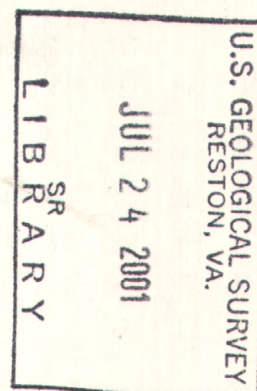


## REFERENCE

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# Water Resources Data Ohio Water Year 1996

## Volume 2. St. Lawrence River Basin and Statewide Project Data



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT OH-96-2  
Prepared in cooperation with the State of Ohio  
and with other agencies



# CALENDAR FOR WATER YEAR 1996

1995

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

1996

JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3						1	2
7	8	9	10	11	12	13	4	5	6	7	8	9	10	3	4	5	6	7	8	9
14	15	16	17	18	19	20	11	12	13	14	15	16	17	10	11	12	13	14	15	16
21	22	23	24	25	26	27	18	19	20	21	22	23	24	17	18	19	20	21	22	23
28	29	30	31				25	26	27	28	29			24	25	26	27	28	29	30
														31						
APRIL							MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6				1	2	3	4							1
7	8	9	10	11	12	13	5	6	7	8	9	10	11	2	3	4	5	6	7	8
14	15	16	17	18	19	20	12	13	14	15	16	17	18	9	10	11	12	13	14	15
21	22	23	24	25	26	27	19	20	21	22	23	24	25	16	17	18	19	20	21	22
28	29	30					26	27	28	29	30	31		23	24	25	26	27	28	29
														30						
JULY							AUGUST							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3	1	2	3	4	5	6	7
7	8	9	10	11	12	13	4	5	6	7	8	9	10	8	9	10	11	12	13	14
14	15	16	17	18	19	20	11	12	13	14	15	16	17	15	16	17	18	19	20	21
	22	23	24	25	26	27	18	19	20	21	22	23	24	22	23	24	25	26	27	28
28	29	30	31				25	26	27	28	29	30	31	29	30					





# Water Resources Data Ohio Water Year 1996

## Volume 2. St. Lawrence River Basin and Statewide Project Data

by H.L. Shindel, J.P. Mangus, and L.E. Trimble



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT OH-96-2  
Prepared in cooperation with the State of Ohio  
and with other agencies



U.S. DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY

Gordon P. Eaton, Director

Prepared in cooperation with the  
State of Ohio  
and with other agencies as listed  
under cooperation

For additional information on the water program in Ohio write to  
District Chief, Water Resources Division  
U.S. Geological Survey  
975 West Third Avenue  
Columbus, OH 43212  
1997



## PREFACE

This volume of the annual hydrologic data report of Ohio 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 Trust Territories. These records of streamflow, ground-water levels, and quality of water provides 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. Hydrologic data for Ohio are contained in two volumes:

- Volume 1. Ohio River Basin
- Volume 2. St. Lawrence River Basin - Statewide Project Data

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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(Letter after station name designates type of data: (c) miscellaneous chemical measurements, (C) daily chemical data, (d) discharge, (e) contents and (or) elevation, (HBM) hydrologic bench mark, (M) water-quality monitor, (m) microbiological, (NAWQA) National Water-Quality Assessment Program, (r) radio-chemical, (s) miscellaneous sediment measurements, (S) daily suspended-sediment data, (t) temperature.)

## ST. LAWRENCE RIVER BASIN

Station Number		Page
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04177000	Ottawa River at University of Toledo, Toledo (d) .....	39
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04187100	Ottawa River at Lima (d) .....	46
04189000	Blanchard River near Findlay (d) .....	47
04191500	Auglaize River near Defiance (dcmtSs) .....	48
04192500	Maumee River near Defiance (d) .....	49
04193500	Maumee River at Waterville (dcmtSs) (NAWQA) .....	50
04195500	Portage River at Woodville (d) .....	58
04196000	Sandusky River near Bucyrus (d) .....	59
04196800	Tymochtee Creek at Crawford (d) .....	60
04197100	Honey Creek at Melmore (d) .....	61
04197170	Rock Creek at Tiffin (d) .....	62
04198000	Sandusky River near Fremont (dcSs) .....	63
04199000	Huron River at Milan (d) .....	68
04199155	Old Womans's Creek at Berlin Road near Huron (d) .....	69
04200500	Black River at Elyria (d) .....	70
04201500	Rocky River near Berea (d) .....	71
04202000	Cuyahoga River at Hiram Rapids (d) .....	72
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04206220	Yellow Creek at Botzum (d) .....	79
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04211820	Grand River at Harpersfield (dcmtSs) (NAWQA) .....	91
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## VIII

## DISCONTINUED SURFACE-WATER STATIONS - ST. LAWRENCE RIVER BASIN

The following continuous-record surface-water discharge or stage-only stations (gaging stations) in Ohio 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 are currently operated as crest-stage partial-record stations. Discontinued project stations with less than 3 years of record have not been included. 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]

Station Name	Station Number	Drainage Area (mi <sup>2</sup> )	Period of Record
ST JOSEPH R NR BLAKESLEE (d)	04177500	394	1926-32
ST MARYS R NR WILLSHIRE (d)	04181000	354	1926-32
MAUMEE R AT ANTWERP (d)	04183500	2,129	1922-35 1939-82
MAUMEE R NR SHERWOOD (d)	04184000	2,275	1903-06
BEAN C AT POWERS (d)	04184500	206	1941-81
TIFFIN R NR BRUNERSBURG (d)	04185500	736	1928-36
MIAMI & ERIE CA AT DELPHOS (d)	04186000	--	1928-33
OTTAWA R AT ALLENTOWN (d)	04187500	160	1924-36 1943-82
OTTAWA R AT KALIDA (d)	04188000	309	1930-36
EAGLE CR NR FINDLAY (d)	04188500	55.0	1947-57
BLANCHARD R AT GLANDORF (d)	04189500	644	1921-28 1947-52
BLANCHARD R AT DUPONT (d)	04190000	756	1928-35
ROLLER CR AT OHIO CITY (d)	04190500	5.14	1946-48
TOWN CR NR VAN WERT (d)	04191000	21.2	1945-53
MIAMI & ERIE CA NR DEFIANCE (d)	04192000	--	1925-29 1953-69
MIAMI & ERIE CA AT WATERVILLE (d)	04193000	--	1921-29
SWAN C AT TOLEDO (d)	04194000	199	1945-48
PORTAGE R NR PEMBERVILLE (d)	04194500	337	1930-35
N B PORTAGE R NR BOWLING GREEN (d)	04195000	45.1	1924-32
LACARPE CR NR OAK HARBOR (d)	04195825	2.95	1988-92
BAYOU DITCH NR OAK HARBOR (d)	04195830	2.82	1988-92 1964-82
BROKEN SWORD C AT NEVADA (d)	04196200	83.8	1976-82
SANDUSKY R NR UPPER SANDUSKY (d)	04196500	298	1922-35 1938-82
TYMOCHTEE C NR MARSEILLES (d)	04196600	137	1970-74
SANDUSKY RIVER NR MEXICO (d)	04197000	774	1923-36 1938-83
HONEY C NR NEW WASHINGTON (d)	04197020	17	1976-90
WOLF C AT BETTSVILLE (d)	04197300	66.2	1976-82
E B WOLF C NR BETTSVILLE (d)	04197450	82.4	1976-82
HAVENS C AT HAVENS (d)	04197500	4.28	1946-49
E B HURON R NR NORWALK (d)	04198500	85.5	1924-35
OLD WOMAN'S CREEK AT U.S. 6 AT HURON	04199165	26.5	1980-94
LAKE ERIE AT RUGGLES BEACH	04199175		1987-94
VERMILION R NR FITCHVILLE	04199287	112	1978-89 1991-93
VERMILION R NR VERMILION	04199500	262	1950-81
E B BLACK R AT ELYRIA (d)	04200000	217	1922-36
W B BLACK R AB LAKE ST AT ELYRIA (d)	04200430	174	1980-85
CUYAHOGA RIVER NR KENT (d)	04202500	210	1934-35
BREAKNECK C NR KENT (d)	04203000	77.6	1927-35
L CUYAHOGA R AT MOGADORE (d)	04204000	14.3	1946-79
CUYAHOGA R AT MASSILLON RD AKRON (d)	04204500	31.6	1946-74
SPRINGFIELD LAKE OUTLET AT AKRON (d)	04205000	9.72	1946-49 1961-74
L CUYAHOGA R AT AKRON (d)	04205500	44.4	1920 1928-34
L CUYAHOGA R BL OHIO CA AT AKRON (d)	04205700	59.2	1974-80
CUYAHOGA R AT IRA (d)	04206250	478	1973-80
OHIO CANAL FEEDER AT BRECKSVILLE (d)	04207000	--	1923-24
OHIO CA AT INDEPENDENCE (d)	04207500	--	1922-23 1927-36 1941 1949-81
BIG C AT CLEVELAND (d)	04208502	35.3	1973-86
EUCLID C NR EUCLID (d)	04208690	22.6	1977-80 1983-86
GRAND R NR NORTH BRISTOL (d)	04209500	85.4	1942-47
PHELPS C NR WINDSOR (d)	04210000	25.6	1942-59
GRAND RIVER NR ROME (d)	04210500	251	1942-47
ROCK C NR ROCK CREEK (d)	04211000	69.2	1942-66
MILL C NR JEFFERSON (d)	04211500	82.0	1942-75

# DISCONTINUED SURFACE-WATER STATIONS - ST. LAWRENCE RIVER BASIN

IX

Station Name	Station Number	Drainage Area (mi <sup>2</sup> )	Period of Record
GRAND R NR MADISON (d)	04212000	581	1923-35 1938-74
ASHTABULA R NR ASHTABULA (d)	04212500	111	1924-36 1939-48 1950-80

-- not determined for canals.



## DISCONTINUED SURFACE-WATER-QUALITY STATIONS - ST. LAWRENCE RIVER BASIN

The following stations were discontinued as continuous-record surface-water-quality stations prior to the 1995 water year. Daily records of temperature, specific conductance, pH, dissolved oxygen or sediment were collected and published for the record shown for each station.

Station Name	Station Number	Drainage Area (mi <sup>2</sup> )	Type of Record	Period of Record
MAUMEE R AT ANTWERP	04183500	2,129	Temp.	1939-82
MAUMEE R AT DEFIANCE	04184100	2,316	Temp., S.C., D.O. pH	1966-70 1973-78
TIFFIN R AT EVANSPOET	04185300	541	Temp., S.C., D.O., pH	1968-78
AUGLAIZE R NR FT. JENNINGS	04186500	332	Temp., S.C., D.O., pH	1969-78
OTTAWA R AT ALLENTOWN	04187500	160	Temp., S.C. D.O., pH	1969-82 1977-82
AUGLAIZE R AT CLOVERDALE	04188200	713	Temp., S.C., D.O., pH	1967-78
BLANCHARD R NR FINDLAY	04189000	346	Temp., S.C., D.O., pH	1968-80
AUGLAIZE R NR DEFIANCE	04191500	2,318	Temp., S.C., D.O., pH Sed.	1966-76 1936
KEITZ RUN AT WATERVILLE	04192900	1.06	Precip.	1981-86
MAUMEE R NR WATERVILLE	04193490	6,313	Temp., S.C., D.O., pH	1977-91
MIAMI RIVER AT WATERVILLE	04193500	6,329	Temp., S.C., D.O., PH	1963-77
MAUMEE R AT MOUTH AT TOLEDO	04194023	6,608	Temp., S.C., D.O., pH.	1967-75
M B PORTAGE R NR PORTAGE	04194310	217	Temp., S.C.	1969-75
PORTAGE R AT RR BRIDGE AT WOODVILLE	04195600	428	Temp., S.C., D.O., pH.	1968-80
PORTAGE R AT ELMORE	04195800	432	Temp D.O. Sed.	1950-52 1970-80 1950-53
SANDUSKY R NR UPPER SANDUSKY	04196500	298	Temp., S.C., D.O., pH	1969-79 1977-79
TYMOCHTEE C AT CRAWFORD	04196800	229	Temp., S.C., D.O., pH.	1968-75
SANDUSKY R AT ST JOHNS BRIDGE NR MEXICO	04196990	711	Temp., S.C., D.O.	1969-76
HONEY CR AT MELMORE	04197100	141	Sed.	1988-89
SANDUKY RIVER BELOW FREMONT	04198005	1,264	Temp., S.C., D.O., pH.	1966-80
W B HURON R NR WILLARD	04198018	86.0	Temp., S.C.	1968-75
SANDHILL C NR MONROEVILLE	04198019	1.76	Precip	1981-86
HURON RIVER AT MILAN	04199000	371	Sed.	1970-74 1988-91
HURON RIVER BL MILAN	04199100	385	Temp., S.C., D.O., pH	1968-78
VERMILION R NR FITCHVILLE	04199287	112	Sed.	1987-89
VERMILION R NR VERMILION	04199500	262	Temp., S.C., D.O., pH	1969-76 1976-80
E B BLACK R AT GRAFTON	04199900	170	Temp., S.C.	1969-75
W B BLACK R NR ELYRIA	04200400	170	Temp., S.C.	1969-75
W B BLACK R AB LAKE ST AT ELYRIA	04200430	174	Sed.	1980-81
BLACK R AT ELYRIA	04200500	396	Temp. S.C. Sed.	1962-70 1964-70 1980-81
BLACK R BL ELYRIA	04200550	412	Temp., S.C., D.O. pH	1966-82 1976-82
CUYAHOGA R AT OLD PORTAGE	04205700	59.2	Temp., S.C., D.O., pH Sed.	1970-84 1972-81
CUYAHOGA R AT BATZUM	04206200	443	Temp.	1947-49
TINKERS C AT BEDFORD	04207200	83.9	Sed.	1972-79
CUYAHOGA R AT INDEPENDENCE	04208000		Temp., S.C., D.O. Temp., S.C., D.O., pH	1965-72 1972-91
BIG C AT CLEVELAND	04208502	35.3	Sed.	1978
CUYAHOGA R AT DUPONT INTAKE IN CLEVELAND	04208505	794	S.C.	1964-75
CUYAHOGA R AT WEST THIRD STREET BRIDGE	04208506	798	Temp., S.C., D.O., pH	1966-87
CUYAHOGA R AT SUPERIOR ST BRIDGE IN CLEVELAND	04208510	808	Temp., S.C., D.O., pH	1964-66
CHAGRIN R AT WILLOUGHBY	04209000	246	Temp Sed.	1950 1969-74
GRAND RIVER AT PAINESVILLE	04212200	701	Temp., S.C., D.O., pH	1966-82
FIELDS BROOK AT ASHTABULA	04212680	3.63	Temp., S.C., D.O., pH	1983-91
ASHTABULA R AT ASHTABULA	04212700	136	Temp., S.C., D.O., pH	1968-79

**GROUND-WATER STATIONS FOR WHICH RECORDS ARE PUBLISHED - ST. LAWRENCE RIVER BASIN    XI**

Well Number	Local Number	Location	Page
<b>CRAWFORD COUNTY</b>			
404838082563100	CR-1	Bucyrus .....	101
<b>GEAUGA COUNTY</b>			
412518081221500	GE-3A	Southeast of Chagrin Falls .....	102
<b>HANCOCK COUNTY</b>			
405940083275500	HA-3	North of Vanlue .....	103
<b>HARDIN COUNTY</b>			
404648083412600	HN-2A	Southeast of Dola .....	104
<b>HENRY COUNTY</b>			
412123083574000	HY-2	Southwest of McClure .....	105
<b>LUCAS COUNTY</b>			
413704083362200	LU-1	Toledo .....	106
<b>MEDINA COUNTY</b>			
410142082005900	MD-1	Lodi .....	107
<b>OTTAWA COUNTY</b>			
413434082494000	O-2	Catawba Island .....	108
<b>PORTAGE COUNTY</b>			
410931081192900	PO-123	East of Kent .....	109
<b>PUTNAM COUNTY</b>			
405505084032900	PU-1	Columbus Grove .....	110
<b>SANDUSKY COUNTY</b>			
411914083045300	S-3	Freemont .....	111
412703083213600	S-2	Woodville .....	112
<b>SENECA COUNTY</b>			
410802083093900	SE-2	Tiffin .....	113
<b>SUMMIT COUNTY</b>			
410330081282000	SU-6	Akron .....	114
410846081271600	SU-7	Cuyahoga Falls .....	115
<b>VAN WERT COUNTY</b>			
405215084335400	VW-1	Van Wert .....	116
<b>WILLIAMS COUNTY</b>			
412821084313600	WM-1	Bryan .....	117
412930084320900	WM-3	Bryan .....	118
413108084415300	WM-12	East of Blakeslee .....	119
<b>WYANDOT COUNTY</b>			
405009083172600	WY-1	Upper Sandusky .....	120





**VOLUME 2: ST. LAWRENCE RIVER BASIN**  
**STATEWIDE PROJECT DATA**

**INTRODUCTION**

The Water Resources Division of the U.S. Geological Survey (USGS), in cooperation with State agencies, obtains a large amount of data each water year (a water year is the 12-month period from October 1 through September 30 and is identified by the calendar year in which it ends) pertaining to the water resources of Ohio. These data, accumulated during many 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 USGS, they are published annually in this report series entitled "Water Resources Data--Ohio."

This report (in two volumes) includes records on surface water and ground water in the State. Specifically, it contains: (1) Discharge records for streamflow-gaging stations, miscellaneous sites, and crest-stage stations; (2) stage and content records for streams, lakes, and reservoirs; (3) water-quality data for streamflow-gaging stations, wells, synoptic sites, and partial-record sites; and (4) water-level data for observation wells. Locations of lake- and streamflow-gaging stations, water-quality stations, and observation wells for which data are presented in this volume are shown in figures 9a through 9d. The data in this report represent that part of the National Water Data System collected by the USGS and cooperating State and Federal agencies in Ohio.

This series of annual reports for Ohio 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 was changed to present (in two to three volumes) data on quantities of surface water, quality of surface and ground water, and ground-water levels.

Prior to the introduction of this series, and for several years concurrent with it, water-resources data for Ohio were published in a series of USGS 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, Parts 3 and 4." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on the 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 ground-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 can be found in libraries of the principal cities of the United States, and can be purchased from the U.S. Geological Survey, Open-File Reports Section, Box 25286, Mail Stop 517, Denver, CO 80225.

Publications similar to this report are published annually by the USGS for all States. These official USGS reports are identified by means of a 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 OH-96-2". For archiving and general distribution, the reports for 1971-74 water years are also identified as water-data reports. These water-data reports can be purchased in paper copy or in microfiche from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

USGS water data can be accessed on the World Wide Web at: <http://water.usgs.gov>. Data at this Web site include historic daily values and peaks, real-time water data, and spatial data. (The USGS Ohio District's Web site can be accessed at: <http://www-oh.er.usgs.gov>.)

Additional information for ordering specific reports, including current prices, may be obtained by writing the District Chief at the address given on the back of title page or by telephoning (614) 469-5553.

**COOPERATION**

The USGS has had cooperative agreements for the collection of water-resource data since 1898. The following organizations assisted in collecting data in this report:

- U. S. Air Force, Air Force Materiel Command, Aeronautical Systems Center,  
Environmental Management Directorate, Restoration Branch, David Lawrence, Chief;
- U. S. Army Corps of Engineers,  
Buffalo District, Walter C. Neitzke, Commander,  
Huntington District, Richard W. Jemiola, Commander,  
Louisville District, Ralph Grieco, Commander,  
Pittsburgh District, Stephen B. Massey, Commander;
- U. S. Bureau of Mines, Dave Hyman, Supervisory Physical Scientist/Geologist;
- U. S. Environmental Protection Agency, Region V, Luanne Vanderpool;
- U. S. Forest Service, Marsha Wikle;

Office of Surface Mining, Reclamation and Enforcement, Judy M. Gerlach;  
 Wright-Patterson Air Force Base, Captain Dan Block  
 Ohio Biological Survey, Brian J. Armitage, Director;  
 Ohio Department of Natural Resources, Donald C. Anderson, Director;  
 Ohio Department of Transportation, Jerry H. Wray, Director;  
 State of Ohio, Adjutant General's Department, Colonel James O. Ashenhurst, Facility Management Officer;  
 Cuyahoga County, Richard G. Hunsinger, Chief Engineer;  
 Cuyahoga County, Board of Health, B. J. Meder, Director;  
 Geauga County, David C. Dietrich, Planning Director;  
 Madison County, Robert Edwards, President County Board of Commissioners;  
 Ross County, James L. Kennard, Administrative Assistant;  
 Summit County, Jeffrey Lintern, Director, and Gene Esser, Chief Deputy Engineer;  
 Washington County Board of Commissioners, Sandra Matthews, Commissioner;  
 City of Akron, Linda A. Sowa, Director of Public Service;  
 City of Canton, Michael L. Miller, Director of Public Service;  
 City of Columbus, Water Division, John R. Douth, Administrator;  
 City of Cortland, Mark E. Dunsmoor, Director of Public Services;  
 City of Fremont, Terry M. Overmyer, Mayor;  
 City of Lima, David J. Berger, Mayor, and Alice Godsey, City Sanitary Engineer;  
 Cuyahoga River Commission, Theodore J. Esbom, President;  
 Eastgate Development and Transportation Agency, John R. Getchey, Director, and  
 James T. Wells, Manager, Transportation Program;  
 Miami Conservancy District, P. Michael Robinette, General Manager, and Douglas N. Johnson, Chief Engineer;  
 Northeast Ohio Regional Sewer District, Erwin J. Odeal, Executive Director;  
 Ohio State University Research Foundation, James F. Ball, Associate Director;  
 University of Toledo, Ronald Gallagher.

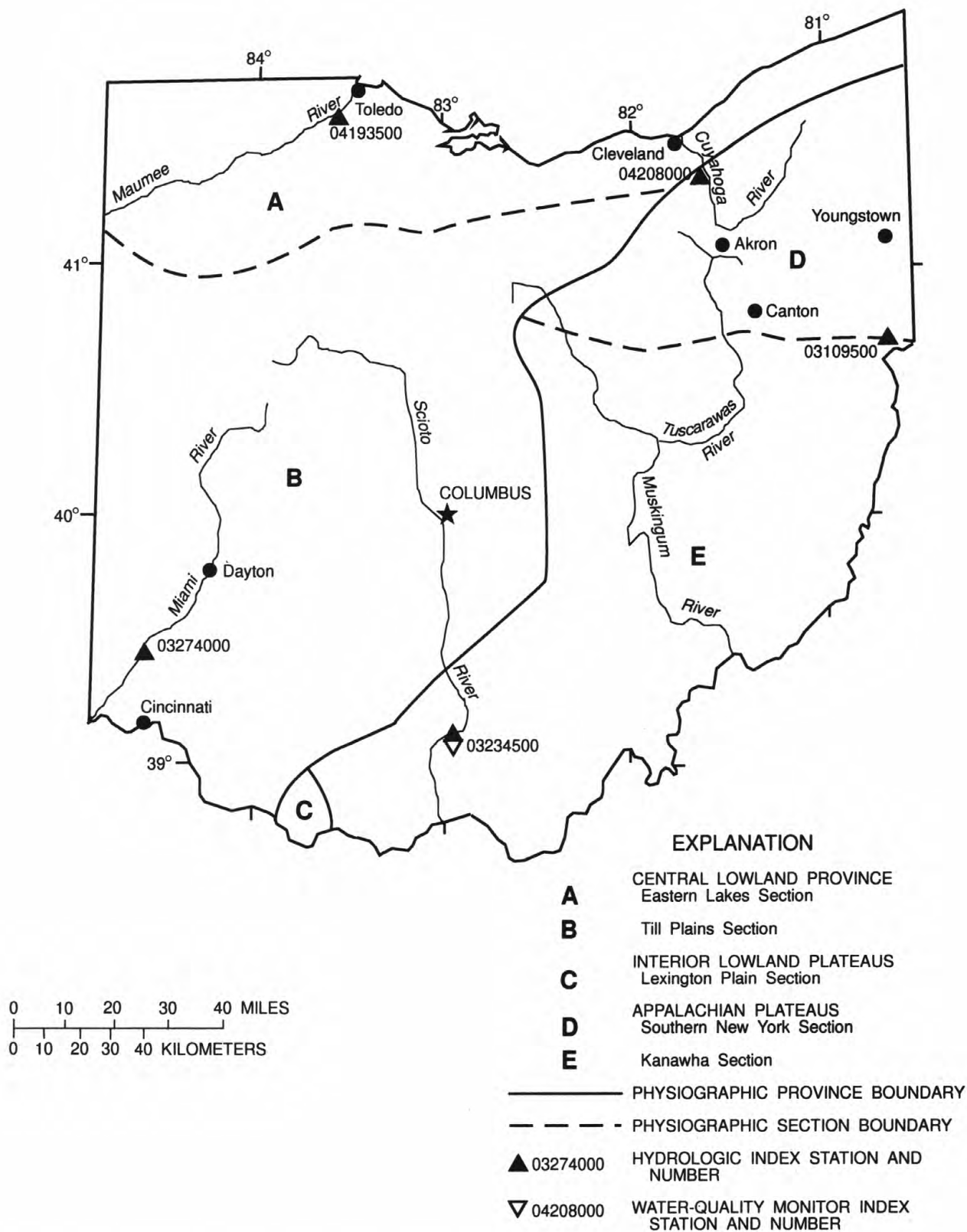
## SUMMARY OF HYDROLOGIC CONDITIONS

Ohio is part of three physiographic provinces. Each province has its own distinctive hydrologic characteristics. The topography of the Till Plains section of the Central Lowlands physiographic province (fig. 1) consists of gently rolling ground moraine, bands of terminal moraine, and outwash-filled valleys. Glaciation altered the courses of most streams in this area. The Eastern Lake Plains section (fig. 1) consists of wide expanses of level or nearly level land interrupted only by the sporadic sandy ridges that are the last visible remnants of glacial-lake beaches. Much of the area was swamp prior to development, and marshes are still present along Lake Erie near Toledo. The Lexington Plains section of the Interior Low Plateau province (fig. 1) is characterized by rolling terrain and a few isolated large hills and ridges. The "barbed" drainage pattern formed when small streams were captured as their headwaters cut back into the hills over time. Streams have carved the Kanawha section of the Appalachian Plateaus province (fig. 1) into an intricate series of hollows and steep-sided ridges. Only the large streams in the section have any appreciable flood plain. In the southern New York section (fig. 1), successive waves of glaciation have subdued the relief, buried many preglacial valleys, and rerouted many streams.

## PRECIPITATION

The average annual precipitation in Ohio is about 38 inches. The annual precipitation decreases from around 42 inches on the southern border to about 32 inches in the northwest. An anomalous area of high precipitation (as much as 44 inches) in northeastern Ohio results from air masses that pick up moisture and heat from Lake Erie and subsequently release precipitation over a range of hills stretching northeastward from Cleveland.

Monthly precipitation typically is greatest from May through July and least in October, December, and February. Of the approximate 38 inches of average annual precipitation, about 10 inches runs off immediately, 2 inches is retained at or near the surface and evaporates and transpires, and 26 inches enters the ground. Of the 26 inches that enters the ground, 20 inches is retained in the unsaturated zone and is later lost by evapotranspiration. The remaining 6 inches reaches the water table. Of this 6 inches, 2 inches eventually discharges to streams, and the rest is lost by evapotranspiration and consumptive use. Average runoff ranges from about 15 to 18 inches along the southern border to about 8 to 12 inches along most of the northern border, except in the northeast, where runoff is as much as 20 inches. The pattern of streamflow differs from the pattern of precipitation because of the contributions of snowmelt to streamflow in the early spring and the reduction in flows by evapotranspiration from June through September.



**Figure 1.** Physiographic divisions and location of Hydrologic Index Stations.



## SURFACE WATER

## Streamflow

Streamflow-data-collection stations are distributed irregularly throughout the State, and tend to be concentrated on the main river systems. The stations are used to sample a wide variety of conditions. The drainage areas range from 12 to 7,420 square miles and represent a wide diversity of topography and other physical characteristics. Streamflow ranges from unregulated to highly regulated.

## Statewide Streamflow, Water Year 1996

At the beginning of water year 1996, streamflow was in the normal<sup>1</sup> range in southern Ohio and deficient elsewhere, owing to below-normal rainfall at the end of last water year. Above-normal precipitation during October caused flows to rise into the normal range in northern Ohio and into the excessive range in southern Ohio. Normal to above-normal flows prevailed through November. In December, streamflow fell into the deficient range in northwestern Ohio and into the normal range elsewhere in response to below-normal precipitation.

During January, most of Ohio received above-normal precipitation, and streamflow increased into the excessive range throughout the State. Damaging floods occurred in many areas along the Ohio River late in the month.

Streamflow was generally in the normal range during February, March, and early April in response to normal and below-normal precipitation.

Record or near-record high precipitation in April and May again put flows into the excessive range statewide. Record high flows were established for May at some gages, and flooding occurred throughout much of the State. Excessive flows prevailed through June. The remainder of the water year was characterized by normal to above-normal flows.

Statewide, average precipitation for water year 1996 was well above normal. Record or near-record high yearly mean discharges were established at gages throughout Ohio.

## Water Quality

Water-quality data in Ohio are collected on a short-term basis in conjunction with local or regional studies. On a long-term basis, water-quality data in Ohio are collected at fixed stations. With the redesign of the National Stream Quality Accounting Network (NASQAN) in 1996 to concentrate on evaluation of large river basins, collection of water-quality data at fixed stations for NASQAN was discontinued in Ohio. Collection at another fixed station, the Hydrologic Benchmark station, located in a small, relatively pristine basin in southern Ohio, continued in 1996, although at a lower frequency than in previous years. Also active in Ohio is the National Water-Quality Assessment (NAWQA) Program, a long-term monitoring program designed to assess the status of and trends in the quality of the Nation's ground- and surface-water resources. Sampling in NAWQA began in 1991 in the Nation and in 1994 at some sites in the St. Lawrence River Basin in Ohio. One of the NAWQA fixed stations, the Maumee River at Waterville, was also a fixed station in NASQAN. In water year 1996 at the Maumee River at Waterville, as part of the NAWQA program, samples were collected monthly beginning in March; two additional samples were collected during high flow. Within the fixed-interval framework, sampling time is varied so that samples are collected over a range of streamflows. Samples are analyzed for major anions and cations, nutrients, trace elements, suspended sediment, selected physical properties, and fecal-coliform and *Escherichia coli* bacteria.

Box plots of discharge and concentrations of selected constituents measured during 1986-95 are shown in figures 3 and 4 for the Maumee River at Waterville as part of the NASQAN program. Land use in the basin is mixed and consists of row crop and heavy agriculture upstream and urban and industrial areas downstream. Results of analysis of samples collected in water year 1996 as part of the NAWQA program are superimposed on the box plots and are represented by solid circles.

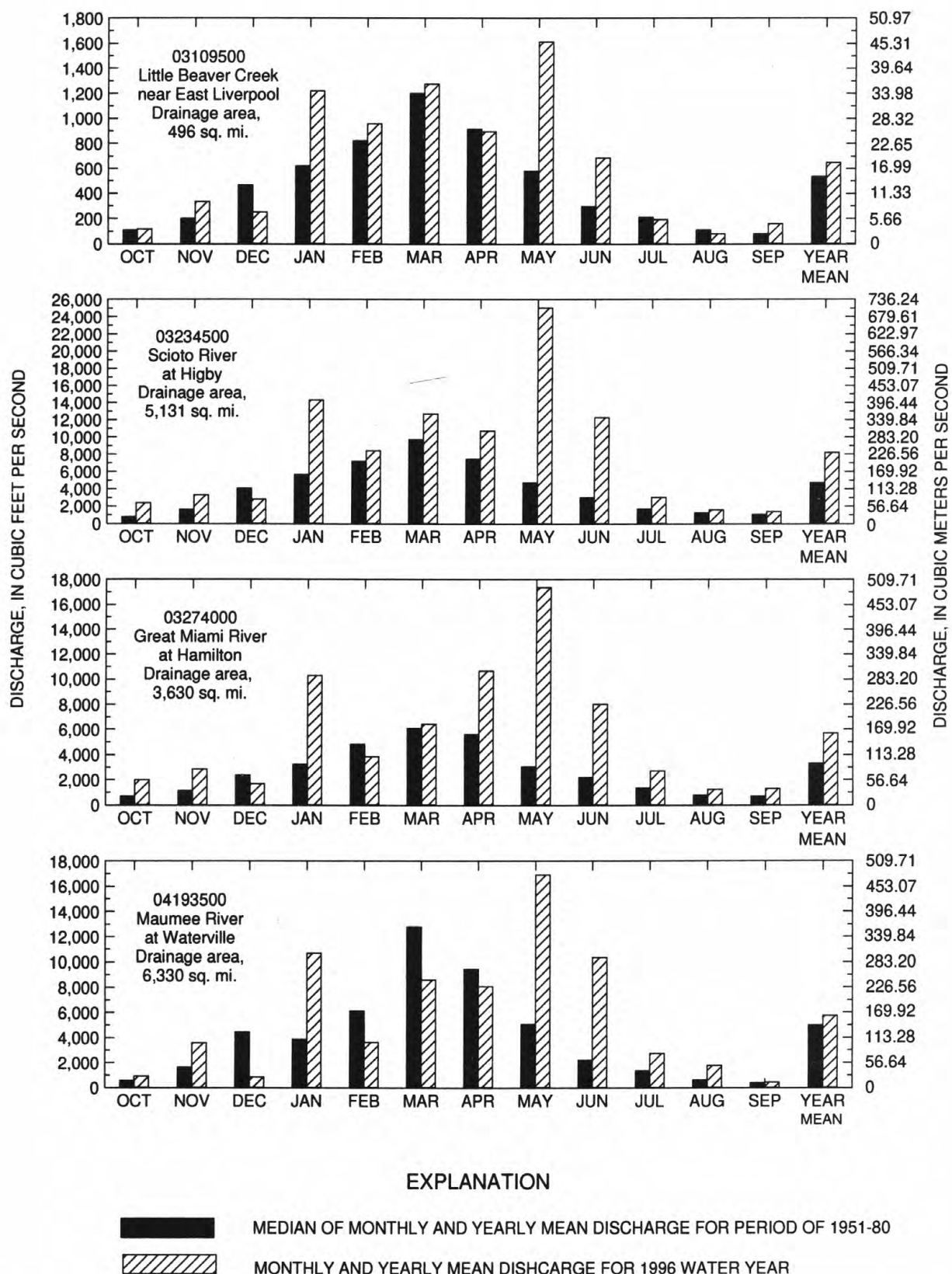
The ranges of instantaneous discharge for water year 1996 were similar to those in the previous 10-year period for the Maumee River. Four samples, however, were collected at high flow; these values were above the 75th percentile of data collected during the previous 10-year period, with discharges ranging from 9,130 to 22,800 cubic feet per second.

Seven out of nine fecal-coliform concentrations found in 1996 for the Maumee River were above the median of data collected during the previous 10-year period. Concentrations in four of these samples exceeded the single-sample bathing-water standard of 400 colonies per 100 milliliters; none of the samples exceeded the single-sample primary-contact standard of 1,000 colonies per 100 milliliters.

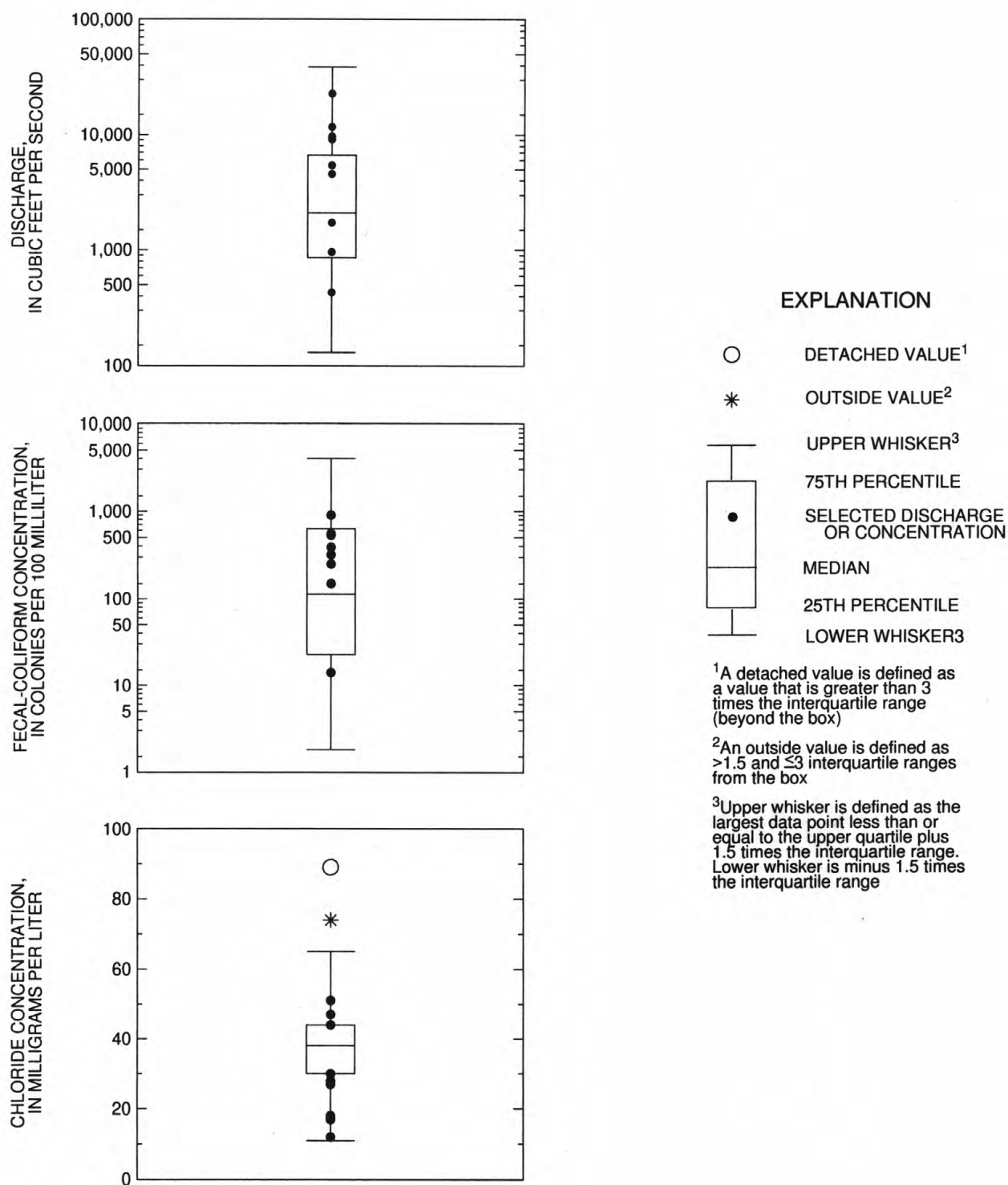
Chloride concentrations, commonly associated with municipal or industrial point sources of wastewater, tended to be higher or lower in 1996 than the 75th and 25th percentiles of concentrations measured during the previous 10-year period. Dissolved-solids concentrations, however, were less than the 75th percentile of concentrations found in previous years.

During 1996, none of nitrate plus nitrite concentrations measured exceeded the U.S. Environmental Protection Agency maximum contaminant level for finished drinking water (10 milligrams per liter, as N). In Ohio, fertilizers are a major source of nitrate. Concentrations in the Maumee River were highly variable and ranged from 0.34 to 8.9 milligrams per liter.

<sup>1</sup>For streamflow, "normal" is defined as being between the 25th and 75th percentiles as measured during the base period water years 1961-90.



**Figure 2.** Discharge during 1996 water year compared with median discharge for period 1951-80 for four representative gaging stations.



**Figure 3.** Discharge, fecal-coliform, and chloride concentrations measured in water year 1996 and the distribution of those constituents from measurements made during the water years 1986-95 for the Maumee River at Waterville.

Agricultural runoff and municipal and industrial point sources are the principal sources of phosphorus in Ohio. Increased phosphorus concentrations may lead to a high rate of production of plant materials in water and eutrophication of the receiving water. Total phosphorus concentrations were highly variable in the Maumee River during 1996, ranging from 0.08 to 0.33 milligrams per liter. Concentrations in the Maumee River during water year 1996 were similar to concentrations found in the previous 10-year period.

## GROUND WATER

Ground water serves the needs of 45 percent of Ohio's population. An estimated 658 million gallons of ground water per day is withdrawn for public supply, domestic, industrial, and agricultural purposes. Many people in Ohio depend on ground water as the only practical source of supply.

Ohio's unconsolidated aquifers are composed of either coarse- or fine-grained sediments. Both types are composed mainly of materials of glacial origin. The coarse-grained unconsolidated aquifers generally consist of highly permeable sand and gravel. Much of the sand and gravel is alluvium derived from glaciofluvial outwash along the courses of some modern streams; thus, these aquifers sometimes are referred to as "watercourse" aquifers. Coarse-grained unconsolidated aquifers in the northwestern corner of the State (fig. 5) underlie glacial till, are locally confined under artesian pressure, and are highly productive. Extensive kame-terrace deposits of water-bearing gravel and sand are widely used ground-water sources in northeastern Ohio. The fine-grained unconsolidated aquifers are similar to the coarse-grained unconsolidated aquifers in form and origin but are less permeable because of higher percentages of mixed fine sand, silt, and clay. Included in the fine-grained unconsolidated aquifers are tills that contain thin or localized stratified lenses of sand and gravel.

Ground-water supply for much of the unglaciated upland area of southeastern Ohio is from bedrock aquifers composed of shaly sandstone and thin limestone. These strata, which range from Mississippian to Permian in age, are dominated by low-yielding shales and shaly sandstones that include numerous coal-bearing strata. In some places, small water supplies are available from fractured coal beds. Several sandstone aquifers in northeastern Ohio are of regional extent and are major ground-water sources for individual and small public supplies. These include the Berea and Black Hand Sandstones of Mississippian age and several sandstone members of the Pottsville and Allegheny Formations of Pennsylvanian age. The Lake Erie coastline of northeastern Ohio is underlain by shale of Devonian and Mississippian age (fig. 5) that yields only small amounts of water to wells. Silurian-age limestone and dolomite and Devonian limestone comprise the carbonate aquifer system (fig. 5) of much of western Ohio. Glacial cover is uneven and consists of valley fill and terminal moraine in some places. The northeastern part of western Ohio contains an area of high-yielding wells that tap a preferentially weathered zone, which developed when carbonate section was periodically exposed as land mass during the Paleozoic Era. The southwestern corner of Ohio near Cincinnati is underlain by shale and a thin limestone aquifer of Ordovician age. Away from the watercourse (coarse unconsolidated) aquifers that traverse the area, the rocks that form the uplands yield only very small amounts of ground water.

## Ground-Water Levels

Most ground-water observation wells in Ohio tap unconsolidated sand and gravel aquifers associated with the State's principal streams. Sample 1-year and 5-year hydrographs of a well completed in an unconfined unconsolidated sand-and-gravel aquifer are shown in figure 6. The observation-well network also includes some bedrock wells in areas where consolidated aquifers are heavily used for water supply, such as in the carbonate-rock region of northwestern Ohio. Sample 1-year and 5-year hydrographs of a well completed in a confined carbonate-rock aquifer are shown in figure 7. The yearly low for most wells occurs during the winter months, especially in cold, dry years or near the end of the growing season. Highs for the year usually occur from March through June, which is the peak of the recharge season. The yearly water-level fluctuation due to climatic conditions in water-table and confined-aquifer wells is commonly 3 to 5 feet, but can be as much as 10 feet.

At the beginning of water year 1996, ground-water levels were in the normal<sup>2</sup> range in western Ohio and below normal in eastern Ohio. In spite of above-normal precipitation in October, ground-water levels were fairly stable during October through December and remained below normal in eastern Ohio and normal elsewhere.

Net rises in ground-water levels were observed statewide in January, owing to above-normal precipitation and snowmelt; however, levels remained below normal in eastern Ohio even though they were normal and above normal elsewhere.

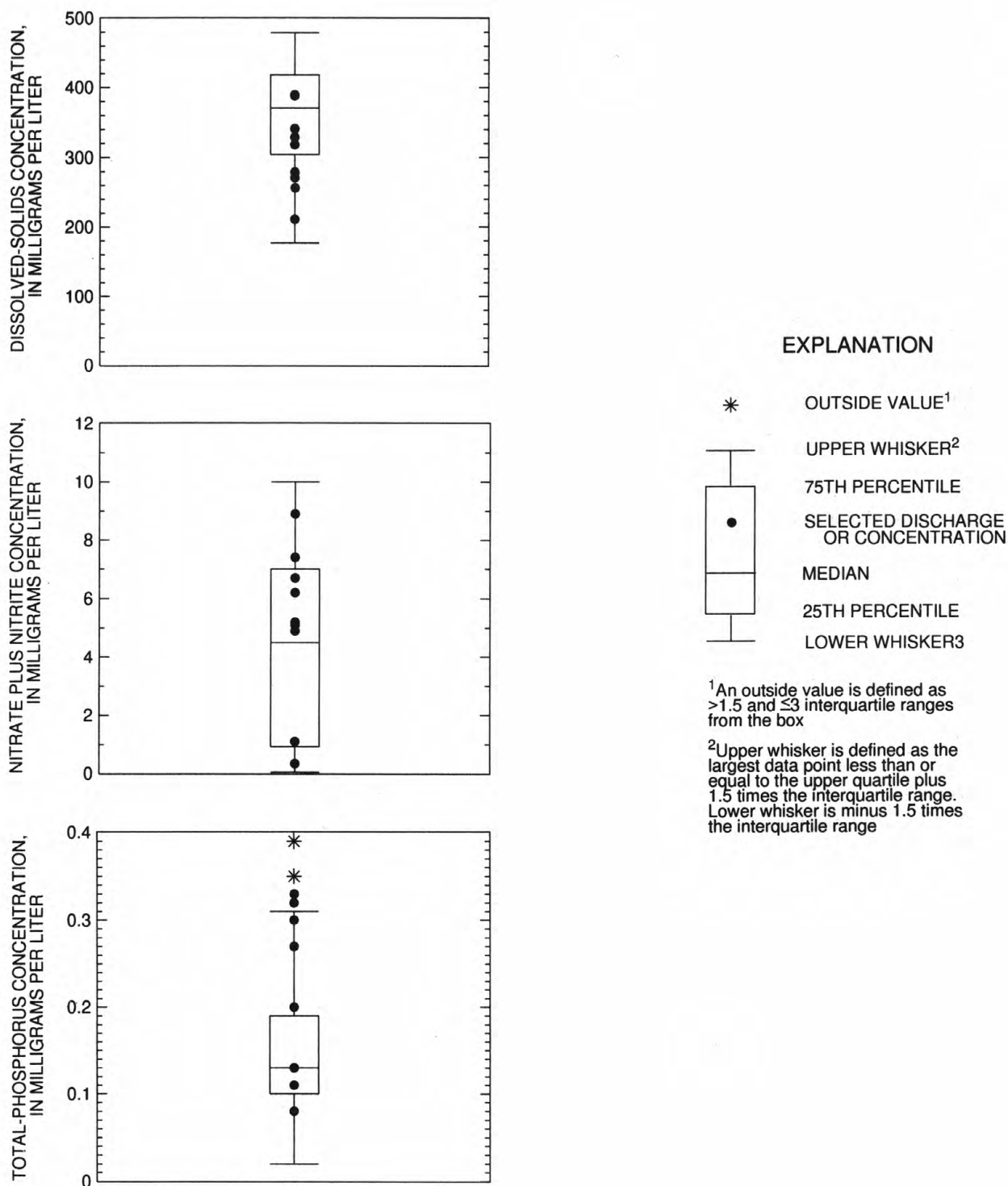
In March and early April, ground-water levels stabilized and were near normal in western Ohio and below normal in eastern Ohio.

Ground-water levels rose statewide in late April and May in response to record or near-record precipitation during these months. Above-normal ground-water levels prevailed in much of the State through June, and record-high levels were established at numerous observation wells.

The remainder of the water year was characterized by seasonal declines, although ground-water levels remained above normal for much of the State. At the end of the water year, the only areas of normal and below-normal levels were in eastern Ohio.

<sup>2</sup>For ground-water levels, "normal" is defined as being between the 25th and 75th percentiles of the range of values recorded during the reference period, 1960-75.





**Figure 4.** Dissolved-solids, nitrate plus nitrite, and total-phosphorus concentrations measured in the water year 1996 and the distribution of those constituents from measurements made during water years 1986-95 for the Maumee River at Waterville.

## SPECIAL NETWORKS AND PROGRAM

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

National Stream-Quality Accounting Network (NASQAN) monitors the water quality of large rivers within four of the Nation's largest river basins--the Mississippi, Columbia, Colorado, and Rio Grande. The network consists of 39 stations. Samples are collected with sufficient frequency that the flux of a wide range of constituents can be estimated. The objective of NASQAN is to characterize the water quality of these large rivers by measuring concentration and mass transport of a wide range of dissolved and suspended constituents, including nutrients, major ions, dissolved and sediment-bound heavy metals, common pesticides, and inorganic and organic forms of carbon. This information will be used (1) to describe the long-term trends and changes in concentration and transport of these constituents; (2) to test findings of the National Water-Quality Assessment Program (NAWQA); (3) to characterize processes unique to large-river systems such as storage and re-mobilization of sediments and associated contaminants; and (4) to refine existing estimates of off-continent transport of water, sediment, and chemicals for assessing human effects on the world's oceans and for determining global cycles of carbon, nutrients, and other chemicals.

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) provides continuous measurement and assessment of the chemical climate of precipitation throughout the United States. As the lead federal agency, the USGS works together with over 100 organizations to accomplish the following objectives: (1) Provide a long-term, spatial and temporal record of atmospheric deposition generated from a network of 191 precipitation chemistry monitoring sites. (2) Provide the mechanism to evaluate the effectiveness of the significant reduction in SO<sub>2</sub> emissions that began in 1995 as implementation of the Clean Air Act Amendments (CAAA) occurred. (3) Provide the scientific basis and nationwide evaluation mechanism for implementation of the Phase II CAAA emission reductions for SO<sub>2</sub> and NO<sub>x</sub> scheduled to begin in 2000.

Data from the network, as well as information about individual sites, are available through the World Wide Web at:

<http://nadp.nrel.colostate.edu/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, representative part of the Nation's ground- and surface-water resources; provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

Assessment activities are being conducted in 53 study units (major watersheds and aquifer systems) that represent a wide range of environmental settings nationwide and that account for a large percentage of the Nation's water use. A wide array of chemical constituents will be measured in ground water, surface water, streambed sediments, and fish tissues. The coordinated application of comparative hydrologic studies at a wide range of spatial and temporal scales will provide information for decision making by water-resources managers and a foundation for aggregation and comparison of findings to address water-quality issues of regional and national interest.

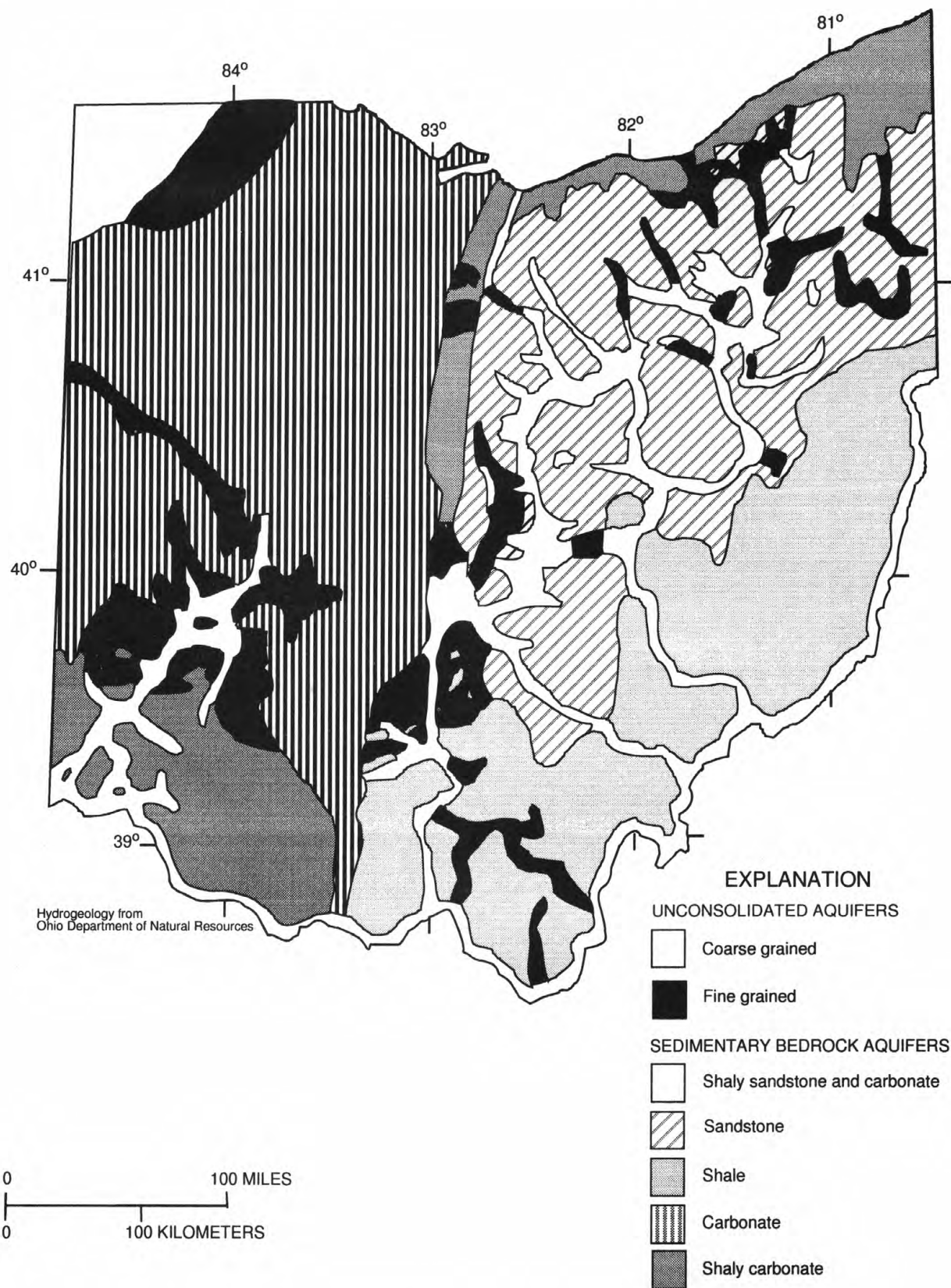
Communication and coordination between USGS personnel and other local, State, and federal interests are critical components of the NAWQA Program. Each study unit has a local liaison committee consisting of representatives from key federal, State, and local water resources agencies, Indian nations, and universities in the study unit. Liaison committees typically meet semiannually to discuss their information needs, monitoring plans and progress, desired information products, and opportunities to collaborate efforts among the agencies.

Additional information about the NAWQA Program is available through the World Wide Web at:

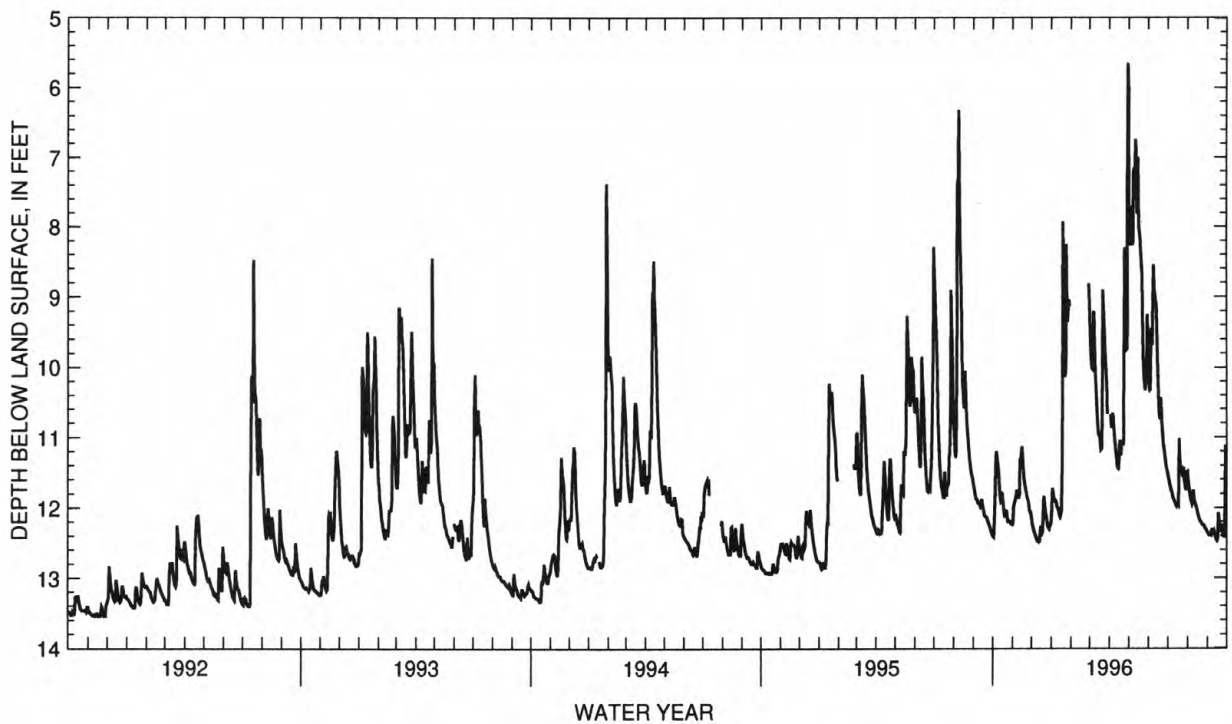
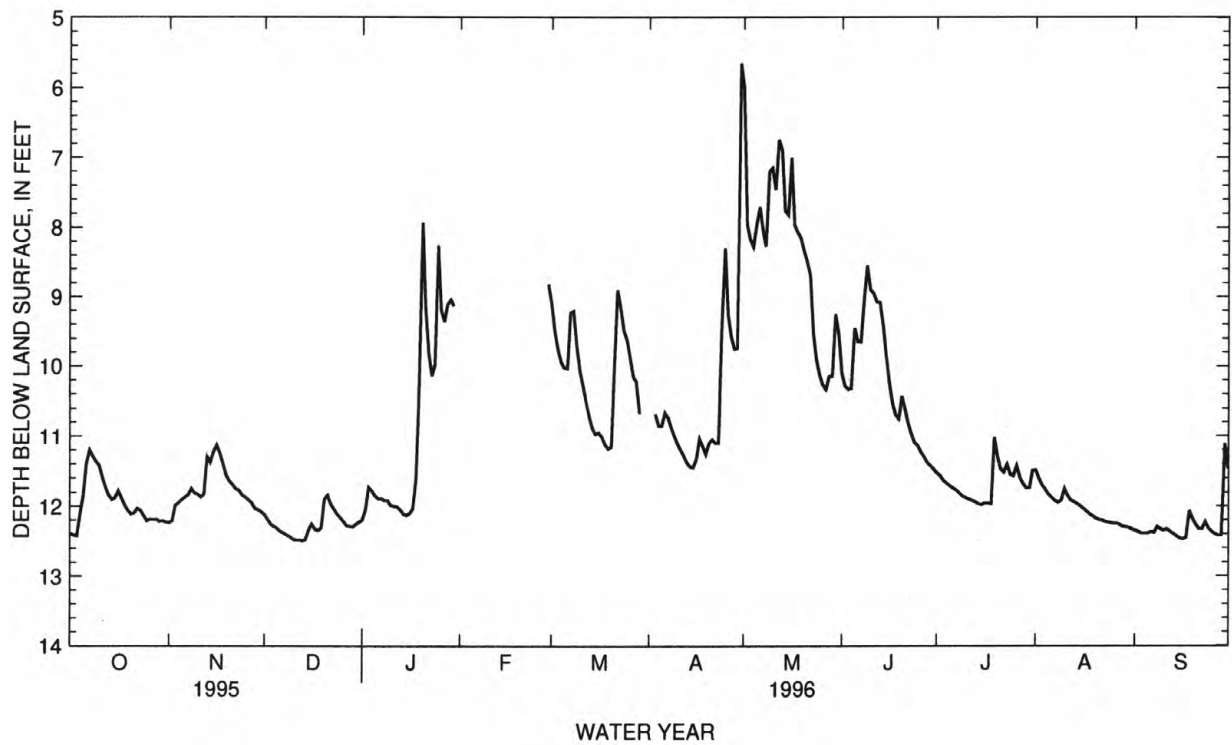
[http://wwwrvares.er.usgs.gov/nawqa/nawqa\\_home.html](http://wwwrvares.er.usgs.gov/nawqa/nawqa_home.html)

## EXPLANATION OF THE RECORDS

The records in this report are for the 1996 water year that began October 1, 1995, and ended September 30, 1996. 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 and ground water, and ground-water-level data. 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.

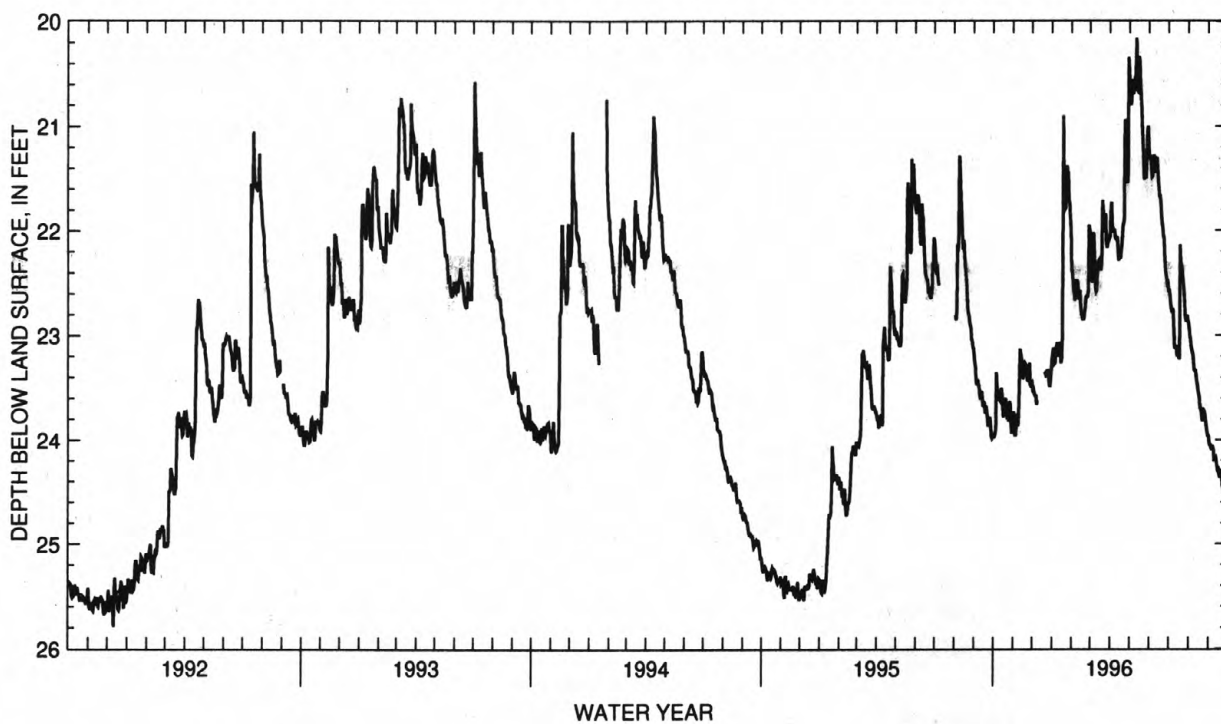
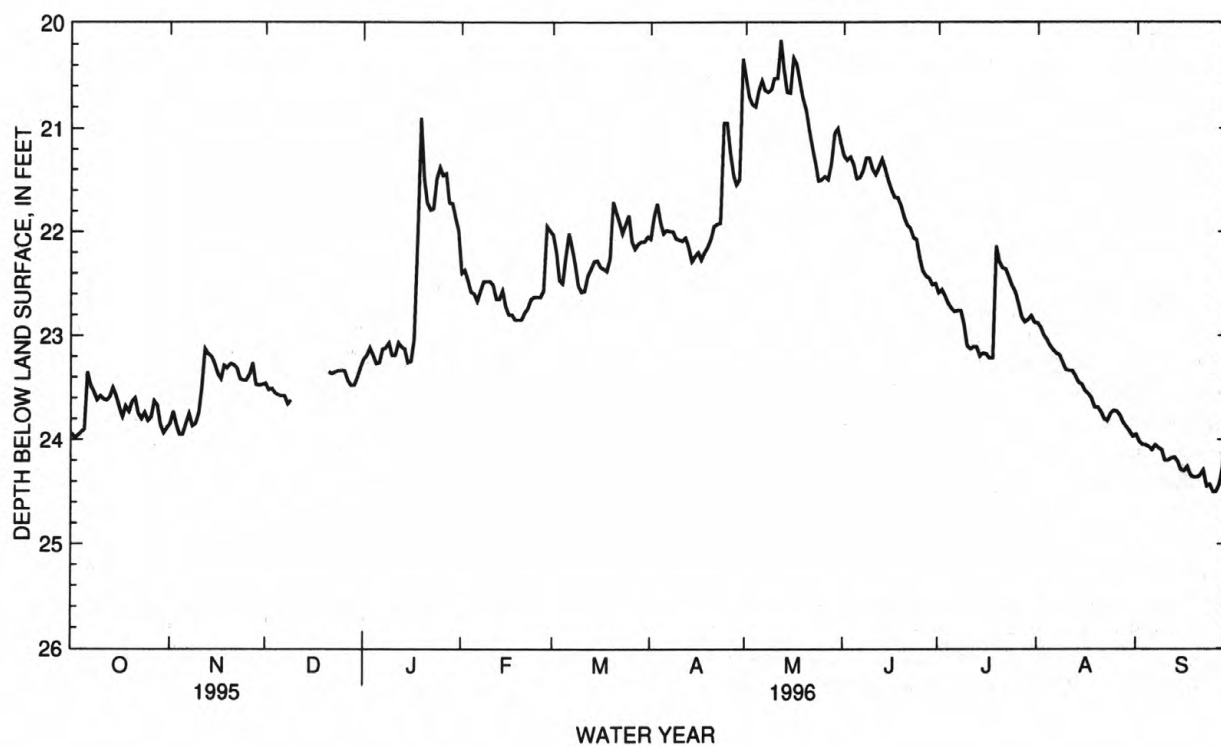


**Figure 5.** Geographic distribution of principal aquifers in Ohio.



**Figure 6.** Sample 1-year and 5-year hydrographs of well FR-3 (395118082573300), completed in an unconfined unconsolidated aquifer.





**Figure 7.** Sample 1-year and 5-year hydrographs of well U-4 (401826083255200), completed in a confined carbonate-rock aquifer.

## STATION IDENTIFICATION NUMBERS

Each data station, whether onstream or at a well, is assigned a unique identification number. The number is generally assigned when a station is first established and is retained for that station indefinitely. The systems used by the USGS to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic locations. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells and, in Ohio, for surface-water stations where only infrequent measurements are made.

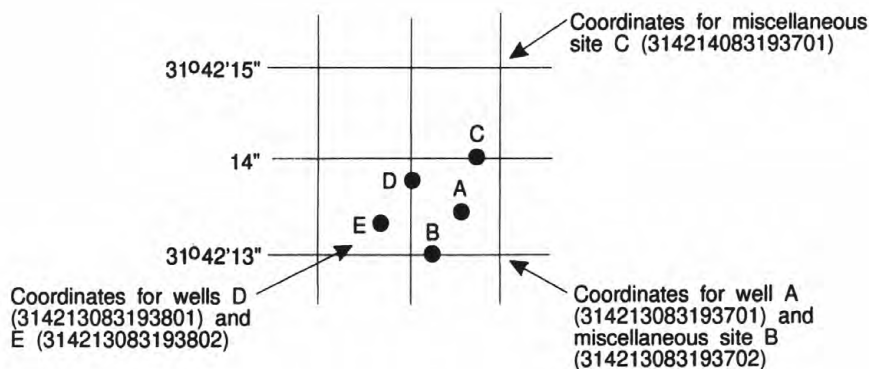
## Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in USGS reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a main-stream station are listed before that station. A station on a tributary that enters between two main-stream 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 a "List of Stations" in the front of the report. Each indentation represents one rank. This downstream order and system of indentation show 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 the above-mentioned 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 04041000, which appears just to the left of the station name, includes the two-digit part number "04" plus the six-digit downstream order number "041000". The part number designates the major river basin; for example, part "03" is the Ohio River Basin, and part "04" is the St. Lawrence River Basin.

## Latitude-Longitude System

The identification numbers for wells and miscellaneous surface-water sites 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. 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 8.)



**Figure 8.** System for numbering wells and miscellaneous sites (latitude and longitude).

## 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 discharge may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir contents, 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 mean daily discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations."

By contrast, partial records are obtained through discrete measurements often without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of a 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 and crest-stage stations for which data are given in this volume are shown in figures 9a through 9d.

## 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, or with digital recorders that punch stage values on paper tapes or store stage data on solid state storage media at selected time intervals. Measurements of discharge are made with current meters using methods adapted by the USGS as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in USGS 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 approximate 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.

Daily mean discharges are computed by applying 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 daily mean 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 curve 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 relation 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 stations the stage-discharge relation is affected by changing stage; at these stations the rate of change in stage is used as a factor in computing discharge.

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

For some gaging stations there are periods when no gage-height record is obtained, or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. 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.

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.

### Data Presentation

The records published for each gaging station consist of two parts--the manuscript or station description and the data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; 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.

#### Station Manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments 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 gage 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 mileage, 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 the drainage areas likewise varies. Drainage areas are updated as better maps become available.

**PERIOD OF RECORD.**--This indicates the period for which there are published records 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 records from it can reasonably be considered equivalent with records from the present station.

**REVISED RECORDS.**--Published records, because of new information, 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 the 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 Mean Sea Level (MSL) (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 record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a REMARKS statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station, in addition, 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 USGS by a cooperating organization are identified here.

**EXTREMES FOR PERIOD OF RECORD.**--"Extremes for Period of Record" is presented as a separate paragraph where outside summary statistical period. Extremes may include maximum and minimum stages and maximum and minimum discharges or contents. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.



**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 USGS.

**PEAK DISCHARGES ABOVE BASE FOR CURRENT YEAR**--Presented as a separate table. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. All peaks greater than the base discharge are listed with the maximum for the year footnoted by an asterisk (\*). Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial regulation or at locations where the instantaneous peak discharge does not exceed the mean daily discharge by 10 percent. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330.

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

Although rare, occasionally the records of a discontinued station 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 data from previously published data reports may wish to contact the District office to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published retrieval of data is always accompanied by revisions of the corresponding data in computer storage.

Manuscript information for lakes 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, AND EXTREMES FOR CURRENT YEAR have been deleted and the information contained in these paragraphs, except for the listing of secondary instantaneous peak discharges in the EXTREMES FOR CURRENT YEAR paragraph, is now presented in the tabular summaries following the discharge table or in the REMARKS paragraph, as appropriate. No changes have been made to the data presentations of lake contents.

### **Data Table of Daily Mean Values**

The daily table for stream-gaging stations gives mean discharge for each day and is followed by monthly and yearly summaries. In the monthly summary below the daily table, the line headed "TOTAL" gives the sum of the daily figures. The line headed "MEAN" gives the average flow in cubic feet per second during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily discharges respectively, for the month. Discharge for the month is often expressed in cubic feet 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 are omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. In the yearly summary below the monthly summary, the figures shown are the appropriate discharges for the calendar and water years. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversions or reservoir contents are given. These figures are identified by 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 SEVEN-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 in the REMARKS paragraph of the manuscript or in the footnotes. When the maximum or minimum statistic occurred outside the designated period, that statistic is listed in the EXTREMES FOR PERIOD OF RECORD paragraph in the manuscript. 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.

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

**INSTANTANEOUS PEAK FLOW.**--The maximum instantaneous stage occurring for the water year or for the designated period. Note that secondary instantaneous peak discharges above a selected base discharge are given in table "PEAK DISCHARGES AND STAGES AT CONTINUOUS-RECORD SURFACE DISCHARGE STATIONS."

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

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

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

Cubic feet per 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 for the area.

Inches (INCHES) indicates the depth to which the drainage area would be covered if all 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 usually presented in two tables. The first is a table of annual maximum stage and discharge at crest-stage stations, and the second, when collected, 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 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.

### Identifying Estimated Daily Discharge

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

### 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 the true; "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 hundredths of a cubic foot per second for values less than 1 ft<sup>3</sup>/s; to the nearest tenth between 1.0 and 10 ft<sup>3</sup>/s; to whole numbers between 10 and 1,000 ft<sup>3</sup>/s; and to three significant figures for more than 1,000 ft<sup>3</sup>/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

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 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

Records of discharge, ground water, reservoir contents, and water quality not published by the USGS are collected in Ohio at several sites by State and other Federal agencies. The National Water Data Exchange (NAWDEX), U.S. Geological Survey, Reston, VA 20192, maintains an index of these sites as well as an index of records of discharge collected by other agencies but not published by the USGS. Information on records at specific sites can be obtained from that office upon request.

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

### 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 or recorded electronically. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recording; however, because of cost, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this volume are shown in figures 9a and 9b.



### 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 a nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of "DISCHARGE MEASUREMENTS."

### On-Site Measurements and Sample Collection

In obtaining water-quality data, a major concern is 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 sample 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" (TWRI), Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A4, and USGS Open-File Report 93-125 "Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory--Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments." The TWRI references are listed in this report. Also, detailed information on collecting, treating, and shipping samples may be obtained from the USGS 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. All 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 that 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. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values for each constituent measured and are based upon hourly readings beginning at 0100 hours and ending at 2400 hours for each day of record. More detailed records (hourly values) may be obtained from the USGS District Office, whose address is given on the back of the title page of this report.

### Water Temperatures

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are frequently taken at the time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small daily 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 or maximum and minimum temperatures for each day are published.

### Sediment

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

During periods of rapidly changing flow or rapidly changing concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharge for days of rapidly changing flow or concentration was computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge values differ from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were



collected, daily loads of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

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

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

### Laboratory Measurements—Chemical and Physical Properties

Sediment samples, samples for microbiological analyses, and samples for specific conductance, pH, and dissolved oxygen are analyzed locally. All other samples are analyzed in the USGS laboratories in Arvada, CO or by a USGS approved outside laboratory. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the USGS laboratory are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A4, and USGS Open-File Report 93-125 "Methods of Analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of Inorganic and Organic Constituents in Water and Fluvial Sediments." Methods used by the USGS laboratory for microbiological analyses are given in TWRI, Book 5, Chap. A4.

Historical and current (1996) dissolved trace-element concentrations are reported herein for water that was collected, processed, and analyzed by using either ultraclean or other than ultraclean techniques. If ultraclean techniques were used, then those concentrations are reported in nanograms per liter. If other than ultraclean techniques were used, then those concentrations are reported in micrograms per liter and could reflect contamination introduced during some phase of the procedure.

### Data Presentation

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

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, 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 on instrumentation is given only if a water-quality monitor, temperature record, sediment pumping sampler, or other sampling device is in operation at a station.

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

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

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

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the USGS computerized data system, the National Water Data Storage and Retrieval 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 USGS water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

### Remark Codes

The following remarks codes may appear with the water-quality data in this report:

PRINTED OUTPUT	REMARK
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptable 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.--To confidently produce dissolved trace-element data with insignificant contamination, the USGS began using a new trace-element protocol at some stations in water year 1994 to collect trace-element data at the microgram per liter ( $\mu\text{g/L}$ ) level (refer to USGS Open-File Report 94-539 "U.S. Geological Survey Protocol For The Collection And Processing Of Surface-Water Samples For The Subsequent Determination Of Inorganic Constituents In Filtered Water"). This protocol was used in water year 1995 at all stations. Therefore, the trace-element data for samples collected before and after implementation of new protocols are not directly comparable.

### 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, CO 80523 (Telephone: 303-491-5643).

### RECORDS OF GROUND-WATER LEVELS

Water-level data from a network of observation wells (in addition to project wells) are given in this report. The network well 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 Ohio are shown in figures 9c and 9d. Water-level data for specific projects are reported under those projects.

### Data Collection and Computation

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

Tables of water-level data are presented by counties arranged in alphabetical order. The prime identification number for a given well is a 15-digit number that is based on latitude and longitude. The secondary identification number is the local well number, which is provided for local needs. Water-level measurements in this report are given in feet with reference to land-surface datum. Land-surface datum is a datum plane that is approximately at land surface at each well. If known, the altitude of the land-surface datum above sea level is given in each well description. The height of the measuring point (MP) above or below land-surface datum is given in each well description.

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 larger units.

### Data Presentation

Each well record consists of two parts, the station description and the data table of water levels observed during the water year. 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.

**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 describes the aquifer by age and composition.

**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.

**DATUM.**--This entry describes both the measuring point and the land-surface altitude 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 altitude 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 are also water-quality observation wells, and may be used to acknowledge the assistance of local (non-USGS) observers.

**PERIOD OF PUBLISHED 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 USGS or cooperating agency, and the words "to current year" if the records are to be continued to the following year. Periods for which water-level records are available, but not published by the USGS, may be noted.

**EXTREMES FOR PERIOD OF PUBLISHED 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 (or above) land-surface datum. All periodic measurements of water levels for wells are listed. For wells equipped with recorders, daily water-level lows are published. The highest and lowest daily lows of the water year are shown on a line below the table. Because only daily lows are published for wells with recorders, the extreme instantaneous high may be a value that is not listed in the table. Missing records are indicated by dashes in place of the water level.

### RECORDS OF GROUND-WATER QUALITY

Records of ground-water quality in this report differ from other types of records in that, for most sampling sites, they consist of only one set of measurements. The quality of ground water ordinarily changes slowly, so that frequent measuring of the same parameter is not necessary unless one is concerned with a particular problem such as monitoring for trends of a particular constituent.

### Data Collection and Computation

The records of ground-water quality in this report were obtained mostly as part of special studies in specific areas. Consequently, a number of chemical analyses are presented for some counties, but none are presented for others. As a result, the records for this year, by themselves, do not provide a balanced view of ground-water quality statewide. Such a view can be attained only by considering records for this year in context with similar records obtained for these and other counties in earlier years.

Most methods for collecting and analyzing water samples are described in the TWRI manuals listed in this report. The data presented in this report represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. All samples were obtained by trained personnel. The wells sampled were pumped long enough to assure that the water collected came directly from aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and the material comprising the casings.

### Data Presentation

The records of ground-water quality are published intermixed with the ground-water-level data for network wells and with the specific project for project wells.

### ACCESS TO WATSTORE DATA

The USGS 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 USGS'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. 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 USGS 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 USGS 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 USGS collects or has collected data.
- Daily Values File - Contains daily values of streamflows, stages, reservoir contents, water temperatures, specific conductances, sediment concentrations, sediment discharges, and ground-water levels for more than 32,000 sites.
- Peak Flow File - Contains maximum (peak) streamflow and gage-height values at surface-water sites for more than 23,000 sites.
- Water Quality File - Contains more than 1.8 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 USGS opened WATSTORE to the public for direct access. The signing of a Memorandum of Agreement with the USGS 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 incurred. Direct access may be obtained by contacting:

U.S. Geological Survey  
National Water Data Exchange  
421 USGS National Center  
Reston, VA 20192

In addition to providing direct access to WATSTORE, data can be provided in various machine-readable formats on magnetic tape or floppy disk. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division's District offices. (See address on the back of the title page.)



## DEFINITION OF TERMS

Terms related to streamflow, water quality, and other hydrologic data, as used in this report, are defined below. See also the table for converting inch-pound units to International System of units (SI) 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 multicelled plants, containing chlorophyll and lacking roots, stems, and leaves.

Algal growth potential (AGP) is the maximum 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 reasonable 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, 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 that ferment lactose with gas formation within 48 hours at 35°C. In the laboratory, these bacteria are defined as the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C  $\pm$  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.

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°C  $\pm$  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 intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria that are capable of growth in brain-heart infusion broth. In the laboratory, they are defined as all the organisms that produce red or pink colonies within 48 hours at 35°C  $\pm$  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 unconsolidated material 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 microorganisms, 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 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<sup>3</sup>), and periphyton and benthic organisms in grams per square meter (g/m<sup>2</sup>).

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 the ash mass and represents the actual mass of the living matter. The organic mass is expressed in the same units as for ash 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).

Cfs-day 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 2,447 cubic meters.

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

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.

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.

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

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

Dissolved: That material in a representative water sample that passes through a 0.45-micrometer membrane filter. This is a convenient operational definition used by Federal 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 totalling 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 specific 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 noncontribution areas, within the area unless otherwise noted.

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 stream and bodies of impounded surface water.

Escherichia coli (*E. coli*) are bacteria present in the intestine and feces of warm-blooded animals. *E. coli* are a member species of the fecal coliform group of indicator bacteria. In the laboratory they are defined as those bacteria that produce yellow or yellow-brown colonies on a filter pad saturated with urea substrate broth after primary culturing for 22 to 24 hours at 44.5°C on mTEC medium.

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 attributable to the presence of alkaline earths (principally calcium and magnesium) and is expressed as the equivalent concentration of calcium carbonate ( $\text{CaCO}_3$ ).

Hydrologic Bench-Mark Station is one that provides hydrologic data for a basin in which the hydrologic regimen will likely be governed solely by natural conditions. Data collected at a bench-mark station may be used to separate effects of natural from human-induced changes in other basins which have been developed and in which the physiography, climate, and geology are similar to those in the undeveloped bench-mark basin.

Hydrologic Index Stations, in this report, refers to four continuous record gaging stations that have been selected as representative of streamflow patterns for their respective regions of Ohio. Station locations are shown in figure 1.

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 8-digit number.

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 substance (MBAS) is a measure of apparent detergents. This determination depends on the formation of a blue color when methylene blue dye reacts with synthetic anionic detergent compounds.

Micrograms per gram (UG/G,  $\mu\text{g/g}$ ) is a unit expressing the concentration of a chemical element as the mass (micrograms) of the element sorbed per unit mass (gram) of sediment.

Microgram per kilogram (UG/KG,  $\mu\text{g/kg}$ ) is a unit expressing the concentration of a chemical element as the mass (micrograms) of the element sorbed per unit mass (kilogram) of bottom material.

Micrograms per liter (UG/L,  $\mu\text{g/L}$ ) 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,  $\text{mg/L}$ ) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represent the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in  $\text{mg/L}$ , and is based on the mass of dry sediment per liter of water-sediment mixture.

National Stream-Quality Accounting Network (NASQAN) is a data-collection network designed by the USGS to meet many of the information demands of agencies or groups involved in national or regional water-quality planning and management. Both accounting and broad-scale monitoring objectives have been incorporated into the network design. Areal configuration of the network is based on river-basin accounting units (identified by 8-digit hydrologic-unit numbers) designated by the Office of Water Data Coordination in consultation with the Water Resources Council. Primary objectives of the network are (1) to depict areal variability of streamflow and water-quality conditions nationwide on a year-by-year basis and (2) to detect and assess long-term changes in streamflow and stream quality.



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 unit area habitat, usually square meters ( $m^2$ ), acres, or hectares. 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 milliliters (mL) or liters (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 USGS 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 U.S. 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 suspended sediment or bed material 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 recommendations made by the American Geophysical Union Subcommittee on Sediment Terminology.

The classifications are as follows:

Classification	Size (mm)			Method of analysis
Clay	0.00024	-	0.004	Sedimentation
Silt	0.004	-	0.062	Sedimentation
Sand	0.062	-	2.0	Sedimentation 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 material 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, number, mass, or volume.

Periphyton is the assemblage of microorganisms attached to and growing upon solid surfaces. While primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms. Periphyton is a useful indicator of water quality.

Pesticide program is a network of regularly sampled water-quality stations where samples are collected to determine the concentration and distribution of pesticides in streams where potential contamination could result from the application of commonly used insecticides and herbicides. Operation of the network is a Federal interagency activity.

Pesticides are chemical compounds used to control undesirable plants and animals. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides. Insecticides and herbicides, which control insects and plants respectively, are the two categories reported.

Picocurie (PCI, pCi) is one trillionth ( $1 \times 10^{-12}$ ) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields  $3.7 \times 10^{10}$  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.

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 millimeter (cells/mm) of sample.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movement 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.

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 by the plants (carbon method).

Milligrams of carbon per area or volume per unit time [ $\text{mg C}/(\text{m}^2 \text{ or } \text{m}^3/\text{time})$ ] for periphyton, macrophytes, and 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 the hour or day, depending on the incubation period.

Milligrams of oxygen per area or volume per unit time [ $\text{mg O}_2/(\text{m}^2 \text{ or } \text{m}^3/\text{time})$ ] for periphyton, macrophytes, and phytoplankton are 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.

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.

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 only readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment; 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.) indicates 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 refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment of the first-order level 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 use, 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).

Suspended-sediment discharge (tons/day) is the rate at which dry weight of sediment passes a section of a stream or is the quantity of sediment, as measured by dry weight or volume, that passes a section in a given time. It is computed by multiplying discharge times mg/L times 0.0027.

Suspended-sediment load is the quantity of suspended sediment passing a section in a specified period.

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 weight or volume, that passes a section during a given time.

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

7-day, 10-year low flow ( $7Q_{10}$ ) 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 of 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 derived from the atmosphere, vegetation, soil, or rocks 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.

Natural substrate refers to any naturally occurring emersed or submersed solid surface, such as a rock or tree, 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 substrate are basket samplers (made of wire cages filled with clean streamsize rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexuses strips for periphyton.

Surface area of a lake is that area outlined on the latest USGS 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 the total concentration in a water-sediment mixture. The water-sediment mixture is associated with (or sorbed on) that material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45-micrometer 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 would be 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-micrometer 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.

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

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

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 substance in solution or suspension that passes a stream section during a 24-hour day.

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 determines all of the constituent in the sample.)

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

Total 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 load (tons) is the total quantity of any individual constituent, as measured by dry mass or volume, that is dissolved in a specific amount of water (discharge) during a given time. It is computed by multiplying the total discharge, times the mg/L of the constituent, times the factor 0.0027, times the number of days.

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 would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Water year in USGS reports dealing with surface-water supply is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1980, is called the "1980 water year."

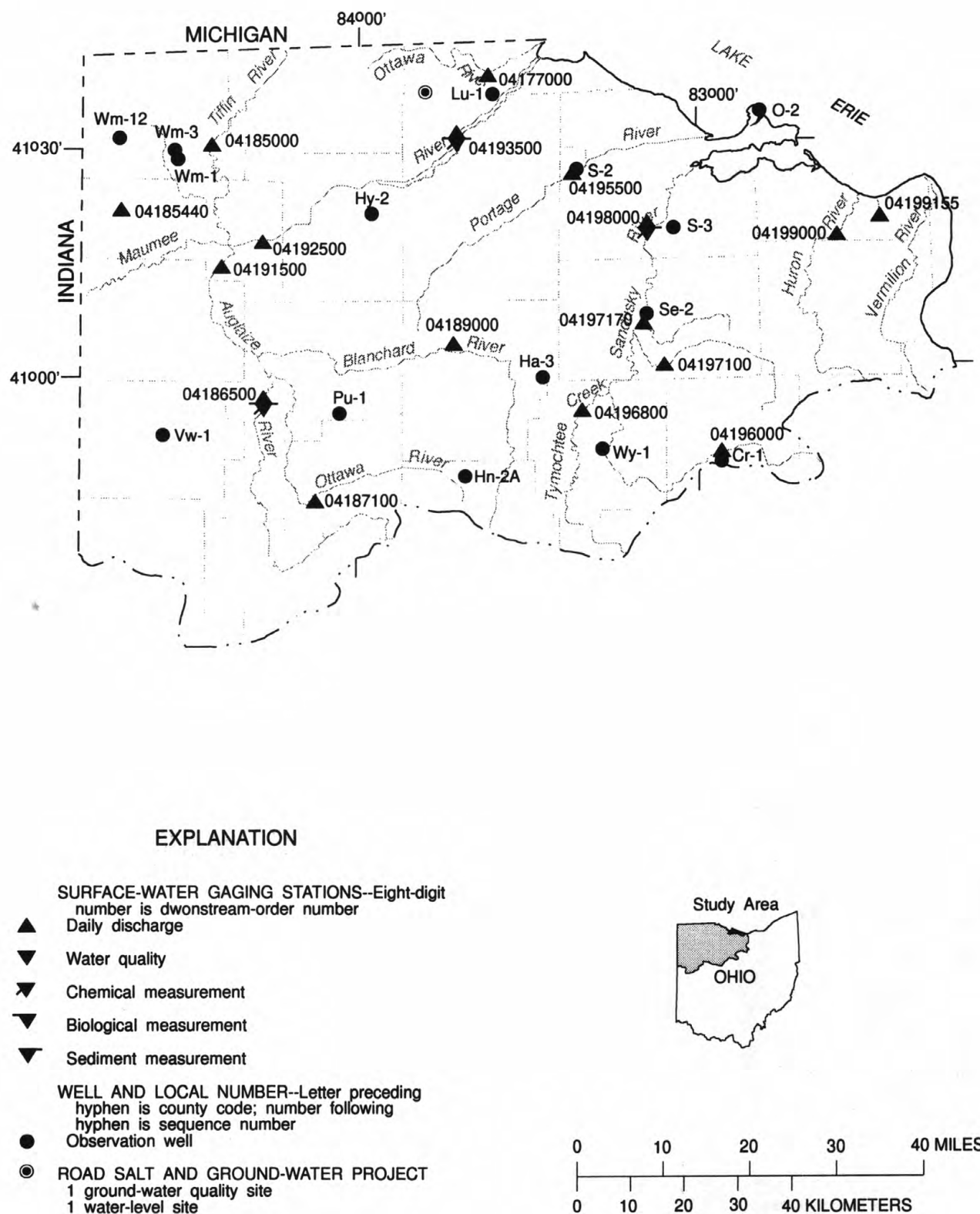
WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual basic-data reports published after 1975.

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.

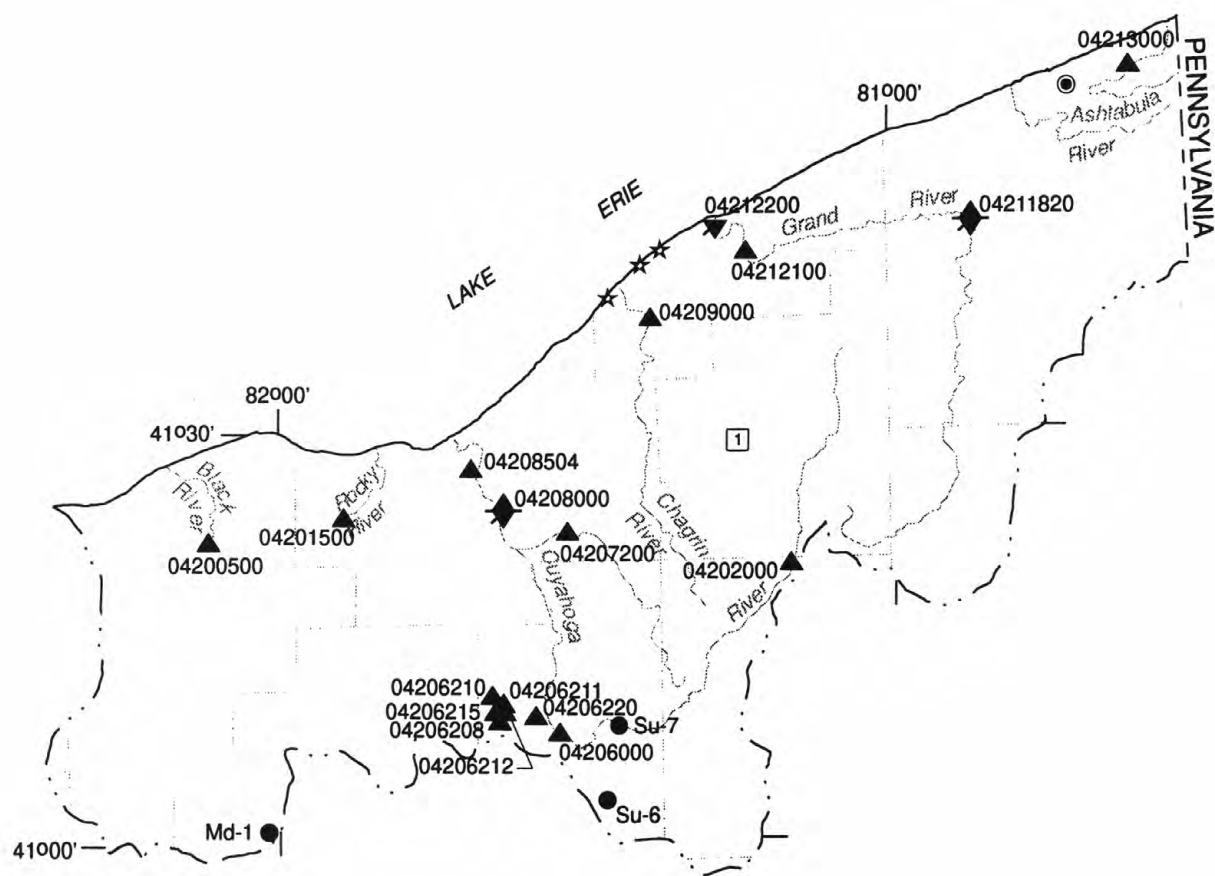
WRD is used as an abbreviation for "Water-Resources Data" in the REVISED RECORDS paragraph to refer to State annual basic-data reports published before 1975.

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





**Figure 9a.** Location of data-collection stations.



## EXPLANATION

- SURFACE-WATER GAGING STATIONS**--Eight-digit number is downstream-order number
- ▲ Daily discharge
  - ▼ Water quality
  - ▼ Chemical measurement
  - ▼ Biological measurement
  - ▼ Sediment measurement
- WELL AND LOCAL NUMBER**--Letter preceding hyphen is county code; number following hyphen is sequence number
- Observation well
  - ⊙ ROAD SALT AND GROUND-WATER PROJECT
    - 1 ground-water quality site
    - 1 water-level site
  - ☆ LAKE ERIE BACTERIA PROJECT
    - 3 surface-water quality sites
  - [1] GEAUGA COUNTY GROUND-WATER PROJECT
    - 28 observation wells

Study Area

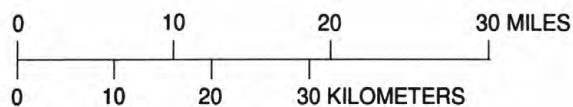
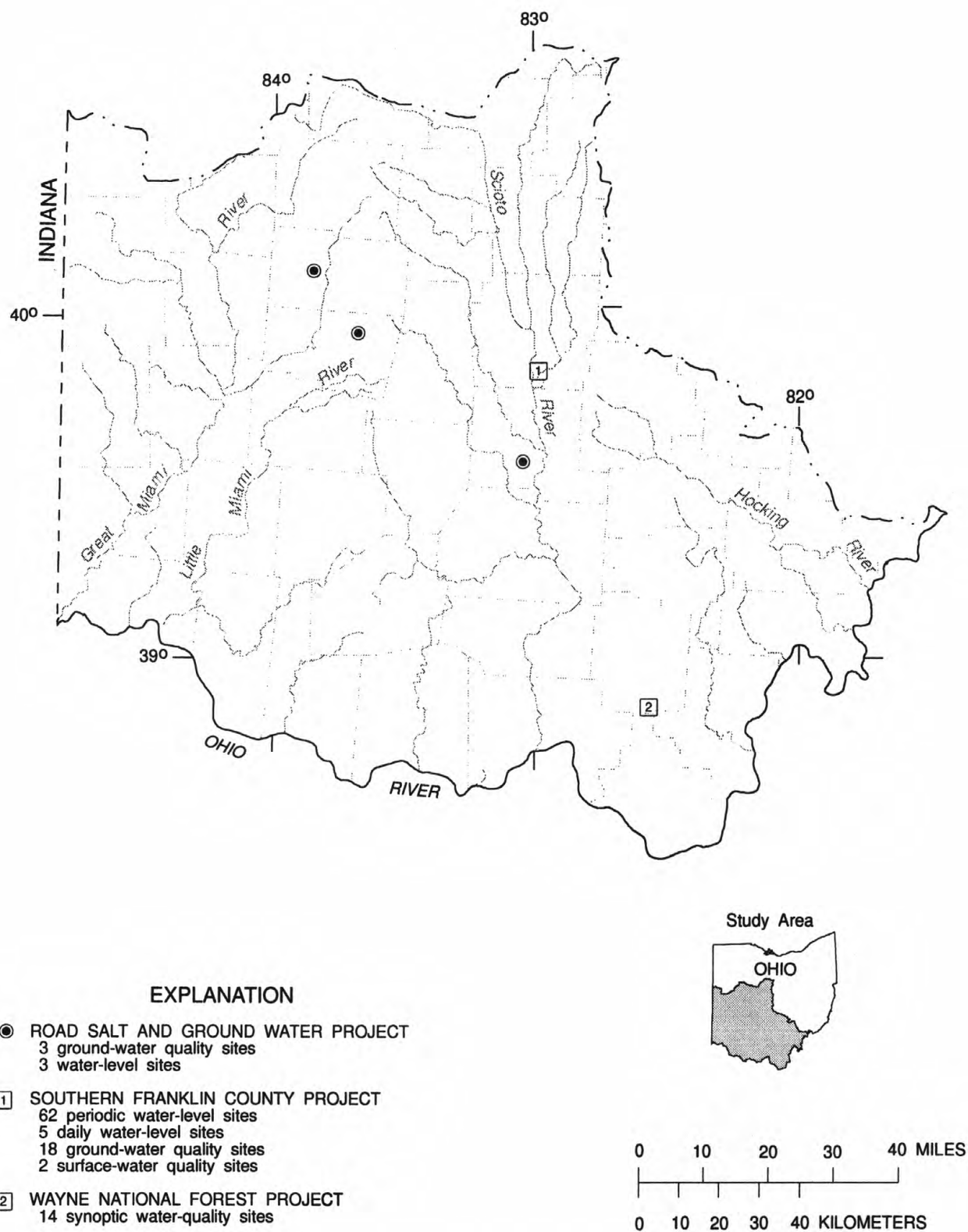
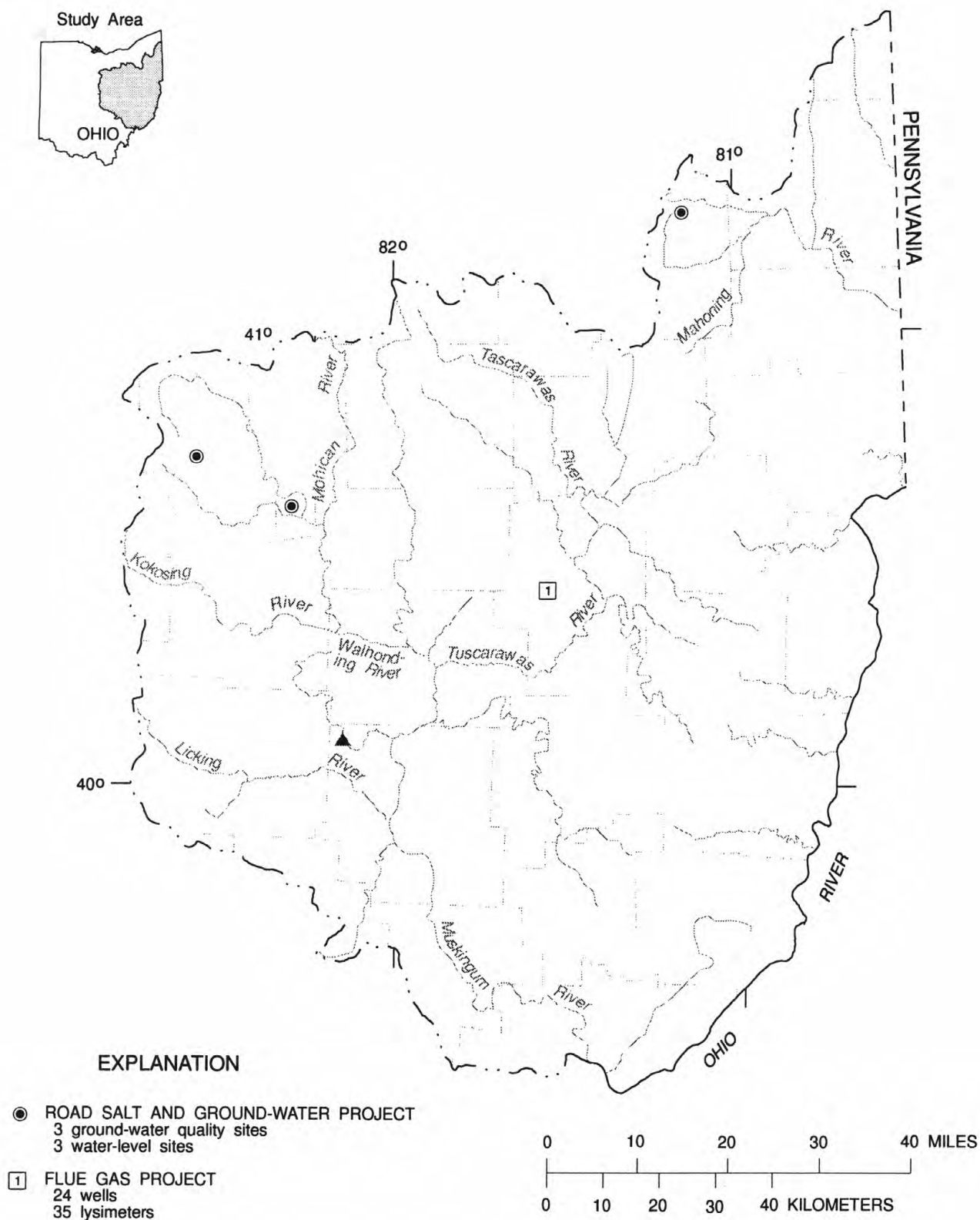


Figure 9b. Location of data-collection stations.



**Figure 9c.** Location of data-collection stations for projects, Ohio River basin.



**Figure 9d.** Location of data-collections stations for projects, Ohio River basin.



## 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.
- 2-E1. *Application of borehole geophysics to water-resources investigations*, by W. S. Keys and L.M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.
- 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.
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- 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.
- 3-A5. *Measurement of peak discharge at dams by indirect methods*, by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.
- 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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- 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.
- 3-A17. *Acoustic velocity meter systems*, by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 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.
- 3-A20. *Simulation of soluble waste transport and buildup in surface waters using tracers*, by F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A20. 1993. 38 pages.
- 3-A21. *Stream-gaging cableways*, by C. Russell Wagner: USGS--TWRI Book 3, Chapter A21. 1995. 56 pages.
- 3-B1. *Aquifer-test design, observation, and data analysis*, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.
- 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.
- 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.
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- 4-A2. *Frequency curves*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
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- 4-B2. *Storage analyses for water supply*, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.
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- 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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- 5-A4. *Methods for collection and analysis of aquatic biological and microbiological samples*, by L. J. Britton and P. E. Greeson, editors: USGS--TWRI Book 5, Chapter A4. 1989. 363 pages.

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- 5-A6. *Quality assurance practices for the chemical and biological analyses of water and fluvial sediments*, by L. C. Friedman and D. E. Erdmann: USGS--TWRI Book 5, Chapter A6. 1982. 181 pages.
- 5-C1. *Laboratory theory and methods for sediment analysis*, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.
- 6-A1. *A modular three-dimensional finite-difference ground-water flow model*, by M. G. McDonald and A. W. Harbaugh: USGS--TWRI Book 6, Chapter A1. 1988. 586 pages.
- 6-A2. *Documentation of a computer program to simulate aquifer-system compaction using the modular finite-difference ground-water flow model*, by S. A. Leake and D. E. Prudic: USGS--TWRI Book 6, Chapter A2. 1991. 68 pages.
- 6-A3. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 1: Model Description and User's Manual*, by L. J. Torak: USGS--TWRI Book 6, Chapter A3. 1993. 136 pages
- 6-A4. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 2: Derivation of finite-element equations and comparisons with analytical solutions*, by R. L. Cooley: USGS--TWRI Book 6, Chapter A4. 1992. 108 pages.
- 6-A5. *A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 3: Design philosophy and programming details*, by L. J. Torak: USGS--TWRI Book 6, Chapter A5, 1993. 243 pages.
- 6-A6. *A coupled surface-water and ground-water flow model (MODBRANCH) for simulation of stream-aquifer interaction*, by Eric D. Swain and Eliezer J. Wexler. 1995. 125 pages.
- 7-C1. *Finite difference model for aquifer simulation in two dimensions with results of numerical experiments*, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.
- 7-C2. *Computer model of two-dimensional solute transport and dispersion in ground water*, by L. F. Konikow and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.
- 7-C3. *A model for simulation of flow in singular and interconnected channels*, by R. W. Schaffranek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.
- 8-A1. *Methods of measuring water levels in deep wells*, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.
- 8-A2. *Installation and service manual for U.S. Geological Survey manometers*, by J. D. Craig: USGS--TWRI Book 8, Chapter A2. 1983. 57 pages.
- 8-B2. *Calibration and maintenance of vertical-axis type current meters*, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.

# STREAMS TRIBUTARY TO LAKE ERIE

39

## 04177000 OTTAWA RIVER AT UNIVERSITY OF TOLEDO, TOLEDO, OH

LOCATION.--Lat 41°39'36", long 83°36'44", in NE 1/4 sec. 32, T.9 S., R.7 E., Lucas County, Hydrologic Unit 04100001, on left bank at auto bridge at University of Toledo, Toledo, Ohio, 0.4 mi downstream from Deline Ditch, 5.6 mi upstream from Sibley Creek, and 10.9 mi upstream from mouth.  
 DRAINAGE AREA.--150 mi<sup>2</sup>. Area at site used prior to Sept. 30, 1948, 150 mi<sup>2</sup>, revised.  
 PERIOD OF RECORD.--March 1945 to September 1948 (published as "Tenmile Creek at Toledo"), August 1976 to current year.  
 REVISED RECORDS.--WSP 1307: Drainage area.  
 GAGE.--Water-stage recorder. Datum of gage is 576.28 ft above sea level. (From Aug. 1976 to July, 1979 at site 500 ft downstream. Prior to Sept. 30, 1948 water-stage recorder at site 2,500 ft upstream at datum 3.72 ft higher.  
 REMARKS.--Records fair, except for periods of estimated record, which are poor. Water-quality data collected at this site.  
 EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1, 1943 reached a stage of 15.1 ft present datum, from floodmark, Lucas County Sanitary Engineers, discharge, 3,400 ft<sup>3</sup>/s. Flood of Apr. 25, 1950 reached a stage of 15.0 ft present datum, from floodmark, discharge, 3,300 ft<sup>3</sup>/s.

### 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	4.8	24	25	e13	e25	e100	185	837	24	24	16	3.2
2	9.5	97	23	e16	e20	e70	127	420	34	19	9.3	3.4
3	76	73	22	e20	e15	e60	99	289	28	17	8.1	3.8
4	20	54	22	e23	e13	e50	85	229	35	15	7.5	4.0
5	174	34	20	e18	e12	e90	70	222	29	14	6.4	3.5
6	194	27	19	e15	e11	e60	57	194	34	12	5.6	2.8
7	45	54	e16	e14	e12	e50	56	156	67	15	5.3	5.9
8	28	39	e15	e13	e15	e43	52	127	32	21	14	6.5
9	21	28	e13	e12	e30	e39	44	148	57	8.5	7.1	15
10	18	26	e11	e11	37	e34	42	485	46	2.9	4.5	5.0
11	16	193	e10	e11	40	e34	39	815	51	2.7	4.1	2.4
12	18	117	e10	e10	41	e35	49	486	70	8.8	4.0	32
13	19	81	e11	e10	37	e50	85	288	75	9.2	3.8	4.0
14	19	57	e20	e9.6	33	e60	175	173	78	10	4.1	6.6
15	17	46	e30	e9.2	e21	e70	114	123	55	45	4.2	7.3
16	17	42	e35	e15	e18	86	95	106	42	11	3.8	4.5
17	18	40	e31	e50	e17	79	73	92	67	8.2	3.5	5.4
18	18	51	e27	e150	e15	75	62	81	406	9.0	3.4	2.1
19	20	48	e25	e580	e14	143	61	78	1130	8.8	6.5	1.7
20	30	55	e23	e800	e14	514	379	67	1520	6.9	11	1.6
21	21	66	e22	e250	e15	488	1170	73	887	6.2	8.2	19
22	14	57	e20	e220	e16	419	862	55	362	6.7	3.9	33
23	13	48	e18	e200	e18	341	963	46	195	15	3.6	7.3
24	15	42	e17	e350	e21	359	901	42	110	13	2.7	2.7
25	16	39	e16	e200	e25	799	535	38	75	6.5	2.7	2.1
26	17	35	e15	e130	37	1250	353	33	54	5.5	2.9	2.1
27	50	32	e15	e100	115	546	226	38	41	5.3	2.5	50
28	30	32	e14	e70	585	286	149	37	36	14	2.5	54
29	14	28	e14	e60	436	220	204	32	34	32	3.3	7.1
30	13	26	e13	e47	---	236	579	29	29	47	3.3	4.1
31	39	---	e13	e37	---	207	---	26	---	17	3.2	---
TOTAL	1024.3	1591	585	3463.8	1708	6893	7891	5865	5703	436.2	171.0	302.1
MEAN	33.0	53.0	18.9	112	58.9	222	263	189	190	14.1	5.52	10.1
MAX	194	193	35	800	585	1250	1170	837	1520	47	16	54
MIN	4.8	24	10	9.2	11	34	39	26	24	2.7	2.5	1.6
CFSM	.22	.35	.13	.74	.39	1.48	1.75	1.26	1.27	.09	.04	.07
IN.	.25	.39	.15	.86	.42	1.71	1.96	1.45	1.41	.11	.04	.07

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1945	65.8	407	1987	.85	1947
1946	107	449	1993	3.04	1947
1947	138	380	1978	6.14	1947
1948	113	561	1993	4.92	1977
1949	152	467	1990	30.4	1978
1950	289	729	1978	56.0	1989
1951	249	438	1977	20.4	1946
1952	134	358	1945	21.4	1988
1953	125	437	1989	7.36	1988
1954	52.5	264	1992	8.46	1984
1955	28.4	143	1980	.82	1946
1956	41.1	406	1981	.13	1946

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1945 - 1996
ANNUAL TOTAL	24158.5	35633.4	
ANNUAL MEAN	66.2	97.4	124
HIGHEST ANNUAL MEAN			215
LOWEST ANNUAL MEAN			65.5
HIGHEST DAILY MEAN	1040	Apr 10	3500
LOWEST DAILY MEAN	1.2	Aug 31	.00
ANNUAL SEVEN-DAY MINIMUM	1.3	Aug 31	.00
INSTANTANEOUS PEAK FLOW		1580	Jun 20 a
INSTANTANEOUS PEAK STAGE		10.39	Jun 20
INSTANTANEOUS LOW FLOW		1.6	Sep 20
ANNUAL RUNOFF (CFSM)	.44	.65	.83
ANNUAL RUNOFF (INCHES)	5.99	8.84	11.28
10 PERCENT EXCEEDS	157	231	312
50 PERCENT EXCEEDS	30	29	40
90 PERCENT EXCEEDS	5.3	4.5	7.0

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
 e Estimated



## STREAMS TRIBUTARY TO LAKE ERIE

## 04185000 TIFFIN RIVER AT STRYKER, OH

LOCATION.--Lat 41°30'16", long 84°25'47", in SE 1/4 sec. 5, T.6 N., R.4 E., Williams County, Hydrologic Unit 04100006, on left bank 0.5 mi downstream from bridge on State Highway 191 at west edge of Stryker, 0.6 mi upstream from Penn Central bridge, and 1.6 mi downstream from Leatherwood Creek.

DRAINAGE AREA.--410 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1921 to September 1928 (published as "near Stryker"), October 1940 to current year.

REVISED RECORDS.--WSP 1144: 1922-28. WSP 1387: 1925. WSP 1912: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 685.1 ft above sea level. Prior to Sept. 30, 1928, nonrecording gage at site 3.5 mi downstream at different datum. Oct. 13, 1940 to Jan. 17, 1941, nonrecording gage and Jan. 18, 1941 to Sept. 30, 1953, water-stage recorder, at site 0.5 mi downstream at same datum.

REMARKS.--Records fair, except for periods of estimated record, which are poor. Small diversion 12.5 mi upstream from gage for municipal supply of Archbold. Diversion averaged 2.68 ft<sup>3</sup>/s is returned as sewage to Brush Creek which flows into Tiffin River about 15 mi downstream from station. Water-quality and sediment data collected at this site.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 16.0 ft, from floodmarks, discharge, 7,600 ft<sup>3</sup>/s. Flood in 1937 reached a stage of 15.0 ft, from information by local resident, discharge, 6,000 ft<sup>3</sup>/s.

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	17	111	232	e110	e190	1480	e450	1010	143	186	87	15
2	18	251	215	126	e150	927	e380	1200	140	165	68	14
3	21	685	197	121	e120	433	e340	1110	144	149	55	14
4	32	836	184	e120	e110	302	e310	756	146	133	47	13
5	32	665	175	107	e100	306	e280	521	151	119	40	14
6	50	386	e150	e100	e94	424	e270	449	137	106	36	14
7	72	286	e140	e90	e110	357	e240	397	167	99	30	15
8	78	247	e130	e84	e140	302	e210	345	209	91	28	16
9	70	211	e110	e78	e180	279	e190	326	333	85	26	16
10	54	185	e100	e74	e290	263	e170	1140	573	79	26	18
11	45	327	e96	e70	424	238	162	1650	736	72	26	17
12	42	818	e90	e66	377	e230	156	1980	697	68	24	16
13	40	994	e92	e64	277	e220	175	2020	439	64	21	18
14	36	908	e160	e62	e200	e210	389	1840	350	62	21	16
15	37	583	270	e60	e170	e200	501	1540	300	61	21	15
16	39	383	331	e100	e150	e200	415	1030	238	63	19	15
17	45	306	315	194	e130	e200	379	1230	205	57	18	16
18	47	285	273	629	e120	e190	345	1080	1290	53	17	17
19	45	311	243	e1000	e120	e220	305	700	2990	57	19	16
20	41	362	208	e800	e120	488	1190	456	4200	52	54	15
21	54	423	e170	e700	e130	e1100	1710	372	3920	47	85	14
22	64	459	e150	e600	e140	e1200	2160	342	3150	46	63	14
23	63	377	e140	e560	e160	e1100	2510	314	2460	41	45	15
24	60	310	e130	e660	e190	e880	2350	276	1940	40	34	16
25	62	266	e130	e900	e220	e1000	2120	247	1350	41	28	14
26	77	238	e120	1060	268	e1100	1780	225	673	40	24	12
27	92	223	e120	844	595	e1100	1300	212	376	35	21	15
28	123	211	e110	605	1300	e1000	761	206	288	32	19	40
29	136	213	e100	417	1510	e760	487	195	245	38	17	56
30	124	240	e100	345	---	e580	668	175	214	74	15	54
31	114	---	e100	e250	---	e500	---	157	---	95	15	---
TOTAL	1830	12100	5081	10996	8085	17789	22703	23501	28204	2350	1049	560
MEAN	59.0	403	164	355	279	574	757	758	940	75.8	33.8	18.7
MAX	136	994	331	1060	1510	1480	2510	2020	4200	186	87	56
MIN	17	111	90	60	94	190	156	157	137	32	15	12

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1922 - 1996, BY WATER YEAR (WY)

	109	230	367	386	528	788	661	381	246	155	64.9	64.6
MEAN	109	230	367	386	528	788	661	381	246	155	64.9	64.6
MAX	887	1339	1785	1687	1569	2563	1990	2112	1422	761	389	460
(WY)	1987	1993	1928	1993	1976	1982	1950	1943	1989	1943	1980	1981
MIN	10.2	14.6	18.4	20.2	21.9	135	106	74.4	24.1	13.7	9.76	7.40
(WY)	1964	1954	1964	1963	1963	1964	1946	1925	1988	1988	1941	1953

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1922 - 1996

ANNUAL TOTAL	89498	134248	
ANNUAL MEAN	245	367	
HIGHEST ANNUAL MEAN			331
LOWEST ANNUAL MEAN			671
HIGHEST DAILY MEAN	2140	4200	59.6
LOWEST DAILY MEAN	17	12	7640
ANNUAL SEVEN-DAY MINIMUM	19	14	2.5
INSTANTANEOUS PEAK FLOW		4350	3.6
INSTANTANEOUS PEAK STAGE		15.16	7800
INSTANTANEOUS LOW FLOW		12	18.36
10 PERCENT EXCEEDS	655	1020	2.5
50 PERCENT EXCEEDS	130	168	917
90 PERCENT EXCEEDS	34	19	122
			23

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

# STREAMS TRIBUTARY TO LAKE ERIE

41

## 04185440 UNNAMED TRIBUTARY TO LOST CREEK NR FARMER, OH

LOCATION.--Lat 41°21'42", long 84°41'28", Defiance County, Hydrologic Unit 04100006, on right bank 400 ft above bridge on Rosedale Rd., 0.5 mi above mouth and 2.0 mi from Farmer.

DRAINAGE AREA.--4.23 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1985 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 760 ft above sea level from topographic map.

REMARKS.--Records poor.

### 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	.00	.08	.13	e.12	e.30	e1.5	.89	5.0	.94	.55	3.2	.03
2	.00	.75	.11	e.13	e.27	e1.0	.75	2.9	1.9	.47	1.4	.03
3	.01	1.5	.11	e.11	e.24	.91	.70	2.1	1.7	.42	.86	.03
4	.04	.30	.10	e.11	e.22	.68	.66	1.9	1.2	.35	.48	.03
5	.05	.12	.10	e.10	e.21	5.5	.57	2.7	1.0	.31	.31	.02
6	.05	.09	.08	e.10	e.21	3.6	.52	5.2	1.0	.28	.23	.02
7	.04	.20	.08	e.10	e.21	1.3	e.49	2.7	2.5	.25	.17	.05
8	.03	.35	.07	e.09	7.8	.52	e.48	1.9	1.6	.24	.14	.05
9	.02	.17	.07	e.09	4.8	e.70	e.46	4.2	68	.23	.12	.09
10	.02	.12	e.07	e.09	e1.5	e.90	e.45	72	26	.21	.10	.11
11	.02	4.4	e.07	e.08	e.60	e1.2	.44	14	7.2	.19	.10	.08
12	.02	2.2	e.07	e.08	e.50	2.2	.44	6.3	7.2	.18	.11	.05
13	.02	.63	e.08	e.08	e.42	2.0	.49	3.5	6.2	.17	.09	.03
14	.02	.37	.20	e.08	e.38	1.5	.46	2.5	2.8	.17	.07	.01
15	.03	.26	.69	e.08	e.35	1.4	.62	3.4	1.8	.24	.08	.08
16	.04	.21	.38	e.12	e.33	1.4	.92	8.8	1.3	.20	.06	.13
17	.04	.18	.23	4.7	e.31	8.7	.82	82	1.1	.22	.08	.11
18	.03	.20	.19	29	e.30	5.7	.70	12	52	.46	.07	.06
19	.03	.40	e.17	34	.30	4.3	1.1	5.7	17	.56	.08	.03
20	.05	.35	e.15	3.9	.36	3.9	26	3.0	5.8	.21	.13	.01
21	.04	.27	e.14	1.9	.36	12	5.7	2.4	2.9	.18	.73	.01
22	.04	.22	e.12	1.3	.39	18	54	1.8	2.0	.25	.33	.16
23	.03	.21	e.12	2.0	.45	5.3	34	1.4	1.4	.18	.27	.18
24	.03	.17	e.11	15	.98	2.2	11	1.3	45	.15	.16	.15
25	.03	.16	e.11	3.2	.89	1.7	5.3	1.1	5.8	.16	.07	.10
26	.04	.16	e.10	1.8	2.0	2.0	4.2	.85	2.6	.13	.05	.07
27	.10	.17	e.10	2.8	44	1.9	3.0	4.3	1.8	.11	.05	.45
28	.09	.14	e.10	1.2	15	1.6	2.2	4.7	1.2	.11	.05	1.7
29	.07	.13	.15	.84	3.8	1.3	1.9	3.3	.94	8.0	.05	.64
30	.06	.11	.14	e.45	---	1.1	9.1	1.8	.70	16	.04	.22
31	.08	---	.13	e.35	---	.97	---	1.2	---	5.7	.04	---
TOTAL	1.17	14.62	4.47	104.00	87.48	96.98	168.36	265.95	272.58	36.88	9.72	4.73
MEAN	.038	.49	.14	3.35	3.02	3.13	5.61	8.58	9.09	1.19	.31	.16
MAX	.10	4.4	.69	34	44	18	54	82	68	16	3.2	1.7
MIN	.00	.08	.07	.08	.21	.52	.44	.85	.70	.11	.04	.01
CFSM	.01	.12	.03	.79	.71	.74	1.33	2.03	2.15	.28	.07	.04
IN.	.01	.13	.04	.91	.77	.85	1.48	2.34	2.40	.32	.09	.04

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 1996, BY WATER YEAR (WY)

	3.34	5.13	6.63	5.23	6.45	6.77	7.35	3.43	2.77	1.85	.88	.55
MEAN	3.34	5.13	6.63	5.23	6.45	6.77	7.35	3.43	2.77	1.85	.88	.55
MAX	12.6	15.6	23.9	13.9	21.2	13.9	14.1	10.9	9.09	7.75	8.47	3.23
(WY)	1987	1993	1991	1993	1990	1986	1991	1990	1996	1986	1990	1992
MIN	.031	.051	.11	1.68	.46	3.13	1.92	.26	.046	.011	.015	.003
(WY)	1995	1995	1990	1988	1995	1996	1987	1988	1988	1988	1989	1991

### SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1986 - 1996

ANNUAL TOTAL	683.17	1066.94	
ANNUAL MEAN	1.87	2.92	
HIGHEST ANNUAL MEAN			4.19
LOWEST ANNUAL MEAN			5.87
HIGHEST DAILY MEAN	73	Apr 9	1991
LOWEST DAILY MEAN	.00	Aug 26	1995
ANNUAL SEVEN-DAY MINIMUM	.00	Aug 26	1995
INSTANTANEOUS PEAK FLOW			244
INSTANTANEOUS PEAK STAGE			1.96
INSTANTANEOUS LOW FLOW			244
ANNUAL RUNOFF (CFSM)	.44		1.96
ANNUAL RUNOFF (INCHES)	6.01		2.44
10 PERCENT EXCEEDS	3.4		1.96
50 PERCENT EXCEEDS	.20		1.96
90 PERCENT EXCEEDS	.01		1.96

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

## 04186500 AUGLAIZE RIVER NEAR FORT JENNINGS, OH

LOCATION.--Lat 40°56'55", long 84°15'58", in SE 1/4 sec. 15, T.1 S., R.5. E., Putnam County, Hydrologic Unit 04100007, on left bank 200 ft upstream from bridge on U. S. Highway 224, 3.5 mi northeast of Fort Jennings, 6 mi upstream from Ottawa River, and 7.3 mi downstream from Jennings Creek.

DRAINAGE AREA.--332 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1921 to December 1935. October 1940 to current year.

REVISED RECORDS.--WSP 744: 1932. WSP 974: 1930(M). WSP 1307: 1922-24(M), 1926-27(M), 1929(M). WSP 1912: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 713.6 ft above sea level. Prior to Oct. 6, 1930, nonrecording gage at same site and datum.

REMARKS.--Records fair, except for periods of estimated record, which are poor. Beginning Jan. 4, 1971, water was diverted at a point 24.3 mi upstream from station into Lake Bresler. Storage in Lake Bresler is available for low-flow augmentation and water supply of city of Lima, in Ottawa River basin. Net withdrawal totaled 4,231.8 mil gal, equivalent to a mean withdrawal of 17.9 ft<sup>3</sup>/s. No releases have been made for low-flow augmentation. Some diversion from Grand Lake to Auglaize River basin through Miami and Erie Canal into Jennings Creek at a point 9.2 mi upstream from station. Annual figures of runoff are considered to be within 10 percent of natural yield. Sediment data collected at this site 1970 to 1974. Water-quality data collected at this site. National Weather Service gage height Handar telemeter at station.

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	23	35	51	e35	e150	1180	261	2970	e800	31	e400	24
2	20	46	48	e100	e130	431	273	1630	e600	39	e200	22
3	25	121	48	e200	e120	e200	255	700	e400	46	e100	18
4	41	361	47	e170	e100	e160	204	541	e240	44	e70	18
5	67	187	44	e100	e94	e200	171	551	366	41	e60	17
6	1100	99	41	e68	e88	303	145	1290	508	38	e60	16
7	1540	104	e31	e58	e80	566	130	1440	486	36	e66	14
8	551	449	e28	e52	e74	e360	120	637	298	35	e40	31
9	236	386	e25	e45	e68	e200	127	614	458	34	e37	26
10	96	169	e28	e40	e120	e150	128	1180	222	31	e35	19
11	57	197	e32	e38	e200	e120	120	2270	626	27	e30	16
12	47	1420	e38	e36	e150	e110	100	3210	413	29	e27	24
13	36	1150	e45	e100	e100	101	89	1700	318	27	e45	22
14	35	420	e50	e80	e76	102	91	582	384	24	e50	19
15	28	243	e60	e70	e62	110	88	484	434	31	e27	18
16	22	163	e72	e60	e50	154	84	1130	281	40	e25	19
17	22	113	e60	650	e45	161	91	1080	194	40	e24	25
18	32	135	e54	3450	e42	137	89	745	156	546	e30	23
19	36	265	e48	e8100	e40	162	81	472	393	3550	e50	24
20	35	275	e45	e6000	e50	1060	87	347	334	3440	e250	25
21	31	188	e42	e2000	e60	1680	128	242	163	638	e60	23
22	26	130	e38	e1200	e80	1090	250	192	107	276	e45	24
23	18	93	e35	649	e100	712	1150	164	104	164	e37	21
24	11	76	e33	1660	e120	734	3140	e190	99	89	34	20
25	10	68	e31	e2400	e170	1400	3280	e180	78	63	51	23
26	28	59	e29	e1000	291	1250	1120	e430	113	53	60	21
27	32	54	e27	e500	1320	549	633	e400	62	41	43	25
28	34	52	e26	e350	3300	362	427	e1000	48	61	35	49
29	29	49	e25	e250	3280	305	536	e1500	41	e500	29	51
30	32	44	e24	e200	---	275	2200	e2000	36	e1800	27	41
31	36	---	e24	e170	---	255	---	e1200	---	e800	26	---
TOTAL	4336	7151	1229	29831	10560	14579	15598	31071	8762	12614	2073	718
MEAN	140	238	39.6	962	364	470	520	1002	292	407	66.9	23.9
MAX	1540	1420	72	8100	3300	1680	3280	3210	800	3550	400	51
MIN	10	35	24	35	40	101	81	164	36	24	24	14
CFSM	.42	.72	.12	2.90	1.10	1.42	1.57	3.02	.88	1.23	.20	.07
IN.	.49	.80	.14	3.34	1.18	1.63	1.75	3.48	.98	1.41	.23	.08

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1921 - 1996, BY WATER YEAR (WY)

	MEAN	77.0	178	301	438	468	602	512	293	242	175	73.9	87.2
MAX	782	1286	1283	2184	1555	2112	1874	1237	1142	1652	477	1090	
(WY)	1927	1973	1991	1950	1950	1978	1957	1943	1981	1992	1979	1926	
MIN	5.44	13.4	11.9	8.23	23.6	81.3	51.3	28.7	13.6	20.4	8.10	5.78	
(WY)	1989	1957	1977	1977	1964	1981	1971	1934	1988	1965	1991	1991	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1921 - 1996

ANNUAL TOTAL	84312	138522	287
ANNUAL MEAN	231	378	537
HIGHEST ANNUAL MEAN			1973
LOWEST ANNUAL MEAN			1931
HIGHEST DAILY MEAN	3300	Apr 12	8100
LOWEST DAILY MEAN	10	Sep 28	10
ANNUAL SEVEN-DAY MINIMUM	11	Sep 24	18
INSTANTANEOUS PEAK FLOW			8780
INSTANTANEOUS PEAK STAGE			17.40
INSTANTANEOUS LOW FLOW			10
ANNUAL RUNOFF (CFSM)	.70	1.14	.86
ANNUAL RUNOFF (INCHES)	9.45	15.52	11.74
10 PERCENT EXCEEDS	550	1120	687
50 PERCENT EXCEEDS	66	93	74
90 PERCENT EXCEEDS	19	25	18

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

04186500 AUGLAIZE RIVER NEAR FORT JENNINGS, OH--Continued  
 [(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

## WATER-QUALITY RECORDS

The data described in the following table was collected and analyzed as part of the NAWQA (National Water-Quality Assessment Program) project in the Lake Erie-Lake St. Clair Basin. The objectives of the NAWQA program are to broadly characterize the water-quality of the Nation's streams and aquifers in relation to human and natural factors. This project is one of 60 river basin and aquifer assessment projects being implemented across the nation. At any one time, 15 to 20 of these projects are actively collecting data. The period of high-intensity data collection for the Lake Erie-Lake St. Clair Basin project is in water years 1996-98.

There are four stream sites in Ohio for which data are being reported in this publication as part of the NAWQA study, Auglaize River near Ft. Jennings (04186500), Maumee River at Waterville (04193500), Cuyahoga River at LTV Steel at Cleveland (04208504), and Grand River at Harpersfield (04211820). Three sites are reported in the 1996 Michigan annual data report.; Black River near Jeddco, MI (04159492), Clinton River at Sterling Heights, MI (04161820) and River Raisin near Manchester, MI (04175600). Two Sites are reported in the 1996 Indiana annual data report; St. Joseph River near Newville, IN (04178000), and Maumee River at New Haven, IN (04183000). One site is reported in the 1996 New York annual data report; Cattaraugus Creek at Gowanda, NY (04213500).

These data also can be obtained electronically at <http://www-oh.er.usgs.gov/nawqa.index.html>.

(---, no data; <, concentration or value reported is less than that indicated; E, estimated value; K, value is estimated from a non-ideal colony count).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

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 AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (MG/L) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)	HARD- NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L) (00904)	
MAR	08...	1000	566	636	7.8	-5.0	0.0	747	12.1	85	610	420	110
APR	18...	0930	54	828	8.3	22.0	9.5	740	11.2	101	K44	K17	110
	30...	1515	2590	424	7.8	9.5	9.5	734	9.3	85	--	K1700	77
MAY	07...	1430	1420	396	7.8	15.0	11.5	--	9.1	84	3400	2300	53
JUN	04...	1445	240	706	8.1	15.0	18.0	738	8.1	89	430	360	100
	20...	0945	334	512	7.7	24.0	22.0	741	6.4	75	3500	2900	86
JUL	19...	1500	4080	263	7.3	29.0	24.5	740	5.3	65	>6000	8000	40
AUG	27...	1410	41	959	8.5	29.0	25.0	741	11.1	138	260	210	140
SEP	10...	1410	19	893	7.8	20.5	22.5	745	6.0	71	200	310	51
DATE		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)	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)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
MAR	08...	76	25	18	2.9	222	182	68	38	0.30	6.9	393	0.020
APR	18...	79	32	37	3.0	266	218	120	68	0.50	0.08	515	0.030
	30...	50	15	8.6	3.6	134	110	37	19	0.20	7.1	261	0.040
MAY	07...	45	14	7.7	3.0	143	117	35	17	0.30	6.5	232	0.040
JUN	04...	84	27	20	2.2	264	216	76	39	0.30	6.6	432	0.030
	20...	57	17	12	3.4	154	126	47	23	0.40	6.8	327	0.070
JUL	19...	27	7.2	5.3	5.1	70	57	19	10	0.30	6.4	163	0.110
AUG	27...	73	33	69	5.3	217	182	120	110	0.70	2.2	563	0.020
SEP	10...	63	28	61	5.9	270	170	120	93	0.60	4.7	513	0.020



## STREAMS TRIBUTARY TO LAKE ERIE

04186500 AUGLAIZE RIVER NEAR FORT JENNINGS, OH--Continued  
 [(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	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)	PHOS- PHORUS ORTH- 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 PENDE- TOTAL (MG/L AS C) (00689)	SEDI- MENT, SUS- PENDE- (MG/L) (80154)
MAR 08...	6.70	0.150	0.80	0.70	0.120	0.070	0.080	12	6.0	4.1	1.5	--
APR 18...	3.30	<0.015	0.60	0.30	0.040	0.020	0.010	21	8.0	3.6	1.3	16
30...	9.60	0.160	1.7	0.90	0.350	0.120	0.120	31	3.0	7.5	6.1	237
MAY 07...	3.50	0.070	1.6	0.70	0.420	0.110	0.100	25	2.0	6.9	5.9	236
JUN 04...	6.30	0.020	0.60	0.40	0.110	0.070	0.070	3.0	7.0	3.7	1.7	53
20...	5.40	0.090	2.0	0.70	0.500	0.130	0.030	10	2.0	7.0	2.0	347
JUL 19...	7.40	0.200	2.0	1.0	0.560	0.180	0.150	36	6.0	8.6	3.3	240
AUG 27...	0.690	0.060	1.3	0.70	0.220	0.030	0.040	5.0	10	5.5	4.9	68
SEP 10...	0.500	0.040	0.80	0.40	0.190	0.110	0.120	6.0	16	4.9	1.7	47

DATE	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)
MAR 08...	0.009	0.032	0.085	E0.020	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	0.020	<0.002
APR 18...	--	--	--	--	--	--	--	--	--	--	--	--
30...	0.150	0.170	1.10	E0.077	<0.001	<0.002	<0.002	<0.003	E0.007	<0.004	0.160	<0.002
MAY 07...	0.064	0.022	0.620	E0.047	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	0.055	<0.002
JUN 04...	0.360	0.160	1.60	E0.055	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	0.270	<0.002
20...	0.750	3.09	18.0	E0.588	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	6.98	<0.002
JUL 19...	0.253	1.45	6.00	E0.263	<0.001	<0.002	<0.002	E0.432	<0.003	0.051	0.973	<0.002
AUG 27...	0.017	0.016	0.413	E0.036	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	0.139	<0.002
SEP 10...	0.013	0.071	0.346	E0.024	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	0.084	<0.002

DATE	P,P' DDE DISSOLV (UG/L) (34653)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	LINDANE DIS- SOLVED (UG/L) (39341)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)
MAR 08...	<0.006	0.012	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
APR 18...	--	--	--	--	--	--	--	--	--	--	--	--
30...	<0.006	0.009	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
MAY 07...	<0.006	0.017	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
JUN 04...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
20...	<0.006	0.014	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
JUL 19...	<0.006	0.015	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	0.023
AUG 27...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
SEP 10...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002

# STREAMS TRIBUTARY TO LAKE ERIE

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04186500 AUGLAIZE RIVER NEAR FORT JENNINGS, OH--Continued  
[(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	MALA- THION, DIS- SOLVED (UG/L) (39532)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	METRI- BUZIN WATER DISSOLV (UG/L) (82630)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PARA- THION, DIS- SOLVED (UG/L) (39542)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	PRO- METON, WATER, DISS, REC (UG/L) (04037)
MAR 08...	<0.005	0.510	0.015	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	E0.011
APR 18...	--	--	--	--	--	--	--	--	--	--	--	--
30...	<0.005	3.00	0.640	<0.004	<0.003	<0.004	<0.006	<0.004	<0.010	<0.005	<0.002	0.021
MAY 07...	<0.005	0.795	0.146	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.037
JUN 04...	<0.005	1.30	0.078	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.120
20...	0.019	E26.0	5.36	<0.004	<0.003	<0.004	<0.006	<0.004	0.045	<0.005	<0.002	0.029
JUL 19...	<0.005	14.0	1.48	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.094
AUG 27...	<0.005	0.649	0.033	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.115
SEP 10...	<0.005	0.281	0.015	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.122

DATE	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)
MAR 08...	<0.003	<0.007	<0.004	<0.013	0.017	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
APR 18...	--	--	--	--	--	--	--	--	--	--	--
30...	<0.003	<0.007	<0.004	<0.013	0.084	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
MAY 07...	<0.003	<0.007	<0.004	<0.013	0.480	0.013	<0.007	<0.013	<0.002	<0.001	<0.002
JUN 04...	<0.003	<0.007	<0.004	<0.013	0.190	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
20...	<0.003	<0.007	<0.004	<0.013	1.09	E0.007	<0.007	<0.013	<0.002	<0.001	0.009
JUL 19...	<0.003	<0.007	<0.004	<0.013	0.547	0.013	<0.007	<0.013	<0.002	<0.001	<0.002
AUG 27...	<0.003	<0.007	<0.004	<0.013	0.061	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
SEP 10...	<0.003	<0.007	<0.004	<0.013	0.051	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002

## STREAMS TRIBUTARY TO LAKE ERIE

## 04187100 OTTAWA RIVER AT LIMA, OH

LOCATION---Lat 40°43'29", long 84°07'35", Allen County, Hydrologic Unit 04100007, on right bank, 70 ft downstream of Erie Lackawanna RR bridge, 300 ft upstream of bridge to Lima STP, 0.7 mi downstream from Collett Street at Lima, Ohio.

DRAINAGE AREA---128 mi<sup>2</sup>.

PERIOD OF RECORD---June 1988 to current year.

GAGE---Water-stage recorder. Datum of gage is 820.00 ft above sea level.

REMARKS---Records fair, except for periods of estimated record, which are poor. Water diverted upstream of gage for City of Lima. Water is returned to stream below gage.

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	7.9	11	18	e10	e27	227	e52	882	94	19	38	e5.3
2	6.4	30	16	e20	e25	84	e52	314	74	15	24	e4.6
3	45	41	16	30	e24	45	e50	173	60	16	21	e4.4
4	9.2	19	17	39	e23	30	e42	138	98	17	17	e4.4
5	324	12	17	e35	22	61	e37	208	384	17	12	e3.9
6	328	8.5	16	e30	21	246	e34	672	158	19	10	e3.6
7	53	82	15	e20	20	119	e32	221	684	20	9.6	e117
8	25	57	13	e16	32	57	e30	110	732	19	10	e66
9	17	23	12	e14	44	55	e29	131	237	15	9.2	e5.4
10	12	26	11	e12	39	30	28	390	201	15	9.6	e8.9
11	13	488	9.7	e11	64	e25	26	1300	73	15	9.2	e8.8
12	9.0	409	9.6	e11	48	e23	26	820	254	13	9.8	e5.4
13	6.4	105	8.5	e10	e25	e22	29	265	188	12	9.9	e5.4
14	3.1	39	14	e10	e20	e23	28	130	91	13	11	e5.1
15	2.2	20	20	e15	e16	e30	28	368	59	30	9.7	e4.4
16	1.8	25	25	28	e15	e36	36	662	45	12	11	e36
17	2.1	38	e18	944	e13	e32	36	335	37	14	7.3	e70
18	2.4	100	e15	2710	e12	e36	32	169	118	979	5.1	e5.4
19	3.7	128	e13	2580	e13	e50	32	102	707	273	143	e5.4
20	8.4	62	e12	e700	e16	e200	32	62	183	71	41	e4.7
21	7.6	24	e11	391	26	e350	38	36	40	36	13	e4.4
22	4.4	17	e11	126	36	e200	61	46	20	26	9.2	e4.4
23	4.1	34	e10	158	46	e160	1460	41	15	20	8.1	e4.4
24	2.9	27	e9.4	e800	68	e200	1420	59	18	16	6.1	e4.0
25	2.1	23	e9.0	e400	78	e300	448	155	29	15	5.4	e3.5
26	2.1	21	e8.4	e100	161	e140	166	96	25	13	5.4	3.4
27	2.6	20	e8.0	e60	1720	e100	95	475	22	12	5.9	15
28	1.8	20	e7.8	e50	2410	e80	65	850	20	16	4.4	27
29	3.6	20	e7.6	e40	899	e64	578	717	19	20	e4.7	14
30	4.1	19	e7.4	e35	---	e60	1450	513	19	79	e4.6	11
31	8.6	---	e7.0	e30	---	e50	---	159	---	74	e4.5	---
TOTAL	923.5	1948.5	392.4	9435	5963	3135	6472	10599	4704	1931	488.7	465.2
MEAN	29.8	64.9	12.7	304	206	101	216	342	157	62.3	15.8	15.5
MAX	328	488	25	2710	2410	350	1460	1300	732	979	143	117
MIN	1.8	8.5	7.0	10	12	22	26	36	15	12	4.4	3.4

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1996, BY WATER YEAR (WY)

	MEAN	39.2	88.1	107	153	142	127	208	116	69.5	111	34.3	56.5
MAX	192	434	586	327	425	422	291	342	195	444	134	346	
(WY)	1991	1993	1991	1993	1990	1993	1995	1996	1990	1992	1990	1992	
MIN	2.90	5.56	5.01	12.2	18.9	42.5	98.3	15.5	7.44	7.85	6.58	4.49	
(WY)	1995	1992	1992	1992	1989	1992	1991	1994	1988	1991	1993	1994	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1988 - 1996

ANNUAL TOTAL	28371.8	46457.3	
ANNUAL MEAN	77.7	127	106
HIGHEST ANNUAL MEAN			156
LOWEST ANNUAL MEAN			56.5
HIGHEST DAILY MEAN	1640	Mar 8	3860
LOWEST DAILY MEAN	1.8	Oct 16	.00
ANNUAL SEVEN-DAY MINIMUM	2.7	Oct 23	.15
INSTANTANEOUS PEAK FLOW			4590
INSTANTANEOUS PEAK STAGE		16.03	18.63
INSTANTANEOUS LOW FLOW		1.8	.00
10 PERCENT EXCEEDS	130	325	213
50 PERCENT EXCEEDS	18	25	24
90 PERCENT EXCEEDS	5.4	5.4	4.6

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04189000 BLANCHARD RIVER NEAR FINDLAY, OH

LOCATION.--Lat 41°03'21", long 83°41'17", on east line of sec. 10, T.1 N., R.10 E., Hancock County, Hydrologic Unit 04100008, on left bank at upstream side of county road bridge, 2 mi west of Findlay, 3 mi downstream from Eagle Creek, and 3 mi upstream from Aurand Run.

DRAINAGE AREA.--346 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1923 to December 1935, October 1940 to current year. Monthly discharge only for October 1923, published in WSP 1307.

REVISED RECORDS.--WSP 974: 1942. WSP 1054: 1927-30, 1933(M), 1945. WSP 1387: 1926, 1928(M), 1930(M), 1952. WSP 1912: Drainage area. WRD-OH-81-2: 1959, 1975 (M).

GAGE.--Water-stage recorder. Datum of gage is 754.55 ft above sea level. Prior to July 24, 1930, nonrecording gage at same site and datum.

REMARKS.--Records fair, except for periods of estimated record and Aug. 31 - Sept. 30, which are poor. Water is diverted upstream from station into Findlay Reservoir. Storage in Findlay Reservoir used for water supply of city of Findlay, and is available for low-flow augmentation. All water returns to stream upstream from station. Water-quality and sediment data collected at this site.

### 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	10	29	37	e35	e70	e500	e160	2590	259	e45	e150	17
2	13	61	35	e40	e60	e300	e150	1350	204	e40	e100	17
3	64	47	33	e30	e50	e150	e160	500	176	e35	e60	15
4	26	32	33	e25	e45	e120	e150	439	196	e32	e45	17
5	193	27	31	e20	e40	e160	e150	422	345	e30	e38	21
6	198	33	29	e17	38	e240	e140	600	286	e28	e30	18
7	187	126	26	e16	37	e250	e130	583	1220	e26	e25	18
8	137	93	27	e15	65	e150	e120	334	1880	e25	e23	18
9	70	86	25	e13	e120	e110	e110	896	1330	e22	e20	22
10	45	77	21	e12	e130	e90	e100	e1930	624	e20	e18	27
11	32	284	19	e12	e150	e74	e80	3080	787	e19	e17	20
12	26	619	18	e11	e90	e66	e70	2590	564	e18	e15	26
13	24	502	20	e11	e66	e60	78	1200	484	e17	e14	21
14	20	212	55	e10	e52	e58	70	551	325	e16	e13	17
15	17	137	50	e10	e45	e150	69	440	225	e16	e13	17
16	18	102	42	e35	e40	e250	92	942	177	e35	e14	19
17	19	80	e35	566	e36	e210	76	1070	155	e40	e14	26
18	19	93	e30	2670	e36	e190	79	589	238	e30	e14	21
19	19	159	e27	4700	e35	e180	88	397	447	e20	e14	20
20	25	196	e25	e2000	e35	e1000	82	291	239	e30	e14	20
21	28	142	e22	e600	e45	e2000	103	231	168	e25	e15	19
22	22	109	e20	e500	e70	e1300	246	186	141	e20	e18	80
23	21	81	e18	e400	153	e1000	1460	159	126	e16	e23	24
24	20	64	e17	e1500	229	e1100	2520	147	e100	e14	e19	23
25	20	54	e16	e900	265	e1400	1910	177	e90	e16	e17	20
26	20	50	e15	e540	385	e800	748	296	e74	e15	e17	20
27	27	47	e14	e350	e1500	e450	462	275	e66	e18	e16	44
28	28	46	e13	e250	e2000	e300	334	982	e60	e15	e16	139
29	29	42	e12	e150	e1800	e250	434	1010	e54	e18	e16	59
30	25	39	e12	e120	---	e200	2270	1210	e50	e40	e16	47
31	34	---	e11	e100	---	e170	---	535	---	e100	17	---
TOTAL	1436	3669	788	15658	7687	13278	12641	26002	11090	841	841	872
MEAN	46.3	122	25.4	505	265	428	421	839	370	27.1	27.1	29.1
MAX	198	619	55	4700	2000	2000	2520	3080	1880	100	150	139
MIN	10	27	11	10	35	58	69	147	50	14	13	15
CFSM	.13	.35	.07	1.46	.77	1.24	1.22	2.42	1.07	.08	.08	.08
IN.	.15	.39	.08	1.68	.83	1.43	1.36	2.80	1.19	.09	.09	.09

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 1996, BY WATER YEAR (WY)

	MEAN	63.9	160	280	370	416	559	463	269	217	127	55.5	88.7
MAX	623	1435	1482	1800	1402	1814	1588	865	1612	1075	474	944	
(WY)	1927	1973	1991	1930	1959	1978	1957	1969	1981	1992	1979	1926	
MIN	2.43	3.67	4.28	6.54	9.86	60.1	33.3	22.1	18.3	4.27	1.24	1.62	
(WY)	1935	1935	1935	1945	1964	1941	1925	1925	1988	1934	1934	1934	

### SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1924 - 1996

	ANNUAL TOTAL	78216.8	94803	255	1973
ANNUAL MEAN		214	259	571	1931
HIGHEST ANNUAL MEAN				57.5	1931
LOWEST ANNUAL MEAN					
HIGHEST DAILY MEAN	3220	Mar 8	4700	Jan 19	12000
LOWEST DAILY MEAN	7.8	Aug 27	10	Oct 1	.40
ANNUAL SEVEN-DAY MINIMUM	9.8	Aug 22	11	Jan 9	.56
INSTANTANEOUS PEAK FLOW			5340	Jan 20 a	13000
INSTANTANEOUS PEAK STAGE			12.31	Jan 20	17.43
INSTANTANEOUS LOW FLOW			10	Oct 1	.40
ANNUAL RUNOFF (CFSM)	.62		.75		.74
ANNUAL RUNOFF (INCHES)	8.41		10.19		10.03
10 PERCENT EXCEEDS	454		661		614
50 PERCENT EXCEEDS	68		56		57
90 PERCENT EXCEEDS	14		16		9.1

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated



## STREAMS TRIBUTARY TO LAKE ERIE

## 04191500 AUGLAIZE RIVER NEAR DEFIANCE, OH

LOCATION.--Lat 41°14'14", long 84°23'59", in NE 1/4 sec. 9, T.3 N. R.4 E., Defiance County, Hydrologic Unit 04100007, on right bank 125 ft downstream from hydroelectric dam of Hydro-Corporation, 0.2 mi upstream from Jackson ditch, and 3 mi south of Defiance.

DRAINAGE AREA.--2,318 mi<sup>2</sup>.

PERIOD OF RECORD.--May to August 1903 (gage heights only), April 1915 to current year. Monthly discharges only for some periods, published in WSP 1307.

REVISED RECORDS.--WSP 954: 1941. WSP 1912: Drainage area. WRD OH-72-1: 1966 (M).

GAGE.--Water-stage recorder. Datum of gage is 659.70 ft above sea level. May 20 to Aug. 8, 1903, non-recording gage at site 1.8 mi downstream at different datum. April 13, 1915, to Dec. 6, 1933, nonrecording gage near right bank on downstream side of dam at datum 6.00 ft higher, and auxiliary tailwater staff gage near right bank on downstream side of dam at present datum. Oct. 1982 to Nov. 1984 at dam 125 ft upstream, at present datum.

REMARKS.--Records good, except for periods of estimated record, which are poor. Flow regulated by dam at powerplant at station; reservoir capacity, 9,800 acre-ft. Plant shut down except for occasional gate operation, Jan. 10, 1963 to Sept. 7, 1985. Some diversion by Miami and Erie Canal from Grand Lake into Jennings Creek, tributary to Auglaize River 70 mi upstream from station. Water-quality data collected at this site.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of March 1913 reached a stage of 38.8 ft, from reading on powerplant tailwater gage at present datum; discharge, 120,000 ft<sup>3</sup>/s, from rating curve extended above 51,000 ft<sup>3</sup>/s.

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	54	e66	359	100	e400	14500	1210	6510	5650	132	5090	126
2	52	e90	94	219	e350	11900	1120	11900	4500	127	3000	124
3	52	e200	91	300	e300	6830	1180	10600	3260	167	1480	126
4	48	e660	351	e280	e250	3610	1120	6730	1690	204	783	125
5	137	e300	402	e220	e230	1680	1140	4350	1260	206	514	125
6	1330	e170	412	e170	e210	1180	1120	3000	1650	195	356	121
7	3630	e180	179	e140	e180	1220	680	3530	4680	184	305	116
8	2580	e760	67	e130	e160	1910	390	5200	9570	257	377	112
9	1180	e700	e56	e120	e140	1930	529	3960	9250	117	120	112
10	601	e300	e52	e100	624	1230	576	2590	8580	119	121	153
11	e110	e350	e46	e96	940	999	640	4480	6600	202	125	170
12	e80	e4500	67	e92	975	968	602	11300	4050	113	127	165
13	e64	4340	68	e200	1010	937	406	14400	3890	113	211	171
14	e56	2680	405	e190	933	907	375	11500	3420	251	117	161
15	e48	1750	308	e170	407	512	358	7270	4770	200	116	156
16	e40	1050	84	e150	97	467	385	4670	2680	97	113	151
17	e43	440	86	e700	105	982	591	6250	1980	101	108	149
18	e54	507	91	e5600	168	1160	425	8910	1560	396	105	148
19	e62	709	90	e27000	402	1110	204	7060	1390	7000	106	132
20	e58	1060	222	28300	578	1100	505	4820	2120	8850	129	122
21	e52	1040	305	e20000	418	7120	484	3130	1900	4590	946	116
22	e40	699	250	e11000	120	11700	275	2010	1250	2000	379	111
23	e30	737	108	e5400	431	11200	805	1450	610	1060	234	110
24	e20	770	97	e8000	578	9150	3320	908	794	571	140	109
25	e19	590	90	e10000	587	6130	14100	1090	364	269	270	109
26	e30	381	180	e7000	1300	7440	14600	1050	452	422	123	109
27	e50	188	349	e4000	4980	5830	10800	2460	478	225	136	104
28	e60	85	367	e1800	14500	3640	5470	2190	305	137	140	101
29	e52	87	356	e1200	14900	2230	3320	7180	400	456	136	103
30	e56	87	214	e800	---	1570	2010	9370	256	2300	132	106
31	e60	---	105	e500	---	1420	---	10400	---	7880	128	---
TOTAL	10748	25476	5951	133977	46273	122562	68740	180268	89359	38941	16167	3843
MEAN	347	849	192	4322	1596	3954	2291	5815	2979	1256	522	128
MAX	3630	4500	412	28300	14900	14500	14600	14400	9570	8850	5090	171
MIN	19	66	46	92	97	467	204	908	256	97	105	101

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1916 - 1996, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1916	489	3445	1955	23.6	1953
1917	1031	7856	1973	7.28	1953
1918	1789	8510	1967	9.34	1977
1919	2531	13350	1950	48.5	1977
1920	2946	10170	1976	111	1964
1921	4145	13090	1982	382	1941
1922	3470	11210	1957	242	1946
1923	1933	10490	1943	69.8	1934
1924	1385	6733	1947	101	1988
1925	823	5762	1992	42.0	1930
1926	312	1988	1979	27.1	1932
1927	425	5571	1992	28.9	1963

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

FOR 1996 WATER YEAR

WATER YEARS 1916 - 1996

ANNUAL TOTAL	508188	742305	1758
ANNUAL MEAN	1392	2028	3337
HIGHEST ANNUAL MEAN			342
LOWEST ANNUAL MEAN			1973
HIGHEST DAILY MEAN	22800	28300	52300
LOWEST DAILY MEAN	19	19	.50
ANNUAL SEVEN-DAY MINIMUM	34	34	1.1
INSTANTANEOUS PEAK FLOW		30700	52500
INSTANTANEOUS PEAK STAGE		20.73	27.65
INSTANTANEOUS LOW FLOW		19	.50
10 PERCENT EXCEEDS	3580	6880	4880
50 PERCENT EXCEEDS	381	402	433
90 PERCENT EXCEEDS	52	89	38

b Ice jam  
e Estimated

## 49

LOCATION. --Lat 41°17'30", long 84°16'52", in NW 1/4 sec. 22, T.4 N., R.5 E., Defiance County, Hydrologic Unit 04100009, on left bank 40 ft. upstream from Independence Dam, 4 mi downstream from mouth of Auglaize River, and 4.5 mi east of Defiance.

PERIOD OF RECORD.--October 1924 to December 1935, March 1939 to September 1974, October 1978 to current year.

GAGE.--Water-stage recorder. Datum of gage is 658.56 ft above sea level. Prior to Nov. 13, 1924, nonrecording gage at same site and datum.

REMARKS.--Records good, except for estimated discharges, which are fair. Flow affected by regulation of Auglaize River at hydroelectric plant of the Hydro-Corporation, 7 mi upstream. Operation of hydroelectric plant there was discontinued Jan. 10, 1963 to Sept. 7, 1985. Low flow slightly regulated by powerplant at Ft. Wayne, Indiana. Slight diversion 275 ft upstream into Miami and Erie Canal through a 24 inch conduit which bypasses station.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	235	724	1160	e520	2300	19400	3820	17100	12700	1530	9370	534
2	218	945	907	632	e1400	13200	3510	16300	10100	1330	5770	448
3	290	1720	865	729	e1300	9140	3190	12200	6730	1180	3460	453
4	270	2130	1070	e660	e1200	5610	3020	9950	4460	1150	2170	454
5	336	2580	1030	e600	e1200	4160	2890	8260	3830	1080	1500	416
6	1190	2610	1110	e540	e1100	4460	2330	8080	4060	981	1180	381
7	3590	2900	868	e480	e1200	4590	e2000	9510	6260	796	894	343
8	3190	2690	e560	e450	1320	4100	1670	8180	12200	817	896	322
9	1770	3130	e430	e420	1560	2910	1690	6160	14600	805	690	305
10	1090	2940	e400	e390	2130	2480	1650	9000	16900	757	541	327
11	1140	3690	e380	e380	3170	2550	1550	18100	18100	785	498	e400
12	1430	6130	e360	e370	3240	2820	1380	23700	15700	646	467	e500
13	1080	7840	486	e360	3010	2530	1190	20500	14600	494	514	299
14	947	6550	774	e360	2660	2120	1240	e16000	11200	535	441	262
15	1050	4960	1000	e400	1980	1820	1400	e13000	10400	699	405	207
16	954	3980	829	611	1260	2500	1630	12800	7780	576	398	e240
17	682	2870	947	1690	1080	2860	1660	22000	5780	656	388	e280
18	666	2760	e900	11400	1020	2820	1430	29100	e8000	842	354	e300
19	373	2630	e820	39300	1040	2840	1700	22500	e13000	7350	358	e290
20	324	2860	e780	41400	1290	9040	2280	17200	e13000	14800	e700	e270
21	304	2700	e760	31800	1210	15000	4420	15400	e12000	10300	e1000	e260
22	300	2420	e700	22800	815	15400	8100	12100	e10000	6390	1480	e350
23	401	2360	e660	17100	1070	13400	13800	8280	e8600	4060	2620	e220
24	435	2290	e640	21200	1510	10700	24200	6770	e8800	2760	2540	272
25	341	2030	e600	21700	1530	12300	24800	5760	e7400	1880	2170	404
26	301	1560	e560	16800	2410	12100	19900	7660	e6000	1470	1610	369
27	377	1340	e540	11700	7450	9430	13700	7800	e4500	1220	1020	439
28	432	1080	e540	8700	20600	7180	10500	12200	3080	897	845	609
29	583	998	e520	6710	22900	6030	8410	16300	2400	1650	680	1710
30	571	931	e520	5570	---	5370	11000	20400	1930	4790	651	1290
31	585	---	e500	3220	---	4470	---	15500	---	10500	594	---
TOTAL	25455	84348	22216	268992	93955	213330	180060	427810	274110	83726	46204	12954
MEAN	821	2812	717	8677	3240	6882	6002	13800	9137	2701	1490	432
MAX	3590	7840	1160	41400	22900	19400	24800	29100	18100	14800	9370	1710
MIN	218	724	360	360	8							

MEAN	1342	2769	4477	5975	6805	9424	8556	5113	3479	2015	920	1055
MAX	8314	16410	18040	30150	22460	33940	23210	27270	20370	10700	4739	11470
(WY)	1955	1973	1967	1950	1959	1982	1957	1943	1981	1992	1958	1926
MIN	63.9	110	158	219	363	1455	789	359	214	211	111	88.1
(WY)	1929	1954	1964	1945	1964	1941	1925	1925	1988	1930	1932	1955

ANNUAL TOTAL	1167870		1733160				
ANNUAL MEAN	3200		4735			4311	
HIGHEST ANNUAL MEAN						8286	1950
LOWEST ANNUAL MEAN						849	1931
HIGHEST DAILY MEAN	41800	Apr 12	41400	Jan 20		98800	Mar 15 1982
LOWEST DAILY MEAN	218	Oct 2	207	Sep 15		3.0	Sep 4 1925
ANNUAL SEVEN-DAY MINIMUM	240	Sep 23	264	Sep 15		27	Aug 31 1925
INSTANTANEOUS PEAK FLOW			45400	Jan 19 a		104000	Mar 15 1982
INSTANTANEOUS PEAK STAGE			8.29	Jan 19		15.87	Mar 15 1982
INSTANTANEOUS LOW FLOW			207	Sep 15		2.0	Sep 3 1925
10 PERCENT EXCEEDS	7110		14000			12300	
50 PERCENT EXCEEDS	1500		1650			1370	
90 PERCENT EXCEEDS	332		380			221	

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

04193500 MAUMEE RIVER AT WATERVILLE, OH

LOCATION.--Lat 41°30'00", long 83°42'46", Lucas County, Hydrologic Unit 04100009, on downstream side of first pier from left end of bridge on State Highway 64 at Waterville, 3 mi downstream from Tontogany Creek, and 20.7 mi upstream from mouth.  
DRAINAGE AREA.--6,330 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--November 1898 to December 1901, August 1921 to December 1935, March 1939 to current year. Miami and Erie Canal flow included at Waterville prior to 1930 when the canal was abandoned.

REVISED RECORDS.--WSP 894: 1930(M). WSP 1084: 1946. WSP 1387: 1900(M), 1922-23, 1933. WDR OH-68-1: 1967. WDR OH-70-1: Drainage area. WRD-OH-82-2: 1981.

GAGE.--Water-stage recorder with auxiliary crest-stage gage. Datum of gage is 595.71 ft above sea level.

Nov. 19, 1898 to Dec. 31, 1901, Aug. 26, 1921 to July 31, 1930, nonrecording gage, Aug. 1, 1930 to Dec. 31, 1935, water-stage recorder, Mar. 14, 1939 to Mar. 12, 1940, nonrecording gage at same site and datum.

REMARKS.--Records fair except for estimated daily discharges which are poor. Satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Practically no flow at times prior to June 30, 1929, when entire river flow was being diverted by canal.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 19.9 ft, from information by local resident, estimated discharge, 180,000 ft<sup>3</sup>/s, from rating curve extended above 94,000 ft<sup>3</sup>/s.

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	236	854	1230	e540	e2800	e22000	e4800	22600	15100	1780	12100	945
2	171	1110	1160	e640	e1700	e15000	e4300	22600	12600	1500	7550	704
3	160	2110	1160	e1000	e1400	e10000	e4100	17900	9250	1300	4950	455
4	395	2590	978	e860	e1300	e6000	e3900	13900	5800	1190	2720	327
5	328	2760	1350	e720	e1250	e4800	e3700	11300	4500	1130	1820	e320
6	1100	3090	1350	e640	e1300	e5000	e3200	10300	4480	1030	1410	309
7	2970	3580	e900	e580	e1400	e5200	e2800	11800	6280	923	1020	407
8	3900	3490	e680	e520	e1500	e4300	e2500	11500	13200	685	861	324
9	2680	3660	e500	e470	e1700	e3400	e2300	8840	15800	834	827	294
10	1420	3670	e450	e450	e2200	e3000	e2100	10100	19800	709	570	307
11	1110	5050	e420	e430	e3500	e2900	e1900	19800	20100	706	477	352
12	1120	7960	e400	e420	e3700	e3100	1720	30000	18500	741	449	538
13	1360	9860	e700	e400	e3500	e2700	1600	27600	17400	580	433	429
14	1100	9030	e1100	e390	e3000	e2400	1460	21100	14400	401	473	445
15	1010	6860	e1400	e380	e2300	e2200	1610	15600	11700	621	419	347
16	870	5300	e1200	e700	e1500	e3000	1920	14200	10000	614	287	253
17	800	3910	e1100	e1500	e1300	e3300	2190	23100	7330	516	296	313
18	720	3540	e1000	e9000	e1200	e3200	1890	34600	5840	669	328	352
19	689	3180	e950	e52000	e1300	e3200	2000	30000	9450	1890	316	329
20	462	3550	e900	e54000	e1450	e11100	2800	21700	13700	16200	517	327
21	379	3550	e840	e45000	e1400	e20600	4100	18700	13800	13000	687	293
22	343	3080	e800	e30000	e960	e20500	8470	15900	11900	8710	1380	454
23	239	2720	e740	e20000	e1400	e18100	18700	10800	10100	5430	2130	276
24	604	2720	e700	e24000	e1700	e16100	33000	7740	8690	3610	2700	230
25	325	2630	e660	e25000	e1800	e16200	35000	6680	9000	2540	2430	266
26	311	2020	e630	e20000	e3500	e16900	29100	6950	7180	1570	1970	263
27	446	1780	e610	e14800	e9000	e12600	20700	8660	5620	1410	1450	456
28	624	1480	e600	e9260	e20000	e9550	14700	10400	3990	1020	1100	649
29	600	1230	e580	e7800	e26000	e7860	12400	18000	3070	1020	1080	716
30	664	1150	e560	e6000	---	e6320	13100	21800	2340	3400	1130	1330
31	763	---	e550	e3500	---	e5800	---	20100	---	8900	1040	---
TOTAL	27899	107514	26198	331000	105060	266330	242060	524270	310920	84629	54920	13010
MEAN	900	3584	845	10680	3623	8591	8069	16910	10360	2730	1772	434
MAX	3900	9860	1400	54000	26000	22000	35000	34600	20100	16200	12100	1330
MIN	160	854	400	380	960	2200	1460	6680	2340	401	287	230
CFSM	.14	.57	.13	1.69	.57	1.36	1.27	2.67	1.64	.43	.28	.07
IN.	.16	.63	.15	1.95	.62	1.57	1.42	3.08	1.83	.50	.32	.08

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1996, BY WATER YEAR (WY)

	MEAN	1456	3097	5299	6889	7796	10900	9740	5969	4091	2378	1057	1079
MAX	9041	19010	23830	34010	30000	38210	25890	29540	24030	11200	6185	10320	
(WY)	1955	1993	1967	1950	1976	1982	1957	1943	1981	1992	1958	1992	
MIN	95.5	196	177	235	424	1759	914	587	231	207	146	127	
(WY)	1964	1965	1964	1945	1934	1941	1946	1934	1988	1930	1941	1963	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1930 - 1996

ANNUAL TOTAL	1368179	2093810	
ANNUAL MEAN	3748	5721	4961
HIGHEST ANNUAL MEAN			9370
LOWEST ANNUAL MEAN			938
HIGHEST DAILY MEAN	51000	Apr 12	54000
LOWEST DAILY MEAN	119	Sep 24	160
ANNUAL SEVEN-DAY MINIMUM	176	Sep 23	301
INSTANTANEOUS PEAK FLOW			60000
INSTANTANEOUS PEAK STAGE			12.25
INSTANTANEOUS LOW FLOW			160
ANNUAL RUNOFF (CFSM)	.59	.90	.78
ANNUAL RUNOFF (INCHES)	8.04	12.30	10.65
10 PERCENT EXCEEDS	9060	17900	13800
50 PERCENT EXCEEDS	1510	1940	1610
90 PERCENT EXCEEDS	406	401	255

c From crest-stage gage at site  
e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

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04193500 MAUMEE RIVER AT WATERVILLE, OHIO--Continued

### WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1950 to current year.

PERIOD OF DAILY RECORD.--

CHLORIDE: October 1987 to September 1994.

NITROGEN, NITRITE + NITRATE: October 1987 to September 1994.

NITROGEN, AMMONIA + ORGANIC: October 1987 to September 1994.

PHOSPHORUS: October 1987 to September 1994.

SUSPENDED SEDIMENT DISCHARGE: April 1950 to September 1984. October 1987 to current year.

INSTRUMENTATION.--Refrigerated water-quality pumping sampler, operated by Heidelberg College Water Quality Laboratory, from October 1987 to September 1994. Sampler located at station 04193490.

REMARKS.--Sediment samples were collected by a local observer on an approximate once daily basis. Sediment loads were calculated using the mean-interval method (Porterfield, George, 1972, Computation of Fluvial-Sediment Discharge: U.S. Geological Survey, Techniques of Water Resources Investigations, Book 3, Chap. C3, 66 p.). For days with unsteady concentration, discharge, or both, the day was sub-divided into hourly intervals and the daily load was calculated by summation of hourly loads. This required interpolation between measured and estimated concentrations.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,240 mg/L, Mar. 26, 1954; minimum daily mean, 1 mg/L, on many days during 1953, 1955, 1963.

SEDIMENT LOADS: Maximum daily, 300,000 tons, Feb. 24, 1990; minimum daily, 0.26 ton, Sep. 18, 1955.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 772 mg/L, Apr. 24; minimum daily mean, 3 mg/L, Jan. 13, 15, and 16.

SEDIMENT LOADS: Maximum daily, 110,000 tons, Jan. 20; minimum daily, 3.3 tons, Jan. 15.



## STREAMS TRIBUTARY TO LAKE ERIE

04193500 MAUMEE RIVER AT WATERVILLE, OHIO--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	SAM- PLING METHOD, CODES* (82398)	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 AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
NOV									
09...	1155	10	3840	624	8.0	1.0	5.0	47	4.8
09...	1325	50	3840	--	--	--	--	53	5.6
MAY									
31...	1050	10	21000	373	7.6	21.0	15.0	16	6.8
31...	1245	50	20600	--	--	--	--	16	7.1
JUN									
25...	1300	10	9130	422	7.9	20.0	23.5	16	5.0
25...	1550	50	8910	--	--	--	--	--	5.3

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	BROM- ACIL WATER WHLREC (UG/L) (30234)	BUTA- CHLOR WATER WHLREC (UG/L) (30235)	BUTYL- ATE WATER WHLREC (UG/L) (30236)	CARBOX- IN WATER RECOV- ERABLE (UG/L) (30245)	CYCLO- ATE WATER RECOV- ERABLE (UG/L) (30254)	DIPHEN- AMID WATER RECOV- ERABLE (UG/L) (30255)	HEXAZI- NONE WATER RECOV- ERABLE (UG/L) (30264)
NOV									
09...	1.1	0.13	--	--	--	--	--	--	--
09...	1.0	0.19	--	--	--	--	--	--	--
MAY									
31...	1.2	0.26	--	--	--	--	--	--	--
31...	1.3	0.25	--	--	--	--	--	--	--
JUN									
25...	1.3	0.26	<0.2	<0.1	<0.1	<0.2	<0.1	<0.1	<0.2
25...	1.2	0.25	--	<0.1	<0.1	<0.2	<0.1	<0.1	<0.2

DATE	ATRA- ZINE WATER UNFLTRD REC (UG/L) (39630)	DE-ISO PROPYL ATRAZINE WATER, WHOLE, TOTAL (UG/L) (75980)	DEETHYL ATRA- ZINE, WATER, WHOLE, TOTAL (UG/L) (75981)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	CYAN- AZINE TOTAL (UG/L) (81757)	AME- TRYNE TOTAL (UG/L) (82184)	METOLA- CHLOR WATER WHOLE TOT.REC (UG/L) (82612)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDIMENT PARTICLE SIZE <.0625MM SILTCLAY (PERCENT) (80250)
NOV									
09...	--	--	--	--	--	--	--	40	94.2
09...	--	--	--	--	--	--	--	--	--
MAY									
31...	--	--	--	--	--	--	--	447	98.3
31...	--	--	--	--	--	--	--	--	--
JUN									
25...	11	0.35	1.0	1.4	5.3	<0.1	5.9	92	--
25...	10	0.33	0.96	1.3	4.8	<0.1	5.5	--	--

\*10 - Stream cross-section sample using equal-width-increment (EWI) sampling method.

\*50 - Point sample obtained from flow tank.

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04193500 MAUMEE RIVER AT WATERVILLE, OHIO--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
OCTOBER			NOVEMBER			DECEMBER			
1	236	26	17	854	21	50	1230	18	59
2	171	26	12	1110	27	83	1160	18	56
3	160	26	11	2110	29	165	1160	19	60
4	395	25	26	2590	20	142	978	21	56
5	328	24	21	2760	20	150	1350	22	79
6	1100	24	74	3090	19	159	1350	17	63
7	2970	49	423	3580	25	248	e900	16	38
8	3900	57	603	3490	49	458	e680	12	22
9	2680	43	315	3660	43	421	e500	10	14
10	1420	39	149	3670	36	356	e450	9	11
11	1110	36	109	5050	36	495	e420	9	10
12	1120	27	82	7960	50	1070	e400	9	9.8
13	1360	24	88	9860	89	2380	e700	11	20
14	1100	24	71	9030	160	3860	e1100	11	32
15	1010	25	69	6860	139	2600	e1400	9	36
16	870	26	60	5300	106	1510	e1200	8	27
17	800	25	54	3910	83	883	e1100	8	24
18	720	25	48	3540	71	682	e1000	10	27
19	689	24	45	3180	51	443	e950	9	24
20	462	24	30	3550	39	375	e900	8	20
21	379	23	24	3550	36	344	e840	8	18
22	343	23	21	3080	41	344	e800	8	16
23	239	22	14	2720	37	269	e740	13	26
24	604	22	36	2720	33	241	e700	9	16
25	325	21	19	2630	33	235	e660	7	13
26	311	21	18	2020	25	139	e630	12	20
27	446	21	25	1780	23	109	e610	12	20
28	624	20	34	1480	25	100	e600	10	16
29	600	20	32	1230	20	66	e580	11	17
30	664	19	35	1150	17	54	e560	7	11
31	763	19	39	---	---	---	e550	4	5.4
TOTAL	27899	---	2604	107514	---	18431	26198	---	866.2

e Estimated

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JANUARY			FEBRUARY			MARCH			
1	e540	4	5.9	e2800	39	296	e22000	502	29800
2	e640	8	14	e1700	37	171	e15000	377	15300
3	e1000	19	52	e1400	31	118	e10000	286	7720
4	e860	19	44	e1300	21	73	e6000	209	3390
5	e720	7	15	e1250	19	65	e4800	164	2120
6	e640	6	11	e1300	18	64	e5000	152	2060
7	e580	95	149	e1400	16	61	e5200	107	1500
8	e520	36	51	e1500	13	52	e4300	91	1050
9	e470	9	11	e1700	13	58	e3400	83	761
10	e450	30	37	e2200	12	69	e3000	59	478
11	e430	38	44	e3500	15	139	e2900	46	358
12	e420	9	9.7	e3700	17	173	e3100	35	297
13	e400	3	3.5	e3500	27	254	e2700	30	218
14	e390	4	3.9	e3000	31	255	e2400	30	193
15	e380	3	3.3	e2300	21	133	e2200	30	179
16	e700	3	5.4	e1500	18	75	e3000	32	258
17	e1500	61	245	e1300	16	56	e3300	28	252
18	e9000	112	2720	e1200	18	57	e3200	30	256
19	e52000	549	77100	e1300	14	48	e3200	38	327
20	e54000	754	110000	e1450	14	54	e11100	68	2030
21	e45000	734	89200	e1400	14	55	e20600	229	12700
22	e30000	303	24600	e960	12	31	e20500	294	16300
23	e20000	175	9460	e1400	12	45	e18100	199	9710
24	e24000	181	11700	e1700	16	72	e16100	158	6860
25	e25000	237	16000	e1800	16	77	e16200	178	7800
26	e20000	210	11300	e3500	15	138	e16900	146	6660
27	e14800	157	6290	e9000	21	500	e12600	112	3810
28	e9260	119	2990	e20000	211	11400	e9550	80	2050
29	e7800	107	2250	e26000	488	34300	e7860	72	1530
30	e6000	81	1310	---	---	---	e6320	69	1170
31	e3500	52	496	---	---	---	e5800	52	809
TOTAL	331000	---	366120.7	105060	---	48889	266330	---	137946

e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

## 04193500 MAUMEE RIVER AT WATERVILLE, OHIO--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
APRIL			MAY			JUNE			
1	e4800	48	623	22600	216	13100	15100	327	13300
2	e4300	47	548	22600	207	12600	12600	277	9490
3	e4100	47	523	17900	190	9230	9250	198	5010
4	e3900	51	539	13900	154	5820	5800	135	2130
5	e3700	56	555	11300	100	3050	4500	95	1150
6	e3200	42	361	10300	93	2590	4480	73	876
7	e2800	29	221	11800	91	2900	6280	67	1160
8	e2500	23	153	11500	82	2560	13200	108	3930
9	e2300	22	137	8840	64	1540	15800	283	12200
10	e2100	44	249	10100	72	2080	19800	357	19100
11	e1900	44	223	19800	183	10300	20100	337	18300
12	1720	38	175	30000	400	32400	18500	260	13000
13	1600	35	150	27600	409	30700	17400	237	11100
14	1460	29	114	21100	308	17700	14400	224	8780
15	1610	24	104	15600	244	10400	11700	152	4800
16	1920	25	130	14200	155	5910	10000	103	2800
17	2190	26	155	23100	184	11700	7330	75	1500
18	1890	30	152	34600	477	45000	5840	61	978
19	2000	32	176	30000	450	37000	9450	144	3770
20	2800	43	348	21700	285	16800	13700	218	8130
21	4100	46	511	18700	291	14700	13800	181	6760
22	8470	68	1650	15900	278	12000	11900	156	5030
23	18700	278	15300	10800	154	4590	10100	134	3670
24	33000	772	70000	7740	90	1880	8690	110	2570
25	35000	523	49800	6680	76	1370	9000	96	2320
26	29100	301	23800	6950	72	1350	7180	111	2160
27	20700	212	12000	8660	69	1620	5620	90	1370
28	14700	151	6030	10400	75	2190	3990	112	1200
29	12400	123	4140	18000	228	11100	3070	162	1340
30	13100	159	5920	21800	354	20900	2340	111	698
31	---	---	---	20100	385	21100	---	---	---
TOTAL	242060	---	194787	524270	---	366180	310920	---	168622

e Estimated

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JULY			AUGUST			SEPTEMBER			
1	1780	61	296	12100	298	9820	945	33	85
2	1500	47	189	7550	164	3420	704	35	66
3	1300	49	172	4950	128	1720	455	31	39
4	1190	57	183	2720	94	700	327	34	30
5	1130	65	196	1820	64	323	e320	47	40
6	1030	53	148	1410	55	211	309	57	48
7	923	33	82	1020	56	153	407	39	42
8	685	40	72	861	37	85	324	34	30
9	834	71	160	827	24	54	294	44	35
10	709	68	131	570	22	34	307	44	37
11	706	35	68	477	16	20	352	45	43
12	741	26	53	449	12	15	538	48	70
13	580	33	52	433	14	16	429	36	43
14	401	45	48	473	18	24	445	30	37
15	621	59	99.7	419	26	30	347	30	28
16	614	29	50	287	25	20	253	27	19
17	516	24	34	296	22	17	313	32	28
18	669	62	114	328	19	17	352	32	30
19	1890	88	521	316	19	16	329	27	24
20	16200	265	12000	517	26	37	327	32	28
21	13000	154	5440	687	38	70	293	26	21
22	8710	123	2890	1380	41	154	454	23	29
23	5430	163	2360	2130	43	249	276	27	20
24	3610	161	1580	2700	46	334	230	31	19
25	2540	123	847	2430	42	279	266	37	26
26	1570	93	396	1970	39	207	263	38	27
27	1410	87	332	1450	30	119	456	33	40
28	1020	118	324	1100	31	92	649	29	52
29	1020	117	320	1080	33	96	716	26	50
30	3400	97	904	1130	33	99	1330	40	146
31	8900	223	5660	1040	31	87	---	---	---
TOTAL	84629	---	35721.7	54920	---	18518	13010	---	1232
YEAR	2093810		1359917.9						

e Estimated

## 04193500 MAUMEE RIVER AT WATERVILLE, OHIO--Continued

[(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

## WATER-QUALITY RECORDS

The data described in the following table was collected and analyzed as part of the NAWQA (National Water-Quality Assessment Program) project in the Lake Erie-Lake St. Clair Basin. The objectives of the NAWQA program are to broadly characterize the water-quality of the Nation's streams and aquifers in relation to human and natural factors. This project is one of 60 river basin and aquifer assessment projects being implemented across the nation. At any one time, 15 to 20 of these projects are actively collecting data. The period of high-intensity data collection for the Lake Erie-Lake St. Clair Basin project is in water years 1996-98.

There are four stream sites in Ohio for which data are being reported in this publication as part of the NAWQA study, Auglaize River near Ft. Jennings (04186500), Maumee River at Waterville (04193500), Cuyahoga River at LTV Steel at Cleveland (04208504), and Grand River at Harpersfield (04211820). Three sites are reported in the 1996 Michigan annual data report.; Black River near Jeddo, MI (04159492), Clinton River at Sterling Heights, MI (04161820) and River Raisin near Manchester, MI (04175600). Two Sites are reported in the 1996 Indiana annual data report; St. Joseph River near Newville, IN (04178000), and Maumee River at New Haven, IN (04183000). One site is reported in the 1996 New York annual data report; Cattaraugus Creek at Gowanda, NY (04213500).

These data also can be obtained electronically at <http://www-oh.er.usgs.gov/nawqa.index.html>.

(---, no data; <, concentration or value reported is less than that indicated; E, estimated value; K, value is estimated from a non-ideal colony count).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DIS-CHARGE,	SPE-	PH	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	BARO-	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN,	COLI-	E. COLI	HARD- NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L) (00904)	
		INST.	CIFIC	WATER			METRIC		DIS-	FORM,	WATER		
		CUBIC	CON-	WHOLE			PRES-		SOLVED	FECAL,	WHOLE		
		FEET	DUCT-	(STAND-			SURE		CENT	UM-MF	UREASE		
		PER	ANCE	ARD			(MM		SATUR-	(COLS./	(COL /		
		SECOND	(US/CM)	(UNITS)			OF		ATION)	100 ML)	100 ML)		
		(00061)	(00095)	(00400)	(00020)	(00010)	HG)	(00300)	(00301)	(31625)	(31633)		
MAR													
20...	1000	9700	620	7.8	0.0	2.5	730	12.1	93	K550	240	98	
APR													
16...	1000	1730	671	8.6	7.0	8.0	736	11.9	104	K14	K10	160	
MAY													
01...	0930	22800	530	7.9	14.0	9.0	738	10.1	90	900	920	97	
08...	0900	11700	571	8.0	15.5	12.5	748	9.5	91	K150	K94	96	
JUN													
05...	0915	4560	427	7.9	17.5	17.5	748	8.4	90	390	520	64	
25...	1100	9130	441	7.9	26.0	24.0	748	6.9	84	250	250	48	
JUL													
23...	1300	5410	332	7.7	27.5	24.5	744	6.8	84	320	310	44	
AUG													
28...	0800	960	588	8.3	26.5	25.0	750	7.3	90	K14	K28	73	
SEP													
11...	0800	432	521	8.1	19.5	21.0	746	7.4	85	530	K55	48	
DATE		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)	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)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
MAR													
20...	76	20	21	3.3	212	174	73	44	0.30	5.7	388	0.040	
APR													
16...	72	23	24	3.3	140	155	92	51	0.30	<0.01	389	0.030	
MAY													
01...	67	16	11	3.5	166	136	50	27	0.20	7.1	318	0.060	
08...	67	18	13	3.1	177	145	60	30	0.30	6.4	329	0.060	
JUN													
05...	52	13	8.6	3.2	146	120	37	18	0.20	6.9	256	0.050	
25...	54	12	7.9	5.0	166	136	31	17	0.30	7.3	271	0.080	
JUL													
23...	37	8.8	7.4	4.5	103	84	26	12	0.30	6.8	211	0.050	
AUG													
28...	49	20	33	5.0	161	132	80	47	0.40	2.5	341	0.030	
SEP													
11...	44	17	19	4.7	161	132	60	28	0.40	1.8	279	0.020	



## STREAMS TRIBUTARY TO LAKE ERIE

04193500 MAUMEE RIVER AT WATERVILLE, OHIO--Continued  
 [(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	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)	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)
MAR 20...	7.40	0.200	1.2	0.90	0.130	0.080	0.060	10	9.0	5.7	3.6	101
APR 16...	5.10	0.020	1.0	0.60	0.080	0.020	0.020	4.0	<1.0	5.2	3.8	23
MAY 01...	8.90	0.140	1.6	1.0	0.300	0.080	0.080	20	2.0	-	3.5	184
08...	5.20	<0.015	1.0	0.80	0.200	0.110	0.080	8.0	2.0	6.4	2.8	79
JUN 05...	6.20	0.040	1.1	0.60	0.330	0.150	0.140	13	2.0	6.2	2.3	114
25...	4.90	0.050	1.1	0.80	0.270	0.110	0.120	19	2.0	7.4	1.5	95
JUL 23...	6.70	0.100	1.5	0.90	0.320	0.120	0.150	23	5.0	7.6	1.3	128
AUG 28...	1.10	0.030	1.5	0.60	0.110	<0.010	0.020	6.0	1.0	6.0	2.6	28
SEP 11...	0.340	0.030	1.4	0.60	0.110	<0.010	<0.010	6.0	<1.0	6.6	2.1	27
DATE	ACETO- CHLOR, WATER, FLTRD REC (UG/L) (49260)	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)
MAR 20...	0.009	0.015	0.130	E0.026	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	0.032	<0.002
APR 16...	0.009	0.014	0.100	E0.020	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	0.026	<0.002
MAY 01...	0.150	0.190	0.790	E0.064	<0.001	<0.002	<0.002	<0.003	<0.003	0.006	0.260	<0.002
08...	0.077	0.066	0.599	E0.033	<0.001	<0.002	<0.002	<0.003	<0.003	<0.080	0.155	<0.002
JUN 05...	1.40	0.340	E6.10	E0.110	<0.001	<0.002	<0.002	E0.026	<0.003	<0.050	1.90	<0.002
25...	2.13	1.88	17.0	E0.565	<0.001	<0.002	<0.002	<0.003	E0.079	0.012	3.50	<0.002
JUL 23...	0.186	0.839	4.15	E0.354	<0.001	<0.002	<0.002	E0.084	E0.247	0.008	0.579	<0.002
AUG 28...	0.018	0.040	1.22	E0.158	<0.001	<0.002	<0.002	<0.003	<0.003	0.021	0.381	<0.002
SEP 11...	0.009	0.036	0.897	E0.099	<0.001	<0.002	<0.002	<0.003	<0.003	0.009	0.217	<0.002
DATE	P, P' DDE DISSOLV (UG/L) (34653)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	LINDANE DIS- SOLVED (UG/L) (39341)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)
MAR 20...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
APR 16...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
MAY 01...	<0.006	0.006	<0.001	<0.003	<0.017	0.004	<0.004	<0.003	<0.003	<0.002	<0.004	0.027
08...	<0.006	0.005	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
JUN 05...	<0.006	0.005	<0.001	<0.003	<0.017	E0.004	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
25...	<0.006	<0.020	0.009	<0.003	<0.017	E0.003	<0.004	<0.003	<0.003	E0.004	<0.004	0.370
JUL 23...	<0.006	0.019	E0.004	E0.001	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	0.017
AUG 28...	<0.006	0.007	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
SEP 11...	<0.006	0.010	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002

# STREAMS TRIBUTARY TO LAKE ERIE

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04193500 MAUMEE RIVER AT WATERVILLE, OHIO--Continued  
 [(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

				MOL- INATE	NAPROP- AMIDE		METHYL PARA- THION	PEB- ULATE	PENDI- METH- ALIN	PER- METHRIN CIS	PHORATE	PRO- METON,
	MALA- THION, DIS- SOLVED (UG/L) (39532)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	WATER FLTRD 0.7 U (UG/L) (82671)	WATER FLTRD 0.7 U (UG/L) (82684)	PARA- THION, DIS- SOLVED (UG/L) (39542)	WAT FLT 0.7 U (UG/L) (82667)	WATER FILTRD 0.7 U (UG/L) (82669)	WAT FLT 0.7 U (UG/L) (82683)	WAT FLT 0.7 U (UG/L) (82687)	WATER FLTRD 0.7 U (UG/L) (82664)	WATER, DISS, REC (UG/L) (04037)
MAR												
20...	<0.005	0.120	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	E0.010
APR												
16...	<0.005	0.099	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	E0.011
MAY												
01...	0.008	1.50	0.370	<0.004	<0.003	<0.017	<0.006	<0.004	<0.010	<0.005	<0.002	0.019
08...	<0.005	0.692	0.137	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.020
JUN												
05...	<0.005	E7.80	0.260	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.024
25...	<0.005	9.30	0.740	<0.004	<0.010	<0.004	<0.006	<0.004	0.030	<0.005	<0.002	0.032
JUL												
23...	<0.005	10.0	1.33	<0.004	<0.003	<0.004	0.008	<0.004	0.039	<0.005	<0.002	0.085
AUG												
28...	<0.005	1.14	0.042	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.069
SEP												
11...	<0.005	0.601	0.024	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.128
	PRON- AMIDE WATER FLTRD 0.7 U (UG/L) (82676)	PROP- CHLOR, WATER, DISS, (UG/L) (04024)	PRO- PANIL WATER FLTRD 0.7 U (UG/L) (82679)	PRO- PARGITE WATER FLTRD 0.7 U (UG/L) (82685)	SI- MAZINE, WATER, DISS, (UG/L) (04035)	TEBU- THIURON WATER FLTRD 0.7 U (UG/L) (82670)	TER- BACIL WATER FLTRD 0.7 U (UG/L) (82665)	TER- BUFOS WATER FLTRD 0.7 U (UG/L) (82675)	THIO- BENCARB WATER FLTRD 0.7 U (UG/L) (82681)	TRIAL- LATE WATER FLTRD 0.7 U (UG/L) (82678)	TRI- FLUR- ALIN WAT FLT 0.7 U (UG/L) (82661)	
MAR												
20...	<0.003	<0.007	<0.004	<0.013	0.018	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002	
APR												
16...	<0.003	<0.007	<0.004	<0.013	0.019	0.018	<0.007	<0.013	<0.002	<0.001	<0.002	
MAY												
01...	<0.003	<0.007	<0.004	<0.013	0.210	E0.019	<0.007	<0.013	<0.002	<0.001	<0.002	
08...	<0.003	<0.007	<0.004	<0.013	0.218	0.010	<0.007	<0.013	<0.002	<0.001	<0.002	
JUN												
05...	<0.003	<0.007	<0.004	<0.013	0.280	E0.007	<0.007	<0.013	<0.002	<0.001	<0.002	
25...	<0.003	<0.007	<0.004	<0.013	0.625	E0.060	<0.007	<0.013	<0.002	<0.001	E0.002	
JUL												
23...	<0.003	<0.007	<0.004	<0.013	0.236	0.021	<0.007	<0.013	<0.002	<0.001	0.005	
AUG												
28...	<0.003	<0.007	<0.004	<0.013	0.124	0.025	<0.007	<0.013	<0.002	<0.001	<0.002	
SEP												
11...	<0.003	<0.007	<0.004	<0.013	0.067	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002	

## STREAMS TRIBUTARY TO LAKE ERIE

## 04195500 PORTAGE RIVER AT WOODVILLE, OH

LOCATION.--Lat 41°26'58", long 83°21'41", in sec. 28, T.6 N., R.13 E., Sandusky County, Hydrologic Unit 04100010, on left bank at upstream side of bridge on U. S. Highway 20 in Woodville, 600 ft downstream from unnamed right bank tributary, and 10.3 mi upstream from Sugar Creek.

DRAINAGE AREA.--428 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1928 to December 1935, October 1939 to current year.

REVISED RECORDS.--WSP 894: 1929-30. WSP 1207: 1933. WSP 1387: 1931, 1933. WSP 1912: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 614.75 ft above sea level. Prior to Oct. 8, 1933, nonrecording gage, Oct. 9, 1933 to Dec. 30, 1935 water-stage recorder, Oct. 17 to Nov. 29, 1939, nonrecording gage, all at same site and datum.

REMARKS.--Records good, except estimated discharges, which are poor. Flow supplemented by water imported from Maumee River basin for municipal supply for city of Bowling Green 16 mi upstream. The importation of this water began Sept. 1, 1951. Water-quality data collected at this site 800 ft downstream. Sediment data collected at this site. National Weather Service gage height telemeter at station.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 17 ft, from information by local residents, discharge, 17,000 ft<sup>3</sup>/s, from rating curve extended above 11,500 ft<sup>3</sup>/s.

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	6.1	16	45	e32	e94	774	272	1980	128	43	157	9.2
2	5.2	34	43	e45	e80	470	289	1070	109	40	74	9.1
3	7.2	132	41	e68	e72	259	264	713	103	36	47	8.8
4	13	172	39	e62	e64	181	248	502	103	33	35	8.1
5	57	94	37	e52	e60	221	271	440	102	30	27	7.0
6	407	61	34	e44	e56	340	248	532	125	26	19	6.9
7	599	65	e29	e39	e54	360	218	576	869	23	16	8.2
8	257	292	e26	e34	e70	232	194	424	2480	21	14	9.6
9	123	236	e24	e31	e120	e180	170	637	1140	19	13	11
10	71	140	e21	e28	e130	e140	153	728	609	17	11	12
11	46	250	e18	e25	e140	e110	137	2550	579	16	10	11
12	32	1130	e17	e24	e150	e100	130	3300	715	16	10	11
13	23	633	e15	e22	e110	e86	143	1500	1100	14	9.0	9.9
14	18	306	e35	e21	e84	128	168	687	887	13	8.0	11
15	15	204	e130	e20	e70	202	159	471	676	18	7.8	15
16	16	150	e170	e22	e62	359	160	404	387	27	7.6	14
17	13	113	e110	e250	e58	345	189	1680	248	41	8.1	13
18	11	101	e80	e2500	e54	291	219	1590	310	29	8.1	11
19	11	130	e66	5070	e52	286	222	810	406	21	8.0	11
20	12	165	e58	3770	e50	2640	224	482	271	30	7.9	12
21	12	158	e52	1570	e54	3410	189	338	265	27	8.6	11
22	13	128	e47	631	e64	2000	168	249	173	20	11	24
23	14	102	e43	447	e86	1400	1310	190	133	16	14	21
24	14	84	e40	1820	e120	1610	3900	156	107	14	10	32
25	12	68	e36	2050	257	2210	2350	133	97	16	9.3	22
26	11	63	e34	843	235	1260	1050	120	88	15	8.4	16
27	12	61	e32	555	1090	606	673	113	73	18	8.3	18
28	13	61	e30	e260	3760	406	452	245	61	15	8.0	38
29	17	57	e28	e190	2600	361	368	355	53	15	8.5	85
30	16	50	e27	e140	---	316	1300	230	46	24	8.7	76
31	15	---	e26	e110	---	271	---	164	---	100	9.6	---
TOTAL	1891.5	5256	1433	20775	9896	21554	15838	23369	12443	793	601.9	551.8
MEAN	61.0	175	46.2	670	341	695	528	754	415	25.6	19.4	18.4
MAX	599	1130	170	5070	3760	3410	3900	3300	2480	100	157	85
MIN	5.2	16	15	20	50	86	130	113	46	13	7.6	6.9
CFSM	.14	.41	.11	1.57	.80	1.62	1.23	1.76	.97	.06	.05	.04
IN.	.16	.46	.12	1.81	.86	1.87	1.38	2.03	1.08	.07	.05	.05

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1996, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)	(+)	MEAN*	CFSM*	IN*
1928	86.2	722	1951	2.96	1935	6.1	54.9	.13	.15
1929	204	1595	1973	3.61	1935	5.7	169	.39	.44
1930	349	1722	1991	4.37	1935	5.1	41.1	.10	.11
1931	455	2129	1952	2.24	1945	5.1	665	1.55	1.79
1932	504	1793	1976	2.00	1934	5.7	335	.78	.84
1933	761	2542	1982	11.8	1941	5.3	690	1.61	1.86
1934	644	1965	1957	41.7	1946	5.6	522	1.22	1.36
1935	397	1685	1943	25.4	1934	5.4	749	1.75	2.02
1936	276	1875	1981	9.29	1988	6.6	408	.95	1.06
1937	153	821	1958	2.81	1930	6.8	18.8	.04	.05
1938	58.9	635	1979	3.09	1933	6.8	12.6	.03	.03
1939	88.4	1088	1981	3.67	1944	6.7	11.7	.03	.03

SUMMARY STATISTICS

	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1928 - 1996
ANNUAL TOTAL	101335.9	114402.2	
ANNUAL MEAN	278	313 (#307)	#328
HIGHEST ANNUAL MEAN			628
LOWEST ANNUAL MEAN			81.4
HIGHEST DAILY MEAN	4870 Mar 9	5070 Jan 19	11000 Feb 15 1950
LOWEST DAILY MEAN	5.2 Oct 2	5.2 Oct 2	.40 Aug 26 1931
ANNUAL SEVEN-DAY MINIMUM	6.9 Sep 27	7.9 Aug 14	.93 Oct 12 1934
INSTANTANEOUS PEAK FLOW		5560 Jan 19 a	11500 Feb 15 1950
INSTANTANEOUS PEAK STAGE		10.24 Jan 19	14.51 Feb 15 1950
INSTANTANEOUS LOW FLOW		5.2 Oct 2	.40 Aug 16 1931
ANNUAL RUNOFF (CFSM)	.65	.73	.77
ANNUAL RUNOFF (INCHES)	8.81	9.94 (#9.74)	#10.41
10 PERCENT EXCEEDS	669	785	832
50 PERCENT EXCEEDS	76	71	67
90 PERCENT EXCEEDS	11	11	7.9

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

(+) Diversion in cubic feet per second, from Maumee River basin for municipal supply; furnished by City of Bowling Green.  
\* Adjusted for diversion.

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LOCATION.--Lat 40°48'13", long 83°00'21", in NE 1/4 sec. 10, T.3 S., R.16 E., Crawford County, Hydrologic Unit 04100011, on right bank at downstream side of bridge on township road, 1 mi upstream from unnamed left bank tributary, 1.5 mi west of Bucyrus, and 12 mi downstream from Loss Creek.

DRAINAGE AREA.--88.8 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1925 to November 1935, July 1938 to December 1951, December 1963 to September 1981, October 1995 to September 1996.

REVISED RECORDS.--WSP 744: 1925-32. WSP 874: 1938. WSP 1307: 1926 (M), 1928 (M), 1931, 1932 (M), 1934-35 (M), 1939, 1940 (M), 1946 (M). WSP 1912: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 955.04 ft above mean sea level. Prior to May 11, 1940, nonrecording gage, and May 12, 1940, to December 31, 1951, water-stage recorder, at same site and datum.

REMARKS.--Records good, except for periods of estimated record, which are poor. Low flow slightly affected by operation of reservoirs 5.3 mi to 6.0 mi upstream from station for municipal supply of Bucyrus. Water-quality and sediment data collected at this site.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of March 23, 1913 reached a stage of 14.5 ft, from floodmarks. Flood of January 22, 1959 reached a stage of 11.9 ft, from floodmarks, discharge, 13,500 ft<sup>3</sup>/s.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.7	15	23	14	e30	e100	1260	668	44	19	43	4.7
2	4.6	35	22	28	e25	e70	734	260	45	17	29	4.7
3	19	35	21	37	e23	e50	255	148	77	16	18	4.9
4	11	31	19	45	e21	e43	147	153	172	14	14	4.5
5	74	22	8.0	40	e20	133	119	192	224	14	11	4.3
6	146	18	7.1	29	24	747	95	293	127	12	9.6	4.2
7	67	34	e6.0	23	25	205	78	142	353	11	8.6	14
8	30	45	e5.2	e18	33	91	59	98	1320	12	8.1	9.4
9	18	37	e4.7	e16	73	e60	44	112	394	11	7.2	15
10	13	53	e4.5	e15	49	e45	38	237	286	10	6.0	10
11	11	815	e4.4	e15	61	e38	32	802	119	9.6	5.3	17
12	9.5	898	4.1	e14	45	e34	33	530	95	9.1	5.7	30
13	9.1	179	4.6	e14	23	e33	42	185	237	7.4	5.9	17
14	9.5	94	18	e13	23	53	42	108	87	6.3	5.7	14
15	7.9	67	33	e16	19	74	43	86	59	27	15	9.8
16	8.1	49	22	25	13	66	83	164	45	16	23	11
17	8.9	38	12	866	10	48	102	554	39	12	13	14
18	9.2	60	e10	3700	9.9	41	76	201	39	39	9.4	12
19	8.8	100	e9.0	1940	9.7	108	69	113	40	29	7.7	12
20	9.4	67	e8.0	512	61	908	87	80	59	19	6.9	10
21	8.6	49	e7.0	183	337	322	133	66	41	12	6.6	12
22	12	38	e6.0	117	206	202	72	57	37	11	6.5	12
23	13	29	e5.6	147	151	173	933	47	30	9.0	9.1	9.2
24	10	23	e5.2	1120	168	287	1840	48	72	8.2	19	13
25	8.5	18	e4.7	486	112	461	376	46	141	13	25	11
26	7.7	17	e4.4	168	133	195	202	42	52	8.1	12	11
27	10	19	e4.2	355	885	97	132	56	35	7.1	8.2	26
28	13	25	e4.0	181	1400	75	95	129	28	7.0	6.8	412
29	12	25	e3.9	e80	320	69	334	114	24	21	6.1	279
30	11	23	e3.8	e50	---	61	1470	87	21	71	5.4	69
31	19	---	e3.7	e35	---	80	---	55	---	100	4.8	---
TOTAL	603.5	2958	298.1	10302	4309.6	4969	9025	5873	4342	577.8	361.6	1076.7
MEAN	19.5	98.6	9.62	332	149	160	301	189	145	18.6	11.7	35.9
MAX	146	898	33	3700	1400	908	1840	802	1320	100	43	412
MIN	4.6	15	3.7	13	9.7	33	32	42	21	6.3	4.8	4.2
CFSM	.22	1.11	.11	3.74	1.67	1.81	3.39	2.13	1.63	.21	.13	.40
IN.	.25	1.24	.12	4.32	1.81	2.08	3.78	2.46	1.82	.24	.15	.40

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	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	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2
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## WATER YEARS 1925 - 1996

ANNUAL TOTAL	44696.3			
ANNUAL MEAN	122		87.8	
HIGHEST ANNUAL MEAN			145	1973
LOWEST ANNUAL MEAN			20.4	1934
HIGHEST DAILY MEAN	3700	Jan 18	4600	Dec 14 1927
LOWEST DAILY MEAN	3.7	Dec 31	.34	Sep 30 1995
ANNUAL SEVEN-DAY MINIMUM	4.1	Dec 25	.36	Sep 24 1995
INSTANTANEOUS PEAK FLOW	4550	Jan 18 a	5800	Dec 14 1927
INSTANTANEOUS PEAK STAGE	9.15	Jan 18	9.83	Dec 14 1977
INSTANTANEOUS LOW FLOW	3.7	Dec 31	.60	Sep 28 1947
ANNUAL RUNOFF (CFSM)	1.38		.99	
ANNUAL RUNOFF (INCHES)	18.72		13.44	
10 PERCENT EXCEEDS	266		194	
50 PERCENT EXCEEDS	30		21	
90 PERCENT EXCEEDS	6.7		2.9	

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated



## STREAMS TRIBUTARY TO LAKE ERIE

## 04196800 TYMOCHTEE CREEK AT CRAWFORD, OH

LOCATION.--Lat 40°55'22", long 83°20'56", in SE 1/4 sec. 27, T.1 S., R.13 E., Wyandot County, Hydrologic Unit 04100011, on right bank at downstream side of bridge on State Highway 199 (formerly U.S. Highway 23), 0.4 mi northwest of Crawford, 1.5 mi downstream from Lick Run, 2.7 mi upstream from Little Tymochtee Creek, and 3 mi southeast of Carey.

DRAINAGE AREA.--229 mi<sup>2</sup>.

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1961-63, and annual maximum, water years 1961-64, June 1964 to current year.

REVISED RECORDS.--WRD Ohio 1969: 1964(P), 1966(M), 1967(P).

GAGE.--Water-stage recorder. Datum of gage is 785.86 ft above sea level.

REMARKS.--Records good, except those for estimated periods, which are poor. Beginning Mar. 9, 1972 water is diverted at a point 29.4 mi upstream from station into Killdeer Reservoir. Storage is available for low-flow augmentation. During the year, withdrawals totaled 22.4 mil gal, equivalent to a mean annual withdrawal of 0.09 ft<sup>3</sup>/s. During the year, releases totaled 516.0 mil gal, equivalent to a mean annual release of 2.18 ft<sup>3</sup>/s. Water-quality and sediment data collected at this site.

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	.88	12	22	e12	e120	1520	136	2360	253	21	282	3.2
2	1.6	13	19	e18	e100	479	131	2030	166	18	153	2.7
3	2.6	11	17	e30	e80	278	202	826	122	16	76	2.0
4	4.0	11	17	e60	e70	189	185	399	630	15	43	1.9
5	9.9	45	17	e100	e64	169	148	337	1080	14	27	1.5
6	72	42	15	e50	62	392	121	529	815	12	19	1.2
7	150	38	e13	e45	57	589	102	750	1230	11	15	1.1
8	141	36	e12	e35	59	335	91	421	1030	9.6	13	1.1
9	73	59	e11	e31	76	e150	82	814	815	9.6	11	.94
10	36	69	e10	e28	87	e110	75	1350	510	9.0	8.3	.86
11	20	146	e9.0	e26	e120	e90	70	1370	350	7.2	6.5	.68
12	16	602	e8.0	e25	e100	80	67	1220	234	6.4	5.8	.83
13	15	764	e7.6	e23	e60	78	63	957	176	7.1	5.7	1.6
14	11	362	e8.6	e22	e50	105	45	466	147	6.3	5.7	1.4
15	8.1	174	9.4	e20	e45	168	39	306	127	12	5.1	1.1
16	6.1	115	12	e20	e37	205	39	521	98	19	3.9	1.8
17	4.6	80	17	e240	e32	186	44	746	78	16	3.4	3.3
18	3.2	69	25	e1000	e29	144	55	450	68	27	3.4	2.8
19	2.7	166	e23	e2500	27	171	72	293	143	211	3.4	2.2
20	2.5	245	e21	4600	27	932	82	203	109	419	3.5	1.9
21	3.3	154	e20	e2500	53	1390	182	149	89	174	5.4	1.9
22	5.0	108	e18	e900	90	1380	272	115	76	74	5.5	3.0
23	5.2	79	e16	519	133	709	582	103	54	44	4.5	2.8
24	4.2	56	e15	900	201	583	1720	84	38	33	4.2	2.7
25	3.7	44	e15	1350	240	562	2880	122	29	21	3.4	2.5
26	3.1	37	e14	1580	311	420	1450	493	48	14	7.8	2.3
27	3.7	33	e14	737	1010	272	552	311	74	9.7	19	2.7
28	4.0	28	e13	532	2710	195	343	580	45	8.1	10	17
29	3.8	26	e12	317	3180	172	496	1010	30	61	6.6	128
30	8.2	25	e11	e180	---	159	1580	1350	26	126	5.3	207
31	14	---	e11	e150	---	150	---	595	---	138	4.2	---
TOTAL	638.38	3649	452.6	18550	9230	12362	11906	21260	8690	1569.0	769.6	404.01
MEAN	20.6	122	14.6	598	318	399	397	686	290	50.6	24.8	13.5
MAX	150	764	25	4600	3180	1520	2880	2360	1230	419	282	207
MIN	.88	11	7.6	12	27	78	39	84	26	6.3	3.4	.68

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 1996, BY WATER YEAR (WY)

	MEAN	33.2	152	226	233	306	414	338	213	135	118	32.2	34.1
MAX	278	844	1104	777	823	1392	946	686	780	741	201	370	
(WY)	1987	1993	1991	1974	1975	1978	1972	1996	1981	1992	1992	1981	
MIN	.084	.86	1.78	1.65	37.2	35.1	32.8	11.7	1.78	1.04	.48	.27	
(WY)	1965	1992	1992	1977	1972	1983	1971	1988	1988	1965	1965	1964	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1964 - 1996
ANNUAL TOTAL	68342.40	89480.59	
ANNUAL MEAN	187	244	186
HIGHEST ANNUAL MEAN			330
LOWEST ANNUAL MEAN			72.2
HIGHEST DAILY MEAN	2870	4600	6280
LOWEST DAILY MEAN	.87	.68	.00
ANNUAL SEVEN-DAY MINIMUM	1.2	.96	.00
INSTANTANEOUS PEAK FLOW		4830	6700
INSTANTANEOUS PEAK STAGE		8.79	11.21
INSTANTANEOUS LOW FLOW		.68	.00
10 PERCENT EXCEEDS	568	747	511
50 PERCENT EXCEEDS	37	51	33
90 PERCENT EXCEEDS	3.0	3.4	1.4

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.

b Ice jam

e Estimated

# STREAMS TRIBUTARY TO LAKE ERIE

61

## 04197100 HONEY CREEK AT MELMORE, OH

LOCATION.--Lat 41°01'20", long 83°06'35", Seneca County, Hydrologic Unit 04100011, at bridge on State Highways 67 and 100 at Melmore, 1.5 mi upstream from Buckeye Creek.

DRAINAGE AREA.--149 mi<sup>2</sup>.

PERIOD OF RECORD.--Annual maximum, water years 1961-75, February 1976 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 818 ft above sea level from topographic map.

REMARKS.--Records good except those for estimated daily discharges which are poor. Water-quality data collected at this site.

### 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	.55	8.9	19	e11	e58	e450	130	1080	32	15	63	1.4
2	.49	11	16	e20	e50	e170	508	590	32	14	40	1.4
3	.70	11	16	e27	e43	e100	506	318	42	12	27	1.2
4	.80	13	15	e23	e38	e85	301	241	69	11	16	1.2
5	4.5	20	14	e19	e35	130	184	210	167	9.2	9.9	1.0
6	25	18	e12	e17	e32	432	131	235	120	8.2	6.7	1.0
7	77	19	e9.6	e15	e30	e270	102	187	1210	7.0	5.3	1.4
8	56	16	e8.0	e14	e54	e150	81	131	990	6.2	4.2	1.5
9	33	26	e7.0	e13	e120	e100	67	275	526	5.8	3.4	2.1
10	20	25	e6.0	e12	e92	e70	58	635	314	5.8	2.9	2.4
11	7.2	89	e5.6	e11	e100	e60	51	1210	207	5.8	2.7	2.5
12	3.1	366	e5.2	e10	e50	e56	47	1270	127	5.2	2.4	3.0
13	1.9	402	e7.0	e9.5	e40	80	44	707	88	4.6	2.3	2.7
14	1.6	172	e10	e9.0	e33	126	44	328	71	4.8	2.1	2.0
15	1.9	95	e12	e10	e29	224	42	194	54	13	1.9	2.7
16	2.1	67	e20	e30	e25	201	44	150	45	11	1.9	3.1
17	2.4	50	e17	e350	e22	129	52	318	37	12	1.9	2.7
18	3.6	42	e15	e1700	e20	93	53	308	48	13	2.0	1.9
19	3.4	63	e14	2830	e18	170	49	171	164	10	2.0	1.1
20	3.7	106	e12	e1200	e31	1030	50	110	248	11	2.0	.93
21	4.7	81	e11	e650	131	1040	50	79	144	12	2.1	1.1
22	5.9	61	e10	e300	167	584	51	61	86	9.1	2.1	1.6
23	5.4	48	e9.0	e230	133	381	985	50	59	6.8	2.0	1.9
24	4.5	39	e8.4	662	158	531	1870	44	44	5.2	1.8	1.3
25	4.0	32	e7.8	756	161	909	1160	40	35	4.8	1.5	1.5
26	3.5	27	e7.4	e400	132	606	555	37	33	4.2	1.4	1.3
27	5.5	25	e7.0	e190	837	284	309	39	29	3.9	1.4	2.5
28	6.2	23	e6.6	e120	2020	166	195	48	23	3.7	2.2	22
29	5.8	22	e6.2	e90	1320	122	157	60	20	5.1	1.7	56
30	5.1	20	e6.2	e76	---	101	941	48	17	13	1.6	39
31	6.7	---	e6.0	e66	---	86	---	39	---	38	1.5	---
TOTAL	306.24	1997.9	326.0	9870.5	5979	8936	8817	9213	5081	290.4	218.9	165.43
MEAN	9.88	66.6	10.5	318	206	288	294	297	169	9.37	7.06	5.51
MAX	77	402	20	2830	2020	1040	1870	1270	1210	38	63	56
MIN	.49	8.9	5.2	9.0	18	56	42	37	17	3.7	1.4	.93
CFSM	.07	.45	.07	2.14	1.38	1.93	1.97	1.99	1.14	.06	.05	.04
IN.	.08	.50	.08	2.46	1.49	2.23	2.20	2.30	1.27	.07	.05	.04

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 1996, BY WATER YEAR (WY)

	MEAN	32.8	117	160	145	222	283	256	112	107	70.8	30.5	36.8
MAX	186	550	518	465	528	765	540	314	740	373	125	242	
(WY)	1991	1993	1978	1993	1990	1978	1979	1983	1981	1992	1990	1981	
MIN	.71	2.51	1.98	1.31	65.6	40.4	77.5	8.69	1.05	.46	1.52	.84	
(WY)	1989	1995	1977	1977	1978	1981	1991	1988	1988	1988	1993	1995	

### SUMMARY STATISTICS

#### FOR 1995 CALENDAR YEAR

#### FOR 1996 WATER YEAR

#### WATER YEARS 1977 - 1996

ANNUAL TOTAL	43382.03	51201.37	
ANNUAL MEAN	119	140	130
HIGHEST ANNUAL MEAN			189
LOWEST ANNUAL MEAN			48.1
HIGHEST DAILY MEAN	1650	2830	4000
LOWEST DAILY MEAN	.49	.49	.07
ANNUAL SEVEN-DAY MINIMUM	.62	1.2	.09
INSTANTANEOUS PEAK FLOW		3110	4440
INSTANTANEOUS PEAK STAGE		9.55	11.00
INSTANTANEOUS LOW FLOW		.49	.07
ANNUAL RUNOFF (CFSM)	.80	.94	.88
ANNUAL RUNOFF (INCHES)	10.83	12.78	11.89
10 PERCENT EXCEEDS	361	370	350
50 PERCENT EXCEEDS	26	28	30
90 PERCENT EXCEEDS	1.3	2.0	1.8

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

## 04197170 ROCK CREEK AT TIFFIN, OH

LOCATION.--Lat 41°06'49", long 83°10'06", Seneca County, Hydrologic Unit 04100011, on left bank 0.05 mi downstream from bridge on Rebecca Street, at Heidelberg College, Tiffin, Ohio.

DRAINAGE AREA.--34.6 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 740 ft above sea level, from topographic map.

REMARKS.--Records fair except those for estimated record, which are poor.

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	.64	3.0	4.8	e2.2	e7.6	e30	20	133	7.4	4.0	2.6	1.2
2	.79	4.5	4.8	e3.5	e7.0	e18	48	80	7.8	3.6	2.2	1.2
3	e1.4	2.9	4.7	e6.8	e6.6	e15	25	39	7.8	3.4	2.0	1.2
4	e1.1	2.6	4.5	e5.8	e6.2	e13	17	44	13	3.3	1.8	1.4
5	6.9	2.7	e4.1	e4.9	e5.8	e23	13	50	11	3.1	1.8	1.4
6	8.8	2.8	e3.7	e4.1	e5.4	97	12	58	9.1	3.1	1.7	1.4
7	3.1	8.6	e3.4	e3.6	e5.2	40	11	32	326	3.1	1.7	1.8
8	1.6	6.2	e3.2	e3.3	e12	e23	9.9	21	190	3.0	1.7	1.7
9	1.1	3.2	e2.9	e3.0	e28	e15	8.8	167	40	2.8	1.6	2.0
10	.91	3.3	e2.7	e2.7	e20	e10	8.0	277	25	2.6	1.6	1.6
11	.81	55	e2.5	e2.5	e23	e6.6	7.6	698	17	2.6	1.5	1.4
12	1.0	86	e2.3	e2.4	e15	e7.6	7.5	193	16	2.5	1.4	1.6
13	.70	29	e2.6	e2.3	e7.9	13	7.5	57	12	2.6	1.5	1.4
14	.62	12	e3.6	e2.1	e6.0	27	7.7	33	10	2.9	1.6	1.5
15	.71	7.8	e5.6	e2.3	e5.0	53	8.1	25	8.6	5.5	1.5	1.5
16	.92	6.3	e4.8	e4.0	e4.1	35	9.8	25	7.1	4.1	1.4	1.8
17	.93	5.7	e4.1	249	e3.8	20	13	290	7.3	3.0	1.4	1.7
18	.95	6.0	e3.7	961	e3.4	15	10	106	20	4.0	1.4	1.4
19	.94	9.0	e3.3	648	e3.2	57	8.7	35	131	3.4	1.3	1.4
20	1.0	9.4	e2.9	194	e5.8	468	22	21	50	2.8	1.4	1.3
21	1.0	8.1	e2.6	52	23	124	27	15	16	2.4	1.3	1.8
22	1.1	6.5	e2.4	24	21	84	25	12	10	2.5	1.3	2.0
23	1.1	5.8	e2.1	19	16	67	686	10	7.9	2.5	1.1	1.3
24	1.1	5.2	e2.0	221	23	176	473	10	7.3	2.4	1.7	1.2
25	1.2	4.8	e1.9	e70	19	347	74	9.8	6.2	2.3	1.5	1.3
26	1.0	4.8	e1.7	e25	18	79	47	8.9	5.5	2.1	.94	1.1
27	2.2	4.7	e1.6	e18	489	30	33	10	5.1	2.1	.74	3.2
28	2.1	4.8	e1.5	e13	935	21	24	13	4.8	2.1	.99	5.7
29	1.9	4.8	e1.5	e10	104	19	24	11	4.5	2.2	1.2	1.6
30	2.0	4.5	e1.4	e9.0	---	17	391	9.3	4.3	4.1	1.4	1.4
31	2.6	---	e1.4	e8.0	---	15	---	8.1	---	3.1	1.2	---
TOTAL	52.22	320.0	94.3	2576.5	1829.0	1965.2	2078.6	2501.1	987.7	93.2	46.47	50.5
MEAN	1.68	10.7	3.04	83.1	63.1	63.4	69.3	80.7	32.9	3.01	1.50	1.68
MAX	8.8	86	5.6	961	935	468	686	698	326	5.5	2.6	5.7
MIN	.62	2.6	1.4	2.1	3.2	6.6	7.5	8.1	4.3	2.1	.74	1.1
CFSM	.05	.31	.09	2.40	1.82	1.83	2.00	2.33	.95	.09	.04	.05
IN.	.06	.34	.10	2.77	1.97	2.11	2.23	2.69	1.06	.10	.05	.05

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1996, BY WATER YEAR (WY)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	11.5	36.6	38.0	37.8	57.4	50.2	56.2	26.8	15.0	14.2	5.91	12.7	
MAX	50.3	145	172	98.5	122	138	92.6	82.3	36.8	82.0	28.1	99.5	
(WY)	1991	1993	1991	1993	1990	1984	1994	1989	1993	1992	1990	1992	
MIN	1.28	2.09	2.09	10.2	13.0	13.6	17.9	2.29	1.12	.55	1.37	.83	
(WY)	1989	1995	1992	1992	1993	1989	1988	1988	1988	1988	1991	1995	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1984 - 1996
ANNUAL TOTAL	8377.86	12594.79	
ANNUAL MEAN	23.0	34.4	30.0
HIGHEST ANNUAL MEAN			48.2
LOWEST ANNUAL MEAN			11.6
HIGHEST DAILY MEAN	708	961	1440
LOWEST DAILY MEAN	.57	.62	.32
ANNUAL SEVEN-DAY MINIMUM	.64	.81	.38
INSTANTANEOUS PEAK FLOW		1400	1850
INSTANTANEOUS PEAK STAGE		7.46	8.05
INSTANTANEOUS LOW FLOW		.62	.32
ANNUAL RUNOFF (CFSM)	.66	.99	.87
ANNUAL RUNOFF (INCHES)	9.01	13.54	11.78
10 PERCENT EXCEEDS	41	56	58
50 PERCENT EXCEEDS	4.5	4.8	6.4
90 PERCENT EXCEEDS	.93	1.3	1.4

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04198000 SANDUSKY RIVER NEAR FREMONT, OH

LOCATION.--Lat 41°18'28", long 83°09'32", in sec. 17, T.4 N., R.15 E., Sandusky County, Hydrologic Unit 04100011, on left bank at downstream side of county road bridge, 2.3 mi upstream from Ballville diversion dam, 2.5 mi downstream from Wolf Creek, and 3.5 mi southwest of Fremont.

DRAINAGE AREA.--1,251 mi<sup>2</sup>.

### WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--November 1898 to March 1901 (gage height and discharge measurements only, published as "at Fremont"), October 1923 to December 1935, July 1938 to current year. Monthly discharge only for October 1923, published in WSP 1307.

REVISED RECORDS.--WSP 744: 1931-32. WSP 874: 1938. WSP 1144: 1924-30. WSP 1387: 1925, 1928-29, 1931-35. WSP 1912: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 626.3 ft above sea level. Nov. 18, 1898, to Mar. 10, 1901, nonrecording gage at site 4 mi downstream at different datum. Nov. 8, 1923, to Sept. 5, 1930, nonrecording gage at present site and datum.

REMARKS.--Records good except for periods of estimated daily discharge which are poor. Water-quality data collected at this site.

### 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	32	68	230	e110	e560	8130	878	9550	1200	230	1630	48
2	29	85	218	e150	e450	4420	1620	8320	726	207	1120	43
3	32	199	209	e190	e370	1740	3120	5920	589	185	655	39
4	48	225	204	e250	e300	1070	2230	3010	653	164	412	37
5	84	200	201	e200	e250	891	1470	2200	2130	148	276	36
6	782	181	192	e160	e220	2030	1040	2250	2730	130	201	36
7	895	297	173	e150	e190	e2300	859	2570	4900	122	149	39
8	785	532	e140	e130	e350	e2000	738	2270	7310	115	122	40
9	533	401	e130	e120	e560	e1300	641	2410	5210	107	107	39
10	349	337	e110	e115	e640	e920	566	6200	3530	101	94	45
11	242	837	e100	e105	e740	e750	503	11300	2290	96	86	43
12	175	3730	e90	e100	e880	e660	468	10200	1640	95	79	44
13	123	4400	e81	e94	e700	629	449	6770	1280	92	78	48
14	95	3100	e140	e88	e510	687	441	3880	1110	92	74	51
15	79	1510	e270	e84	e400	1010	434	2100	947	129	64	51
16	69	869	e480	e90	e350	1300	442	1690	689	181	61	53
17	62	635	e370	e500	e320	1160	462	4280	561	203	56	57
18	55	534	e310	e3000	e300	931	506	4030	756	196	53	54
19	54	592	e270	15700	e280	825	557	2460	1200	200	52	50
20	54	862	e230	e13000	e270	5680	587	1540	1040	354	58	49
21	57	964	e210	e11000	e260	7000	722	1100	772	606	62	48
22	55	718	e190	9650	e500	5560	962	840	702	399	58	64
23	51	550	e180	4430	1380	4090	4170	688	547	258	54	58
24	50	448	e165	4780	1220	3920	11700	594	482	193	52	51
25	50	378	e160	e5600	1270	5200	9560	540	487	156	50	48
26	50	326	e150	e4300	1190	3680	8570	544	426	129	47	43
27	52	299	e140	e2600	4210	2260	5170	892	525	110	45	45
28	68	277	e135	e1900	14300	1430	2290	958	e423	103	45	162
29	68	256	e130	e1400	11100	1060	1660	1590	330	103	55	345
30	63	240	e120	e1000	---	894	6560	2210	267	1020	62	781
31	62	---	e115	e700	---	803	---	2110	---	2220	54	---
TOTAL	5203	24050	5843	81696	44070	74330	69375	105016	45452	8444	6011	2547
MEAN	168	802	188	2635	1520	2398	2312	3388	1515	272	194	84.9
MAX	895	4400	480	15700	14300	8130	11700	11300	7310	2220	1630	781
MIN	29	68	81	84	190	629	434	540	267	92	45	36
CFSM	.13	.64	.15	2.11	1.21	1.92	1.85	2.71	1.21	.22	.15	.07
IN.	.15	.72	.17	2.43	1.31	2.21	2.06	3.12	1.35	.25	.18	.08

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 1996, BY WATER YEAR (WY)

	MEAN	227	596	1071	1555	1917	2331	1840	1051	777	453	211	258
MAX	2521	4413	5495	7659	7504	8261	5524	3654	6091	3479	1660	3713	
(WY)	1927	1993	1991	1930	1984	1978	1957	1969	1981	1992	1958	1981	
MIN	9.94	25.4	32.6	53.5	60.3	319	144	100	43.4	30.9	22.4	13.5	
(WY)	1964	1954	1964	1961	1964	1941	1946	1941	1988	1934	1952	1953	

### SUMMARY STATISTICS

	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1924 - 1996
ANNUAL TOTAL	373811	472037	
ANNUAL MEAN	1024	1290	1019
HIGHEST ANNUAL MEAN			2167
LOWEST ANNUAL MEAN			275
HIGHEST DAILY MEAN	11600	Apr 22	36000
LOWEST DAILY MEAN	29	Oct 2	5.0
ANNUAL SEVEN-DAY MINIMUM	34	Sep 27	6.3
INSTANTANEOUS PEAK FLOW			16300
INSTANTANEOUS PEAK STAGE		8.07	Jan 19 a
INSTANTANEOUS LOW FLOW		29	Oct 2
ANNUAL RUNOFF (CFSM)	.82	1.03	.81
ANNUAL RUNOFF (INCHES)	11.12	14.04	11.07
10 PERCENT EXCEEDS	2630	4050	2720
50 PERCENT EXCEEDS	329	374	270
90 PERCENT EXCEEDS	52	52	39

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated



## STREAMS TRIBUTARY TO LAKE ERIE

04198000 SANDUSKY RIVER NEAR FREMONT, OH--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1951-56, 1978 to current year.

PERIOD OF DAILY RECORD.--

CHLORIDE: February 1988 to September 1994.

NITROGEN, NITRITE + NITRATE: February 1988 to September 1994.

NITROGEN, AMMONIA + ORGANIC: February 1988 to September 1994.

PHOSPHORUS: February 1988 to September 1994.

SUSPENDED SEDIMENT DISCHARGE: Water years 1951-1956, 1978 to current year.

INSTRUMENTATION.--Refrigerated water-quality pumping sampler, operated by Heidelberg College Water Quality Laboratory, from February 1988 to September 1994.

REMARKS.--Sediment samples were collected by a local observer on an approximate once daily basis. Sediment loads were calculated using the mean-interval method (Porterfield, George, 1972, Computation of Fluvial-Sediment Discharge: U.S. Geological Survey, Techniques of Water Resources Investigations, Book 3, Chap. C3, 66 p.). For days with unsteady concentration, discharge, or both, the day was sub-divided into half-hour intervals and the daily load was calculated by summing the loads for these half-hour intervals. This required interpolation between measured and estimated concentrations.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 2,420 mg/L, Jun. 9, 1981; minimum daily mean, 1 mg/L, on many days during 1951-56, 1980, 1981, 1988, 1992.

SEDIMENT LOADS: Maximum daily, 124,000 tons, Jun. 14, 1981; minimum daily, less than 0.05 ton, on several days during 1952, 1954, 1989.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 817 mg/L, Feb. 28; minimum daily mean, 7 mg/L, Feb. 21.

SEDIMENT LOADS: Maximum daily, 31,200 tons, Feb. 28; minimum daily, .82 ton, Sep. 4.

# STREAMS TRIBUTARY TO LAKE ERIE

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04198000 SANDUSKY RIVER NEAR FREMONT, OH--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	SAM- PLING METHOD, CODES* (82398)	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 AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)
NOV							
08...	1615	10	550	784	7.9	4.0	6.0
08...	1740	50	542	--	--	--	--
MAY							
30...	1615	10	2370	470	--	22.0	15.0
JUN							
06...	1240	10	2720	395	7.8	19.0	16.0
06...	1345	50	2680	--	--	--	--
28...	1300	10	417	638	8.2	33.5	25.5
28...	1415	50	417	--	--	--	--

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDIMENT PARTICLE SIZE <.0625MM SILTCLAY (PERCENT) (80250)
NOV						
08...	65	3.7	0.9	0.22	42	87.4
08...	73	5.1	0.9	0.24	--	--
MAY						
30...	--	--	--	--	281	97.7
JUN						
06...	19	7.4	1.3	0.22	665	--
06...	20	6.9	1.2	0.25	--	--
28...	28	5.6	0.9	0.18	88	--
28...	30	5.7	1.0	0.15	--	--

\*10 - Stream cross-section sample using equal-width-increment (EWI) sampling method.

\*50 - Point sample obtained from flow tank.

## STREAMS TRIBUTARY TO LAKE ERIE

04198000 SANDUSKY RIVER NEAR FREMONT, OH--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
OCTOBER			NOVEMBER			DECEMBER			
1	32	19	1.6	68	11	2.0	230	16	10
2	29	12	.95	85	11	2.4	218	21	12
3	32	11	.96	199	18	10	209	29	17
4	48	13	1.7	225	18	11	204	39	22
5	84	19	5.9	200	16	8.8	201	37	20
6	782	98	215	181	14	7.1	192	32	17
7	895	83	201	297	39	36	173	28	13
8	785	64	136	532	58	85	e140	24	9.2
9	533	51	74	401	41	45	e130	21	7.4
10	349	41	39	337	37	34	e110	18	5.4
11	242	35	23	837	82	241	e100	16	4.3
12	175	27	13	3730	263	2790	e90	14	3.4
13	123	20	6.8	4400	390	4640	e81	13	2.8
14	95	15	3.9	3100	194	1670	e140	19	7.2
15	79	12	2.5	1510	153	630	e270	30	22
16	69	11	2.0	869	107	255	e480	42	55
17	62	11	1.9	635	70	121	e370	42	42
18	55	11	1.6	534	44	64	e310	39	33
19	54	10	1.4	592	22	36	e270	36	26
20	54	9	1.3	862	27	64	e230	34	21
21	57	9	1.3	964	30	77	e210	31	18
22	55	8	1.2	718	27	52	e190	29	15
23	51	11	1.6	550	24	36	e180	27	13
24	50	13	1.8	448	22	27	e165	25	11
25	50	14	1.9	378	20	21	e160	23	10
26	50	13	1.8	326	19	16	e150	22	8.8
27	52	12	1.7	299	17	14	e140	20	7.6
28	68	12	2.2	277	16	12	e135	19	6.8
29	68	12	2.2	256	14	9.9	e130	17	6.1
30	63	12	2.0	240	15	9.6	e120	16	5.3
31	62	11	1.9	---	---	---	e115	15	4.7
TOTAL	5203	---	753.11	24050	---	11026.8	5843	---	456.0

e Estimated

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JANUARY			FEBRUARY			MARCH			
1	e110	14	4.3	e560	54	82	8130	268	5940
2	e150	17	6.7	e450	44	54	4420	184	2260
3	e190	20	10	e370	36	36	1740	126	606
4	e250	22	15	e300	30	24	1070	87	254
5	e200	22	12	e250	24	16	891	60	144
6	e160	21	8.9	e220	20	12	2030	102	599
7	e150	20	7.9	e190	17	8.7	e2300	121	751
8	e130	19	6.5	e350	21	20	e2000	99	533
9	e120	18	5.7	e560	28	43	e1300	81	283
10	e115	17	5.2	e640	37	64	e920	66	163
11	e105	16	4.5	e740	49	98	e750	54	109
12	e100	15	4.0	e880	59	141	e660	43	77
13	e94	14	3.6	e700	46	86	629	30	51
14	e88	13	3.2	e510	32	44	687	28	52
15	e84	13	2.9	e400	23	24	1010	35	96
16	e90	14	3.5	e350	16	15	1300	40	140
17	e500	41	56	e320	13	12	1160	39	122
18	e3000	123	997	e300	12	9.6	931	36	91
19	15700	308	13200	e280	10	7.9	825	37	86
20	e13000	303	10600	e270	9	6.7	5680	344	6380
21	e11000	209	6200	e260	7	5.0	7000	462	8800
22	9650	143	3790	e500	14	18	5560	256	3890
23	4430	101	1240	1380	23	84	4090	140	1580
24	4780	144	2060	1220	31	102	3920	110	1180
25	e5600	225	3400	1270	40	136	5200	175	2470
26	e4300	184	2130	1190	34	108	3680	126	1270
27	e2600	150	1050	4210	347	7560	2260	85	525
28	e1900	122	628	14300	817	31200	1430	60	235
29	e1400	100	378	11100	405	12400	1060	45	129
30	e1000	82	220	---	---	---	894	41	99
31	e700	67	126	---	---	---	803	36	79
TOTAL	81696	---	46178.9	44070	---	52416.9	74330	---	38994

e Estimated

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04198000 SANDUSKY RIVER NEAR FREMONT, OH--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
APRIL			MAY			JUNE			
1	878	30	72	9550	398	10400	1200	208	686
2	1620	53	290	8320	278	6280	726	147	290
3	3120	366	3100	5920	200	3250	589	116	184
4	2230	232	1420	3010	141	1170	653	132	245
5	1470	123	501	2200	102	608	2130	581	3730
6	1040	68	194	2250	122	761	2730	665	4930
7	859	46	108	2570	145	1010	4900	622	8860
8	738	32	64	2270	108	665	7310	607	12100
9	641	23	39	2410	203	1570	5210	386	5480
10	566	22	33	6200	732	12500	3530	281	2720
11	503	23	31	11300	714	21300	2290	197	1230
12	468	24	30	10200	433	12200	1640	151	671
13	449	22	26	6770	286	5290	1280	125	434
14	441	19	23	3880	200	2140	1110	104	312
15	434	26	30	2100	140	806	947	86	222
16	442	27	32	1690	103	474	689	73	135
17	462	23	29	4280	298	3690	561	61	92
18	506	26	36	4030	302	3320	756	89	188
19	557	29	43	2460	197	1330	1200	165	542
20	587	30	47	1540	128	541	1040	142	399
21	722	36	70	1100	84	251	772	133	278
22	962	56	155	840	67	152	702	127	240
23	4170	216	3250	688	59	110	547	120	178
24	11700	460	14600	594	53	85	482	113	147
25	9560	311	8050	540	47	69	487	111	146
26	8570	210	4890	544	43	64	426	107	123
27	5170	142	2040	892	68	163	525	102	145
28	2290	96	603	958	64	171	e423	97	111
29	1660	71	322	1590	136	580	330	89	79
30	6560	337	7240	2210	204	1240	267	82	59
31	---	---	---	2110	237	1360	---	---	---
TOTAL	69375	---	47368	105016	---	93550	45452	---	44956

e Estimated

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JULY			AUGUST			SEPTEMBER			
1	230	75	47	1630	270	1200	48	12	1.6
2	207	69	39	1120	180	557	43	12	1.4
3	185	62	31	655	130	232	39	9	.96
4	164	54	24	412	105	118	37	8	.82
5	148	45	18	276	93	70	36	9	.85
6	130	37	13	201	78	43	36	9	.90
7	122	42	14	149	64	26	39	10	1.0
8	115	33	10	122	52	17	40	10	1.1
9	107	23	6.6	107	43	12	39	10	1.1
10	101	17	4.5	94	41	10	45	10	1.2
11	96	15	3.8	86	42	9.6	43	10	1.2
12	95	14	3.6	79	41	8.7	44	10	1.2
13	92	13	3.3	78	36	7.6	48	10	1.3
14	92	13	3.2	74	32	6.4	51	10	1.4
15	129	47	18	64	29	5.1	51	10	1.4
16	181	84	41	61	27	4.4	53	10	1.4
17	203	63	35	56	25	3.8	57	12	1.9
18	196	68	36	53	24	3.5	54	13	1.9
19	200	57	31	52	23	3.3	50	13	1.7
20	354	70	75	58	22	3.5	49	13	1.7
21	606	119	196	62	21	3.6	48	13	1.7
22	399	93	101	58	19	3.0	64	13	2.2
23	258	77	54	54	16	2.4	58	13	2.0
24	193	67	35	52	14	1.9	51	13	1.8
25	156	59	25	50	13	1.8	48	13	1.7
26	129	51	18	47	12	1.6	43	13	1.5
27	110	45	13	45	11	1.4	45	13	1.6
28	103	39	11	45	13	1.5	162	42	22
29	103	34	9.5	55	16	2.4	345	54	53
30	1020	169	892	62	16	2.6	781	110	239
31	2220	441	2650	54	14	2.1	---	---	---
TOTAL	8444	---	4461.5	6011	---	2365.2	2547	---	352.53
YEAR	472037		342878.94						



## STREAMS TRIBUTARY TO LAKE ERIE

## 04199000 HURON RIVER AT MILAN, OH

LOCATION.--Lat 41°18'04", long 82°36'36, in SW 1/4 sec. 4, T.5 N., R.22 W., Erie County, Hydrologic Unit 04100012, on right bank on upstream side of bridge on U.S. Highway 250, 0.2 mi northwest of Milan and 2.0 mi downstream from confluence of East and West Branches.

DRAINAGE AREA.--371 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1950 to September 1980, October 1987 to current year.

REVISED RECORDS.--WSP 1912: Drainage area. WDR OH-89-2: 1988.

GAGE.--Water-stage recorder. Datum of gage is 573.26 ft above sea level. July 29, 1953 to Oct. 5, 1979, water-stage recorder at site of former highway bridge 500 ft downstream at same datum. July 29, 1953, nonrecording gage at site of former highway 450 ft downstream at same datum.

REMARKS.--Records fair, except for periods of estimated record, which are poor. Water-quality and sediment data collected at this site.

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	8.5	24	54	e30	e56	633	1350	1790	48	38	56	9.0
2	9.0	38	51	e50	e50	e350	1950	1050	51	35	48	9.0
3	21	83	48	e70	e45	e280	928	550	50	31	41	9.0
4	35	63	45	e86	e43	e250	574	566	67	24	34	9.2
5	113	52	43	e70	e41	e300	457	580	120	24	29	8.8
6	552	43	39	e54	e39	1290	381	552	103	22	26	8.7
7	317	150	e35	e45	e37	633	320	394	2480	20	22	166
8	124	218	e30	e38	e45	e250	272	292	1250	19	19	64
9	72	120	e28	e33	e70	e170	238	1540	942	18	17	56
10	53	81	e26	e29	e110	e150	213	2320	848	18	15	40
11	37	947	e25	e26	e230	e130	173	5910	481	16	14	31
12	32	1410	e26	e24	e200	e115	150	2930	591	15	16	44
13	28	469	e40	e22	e160	e110	162	1060	411	14	15	41
14	26	262	e90	e20	e120	424	158	534	246	15	17	47
15	25	184	e140	e19	e88	586	155	380	157	39	15	39
16	25	134	e115	e18	e72	426	194	349	120	36	14	34
17	23	94	e90	e150	e62	275	218	1480	83	36	16	40
18	22	96	e78	e1000	e56	218	191	816	99	28	13	70
19	22	169	e66	e800	e50	327	169	387	1080	27	13	61
20	23	197	e56	e600	e70	3520	379	277	556	31	13	48
21	26	135	e50	e450	e410	1630	277	213	254	27	13	42
22	25	104	e45	e370	e340	1130	318	166	139	23	14	56
23	25	88	e40	e350	e280	909	4500	123	93	20	13	59
24	25	71	e37	e900	e380	1680	5650	89	136	19	12	50
25	21	64	e35	e700	333	3790	1540	79	109	19	11	39
26	20	62	e32	e450	255	1340	756	73	75	17	13	32
27	22	62	e30	e250	2400	582	499	83	60	16	11	37
28	25	57	e28	e150	6530	421	357	99	53	16	9.8	989
29	22	54	e27	e100	1520	357	335	100	48	18	9.2	804
30	21	51	e26	e74	---	303	3120	71	44	38	9.4	232
31	24	---	e25	e64	---	289	---	55	---	49	9.2	---
TOTAL	1823.5	5582	1500	7042	14092	22868	25984	24908	10794	768	577.6	3174.7
MEAN	58.8	186	48.4	227	486	738	866	803	360	24.8	18.6	106
MAX	552	1410	140	1000	6530	3790	5650	5910	2480	49	56	989
MIN	8.5	24	25	18	37	110	150	55	44	14	9.2	8.7
CFSM	.16	.50	.13	.61	1.31	1.99	2.33	2.17	.97	.07	.05	.29
IN.	.18	.56	.15	.71	1.41	2.29	2.61	2.50	1.08	.08	.06	.32

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1996, BY WATER YEAR (WY)

	MEAN	55.0	174	335	453	529	695	569	312	214	177	83.7	75.2
MAX	402	1259	1909	1302	1422	1697	1536	929	980	1821	514	573	
(WY)	1991	1973	1991	1952	1959	1978	1957	1967	1981	1969	1958	1972	
MIN	7.86	14.0	9.23	26.8	24.0	117	86.0	46.5	14.9	11.8	11.3	5.76	
(WY)	1964	1964	1964	1977	1964	1981	1971	1962	1988	1963	1952	1955	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1951 - 1996

ANNUAL TOTAL	101180.2	119113.8	305
ANNUAL MEAN	277	325	528
HIGHEST ANNUAL MEAN			1973
LOWEST ANNUAL MEAN			145
HIGHEST DAILY MEAN	3500	Apr 11	31400
LOWEST DAILY MEAN	8.5	Oct 1	3.0
ANNUAL SEVEN-DAY MINIMUM	9.7	Sep 13	3.4
INSTANTANEOUS PEAK FLOW			49600
INSTANTANEOUS PEAK STAGE			31.10
INSTANTANEOUS LOW FLOW			2.2
ANNUAL RUNOFF (CFSM)	.75		.82
ANNUAL RUNOFF (INCHES)	10.15	11.94	11.17
10 PERCENT EXCEEDS	748	826	696
50 PERCENT EXCEEDS	85	66	83
90 PERCENT EXCEEDS	16	17	15

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04199155 OLD WOMAN'S CREEK AT BERLIN ROAD NEAR HURON, OH

LOCATION.--Lat 41°20'54", long 82°30'50, Erie County, Hydrologic Unit 04100012, on left downstream side of Berlin Road Bridge, 3.8 mi southeast of Huron.

DRAINAGE AREA.--22.1 mi².

PERIOD OF RECORD.--October 1987 to September 1994, October 1995 to September 1996.

REVISED RECORDS.--WSP 1912; Drainage area. WDR OH-89-2; 1988.

GAGE.--Water-stage recorder. Datum of gage is 570 ft above sea level. Erie county benchmark.

REMARKS.--Records fair, except for periods of estimated record, which are poor.

### 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	.00	1.6	4.1	e1.3	e4.6	e16	82	66	2.7	2.1	1.1	.00
2	.00	1.3	3.7	e1.3	e3.7	e10	111	46	3.0	1.8	.76	.00
3	.12	2.8	3.6	e4.5	e3.0	e6.0	73	28	3.4	1.7	.52	.00
4	.61	1.4	3.6	e9.0	e2.6	e10	42	42	4.2	1.2	.38	.00
5	14	.48	3.3	e8.0	e2.3	34	38	35	6.9	1.1	.29	.00
6	50	.26	e2.5	e5.0	e2.1	57	26	33	4.5	.96	.24	.00
7	7.8	21	e1.9	e3.7	e2.0	26	20	21	125	.75	.15	72
8	1.7	12	e1.6	e3.1	e2.7	e12	16	18	46	.99	.09	39
9	.73	1.8	e1.3	e2.9	e4.5	e8.6	14	23	24	1.3	.10	7.3
10	.42	.65	e1.1	e2.0	e11	e6.6	13	88	17	8.7	.03	8.3
11	.26	129	e.94	e1.7	e9.0	e5.6	11	413	37	2.0	.00	3.1
12	.19	60	e.80	e1.5	e6.0	e5.0	10	117	53	1.2	.00	11
13	.15	21	e1.0	e1.3	e5.0	e4.6	14	46	41	.88	.00	7.8
14	.14	15	21	e1.2	e4.5	e15	17	28	18	.73	.00	2.7
15	.20	12	26	e1.1	e4.0	37	16	23	11	16	.00	3.3
16	.30	8.4	13	e1.0	e3.5	22	28	24	7.1	5.0	.03	2.6
17	.36	7.0	e8.0	571	e3.1	16	18	22	5.8	5.9	.04	4.4
18	.39	16	e5.0	319	e2.8	13	14	19	7.3	3.1	.07	46
19	.35	26	e4.2	269	e2.6	37	12	13	46	2.2	.00	11
20	.40	15	e3.5	e25	e2.5	182	108	9.8	134	1.3	.00	4.2
21	.85	11	e3.0	e18	e6.0	e50	37	8.3	24	.94	.00	2.6
22	.85	8.2	e2.6	e13	e15	e40	48	6.7	13	.79	.00	12
23	.79	7.2	e2.4	e19	e12	e31	611	5.5	7.6	.62	.00	22
24	.64	5.7	e2.2	e80	e17	e100	215	4.9	41	.55	.00	7.5
25	.57	5.2	e2.1	e30	e13	e200	59	4.3	18	.90	.00	4.0
26	.42	5.2	e1.9	e25	e9.5	e35	39	4.0	8.2	.53	.00	2.6
27	.60	5.3	e1.7	e35	e35	e22	27	5.6	5.4	.42	.00	3.7
28	1.5	4.6	e1.6	e15	228	e18	20	6.4	4.2	.31	.00	346
29	1.5	3.9	e1.5	e11	38	e14	25	5.0	3.5	.30	.00	52
30	.95	3.7	e1.5	e7.6	---	e11	212	3.8	2.8	1.8	.00	18
31	1.1	---	e1.4	e5.8	---	e10	---	3.1	---	1.8	.00	---
TOTAL	87.89	412.69	132.04	1492.0	455.0	1054.4	1976	1172.4	724.6	67.87	3.80	693.10
MEAN	2.84	13.8	4.26	48.1	15.7	34.0	65.9	37.8	24.2	2.19	.12	23.1
MAX	50	129	26	571	228	200	611	413	134	16	1.1	346
MIN	.00	.26	.80	1.0	2.0	4.6	10	3.1	2.7	.30	.00	.00
CFSM	.13	.62	.19	2.18	.71	1.54	2.98	1.71	1.09	.10	.01	1.05
IN.	.15	.69	.22	2.51	.77	1.77	3.33	1.97	1.22	.11	.01	1.17

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1996, BY WATER YEAR (WY)

	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	2.88	13.3	21.2	34.3	30.8	31.4	43.6	17.9	13.1
MAX	14.8	68.4	98.2	74.8	78.6	86.3	65.9	52.2	37.4
(WY)	1991	1993	1991	1993	1990	1993	1996	1989	1995
MIN	.001	.31	.70	8.03	10.3	12.4	18.4	2.20	.17
(WY)	1995	1992	1992	1988	1989	1990	1988	1988	1991

### SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1988 - 1996

	1995 CALENDAR YEAR	1996 WATER YEAR	WATER YEARS 1988 - 1996
ANNUAL TOTAL	7791.66	8271.79	
ANNUAL MEAN	21.3	22.6	18.7
HIGHEST ANNUAL MEAN			29.7
LOWEST ANNUAL MEAN			8.77
HIGHEST DAILY MEAN	449	611	728
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.02	.00	.00
INSTANTANEOUS PEAK FLOW		1020	1130
INSTANTANEOUS PEAK STAGE		9.96	11.66
INSTANTANEOUS LOW FLOW		.00	.00
ANNUAL RUNOFF (CFSM)	.97	1.02	.85
ANNUAL RUNOFF (INCHES)	13.12	13.92	11.49
10 PERCENT EXCEEDS	48	46	40
50 PERCENT EXCEEDS	5.2	5.0	4.2
90 PERCENT EXCEEDS	.30	.18	.00

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

## 04200500 BLACK RIVER AT ELYRIA, OH

LOCATION.--Lat 41°22'49", long 82°06'17", in T.6 N., R.17 W., Lorain County, Hydrologic Unit 04110001, on left bank in Cascade Park at Elyria, 0.8 mi downstream from confluence of East and West Branches.

DRAINAGE AREA.--396 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1944 to current year. Records for May 1903 to July 1906 (published as "near Elyria") published in WSP 97, 129, and 205, are unreliable and should not be used.

REVISED RECORDS.--WSP 1912: Drainage area. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 620.83 ft above sea level.

REMARKS.--Records fair, except for periods of estimated record and for discharges greater than 1,000 ft<sup>3</sup>/s, which are poor. Some regulation at low flow for industrial use. Water-quality and sediment data collected at this site.

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	5.7	13	37	e30	e50	712	300	3260	e52	38	28	5.7
2	7.4	37	31	e62	e46	399	1320	1450	e50	30	26	5.5
3	26	36	30	e76	e43	277	1210	721	e54	31	25	5.4
4	27	34	29	e94	e38	203	690	556	e60	24	34	5.6
5	131	22	30	e60	e36	389	508	871	e74	19	30	5.5
6	218	23	30	e47	e34	1720	369	663	e110	16	18	5.4
7	147	67	26	e38	e38	e500	273	537	e2000	15	14	1270
8	106	93	22	e35	e52	e200	212	340	e1200	14	12	2430
9	59	79	20	e31	e66	e140	181	260	e1000	20	12	999
10	35	103	17	e28	e110	e110	168	300	e840	26	10	1230
11	22	1160	16	e25	e170	e94	156	2240	e520	20	8.4	431
12	15	1910	16	e23	263	e86	143	3520	e600	14	7.1	397
13	11	993	17	e21	222	e78	137	1600	e380	14	7.1	1040
14	11	389	93	e20	e130	e450	140	567	e280	14	7.2	620
15	8.9	269	158	e19	e100	558	150	370	e190	62	6.7	324
16	9.0	225	e130	e18	e80	464	267	319	e130	55	6.3	198
17	8.1	173	e100	1260	e70	310	420	e1400	e88	82	6.5	187
18	7.7	201	e82	4920	e60	233	296	e900	e150	55	6.5	273
19	5.9	298	e70	8370	e52	269	217	e450	e350	33	6.2	186
20	16	375	e58	4110	e70	2740	267	e290	674	22	5.8	136
21	12	253	e52	801	e420	2480	439	e210	520	16	17	105
22	13	172	e45	437	e370	1090	399	e170	193	14	8.5	149
23	9.1	130	e40	409	e330	813	3350	e140	127	12	9.3	497
24	9.0	102	e37	1500	e400	1200	6310	e96	119	13	9.2	264
25	11	80	e35	1890	e340	2140	3060	e80	335	14	8.7	176
26	13	65	e32	e600	e290	1090	770	e74	407	14	8.1	123
27	14	56	e30	e250	978	528	491	e86	161	11	7.4	122
28	14	49	e28	e180	5020	319	365	e100	105	10	7.0	2450
29	14	43	e27	e88	3380	253	300	e70	70	10	6.8	3670
30	11	38	e26	e70	---	215	2210	e60	50	40	6.3	1410
31	14	---	e24	e55	---	191	---	e54	---	31	6.0	---
TOTAL	1010.8	7488	1388	25567	13258	20251	25118	21754	10889	789	371.1	18720.1
MEAN	32.6	250	44.8	825	457	653	837	702	363	25.5	12.0	624
MAX	218	1910	158	8370	5020	2740	6310	3520	2000	82	34	3670
MIN	5.7	13	16	18	34	78	137	54	50	10	5.8	5.4
CFSM	.08	.63	.11	2.08	1.15	1.65	2.11	1.77	.92	.06	.03	1.58
IN.	.09	.70	.13	2.40	1.25	1.90	2.36	2.04	1.02	.07	.03	1.76

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

	MEAN	56.5	225	386	486	601	798	630	359	203	142	69.0	79.5
MAX	431	1238	1885	1825	1505	1866	1728	1122	1245	1472	529	701	
(WY)	1991	1986	1991	1952	1959	1978	1957	1969	1947	1969	1958	1972	
MIN	2.34	5.78	5.82	8.48	16.6	135	22.0	50.0	10.6	7.42	4.72	2.84	
(WY)	1945	1945	1945	1945	1964	1953	1946	1963	1988	1991	1952	1946	

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

FOR 1996 WATER YEAR

WATER YEARS 1945 - 1996

ANNUAL TOTAL	99667.6	146604.0	
ANNUAL MEAN	273	401	
HIGHEST ANNUAL MEAN			335
LOWEST ANNUAL MEAN			534
HIGHEST DAILY MEAN	7130	Jan 16	130
LOWEST DAILY MEAN	4.7	Sep 11	1953
ANNUAL SEVEN-DAY MINIMUM	5.1	Sep 6	24900
INSTANTANEOUS PEAK FLOW			Jan 22 1959
INSTANTANEOUS PEAK STAGE			Oct 5 1944
INSTANTANEOUS LOW FLOW			Oct 1 1944
ANNUAL RUNOFF (CFSM)	.69		Jul 6 1969
ANNUAL RUNOFF (INCHES)	9.36		Jul 6 1969
10 PERCENT EXCEEDS	590	1090	Oct 10 1956
50 PERCENT EXCEEDS	69	88	
90 PERCENT EXCEEDS	9.4	10	

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04201500 ROCKY RIVER NEAR BEREHA, OH

LOCATION.--Lat 41°24'24", long 81°53'14", in T.6 N., R.15 W., Cuyahoga County, Hydrologic Unit 04110001, on right bank at downstream side of Cedar Point Road Bridge in Rocky River Reservation, just downstream from confluence of East and West Branches, and 3.0 mi northwest of Bereha.

DRAINAGE AREA.--267 mi².

PERIOD OF RECORD.--October 1923 to September 1935, September 1943 to current year. Monthly discharge only for October 1923, published in WSP 1307.

REVISED RECORDS.--WSP 1437: 1924, 1925(M), 1926, 1927(M), 1928-29, 1930-35(M), 1945. WSP 1912: Drainage area. WDR-OH-2-1983: 1978-1982(M).

GAGE.--Water-stage recorder. Datum of gage is 649.90 ft above sea level (Cuyahoga County bench mark). Prior to Sept. 30, 1935, nonrecording gage at same site and datum.

REMARKS.--Records good except for periods of estimated record which are poor. Some regulation at low flow by small reservoirs on East Branch. Some interbasin transfer of water from Lake Erie for municipal water supply by Cleveland Metro Water District. Water-quality and sediment data collected at this site.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 20.9 ft.

### 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	17	e56	83	e82	e190	460	299	1730	55	40	103	13
2	16	e94	78	e150	e160	e260	580	1100	72	35	66	12
3	65	e88	80	e190	e150	e200	426	542	115	37	46	11
4	163	e84	87	e260	e130	e170	290	575	177	36	35	13
5	448	e62	81	e210	e120	e500	293	609	137	35	33	12
6	913	e160	73	e170	e110	2600	215	518	105	29	26	30
7	e600	e400	e66	e150	e230	672	170	345	326	25	23	3780
8	e290	e350	e50	e130	e570	e300	144	256	630	26	25	2360
9	e150	199	e43	e120	e1200	e250	140	236	1060	29	50	815
10	e86	195	e40	e110	e750	e210	138	388	491	46	26	866
11	e46	2920	e39	e99	e600	e190	127	3680	340	41	23	262
12	e32	2080	e40	e90	e480	e210	112	2380	1230	33	23	513
13	e25	484	e100	e85	e400	e310	135	687	1210	28	22	590
14	e24	293	e250	e80	e330	413	180	388	1210	67	21	386
15	e20	440	e480	e74	e270	417	287	322	476	320	19	312
16	e19	407	295	e70	e230	306	1150	441	212	217	39	196
17	e18	238	171	e1500	e190	215	525	584	139	287	38	327
18	e16	368	126	5720	e160	181	312	580	112	92	32	771
19	e14	643	e110	6160	e130	496	222	278	1030	60	24	304
20	e34	350	e105	e700	e300	3500	577	194	494	46	21	151
21	e28	239	e96	e350	e1100	1190	507	157	296	39	129	101
22	e29	205	e90	e300	851	719	316	132	153	32	59	365
23	e20	174	e84	e280	577	615	4410	107	107	27	45	920
24	e20	145	e77	2170	565	1050	5020	92	149	25	29	345
25	e24	122	e72	1090	389	1560	948	81	412	69	26	170
26	e26	106	e68	479	289	789	529	72	157	49	21	119
27	e29	99	e63	2140	1960	372	454	86	98	38	19	190
28	e31	95	e59	1010	4680	270	311	114	69	28	17	3130
29	e29	84	e56	442	1040	233	458	108	57	26	15	1670
30	e25	81	e54	290	---	198	4180	77	50	83	15	398
31	e32	---	e52	e230	---	173	---	63	---	104	14	---
TOTAL	3289	11261	3168	24931	18151	19029	23455	16922	11169	2049	1084	19132
MEAN	106	375	102	804	626	614	782	546	372	66.1	35.0	638
MAX	913	2920	480	6160	4680	3500	5020	3680	1230	320	129	3780
MIN	14	56	39	70	110	170	112	63	50	25	14	11
CFSM	.40	1.41	.38	3.01	2.34	2.30	2.93	2.04	1.39	.25	.13	2.39
IN.	.46	1.57	.44	3.47	2.53	2.65	3.27	2.36	1.56	.29	.15	2.67

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 1996, BY WATER YEAR (WY)

	MEAN	87.9	218	339	412	472	598	503	293	171	116	73.0	104
MAX	935	1080	1534	1398	1245	1253	1374	845	911	887	553	820	
(WY)	1927	1986	1991	1930	1959	1984	1961	1984	1947	1992	1935	1924	
MIN	1.25	9.14	8.15	32.4	17.0	141	40.9	17.6	10.1	4.25	.90	.94	
(WY)	1934	1964	1964	1945	1934	1969	1946	1934	1933	1954	1933	1933	

### SUMMARY STATISTICS

#### FOR 1995 CALENDAR YEAR

#### FOR 1996 WATER YEAR

#### WATER YEARS 1924 - 1996

ANNUAL TOTAL	100212	153640	
ANNUAL MEAN	275	420	281
HIGHEST ANNUAL MEAN			462
LOWEST ANNUAL MEAN			79.5
HIGHEST DAILY MEAN	9350	Jan 16	14300
LOWEST DAILY MEAN	14	Jun 20	.20
ANNUAL SEVEN-DAY MINIMUM	16	Sep 4	.27
INSTANTANEOUS PEAK FLOW			21400
INSTANTANEOUS PEAK STAGE			18.60
INSTANTANEOUS LOW FLOW			.20
ANNUAL RUNOFF (CFSM)	1.03	1.57	1.05
ANNUAL RUNOFF (INCHES)	13.96	21.41	14.31
10 PERCENT EXCEEDS	541	967	653
50 PERCENT EXCEEDS	95	160	82
90 PERCENT EXCEEDS	21	26	10

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated



## STREAMS TRIBUTARY TO LAKE ERIE

## 04202000 CUYAHOGA RIVER AT HIRAM RAPIDS, OH

LOCATION.--Lat 41°20'26", long 81°10'01", in T.5 N., R.7 W., Portage County, Hydrologic Unit 04110002, on left bank at downstream side of bridge on Winchell Road at Hiram Rapids, 0.6 mi downstream from Black Brook.

DRAINAGE AREA.--151 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1927 to December 1935 (published as "near Hiram"), October 1944 to current year.

REVISED RECORDS.--WSP 1054: 1945. WSP 1437: 1931. WSP 1912: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,087.46 ft above sea level. Prior to Aug. 26, 1927, nonrecording gage and Aug. 26, 1927, to Dec. 31, 1935, water-stage recorder, at site 2.8 mi downstream at different datum. Oct. 20, 1944, to Oct. 22, 1946, nonrecording gage at present site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated by East Branch Reservoir, usable capacity, 4,140 acre-ft, 14.6 mi upstream since 1939 and by LaDue Reservoir, usable capacity, 18,110 acre-ft, 9.8 mi upstream since 1961. Water-quality data collected at this site.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3670 ft<sup>3</sup>/s Jan. 23, 1959, gage height 8.11 ft; minimum daily, 6.6 ft<sup>3</sup>/s Sept. 10, 1933.

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	28	49	240	e62	e270	705	218	734	129	e98	81	e58
2	26	60	222	e90	e210	595	209	839	112	e92	73	e58
3	26	76	185	117	e170	507	201	771	115	e90	67	e56
4	38	83	152	205	e140	428	188	604	99	e86	68	e82
5	54	74	134	e150	e120	377	183	496	90	e84	67	68
6	119	67	121	e130	e110	511	178	418	85	e80	65	56
7	137	76	105	e120	e98	556	170	393	96	e80	64	87
8	112	126	89	e110	e90	589	159	360	149	e78	65	137
9	76	151	81	e100	e150	538	149	324	169	e78	72	150
10	57	154	e68	e92	228	430	145	292	156	96	71	140
11	45	187	e62	e86	285	333	140	414	133	98	66	112
12	39	275	e58	e80	279	260	127	701	124	98	64	94
13	36	403	e54	e76	258	241	125	890	150	97	63	99
14	37	457	e66	e72	e180	255	163	828	194	100	61	102
15	42	427	135	e70	e150	294	214	691	213	112	63	125
16	46	351	208	e110	e130	324	347	578	188	136	72	127
17	43	279	316	197	e110	346	480	502	142	161	74	112
18	40	239	356	426	e100	328	564	e530	116	180	68	117
19	37	237	309	1200	e96	300	524	e560	110	149	64	136
20	35	249	219	2140	e90	547	449	e400	107	119	63	147
21	35	275	e160	1940	e160	740	389	e300	95	91	e100	137
22	42	306	e140	1340	392	822	341	e310	85	76	e100	126
23	42	313	e120	801	529	775	407	e280	81	68	e88	138
24	39	295	e105	663	583	683	748	e150	124	63	e90	158
25	36	256	e96	587	543	605	1120	e220	181	63	e76	165
26	35	219	e86	571	479	567	1180	e200	176	66	e66	153
27	34	184	e80	602	464	534	959	e180	134	64	e70	144
28	36	175	e76	643	609	500	680	e170	e120	61	e70	205
29	43	202	e72	665	719	437	569	e190	e110	58	e64	271
30	46	231	e68	e480	---	332	627	e180	e105	60	e62	329
31	46	---	e64	e350	---	254	---	164	---	81	e60	---
TOTAL	1507	6476	4247	14275	7742	14713	11953	13669	3888	2863	2197	3889
MEAN	48.6	216	137	460	267	475	398	441	130	92.4	70.9	130
MAX	137	457	356	2140	719	822	1180	890	213	180	100	329
MIN	26	49	54	62	90	241	125	150	81	58	60	56
CFSM	.32	1.43	.91	3.05	1.77	3.14	2.64	2.92	.86	.61	.47	.86
IN.	.37	1.60	1.05	3.52	1.91	3.62	2.94	3.37	.96	.71	.54	.96

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1996, BY WATER YEAR (WY)

	MEAN	107	202	274	276	358	453	354	204	128	102	94.6	110
MAX	315	616	816	707	883	835	649	569	542	325	307	374	
(WY)	1991	1986	1978	1993	1976	1963	1961	1984	1989	1969	1992	1975	
MIN	39.0	33.5	45.2	43.5	56.6	174	134	59.8	35.2	48.4	37.1	36.6	
(WY)	1984	1992	1961	1961	1963	1989	1986	1987	1991	1991	1961	1967	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR		FOR 1996 WATER YEAR		WATER YEARS 1961 - 1996	
ANNUAL TOTAL	62032		87419			
ANNUAL MEAN	170		239		221	
HIGHEST ANNUAL MEAN					301	
LOWEST ANNUAL MEAN					131	
HIGHEST DAILY MEAN	1520		2140		3250	
LOWEST DAILY MEAN	26		26		12	
ANNUAL SEVEN-DAY MINIMUM	38		38		13	
INSTANTANEOUS PEAK FLOW			2320		3320	
INSTANTANEOUS PEAK STAGE			6.54		7.67	
INSTANTANEOUS LOW FLOW			25		12	
ANNUAL RUNOFF (CFSM)	1.13		1.58		1.46	
ANNUAL RUNOFF (INCHES)	15.28		21.54		19.89	
10 PERCENT EXCEEDS	382		573		518	
50 PERCENT EXCEEDS	107		139		126	
90 PERCENT EXCEEDS	49		60		44	

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## e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

## 04206208 YELLOW CREEK AT GHENT, OH

LOCATION.--Lat 41°09'29", long 81°38'32", Summit County, Hydrologic Unit 04110002, on left downstream bank at driveway bridge of Creekside Farm at 3680 Granger Road, 150 ft south of Granger Road, 0.25 mi west of Cleveland-Massillon Road, 2.9 mi northwest of Akron corporate boundary.

DRAINAGE AREA.--12.7 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1, 1991 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 908 ft above sea level, from topographic map.

REMARKS.--Records fair, except for periods of estimated record and discharges less than 3.0 ft<sup>3</sup>/s, which are poor.

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	1.8	7.2	5.2	e7.7	e9.9	e15	13	50	8.7	7.9	7.4	1.6
2	2.1	14	4.8	e7.3	e8.5	e13	12	35	10	7.8	5.0	1.8
3	3.9	16	5.7	e6.5	e8.0	e12	12	24	13	7.6	4.0	1.5
4	6.8	8.1	4.7	e5.6	e7.7	e11	12	24	19	6.9	3.7	1.6
5	20	6.0	4.5	e5.3	e7.7	41	11	22	17	6.3	3.5	1.7
6	23	6.0	4.6	e5.0	e8.0	48	9.5	22	13	5.9	3.0	2.0
7	7.0	18	e4.6	e4.6	18	e22	8.7	18	41	5.7	2.8	35
8	4.7	13	e4.0	e4.3	32	e16	8.1	18	63	6.7	2.6	14
9	3.9	9.7	e3.7	e4.0	28	e14	8.1	19	48	5.8	2.4	7.1
10	3.2	12	e3.5	e3.7	15	e12	8.2	33	26	6.5	2.1	6.2
11	3.0	62	e3.5	e3.5	e9.6	e12	7.8	123	19	5.4	2.2	4.4
12	2.8	33	e3.2	e3.5	e7.0	13	7.7	73	25	5.1	2.2	7.9
13	2.7	15	e3.2	e3.5	e5.2	13	9.7	36	24	5.3	2.8	6.3
14	6.8	12	14	e5.0	e4.2	14	9.5	27	47	7.1	3.4	4.8
15	6.3	14	10	8.1	e3.8	15	14	25	21	10	3.5	5.5
16	4.1	11	6.7	7.6	e3.5	13	22	29	15	7.5	4.3	4.6
17	3.7	9.4	e7.7	59	e3.3	11	15	24	14	6.2	3.2	15
18	3.3	14	6.0	83	e3.1	11	12	21	15	6.0	2.9	25
19	3.2	16	e16	144	e3.0	28	11	18	19	6.5	2.6	8.8
20	6.4	12	e9.9	41	26	67	15	16	35	5.2	2.5	5.7
21	12	9.2	e8.5	e17	34	30	13	17	17	4.7	3.1	4.7
22	6.8	8.0	e8.0	15	23	20	11	16	14	4.9	2.7	8.8
23	5.3	7.4	e7.7	16	18	18	94	14	12	4.6	2.6	13
24	4.2	7.3	e7.3	51	18	19	64	13	24	4.2	2.7	7.5
25	4.1	6.5	e7.0	27	15	19	29	13	20	6.2	2.1	5.9
26	4.3	6.4	e7.0	17	14	15	24	12	14	4.9	2.0	5.0
27	5.2	11	e7.0	59	60	14	20	14	12	4.0	2.0	5.1
28	6.7	6.4	e7.3	e22	84	13	16	14	11	3.6	2.0	40
29	6.4	5.4	e7.7	17	29	12	40	12	9.5	4.0	1.8	17
30	5.2	5.1	e7.7	e13	---	12	119	10	8.4	7.1	1.7	8.8
31	6.2	---	e7.7	e11	---	11	---	9.0	---	6.0	1.6	---
TOTAL	185.1	381.1	208.4	677.2	506.5	584	656.3	801.0	634.6	185.6	90.4	276.3
MEAN	5.97	12.7	6.72	21.8	17.5	18.8	21.9	25.8	21.2	5.99	2.92	9.21
MAX	23	62	16	144	84	67	119	123	63	10	7.4	40
MIN	1.8	5.1	3.2	3.5	3.0	11	7.7	9.0	8.4	3.6	1.6	1.5
CFSM	.47	1.00	.53	1.72	1.38	1.48	1.72	2.03	1.67	.47	.23	.73
IN.	.54	1.12	.61	1.98	1.48	1.71	1.92	2.35	1.86	.54	.26	.81

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

	1992	1993	1994	1995	1996
MEAN	5.31	13.2	11.2	19.9	14.0
MAX	9.44	25.3	19.3	33.9	18.5
(WY)	1993	1993	1993	1994	1994
MIN	3.31	4.63	6.68	7.89	9.42
(WY)	1992	1992	1992	1992	1995

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1992 - 1996

ANNUAL TOTAL	3292.8	5186.5	
ANNUAL MEAN	9.02	14.2	12.8
HIGHEST ANNUAL MEAN			16.7
LOWEST ANNUAL MEAN			8.48
HIGHEST DAILY MEAN	123	Jan 16	175
LOWEST DAILY MEAN	1.3	Sep 3	1.1
ANNUAL SEVEN-DAY MINIMUM	1.4	Sep 1	1.3
INSTANTANEOUS PEAK FLOW			204
INSTANTANEOUS PEAK STAGE			12.74
INSTANTANEOUS LOW FLOW			1.5
ANNUAL RUNOFF (CFSM)	.71	1.12	1.01
ANNUAL RUNOFF (INCHES)	9.65	15.19	13.70
10 PERCENT EXCEEDS	16	28	25
50 PERCENT EXCEEDS	6.8	8.6	8.1
90 PERCENT EXCEEDS	2.4	3.2	2.8

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04206210 NORTH FORK AT BATH, OH

LOCATION.--Lat 41°11'20", long 81°39'12", Summit County, Hydrologic Unit 04110002, on right upstream bank at triple barrel culvert under Ira Road, 0.9 mi west of Cleveland-Massillon Road, 4.7 mi northwest of Akron corporate boundary.

DRAINAGE AREA.--2.81 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1, 1991 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 996 ft above sea level, from topographic map.

REMARKS.--Records fair, except for periods of estimated record and discharges less than 6.0 ft<sup>3</sup>/s, which are poor.

### 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	.19	4.0	.96	e.47	e1.8	e3.2	3.2	12	.32	.31	.30	.13
2	.19	7.6	.81	e.41	e1.1	e1.8	3.1	8.4	.80	.29	.16	.13
3	.60	7.4	.93	e.38	e.79	e1.4	2.8	4.5	3.0	.32	.12	.13
4	1.5	3.2	1.2	e.35	e.79	e1.1	2.4	6.7	4.8	.31	.10	.13
5	9.9	2.2	.84	e.33	e.69	42	2.2	5.0	1.5	.31	.10	.15
6	4.6	1.7	.66	e.32	e.79	21	1.7	4.5	.70	.29	.07	.25
7	1.1	6.6	.55	e.31	e.79	e6.3	1.4	2.5	16	.29	.07	20
8	.80	2.4	.49	e.31	e3.2	e2.5	1.4	2.2	9.7	.29	.37	4.9
9	.73	2.0	.48	e.31	8.3	e1.8	1.3	3.3	8.1	.26	.77	.88
10	.79	6.3	.48	e.30	5.0	2.4	1.3	14	3.4	.26	.10	1.9
11	.79	42	.48	e.30	4.0	3.3	.85	37	2.9	.20	.07	.42
12	.83	8.8	.51	e.30	2.7	5.1	.71	11	5.8	.20	.07	1.8
13	1.1	3.8	.56	e.29	2.1	5.7	1.3	6.5	8.6	.30	.07	.58
14	4.3	3.6	5.9	e.29	e1.1	5.1	1.4	4.0	19	1.1	.07	.48
15	2.8	7.0	4.7	2.9	e.95	4.8	4.5	5.7	3.4	3.2	4.3	1.5
16	2.3	3.9	2.4	2.6	e.79	2.3	6.6	6.1	1.1	.42	.71	.58
17	2.1	3.0	1.3	52	e.69	1.6	3.3	5.2	.74	.93	.21	8.8
18	1.8	7.5	e1.0	45	e.60	1.4	1.8	3.8	.61	.32	.12	7.8
19	1.8	7.2	e.92	90	e.79	23	1.3	2.2	.79	.31	.10	.79
20	3.4	4.5	e.82	11	21	31	4.3	1.3	11	.23	.42	.41
21	3.6	3.3	e.72	5.0	37	11	1.8	.93	1.5	.13	3.7	.37
22	2.5	2.4	e.66	2.9	21	8.7	1.1	.74	.73	.13	.26	3.9
23	2.0	2.1	e.62	3.2	14	8.7	43	.60	.45	.10	.17	4.4
24	1.7	1.8	e.58	34	12	12	13	.59	4.7	.10	.19	.62
25	1.8	1.5	e.56	7.9	7.7	12	6.4	.47	2.3	.12	.11	.43
26	1.8	1.2	e.52	4.5	7.0	6.3	5.3	.40	.53	.13	.07	.36
27	1.9	1.1	e.48	41	53	3.6	4.0	1.0	.39	.12	.08	.79
28	2.9	.97	e.45	e6.3	38	3.1	2.7	.76	.38	.10	.11	21
29	4.3	.82	e.43	e3.5	11	2.7	14	.55	.32	.10	.12	3.2
30	3.1	.75	e.64	e2.8	---	2.6	44	.39	.32	1.0	.12	.61
31	3.3	---	e.54	e2.1	---	2.5	---	.34	---	.28	.13	---
TOTAL	70.52	150.64	32.19	321.37	258.67	240.0	182.16	152.67	113.88	12.45	13.36	87.44
MEAN	2.27	5.02	1.04	10.4	8.92	7.74	6.07	4.92	3.80	.40	.43	2.91
MAX	9.9	42	5.9	90	53	42	44	37	19	3.2	4.3	21
MIN	.19	.75	.43	.29	.60	1.1	.71	.34	.32	.10	.07	.13
CFSM	.81	1.79	.37	3.69	3.17	2.76	2.16	1.75	1.35	.14	.15	1.04
IN.	.93	1.99	.43	4.25	3.42	3.18	2.41	2.02	1.51	.16	.18	1.16

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

	1992	1993	1994	1995	1996
MEAN	1.14	4.28	2.70	7.78	5.13
MAX	2.27	7.87	5.77	12.5	8.92
(WY)	1996	1994	1993	1993	1996
MIN	.34	.56	1.04	2.31	3.11
(WY)	1995	1995	1996	1992	1995

### SUMMARY STATISTICS

#### FOR 1995 CALENDAR YEAR

#### FOR 1996 WATER YEAR

#### WATER YEARS 1992 - 1996

ANNUAL TOTAL	1052.34	1635.35	
ANNUAL MEAN	2.88	4.47	
HIGHEST ANNUAL MEAN			3.75
LOWEST ANNUAL MEAN			4.90
HIGHEST DAILY MEAN	68	Jan 15	2.40
LOWEST DAILY MEAN	.19	Oct 1	.01
ANNUAL SEVEN-DAY MINIMUM	.27	Sep 26	.01
INSTANTANEOUS PEAK FLOW			635
INSTANTANEOUS PEAK STAGE			15.21
INSTANTANEOUS LOW FLOW			.01
ANNUAL RUNOFF (CFSM)	1.03		1.33
ANNUAL RUNOFF (INCHES)	13.93		18.13
10 PERCENT EXCEEDS	6.2		8.5
50 PERCENT EXCEEDS	1.6		1.1
90 PERCENT EXCEEDS	.46		.29

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated



## STREAMS TRIBUTARY TO LAKE ERIE

## 04206211 PARK CREEK AT BATH CENTER, OH

LOCATION.--Lat 41°10'44", long 81°38'09", Summit County, Hydrologic Unit 04110002, on upstream left bank at culvert under the entrance of the Bath Community Center, 200 ft east of Cleveland-Massillon Road, 0.7 mi north of Bath Road, 3.7 mi northwest of Akron corporate boundary.

DRAINAGE AREA.--0.826 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1, 1991 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 980 ft above sea level, from topographic map.

REMARKS.--Records poor.

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	.00	.01	.07	.38	e.34	e1.7	1.2	3.9	.03	.01	.00	.00
2	.00	.68	.07	.88	e.22	e1.4	1.1	2.5	.08	.00	.00	.00
3	.29	.53	.07	e.22	e.10	e1.2	1.1	1.6	.51	.00	.00	.00
4	.19	.12	.05	e.14	e.07	e1.1	1.1	1.7	2.3	.00	.00	.00
5	4.6	.09	.05	e.14	e.05	13	1.0	1.5	.61	.00	.00	.00
6	1.0	.07	.05	e.14	e.05	4.8	1.0	1.3	.16	.00	.00	.05
7	.18	1.6	.10	e.14	e.05	e2.2	.71	1.0	9.7	.00	.00	4.9
8	.11	.42	e.07	.11	e1.1	e1.7	.65	.65	2.8	.00	.84	.60
9	.08	.49	e.07	.08	e2.4	e1.3	.49	.71	2.1	.00	.01	.54
10	.07	2.5	e.07	.07	.34	e1.2	.44	12	.99	.00	.00	.28
11	.05	13	e.07	.07	.34	e1.0	.34	27	.87	.00	.00	.14
12	.04	1.8	e.07	.07	.34	e1.0	.37	4.4	1.4	.00	.00	.27
13	.03	1.3	e.07	.07	.34	1.5	.80	2.0	2.0	.01	.00	.20
14	.40	1.2	e4.9	.29	.34	1.5	.47	1.4	6.8	.00	.00	.14
15	.17	1.7	e2.1	.33	.34	1.3	2.7	1.8	1.3	.09	.22	.17
16	.10	1.2	e.65	.85	.32	1.1	1.4	1.4	.57	.00	.02	.25
17	.07	1.1	e.22	e13	.28	1.1	.99	1.2	.09	.00	.01	2.7
18	.04	2.1	e.22	16	.28	1.1	.42	.92	.33	.00	.01	1.8
19	.03	1.4	e.22	20	.28	9.4	.33	.46	.32	.00	.00	.22
20	.54	1.0	e.22	e1.5	e2.7	7.1	1.8	.37	6.4	.00	.02	.15
21	.19	.50	e.22	1.1	e8.3	2.5	.86	.36	1.2	.00	.19	.16
22	.09	.28	e.22	.97	3.2	1.8	.70	.30	.49	.00	.02	.66
23	.07	.23	e.22	1.9	2.4	e1.6	22	.29	.19	.00	.03	.44
24	.05	.15	e.14	7.4	1.9	2.1	4.1	.26	2.4	.00	.02	.25
25	.04	.14	e.14	1.8	1.3	1.9	2.0	.19	.74	.00	.02	.28
26	.03	.14	e.14	1.4	1.3	1.4	1.6	.15	.09	.00	.01	.24
27	.02	.13	.07	9.9	15	e1.0	1.2	.28	.02	.00	.01	.22
28	.02	.10	.07	e1.9	9.1	e1.0	1.1	.14	.01	.00	.00	6.7
29	.02	.08	.07	e1.1	3.4	e1.0	8.3	.09	.01	.00	.00	1.1
30	.01	.07	.07	e.34	---	1.1	21	.06	.00	.02	.00	.30
31	.01	---	.07	e.14	---	1.1	---	.04	---	.00	.00	---
TOTAL	8.54	34.13	10.84	82.43	56.18	72.2	81.27	69.97	44.51	0.13	1.43	22.76
MEAN	.28	1.14	.35	2.66	1.94	2.33	2.71	2.26	1.48	.004	.046	.76
MAX	4.6	13	4.9	20	15	13	22	27	9.7	.09	.84	6.7
MIN	.00	.01	.05	.07	.05	1.0	.33	.04	.00	.00	.00	.00
CFSM	.33	1.37	.42	3.20	2.33	2.81	3.26	2.72	1.79	.01	.06	.91
INF.	.38	1.53	.49	3.69	2.52	3.24	3.64	3.14	1.99	.01	.06	1.02

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

	MEAN	.17	1.13	1.06	2.28	1.01	1.72	1.88	.85	.72	.78	.39	.47
MAX	.28	3.46	3.95	3.45	1.94	3.06	2.71	2.26	1.48	2.84	.86	1.09	
(WY)	1996	1993	1993	1993	1996	1993	1996	1996	1996	1992	1994	1992	
MIN	.012	.038	.21	1.20	.43	.83	1.26	.31	.12	.004	.000	.030	
(WY)	1995	1995	1992	1992	1993	1994	1995	1993	1992	1996	1993	1993	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1992 - 1996

ANNUAL TOTAL	280.42	484.39	
ANNUAL MEAN	.77	1.32	
HIGHEST ANNUAL MEAN			1.04
LOWEST ANNUAL MEAN			1.49
HIGHEST DAILY MEAN	28	27	.66
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		85	162
INSTANTANEOUS PEAK STAGE		13.09	15.18
INSTANTANEOUS LOW FLOW		.00	.00
ANNUAL RUNOFF (CFSM)	.93	1.59	1.25
ANNUAL RUNOFF (INCHES)	12.57	21.71	16.98
10 PERCENT EXCEEDS	1.6	2.5	2.5
50 PERCENT EXCEEDS	.15	.28	.26
90 PERCENT EXCEEDS	.02	.00	.00

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04206212 NORTH FORK AT BATH CENTER, OH

LOCATION.--Lat 41°10'08", long 81°38'04", Summit County, Hydrologic Unit 04110002, on left upstream side of bridge on Bath Road, 750 ft east of Cleveland-Massillon Road at Bath Center, 3.1 mi northwest of Akron corporate boundary.  
DRAINAGE AREA.--5.58 mi<sup>2</sup>.  
PERIOD OF RECORD.--October 1, 1991 to current year.  
GAGE.--Water-stage recorder. Elevation of gage is 936 ft above sea level, from topographic map.  
REMARKS.--Records fair, except for periods of estimated record and discharges of less than 5 ft<sup>3</sup>/s, which are poor.

### 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	1.0	3.0	3.5	e1.6	e1.8	e9.0	e4.3	e17	e.58	e.43	1.0	.23
2	1.0	7.3	2.6	e1.5	e1.5	e3.3	e4.1	e10	e1.2	e.36	.67	.24
3	2.4	7.1	2.9	e1.4	e1.3	e2.5	e3.8	e6.2	e2.7	e.50	.49	.25
4	2.8	2.8	3.6	e1.3	e1.1	e2.0	e3.3	e9.0	e6.4	e.46	.50	.20
5	20	1.8	3.0	e1.3	e1.1	e56	e3.0	e7.0	e3.2	e.49	.46	.21
6	10	2.1	2.0	e1.2	e1.1	e25	e2.5	e6.0	e1.2	e.35	.45	.29
7	2.0	14	1.1	e1.2	e1.3	e10	e1.9	e3.4	e20	e.35	.52	30
8	1.0	6.9	.92	e1.2	9.8	e4.5	e1.9	e3.0	e13	e.35	2.7	7.3
9	.97	5.7	.78	e1.1	7.5	e3.3	e1.7	e4.0	e11	e.33	2.4	2.6
10	.97	15	.30	e1.1	5.6	e4.0	e1.7	e15	e4.2	e.33	.76	3.4
11	.94	70	.17	e1.1	6.5	e5.0	e1.5	e50	e3.8	e.28	.61	1.0
12	1.0	17	.38	e1.0	4.0	e6.6	e1.1	e15	e7.0	e.28	.61	2.3
13	1.0	7.9	.75	e1.0	e3.2	e7.6	e1.0	e8.0	e14	e.40	.55	1.6
14	4.3	6.8	9.3	e1.0	e2.2	e7.2	e1.9	e5.4	e26	e1.0	.51	1.0
15	2.2	13	7.1	e1.0	e1.3	e6.4	e6.0	e7.6	e7.0	e4.0	5.6	2.2
16	1.3	7.3	4.2	4.8	e1.1	e3.0	e9.0	e8.2	e1.8	e.90	2.0	1.6
17	1.4	5.4	2.5	66	e1.0	e2.8	e6.0	e7.4	e1.4	1.9	.78	13
18	1.4	15	3.1	79	e.82	e2.5	e3.5	e5.0	e1.0	.90	.62	14
19	1.4	12	2.6	111	e1.1	e32	e2.3	e3.5	e1.3	1.0	.61	2.9
20	4.2	7.6	e2.3	e9.8	e30	e42	e5.8	e2.5	e15	.66	.59	1.7
21	3.3	5.5	e2.0	e5.2	e50	e15	e3.5	e1.8	e5.6	.60	5.1	1.4
22	1.3	4.3	e1.9	6.7	e30	e12	e2.0	e1.4	e1.7	.54	.94	4.8
23	1.0	3.7	e1.8	11	e19	e12	e58	e1.1	e.70	.50	.88	6.8
24	1.0	3.2	e1.7	48	e17	e16	e27	e1.1	e3.5	.50	.76	2.2
25	1.0	2.9	e1.6	e8.6	e11	e16	e13	e.88	e3.0	.56	.54	1.4
26	1.1	2.2	e1.5	10	e9.6	e10	e8.0	e.62	e.78	.50	.46	1.1
27	2.2	3.0	e1.5	54	e70	e7.0	e6.4	e1.7	e.62	.43	.34	1.3
28	4.2	3.1	3.0	e8.1	e52	e4.5	e5.0	e1.3	e.60	.44	.24	37
29	6.4	3.0	2.1	e4.2	e23	e3.8	e15	e.90	e.52	.41	.24	7.3
30	3.5	2.9	e1.9	e2.2	---	e3.6	e60	e.62	e.52	1.7	.25	3.1
31	2.2	---	e1.7	e1.8	---	e3.5	---	e.60	---	1.1	.20	---
TOTAL	88.48	261.5	73.80	448.4	364.92	338.1	264.2	205.22	159.32	22.55	32.38	152.42
MEAN	2.85	8.72	2.38	14.5	12.6	10.9	8.81	6.62	5.31	.73	1.04	5.08
MAX	20	70	9.3	111	70	56	60	50	26	4.0	5.6	37
MIN	.94	1.8	.17	1.0	.82	2.0	1.0	.60	.52	.28	.20	.20
CFSM	.51	1.56	.43	2.59	2.26	1.95	1.58	1.19	.95	.13	.19	.91
IN.	.59	1.74	.49	2.99	2.43	2.25	1.76	1.37	1.06	.15	.22	1.02

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

	1992	1993	1994	1995	1996
MEAN	3.16	8.51	6.10	12.0	8.06
MAX	4.56	15.3	13.4	17.4	12.6
(WY)	1992	1993	1993	1993	1996
MIN	.66	1.14	1.97	3.76	4.16
(WY)	1995	1995	1992	1992	1993

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1992 - 1996
ANNUAL TOTAL	1934.99	2411.29	
ANNUAL MEAN	5.30	6.59	6.89
HIGHEST ANNUAL MEAN			8.97
LOWEST ANNUAL MEAN			4.58
HIGHEST DAILY MEAN	130	Jan 15	190
LOWEST DAILY MEAN	.17	Dec 11	.07
ANNUAL SEVEN-DAY MINIMUM	.54	Jan 3	.10
INSTANTANEOUS PEAK FLOW			885
INSTANTANEOUS PEAK STAGE			12.93
INSTANTANEOUS LOW FLOW			.02
ANNUAL RUNOFF (CFSM)	.95	1.18	1.23
ANNUAL RUNOFF (INCHES)	12.90	16.08	16.77
10 PERCENT EXCEEDS	11	15	15
50 PERCENT EXCEEDS	2.8	2.3	3.1
90 PERCENT EXCEEDS	.74	.50	.57

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

## 04206215 BATH CREEK AT BATH CENTER, OH

LOCATION.--Lat 41°10'09", long 81°38'56", Summit County, Hydrologic Unit 04110002, on upstream left bank at bridge on Bath Road, 0.2 mi downstream from Steriner Pond, 0.6 mi west of Cleveland-Massillon Road, and 3.6 mi northwest of Akron corporate boundary.

DRAINAGE AREA.--3.52 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1, 1991 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 961 ft above sea level, from topographic map.

REMARKS.--Records good, except for periods of estimated record and discharges less than 3.0 ft<sup>3</sup>/s, which are poor.

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	.06	1.3	1.2	e.33	e.46	e2.6	2.3	15	.82	.77	.59	.05
2	.02	2.3	.90	e.30	e.42	e2.0	2.5	10	1.2	.56	.42	.36
3	.25	3.1	.97	e.28	e.38	e1.8	2.1	5.6	2.0	.69	.40	.40
4	.80	1.9	1.2	e.26	e.36	e1.6	2.0	6.8	4.4	.57	2.8	.40
5	2.9	1.4	.82	e.25	e.34	23	1.9	5.6	3.0	.55	4.9	.40
6	5.4	1.2	.83	e.24	e.33	19	1.6	5.5	1.9	.51	.35	.47
7	1.5	4.6	.81	e.24	e.32	e4.5	1.6	3.7	16	.50	.32	4.4
8	.75	3.4	.72	e.23	e.39	e2.6	1.5	3.2	24	.51	.36	2.7
9	.60	2.7	e.70	e.23	e.34	e2.4	1.6	3.3	14	.55	.40	.81
10	.62	5.1	e.62	e.22	e.31	2.3	1.6	21	5.2	.58	.36	1.3
11	.59	37	e.60	e.22	e.29	2.4	1.4	74	3.7	.45	.31	.88
12	.60	18	e.60	e.22	e.28	2.8	1.4	22	6.8	.40	.24	.93
13	.58	5.9	e.58	e.22	e.27	3.1	1.6	7.8	9.5	.52	.32	.68
14	1.0	4.4	5.8	e1.2	e.26	3.6	1.7	4.7	20	.70	.41	.60
15	1.4	7.0	4.1	e2.6	e.26	4.0	3.3	5.5	4.8	1.3	.47	.43
16	.66	4.8	2.6	e1.4	e.25	2.7	6.6	6.4	2.8	.81	.84	.14
17	.60	3.7	e1.6	30	e.25	2.1	4.1	4.7	2.1	.59	.23	1.7
18	.60	6.5	e1.6	50	e.25	2.0	2.9	3.8	2.1	.52	.05	4.5
19	.60	7.0	e1.8	76	e.82	12	2.3	2.8	2.1	.60	.05	1.5
20	.81	4.3	e.70	e8.9	e1.2	30	4.5	2.3	14	.53	.09	.88
21	1.5	3.3	e.50	e4.2	4.0	9.0	3.6	2.0	3.8	.41	.53	.56
22	.84	2.7	e.43	e3.1	1.7	5.9	3.3	1.6	2.5	.39	.34	1.2
23	.63	2.4	e.38	4.8	1.6	5.4	55	1.3	1.8	.40	.34	1.7
24	.52	1.9	e.35	25	4.4	6.4	23	1.7	4.2	.34	.32	.80
25	.50	1.6	e.34	e5.2	5.0	6.5	7.7	1.9	3.7	.41	.24	.55
26	.50	1.4	e.32	e3.1	4.6	4.2	5.4	1.6	1.8	.38	.20	.37
27	.62	1.5	e.31	28	29	2.9	4.2	1.8	1.2	.40	.07	.32
28	.98	1.3	e.30	e4.8	36	2.7	3.3	1.8	.81	.34	.06	12
29	1.3	1.2	e.29	e1.4	e5.9	2.5	14	1.5	.85	.40	.22	6.6
30	.94	.88	e.34	e.70	---	2.2	58	1.2	.99	.48	.27	1.8
31	1.2	---	e.38	e.54	---	2.0	---	.98	---	.63	.12	---
TOTAL	29.87	143.78	32.69	254.18	99.98	176.2	226.0	231.08	162.07	16.79	16.62	49.43
MEAN	.96	4.79	1.05	8.20	3.45	5.68	7.53	7.45	5.40	.54	.54	1.65
MAX	5.4	37	5.8	76	36	30	58	74	24	1.3	4.9	12
MIN	.02	.88	.29	.22	.25	1.6	1.4	.98	.81	.34	.05	.05
CFSM	.27	1.36	.30	2.33	.98	1.61	2.14	2.12	1.53	.15	.15	.47
IN.	.32	1.52	.35	2.69	1.06	1.86	2.39	2.44	1.71	.18	.18	.52

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

	1992	1993	1994	1995	1996
MEAN	.79	4.39	3.26	7.20	3.81
MAX	1.34	8.75	7.80	11.2	5.16
(WY)	1993	1993	1993	1993	1993
MIN	.41	.45	.72	1.80	2.44
(WY)	1992	1992	1992	1992	1993

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

FOR 1996 WATER YEAR

WATER YEARS 1992 - 1996

ANNUAL TOTAL	1018.44	1438.69	
ANNUAL MEAN	2.79	3.93	
HIGHEST ANNUAL MEAN			3.64
LOWEST ANNUAL MEAN			4.67
HIGHEST DAILY MEAN	71	Jan 15	2.48
LOWEST DAILY MEAN	.02	Oct 2	.00
ANNUAL SEVEN-DAY MINIMUM	.15	Sep 27	.14
INSTANTANEOUS PEAK FLOW			105
INSTANTANEOUS PEAK STAGE			Dec 31 1992
INSTANTANEOUS LOW FLOW			204
ANNUAL RUNOFF (CFSM)	.79		Dec 31 1992
ANNUAL RUNOFF (INCHES)	10.76		Aug 26 1996
10 PERCENT EXCEEDS	5.3		14.49
50 PERCENT EXCEEDS	1.4		.00
90 PERCENT EXCEEDS	.40		1.04

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04206220 YELLOW CREEK AT BOTZUM, OH

LOCATION.--Lat 41°09'47", long 81°35'03", Summit County, Hydrologic Unit 04110002, on right downstream bank near Bath Road truss bridge over Yellow Creek, 0.5 mi upstream from confluence with Cuyahoga River, 0.7 mi west of Akron sewage treatment plant.  
DRAINAGE AREA.--30.7 mi<sup>2</sup>.  
PERIOD OF RECORD.--October 1, 1991 to current year.  
GAGE.--Water-stage recorder. Elevation of gage is 743 ft above sea level, from topographic map.  
REMARKS.--Records fair, except for periods of estimated record, which are poor. (Formerly named Yellow Creek at Bath Road near Botzum, Ohio)

### 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	3.0	13	14	e11	e20	e44	28	e130	e19	14	16	4.6
2	3.1	28	13	e6.0	e19	e30	28	e84	e22	13	10	5.0
3	13	35	15	e5.4	e18	e26	27	e52	e27	13	8.4	4.5
4	25	18	14	e4.8	e17	e22	25	e50	e39	11	9.0	4.6
5	77	13	12	e4.5	e17	190	24	e45	e37	10	13	4.8
6	70	12	12	e4.2	e16	153	22	e47	e29	9.9	8.3	5.3
7	20	49	e12	e4.0	e16	e55	21	e40	e110	9.8	7.1	131
8	12	34	e12	e3.8	e55	e30	20	e38	e160	10	12	40
9	9.1	26	e11	e3.7	105	e26	19	e42	e140	9.9	11	18
10	7.5	38	e10	e3.5	71	e22	e18	e84	e60	11	7.0	17
11	6.7	289	e9.5	e3.4	79	e22	e17	e310	e40	9.4	6.3	11
12	5.9	111	e9.0	e3.3	e43	30	e17	e180	e50	9.0	6.3	28
13	5.7	46	e18	e3.2	e28	30	e21	e110	e52	9.9	6.3	17
14	21	33	80	e24	e15	31	e21	e56	166	15	7.7	12
15	17	52	67	88	e12	33	e32	e54	48	26	12	13
16	9.3	35	32	e39	e11	28	e56	e62	30	15	13	11
17	6.6	28	22	e260	e11	24	e30	e52	26	12	7.8	39
18	5.9	48	22	326	e10	23	e28	e45	29	11	7.0	67
19	5.6	50	e22	513	e10	118	e25	e37	40	12	6.2	21
20	15	32	e14	e84	e180	227	e32	e35	106	9.8	6.3	14
21	23	27	e11	e54	e260	90	e27	e37	36	8.7	12	11
22	13	24	e9.5	e38	81	60	e25	e33	27	8.4	7.5	23
23	9.5	22	e9.0	46	59	52	e230	e29	21	8.2	7.1	31
24	8.0	20	e9.0	192	54	55	e170	e29	66	8.0	7.4	18
25	6.7	18	e8.5	e69	38	57	e60	e27	46	9.2	6.1	13
26	6.6	17	e8.5	e47	36	38	e50	e27	26	8.3	5.7	11
27	8.4	20	e8.1	218	231	31	e45	e29	21	7.8	5.6	10
28	13	16	e8.1	e55	268	29	e33	e29	18	7.4	5.4	147
29	13	14	e7.2	e35	80	27	e100	e25	17	7.5	5.2	46
30	11	13	e7.2	e28	---	25	e300	e23	15	17	4.9	22
31	12	---	e9.0	e26	---	24	---	e21	---	14	5.1	---
TOTAL	462.6	1181	515.6	2202.8	1860	1652	1551	1862	1523	345.2	252.7	799.8
MEAN	14.9	39.4	16.6	71.1	64.1	53.3	51.7	60.1	50.8	11.1	8.15	26.7
MAX	77	289	80	513	268	227	300	310	166	26	16	147
MIN	3.0	12	7.2	3.2	10	22	17	21	15	7.4	4.9	4.5
CFSM	.49	1.28	.54	2.31	2.09	1.74	1.68	1.96	1.65	.36	.27	.87
IN.	.56	1.43	.62	2.67	2.25	2.00	1.88	2.26	1.85	.42	.31	.97

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

	1992	1993	1994	1995	1996
MEAN	12.2	38.4	29.2	60.2	41.5
MAX	19.3	76.2	61.5	98.2	64.1
(WY)	1993	1993	1993	1993	1996
MIN	6.31	9.23	12.1	17.8	25.4
(WY)	1995	1992	1992	1992	1995

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1992 - 1996
ANNUAL TOTAL	9104.4	14207.7	
ANNUAL MEAN	24.9	38.8	34.9
HIGHEST ANNUAL MEAN			46.7
LOWEST ANNUAL MEAN			22.1
HIGHEST DAILY MEAN	500	Jan 15	765
LOWEST DAILY MEAN	2.4	Sep 5	2.4
ANNUAL SEVEN-DAY MINIMUM	2.6	Sep 1	2.6
INSTANTANEOUS PEAK FLOW			1470
INSTANTANEOUS PEAK STAGE		930	Jan 19 a
INSTANTANEOUS LOW FLOW		14.23	Jan 17
ANNUAL RUNOFF (CFSM)	.81	2.6	Oct 2
ANNUAL RUNOFF (INCHES)	11.03	1.26	1.14
10 PERCENT EXCEEDS	48	17.22	15.43
50 PERCENT EXCEEDS	13	82	71
90 PERCENT EXCEEDS	4.9	21	18
		6.5	5.9

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated



## STREAMS TRIBUTARY TO LAKE ERIE

## 04207200 TINKERS CREEK AT BEDFORD, OH

LOCATION.--Lat 41°23'04", long 81°31'39", in T.6 N., R.11 W., Cuyahoga County, Hydrologic Unit 04110002, on left bank at downstream side of bridge on State Highway 14 in Bedford, 5.5 mi upstream from mouth.

DRAINAGE AREA.--83.9 mi<sup>2</sup>.

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

REVISED RECORDS.--WSP 1912: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 876.18 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are poor. Water-quality and sediment data collected at this site.

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	17	56	73	e58	e94	e250	92	863	38	e34	49	e29
2	18	128	62	100	e80	e176	104	563	59	e32	41	e28
3	86	109	69	e72	e66	e150	89	306	71	77	e34	e31
4	128	62	63	e60	e60	e140	95	282	84	40	e31	e31
5	229	47	61	e54	e55	499	85	214	59	35	e28	e29
6	268	51	54	e50	e52	592	71	158	55	e31	e27	41
7	110	242	51	e46	e50	e350	63	106	173	e28	41	642
8	47	145	48	e44	e150	e210	60	87	257	e32	47	298
9	34	96	e46	e42	196	e150	63	92	154	e31	41	346
10	30	144	e44	e40	121	e130	68	327	99	e30	38	187
11	28	823	e42	e39	139	e130	61	895	318	e29	e34	86
12	26	505	e40	e38	e120	e125	56	800	368	e28	e32	175
13	25	408	e39	e36	e96	130	90	540	183	40	e31	166
14	68	232	248	e35	e82	127	79	215	745	51	e30	152
15	45	360	180	e34	e70	128	297	186	353	185	97	116
16	34	253	110	e34	e64	100	421	182	117	103	81	92
17	28	189	e76	e200	e60	81	291	168	86	198	42	167
18	27	314	65	e900	e56	75	146	209	82	63	35	149
19	26	315	64	e1700	e52	335	100	114	128	51	e30	83
20	76	225	e57	e700	e170	924	272	81	129	38	212	53
21	60	163	e65	e400	587	780	149	72	76	e32	306	44
22	48	141	e56	e350	537	381	129	60	54	e30	156	171
23	37	123	e52	e300	406	286	e1400	56	43	e28	60	135
24	48	105	e49	618	293	287	1140	51	334	58	38	85
25	44	83	e47	e442	180	270	677	46	79	140	e34	57
26	40	71	e45	270	133	257	298	42	55	47	e32	47
27	43	77	e42	e726	669	140	203	48	44	36	e35	57
28	45	73	e40	e460	909	105	110	52	40	e31	e33	625
29	56	65	e38	e200	e700	85	254	49	38	42	e31	345
30	35	61	e36	e150	---	74	e1500	43	36	105	e30	155
31	52	---	e35	e120	---	67	---	41	---	50	e29	---
TOTAL	1858	5666	1997	8318	6247	7534	8463	6948	4357	1755	1785	4622
MEAN	59.9	189	64.4	268	215	243	282	224	145	56.6	57.6	154
MAX	268	823	248	1700	909	924	1500	895	745	198	306	642
MIN	17	47	35	34	50	67	56	41	36	28	27	28
CFSM	.01	.02	.01	.03	.03	.03	.03	.03	.02	.01	.01	.02
IN.	.01	.03	.01	.04	.03	.03	.04	.03	.02	.01	.01	.02

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1996, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1963	67.3	261	1991	8.55	1964
1964	138	402	1986	13.4	1965
1965	173	506	1991	16.9	1964
1966	152	396	1993	33.1	1977
1967	200	463	1976	39.0	1963
1968	248	457	1963	81.2	1990
1969	190	314	1964	54.1	1971
1970	123	339	1989	33.4	1965
1971	84.5	257	1975	16.5	1964
1972	80.5	329	1969	13.1	1967
1973	63.8	255	1992	11.3	1963
1974	74.9	289	1990	8.73	1964

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1963 - 1996
ANNUAL TOTAL	37460	59550	
ANNUAL MEAN	103	163	134
HIGHEST ANNUAL MEAN			185
LOWEST ANNUAL MEAN			81.7
HIGHEST DAILY MEAN	1200	1700	2920
LOWEST DAILY MEAN	17	17	5.8
ANNUAL SEVEN-DAY MINIMUM	19	30	6.5
INSTANTANEOUS PEAK FLOW		2300	7220
INSTANTANEOUS PEAK STAGE		6.77	10.10
INSTANTANEOUS LOW FLOW		16	5.2
ANNUAL RUNOFF (CFSM)	.012	.020	.016
ANNUAL RUNOFF (INCHES)	.17	.27	.22
10 PERCENT EXCEEDS	256	362	320
50 PERCENT EXCEEDS	54	76	61
90 PERCENT EXCEEDS	24	32	20

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04208000 CUYAHOGA RIVER AT INDEPENDENCE, OH

LOCATION.--Lat 41°23'43", long 81°37'48", in T.6 N., R.12 W., Cuyahoga County, Hydrologic Unit 04110002, on left bank 240 ft downstream from bridge on Old Rockside Road, 0.8 mi northeast of Independence, and 3.0 mi downstream from Tinkers Creek.  
DRAINAGE AREA.--707 mi<sup>2</sup>.

### WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1903 to December 1905 (fragmentary), January to July 1906 (gage heights and discharge measurements only), September 1921 to May 1923, September 1927 to December 1935, March 1940 to current year.  
REVISED RECORDS.--WSP 1307: 1922-23(M), 1928-30(M), 1933(M), 1940(M), 1947(M), 1950(M). WSP 1912: Drainage area.  
GAGE.--Water-stage recorder. Datum of gage is 583.57 ft above sea level. Sept. 21, 1903 to July 21, 1906, nonrecording gage at bridge 240 ft upstream at present datum. Sept. 28, 1921 to May 30, 1923, nonrecording gage at bridge 240 ft upstream at datum 2.42 ft higher. Sept., to Oct. 8, 1927, nonrecording gage, and Oct. 9, 1927, to Dec. 31, 1935, Mar. 5, 1940, to June 19, 1969, water-stage recorder, at site 100 ft upstream at present datum.  
REMARKS.--Records good except for periods of estimated daily discharge, which are poor. Natural flow of stream affected by diversion, storage reservoirs and power plants. Some diversion from the Tuscarawas River basin drainage into this basin at Portage Lakes (see REMARKS for station 03117000). Water diverted into Ohio Canal at Brecksville, 6 mi upstream from station, bypasses station. These records do not include flow in canal except above about 15,000 ft<sup>3</sup>/s, when channels merge. Satellite telemeter at gage. Water-quality data collected at this site.

### 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	181	358	613	e450	e900	2260	986	4720	507	389	489	274
2	179	504	803	636	e780	2000	981	3820	547	368	376	268
3	319	629	663	548	e700	1750	868	2920	676	378	313	277
4	1060	404	581	e520	e620	1340	831	2720	775	339	294	289
5	1020	335	531	e490	e570	2730	801	2320	728	318	289	279
6	2050	315	383	e470	e540	3930	714	2020	576	300	289	279
7	714	916	333	e450	e520	2510	654	1560	1040	320	280	3350
8	421	812	331	e430	e700	1700	637	1380	2170	368	280	1810
9	327	638	351	e420	1120	1470	640	1710	1600	344	643	1310
10	291	643	307	e400	819	1280	612	1950	1110	325	377	1210
11	268	3410	312	e390	950	1200	586	5260	1250	302	316	666
12	265	2380	332	e380	923	1130	544	5790	2230	303	330	1060
13	262	1350	340	e370	822	1070	618	3920	1490	304	329	971
14	363	938	843	e360	e730	1040	652	3140	4380	467	318	857
15	418	1410	810	e360	e670	1030	952	2830	1930	863	410	702
16	294	1140	519	e350	e610	930	2360	2720	1180	579	605	567
17	283	968	437	e2500	e560	877	1630	2130	980	813	337	898
18	270	1270	482	4440	e530	838	1250	2240	950	519	277	1220
19	275	1430	682	8080	e500	1410	1190	1550	1820	542	250	693
20	332	1080	641	4990	e1100	5200	1720	1170	1680	477	404	534
21	620	911	e550	3670	2830	3690	1310	932	764	425	1050	479
22	376	818	e500	3370	2610	2760	1060	1100	610	390	469	736
23	307	754	e480	3080	2200	2580	5820	967	517	330	433	1110
24	297	708	e450	4290	2120	2540	6570	852	1100	312	571	802
25	273	659	e430	3010	1850	2450	3700	778	1080	509	371	628
26	250	614	e410	2140	1660	1910	2930	693	607	325	335	531
27	288	600	e400	4010	3620	1470	2760	686	515	272	353	538
28	313	598	e390	2750	5300	1280	2160	745	465	253	347	3010
29	321	556	e370	2020	3150	1170	2640	641	423	254	313	2070
30	287	523	e360	e1400	---	1040	7300	595	398	417	294	1340
31	309	---	e360	e1100	---	905	---	533	---	588	282	---
TOTAL	13233	27671	14994	57874	40004	57490	55476	64392	34098	12693	12024	28758
MEAN	427	922	484	1867	1379	1855	1849	2077	1137	409	388	959
MAX	2050	3410	843	8080	5300	5200	7300	5790	4380	863	1050	3350
MIN	179	315	307	350	500	838	544	533	398	253	250	268

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1922 - 1996, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1922	364	1747	1955	65.8	1934
1923	636	2713	1986	74.9	1931
1924	926	2889	1978	115	1964
1925	1122	3585	1952	191	1945
1926	1307	3217	1959	194	1934
1927	1670	3008	1963	584	1931
1928	1457	3175	1957	243	1946
1929	940	2396	1984	120	1934
1930	614	2450	1989	111	1934
1931	459	1543	1992	82.9	1954
1932	358	1363	1992	62.3	1933
1933	371	1866	1979	61.0	1933

### SUMMARY STATISTICS

	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1922 - 1996
ANNUAL TOTAL	279921	418707	
ANNUAL MEAN	767	1144	853
HIGHEST ANNUAL MEAN			1393
LOWEST ANNUAL MEAN			278
HIGHEST DAILY MEAN	9270	Jan 16	16700 Jan 22 1959
LOWEST DAILY MEAN	179	Oct 2	21 Aug 28 1933
ANNUAL SEVEN-DAY MINIMUM	205	Sep 26	37 Aug 26 1933
INSTANTANEOUS PEAK FLOW		9680	24800 Jan 22 1959
INSTANTANEOUS PEAK STAGE		17.71	22.41 Jan 22 1959
INSTANTANEOUS LOW FLOW		160	21 Aug 28 1933
10 PERCENT EXCEEDS	1470	2740	2010
50 PERCENT EXCEEDS	512	661	480
90 PERCENT EXCEEDS	264	304	128

e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

04208000 CUYAHOGA RIVER AT INDEPENDENCE, OH--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1948 to September 1949, October 1950 to current year.

PERIOD OF DAILY RECORD.--

CHLORIDE: October 1987 to September 1994.

NITROGEN, NITRITE + NITRATE: October 1987 to September 1994.

NITROGEN, AMMONIA + ORGANIC: October 1987 to September 1994.

PHOSPHORUS: October 1987 to September 1994.

SUSPENDED SEDIMENT DISCHARGE: Water years 1950-74, December 1976 to September 1984, October 1987 to current year.

INSTRUMENTATION.--Alcohol-actuated thermograph October 1956 to June 1965, water-quality monitor from July 1965 to September 1991, and a refrigerated water-quality pumping sampler, operated by Heidelberg College Water Quality Laboratory, from October 1987 to September 1994.

REMARKS.--Sediment samples were collected by a local observer on an approximate once daily basis. Sediment loads were calculated using the mean-interval method (Porterfield, George, 1972, Computation of Fluvial-Sediment Discharge: U.S. Geological Survey, Techniques of Water Resources Investigations, Book 3, Chap. C3, 66 p.). For days with unsteady concentration, discharge, or both, the day was sub-divided into half-hour intervals and the daily load was calculated by summing the loads for these half-hour intervals. This required interpolation between measured and estimated concentrations.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 3,400 mg/L, Dec. 31, 1992; minimum daily mean, 1 mg/L, Feb. 12, 13, 1989.

SEDIMENT LOADS: Maximum daily, 82,900 tons, Dec. 31, 1992; minimum daily, 1.2 tons, Feb. 13, 1989.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATIONS: Maximum daily mean, 1,600 mg/L, Feb. 27; minimum daily mean, 4 mg/L, Nov. 6.

SEDIMENT LOADS: Maximum daily, 25,400 tons, Feb. 28; minimum daily, 3.5 tons, Nov. 6.

# STREAMS TRIBUTARY TO LAKE ERIE

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04208000 CUYAHOGA RIVER AT INDEPENDENCE, OH--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	SAM- PLING METHOD, CODES* (82398)	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 AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)
NOV							
08...	1145	10	790	714	7.8	2.0	6.5
08...	1250	50	772	--	--	--	--
MAY							
30...	1140	10	602	802	7.8	17.0	15.0
30...	1240	50	577	--	--	--	--

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDIMENT PARTICLE SIZE <.0625MM SILTCLAY (PERCENT) (80250)
NOV						
08...	90	1.9	0.8	0.26	57	90.2
08...	89	1.8	0.8	0.26	--	--
MAY						
30...	120	2.4	0.6	0.08	22	71.4
30...	120	2.5	0.6	0.08	--	--

\*10 - Stream cross-section sample using equal-width-increment (EWI) sampling method.

\*50 - Point sample obtained from flow tank.



## STREAMS TRIBUTARY TO LAKE ERIE

## 04208000 CUYAHOGA RIVER AT INDEPENDENCE, OH--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
OCTOBER			NOVEMBER			DECEMBER			
1	181	19	9.5	358	17	17	613	22	38
2	179	21	10	504	61	88	803	39	86
3	319	74	96	629	64	115	663	27	50
4	1060	387	1230	404	14	16	581	19	30
5	1020	352	2120	335	7	6.4	531	16	23
6	2050	612	4100	315	4	3.5	383	15	16
7	714	133	274	916	252	876	333	11	10
8	421	61	70	812	88	205	331	13	11
9	327	36	32	638	32	56	351	13	12
10	291	31	24	643	36	70	307	12	9.7
11	268	24	17	3410	573	6340	312	15	12
12	265	22	16	2380	316	2320	332	18	16
13	262	24	17	1350	112	420	340	20	18
14	363	46	51	938	62	159	843	138	474
15	418	46	55	1410	90	353	810	120	289
16	294	18	15	1140	49	154	519	31	45
17	283	13	10	968	34	90	437	13	15
18	270	25	18	1270	53	204	482	14	19
19	275	23	17	1430	59	232	682	48	88
20	332	26	28	1080	37	109	641	23	41
21	620	87	159	911	27	67	e550	15	23
22	376	24	25	818	23	51	e500	12	16
23	307	14	12	754	20	42	e480	11	14
24	297	17	14	708	18	35	e450	9	11
25	273	16	12	659	15	27	e430	9	10
26	250	7	5.0	614	16	27	e410	9	9.7
27	288	11	8.9	600	20	32	e400	8	8.5
28	313	18	15	598	22	35	e390	8	8.1
29	321	11	9.7	556	20	30	e370	8	7.7
30	287	10	7.6	523	13	19	e360	8	7.3
31	309	10	8.7	---	---	---	e360	7	6.7
TOTAL	13233	---	8486.4	27671	---	12198.9	14994	---	1424.7

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JANUARY			FEBRUARY			MARCH			
1	e450	10	12	e900	59	144	2260	254	1560
2	636	22	38	e780	48	102	2000	177	958
3	548	35	52	e700	41	78	1750	141	667
4	e520	48	67	e620	35	59	1340	115	415
5	e490	26	35	e570	30	47	2730	572	7060
6	e470	18	23	e540	27	39	3930	739	8750
7	e450	11	14	e520	35	49	2510	255	1770
8	e430	21	24	e700	136	257	1700	134	619
9	e420	12	14	1120	145	459	1470	104	413
10	e400	7	7.7	819	70	155	1280	92	316
11	e390	9	9.2	950	80	205	1200	84	271
12	e380	12	13	923	58	145	1130	81	246
13	e370	22	22	822	42	94	1070	71	206
14	e360	11	11	e730	33	66	1040	68	192
15	e360	12	12	e670	31	56	1030	73	204
16	e350	25	23	e610	30	50	930	55	139
17	e2500	752	5080	e560	26	39	877	38	91
18	4440	577	7100	e530	29	41	838	33	75
19	8080	1130	24800	e500	30	40	1410	104	1020
20	4990	496	6830	e1100	313	929	5200	1150	16700
21	3670	371	3690	2830	461	3550	3690	538	5460
22	3370	315	2870	2610	258	1830	2760	267	2010
23	3080	271	2250	2200	181	1080	2580	179	1250
24	4290	461	5410	2120	189	1080	2540	173	1180
25	3010	280	2310	1850	133	665	2450	169	1120
26	2140	215	1240	1660	114	514	1910	138	716
27	4010	617	7300	3620	1600	24800	1470	86	343
28	2750	264	2010	5300	1590	25400	1280	64	220
29	2020	152	832	3150	377	3270	1170	60	191
30	e1400	110	415	---	---	---	1040	62	174
31	e1100	89	266	---	---	---	905	51	125
TOTAL	57874	---	72779.9	40004	---	65243	57490	---	54461

e Estimated

## STREAMS TRIBUTARY TO LAKE ERIE

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## 04208000 CUYAHOGA RIVER AT INDEPENDENCE, OH--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
APRIL			MAY			JUNE			
1	986	41	110	4720	366	4740	507	20	27
2	981	36	95	3820	245	2560	547	36	53
3	868	30	70	2920	178	1410	676	38	69
4	831	27	61	2720	190	1400	775	64	133
5	801	20	44	2320	192	1200	728	79	156
6	714	19	36	2020	129	711	576	42	65
7	654	16	29	1560	105	445	1040	124	430
8	637	14	24	1380	88	330	2170	419	2810
9	640	13	23	1710	166	791	1600	220	965
10	612	11	19	1950	163	1140	1110	119	361
11	586	15	23	5260	870	13500	1250	188	927
12	544	17	25	5790	557	9370	2230	383	2390
13	618	20	35	3920	245	2620	1490	164	677
14	652	18	33	3140	199	1690	4380	975	13700
15	952	143	989	2830	170	1300	1930	210	1120
16	2360	581	4110	2720	146	1080	1180	115	372
17	1630	136	616	2130	140	805	980	106	282
18	1250	61	210	2240	114	693	950	84	220
19	1190	59	190	1550	88	370	1820	281	1400
20	1720	209	1110	1170	83	263	1680	247	1190
21	1310	78	285	932	92	232	764	89	188
22	1060	58	168	1100	74	221	610	53	88
23	5820	1130	23700	967	55	143	517	41	58
24	6570	672	12900	852	49	114	1100	584	2310
25	3700	335	3390	778	43	91	1080	287	1010
26	2930	266	2100	693	42	78	607	66	108
27	2760	213	1590	686	31	58	515	51	70
28	2160	179	1050	745	30	61	465	40	50
29	2640	274	2180	641	27	46	423	31	36
30	7300	585	11700	595	24	39	398	27	29
31	---	---	---	533	22	31	---	---	---
TOTAL	55476	---	66915	64392	---	47532	34098	---	31294

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JULY			AUGUST			SEPTEMBER			
1	389	25	26	489	52	70	274	15	11
2	368	24	24	376	32	33	268	13	9.3
3	378	26	26	313	24	20	277	16	12
4	339	21	19	294	21	17	289	15	11
5	318	16	14	289	20	16	279	15	12
6	300	14	11	289	24	19	279	16	12
7	320	15	13	280	14	11	3350	745	8510
8	368	25	26	280	15	11	1810	315	1710
9	344	28	26	643	414	898	1310	300	1260
10	325	27	23	377	77	82	1210	286	1170
11	302	28	22	316	43	37	666	69	128
12	303	26	21	330	39	34	1060	255	940
13	304	23	19	329	29	26	971	141	378
14	467	43	56	318	17	15	857	134	322
15	863	422	1300	410	108	213	702	90	173
16	579	134	227	605	360	672	567	44	68
17	813	185	502	337	59	57	898	153	605
18	519	79	111	277	30	23	1220	261	990
19	542	80	117	250	31	21	693	58	112
20	477	78	101	404	81	230	534	39	57
21	425	43	49	1050	870	3190	479	38	49
22	390	30	32	469	124	165	736	101	216
23	330	25	22	433	89	112	1110	139	425
24	312	26	25	571	127	229	802	67	147
25	509	286	422	371	37	37	628	38	65
26	325	66	59	335	34	31	531	28	40
27	272	31	23	353	37	35	538	36	52
28	253	19	13	347	25	23	3010	592	6390
29	254	21	14	313	20	17	2070	305	1770
30	417	133	209	294	21	16	1340	106	400
31	588	226	439	282	18	14	---	---	---
TOTAL	12693	---	3991	12024	---	6374	28758	---	26044.3
YEAR	418707		396744.2						

## STREAMS TRIBUTARY TO LAKE ERIE

04208504 CUYAHOGA RIVER AT LTV STEEL AT CLEVELAND, OH

LOCATION.--Lat 41°27'54", long 82°22'50", Cuyahoga County, Hydrologic Unit 04110002, on left bank, at LTV Steel Company footbridge, 1.2 mi downstream from Big Creek, 5.5 mi upstream from mouth at Cleveland.  
DRAINAGE AREA.--788 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1, 1991 to current year.

GAGE.--Water-stage and acoustic velocity meter recorder. Elevation of gage is 583.57 ft above sea level, from topographic map.

REMARKS.--Estimated daily discharges are marked in table. Records fair, except for periods of estimated record, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,500 ft<sup>3</sup>/s Aug. 13, 1994; minimum daily discharge, 310 ft<sup>3</sup>/s Aug. 29, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum discharge estimated, 10,500 ft<sup>3</sup>/s April 23; minimum daily discharge, 370 ft<sup>3</sup>/s Oct. 31.

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	599	974	1570	e740	e1500	e5600	1490	e6000	e840	e660	e800	515
2	572	1430	1830	e1000	e1200	e4000	1470	e5000	e950	e620	e600	519
3	1640	1420	1670	e900	e1000	e3300	1290	e4000	e1100	e580	e450	522
4	2600	1110	1350	e820	e900	e3000	1240	e3300	e1200	e540	373	553
5	e2500	927	1750	e760	e760	e5000	1230	e2900	e1100	e520	471	549
6	2790	824	646	e710	e720	e6400	1070	e2400	e1000	e500	566	678
7	1300	3570	460	e680	e700	e4500	1000	e2100	e2100	e540	527	6780
8	997	2590	370	e640	e1000	e2500	973	e1900	e3100	e600	541	2720
9	762	e1500	665	e620	e1500	1720	977	e2200	e2500	e540	972	2570
10	687	e1100	982	e600	e1100	1600	958	e5000	e2000	e490	705	2050
11	572	e5000	1830	e580	e1300	1650	905	e6800	e2500	e480	580	1130
12	596	2880	1360	e560	e1500	1540	844	e7600	e3100	e470	e530	2150
13	409	2500	1190	e540	e1200	1410	1120	e6000	e5000	e460	e530	2230
14	1410	1810	2650	e520	e1000	1220	1040	e4700	e6000	e900	559	1900
15	1220	2580	1560	e500	e920	1560	1410	e3600	e4000	e1200	655	1070
16	555	2340	952	e1400	e850	1380	2970	e3200	e2200	e1000	986	760
17	544	1890	704	e3500	e780	1270	2070	e2700	e1500	e1300	616	1430
18	611	2610	728	e6400	e720	1260	1620	e2900	e1900	e1000	546	1970
19	549	2750	1430	e8500	e700	1750	e1500	e2200	e2500	e820	496	909
20	908	2360	1880	e6000	e1200	5780	e2200	e1700	e2200	e700	950	688
21	1640	2000	e1400	e4500	e3700	4240	e1600	e1300	e1900	e640	2010	802
22	1150	1520	e1200	e4200	e3300	3350	e4000	e1400	e1000	e580	e1200	1470
23	1290	1430	e1100	e4000	e3000	3180	e6400	e1200	e900	e540	e720	1730
24	2670	1590	e1000	e5400	e2800	3220	e7000	e1100	e1300	e500	941	1210
25	2300	2090	e850	e4200	e2600	3440	e4600	e1000	e1500	e750	665	1000
26	660	2330	e780	e3500	e2500	2540	e3700	e980	e1100	e600	e620	890
27	640	2410	e720	e5200	e3500	1930	e3200	e960	e900	e500	631	860
28	841	1150	e680	e4000	e5000	1690	e2800	e1100	e820	e460	665	4610
29	814	1230	e640	e3100	e8000	1580	e6000	e960	e750	e450	597	2720
30	700	1710	e620	e2400	---	1440	e9000	e900	e700	e700	565	1790
31	887	---	e600	e1800	---	1300	---	e860	---	e950	542	---
TOTAL	35413	59625	35167	78270	54950	84350	75677	87960	57660	20590	21609	48775
MEAN	1142	1987	1134	2525	1895	2721	2523	2837	1922	664	697	1626
MAX	2790	5000	2650	8500	8000	6400	9000	7600	6000	1300	2010	6780
MIN	409	824	370	500	700	1220	844	860	700	450	373	515

CAL YR 1995 TOTAL 449594 MEAN 1232 MAX 9500 MIN 362  
WTR YR 1996 TOTAL 660046 MEAN 1803 MAX 9000 MIN 370

04208504 CUYAHOGA RIVER AT LTV STEEL AT CLEVELAND, OH--Continued  
 [(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

## WATER-QUALITY RECORDS

The data described in the following table was collected and analyzed as part of the NAWQA (National Water-Quality Assessment Program) project in the Lake Erie-Lake St. Clair Basin. The objectives of the NAWQA program are to broadly characterize the water-quality of the Nation's streams and aquifers in relation to human and natural factors. This project is one of 60 river basin and aquifer assessment projects being implemented across the nation. At any one time, 15 to 20 of these projects are actively collecting data. The period of high-intensity data collection for the Lake Erie-Lake St. Clair Basin project is in water years 1996-98.

There are four stream sites in Ohio for which data are being reported in this publication as part of the NAWQA study, Auglaize River near Ft. Jennings (04186500), Maumee River at Waterville (04193500), Cuyahoga River at LTV Steel at Cleveland (04208504), and Grand River at Harpersfield (04211820). Three sites are reported in the 1996 Michigan annual data report.; Black River near Jeddo, MI (04159492), Clinton River at Sterling Heights, MI (04161820) and River Raisin near Manchester, MI (04175600). Two Sites are reported in the 1996 Indiana annual data report; St. Joseph River near Newville, IN (04178000), and Maumee River at New Haven, IN (04183000). One site is reported in the 1996 New York annual data report; Cattaraugus Creek at Gowanda, NY (04213500).

These data also can be obtained electronically at <http://www-oh.er.usgs.gov/nawqa.index.html>.

(---, no data; <, concentration or value reported is less than that indicated; E, estimated value; K, value is estimated from a non-ideal colony count).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	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)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)	HARD- NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L) (00904)	CALCIUM DIS- SOLVED AS CA) (MG/L) (00915)	
			WATER WHOLE FIELD (STAND- ARD UNITS) (00400)			SURE							
MAR	27...	0900	877	7.7	0.0	4.5	760	12.0	93	2100	970	80	51
APR	10...	1130	1190	7.7	5.0	8.0	745	12.3	107	1600	120	99	66
	23...	1130	547	7.7	4.5	10.0	743	10.0	91	52000	36000	40	37
MAY	10...	0830	708	7.5	22.5	16.0	746	8.6	89	10000	7300	65	48
JUN	07...	0845	836	7.5	22.0	17.5	743	8.2	88	9300	8300	82	53
	27...	0900	970	7.7	27.0	21.0	753	7.2	82	3700	3400	94	68
JUL	24...	1130	1100	7.7	--	23.0	745	6.4	76	260	270	89	66
AUG	30...	0810	1120	7.8	25.0	22.5	750	6.6	78	21000	7000	65	72
SEP	11...	1400	850	7.8	22.0	22.0	743	7.6	89	2000	2100	84	58
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)	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)
MAR	27...	11	92	5.2	113	93	65	160	0.30	5.7	471	0.040	2.60
APR	10...	15	130	9.1	155	127	93	230	0.50	3.4	650	0.070	4.40
	23...	7.3	61	4.3	100	82	50	98	0.40	4.9	338	0.030	1.40
MAY	10...	10	65	5.1	117	96	63	110	0.50	4.1	394	0.040	2.20
JUN	07...	11	76	8.9	117	96	71	130	0.80	5.2	485	0.070	4.20
	27...	15	87	10	168	138	84	140	0.90	8.7	554	0.050	4.70
JUL	24...	15	100	15	168	138	100	170	1.0	7.4	646	0.030	7.60
AUG	30...	16	120	17	220	180	100	170	1.5	6.4	628	0.040	7.90
SEP	11...	13	75	7.7	139	114	77	120	0.60	8.8	469	0.030	2.90



## STREAMS TRIBUTARY TO LAKE ERIE

04208504 CUYAHOGA RIVER AT LTV STEEL AT CLEVELAND, OH--Continued  
 [(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	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)	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)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)
MAR 27...	0.130	0.90	0.60	0.120	0.040	0.020	51	64	5.2	2.4	91	<0.002
APR 10...	0.180	1.1	1.0	0.050	0.040	<0.010	82	110	6.6	1.2	8	<0.002
23...	0.230	2.5	0.80	0.680	0.040	0.030	56	75	6.0	14	2130	<0.002
MAY 10...	0.170	1.2	0.80	0.190	0.090	0.090	69	28	6.2	1.6	78	<0.002
JUN 07...	0.240	2.0	0.90	0.370	0.050	0.030	29	52	6.2	2.0	320	0.050
27...	0.130	1.4	1.0	0.210	0.130	0.130	39	51	7.6	0.90	50	0.022
JUL 24...	0.170	1.5	1.0	0.290	0.180	0.180	29	61	6.6	0.80	48	<0.002
AUG 30...	0.140	1.1	0.90	0.340	0.280	0.290	31	47	3.3	1.2	53	<0.002
SEP 11...	0.090	0.90	0.60	0.150	0.110	0.110	31	23	6.3	1.0	51	<0.002
DATE	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ATRA- ZINE, WATER, DISS, REC, (UG/L) (39632)	DEETHYL ATRA- ZINE, WATER, DISS, REC, (UG/L) (04040)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	P, P' DDE DISSOLV (UG/L) (34653)
MAR 27...	<0.002	0.020	E0.007	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006
APR 10...	0.020	0.200	E0.008	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006
23...	<0.002	0.030	E0.007	<0.001	<0.002	<0.002	E0.033	<0.003	0.007	<0.004	E0.003	<0.006
MAY 10...	<0.002	0.045	E0.009	<0.001	<0.002	<0.002	E0.110	<0.003	0.010	<0.004	<0.002	<0.006
JUN 07...	<0.002	0.099	E0.019	<0.001	<0.002	<0.002	<0.003	<0.003	0.019	<0.004	<0.002	<0.006
27...	0.021	0.340	E0.038	<0.001	<0.002	<0.002	E0.016	<0.003	0.025	0.080	<0.002	<0.006
JUL 24...	<0.002	0.164	E0.022	<0.001	<0.002	<0.002	<0.003	<0.003	0.021	0.030	<0.002	<0.006
AUG 30...	<0.002	0.080	E0.012	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006
SEP 11...	<0.002	0.056	E0.008	<0.001	<0.002	<0.002	E0.034	<0.003	<0.004	<0.004	<0.002	<0.006
DATE	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN, DIS- SOLVED (UG/L) (39381)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	LINDANE DIS- SOLVED (UG/L) (39341)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	MALA- THION, DIS- SOLVED (UG/L) (39532)
MAR 27...	0.010	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005
APR 10...	0.020	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005
23...	0.290	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005
MAY 10...	0.035	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005
JUN 07...	0.160	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005
27...	0.084	<0.001	<0.003	<0.017	E0.004	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	0.015
JUL 24...	0.068	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005
AUG 30...	0.063	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005
SEP 11...	0.071	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005

# STREAMS TRIBUTARY TO LAKE ERIE

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04208504 CUYAHOGA RIVER AT LTV STEEL AT CLEVELAND, OH--Continued  
[(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	METRI- BUZIN WATER DISSOLV (UG/L) (82630)	MOL- INATE WATER FLTRD GF, REC (UG/L) (82671)	NAPROP- AMIDE WATER FLTRD GF, REC (UG/L) (82684)	PARA- THION, DIS- SOLVED (UG/L) (39542)	METHYL PARA- THION WAT FLT GF, REC (UG/L) (82667)	PEB- ULATE WATER FILTRD GF, REC (UG/L) (82669)	PENDI- METH- ALIN WAT FLT GF, REC (UG/L) (82683)	PER- METHRIN CIS WAT FLT GF, REC (UG/L) (82687)	PHORATE WATER FLTRD GF, REC (UG/L) (82664)	PRO- METON, WATER, DISS, REC (UG/L) (04037)
MAR 27...	0.009	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.023
APR 10...	0.010	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	E0.015
23...	0.011	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.049
MAY 10...	0.012	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.054
JUN 07...	0.069	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.079
27...	0.120	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.089
JUL 24...	0.047	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.074
AUG 30...	0.019	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.063
SEP 11...	0.015	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.102
DATE	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)
MAR 27...	<0.003	<0.007	<0.004	<0.013	0.009	E0.003	<0.007	<0.013	<0.002	<0.001	<0.002
APR 10...	<0.003	<0.007	<0.004	<0.013	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
23...	<0.003	<0.007	<0.004	<0.013	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	E0.007
MAY 10...	<0.003	<0.007	<0.004	<0.013	0.050	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
JUN 07...	<0.003	<0.007	<0.004	<0.013	0.032	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
27...	<0.003	<0.007	<0.004	<0.013	0.064	0.030	E0.014	<0.013	<0.002	<0.001	<0.002
JUL 24...	<0.003	<0.007	<0.004	<0.013	0.026	<0.010	<0.007	<0.013	<0.002	<0.001	0.005
AUG 30...	<0.003	<0.007	<0.004	<0.013	<0.005	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
SEP 11...	<0.003	<0.007	<0.004	<0.013	0.031	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002

## STREAMS TRIBUTARY TO LAKE ERIE

## 04209000 CHAGRIN RIVER AT WILLOUGHBY, OH

LOCATION.--Lat 41°37'51", long 81°24'13", in T.9 N., R.10 W., Lake County, Hydrologic Unit 04110003, on left bank, 150 ft downstream from city waterworks dam, 800 ft downstream from East Branch, 1.0 mi southeast of Willoughby, and 5.0 mi upstream from mouth.

DRAINAGE AREA.--246 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1925 to November 1935, October 1939 to 1984, March 25, 1988 to September 1994, October 1, 1995 to September, 1996. (July 1925 to September 1932 monthly run-off in inches, adjusted for diversion, published in WSP 1307; previously published run-off was unadjusted and should not be used).

REVISED RECORDS.--WSP 1084: 1929 (M), 1931 (M). WSP 1307: 1926-28 (M), 1930 (M), 1932-35 (M), 1942 (M). WSP 1912: Drainage area. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is 594.57 ft above sea level. Prior to Dec. 20, 1939, nonrecording gage at site 150 ft upstream at datum 7 ft higher.

REMARKS.--Records good except for periods of estimated record, which are poor. Water diverted 200 ft upstream from station for municipal supply of city of Willoughby until 1988 when water treatment plant was relocated downstream of gaging station. Water-quality and sediment data collected at this site.

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	e32	e170	e230	e160	e230	529	202	1060	113	82	170	44
2	e36	e400	e180	e240	e200	479	228	652	123	74	103	42
3	e240	e350	e220	e200	e180	438	220	457	164	85	73	43
4	e440	e180	e200	e160	e170	425	215	444	204	76	64	41
5	e780	e130	e180	e150	e160	1170	246	431	235	66	60	40
6	e880	e140	e150	e140	e150	1500	199	395	143	60	59	43
7	e400	e820	e140	e140	e140	559	177	331	385	59	57	1060
8	e130	e440	e130	e130	e350	421	161	302	415	65	55	605
9	e90	e270	e120	e130	e592	400	151	288	262	57	53	338
10	e74	e500	e110	e120	411	378	152	419	218	54	49	357
11	e68	e2900	e110	e120	443	364	149	1880	303	56	45	182
12	e62	e1400	e100	e115	281	395	158	1470	592	54	45	377
13	e58	e700	e100	e110	165	453	481	542	313	53	46	644
14	e210	e600	e840	e105	e150	476	362	380	434	139	46	1490
15	e140	e1100	e560	e105	e140	467	564	353	266	264	164	388
16	e92	e750	e250	e100	e130	404	1530	381	174	233	160	242
17	e78	e500	e190	e1100	e120	360	462	942	147	250	92	272
18	e74	e940	e170	e2500	e115	340	294	507	192	171	64	342
19	e72	e940	e150	e5200	e110	539	233	351	278	169	58	261
20	e240	e600	e140	e2400	e300	3380	410	287	599	117	122	175
21	e190	e440	e200	e1000	1150	721	369	319	202	83	916	130
22	e130	e350	e170	e300	922	381	293	253	165	70	213	640
23	e100	e300	e150	e450	555	322	4820	205	131	63	196	630
24	e150	e250	e140	1260	468	395	3030	183	459	62	115	310
25	e120	e210	e130	649	339	952	794	164	315	138	68	205
26	e110	e180	e120	443	290	472	521	151	182	140	59	153
27	e120	e240	e120	1540	1150	284	470	153	131	100	54	164
28	e130	e210	e115	611	2410	244	376	155	111	69	60	2230
29	e180	e180	e110	402	731	226	396	146	97	59	52	676
30	e100	e160	e110	312	---	204	3250	131	89	182	47	293
31	e150	---	e110	e270	---	192	---	120	---	217	45	---
TOTAL	5676	16350	5745	20662	12552	17870	20913	13852	7442	3367	3410	12417
MEAN	183	545	185	667	433	576	697	447	248	109	110	414
MAX	880	2900	840	5200	2410	3380	4820	1880	599	264	916	2230
MIN	32	130	100	100	110	192	149	120	89	53	45	40
CFSM	.74	2.22	.75	2.71	1.76	2.34	2.83	1.82	1.01	.44	.45	1.68
IN.	.86	2.47	.87	3.12	1.90	2.70	3.16	2.09	1.13	.51	.52	1.88

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 1996, BY WATER YEAR (WY)

MEAN	154	306	418	480	552	693	549	359	210	130	123	129
MAX	976	850	1284	1312	1242	1234	1409	1088	781	698	602	641
(WY)	1927	1984	1991	1952	1982	1963	1957	1989	1947	1969	1992	1926
MIN	21.9	44.3	60.4	115	48.1	179	120	53.4	23.1	20.3	16.8	17.6
(WY)	1954	1965	1964	1977	1934	1990	1946	1934	1934	1934	1930	1933

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1925 - 1996

ANNUAL TOTAL	140256	
ANNUAL MEAN	383	340
HIGHEST ANNUAL MEAN		465
LOWEST ANNUAL MEAN		148
HIGHEST DAILY MEAN	5200	12300
LOWEST DAILY MEAN	32	3.0
ANNUAL SEVEN-DAY MINIMUM	43	7.0
INSTANTANEOUS PEAK FLOW	9500	28000
INSTANTANEOUS PEAK STAGE	11.15	17.95
INSTANTANEOUS LOW FLOW	32	3.0
ANNUAL RUNOFF (CFSM)	1.56	1.38
ANNUAL RUNOFF (INCHES)	21.21	18.79
10 PERCENT EXCEEDS	784	776
50 PERCENT EXCEEDS	202	150
90 PERCENT EXCEEDS	63	36
		1975
		1934
	Jan 19	Mar 22 1948
	Oct 1	Jul 25 1934
	Aug 31	Aug 25 1933
	Jan 19 e a	Mar 22 1948
	Jan 19 e	Mar 22 1948
	Oct 1	Jul 25 1934

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04211820 GRAND RIVER AT HARPERSFIELD, OH

LOCATION.--Lat 41°45'19", long 80°56'55", Ashtabula County, Hydrologic Unit 04110004, on left bank, 2000 ft downstream of bridge on State Highway 534, 0.25 mi south of Harpersfield, 4.85 mi upstream of Mill Creek confluence.  
DRAINAGE AREA.--552 mi².

### WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1996 to September 1996.

GAGE.--Water-stage recorder. Altitude of gage is 735 ft above sea level.

REMARKS.--Records excellent, except for periods of estimated record, which are fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,000 ft³/s Apr. 24, 1996, gage height, 9.15 ft; minimum daily discharge, 6.9 ft³/s Sept. 6, 1996..

### 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	---	---	---	---	---	2540	339	4950	73	115	82	12
2	---	---	---	---	---	2000	349	3310	67	92	70	11
3	---	---	---	---	---	1350	400	2680	68	76	58	9.9
4	---	---	---	---	---	815	421	2090	89	66	47	8.9
5	---	---	---	---	---	741	453	1540	135	60	39	7.8
6	---	---	---	---	---	2880	416	1160	198	50	31	6.9
7	---	---	---	---	---	2590	e360	880	366	42	25	47
8	---	---	---	---	---	1680	e310	632	768	44	21	183
9	---	---	---	---	---	1330	e280	465	1410	46	23	329
10	---	---	---	---	---	841	e250	547	1120	36	302	277
11	---	---	---	---	---	626	e225	4120	926	29	182	161
12	---	---	---	---	---	525	215	6310	1450	25	108	180
13	---	---	---	---	---	739	707	3630	3730	23	69	238
14	---	---	---	---	---	1440	1800	2500	2280	23	47	662
15	---	---	---	---	---	1870	1260	2110	1630	47	37	700
16	---	---	---	---	---	1430	4260	1330	1120	111	33	579
17	---	---	---	---	---	921	4420	751	532	155	29	341
18	---	---	---	---	---	651	2450	844	369	205	38	236
19	---	---	---	---	---	506	1710	1220	1020	531	41	178
20	---	---	---	---	---	2380	1270	819	1680	1540	35	128
21	---	---	---	---	---	3920	1080	513	969	538	32	92
22	---	---	---	---	---	3120	832	435	676	210	35	106
23	---	---	---	---	---	2820	3490	301	548	118	100	512
24	---	---	---	---	---	2530	9060	221	408	81	87	541
25	---	---	---	---	---	2120	5060	170	561	65	56	292
26	---	---	---	---	---	1460	3340	136	751	55	39	177
27	---	---	---	---	---	914	2580	118	746	43	29	122
28	---	---	---	---	---	620	1470	107	502	36	22	1730
29	---	---	---	---	---	480	803	94	249	35	18	4270
30	---	---	---	---	---	402	3000	86	157	54	16	2070
31	---	---	---	---	---	345	---	79	---	89	13	---
TOTAL	---	---	---	---	---	46586	52610	44148	24598	4640	1764	14207.5
MEAN	---	---	---	---	---	1503	1754	1424	820	150	56.9	474
MAX	---	---	---	---	---	3920	9060	6310	3730	1540	302	4270
MIN	---	---	---	---	---	345	215	79	67	23	13	6.9

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

	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996
MEAN	---	---	---	---	---	1503	1754	1424	820	150	56.9	474
MAX	---	---	---	---	---	1503	1754	1424	820	150	56.9	474
(WY)	---	---	---	---	---	1996	1996	1996	1996	1996	1996	1996
MIN	---	---	---	---	---	1503	1754	1424	820	150	56.9	474
(WY)	---	---	---	---	---	1996	1996	1996	1996	1996	1996	1996



## STREAMS TRIBUTARY TO LAKE ERIE

04211820 GRAND RIVER AT HARPERSFIELD, OH--Continued  
 [(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

## WATER-QUALITY RECORDS

The data described in the following table was collected and analyzed as part of the NAWQA (National Water-Quality Assessment Program) project in the Lake Erie-Lake St. Clair Basin. The objectives of the NAWQA program are to broadly characterize the water-quality of the Nation's streams and aquifers in relation to human and natural factors. This project is one of 60 river basin and aquifer assessment projects being implemented across the nation. At any one time, 15 to 20 of these projects are actively collecting data. The period of high-intensity data collection for the Lake Erie-Lake St. Clair Basin project is in water years 1996-98.

There are four stream sites in Ohio for which data are being reported in this publication as part of the NAWQA study, Auglaize River near Ft. Jennings (04186500), Maumee River at Waterville (04193500), Cuyahoga River at LTV Steel at Cleveland (04208504), and Grand River at Harpersfield (04211820). Three sites are reported in the 1996 Michigan annual data report.; Black River near Jeddo, MI (04159492), Clinton River at Sterling Heights, MI (04161820) and River Raisin near Manchester, MI (04175600). Two Sites are reported in the 1996 Indiana annual data report; St. Joseph River near Newville, IN (04178000), and Maumee River at New Haven, IN (04183000). One site is reported in the 1996 New York annual data report; Cattaraugus Creek at Gowanda, NY (04213500).

These data also can be obtained electronically at <http://www-oh.er.usgs.gov/nawqa.index.html>.

(---, no data; <, concentration or value reported is less than that indicated; E, estimated value; K, value is estimated from a non-ideal colony count).

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

		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 AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, UM-MF (COLS./100 ML) (31625)	E. COLI WATER WHOLE TOTAL UREASE (COL /100 ML) (31633)	HARD-NESS NONCARB DISSOLV FLD. AS CACO3 (MG/L) (00904)	
MAR	26...	0915	1410	218	7.3	0.0	4.5	749	12.3	97	110	85	32
APR	11...	0915	225	305	7.9	16.0	6.5	739	13.0	109	42	<14	35
	24...	0930	10200	140	7.2	11.0	8.5	743	10.6	93	2300	1900	17
MAY	09...	0915	485	221	7.4	15.0	13.5	745	9.5	93	K40	K40	20
JUN	06...	0930	192	330	7.9	24.0	18.5	744	9.2	101	220	160	31
	26...	1045	739	243	7.4	26.0	21.0	750	7.4	84	250	290	15
JUL	25...	0900	62	246	7.8	21.0	22.5	740	8.2	98	90	K62	26
AUG	29...	0815	19	375	8.1	27.0	23.5	746	8.0	97	K100	K170	35
SEP	12...	0915	182	408	7.6	21.0	21.0	742	7.9	91	570	320	60
DATE		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 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)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
MAR	26...	17	4.4	16	2.0	35	29	22	27	<0.10	4.1	131	<0.010
APR	11...	25	6.7	21	2.2	67	55	34	35	0.10	1.7	171	<0.010
	24...	13	3.0	8.4	2.0	34	28	15	14	0.10	4.0	103	<0.010
MAY	09...	20	5.0	12	1.8	62	50	23	18	0.10	3.3	143	0.010
JUN	06...	35	8.7	18	2.3	113	93	29	26	0.10	2.7	191	<0.010
	26...	24	6.3	11	2.5	87	71	16	16	0.20	6.4	160	0.030
JUL	25...	24	6.1	12	3.3	72	59	20	18	0.20	5.6	157	0.020
AUG	29...	36	9.5	20	3.4	115	94	31	31	0.20	3.0	213	0.010
SEP	12...	35	8.8	25	3.7	77	63	33	39	0.20	4.7	230	0.020

## STREAMS TRIBUTARY TO LAKE ERIE

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04211820 GRAND RIVER AT HARPERSFIELD, OH--Continued  
 [(National Water-Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	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)	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)
MAR 26...	0.630	0.030	0.50	0.30	0.060	0.050	0.010	110	25	5.1	1.4	--
APR 11...	0.110	<0.015	0.40	0.30	0.030	<0.010	<0.010	200	41	5.4	1.2	9
24...	0.480	0.050	1.2	0.60	0.130	0.060	0.020	230	44	8.8	3.1	243
MAY 09...	0.220	0.040	0.60	0.50	0.050	0.030	0.040	290	49	7.6	0.60	19
JUN 06...	0.140	0.030	0.70	0.40	0.060	0.010	0.010	270	25	7.2	1.3	18
26...	0.470	0.050	0.90	0.70	0.100	0.040	0.040	630	65	12	1.0	36
JUL 25...	0.790	0.030	1.2	0.70	0.070	<0.010	0.020	210	35	9.2	1.7	16
AUG 29...	0.120	0.040	0.60	0.50	0.080	0.020	<0.010	32	11	7.1	1.0	3
SEP 12...	0.320	0.050	0.70	0.50	0.070	0.020	0.020	82	32	6.8	1.0	31
DATE	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)
MAR 26...	0.005	0.005	0.034	E0.008	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	<0.004	<0.002
APR 11...	<0.002	<0.002	0.022	E0.007	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	<0.004	<0.002
24...	<0.002	<0.002	0.064	E0.013	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	<0.004	<0.002
MAY 09...	<0.002	<0.002	0.050	E0.010	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	<0.004	<0.002
JUN 06...	0.018	0.008	0.098	E0.013	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	<0.004	<0.002
26...	0.070	0.037	1.50	E0.100	<0.001	<0.002	<0.002	E0.007	<0.003	<0.004	0.042	<0.002
JUL 25...	0.066	0.065	2.31	E0.211	<0.001	<0.002	<0.002	E0.031	<0.003	0.005	0.039	<0.002
AUG 29...	0.013	<0.002	0.942	E0.099	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	0.091	<0.002
SEP 12...	0.086	0.005	0.828	E0.062	<0.001	<0.002	<0.002	<0.003	<0.003	<0.004	0.113	<0.002
DATE	P, P' DDE DISSOLV (UG/L) (34653)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	LINDANE DIS- SOLVED (UG/L) (39341)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)
MAR 26...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
APR 11...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
24...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
MAY 09...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
JUN 06...	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
26...	<0.006	0.005	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
JUL 25...	<0.006	0.005	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	0.054
AUG 29...	<0.006	0.049	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002
SEP 12...	<0.006	0.013	<0.001	<0.003	<0.017	<0.002	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002

## STREAMS TRIBUTARY TO LAKE ERIE

04211820 GRAND RIVER AT HARPERSFIELD, OH--Continued  
 [(National Water Quality Assessment Program), Lake Erie-Lake St. Clair Basin Study Unit]

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	MALA- THION, DIS- SOLVED (UG/L) (39532)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PARA- THION, DIS- SOLVED (UG/L) (39542)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	PRO- METON, WATER, DISS, REC (UG/L) (04037)
MAR 26...	<0.005	0.014	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	E0.006
APR 11...	<0.005	0.012	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	E0.005
24...	<0.005	0.029	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	E0.006
MAY 09...	<0.005	0.013	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	E0.006
JUN 06...	<0.005	0.031	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	E0.013
26...	0.008	0.880	0.038	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.024
JUL 25...	<0.005	1.19	0.073	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.055
AUG 29...	<0.005	0.254	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.026
SEP 12...	<0.005	0.194	<0.004	<0.004	<0.003	<0.004	<0.006	<0.004	<0.004	<0.005	<0.002	0.040

DATE	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)
MAR 26...	<0.003	<0.007	<0.004	<0.013	0.007	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
APR 11...	<0.003	<0.007	<0.004	<0.013	0.009	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
24...	<0.003	<0.007	<0.004	<0.013	0.028	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
MAY 09...	<0.003	<0.007	<0.004	<0.013	0.023	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
JUN 06...	<0.003	<0.007	<0.004	<0.013	0.014	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
26...	<0.003	<0.007	<0.004	<0.013	0.047	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
JUL 25...	<0.003	<0.007	<0.004	<0.013	0.167	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
AUG 29...	<0.003	<0.007	<0.004	<0.013	0.046	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002
SEP 12...	<0.003	<0.007	<0.004	<0.013	0.041	<0.010	<0.007	<0.013	<0.002	<0.001	<0.002

# STREAMS TRIBUTARY TO LAKE ERIE

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## 04212100 GRAND RIVER NEAR PAINESVILLE, OH

LOCATION.--Lat 41°43'08", long 81°13'41", Lake County, Hydrologic Unit 04110004, on downstream left abutment of bridge on State Highway 84 (Walnut Avenue), 0.9 mi downstream from Big Creek in Painesville.

DRAINAGE AREA.--685 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1974 to current year.

GAGE.--Water-stage recorder. Datum of gage is 596.37 ft above sea level. Previously published, in error, as 620.37 ft above sea level.

REMARKS.--Records good except periods of estimated record, which are poor. Water-quality data collected at this site.

### 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	12	106	667	e430	e820	3050	493	5720	114	179	168	30
2	15	160	569	e1000	e660	2370	525	4090	108	138	126	26
3	17	347	518	e830	e580	1720	607	3150	111	122	101	24
4	37	553	587	e700	e520	1300	637	2560	172	100	85	24
5	66	493	557	e620	e470	1610	753	1930	278	87	65	23
6	381	452	479	e550	e430	3500	642	1540	233	80	55	23
7	302	1100	395	e520	e410	2330	555	1210	647	70	48	559
8	254	1830	335	e480	e900	2040	475	924	790	62	41	442
9	212	1310	291	e440	2470	1530	408	740	1420	62	38	425
10	136	841	e260	e410	2690	1200	366	902	1300	64	127	490
11	82	4100	e240	e400	3800	884	341	4660	1410	53	299	310
12	56	5890	e230	e380	2370	745	345	6990	1920	45	185	343
13	44	3830	e230	e350	e750	1000	1290	4500	3780	41	121	481
14	39	1950	e600	e330	e520	1930	2140	2840	2690	51	84	1780
15	130	2650	2780	e310	e410	2470	2080	2430	1770	118	148	1470
16	172	2810	3590	e300	e360	1840	5190	1760	1340	122	122	959
17	180	1890	2250	e2500	e340	1240	5240	1320	821	156	58	670
18	153	1760	1350	6680	e310	927	3080	1120	573	218	48	839
19	107	2450	866	13200	e300	753	2130	1400	949	530	51	404
20	80	2710	2550	11500	e280	2750	1850	1140	2490	1450	60	269
21	145	2360	3280	6860	e2500	4550	1530	850	1350	965	131	194
22	548	1890	e2300	5300	4670	3690	1270	717	863	381	68	603
23	381	1520	e1600	4240	3930	3170	6410	511	768	206	57	964
24	231	1210	e1300	4740	3350	3020	9370	367	960	135	138	851
25	158	944	e1000	4110	2850	4420	6090	279	731	136	107	538
26	108	772	e800	2480	1980	2450	3830	223	836	98	75	332
27	82	843	e700	4150	1870	1330	3120	194	874	81	59	235
28	79	1290	e600	4190	5480	947	1960	174	732	71	48	2390
29	80	1240	e550	2530	4730	751	1180	157	433	55	43	4500
30	77	910	e480	1920	---	622	4590	138	256	147	36	2710
31	87	---	e450	1300	---	533	---	124	---	149	32	---
TOTAL	4451	50211	32404	83750	50750	61572	68497	54660	30719	6172	2824	22908
MEAN	144	1674	1045	2702	1750	1986	2283	1763	1024	199	91.1	764
MAX	548	5890	3590	13200	5480	4550	9370	6990	3780	1450	299	4500
CFSM	.21	2.44	1.53	3.94	2.55	2.90	3.33	2.57	1.49	.29	.13	1.11
IN.	.24	2.73	1.76	4.55	2.76	3.34	3.72	2.97	1.67	.34	.15	1.24

### STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1996, BY WATER YEAR (WY)

MEAN	483	1245	1582	1429	1844	2041	1489	796	624	294	291	447
MAX	1880	4026	3816	3327	4044	3753	2598	3214	2851	1106	1106	1854
(WY)	1991	1986	1978	1993	1981	1993	1987	1989	1986	1987	1980	1990

### SUMMARY STATISTICS

#### FOR 1995 CALENDAR YEAR

#### FOR 1996 WATER YEAR

#### WATER YEARS 1975 - 1996

ANNUAL TOTAL	289959.8	468918	
ANNUAL MEAN	794	1281	1042
HIGHEST ANNUAL MEAN			1375
HIGHEST DAILY MEAN	12100	Jan 16	15300
LOWEST DAILY MEAN	7.1	Sep 12	5.1
ANNUAL SEVEN-DAY MINIMUM	7.6	Sep 7	5.3
INSTANTANEOUS PEAK FLOW			18700
INSTANTANEOUS PEAK STAGE		11.66	Jan 19
INSTANTANEOUS LOW FLOW		12	Oct 1
ANNUAL RUNOFF (CFSM)	1.16	1.87	5.1
ANNUAL RUNOFF (INCHES)	15.75	25.47	1.52
10 PERCENT EXCEEDS	2320	3530	20.67
50 PERCENT EXCEEDS	291	600	2810
90 PERCENT EXCEEDS	17	66	420
			42

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated



LOCATION.--Lat 41°55'37", long 80°36'15", Ashtabula County, Hydrologic Unit 04120101, on right bank at downstream side of Keefus Road bridge at Conneaut, and 6.4 mi upstream from mouth.

DRAINAGE AREA.--175 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1922 to December 1935, March 1950 to September 1961 (published as "at Amboy"), October 1961 to current year.

REVISED RECORDS.--WSP 714: 1926. WSP 784: 1933. WSP 1437: 1923-25(M), 1926-30, 1931-32(M), 1933, 1935(M). WSP 1912: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 610.30 ft above sea level. Prior to Aug. 17, 1924, nonrecording gage at same site and datum.

REMARKS.--Records fair, except for periods of estimated record, which are poor. Water-quality and sediment data collected at this site.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e4.5	e30	e216	e110	e190	409	121	2400	e31	e46	e70	10
2	e5.2	e40	210	e270	e150	280	135	982	e29	e39	e56	10
3	e6.0	e63	183	e210	e130	232	164	550	e27	e35	e49	9.6
4	e12	131	200	e180	e110	187	148	466	e26	e31	e43	8.8
5	e30	105	e260	e150	e100	248	137	466	e90	e28	e37	8.4
6	e140	85	e180	e130	e90	1020	134	399	153	e25	e33	8.2
7	e90	126	e140	e120	e84	887	123	339	145	e23	e30	53
8	e65	427	e100	e110	e260	391	109	e270	1030	e21	e26	71
9	e45	314	e80	e100	e580	267	97	e220	1040	e20	e24	70
10	e19	156	e70	e94	e700	656	94	e200	295	e18	e22	62
11	e14	489	e64	e90	e1100	942	98	e2700	371	e17	e110	43
12	e11	2100	e58	e86	e480	167	108	3700	1030	e16	e56	105
13	e9.4	1610	e56	e80	e160	249	266	1650	611	e14	e28	97
14	e8.0	459	e190	e76	e130	530	1470	447	265	e13	e20	260
15	e35	911	e740	e74	e100	760	664	277	164	e50	e30	293
16	e54	1030	e1100	e72	e88	477	1430	223	120	e64	46	301
17	e60	621	e450	e560	e80	275	1890	193	92	e80	29	362
18	e40	495	e270	e2300	e74	204	678	161	348	e250	22	1930
19	25	800	e230	e5000	e70	174	358	138	3610	e600	20	860
20	25	1110	e700	e3800	e700	204	382	120	2730	e1000	27	220
21	44	875	e860	e1500	e2000	610	538	105	2050	e500	45	118
22	25	679	e600	e1100	2220	398	367	146	e500	e200	54	142
23	53	479	e450	e1000	1220	272	1480	e140	e100	e100	47	847
24	38	367	e330	e1300	688	310	4100	e110	e170	e80	33	772
25	28	287	e250	e1000	492	484	1700	e84	e120	e58	24	230
26	22	236	e200	e580	308	388	538	e66	e130	e45	19	131
27	e18	278	e170	e1200	262	274	378	e56	e150	e36	17	93
28	20	669	e150	e1100	1310	186	306	e50	e110	e30	15	772
29	20	582	e130	e660	1390	158	272	e44	e72	e26	13	2680
30	20	306	e120	e400	---	140	1030	e39	e56	e50	12	965
31	23	---	e110	e280	---	124	---	e35	---	e58	11	---
TOTAL	1009.1	15860	8867	23732	15266	11903	19315	16776	15665	3573	1068	11532.0
MEAN	32.6	529	286	766	526	384	644	541	522	115	34.5	384
MAX	140	2100	1100	5000	2220	1020	4100	3700	3610	1000	110	2680
MIN	4.5	30	56	72	70	124	94	35	26	13	11	8.2
CFSM	.19	3.02	1.63	4.37	3.01	2.19	3.68	3.09	2.98	.66	.20	2.20
IN.	.21	3.37	1.88	5.04	3.25	2.53	4.11	3.57	3.33	.76	.23	2.45

MEAN	136	317	418	417	460	540	391	231	131	78.3	67.4	108
MAX	804	1373	1049	929	1115	987	839	670	1013	415	493	709
(WY)	1927	1986	1928	1990	1981	1972	1957	1953	1986	1969	1980	1990
MIN	4.95	17.1	35.1	81.0	39.6	235	69.9	20.2	5.46	2.79	3.19	3.56
(WY)	1924	1954	1961	1977	1934	1969	1935	1934	1934	1934	1923	1932

ANNUAL TOTAL	69758.8		144566.1				
ANNUAL MEAN	191		395		274		
HIGHEST ANNUAL MEAN					401		1986
LOWEST ANNUAL MEAN					140		1931
HIGHEST DAILY MEAN	2100	Nov 12	5000	Jan 19	11000		Jan 31 1968
LOWEST DAILY MEAN	1.8	Sep 11	4.5	Oct 1		.30	Jul 30 1933
ANNUAL SEVEN-DAY MINIMUM	2.1	Sep 7	9.4	Aug 31		.64	Aug 27 1933
INSTANTANEOUS PEAK FLOW			7200	Jan 19 e a	17000		Jan 22 1959
INSTANTANEOUS PEAK STAGE			8.79	Jan 19 e		12.94	Mar 4 1934
INSTANTANEOUS LOW FLOW			4.5	Oct 1		.20	Jul 31 1933
ANNUAL RUNOFF (CFSM)	1.09		2.26			1.57	
ANNUAL RUNOFF (INCHES)	14.83		30.73			21.27	
10 PERCENT EXCEEDS	511		1030		680		
50 PERCENT EXCEEDS	70		145		96		
90 PERCENT EXCEEDS	5.4		22		10		

a Peaks above base shown in Table of peak discharges and stages at continuous-record surface-water-discharge stations.  
e Estimated

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or flood-flow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in 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.

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 discharge for crest-stage stations. A crest-stage gage is a device that will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained, but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

## Maximum discharge at crest-stage partial-record stations

Station name and number	Location and drainage area	Period of record	Water year 1996 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> / s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> / s)
LAKE ERIE BASIN								
Astabula River nr Astabula, Oh. (04212500)	Lat 41°51'20", long 80°45'44", Astabula County, Hydrologic Unit 04110003, on left bank at downstream side of State Road bridge, 1.1 mi upstream from Hubbard Run, 1.3 mi southeast of Astabula, and 5.5 mi upstream from mouth. Drainage area is 121 mi <sup>2</sup> .	1924-35 ≠ 1950-80 ≠ 1994-96	1-17-96	5.52	5,240	1-22-59	11.03	11,600

\* Operated as a continuous-record station

# 98 PEAK DISCHARGES AND STAGES AT CONTINUOUS-RECORD SURFACE DISCHARGE STATIONS

For continuous-record surface-water-discharge stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented in this table. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. The peaks are listed in chronological order. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by human intervention. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030 and 1:30 p.m. is 1330. The maximum peak discharge and gage height for the water year are flagged with an asterisk (\*). Note - a = From Highwater Mark, b = Ice Jam, c = Observed, e = Estimated.

Peak discharges equal to or greater than base discharges, water year October 1995 to September 1996

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
STREAMS TRIBUTARY TO LAKE ERIE							
04177000 OTTAWA RIVER AT TOLEDO UNIVERSITY, TOLEDO, OH (Base discharge: 1,150 ft <sup>3</sup> /s)							
Mar. 26	0930	1,320	9.60	Jan. 20	1300	*1,580	*10.39
Apr. 21	1700	1,280	9.48				
04185000 TIFFIN RIVER AT STRYKER, OH (Base discharge: 1,850 ft <sup>3</sup> /s)							
Apr. 23	0200	2,540	12.97	Jun. 20	1500	*4,350	*15.16
May. 12	2300	2,060	12.27				
04185440 UNNAMED TRIBUTARY TO LOST CREEK NR FARMER, OH (Base discharge: 120 ft <sup>3</sup> /s)							
Feb. 27	1445	132	3.44	Jun. 9	1145	*219	*3.95
Apr. 22	1345	142	3.51	Jun. 18	1030	133	3.45
May 10	0630	145	3.53	Jun. 24	0815	138	3.48
May 17	0445	185	3.77				
04186500 AUGLAIZE RIVER NEAR FORT JENNINGS, OH (Base discharge: 2,700 ft <sup>3</sup> /s)							
Jan. 19	1330	*e8,780	*e17.40	May 1	0900	3,100	11.73
Feb. 28	2100	3,550	12.48	May 12	1030	3,340	12.15
Apr. 25	0030	3,630	12.60	Jul. 19	2000	4,240	13.45
04187100 OTTAWA RIVER AT LIMA, OH (Base discharge: 1,300 ft <sup>3</sup> /s)							
Jan. 18	2400	*3,200	*16.03	Apr. 30	0900	1,640	13.52
Feb. 28	0700	2,790	15.34	May 11	0330	1,520	13.34
Apr. 23	1800	2,180	14.36	Jul. 18	0900	1,640	13.52
04189000 BLANCHARD RIVER NEAR FINDLAY, OH (Base discharge: 2,800 ft <sup>3</sup> /s)							
Jan. 20	0030	*5,340	*12.31	Apr. 30	2230	2,870	8.42
Apr. 24	0400	2,740	8.13	May 11	1630	3,160	9.04
4192500 MAUMEE RIVER NEAR DEFIANCE, OH (Base discharge: 23,000 ft <sup>3</sup> /s)							
Jan. 19	1800	*45,400	*8.29	May 12	1700	24,400	6.06
Feb. 28	1700	24,000	5.58	May 18	0800	30,500	6.73
Apr. 24	1800	26,800	6.33				
04195500 PORTAGE RIVER AT WOODVILLE, OH (Base discharge: 3,500 ft <sup>3</sup> /s)							
Jan. 19	1900	*5,560	*10.24	Apr. 24	1300	4,140	8.97
Feb. 28	1730	4,020	8.85	May 12	0530	3,680	8.51
Mar. 21	0130	3,860	8.69				
04196000 SANDUSKY RIVER NEAR BUCYRUS, OH (Base discharge: 1,200 ft <sup>3</sup> /s)							
Nov. 12	0400	1,450	6.17	Apr. 1	1730	1,680	6.65
Jan. 18	0800	*4,550	*9.15	Apr. 24	0600	2,540	7.98
Jan. 24	1700	1,480	6.24	Apr. 30	1830	1,780	6.85
Feb. 24	0300	1,810	6.90	Jun. 8	1330	1,710	6.71
Mar. 20	1000	1,250	5.72				
04196800 TYMOCHTEE CREEK AT CRAWFORD, OH (Base discharge: 1,800 ft <sup>3</sup> /s)							
Jan. 19	1830	Unknown	*b8.79	Apr. 25	0900	3,210	7.40
Jan. 20	1630	*4,830	8.58	May 1	2200	2,570	6.84
Feb. 29	0100	3,590	7.70				

**PEAK DISCHARGES AND STAGES AT CONTINUOUS-RECORD SURFACE DISCHARGE STATIONS**
**99**

Peak discharges equal to or greater than base discharges, water year October 1995 to September 1996 (Continued)

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
04197100 HONEY CREEK AT MELMORE, OH (Base discharge: 1,500 ft <sup>3</sup> /s)							
Jan. 19	0400	*3,110	*9.55	Apr. 24	1330	1,920	7.79
Feb. 28	1330	2,150	8.16				
04198000 SANDUSKY RIVER NEAR FREMONT, OH (Base discharge: 10,000 ft <sup>3</sup> /s)							
Jan. 19	1700	*16,300	*8.07	May 1	0030	10,600	6.27
Feb. 28	1400	15,300	7.72	May 11	1830	12,800	6.95
Apr. 24	0900	12,500	6.85				
04199000 HURON RIVER AT MILAN, OH (Base discharge: 4,700 ft <sup>3</sup> /s)							
Feb. 28	0515	8,250	17.55	Apr. 23	2245	*8,540	*17.79
Mar. 25	0345	5,110	14.64	May 11	0930	6,970	16.44
04199155 OLD WOMAN'S CREEK AT BERLIN ROAD NEAR HURON, OH (Base discharge: 400 ft <sup>3</sup> /s)							
Jan. 17	1745	*1,020	*9.96	Apr. 30	1030	429	7.32
Feb. 28	0300	499	7.77	May 11	0145	814	9.27
Mar. 20	0200	407	7.16	Jun. 20	0130	534	7.97
Mar. 25	0030	675	8.70	Sep. 28	1115	632	8.51
Apr. 23	1700	1,010	9.93				
04200500 BLACK RIVER AT ELYRIA, OH (Base discharge: 3,200 ft <sup>3</sup> /s)							
Jan. 19	1100	*9,120	*14.09	May 1	0230	3,870	9.06
Feb. 28	2330	5,650	11.01	May 12	0430	3,900	9.09
Mar. 20	2230	3,480	8.57	Sep. 28	2200	4,240	9.49
Apr. 24	1830	6,570	11.90				
04201500 ROCKY RIVER NEAR BERE, OH (Base discharge: 4,000 ft <sup>3</sup> /s)							
Nov. 11	2130	4,360	4.78	Apr. 24	0230	*8,680	*6.63
Jan. 19	0915	6,910	5.89	Apr. 30	1400	5,400	5.27
Feb. 28	0145	6,500	5.73	May 11	2100	4,260	4.73
Mar. 6	0315	4,060	4.63	Sep. 7	1330	5,520	5.32
Mar. 20	0630	4,710	4.95	Sep. 28	1530	4,980	5.08
04206208 YELLOW CREEK AT GHENT, OH (Base discharge: 140 ft <sup>3</sup> /s - Revised)							
Jan. 19	0815	*204	*12.74	Apr. 30	0825	165	12.54
Apr. 23	1725	174	12.59	May 11	1655	174	12.59
04206210 NORTH FORK AT BATH, OH (Base discharge: 140 ft <sup>3</sup> /s - Revised)							
Jan. 19	0500	*252	*13.00	Feb. 27	1345	185	12.54
04206211 PARK CREEK AT BATH CENTER, OH (Base discharge: 60.0 ft <sup>3</sup> /s - Revised)							
Jan. 19	0405	65	12.48	May 10	1705	*85	*13.09
Apr. 23	1135	64	12.46				
04206212 NORTH FORK AT BATH CENTER, OH (Base discharge: 230 ft <sup>3</sup> /s - Revised)							
Jan. 19	0445	*309	*11.85				
04206215 BATH CREEK AT BATH CENTER, OH (Base discharge: 80.0 ft <sup>3</sup> /s - Revised)							
Jan. 19	0535	*131	*13.85	Apr. 30	0750	88	13.42
Apr. 23	1630	114	13.69	May 11	1530	98	13.53
04206220 YELLOW CREEK AT BOTZUM, OH (Base discharge: 650 ft <sup>3</sup> /s - Revised)							
Jan. 19	0505	*930	*14.12				
04207200 TINKERS CREEK AT BEDFORD, OH (Base discharge: 1,500 ft <sup>3</sup> /s)							
Jan. 19	Unknown	*e2,300	*e6.77	Apr. 30	Unknown	2,100e	Unknown
Apr. 23	Unknown	e2,000	Unknown				



# 100 PEAK DISCHARGES AND STAGES AT CONTINUOUS-RECORD SURFACE DISCHARGE STATIONS

Peak discharges equal to or greater than base discharges, water year October 1995 to September 1996 (Continued)

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
04209000 CHAGRIN RIVER AT WILLOUGHBY, OH (Base discharge: 4,000 ft <sup>3</sup> /s)							
Nov. 11	Unknown	e4,500	Unknown	Apr. 23	1700	8,810	10.66
Jan. 19	Unknown	*e9,500	*e11.15	Apr. 30	0730	4,940	7.89
Feb. 28	0400	4,080	7.26	Sep. 14	0230	4,060	7.24
Mar. 20	0130	5,940	8.64	Sep. 28	1130	4,980	7.92
04212100 GRAND RIVER NEAR PAINESVILLE, OH (Base discharge: 6,500 ft <sup>3</sup> /s)							
Nov. 11	1930	6,930	7.38	Apr. 23	1500	10,900	9.52
Jan. 19	1000	*15,500	*11.66	May 12	0300	7,550	7.78
Feb. 21	0300	9,370	8.76				
04213000 CONNEAUT CREEK AT CONNEAUT, OH (Base discharge: 2,900 ft <sup>3</sup> /s)							
Jan. 19	Unknown	*e7,200	*e8.79	Jun. 19	0500	5,270	7.66
Apr. 24	1700	5,010	7.49	Sep. 29	1830	3,110	5.96
May 12	0100	4,580	7.20				

## GROUND-WATER RECORDS

101

## CRAWFORD COUNTY

404838082563100. Local number, CR-1.

LOCATION.--Lat 40°48'38", long 82°56'31", Hydrologic Unit 04100011, Timken Roller Bearing Co., U.S. 30 in Bucyrus.

Owner: Timken Roller Bearing Co.

AQUIFER.--Sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled test water-table well, diameter 6 in., depth 54 ft, cased.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 1039.13 ft above sea level.

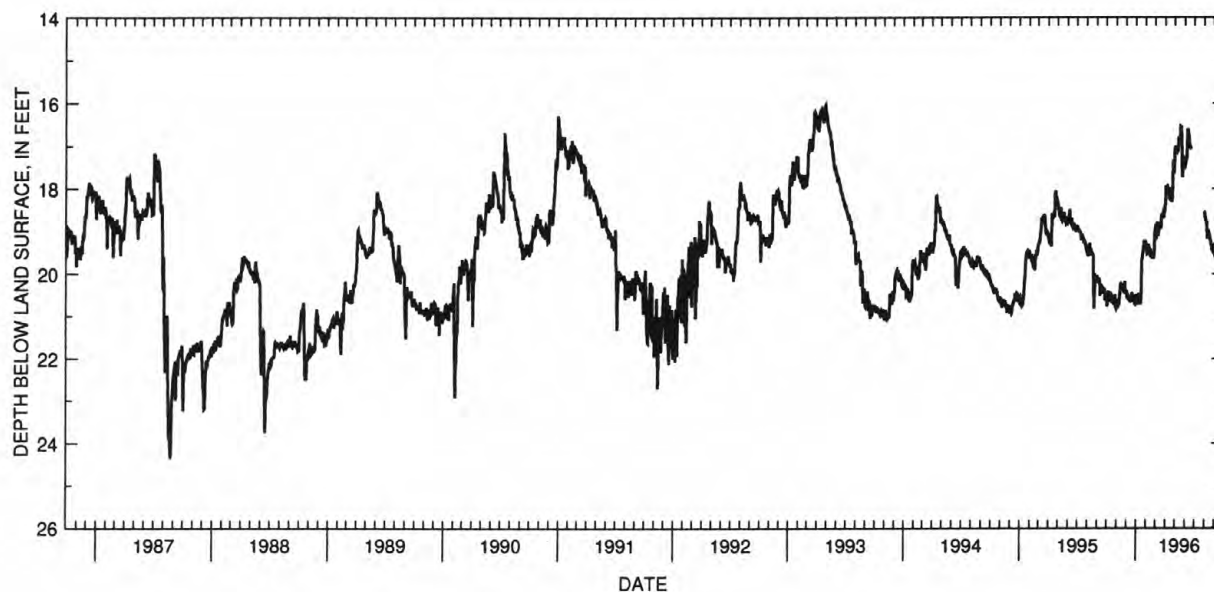
Measuring point: Floor of instrument shelter 3.50 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of water.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 37.64 ft below land-surface datum, Dec. 11, 1962;  
minimum daily low, 16.04 ft below land-surface datum, Apr. 29, 1993.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20.47	20.71	20.42	20.51	19.32	18.90	18.39	17.01	17.46	---	18.56	19.51
2	20.78	20.60	20.48	20.48	19.41	18.91	18.19	17.04	17.41	---	18.61	19.54
3	20.67	20.73	20.43	20.55	19.44	19.16	17.92	17.02	17.39	---	18.67	19.55
4	20.58	20.79	20.50	20.63	19.50	19.19	18.01	17.15	17.29	---	18.72	19.58
5	20.53	20.79	20.48	20.72	19.48	18.89	18.09	17.17	17.33	---	18.74	19.62
6	20.40	20.69	20.52	20.68	19.52	18.81	17.95	17.19	17.28	---	18.77	19.60
7	20.52	20.60	20.55	20.51	19.35	18.81	17.94	17.13	17.11	---	18.79	19.56
8	20.56	20.72	20.57	20.53	19.30	18.91	17.96	17.09	16.80	---	18.79	19.60
9	20.51	20.74	20.55	20.46	19.39	19.05	18.02	17.14	16.60	---	19.17	19.67
10	20.54	20.58	20.55	20.62	19.36	19.11	18.05	17.07	16.64	---	18.98	19.72
11	20.58	20.45	20.60	20.59	19.47	19.02	18.04	16.90	16.65	---	18.98	19.70
12	20.57	20.40	20.62	20.48	19.53	18.87	17.97	16.79	16.73	---	18.98	19.63
13	20.50	20.24	20.61	20.52	19.53	18.82	18.14	16.88	16.80	---	19.00	19.61
14	20.43	20.23	20.54	20.58	19.41	18.79	18.26	16.94	16.88	---	19.02	19.67
15	20.52	20.24	20.57	20.73	19.55	18.87	18.08	16.86	16.97	---	19.06	19.74
16	20.66	20.33	20.65	20.59	19.61	18.94	18.24	16.87	17.01	---	19.10	19.73
17	20.68	20.38	20.67	20.40	19.55	18.89	18.29	16.61	17.03	---	19.14	19.82
18	20.60	20.31	20.56	20.01	19.62	18.93	18.19	16.55	17.03	---	19.17	19.84
19	20.64	20.36	20.43	19.63	19.59	18.85	18.15	16.56	17.08	---	19.20	19.83
20	20.51	20.23	20.51	19.62	19.61	18.62	18.23	16.56	---	---	19.24	19.83
21	20.55	20.32	20.54	19.55	19.64	18.62	18.31	16.74	---	---	19.30	19.79
22	20.67	20.36	20.57	19.51	19.61	18.62	18.24	17.17	---	---	19.32	19.84
23	20.70	20.39	20.56	19.43	19.50	18.68	18.17	17.59	---	---	19.34	19.90
24	20.70	20.45	20.55	19.36	19.58	18.62	17.67	17.73	---	---	19.37	19.92
25	20.73	20.36	20.55	19.38	19.59	18.55	17.33	17.48	---	---	19.35	19.98
26	20.63	20.29	20.55	19.20	19.50	18.66	17.55	17.33	---	---	19.34	19.97
27	20.48	20.17	20.65	19.34	19.40	18.69	17.61	17.31	---	---	19.43	19.88
28	20.69	20.46	20.71	19.37	19.04	18.46	17.65	17.35	---	---	19.47	19.78
29	20.79	20.44	20.72	19.21	19.03	18.49	17.46	17.46	---	---	19.48	19.81
30	20.81	20.40	20.68	19.24	---	18.50	17.12	17.46	---	18.53	19.50	19.88
31	20.75	---	20.53	19.27	---	18.41	---	17.45	---	18.54	19.50	---
MAX	20.81	20.79	20.72	20.73	19.64	19.19	18.39	17.73	17.46	18.54	19.50	19.98

CAL YR 1995 LOW 20.83  
WTR YR 1996 LOW 20.81

## GROUND-WATER RECORDS

## GEAUGA COUNTY

412518081221500. Local number, GE-3A.

LOCATION.--Lat 41°25'18", long 81°22'15", Hydrologic Unit 04110003, 1.2 miles southeast of Chagrin Falls.

Owner: City of Chagrin Falls

AQUIFER.--Sandstone of Pennsylvanian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth drilled 120 ft, present depth 89 ft, cased. INSTRUMENTATION.--Periodic measurement with chalked tape by Ohio Department of Natural Resources personnel.

DATUM.--Elevation of land-surface datum is 1130 ft above sea level.

Measuring point: Floor of instrument shelter 3.50 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Floor of instrument shelter 3.0 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water. Water level affected by pumping wells nearby for Chagrin Falls municipal supply.

PERIOD OF RECORD.--September 1951 to September 1991 continuous. Discontinued October 1991 to March 1996. Periodic measurements April 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 52.85 ft below land-surface datum, Oct. 2, 1965; minimum daily low, 7.57 ft below land-surface datum, Apr. 22, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM  
INSTANTANEOUS OBSERVATIONS

Date	Water Level
April 10, 1996	10.74

## GROUND-WATER RECORDS

103

## HANCOCK COUNTY

405940083275500. Local number, HA-3.

LOCATION.--Lat 40°59'40", long 83°27'55", Hydrologic Unit 0410008, 2 miles south of Vanlue.

Owner: City of Findlay.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled artesian well, diameter 10 in., diameter 6 in. below 55 ft., depth 240 ft, cased to 55 ft.

INSTRUMENTATION.--Type F continuous recorder.

DATUM.--Elevation of land-surface datum is 815 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 1.40 ft above land-surface datum.

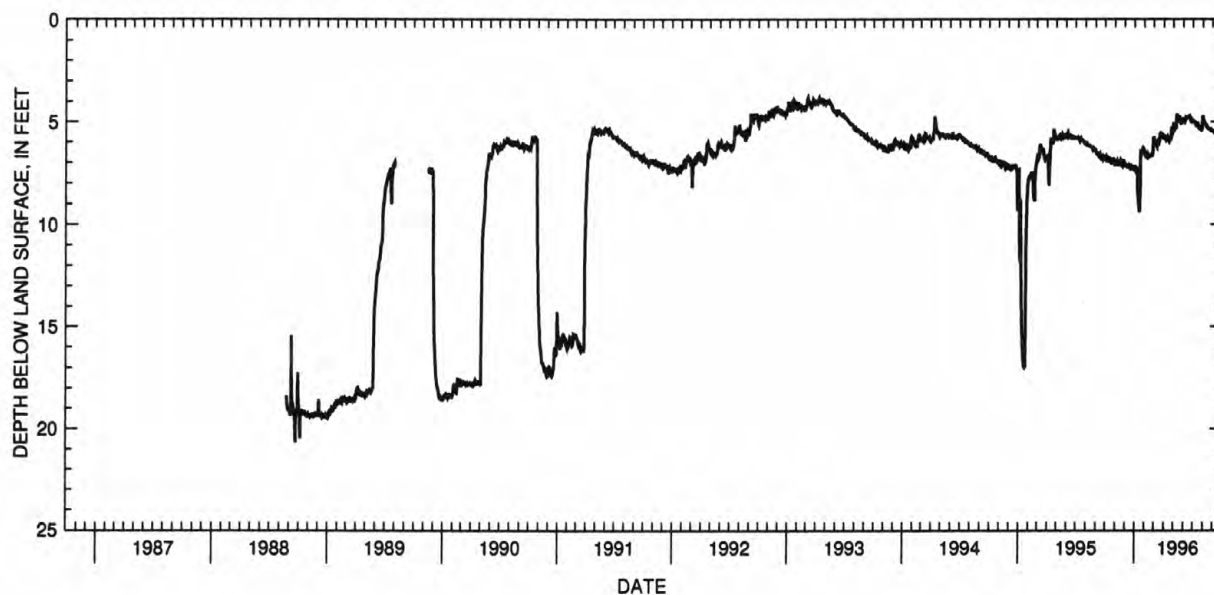
REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

PERIOD OF RECORD.--May 1947 to October 1972 and August 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 20.67 ft below land-surface datum, Sept. 22, 1988; minimum daily low, 3.82 ft below land-surface datum, Mar. 7, 1993.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.73	6.99	7.12	7.19	6.51	5.75	5.77	5.13	4.97	4.98	4.77	5.45
2	6.79	6.90	7.18	7.20	6.62	5.87	5.77	5.14	4.92	4.96	4.85	5.46
3	6.74	7.05	7.12	7.29	6.62	6.10	5.65	5.16	4.91	4.98	4.94	5.46
4	6.79	7.10	7.22	7.38	6.66	6.11	5.81	5.25	4.92	4.99	4.99	5.49
5	6.75	7.10	7.14	7.46	6.63	5.93	5.85	5.25	4.98	5.00	5.03	5.51
6	6.74	7.00	7.17	7.44	6.66	6.01	5.76	5.30	4.95	5.02	5.07	5.50
7	6.87	6.95	7.20	7.29	6.50	6.02	5.76	5.25	4.88	5.02	5.10	5.49
8	6.89	7.06	7.21	7.27	6.50	6.06	5.84	5.22	4.87	5.02	5.13	5.51
9	6.84	7.07	7.18	7.23	6.60	6.18	5.85	5.23	4.81	5.14	5.15	5.57
10	6.85	6.90	7.18	8.50	6.57	6.22	5.86	4.87	4.83	5.20	5.17	5.60
11	6.87	7.03	7.21	8.58	6.68	6.12	5.86	4.65	4.81	5.20	5.20	5.58
12	6.87	7.06	7.22	8.82	6.73	5.99	5.80	4.68	4.81	5.14	5.19	5.54
13	6.79	6.97	7.22	8.99	6.70	5.95	5.89	4.76	4.79	5.13	5.22	5.56
14	6.73	6.98	7.16	9.17	6.56	5.93	5.98	4.83	4.78	5.15	5.24	5.58
15	6.83	6.97	7.20	9.40	6.68	5.94	5.84	4.81	4.79	5.20	5.29	5.61
16	6.96	7.04	7.27	9.32	6.74	5.98	5.94	4.86	4.80	5.23	5.32	5.61
17	6.98	7.07	7.29	8.39	6.63	5.91	5.96	4.78	4.79	5.26	5.32	5.66
18	6.87	7.01	7.18	8.29	6.71	5.93	5.87	4.79	4.76	5.21	5.32	5.66
19	6.92	7.04	7.09	6.57	6.64	5.88	5.83	4.79	4.74	5.27	5.35	5.66
20	6.81	6.93	7.18	6.60	6.64	5.59	5.90	4.79	4.80	5.30	5.35	5.64
21	6.86	6.97	7.24	6.54	6.68	5.57	5.94	4.90	4.82	5.27	5.35	5.62
22	6.96	7.03	7.25	6.53	6.68	5.58	5.87	4.94	4.84	5.25	5.35	5.66
23	6.98	7.09	7.25	6.43	6.58	5.62	5.82	4.99	4.90	5.27	5.37	5.72
24	6.99	7.13	7.22	6.38	6.64	5.58	5.50	5.07	4.88	5.29	5.40	5.73
25	6.99	7.05	7.22	6.45	6.63	5.58	5.24	5.05	4.97	5.33	5.39	5.77
26	6.92	6.97	7.23	6.25	6.50	5.74	5.46	4.97	5.00	5.39	5.38	5.76
27	6.78	6.86	7.30	6.42	6.38	5.76	5.48	4.96	4.98	5.41	5.43	5.68
28	7.01	7.17	7.36	6.48	5.78	5.61	5.50	4.93	4.98	5.40	5.46	5.76
29	7.10	7.14	7.36	6.36	5.81	5.68	5.39	4.98	4.97	5.37	5.46	5.80
30	7.10	7.08	7.27	6.39	---	5.69	5.22	5.01	4.96	4.86	5.46	5.81
31	7.02	---	7.15	6.45	---	5.69	---	4.98	---	4.71	5.45	---
MAX	7.10	7.17	7.36	9.40	6.74	6.22	5.98	5.30	5.00	5.41	5.46	5.81

CAL YR 1995 LOW 16.99  
WTR YR 1996 LOW 9.40



## GROUND-WATER RECORDS

## HARDIN COUNTY

404648083412600. Local number, HN-2A.

LOCATION.--Lat 40°46'48", long 83°41'26", Hydrologic Unit 04100007, at southeast edge of Dola.

Owner: Kevin Eikenbary.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 51 ft cased.

INSTRUMENTATION.--Type F continuous recorder.

DATUM.--Elevation of land-surface datum is 945 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 2.88 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

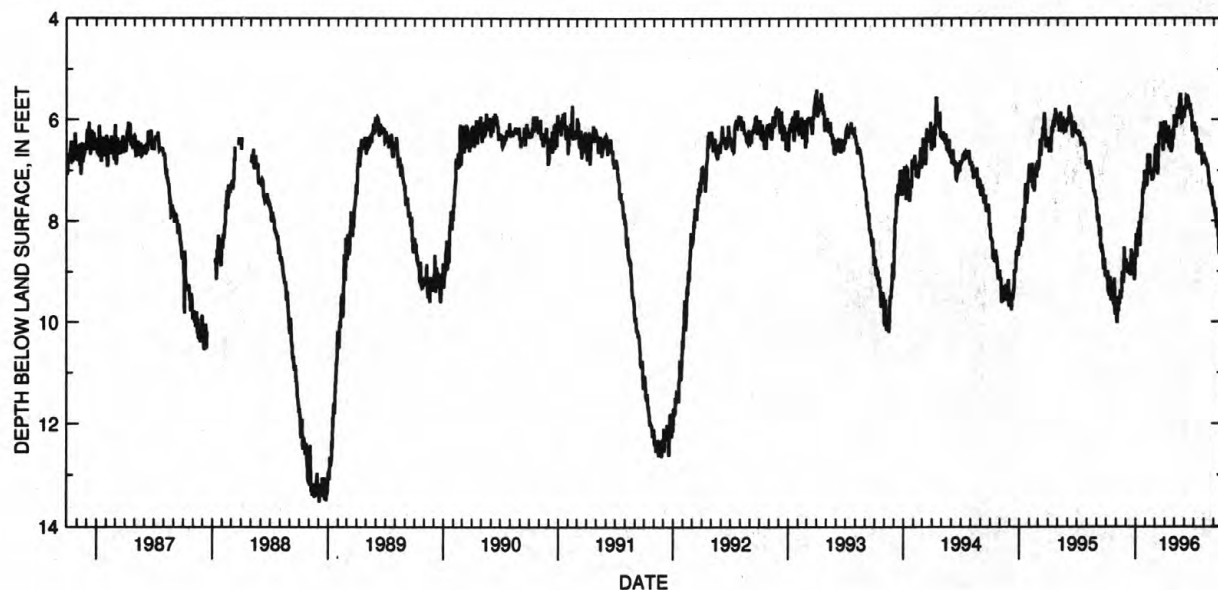
PERIOD OF RECORD.--December 1954 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 15.86 ft below land-surface datum, Jan. 20, 21, 1965;  
minimum daily low, 5.40 ft below land-surface datum, Apr. 1, 1993.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.00	9.75	8.75	8.64	7.02	6.80	6.25	5.99	5.91	6.10	6.64	7.62
2	9.11	9.55	8.82	8.63	7.15	6.53	6.28	6.07	5.79	6.05	6.71	7.65
3	9.06	9.79	8.81	8.25	7.18	6.95	6.03	5.97	5.75	6.12	6.77	7.73
4	9.10	10.00	8.90	8.52	7.29	6.98	6.35	6.08	5.72	6.22	6.82	7.78
5	9.09	10.00	8.94	8.68	7.29	6.48	6.47	6.11	5.80	6.28	6.85	7.83
6	8.99	9.84	8.96	8.68	7.22	6.52	6.36	6.15	5.76	6.29	6.85	7.81
7	9.30	9.50	9.00	8.30	6.95	6.57	6.24	6.10	5.55	6.25	6.85	7.75
8	9.39	9.75	9.02	8.29	6.67	6.71	6.27	5.95	5.56	6.13	6.83	7.81
9	9.39	9.79	8.93	8.15	6.75	6.98	6.30	5.90	5.50	6.40	6.87	8.00
10	9.40	9.49	8.95	8.36	6.75	7.08	6.35	5.81	5.56	6.63	6.89	8.11
11	9.47	9.55	9.01	8.33	6.85	6.97	6.29	5.75	5.53	6.63	6.92	8.11
12	9.46	9.65	9.03	8.01	7.03	6.63	6.12	5.81	5.55	6.58	6.88	8.00
13	9.35	9.48	9.03	8.05	7.03	6.42	6.21	5.93	5.60	6.37	6.92	8.02
14	9.10	9.47	8.83	8.26	6.67	6.28	6.54	5.98	5.63	6.40	6.96	8.10
15	9.23	9.37	8.88	8.50	6.93	6.25	6.43	5.79	5.75	6.49	7.02	8.25
16	9.52	9.50	9.04	8.28	7.08	6.34	6.48	5.66	5.77	6.62	7.10	8.25
17	9.58	9.54	9.08	8.02	7.01	6.23	6.58	5.56	5.77	6.69	7.17	8.54
18	9.44	9.35	8.90	7.83	7.06	6.27	6.50	5.53	5.70	6.62	7.26	8.63
19	9.48	9.42	8.56	7.88	7.04	6.16	6.35	5.53	5.68	6.53	7.32	8.64
20	9.27	9.18	8.66	7.94	7.03	6.05	6.45	5.48	5.78	6.61	7.30	8.63
21	9.22	9.00	8.76	7.78	7.18	6.12	6.63	5.63	5.86	6.58	7.32	8.60
22	9.50	9.07	8.78	7.69	7.18	6.22	6.62	5.74	5.85	6.47	7.31	8.63
23	9.57	9.13	8.78	7.36	7.09	6.36	6.54	5.87	5.92	6.51	7.33	8.76
24	9.58	9.23	8.76	7.40	7.15	6.36	6.54	6.05	5.90	6.56	7.42	8.85
25	9.66	9.10	8.78	7.47	7.18	6.30	6.21	6.04	6.12	6.61	7.41	8.96
26	9.51	8.88	8.77	7.23	7.09	6.58	6.20	5.95	6.21	6.78	7.33	8.95
27	9.13	8.52	8.99	7.32	6.98	6.61	6.28	5.88	6.21	6.84	7.45	8.78
28	9.48	8.90	9.13	7.38	6.96	6.38	6.39	5.75	6.17	6.83	7.55	8.97
29	9.79	8.92	9.17	7.02	6.97	6.17	6.21	5.85	6.15	6.77	7.57	9.21
30	9.85	8.88	9.01	7.04	---	6.17	5.90	5.94	6.05	6.68	7.65	9.27
31	9.82	---	8.74	7.02	---	6.03	---	5.94	---	6.71	7.64	---
MAX	9.85	10.00	9.17	8.68	7.29	7.08	6.63	6.15	6.21	6.84	7.65	9.27

CAL YR 1995 LOW 10.00

WTR YR 1996 LOW 10.00



## GROUND-WATER RECORDS

105

## HENRY COUNTY

412123083574000. Local number, HY-2.

LOCATION.--Lat 41°21'23", long 83°57'40", Hydrologic Unit 04100009, 1.4 Mi southwest of McClure.

Owner: State of Ohio.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in., depth drilled 300 ft, cased to 43 ft.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 680 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 3.00 ft above land-surface datum.

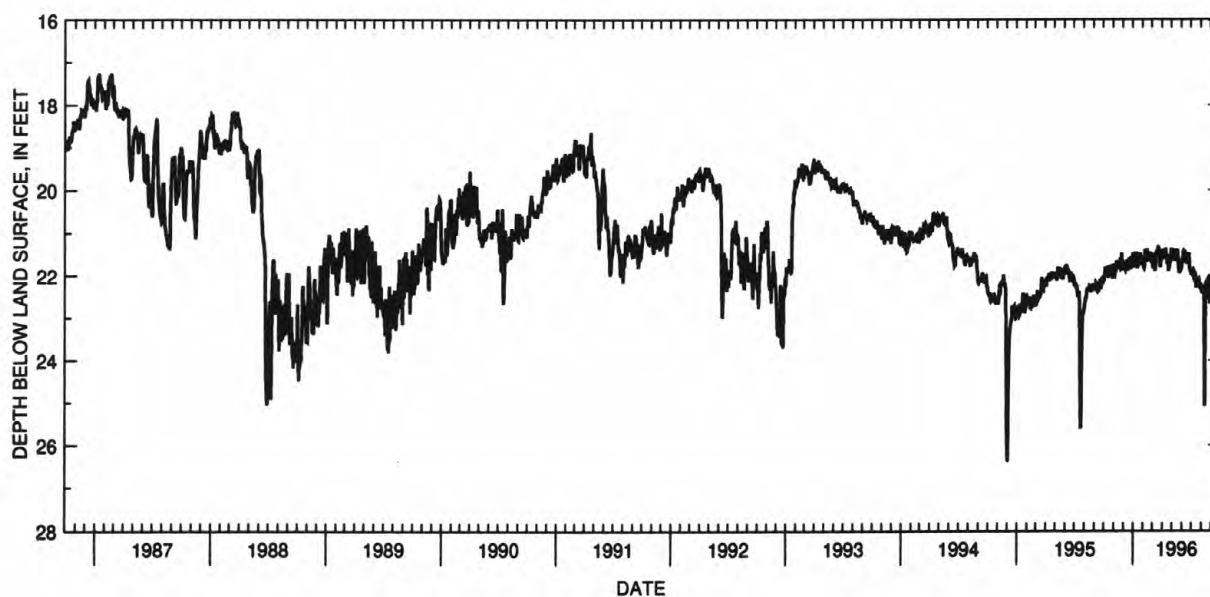
PERIOD OF RECORD.--June 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 26.38 ft below land-surface datum, Dec. 3, 1994;

minimum daily low, 14.55 ft below land-surface datum, Mar. 22, 1978.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22.02	21.95	21.67	21.49	21.65	21.60	21.50	21.40	21.78	21.88	22.33	22.26
2	22.12	21.73	21.77	21.49	21.71	21.48	21.50	21.46	21.70	21.86	22.35	22.26
3	22.10	21.85	21.75	21.49	21.77	21.79	21.39	21.46	21.63	21.86	22.38	22.35
4	22.02	21.96	21.81	21.67	21.80	21.82	21.45	21.52	21.59	21.95	22.38	22.32
5	21.99	21.98	21.80	21.75	21.82	21.59	21.61	21.59	21.67	21.97	22.36	22.35
6	21.80	21.92	21.78	21.81	21.77	21.49	21.47	21.64	21.59	21.95	22.33	22.27
7	21.95	21.72	21.84	21.74	21.61	21.60	21.45	21.61	21.41	21.92	22.35	22.93
8	22.00	21.86	21.86	21.68	21.39	21.67	21.45	21.50	21.48	21.89	22.38	22.61
9	21.98	21.92	21.77	21.46	21.44	21.83	21.52	21.47	21.42	21.92	22.36	22.46
10	21.97	21.75	21.80	21.63	21.41	21.89	21.51	21.41	21.43	22.07	22.27	22.27
11	22.00	21.65	21.84	21.63	21.46	21.84	21.44	21.41	21.41	22.09	24.11	22.20
12	22.02	21.74	21.85	21.46	21.60	21.74	21.35	21.54	21.46	21.98	25.08	22.09
13	21.93	21.74	21.85	21.48	21.61	21.61	21.46	21.60	21.49	21.95	23.74	21.97
14	21.78	21.72	21.63	21.60	21.37	21.46	21.59	21.65	21.53	21.97	22.68	21.90
15	21.86	21.67	21.70	21.82	21.47	21.44	21.49	21.55	21.57	22.03	22.25	21.88
16	22.00	21.76	21.81	21.76	21.48	21.49	21.59	21.45	21.72	22.26	22.20	21.88
17	22.05	21.83	21.82	21.50	21.47	21.45	21.73	21.42	21.68	22.28	22.16	21.94
18	21.95	21.78	21.77	21.49	21.48	21.46	21.67	21.39	21.54	22.19	22.16	21.98
19	21.94	21.81	21.64	21.66	21.47	21.42	21.64	21.42	21.49	22.17	22.17	22.24
20	21.82	21.73	21.59	21.75	21.45	21.31	21.65	21.42	21.59	22.24	22.16	22.22
21	21.76	21.67	21.64	21.73	21.60	21.34	21.89	21.62	21.55	22.17	22.08	21.99
22	21.94	21.68	21.64	21.73	21.61	21.37	21.82	21.71	21.48	22.11	22.56	21.85
23	21.96	21.79	21.68	21.61	21.48	21.48	21.80	21.82	21.54	22.06	22.46	22.39
24	21.93	21.84	21.64	21.47	21.60	21.47	21.78	21.89	21.47	22.09	22.08	22.37
25	21.94	21.83	21.59	21.62	21.62	21.50	21.59	21.94	21.61	22.08	22.08	22.30
26	21.92	21.71	21.59	21.58	21.58	21.76	21.53	21.88	21.81	22.16	22.01	22.16
27	21.74	21.47	21.68	21.60	21.46	21.80	21.63	21.81	21.86	22.24	22.08	21.96
28	21.83	21.72	21.79	21.69	21.65	21.66	21.68	21.73	21.89	22.30	22.67	22.03
29	22.00	21.77	21.78	21.60	21.68	21.58	21.54	21.79	21.87	22.24	22.49	22.28
30	22.07	21.71	21.72	21.59	---	21.59	21.36	21.84	21.82	22.17	22.24	22.30
31	22.00	---	21.63	21.62	---	21.43	---	21.82	---	22.26	22.23	---
MAX	22.12	21.98	21.86	21.82	21.82	21.89	21.89	21.94	21.89	22.30	25.08	22.93

CAL YR 1995 LOW 25.62  
WTR YR 1996 LOW 25.08

## GROUND-WATER RECORDS

## LUCAS COUNTY

413704083362200. Local number, LU-1.

LOCATION.--Lat 41°37'04", long 83°36'22", Hydrologic Unit 04100001, at Toledo State Hospital.

Owner: State of Ohio.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in., depth drilled 525 ft, present depth 523.0 ft, cased to 93 ft.

INSTRUMENTATION.--Type F continuous recorder.

DATUM.--Elevation of land-surface datum is 624 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 2.98 ft above land-surface datum (Revised from 1978 and 1979).

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water. Prior to Aug. 23, 1978,

measuring point was 3.10 ft above land-surface datum. Reported in 1979 as 3.00 ft above land-surface datum.

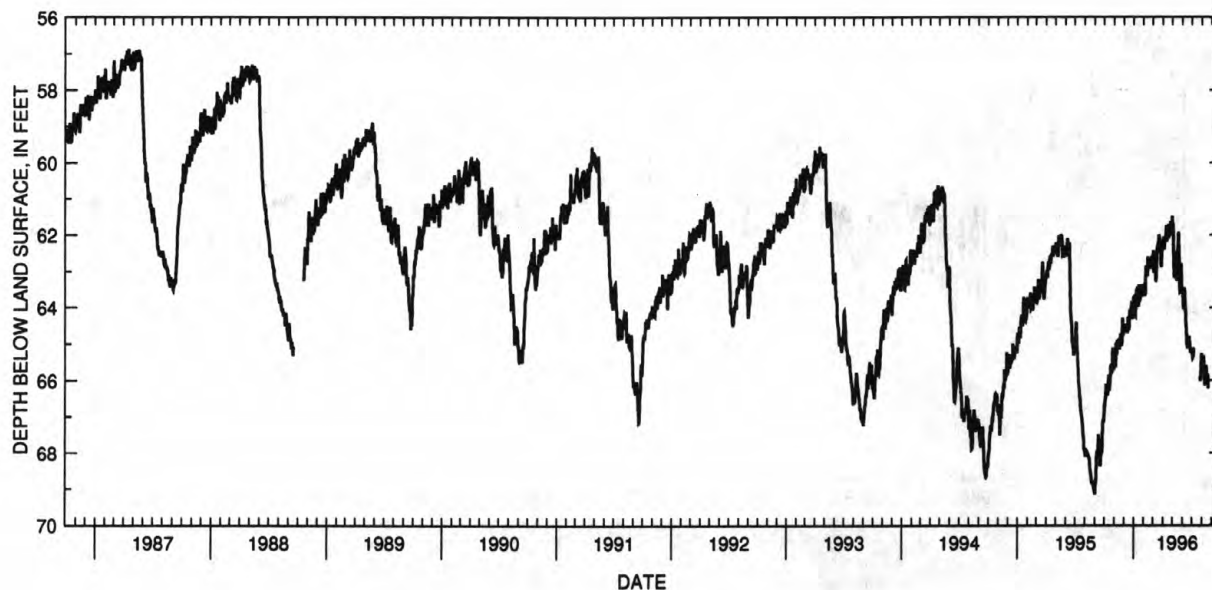
PERIOD OF RECORD.--March 1946 to September 1982 continuous, October 1983 to January 1985 periodic, continuous thereafter.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 117.25 ft below land-surface datum, Sept. 18, 1957;

minimum daily low, 56.87 ft below land-surface datum, Apr. 16, 1987.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	66.72	65.48	64.51	63.72	63.40	62.70	62.33	61.63	63.50	65.28	65.41	---
2	66.73	65.13	64.66	63.71	63.62	62.43	62.37	61.72	63.65	65.21	65.55	---
3	66.59	65.39	64.46	63.70	63.62	62.97	62.07	61.75	63.69	65.36	65.57	---
4	66.51	65.60	64.61	63.96	63.68	63.04	62.23	62.37	63.95	65.35	65.50	---
5	66.42	65.60	64.54	64.20	63.63	62.56	62.39	62.66	64.05	65.30	65.42	---
6	66.10	65.43	64.52	64.22	63.61	62.64	62.26	63.18	63.91	65.11	65.32	---
7	66.35	64.98	64.63	64.01	63.24	62.68	62.07	63.14	63.45	---	65.56	---
8	66.43	65.26	64.68	63.80	62.87	62.82	62.08	62.86	63.59	---	65.80	---
9	66.37	65.28	64.47	63.51	62.93	63.16	62.09	62.64	63.73	---	66.04	---
10	66.34	64.96	64.50	63.86	62.85	63.29	62.08	62.46	64.01	---	66.14	---
11	66.41	64.91	64.58	63.83	62.94	63.18	61.98	62.67	64.15	---	65.98	67.96
12	66.34	65.08	64.66	63.46	63.10	62.86	61.74	62.92	64.41	---	65.72	67.75
13	66.17	64.98	64.66	63.45	63.10	62.60	61.89	63.20	64.55	---	65.59	67.48
14	65.85	65.01	64.26	63.61	62.61	62.37	62.17	63.26	64.79	---	65.66	67.38
15	65.90	64.87	64.37	63.98	62.89	62.32	61.96	63.03	64.97	---	65.63	67.14
16	66.20	65.04	64.55	63.85	62.89	62.42	61.95	62.66	65.02	---	65.90	67.06
17	66.28	65.14	64.62	63.43	62.85	62.25	62.09	62.51	65.12	---	65.95	66.84
18	66.00	64.99	64.48	63.37	62.88	62.23	61.95	62.24	65.00	---	65.89	66.87
19	66.00	65.07	64.18	63.66	62.81	62.16	61.72	62.17	64.88	---	65.88	66.96
20	65.71	64.87	64.05	63.83	62.73	62.00	61.77	61.93	64.89	---	65.98	67.10
21	65.56	64.72	64.11	63.72	62.89	62.08	62.02	62.43	64.85	---	66.22	67.11
22	65.78	64.80	64.12	63.69	62.89	62.20	61.93	62.78	64.79	---	---	67.52
23	65.81	64.92	64.12	63.41	62.74	62.45	61.99	63.22	64.97	---	---	67.72
24	65.73	65.05	64.02	63.41	62.75	62.45	61.97	63.58	64.94	---	---	67.57
25	65.78	64.91	63.94	63.64	62.81	62.35	61.63	63.57	65.10	---	---	67.42
26	65.58	64.69	63.96	63.40	62.70	62.82	61.71	63.29	65.23	65.89	---	67.30
27	65.11	64.29	64.13	63.52	62.58	62.88	61.88	62.99	65.18	66.01	---	66.76
28	65.29	64.73	64.26	63.69	62.84	62.63	62.01	62.79	65.13	65.87	---	66.53
29	65.60	64.76	64.31	63.38	62.88	62.40	61.80	63.17	65.15	65.62	---	66.58
30	65.71	64.69	64.17	63.41	---	62.40	61.49	63.51	65.17	65.33	---	66.63
31	65.61	---	63.91	63.41	---	62.18	---	63.53	---	65.26	---	---
MAX	66.73	65.60	64.68	64.22	63.68	63.29	62.39	63.58	65.23	66.01	66.22	67.96
CAL YR 1995	LOW 69.15											
WTR YR 1996	LOW 67.96											



## GROUND-WATER RECORDS

107

## MEDINA COUNTY

410142082005900. Local number, MD-1.

LOCATION.--Lat 41°01'42", long 82°00'59", Hydrologic Unit 04110001, at waterworks plant at Lodi.

Owner: Lodi Water Dept.

AQUIFER.--Sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 65 ft, cased.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 910 ft above sea level, from topographic map.

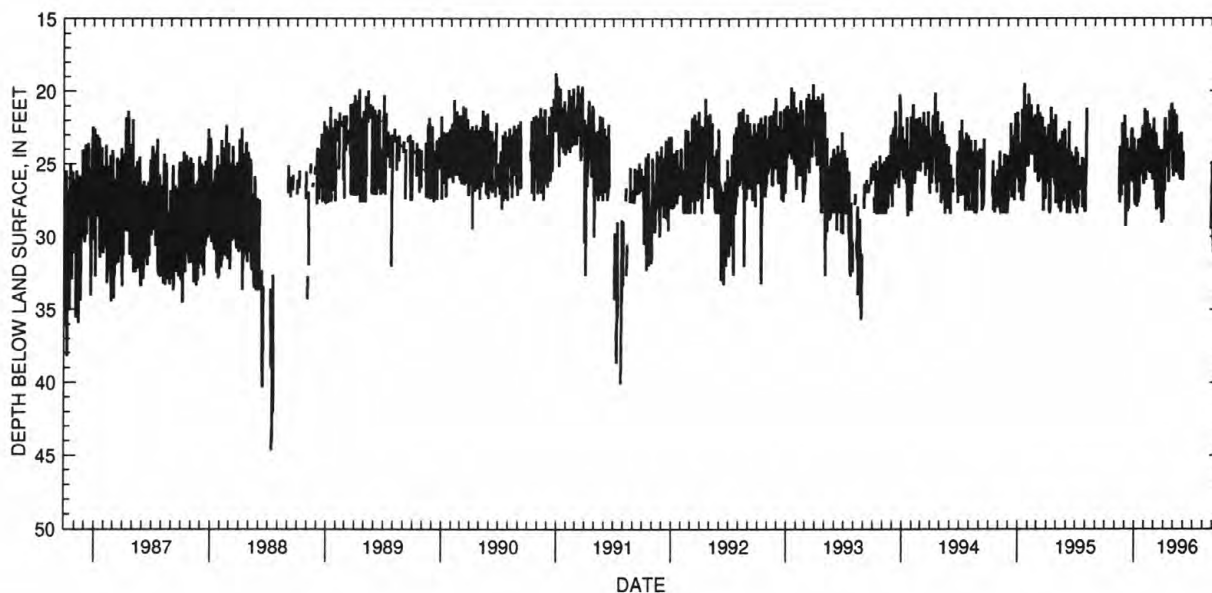
Measuring point: Floor of instrument shelter 1.90 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

PERIOD OF RECORD.--September 1946 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 45.21 ft below land-surface datum, July 8, 1988;  
minimum daily low, 7.60 ft below land-surface datum, July 6, 1969.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	25.19	23.42	24.49	25.05	28.87	25.38	26.15	---	---	24.87
2	---	---	24.43	25.50	25.54	23.07	25.60	23.14	24.17	---	---	25.85
3	---	---	21.65	27.56	23.09	21.87	27.00	25.86	24.33	---	---	28.95
4	---	---	25.56	27.24	21.21	25.81	24.49	22.48	---	---	---	29.24
5	---	---	25.14	27.84	26.11	24.88	26.88	21.28	---	---	---	31.09
6	---	---	29.25	24.68	23.33	26.81	22.84	24.30	---	---	---	28.81
7	---	---	25.84	24.07	26.13	25.29	21.84	25.47	---	---	---	24.88
8	---	---	26.85	26.46	23.51	26.12	25.13	23.31	---	---	---	24.61
9	---	---	25.05	25.33	24.27	22.85	22.70	24.78	---	---	---	26.49
10	---	---	23.24	27.95	23.19	23.45	24.87	24.38	---	---	---	26.22
11	---	---	26.47	25.68	21.38	28.14	23.89	21.78	---	---	---	25.78
12	---	---	28.27	27.35	25.20	25.35	24.66	21.62	---	---	---	27.50
13	---	---	26.67	25.33	24.02	26.41	25.22	25.62	---	---	---	27.45
14	---	---	25.69	23.34	25.45	26.38	24.10	---	---	---	---	24.62
15	---	---	28.08	27.65	25.34	25.12	24.23	25.87	---	---	---	23.65
16	---	25.22	25.20	25.43	25.21	23.78	24.85	---	---	---	---	26.29
17	---	27.66	24.03	27.26	22.51	24.28	24.17	24.63	---	---	---	23.82
18	---	24.30	25.96	25.75	22.27	27.01	26.27	22.99	---	---	---	25.87
19	---	23.79	23.89	25.75	25.59	25.48	22.98	25.22	---	---	---	27.83
20	---	26.34	24.66	25.37	23.06	28.02	23.23	25.78	---	---	---	26.60
21	---	26.41	24.72	23.24	25.67	26.03	21.33	24.53	---	---	---	23.02
22	---	27.16	26.20	25.52	25.05	27.87	---	---	---	---	---	22.26
23	---	25.19	23.51	25.51	24.84	25.54	23.50	25.44	---	---	---	26.54
24	---	24.79	22.75	24.66	24.02	24.04	---	26.11	---	---	---	24.39
25	---	23.63	22.69	23.73	22.58	27.72	22.44	25.45	---	---	---	25.12
26	---	22.17	22.55	24.14	24.68	26.33	21.78	22.92	---	---	---	25.62
27	---	25.07	25.02	23.16	24.30	29.07	21.12	22.86	---	---	---	26.09
28	---	26.37	26.26	22.38	26.09	27.77	20.81	24.47	---	---	---	23.50
29	---	26.44	25.10	24.88	24.18	28.59	24.02	---	---	---	29.48	23.07
30	---	26.19	24.14	24.88	---	25.50	24.12	---	---	---	28.60	25.65
31	---	---	23.21	26.41	---	24.01	---	---	---	---	25.71	---
MAX	---	27.66	29.25	27.95	26.13	29.07	28.87	26.11	26.15	---	29.48	31.09

CAL YR 1995 LOW 29.25  
WTR YR 1996 LOW 31.09



## GROUND-WATER RECORDS

## OTTAWA COUNTY

413434082494000. Local number, O-2.

LOCATION.--Lat 41°34'34", long 82°49'40", Hydrologic Unit 04100010. Catawba Island near Port Clinton.

Owner: William Williams.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled water table well, diameter 6 in., depth 62 ft, cased to 26 ft.

INSTRUMENTATION.--Type F continuous recorder.

DATUM.--Elevation of land-surface datum is 591 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 1.60 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

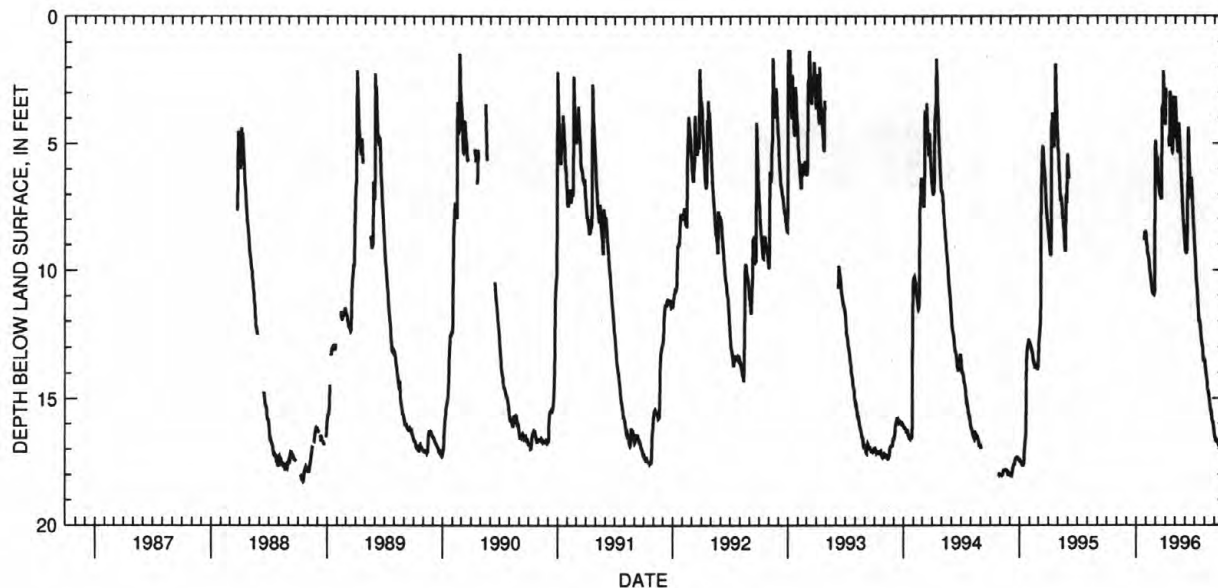
PERIOD OF RECORD.--March 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 18.27 ft below land-surface datum, Sept. 17, 1989;  
minimum daily low, 1.29 ft below land-surface datum, Dec. 31, 1992.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	8.76	4.99	2.84	3.16	9.22	9.27	13.50	16.49
2	---	---	---	---	8.99	5.61	---	3.58	9.26	9.40	13.66	16.55
3	---	---	---	---	9.09	6.03	---	3.96	9.34	9.70	13.80	16.56
4	---	---	---	---	9.22	6.05	---	4.46	9.25	9.98	13.87	16.64
5	---	---	---	---	9.35	5.95	---	4.65	9.32	10.32	14.03	16.68
6	---	---	---	---	9.43	5.49	---	4.86	9.31	10.54	14.09	16.71
7	---	---	---	---	9.39	5.72	---	4.98	8.54	10.56	14.17	16.74
8	---	---	---	---	9.49	6.13	---	5.22	6.73	10.74	14.26	16.68
9	---	---	---	---	9.66	6.51	---	5.38	6.71	10.98	14.47	16.72
10	---	---	---	---	9.64	6.67	4.74	5.30	4.36	11.26	14.67	16.71
11	---	---	---	---	9.93	6.73	4.87	4.34	4.82	11.40	14.69	16.73
12	---	---	---	---	10.05	6.84	5.12	4.20	5.35	11.66	14.70	16.76
13	---	---	---	---	10.06	6.94	4.60	4.58	5.80	11.90	14.79	16.72
14	---	---	---	---	10.17	7.01	2.96	4.88	6.20	12.04	14.87	16.74
15	---	---	---	---	10.36	7.06	3.07	5.07	6.66	11.89	15.00	16.65
16	---	---	---	---	10.42	7.09	3.50	5.37	6.93	11.96	15.09	16.60
17	---	---	---	---	10.59	7.13	3.83	5.63	7.11	12.09	15.23	16.61
18	---	---	---	---	10.68	7.20	4.03	6.01	7.14	12.14	15.30	16.64
19	---	---	---	---	10.79	7.15	4.40	6.24	6.33	12.32	15.41	16.68
20	---	14.29	---	---	10.86	3.73	5.02	6.44	6.41	12.47	15.51	16.70
21	---	14.26	---	---	10.91	3.48	5.32	6.80	6.64	12.69	15.50	16.73
22	---	---	---	---	10.92	3.84	5.33	7.06	7.00	12.73	15.55	16.66
23	---	14.31	---	---	10.89	3.90	5.27	7.36	7.28	12.85	15.78	16.59
24	---	14.34	---	---	10.97	3.70	3.15	7.66	7.49	12.88	15.85	16.51
25	---	---	---	8.83	10.98	2.16	3.48	7.91	7.84	12.95	15.91	16.58
26	---	---	---	8.63	10.92	2.83	4.13	8.06	8.17	13.18	15.94	16.64
27	---	---	---	8.49	10.84	3.15	4.56	8.23	8.30	13.40	15.96	16.65
28	---	---	---	8.56	5.21	3.49	4.80	8.34	8.54	13.51	16.08	16.52
29	---	---	---	8.45	4.88	3.91	4.77	8.60	8.79	13.58	16.14	16.02
30	---	---	---	8.53	---	4.04	3.47	8.82	9.04	13.49	16.24	16.00
31	---	---	---	8.65	---	4.28	---	9.04	---	13.43	16.39	---
MAX	---	14.34	---	8.83	10.98	7.20	5.33	9.04	9.34	13.58	16.39	16.76

CAL YR 1995 LOW 17.65

WTR YR 1996 LOW 16.76



## GROUND-WATER RECORDS

109

## PORTAGE COUNTY

410931081192900. Local number, PO-123.

LOCATION.--Lat 41°09'31", long 81°19'29", Hydrologic Unit 04110002, east of Kent.

Owner: City of Kent.

AQUIFER.--Sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., cased.

INSTRUMENTATION.--Digital recorder - 60-minute punch.

DATUM.--Elevation of land-surface datum is 1042 ft above sea level, from topographic map.

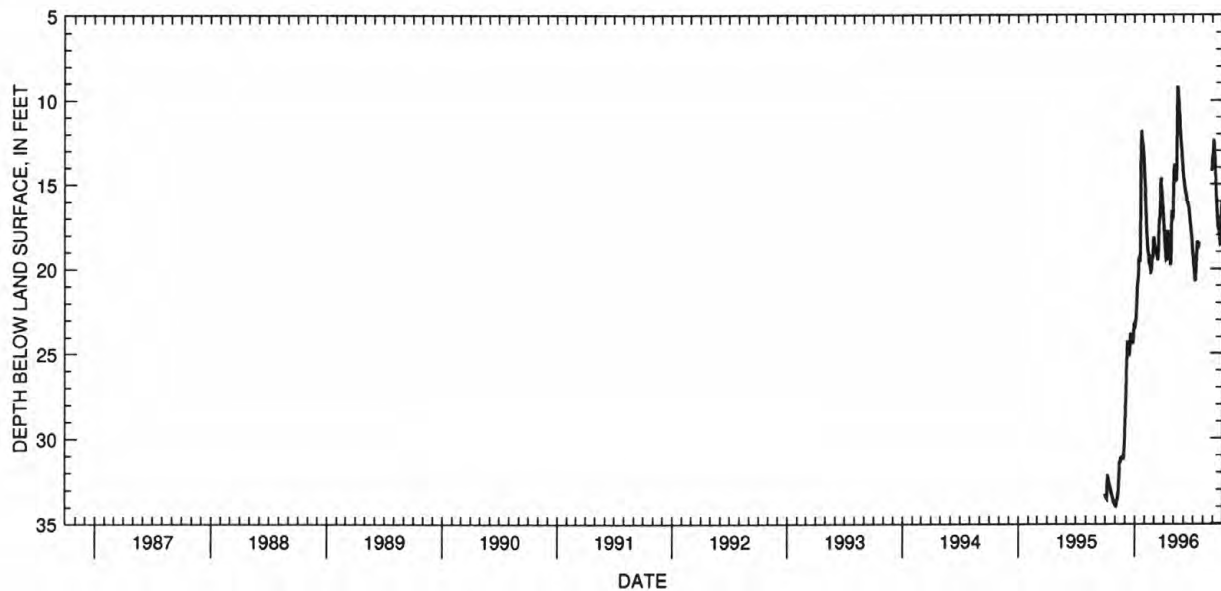
Measuring point: Floor of instrument shelter 3.5 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 33.97 ft below land-surface datum, Nov. 3, 1995;  
minimum daily low, 9.21 ft below land-surface datum, May 15, 1996.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	33.26	33.92	29.98	23.38	14.19	18.16	17.14	16.12	14.25	19.05	---	13.39
2	33.37	33.95	29.51	23.48	14.68	18.20	17.45	15.16	14.51	19.18	---	13.37
3	33.45	33.97	28.84	23.46	15.14	18.48	17.76	14.25	14.63	19.48	---	12.88
4	33.48	33.95	28.28	23.21	15.69	18.67	18.16	13.90	14.81	19.69	---	12.55
5	33.48	33.74	27.62	22.94	16.32	18.91	18.48	13.89	14.98	19.85	---	12.31
6	33.51	33.65	26.96	22.91	16.84	18.89	18.73	14.00	15.14	20.16	---	12.72
7	32.79	33.63	26.15	22.42	17.32	18.76	18.96	14.10	15.28	20.43	---	12.92
8	32.50	33.61	25.47	21.97	17.80	18.73	19.20	14.26	15.46	20.68	---	13.12
9	32.23	33.47	24.75	21.46	18.19	18.72	19.47	14.52	15.55	20.68	---	13.63
10	32.24	33.26	24.26	21.02	18.44	18.76	19.44	14.75	15.60	20.24	---	14.15
11	32.36	33.11	24.54	20.79	18.72	19.03	18.99	14.73	15.61	20.17	---	14.68
12	32.48	32.90	24.99	20.76	19.03	19.20	18.39	13.55	15.83	19.55	---	15.16
13	32.61	32.35	25.03	20.47	19.03	19.44	17.73	11.07	16.00	19.30	---	15.59
14	32.73	31.87	24.82	19.97	19.12	19.43	17.90	9.25	16.01	18.68	---	15.97
15	32.78	31.44	25.05	19.46	19.43	19.15	18.14	9.21	16.08	18.37	---	16.31
16	32.83	31.39	25.06	19.32	19.67	18.60	18.27	9.46	16.15	18.50	---	16.74
17	32.89	31.32	24.83	19.59	19.66	17.86	18.50	9.69	16.17	18.72	---	17.06
18	33.00	31.25	24.55	19.55	19.53	17.25	18.68	9.97	16.30	18.81	---	17.35
19	33.09	31.27	24.18	19.18	19.79	16.99	18.92	10.25	16.32	18.72	---	17.63
20	33.22	31.15	23.77	16.44	20.05	16.98	19.24	10.56	16.56	18.42	---	17.62
21	33.24	31.11	23.94	13.77	20.20	16.33	19.48	10.98	16.77	---	---	17.48
22	33.33	31.11	23.94	12.28	20.18	15.55	19.72	11.38	17.07	---	---	17.78
23	33.35	31.12	23.94	11.78	19.86	14.88	19.72	11.78	17.23	---	---	18.06
24	33.46	31.10	24.10	12.09	19.48	14.61	19.28	12.16	17.39	---	---	18.33
25	33.52	31.07	24.26	12.32	19.21	15.11	17.58	12.46	17.60	---	---	18.55
26	33.60	31.10	24.38	12.76	19.33	15.39	16.96	12.65	17.75	---	---	18.53
27	33.71	31.17	24.38	12.73	19.35	15.65	16.57	12.87	17.98	---	---	17.90
28	33.75	31.25	24.24	12.70	19.33	15.87	16.92	13.08	18.26	---	---	17.21
29	33.81	30.93	23.84	12.97	18.49	16.19	17.09	13.40	18.51	---	---	16.45
30	33.85	30.49	23.31	13.41	---	16.42	17.02	13.69	18.78	---	14.22	16.09
31	33.89	---	23.18	13.78	---	16.74	---	13.97	---	---	13.52	---
MAX	33.89	33.97	29.98	23.48	20.20	19.44	19.72	16.12	18.78	20.68	14.22	18.55
WTR YR 1996	LOW 33.97											



## GROUND-WATER RECORDS

## PUTNAM COUNTY

405505084032900. Local number, PU-1.

LOCATION.--Lat 40°55'05", long 84°03'29", Hydrologic Unit 04100007, Center and Broadway Streets, Columbus Grove.

Owner: Columbus Grove Water Department.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 110 ft, cased.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 770 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 3.00 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resource, Division of Water.

PERIOD OF RECORD.--July 1946 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 24.30 ft below land-surface datum, Aug. 24, 1962;

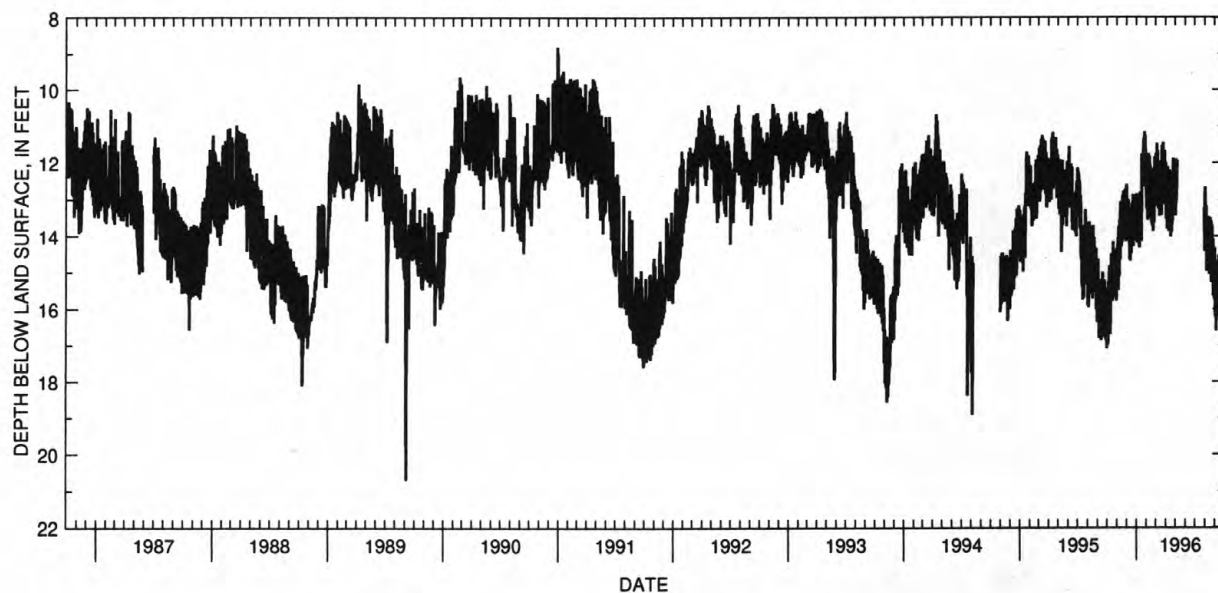
minimum daily low, 8.80 ft below land-surface datum, Dec. 30, 1990.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16.33	14.33	12.60	12.92	12.78	12.65	12.00	11.96	---	---	12.99	14.31
2	15.99	15.20	13.56	12.85	13.25	11.75	13.52	13.43	---	---	12.66	16.20
3	16.97	15.34	13.77	14.18	13.10	12.78	12.43	12.25	---	---	14.31	15.27
4	16.86	14.05	13.03	13.99	13.05	13.17	12.39	11.90	---	---	13.22	14.97
5	15.25	15.48	14.13	14.10	13.54	11.47	13.79	13.01	---	---	13.16	16.61
6	16.17	14.17	13.83	14.09	13.47	11.95	12.51	12.35	---	---	14.96	15.36
7	15.19	13.72	13.00	14.03	12.31	11.67	12.11	11.94	---	---	14.10	14.71
8	14.82	15.10	13.96	13.27	11.75	12.86	13.52	---	---	---	13.66	15.88
9	15.92	13.86	13.90	14.06	13.21	13.24	12.76	---	---	---	14.90	15.13
10	14.88	13.53	13.90	14.31	12.21	13.10	12.56	---	---	---	14.01	14.68
11	16.70	14.65	14.65	13.26	11.82	12.54	13.86	---	---	---	13.46	16.20
12	16.13	13.31	13.30	12.80	13.49	12.10	12.69	---	---	---	14.93	15.44
13	15.07	13.05	14.69	13.97	12.06	13.44	12.21	---	---	---	13.95	14.53
14	14.49	14.08	13.74	12.92	12.43	12.33	13.73	---	---	---	13.57	15.68
15	15.77	14.28	13.28	12.97	13.37	11.97	12.74	---	---	---	15.04	14.73
16	14.85	13.20	14.47	14.14	12.18	13.31	12.43	---	---	---	13.99	14.73
17	14.89	14.08	13.40	13.03	13.62	12.15	14.02	---	---	---	13.47	16.09
18	15.78	14.16	13.10	11.76	12.18	12.04	12.83	---	---	---	14.86	15.08
19	14.82	12.86	14.27	12.66	13.71	13.42	12.52	---	---	---	14.08	14.86
20	14.15	14.03	13.38	12.59	12.76	12.05	13.88	---	---	---	13.57	16.12
21	15.67	13.12	12.86	12.33	12.43	11.53	13.08	---	---	---	15.26	15.67
22	14.60	12.77	14.27	12.35	13.86	12.88	12.53	---	---	---	14.24	14.75
23	14.44	13.89	13.20	11.34	12.65	12.11	13.58	---	---	---	13.68	16.26
24	15.61	13.73	12.90	12.10	12.26	11.45	12.34	---	---	---	15.20	15.43
25	14.56	12.83	14.07	12.43	13.62	12.93	11.87	---	---	---	14.68	15.01
26	14.39	13.60	13.26	11.16	12.58	12.01	13.05	---	---	---	14.08	16.37
27	15.29	12.85	13.10	12.31	11.84	13.12	12.04	---	---	---	15.63	15.69
28	15.08	12.71	14.09	12.07	12.77	12.12	11.92	---	---	---	14.72	14.58
29	14.50	14.14	13.84	11.25	11.83	11.66	13.25	---	---	---	14.42	16.05
30	15.77	12.87	12.87	12.63	---	13.05	12.05	---	---	13.20	15.73	---
31	14.53	---	14.12	12.69	---	12.18	---	---	---	14.41	14.93	---
MAX	16.97	15.48	14.69	14.31	13.86	13.44	14.02	13.43	---	14.41	15.73	16.61

CAL YR 1995 LOW 17.10

WTR YR 1996 LOW 16.97



## GROUND-WATER RECORDS

111

## SANDUSKY COUNTY

411914083045300. Local number, S-3.

LOCATION.--Lat 41°19'14", long 83°04'53", Hydrologic Unit 04100011, 2.6 mi southeast of Fremont Post Office.

Owner: State of Ohio.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled test artesian well, diameter 12 in., depth 121 ft, cased to 93 ft.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 627 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 3.00 ft above land-surface datum.

PERIOD OF RECORD.--December 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 26.38 ft below land-surface datum, Aug. 30, 1993;

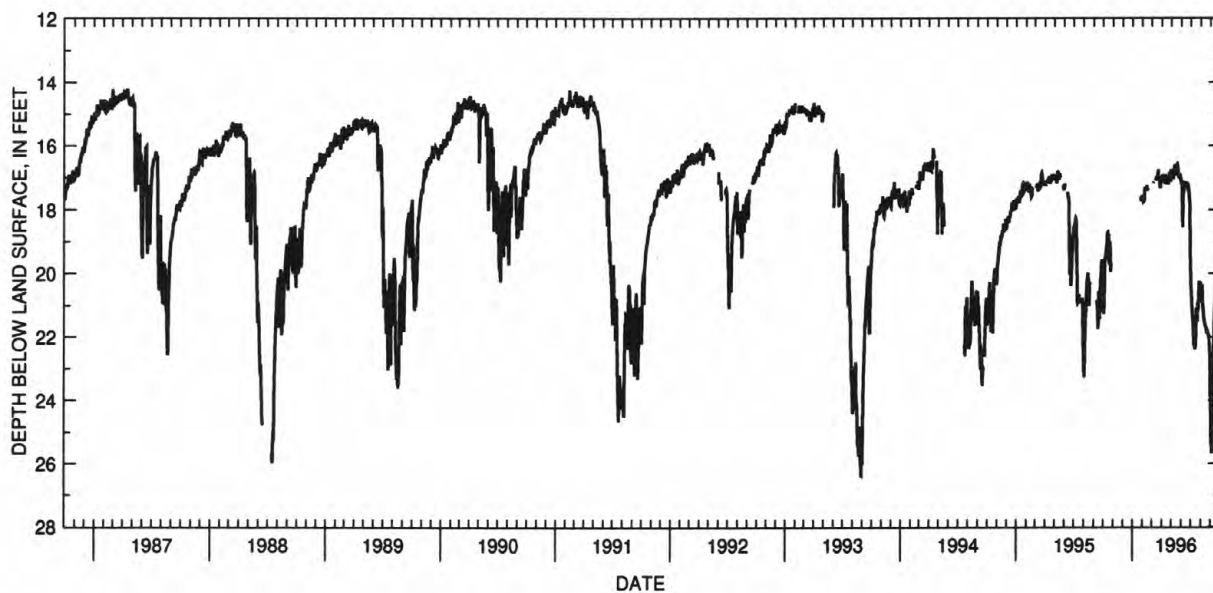
minimum daily low, 14.02 ft below land-surface datum, Mar. 24, 1975.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21.22	---	---	---	17.61	---	17.08	16.86	17.17	20.30	20.64	24.12
2	21.03	---	---	---	17.65	---	17.08	16.93	17.20	20.48	20.83	25.11
3	21.26	---	---	---	17.67	---	16.91	16.87	17.07	20.71	20.89	25.43
4	20.87	---	---	---	17.74	---	16.97	16.90	17.80	20.98	20.45	25.20
5	20.31	---	---	---	17.73	17.17	17.13	16.97	18.55	21.12	20.35	25.69
6	19.61	---	---	---	17.68	17.14	17.00	17.04	18.13	21.32	20.72	24.70
7	19.51	---	---	---	17.53	---	17.01	16.97	17.48	21.40	20.95	24.75
8	19.51	---	---	---	17.30	---	17.12	16.88	17.36	21.60	21.10	23.58
9	19.42	---	---	---	17.35	---	17.13	16.81	17.23	21.91	21.24	22.84
10	19.28	---	---	---	17.31	---	17.09	16.69	17.23	22.23	21.34	22.38
11	19.22	---	---	---	---	---	17.03	16.60	17.25	22.25	21.45	22.08
12	19.11	---	---	---	---	---	16.91	16.74	17.20	22.25	21.47	21.68
13	18.97	---	---	---	---	17.09	17.00	16.84	17.19	22.26	21.55	21.30
14	18.72	---	---	---	17.25	17.00	17.18	16.93	17.13	22.39	21.60	21.03
15	18.71	---	---	---	17.37	16.99	17.04	16.78	17.24	22.26	21.61	20.80
16	18.87	---	---	---	17.40	17.08	17.06	16.72	17.34	22.25	21.68	20.67
17	18.95	---	---	---	17.32	17.03	17.21	16.62	17.27	21.63	21.69	20.47
18	18.75	---	---	---	---	17.06	17.10	16.61	17.15	21.09	21.69	20.45
19	19.58	---	---	---	---	16.95	17.01	16.65	17.20	21.15	21.86	20.32
20	19.71	---	---	---	---	16.75	16.97	16.64	17.29	21.46	21.83	20.18
21	19.20	---	---	---	---	16.89	17.22	16.74	17.31	21.52	21.84	19.94
22	18.99	---	---	---	---	---	17.14	16.84	17.29	20.93	21.82	19.71
23	19.39	---	---	---	---	---	17.05	16.90	17.45	20.91	21.86	19.78
24	19.95	---	---	---	---	16.98	16.99	16.98	17.35	21.13	21.92	19.64
25	19.65	---	---	17.70	---	16.97	16.83	17.01	17.52	20.66	21.95	19.66
26	---	---	---	17.63	---	17.29	16.89	16.93	17.63	20.42	21.95	19.61
27	---	---	---	17.65	17.17	17.33	17.02	16.93	17.69	20.24	22.06	19.37
28	---	---	---	17.73	---	17.13	17.12	16.89	18.70	20.36	22.25	19.18
29	---	---	---	17.57	---	17.08	16.98	16.98	19.39	20.48	22.30	19.23
30	---	---	---	17.59	---	17.08	16.75	17.05	19.89	20.64	22.95	19.28
31	---	---	---	17.60	---	16.98	---	17.14	---	20.27	23.91	---
MAX	21.26	---	---	17.73	17.74	17.33	17.22	17.14	19.89	22.39	23.91	25.69

CAL YR 1995 LOW 23.27

WTR YR 1996 LOW 25.69





## GROUND-WATER RECORDS

## SANDUSKY COUNTY--Continued

412703083213600. Local number, S-2.

LOCATION.--Lat 41°27'03", long 83°21'36", Hydrologic Unit 04100010, at waterworks in Woodville.

Owner: Woodville Water department.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 8 in., depth 198 ft cased.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 635 ft above sea level from topographic map.

Measuring point: Top of casing at land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

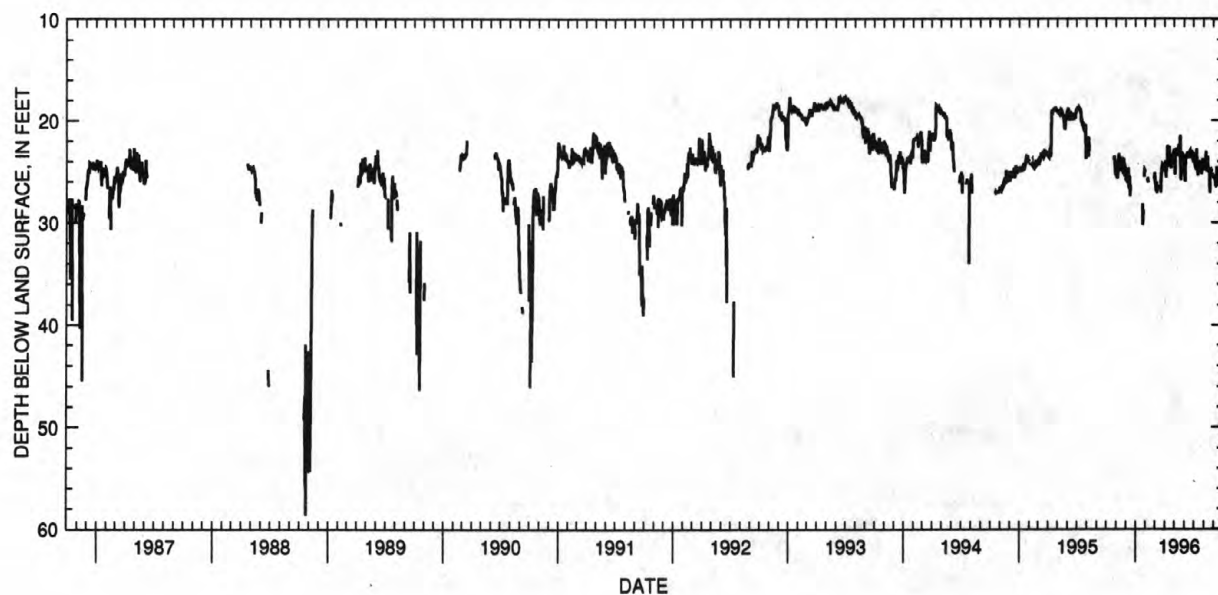
PERIOD OF RECORD.--June 1976 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 100.97 ft below land-surface datum, Jan. 29, 1982;

minimum daily low, 17.58 ft below land-surface datum, June 11, 1993.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	24.78	25.39	---	---	25.09	24.30	22.80	23.76	23.37	23.92	25.56
2	---	25.46	25.79	---	---	25.93	24.47	23.06	25.47	23.43	24.28	25.58
3	---	24.01	25.82	---	---	26.03	24.37	25.27	24.03	23.23	24.50	25.43
4	---	25.66	24.82	---	---	26.28	24.39	23.20	25.96	24.03	24.46	25.46
5	---	25.51	25.77	---	---	26.96	25.57	22.92	23.70	24.35	24.41	25.70
6	---	25.55	25.79	---	---	26.39	24.87	23.39	23.61	24.50	24.43	25.83
7	---	24.89	26.14	---	---	26.04	24.48	22.92	23.55	24.80	24.45	26.37
8	---	25.00	25.97	---	25.60	27.11	24.31	22.93	23.54	24.49	22.98	26.38
9	---	23.96	24.67	---	26.07	26.51	24.19	22.84	23.36	24.54	24.55	26.33
10	---	23.20	24.79	---	---	---	22.45	22.83	23.33	22.76	24.78	26.26
11	---	24.71	26.64	---	26.49	---	24.22	23.26	23.27	24.77	24.97	24.49
12	---	23.83	25.37	---	---	26.45	24.16	23.45	23.10	24.80	24.79	25.98
13	---	24.74	26.69	---	---	---	24.27	23.09	23.20	24.74	23.50	26.01
14	---	24.90	25.45	---	---	26.39	24.52	22.92	23.16	25.36	24.73	25.89
15	---	23.56	27.41	---	---	26.76	22.52	22.33	23.24	24.59	24.77	26.28
16	---	24.76	26.34	---	---	---	23.85	22.98	23.16	24.48	24.83	24.74
17	---	24.82	---	---	---	---	24.23	22.55	23.64	24.75	25.04	26.02
18	---	24.75	---	---	---	---	24.18	23.19	23.23	24.54	24.98	26.34
19	---	24.91	---	---	---	---	24.38	23.04	23.03	24.57	25.06	26.27
20	---	24.92	---	29.48	---	27.04	24.32	21.46	23.00	24.35	27.06	26.44
21	---	23.60	---	---	---	25.40	24.67	25.30	23.33	24.15	25.05	26.30
22	---	24.74	25.76	---	---	24.99	24.42	25.83	23.49	24.19	24.86	25.13
23	---	24.93	---	28.16	---	24.73	24.03	25.02	23.11	24.26	24.81	25.95
24	---	25.11	---	30.25	---	24.54	24.06	23.98	22.94	24.12	25.03	25.84
25	23.89	25.14	---	28.76	---	24.38	23.24	23.71	23.26	25.23	24.76	24.34
26	23.76	23.69	---	---	---	24.46	23.41	23.37	23.58	24.52	---	25.69
27	23.42	24.76	---	---	---	24.82	23.45	23.30	23.64	24.52	25.49	24.27
28	24.02	25.46	---	25.51	---	24.82	23.26	23.38	23.47	24.36	25.32	23.94
29	24.97	24.29	---	25.19	25.74	24.55	23.11	23.52	23.83	23.75	25.19	25.20
30	25.17	24.94	---	24.85	---	24.41	23.01	23.64	24.04	23.87	25.35	25.59
31	25.24	---	---	24.97	---	24.40	---	23.74	---	23.91	25.47	---
MAX	25.24	25.66	27.41	30.25	26.49	27.11	25.57	25.83	25.96	25.36	27.06	26.44

CAL YR 1995 LOW 27.41  
WTR YR 1996 LOW 30.25

## GROUND-WATER RECORDS

113

## SENECA COUNTY

410802083093900. Local number, SE-2.

LOCATION.--Lat 41°08'02", long 83°09'39", Hydrologic Unit 04100011, Tiffin State Hospital, Tiffin.

Owner: State of Ohio.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 12 in., depth 250 ft, cased.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 740 ft above sea level, from topographic map.

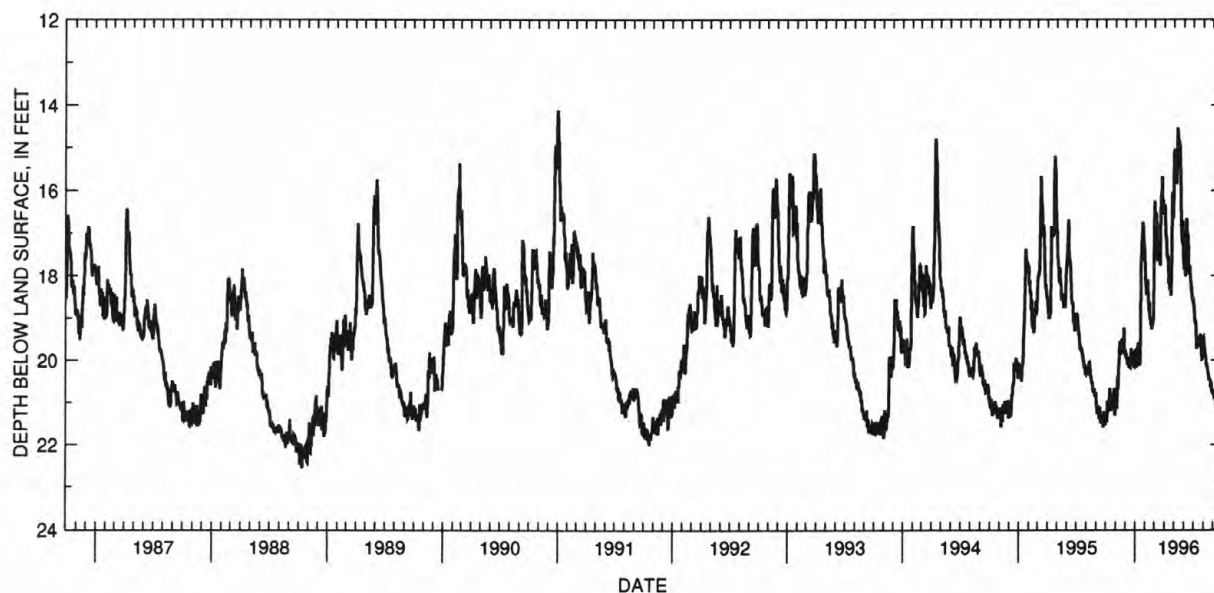
Measuring point: Floor of instrument shelter 0.50 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 23.76 ft below land-surface datum, Nov. 22, 1964;  
minimum daily low, 14.11 ft below land-surface datum, Jan. 2, 1991.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21.34	21.05	19.76	19.78	17.86	16.39	16.48	15.14	17.85	18.75	19.47	20.70
2	21.48	20.75	19.91	19.77	18.11	16.24	16.58	15.07	17.72	18.65	19.54	20.74
3	21.41	20.99	19.83	19.82	18.25	17.21	16.33	15.05	17.76	18.85	19.64	20.80
4	21.46	21.12	19.95	20.01	18.40	17.32	16.79	15.25	17.77	18.99	19.74	20.83
5	21.41	21.12	19.93	20.14	18.41	16.87	17.13	15.36	18.03	19.07	19.81	20.92
6	20.96	20.90	19.96	20.16	18.45	16.51	17.08	15.51	17.97	19.12	19.86	20.88
7	21.16	20.39	20.06	19.86	18.24	16.63	17.16	15.52	17.31	19.06	19.92	20.74
8	21.17	20.65	20.10	19.71	18.09	16.87	17.31	15.71	16.79	19.09	19.93	20.83
9	21.07	20.68	20.02	19.71	18.39	17.43	17.51	15.85	16.65	19.40	20.07	20.93
10	20.99	20.32	20.06	19.61	18.36	17.66	17.58	15.28	16.98	19.66	20.11	21.07
11	21.05	20.08	20.08	19.61	18.60	17.59	17.59	14.88	17.11	19.73	20.15	21.01
12	20.98	19.98	20.14	19.61	18.84	17.31	17.52	14.54	17.28	19.59	20.08	20.85
13	20.85	19.69	20.17	19.66	18.82	17.22	17.90	14.67	17.01	19.44	20.14	20.81
14	20.66	19.58	19.92	19.77	18.61	17.24	18.19	14.83	17.40	19.60	20.20	20.85
15	20.85	19.55	20.02	20.13	18.96	17.46	17.97	14.81	17.72	19.53	20.20	20.96
16	21.11	19.76	20.16	20.05	19.04	17.63	18.16	14.98	17.89	19.54	20.35	20.99
17	21.20	19.87	20.17	19.51	19.00	17.65	18.34	14.87	17.98	19.68	20.34	21.09
18	20.98	19.68	20.02	18.69	19.10	17.76	18.19	14.89	17.79	19.54	20.39	21.14
19	21.03	19.76	19.75	17.59	19.09	17.71	18.13	15.00	17.77	19.49	20.45	21.11
20	20.84	19.59	19.75	17.60	19.13	16.65	18.11	15.17	17.97	19.57	20.41	20.84
21	20.92	19.48	19.87	17.20	19.24	16.31	18.47	15.61	18.07	19.50	20.45	20.91
22	21.11	19.58	19.90	17.17	19.26	16.01	18.36	16.04	18.16	19.38	20.46	20.95
23	21.13	19.73	19.94	16.97	19.07	16.16	17.97	16.55	18.34	19.45	20.50	21.13
24	21.14	19.81	19.86	16.73	19.13	16.14	16.96	16.97	18.22	19.57	20.64	21.07
25	21.17	19.74	19.81	17.06	19.13	15.67	16.09	17.07	18.42	19.65	20.56	21.18
26	21.03	19.55	19.85	16.81	19.03	16.29	16.04	17.16	18.57	19.82	20.52	21.18
27	20.66	19.23	19.98	17.11	18.95	16.40	16.45	17.25	18.53	19.97	20.63	20.92
28	20.97	19.84	20.14	17.35	17.62	16.21	16.67	16.71	18.53	19.96	20.76	20.85
29	21.21	19.86	20.15	17.27	17.02	16.47	16.51	17.35	18.58	19.84	20.76	20.78
30	21.31	19.79	20.06	17.41	---	16.56	15.53	17.61	18.57	19.70	20.77	20.90
31	21.15	---	19.85	17.70	---	16.51	---	17.75	---	19.48	20.72	---
MAX	21.48	21.12	20.17	20.16	19.26	17.76	18.47	17.75	18.58	19.97	20.77	21.18

CAL YR 1995 LOW 21.59  
WTR YR 1996 LOW 21.48

## GROUND-WATER RECORDS

## SUMMIT COUNTY

410330081282000. Local number, SU-6.

LOCATION.--Lat 41°03'30", long 81°28'20", Hydrologic Unit 04110002, Seiberling St, Akron.

Owner: Goodyear Tire and Rubber Co.

AQUIFER.--Sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 24 in., depth 89 ft, cased.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 1000 ft above sea level from topographic map.

Measuring point: Floor of instrument shelter 2.63 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

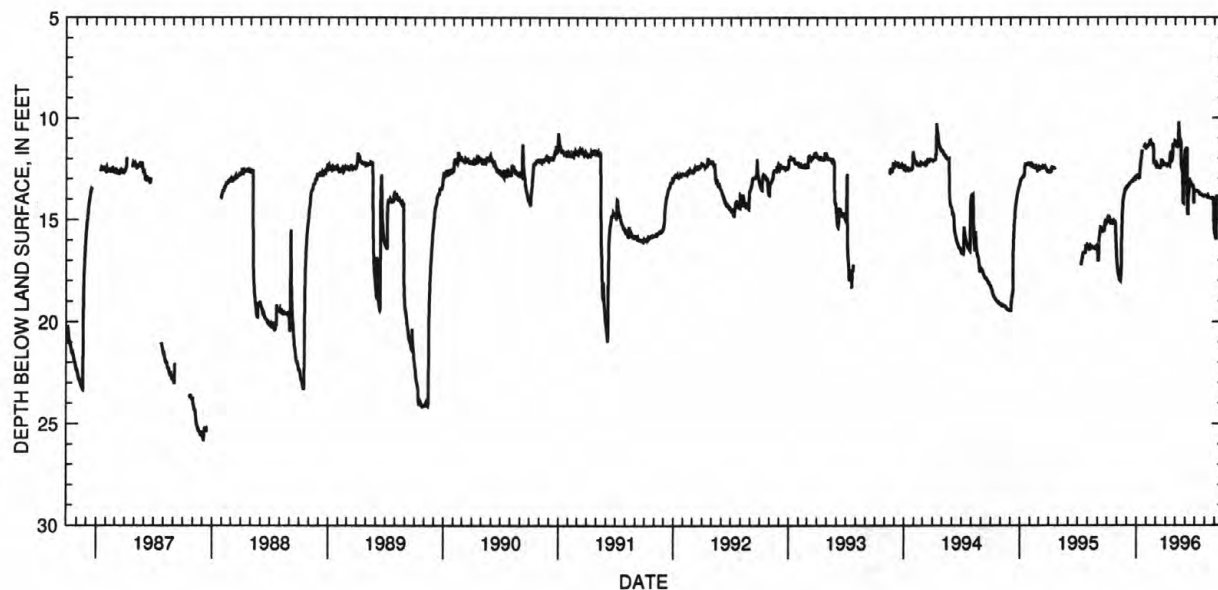
PERIOD OF RECORD.--March 1944 to current year. Records for May 14-Sept. 30, 1980, published in USGS-WDR-OH-80-1, are unreliable and should not be used.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 59.47 ft below land-surface datum, Oct. 18, 1947;  
minimum daily low, 10.19 ft below land-surface datum, May 12, 1996.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15.10	16.91	13.44	12.90	11.45	12.30	12.32	11.16	11.63	13.57	13.84	15.63
2	15.06	17.15	13.45	12.87	11.47	12.35	12.33	11.26	11.64	13.59	13.84	15.67
3	15.04	17.33	13.40	12.91	11.45	12.39	12.32	11.32	11.65	13.62	13.84	15.77
4	14.91	17.45	13.36	12.92	11.43	12.43	12.34	11.33	11.68	13.62	13.84	15.84
5	14.91	17.57	13.35	12.94	11.40	12.42	12.36	11.36	11.55	13.60	13.84	15.92
6	14.79	17.64	13.36	12.94	11.40	12.31	12.34	11.42	11.52	13.60	13.87	15.96
7	14.90	17.73	13.33	12.90	11.37	12.35	12.31	11.43	11.49	13.59	13.87	15.62
8	14.90	17.83	13.34	12.88	11.34	12.40	12.33	11.42	13.95	13.59	13.88	13.83
9	14.91	17.90	13.31	12.89	11.33	12.44	12.33	11.43	14.62	13.63	13.89	13.90
10	14.95	17.98	13.30	12.96	11.33	12.45	12.34	11.39	14.79	13.65	13.92	13.93
11	15.12	17.99	13.23	12.95	11.28	12.44	12.34	11.20	13.67	13.65	13.92	13.93
12	15.17	17.91	13.23	12.58	11.15	12.45	12.35	10.19	13.54	13.66	13.89	13.93
13	15.17	17.94	13.22	12.43	11.14	12.47	12.35	10.72	13.57	13.66	13.93	13.91
14	15.13	17.68	13.19	12.32	11.12	12.47	12.36	10.93	13.00	13.68	13.94	13.91
15	15.00	17.49	13.17	12.11	11.17	12.47	11.96	11.02	13.06	13.68	13.94	13.89
16	15.09	15.79	13.17	12.00	11.31	12.46	11.76	11.06	13.17	13.71	13.95	13.90
17	15.12	15.08	13.15	11.92	11.31	12.39	11.73	11.09	13.24	13.75	13.95	13.90
18	15.15	14.73	13.12	11.77	11.32	12.36	11.71	11.25	13.27	13.75	13.95	13.92
19	15.17	14.47	13.10	11.60	11.29	12.35	11.66	11.12	13.24	13.79	13.96	13.93
20	15.15	14.21	13.11	---	11.29	12.05	11.86	12.21	13.31	13.79	13.97	13.93
21	15.10	14.01	13.11	---	11.36	12.10	12.00	12.46	13.36	13.78	13.97	13.92
22	15.11	13.94	13.11	---	11.41	12.13	12.04	12.52	13.36	13.80	13.97	13.90
23	15.10	13.84	13.04	11.37	11.40	12.16	11.99	12.58	13.37	13.82	13.97	13.85
24	15.15	13.74	13.01	11.38	12.03	12.16	11.36	12.64	13.39	13.83	13.94	13.91
25	15.16	13.69	12.97	11.42	12.27	12.20	11.32	13.82	13.27	13.84	13.93	13.95
26	15.15	13.61	12.95	11.44	12.23	12.26	11.32	14.19	13.38	13.85	13.94	13.95
27	15.13	13.53	13.00	11.40	12.29	12.31	11.36	14.21	13.43	13.87	13.96	13.95
28	15.20	13.54	13.03	11.42	12.19	12.31	11.38	13.52	14.23	13.87	13.97	13.93
29	15.75	13.51	13.04	11.39	12.25	12.34	11.37	12.33	13.72	13.86	13.99	13.66
30	16.25	13.48	13.03	11.44	---	12.34	11.15	12.04	13.58	13.87	15.13	13.75
31	16.61	---	12.95	11.47	---	12.31	---	11.65	---	13.84	15.50	---
MAX	16.61	17.99	13.45	12.96	12.29	12.47	12.36	14.21	14.79	13.87	15.50	15.96

CAL YR 1995 LOW 17.99

WTR YR 1996 LOW 17.99



## GROUND-WATER RECORDS

115

## SUMMIT COUNTY--Continued

410846081271600. Local number, SU-7.

LOCATION.--Lat 41°08'46", long 81°27'16", Hydrologic Unit 04110002, Monroe Falls Road, Cuyahoga Falls.

Owner: Cuyahoga Falls Water Department.

AQUIFER.--Sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused water-table, diameter 6 in., depth 100 ft, cased.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 994 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 5.00 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

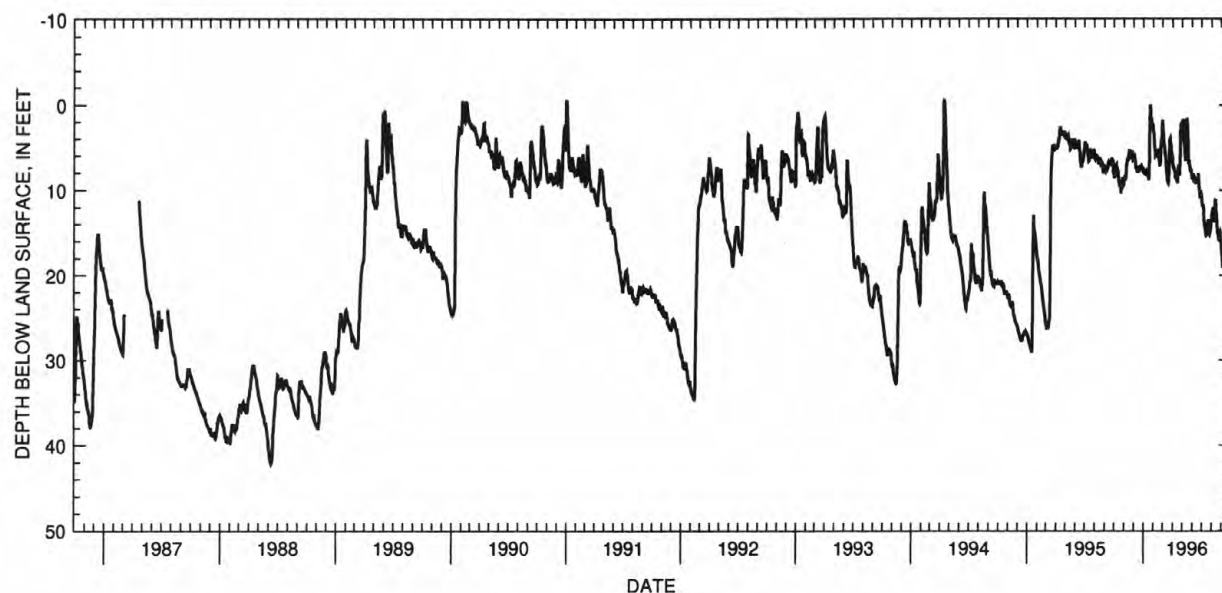
PERIOD OF RECORD.--August 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 44.19 ft below land-surface datum, Sept. 7, 1971;

minimum daily low, 0.67 ft above land-surface datum, Apr. 15, 1994.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.58	8.62	6.21	8.02	3.12	2.44	7.06	2.06	8.15	11.08	13.00	17.10
2	8.36	8.96	6.18	7.84	3.22	3.19	7.13	1.87	8.47	11.85	12.54	17.76
3	8.48	8.34	6.16	8.00	4.14	3.61	7.34	1.75	8.25	11.66	12.73	18.18
4	8.08	8.37	6.12	8.18	4.69	4.30	7.37	1.68	8.57	11.84	12.23	18.96
5	7.49	8.85	6.47	8.01	5.11	4.94	7.51	3.30	8.50	11.71	12.02	18.99
6	7.43	8.58	6.71	8.19	5.42	4.62	7.66	3.95	8.96	12.04	12.86	19.00
7	7.04	8.47	6.99	8.08	6.06	5.35	7.82	4.61	8.94	13.40	12.92	18.79
8	6.98	7.68	7.34	7.91	6.00	5.91	7.76	5.04	8.56	13.75	13.61	17.23
9	7.59	7.04	7.54	7.94	5.66	5.70	8.47	5.13	8.61	14.18	13.62	16.92
10	7.32	6.76	7.17	7.98	6.01	6.35	8.50	6.41	8.76	14.18	12.53	16.43
11	7.46	6.59	7.72	7.65	5.79	6.69	8.52	6.53	9.27	14.48	11.68	16.25
12	8.15	6.24	7.90	7.68	5.95	7.42	8.62	4.15	8.74	14.92	11.16	16.34
13	8.24	6.51	7.75	8.35	5.46	8.10	8.55	1.95	8.56	15.25	11.18	16.18
14	8.17	6.45	7.74	8.22	5.40	8.33	8.77	1.79	9.08	15.34	11.75	16.12
15	8.87	6.27	7.73	8.14	5.77	8.93	9.17	1.54	8.74	15.32	12.46	16.14
16	9.01	5.73	7.79	8.41	6.06	8.78	8.78	1.75	8.66	15.26	12.90	16.37
17	9.26	5.81	7.76	8.82	6.18	9.11	8.07	2.68	8.66	14.67	13.71	16.15
18	9.57	5.57	7.77	8.35	6.13	9.17	7.63	3.73	9.08	14.56	14.31	16.86
19	9.22	5.40	7.34	6.65	6.52	8.94	7.02	4.45	8.84	13.94	14.92	16.30
20	9.20	5.27	7.29	2.15	7.06	8.05	7.79	6.90	8.06	13.46	15.17	16.17
21	9.51	5.76	7.27	1.49	7.06	6.17	7.75	6.57	8.99	13.63	15.19	16.88
22	10.39	6.18	7.10	-.01	6.99	4.79	8.28	6.45	9.61	14.47	15.42	16.83
23	9.85	6.34	7.27	.47	5.88	4.00	7.55	6.96	10.02	14.62	15.90	16.47
24	9.96	5.93	7.31	1.76	4.89	3.90	6.44	7.11	10.18	14.97	15.98	16.43
25	9.64	5.86	7.22	1.70	4.23	4.39	3.35	7.53	10.92	15.13	15.38	16.11
26	9.30	5.93	7.40	1.67	4.07	4.67	2.65	7.66	10.43	14.95	14.86	15.96
27	8.61	5.83	7.50	2.28	4.00	4.82	2.08	7.69	10.05	14.63	14.82	15.94
28	8.69	6.31	7.56	2.20	2.99	5.51	2.87	7.51	10.39	14.32	15.08	15.94
29	9.50	6.27	7.58	2.23	1.75	5.85	3.83	7.86	10.52	14.02	15.63	15.39
30	9.43	6.33	7.78	2.54	---	5.87	4.20	8.20	10.72	13.68	16.10	13.29
31	9.22	---	7.77	2.53	---	6.20	---	8.69	---	13.32	16.71	---
MAX	10.39	8.96	7.90	8.82	7.06	9.17	9.17	8.69	10.92	15.34	16.71	19.00

CAL YR 1995 LOW 28.99  
WTR YR 1996 LOW 19.00



## GROUND-WATER RECORDS

## VAN WERT COUNTY

405215084335400. Local number, VW-1.

LOCATION.--Lat 40°52'15", long 84°33'54", Hydrologic Unit 04100007, Ridge Road near Van Wert.

Owner: Marsh Foundation.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 8 in., depth 340 ft, cased.

INSTRUMENTATION.--Type F continuous recorder.

DATUM.--Elevation of land-surface datum is 790.37 ft above sea level.

Measuring point: Floor of instrument shelter 6.15 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

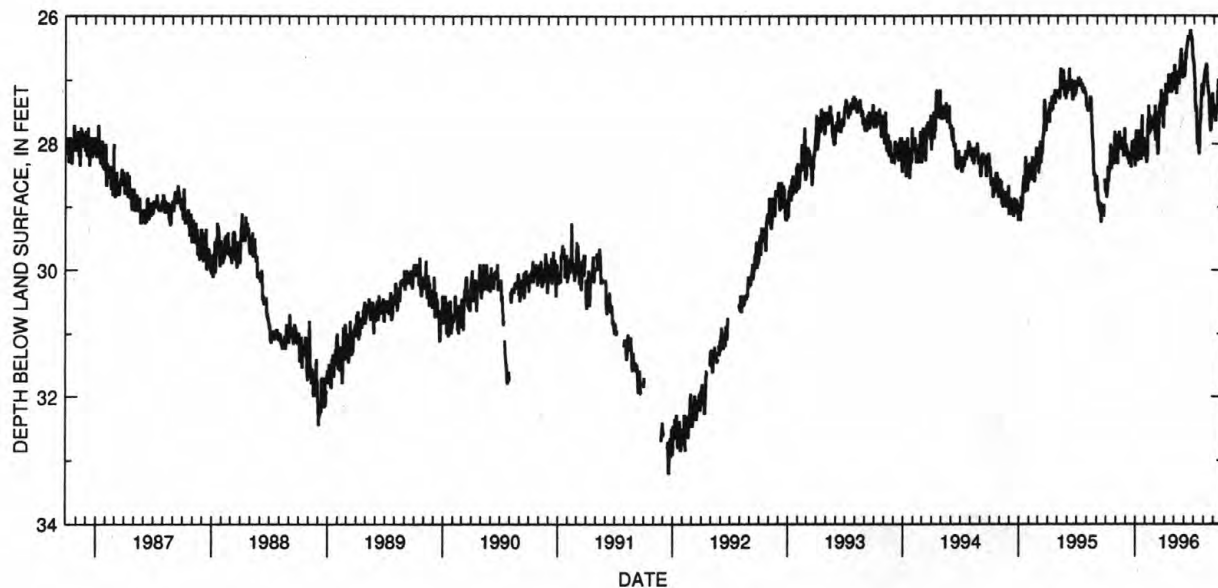
PERIOD OF RECORD.--August 1957 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low 33.20 ft below land-surface datum, Dec. 20-21, 1991;  
minimum daily low, 18.85 ft below land-surface datum, Mar. 6, 1959.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28.70	28.10	28.00	27.95	28.10	27.40	27.35	26.80	26.90	26.85	26.95	27.45
2	28.85	27.90	28.10	27.80	28.15	27.85	27.35	27.00	26.85	26.90	26.90	27.45
3	28.80	28.10	28.05	27.80	28.25	27.95	27.05	26.95	26.75	27.10	26.85	27.45
4	28.75	28.30	28.15	27.85	28.30	27.90	27.30	27.00	26.55	27.30	26.85	27.55
5	28.65	28.30	28.10	28.05	28.15	27.50	27.40	27.05	26.65	27.40	26.85	27.65
6	28.35	28.15	28.20	28.25	28.20	27.70	27.20	27.20	26.65	27.50	26.80	27.60
7	28.55	27.85	28.20	28.25	27.75	27.75	27.20	27.20	26.50	27.45	26.75	27.55
8	28.60	28.05	28.25	28.10	27.60	27.95	27.20	27.05	26.45	27.40	26.75	27.50
9	28.60	28.05	28.15	28.00	27.65	28.15	27.30	27.00	26.45	27.70	26.80	27.50
10	28.40	27.80	28.25	27.80	27.40	28.15	27.40	26.95	26.40	27.90	26.90	27.50
11	28.45	27.90	28.30	28.05	27.80	28.10	27.20	26.85	26.35	28.00	27.05	27.45
12	28.35	27.95	28.30	28.05	27.85	27.80	26.80	26.90	26.30	27.95	27.10	27.25
13	28.25	27.90	28.30	27.80	27.75	27.60	27.20	27.00	26.35	27.85	27.10	27.10
14	28.00	27.95	28.15	27.80	27.55	27.45	27.40	27.05	26.35	28.00	27.20	27.00
15	28.10	27.90	28.15	27.90	27.75	27.40	26.80	27.05	26.35	28.05	27.20	27.00
16	28.35	28.00	28.20	28.20	27.80	27.45	27.30	26.80	26.35	28.15	27.25	27.00
17	28.40	28.10	28.35	28.25	27.70	27.35	27.40	26.85	26.35	28.15	27.45	27.20
18	28.25	28.05	28.35	27.90	27.70	27.40	27.20	26.70	26.25	27.95	27.50	27.30
19	28.25	28.10	28.15	27.80	27.60	27.30	26.90	26.65	26.20	27.65	27.65	27.30
20	28.10	28.00	27.95	27.55	27.70	27.15	27.00	26.60	26.25	27.65	27.75	27.10
21	28.05	27.90	28.00	28.05	27.75	27.25	27.40	26.50	26.35	27.55	27.80	26.95
22	28.30	28.00	28.05	28.15	27.65	27.30	27.20	26.65	26.30	27.40	27.75	27.00
23	28.30	28.10	28.05	28.10	27.65	27.55	27.30	26.70	26.40	27.25	27.65	27.10
24	28.30	28.20	28.05	28.00	27.70	27.55	27.30	26.80	26.35	27.15	27.60	27.05
25	28.30	28.15	28.00	28.10	27.65	27.40	26.90	26.95	26.50	27.05	27.45	27.10
26	28.15	27.95	27.95	27.90	27.55	27.70	26.90	26.95	26.60	27.15	27.25	27.05
27	27.80	27.75	27.95	28.10	27.65	27.75	27.05	26.85	26.65	27.20	27.20	26.75
28	27.90	28.10	28.15	28.20	27.80	27.55	27.15	26.80	26.70	27.25	27.35	26.85
29	28.20	28.15	28.25	27.95	27.70	27.40	27.05	26.70	26.70	27.15	27.40	26.95
30	28.25	28.05	28.35	28.00	---	27.35	26.75	26.85	26.75	27.10	27.40	27.00
31	28.20	---	28.15	28.00	---	27.20	---	26.95	---	27.00	27.40	---
MAX	28.85	28.30	28.35	28.25	28.30	28.15	27.40	27.20	26.90	28.15	27.80	27.65

CAL YR 1995 LOW 29.25

WTR YR 1996 LOW 28.85



## GROUND-WATER RECORDS

117

## WILLIAMS COUNTY

412821084313600. Local number, WM-1.

LOCATION.--Lat 41°28'21", long 84°31'36", Hydrologic Unit 04100006, Bryan Water Treatment Plant, Bryan.

Owner: City of Bryan.

AQUIFER.--Sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused production well, diameter 8 in., depth 118 ft, cased.

INSTRUMENTATION.--Type F continuous recorder.

DATUM.--Elevation of land-surface datum is 747 ft above sea level, from topographic map.

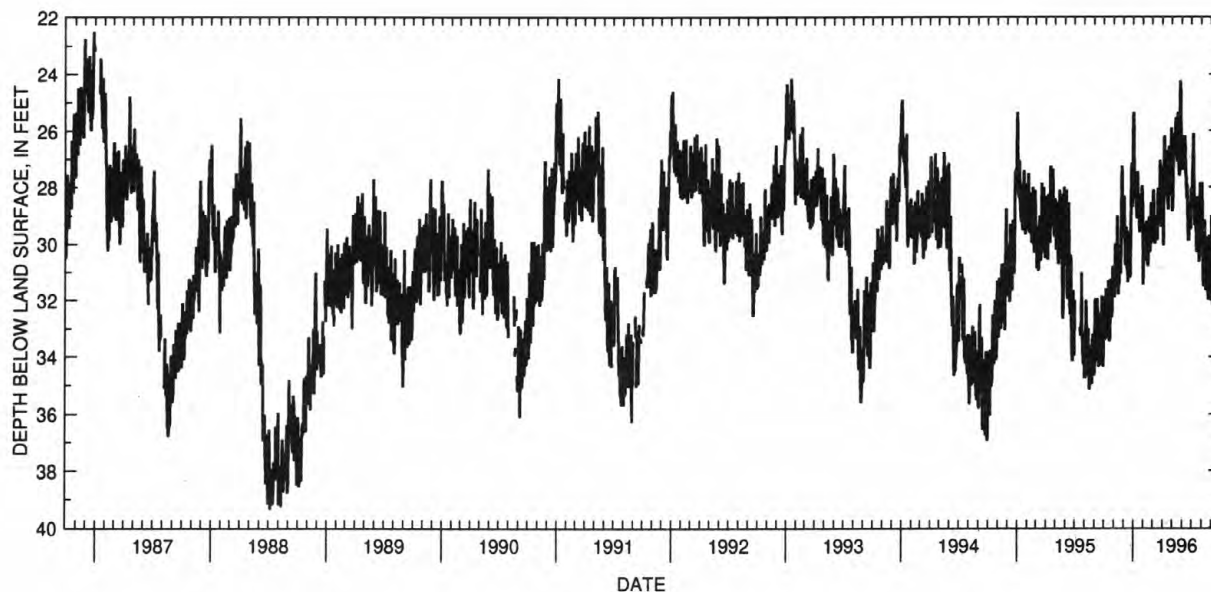
Measuring point: Floor of instrument shelter 3.30 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

PERIOD OF RECORD.--May 1951 to May 1957, discontinued June 1957 to September 1984, reactivated October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 39.35 ft below land-surface datum, July 7, 1988;  
minimum daily low, 1.45 ft below land-surface datum, Jan. 27, 1952.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	32.45	31.75	29.80	25.75	31.45	29.90	27.30	27.75	27.40	28.45	28.75	30.25
2	31.90	31.60	29.35	25.35	30.60	29.45	27.40	28.85	26.75	28.35	28.90	29.00
3	33.00	31.90	28.30	26.15	30.50	28.30	28.85	28.45	26.30	28.55	27.85	29.10
4	33.40	31.35	28.85	27.15	29.45	28.10	30.05	27.75	26.75	27.55	28.60	30.95
5	33.30	30.55	29.40	27.80	29.55	29.00	27.80	26.70	27.00	27.35	29.75	31.85
6	33.35	30.00	29.90	28.05	29.30	29.15	27.40	26.10	27.40	26.80	30.35	32.20
7	32.45	31.00	30.60	27.85	30.10	29.75	26.20	26.85	26.80	26.10	31.45	30.55
8	31.60	31.40	30.75	27.70	30.00	29.85	27.90	26.85	26.70	27.60	31.50	30.80
9	31.65	31.55	29.85	27.95	30.40	30.00	27.80	26.80	26.20	28.15	31.15	30.25
10	32.75	31.50	29.40	28.45	30.60	29.15	28.20	26.75	26.35	28.95	30.45	---
11	33.20	30.50	30.35	28.85	29.20	29.00	28.25	26.85	26.65	29.35	29.15	---
12	33.30	29.00	30.85	29.10	29.65	29.25	28.20	25.95	27.05	29.00	30.35	---
13	33.30	30.35	30.70	29.00	29.60	29.50	28.10	25.55	27.55	28.80	31.00	---
14	32.35	30.50	30.90	27.80	30.45	29.55	26.75	26.85	27.70	28.35	31.30	---
15	31.30	31.80	31.35	27.45	30.65	29.75	26.75	26.95	28.00	29.05	31.65	---
16	32.60	31.45	30.65	28.45	30.80	29.85	27.75	26.55	28.40	29.90	31.35	---
17	32.90	31.25	29.95	28.55	30.15	28.90	28.30	27.10	27.90	30.30	30.45	---
18	33.40	31.40	29.55	28.55	29.40	28.05	28.60	26.45	28.30	30.15	29.75	31.90
19	33.45	30.90	30.45	28.85	29.05	28.10	28.80	25.85	29.00	29.55	30.60	32.30
20	33.25	30.05	30.45	29.60	29.30	28.70	28.15	25.35	29.50	29.05	31.15	31.80
21	32.30	30.70	30.85	28.55	30.05	29.15	27.50	26.40	29.85	28.35	31.45	31.50
22	31.40	31.05	31.20	28.25	30.30	29.15	26.55	26.90	29.85	28.80	31.85	30.35
23	31.25	30.75	30.95	28.85	30.10	28.70	27.05	27.45	28.95	30.30	32.00	30.00
24	32.10	29.55	29.40	28.55	29.40	28.00	27.80	27.60	28.55	30.00	31.60	31.20
25	32.55	28.35	28.55	28.95	28.80	27.05	28.30	27.30	29.35	30.65	30.20	32.25
26	32.60	27.65	27.55	28.85	28.55	28.70	28.00	25.75	29.00	30.15	29.70	32.60
27	32.30	27.25	27.15	28.40	29.30	29.20	27.60	24.25	29.45	28.85	30.50	32.00
28	31.35	28.55	28.35	28.00	29.65	29.40	26.80	24.75	29.45	27.85	31.35	31.45
29	30.80	29.40	28.70	28.00	29.95	29.10	25.90	25.90	29.00	28.10	31.95	30.55
30	30.85	29.55	28.35	28.45	---	29.15	27.50	26.35	28.05	29.00	32.00	30.20
31	31.70	---	26.75	29.95	---	27.90	---	27.05	---	28.85	31.10	---
MAX	33.45	31.90	31.35	29.95	31.45	30.00	30.05	28.85	29.85	30.65	32.00	32.60

CAL YR 1995 LOW 35.15  
WTR YR 1996 LOW 33.45

## GROUND-WATER RECORDS

## WILLIAMS COUNTY--Continued

412930084320900. Local number, WM-3.

LOCATION.--Lat 41°29'30", long 84°32'09", Hydrologic Unit 04100006, Union Street, Bryan.

Owner: City of Bryan.

AQUIFER.--Sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled unused test well, diameter 8 in., depth 174 ft, cased.

INSTRUMENTATION.--Type F continuous recorder.

DATUM.--Elevation of land-surface datum is 760 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 2.00 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

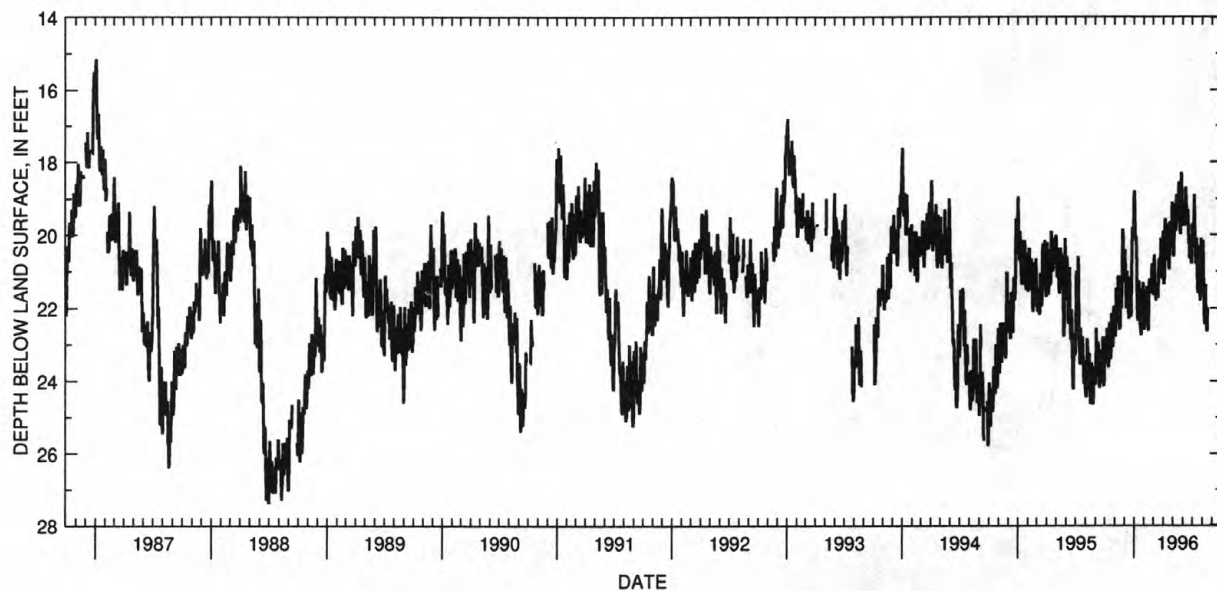
PERIOD OF RECORD.--October 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 27.35 ft below land-surface datum, June 30 - July 1, 1988;  
minimum daily low, 15.15 ft below land-surface datum, Jan. 4, 1987.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23.15	22.50	21.30	18.90	22.60	21.65	19.90	19.90	19.70	19.90	20.85	---
2	22.80	22.65	21.25	18.80	22.55	21.50	20.35	20.55	19.75	19.95	20.75	---
3	23.10	22.80	20.40	19.25	22.35	20.80	21.35	20.60	19.30	20.15	20.15	---
4	23.45	22.60	20.60	19.75	21.65	20.55	21.15	20.45	19.10	19.95	20.60	---
5	23.45	21.85	21.05	20.10	21.50	20.90	21.15	19.60	19.40	19.75	21.40	---
6	23.50	21.45	21.60	20.10	21.75	21.20	20.30	19.15	19.75	19.40	21.80	---
7	23.35	22.00	21.95	20.10	21.70	21.50	19.55	19.45	19.70	18.90	22.25	---
8	22.60	22.30	22.00	20.35	---	21.70	19.90	19.60	19.55	19.70	22.45	---
9	22.60	22.35	21.65	20.90	---	21.80	20.30	19.85	19.25	20.15	22.40	---
10	23.10	22.40	21.00	21.65	21.40	21.45	20.55	19.90	18.70	20.45	21.80	---
11	23.40	21.90	21.45	22.15	21.70	21.35	20.60	19.75	19.00	20.80	21.35	---
12	23.60	21.15	21.80	22.35	21.95	21.45	20.65	18.95	19.15	20.70	21.90	---
13	23.60	21.15	21.81	22.30	22.35	21.55	20.65	18.90	19.45	20.50	22.30	---
14	23.30	21.65	22.05	21.45	22.60	21.55	19.80	19.35	19.50	20.10	22.55	---
15	22.60	22.30	22.30	21.30	22.60	21.70	19.70	19.35	19.55	20.45	22.65	---
16	22.40	22.55	22.15	21.30	21.80	21.70	20.25	19.55	19.55	21.00	22.60	---
17	22.90	22.60	21.55	21.55	21.40	21.25	20.65	19.60	19.30	21.40	22.00	---
18	23.30	22.55	21.15	21.55	21.20	20.80	20.85	19.40	19.70	21.55	---	---
19	23.40 <sup>a</sup>	22.00	21.50	22.25	---	20.65	20.95	18.85	20.05	21.55	---	---
20	23.35	21.55	21.90	22.55	---	20.85	20.70	18.55	20.25	21.05	---	---
21	23.05	21.90	22.15	22.25	---	21.05	20.20	18.90	20.05	20.30	---	---
22	22.20	22.00	22.25	22.70	---	21.15	19.65	19.30	20.65	20.75	---	---
23	22.15	21.90	22.00	22.75	---	21.05	20.10	19.75	20.35	21.20	---	---
24	22.65	21.20	21.20	22.30	21.60	20.40	20.35	19.95	20.25	21.45	---	21.80
25	23.05	20.50	20.40	22.20	21.10	20.10	20.30	19.95	20.40	21.80	---	22.65
26	23.05	19.85	19.80	22.15	20.80	20.75	20.30	19.20	20.45	21.65	---	22.70
27	22.95	19.95	19.85	21.80	21.10	21.10	20.15	18.30	20.70	20.95	---	22.75
28	22.60	20.50	20.05	21.45	21.50	21.10	19.40	18.35	20.80	20.10	---	22.50
29	21.95	20.95	20.15	21.30	21.60	21.20	19.10	18.80	20.55	20.50	---	21.95
30	22.00	21.10	19.95	21.50	---	21.15	19.75	19.30	19.70	20.75	---	21.35
31	22.40	---	19.35	22.35	---	20.40	---	19.65	---	20.85	---	---
MAX	23.60	22.80	22.30	22.75	22.60	21.80	21.35	20.60	20.80	21.80	22.65	22.75

CAL YR 1995 LOW 24.65

WTR YR 1996 LOW 23.60



# GROUND-WATER RECORDS

119

## WILLIAMS COUNTY--Continued

413108084415300. Local number, WM-12.

LOCATION.--Lat 41°31'08", long 84°41'53", Hydrologic Unit 04100003, 1.7 mi east of Blakeslee.

Owner: State of Ohio.

AQUIFER.--Sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Drilled test artesian well, diameter 10 in., depth 115 ft, cased to 115 ft, screened 85 ft to 115 ft.

INSTRUMENTATION.--Periodic measurement with chalked tape by ODNR personnel.

DATUM.--Elevation of land-surface datum is 830 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 1.50 ft above land-surface datum.

REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

PERIOD OF RECORD.--1974 to September 1982 continuous, periodic October 1983 to December 1984, continuous January 1985 to November 1986, periodic thereafter.

EXTREMES FOR PERIOD OF RECORD.--Maximum measured low, 10.66 ft below land-surface datum, Oct. 24, 1994; minimum daily low, 3.83 ft below land-surface datum, Mar. 17, 1982.

## WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM INSTANTANEOUS OBSERVATIONS

Date	Water Level
Oct. 10, 1995	10.41
Apr. 9, 1996	9.15
Aug. 14, 1996	9.91



## GROUND-WATER RECORDS

## WYANDOT COUNTY

405009083172600. Local number, WY-1.

LOCATION.--Lat 40°50'09", long 83°17'26", Hydrologic Unit 04100011, State Rt 199, Upper Sandusky.

Owner: Karg Supply Co.

AQUIFER.--Limestone of Silurian Age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 5 in, depth 90 ft, cased.

INSTRUMENTATION.--Digital recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 850 ft above sea level, from topographic map.

Measuring point: Floor of instrument shelter 3.00 ft above land-surface datum.

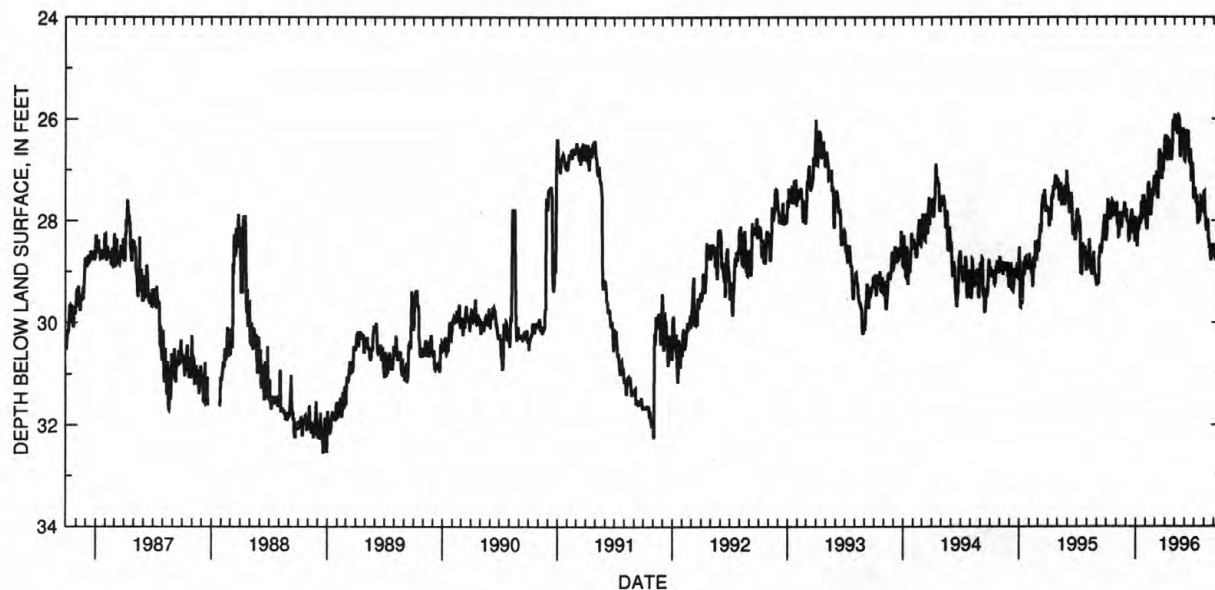
REMARKS.--Station operated by Ohio Department of Natural Resources, Division of Water.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 40.90 ft below land-surface datum, July 12, 15, 17, 21, Aug. 26, 1961; minimum daily low, 25.75 ft below land-surface datum, Apr. 16, 1980.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28.38	27.73	27.85	27.96	27.92	27.39	26.38	25.96	26.80	27.55	27.44	28.53
2	28.29	27.63	27.81	27.94	27.99	27.14	26.34	25.92	26.81	27.42	27.43	28.51
3	28.20	27.67	27.76	28.02	28.08	27.31	26.36	25.95	26.76	27.40	27.71	28.52
4	28.02	27.95	27.90	28.22	28.10	27.38	26.32	26.14	26.58	27.34	27.83	28.67
5	27.90	28.07	27.99	28.44	28.18	27.26	26.71	26.13	26.37	27.43	27.88	28.74
6	27.57	28.08	28.01	28.52	28.10	27.03	26.79	26.09	26.37	27.55	27.99	28.76
7	27.61	28.02	28.01	28.32	27.95	27.26	26.72	26.10	26.22	27.63	28.10	28.80
8	27.70	28.15	28.04	28.16	27.70	27.41	26.73	26.15	26.25	27.64	28.14	28.72
9	27.70	28.31	27.99	28.04	27.27	27.55	26.76	26.27	26.31	27.49	28.21	28.73
10	27.66	28.30	28.29	28.12	27.29	27.53	26.81	26.27	26.31	27.53	28.14	28.56
11	27.69	28.12	28.38	28.18	27.23	27.56	26.72	26.03	26.28	27.79	28.09	28.40
12	27.86	27.82	28.37	28.08	27.54	27.22	26.59	25.97	26.23	27.98	27.97	28.35
13	27.95	27.97	28.20	27.98	27.68	27.03	26.47	25.93	26.41	28.07	28.02	28.02
14	27.98	27.98	28.09	27.90	27.68	26.80	26.43	25.94	26.64	27.96	28.28	27.83
15	27.77	28.02	27.97	28.02	27.52	26.60	26.44	26.21	26.72	27.77	28.35	27.90
16	27.93	28.12	28.10	28.06	27.80	26.71	26.55	25.98	26.82	27.87	28.39	27.90
17	27.91	28.12	27.88	28.03	27.90	26.71	26.69	26.35	26.83	27.99	28.45	28.19
18	27.65	28.12	27.96	27.89	27.77	26.66	26.63	26.69	26.80	28.01	28.52	28.11
19	27.61	28.04	27.86	27.62	27.74	26.70	26.53	26.75	26.60	27.83	28.52	27.88
20	27.63	27.93	27.78	27.99	27.62	26.76	26.75	26.69	26.63	27.84	28.56	27.88
21	27.60	27.82	27.91	27.95	27.43	26.95	26.79	26.56	26.78	27.72	28.70	27.93
22	27.70	27.93	28.22	27.76	27.39	27.16	26.79	26.38	27.20	27.53	28.74	27.92
23	27.71	27.91	28.25	27.75	27.39	27.16	26.64	26.38	27.20	27.54	28.79	27.91
24	27.78	27.83	28.05	27.49	27.50	27.00	26.50	26.39	27.14	27.54	28.71	27.84
25	27.92	27.93	27.96	27.68	27.50	26.77	26.38	26.31	26.99	27.59	28.62	27.81
26	27.86	27.79	27.92	27.73	27.41	26.93	26.02	26.23	26.85	27.60	28.46	27.85
27	27.80	27.63	28.05	27.49	27.24	27.02	26.16	26.19	26.99	27.78	28.57	27.85
28	27.65	27.70	28.16	27.58	27.11	26.87	26.21	26.24	27.20	27.79	28.53	27.88
29	27.74	27.80	28.37	27.61	27.37	26.69	26.21	26.36	27.50	27.77	28.47	27.91
30	27.80	27.86	28.42	27.59	---	26.68	26.02	26.39	27.55	27.64	28.49	27.94
31	27.83	---	28.25	27.75	---	26.54	---	26.65	---	27.48	28.51	---
MAX	28.38	28.31	28.42	28.52	28.18	27.56	26.81	26.75	27.55	28.07	28.79	28.80
CAL YR 1995	LOW 29.70											
WTR YR 1996	LOW 28.80											



# SELECTED WATER-QUALITY DATA IN THE VICINITY OF WAYNE NATIONAL FOREST

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The following table lists the results of physical and chemical analyses of surface-water samples collected from the Monday Creek basin. Past mining practices have affected many streams there. The intent of the study that produced the following data was to identify streams most affected by acid mine drainage. Restoration efforts can then be focused where needed most. Additional samples were collected from several major tributaries to the Ohio River. The study began in 1995 and will continue into 1997.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

393828082131500 - UNAM TRIB TO MONDAY C NR MCCUNEVILLE OH

DATE	TIME	TEMPER-	DIS-	SPE-		PH		BICAR-
		ATURE	CHARGE,	CIFIC		WATER		BONATE
		WATER	INST.	CON-	OXYGEN,	WHOLE	ACIDITY	WATER
		(DEG C)	CUBIC	DUCT-	DIS-	FIELD	(MG/L	DIS IT
		FEET	ANCE	SOLVED	(STAND-	AS	FIELD	
		SECOND	(US/CM)	(MG/L)	ARDS	UNITS)	CACO3)	HCO3
		(00010)	(00061)	(00095)	(00300)	(00400)	(00435)	(00453)
NOV 1995								
13...	1140	4.0	0.37	1600	12.6	2.6	224	--
		IRON,		MANGA-		ALUM-		ALKA-
	SULFATE	TOTAL	IRON,	NESE,	MANGA-	INUM,	ALUM-	LINITY
	DIS-	RECOV-	DIS-	TOTAL	NESE,	TOTAL	INUM,	WAT DIS
	SOLVED	ERABLE	SOLVED	RECOV-	DIS-	RECOV-	DIS-	TOT IT
DATE	(MG/L	(UG/L	(UG/L	(UG/L	(UG/L	(UG/L	(UG/L	FIELD
	AS SO4)	AS FE)	AS FE)	AS MN)	AS MN)	AS AL)	AS AL)	MG/L AS
	(00945)	(01045)	(01046)	(01055)	(01056)	(01105)	(01106)	CACO3
								(39086)
NOV 1995								
13...	660	21000	21000	4800	4900	12000	12000	--

393743082135900 - MONDAY C AT MCCUNEVILLE OH

DATE	TIME	DIS-CHARGE,	SPE-CIFIC	PH	BICAR-			
		INST.	CON-	WATER	BONATE			
		CUBIC	DUCT-	WHOLE	WATER			
		FEET	ANCE	FIELD	ACIDITY	DIS IT		
WATER	PER	(US/CM)	(MG/L)	(STAND-ARD	(MG/L	AS	MG/L AS	
(DEG C)	SECOND	(00061)	(00095)	SOLVED	UNITS)	CACO3)	HCO3	
(00010)	(00061)	(00095)	(00300)	(00400)	(00435)	(00453)	(00453)	
NOV 1995								
13...	1445	4.5	2.6	1020	11.6	3.4	58	--
				MANGA-		ALUM-		ALKA-
				NESE,	MANGA-	INUM,	ALUM-	LINITY
	SULFATE	IRON,	IRON,	TOTAL	NESE,	TOTAL	INUM,	WAT DIS
	DIS-	TOTAL	DIS-	RECOV-	DIS-	RECOV-	DIS-	TOT IT
	SOLVED	ERABLE	SOLVED	ERABLE	SOLVED	ERABLE	SOLVED	FIELD
DATE	(MG/L	(UG/L	(UG/L	(UG/L	(UG/L	(UG/L	(UG/L	MG/L AS
	AS SO4)	AS FE)	AS FE)	AS MN)	AS MN)	AS AL)	AS AL)	CACO3
	(00945)	(01045)	(01046)	(01055)	(01056)	(01105)	(01106)	(39086)
NOV 1995								
13...	450	1700	650	3700	1400	4400	1900	--

392950082141100 - MONDAY C AT CARBON HILL OH

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
NOV 1995 20...	1400	5.0	46	746	11.4	6.5	--	34

## SELECTED WATER-QUALITY DATA IN THE VICINITY OF WAYNE NATIONAL FOREST

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996--Continued

392950082141100 - MONDAY C AT CARBON HILL OH--Continued

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
NOV 1995 20...	250	400	210	1600	1500	440	40	28

392804082122500 - MONDAY C NR BUCHTEL OH

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
NOV 1995 21...	1230	4.0	21	721	11.4	6.6	--	27

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
NOV 1995 21...	260	320	190	1500	1300	170	20	22

393451082163900 - UNAM TRIB TO MONDAY C AT GORE OH

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
NOV 1995 21...	1600	4.5	0.86	389	11.5	6.8	--	65

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
NOV 1995 21...	85	160	90	140	140	20	<10	53

# SELECTED WATER-QUALITY DATA IN THE VICINITY OF WAYNE NATIONAL FOREST

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996--Continued

393102082153600 - MONDAY C NR CARBON HILL OH

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
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NOV 1995 22...	1300	2.5	19	942	11.9	6.8	--	39
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DATE	TIME	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
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NOV 1995 22...	260	600	380	2000	1300	200	10	32
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383752082445800 - PINE C NR PEDRO OH

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
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DEC 1995 12...	1430	0.5	18	385	12.3	7.1	--	78
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DATE	TIME	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
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DEC 1995 12...	--	--	--	--	--	--	--	64
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383749082453500 - PINE C NR POWELLVILLE OH

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
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DEC 1995 12...	1630	0.5	21	397	13.6	7.2	--	59
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383749082453500 - PINE C NR POWELLSVILLE OH--Continued

383637082443400 - UNION BRANCH NR PINE GROVE OH

[illegible]

DATE	TIME	TEMPERATURE (DEG C) (00010)	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CON- DUCT-ANCE (US/CM) (00095)	OXYGEN, DIS-SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
			DEC 1995 13...	1150	0.5	1.0	667	12.1

	SULFATE	IRON,	MANGA-	ALUM-	ALKA-
	TOTAL	NESE,	NUM,	LINITY	
	RECOV-	TOTAL	NESE,	TOTAL	WAT DIS
	DIS-	RECOV-	DIS-	RECOV-	TOT IT
	ERABLE	ERABLE	ERABLE	ERABLE	FIELD
DATE	(MG/L	(UG/L	(UG/L	(UG/L	MG/L AS
	AS S04)	AS FE)	AS MN)	AS AL)	CAC03
	(00945)	(01046)	(01055)	(01056)	(01105) (01106) (39086)
DEC 1995	--	--	--	--	--
13...	--	--	--	--	3

# SELECTED WATER-QUALITY DATA IN THE VICINITY OF WAYNE NATIONAL FOREST

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996--Continued

383644082431900 - SPERRY FK AT PINE GROVE OH

DATE	TIME	TEMPER -	DIS -	SPE -	OXYGEN,	PH	ACIDITY	BICAR -
		ATURE	CHARGE,	CIFIC		WATER		ONATE
		WATER	INST.	CON -		WHOLE		WATER
		(DEG C)	CUBIC	DUCT -		FIELD		DIS IT
		PER	ANCE	ANCE	DIS -	(STAND -	(MG/L	FIELD
		(00010)	(00061)	(00095)	(00300)	(MG/L)	ARD	AS
		SECOND				UNITS)	CACO3)	HCO3
		(00010)	(00061)	(00095)	(00300)	(00400)	(00435)	(00453)
DEC 1995								
13...	1345	1.0	0.98	706	12.1	5.6	8.0	4

384321082285400 - SYMMES C NR WATERLOO OH

DATE	TIME	TEMPER-	DIS-	SPE-	OXYGEN,	PH	ACIDITY	BICAR-
		ATURE	CHARGE,	CIFIC		WATER		BONATE
		WATER	INST.	CON-		WHOLE		WATER
		(DEG C)	FEET	DUCT-	DIS-	(STAND-	(MG/L	DIS IT
		(00010)	PER	ANCE	SOLVED	ARD	AS	FIELD
			SECOND	(US/CM)	(MG/L)	UNITS)	CACO3)	MG/L AS
			(00061)	(00095)	(00300)	(00400)	(00435)	HCO3
								(00453)
DEC 1995								
13...	1630	0.5	20	338	12.2	7.2	--	60
				MANGA-		ALUM-		ALKA-
		IRON,		NESE,	MANGA-	INUM,	ALUM-	LINITY
	SULFATE	TOTAL	IRON,	TOTAL	NESE,	TOTAL	INUM,	WAT DIS
	DIS-	RECOV-	DIS-	RECOV-	DIS-	RECOV-	DIS-	TOT IT
	SOLVED	ERABLE	SOLVED	ERABLE	SOLVED	ERABLE	SOLVED	FIELD
DATE	(MG/L	(UG/L	(UG/L	(UG/L	(UG/L	(UG/L	(UG/L	MG/L AS
	AS SO4)	AS FE)	AS FE)	AS MN)	AS MN)	AS AL)	AS AL)	CACO3
	(00945)	(01045)	(01046)	(01055)	(01056)	(01105)	(01106)	(39086)
DEC 1995								
13...	--	--	--	--	--	--	--	49

384210082282900 - SYMMES C AT WATERLOO OH

DATE	TIME	TEMPER- ATURE (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
DEC 1995 14...	1045	0.5	23	332	11.8	7.1	--	76
SEP 1996 04...	1325	21.5	3.7	361	5.6	7.1	--	162

## SELECTED WATER-QUALITY DATA IN THE VICINITY OF WAYNE NATIONAL FOREST

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996--Continued

384210082282900 - SYMMES C AT WATERLOO OH--Continued

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
DEC 1995 14...	--	--	--	--	--	--	--	62
SEP 1996 04...	91	540	12	580	550	250	38	133

384321082285400 - SYMMES C NR WATERLOO OH

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
SEP 1996 04...	1645	21.5	2.9	380	4.0	7.2	--	89

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
SEP 1996 04...	100	760	6.0	740	750	180	<5.0	73

384249082282300 - UNAM TRIB TO SYMMES C NR WATERLOO OH

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	OXYGEN, DIS- SOLVED (MG/L) (00300)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	ACIDITY (MG/L AS CACO3) (00435)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
SEP 1996 05...	0930	18.5	<0.01	1590	6.0	8.1	--	293

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)
SEP 1996 05...	640	1200	<3.0	40	5.0	620	<5.0	240

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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The following tables list the results of chemical analysis of ground-water samples collected from eight sites throughout Ohio, established to monitor the ground-water quality in areas near state highways where road deicing is practiced. Some wells, with station ID's ending in "01" through "06", represent the multiports within the same well ending in "00". Level "01" is the deepest port and level "06" is the shallowest port. These ports were sampled using dialysis tubing filled with distilled water, set at each level and allowed to come to equilibrium for approximately 6 weeks. Wells at the sites in Pickaway, Clark, and Champaign Counties were not sampled on a regular basis this water year due to lack of salt application in those areas. Sampling will resume at those sites as soon as salt enters the aquifer system. Ground-water level measurements are listed in the fourth table.

This study began in 1988 and will continue through 2001. Water-quality sampling began in 1991 and will continue until 1999. These data are presented to the Ohio Department of Transportation for their use in reviewing deicing practices and to accumulate baseline data. Dashes (--) indicate sample was not analyzed for that constituent.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR (71870)
393541083000801 PK-50 NR CIRCLEVILLE OH-LEVEL 1 (LAT 39 35 41N LONG 083 00 08W)					
JUN 1996					
03...	713	100	6.7	16	0.030
JUL					
15...	922	110	24	62	0.040
AUG					
21...	1030	110	35	110	0.070
393541083000802 PK-50 NR CIRCLEVILLE OH-LEVEL 2 (LAT 39 35 41N LONG 083 00 08W)					
JUN 1996					
03...	692	97	7.9	19	0.030
JUL					
15...	871	110	26	53	0.040
AUG					
21...	969	100	40	90	0.060
393541083000803 PK-50 NR CIRCLEVILLE OH-LEVEL 3 (LAT 39 35 41N LONG 083 00 08W)					
JUN 1996					
03...	860	100	17	55	0.030
JUL					
15...	980	110	35	100	0.040
AUG					
21...	1180	100	69	160	0.080
393541083000804 PK-50 NR CIRCLEVILLE OH-LEVEL 4 (LAT 39 35 41N LONG 083 00 08W)					
JUN 1996					
03...	864	120	17	45	0.030
JUL					
15...	951	120	34	83	0.040
AUG					
21...	1160	100	65	150	0.070
393541083000805 PK-50 NR CIRCLEVILLE OH-LEVEL 5 (LAT 39 35 41N LONG 083 00 08W)					
JUN 1996					
03...	810	110	13	34	0.030
JUL					
15...	967	110	33	74	0.040
AUG					
21...	1140	110	60	140	--
393541083000806 PK-50 NR CIRCLEVILLE OH-LEVEL 6 (LAT 39 35 41N LONG 083 00 08W)					
JUN 1996					
03...	942	120	23	67	0.040
JUL					
15...	997	97	35	100	0.050
AUG					
21...	1070	110	68	140	0.070
393541083000904 PK-49 NR CIRCLEVILLE OH-LEVEL 4 (LAT 39 35 41N LONG 083 00 09W)					
JUN 1996					
03...	819	96	11	82	--
JUL					
15...	893	98	53	130	--
AUG					
21...	892	100	44	93	--



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
393541083000905 PK-49 NR CIRCLEVILLE OH-LEVEL 5 (LAT 39 35 41N LONG 083 00 09W)					
JUN 1996					
03...	753	92	12	73	--
JUL					
15...	963	100	50	130	--
AUG					
21...	849	93	37	85	--
393541083000906 PK-49 NR CIRCLEVILLE OH-LEVEL 6 (LAT 39 35 41N LONG 083 00 09W)					
JUN 1996					
03...	623	--	--	24	--
JUL					
15...	724	--	--	60	--
AUG					
21...	837	89	31	96	--
393541083001001 PK-47 NR CIRCLEVILLE OH-LEVEL 1 (LAT 39 35 41N LONG 083 00 10W)					
JUN 1996					
03...	688	92	11	32	--
JUL					
15...	648	92	23	41	--
AUG					
21...	699	97	16	33	--
393541083001002 PK-47 NR CIRCLEVILLE OH-LEVEL 2 (LAT 39 35 41N LONG 083 00 10W)					
JUN 1996					
03...	702	94	11	32	--
JUL					
15...	681	92	22	39	--
AUG					
21...	699	95	16	32	--
393541083001003 PK-47 NR CIRCLEVILLE OH-LEVEL 3 (LAT 39 35 41N LONG 083 00 10W)					
JUN 1996					
03...	707	93	11	33	--
JUL					
15...	717	90	23	42	--
AUG					
21...	771	95	16	32	--
393541083001004 PK-47 NR CIRCLEVILLE OH-LEVEL 4 (LAT 39 35 41N LONG 083 00 10W)					
JUN 1996					
03...	646	91	9.1	29	--
JUL					
15...	667	91	24	44	--
AUG					
21...	747	94	17	34	--
393541083001005 PK-47 NR CIRCLEVILLE OH-LEVEL 5 (LAT 39 35 41N LONG 083 00 10W)					
JUN 1996					
03...	707	92	13	36	--
JUL					
15...	630	89	18	35	--
AUG					
21...	723	96	14	31	--
393541083001006 PK-47 NR CIRCLEVILLE OH-LEVEL 6 (LAT 39 35 41N LONG 083 00 10W)					
JUL 1996					
15...	--	51	52	22	--
AUG					
21...	685	86	26	32	--
393541083001201 PK-53 NR CIRCLEVILLE OH-LEVEL 1 (LAT 39 35 41N LONG 083 00 12W)					
JUN 1996					
03...	646	87	2.1	13	--
JUL					
15...	551	80	2.3	16	--
AUG					
21...	541	80	2.2	15	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR) (71870)
393541083001202 PK-53 NR CIRCLEVILLE OH-LEVEL 2 (LAT 39 35 41N LONG 083 00 12W)					
JUN 1996					
03...	622	87	1.9	13	--
JUL					
15...	536	--	--	15	--
AUG					
21...	553	78	2.1	15	--
393541083001203 PK-53 NR CIRCLEVILLE OH-LEVEL 3 (LAT 39 35 41N LONG 083 00 12W)					
JUN 1996					
03...	661	90	2.0	14	--
JUL					
15...	560	79	2.3	15	--
AUG					
21...	550	79	2.1	15	--
393541083001204 PK-53 NR CIRCLEVILLE OH-LEVEL 4 (LAT 39 35 41N LONG 083 00 12W)					
JUN 1996					
03...	622	91	2.0	14	--
JUL					
15...	483	79	2.7	15	--
AUG					
21...	552	79	2.1	15	--
393541083001205 PK-53 NR CIRCLEVILLE OH-LEVEL 5 (LAT 39 35 41N LONG 083 00 12W)					
JUN 1996					
03...	644	88	2.2	13	--
JUL					
15...	--	--	--	16	--
AUG					
21...	564	78	2.1	13	--
393541083001206 PK-53 NR CIRCLEVILLE OH-LEVEL 6 (LAT 39 35 41N LONG 083 00 12W)					
JUN 1996					
03...	586	89	2.4	14	--
JUL					
15...	541	79	2.5	15	--
AUG					
21...	538	--	--	14	--
393542083000504 PK-52 NR CIRCLEVILLE OH-LEVEL 4 (LAT 39 35 42N LONG 083 00 05W)					
JUN 1996					
03...	729	88	25	68	--
JUL					
15...	898	100	30	72	--
AUG					
21...	844	110	38	60	--
393542083000505 PK-52 NR CIRCLEVILLE OH-LEVEL 5 (LAT 39 35 42N LONG 083 00 05W)					
JUN 1996					
03...	776	90	27	71	--
JUL					
15...	808	100	29	71	--
AUG					
21...	877	110	40	63	--
393542083000506 PK-52 NR CIRCLEVILLE OH-LEVEL 6 (LAT 39 35 42N LONG 083 00 05W)					
JUN 1996					
03...	778	86	26	70	--
JUL					
15...	813	100	30	73	--
AUG					
21...	855	110	39	66	--
393542083000701 PK-51 NR CIRCLEVILLE OH-LEVEL 1 (LAT 39 35 42N LONG 083 00 07W)					
JUN 1996					
03...	707	88	12	47	--
JUL					
15...	715	90	21	49	--
AUG					
21...	657	97	19	36	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR) (71870)
393542083000702 PK-51 NR CIRCLEVILLE OH-LEVEL 2 (LAT 39 35 42N LONG 083 00 07W)					
JUN 1996					
03...	642	86	12	46	--
JUL					
15...	660	90	23	50	--
AUG					
21...	688	96	19	34	--
393542083000703 PK-51 NR CIRCLEVILLE OH-LEVEL 3 (LAT 39 35 42N LONG 083 00 07W)					
JUN 1996					
03...	735	90	19	48	--
JUL					
15...	741	95	22	54	--
AUG					
21...	744	100	17	28	--
393542083000704 PK-51 NR CIRCLEVILLE OH-LEVEL 4 (LAT 39 35 42N LONG 083 00 07W)					
JUN 1996					
03...	728	90	19	47	--
JUL					
15...	646	--	--	52	--
AUG					
21...	676	98	16	28	--
393542083000705 PK-51 NR CIRCLEVILLE OH-LEVEL 5 (LAT 39 35 42N LONG 083 00 07W)					
JUN 1996					
03...	738	86	19	48	--
JUL					
15...	772	97	22	56	--
AUG					
21...	706	100	17	28	--
393542083000706 PK-51 NR CIRCLEVILLE OH-LEVEL 6 (LAT 39 35 42N LONG 083 00 07W)					
JUN 1996					
03...	683	85	14	38	--
JUL					
15...	695	97	20	52	--
AUG					
21...	711	99	16	26	--
395859083440201 CL-141 NR SPRINGFIELD OH-LEVEL 1 (LAT 39 58 59N LONG 083 44 02W)					
JUN 1996					
10...	791	110	29	52	--
JUL					
16...	700	100	22	25	--
AUG					
20...	745	--	--	15	--
395859083440202 CL-141 NR SPRINGFIELD OH-LEVEL 2 (LAT 39 58 59N LONG 083 44 02W)					
JUN 1996					
10...	769	95	24	39	--
JUL					
16...	705	--	--	23	--
AUG					
20...	712	110	11	15	--
395859083440203 CL-141 NR SPRINGFIELD OH-LEVEL 3 (LAT 39 58 59N LONG 083 44 02W)					
JUN 1996					
10...	807	--	--	56	--
AUG					
20...	778	110	13	19	--
395859083440204 CL-141 NR SPRINGFIELD OH-LEVEL 4 (LAT 39 58 59N LONG 083 44 02W)					
JUN 1996					
10...	825	100	36	70	--
JUL					
16...	681	99	28	20	--
AUG					
20...	757	100	19	23	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
395859083440205 CL-141 NR SPRINGFIELD OH-LEVEL 5 (LAT 39 58 59N LONG 083 44 02W)					
JUN 1996					
10...	766	110	28	83	--
JUL					
16...	781	100	29	48	--
AUG					
20...	798	100	33	41	--
395859083440301 CL-143 NR SPRINGFIELD OH-LEVEL 1 (LAT 39 58 59N LONG 083 44 03W)					
JUN 1996					
10...	787	110	23	54	--
JUL					
16...	816	110	25	49	--
AUG					
20...	763	--	--	51	--
395859083440302 CL-143 NR SPRINGFIELD OH-LEVEL 2 (LAT 39 58 59N LONG 083 44 03W)					
JUN 1996					
10...	639	92	11	23	--
JUL					
16...	676	90	9.3	15	--
AUG					
20...	570	88	8.9	16	--
395859083440303 CL-143 NR SPRINGFIELD OH-LEVEL 3 (LAT 39 58 59N LONG 083 44 03W)					
JUN 1996					
10...	660	91	11	19	--
JUL					
16...	505	88	8.9	15	--
AUG					
20...	589	87	6.1	10	--
395859083440304 CL-143 NR SPRINGFIELD OH-LEVEL 4 (LAT 39 58 59N LONG 083 44 03W)					
JUN 1996					
10...	579	84	3.4	4.9	--
JUL					
16...	483	84	3.1	4.1	--
AUG					
20...	582	85	3.2	4.2	--
395859083440305 CL-143 NR SPRINGFIELD OH-LEVEL 5 (LAT 39 58 59N LONG 083 44 03W)					
JUN 1996					
10...	490	82	2.9	4.5	--
JUL					
16...	552	87	3.7	4.8	--
AUG					
20...	535	85	3.6	4.7	--
395859083440401 CL-142 NR SPRINGFIELD OH-LEVEL 1 (LAT 39 58 59N LONG 083 44 04W)					
JUN 1996					
10...	890	96	36	59	--
JUL					
16...	784	92	32	42	--
AUG					
20...	694	96	30	25	--
395859083440402 CL-142 NR SPRINGFIELD OH-LEVEL 2 (LAT 39 58 59N LONG 083 44 04W)					
JUN 1996					
10...	734	99	35	59	--
JUL					
16...	738	89	35	48	--
AUG					
20...	712	93	34	40	--
395859083440403 CL-142 NR SPRINGFIELD OH-LEVEL 3 (LAT 39 58 59N LONG 083 44 04W)					
JUN 1996					
10...	694	99	30	53	--
JUL					
16...	744	93	31	50	--
AUG					
20...	763	93	35	46	--



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
395859083440404 CL-142 NR SPRINGFIELD OH-LEVEL 4 (LAT 39 58 59N LONG 083 44 04W)					
JUN 1996					
10...	585	89	15	18	--
JUL					
16...	683	91	20	30	--
AUG					
20...	610	90	8.7	14	--
395859083440501 CL-140 NR SPRINGFIELD OH-LEVEL 1 (LAT 39 58 59N LONG 083 44 05W)					
JUN 1996					
10...	799	96	21	33	0.030
JUL					
16...	755	96	14	16	0.040
AUG					
20...	852	100	11	14	0.060
395859083440502 CL-140 NR SPRINGFIELD OH-LEVEL 2 (LAT 39 58 59N LONG 083 44 05W)					
JUN 1996					
10...	800	95	19	31	0.030
JUL					
16...	807	90	11	15	0.050
AUG					
20...	837	100	9.1	13	0.050
395859083440503 CL-140 NR SPRINGFIELD OH-LEVEL 3 (LAT 39 58 59N LONG 083 44 05W)					
JUN 1996					
10...	814	92	28	42	0.030
JUL					
16...	820	99	15	17	0.050
AUG					
20...	827	100	10	16	0.060
395859083440504 CL-140 NR SPRINGFIELD OH-LEVEL 4 (LAT 39 58 59N LONG 083 44 05W)					
JUN 1996					
10...	1020	120	30	93	0.080
JUL					
16...	977	98	52	74	0.080
AUG					
20...	886	95	37	38	0.060
395859083440505 CL-140 NR SPRINGFIELD OH-LEVEL 5 (LAT 39 58 59N LONG 083 44 05W)					
JUN 1996					
10...	752	100	9.6	30	0.020
JUL					
16...	1040	110	32	85	0.090
AUG					
20...	928	96	45	49	0.070
395859083440601 CL-137 NR SPRINGFIELD OH-LEVEL 1 (LAT 39 58 59N LONG 083 44 06W)					
JUN 1996					
10...	647	100	16	22	--
JUL					
16...	693	110	11	14	--
AUG					
20...	754	--	--	11	--
395859083440602 CL-137 NR SPRINGFIELD OH-LEVEL 2 (LAT 39 58 59N LONG 083 44 06W)					
JUL 1996					
16...	741	100	13	18	--
AUG					
20...	663	110	13	17	--
395859083440603 CL-137 NR SPRINGFIELD OH-LEVEL 3 (LAT 39 58 59N LONG 083 44 06W)					
JUN 1996					
10...	662	100	19	24	--
JUL					
16...	594	110	12	16	--
AUG					
20...	704	110	13	18	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
395859083440604 CL-137 NR SPRINGFIELD OH-LEVEL 4 (LAT 39 58 59N LONG 083 44 06W)					
JUN 1996					
10...	837	100	30	53	--
JUL					
16...	624	110	17	22	--
AUG					
20...	757	--	--	22	--
395859083440605 CL-137 NR SPRINGFIELD OH-LEVEL 5 (LAT 39 58 59N LONG 083 44 06W)					
JUN 1996					
10...	914	100	33	65	--
JUL					
16...	700	96	34	45	--
AUG					
20...	739	110	24	48	--
395901083440701 CL-136 NR SPRINGFIELD OH-LEVEL 1 (LAT 39 59 01N LONG 083 44 07W)					
JUN 1996					
10...	783	100	12	28	--
JUL					
16...	590	90	5.4	6.1	--
AUG					
20...	500	92	4.5	4.8	--
395901083440702 CL-136 NR SPRINGFIELD OH-LEVEL 2 (LAT 39 59 01N LONG 083 44 07W)					
JUN 1996					
10...	806	--	--	26	--
JUL					
16...	622	110	5.0	9.2	--
AUG					
20...	615	99	3.9	5.8	--
395901083440703 CL-136 NR SPRINGFIELD OH-LEVEL 3 (LAT 39 59 01N LONG 083 44 07W)					
JUN 1996					
10...	777	120	15	31	--
JUL					
16...	623	100	4.8	8.2	--
AUG					
20...	623	110	3.8	5.7	--
395901083440704 CL-136 NR SPRINGFIELD OH-LEVEL 4 (LAT 39 59 01N LONG 083 44 07W)					
JUL 1996					
16...	723	110	5.0	8.7	--
AUG					
20...	677	100	3.8	5.9	--
400947083480001 CH-44 NR URBANA OH-LEVEL 1 (LAT 40 09 47N LONG 083 48 00W)					
JUN 1996					
11...	1040	110	42	85	0.030
JUL					
17...	971	110	37	65	0.040
AUG					
22...	808	100	8.9	16	0.040
400947083480002 CH-44 NR URBANA OH-LEVEL 2 (LAT 40 09 47N LONG 083 48 00W)					
JUN 1996					
11...	992	110	36	83	0.020
JUL					
17...	996	110	39	74	0.050
AUG					
22...	843	100	19	30	0.040
400947083480003 CH-44 NR URBANA OH-LEVEL 3 (LAT 40 09 47N LONG 083 48 00W)					
JUN 1996					
11...	987	110	36	70	0.020
JUL					
17...	972	110	36	66	0.030
AUG					
22...	891	110	21	45	0.040

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR (71870)
400947083480004 CH-44 NR URBANA OH-LEVEL 4 (LAT 40 09 47N LONG 083 48 00W)					
JUN 1996					
11...	1080	120	44	60	0.030
JUL 17...	1080	120	44	65	0.030
AUG 22...	1140	120	41	72	0.050
400947083480006 CH-44 NR URBANA OH-LEVEL 6 (LAT 40 09 47N LONG 083 48 00W)					
JUN 1996					
11...	1470	160	73	42	--
400948083475801 CH-46 NR URBANA OH-LEVEL 1 (LAT 40 09 48N LONG 083 47 58W)					
JUN 1996					
11...	821	100	25	51	--
JUL 17...	830	110	26	48	--
AUG 22...	775	100	25	41	--
400948083475802 CH-46 NR URBANA OH-LEVEL 2 (LAT 40 09 48N LONG 083 47 58W)					
JUN 1996					
11...	824	100	22	52	--
JUL 17...	826	100	26	47	--
AUG 22...	745	100	25	42	--
400948083475803 CH-46 NR URBANA OH-LEVEL 3 (LAT 40 09 48N LONG 083 47 58W)					
JUN 1996					
11...	825	110	24	51	--
JUL 17...	811	110	26	50	--
AUG 22...	802	100	25	43	--
400948083475804 CH-46 NR URBANA OH-LEVEL 4 (LAT 40 09 48N LONG 083 47 58W)					
JUN 1996					
11...	788	100	20	51	--
JUL 17...	762	100	27	57	--
AUG 22...	768	97	26	38	--
400948083475805 CH-46 NR URBANA OH-LEVEL 5 (LAT 40 09 48N LONG 083 47 58W)					
JUN 1996					
11...	773	97	19	46	--
JUL 17...	814	--	--	56	--
AUG 22...	627	91	22	35	--
400948083475806 CH-46 NR URBANA OH-LEVEL 6 (LAT 40 09 48N LONG 083 47 58W)					
JUN 1996					
11...	616	81	13	19	--
JUL 17...	691	92	16	31	--
AUG 22...	719	--	--	47	--
400948083480002 CH-45 NR URBANA OH-LEVEL 2 (LAT 40 09 48N LONG 083 48 00W)					
JUN 1996					
11...	866	110	32	70	--
JUL 17...	824	110	30	59	--
AUG 22...	717	100	8.0	17	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
400948083480003 CH-45 NR URBANA OH-LEVEL 3 (LAT 40 09 48N LONG 083 48 00W)					
JUN 1996					
11...	895	110	32	72	--
JUL					
17...	824	110	41	76	--
AUG					
22...	694	100	8.9	17	--
400948083480004 CH-45 NR URBANA OH-LEVEL 4 (LAT 40 09 48N LONG 083 48 00W)					
JUN 1996					
11...	892	110	32	68	--
JUL					
17...	987	110	42	78	--
AUG					
22...	742	100	15	27	--
400948083480005 CH-45 NR URBANA OH-LEVEL 5 (LAT 40 09 48N LONG 083 48 00W)					
JUN 1996					
11...	805	100	26	57	--
JUL					
17...	887	110	39	79	--
AUG					
22...	921	100	42	65	--
400948083480006 CH-45 NR URBANA OH-LEVEL 6 (LAT 40 09 48N LONG 083 48 00W)					
JUN 1996					
11...	582	72	20	15	--
JUL					
17...	593	77	16	16	--
400948083480101 CH-43 NR URBANA OH-LEVEL 1 (LAT 40 09 48N LONG 083 48 01W)					
JUN 1996					
11...	944	120	45	96	--
JUL					
17...	828	110	22	44	--
AUG					
22...	662	100	7.8	19	--
400948083480102 CH-43 NR URBANA OH-LEVEL 2 (LAT 40 09 48N LONG 083 48 01W)					
JUN 1996					
11...	934	110	43	90	--
JUL					
17...	803	110	17	32	--
AUG					
22...	650	100	7.3	17	--
400948083480103 CH-43 NR URBANA OH-LEVEL 3 (LAT 40 09 48N LONG 083 48 01W)					
JUN 1996					
11...	947	110	39	83	--
JUL					
17...	891	110	29	48	--
AUG					
22...	741	100	10	30	--
400948083480104 CH-43 NR URBANA OH-LEVEL 4 (LAT 40 09 48N LONG 083 48 01W)					
JUN 1996					
11...	931	110	34	73	--
JUL					
17...	804	110	37	69	--
AUG					
22...	742	110	17	45	--
400948083480105 CH-43 NR URBANA OH-LEVEL 5 (LAT 40 09 48N LONG 083 48 01W)					
JUN 1996					
11...	788	99	16	38	--
JUL					
17...	852	100	36	71	--
AUG					
22...	850	110	35	72	--



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPECIFIC CONDUCTANCE LAB (US/CM) (90095)	CALCIUM DIS-SOLVED (MG/L) AS CA (00915)	SODIUM, DIS-SOLVED (MG/L) AS NA (00930)	CHLORIDE, DIS-SOLVED (MG/L) AS CL (00940)	BROMIDE DIS-SOLVED (MG/L) AS BR (71870)
400948083480106 CH-43 NR URBANA OH-LEVEL 6 (LAT 40 09 48N LONG 083 48 01W)					
JUN 1996					
11...	680	93	12	25	--
JUL					
17...	695	--	--	31	--
400948083480201 CH-41 NR URBANA OH-LEVEL 1 (LAT 40 09 48N LONG 083 48 02W)					
JUN 1996					
11...	736	110	6.6	17	--
JUL					
17...	756	100	6.3	16	--
AUG					
22...	724	100	6.0	18	--
400948083480202 CH-41 NR URBANA OH-LEVEL 2 (LAT 40 09 48N LONG 083 48 02W)					
JUN 1996					
11...	763	110	5.6	16	--
JUL					
17...	764	100	7.8	17	--
AUG					
22...	660	110	5.9	16	--
400948083480203 CH-41 NR URBANA OH-LEVEL 3 (LAT 40 09 48N LONG 083 48 02W)					
JUN 1996					
11...	747	110	5.5	16	--
JUL					
17...	759	110	6.2	16	--
AUG					
22...	627	100	5.6	17	--
400948083480204 CH-41 NR URBANA OH-LEVEL 4 (LAT 40 09 48N LONG 083 48 02W)					
JUN 1996					
11...	790	110	12	26	--
JUL					
17...	764	100	14	29	--
AUG					
22...	660	100	6.4	20	--
400948083480205 CH-41 NR URBANA OH-LEVEL 5 (LAT 40 09 48N LONG 083 48 02W)					
JUN 1996					
11...	905	110	39	75	--
JUL					
17...	915	110	41	79	--
AUG					
22...	750	100	23	54	--
400948083480206 CH-41 NR URBANA OH-LEVEL 6 (LAT 40 09 48N LONG 083 48 02W)					
JUN 1996					
11...	978	120	42	77	--
JUL					
17...	912	110	42	88	--
AUG					
22...	806	98	32	66	--
400952083480801 CH-40 NR URBANA OH-LEVEL 1 (LAT 40 09 52N LONG 083 48 08W)					
JUN 1996					
11...	740	110	6.0	23	--
JUL					
17...	640	110	6.7	24	--
AUG					
22...	722	110	6.4	23	--
400952083480802 CH-40 NR URBANA OH-LEVEL 2 (LAT 40 09 52N LONG 083 48 08W)					
JUN 1996					
11...	713	110	6.0	23	--
JUL					
17...	706	110	6.6	23	--
AUG					
22...	705	100	6.1	23	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR) (71870)
400952083480803 CH-40 NR URBANA OH-LEVEL 3 (LAT 40 09 52N LONG 083 48 08W)					
JUN 1996					
11...	691	110	6.0	23	--
JUL					
17...	642	110	6.5	24	--
AUG					
22...	709	100	6.3	23	--
400952083480804 CH-40 NR URBANA OH-LEVEL 4 (LAT 40 09 52N LONG 083 48 08W)					
JUN 1996					
11...	746	100	6.2	23	--
JUL					
17...	747	--	--	24	--
AUG					
22...	750	--	--	24	--
400952083480805 CH-40 NR URBANA OH-LEVEL 5 (LAT 40 09 52N LONG 083 48 08W)					
JUN 1996					
11...	562	81	5.3	12	--
JUL					
17...	782	100	6.3	22	--
AUG					
22...	679	100	6.1	23	--
400952083480806 CH-40 NR URBANA OH-LEVEL 6 (LAT 40 09 52N LONG 083 48 08W)					
JUN 1996					
11...	570	70	10	8.3	--
JUL					
17...	598	83	5.2	14	--
AUG					
22...	658	100	6.5	25	--
403635082152101 AS-48 NR LOUDONVILLE OH-LEVEL 1 (LAT 40 36 35N LONG 082 15 21W)					
OCT 1995					
11...	491	62	14	8.1	--
403635082152102 AS-48 NR LOUDONVILLE OH-LEVEL 2 (LAT 40 36 35N LONG 082 15 21W)					
OCT 1995					
11...	295	58	13	8.3	--
403635082152103 AS-48 NR LOUDONVILLE OH-LEVEL 3 (LAT 40 36 35N LONG 082 15 21W)					
OCT 1995					
11...	294	57	13	8.4	--
403635082152104 AS-48 NR LOUDONVILLE OH-LEVEL 4 (LAT 40 36 35N LONG 082 15 21W)					
OCT 1995					
11...	294	54	13	8.3	--
403635082152105 AS-48 NR LOUDONVILLE OH-LEVEL 5 (LAT 40 36 35N LONG 082 15 21W)					
OCT 1995					
11...	496	--	--	8.9	--
403635082152201 AS-47 NR LOUDONVILLE OH-LEVEL 1 (LAT 40 36 35N LONG 082 15 22W)					
OCT 1995					
11...	862	120	68	110	--
403635082152202 AS-47 NR LOUDONVILLE OH-LEVEL 2 (LAT 40 36 35N LONG 082 15 22W)					
OCT 1995					
11...	986	110	67	110	--
403635082152204 AS-47 NR LOUDONVILLE OH-LEVEL 4 (LAT 40 36 35N LONG 082 15 22W)					
OCT 1995					
11...	812	--	--	71	--
403635082152401 AS-46 NR LOUDONVILLE OH-LEVEL 1 (LAT 40 36 35N LONG 082 15 24W)					
OCT 1995					
11...	848	130	65	100	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
403635082152402 AS-46 NR LOUDONVILLE OH-LEVEL 2 (LAT 40 36 35N LONG 082 15 24W)					
OCT 1995					
11...	884	130	68	110	--
403635082152403 AS-46 NR LOUDONVILLE OH-LEVEL 3 (LAT 40 36 35N LONG 082 15 24W)					
OCT 1995					
11...	957	--	--	110	--
403635082152502 AS-44 NR LOUDONVILLE OH-LEVEL 2 (LAT 40 36 35N LONG 082 15 25W)					
OCT 1995					
11...	1240	--	--	220	--
403635082152503 AS-44 NR LOUDONVILLE OH-LEVEL 3 (LAT 40 36 35N LONG 082 15 25W)					
OCT 1995					
11...	1010	100	100	140	--
403635082152504 AS-44 NR LOUDONVILLE OH-LEVEL 4 (LAT 40 36 35N LONG 082 15 25W)					
OCT 1995					
11...	1030	100	100	140	--
403635082152505 AS-44 NR LOUDONVILLE OH-LEVEL 5 (LAT 40 36 35N LONG 082 15 25W)					
OCT 1995					
11...	965	99	83	120	--
403635082152602 AS-49 NR LOUDONVILLE OH-LEVEL 2 (LAT 40 36 35N LONG 082 15 26W)					
OCT 1995					
11...	697	93	43	50	0.050
403635082152603 AS-49 NR LOUDONVILLE OH-LEVEL 3 (LAT 40 36 35N LONG 082 15 26W)					
OCT 1995					
11...	818	98	46	61	0.050
403635082152604 AS-49 NR LOUDONVILLE OH-LEVEL 4 (LAT 40 36 35N LONG 082 15 26W)					
OCT 1995					
11...	894	100	55	85	0.070
403635082152702 AS-43 NR LOUDONVILLE OH-LEVEL 2 (LAT 40 36 35N LONG 082 15 27W)					
OCT 1995					
11...	635	130	28	35	--
403635082152703 AS-43 NR LOUDONVILLE OH-LEVEL 3 (LAT 40 36 35N LONG 082 15 27W)					
OCT 1995					
11...	554	100	19	11	--
403635082152704 AS-43 NR LOUDONVILLE OH-LEVEL 4 (LAT 40 36 35N LONG 082 15 27W)					
OCT 1995					
11...	562	98	16	11	--
403635082152705 AS-43 NR LOUDONVILLE OH-LEVEL 5 (LAT 40 36 35N LONG 082 15 27W)					
OCT 1995					
11...	630	--	--	12	--
403922082325901 R-19 NR LEXINGTON OH-LEVEL 1 (LAT 40 39 22N LONG 082 32 59W)					
OCT 1995					
18...	551	92	10	45	--
JAN 1996					
18...	432	71	6.3	54	--
APR					
09...	569	71	21	51	--
JUN					
04...	537	66	17	46	--
JUL					
22...	494	58	17	32	--
AUG					
27...	494	64	16	34	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
403922082325902 R-19 NR LEXINGTON OH-LEVEL 2 (LAT 40 39 22N LONG 082 32 59W)					
OCT 1995					
18...	591	98	9.4	46	--
JAN 1996					
18...	531	73	7.0	53	--
FEB					
15...	655	--	--	74	--
APR					
09...	542	64	20	47	--
JUN					
04...	536	64	17	47	--
JUL					
22...	478	55	19	31	--
AUG					
27...	450	62	16	37	--
403922082325903 R-19 NR LEXINGTON OH-LEVEL 3 (LAT 40 39 22N LONG 082 32 59W)					
OCT 1995					
18...	595	96	9.7	45	--
JAN 1996					
18...	502	74	6.2	52	--
FEB					
15...	636	83	8.4	71	--
APR					
09...	521	57	21	41	--
JUN					
04...	488	55	21	38	--
JUL					
22...	485	58	19	30	--
AUG					
27...	497	62	16	37	--
403922082325904 R-19 NR LEXINGTON OH-LEVEL 4 (LAT 40 39 22N LONG 082 32 59W)					
OCT 1995					
18...	295	86	9.0	47	--
JAN 1996					
18...	579	74	6.9	52	--
FEB					
15...	662	--	--	75	--
APR					
09...	491	53	22	39	--
JUN					
04...	453	50	22	28	--
JUL					
22...	456	50	25	21	--
AUG					
27...	495	--	--	34	--
403922082325905 R-19 NR LEXINGTON OH-LEVEL 5 (LAT 40 39 22N LONG 082 32 59W)					
FEB 1996					
15...	722	--	--	100	--
APR					
09...	464	--	--	34	--
JUN					
04...	458	48	23	32	--
403922082330001 R-20 NR LEXINGTON OH-LEVEL 1 (LAT 40 39 22N LONG 082 33 00W)					
OCT 1995					
18...	618	110	11	25	--
JAN 1996					
18...	601	96	9.3	33	--
FEB					
15...	521	60	15	22	--
APR					
09...	488	64	11	21	--
JUN					
04...	406	59	7.6	12	--
JUL					
22...	404	58	9.2	15	--
AUG					
27...	447	66	11	19	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR) (71870)
403922082330002 R-20 NR LEXINGTON OH-LEVEL 2 (LAT 40 39 22N LONG 082 33 00W)					
OCT 1995					
18...	563	110	11	26	--
JAN 1996					
18...	608	95	9.3	36	--
FEB					
15...	521	69	15	22	--
APR					
09...	485	64	11	20	--
JUN					
04...	255	56	6.9	10	--
JUL					
22...	427	--	--	15	--
AUG					
27...	436	66	11	19	--
403922082330003 R-20 NR LEXINGTON OH-LEVEL 3 (LAT 40 39 22N LONG 082 33 00W)					
OCT 1995					
18...	599	110	11	27	--
JAN 1996					
18...	553	95	9.2	37	--
FEB					
15...	518	72	15	23	--
APR					
09...	483	68	11	20	--
JUN					
04...	251	54	7.8	10	--
JUL					
22...	421	55	12	18	--
AUG					
27...	477	--	--	20	--
403922082330004 R-20 NR LEXINGTON OH-LEVEL 4 (LAT 40 39 22N LONG 082 33 00W)					
OCT 1995					
18...	570	99	11	23	--
JAN 1996					
18...	595	96	9.2	35	--
FEB					
15...	524	71	15	22	--
APR					
09...	483	66	11	19	--
JUN					
04...	372	53	8.4	8.3	--
JUL					
22...	408	47	18	23	--
AUG					
27...	414	60	11	18	--
403922082330005 R-20 NR LEXINGTON OH-LEVEL 5 (LAT 40 39 22N LONG 082 33 00W)					
OCT 1995					
18...	295	89	11	23	--
JAN 1996					
18...	580	79	9.6	27	--
FEB					
15...	549	82	10	32	--
APR					
09...	532	71	11	26	--
JUN					
04...	472	64	11	18	--
JUL					
22...	425	62	8.9	14	--
AUG					
27...	402	61	10	17	--
403922082330006 R-20 NR LEXINGTON OH-LEVEL 6 (LAT 40 39 22N LONG 082 33 00W)					
OCT 1995					
18...	513	97	11	24	--
JAN 1996					
18...	461	80	10	25	--
FEB					
15...	557	77	11	31	--
APR					
09...	530	71	12	27	--
JUN					
04...	477	67	11	19	--
JUL					
22...	443	61	9.0	14	--
AUG					
27...	428	--	--	16	--



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR) (71870)
403923082325401 R-21 NR LEXINGTON OH-LEVEL 1 (LAT 40 39 23N LONG 082 32 54W)					
OCT 1995					
18...	364	60	3.3	3.2	--
JAN 1996					
18...	234	33	1.9	2.5	--
FEB					
15...	305	45	3.6	4.3	--
APR					
09...	292	--	--	2.6	--
JUN					
04...	281	40	2.3	3.2	--
JUL					
22...	386	--	--	3.2	--
AUG					
27...	251	35	2.0	2.6	--
403923082325402 R-21 NR LEXINGTON OH-LEVEL 2 (LAT 40 39 23N LONG 082 32 54W)					
OCT 1995					
18...	294	49	3.1	3.0	--
JAN 1996					
18...	199	27	1.9	2.8	--
FEB					
15...	295	44	3.1	3.3	--
APR					
09...	290	42	2.5	3.0	--
JUN					
04...	282	41	2.2	3.4	--
JUL					
22...	350	59	2.2	3.3	--
AUG					
27...	244	34	2.0	2.6	--
403923082325403 R-21 NR LEXINGTON OH-LEVEL 3 (LAT 40 39 23N LONG 082 32 54W)					
OCT 1995					
18...	249	41	2.9	2.8	--
JAN 1996					
18...	205	24	2.0	2.7	--
FEB					
15...	293	--	--	2.7	--
APR					
09...	289	--	--	2.7	--
JUN					
04...	298	--	--	3.2	--
JUL					
22...	401	--	--	3.3	--
AUG					
27...	245	--	--	2.6	--
403923082325404 R-21 NR LEXINGTON OH-LEVEL 4 (LAT 40 39 23N LONG 082 32 54W)					
FEB 1996					
15...	272	41	2.4	2.9	--
APR					
09...	280	40	2.8	2.7	--
JUN					
04...	288	40	2.5	3.3	--
JUL					
22...	333	--	--	3.6	--
403923082325405 R-21 NR LEXINGTON OH-LEVEL 5 (LAT 40 39 23N LONG 082 32 54W)					
FEB 1996					
15...	254	--	--	2.9	--
JUL					
22...	294	--	--	2.8	--
403923082325601 R-15 NR LEXINGTON OH-LEVEL 1 (LAT 40 39 23N LONG 082 32 56W)					
OCT 1995					
18...	362	37	21	33	--
JAN 1996					
18...	619	--	--	120	--
FEB					
15...	346	23	30	44	--
APR					
09...	314	20	23	37	--
JUN					
04...	377	19	19	19	--
JUL					
22...	219	20	11	9.9	--
AUG					
27...	331	30	19	18	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
403923082325602 R-15 NR LEXINGTON OH-LEVEL 2 (LAT 40 39 23N LONG 082 32 56W)					
OCT 1995					
18...	503	36	21	35	--
JAN 1996					
18...	661	50	46	140	--
FEB					
15...	340	24	29	42	--
APR					
09...	333	21	22	41	--
JUN					
04...	391	20	19	17	--
JUL					
22...	220	--	--	10	--
AUG					
27...	327	30	18	17	--
403923082325603 R-15 NR LEXINGTON OH-LEVEL 3 (LAT 40 39 23N LONG 082 32 56W)					
OCT 1995					
18...	325	--	--	29	--
JAN 1996					
18...	656	--	--	150	--
FEB					
15...	332	23	29	41	--
APR					
09...	294	20	22	32	--
JUN					
04...	251	20	17	17	--
JUL					
22...	311	--	--	33	--
AUG					
27...	119	--	--	7.6	--
403923082325604 R-15 NR LEXINGTON OH-LEVEL 4 (LAT 40 39 23N LONG 082 32 56W)					
APR 1996					
09...	312	--	--	34	--
JUN					
04...	245	19	17	17	--
403923082325701 R-18 NR LEXINGTON OH-LEVEL 1 (LAT 40 39 23N LONG 082 32 57W)					
OCT 1995					
18...	480	51	6.6	52	0.050
JAN 1996					
18...	465	54	5.6	48	0.060
APR					
09...	457	42	25	54	0.040
JUN					
04...	495	47	32	57	0.030
JUL					
22...	381	37	18	38	0.040
AUG					
27...	449	48	9.0	49	0.050
403923082325702 R-18 NR LEXINGTON OH-LEVEL 2 (LAT 40 39 23N LONG 082 32 57W)					
OCT 1995					
18...	466	57	7.4	52	0.050
JAN 1996					
18...	454	73	5.6	50	0.050
FEB					
15...	533	60	14	73	0.050
APR					
09...	470	40	26	57	0.040
JUN					
04...	483	42	31	57	0.040
JUL					
22...	366	36	18	36	0.040
AUG					
27...	437	46	8.4	50	0.050

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
403923082325703 R-18 NR LEXINGTON OH-LEVEL 3 (LAT 40 39 23N LONG 082 32 57W)					
OCT 1995					
18...	527	77	12	50	0.040
JAN 1996					
18...	457	63	8.8	43	0.050
FEB					
15...	574	74	11	67	0.050
APR					
09...	452	60	17	48	0.030
JUN					
04...	516	66	20	56	0.030
JUL					
22...	498	51	17	41	0.040
AUG					
27...	489	50	13	46	0.040
403923082325704 R-18 NR LEXINGTON OH-LEVEL 4 (LAT 40 39 23N LONG 082 32 57W)					
OCT 1995					
18...	565	68	18	49	0.040
JAN 1996					
18...	546	71	12	52	0.050
FEB					
15...	622	75	15	69	0.060
APR					
09...	640	68	25	67	0.030
JUN					
04...	660	79	28	71	0.050
JUL					
22...	560	64	24	46	0.040
AUG					
27...	535	63	23	47	0.050
403923082325705 R-18 NR LEXINGTON OH-LEVEL 5 (LAT 40 39 23N LONG 082 32 57W)					
OCT 1995					
18...	531	70	12	53	0.050
JAN 1996					
18...	564	56	12	51	0.050
FEB					
15...	696	87	27	82	0.060
APR					
09...	587	58	37	65	0.030
JUN					
04...	555	54	41	50	0.030
JUL					
22...	542	58	30	40	0.030
AUG					
27...	557	55	22	45	0.050
403923082325706 R-18 NR LEXINGTON OH-LEVEL 6 (LAT 40 39 23N LONG 082 32 57W)					
FEB 1996					
15...	704	78	38	91	0.050
JUN					
04...	531	49	44	45	0.030
403923082325901 R-17 NR LEXINGTON OH-LEVEL 1 (LAT 40 39 23N LONG 082 32 59W)					
OCT 1995					
18...	522	79	10	53	--
JAN 1996					
18...	421	70	6.4	52	--
FEB					
15...	626	77	13	84	--
APR					
09...	562	65	26	62	--
JUN					
04...	604	60	31	77	--
JUL					
22...	--	48	26	34	--
AUG					
27...	493	--	--	49	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
403923082325902 R-17 NR LEXINGTON OH-LEVEL 2 (LAT 40 39 23N LONG 082 32 59W)					
OCT 1995					
18...	500	77	8.6	52	--
JAN 1996					
18...	505	62	5.5	55	--
FEB					
15...	615	76	14	85	--
APR					
09...	520	53	26	61	--
JUN					
04...	545	49	35	68	--
JUL					
22...	414	41	22	35	--
AUG					
27...	479	59	9.3	49	--
403923082325903 R-17 NR LEXINGTON OH-LEVEL 3 (LAT 40 39 23N LONG 082 32 59W)					
OCT 1995					
18...	482	65	8.2	52	--
JAN 1996					
18...	485	60	5.0	55	--
FEB					
15...	571	65	17	78	--
APR					
09...	487	47	27	59	--
JUN					
04...	529	46	35	62	--
JUL					
22...	402	40	20	39	--
AUG					
27...	466	54	7.4	49	--
403923082325904 R-17 NR LEXINGTON OH-LEVEL 4 (LAT 40 39 23N LONG 082 32 59W)					
APR 1996					
09...	485	45	28	59	--
JUN					
04...	505	41	37	55	--
JUL					
22...	416	--	--	30	--
AUG					
27...	246	--	--	11	--
41136081172403 PO-122 NR RAVENNA OH-LEVEL 3 (LAT 41 11 36N LONG 081 17 24W)					
MAR 1996					
05...	531	50	28	55	--
APR					
11...	520	48	23	54	--
JUN					
06...	488	53	26	52	--
JUL					
26...	659	57	39	91	--
SEP					
11...	788	58	50	120	0.060
41136081172404 PO-122 NR RAVENNA OH-LEVEL 4 (LAT 41 11 36N LONG 081 17 24W)					
JAN 1996					
16...	443	54	23	48	--
MAR					
05...	520	48	25	53	--
APR					
11...	460	52	25	48	--
JUN					
06...	455	53	26	50	--
JUL					
26...	658	57	39	94	--
SEP					
11...	765	63	55	130	0.060

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR) (71870)
41136081172405 PO-122 NR RAVENNA OH-LEVEL 5 (LAT 41 11 36N LONG 081 17 24W)					
JAN 1996					
16...	557	54	28	58	--
MAR					
05...	538	52	27	55	--
APR					
11...	453	19	24	49	--
JUN					
06...	461	54	26	48	--
JUL					
26...	666	58	40	93	--
SEP					
11...	792	68	61	130	0.060
41136081172407 PO-122 NR RAVENNA OH-LEVEL 7 (LAT 41 11 36N LONG 081 17 24W)					
JAN 1996					
16...	551	58	26	61	--
MAR					
05...	392	50	27	40	--
APR					
11...	526	52	24	54	--
JUN					
06...	679	55	43	98	--
411136081172501 PO-119 NR RAVENNA OH-LEVEL 1 (LAT 41 11 36N LONG 081 17 25W)					
OCT 1995					
20...	574	86	29	42	--
JAN 1996					
16...	511	83	24	39	--
MAR					
05...	511	67	27	23	--
APR					
11...	468	61	23	19	--
411136081172502 PO-119 NR RAVENNA OH-LEVEL 2 (LAT 41 11 36N LONG 081 17 25W)					
OCT 1995					
20...	478	83	14	13	--
JAN 1996					
16...	426	69	17	17	--
MAR					
05...	394	--	--	6.1	--
APR					
11...	405	--	--	9.4	--
411136081172503 PO-119 NR RAVENNA OH-LEVEL 3 (LAT 41 11 36N LONG 081 17 25W)					
OCT 1995					
20...	462	87	14	11	--
JAN 1996					
16...	265	51	9.1	3.9	--
MAR					
05...	297	--	--	3.0	--
APR					
11...	260	36	15	4.3	--
411136081172504 PO-119 NR RAVENNA OH-LEVEL 4 (LAT 41 11 36N LONG 081 17 25W)					
JAN 1996					
16...	309	--	--	2.1	--
MAR					
05...	290	33	19	3.0	--
APR					
11...	249	--	--	4.4	--
411136081172505 PO-119 NR RAVENNA OH-LEVEL 5 (LAT 41 11 36N LONG 081 17 25W)					
MAR 1996					
05...	281	--	--	2.9	--
APR					
11...	253	--	--	4.9	--



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
411136081172601 PO-120 NR RAVENNA OH-LEVEL 1 (LAT 41 11 36N LONG 081 17 26W)					
OCT 1995					
20...	380	66	13	13	--
JAN 1996					
16...	403	62	14	14	--
MAR					
05...	256	29	17	3.6	--
APR					
11...	261	35	10	3.2	--
411136081172602 PO-120 NR RAVENNA OH-LEVEL 2 (LAT 41 11 36N LONG 081 17 26W)					
OCT 1995					
20...	399	76	12	14	--
JAN 1996					
16...	325	53	9.8	6.4	--
MAR					
05...	243	25	18	3.1	--
APR					
11...	240	--	--	3.5	--
411136081172603 PO-120 NR RAVENNA OH-LEVEL 3 (LAT 41 11 36N LONG 081 17 26W)					
OCT 1995					
20...	389	71	12	14	--
JAN 1996					
16...	323	54	9.3	5.7	--
MAR					
05...	248	--	--	3.3	--
APR					
11...	218	--	--	3.5	--
411136081172604 PO-120 NR RAVENNA OH-LEVEL 4 (LAT 41 11 36N LONG 081 17 26W)					
OCT 1995					
20...	451	--	--	13	--
MAR 1996					
05...	243	26	17	3.1	--
APR					
11...	216	31	7.6	3.4	--
411136081172605 PO-120 NR RAVENNA OH-LEVEL 5 (LAT 41 11 36N LONG 081 17 26W)					
JAN 1996					
16...	220	--	--	2.1	--
MAR					
05...	231	25	16	3.5	--
APR					
11...	207	--	--	3.8	--
411137081172101 PO-114 NR RAVENNA OH-LEVEL 1 (LAT 41 11 37N LONG 081 17 21W)					
OCT 1995					
20...	483	100	9.1	5.3	--
JAN 1996					
16...	435	68	8.2	5.4	--
MAR					
05...	--	39	15	5.8	--
APR					
11...	--	--	--	7.0	--
JUN					
06...	432	68	8.9	9.9	--
JUL					
26...	485	82	7.5	9.0	--
SEP					
11...	--	90	7.0	13	--
411137081172102 PO-114 NR RAVENNA OH-LEVEL 2 (LAT 41 11 37N LONG 081 17 21W)					
OCT 1995					
20...	491	97	8.6	5.8	--
JAN 1996					
16...	342	71	8.5	5.4	--
MAR					
05...	315	--	--	6.2	--
JUN					
06...	439	67	6.3	12	--
JUL					
26...	499	83	6.2	9.8	--
SEP					
11...	549	91	7.3	14	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR (71870)
411137081172103 PO-114 NR RAVENNA OH-LEVEL 3 (LAT 41 11 37N LONG 081 17 21W)					
OCT 1995					
20...	492	100	8.1	6.3	--
JAN 1996					
16...	337	68	8.3	4.2	--
MAR					
05...	290	39	15	5.6	--
APR					
11...	--	--	--	8.1	--
JUN					
06...	443	67	6.2	12	--
JUL					
26...	511	84	4.4	16	--
SEP					
11...	555	94	6.3	12	--
411137081172104 PO-114 NR RAVENNA OH-LEVEL 4 (LAT 41 11 37N LONG 081 17 21W)					
OCT 1995					
20...	517	100	8.1	6.7	--
JAN 1996					
16...	415	65	8.7	3.8	--
MAR					
05...	350	50	13	8.5	--
APR					
11...	324	--	--	7.7	--
JUN					
06...	435	66	6.4	13	--
JUL					
26...	508	83	4.6	15	--
SEP					
11...	542	91	7.8	11	--
411137081172105 PO-114 NR RAVENNA OH-LEVEL 5 (LAT 41 11 37N LONG 081 17 21W)					
OCT 1995					
20...	475	110	8.0	6.8	--
JAN 1996					
16...	319	67	8.8	4.3	--
MAR					
05...	326	45	13	7.1	--
APR					
11...	338	--	--	8.8	--
JUN					
06...	433	69	5.9	12	--
JUL					
26...	546	92	4.8	15	--
SEP					
11...	523	92	8.0	9.4	--
411137081172106 PO-114 NR RAVENNA OH-LEVEL 6 (LAT 41 11 37N LONG 081 17 21W)					
APR 1996					
11...	330	--	--	8.2	--
JUN					
06...	427	68	5.4	12	--
JUL					
26...	551	95	5.4	13	--
411137081172301 PO-118 NR RAVENNA OH-LEVEL 1 (LAT 41 11 37N LONG 081 17 23W)					
OCT 1995					
20...	295	73	460	590	--
JAN 1996					
16...	1810	55	310	440	--
MAR					
05...	345	16	56	56	--
APR					
11...	516	21	66	110	--
JUN					
06...	1130	--	--	290	--
JUL					
26...	3410	140	520	890	--
SEP					
11...	--	160	670	1200	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR) (71870)
411137081172302 PO-118 NR RAVENNA OH-LEVEL 2 (LAT 41 11 37N LONG 081 17 23W)					
OCT 1995					
20...	2540	--	--	580	--
JAN 1996					
16...	1820	--	--	420	--
MAR					
05...	408	15	49	72	--
APR					
11...	428	22	64	92	--
JUN					
06...	--	73	110	390	--
JUL					
26...	--	140	520	960	--
SEP					
11...	--	170	680	1300	--
411137081172303 PO-118 NR RAVENNA OH-LEVEL 3 (LAT 41 11 37N LONG 081 17 23W)					
OCT 1995					
20...	2520	81	440	600	--
JAN 1996					
16...	1500	--	--	310	--
APR					
11...	337	17	49	69	--
JUN					
06...	1210	73	120	310	--
JUL					
26...	3570	--	--	950	--
SEP					
11...	4390	--	--	1300	--
411137081172304 PO-118 NR RAVENNA OH-LEVEL 4 (LAT 41 11 37N LONG 081 17 23W)					
OCT 1995					
20...	295	67	460	570	--
JAN 1996					
16...	1460	30	260	300	--
MAR					
05...	624	--	--	130	--
APR					
11...	400	17	44	80	--
JUN					
06...	921	71	100	230	--
JUL					
26...	3480	--	--	900	--
SEP					
11...	--	170	680	1200	--
411137081172305 PO-118 NR RAVENNA OH-LEVEL 5 (LAT 41 11 37N LONG 081 17 23W)					
OCT 1995					
20...	2500	78	440	580	--
MAR 1996					
05...	309	--	--	50	--
APR					
11...	423	20	49	86	--
JUN					
06...	1060	71	100	270	--
JUL					
26...	2310	140	260	620	--
SEP					
11...	4230	190	680	1200	--
411137081172306 PO-118 NR RAVENNA OH-LEVEL 6 (LAT 41 11 37N LONG 081 17 23W)					
JUN 1996					
06...	633	--	--	150	--
JUL					
26...	1300	85	160	300	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR) (71870)
411137081172401 PO-117 NR RAVENNA OH-LEVEL 1 (LAT 41 11 37N LONG 081 17 24W)					
OCT 1995					
20...	1400	100	170	290	0.060
JAN 1996					
16...	1430	88	150	290	0.070
MAR					
05...	736	61	84	95	0.030
APR					
11...	668	48	63	96	0.010
JUN					
06...	624	54	63	83	0.020
JUL					
26...	702	61	57	100	0.030
SEP					
11...	948	75	88	180	0.040
411137081172402 PO-117 NR RAVENNA OH-LEVEL 2 (LAT 41 11 37N LONG 081 17 24W)					
OCT 1995					
20...	1560	97	200	330	0.070
JAN 1996					
16...	1590	83	210	360	0.080
MAR					
05...	1220	66	160	230	0.050
APR					
11...	857	52	110	140	0.020
JUN					
06...	740	52	90	110	0.030
JUL					
26...	905	58	110	160	0.030
SEP					
11...	1070	65	130	210	0.040
411137081172403 PO-117 NR RAVENNA OH-LEVEL 3 (LAT 41 11 37N LONG 081 17 24W)					
OCT 1995					
20...	1830	110	240	410	0.080
JAN 1996					
16...	1690	88	220	380	0.090
MAR					
05...	1140	54	170	210	0.050
APR					
11...	764	43	120	110	0.010
JUN					
06...	691	45	91	96	0.030
JUL					
26...	839	56	93	140	0.030
SEP					
11...	1320	90	140	300	0.050
411137081172404 PO-117 NR RAVENNA OH-LEVEL 4 (LAT 41 11 37N LONG 081 17 24W)					
OCT 1995					
20...	2100	120	290	480	0.090
JAN 1996					
16...	1770	79	200	410	0.090
MAR					
05...	1010	55	150	160	0.040
APR					
11...	761	48	90	110	0.010
JUN					
06...	637	49	71	80	0.020
JUL					
26...	1030	77	100	200	0.040
SEP					
11...	1850	130	220	470	0.080
411137081172405 PO-117 NR RAVENNA OH-LEVEL 5 (LAT 41 11 37N LONG 081 17 24W)					
OCT 1995					
20...	2110	110	310	480	0.090
JAN 1996					
16...	1610	84	210	310	0.080
MAR					
05...	790	63	110	99	0.030
APR					
11...	687	51	77	100	0.020
JUN					
06...	596	54	58	68	0.020
JUL					
26...	1380	99	150	330	0.060
SEP					
11...	2610	140	240	700	0.12

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
411137081172406 PO-117 NR RAVENNA OH-LEVEL 6 (LAT 41 11 37N LONG 081 17 24W)					
OCT 1995					
20...	1340	100	180	230	0.050
JAN 1996					
16...	812	64	80	90	0.040
MAR					
05...	430	44	37	25	0.020
APR					
11...	356	38	25	27	<0.010
JUN					
06...	371	42	31	25	<0.010
JUL					
26...	633	65	46	100	0.030
SEP					
11...	2040	160	330	520	0.090
411138081172401 PO-115 NR RAVENNA OH-LEVEL 1 (LAT 41 11 38N LONG 081 17 24W)					
OCT 1995					
20...	1350	30	250	240	--
JAN 1996					
16...	899	--	--	160	--
MAR					
05...	1800	--	--	470	--
APR					
11...	2310	130	290	650	--
JUN					
06...	1860	85	270	460	--
JUL					
26...	2440	75	410	580	--
SEP					
11...	--	--	--	630	--
411138081172402 PO-115 NR RAVENNA OH-LEVEL 2 (LAT 41 11 38N LONG 081 17 24W)					
OCT 1995					
20...	1350	30	250	250	--
JAN 1996					
16...	1050	--	--	190	--
MAR					
05...	1910	110	240	510	--
APR					
11...	--	130	280	620	--
JUN					
06...	1830	85	250	440	--
JUL					
26...	2440	71	410	550	--
411138081172403 PO-115 NR RAVENNA OH-LEVEL 3 (LAT 41 11 38N LONG 081 17 24W)					
OCT 1995					
20...	1320	28	240	240	--
APR 1996					
11...	2110	130	260	570	--
JUN					
06...	1700	85	230	410	--
JUL					
26...	2330	71	400	550	--
SEP					
11...	2260	--	--	510	--
411138081172404 PO-115 NR RAVENNA OH-LEVEL 4 (LAT 41 11 38N LONG 081 17 24W)					
OCT 1995					
20...	1020	--	--	140	--
JAN 1996					
16...	1060	--	--	210	--
MAR					
05...	1510	97	160	390	--
APR					
11...	1900	120	220	500	--
JUN					
06...	1740	--	--	400	--
JUL					
26...	2180	68	360	520	--



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR (71870)
411138081172405 PO-115 NR RAVENNA OH-LEVEL 5 (LAT 41 11 38N LONG 081 17 24W)					
OCT 1995					
20...	1180	25	220	200	--
APR 1996					
11...	1330	120	140	340	--
JUN					
06...	1070	--	--	220	--
JUL					
26...	1520	71	230	330	--
SEP					
11...	2060	--	--	480	--
411138081172406 PO-115 NR RAVENNA OH-LEVEL 6 (LAT 41 11 38N LONG 081 17 24W)					
APR 1996					
11...	869	78	42	190	--
JUN					
06...	861	76	72	170	--
JUL					
26...	1150	77	130	210	--
413546083480901 LU-28 NR HOLLAND OH-LEVEL 1 (LAT 41 35 46N LONG 083 48 09W)					
NOV 1995					
01...	512	84	9.1	34	--
DEC					
14...	606	96	11	68	--
MAR 1996					
12...	559	86	10	55	--
APR					
17...	588	87	17	62	--
JUN					
12...	648	100	12	78	--
JUL					
24...	637	98	12	71	--
AUG					
23...	587	87	14	60	--
413546083480902 LU-28 NR HOLLAND OH-LEVEL 2 (LAT 41 35 46N LONG 083 48 09W)					
NOV 1995					
01...	596	97	12	62	--
DEC					
14...	793	120	16	140	--
MAR 1996					
12...	911	130	22	170	--
APR					
17...	941	130	30	180	--
JUN					
12...	885	--	--	160	--
JUL					
24...	772	95	41	120	--
AUG					
23...	676	82	36	93	--
413546083480903 LU-28 NR HOLLAND OH-LEVEL 3 (LAT 41 35 46N LONG 083 48 09W)					
NOV 1995					
01...	647	93	20	86	--
DEC					
14...	929	120	31	180	--
MAR 1996					
12...	1140	140	41	250	--
APR					
17...	992	120	48	200	--
JUN					
12...	812	85	56	140	--
JUL					
24...	733	71	58	110	--
AUG					
23...	648	56	60	85	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR (71870)
413546083480904 LU-28 NR HOLLAND OH-LEVEL 4 (LAT 41 35 46N LONG 083 48 09W)					
NOV 1995					
01...	709	77	52	110	--
DEC					
14...	1390	78	170	350	--
MAR 1996					
12...	1230	53	180	280	--
APR					
17...	954	39	140	180	--
JUN					
12...	779	31	120	130	--
JUL					
24...	892	32	130	140	--
AUG					
23...	865	26	140	150	--
413546083480905 LU-28 NR HOLLAND OH-LEVEL 5 (LAT 41 35 46N LONG 083 48 09W)					
NOV 1995					
01...	799	70	75	140	--
DEC					
14...	1030	71	110	--	--
MAR 1996					
12...	764	65	69	110	--
APR					
17...	--	52	27	44	--
JUN					
12...	660	40	79	93	--
JUL					
24...	446	56	8.7	27	--
AUG					
23...	914	79	68	80	--
413547083481001 LU-26 NR HOLLAND OH-LEVEL 1 (LAT 41 35 47N LONG 083 48 10W)					
NOV 1995					
01...	614	99	13	63	0.030
DEC					
14...	614	98	10	68	0.070
MAR 1996					
12...	613	100	8.1	67	0.050
APR					
17...	620	98	7.3	65	--
JUN					
12...	666	110	7.6	83	0.020
JUL					
24...	770	120	7.8	120	0.060
AUG					
23...	755	120	7.5	120	0.040
413547083481002 LU-26 NR HOLLAND OH-LEVEL 2 (LAT 41 35 47N LONG 083 48 10W)					
NOV 1995					
01...	798	16	130	180	0.030
DEC					
14...	1240	45	180	330	0.050
MAR 1996					
12...	490	8.2	100	24	0.010
APR					
17...	288	3.4	63	3.3	--
JUN					
12...	258	3.0	54	4.5	<0.010
JUL					
24...	496	9.7	81	95	0.040
AUG					
23...	674	18	99	170	0.030
413547083481003 LU-26 NR HOLLAND OH-LEVEL 3 (LAT 41 35 47N LONG 083 48 10W)					
NOV 1995					
01...	578	27	79	93	0.020
DEC					
14...	922	77	48	220	0.040
MAR 1996					
12...	902	62	89	200	0.030
APR					
17...	892	81	55	220	--
JUN					
12...	371	44	14	46	<0.010
JUL					
24...	419	55	11	33	0.010
AUG					
23...	1060	110	40	260	0.040

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR) (71870)
413547083481004 LU-26 NR HOLLAND OH-LEVEL 4 (LAT 41 35 47N LONG 083 48 10W)					
NOV 1995					
01...	486	67	20	48	0.030
DEC					
14...	498	64	21	47	0.030
MAR 1996					
12...	465	63	5.6	42	0.030
APR					
17...	534	81	5.6	69	--
JUN					
12...	766	110	5.6	150	0.030
JUL					
24...	763	110	5.7	130	0.030
AUG					
23...	689	100	5.5	110	0.040
413547083481005 LU-26 NR HOLLAND OH-LEVEL 5 (LAT 41 35 47N LONG 083 48 10W)					
NOV 1995					
01...	1150	29	190	270	0.070
DEC					
14...	2410	76	190	660	0.11
MAR 1996					
12...	1620	42	280	350	0.080
APR					
17...	796	12	160	100	--
JUN					
12...	442	4.6	95	26	<0.010
JUL					
24...	1290	31	210	260	0.090
AUG					
23...	952	22	160	180	0.070
413547083481006 LU-26 NR HOLLAND OH-LEVEL 6 (LAT 41 35 47N LONG 083 48 10W)					
MAR 1996					
12...	258	24	8.4	15	--
APR					
17...	176	14	7.4	11	--
JUN					
12...	317	27	12	35	0.020
JUL					
24...	307	27	9.5	34	0.010
AUG					
23...	305	29	9.1	33	0.020
413547083481101 LU-27 NR HOLLAND OH-LEVEL 1 (LAT 41 35 47N LONG 083 48 11W)					
NOV 1995					
01...	652	100	16	74	--
DEC					
14...	663	100	16	84	--
MAR 1996					
12...	629	98	11	74	--
APR					
17...	1040	140	31	71	--
JUN					
12...	1660	--	--	90	--
JUL					
24...	1790	170	46	61	--
AUG					
23...	1700	160	89	150	--
413547083481102 LU-27 NR HOLLAND OH-LEVEL 2 (LAT 41 35 47N LONG 083 48 11W)					
NOV 1995					
01...	1160	130	64	240	--
DEC					
14...	1130	120	70	260	--
MAR 1996					
12...	616	51	58	76	--
APR					
17...	--	150	43	55	--
JUN					
12...	2110	180	63	100	--
JUL					
24...	1780	170	63	110	--
AUG					
23...	1670	160	90	150	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
413547083481103 LU-27 NR HOLLAND OH-LEVEL 3 (LAT 41 35 47N LONG 083 48 11W)					
NOV 1995					
01...	1550	110	150	380	--
DEC					
14...	871	64	110	180	--
MAR 1996					
12...	623	58	57	51	--
APR					
17...	1380	180	45	60	--
JUN					
12...	2120	190	61	84	--
JUL					
24...	1810	170	51	70	--
AUG					
23...	1700	150	120	200	--
413547083481104 LU-27 NR HOLLAND OH-LEVEL 4 (LAT 41 35 47N LONG 083 48 11W)					
NOV 1995					
01...	774	60	91	65	--
DEC					
14...	666	60	63	54	--
MAR 1996					
12...	694	58	69	69	--
APR					
17...	1390	150	57	71	--
JUN					
12...	1940	170	88	130	--
JUL					
24...	1750	150	79	93	--
AUG					
23...	1670	140	120	100	--
413547083481105 LU-27 NR HOLLAND OH-LEVEL 5 (LAT 41 35 47N LONG 083 48 11W)					
NOV 1995					
01...	551	--	--	7.7	--
DEC					
14...	368	--	--	6.3	--
APR 1996					
17...	1710	--	--	30	--
JUN					
12...	2170	210	19	19	--
JUL					
24...	2090	220	14	15	--
AUG					
23...	1820	220	23	19	--
413547083481201 LU-25 NR HOLLAND OH-LEVEL 1 (LAT 41 35 47N LONG 083 48 12W)					
NOV 1995					
01...	583	98	8.3	56	--
DEC					
14...	569	95	9.4	53	--
MAR 1996					
12...	620	100	8.4	68	--
APR					
17...	637	100	9.6	72	--
JUN					
12...	633	110	7.9	71	--
JUL					
24...	686	120	8.0	84	--
AUG					
23...	705	110	7.4	100	--
413547083481202 LU-25 NR HOLLAND OH-LEVEL 2 (LAT 41 35 47N LONG 083 48 12W)					
NOV 1995					
01...	547	87	8.1	54	--
DEC					
14...	597	98	7.9	63	--
MAR 1996					
12...	523	85	5.9	53	--
APR					
17...	667	91	20	94	--
JUN					
12...	680	100	6.1	100	--
JUL					
24...	825	120	5.9	160	--
AUG					
23...	916	130	6.1	200	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
413547083481203 LU-25 NR HOLLAND OH-LEVEL 3 (LAT 41 35 47N LONG 083 48 12W)					
NOV 1995					
01...	690	68	45	130	--
DEC					
14...	819	91	40	170	--
MAR 1996					
12...	1050	94	77	250	--
APR					
17...	952	83	67	230	--
JUN					
12...	644	73	22	130	--
JUL					
24...	408	50	12	53	--
AUG					
23...	692	77	21	140	--
413547083481204 LU-25 NR HOLLAND OH-LEVEL 4 (LAT 41 35 47N LONG 083 48 12W)					
NOV 1995					
01...	700	61	56	140	--
DEC					
14...	999	77	91	220	--
MAR 1996					
12...	1210	55	170	280	--
APR					
17...	--	37	93	130	--
JUL					
24...	603	14	100	89	--
AUG					
23...	645	17	110	120	--
413547083481205 LU-25 NR HOLLAND OH-LEVEL 5 (LAT 41 35 47N LONG 083 48 12W)					
NOV 1995					
01...	1030	49	140	220	--
DEC					
14...	945	76	83	210	--
APR 1996					
17...	881	29	130	160	--
JUN					
12...	774	21	120	140	--
JUL					
24...	426	31	31	50	--
AUG					
23...	752	20	130	120	--
413547083481301 LU-22 NR HOLLAND OH-LEVEL 1 (LAT 41 35 47N LONG 083 48 13W)					
NOV 1995					
01...	783	120	8.4	130	--
DEC					
14...	760	100	30	120	--
MAR 1996					
12...	676	100	12	86	--
APR					
17...	690	110	10	85	--
JUN					
12...	694	110	10	91	--
JUL					
24...	707	110	12	93	--
AUG					
23...	725	100	19	110	--
413547083481302 LU-22 NR HOLLAND OH-LEVEL 2 (LAT 41 35 47N LONG 083 48 13W)					
NOV 1995					
01...	736	120	9.3	120	--
DEC					
14...	761	95	40	120	--
MAR 1996					
12...	616	94	12	69	--
APR					
17...	598	94	13	67	--
JUN					
12...	552	85	11	61	--
JUL					
24...	577	83	13	75	--
AUG					
23...	637	89	18	95	--



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
413547083481303 LU-22 NR HOLLAND OH-LEVEL 3 (LAT 41 35 47N LONG 083 48 13W)					
NOV 1995					
01...	628	85	20	93	--
DEC					
14...	749	84	42	130	--
MAR 1996					
12...	558	82	11	64	--
APR					
17...	548	83	12	57	--
JUN					
12...	775	110	14	150	--
JUL					
24...	844	85	57	160	--
AUG					
23...	1170	74	120	260	--
413547083481304 LU-22 NR HOLLAND OH-LEVEL 4 (LAT 41 35 47N LONG 083 48 13W)					
NOV 1995					
01...	1420	39	230	310	--
DEC					
14...	932	41	140	170	--
MAR 1996					
12...	662	--	--	96	--
APR					
17...	606	33	77	110	--
JUN					
12...	1260	--	--	310	--
JUL					
24...	2500	86	380	660	--
AUG					
23...	1260	81	140	290	--
413547083481305 LU-22 NR HOLLAND OH-LEVEL 5 (LAT 41 35 47N LONG 083 48 13W)					
NOV 1995					
01...	1050	--	--	250	--
DEC					
14...	1170	--	--	260	--
APR 1996					
17...	772	28	120	150	--
JUN					
12...	999	95	84	230	--
JUL					
24...	741	51	63	130	--
AUG					
23...	972	53	120	170	--
413549083481501 LU-21 NR HOLLAND OH-LEVEL 1 (LAT 41 35 49N LONG 083 48 15W)					
NOV 1995					
01...	832	150	8.3	110	--
DEC					
14...	849	140	7.4	120	--
MAR 1996					
12...	814	140	8.2	110	--
APR					
17...	846	140	8.4	110	--
JUN					
12...	855	150	8.5	120	--
JUL					
24...	870	150	8.3	120	--
AUG					
23...	845	140	7.8	110	--
413549083481502 LU-21 NR HOLLAND OH-LEVEL 2 (LAT 41 35 49N LONG 083 48 15W)					
NOV 1995					
01...	541	93	4.8	54	--
DEC					
14...	379	63	3.9	34	--
MAR 1996					
12...	--	58	4.0	19	--
APR					
17...	417	65	4.5	31	--
JUN					
12...	553	--	--	55	--
JUL					
24...	352	53	3.4	21	--
AUG					
23...	361	54	3.2	23	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR (71870)
413549083481503 LU-21 NR HOLLAND OH-LEVEL 3 (LAT 41 35 49N LONG 083 48 15W)					
NOV 1995					
01...	326	49	3.0	19	--
DEC					
14...	280	43	3.5	12	--
MAR 1996					
12...	253	37	2.3	8.2	--
APR					
17...	259	37	3.2	9.3	--
JUN					
12...	324	49	3.2	19	--
JUL					
24...	256	35	2.5	9.6	--
AUG					
23...	251	--	--	8.7	--
413549083481504 LU-21 NR HOLLAND OH-LEVEL 4 (LAT 41 35 49N LONG 083 48 15W)					
NOV 1995					
01...	272	40	2.7	12	--
DEC					
14...	191	29	2.9	7.4	--
MAR 1996					
12...	168	20	4.0	7.9	--
APR					
17...	173	17	6.3	9.9	--
JUN					
12...	278	40	2.7	13	--
JUL					
24...	186	20	3.9	11	--
AUG					
23...	212	28	2.5	6.4	--
413549083481505 LU-21 NR HOLLAND OH-LEVEL 5 (LAT 41 35 49N LONG 083 48 15W)					
NOV 1995					
01...	147	18	3.5	7.4	--
DEC					
14...	138	15	4.2	9.6	--
MAR 1996					
12...	160	19	4.0	9.8	--
APR					
17...	--	17	5.7	10	--
JUN					
12...	246	33	2.7	10	--
JUL					
24...	184	20	4.0	11	--
AUG					
23...	209	27	3.9	12	--
415305080414201 AB-139 NR KINGSVILLE OH-LEVEL 1 (LAT 41 53 05N LONG 080 41 42W)					
OCT 1995					
19...	436	56	13	9.9	--
JAN 1996					
17...	531	73	15	31	--
MAR					
06...	345	44	5.9	7.1	--
APR					
10...	370	55	3.7	3.5	--
JUN					
05...	344	49	6.6	6.5	--
JUL					
25...	377	56	16	11	--
SEP					
12...	598	58	55	49	--
415305080414202 AB-139 NR KINGSVILLE OH-LEVEL 2 (LAT 41 53 05N LONG 080 41 42W)					
OCT 1995					
19...	440	61	12	10	--
JAN 1996					
17...	440	61	4.5	4.3	--
MAR					
06...	285	35	3.9	3.3	--
APR					
10...	327	--	--	3.5	--
JUN					
05...	328	47	4.3	3.7	--
JUL					
25...	400	--	--	17	--
SEP					
12...	448	67	8.4	13	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
415305080414203 AB-139 NR KINGSVILLE OH-LEVEL 3 (LAT 41 53 05N LONG 080 41 42W)					
OCT 1995					
19...	441	--	--	11	--
JAN 1996					
17...	339	66	5.7	4.0	--
MAR					
06...	278	--	--	3.4	--
APR					
10...	330	48	3.5	3.5	--
JUN					
05...	305	41	4.5	3.4	--
JUL					
25...	350	48	11	9.4	--
SEP					
12...	453	--	--	9.7	--
415305080414204 AB-139 NR KINGSVILLE OH-LEVEL 4 (LAT 41 53 05N LONG 080 41 42W)					
OCT 1995					
19...	--	--	--	1.4	--
JAN 1996					
17...	370	--	--	5.1	--
MAR					
06...	240	--	--	3.2	--
APR					
10...	314	--	--	3.8	--
JUN					
05...	297	39	4.2	3.3	--
JUL					
25...	346	40	7.5	11	--
SEP					
12...	448	72	7.0	10	--
415305080414205 AB-139 NR KINGSVILLE OH-LEVEL 5 (LAT 41 53 05N LONG 080 41 42W)					
JAN 1996					
17...	427	--	--	8.1	--
MAR					
06...	222	--	--	3.4	--
APR					
10...	294	39	3.4	3.2	--
JUN					
05...	259	31	6.5	4.7	--
JUL					
25...	312	36	7.3	9.5	--
415305080414206 AB-139 NR KINGSVILLE OH-LEVEL 6 (LAT 41 53 05N LONG 080 41 42W)					
JUN 1996					
05...	283	--	--	6.0	--
415307080414201 AB-133 NR KINGSVILLE OH-LEVEL 1 (LAT 41 53 07N LONG 080 41 42W)					
OCT 1995					
19...	4960	260	760	1400	--
JAN 1996					
17...	2200	67	200	520	--
MAR					
06...	2330	--	--	630	--
APR					
10...	3340	130	500	1000	--
JUN					
05...	2170	26	100	550	--
JUL					
25...	2450	70	400	600	--
SEP					
12...	2600	110	400	650	--
415307080414202 AB-133 NR KINGSVILLE OH-LEVEL 2 (LAT 41 53 07N LONG 080 41 42W)					
OCT 1995					
19...	4910	260	770	1400	--
JAN 1996					
17...	2240	64	--	530	--
MAR					
06...	2040	87	310	590	--
APR					
10...	3430	130	510	1000	--
JUN					
05...	2350	65	400	620	--
JUL					
25...	2380	61	380	590	--
SEP					
12...	2580	110	400	630	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR (71870)
415307080414203 AB-133 NR KINGSVILLE OH-LEVEL 3 (LAT 41 53 07N LONG 080 41 42W)					
OCT 1995					
19...	4320	250	650	1200	--
JAN 1996					
17...	2240	97	320	570	--
MAR					
06...	2040	80	290	590	--
APR					
10...	--	130	510	990	--
JUN					
05...	2330	57	370	600	--
JUL					
25...	2230	58	370	520	--
SEP					
12...	2450	79	400	620	--
415307080414204 AB-133 NR KINGSVILLE OH-LEVEL 4 (LAT 41 53 07N LONG 080 41 42W)					
OCT 1995					
19...	4120	240	620	1100	--
JAN 1996					
17...	2110	--	--	520	--
MAR					
06...	1790	--	--	500	--
APR					
10...	3370	130	510	990	--
JUN					
05...	2300	56	380	590	--
JUL					
25...	2270	55	380	540	--
SEP					
12...	2400	77	400	640	--
415307080414205 AB-133 NR KINGSVILLE OH-LEVEL 5 (LAT 41 53 07N LONG 080 41 42W)					
OCT 1995					
19...	3700	--	--	990	--
JAN 1996					
17...	1900	--	--	480	--
MAR					
06...	1800	66	270	510	--
APR					
10...	3360	130	510	980	--
JUN					
05...	2280	56	380	610	--
JUL					
25...	2190	49	370	510	--
SEP					
12...	2400	75	400	610	--
415307080414206 AB-133 NR KINGSVILLE OH-LEVEL 6 (LAT 41 53 07N LONG 080 41 42W)					
MAR 1996					
06...	1760	--	--	480	--
APR					
10...	3250	130	480	950	--
JUN					
05...	2010	47	330	530	--
JUL					
25...	2080	47	340	480	--
415308080414301 AB-135 NR KINGSVILLE OH-LEVEL 1 (LAT 41 53 08N LONG 080 41 43W)					
OCT 1995					
19...	1060	110	79	200	--
JAN 1996					
17...	1410	120	130	330	--
MAR					
06...	1250	100	120	270	--
APR					
10...	1180	100	100	240	--
JUN					
05...	1100	93	87	210	--
JUL					
25...	1060	90	79	190	--
SEP					
12...	969	91	80	190	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR (71870)
415308080414302 AB-135 NR KINGSVILLE OH-LEVEL 2 (LAT 41 53 08N LONG 080 41 43W)					
OCT 1995					
19...	1100	100	86	220	--
JAN 1996					
17...	1340	110	110	270	--
MAR					
06...	1200	96	110	250	--
APR					
10...	1120	88	99	220	--
JUN					
05...	1070	90	86	200	--
JUL					
25...	1010	86	76	190	--
SEP					
12...	985	87	80	180	--
415308080414303 AB-135 NR KINGSVILLE OH-LEVEL 3 (LAT 41 53 08N LONG 080 41 43W)					
OCT 1995					
19...	1130	110	88	220	--
JAN 1996					
17...	1260	100	110	260	--
MAR					
06...	1180	--	--	250	--
APR					
10...	1120	--	--	230	--
JUN					
05...	1060	88	85	200	--
JUL					
25...	1010	85	77	190	--
SEP					
12...	975	87	79	190	--
415308080414304 AB-135 NR KINGSVILLE OH-LEVEL 4 (LAT 41 53 08N LONG 080 41 43W)					
OCT 1995					
19...	1140	110	90	220	--
JAN 1996					
17...	1200	97	110	240	--
MAR					
06...	1120	--	--	230	--
APR					
10...	1100	90	95	230	--
JUN					
05...	1030	88	80	190	--
JUL					
25...	964	84	70	170	--
SEP					
12...	953	89	77	180	--
415308080414305 AB-135 NR KINGSVILLE OH-LEVEL 5 (LAT 41 53 08N LONG 080 41 43W)					
OCT 1995					
19...	1040	110	78	200	--
JAN 1996					
17...	1190	100	99	250	--
MAR					
06...	--	96	110	240	--
APR					
10...	1140	--	--	230	--
JUN					
05...	1060	90	83	200	--
JUL					
25...	1010	87	72	170	--
SEP					
12...	982	90	78	180	--
415308080414306 AB-135 NR KINGSVILLE OH-LEVEL 6 (LAT 41 53 08N LONG 080 41 43W)					
OCT 1995					
19...	1000	120	68	180	--
JAN 1996					
17...	1170	66	93	240	--
MAR					
06...	1240	--	--	260	--
APR					
10...	1160	94	110	250	--
JUN					
05...	1120	93	90	210	--
JUL					
25...	1020	88	76	190	--
SEP					
12...	976	92	80	190	--



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L) AS CA (00915)	SODIUM, DIS- SOLVED (MG/L) AS NA (00930)	CHLO- RIDE, DIS- SOLVED (MG/L) AS CL (00940)	BROMIDE DIS- SOLVED (MG/L) AS BR (71870)
415309080414301 AB-136 NR KINGSVILLE OH-LEVEL 1 (LAT 41 53 09N LONG 080 41 43W)					
OCT 1995					
19...	1170	82	130	230	--
JAN 1996					
17...	1380	--	--	340	--
MAR					
06...	1420	67	200	320	--
APR					
10...	1370	72	180	300	--
JUN					
05...	1350	66	180	290	--
JUL					
25...	1510	71	200	340	--
SEP					
12...	1650	79	220	410	--
415309080414302 AB-136 NR KINGSVILLE OH-LEVEL 2 (LAT 41 53 09N LONG 080 41 43W)					
OCT 1995					
19...	1080	77	120	210	--
JAN 1996					
17...	1450	--	--	330	--
MAR					
06...	1430	64	200	320	--
APR					
10...	1400	71	180	310	--
JUN					
05...	1370	66	180	290	--
JUL					
25...	1530	69	200	340	--
SEP					
12...	1650	77	220	390	--
415309080414303 AB-136 NR KINGSVILLE OH-LEVEL 3 (LAT 41 53 09N LONG 080 41 43W)					
OCT 1995					
19...	1560	95	200	350	--
JAN 1996					
17...	1430	67	200	330	--
MAR					
06...	1410	65	200	320	--
APR					
10...	1380	70	180	310	--
JUN					
05...	1400	65	190	310	--
JUL					
25...	1520	68	200	330	--
SEP					
12...	1630	76	230	390	--
415309080414304 AB-136 NR KINGSVILLE OH-LEVEL 4 (LAT 41 53 09N LONG 080 41 43W)					
OCT 1995					
19...	1560	91	200	340	--
JAN 1996					
17...	1410	--	--	320	--
MAR					
06...	1380	63	200	310	--
APR					
10...	1450	76	200	330	--
JUN					
05...	1380	63	190	310	--
JUL					
25...	1510	67	200	330	--
SEP					
12...	1590	74	230	400	--
415309080414305 AB-136 NR KINGSVILLE OH-LEVEL 5 (LAT 41 53 09N LONG 080 41 43W)					
OCT 1995					
19...	1650	91	220	380	--
JAN 1996					
17...	1310	67	190	300	--
MAR					
06...	1370	--	--	310	--
APR					
10...	1450	74	190	330	--
JUN					
05...	1240	57	170	270	--
JUL					
25...	1420	64	190	310	--
SEP					
12...	1560	72	220	390	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
415309080414306 AB-136 NR KINGSVILLE OH-LEVEL 6 (LAT 41 53 09N LONG 080 41 43W)					
OCT 1995					
19...	1520	83	200	340	--
JAN 1996					
17...	1250	67	170	280	--
MAR					
06...	1250	67	170	270	--
APR					
10...	1230	--	--	270	--
JUN					
05...	1190	63	150	250	--
JUL					
25...	1180	62	140	240	--
SEP					
12...	1280	69	160	290	--
415309080414401 AB-138 NR KINGSVILLE OH-LEVEL 1 (LAT 41 53 09N LONG 080 41 44W)					
OCT 1995					
19...	769	94	31	100	0.040
JAN 1996					
17...	869	53	51	160	0.050
MAR					
06...	755	58	71	130	0.040
APR					
10...	710	60	60	120	0.020
JUN					
05...	628	53	58	98	0.030
JUL					
25...	532	52	38	68	0.030
SEP					
12...	567	62	34	68	0.030
415309080414402 AB-138 NR KINGSVILLE OH-LEVEL 2 (LAT 41 53 09N LONG 080 41 44W)					
OCT 1995					
19...	798	100	30	110	0.040
JAN 1996					
17...	730	63	53	110	--
MAR					
06...	665	60	50	94	0.040
APR					
10...	615	63	45	89	0.020
JUN					
05...	593	54	44	81	0.040
JUL					
25...	525	56	28	58	0.030
SEP					
12...	536	61	29	59	0.030
415309080414403 AB-138 NR KINGSVILLE OH-LEVEL 3 (LAT 41 53 09N LONG 080 41 44W)					
OCT 1995					
19...	776	93	29	110	0.040
JAN 1996					
17...	558	73	37	76	0.030
MAR					
06...	638	62	46	87	0.040
APR					
10...	636	57	45	94	0.030
JUN					
05...	558	56	36	68	0.030
JUL					
25...	529	58	29	60	0.030
SEP					
12...	572	62	29	63	0.030
415309080414404 AB-138 NR KINGSVILLE OH-LEVEL 4 (LAT 41 53 09N LONG 080 41 44W)					
OCT 1995					
19...	862	110	32	130	0.050
JAN 1996					
17...	547	42	26	72	0.030
MAR					
06...	660	52	53	100	0.040

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
415309080414405 AB-138 NR KINGSVILLE OH-LEVEL 5 (LAT 41 53 09N LONG 080 41 44W)					
OCT 1995					
19...	698	56	44	100	0.030
JAN 1996					
17...	564	60	65	96	0.040
MAR					
06...	622	53	58	99	0.030
APR					
10...	559	46	38	86	0.030
JUN					
05...	390	42	33	46	0.030
JUL					
25...	397	46	26	45	0.020
SEP					
12...	490	48	36	63	0.030
415309080414406 AB-138 NR KINGSVILLE OH-LEVEL 6 (LAT 41 53 09N LONG 080 41 44W)					
OCT 1995					
19...	706	63	61	110	0.030
JAN 1996					
17...	881	55	43	160	0.050
MAR					
06...	771	54	70	140	0.040
APR					
10...	734	56	70	130	0.040
JUN					
05...	633	49	65	96	0.040
JUL					
25...	540	46	45	75	0.030
SEP					
12...	613	48	65	94	0.030
415310080414401 AB-137 NR KINGSVILLE OH-LEVEL 1 (LAT 41 53 10N LONG 080 41 44W)					
OCT 1995					
19...	781	94	45	100	--
JAN 1996					
17...	744	95	42	99	--
MAR					
06...	713	78	49	85	--
APR					
10...	724	74	45	85	--
JUN					
05...	706	71	46	80	--
JUL					
25...	691	69	42	73	--
SEP					
12...	703	79	42	81	--
415310080414402 AB-137 NR KINGSVILLE OH-LEVEL 2 (LAT 41 53 10N LONG 080 41 44W)					
OCT 1995					
19...	723	85	48	100	--
JAN 1996					
17...	776	98	46	93	--
MAR					
06...	720	76	49	86	--
APR					
10...	714	69	46	84	--
JUN					
05...	704	69	46	81	--
JUL					
25...	677	69	42	71	--
SEP					
12...	709	83	42	79	--
415310080414403 AB-137 NR KINGSVILLE OH-LEVEL 3 (LAT 41 53 10N LONG 080 41 44W)					
OCT 1995					
19...	739	85	50	100	--
JAN 1996					
17...	784	88	46	93	--
MAR					
06...	698	77	49	86	--
APR					
10...	706	68	46	84	--
JUN					
05...	699	70	45	82	--
JUL					
25...	684	68	42	72	--
SEP					
12...	703	80	42	80	--

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 THROUGH SEPTEMBER 1996--Continued

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)
415310080414404 AB-137 NR KINGSVILLE OH-LEVEL 4 (LAT 41 53 10N LONG 080 41 44W)					
OCT 1995					
19...	733	88	50	100	--
JAN 1996					
17...	724	87	46	85	--
MAR					
06...	--	75	47	85	--
APR					
10...	708	68	46	86	--
JUN					
05...	698	69	46	78	--
JUL					
25...	678	70	42	72	--
SEP					
12...	717	82	42	76	--
415310080414405 AB-137 NR KINGSVILLE OH-LEVEL 5 (LAT 41 53 10N LONG 080 41 44W)					
OCT 1995					
19...	762	84	49	100	--
JAN 1996					
17...	734	86	47	87	--
MAR					
06...	712	74	50	86	--
APR					
10...	714	68	46	85	--
JUN					
05...	700	70	46	78	--
JUL					
25...	682	70	43	68	--
SEP					
12...	717	83	43	82	--
415310080414406 AB-137 NR KINGSVILLE OH-LEVEL 6 (LAT 41 53 10N LONG 080 41 44W)					
OCT 1995					
19...	745	90	49	110	--
JAN 1996					
17...	737	84	47	89	--
MAR					
06...	714	78	50	90	--
APR					
10...	704	69	45	87	--
JUN					
05...	--	68	49	81	--
JUL					
25...	678	70	42	68	--
SEP					
12...	708	100	34	40	--

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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SAMPLE ANALYSES FROM ONE WELL AT EACH SITE  
WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	CYANIDE DIS- SOLVED (MG/L) AS CN) (00723)
393541083000801 PK-50 NR CIRCLEVILLE OH-LEVEL 1 (LAT 39 35 41N LONG 083 00 08W)				
APR 1996 25...	722	7.3	449	<0.01
393541083000802 PK-50 NR CIRCLEVILLE OH-LEVEL 2 (LAT 39 35 41N LONG 083 00 08W)				
OCT 1995 31...	685	7.3	413	<0.01
393541083000803 PK-50 NR CIRCLEVILLE OH-LEVEL 3 (LAT 39 35 41N LONG 083 00 08W)				
FEB 1996 28...	811	7.3	556	<0.01
393541083000804 PK-50 NR CIRCLEVILLE OH-LEVEL 4 (LAT 39 35 41N LONG 083 00 08W)				
OCT 1995 31...	677	7.3	416	<0.01
APR 1996 25...	803	7.3	528	<0.01
393541083000805 PK-50 NR CIRCLEVILLE OH-LEVEL 5 (LAT 39 35 41N LONG 083 00 08W)				
FEB 1996 28...	688	7.4	429	<0.01
395859083440501 CL-140 NR SPRINGFIELD OH-LEVEL 1 (LAT 39 58 59N LONG 083 44 05W)				
NOV 1995 07...	885	7.2	486	<0.01
FEB 1996 13...	940	7.2	531	<0.01
APR 24...	917	7.2	544	<0.01
395859083440504 CL-140 NR SPRINGFIELD OH-LEVEL 4 (LAT 39 58 59N LONG 083 44 05W)				
NOV 1995 07...	950	7.1	527	<0.01
FEB 1996 13...	911	7.2	523	<0.01
APR 24...	992	7.2	594	<0.01
400947083480001 CH-44 NR URBANA OH-LEVEL 1 (LAT 40 09 47N LONG 083 48 00W)				
APR 1996 26...	919	7.2	543	<0.01
400947083480002 CH-44 NR URBANA OH-LEVEL 2 (LAT 40 09 47N LONG 083 48 00W)				
FEB 1996 13...	1050	7.2	626	<0.01
400947083480003 CH-44 NR URBANA OH-LEVEL 3 (LAT 40 09 47N LONG 083 48 00W)				
FEB 1996 13...	997	7.3	610	<0.01
400947083480004 CH-44 NR URBANA OH-LEVEL 4 (LAT 40 09 47N LONG 083 48 00W)				
APR 1996 26...	1130	7.3	728	<0.01
400948083480202 CH-41 NR URBANA OH-LEVEL 2 (LAT 40 09 48N LONG 083 48 02W)				
NOV 1995 08...	859	7.2	511	<0.01



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

SAMPLE ANALYSES FROM ONE WELL AT EACH SITE--Continued  
WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	CYANIDE DIS- SOLVED (MG/L) AS CN) (00723)
400948083480204 CH-41 NR URBANA OH-LEVEL 4 (LAT 40 09 48N LONG 083 48 02W)				
NOV 1995 08...	1170	7.2	740	<0.01
403923082325701 R-18 NR LEXINGTON OH-LEVEL 1 (LAT 40 39 23N LONG 082 32 57W)				
OCT 1995 25...	474	7.2	257	<0.01
403923082325702 R-18 NR LEXINGTON OH-LEVEL 2 (LAT 40 39 23N LONG 082 32 57W)				
FEB 1996 15...	543	7.1	292	<0.01
MAY 07...	448	7.2	260	<0.01
403923082325704 R-18 NR LEXINGTON OH-LEVEL 4 (LAT 40 39 23N LONG 082 32 57W)				
OCT 1995 25...	577	7.5	321	<0.01
MAY 1996 07...	654	7.5	378	<0.01
403923082325705 R-18 NR LEXINGTON OH-LEVEL 5 (LAT 40 39 23N LONG 082 32 57W)				
FEB 1996 15...	685	7.3	373	<0.01
411137081172402 PO-117 NR RAVENNA OH-LEVEL 2 (LAT 41 11 37N LONG 081 17 24W)				
MAR 1996 05...	1220	7.4	664	<0.01
MAY 09...	753	7.4	429	<0.01
411137081172403 PO-117 NR RAVENNA OH-LEVEL 3 (LAT 41 11 37N LONG 081 17 24W)				
OCT 1995 27...	1830	7.4	1010	<0.01
411137081172404 PO-117 NR RAVENNA OH-LEVEL 4 (LAT 41 11 37N LONG 081 17 24W)				
MAR 1996 05...	1010	7.7	552	<0.01
MAY 09...	688	7.7	394	0.01
411137081172405 PO-117 NR RAVENNA OH-LEVEL 5 (LAT 41 11 37N LONG 081 17 24W)				
OCT 1995 27...	2020	7.5	1150	<0.01
413547083481003 LU-26 NR HOLLAND OH-LEVEL 3 (LAT 41 35 47N LONG 083 48 10W)				
NOV 1995 02...	549	7.8	319	<0.01
MAR 1996 12...	902	7.5	513	<0.01
APR 18...	867	8.0	552	<0.01
413547083481005 LU-26 NR HOLLAND OH-LEVEL 5 (LAT 41 35 47N LONG 083 48 10W)				
NOV 1995 02...	1090	7.3	600	<0.01
MAR 1996 12...	1620	7.7	884	<0.01
APR 18...	802	8.3	438	<0.01

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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SAMPLE ANALYSES FROM ONE WELL AT EACH SITE--Continued  
WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	CYANIDE DIS- SOLVED (MG/L) AS CN) (00723)
415309080414401 AB-138 NR KINGSVILLE OH-LEVEL 1 (LAT 41 53 09N LONG 080 41 44W)				
MAY 1996 08...	693	7.7	419	<0.01
415309080414402 AB-138 NR KINGSVILLE OH-LEVEL 2 (LAT 41 53 09N LONG 080 41 44W)				
OCT 1995 26...	780	7.5	434	<0.01
MAR 1996 06...	665	7.5	374	<0.01
415309080414403 AB-138 NR KINGSVILLE OH-LEVEL 3 (LAT 41 53 09N LONG 080 41 44W)				
MAR 1996 06...	638	7.5	346	<0.01
MAY 08...	635	7.7	352	<0.01
415309080414404 AB-138 NR KINGSVILLE OH-LEVEL 4 (LAT 41 53 09N LONG 080 41 44W)				
OCT 1995 26...	852	7.5	482	<0.01

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

ADDITIONAL SAMPLE ANALYSES  
WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	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)	ALKA- LITY, CARBON- ATE IT-FLD (MG/L - CACO3) (99430)
393541083001000 PK-47 NR CIRCLEVILLE OH (LAT 39 35 41N LONG 083 00 10W)												
OCT 1995 31...	11.88	662	710	7.1	7.3	13.0	360	90	32	2.3	2.0	276
APR 1996 25...	10.08	682	715	7.2	7.3	13.5	360	93	32	4.5	1.8	274
393541083001200 PK-53 NR CIRCLEVILLE OH (LAT 39 35 41N LONG 083 00 12W)												
OCT 1995 31...	11.47	708	751	7.1	7.3	13.0	380	97	33	2.9	1.2	296
APR 1996 25...	9.71	690	716	7.1	7.3	12.5	370	96	32	2.5	1.0	279
395859083440600 CL-137 NR SPRINGFIELD OH (LAT 39 58 59N LONG 083 44 06W)												
NOV 1995 07...	21.71	802	838	7.1	7.1	13.0	400	100	37	11	2.4	375
APR 1996 24...	19.67	828	862	6.8	7.1	12.0	410	100	38	15	2.1	355
395901083440600 CL-135 NR SPRINGFIELD OH (LAT 39 59 01N LONG 083 44 06W)												
NOV 1995 07...	19.76	722	766	7.2	7.2	11.5	390	94	37	6.1	1.6	380
395901083440700 CL-136 NR SPRINGFIELD OH (LAT 39 59 01N LONG 083 44 07W)												
APR 1996 24...	18.61	720	747	7.1	7.2	11.5	390	95	38	6.3	1.0	353
400948083480200 CH-41 NR URBANA OH (LAT 40 09 48N LONG 083 48 02W)												
NOV 1995 08...	9.97	825	877	7.2	7.1	12.0	400	100	37	18	3.7	312
APR 1996 26...	7.19	830	866	7.0	7.2	11.5	430	110	37	17	3.5	324
400950083480600 CH-38 NR URBANA OH (LAT 40 09 50N LONG 083 48 06W)												
MAY 1996 02...	3.24	744	785	7.1	7.3	9.5	430	110	37	4.1	1.7	--
400952083480800 CH-40 NR URBANA OH (LAT 40 09 52N LONG 083 48 08W)												
NOV 1995 08...	7.92	763	812	7.4	7.2	11.0	410	100	38	6.1	2.4	298
403923082325400 R-21 NR LEXINGTON OH (LAT 40 39 23N LONG 082 32 54W)												
OCT 1995 25...	17.08	157	168	6.6	7.0	12.0	68	19	5.0	1.8	1.1	50
MAY 1996 07...	5.65	200	211	6.9	7.2	10.0	94	27	6.4	1.9	1.1	64
403923082325600 R-15 NR LEXINGTON OH (LAT 40 39 23N LONG 082 32 56W)												
OCT 1995 25...	17.53	320	338	6.6	7.0	11.5	100	27	8.5	21	1.3	77
MAY 1996 07...	10.27	335	359	6.5	6.7	9.0	88	24	6.9	31	1.0	57
411137081172100 PO-114 NR RAVENNA OH (LAT 41 11 37N LONG 081 17 21W)												
OCT 1995 27...	5.15	454	475	7.4	7.4	12.5	220	76	7.2	6.6	1.7	180
MAY 1996 09...	0.77	300	305	7.0	7.1	10.0	140	47	4.6	9.1	1.1	122

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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ADDITIONAL SAMPLE ANALYSES--Continued  
WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	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)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	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)
393541083001000 PK-47 NR CIRCLEVILLE OH (LAT 39 35 41N LONG 083 00 10W)											
OCT 1995 31...	283	75	16	0.10	0.040	8.6	422	396	0.020	0.960	<0.015
APR 1996 25...	285	78	20	0.10	0.040	8.8	430	413	0.010	0.760	<0.015
393541083001200 PK-53 NR CIRCLEVILLE OH (LAT 39 35 41N LONG 083 00 12W)											
OCT 1995 31...	266	67	15	0.20	0.030	9.2	456	403	--	--	--
APR 1996 25...	284	57	15	0.10	0.040	8.8	438	422	0.010	8.80	<0.015
395859083440600 CL-137 NR SPRINGFIELD OH (LAT 39 58 59N LONG 083 44 06W)											
NOV 1995 07...	366	32	19	0.20	0.040	12	457	478	<0.010	8.80	<0.015
APR 1996 24...	373	32	31	0.20	0.050	12	499	489	<0.010	7.80	<0.015
395901083440600 CL-135 NR SPRINGFIELD OH (LAT 39 59 01N LONG 083 44 06W)											
NOV 1995 07...	326	48	8.7	0.30	0.040	11	430	445	<0.010	2.20	<0.015
395901083440700 CL-136 NR SPRINGFIELD OH (LAT 39 59 01N LONG 083 44 07W)											
APR 1996 24...	329	38	9.3	0.20	0.040	13	436	417	<0.010	4.20	<0.015
400948083480200 CH-41 NR URBANA OH (LAT 40 09 48N LONG 083 48 02W)											
NOV 1995 08...	304	98	37	0.30	0.040	8.3	506	490	--	--	--
APR 1996 26...	332	93	35	0.30	0.040	8.7	519	511	0.010	1.50	0.020
400950083480600 CH-38 NR URBANA OH (LAT 40 09 50N LONG 083 48 06W)											
MAY 1996 02...	311	110	13	0.30	0.020	6.2	494	470	<0.010	<0.050	0.040
400952083480800 CH-40 NR URBANA OH (LAT 40 09 52N LONG 083 48 08W)											
NOV 1995 08...	290	120	22	0.40	0.040	11	477	479	<0.010	<0.050	<0.015
403923082325400 R-21 NR LEXINGTON OH (LAT 40 39 23N LONG 082 32 54W)											
OCT 1995 25...	49	15	2.1	<0.10	0.030	10	104	97	0.030	2.90	0.030
MAY 1996 07...	64	23	2.7	<0.10	0.020	9.6	118	125	0.030	3.30	0.060
403923082325600 R-15 NR LEXINGTON OH (LAT 40 39 23N LONG 082 32 56W)											
OCT 1995 25...	79	24	33	<0.10	0.030	9.3	194	178	<0.010	1.80	<0.015
MAY 1996 07...	55	26	50	<0.10	0.020	8.5	203	194	<0.010	3.00	0.030
411137081172100 PO-114 NR RAVENNA OH (LAT 41 11 37N LONG 081 17 21W)											
OCT 1995 27...	181	50	7.3	<0.10	0.020	6.9	305	270	0.020	1.20	0.030
MAY 1996 09...	112	25	7.8	<0.10	<0.010	5.7	180	179	0.020	2.50	0.040

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

ADDITIONAL SAMPLE ANALYSES--Continued  
WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)
393541083001000 PK-47 NR CIRCLEVILLE OH (LAT 39 35 41N LONG 083 00 10W)											
OCT 1995 31...	<0.20	0.020	<0.010	<1	78	<0.50	30	1.0	<1.0	<3.0	<10
APR 1996 25...	<0.20	<0.010	<0.010	<1	76	<0.50	30	<1.0	<1.0	<3.0	<10
393541083001200 PK-53 NR CIRCLEVILLE OH (LAT 39 35 41N LONG 083 00 12W)											
OCT 1995 31...	--	--	--	<1	85	<0.50	20	<1.0	<1.0	<3.0	<10
APR 1996 25...	<0.20	<0.010	<0.010	<1	73	<0.50	20	<1.0	<1.0	<3.0	<10
395859083440600 CL-137 NR SPRINGFIELD OH (LAT 39 58 59N LONG 083 44 06W)											
NOV 1995 07...	<0.20	0.010	<0.010	<1	140	<0.50	30	<1.0	<1.0	<3.0	<10
APR 1996 24...	<0.20	<0.010	<0.010	<1	140	<0.50	20	<1.0	<1.0	<3.0	<10
395901083440600 CL-135 NR SPRINGFIELD OH (LAT 39 59 01N LONG 083 44 06W)											
NOV 1995 07...	<0.20	<0.010	<0.010	<1	150	<0.50	20	<1.0	<1.0	<3.0	<10
395901083440700 CL-136 NR SPRINGFIELD OH (LAT 39 59 01N LONG 083 44 07W)											
APR 1996 24...	<0.20	<0.010	<0.010	<1	100	<0.50	20	<1.0	<1.0	<3.0	<10
400948083480200 CH-41 NR URBANA OH (LAT 40 09 48N LONG 083 48 02W)											
NOV 1995 08...	--	--	--	<1	77	<0.50	30	<1.0	<1.0	<3.0	<10
APR 1996 26...	<0.20	<0.010	<0.010	<1	76	<0.50	40	<1.0	<1.0	<3.0	<10
400950083480600 CH-38 NR URBANA OH (LAT 40 09 50N LONG 083 48 06W)											
MAY 1996 02...	0.20	0.010	<0.010	1	67	<0.50	20	<1.0	<1.0	4.0	<10
400952083480800 CH-40 NR URBANA OH (LAT 40 09 52N LONG 083 48 08W)											
NOV 1995 08...	<0.20	0.030	<0.010	<1	93	<0.50	20	<1.0	<1.0	<3.0	<10
403923082325400 R-21 NR LEXINGTON OH (LAT 40 39 23N LONG 082 32 54W)											
OCT 1995 25...	<0.20	0.020	<0.010	<1	19	<0.50	20	<1.0	<1.0	<3.0	<10
MAY 1996 07...	<0.20	<0.010	<0.010	<1	20	<0.50	20	2.0	<1.0	<3.0	<10
403923082325600 R-15 NR LEXINGTON OH (LAT 40 39 23N LONG 082 32 56W)											
OCT 1995 25...	<0.20	0.020	<0.010	<1	26	<0.50	30	<1.0	<1.0	<3.0	<10
MAY 1996 07...	<0.20	<0.010	<0.010	<1	20	<0.50	20	<1.0	1.0	<3.0	<10
411137081172100 PO-114 NR RAVENNA OH (LAT 41 11 37N LONG 081 17 21W)											
OCT 1995 27...	0.30	0.010	<0.010	<1	34	<0.50	30	<1.0	<1.0	<3.0	<10
MAY 1996 09...	<0.20	<0.010	<0.010	<1	21	<0.50	30	1.0	<1.0	<3.0	<10



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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## ADDITIONAL SAMPLE ANALYSES--Continued WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)
393541083001000 PK-47 NR CIRCLEVILLE OH (LAT 39 35 41N LONG 083 00 10W)											
OCT 1995 31...	<3.0	<10	<4	19	<0.1	<10	150	<6	7.0	--	<0.01
APR 1996 25...	<3.0	<10	<4	10	<0.1	20	150	<6	12	0.80	<0.01
393541083001200 PK-53 NR CIRCLEVILLE OH (LAT 39 35 41N LONG 083 00 12W)											
OCT 1995 31...	<3.0	<10	<4	35	<0.1	<10	110	<6	5.0	--	<0.01
APR 1996 25...	<3.0	<10	<4	8.0	<0.1	10	93	<6	17	0.80	<0.01
395859083440600 CL-137 NR SPRINGFIELD OH (LAT 39 58 59N LONG 083 44 06W)											
NOV 1995 07...	<3.0	<10	<4	<1.0	<0.1	20	180	<6	<3.0	--	<0.01
APR 1996 24...	<3.0	<10	<4	<1.0	<0.1	<10	180	<6	10	0.70	<0.01
395901083440600 CL-135 NR SPRINGFIELD OH (LAT 39 59 01N LONG 083 44 06W)											
NOV 1995 07...	8.0	<10	<4	32	<0.1	30	360	<6	33	--	<0.01
395901083440700 CL-136 NR SPRINGFIELD OH (LAT 39 59 01N LONG 083 44 07W)											
APR 1996 24...	<3.0	<10	<4	15	<0.1	<10	440	<6	5.0	<0.10	<0.01
400948083480200 CH-41 NR URBANA OH (LAT 40 09 48N LONG 083 48 02W)											
NOV 1995 08...	76	<10	<4	120	<0.1	<10	400	<6	6.0	--	<0.01
APR 1996 26...	56	<10	<4	110	0.6	10	390	<6	<3.0	1.1	<0.01
400950083480600 CH-38 NR URBANA OH (LAT 40 09 50N LONG 083 48 06W)											
MAY 1996 02...	540	20	<4	140	<0.1	<10	310	<6	22	4.6	--
400952083480800 CH-40 NR URBANA OH (LAT 40 09 52N LONG 083 48 08W)											
NOV 1995 08...	180	<10	<4	120	<0.1	<10	620	<6	6.0	--	<0.01
403923082325400 R-21 NR LEXINGTON OH (LAT 40 39 23N LONG 082 32 54W)											
OCT 1995 25...	190	<10	<4	170	<0.1	<10	37	<6	9.0	--	<0.01
MAY 1996 07...	27	10	<4	46	<0.1	<10	43	<6	10	0.70	<0.01
403923082325600 R-15 NR LEXINGTON OH (LAT 40 39 23N LONG 082 32 56W)											
OCT 1995 25...	<3.0	<10	<4	2.0	<0.1	<10	52	<6	5.0	--	<0.01
MAY 1996 07...	<3.0	<10	<4	<1.0	<0.1	<10	45	<6	8.0	0.70	<0.01
411137081172100 PO-114 NR RAVENNA OH (LAT 41 11 37N LONG 081 17 21W)											
OCT 1995 27...	<3.0	<10	<4	240	<0.1	<10	150	<6	<3.0	--	<0.01
MAY 1996 09...	<3.0	<10	<4	30	<0.1	<10	96	<6	<3.0	1.4	<0.01

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

ADDITIONAL SAMPLE ANALYSES--Continued  
WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (90095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	PH WATER WHOLE LAB (STAND- ARD UNITS) (00403)	TEMPER- ATURE WATER (DEG C) (00010)	HARD- NESS TOTAL (MG/L AS CAC03) (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)	ALKA- LITY, CARBON- ATE IT-FLD (MG/L - CAC03) (99430)
411138081172400 PO-115 NR RAVENNA OH (LAT 41 11 38N LONG 081 17 24W)												
OCT 1995 27...	8.62	1780	1850	7.1	7.2	13.5	150	49	5.5	310	1.8	219
MAY 1996 09...	5.94	2430	2620	7.1	6.9	8.5	350	120	13	360	4.5	126
413547083481300 LU-22 NR HOLLAND OH (LAT 41 35 47N LONG 083 48 13W)												
NOV 1995 02...	7.18	1040	1060	7.6	7.6	14.5	160	52	7.1	140	3.1	121
APR 1996 18...	5.70	680	678	7.7	7.9	10.0	120	39	4.7	89	1.9	93
413549083481500 LU-21 NR HOLLAND OH (LAT 41 35 49N LONG 083 48 15W)												
NOV 1995 02...	7.51	287	283	7.4	7.6	14.0	120	40	5.5	2.8	1.4	71
APR 1996 18...	5.30	270	274	7.7	7.8	9.0	120	40	5.4	3.5	1.4	68
415305080414200 AB-139 NR KINGSVILLE OH (LAT 41 53 05N LONG 080 41 42W)												
OCT 1995 26...	12.51	425	432	7.4	7.6	13.0	190	59	11	11	0.90	196
MAY 1996 08...	6.74	593	604	7.5	7.5	11.0	200	61	11	36	0.70	114
415307080414200 AB-133 NR KINGSVILLE OH (LAT 41 53 07N LONG 080 41 42W)												
OCT 1995 26...	8.87	4010	4110	7.1	7.1	13.0	570	170	34	630	2.6	317
MAY 1996 08...	5.20	2860	2970	7.3	7.2	9.0	350	110	18	460	3.2	120

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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ADDITIONAL SAMPLE ANALYSES--Continued  
WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	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)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	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)
411138081172400 PO-115 NR RAVENNA OH (LAT 41 11 38N LONG 081 17 24W)											
OCT 1995 27...	225	51	390	0.30	0.070	6.4	1020	951	<0.010	1.00	<0.015
MAY 1996 09...	124	54	710	<0.10	0.10	4.4	1440	1350	<0.010	1.20	0.040
413547083481300 LU-22 NR HOLLAND OH (LAT 41 35 47N LONG 083 48 13W)											
NOV 1995 02...	114	45	230	0.10	0.050	8.4	574	566	<0.010	1.50	0.050
APR 1996 18...	99	41	120	0.10	0.040	7.4	372	368	<0.010	1.10	0.060
413549083481500 LU-21 NR HOLLAND OH (LAT 41 35 49N LONG 083 48 15W)											
NOV 1995 02...	71	36	18	<0.10	0.010	8.6	172	156	<0.010	0.140	0.040
APR 1996 18...	69	35	19	<0.10	0.020	8.3	148	156	<0.010	0.190	0.050
415305080414200 AB-139 NR KINGSVILLE OH (LAT 41 53 05N LONG 080 41 42W)											
OCT 1995 26...	142	68	8.9	0.30	0.010	11	278	288	--	--	--
MAY 1996 08...	118	66	75	0.30	0.020	11	339	333	<0.010	0.210	0.030
415307080414200 AB-133 NR KINGSVILLE OH (LAT 41 53 07N LONG 080 41 42W)											
OCT 1995 26...	307	82	1100	<0.10	0.23	12	2420	2220	0.010	0.160	<0.015
MAY 1996 08...	120	56	840	<0.10	0.11	5.6	1760	1570	<0.010	0.200	0.040

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

ADDITIONAL SAMPLE ANALYSES--Continued  
WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00671)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)
411138081172400 PO-115 NR RAVENNA OH (LAT 41 11 38N LONG 081 17 24W)											
OCT 1995 27...	0.30	0.050	0.040	<1	34	<0.50	70	<1.0	<1.0	<3.0	<10
MAY 1996 09...	<0.20	0.020	0.020	1	85	<1.0	40	2.0	<1.0	<6.0	<20
413547083481300 LU-22 NR HOLLAND OH (LAT 41 35 47N LONG 083 48 13W)											
NOV 1995 02...	0.20	0.010	<0.010	2	50	<0.50	30	<1.0	<1.0	3.0	<10
APR 1996 18...	<0.20	0.010	0.020	1	39	<0.50	<10	<1.0	<1.0	<3.0	<10
413549083481500 LU-21 NR HOLLAND OH (LAT 41 35 49N LONG 083 48 15W)											
NOV 1995 02...	<0.20	0.040	<0.010	2	34	<0.50	30	<1.0	<1.0	<3.0	<10
APR 1996 18...	<0.20	<0.010	0.010	2	34	<0.50	<10	<1.0	<1.0	<3.0	<10
415305080414200 AB-139 NR KINGSVILLE OH (LAT 41 53 05N LONG 080 41 42W)											
OCT 1995 26...	--	--	--	<1	24	<0.50	30	<1.0	<1.0	<3.0	<10
MAY 1996 08...	<0.20	<0.010	<0.010	<1	28	<0.50	30	1.0	<1.0	<3.0	<10
415307080414200 AB-133 NR KINGSVILLE OH (LAT 41 53 07N LONG 080 41 42W)											
OCT 1995 26...	<0.20	0.010	<0.010	<1	190	<1.5	40	<3.0	<1.0	<9.0	<30
MAY 1996 08...	<0.20	<0.010	<0.010	<1	130	<1.5	30	<3.0	1.0	<9.0	<30

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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## ADDITIONAL SAMPLE ANALYSES--Continued WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)
411138081172400 PO-115 NR RAVENNA OH (LAT 41 11 38N LONG 081 17 24W)											
OCT 1995 27...	5.0	<10	<4	5.0	<0.1	<10	170	<6	<3.0	--	0.01
MAY 1996 09...	<6.0	<20	<8	3.0	<0.1	<20	420	<12	16	1.6	0.01
413547083481300 LU-22 NR HOLLAND OH (LAT 41 35 47N LONG 083 48 13W)											
NOV 1995 02...	460	<10	<4	88	<0.1	<10	290	<6	11	--	<0.01
APR 1996 18...	450	20	<4	67	<0.1	<10	140	<6	<3.0	1.7	<0.01
413549083481500 LU-21 NR HOLLAND OH (LAT 41 35 49N LONG 083 48 15W)											
NOV 1995 02...	580	<10	<4	83	<0.1	<10	88	<6	7.0	--	<0.01
APR 1996 18...	640	20	<4	56	<0.1	<10	94	<6	<3.0	1.4	<0.01
415305080414200 AB-139 NR KINGSVILLE OH (LAT 41 53 05N LONG 080 41 42W)											
OCT 1995 26...	<3.0	<10	<4	360	<0.1	<10	89	<6	4.0	--	<0.01
MAY 1996 08...	<3.0	<10	4	100	0.2	10	97	<6	3.0	0.70	<0.01
415307080414200 AB-133 NR KINGSVILLE OH (LAT 41 53 07N LONG 080 41 42W)											
OCT 1995 26...	19	<30	<12	35	<0.1	<30	340	<18	13	--	<0.01
MAY 1996 08...	<9.0	<30	<12	<3.0	<0.1	<30	330	<18	26	1.4	<0.01



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

The following table lists ground-water level measurements from wells located throughout the eight sites in the "Effects of Highway Deicing Chemicals" study area. The water level in these wells is measured periodically, however, they are not part of the routine water-quality network.

## **GROUND-WATER LEVELS**

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
393540083001200	PK-46 NR CIRCLEVILLE, OH	34.6	112OTSH	02-28-96	11.32	679.16
				04-25-96	10.42	
				06-03-96	6.89	
				07-15-96	7.63	
				08-21-96	9.07	
393541083000700	PK-44 NR CIRCLEVILLE OH	38	112OTSH	02-28-96	12.67	679.54
				04-25-96	11.82	
				06-03-96	8.70	
				07-15-96	9.37	
				08-21-96	10.72	
393541083000800	PK-50 NR CIRCLEVILLE OH	34.3	112OTSH	02-28-96	12.47	679.62
				04-25-96	11.61	
				06-03-96	8.01	
				07-15-96	8.74	
				08-21-96	10.14	
393541083000900	PK-49 NR CIRCLEVILLE OH	35.6	112OTSH	02-28-96	12.11	679.51
				04-25-96	11.22	
				06-03-96	7.84	
				07-15-96	8.59	
				08-21-96	10.00	
393541083001000	PK-47 NR CIRCLEVILLE OH	36.1	112OTSH	10-31-95	11.88	678.37
				02-28-96	10.96	
				04-25-96	10.08	
				06-03-96	7.05	
				07-15-96	7.68	
393541083001100	PK-48 NR CIRCLEVILLE OH	28.0	112OTSH	08-21-96	9.01	
				10-31-95	12.12	
				02-28-96	11.34	
				04-25-96	10.49	
				06-03-96	7.22	
393541083001200	PK-53 NR CIRCLEVILLE OH	35.6	112OTSH	07-15-96	7.89	
				08-21-96	9.25	
				10-31-95	11.47	
				02-28-96	10.63	
				04-25-96	9.71	
393542083000500	PK-52 NR CIRCLEVILLE OH	36.2	112OTSH	06-03-96	6.19	
				07-15-96	6.92	
				08-21-96	8.37	
				02-28-96	12.52	
				04-25-96	11.63	
393542083000700	PK-51 NR CIRCLEVILLE OH	35.5	112OTSH	06-03-96	8.36	
				07-15-96	8.98	
				08-21-96	10.29	
				02-28-96	12.32	
				04-25-96	11.46	
395854083440500	CL-132 NR SPRINGFIELD OH	27.3	112OTSH	06-03-96	8.11	1022.59
				07-15-96	8.86	
				08-21-96	10.26	
395858083440100	CL-133 NR SPRINGFIELD OH	22.3	112OTSH	04-24-96	12.51	1024.24

**EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
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GROUND-WATER LEVELS--Continued

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
395859083440200	CL-141 NR SPRINGFIELD OH	37.5	112OTSH	02-13-96	21.30	1030.70
				04-24-96	19.01	
				06-10-96	17.73	
				07-16-96	18.26	
				08-20-96	18.77	
395859083440300	CL-143 NR SPRINGFIELD OH	40.0	112OTSH	02-13-96	20.09	1029.45
				04-24-96	17.77	
				06-10-96	16.51	
				07-16-96	17.02	
				08-20-96	17.54	
395859083440400	CL-142 NR SPRINGFIELD OH	35.9	112OTSH	02-13-96	20.61	1030.00
				04-24-96	18.31	
				06-10-96	17.04	
				07-16-96	17.53	
				08-20-96	18.06	
395859083440500	CL-140 NR SPRINGFIELD OH	36.7	112OTSH	11-07-95	20.96	1030.49
				02-13-96	21.15	
				04-24-96	18.85	
				06-10-96	17.58	
				07-16-96	18.07	
				08-20-96	18.60	
395859083440600	CL-137 NR SPRINGFIELD OH	38.0	112OTSH	11-07-95	21.71	1031.34
				02-13-96	21.95	
				04-24-96	19.67	
				06-10-96	18.37	
				07-16-96	18.88	
				08-20-96	19.40	
395859083440700	CL-138 NR SPRINGFIELD OH	28.5	112OTSH	11-07-95	21.99	1031.61
				12-15-95	22.52	
				02-13-96	22.23	
				04-24-96	19.92	
				06-10-96	18.61	
				07-16-96	19.14	
				08-20-96	19.65	
395859083440800	CL-139 NR SPRINGFIELD OH	36.9	112OTSH	02-13-96	21.53	1031.33
				04-24-96	19.26	
				06-10-96	17.95	
				07-16-96	18.44	
				08-20-96	18.98	
395901083440600	CL-135 NR SPRINGFIELD OH	37.2	112OTSH	11-07-95	19.76	1031.89
				02-13-96	19.51	
				04-24-96	18.28	
				06-10-96	16.91	
				07-16-96	17.59	
				08-20-96	17.98	
395901083440700	CL-136 NR SPRINGFIELD OH	37.5	112OTSH	02-13-96	19.78	1032.08
				04-24-96	18.61	
				06-10-96	17.18	
				07-16-96	17.87	
				08-20-96	18.32	
400947083480000	CH-44 NR URBANA OH	31.0	112OTSH	02-13-96	8.60	1029.71
				04-26-96	6.98	
				06-11-96	7.80	
				07-17-96	9.19	
				08-22-96	9.63	

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

## GROUND-WATER LEVELS--Continued

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
400948083475800	CH-46 NR URBANA OH	34.8	112OTSH	02-13-96 04-26-96 06-11-96 07-17-96 08-22-96	7.73 5.94 6.70 8.11 9.52	1028.56
400948083480000	CH-45 NR URBANA OH	34.4	112OTSH	02-13-96 04-26-96 06-11-96 07-17-96 08-22-96	8.35 6.54 7.33 8.72 9.16	1029.26
400948083480100	CH-43 NR URBANA OH	32.2	112OTSH	02-13-96 04-26-96 06-11-96 07-17-96 08-22-96	8.59 6.76 7.58 8.99 9.41	1029.48
400948083480200	CH-41 NR URBANA OH	34.3	112OTSH	11-08-95 02-13-96 04-26-96 06-11-96 07-17-96 08-22-96	9.97 9.00 7.19 7.99 9.42 9.85	1029.98
400949083480100	CH-42 NR URBANA OH	28.7	112OTSH	11-08-95 12-15-95 02-13-96 04-26-96 06-11-96 07-17-96 08-22-96	9.89 9.90 8.96 7.15 7.93 9.37 9.79	1029.89
400950083480600	CH-38 NR URBANA OH	19.2	112OTSH	02-13-96 05-02-96 06-11-96 07-17-96 08-22-96	6.19 3.24 5.18 6.64 7.12	1027.30
400952083480800	CH-40 NR URBANA OH	34.7	112OTSH	11-08-95 02-13-96 05-02-96 06-11-96 07-17-96 08-22-96	7.92 6.88 4.06 5.93 7.32 7.77	1028.95
403635082152100	AS-48 NR LOUDONVILLE OH	16.0	111ALVM	10-11-95	5.66	931.00
403635082152200	AS-47 NR LOUDONVILLE OH	11.2	111ALVM	10-11-95	5.54	930.99
403635082152300	AS-45 NR LOUDONVILLE OH	15.7	111ALVM	10-11-95	5.11	931.74
403635082152400	AS-46 NR LOUDONVILLE OH	11.6	111ALVM	10-11-95	5.00	931.19
403635082152500	AS-44 NR LOUDONVILLE OH	18.0	111ALVM	10-11-95	4.92	931.50
403635082152700	AS-43 NR LOUDONVILLE OH	16.2	111ALVM	10-11-95	4.33	933.40
403635082152800	AS-8 NR LOUDONVILLE OH	16.2	111ALVM	10-11-95	4.10	933.24

**EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
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GROUND-WATER LEVELS--Continued

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
403922082325900	R-19 NR LEXINGTON OH	30.0	112OTSH	10-18-95	13.05	1164.90
				01-18-96	12.33	
				02-15-96	11.63	
				04-09-96	10.90	
				06-04-96	10.37	
				07-22-96	12.30	
				08-27-96	12.99	
403922082330000	R-20 NR LEXINGTON OH	34.2	112OTSH	10-18-95	9.77	1161.26
				01-18-96	8.90	
				02-15-96	8.43	
				04-09-96	7.62	
				06-04-96	7.25	
				07-22-96	9.10	
				08-27-96	9.70	
403923082325400	R-21 NR LEXINGTON OH	25.0	112OTSH	10-18-95	17.11	1185.19
				10-25-95	17.08	
				01-18-96	9.61	
				02-15-96	14.45	
				04-09-96	13.35	
				05-07-96	5.65	
				06-04-96	13.40	
				07-22-96	16.34	
403923082325500	R-16 NR LEXINGTON OH	18.9	112OTSH	10-18-95	16.44	1168.37
				01-18-96	15.44	
				02-15-96	13.95	
				04-09-96	13.08	
				06-04-96	12.82	
				07-22-96	15.73	
				08-27-96	16.40	
403923082325600	R-15 NR LEXINGTON OH	23.0	112OTSH	10-18-95	16.66	1168.39
				10-25-95	17.53	
				01-18-96	13.84	
				02-15-96	12.89	
				04-09-96	12.37	
				05-07-96	10.27	
				06-04-96	13.36	
				07-22-96	15.98	
403923082325700	R-18 NR LEXINGTON OH	23.0	112OTSH	10-18-95	14.97	1167.10
				01-18-96	14.30	
				02-15-96	13.43	
				04-09-96	12.61	
				05-07-96	10.01	
				06-04-96	12.11	
				07-22-96	14.19	
				08-27-96	14.88	
403923082325800	R-12 NR LEXINGTON OH	22.0	112OTSH	10-18-95	15.12	1167.02
				01-18-96	14.37	
				02-15-96	13.60	
				04-09-96	12.79	
				06-04-96	12.27	
				07-22-96	14.32	
				08-27-96	15.05	

**EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
UNCONSOLIDATED AQUIFERS IN OHIO**

GROUND-WATER LEVELS--Continued

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
403923082325900	R-17 NR LEXINGTON OH	23.2	112OTSH	10-18-95	14.61	1166.89
				01-18-96	13.91	
				02-15-96	13.05	
				04-09-96	12.23	
				06-04-96	11.71	
				07-22-96	13.82	
				08-27-96	14.50	
403923082330000	R-13 NR LEXINGTON, OH	30	112OTSH	10-18-95	10.89	1162.27
				01-18-96	10.03	
				02-15-96	9.66	
				04-09-96	8.99	
				06-04-96	8.47	
				07-22-96	10.17	
				08-27-96	10.84	
403925082325600	R-14 NR LEXINGTON OH	30	112OTSH	10-18-95	19.89	1185.01
				01-18-96	12.45	
				02-15-96	17.28	
				04-09-96	16.16	
				06-04-96	16.19	
				07-22-96	19.13	
				08-27-96	19.65	
411135081172600	PO-113 NR RAVENNA OH	9.2	112OTSH	01-16-96	0.70	1061.12
				03-05-96	-0.10	
				04-11-96	0.46	
411136081172400	PO-122 NR RAVENNA OH	24	112OTSH	10-20-95	5.27	1065.22
				01-16-96	4.31	
				03-05-96	2.86	
				04-11-96	3.43	
				06-06-96	3.54	
				07-26-96	4.78	
				09-11-96	4.80	
411136081172500	PO-119 NR RAVENNA OH	11.0	112OTSH	10-20-95	5.80	1064.91
				01-16-96	4.32	
				03-05-96	2.29	
				04-11-96	3.04	
				06-06-96	3.17	
				07-26-96	4.69	
				09-11-96	4.65	
411136081172600	PO-120 NR RAVENNA OH	10.4	112OTSH	10-20-95	4.46	1063.89
				01-16-96	3.40	
				03-05-96	0.93	
				04-11-96	3.14	
				06-06-96	2.84	
411137081172100	PO-114 NR RAVENNA OH	12.3	112OTSH	10-20-95	4.47	1064.40
				10-27-95	5.15	
				01-16-96	4.08	
				03-05-96	0.55	
				04-11-96	1.25	
				05-09-96	0.77	
				06-06-96	1.52	
				07-26-96	3.17	
				09-11-96	3.68	



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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## GROUND-WATER LEVELS--Continued

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
411137081172300	PO-118 NR RAVENNA OH	19.0	112OTSH	10-20-95	7.15	1067.14
				01-16-96	6.17	
				03-05-96	4.64	
				04-11-96	5.24	
				06-06-96	5.39	
				07-26-96	6.63	
				09-11-96	6.63	
411137081172400	PO-117 NR RAVENNA OH	18.5	112OTSH	10-20-95	6.85	1066.86
				01-16-96	5.88	
				03-05-96	4.35	
				04-11-96	4.96	
				05-09-96	4.29	
				06-06-96	5.11	
				07-26-96	6.34	
411137081172500	PO-112 NR RAVENNA OH	8.5	112OTSH	10-20-95	4.48	1064.50
				01-16-96	3.44	
				03-05-96	1.85	
				04-11-96	2.63	
				06-06-96	2.74	
				07-26-96	3.95	
				09-11-96	4.00	
411138081172100	PO-111 NR RAVENNA OH	10.0	112OTSH	10-20-95	3.68	1069.92
				01-16-96	2.38	
				03-05-96	0.45	
				04-11-96	0.85	
				06-06-96	1.04	
				07-26-96	2.60	
				09-11-96	3.02	
411138081172400	PO-115 NR RAVENNA OH	17.5	112OTSH	10-20-95	8.56	1068.59
				10-27-95	8.62	
				01-16-96	7.61	
				03-05-96	6.06	
				04-11-96	6.67	
				05-09-96	5.94	
				06-06-96	6.81	
411138081172500	PO-116 NR RAVENNA OH	17.5	112OTSH	10-20-95	8.41	1068.39
				01-16-96	7.44	
				03-05-96	5.93	
				04-11-96	6.50	
				06-06-96	6.65	
				07-26-96	7.90	
				09-11-96	7.92	
411138081172600	PO-121 NR RAVENNA OH	18.4	112OTSH	10-20-95	8.26	1068.24
				01-16-96	7.29	
				03-05-96	5.77	
				04-11-96	6.34	
				06-06-96	6.50	
				07-26-96	7.75	
				09-11-96	7.81	

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

## GROUND-WATER LEVELS--Continued

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
413546083480900	LU-28 NR HOLLAND OH	28.2	112LAKE	11-01-95	7.57	676.61
				12-14-95	6.98	
				03-12-96	6.73	
				04-17-96	6.08	
				06-12-96	5.64	
				07-24-96	6.19	
				08-23-96	6.89	
413547083481000	LU-26 NR HOLLAND OH	29.6	112LAKE	11-01-95	7.02	676.75
				12-14-95	6.47	
				03-12-96	6.19	
				04-17-96	5.54	
				06-12-96	5.03	
				07-24-96	5.66	
				08-23-96	6.37	
413547083481100	LU-27 NR HOLLAND OH	28.4	112LAKE	11-01-95	6.84	676.39
				12-14-95	6.27	
				03-12-96	5.99	
				04-17-96	5.35	
				06-12-96	4.87	
				07-24-96	5.46	
				08-23-96	6.18	
413547083481200	LU-25 NR HOLLAND OH	29.4	112LAKE	11-01-95	6.97	676.68
				12-14-95	6.44	
				03-12-96	6.13	
				04-17-96	5.49	
				06-12-96	4.97	
				07-24-96	5.62	
				08-23-96	6.31	
413547083481300	LU-22 NR HOLLAND OH	28.3	112LAKE	11-01-95	7.18	677.08
				12-14-95	6.62	
				03-12-96	6.45	
				04-17-96	5.69	
				06-12-96	6.02	
				07-24-96	5.93	
				08-23-96	6.50	
413547083481400	LU-23 NR HOLLAND OH	29.4	112LAKE	11-01-95	7.20	676.97
				12-15-95	6.67	
				03-12-96	6.35	
				04-17-96	5.72	
				06-12-96	5.17	
				07-24-96	5.83	
				08-23-96	6.53	
413547083481500	LU-24 NR HOLLAND OH	18.7	112LAKE	11-01-95	7.45	677.21
				12-15-95	6.92	
				03-12-96	6.59	
				04-17-96	5.93	
				06-12-96	5.41	
				07-24-96	6.08	
				08-23-96	6.78	
413548083480400	LU-17 NR HOLLAND OH	29.2	112LAKE	11-02-95	7.46	676.23
				12-14-95	6.90	
				03-12-96	6.60	
				04-17-96	6.03	
				06-12-96	5.61	
				07-24-96	6.20	
				08-23-96	6.91	

**EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
UNCONSOLIDATED AQUIFERS IN OHIO**

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GROUND-WATER LEVELS--Continued

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
413549083481500	LU-21 NR HOLLAND OH	29.1	112LAKE	11-01-95	7.51	677.07
				12-14-95	7.37	
				03-12-96	5.90	
				04-17-96	5.29	
				06-12-96	4.86	
				07-24-96	5.48	
				08-23-96	6.09	
413551083481200	LU-20 NR HOLLAND OH	31.0	112LAKE	11-01-95	5.91	676.13
				12-15-95	5.41	
				03-12-96	5.02	
				04-17-96	4.46	
				06-12-96	3.98	
				07-24-96	4.81	
				08-23-96	5.42	
413553083480600	LU-18 NR HOLLAND OH	29.0	112LAKE	11-02-95	5.88	675.75
				12-14-95	5.42	
				03-12-96	4.00	
				04-17-96	4.54	
				06-12-96	4.09	
				07-24-96	5.13	
				08-23-96	5.72	
413553083480900	LU-19 NR HOLLAND OH	31.3	112LAKE	11-02-95	5.38	675.75
				12-14-95	4.90	
				03-12-96	4.49	
				04-17-96	4.02	
				06-12-96	3.56	
				07-24-96	4.54	
				08-23-96	5.10	
415305080414200	AB-139 NR KINGSVILLE OH	20.2	111TRRC	10-19-95	11.98	777.51
				10-26-95	12.51	
				01-17-96	10.28	
				03-06-96	7.16	
				04-10-96	9.42	
				05-08-96	6.74	
				06-05-96	10.25	
				07-25-96	9.97	
				09-12-96	10.36	
415305080414300	AB-132 NR KINGSVILLE OH	14.5	111TRRC	10-19-95	12.89	778.47
				01-17-96	11.21	
				03-06-96	7.97	
				04-10-96	10.27	
				06-05-96	11.91	
				07-25-96	10.84	
				09-12-96	11.26	
415307080414200	AB-133 NR KINGSVILLE OH	20.0	111TRRC	10-19-95	9.26	772.10
				10-26-95	8.87	
				01-17-96	6.31	
				03-06-96	4.75	
				04-10-96	6.11	
				05-08-96	5.20	
				06-05-96	7.00	
				07-25-96	7.14	
				09-12-96	6.93	

**EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
UNCONSOLIDATED AQUIFERS IN OHIO**

GROUND-WATER LEVELS--Continued

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
415307080414300	AB-129 NR KINGSVILLE OH	18.0	111TRRC	10-19-95	9.55	772.50
				01-17-96	6.52	
				03-06-96	5.18	
				04-10-96	6.49	
				06-05-96	7.36	
				07-25-96	7.52	
				09-12-96	7.16	
415307080414400	AB-130 NR KINGSVILLE OH	10.0	111TRRC	10-19-95	9.69	770.95
				01-17-96	6.46	
				03-06-96	5.26	
				04-10-96	5.72	
				06-05-96	6.45	
				07-25-96	6.73	
				09-12-96	7.18	
415307080414500	AB-134 NR KINGSVILLE OH	17.4	111TRRC	10-19-95	9.28	772.10
				01-17-96	6.24	
				03-06-96	4.72	
				04-10-96	6.11	
				06-05-96	6.97	
				07-25-96	7.14	
				09-12-96	6.85	
415307080414600	AB-140 NR KINGSVILLE OH	20.8	111TRRC	10-19-95	9.41	772.22
				01-17-96	6.41	
				03-06-96	4.90	
				04-10-96	6.26	
				06-05-96	7.12	
				07-25-96	7.29	
				09-12-96	7.04	
415308080414300	AB-135 NR KINGSVILLE OH	19.5	111TRRC	10-19-95	9.66	771.36
				01-17-96	6.77	
				03-06-96	5.42	
				04-10-96	6.24	
				06-05-96	6.96	
				07-25-96	7.26	
				09-12-96	7.45	
415308080414400	AB-131 NR KINGSVILLE OH	21	111TRRC	10-19-95	7.55	765.00
				01-17-96	4.81	
				03-06-96	4.11	
				04-10-96	4.84	
				06-05-96	4.98	
				07-25-96	5.22	
				09-12-96	4.96	
415309080414300	AB-136 NR KINGSVILLE OH	20.1	111TRRC	10-19-95	8.16	767.66
				01-17-96	5.51	
				03-06-96	4.67	
				04-10-96	5.30	
				06-05-96	5.69	
				07-25-96	5.95	
				09-12-96	5.99	
415309080414400	AB-138 NR KINGSVILLE OH	19.5	111TRRC	10-19-95	8.41	767.87
				01-17-96	5.76	
				03-06-96	4.93	
				04-10-96	5.55	
				05-08-96	4.90	
				06-05-96	5.91	
				07-25-96	6.21	
				09-12-96	6.24	

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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## GROUND-WATER LEVELS--Continued

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FEET)	ALTITUDE OF LAND SURFACE (FEET)
415310080414400	AB-137 NR KINGSVILLE OH	19.5	111TRRC	10-19-95	6.30	763.76
				01-17-96	3.55	
				03-06-96	2.85	
				04-10-96	3.60	
				06-05-96	3.75	
				07-25-96	3.99	
				09-12-96	3.74	

## AQUIFER CODE (Geologic Unit)

111ALVM - Alluvium, Holocene Epoch  
111TRRC - Terrace Deposits, Holocene Epoch  
112LAKE - Lake Deposits, Pleistocene Epoch  
112OTSH - Outwash, Pleistocene Epoch



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

## GROUND-WATER RECORDS

415307080414500. Local number, AB-134.

LOCATION.--Lat 41°53'07" Long 80°41'45", Hydrologic Unit 04120101, along State Route 84 near Kingsville, OH.  
Owner.--USGS-Ohio State University (OARDC).

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 17.4 ft. Cased with Sch 40 PVC to 7.5 ft; .010-in. screen from 7.5 to 17.4 ft.

INSTRUMENTATION - Data logger--60-minute record. Precipitation data collected with a propane-heated, tipping-bucket rain gage. Also collected: water level, air temperature, soil temperature, water temperature, and specific conductance. Conductivity/water temperature probe was set at 10.0 ft below land surface; probe removed July 1992.

DATUM.--Elevation of land-surface datum is 772.10 ft above sea level.  
Measuring point: shelter shelf 3.93 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality. Water-quality data for nearby wells are available in preceding tables.

PERIOD OF RECORD.--February 1991 to current year.

### PERIOD OF DAILY RECORD.--

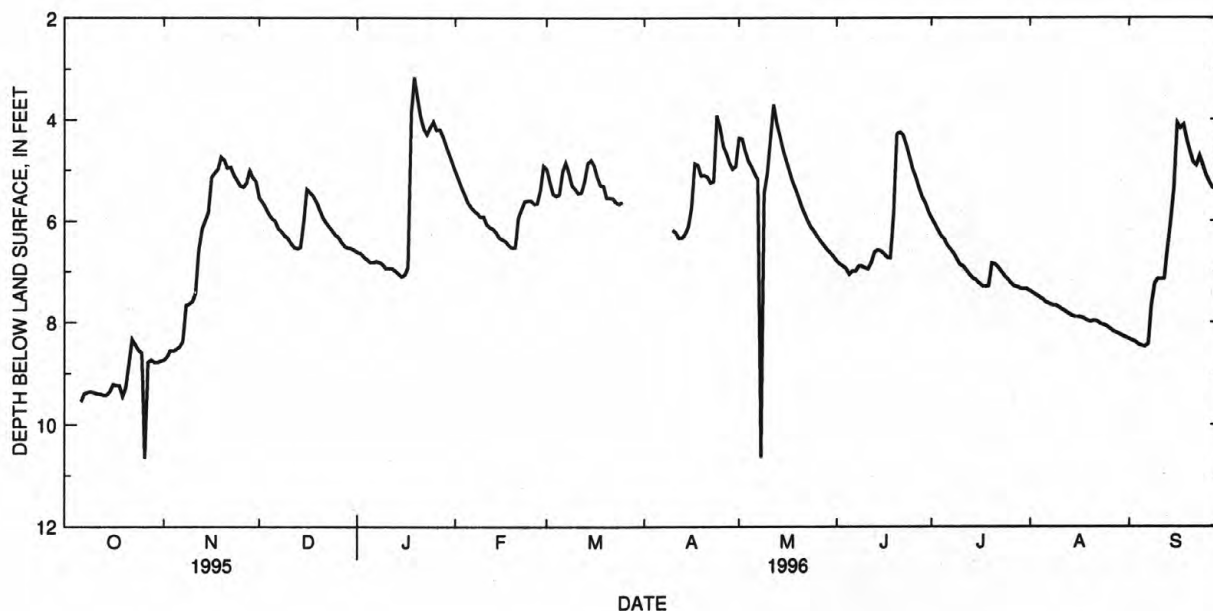
WATER LEVEL: February 1991 to current year  
SPECIFIC CONDUCTANCE: February 1991 to July 1992  
AIR TEMPERATURE: February 1991 to current year  
WATER TEMPERATURE: February 1991 to July 1992  
SOIL TEMPERATURE: July 1992 to current year  
PRECIPITATION: February 1991 to current year

### EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER LEVEL: Maximum daily low, 10.66 ft below land-surface datum, October 26, 1995 (this represents an artificial low due to pumping of well AB-133, 4 ft away); maximum daily high, 2.11 ft below land-surface datum, March 23, 1993.  
SPECIFIC CONDUCTANCE: Maximum, 2560 microsiemens March 27, 1991; minimum, 948 microsiemens August 8, 1991.  
AIR TEMPERATURE: Maximum, 33.1°C July 13, 1995; minimum, -29.6°C January 19, 1994.  
WATER TEMPERATURE: Maximum, 15.5°C many days in 1991; minimum, 6.6°C March 26-28, April 1-7 1992.  
SOIL TEMPERATURE: Maximum, 31.8°C July 11, 1993; minimum, -3.1°C February 5, 1996.

### EXTREMES FOR CURRENT YEAR.--

WATER LEVEL: Maximum daily low, 10.66 ft below land-surface datum, October 26, 1995 (this represents an artificial low due to pumping of well AB-133, 4 ft away); maximum daily high, 2.63 ft below land-surface datum, January 19, 1996.  
AIR TEMPERATURE: Maximum, 31.4°C May 20, 1996; minimum, -25.0°C January 4, 1996.  
SOIL TEMPERATURE: Maximum, 26.3°C June 30, July 1, 1996; minimum, -3.1°C February 5, 1996.



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DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

415307080414500 AB-134 NR KINGSVILLE OH--Continued

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	18.7	8.5	14.3	10.6	1.2	5.7	1.2	-2.1	.0
2	---	---	---	20.5	12.7	16.9	3.5	.1	1.3	-2.1	-7.3	-4.8
3	---	---	---	12.7	-1.4	4.1	9.9	2.4	5.6	-6.9	-22.5	-10.6
4	---	---	---	.9	-2.0	-1.0	3.3	-3.2	1.0	-7.2	-25.0	-14.5
5	---	---	---	1.5	-2.9	-1.1	7.3	-2.1	2.7	-7.9	-15.6	-10.3
6	21.3	13.6	16.6	7.0	-4.6	1.2	.6	-3.8	-.9	-8.2	-23.8	-13.7
7	14.9	9.3	12.8	6.8	2.9	5.3	-.5	-4.7	-2.6	-8.1	-10.1	-9.2
8	13.2	8.6	11.0	3.7	-1.5	.6	-1.0	-7.4	-3.9	-7.1	-12.0	-9.0
9	18.9	5.2	10.8	1.2	-2.6	-1.0	-1.3	-14.7	-7.6	-4.3	-9.8	-7.1
10	22.9	6.5	14.4	12.9	1.2	7.3	-9.9	-14.8	-12.8	-4.6	-21.2	-10.3
11	22.6	5.9	13.1	13.1	-.2	7.2	-9.0	-11.0	-10.0	-7.9	-23.4	-13.4
12	25.3	11.4	17.0	-.2	-2.7	-1.7	-8.0	-11.9	-9.0	-4.6	-10.0	-7.2
13	25.5	11.0	17.8	1.6	-2.9	-.1	-2.6	-13.5	-6.8	-1.3	-8.4	-4.0
14	19.4	8.1	14.3	2.4	1.4	1.9	9.6	-2.6	3.7	7.1	-1.5	1.3
15	9.8	5.4	7.8	1.6	-1.2	.1	2.5	-.1	1.4	-1.3	-12.5	-8.4
16	11.3	7.4	9.2	1.8	-2.7	-.9	.5	-2.9	-1.4	7.5	-13.5	-.3
17	16.3	.0	9.9	2.6	-2.8	.1	1.1	-3.2	-1.6	10.1	7.0	8.2
18	20.6	8.7	13.7	3.7	-.4	2.1	-.2	-4.7	-1.9	15.5	7.9	12.2
19	23.2	8.0	16.3	4.2	.6	3.0	-1.7	-7.6	-5.0	12.7	-10.4	-4.5
20	22.9	7.9	14.5	8.1	.5	3.7	-4.9	-8.9	-6.9	-6.8	-12.0	-9.6
21	8.7	4.8	6.7	5.3	-1.7	.8	-4.4	-7.5	-5.5	-2.2	-9.0	-5.9
22	16.0	3.4	9.2	.2	-3.2	-1.4	-2.2	-6.2	-4.0	5.6	-4.6	-.9
23	21.8	8.6	14.7	2.1	-2.5	-.1	-2.3	-5.6	-4.1	3.5	.2	2.0
24	16.8	8.4	12.4	-1.2	-9.5	-3.5	-2.7	-5.6	-3.9	6.4	-6.8	.1
25	11.1	3.3	8.1	3.0	-5.8	-.4	-2.7	-5.8	-4.5	-3.2	-7.7	-5.8
26	14.0	2.2	8.0	6.3	-.9	2.7	-5.5	-7.7	-6.6	6.1	-3.3	1.5
27	15.0	9.7	12.9	14.4	3.4	8.8	-4.0	-8.0	-5.4	8.5	-5.8	-1.1
28	10.8	8.2	9.3	14.4	-.6	1.7	-2.6	-5.8	-4.0	-3.4	-9.2	-5.5
29	8.2	3.8	6.3	.2	-1.5	-1.0	-1.0	-9.3	-5.7	4.4	-5.7	-1.4
30	7.3	5.1	6.5	2.8	-1.8	.3	-.5	-9.2	-4.8	-4.4	-11.0	-7.8
31	10.0	4.8	7.7	---	---	---	3.2	-2.9	.4	-11.0	-17.5	-13.5
MONTH	25.5	.0	11.6	20.5	-9.5	2.3	10.6	-14.8	-3.1	15.5	-25.0	-4.9

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	-9.2	-17.2	-12.5	-.8	-9.1	-4.5	3.2	-1.6	.6	11.6	4.6	7.7
2	-11.3	-16.6	-14.8	2.3	-5.7	-1.4	4.4	-3.7	.3	16.0	-1.0	9.6
3	-15.2	-23.0	-18.1	-5.7	-12.4	-9.4	10.9	-.3	3.8	16.2	9.1	12.2
4	-14.7	-23.4	-18.6	-1.3	-11.0	-5.8	3.2	-2.4	-.3	15.6	7.1	10.4
5	-8.4	-19.0	-13.8	5.5	-3.2	.1	2.0	-2.3	-.6	12.9	6.7	8.3
6	-4.6	-19.0	-9.7	-2.3	-8.6	-4.4	2.1	-7.5	-1.3	11.5	5.6	8.3
7	3.1	-4.6	-.3	-8.2	-12.8	-10.2	1.4	-6.4	-1.6	13.5	5.9	9.6
8	7.5	1.4	4.2	-11.1	-13.5	-12.4	3.5	-9.2	-2.1	15.5	8.1	12.0
9	1.6	-2.1	.6	-8.5	-16.1	-12.1	2.9	-8.1	-2.0	23.6	8.1	15.1
10	11.5	.0	5.8	-.9	-14.8	-8.4	7.7	-1.4	2.7	26.0	9.1	18.9
11	8.6	-6.2	-.9	4.3	-9.9	-3.1	20.8	-.9	11.6	9.1	3.2	5.5
12	-6.2	-11.4	-9.8	7.8	-8.5	-.8	20.3	3.1	13.4	7.9	3.1	5.0
13	-4.1	-12.8	-7.7	11.9	-4.6	3.7	16.5	2.4	7.4	9.9	-.6	5.1
14	-1.8	-9.1	-4.2	16.6	3.6	9.7	5.2	-.4	1.7	13.5	.2	7.6
15	-2.8	-10.9	-7.7	5.6	-2.8	2.1	16.9	.8	8.4	14.2	7.4	10.5
16	-9.0	-18.8	-12.3	1.0	-6.1	-2.5	9.1	1.1	2.9	16.7	8.2	11.1
17	-3.0	-17.9	-8.9	9.0	-3.9	2.1	8.3	.7	3.6	22.6	11.1	17.1
18	-8.1	-17.6	-12.3	6.0	-3.0	1.6	23.2	1.3	13.2	30.0	18.4	24.1
19	4.3	-12.4	-2.4	7.5	-2.4	2.4	21.1	13.2	17.8	31.2	20.8	25.8
20	6.8	2.6	5.1	1.1	-1.2	-.3	22.8	11.6	18.0	31.4	18.9	25.7
21	7.9	1.1	4.9	-1.2	-6.8	-4.8	13.4	3.9	10.0	24.1	11.3	17.1
22	1.4	-.2	.5	-1.7	-6.8	-4.0	23.5	5.5	13.2	20.8	9.4	15.4
23	12.0	-1.3	5.7	.7	-6.8	-2.2	13.9	1.0	4.8	23.5	11.2	15.9
24	12.0	3.2	6.4	11.1	-7.1	3.4	15.0	-2.1	7.3	14.3	6.2	11.7
25	10.0	-.8	6.1	15.5	-2.2	7.5	22.1	9.6	15.9	16.3	3.2	11.1
26	8.0	-.9	3.4	-2.2	-8.8	-4.0	15.5	1.8	10.1	14.0	10.0	11.8
27	12.3	-.8	6.5	-1.9	-9.9	-6.1	10.2	-2.2	5.3	15.4	8.2	12.5
28	10.0	-6.6	-1.3	6.1	-6.6	.9	12.3	1.3	8.2	14.6	8.8	11.8
29	-6.6	-9.3	-7.7	7.1	-2.9	2.4	14.6	5.1	8.4	12.0	2.4	9.6
30	---	---	---	8.5	-3.9	3.5	14.9	4.9	8.2	17.9	-.2	9.4
31	---	---	---	17.0	-3.2	6.1	---	---	---	19.8	1.9	11.9
MONTH	12.3	-23.4	-3.9	17.0	-16.1	-1.7	23.5	-9.2	6.3	31.4	-1.0	12.5

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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415307080414500 AB-134 NR KINGSVILLE OH--Continued

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	25.1	5.3	16.4	26.3	14.7	21.5	22.2	14.7	18.0	25.2	13.2	19.1
2	21.1	13.5	17.4	26.1	13.7	20.4	22.7	13.2	18.1	25.8	11.7	18.5
3	22.3	13.9	17.4	18.2	15.3	16.4	25.7	12.7	18.9	26.1	11.4	18.5
4	17.3	11.8	13.8	21.3	9.9	17.4	26.7	13.5	20.4	26.2	14.8	20.3
5	18.5	10.7	14.3	23.7	7.3	16.8	28.6	18.0	22.7	25.6	15.3	20.9
6	21.3	11.0	16.4	26.8	13.7	20.5	30.8	18.2	24.3	24.1	19.0	21.7
7	23.8	17.4	19.7	28.7	16.4	22.8	31.0	21.7	26.1	20.8	18.5	19.9
8	21.2	14.2	18.4	26.3	16.0	21.0	29.5	18.4	24.0	23.8	15.0	19.4
9	25.7	14.0	18.3	19.6	13.5	17.2	22.8	17.2	20.1	22.7	15.0	19.5
10	27.2	16.9	21.6	19.4	8.4	15.4	22.3	11.2	17.6	22.2	14.7	19.2
11	26.3	15.3	18.7	23.7	8.0	16.4	22.2	11.4	16.7	25.5	14.2	19.4
12	21.8	15.0	17.8	27.7	12.0	21.5	22.0	12.8	17.9	20.6	11.7	16.9
13	24.9	15.2	20.4	27.2	18.5	22.7	25.1	13.6	19.4	14.3	11.8	13.2
14	25.6	16.0	21.0	27.6	18.1	22.5	27.2	14.9	21.3	13.4	9.9	11.8
15	26.0	13.0	20.0	23.6	17.9	20.0	28.5	17.6	21.1	13.7	11.2	12.6
16	26.5	11.2	20.0	26.7	16.8	22.2	22.3	15.2	19.0	17.0	11.8	14.7
17	23.9	15.4	19.1	27.8	17.3	22.7	23.3	12.7	18.4	15.5	14.2	14.8
18	20.9	15.8	18.2	26.1	19.9	23.0	24.5	11.8	18.1	20.7	14.8	17.1
19	27.3	18.7	21.8	25.3	16.7	21.4	26.8	13.5	20.5	18.9	6.5	13.9
20	23.0	17.9	20.1	20.0	13.5	16.8	30.1	18.6	22.8	20.6	7.0	13.2
21	23.9	17.0	20.2	23.1	9.5	17.4	24.9	14.5	21.1	23.7	9.5	16.5
22	25.9	16.2	21.3	24.3	15.5	19.8	29.6	14.0	21.7	18.0	13.0	15.4
23	21.2	11.3	16.2	24.9	15.0	19.6	25.2	19.9	22.5	16.4	8.6	13.6
24	25.9	13.7	20.8	26.5	16.4	20.5	23.3	15.4	20.0	16.7	10.2	13.8
25	20.2	10.9	16.8	24.4	17.0	20.4	25.8	13.7	19.6	15.6	7.3	12.7
26	22.2	8.4	16.0	22.7	15.2	19.3	26.8	14.9	20.3	18.5	8.0	14.0
27	25.5	9.8	18.1	21.4	11.5	17.9	26.3	16.5	20.6	20.2	16.1	18.5
28	26.7	16.7	21.6	24.4	10.8	18.2	23.8	13.9	19.4	19.4	11.0	13.5
29	29.7	18.5	24.8	26.0	16.2	20.5	23.2	12.3	17.6	19.4	8.5	14.0
30	29.0	20.9	26.3	24.0	17.3	19.9	24.0	11.3	17.2	20.8	5.4	13.8
31	---	---	---	21.5	15.3	18.8	24.6	10.2	17.6	---	---	---
MONTH	29.7	5.3	19.1	28.7	7.3	19.7	31.0	10.2	20.1	26.2	5.4	16.3
YEAR	31.4	-25.0	7.8									

TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	---	---	11.7	9.2	4.4	2.6	1.2	1.1	.0	-.2	.8	.5
2	---	---	13.8	11.6	4.0	3.0	1.1	1.1	-.2	-.5	.5	.4
3	---	---	13.5	8.6	4.8	2.9	1.1	1.0	-.5	-1.4	.4	.4
4	---	---	8.6	6.7	4.5	3.1	1.0	1.0	-1.4	-2.3	.4	.2
5	---	---	6.7	5.7	3.5	2.4	1.0	1.0	-2.3	-3.1	.3	.2
6	16.9	15.6	5.7	4.7	3.2	1.9	1.0	1.0	-1.7	-2.5	.2	.2
7	16.5	15.0	6.1	5.0	1.9	1.4	1.0	.9	-1.0	-1.8	.2	.2
8	15.1	14.0	5.9	3.9	1.4	1.1	.9	.8	-.2	-1.0	.2	.2
9	15.3	12.6	3.9	3.2	1.1	1.1	.8	.7	-.2	-.2	.2	.1
10	15.6	12.8	5.8	3.1	1.1	.8	.7	.7	-.2	-.2	.2	.1
11	16.0	13.2	7.7	5.8	.8	.7	.7	.7	-.2	-.2	.1	.1
12	16.4	13.6	5.8	3.6	.7	.6	.7	.7	-.2	-.2	.1	.1
13	16.9	14.3	3.7	3.4	.6	.5	.7	.7	-.2	-.2	.1	.1
14	16.1	14.6	4.0	3.7	.6	.5	.7	.7	-.2	-.2	.9	.1
15	14.6	11.9	3.9	2.9	1.6	.6	.8	.7	-.2	-.2	3.8	.5
16	11.9	10.7	2.9	2.7	1.5	1.0	.8	.6	-.2	-.2	2.4	.8
17	11.9	9.7	2.7	2.7	1.1	1.0	2.4	.5	-.2	-.2	3.4	.7
18	12.8	10.5	3.2	2.6	1.0	.9	5.3	2.4	-.2	-.2	3.4	1.6
19	14.0	11.8	4.4	3.2	.9	.9	5.8	2.1	-.2	-.2	3.1	1.4
20	14.4	12.6	4.4	3.0	.9	.9	2.1	1.3	-.2	-.2	2.5	1.5
21	13.0	10.8	3.9	3.0	.9	.9	1.3	1.0	-.2	-.2	1.5	1.2
22	11.6	9.6	3.0	2.8	.9	.9	1.0	.8	-.1	-.2	1.2	1.0
23	12.5	9.8	2.8	2.6	1.0	.9	1.5	.8	.7	-.2	1.0	1.0
24	12.2	11.1	2.6	2.5	1.0	.9	2.5	1.4	1.8	.5	1.0	.7
25	11.2	10.2	2.5	2.3	1.1	1.0	1.4	.9	3.1	.5	4.1	.7
26	10.2	8.6	2.3	2.1	1.1	1.1	1.2	.8	3.0	.9	2.5	1.3
27	11.1	9.6	5.0	2.1	1.1	1.1	2.4	1.2	4.4	1.3	1.3	.7
28	11.1	10.1	5.4	3.8	1.2	1.1	1.2	.7	4.6	1.6	2.5	.6
29	10.1	8.8	3.8	3.0	1.2	1.1	.7	.5	1.6	.8	5.2	1.8
30	8.8	8.4	3.1	2.4	1.2	1.1	.5	.2	---	---	5.3	2.1
31	9.2	8.4	---	---	1.2	1.1	.2	.0	---	---	6.6	2.7
MONTH	16.9	8.4	13.8	2.1	4.8	.5	5.8	.0	4.6	-3.1	6.6	.1



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

415307080414500 AB-134 NR KINGSVILLE OH--Continued

TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	5.7	2.9	10.2	7.3	20.3	13.8	26.3	22.3	22.1	19.7	22.0	19.5
2	4.6	2.1	11.4	7.0	18.5	16.1	25.6	21.5	21.5	19.6	22.1	19.2
3	6.0	2.7	11.9	9.1	19.5	16.2	23.9	19.5	22.6	19.2	21.9	19.2
4	4.8	3.1	12.9	10.3	17.9	16.0	21.5	18.3	22.9	19.7	22.3	19.7
5	4.8	2.3	12.2	10.4	18.5	14.9	22.5	17.7	23.6	20.6	22.5	20.2
6	4.6	2.3	13.3	9.7	17.9	15.4	23.8	18.9	24.4	21.2	22.0	20.8
7	4.9	2.7	11.4	9.1	19.4	17.0	24.8	20.1	25.0	22.3	21.5	20.9
8	4.2	2.0	13.2	9.9	20.8	17.9	24.9	21.2	24.5	23.2	21.5	20.2
9	4.5	1.9	15.9	11.5	20.7	18.1	23.1	20.6	23.5	21.8	21.1	19.9
10	5.1	2.7	16.9	13.9	22.1	18.9	23.1	19.0	23.0	20.3	22.1	20.2
11	7.6	2.4	16.1	10.4	21.8	19.2	24.4	18.5	21.8	19.7	21.9	19.6
12	9.2	7.0	11.1	8.7	20.4	18.7	24.7	19.9	21.1	19.4	21.2	19.3
13	8.5	6.9	11.5	7.3	21.8	18.6	25.5	21.3	22.2	19.3	19.3	17.5
14	8.4	5.1	12.3	7.6	23.2	19.4	25.2	21.7	22.5	19.9	17.5	16.1
15	7.9	4.6	11.9	9.5	24.1	19.7	24.0	21.5	21.8	20.7	16.1	15.4
16	7.9	5.6	13.0	10.3	23.7	19.3	24.2	20.5	21.5	20.0	16.6	15.4
17	7.5	4.2	16.2	11.8	22.3	20.3	24.0	21.4	22.1	19.7	16.4	16.0
18	10.0	4.1	19.5	14.6	20.6	19.1	23.4	22.0	22.2	19.1	17.8	15.6
19	12.6	9.0	20.4	17.0	22.7	19.5	23.0	21.6	21.8	19.5	17.7	15.5
20	13.6	11.1	22.1	17.9	22.3	20.6	22.3	19.6	22.6	20.2	17.8	15.1
21	13.3	10.1	20.6	18.2	23.5	20.2	21.7	18.9	22.2	21.1	17.8	15.5
22	12.3	9.6	19.5	16.2	23.5	21.1	23.2	19.9	22.8	20.0	17.5	16.5
23	11.9	7.2	18.0	16.1	23.3	19.5	22.9	20.2	22.7	21.6	17.7	16.0
24	9.3	5.7	18.3	15.4	23.1	20.0	22.5	20.1	22.2	20.7	16.6	15.4
25	11.5	8.4	18.4	13.4	22.8	19.9	22.3	20.2	22.0	19.7	16.2	14.6
26	11.9	9.5	16.5	14.5	22.8	18.5	22.4	20.1	22.3	19.7	15.7	14.5
27	10.0	6.4	15.6	13.5	23.3	18.8	22.7	19.8	22.5	20.1	16.6	15.4
28	10.3	7.0	15.4	13.6	24.5	20.0	22.9	19.4	22.7	20.4	16.7	15.1
29	10.8	8.5	17.8	13.0	24.4	21.3	22.1	20.0	22.1	19.9	16.0	14.2
30	10.3	8.5	17.9	12.0	26.3	22.3	21.7	20.3	22.0	19.2	16.4	14.2
31	---	---	18.7	12.7	---	---	22.0	20.2	21.7	18.8	---	---
MONTH	13.6	1.9	22.1	7.0	26.3	13.8	26.3	17.7	25.0	18.8	22.5	14.2
YEAR	26.3	-3.1										

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	.00	.06	.02	.16	.00	.19	.21	.00	.00	.03	.00
2	---	.48	.00	.00	.23	.01	.00	.00	.21	.00	.00	.00
3	---	.00	.11	.00	.14	.00	.00	.21	.06	.25	.00	.00
4	---	.06	.00	.00	.19	.00	.05	.11	.85	.09	.00	.00
5	1.95	.03	.01	.00	.24	.46	.03	.18	.01	.04	.00	.00
6	.17	.04	.00	.00	.12	.00	.00	.01	.17	.00	.00	.25
7	.11	.80	.00	.00	.13	.00	.00	.00	.86	.01	.00	2.30
8	.01	.00	.00	.00	.27	.00	.00	.01	.02	.02	.63	.42
9	.00	.01	.00	.00	.08	.00	.01	1.00	.11	.00	.00	.28
10	.00	.63	.00	.00	.08	.00	.05	.75	.00	.00	.00	.00
11	.00	1.04	.00	.00	.13	.00	.00	.77	.80	.00	.00	.00
12	.00	.00	.00	.01	.10	.00	.46	.01	.23	.00	.00	1.15
13	.00	.03	.00	.00	.00	.01	.37	.00	.01	.00	.00	.92
14	.47	.33	.58	.02	.00	.00	.00	.00	.12	.02	.00	.51
15	.57	.22	.00	.00	.13	.00	.79	.08	.00	.03	.87	.98
16	.00	.08	.00	.01	.00	.00	.22	.00	.00	.03	.02	.00
17	.00	.07	.00	.21	.00	.00	.00	.00	.00	.02	.00	.59
18	.00	.17	.00	.02	.00	.00	.00	.00	2.55	.02	.00	.00
19	.00	.00	.00	.97	.04	.11	.02	.00	.68	.04	.00	.00
20	1.53	.00	.00	.15	.27	.03	.50	.00	.17	.01	.59	.00
21	.00	.02	.00	.00	.11	.00	.00	.33	.00	.02	.01	.07
22	.05	.00	.00	.01	.01	.02	.35	.00	.51	.02	.00	.98
23	.00	.00	.00	.35	.00	.01	1.48	.00	.00	.01	.01	.00
24	.00	.00	.00	.22	.04	.00	.01	.00	.28	.01	.00	.06
25	.00	.09	.00	.09	.00	.15	.02	.00	.00	.65	.00	.00
26	.00	.00	.00	.00	.00	.00	.17	.00	.00	.00	.00	.00
27	.22	.00	.00	.34	.87	.00	.00	.01	.00	.00	.00	.17
28	.21	.01	.00	.08	.01	.00	.04	.02	.00	.00	.00	1.67
29	.20	.00	.04	.02	.00	.00	.47	.00	.00	.43	.00	.00
30	.00	.00	.01	.12	---	.00	.67	.00	.00	.50	.00	.00
31	.13	---	.00	.24	---	.00	---	.00	---	.08	.00	---
TOTAL	5.62	4.11	0.81	2.88	3.35	0.80	5.90	3.70	7.64	2.30	2.16	10.35

WTR YR 1996 TOTAL 49.62



EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
UNCONSOLIDATED AQUIFERS IN OHIO

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GROUND-WATER RECORDS

415307080414600. Local number, AB-140.

LOCATION.--Lat 41°53'07" Long 80°41'46", Hydrologic Unit 04120101, along State Route 84 near Kingsville, OH.  
Owner.--USGS-Ohio State University (OARDC).

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 20.8 ft. Cased with Sch 40 PVC to 5.8 ft; .020-in. screen from 5.8 to 20.8 ft.

INSTRUMENTATION - Data logger--60-minute record. At this well there are 4 conductivity/water temperature probes at increasing depths within the well to better document vertical movement of high-conductivity water on an hourly basis. Conductance/water temperature probes are set at 8.3 (level 4), 12.3 (level 3), 16.3 (level 2), and 20.3 (level 1) ft below land surface.

DATUM.--Elevation of land-surface datum is 772.22 ft above sea level.  
Measuring point: top of PVC casing 1.70 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality. Water-quality data for nearby wells are available in preceding tables.

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

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: (FOUR LEVELS): July 1992 to current year  
WATER TEMPERATURE: (FOUR LEVELS): July 1992 to current year

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE:

LEVEL 1-Maximum, 3460 microsiemens October 28, 1993; minimum, 837 microsiemens January 30-31, 1995.  
LEVEL 2- Maximum, 3540 microsiemens October 26-27, 1995; minimum, 359 microsiemens January 18, 1996.  
LEVEL 3- Maximum, 3000 microsiemens October 27, 1995; minimum, 322 microsiemens March 13, 1995.  
LEVEL 4- Maximum, 2920 microsiemens November 12-13, 1995; minimum, 254 microsiemens October 21, 1995.

WATER TEMPERATURE:

LEVEL 1- Maximum, 12.3°C October 29-December 13, 1993; minimum, 7.2°C March 31, April 2-3, 1993.  
LEVEL 2- Maximum, 13.0°C many days October, November, 1992,1995; minimum, 6.7°C March 23, 1993, and 1994.  
LEVEL 3- Maximum, 14.8°C September 30, 1996; minimum, 5.7°C March 22, 1994.  
LEVEL 4- Maximum, 17.8°C August 12, 1994; minimum, 3.8°C March 23-24, 1993.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE:

LEVEL 1-Maximum, 3190 microsiemens October 27-28, 1995; minimum, 920 microsiemens February 10, 1996.  
LEVEL 2-Maximum, 3540 microsiemens October 26-27, 1995; minimum, 359 microsiemens January 18, 1996.  
LEVEL 3-Maximum, 3000 microsiemens October 27, 1995; minimum, 354 microsiemens January 18, 1996.  
LEVEL 4-Maximum, 2920 microsiemens November 12-13, 1995; minimum, 254 microsiemens October 21, 1995.

WATER TEMPERATURE:

LEVEL 1-Maximum, 12.3°C many days in October,November, 1995; minimum, 7.9°C March 30, 1996.  
LEVEL 2-Maximum, 13.0°C October 21-November 18, 1995; minimum, 7.0°C April 25, 1996.  
LEVEL 3-Maximum, 14.8°C September 30, 1996; minimum, 6.3°C April 17, 1996.  
LEVEL 4-Maximum, 16.4°C September 18, 1996; minimum, 5.3°C March 31, 1996.

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

415307080414600 AB-140 NR KINGSVILLE, OH--Continued

#1 (22.0' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	3160	3140	3150	1370	1290	1330	1080	1060	1070
2	---	---	---	3160	3140	3150	1290	1230	1260	1090	1080	1080
3	---	---	---	3140	3140	3140	1230	1180	1200	1100	1090	1100
4	---	---	---	3140	3130	3140	1180	1150	1160	1120	1100	1110
5	---	---	---	3140	3130	3130	1150	1120	1130	1130	1120	1120
6	2150	2140	2140	3130	3120	3120	1120	1100	1110	1140	1120	1130
7	2170	2140	2150	3120	3110	3110	1100	1080	1090	1150	1140	1150
8	2200	2160	2180	3110	3110	3110	1090	1070	1080	1170	1150	1160
9	2230	2200	2210	3110	3100	3110	1080	1070	1070	1180	1170	1170
10	2250	2220	2240	3110	3100	3100	1070	1070	1070	1180	1160	1170
11	2270	2250	2260	3100	3100	3100	1070	1070	1070	1160	1160	1160
12	2280	2260	2270	3100	3100	3100	1070	1070	1070	1170	1160	1170
13	2300	2280	2290	3100	3100	3100	1070	1070	1070	1170	1170	1170
14	2320	2300	2310	3100	3090	3100	1120	1070	1080	1180	1170	1170
15	2340	2310	2330	3090	3090	3090	1220	1120	1190	1210	1170	1200
16	2380	2340	2360	3090	3080	3090	1230	1220	1230	1210	1190	1200
17	2420	2370	2400	3090	3080	3080	1230	1220	1230	1310	1190	1240
18	2450	2410	2430	3080	3070	3070	1230	1230	1230	1440	1310	1390
19	---	---	---	3070	3040	3050	1230	1210	1220	1470	1440	1460
20	2560	2410	2470	3040	3000	3020	1210	1200	1200	1440	1340	1400
21	3070	2560	2850	3000	2940	2970	1200	1190	1190	1340	1240	1290
22	3110	3070	3100	2940	2860	2910	1190	1180	1190	1240	1200	1220
23	3110	3100	3100	2860	2760	2820	1190	1170	1180	1200	1170	1180
24	3100	3100	3100	2760	2590	2680	1170	1150	1170	1170	1130	1150
25	3100	3090	3090	2590	2330	2460	1150	1110	1130	1130	1070	1100
26	3170	3070	3100	2330	2050	2190	1110	1070	1090	1070	1010	1040
27	3190	3160	3190	2050	1840	1940	1070	1050	1060	1010	980	997
28	3190	3170	3180	1840	1650	1750	1060	1050	1050	980	953	964
29	3180	3160	3170	1650	1490	1570	1050	1040	1050	953	938	945
30	3160	3150	3160	1490	1370	1420	1050	1050	1050	939	932	934
31	3150	3150	3150	---	---	---	1060	1050	1060	932	928	930
MONTH	3190	2140	2650	3160	1370	2830	1370	1040	1140	1470	928	1150

#1 (22.0' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	928	925	927	1510	1470	1500	1710	1680	1690	1930	1900	1920
2	929	925	926	1480	1450	1460	1680	1650	1660	1910	1880	1890
3	944	929	935	1450	1420	1440	1650	1640	1640	1880	1870	1880
4	950	944	947	1420	1400	1410	1640	1630	1640	1870	1860	1870
5	950	946	948	1400	1370	1390	1660	1640	1650	1860	1850	1860
6	946	941	944	1370	1340	1360	1760	1660	1700	1850	1830	1840
7	941	935	937	1340	1280	1310	---	---	---	1830	1800	1820
8	935	929	931	1280	1200	1240	1840	1800	1820	1830	1730	1790
9	931	928	929	1200	1120	1160	1850	1830	1840	1730	1700	1710
10	931	920	926	1120	1060	1090	1860	1840	1850	1770	1710	1730
11	945	925	935	1070	1040	1050	1890	1850	1870	1830	1770	1810
12	959	945	955	1040	1020	1030	1930	1880	1910	1830	1820	1830
13	1010	959	984	1030	1010	1020	1990	1930	1960	1820	1800	1810
14	1050	1010	1030	1050	1030	1040	2060	1990	2030	1850	1820	1840
15	1090	1050	1070	1050	1040	1040	2110	2050	2090	1860	1850	1860
16	1130	1090	1110	1040	1030	1030	2180	2090	2150	1860	1850	1860
17	1170	1130	1150	1120	1040	1090	2190	2150	2170	1850	1830	1840
18	1210	1170	1190	1170	1120	1150	2150	2140	2150	1830	1800	1820
19	1270	1210	1240	1200	1170	1190	2150	2140	2150	1800	1770	1790
20	1350	1270	1300	1210	1200	1210	2160	2140	2150	1780	1760	1770
21	1400	1350	1380	1290	1210	1250	2160	2150	2160	1760	1740	1750
22	1430	1390	1410	1370	1290	1330	2170	2160	2170	1740	1730	1730
23	1440	1420	1430	1490	1370	1430	2190	2160	2180	1730	1700	1710
24	1470	1440	1450	1590	1490	1530	2190	2160	2180	1700	1680	1690
25	1470	1450	1460	1780	1590	1700	2170	2120	2150	1680	1670	1670
26	1470	1460	1470	1810	1780	1800	2120	2080	2100	1670	1660	1660
27	1500	1460	1480	1810	1800	1800	2080	2060	2070	1660	1640	1650
28	1520	1500	1510	1810	1790	1800	2060	2030	2050	1650	1630	1640
29	1530	1510	1520	1810	1790	1800	2030	1990	2010	1640	1620	1630
30	---	---	---	1790	1750	1770	2000	1930	1970	1620	1610	1620
31	---	---	---	1750	1710	1730	---	---	---	1620	1600	1610
MONTH	1530	920	1150	1810	1010	1360	2190	1630	1970	1930	1600	1770

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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415307080414600 AB-140 NR KINGSVILLE, OH--Continued

#1 (22.0' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	1600	1590	1600	1690	1670	1680	1970	1960	1960	2020	2010	2020
2	1600	1590	1600	1680	1680	1680	1960	1950	1960	2020	2010	2020
3	1600	1600	1600	1750	1680	1710	1950	1940	1950	2020	2010	2020
4	1610	1600	1600	1800	1750	1780	1950	1940	1940	2020	2010	2010
5	1620	1560	1590	1800	1790	1800	1970	1940	1960	2020	2010	2020
6	1580	1560	1570	1810	1800	1810	1990	1970	1980	2020	2010	2020
7	1630	1570	1600	1820	1810	1820	1980	1970	1980	2020	2020	2020
8	1680	1620	1650	1840	1820	1830	1990	1970	1980	2080	2020	2050
9	1720	1670	1700	1840	1840	1840	1990	1980	1980	2100	2070	2090
10	1780	1720	1750	1840	1820	1840	2000	1990	1990	2100	2090	2090
11	1810	1780	1790	1830	1820	1830	2000	2000	2000	2110	2090	2100
12	1800	1760	1780	1850	1830	1840	2010	2000	2010	2100	2070	2090
13	1860	1800	1840	1850	1820	1840	2010	2010	2010	2140	2090	2110
14	1900	1860	1880	1820	1790	1810	2010	2010	2010	2220	2140	2190
15	1900	1880	1890	1790	1770	1780	2020	2000	2020	2220	2210	2220
16	1900	1890	1890	1780	1770	1780	2020	2000	2010	2220	2190	2210
17	1920	1890	1910	1770	1750	1760	2020	2010	2010	2200	2190	2190
18	1950	1900	1930	1760	1750	1750	2010	2010	2010	2190	2170	2180
19	2020	1940	1990	1790	1730	1770	2020	2010	2020	2170	2120	2150
20	2040	1950	1980	1840	1790	1810	2020	2020	2020	2120	2080	2100
21	1950	1940	1950	1860	1840	1850	2020	2020	2020	2080	2040	2060
22	1950	1940	1940	1870	1850	1860	2020	2020	2020	2040	2010	2030
23	1950	1930	1940	1900	1860	1880	2030	2020	2030	2040	2020	2030
24	1980	1930	1960	1920	1900	1910	2030	2020	2030	2020	1970	2000
25	1980	1950	1980	1940	1920	1930	2030	2020	2030	1970	1920	1950
26	1960	1900	1930	1940	1930	1940	2030	2020	2020	1920	1870	1900
27	1900	1850	1880	1960	1940	1950	2030	2020	2020	1870	1830	1850
28	1850	1780	1810	1960	1950	1960	2020	2020	2020	1860	1820	1830
29	1780	1730	1750	1960	1940	1950	2020	2020	2020	1860	1810	1830
30	1730	1690	1710	1960	1940	1940	2020	2010	2010	1810	1760	1790
31	---	---	---	1970	1950	1960	2020	2010	2010	---	---	---
MONTH	2040	1560	1800	1970	1670	1840	2030	1940	2000	2220	1760	2040
YEAR	3190	920	1790									

#2 (18.0' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	3230	3210	3220	644	638	640	1410	1370	1390
2	---	---	---	3270	3220	3240	663	644	653	1440	1410	1420
3	---	---	---	3290	3250	3270	673	663	668	1470	1440	1460
4	---	---	---	3320	3290	3310	682	671	676	1490	1460	1480
5	---	---	---	3340	3320	3330	702	682	693	1510	1490	1500
6	2210	2190	2200	3360	3340	3350	720	699	708	1540	1510	1530
7	2250	2210	2230	3400	3360	3380	741	717	727	1570	1540	1560
8	2270	2240	2260	3400	3310	3360	801	738	766	1600	1570	1580
9	2310	2270	2300	3310	3220	3260	850	801	827	1620	1590	1610
10	2340	2300	2320	3220	3150	3180	925	850	889	1630	1620	1620
11	2360	2330	2340	3260	3150	3210	984	925	954	1640	1620	1630
12	2380	2350	2360	3300	3260	3280	1030	984	1010	1660	1640	1650
13	2400	2370	2390	3260	2950	3100	1090	1030	1060	1670	1650	1660
14	2420	2400	2410	2950	2730	2810	1250	1080	1130	1680	1660	1670
15	2460	2420	2440	2730	2680	2710	1480	1250	1400	1670	1660	1670
16	2490	2450	2480	2680	2520	2630	1500	1480	1490	1690	1670	1680
17	2540	2490	2520	2520	1860	2200	1500	1460	1490	1930	1690	1790
18	2560	2540	2550	1860	644	816	1460	844	1190	1910	359	842
19	---	---	---	646	604	620	884	841	862	1260	622	1090
20	2860	2660	2730	604	599	600	924	882	904	1470	1260	1370
21	3400	2860	3200	612	603	608	944	924	936	1560	1470	1540
22	3460	3400	3440	611	598	604	960	943	952	1560	1400	1500
23	3440	3410	3430	598	591	594	989	960	974	1400	1300	1350
24	3430	3390	3410	591	589	590	1030	989	1010	1300	1210	1280
25	3400	3380	3380	590	587	589	1090	1030	1060	1210	1070	1110
26	3540	3360	3430	591	589	590	1150	1090	1120	1070	1050	1060
27	3540	3400	3500	591	587	589	1210	1150	1180	1080	1070	1070
28	3400	3220	3290	603	580	588	1250	1210	1230	1100	1070	1080
29	3220	3190	3200	635	603	621	1290	1250	1270	1160	1100	1130
30	3200	3190	3200	644	635	641	1330	1290	1310	1190	1160	1170
31	3210	3200	3210	---	---	---	1370	1330	1350	1210	1190	1200
MONTH	3540	2190	2810	3400	580	2030	1500	638	1000	1930	359	1410





# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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415307080414600 AB-140 NR KINGSVILLE, OH--Continued

#3 (14.0' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	2770	2740	2760	640	632	636	1380	1350	1370
2	---	---	---	2770	2760	2760	659	639	650	1420	1380	1400
3	---	---	---	2800	2770	2780	669	658	663	1450	1420	1440
4	---	---	---	2810	2790	2810	677	667	671	1470	1440	1460
5	---	---	---	2820	2810	2820	695	677	686	1490	1470	1480
6	1770	1760	1760	2820	2800	2810	709	691	699	1520	1490	1510
7	1790	1770	1780	2870	2810	2830	734	707	718	1550	1520	1540
8	1800	1790	1790	2850	2780	2820	791	733	755	1580	1550	1560
9	1800	1800	1800	2780	2730	2760	837	790	815	1600	1570	1590
10	1810	1800	1800	2740	2690	2710	915	836	877	1600	1590	1600
11	1810	1800	1810	2760	2690	2720	975	915	943	1620	1600	1610
12	1810	1800	1810	2790	2760	2780	1020	975	999	1640	1620	1630
13	1810	1810	1810	2770	2700	2730	1070	1020	1040	1640	1630	1640
14	1810	1810	1810	2700	2660	2680	1200	1070	1110	1650	1640	1640
15	1820	1810	1820	2660	2590	2620	1460	1200	1360	1650	1640	1640
16	1830	1820	1830	2590	581	2260	1480	1460	1470	1670	1640	1650
17	1830	1830	1830	646	575	618	1480	739	1050	1890	1670	1750
18	1830	1830	1830	650	629	642	827	754	792	1880	354	560
19	---	---	---	629	598	611	877	827	854	1250	677	1100
20	2180	1930	1950	603	593	597	915	876	895	1460	1250	1360
21	2840	2180	2660	607	601	604	936	912	925	1550	1460	1520
22	2870	2840	2860	605	592	598	953	933	942	1550	1380	1470
23	2850	2810	2820	593	583	587	980	949	962	1380	1280	1330
24	2810	2780	2790	585	583	584	1020	975	997	1280	1180	1250
25	2780	2750	2760	585	582	583	1070	1020	1050	1180	1050	1090
26	2990	2750	2840	587	583	585	1130	1070	1110	1060	1040	1050
27	3000	2880	2940	588	577	582	1190	1130	1160	1070	1050	1060
28	2880	2820	2850	601	573	582	1230	1190	1210	1090	1060	1070
29	2820	2790	2800	633	601	619	1270	1230	1250	1150	1090	1120
30	2790	2770	2780	641	632	638	1320	1270	1290	1180	1140	1160
31	2770	2750	2760	---	---	---	1360	1310	1330	1190	1180	1180
MONTH	3000	1760	2250	2870	573	1740	1480	632	965	1890	354	1380

#3 (14.0' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	1200	1180	1190	573	495	538	2310	2200	2280	1800	1530	1640
2	1180	1150	1160	632	573	604	2280	2260	2270	1820	1570	1710
3	1150	1120	1140	679	632	657	2360	2280	2320	1930	1820	1890
4	1120	1100	1110	704	675	691	2420	2260	2360	1970	1930	1950
5	1100	1090	1100	837	704	732	2300	2150	2210	1970	1950	1960
6	1090	1080	1090	1020	837	943	2150	2120	2130	1970	1770	1880
7	1090	1080	1090	1020	614	750	---	---	---	1810	1730	1760
8	1100	1080	1090	1070	911	997	2090	2000	2030	2330	1690	2000
9	1160	1100	1130	1140	1070	1110	2010	1990	1990	2310	2030	2160
10	1240	1160	1200	1170	1140	1150	2010	2000	2010	2080	2050	2070
11	1300	1240	1270	1180	1160	1170	2010	2000	2000	2090	1750	2040
12	1320	1290	1310	1290	1180	1210	2020	2010	2010	1750	1040	1290
13	1410	1320	1360	1340	971	1180	2020	2010	2020	1200	1040	1080
14	1470	1410	1440	1190	911	1040	2080	2010	2030	1620	1200	1420
15	1530	1470	1500	1440	1190	1320	2230	2070	2120	1780	1620	1720
16	1600	1530	1560	1640	1440	1550	2410	2230	2320	1800	1780	1790
17	1660	1600	1630	1740	1640	1700	2260	1860	2030	1810	1660	1740
18	1720	1660	1690	1820	1740	1780	2330	2070	2220	1660	1570	1620
19	1760	1410	1650	1860	1820	1840	2380	2330	2360	1570	1520	1540
20	1820	1410	1500	1870	1850	1860	2380	2340	2360	1530	1520	1520
21	1530	1450	1470	1990	1870	1920	2370	2130	2250	1530	1510	1520
22	2070	1530	1940	2130	1990	2060	2180	2000	2080	1530	1510	1520
23	1670	1460	1510	2020	1840	1860	2210	2000	2110	1520	1510	1510
24	1480	1420	1470	1920	1740	1800	2210	755	1330	1510	1490	1500
25	1420	1150	1190	1910	1890	1900	1100	778	921	1530	1500	1510
26	1150	1030	1070	2220	1840	2020	1570	1100	1350	1590	1520	1550
27	1050	1030	1040	2400	2220	2330	1820	1570	1720	1660	1590	1630
28	1060	1040	1050	2450	2400	2430	1860	1810	1840	1730	1660	1700
29	1060	423	572	2440	2400	2430	1890	1740	1830	1780	1730	1750
30	---	---	---	2420	2380	2400	1800	1700	1750	1840	1770	1810
31	---	---	---	2420	2190	2350	---	---	---	1910	1830	1870
MONTH	2070	423	1290	2450	495	1490	2420	755	2010	2330	1040	1700



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

415307080414600 AB-140 NR KINGSVILLE, OH--Continued

#3 (14.0' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	1950	1900	1930	1420	1400	1410	1800	1800	1800	1930	1930	1930
2	1980	1950	1960	1450	1420	1430	1800	1800	1800	1930	1930	1930
3	2030	1980	2010	1490	1450	1470	1800	1790	1800	1940	1930	1940
4	2060	2030	2040	1530	1480	1510	1790	1790	1790	1940	1930	1940
5	2080	2060	2070	1570	1520	1540	1800	1790	1800	1940	1930	1940
6	2090	2070	2080	1600	1560	1580	1820	1800	1810	1950	1930	1940
7	2110	2090	2100	1630	1590	1610	1830	1820	1820	1950	1890	1910
8	2140	2110	2120	1650	1630	1640	1840	1820	1830	2070	1950	2000
9	2160	2140	2150	1660	1650	1660	1850	1830	1840	2110	2060	2090
10	2170	2160	2170	1670	1660	1670	1860	1840	1850	2110	2100	2110
11	2170	2150	2170	1680	1670	1680	1860	1850	1850	2100	2090	2100
12	2150	2090	2110	1690	1670	1680	1870	1850	1860	2210	2060	2150
13	2110	2090	2100	1700	1690	1690	1870	1860	1860	2280	2210	2260
14	2100	2090	2100	1710	1700	1700	1870	1870	1870	2340	2280	2320
15	2100	2090	2090	1710	1680	1700	1880	1870	1880	2320	2190	2240
16	2090	2090	2090	1680	1650	1670	1890	1880	1880	2190	1110	1820
17	2170	2090	2140	1650	1610	1630	1910	1890	1900	1110	906	930
18	2170	2130	2150	1620	1610	1610	1910	1900	1910	944	715	854
19	2390	2170	2330	1900	1610	1750	1920	1900	1910	900	746	821
20	2330	930	1870	1960	1900	1940	1920	1900	1910	982	900	948
21	1070	809	899	1960	1950	1950	1920	1900	1910	1010	982	999
22	1230	1070	1170	1950	1930	1940	1940	1920	1930	1020	1000	1010
23	1360	1230	1300	1930	1890	1920	1940	1940	1940	1050	1020	1030
24	1400	1360	1380	1890	1860	1880	1940	1940	1940	1020	865	945
25	1390	1370	1380	1860	1820	1840	1940	1940	1940	865	855	858
26	1370	1350	1350	1820	1780	1810	1940	1930	1930	876	859	867
27	1350	1340	1340	1790	1780	1780	1930	1920	1930	887	876	882
28	1350	1340	1350	1790	1790	1790	1930	1920	1930	1250	886	1050
29	1370	1350	1360	1800	1790	1800	1940	1920	1930	1230	839	1000
30	1400	1370	1390	1800	1790	1800	1940	1930	1930	840	833	837
31	---	---	---	1810	1790	1800	1930	1930	1930	---	---	---
MONTH	2390	809	1820	1960	1400	1710	1940	1790	1880	2340	715	1520
YEAR	3000	354	1640									

#4 (10.0' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	---	---	---	662	653	656	1420	1390	1410
2	---	---	---	---	---	---	678	662	671	1460	1420	1440
3	---	---	---	---	---	---	686	678	682	1490	1460	1480
4	---	---	---	---	---	---	696	685	691	1520	1490	1500
5	---	---	---	---	---	---	710	696	704	1540	1520	1530
6	---	---	---	---	---	---	728	710	718	1570	1540	1560
7	---	---	---	2590	767	1940	751	725	736	1600	1570	1590
8	---	---	---	2590	2560	2570	808	750	773	1630	1600	1620
9	---	---	---	2630	2550	2580	861	808	835	1660	1630	1650
10	---	---	---	2810	2620	2640	933	861	899	1660	1650	1660
11	---	---	---	2880	2810	2830	995	933	964	1680	1660	1670
12	---	---	---	2920	2870	2900	1050	995	1020	1690	1680	1690
13	---	---	---	2920	2850	2890	1090	1050	1070	1700	1690	1700
14	---	---	---	2850	2750	2830	1220	1090	1130	1710	1700	1700
15	---	---	---	2780	2540	2750	1510	1220	1390	1700	1700	1700
16	---	---	---	2540	469	808	1520	716	1240	1730	1700	1720
17	---	---	---	668	591	640	774	708	737	1950	1690	1810
18	---	---	---	671	652	665	853	774	816	1690	359	474
19	---	---	---	652	617	632	905	853	880	1280	747	1140
20	---	---	---	623	613	616	944	902	922	1500	1280	1390
21	643	254	---	627	620	625	962	941	952	1590	1500	1560
22	616	319	447	624	609	616	974	957	967	1580	1420	1510
23	---	---	---	613	602	606	1000	974	986	1420	1310	1360
24	---	---	---	605	601	603	1040	1000	1020	1310	1020	1260
25	---	---	---	605	601	603	1100	1040	1070	1130	1020	1100
26	---	---	---	608	604	606	1160	1100	1130	1080	1060	1070
27	---	---	---	606	592	599	1220	1160	1190	1080	1070	1080
28	---	---	---	623	590	601	1270	1220	1240	1110	1070	1090
29	---	---	---	655	623	641	1310	1270	1290	1170	1110	1140
30	---	---	---	662	654	659	1350	1310	1330	1200	1170	1190
31	---	---	---	---	---	---	1390	1350	1370	1220	1200	1210
MONTH	643	254	447	2920	469	1390	1520	653	970	1950	359	1420



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

415307080414600 AB-140 NR KINGSVILLE, OH--Continued

#1 (22.0' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	---	---	12.3	12.1	12.0	12.0	11.1	10.9	9.5	9.4	10.5	10.3
2	---	---	12.3	12.1	12.0	12.0	11.1	10.9	9.4	9.4	10.5	10.3
3	---	---	12.3	12.2	12.0	12.0	11.1	10.9	9.4	9.4	10.3	10.2
4	---	---	12.3	12.2	12.0	12.0	11.1	10.9	9.4	9.4	10.3	9.9
5	---	---	12.3	12.2	12.0	12.0	11.1	10.9	9.4	9.4	9.9	9.7
6	11.6	11.6	12.3	12.2	12.0	12.0	11.1	10.9	9.5	9.4	9.9	9.4
7	11.9	11.6	12.3	12.3	12.0	12.0	10.9	10.9	9.5	9.4	9.6	8.8
8	11.8	11.6	12.3	12.2	12.0	11.8	10.9	10.9	9.5	9.5	8.8	8.6
9	11.9	11.6	12.3	12.2	12.0	11.8	10.9	10.9	9.5	9.5	8.6	8.5
10	11.9	11.7	12.3	12.3	12.0	11.8	10.9	10.7	9.5	9.5	8.6	8.4
11	11.9	11.7	12.3	12.3	12.0	11.8	10.9	10.7	9.7	9.5	8.7	8.4
12	11.9	11.8	12.3	12.2	11.8	11.8	10.9	10.7	9.6	9.6	8.7	8.6
13	11.9	11.8	12.3	12.2	11.8	11.6	10.7	10.7	9.7	9.5	9.3	8.7
14	11.9	11.8	12.3	12.3	11.8	11.6	10.7	10.5	9.7	9.4	9.7	9.3
15	12.0	11.8	12.3	12.2	11.8	11.6	10.7	10.5	9.7	9.5	9.5	8.3
16	12.1	11.8	12.3	12.2	11.8	11.6	10.7	10.5	9.7	9.6	8.3	8.1
17	12.1	11.8	12.3	12.2	12.0	11.8	10.7	10.5	9.7	9.6	8.3	8.1
18	12.1	11.8	12.3	12.2	12.0	12.0	11.4	10.5	9.8	9.6	8.3	8.1
19	12.1	---	12.3	12.3	12.0	12.0	11.2	9.4	9.9	9.6	8.3	8.1
20	12.1	12.0	12.3	12.2	12.0	12.0	9.4	8.8	9.9	9.7	8.5	8.3
21	12.3	12.0	12.3	12.2	12.0	11.8	9.0	8.8	9.9	9.7	8.5	8.3
22	12.1	12.0	12.3	12.2	11.8	11.6	9.5	8.9	9.9	9.7	8.9	8.5
23	12.1	12.0	12.3	12.2	11.6	11.3	9.5	9.5	9.9	9.7	9.3	8.9
24	12.1	12.0	12.3	12.2	11.6	11.3	9.7	9.4	10.1	9.9	9.5	9.1
25	12.1	12.0	12.3	12.2	11.4	11.3	9.5	9.3	10.3	10.1	9.3	9.1
26	12.3	12.0	12.3	12.2	11.4	11.3	9.5	9.4	10.3	10.3	9.7	9.3
27	12.3	12.0	12.3	12.3	11.4	11.1	9.5	9.4	10.5	10.3	9.6	9.0
28	12.3	12.0	12.3	12.0	11.3	11.1	9.5	9.4	10.3	9.9	9.0	8.7
29	12.3	12.0	12.2	12.0	11.3	11.1	9.5	9.4	10.3	10.0	8.7	8.1
30	12.3	12.3	12.0	12.0	11.1	11.1	9.5	9.4	---	---	8.1	7.9
31	12.3	12.3	---	---	11.1	11.1	9.4	9.4	---	---	8.5	8.1
MONTH	12.3	11.6	12.3	12.0	12.0	11.1	11.4	8.8	10.5	9.4	10.5	7.9

#1 (22.0' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

## 199

#2 (18.0' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

#2 (18.0' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

415307080414600 AB-140 NR KINGSVILLE, OH--Continued

#3 (14.0' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	---	---	14.0	13.7	11.8	11.6	10.9	10.5	8.9	8.6	7.7	7.1
2	---	---	13.7	13.7	12.0	11.8	10.9	10.5	8.8	8.6	7.9	7.5
3	---	---	13.9	13.7	11.8	11.8	10.9	10.5	8.8	8.6	8.1	7.9
4	---	---	13.9	13.7	11.8	11.6	10.9	10.5	8.8	8.6	8.1	7.9
5	---	---	13.7	13.7	11.8	11.6	10.7	10.5	8.9	8.8	8.3	7.9
6	14.0	14.0	13.9	13.7	11.8	11.8	10.7	10.4	9.0	8.8	8.9	8.1
7	14.0	14.0	13.7	13.4	11.8	11.6	10.7	10.5	8.9	8.8	8.1	6.6
8	14.0	14.0	13.7	13.7	11.8	11.5	10.5	10.3	8.9	8.9	7.9	7.7
9	14.0	13.9	13.7	13.4	11.8	11.5	10.5	10.5	9.3	8.9	7.9	7.7
10	14.0	14.0	13.7	13.4	11.8	11.5	10.5	10.3	9.3	9.1	7.9	7.7
11	14.0	14.0	13.5	13.4	11.8	11.5	10.5	10.2	9.5	9.3	8.1	7.7
12	14.0	14.0	13.4	13.4	11.5	11.5	10.5	10.2	9.4	9.2	8.3	7.9
13	14.0	14.0	13.4	13.4	11.6	11.5	10.3	10.2	9.4	9.2	8.7	6.6
14	14.0	14.0	13.4	13.4	11.6	11.4	10.3	10.3	9.5	9.2	7.4	6.6
15	14.0	13.9	13.4	13.2	11.6	11.4	10.3	10.2	9.5	9.3	7.8	7.4
16	14.0	14.0	13.5	12.7	11.8	11.3	10.3	10.1	9.5	9.3	7.7	7.4
17	14.0	13.9	12.7	12.7	12.0	10.3	10.3	9.9	9.5	9.2	7.8	7.5
18	14.0	14.0	12.7	12.7	10.9	10.5	10.1	7.6	9.6	9.4	7.7	7.4
19	14.0	---	12.7	12.5	11.1	10.9	7.9	7.5	9.6	8.5	7.7	7.4
20	14.0	14.0	12.7	12.3	11.1	10.9	7.9	7.7	8.7	8.3	7.9	7.7
21	14.0	13.9	12.5	12.2	11.1	10.9	8.1	7.9	8.3	8.1	8.1	7.9
22	14.0	13.9	12.5	12.2	11.1	10.9	8.9	7.9	9.1	8.1	8.5	7.4
23	14.0	14.0	12.2	12.2	11.1	10.9	9.1	8.7	8.1	7.9	7.6	7.2
24	14.0	14.0	12.3	12.2	11.1	10.9	9.3	8.9	8.7	8.1	7.5	6.8
25	14.0	13.9	12.3	12.2	11.1	10.9	9.0	8.5	8.3	7.9	7.6	7.2
26	14.2	13.2	12.3	12.0	11.1	10.9	8.9	8.7	8.3	8.1	7.2	6.5
27	14.0	13.7	12.3	12.0	10.9	10.9	9.1	8.9	8.5	8.3	7.4	7.1
28	14.0	13.9	12.1	11.8	10.9	10.9	8.9	8.6	8.5	7.7	7.6	7.1
29	13.9	13.9	12.0	11.8	10.9	10.7	8.9	8.7	8.5	6.6	7.6	7.2
30	13.9	13.9	12.0	11.8	10.9	10.7	8.9	8.6	---	---	7.7	7.2
31	14.0	13.9	---	---	10.9	10.5	8.8	8.6	---	---	8.0	6.8
MONTH	14.2	13.2	14.0	11.8	12.0	10.3	10.9	7.5	9.6	6.6	8.9	6.5

#3 (14.0' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]



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#4 (10.0' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

#4 (10.0' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996[illegible]

EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
UNCONSOLIDATED AQUIFERS IN OHIO

## GROUND-WATER RECORDS

413551083481200. Local number, LU-20.

LOCATION.--Lat 41°35'51" Long 83°48'12", Hydrologic Unit 04100009, along State Route 2 near Holland, OH.  
Owner.--USGS-Toledo Express Airport.

AQUIFER.--Sand of Quaternary age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 31 ft. Cased with Sch 40 PVC to 6.0 ft; .010-in. screen from 6.0 to 31 ft.

INSTRUMENTATION - Data logger--60-minute record. Precipitation data collected with a propane-heated, tipping-bucket rain gage. Also collected: air temperature, soil temperature, water temperature, and specific conductance. At this well there are 4 conductivity/water temperature probes at various depths within the well to better document vertical movement of high-conductivity water on an hourly basis. Conductivity/water temperature probes set at 8.6 (level 4), 13.6 (level 3), 21.6 (level 2), and 26.6 (level 1) ft below land surface.

DATUM.--Elevation of land-surface datum is 676.13 ft above sea level.  
Measuring point: shelter shelf 2.38 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality. Water-quality data for nearby wells are available in preceding tables. Incomplete data this year due to damage to wiring by animals or problems with recorder.

PERIOD OF RECORD.--February 1991 to current year.

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (FOUR LEVELS): February 1991 to current year.

AIR TEMPERATURE: February 1991 to current year.

WATER TEMPERATURE (FOUR LEVELS): February 1991 to current year.

SOIL TEMPERATURE: February 1991 to current year.

PRECIPITATION: February 1991 to current year.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

## SPECIFIC CONDUCTANCE:

LEVEL 1- Maximum, 1260 microsiemens August 13, 1991; minimum, 330 microsiemens April 1, 1993.

LEVEL 2- Maximum, 953 microsiemens July 1, 1991; minimum, 293 microsiemens April 1-2, 1993.

LEVEL 3- Maximum, 785 microsiemens April 25, 1991; minimum, 99 microsiemens June 9-10, 1993.

LEVEL 4- Maximum, 634 microsiemens January 29, 1994; minimum, 70 microsiemens July 14-17, 19, 1996.

AIR TEMPERATURE: Maximum, 38.2°C July 14, 1995; minimum, -28.1°C January 19, 1994.

## WATER TEMPERATURE:

LEVEL 1- Maximum, 12.7°C several days in November, December 1991; minimum, 9.6°C April 8, 1993.

LEVEL 2- Maximum, 13.6°C several days in November, 1991; minimum, 9.2°C April 8, 1993.

LEVEL 3- Maximum, 15.2°C many days in October 1991; minimum, 7.6°C March 26, 28, 1993.

LEVEL 4- Maximum, 17.5°C many days in 1991; minimum, 6.0°C March 24-26, 1993.

SOIL TEMPERATURE: Maximum, 31.3°C June 19, 1994; minimum, -4.7°C February 6, 1994.

## EXTREMES FOR CURRENT YEAR.--

## SPECIFIC CONDUCTANCE:

LEVEL 1- Maximum, 826 microsiemens January 9-11, 13, 15, 1996; minimum, 360 microsiemens April 10, 1996.

LEVEL 2- Maximum, 803 microsiemens December 18-22, 1995; minimum, 350 microsiemens February 24-25, 1996.

LEVEL 3- Maximum, 414 microsiemens May 7, 1996; minimum, 106 microsiemens July 11, 14-15, 1996.

LEVEL 4- Maximum, 364 microsiemens February 29, March 1, 1996; minimum, 70 microsiemens July 14-17, 19, 1996.

AIR TEMPERATURE: Maximum, 32.5°C August 20, 22, 1996; minimum, -21.2°C January 4, 1996.

## WATER TEMPERATURE:

LEVEL 1- Maximum, 12.6°C many days in November, December, 1995, and January, 1996; minimum, 10.2°C April 12, May 5-7, 1996.

LEVEL 2- Maximum, 13.3°C many days in November, December, 1995; minimum, 9.6°C April 11, 12, 15, 1996.

LEVEL 3- Maximum, 14.9°C October 28-November 3, 6-7, 1995; minimum, 8.4°C April 11, 1996.

LEVEL 4- Maximum, 16.8°C September 11-19, 1996; minimum, 7.5°C April 10-12, 1996.

SOIL TEMPERATURE: Maximum, 26.2°C August 24, 1996; minimum, -2.0°C February 18, 1996.

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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413551083481200 LU-20 NR HOLLAND OH--Continued

#1 (26.6' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	824	818	820	816	811	815	825	820	820
2	---	---	---	822	800	---	816	811	813	821	820	820
3	---	---	---	805	801	803	817	812	816	822	820	821
4	---	---	---	806	801	805	818	813	815	822	820	821
5	---	---	---	806	801	804	819	813	815	822	820	821
6	---	---	---	807	802	805	815	814	815	822	821	821
7	---	---	---	806	801	805	820	815	816	822	820	821
8	---	---	---	806	802	803	817	816	816	825	821	821
9	---	---	---	807	803	803	818	816	817	826	820	821
10	---	---	---	808	803	805	818	817	817	826	820	822
11	---	---	---	808	800	803	818	817	818	826	820	822
12	---	---	---	803	797	800	818	817	818	825	819	823
13	---	---	---	803	797	800	819	817	818	826	824	825
14	---	---	---	804	803	804	822	817	818	825	820	824
15	---	---	---	806	804	805	818	817	818	826	821	824
16	---	---	---	806	805	806	818	816	817	---	---	---
17	---	---	---	807	806	806	818	816	817	---	---	---
18	---	---	---	807	806	807	818	816	817	---	---	---
19	---	---	---	807	806	807	818	817	818	---	---	---
20	---	---	---	807	805	806	819	817	818	---	---	---
21	---	---	---	808	806	807	819	817	818	---	---	---
22	---	---	---	809	808	809	819	818	819	---	---	---
23	---	---	---	811	809	810	819	818	818	---	---	---
24	---	---	---	812	807	811	819	818	819	---	---	---
25	---	---	---	812	807	811	820	818	819	---	---	---
26	---	---	---	813	808	812	820	819	819	---	---	---
27	---	---	---	813	812	813	820	819	820	---	---	---
28	823	817	821	814	809	813	820	819	820	---	---	---
29	823	818	820	815	809	813	821	819	820	---	---	---
30	823	818	820	816	811	813	821	819	820	---	---	---
31	819	818	818	---	---	---	824	819	820	---	---	---
MONTH	823	817	820	824	797	807	824	811	818	826	819	822

#1 (26.6' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	438	434	437	---	---	---	---	---	---
2	---	---	---	436	429	433	---	---	---	---	---	---
3	---	---	---	429	420	425	---	---	---	---	---	---
4	---	---	---	423	416	419	---	---	---	---	---	---
5	---	---	---	417	412	414	---	---	---	461	451	454
6	---	---	---	413	411	412	---	---	---	467	459	464
7	---	---	---	412	411	411	---	---	---	469	465	467
8	---	---	---	413	411	412	---	---	---	---	---	---
9	---	---	---	414	411	412	---	---	---	---	---	---
10	---	---	---	413	410	412	363	360	362	---	---	---
11	382	368	375	412	408	410	364	362	363	---	---	---
12	368	363	366	---	---	---	364	362	362	---	---	---
13	365	363	364	---	---	---	367	362	364	---	---	---
14	365	362	363	---	---	---	372	367	369	---	---	---
15	364	363	363	---	---	---	373	370	371	---	---	---
16	367	364	365	---	---	---	376	372	374	---	---	---
17	367	365	366	---	---	---	---	---	---	---	---	---
18	501	364	403	---	---	---	---	---	---	---	---	---
19	595	496	537	---	---	---	---	---	---	---	---	---
20	657	595	622	---	---	---	---	---	---	---	---	---
21	658	655	657	---	---	---	---	---	---	---	---	---
22	658	657	657	---	---	---	---	---	---	---	---	---
23	657	641	652	---	---	---	---	---	---	---	---	---
24	641	618	629	---	---	---	---	---	---	---	---	---
25	618	598	608	---	---	---	---	---	---	---	---	---
26	598	580	589	---	---	---	---	---	---	---	---	---
27	580	549	570	---	---	---	---	---	---	---	---	---
28	549	433	456	---	---	---	---	---	---	---	---	---
29	437	433	435	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	658	362	494	438	408	418	376	360	366	469	451	462

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

413551083481200 LU-20 NR HOLLAND OH--Continued

#1 (26.6' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	---	---	---	---	---	---	728	725	726
2	---	---	---	---	---	---	---	---	---	731	728	729
3	---	---	---	---	---	---	---	---	---	733	731	732
4	---	---	---	---	---	---	---	---	---	736	733	734
5	---	---	---	---	---	---	---	---	---	738	732	736
6	---	---	---	---	---	---	---	---	---	741	738	739
7	---	---	---	---	---	---	---	---	---	743	737	740
8	---	---	---	---	---	---	---	---	---	745	739	742
9	---	---	---	---	---	---	---	---	---	747	742	744
10	---	---	---	---	---	---	---	---	---	747	744	745
11	---	---	---	581	576	579	---	---	---	752	747	748
12	---	---	---	583	578	582	---	---	---	752	749	751
13	---	---	---	584	581	583	---	---	---	755	749	753
14	---	---	---	587	582	585	---	---	---	757	751	755
15	---	---	---	589	585	587	---	---	---	759	753	757
16	---	---	---	591	587	590	---	---	---	761	755	758
17	---	---	---	594	589	592	---	---	---	762	757	759
18	---	---	---	597	591	594	---	---	---	764	758	761
19	---	---	---	599	596	597	---	---	---	765	760	762
20	---	---	---	601	596	599	695	690	691	767	762	764
21	---	---	---	603	599	601	696	693	694	766	764	765
22	---	---	---	607	602	604	699	696	697	767	765	766
23	---	---	---	609	603	607	---	---	---	769	767	768
24	---	---	---	---	---	---	705	701	703	771	769	770
25	---	---	---	---	---	---	708	705	706	773	771	772
26	---	---	---	---	---	---	711	708	709	774	772	773
27	---	---	---	---	---	---	714	711	712	775	774	774
28	---	---	---	---	---	---	717	714	715	776	772	774
29	---	---	---	---	---	---	720	717	718	778	772	775
30	---	---	---	---	---	---	722	720	721	779	774	776
31	---	---	---	---	---	---	725	722	723	---	---	---
MONTH	---	---	---	609	576	592	725	690	708	779	725	755
YEAR	826	360	696									

#2 (21.6' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	790	788	789	781	780	780	798	797	798
2	---	---	---	792	766	---	780	776	780	798	797	798
3	---	---	---	776	774	775	779	778	779	797	796	797
4	---	---	---	777	776	776	779	777	778	797	793	795
5	---	---	---	777	777	777	778	777	778	796	794	795
6	---	---	---	778	776	777	778	777	777	795	793	794
7	---	---	---	776	775	776	777	776	777	793	792	793
8	---	---	---	776	775	776	777	776	777	793	791	792
9	---	---	---	776	776	776	777	776	777	791	788	790
10	---	---	---	776	775	776	777	776	777	788	785	787
11	---	---	---	780	776	777	776	776	776	785	780	783
12	---	---	---	788	780	784	776	775	776	780	773	777
13	---	---	---	791	788	790	776	775	776	777	770	774
14	---	---	---	792	787	792	776	776	776	772	758	768
15	---	---	---	792	788	792	781	776	778	758	746	750
16	---	---	---	791	781	789	793	781	786	---	---	---
17	---	---	---	786	778	782	797	791	794	---	---	---
18	---	---	---	782	778	780	803	797	799	---	---	---
19	---	---	---	781	777	778	803	799	800	---	---	---
20	---	---	---	784	781	782	803	798	801	---	---	---
21	---	---	---	786	781	785	803	798	801	---	---	---
22	---	---	---	786	781	785	803	797	801	---	---	---
23	---	---	---	786	781	784	802	797	801	---	---	---
24	---	---	---	785	780	782	801	800	800	---	---	---
25	---	---	---	785	780	784	800	799	799	---	---	---
26	---	---	---	784	780	783	799	798	799	---	---	---
27	---	---	---	784	782	783	799	797	798	---	---	---
28	788	787	787	782	777	781	797	796	797	---	---	---
29	791	786	787	782	777	781	796	795	796	---	---	---
30	787	787	787	782	777	781	799	794	795	---	---	---
31	788	787	788	---	---	---	799	794	797	---	---	---
MONTH	791	786	787	792	766	782	803	775	788	798	746	786





# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

413551083481200 LU-20 NR HOLLAND OH--Continued

#3 (13.6' BLS)-SPE CIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	290	286	287	143	142	142	173	171	172
2	---	---	---	314	290	---	142	142	142	175	173	174
3	---	---	---	316	314	315	143	142	142	175	174	175
4	---	---	---	317	315	316	143	142	142	175	174	175
5	---	---	---	315	311	313	143	142	143	176	175	175
6	---	---	---	311	309	310	144	142	143	178	175	177
7	---	---	---	312	310	311	144	144	144	179	177	178
8	---	---	---	310	303	306	145	144	145	180	178	179
9	---	---	---	308	303	305	146	145	145	181	179	180
10	---	---	---	308	306	308	147	146	146	181	179	180
11	---	---	---	320	308	313	147	146	147	182	179	181
12	---	---	---	371	320	340	149	147	148	183	181	182
13	---	---	---	390	371	385	150	148	149	184	183	183
14	---	---	---	389	379	385	150	149	149	185	183	184
15	---	---	---	379	355	369	152	150	151	184	182	183
16	---	---	---	355	283	333	155	152	154	---	---	---
17	---	---	---	283	182	201	159	155	157	---	---	---
18	---	---	---	182	143	156	161	159	160	---	---	---
19	---	---	---	143	139	141	163	161	162	---	---	---
20	---	---	---	281	139	203	164	162	163	---	---	---
21	---	---	---	277	232	254	166	163	165	---	---	---
22	---	---	---	232	186	208	167	165	166	---	---	---
23	---	---	---	188	142	155	168	167	168	---	---	---
24	---	---	---	143	142	142	169	168	168	---	---	---
25	---	---	---	149	143	146	170	169	169	---	---	---
26	---	---	---	146	145	146	170	169	169	---	---	---
27	---	---	---	146	144	145	170	169	169	---	---	---
28	290	286	289	144	143	143	170	168	169	---	---	---
29	286	284	284	143	142	143	171	169	170	---	---	---
30	284	283	284	143	142	142	172	170	171	---	---	---
31	286	284	285	---	---	---	173	171	172	---	---	---
MO NTH	290	283	285	390	139	249	173	142	156	185	171	179

#3 (13.6' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	380	377	379	---	---	---	---	---	---
2	---	---	---	378	370	375	---	---	---	---	---	---
3	---	---	---	372	364	368	---	---	---	---	---	---
4	---	---	---	367	361	363	---	---	---	---	---	---
5	---	---	---	362	356	359	---	---	---	402	397	399
6	---	---	---	358	354	356	---	---	---	413	402	409
7	---	---	---	358	355	356	---	---	---	414	411	412
8	---	---	---	359	355	357	---	---	---	---	---	---
9	---	---	---	359	356	357	---	---	---	---	---	---
10	---	---	---	359	356	357	317	314	316	---	---	---
11	333	320	326	358	354	355	318	314	316	---	---	---
12	321	315	318	---	---	---	318	315	316	---	---	---
13	319	315	317	---	---	---	321	315	317	---	---	---
14	318	314	316	---	---	---	324	319	322	---	---	---
15	318	315	316	---	---	---	325	322	324	---	---	---
16	320	316	318	---	---	---	329	325	327	---	---	---
17	322	317	319	---	---	---	---	---	---	---	---	---
18	319	317	318	---	---	---	---	---	---	---	---	---
19	320	317	318	---	---	---	---	---	---	---	---	---
20	319	315	316	---	---	---	---	---	---	---	---	---
21	316	313	315	---	---	---	---	---	---	---	---	---
22	314	311	313	---	---	---	---	---	---	---	---	---
23	314	311	312	---	---	---	---	---	---	---	---	---
24	314	309	311	---	---	---	---	---	---	---	---	---
25	312	309	310	---	---	---	---	---	---	---	---	---
26	313	310	312	---	---	---	---	---	---	---	---	---
27	328	311	317	---	---	---	---	---	---	---	---	---
28	377	328	366	---	---	---	---	---	---	---	---	---
29	381	375	378	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	381	309	322	380	354	362	329	314	320	414	397	407

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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#3 (13.6' BLS)--SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE				JULY				AUGUST		
											SEPTEMBER	
1	---	---	---	---	---	---	---	---	---	210	207	208
2	---	---	---	---	---	---	---	---	---	211	208	210
3	---	---	---	---	---	---	---	---	---	212	210	211
4	---	---	---	---	---	---	---	---	---	214	212	213
5	---	---	---	---	---	---	---	---	---	216	214	215
6	---	---	---	---	---	---	---	---	---	218	216	217
7	---	---	---	---	---	---	---	---	---	221	218	220
8	---	---	---	---	---	---	---	---	---	223	221	222
9	---	---	---	---	---	---	---	---	---	224	222	223
10	---	---	---	---	---	---	---	---	---	225	222	224
11	---	---	---	108	106	107	---	---	---	227	224	225
12	---	---	---	108	107	108	---	---	---	231	226	228
13	---	---	---	108	107	107	---	---	---	233	231	232
14	---	---	---	107	106	107	---	---	---	234	232	233
15	---	---	---	108	106	107	---	---	---	236	233	234
16	---	---	---	110	108	109	---	---	---	238	235	237
17	---	---	---	111	109	110	---	---	---	238	237	238
18	---	---	---	114	111	112	---	---	---	239	238	238
19	---	---	---	114	112	113	---	---	---	241	239	240
20	---	---	---	118	113	115	183	181	182	243	241	241
21	---	---	---	119	117	118	186	183	185	246	243	244
22	---	---	---	120	118	119	189	186	187	246	245	246
23	---	---	---	120	118	119	---	---	---	248	244	246
24	---	---	---	---	---	---	194	191	192	251	247	250
25	---	---	---	---	---	---	196	192	194	254	249	251
26	---	---	---	---	---	---	198	195	196	264	253	259
27	---	---	---	---	---	---	198	197	197	283	263	269
28	---	---	---	---	---	---	200	198	199	306	283	299
29	---	---	---	---	---	---	203	200	202	305	295	301
30	---	---	---	---	---	---	205	203	204	295	291	293
31	---	---	---	---	---	---	207	204	206	---	---	---
MONTH	---	---	---	120	106	112	207	181	195	306	207	239
YEAR	414	106	232									

#4 (8.6' BLS)--SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER				NOVEMBER				DECEMBER		
											JANUARY	
1	---	---	---	99	98	98	150	147	148	175	174	175
2	---	---	---	119	99	---	148	147	147	176	175	175
3	---	---	---	114	112	113	148	147	148	177	176	177
4	---	---	---	115	114	114	149	147	148	178	176	177
5	---	---	---	114	114	114	150	148	149	178	176	177
6	---	---	---	114	111	112	150	148	149	180	178	179
7	---	---	---	112	110	111	151	150	150	181	179	180
8	---	---	---	110	109	110	151	149	150	181	180	180
9	---	---	---	110	109	109	151	150	151	181	180	181
10	---	---	---	111	110	111	152	151	151	181	180	181
11	---	---	---	115	111	112	153	152	153	183	180	181
12	---	---	---	247	115	135	154	153	153	183	181	182
13	---	---	---	257	205	220	154	153	154	184	183	183
14	---	---	---	216	198	207	155	154	155	186	184	185
15	---	---	---	198	181	189	157	154	155	185	183	184
16	---	---	---	181	168	175	161	156	158	---	---	---
17	---	---	---	168	158	163	164	160	162	---	---	---
18	---	---	---	158	152	155	165	164	165	---	---	---
19	---	---	---	152	148	150	167	165	166	---	---	---
20	---	---	---	148	147	148	169	167	168	---	---	---
21	---	---	---	148	147	147	169	168	169	---	---	---
22	---	---	---	152	148	150	171	168	170	---	---	---
23	---	---	---	151	150	151	172	170	171	---	---	---
24	---	---	---	151	150	150	173	172	172	---	---	---
25	---	---	---	155	150	153	173	172	173	---	---	---
26	---	---	---	154	153	153	173	172	173	---	---	---
27	---	---	---	153	151	152	173	172	173	---	---	---
28	98	97	98	151	149	150	174	172	172	---	---	---
29	98	97	98	150	149	149	174	172	173	---	---	---
30	98	98	98	150	149	149	175	173	174	---	---	---
31	98	98	98	---	---	---	175	174	174	---	---	---
MONTH	98	97	98	257	98	143	175	147	160	186	174	180



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	18.8	9.2	14.0	9.9	-1.5	6.5	1.9	.3	1.0
2	---	---	---	19.2	6.8	15.3	6.1	-5.5	.7	.4	-9.0	-3.8
3	---	---	---	6.8	-2.3	.6	12.5	1.5	8.5	-7.3	-17.2	-10.2
4	---	---	---	1.1	-3.9	-1.0	6.7	-2.9	2.0	-8.5	-21.2	-13.5
5	---	---	---	-.2	-7.0	-2.8	8.3	-2.4	2.2	-7.9	-20.2	-11.4
6	---	---	---	8.3	-5.4	2.2	1.3	-5.2	-2.0	-7.1	-14.5	-10.0
7	---	---	---	10.3	2.0	6.0	.3	-6.8	-4.1	-7.2	-10.3	-8.6
8	---	---	---	2.0	-4.7	-.9	-3.1	-12.7	-6.4	-5.8	-15.6	-10.3
9	---	---	---	2.0	-5.9	-1.3	-2.9	-18.2	-12.8	-2.0	-8.1	-5.4
10	---	---	---	12.3	1.5	8.8	-10.9	-17.1	-14.0	-4.3	-17.2	-9.6
11	---	---	---	12.0	-2.3	5.2	-9.9	-14.3	-11.5	-6.9	-17.2	-10.3
12	---	---	---	-2.3	-5.1	-3.4	-6.7	-11.5	-9.5	-3.1	-9.3	-6.2
13	---	---	---	3.6	-3.4	.0	-.2	-8.9	-5.3	-1.1	-3.1	-2.2
14	---	---	---	1.6	-6.3	-2.0	9.6	-.2	4.3	6.1	-2.1	2.0
15	---	---	---	2.0	-5.1	-1.8	3.8	.1	1.6	-.5	-9.6	-6.7
16	---	---	---	1.8	-2.4	-.4	2.0	-6.7	-1.9	---	---	---
17	---	---	---	1.3	-5.4	-1.3	2.2	-9.2	-3.3	---	---	---
18	---	---	---	2.2	.2	1.4	-.5	-1.7	-1.1	---	---	---
19	---	---	---	7.7	-.6	2.3	-1.7	-6.4	-4.3	---	---	---
20	---	---	---	11.7	.1	5.2	-2.8	-10.4	-6.0	---	---	---
21	---	---	---	5.3	-3.4	-.1	-4.0	-11.5	-6.8	---	---	---
22	---	---	---	2.0	-4.5	-.7	-1.2	-11.9	-5.1	---	---	---
23	---	---	---	3.4	-4.1	.1	-1.7	-5.5	-4.0	---	---	---
24	---	---	---	.8	-9.2	-4.6	-1.9	-5.0	-3.6	---	---	---
25	---	---	---	6.5	-5.8	.7	-2.6	-10.9	-5.1	---	---	---
26	---	---	---	11.3	-4.3	3.8	-6.5	-11.2	-7.9	---	---	---
27	---	---	---	13.5	3.7	7.7	-4.7	-13.9	-8.2	---	---	---
28	10.9	6.0	9.2	5.1	-2.2	-.8	-3.0	-7.8	-5.4	---	---	---
29	10.3	3.4	6.6	.8	-5.1	-2.2	-2.7	-9.4	-6.3	---	---	---
30	9.0	4.1	6.6	7.5	-5.8	.4	-.4	-9.4	-4.6	---	---	---
31	9.4	5.8	7.8	---	---	---	4.5	-2.1	1.4	---	---	---
MONTH	10.9	3.4	7.6	19.2	-9.2	1.7	12.5	-18.2	-3.6	6.1	-21.2	-7.0

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	1.6	-9.1	-3.6	---	---	---	---	---	---
2	---	---	---	.5	-9.3	-2.2	---	---	---	---	---	---
3	---	---	---	-5.6	-14.6	-9.7	---	---	---	---	---	---
4	---	---	---	.6	-10.1	-3.9	---	---	---	---	---	---
5	---	---	---	.6	-2.1	-.7	---	---	---	12.3	4.4	8.2
6	---	---	---	-1.8	-10.0	-4.4	---	---	---	13.3	7.3	10.3
7	---	---	---	-7.2	-13.7	-10.5	---	---	---	13.6	8.2	10.7
8	---	---	---	-9.2	-15.7	-12.4	---	---	---	---	---	---
9	---	---	---	-4.9	-14.5	-9.4	---	---	---	---	---	---
10	---	---	---	1.6	-12.5	-4.8	19.2	2.0	8.6	---	---	---
11	3.0	-5.1	-.2	6.7	-5.5	.1	24.2	16.7	19.8	---	---	---
12	-4.6	-8.8	-6.6	---	---	---	25.5	7.0	11.7	---	---	---
13	-.3	-11.0	-5.0	---	---	---	11.0	-.2	4.8	---	---	---
14	.4	-3.9	-1.7	---	---	---	8.5	2.2	5.1	---	---	---
15	-1.9	-7.6	-4.8	---	---	---	15.8	1.7	6.1	---	---	---
16	-4.2	-12.2	-7.2	---	---	---	9.5	-.1	3.7	---	---	---
17	-3.0	-10.3	-5.4	---	---	---	---	---	---	---	---	---
18	-5.5	-17.2	-9.6	---	---	---	---	---	---	---	---	---
19	4.3	-6.1	-.5	---	---	---	---	---	---	---	---	---
20	8.5	3.3	5.9	---	---	---	---	---	---	---	---	---
21	4.8	.8	3.8	---	---	---	---	---	---	---	---	---
22	1.7	-.4	.5	---	---	---	---	---	---	---	---	---
23	13.2	.1	5.0	---	---	---	---	---	---	---	---	---
24	12.0	2.6	6.5	---	---	---	---	---	---	---	---	---
25	12.9	1.3	7.4	---	---	---	---	---	---	---	---	---
26	7.0	2.9	5.3	---	---	---	---	---	---	---	---	---
27	19.3	3.7	8.7	---	---	---	---	---	---	---	---	---
28	4.3	-7.9	-3.3	---	---	---	---	---	---	---	---	---
29	-5.4	-9.1	-7.3	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	19.3	-17.2	-.4	6.7	-15.7	-5.6	25.5	-.2	8.5	13.6	4.4	9.7

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

413551083481200 LU-20 NR HOLLAND OH--Continued

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	---	---	---	---	---	---	30.8	13.0	20.9
2	---	---	---	---	---	---	---	---	---	29.1	14.4	21.7
3	---	---	---	---	---	---	---	---	---	29.4	14.3	22.1
4	---	---	---	---	---	---	---	---	---	30.2	16.8	22.6
5	---	---	---	---	---	---	---	---	---	29.1	14.5	21.9
6	---	---	---	---	---	---	---	---	---	27.2	20.5	23.2
7	---	---	---	---	---	---	---	---	---	24.5	18.3	21.5
8	---	---	---	---	---	---	---	---	---	28.2	16.4	21.3
9	---	---	---	---	---	---	---	---	---	27.9	17.5	21.7
10	---	---	---	---	---	---	---	---	---	25.6	14.7	19.1
11	---	---	---	28.5	9.5	19.2	---	---	---	29.4	14.6	20.7
12	---	---	---	31.1	13.6	23.0	---	---	---	21.3	13.5	18.0
13	---	---	---	29.7	17.7	24.3	---	---	---	15.4	11.1	12.9
14	---	---	---	29.9	14.8	22.6	---	---	---	13.4	8.5	11.4
15	---	---	---	26.6	17.9	21.5	---	---	---	18.2	12.1	14.5
16	---	---	---	31.0	18.1	24.1	---	---	---	16.9	9.5	13.9
17	---	---	---	29.6	18.9	24.1	---	---	---	19.4	12.3	15.7
18	---	---	---	28.5	20.9	24.0	---	---	---	23.3	10.1	16.2
19	---	---	---	27.9	18.1	25.7	---	---	---	24.4	8.2	15.1
20	---	---	---	24.9	10.1	18.1	32.5	19.0	23.7	26.1	5.7	15.5
21	---	---	---	22.5	9.6	16.9	30.1	18.6	23.8	23.5	12.4	15.9
22	---	---	---	28.4	13.2	21.0	32.5	20.6	25.8	18.6	13.0	15.5
23	---	---	---	29.8	17.8	23.6	---	---	---	22.7	10.3	15.3
24	---	---	---	---	---	---	28.6	13.5	21.1	22.2	9.8	16.2
25	---	---	---	---	---	---	29.5	13.6	21.5	19.0	5.7	12.3
26	---	---	---	---	---	---	30.2	13.4	22.1	20.6	11.9	16.3
27	---	---	---	---	---	---	29.1	15.5	21.0	22.0	13.6	18.7
28	---	---	---	---	---	---	27.5	16.5	20.8	16.9	9.5	12.5
29	---	---	---	---	---	---	27.6	15.2	21.1	21.8	7.7	14.1
30	---	---	---	---	---	---	26.9	12.6	19.9	24.4	5.1	14.6
31	---	---	---	---	---	---	29.0	13.0	20.6	---	---	---
MONTH	---	---	---	31.1	9.5	22.2	32.5	12.6	21.9	30.8	5.1	17.4
YEAR	32.5	-21.2	5.4									

#1 (26.6' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	---	---	12.2	12.0	12.6	12.4	12.6	12.4	---	---	11.2	11.0
2	---	---	12.2	12.0	12.6	12.4	12.6	12.6	---	---	11.2	11.0
3	---	---	12.2	12.1	12.6	12.4	12.6	12.5	---	---	11.2	11.0
4	---	---	12.4	12.1	12.6	12.4	12.6	12.5	---	---	11.2	11.0
5	---	---	12.4	12.1	12.6	12.4	12.6	12.5	---	---	11.0	11.0
6	---	---	12.4	12.1	12.6	12.6	12.6	12.6	---	---	11.0	11.0
7	---	---	12.4	12.1	12.6	12.4	12.6	12.6	---	---	11.0	11.0
8	---	---	12.4	12.1	12.6	12.6	12.6	12.4	---	---	11.0	11.0
9	---	---	12.4	12.1	12.6	12.5	12.6	12.4	---	---	11.0	10.8
10	---	---	12.4	12.2	12.6	12.5	12.6	12.4	---	---	11.0	10.8
11	---	---	12.4	12.2	12.6	12.6	12.6	12.3	11.5	11.2	11.0	10.8
12	---	---	12.4	12.4	12.6	12.6	12.6	12.4	11.5	11.2	---	---
13	---	---	12.4	12.4	12.6	12.6	12.4	12.4	11.4	11.2	---	---
14	---	---	12.4	12.4	12.6	12.4	12.6	12.4	11.2	11.2	---	---
15	---	---	12.4	12.4	12.6	12.6	12.6	12.3	11.3	11.2	---	---
16	---	---	12.4	12.4	12.6	12.6	---	---	11.2	11.0	---	---
17	---	---	12.4	12.4	12.6	12.6	---	---	11.2	11.0	---	---
18	---	---	12.4	12.4	12.6	12.6	---	---	11.0	11.0	---	---
19	---	---	12.4	12.4	12.6	12.6	---	---	11.5	11.0	---	---
20	---	---	12.4	12.4	12.6	12.6	---	---	11.7	11.5	---	---
21	---	---	12.4	12.4	12.6	12.6	---	---	11.7	11.7	---	---
22	---	---	12.4	12.4	12.6	12.6	---	---	11.7	11.7	---	---
23	---	---	12.4	12.4	12.6	12.6	---	---	11.7	11.7	---	---
24	---	---	12.6	12.3	12.6	12.6	---	---	11.7	11.7	---	---
25	---	---	12.6	12.4	12.6	12.6	---	---	11.7	11.7	---	---
26	---	---	12.6	12.4	12.6	12.6	---	---	11.7	11.7	---	---
27	---	---	12.4	12.4	12.6	12.6	---	---	11.7	11.5	---	---
28	12.2	11.9	12.6	12.4	12.6	12.6	---	---	11.7	11.2	---	---
29	12.2	11.9	12.6	12.4	12.6	12.6	---	---	11.2	11.2	---	---
30	12.2	11.9	12.6	12.4	12.6	12.6	---	---	---	---	---	---
31	12.2	12.2	---	---	12.6	12.4	---	---	---	---	---	---
MONTH	12.2	11.9	12.6	12.0	12.6	12.4	12.6	12.3	11.7	11.0	11.2	10.8



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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413551083481200 LU-20 NR HOLLAND OH--Continued

#1 (26.6' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPT EMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	---	---	---	---	---	---	---	---	---	---	10.9	10.8
2	---	---	---	---	---	---	---	---	---	---	10.9	10.9
3	---	---	---	---	---	---	---	---	---	---	10.9	10.9
4	---	---	---	---	---	---	---	---	---	---	10.9	10.9
5	---	---	10.4	10.2	---	---	---	---	---	---	11.1	10.9
6	---	---	10.4	10.2	---	---	---	---	---	---	10.9	10.9
7	---	---	10.4	10.2	---	---	---	---	---	---	11.1	10.9
8	---	---	---	---	---	---	---	---	---	---	11.1	10.9
9	---	---	---	---	---	---	---	---	---	---	11.1	10.9
10	10.6	10.4	---	---	---	---	---	---	---	---	11.1	11.1
11	10.5	10.4	---	---	---	---	10.6	10.4	---	---	11.1	10.9
12	10.5	10.2	---	---	---	---	10.6	10.4	---	---	11.1	11.1
13	10.6	10.4	---	---	---	---	10.6	10.4	---	---	11.3	11.1
14	10.6	10.4	---	---	---	---	10.6	10.4	---	---	11.3	11.0
15	10.6	10.4	---	---	---	---	10.6	10.4	---	---	11.3	11.1
16	10.6	10.4	---	---	---	---	10.6	10.4	---	---	11.3	11.1
17	---	---	---	---	---	---	10.7	10.4	---	---	11.3	11.1
18	---	---	---	---	---	---	10.7	10.4	---	---	11.3	11.1
19	---	---	---	---	---	---	10.7	10.5	---	---	11.3	11.1
20	---	---	---	---	---	---	10.7	10.4	10.9	10.7	11.3	11.1
21	---	---	---	---	---	---	10.7	10.4	10.9	10.9	11.3	11.3
22	---	---	---	---	---	---	10.7	10.5	10.9	10.9	11.3	11.3
23	---	---	---	---	---	---	10.7	10.5	---	---	11.3	11.3
24	---	---	---	---	---	---	---	---	10.9	10.9	11.3	11.3
25	---	---	---	---	---	---	---	---	10.9	10.8	11.3	11.2
26	---	---	---	---	---	---	---	---	10.9	10.9	11.3	11.3
27	---	---	---	---	---	---	---	---	10.9	10.9	11.3	11.3
28	---	---	---	---	---	---	---	---	10.9	10.9	11.5	11.3
29	---	---	---	---	---	---	---	---	10.9	10.9	11.5	11.3
30	---	---	---	---	---	---	---	---	10.9	10.8	11.5	11.3
31	---	---	---	---	---	---	---	---	10.9	10.8	---	---
MONTH	10.6	10.2	10.4	10.2	---	---	10.7	10.4	10.9	10.7	11.5	10.8
YEAR	12.6	10.2										

#2 (21.6' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	---	---	13.1	13.1	13.1	13.1	12.6	12.6	---	---	10.8	10.6
2	---	---	13.1	13.1	13.3	13.1	12.6	12.6	---	---	10.6	10.6
3	---	---	13.1	13.1	13.1	13.1	12.6	12.5	---	---	10.8	10.5
4	---	---	13.1	13.1	13.1	13.1	12.8	12.5	---	---	10.6	10.6
5	---	---	13.1	13.0	13.1	13.1	12.6	12.5	---	---	10.6	10.6
6	---	---	13.1	13.1	13.1	13.1	12.6	12.6	---	---	10.6	10.4
7	---	---	13.1	13.1	13.1	13.0	12.6	12.6	---	---	10.6	10.3
8	---	---	13.1	13.1	13.1	13.0	12.6	12.5	---	---	10.6	10.3
9	---	---	13.1	13.1	13.1	13.0	12.6	12.6	---	---	10.6	10.3
10	---	---	13.1	13.1	13.0	13.0	12.6	12.5	---	---	10.6	10.2
11	---	---	13.1	13.1	13.0	13.0	12.6	12.5	11.0	10.8	10.6	10.4
12	---	---	13.1	13.1	13.1	13.0	12.6	12.4	11.0	10.8	---	---
13	---	---	13.1	13.1	13.1	13.0	12.6	12.4	11.0	10.8	---	---
14	---	---	13.3	13.1	13.1	13.1	12.4	12.4	10.8	10.8	---	---
15	---	---	13.3	13.1	13.1	13.1	12.4	12.3	11.0	10.8	---	---
16	---	---	13.3	13.1	13.1	12.9	---	---	10.8	10.8	---	---
17	---	---	13.3	13.1	13.1	13.0	---	---	10.8	10.8	---	---
18	---	---	13.1	13.1	13.1	12.8	---	---	10.8	10.7	---	---
19	---	---	13.1	13.1	13.1	12.8	---	---	10.8	10.8	---	---
20	---	---	13.1	13.1	13.1	12.8	---	---	10.8	10.6	---	---
21	---	---	13.3	13.1	13.1	12.8	---	---	10.6	10.6	---	---
22	---	---	13.3	13.1	13.0	12.8	---	---	10.6	10.6	---	---
23	---	---	13.3	13.1	13.1	12.8	---	---	10.6	10.6	---	---
24	---	---	13.3	13.0	12.8	12.8	---	---	10.6	10.4	---	---
25	---	---	13.3	13.1	12.8	12.8	---	---	10.6	10.4	---	---
26	---	---	13.3	13.1	12.8	12.8	---	---	10.6	10.4	---	---
27	---	---	13.1	13.1	12.8	12.8	---	---	10.4	10.2	---	---
28	13.1	13.1	13.3	13.1	12.8	12.8	---	---	10.8	10.2	---	---
29	13.1	12.9	13.3	13.1	12.8	12.8	---	---	10.8	10.6	---	---
30	13.1	13.1	13.3	13.1	12.8	12.6	---	---	---	---	---	---
31	13.1	13.1	---	---	12.8	12.6	---	---	---	---	---	---
MONTH	13.1	12.9	13.3	13.0	13.3	12.6	12.8	12.3	11.0	10.2	10.8	10.2

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

413551083481200 LU-20 NR HOLLAND OH--Continued

#2 (21.6' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	---	---	---	---	---	---	---	---	---	---	11.6	11.4
2	---	---	---	---	---	---	---	---	---	---	11.6	11.3
3	---	---	---	---	---	---	---	---	---	---	11.7	11.5
4	---	---	---	---	---	---	---	---	---	---	11.7	11.5
5	---	---	10.0	9.8	---	---	---	---	---	---	11.8	11.5
6	---	---	10.0	9.8	---	---	---	---	---	---	11.8	11.5
7	---	---	10.0	9.8	---	---	---	---	---	---	11.8	11.7
8	---	---	---	---	---	---	---	---	---	---	11.8	11.7
9	---	---	---	---	---	---	---	---	---	---	11.8	11.7
10	10.0	9.8	---	---	---	---	---	---	---	---	11.8	11.7
11	10.0	9.6	---	---	---	---	10.5	10.2	---	---	11.8	11.7
12	10.0	9.6	---	---	---	---	10.5	10.2	---	---	11.8	11.7
13	10.0	9.8	---	---	---	---	10.5	10.3	---	---	11.7	11.7
14	10.0	9.8	---	---	---	---	10.5	10.3	---	---	11.9	11.7
15	10.0	9.6	---	---	---	---	10.5	10.4	---	---	12.0	11.7
16	10.0	9.7	---	---	---	---	10.6	10.4	---	---	12.0	11.7
17	---	---	---	---	---	---	10.6	10.4	---	---	12.0	11.7
18	---	---	---	---	---	---	10.7	10.4	---	---	12.0	11.8
19	---	---	---	---	---	---	10.7	10.4	---	---	12.0	11.9
20	---	---	---	---	---	---	10.7	10.4	11.3	11.1	12.0	11.9
21	---	---	---	---	---	---	10.7	10.5	11.3	11.1	12.0	11.9
22	---	---	---	---	---	---	10.7	10.5	11.3	11.1	12.0	12.0
23	---	---	---	---	---	---	10.7	10.5	---	---	12.2	11.9
24	---	---	---	---	---	---	---	---	11.4	11.1	12.2	12.0
25	---	---	---	---	---	---	---	---	11.3	11.3	12.2	12.0
26	---	---	---	---	---	---	---	---	11.4	11.3	12.2	12.0
27	---	---	---	---	---	---	---	---	11.4	11.3	12.2	12.0
28	---	---	---	---	---	---	---	---	11.3	11.3	12.2	12.2
29	---	---	---	---	---	---	---	---	11.5	11.3	12.2	12.2
30	---	---	---	---	---	---	---	---	11.5	11.3	12.4	12.2
31	---	---	---	---	---	---	---	---	11.5	11.3	---	---
MONTH	10.0	9.6	10.0	9.8	---	---	10.7	10.2	11.5	11.1	12.4	11.3
YEAR	13.3	9.6										

#3 (13.6' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	---	---	14.9	14.9	12.9	12.8	11.5	11.2	---	---	9.5	9.3
2	---	---	14.9	14.9	12.9	12.8	11.5	11.2	---	---	9.4	9.3
3	---	---	14.9	14.8	12.9	12.6	11.2	11.2	---	---	9.3	9.3
4	---	---	14.8	14.8	12.9	12.6	11.2	11.2	---	---	9.4	9.3
5	---	---	14.8	14.8	12.8	12.6	11.2	11.0	---	---	9.4	9.1
6	---	---	14.9	14.8	12.8	12.6	11.2	11.0	---	---	9.4	9.1
7	---	---	14.9	14.8	12.6	12.6	11.2	11.0	---	---	9.4	9.1
8	---	---	14.8	14.8	12.6	12.6	11.0	11.0	---	---	9.3	9.1
9	---	---	14.8	14.6	12.6	12.5	11.0	10.8	---	---	9.4	9.1
10	---	---	14.8	14.6	12.6	12.5	11.0	10.8	---	---	9.4	9.1
11	---	---	14.6	14.6	12.6	12.6	11.0	10.7	10.2	10.0	9.3	9.1
12	---	---	14.6	14.5	12.6	12.3	10.8	10.8	10.2	9.9	---	---
13	---	---	14.6	14.5	12.6	12.3	10.8	10.8	10.0	9.7	---	---
14	---	---	14.6	14.5	12.4	12.4	10.8	10.8	10.0	9.7	---	---
15	---	---	14.6	14.3	12.4	12.1	10.8	10.8	10.0	9.7	---	---
16	---	---	14.5	14.1	12.4	12.1	---	---	10.0	9.7	---	---
17	---	---	14.1	13.8	12.1	11.9	---	---	10.0	9.7	---	---
18	---	---	13.8	13.8	11.9	11.9	---	---	9.9	9.5	---	---
19	---	---	13.8	13.6	11.9	11.9	---	---	9.8	9.5	---	---
20	---	---	13.8	13.6	11.9	11.7	---	---	9.8	9.6	---	---
21	---	---	13.8	13.8	11.9	11.6	---	---	9.6	9.6	---	---
22	---	---	13.8	13.3	11.9	11.6	---	---	9.8	9.5	---	---
23	---	---	13.6	13.3	11.7	11.7	---	---	9.6	9.4	---	---
24	---	---	13.3	13.3	11.7	11.7	---	---	9.6	9.4	---	---
25	---	---	13.3	13.1	11.7	11.6	---	---	9.6	9.4	---	---
26	---	---	13.3	13.1	11.7	11.6	---	---	9.6	9.4	---	---
27	---	---	13.1	13.1	11.7	11.6	---	---	9.4	9.4	---	---
28	14.9	14.9	13.1	13.1	11.7	11.5	---	---	9.6	9.3	---	---
29	14.9	14.8	13.1	13.1	11.7	11.4	---	---	9.5	9.3	---	---
30	14.9	14.8	13.1	12.8	11.7	11.4	---	---	---	---	---	---
31	14.9	14.8	---	---	11.5	11.2	---	---	---	---	---	---
MONTH	14.9	14.8	14.9	12.8	12.9	11.2	11.5	10.7	10.2	9.3	9.5	9.1

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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413551083481200 LU-20 NR HOLLAND OH--Continued

#3 (13.6' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	---	---	---	---	---	---	---	---	---	---	13.9	13.6
2	---	---	---	---	---	---	---	---	---	---	13.9	13.7
3	---	---	---	---	---	---	---	---	---	---	13.9	13.9
4	---	---	---	---	---	---	---	---	---	---	13.9	13.9
5	---	---	9.4	9.2	---	---	---	---	---	---	13.9	13.9
6	---	---	9.4	9.2	---	---	---	---	---	---	13.9	13.9
7	---	---	9.4	9.2	---	---	---	---	---	---	13.9	13.9
8	---	---	---	---	---	---	---	---	---	---	13.9	13.9
9	---	---	---	---	---	---	---	---	---	---	14.1	13.9
10	8.8	8.6	---	---	---	---	---	---	---	---	14.1	13.9
11	8.8	8.4	---	---	---	---	11.3	11.1	---	---	14.2	13.9
12	8.8	8.6	---	---	---	---	11.4	11.3	---	---	14.1	14.1
13	9.0	8.6	---	---	---	---	11.4	11.3	---	---	14.4	14.1
14	8.8	8.6	---	---	---	---	11.5	11.3	---	---	14.4	14.1
15	8.8	8.6	---	---	---	---	11.6	11.3	---	---	14.4	14.1
16	9.0	8.6	---	---	---	---	11.6	11.5	---	---	14.4	14.1
17	---	---	---	---	---	---	11.8	11.5	---	---	14.4	14.3
18	---	---	---	---	---	---	11.8	11.7	---	---	14.4	14.3
19	---	---	---	---	---	---	11.8	11.7	---	---	14.4	14.3
20	---	---	---	---	---	---	11.8	11.7	13.2	13.1	14.4	14.3
21	---	---	---	---	---	---	11.8	11.7	13.4	13.1	14.4	14.3
22	---	---	---	---	---	---	12.0	11.7	13.4	13.2	14.4	14.4
23	---	---	---	---	---	---	12.0	11.8	---	---	14.6	14.3
24	---	---	---	---	---	---	---	---	13.6	13.4	14.6	14.4
25	---	---	---	---	---	---	---	---	13.6	13.4	14.6	14.4
26	---	---	---	---	---	---	---	---	13.7	13.4	14.6	14.3
27	---	---	---	---	---	---	---	---	13.7	13.6	14.6	14.4
28	---	---	---	---	---	---	---	---	13.7	13.6	14.6	14.3
29	---	---	---	---	---	---	---	---	13.7	13.6	14.6	14.6
30	---	---	---	---	---	---	---	---	13.9	13.6	14.6	14.4
31	---	---	---	---	---	---	---	---	13.9	13.6	---	---
MONTH	9.0	8.4	9.4	9.2	---	---	12.0	11.1	13.9	13.1	14.6	13.6
YEAR	14.9	8.4										

#4 (8.6' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	---	---	15.1	14.9	12.4	12.4	10.6	10.4	---	---	8.1	7.8
2	---	---	14.9	14.9	12.4	12.1	10.6	10.4	---	---	8.0	7.8
3	---	---	14.9	14.8	12.4	12.1	10.6	10.3	---	---	8.0	7.8
4	---	---	14.8	14.8	12.4	12.1	10.5	10.1	---	---	8.0	7.8
5	---	---	14.8	14.8	12.1	11.9	10.4	10.1	---	---	8.0	7.8
6	---	---	14.9	14.6	12.1	11.9	10.4	10.1	---	---	8.0	7.8
7	---	---	14.8	14.6	11.9	11.9	10.1	10.1	---	---	8.0	7.8
8	---	---	14.6	14.5	11.9	11.9	10.1	10.1	---	---	8.0	7.7
9	---	---	14.6	14.3	11.9	11.9	10.1	10.1	---	---	7.9	7.7
10	---	---	14.4	14.3	11.9	11.6	10.2	10.0	---	---	7.9	7.6
11	---	---	14.3	14.0	11.9	11.6	10.1	9.9	8.8	8.5	7.8	7.6
12	---	---	14.0	13.8	11.7	11.6	10.1	9.9	8.7	8.5	---	---
13	---	---	14.3	13.8	11.7	11.7	10.0	10.0	8.7	8.5	---	---
14	---	---	13.8	13.8	11.7	11.5	10.0	9.7	8.6	8.4	---	---
15	---	---	13.8	13.6	11.7	11.5	10.0	9.7	8.6	8.4	---	---
16	---	---	13.8	13.5	11.5	11.2	---	---	8.5	8.3	---	---
17	---	---	13.8	13.5	11.4	11.2	---	---	8.5	8.3	---	---
18	---	---	13.6	13.3	11.2	11.2	---	---	8.5	8.3	---	---
19	---	---	13.6	13.1	11.2	11.0	---	---	8.4	8.4	---	---
20	---	---	13.3	13.1	11.2	11.0	---	---	8.4	8.4	---	---
21	---	---	13.1	13.1	11.0	11.0	---	---	8.4	8.4	---	---
22	---	---	13.1	12.8	11.0	10.8	---	---	8.4	8.2	---	---
23	---	---	13.1	12.8	11.0	10.8	---	---	8.4	8.2	---	---
24	---	---	12.9	12.6	10.8	10.8	---	---	8.4	8.2	---	---
25	---	---	12.8	12.6	10.8	10.8	---	---	8.2	8.0	---	---
26	---	---	12.8	12.6	10.8	10.8	---	---	8.2	8.0	---	---
27	---	---	12.6	12.6	10.8	10.8	---	---	8.2	8.0	---	---
28	15.4	15.4	12.6	12.4	10.8	10.6	---	---	8.2	8.0	---	---
29	15.4	15.1	12.6	12.4	10.8	10.5	---	---	8.2	8.0	---	---
30	15.1	15.1	12.6	12.4	10.8	10.5	---	---	---	---	---	---
31	15.1	15.1	---	---	10.6	10.6	---	---	---	---	---	---
MONTH	15.4	15.1	15.1	12.4	12.4	10.5	10.6	9.7	8.8	8.0	8.1	7.6

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

413551083481200 LU-20 NR HOLLAND OH--Continued

#4 (8.6' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	---	---	---	---	---	---	---	---	---	---	16.5	16.2
2	---	---	---	---	---	---	---	---	---	---	16.5	16.3
3	---	---	---	---	---	---	---	---	---	---	16.5	16.3
4	---	---	---	---	---	---	---	---	---	---	16.5	16.5
5	---	---	8.0	7.8	---	---	---	---	---	---	16.5	16.5
6	---	---	8.0	7.8	---	---	---	---	---	---	16.5	16.5
7	---	---	8.0	8.0	---	---	---	---	---	---	16.5	16.5
8	---	---	---	---	---	---	---	---	---	---	16.5	16.5
9	---	---	---	---	---	---	---	---	---	---	16.5	16.5
10	7.7	7.5	---	---	---	---	---	---	---	---	16.5	16.5
11	7.7	7.5	---	---	---	---	13.9	13.8	---	---	16.8	16.5
12	7.7	7.5	---	---	---	---	14.1	13.9	---	---	16.8	16.5
13	7.6	7.6	---	---	---	---	14.2	13.9	---	---	16.8	16.5
14	7.6	7.6	---	---	---	---	14.4	14.1	---	---	16.8	16.7
15	7.8	7.6	---	---	---	---	14.4	14.1	---	---	16.8	16.5
16	7.8	7.6	---	---	---	---	14.4	14.4	---	---	16.8	16.5
17	---	---	---	---	---	---	14.4	14.4	---	---	16.8	16.5
18	---	---	---	---	---	---	14.4	14.4	---	---	16.8	16.5
19	---	---	---	---	---	---	14.7	14.4	---	---	16.8	16.5
20	---	---	---	---	---	---	14.7	14.6	16.0	16.0	16.7	16.5
21	---	---	---	---	---	---	14.6	14.6	16.0	16.0	16.5	16.5
22	---	---	---	---	---	---	14.7	14.6	16.0	16.0	16.5	16.5
23	---	---	---	---	---	---	14.9	14.6	---	---	16.5	16.5
24	---	---	---	---	---	---	---	---	16.2	15.9	16.5	16.5
25	---	---	---	---	---	---	---	---	16.2	15.9	16.5	16.2
26	---	---	---	---	---	---	---	---	16.3	15.9	16.5	16.2
27	---	---	---	---	---	---	---	---	16.3	16.0	16.2	16.2
28	---	---	---	---	---	---	---	---	16.3	16.2	16.2	16.2
29	---	---	---	---	---	---	---	---	16.3	16.2	16.2	16.2
30	---	---	---	---	---	---	---	---	16.5	16.2	16.2	16.0
31	---	---	---	---	---	---	---	---	16.5	16.2	---	---
MONTH	7.8	7.5	8.0	7.8	---	---	14.9	13.8	16.5	15.9	16.8	16.0
YEAR	16.8	7.5										

TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	---	---	12.5	10.0	5.3	3.2	.5	.4	---	---	1.0	.7
2	---	---	14.2	12.5	4.9	3.4	.5	.5	---	---	.7	.6
3	---	---	13.4	7.9	6.4	4.0	.6	.5	---	---	.7	.5
4	---	---	7.9	6.1	5.8	4.3	.6	.6	---	---	.5	.3
5	---	---	6.1	4.8	4.9	4.3	.6	.5	---	---	.4	.3
6	---	---	5.8	4.2	4.4	3.0	.5	.4	---	---	.4	.3
7	---	---	7.7	5.8	3.0	2.2	.5	.4	---	---	.4	.4
8	---	---	6.7	4.9	2.2	1.6	.4	.2	---	---	.4	.3
9	---	---	4.9	3.9	1.6	1.5	.2	.1	---	---	.3	.1
10	---	---	6.7	4.1	1.5	1.1	.1	.1	---	---	.1	.0
11	---	---	8.0	5.8	1.1	.8	.1	.0	-.2	-.3	.1	.0
12	---	---	5.8	4.1	.8	.7	.0	.0	-.2	-.2	---	---
13	---	---	5.1	3.9	.7	.7	.0	.0	-.1	-.2	---	---
14	---	---	4.6	3.4	.8	.7	.0	.0	-.2	-.2	---	---
15	---	---	3.7	3.0	2.1	.8	.1	.0	-.2	-.3	---	---
16	---	---	3.6	3.0	1.9	1.4	---	---	-.2	-.5	---	---
17	---	---	3.5	2.7	1.5	1.2	---	---	-.5	-1.1	---	---
18	---	---	3.0	2.9	1.2	1.2	---	---	-.7	-2.0	---	---
19	---	---	4.1	2.9	1.2	1.2	---	---	-.6	-1.2	---	---
20	---	---	4.9	3.2	1.2	1.1	---	---	-.3	-.6	---	---
21	---	---	4.7	3.7	1.1	1.0	---	---	-.2	-.3	---	---
22	---	---	3.7	3.1	1.0	.8	---	---	-.1	-.2	---	---
23	---	---	3.6	2.9	.8	.7	---	---	-.1	-.1	---	---
24	---	---	3.2	2.3	.8	.7	---	---	-.1	-.1	---	---
25	---	---	3.0	2.2	.7	.7	---	---	.0	-.1	---	---
26	---	---	3.9	2.4	.7	.7	---	---	.5	.0	---	---
27	---	---	5.7	3.9	.7	.6	---	---	4.8	.3	---	---
28	12.0	10.9	5.7	4.3	.6	.5	---	---	4.8	1.9	---	---
29	10.9	9.4	4.4	3.4	.6	.4	---	---	1.9	1.0	---	---
30	10.2	9.0	3.5	2.5	.5	.3	---	---	---	---	---	---
31	10.0	9.5	---	---	.4	.4	---	---	---	---	---	---
MONTH	12.0	9.0	14.2	2.2	6.4	.3	.6	.0	4.8	-2.0	1.0	.0

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	---	---	---	---	---	---	---	---	---	---	24.4	21.5
2	---	---	---	---	---	---	---	---	---	---	24.3	21.9
3	---	---	---	---	---	---	---	---	---	---	24.2	22.0
4	---	---	---	---	---	---	---	---	---	---	24.9	22.3
5	---	---	12.8	10.5	---	---	---	---	---	---	24.8	22.3
6	---	---	12.3	9.8	---	---	---	---	---	---	24.8	23.2
7	---	---	11.8	10.2	---	---	---	---	---	---	24.0	22.7
8	---	---	---	---	---	---	---	---	---	---	23.3	20.9
9	---	---	---	---	---	---	---	---	---	---	23.2	21.9
10	6.7	3.1	---	---	---	---	---	---	---	---	22.8	20.3
11	9.5	5.2	---	---	---	---	---	---	---	---	23.3	19.5
12	11.4	9.5	---	---	---	---	---	---	---	---	22.7	19.5
13	9.8	6.9	---	---	---	---	---	---	---	---	20.0	17.0
14	9.0	7.0	---	---	---	---	---	---	---	---	17.0	15.2
15	9.0	6.7	---	---	---	---	---	---	---	---	17.3	14.7
16	7.3	5.0	---	---	---	---	---	---	---	---	16.8	14.8
17	---	---	---	---	---	---	---	---	---	---	17.6	15.0
18	---	---	---	---	---	---	---	---	---	---	20.0	14.7
19	---	---	---	---	---	---	---	---	---	---	20.7	15.2
20	---	---	---	---	---	---	---	---	---	---	21.0	15.6
21	---	---	---	---	---	---	---	---	---	---	19.8	17.5
22	---	---	---	---	---	---	---	---	---	---	18.5	16.9
23	---	---	---	---	---	---	---	---	---	---	19.5	15.0
24	---	---	---	---	---	---	---	---	26.2	22.0	19.3	17.2
25	---	---	---	---	---	---	---	---	26.0	22.0	18.1	14.4
26	---	---	---	---	---	---	---	---	26.1	22.2	17.5	15.8
27	---	---	---	---	---	---	---	---	25.7	22.7	18.5	17.4
28	---	---	---	---	---	---	---	---	25.4	23.2	17.7	15.4
29	---	---	---	---	---	---	---	---	24.8	22.5	16.9	13.3
30	---	---	---	---	---	---	---	---	24.6	22.1	18.4	13.5
31	---	---	---	---	---	---	---	---	24.0	21.5	---	---
MONTH	11.4	3.1	12.8	9.8	---	---	---	---	26.2	21.5	24.9	13.3
YEAR	26.2	-2.0										

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	.22	.00	.00	---	.00	---	---	---	---	---	.00
2	---	.19	.00	.01	---	.00	---	---	---	---	---	.00
3	---	.00	.00	.04	---	.00	---	---	---	---	---	.00
4	---	.00	.00	.03	---	.00	---	---	---	---	---	.00
5	---	.00	.00	.02	---	.16	---	.21	---	---	---	.00
6	---	.00	.00	.06	---	.00	---	.01	---	---	---	.00
7	---	.12	.00	.04	---	.00	---	.00	---	---	---	.06
8	---	.00	.00	.04	---	.00	---	---	---	---	---	.00
9	---	.00	.00	.01	---	.02	.01	---	---	---	---	.23
10	---	.04	.00	.03	---	.00	.00	---	---	---	---	.00
11	---	.31	.00	.00	.00	.00	.00	---	---	.00	---	.02
12	---	.00	.00	.02	.00	---	.31	---	---	.00	---	.11
13	---	.02	.00	.00	.00	---	.00	---	---	.00	---	.00
14	---	.00	.15	.01	.00	---	.01	---	---	.00	---	.01
15	---	.00	.00	.00	.00	---	.09	---	---	.00	---	.01
16	---	.00	.00	---	.00	---	.00	---	---	.00	---	.00
17	---	.01	.00	---	.00	---	---	---	---	.00	---	.00
18	---	.08	.00	---	.00	---	---	---	---	.00	---	.01
19	---	.00	.00	---	.01	---	---	---	---	.00	---	.00
20	---	.00	.00	---	.01	---	---	---	---	.00	.00	.00
21	---	.00	.04	---	.00	---	---	---	---	.00	.00	.00
22	---	.00	.02	---	.01	---	---	---	---	.00	.00	.00
23	---	.00	.02	---	.00	---	---	---	---	.00	---	.00
24	---	.00	.03	---	.00	---	---	---	---	---	.00	.00
25	---	.00	.02	---	.00	---	---	---	---	---	.00	.01
26	---	.00	.06	---	.02	---	---	---	---	---	.00	.01
27	---	.02	.04	---	.37	---	---	---	---	---	.00	.20
28	.02	.00	.02	---	.00	---	---	---	---	---	.00	.02
29	.00	.00	.06	---	.00	---	---	---	---	---	.00	.00
30	.01	.00	.04	---	---	---	---	---	---	---	.00	.00
31	.11	---	.00	---	---	---	---	---	---	---	.00	---
TOTAL	0.14	1.01	0.50	0.31	0.42	0.18	0.42	0.22	---	0.00	0.00	0.69

WTR YR 1996 TOTAL 3.89



EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
UNCONSOLIDATED AQUIFERS IN OHIO

## GROUND-WATER RECORDS

413547083481400. Local number, LU-23.

LOCATION.--Lat 41°35'47" Long 83°48'14", Hydrologic Unit 04100009, along State Route 2 near Holland, OH.  
Owner.--USGS-Toledo Express Airport.

AQUIFER.--Sand of Quaternary age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 29.4 ft. Cased with Sch 40 PVC to 4.4 ft; .010-in. screen from 4.4 to 29.4 ft.

INSTRUMENTATION - Data logger--60-minute record. At this well there are 4 conductivity/water temperature probes at increasing depths within the well to better document vertical movement of high-conductivity water on an hourly basis. Conductivity/water temperature probes are set at 6.9 (level 4), 10.4 (level 3), 16.9 (level 2), and 25.4 (level 1) ft below land surface.

DATUM.--Elevation of land-surface datum is 676.97 ft above sea level.  
Measuring point: top of PVC casing 0.58 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality. Water-quality data for nearby wells are available in preceding tables.

PERIOD OF RECORD.--February 1991 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE (FOUR LEVELS): February 1991 to current year.  
WATER TEMPERATURE (FOUR LEVELS): February 1991 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE:

LEVEL 1- Maximum, 1630 microsiemens July 16 and 17, 1991; minimum, 441 microsiemens March 2-3, 1992.  
LEVEL 2- Maximum, 1790 microsiemens July 15, 1991; minimum, 439 microsiemens June 14-15, 1995.  
LEVEL 3- Maximum, 1530 microsiemens July 22 and 23, 1991; minimum, 413 microsiemens October 8, 1991.  
LEVEL 4- Maximum, 1180 microsiemens August 17-18, 1994; minimum, 107 microsiemens August 31, 1991.

WATER TEMPERATURE:

LEVEL 1- Maximum, 13.9°C many days in 1991; minimum, 11.1°C many days April, May, June, 1993, May, 1994, and May 29-31, June 4-5, 13, 1996.  
LEVEL 2- Maximum, 15.4°C October 30, November 11, 16, 1991; minimum, 9.6°C April 2, 7, 13, 18, 1993.  
LEVEL 3- Maximum, 17.5°C many days in 1991; minimum, 7.4°C several days in March and April, 1996.  
LEVEL 4- Maximum, 19.0°C many days in 1991; minimum, 7.4°C March 25-29, 1993.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE:

LEVEL 1- Maximum, 1240 microsiemens June 20-21, 1996; minimum, 500 microsiemens May 16, 1996.  
LEVEL 2- Maximum, 1230 microsiemens June 20-21, 1996; minimum, 496 microsiemens May 17-19, 1996.  
LEVEL 3- Maximum, 1200 microsiemens June 19, 1996; minimum, 505 microsiemens May 10, 16-19, 1996.  
LEVEL 4- Maximum, 1050 microsiemens June 23, 1996; minimum, 430 microsiemens August 15, 16, 1996.

WATER TEMPERATURE:

LEVEL 1- Maximum, 13.6°C November 22-December 23, 1995; minimum, 11.1°C May 29-31, June 4-5, 13, 1996.  
LEVEL 2- Maximum, 15.2°C October 17-19, November 1, 1995; minimum, 9.9°C April 8, 21, 26-28, 1996.  
LEVEL 3- Maximum, 16.0°C October 1-3, 6, 8-9, 1995; minimum, 7.4°C several days in March and April, 1996.  
LEVEL 4- Maximum, 17.4°C many days in October, 1995, September, 1996; minimum, 8.3°C March 29-April 3, 1996.

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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413547083481400 LU-23 NR HOLLAND OH--Continued

#1 (25.4' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	904	893	899	---	---	---	995	945	963	948	942	944
2	908	898	902	1000	964	979	1000	976	993	947	940	944
3	910	904	907	985	975	981	1010	978	1000	947	944	945
4	914	906	910	989	982	985	1010	963	987	947	943	945
5	924	912	916	989	983	986	1010	973	987	945	943	944
6	919	912	915	989	979	986	1000	966	977	945	942	943
7	921	915	918	993	986	989	997	972	977	942	939	940
8	925	917	921	993	987	989	1020	975	991	940	935	937
9	931	921	926	992	985	990	1000	977	983	936	931	934
10	933	924	929	996	980	989	1020	976	990	934	927	930
11	938	928	933	999	967	990	984	978	981	928	919	923
12	939	931	935	993	965	981	985	980	983	923	915	920
13	941	932	938	992	978	984	1010	985	995	921	916	919
14	945	937	942	987	977	983	992	974	984	920	914	917
15	948	938	942	984	976	981	982	974	979	917	912	914
16	949	940	944	986	967	980	982	973	977	914	908	911
17	952	940	945	989	982	986	974	963	967	908	903	905
18	951	943	946	989	982	986	964	955	959	911	901	906
19	953	945	948	989	979	986	955	953	954	917	906	910
20	952	945	949	991	981	987	959	947	954	908	889	897
21	952	945	949	992	965	984	947	931	939	893	890	892
22	952	948	950	990	973	983	942	921	935	890	881	885
23	956	948	953	992	975	986	942	929	935	890	881	886
24	957	952	954	989	974	983	929	919	922	885	873	880
25	959	950	955	992	976	983	922	910	916	878	866	872
26	959	950	955	993	980	986	928	910	920	871	862	866
27	961	953	956	995	959	981	925	918	921	862	846	855
28	960	953	957	992	962	976	918	912	914	846	837	842
29	962	949	956	992	958	977	918	915	917	837	828	832
30	961	953	956	999	954	971	925	917	919	828	821	825
31	959	953	956	---	---	---	945	925	941	821	814	818
MONTH	962	893	937	1000	954	984	1020	910	960	948	814	903

#1 (25.4' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	814	808	811	663	659	661	558	557	557	584	565	575
2	808	801	805	659	653	656	559	555	558	571	516	540
3	801	795	798	653	649	651	559	555	558	517	513	515
4	795	788	791	649	644	646	559	557	558	516	515	516
5	789	782	786	644	640	642	560	557	558	560	515	519
6	783	779	781	640	634	637	560	557	558	574	560	571
7	779	773	776	634	630	632	---	---	---	571	561	567
8	773	767	770	630	625	627	560	556	557	563	550	560
9	767	761	764	625	621	624	557	556	557	562	549	556
10	762	756	760	622	616	620	559	555	556	572	557	563
11	759	751	754	619	615	617	558	554	556	557	506	530
12	751	745	747	617	610	614	559	554	557	506	504	505
13	749	742	744	610	603	607	558	554	557	505	501	504
14	743	734	740	603	597	600	558	554	556	505	502	504
15	737	732	734	597	591	595	557	553	556	505	503	504
16	732	726	729	591	585	589	557	555	556	506	500	503
17	727	722	724	585	579	582	556	551	554	505	502	503
18	722	716	719	581	574	578	554	546	551	505	502	502
19	716	711	714	576	571	573	551	537	544	505	502	503
20	711	705	708	583	568	576	591	535	551	506	501	504
21	705	700	703	574	559	566	587	571	578	539	504	522
22	700	695	698	559	555	557	612	573	591	541	509	519
23	695	690	692	556	555	555	595	581	588	516	510	512
24	690	685	688	559	556	556	596	565	586	516	513	514
25	685	680	684	560	551	555	568	520	546	518	513	515
26	680	675	678	553	551	552	581	523	549	521	513	514
27	678	670	674	555	551	552	582	565	575	522	513	514
28	673	665	667	556	552	553	578	522	538	521	513	516
29	666	660	664	557	552	554	533	522	525	527	516	521
30	---	---	---	557	553	555	595	529	584	542	526	533
31	---	---	---	558	553	556	---	---	---	556	540	547
MONTH	814	660	735	663	551	595	612	520	559	584	500	525

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

413547083481400 LU-23 NR HOLLAND OH--Continued

#1 (25.4' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE				JULY				AUGUST		
										SEPTEMBER		
1	571	553	561	910	886	898	621	617	619	736	728	731
2	581	570	574	889	866	878	622	617	619	743	733	737
3	594	579	586	870	848	859	622	614	618	749	739	742
4	606	592	599	851	829	839	622	616	618	752	745	748
5	620	605	612	832	813	822	622	614	618	756	750	754
6	637	618	627	816	803	811	620	613	615	766	756	760
7	639	634	635	806	788	798	621	613	616	770	764	766
8	647	636	641	793	777	784	617	610	614	775	769	772
9	652	645	648	781	766	773	617	614	616	781	774	777
10	648	644	646	767	752	760	618	613	617	785	779	781
11	652	645	647	756	741	748	618	615	618	785	778	782
12	765	649	678	744	725	735	620	616	619	788	779	783
13	843	765	812	730	712	722	621	617	620	785	780	783
14	908	843	867	716	702	709	622	618	621	784	780	781
15	959	908	933	705	684	694	623	618	621	786	780	782
16	980	955	966	686	668	676	623	620	622	783	781	782
17	991	976	985	673	657	664	625	620	623	788	783	784
18	1130	985	1050	661	645	653	626	621	624	787	781	785
19	1230	1130	1190	646	636	640	628	623	626	789	782	787
20	1240	1230	1240	640	627	632	630	626	628	789	782	787
21	1240	1200	1230	628	620	624	631	628	629	789	783	787
22	1210	1150	1180	621	618	620	659	630	639	790	787	789
23	1150	1090	1120	619	614	618	680	659	672	791	783	788
24	1100	1050	1080	618	613	617	694	676	684	792	785	789
25	1060	1020	1040	619	614	617	701	689	695	795	788	792
26	1020	992	1010	620	617	619	712	700	705	796	790	795
27	996	967	983	620	616	619	720	712	717	805	791	797
28	973	946	961	620	616	618	726	719	722	801	793	797
29	951	925	939	620	615	618	723	718	721	797	790	794
30	929	905	919	620	612	618	724	718	722	795	785	789
31	---	---	---	621	615	618	731	722	726	---	---	---
MONTH	1240	553	865	910	612	706	731	610	646	805	728	777
YEAR	1240	500	766									

#2 (16.9' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER				NOVEMBER				DECEMBER		
										JANUARY		
1	677	670	674	---	---	---	886	885	886	964	958	962
2	681	674	677	881	859	870	890	886	888	962	959	961
3	705	680	686	881	873	878	896	888	891	960	956	958
4	710	705	709	885	878	882	899	890	895	958	954	956
5	722	709	710	892	881	887	903	893	899	955	951	953
6	735	722	732	892	861	875	907	896	903	955	948	950
7	730	719	725	873	858	865	910	901	907	953	945	948
8	719	715	717	881	867	875	914	910	912	951	942	947
9	720	716	716	884	872	877	919	914	916	946	940	943
10	720	715	716	885	876	881	927	919	923	941	935	938
11	721	716	717	904	885	894	931	923	929	938	931	934
12	725	717	719	903	898	901	936	931	933	936	929	932
13	728	721	723	900	888	895	940	936	938	932	925	929
14	728	724	726	890	875	883	947	939	942	927	922	925
15	729	727	728	877	873	875	954	944	948	923	918	920
16	733	728	731	878	875	876	961	951	956	919	913	916
17	734	728	732	878	869	874	966	956	961	919	913	916
18	734	729	733	874	870	872	968	965	967	923	917	921
19	736	731	735	883	874	879	969	968	969	924	918	922
20	738	736	737	882	874	876	970	968	969	922	913	917
21	740	738	738	875	874	875	969	967	968	917	907	912
22	742	737	740	880	874	877	969	966	967	908	898	902
23	742	737	741	879	877	878	967	965	966	898	888	893
24	746	742	745	879	877	878	966	964	965	891	878	884
25	746	745	745	882	877	878	969	963	966	879	871	874
26	749	746	747	882	877	879	969	962	967	872	862	866
27	750	743	747	883	881	882	968	963	966	865	847	854
28	747	744	746	884	882	883	966	964	965	852	839	844
29	748	747	747	885	884	884	968	962	964	843	830	836
30	747	743	746	886	884	885	967	960	963	833	822	827
31	746	741	743	---	---	---	966	960	964	825	814	819
MONTH	750	670	727	904	858	880	970	885	940	964	814	912





# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

413547083481400 LU-23 NR HOLLAND OH--Continued

#3 (10.4' BLS) -SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	665	657	660	---	---	---	894	891	893	978	972	975
2	668	661	663	972	888	913	896	893	895	977	971	974
3	670	664	668	916	903	908	902	895	898	973	968	971
4	673	670	672	903	898	900	906	897	901	971	966	968
5	675	673	674	901	896	897	909	904	906	969	963	966
6	677	672	676	900	890	895	912	907	909	969	960	964
7	683	677	680	890	881	885	919	911	914	965	959	962
8	691	682	686	881	878	879	924	915	919	961	954	958
9	694	688	691	882	877	880	930	920	926	955	948	952
10	703	694	699	881	878	879	933	925	931	951	944	947
11	715	703	708	878	875	876	942	931	936	947	940	943
12	723	713	716	876	875	875	946	937	943	945	936	940
13	728	720	723	883	875	879	950	942	947	940	935	937
14	732	728	730	883	881	882	958	949	952	938	931	935
15	733	731	732	884	879	882	965	953	959	933	925	930
16	735	733	734	883	879	881	971	959	966	931	925	928
17	738	732	736	879	876	878	978	970	973	931	926	929
18	739	734	737	880	874	878	977	972	975	936	930	933
19	742	736	740	878	871	877	982	975	978	935	928	933
20	745	742	743	877	874	875	982	978	980	935	926	931
21	747	745	746	876	874	875	981	978	979	927	916	922
22	752	747	749	880	874	877	981	976	979	920	910	915
23	756	749	752	879	876	878	978	976	977	910	899	905
24	759	756	757	882	876	878	982	976	978	902	889	896
25	759	754	759	883	877	881	981	975	978	890	878	885
26	762	759	760	884	880	881	980	975	978	881	867	874
27	766	761	762	887	880	884	980	976	978	872	854	862
28	761	756	759	888	881	886	981	972	977	854	845	850
29	760	755	757	892	885	888	980	973	976	848	838	843
30	758	756	757	893	887	890	980	973	976	840	830	834
31	758	756	757	---	---	---	979	972	975	830	821	826
MONTH	766	657	722	972	871	884	982	891	950	978	821	922

#3 (10.4' BLS) -SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	823	814	818	663	656	659	558	555	556	516	513	516
2	815	805	810	657	651	654	559	555	556	517	514	516
3	805	798	803	653	648	650	559	554	557	518	514	517
4	802	792	797	650	644	647	558	555	556	519	518	518
5	795	787	791	646	640	643	559	556	557	519	516	517
6	788	783	785	642	632	638	558	554	556	519	515	516
7	783	776	780	635	631	633	---	---	---	517	515	515
8	776	768	773	631	624	628	557	554	556	516	514	515
9	771	764	767	626	621	624	557	554	556	515	511	513
10	765	757	761	622	616	619	559	553	556	514	505	509
11	760	751	755	618	614	616	557	553	555	510	508	509
12	753	745	749	615	608	612	557	552	554	511	510	510
13	749	740	745	610	601	606	556	553	555	512	508	510
14	745	735	739	603	594	598	556	551	554	512	508	510
15	737	730	734	597	587	592	555	552	554	509	509	509
16	732	726	729	590	582	586	556	551	553	509	505	508
17	728	721	724	582	573	578	557	551	553	509	505	507
18	724	717	719	575	568	572	573	547	553	508	505	507
19	719	712	715	570	562	566	549	533	541	509	505	507
20	714	708	711	563	551	557	535	523	529	510	506	508
21	709	703	706	551	548	550	524	519	522	513	508	510
22	704	697	701	552	548	550	523	516	520	514	510	512
23	699	692	695	556	551	553	520	517	518	518	513	516
24	693	688	690	556	551	553	523	518	520	519	516	517
25	688	681	685	554	548	552	522	520	521	520	515	518
26	684	676	681	554	549	551	522	521	521	518	517	518
27	680	670	676	554	550	552	522	521	521	518	518	518
28	675	665	671	554	552	553	522	519	521	520	516	518
29	667	662	664	556	551	554	522	519	520	525	518	521
30	---	---	---	558	552	555	520	516	518	540	525	531
31	---	---	---	558	554	555	---	---	---	554	540	546
MONTH	823	662	737	663	548	592	573	516	542	554	505	515



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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413547083481400 LU-23 NR HOLLAND OH--Continued

#3 (10.4' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE				JULY				AUGUST		
											SEPTEMBER	
1	568	554	560	931	905	918	545	539	541	574	564	567
2	581	568	574	909	884	896	540	536	539	579	571	573
3	595	581	587	887	866	877	540	535	538	583	576	580
4	606	593	599	869	848	857	539	535	537	589	583	586
5	620	606	612	848	829	839	538	533	535	597	589	593
6	636	620	628	834	818	825	537	530	533	604	597	600
7	641	636	639	824	806	815	533	527	530	612	604	608
8	650	639	643	810	795	802	531	527	528	618	608	612
9	655	647	650	799	782	791	529	524	527	623	615	619
10	653	648	652	782	770	777	528	523	526	625	620	623
11	653	648	651	776	759	766	528	523	526	630	623	627
12	685	652	662	763	750	754	527	523	525	634	628	631
13	773	685	720	750	734	742	527	522	524	639	634	637
14	855	773	820	738	720	728	526	522	524	644	639	642
15	882	855	868	720	702	711	527	522	524	650	644	647
16	932	882	901	705	688	695	527	523	525	655	648	652
17	983	932	956	692	673	682	528	524	525	659	652	656
18	1110	983	1040	677	663	670	529	525	526	664	656	659
19	1200	1110	1180	667	654	659	528	524	527	667	660	662
20	1180	1120	1150	657	644	649	530	526	528	670	663	665
21	1140	1110	1120	646	634	640	531	527	530	673	667	669
22	1180	1140	1160	634	620	629	534	529	531	677	670	673
23	1170	1120	1150	622	611	617	555	531	540	680	673	676
24	1120	1080	1100	620	608	612	557	550	553	685	677	682
25	1080	1040	1060	620	605	614	555	550	551	689	681	684
26	1040	1010	1030	605	589	597	557	552	553	693	685	691
27	1020	992	1000	592	574	582	557	551	554	697	693	695
28	998	971	982	577	564	569	557	553	556	703	697	700
29	971	947	960	564	556	562	559	554	557	711	701	705
30	951	931	940	559	549	554	562	557	559	722	711	716
31	---	---	---	549	541	544	567	560	563	---	---	---
MONTH	1200	554	853	931	541	709	567	522	537	722	564	644
YEAR	1200	505	717									

#4 (6.9' BLS)-SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER				NOVEMBER				DECEMBER		
											JANUARY	
1	647	642	644	920	745	809	883	877	879	949	943	946
2	652	646	648	979	899	928	884	878	882	948	942	946
3	657	650	654	927	910	916	888	884	885	946	941	943
4	661	657	659	911	905	908	893	886	888	942	936	940
5	663	661	661	905	900	903	895	888	890	940	934	937
6	665	660	664	900	888	896	900	891	896	937	930	933
7	669	665	666	888	875	882	903	896	901	936	929	932
8	675	669	670	875	869	872	907	902	905	932	925	928
9	679	671	674	874	869	872	912	906	909	927	919	923
10	684	676	679	871	867	869	915	911	913	920	914	917
11	688	681	684	872	865	870	924	915	917	914	909	912
12	692	688	690	870	865	870	926	919	923	911	904	907
13	701	692	695	873	869	871	930	926	928	906	899	903
14	705	697	701	878	872	875	938	930	935	903	898	900
15	711	703	706	881	877	879	945	933	941	899	890	896
16	716	707	712	883	877	880	950	945	947	894	890	892
17	721	713	717	881	875	878	954	950	951	898	890	893
18	725	719	722	877	871	874	955	952	953	899	892	897
19	730	724	727	875	871	874	958	952	953	900	894	897
20	734	730	732	874	870	871	957	951	954	899	887	894
21	735	733	734	871	868	870	957	951	955	891	880	886
22	741	735	738	873	867	870	957	950	954	881	873	877
23	743	737	739	873	867	872	955	952	954	875	864	868
24	745	743	744	876	870	872	957	950	953	864	854	858
25	749	744	745	875	869	873	956	950	954	854	842	848
26	751	745	747	877	873	874	956	950	954	842	831	836
27	751	743	749	879	873	876	956	950	952	831	817	825
28	743	733	737	878	873	877	956	949	953	817	807	811
29	742	735	739	879	877	878	955	949	952	808	796	803
30	747	738	744	879	875	877	951	948	949	800	787	794
31	747	745	746	---	---	---	951	944	947	791	782	786
MONTH	751	642	705	979	745	878	958	877	930	949	782	888



## 223

#1 (25.4' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

#1 (25.4' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996[illegible]

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

413547083481400 LU-23 NR HOLLAND OH--Continued

#2 (16.9' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	14.7	14.4	---	---	14.1	14.1	13.1	12.9	11.9	11.7	11.1	10.9
2	14.9	14.4	15.2	14.9	14.1	14.1	12.9	12.9	11.9	11.7	11.1	10.9
3	14.7	14.6	15.1	14.9	14.1	13.9	12.9	12.9	11.7	11.7	11.1	10.9
4	14.7	14.6	14.9	14.9	14.1	13.9	12.9	12.8	11.7	11.7	10.9	10.7
5	14.7	14.6	15.1	14.9	14.1	13.9	12.9	12.9	11.7	11.5	10.9	10.7
6	14.9	14.6	15.1	14.9	14.1	13.9	12.9	12.7	11.7	11.5	10.9	10.6
7	14.9	14.6	14.9	14.9	14.1	13.8	12.9	12.6	11.8	11.5	10.9	10.6
8	15.0	14.6	15.1	14.9	13.9	13.8	12.9	12.6	11.6	11.3	10.9	10.6
9	15.0	14.6	14.9	14.9	13.9	13.8	12.7	12.6	11.6	11.3	10.9	10.6
10	15.0	14.6	14.9	14.9	13.8	13.6	12.7	12.5	11.6	11.3	10.9	10.5
11	15.0	14.7	14.9	14.9	13.8	13.6	12.7	12.4	11.6	11.3	10.7	10.5
12	15.0	14.7	14.9	14.9	13.6	13.6	12.6	12.4	11.5	11.3	10.9	10.5
13	15.0	14.7	14.9	14.9	13.6	13.6	12.7	12.4	11.5	11.3	10.7	10.5
14	14.9	14.9	14.9	14.9	13.6	13.4	12.5	12.4	11.3	11.3	10.7	10.5
15	14.9	14.9	14.9	14.9	13.6	13.4	12.5	12.4	11.3	11.3	10.7	10.5
16	14.9	14.9	14.9	14.9	13.6	13.4	12.5	12.4	11.3	11.3	10.7	10.5
17	15.2	14.9	14.9	14.9	13.6	13.4	12.5	12.5	11.3	11.3	10.7	10.5
18	15.2	14.9	14.9	14.9	13.4	13.4	12.5	12.2	11.3	11.3	10.7	10.5
19	15.2	14.9	14.9	14.6	13.4	13.4	12.5	12.2	11.3	11.3	10.5	10.5
20	14.9	14.9	14.7	14.4	13.4	13.4	12.4	12.2	11.4	11.1	10.7	10.5
21	14.9	14.9	14.6	14.6	13.4	13.3	12.4	12.2	11.3	11.1	10.7	10.5
22	15.2	14.9	14.6	14.4	13.4	13.3	12.2	12.2	11.3	11.1	10.5	10.5
23	15.2	14.9	14.4	14.4	13.4	13.4	12.2	12.0	11.3	11.1	10.5	10.2
24	14.9	14.9	14.4	14.3	13.4	13.4	12.2	12.0	11.3	11.1	10.5	10.3
25	14.9	14.9	14.4	14.1	13.4	13.1	12.2	12.0	11.1	11.1	10.5	10.3
26	14.9	14.9	14.4	14.1	13.4	13.1	12.2	11.8	11.1	10.9	10.5	10.2
27	14.9	14.9	14.1	14.1	13.4	13.1	12.0	11.7	11.4	10.9	10.5	10.2
28	14.9	14.9	14.1	14.1	13.2	13.1	12.0	11.7	11.1	11.1	10.5	10.1
29	14.9	14.9	14.1	14.1	13.1	12.9	12.0	11.7	11.1	11.1	10.5	10.1
30	14.9	14.9	14.1	14.1	13.1	12.9	12.0	11.7	---	---	10.5	10.1
31	14.9	14.9	---	---	13.1	12.9	12.0	11.7	---	---	10.3	10.1
MONTH	15.2	14.4	15.2	14.1	14.1	12.9	13.1	11.7	11.9	10.9	11.1	10.1

#2 (16.9' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]



## 225

#3 (10.4' BLS) - WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	#3 (10.4' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996											
DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	7.6	7.4	8.3	8.1	9.4	9.1	11.2	10.9	13.5	13.2	14.7	14.4
2	7.7	7.4	8.4	8.1	9.3	9.1	11.4	11.0	13.7	13.4	14.7	14.4
3	7.6	7.4	8.4	8.1	9.3	9.1	11.4	11.1	13.7	13.4	15.0	14.7
4	7.6	7.5	8.1	8.1	9.3	9.1	11.4	11.2	13.7	13.4	15.0	14.7
5	7.6	7.4	8.3	8.1	9.3	9.3	11.6	11.4	13.7	13.4	15.0	14.7
6	7.7	7.5	8.3	8.1	9.3	9.3	11.7	11.4	13.7	13.4	15.0	14.7
7	---	---	8.3	8.1	9.5	9.3	11.7	11.4	13.7	13.5	15.0	14.7
8	7.7	7.5	8.3	8.3	9.5	9.3	11.9	11.4	13.7	13.5	15.0	14.7
9	7.7	7.5	8.5	8.3	9.5	9.3	11.8	11.6	14.0	13.7	15.0	14.7
10	7.8	7.4	8.5	8.3	9.7	9.5	12.1	11.8	14.0	13.7	15.2	14.9
11	7.7	7.4	8.3	8.3	9.7	9.5	12.1	11.8	14.0	13.7	15.2	14.9
12	7.8	7.4	8.3	8.3	9.7	9.5	12.1	11.8	14.0	13.7	15.2	14.9
13	7.7	7.6	8.5	8.3	9.9	9.5	12.3	12.0	14.0	13.7	14.9	14.9
14	7.7	7.5	8.5	8.3	9.9	9.7	12.3	12.0	14.0	13.7	14.9	14.9
15	7.7	7.6	8.5	8.5	10.0	9.7	12.5	12.3	14.2	13.7	14.9	14.9
16	7.7	7.6	8.7	8.5	10.0	9.7	12.5	12.3	14.2	13.9	15.1	14.9
17	8.0	7.6	8.7	8.5	9.7	9.7	12.7	12.3	14.2	13.9	15.2	14.9
18	8.0	7.6	8.8	8.5	10.1	9.7	12.8	12.5	14.2	14.0	15.2	14.9
19	8.0	7.6	8.8	8.5	10.4	9.9	12.8	12.5	14.4	14.1	15.2	14.9
20	8.0	7.8	8.8	8.5	10.3	10.1	12.8	12.5	14.5	14.2	15.2	14.9
21	8.0	7.7	8.7	8.5	10.4	10.1	12.7	12.5	14.5	14.2	15.2	14.9
22	8.0	7.7	8.9	8.7	10.4	10.1	13.0	12.7	14.5	14.2	15.2	14.9
23	7.9	7.7	8.9	8.7	10.4	10.1	13.0	12.7	14.5	14.2	15.2	14.9
24	8.0	7.8	8.9	8.7	10.6	10.3	13.0	12.7	14.5	14.1	15.2	14.9
25	8.2	7.8	9.1	8.7	10.7	10.3	13.0	12.7	14.5	14.1	15.2	14.9
26	7.9	7.9	8.9	8.9	10.8	10.5	13.2	12.9	14.5	14.2	15.2	14.9
27	8.0	7.9	8.9	8.9	10.8	10.5	13.2	12.9	14.7	14.2	14.9	14.9
28	8.1	7.9	9.1	8.9	10.8	10.5	13.2	13.0	14.7	14.4	14.9	14.9
29	8.1	7.9	9.1	8.9	11.0	10.7	13.5	13.2	14.7	14.4	15.2	14.9
30	8.1	8.1	9.3	9.1	11.0	10.7	13.5	13.2	14.7	14.4	15.2	14.9
31	---	---	9.4	9.1	---	---	13.5	13.2	14.7	14.4	---	---
MONTH	8.2	7.4	9.4	8.1	11.0	9.1	13.5	10.9	14.7	13.2	15.2	14.4
YEAR	16.0	7.4										



#4 (6.9' BLS) -WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

#4 (6.9' BLS)-WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996[illegible]

EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
UNCONSOLIDATED AQUIFERS IN OHIO

227

GROUND-WATER RECORDS

413547083481500. Local number, LU-24.

LOCATION.--Lat 41°35'47" Long 83°48'15", Hydrologic Unit 04100009, along State Route 2 near Holland, OH.  
Owner.--USGS-Toledo Express Airport.

AQUIFER.--Sand of Quaternary age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 18.7 ft. Cased with Sch 40 PVC to 8.7 ft; .010-in. screen from 8.7 to 18.7 ft.

INSTRUMENTATION - Data logger--60-minute record. Water-level data only were collected at this well.

DATUM.--Elevation of land-surface datum is 677.21 ft above sea level.  
Measuring point: shelter floor 2.12 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality. Water-quality data for nearby wells are available in adjacent tables.

PERIOD OF RECORD.--February 1991 to current year.

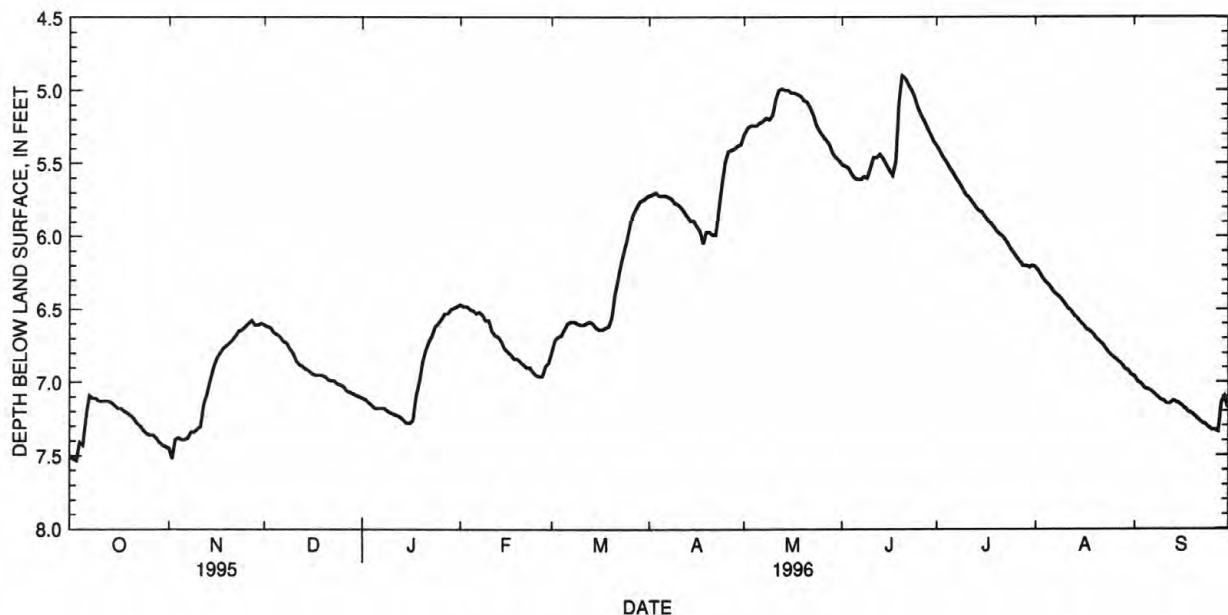
PERIOD OF DAILY RECORD.--  
WATER LEVEL: February 1991 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER LEVEL: Maximum daily low, 8.10 ft below land-surface datum, October 24, 1991; maximum daily high, 3.70 ft below land-surface datum, April 2, 1993.

EXTREMES FOR CURRENT YEAR.--

WATER LEVEL: Maximum daily low, 7.53 ft below land-surface datum, October 3, 1995; maximum daily high, 4.89 ft below land-surface datum, June 20, 1996.



DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

229

## GROUND-WATER RECORDS

403923082325500. Local number, R-16.

LOCATION.--Lat 40°39'23" Long 82°32'55", Hydrologic Unit 05040002, along State Route 97 near Lexington, OH.  
Owner.--USGS-Sam McBride.

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 18.9 ft. Cased with Sch 40 PVC to 8.9 ft; .010-in. screen from 8.9 to 18.9 ft.

INSTRUMENTATION - Data logger--60-minute record. Precipitation data collected with a propane-heated, tipping-bucket rain gage. Also collected: air temperature, soil temperature, water temperature, and specific conductance. Conductivity/water temperature probe set at 18.6 ft below land surface.

DATUM.--Elevation of land-surface datum is 1168.37 ft above sea level.  
Measuring point: shelter shelf 2.36 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality. Water-quality data for nearby wells are available in preceding tables. Incomplete data this year due to problems with recorder.

PERIOD OF RECORD.--February 1991 to current year.

### PERIOD OF DAILY RECORD.--

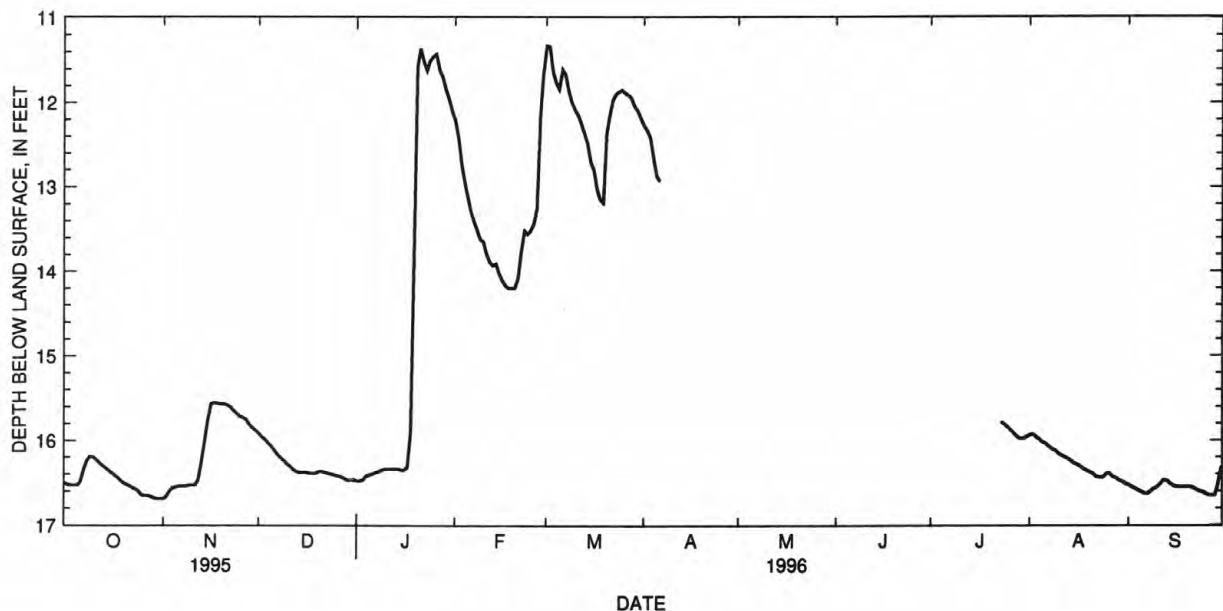
WATER LEVEL: February 1991 to current year.  
SPECIFIC CONDUCTANCE: February 1991 to current year.  
AIR TEMPERATURE: February 1991 to current year.  
WATER TEMPERATURE: February 1991 to current year.  
SOIL TEMPERATURE: February 1991 to current year.  
PRECIPITATION: February 1991 to current year.

### EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER LEVEL: Maximum daily low, 17.62 ft below land-surface datum, November 30-December 3, 1991, November 26-28, 1994; maximum daily high, 10.56 ft below land-surface datum, March 27, 1993.  
SPECIFIC CONDUCTANCE: Maximum, 774 microsiemens August 9, 1995; minimum, 157 microsiemens March 6, 1991.  
AIR TEMPERATURE: Maximum, 36.0°C August 1, 1991; minimum, -26.1°C January 19, 1992.  
WATER TEMPERATURE: Maximum, 12.6°C October 11-13, 1995; minimum, 7.7°C April 16-17, 1994, and March 22-April 8, 1996.  
SOIL TEMPERATURE: Maximum, 29.3°C August 29, 1993, and June 19, 1994; minimum, -1.6°C February 6, 1996.

### EXTREMES FOR CURRENT YEAR.--

WATER LEVEL: Maximum daily low, 16.69 ft below land-surface datum, October 30-November 1, 1995; maximum daily high, 11.15 ft below land-surface datum, March 2, 1996.  
SPECIFIC CONDUCTANCE: Maximum, 603 microsiemens January 19, 1996; minimum, 265 microsiemens July 23, 1996.  
AIR TEMPERATURE: Maximum, 31.5°C August 7, 1996; minimum, -23.6°C December 22, 1995.  
WATER TEMPERATURE: Maximum, 12.6°C October 11-13, 1995; minimum, 7.7°C March 22-April 8, 1996.  
SOIL TEMPERATURE: Maximum, 24.8°C August 22, 1996; minimum, -1.6°C February 6, 1996.



DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

231

403923082325500 R-16 NR LEXINGTON OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	444	439	441	505	501	502	514	510	511	535	529	533
2	447	442	444	503	502	502	515	510	513	536	532	534
3	448	445	446	507	502	505	515	511	512	537	533	535
4	450	447	449	508	504	507	516	511	515	537	533	535
5	453	450	452	509	505	508	517	513	515	537	532	535
6	456	453	455	510	505	507	518	514	517	537	535	536
7	462	456	458	510	506	508	518	513	517	537	537	537
8	465	458	461	511	507	510	519	518	519	538	532	536
9	468	461	464	513	508	511	521	519	520	537	536	536
10	469	463	467	512	508	510	522	520	521	538	532	536
11	470	465	468	514	509	511	522	520	521	539	535	537
12	471	468	470	515	514	514	522	520	521	538	535	536
13	474	469	472	515	514	514	521	520	521	538	535	536
14	477	473	474	515	512	515	524	520	521	537	531	535
15	479	474	476	516	512	514	525	521	523	535	530	534
16	482	477	480	516	516	516	525	521	523	535	526	532
17	483	479	481	516	512	515	526	522	524	531	528	528
18	485	481	482	515	511	514	527	526	526	542	522	527
19	486	483	484	514	510	513	528	527	527	603	542	585
20	490	484	486	514	510	511	529	525	527	585	535	559
21	492	488	490	514	511	512	529	524	528	535	502	516
22	493	489	491	514	511	512	529	527	528	502	489	494
23	494	490	493	515	510	512	530	529	529	491	487	489
24	496	492	493	514	511	512	530	529	529	522	490	508
25	498	494	495	514	510	512	530	529	530	532	522	527
26	499	496	497	514	511	512	531	529	530	533	525	529
27	498	496	497	514	511	511	532	528	530	527	519	524
28	501	497	498	515	511	514	532	529	530	522	519	520
29	503	499	500	515	512	514	532	528	530	520	508	514
30	504	500	502	515	511	513	534	528	531	509	501	505
31	504	501	502	---	---	---	535	528	532	501	493	497
MONTH	504	439	476	516	501	511	535	510	523	603	487	529

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	493	482	488	452	435	444	343	334	338	---	---	---
2	482	466	475	435	418	428	334	324	330	---	---	---
3	468	449	458	418	401	408	324	318	321	---	---	---
4	449	435	442	403	400	401	318	308	313	---	---	---
5	436	421	428	406	401	402	310	304	307	---	---	---
6	421	408	414	431	406	420	305	297	301	---	---	---
7	408	393	401	434	430	433	---	---	---	---	---	---
8	394	380	386	432	424	429	293	284	288	---	---	---
9	381	370	375	424	415	420	---	---	---	---	---	---
10	370	360	365	415	406	411	---	---	---	---	---	---
11	361	355	358	408	397	401	---	---	---	---	---	---
12	355	351	353	398	385	392	---	---	---	---	---	---
13	351	345	348	387	374	380	---	---	---	---	---	---
14	345	337	341	374	361	368	---	---	---	---	---	---
15	337	330	333	361	349	354	---	---	---	---	---	---
16	331	325	327	350	339	345	---	---	---	---	---	---
17	325	321	323	339	328	334	---	---	---	---	---	---
18	321	318	319	329	319	324	---	---	---	---	---	---
19	318	312	315	320	312	316	---	---	---	---	---	---
20	323	310	317	371	316	348	---	---	---	---	---	---
21	318	314	316	390	371	383	---	---	---	---	---	---
22	324	318	320	393	389	391	---	---	---	---	---	---
23	327	323	325	389	380	384	---	---	---	---	---	---
24	329	324	326	381	373	377	---	---	---	---	---	---
25	326	319	322	375	370	373	---	---	---	---	---	---
26	321	317	318	371	362	366	---	---	---	---	---	---
27	406	317	347	365	360	362	---	---	---	---	---	---
28	478	406	458	363	359	361	---	---	---	---	---	---
29	475	452	464	360	356	358	---	---	---	---	---	---
30	---	---	---	358	349	354	---	---	---	---	---	---
31	---	---	---	350	341	346	---	---	---	---	---	---
MONTH	493	310	371	452	312	381	343	284	314	---	---	---

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

403923082325500 R-16 NR LEXINGTON OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	---	---	---	309	304	306	405	401	403
2	---	---	---	---	---	---	313	308	310	406	403	405
3	---	---	---	---	---	---	317	312	314	409	406	407
4	---	---	---	---	---	---	321	316	318	410	408	409
5	---	---	---	---	---	---	325	319	321	412	409	411
6	---	---	---	---	---	---	329	323	325	413	412	413
7	---	---	---	---	---	---	332	328	329	416	413	415
8	---	---	---	---	---	---	337	331	334	418	415	416
9	---	---	---	---	---	---	341	336	338	420	418	419
10	---	---	---	---	---	---	345	339	341	421	420	420
11	---	---	---	---	---	---	348	343	345	423	421	422
12	---	---	---	---	---	---	351	347	349	425	423	424
13	---	---	---	---	---	---	355	351	353	426	423	425
14	---	---	---	---	---	---	360	354	357	428	425	426
15	---	---	---	---	---	---	364	358	361	429	426	427
16	---	---	---	---	---	---	367	364	365	429	427	428
17	---	---	---	---	---	---	371	365	368	432	429	430
18	---	---	---	---	---	---	372	368	370	433	430	431
19	---	---	---	---	---	---	374	370	372	435	432	432
20	---	---	---	---	---	---	377	373	375	436	433	434
21	---	---	---	---	---	---	379	376	377	436	434	435
22	---	---	---	---	---	---	382	378	380	437	436	437
23	---	---	---	270	265	267	384	381	382	438	437	438
24	---	---	---	273	269	270	386	383	384	439	438	439
25	---	---	---	277	272	274	389	386	387	441	438	439
26	---	---	---	280	276	278	391	389	390	442	439	441
27	---	---	---	285	280	282	393	390	392	444	440	442
28	---	---	---	289	285	286	395	393	394	444	441	442
29	---	---	---	294	289	291	398	395	397	445	442	443
30	---	---	---	298	294	296	401	397	399	444	443	444
31	---	---	---	304	298	301	403	399	401	---	---	---
MONTH	---	---	---	304	265	283	403	304	359	445	401	427
YEAR	603	265	438									

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	23.3	12.3	17.4	18.0	4.2	12.7	13.6	.4	7.8	2.9	.5	1.5
2	25.0	7.6	14.9	19.3	9.1	17.0	6.7	-6.7	.8	.7	-6.2	-3.1
3	17.4	5.6	13.0	9.1	-2.3	1.7	11.5	-1.7	7.6	-6.1	-13.3	-9.2
4	14.9	11.5	13.0	.5	-5.3	-1.7	4.5	-3.6	.0	-7.7	-21.6	-13.3
5	18.2	13.0	15.6	-.8	-9.3	-4.2	8.7	-2.4	2.8	-7.8	-17.6	-12.2
6	22.2	12.9	16.1	6.9	-7.5	.5	1.0	-5.5	-2.0	-7.6	-15.5	-10.4
7	13.6	8.6	11.3	7.6	.4	4.9	.4	-8.0	-4.0	-8.4	-12.0	-9.7
8	13.9	3.4	9.7	1.0	-5.3	-1.5	-2.1	-11.7	-5.8	-8.7	-15.3	-11.4
9	20.3	.8	9.4	1.5	-9.6	-3.1	-2.0	-15.5	-10.1	-3.2	-9.2	-6.2
10	22.5	3.3	12.0	14.5	1.5	8.7	-10.0	-17.0	-13.9	-3.2	-22.3	-11.2
11	24.1	2.3	12.2	12.1	-3.1	5.1	-8.9	-14.2	-11.2	-6.9	-23.2	-11.9
12	25.7	4.6	13.8	-1.1	-5.9	-3.4	-6.5	-11.3	-8.9	-5.2	-7.8	-6.7
13	25.8	4.4	15.5	1.7	-2.1	.2	1.0	-7.6	-4.2	-1.5	-6.7	-3.0
14	18.9	7.4	12.8	.7	-1.4	-.6	14.5	1.0	6.9	7.6	-3.1	2.0
15	11.9	2.3	7.4	1.7	-3.6	-1.4	7.7	.2	2.5	1.3	-11.7	-4.8
16	13.6	-1.7	5.1	-.1	-5.4	-1.9	3.1	-7.0	-.8	8.1	-11.6	-.3
17	17.0	-4.0	7.1	1.5	-2.5	-.3	3.3	-8.5	-2.9	9.4	7.5	8.4
18	22.4	5.0	13.9	5.2	-.8	2.5	.4	-1.4	-.3	16.6	8.0	11.8
19	22.4	4.9	14.5	5.3	-.8	1.4	-.3	-8.9	-3.7	8.9	-13.5	-8.7
20	18.1	3.7	11.3	9.7	-1.1	4.1	-6.1	-11.6	-8.6	-5.8	-13.6	-9.5
21	7.0	3.0	5.1	3.8	-3.8	-.6	-6.2	-20.2	-9.6	.5	-10.2	-4.4
22	16.6	2.7	8.8	1.2	-3.9	-1.6	-4.7	-23.6	-11.9	5.0	-3.9	.6
23	20.9	1.4	11.3	3.5	-3.2	.9	-5.4	-8.9	-7.0	4.0	.4	2.5
24	16.7	7.0	11.2	.9	-7.8	-3.8	-4.2	-5.4	-5.0	6.3	-6.9	.1
25	14.3	.1	7.4	4.9	-7.6	-1.3	-3.8	-14.0	-5.8	-3.2	-10.1	-6.1
26	12.2	-1.9	6.2	10.9	-6.0	2.9	-7.4	-17.1	-10.1	7.8	-3.2	1.3
27	14.0	9.5	12.2	14.1	6.8	11.0	-7.2	-11.2	-9.2	8.9	-7.0	-2.4
28	10.8	7.1	8.6	6.8	-1.8	-.6	-4.6	-16.2	-7.4	-3.8	-13.2	-6.9
29	9.1	.2	5.5	.2	-7.7	-2.5	-2.2	-18.4	-11.3	5.5	-5.6	-1.0
30	8.6	.9	6.0	5.2	-8.2	-1.4	.8	-17.4	-7.6	-5.6	-10.1	-7.5
31	11.5	6.4	8.8	---	---	---	3.7	-.9	1.5	-10.1	-17.5	-14.0
MONTH	25.8	-4.0	10.9	19.3	-9.6	1.5	14.5	-23.6	-4.2	16.6	-23.2	-4.7



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

403923082325500 R-16 NR LEXINGTON OH--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	12.3	12.1	12.5	12.2	12.5	12.2	12.0	11.6	10.0	9.8	8.6	8.3
2	12.3	12.1	12.5	12.5	12.5	12.2	11.8	11.5	10.0	9.8	8.5	8.3
3	12.3	12.0	12.5	12.2	12.5	12.2	11.8	11.5	10.0	9.6	8.6	8.3
4	12.3	12.3	12.5	12.2	12.5	12.2	12.0	11.5	10.0	9.8	8.6	8.3
5	12.3	12.3	12.4	12.2	12.5	12.2	11.8	11.5	10.0	9.8	8.5	8.3
6	12.3	12.3	12.5	12.2	12.5	12.2	11.7	11.5	9.9	9.6	8.3	8.2
7	12.3	12.0	12.5	12.2	12.5	12.2	11.5	11.5	9.9	9.6	8.4	8.2
8	12.5	12.0	12.5	12.2	12.2	12.2	11.8	11.5	9.9	9.6	8.4	8.2
9	12.5	12.0	12.5	12.2	12.2	12.2	11.5	11.5	9.9	9.6	8.5	8.2
10	12.5	12.0	12.5	12.2	12.2	12.2	11.8	11.5	9.9	9.6	8.5	8.2
11	12.6	12.2	12.5	12.2	12.2	12.2	11.7	11.5	9.9	9.6	8.5	8.2
12	12.6	12.2	12.2	12.2	12.2	12.2	11.5	11.3	9.6	9.6	8.5	8.2
13	12.6	12.2	12.2	12.2	12.2	12.2	11.5	11.3	9.9	9.6	8.5	8.2
14	12.5	12.3	12.5	12.2	12.3	12.0	11.6	11.3	9.9	9.6	8.5	8.3
15	12.5	12.2	12.5	12.2	12.3	12.0	11.6	11.3	9.7	9.5	8.5	8.3
16	12.5	12.2	12.2	12.2	12.3	12.0	11.6	11.1	9.7	9.4	8.5	8.3
17	12.5	12.2	12.5	12.2	12.3	12.0	11.4	11.1	9.6	9.4	8.5	8.3
18	12.5	12.3	12.5	12.2	12.0	12.0	11.4	10.9	9.7	9.4	8.5	8.3
19	12.5	12.3	12.5	12.2	12.0	12.0	10.9	10.4	9.7	9.4	8.5	8.1
20	12.5	12.2	12.5	12.2	12.2	12.0	10.4	10.2	9.6	9.3	8.1	7.9
21	12.5	12.2	12.5	12.2	12.3	12.0	10.5	10.1	9.5	9.2	8.1	7.9
22	12.5	12.2	12.5	12.2	12.2	12.0	10.3	10.1	9.5	9.2	8.1	7.7
23	12.5	12.2	12.5	12.2	12.0	12.0	10.3	10.1	9.5	9.0	7.9	7.7
24	12.5	12.3	12.5	12.2	12.0	12.0	10.1	9.9	9.3	9.0	7.9	7.7
25	12.5	12.2	12.5	12.2	12.0	12.0	10.1	9.8	9.3	9.0	7.9	7.7
26	12.5	12.2	12.5	12.2	12.0	12.0	10.1	9.8	9.3	8.9	7.9	7.7
27	12.5	12.5	12.5	12.2	12.0	11.8	10.1	9.8	9.1	8.7	7.9	7.7
28	12.5	12.3	12.5	12.2	12.0	11.8	10.0	9.8	8.9	8.5	7.9	7.7
29	12.5	12.2	12.5	12.2	12.0	11.8	10.1	9.8	8.6	8.3	7.9	7.7
30	12.5	12.2	12.5	12.2	12.0	11.6	9.8	9.8	---	---	7.9	7.7
31	12.5	12.2	---	---	12.0	11.6	10.0	9.8	---	---	7.9	7.7
MONTH	12.6	12.0	12.5	12.2	12.5	11.6	12.0	9.8	10.0	8.3	8.6	7.7

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]



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TEMPERATURE, SOIL DEG. C. WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

TEMPERATURE, SOIL DEG. C. WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]



RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

237

## GROUND-WATER RECORDS

411138081172500. Local number, PO-116.

LOCATION.--Lat 41°11'38" Long 81°17'25", Hydrologic Unit 04110002, along State Route 14 near Ravenna, OH.  
Owner.--USGS-City of Akron, OH.

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 17.5 ft. Cased with Sch 40 PVC to 5.2 ft; .010-in. screen from 5.2 to 17.5 ft.

INSTRUMENTATION - Data logger--60-minute record. Precipitation data collected with a propane-heated, tipping-bucket rain gage. Also collected: water level, air temperature, soil temperature, water temperature and specific conductance. Conductivity/water temperature probe set at 10.8 ft below land surface from February, 1991, through July 1992, when removed; probe reinstalled August, 1994, through current year at at depth of 13.4 ft below land surface.

DATUM.--Elevation of land-surface datum is 1068.39 ft above sea level.  
Measuring point: shelter shelf 2.20 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality. Water-quality data for nearby wells are available in preceding tables.

PERIOD OF RECORD.--February 1991 to current year.

### PERIOD OF DAILY RECORD.--

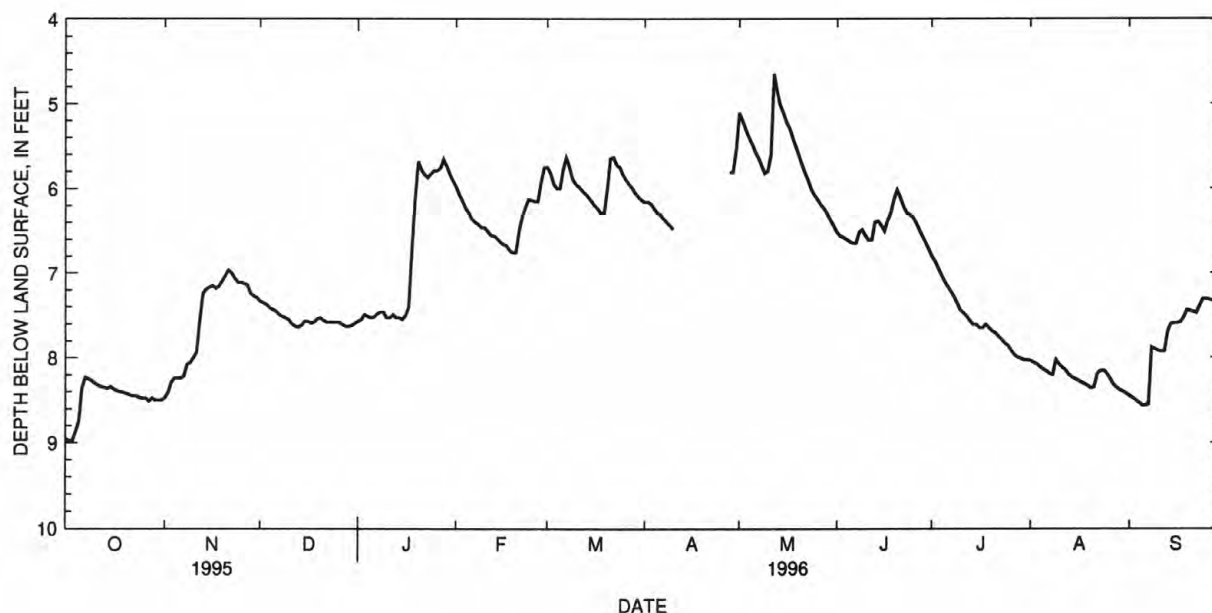
WATER LEVEL: February 1991 to current year.  
SPECIFIC CONDUCTANCE: February 1991 to July 1992; September, 1994 to current year.  
AIR TEMPERATURE: February 1991 to current year.  
SOIL TEMPERATURE: July 1992 to current year.  
PRECIPITATION: February 1991 to current year. (Incomplete data this year due to malfunctioning of raingage).  
WATER TEMPERATURE: February 1991 to July 1992; September, 1994, to current year.

### EXTREMES FOR PERIOD OF DAILY RECORD:

WATER LEVEL: Maximum daily low, 9.45 ft below land-surface datum, October 9-10, 1991; maximum daily high, 4.35 ft below land-surface datum, April 13, 1994.  
SPECIFIC CONDUCTANCE: Maximum, 2540 microsiemens December 19-20, 22-28, 1991; minimum, 242 microsiemens April 10, 1992.  
AIR TEMPERATURE: Maximum, 36.0°C August 2, 1991; minimum, -32.2°C January 19, 1994.  
WATER TEMPERATURE: Maximum, 14.8°C October 1, 1991; minimum, 6.1°C March 23-28, 1996.  
SOIL TEMPERATURE: Maximum, 28.5°C August 11, 1992; minimum, -0.4°C February 10-14, 1994.

### EXTREMES FOR CURRENT YEAR:

WATER LEVEL: Maximum daily low, 8.98 ft below land-surface datum, October 2-3, 1995; maximum daily high, 4.49 ft below land-surface datum, May 11-12, 1996.  
SPECIFIC CONDUCTANCE: Maximum, 1330 microsiemens October 1-4, 1995; minimum, 410 microsiemens March 23, 1996.  
AIR TEMPERATURE: Maximum, 33.7°C August 7, 1996; minimum, -25.5°C February 4, 1996.  
WATER TEMPERATURE: Maximum, 14.0°C several days in October, 1995; minimum, 6.1°C March 23-28, 1996.  
SOIL TEMPERATURE: Maximum, 24.3°C June 30, 1996; minimum, 0.4°C February 6, 1996



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

411138081172500 PO-116 NR RAVENNA OH--Continued

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	8.96	8.95	8.47	8.41	7.33	7.25	7.57	7.55	5.98	5.91	5.75	5.75
2	8.98	8.96	8.41	8.29	7.35	7.33	7.55	7.44	6.07	5.98	5.82	5.75
3	8.98	8.87	8.29	8.24	7.37	7.34	7.49	7.44	6.15	6.07	5.95	5.82
4	8.87	8.75	8.24	8.24	7.41	7.37	7.51	7.49	6.23	6.15	6.00	5.95
5	8.75	8.35	8.24	8.24	7.43	7.37	7.53	7.51	6.29	6.23	6.00	5.77
6	8.35	8.21	8.24	8.22	7.45	7.43	7.52	7.48	6.36	6.29	5.77	5.64
7	8.23	8.21	8.22	8.08	7.49	7.45	7.48	7.45	6.40	6.36	5.64	5.64
8	8.25	8.23	8.08	8.06	7.51	7.48	7.46	7.45	6.42	6.40	5.75	5.64
9	8.27	8.25	8.06	8.00	7.53	7.47	7.46	7.44	6.46	6.42	5.89	5.75
10	8.30	8.27	8.00	7.94	7.55	7.53	7.53	7.46	6.46	6.45	5.95	5.89
11	8.32	8.30	7.94	7.57	7.60	7.55	7.53	7.48	6.50	6.45	5.98	5.95
12	8.34	8.32	7.57	7.24	7.63	7.60	7.49	7.48	6.55	6.50	6.02	5.98
13	8.35	8.34	7.24	7.19	7.64	7.62	7.53	7.49	6.56	6.53	6.06	6.02
14	8.36	8.34	7.19	7.17	7.62	7.57	7.53	7.51	6.59	6.53	6.10	6.06
15	8.34	8.33	7.17	7.14	7.57	7.54	7.55	7.50	6.63	6.59	6.15	6.10
16	8.37	8.33	7.15	7.14	7.57	7.53	7.50	7.40	6.66	6.63	6.20	6.15
17	8.39	8.37	7.18	7.15	7.59	7.57	7.40	6.71	6.68	6.66	6.24	6.20
18	8.40	8.39	7.16	7.10	7.58	7.54	6.71	6.12	6.73	6.68	6.29	6.24
19	8.41	8.40	7.10	7.03	7.54	7.48	6.12	5.63	6.76	6.73	6.29	6.01
20	8.42	8.39	7.03	6.97	7.53	7.50	5.68	5.63	6.76	6.50	6.01	5.65
21	8.44	8.41	6.97	6.96	7.56	7.53	5.78	5.68	6.50	6.34	5.65	5.64
22	8.45	8.41	7.00	6.97	7.58	7.56	5.84	5.78	6.34	6.22	5.64	5.64
23	8.45	8.45	7.06	6.99	7.58	7.58	5.87	5.83	6.22	6.12	5.72	5.64
24	8.47	8.44	7.11	7.06	7.58	7.58	5.83	5.74	6.13	6.12	5.75	5.72
25	8.48	8.47	7.11	7.10	7.58	7.56	5.79	5.76	6.14	6.13	5.84	5.75
26	8.48	8.48	7.13	7.11	7.58	7.57	5.79	5.76	6.15	6.14	5.90	5.84
27	8.51	8.42	7.14	7.13	7.61	7.58	5.76	5.65	6.15	5.92	5.95	5.90
28	8.48	8.44	7.24	7.14	7.63	7.61	5.66	5.65	5.92	5.75	5.99	5.95
29	8.50	8.48	7.27	7.24	7.63	7.62	5.74	5.66	5.75	5.75	6.06	5.99
30	8.50	8.50	7.29	7.25	7.62	7.59	5.83	5.74	---	---	6.10	6.06
31	8.50	8.47	---	---	7.59	7.56	5.91	5.83	---	---	6.14	6.10
MONTH	8.98	8.21	8.47	6.96	7.64	7.25	7.57	5.63	6.76	5.75	6.29	5.64

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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411138081172500 PO-116 NR RAVENNA OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	1330	1320	1320	1260	1250	1260	1100	1080	1090	819	814	816
2	1330	1320	1320	1260	1250	1260	1090	1070	1080	814	810	812
3	1330	1320	1320	1260	1250	1260	1070	1060	1070	811	806	808
4	1330	1310	1320	1250	1250	1250	1060	1040	1050	815	803	809
5	1320	1290	1320	1250	1240	1240	1040	1030	1040	806	800	803
6	1290	1280	1290	1250	1240	1240	1030	1020	1030	802	798	800
7	1290	1280	1280	1250	1240	1240	1020	1010	1010	800	795	798
8	1290	1280	1290	1240	1240	1240	1010	994	1000	799	791	794
9	1290	1280	1290	1240	1240	1240	999	983	991	793	786	790
10	1290	1280	1290	1240	1230	1240	983	976	980	787	782	785
11	1290	1280	1280	1240	1240	1240	977	962	968	791	782	787
12	1290	1280	1280	1250	1240	1250	962	948	955	787	782	784
13	1290	1280	1280	1260	1250	1250	948	935	942	782	776	780
14	1290	1280	1290	1260	1250	1250	940	927	932	777	772	775
15	1290	1280	1290	1250	1240	1240	927	915	921	775	770	773
16	1290	1280	1280	1240	1230	1230	915	905	911	773	768	771
17	1280	1270	1280	1230	1220	1220	906	900	903	815	770	779
18	1280	1270	1280	1220	1200	1210	901	891	895	886	815	863
19	1280	1270	1280	1210	1200	1200	891	882	887	890	882	886
20	1280	1270	1280	1200	1190	1200	886	879	881	885	876	879
21	1280	1270	1270	1190	1180	1190	879	870	874	876	870	874
22	1290	1280	1280	1180	1170	1180	871	863	866	871	867	869
23	1290	1280	1290	1170	1170	1170	865	859	862	867	858	864
24	1290	1280	1290	1170	1160	1160	859	853	856	860	850	855
25	1290	1280	1280	1160	1150	1160	853	846	849	850	838	844
26	1280	1270	1280	1150	1140	1150	846	839	842	838	822	831
27	1280	1270	1280	1150	1140	1140	840	833	836	823	807	815
28	1270	1270	1270	1140	1130	1130	837	827	833	807	782	795
29	1270	1260	1270	1130	1110	1120	828	826	827	784	764	774
30	1270	1260	1260	1110	1100	1110	828	820	824	764	743	754
31	1260	1260	1260	---	---	---	823	818	820	743	723	732
MONTH	1330	1260	1290	1260	1100	1210	1100	818	930	890	723	810

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	723	700	710	454	450	453	443	438	441	1120	1120	1120
2	700	681	690	451	447	449	446	441	444	1120	1120	1120
3	682	663	672	447	445	446	450	444	447	1120	1110	1120
4	665	642	653	445	441	443	460	449	453	1120	1110	1120
5	643	627	635	443	440	441	476	460	468	1120	1110	1110
6	627	611	618	441	437	439	493	476	483	1110	1100	1110
7	611	598	604	440	435	438	601	575	587	1110	1100	1110
8	599	586	592	437	435	435	529	516	522	1110	1100	1110
9	586	573	580	436	433	434	540	529	535	1110	1100	1110
10	573	564	569	433	430	432	550	540	544	1110	1100	1110
11	564	553	559	432	429	431	---	---	---	1110	1100	1100
12	553	544	549	430	426	429	---	---	---	1110	1100	1100
13	545	537	540	430	425	427	---	---	---	1110	1100	1100
14	537	527	531	428	423	425	---	---	---	1110	1100	1100
15	527	520	524	424	422	424	---	---	---	1110	1100	1100
16	520	514	517	424	421	422	---	---	---	1100	1090	1100
17	517	506	511	422	418	420	---	---	---	1100	1090	1100
18	506	500	503	420	417	419	---	---	---	1100	1090	1100
19	500	496	498	418	416	417	---	---	---	1100	1090	1100
20	496	490	493	416	413	415	---	---	---	1100	1090	1100
21	490	487	488	415	413	414	---	---	---	1100	1080	1090
22	487	481	484	414	412	413	---	---	---	1100	1080	1090
23	482	476	478	414	410	412	---	---	---	1100	1080	1090
24	476	472	474	415	411	413	---	---	---	1090	1080	1080
25	472	468	470	417	413	415	---	---	---	1090	1080	1080
26	469	465	467	421	416	419	---	---	---	1080	1080	1080
27	465	460	463	426	420	423	---	---	---	1080	1070	1080
28	461	456	459	430	424	427	1110	1090	1100	1080	1070	1070
29	457	454	455	432	428	430	1120	1110	1110	1070	1060	1070
30	---	---	---	436	431	434	1120	1110	1120	1070	1060	1070
31	---	---	---	440	435	437	---	---	---	1070	1060	1070
MONTH	723	454	544	454	410	428	1120	438	635	1120	1060	1100

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

411138081172500 PO-116 NR RAVENNA OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	1070	1060	1070	857	831	846	843	834	839	845	833	838
2	1070	1060	1060	833	818	828	843	834	838	846	834	838
3	1060	1050	1060	822	803	812	841	835	839	845	833	836
4	1050	1050	1050	805	783	793	841	834	838	843	834	838
5	1050	1040	1050	795	784	787	843	836	839	844	835	840
6	1050	1030	1050	799	785	791	845	836	840	844	837	840
7	1060	1050	1050	792	786	789	846	836	840	928	840	894
8	1060	1050	1060	796	785	789	843	833	838	946	928	936
9	1060	1050	1060	798	791	795	844	834	839	946	939	943
10	1060	1050	1060	802	796	798	841	835	837	947	939	943
11	1050	1040	1050	810	797	803	840	833	835	944	937	939
12	1040	1030	1040	823	808	816	836	829	834	980	937	958
13	1040	1020	1030	827	813	820	839	829	834	1000	980	986
14	1030	1020	1030	831	818	823	839	828	833	1010	1000	1000
15	1030	1010	1020	828	821	824	835	827	831	1010	1000	1010
16	1020	1010	1020	826	820	823	831	824	828	1010	1010	1010
17	1010	1000	1010	825	820	823	829	821	825	1020	1010	1020
18	1000	993	999	824	814	819	827	815	822	1040	1020	1030
19	1000	990	995	835	812	821	823	811	818	1040	1040	1040
20	996	986	990	840	835	837	821	810	816	1050	1040	1040
21	987	971	983	843	836	839	829	809	818	1040	1040	1040
22	974	957	968	845	838	842	831	820	824	1060	1030	1040
23	963	949	955	843	833	839	826	821	824	1080	1060	1070
24	952	943	948	844	835	839	832	822	829	1100	1080	1090
25	944	931	939	842	833	837	837	830	832	1100	1090	1100
26	940	923	931	840	833	836	840	831	834	1100	1090	1100
27	924	906	919	842	833	837	838	832	835	1090	1090	1090
28	911	889	904	847	835	840	837	833	836	1210	1090	1150
29	892	877	886	843	838	840	837	832	834	1220	1210	1210
30	877	857	870	843	838	840	841	829	835	1220	1210	1220
31	---	---	---	844	834	839	843	831	836	---	---	---
MONTH	1070	857	1000	857	783	821	846	809	832	1220	833	996
YEAR	1330	410	896									

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	25.7	6.8	16.3	19.5	4.9	13.3	12.6	2.3	6.8	5.0	.2	1.8
2	24.5	7.7	16.1	20.4	14.6	17.2	5.3	-2.6	1.1	.2	-7.5	-3.3
3	17.3	5.5	11.9	15.2	-1.1	4.1	10.4	-.6	6.7	-7.1	-20.6	-10.1
4	17.6	10.7	14.2	2.3	-2.8	-.7	3.9	-3.8	.6	-7.8	-24.8	-15.0
5	20.3	12.0	16.1	1.1	-6.0	-2.2	8.7	-3.1	2.8	-7.5	-17.5	-11.5
6	22.0	13.4	16.9	7.8	-8.4	.3	1.1	-4.8	-1.5	-7.9	-19.0	-12.4
7	15.0	8.3	12.3	6.8	2.8	5.3	-1.0	-5.9	-3.4	-8.5	-10.6	-9.6
8	14.2	3.4	9.9	3.3	-4.2	-1.1	-1.8	-6.9	-3.8	-6.4	-14.3	-10.1
9	20.9	1.3	9.5	1.6	-4.8	-1.7	-.8	-15.1	-7.8	-3.9	-10.8	-7.0
10	23.0	3.1	12.4	15.4	1.6	8.9	-11.3	-15.5	-13.6	-3.9	-19.9	-10.1
11	24.3	3.5	12.6	13.1	-.9	6.8	-8.8	-13.2	-11.3	-7.5	-22.4	-13.4
12	26.9	5.0	14.5	-.9	-3.9	-2.3	-7.1	-11.1	-8.9	-3.7	-8.0	-6.4
13	26.6	5.7	15.4	1.4	-2.4	.1	-.6	-8.0	-5.3	-1.2	-7.3	-3.7
14	18.7	8.2	13.9	2.2	.5	1.2	12.5	-.6	6.2	7.1	-1.4	2.1
15	10.5	6.3	8.6	1.1	-2.3	-.4	7.9	.4	2.8	1.4	-12.6	-5.7
16	12.8	1.6	7.2	.9	-3.0	-1.2	1.6	-7.2	-1.2	9.0	-13.4	-.7
17	17.1	-2.3	7.7	4.3	-1.6	.8	3.7	-8.9	-3.1	11.5	7.4	9.1
18	23.1	8.0	14.4	4.4	.1	2.2	.3	-3.2	-.8	17.2	9.3	12.5
19	23.7	5.8	13.5	2.8	-1.3	.8	-.4	-7.5	-4.5	10.1	-11.5	-5.5
20	22.0	6.9	13.0	9.2	-1.5	3.7	-5.0	-9.8	-7.5	-6.3	-13.3	-9.3
21	9.0	3.6	6.1	4.3	-2.4	.2	-4.7	-11.6	-7.0	.6	-8.2	-4.1
22	16.9	3.4	8.6	-.1	-3.5	-1.9	-4.3	-17.7	-8.4	6.8	-7.7	.7
23	22.9	2.2	11.3	3.2	-1.5	.8	-4.3	-6.5	-5.4	4.2	1.1	2.5
24	16.2	7.8	12.4	1.0	-7.9	-3.2	-3.1	-6.1	-4.4	6.2	-5.5	.8
25	11.8	.7	7.2	5.8	-7.8	-1.1	-3.2	-6.4	-4.7	-3.5	-10.2	-5.7
26	14.5	-1.5	6.7	9.1	-6.0	1.8	-6.1	-15.4	-8.2	6.4	-4.8	1.7
27	15.2	9.5	13.0	14.0	2.0	9.8	-4.4	-17.0	-8.8	9.6	-6.2	-.8
28	11.2	7.4	8.9	13.8	-.9	1.1	-2.9	-9.6	-4.6	-3.5	-8.0	-5.4
29	9.6	2.4	6.1	1.2	-5.2	-1.4	-1.6	-14.7	-9.3	5.4	-4.2	-.5
30	10.8	3.3	6.4	3.8	-7.1	-1.0	1.3	-17.5	-8.4	-4.2	-10.3	-6.9
31	9.2	5.7	7.8	---	---	---	4.8	-6.2	.2	-10.3	-17.3	-13.0
MONTH	26.9	-2.3	11.3	20.4	-8.4	2.0	12.6	-17.7	-3.7	17.2	-24.8	-4.5





# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

411138081172500 PO-116 NR RAVENNA OH--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	14.0	13.7	13.7	13.4	12.0	11.7	10.0	10.0	8.2	7.8	6.9	6.7
2	14.0	13.6	13.7	13.4	12.0	11.7	10.0	10.0	8.0	8.0	6.9	6.7
3	13.9	13.6	13.4	13.4	11.8	11.7	10.0	9.8	8.0	7.8	6.9	6.7
4	13.9	13.6	13.6	13.4	11.7	11.7	10.0	9.7	8.0	7.8	6.9	6.7
5	13.9	13.6	13.6	13.4	11.7	11.5	10.0	9.8	8.0	7.8	6.8	6.6
6	13.9	13.6	13.6	13.2	11.7	11.5	10.0	9.6	8.0	7.7	6.7	6.6
7	13.9	13.6	13.4	13.1	11.5	11.3	9.8	9.6	7.9	7.6	6.7	6.5
8	13.9	13.6	13.4	13.4	11.5	11.3	9.8	9.6	7.7	7.7	6.7	6.5
9	13.9	13.6	13.4	13.1	11.5	11.3	9.6	9.6	7.7	7.5	6.7	6.5
10	14.0	13.6	13.4	13.1	11.5	11.2	9.6	9.5	7.7	7.5	6.7	6.4
11	14.0	13.6	13.2	13.1	11.3	11.2	9.6	9.3	7.6	7.5	6.7	6.4
12	14.0	13.6	13.1	13.1	11.3	11.2	9.4	9.4	7.6	7.4	6.6	6.4
13	14.0	13.6	13.1	12.9	11.3	11.1	9.4	9.4	7.6	7.4	6.6	6.4
14	13.9	13.6	13.1	12.9	11.3	11.1	9.4	9.4	7.5	7.5	6.6	6.4
15	13.9	13.6	12.9	12.9	11.1	10.9	9.4	9.2	7.5	7.3	6.6	6.4
16	13.9	13.6	12.9	12.9	11.1	10.9	9.4	9.2	7.6	7.3	6.6	6.4
17	13.9	13.6	12.9	12.9	11.1	10.8	9.2	9.0	7.5	7.2	6.6	6.3
18	13.9	13.6	12.9	12.9	10.9	10.8	9.0	8.8	7.5	7.3	6.4	6.3
19	14.0	13.6	12.9	12.6	10.9	10.6	9.4	8.8	7.4	7.3	6.4	6.4
20	13.9	13.6	12.6	12.4	10.8	10.6	9.6	9.4	7.3	7.3	6.4	6.2
21	13.6	13.6	12.6	12.4	10.6	10.6	9.6	9.4	7.3	7.1	6.4	6.2
22	13.9	13.6	12.7	12.6	10.6	10.6	9.6	9.4	7.1	7.1	6.4	6.2
23	13.9	13.6	12.7	12.6	10.6	10.4	9.4	9.4	7.1	7.1	6.4	6.1
24	13.9	13.6	12.7	12.6	10.4	10.4	9.4	9.2	7.2	7.0	6.4	6.1
25	13.9	13.6	12.6	12.4	10.4	10.4	9.4	9.2	7.2	6.9	6.3	6.1
26	13.9	13.6	12.4	12.4	10.4	10.4	9.2	8.2	7.1	6.9	6.4	6.1
27	13.6	13.6	12.4	12.0	10.4	10.4	8.4	8.2	7.2	6.9	6.4	6.1
28	13.6	13.6	12.0	12.0	10.4	10.2	8.2	8.0	7.0	6.9	6.4	6.1
29	13.6	13.4	12.0	11.9	10.4	10.2	8.2	8.0	6.9	6.7	6.4	6.2
30	13.6	13.4	12.0	11.9	10.4	10.0	8.0	8.0	---	---	6.5	6.3
31	13.6	13.4	---	---	10.2	10.0	8.2	8.0	---	---	6.5	6.2
MONTH	14.0	13.4	13.7	11.9	12.0	10.0	10.0	8.0	8.2	6.7	6.9	6.1

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

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TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

411138081172500 PO-116 NR RAVENNA OH--Continued

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

## DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.14	.12	.12	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.32	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	1.22	.08	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.27	.00	.01	.01	.01	.00	.01	.00	.00	.00	.00	.00
5	1.72	.00	.03	.00	.00	.76	.00	.00	.00	.00	.00	.00
6	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.54	.00	.00	.01	.00	---	.00	.00	.00	.00	.00
8	.00	.12	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00
9	.00	.09	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.13	.00	.00	.00	.01	.01	.00	.00	.00	.00	.00
11	.00	.82	.00	.00	.05	.00	---	.00	.00	.00	.00	.01
12	.00	.00	.00	.00	.00	.00	---	.00	.00	.00	.00	.05
13	.00	.03	.00	.00	.05	.00	---	.00	.00	.00	.00	.01
14	.56	.10	.22	.35	.01	.00	---	.00	.00	.00	.00	.00
15	.00	.10	.00	.00	.00	.00	---	.00	.00	.00	.00	.00
16	.00	.02	.00	.05	.00	.00	---	.00	.00	.00	.00	.00
17	.00	.01	.00	.02	.00	.00	---	.00	.00	.00	.00	.00
18	.00	.32	.17	.33	.00	.00	---	.00	.00	.00	.00	.00
19	.00	.02	.00	.76	.02	.01	---	.00	.00	.00	.00	.00
20	.39	.00	.00	.08	.00	.00	---	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.01	.00	---	.00	.00	.00	.01	.01
22	.03	.02	.00	.00	.00	.00	---	.00	.00	.00	.00	.01
23	.00	.00	.00	.29	.00	.01	---	.00	.00	.00	.00	.00
24	.00	.00	.00	.15	.00	.00	---	.00	.00	.00	.00	.03
25	.00	.00	.00	.02	.00	.02	---	.00	.00	.00	.00	.00
26	.00	.00	.00	.01	.02	.00	---	.00	.00	.00	.00	.00
27	.09	.01	.00	.29	.03	.00	---	.00	.00	.00	.00	.02
28	.13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
29	.04	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00
30	.01	.01	.00	.02	---	.00	.00	.00	.00	.00	.00	.00
31	.19	---	.30	.00	---	.01	---	.00	---	.00	.00	---
TOTAL	4.67	2.88	0.91	2.50	0.22	0.82	0.02	0.00	0.00	0.00	0.01	0.15

WTR YR 1996 TOTAL 12.18

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

245

## GROUND-WATER RECORDS

393541083001100. Local number, PK-48.

LOCATION.--Lat 39°35'41" Long 83°00'11", Hydrologic Unit 05060002, along State Route 104 near Circleville, OH.  
Owner.--USGS-Stacy Thomas.

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 28 ft. Cased with Sch 40 PVC to 8 ft; .010-in. screen from 8 to 28 ft.

INSTRUMENTATION - Data logger--60-minute record. Precipitation data collected with a propane-heated, tipping-bucket rain gage. Also collected: water level, air temperature, soil temperature, water temperature, and specific conductance. Conductivity/water temperature probe set at 16.0 ft below land surface.

DATUM.--Elevation of land-surface datum is 678.50 ft above sea level.  
Measuring point: shelter shelf 3.36 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality.

PERIOD OF RECORD.--February 1991 to current year.

### PERIOD OF DAILY RECORD.--

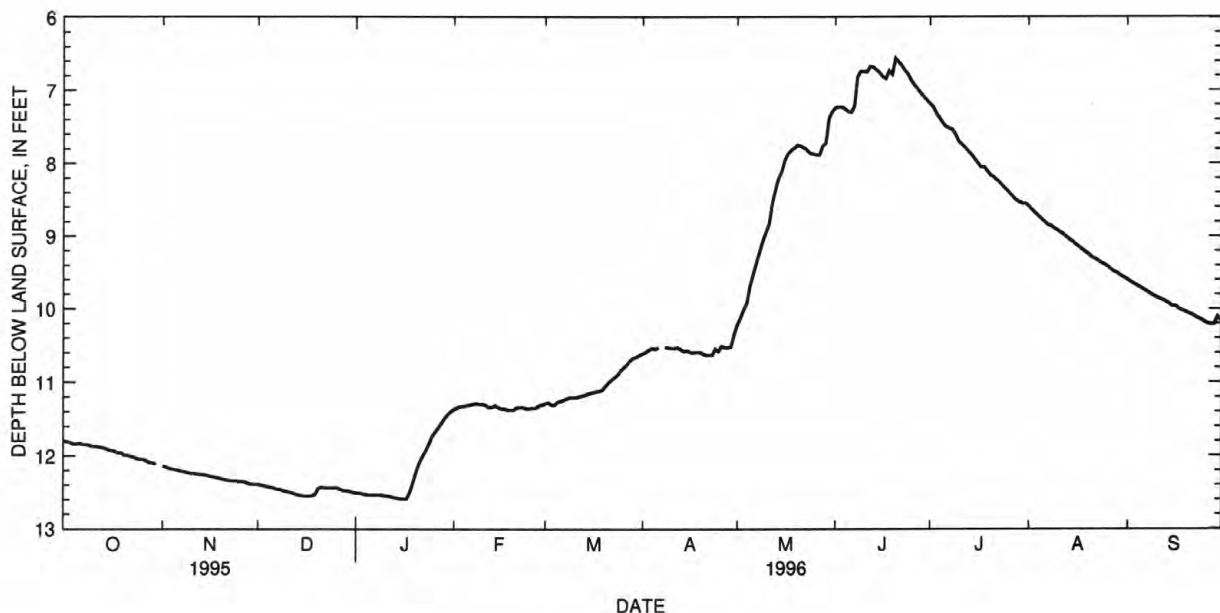
WATER LEVEL: February 1991 to current year.  
SPECIFIC CONDUCTANCE: February 1991 to current year.  
AIR TEMPERATURE: February 1991 to current year.  
WATER TEMPERATURE: February 1991 to current year.  
SOIL TEMPERATURE: February 1991 to current year.  
PRECIPITATION: February 1991 to current year.

### EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER LEVEL: Maximum daily low, 13.11 ft below land-surface datum, June 18, 1992; maximum daily high, 6.50 ft below land-surface datum, June 20, 1996.  
SPECIFIC CONDUCTANCE: Maximum, 933 microsiemens April 15, 1994; minimum, 585 microsiemens October 23, 1992.  
AIR TEMPERATURE: Maximum, 37.5°C July 15, 1995; minimum, -34.1°C January 19, 1994.  
WATER TEMPERATURE: Maximum, 15.0°C October 20-21 1991; minimum, 10.6°C April 29, 1993.  
SOIL TEMPERATURE: Maximum, 32.5°C September 16, 1991; minimum, -2.2°C February 12, 1994.

### EXTREMES FOR CURRENT YEAR.--

WATER LEVEL: Maximum daily low, 12.59 ft below land-surface datum, January 15-17, 1996; maximum daily high, 6.50 ft below land-surface datum, June 20, 1996.  
SPECIFIC CONDUCTANCE: Maximum, 919 microsiemens August 4-6, 1996; minimum, 604 microsiemens October 27, 29-30, 1995.  
AIR TEMPERATURE: Maximum, 33.5°C August 22, 1996; minimum, -21.5°C February 4, 1996.  
WATER TEMPERATURE: Maximum, 13.8°C November 25, 1995; minimum, 11.0°C many days in April, May, and June, 1996.  
SOIL TEMPERATURE: Maximum, 24.7°C July 19, 1996; minimum, -1.4°C February 5-6, 1996.





DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

247

393541083001100 PK-48 NR CIRCLEVILLE OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	612	611	611	617	609	613	613	610	611	617	615	616
2	612	611	611	609	608	609	614	611	612	618	616	617
3	612	611	612	611	609	610	613	611	612	619	617	618
4	612	612	612	612	610	611	614	611	612	619	617	618
5	612	612	612	613	610	612	613	612	612	619	616	618
6	612	612	612	613	609	611	614	613	613	619	615	618
7	612	611	612	610	609	609	615	612	614	619	618	619
8	613	611	612	611	610	610	616	613	614	624	616	619
9	613	607	611	613	610	611	616	613	614	621	616	619
10	612	607	611	611	609	610	616	614	615	624	618	621
11	612	607	610	611	609	610	616	612	615	624	620	622
12	612	606	609	612	610	611	615	613	614	622	618	621
13	612	606	608	611	611	611	614	614	614	622	619	620
14	608	607	608	612	611	612	614	611	612	621	617	619
15	609	607	608	612	611	611	613	612	613	622	619	621
16	610	608	609	612	611	612	614	612	613	625	618	620
17	610	607	609	612	611	611	615	612	613	621	617	618
18	608	607	608	611	610	611	614	613	614	622	617	620
19	608	608	608	612	609	610	614	613	614	627	619	624
20	609	608	608	612	609	611	615	614	615	628	623	626
21	609	609	609	612	611	611	615	614	615	630	626	628
22	610	608	609	612	610	611	616	614	615	632	629	630
23	610	607	609	612	611	611	616	615	616	634	631	633
24	609	607	608	613	610	612	617	616	616	638	634	636
25	609	607	608	614	609	612	617	616	617	642	638	640
26	609	608	609	613	610	611	618	616	617	643	642	642
27	609	604	608	611	610	610	619	614	617	651	643	645
28	609	605	608	612	610	612	619	615	617	653	647	650
29	609	604	606	613	612	612	620	614	617	655	649	652
30	610	604	605	614	611	613	619	615	616	658	652	656
31	---	---	---	---	---	---	617	616	616	661	658	659
MONTH	613	604	609	617	608	611	620	610	614	661	615	628

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	662	660	661	658	649	654	687	681	684	653	651	652
2	663	658	662	655	651	653	688	684	686	655	652	654
3	665	659	663	655	650	653	689	687	688	658	655	656
4	665	659	663	655	649	651	691	687	689	661	656	659
5	665	661	663	653	647	649	695	690	692	679	661	669
6	666	659	662	652	647	650	695	690	692	700	679	690
7	666	660	663	653	648	651	---	---	---	712	699	706
8	665	661	664	652	646	650	695	688	692	727	712	718
9	666	664	665	652	647	650	694	687	691	743	727	736
10	666	662	664	651	645	648	692	686	689	755	743	750
11	665	663	664	650	643	647	690	681	686	773	755	763
12	666	665	665	647	643	645	686	682	684	791	773	782
13	666	663	665	647	642	644	683	680	681	805	791	799
14	664	662	663	644	642	643	681	677	679	806	800	803
15	664	662	663	643	641	643	679	675	677	801	797	799
16	664	662	663	644	640	642	677	673	675	804	797	799
17	664	661	662	643	640	642	674	669	672	809	804	807
18	663	659	661	645	640	642	671	664	668	808	803	807
19	662	658	660	645	640	643	666	663	665	804	794	800
20	662	657	659	646	641	644	663	660	662	794	787	791
21	661	656	659	647	642	645	664	656	659	787	778	783
22	660	658	659	649	646	647	660	654	656	779	773	776
23	659	656	658	650	647	648	657	652	654	776	773	774
24	658	655	657	651	648	649	656	649	653	777	774	775
25	657	654	656	654	649	652	654	648	651	779	777	778
26	655	653	654	661	654	657	653	649	651	781	778	780
27	654	651	652	665	660	662	653	648	651	782	777	780
28	657	650	653	671	664	667	651	647	650	782	777	780
29	657	652	655	675	667	671	650	646	649	782	774	778
30	---	---	---	679	673	676	651	649	650	774	751	763
31	---	---	---	682	678	680	---	---	---	752	735	744
MONTH	666	650	661	682	640	652	695	646	672	809	651	753

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

393541083001100 PK-48 NR CIRCLEVILLE OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	738	724	731	736	729	734	907	899	903	689	683	687
2	728	712	719	733	728	731	913	907	910	683	677	681
3	712	699	706	729	723	727	917	909	914	678	676	677
4	703	691	694	726	720	723	919	912	916	677	672	675
5	692	683	687	724	720	722	919	913	917	672	671	672
6	684	680	683	730	722	725	919	914	916	674	667	672
7	705	680	685	736	726	731	914	902	911	669	666	668
8	753	705	735	754	736	745	911	902	907	667	666	667
9	756	743	751	774	754	765	903	887	897	668	664	667
10	743	728	735	797	774	787	890	882	885	666	661	665
11	728	717	723	822	797	811	893	879	885	665	658	661
12	717	715	715	838	822	831	884	878	882	662	656	659
13	718	715	717	855	838	849	885	875	881	657	656	657
14	717	714	716	868	855	862	881	870	876	657	653	655
15	719	713	717	873	868	871	876	864	870	655	653	654
16	720	712	718	880	873	877	864	859	861	654	652	653
17	715	705	711	887	879	884	859	852	854	655	652	654
18	717	705	713	889	885	887	853	843	848	653	651	652
19	724	717	719	893	888	890	843	836	839	653	652	653
20	731	720	723	903	887	895	837	821	829	653	652	653
21	739	731	736	904	896	899	812	798	806	653	652	653
22	741	738	740	900	892	897	798	790	795	654	653	654
23	740	736	739	897	892	895	790	773	782	654	652	654
24	737	734	736	901	893	898	777	759	768	654	652	652
25	736	732	734	903	900	901	760	749	755	654	652	653
26	732	728	731	903	899	901	749	739	743	653	653	653
27	729	727	728	904	898	902	739	727	733	654	653	653
28	731	727	729	905	898	902	727	718	722	655	653	654
29	735	729	732	903	894	899	719	709	712	655	653	654
30	736	733	735	897	893	895	709	698	704	656	654	655
31	---	---	---	903	893	898	698	689	694	---	---	---
MONTH	756	680	721	905	720	837	919	689	836	689	651	661
YEAR	919	604	688									

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	25.1	8.4	16.7	18.8	9.0	14.4	14.5	-2.5	8.1	5.0	.0	1.8
2	28.7	7.6	16.2	20.1	10.2	16.9	10.0	-6.5	1.0	1.5	-4.9	-1.0
3	18.5	7.2	14.5	10.2	-4.1	2.9	13.0	.3	7.8	-4.9	-10.1	-8.5
4	16.7	12.8	14.0	4.5	-6.1	-.9	6.6	-5.6	-.2	-5.2	-11.2	-7.5
5	19.7	14.0	16.2	.7	-10.9	-3.8	9.1	-3.2	2.1	-7.7	-14.6	-9.7
6	23.1	10.9	17.0	7.9	-7.5	.7	1.5	-8.3	-2.5	-6.5	-11.5	-8.9
7	17.5	7.5	12.0	8.3	-.1	5.9	3.2	-10.5	-4.4	-8.6	-11.5	-9.2
8	17.5	3.7	10.4	1.9	-6.1	-.8	-.4	-11.2	-5.2	-7.0	-17.4	-11.7
9	22.4	1.8	10.8	3.1	-9.5	-2.7	-.8	-14.3	-8.0	-2.5	-9.2	-5.6
10	24.5	4.3	13.1	16.5	-.4	10.0	-7.8	-15.9	-12.1	-3.0	-19.8	-9.6
11	26.7	5.2	14.5	13.3	-4.3	5.1	-5.9	-12.5	-8.7	-5.9	-19.7	-10.1
12	27.7	5.3	14.6	.3	-7.5	-3.5	-4.1	-9.0	-6.3	-5.0	-6.7	-6.0
13	27.5	5.0	16.0	1.3	-.8	.3	.0	-5.4	-2.9	-.7	-6.0	-2.5
14	17.0	7.6	12.5	.6	-2.8	-1.0	15.9	.0	8.0	8.8	-5.9	1.1
15	14.6	1.5	8.1	2.7	-3.9	-.6	3.4	-2.2	.9	-1.3	-11.3	-5.2
16	15.8	-.7	6.1	.7	-4.6	-1.4	6.1	-5.1	.5	5.8	-10.4	-.6
17	18.8	-4.2	6.7	3.6	-5.4	.5	3.2	-7.9	-2.4	10.3	4.4	7.3
18	23.6	3.2	13.0	7.3	2.1	4.3	.8	-.9	.2	17.8	6.1	11.3
19	24.2	5.7	13.9	8.1	-1.9	2.7	.3	-7.0	-2.3	7.9	-12.7	-8.5
20	18.2	2.7	10.1	12.4	-2.8	3.8	-4.1	-11.9	-7.1	-4.5	-14.5	-9.2
21	6.5	2.5	4.8	1.3	-4.4	-.8	-3.2	-7.0	-5.4	1.8	-9.7	-3.8
22	19.9	1.9	9.5	2.8	-5.7	-.9	-3.5	-13.2	-6.4	3.9	-5.9	-1.0
23	22.2	1.6	11.1	6.9	-3.5	2.5	-4.7	-9.1	-6.6	4.1	1.0	2.4
24	17.1	2.1	11.3	2.8	-8.3	-3.3	-3.8	-6.3	-5.1	4.4	-6.0	-.7
25	13.3	.7	6.8	6.4	-9.0	-2.4	-2.6	-6.3	-4.6	-1.3	-9.3	-4.8
26	14.6	-2.4	6.3	15.5	-5.1	5.0	-6.0	-12.0	-7.9	7.4	-4.4	1.1
27	15.5	9.1	12.7	15.3	5.7	11.4	-6.0	-15.3	-8.6	8.1	-5.5	-1.4
28	12.3	6.4	8.7	6.3	-1.1	.8	-3.3	-13.2	-7.1	-1.5	-10.7	-5.2
29	12.7	1.8	7.0	1.5	-7.4	-1.5	-.9	-15.4	-9.1	6.3	-3.7	.5
30	13.5	4.3	8.0	7.5	-9.3	-1.0	2.3	-13.6	-5.0	-3.7	-8.7	-5.6
31	---	---	---	---	---	---	3.2	-.2	1.1	-8.7	-15.5	-11.7
MONTH	28.7	-4.2	11.4	20.1	-10.9	2.1	15.9	-15.9	-3.2	17.8	-19.8	-4.0





WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	13.1	13.1	13.6	13.5	13.6	13.5	13.5	13.5	12.8	12.8	12.5	12.1
2	13.1	13.1	13.6	13.6	13.6	13.5	13.5	13.5	13.0	12.8	12.3	12.1
3	13.1	13.1	13.6	13.5	13.6	13.5	13.5	13.5	13.0	12.7	12.3	12.1
4	13.1	13.1	13.5	13.5	13.6	13.5	13.5	13.5	13.0	12.7	12.3	11.9
5	13.1	13.1	13.5	13.5	13.5	13.5	13.7	13.5	13.0	12.7	12.1	11.9
6	13.1	13.1	13.6	13.5	13.5	13.5	13.7	13.5	12.8	12.6	12.1	11.9
7	13.1	13.1	13.5	13.5	13.5	13.5	13.5	13.5	12.8	12.6	12.1	11.9
8	13.1	13.1	13.5	13.5	13.5	13.5	13.7	13.2	12.8	12.6	12.3	11.9
9	13.4	13.0	13.6	13.5	13.5	13.5	13.5	13.3	12.6	12.6	12.1	11.9
10	13.4	13.1	13.6	13.5	13.5	13.5	13.5	13.2	12.6	12.6	12.1	11.9
11	13.4	13.1	13.6	13.5	13.7	13.5	13.5	13.2	12.6	12.6	12.0	11.9
12	13.4	13.1	13.5	13.5	13.5	13.5	13.5	13.3	12.6	12.6	12.0	11.9
13	13.4	13.1	13.5	13.5	13.5	13.5	13.3	13.3	12.6	12.5	12.0	11.9
14	13.3	13.3	13.5	13.5	13.6	13.5	13.4	13.3	12.6	12.6	12.0	11.9
15	13.4	13.3	13.5	13.5	13.5	13.5	13.3	13.2	12.6	12.6	12.0	11.9
16	13.4	13.3	13.5	13.5	13.6	13.5	13.3	13.0	12.6	12.5	12.0	11.9
17	13.4	13.3	13.5	13.5	13.5	13.5	13.3	13.1	12.6	12.5	11.9	11.9
18	13.4	13.3	13.5	13.5	13.5	13.5	13.3	13.1	12.8	12.4	11.9	11.7
19	13.4	13.3	13.6	13.5	13.5	13.5	13.3	13.0	12.6	12.3	11.9	11.7
20	13.3	13.3	13.6	13.5	13.5	13.5	13.2	13.0	12.6	12.4	11.9	11.7
21	13.3	13.3	13.5	13.5	13.5	13.5	13.3	13.0	12.6	12.4	11.9	11.7
22	13.4	13.3	13.6	13.5	13.5	13.5	13.1	13.0	12.4	12.4	11.7	11.7
23	13.4	13.3	13.5	13.5	13.5	13.5	13.1	13.0	12.4	12.4	11.7	11.6
24	13.4	13.3	13.6	13.5	13.5	13.5	13.1	13.0	12.4	12.4	11.7	11.7
25	13.4	13.3	13.8	13.5	13.5	13.5	13.1	13.0	12.4	12.4	11.7	11.7
26	13.3	13.3	13.6	13.5	13.5	13.5	13.1	13.0	12.4	12.4	11.7	11.6
27	13.6	13.3	13.6	13.5	13.7	13.5	13.1	12.8	12.4	12.4	11.7	11.5
28	13.6	13.3	13.6	13.5	13.7	13.5	13.0	12.8	12.6	12.1	11.7	11.5
29	13.6	13.3	13.5	13.5	13.7	13.5	13.1	12.8	12.3	12.1	11.7	11.5
30	13.6	13.3	13.6	13.5	13.7	13.5	13.0	12.8	---	---	11.7	11.4
31	---	---	---	---	13.5	13.5	12.8	12.8	---	---	11.5	11.5
MONTH	13.6	13.0	13.8	13.5	13.7	13.5	13.7	12.8	13.0	12.1	12.5	11.4

WATER TEMPERATURE. DEGREES CELSIUS. WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]



## 251

TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

393541083001100 PK-48 NR CIRCLEVILLE OH--Continued

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

## DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.19	.00	.00	.00	.00	.00	.19	.00	.00	.00	.00
2	.00	.08	.00	.19	.00	.00	.00	.00	.32	.00	.00	.00
3	1.00	.01	.04	.00	.00	.00	.00	.00	.41	.00	.00	.00
4	.05	.00	.00	.00	.00	.00	.00	1.60	.18	.00	.00	.00
5	1.74	.00	.01	.00	.00	.46	.00	.36	.00	.00	.00	.09
6	.02	.00	.00	.00	.00	.23	.00	.00	.73	.00	.01	.02
7	.00	.42	.00	.00	.01	.00	---	.05	1.02	1.01	.00	.00
8	.00	.00	.00	.06	.17	.00	.00	.59	.05	.00	.79	.00
9	.00	.00	.00	.03	.00	.01	.00	.12	.11	.00	.00	.00
10	.00	.00	.00	.02	.00	.00	.00	.65	.03	.00	.00	.00
11	.00	.73	.00	.00	.00	.00	.00	.80	.62	.00	.00	.21
12	.00	.00	.00	.00	.00	.00	.00	.00	.03	.00	.00	.04
13	.01	.18	.37	.08	.00	.00	.00	.00	.00	.07	.00	.00
14	.24	.00	.03	.18	.00	.00	.00	.00	.16	.00	.00	.00
15	.00	.00	.52	.00	.00	.38	.00	.95	.01	.60	.00	1.32
16	.00	.01	.01	.00	.00	.02	.00	.07	.00	.00	.00	.00
17	.00	.18	.00	.03	.00	.06	.00	.00	.52	.01	.00	.00
18	.00	.01	.76	.86	.00	.00	.00	.00	.09	.61	.00	.00
19	.00	.00	.61	.13	.16	.92	.00	.00	.81	.00	.00	.00
20	.25	.00	.04	.00	.51	.20	.00	.00	.03	.00	.00	.44
21	.05	.00	.00	.00	.00	.01	.00	.08	.00	.33	.00	.06
22	.00	.00	.00	.01	.00	.00	.00	.00	.00	.15	.24	.00
23	.00	.00	.00	1.18	.10	.00	.00	.28	.00	.00	.51	.03
24	.03	.00	.00	.24	.00	.00	.00	.02	.13	.10	.00	.00
25	.00	.00	.01	.00	.00	.04	.01	.00	.00	.01	.00	.01
26	.00	.00	.00	.06	.35	.00	.11	.29	.00	.00	.00	.36
27	.16	.00	.00	.35	.45	.00	.00	1.01	.00	.00	.00	1.97
28	.00	.00	.00	.00	.01	.03	.31	.34	.00	.00	.00	.00
29	.14	.00	.00	.00	.00	.00	1.34	.76	.00	.11	.00	.00
30	.00	.00	.00	.00	---	.00	.56	.00	.00	.77	.00	.00
31	---	---	.17	.00	---	.00	---	.00	---	.00	.00	---
TOTAL	3.69	1.81	2.57	3.42	1.76	2.36	2.33	8.16	5.25	3.77	1.55	4.55

WTR YR 1996 TOTAL 41.22

EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW  
UNCONSOLIDATED AQUIFERS IN OHIO

253

GROUND-WATER RECORDS

400949083480100. Local number, CH-42.

LOCATION.--Lat 40°09'49" Long 83°48'01", Hydrologic Unit 05080001, along State Route 29 near Urbana, OH.  
Owner.--USGS-Jack Sommers.

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 28.7 ft. Cased with Sch 40 PVC to 13.7 ft; .020-in. screen from 13.7 to 28.7 ft.

INSTRUMENTATION - Data logger--60-minute record. Precipitation data collected with a propane-heated, tipping-bucket rain gage. Also collected: air temperature, soil temperature, water temperature, and specific conductance. Conductivity/water temperature probe set at 23.7 ft below land surface.

DATUM.--Elevation of land-surface datum is 1029.89 ft above sea level.  
Measuring point: shelter shelf 2.32 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality. Water-quality data for nearby wells are available in preceding tables. Incomplete data this year due to problems with recorder.

PERIOD OF RECORD.--February 1991 to current year.

PERIOD OF DAILY RECORD.--

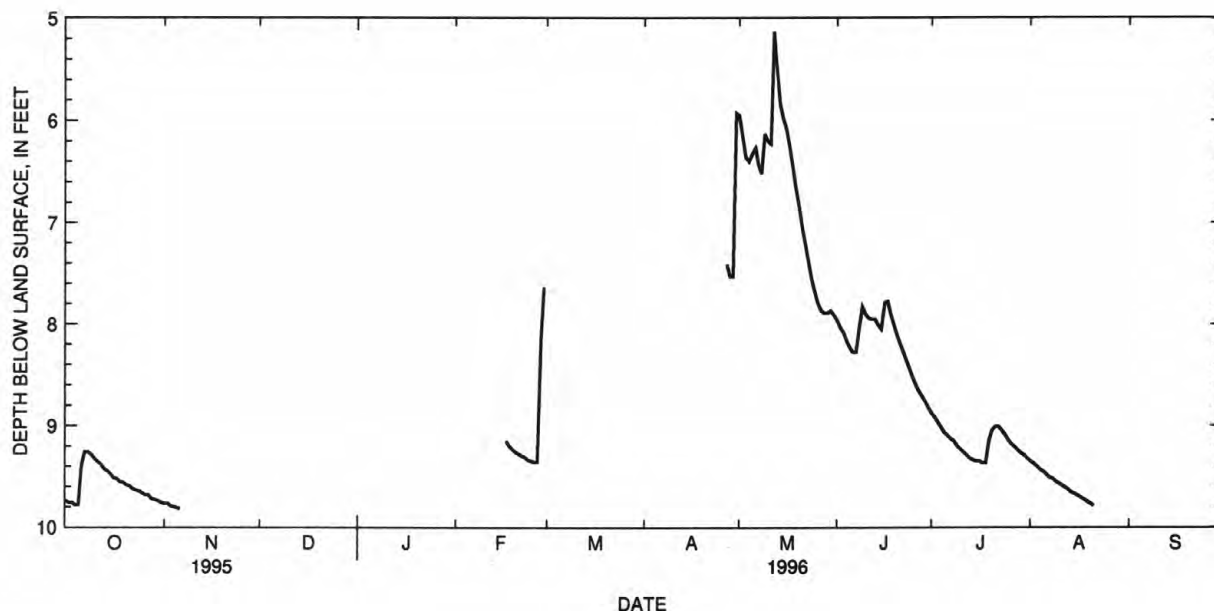
WATER LEVEL: February 1991 to current year.  
SPECIFIC CONDUCTANCE: February 1991 to current year.  
AIR TEMPERATURE: February 1991 to current year.  
WATER TEMPERATURE: February 1991 to current year.  
SOIL TEMPERATURE: February 1991 to current year.  
PRECIPITATION: February 1991 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER LEVEL: Maximum daily low, 10.62 ft below land-surface datum, December 19, 1991; maximum daily high, 4.64 ft below land-surface datum, May 11, 1996.  
SPECIFIC CONDUCTANCE: Maximum, 919 microsiemens December 11-12, 1993; minimum, 725 microsiemens July 31, 1991.  
AIR TEMPERATURE: Maximum, 37.6°C June 18, 1994; minimum, -33.6°C January 19, 1994.  
WATER TEMPERATURE: Maximum, 13.2°C many days October, November 1992; minimum, 10.2°C many days in May, June, and July, 1996.  
SOIL TEMPERATURE: Maximum, 30.5°C August 2, 1991; minimum, -1.8°C February 10, 1994.

EXTREMES FOR CURRENT YEAR.--

WATER LEVEL: Maximum daily low, 9.82 ft below land-surface datum, November 6, 1995; maximum daily high, 4.64 ft below land-surface datum, May 11, 1996.  
SPECIFIC CONDUCTANCE: Maximum, 911 microsiemens May 20-21, 1996; minimum, 746 microsiemens November 7, 1995.  
AIR TEMPERATURE: Maximum, 33.2°C August 21, 1996; minimum, -20.1°C February 18, 1996.  
WATER TEMPERATURE: Maximum, 12.7°C October 28-November 4, 6-7, 1995; minimum, 10.2°C many days in May, June, and July, 1996.  
SOIL TEMPERATURE: Maximum, 23.9°C June 30, 1996; minimum, -0.2°C February 17-21, 1996.



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

400949083480100 CH-42 NR URBANA OH--Continued

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	9.74	9.73	9.77	9.76	---	---	---	---	---	---	---	---
2	9.76	9.74	9.77	9.77	---	---	---	---	---	---	---	---
3	9.76	9.76	9.79	9.77	---	---	---	---	---	---	---	---
4	9.78	9.76	9.80	9.79	---	---	---	---	---	---	---	---
5	9.78	9.40	9.81	9.80	---	---	---	---	---	---	---	---
6	9.40	9.26	9.82	9.81	---	---	---	---	---	---	---	---
7	9.26	9.24	---	---	---	---	---	---	---	---	---	---
8	9.26	9.24	---	---	---	---	---	---	---	---	---	---
9	9.28	9.26	---	---	---	---	---	---	---	---	---	---
10	9.32	9.28	---	---	---	---	---	---	---	---	---	---
11	9.35	9.32	---	---	---	---	---	---	---	---	---	---
12	9.38	9.35	---	---	---	---	---	---	---	---	---	---
13	9.42	9.38	---	---	---	---	---	---	---	---	---	---
14	9.44	9.42	---	---	---	---	---	---	---	---	---	---
15	9.47	9.44	---	---	---	---	---	---	---	---	---	---
16	9.51	9.47	---	---	---	---	---	---	---	---	---	---
17	9.52	9.51	---	---	---	---	---	---	9.15	9.12	---	---
18	9.55	9.52	---	---	---	---	---	---	9.20	9.15	---	---
19	9.56	9.55	---	---	---	---	---	---	9.23	9.20	---	---
20	9.58	9.56	---	---	---	---	---	---	9.26	9.23	---	---
21	9.59	9.58	---	---	---	---	---	---	9.28	9.26	---	---
22	9.62	9.59	---	---	---	---	---	---	9.30	9.28	---	---
23	9.63	9.62	---	---	---	---	---	---	9.31	9.30	---	---
24	9.64	9.63	---	---	---	---	---	---	9.34	9.31	---	---
25	9.66	9.64	---	---	---	---	---	---	9.35	9.34	---	---
26	9.68	9.66	---	---	---	---	---	---	9.36	9.35	---	---
27	9.68	9.68	---	---	---	---	---	---	9.36	8.16	---	---
28	9.72	9.68	---	---	---	---	---	---	8.16	7.63	---	---
29	9.73	9.72	---	---	---	---	---	---	7.63	7.56	---	---
30	9.74	9.73	---	---	---	---	---	---	---	---	---	---
31	9.76	9.74	---	---	---	---	---	---	---	---	---	---
MONTH	9.78	9.24	9.82	9.76	---	---	---	---	9.36	7.56	---	---

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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400949083480100 CH-42 NR URBANA OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	776	774	775	753	748	751	---	---	---	---	---	---
2	775	774	774	752	747	751	---	---	---	---	---	---
3	774	773	774	752	748	749	---	---	---	---	---	---
4	774	772	773	750	748	749	---	---	---	---	---	---
5	772	770	771	752	750	751	---	---	---	---	---	---
6	770	767	768	752	747	749	---	---	---	---	---	---
7	767	766	767	748	746	747	---	---	---	---	---	---
8	766	764	766	---	---	---	---	---	---	---	---	---
9	766	764	765	---	---	---	---	---	---	---	---	---
10	766	763	765	---	---	---	---	---	---	---	---	---
11	765	762	764	---	---	---	---	---	---	---	---	---
12	764	761	762	---	---	---	---	---	---	---	---	---
13	762	760	761	---	---	---	---	---	---	---	---	---
14	761	760	760	---	---	---	---	---	---	---	---	---
15	761	759	760	---	---	---	---	---	---	---	---	---
16	761	756	758	---	---	---	---	---	---	---	---	---
17	759	755	758	---	---	---	---	---	---	---	---	---
18	759	755	757	---	---	---	---	---	---	---	---	---
19	759	754	757	---	---	---	---	---	---	---	---	---
20	755	753	754	---	---	---	---	---	---	---	---	---
21	755	754	754	---	---	---	---	---	---	---	---	---
22	755	752	753	---	---	---	---	---	---	---	---	---
23	754	752	753	---	---	---	---	---	---	---	---	---
24	754	753	753	---	---	---	---	---	---	---	---	---
25	754	751	753	---	---	---	---	---	---	---	---	---
26	755	753	754	---	---	---	---	---	---	---	---	---
27	753	751	753	---	---	---	---	---	---	---	---	---
28	753	748	752	---	---	---	---	---	---	---	---	---
29	753	748	751	---	---	---	---	---	---	---	---	---
30	753	748	750	---	---	---	---	---	---	---	---	---
31	753	748	751	---	---	---	---	---	---	---	---	---
MONTH	776	748	760	753	746	750	---	---	---	---	---	---

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	---	---	---	---	---	---	899	897	898
2	---	---	---	---	---	---	---	---	---	903	897	898
3	---	---	---	---	---	---	---	---	---	905	898	900
4	---	---	---	---	---	---	---	---	---	905	899	902
5	---	---	---	---	---	---	---	---	---	904	898	901
6	---	---	---	---	---	---	---	---	---	904	898	902
7	---	---	---	---	---	---	---	---	---	905	898	902
8	---	---	---	---	---	---	---	---	---	904	898	903
9	---	---	---	---	---	---	---	---	---	906	900	902
10	---	---	---	---	---	---	---	---	---	907	900	902
11	---	---	---	---	---	---	---	---	---	904	896	899
12	---	---	---	---	---	---	---	---	---	903	897	899
13	---	---	---	---	---	---	---	---	---	904	898	900
14	---	---	---	---	---	---	---	---	---	906	899	902
15	---	---	---	---	---	---	---	---	---	906	901	903
16	---	---	---	---	---	---	---	---	---	906	904	905
17	832	828	830	---	---	---	---	---	---	910	904	905
18	831	825	828	---	---	---	---	---	---	906	903	905
19	830	824	827	---	---	---	---	---	---	910	904	905
20	830	823	827	---	---	---	---	---	---	911	903	906
21	827	822	826	---	---	---	---	---	---	911	902	905
22	826	821	825	---	---	---	---	---	---	910	903	905
23	825	822	824	---	---	---	---	---	---	909	903	905
24	825	820	822	---	---	---	---	---	---	908	902	904
25	824	819	821	---	---	---	---	---	---	909	902	904
26	823	817	820	---	---	---	---	---	---	907	902	903
27	823	812	816	---	---	---	900	894	898	908	901	903
28	816	812	813	---	---	---	899	895	899	907	900	902
29	816	812	813	---	---	---	900	894	897	906	899	902
30	---	---	---	---	---	---	902	895	897	905	897	901
31	---	---	---	---	---	---	---	---	---	903	895	899
MONTH	832	812	822	---	---	---	902	894	898	911	895	902



# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

400949083480100 CH-42 NR URBANA OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	902	895	898	880	873	875	841	835	836	---	---	---
2	900	895	896	879	872	875	837	834	836	---	---	---
3	900	894	896	879	871	874	841	833	835	---	---	---
4	897	892	894	879	870	873	836	832	835	---	---	---
5	897	891	894	873	866	871	837	832	835	---	---	---
6	897	890	893	876	866	871	836	832	834	---	---	---
7	895	889	892	870	865	869	837	832	835	---	---	---
8	893	886	888	873	865	868	837	831	835	---	---	---
9	892	885	888	868	866	867	836	830	834	---	---	---
10	891	884	887	867	863	865	836	828	834	---	---	---
11	---	---	---	866	861	864	834	828	833	---	---	---
12	889	884	885	866	860	864	834	828	832	---	---	---
13	889	882	885	864	860	863	834	827	830	---	---	---
14	889	882	885	864	857	862	833	827	829	---	---	---
15	888	881	884	862	855	859	833	826	828	---	---	---
16	887	880	883	860	854	857	832	825	826	---	---	---
17	887	881	885	859	852	856	826	825	826	---	---	---
18	887	881	885	856	851	853	826	821	824	---	---	---
19	886	882	884	856	849	852	825	823	824	---	---	---
20	887	882	884	850	845	848	824	822	823	---	---	---
21	887	881	884	848	846	847	823	819	822	---	---	---
22	887	880	885	847	845	846	---	---	---	---	---	---
23	888	882	885	846	844	845	---	---	---	---	---	---
24	885	881	884	845	843	844	---	---	---	---	---	---
25	885	878	883	844	843	844	---	---	---	---	---	---
26	884	877	880	844	838	842	---	---	---	---	---	---
27	883	876	879	843	838	841	---	---	---	---	---	---
28	882	875	878	843	837	841	---	---	---	---	---	---
29	881	875	878	842	837	839	---	---	---	---	---	---
30	880	874	877	842	837	837	---	---	---	---	---	---
31	---	---	---	841	836	837	---	---	---	---	---	---
MONTH	902	874	886	880	836	856	841	819	831	---	---	---
YEAR	911	746	843									

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	23.6	12.7	17.7	18.9	7.8	14.4	---	---	---	---	---	---
2	27.9	5.9	15.6	20.9	6.7	16.5	---	---	---	---	---	---
3	18.3	6.6	14.5	6.7	-1.5	1.0	---	---	---	---	---	---
4	17.4	11.2	13.5	1.6	-6.7	-1.4	---	---	---	---	---	---
5	17.5	13.0	14.9	-.7	-10.7	-4.6	---	---	---	---	---	---
6	23.2	13.5	17.0	9.0	-6.7	2.0	---	---	---	---	---	---
7	14.6	10.3	12.2	9.9	.4	5.8	---	---	---	---	---	---
8	20.2	4.8	12.5	---	---	---	---	---	---	---	---	---
9	21.7	1.2	11.3	---	---	---	---	---	---	---	---	---
10	25.0	4.2	13.7	---	---	---	---	---	---	---	---	---
11	26.8	3.0	14.4	---	---	---	---	---	---	---	---	---
12	27.7	5.6	15.7	---	---	---	---	---	---	---	---	---
13	27.6	5.3	16.7	---	---	---	---	---	---	---	---	---
14	18.5	8.6	12.9	---	---	---	---	---	---	---	---	---
15	14.6	2.5	8.0	---	---	---	---	---	---	---	---	---
16	16.4	-1.2	6.6	---	---	---	---	---	---	---	---	---
17	19.6	-4.2	8.1	---	---	---	---	---	---	---	---	---
18	24.6	8.0	15.4	---	---	---	---	---	---	---	---	---
19	24.8	7.8	16.2	---	---	---	---	---	---	---	---	---
20	16.2	4.6	10.6	---	---	---	---	---	---	---	---	---
21	5.8	3.6	4.7	---	---	---	---	---	---	---	---	---
22	19.3	.8	9.8	---	---	---	---	---	---	---	---	---
23	21.8	5.3	13.4	---	---	---	---	---	---	---	---	---
24	16.4	7.1	10.3	---	---	---	---	---	---	---	---	---
25	14.9	2.2	8.3	---	---	---	---	---	---	---	---	---
26	15.9	-.3	7.9	---	---	---	---	---	---	---	---	---
27	14.4	9.1	12.4	---	---	---	---	---	---	---	---	---
28	10.2	6.9	8.1	---	---	---	---	---	---	---	---	---
29	12.4	3.0	7.4	---	---	---	---	---	---	---	---	---
30	13.7	5.0	8.8	---	---	---	---	---	---	---	---	---
31	14.5	6.9	9.6	---	---	---	---	---	---	---	---	---
MONTH	27.9	-4.2	11.9	20.9	-10.7	4.8	---	---	---	---	---	---



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

400949083480100 CH-42 NR URBANA OH--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	12.3	12.2	12.7	12.4	---	---	---	---	---	---	---	---
2	12.3	12.2	12.7	12.5	---	---	---	---	---	---	---	---
3	12.2	12.2	12.7	12.4	---	---	---	---	---	---	---	---
4	12.2	12.2	12.7	12.6	---	---	---	---	---	---	---	---
5	12.2	12.2	12.6	12.6	---	---	---	---	---	---	---	---
6	12.3	12.2	12.7	12.6	---	---	---	---	---	---	---	---
7	12.2	12.2	12.7	12.6	---	---	---	---	---	---	---	---
8	12.3	12.2	---	---	---	---	---	---	---	---	---	---
9	12.3	12.2	---	---	---	---	---	---	---	---	---	---
10	12.3	12.2	---	---	---	---	---	---	---	---	---	---
11	12.3	12.2	---	---	---	---	---	---	---	---	---	---
12	12.3	12.2	---	---	---	---	---	---	---	---	---	---
13	12.3	12.2	---	---	---	---	---	---	---	---	---	---
14	12.2	12.2	---	---	---	---	---	---	---	---	---	---
15	12.2	12.2	---	---	---	---	---	---	---	---	---	---
16	12.4	12.2	---	---	---	---	---	---	---	---	---	---
17	12.5	12.2	---	---	---	---	---	12.0	11.9	---	---	---
18	12.5	12.2	---	---	---	---	---	12.0	11.7	---	---	---
19	12.5	12.2	---	---	---	---	---	12.0	11.7	---	---	---
20	12.5	12.4	---	---	---	---	---	12.0	11.7	---	---	---
21	12.4	12.4	---	---	---	---	---	12.0	11.7	---	---	---
22	12.5	12.4	---	---	---	---	---	12.0	11.7	---	---	---
23	12.5	12.4	---	---	---	---	---	11.8	11.7	---	---	---
24	12.5	12.4	---	---	---	---	---	11.8	11.6	---	---	---
25	12.5	12.4	---	---	---	---	---	11.8	11.5	---	---	---
26	12.5	12.4	---	---	---	---	---	11.8	11.5	---	---	---
27	12.5	12.4	---	---	---	---	---	11.8	11.5	---	---	---
28	12.7	12.4	---	---	---	---	---	11.8	11.5	---	---	---
29	12.7	12.4	---	---	---	---	---	11.7	11.5	---	---	---
30	12.7	12.4	---	---	---	---	---	---	---	---	---	---
31	12.7	12.4	---	---	---	---	---	---	---	---	---	---
MONTH	12.7	12.2	12.7	12.4	---	---	---	---	12.0	11.5	---	---

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

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TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]



# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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## GROUND-WATER RECORDS

395859083440700. Local number, CL-138.

LOCATION.--Lat 39°58'59" Long 83°44'07", Hydrologic Unit 05080001, along State Route 4 near Springfield, OH.  
Owner.--USGS-U.S. Army Corps of Engineers.

AQUIFER.--Sand and gravel of Pleistocene age.

WELL CHARACTERISTICS.--Observation well drilled by hollow-stem auger, diameter 4.0 in., depth 28.5 ft. Cased with Sch 40 PVC to 18.5 ft; .020-in. screen from 18.5 to 28.5 ft.

INSTRUMENTATION - Data logger--60-minute record. Precipitation data collected with a propane-heated, tipping-bucket rain gage. Also collected: water level, air temperature, soil temperature, water temperature, and specific conductance.

DATUM.--Elevation of land-surface datum is 1031.61 ft above sea level.  
Measuring point: shelter shelf 3.31 ft above land-surface datum.

REMARKS.--This station is part of an eight-site network to collect data for the Ohio Department of Transportation concerning road salt application and its effect(s) on shallow ground-water quality. Water-quality data for nearby wells are available in preceding tables. Incomplete conductance data this year due to defective probe.

PERIOD OF RECORD.--February 1991 to current year.

PERIOD OF DAILY RECORD.--

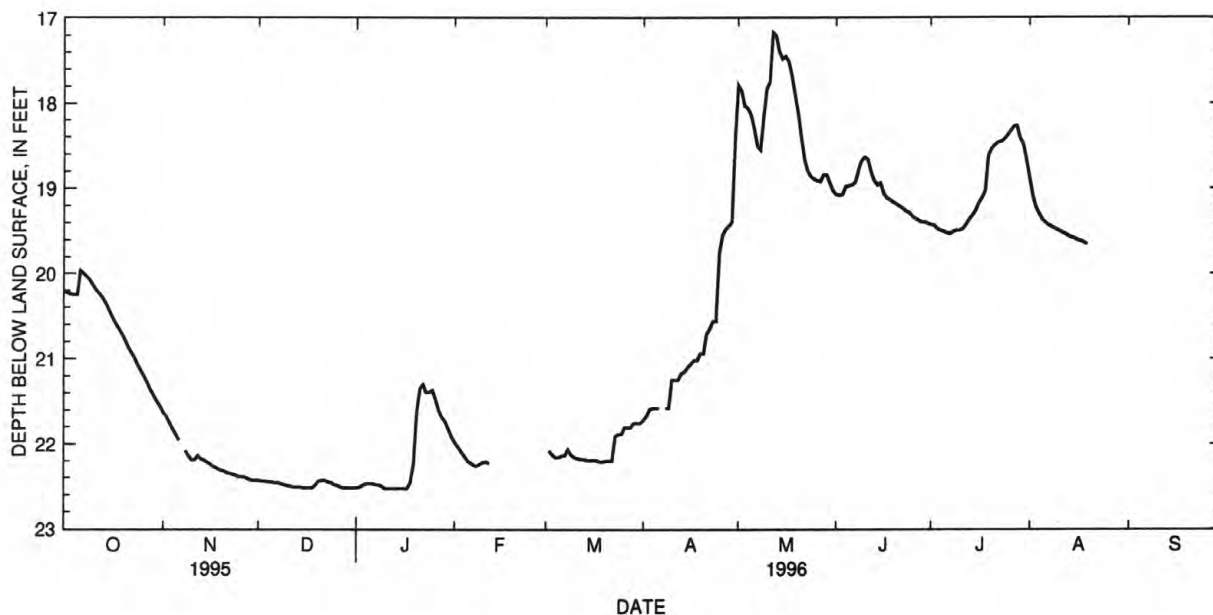
WATER LEVEL: February 1991 to current year.  
SPECIFIC CONDUCTANCE: July 1992 to current year.  
AIR TEMPERATURE: February 1991 to current year.  
WATER TEMPERATURE: July 1992 to current year.  
SOIL TEMPERATURE: February 1991 to current year.  
PRECIPITATION: February 1991 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER LEVEL: Maximum daily low, 22.61 ft below land-surface datum, February 2,3, 1995; maximum daily high, 17.00 ft below land-surface datum, May 12, 1996.  
WATER TEMPERATURE: Maximum, 13.9°C many days in November, December, 1993; minimum, 2.2°C August 29-September 4, 1995.  
AIR TEMPERATURE: Maximum, 37.5°C July 22, 1991; minimum, -30.7°C January 21, 1994.  
SOIL TEMPERATURE: Maximum, 39.5°C July 22 and August 2, 1991; minimum, -2.7°C Dec. 27, 1992.  
SPECIFIC CONDUCTANCE: Maximum, 1010 microsiemens, February 4-7, May 13-15, 1996; minimum 733 microsiemens, May 19-20, July 14-16, 1995.

EXTREMES FOR CURRENT YEAR.--

WATER LEVEL: Maximum daily low, 22.53 ft below land-surface datum, January 10-17, 1996; maximum daily high, 17.00 ft below land-surface datum, May 12, 1996.  
SPECIFIC CONDUCTANCE: Maximum, 1010 microsiemens, February 4-7, May 13-15, 1996; minimum 783 microsiemens, July 19, 1996.  
AIR TEMPERATURE: Maximum, 34.2°C June 30, 1996; minimum, -22.3°C February 4, 1996.  
WATER TEMPERATURE: Maximum, 13.4°C January 22-February 1, 1996; minimum, 9.2°C May 31-June 14, 1996.  
SOIL TEMPERATURE: Maximum, 26.8°C June 30, 1996; minimum, -2.5°C February 5, 1996.



DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	20.20	20.16	21.63	21.56	22.43	22.43	22.52	22.51	21.98	21.91	---	---
2	20.23	20.20	21.68	21.63	22.44	22.43	22.51	22.49	22.03	21.98	22.08	22.04
3	20.24	20.20	21.75	21.68	22.44	22.44	22.49	22.47	22.09	22.03	22.13	22.08
4	20.25	20.20	21.82	21.75	22.45	22.44	22.47	22.47	22.14	22.09	22.16	22.13
5	20.25	19.97	21.89	21.82	22.45	22.44	22.47	22.47	22.19	22.14	22.16	22.14
6	19.97	19.92	21.96	21.89	22.46	22.45	22.47	22.47	22.22	22.19	22.14	22.14
7	20.00	19.95	---	---	22.46	22.46	22.48	22.47	22.25	22.22	22.14	22.07
8	20.04	20.00	22.08	22.01	22.47	22.46	22.48	22.48	22.26	22.24	22.07	22.07
9	20.08	20.04	22.14	22.08	22.48	22.47	22.50	22.48	22.24	22.22	22.13	22.07
10	20.14	20.08	22.19	22.14	22.49	22.48	22.53	22.50	22.22	22.20	22.16	22.13
11	20.19	20.14	22.19	22.13	22.50	22.49	22.53	22.53	22.21	22.20	22.17	22.16
12	20.24	20.19	22.14	22.13	22.51	22.50	22.53	22.53	22.23	22.21	22.18	22.17
13	20.29	20.24	22.18	22.14	22.51	22.51	22.53	22.53	---	---	22.18	22.17
14	20.35	20.29	22.19	22.18	22.51	22.51	22.53	22.53	---	---	22.19	22.18
15	20.43	20.35	22.22	22.19	22.52	22.50	22.53	22.53	---	---	22.19	22.19
16	20.51	20.43	22.24	22.22	22.52	22.52	22.53	22.53	---	---	22.19	22.19
17	20.58	20.51	22.27	22.24	22.52	22.52	22.53	22.46	---	---	22.19	22.19
18	20.64	20.58	22.29	22.27	22.52	22.49	22.46	22.25	---	---	22.21	22.19
19	20.71	20.64	22.31	22.29	22.49	22.44	22.25	21.63	---	---	22.21	22.20
20	20.78	20.71	22.32	22.31	22.44	22.43	21.63	21.35	---	---	22.20	22.20
21	20.86	20.78	22.34	22.32	22.43	22.42	21.35	21.25	---	---	22.20	22.20
22	20.93	20.86	22.35	22.34	22.43	22.42	21.30	21.25	---	---	22.20	21.91
23	20.99	20.93	22.36	22.35	22.45	22.43	21.39	21.30	---	---	21.91	21.89
24	21.07	20.99	22.38	22.36	22.46	22.45	21.39	21.30	---	---	21.89	21.89
25	21.14	21.07	22.39	22.38	22.48	22.46	21.37	21.30	---	---	21.89	21.81
26	21.21	21.14	22.39	22.39	22.49	22.48	21.48	21.37	---	---	21.81	21.81
27	21.28	21.21	22.40	22.39	22.51	22.49	21.61	21.48	---	---	21.81	21.81
28	21.36	21.28	22.42	22.40	22.52	22.51	21.69	21.61	---	---	21.81	21.76
29	21.43	21.36	22.43	22.42	22.52	22.52	21.74	21.69	---	---	21.76	21.76
30	21.50	21.43	22.43	22.42	22.52	22.52	21.82	21.74	---	---	21.76	21.76
31	21.56	21.50	---	---	22.52	22.52	21.91	21.82	---	---	21.76	21.72
MONTH	21.56	19.92	22.43	21.56	22.52	22.42	22.53	21.25	22.26	21.91	22.21	21.72

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO

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395859083440700 CL-138 NR SPRINGFIELD, OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	854	834	848
23	---	---	---	---	---	---	---	---	---	869	854	863
24	---	---	---	---	---	---	---	---	---	877	869	873
25	---	---	---	---	---	---	---	---	---	879	877	878
26	---	---	---	---	---	---	---	---	---	888	878	882
27	---	---	---	---	---	---	---	---	---	913	888	901
28	---	---	---	---	---	---	---	---	---	931	913	922
29	---	---	---	---	---	---	---	---	---	949	931	940
30	---	---	---	---	---	---	---	---	---	966	949	958
31	---	---	---	---	---	---	---	---	---	978	966	972
MONTH	---	---	---	---	---	---	---	---	---	978	834	904

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	990	978	982	---	---	---	871	869	870	877	866	871
2	997	987	991	855	843	850	875	870	871	889	877	883
3	1000	994	999	864	851	859	879	872	876	902	887	894
4	1010	999	1000	865	859	864	881	879	880	918	902	911
5	1010	1000	1010	863	856	860	881	875	879	947	918	932
6	1010	1000	1010	856	847	852	879	877	878	973	947	960
7	1010	1000	1000	848	842	844	---	---	---	996	973	986
8	1000	991	996	846	841	843	879	874	877	1000	996	1000
9	992	983	987	846	841	844	879	874	877	1000	983	992
10	983	972	977	846	844	845	878	876	877	1000	993	999
11	973	965	969	845	841	843	882	877	880	997	976	986
12	966	960	963	842	838	840	884	882	882	985	976	978
13	---	---	---	838	835	836	885	883	884	1010	985	996
14	---	---	---	836	834	834	886	885	886	1010	1010	1010
15	---	---	---	839	834	835	888	886	887	1010	1000	1010
16	---	---	---	839	834	836	893	887	888	1000	992	996
17	---	---	---	840	835	838	893	888	890	995	984	991
18	---	---	---	840	835	838	893	888	891	984	972	978
19	---	---	---	839	837	838	891	889	890	972	955	963
20	---	---	---	837	835	836	889	886	887	955	940	945
21	---	---	---	835	833	835	887	885	886	941	933	936
22	---	---	---	837	834	835	887	885	886	934	929	930
23	---	---	---	847	837	841	886	873	881	931	924	927
24	---	---	---	853	843	849	883	869	871	924	916	919
25	---	---	---	859	853	856	887	872	880	920	913	916
26	---	---	---	866	859	862	888	883	886	915	909	912
27	---	---	---	871	864	867	883	872	877	910	895	904
28	---	---	---	872	866	871	873	869	870	897	891	895
29	---	---	---	873	872	872	869	854	863	891	885	887
30	---	---	---	873	871	872	866	854	860	889	884	886
31	---	---	---	872	871	871	---	---	---	892	886	889
MONTH	1010	960	990	873	833	849	893	854	880	1010	866	945

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

395859083440700 CL-138 NR SPRINGFIELD, OH--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	892	879	885	804	802	803	818	808	812	---	---	---
2	883	869	875	804	801	802	822	815	818	---	---	---
3	874	858	868	804	800	803	825	821	822	---	---	---
4	862	854	858	804	799	801	826	822	824	---	---	---
5	858	852	856	804	799	801	828	824	825	---	---	---
6	854	847	851	804	798	801	829	825	827	---	---	---
7	847	827	841	802	799	801	830	826	827	---	---	---
8	830	822	825	802	798	799	830	825	827	---	---	---
9	830	825	828	801	799	800	829	822	827	---	---	---
10	838	818	822	801	796	799	829	823	825	---	---	---
11	824	818	820	801	795	798	824	820	821	---	---	---
12	827	819	822	800	795	798	822	819	820	---	---	---
13	828	823	825	799	793	796	821	817	819	---	---	---
14	827	812	820	798	793	795	821	816	818	---	---	---
15	823	812	817	795	790	792	820	815	817	---	---	---
16	827	820	823	794	791	792	818	812	815	---	---	---
17	824	818	820	795	788	793	818	809	813	---	---	---
18	819	815	816	795	786	790	814	808	811	---	---	---
19	816	812	813	792	783	789	811	808	809	---	---	---
20	813	807	811	790	786	788	---	---	---	---	---	---
21	811	807	809	790	788	789	---	---	---	---	---	---
22	809	802	807	792	789	790	---	---	---	---	---	---
23	807	802	805	796	791	793	---	---	---	---	---	---
24	804	800	801	798	795	796	---	---	---	---	---	---
25	801	799	800	803	798	800	---	---	---	---	---	---
26	801	799	800	808	803	805	---	---	---	---	---	---
27	801	798	800	811	803	807	---	---	---	---	---	---
28	801	798	800	813	807	809	---	---	---	---	---	---
29	802	799	800	811	809	810	---	---	---	---	---	---
30	804	799	801	811	807	809	---	---	---	---	---	---
31	---	---	---	811	807	808	---	---	---	---	---	---
MONTH	892	798	824	813	783	799	830	808	820	---	---	---
YEAR	1010	783	866									

TEMPERATURE, AIR, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	23.8	14.1	18.2	18.7	9.7	14.8	15.7	1.1	9.3	2.9	1.0	1.6
2	25.9	9.1	16.3	20.7	7.1	16.8	9.5	-5.3	2.5	1.1	-7.6	-2.1
3	18.9	8.6	15.6	7.1	-1.2	1.8	13.4	-1.9	8.3	-6.6	-17.8	-9.8
4	16.6	11.8	13.9	1.6	-5.2	-9	9.4	-4.1	1.5	-6.2	-20.3	-11.1
5	18.6	13.5	15.5	-.3	-8.3	-3.5	10.0	-2.3	3.7	-6.6	-19.8	-12.6
6	24.6	11.6	17.6	8.7	-4.7	3.1	2.2	-5.5	-1.2	-7.4	-12.3	-9.7
7	14.8	10.3	12.4	---	---	---	2.9	-10.1	-3.5	-7.4	-10.0	-8.8
8	17.2	6.6	11.8	2.0	-7.5	-1.0	-2.0	-11.0	-5.5	-6.5	-17.7	-10.3
9	21.9	5.1	12.4	2.6	-8.8	-2.0	-1.7	-15.4	-10.6	-1.8	-8.0	-4.6
10	24.5	6.6	14.5	14.0	2.6	9.7	-8.9	-16.7	-12.9	-2.6	-16.6	-8.1
11	27.0	7.0	15.2	12.5	-4.5	4.4	-7.1	-12.8	-9.8	-6.1	-16.6	-8.9
12	27.2	8.0	16.0	.4	-7.7	-3.4	-5.3	-9.9	-7.5	-4.6	-6.4	-5.7
13	27.1	8.1	17.7	3.6	.3	1.9	1.7	-6.1	-2.8	-.1	-4.6	-1.7
14	18.1	8.7	13.1	2.5	-4.1	-1.1	17.4	1.3	9.6	9.7	-3.1	2.3
15	14.3	4.0	8.2	2.7	-3.8	-.5	8.0	-.5	3.2	.5	-9.1	-3.6
16	15.7	-.5	6.6	1.0	-2.6	-.7	6.5	-3.8	.4	5.8	-9.4	.5
17	19.5	-1.5	9.3	4.5	-6.3	.2	3.5	-5.6	-1.2	9.5	5.2	7.3
18	23.9	7.8	16.3	6.8	2.7	4.6	1.1	-.1	.5	15.8	7.7	10.4
19	23.4	8.9	16.4	8.1	.2	3.4	.4	-8.2	-2.8	7.8	-13.6	-10.5
20	17.4	4.6	11.3	12.7	.4	5.8	-4.8	-13.6	-7.6	-4.8	-13.6	-9.0
21	6.6	4.0	5.3	4.0	-2.7	-.3	-2.9	-7.4	-5.6	1.5	-10.4	-3.9
22	19.9	2.5	10.3	3.1	-4.5	-.1	-3.5	-13.7	-7.0	4.5	-4.0	.5
23	22.1	5.0	13.4	4.7	-4.7	1.7	-5.8	-12.2	-8.1	5.9	2.3	3.0
24	16.4	7.1	11.0	3.0	-7.0	-3.2	-4.1	-6.3	-5.1	6.4	-6.1	-.5
25	14.3	1.0	8.0	6.9	-4.7	-.1	-2.6	-6.8	-4.4	-2.3	-10.5	-5.2
26	15.0	.7	8.4	16.2	-4.4	6.7	-5.8	-16.2	-8.7	6.8	-4.1	1.3
27	15.0	10.9	13.0	14.7	5.4	10.2	-4.8	-12.9	-7.6	7.6	-6.4	-2.3
28	11.2	7.0	8.6	5.4	-2.8	.0	-2.8	-16.0	-7.9	-1.8	-10.6	-5.3
29	12.8	4.3	8.0	2.8	-7.2	-2.7	-1.9	-18.1	-10.9	6.3	-5.9	.2
30	14.6	5.7	9.5	7.0	-6.3	.6	2.3	-13.6	-5.0	-5.3	-9.7	-6.9
31	15.8	7.7	10.5	---	---	---	3.7	1.2	2.2	-9.7	-17.7	-12.9
MONTH	27.2	-1.5	12.4	20.7	-8.8	2.3	17.4	-18.1	-3.0	15.8	-20.3	-4.1







WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996[illegible]

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TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

TEMPERATURE, SOIL DEG. C, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

[illegible]

# **EFFECTS OF HIGHWAY DEICING CHEMICALS ON SHALLOW UNCONSOLIDATED AQUIFERS IN OHIO**

395859083440700 CL-138 NR SPRGFLO, OH--Continued

RAINFALL ACCUMULATED (INCHES), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

## DAILY SUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.17	.00	.00	.00	---	.19	.11	.00	.00	.00	---
2	.00	.09	.00	.09	.00	.05	.00	.00	.16	.00	.00	---
3	.57	.00	.01	.08	.00	.01	.00	.06	.36	.00	.00	---
4	.00	.00	.00	.08	.00	.00	.15	.47	.14	.00	.00	---
5	1.07	.00	.00	.01	.00	.23	.00	.34	.01	.00	.00	---
6	.00	.00	.00	.00	.00	.18	.06	.00	.27	.00	.00	---
7	.00	---	.00	.00	.01	.04	---	.13	.67	1.03	.00	---
8	.00	.00	.00	.04	.14	.01	.01	1.02	.02	.00	.08	---
9	.00	.00	.00	.02	.00	.01	.00	.02	.38	.00	.00	---
10	.00	.09	.00	.02	.00	.00	.00	.49	.02	.00	.00	---
11	.00	.46	.00	.00	.01	.00	.00	.47	.25	.00	.00	---
12	.00	.00	.00	.04	.00	.01	.00	.00	.02	.00	.00	---
13	.00	.01	.07	.02	---	.01	.13	.00	.00	.09	.00	---
14	.10	.00	.03	.12	---	.00	.00	.00	.53	.03	.00	---
15	.00	.00	.01	.00	---	.15	.19	.39	.00	.81	.00	---
16	.00	.03	.00	.00	---	.00	.08	.10	.00	.09	.00	---
17	.00	.08	.00	.01	---	.00	.00	.00	.00	.26	.00	---
18	.00	.01	.18	.41	---	.00	.00	.00	.11	1.17	.00	---
19	.00	.00	.18	.00	---	.39	.24	.00	.01	.00	.00	---
20	.13	.00	.19	.00	---	.00	.32	.00	.00	.00	---	---
21	.01	.04	.07	.00	---	.09	.00	.03	.00	.17	---	---
22	.00	.04	.06	.01	---	.01	.11	.00	.00	.00	---	---
23	.00	.00	.06	.48	---	.00	.31	.17	.00	.00	---	---
24	.03	.00	.05	.04	---	.00	.01	.11	.22	.17	---	---
25	.00	.00	.04	.02	---	.03	.08	.00	.00	.00	---	---
26	.00	.00	.04	.03	---	.00	.00	.06	.00	.00	---	---
27	.09	.01	.03	.03	---	.00	.00	.50	.00	.00	---	---
28	.07	.00	.05	.00	---	.02	.28	.06	.00	.00	---	---
29	.02	.00	.12	.00	---	.03	.89	.18	.00	.00	---	---
30	.00	.00	.03	.00	---	.00	.09	.00	.00	1.22	---	---
31	.00	---	.04	.01	---	.08	---	.00	---	.01	---	---
TOTAL	2.09	1.03	1.26	1.56	0.16	1.35	3.14	4.71	3.17	5.05	0.08	---

WTR YR 1996 TOTAL 23.60

# GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS

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The following tables list ground-water levels and chemical analyses of interstitial-, ground-, and surface-water samples collected from an abandoned mine site that has been reclaimed in part by application of using flue-gas desulfurization (FGD) by-products. Water levels in these wells are measured periodically. The second and third rounds of water-quality analyses from ground- and surface-water samples are presented herein--subsequent sampling rounds will continue through 1998. Additionally, interstitial waters were sampled by use of soil-suction lysimeters. The lysimeters produced only small amounts of water; thus, chemical analyses for interstitial water are incomplete.

The site selected for study is in Tuscarawas County, Ohio, and is also known as the Fleming abandoned mine site. FGD by-products are produced as a result of injection of limestone slurry through the flue gases of coal-burning utilities that use high-sulfur coals as fuel. Beneficial uses of the by-products are being developed, and their environmental effects are being assessed.

The following site description applies to all wells, soil-suction lysimeters, and surface-water sites used for this study.

LOCATION.--Hydrologic Unit 05040001, approximately 1.5 mi northwest of the city of Dover, Ohio; 0.5 mi west of Interstate I-77.

AQUIFER.--Sandstones and coals of Allegheny and Conemaugh Groups, of Middle and Early Pennsylvanian age.

INSTRUMENTATION.--Periodic measurement of water level with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is given in feet above National Geodetic Vertical Datum of 1983, surveyed using total station with reference points established by global positioning system, accurate to 0.01 ft.

PERIOD OF RECORD.--Mar. 1995 to current year for wells TU-100 through TU-114; Dec. 1995 to current year for wells TU-115 through TU-119.

REMARKS.--These sites are used for chemical-quality sampling only as part of a cooperative study with The Ohio State University.

## WELL, SOIL-SUCTION LYSIMETER, AND SURFACE-WATER SITE DESCRIPTIONS

LOCAL NUMBER	SITE ID	LATITUDE (DMS)	LONGITUDE (DMS)	CASING INNER			MP (FT)	DEPTH (FT) BELOW LSD)	SCREEN INTERVAL	
				DIAMETER (IN)	LSD (FT)	TOP			BOTTOM	
Ground-water wells										
TU-100-W1S	403321081311901	40 33 21	081 31 19	6	1,078.90	1,081.48	68.00	1,022.90	1,012.90	
TU-101-W1D	403321081311902	40 33 21	081 31 19	6	1,079.05	1,081.79	98.00	993.05	983.05	
TU-102-W2	403319081312000	40 33 19	081 31 20	6	1,079.99	1,082.64	68.00	1,023.99	1,013.99	
TU-103-W3S	403315081312301	40 33 15	081 31 23	6	1,072.89	1,075.38	70.00	1,014.89	1,004.89	
TU-104-W3D	403315081312302	40 33 15	081 31 23	6	1,072.93	1,075.53	86.00	998.93	988.93	
TU-105-W4S	403313081311901	40 33 13	081 31 19	6	1,047.80	1,050.49	46.00	1,013.80	1,003.80	
TU-106-W4I	403313081311902	40 33 13	081 31 19	6	1,047.32	1,050.19	63.50	995.82	985.82	
TU-107-W4D	403313081311903	40 33 13	081 31 19	6	1,046.58	1,049.19	100.00	958.58	948.58	
TU-108-W5SP	403312081311401	40 33 12	081 31 14	6	1,045.84	1048.53	16.00	1036.84	1031.84	
TU-109-W5D	403312081311402	40 33 12	081 31 14	6	1,045.90	1,048.53	38.00	1,019.90	1,009.90	
TU-110-W6S	403315081311001	40 33 15	081 31 10	6	1,051.18	1,053.81	43.00	1,020.18	1,010.18	
TU-111-W6D	403315081311002	40 33 15	081 31 10	6	1,051.62	1,054.02	60.00	1,003.62	993.62	
TU-112-W7	403320081311000	40 33 20	081 31 10	6	1,059.13	1,061.75	53.00	1,018.13	1,008.13	
TU-113-W8S	403323081311601	40 33 23	081 31 16	6	1,076.57	1,079.26	68.00	1,020.57	1,010.57	
TU-114-W8D	403323081311602	40 33 23	081 31 16	6	1,075.54	1,078.26	92.00	995.54	985.54	
TU-115-W9	403316081310600	40 33 16	081 31 06	2	1,049.88	1,051.38	49.00	1,012.88	1,002.88	
TU-116-W10	403314081311500	40 33 14	081 31 15	2	1,053.53	1,055.33	57.00	1,008.53	998.53	
TU-117-W11	403316081311300	40 33 16	081 31 13	2	1,055.69	1,057.18	58.00	1,009.69	999.69	
TU-118-W12	403318081311200	40 33 18	081 31 12	2	1,057.07	1,059.14	57.60	1,011.47	1,001.47	
TU-119-W13	403321081311400	40 33 21	081 31 14	2	1,070.98	1,072.71	70.00	1,012.98	1,002.98	

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WELL, SOIL-SUCTION LYSIMETER, AND SURFACE-WATER SITE DESCRIPTIONS (CONTINUED)

LOCAL NUMBER	SITE ID	LATITUDE (DMS)	LONGITUDE (DMS)	CASING INNER DIAMETER	LSD	MP (FT)	DEPTH (FT) BELOW LSD)	SCREEN INTERVAL	
				(IN)	(FT)			TOP	BOTTOM
Soil-suction lysimeters									
TU-130-L1A-1.5	403316081311101	40 33 16	081 31 11	--	--	--	1.50	--	--
TU-131-L1A-2.5	403316081311102			--	--	--	2.50	--	--
TU-132-L1A-3.5	403316081311103			--	--	--	3.50	--	--
TU-133-L1B-1.5	403316081311104			--	--	--	1.50	--	--
TU-136-L2A-1.5	4033130813111401	40 33 13	081 31 14	--	--	--	1.50	--	--
TU-137-L2A-2.5	4033130813111402			--	--	--	2.50	--	--
TU-138-L2A-3.5	4033130813111403			--	--	--	3.50	--	--
TU-139-L2B-1.5	4033130813111404			--	--	--	1.50	--	--
TU-140-L2B-2.5	4033130813111405			--	--	--	2.50	--	--
TU-141-L2B-3.5	4033130813111406			--	--	--	3.50	--	--
TU-142-L3A-4.5A	4033140813111801	40 33 14	081 31 18	--	--	--	4.50	--	--
TU-144-L3B-1.5	4033140813111803			--	--	--	1.50	--	--
TU-145-L3B-2.5	4033140813111804			--	--	--	2.50	--	--
TU-147-L3C-1.5	4033140813111806			--	--	--	1.50	--	--
TU-148-L3C-2.5	4033140813111807			--	--	--	2.50	--	--
TU-149-L3C-3.5	4033140813111808			--	--	--	3.50	--	--
TU-150-L4A-1.5	403315081312101	40 33 15	081 31 21	--	--	--	1.50	--	--
TU-151-L4A-2.5	403315081312102			--	--	--	2.50	--	--
TU-152-L4A-3.5	403315081312103			--	--	--	3.50	--	--
TU-153-L4B-1.5	403315081312104			--	--	--	1.50	--	--
TU-154-L4B-2.5	403315081312105			--	--	--	2.50	--	--
TU-155-L4B-3.5	403315081312106			--	--	--	3.50	--	--
TU-156-L4C-1.5UP	403315081312107			--	--	--	1.50	--	--
TU-157-L4C-2.5UP	403315081312108			--	--	--	2.50	--	--
TU-158-L4C-3.5UP	403315081312109			--	--	--	3.50	--	--
TU-159-L5A-1.5	403316081310501	40 33 16	081 31 05	--	--	--	1.50	--	--
TU-160-L5A-2.5	403316081310502			--	--	--	2.50	--	--
TU-161-L5A-3.5	403316081310503			--	--	--	3.50	--	--
TU-162-L5B-1.5	403316081310504			--	--	--	1.50	--	--
Surface-water sites									
TU-120	4032580813111900	40 32 58	081 31 19	--	--	--	--	--	--
TU-124	4033110813111600	40 33 11	081 31 16	--	--	--	--	--	--
TU-125	403304081305700	40 33 04	081 30 57	--	--	--	--	--	--



**GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED  
WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

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**WATER LEVELS IN GROUND-WATER WELLS**

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FT BELOW LAND SURFACE)	ALTITUDE OF LAND SURFACE (FEET)
403321081311901	TU-100-W1S	68.0	324ALGN	10-20-95	44.97	1078.90
				12-13-95	45.68	
				01-16-96	45.36	
				02-25-96	45.17	
				04-02-96	44.71	
				05-22-96	43.55	
				06-13-96	43.21	
				07-17-96	43.03	
				08-21-96	43.16	
403321081311902	TU-101-W1D	98.0	324PSVL	10-20-95	44.78	1079.05
				12-13-95	45.42	
				01-16-96	45.20	
				02-25-96	44.98	
				04-02-96	44.50	
				05-22-96	43.29	
				06-13-96	42.94	
				07-17-96	42.96	
				08-21-96	43.04	
403319081312000	TU-102-W2	68.0	324ALGN	10-20-95	46.53	1079.99
				12-13-95	47.07	
				01-16-96	46.80	
				02-25-96	46.67	
				04-02-96	46.08	
				05-22-96	44.99	
				06-13-96	44.65	
				07-17-96	44.55	
				08-21-96	44.69	
403315081312301	TU-103-W3S	70.0	324ALGN	10-20-95	42.41	1072.89
				12-13-95	42.78	
				01-16-96	42.57	
				02-25-96	42.21	
				04-02-96	41.74	
				05-22-96	40.82	
				06-13-96	40.77	
				07-17-96	40.76	
				08-21-96	40.86	
403315081312302	TU-104-W3D	86.0	324PSVL	10-20-95	42.16	1072.93
				12-13-95	42.55	
				01-16-96	42.36	
				02-25-96	42.04	
				04-02-96	41.57	
				05-22-96	40.64	
				06-13-96	40.57	
				07-17-96	40.54	
				08-21-96	40.65	
403313081311901	TU-105-W4S	46.0	324ALGN	10-20-95	17.86	1047.80
				12-13-95	18.24	
				01-16-96	18.04	
				02-25-96	17.65	
				04-02-96	17.15	
				05-22-96	16.18	
				06-13-96	16.15	
				07-17-96	16.13	
				08-21-96	16.28	
403313081311902	TU-106-W4I	63.5	324PSVL	10-20-95	40.80	1047.32
				12-13-95	40.68	
				01-16-96	40.83	
				02-25-96	40.44	
				04-02-96	40.22	
				05-22-96	39.85	
				06-13-96	39.77	
				07-17-96	40.02	
				08-21-96	40.10	

**272 GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

WATER LEVELS IN GROUND-WATER WELLS (CONTINUED)

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FT BELOW LAND SURFACE)	ALTITUDE OF LAND SURFACE (FEET)
403313081311903	TU-107-W4D	100.0	324PSVL	10-20-95	66.50	1046.58
				12-13-95	66.28	
				01-16-96	65.98	
				02-25-96	65.46	
				04-02-96	64.99	
				05-22-96	64.37	
				06-13-96	64.45	
				07-17-96	65.11	
				08-21-96	65.18	
403312081311401	TU-108-W5S	16.0	324ALGN	10-20-95	dry	1045.84
				12-13-95	dry	
				01-16-96	dry	
				02-25-96	dry	
				04-02-96	12.96	
				05-22-96	11.97	
				06-13-96	12.55	
				07-17-96	dry	
				08-21-96	dry	
403312081311402	TU-109-W5D	38.0	324ALGN	10-20-95	16.68	1045.90
				12-13-95	17.12	
				01-16-96	16.78	
				02-25-96	16.19	
				04-02-96	15.64	
				05-22-96	14.59	
				06-13-96	14.50	
				07-17-96	14.79	
				08-21-96	15.07	
403315081311001	TU-110-W6S	43.0	324ALGN	10-20-95	18.55	1051.18
				12-13-95	19.03	
				01-16-96	18.83	
				02-25-96	18.42	
				04-02-96	17.70	
				05-22-96	16.43	
				06-13-96	17.30	
				07-17-96	16.15	
				08-21-96	16.54	
403315081311002	TU-111-W6D	60.0	324PSVL	10-20-95	19.09	1051.62
				12-13-95	19.56	
				01-16-96	19.36	
				02-25-96	18.90	
				04-02-96	18.20	
				05-22-96	16.88	
				06-13-96	16.56	
				07-17-96	16.60	
				08-21-96	17.02	
403320081311000	TU-112-W7	53.0	324ALG	10-20-95	26.65	1059.13
				12-13-95	27.10	
				01-16-96	26.88	
				02-25-96	26.39	
				04-02-96	25.68	
				05-22-96	24.37	
				06-13-96	24.04	
				07-17-96	24.13	
				08-21-96	24.66	
403323081311601	TU-113-W8S	68.0	324ALGN	10-20-95	42.61	1076.57
				12-13-95	43.25	
				01-16-96	43.02	
				02-25-96	42.77	
				04-02-96	42.32	
				05-22-96	41.15	
				06-13-96	40.79	
				07-17-96	40.60	
				08-21-96	40.72	

**GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED  
WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

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WATER LEVELS IN GROUND-WATER WELLS (CONTINUED)

SITE-ID	LOCAL WELL NUMBER	DEPTH OF WELL (FEET)	AQUIFER CODE	WATER- LEVEL DATE	WATER LEVEL (FT BELOW LAND SURFACE)	ALTITUDE OF LAND SURFACE (FEET)
403323081311602	TU-114-W8D	92.0	324PSVL	10-20-95	41.54	1075.54
				12-13-95	42.36	
				01-16-96	41.98	
				02-25-96	41.91	
				04-02-96	41.33	
				05-22-96	40.16	
				06-13-96	39.80	
				07-17-96	39.60	
				08-21-96	39.71	
403316081310600	TU-115-W9	49.0	324ALGN	12-13-95	18.21	1049.88
				01-16-96	17.99	
				02-25-96	17.43	
				04-02-96	16.67	
				05-22-96	15.31	
				06-13-96	15.00	
				07-17-96	15.13	
				08-21-96	15.80	
403314081311500	TU-116-W10	57.0	324ALGN	12-13-95	23.21	1053.53
				01-16-96	23.14	
				02-25-96	22.64	
				04-02-96	22.14	
				05-22-96	21.11	
				06-13-96	20.96	
				07-17-96	20.98	
				08-21-96	21.14	
403316081311300	TU-117-W11	58.0	324ALGN	12-13-95	23.15	1055.69
				01-16-96	22.99	
				02-25-96	22.52	
				04-02-96	21.95	
				05-22-96	20.75	
				06-13-96	20.44	
				07-17-96	20.34	
				08-21-96	20.66	
403318081311200	TU-118-W12	57.6	324ALGN	12-13-95	24.58	1057.07
				01-16-96	24.29	
				02-25-96	23.94	
				04-02-96	23.34	
				05-22-96	22.12	
				06-13-96	21.78	
				07-17-96	21.73	
				08-21-96	22.10	
403321081311400	TU-119-W13	70.0	324ALGN	12-13-95	38.26	1070.98
				01-16-96	37.67	
				02-25-96	37.70	
				04-02-96	37.14	
				05-22-96	35.93	
				06-13-96	35.60	
				07-17-96	35.45	
				08-21-96	35.81	

# 274 GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	TIME	DEPTH TO WATER (FT BELOW LSD)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH	REDUX	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TURBID- ITY (NTU)	OXYGEN DIS- SOLVED (mg/L)	HARD- NESS (mg/L AS CaCO <sub>3</sub> )	ACID- ITY (mg/L AS CaCO <sub>3</sub> )
					WATER WHOLE FIELD (STAND- ARD UNITS)							
TU-100-W1S	960117	1430	45.36	3,190	5.5	136	10	12.9	3	<0.10	8,710	11.5
	960620	1200	43.15	2,970	5.5	142	27	13.3	0	0.20	7,930	13.8
TU-101-W1D	960118	830	45.20	2,560	7.2	-37	13	14.5	64	<0.10	4,090	0.1
	960620	1030	52.00	2,340	6.9	3	27	14.5	28	1.30	4,140	0.3
TU-102-W2	960119	1350	46.8	3,090	5.5	162	-8	11.2	1	<0.10	5,260	14.4
	960620	830	44.62	3,000	5.3	159	25	12.6	5	0.10	5,130	14.5
TU-103-W3S	960119	1210	42.57	2,460	5.9	120	-7	12.0	6	<0.10	3,770	0.6
	960617	905	40.73	2,070	5.9	109	24	12.6	25	0.10	2,930	2.3
TU-104-W3D	960119	1105	42.36	2,370	6.1	101	-5	12.5	1	<0.10	4,020	0.5
	960617	1130	40.56	2,240	6.2	90	27	13.3	7	0.20	3,950	0.6
TU-105-W4S	960118	1520	18.04	3,120	5.4	134	16	12.5	1	<0.10	5,690	10.5
	960617	1610	16.07	2,690	5.6	154	29	12.8	1	0.20	5,450	10.0
TU-106-W4I	960118	1405	40.83	3,060	5.5	121	18	13.5	16	<0.10	5,620	8.1
	960617	1430	39.75	2,790	5.6	138	27	13.6	58	0.10	5,920	9.2
TU-107-W4D	960119	945	65.98	1,880	6.5	63	-7	12.5	35	0.87	3,600	0.4
	960618	730	64.41	1,670	6.3	70	27	12.4	--	0.50	3,740	0.9
TU-109-W5D	960118	1200	16.78	3,060	5.5	112	15	13.5	50	0.60	5,070	9.7
	960617	1750	14.43	2,640	5.6	155	32	13.1	5	0.10	4,790	11.4
TU-110-W6S	960120	1100	18.83	3,830	5.2	319	-2	12.9	44	0.19	3,480	29.5
	960618	1130	17.25	3,690	5.0	211	29	13.4	121	<0.10	3,320	32.9
TU-111-W6D	960120	900	19.36	3,900	6.1	-108	-11	10.0	5	1.50	5,590	10.3
	960618	930	16.51	3,700	5.5	150	27	14.0	191	0.50	5,370	20.7
TU-112-W7	960119	1600	26.88	2,150	5.8	156	-8	12.7	1	1.50	4,610	4.6
	960618	1700	24.05	2,470	5.6	153	29	13.0	3	0.10	5,030	6.2
TU-113-W8S	960120	1540	43.02	1,160	6.3	98	-3	12.7	13	0.19	1,580	0.0
	960619	1430	40.74	1,240	6.1	87	29	13.2	126	0.10	1,860	1.1
TU-114-W8D	960120	1420	41.98	2,880	5.7	141	-4	12.5	1	<0.10	3,730	5.8
	960619	1615	39.76	2,740	5.5	134	29	12.9	2	<0.10	3,260	7.1
TU-115-W9	960117	845	17.99	2,420	5.3	150	8	13.0	1	0.14	4,310	6.5
	960618	1500	14.50	2,480	5.4	182	29	13.7	0	0.10	4,060	7.9
TU-116-W10	960116	1130	23.14	3,230	5.6	155	3	12.8	1	<0.10	5,480	10.7
	960618	1320	20.76	2,950	5.2	181	29	16.4	2	0.40	4,960	12.7
TU-117-W11	960116	1545	22.99	2,760	5.8	178	6	14.2	4	3.40	4,990	8.8
	960619	900	19.93	2,940	5.3	203	27	16.0	3	0.20	4,600	10.1
TU-118-W12	960117	1030	24.38	3,120	5.4	154	9	13.0	1	<0.10	6,410	6.1
	960619	1040	21.85	3,020	5.4	178	29	14.5	2	0.10	6,160	6.5
TU-119-W13	960117	1240	37.67	3,150	5.7	105	9	13.5	1	<0.10	5,800	6.9
	960619	1230	35.33	2,910	5.7	121	29	14.9	4	0.10	5,370	8.0
Interstitial water												
TU-130-L1A-1.5	960118	950	1.5	--	7.1	--	--	--	--	--	8,690	0.3
TU-131-L1A-2.5	951020	900	2.5	7,760	4.3	--	--	--	--	--	7,190	4.7
	960118	945	2.5	--	5.6	--	--	--	--	--	8,200	0.2
TU-132-L1A-3.5	960118	940	3.5	--	--	--	--	--	--	--	8,840	--
TU-133-L1B-1.5	951020	905	1.5	10,600	6.3	--	--	--	--	--	11,000	0.7
	960118	935	1.5	--	7.0	--	--	--	--	--	14,990	0.5

**GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED  
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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	TIME	DEPTH TO WATER (FT BELOW LSD)	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH	REDOX POT- ENT- IAL (MV)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	TURBID- ITY (NTU)	OXYGEN DIS- SOLVED (mg/L)	HARD- NESS (mg/L AS CaCO <sub>3</sub> )	ACID- ITY (mg/L AS CaCO <sub>3</sub> )
					WATER WHOLE FIELD (STAND- ARD UNITS)							
Interstitial water (continued)												
TU-136-L2A-1.5	951020	910	1.5	11,100	6.2	--	--	--	--	--	11,420	0.3
	960118	930	1.5	--	7.2	--	--	--	--	--	7,930	--
TU-137-L2A-2.5	951020	920	2.5	14,620	6.2	--	--	--	--	--	15,360	1.1
	960118	925	2.5	--	6.8	--	--	--	--	--	8,210	--
TU-138-L2A-3.5	951020	930	3.5	12,000	6.2	--	--	--	--	--	11,890	1.1
	960118	920	3.5	--	6.7	--	--	--	--	--	7,860	0.1
TU-139-L2B-1.5	951020	940	1.5	14,700	6.7	--	--	--	--	--	15,240	0.5
	960118	915	1.5	--	7.3	--	--	--	--	--	8,140	--
TU-140-L2B-2.5	951020	950	2.5	10,400	6.1	--	--	--	--	--	10,310	0.3
	960118	910	2.5	--	6.0	--	--	--	--	--	10,780	0.0
TU-141-L2B-3.5	951020	1000	3.5	9,410	6.4	--	--	--	--	--	9,110	0.6
	960118	905	3.5	--	7.2	--	--	--	--	--	6,390	--
TU-142-L3A-4.5A	960118	1025	4.5	5,610	6.5	--	--	--	--	--	5,810	0.0
TU-144-L3B-1.5	951020	1010	1.5	8,790	6.0	--	--	--	--	--	7,920	0.2
	960118	900	1.5	--	7.0	--	--	--	--	--	5,480	--
TU-145-L3B-2.5	960118	855	2.5	--	6.9	--	--	--	--	--	6,320	--
TU-147-L3C-1.5	960118	850	1.5	--	--	--	--	--	--	--	5,230	--
TU-148-L3C-2.5	951020	1015	2.5	9,020	5.8	--	--	--	--	--	8,330	0.8
	960118	830	2.5	--	6.8	--	--	--	--	--	5,730	--
TU-149-L3C-3.5	960118	845	3.5	--	6.6	--	--	--	--	--	6,350	--
TU-150-L4A-1.5	960118	700	1.5	--	7.6	--	--	--	--	--	5,170	--
TU-151-L4A-2.5	951020	1020	2.5	9,260	5.9	--	--	--	--	--	8,550	0.6
	960118	705	2.5	--	6.7	--	--	--	--	--	7,890	0.0
TU-152-L4A-3.5	951020	1030	3.5	5,810	5.3	--	--	--	--	--	5,080	0.3
	960118	710	3.5	--	6.3	--	--	--	--	--	7,490	0.0
TU-153-L4B-1.5	951020	1040	1.5	8,830	5.8	--	--	--	--	--	7,890	0.4
TU-154-L4B-2.5	951020	1050	2.5	8,360	6.3	--	--	--	--	--	7,510	0.7
	960118	715	2.5	--	6.9	--	--	--	--	--	7,820	--
TU-155-L4B-3.5	951020	1100	3.5	9,190	6.2	--	--	--	--	--	8,650	0.5
	960118	720	3.5	--	7.0	--	--	--	--	--	6,110	--
TU-156-L4C-1.5UP	960118	725	1.5	9,010	6.9	--	--	--	--	--	9,090	--
TU-157-L4C-2.5UP	951020	1120	2.5	9,610	6.0	--	--	--	--	--	8,830	0.2
TU-158-L4C-3.5UP	960118	1020	3.5	--	6.8	--	--	--	--	--	7,430	--
TU-159-L5A-1.5	960118	1000	1.5	--	4.4	--	--	--	--	--	807	--
TU-160-L5A-2.5	960118	1005	2.5	--	--	--	--	--	--	--	661	0.0
TU-161-L5A-3.5	960118	1010	3.5	--	5.7	--	--	--	--	--	1,240	0.0
TU-162-L5B-1.5	960118	1015	1.5	--	5.3	--	--	--	--	--	2,000	0.0
Surface water												
TU-120	960627	1100	--	1,420	4.6	377	27	18.6	10	8.20	1,260	0.9
TU-124	960627	900	--	1,450	5.5	--	21	19.9	13	8.10	1,440	0.3
TU-125	960627	1300	--	580	5.8	262	27	16.5	10	7.90	409	0.1



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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	CALCIUM DIS- SOLVED (mg/L AS Ca)	MAGNE- SIUM DIS- SOLVED (mg/L AS Mg)	SODIUM DIS- SOLVED (mg/L AS Na)	POTAS- SIUM DIS- SOLVED (mg/L AS K)	BI- CARB- ONATE IT-FLD (mg/L AS HCO <sub>3</sub> ) AS	ALKA- LIN- ITY WATER WHOLE FIELD (mg/L AS CaCO <sub>3</sub> ) AS	SULF- ATE DIS- SOLVED (mg/L AS SO <sub>4</sub> )	CHLOR- IDE DIS- SOLVED (mg/L AS Cl)	FLUOR- IDE DIS- SOLVED (mg/L AS F)	SILICA DIS- SOLVED (mg/L AS SiO <sub>2</sub> )
		Ground water									
TU-100-W1S	960117	481.0	264.00	16.20	19.10	84	68	2,071	<0.1	<0.1	13.90
	960620	369.1	223.64	13.17	15.52	78	62	2,382	2.2	<0.1	4.26
TU-101-W1D	960118	230.0	75.00	245.10	9.60	237	190	1,106	5.1	<0.1	9.20
	960620	231.6	91.15	203.51	9.58	223	183	1,181	1.5	2.2	3.46
TU-102-W2	960119	386.0	205.00	10.80	13.20	78	56	2,203	3.5	<0.1	11.60
	960620	367.1	236.59	11.10	16.78	59	48	2,357	3.3	3.6	3.60
TU-103-W3S	960119	450.0	163.00	9.40	7.70	131	105	1,450	<0.1	<0.1	10.80
	960617	336.2	165.17	8.38	6.81	105	88	1,370	2.5	<0.1	3.61
TU-104-W3D	960119	454.0	138.00	10.30	7.60	149	122	1,463	<0.1	<0.1	10.70
	960617	410.8	151.58	10.29	8.55	139	112	1,549	2.5	<0.1	3.64
TU-105-W4S	960118	404.0	197.00	10.00	13.00	73	54	2,040	<0.1	<0.1	11.47
	960617	364.1	215.06	9.64	12.27	66	47	2,131	3.2	<0.1	3.82
TU-106-W4I	960118	441.0	202.00	10.20	12.20	92	73	2,070	4.5	<0.1	12.10
	960617	460.2	266.77	10.41	12.98	70	54	2,197	2.7	<0.1	4.35
TU-107-W4D	960119	280.0	86.00	18.60	29.70	238	194	755	3.4	<0.1	10.50
	960618	302.4	109.27	13.79	16.58	226	178	900	2.0	1.9	3.35
TU-109-W5D	960118	395.0	203.00	9.90	12.70	73	57	2,130	3.8	<0.1	10.80
	960617	366.1	228.98	9.75	11.70	70	57	2,128	2.4	<0.1	3.68
TU-110-W6S	960120	358.0	281.00	9.40	13.10	68	52	3,430	3.2	4.8	8.20
	960618	289.2	280.21	9.68	13.42	40	27	3,505	3.1	<0.1	2.52
TU-111-W6D	960120	531.0	361.00	19.20	24.50	288	236	3,108	<0.1	2.5	20.60
	960618	493.5	417.62	14.41	16.45	131	99	3,503	2.6	6.1	5.48
TU-112-W7	960119	351.0	156.00	11.00	13.90	106	88	1,503	6.0	<0.1	11.60
	960618	333.6	173.42	11.00	11.03	77	58	1,710	2.4	<0.1	3.91
TU-113-W8S	960120	154.0	57.00	6.50	5.30	139	115	438	<0.1	<0.1	10.05
	960619	159.0	68.08	7.00	5.69	142	11	579	1.7	1.0	3.45
TU-114-W8D	960120	441.0	177.00	10.50	7.80	140	111	1,880	3.8	<0.1	12.20
	960619	380.3	188.12	10.00	7.66	104	77	1,978	3.3	2.6	4.25
TU-115-W9	960117	313.0	165.00	8.60	12.40	63	44	1,604	4.3	<0.1	13.80
	960618	263.2	155.86	7.75	11.40	50	38	1,606	2.9	3.1	4.26
TU-116-W10	960116	412.0	234.00	11.10	12.50	55	45	2,241	3.5	<0.1	10.60
	960618	328.1	213.37	9.69	11.48	38	29	2,331	2.6	<0.1	3.44
TU-117-W11	960116	395.0	201.00	13.00	13.70	76	59	1,974	3.5	<0.1	14.90
	960619	352.3	201.21	10.86	11.93	43	33	1,963	2.7	2.7	4.74
TU-118-W12	960117	441.0	213.00	13.10	12.70	66	52	2,005	5.5	<0.1	12.50
	960619	377.3	205.65	11.58	11.94	39	31	2,009	3.5	3.3	4.04
TU-119-W13	960117	444.0	213.00	14.20	10.30	92	75	2,033	<0.1	<0.1	10.90
	960619	388.0	208.76	12.47	9.39	70	54	2,046	1.7	<0.1	3.78
Interstitial water											
TU-130-L1A-1.5	960118	406.0	1,513.00	47.70	93.90	--	--	5,253	81.1	9.1	27.00
TU-131-L1A-2.5	951020	411.0	1,244.00	90.70	30.60	--	--	6,501	36.7	10.4	48.30
	960118	361.0	1,566.00	81.90	23.10	--	--	6,075	101.6	9.6	21.60
TU-132-L1A-3.5	960118	340.0	1,723.00	65.00	29.10	--	--	--	--	--	17.10
TU-133-L1B-1.5	951020	434.0	1,979.00	116.10	99.90	--	--	8,057	112.1	8.6	51.70
	960118	364.0	3,082.00	71.50	106.70	--	--	11,320	260.7	15.0	26.80

**GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED  
WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	ALKA-LIN-ITY WATER WHOLE FIELD (mg/L AS CaCO <sub>3</sub> ) AS SO <sub>4</sub> ) AS Cl) AS F) AS SiO <sub>2</sub> )									
		CALCIUM DIS- SOLVED (mg/L AS Ca)	MAGNE- SIUM DIS- SOLVED (mg/L AS Mg)	SODIUM DIS- SOLVED (mg/L AS Na)	POTAS- SIUM DIS- SOLVED (mg/L AS K)	BI- CARB- ONATE IT-FLD (mg/L AS HCO <sub>3</sub> )	WATER WHOLE FIELD (mg/L AS CaCO <sub>3</sub> )	SULF- ATE DIS- SOLVED (mg/L AS SO <sub>4</sub> )	CHLOR- IDE DIS- SOLVED (mg/L AS Cl)	FLUOR- IDE DIS- SOLVED (mg/L AS F)	SILICA DIS- SOLVED (mg/L AS SiO <sub>2</sub> )
		Interstitial water (continued)									
TU-136-L2A-1.5	951020	417.0	2,009.00	224.80	52.40	--	--	8,327	54.2	9.0	47.00
	960118	389.0	1,475.00	28.70	66.20	--	--	5,267	44.1	9.0	15.90
TU-137-L2A-2.5	951020	427.0	2,939.00	237.20	96.60	--	--	11,936	72.2	14.2	39.00
	960118	368.0	1,595.00	28.80	65.60	--	--	5,785	38.7	9.7	16.30
TU-138-L2A-3.5	951020	446.0	2,217.00	274.90	41.10	--	--	10,123	58.3	8.5	26.90
	960118	377.0	1,488.00	19.80	63.60	--	--	5,705	34.6	9.5	9.50
TU-139-L2B-1.5	951020	433.0	3,023.00	191.20	115.80	--	--	13,475	90.1	14.8	34.50
	960118	350.0	1,554.00	37.40	79.70	--	--	5,811	50.9	<0.1	12.50
TU-140-L2B-2.5	951020	438.0	1,855.00	199.50	53.80	--	--	8,250	54.9	6.9	35.20
	960118	376.0	2,061.00	99.70	48.00	--	--	7,910	78.4	<0.1	19.10
TU-141-L2B-3.5	951020	394.0	1,730.00	54.90	111.40	--	--	7,311	32.1	5.4	29.30
	960118	355.0	1,207.00	13.50	68.30	--	--	4,588	26.3	<0.1	19.50
TU-142-L3A-4.5A	960118	386.0	1,038.00	21.00	72.40	--	--	4,020	40.0	6.2	9.10
TU-144-L3B-1.5	951020	403.0	1,458.00	155.50	114.40	--	--	6,279	76.0	5.9	23.20
	960118	348.0	980.00	47.30	77.40	--	--	3,774	63.3	5.8	9.00
TU-145-L3B-2.5	960118	385.0	1,107.00	27.20	61.60	--	--	3,982	55.9	<0.1	14.60
TU-147-L3C-1.5	960118	314.0	944.00	15.60	62.40	--	--	--	--	--	11.00
TU-148-L3C-2.5	951020	390.0	1,589.00	31.80	126.10	--	--	7,424	51.8	9.5	20.30
	960118	373.0	1,057.00	13.10	65.10	--	--	4,097	39.3	6.7	7.50
TU-149-L3C-3.5	960118	370.0	1,171.00	17.70	59.20	--	--	--	--	--	8.90
TU-150-L4A-1.5	960118	222.0	1,055.00	91.70	25.70	--	--	--	--	--	8.60
TU-151-L4A-2.5	951020	453.0	1,565.00	168.40	73.30	--	--	7,349	223.5	9.4	25.80
	960118	403.0	1,488.00	82.10	77.50	--	--	5,284	231.7	9.3	13.20
TU-152-L4A-3.5	951020	482.0	762.00	74.80	25.50	--	--	4,511	56.4	6.4	50.10
	960118	365.0	1,451.00	38.00	96.70	--	--	5,020	166.6	8.9	17.10
TU-153-L4B-1.5	951020	478.0	1,441.00	117.60	62.30	--	--	8,267	83.8	11.6	38.90
TU-154-L4B-2.5	951020	461.0	1,326.00	159.80	46.10	--	--	6,025	63.5	9.2	44.50
	960118	411.0	1,437.00	48.90	87.90	--	--	5,013	74.9	<0.1	18.70
TU-155-L4B-3.5	951020	450.0	1,596.00	69.30	118.70	--	--	7,024	145.9	11.3	50.10
	960118	374.0	1,150.00	15.70	91.40	--	--	4,078	53.7	7.4	18.10
TU-156-L4C-1.5UP	960118	430.0	1,728.00	106.40	46.90	--	--	5,583	102.9	10.6	17.50
TU-157-L4C-2.5UP	951020	572.0	1,498.00	305.30	36.80	--	--	7,944	67.7	9.1	37.90
TU-158-L4C-3.5UP	960118	395.0	1,367.00	68.60	42.60	--	--	--	--	--	18.30
TU-159-L5A-1.5	960118	109.0	48.00	52.50	10.10	--	--	554	17.5	<0.1	22.40
TU-160-L5A-2.5	960118	88.0	51.00	41.30	9.90	--	--	458	16.0	<0.1	23.30
TU-161-L5A-3.5	960118	158.0	104.00	34.90	15.10	--	--	741	18.4	<0.1	23.10
TU-162-L5B-1.5	960118	300.0	154.00	102.90	16.60	--	--	1,395	28.0	1.9	24.50
Surface water											
TU-120	960627	166.5	103.00	7.37	4.14	--	--	838	8.3	2.1	6.63
TU-124	960627	170.0	104.35	3.70	8.78	4	5	805	3.7	1.8	2.53
TU-125	960627	46.3	29.91	10.70	2.59	8	6	249	14.7	0.7	4.71

**278 GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	DIS- SOLVED SOLIDS RESI- DUE AT 180°C (mg/L)	NITRO- GEN AMMONIA DIS- SOLVED (mg/L AS N)	NITRO- GEN NITRITE DIS- SOLVED (mg/L AS N)	NITRO- GEN NITRITE PLUS NITRATE DIS- SOLVED (mg/L AS N)	PHOS- PHORUS ORTHO- PHOS- PHATE DIS- SOLVED (mg/L AS P)	ALUM- INUM TOTAL (ug/L AS Al)	ALUM- INUM DIS- SOLVED (ug/L AS Al)	ANTI- MONY DIS- SOLVED (ug/L AS Sb)	ARS- ENIC DIS- SOLVED (ug/L AS As)
		Ground water								
TU-100-W1S	960117	3,609	1.40	<0.01	<0.05	0.03	30	127	<100	<1
	960620	3,857	2.00	0.01	0.05	0.04	80	87	108	<1
TU-101-W1D	960118	1,864	1.90	<0.01	<0.05	<0.01	540	57	<100	<1
	960620	2,000	2.00	0.01	0.44	<0.01	90	<30	<100	<1
TU-102-W2	960119	3,731	1.20	<0.01	<0.05	0.03	640	727	<100	<5
	960620	3,777	1.30	0.10	4.50	0.03	630	597	<100	<1
TU-103-W3S	960119	2,285	0.44	<0.01	<0.05	<0.01	360	186	<100	<1
	960617	2,330	0.37	0.02	0.24	0.01	170	48	<100	<1
TU-104-W3D	960119	2,407	0.58	<0.01	<0.05	0.01	70	124	<100	<1
	960617	2,536	0.65	0.01	0.12	0.01	100	74	<100	<1
TU-105-W4S	960118	3,413	0.95	<0.01	<0.05	0.02	50	69	<100	<1
	960617	3,464	1.10	0.05	0.85	0.03	130	53	<100	<1
TU-106-W4I	960118	3,408	0.83	<0.01	<0.05	0.02	250	55	<100	1
	960617	3,564	0.96	0.01	0.06	0.03	520	46	<100	1
TU-107-W4D	960119	1,457	1.40	<0.01	0.14	<0.01	330	61	<100	1
	960618	1,624	1.30	0.02	0.05	0.01	70	<30	<100	1
TU-109-W5D	960118	3,228	0.75	<0.01	<0.05	0.02	460	178	<100	<1
	960617	3,369	0.84	0.02	0.06	0.03	160	152	<100	<1
TU-110-W6S	960120	5,591	1.10	<0.01	<0.05	0.01	6,560	5,101	<100	<5
	960618	5,854	1.10	0.01	0.05	0.05	5,840	5,149	<100	<5
TU-111-W6D	960120	4,947	0.90	<0.01	<0.05	0.01	150	250	<100	<5
	960618	5,856	0.92	0.02	0.06	0.04	1,160	987	<100	<5
TU-112-W7	960119	2,503	0.78	<0.01	<0.05	0.02	60	171	<100	<1
	960618	2,711	0.98	0.01	0.08	0.02	130	72	<100	<1
TU-113-W8S	960120	918	0.32	<0.01	<0.05	0.02	100	65	<100	<1
	960619	976	0.43	0.02	1.30	0.01	320	34	<100	<1
TU-114-W8D	960120	3,104	0.63	<0.01	<0.05	<0.01	30	111	<100	<2
	960619	3,089	0.74	0.02	<0.05	0.02	60	41	<100	<1
TU-115-W9	960117	2,528	1.00	<0.01	<0.05	0.01	290	367	<100	<1
	960618	2,667	1.20	0.01	0.07	0.02	370	346	<100	<1
TU-116-W10	960116	3,480	0.78	<0.01	<0.05	0.02	160	289	<100	<1
	960618	3,686	0.91	0.01	0.05	0.03	380	321	<100	<1
TU-117-W11	960116	3,092	1.00	<0.01	<0.05	0.01	160	366	<100	<1
	960619	3,181	1.20	0.01	0.05	0.02	340	328	<100	<1
TU-118-W12	960117	3,103	1.10	<0.01	<0.05	0.02	290	366	<100	<1
	960619	3,162	1.30	0.01	0.16	0.01	380	328	<100	<1
TU-119-W13	960117	3,199	0.87	<0.01	<0.05	0.02	30	71	<100	<1
	960619	3,247	0.96	0.01	0.05	0.02	120	50	<100	<1
Interstitial water										
TU-130-L1A-1.5	960118	--	0.31	<0.01	0.42	0.04	--	245	<100	--
TU-131-L1A-2.5	951020	9,415	--	--	--	--	--	3,668	<106	--
	960118	--	1.60	<0.01	0.11	<0.01	--	1,290	<100	--
TU-132-L1A-3.5	960118	--	--	--	--	--	--	308	<100	--
TU-133-L1B-1.5	951020	13,850	--	--	--	--	--	404	<106	--
	960118	18,040	0.13	<0.01	1.10	0.02	--	325	<100	2

**GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED  
WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	DIS- SOLVED SOLIDS RESI- DUE AT 180°C (mg/L)	NITRO- GEN AMMONIA DIS- SOLVED (mg/L AS N)	NITRO- GEN NITRITE DIS- SOLVED (mg/L AS N)	NITRO- GEN NITRITE PLUS NITRATE DIS- SOLVED (mg/L AS N)	PHOS- PHORUS ORTHO- PHOS- PHATE DIS- SOLVED (mg/L AS P)	ALUM- INUM TOTAL (ug/L AS Al)	ALUM- INUM DIS- SOLVED (ug/L AS Al)	ANTI- MONY DIS- SOLVED (ug/L AS Sb)	ARS- ENIC DIS- SOLVED (ug/L AS As)
		Interstitial water (continued)								
TU-136-L2A-1.5	951020	14,860	--	--	--	--	--	424	<106	--
	960118	--	0.13	<0.01	0.06	<0.01	--	233	<100	--
TU-137-L2A-2.5	951020	20,850	--	--	--	--	--	552	<106	--
	960118	9,604	0.09	<0.01	<0.05	0.01	--	293	<100	--
TU-138-L2A-3.5	951020	16,110	--	--	--	--	--	360	<106	--
	960118	8,832	0.12	<0.01	<0.05	<0.01	--	241	<100	--
TU-139-L2B-1.5	951020	20,490	--	--	--	--	--	448	155	--
	960118	8,956	0.08	<0.01	<0.05	0.04	--	201	<100	--
TU-140-L2B-2.5	951020	13,535	--	--	--	--	--	551	<106	--
	960118	11,832	0.13	<0.01	0.05	0.02	--	417	<100	<1
TU-141-L2B-3.5	951020	11,905	--	--	--	--	--	258	<106	--
	960118	7,434	0.08	<0.01	<0.05	0.01	--	102	<100	<1
TU-142-L3A-4.5A	960118	6,756	0.19	<0.01	<0.05	<0.01	--	126	<100	--
TU-144-L3B-1.5	951020	11,195	--	--	--	--	--	362	<106	--
	960118	6,492	0.09	<0.01	0.06	0.05	--	195	<100	--
TU-145-L3B-2.5	960118	5,654	--	--	--	--	--	229	<100	--
TU-147-L3C-1.5	960118	--	--	--	--	--	--	92	<100	--
TU-148-L3C-2.5	951020	11,080	--	--	--	--	--	411	<106	--
	960118	6,686	0.12	<0.01	0.07	0.02	--	191	<100	--
TU-149-L3C-3.5	960118	--	0.12	<0.01	<0.05	0.01	--	201	<100	<1
TU-150-L4A-1.5	960118	--	--	--	--	--	--	176	<100	--
TU-151-L4A-2.5	951020	11,415	--	--	--	--	--	305	<106	--
	960118	8,706	0.10	<0.01	<0.05	0.05	--	256	<100	1
TU-152-L4A-3.5	951020	6,560	--	--	--	--	--	4,126	<106	--
	960118	8,452	0.12	<0.01	0.16	<0.01	--	290	<100	--
TU-153-L4B-1.5	951020	10,590	--	--	--	--	--	557	<106	--
TU-154-L4B-2.5	951020	10,065	--	--	--	--	--	282	144	--
	960118	8,916	0.23	<0.01	<0.05	0.05	--	236	<100	--
TU-155-L4B-3.5	951020	11,530	--	--	--	--	--	310	<106	--
	960118	6,880	0.10	<0.01	0.48	0.04	--	182	<100	1
TU-156-L4C-1.5UP	960118	10,430	0.10	<0.01	0.74	0.03	--	293	<100	<1
TU-157-L4C-2.5UP	951020	12,475	--	--	--	--	--	425	<106	--
TU-158-L4C-3.5UP	960118	--	0.50	<0.01	0.11	<0.01	--	220	<100	--
TU-159-L5A-1.5	960118	--	0.93	<0.01	0.07	<0.01	--	3,764	<100	--
TU-160-L5A-2.5	960118	--	--	--	--	--	--	117	<100	--
TU-161-L5A-3.5	960118	--	0.32	<0.01	0.06	<0.01	--	303	<100	--
TU-162-L5B-1.5	960118	--	0.92	<0.01	<0.05	<0.01	--	1,279	<100	<1
Surface water										
TU-120	960627	1,291	0.19	<0.01	0.12	<0.01	6,240	5,470	<100	<1
TU-124	960627	1,246	0.05	<0.01	<0.05	<0.01	430	331	<100	<1
TU-125	960627	363	0.15	<0.01	0.33	<0.01	510	296	<100	<1



**280 GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	BARIUM DIS- SOLVED (ug/L AS Ba)	BERYL- LIUM DIS- SOLVED (ug/L AS Be)	BORON DIS- SOLVED (ug/L AS B)	CAD- MIUM DIS- SOLVED (ug/L AS Cd)	CHROM- IUM DIS- SOLVED (ug/L AS Cr)	COBALT DIS- SOLVED (ug/L AS Co)	COPPER DIS- SOLVED (ug/L AS Cu)	IRON TOTAL (ug/L AS Fe)	IRON DIS- SOLVED (ug/L AS Fe)	LEAD DIS- SOLVED (ug/L AS Pb)
Ground water											
TU-100-W1S	960117	25	4.0	468	<1	18	248	<2	374,000	375,000	<5
	960620	21	4.0	345	4	4	214	<2	379,000	392,000	<2
TU-101-W1D	960118	16	<1.0	301	<1	4	11	2	3,140	900	<5
	960620	18	<1.0	263	<1	3	<6	<2	10,800	11,800	<2
TU-102-W2	960119	16	9.0	231	2	6	218	<2	455,000	433,000	<1
	960620	15	7.0	184	4	2	212	<2	402,000	405,000	<2
TU-103-W3S	960119	15	<1.0	125	<1	6	49	<2	91,600	86,300	<2
	960617	13	<1.0	78	2	4	84	<2	77,300	74,500	<2
TU-104-W3D	960119	15	<1.0	181	<1	6	7	<2	56,000	50,700	<1
	960617	13	<1.0	149	2	5	26	<2	59,800	55,200	<2
TU-105-W4S	960118	16	3.0	296	<1	6	222	<2	346,000	325,000	<5
	960617	14	2.0	234	4	<2	219	<2	293,000	300,000	<2
TU-106-W4I	960118	12	3.0	311	1	8	200	<2	309,000	285,000	<5
	960617	11	2.0	257	1	4	229	<2	297,000	278,000	<2
TU-107-W4D	960119	20	<1.0	329	1	5	9	<2	30,500	19,500	<1
	960618	17	<1.0	258	5	2	11	<2	19,800	19,500	<1
TU-109-W5D	960118	17	5.0	257	2	6	234	<2	342,000	316,000	<5
	960617	14	3.0	190	9	4	268	<2	301,000	299,000	<2
TU-110-W6S	960120	9	36.0	10	<1	6	673	<2	931,000	836,000	<2
	960618	7	33.0	6	11	4	640	<2	843,000	865,000	<2
TU-111-W6D	960120	15	4.0	209	<1	4	263	<2	508,000	457,000	<2
	960618	11	12.0	89	12	4	497	<2	621,000	629,000	<2
TU-112-W7	960119	20	2.0	271	<1	2	162	<2	176,000	164,000	<2
	960618	20	<1.0	251	<1	6	168	<2	159,000	159,000	<2
TU-113-W8S	960120	28	<1.0	159	<1	4	7	<2	28,500	22,300	<1
	960619	28	<1.0	146	<1	<2	16	<2	23,500	26,600	1
TU-114-W8D	960120	18	2.0	150	<1	6	112	<2	247,000	227,000	<2
	960619	15	<1.0	121	5	2	134	<2	224,000	221,000	<2
TU-115-W9	960117	16	13.0	349	<1	4	313	<2	216,000	194,000	<5
	960618	13	9.0	269	<1	5	280	<2	197,000	201,000	<2
TU-116-W10	960116	17	4.0	317	<1	3	299	<2	344,000	311,000	6
	960618	13	4.0	228	7	5	282	<2	317,000	327,000	<2
TU-117-W11	960116	13	6.0	384	<1	11	259	<2	195,000	240,000	<5
	960619	9	4.0	280	1	5	222	<2	225,000	235,000	<2
TU-118-W12	960117	18	9.0	332	<1	6	211	<2	207,000	185,000	<5
	960619	17	8.0	280	2	5	219	<2	193,000	187,000	<2
TU-119-W13	960117	21	3.0	276	3	2	123	<2	260,000	228,000	<5
	960619	18	<1.0	207	3	3	115	<2	242,000	242,000	<2
Interstitial water											
TU-130-L1A-1.5	960118	12	<1.0	492	2	4	9	45	--	30	--
TU-131-L1A-2.5	951020	14	14.0	529	6	17	586	308	--	564	--
	960118	8	1.0	290	1	6	423	67	--	30	<10
TU-132-L1A-3.5	960118	14	<1.0	348	<1	13	557	19	--	170	--
TU-133-L1B-1.5	951020	26	<1.0	731	<1	13	43	81	--	53	--
	960118	15	<1.0	396	<1	11	8	110	--	60	<10
TU-136-L2A-1.5	951020	21	<1.0	823	2	21	460	254	--	143	--
	960118	11	<1.0	416	<1	6	16	87	--	30	<10



**GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED  
WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	BARIUM	BERYL-	BORON	CAD-	CHROM-	COBALT	COPPER	IRON TOTAL (ug/L AS Fe)	IRON	LEAD	
		DIS	LIUM	DIS-	MIUM	IUM	DIS-	DIS-		DIS-	DIS-	DIS-
		SOLVED (ug/L AS Ba)	SOLVED (ug/L AS Be)	SOLVED (ug/L AS B)	SOLVED (ug/L AS Cd)	SOLVED (ug/L AS Cr)	SOLVED (ug/L AS Co)	SOLVED (ug/L AS Cu)		SOLVED (ug/L AS Fe)	SOLVED (ug/L AS Pb)	
Interstitial water (continued)												
TU-137-L2A-2.5	951020	27	<1.0	1,018	1	24	266	46	--	1,410	--	
	960118	14	<1.0	469	<1	6	123	30	--	40	<10	
TU-138-L2A-3.5	951020	25	<1.0	794	2	16	245	20	--	252	--	
	960118	11	<1.0	389	<1	5	94	5	--	30	<10	
TU-139-L2B-1.5	951020	29	<1.0	891	1	15	51	78	--	123	--	
	960118	12	<1.0	429	<1	3	10	18	--	50	<10	
TU-140-L2B-2.5	951020	20	<1.0	692	1	24	436	40	--	70	--	
	960118	11	<1.0	437	<1	11	398	33	--	160	<10	
TU-141-L2B-3.5	951020	24	<1.0	989	<1	8	132	23	--	743	--	
	960118	15	<1.0	431	<1	7	11	12	--	30	<10	
TU-142-L3A-4.5A	960118	6	<1.0	473	<1	3	118	8	--	40	<10	
TU-144-L3B-1.5	951020	13	<1.0	774	2	11	106	33	--	38	--	
	960118	7	<1.0	495	<1	3	24	10	--	10	<10	
TU-145-L3B-2.5	960118	9	<1.0	645	<1	3	86	30	--	30	--	
TU-147-L3C-1.5	960118	7	<1.0	411	<1	<2	<6	22	--	10	--	
TU-148-L3C-2.5	951020	11	<1.0	1,063	3	9	95	36	--	46	--	
	960118	5	<1.0	479	<1	5	<6	9	--	20	<10	
TU-149-L3C-3.5	960118	6	<1.0	399	<1	9	68	7	--	20	<10	
TU-150-L4A-1.5	960118	5	<1.0	306	<1	<2	<6	15	--	11	--	
TU-151-L4A-2.5	951020	15	<1.0	833	<1	13	49	28	--	24	--	
	960118	9	<1.0	448	<1	<2	9	9	--	10	<10	
TU-152-L4A-3.5	951020	27	<1.0	656	8	26	654	73	--	396	--	
	960118	7	<1.0	519	1	8	23	14	--	30	<10	
TU-153-L4B-1.5	951020	21	<1.0	784	5	13	200	90	--	60	--	
TU-154-L4B-2.5	951020	20	<1.0	1,100	<1	15	146	35	--	28	--	
	960118	10	<1.0	520	<1	4	17	18	--	10	--	
TU-155-L4B-3.5	951020	17	<1.0	896	<1	11	79	48	--	37	--	
	960118	7	<1.0	542	<1	7	10	22	--	20	<10	
TU-156-L4C-1.5UP	960118	26	<1.0	495	<1	4	33	25	--	20	--	
TU-157-L4C-2.5UP	951020	44	<1.0	939	3	21	374	23	--	58	--	
TU-158-L4C-3.5UP	960118	16	<1.0	546	<1	9	50	9	--	40	--	
TU-159-L5A-1.5	960118	9	2.0	41	3	<2	124	75	--	40	3	
TU-160-L5A-2.5	960118	10	<1.0	45	1	<2	116	8	--	180	--	
TU-161-L5A-3.5	960118	16	2.0	--	<1	<2	47	32	--	230	<10	
TU-162-L5B-1.5	960118	20	3.0	56	<1	5	466	11	--	11,300	--	
Surface water												
TU-120	960627	20	2.0	110	<1	4	138	11	394	780	1	
TU-124	960627	20	<1.0	249	<1	<2	98	<2	1,360	2,200	<1	
TU-125	960627	38	<1.0	50	4	3	<6	<2	35	270	<1	

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	LITH- IUM DIS- SOLVED (ug/L AS Li)	MANGA- NESE TOTAL (ug/L AS Mn)	MANGA- NESE DIS- SOLVED (ug/L AS Mn)	MERC- URY DIS- SOLVED (ug/L AS Hg)	MOLYB- DENUM DIS- SOLVED (ug/L AS Mo)	NICKEL DIS- SOLVED (ug/L AS Ni)	SELEN- IUM DIS- SOLVED (ug/L AS Se)	SILVER DIS- SOLVED (ug/L AS Ag)	STRONT- IUM DIS- SOLVED (ug/L AS Sr)	VANAD- IUM DIS- SOLVED (ug/L AS V)
		Ground water									
TU-100-W1S	960117	171	16,800	18,900	<0.1	22.0	610	<1	<10	5,620	<5
	960620	159	17,600	19,400	--	<10.0	555	<5	<10	5,328	<5
TU-101-W1D	960118	26	290	261	<0.1	14.0	<4	<1	14	2,807	<5
	960620	<30	673	721	--	<10.0	<5	<5	<10	2,791	<5
TU-102-W2	960119	232	20,200	19,300	<0.1	<10.0	441	<5	<10	3,022	6
	960620	211	19,000	20,000	--	<10.0	442	<1	<10	2,840	<5
TU-103-W3S	960119	122	8,890	8,540	<0.1	<10.0	47	<1	18	1,729	<5
	960617	117	13,300	13,700	--	<10.0	59	<1	<10	1,236	<5
TU-104-W3D	960119	88	3,490	3,270	<0.1	<10.0	11	<1	14	2,034	6
	960617	10	13,800	3,880	--	<10.0	13	<1	<10	2,012	<5
TU-105-W4S	960118	206	15,500	15,240	<0.1	<10.0	488	<1	<10	3,388	<5
	960617	193	14,800	15,200	--	<10.0	478	<1	<10	3,203	7
TU-106-W4I	960118	211	14,200	13,700	<0.1	17.0	423	1	<10	3,225	<5
	960617	197	14,900	14,700	--	<10.0	493	<5	<10	3,215	<5
TU-107-W4D	960119	68	2,150	1,970	<0.1	18.0	11	1	15	2,233	<5
	960618	33	1,590	1,570	--	<10.0	8	<1	<10	2,215	6
TU-109-W5D	960118	227	16,600	16,100	<0.1	<10.0	465	<1	<10	2,845	<5
	960617	222	16,400	16,600	--	13.0	491	<1	<10	2,567	7
TU-110-W6S	960120	249	66,100	61,500	<0.1	14.0	1,027	<5	<10	1,249	9
	960618	254	58,500	66,500	--	<10.0	865	<5	<10	1,267	<5
TU-111-W6D	960120	429	33,100	30,500	<0.1	<10.0	312	<5	<10	2,437	12
	960618	423	45,800	46,500	--	<10.0	847	<1	<10	2,116	7
TU-112-W7	960119	285	10,800	10,300	<0.1	<10.0	378	<1	10	2,709	<5
	960618	232	10,700	11,300	--	<10.0	383	<5	<10	3,050	<5
TU-113-W8S	960120	65	910	884	--	<10.0	6	--	23	840	<5
	960619	67	920	950	--	31.0	<5	<1	<10	1,031	<5
TU-114-W8D	960120	170	13,100	12,300	<0.1	<11.0	309	<2	<10	1,663	9
	960619	169	13,400	14,100	--	<10.0	354	<5	<10	1,342	<5
TU-115-W9	960117	292	20,400	20,400	<0.1	<10.0	721	<1	<10	2,496	<5
	960618	269	18,600	21,200	--	<10.0	638	<1	<10	2,416	<5
TU-116-W10	960116	228	20,100	20,500	<0.1	<10.0	608	<1	<10	3,055	7
	960618	224	19,200	21,900	--	11.0	563	<1	<10	2,856	<5
TU-117-W11	960116	237	12,500	15,800	<0.1	12.0	616	<1	<10	2,784	<5
	960619	207	15,700	17,400	--	17.0	492	<1	<10	2,532	<5
TU-118-W12	960117	181	18,100	18,200	<0.1	16.0	519	<1	<10	3,885	6
	960619	181	17,900	18,700	--	<10.0	484	<5	<10	3,825	<5
TU-119-W13	960117	130	9,400	9,380	<0.1	<10.0	320	<1	11	3,337	<5
	960619	113	9,100	9,740	--	<10.0	309	<1	<10	3,101	<5
Interstitial water											
TU-130-L1A-1.5	960118	41	--	2,670	--	<10.0	89	--	<10	1,271	14
TU-131-L1A-2.5	951020	354	--	27,900	--	<11.0	1,355	--	<10	916	8
	960118	181	--	23,700	--	26.0	902	--	<10	753	13
TU-132-L1A-3.5	960118	143	--	70,000	--	23.0	1,008	--	<10	796	11
TU-133-L1B-1.5	951020	121	--	7,340	--	<11.0	151	--	<10	1,556	29
	960118	56	--	2,340	<0.1	<10.0	134	2	<10	1,230	7
TU-136-L2A-1.5	951020	156	--	73,000	--	12.0	574	--	<10	1,851	22
	960118	64	--	16,900	<0.1	21.0	59	--	<10	779	19

**GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED  
WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	LITH- IUM DIS- SOLVED (ug/L AS Li)	MANGA- NESE TOTAL (ug/L AS Mn)	MANGA- NESE DIS- SOLVED (ug/L AS Mn)	MERC- URY DIS- SOLVED (ug/L AS Hg)	MOLYB- DENUM DIS- SOLVED (ug/L AS Mo)	NICKEL DIS- SOLVED (ug/L AS Ni)	SELEN- IUM DIS- SOLVED (ug/L AS Se)	SILVER DIS- SOLVED (ug/L AS Ag)	STRONT- IUM DIS- SOLVED (ug/L AS Sr)	VANAD- IUM DIS- SOLVED (ug/L AS V)
Interstitial water (continued)											
TU-137-L2A-2.5	951020	105	--	72,600	--	18.0	316	--	<10	1,932	17
	960118	65	--	27,300	<0.1	32.0	156	--	<10	642	<5
TU-138-L2A-3.5	951020	172	--	52,800	--	<11.0	208	--	<10	1,455	18
	960118	62	--	17,500	<0.1	19.0	98	--	<10	700	10
TU-139-L2B-1.5	951020	109	--	24,000	--	32.0	96	--	<10	1,519	34
	960118	53	--	14,100	<0.1	53.0	38	--	<10	764	13
TU-140-L2B-2.5	951020	86	--	85,300	--	18.0	549	--	<10	1,391	22
	960118	51	--	62,500	<0.1	14.0	470	<1	<10	1,197	16
TU-141-L2B-3.5	951020	152	--	18,800	--	24.0	161	--	<10	886	11
	960118	50	--	1,880	<0.1	47.0	24	<1	<10	470	15
TU-142-L3A-4.5A	960118	69	--	21,100	<0.1	35.0	201	--	<10	505	14
TU-144-L3B-1.5	951020	203	--	31,600	--	<11.0	222	--	<10	805	19
	960118	49	--	7,560	<0.1	34.0	56	--	<10	508	15
TU-145-L3B-2.5	960118	74	--	13,500	--	20.0	207	--	<10	709	27
TU-147-L3C-1.5	960118	35	--	593	--	<10.0	20	--	<10	494	17
TU-148-L3C-2.5	951020	146	--	15,700	--	<11.0	222	--	<10	721	12
	960118	26	--	2,040	<0.1	<10.0	45	--	<10	394	7
TU-149-L3C-3.5	960118	63	--	14,700	<0.1	<10.0	170	<1	<10	535	13
TU-150-L4A-1.5	960118	48	--	2,230	--	20.0	49	--	<10	242	7
TU-151-L4A-2.5	951020	180	--	8,330	--	<11.0	130	--	<10	860	18
	960118	53	--	5,310	<0.1	<10.0	60	1	<10	668	5
TU-152-L4A-3.5	951020	416	--	86,700	--	23.0	1,424	--	15	651	19
	960118	46	--	4,220	<0.1	15.0	156	--	<10	536	<5
TU-153-L4B-1.5	951020	217	--	19,000	--	19.0	500	--	<10	678	16
TU-154-L4B-2.5	951020	141	--	15,700	--	18.0	319	--	<10	794	42
	960118	34	--	6,730	<0.1	21.0	60	--	<10	772	8
TU-155-L4B-3.5	951020	106	--	11,700	--	11.0	213	--	<10	842	25
	960118	22	--	936	<0.1	11.0	47	1	<10	396	<5
TU-156-L4C-1.5UP	960118	58	--	6,150	--	<10.0	96	<1	<10	798	7
TU-157-L4C-2.5UP	951020	211	--	73,700	--	<11.0	570	--	<10	1,087	13
TU-158-L4C-3.5UP	960118	34	--	20,700	--	<10.0	93	--	<10	719	8
TU-159-L5A-1.5	960118	48	--	16,100	<0.1	<10.0	260	--	<10	297	15
TU-160-L5A-2.5	960118	45	--	14,900	--	<10.0	232	--	<10	203	9
TU-161-L5A-3.5	960118	195	--	5,430	<0.1	24.0	528	--	<10	360	19
TU-162-L5B-1.5	960118	122	--	36,100	<0.1	<10.0	909	<1	<10	542	8
Surface water											
TU-120	960627	156	20,786	22,600	--	17.0	313	<1	<10	370	<5
TU-124	960627	115	7,427	8,180	--	16.0	165	<1	<10	510	<5
TU-125	960627	49	3,029	3,400	--	15.0	134	<1	<10	149	<5

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	ZINC DIS- SOLVED (ug/L AS Zn)	CARBON ORGANIC DIS- SOLVED (mg/L AS C)	$\delta^{34}\text{S}$ (PER MIL)
Ground water				
TU-100-W1S	960117	370	0.7	-10.2
	960620	337	0.6	-10.4
TU-101-W1D	960118	<1	0.4	-6.1
	960620	<20	1.2	-6.9
TU-102-W2	960119	355	0.9	-9.4
	960620	405	0.9	-9.7
TU-103-W3S	960119	14	1.2	-13.7
	960617	21	0.8	-13.8
TU-104-W3D	960119	<1	1.0	-14.1
	960617	<20	0.8	-13.9
TU-105-W4S	960118	465	1.0	-9.3
	960617	450	0.7	-9.4
TU-106-W4I	960118	326	0.8	-9.4
	960617	419	0.8	-9.6
TU-107-W4D	960119	6	2.4	-8.5
	960618	<20	0.9	-8.9
TU-109-W5D	960118	483	1.7	-9.6
	960617	540	1.0	-9.6
TU-110-W6S	960120	1,618	1.6	-8.7
	960618	1,437	1.6	-8.5
TU-111-W6D	960120	5	2.0	-8.2
	960618	541	1.3	-8.1
TU-112-W7	960119	211	1.2	-11.0
	960618	220	0.7	-10.8
TU-113-W8S	960120	2	0.8	-6.4
	960619	<20	0.6	-7.6
TU-114-W8D	960120	98	1.0	-12.2
	960619	103	0.9	-12.0
TU-115-W9	960117	933	0.5	-11.4
	960618	792	0.4	-11.7
TU-116-W10	960116	799	1.0	-10.1
	960618	756	1.0	-10.0
TU-117-W11	960116	574	0.8	-9.9
	960619	499	0.6	-11.0
TU-118-W12	960117	584	0.6	-11.8
	960619	556	0.6	-11.8
TU-119-W13	960117	70	0.6	-5.7
	960619	63	0.6	-5.8
Interstitial water				
TU-130-L1A-1.5	960118	59	--	3.0
TU-131-L1A-2.5	951020	2,640	--	-1.3
TU-131-L1A-2.5	960118	1,433	--	-1.2
TU-132-L1A-3.5	960118	341	--	--
TU-133-L1B-1.5	951020	173	--	-0.2
TU-133-L1B-1.5	960118	156	--	0.0
TU-136-L2A-1.5	951020	663	--	-2.8
TU-136-L2A-1.5	960118	74	22.0	1.7

**GEOCHEMISTRY AND GROUND-WATER FLOW BENEATH AN ABANDONED COAL MINE TREATED  
WITH FLUE-GAS DESULFURIZATION BY-PRODUCTS AS SOIL AND SPOIL AMENDMENTS**

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

LOCAL NUMBER	DATE	ZINC DIS- SOLVED (ug/L AS Zn)	CARBON ORGANIC DIS- SOLVED (mg/L AS C)	$\delta^{34}\text{S}$ (PER MIL)
		Interstitial water (continued)		
TU-137-L2A-2.5	951020	217	--	-0.9
	960118	81	26.0	1.0
TU-138-L2A-3.5	951020	104	--	-3.3
	960118	28	19.0	1.8
TU-139-L2B-1.5	951020	54	--	0.7
	960118	35	30.0	1.8
TU-140-L2B-2.5	951020	423	--	-3.0
	960118	376	28.0	0.2
TU-141-L2B-3.5	951020	54	--	0.4
	960118	6	20.0	1.9
TU-142-L3A-4.5A	960118	73	14.0	-2.1
TU-144-L3B-1.5	951020	169	--	-4.6
	960118	27	--	-1.9
TU-145-L3B-2.5	960118	107	--	-2.3
TU-147-L3C-1.5	960118	27	--	--
TU-148-L3C-2.5	951020	132	--	-4.1
	960118	14	20.0	-2.2
TU-149-L3C-3.5	960118	50	17.0	-3.2
TU-150-L4A-1.5	960118	38	--	-4.5
TU-151-L4A-2.5	951020	117	--	-2.7
	960118	25	24.0	-4.1
TU-152-L4A-3.5	951020	1,400	--	-13.3
	960118	74	24.0	-2.1
TU-153-L4B-1.5	951020	737	--	-4.2
TU-154-L4B-2.5	951020	274	--	-9.8
	960118	42	2.6	-1.6
TU-155-L4B-3.5	951020	180	--	-4.2
	960118	25	28.0	-4.5
TU-156-L4C-1.5UP	960118	116	--	-0.9
TU-157-L4C-2.5UP	951020	402	--	-4.1
TU-158-L4C-3.5UP	960118	31	0.6	-2.0
TU-159-L5A-1.5	960118	422	--	-12.1
TU-160-L5A-2.5	960118	1,177	--	--
TU-161-L5A-3.5	960118	312	2.8	-12.2
TU-162-L5B-1.5	960118	814	8.6	-15.5
Surface water				
TU-120	960627	331	1.8	-14.3
TU-124	960627	153	4.0	-9.6
TU-125	960627	156	2.2	-14.0



## BACTERIOLOGICAL AND SELECTED WATER-QUALITY DATA AT LAKE ERIE

The following tables list the results of bacteriological and physical measurements collected in the nearshore zone of three Lake Erie beaches in Cuyahoga County, Ohio, during August and September 1996. Samples were collected as part of a three-year study to investigate the effects of sediment-stored fecal-indicator bacteria on the recreational water quality of Lake Erie beaches.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

## 412917081442810 LAKE ERIE AT EDGEWATER PARK, AREA 1

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG 21...	0715	7.3	329	8.0	24.5	7.2	7.7	310	340
SEP 05...	0920	5.1	422	7.9	24.0	4.4	6.6	51	48

## 412917081442820 LAKE ERIE AT EDGEWATER PARK, AREA 2

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
SEP 10...	0930	2.5	--	--	--	22	--	2200	--
11...	0930	4.0	287	7.9	23.0	12	--	390	--

## 412917081442830 LAKE ERIE AT EDGEWATER PARK, AREA 3

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG 07...	0700	7.4	300	8.0	23.0	--	7.8	K3	--
07...	0705	7.0	313	8.1	23.5	--	7.7	K18	--
21...	0730	2.0	330	8.1	23.5	12	8.1	680	600
SEP 05...	0927	7.0	415	7.8	24.0	3.8	6.7	56	73
10...	0940	4.0	--	--	--	21	--	K2700	--
12...	0800	2.0	264	8.2	23.0	21	--	2100	--

## 412917081442840 LAKE ERIE AT EDGEWATER PARK, AREA 4

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
SEP 05...	0930	5.6	419	7.9	24.0	4.1	6.8	58	77

K indicates result was based on colony count outside the ideal range.  
E indicates result was based on estimated value.

## BACTERIOLOGICAL AND SELECTED WATER-QUALITY DATA AT LAKE ERIE

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996--Continued

## 412917081442850 LAKE ERIE AT EDGEWATER PARK, AREA 5

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG									
07...	0900	5.1	310	8.2	23.5	--	8.1	K12	K15
07...	0905	2.9	304	8.1	23.5	--	7.4	<3	--
21...	0740	3.3	320	8.1	24.0	9.1	8.2	80	67
21...	0750	6.0	319	8.2	24.0	4.2	8.6	K44	K28

## 413509081340210 LAKE ERIE AT VILLA ANGELA, AREA 1

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG									
20...	1640	6.0	299	8.2	26.5	4.7	7.6	270	400
21...	1140	6.5	290	8.1	24.5	3.4	9.1	430	300
SEP									
10...	1100	7.0	286	--	23.0	11	--	340	--

## 413509081340230 LAKE ERIE AT VILLA ANGELA, AREA 3

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG									
07...	1000	3.0	293	8.1	24.0	--	8.0	K18	--
07...	1005	7.0	292	8.1	24.0	--	8.1	K13	K15
20...	1650	3.9	294	8.3	26.0	2.7	8.2	150	K90
21...	1150	4.0	292	8.1	24.5	2.6	8.7	490	520

## 413509081340240 LAKE ERIE AT VILLA ANGELA, AREA 4

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG									
20...	1700	2.8	295	8.3	25.5	2.0	8.5	140	150
21...	1200	2.8	293	8.2	24.5	7.1	8.3	870	770
SEP									
10...	1120	4.5	286	--	23.0	8.0	--	280	--
11...	1015	5.8	282	7.6	23.0	2.4	--	K78	--

K indicates result was based on colony count outside the ideal range.  
E indicates result was based on estimated value.

## BACTERIOLOGICAL AND SELECTED WATER-QUALITY DATA AT LAKE ERIE

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996--Continued

## 413509081340250 LAKE ERIE AT VILLA ANGELA, AREA 5

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
SEP 12...	0850	3.0	265	8.2	23.0	18	--	340	--

## 413509081340260 LAKE ERIE AT VILLA ANGELA, AREA 6

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
SEP 10...	1125	4.0	286	--	23.0	11	--	540	--

## 413700081312510 LAKE ERIE AT SIMMS BEACH, AREA 1

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG 07...	1045	6.0	277	8.0	23.5	--	7.8	140	97
07...	1055	4.0	278	8.2	24.0	--	8.7	480	--
SEP 05...	0720	5.5	289	7.9	23.5	1.7	5.9	73	100
10...	1205	4.5	290	--	23.0	67	--	3200	--

## 413700081312520 LAKE ERIE AT SIMMS BEACH, AREA 2

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG 20...	1540	6.5	311	7.7	25.0	3.8	8.6	770	550
21...	1040	6.5	302	7.8	24.0	17	9.0	K30000	3200
SEP 05...	0730	6.5	289	8.1	23.5	1.7	6.3	K48	73
05...	0735	4.2	288	7.9	23.5	1.2	6.1	87	120
10...	1210	5.8	286	--	23.0	39	--	1600	--
11...	1050	4.5	291	7.4	23.5	8.5	--	180	--
12...	0910	4.0	290	7.9	23.0	31	--	1600	--

K indicates result was based on colony count outside the ideal range.  
E indicates result was based on estimated value.

## BACTERIOLOGICAL AND SELECTED WATER-QUALITY DATA AT LAKE ERIE

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996--Continued

## 413700081312530 LAKE ERIE AT SIMMS BEACH, AREA 3

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG									
20...	1550	5.5	304	7.7	25.0	5.5	7.8	K3200	>2000
21...	1050	5.4	311	7.7	24.0	21	9.8	K24000	29000
SEP									
10...	1220	5.8	288	--	23.0	58	--	29000	--

## 413700081312540 LAKE ERIE AT SIMMS BEACH, AREA 4

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)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	FECAL COLI- FORM 24-HR MEM.FIL (COLS./ 100 ML) (31613)	E. COLI WATER WHOLE TOTAL UREASE (COL / 100 ML) (31633)
AUG									
20...	1555	3.7	317	7.8	25.5	10	7.7	E1800	>2000
21...	1105	3.0	313	7.8	24.0	49	7.7	K53000	57000
SEP									
05...	0745	5.3	286	8.1	23.5	1.4	6.5	90	--

K indicates result was based on colony count outside the ideal range.

E indicates result was based on estimated value.

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

The following tables contain ground-water-level measurements and chemical analyses from a network of wells and two surface-water sites in southern Franklin County. The data were collected as part of a cooperative study with the City of Columbus. The objective of the study is to present estimates of ground-water travel times and flow paths under transient flow to determine the zone of contribution to the City of Columbus' South Well Field. The five-digit parameter codes (in parentheses) in the water-quality reports are defined in WATSTORE.

03227500 - SCIOTO R AT COLUMBUS OH

LOCATION.--Lat 39°54'34", long 83°00'33", Franklin County, Hydrologic Unit 05060001, on right bank at sewage-treatment plant of city of Columbus, 0.4 mi downstream from bridge on Frank Road, 2.8 mi upstream from Scioto Big Run, and 5 mi downstream from Olentangy River.

PERIOD OF RECORD.--Discharge - October 1920 to current year. Monthly discharge only for some periods, published in WSP 1305. Chemical-quality sampling only as part of a cooperative study with the City of Columbus - Dec. 15, 1995 and Mar. 12, 1996.

REMARKS.--Flow regulated by Griggs Reservoir 10.4 mi upstream (see station 03221500), O'Shaughnessy Reservoir 20.4 mi upstream (see station 03220500), and Delaware Lake 35 mi upstream from station.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	PH								
		SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	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)
DEC 15...	1103	726	8.1	2.5	10.3	280	75	23	33	4.5
MAR 12...	1230	567	7.5	2.5	13.9	240	65	19	20	3.4
DATE		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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L) AS N (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L) AS N (00631)
DEC 15...		215	176	96	62	0.40	7.2	429	0.020	4.50
MAR 12...		173	142	71	41	0.30	7.3	337	0.030	5.30
DATE		NITRO- GEN, AMMONIA DIS- SOLVED (MG/L) AS N (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L) AS N (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L) AS P (00671)	BARIUM, DIS- SOLVED (UG/L) AS BA (01005)	BERYL- LIUM, DIS- SOLVED (UG/L) AS BE (01010)	CADMIUM DIS- SOLVED (UG/L) AS CD (01025)	COBALT, DIS- SOLVED (UG/L) AS CO (01035)	COPPER, DIS- SOLVED (UG/L) AS CU (01040)	IRON, DIS- SOLVED (UG/L) AS FE (01046)
DEC 15...		0.080	0.50	0.110	47	<0.50	<1.0	3.0	<10	35
MAR 12...		0.140	0.80	0.080	42	<0.50	<1.0	<3.0	<10	95
DATE		LEAD, DIS- SOLVED (UG/L) AS PB (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L) AS SR (01080)	VANA- DIUM, DIS- SOLVED (UG/L) AS V (01085)	ZINC, DIS- SOLVED (UG/L) AS ZN (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L) AS C (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
DEC 15...	20		8	19	<10	1500	<6	15	5.1	451
MAR 12...	<10		4	14	10	980	<6	53	5.2	365



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

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03229500 - BIG WALNUT C AT REES OH

LOCATION.--Lat 39°51'24", long 82°57'26", in NE 1/4 sec. 26, T.4 N., R.22 W., Franklin County, Hydrologic Unit 05060001, on right bank at downstream side of bridge on Reese Road, 0.5 mi southwest of Rees, 4.2 mi downstream from Alum Creek, and 10.5 mi upstream from mouth.

PERIOD OF RECORD.--Discharge - August 1921 to December 1935, October 1938 to current year. Monthly discharge only for some periods, published in WSP 1305. Chemical-quality sampling only as part of a cooperative study with the City of Columbus - beginning Dec. 15, 1995.

REMARKS.--Flow regulated by Hoover Reservoir 26 mi upstream (see station 03228400) and Alum Creek Lake 30 mi upstream since August 1973. Beginning June 15, 1956, diversion at Morse Road Treatment Plant, 21 mi upstream from station, for municipal water supply for the city of Columbus.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

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)	HARD- NESS TOTAL (MG/L 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)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
DEC 15...	1007	656	7.5	9.0	7.0	220	59	18	210	5.0	161
MAR 12...	0930	714	7.9	4.0	12.7	250	67	21	40	3.5	220
JUN 05...	0947	389	7.7	16.0	8.8	160	44	12	12	3.3	124
AUG 16...	1015	718	7.7	23.0	7.6	290	77	24	33	3.7	256
DATE	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	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 ORTHO, DIS- SOLVED (MG/L AS P) (00671)
DEC 15...	132	62	350	0.20	2.1	791	0.030	0.950	0.210	2.3	0.010
MAR 12...	180	69	73	0.20	5.7	396	0.030	1.70	0.140	0.60	0.020
JUN 05...	122	37	22	0.20	4.7	205	0.060	1.80	0.080	0.80	0.030
AUG 16...	210	78	63	0.30	6.1	415	0.010	0.800	0.030	0.30	0.020
DATE	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
DEC 15...	67	<0.50	<1.0	<3.0	<10	93	<10	6	68	10	430
MAR 12...	69	<0.50	<1.0	<3.0	<10	67	<10	<4	41	20	360
JUN 05...	45	<0.50	<1.0	<3.0	<10	180	20	<4	6.0	<10	220
AUG 16...	100	<0.50	<1.0	<3.0	<10	5.0	<10	6	20	10	500
DATE	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)	FONOFOS WATER DISS REC (UG/L) (04095)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
DEC 15...	<6	43	7.3	--	--	--	--	--	--	--	--
MAR 12...	<6	<3.0	4.0	--	--	--	--	--	--	--	--
JUN 05...	<6	<3.0	5.3	--	--	--	--	--	--	--	--
AUG 16...	<6	3.0	3.5	<0.007	<0.002	0.160	0.036	E0.041	0.177	<0.003	430

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

03229500 - BIG WALNUT C AT REES OH--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P, P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)
DEC 15...	--	--	--	--	--	--	--	--	--	--	--
MAR 12...	--	--	--	--	--	--	--	--	--	--	--
JUN 05...	--	--	--	--	--	--	--	--	--	--	--
AUG 16...	<0.002	<0.006	0.010	<0.004	<0.001	0.327	0.018	<0.004	0.043	0.684	0.009
	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)	
DEC 15...	--	834	--	--	--	--	--	--	--	--	--
MAR 12...	--	421	--	--	--	--	--	--	--	--	--
JUN 05...	--	216	--	--	--	--	--	--	--	--	--
AUG 16...	0.006	471	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	
	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
DEC 15...	--	--	--	--	--	--	--	--	--	--	--
MAR 12...	--	--	--	--	--	--	--	--	--	--	--
JUN 05...	--	--	--	--	--	--	--	--	--	--	--
AUG 16...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	
	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	
DEC 15...	--	--	--	--	--	--	--	--	--	--	--
MAR 12...	--	--	--	--	--	--	--	--	--	--	--
JUN 05...	--	--	--	--	--	--	--	--	--	--	--
AUG 16...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

293

394957083002900. SCIOTO RIVER AT ROUTE 665 AT SHADEVILLE.

LOCATION.--Lat 39°49'57", long 83°00'29", Hydrologic Unit 05060001, north side of Rt. 665 bridge over the Scioto River, 0.1 mi west of Shadeville.

PERIOD OF RECORD.--Aug. 1987 intermittently to current year.

REMARKS.--This site is used for chemical-quality sampling only as part of a cooperative study with the City of Columbus. A "K" associated with bacteriologic data indicates non-ideal colony counts.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

		PH										BICAR-	ALKA-
		SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	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)	BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	
JUN 05...	1247	530	7.7	17.0	8.4	220	63	16	17	3.8	151	124	
AUG 16...	1330	915	7.9	25.0	8.8	330	91	24	54	9.1	185	152	
DATE	TIME	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, SUM OF CONSTI- TUENTS, SOLVED (MG/L) (70301)	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 ORTHO, DIS- SOLVED (MG/L) AS P (00671)	BERYL- LIUM, DIS- SOLVED (UG/L) AS BE (01010)	
JUN 05...	65	30	0.30	7.5	296	0.080	4.00	0.100	0.80	0.220	39	<0.50	
AUG 16...	200	83	0.80	5.4	586	0.030	5.10	<0.015	0.60	0.930	36	<0.50	
DATE		CADMIUM DIS- SOLVED (UG/L) AS CD (01025)	COBALT, DIS- SOLVED (UG/L) AS CO (01035)	COPPER, DIS- SOLVED (UG/L) AS CU (01040)	IRON, DIS- SOLVED (UG/L) AS FE (01046)	LEAD, DIS- SOLVED (UG/L) AS PB (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L) AS SR (01080)	VANA- DIUM, DIS- SOLVED (UG/L) AS V (01085)	CARBON, ORGANIC DIS- SOLVED (MG/L) AS C (00681)	
JUN 05...	<1.0	<3.0	<10	150	<10	6	7.0	<10	770	<6	10	5.4	
AUG 16...	<1.0	<3.0	<10	8.0	<10	18	10	10	1800	<6	24	4.9	
DATE		PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)	FONOFOS WATER, DISS, REC (UG/L) (04095)	COLI- FORM, FECAL, UM-MF (COLS./ 100 ML) (31625)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	CHLOR- P,P' DDE DISSOLV (UG/L) (34653)	LINDANE DIS- SOLVED (UG/L) (39341)	
JUN 05...	--	--	--	--	--	--	--	--	--	--	--	--	
AUG 16...	<0.007	<0.002	0.298	0.046	E0.121	0.448	<0.003	340	<0.002	<0.006	0.036	0.012	
DATE		DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)	ALA- CHLOR, WATER, DISS, REC (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)
JUN 05...	--	--	--	--	--	--	--	--	--	305	--	--	
AUG 16...	<0.001	2.11	0.012	<0.004	0.066	2.82	0.057	0.031	612	0.023	<0.003	0.004	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

394957083002900. SCIOTO RIVER AT ROUTE 665 AT SHADEVILLE--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	ETHAL- FLUR- ALIN WAT FLT	PHORATE WATER FLTRD	TER- BACIL WATER FLTRD	LIN- URON WATER FLTRD	METHYL PARA- THION WAT FLT	EPTC WATER FLTRD	FEB- ULATE WATER FILTRD	TEBU- THIURON WATER FLTRD	MOL- INATE WATER FLTRD	ETHO- PROP WATER FLTRD	BEN- FLUR- ALIN WAT FLD	CARBO- FURAN WATER FLTRD
DATE	0.7 U GF, REC (UG/L) (82663)	0.7 U GF, REC (UG/L) (82664)	0.7 U GF, REC (UG/L) (82665)	0.7 U GF, REC (UG/L) (82666)	0.7 U GF, REC (UG/L) (82667)	0.7 U GF, REC (UG/L) (82668)	0.7 U GF, REC (UG/L) (82669)	0.7 U GF, REC (UG/L) (82670)	0.7 U GF, REC (UG/L) (82671)	0.7 U GF, REC (UG/L) (82672)	0.7 U GF, REC (UG/L) (82673)	0.7 U GF, REC (UG/L) (82674)
JUN 05...	--	--	--	--	--	--	--	--	--	--	--	--
AUG 16...	<0.004	<0.002	<0.007	<0.002	<0.006	<0.002	<0.004	0.013	<0.004	<0.003	<0.002	<0.003
	TER- BUFOS WATER FLTRD	PRON- AMIDE WATER FLTRD	DISUL- FOTON WATER FLTRD	TRIAL- LATE WATER FLTRD	PRO- PANIL WATER FLTRD	CAR- BARYL WATER FLTRD	THIO- BENCARB WATER FLTRD	PENDI- METH- ALIN WAT FLT	NAPROP- AMIDE WATER FLTRD	PRO- PARGITE WATER FLTRD	METHYL AZIN- PHOS WAT FLT	PER- METHRIN CIS WAT FLT
DATE	0.7 U GF, REC (UG/L) (82675)	0.7 U GF, REC (UG/L) (82676)	0.7 U GF, REC (UG/L) (82677)	0.7 U GF, REC (UG/L) (82678)	0.7 U GF, REC (UG/L) (82679)	0.7 U GF, REC (UG/L) (82680)	0.7 U GF, REC (UG/L) (82681)	0.7 U GF, REC (UG/L) (82683)	0.7 U GF, REC (UG/L) (82684)	0.7 U GF, REC (UG/L) (82685)	0.7 U GF, REC (UG/L) (82686)	0.7 U GF, REC (UG/L) (82687)
JUN 05...	--	--	--	--	--	--	--	--	--	--	--	--
AUG 16...	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005

395118082573300. Local number, FR-3

LOCATION.--Lat 39°51'18", long 82°57'33", Hydrologic Unit 05060001.

Owner.--R. Hann.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 60 ft.; 12 in. casing.

INSTRUMENTATION - Continuous recorder operated by the Ohio Department of Natural Resources, Division of Water.

DATUM.--Elevation of land-surface datum is 713.0 feet above National Geodetic Vertical Datum of 1929. Measuring point: Floor of shelter, 3.43 ft. above land-surface datum

PERIOD OF RECORD.--Oct. 1965 to current year

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.33 ft below land-surface datum, Mar. 30, 1984 and Nov 29, 1985; lowest measured, 16.48 feet below land-surface datum, Dec. 20, 1989.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	12.08
FEB 27	10.30
MAY 31	9.40
SEP 04	12.34

395037082581900. Local number, FR-36

LOCATION.--Lat 39°50'37", long 82°58'19", Hydrologic Unit 05060001.

Owner.--J.P. Sand and Gravel

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 4 in., depth 31 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 715 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.3 ft above land-surface datum

PERIOD OF RECORD.--Oct. 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.03 ft below land-surface datum, Oct. 17, 1979; lowest measured, 21.69 ft below land-surface datum, Mar. 16, 1992.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	18.53
FEB 27	18.04
MAY 31	14.17
SEP 04	15.90

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

295

394927082595800. Local number, FR-70.

LOCATION.--Lat 39°49'27", long 82°59'58", Hydrologic Unit 05060001.

Owner.--St. Joseph Cemetery.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 59 ft.; 4 in. casing.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 705 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of concrete base, 0.35 ft above land-surface datum.

PERIOD OF RECORD.--Apr. 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.24 ft below land-surface datum, Mar. 18, 1991; lowest measured, 27.60 ft below land-surface datum, June 12, 1992.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	19.66
FEB 28	19.59
MAY 31	14.74
SEP 04	17.00

395217083002300. Local number FR-72

LOCATION.--Lat 39°52'17", long 83°00'23", Hydrologic Unit 05060001.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 34.6 ft, 3 in. casing.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 715 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of casing inside pit, 3.5 ft below land-surface datum.

PERIOD OF RECORD.--May 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 23.01 ft below land-surface datum, June 27, 1990; lowest measured, dry on dates in 1992, 1995 and Oct 25 and Sep 4 of this water year.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	DRY
FEB 26	36.80
MAY 31	32.23
SEP 04	DRY

395019083003300. Local number, FR-104 (TH-A)

LOCATION.--Lat 39°50'19", long 83°00'33", Hydrologic Unit 05060001.

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation well, diameter 6 in., depth 79.3 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 683 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of casing, 3.89 ft above land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.67 ft below land-surface datum, July 28, 1992; lowest measured, 53.59 ft below land-surface datum, Dec. 11, 1991.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	24.69
FEB 26	31.45
MAY 31	11.51
SEP 04	29.21

394956083002700. Local number, FR-106 (ODNR FR-18)

LOCATION.--Lat 39°49'56", long 83°00'27", Hydrologic Unit 05060001.

Owner.--City of Columbus.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 74.75 ft, 6 in. casing.

INSTRUMENTATION - Continuous recorder operated by the Ohio Department of Natural Resources, Division of Water.

DATUM.--Elevation of land-surface datum is 695 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Floor of shelter, 4.05 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.11 ft below land-surface datum, May 12, 1996; lowest measured, 32.04 ft below land-surface datum, Mar. 16, 1992.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	21.11
FEB 28	18.61
MAY 12	12.41
SEP 21	18.90



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395157083003500. Local number, FR-109

LOCATION.--Lat 39°51'57", long 83°00'35", Hydrologic Unit 05060001.

Owner.--City of Columbus.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 6 in., depth 92 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 702.2 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of outer steel casing, 30.8 ft above land-surface datum.

PERIOD OF RECORD.--June 1975 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.47 ft above land-surface datum, Sept. 05, 1990; lowest measured, 30.56 ft below land-surface datum, Aug. 05, 1988.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	9.05
FEB 26	8.68
MAY 31	14.74
SEP 04	9.92

395039082585800. Local number, FR-115 (TH-67)

LOCATION.--Lat 39°50'39", long 82°58'58", Hydrologic Unit 05060001, near Hamilton Meadows.

Owner.--City of Columbus.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation well, diameter 6 in., depth 116 ft.

INSTRUMENTATION - Data logger - 60 minute record.

DATUM.--Elevation of land-surface datum is 721 feet above National Geodetic Vertical Datum of 1929. Measuring point: Floor of instrument shelter, 2.10 ft above land-surface datum.

PERIOD OF RECORD.--Aug. 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 48.15 ft below land-surface datum, Feb. 28 and 29, 1992; minimum daily low, 27.21 ft below land-surface datum, May 3, 1984.

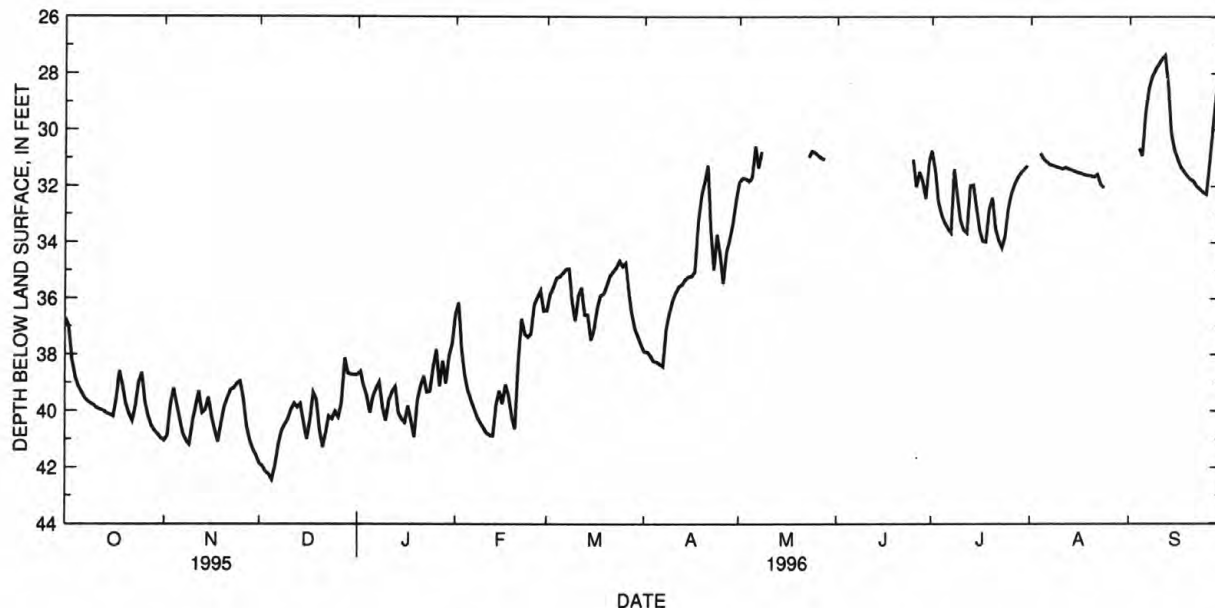
DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36.88	41.06	41.87	38.75	38.07	36.84	37.90	32.48	---	31.12	---	---
2	37.01	41.13	41.96	38.73	36.55	36.43	37.93	31.86	---	31.48	---	---
3	38.20	40.90	42.16	39.11	37.85	35.87	38.04	31.73	---	32.54	---	---
4	38.76	39.82	42.25	39.53	38.74	35.60	38.25	31.83	---	32.99	---	---
5	39.14	39.72	42.44	40.07	39.29	35.27	38.29	31.84	---	33.28	31.00	30.92
6	39.33	40.30	42.45	40.07	39.61	35.22	38.34	---	---	33.48	31.12	30.98
7	39.54	40.82	41.93	39.46	39.92	35.10	38.44	---	---	33.63	31.22	29.37
8	39.66	41.07	41.24	39.21	40.22	34.97	38.42	31.68	---	33.69	31.26	28.53
9	39.74	41.20	40.73	39.90	40.42	36.10	37.09	---	---	32.40	31.30	28.10
10	39.82	41.23	40.51	40.35	40.61	36.81	36.50	---	---	33.21	31.34	27.86
11	39.91	40.37	40.30	40.35	40.79	36.81	36.07	---	---	33.53	31.38	27.66
12	39.98	39.85	39.97	39.62	40.88	35.90	35.77	---	---	33.67	31.37	27.46
13	40.00	40.08	40.06	39.33	40.93	36.58	35.57	---	---	33.70	31.39	28.54
14	40.10	40.41	39.87	40.07	40.95	36.89	35.51	---	---	32.06	31.42	30.10
15	40.13	39.98	40.43	40.59	39.79	37.49	35.31	---	---	32.71	31.47	30.70
16	40.20	40.19	41.07	40.42	39.89	37.71	35.24	---	---	33.54	31.51	31.02
17	40.22	40.70	41.01	40.42	39.74	37.11	35.20	---	---	33.94	31.54	31.32
18	39.54	41.11	40.35	40.35	39.46	36.34	35.04	---	---	34.00	31.59	31.48
19	39.12	41.18	39.61	40.95	40.22	35.96	33.26	---	---	33.98	31.62	31.62
20	39.75	40.45	40.67	40.95	40.65	35.83	32.33	---	---	32.80	31.64	31.75
21	40.12	39.85	41.30	39.63	40.67	35.54	31.83	---	---	33.50	31.66	31.82
22	40.36	39.54	41.44	39.14	38.23	35.19	33.57	---	---	33.90	31.68	32.01
23	40.45	39.26	40.80	39.34	37.27	35.04	34.97	---	---	34.18	31.94	32.09
24	39.82	39.20	40.58	39.73	37.45	34.90	34.97	30.96	---	34.26	32.09	32.22
25	39.00	39.03	40.29	39.30	37.38	34.85	34.47	30.81	---	33.78	---	32.29
26	39.67	39.58	40.36	38.44	37.26	34.85	35.45	30.90	32.02	32.78	---	32.29
27	40.18	40.53	40.23	39.14	36.21	35.69	35.45	30.99	32.32	32.25	---	31.22
28	40.53	41.03	39.73	39.23	35.97	36.50	34.32	31.04	31.84	31.91	---	29.79
29	40.71	41.37	38.67	39.03	36.44	37.07	33.90	---	32.44	31.67	---	28.74
30	40.84	41.57	38.72	39.04	---	37.34	33.31	---	32.44	31.53	---	28.33
31	40.98	---	38.73	38.07	---	37.65	---	---	---	31.39	---	---
MAX	40.98	41.57	42.45	40.95	40.95	37.71	38.44	---	---	34.26	---	---

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

297

395039082585800. Local number, FR-115 (TH-67)--Continued



395016083010300. Local number, FR-117, (M-2)

LOCATION.--Lat 39°50'16", long 83°01'03", Hydrologic Unit 05060001.

Owner.--Jackson Township.

AQUIFER.--Clay, sand, and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 2 in., depth 45 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 700 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of 2-inch steel pipe, 3.08 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.02 ft below land-surface datum, June 17, 1981; lowest measured, 24.15 ft below land-surface datum, Dec. 10, 1991.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	18.12
FEB 26	16.20
JUN 03	14.40
SEP 05	17.99

395058083002400. Local number, FR-119, (M-5)

LOCATION.--Lat 39°51'11", long 83°00'26", Hydrologic Unit 05060001.

Owner.--Franklin County.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in., depth 85 ft.

INSTRUMENTATION - Data logger -- 60 minute record.

DATUM.--Elevation of land-surface datum is 700 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of plywood, 2.48 ft above land-surface datum.

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

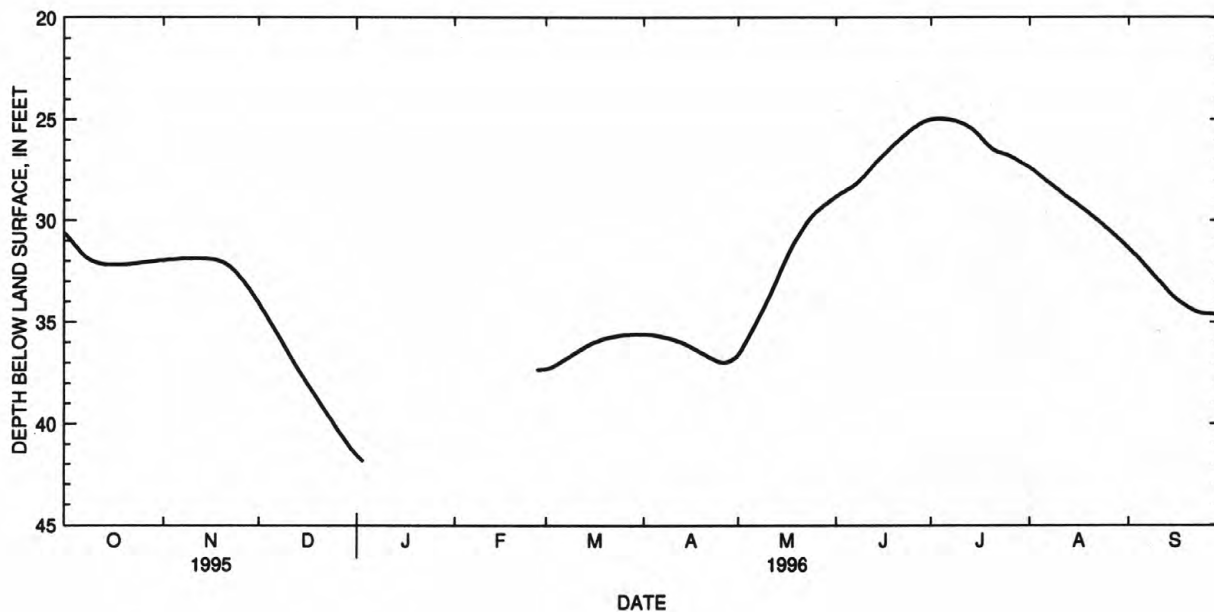
EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 52.34 ft below land-surface datum, Mar. 4-7, 1992; minimum daily low, 11.10 ft below land-surface datum, June 17, 1981.

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395058083002400. Local number, FR-119, (M-5)--Continued

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30.62	31.97	34.07	41.56	---	37.33	35.60	36.75	28.92	25.04	27.37	31.37
2	30.79	31.96	34.33	41.70	---	37.31	35.61	36.59	28.81	25.00	27.48	31.53
3	30.98	31.94	34.59	41.86	---	37.27	35.62	36.36	28.70	24.98	27.61	31.68
4	31.18	31.92	34.85	---	---	37.20	35.64	36.08	28.61	24.97	27.74	31.84
5	31.37	31.92	35.11	---	---	37.12	35.66	35.80	28.52	24.98	27.88	32.01
6	31.56	31.90	35.37	---	---	37.02	35.69	35.51	28.42	25.00	28.01	32.19
7	31.71	31.89	35.63	---	---	36.93	35.72	35.22	28.32	25.02	28.12	32.36
8	31.84	31.88	35.90	---	---	36.83	35.76	34.91	28.20	25.05	28.24	32.54
9	31.95	31.88	36.16	---	---	36.74	35.79	34.62	28.08	25.09	28.37	32.72
10	32.02	31.88	36.44	---	---	36.63	35.84	34.32	27.93	25.14	28.50	32.89
11	32.08	31.87	36.70	---	---	36.53	35.89	34.00	27.76	25.20	28.63	33.07
12	32.12	31.87	36.96	---	---	36.45	35.94	33.68	27.58	25.28	28.77	33.24
13	32.15	31.87	37.23	---	---	36.35	36.00	33.34	27.39	25.38	28.88	33.43
14	32.17	31.88	37.49	---	---	36.26	36.07	32.98	27.20	25.49	28.99	33.60
15	32.17	31.89	37.71	---	---	36.17	36.15	32.61	27.02	25.63	29.10	33.75
16	32.17	31.90	37.95	---	---	36.09	36.23	32.26	26.87	25.78	29.22	33.89
17	32.17	31.92	38.20	---	---	36.01	36.31	31.92	26.72	25.94	29.34	34.01
18	32.17	31.95	38.43	---	---	35.95	36.40	31.59	26.57	26.12	29.46	34.11
19	32.17	32.01	38.67	---	---	35.89	36.49	31.29	26.42	26.28	29.58	34.22
20	32.17	32.12	38.92	---	---	35.83	36.57	31.01	26.26	26.41	29.71	34.32
21	32.17	32.17	39.16	---	---	35.79	36.65	30.75	26.12	26.51	29.84	34.41
22	32.16	32.29	39.39	---	---	35.75	36.74	30.51	25.98	26.59	29.96	34.48
23	32.14	32.43	39.62	---	---	35.72	36.82	30.27	25.85	26.64	30.09	34.54
24	32.13	32.58	39.85	---	---	35.70	36.90	30.06	25.72	26.69	30.22	34.57
25	32.11	32.76	40.08	---	---	35.67	36.96	29.87	25.59	26.74	30.36	34.59
26	32.09	32.95	40.31	---	---	35.65	36.98	29.69	25.47	26.81	30.49	34.59
27	32.07	33.16	40.54	---	---	35.63	36.98	29.53	25.36	26.90	30.63	34.60
28	32.05	33.37	40.76	---	37.35	35.62	36.98	29.40	25.25	26.99	30.77	34.62
29	32.03	33.61	40.99	---	37.34	35.61	36.93	29.27	25.16	27.09	30.91	34.64
30	32.01	33.84	41.19	---	---	35.61	36.86	29.16	25.09	27.18	31.06	34.67
31	31.99	---	41.38	---	---	35.60	---	29.04	---	27.27	31.22	---
MAX	32.17	33.84	41.38	---	---	37.33	36.98	36.75	28.92	27.27	31.22	34.67



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

299

395117083011600. Local number, FR-120, (M-6)

LOCATION.--Lat 39°51'17", long 83°01'16", Hydrologic Unit 05060001, near Columbus.

Owner.--Franklin County.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 2 in., depth 72 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 685 feet above National Geodetic Vertical Datum of 1929. Measuring point: Floor of instrument shelter, 7.14 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.36 ft below land-surface datum, Mar. 21, 1984; lowest measured, 35.24 ft below land-surface datum, Mar. 16, 1992.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	18.01
FEB 28	FLOODED
JUN 09	13.50
SEP 05	16.68

395123083003301. Local number, FR-121A

LOCATION.--Lat 39°51'23", long 83°00'33", Hydrologic Unit 05060001.

Owner.--City of Columbus.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 2 in., depth 60 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 690.99 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of outer steel casing, 3.16 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.53 ft below land-surface datum, Mar. 26, 1993; lowest measured, 32.94 ft below land-surface datum, Dec 8, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	17.70
DEC 05	32.22
FEB 26	22.29
MAY 31	11.98
SEP 04	24.61

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	HARD- NESS TOTAL (MG/L CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	
DEC 05...	1432	35.38	17	1280	7.3	12.0	0.2	690	190	52	
FEB 28...	1429	22.04	34	1430	6.7	12.0	0.3	760	210	57	
AUG 09...	0922	22.31	22	1200	6.7	14.0	0.3	650	180	49	
DATE		SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD HCO3 (00453)	ALKA- LINITY WAT DIS TOT IT FIELD 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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
DEC 05...	20	2.6	493	404	250	41	0.20	14	816	<0.010	
FEB 28...	21	2.6	532	436	320	47	0.30	14	937	<0.010	
AUG 09...	19	2.7	495	406	260	49	0.30	13	820	0.010	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395123083003301. Local number, FR-121A--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	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 ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
DEC 05...	<0.050	0.100	<0.20	<0.010	19	<0.50	<1.0	13	<10	3000
FEB 28...	<0.050	0.120	<0.20	<0.010	21	<0.50	2.0	<3.0	<10	2700
AUG 09...	0.070	0.130	<0.20	0.020	19	1.1	<1.0	<3.0	<10	2600

DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
DEC 05...	<10	11	210	20	230	<6	5.0	1.1	752
FEB 28...	60	9	240	10	290	<6	6.0	1.0	1000
AUG 09...	<10	10	180	<10	210	<6	<3.0	1.2	894

395059083000900. Local number, FR-122A (MW 26)

LOCATION.--Lat 39°50'59", long 83°00'09", Hydrologic Unit 05060002, near Shadeville.

Owner.--Franklin County.

AQUIFER.--Clay, sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 4 in., depth 70ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 730.38 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of 4-inch PVC casing, 2.61 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 40.69 ft below land-surface datum, Sep 4, 1996; lowest measured, 44.99 ft below land-surface datum, Oct 25, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	44.99
FEB 27	43.69
MAY 31	40.97
SEP 04	40.69

395131082592400. Local number, FR-123, (M-9)

LOCATION.--Lat 39°51'31", long 82°59'24", Hydrologic Unit 05060001, near Hamilton Meadows.

Owner.--Franklin County.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 2 in., depth 36.5 ft.

INSTRUMENTATION - Data logger -- 60 minute record.

DATUM.--Elevation of land-surface datum is 710 feet above National Geodetic Vertical Datum of 1929. Measuring point: Floor of shelter, 2.25 ft above land-surface datum.

PERIOD OF RECORD.--Apr. 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 18.55 ft below land-surface datum, May 12, 1992; minimum daily low, 6.87 ft below land-surface datum, April 01, 1980.



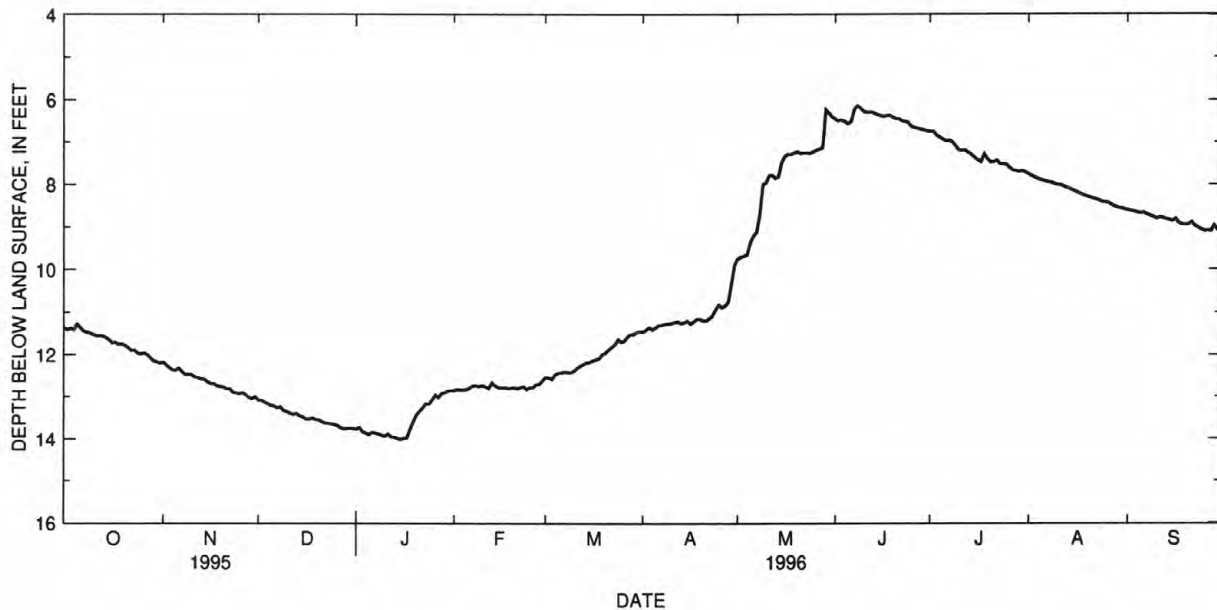
## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

301

395131082592400. Local number, FR-123, (M-9)--Continued

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11.38	12.21	13.09	13.78	12.85	12.62	11.48	9.90	6.46	6.77	7.77	8.60
2	11.41	12.24	13.12	13.78	12.87	12.56	11.47	9.75	6.51	6.76	7.80	8.62
3	11.41	12.31	13.14	13.84	12.85	12.62	11.41	9.71	6.50	6.84	7.84	8.63
4	11.42	12.36	13.18	13.87	12.85	12.59	11.41	9.70	6.52	6.89	7.87	8.66
5	11.41	12.38	13.21	13.90	12.84	12.48	11.43	9.65	6.57	6.94	7.90	8.68
6	11.36	12.38	13.23	13.90	12.83	12.45	11.36	9.37	6.57	6.97	7.92	8.68
7	11.44	12.40	13.27	13.87	12.78	12.43	11.32	9.20	6.52	6.97	7.94	8.70
8	11.47	12.47	13.29	13.91	12.74	12.43	11.30	9.12	6.22	7.00	7.95	8.73
9	11.49	12.49	13.34	13.91	12.77	12.43	11.28	8.72	6.20	7.10	7.99	8.77
10	11.53	12.49	13.36	13.95	12.76	12.43	11.28	8.01	6.28	7.19	8.01	8.80
11	11.56	12.53	13.40	13.94	12.77	12.39	11.27	7.96	6.30	7.21	8.03	8.81
12	11.57	12.56	13.43	13.95	12.80	12.32	11.23	7.80	6.34	7.22	8.05	8.78
13	11.58	12.58	13.44	13.98	12.80	12.27	11.26	7.85	6.31	7.25	8.08	8.82
14	11.60	12.60	13.46	13.99	12.74	12.23	11.31	7.88	6.35	7.30	8.11	8.83
15	11.65	12.65	13.49	14.03	12.78	12.19	11.24	7.82	6.37	7.37	8.14	8.86
16	11.72	12.69	13.54	14.01	12.81	12.19	11.27	7.48	6.40	7.43	8.18	8.86
17	11.74	12.72	13.56	14.01	12.79	12.14	11.28	7.34	6.41	7.48	8.21	8.91
18	11.76	12.74	13.54	13.99	12.82	12.13	11.23	7.31	6.39	7.48	8.25	8.94
19	11.78	12.77	13.55	13.78	12.81	12.09	11.19	7.30	6.41	7.40	8.28	8.94
20	11.79	12.77	13.57	13.61	12.81	11.99	11.20	7.26	6.45	7.48	8.30	8.96
21	11.83	12.81	13.60	13.44	12.80	11.96	11.23	7.27	6.48	7.50	8.32	8.94
22	11.90	12.84	13.63	13.36	12.80	11.88	11.20	7.28	6.50	7.47	8.35	8.98
23	11.93	12.89	13.64	13.27	12.78	11.82	11.15	7.27	6.53	7.52	8.38	9.03
24	11.97	12.92	13.65	13.18	12.82	11.76	11.09	7.29	6.54	7.57	8.41	9.06
25	11.99	12.93	13.67	13.18	12.83	11.71	10.94	7.29	6.63	7.54	8.42	9.10
26	11.98	12.93	13.69	13.08	12.78	11.72	10.89	7.23	6.66	7.62	8.44	9.10
27	12.00	12.95	13.74	13.03	12.80	11.68	10.89	7.20	6.68	7.67	8.48	9.11
28	12.08	13.02	13.77	13.02	12.72	11.59	10.85	7.17	6.70	7.68	8.52	9.10
29	12.15	13.05	13.78	12.92	12.70	11.54	10.77	7.13	6.72	7.70	8.55	9.07
30	12.18	13.06	13.78	12.90	--	11.53	10.36	6.32	6.74	7.72	8.56	9.11
31	12.20	--	13.76	12.88	--	11.47	--	6.41	--	7.72	8.58	--
MAX	12.20	13.06	13.78	14.03	12.87	12.62	11.48	9.90	6.74	7.72	8.58	9.11



395008082593100. Local number, FR-126 (M-13)

LOCATION.--Lat 39°50'08", long 82°59'31", Hydrologic Unit 05060001, near Shadeville.

Owner.--Franklin County.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 2 in., depth 122 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 703 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of PVC casing, 4.2 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.96 ft below land-surface datum, June 17, 1981; lowest measured, 51.42 ft below land-surface datum, Nov. 09, 1977.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	16.54
FEB 27	14.05
MAY 31	9.38
SEP 04	11.85

395126083014000. Local number, FR-131 (M-18).

LOCATION.--Lat 39°51'26", long 83°01'40", Hydrologic Unit 05060001, near Columbus.

Owner.--Franklin County.

AQUIFER.--Clay, sand, and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 2 in., depth 53 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 728 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of plastic coupling, 2.4 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 37.41 ft below land-surface datum, Sept 5, 1996; lowest measured, dry on Dec. 10, 1991; Mar. 16, June 12, July 28, 1992; and Apr. 11, 1995.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	49.74
FEB 28	50.03
JUN 03	43.90
SEP 05	37.41

395218083023900. Local number, FR-133

LOCATION.--Lat 39°52'18", long 83°02'39", Hydrologic Unit 05060001, on White Road near Grove City, Ohio

Owner.--Franklin County.

AQUIFER.--Gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 2 in., depth 82 ft, cased to 78 ft, finish: 4.0 ft of 0.80 in. well screen.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 765 feet above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of casing, 0.0 ft above land-surface datum.

PERIOD OF RECORD.--Apr. 1977 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 49.05 ft below land-surface datum, Apr. 1, 1981; lowest measured, 79.36 ft below land-surface datum, June 22, 1978.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	60.22
FEB 28	59.60
JUN 03	56.97
SEP 05	58.70

395020083014400. Local number, FR-141

LOCATION.--Lat 39°50'20", long 83°01'44", Hydrologic Unit 05060001.

Owner.--John Lako.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled domestic water well, diameter 4.25 in., depth 64 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 720 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.6 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 25.60 ft below land-surface datum, June 3, 1996; lowest measured, 31.72 ft below land-surface datum, Dec. 10, 1991.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	28.54
FEB 28	27.74
JUN 03	25.60
SEP 05	27.77

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

303

395027082592500. Local number, FR-151

LOCATION.--Lat 39°50'27", long 82°59'25", Hydrologic Unit 05060001, near Shadeville.

Owner.--City of Columbus.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, diameter 2 in., depth 60 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 718 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of plastic pipe, 2.50 ft above land-surface datum.

PERIOD OF RECORD.--July 1983 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 23.00 ft below land-surface datum, Mar. 26, 1986; lowest measured, 37.56 ft below land-surface datum, Mar. 16, 1992.

REMARKS.--A "K" associated with bacteriological data indicates non-ideal colony counts.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	32.22
DEC 06	33.60
FEB 27	31.23
SEP 04	25.80

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	HARD- NESS TOTAL (MG/L CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	
DEC 06...	1518	36.10	31	1070	7.1	13.5	0.1	620	170	47	
MAY 31...	0926	24.12	22	1150	6.8	14.0	0.6	670	190	48	
DATE		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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L AS N) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
DEC 06...	9.0	1.9	432	354	240	17	0.20	14	715	<0.010	
MAY 31...	5.2	2.4	598	490	270	16	0.20	13	841	<0.010	
DATE		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. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
DEC 06...	<0.050	0.050	<0.20	<0.010	40	<0.50	<1.0	17	<10	3000	
MAY 31...	<0.050	0.080	<0.20	<0.010	78	<0.50	<1.0	<3.0	<10	1400	
DATE		LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS SR) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	
DEC 06...	20	7	66	<10	300	<6	<3.0	0.80	710		
MAY 31...	<10	6	160	<10	310	<6	4.0	1.0	824		

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395314083021900. Local number, FR-202

LOCATION.--Lat 39°53'14", long 83°02'19", Hydrologic Unit 05060001.

Owner.--Mr. Daniel Himes

AQUIFER.--Devonian limestone

WELL CHARACTERISTICS.--Drilled domestic water well, diameter 4 in., depth 220 ft., cased to 175 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 752 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.17 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 66.17 ft below land-surface datum, June 25, 1979; lowest measured, 96.50 ft below land-surface datum, July 19, 1984.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	94.40
FEB 28	93.47
JUN 03	93.09
SEP 05	88.59

395206083014501. Local number, FR-209

LOCATION.--Lat 39°52'06", long 83°01'45", Hydrologic Unit 05060001.

Owner.--Mr. Martin Davis

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled domestic water well, diameter 4 in.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 704 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.72 ft above land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.51 ft below land-surface datum, May 23, 1984; lowest measured, 18.11 ft below land-surface datum, Mar. 16, 1992.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	15.37
FEB 28	14.12
JUN 03	12.71
SEP 05	14.60

395315083020002. Local number, FR-213

LOCATION.--Lat 39°53'15", long 83°02'00", Hydrologic Unit 05060001.

Owner.--Tom Cannon Co.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled commercial water well, diameter 5 in., depth 97 ft., cased to 97 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 730 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.80 ft above land-surface datum

PERIOD OF RECORD.--June 1982 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 71.38 ft below land-surface datum, June 08, 1982; lowest measured, 84.83 ft below land-surface datum, Mar. 16, 1992.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	81.76
FEB 26	80.58
JUN 03	79.96
SEP 05	79.81

395323083014000. Local number, FR-269

LOCATION.--Lat 39°53'23", long 83°01'40", Hydrologic Unit 05060001.

Owner.--Franklin County Waste to Energy Facility.

AQUIFER.--Devonian limestone.

WELL CHARACTERISTICS.--Drilled commercial water well, depth 90 ft.; 75 ft of 6 in casing.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 705 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.22 ft above land-surface datum.

PERIOD OF RECORD.--Aug. 1988 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 66.84 ft below land-surface datum, June 3 and Sept 5, 1996; lowest measured, 71.79 ft below land-surface datum, Dec. 10, 1990.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	67.87
FEB 26	67.22
JUN 03	66.84
SEP 05	66.84

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

305

395055082592400. Local number, FR-271

LOCATION.--Lat 39°50'55", long 82°59'24", Hydrologic Unit 05060001, at Parsons Avenue Water Plant

Owner.--Franklin County

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 91.8 ft.; 76 ft of 2 in casing.

INSTRUMENTATION - Data logger -- 60 minute record.

DATUM.--Elevation of land-surface datum is 710 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of PVC casing, 2.53 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 25.00 ft below land-surface datum, Apr. 25 - May 2, 1992; minimum daily low, 13.92 ft below land-surface datum, Mar. 18, 1991.

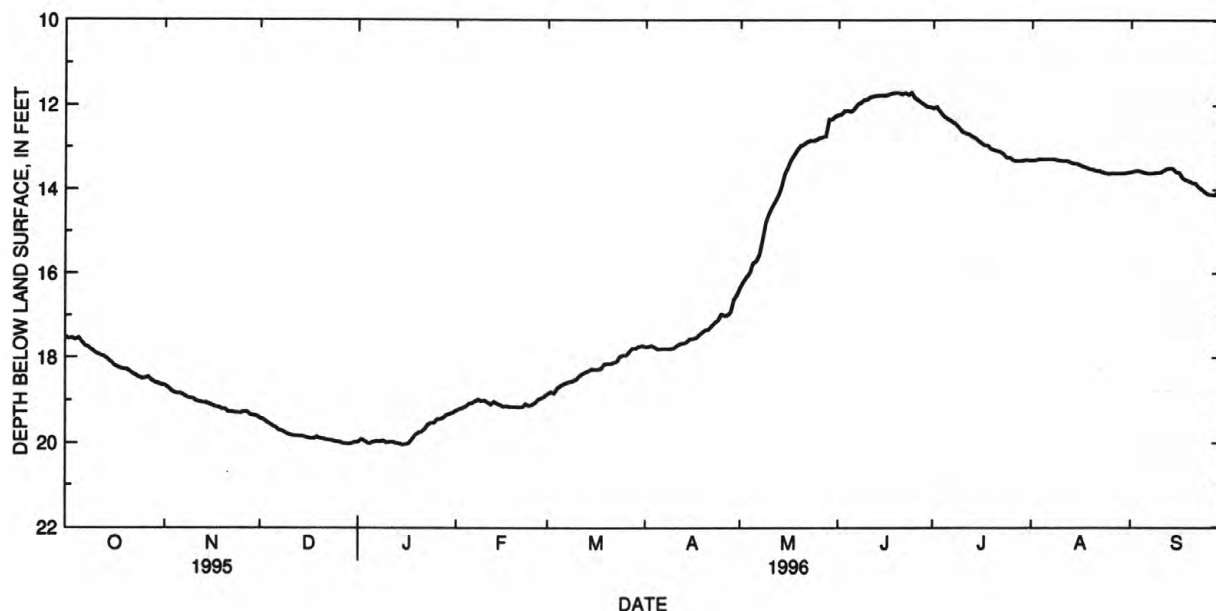
DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17.52	18.66	19.42	19.99	19.30	18.92	17.74	16.50	12.26	12.07	13.30	13.60
2	17.56	18.70	19.45	19.99	19.25	18.85	17.74	16.34	12.23	12.07	13.30	13.58
3	17.55	18.77	19.50	19.95	19.21	18.84	17.74	16.20	12.21	12.14	13.30	13.56
4	17.58	18.82	19.55	20.02	19.19	18.84	17.76	16.09	12.13	12.23	13.28	13.56
5	17.58	18.84	19.60	20.01	19.15	18.73	17.81	15.99	12.16	12.30	13.28	13.60
6	17.63	18.84	19.64	20.01	19.09	18.67	17.81	15.76	12.15	12.34	13.28	13.61
7	17.72	18.87	19.70	19.98	19.07	18.63	17.80	15.71	12.08	12.39	13.28	13.61
8	17.76	18.93	19.72	19.97	19.03	18.60	17.80	15.56	11.98	12.44	13.29	13.61
9	17.82	18.95	19.76	19.97	19.02	18.57	17.80	15.23	11.94	12.53	13.30	13.61
10	17.88	18.96	19.80	20.00	19.03	18.56	17.80	14.80	11.88	12.62	13.31	13.61
11	17.92	19.02	19.83	20.00	19.05	18.52	17.78	14.59	11.86	12.65	13.32	13.60
12	17.96	19.04	19.84	19.99	19.10	18.45	17.72	14.43	11.81	12.68	13.32	13.55
13	17.98	19.05	19.84	20.01	19.10	18.39	17.67	14.30	11.79	12.73	13.35	13.51
14	18.04	19.05	19.84	20.02	19.09	18.35	17.67	14.15	11.78	12.76	13.38	13.50
15	18.10	19.09	19.86	20.05	19.11	18.31	17.64	13.95	11.77	12.83	13.38	13.58
16	18.18	19.12	19.88	20.05	19.15	18.28	17.56	13.64	11.77	12.89	13.41	13.60
17	18.22	19.15	19.90	20.04	19.15	18.28	17.55	13.48	11.77	12.94	13.45	13.72
18	18.25	19.16	19.90	20.02	19.16	18.28	17.54	13.30	11.74	12.97	13.47	13.77
19	18.27	19.20	19.90	19.93	19.16	18.26	17.47	13.18	11.72	13.02	13.51	13.80
20	18.28	19.27	19.90	19.83	19.16	18.15	17.40	13.06	11.71	13.06	13.52	13.84
21	18.32	19.27	19.91	19.77	19.17	18.14	17.35	12.96	11.74	13.08	13.55	13.85
22	18.39	19.28	19.93	19.75	19.17	18.14	17.33	12.93	11.74	13.10	13.55	13.94
23	18.42	19.29	19.94	19.68	19.17	18.12	17.25	12.87	11.75	13.16	13.58	13.99
24	18.47	19.30	19.95	19.58	19.13	18.09	17.17	12.85	11.75	13.24	13.61	14.06
25	18.52	19.30	19.97	19.54	19.13	17.97	17.11	12.84	11.82	13.24	13.62	14.11
26	18.50	19.30	19.98	19.54	19.11	17.95	17.00	12.82	11.88	13.30	13.62	14.12
27	18.49	19.27	20.01	19.45	19.07	17.95	17.00	12.78	11.93	13.32	13.61	14.13
28	18.54	19.34	20.02	19.45	18.99	17.86	16.99	12.75	11.98	13.32	13.61	14.13
29	18.59	19.36	20.03	19.41	18.95	17.78	16.91	12.74	12.03	13.32	13.61	14.06
30	18.61	19.37	20.03	19.35	---	17.78	16.62	12.34	12.04	13.31	13.61	14.08
31	18.64	---	20.02	19.32	---	17.74	---	12.33	---	13.30	13.61	---
MAX	18.64	19.37	20.03	20.05	19.30	18.92	17.81	16.50	12.26	13.32	13.62	14.13



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395055082592400. Local number, FR-271--Continued



## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

		DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	HARD- NESS TOTAL (MG/L CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)
MAY 30...	1111	12.19	29	830	7.1	13.0	0.5	520	140	41
DATE	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
MAY 30...	6.1	1.3	400	328	160	32	0.30	16	597	0.010
DATE	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. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
MAY 30...	<0.050	0.070	<0.20	<0.010	65	<0.50	<1.0	<3.0	<10	3000
DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	
MAY 30...	<10	6	47	<10	160	<6	10	1.0	631	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

307

395055082592401. Local number FR-272

LOCATION.--Lat 39°50'55", long 82°59'24", Hydrologic Unit 05060001.

Owner.--City of Columbus.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 45.95; 2 in. PVC.

INSTRUMENTATION - Data logger -- 60 minute record.

DATUM.--Elevation of land-surface datum is 710 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of outer steel casing, 2.36 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum daily low, 25.45 ft below land-surface datum, Apr. 24, 1992; minimum daily low, 14.53 ft below land-surface datum, Mar. 18, 1991.

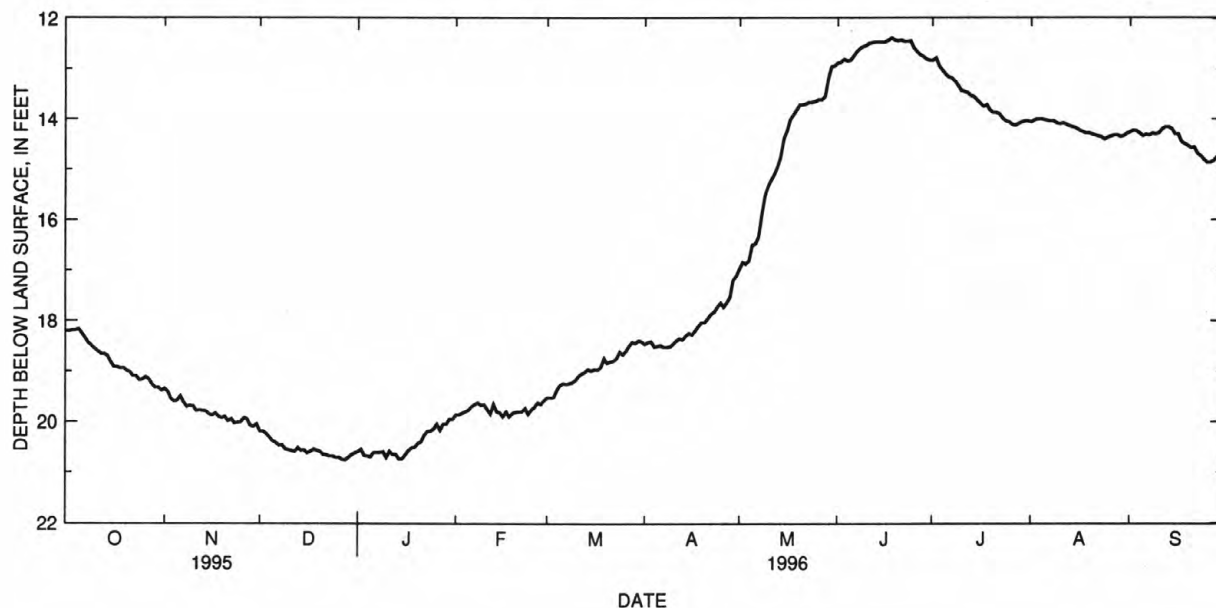
REMARKS.--A "K" associated with bacteriological data indicates non-ideal colony counts.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18.20	19.40	20.19	20.64	19.96	19.60	18.48	17.12	12.96	12.86	14.06	14.29
2	18.22	19.41	20.22	20.60	19.91	19.53	18.49	16.98	12.91	12.84	14.06	14.27
3	18.21	19.55	20.24	20.67	19.87	19.60	18.43	16.93	12.88	12.95	14.02	14.24
4	18.22	19.60	20.31	20.68	19.84	19.53	18.52	16.88	12.86	13.03	14.03	14.29
5	18.19	19.61	20.38	20.70	19.81	19.39	18.56	16.81	12.88	13.11	14.03	14.33
6	18.25	19.61	20.41	20.70	19.78	19.29	18.51	16.57	12.84	13.17	14.04	14.35
7	18.35	19.62	20.47	20.61	19.71	19.29	18.53	16.48	12.75	13.21	14.06	14.33
8	18.44	19.71	20.50	20.66	19.67	19.27	18.54	16.35	12.67	13.25	14.05	14.32
9	18.50	19.74	20.54	20.61	19.69	19.25	18.53	15.92	12.60	13.34	14.08	14.30
10	18.56	19.72	20.56	20.72	19.69	19.24	18.52	15.53	12.59	13.44	14.10	14.31
11	18.61	19.79	20.58	20.71	19.76	19.18	18.47	15.36	12.54	13.46	14.12	14.28
12	18.66	19.82	20.59	20.69	19.85	19.10	18.40	15.22	12.50	13.49	14.11	14.20
13	18.69	19.79	20.59	20.67	19.85	19.06	18.38	15.11	12.50	13.54	14.15	14.16
14	18.70	19.81	20.57	20.74	19.82	19.02	18.40	14.95	12.49	13.57	14.16	14.20
15	18.82	19.86	20.59	20.76	19.84	19.00	18.30	14.75	12.48	13.63	14.18	14.30
16	18.92	19.88	20.62	20.74	19.93	19.02	18.28	14.39	12.49	13.69	14.22	14.30
17	18.94	19.90	20.64	20.70	19.91	18.98	18.28	14.24	12.47	13.75	14.25	14.45
18	18.95	19.90	20.59	20.59	19.92	18.99	18.20	14.04	12.44	13.76	14.28	14.49
19	18.98	19.93	20.57	20.52	19.91	18.93	18.12	13.93	12.43	13.83	14.30	14.53
20	18.99	19.94	20.62	20.51	19.86	18.84	18.04	13.82	12.45	13.87	14.31	14.57
21	19.02	19.99	20.65	20.43	19.88	18.84	18.04	13.75	12.48	13.88	14.32	14.58
22	19.10	20.01	20.67	20.40	19.85	18.82	17.96	13.72	12.46	13.91	14.34	14.68
23	19.14	20.03	20.68	20.30	19.81	18.80	17.87	13.70	12.50	13.99	14.37	14.73
24	19.18	20.05	20.69	20.20	19.86	18.75	17.83	13.70	12.46	14.06	14.40	14.80
25	19.19	20.02	20.71	20.20	19.86	18.68	17.73	13.70	12.59	14.06	14.41	14.86
26	19.18	20.01	20.73	20.15	19.77	18.68	17.73	13.65	12.66	14.11	14.38	14.86
27	19.16	19.95	20.75	20.17	19.72	18.61	17.73	13.63	12.73	14.13	14.34	14.87
28	19.26	20.08	20.76	20.17	19.66	18.51	17.65	13.62	12.76	14.13	14.33	14.83
29	19.33	20.10	20.77	20.05	19.66	18.46	17.54	13.56	12.81	14.09	14.35	14.80
30	19.35	20.12	20.72	20.05	---	18.45	17.20	13.20	12.84	14.07	14.37	14.81
31	19.39	---	20.66	19.98	---	18.42	---	12.98	---	14.08	14.35	---
MAX	19.39	20.12	20.77	20.76	19.96	19.60	18.56	17.12	12.96	14.13	14.41	14.87

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395055082592401. Local number FR-272--Continued



## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH	PUMP	SPE-	PH	TEMPER-	OXYGEN,	HARD-	CALCIUM	MAGNE-
		BELOW	OR FLOW		WATER					
		LAND	PERIOD	CIFIC	WHOLE			TOTAL	DIS-	SIUM,
		SURFACE	PRIOR	CON-	FIELD			(MG/L	SOLVED	DIS-
		(WATER	TO SAM-	DUCT-	(STAND-	ATURE	DIS-	AS	(MG/L	SOLVED
		LEVEL)	PLING	ANCE	ARD	WATER	SOLVED	CACO3)	AS CA)	(MG/L
		(FEET)	(MIN)	(US/CM)	UNITS)	(DEG C)	(MG/L)			AS MG)
		(72019)	(72004)	(00095)	(00400)	(00010)	(00300)	(00900)	(00915)	(00925)
DEC										
06...	1636	22.70	20	1200	7.2	12.5	0.2	640	170	52
MAY										
30...	1003	12.80	18	1230	6.9	13.0	1.3	690	190	53
DATE		SODIUM,	BICAR-	ALKA-	SULFATE	CHLO-	FLUO-	SILICA,	SUM OF	NITRO-
		DIS-	BONATE	LINITY						
		SOLVED	WATER	WAT DIS	DIS-	DIS-	DIS-	SOLVED	TUENTS,	DIS-
		(MG/L	DIS IT	TOT IT	SOLVED	SOLVED	SOLVED	(MG/L	DIS-	SOLVED
		AS NA)	FIELD	FIELD	(MG/L	(MG/L	(MG/L	AS	SOLVED	(MG/L
		(00930)	MG/L AS	MG/L AS	AS SO4)	AS CL)	AS F)	SIO2)	(MG/L)	AS N)
			HCO3	CACO3	(00945)	(00940)	(00950)	(00955)	(70301)	(00613)
DEC										
06...	13	2.4	477	366	190	33	0.20	13	713	<0.010
MAY										
30...	14	2.4	464	380	270	48	0.20	14	824	0.010
DATE		NITRO-	NITRO-	PHOS-	BARIUM,	BERYL-	CADMIUM	COBALT,	COPPER,	IRON,
		GEN,	GEN,	PHORUS						
		NO2+NO3	AMMONIA	MONIA +	ORTHO,	DIS-	DIS-	DIS-	SOLVED	SOLVED
		DIS-	DIS-	ORGANIC	DIS-	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED
		(MG/L	(MG/L	(MG/L	(MG/L	(UG/L	(UG/L	(UG/L	(UG/L	(UG/L
		AS N)	AS N)	AS N)	AS P)	AS BA)	AS BE)	AS CD)	AS CU)	AS FE)
		(00631)	(00608)	(00623)	(00671)	(01005)	(01010)	(01025)	(01035)	(01046)
DEC										
06...	<0.050	0.060	<0.20	<0.010	29	<0.50	<1.0	21	<10	4000
MAY										
30...	<0.050	0.060	<0.20	<0.010	31	<0.50	<1.0	6.0	<10	4000

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

309

395055082592401. Local number FR-272--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
DEC 06...	<10	7	88	<10	150	<6	<3.0	1.0	554
MAY 30...	<10	8	92	10	150	<6	8.0	1.2	882

395224083000500. Local number, FR-273

LOCATION.--Lat 39°52'24", long 83°00'05", Hydrologic Unit 05060001, at County Water-Treatment Plant.

Owner.--Franklin County

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 91.5 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 710 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of casing, 1.15 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.5 ft below land-surface datum, June 27, 1990; lowest measured, 20.78 ft below land-surface datum, Mar. 16, 1992.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	18.17
FEB 27	17.38
SEP 05	17.21

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

		DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	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)	
MAY 30...	1508	13.22	22	593	7.3	15.0	4.9	330	88	26	
DATE	TIME	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD HCO3 (00453)	ALKA- LINEITY WAT DIS TOT IT FIELD 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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L AS N) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
MAY 30...	9.3	1.6	349	286	49	12	0.50	12	372	0.030	
DATE	TIME	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. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
MAY 30...	0.470	0.020	<0.20	<0.010	160	<0.50	<1.0	4.0	<10	<3.0	

DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
MAY 30...	<10	<4	12	<10	160	<6	11	1.5	381

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395224083000501. Local number, FR-274

LOCATION.--Lat 39°52'24", long 83°00'05", Hydrologic Unit 05060001, at County Water-Treatment Plant.

Owner.--Franklin County

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 25 ft.; 4 in. casing.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 705 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of PVC casing, 2.44 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.63 ft below land-surface datum, Mar. 18, 1991; lowest measured, 16.98 ft below land-surface datum, Mar. 16, 1992.

REMARKS.--A "K" associated with bacteriological data indicates non-ideal colony counts.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	14.66
NOV 30	14.40
FEB 27	14.33
MAR 04	13.44
SEP 05	13.76

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)	
NOV 30...	1345	14.40	25	1060	7.0	14.0	0.3	310	82	25	
MAR 04...	1248	13.44	18	1040	7.0	13.5	0.4	300	84	23	
MAY 30...	1317	11.66	32	952	7.3	13.0	0.9	320	88	24	
DATE	TIME	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L) AS N (00613)
NOV 30...	100	2.4	327	268	100	180	0.40	12	664	--	
MAR 04...	100	2.3	310	254	88	130	0.50	11	594	<0.010	
MAY 30...	73	1.9	325	266	78	92	0.40	11	531	0.010	
DATE	TIME	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 ORTHO, DIS- SOLVED (MG/L) AS P (00671)	BARIUM, DIS- SOLVED (UG/L) AS BA (01005)	BERYL- LIUM, DIS- SOLVED (UG/L) AS BE (01010)	CADMIUM DIS- SOLVED (UG/L) AS CD (01025)	COBALT, DIS- SOLVED (UG/L) AS CO (01035)	COPPER, DIS- SOLVED (UG/L) AS CU (01040)	IRON, DIS- SOLVED (UG/L) AS FE (01046)
NOV 30...	--	--	--	--	50	<0.50	<1.0	8.0	<10	1400	
MAR 04...	0.430	0.110	<0.20	<0.010	48	<0.50	<1.0	<3.0	<10	810	
MAY 30...	0.450	0.100	<0.20	<0.010	46	<0.50	<1.0	<3.0	<10	780	
DATE	TIME	LEAD, DIS- SOLVED (UG/L) AS PB (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L) AS SR (01080)	VANA- DIUM, DIS- SOLVED (UG/L) AS V (01085)	ZINC, DIS- SOLVED (UG/L) AS ZN (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L) AS C (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	
NOV 30...	<10	7	35	20	160	<6	<3.0	2.1	696		
MAR 04...	<10	<4	37	20	140	<6	<3.0	1.8	622		
MAY 30...	<10	8	40	10	140	<6	<3.0	1.8	557		



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

311

394941083004400. Local number, FR-275

LOCATION.--Lat 39°49'41", long 83°00'44", Hydrologic Unit 05060001, near Shadeville.

Owner.--Franklin County

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 25 ft.; 2 in. casing.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 680 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of steel protective casing, 5.00 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.44 ft below land-surface datum, Mar. 26, 1993; lowest measured, 13.12 ft below land-surface datum, Apr. 18, 1991.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	11.40
FEB 26	flooded
MAY 31	4.99
SEP 04	11.95

395239083021400. Local number, FR-276

LOCATION.--Lat 39°52'39", long 83°02'14", Hydrologic Unit 05060001

Owner.--Stanley and Betty Wray.

AQUIFER.--Devonian limestone

WELL CHARACTERISTICS.--Drilled domestic water well, depth 155 ft.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel. 1.25 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 71.46 ft below land-surface datum, Mar. 18, 1991; lowest measured, 76.05 ft below land-surface datum, Mar. 16, 1992.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 23	73.49
FEB 26	72.67
JUN 05	74.96
SEP 05	71.86

394930083013100. Local number, FR-277

LOCATION.--Lat 39°49'30", long 83°01'31", Hydrologic unit 05060001

Owner.--Mr. and Mrs. Steve Doersam

AQUIFER.--Sand and gravel of Quaternary Age

WELL CHARACTERISTICS.--Drilled domestic water well, depth 52 ft.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 713 ft. above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.5 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.-- Highest water level measured, 14.79 ft below land-surface datum, Feb 26, 1993; lowest measured, 21.33 ft below land-surface datum, Dec. 10, 1991.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	18.40
FEB 26	15.78
JUN 03	14.79
SEP 05	16.44

395115083022600. Local number, FR-278

LOCATION.--Lat 39°51'15", long 83°02'26", Hydrologic Unit 05060001

Owner.--Mr. Mark Boster

AQUIFER.--Quaternary sand and gravel-primary; Devonian limestone-secondary

WELL CHARACTERISTICS.--Drilled domestic water well, diameter 5 in, depth 114 ft, 10 ft screen.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 735 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.95 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.07 ft below land-surface datum, Dec. 15, 1993; lowest measured, 35.11 ft below land-surface datum, Dec. 10, 1991.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
JUN 03	33.35
SEP 05	34.84

394932083022700. Local number, FR-279

LOCATION.--Lat 39°49'32", long 83°02'27", Hydrologic unit 05060001

Owner.--Mr. Gerald Boggs

AQUIFER.--Devonian limestone

WELL CHARACTERISTICS.--Drilled domestic water well, diameter 5 in, depth 145 ft, cased to 102 ft.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 735 ft. above National Geodetic Vertical datum of 1929. Measuring point:

Top of casing, 1.35 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.85 ft below land-surface datum, Mar. 18, 1991; lowest measured, 31.54 ft below land-surface datum, Apr. 11, 1994.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	13.57
FEB 28	10.88
JUN 05	17.94
SEP 05	20.21

395000082581700. Local number, FR-281

LOCATION.--Lat 39°50'00", long 82°58'17", Hydrologic Unit 05060001.

Owner.--Hamilton Township Trustees.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled domestic water-supply well, depth 83 ft., 4 in. steel.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 731 feet above National Geodetic Vertical Datum of 1929. Measuring point:  
top of casing, 1.40 ft above land-surface datum.

PERIOD OF RECORD.--December 1991 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 35.21 ft below land-surface datum, May 31, 1996;  
lowest measured, 42.42 ft below land-surface datum, March 16, 1992.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	39.43
FEB 27	37.79
MAY 31	35.21
SEP 04	36.27

394921083004700. Local number, FR-282

LOCATION.--Lat 39°49'21", long 83°00'47", Hydrologic Unit 05060001.

Owner.--City of Columbus.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, depth 56 ft., 2 in. PVC.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 673 feet above National Geodetic Vertical Datum of 1929. Measuring point:  
top of casing, 3.00 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.75 ft below land-surface datum, March 26, 1993; lowest measured, 10.90 ft below land-surface datum, Sept. 13, 1993.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	10.07
FEB 28	flooded
MAY 31	3.84
SEP 05	10.71

395131083003801. Local number FR-301

LOCATION.--Lat 39°51'31", long 83°00'38", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 8 in. diameter, 74 feet deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 684 feet above National Geodetic Vertical Datum of 1929. Measuring point:  
Top of casing, 1.95 ft above land-surface datum

PERIOD OF RECORD.--Dec.15, 1993 to current year.

EXTREMES FOR PERIOD OF RECORD.--highest water level measured, 4.36 ft below land-surface datum, May 31, 1993; lowest measured, 28.57 ft below land-surface datum, Dec. 12, 1994.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	23.84
FEB 25	16.48
MAY 31	4.36
AUG 07	14.99
SEP 04	17.48

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

313

395131083003801. Local number FR-301--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

		DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)
DEC 01...	1630	27.62	75	1210	7.0	13.0	0.1	640	170	52	7.4
AUG 07...	1351	14.99	121	1120	7.0	13.5	0.4	600	160	49	7.6
DATE	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)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	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)
DEC 01...	1.3	478	392	340	24	0.30	15	850	--	--	--
AUG 07...	1.4	375	307	310	25	0.30	14	757	0.010	0.050	0.170
DATE	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
DEC 01...	--	--	46	<0.50	<1.0	18	<10	3900	<10	7	66
AUG 07...	<0.20	0.010	36	1.1	<1.0	<3.0	<10	3800	<10	7	73
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
DEC 01...	20	740	<6	3.0	1.4	--	--	--	--	--	--
AUG 07...	10	680	<6	<3.0	1.2	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004
DATE	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P, P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
DEC 01...	--	--	--	--	--	--	--	--	--	--	--
AUG 07...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395131083003801. Local number FR-301--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U (UG/L) (82667)
DEC 01...	--	--	854	--	--	--	--	--	--	--	--
AUG 07...	<0.002	<0.002	824	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006
	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
DEC 01...	--	--	--	--	--	--	--	--	--	--	
AUG 07...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	
	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	
DEC 01...	--	--	--	--	--	--	--	--	--	--	
AUG 07...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	

395140083003901. Local number FR-302

LOCATION---Lat 39°51'40", long 83°00'39", Hydrologic Unit 05060001

Owner---City of Columbus

AQUIFER---Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS---Drilled observation water well, 8 in. diameter, 56 feet deep.

INSTRUMENTATION---Periodic measurement with steel or electric tape by USGS personnel.

DATUM---Elevation of land-surface datum is 684 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of casing, 1.40 ft above land-surface datum

PERIOD OF RECORD---Dec.15, 1993 to current year.

EXTREMES FOR PERIOD OF RECORD---highest water level measured, 4.92 ft below land-surface datum, May 31, 1996; lowest measured, 27.45 ft below land-surface datum, Dec. 05, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	23.94
DEC 05	27.45
FEB 26	14.78
MAY 31	4.92
SEP 04	17.58

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	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)	HARD- NESS TOTAL (MG/L 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)
DEC 05...	1320	26.85	1210	7.4	14.5	0.1	620	170	47	9.4	1.7	340

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

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395140083003901. Local number FR-302--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

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, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	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 DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)
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DEC 05...	22	0.30	13	784	<0.010	<0.050	0.220	0.30	<0.010	32	<0.50	<1.0
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DATE	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
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DEC 05...	20	<10	3400	10	6	85	10	1300	<6	<3.0	850
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395150083004001. Local number FR-303

LOCATION.--Lat 39°51'50", long 83°00'40", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 8 in. diameter, 57 feet deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 691 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of casing, 1.75 ft above land-surface datum

PERIOD OF RECORD.--Dec.15, 1993 to current year.

EXTREMES FOR PERIOD OF RECORD.--highest water level measured, 11.32 ft below land-surface datum, May 31, 1996; lowest measured, 31.85 ft below land-surface datum, Dec. 15, 1994.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	25.37
FEB 26	19.77
MAY 31	11.32
AUG 04	20.97
SEP 08	22.95

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)
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AUG 08...	0948	20.97	75	1350	7.0	13.5	0.3	740	200	57
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DATE	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
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AUG 08...	8.4	1.6	386	316	480	24	0.20	14	984	0.010
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## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395150083004001. Local number FR-303--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	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. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
AUG 08...	0.060	0.250	0.20	0.010	32	1.6	<1.0	<10	6300
DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
AUG 08...	20	5	130	10	1400	<6	<3.0	1.2	1080

395157083004101. Local number FR-304

LOCATION.--Lat 39°51'57", long 83°00'41", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 8 in. diameter, 43 feet deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 689 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of casing, 2.00 ft above land-surface datum

PERIOD OF RECORD.--Dec.15, 1993 to current year.

EXTREMES FOR PERIOD OF RECORD.--highest water level measured, 11.03 ft below land-surface datum, May 31, 1996; lowest measured, 27.96 ft below land-surface datum, Dec. 14, 1994.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	22.25
DEC 06	25.32
FEB 26	18.26
MAY 31	11.03
AUG 08	21.50
SEP 04	21.50

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)
DEC 06...	1122	27.32	92	1580	7.0	15.0	0.5	1000	310	66	13
JUN 03...	1049	11.38	89	1070	7.0	14.0	0.1	620	180	40	11
AUG 08...	1144	21.50	44	945	7.1	12.5	0.2	480	140	32	15
DATE	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	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)
DEC 06...	4.1	344	282	700	27	<0.10	13	1310	<0.010	<0.050	0.120
JUN 03...	2.9	381	312	300	32	0.20	11	768	0.010	0.230	0.060
AUG 08...	0.60	242	198	290	34	0.20	7.7	641	0.010	0.050	0.070

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

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395157083004101. Local number FR-304--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHOS DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
DEC 06...	<0.20	<0.010	25	<0.50	<1.0	17	<10	4100	<10	9	450
JUN 03...	<0.20	<0.010	27	0.70	<1.0	<3.0	<10	1200	<10	7	300
AUG 08...	<0.20	<0.010	24	<0.50	<1.0	6.0	<10	1300	<10	7	300
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
DEC 06...	<10	1300	<6	<3.0	1.2	--	--	--	--	--	--
JUN 03...	<10	1000	<6	<3.0	1.2	--	--	--	--	--	--
AUG 08...	20	790	<6	9.0	1.2	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004
DATE	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P, P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
DEC 06...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 08...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001
DATE	ALA- CHLOR, WATER, DISS, REC (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT GF, REC (UG/L) (82663)	PHORATE WATER FLTRD GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT GF, REC (UG/L) (82667)
DEC 06...	--	--	1410	--	--	--	--	--	--	--	--
JUN 03...	--	--	832	--	--	--	--	--	--	--	--
AUG 08...	<0.002	<0.002	685	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006
DATE	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
DEC 06...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 08...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.015	<0.013	<0.003	<0.017	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395157083004101. Local number FR-304--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	TRIAL- LATE WATER FLTRD 0.7 U	PRO- PANIL WATER FLTRD 0.7 U	CAR- BARYL WATER FLTRD 0.7 U	THIO- BENCARB WATER FLTRD 0.7 U	DCPA WATER FLTRD 0.7 U	PENDI- METH- ALIN WAT FLT 0.7 U	NAPROP- AMIDE WATER FLTRD 0.7 U	PRO- PARGITE WATER FLTRD 0.7 U	METHYL AZIN- PHOS WAT FLT 0.7 U	PER- METHRIN CIS WAT FLT 0.7 U
DATE	GF, REC (UG/L) (82678)	GF, REC (UG/L) (82679)	GF, REC (UG/L) (82680)	GF, REC (UG/L) (82681)	GF, REC (UG/L) (82682)	GF, REC (UG/L) (82683)	GF, REC (UG/L) (82684)	GF, REC (UG/L) (82685)	GF, REC (UG/L) (82686)	GF, REC (UG/L) (82687)
DEC 06...	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--
AUG 08...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005

395158083005401. Local number FR-305

LOCATION.--Lat 39°51'58", long 83°00'54", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 8 in. diameter, 78.50 feet deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 688 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of casing, 1.70 ft above land-surface datum

PERIOD OF RECORD.--Dec.15, 1993 to current year.

EXTREMES FOR PERIOD OF RECORD.--highest water level measured, 10.00 ft below land-surface datum, May 31, 1996; lowest measured, 47.75 ft below land-surface datum, Sept. 30, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	56.08
FEB 26	18.06
MAY 31	10.00
SEP 04	21.13

395048083004500. Local number FR-310

LOCATION.--Lat 39°50'48", long 83°00'45", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 2-in. diameter PVC, 61 feet deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 683.36 feet above National Geodetic Vertical Datum of 1929. Measuring point: top of outer steel protective casing, 4.25 ft above land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--highest water level measured, 8.21 ft below land-surface datum, May. 31, 1996; lowest measured, 23.66 ft below land-surface datum, Sep. 13, 1993.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	17.97
FEB 26	20.46
MAY 31	8.21
SEP 04	20.67

395044083010500. Local number FR-311

LOCATION.--Lat 39°50'44", long 83°01'05", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 2-in. diameter PVC, 42 feet deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 683.01 feet above National Geodetic Vertical Datum of 1929. Measuring point: top of outer steel protective casing, 4.10 ft above land-surface datum

PERIOD OF RECORD.--March 1993 to current year

EXTREMES FOR PERIOD OF RECORD.--highest water level measured, 5.86 ft below land-surface datum, May. 31, 1996; lowest measured, 16.13 ft below land-surface datum, Sep. 13, 1993.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	16.00
FEB 26	14.63
MAY 31	5.86
SEP 04	14.94

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

319

395151082591700. Local number FR-312

LOCATION.--Lat 39°51'51", long 83°59'17", Hydrologic Unit 05060001

Owner.--Walter Kuhnwein

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 54.5 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 725.57 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 0.20 ft below land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--highest water level measured, 23.56 ft below land-surface datum, May. 31, 1996; lowest measured, 30.55 ft below land-surface datum, Dec.7, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	29.33
DEC 07	30.55
FEB 27	28.85
MAY 31	23.56
AUG 15	25.47
SEP 04	26.18

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	HARD- NESS TOTAL (MG/L 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)	
DEC 07...	1344	30.35	29	751	7.0	12.5	0.1	380	98	32	2.8	
MAR 04...	1448	29.60	28	733	7.0	13.0	0.2	420	110	34	3.0	
JUN 03...	1557	23.33	28	747	7.1	13.5	0.1	390	100	33	3.1	
AUG 15...	1335	25.27	30	711	7.1	13.5	0.1	380	100	32	2.8	
DATE		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)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L AS (70301)	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)
DEC 07...	1.3	329	270	71	33	0.30	13	415	<0.010	<0.050	0.020	
MAR 04...	1.3	381	312	62	32	0.30	14	446	0.020	<0.050	0.040	
JUN 03...	1.3	359	294	70	31	0.30	14	430	<0.010	0.060	0.040	
AUG 15...	1.3	376	308	76	28	0.30	13	440	<0.010	<0.050	0.050	
DATE		NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
DEC 07...	<0.20	<0.010	110	<0.50	<1.0	6.0	<10	1700	<10	5	76	
MAR 04...	<0.20	<0.010	130	<0.50	<1.0	<3.0	<10	1800	30	5	75	
JUN 03...	<0.20	<0.010	130	<0.50	<1.0	<3.0	<10	38	<10	6	68	
AUG 15...	<0.20	<0.010	120	<0.50	<1.0	<3.0	<10	1500	20	5	76	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395151082591700. Local number FR-312--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
DEC 07...	<10	150	<6	<3.0	0.50	--	--	--	--	--	--
MAR 04...	20	160	<6	<3.0	0.50	--	--	--	--	--	--
JUN 03...	10	160	<6	<3.0	0.60	--	--	--	--	--	--
AUG 15...	<10	150	<6	<3.0	0.60	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004
DATE	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
DEC 07...	--	--	--	--	--	--	--	--	--	--	--
MAR 04...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001
DATE	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
DEC 07...	--	--	455	--	--	--	--	--	--	--	--
MAR 04...	--	--	458	--	--	--	--	--	--	--	--
JUN 03...	--	--	475	--	--	--	--	--	--	--	--
AUG 15...	<0.002	<0.002	444	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006
DATE	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
DEC 07...	--	--	--	--	--	--	--	--	--	--	--
MAR 04...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

321

395151082591700. Local number FR-312--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)
DEC 07...	--	--	--	--	--	--	--	--	--	--
MAR 04...	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005

394948082583400. Local number FR-313

LOCATION.--Lat 39°49'48", long 83°58'34", Hydrologic Unit 05060001

Owner.--Jeanne Badders

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 79 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 744.53 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 0.18 ft below land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--highest water level measured, 51.58 ft below land-surface datum, May. 31, 1996; lowest measured, 57.48 ft below land-surface datum, Dec. 7, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	56.97
DEC 07	57.48
FEB 27	54.92
MAR 19	53.92
MAY 31	51.58
AUG 15	53.42
SEP 04	53.90

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH	PUMP		PH						
		BELOW	OR FLOW	SPE-	WATER						
		LAND	PERIOD	CIFIC	WHOLE						
		SURFACE	PRIOR	CON-	FIELD	TEMPER-	OXYGEN,	HARD-	CALCIUM	MAGNE-	SODIUM,
		(WATER	TO SAM-	DUCT-	(STAND-	ATURE	DIS-	NESS	DIS-	SIUM,	DIS-
		LEVEL)	PLING	ANCE	ARD	WATER	SOLVED	TOTAL	SOLVED	DIS-	SOLVED
		(FEET)	(MIN)	(US/CM)	UNITS)	(DEG C)	(MG/L)	(MG/L	AS	(MG/L	(MG/L
		(72019)	(72004)	(00095)	(00400)	(00010)	(00300)	AS	CA)	AS	AS NA)
								CACO3)	(00915)	(00925)	(00930)
DEC											
07...	1542	57.50	27	795	7.1	13.5	0.2	320	92	23	31
MAR											
19...	1323	53.93	56	728	7.2	13.5	--	340	100	23	34
JUN											
07...	1008	51.45	33	731	7.3	13.5	0.1	300	88	20	32
AUG											
15...	1150	53.24	35	718	7.2	14.0	0.1	290	85	20	31
DATE		POTAS-	BICAR-	ALKA-		CHLO-	FLUO-	SILICA,	SOLIDS,	NITRO-	NITRO-
		SIUM,	BONATE	LINITY		RIDE,	RIDE,	DIS-	SUM OF	GEN,	GEN,
		DIS-	WATER	WAT DIS	SULFATE	RIDE,	RIDE,	SOLVED	CONSTI-	NITRITE	NO2+NO3
		SOLVED	DIS IT	TOT IT	DIS-	DIS-	DIS-	TUENTS,	DIS-	DIS-	DIS-
		(MG/L	FIELD	FIELD	SOLVED	SOLVED	SOLVED	(MG/L	DIS-	SOLVED	SOLVED
		AS K)	MG/L AS	MG/L AS	(MG/L	(MG/L	(MG/L	AS	SOLVED	(MG/L	(MG/L
		(00935)	HCO3	CACO3	AS SO4)	AS CL)	AS F)	SIO2)	(MG/L)	AS N)	AS N)
			(00453)	(39086)	(00945)	(00940)	(00950)	(00955)	(70301)	(00613)	(00631)
DEC											
07...	2.3	--	--	85	70	0.20	10	455	<0.010	<0.050	0.090
MAR											
19...	2.4	288	236	94	62	0.20	10	470	0.010	<0.050	0.090
JUN											
07...	2.2	239	196	73	77	0.30	9.9	422	<0.010	<0.050	0.120
AUG											
15...	2.4	273	224	79	65	0.20	9.2	428	<0.010	<0.050	0.120

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

394948082583400. Local number FR-313--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
DEC 07...	<0.20	<0.010	57	<0.50	<1.0	12	<10	2100	10	5	89
MAR 19...	0.20	<0.010	63	<0.50	1.0	25	<10	2200	<10	<4	96
JUN 07...	0.20	<0.010	54	<0.50	<1.0	5.0	<10	1500	<10	<4	94
AUG 15...	<0.20	<0.010	56	<0.50	<1.0	<3.0	<10	1800	<10	4	81
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
DEC 07...	10	160	<6	<3.0	1.6	--	--	--	--	--	--
MAR 19...	10	180	<6	<3.0	1.8	--	--	--	--	--	--
JUN 07...	<10	150	<6	<3.0	1.8	--	--	--	--	--	--
AUG 15...	10	170	<6	<3.0	1.8	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004
DATE	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
DEC 07...	--	--	--	--	--	--	--	--	--	--	--
MAR 19...	--	--	--	--	--	--	--	--	--	--	--
JUN 07...	--	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001
DATE	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
DEC 07...	--	--	472	--	--	--	--	--	--	--	--
MAR 19...	--	--	480	--	--	--	--	--	--	--	--
JUN 07...	--	--	435	--	--	--	--	--	--	--	--
AUG 15...	<0.002	<0.002	478	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

323

394948082583400. Local number FR-313--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	EPTC WATER FLTRD 0.7 U	PEB- ULATE WATER FLTRD 0.7 U	TEBU- THIURON WATER FLTRD 0.7 U	MOL- INATE WATER FLTRD 0.7 U	ETHO- PROP WATER FLTRD 0.7 U	BEN- FLUR- ALIN WAT FLD 0.7 U	CARBO- FURAN WATER FLTRD 0.7 U	TER- BUFOS WATER FLTRD 0.7 U	PRON- AMIDE WATER FLTRD 0.7 U	DISUL- FOTON WATER FLTRD 0.7 U
DATE	GF, REC (UG/L) (82668)	GF, REC (UG/L) (82669)	GF, REC (UG/L) (82670)	GF, REC (UG/L) (82671)	GF, REC (UG/L) (82672)	GF, REC (UG/L) (82673)	GF, REC (UG/L) (82674)	GF, REC (UG/L) (82675)	GF, REC (UG/L) (82676)	GF, REC (UG/L) (82677)
DEC 07...	--	--	--	--	--	--	--	--	--	--
MAR 19...	--	--	--	--	--	--	--	--	--	--
JUN 07...	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017
	TRIAL- LATE WATER FLTRD 0.7 U	PRO- PANIL WATER FLTRD 0.7 U	CAR- BARYL WATER FLTRD 0.7 U	THIO- BENCARB WATER FLTRD 0.7 U	DCPA WATER FLTRD 0.7 U	PENDI- METH- ALIN WAT FLT 0.7 U	NAPROP- AMIDE WATER FLTRD 0.7 U	PRO- PARGITE WATER FLTRD 0.7 U	METHYL AZIN- PHOS WAT FLT 0.7 U	PER- METHRIN CIS WAT FLT 0.7 U
DATE	GF, REC (UG/L) (82678)	GF, REC (UG/L) (82679)	GF, REC (UG/L) (82680)	GF, REC (UG/L) (82681)	GF, REC (UG/L) (82682)	GF, REC (UG/L) (82683)	GF, REC (UG/L) (82684)	GF, REC (UG/L) (82685)	GF, REC (UG/L) (82686)	GF, REC (UG/L) (82687)
DEC 07...	--	--	--	--	--	--	--	--	--	--
MAR 19...	--	--	--	--	--	--	--	--	--	--
JUN 07...	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005

395241082584500. Local number FR-314 (MW 32)

LOCATION.--Lat 39°52'41", long 83°58'45", Hydrologic Unit 05060001 Owner.--WTVN

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 72 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 733.40 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 0.17 ft below land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--highest water level measured, 16.97 ft below land-surface datum, May. 31, 1996; lowest measured, 22.49 ft below land-surface datum, Dec. 7, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	21.72
DEC 07	22.49
FEB 27	21.60
FEB 28	21.83
MAY 31	16.97
SEP 04	19.84

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)
DATE	TIME								
DEC 07...	1208	22.32	51	665	7.1	14.0	0.1	350	91
FEB 28...	1654	21.54	39	680	7.2	13.5	0.1	350	94
JUN 04...	1339	17.03	62	655	7.3	14.0	0.2	330	85

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395241082584500. Local number FR-314 (MW 32)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
DEC 07...	9.2	2.5	377	276	54	11	0.30	16	402	<0.010
FEB 28...	7.6	2.2	369	302	52	12	0.30	15	7480	0.170
JUN 04...	5.8	1.9	359	294	56	11	0.20	15	382	<0.010
DATE	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. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
DEC 07...	<0.050	0.020	<0.20	<0.010	450	<0.50	<1.0	12	<10	2000
FEB 28...	1600	0.080	<0.20	<0.010	370	<0.50	<1.0	<3.0	<10	<3.0
JUN 04...	0.050	0.040	0.30	<0.010	320	<0.50	<1.0	<3.0	<10	1700
DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	
DEC 07...	<10	10	360	20	140	<6	<3.0	16	415	
FEB 28...	10	6	270	10	140	<6	<3.0	10	415	
JUN 04...	<10	7	250	10	120	<6	<3.0	5.2	399	

395100083015700. Local number FR-315 (MW 42)

LOCATION.--Lat 39°51'00", long 83°01'57", Hydrologic Unit 05060001

Owner.--SW Conservation Club.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 65 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 729.14 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 0.22 ft below land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.63 ft below land-surface datum, Jun 3, 1996; lowest measured, 28.16 ft below land-surface datum, Dec.7, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	27.60
DEC 07	28.16
FEB 28	26.50
MAR 19	25.03
JUN 03	18.63
AUG 15	23.92
SEP 05	24.34

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

325

395100083015700. Local number FR-315 (MW 42)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

		DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)
DEC 07...	1708	28.14	33	662	7.2	12.5	0.1	340	86	30	2.9
MAR 19...	1122	25.01	82	605	7.2	13.0	--	370	98	31	2.8
JUN 06...	1318	19.12	33	651	7.2	13.0	0.3	--	--	--	--
AUG 15...	0950	23.70	50	626	7.2	13.5	0.2	330	83	29	2.8
DATE	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	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)
	DEC 07...	1.2	--	--	71	18	0.30	12	374	<0.010	<0.050
MAR 19...	1.1	325	266	74	19	0.30	13	402	0.010	<0.050	0.020
JUN 06...	--	327	268	--	--	--	--	--	<0.010	<0.050	0.040
AUG 15...	1.2	359	294	70	14	0.30	12	392	<0.010	<0.050	0.040
DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
	DEC 07...	<0.20	<0.010	210	<0.50	1.0	13	<10	2100	20	5
MAR 19...	<0.20	<0.010	230	<0.50	<1.0	32	<10	2300	20	<4	78
JUN 06...	<0.20	<0.010	--	--	--	--	--	--	--	--	--
AUG 15...	<0.20	<0.010	210	<0.50	2.0	<3.0	<10	2200	<10	<4	79
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
	DEC 07...	10	230	<6	<3.0	0.60	--	--	--	--	--
MAR 19...	20	240	<6	3.0	0.70	--	--	--	--	--	--
JUN 06...	--	--	--	--	0.60	--	--	--	--	--	--
AUG 15...	20	220	<6	<3.0	0.70	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395100083015700. Local number FR-315 (MW 42)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
DEC 07...	--	--	--	--	--	--	--	--	--	--	--
MAR 19...	--	--	--	--	--	--	--	--	--	--	--
JUN 06...	--	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	E0.002	<0.001
DATE	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
DEC 07...	--	--	403	--	--	--	--	--	--	--	--
MAR 19...	--	--	414	--	--	--	--	--	--	--	--
JUN 06...	--	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.002	<0.002	450	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006
DATE	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
DEC 07...	--	--	--	--	--	--	--	--	--	--	--
MAR 19...	--	--	--	--	--	--	--	--	--	--	--
JUN 06...	--	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	
DATE	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	
DEC 07...	--	--	--	--	--	--	--	--	--	--	--
MAR 19...	--	--	--	--	--	--	--	--	--	--	--
JUN 06...	--	--	--	--	--	--	--	--	--	--	--
AUG 15...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

327

395035083014700. Local number FR-316 (MW 44A)

LOCATION.--Lat 39°50'35", long 83°01'47", Hydrologic Unit 05060001

Owner.--SW Conservation Club.

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 62 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 725.72 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.61 ft above land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.31 ft below land-surface datum, Jun 3, 1996; lowest measured, 37.54 ft below land-surface datum, Dec.8, 1995 and Mar 18, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	37.21
DEC 08	37.54
FEB 28	35.92
MAR 18	37.54
JUN 03	34.31
SEP 05	36.11

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (FEET) (72019)	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)	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)	
DEC 08...	1030	40.15	827	7.3	12.5	0.3	420	97	43	39	
MAR 18...	1338	35.74	845	7.2	14.0	--	380	92	37	38	
JUN 07...	1121	33.99	886	7.1	13.5	1.6	--	--	--	--	
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD MG/L AS (00453)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS (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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)
DEC 08...	3.7	351	288	76	54	0.40	13		500	0.010	<0.050
MAR 18...	3.2	386	316	72	50	0.50	13		497	0.010	<0.050
JUN 07...	--	344	282	--	--	--	--	--	--	<0.010	0.120
DATE		NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	
DEC 08...	0.050	<0.20	<0.010	95	<0.50	<1.0	4.0	<10		110	
MAR 18...	0.060	<0.20	<0.010	110	<0.50	<1.0	11	<10		950	
JUN 07...	0.090	<0.20	<0.010	--	--	--	--	--	--	--	
DATE		LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	
DEC 08...	<10		11	100	20	520	<6	<3.0	1.0	492	
MAR 18...	20		6	110	10	560	<6	4.0	1.5	503	
JUN 07...	--	--	--	--	--	--	--	--	1.0	--	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395153083014000. Local number FR-317 (MW 43)

LOCATION.--Lat 39°51'53", long 83°01'40", Hydrologic Unit 05060001

Owner.--Heimat Haus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 40 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 689.64 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 0.24 ft below land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.44 ft below land-surface datum, Feb 28, 1996; lowest measured, 6.04 ft below land-surface datum, Oct. 25, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	6.04
FEB 28	2.44
JUN 03	3.94
SEP 05	5.81

395042082585900. Local number FR-318 (MW 13)

LOCATION.--Lat 39°50'42", long 82°58'59", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 85 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 738.68 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 3.11 ft above land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 46.24 ft below land-surface datum, May 31, 1996; lowest measured, 55.19 ft below land-surface datum, Dec 6, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	53.05
DEC 06	55.19
FEB 27	52.42
MAY 31	46.24
SEP 04	47.19

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	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)	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)
DEC 06...	1333	58.30	821	7.4	14.5	0.1	410	110	34	13	2.1	140
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, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	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 ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)
DEC 06...	43	0.30	13	503	<0.010	<0.050	0.040	<0.20	<0.010	50	<0.50	<1.0
DATE	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
DEC 06...	14	<10	2000	20	6	150	<10	140	<6	<3.0	0.90	521

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

329

395205083001500. Local number FR-319 (MW 45)

LOCATION.--Lat 39°52'05", long 83°00'15", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 55 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 721.80 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.22 ft above land-surface datum

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.75 ft below land-surface datum, Jun 3, 1996; lowest measured, 35.76 ft below land-surface datum, Nov 29, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	34.64
NOV 29	35.76
FEB 29	35.31
JUN 03	29.75
AUG 09	31.48
SEP 04	33.26

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)	
NOV											
29...	1235	35.55	24	1230	6.6	12.5	0.1	560	150	44	
FEB											
29...	1119	32.83	25	1270	6.8	12.0	0.1	560	150	44	
MAY											
29...	1013	29.60	31	1230	6.9	13.0	0.7	550	150	43	
AUG											
09...	1247	31.40	27	1170	6.9	13.5	0.3	500	130	42	
DATE		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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
NOV											
29...	36	1.8	361	296	110	150	0.20	14	687	--	
FEB											
29...	42	1.9	410	336	110	150	0.40	15	718	<0.010	
MAY											
29...	44	1.8	408	334	110	150	0.30	15	718	0.020	
AUG											
09...	45	1.9	425	348	110	150	0.30	14	706	0.010	
DATE		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 P) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM, DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
NOV											
29...	--	--	--	--	43	<0.50	<1.0	14	<10	2800	
FEB											
29...	<0.050	0.050	<0.20	<0.010	46	<0.50	<1.0	<3.0	<10	3100	
MAY											
29...	<0.050	0.060	<0.20	<0.010	46	<0.50	<1.0	3.0	<10	2800	
AUG											
09...	0.050	0.060	<0.20	0.010	45	1.2	<1.0	<3.0	<10	2800	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395205083001500. Local number FR-319 (MW 45)--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
NOV 29...	10	8	89	20	120	<6	4.0	0.90	650
FEB 29...	60	<4	90	20	150	<6	<3.0	0.80	750
MAY 29...	<10	8	80	10	120	<6	4.0	1.0	758
AUG 09...	<10	7	75	10	120	<6	<3.0	1.0	728

394954083002801. Local number FR-320 (MW 34)

LOCATION.--Lat 39°49'54", long 83°00'28", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 70 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 690.64 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.97 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.25 ft below land-surface datum, May 31, 1996; lowest measured, 20.83 ft below land-surface datum, Oct 25, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	20.83
FEB 28	18.18
MAR 04	16.56
MAY 31	12.25
AUG 12	18.41
SEP 04	20.30

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH	PUMP		PH			HARD-		MAGNE-	
		BELOW	OR FLOW	SPE-	WATER			NESS	CALCIUM	SIUM,	SODIUM,
		LAND	PERIOD	CIFIC	WHOLE				DIS-	DIS-	DIS-
		SURFACE	PRIOR	CON-	FIELD	TEMPER-	OXYGEN,	TOTAL	SOLVED	SOLVED	SOLVED
		(WATER	TO SAM-	DUCT-	(STAND-	ATURE	DIS-	(MG/L			
		LEVEL)	PLING	ANCE	ARD	WATER	SOLVED	AS	(MG/L	(MG/L	(MG/L
		(FEET)	(MIN)	(US/CM)	UNITS)	(DEG C)	(MG/L)	CACO3)	AS CA)	AS MG)	AS NA)
		(72019)	(72004)	(00095)	(00400)	(00010)	(00300)	(00900)	(00915)	(00925)	(00930)
NOV											
30...	1155	22.50	47	956	6.9	12.5	0.1	440	120	35	20
MAR											
04...	1647	16.58	37	845	7.0	13.0	0.1	440	120	35	12
MAY											
31...	1116	12.27	46	849	7.0	13.0	0.4	450	120	36	16
AUG											
12...	1407	18.43	40	827	7.0	13.0	0.1	420	110	35	16
DATE	POTAS-	BICAR-	ALKA-		CHLO-	FLUO-	SILICA,	SOLIDS,	NITRO-	NITRO-	NITRO-
	SIUM,	BONATE	LINITY		RIDE,	RIDE,	DIS-	SUM OF	GEN,	GEN,	GEN,
	DIS-	WATER	WAT DIS	SULFATE	DIS-	DIS-	SOLVED	CONSTI-	NITRITE	NO2+NO3	AMMONIA
	SOLVED	DIS IT	TOT IT	DIS-	SOLVED	SOLVED	(MG/L	TUENTS,	DIS-	SOLVED	SOLVED
	(MG/L	MG/L AS	MG/L AS	(MG/L	(MG/L	(MG/L	AS	DIS-	SOLVED	SOLVED	SOLVED
	AS K)	HCO3	CACO3	AS SO4)	AS CL)	AS F)	SIO2)	(MG/L)	AS N)	AS N)	AS N)
	(00935)	(00453)	(39086)	(00945)	(00940)	(00950)	(00955)	(70301)	(00613)	(00631)	(00608)
NOV											
30...	2.6	390	320	110	42	0.10	12	535	--	--	--
MAR											
04...	2.4	469	384	110	32	0.20	12	556	<0.010	<0.050	0.030
MAY											
31...	2.2	400	328	110	34	0.20	13	530	<0.010	<0.050	0.050
AUG											
12...	0.70	408	334	110	34	0.20	12	521	0.010	0.170	0.040



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

331

394954083002801. Local number FR-320 (MW 34)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
NOV 30...	--	--	53	<0.50	<1.0	3.0	<10	650	<10	8	100
MAR 04...	<0.20	<0.010	48	<0.50	<1.0	<3.0	<10	970	<10	<4	110
MAY 31...	<0.20	<0.010	52	<0.50	<1.0	<3.0	<10	790	<10	6	100
AUG 12...	<0.20	<0.010	49	<0.50	<1.0	<3.0	<10	550	<10	7	92
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- WATER, DISS, REC (UG/L) (04041)
NOV 30...	<10	540	<6	7.0	0.80	--	--	--	--	--	--
MAR 04...	<10	580	<6	<3.0	0.60	--	--	--	--	--	--
MAY 31...	<10	590	<6	7.0	0.90	--	--	--	--	--	--
AUG 12...	20	510	<6	6.0	0.70	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004
DATE	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
NOV 30...	--	--	--	--	--	--	--	--	--	--	--
MAR 04...	--	--	--	--	--	--	--	--	--	--	--
MAY 31...	--	--	--	--	--	--	--	--	--	--	--
AUG 12...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001
DATE	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
NOV 30...	--	--	542	--	--	--	--	--	--	--	--
MAR 04...	--	--	542	--	--	--	--	--	--	--	--
MAY 31...	--	--	549	--	--	--	--	--	--	--	--
AUG 12...	<0.002	<0.002	556	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

394954083002801. Local number FR-320 (MW 34)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	EPTC	PEB-	TEBU-	MOL-	ETHO-	BEN-	CARBO-	TER-	PRON-	DISUL-
	WATER	ULATE	THIURON	INATE	PROP	FLUR-	FURAN	BUFOS	AMIDE	FOTON
	FLTRD	FILTRD	FLTRD	FLTRD	FLTRD	WAT FLD	FLTRD	FLTRD	FLTRD	FLTRD
	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
DATE	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC
	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	(82668)	(82669)	(82670)	(82671)	(82672)	(82673)	(82674)	(82675)	(82676)	(82677)
NOV										
30...	--	--	--	--	--	--	--	--	--	--
MAR										
04...	--	--	--	--	--	--	--	--	--	--
MAY										
31...	--	--	--	--	--	--	--	--	--	--
AUG										
12...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.016	<0.013	<0.003	<0.017
	TRIAL-	PRO-	CAR-	THIO-		PENDI-	NAPROP-	PRO-	METHYL	PER-
	LATE	PANIL	BARYL	BENCARB	DCPA	METH-	AMIDE	PARGITE	AZIN-	METHRIN
	WATER	WATER	WATER	WATER	WATER	ALIN	WATER	WATER	PHOS	CIS
	FLTRD	FLTRD	FLTRD	FLTRD	FLTRD	WAT FLT	FLTRD	FLTRD	WAT FLT	WAT FLT
	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
DATE	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC
	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	(82678)	(82679)	(82680)	(82681)	(82682)	(82683)	(82684)	(82685)	(82686)	(82687)
NOV										
30...	--	--	--	--	--	--	--	--	--	--
MAR										
04...	--	--	--	--	--	--	--	--	--	--
MAY										
31...	--	--	--	--	--	--	--	--	--	--
AUG										
12...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005

395038083002100. Local number FR-321 (MW 21)

LOCATION.--Lat 39°50'38", long 83°00'21", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 68 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 697.05 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.50 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 28.91 ft below land-surface datum, May 31, 1996; lowest measured, 47.13 ft below land-surface datum, Feb 26, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	35.28
DEC 04	47.10
FEB 26	47.13
MAR 18	40.77
MAY 31	28.91
AUG 08	33.60
SEP 04	42.42

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH	PUMP		PH						
		BELOW	OR FLOW	SPE-	WATER			HARD-		MAGNE-	SODIUM,
		LAND	PERIOD	CIFIC	WHOLE			NESS	CALCIUM	SIMUM,	DIS-
		SURFACE	PRIOR	CON-	FIELD	TEMPER-	OXYGEN,	TOTAL	DIS-	DIS-	DIS-
		(WATER	TO SAM-	DUCT-	(STAND-	ATURE	DIS-	(MG/L	SOLVED	SOLVED	SOLVED
		LEVEL)	PLING	ANCE	ARD	WATER	SOLVED	AS	(MG/L	(MG/L	
		(FEET)	(MIN)	(US/CM)	UNITS)	(DEG C)	(MG/L)	CACO3)	AS CA)	AS MG)	AS NA)
		(72019)	(72004)	(00095)	(00400)	(00010)	(00300)	(00900)	(00915)	(00925)	(00930)
DEC											
04...	1735	47.40	50	1580	7.0	13.0	0.7	880	250	63	13
MAR											
18...	1529	40.87	36	1410	6.6	13.0	--	890	260	58	12
MAY											
29...	1410	29.19	44	1250	6.8	13.5	1.7	740	220	47	11
AUG											
08...	1338	36.10	33	1260	6.6	13.0	1.5	700	200	48	10

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

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395038083002100. Local number FR-321 (MW 21)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD 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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	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)
DEC 04...	3.1	488	400	420	17	0.20	14	1030	<0.010	0.990	0.040
MAR 18...	3.0	517	424	460	24	0.20	14	1090	<0.010	1.00	0.090
MAY 29...	3.0	466	382	340	25	0.20	14	892	0.010	0.410	0.030
AUG 08...	0.70	588	482	300	21	0.20	13	894	0.010	2.40	0.090
DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
DEC 04...	<0.20	<0.010	41	<0.50	<1.0	<3.0	<10	14	20	9	8.0
MAR 18...	<0.20	0.030	38	<0.50	<1.0	<3.0	<10	9.0	20	<4	1.0
MAY 29...	<0.20	0.030	32	<0.50	<1.0	<3.0	<10	<3.0	<10	10	<1.0
AUG 08...	<0.20	0.040	31	0.80	<1.0	<3.0	<10	<3.0	<10	9	<1.0
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
DEC 04...	10	800	<6	<3.0	--	--	--	--	--	--	--
MAR 18...	20	770	<6	<3.0	0.90	--	--	--	--	--	--
MAY 29...	20	680	<6	<3.0	0.90	--	--	--	--	--	--
AUG 08...	<10	640	<6	<3.0	0.80	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004
DATE	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P, P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
DEC 04...	--	--	--	--	--	--	--	--	--	--	--
MAR 18...	--	--	--	--	--	--	--	--	--	--	--
MAY 29...	--	--	--	--	--	--	--	--	--	--	--
AUG 08...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395038083002100. Local number FR-321 (MW 21)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U (UG/L) (82667)
DEC 04...	--	--	948	--	--	--	--	--	--	--	--
MAR 18...	--	--	1150	--	--	--	--	--	--	--	--
MAY 29...	--	--	966	--	--	--	--	--	--	--	--
AUG 08...	<0.002	<0.002	932	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006
	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
DEC 04...	--	--	--	--	--	--	--	--	--	--	
MAR 18...	--	--	--	--	--	--	--	--	--	--	
MAY 29...	--	--	--	--	--	--	--	--	--	--	
AUG 08...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.016	<0.013	<0.003	<0.017	
	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	
DEC 04...	--	--	--	--	--	--	--	--	--	--	
MAR 18...	--	--	--	--	--	--	--	--	--	--	
MAY 29...	--	--	--	--	--	--	--	--	--	--	
AUG 08...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	

395131083005200. Local number FR-322 (MW 22)

LOCATION.--Lat 39°51'31", long 83°00'52", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 60 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 686.42 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.30 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.23 ft below land-surface datum, May 31, 1996; lowest measured, 28.35 ft below land-surface datum, Dec 5, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	22.96
DEC 05	28.35
FEB 26	20.85
MAY 31	8.23
AUG 13	20.15
SEP 13	21.98

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

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395131083005200. Local number FR-322 (MW 22)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

		DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)	
DEC 05...	1115	30.65	35	848	7.4	13.5	0.3	410	120	27	17	
AUG 13...	1433	20.05	43	856	7.0	13.0	0.3	470	140	29	15	
		BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3 (00935)	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	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)	
DEC 05...	2.1	308	252	140	27	0.20	9.9	497	<0.010	<0.050	0.040	
AUG 13...	2.1	329	270	210	29	0.30	8.2	598	0.010	<0.050	0.040	
		NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
DEC 05...	<0.20	<0.010	33	<0.50	<1.0	9.0	<10	1300	20	6	200	
AUG 13...	<0.20	<0.010	36	<0.50	<1.0	<3.0	<10	1400	<10	4	280	
		MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
DEC 05...	<10	620	<6	<3.0	1.2	--	--	--	--	--	--	
AUG 13...	<10	750	<6	<3.0	1.1	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004	
		FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
DEC 05...	--	--	--	--	--	--	--	--	--	--	--	
AUG 13...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	0.007	<0.005	<0.004	<0.002	<0.001	
		ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THON WAT FLT 0.7 U GF, REC (UG/L) (82667)
DEC 05...	--	--	532	--	--	--	--	--	--	--	--	
AUG 13...	E0.003	<0.002	621	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395131083005200. Local number FR-322 (MW 22)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	EPTC	PEB-	TEBU-	MOL-	ETHO-	BEN-	CARBO-	TER-	PRON-	DISUL-
	WATER	WATER	WATER	WATER	WATER	FLUR-	FURAN	BUFOS	AMIDE	FOTON
	FLTRD	FILTRD	FLTRD	FLTRD	FLTRD	WAT FLD	FLTRD	FLTRD	FLTRD	FLTRD
	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
DATE	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC
	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	(82668)	(82669)	(82670)	(82671)	(82672)	(82673)	(82674)	(82675)	(82676)	(82677)
DEC										
05...	--	--	--	--	--	--	--	--	--	--
AUG										
13...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.021	<0.013	<0.003	<0.017
	TRIAL-	PRO-	CAR-	THIO-	DCPA	PENDI-	NAPROP-	PRO-	METHYL	PER-
	LATE	PANIL	BARYL	BENCARB	WATER	METH-	AMIDE	PARGITE	AZIN-	METHRIN
	WATER	WATER	WATER	WATER	WATER	ALIN	WATER	WATER	PHOS	CIS
	FLTRD	FLTRD	FLTRD	FLTRD	FLTRD	WAT FLT	FLTRD	FLTRD	WAT FLT	WAT FLT
	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
DATE	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC	GF, REC
	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)	(UG/L)
	(82678)	(82679)	(82680)	(82681)	(82682)	(82683)	(82684)	(82685)	(82686)	(82687)
DEC										
05...	--	--	--	--	--	--	--	--	--	--
AUG										
13...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005

395146082594300. Local number FR-323 (MW 19)

LOCATION.--Lat 39°51'45", long 82°59'44", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 59.5 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 714.29 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.69 ft above land-surface datum.

PERIOD OF RECORD.--Feb. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.69 ft below land-surface datum, May 31, 1996; lowest measured, 20.88 ft below land-surface datum, Feb 29, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
FEB 29	20.88
MAY 31	16.69
AUG 13	17.73
SEP 04	18.35

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	DEPTH	PUMP		PH							
	BELOW	OR FLOW	SPE-	WATER							
	LAND	PERIOD	CIFIC	WHOLE							
	SURFACE	PRIOR	CON-	FIELD	TEMPER-	OXYGEN,					
	(WATER	TO SAM-	DUCT-	(STAND-	ATURE	DIS-					
	LEVEL)	PLING	ANCE	ARD	WATER	SOLVED					
	(FEET)	(MIN)	(US/CM)	UNITS)	(DEG C)	(MG/L)					
	(72019)	(72004)	(00095)	(00400)	(00010)	(00300)					
DATE	TIME										
FEB											
29...	1540	20.49	40	1150	7.0	13.0	--	510	140	38	39
AUG											
13...	0953	17.50	43	1170	6.9	15.0	1.2	560	160	39	41
	POTAS-	BICAR-	ALKA-								
	SIUM,	BONATE	LINITY	CHLO-	FLUO-	SILICA,	SOLIDS,	NITRO-	NITRO-	NITRO-	
	DIS-	WATER	WAT DIS	RIDE,	RIDE,	DIS-	SUM OF	GEN,	GEN,	GEN,	
	SOLVED	DIS IT	TOT IT	DIS-	DIS-	SOLVED	CONSTI-	NITRITE	NO2+NO3	AMMONIA	
	FIELD	FIELD	DIS-	SOLVED	SOLVED	SOLVED	TUENTS,	DIS-	SOLVED	SOLVED	
	(MG/L	MG/L AS	MG/L AS	(MG/L	(MG/L	(MG/L	AS	(MG/L	(MG/L	(MG/L	
	AS K)	HCO3	CACO3	AS SO4)	AS CL)	AS F)	SIO2)	AS N)	AS N)	AS N)	
	(00935)	(00453)	(39086)	(00945)	(00940)	(00950)	(00955)	(70301)	(00613)	(00631)	(00608)
FEB											
29...	3.4	427	350	150	75	0.20	16	680	0.010	<0.050	0.290
AUG											
13...	3.4	510	418	160	100	0.20	16	780	0.020	0.070	0.310

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

337

395146082594300. Local number FR-323 (MW 19)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)
FEB 29...	0.40	<0.010	330	<0.50	1.0	<10	7400	30	8	210	20
AUG 13...	0.40	0.010	330	1.1	1.0	<10	8600	<10	9	170	10
DATE	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)	MONOFOS WATER DISS, REC (UG/L) (04095)
FEB 29...	200	<6	7.0	1.4	--	--	--	--	--	--	--
AUG 13...	200	<6	<3.0	2.0	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004	<0.003
DATE	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P, P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)	ALA- CHLOR, WATER, DISS, REC (UG/L) (46342)
FEB 29...	--	--	--	--	--	--	--	--	--	--	--
AUG 13...	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001	<0.002
DATE	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN WATER FLTRD DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT GF, REC (UG/L) (82663)	PHORATE BACIL WATER FLTRD GF, REC (UG/L) (82664)	TER- URON WATER FLTRD GF, REC (UG/L) (82665)	LIN- METHYL WATER FLTRD GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT GF, REC (UG/L) (82667)	
FEB 29...	--	732	--	--	--	--	--	--	--	--	--
AUG 13...	<0.002	864	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	
DATE	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FLTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
FEB 29...	--	--	--	--	--	--	--	--	--	--	--
AUG 13...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.025	<0.013	<0.003	<0.017	
DATE	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- FARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT GF, REC (UG/L) (82687)	
FEB 29...	--	--	--	--	--	--	--	--	--	--	--
AUG 13...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.009	<0.003	<0.013	<0.001	<0.005	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395146082594301. Local number FR-324 (MW 19D)

LOCATION.--Lat 39°51'45", long 82°59'44", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Devonian limestone

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 169.89 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 714.17 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 3.00 ft above land-surface datum.

PERIOD OF RECORD.--Feb. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 136.59 ft below land-surface datum, Mar 1, 1996; lowest measured, 156.30 ft below land-surface datum, Aug 13, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
MAR 01	136.59
MAY 31	>100
AUG 13	156.30
SEP 04	>100

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	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)	
MAR	01...	1603	136.59	1130	7.1	11.5	410	94	43	86	6.8
		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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	
MAR	01...	322	264	170	130	0.80	9.6	703	<0.010	<0.050	
		NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	
MAR	01...	0.360	0.50	<0.010	68	<0.50	<1.0	<3.0	<10	45	
		LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	
MAR	01...	<10	91	1400	20	1900	<6	8.0	5.0	738	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

339

395010083000200. Local number FR-325 (MW 23)

LOCATION.--Lat 39°50'10", long 83°50'02", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 93 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 719.55 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.51 ft above land-surface datum.

PERIOD OF RECORD.--Feb. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.49 ft below land-surface datum, May 31, 1996; lowest measured, 35.99 ft below land-surface datum, Feb 29, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
FEB 26	35.99
MAY 31	29.49
SEP 04	32.47

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
JUN 06...	0946	29.69	43	789	7.2	13.0	0.2	439
DATE		ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	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. AS P) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)
JUN 06...		360	<0.010	<0.050	0.640	0.70	0.020	1.0

395254083000900. Local number FR-326 (MW 31)

LOCATION.--Lat 39°52'54", long 83°00'07", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 68.38 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 718.84 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.58 ft above land-surface datum.

PERIOD OF RECORD.--Feb. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 41.68 ft below land-surface datum, June 3, 1996; lowest measured, 46.17 ft below land-surface datum, Sept 4, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
MAR 14	44.84
JUN 03	41.68
AUG 09	45.12
SEP 04	46.17

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)
MAR 14...	1327	44.42	32	925	7.1	13.5	--	390	100	35	18
JUN 03...	1429	41.25	28	940	7.1	14.0	0.2	430	110	37	22
AUG 09...	1413	44.70	28	912	7.0	14.0	0.2	450	120	37	19

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395254083000900. Local number FR-326 (MW 31)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (70301)	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)
MAR 14...	1.9	508	409	85	48	0.30	12	553	<0.010	<0.050	0.040
JUN 03...	2.0	439	360	82	56	0.30	13	542	<0.010	0.060	0.050
AUG 09...	0.60	449	368	96	55	0.30	13	565	0.010	0.060	0.070
DATE	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
MAR 14...	<0.20	<0.010	85	<0.50	<1.0	<3.0	<10	2400	<10	4	58
JUN 03...	<0.20	<0.010	87	<0.50	<1.0	<3.0	<10	2600	10	6	55
AUG 09...	<0.20	<0.010	84	<0.50	<1.0	8.0	<10	2700	<10	7	56
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
MAR 14...	10	320	<6	<3.0	0.60	--	--	--	--	--	--
JUN 03...	<10	430	<6	<3.0	0.80	--	--	--	--	--	--
AUG 09...	30	440	<6	<3.0	0.80	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004
DATE	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
MAR 14...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 09...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001
DATE	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
MAR 14...	--	--	567	--	--	--	--	--	--	--	--
JUN 03...	--	--	578	--	--	--	--	--	--	--	--
AUG 09...	<0.002	<0.002	615	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

341

395254083000900. Local number FR-326 (MW 31)--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	EPTC WATER FLTRD 0.7 U	FEB- ULATE WATER FILTRD 0.7 U	TEBU- THIURON WATER FLTRD 0.7 U	MOL- INATE WATER FLTRD 0.7 U	ETHO- PROP WATER FLTRD 0.7 U	BEN- FLUR- ALIN WAT FLD 0.7 U	CARBO- FURAN WATER FLTRD 0.7 U	TER- BUFOS WATER FLTRD 0.7 U	PRON- AMIDE WATER FLTRD 0.7 U	DISUL- FOTON WATER FLTRD 0.7 U
DATE	GF, REC (UG/L) (82668)	GF, REC (UG/L) (82669)	GF, REC (UG/L) (82670)	GF, REC (UG/L) (82671)	GF, REC (UG/L) (82672)	GF, REC (UG/L) (82673)	GF, REC (UG/L) (82674)	GF, REC (UG/L) (82675)	GF, REC (UG/L) (82676)	GF, REC (UG/L) (82677)
MAR 14...	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--
AUG 09...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.019	<0.013	<0.003	<0.017
	TRIAL- LATE WATER FLTRD 0.7 U	PRO- PANIL WATER FLTRD 0.7 U	CAR- BARYL WATER FLTRD 0.7 U	THIO- BENCARB WATER FLTRD 0.7 U	DCPA WATER FLTRD 0.7 U	PENDI- METH- ALIN WAT FLT 0.7 U	NAPROP- AMIDE WATER FLTRD 0.7 U	PRO- FARGITE WATER FLTRD 0.7 U	METHYL AZIN- PHOS WAT FLT 0.7 U	PER- METHRIN CIS WAT FLT 0.7 U
DATE	GF, REC (UG/L) (82678)	GF, REC (UG/L) (82679)	GF, REC (UG/L) (82680)	GF, REC (UG/L) (82681)	GF, REC (UG/L) (82682)	GF, REC (UG/L) (82683)	GF, REC (UG/L) (82684)	GF, REC (UG/L) (82685)	GF, REC (UG/L) (82686)	GF, REC (UG/L) (82687)
MAR 14...	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--
AUG 09...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005

395133083001800. Local number FR-327 (MW 25)

LOCATION.--Lat 39°51'33", long 83°00'22", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 74.75 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 740.73 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.76 ft above land-surface datum.

PERIOD OF RECORD.--Feb. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 44.71 ft below land-surface datum, Aug. 10, 1996; lowest measured, 52.54 ft below land-surface datum, Oct 25, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	52.54
FEB 26	51.85
MAR 14	52.27
MAY 31	47.48
AUG 20	44.71
SEP 04	47.81

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH	PUMP		PH						
		BELOW	OR FLOW	SPE-	WATER				HARD-		MAGNE-
		LAND	PERIOD	CIFIC	WHOLE				NESS	CALCIUM	SIUM,
		SURFACE	PRIOR	CON-	FIELD	TEMPER-	OXYGEN,	TOTAL	DIS-	DIS-	DIS-
		(WATER	TO SAM-	DUCT-	(STAND-	ATURE	DIS-	(MG/L	SOLVED	SOLVED	SOLVED
		LEVEL)	PLING	ANCE	ARD	WATER	SOLVED	AS	(MG/L	(MG/L	(MG/L
		(FEET)	(MIN)	(US/CM)	UNITS)	(DEG C)	(MG/L)	CACO3)	AS CA)	AS MG)	AS NA)
		(72019)	(72004)	(00095)	(00400)	(00010)	(00300)	(00900)	(00915)	(00925)	(00930)
MAR											
14...	1117	52.23	30	1010	6.8	13.0	--	480	130	37	15
MAY											
29...	1203	48.24	39	1080	6.8	13.0	3.1	550	150	42	20
AUG											
20...	1105	47.53	50	1080	6.7	13.0	2.8	520	140	41	27

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395133083001800. Local number FR-327 (MW 25)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	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)
MAR 14...	3.4	537	440	110	14	0.20	12	589	0.040	0.750	0.020
MAY 29...	3.7	537	440	150	23	0.20	13	673	0.030	1.40	0.020
AUG 20...	3.7	561	460	120	38	0.20	13	684	0.020	5.60	0.020
DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS- (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
MAR 14...	<0.20	<0.010	57	<0.50	<1.0	<3.0	<10	<3.0	30	7	19
MAY 29...	<0.20	<0.010	63	<0.50	<1.0	<3.0	<10	7.0	<10	8	21
AUG 20...	<0.20	<0.010	66	<0.50	<1.0	<3.0	<10	<3.0	<10	7	24
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
MAR 14...	30	300	<6	<3.0	1.4	--	--	--	--	--	--
MAY 29...	10	290	<6	5.0	1.6	--	--	--	--	--	--
AUG 20...	<10	240	<6	<3.0	1.4	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004
DATE	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
MAR 14...	--	--	--	--	--	--	--	--	--	--	--
MAY 29...	--	--	--	--	--	--	--	--	--	--	--
AUG 20...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001
DATE	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
MAR 14...	--	--	634	--	--	--	--	--	--	--	--
MAY 29...	--	--	718	--	--	--	--	--	--	--	--
AUG 20...	<0.002	<0.002	726	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

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395133083001800. Local number FR-327 (MW 25)--Continued

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)
MAR										
14...	--	--	--	--	--	--	--	--	--	--
MAY										
29...	--	--	--	--	--	--	--	--	--	--
AUG										
20...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017
	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)
MAR										
14...	--	--	--	--	--	--	--	--	--	--
MAY										
29...	--	--	--	--	--	--	--	--	--	--
AUG										
20...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005

395108082591100. Local number FR-329 (MW 15)

LOCATION.--Lat 39°51'08", long 83°59'12", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 69.19 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 733.26 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.83 ft above land-surface datum.

PERIOD OF RECORD.--May 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 35.74 ft below land-surface datum, May 31, 1996; lowest measured, 37.27 ft below land-surface datum, Sep 4, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
MAY 31	35.74
SEP 04	37.27

395108082591101. Local number FR-330 (MW 15D)

LOCATION.--Lat 39°51'08", long 83°59'12", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Devonian limestone.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 115ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 734.29 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.00 ft above land-surface datum.

PERIOD OF RECORD.--May 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--New well

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
MAY 31	>100
SEP 04	>100

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395054082585300. Local number FR-331 (MW 14)

LOCATION.--Lat 39°50'54", long 83°58'55", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 74.33 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum 738.32 is feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.60 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 42.40 ft below land-surface datum, May 31, 1996; lowest measured, 49.93 ft below land-surface datum, Dec 6, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
DEC 06	49.93
FEB 27	48.97
MAY 31	42.40
SEP 04	43.68

395031082590000. Local number FR-332 (MW 04)

LOCATION.--Lat 39°50'31", long 83°59'00", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 48.03 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 707.13 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.81 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.05 ft below land-surface datum, May 31, 1996; lowest measured, 31.20 ft below land-surface datum, Oct 25, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	31.20
FEB 27	28.91
MAR 13	30.44
MAY 31	22.02
SEP 04	22.35

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	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)
MAR 13...	1157	30.17	31	1060	7.1	12.5	500	140	36	18
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER DIS IT FIELD MG/L AS (00453)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS (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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00631)
MAR 13...	2.4	315	258	230	39	0.20	8.5	632	<0.010	<0.050
DATE		NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
MAR 13...	0.100	<0.20	<0.010	50	<0.50	<1.0	<3.0	<10	2300	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

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395031082590000. Local number FR-332 (MW 04)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	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)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
MAR 13...	30	5	280	<10	280	<6	<3.0	1.1	688

395031082590001. Local number FR-333 (MW 04D)

LOCATION.--Lat 39°50'30", long 83°59'00", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Devonian limestone.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 194.39 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 706.98 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.61 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 67.53 ft below land-surface datum, Oct 25, 1995; lowest measured, 135.40 ft below land-surface datum, Mar 13, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	67.53
FEB 27	>100
MAR 13	135.40
MAY 31	>100
SEP 04	>100

395139082581600. Local number FR-334 (MW 17)

LOCATION.--Lat 39°51'40", long 83°58'15", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 64.32 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 740.07 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 0.20 ft below land-surface datum.

PERIOD OF RECORD.--Mar. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 28.45 ft below land-surface datum, May 31, 1996; lowest measured, 31.72 ft below land-surface datum, Mar 13, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
MAR 13	31.72
MAY 31	28.45
AUG 12	31.20
SEP 04	32.25

395134082560600. Local number FR-335 (MW 18)

LOCATION.--Lat 39°51'35", long 83°59'05", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 56.86 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 734.68 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 0.25 ft below land-surface datum.

PERIOD OF RECORD.--May 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 33.03 ft below land-surface datum, May 31, 1996; lowest measured, 36.17 ft below land-surface datum, Sept 4, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
MAY 31	33.03
SEP 04	36.17



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395108083010601. Local number FR-336 (MW 33)

LOCATION.--Lat 39°51'05", long 83°01'06", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 59 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 685.90 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.75 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.31 ft below land-surface datum, May 31, 1996; lowest measured, 30.39 ft below land-surface datum, Dec 4, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
DEC 04	30.39
FEB 26	25.87
MAY 31	10.61
AUG 09	21.02
SEP 04	23.62

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	HARD- NESS TOTAL (MG/L 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)	
DEC 04...	1435	29.97	30	931	7.2	13.5	0.2	160	46	12	11	
JUN 03...	1247	12.15	47	849	7.1	12.0	0.4	420	120	29	27	
AUG 09...	1112	20.70	42	765	6.9	13.0	0.2	390	110	28	27	
DATE		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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L (70301)	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)
DEC 04...	1.3	325	266	92	28	0.30	4.1	359	<0.010	0.770	0.100	
JUN 03...	3.4	347	284	130	47	0.30	8.4	538	<0.010	0.070	0.040	
AUG 09...	0.90	344	282	120	51	0.30	8.0	516	0.010	0.060	0.060	
DATE		NITRO- GEN, AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
DEC 04...	0.30	<0.010	17	<0.50	<1.0	<3.0	<10	450	<10	5	84	
JUN 03...	<0.20	<0.010	41	<6.0	<12	<36	<120	63	<120	<48	250	
AUG 09...	<0.20	<0.010	41	1.1	<1.0	<3.0	<10	320	<10	8	220	
DATE		MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
DEC 04...	<10	510	<6	<3.0	--	--	--	--	--	--	--	
JUN 03...	<120	1200	<72	<36	1.5	--	--	--	--	--	--	
AUG 09...	<10	1100	<6	<3.0	1.6	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

347

395108083010601. Local number FR-336 (MW 33)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
DEC 04...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 09...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001
DATE	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
DEC 04...	--	--	369	--	--	--	--	--	--	--	--
JUN 03...	--	--	660	--	--	--	--	--	--	--	--
AUG 09...	<0.002	<0.002	584	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006
DATE	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FLTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
DEC 04...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 09...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.019	<0.013	<0.003	<0.017	
DATE	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	
DEC 04...	--	--	--	--	--	--	--	--	--	--	--
JUN 03...	--	--	--	--	--	--	--	--	--	--	--
AUG 09...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395115083010601. Local number FR-337 (MW 01)

LOCATION.--Lat 39°51'13", long 83°01'05", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 60 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 687 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of PVC casing, 2.40 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.36 ft below land-surface datum, May 31, 1996; lowest measured, 27.40 ft below land-surface datum, Feb 26, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	27.35
FEB 26	27.40
MAY 31	11.36
SEP 04	25.11

395115083010602. Local number FR-338 (MW 01D)

LOCATION.--Lat 39°51'13", long 83°01'05", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Devonian limestone.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 105 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 686.83 feet above National Geodetic Vertical Datum of 1929. Measuring

point: Top of PVC casing, 2.48 ft above land-surface datum.

PERIOD OF RECORD.--Feb. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.35 ft below land-surface datum, May 31, 1996; lowest measured, 23.30 ft below land-surface datum, Feb 26, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
FEB 26	23.30
MAY 31	7.35
SEP 04	17.50

395046083003107. Local number FR-339 (MW 02)

LOCATION.--Lat 39°50'47", long 83°00'30", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 70 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 696.60 feet above National Geodetic Vertical Datum of 1929. Measuring

point: Top of PVC casing, 2.35 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 31.55 ft below land-surface datum, May 31, 1996; lowest measured, 51.00 ft below land-surface datum, Feb 26, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	34.05
FEB 26	51.00
MAY 31	31.55
SEP 04	44.80

395046083003107. Local number FR-340 (MW 02D)

LOCATION.--Lat 39°50'47", long 83°00'30", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Devonian limestone.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 138 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 697 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of PVC casing, 2.40 ft above land-surface datum.

PERIOD OF RECORD.--Feb. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.70 ft below land-surface datum, May 31, 1996; lowest measured, 50.16 ft below land-surface datum, Feb 26, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
FEB 26	50.16
MAY 31	32.70
SEP 04	45.23

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

349

395020083003406. Local number FR-341 (MW 03)

LOCATION.--Lat 39°50'24", long 83°00'28", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 75 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 683.43 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.52 ft above land-surface datum.

PERIOD OF RECORD.--Feb. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.79 ft below land-surface datum, May 31, 1996; lowest measured, 32.39 ft below land-surface datum, Feb 26, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
FEB 26	32.39
MAY 31	11.79
SEP 04	28.00

395020083003407. Local number FR-342 (MW 03D)

LOCATION.--Lat 39°50'24", long 83°00'28", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Devonian limestone.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 123 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 683 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.50 ft above land-surface datum.

PERIOD OF RECORD.--Feb. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.30 ft below land-surface datum, May 31, 1996; lowest measured, 20.46 ft below land-surface datum, Feb 26, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
FEB 26	20.46
MAY 31	12.30
SEP 04	18.46

395031082585400. Local number FR-343 (MW 35)

LOCATION.--Lat 39°50'20", long 83°58'54", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 52 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 708.30 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.61 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.61 ft below land-surface datum, May 31, 1996; lowest measured, 26.09 ft below land-surface datum, Oct 25, 1995.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
OCT 25	26.09
FEB 26	24.65
MAY 31	18.61
SEP 04	19.11

395222083002900. Local number FR-344 (MW 27)

LOCATION.--Lat 39°52'22", long 83°00'29", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 134 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 707.88 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.17 ft above land-surface datum.

PERIOD OF RECORD.--May 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 37.26 ft below land-surface datum, Aug 13, 1996; lowest measured, &gt;100 ft below land-surface datum, Sept 4, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
MAY 31	37.81
AUG 13	37.26
SEP 04	>100

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395236083004201. Local number FR-345 (MW 41)

LOCATION.--Lat 39°52'36", long 83°00'42", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 45 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 688.90 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.53 ft above land-surface datum.

PERIOD OF RECORD.--Aug. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.67 ft below land-surface datum, Aug 13, 1996; lowest measured, 24.09 ft below land-surface datum, Sep 4, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date Water Level

AUG 13 22.67  
SEP 04 24.09

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	HARD- NESS TOTAL (MG/L CACO3) (00900)	CALCIUM DIS- SOLVED AS (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED AS MG (00925)	SODIUM, DIS- SOLVED AS NA (00930)	
AUG 14...	1345	22.47	27	850	7.2	23.0	0.2	430	120	32	16	
DATE	TIME	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 AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L AS (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS AS N) (00608)
AUG 14...	2.7	159	130	310	36	0.50	7.7	606	0.010	<0.050	0.130	
DATE	TIME	NITRO- GEN, AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS AS MN) (01056)
AUG 14...	<0.20	<0.010	72	<0.50	<1.0	<3.0	<10	1900	<10	7	170	
DATE	TIME	MOLYB- DENUM, DIS- SOLVED (UG/L AS AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L AS (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L AS (04028)	SI- MAZINE, WATER, DISS, REC (UG/L AS (04035)	PRO- METON, WATER, DISS, REC (UG/L AS (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L AS (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L AS (04041)
AUG 14...	40	530	<6	4.0	1.0	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004	
DATE	TIME	FONOFOS WATER DISS REC (UG/L AS (04095)	ALPHA BHC DIS- SOLVED (UG/L AS (34253)	P, P' DDE DISSOLV (UG/L AS (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L AS (38933)	LINDANE DIS- SOLVED (UG/L AS (39341)	DI- ELDRIN DIS- SOLVED (UG/L AS (39381)	METO- LACHLOR WATER DISSOLV (UG/L AS (39415)	MALA- THION, DIS- SOLVED (UG/L AS (39532)	PARA- THION, DIS- SOLVED (UG/L AS (39542)	DI- AZINON, DIS- SOLVED (UG/L AS (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L AS (39632)
AUG 14...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	0.005	<0.005	<0.004	<0.002	<0.001	



## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

351

395236083004201. Local number FR-345 (MW 41)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U (UG/L) (82667)
AUG 14...	<0.002	<0.002	645	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006
	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
AUG 14...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.029	<0.013	<0.003	<0.017	
	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	
AUG 14...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	

395225083012301. Local number FR-346 (MW 40)

LOCATION.--Lat 39°52'25", long 83°01'23", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 51 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 695.26 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.58 ft above land-surface datum.

PERIOD OF RECORD.--Aug. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 20.70 ft below land-surface datum, Aug 13, 1996; lowest measured, 21.76 ft below land-surface datum, Sep 4, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
AUG 13	20.70
SEP 04	21.76

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER SOLVED (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	HARD- NESS TOTAL AS (MG/L) (00900)	CALCIUM DIS- SOLVED AS CA (MG/L) (00915)	MAGNE- SIUM, DIS- SOLVED AS MG (MG/L) (00925)	SODIUM, DIS- SOLVED AS NA (MG/L) (00930)
AUG 14...	1137	20.77	32	670	7.4	12.5	0.5	250	69	19	48
DATE	POTAS- SIUM, DIS- SOLVED (MG/L) AS K (00935)	BICAR- BONATE WATER DIS IT FIELD MG/L AS (00453)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS (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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L) (00608)
AUG 14...	4.9	215	176	110	67	1.0	8.1	436	<0.010	0.050	0.140

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395225083012301. Local number FR-346 (MW 40)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
AUG 14...	0.30	<0.010	59	<0.50	<1.0	<3.0	<10	480	20	11	130
DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
AUG 14...	20	2500	<6	<3.0	2.0	<0.007	<0.002	<0.005	<0.018	E0.012	0.016
DATE	FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
AUG 14...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	0.033	<0.005	<0.004	<0.002	<0.001
DATE	ALA- CHLOR, WATER, DISS, REC (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (UG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
AUG 14...	<0.002	<0.002	451	0.006	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006
DATE	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
AUG 14...	<0.002	<0.004	0.018	<0.004	<0.003	<0.002	<0.024	<0.013	<0.003	<0.017	
DATE	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	
AUG 14...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

353

395206083012401. Local number FR-347 (MW 28)

LOCATION.--Lat 39°52'06", long 83°01'24", Hydrologic Unit 05060001

Owner.--City of Columbus

AQUIFER.--Sand and gravel of Quaternary Age.

WELL CHARACTERISTICS.--Drilled observation water well, 4 in. diameter, 43 ft. deep.

INSTRUMENTATION.--Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 695.69 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of PVC casing, 2.79 ft above land-surface datum.

PERIOD OF RECORD.--Aug. 1996 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.01 ft below land-surface datum, Aug 13, 1996; lowest measured, 23.33 ft below land-surface datum, Sep 4, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
AUG 13	22.01
SEP 04	23.33

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	PUMP OR FLOW PERIOD PRIOR TO SAM- PLING (MIN) (72004)	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)	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)	
AUG 14...	1009	22.11	44	604	7.3	11.5	0.2	290	87	18	24	
DATE		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)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) AS (70301)	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)
AUG 14...	2.3	290	238	73	33	0.30	7.6	391	<0.010	<0.050	0.110	
DATE		NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L) AS N (00623)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L) AS P (00671)	BARIUM, DIS- SOLVED (UG/L) AS BA (01005)	BERYL- LIUM, DIS- SOLVED (UG/L) AS BE (01010)	CADMIUM DIS- SOLVED (UG/L) AS CD (01025)	COBALT, DIS- SOLVED (UG/L) AS CO (01035)	COPPER, DIS- SOLVED (UG/L) AS CU (01040)	IRON, DIS- SOLVED (UG/L) AS FE (01046)	LEAD, DIS- SOLVED (UG/L) AS PB (01049)	LITHIUM DIS- SOLVED (UG/L) AS LI (01130)	MANGA- NESE, DIS- SOLVED (UG/L) AS MN (01056)
AUG 14...	0.20	<0.010	66	<0.50	<1.0	<3.0	<10	1400	<10	4	87	
DATE		MOLYB- DENUM, DIS- SOLVED (UG/L) AS MO (01060)	STRON- TIUM, DIS- SOLVED (UG/L) AS SR (01080)	VANA- DIUM, DIS- SOLVED (UG/L) AS V (01085)	ZINC, DIS- SOLVED (UG/L) AS ZN (01090)	CARBON, ORGANIC DIS- SOLVED (MG/L) AS C (00681)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)
AUG 14...	<10	1100	<6	5.0	1.8	<0.007	<0.002	<0.005	<0.018	E0.004	<0.004	
DATE		FONOFOS WATER DISS REC (UG/L) (04095)	ALPHA BHC DIS- SOLVED (UG/L) (34253)	P,P' DDE DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS DIS- SOLVED (UG/L) (38933)	LINDANE DIS- SOLVED (UG/L) (39341)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	METO- LACHLOR WATER DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)
AUG 14...	<0.003	<0.002	<0.006	<0.004	<0.004	<0.001	0.009	<0.005	<0.004	<0.002	<0.001	

## GROUND-WATER RECORDS--SOUTHERN FRANKLIN COUNTY

395206083012401. Local number FR-347 (MW 28)--Continued

WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	ALA- CHLOR, WATER, DISS, REC, (UG/L) (46342)	ACETO- CHLOR, WATER FLTRD REC (UG/L) (49260)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	METRI- BUZIN SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE WATER FLTRD GF, REC (UG/L) (82664)	TER- BACIL WATER FLTRD GF, REC (UG/L) (82665)	LIN- URON WATER FLTRD GF, REC (UG/L) (82666)	METHYL PARA- THION WAT FLT 0.7 U GF, REC (UG/L) (82667)
DATE											
AUG 14...	E0.003	<0.002	405	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006
	EPTC WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE WATER FILTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON WATER FLTRD 0.7 U GF, REC (UG/L) (82670)	MOL- INATE WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	
DATE											
AUG 14...	<0.002	<0.004	<0.010	<0.004	<0.003	<0.002	<0.025	<0.013	<0.003	<0.017	
	TRIAL- LATE WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB WATER FLTRD 0.7 U GF, REC (UG/L) (82681)	DCPA WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	
DATE											
AUG 14...	<0.001	<0.004	<0.003	<0.002	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	

The following tables contain ground-water-level measurements from the 28 wells that comprise the long-term ground-water monitoring network in Geauga County. In addition to the 28 network wells, water levels were measured in 8 supplemental wells that are no longer considered to be part of the network. The data were collected as part of a cooperative study with the Geauga County Planning Commission and Board of County Commissioners. The purpose of the study is to determine whether fluctuations in water levels represent consistent, long-term trends caused by anthropogenic factors or are predominantly the result of seasonal and annual variations in recharge. Precipitation data presented in this section were obtained from National Weather Service station 331458 in Chardon, Ohio. Land-surface datums are accurate within  $\pm 5$  ft.

412331081123000. Local number GE-22

LOCATION.--Lat 41°23'31", long 81°12'30"; west of Valley View Road by La Due Reservoir at old Sugar House; Auburn Township.

Owner.--City of Akron.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Water supply well located in pit, not currently in use; diameter 6.25 in.; depth 80 ft.

INSTRUMENTATION - Pressure transducer and CR10 data logger (records hourly) with SM192 storage module.

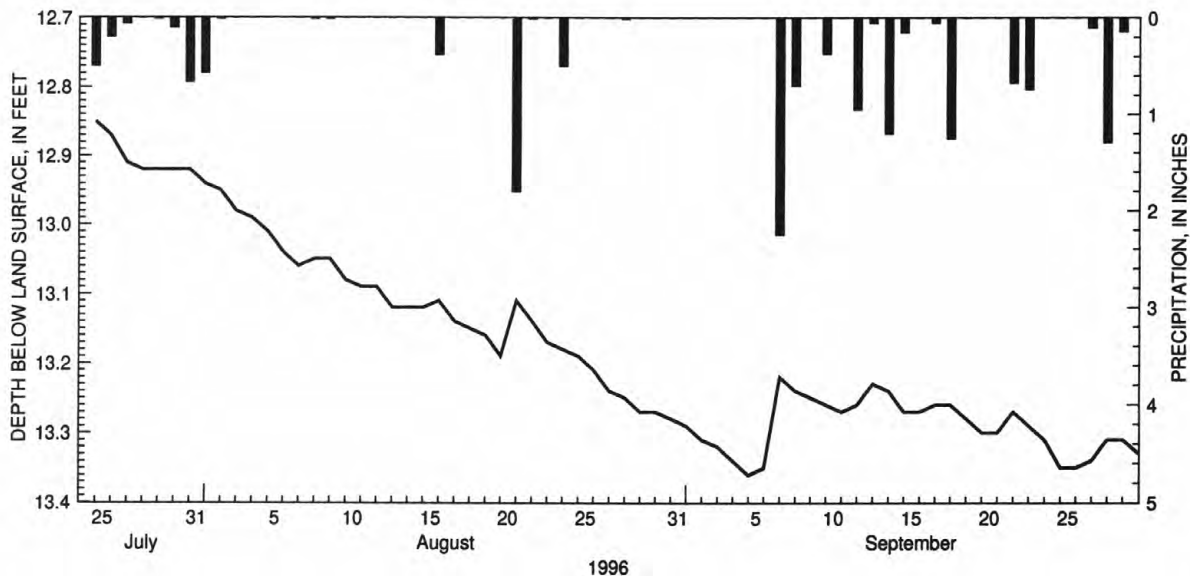
DATUM.--Elevation of land-surface datum is 1,160 feet above National Geodetic Vertical Datum of 1929. Measuring point: Mark on wooden base of instrument shelter, inside pit, 3.96 ft below land-surface datum.

PERIOD OF RECORD.--Periodic water-level measurements from June 8, 1978 through September 8, 1994. Continuous water-level data from July 25, 1996 through September 30, 1996.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 12.36 ft below land-surface datum, October 19, 1978; lowest measured, 14.34 ft below land-surface datum, November 12, 1980.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	12.94	13.29
2	---	---	---	---	---	---	---	---	---	---	12.95	13.31
3	---	---	---	---	---	---	---	---	---	---	12.98	13.32
4	---	---	---	---	---	---	---	---	---	---	12.99	13.34
5	---	---	---	---	---	---	---	---	---	---	13.01	13.36
6	---	---	---	---	---	---	---	---	---	---	13.04	13.35
7	---	---	---	---	---	---	---	---	---	---	13.06	13.22
8	---	---	---	---	---	---	---	---	---	---	13.05	13.24
9	---	---	---	---	---	---	---	---	---	---	13.05	13.25
10	---	---	---	---	---	---	---	---	---	---	13.08	13.26
11	---	---	---	---	---	---	---	---	---	---	13.09	13.27
12	---	---	---	---	---	---	---	---	---	---	13.09	13.26
13	---	---	---	---	---	---	---	---	---	---	13.12	13.23
14	---	---	---	---	---	---	---	---	---	---	13.12	13.24
15	---	---	---	---	---	---	---	---	---	---	13.12	13.27
16	---	---	---	---	---	---	---	---	---	---	13.11	13.27
17	---	---	---	---	---	---	---	---	---	---	13.14	13.26
18	---	---	---	---	---	---	---	---	---	---	13.15	13.26
19	---	---	---	---	---	---	---	---	---	---	13.16	13.28
20	---	---	---	---	---	---	---	---	---	---	13.19	13.30
21	---	---	---	---	---	---	---	---	---	---	13.11	13.30
22	---	---	---	---	---	---	---	---	---	---	13.14	13.27
23	---	---	---	---	---	---	---	---	---	---	13.17	13.29
24	---	---	---	---	---	---	---	---	---	---	13.18	13.31
25	---	---	---	---	---	---	---	---	---	12.85	13.19	13.35
26	---	---	---	---	---	---	---	---	---	12.87	13.21	13.35
27	---	---	---	---	---	---	---	---	---	12.91	13.24	13.34
28	---	---	---	---	---	---	---	---	---	12.92	13.25	13.31
29	---	---	---	---	---	---	---	---	---	12.92	13.27	13.31
30	---	---	---	---	---	---	---	---	---	12.92	13.27	13.33
31	---	---	---	---	---	---	---	---	---	12.92	13.28	---
MAX	---	---	---	---	---	---	---	---	---	---	13.28	13.36





## GROUND-WATER RECORDS - GEAUGA COUNTY

412309081202400. Local number GE-23

LOCATION.--Lat 41°23'09", long 81°20'24"; Alltel building on Bainbridge Rd., west of S.R. 306; Bainbridge Township.

Owner.--Alltel Telephone Company.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Commercial water supply well; diameter 5.63 in.; depth 42.5 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1162 feet above National Geodetic Vertical Datum of 1929. Measuring point:

Top of casing, 1.32 ft above land-surface datum.

PERIOD OF RECORD.--April 26, 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.46 ft below land-surface datum, April 26, 1978; lowest measured, 19.37 ft below land-surface datum, January 16, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-16-96	19.37
03-26-96	18.86
05-29-96	17.96
07-15-96	18.42
09-09-96	18.91

413202081015700. Local number, GE-48

LOCATION.--Lat 41°32'02", long 81°01'57"; Huntsburg Recreational Park, S.R. 322, 1/2 mi. east of S.R. 528; Huntsburg Township.

Owner.--Huntsburg Township Trustees.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Small public water supply well; diameter 5.63 in.; depth 58 ft; hand pump.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,090 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 1.09 ft above land-surface datum

PERIOD OF RECORD.--May 10, 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.58 ft below land-surface datum, September 17, 1980; lowest measured, 6.25 ft below land-surface datum, March 27, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-27-96	6.25
05-29-96	5.62
07-16-96	5.68

412051081165700. Local number GE-60

LOCATION.--Lat 41°20'51", long 81°16'57"; 10098 Crackell Road; Auburn Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 6 in.; depth 115 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,200 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.28 ft above land-surface datum.

PERIOD OF RECORD.--May 24, 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 58.23 ft below land-surface datum, May 24, 1978; lowest measured, 62.36 ft below land-surface datum, March 26, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-18-96	61.85
03-26-96	62.36

413138081152000. Local number, GE-76

LOCATION.--Lat 41°31'38", long 81°15'20"; 10755 Mayfield Road; Munson Township.

Owner.--Fowler's Mill Christian Church.

AQUIFER.--Sand and gravel of Quaternary age.

WELL CHARACTERISTICS.--Private water supply well; diameter 6.0 in.; depth 150 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,170 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.68 ft above land-surface datum.

PERIOD OF RECORD.--June 15, 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.19 ft below land-surface datum, June 15, 1978; lowest measured, 24.50 ft below land-surface datum, May 9, 1986 and August 21, 1986.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	24.01
03-26-96	23.09
05-29-96	22.20
07-15-96	22.48
09-09-96	23.52

412748081143900. Local number, GE-91

LOCATION.--Lat 41°27'48", long 81°14'39"; northeast corner of Auburn Rd. and S.R. 87 intersection; Newbury Township.  
Owner.--Dairy Mart.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Commercial water supply well; diameter 5.63 in.; depth 85 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,250 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.16 ft above land-surface datum.

PERIOD OF RECORD.--October 19, 1978 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 40.10 ft below land-surface datum, October 19, 1978; lowest measured, 45.83 ft below land-surface datum, March 27, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	45.37
03-27-96	45.66
05-28-96	44.73
07-15-96	44.56
09-09-96	44.49

413757081122300. Local number, GE-101

LOCATION.--Lat 41°37'57", long 81°12'23"; 12080 Clark Road; Chardon Township.

Owner.--Privately owned.

AQUIFER.--Sand and gravel of Quaternary age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 6.25 in.; depth 48 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 990 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.90 ft above land-surface datum.

PERIOD OF RECORD.--May 7, 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.49 ft below land-surface datum, January 29, 1986; lowest measured, 25.08 ft below land-surface datum, August 21, 1986.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	23.33
03-28-96	21.55
05-28-96	21.80
07-16-96	23.38
09-10-96	24.06

413755081101200. Local number, GE-103

LOCATION.--Lat 41°37'55", long 81°10'12"; 8755 Old State Road (S.R. 608); Hambden Township.

Owner.--Privately owned.

AQUIFER.--Berea Sandstone of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 136 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,159 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.40 ft above land-surface datum.

PERIOD OF RECORD.--May 7, 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 79.44 ft below land-surface datum, May 7, 1980; lowest measured, 91.85 ft below land-surface datum, March 27, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	91.25
03-27-96	91.85
05-29-96	91.26
07-16-96	91.35
09-10-96	91.24

413456081035600. Local number, GE-106

LOCATION.--Lat 41°34'56", long 81°03'56"; 10691 Clay Street; Montville Township.

Owner.--Privately owned.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 72 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,255 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.20 ft above land-surface datum.

PERIOD OF RECORD.--May 7, 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.84 ft below land-surface datum, May 7, 1980; lowest measured, 37.44 ft below land-surface datum, May 29, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	35.99
05-29-96	37.44
07-16-96	35.60
09-10-96	35.48

413207081044400. Local number GE-112

LOCATION.--Lat 41°32'07", long 81°04'44"; by golf course maintenance building at 15900 Mayfield Road; Huntsburg Township.

Owner.--Rolling Green Golf Course.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Commercial water supply well (not used for irrigation); diameter 5.63 in.; depth 80 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,265 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.30 ft above land-surface datum.

PERIOD OF RECORD.--May 8, 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 43.86 ft below land-surface datum, May 5, 1980; lowest measured, 48.77 ft below land-surface datum, March 27, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-16-96	48.17
03-27-96	48.77
05-29-96	48.16
07-16-96	48.04
09-10-96	47.93

412737081063300. Local number GE-115

LOCATION.--Lat 41°27'37", long 81°06'33"; 14992 White Road; Burton Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 80 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,170 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.30 ft above land-surface datum.

PERIOD OF RECORD.--May 9, 1980 to current year. Measurements discontinued after September 1996.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 23.10 ft below land-surface datum, May 9, 1980; lowest measured, 25.38 ft below land-surface datum, February 6, 1986.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-18-96	24.99
03-28-96	24.60
05-28-96	24.14
07-15-96	24.32
09-09-96	24.61

412657081040500. Local number GE-119

LOCATION.--Lat 41°26'57", long 81°03'57"; 15400 S.R. 608; Middlefield Township.

Owner.--Geauga County Airport.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Commercial water supply well; diameter 5.63 in.; depth 79 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,170 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.50 ft above land-surface datum.

PERIOD OF RECORD.--August 20, 1980 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.96 ft below land-surface datum, August 20, 1980; lowest measured, 15.31 ft below land-surface datum, March 28, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-16-96	14.49
03-28-96	15.31
05-28-96	13.69
07-15-96	13.46
09-09-96	13.96

412841081023200. Local number, GE-136

LOCATION.--Lat 41°28'41", long 81°02'32"; 16826 Nauvoo Road; Middlefield Township.

Owner.--Privately owned.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 58 ft; water level not static in spring and summer months--pump removes approximately 1 gal/min. of water from well during the growing season.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,130 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 1.20 ft above land-surface datum

PERIOD OF RECORD.--August 8, 1985 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.31 ft below land-surface datum, May 8, 1986; lowest measured, 24.27 ft below land-surface datum, May 28, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-16-96	17.44
03-28-96	19.34
05-28-96	24.27
07-15-96	18.71
09-09-96	18.87

## GROUND-WATER RECORDS - GEAUGA COUNTY

359

412138081072000. Local number GE-139

LOCATION.--Lat 41°21'38", long 81°07'20"; 14515 Hoover Road; Troy Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 90 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,171 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.37 ft above land-surface datum.

PERIOD OF RECORD.--August 15, 1985 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.02 ft below land-surface datum, May 28, 1996; lowest measured, 36.89 ft below land-surface datum, September 9, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	36.68
03-27-96	35.24
05-28-96	34.02
07-15-96	34.49
09-09-96	36.89

413155081214900. Local number GE-150

LOCATION.--Lat 41°31'55", long 81°21'49"; 12390 Caves Road; Chester Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 6.63 in.; depth 90 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,220 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.55 ft above land-surface datum.

PERIOD OF RECORD.--February 13, 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 25.12 ft below land-surface datum, May 9, 1986; lowest measured, 26.20 ft below land-surface datum, September 11, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-28-96	25.97
05-28-96	25.21
07-15-96	25.74
09-11-96	26.20

412319081135000. Local number GE-151

LOCATION.--Lat 41°23'19", long 81°13'50"; 17681 Messinger Road; Auburn Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 6 in.; depth 148 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,268 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.30 ft above land-surface datum.

PERIOD OF RECORD.--September 19, 1985 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 82.28 ft below land-surface datum, February 4, 1986; lowest measured, 85.96 ft below land-surface datum, March 27, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-16-96	85.62
03-27-96	85.96
05-28-96	84.85
07-16-96	85.03

412415081033500. Local number GE-163

LOCATION.--Lat 41°24'15", long 81°03'35"; 17115 Madison Road; Parkman Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 60 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,182 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.10 ft above land-surface datum.

PERIOD OF RECORD.--February 5, 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.17 ft below land-surface datum, February 5, 1986; lowest measured, 15.81 ft below land-surface datum, September 9, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-16-96	15.45
03-27-96	15.08
05-28-96	14.52
07-15-96	15.13
09-09-96	15.81

## GROUND-WATER RECORDS - GEAUGA COUNTY

412454081162400. Local number GE-166

LOCATION.--Lat 41°24'54", long 81°16'24"; 16725 Munn Road; Auburn Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 155 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,260 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.88 ft above land-surface datum.

PERIOD OF RECORD.--February 4, 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 50.92 ft below land-surface datum, February 4, 1986; lowest measured, 69.18 ft below land-surface datum, March 27, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-27-96	69.18
05-28-96	52.05
07-16-96	51.70
09-09-96	52.64

412311081213000. Local number, GE-170

LOCATION.--Lat 41°23'11", long 81°21'30"; 7956 Bainbridge Road; Bainbridge Township.

Owner.--Privately owned.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 92 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,110 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.47 ft above land-surface datum

PERIOD OF RECORD.--February 4, 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 44.95 ft below land-surface datum, March 26 and May 29, 1996; lowest measured, 50.00 ft below land-surface datum, August 18, 1986.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-26-96	44.95
05-29-96	44.95
07-15-96	46.63
09-09-96	47.49

412511081225900. Local number, GE-171

LOCATION.--Lat 41°25'11", long 81°22'59"; 7273 Chagrin-Bainbridge Road; Bainbridge Township.

Owner.--Privately owned.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 88 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 985 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.50 ft above land-surface datum

PERIOD OF RECORD.--February 4, 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 53.93 ft below land-surface datum, November 3, 1986; lowest measured, 55.39 ft below land-surface datum, August 18, 1986.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-26-96	54.17
05-29-96	55.26

413138081084200. Local number GE-178

LOCATION.--Lat 41°31'38", long 81°08'42"; 12616 Claridon-Troy Road; Claridon Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 94 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,312 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.50 ft above land-surface datum.

PERIOD OF RECORD.--February 6, 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 43.30 ft below land-surface datum, January 16, 1996; lowest measured, 57.40 ft below land-surface datum, March 28, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-16-96	43.30
03-28-96	57.40
05-29-96	56.85
07-16-96	56.70



## GROUND-WATER RECORDS - GEAUGA COUNTY

361

413114081201600. Local number GE-180

LOCATION.--Lat 41°31'14", long 81°20'16"; 12809 Chillicothe Road (S.R. 306); Chester Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 6 in.; depth 90 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,212 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.57 ft above land-surface datum.

PERIOD OF RECORD.--January 29, 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.83 ft below land-surface datum, May 28, 1996; lowest measured, 31.48 ft below land-surface datum, November 6, 1986.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-26-96	31.22
05-28-96	29.83

413118081193600. Local number GE-181

LOCATION.--Lat 41°31'18", long 81°19'36"; 8833 Mayfield Road; Chester Township.

Owner.--Rick's Body Shop.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Commercial water supply well; diameter 5.63 in.; depth 62 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,228 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.07 ft above land-surface datum.

PERIOD OF RECORD.--January 29, 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.25 ft below land-surface datum, March 26, 1996; lowest measured, 10.09 ft below land-surface datum, September 6, 1994.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-26-96	5.25

413630081145000. Local number, GE-185A

LOCATION.--Lat 41°36'30", long 81°14'50"; 9673 Mentor Road; Chardon Township.

Owner.--Privately owned.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.5 in.; depth 90 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,260 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 0.84 ft above land-surface datum

PERIOD OF RECORD.--January 1, 1996 through September 30, 1996.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 33.72 ft below land-surface datum, March 28, 1996; lowest measured, 35.64 ft below land-surface datum, July 16, 1986.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	34.83
03-28-96	33.72
05-28-96	34.21
07-16-96	35.64
09-11-96	33.78

413607081032500. Local number, GE-202

LOCATION.--Lat 41°36'07", long 81°03'25"; 9999 Plank Road; Montville Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 74 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,247 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.60 ft above land-surface datum.

PERIOD OF RECORD.--February 10, 1986 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 27.60 ft below land-surface datum, February 10, 1986; lowest measured, 30.30 ft below land-surface datum, September 6, 1994.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	29.88
03-27-96	30.22
05-29-96	29.46
07-16-96	29.72
09-10-96	29.94

## GROUND-WATER RECORDS - GEAUGA COUNTY

412408081221500. Local number, GE-228

LOCATION.--Lat 41°24'08", long 81°22'15"; 17172 Cats Den; Bainbridge Township.

Owner.--Privately owned.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 6 in.; depth 65 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,060 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 1.00 ft above land-surface datum

PERIOD OF RECORD.--September 7, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.92 ft below land-surface datum, September 7, 1994; lowest measured, 3.07 ft below land-surface datum, March 26, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-26-96	3.07

413755081134400. Local number, GE-246

LOCATION.--Lat 41°37'55", long 81°13'44"; 11445 Oak Hollow Drive; Chardon Township.

Owner.--Privately owned.

AQUIFER.--Sand and gravel of Quaternary age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 101 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,125 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.95 ft above land-surface datum.

PERIOD OF RECORD.--September 7, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 38.21 ft below land-surface datum, May 28, 1996; lowest measured, 39.38 ft below land-surface datum, March 28, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-28-96	39.38
05-28-96	38.21

413357081214800. Local number, GE-255

LOCATION.--Lat 41°33'57", long 81°21'48"; 11240 Caves Road; Chester Township.

Owner.--Privately owned.

AQUIFER.--Berea Sandstone of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 123 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,075 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.08 ft above land-surface datum.

PERIOD OF RECORD.--September 8, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 52.02 ft below land-surface datum, May 28, 1996; lowest measured, 54.04 ft below land-surface datum, January 17, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	54.04
03-27-96	53.05
05-28-96	52.02
07-15-96	53.03
09-11-96	53.23

413634081103500. Local number, GE-262

LOCATION.--Lat 41°36'34", long 81°10'35"; 9593 Wildwood Road; Hambden Township.

Owner.--Privately owned.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 6 in.; depth 100 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,200 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 1.60 ft above land-surface datum

PERIOD OF RECORD.--September 7, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.19 ft below land-surface datum, September 10, 1996; lowest measured, 40.26 ft below land-surface datum, March 27, 1996.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-27-96	40.26
05-29-96	38.89
07-16-96	34.25
09-10-96	34.19

413350081163500. Local number, GE-303

LOCATION.--Lat 41°33'50", long 81°16'35"; 10250 Mulberry Road; Munson Township.

Owner.--Privately owned.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 6 in.; depth 95 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,230 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 1.60 ft above land-surface datum

PERIOD OF RECORD.--September 7, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 59.90 ft below land-surface datum, May 29, 1996; lowest measured, 62.63 ft below land-surface datum, September 10, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-18-96	62.26
03-27-96	61.58
05-29-96	59.90
07-16-96	62.07
09-10-96	62.63

413315081134200. Local number, GE-308

LOCATION.--Lat 41°33'15", long 81°13'42"; 11675 Chestnutdale Drive; Munson Township.

Owner.--Privately owned.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 6 in.; depth 98 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,165 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 1.68 ft above land-surface datum

PERIOD OF RECORD.--September 7, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.77 ft below land-surface datum, September 7, 1994; lowest measured, 24.80 ft below land-surface datum, July 15, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-16-96	24.74
03-27-96	24.06
05-28-96	23.14
07-15-96	24.80
09-09-96	23.94

412558081184200. Local number GE-332

LOCATION.--Lat 41°25'58", long 81°18'42"; 103 Silver Springs; Russell Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 104 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,180 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.14 ft above land-surface datum.

PERIOD OF RECORD.--September 8, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 34.13 ft below land-surface datum, September 8, 1994; lowest measured, 34.89 ft below land-surface datum, September 9, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
05-28-96	34.42
07-15-96	34.68
09-09-96	34.89

412743081195700. Local number, GE-338

LOCATION.--Lat 41°27'43", long 81°19'57"; 14940 Surrey Downs; Russell Township.

Owner.--Privately owned.

AQUIFER.--Berea Sandstone of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.56 in.; depth 160 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,078 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.38 ft above land-surface datum.

PERIOD OF RECORD.--September 8, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 58.84 ft below land-surface datum, September 8, 1994; lowest measured, 67.47 ft below land-surface datum, September 9, 1996.

#### WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-17-96	65.68
03-27-96	65.53
05-28-96	65.37
07-15-96	67.33
09-09-96	67.47

## GROUND-WATER RECORDS - GEAUGA COUNTY

414121081030800. Local number, GE-341

LOCATION.--Lat 41°41'21", long 81°03'08"; 6758 Madison Road; Thompson Township.

Owner.--Thompson United Methodist Church.

AQUIFER.--Cuyahoga Group (interbedded shales and sandstones) of Mississippian age.

WELL CHARACTERISTICS.--Private water supply well; diameter 6.63 in.; depth 120 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,267 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 2.00 ft above land-surface datum

PERIOD OF RECORD.--September 7, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.31 ft below land-surface datum, March 27, 1996; lowest measured, 10.11 ft below land-surface datum, September 7, 1994.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
01-18-96	4.69
03-27-96	4.31
05-29-96	5.48
07-17-96	6.25
09-10-96	6.60

413957081052100. Local number, GE-343

LOCATION.--Lat 41°39'57", long 81°05'21"; 15554 Valentine Road; Thompson Township.

Owner.--Privately owned.

AQUIFER.--Berea Sandstone of Mississippian age.

WELL CHARACTERISTICS.--Domestic water supply well; diameter 5.63 in.; depth 120 ft.

INSTRUMENTATION - Periodic measurement with steel or electric tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 1,145 feet above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.60 ft above land-surface datum.

PERIOD OF RECORD.--September 7, 1994 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 70.73 ft below land-surface datum, July 17, 1996; lowest measured, 72.93 ft below land-surface datum, September 7, 1994.

## WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

Date	Water Level
03-27-96	71.79
05-29-96	71.10
07-17-96	70.73

## GROUND-WATER RECORDS - GEAUGA COUNTY

365

414125081031500. Local number GE-348

LOCATION.--Lat 41°41'25", long 81°03'15"; 66506 W. Thompson Road; Thompson Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well, not currently in use; diameter 6.0 in.; depth 53 ft.

INSTRUMENTATION - Pressure transducer and CR10 data logger (records hourly) with SM192 storage module.

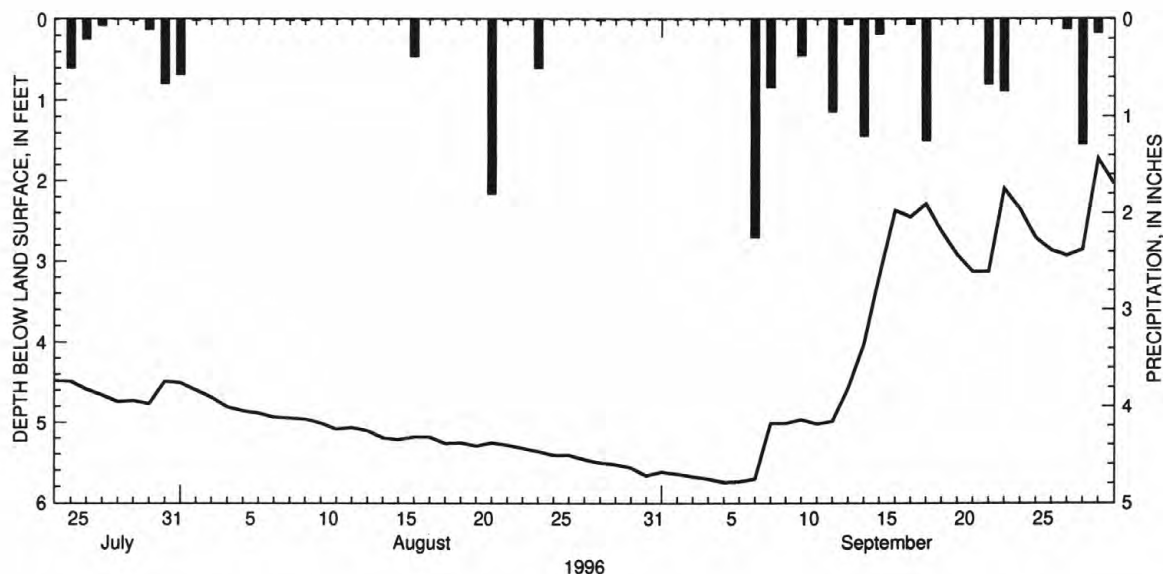
DATUM.--Elevation of land-surface datum is 1,265 feet above National Geodetic Vertical Datum of 1929. Measuring

point: Mark on wooden base of instrument shelter, 2.55 ft above land-surface datum.

PERIOD OF RECORD.--July 23, 1996 through September 30, 1996.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.25 ft below land-surface datum, September 28, 1996;  
lowest measured, 5.75 ft below land-surface datum, September 5, 1996.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	4.51	5.62
2	---	---	---	---	---	---	---	---	---	---	4.60	5.65
3	---	---	---	---	---	---	---	---	---	---	4.69	5.68
4	---	---	---	---	---	---	---	---	---	---	4.81	5.71
5	---	---	---	---	---	---	---	---	---	---	4.86	5.75
6	---	---	---	---	---	---	---	---	---	---	4.89	5.74
7	---	---	---	---	---	---	---	---	---	---	4.94	5.71
8	---	---	---	---	---	---	---	---	---	---	4.95	5.01
9	---	---	---	---	---	---	---	---	---	---	4.96	5.01
10	---	---	---	---	---	---	---	---	---	---	5.01	4.97
11	---	---	---	---	---	---	---	---	---	---	5.09	5.02
12	---	---	---	---	---	---	---	---	---	---	5.07	4.99
13	---	---	---	---	---	---	---	---	---	---	5.11	4.58
14	---	---	---	---	---	---	---	---	---	---	5.20	4.03
15	---	---	---	---	---	---	---	---	---	---	5.22	3.18
16	---	---	---	---	---	---	---	---	---	---	5.19	2.37
17	---	---	---	---	---	---	---	---	---	---	5.19	2.45
18	---	---	---	---	---	---	---	---	---	---	5.27	2.29
19	---	---	---	---	---	---	---	---	---	---	5.26	2.63
20	---	---	---	---	---	---	---	---	---	---	5.30	2.92
21	---	---	---	---	---	---	---	---	---	---	5.26	3.13
22	---	---	---	---	---	---	---	---	---	---	5.29	3.13
23	---	---	---	---	---	---	---	---	---	---	5.33	2.10
24	---	---	---	---	---	---	---	---	---	4.48	5.37	2.35
25	---	---	---	---	---	---	---	---	---	4.49	5.42	2.71
26	---	---	---	---	---	---	---	---	---	4.59	5.42	2.86
27	---	---	---	---	---	---	---	---	---	4.66	5.47	2.93
28	---	---	---	---	---	---	---	---	---	4.74	5.51	2.85
29	---	---	---	---	---	---	---	---	---	4.73	5.53	1.73
30	---	---	---	---	---	---	---	---	---	4.77	5.57	2.04
31	---	---	---	---	---	---	---	---	---	4.49	5.67	---
MAX	---	---	---	---	---	---	---	---	---	---	5.67	5.75





## GROUND-WATER RECORDS - GEAUGA COUNTY

413247081103300. Local number GE-349

LOCATION.--Lat 41°32'47", long 81°10'33"; 121 Bershire Drive, Aquilla Village; Claridon Township.

Owner.--Privately owned.

AQUIFER.--Pottsville Formation (sandstone) of Pennsylvanian age.

WELL CHARACTERISTICS.--Domestic water supply well, not currently in use; diameter 5.63 in.; depth 58.19 ft.

INSTRUMENTATION - Pressure transducer and CR10 data logger (records hourly) with SM192 storage module.

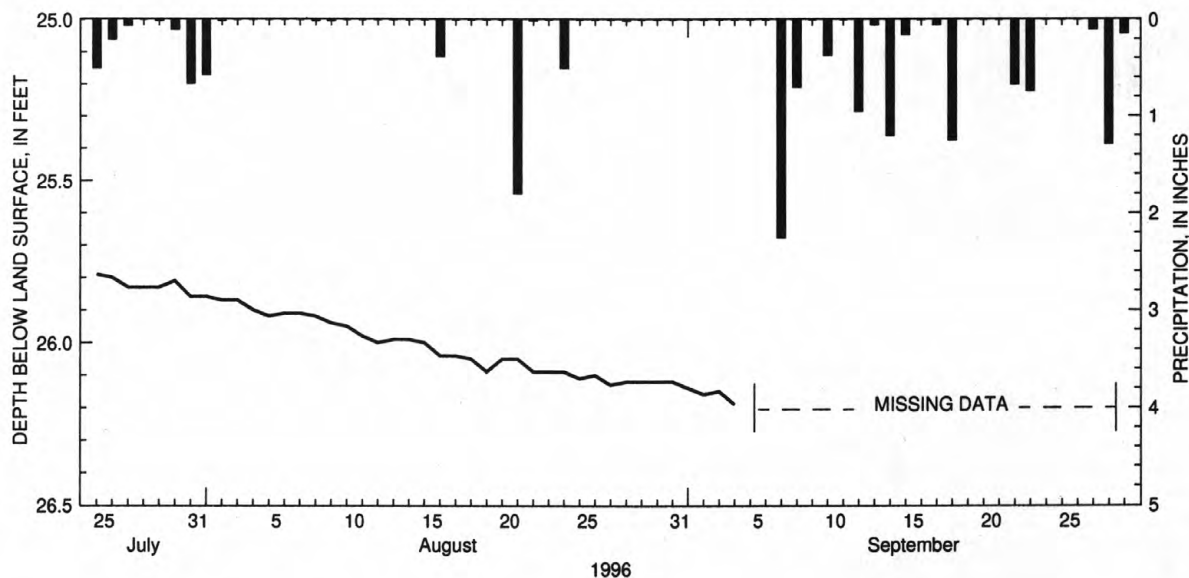
DATUM.--Elevation of land-surface datum is 1,190 feet above National Geodetic Vertical Datum of 1929. Measuring

point: Mark on wooden base of instrument shelter, 1.05 ft above land-surface datum.

PERIOD OF RECORD.--July 27, 1996 through September 5, 1996.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 25.64 ft below land-surface datum, July 25, 1996;  
lowest measured, 26.19 ft below land-surface datum, September 4, 1996.DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	25.86	26.14
2	---	---	---	---	---	---	---	---	---	---	25.87	26.16
3	---	---	---	---	---	---	---	---	---	---	25.87	26.15
4	---	---	---	---	---	---	---	---	---	---	25.90	26.19
5	---	---	---	---	---	---	---	---	---	---	25.92	---
6	---	---	---	---	---	---	---	---	---	---	25.91	---
7	---	---	---	---	---	---	---	---	---	---	25.91	---
8	---	---	---	---	---	---	---	---	---	---	25.92	---
9	---	---	---	---	---	---	---	---	---	---	25.94	---
10	---	---	---	---	---	---	---	---	---	---	25.95	---
11	---	---	---	---	---	---	---	---	---	---	25.98	---
12	---	---	---	---	---	---	---	---	---	---	26.00	---
13	---	---	---	---	---	---	---	---	---	---	25.99	---
14	---	---	---	---	---	---	---	---	---	---	25.99	---
15	---	---	---	---	---	---	---	---	---	---	26.00	---
16	---	---	---	---	---	---	---	---	---	---	26.04	---
17	---	---	---	---	---	---	---	---	---	---	26.04	---
18	---	---	---	---	---	---	---	---	---	---	26.05	---
19	---	---	---	---	---	---	---	---	---	---	26.09	---
20	---	---	---	---	---	---	---	---	---	---	26.05	---
21	---	---	---	---	---	---	---	---	---	---	26.05	---
22	---	---	---	---	---	---	---	---	---	---	26.09	---
23	---	---	---	---	---	---	---	---	---	---	26.09	---
24	---	---	---	---	---	---	---	---	---	---	26.09	---
25	---	---	---	---	---	---	---	---	---	25.79	26.11	---
26	---	---	---	---	---	---	---	---	---	25.80	26.10	---
27	---	---	---	---	---	---	---	---	---	25.83	26.13	---
28	---	---	---	---	---	---	---	---	---	25.83	26.12	---
29	---	---	---	---	---	---	---	---	---	25.83	26.12	---
30	---	---	---	---	---	---	---	---	---	25.81	26.12	---
31	---	---	---	---	---	---	---	---	---	25.86	26.12	---
MAX	---	---	---	---	---	---	---	---	---	---	26.13	---



# LOW-FLOW MAGNITUDE AND FREQUENCY OF OHIO STREAMS

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The following table lists the sites of the low-flow partial record network in Ohio, including the instantaneous discharge measurements made at each site for the 1996 water year. The data were collected as part of a cooperative study with The Ohio Department of Natural Resources. The objective of the study is to define the low-flow characteristics of 180 stream sites that have essentially unregulated flow.

## 03098390 MILL CREEK NEAR YOUNGSTOWN, OHIO

LOCATION.-- Lat 41°02'00", Long 80°41'37", Mahoning County, Hydrologic Unit 05030103 at pedestrian bridge over Mill Creek at end of extra parking lot next to Mill Creek Park Golf Course, 0.75 northeast of park entrance at SR 224, 0.75 mi. downstream of Indian Run, 3.1 mi. upstream of Newport Lake Dam, 3 mi. southwest of South Side Youngstown, Ohio. (Youngstown 1:24000 quad)

DRAINAGE AREA.-- 51.5 mi<sup>2</sup>.

Station Number	Date	Discharge
03098390	8/8/96	7.36

## 03108996 MIDDLE FORK LITTLE BEAVER CREEK AT TEEGARDEN, OHIO

LOCATION.-- Lat 40°49'18", Long 80°49'37", Columbiana County, Hydrologic Unit 05030101 at Teegarden covered bridge of Eagleton Road over Middle Fork Little Beaver Creek (covered bridge is abandoned, next to new bridge), 3.3 mi. below Stone Mill Run, 1 mi. northeast of Salem Reservoir, 4.5 mi. northwest of Lisbon, Ohio. (Lisbon 1:24000 quad)

DRAINAGE AREA.-- 90.2 mi<sup>2</sup>.

Station Number	Date	Discharge
03108996	8/7/96	18.7

## 03109861 YELLOW CREEK AT BERGHOLZ, OHIO

LOCATION.-- Lat 40°30'54", Long 80°53'17", Jefferson County, Hydrologic Unit 05030101 at state route 164 bridge over Yellow Creek, 0.8 mi. below confluence of Elkhorn Creek, 0.4 mi. southwest of Bergholz, Ohio. (Bergholz 1:24000 quad)

DRAINAGE AREA.-- 65.8 mi<sup>2</sup>.

Station Number	Date	Discharge
03109861	8/7/96	5.91

## 03111465 SHORT CREEK AT ADENA, OHIO

LOCATION.-- Lat 40°13'09", Long 80°52'22", Jefferson County, Hydrologic Unit 05030106 at bridge on Adena-Smithfield Road in Adena, 400 ft downstream from North Fork.

DRAINAGE AREA.-- 63.9 mi<sup>2</sup>.

Station Number	Date	Discharge
03111465	8/7/96	28.1

## 03112820 MCMAHON CREEK AT GLENCOE, OHIO

LOCATION.-- Lat 40°00'10", Long 80°52'38", Belmont County, Hydrologic Unit 05030106 at bridge on County Road 149, 0.7 mi. (1.1 km) southeast of Glencoe, Ohio. (St. Clairsville 1:24000 quad)

DRAINAGE AREA.-- 50.7 mi<sup>2</sup>.

Station Number	Date	Discharge
None Performed		

## 03113550 MCMAHON CREEK AT BELLAIRE, OHIO

LOCATION.-- Lat 40°00'39", Long 80°45'45", Belmont County, Hydrologic Unit 05030106 at bridge on county road connecting Bellaire with State Route 147 on right bank of McMahon Creek, 300 ft upstream from Bellaire City Limits at stream crossing. (Lansing 1:24000 quad)

DRAINAGE AREA.-- 90.2 mi<sup>2</sup>.

Station Number	Date	Discharge
03113550	9/26/96	15.0

## 03114241 SUNFISH CREEK AT COATS, OHIO

LOCATION.-- Lat 39°46'14", Long 81°02'34", Monroe County, Hydrologic Unit 05030201 at riffle beside Sunfish Creek Road, 800 ft downstream from confluence of unnamed tributary, 0.7 mi. downstream from confluence of Standingstone Run, 1.0 mi. southeast of Coats, 4.0 mi east of Woodsfield, Ohio. (Woodsfield 1:24000 quad)

DRAINAGE AREA.-- 51.3 mi<sup>2</sup>.

Station Number	Date	Discharge
None Performed		

## 03140700 BUFFALO FORK AT PLEASANT CITY, OHIO

LOCATION.-- 39°54'10", Long 81°33'15", Guernsey County, Hydrologic Unit 05040005 at bridge on State Highway 82, 500 ft north of junction with State Highway 146, at Pleasant City. (Byesville 1:24000 quad)

DRAINAGE AREA.-- 71.1 mi<sup>2</sup>.

Station Number	Date	Discharge
03140700	9/25/96	4.52

## LOW-FLOW MAGNITUDE AND FREQUENCY OF OHIO STREAMS

03143760 WAKATOMIKA CREEK NEAR PERRYTON, OHIO

LOCATION.-- Lat 40°13'10", Long 82°10'53", Coshocton County, Hydrologic Unit 05040004, at point in stream 0.15 mile north of east-west section of county road, 0.7 mi. upstream from Winding Fork, 5.2 mi. north of Perryton, Ohio.

(Perryton 1:24000 quad)  
DRAINAGE AREA.-- 58.3 mi<sup>2</sup>.

Station Number	Date	Discharge
03143760	8/7/96	6.69
03143760	9/26/96	8.00

03150200 MEIGS CREEK NEAR REINERSVILLE, OHIO

LOCATION.-- Lat 39°37'43", Long 81°43'12", Morgan County, Hydrologic Unit 05040004, at county road bridge at Unionville, 0.1 mi. upstream from Dyes Fork, 5.1 mi. southwest of Reinersville, Ohio. (Reinersville 1:24000 quad)

DRAINAGE AREA.-- 73.0 mi<sup>2</sup>.

Station Number	Date	Discharge
03150200	9/25/96	3.47

03158165 MONDAY CREEK NEAR GREENDALE, OHIO

LOCATION.-- Lat 39°31'24", Long 82°16'17", Hocking County, Hydrologic Unit 05030204 at Dawley Road over Monday Creek, 0.7 mi above confluence with Sand Run, 0.9 mi. above proposed reservoir site, 1.3 m. southeast of Greendale, 4 mi. northeast of Haydenville, Ohio. (Gore 1:24000 quad)

DRAINAGE AREA.-- 67.2 mi<sup>2</sup>.

Station Number	Date	Discharge
03158165	9/6/96	6.68

03159555 EAST BRANCH SHADE RIVER NEAR TUPPERS PLAINS, OHIO

LOCATION.-- Lat 39°08'29", Long 81°52'39", Meigs County, Hydrologic Unit 05030202 at bridge on private road, adjacent to Township Road 279, 2.1 mi. downstream from Meigs Creek, 2.8 mi. upstream from Big Run, 2.7 mi. southwest of Tappers Plains, Ohio (Alfred 1:24000 quad)

DRAINAGE AREA.-- 37.5 mi<sup>2</sup>.

Station Number	Date	Discharge
03159555	9/26/96	2.02

03160050 LEADING CREEK NEAR MIDDLEPORT, OHIO

LOCATION.-- Lat 39°00'25", Long 82°05'10", Meigs County, Hydrologic Unit 05030202 at first private road bridge, 1.2 mi. above State Highway 7, 1.75 mi. northwest of Middleport, Ohio. (Pomeroy 1:24000 quad)

DRAINAGE AREA.-- 118 mi<sup>2</sup>.

Station Number	Date	Discharge
03160050	9/26/96	9.94

03230745 DEER CREEK AT US 142 NEAR LONDON, OHIO

LOCATION.-- Lat 39°54'17", Long 83°23'35", Madison County, Hydrologic Unit 05060002 at bridge on State Route 142, 3.0 mi. northeast of London, Ohio. (London 1:24000 quad)

DRAINAGE AREA.-- 50.7 mi<sup>2</sup>.

Station Number	Date	Discharge
03230745	10/30/96	2.92

03231550 PAINT CREEK AT WASHINGTON COURT HOUSE, OHIO

LOCATION.-- Lat 39°32'12", Long 83°26'46", Fayette County, Hydrologic Unit 05060003 at bridge on US 35 (Dayton Avenue) in Washington Court House, 1.7 mi. (2.7 km) upstream from East Fork Paint Creek. (Washington Court House 1:24000 quad)

DRAINAGE AREA.-- 62.3 mi<sup>2</sup>.

Station Number	Date	Discharge
03231500	9/30/96	1.87

03231620 EAST FORK PAINT CREEK NEAR BLOOMINGBURG, OHIO

LOCATION.-- Lat 39°35'15", Long 83°23'47", Fayette County, Hydrologic Unit 05060003 at bridge on Matthews Road, 0.3 mi. upstream from Green Ditch, 1.2 mi. south of Bloomingburg, Ohio, 2.0 mi. upstream from Big Run. (Washington Court House 1:24000 quad)

DRAINAGE AREA.-- 36.8 mi<sup>2</sup>.

Station Number	Date	Discharge
03231620	8/30/96	<0.10

03237040 BIG BEAVER CREEK NEAR PIKETON, OHIO

LOCATION.-- Lat 39°02'41", Long 83°01'18", Pike County, Hydrologic Unit 05060002 at bridge on State Route 124, 0.9 mi. upstream from Little Beaver Creek, 1.2 mi. south of Piketon, Ohio. (Piketon 1:24000 quad)

DRAINAGE AREA.-- 62.0 mi<sup>2</sup>.

Station Number	Date	Discharge
03237040	8/29/96	1.72
03237040	9/25/96	0.43

03237130 SCIOTO BRUSH CREEK AT OTWAY, OHIO

LOCATION.-- Lat 38°51'43", Long 83°11'24", Scioto County, Hydrologic Unit 05060002, 600 ft upstream from South Fork, at State Highway 348 bridge in Otway Ohio. (Otway 1:24000 quad)

DRAINAGE AREA.-- 94.4 mi<sup>2</sup>.

Station Number	Date	Discharge
03237130	8/27/96	1.00
03237130	9/25/96	0.52

# LOW-FLOW MAGNITUDE AND FREQUENCY OF OHIO STREAMS

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03238370 EAST FORK WHITE OAK CREEK NEAR SARDINIA, OHIO

LOCATION.-- Lat 39°00'24", Long 83°49'19", Brown County, Hydrologic Unit 05090201, at State Route 32 bridge, 0.2 mi. (0.3 km) upstream from Slab Camp Run, 0.7 mi. (1.1 km) west of Sardinia, Ohio. (Sardinia 1:24000 quad)

DRAINAGE AREA.-- 60.1 mi<sup>2</sup>.

Station Number  
03238370

Date  
8/29/96

Discharge  
5.31

03243150 TODD FORK NEAR CLARKSVILLE, OHIO

LOCATION.-- Lat 39°26'10", Long 83°56'41", Clinton County, Hydrologic Unit 05090202, at bridge on U.S. Highway 22, 1.0 mi. (1.6 km) upstream from Lytle Creek, 2.7 mi. (4.3 km) northeast of Clarksville, Ohio. (Clarksville 1:24000 quad)

DRAINAGE AREA.-- 56.6 mi<sup>2</sup>.

Station Number  
03243150

Date  
8/30/96

Discharge  
2.36

03260450 SOUTH FORK GREAT MIAMI RIVER NEAR HUNTSVILLE, OHIO

LOCATION.-- Lat 40°28'43", Long 83°48'43", Logan County, Hydrologic Unit 05080001, at State Route 117 bridge, 3.3 mi. (5.3 km) upstream from Indian Lake, 2.5 mi. (4.0 km) north of Huntsville, Ohio. (Huntsville 1:24000 quad)

DRAINAGE AREA.-- 47.5 mi<sup>2</sup>.

Station Number  
03260450

Date  
9/6/96

Discharge  
4.66

03263168 STILLWATER RIVER NEAR ANSONIA, OHIO

LOCATION.-- Lat 40°13'01", Long 84°36'44", Darke County, Hydrologic Unit 05080001, at Beisner Road over Stillwater River, 0.1 mi. north of State Route 47, 1.2 mi. east of Ansonia, 1.8 mi. west of Dawn, Ohio. (Dawn 1:24000 quad)

DRAINAGE AREA.-- 74.3 mi<sup>2</sup>.

Station Number  
03263168

Date  
8/30/96

Discharge  
2.68

03263390 GREENVILLE CREEK NEAR COLETOWN, OHIO

LOCATION.-- Lat 40°08'54", Long 84°43'56", Darke County, Hydrologic Unit 05080001, at bridge on Fisher Road, 1.9 mi. (2.9 km) northwest of Coletown, Ohio. (Ansonia 1:24000 quad)

DRAINAGE AREA.-- 69.2 mi<sup>2</sup>.

Station Number  
03263390

Date  
8/30/96

Discharge  
7.41

03266647 MAD RIVER AT LIPPINCOTT, OHIO

LOCATION.-- Lat 40°11'41", Long 83°47'48", Champaign County, Hydrologic Unit 05080001, at Lippincott Road bridge over Mad River, 0.55 mi. upstream from confluence of Macochee Ditch, 1.5 mi. upstream from confluence of Gladly Creek, 4.0 mi. southwest of West Liberty, Ohio, 5.0 mi. northwest of Urbana, Ohio. (Northville 1:24000 quad)

DRAINAGE AREA.-- 68.4 mi<sup>2</sup>.

Station Number  
03266647

Date  
9/6/96

Discharge  
47.1

03266897 KINGS CREEK NEAR URBANA, OHIO

LOCATION.-- Lat 40°09'25", Long 83°47'08", Champaign County, Hydrologic Unit 05080001, at State Route 290 bridge over Kings Creek, just above confluence with Mad River, 3.0 mi. northwest of Urbana, Ohio. (Northville 1:24000 quad)

DRAINAGE AREA.-- 43.6 mi<sup>2</sup>.

Station Number  
03266897

Date  
9/6/96

Discharge  
36.2

03271736 TWIN CREEK AT LEWISBURG, OHIO

LOCATION.-- Lat 39°51'17", Long 84°31'54", Preble County, Hydrologic Unit 05080002, at U.S. Route 40 over Twin Creek, 0.1 mi. below confluence with Millers Fork, 0.1 mi. above confluence with Swamp Creek, 0.3 mi. east of Lewisburg, Ohio. (Lewisburg 1:24000 quad)

DRAINAGE AREA.-- 68.4 mi<sup>2</sup>.

Station Number  
03271736

Date  
8/30/96

Discharge  
3.12

04180911 ST MARYS RIVER ABOVE KOPP CREEK AT ST MARYS, OHIO

LOCATION.-- Lat 40°32'07", Long 84°22'38", Auglaize County, Hydrologic Unit 04100004, at Aqueduct Road over St. Mary's River, 150 ft. upstream of Miami and Erie Canal aqueduct, 0.3 mi. above confluence of Kopp Creek, 2.1 mi. east of Grand Lake, 0.5 mi. southeast of St. Mary's, Ohio. (St. Marys 1:24000 quad)

DRAINAGE AREA.-- 67.0 mi<sup>2</sup>.

Station Number  
04180911

Date  
8/30/96

Discharge  
1.28

04185200 BEAVER CREEK NEAR STRYKER, OHIO

LOCATION.-- Lat 41°27'23", Long 84°26'09", Williams County, Hydrologic Unit 04100006, at bridge of township road, 0.3 mi. (0.5 km) upstream from mouth, 3.1 mi. (5.0 km) southwest of Stryker, Ohio (Evansport 1:24000 quad)

DRAINAGE AREA.-- 44.8 mi<sup>2</sup>.

Station Number  
04185200

Date  
8/31/96

Discharge  
1.85

## LOW-FLOW MAGNITUDE AND FREQUENCY OF OHIO STREAMS

04185299 BRUSH CREEK AT EVANSPOUT, OHIO

LOCATION.-- Lat 41°26'00", Long 84°23'24", Williams County, Hydrologic Unit 04100006, at county road over Brush Creek, 1.0 mi. above mouth, 0.4 mi. north of Williams/Defiance county line, 0.6 mi northeast of Evansport, Ohio. (Evansport 1:24000 quad)

DRAINAGE AREA.-- 64.8 mi<sup>2</sup>.

Station Number	Date	Discharge
04185299	8/31/96	2.20

04189172 RILEY CREEK NEAR BLUFFTON, OHIO

LOCATION.-- Lat 40°54'12", Long 83°56'19", Allen County, Hydrologic Unit 04100007, at Phillips Road bridge over Riley Creek, 3.7 mi. downstream from confluence of Little Riley Creek, 2.5 mi. northwest of Bluffton, Ohio. (Bluffton 1:24000 quad)

DRAINAGE AREA.-- 64.4 mi<sup>2</sup>.

Station Number	Date	Discharge
04189172	9/4/96	1.80

04191007 TOWN CREEK NEAR HOAGLIN, OHIO

LOCATION.-- Lat 40°58'36", Long 84°28'36", Van Wert County, Hydrologic Unit 04100007, at State Route 637 bridge over Town Creek, 2.1 mi. above confluence with Maddox Creek, 0.9 mi. south of Paulding/Van Wert County line, 2.3 mi. northeast of Hoaglin, 3.1 mi. north of State Route 224, 10 mi. northeast of Van Wert, Ohio. (Wetsel 1:24000 quad)

DRAINAGE AREA.-- 51.7 mi<sup>2</sup>.

Station Number	Date	Discharge
04191007	9/6/96	4.36

04191100 FLATROCK CREEK NEAR PAYNE, OHIO

LOCATION.-- Lat 41°05'57", Long 84°40'06", Paulding County, Hydrologic Unit 04100007, at Township road 71 bridge, 2.0 mi. downstream from Wildcat Creek, 3.5 mi. northeast of Payne, Ohio. Proceed 3.4 mi. northeast from Payne on State Highway 500 to township road 71, turn right and go 0.1 mi. to bridge and station. (Payne 1:24000 quad)

DRAINAGE AREA.-- 147 mi<sup>2</sup>.

Station Number	Date	Discharge
04191100	8/31/96	2.92

04194362 SOUTH BRANCH PORTAGE RIVER NEAR JERRY CITY, OHIO

LOCATION.-- Lat 41°16'22", Long 83°30'56", Wood County, Hydrologic Unit 04100010, at Portage View Road over South Branch Portage River, 0.6 mi. above confluence with East Branch, 2.1 mi. southeast of Six Points, 4.5 mi. northeast of Jerry City, Ohio. (Jerry City 1:24000 quad)

DRAINAGE AREA.-- 54.0 mi<sup>2</sup>.

Station Number	Date	Discharge
04194362	9/4/96	0

04197052 HONEY CREEK NEAR CAROLINE, OHIO

LOCATION.-- Lat 41°02'41", Long 82°51'04", Seneca County, Hydrologic Unit 04100011, at truss bridge over Honey Creek, 1.7 mi. below confluence with Brokenknife Creek, 2.3 mi. east of Caroline, 2.5 mi. southeast of Attica, Ohio. (Centerton 1:24000 quad)

DRAINAGE AREA.-- 69.0 mi<sup>2</sup>.

Station Number	Date	Discharge
04197052	9/4/96	0.88

04198007 MUSKELLUNGE CREEK NEAR FREMONT, OHIO

LOCATION.-- Lat 41°22'21", Long 83°08'46", Sandusky County, Hydrologic Unit 04100011, at Christy Road bridge, 1.8 mi. (2.9 km) upstream from mouth, 1.8 mi. (2.9 km) northwest of Fremont, Ohio. (Fremont West 1:24000 quad)

DRAINAGE AREA.-- 41.8 mi<sup>2</sup>.

Station Number	Date	Discharge
04198007	9/4/96	0.29

04199706 EAST BRANCH BLACK RIVER NEAR PENFIELD, OHIO

LOCATION.-- Lat 41°08'12", Long 82°07'00", Medina/Lorain County, Hydrologic Unit 04110001, at Smith Road bridge over East Branch Black River, on Medina/Lorain County Line, 0.3 mi. east of State Route 301, 2.2 mi. south of Penfield, 3.2 mi. north of Spencer, Ohio. (Lagrange 1:24000 quad)

DRAINAGE AREA.-- 105 mi<sup>2</sup>.

Station Number	Date	Discharge
04199706	8/28/96	2.18

04201079 WEST BRANCH ROCKY RIVER NEAR MEDINA, OHIO

LOCATION.-- Lat 41°09'09", Long 81°50'02", Medina County, Hydrologic Unit 04110001, at Weymouth Road bridge over West Branch Rocky River, 0.3 mi. below confluence with North Branch, 1.9 mi northeast of Medina, Ohio. (Medina 1:24000 quad)

DRAINAGE AREA.-- 61.2 mi<sup>2</sup>.

Station Number	Date	Discharge
04201079	8/29/96	0.04

04208815 CHAGRIN RIVER AT CHAGRIN FALLS, OHIO

LOCATION.-- Lat 41°25'33", Long 81°23'52", Geauga County, Hydrologic Unit 04110003, at bridge on Miles Road, at west city limits of Chagrin Falls, Ohio. (Chagrin Falls 1:24000 quad)

DRAINAGE AREA.-- 57.3 mi<sup>2</sup>.

Station Number	Date	Discharge
04208815	8/29/96	12.3



# LOW-FLOW MAGNITUDE AND FREQUENCY OF OHIO STREAMS

371

04212085 BIG CREEK AT PAINESVILLE, OHIO

LOCATION.-- Lat 41°41'50", Long 81°13'47", Lake County, Hydrologic Unit 04110004, at Fry Road bridge, 1.1 mi. (1.8 km) upstream from mouth, 0.5 mi. (0.8 km) south of south city limits of Painesville, Ohio. (Painesville 1:24000 quad)

DRAINAGE AREA.-- 36.4 mi<sup>2</sup>.

Station Number  
04212085

Date  
8/7/96

Discharge  
5.24

04212453 ASHTABULA RIVER NEAR KELLOGGSVILLE, OHIO

LOCATION.-- Lat 41°50'00", Long 80°37'13", Ashtabula County, Hydrologic Unit 04110003, at Root Road Covered Bridge over Ashtabula River, 1.7 mi. downstream of confluence of East and West Branches of Ashtabula River, 1.6 mi. south of Kelloggsville, 2.4 mi. east of Sheffield Center, 7.5 mi. southeast of Ashtabula, Ohio. (Pierpont 1:24000 quad)

DRAINAGE AREA.-- 66.5 mi<sup>2</sup>.

Station Number  
04212453

Date  
8/7/96

Discharge  
2.09



**Figure 10.** Low-flow station network.

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## CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To obtain
<i>Length</i>		
inch (in.)	$2.54 \times 10^1$	millimeter
	$2.54 \times 10^{-2}$	meter
foot (ft)	$3.048 \times 10^{-1}$	meter
mile (mi)	$1.609 \times 10^0$	kilometer
<i>Area</i>		
acre	$4.047 \times 10^3$	square meter
	$4.047 \times 10^{-1}$	square hectometer
	$4.047 \times 10^{-3}$	square kilometer
square mile (mi <sup>2</sup> )	$2.590 \times 10^0$	square kilometer
<i>Volume</i>		
gallon (gal)	$3.785 \times 10^0$	liter
	$3.785 \times 10^0$	cubic decimeter
	$3.785 \times 10^{-3}$	cubic meter
million gallons (Mgal)	$3.785 \times 10^3$	cubic meter
	$3.785 \times 10^{-3}$	cubic hectometer
cubic foot (ft <sup>3</sup> )	$2.832 \times 10^1$	cubic decimeter
	$2.832 \times 10^{-2}$	cubic meter
cubic-foot-per-second day [(ft <sup>3</sup> /s) d]	$2.447 \times 10^3$	cubic meter
	$2.447 \times 10^{-3}$	cubic hectometer
acre-foot (acre-ft)	$1.233 \times 10^3$	cubic meter
	$1.233 \times 10^{-3}$	cubic hectometer
	$1.233 \times 10^{-6}$	cubic kilometer
<i>Flow</i>		
cubic foot per second (ft <sup>3</sup> /s)	$2.832 \times 10^1$	liter per second
	$2.832 \times 10^1$	cubic decimeter per second
	$2.832 \times 10^{-2}$	cubic meter per second
gallon per minute (gal/min)	$6.309 \times 10^{-2}$	liter per second
	$6.309 \times 10^{-2}$	cubic decimeter per second
	$6.309 \times 10^{-5}$	cubic meter per second
million gallons per day (Mgal/d)	$4.381 \times 10^1$	cubic decimeter per second
	$4.381 \times 10^{-2}$	cubic meter per second
<i>Mass</i>		
ton (short)	$9.072 \times 10^{-1}$	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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