester, 1.5 mi upstream from mouth.

DRAINAGE AREA.--70.9 mi².

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.--Records good except for estimated daily discharges, which are fair. Occasional regulation by Lake Orion. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	85	80	39	55	58	53	53	63	43	58	29	19
2	54	58	38	50	53	51	52	61	52	42	26	19
3	40	42	41	45	e50	e49	51	60	109	35	56	18
4	34	40	41	e38	48	47	47	59	69	33	41	16
5	32	44	71	e38	e45	50	44	57	53	37	33	15
6	31	127	64	e38	e44	54	48	55	45	31	29	14
7	30	82	68	e37	e43	156	47	51	42	27	24	14
8	29	64	65	e37	e42	130	53	48	39	25	30	14
9	37	84	68	e36	e41	81	56	41	33	24	69	13
10	33	94	68	e35	e40	69	57	55	33	23	36	13
11	30	81	62	e39	e39	105	57	74	32	21	29	12
12	29	65	56	e45	e38	141	84	54	31	20	27	12
13	27	55	53	e60	e37	129	72	56	30	25	27	12
14	27	49	51	78	e36	126	67	57	28	40	33	12
15	26	45	49	111	e36	131	61	55	25	35	24	12
16	24	42	58	80	e35	140	61	47	24	56	22	12
17	23	56	135	72	e34	138	61	50	24	88	33	11
18	23	48	92	71	e35	124	77	45	23	51	34	11
19	33	40	74	72	38	113	84	43	21	37	31	11
20	29	45	67	113	41	108	68	40	22	33	30	12
21	28	45	63	132	42	106	90	39	21	32	28	14
22	40	37	61	104	39	95	80	36	21	28	26	20
23	37	34	61	96	40	87	67	34	18	28	23	15
24	35	31	59	92	42	81	61	73	17	27	21	14
25	34	30	56	87	40	75	61	65	26	32	20	13
26	33	29	53	82	43	71	69	58	41	28	19	13
27	32	43	51	77	52	67	103	48	47	28	19	13
28	32	75	51	73	58	66	77	52	242	28	19	13
29	31	49	48	e68	---	62	68	73	137	26	19	12
30	30	41	46	e64	---	58	65	59	75	22	18	12
31	31	---	49	61	---	55	---	48	---	20	19	---
TOTAL	1039	1655	1858	2086	1189	2818	1941	1656	1423	1040	894	411
MEAN	33.5	55.2	59.9	67.3	42.5	90.9	64.7	53.4	47.4	33.5	28.8	13.7
MAX	85	127	135	132	58	156	103	74	242	88	69	20
MIN	23	29	38	35	34	47	44	34	17	20	18	11
CFSM	.47	.78	.85	.95	.60	1.28	.91	.75	.67	.47	.41	.19
IN.	.55	.87	.97	1.09	.62	1.48	1.02	.87	.75	.55	.47	.22

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1995, BY WATER YEAR (WY)

	MEAN	39.0	45.6	52.1	51.1	58.7	96.7	98.9	62.2	45.2	28.9	25.8	34.2
MAX	123	120	103	127	160	204	204	194	146	115	58.0	66.7	104
(WY)	1982	1986	1976	1973	1976	1975	1975	1975	1974	1989	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	12.2
(WY)	1964	1964	1965	1964	1963	1964	1964	1977	1988	1963	1965	1963	1963

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1960 - 1995

ANNUAL TOTAL	19342		18010		53.1	
ANNUAL MEAN	53.0		49.3		86.7	1976
HIGHEST ANNUAL MEAN					20.4	1964
LOWEST ANNUAL MEAN					660	Feb 2 1968
HIGHEST DAILY MEAN	230	Jan 28	242	Jun 28	6.8	Aug 15 1988
LOWEST DAILY MEAN	13	Sep 13	11	Sep 17	7.9	Oct 4 1963
ANNUAL SEVEN-DAY MINIMUM	14	Sep 18	12	Sep 13	(a)918	Feb 1 1968
INSTANTANEOUS PEAK FLOW			3.35	Jun 28	(b)5.95	Feb 10 1965
INSTANTANEOUS PEAK STAGE			10	Sep 19	(c)1.2	Aug 19 1974
INSTANTANEOUS LOW FLOW					.75	
ANNUAL RUNOFF (CFSM)	.75		.70		10.18	
ANNUAL RUNOFF (INCHES)	10.15		9.45		103	
10 PERCENT EXCEEDS	100		83		40	
50 PERCENT EXCEEDS	40		43		16	
90 PERCENT EXCEEDS	21		19			

(a) Gage height 5.22 ft.

(b) Backwater from ice.

(c) Result of regulation due to bridge construction.

(e) Estimated.

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 Romeo Road, 4.0 mi west of Romeo.

DRAINAGE AREA.--25.6 mi².

PERIOD OF RECORD.--October 1964 to current year.

GAGE.--Water-stage recorder. Datum of gage is 861.64 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	23	16	14	e11	11	12	15	15	50	4.4	1.9
2	15	14	16	e12	e10	e10	12	14	15	39	4.4	1.9
3	10	12	17	e11	e10	e9.5	11	12	23	21	9.5	1.8
4	4.6	12	17	e10	e9.8	e9.0	12	12	26	11	11	2.0
5	4.0	13	23	e9.5	e9.5	8.5	10	11	18	9.5	9.8	1.9
6	5.3	33	20	e9.0	e9.2	9.1	13	10	18	8.1	7.9	1.7
7	5.6	22	20	e9.0	e9.0	24	14	9.4	17	6.8	5.3	1.9
8	10	16	20	e9.0	e8.8	24	15	8.8	15	6.0	4.6	2.0
9	14	18	21	e8.8	e8.6	e20	16	9.8	12	5.2	5.3	2.0
10	13	14	21	e8.8	e8.4	e17	16	13	11	4.8	5.6	1.8
11	12	11	19	e9.0	e8.2	27	16	21	9.6	4.3	6.1	1.8
12	11	13	e17	9.9	e8.1	40	23	18	8.6	3.6	6.8	1.8
13	10	13	15	18	e8.0	56	23	16	7.3	3.5	5.2	2.0
14	10	12	14	24	e7.9	66	21	14	5.7	4.2	10	1.9
15	9.1	11	13	33	e7.9	64	18	13	4.5	3.7	26	1.5
16	8.5	8.2	14	24	e7.8	59	15	12	4.0	3.6	29	1.2
17	8.2	9.9	32	19	e7.7	51	14	12	3.6	3.9	25	1.3
18	8.8	10	28	18	7.5	41	17	12	3.2	3.6	34	1.3
19	11	9.3	24	17	7.7	39	24	11	3.9	3.2	33	1.2
20	10	14	21	25	8.3	36	21	10	3.8	3.2	24	1.1
21	10	18	19	35	8.5	36	25	8.9	3.0	3.5	15	1.2
22	10	12	17	30	7.9	32	27	7.9	2.3	3.3	7.1	1.9
23	10	13	16	28	8.8	29	22	7.8	1.9	4.1	3.8	1.7
24	10	12	17	27	9.1	25	20	14	3.2	3.9	2.9	1.6
25	11	11	16	25	8.1	22	19	20	4.7	3.6	2.5	1.7
26	11	10	15	22	11	20	23	19	5.8	7.3	2.3	1.6
27	10	12	14	e18	11	17	39	16	9.5	17	2.2	1.5
28	10	23	14	e16	12	16	28	16	40	11	2.2	1.3
29	9.4	19	13	e14	---	15	20	21	54	8.5	2.2	1.3
30	8.9	17	11	e13	---	14	17	20	54	6.3	2.1	1.4
31	8.8	---	12	e12	---	13	---	17	---	5.1	2.0	---
TOTAL	301.2	435.4	552	538.0	249.8	860.1	563	421.6	402.6	271.8	311.2	49.2
MEAN	9.72	14.5	17.8	17.4	8.92	27.7	18.8	13.6	13.4	8.77	10.0	1.64
MAX	15	33	32	35	12	66	39	21	54	50	34	2.0
MIN	4.0	8.2	11	8.8	7.5	8.5	10	7.8	1.9	3.2	2.0	1.1
CFSM	.38	.57	.70	.68	.35	1.08	.73	.53	.52	.34	.39	.06
IN.	.44	.63	.80	.78	.36	1.25	.82	.61	.59	.39	.45	.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1995, BY WATER YEAR (WY)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	10.6	15.6	18.0	16.9	20.6	35.7	35.1	18.1	13.1	8.17	7.03	8.63																			
MAX	25.1	46.2	41.3	47.7	62.9	79.7	75.1	57.1	47.7	20.0	48.5	41.2																			
(WY)	1982	1986	1976	1973	1976	1976	1975	1974	1989	1969	1975	1975																			
MIN	1.79	2.06	3.56	5.26	7.22	14.6	18.2	5.82	2.67	1.47	1.63	1.52																			
(WY)	1967	1965	1965	1965	1979	1983	1966	1977	1988	1965	1965	1966																			

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1965 - 1995

ANNUAL TOTAL	5015.7	4955.9	17.3
ANNUAL MEAN	13.7	13.6	31.5
HIGHEST ANNUAL MEAN			9.38
LOWEST ANNUAL MEAN			245
HIGHEST DAILY MEAN	61	Mar 22	66
LOWEST DAILY MEAN	1.6	Sep 12	1.1
ANNUAL SEVEN-DAY MINIMUM	2.0	Sep 7	1.3
INSTANTANEOUS PEAK FLOW			70
INSTANTANEOUS PEAK STAGE			2.92
INSTANTANEOUS LOW FLOW			1.1
ANNUAL RUNOFF (CFSM)	.54		.53
ANNUAL RUNOFF (INCHES)	7.29		7.20
10 PERCENT EXCEEDS	31		25
50 PERCENT EXCEEDS	10		11
90 PERCENT EXCEEDS	2.9		2.3

(a) Sept. 19, 20, 21.

(b) Oct. 5, 9, 1967.

(c) 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 mi².

PERIOD OF RECORD.--February 1963 to current year.

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); gage readings have been converted to elevations above sea level.

REMARKS.--Reservoir is formed by an earthfill dam with concrete spillway completed in 1962. The spillway section includes a drum gate with minimum crest elevation of 796 ft, maximum of 802 ft; and 2 sluices, one on each side, with valve controls capable of draining lake. Total capacity, 4,649 acre-ft at elevation of 802 ft. The reservoir began filling February 1963. Lake is used for recreational purposes.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 5,495 acre-ft, May 17, 18, 1974, Apr. 20, 1975, Apr. 1, 1993, elevation, 803.60 ft; minimum recorded, 1,758 acre-ft, Nov. 21, 1967, elevation, 794.7 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 4,971 acre-ft, June 29, 30, elevation, 802.62 ft; minimum, 3,355 acre-ft, Feb. 18-20, elevation, 799.26 ft.

MONTHEND ELEVATION, IN FEET ABOVE SEA LEVEL, AND CONTENTS AT 2400, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

Date	Elevation (feet)	Contents (acre-feet)	Change in contents	
			(acre- feet)	(equivalent in ft ³ /s)
Sept. 30	802.01	4,654	--	--
Oct. 31	802.15	4,727	+73	+1.2
Nov. 30	802.33	4,821	+94	+1.6
Dec. 31	799.91	3,642	-1,179	-19.2
CAL YR 1994	--	--	+937	+1.3
Jan. 31	799.92	3,646	+4	+0.1
Feb. 28	799.53	3,474	-172	-3.1
Mar. 31	799.56	3,487	+13	+0.2
Apr. 30	802.46	4,888	+1,401	+23.5
May 31	802.40	4,857	-31	-0.5
June 30	802.59	4,956	+99	+1.7
July 31	802.08	4,691	-265	-4.3
Aug. 31	802.00	4,649	-42	-0.7
Sept. 30	801.96	4,629	-20	-0.3
WTR YR 1995	--	--	-25	0.0

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04161800 STONY CREEK NEAR WASHINGTON, MI

LOCATION.--Lat 42°42'55", long 83°05'31", in SW1/4 sec.31, T.4 N., R.12 E., Macomb County, Hydrologic Unit 04090003, on left bank at downstream side of bridge on Mt. Vernon Road, 500 ft downstream from Stony Lake Dam, and 2.9 mi west of Washington.

DRAINAGE AREA.--68.2 mi².

PERIOD OF RECORD.--July 1958 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 772.59 ft above sea level (levels by Huron-Clinton Metropolitan Authority).

REMARKS.--Records good. Occasional diurnal fluctuation caused by mills upstream from station prior to February 1963; occasional regulation by Stony Lake since (see preceding page). From 1963 to 1991 annual mean discharge and runoff figures adjusted for change in contents in Stony Lake. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28	35	40	33	42	27	34	56	40	99	19	8.3
2	30	37	38	33	41	27	35	47	38	86	25	6.7
3	29	39	39	32	41	31	31	40	43	70	28	7.0
4	28	38	39	30	41	33	27	38	52	57	32	5.8
5	26	38	66	30	42	33	27	37	53	48	34	5.4
6	23	46	78	30	38	33	26	36	49	38	33	5.2
7	21	64	84	30	34	34	26	35	42	31	26	9.2
8	24	67	79	30	34	44	26	32	36	27	25	6.2
9	26	69	73	30	29	57	26	31	31	23	32	4.1
10	32	64	70	30	25	67	26	21	30	22	29	4.2
11	35	54	71	30	25	73	27	29	30	20	27	2.6
12	32	46	81	30	26	73	27	41	28	18	25	2.8
13	30	40	87	30	26	82	27	46	25	18	22	3.3
14	27	37	86	29	27	88	27	43	24	20	22	6.5
15	24	35	86	29	26	92	28	39	20	19	22	4.2
16	22	33	85	34	26	94	28	36	19	19	24	4.2
17	22	30	85	52	27	96	28	38	18	22	33	8.4
18	26	30	85	69	26	100	28	36	16	17	39	3.9
19	29	30	85	74	27	100	28	33	15	14	42	3.6
20	28	29	85	74	27	101	28	31	15	14	44	6.4
21	28	31	85	74	27	104	29	30	12	14	42	7.9
22	26	33	85	74	27	103	29	27	10	14	33	7.4
23	24	32	85	74	27	103	29	26	9.0	15	25	6.8
24	22	30	84	82	27	102	29	37	8.7	14	20	6.6
25	21	29	83	89	27	101	30	50	13	14	14	6.5
26	21	29	71	89	27	97	34	54	25	13	12	6.8
27	22	30	48	88	27	94	54	45	36	13	13	7.4
28	22	40	34	88	27	86	70	42	99	17	9.9	7.4
29	23	43	34	88	---	65	71	47	131	21	10	7.4
30	22	44	34	64	---	46	65	49	115	20	8.8	7.7
31	24	---	33	42	---	34	---	45	---	17	9.1	---
TOTAL	797	1202	2118	1611	846	2220	1000	1197	1082.7	854	779.8	179.9
MEAN	25.7	40.1	68.3	52.0	30.2	71.6	33.3	38.6	36.1	27.5	25.2	6.00
MAX	35	69	87	89	42	104	71	56	131	99	44	9.2
MIN	21	29	33	29	25	27	26	21	8.7	13	8.8	2.2

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1995, BY WATER YEAR (WY)

MEAN	31.5	43.1	46.5	42.2	48.6	77.8	77.8	49.0	35.1	21.5	19.5	23.0
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	9.11	10.7	9.79	5.14	10.0	17.2	6.93	4.41	4.00	4.72
(WY)	1963	1964	1964	1963	1963	1964	1963	1963	1964	1988	1964	1964

SUMMARY STATISTICS	FOR 1994 CALENDAR YEAR	FOR 1995 WATER YEAR	WATER YEARS 1958 - 1995
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ANNUAL TOTAL	14164.1		13887.4			
ANNUAL MEAN	38.8		38.0		43.0	
HIGHEST ANNUAL MEAN					79.1	1976
LOWEST ANNUAL MEAN					12.0	1963
HIGHEST DAILY MEAN	170	Feb 21	131	Jun 29	407	Feb 2 1968
LOWEST DAILY MEAN	7.0	Sep 24	2.6	Sep 11	1.3	(a)
ANNUAL SEVEN-DAY MINIMUM	8.2	Sep 20	4.0	Sep 9	2.2	Jul 31 1964
INSTANTANEOUS PEAK FLOW			135	Jun 29	(b)552	Jun 10 1988
INSTANTANEOUS PEAK STAGE			3.66	Jun 29	(c)6.71	Mar 6 1959
INSTANTANEOUS LOW FLOW			2.4	Sep 11	.90	Jul 10 1963
10 PERCENT EXCEEDS	78		84		87	
50 PERCENT EXCEEDS	30		30		31	
90 PERCENT EXCEEDS	12		10		9.8	

(a) July 31, Aug. 1, 1964.

(b) From rating curve extended above 380 ft³/s; result of momentary release of water from Stony Lake; gage height 6.44 ft.

(c) Backwater from ice.

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 upstream side of bridge on Ryan Road, 1.0 mi southwest of Utica.

DRAINAGE AREA.--16.5 mi².

PERIOD OF RECORD.--July 1965 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. Occasional diversion for sprinkler irrigation. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	49	37	5.9	14	e6.6	12	5.5	11	9.2	7.0	25	1.6
2	20	21	5.2	11	e6.0	e7.6	5.3	9.1	7.9	4.1	26	1.6
3	10	7.4	5.6	e6.2	e5.4	e7.5	5.1	8.0	31	3.1	70	1.6
4	9.1	5.7	5.7	e5.2	e5.0	e8.8	5.4	10	14	2.9	36	1.8
5	7.2	8.0	38	e4.6	e4.7	e14	4.4	10	8.3	6.2	20	1.8
6	5.8	70	23	e4.4	e4.4	23	6.7	8.7	7.3	4.7	19	1.6
7	5.0	21	19	e4.2	e4.2	124	6.9	6.8	6.7	3.1	9.2	1.6
8	4.6	11	22	e3.9	e3.8	86	12	5.6	7.4	2.6	9.6	4.3
9	8.4	26	17	e3.8	e3.7	28	15	9.7	5.2	2.4	24	3.9
10	8.6	17	17	e3.7	e3.5	e18	19	17	4.6	2.3	11	2.8
11	6.3	10	13	e4.8	e3.4	31	16	25	4.8	2.2	7.2	2.2
12	5.0	8.2	10	e7.0	e3.4	40	32	14	3.7	2.0	5.5	2.1
13	4.5	7.2	8.2	e13	e3.4	31	25	9.8	3.7	3.4	4.8	2.0
14	4.4	6.7	7.2	e20	4.1	27	16	8.4	3.3	9.1	9.1	1.8
15	4.2	7.9	7.7	60	5.1	24	12	7.0	2.7	11	8.5	1.6
16	3.8	7.7	21	25	4.5	21	10	5.9	2.3	41	5.4	2.0
17	3.4	5.7	113	15	4.6	16	10	8.0	2.3	54	13	2.5
18	2.8	4.7	39	13	4.1	12	28	7.7	2.1	12	15	2.6
19	6.5	3.7	25	e15	4.8	11	39	6.1	2.6	6.1	8.5	2.4
20	9.4	3.6	17	e35	6.0	12	19	5.1	1.6	5.9	6.0	2.9
21	5.9	5.1	14	e70	5.5	12	53	4.5	1.5	9.3	4.7	3.3
22	4.8	4.6	11	e45	4.4	9.6	39	3.9	2.2	5.9	4.0	8.8
23	4.6	3.4	9.0	e30	4.5	8.3	19	3.4	1.6	8.7	4.5	5.0
24	4.7	3.3	8.2	e22	4.5	7.5	15	22	1.8	5.4	4.9	3.2
25	5.1	3.3	7.2	e17	4.1	6.8	13	23	2.0	6.8	3.8	2.9
26	5.4	3.2	6.6	e14	3.6	6.3	17	15	2.0	9.4	2.6	2.8
27	6.9	14	7.1	e12	9.9	7.4	49	8.1	9.9	14	2.5	2.4
28	8.5	55	6.1	e10	21	11	22	17	52	14	2.6	1.9
29	4.6	14	5.6	e9.2	---	8.9	14	61	25	7.3	3.5	1.8
30	4.0	8.2	4.7	e8.4	---	7.3	11	23	13	3.9	2.5	1.6
31	5.0	---	7.1	e7.5	---	6.2	---	13	---	2.8	1.9	---
TOTAL	237.5	403.6	506.1	513.9	148.2	645.2	544.3	386.8	241.7	272.6	370.3	78.4
MEAN	7.66	13.5	16.3	16.6	5.29	20.8	18.1	12.5	8.06	8.79	11.9	2.61
MAX	49	70	113	70	21	124	53	61	52	54	70	8.8
MIN	2.8	3.2	4.7	3.7	3.4	6.2	4.4	3.4	1.5	2.0	1.9	1.6
CFSM	.46	.82	.99	1.00	.32	1.26	1.10	.76	.49	.53	.72	.16
IN.	.54	.91	1.14	1.16	.33	1.45	1.23	.87	.54	.61	.83	.18

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1995, BY WATER YEAR (WY)

	MEAN	7.43	12.0	15.3	12.6	17.7	31.1	25.2	14.1	9.89	6.89	5.49	5.74
MAX	33.7	39.8	37.7	40.7	60.3	83.6	47.4	39.9	37.4	23.0	16.0	18.6	
(WY)	1982	1986	1973	1993	1976	1982	1979	1968	1968	1969	1972	1986	
MIN	.82	1.45	1.99	1.23	2.62	10.1	8.30	3.46	1.51	.29	.43	.44	
(WY)	1967	1966	1977	1977	1980	1981	1971	1971	1988	1965	1965	1969	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1965 - 1995

ANNUAL TOTAL	4877.30	4348.6	13.6
ANNUAL MEAN	13.4	11.9	20.5
HIGHEST ANNUAL MEAN			6.67
LOWEST ANNUAL MEAN			1970
HIGHEST DAILY MEAN	130	124	707
LOWEST DAILY MEAN	.58	1.5	.04
ANNUAL SEVEN-DAY MINIMUM	.98	1.7	.09
INSTANTANEOUS PEAK FLOW		253	1160
INSTANTANEOUS PEAK STAGE		6.80	10.36
INSTANTANEOUS LOW FLOW		.45	.00
ANNUAL RUNOFF (CFSM)	.81	.72	.83
ANNUAL RUNOFF (INCHES)	11.00	9.80	11.23
10 PERCENT EXCEEDS	32	25	29
50 PERCENT EXCEEDS	6.6	7.2	5.8
90 PERCENT EXCEEDS	2.0	2.6	1.2

(a) June 20, 21.

(b) Part of each day July 19, 28, 1966, Aug. 22-28, Sept. 3, 11, 1969.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164000 CLINTON RIVER NEAR FRASER, MI

LOCATION.--Lat 42°34'38", long 82°57'05", in SE1/4 NE1/4 sec.19, T.2 N., R.13 E., Macomb County, Hydrologic Unit 04090003, on right bank 50 ft downstream from bridge on Garfield Road, 2.8 mi north of Fraser, and 4.0 mi upstream from North Branch.

DRAINAGE AREA.--444 mi².

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. National Weather Service 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 about 9,000 ft³/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1190	700	295	458	347	331	313	386	311	519	324	115
2	534	505	272	370	337	278	298	324	265	398	571	117
3	275	301	287	308	320	270	298	280	679	325	2010	103
4	259	281	279	265	317	281	296	256	381	254	1720	97
5	252	306	595	275	e290	355	259	237	311	293	643	98
6	213	1030	504	271	e285	481	284	249	290	226	402	99
7	181	626	514	274	e280	1320	219	206	284	192	280	105
8	174	450	528	261	276	1910	403	196	261	167	312	210
9	291	684	511	250	252	675	326	347	216	149	716	130
10	215	549	502	241	263	512	433	486	197	140	388	101
11	191	433	447	255	244	511	394	650	185	126	380	97
12	186	388	402	338	247	743	678	495	177	115	295	94
13	186	354	387	452	237	676	529	429	171	126	251	93
14	172	338	369	433	212	630	404	404	174	421	482	94
15	161	325	365	905	218	593	350	322	168	387	393	92
16	140	302	480	535	230	582	313	283	160	1050	186	90
17	137	299	1540	415	211	560	302	356	156	1900	1380	92
18	134	300	798	395	210	536	556	316	147	616	913	95
19	406	271	559	390	222	509	690	256	133	321	357	90
20	216	262	488	884	237	496	502	222	123	263	276	106
21	196	297	451	1290	233	512	861	214	120	385	240	109
22	205	297	425	712	220	486	752	190	115	361	204	274
23	197	263	405	582	216	472	482	183	115	699	175	130
24	192	237	394	563	222	461	420	698	114	384	150	106
25	192	230	380	543	218	436	405	714	110	306	139	101
26	187	197	366	503	218	426	479	597	146	433	129	103
27	196	367	342	474	344	417	871	392	216	424	121	97
28	201	939	316	468	486	504	575	515	1070	252	122	95
29	188	416	301	438	---	420	474	897	920	231	121	93
30	182	319	291	406	---	369	423	527	648	179	118	93
31	206	---	332	370	---	338	---	401	---	160	113	---
TOTAL	7655	12266	14125	14324	7392	17090	13589	12028	8363	11802	13911	3319
MEAN	247	409	456	462	264	551	453	388	279	381	449	111
MAX	1190	1030	1540	1290	486	1910	871	897	1070	1900	2010	274
MIN	134	197	272	241	210	270	219	183	110	115	113	90
CFSM	.56	.92	1.03	1.04	.59	1.24	1.02	.87	.63	.86	1.01	.25
IN.	.64	1.03	1.18	1.20	.62	1.43	1.14	1.01	.70	.99	1.17	.28

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1995, BY WATER YEAR (WY)

	MEAN	269	331	392	386	448	668	655	452	347	263	223	236
MAX	1021	834	837	975	1119	1313	1237	1382	841	664	480	758	
(WY)	1982	1986	1968	1950	1976	1976	1950	1956	1989	1957	1980	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1947 - 1995

ANNUAL TOTAL	140043		135864										
ANNUAL MEAN	384		372										
HIGHEST ANNUAL MEAN										388			
LOWEST ANNUAL MEAN										595		1976	
HIGHEST DAILY MEAN	2590									189		1964	
LOWEST DAILY MEAN	96									6930		May 11 1948	
ANNUAL SEVEN-DAY MINIMUM	99									49		Sep 6 1955	
INSTANTANEOUS PEAK FLOW										59		Sep 3 1954	
INSTANTANEOUS PEAK STAGE										8840		Oct 1 1981	
INSTANTANEOUS LOW FLOW										19.56		Oct 1 1981	
ANNUAL RUNOFF (CFSM)	.86									47		Sep 6 1955	
ANNUAL RUNOFF (INCHES)	11.73									11.87			
10 PERCENT EXCEEDS	688									741			
50 PERCENT EXCEEDS	291									280			
90 PERCENT EXCEEDS	139									115			

(a) Sept. 16, 29.

(e) Estimated.

- (a) Gage height 2.19 ft.
- (b) Gage height 4.48 ft.
- (c) Backwater from ice.
- (d) Sept. 12, 19, 20.
- (e) Estimated.
- (f) July 30, 31, 1964, Aug. 6, 7, 1965.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04164300 EAST BRANCH COON CREEK AT ARMADA, MI

LOCATION.--Lat 42°50'45", long 82°53'06", in NE1/4 sec.23, T.5 N., R.13 E., Macomb County, Hydrologic Unit 04090003, on right bank at downstream side of bridge on Prospect Street in Armada.

DRAINAGE AREA.--13.0 mi².

PERIOD OF RECORD.--October 1958 to current year.

REVISED RECORDS.--WDR MI-83-1: 1982.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 735 ft above sea level, from topographic map.

REMARKS.--Records good except for daily discharges below 1.0 ft³/s and estimated daily discharges, which are poor. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.3	1.8	1.9	3.4	3.6	e6.0	2.3	5.5	2.4	17	1.6	.33
2	2.0	1.9	1.7	2.8	3.0	e4.0	2.3	4.4	2.0	3.8	.70	.36
3	.81	1.5	1.7	2.6	2.3	e2.8	2.3	3.8	1.8	2.2	1.4	.34
4	.49	1.2	2.1	e2.3	e1.9	3.8	2.2	3.2	1.6	1.6	1.3	.33
5	.36	1.4	9.0	e2.0	e1.5	5.2	1.8	3.0	1.3	e1.3	1.4	.33
6	.32	9.0	14	e1.6	e1.2	8.0	2.3	2.8	1.2	e1.0	1.2	.21
7	.27	7.6	9.6	1.3	.90	e100	2.4	2.5	1.3	e.85	.89	.34
8	.22	4.1	8.2	1.3	.79	e170	3.1	2.2	1.4	e.75	.72	.45
9	e.35	5.3	10	1.3	.80	e90	3.8	2.9	1.0	e.65	.69	.23
10	e.30	4.9	14	1.1	.79	11	4.3	3.7	.92	e.55	.65	.21
11	e.25	2.9	11	1.2	.79	55	3.9	5.6	.95	e.49	.55	.23
12	e.24	2.2	6.7	3.6	.79	121	6.9	5.4	1.0	.44	.48	.17
13	e.23	1.8	5.5	29	.79	66	8.6	3.6	.87	.60	.47	.18
14	e.22	1.7	3.7	47	.76	39	7.8	2.9	.76	.55	1.1	.24
15	e.22	1.5	3.4	108	.73	30	5.5	2.5	.57	.52	1.4	.27
16	e.21	1.3	5.3	45	.88	24	4.1	1.9	.46	.44	.75	.15
17	e.21	1.2	113	18	.92	18	3.2	2.8	.38	.56	1.0	.21
18	e.20	1.2	73	12	1.0	12	4.8	2.1	.38	.45	.90	.20
19	e.25	1.1	29	13	2.2	10	8.1	1.8	.37	.38	.68	.16
20	e.35	1.1	16	35	3.5	11	5.9	1.6	.34	.40	.52	.18
21	e.30	1.0	11	113	3.3	11	22	1.5	.38	.36	.43	.22
22	e.25	1.2	8.3	40	2.5	8.7	26	1.2	.45	.22	.32	.46
23	e.23	1.1	6.8	22	2.2	6.4	12	1.2	.46	.28	.28	.41
24	e.22	1.1	6.2	18	2.4	5.0	7.0	2.7	.30	1.4	.65	.29
25	e.22	1.1	5.4	16	1.9	3.9	5.3	2.7	.30	.47	.22	.40
26	e.22	1.1	4.5	15	1.6	3.5	7.3	2.1	.33	2.2	.22	.40
27	e.22	1.7	4.0	10	2.3	3.2	61	1.6	2.2	1.4	.24	.38
28	e.23	5.0	3.8	7.7	e3.5	3.1	28	2.0	15	1.2	.27	.31
29	e.25	3.5	3.3	5.4	---	2.9	12	7.4	22	1.6	.29	.34
30	e.30	2.5	2.1	4.4	---	2.8	7.4	6.3	17	1.6	.30	.39
31	.51	---	3.0	3.8	---	2.5	---	3.6	---	1.0	.30	---
TOTAL	12.75	74.0	397.2	586.8	48.84	839.8	273.6	96.5	79.42	46.26	21.92	8.72
MEAN	.41	2.47	12.8	18.9	1.74	27.1	9.12	3.11	2.65	1.49	.71	.29
MAX	2.3	9.0	113	113	3.6	170	61	7.4	22	17	1.6	.46
MIN	.20	1.0	1.7	1.1	.73	2.5	1.8	1.2	.30	.22	.22	.15
CFSM	.03	.19	.99	1.46	.13	2.08	.70	.24	.20	.11	.05	.02
IN.	.04	.21	1.14	1.68	.14	2.40	.78	.28	.23	.13	.06	.02

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1995, BY WATER YEAR (WY)

MEAN	2.32	5.27	8.36	6.31	10.5	24.9	15.9	5.15	4.08	1.65	1.27	2.04
MAX	24.1	43.3	35.7	37.6	60.3	75.2	47.1	23.5	21.9	19.7	12.3	33.9
(WY)	1982	1986	1973	1974	1976	1982	1967	1974	1989	1967	1975	1985
MIN	.047	.088	.074	.078	.087	.23	.83	.61	.059	.047	.055	.056
(WY)	1964	1964	1964	1961	1964	1964	1964	1977	1964	1964	1963	1964

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1959 - 1995

ANNUAL TOTAL	2249.53		2485.81		
ANNUAL MEAN	6.16		6.81		
HIGHEST ANNUAL MEAN				7.29	
LOWEST ANNUAL MEAN				14.9	1985
HIGHEST DAILY MEAN	113	Dec 17	(e)170	Mar 8	497
LOWEST DAILY MEAN	.08	Jan 21	.15	Sep 16	.00
ANNUAL SEVEN-DAY MINIMUM	.11	Jan 20	.20	Sep 15	.00
INSTANTANEOUS PEAK FLOW			(e)275	Mar 7	910
INSTANTANEOUS PEAK STAGE			(b)4.29	Mar 7	6.69
INSTANTANEOUS LOW FLOW					.00
ANNUAL RUNOFF (CFSM)	.47		.52		.56
ANNUAL RUNOFF (INCHES)	6.44		7.11		7.62
10 PERCENT EXCEEDS	14		13		14
50 PERCENT EXCEEDS	1.2		1.7		.99
90 PERCENT EXCEEDS	.22		.27		.10

(a) Jan. 25 to Feb. 9, 1961, result of freezeup.

(b) Backwater from ice.

(c) 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 30 ft upstream from bridge on State Highway 59, 2 mi north of Mount Clemens, and 3.6 mi upstream from mouth.

DRAINAGE AREA.--199 mi².

PERIOD OF RECORD.--May 1947 to current year.

REVISED RECORDS.--WSP 1437: 1948. WSP 1557: Drainage area.

GAGE.--Water-stage recorder. Concrete control since September 1961. Datum of gage is 576.38 ft above sea level (levels by Michigan Department of Natural Resources). Prior to Nov. 15, 1949, 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. National Weather Service 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	21	70	78	e55	91	79	151	92	283	18	9.0
2	47	45	58	89	e50	e100	75	124	71	136	20	8.3
3	54	66	53	e60	e45	e90	73	108	73	87	32	8.8
4	33	49	52	e52	e40	e75	71	97	89	64	50	9.4
5	26	39	61	e50	e37	92	67	90	77	56	72	9.0
6	21	52	126	e47	e36	170	64	85	60	55	47	7.2
7	17	133	178	e45	e36	310	75	79	50	46	35	7.0
8	15	153	152	e43	e35	848	87	72	46	39	29	7.1
9	15	99	132	e42	e35	1250	102	69	42	36	34	7.5
10	15	92	137	e41	e35	665	118	90	41	32	33	8.1
11	17	85	157	e41	e35	354	125	140	37	29	29	7.0
12	16	70	154	e45	e35	438	150	152	34	25	24	5.0
13	15	59	152	80	34	787	216	119	31	23	22	4.0
14	15	52	104	234	35	701	212	95	28	21	21	4.2
15	15	48	76	439	33	526	172	81	21	23	61	5.3
16	17	44	77	627	33	432	126	71	19	24	53	4.1
17	16	40	265	558	37	371	104	65	17	25	46	3.1
18	13	38	536	279	38	291	100	69	15	23	80	3.4
19	14	37	645	198	43	223	245	68	14	21	65	4.1
20	15	35	423	215	50	206	251	59	12	16	42	6.2
21	18	33	237	485	60	207	239	53	10	16	31	4.7
22	17	32	175	787	60	198	489	48	9.0	17	25	7.4
23	16	32	140	581	58	164	433	42	7.0	18	20	9.5
24	16	31	120	344	59	135	227	47	7.2	16	17	12
25	16	29	110	264	55	115	159	123	8.5	16	15	9.5
26	17	28	101	e200	46	104	135	151	28	26	15	7.2
27	17	31	92	e150	46	97	304	108	59	50	13	8.4
28	16	54	86	e120	68	93	514	82	128	48	13	7.3
29	16	112	81	e97	---	88	403	162	320	37	11	5.2
30	16	101	68	e75	---	83	213	235	467	28	12	6.4
31	17	---	71	e65	---	80	---	145	---	21	9.8	---
TOTAL	604	1740	4889	6431	1229	9384	5628	3080	1912.7	1357	994.8	205.4
MEAN	19.5	58.0	158	207	43.9	303	188	99.4	63.8	43.8	32.1	6.85
MAX	54	153	645	787	68	1250	514	235	467	283	80	12
MIN	13	21	52	41	33	75	64	42	7.0	16	9.8	3.1
CFSM	.10	.29	.79	1.04	.22	1.52	.94	.50	.32	.22	.16	.03
IN.	.11	.33	.91	1.20	.23	1.75	1.05	.58	.36	.25	.19	.04

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1995, BY WATER YEAR (WY)

	MEAN	51.9	91.7	136	131	197	359	271	134	74.2	32.9	25.3	39.5
MAX	479	595	460	507	766	928	560	790	424	127	247	484	
(WY)	1982	1986	1968	1974	1976	1982	1975	1956	1989	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 1994 CALENDAR YEAR FOR 1995 WATER YEAR WATER YEARS 1947 - 1995

ANNUAL TOTAL	45085.8	37454.9	
ANNUAL MEAN	124	103	
HIGHEST ANNUAL MEAN			128
LOWEST ANNUAL MEAN			230
HIGHEST DAILY MEAN	1790	Mar 8	25.4
LOWEST DAILY MEAN	4.0	Sep 8	5040
ANNUAL SEVEN-DAY MINIMUM	5.2	Sep 8	.09
INSTANTANEOUS PEAK FLOW			.10
INSTANTANEOUS PEAK STAGE			6700
INSTANTANEOUS LOW FLOW			18.62
ANNUAL RUNOFF (CFSM)	.62		.08
ANNUAL RUNOFF (INCHES)	8.43		.64
10 PERCENT EXCEEDS	330		8.73
50 PERCENT EXCEEDS	40		309
90 PERCENT EXCEEDS	12		41
			7.2

(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
(National stream quality accounting network station)

LOCATION.--Lat 42°35'45", long 82°54'35", Macomb County, Hydrologic Unit 04090003, on left bank at downstream side of bridge on Moravian Drive, 0.2 mi downstream from North Branch, and 0.5 mi west of Mount Clemens.

DRAINAGE AREA.--734 mi².

WATER-DISCHARGE RECORDS

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. Datum of gage is 570.43 ft above sea level. May 10, 1934, to Jan. 11, 1939, nonrecording gage at same site and datum. Auxiliary gage is a water-stage recorder on right bank 2.0 mi downstream from base gage at same datum. Mar. 15, 1938, to Jan. 3, 1952, auxiliary nonrecording gage 1.6 mi downstream from base gage at same datum.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are fair. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1350	851	463	653	e500	466	478	654	488	894	338	155
2	680	689	436	553	e470	389	457	546	394	549	706	155
3	327	418	435	462	e450	371	448	458	806	404	1980	144
4	286	363	431	e390	e430	373	428	412	538	317	2220	141
5	270	381	773	e395	e410	462	393	378	423	339	1050	140
6	239	1290	760	e385	e400	712	427	395	381	287	595	138
7	217	932	776	e380	e390	1740	389	321	370	262	367	153
8	206	721	814	e370	e380	3410	577	308	358	232	391	230
9	314	969	755	e360	e350	1900	538	488	292	214	966	169
10	238	818	761	e350	e360	1260	687	718	271	203	515	145
11	218	609	677	353	e350	983	654	949	260	192	459	145
12	209	530	614	442	e340	1430	993	760	251	192	367	144
13	215	470	616	670	e320	1690	893	620	242	196	315	135
14	196	445	570	833	e310	1590	739	547	245	412	576	136
15	193	421	542	1680	e310	1340	656	444	236	334	540	139
16	183	381	668	1400	e320	1210	558	373	227	958	279	138
17	179	369	2280	1210	e310	1100	508	444	219	2000	1330	139
18	181	384	1640	891	e320	979	784	416	213	712	1390	137
19	464	346	1390	752	346	869	1180	354	195	357	427	139
20	270	322	1090	1360	372	820	915	310	195	289	313	148
21	230	371	831	2370	371	802	1400	289	192	390	268	157
22	233	398	728	e1800	353	763	1620	282	181	354	227	325
23	228	356	668	e1400	343	717	1150	243	185	752	205	180
24	226	308	629	e1100	345	676	845	828	177	388	185	160
25	227	310	618	e1000	328	646	713	992	184	308	171	154
26	223	272	590	e850	295	626	755	883	215	572	169	154
27	226	434	553	e770	445	615	1520	558	291	846	158	151
28	234	1290	508	e700	665	685	1310	637	1350	347	160	146
29	228	610	480	e650	---	610	1080	1360	1370	323	159	150
30	220	501	434	e600	---	546	801	957	1190	246	160	149
31	229	---	494	e550	---	508	---	682	---	226	160	---
TOTAL	8939	16559	23024	25679	10583	30288	23896	17606	11939	14095	17146	4696
MEAN	288	552	743	828	378	977	797	568	398	455	553	157
MAX	1350	1290	2280	2370	665	3410	1620	1360	1370	2000	2220	325
MIN	179	272	431	350	295	371	389	243	177	192	158	135
CFSM	.39	.75	1.01	1.13	.51	1.33	1.09	.77	.54	.62	.75	.21
IN.	.45	.84	1.17	1.30	.54	1.54	1.21	.89	.61	.71	.87	.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 1995, BY WATER YEAR (WY)

	MEAN	311	413	534	549	732	1141	1054	673	464	293	246	265
MAX	1550	1492	1615	1739	2407	2255	3090	2747	1543	865	744	1144	
(WY)	1982	1986	1968	1993	1938	1982	1947	1943	1989	1969	1975	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1934 - 1995

ANNUAL TOTAL	215508		204450										
ANNUAL MEAN	590		560										
HIGHEST ANNUAL MEAN										557			
LOWEST ANNUAL MEAN										929		1974	
HIGHEST DAILY MEAN	3300		3410		Jun 27		19200		Mar 8	230		1964	
LOWEST DAILY MEAN	179		135		Oct 17		25		Sep 13	25		Aug 24 1934	
ANNUAL SEVEN-DAY MINIMUM	191		138		Sep 18		28		Sep 13	28		Aug 22 1934	
INSTANTANEOUS PEAK FLOW			3990						Mar 8	21200		Apr 6 1947	
INSTANTANEOUS PEAK STAGE			10.41						Mar 8	(a)23.55		Apr 6 1947	
ANNUAL RUNOFF (CFSM)	.80		.76							.76			
ANNUAL RUNOFF (INCHES)	10.92		10.36							10.32			
10 PERCENT EXCEEDS	1290		1160							1180			
50 PERCENT EXCEEDS	375		418							320			
90 PERCENT EXCEEDS	208		180							118			

(a) From floodmark.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165500 CLINTON RIVER AT MOUNT CLEMENS, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1967, 1969, 1973 to August 1995 (discontinued).

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1974 to September 1981.

WATER TEMPERATURE: October 1974 to September 1981.

INSTRUMENTATION.--Water-quality monitor from Aug. 13, 1975 to Sept. 6, 1981.

REMARKS.--Quarterly cross-sectional samples were collected at bridge.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1975-76, 1978-81): Maximum, 3,580 microsiemens, Jan. 26, 1978; minimum, 126 microsiemens, July 29, 1976.

WATER TEMPERATURE (water years 1975-81): Maximum, 29.5°C, Sept. 20, 1978; minimum, 0.0°C on many days during winter.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
DEC 29...	1240	468	845	8.3	2.5	2.1	12.4	91	180	160
APR 12...	1135	1030	1270	8.2	9.5	21	9.4	85	340	860
JUN 07...	1340	380	879	8.1	20.5	8.0	6.2	72	2400	7400
AUG 24...	1132	160	884	8.1	22.0	6.5	6.9	80	K1300	3200

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	HARD- NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L) (00904)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00453)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3 (39086)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)
DEC 29...	310	84	83	24	62	3.7	271	222	50	120
APR 12...	250	88	71	18	160	5.0	200	164	52	270
JUN 07...	290	63	78	23	71	4.4	276	226	45	130
AUG 24...	270	49	73	21	71	7.5	268	220	52	120

DATE	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
DEC 29...	0.20	5.2	521	0.71	658	0.010	2.20	0.080	0.50
APR 12...	0.10	3.5	718	0.98	2000	0.040	1.50	0.160	0.80
JUN 07...	0.30	5.3	511	0.69	524	0.050	2.00	0.110	0.60
AUG 24...	0.40	6.0	500	0.68	216	0.030	2.20	0.090	0.70

STREAMS TRIBUTARY TO LAKE ST. CLAIR

04165500 CLINTON RIVER AT MOUNT CLEMENS, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
DEC 29...	0.110	0.080	0.090	<10	52	<3	47	5	33
APR 12...	0.060	0.040	0.050	10	51	<3	61	<4	58
JUN 07...	0.210	0.150	0.120	20	59	<3	49	5	36
AUG 24...	0.160	0.140	0.120	10	56	5	28	10	33
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
DEC 29...	<10	6	<1	<1.0	230	<6	9	11	92
APR 12...	<10	7	<1	<1.0	310	<6	73	203	88
JUN 07...	<10	4	<1	<1.0	260	<6	29	30	97
AUG 24...	20	9	<2	<1.0	260	<6	15	6.5	94

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 at Birmingham.

DRAINAGE AREA.--33.3 mi². Prior to water year 1971, drainage area was 36.9 mi². An area of 3.6 mi² noncontributing since then.

PERIOD OF RECORD.--June 1950 to current year.

REVISED RECORDS.--WSP 1387: 1951-52(M). WSP 1557: Drainage area.

GAGE.--Water-stage recorder. Concrete control since July 27, 1962. Datum of gage is 715.94 ft above sea level.

REMARKS.--Records good. Occasional regulation by Quarton Lake upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	78	53	16	31	22	24	17	24	19	39	27	10
2	32	36	15	24	22	20	17	23	45	19	25	10
3	16	17	15	19	21	19	17	22	127	14	89	9.3
4	13	14	15	17	20	19	16	21	41	12	45	9.0
5	12	17	46	15	16	27	14	21	27	12	38	8.0
6	10	110	33	15	16	35	18	21	22	10	27	7.4
7	9.6	43	32	17	16	162	18	19	20	9.4	20	7.6
8	8.9	25	30	16	16	116	26	19	18	9.3	21	12
9	18	45	28	15	15	43	27	22	17	7.9	27	10
10	13	32	28	15	16	32	30	31	16	7.9	20	7.9
11	11	24	25	15	16	55	30	42	14	7.2	17	7.1
12	9.4	21	21	19	13	79	66	26	12	7.0	15	7.0
13	8.7	18	19	35	14	61	47	22	11	16	13	6.6
14	8.4	18	19	42	14	47	33	20	13	42	45	6.8
15	8.1	16	18	77	14	41	25	19	10	52	21	5.6
16	7.8	15	32	40	16	37	22	18	7.8	106	16	5.3
17	7.5	15	123	30	15	31	22	23	8.3	85	51	5.0
18	7.5	14	55	26	16	27	41	19	7.9	31	36	4.4
19	22	12	36	26	18	26	43	18	7.7	21	21	4.5
20	16	12	29	73	18	26	27	16	8.3	20	16	5.8
21	10	15	26	83	18	26	65	15	6.9	22	14	7.2
22	9.3	14	24	52	16	24	48	14	6.3	15	14	15
23	8.4	12	23	41	17	21	31	14	6.1	19	13	8.4
24	8.6	12	22	36	17	20	26	55	6.6	15	13	6.4
25	8.0	11	21	34	16	19	25	44	7.2	25	12	5.7
26	8.1	11	20	30	17	18	33	31	12	33	12	5.6
27	8.0	29	20	28	32	19	62	20	21	26	12	5.3
28	7.7	63	19	26	39	24	35	41	89	20	12	4.8
29	7.2	26	18	23	---	21	28	75	47	16	11	4.9
30	6.8	18	17	21	---	21	25	32	30	14	11	5.8
31	8.5	---	22	22	---	18	---	23	---	12	11	---
TOTAL	407.5	768	867	963	506	1158	934	810	684.1	744.7	725	218.4
MEAN	13.1	25.6	28.0	31.1	18.1	37.4	31.1	26.1	22.8	24.0	23.4	7.28
MAX	78	110	123	83	39	162	66	75	127	106	89	15
MIN	6.8	11	15	15	13	18	14	14	6.1	7.0	11	4.4
CFSM	.39	.77	.84	.93	.54	1.12	.93	.78	.68	.72	.70	.22
IN.	.46	.86	.97	1.08	.57	1.29	1.04	.90	.76	.83	.81	.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1995, BY WATER YEAR (WY)

	MEAN	12.0	16.4	20.1	19.5	23.5	39.3	36.0	25.4	18.8	12.6	10.1	10.5
MAX	50.7	47.7	51.5	56.0	71.5	82.5	63.6	98.1	84.0	48.2	25.6	42.3	
(WY)	1982	1993	1988	1993	1976	1982	1974	1956	1989	1968	1968	1986	
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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1950 - 1995

ANNUAL TOTAL	9862.9	8785.7	
ANNUAL MEAN	27.0	24.1	(a)20.4
HIGHEST ANNUAL MEAN			35.6
LOWEST ANNUAL MEAN			4.55
HIGHEST DAILY MEAN	239	162	902
LOWEST DAILY MEAN	5.6	4.4	.20
ANNUAL SEVEN-DAY MINIMUM	6.0	5.3	.34
INSTANTANEOUS PEAK FLOW		312	1390
INSTANTANEOUS PEAK STAGE		3.98	8.70
INSTANTANEOUS LOW FLOW		4.0	.10
ANNUAL RUNOFF (CFSM)	.81	.72	.61
ANNUAL RUNOFF (INCHES)	11.02	9.81	8.31
10 PERCENT EXCEEDS	53	44	42
50 PERCENT EXCEEDS	18	19	12
90 PERCENT EXCEEDS	9.1	7.9	3.0

(a) Annual mean, water years 1951-70, 15.3 ft³/s, 5.63 in/yr; water years 1971-95, 24.4 ft³/s, 9.95 in/yr.

(b) Aug. 8, 9, 1963.

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 at Southfield, 4.2 mi east of Farmington.

DRAINAGE AREA.--87.9 mi².

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.--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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	619	197	48	e85	59	78	57	72	61	231	232	29
2	131	134	44	e70	55	64	56	68	57	76	154	28
3	62	60	45	e60	e52	e60	54	64	391	54	677	28
4	44	46	44	e50	e50	e65	54	61	101	45	359	26
5	38	53	153	e45	e48	89	49	63	66	42	611	26
6	34	599	108	e43	e47	122	80	69	55	36	116	25
7	31	150	111	e48	e45	540	65	57	56	33	73	27
8	29	85	105	e45	e44	688	159	53	47	31	100	66
9	65	156	101	e43	e41	156	120	71	41	31	246	36
10	39	113	99	e42	e41	114	149	117	41	30	89	28
11	31	72	81	e43	e41	163	170	194	41	28	66	26
12	29	63	65	e60	e41	298	424	96	38	27	54	25
13	27	54	57	e100	e41	231	201	74	35	49	48	24
14	26	50	53	e150	e42	178	130	65	39	157	367	24
15	26	47	50	e300	e43	150	95	59	34	82	211	23
16	26	42	e100	e150	e45	134	81	55	30	255	68	22
17	25	42	e480	e100	e46	111	74	63	29	432	231	23
18	25	40	e200	e80	e48	94	163	57	28	101	164	22
19	97	37	e110	e75	e52	89	164	52	27	63	77	21
20	54	35	e85	e150	e55	88	96	50	25	52	59	26
21	35	43	e75	e375	e52	91	316	47	25	70	49	27
22	31	40	e70	e170	e50	79	193	43	24	50	43	74
23	28	35	e68	e130	e46	73	108	42	24	87	40	33
24	27	34	e62	e110	54	67	88	239	24	94	38	26
25	28	33	e59	e100	43	62	80	191	31	175	36	24
26	27	31	e57	e90	68	59	105	119	44	140	33	24
27	26	105	e55	e80	104	59	276	69	38	90	33	23
28	25	264	e53	e75	132	94	125	145	446	53	33	22
29	25	87	e51	e68	---	74	92	462	295	46	33	21
30	24	58	e50	e64	---	68	78	116	110	39	31	22
31	28	---	e65	e61	---	63	---	75	---	35	31	---
TOTAL	1762	2805	2804	3062	1485	4301	3902	3008	2303	2734	4402	851
MEAN	56.8	93.5	90.5	98.8	53.0	139	130	97.0	76.8	88.2	142	28.4
MAX	619	599	480	375	132	688	424	462	446	432	677	74
MIN	24	31	44	42	41	59	49	42	24	27	31	21
CFSM	.65	1.06	1.03	1.12	.60	1.58	1.48	1.10	.87	1.00	1.62	.32
IN.	.75	1.19	1.19	1.30	.63	1.82	1.65	1.27	.97	1.16	1.86	.36

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1995, BY WATER YEAR (WY)

MEAN	41.9	57.6	68.3	63.7	75.9	133	118	75.7	62.5	38.6	35.5	37.6
MAX	207	164	178	203	254	327	225	191	241	118	142	147
(WY)	1982	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1958 - 1995

ANNUAL TOTAL	30626	33419	67.8
ANNUAL MEAN	83.9	91.6	105
HIGHEST ANNUAL MEAN			20.4
LOWEST ANNUAL MEAN			1993
HIGHEST DAILY MEAN	900	688	3210
LOWEST DAILY MEAN	18	21	.30
ANNUAL SEVEN-DAY MINIMUM	19	23	.66
INSTANTANEOUS PEAK FLOW		1180	4900
INSTANTANEOUS PEAK STAGE		10.99	19.04
INSTANTANEOUS LOW FLOW		20	.10
ANNUAL RUNOFF (CFSM)	.95	1.04	.77
ANNUAL RUNOFF (INCHES)	12.96	14.14	10.48
10 PERCENT EXCEEDS	166	176	131
50 PERCENT EXCEEDS	46	59	38
90 PERCENT EXCEEDS	25	27	11

(a) Sept. 19, 30.

(e) Estimated.

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 at Southfield, 1.6 mi upstream from mouth, and 5.5 mi east of Farmington.

DRAINAGE AREA.--9.49 mi².

PERIOD OF RECORD.--September 1958 to current year.

REVISED RECORDS.--WSP 1912: 1963.

GAGE.--Water-stage recorder. Datum of gage is 615.07 ft above sea level (City of Southfield bench mark).

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	125	37	3.2	11	4.2	4.5	3.0	4.9	3.1	4.8	88	1.8
2	5.2	3.4	2.9	4.8	4.3	3.5	2.9	4.5	12	2.5	8.5	2.0
3	2.9	1.6	3.2	3.5	3.9	3.5	2.9	4.1	42	2.2	230	2.0
4	2.5	1.7	2.5	3.1	3.6	4.1	3.0	3.8	4.1	2.2	84	1.9
5	2.2	8.1	26	2.9	3.2	16	2.7	5.8	3.2	2.8	45	1.9
6	1.9	68	5.5	2.8	2.9	10	9.4	4.7	2.9	2.1	10	1.9
7	1.8	5.8	13	3.4	2.9	136	3.2	3.3	7.7	2.1	6.6	2.4
8	2.1	4.2	8.6	3.2	2.7	21	22	3.3	2.8	2.1	33	12
9	10	24	13	2.8	2.7	8.4	15	10	2.3	2.1	28	2.0
10	1.9	7.6	8.3	2.7	2.8	7.1	14	18	2.2	2.2	7.3	1.5
11	1.6	4.1	6.4	2.9	2.6	13	21	13	2.2	2.0	5.2	1.5
12	1.8	3.5	4.3	8.3	2.5	12	38	5.1	2.1	2.0	4.2	1.4
13	1.8	3.3	3.9	11	2.4	9.3	13	4.3	2.0	2.5	4.9	1.6
14	1.8	3.0	3.9	33	2.4	8.1	8.1	4.0	2.2	6.3	68	1.6
15	1.7	2.9	3.7	31	2.8	7.4	6.0	3.5	2.1	2.5	14	1.6
16	2.0	2.7	46	8.9	3.7	6.9	5.0	3.3	2.0	74	4.9	1.4
17	2.2	2.7	58	6.4	2.6	5.6	4.8	4.6	2.3	23	15	1.7
18	2.0	2.5	12	5.7	2.9	4.8	29	3.2	2.1	2.8	4.4	1.5
19	20	2.7	7.4	5.8	3.4	4.8	15	2.9	2.2	2.2	3.3	1.4
20	1.7	2.6	6.0	61	3.2	5.0	7.0	4.3	2.3	4.3	2.9	2.4
21	1.4	5.0	5.2	32	2.8	4.8	54	3.2	2.4	8.8	2.8	2.1
22	1.3	2.6	4.8	15	2.5	4.0	12	2.7	2.2	2.3	3.5	11
23	1.3	2.5	4.4	12	2.7	3.7	7.8	2.8	2.3	33	2.3	1.5
24	1.3	2.4	4.3	11	2.6	3.4	6.6	53	2.3	22	2.2	1.3
25	1.6	2.4	4.0	8.8	2.7	3.3	6.7	15	26	81	2.1	1.5
26	1.4	2.3	3.7	7.2	3.1	3.1	19	5.8	9.7	14	2.1	1.3
27	1.3	32	3.7	6.1	19	4.1	28	4.0	21	5.7	2.1	1.3
28	1.3	19	3.7	5.3	8.4	8.7	8.7	48	102	5.5	2.1	1.2
29	1.3	4.1	3.3	4.7	---	3.8	6.5	35	9.6	2.9	2.3	1.4
30	1.4	3.2	3.2	4.5	---	3.5	5.5	6.0	8.0	2.3	2.7	1.3
31	6.5	---	9.3	4.2	---	3.2	---	3.8	---	2.1	2.0	---
TOTAL	212.2	266.9	287.4	325.0	105.5	336.6	379.8	289.9	289.3	371.3	693.4	69.4
MEAN	6.85	8.90	9.27	10.5	3.77	10.9	12.7	9.35	9.64	12.0	22.4	2.31
MAX	125	68	58	61	19	136	54	53	102	81	230	12
MIN	1.3	1.6	2.5	2.7	2.4	3.1	2.7	2.7	2.0	2.0	2.0	1.2
CFSM	.72	.94	.98	1.10	.40	1.14	1.33	.99	1.02	1.26	2.36	.24
IN.	.83	1.05	1.13	1.27	.41	1.32	1.49	1.14	1.13	1.46	2.72	.27

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1995, BY WATER YEAR (WY)

	MEAN	5.86	7.85	9.07	7.34	9.13	14.3	13.4	8.80	9.17	7.02	6.97	6.35
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	.44	1.13	.71	.49	.79	5.28	3.27	2.35	1.68	.73	1.35	.58	
(WY)	1964	1964	1964	1963	1963	1964	1971	1962	1959	1962	1960	1965	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1958 - 1995

ANNUAL TOTAL	3049.2		3626.7		8.77	
ANNUAL MEAN	8.35		9.94		16.9	1968
HIGHEST ANNUAL MEAN					3.12	1963
LOWEST ANNUAL MEAN						
HIGHEST DAILY MEAN	148	Jun 13	230	Aug 3	442	Oct 1 1981
LOWEST DAILY MEAN	1.3	Jan 20	1.2	Sep 28	.00	(a)
ANNUAL SEVEN-DAY MINIMUM	1.4	Jan 18	1.3	Sep 24	.27	Dec 15 1963
INSTANTANEOUS PEAK FLOW			754	Aug 3	(b)1200	Oct 1 1981
INSTANTANEOUS PEAK STAGE			11.68	Aug 3	(c)15.03	Oct 1 1981
ANNUAL RUNOFF (CFSM)	.88		1.05		.92	
ANNUAL RUNOFF (INCHES)	11.95		14.22		12.56	
10 PERCENT EXCEEDS	15		22		18	
50 PERCENT EXCEEDS	2.9		3.7		3.4	
90 PERCENT EXCEEDS	1.6		1.8		1.1	

(a) June 13-15, 1986, result of regulation from unknown source.

(b) From rating curve extended above 410 ft³/s.

(c) From floodmark.

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 at Farmington.

DRAINAGE AREA.--17.5 mi².

PERIOD OF RECORD.--March 1958 to current year.

REVISED RECORDS.--WSP 1912: 1959(M), 1960(M).

GAGE.--Water-stage recorder and concrete control. Datum of gage is 690.4 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	138	40	11	20	12	e15	11	15	13	79	9.6	6.1
2	44	26	10	14	11	e13	10	13	18	31	12	6.0
3	22	14	11	12	11	e12	10	12	36	17	98	5.7
4	15	12	10	9.5	10	e12	10	12	12	13	51	5.3
5	11	14	32	e9.0	e9.5	19	9.4	13	10	11	51	5.2
6	9.6	96	23	e8.5	e9.2	25	14	14	9.5	10	25	5.1
7	8.9	36	26	e9.5	e9.1	98	12	12	9.4	9.1	15	6.9
8	8.1	20	23	e9.0	e9.0	75	32	11	9.7	8.3	21	13
9	15	35	23	e8.5	e8.5	e35	29	15	8.4	7.8	59	8.9
10	9.7	32	22	e8.4	e8.4	e21	31	25	7.8	7.6	28	6.7
11	8.2	22	17	9.2	e8.3	e35	38	50	7.5	7.1	16	5.7
12	7.3	15	14	14	e8.2	e55	83	30	7.4	6.8	12	5.6
13	7.0	13	12	29	e8.1	e40	49	20	7.1	14	11	5.3
14	6.9	12	11	34	e7.8	e32	32	16	6.9	33	60	4.9
15	6.7	10	11	52	e7.6	e28	23	14	6.5	20	40	4.8
16	6.7	9.4	25	29	7.1	e23	19	13	6.2	38	18	5.1
17	6.6	9.0	98	20	6.0	e20	17	12	6.2	58	66	5.5
18	6.3	8.9	50	16	5.6	e17	29	11	6.0	24	53	5.0
19	25	8.2	32	15	8.4	e16	30	11	5.8	14	25	4.9
20	13	7.8	22	54	17	e16	20	10	5.8	12	16	6.6
21	11	9.0	18	55	16	e16	45	9.8	5.5	15	12	7.0
22	8.9	8.7	16	36	13	15	37	9.0	5.2	11	9.6	13
23	7.6	8.0	14	29	12	14	24	8.7	5.1	16	8.7	8.3
24	6.9	7.4	14	24	13	12	19	41	5.2	13	7.8	6.5
25	6.8	7.3	12	21	11	11	16	40	6.9	15	7.2	5.8
26	6.8	7.0	12	18	9.6	11	22	28	6.5	13	7.1	5.7
27	6.8	25	11	e16	21	11	44	17	32	11	7.0	5.4
28	6.4	41	11	e15	26	17	27	32	109	8.7	6.7	5.2
29	6.1	21	10	e14	---	15	20	52	63	7.5	6.5	5.1
30	6.1	14	9.5	e13	---	13	16	25	47	6.6	6.4	5.2
31	7.7	---	15	e13	---	12	---	17	---	6.2	6.2	---
TOTAL	456.1	588.7	625.5	634.6	303.4	754	778.4	608.5	484.6	543.7	771.8	189.5
MEAN	14.7	19.6	20.2	20.5	10.8	24.3	25.9	19.6	16.2	17.5	24.9	6.32
MAX	138	96	98	55	26	98	83	52	109	79	98	13
MIN	6.1	7.0	9.5	8.4	5.6	11	9.4	8.7	5.1	6.2	6.2	4.8
CFSM	.84	1.12	1.15	1.17	.62	1.39	1.48	1.12	.92	1.00	1.42	.36
IN.	.97	1.25	1.33	1.35	.64	1.60	1.65	1.29	1.03	1.16	1.64	.40

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1995, BY WATER YEAR (WY)

	MEAN	7.72	10.9	12.5	12.6	15.7	27.3	23.9	15.4	12.6	7.11	6.64	6.97
MAX	42.2	31.3	29.0	39.8	51.6	63.6	42.3	38.7	63.9	24.8	24.9	26.5	26.5
(WY) 1982	1993	1991	1974	1976	1982	1977	1983	1989	1992	1995	1975	1975	1975
MIN	1.10	1.69	1.70	2.06	2.20	6.81	9.10	3.46	2.13	1.00	.97	1.00	1.00
(WY) 1965	1965	1964	1964	1961	1963	1964	1971	1971	1971	1964	1963	1964	1964

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1958 - 1995

ANNUAL TOTAL	5984.7	6738.8	13.3
ANNUAL MEAN	16.4	18.5	21.2
HIGHEST ANNUAL MEAN			4.54
LOWEST ANNUAL MEAN			1968
HIGHEST DAILY MEAN	145	138	653
LOWEST DAILY MEAN	4.1	4.8	.32
ANNUAL SEVEN-DAY MINIMUM	4.2	5.1	.61
INSTANTANEOUS PEAK FLOW		269	1500
INSTANTANEOUS PEAK STAGE		4.88	8.70
INSTANTANEOUS LOW FLOW		4.2	(c).07
ANNUAL RUNOFF (CFSM)	.94	1.05	.76
ANNUAL RUNOFF (INCHES)	12.72	14.32	10.35
10 PERCENT EXCEEDS	33	38	28
50 PERCENT EXCEEDS	11	12	7.1
90 PERCENT EXCEEDS	5.2	6.3	2.1

(a) Aug. 10, 1964, Aug. 29, 1966.

(b) Sept. 7, 14, 15, 19, 28.

(c) Result of regulation.

(e) Estimated.

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 at Detroit, 4 mi upstream from Middle River Rouge.

DRAINAGE AREA.--187 mi².

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.--Records good except for estimated daily discharges, which are fair. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1070	310	86	185	106	151	94	121	113	357	135	43
2	507	292	78	151	e98	e105	91	115	107	168	456	41
3	127	111	e75	98	e90	e100	90	110	430	106	603	40
4	83	76	e74	e85	e86	e96	99	106	189	87	1060	38
5	67	83	e220	e78	e84	137	85	103	118	81	685	38
6	59	747	e190	e77	e80	240	106	121	102	72	270	36
7	53	404	e220	e85	e76	512	121	102	94	65	150	37
8	50	155	e220	e80	e74	1110	325	95	104	59	185	110
9	125	264	e215	e75	73	316	225	113	85	57	585	88
10	77	233	197	e75	74	194	268	168	83	56	213	49
11	54	138	147	e76	76	188	257	331	83	53	143	41
12	48	107	117	99	71	330	622	179	78	50	112	37
13	45	94	102	184	71	294	374	130	75	83	98	36
14	43	86	93	222	73	241	227	113	76	303	351	35
15	41	83	88	513	73	207	170	103	73	237	304	33
16	41	73	131	256	81	186	142	97	68	513	145	33
17	40	68	844	164	83	164	130	103	64	1000	199	33
18	40	67	450	137	82	140	218	99	64	242	330	35
19	214	63	224	127	91	130	322	91	61	137	146	31
20	121	59	167	338	100	131	173	92	62	113	105	37
21	64	69	143	634	95	137	350	98	61	158	87	47
22	52	78	129	325	93	123	388	82	61	117	75	139
23	48	63	120	236	83	112	190	78	59	312	65	62
24	45	57	114	199	92	105	151	371	61	194	62	43
25	44	57	110	179	83	99	135	300	86	283	56	37
26	45	55	103	158	111	94	142	218	259	384	51	36
27	43	e150	99	139	121	94	363	129	150	224	49	34
28	42	e450	96	127	257	149	220	166	846	122	51	32
29	40	e200	92	e115	---	124	155	530	930	103	48	30
30	39	107	88	e105	---	108	132	218	210	86	47	29
31	47	---	99	118	---	100	---	141	---	77	45	---
TOTAL	3414	4799	5131	5440	2577	6217	6365	4823	4852	5899	6911	1360
MEAN	110	160	166	175	92.0	201	212	156	162	190	223	45.3
MAX	1070	747	844	634	257	1110	622	530	930	1000	1060	139
MIN	39	55	74	75	71	94	85	78	59	50	45	29
CFSM	.59	.86	.89	.94	.49	1.07	1.13	.83	.86	1.02	1.19	.24
IN.	.68	.95	1.02	1.08	.51	1.24	1.27	.96	.97	1.17	1.37	.27

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1995, BY WATER YEAR (WY)

MEAN	66.1	89.6	113	119	163	236	232	165	109	67.1	57.8	57.2
MAX	450	321	321	456	519	488	965	683	478	385	223	274
(WY)	1982	1993	1968	1950	1938	1950	1947	1943	1968	1957	1995	1975
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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1931 - 1995

ANNUAL TOTAL	55572	57788	123
ANNUAL MEAN	152	158	222
HIGHEST ANNUAL MEAN			25.7
LOWEST ANNUAL MEAN			7380
HIGHEST DAILY MEAN	1460	1110	1.8
LOWEST DAILY MEAN	28	29	2.7
ANNUAL SEVEN-DAY MINIMUM	31	34	13000
INSTANTANEOUS PEAK FLOW		1560	21.40
INSTANTANEOUS PEAK STAGE		13.68	1.8
INSTANTANEOUS LOW FLOW		28	.66
ANNUAL RUNOFF (CFSM)	.81	.85	8.91
ANNUAL RUNOFF (INCHES)	11.05	11.50	
10 PERCENT EXCEEDS	321	325	260
50 PERCENT EXCEEDS	85	103	61
90 PERCENT EXCEEDS	43	45	16

(a) Sept. 29, 30.

(b) Aug. 1, 2, 1964.

(c) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04167000 MIDDLE RIVER ROUGE NEAR GARDEN CITY, MI

LOCATION.--Lat 42°20'55", long 83°18'45", in SW1/4 NW1/4 sec.6, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, on right bank 200 ft downstream from bridge on Inkster Road, 1.8 mi northeast of Garden City, and 6.0 mi upstream from mouth.

DRAINAGE AREA.--99.9 mi².

PERIOD OF RECORD.--October 1930 to September 1933 (published as "at Detroit"), June 1947 to September 1977, October 1977 to September 1983 (operated as a crest-stage partial-record station), October 1983 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 600.95 ft above sea level. Nov. 21, 1930, to Sept. 30, 1933, nonrecording gage at site 4.8 mi downstream at datum 17.48 ft lower. June 6, 1947, to Oct. 18, 1948, nonrecording gage at site 200 ft upstream at present datum.

REMARKS.--Records good. Occasional regulation by reservoirs upstream from station since 1956. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	438	214	56	105	61	80	60	76	75	182	53	29
2	206	140	48	84	62	62	57	71	93	101	93	28
3	59	71	51	59	58	54	55	66	147	73	150	28
4	35	49	46	e50	56	54	71	62	53	64	285	28
5	27	58	140	e45	e51	81	56	62	46	59	172	30
6	25	395	116	42	46	121	63	66	42	51	121	30
7	22	208	142	46	45	335	66	58	40	50	84	30
8	22	100	142	44	43	489	221	53	39	46	126	78
9	59	174	139	42	41	238	196	73	39	43	173	54
10	36	147	137	40	41	150	209	111	39	43	126	39
11	27	91	113	40	40	140	223	262	39	39	83	33
12	24	69	83	65	36	193	409	164	36	37	68	29
13	26	56	67	118	38	204	295	107	33	44	85	28
14	28	49	60	170	38	183	188	85	31	83	198	28
15	31	44	56	259	39	159	136	74	30	102	124	26
16	30	40	121	182	42	139	110	64	28	206	78	26
17	31	37	427	121	41	119	98	75	28	320	81	29
18	34	36	310	92	40	99	176	58	27	110	79	28
19	133	33	194	84	44	86	183	54	25	70	69	25
20	91	31	131	227	50	88	124	62	25	69	56	35
21	46	40	102	325	52	94	234	70	23	84	50	41
22	36	40	86	242	47	81	191	49	21	63	46	92
23	33	36	77	172	46	72	133	46	21	167	43	49
24	33	33	72	143	50	67	104	274	31	98	41	38
25	34	33	68	122	49	61	91	185	45	165	38	35
26	31	32	64	105	49	57	98	132	141	118	35	34
27	30	111	59	91	82	60	156	92	148	89	33	33
28	30	256	58	82	117	105	131	131	619	59	32	31
29	30	128	53	71	---	85	100	192	708	49	32	31
30	31	75	50	64	---	74	83	161	201	43	31	30
31	43	---	64	63	---	66	---	100	---	40	30	---
TOTAL	1761	2826	3332	3395	1404	3896	4317	3135	2873	2767	2715	1075
MEAN	56.8	94.2	107	110	50.1	126	144	101	95.8	89.3	87.6	35.8
MAX	438	395	427	325	117	489	409	274	708	320	285	92
MIN	22	31	46	40	36	54	55	46	21	37	30	25
CFSM	.57	.94	1.08	1.10	.50	1.26	1.44	1.01	.96	.89	.88	.36
IN.	.66	1.05	1.24	1.26	.52	1.45	1.61	1.17	1.07	1.03	1.01	.40

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1995, BY WATER YEAR (WY)

MEAN	39.7	57.0	74.2	81.0	103	148	133	90.3	63.9	42.2	36.1	41.2
MAX	124	178	177	269	324	313	313	310	225	179	90.6	171
(WY)	1955	1993	1988	1952	1976	1976	1950	1956	1968	1957	1994	1975
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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1931 - 1995

ANNUAL TOTAL	31120	33496	75.5
ANNUAL MEAN	85.3	91.8	133
HIGHEST ANNUAL MEAN			20.8
LOWEST ANNUAL MEAN			2060
HIGHEST DAILY MEAN	746	Aug 14	708
LOWEST DAILY MEAN	18	Sep 22	21
ANNUAL SEVEN-DAY MINIMUM	19	Sep 18	24
INSTANTANEOUS PEAK FLOW			885
INSTANTANEOUS PEAK STAGE			8.87
INSTANTANEOUS LOW FLOW			19
ANNUAL RUNOFF (CFSM)	.85	.92	.90
ANNUAL RUNOFF (INCHES)	11.59	12.47	10.27
10 PERCENT EXCEEDS	197	189	162
50 PERCENT EXCEEDS	51	62	41
90 PERCENT EXCEEDS	26	30	13

(a) Gage height 9.96 ft.

(b) From floodmark.

(c) Estimated.

STREAMS TRIBUTARY TO DETROIT RIVER

04168000 LOWER RIVER ROUGE AT INKSTER, MI

LOCATION.--Lat 42°18'00", long 83°18'00", in SW1/4 SE1/4 sec.19, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, on right bank 10 ft downstream from bridge on John Daly Road, 0.6 mi northeast of Inkster, and 4.8 mi upstream from mouth.

DRAINAGE AREA.--83.2 mi².

PERIOD OF RECORD.--June 1947 to current year.

REVISED RECORDS.--WSP 1174: 1948(M). WSP 1437: 1949. WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 593.14 ft above sea level. Prior to Oct. 20, 1948, nonrecording gage at same site and datum.

REMARKS.--Records 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 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	198	100	20	49	27	54	43	35	36	255	59	21
2	60	55	16	40	e24	50	35	38	35	95	85	17
3	22	23	17	35	e22	43	32	35	104	52	85	19
4	13	16	15	28	e20	47	40	35	45	37	140	19
5	9.0	19	47	e23	e19	70	30	27	25	31	71	18
6	8.3	208	53	e20	e18	110	34	35	18	26	33	21
7	5.7	83	69	e21	e18	359	34	24	16	19	24	27
8	5.5	37	84	e20	e17	656	113	20	12	15	67	55
9	25	80	81	e19	e17	191	135	38	9.1	12	50	34
10	11	74	106	e18	e17	112	213	87	8.1	22	27	33
11	15	52	77	20	e17	113	269	186	8.9	12	15	32
12	13	32	48	48	e17	164	561	98	8.3	8.0	11	31
13	5.1	23	47	99	e16	142	308	61	7.6	12	26	27
14	4.8	19	39	157	e16	117	146	42	7.9	26	179	30
15	4.5	16	34	285	e17	100	93	33	5.3	34	45	26
16	4.1	14	76	147	e18	90	70	37	5.1	94	20	26
17	3.4	12	457	80	e19	76	60	41	6.7	135	18	30
18	3.9	10	251	70	e20	57	113	32	3.3	49	36	28
19	43	9.5	122	60	e21	49	189	29	2.7	35	31	22
20	19	8.3	80	209	e22	52	99	26	2.8	56	27	36
21	9.9	13	63	446	e22	62	227	15	1.9	61	21	35
22	7.3	13	60	199	e22	51	221	14	1.0	43	27	69
23	5.3	9.0	43	121	e23	42	98	17	6.5	122	26	37
24	4.0	8.2	34	95	e24	36	70	228	17	59	26	32
25	4.5	7.4	31	87	e27	31	57	165	72	54	17	32
26	4.3	6.8	28	69	39	28	57	112	81	87	15	30
27	4.3	54	25	54	59	31	87	64	89	51	19	26
28	8.1	145	23	50	65	59	72	132	667	42	15	27
29	8.1	56	21	49	---	59	55	110	928	40	29	26
30	4.3	30	17	48	---	55	41	64	301	40	23	27
31	11	---	27	33	---	47	---	44	---	38	22	---
TOTAL	544.4	1233.2	2111	2699	663	3153	3602	1924	2531.2	1662.0	1289	893
MEAN	17.6	41.1	68.1	87.1	23.7	102	62.1	84.4	53.6	41.6	29.8	29.8
MAX	198	208	457	446	65	656	561	228	928	255	179	69
MIN	3.4	6.8	15	18	16	28	30	14	1.0	8.0	11	17
CFSM	.21	.49	.82	1.05	.28	1.22	1.44	.75	1.01	.64	.50	.36
IN.	.24	.55	.94	1.21	.30	1.41	1.61	.86	1.13	.74	.58	.40

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1995, BY WATER YEAR (WY)

	MEAN	20.1	37.0	61.1	57.3	85.3	134	112	56.4	35.1	19.5	14.4	19.9
MAX	110	176	179	294	307	301	280	183	221	95.8	65.7	99.5	99.5
(WY)	1982	1986	1968	1952	1976	1982	1950	1983	1968	1969	1975	1975	1975
MIN	2.11	3.23	2.32	1.86	4.18	19.4	22.2	4.47	2.75	2.26	.83	1.86	1.86
(WY)	1949	1964	1964	1961	1964	1964	1958	1958	1949	1948	1950	1952	1952

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1947 - 1995

ANNUAL TOTAL	17486.77	22304.8	
ANNUAL MEAN	47.9	61.1	54.1
HIGHEST ANNUAL MEAN			98.8
LOWEST ANNUAL MEAN			15.9
HIGHEST DAILY MEAN	552	Mar 22	2520
LOWEST DAILY MEAN	.97	Sep 24	.30
ANNUAL SEVEN-DAY MINIMUM	2.4	Sep 2	.53
INSTANTANEOUS PEAK FLOW			3600
INSTANTANEOUS PEAK STAGE			13.62
INSTANTANEOUS LOW FLOW			.20
ANNUAL RUNOFF (CFSM)	.58		.65
ANNUAL RUNOFF (INCHES)	7.82		8.83
10 PERCENT EXCEEDS	106	126	120
50 PERCENT EXCEEDS	21	34	16
90 PERCENT EXCEEDS	4.3	8.7	2.6

(a) Result of regulation from unknown source.

(b) Sept. 13, 1955, Jan. 23, 1961.

(c) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04170000 HURON RIVER AT MILFORD, MI

LOCATION.--Lat 42°34'44", long 83°37'36", in NE1/4 sec.16, T.2 N., R.7 E., Oakland County, Hydrologic Unit 04090005, on left bank 40 ft downstream from bridge on General Motors Road, 0.5 mi downstream from Sherwood Creek, and 0.5 mi west of Milford.

DRAINAGE AREA.--132 mi².

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.--Records good. Flow below about 300 ft³/s regulated by powerplant 1.5 mi upstream from station prior to May 20, 1957; occasional regulation for lake level control since. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	164	141	162	148	150	123	127	130	134	100	88	58
2	197	158	158	141	146	119	121	128	131	93	118	56
3	181	142	160	134	138	116	117	123	122	86	162	53
4	151	136	160	126	128	113	114	117	110	90	159	51
5	131	141	177	120	120	115	109	110	101	101	156	50
6	121	196	189	117	116	123	105	108	94	96	157	49
7	112	217	198	118	113	150	105	103	88	91	141	50
8	105	195	194	116	112	189	111	97	78	89	130	54
9	115	201	191	113	110	180	122	97	72	86	135	51
10	112	202	193	112	108	163	124	114	72	80	132	47
11	112	192	184	110	104	164	126	160	70	69	120	45
12	116	184	175	113	100	192	144	162	69	60	111	44
13	113	175	173	136	98	221	150	159	66	57	102	44
14	105	169	169	152	96	232	143	152	60	62	107	43
15	99	162	163	174	95	231	134	152	55	65	96	42
16	100	157	162	174	93	223	129	149	49	86	88	42
17	101	152	202	159	93	216	126	147	41	113	102	44
18	100	147	223	152	94	200	131	137	38	100	114	45
19	110	142	205	153	97	190	138	121	38	97	103	45
20	116	138	188	173	103	186	136	109	37	106	96	49
21	114	137	176	208	105	183	135	99	36	114	96	52
22	108	136	167	214	105	181	147	92	35	109	93	62
23	104	134	163	200	104	174	141	76	35	113	89	59
24	102	131	161	191	108	165	131	95	36	112	85	55
25	99	129	159	186	108	159	123	124	50	104	77	54
26	97	129	155	180	109	152	126	125	63	96	71	55
27	96	137	152	177	118	147	144	118	75	95	69	54
28	94	167	146	173	126	150	144	121	102	94	66	51
29	92	171	147	164	---	150	137	142	113	93	64	51
30	92	167	143	158	---	141	133	143	99	92	62	52
31	92	---	141	154	---	133	---	135	---	85	60	---
TOTAL	3551	4785	5336	4746	3097	5181	3873	3845	2169	2834	3249	1507
MEAN	115	159	172	153	111	167	129	124	72.3	91.4	105	50.2
MAX	197	217	223	214	150	232	150	162	134	114	162	62
MIN	92	129	141	110	93	113	105	76	35	57	60	42
CFSM	.87	1.21	1.30	1.16	.84	1.27	.98	.94	.55	.69	.79	.38
IN.	1.00	1.35	1.50	1.34	.87	1.46	1.09	1.08	.61	.80	.92	.42

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 1995, BY WATER YEAR (WY)

	MEAN	80.8	95.0	108	106	112	156	164	115	86.4	66.6	54.2	64.8
MAX	283	179	218	211	226	337	389	340	181	233	142	247	
(WY)	1982	1993	1951	1993	1951	1976	1950	1956	1993	1968	1968	1975	
MIN	32.6	34.0	35.8	42.5	42.0	66.9	79.4	51.8	28.8	19.3	26.5	27.2	
(WY)	1965	1964	1964	1964	1963	1964	1963	1988	1988	1988	1971	1964	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1948 - 1995

ANNUAL TOTAL	45206	44173	101
ANNUAL MEAN	124	121	157
HIGHEST ANNUAL MEAN			1974
LOWEST ANNUAL MEAN			1964
HIGHEST DAILY MEAN	282	232	632
LOWEST DAILY MEAN	39	35	5.2
ANNUAL SEVEN-DAY MINIMUM	47	36	11
INSTANTANEOUS PEAK FLOW		233	(a)648
INSTANTANEOUS PEAK STAGE		6.33	8.26
INSTANTANEOUS LOW FLOW		34	(b)
ANNUAL RUNOFF (CFSM)	.94	.92	.76
ANNUAL RUNOFF (INCHES)	12.74	12.45	10.36
10 PERCENT EXCEEDS	189	180	185
50 PERCENT EXCEEDS	121	118	85
90 PERCENT EXCEEDS	63	55	37

(a) Gage height 7.87 ft.

(b) June 21, 22, 23.

STREAMS TRIBUTARY TO LAKE ERIE

04170490 KENT LAKE NEAR NEW HUDSON, MI

LOCATION.--Lat 42°30'45", long 83°40'34", in sec.1, T.1 N., R.6 E., Livingston County, Hydrologic Unit 04090005, at Kent Lake Dam, 2 mi upstream from Woodruff Creek, and 3 mi west of New Hudson.

DRAINAGE AREA.--148 mi².

PERIOD OF RECORD.--April 1949 to current year.

GAGE.--Water-stage recorder. Datum of gage is 868.00 ft above sea level (Huron-Clinton Metropolitan Authority bench mark).

REMARKS.--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, 10.77 ft, Dec. 23, 1992, but may have been lower during period of no gage-height record Nov. 13, 1992, to Jan. 22, 1993, due to repairs on dam structure.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 15.98 ft, Oct. 2, 3; minimum, 12.61 ft, Feb. 17, 18.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.90	---	12.85	12.79	12.81	12.72	13.73	15.50	15.58	15.50	15.46	15.37
2	15.96	---	12.85	12.77	12.80	12.71	13.76	15.50	15.57	15.47	15.54	15.36
3	15.97	---	12.84	12.77	12.78	12.70	13.78	15.49	15.56	15.44	15.71	15.36
4	15.94	---	12.84	12.76	12.76	12.69	13.89	15.49	15.54	15.44	15.75	15.37
5	15.90	---	12.88	12.73	12.73	12.70	13.94	15.48	15.51	15.46	15.75	15.37
6	15.86	---	12.91	12.72	12.71	12.71	13.97	15.47	15.48	15.45	15.73	15.37
7	15.83	---	12.96	12.71	12.70	12.77	14.02	15.46	15.45	15.45	15.69	15.39
8	---	---	12.94	12.70	12.68	12.86	14.14	15.44	15.44	15.44	15.65	15.40
9	---	---	12.93	12.69	12.67	12.89	14.23	15.44	15.40	15.44	15.62	15.40
10	---	---	12.93	12.68	12.67	12.88	14.29	15.48	15.38	15.42	15.62	15.40
11	---	---	12.91	12.67	12.66	12.86	14.39	15.60	15.38	15.41	15.60	15.39
12	---	---	12.89	12.68	12.64	12.89	14.52	15.62	15.37	15.38	15.58	15.41
13	---	---	12.87	12.71	12.64	12.94	14.71	15.61	15.35	15.36	15.54	15.41
14	---	---	12.86	12.76	12.63	12.98	14.82	15.60	15.35	15.36	15.53	15.42
15	---	---	12.85	12.82	12.63	12.99	14.86	15.61	15.33	15.37	15.54	15.41
16	---	---	12.84	12.85	12.62	13.00	14.91	15.59	15.31	15.43	15.51	15.41
17	---	---	12.90	12.84	12.61	12.99	15.04	15.61	15.30	15.50	15.53	15.42
18	---	13.22	12.94	12.83	12.61	12.97	15.15	15.59	15.28	15.50	15.55	15.42
19	---	13.14	12.95	12.82	12.62	12.95	15.23	15.56	15.27	15.48	15.54	15.42
20	---	13.08	12.94	12.86	12.63	12.93	15.30	15.52	15.27	15.49	15.51	15.45
21	---	12.98	12.92	12.93	12.65	12.91	15.32	15.50	15.25	15.52	15.50	15.46
22	---	12.93	12.89	12.96	12.65	12.90	15.36	15.47	15.23	15.51	15.49	15.48
23	---	12.87	12.87	12.96	12.66	12.89	15.37	15.44	15.23	15.55	15.45	15.49
24	---	12.82	12.85	12.94	12.66	12.99	15.36	15.48	15.22	15.55	15.45	15.50
25	---	12.80	12.84	12.92	12.67	13.12	15.34	15.53	15.24	15.55	15.43	15.49
26	---	12.79	12.83	12.91	12.68	13.18	15.35	15.55	15.29	15.52	15.41	15.49
27	---	12.79	12.82	12.89	12.71	13.24	15.37	15.54	15.33	15.50	15.41	15.50
28	---	12.78	12.81	12.88	12.72	13.38	15.45	15.54	15.42	15.48	15.39	15.49
29	---	12.86	12.80	12.85	---	13.47	15.49	15.58	15.50	15.46	15.39	15.49
30	---	12.87	12.78	12.84	---	13.54	15.50	15.60	15.50	15.46	15.38	15.48
31	---	---	12.78	12.82	---	13.67	---	15.59	---	15.44	15.38	---
MEAN	---	---	12.87	12.81	12.68	12.98	14.75	15.53	15.38	15.46	15.54	15.43
MAX	---	---	12.96	12.96	12.81	13.67	15.50	15.62	15.58	15.55	15.75	15.50
MIN	---	---	12.78	12.67	12.61	12.69	13.73	15.44	15.22	15.36	15.38	15.36

STREAMS TRIBUTARY TO LAKE ERIE

04170500 HURON RIVER NEAR NEW HUDSON, MI

LOCATION.--Lat 42°30'45", long 83°40'35", in NE1/4 sec.1, T.1 N., R.6 E., Livingston County, Hydrologic Unit 04090005, on right bank 150 ft downstream from Kent Lake Dam, 2 mi upstream from Woodruff Creek, and 3 mi west of New Hudson.

DRAINAGE AREA.--148 mi².

PERIOD OF RECORD.--August 1948 to current year.

REVISED RECORDS.--WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 868.00 ft above sea level (Huron-Clinton Metropolitan Authority bench mark).

REMARKS.--Records good. Occasional regulation by Kent Lake (see preceding page). Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	155	190	190	176	173	141	117	144	159	127	106	63
2	172	242	189	170	170	139	125	142	159	118	132	59
3	179	233	189	167	165	135	85	139	157	107	192	56
4	165	252	190	164	160	133	81	136	149	104	213	54
5	154	240	200	157	151	134	97	133	140	110	213	52
6	141	237	208	151	145	138	108	131	132	107	209	51
7	131	297	229	149	139	161	80	128	123	102	189	57
8	123	292	222	146	135	186	88	118	117	101	172	58
9	128	290	220	143	133	192	120	114	102	98	165	54
10	124	320	219	142	131	186	90	128	101	97	163	50
11	119	294	214	138	129	183	80	166	97	93	154	46
12	119	305	207	135	124	195	75	177	97	81	148	45
13	118	271	202	145	121	211	84	173	90	74	137	45
14	117	254	197	160	118	223	121	166	86	73	133	46
15	112	244	193	178	117	229	133	169	79	80	134	44
16	108	279	192	187	115	230	79	164	73	98	123	42
17	106	285	209	185	112	227	80	167	64	120	127	45
18	107	243	224	181	111	219	93	163	59	118	136	43
19	116	211	230	179	114	210	109	152	55	113	135	45
20	119	194	225	192	119	202	133	141	55	111	128	49
21	122	193	216	216	120	198	141	132	49	125	118	52
22	120	207	207	230	122	204	150	125	44	126	112	56
23	115	194	200	229	123	167	154	114	42	135	103	58
24	112	176	195	221	123	115	149	127	42	135	102	57
25	110	170	192	213	129	125	142	141	48	134	91	56
26	109	168	188	206	131	144	145	149	62	127	85	55
27	106	170	184	201	141	107	132	146	75	121	84	55
28	102	168	181	197	141	110	130	144	108	114	77	54
29	101	191	178	189	---	e125	143	156	131	110	76	52
30	102	195	173	183	---	e90	145	168	130	110	68	50
31	159	---	171	178	---	e95	---	164	---	104	65	---
TOTAL	3871	7005	6234	5508	3712	5154	3409	4517	2825	3373	4090	1549
MEAN	125	233	201	178	133	166	114	146	94.2	109	132	51.6
MAX	179	320	230	230	173	230	154	177	159	135	213	63
MIN	101	168	171	135	111	90	75	114	42	73	65	42

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 1995, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1948	97.3	262	1982	35.1	1964
1949	150	233	1995	70.1	1964
1950	133	248	1951	63.2	1961
1951	123	236	1951	53.8	1964
1952	130	252	1951	53.7	1964
1953	166	315	1974	61.7	1964
1954	143	357	1950	42.9	1966
1955	122	379	1956	34.5	1988
1956	99.9	198	1993	33.6	1988
1957	74.2	219	1957	21.6	1988
1958	63.8	147	1968	27.9	1963
1959	75.5	231	1975	31.5	1966

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1948 - 1995

ANNUAL TOTAL	50394	51247	115
ANNUAL MEAN	138	140	181
HIGHEST ANNUAL MEAN			1974
LOWEST ANNUAL MEAN			1964
HIGHEST DAILY MEAN	320	Nov 10	582
LOWEST DAILY MEAN	40	Jun 12	6.4
ANNUAL SEVEN-DAY MINIMUM	49	Jun 7	12
INSTANTANEOUS PEAK FLOW			358
INSTANTANEOUS PEAK STAGE			2.90
INSTANTANEOUS LOW FLOW			35
10 PERCENT EXCEEDS	219		203
50 PERCENT EXCEEDS	122		102
90 PERCENT EXCEEDS	73		43

(a) From rating curve extended above 600 ft³/s.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04173500 MILL CREEK NEAR DEXTER, MI

LOCATION.--Lat 42°18'00", long 83°53'55", in SW1/4 sec.18, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, on left bank 12 ft downstream from bridge on Parker Road, 2.5 mi south of Dexter, and 4 mi upstream from mouth.

DRAINAGE AREA.--128 mi².

PERIOD OF RECORD.--February 1952 to December 1982, October 1994 to September 1995.

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, non-recording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges during the winter period, which are fair, and those for Oct. 1 to Nov. 22, which are poor. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e210	e200	75	e82	87	83	98	97	72	90	60	39
2	e215	e280	70	e80	88	78	93	92	66	69	201	38
3	e140	e180	68	e75	82	74	88	86	64	58	522	37
4	e80	e130	66	e70	80	69	88	81	60	53	632	36
5	e65	e130	91	e66	e73	69	81	84	55	67	405	35
6	e57	e250	107	e64	e68	84	82	82	51	56	309	34
7	e51	e260	115	e62	e64	227	80	76	48	49	214	33
8	e47	e160	119	e60	e60	418	118	71	46	45	148	38
9	e70	e160	117	e59	e58	294	169	71	45	44	138	38
10	e65	e190	132	e58	e57	217	257	90	45	73	119	35
11	e56	e140	121	e62	e55	280	251	267	46	54	102	33
12	e50	e115	100	71	e54	389	364	183	45	43	87	33
13	e46	e100	89	154	e53	364	321	128	42	40	82	33
14	e42	e92	80	188	e52	325	242	107	39	38	75	33
15	e40	e84	75	201	e51	285	185	94	37	36	74	31
16	e38	e78	79	168	e50	246	154	82	37	37	147	31
17	e36	e73	263	135	e50	209	135	76	37	52	123	31
18	e35	e68	285	120	e52	177	138	71	36	41	191	31
19	e60	e64	234	117	64	156	159	67	35	36	179	30
20	e70	e60	182	226	77	149	138	61	34	36	124	33
21	e60	e57	150	345	81	169	159	58	32	49	88	34
22	e53	e54	132	282	73	150	176	54	31	42	72	43
23	e47	52	122	237	80	131	145	52	29	62	62	39
24	e43	49	121	198	88	118	126	89	30	68	56	35
25	e40	50	116	173	79	108	116	136	32	212	51	34
26	e39	48	106	149	70	101	114	133	39	171	48	33
27	e37	51	100	135	82	97	144	97	64	122	46	31
28	e36	124	94	122	90	107	134	88	206	88	45	31
29	e36	111	89	e105	---	123	115	126	166	70	45	31
30	e36	88	79	e95	---	116	103	105	117	57	44	30
31	e36	---	81	89	---	106	---	85	---	49	41	---
TOTAL	1936	3498	3658	4048	1918	5519	4573	2989	1686	2007	4530	1023
MEAN	62.5	117	118	131	68.5	178	152	96.4	56.2	64.7	146	34.1
MAX	215	280	285	345	90	418	364	267	206	212	632	43
MIN	35	48	66	58	50	69	80	52	29	36	41	30
CFSM	.49	.91	.92	1.02	.54	1.39	1.19	.75	.44	.51	1.14	.27
IN.	.56	1.02	1.06	1.18	.56	1.60	1.33	.87	.49	.58	1.32	.30

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1995, BY WATER YEAR (WY)

	MEAN	40.9	58.7	83.2	73.3	98.3	182	158	98.4	64.1	41.0	35.4	34.3
MAX	193	117	192	251	337	423	271	265	256	165	146	180	180
(WY)	1955	1995	1958	1974	1976	1982	1969	1956	1968	1968	1995	1975	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	11.0
(WY)	1964	1964	1964	1964	1964	1964	1963	1958	1958	1965	1963	1963	1963

SUMMARY STATISTICS

FOR 1995 WATER YEAR

WATER YEARS 1952 - 1995

ANNUAL TOTAL	37385		
ANNUAL MEAN	102		
HIGHEST ANNUAL MEAN		80.2	
LOWEST ANNUAL MEAN		142	1974
HIGHEST DAILY MEAN		29.9	1964
LOWEST DAILY MEAN	632		
ANNUAL SEVEN-DAY MINIMUM	29	Aug 4	Jun 27 1968
INSTANTANEOUS PEAK FLOW	31	Jun 23	Oct 7 1963
INSTANTANEOUS PEAK STAGE	691	Sep 13	Oct 5 1963
INSTANTANEOUS LOW FLOW	10.13	Aug 4	Jun 26 1968
ANNUAL RUNOFF (CFSM)	29	Aug 4	Jun 26 1968
ANNUAL RUNOFF (INCHES)	.80	(a)	Dec 13 1963
10 PERCENT EXCEEDS	10.87		
50 PERCENT EXCEEDS	203		
90 PERCENT EXCEEDS	79		
	36		

(a) June 23, 24, Sept. 30.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04174050 HURON RIVER AT DELHI MILLS, MI

LOCATION.--Lat 42°20'01", long 83°48'34", in SE1/4 sec.2, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at bridge on East Delhi Road, 5.0 mi northwest of Ann Arbor, 5.2 mi downstream from Mill Creek, 5.1 mi upstream from Barton Dam, and 60.0 mi upstream from mouth.

DRAINAGE AREA.--699 mi².

PERIOD OF RECORD.--Water years 1971-81, 1983 to September 1995 (discontinued).

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	TEMPER- ATURE WATER (DEG C) (00010)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	PCB, TOTAL (UG/L) (39516)	ALDRIN, TOTAL (UG/L) (39330)	CHLOR- DANE, TECH- NICAL TOTAL (UG/L) (39350)	CHLOR- PYRIFOS TOTAL RECOVER (UG/L) (38932)	DEF TOTAL (UG/L) (39040)
APR 11...	0940	618	4.5	7.4	<0.100	<0.010	<0.100	<0.010	<0.010
MAY 19...	0840	676	15.0	6.3	<0.100	<0.010	<0.100	<0.010	<0.010
JUN 06...	0945	670	20.5	11	<0.100	<0.010	<0.100	<0.010	<0.010
JUL 27...	0800	621	23.0	11	<0.100	<0.010	<0.100	<0.010	<0.010
AUG 23...	0940	614	23.0	9.8	<0.100	<0.010	<0.100	<0.010	<0.010
SEP 28...	0935	644	--	13	<0.100	<0.010	<0.100	<0.010	<0.010

DATE	P.P'- DDD UNFLT RECOVER (UG/L) (39360)	DDE, TOTAL (UG/L) (39365)	P.P'- DDT UNFLT RECOVER (UG/L) (39370)	DI- AZINON, TOTAL (UG/L) (39570)	DISUL- FOTON UNFLT RECOVER (UG/L) (39011)	DI- ELDRIN TOTAL (UG/L) (39380)	ENDO- SULFAN, I TOTAL (UG/L) (39388)	ENDRIN WATER UNFLTRD REC (UG/L) (39390)	ETHION, TOTAL (UG/L) (39398)
APR 11...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
MAY 19...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
JUN 06...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
JUL 27...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
AUG 23...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
SEP 28...	<0.010	<0.010	<0.010	<0.010	--	<0.010	<0.010	<0.010	<0.010

DATE	FONOFOS (DY- FONATE) WATER WHOLE TOT.REC (UG/L) (82614)	HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)	LINDANE TOTAL (UG/L) (39340)	MALA- THION, TOTAL (UG/L) (39530)	METH- OXY- CHLOR, TOTAL (UG/L) (39480)	METHYL PARA- THION, TOTAL (UG/L) (39600)	MIREX, TOTAL (UG/L) (39755)	PCNS UNFLT RECOVER (UG/L) (39250)
APR 11...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.100
MAY 19...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.100
JUN 06...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.100
JUL 27...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.100
AUG 23...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.100
SEP 28...	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.100

DATE	PARA- THION, TOTAL (UG/L) (39540)	PER- THANE TOTAL (UG/L) (39034)	PHORATE TOTAL (UG/L) (39023)	TOX- APHENE, TOTAL (UG/L) (39400)	TOTAL TRI- THION (UG/L) (39786)	2,4-D, TOTAL (UG/L) (39730)	2,4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)	SILVEX, TOTAL (UG/L) (39760)
APR 11...	<0.010	<0.100	<0.010	<1.00	<0.010	<0.010	<0.010	<0.010	<0.010
MAY 19...	<0.010	<0.100	<0.010	<1.00	<0.010	0.230	<0.010	<0.010	<0.010
JUN 06...	<0.010	<0.100	<0.010	<1.00	<0.010	0.850	<0.010	<0.010	<0.010
JUL 27...	<0.010	<0.100	<0.010	<1.00	<0.010	0.210	<0.010	<0.010	<0.010
AUG 23...	<0.010	<0.100	<0.010	<1.00	<0.010	0.080	<0.010	<0.010	<0.010
SEP 28...	<0.010	<0.100	<0.010	<1.00	<0.010	0.030	<0.010	<0.010	<0.010

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 mi².

PERIOD OF RECORD.--February 1904 to current year. Monthly discharge only for February 1904 to September 1914 and October 1947 to July 1948, published in WSP 1307. Published as "at Geddes" February 1904 to December 1914 and as "at Barton" January 1914 to September 1940.

REVISED RECORDS.--WSP 874: 1938. WSP 2112: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 744.81 ft above sea level (levels by Michigan Department of Natural Resources). February 1904 to December 1914 at Geddes Dam, 4.2 mi downstream, and January 1914 to September 1947 at Barton Dam, 2.6 mi upstream, flow computed from records of operation of powerplants and records of depth of flow over dam and/or flow through undersluices.

REMARKS.--Records good. Prior to 1955, diversion upstream from station for Ann Arbor municipal supply had negligible effect on natural flow; annual mean discharge and runoff figures adjusted for diversion from 1955 to 1991. Flow regulated by powerplants prior to May 1962. From June 1962 to 1975 occasional regulation for lake level control operations upstream from station. Since 1975 extensive regulation of flow exists due to automation of gates at dams upstream from station. Several measurements of water temperature were made during the year. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	503	397	515	632	692	474	620	614	515	618	288	220
2	542	482	505	606	665	462	438	683	593	407	606	184
3	501	472	507	560	629	459	257	696	514	425	1290	186
4	497	492	510	507	606	461	597	611	539	418	1350	195
5	539	610	577	461	516	471	599	618	524	561	1220	182
6	652	752	589	466	532	475	290	664	443	449	1120	182
7	376	880	645	466	488	740	442	657	367	371	933	180
8	403	830	644	440	468	1050	526	507	371	361	639	231
9	542	852	672	447	453	933	648	478	367	356	743	204
10	575	850	696	446	456	854	755	561	359	373	755	190
11	423	857	694	449	421	957	953	902	358	268	661	178
12	416	942	663	463	453	1220	1240	953	263	253	425	174
13	319	944	647	540	399	1340	1290	838	257	259	468	167
14	323	1020	625	647	367	1320	926	777	318	251	467	159
15	336	830	601	690	380	1300	903	608	301	244	548	164
16	397	561	642	686	380	1340	856	676	206	301	557	199
17	405	613	824	661	370	1510	829	641	201	299	429	108
18	378	619	970	651	374	1190	877	617	147	267	661	117
19	411	625	911	678	384	1250	864	513	167	258	681	120
20	261	647	860	870	399	1190	835	496	168	293	527	138
21	278	619	833	1090	400	1050	888	487	205	366	443	161
22	308	572	801	1070	392	1040	897	473	184	357	423	184
23	349	526	802	1000	401	1010	855	446	171	402	411	203
24	329	508	784	970	419	977	821	517	141	451	386	191
25	316	488	760	937	422	929	804	578	141	535	366	140
26	302	460	731	906	413	694	816	681	360	521	347	145
27	310	509	702	874	463	705	855	613	383	480	300	150
28	290	542	675	866	462	713	839	657	711	540	296	151
29	273	544	646	798	---	727	807	757	890	487	288	154
30	274	529	616	751	---	712	774	697	717	306	251	152
31	293	---	621	731	---	692	---	425	---	265	220	---
TOTAL	12121	19572	21268	21359	12804	28245	23101	19443	10881	11742	18099	5129
MEAN	391	652	686	689	457	911	770	627	363	379	584	171
MAX	652	1020	970	1090	692	1510	1290	953	890	618	1350	231
MIN	261	397	505	440	367	459	257	425	141	244	220	108

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1915 - 1995, BY WATER YEAR (WY)

	MEAN	268	380	423	447	541	864	868	599	396	241	181	213
MAX	904	1018	1080	1257	1431	2308	2647	2085	1341	1130	584	919	
(WY)	1982	1993	1951	1950	1976	1918	1947	1943	1943	1968	1995	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1915 - 1995

ANNUAL TOTAL	189239	203764	
ANNUAL MEAN	518	558	
HIGHEST ANNUAL MEAN			(a)451
LOWEST ANNUAL MEAN			824
HIGHEST DAILY MEAN	1380	Mar 25	1510
LOWEST DAILY MEAN	128	Sep 21	108
ANNUAL SEVEN-DAY MINIMUM	161	Sep 20	144
INSTANTANEOUS PEAK FLOW			2980
INSTANTANEOUS PEAK STAGE			15.35
10 PERCENT EXCEEDS	879		917
50 PERCENT EXCEEDS	492		515
90 PERCENT EXCEEDS	220		205
			119

(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

04174950 WILLOW RUN NEAR RAWSONVILLE, MI

LOCATION.--Lat 42°13'09", long 83°32'13", in SW1/4 sec.18, T.3 S., R.8 E., Wayne County, Hydrologic Unit 04090005, on right bank 30 ft upstream from culverts on North I-94 Service Road, 0.7 mi upstream from mouth, and 0.8 mi northeast of Rawsonville.

DRAINAGE AREA.--Indeterminate.

PERIOD OF RECORD.--April 1986 to current year (seasonal records only, April to September).

GAGE.--Water-stage recorder. Elevation of gage is 670 ft above sea level, from topographic map.

REMARKS.--Records good. Actual surface drainage area is 6.28 mi². Flow contains effluent from sewage-treatment plant about 1 mi upstream from station. Some of this flow originates from ground-water sources and other sources outside the basin. Several measurements of water temperature were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge during period April to September, 142 ft³/s, Aug. 19, 1990; minimum daily, 6.7 ft³/s, Sept. 29, 1995.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	40	25	37	53	43	18
2	---	---	---	---	---	---	35	26	45	45	26	16
3	---	---	---	---	---	---	33	29	42	43	20	17
4	---	---	---	---	---	---	39	40	42	40	31	18
5	---	---	---	---	---	---	31	33	40	41	43	17
6	---	---	---	---	---	---	26	42	39	41	35	12
7	---	---	---	---	---	---	31	43	42	40	43	8.0
8	---	---	---	---	---	---	56	33	41	39	38	17
9	---	---	---	---	---	---	54	33	36	40	34	7.6
10	---	---	---	---	---	---	50	51	37	38	41	7.0
11	---	---	---	---	---	---	59	40	38	38	42	7.0
12	---	---	---	---	---	---	68	38	39	39	41	7.2
13	---	---	---	---	---	---	53	44	40	41	44	7.6
14	---	---	---	---	---	---	51	42	38	29	42	7.3
15	---	---	---	---	---	---	44	31	34	12	43	7.0
16	---	---	---	---	---	---	43	32	35	13	42	7.0
17	---	---	---	---	---	---	41	37	35	13	29	10
18	---	---	---	---	---	---	52	30	40	19	22	8.0
19	---	---	---	---	---	---	51	29	39	12	23	9.0
20	---	---	---	---	---	---	42	40	38	15	23	7.7
21	---	---	---	---	---	---	54	39	39	13	13	11
22	---	---	---	---	---	---	49	36	37	12	16	15
23	---	---	---	---	---	---	48	41	37	28	14	8.0
24	---	---	---	---	---	---	44	81	95	15	17	7.4
25	---	---	---	---	---	---	39	51	60	14	19	7.3
26	---	---	---	---	---	---	42	43	46	13	22	7.5
27	---	---	---	---	---	---	38	34	95	12	25	7.6
28	---	---	---	---	---	---	30	48	104	13	18	7.5
29	---	---	---	---	---	---	33	45	63	10	19	6.7
30	---	---	---	---	---	---	31	40	49	9.5	21	7.2
31	---	---	---	---	---	---	---	43	---	11	20	---
TOTAL	---	---	---	---	---	---	1307	1219	1402	801.5	909	300.6
MEAN	---	---	---	---	---	---	43.6	39.3	46.7	25.9	29.3	10.0
MAX	---	---	---	---	---	---	68	81	104	53	44	18
MIN	---	---	---	---	---	---	26	25	34	9.5	13	6.7

STREAMS TRIBUTARY TO LAKE ERIE

04175600 RIVER RAISIN NEAR MANCHESTER, MI

LOCATION.--Lat 42°10'05", long 84°04'34", in NE1/4 SE1/4 sec.33, T.3 S., R.3 E., Washtenaw County, Hydrologic Unit 04100002, on left bank at downstream side of bridge on Sharon Valley Road, 2.5 mi northwest of Manchester.

DRAINAGE AREA.--132 mi².

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.--Records good except for estimated daily discharges, which are fair. Occasional regulation caused by many dams upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	66	74	114	125	95	112	120	103	146	36	56
2	63	95	71	110	121	90	107	114	98	121	54	49
3	47	80	69	93	114	e87	104	110	94	102	169	45
4	39	70	66	90	112	e84	105	105	91	89	195	42
5	37	70	84	e88	e100	81	96	111	83	82	143	39
6	35	111	103	e86	e95	88	95	111	77	75	125	36
7	34	113	118	e83	e90	138	92	102	72	66	107	34
8	34	96	128	e81	e85	228	120	93	66	55	98	36
9	57	98	127	e80	e82	208	160	91	62	49	101	37
10	58	118	133	e79	e77	181	205	100	59	79	95	34
11	42	107	126	e79	e75	183	202	133	60	67	88	30
12	35	95	112	86	e73	210	210	119	57	53	81	28
13	37	89	103	131	e72	221	218	112	53	44	78	28
14	37	85	96	148	e70	220	195	111	48	42	76	29
15	38	80	91	162	e68	213	177	106	46	40	79	26
16	36	74	93	151	e67	204	163	95	43	37	163	24
17	33	70	162	135	e66	192	152	92	43	39	200	25
18	35	70	184	126	e68	178	151	87	37	37	220	24
19	45	67	165	125	72	170	167	84	37	31	197	22
20	54	65	148	176	79	169	155	78	35	28	172	24
21	49	65	135	236	81	185	164	72	31	32	151	27
22	46	70	125	228	78	172	171	65	27	32	131	36
23	45	59	120	214	80	158	156	60	25	32	116	34
24	44	51	117	208	86	147	145	97	24	32	103	31
25	42	53	120	195	81	137	139	143	26	33	92	27
26	40	51	e115	e175	81	129	136	154	31	38	83	28
27	38	51	110	e160	86	122	148	138	84	39	76	27
28	36	101	108	e150	95	127	149	126	240	40	72	26
29	38	108	101	e140	---	129	135	141	204	41	68	24
30	39	85	94	e135	---	126	124	129	165	38	64	25
31	37	---	96	e130	---	118	---	114	---	34	61	---
TOTAL	1314	2413	3494	4194	2379	4790	4453	3313	2121	1673	3494	953
MEAN	42.4	80.4	113	135	85.0	155	148	107	70.7	54.0	113	31.8
MAX	64	118	184	236	125	228	218	154	240	146	220	56
MIN	33	51	66	79	66	81	92	60	24	28	36	22
CFSM	.32	.61	.85	1.02	.64	1.17	1.12	.81	.54	.41	.85	.24
IN.	.37	.68	.98	1.18	.67	1.35	1.25	.93	.60	.47	.98	.27

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 1995, BY WATER YEAR (WY)

	MEAN	67.5	94.4	112	112	122	202	191	119	88.4	55.6	49.8	56.8
MAX	169	212	160	280	241	356	275	275	191	249	114	116	142
(WY)	1987	1993	1991	1993	1976	1976	1978	1974	1989	1981	1981	1981	1981
MIN	24.8	25.1	30.7	27.6	45.0	123	116	52.7	13.9	10.4	12.4	15.1	15.1
(WY)	1980	1972	1977	1977	1972	1987	1987	1971	1988	1988	1971	1971	1971

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1970 - 1995

ANNUAL TOTAL	35671		34591									
ANNUAL MEAN	97.7		94.8									
HIGHEST ANNUAL MEAN												1993
LOWEST ANNUAL MEAN												1977
HIGHEST DAILY MEAN	316			Mar 22	240		Jun 28	690				Feb 24 1985
LOWEST DAILY MEAN	21			Sep 21	22		Sep 19	5.7				Jul 9 1988
ANNUAL SEVEN-DAY MINIMUM	22			Sep 19	25		Sep 15	6.1				Jul 3 1988
INSTANTANEOUS PEAK FLOW					252		Jun 28	869				Feb 24 1985
INSTANTANEOUS PEAK STAGE					4.40		Jun 28	7.21				Feb 24 1985
INSTANTANEOUS LOW FLOW					18		(a)	4.5				Nov 29 1971
ANNUAL RUNOFF (CFSM)	.74				.72			.81				
ANNUAL RUNOFF (INCHES)	10.05				9.75			10.94				
10 PERCENT EXCEEDS	176				169			212				
50 PERCENT EXCEEDS	84				87			86				
90 PERCENT EXCEEDS	35				34			26				

(a) Oct. 11, Sept. 30.

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04175957 SOUTH BRANCH RIVER RAISIN AT ADRIAN, MI

LOCATION.--Lat 41°54'30", long 84°01'42", in SE1/4 NE1/4 sec.35, T.6 S., R.3 E., Lenawee County, Hydrologic Unit 04100002, on right bank 600 ft downstream from bridge on State Highway 52 in Adrian, and 1,000 ft downstream from Wolf Creek.

DRAINAGE AREA.--164 mi².

PERIOD OF RECORD.--October 1991 to September 1995 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 720.00 ft above sea level (City of Adrian bench mark).

REMARKS.--Records good except for estimated daily discharges, which are poor. Some regulation by reservoir upstream from station. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	39	35	49	119	57	77	90	110	406	71	42
2	21	32	33	46	111	43	71	84	94	244	75	38
3	62	36	33	34	107	41	68	71	82	182	354	35
4	47	34	32	e31	104	47	64	71	72	151	786	33
5	13	41	44	e30	75	61	61	77	61	108	709	30
6	12	52	54	e29	e66	74	61	78	55	87	350	28
7	12	45	97	e28	e62	229	59	74	48	78	217	30
8	12	41	119	e27	e58	528	73	66	44	65	180	41
9	22	50	112	e27	e52	497	188	68	40	68	203	30
10	14	49	114	e27	e50	265	504	89	38	122	156	26
11	15	50	110	e29	e46	207	594	116	37	90	123	24
12	17	43	88	42	e43	194	463	173	32	61	96	22
13	17	38	74	63	e42	198	443	131	28	46	97	21
14	15	34	66	109	e40	197	320	108	28	36	116	20
15	17	33	61	163	e39	186	229	99	26	95	97	19
16	17	31	74	173	e38	170	177	53	22	203	203	19
17	18	29	197	109	39	141	154	48	21	187	1010	21
18	19	28	334	84	41	134	167	46	20	110	1290	21
19	30	26	247	85	46	125	224	53	19	77	1060	20
20	17	26	150	292	74	121	196	52	15	63	561	24
21	15	26	109	625	82	125	197	46	13	45	301	25
22	17	24	88	694	68	135	247	41	12	25	216	30
23	19	23	75	393	62	119	191	42	16	32	170	23
24	16	23	66	268	63	105	152	169	16	31	138	23
25	16	23	61	218	59	93	133	397	16	32	114	51
26	16	22	56	193	52	84	120	419	43	108	98	41
27	16	39	50	140	55	81	115	227	160	99	84	17
28	16	41	45	158	57	84	113	245	700	61	65	16
29	18	42	43	119	---	87	104	293	1070	42	54	16
30	17	39	44	117	---	88	96	193	757	30	50	16
31	21	---	45	132	---	83	---	125	---	24	46	---
TOTAL	607	1059	2756	4534	1750	4599	5661	3844	3695	3008	9090	802
MEAN	19.6	35.3	88.9	146	62.5	148	189	124	123	97.0	293	26.7
MAX	62	52	334	694	119	528	594	419	1070	406	1290	51
MIN	12	22	32	27	38	41	59	41	12	24	46	16
CFSM	.12	.22	.54	.89	.38	.90	1.15	.76	.75	.59	1.79	.16
IN.	.14	.24	.63	1.03	.40	1.04	1.28	.87	.84	.68	2.06	.18

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1995, BY WATER YEAR (WY)

	MEAN	64.6	140	104	198	128	260	239	108	96.6	83.4	99.8	51.5
MAX	120	376	152	502	213	493	355	161	125	127	293	117	
(WY)	1993	1993	1993	1993	1994	1993	1993	1993	1993	1992	1995	1992	
MIN	19.6	35.3	66.4	67.3	62.5	148	189	63.5	57.0	31.5	19.9	19.9	
(WY)	1995	1995	1992	1992	1995	1995	1995	1992	1992	1994	1993	1994	

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1992 - 1995

ANNUAL TOTAL	33542						41405					
ANNUAL MEAN	91.9						113			131		
HIGHEST ANNUAL MEAN										210		1993
LOWEST ANNUAL MEAN										96.8		1992
HIGHEST DAILY MEAN	1050				Feb 21		1290		Aug 18	2540		Jan 5 1993
LOWEST DAILY MEAN	12				Sep 10		12		Oct 6	11		Oct 1 1991
ANNUAL SEVEN-DAY MINIMUM	13				Sep 8		14		Oct 5	13		Sep 8 1994
INSTANTANEOUS PEAK FLOW							1370		Aug 18	2870		Jan 5 1993
INSTANTANEOUS PEAK STAGE							7.90		Aug 18	10.45		Jan 5 1993
INSTANTANEOUS LOW FLOW							10		(a)	9.4		Oct 2 1991
ANNUAL RUNOFF (CFSM)	.56						.69			.80		
ANNUAL RUNOFF (INCHES)	7.61						9.39			10.87		
10 PERCENT EXCEEDS	210						228			292		
50 PERCENT EXCEEDS	44						61			73		
90 PERCENT EXCEEDS	16						19			21		

(a) June 21, 23.

(e) Estimated.

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 mi².

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. National Weather Service gage-height telemeter at station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	142	168	236	322	418	290	338	357	348	e940	119	176
2	154	180	212	e300	401	275	323	341	314	560	181	166
3	187	215	198	e270	380	260	300	320	305	411	458	156
4	207	215	190	e250	363	262	301	294	291	339	e1050	146
5	132	226	217	e240	334	286	295	313	266	288	e1250	139
6	116	279	246	e220	e310	317	293	293	249	239	847	130
7	105	280	370	e215	e290	517	282	304	233	211	499	125
8	98	279	439	e210	e270	1100	298	292	218	197	401	161
9	126	286	415	e210	e250	1400	436	286	205	170	422	139
10	125	298	417	e210	e240	e975	896	298	197	284	379	128
11	133	297	422	e220	e230	682	e1300	356	194	228	330	119
12	135	276	374	e300	e220	638	e1500	414	184	204	293	108
13	119	250	328	364	e215	662	e1250	380	165	172	281	101
14	106	232	295	472	e210	672	996	339	166	146	397	96
15	103	219	272	601	e205	651	714	328	136	163	308	88
16	101	207	267	654	e200	615	591	278	143	427	337	85
17	101	197	573	535	e200	563	508	262	138	276	797	84
18	97	188	899	449	e220	511	504	252	131	216	e1350	82
19	143	179	940	422	257	479	600	248	126	166	e1550	78
20	196	174	714	656	296	454	584	242	115	143	e1200	90
21	133	171	550	1230	312	445	566	230	103	129	e740	90
22	131	164	469	1660	295	478	644	218	95	92	e510	124
23	127	164	420	1350	281	456	590	207	84	96	e400	107
24	120	163	390	890	285	421	502	354	90	94	353	107
25	116	156	371	706	282	391	450	662	83	95	312	139
26	114	148	354	628	273	367	418	768	108	196	278	126
27	110	167	342	527	272	352	415	581	236	206	255	90
28	109	224	331	503	285	357	411	566	697	178	231	85
29	105	225	317	476	---	358	398	603	e1100	137	211	82
30	101	251	307	434	---	362	366	517	e1250	109	201	80
31	104	---	302	424	---	352	---	388	---	91	189	---
TOTAL	3896	6478	12177	15948	7794	15948	17069	11291	7970	7203	16129	3427
MEAN	126	216	393	514	278	514	569	364	266	232	520	114
MAX	207	298	940	1660	418	1400	1500	768	1250	940	1550	176
MIN	97	148	190	210	200	260	282	207	83	91	119	78
CFSM	.27	.47	.85	1.11	.60	1.11	1.23	.79	.57	.50	1.12	.25
IN.	.31	.52	.98	1.28	.63	1.28	1.37	.91	.64	.58	1.30	.28

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 1995, BY WATER YEAR (WY)

	MEAN	182	275	362	378	464	718	620	369	267	179	136	135
MAX	576	941	871	1271	1176	1517	1115	939	1025	609	520	420	
(WY)	1991	1993	1988	1993	1976	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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1954 - 1995

ANNUAL TOTAL	119142	125330	340
ANNUAL MEAN	326	343	605
HIGHEST ANNUAL MEAN			1993
LOWEST ANNUAL MEAN			1964
HIGHEST DAILY MEAN	2100	Feb 21	5350
LOWEST DAILY MEAN	72	Sep 23	25
ANNUAL SEVEN-DAY MINIMUM	74	Sep 18	27
INSTANTANEOUS PEAK FLOW			6660
INSTANTANEOUS PEAK STAGE			15.77
INSTANTANEOUS LOW FLOW			18
ANNUAL RUNOFF (CFSM)	.71		.73
ANNUAL RUNOFF (INCHES)	9.57		9.98
10 PERCENT EXCEEDS	625	652	721
50 PERCENT EXCEEDS	226	279	218
90 PERCENT EXCEEDS	106	108	76

(e) Estimated.

STREAMS TRIBUTARY TO LAKE ERIE

04176500 RIVER RAISIN NEAR MONROE, MI
(National stream quality accounting network station)

LOCATION.--Lat 41°57'38", long 83°31'52", Monroe County, Hydrologic Unit 04100002, on left bank 0.8 mi downstream from bridge on Ida Maybee Road, 5.0 mi downstream from Saline River, and 7.5 mi west of Monroe.

DRAINAGE AREA.--1,042 mi².

WATER-DISCHARGE RECORDS

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.--Water-discharge records good except for estimated daily discharges, which are poor. Diurnal fluctuation caused by powerplants upstream from station prior to June 27, 1968. At times, flow is affected by irrigation pumpage.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	179	160	362	483	895	531	549	614	846	1740	223	273
2	186	178	358	523	831	557	527	583	675	1670	300	255
3	181	208	347	e490	731	547	502	559	582	1360	591	242
4	170	229	315	e420	734	521	485	522	532	903	1070	225
5	189	244	306	e410	584	484	443	493	496	678	1560	217
6	222	295	321	e400	e530	561	442	472	453	553	1970	209
7	186	360	423	e400	e500	956	435	473	411	460	1920	203
8	149	392	613	e390	e480	2560	446	460	368	385	1590	212
9	137	398	710	e390	e460	2280	621	471	336	341	1040	205
10	135	458	832	e400	e440	2420	1830	508	316	315	854	213
11	144	477	807	e430	e420	2280	2070	1100	298	326	789	209
12	154	440	740	450	e400	1940	2710	837	288	372	619	200
13	152	411	678	524	e390	1740	2830	736	277	326	510	184
14	155	385	602	698	e380	1640	2580	695	255	299	547	182
15	147	355	537	1200	e370	1540	2200	602	235	283	720	168
16	137	327	517	1320	e375	1390	1740	534	226	353	625	164
17	131	314	1560	1200	e400	1250	1310	501	210	558	594	160
18	130	299	1990	1040	389	1110	1080	454	187	877	989	151
19	146	283	1750	917	400	980	1080	415	182	665	1630	147
20	148	272	1650	1630	465	909	1110	384	172	390	2020	155
21	150	270	1380	2970	540	867	1170	359	156	294	2170	153
22	193	256	1080	2800	613	813	1320	341	144	261	1990	163
23	183	248	881	2740	580	776	1320	329	127	232	1350	161
24	159	240	767	2620	585	754	1250	439	120	216	824	168
25	156	234	685	2290	535	688	1050	1080	115	225	615	169
26	153	232	623	1780	505	631	888	1320	129	289	512	162
27	147	245	582	1370	506	595	804	1380	252	358	443	165
28	144	341	550	1170	494	580	750	1380	784	386	388	182
29	143	398	517	969	---	580	710	1500	1220	346	360	169
30	140	386	483	911	---	586	662	1170	1660	286	326	145
31	142	---	475	892	---	570	---	1070	---	241	297	---
TOTAL	4888	9335	23441	34227	14532	33636	34914	21781	12052	15988	29436	5611
MEAN	158	311	756	1104	519	1085	1164	703	402	516	950	187
MAX	222	477	1990	2970	895	2560	2830	1500	1660	1740	2170	273
MIN	130	160	306	390	370	484	435	329	115	216	223	145
CFSM	.15	.30	.73	1.06	.50	1.04	1.12	.67	.39	.49	.91	.18
IN.	.17	.33	.84	1.22	.52	1.20	1.25	.78	.43	.57	1.05	.20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1995, BY WATER YEAR (WY)

	MEAN	301	493	743	806	1066	1681	1474	916	607	356	227	244
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 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1937 - 1995

ANNUAL TOTAL	219842												
ANNUAL MEAN	602												
HIGHEST ANNUAL MEAN													
LOWEST ANNUAL MEAN													
HIGHEST DAILY MEAN													
LOWEST DAILY MEAN	3340					Apr 16	2970		Jan 21	14600		Mar 16 1982	
ANNUAL SEVEN-DAY MINIMUM	89					Sep 24	115		Jun 25	9.0		Sep 30 1941	
INSTANTANEOUS PEAK FLOW	95					Sep 18	138		Jun 20	18		Sep 26 1941	
INSTANTANEOUS PEAK STAGE							3110		Jan 21	(a)15300		Mar 16 1982	
INSTANTANEOUS LOW FLOW							5.92		Jan 21	(b)11.16		Mar 15 1982	
ANNUAL RUNOFF (CFSM)							112		Jun 25	(c)2.0		(d)	
ANNUAL RUNOFF (INCHES)	.58						.63			.71			
10 PERCENT EXCEEDS	7.85						8.56			9.66			
50 PERCENT EXCEEDS	1470						1550			1830			
90 PERCENT EXCEEDS	351						472			358			
	138						162			104			

(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

04176500 RIVER RAISIN NEAR MONROE, MI--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1966-75, 1978 to August 1995 (discontinued).

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April 1978 to July 1981.

WATER TEMPERATURE: March 1966 to September 1972, April 1978 to July 1981.

SUSPENDED-SEDIMENT DISCHARGE: March 1966 to September 1972.

INSTRUMENTATION.--Water-quality monitor from Mar. 23 to July 13, 1981.

REMARKS.--Cross-sectional samples were collected at gaging station, or 0.8 mi upstream at bridge on Ida Maybee Road.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (water years 1979-81): Maximum daily, 1,020 microsiemens, Feb. 16, 1979; minimum daily recorded (more than 20 percent missing record), 263 microsiemens, Jan. 25, 1981.

WATER TEMPERATURE (water years 1967, 1970-72, 1979-80): Maximum daily recorded (more than 20 percent missing record), 32.0°C, July 18, 1972; minimum daily, 0.0°C on many days during winter.

SEDIMENT CONCENTRATION (water years 1967-72): Maximum daily mean, 1,430 mg/L, Dec. 22, 1967; minimum daily mean, 1 mg/L on several days in 1970.

SEDIMENT LOAD: Maximum daily, 28,000 tons, Dec. 22, 1967; minimum daily, 0.29 ton, Aug. 31, 1971.

EXTREMES OUTSIDE PERIOD OF DAILY RECORD.--A specific conductance of 200 microsiemens was measured Feb. 25, 1985.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)
DEC 28...	1140	548	731	8.3	2.0	3.8	13.8	102	120	120
APR 11...	1500	2110	570	8.1	5.0	74	12.2	98	K350	K1100
JUN 06...	1440	445	686	8.2	21.0	23	8.1	94	76	330
AUG 23...	1350	1280	476	7.9	23.5	28	7.3	88	160	440

DATE	HARD-NESS TOTAL (MG/L AS CaCO3) (00900)	HARD-NESS NONCARB DISSOLV FLD. AS CaCO3 (MG/L) (00904)	CALCIUM DIS-SOLVED (MG/L AS Ca) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CaCO3 (39086)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
DEC 28...	330	120	96	22	18	9.8	261	214	86	41
APR 11...	280	120	82	17	12	2.7	193	158	49	37
JUN 06...	330	100	96	22	18	13	278	228	82	38
AUG 23...	220	46	65	14	9.0	11	213	175	44	20

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)
DEC 28...	0.20	7.2	404	0.55	598	<0.010	3.70	0.050	0.50
APR 11...	0.10	5.7	346	0.47	1970	0.030	9.60	0.090	0.90
JUN 06...	0.20	7.6	442	0.60	531	0.050	3.80	0.040	0.60
AUG 23...	0.20	11	310	0.42	1070	0.030	1.40	0.060	0.90

STREAMS TRIBUTARY TO LAKE ERIE

04176500 RIVER RAISIN NEAR MONROE, MI--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01066)
DEC 28...	0.050	0.020	0.030	20	56	<3	32	6	15
APR 11...	0.070	0.020	0.030	<10	39	<3	41	<4	10
JUN 06...	0.070	0.040	0.030	20	70	<3	15	6	19
AUG 23...	0.110	0.090	0.090	30	49	<3	73	6	11

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDEDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
DEC 28...	10	1	<1	<1.0	510	<6	9	13	90
APR 11...	<10	1	1	<1.0	280	<6	136	775	99
JUN 06...	<10	2	<1	<1.0	580	<6	44	53	100
AUG 23...	<10	2	<2	<1.0	300	<6	67	232	96

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 150 ft upstream from bridge on State Highway 125 in La Salle, 2.3 mi downstream from South Branch, and 4.6 mi southwest of Monroe.

DRAINAGE AREA.--51.0 mi².

PERIOD OF RECORD.--October 1987 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 580 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges and discharges below 1.0 ft³/s, which are poor. Several measurements of water temperature were made during the year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.77	.75	4.4	23	31	e35	18	25	19	20	.33	1.5
2	.82	1.5	4.1	e20	30	e31	17	23	18	13	.93	1.2
3	.74	1.7	3.8	e16	28	e29	16	20	39	9.0	1.6	1.0
4	.76	1.4	3.5	e13	e25	e27	16	18	35	7.0	11	.86
5	.51	1.3	3.8	e10	e22	e27	13	18	23	5.8	8.8	.78
6	.38	2.1	4.5	e9.0	e19	40	15	18	18	4.8	4.6	.70
7	.34	2.7	15	e8.0	e16	182	16	17	16	4.1	3.1	.67
8	.24	2.2	35	e7.0	e14	420	20	15	13	3.3	95	3.2
9	.29	2.5	24	e7.0	e13	186	154	16	11	2.7	36	6.1
10	.27	3.8	34	e9.0	e12	115	285	29	9.7	2.8	16	4.0
11	.24	4.0	29	e11	e11	102	165	66	9.5	2.5	8.5	2.5
12	.23	3.3	23	22	e10	103	226	50	8.8	2.1	5.2	1.9
13	.20	3.0	19	37	e9.0	91	164	36	7.6	1.8	4.1	1.5
14	.20	2.7	17	36	e8.5	75	99	30	6.5	2.2	5.5	1.2
15	.20	3.4	17	107	e8.0	61	70	25	5.7	2.0	4.4	.96
16	.14	5.8	28	80	e7.5	52	56	23	4.9	3.4	3.6	.61
17	.13	6.5	229	52	e7.0	44	45	22	4.4	5.7	23	.47
18	.13	6.3	122	43	e10	37	61	21	4.0	3.3	213	.44
19	.18	5.1	69	40	e35	34	92	20	3.5	2.2	73	.54
20	.21	3.8	48	249	e45	33	60	18	3.3	1.8	30	.92
21	.25	2.8	38	383	e37	31	129	16	2.8	1.6	16	.99
22	.33	1.9	32	207	e32	27	139	14	2.4	1.5	9.9	1.8
23	.35	1.2	28	127	e28	24	77	13	2.1	1.7	6.9	1.9
24	.33	1.1	25	99	e25	21	59	77	1.9	1.4	5.2	1.7
25	.26	1.2	22	81	e21	19	48	142	2.0	1.2	4.2	1.3
26	.25	1.1	20	69	e19	18	40	78	2.2	1.1	3.4	1.1
27	.26	1.4	19	59	e22	18	45	48	10	1.0	3.0	.73
28	.28	5.8	18	47	e24	20	39	39	17	.95	2.7	.51
29	.30	8.0	16	41	---	23	33	41	48	.81	2.5	.33
30	.30	5.8	13	e38	---	22	28	30	35	.56	2.1	.14
31	.32	---	15	e35	---	20	---	24	---	.36	1.9	---
TOTAL	10.21	94.15	979.1	1985.0	569.0	1967	2245	1032	383.3	111.68	605.46	41.55
MEAN	.33	3.14	31.6	64.0	20.3	63.5	74.8	33.3	12.8	3.60	19.5	1.38
MAX	.82	8.0	229	383	45	420	285	142	48	20	213	6.1
MIN	.13	.75	3.5	7.0	7.0	18	13	13	1.9	.36	.33	.14
CFSM	.01	.06	.62	1.26	.40	1.24	1.47	.65	.25	.07	.38	.03
IN.	.01	.07	.71	1.45	.42	1.43	1.64	.75	.28	.08	.44	.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1995, BY WATER YEAR (WY)

	1988	1989	1990	1991	1992	1993	1994	1995	1988	1989	1990	1991	1992	1993	1994	1995
MEAN	16.8	41.8	61.1	66.3	61.0	88.8	92.0	51.2	39.4	13.0	6.89	8.67				
MAX	53.3	144	168	181	186	199	152	130	141	55.1	19.5	46.2				
(WY) 1993	1993	1993	1991	1993	1990	1993	1993	1991	1989	1989	1995	1992				
MIN	.33	3.14	5.69	17.6	16.6	24.7	49.6	9.47	.58	.17	.15	.14				
(WY) 1995	1995	1995	1990	1994	1989	1989	1988	1988	1988	1988	1988	1991				

SUMMARY STATISTICS

FOR 1994 CALENDAR YEAR

FOR 1995 WATER YEAR

WATER YEARS 1988 - 1995

ANNUAL TOTAL	10836.01	10023.45	
ANNUAL MEAN	29.7	27.5	45.5
HIGHEST ANNUAL MEAN			74.9
LOWEST ANNUAL MEAN			27.5
HIGHEST DAILY MEAN	473	420	1480
LOWEST DAILY MEAN	.00	.13	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.17	.00
INSTANTANEOUS PEAK FLOW		575	(c)2050
INSTANTANEOUS PEAK STAGE		8.42	10.73
ANNUAL RUNOFF (CFSM)	.58	.54	.89
ANNUAL RUNOFF (INCHES)	7.90	7.31	12.11
10 PERCENT EXCEEDS	80	69	108
50 PERCENT EXCEEDS	6.8	11	19
90 PERCENT EXCEEDS	.31	.59	.80

(a) Oct. 17, 18.

(b) On several days in water years 1988, 1991, 1992, 1994.

(c) From rating curve extended above 700 ft³/s.

(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 low-flow partial-record sites and at miscellaneous sites and for special studies are given in separate tables.

Crest-stage partial-record stations

The following table contains annual maximum discharges for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

Maximum discharge at crest-stage partial-record stations

Station name and number	Location and drainage area	Period of record	Date	Water year 1995 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE SUPERIOR								
Two Hearted River near Paradise, MI (04044813)	Lat 46°41'15", long 85°26'26", in SE1/4 NW1/4 sec.33, T.50 N., R.9 W., Luce County, Hydrologic Unit 04020201, on right bank 300 ft down- stream from end of Trail Road, 3.2 mi upstream from mouth, and 20 mi northwest of Paradise. Drainage area is 200 mi ² .	1973-95	04-28-95	9.33	917	04-25-85	a8.42	3,210
West Branch Waika River near Brimley, MI (04045538)	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 .	1973-95	04-28-95	6.77	361	04-18-74	b9.19	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 mi northwest of Perron- ville, and 11.5 mi upstream from Ford River. Drainage area is 38.4 mi ² .	1971-77†, 1978-95	04-19-95	c	<185	04-24-75	d5.42	810

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations--Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 1995 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued								
Portage River near Vicksburg, MI (04097170)	Lat 42°06'53", long 85°29'08", in SW1/4 sec.16, T.4 S., R.10 W., Kalamazoo County, Hydrologic Unit 04050001, at W Avenue, 2.4 mi east of Vicksburg. Datum of gage is 839.94 ft above sea level. Drainage area is 68.2 mi ² .	1946-51†, 1965-80†, 1980-95	08-19-95	4.75	135	06-02-89	15.81	416
Rabbit River at Hamilton, MI (04108645)	Lat 42°40'31", long 86°00'13", in NE1/4 sec.6, T.3 N., R.14 W., Allegan County, Hydro- logic Unit 04050003, at State Highway 40 in Hamil- ton. Drainage area is 274 mi ² .	1979-95	11-07-94	14.88	1,880	06-01-89	18.2	5,260
Sycamore Creek near Mason, MI (04112700)	Lat 42°36'40", long 84°27'58", in NE1/4 sec.31, T.3 N., R.1 W., Ingham County, Hydrologic Unit 04050004, at Harper Road, 0.7 mi downstream from Aurelius and Vevay Drain, and 2.6 mi northwest of Mason. Drain- age area is 39.5 mi ² .	1975-95	03-11-95	9.44	286	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†, 1993-95	11-07-94	h	1,500	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, Hy- drologic Unit 04050007, on right bank 200 ft down- stream from LaBarge power- plant, 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	11-07-94	7.31	2,850	02-27-85	11.43	6,700

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations--Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 1995 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued								
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 .	1974-95	11-06-94	7.61	572	03-04-79	--	e1,700
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 .	1974-95	11-06-94	8.02	685	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 .	1975-95	01-15-95	3.04	228	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 .	1975-95	04-27-95	3.52	596	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†, 1983-95	03-14-95	2.64	591	05-20-59	6.76	2,760
North Branch Flint River near Columbiaville, MI (04146450)	Lat 43°11'18", long 83°22'03", in NW1/4 sec. 24, T.9 N., R.9 E., Lapeer County, Hydro- logic Unit 04080204, at Barnes Lake Road, 2.9 mi northeast of Columbiaville. Drainage area is 223 mi ² .	1987-95	03-14-95	13.55	998	07-08-94	16.36	1,720

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations--Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 1995 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE HURON--Continued								
Swartz Creek at Flint, MI (04148300)	Lat 42°59'16", long 83°43'57", in NW1/4 sec. 26, T.7 N., R.6 E., Genesee County, Hydro- logic Unit 04080204, at South Ballenger Highway in Flint, 3.6 mi upstream from mouth. Datum of gage is 727.05 ft above sea level. Drainage area is 115 mi ² .	1970-84†, 1991-95	08-17-95	6.82	892	04-19-75	9.02	3,160
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, 6.0 mi upstream from mouth, and 4.0 mi southeast of Flint. Datum of gage is 764.36 ft above sea level. Drainage area is 54.4 mi ² .	1970-84†, 1991-95	03-12-95	5.07	254	04-19-75	g7.65	1,260
STREAMS TRIBUTARY TO ST. CLAIR RIVER								
Pine River near Rattle Run, MI (04160350)	Lat 42°52'49", long 82°34'04", in NE1/4 sec.9, T.5 N., R.16 E., St. Clair County, Hydro- logic Unit 04090001, at Gratiot Road, 1.9 mi north- east of Rattle Run. Drainage area is 135 mi ² .	1974-95	03-12-95	14.74	1,070	04-19-75	23.87	5,400
STREAMS TRIBUTARY TO LAKE ST. CLAIR								
West Branch Stony Creek near Washington, MI (04161760)	Lat 42°43'53", long 83°06'02", in SE1/4 sec.25, T.4 N., R.11 E., Oakland County, Hydro- logic Unit 04090003, at Huron-Clinton Metropoli- tan Park Road, 3.4 mi west of Washington. Drainage area is 22.5 mi ² .	1965-95	03-14-95	i	e45	04-19-75	j4.42	470
North Branch Clinton River at Almont, MI (04164010)	Lat 42°54'59", long 83°02'42", in NE1/4 sec.28, T.6 N., R.12 E., Lapeer County, Hydro- logic Unit 04090003, at State Highway 53 in Al- mont. Drainage area is 9.56 mi ² .	1959-62, 1963-68†, 1969-95	03-08-95	3.48	136	09-06-85	k8.60	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. Drain- age area is 49.7 mi ² .	1959-64, 1965-69†, 1970-95	06-29-95	3.70	694	04-19-75	m5.44	3,500

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations--Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 1995 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE ST. CLAIR--Continued								
North Branch Clinton River near Meade, MI (04164150)	Lat 42°43'50", long 82°54'23", in NE1/4 sec.34, T.4 N., R.13 E., Macomb County, Hydro- logic Unit 04090003, at 27 Mile Road, 1.9 mi northwest of Meade. Drainage area is 89.6 mi ² .	1959-67, 1968-72‡, 1973-95	06-29-95	6.39	674	04-19-75	n7.76	4,500
Coon Creek near Armada, MI (04164200)	Lat 42°47'41", long 82°52'58", in SW1/4 sec.1, T.4 N., R.13 E., Macomb County, Hydro- logic Unit 04090003, at North Road, 3.4 mi south of Armada. Drainage area is 10.0 mi ² .	1959-65, 1966-70‡, 1971-95	03-08-95	o5.21	e115	04-19-75	p6.25	480
Highbank Creek near Armada, MI (04164350)	Lat 42°28'24", long 82°51'08", in NW1/4 sec.6, T.4 N., R.14 E., Macomb County, Hydro- logic Unit 04090003, at 32 Mile Road, 3.0 mi southeast of Armada. Drainage area is 14.9 mi ² .	1959-65, 1965-70‡, 1971-95	03-08-95	o15.48	e300	09-06-85	16.77	2,240
East Branch Coon Creek near New Haven, MI (04164360)	Lat 42°45'46", long 82°50'57", in NW1/4 sec.19, 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‡, 1973-95	03-08-95	q6.76	447	04-19-75	r8.95	2,700
Deer Creek near Meade, MI (04164400)	Lat 42°42'39", long 82°51'32", in NW1/4 sec.6, T.3 N., R.14 E., Macomb County, Hydro- logic Unit 04090003, at 25 1/2 Mile Road, 0.9 mi southeast of Meade. Drain- age area is 12.7 mi ² .	1959-60, 1960-65‡, 1966-95	03-08-95	o6.67	e275	09-06-85	8.90	691
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‡, 1965-95	03-08-95	5.05	58	02-10-65	s8.82	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, Hydro- logic Unit 04090003, at Schoenherr Road, 2.0 mi west of Macomb. Drainage area is 22.2 mi ² .	1959-64, 1965-69‡, 1971-95	06-28-95	10.17	517	06-26-68	t12.17	1,400

See footnotes at end of table.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Maximum discharge at crest-stage partial-record stations--Continued

Station name and number	Location and drainage area	Period of record	Date	Water year 1995 maximum		Period of record maximum		
				Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO DETROIT RIVER								
Frank and Poet Drain at Trenton, MI (04168660)	Lat 42°09'19", long 83°12'22", in NW1/4 sec.13, T.4 S., R.10 E., Wayne County, Hydro- logic Unit 04090004, at King Road in Trenton. Drainage area is 19.3 mi ² .	1972-95	03-08-95	7.54	200	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, at Maple Road, 2.8 mi south of Saline. Drainage area is 94.6 mi ² .	1966-77‡, 1978-95	03-08-95	10.11	794	06-26-68	13.37	3,990

‡ Operated as a continuous-record gaging station.

a Maximum gage height, 12.36 ft, Apr. 9, 1991, site and datum then in use.

b Maximum gage height, 9.84 ft, Apr. 6, 1988.

c Maximum gage height, 4.76 ft, Mar. 16, backwater from ice.

d Maximum gage height, 8.94 ft, Mar. 30, 1977, backwater from ice.

e Estimated.

f Maximum gage height, 5.86 ft, Dec. 31, 1988, backwater from ice.

g From floodmark.

h Maximum gage height, 6.48 ft, Jan. 6, backwater from ice.

i Maximum gage height, 3.21 ft, Mar. 8, backwater from ice.

j Maximum gage height, 5.93 ft, Jan. 27, 1974, backwater from ice.

k Maximum gage height, 8.62 ft, Apr. 19, 1975.

m Maximum gage height, 7.1 ft, Mar. 12 or 13, 1962, backwater from ice, site and datum then in use.

n Maximum gage height, 7.85 ft, Mar. 12, 1962, backwater from ice.

o Backwater from ice.

p Maximum gage height, 6.95 ft, Sept. 6, 1985.

q Maximum gage height, 6.77 ft, backwater from ice, date not determined.

r Maximum gage height, 9.48 ft, Sept. 6, 1985.

s Maximum gage height, 9.55 ft, June 26, 1968.

t Maximum gage height, 15.89 ft, Mar. 14, 1972, backwater from ice.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Low-flow partial-record stations

Measurements of streamflow in the area covered by this report made at low-flow partial-record stations are given in the following table. These measurements were made during periods of base flow when streamflow is primarily from ground-water storage. These measurements, when correlated with the simultaneous discharge of a nearby stream where continuous records are available, will give a picture of the low-flow potentiality of a stream. The column headed "Period of record" shows the water years in which measurements were made at the same, or practically the same, site.

Discharge measurements made at low-flow partial-record stations during water year 1995

Station No.	Station name	Location	Drainage area (mi ²)	Period of record	Measurements	
					Date	Discharge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN						
04096517	South Branch Hog Creek Tributary near Allen, MI	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, and 3.0 mi west of Allen.	2.61	1969-95	05-19-95	1.44
					06-23-95	1.27
					08-03-95	a2.51
					09-22-95	1.19
04114594	Maple River near St. Johns, MI	Lat 43°02'43", long 84°28'11", in SW1/4 SE1/4 sec.30, T.8 N., R.1 W., Clinton County, Hydrologic Unit 04050005, at Colony Road, 4.5 mi northeast of St. Johns.	--	1981-95	10-17-94	48.9
					12-12-94	129
					04-27-95	a482
					05-23-95	88.1

a Not base flow.

DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Special study and miscellaneous sites

Discharge measurements in the following table were made at special study and miscellaneous sites throughout the State.

Discharge measurements made at special study and miscellaneous sites during water year 1995

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE SUPERIOR							
04034100	Bond Falls Lower By-Pass	Middle Branch Ontonagon River	Lat 46°24'27", long 89°07'44", in SE1/4 SW1/4 sec.1, T.46 N., R.39 W., Ontonagon County, Hydrologic Unit 04020102, at Bond Falls Road, 2.2 mi west of Calderwood.	--	1942,1945, 1963-64, 1967,1969, 1971-72, 1974, 1979-81, 1983-84, 1987-94	08-03-95	a39.5
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†, 1993-94	06-27-95 07-25-95 08-16-95 09-28-95	a46.9 a50.0 a33.7 a21.0
04044525	Silver Lead Creek	West Branch Chocolay River	Lat 46°19'19", long 87°23'20", in SE1/4 sec.2, T.45 N., R.25 W., Marquette County, Hydrologic Unit 04020201, above K.I. Sawyer Air Force Base, at culvert 0.1 mi downstream from Stump Lake, 3.7 mi northeast of Gwinn.	b1.0	1985-86	10-25-94	*1.30
04044563	Big Creek	Chocolay River	Lat 46°26'04", long 87°19'04", in SE1/4 SW1/4 sec.28, T.47 N. R.24 W., Marquette County, Hydrologic Unit 04020201, at former gaging station, 5.0 mi southeast of Harvey.	17.0	1964-70†, 1979-81†, 1982, 1994	10-24-94	*26.4
04044583	Cherry Creek	Chocolay River	Lat 46°27'57", long 87°21'53", in NE1/4 SE1/4 sec.13, T.47 N., R.25 W., Marquette County, Hydrologic Unit 04020201, at former gaging station, 0.5 mi upstream from County Highway 551, and 2.0 mi south of Harvey.	4.53	1964-65, 1966-70†, 1971-79†, 1979-81†, 1982, 1994	10-24-94	*18.7
STREAMS TRIBUTARY TO LAKE MICHIGAN							
04057529	West Branch Whitefish River	Whitefish River	Lat 46°13'03", long 87°02'58", in SW1/4 SW1/4 sec.10, T.44 N., R.22 W., Alger County, Hydrologic Unit 04030111, at Whitefish Falls, 1.0 mi northwest of Diffin.	--	1992	07-13-95	*10.4

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 1995--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
04057577	Chippeny Creek	Whitefish River	Lat 45°58'42", long 86°55'46", in SW1/4 NW1/4 sec.03, T.41 N., R.21 W., Delta County, Hydrologic Unit 04030111, at county road, 3.5 mi northeast of Rapid River, MI.	15.0	1976	07-13-95	*0.72
04057658	Days River	Little Bay de Noc	Lat 45°55'05", long 87°05'17", in NE1/4 SW1/4 sec.29, T.41 N., R.22 W., Delta County, Hydrologic Unit 04030111, at county road, 1.0 mi southeast of Brampton.	--	--	07-13-95	*0.48
04057950	Black River	Middle Branch Escanaba River	Lat 46°24'09", long 87°50'35", in SW1/4 NW1/4 sec.08, T.46 N., R.28 W., Marquette County, Hydrologic Unit 04030107, 5.5 mi east of Republic.	--	--	07-13-95	*0.50
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†, 1993-94	10-17-94 06-29-95 07-25-95 08-14-95	a3.71 a3.57 a21.2 a3.96
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, 2.0 mi north- west of Wells, and 2.5 mi upstream from mouth.	b920	1981-92†, 1993-94	11-17-94 06-19-95 07-26-95 09-29-95	a421 a247 a512 a343
04059685	Cedar River	Lake Michigan	Lat 45°44'18", long 87°31'40", in NW1/4 NW1/4 sec.33, T.39 N., R.26 W., Menominee County, Hydrologic Unit 04030109, 3.0 mi north of Spalding.	--	--	07-13-95	*4.83
04061050	South Branch Paint River	Paint River	Lat 46°13'33", long 88°52'08", in SE1/4 NE1/4 sec.12, T.44 N., R.37 W., Iron County, Hydrologic Unit 04030106, at U.S. Forest Service Road 149, 2.0 mi east of Elmwood.	--	1992	07-13-95	*17.1
04061200	West Branch Net River	Net River	Lat 46°23'11", long 88°30'15", in NW1/4 sec.13, T.46 N., R.34 W., Iron County, Hydro- logic Unit 04030106, at county road, 1.1 mi east of Park Siding.	56.0	1963, 1970, 1976	07-13-95	*9.40

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 1995--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
04061245	East Branch Net River	Net River	Lat 46°21'57", long 88°28'07", in SW1/4 SW1/4 sec.20, T.46 N., R.33 W., Iron County, Hydrologic Unit 04030106, at U.S. Highway 141, 3.2 mi southeast of Park Siding.	--	--	07-13-95	16.0
04062085	Peshekee River	Lake Michigamme	Lat 46°36'35", long 88°01'20", in SW1/4 SE1/4 sec.26, T.49 N., R.30 W., Marquette County, Hydrologic Unit 04030107, at Huron Bay Peshekee Grade Road, 5.4 mi northwest of Martins Land-ing.	43.9	1992-94	11-01-94	44.4
						11-28-94	48.6
						01-05-95	*16.7
						02-02-95	*17.9
						03-23-95	147
						04-25-95	239
	05-03-95	407					
	05-25-95	121					
04062095	Dishno Creek	Peshekee River	Lat 46°35'32", long 87°59'05", in NW1/4 sec.06, T.48 N., R.29 W., Marquette County, Hydrologic Unit 04030107, at logging road, 1.2 mi upstream from mouth, 5.0 mi north of Champion.	18.8	1963-72, 1976	07-13-95	*0.28
04062190	West Branch Peshekee River	Peshekee River	Lat 46°33'51", long 88°00'20", in NE1/4 NW1/4 sec.13, T.48 N., R.30 W., Marquette County, Hydrologic Unit 04030107, 4.0 mi northwest of Champion.	--	--	07-13-95	*16.9
04062462	Fence River	Michigamme River	Lat 46°18'08", long 88°12'52", in NE1/4 NW1/4 sec.17, T.45 N., R.31 W., Iron County, Hydrologic Unit 04030107, at county road, 16 mi southwest of Michigamme.	--	--	07-13-95	*87.8
04067080	Little Cedar River	Menominee River	Lat 45°33'56", long 87°37'46", in NE1/4 NW1/4 sec.34, T.37 N., R.27 W., Menominee County, Hydrologic Unit 04030109, at county road, 2.9 mi northwest of Bagley.	--	--	07-12-95	*1.14
04105688	Augusta Creek	Kalamazoo River	Lat 42°24'10", long 85°21'16", in NW1/4 NW1/4 sec.10, T.1 S., R.9 W., Kalamazoo County, Hydrologic Unit 04050003, at 43 rd Street (Lepper Road), 2.7 mi north of Augusta.	--	--	07-25-95	*c21.9
04110663	Unnamed Tributary	Perry Creek	Lat 42°27'38", long 84°28'57", in SW1/4 NW1/4 sec.19, T.1 N., R.1 W., Ingham County, Hydrologic Unit 04050004, at Ridley Road, 2.0 mi west of Leslie.	--	1990-94	04-27-95	c3.66
						05-23-95	*c0.72
						06-30-95	c1.59

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 1995--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
04112670	Willow Creek	Sycamore Creek	Lat 42°32'18", long 84°29'26", in SW1/4 SE1/4 sec.24, T.2 N., R.2 W., Ingham County, Hydrologic Unit 04050004, at Toles Road, 3.7 mi southwest of Mason.	--	1990-94	04-27-95	c4.41
						05-23-95	c2.49
						06-30-95	c2.84
04112673	Unnamed Tributary	Willow Creek	Lat 42°32'33", long 84°27'45", in NW1/4 SW1/4 sec.20, T.2 N., R.1 W., Ingham County, Hydrologic Unit 04050004, at Tuttle Road, 0.2 mi south of Lyon Road, and 2.7 mi southwest of Mason.	--	1990-94	05-23-95	*c0.12
04118239	Bear Creek	Grand River	Lat 43°03'09", long 85°26'36", in SE1/4 NW1/4 sec.25, T.8 N., R.10 W., Kent County, Hydrologic Unit 04050006, at private drive (Steinhauer), 1.5 mi east of Cannonsburg.	--	--	03-13-95	c21.2
						03-29-95	c13.9
						04-20-95	c9.41
						04-27-95	c31.6
						05-11-95	c43.8
04118247	Bear Creek	Grand River	Lat 43°03'17", long 85°27'02", in NW1/4 NW1/4 sec.25, T.8 N., R.10 W., Kent County, Hydrologic Unit 04050006, at Giles Avenue, 1.0 mi east of Cannonsburg.	--	1991	10-05-94	*c9.23
						11-17-94	*c16.5
04118250	Bear Creek	Grand River	Lat 43°03'15", long 85°28'01", in NW1/4 NW1/4 sec.26, T.8 N., R.10 W., Kent County, Hydrologic Unit 04050006, at Ramsdell Drive, 0.2 mi northeast of Cannonsburg.	--	1991	10-05-94	*c11.4
						11-17-94	*c18.6
04118255	Bear Creek	Grand River	Lat 43°03'14", long 85°28'57", in NE1/4 NW1/4 sec.27, T.8 N., R.10 W., Kent County, Hydrologic Unit 04050006, at private drive of Meandering Creek Estates, 0.6 mi west of Cannonsburg.	--	--	10-05-94	*c13.6
						11-17-94	*c22.0
						03-13-95	c52.1
						03-29-95	c27.2
						04-27-95	c70.0
05-11-95	c110						
04118256	Unnamed Tributary	Bear Creek	Lat 43°03'08", long 85°29'02", in SE1/4 NW1/4 sec.27, T.8 N., R.10 W., Kent County, Hydrologic Unit 04050006, at private drive of Meandering Creek Estates, 0.6 mi west of Cannonsburg.	--	--	07-19-95	*c0.11
						09-06-95	*c0.12
04118257	Bear Creek	Grand River	Lat 43°03'15", long 85°29'13", in NW1/4 NW1/4 sec.27, T.8 N., R.10 W., Kent County, Hydrologic Unit 04050006, at Dunrobin Road, 0.8 mi west of Cannonsburg.	--	--	10-05-94	*c15.4
						11-17-94	*c24.1

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 1995--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN—Continued							
04118269	Stout Creek	Bear Creek	Lat 43°03'53", long 85°31'39", in SW1/4 NW1/4 sec.20, T.8 N., R.10 W., Kent County, Hydrologic Unit 04050006, 0.5 mi south of 7 Mile Road, 2.8 mi northwest of Cannons- burg.	--	--	09-06-95	*c1.73
04118264	Armstrong Creek	Bear Creek	Lat 43°03'29", long 85°30'46", in SE1/4 SE1/4 sec.20, T.8 N., R.10 W., Kent County, Hydro- logic Unit 04050006, at Can- nonsburg Road, 2.0 mi west of Cannonsburg.	--	--	10-05-94	*c1.84
						11-17-94	*c2.01
						07-19-95	*c1.45
						09-06-95	*c1.22
04118267	Bear Creek	Grand River	Lat 43°03'27", long 85°31'24", in SE1/4 SW1/4 sec.20, T.8 N., R.10 W., Kent County, Hydro- logic Unit 04050006, at Can- nonsburg Road, 2.1 mi west of Cannonsburg.	--	--	10-05-94	*c21.8
						11-17-94	*c29.7
04118270	Bear Creek	Grand River	Lat 43°03'26", long 85°32'02", in NE1/4 NE1/4 sec.30, T.8 N., R.10 W., Kent County, Hydrologic Unit 04050006, at Cannonsburg Road, 3.2 mi west of Cannonsburg.	--	1991	10-05-94	*c25.7
						11-17-94	*c35.2
04118274	Bear Creek	Grand River	Lat 43°03'08", long 85°32'35", in SE1/4 NW1/4 sec.30, T.8 N., R.10 W., Kent County, Hydrologic Unit 04050006, at Dozema private drive, 3.7 mi west of Cannonsburg.	--	--	10-05-94	*c26.6
						11-17-94	*c36.7
						03-13-95	c94.9
						03-29-95	c46.7
						04-27-95	c130
						05-11-95	c167
04119067	Unnamed Tributary	Grand River	Lat 42°54'49", long 85°43'48", in SW1/4 SE1/4 sec.9, T.6 N., R.12 W., Kent County, Hydro- logic Unit 04050006, at 28th Street in Wyoming.	--	1994	11-17-94	*c3.08
04119068	Unnamed Tributary	Grand River	Lat 42°55'03", long 85°44'00", in NW1/4 SE1/4 sec.9, T.6 N., R.12 W., Kent County, Hydro- logic Unit 04050006, at Lee Street in Wyoming.	--	1994	11-17-94	*c3.23
04120500	Higgins Lake Outlet ("The Cut")	Marl Lake	Lat 44°25'59", long 84°40'12", in NW1/4 NW1/4 sec.34, T.24 N., R.3 W., Roscommon County, Hydrologic Unit 04060102, at county road, 5.9 mi southwest of Roscommon.	49.2	1942-50†, 1973, 1993-94	07-26-95	c27.4
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, at Smith Street in Cadillac.	c48	1983-84†, 1986-92†, 1993-94	10-11-94	61.6
						12-02-94	49.1
						02-23-95	33.1
						05-03-95	87.5
						08-01-95	6.80

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 1995--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
04121660	Muskegon River	Muskegon Lake	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, at Rogers Dam, 2.7 mi north-west of Stanwood.	--	--	11-01-94	a1,120
						11-01-94	a1,260
						11-01-94	a1,180
						11-01-94	a1,250
						11-02-94	a589
						11-02-94	a709
						11-02-94	a845
						11-02-94	a979
						11-02-94	a1,040
						11-03-94	a574
						11-03-94	a710
						11-03-94	a843
04124200	Manistee River	Manistee Lake	Lat 44°21'30", long 85°49'15", in SE1/4, NE1/4 sec.25, T.23 N., R.13 W., Manistee County, Hydrologic Unit 04060103, at Hodenpyl Dam, 3.0 mi east of Marilla.	999	1969-70, 1987	10-19-94	a178
						10-19-94	a1,300
						10-19-94	a1,600
						10-19-94	a1,740
						10-20-94	a2,000
						10-20-94	a2,180
10-20-94	a1,770						
04126858	Mebert Creek	Lake Leelanau	Lat 44°55'00", long 85°41'34", in SW1/4, NW1/4 sec.18, T.29 N., R.11 W., Leelanau County, Hydrologic Unit 04060104, at county road 641, 4.4 mi southeast of Suttons Bay.	3.50	--	02-21-92	*c3.70
04126860	Lake Leelanau Narrows	Lake Leelanau	Lat 44°58'53", long 85°42'42", in NW1/4, NW1/4 sec.25, T.30 N., R.12 W., Leelanau County, Hydrologic Unit 04060104, at State Highway 204, in Lake Leelanau.	--	--	05-04-95	c136
						06-06-95	c86.3
						07-21-95	c75.5
						08-10-95	c74.7
						09-08-95	c85.9
04126865	Lake Leelanau Outlet	Lake Michigan	Lat 45°01'21", long 85°45'37", in SW1/4, NW1/4 sec.9, T.30 N., R.12 W., Leelanau County, Hydrologic Unit 04060104, at State Highway 22, in Leland.	--	--	05-04-95	c129
						06-06-95	c95.5
						07-21-95	c45.8
						08-10-95	c76.4
						09-08-95	c17.5
04127513	Unnamed Tributary	Fourmile Creek	Lat 44°43'22", long 85°32'44", in NW1/4, SE1/4 sec.20, T.27 N., R.10 W., Grand Traverse County, Hydrologic Unit 04060105, at Vanderlip Road, 1.0 mi southeast of Traverse City.	--	--	10-07-94	*c0.88
						05-03-95	c0.99
						06-05-95	*c0.84
						07-20-95	c0.85
						08-09-95	*c0.77
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.	--	--	10-06-94	*c0.30
						05-03-95	c0.66
						06-05-95	*c0.39
						07-20-95	c0.38
						08-09-95	*c0.34

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 1995--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE MICHIGAN--Continued							
04127525	Acme Creek	Lake Michigan	Lat 44°45'32", long 85°29'20", in SE1/4, SW1/4 sec.2, T.27 N., R.10 W., Grand Traverse County, Hydrologic Unit 04060105, at Bunker Hill Rd, 1.2 mi southeast of Acme.	--	--	05-03-95	*c5.03
04127526	West Arm	Acme Creek	Lat 44°45'31", long 85°29'00", in SW1/4, SE1/4 sec.2, T.27 N., R.10 W., Grand Traverse County, Hydrologic Unit 04060105, at Bunker Hill Rd, 1.3 southeast of Acme.	--	--	05-03-95	*c5.93
04127528	Acme Creek	Lake Michigan	Lat 44°46'32", long 85°29'58", in SE1/4, SE1/4 sec.34, T.28 N., R.10 W., Grand Traverse County, Hydrologic Unit 04060105, at U.S. Highway 31, in Acme.	--	1984-86	05-03-95	*c15.2
STREAMS TRIBUTARY TO LAKE ST. CLAIR							
04161820	Clinton River	Lake St. Clair	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, at former gaging station in Ster- ling Heights.	309	1978-83‡	07-26-95	121
STREAMS TRIBUTARY TO DETROIT RIVER							
04165980	River Rouge	Detroit River	Lat 42°34'27", long 83°12'26", in NW1/4 NW1/4 sec.19, T.2 N., R.11 E., Oakland County, Hydrologic Unit 04090004, at Adams Road in Troy.	12.0	1994	11-02-94 11-06-94 07-22-95 07-27-95	12.3 75.3 *3.35 8.18
04166020	River Rouge	Detroit River	Lat 42°30'36", long 83°15'45", in SW1/4 NW1/4 sec.10, T.1 N., R.10 E., Oakland County, Hydrologic Unit 04090004, at Lahser Road in Beverly Hills.	--	1994	11-06-94 06-22-95 07-27-95	183 *13.1 37.9
04166225	River Rouge	Detroit River	Lat 42°26'12", long 83°16'27", in NW1/4 sec.4, T.1 S., R.10 E., Wayne County, Hydrologic Unit 04090004, at footbridge near Bonnie Brook Golf Course clubhouse, 0.2 mi east of Telegraph Road, in Red- ford.	100	1994	06-22-95 07-27-95 08-04-95 09-13-95	*26.0 111 355 *25.1
04166435	Bell Branch	Upper River Rouge	Lat 42°24'23", long 83°18'55", in SE1/4 NE1/4 sec.13, T.1 S., R.9 E., Wayne County, Hydro- logic Unit 04090004, at Ink- ster Road in Livonia.	--	--	06-22-95 06-29-95 07-06-95 07-27-95 07-28-95 08-04-95 09-13-95	*3.92 190 *11.6 28.9 15.9 64.5 *3.64

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 1995--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis-charge (ft ³ /s)
STREAMS TRIBUTARY TO DETROIT RIVER--Continued							
04166470	Upper River Rouge	River Rouge	Lat 42°23'38", long 83°16'35", in SW1/4 NE1/4 sec.20, T.1 S., R.10 E., Wayne County, Hydrologic Unit 04090004, at Telegraph Road in Detroit.	67.3	1979-80, 1994	06-22-95 07-27-95 08-04-95 09-13-95	*10.7 52.8 223 *11.4
04166598	Walled Lake Branch	Middle River Rouge	Lat 42°27'08", long 83°27'37", in NW1/4 NE1/4 sec.35, T.1 N., R.8 E., Oakland County, Hydrologic Unit 04090004, at 9 Mile Road in Novi.	--	1994	11-06-94 06-23-95 06-29-95 07-28-95	86.6 *4.15 45.0 *7.04
04166700	Johnson Drain	Middle River Rouge	Lat 42°25'33", long 83°28'52", in SW1/4 SE1/4 sec.3, T.1 S., R.8 E., Wayne County, Hydrologic Unit 04090004, at Hines Drive, 0.1 mi upstream from confluence with Walled Lake Branch, in Northville.	26.1	1967-68, 1976-77, 1986-88, 1994	11-06-94 06-23-95 06-29-95 07-28-95	47.3 *8.28 40.1 *12.2
04166735	Middle River Rouge	River Rouge	Lat 42°23'33", long 83°28'02", in NW1/4 NW1/4 sec.23, T.1 S., R.8 E., Wayne County, Hydrologic Unit 04090004, at dam at outlet of Phoenix Lake, 1.0 mi north of Plymouth.	56.5	1974, 1994	11-06-94 06-23-95 06-29-95	206 *17.2 138
04166760	Middle River Rouge	River Rouge	Lat 42°22'00", long 83°24'41", in NW1/4 NW1/4 sec.32, T.1 S., R.9 E., Wayne County, Hydrologic Unit 04090004, at dam at outlet of Newburgh Lake in Livonia.	62.3	1973-74, 1994	06-23-95 09-19-95	*20.4 *17.8
04166950	Middle River Rouge	River Rouge	Lat 42°20'27", long 83°21'05", in SE1/4, SE1/4 sec.3, T.2 S., R.9 E., Wayne County, Hydrologic Unit 04090004, at Hines Drive in Westland.	--	1994	06-22-95 07-06-95 07-27-95 08-04-95 09-13-95	*28.8 51.2 73.0 243 *26.1
04167150	Middle River Rouge	River Rouge	Lat 42°19'50", long 83°14'53", in SW1/4 sec.10, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, at Hines Drive in Dearborn Heights.	110	1994	11-02-94 06-23-95 08-04-95 09-19-95	158 *29.3 337 *18.8
04167200	River Rouge	Detroit River	Lat 42°19'39", long 83°14'29", in land grant 615, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, at Ford Road in Dearborn.	307	1994	11-02-94 06-23-95 08-04-95 09-19-95	560 *71.2 1,670 *60.6
04167300	Lower River Rouge	River Rouge	Lat 42°17'01", long 83°30'20", in NW1/4 SW1/4 sec.28, T.2 S., R.8 E. Wayne County, Hydrologic Unit 04090004, at Beck Road, 1.5 mi northwest of Sheldon.	9.01	1967-68, 1994	07-22-95	*0.08

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 1995--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO DETROIT RIVER--Continued							
04167665	Lower River Rouge	River Rouge	Lat 42°17'06", long 83°23'02", in NW1/4 SE1/4 sec.28, T.2 S., R.9 E., Wayne County, Hydro- logic Unit 04090004, at Wayne Road in Wayne.	71.2	1994	11-06-94 06-22-95	201 *3.00
04168400	Lower River Rouge	River Rouge	Lat 42°18'31", long 83°15'10", in NE1/4 sec.22, T.2 S., R.10 E., Wayne County, Hydrologic Unit 04090004, at Military Road in Dearborn.	b91	1979-80, 1994	06-23-95 07-27-95	*20.7 49.6
STREAMS TRIBUTARY TO LAKE ERIE							
04173254	Mill Creek	Huron River	Lat 42°16'53", long 83°55'22", in NW1/4 NE1/4 , sec.26, T.2 S., R.4 E., Washtenaw County, Hydrologic Unit 04090005, at Jerusalem Rd., 2.0 mi southeast of Lima Cen- ter.	59.8	1970-72, 1981-82	04-14-95 05-26-95 07-10-95 09-20-95	c102 c55.9 c29.3 *c16.3
04173350	North Fork Mill Creek	Mill Creek	Lat 42°17'15", long 83°56'14", in SW1/4 sec.23, T.2 S., R.4 E., Washtenaw County, Hydrologic Unit 04090005, at Dancer Rd., 1.2 mi southeast of Lima Center.	59.0	1970-72†, 1974-75d, 1982	04-14-95 05-26-95 07-10-95 09-20-95	c101 c56.8 c33.4 *c12.2
04173515	Mill Creek	Huron River	Lat 42°19'30", long 83°53'32", in NE1/4 NW1/4 sec.7, T.2 S., R.5 E., Washtenaw County, Hydrologic Unit 04090005, at Shield Road, 0.5 mi southwest of Dexter.	--	--	03-16-95 04-12-95 05-24-95 07-10-95 09-20-95	c248 c400 c103 *c70.8 *c30.8
04174050	Huron River	Lake Erie	Lat 42°20'01", long 83°48'34", in SE1/4 sec.2, T.2 S., R.5 E., Washtenaw County, Hydro- logic Unit 04090005, at bridge on East Delhi Rd, 5.0 mi northwest of Ann Arbor.	699	--	07-27-95	446
04174511	Traver Creek	Huron River	Lat 42°17'25", long 83°44'02", in SE1/4 SW1/4 sec.21, T.2 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Nielson Court, in Ann Arbor.	--	--	04-13-95 05-26-95 07-10-95 09-20-95	c10.6 *c3.68 *c0.72 *c0.81
04174518	Pittsfield-Ann Arbor Drain	Huron River	Lat 42°15'53", long 83°41'18", in NW1/4 SE1/4 sec.35, T.2 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Chalmers Drive, 0.8 mi east of Ann Arbor.	10.9	1970-72, 1974-75d	03-21-95 04-12-95 05-24-95 07-10-95 09-20-95	c6.54 c50.6 c83.5 *c4.22 c6.86

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 1995--Continued

Station No.	Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
						Date	Dis- charge (ft ³ /s)
STREAMS TRIBUTARY TO LAKE ERIE--Continued							
04174522	Swift Drain	Huron River	Lat 42°15'53", long 83°40'36", in NW1/4 SW1/4 sec.36, T.2 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Huron River Drive, 1.3 mi east of Ann Arbor.	4.79	1974-75d	04-13-95	c5.58
						05-24-95	c19.6
						07-10-95	*c0.41
						09-20-95	c0.91
04174705	Fleming Creek	Huron River	Lat 42°16'58", long 83°39'59", in SE1/4 NE1/4 sec.25, T.2 S., R.6 E., Washtenaw County, Hydrologic Unit 04090005, at Radrick Golf Course, 1.0 mi north of Geddes.	30.2	1989-91	03-21-95	c29.2
						04-12-95	c64.1
						05-24-95	*c37.6
						07-10-95	*c6.93
						09-20-95	*c5.40
04175690	River Raisin	Lake Erie	Lat 41°59'12", long 83°56'03", in SW1/4 NE1/4 sec.03, T.6 S., R.4 E., Lenawee County, Hydrologic Unit 04100002, at Mill Highway, 1.0 mi south- east of Tecumseh.	--	--	08-24-92	c68.0

* Base flow.

† Operated as a low-flow partial-record station.

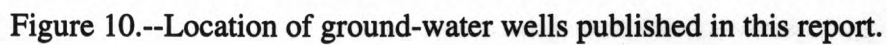
‡ Operated as a continuous-record gaging station.

a Affected by regulation and/or diversion.

b Approximately.

c Discharge measurement made by employees of Michigan Department of Environmental Quality.

d Operated as a crest-stage partial-record station.



GROUND-WATER LEVELS

BRANCH COUNTY

415602084593701. Local number, 6S 6W 22CABA.

LOCATION.--Lat 41°56'02", long 84°59'37", Hydrologic Unit 04050001, at Bennett and Tibbits Streets in Coldwater. Owner: City of Coldwater.

AQUIFER.--Sand and gravel of Pleistocene age.

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 shelter base, 2.50 ft above land-surface datum.

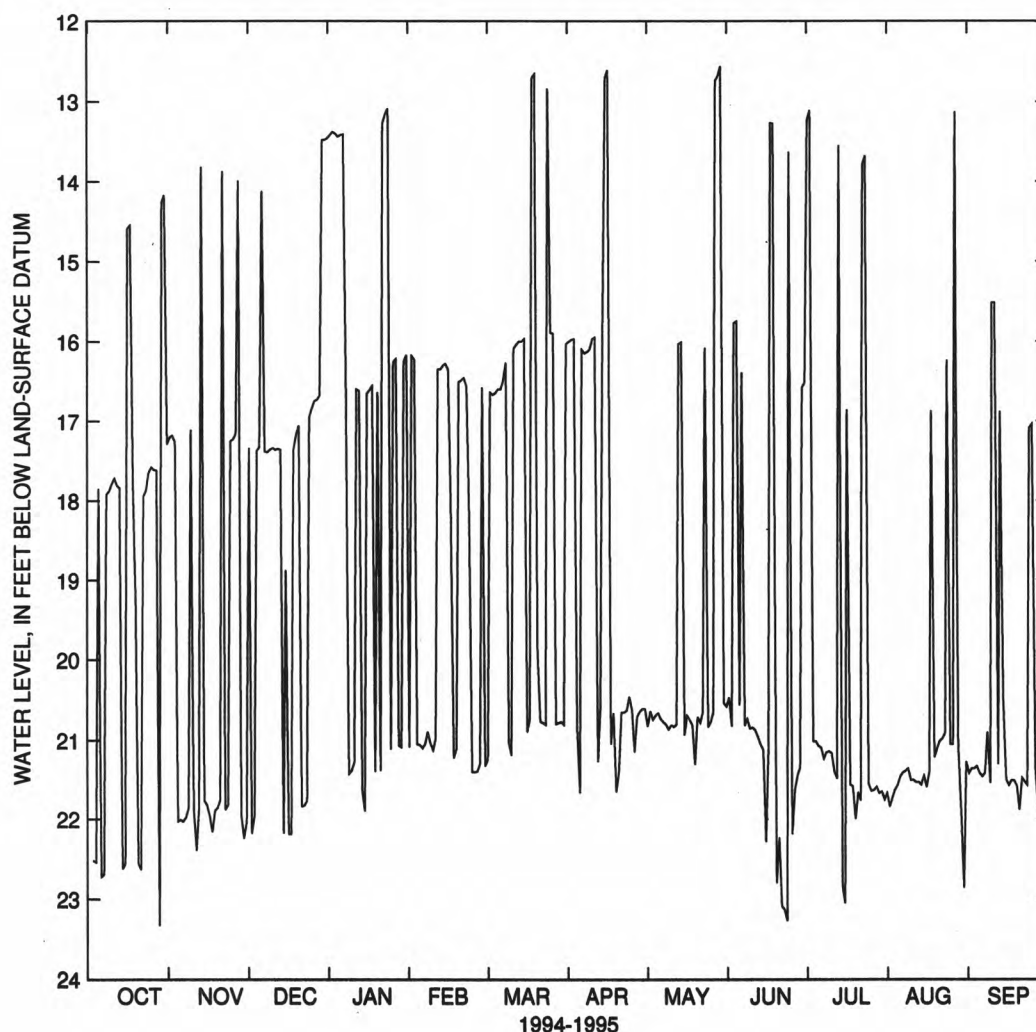
REMARKS.--Water levels affected by nearby pumping.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	22.72	22.03	14.12	13.41	21.05	16.60	21.67	20.67	20.57	21.08	21.47	21.47
10	17.72	22.39	17.36	16.60	16.35	21.19	15.97	20.82	20.85	21.17	21.51	15.51
15	14.59	21.96	22.19	16.61	18.04	15.97	12.70	20.94	22.29	23.05	21.60	21.58
20	22.63	13.87	21.84	13.28	16.46	19.88	21.40	20.72	22.24	21.67	21.02	21.49
25	17.61	17.16	16.75	16.22	21.40	15.89	20.63	20.78	22.19	21.65	21.06	21.39
EOM	17.20	17.34	13.42	16.18	21.33	16.03	20.62	20.59	16.52	21.68	21.43	19.01
WTR YR 1995	HIGHEST			11.98	MAY 30			LOWEST	23.33	OCT 27		



GROUND-WATER LEVELS

CALHOUN COUNTY

422032085091801. Local number, 1S 7W 32BDCC1.

LOCATION.--Lat 42°20'32", long 85°09'18", Hydrologic Unit 04050003, at Hopkins Street and State Highway 66, at 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.

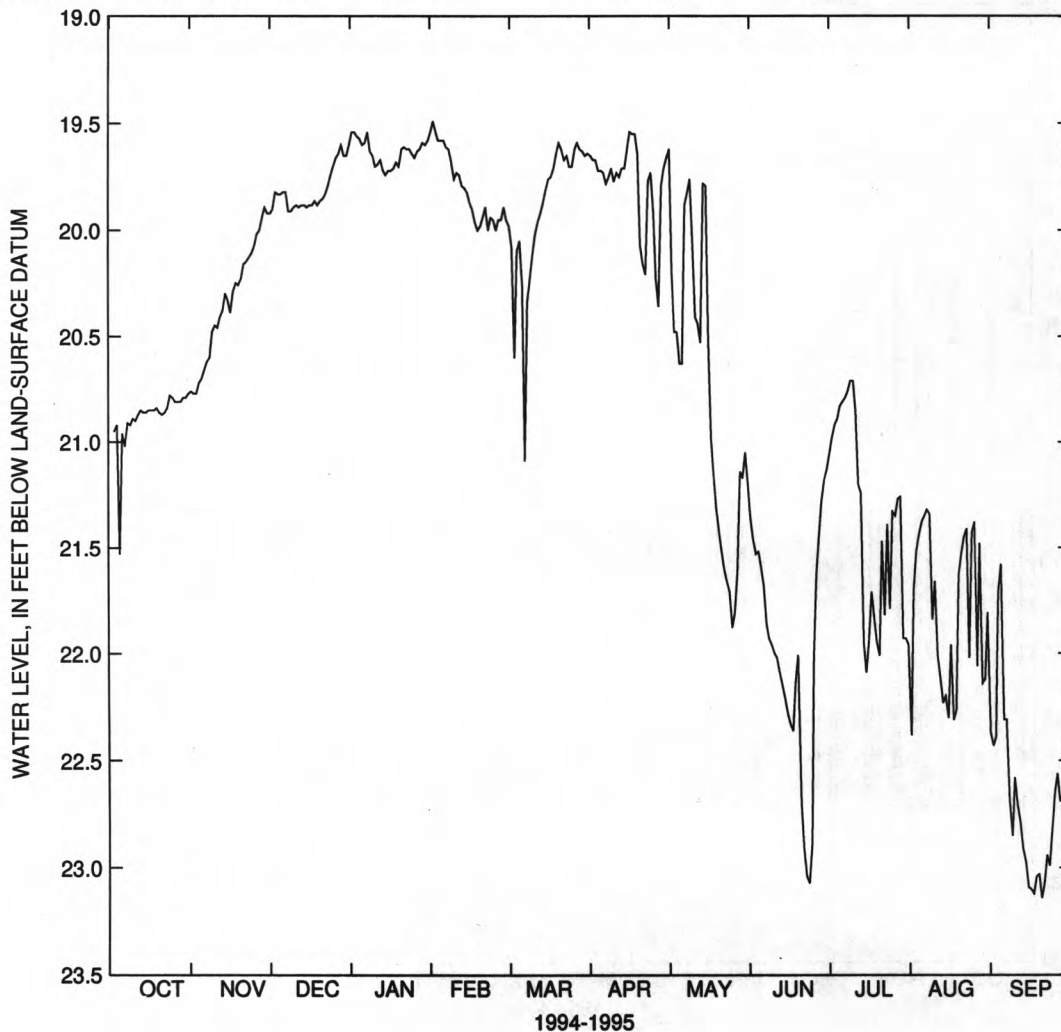
REMARKS.--Water levels affected by nearby pumping.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	20.96	20.66	19.82	19.59	19.61	20.05	19.72	20.63	21.59	20.83	21.38	22.31
10	20.90	20.46	19.88	19.69	19.74	20.12	19.77	20.06	22.00	20.71	21.66	22.71
15	20.85	20.39	19.88	19.72	19.90	19.81	19.62	19.79	22.28	22.09	22.30	23.10
20	20.87	20.16	19.85	19.61	19.89	19.59	20.07	21.42	22.70	22.01	21.53	23.07
25	20.81	20.02	19.66	19.63	19.95	19.70	19.91	21.88	22.03	21.33	21.38	22.56
EOM	20.76	19.92	19.54	19.49	19.95	19.64	19.66	21.20	21.13	21.96	22.37	23.08
WTR YR 1995	HIGHEST			19.41	APR 18			LOWEST	23.14	SEP 19		



GROUND-WATER LEVELS

CLARE COUNTY

434900084462501. Local number, 17N 4W 34DCAD.

LOCATION.--Lat 43°49'00", long 84°46'25", Hydrologic Unit 04080201, at Clare. Owner: City of Clare.

AQUIFER.--Gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, diameter 4 in., depth 91 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 850 ft above sea level, from topographic map. Measuring point: Top of shelter base, 3.50 ft above land-surface datum.

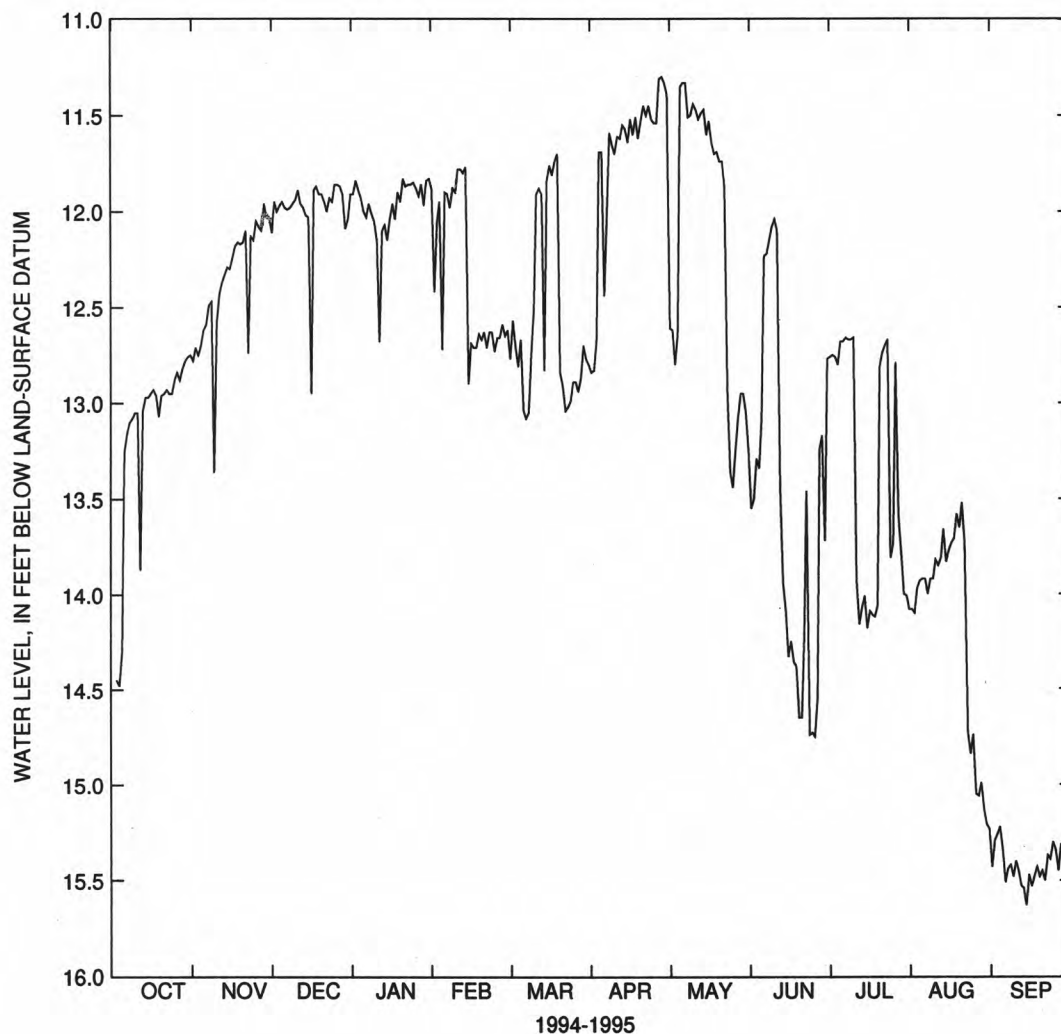
REMARKS.--Levels affected by nearby pumping.

PERIOD OF RECORD.--January 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 7.91 ft below land-surface datum, Mar. 31, 1976; lowest recorded, 24.95 ft below land-surface datum, May 28, 1977.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	13.26	12.59	11.98	12.03	11.91	12.67	11.69	11.35	13.08	12.68	13.92	15.51
10	13.05	12.43	11.89	12.68	11.78	12.52	11.70	11.44	12.04	12.66	13.82	15.45
15	12.95	12.24	12.95	11.96	12.71	11.84	11.64	11.60	14.33	14.18	13.77	15.53
20	12.95	12.10	11.95	11.87	12.71	12.84	11.53	11.74	14.65	12.81	13.52	15.50
25	12.84	12.08	11.86	11.92	12.66	12.89	11.54	13.44	14.75	13.73	15.05	15.45
EOM	12.78	12.11	11.91	12.42	12.62	12.80	11.39	13.26	12.77	14.08	15.43	15.27
WTR YR 1995	HIGHEST			9.97	APR 28			LOWEST	15.63	SEP 13		



GROUND-WATER LEVELS

EATON COUNTY

424058084380301. Local number, 3N 3W 2BA.

LOCATION.--Lat 42°40'58", long 84°38'03", Hydrologic Unit 04050004, on Stiefel Farm grounds, 1.6 mi north of Dimondale. Owner: City of Lansing.

AQUIFER.--Glacial deposits of Pleistocene age.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 1.25 in., depth 66 ft, screened 63 ft to 66 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 839 ft above sea level. Measuring point: Plywood instrument shelf, 3.0 ft above land-surface datum.

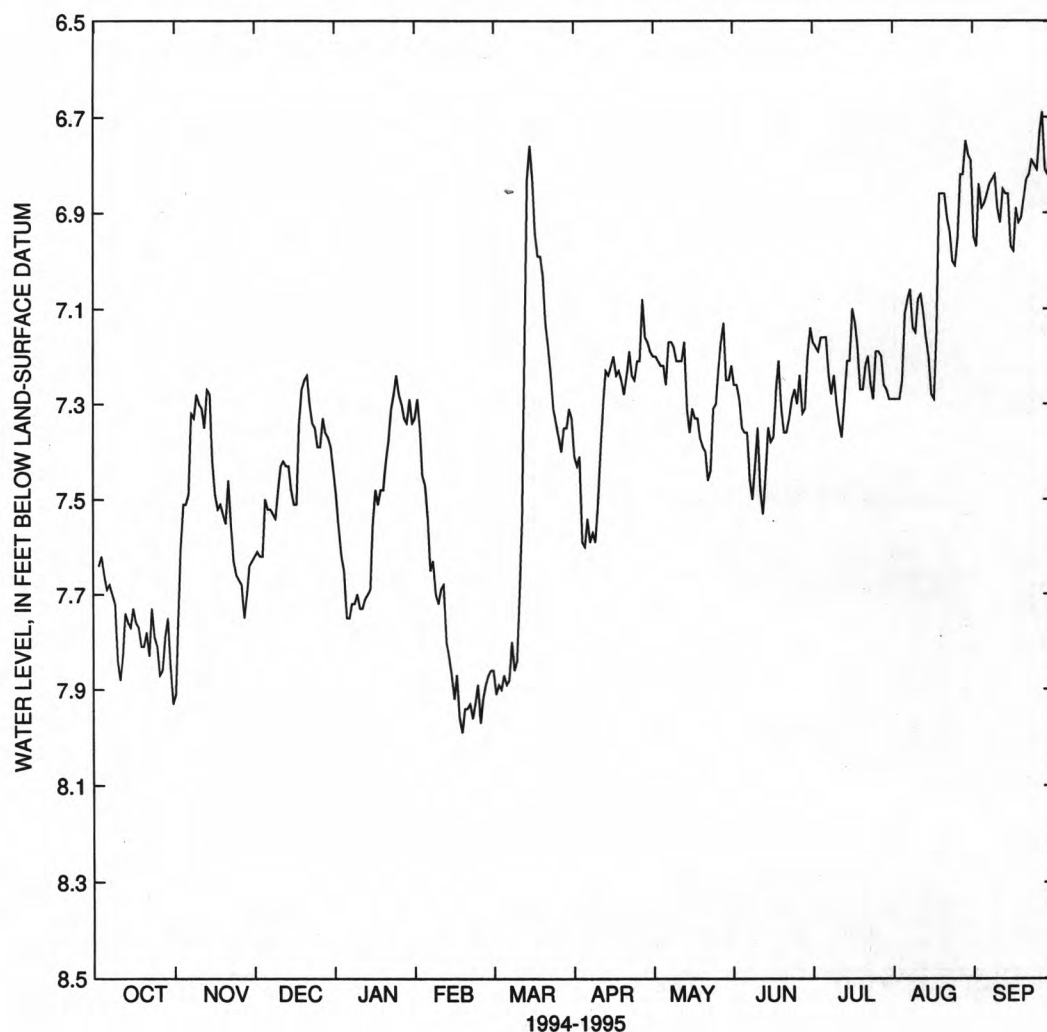
REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--April 1964 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 2.98 ft below land-surface datum, June 11, 1986; lowest recorded, 18.0 ft below land-surface datum, November 1968.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	7.69	7.49	7.52	7.75	7.65	7.87	7.60	7.22	7.36	7.16	7.11	6.86
10	7.88	7.31	7.43	7.73	7.68	7.84	7.51	7.21	7.35	7.30	7.08	6.92
15	7.73	7.49	7.51	7.48	7.87	6.76	7.22	7.36	7.38	7.21	7.28	6.98
20	7.78	7.46	7.24	7.38	7.93	7.03	7.28	7.39	7.36	7.27	6.86	6.83
25	7.87	7.68	7.39	7.30	7.92	7.34	7.21	7.30	7.30	7.19	6.95	6.73
EOM	7.91	7.62	7.49	7.29	7.86	7.33	7.19	7.22	7.14	7.29	6.95	6.78
WTR YR 1995	HIGHEST			6.45	MAR 13			LOWEST	7.99	FEB 17		



GROUND-WATER LEVELS

EATON COUNTY

424108084363201. Local number, 4N 3W 36DCAD.

LOCATION.--Lat 42°41'08", long 84°36'32", Hydrologic Unit 04050004, at end of Roscommon Street, in Delta Township, in Lansing. Owner: City of Lansing.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 14 in., depth 344 ft, cased to 123 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, 4.0 ft above land-surface datum.

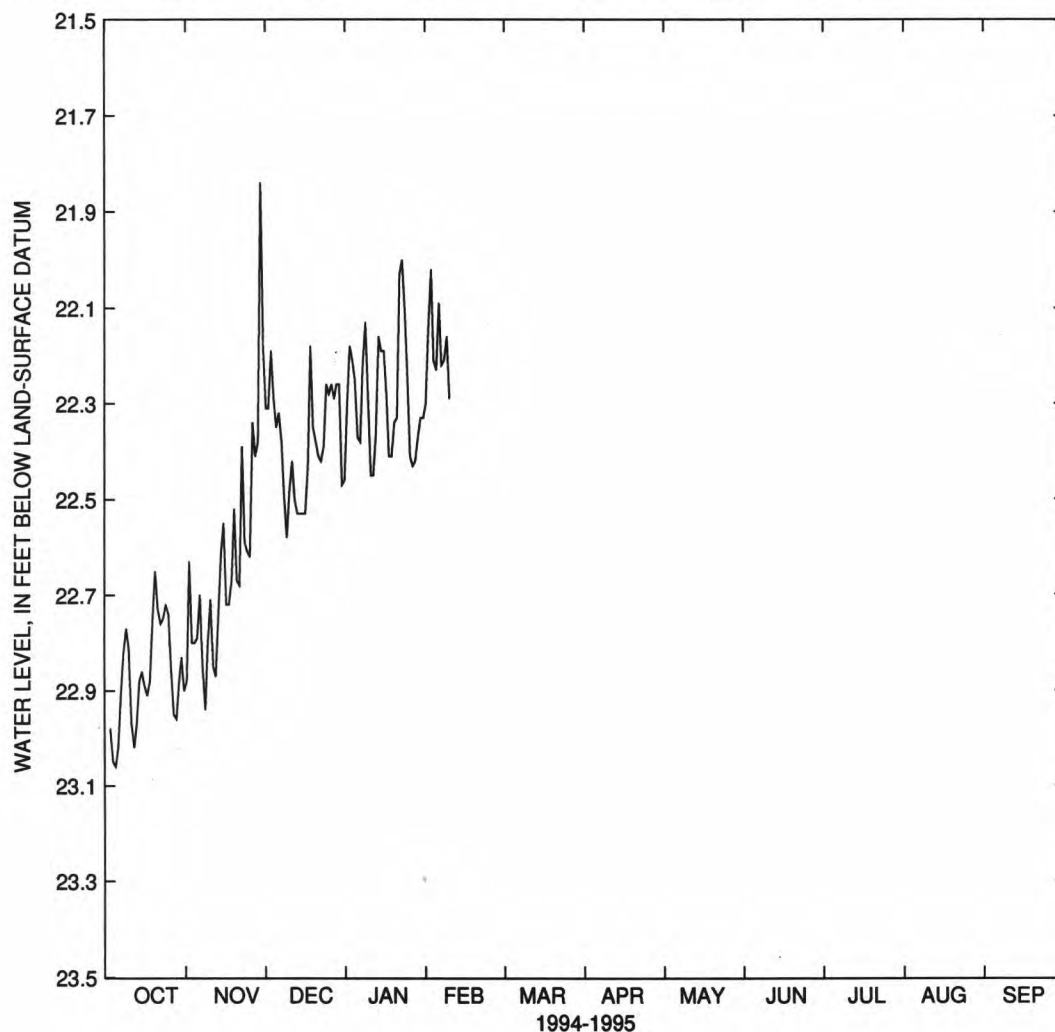
REMARKS.--Water levels affected by regional pumping.

PERIOD OF RECORD.--October 1993 to February 9, 1995 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 21.69 ft below land-surface datum, Nov. 28, 1994; lowest recorded, 27.14 ft below land-surface datum, Oct. 6, 1993.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	23.02	22.70	22.32	22.38	22.22	---	---	---	---	---	---	---
10	22.97	22.85	22.42	22.45	---	---	---	---	---	---	---	---
15	22.89	22.72	22.53	22.28	---	---	---	---	---	---	---	---
20	22.73	22.68	22.41	22.03	---	---	---	---	---	---	---	---
25	22.85	22.34	22.26	22.43	---	---	---	---	---	---	---	---
EOM	22.88	22.31	22.31	22.14	---	---	---	---	---	---	---	---
WTR YR 1995	HIGHEST		21.69	NOV 28	LOWEST		23.06	OCT 4				



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 of Pennsylvanian age.

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.

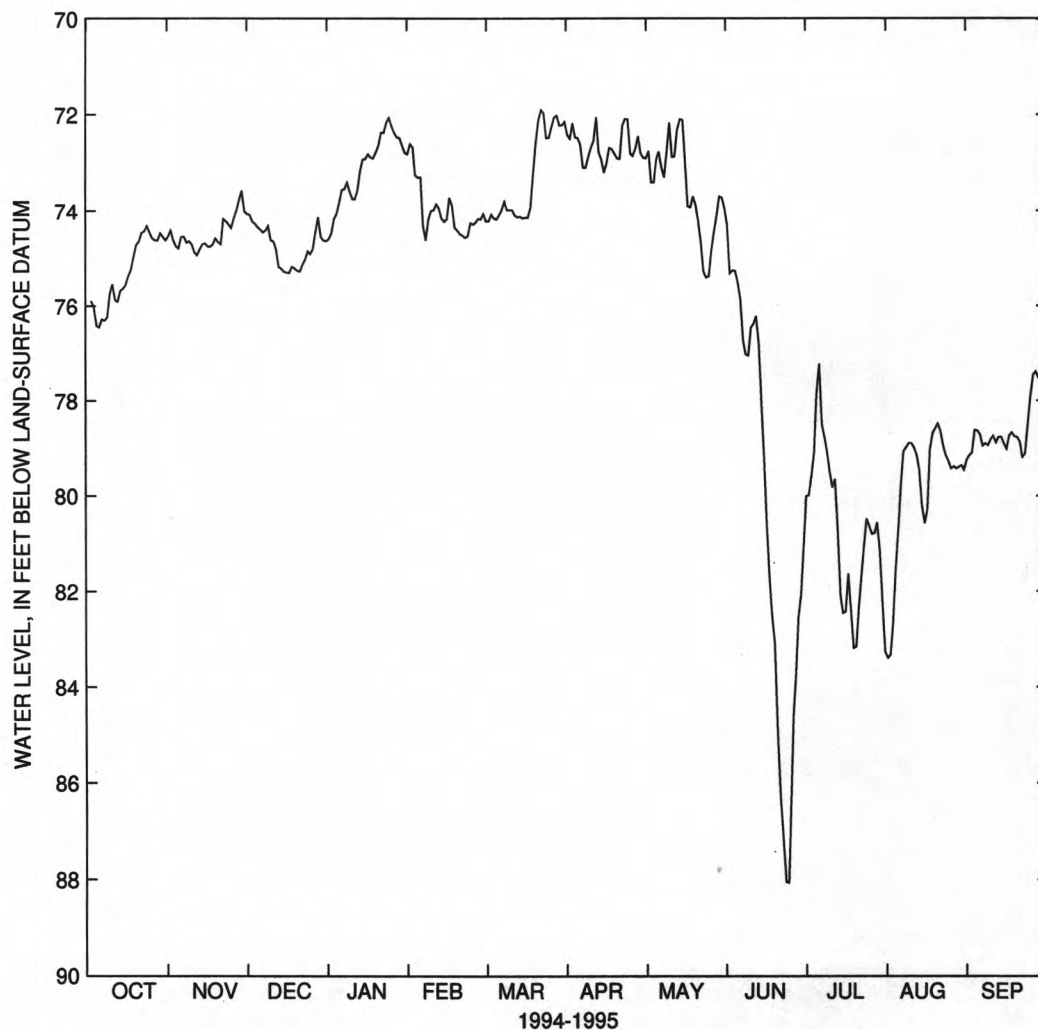
REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--October 1953 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 63.92 ft below land-surface datum, Feb. 20, 1991; lowest recorded, 103.6 ft below land-surface datum, Aug. 28, 1969.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	76.45	74.55	74.39	73.56	74.31	74.18	72.49	72.93	75.50	77.85	80.71	78.71
10	75.55	74.87	74.65	73.75	73.86	73.99	72.69	72.17	76.45	79.51	78.89	78.74
15	75.56	74.75	75.30	72.82	73.73	74.16	73.20	72.11	79.19	82.46	80.57	79.01
20	74.65	74.71	75.28	72.37	74.52	72.62	72.91	73.88	85.01	83.16	78.49	78.85
25	74.57	74.16	74.80	72.38	74.25	72.48	72.81	75.38	86.38	80.63	79.43	77.46
EOM	74.54	74.07	74.60	72.61	74.07	72.15	72.90	73.96	81.03	83.27	79.25	77.65
WTR YR 1995	HIGHEST			71.59	MAY 10			LOWEST	88.06	JUN 24		



GROUND-WATER LEVELS

HURON COUNTY

434103083130301. Local number, 15N 11E 32BBCB.

LOCATION.--Lat 43°41'03", long 83°13'03", Hydrologic Unit 04080103, 2 mi northeast of Gagetown at Gagetown State Game Area. Owner: Huron County.

AQUIFER.--Sand of Pleistocene age.

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.

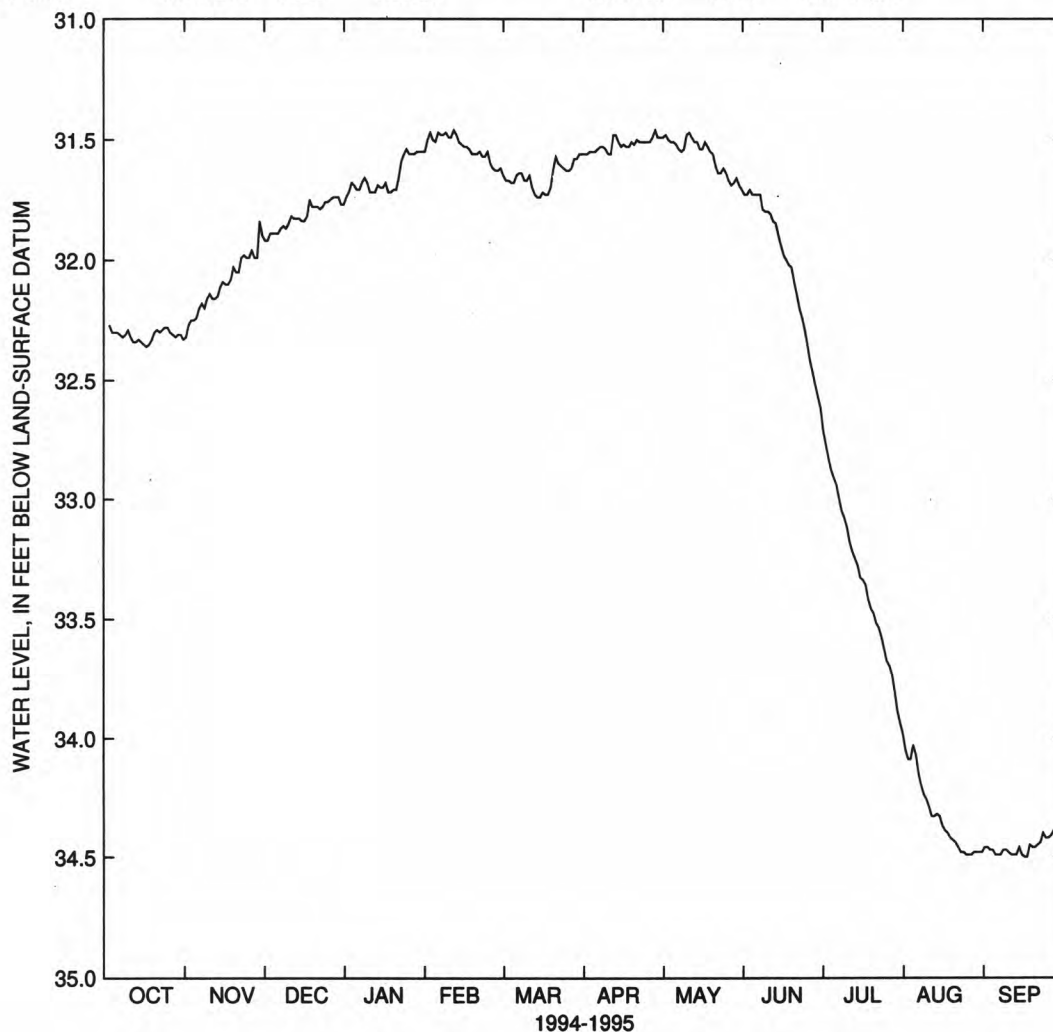
PERIOD OF RECORD.--February 1991 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 30.38 ft below land-surface datum, May 6, 1991; lowest recorded, 34.38 ft below land-surface datum, Sept. 20, 21, 1991.

EXTREMES OUTSIDE PERIOD OF RECORD.--Lowest water level measured, 35.60 ft below land-surface datum, June 2, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	32.30	32.20	31.89	31.71	31.48	31.68	31.55	31.51	31.73	32.91	34.07	34.49
10	32.32	32.16	31.82	31.72	31.46	31.67	31.56	31.48	31.80	33.12	34.29	34.49
15	32.35	32.10	31.84	31.68	31.53	31.74	31.53	31.54	31.94	33.33	34.37	34.50
20	32.29	32.05	31.78	31.66	31.55	31.63	31.52	31.56	32.09	33.48	34.44	34.45
25	32.30	31.96	31.75	31.56	31.62	31.63	31.51	31.64	32.35	33.68	34.49	34.41
EOM	32.32	31.92	31.74	31.50	31.62	31.56	31.49	31.71	32.62	33.98	34.46	34.43
WTR YR 1995	HIGHEST			31.40	FEB 10			LOWEST	34.50	SEP 15,16		



GROUND-WATER LEVELS

HURON COUNTY

434323082561901. Local number, 15N 13E 22BBCC.

LOCATION.--Lat.43°43'23", long 82°56'19", Hydrologic Unit 04080205, on State Highway 19, 1 mi north of Uby. Owner: Huron County.

AQUIFER.--Napoleon Sandstone Member of Marshall Formation.

WELL CHARACTERISTICS.--Rotary drilled observation well, diameter 4 in., depth 70 ft, cased to top of Napoleon Sandstone.

INSTRUMENTATION.--Water-level recorder.

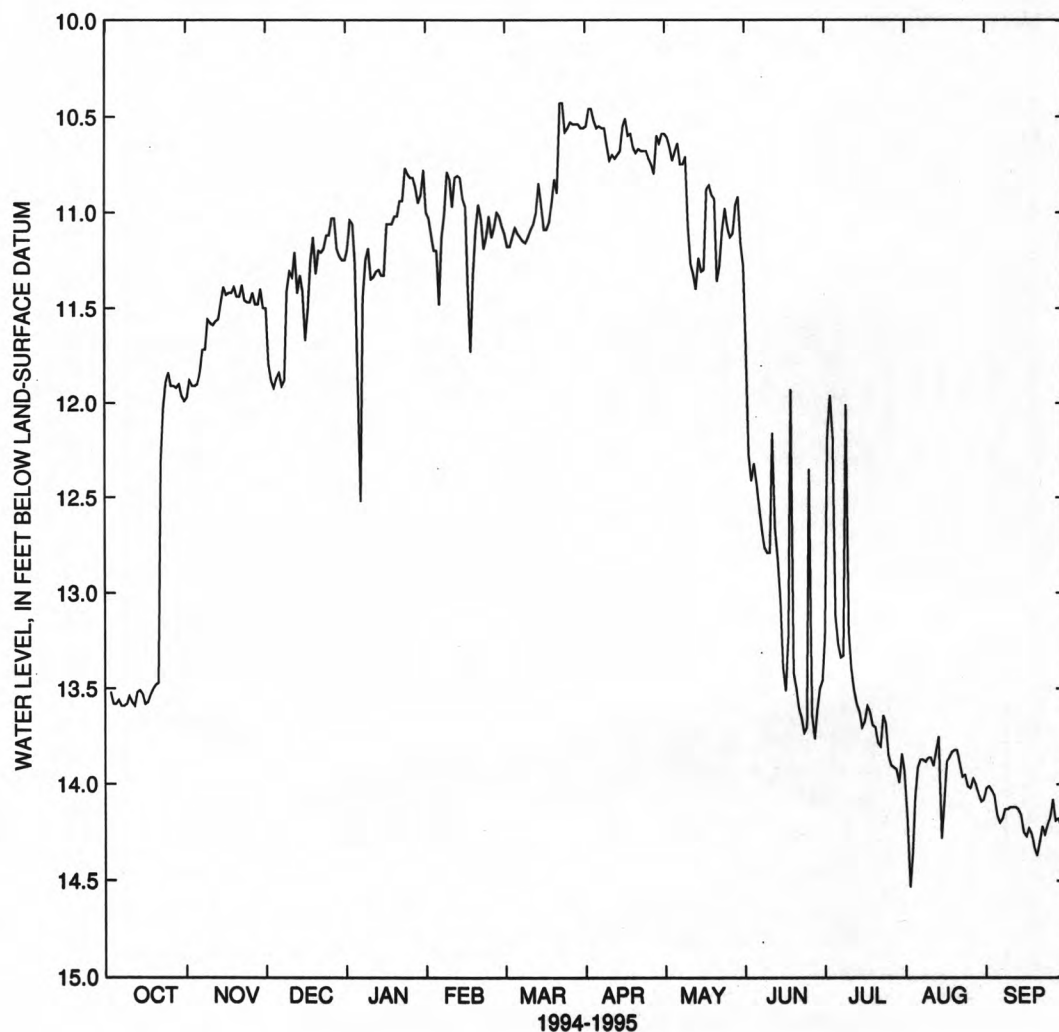
DATUM.--Elevation of land-surface datum is 795 ft above sea level, from topographic map. Measuring point: Top of casing, 2.81 ft above land-surface datum.

PERIOD OF RECORD.--December 1988 to September 1989, December 1992 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 9.67 ft below land-surface datum, Apr. 25, 1993; lowest recorded, 16.38 ft below land-surface datum, July 26, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	13.56	11.84	11.84	12.52	11.13	11.08	10.56	10.68	12.42	13.12	13.91	14.20
10	13.57	11.59	11.34	11.34	10.82	11.13	10.73	11.07	12.79	13.20	13.86	14.12
15	13.58	11.43	11.67	11.06	11.38	10.96	10.55	11.31	13.39	13.70	14.09	14.27
20	13.47	11.44	11.20	10.94	11.03	10.83	10.69	10.93	13.50	13.70	13.82	14.30
25	11.91	11.42	11.03	10.82	11.08	10.56	10.72	11.08	12.35	13.85	14.02	14.08
EOM	11.97	11.50	11.19	11.03	11.07	10.56	10.59	11.28	13.46	13.93	14.02	14.19
WTR YR 1995	HIGHEST			10.31	MAR 23			LOWEST	14.53	AUG 2		



GROUND-WATER LEVELS

HURON COUNTY

434947083233301. Local number, 16N 9E 2CDCA.

LOCATION.--Lat 43°49'47", long 83°23'33", Hydrologic Unit 04080103, 6 mi west of Pigeon at Wildfowl Bay State Wildlife Area. Owner: Huron County.

AQUIFER.--Saginaw, Marshall Formation (Pennsylvanian, Mississippian age).

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, 2.2 ft above land-surface datum.

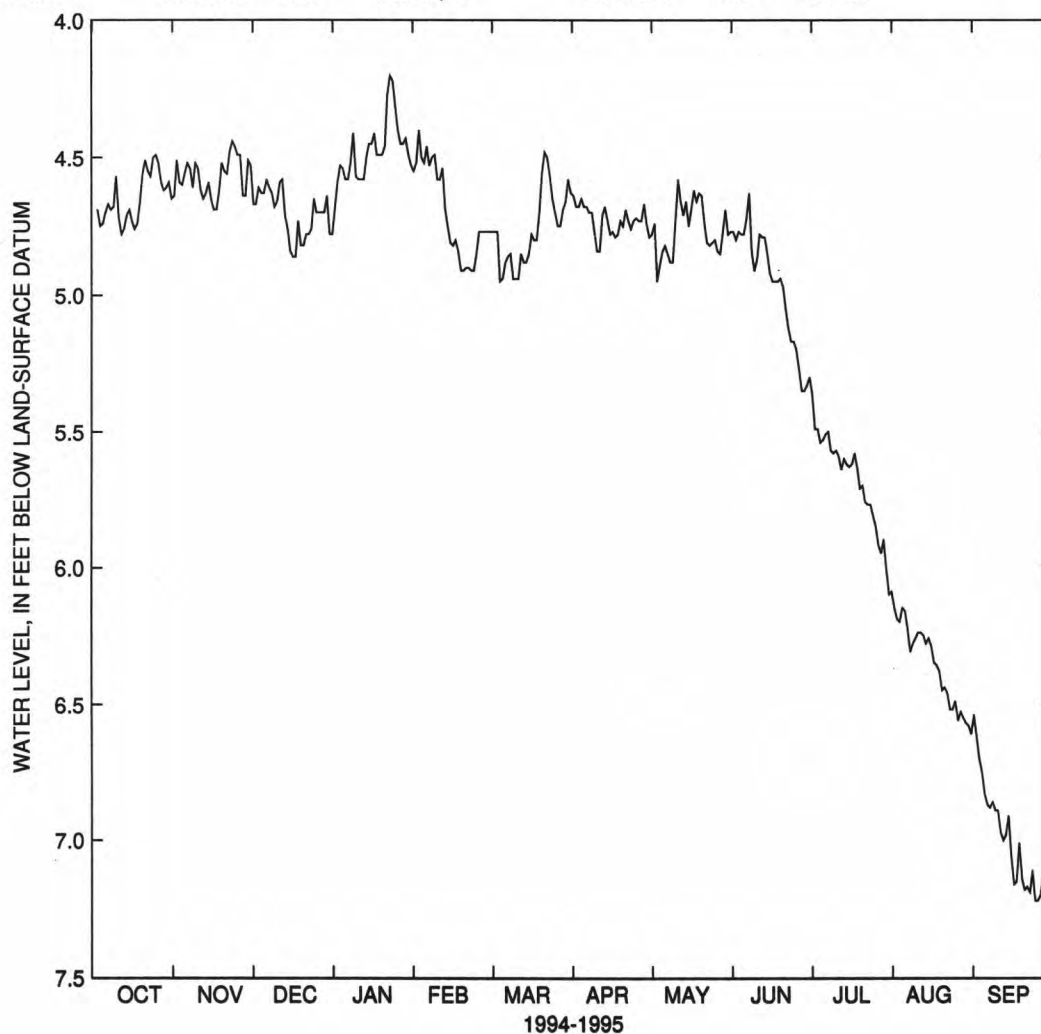
PERIOD OF RECORD.--February 1991 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 3.12 ft below land-surface datum, Apr. 20, 1993; lowest recorded, 7.24 ft below land-surface datum, Sept. 29, 1995.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	4.70	4.52	4.58	4.58	4.53	4.94	4.68	4.84	4.78	5.53	6.16	6.87
10	4.72	4.62	4.59	4.58	4.54	4.94	4.84	4.73	4.87	5.57	6.24	6.97
15	4.73	4.69	4.86	4.41	4.80	4.85	4.78	4.75	4.92	5.63	6.29	7.16
20	4.51	4.56	4.78	4.27	4.90	4.56	4.75	4.64	4.97	5.70	6.44	7.17
25	4.52	4.49	4.70	4.45	4.77	4.70	4.72	4.80	5.20	5.85	6.56	7.20
EOM	4.64	4.67	4.69	4.52	4.77	4.63	4.79	4.77	5.30	6.09	6.54	7.19
WTR YR 1995	HIGHEST			4.15	JAN 20,21			LOWEST	7.24	SEP 29		



GROUND-WATER LEVELS

HURON COUNTY

435736083094801. Local number, 18N 11E 27AADD.

LOCATION.--Lat 43°57'36", long 83°09'48", Hydrologic Unit 04080103, 6 mi northeast of Caseville at Rush Lake State Game Area. Owner: Huron County.

AQUIFER.--Marshall Sandstone, Lower

WELL CHARACTERISTICS.--Rotary drilled observation well, diameter 4 in., depth 200 ft, cased to 178 ft.

INSTRUMENTATION.--Water-level recorder.

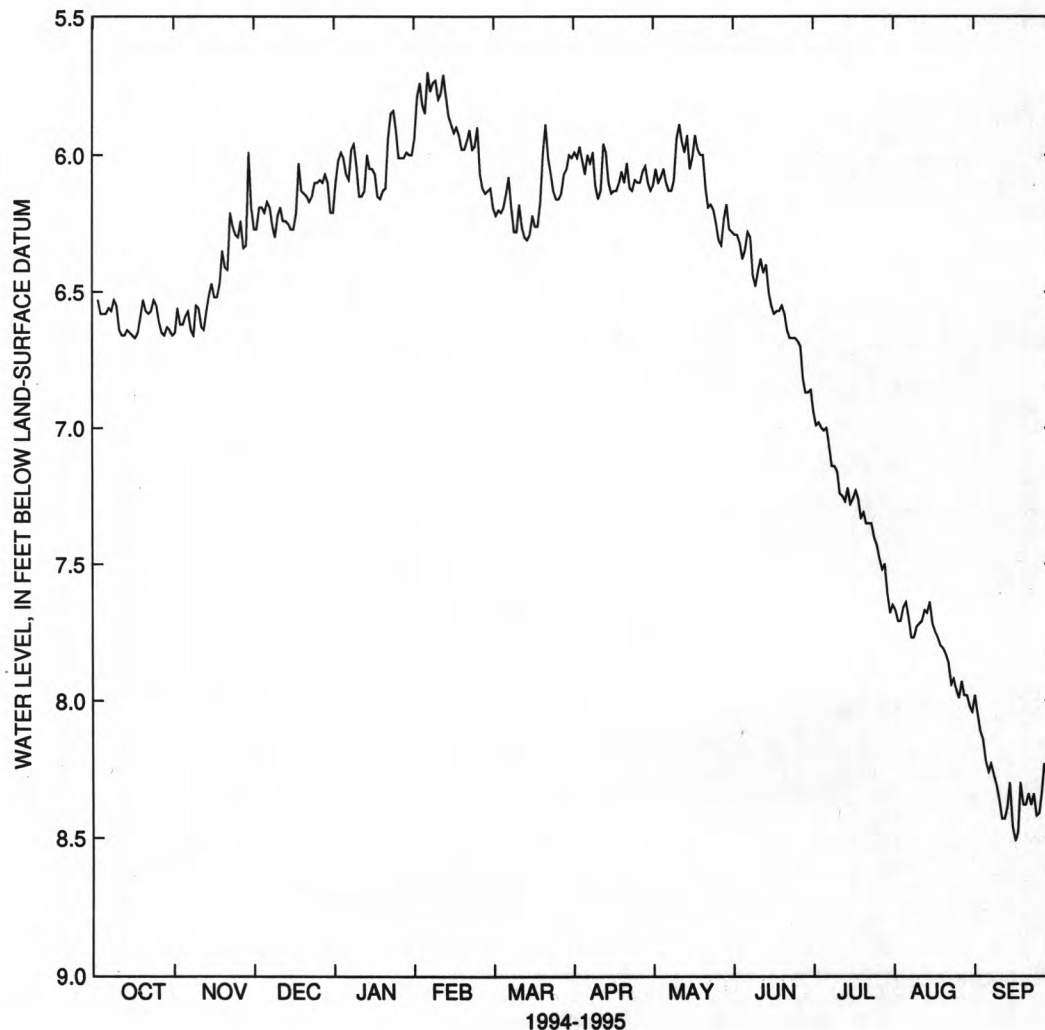
DATUM.--Elevation of land-surface datum is 600 ft above sea level, from topographic map. Measuring Point: Top of casing, 4.03 ft above land-surface datum.

PERIOD OF RECORD.--October 1988 to August 1989, December 1992 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 5.50 ft below land-surface datum, Feb. 10, 1995; lowest recorded, 8.62 ft below land-surface datum, Aug. 16, 1989.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	6.58	6.57	6.17	6.09	5.77	6.19	6.07	6.05	6.35	7.01	7.64	8.26
10	6.64	6.63	6.19	6.15	5.71	6.28	6.16	5.94	6.42	7.16	7.72	8.43
15	6.66	6.52	6.27	6.07	5.90	6.29	6.14	6.05	6.55	7.28	7.72	8.51
20	6.57	6.42	6.15	5.94	5.91	6.00	6.10	6.00	6.58	7.31	7.83	8.34
25	6.61	6.24	6.09	6.01	6.12	6.16	6.10	6.25	6.68	7.43	7.99	8.33
EOM	6.65	6.27	6.10	5.79	6.12	6.01	6.13	6.28	6.86	7.65	7.98	8.27
WTR YR 1995	HIGHEST			5.50	FEB 10			LOWEST	8.51	SEP 15		



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, in Lansing Township, in Lansing. Owner: City of Lansing.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 12 in., depth 417 ft, cased.

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.

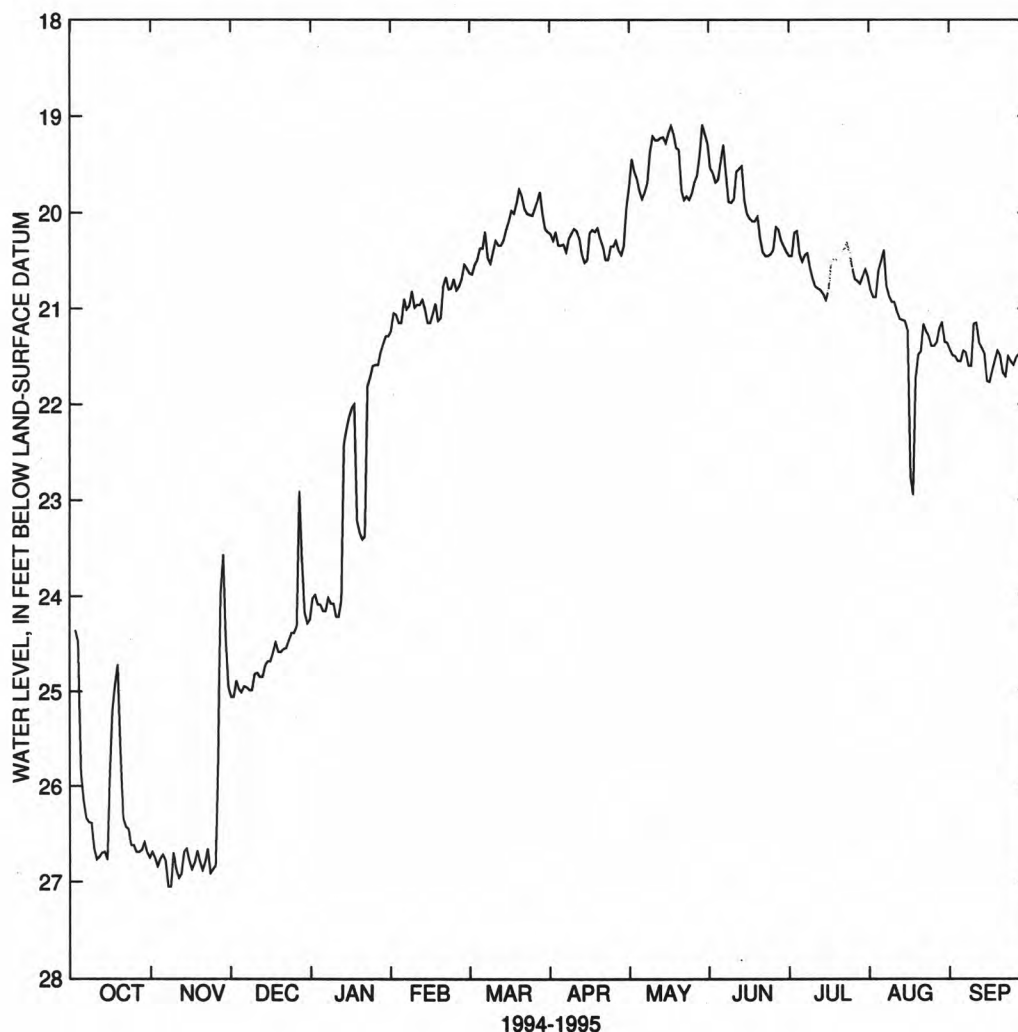
REMARKS.--Water levels affected by regional pumping.

PERIOD OF RECORD.--September 1945 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 18.26 ft below land-surface datum, May 9, 1994; lowest recorded, 67.0 ft below land-surface datum, August 1949.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	26.15	26.78	24.95	24.16	21.01	20.37	20.34	19.78	19.48	20.43	20.50	21.44
10	26.77	26.96	24.81	24.22	20.96	20.41	20.17	19.21	19.86	20.69	20.93	21.15
15	25.90	26.87	24.69	22.04	21.06	20.18	20.49	19.28	20.01	20.91	21.23	21.77
20	26.34	26.79	24.56	23.38	20.67	19.76	20.27	19.35	20.27	20.38	21.45	21.67
25	26.69	25.73	24.32	21.59	20.77	20.03	20.35	19.80	20.39	20.56	21.39	21.51
EOM	26.69	25.06	24.03	21.05	20.58	20.20	19.95	19.29	20.41	20.67	21.43	21.54
WTR YR 1995	HIGHEST			18.89	MAY 17			LOWEST	27.05	NOV 6,7		



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, in 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.

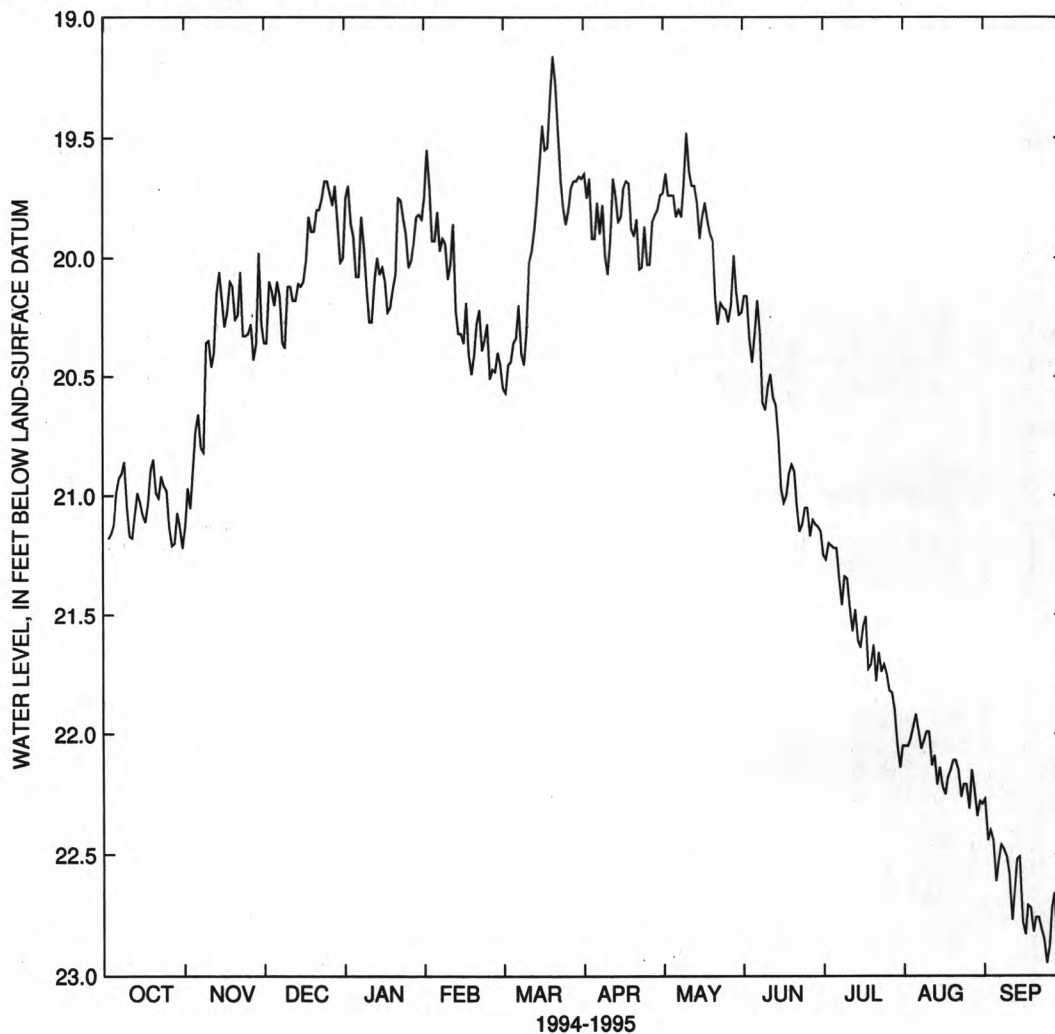
REMARKS.--Water levels affected by regional pumping.

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, 26.34 ft below land-surface datum, June 5, 1991.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	20.99	20.66	20.10	20.08	19.97	20.36	19.92	19.74	20.33	21.22	21.92	22.52
10	21.17	20.46	20.12	20.27	19.86	20.32	20.07	19.48	20.54	21.35	21.99	22.77
15	21.08	20.29	20.10	20.10	20.19	19.61	19.83	19.92	20.97	21.64	22.22	22.83
20	20.99	20.24	19.80	19.75	20.22	19.16	19.91	19.93	20.90	21.63	22.11	22.76
25	21.13	20.28	19.73	20.01	20.47	19.86	20.03	20.22	21.05	21.75	22.31	22.72
EOM	21.13	20.36	19.75	19.55	20.45	19.67	19.74	20.23	21.15	22.05	22.27	22.97
WTR YR 1995	HIGHEST			18.92	MAR 20			LOWEST	22.97	SEP 30		



GROUND-WATER LEVELS

INGHAM COUNTY

424235084311201. Local number, 4N 2W 27BB.

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.

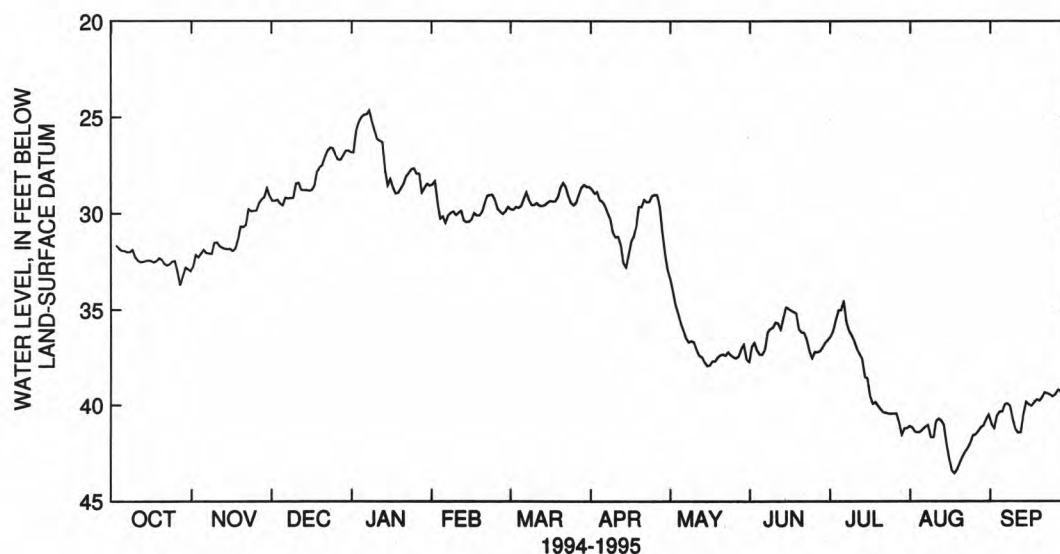
PERIOD OF RECORD.--July 1968 to current year.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	31.94	32.05	29.19	24.86	30.11	29.59	29.40	35.73	37.33	35.02	41.26	39.96
10	32.44	31.70	28.41	26.23	29.85	29.55	31.24	36.69	35.66	36.63	40.85	41.45
15	32.46	31.95	28.79	28.65	29.97	29.44	32.12	37.93	34.94	38.59	42.83	40.04
20	32.61	30.59	27.06	28.09	29.09	28.68	29.65	37.37	36.18	40.22	42.72	39.34
25	33.01	29.47	27.19	27.93	29.89	29.57	29.03	37.47	37.21	40.45	41.54	39.20
EOM	32.75	29.34	26.83	28.31	29.65	28.62	32.95	37.72	36.56	41.10	40.99	38.84

WTR YR 1995 HIGHEST 24.50 JAN 6 LOWEST 43.58 AUG 17



424312084321801. Local number, 4N 2W 22BC.

LOCATION.--Lat 42°43'12", long 84°32'18", Hydrologic Unit 04050004, at Pennsylvania Avenue, in Lansing. Owner: City of Lansing.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 12 in., depth 338 ft, cased to 60 ft.

INSTRUMENTATION.--Periodic measurement.

DATUM.--Elevation of land-surface datum is 823.64 ft above sea level. Measuring point: Top of flange, 4.0 ft above land-surface datum.

REMARKS.--Water levels affected by nearby pumping.

PERIOD OF RECORD.--October 1930 to September 1995 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.1 ft below land-surface datum, July 1932; lowest measured, 80.49 ft below land-surface datum, Feb. 24, 1970.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 6	20.60	DEC 29	19.74	APR 20	19.26	MAY 31	19.86	JUL 13	21.11	SEP 1	22.59
NOV 17	19.68	FEB 22	18.20								

GROUND-WATER LEVELS

INGHAM COUNTY

424324084331802. Local number, 4N 2W 21BADB.

LOCATION.--Lat 42°43'24", long 84°33'18", Hydrologic Unit 04050004, near Townsend and West Elm Streets, in Lansing.

AQUIFER.--Saginaw Formation.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 4 in., depth 400 ft, cased to 42 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 835 ft above sea level, from topographic map. Measuring point; top of flange, 7.0 ft above land-surface datum.

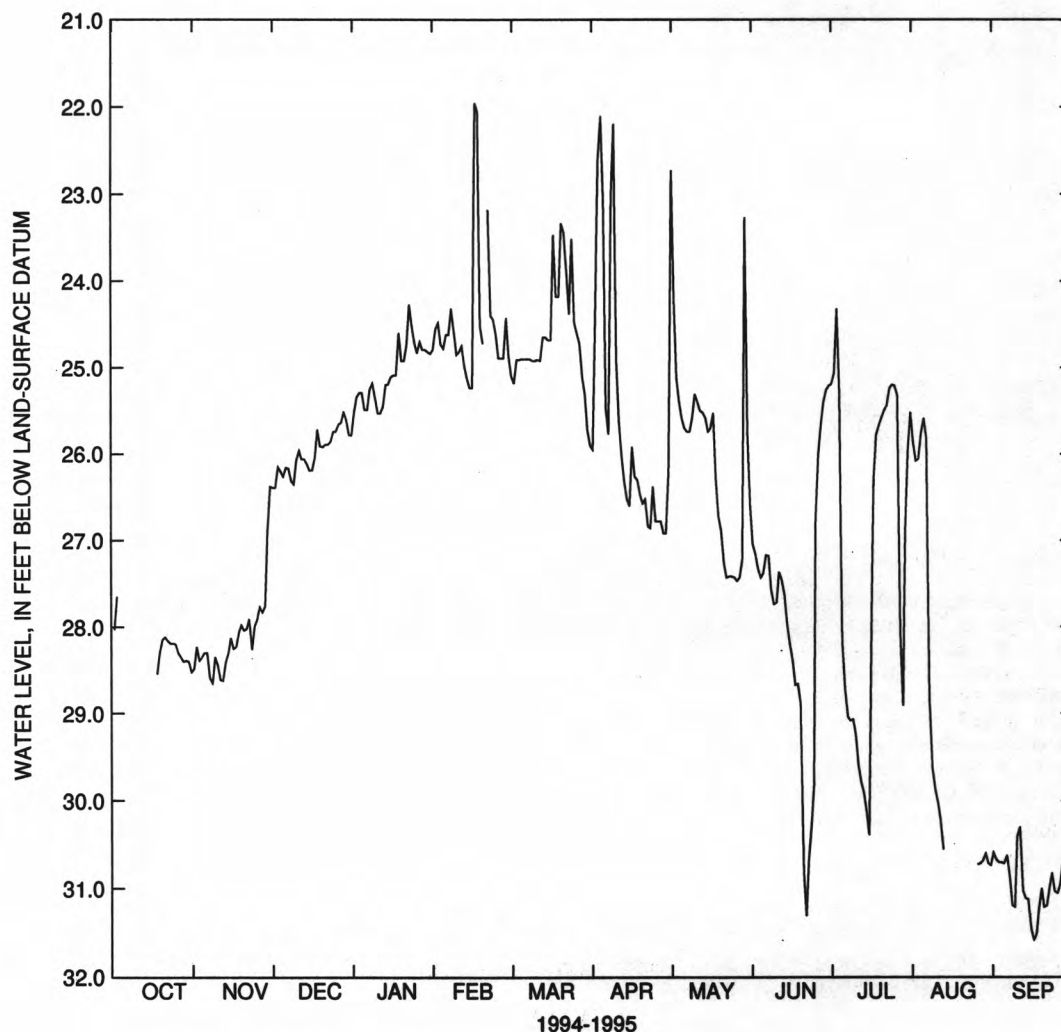
REMARKS.--Water levels affected by regional pumping.

PERIOD OF RECORD.--February 1979 to April 1988, October 1993 to September 1995 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 17.30 ft below land-surface datum, Mar. 4, 1994; lowest recorded, 58.77 ft, below land-surface datum, June 28, 1979.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	28.30	26.16	25.49	24.62	24.90	23.05	25.59	27.38	28.18	25.59	30.62
10	---	28.61	25.96	25.53	24.75	24.92	24.91	25.31	27.72	29.25	30.01	30.30
15	---	28.25	26.19	25.09	21.96	24.68	26.60	25.74	28.20	30.39	---	31.58
20	28.12	28.02	25.89	24.74	23.18	23.34	26.57	26.89	30.81	25.58	---	31.19
25	28.30	27.77	25.66	24.70	24.89	24.48	26.78	27.43	26.75	25.21	30.72	30.95
EOM	28.48	26.39	25.52	24.55	24.87	25.90	26.20	26.59	25.21	25.52	30.59	30.39
WTR YR 1995	HIGHEST			20.42	MAR 17			LOWEST	31.58	SEP 15		



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 of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 20 in., depth 424 ft.

INSTRUMENTATION.--Water-level recorder. Monthly measurement prior to August 1960.

DATUM.--Elevation of land-surface datum is 858.72 ft above sea level. Measuring point: Plywood shelter base at land-surface datum.

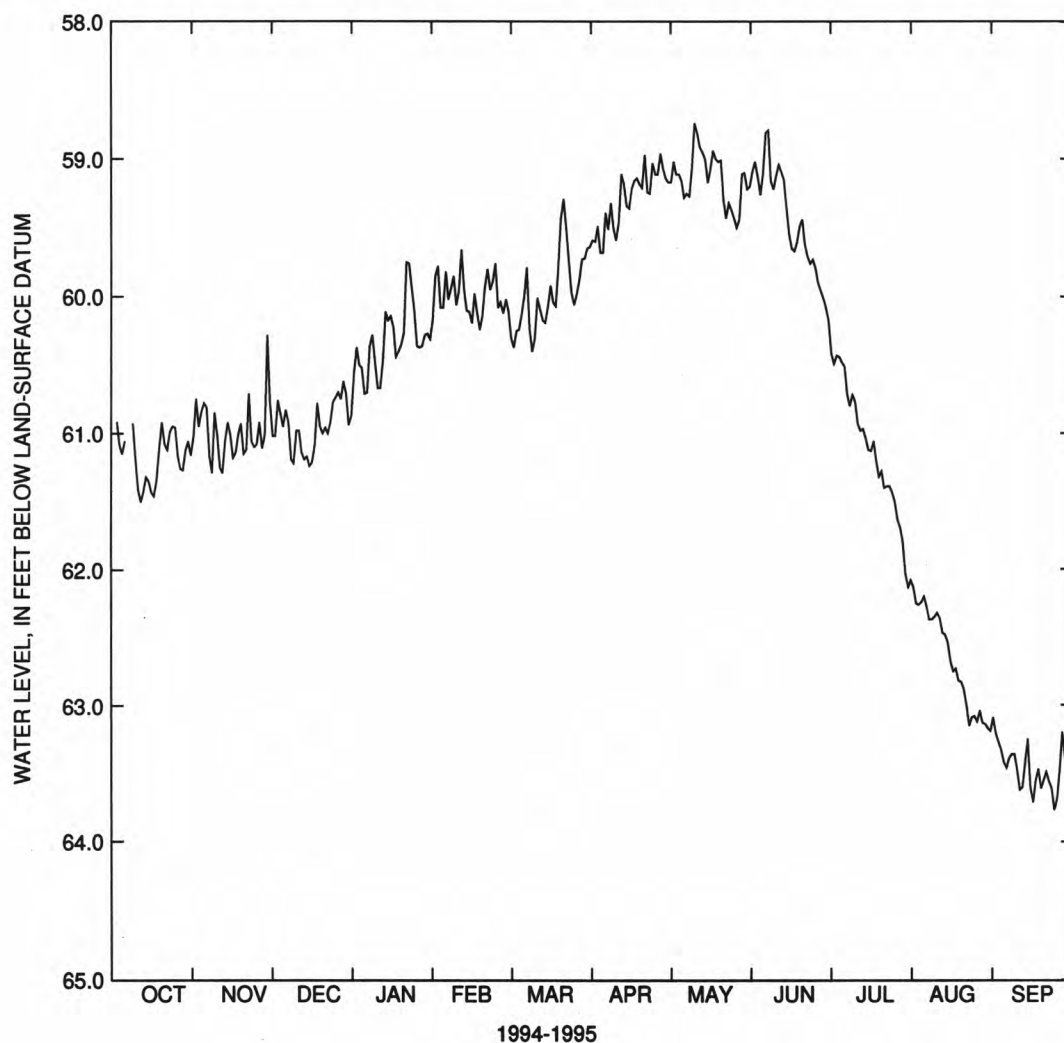
REMARKS.--Water levels affected by regional pumping.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	61.06	60.81	60.83	60.70	60.02	60.13	59.68	59.16	59.11	60.48	62.20	63.46
10	61.41	61.25	60.98	60.67	59.66	60.31	59.59	58.74	59.12	60.77	62.32	63.62
15	61.43	61.18	61.21	60.22	59.98	60.07	59.36	59.17	59.54	61.12	62.68	63.71
20	61.08	61.12	60.96	59.75	59.80	59.43	59.21	59.01	59.44	61.28	62.88	63.49
25	61.16	60.92	60.70	60.37	60.04	60.06	59.11	59.43	59.79	61.50	63.12	63.47
EOM	61.02	61.02	60.56	59.85	60.10	59.64	59.17	59.20	60.18	62.08	63.09	63.32
WTR YR 1995	HIGHEST			58.40	APR 18			LOWEST	63.77	SEP 23		



GROUND-WATER LEVELS

INGHAM COUNTY

424502084331301. Local number, 4N 2W 9BDAD.

LOCATION.--Lat 42°45'02", 84°33'13", Hydrologic Unit 04050004, at North Grand River Avenue, in 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.

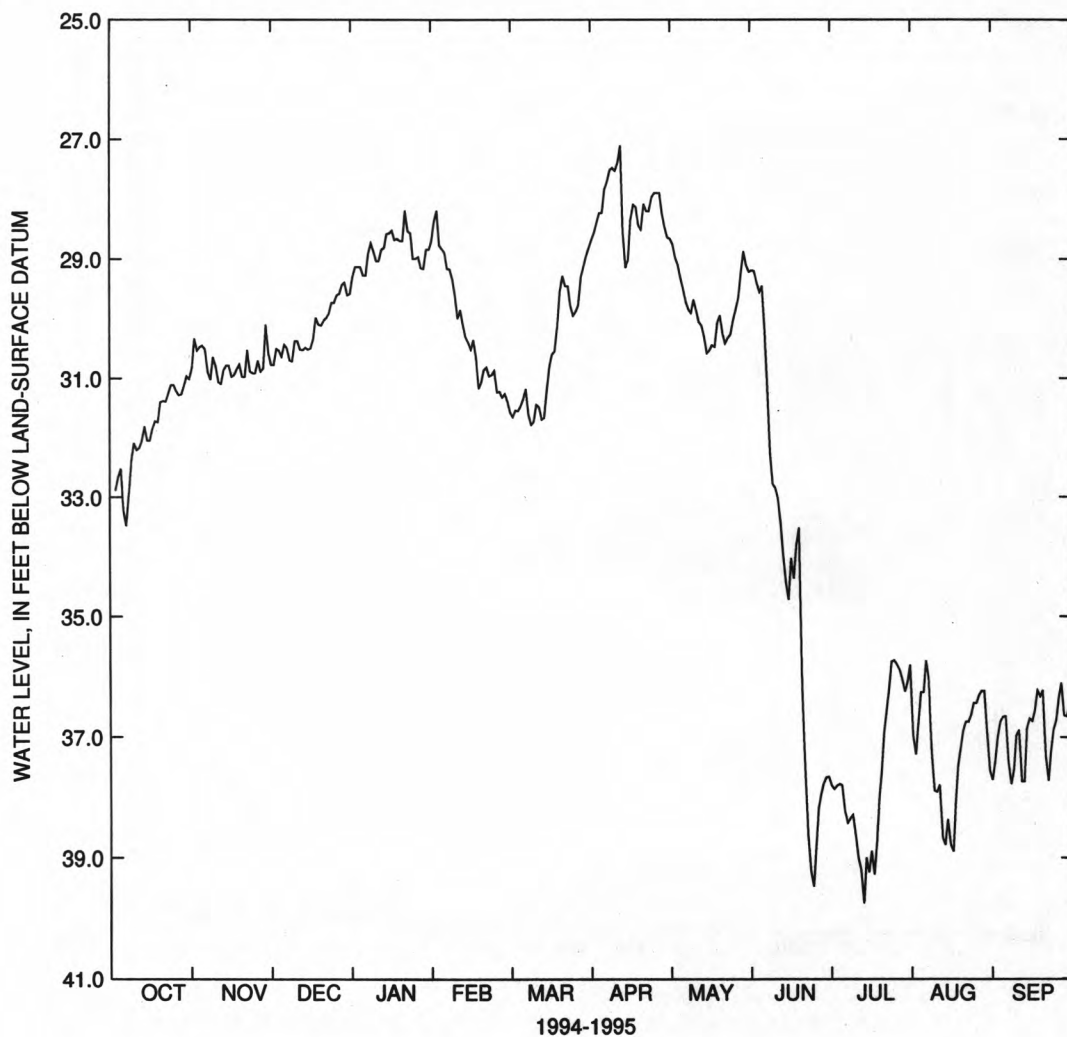
REMARKS.--Water levels affected by regional pumping.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	33.22	30.51	30.43	29.27	29.16	31.47	28.23	29.32	29.45	37.80	36.25	36.65
10	32.21	31.06	30.37	29.03	29.85	31.73	27.53	29.68	32.85	38.63	37.91	36.88
15	32.05	30.97	30.49	28.52	30.35	31.19	29.01	30.57	34.72	39.23	38.78	36.73
20	31.38	30.97	30.02	28.19	30.81	29.54	28.51	29.94	36.18	37.55	36.89	37.31
25	31.21	30.70	29.60	28.96	31.22	29.94	27.90	30.02	38.84	35.73	36.43	36.33
EOM	30.82	30.77	29.30	28.37	31.38	28.81	28.64	29.21	37.66	35.81	37.71	36.19
WTR YR 1995	HIGHEST			26.94	APR 11			LOWEST	39.74	JUL 13		



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421151085351601. Local number, 3S 11W 22BCD.

LOCATION.--Lat 42°11'51", long 85°35'16", Hydrologic Unit 04050003, at Portage Central High School, in Kalamazoo Township, in Portage.

Owner: Portage Public Schools.

AQUIFER.--Glacial deposits of Pleistocene age.

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.

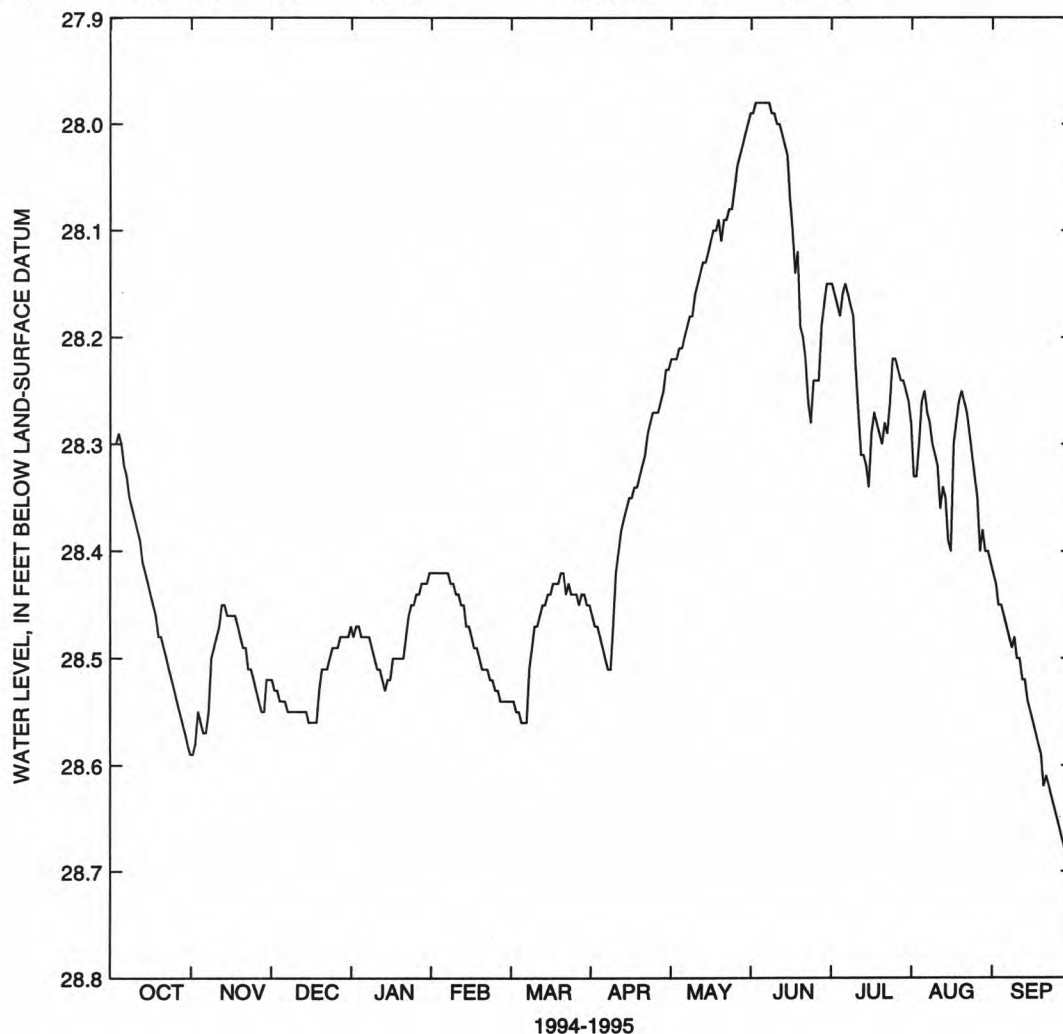
REMARKS.--Water levels affected by pumping.

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, 28.72 ft below land-surface datum, Sept. 30, 1995.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	28.32	28.57	28.54	28.48	28.42	28.56	28.49	28.21	27.98	28.16	28.25	28.47
10	28.38	28.47	28.55	28.51	28.45	28.47	28.42	28.16	28.00	28.23	28.32	28.50
15	28.44	28.46	28.56	28.50	28.49	28.44	28.35	28.12	28.07	28.34	28.40	28.56
20	28.49	28.49	28.51	28.48	28.51	28.42	28.32	28.11	28.20	28.30	28.26	28.61
25	28.54	28.54	28.49	28.44	28.54	28.44	28.27	28.06	28.24	28.22	28.35	28.66
EOM	28.59	28.52	28.48	28.42	28.54	28.45	28.23	27.99	28.15	28.28	28.42	28.72
WTR YR 1995	HIGHEST			27.97	JUN 5-8			LOWEST	28.72	SEP 30		



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 of Pleistocene age.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 3 in., depth 248 ft, screened 245 ft to 248 ft.

INSTRUMENTATION.--Water-level recorder.

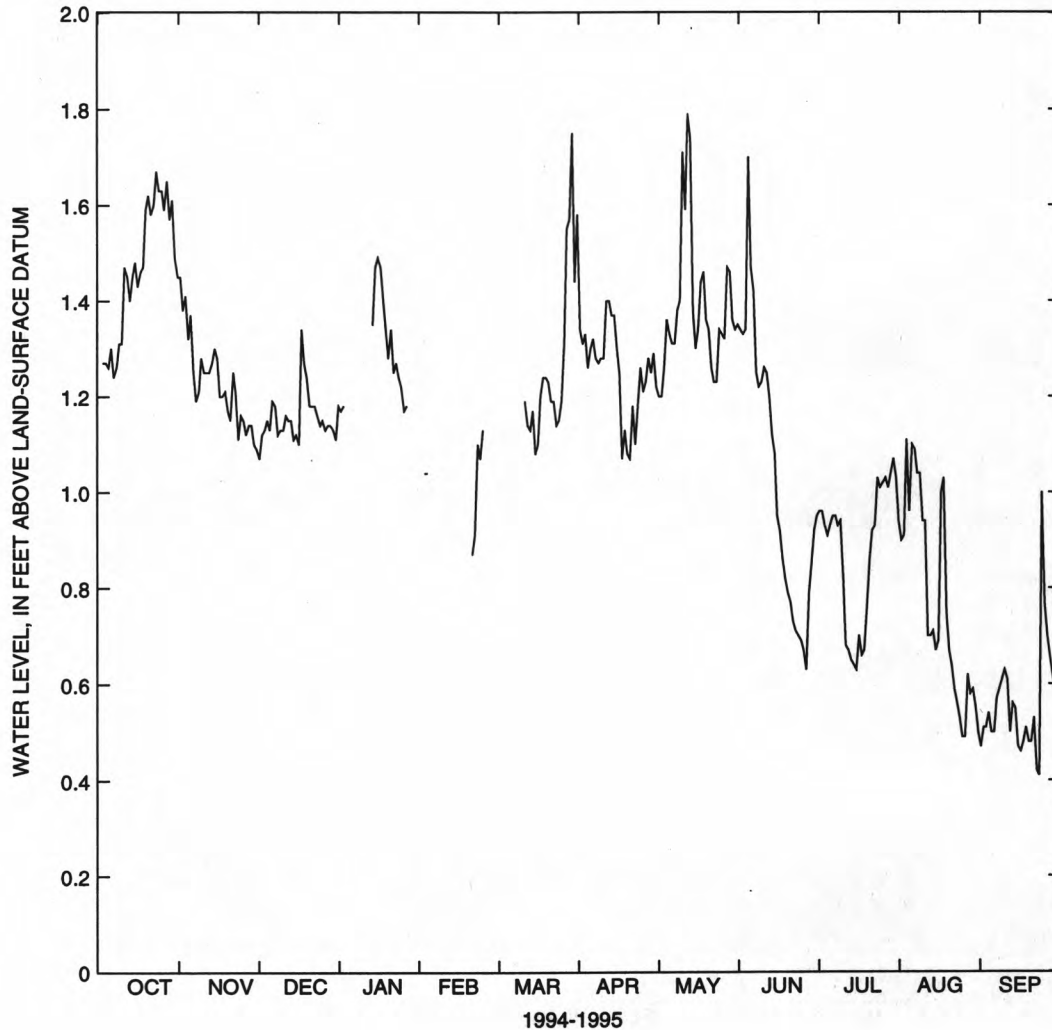
DATUM.--Elevation of land-surface datum is 880 ft above sea level, from topographic map. Measuring point: Top of shelter base, 3.5 ft above land-surface datum.

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, 1.10 ft below land-surface datum, July 14, 15, 1988.

WATER LEVEL, IN FEET ABOVE (+) AND BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	+1.30	+1.25	+1.19	---	---	---	+1.30	+1.33	+1.47	+0.93	+1.10	+0.50
10	+1.47	+1.25	+1.16	---	---	---	+1.28	+1.71	+1.26	+0.82	+0.94	+0.61
15	+1.43	+1.20	+1.10	+1.47	---	+1.08	+1.30	+1.30	+0.95	+0.63	+0.69	+0.46
20	+1.58	+1.25	+1.18	+1.25	+0.91	+1.23	+1.07	+1.34	+0.77	+0.86	+0.64	+0.53
25	+1.59	+1.12	+1.13	+1.18	---	+1.19	+1.21	+1.33	+0.67	+1.02	+0.49	+0.70
EOM	+1.45	+1.07	+1.17	---	---	+1.58	+1.22	+1.35	+0.95	+0.94	+0.47	+0.59
WTR YR 1995	HIGHEST			+2.16	OCT 22	LOWEST			+0.41	SEP 22		



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 of Pleistocene age.

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. Measuring point: Plywood instrument shelf, 2.5 ft above land-surface datum.

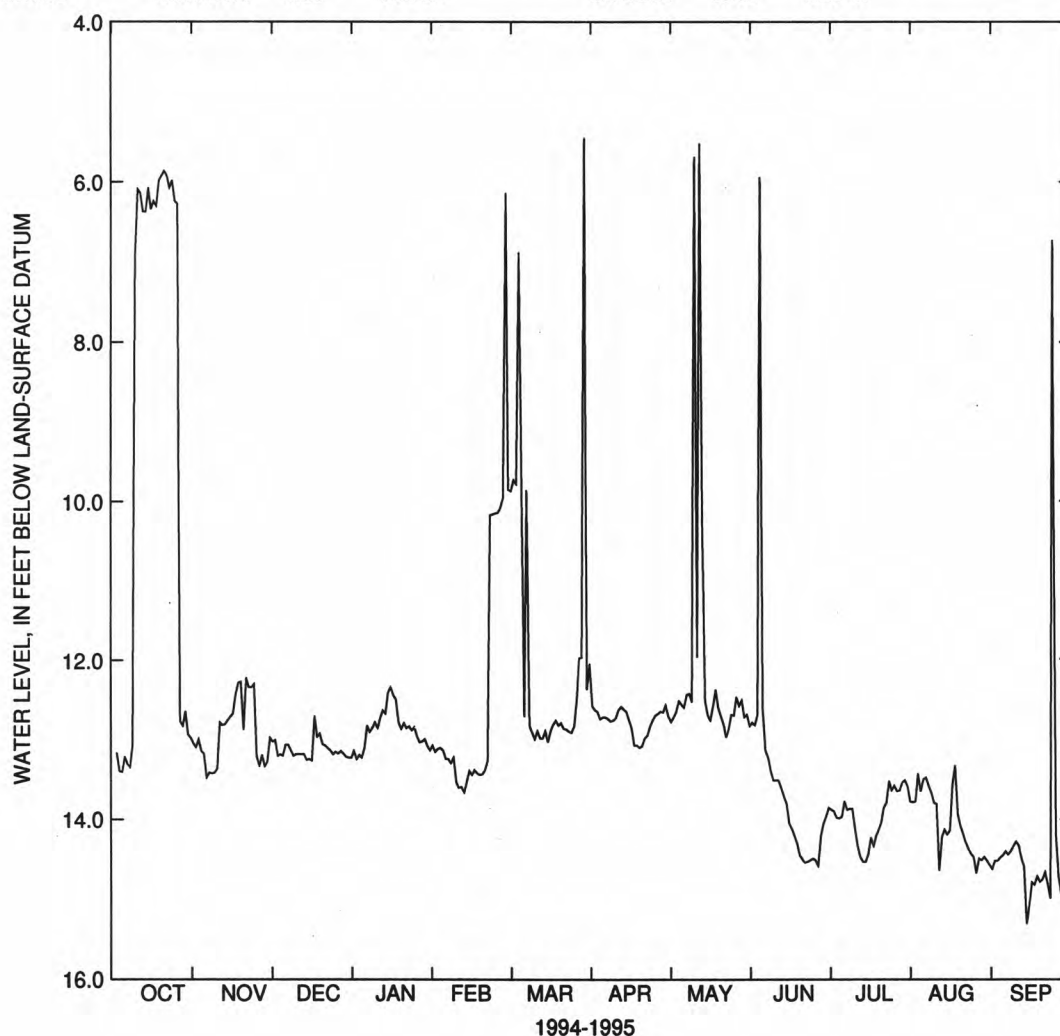
REMARKS.--Water levels affected by pumping.

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, 17.09 ft below land-surface datum, July 20, 1994.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	13.21	13.47	13.06	12.82	13.24	9.57	12.72	12.56	12.62	13.97	13.50	14.40
10	6.09	12.78	13.18	12.73	13.59	12.99	12.73	5.69	13.51	14.12	13.81	14.33
15	6.34	12.67	13.26	12.44	13.38	13.03	12.76	12.70	14.05	14.44	14.14	14.79
20	5.86	12.22	13.07	12.85	13.26	12.79	13.08	12.71	14.50	14.04	14.18	14.66
25	6.27	13.32	13.17	13.03	10.08	12.83	12.70	12.70	14.51	13.58	14.67	14.71
EOM	13.04	13.02	13.14	13.15	9.85	12.05	12.71	12.83	13.86	13.78	14.62	14.14
WTR YR 1995	HIGHEST			5.24	OCT 25			LOWEST	15.31	SEP 13		



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421332085401902. Local number, 3S 12W 22AD2.

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 of Pleistocene age.

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. Measuring point: Plywood instrument shelf, 2.5 ft above land-surface datum.

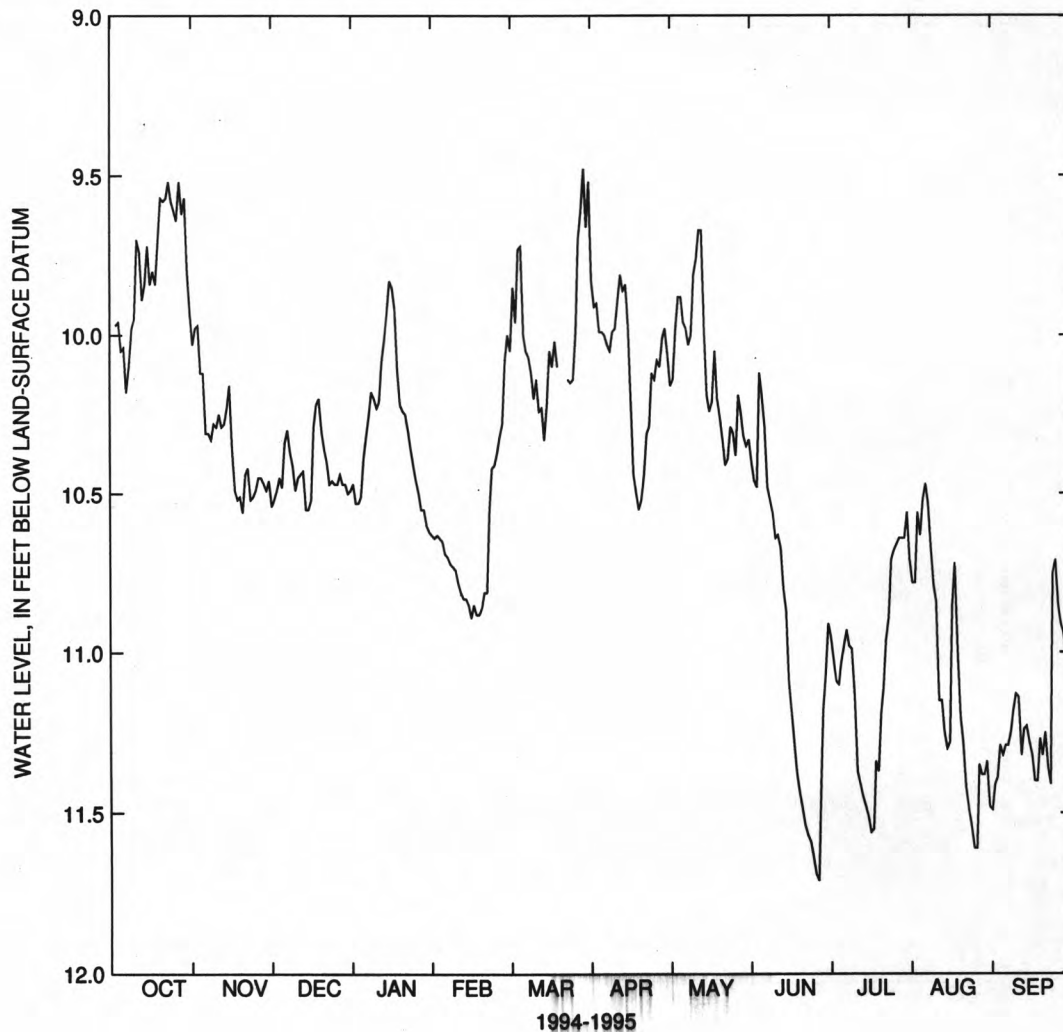
REMARKS.--Water levels affected by pumping.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 9.1 ft below land-surface datum, August 1975; lowest recorded, 12.8 ft below land-surface datum, August, 1984.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	10.04	10.31	10.34	10.32	10.70	9.72	9.99	9.88	10.19	11.03	10.52	11.29
10	9.70	10.25	10.45	10.21	10.81	10.20	9.98	9.81	10.64	11.14	10.84	11.14
15	9.84	10.36	10.52	9.85	10.85	10.22	9.98	10.19	11.09	11.51	11.28	11.32
20	9.58	10.44	10.36	10.25	10.81	---	10.52	10.26	11.49	11.19	11.28	11.25
25	9.64	10.45	10.47	10.50	10.32	10.14	10.14	10.31	11.69	10.68	11.61	10.85
EOM	10.03	10.54	10.47	10.64	10.00	9.52	10.06	10.33	10.91	10.71	11.49	11.04
WTR YR 1995	HIGHEST			9.18	OCT 22			LOWEST		11.71	JUN 26	



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 of Pleistocene age.

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. 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, 15.98 ft below land-surface datum, Sept. 29-30, 1995.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	11.98	11.36	11.04	---	11.53	12.34	12.51	12.22	12.06	13.00	14.40	15.33
10	11.94	11.28	11.17	---	11.60	---	12.08	12.15	12.11	13.02	14.28	15.45
15	12.03	11.19	---	---	11.61	---	11.90	11.99	12.42	13.67	14.36	15.71
20	12.03	11.05	---	---	11.60	---	11.92	12.18	12.93	14.08	14.28	15.80
25	12.19	11.00	---	---	12.03	---	12.05	12.38	13.59	14.10	14.46	15.87
EOM	11.86	11.14	---	11.54	12.19	12.51	12.14	12.07	13.53	14.26	15.01	15.98

WTR YR 1995

HIGHEST

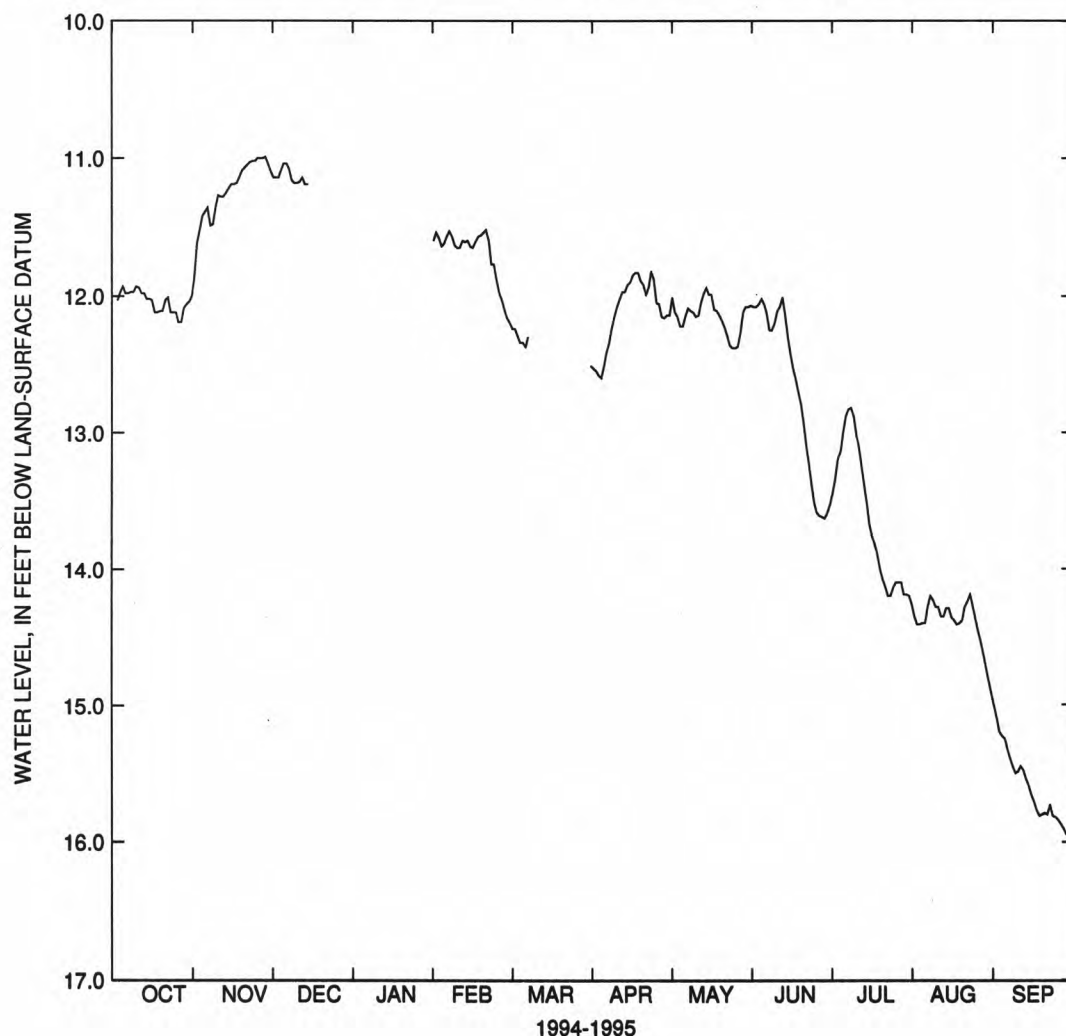
10.93

NOV 27, 28

LOWEST

15.98

SEP 29, 30



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 of Pleistocene age.

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. Measuring point: Plywood instrument shelf, 3.0 ft above land-surface datum.

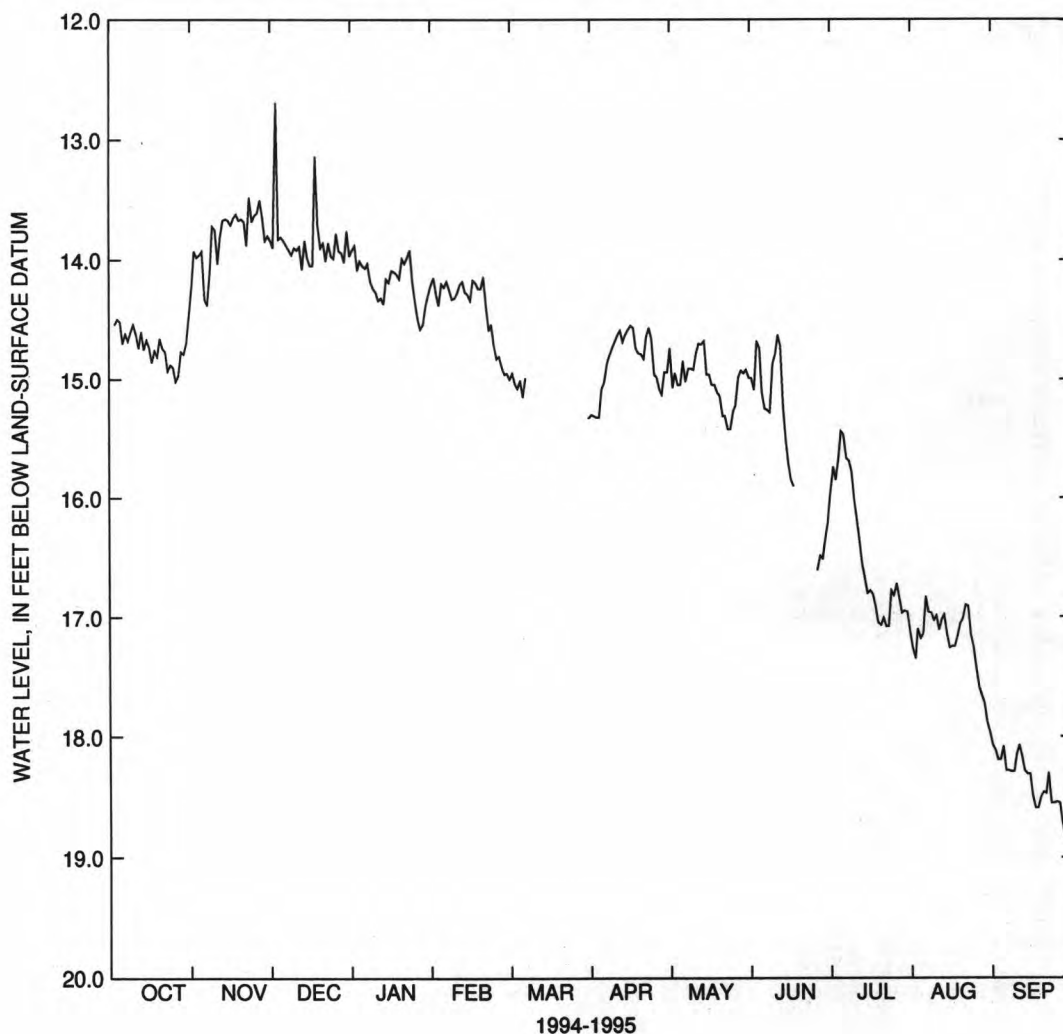
REMARKS.--Water levels affected by pumping.

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, 18.83 ft below land-surface datum, Sept. 27, 1995.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	14.70	14.33	13.84	14.07	14.18	15.01	15.08	15.05	15.10	15.44	17.14	18.28
10	14.62	14.03	13.92	14.34	14.21	---	14.69	14.92	14.79	16.01	16.99	18.07
15	14.73	13.71	14.05	14.09	14.17	---	14.58	14.96	15.71	16.80	17.26	18.50
20	14.74	13.68	13.86	14.03	14.38	---	14.79	15.14	---	17.07	17.02	18.47
25	15.02	13.61	13.78	14.50	14.81	---	14.96	15.27	---	16.82	17.44	18.55
EOM	14.23	13.84	13.92	14.15	14.95	15.33	14.94	14.99	16.20	17.12	18.07	18.69
WTR YR 1995	HIGHEST			12.34	NOV 27			LOWEST	18.83	SEP 27		



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 of Pleistocene age.

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.

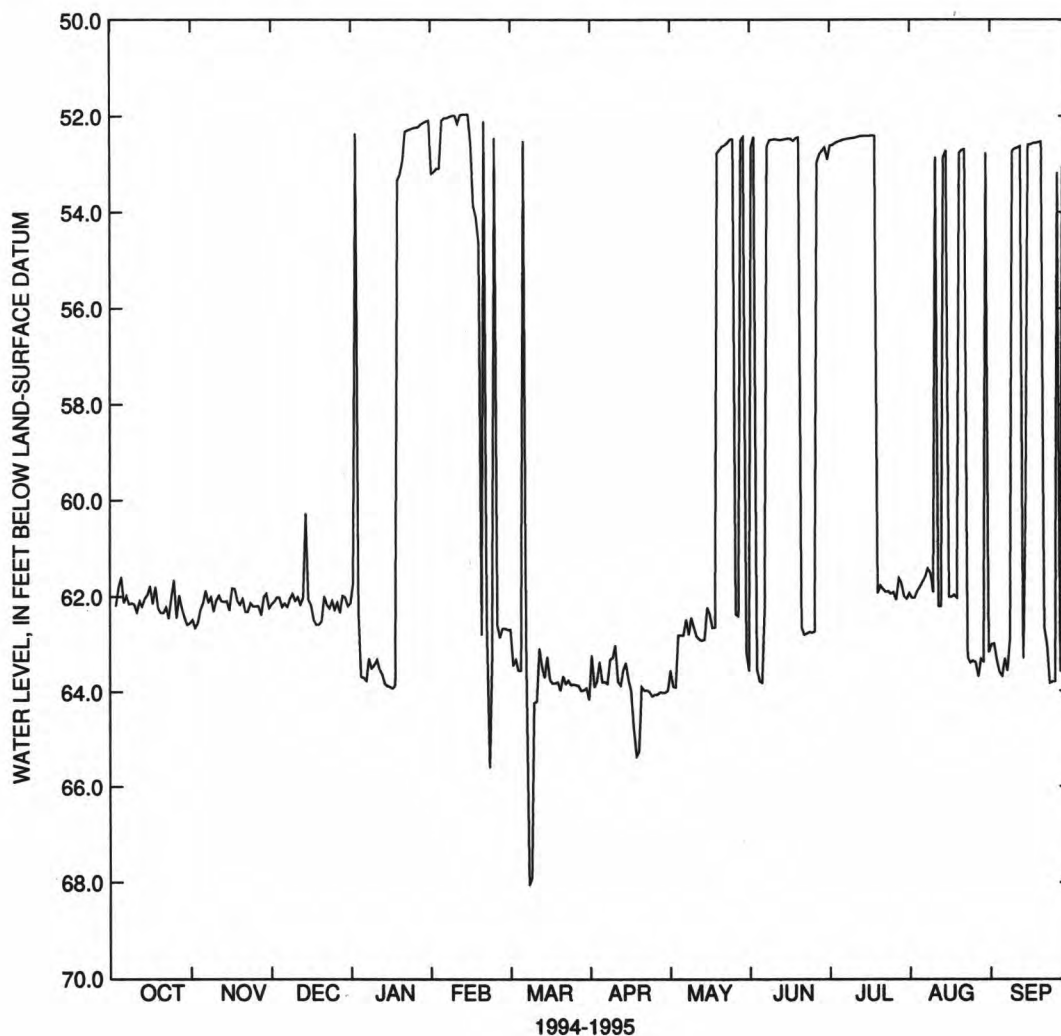
REMARKS.--Water levels affected by pumping.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	62.13	61.88	62.15	63.77	52.04	63.56	63.81	62.83	63.83	52.51	61.71	63.33
10	62.33	61.98	62.01	63.53	51.98	64.24	63.04	62.67	52.48	52.45	52.86	52.66
15	61.78	61.83	62.18	63.93	53.87	63.28	63.77	62.25	52.47	52.41	62.03	52.59
20	62.34	62.32	62.00	52.32	62.69	63.98	63.91	52.70	62.66	61.79	52.71	62.67
25	62.45	62.20	62.13	52.23	62.87	63.85	64.07	52.48	62.75	61.93	63.40	53.18
EOM	62.49	62.16	61.72	53.16	62.71	64.17	63.99	63.58	52.90	61.95	63.03	63.61
WTR YR 1995	HIGHEST			51.89	FEB 9			LOWEST	68.06	MAR 8		



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 of Pleistocene age.

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.

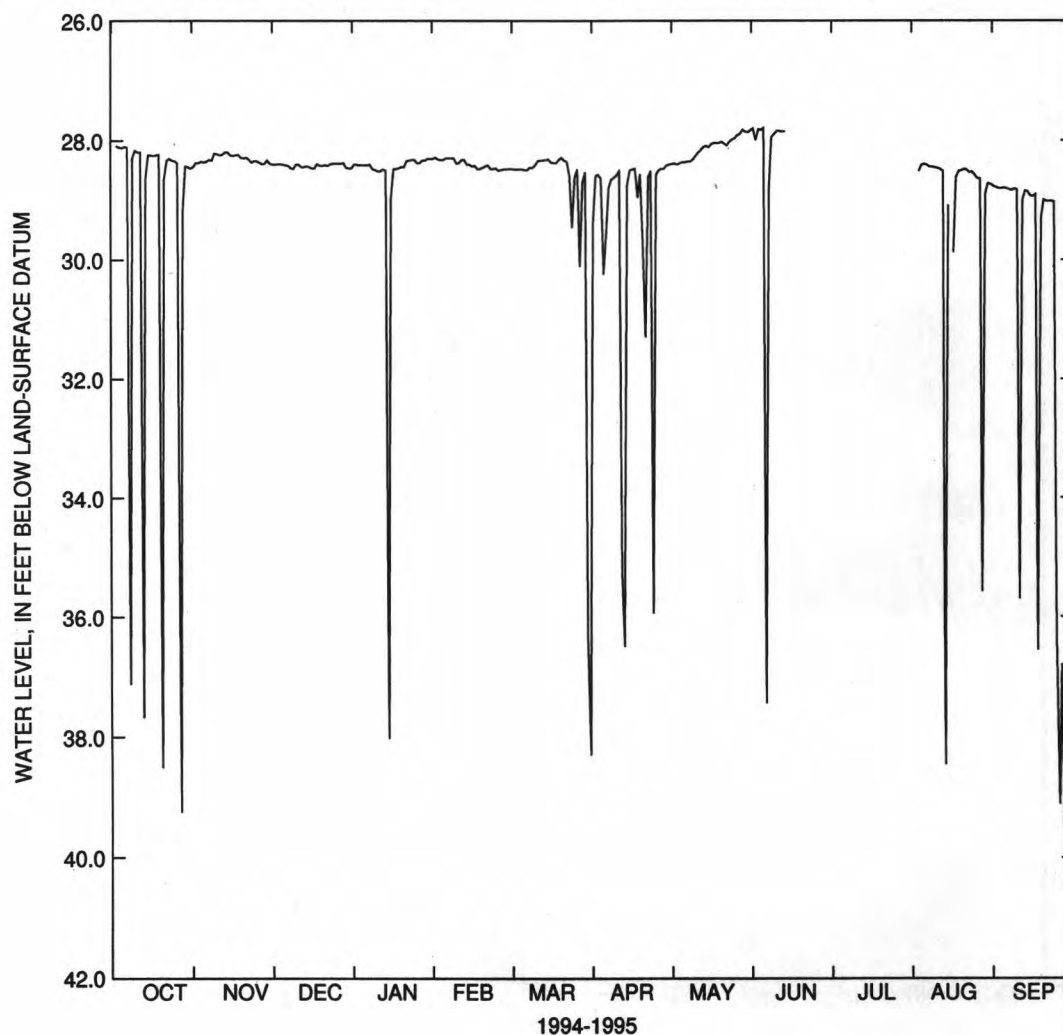
REMARKS.--Water levels affected by pumping.

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, 50.4 ft below land-surface datum, June 1971.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	28.10	28.35	28.41	28.41	28.29	28.48	30.24	28.36	27.79	---	28.39	28.80
10	28.19	28.24	28.40	28.51	28.32	28.41	28.58	28.26	27.84	---	28.46	35.70
15	28.24	28.25	28.46	28.47	28.42	28.31	28.50	28.11	---	---	---	28.93
20	28.64	28.28	28.41	28.34	28.41	28.28	29.76	28.02	---	---	28.48	29.01
25	28.37	28.36	28.38	28.37	28.49	28.61	28.57	27.96	---	---	28.63	39.10
EOM	28.44	28.40	28.40	28.28	28.47	38.29	28.40	27.83	---	---	28.76	29.18
WTR YR 1995	HIGHEST			27.76	JUN 6			LOWEST	40.55	SEP 27		



GROUND-WATER LEVELS

KALAMAZOO COUNTY

421614085270801. Local number, 2S 10W 26BCC.

LOCATION.--Lat 42°16'14", long 85°27'08", Hydrologic Unit 04050003, at end of Miller Road by Morrow Lake, Comstock Township, 4.0 mi east of Kalamazoo. Owner: City of Kalamazoo.

AQUIFER.--Glacial deposits of Pleistocene age.

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.

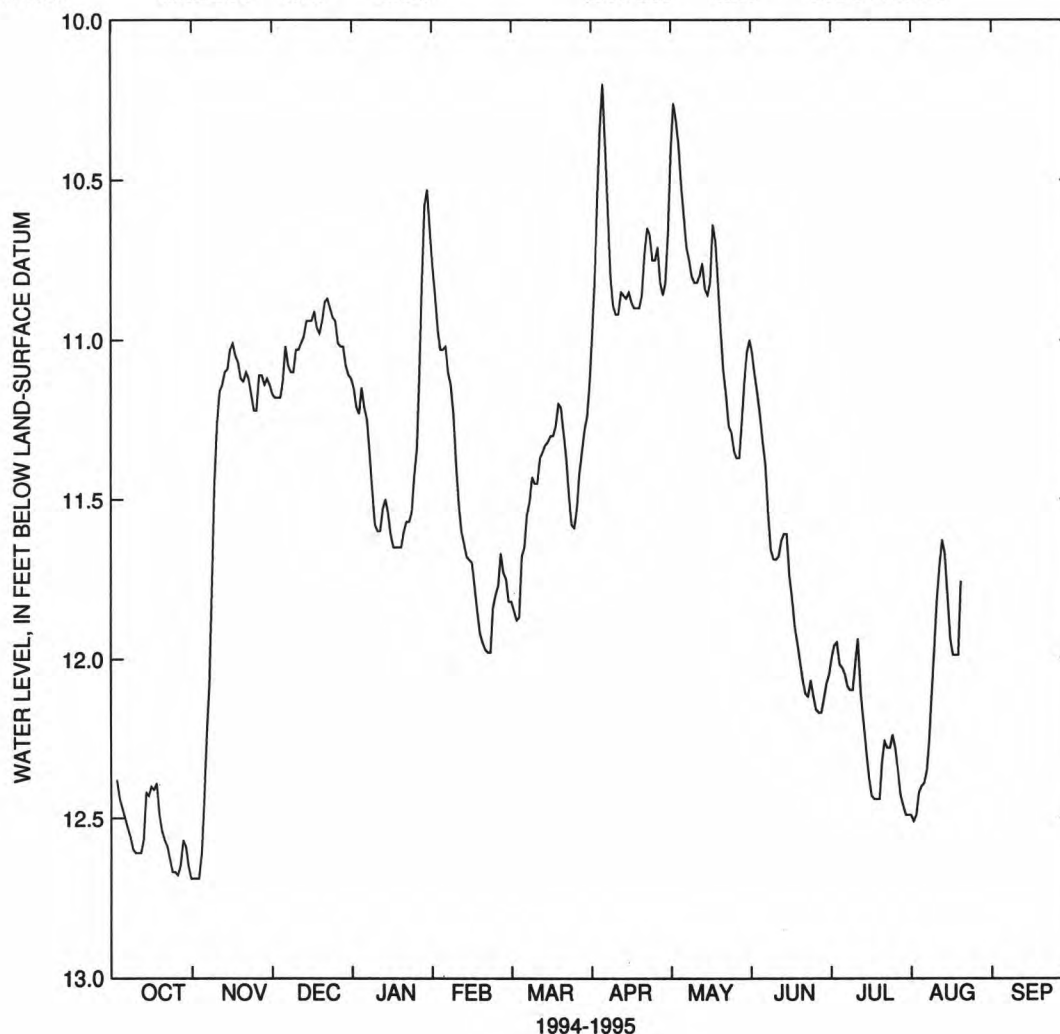
REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--February 1987 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 5.9 ft below land-surface datum, April 1988; lowest recorded, 13.1 ft below land-surface datum, September 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	12.50	12.24	11.02	11.25	11.10	11.68	10.20	10.52	11.32	12.03	12.39	---
10	12.61	11.16	11.03	11.60	11.60	11.45	10.92	10.82	11.69	12.01	11.82	---
15	12.40	11.01	10.94	11.65	11.77	11.32	10.85	10.86	11.74	12.37	11.94	---
20	12.57	11.10	10.88	11.57	11.98	11.21	10.86	10.97	12.07	12.32	---	---
25	12.68	11.11	11.01	11.10	11.67	11.59	10.75	11.35	12.16	12.28	---	---
EOM	12.69	11.17	11.15	10.86	11.82	11.13	10.66	11.00	12.05	12.49	---	---
WTR YR 1995	HIGHEST 10.19			APR 5			LOWEST 12.69			OCT 30- NOV 2		



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 of Pleistocene age.

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.

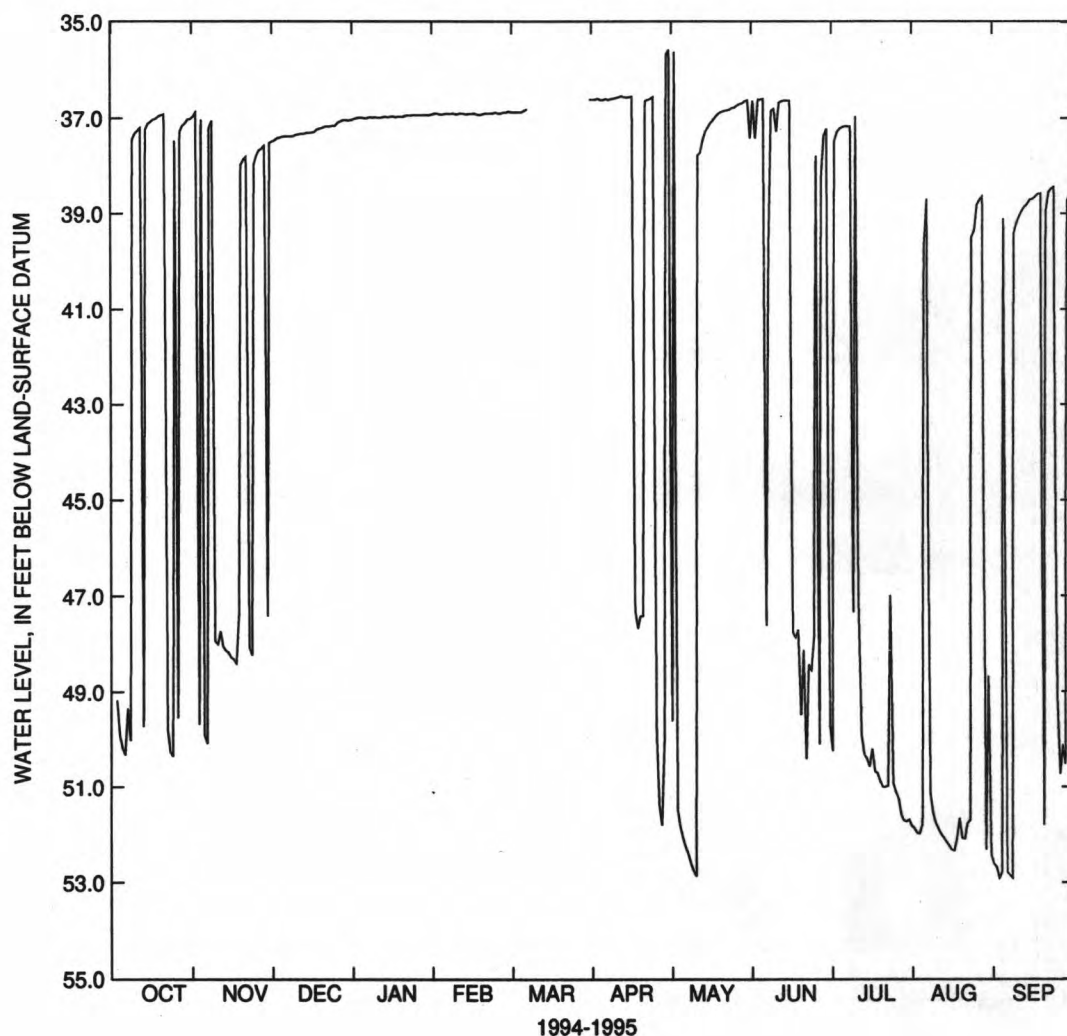
REMARKS.--Water levels affected by pumping.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	50.32	50.08	37.38	37.00	36.91	36.87	36.62	52.08	36.60	37.19	39.70	52.79
10	37.27	47.74	37.34	36.99	36.90	---	36.58	52.86	37.28	36.97	51.87	39.06
15	37.08	48.31	37.30	36.96	36.90	---	36.56	37.19	36.63	50.57	52.31	38.69
20	36.92	37.81	37.18	36.94	36.90	---	47.42	36.87	48.14	51.00	52.08	38.95
25	49.55	37.68	37.09	36.93	36.90	---	49.91	36.78	37.79	51.11	38.81	50.73
EOM	36.97	37.49	37.02	36.90	36.86	36.61	35.58	37.42	49.71	51.81	52.61	38.54
WTR YR 1995	HIGHEST			35.27	APR 25			LOWEST	52.91	SEP 2		



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 of Pleistocene age.

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.

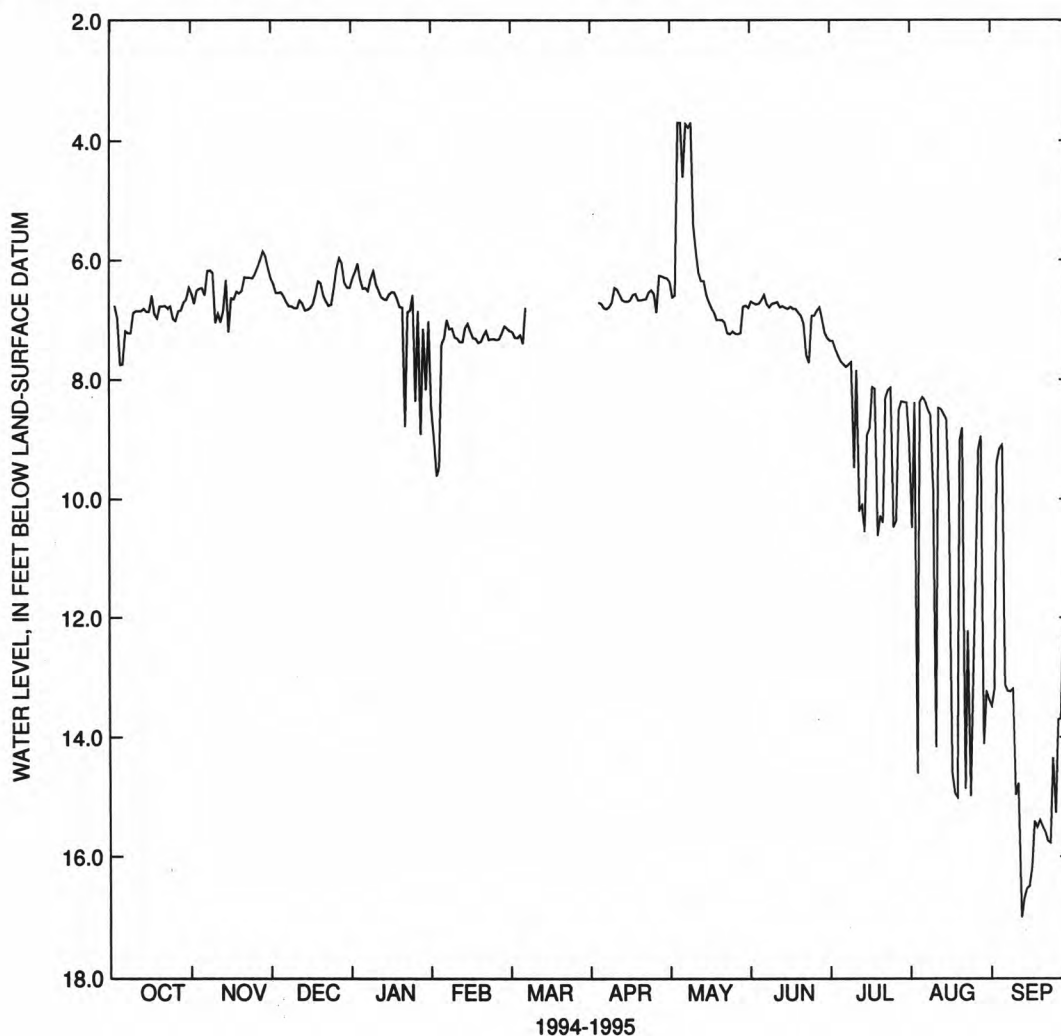
REMARKS.--Water levels affected by pumping.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 3.60 ft below land-surface datum, May 5-6, 1995; lowest recorded, 31.1 ft below land surface datum, August 1961.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	7.74	6.58	6.60	6.46	7.00	7.25	6.73	3.70	6.67	7.69	8.30	13.13
10	6.85	6.89	6.80	6.50	7.37	---	6.46	5.41	6.72	9.47	14.17	14.78
15	6.86	6.63	6.80	6.53	7.30	---	6.69	6.59	6.82	8.93	10.13	16.17
20	6.77	6.28	6.59	8.78	7.18	---	6.67	7.00	6.93	10.29	8.81	15.59
25	7.01	6.12	6.14	6.85	7.32	---	6.56	7.19	6.93	10.48	11.26	13.71
EOM	6.55	6.30	6.31	8.99	7.14	7.82	6.30	6.80	7.31	9.03	13.48	16.11
WTR YR 1995	HIGHEST		3.60	MAY 5, 6		LOWEST		17.00	SEP 11			



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 of Pleistocene age.

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.

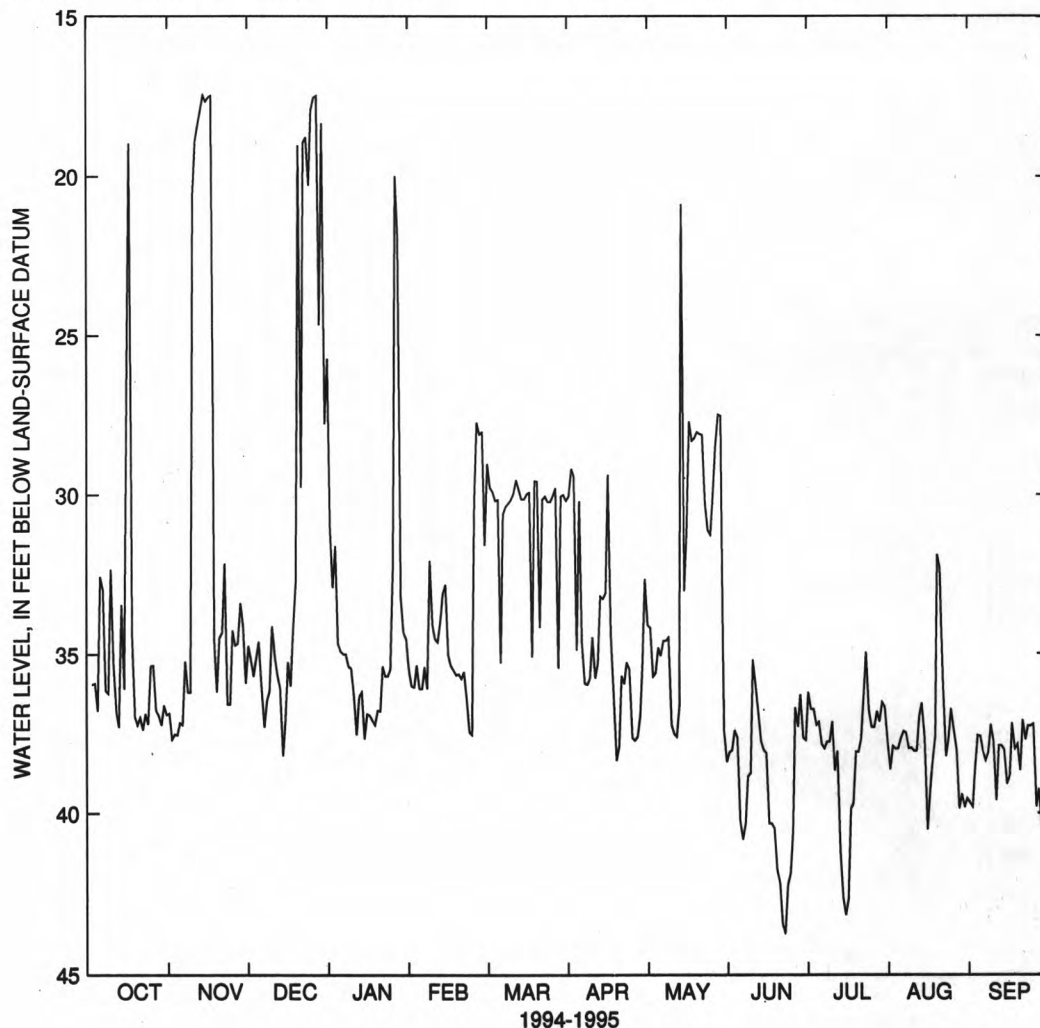
REMARKS.--Water levels affected by pumping.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	32.57	37.21	36.06	35.00	35.41	30.15	30.20	34.81	40.25	37.14	37.66	38.08
10	35.33	18.87	35.06	37.52	34.63	30.15	34.48	37.23	35.19	37.14	38.05	39.60
15	26.49	17.53	35.25	36.92	35.36	30.13	33.08	33.02	38.12	43.16	40.51	38.85
20	36.98	34.32	29.76	35.39	35.56	29.58	37.89	28.04	42.17	38.08	32.32	37.09
25	35.35	34.72	17.54	19.99	27.73	30.21	37.63	31.26	40.62	37.30	37.41	39.79
EOM	36.85	34.74	30.99	36.00	31.57	30.18	32.65	38.39	37.71	37.73	39.67	38.32
WTR YR 1995	HIGHEST			17.32	NOV 13			LOWEST	43.74	JUN 22		



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 of Pleistocene age.

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.

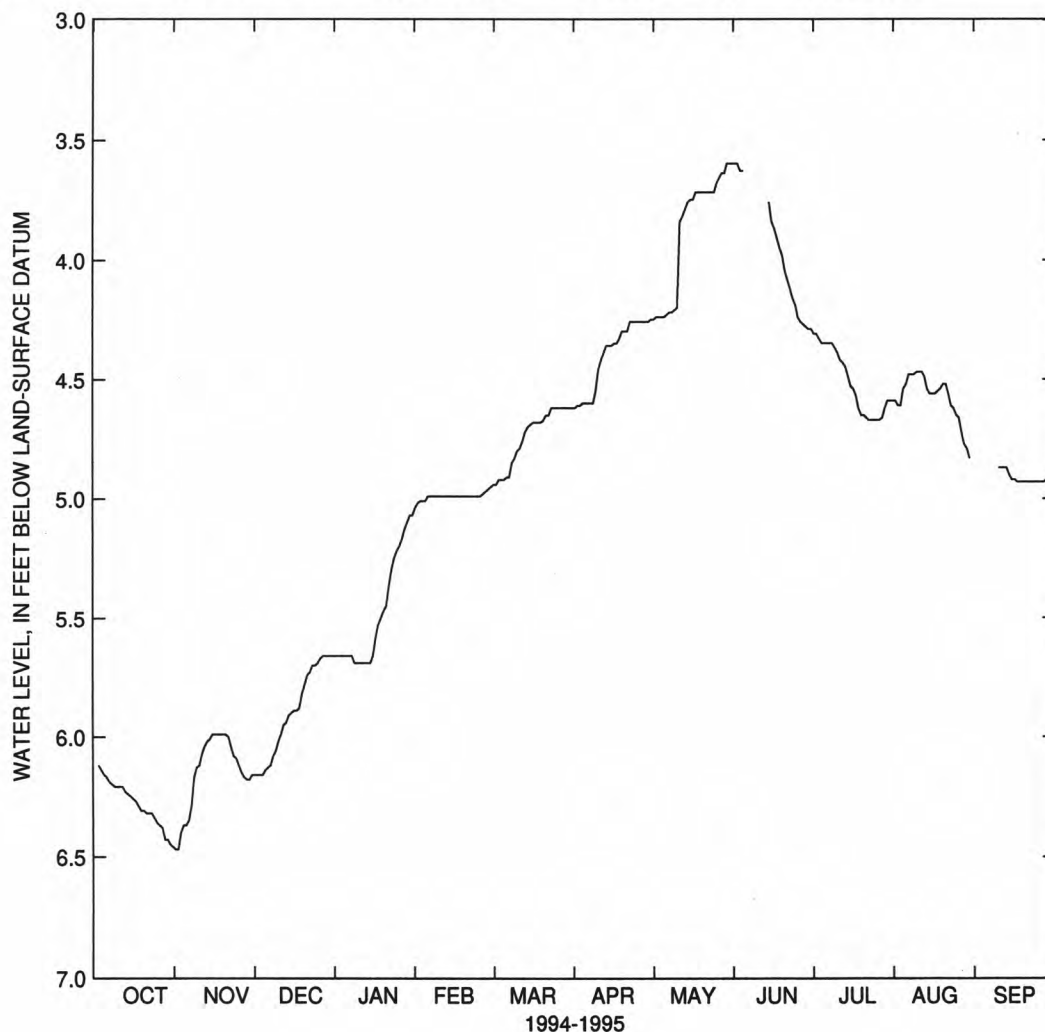
REMARKS.--Water levels affected by pumping.

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, 6.67 ft below land-surface datum, Sept. 2, 1988.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	6.17	6.35	6.13	5.66	4.99	4.92	4.60	4.24	---	4.35	4.52	---
10	6.21	6.07	5.99	5.69	4.99	4.80	4.46	4.20	---	4.39	4.47	4.87
15	6.26	5.99	5.89	5.58	4.99	4.69	4.36	3.75	3.84	4.53	4.56	4.92
20	6.32	6.00	5.74	5.37	4.99	4.67	4.30	3.72	4.05	4.65	4.52	4.93
25	6.37	6.15	5.67	5.17	4.98	4.62	4.26	3.68	4.24	4.67	4.66	4.93
EOM	6.47	6.16	5.66	5.02	4.95	4.62	4.25	3.60	4.29	4.59	---	4.95
WTR YR 1995	HIGHEST			3.60	MAY 28- JUN 3			LOWEST	6.47	OCT 31- NOV 1		



GROUND-WATER LEVELS

LIVINGSTON COUNTY

422853083402801. Local number, 1N 6E 13DBAB.

LOCATION.--Lat 42°28'53", long 83°40'28", Hydrologic Unit 04090005, at Twelve Mile Road, 2 mi northwest of South Lyon. Owner: American Aggregates Company.

AQUIFER.--Glacial deposits of Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, diameter 2 in., depth 29 ft, 1.25 in. diameter screen.

INSTRUMENTATION.--Water-level recorder.

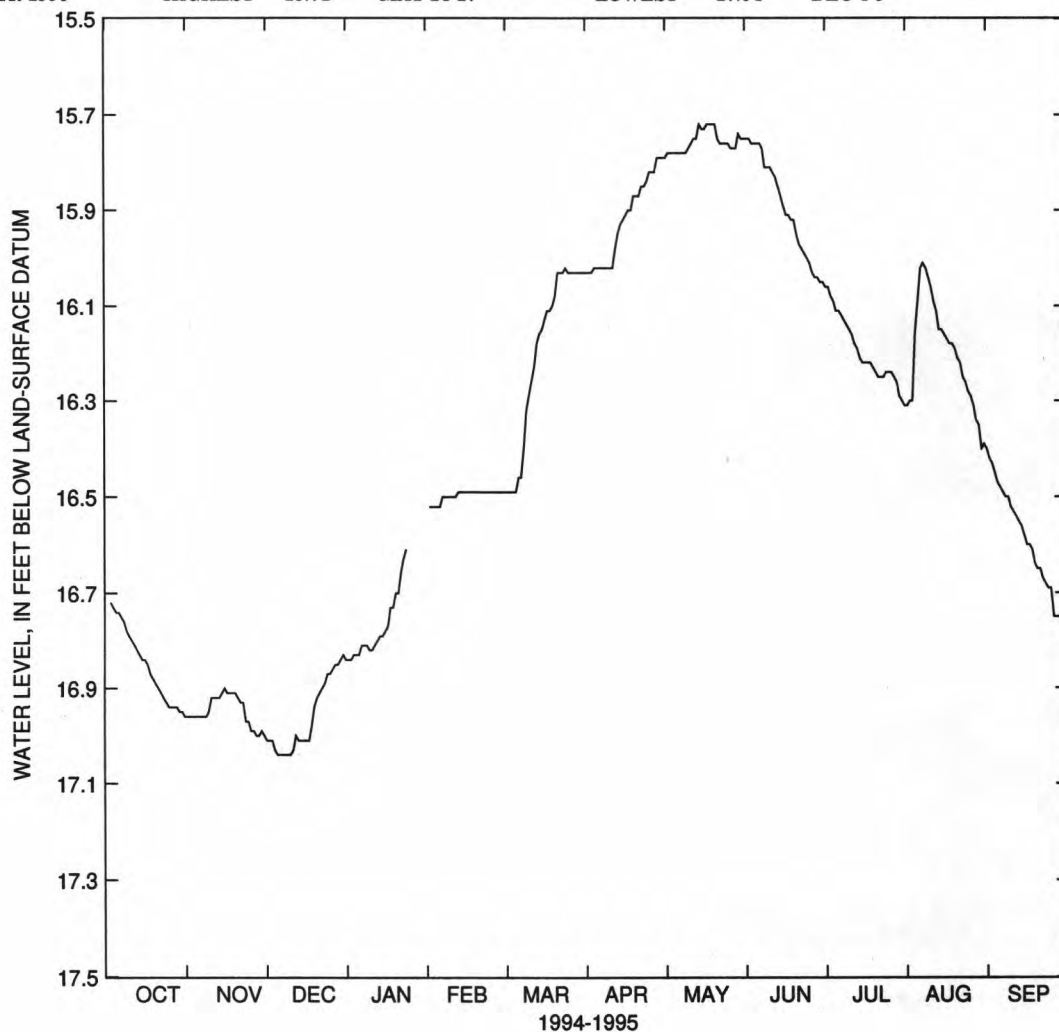
DATUM.--Elevation of land-surface datum is 930 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 2.50 ft above land-surface datum.

PERIOD OF RECORD.--April 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 12.1 ft below land-surface datum, Apr. 22, 1974; lowest recorded, 21.58 ft below land-surface datum, Oct. 30, 31, Nov. 1, 1979.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	16.74	16.96	17.04	16.81	16.50	16.49	16.02	15.78	15.76	16.11	16.09	16.48
10	16.80	16.92	17.03	16.81	16.50	16.29	16.02	15.77	15.81	16.15	16.06	16.53
15	16.84	16.91	17.01	16.77	16.49	16.15	15.92	15.73	15.89	16.22	16.16	16.60
20	16.90	16.93	16.91	16.66	16.49	16.08	15.87	15.72	15.95	16.24	16.21	16.65
25	16.94	16.99	16.86	---	16.49	16.03	15.82	15.76	16.01	16.24	16.29	16.75
EOM	16.96	17.01	16.84	16.52	16.49	16.03	15.79	15.75	16.05	16.31	16.40	16.78
WTR YR 1995	HIGHEST			15.71	MAY 14-17			LOWEST	17.04	DEC 4-9		



GROUND-WATER LEVELS

MARQUETTE COUNTY

461922087212301. Local number, 45N 24W 06CB.

LOCATION.--Lat 46°19'22", long 87°21'23", Hydrologic Unit 04030110, 0.2 mi south of McDonald School, K.I. Sawyer Air Force Base, 5.2 mi northeast of Gwinn. Owner: K.I. Sawyer Air Force Base.

AQUIFER.--Glacial deposits of Pleistocene age.

WELL CHARACTERISTICS.--Hand augered observation well, diameter 2 in., depth 10 ft, screened 7 to 10 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 1,116.65 ft above sea level. Measuring point: Top of casing 2.0 ft above land-surface datum.

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

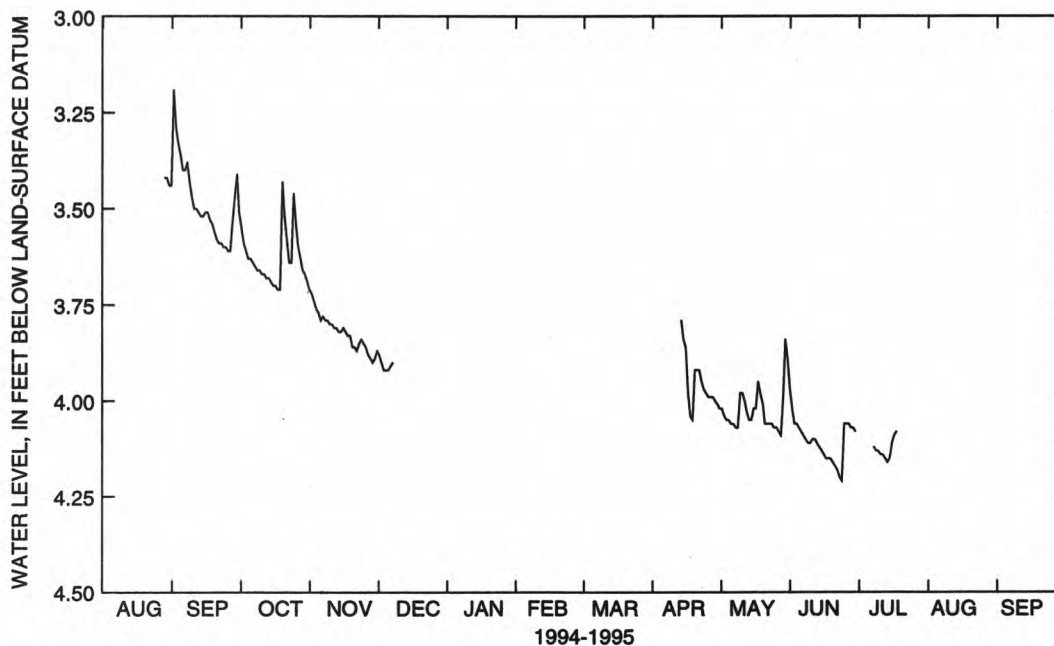
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 3.16 ft below land-surface datum, Aug. 31, 1994; lowest recorded, 4.21 ft below land-surface datum, June 23, 1995.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	---	---	---	---	---	---	---	---	---	---	3.40
10	---	---	---	---	---	---	---	---	---	---	---	3.50
15	---	---	---	---	---	---	---	---	---	---	---	3.51
20	---	---	---	---	---	---	---	---	---	---	---	3.59
25	---	---	---	---	---	---	---	---	---	---	---	3.61
EOM	---	---	---	---	---	---	---	---	---	---	3.19	3.55
WTR YR 1994	HIGHEST		3.16	AUG 31		LOWEST		3.61	SEP 24, 25			

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	3.64	3.78	3.91	---	---	---	---	4.06	4.08	---	---	---
10	3.67	3.81	---	---	---	---	---	3.98	4.10	4.14	---	---
15	3.70	3.82	---	---	---	---	3.86	4.02	4.14	4.11	---	---
20	3.58	3.87	---	---	---	---	3.92	4.06	4.17	---	---	---
25	3.60	3.88	---	---	---	---	3.99	4.07	4.06	---	---	---
EOM	3.72	3.88	---	---	---	---	4.02	3.97	---	---	---	4.10
WTR YR 1995	HIGHEST		3.34	OCT 18		LOWEST		4.21	JUN 23			



GROUND-WATER LEVELS

MARQUETTE COUNTY

461931087250701. Local number, 45N 25W 01DABA.

LOCATION.--Lat 46°19'31", long 87°25'07", Hydrologic Unit 04030110, 600 ft south of intersection of Panther Road and Aircobra Road, K.I. Sawyer Air Force Base, 5.0 mi northeast of Gwinn. Owner: K.I. Sawyer Air Force Base.

AQUIFER.--Glacial deposits of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in., depth 125 ft, screened 121 to 125 ft.

INSTRUMENTATION.--Water-level recorder.

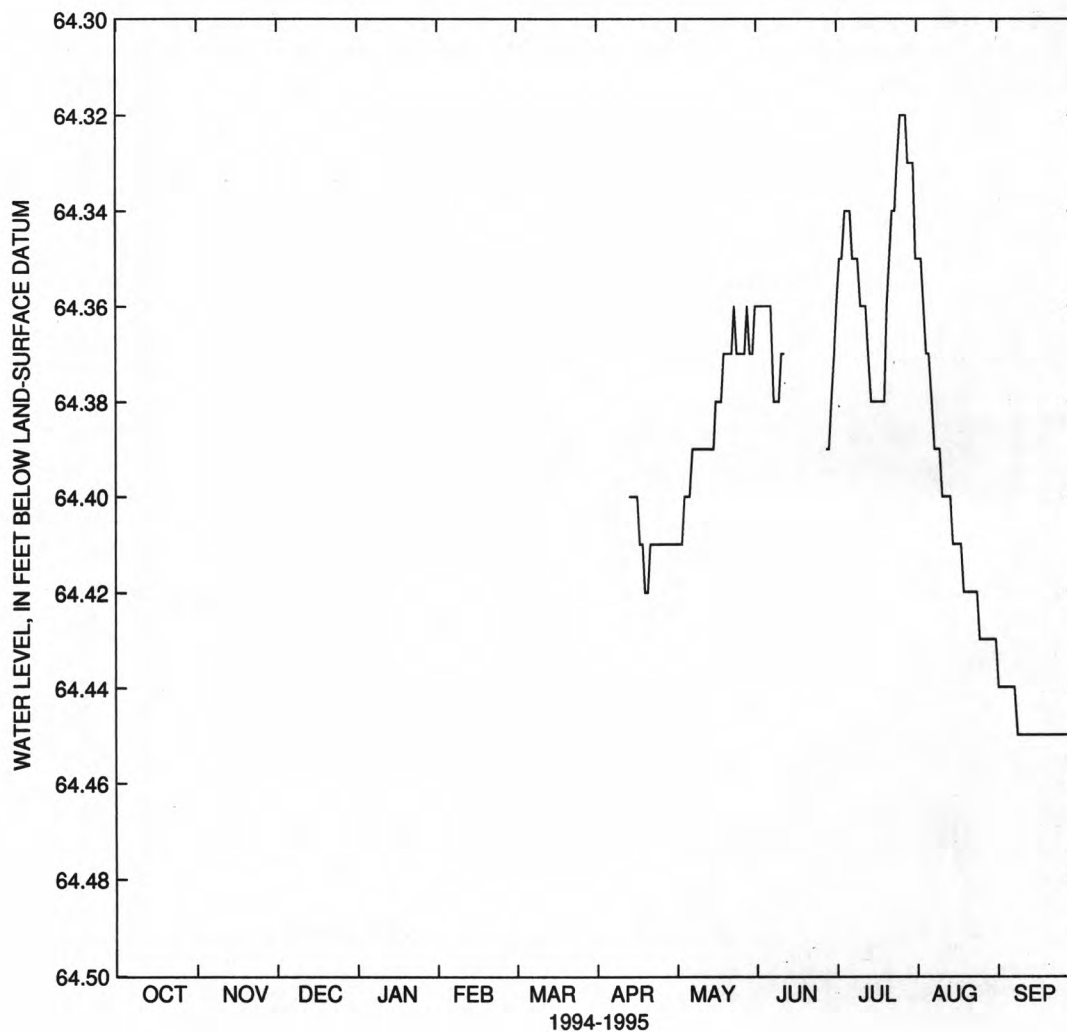
DATUM.--Elevation of land-surface datum is 1,171.59 ft above sea level. Measuring point: Top of well casing, 3.0 ft above land-surface datum.

PERIOD OF RECORD.--April 1995 to September 1995.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 64.45 ft below land-surface datum, Sept. 7-30, 1995; lowest recorded, 64.32 ft below land-surface datum, July 24-28, 1995.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	---	---	---	---	---	---	64.40	64.36	64.34	64.37	64.44
10	---	---	---	---	---	---	---	64.39	64.37	64.36	64.40	64.45
15	---	---	---	---	---	---	64.40	64.39	---	64.38	64.41	64.45
20	---	---	---	---	---	---	64.42	64.37	---	64.36	64.42	64.45
25	---	---	---	---	---	---	64.41	64.37	---	64.32	64.43	64.45
EOM	---	---	---	---	---	---	64.41	64.36	64.37	64.35	64.44	64.45
WTR YR 1995	HIGHEST		64.32	JUL 24-28		LOWEST		64.45	SEP 7-30			



GROUND-WATER LEVELS

MARQUETTE COUNTY

461947087210901. Local number, 45N 24W 06ABCA.

LOCATION.--Lat 46°19'47", long 87°21'09", Hydrologic Unit 04030110, near McDonald School, K.I. Sawyer Air Force Base, 5.3 mi northeast of Gwinn. Owner: K.I. Sawyer Air Force Base.

AQUIFER.--Glacial deposits of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation well, diameter 6 in., depth 180 ft, screened 160 to 180 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 1,173.38 ft above sea level. Measuring point: Top of well casing, 3.0 ft above land-surface datum.

REMARKS.--Water levels affected by nearby pumping.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 65.26 ft below land-surface datum, Aug. 25, 1995; lowest recorded, 74.56 ft below land-surface datum, Aug. 26, 1994.

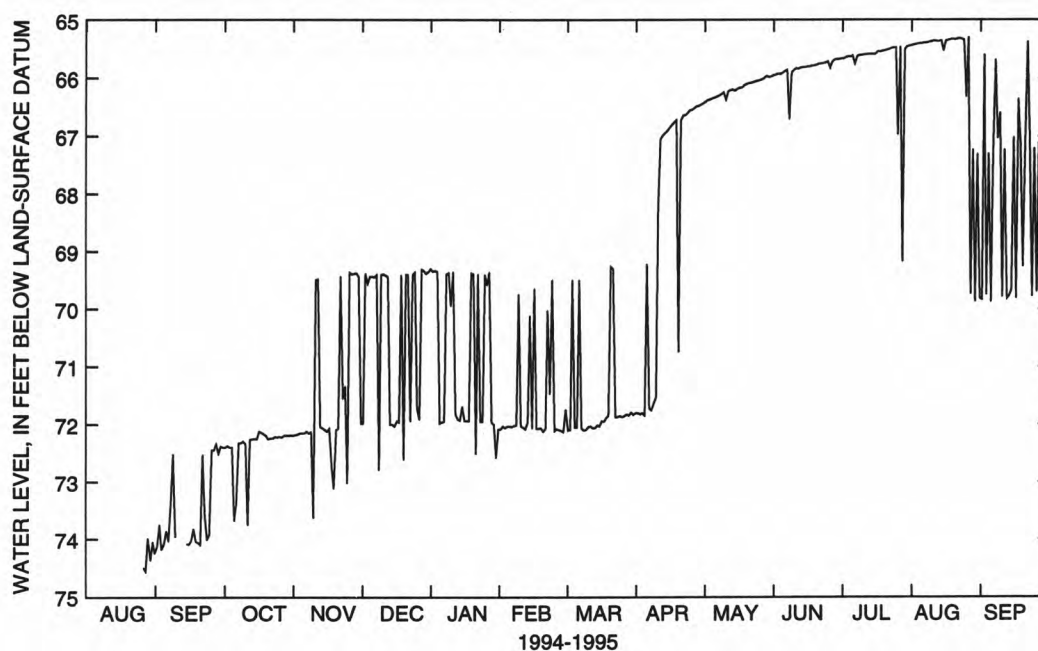
WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	---	---	---	---	---	---	---	---	---	---	74.03
10	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	74.03
20	---	---	---	---	---	---	---	---	---	---	---	72.53
25	---	---	---	---	---	---	---	---	---	---	74.50	72.45
EOM	---	---	---	---	---	---	---	---	---	---	74.12	72.40

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	73.37	72.12	69.44	71.95	72.02	72.05	69.22	66.33	65.88	65.61	65.39	67.29
10	73.75	69.48	69.41	71.82	72.08	72.04	68.16	66.36	65.83	65.59	65.35	67.23
15	72.12	72.07	71.94	71.94	72.07	72.03	66.85	66.18	65.80	65.58	65.35	69.80
20	72.24	69.43	69.40	69.39	70.03	69.26	66.72	66.08	65.75	65.51	65.32	65.37
25	72.22	69.39	71.91	69.36	72.09	71.87	66.54	66.03	65.82	66.97	65.29	67.11
EOM	72.18	71.98	69.34	72.03	71.74	71.80	66.43	65.95	65.66	65.43	69.83	69.77

WTR YR 1995 HIGHEST 65.26 AUG 25 LOWEST 73.75 OCT 10



GROUND-WATER LEVELS

MONROE COUNTY

420414083351501. Local number, 5S 7E 10BBA.

LOCATION.--Lat 42°04'14", long 83°35'15", 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, open hole 72 ft to 95 ft.

INSTRUMENTATION.--Water-level recorder.

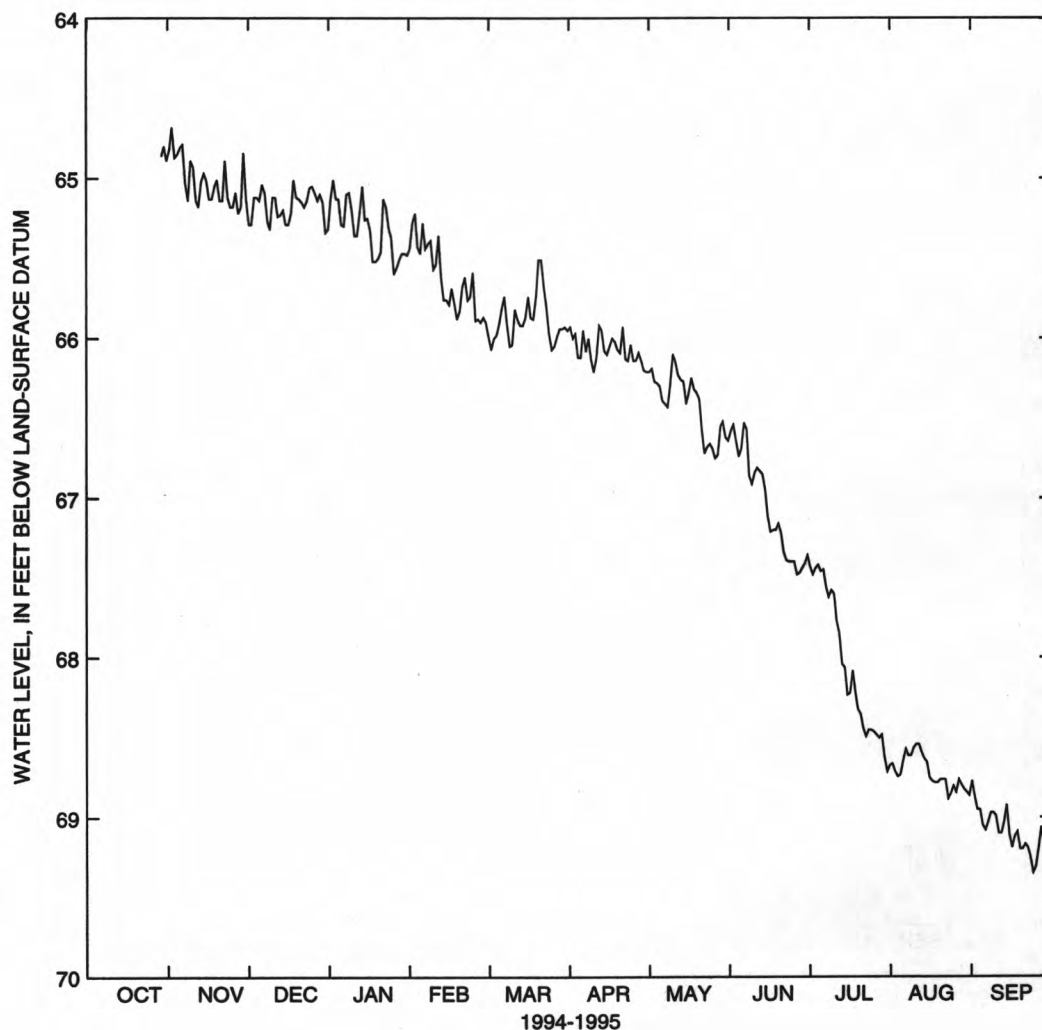
DATUM.--Elevation of land-surface datum is 665 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf.

PERIOD OF RECORD.--August 1994 to October 1995 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 64.28 ft below land-surface datum, Nov. 1, 1994; lowest recorded, 69.35 ft below land-surface datum, Sept. 23, 1995.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	---	64.79	65.04	65.30	65.44	65.91	66.12	66.30	66.69	67.46	68.64	69.08
10	---	65.14	65.12	65.36	65.36	66.04	66.21	66.10	66.84	67.60	68.54	69.10
15	---	65.13	65.29	65.33	65.69	65.87	66.10	66.41	67.11	68.23	68.75	69.19
20	---	65.14	65.15	65.13	65.62	65.51	66.09	66.38	67.22	68.35	68.76	69.17
25	---	65.09	65.09	65.56	65.88	66.07	66.14	66.69	67.40	68.46	68.84	69.19
EOM	64.82	65.29	65.13	65.28	65.90	65.95	66.21	66.64	67.36	68.67	68.77	69.30
WTR YR 1995	HIGHEST			64.28	NOV 1		LOWEST		69.35	SEP 23		



GROUND-WATER LEVELS

OAKLAND COUNTY

423622083390701. Local number, 2N 7E 5BAAD.

LOCATION.--Lat 42°36'22", long 83°39'07", Hydrologic Unit 04090005, at Honeywell Lake Road, 3.5 mi northwest of Milford. Owner: American Aggregates Company.

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Bored observation well, diameter 2 in., depth 44 ft, screened 41 ft to 44 ft.

INSTRUMENTATION.--Water-level recorder.

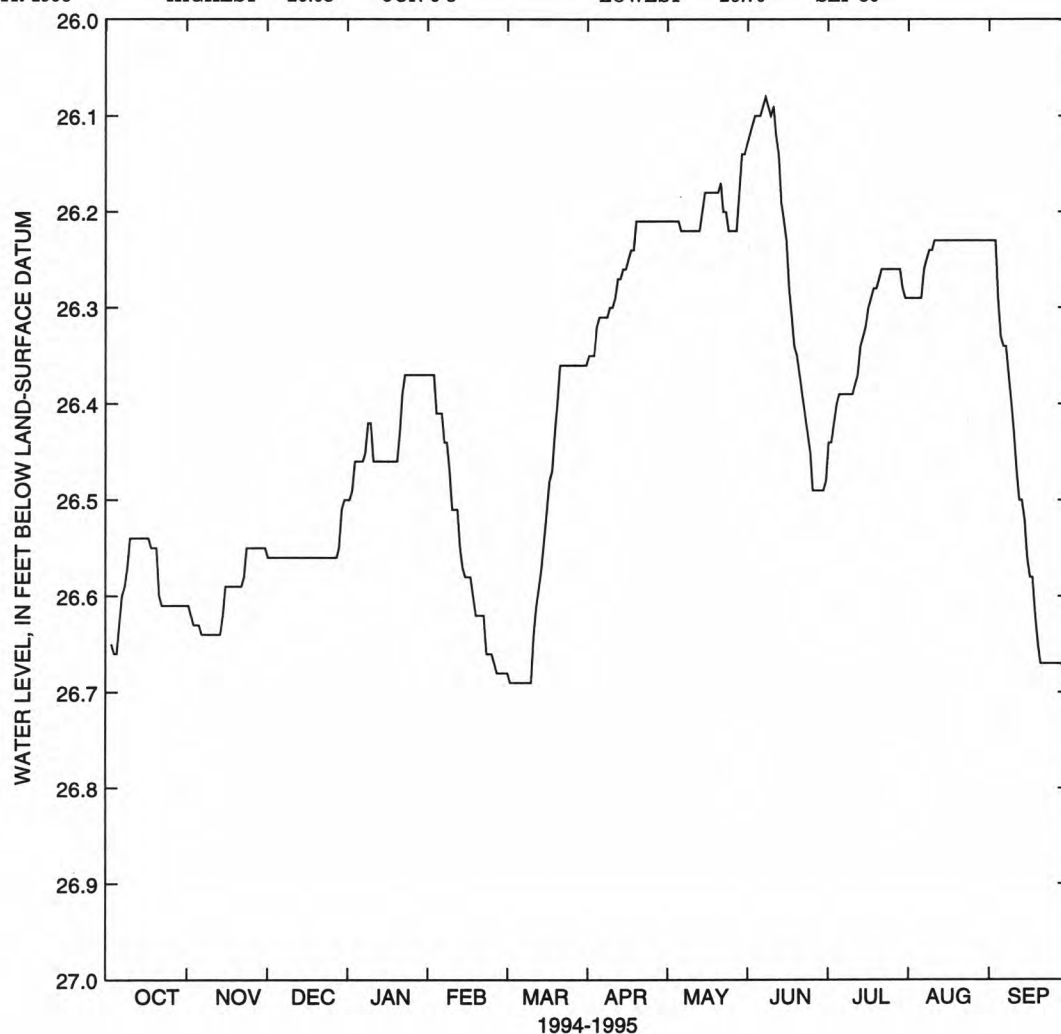
DATUM.--Elevation of land-surface datum is 1,020 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 3.0 ft above land-surface datum.

PERIOD OF RECORD.--March 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 23.9 ft below land-surface datum, April 1976; lowest recorded, 28.89 ft below land-surface datum, Dec. 1, 1971.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	26.63	26.64	26.56	26.46	26.44	26.69	26.31	26.21	26.10	26.39	26.29	26.34
10	26.54	26.64	26.56	26.46	26.51	26.69	26.30	26.22	26.09	26.39	26.23	26.47
15	26.54	26.59	26.56	26.46	26.58	26.54	26.26	26.18	26.23	26.32	26.23	26.58
20	26.60	26.59	26.56	26.39	26.62	26.40	26.21	26.18	26.37	26.27	26.23	26.67
25	26.61	26.55	26.56	26.37	26.68	26.36	26.21	26.22	26.49	26.26	26.23	26.67
EOM	26.61	26.56	26.50	26.37	26.68	26.36	26.21	26.13	26.48	26.29	26.23	26.70
WTR YR 1995	HIGHEST			26.08	JUN 6-8			LOWEST	26.70	SEP 30		



GROUND-WATER LEVELS

OAKLAND COUNTY

424109083384301. Local number, 3N 7E 5BA.

LOCATION.--Lat 42°41'09", long 83°38'43", Hydrologic Unit 04080203, 150 ft west of Fish Lake Road, 1.2 mi east of Clyde. Owner: American Aggregates Company.

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in., depth 49 ft.

INSTRUMENTATION.--Water-level recorder.

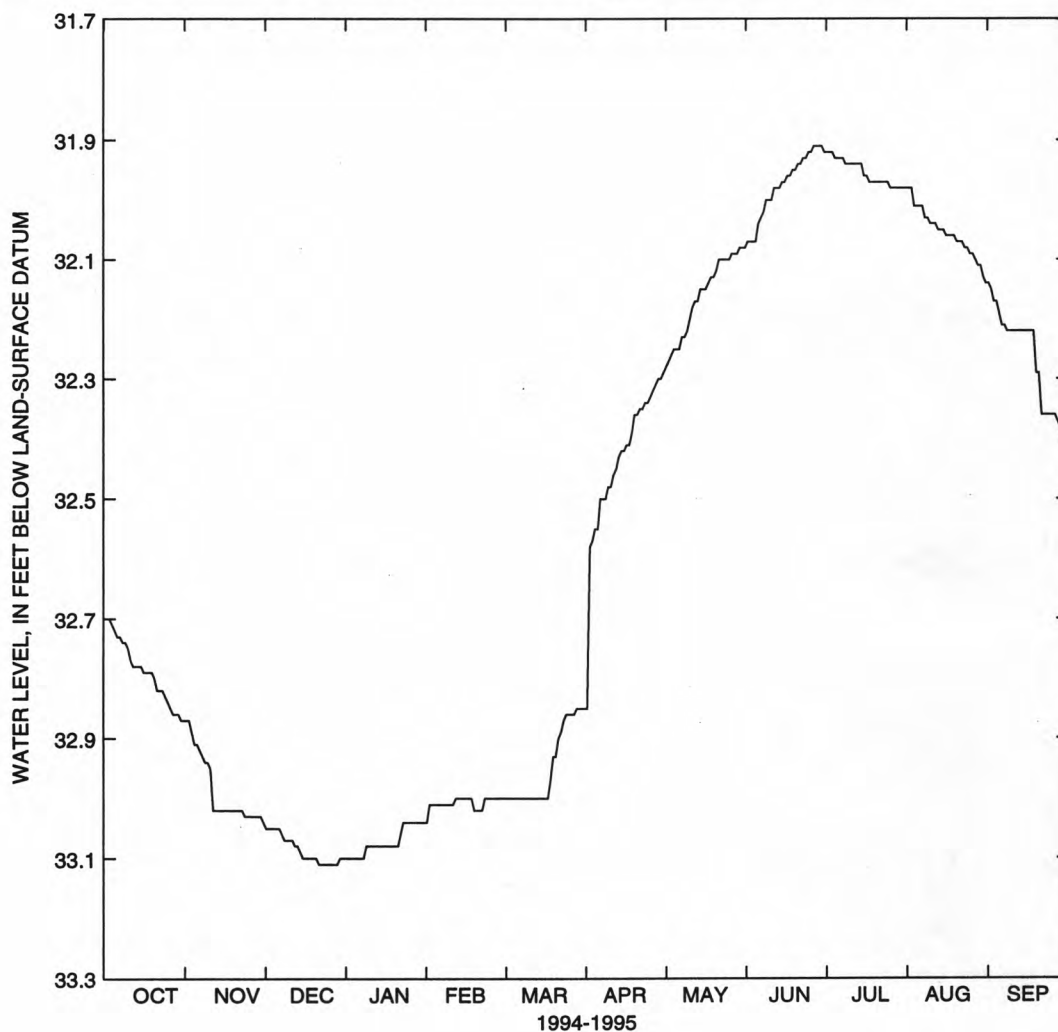
DATUM.--Elevation of land-surface datum is 1,055 ft above sea level, from topographic map. Measuring point: Top of flange, 3.0 ft above land-surface datum.

PERIOD OF RECORD.--Apr. 24, 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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	32.73	32.92	33.05	33.10	33.01	33.00	32.55	32.25	32.04	31.93	32.01	32.21
10	32.77	33.02	33.07	33.08	33.00	33.00	32.48	32.20	32.00	31.94	32.04	32.22
15	32.79	33.02	33.10	33.08	33.00	33.00	32.42	32.15	31.97	31.96	32.06	32.22
20	32.82	33.02	33.11	33.06	33.02	32.93	32.36	32.12	31.94	31.97	32.07	32.36
25	32.85	33.03	33.11	33.04	33.00	32.86	32.33	32.10	31.92	31.98	32.09	32.36
EOM	32.87	33.05	33.10	33.01	33.00	32.85	32.29	32.08	31.92	31.98	32.14	32.40
WTR YR 1995	HIGHEST			31.91	JUN 25-30			LOWEST	33.11	DEC 20-27		



GROUND-WATER LEVELS

ROSCOMMON COUNTY

442722084350701. Local number, 24N 2W 20BABA.

LOCATION.--Lat 44°27'22", long 84°35'07", Hydrologic Unit 04070007, at State Highway 103, 2 mi south of Roscommon. Owner: Michigan Department of Natural Resources.

AQUIFER.--Sand of Pleistocene age.

WELL CHARACTERISTICS.--Jetted water-table well, diameter 8 in., depth 14 ft, open bottom.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 1,145.30 ft above sea level. Measuring point: Top of casing, 2.5 ft above land-surface datum.

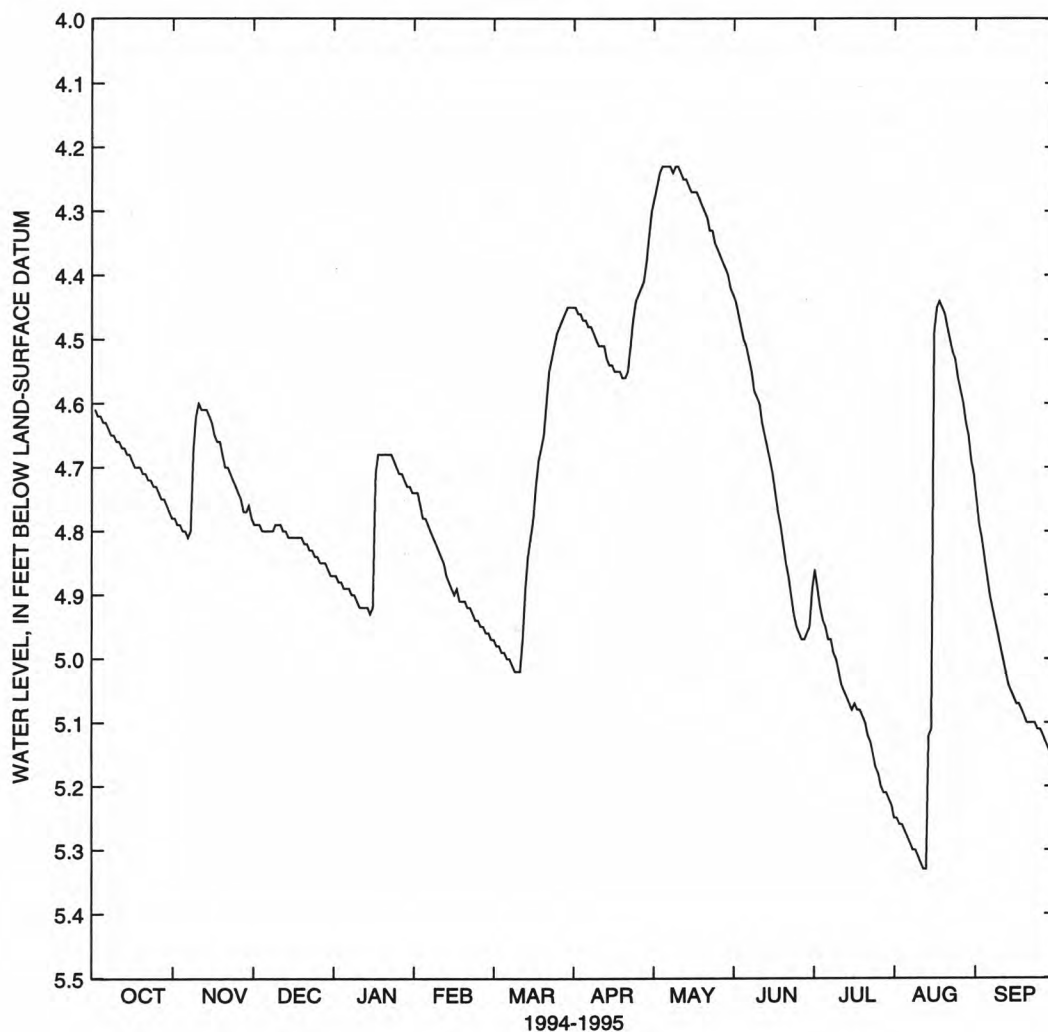
REMARKS.--Federal key well.

PERIOD OF RECORD.--December 1934 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 2.29 ft below land-surface datum, Apr. 19, 1985; lowest recorded, 6.23 ft below land-surface datum, Dec. 6-11, 1949.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	4.63	4.81	4.80	4.89	4.80	4.99	4.47	4.23	4.51	4.95	5.28	4.90
10	4.66	4.61	4.79	4.92	4.85	5.02	4.51	4.23	4.60	5.02	5.32	5.00
15	4.69	4.65	4.81	4.71	4.89	4.81	4.54	4.27	4.71	5.08	4.49	5.07
20	4.71	4.70	4.82	4.68	4.92	4.65	4.56	4.30	4.85	5.10	4.48	5.10
25	4.74	4.75	4.85	4.71	4.95	4.49	4.43	4.36	4.96	5.18	4.58	5.12
EOM	4.78	4.79	4.87	4.74	4.97	4.45	4.30	4.43	4.89	5.25	4.75	5.17
WTR YR 1995	HIGHEST		4.22	MAY 5		LOWEST		5.33	AUG 11,12			



GROUND-WATER LEVELS

WASHTENAW COUNTY

421220083332501. Local number, 3S 7E 24CDBC.

LOCATION.--Lat 42°12'20", long 83°33'25", Hydrologic Unit 04090005, at Bridge Street, at Ypsilanti Township Waterworks. Owner: Ypsilanti Township.

AQUIFER.--Gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, diameter 6 in., depth 75 ft, screened 70 ft to 75 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 657.83 ft above sea level. Measuring point: Plywood instrument shelf, 5.5 ft above land-surface datum.

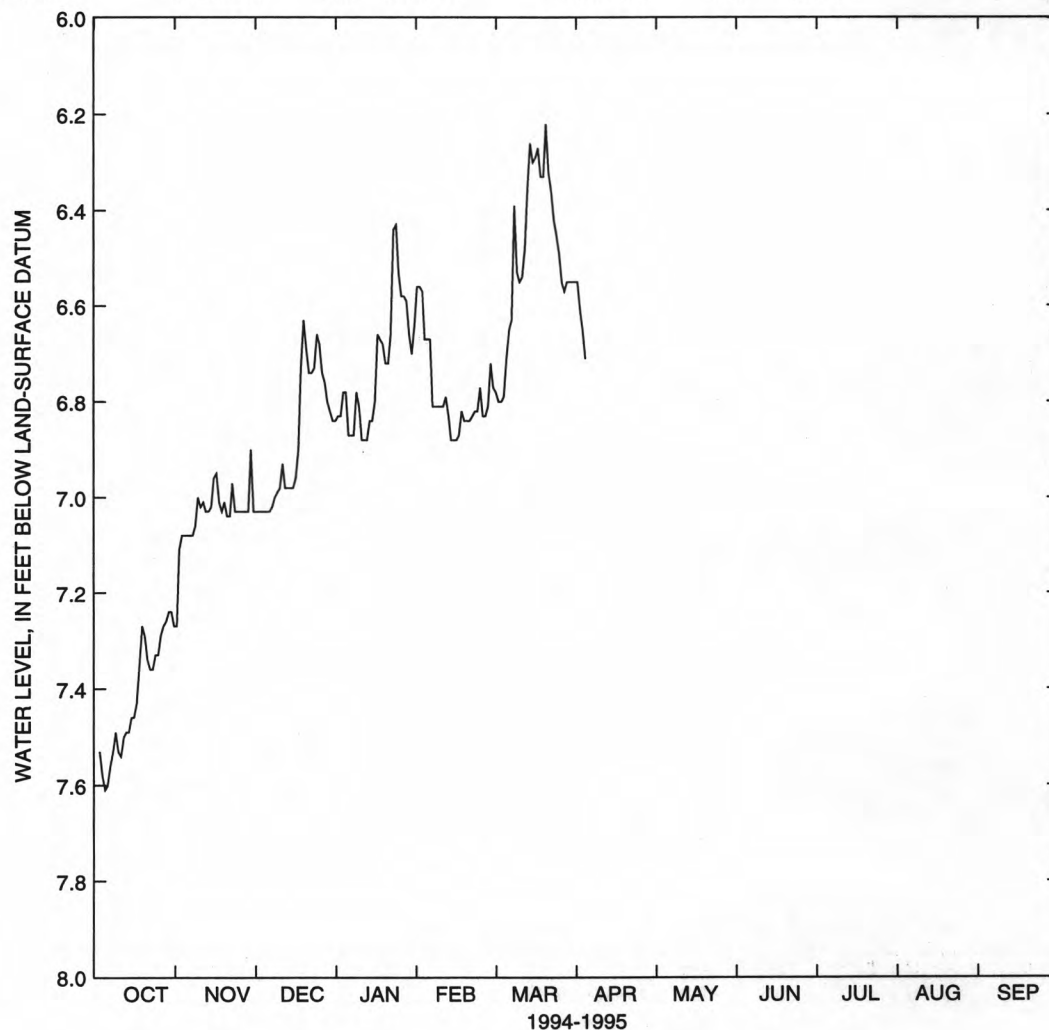
REMARKS.--Water levels affected by pumping.

PERIOD OF RECORD.--April 1944 to June 1945, December 1949 to April 1995 (discontinued).

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 4.7 ft below land-surface datum, October 1981; lowest recorded, 63.2 ft below land-surface datum, February 1970.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	7.60	7.08	7.03	6.87	6.81	6.71	---	---	---	---	---	---
10	7.54	7.01	6.93	6.88	6.79	6.55	---	---	---	---	---	---
15	7.46	6.95	6.96	6.66	6.87	6.30	---	---	---	---	---	---
20	7.34	7.04	6.74	6.66	6.83	6.22	---	---	---	---	---	---
25	7.29	7.03	6.74	6.58	6.83	6.49	---	---	---	---	---	---
EOM	7.27	7.03	6.83	6.56	6.77	6.55	---	---	---	---	---	---
WTR YR 1995	HIGHEST			6.19	MAR 20	LOWEST	7.67	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 of Pleistocene age.

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.

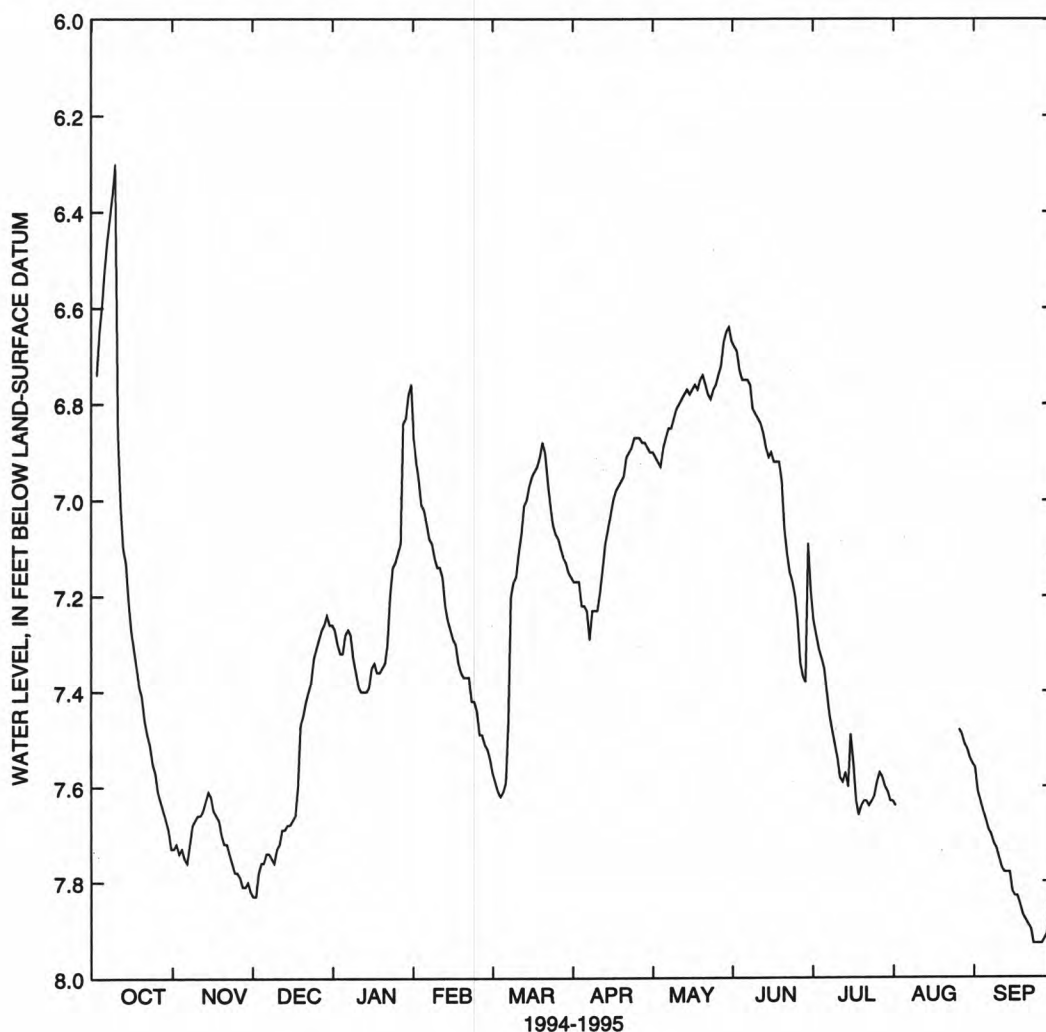
REMARKS.--Water levels affected by pumping.

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 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	6.52	7.76	7.74	7.27	7.08	7.61	7.22	6.89	6.75	7.35	---	7.69
10	6.86	7.66	7.72	7.40	7.16	7.16	7.23	6.81	6.83	7.54	---	7.77
15	7.27	7.65	7.67	7.34	7.30	6.97	7.03	6.78	6.90	7.49	---	7.83
20	7.46	7.72	7.42	7.30	7.37	6.88	6.95	6.74	7.06	7.63	---	7.89
25	7.61	7.79	7.29	7.09	7.49	7.07	6.87	6.76	7.25	7.59	7.48	7.93
EOM	7.73	7.83	7.27	6.92	7.54	7.16	6.90	6.67	7.19	7.63	7.56	7.80
WTR YR 1995	HIGHEST			6.24	OCT 10	LOWEST			7.93	SEP 22-24		



GROUND-WATER LEVELS

WASHTENAW COUNTY

421427083362301. Local number, 3S 7E 9ADBC1.

LOCATION.--Lat 42°14'27", long 83°36'23", Hydrologic Unit 04090005, at intersection of Park Street and Michigan Avenue, in Ypsilanti. Owner: City of Ypsilanti.

AQUIFER.--Medium to coarse gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, diameter 6 in., depth 94 ft, screened 89 ft to 94 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 710 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 1944 to November, 1995 (discontinued).

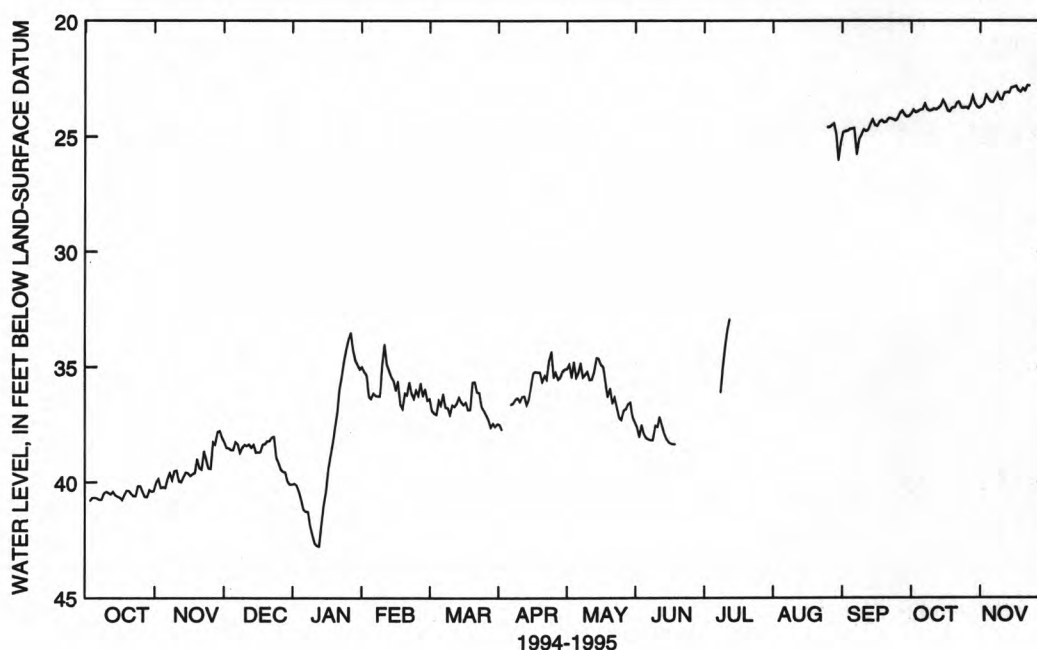
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.46 ft below land-surface datum, November 1995; lowest recorded, 78.8 ft below land-surface datum, October 1974.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	40.68	39.84	38.24	41.26	36.24	36.45	---	35.45	38.07	---	---	24.63
10	40.44	39.95	38.41	42.75	34.89	37.07	36.49	35.20	37.58	34.15	---	24.77
15	40.65	39.72	38.69	39.47	35.62	36.52	35.83	34.64	38.27	---	---	24.54
20	40.49	39.44	38.20	35.94	35.66	35.66	35.63	35.93	---	---	---	24.20
25	40.41	38.25	39.44	33.52	35.71	36.88	35.45	37.29	---	---	24.60	24.00
EOM	40.00	38.23	40.06	35.21	36.44	37.46	35.10	37.38	---	---	24.80	23.99
WTR YR 1995	HIGHEST			23.84	SEP 30	LOWEST			42.77	JAN 11		

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	23.82	23.51	---	---	---	---	---	---	---	---	---	---
10	23.79	23.12	---	---	---	---	---	---	---	---	---	---
15	23.61	22.82	---	---	---	---	---	---	---	---	---	---
20	23.54	22.78	---	---	---	---	---	---	---	---	---	---
25	23.78	---	---	---	---	---	---	---	---	---	---	---
EOM	23.69	---	---	---	---	---	---	---	---	---	---	---



GROUND-WATER LEVELS

WASHTENAW COUNTY

421532083382001. Local number, 3S 7E 5BBAC.

LOCATION.--Lat 42°15'32", long 83°38'20", Hydrologic Unit 04090005, at Superior Road, 1.5 mi northwest of Ypsilanti. Owner: City of Ypsilanti.

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Drilled water-table well, diameter 8 in., depth 70 ft, screened 40 ft to 70 ft.

INSTRUMENTATION.--Water-level recorder.

DATUM.--Elevation of land-surface datum is 720 ft above sea level, from topographic map. Measuring point: Plywood instrument shelf, 6.0 ft above land-surface datum.

REMARKS.--Water levels affected by pumping.

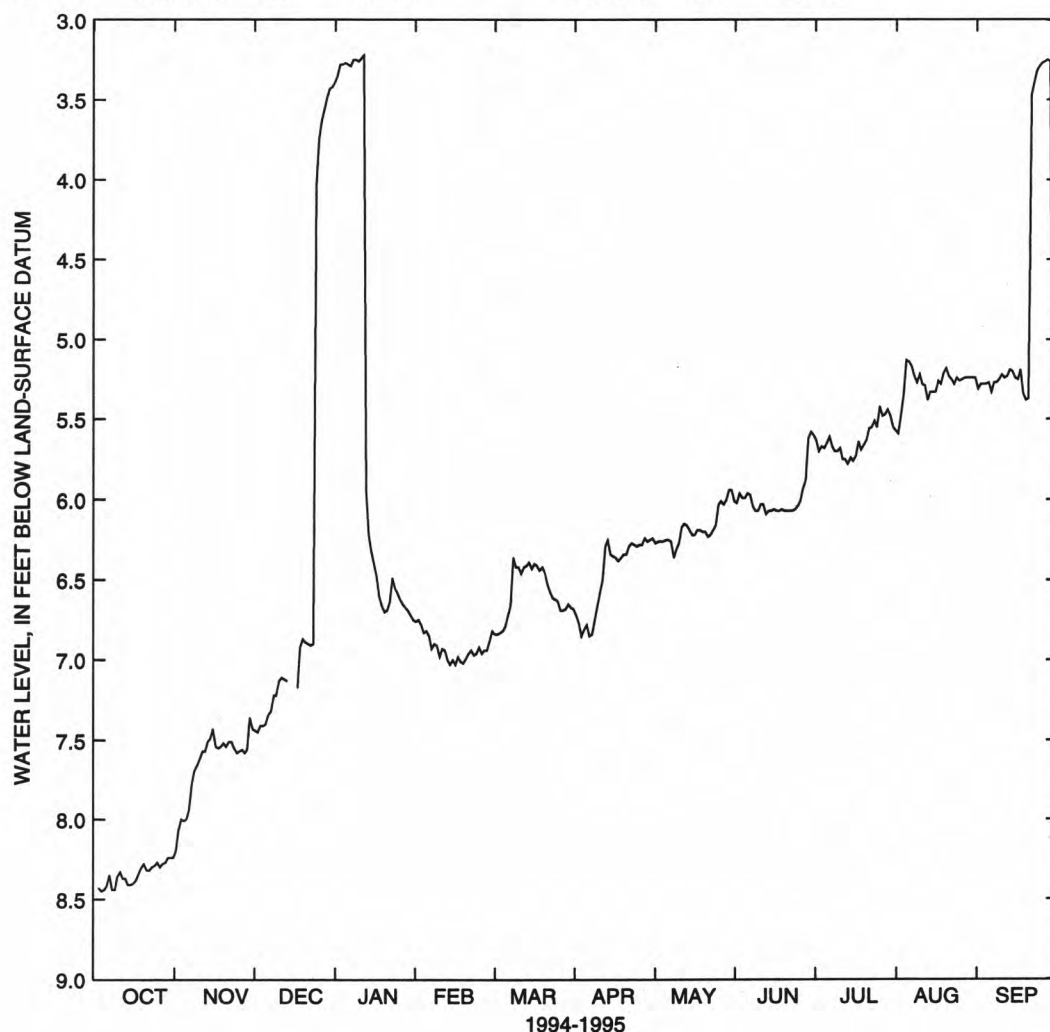
PERIOD OF RECORD.--July 1962 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 1.22 ft below land-surface datum, Jan. 30, 1992; lowest recorded, 21.4 ft below land-surface datum, Dec. 25, 1965.

WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995
LOWEST VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	8.42	7.94	7.34	3.29	6.93	6.79	6.78	6.25	5.96	5.65	5.14	5.33
10	8.33	7.57	7.11	3.22	6.94	6.42	6.58	6.27	6.03	5.68	5.28	5.24
15	8.40	7.54	---	6.48	6.98	6.43	6.35	6.22	6.06	5.76	5.33	5.25
20	8.32	7.51	6.90	6.64	6.94	6.45	6.34	6.20	6.07	5.63	5.23	3.47
25	8.30	7.56	3.63	6.65	6.94	6.63	6.28	6.03	6.01	5.42	5.25	3.26
EOM	8.20	7.44	3.35	6.75	6.82	6.68	6.24	6.01	5.60	5.57	5.31	5.97

WTR YR 1995 HIGHEST 3.17 SEP 29 LOWEST 8.53 OCT 1



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CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To obtain
<i>Length</i>		
inch (in.)	2.54×10^1	millimeter
	2.54×10^{-2}	meter
foot (ft)	3.048×10^{-1}	meter
mile (mi)	1.609×10^0	kilometer
<i>Area</i>		
acre	4.047×10^3	square meter
	4.047×10^{-1}	square hectometer
	4.047×10^{-3}	square kilometer
square mile (mi ²)	2.590×10^0	square kilometer
<i>Volume</i>		
gallon (gal)	3.785×10^0	liter
	3.785×10^0	cubic decimeter
	3.785×10^{-3}	cubic meter
million gallons (Mgal)	3.785×10^3	cubic meter
	3.785×10^{-3}	cubic hectometer
cubic foot (ft ³)	2.832×10^1	cubic decimeter
	2.832×10^{-2}	cubic meter
cubic-foot-per-second day [(ft ³ /s) d]	2.447×10^3	cubic meter
	2.447×10^{-3}	cubic hectometer
acre-foot (acre-ft)	1.233×10^3	cubic meter
	1.233×10^{-3}	cubic hectometer
	1.233×10^{-6}	cubic kilometer
<i>Flow</i>		
cubic foot per second (ft ³ /s)	2.832×10^1	liter per second
	2.832×10^1	cubic decimeter per second
	2.832×10^{-2}	cubic meter per second
gallon per minute (gal/min)	6.309×10^{-2}	liter per second
	6.309×10^{-2}	cubic decimeter per second
	6.309×10^{-5}	cubic meter per second
million gallons per day (Mgal/d)	4.381×10^1	cubic decimeter per second
	4.381×10^{-2}	cubic meter per second
<i>Mass</i>		
ton (short)	9.072×10^{-1}	megagram or metric ton

Sea level: In this report “sea level” refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment for the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

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