



MONTHLY WATER INVENTORY REPORT FOR OHIO

January 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

SUMMARY

Precipitation was below normal throughout most of the state with only the Northwest Region and a few areas in southern Ohio having above normal precipitation. Streamflow was above normal statewide. Reservoir storage continued to remain above the normal seasonal levels. Ground water levels showed net improvement during the month and were near or above normal statewide. Lake Erie level rose 0.04 foot and was 1.91 feet above the long-term January average. Water supplies continue to remain in good condition throughout the state.

NOTES AND COMMENTS

The Ohio Department of Natural Resources, as well as many other state and local agencies, cooperate with the U. S. Geological Survey on water resource programs and studies in Ohio. As part of the ODNR Division of Water's effort to disseminate Ohio water resource information, the "Monthly Water Inventory Report For Ohio" will now announce the availability of new reports and documents published cooperatively with the U. S. Geological Survey that concern Ohio's water resources.

NEW PUBLICATION

Effects of Receiving-Water Quality and Wastewater Treatment on Injury, Survival, and Regrowth of Fecal-Indicator Bacteria and Implications for Assessment of Recreational Water Quality (U. S. Geological Survey Water-Resources Investigations Report 96-4199)

by Donna S. Francy, Teresa L. Hart, and Cathy M. Vrosteck

This report, prepared in cooperation with the Ohio Water Development Authority, the Northeast Ohio Regional Sewer District, and the Summit County Department of Environmental Services, describes a recent study of the current testing methods for concentration of fecal coliforms that are used for determining the health risks of swimming in receiving waters. The study concluded that different testing standards are needed, particularly in waters in which proportions of chlorinated or dechlorinated effluents are high.

The U. S. Environmental Protection Agency has required states to develop new chlorine water-quality standards for protection of aquatic life. This will require the reduction of chlorine concentration in receiving waters. To meet these standards, many wastewater treatment plants must dechlorinate effluents before discharging them into inland waterways. This process results in a reduction in chlorine-contact time for fecal-indicator bacteria and pathogenic microorganisms. Limited information exists on the effect of dechlorination on the repair and survival of chlorine-injured fecal-indicator bacteria and the possible increased risk of swimming in waters with an undetected population of injured bacteria.

The authors studied the effects of receiving-water quality and wastewater-plant chlorination practices on fecal-coliform injury and survival in receiving waters and on fecal-coliform regrowth on growth medium. Field studies were done to analyze the concentrations of injured and healthy fecal coliforms by the use of standard selective and enhanced-recovery membrane-filtration methods. An attempt was made to determine the relation between the concentrations of fecal coliforms by these two methods by use of linear regression analysis. The report provides water-resource managers with information on the use of enhanced-recovery methods to assess recreational water quality and on the effectiveness of different chlorination practices in reducing fecal-coliform concentrations.

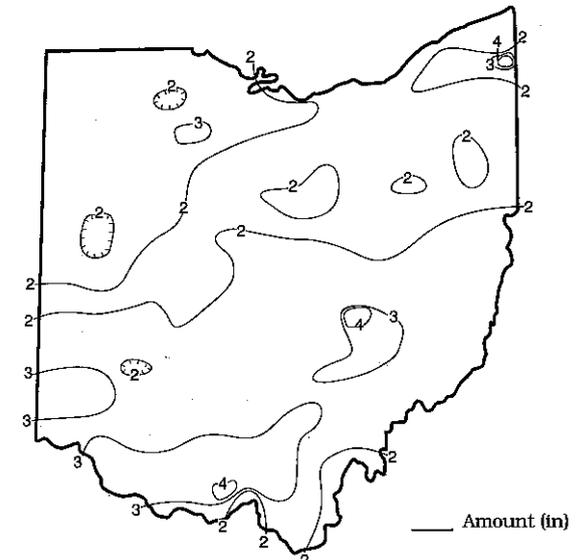
Copies of this report are available from the U. S. Geological Survey, Water Resources Division, 975 West Third Avenue, Columbus, Ohio 43212-5626, phone (614) 469-5553.

PRECIPITATION during January was below normal throughout most of the state with only the Northwest Region and a few areas in southern Ohio having above normal precipitation. The state average was 2.21 inches, 0.55 inch below normal. Regional averages ranged from 2.72 inches, 0.51 inch below normal, for the Southwest Region to 1.80 inches, 0.50 inch below normal, for the North Central Region. The Northwest Region averaged 2.28 inches of precipitation in January, 0.10 inch above normal. Shawnee State Forest (Scioto County) reported the greatest amount of precipitation for the month, 4.67 inches. Zanesville (Muskingum County) and Andover (Ashtabula County) also reported 4 or more inches of precipitation for January. Fredericktown (Knox County) reported the least amount of January precipitation, 1.17 inches.

Most of the precipitation during January fell as rain. Snow amounts were below normal throughout most of the state with only a few areas in northwestern and northeastern Ohio having near or above normal snowfall. The first three weeks of the month were rather dry in most areas of Ohio, although some precipitation fell during every week. Weekly amounts during this period were generally 0.25 to 0.5 inch or less. The last ten days of the month were much wetter with many reporting stations having measurable precipitation on several days during the January 22-28 period. Most areas of the state received up to 1 inch of rain during January 22-25 with some locations reporting nearly 2 inches. The month's heaviest storms crossed the state on January 26-27 when nearly 1 inch of rain fell at most locations with greater amounts of nearly 2 inches reported in some southern areas of the state.

Precipitation for the 1997 water year is above normal throughout Ohio. The state average is 11.83 inches, 1.50 inches above normal. Regional averages range from 14.60 inches, 3.77 inches above normal, for the Northeast Region to 10.66 inches, 0.56 inch above normal, for the Central Region.

PRECIPITATION JANUARY 1997

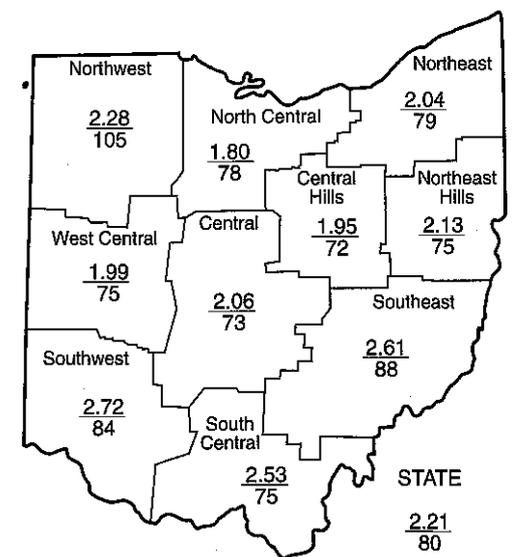


PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.)					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+0.10	+1.97	+0.29	+1.38	-1.43	+1.7
North Central	-0.50	+1.82	+4.36	+6.72	+8.55	+3.5
Northeast	-0.55	+2.08	+7.78	+12.25	+12.30	+4.8
West Central	-0.68	+2.07	+1.06	+8.00	+14.38	+3.8
Central	-0.75	+1.00	+0.71	+7.37	+11.83	+3.0
Central Hills	-0.75	+1.55	+3.78	+8.41	+9.98	+3.4
Northeast Hills	-0.70	+1.24	+3.30	+7.51	+5.15	+3.1
Southwest	-0.51	+1.38	+1.08	+13.36	+18.02	+4.0
South Central	-0.84	+0.69	+0.15	+7.12	+7.25	+2.2
Southeast	-0.36	+0.71	+0.40	+8.15	+8.16	+2.9
State	-0.55	+1.46	+2.29	+8.04	+9.45	

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Volnovich
Governor

Donald C. Anderson
Director

Michele Willis
Chief

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MEAN STREAM DISCHARGE

River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	This Month		
				% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	1,768	168	168	174	144
Great Miami River at Hamilton	3,630	4,783	161	155	149	180
Huron River at Milan	371	1,130	318	331	278	179
Killbuck Creek at Killbuck	464	597	158	235	237	170
Little Beaver Creek near East Liverpool	496	716	144	192	189	139
Maumee River at Waterville	6,330	6,929	220	177	143	122
Muskingum River at McConnelsville	7,422	9,774	124	165	160	153
Scioto River near Prospect	567	571	169	263	227	159
Scioto River at Higby	5,131	6,337	170	179	176	180
Stillwater River at Pleasant Hill	503	637	176	185	160	151

STREAMFLOW during January was above normal throughout the state. Flows in north-central and northeastern Ohio were high enough to be considered excessive. Flows during January were less than the near-record flows recorded during December.

Flows at the beginning of the month were above normal throughout most of the state, but had fallen to slightly below normal in the basins draining into Lake Erie in north-central and northeastern Ohio. Generally, flows declined during the first three weeks of the month with slight increases occurring after light showers. Most drainage

basins had their lowest flows for the month during January 19-21. The exception was in northeastern Ohio where the lowest flows occurred much earlier in the month happening around either January 2 or January 10. The greatest flows for January occurred during the last week of the month following several days of precipitation that fell during January 22-28. Most drainage basin flows peaked on January 28, but in western and northwestern Ohio, peak flows were a few days earlier. Minor flooding caused by ice jams was reported in some areas. Flows at the end of the month were above normal throughout the state.

RESERVOIR STORAGE for water supply during January increased in the Scioto basin reservoirs and was unchanged in the Mahoning basin reservoirs. Storage remained above normal in both basins.

Reservoir storage at the end of January in the Mahoning basin index reservoirs was 81 percent of rated capacity for water supply compared with the same for last month and 93 percent for January 1996. Month-end storage in the Scioto basin index reservoirs was 103 percent of rated capacity for water supply compared with 97 percent for last month and 105 percent for January 1996.

GROUND WATER LEVELS during January showed net rises from last month's levels throughout the state. Generally, levels in consolidated aquifers were stable throughout the month while levels in unconsolidated aquifers declined during the first three weeks of the month and then rose during the last ten days. Net changes during January from December's levels were near normal in consolidated aquifers, but less than usually observed in unconsolidated aquifers.

Ground water supplies are in good condition throughout Ohio. Current levels are higher than they were a year ago and near or above normal throughout the state. Precipitation so far during the 1997 water year has resulted in an excellent start to the recharge period for ground water supplies statewide. Even with the below normal precipitation in January, the current hydrologic and climatic conditions are still favorable for continued improvement in ground water storage. With near-normal climatic conditions during the next several months, ground water supplies should continue to improve and maintain their favorable condition.

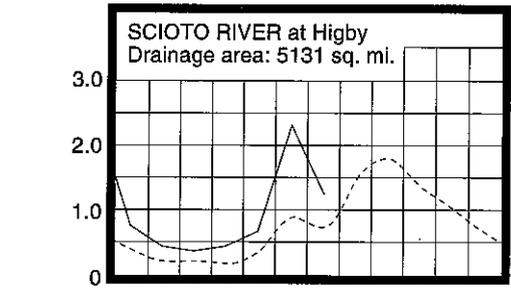
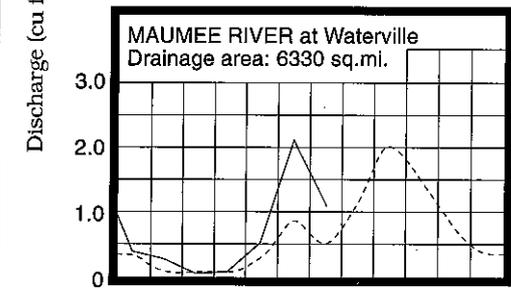
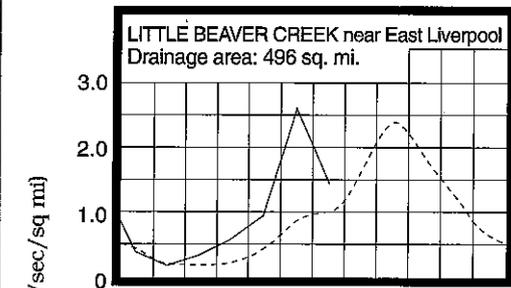
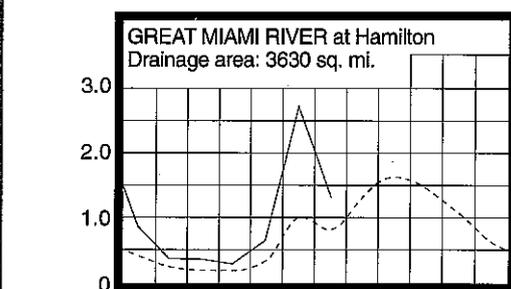
LAKE ERIE level rose slightly during January. The mean level was 572.51 feet (IGLD-1985), 0.04 foot above last month's mean level and 1.91 feet above normal. This month's level is 1.45 feet above the January 1996 level and 3.31 feet above Low Water Datum.

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	15.69	-0.14	+1.23	+1.82
Fa-1	Jasper Mill, Fayette Co.	Limestone	7.47	-0.03	+0.63	-0.46
Fr-10	Columbus, Franklin Co.	Gravel	42.02	+1.59	+0.32	+0.39
H-1	Harrison, Hamilton Co.	Gravel	20.99	+1.14	+0.06	+0.52
Hn-2a	Dola, Hardin Co.	Dolomite	7.13	+1.07	+1.71	+0.77
Po-1	Windham, Portage Co.	Sandstone	19.30	+1.25	+0.25	+1.71
Tu-1	Strasburg, Tuscarawas Co.	Gravel	12.44	+0.49	+0.19	+2.90

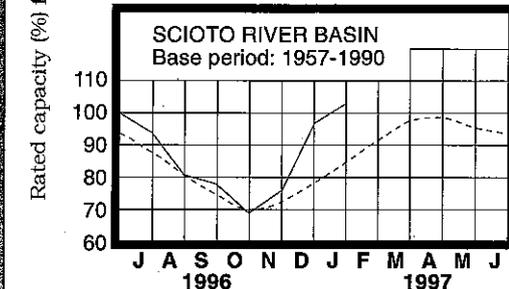
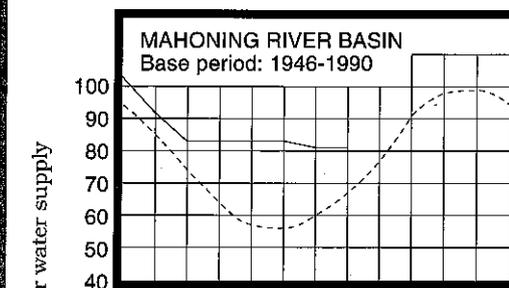
MEAN STREAM DISCHARGE



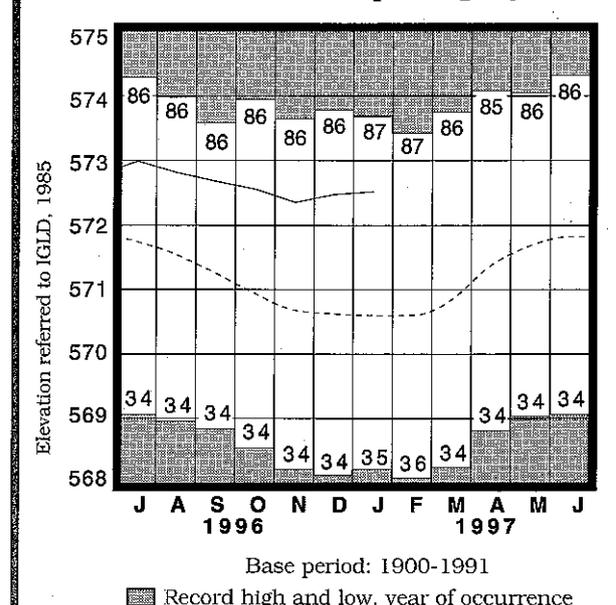
Base period for all streams: 1961-1990

Normal - - - - Current - - - -

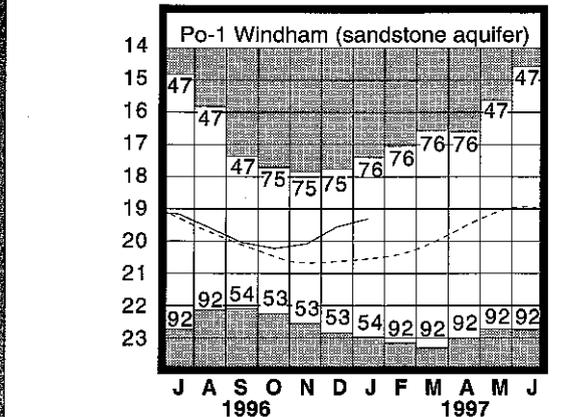
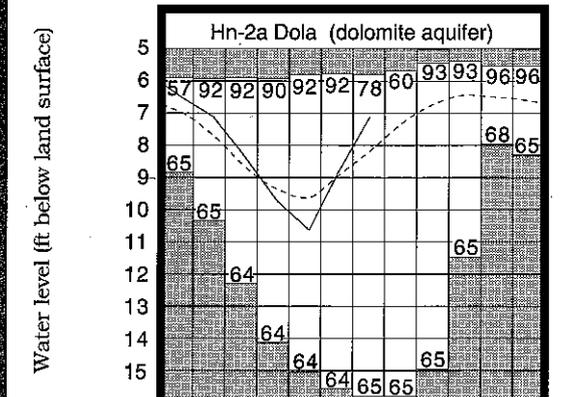
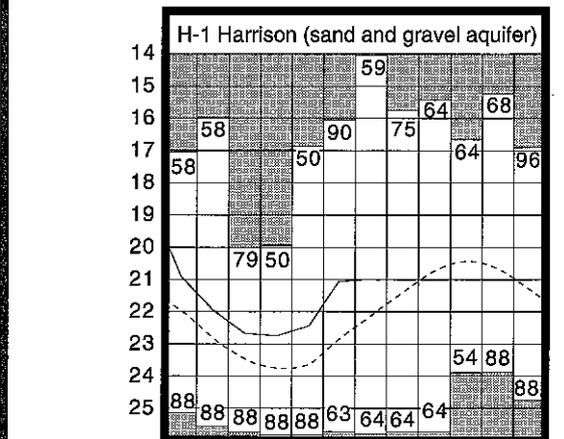
RESERVOIR STORAGE FOR WATER SUPPLY



LAKE ERIE LEVELS at Fairport

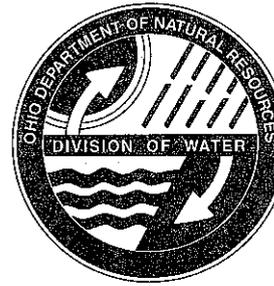


GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990. Po-1, 1947-1990
Record high and low, year of occurrence

Normal - - - - Current - - - -



MONTHLY WATER INVENTORY REPORT FOR OHIO

February 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

SUMMARY

Precipitation was above normal in northern and western Ohio, but below normal elsewhere. Streamflow was above normal throughout most of the state. Reservoir storage increased and remained above normal. Ground water levels improved in nearly all aquifers. Lake Erie level rose 0.19 foot and was 2.10 feet above the long-term February average level.

NOTES AND COMMENTS

WMAO ANNUAL SPRING MEETING

The Water Management Association of Ohio (WMAO) will hold its annual spring meeting on May 16-18, 1997 at the Akron Ramada Inn. The meeting is being co-sponsored by WMAO, the Ohio Department of Natural Resources, the All Ohio Chapter of the Soil and Water Conservation Society, and Rivers Unlimited. The theme of this conference will be "Ohio Greenways: Making the Connections." The conference will feature several regional greenways across Ohio and will address topics that focus on economic development, recreation, land use planning, flood control, water quality improvement and protection of sensitive environments.

The meeting is structured so that participants can attend one day or all three days. Several tours have been arranged that will demonstrate how cities, municipalities, regional planners, and others have utilized greenways and the benefits that have been achieved. This meeting will offer an opportunity to network and interact with many new faces and interests and to find out how the many and diverse water management disciplines throughout the state are compatible with land trusts, river protection and other environmental groups, and recreational enthusiasts.

Registration materials will be available soon. For more information contact:

Elaine Marsh
Rivers Unlimited
4570 Akron-Peninsula Road
Peninsula, Ohio 44264-9634
Phone: (216) 657-2055
e-mail: ohgreenway@aol.com

EDITORS NOTE: Flooding in Southern Ohio

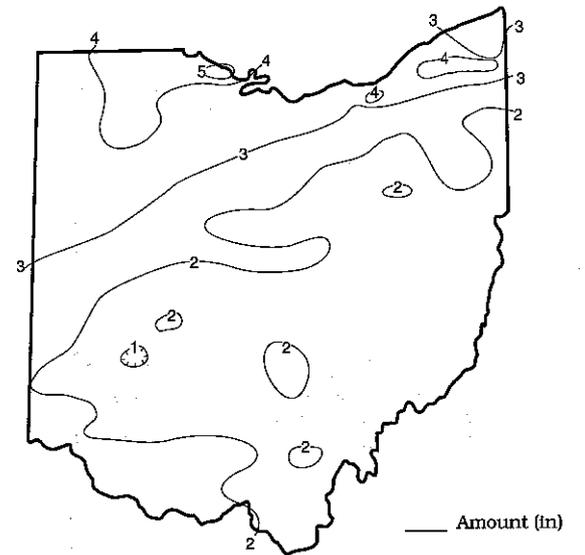
As we are all aware, significant flooding occurred in southern Ohio during the first week of March. Information concerning this event will be included in the March issue of the "Monthly Water Inventory Report for Ohio." Verified and detailed information will be available at that time. Governor Voinovich's request to the federal government to declare at least 16 counties in southern Ohio as disaster areas has been approved.

ACKNOWLEDGMENTS

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Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conserancy District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

PRECIPITATION FEBRUARY 1997



PRECIPITATION during February was above normal in northern and western Ohio, but below normal in the central, eastern and southern areas of the state. The state average was 2.28 inches, 0.04 inch above normal. Regional averages ranged from 3.70 inches, 1.86 inches above normal, for the Northwest Region to 1.68 inches, 0.81 inch below normal, for the Southeast Region. Crane Creek State Park (Ottawa County) reported the greatest amount of precipitation for the month, 5.30 inches. Xenia (Greene County) reported the least amount, 0.91 inch.

Most of the precipitation during February fell as rain. Precipitation for the month accumulated in an atypical pattern with the greatest amounts in northwestern Ohio and lesser amounts in the southern and eastern areas of the state. Snow amounts were generally less than one-half of those usually observed throughout the state. Chardon (Geauga County) reported 11.5 inches of snow for February, about 9 inches below normal. Most of February's precipitation fell during two periods. The first was February 4-5 when most areas of the state received between 0.5 and 1 inch of precipitation with some locations reporting nearly 1.5 inches. This was the month's greatest precipitation for most of the southern half of the state. The next three weeks of the month were rather dry, although some light precipitation fell on many days. Generally, daily amounts were nominal, seldom exceeding 0.1 inch, but a few areas received amounts of up to 0.25 inch on a couple of the days during this period. The month's heaviest storms crossed the northern portion of the state on February 26-27. Most areas in northwestern and extreme northern Ohio received more than 1 inch of rain and some locations reported more than 2 inches. Precipitation amounts decreased rapidly to the south and east totaling only around 0.25 inch in southeastern Ohio. Minor flooding was reported in northern Ohio following these storms.

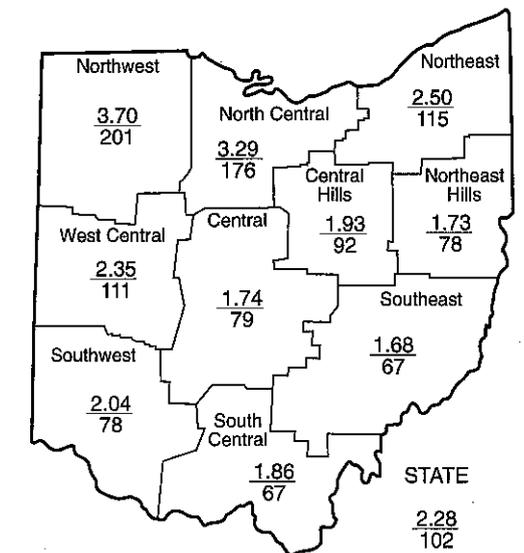
Precipitation for the 1997 calendar year is below normal throughout most of the state with only the Northwest and North Central regions having above normal precipitation. The state average is 4.50 inches, 0.50 inch below normal. Regional averages range from 6.00 inches, 1.98 inches above normal, for the Northwest Region to 3.82 inches for both the Central Hills and Northeast Hills regions, 0.97 inch and 1.24 inches below normal respectively.

Precipitation for the 1997 water year is above normal throughout most of Ohio with only the South Central and Southeast regions having slightly below normal precipitation. The state average is 14.12 inches, 1.55 inches above normal. Regional averages range from 16.78 inches, 3.78 inches above normal, for the Northeast Region to 12.32 inches, 0.01 inch above normal, for the Central Region.

PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.)					Palmer Drought Severity Index*
	This Month	Past				
	3 Mos.	6 Mos.	12 Mos.	24 Mos.		
Northwest	+1.86	+2.91	+3.62	+3.94	+1.53	+3.0
North Central	+1.42	+2.82	+7.94	+8.15	+10.74	+4.4
Northeast	+0.33	+0.77	+8.83	+12.42	+13.07	+5.1
West Central	+0.24	+1.66	+4.47	+8.92	+16.28	+4.2
Central	-0.47	-0.11	+2.39	+6.76	+12.12	+3.2
Central Hills	-0.16	+0.97	+5.43	+8.22	+10.91	+3.2
Northeast Hills	-0.50	+0.09	+4.16	+7.03	+5.39	+2.7
Southwest	-0.58	+0.30	+2.82	+13.74	+18.83	+4.0
South Central	-0.92	-1.12	+0.81	+6.45	+7.39	+3.6
Southeast	-0.81	-1.10	+1.64	+6.34	+7.70	+3.3
State	+0.04	+0.72	+4.20	+8.20	+10.42	

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
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Below -4.0 = Extreme Drought



Average (in)
Percent of normal



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor
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Director
Michele Wilks
Chief

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MEAN STREAM DISCHARGE

River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	This Month		
				% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	2,240	114	130	167	145
Great Miami River at Hamilton	3,630	6,276	129	174	147	185
Huron River at Milan	371	1,231	264	267	268	193
Killbuck Creek at Killbuck	464	799	114	179	185	173
Little Beaver Creek near East Liverpool	496	740	88	148	148	132
Maumee River at Waterville	6,330	15,264	217	195	160	140
Muskingum River at McConnelsville	7,422	12,180	100	137	138	150
Scioto River near Prospect	567	983	147	219	188	164
Scioto River at Higby	5,131	8,893	118	157	149	180
Stillwater River at Pleasant Hill	503	936	168	191	138	156

STREAMFLOW during February was above normal throughout most of the state with only a few drainage basins in eastern Ohio having slightly below normal flows. Flows in northwestern and north-central Ohio were high enough to be considered excessive. Flows during February increased seasonally from the flows recorded during January.

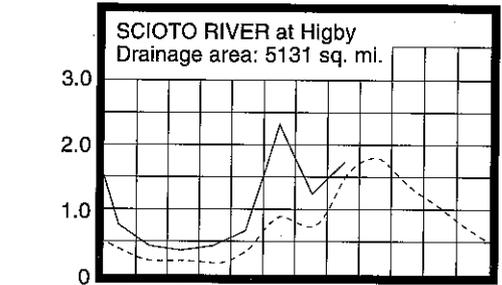
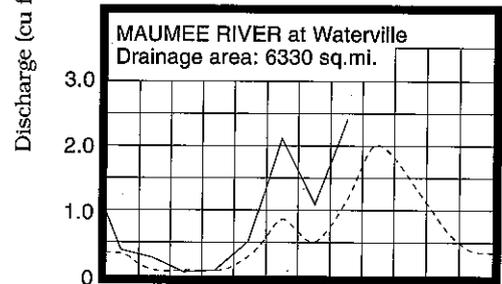
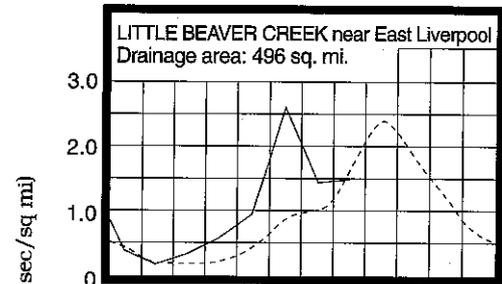
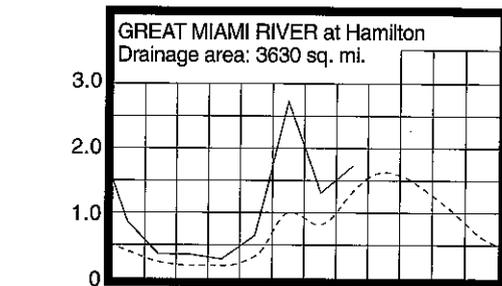
Flows at the beginning of the month were near or slightly below normal throughout the state. Flows increased rapidly after February 4 following the month's most widespread precipitation. Most drainage basins had their greatest flows for the month during February 5-7. Exceptions were in northwestern and north-central Ohio where the month's greatest flows occurred during February 27-28 following heavy storms in north-

ern Ohio. Minor flooding was reported during this period in some basins in this area. Lowest flows for the month occurred during February 16-18 in all drainage basins. Flows at the end of the month above normal in most areas of the state, but slightly below normal in southeastern Ohio.

RESERVOIR STORAGE for water supply during February increased in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of February in the Mahoning basin index reservoirs was 88 percent of rated capacity for water supply compared with 81 percent for last month and 92 percent for February 1996. Month-end storage in the Scioto basin index reservoirs was 106 percent of rated capacity for water supply compared with 103 percent for last month and 105 percent for February 1996. Surface water supplies continue to remain in good shape throughout the state.

MEAN STREAM DISCHARGE

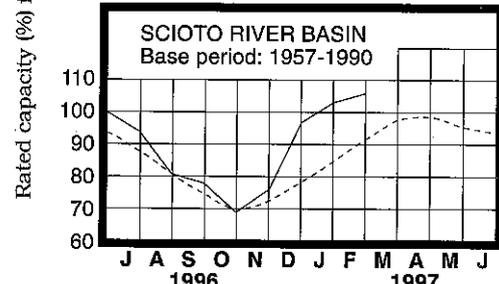
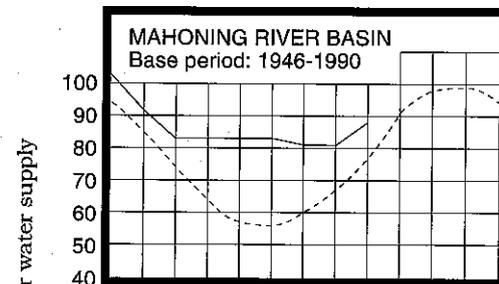


J A S O N D J F M A M J
1996 1997

Base period for all streams: 1961-1990

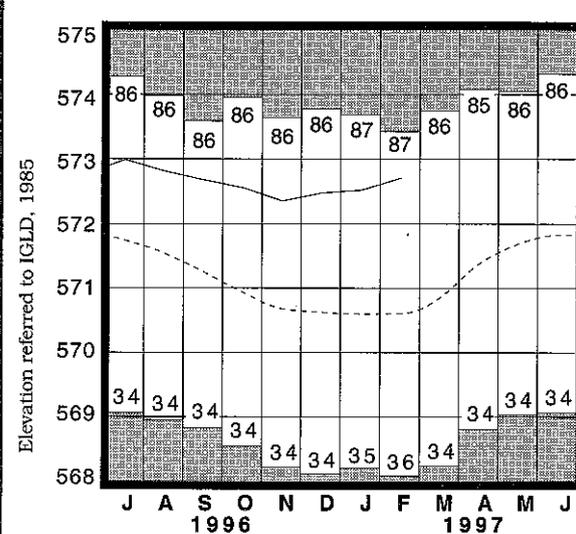
Normal - - - - Current - - - -

RESERVOIR STORAGE FOR WATER SUPPLY



J A S O N D J F M A M J
1996 1997

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

Normal - - - - Current - - - -

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	14.63	-0.15	+1.06	+0.06
Fa-1	Jasper Mill, Fayette Co.	Limestone	7.36	-0.28	+0.11	-0.41
Fr-10	Columbus, Franklin Co.	Gravel	41.74	+1.35	+0.28	+0.10
H-1	Harrison, Hamilton Co.	Gravel	20.78	+0.62	+0.21	+0.62
Hn-2a	Dola, Hardin Co.	Dolomite	6.66	+0.68	+0.47	+0.37
Po-1	Windham, Portage Co.	Sandstone	19.12	+1.28	+0.18	+1.64
Tu-1	Strasburg, Tuscarawas Co.	Gravel	12.56	-0.42	-0.12	+1.03

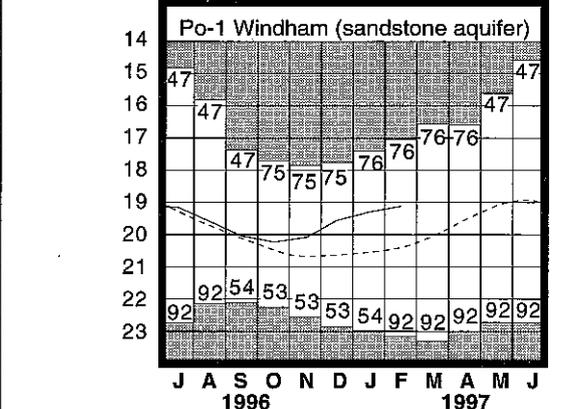
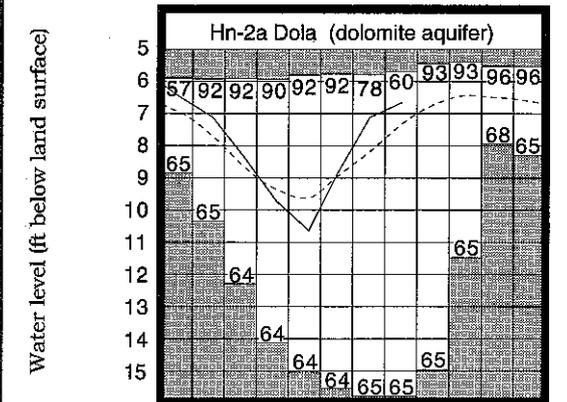
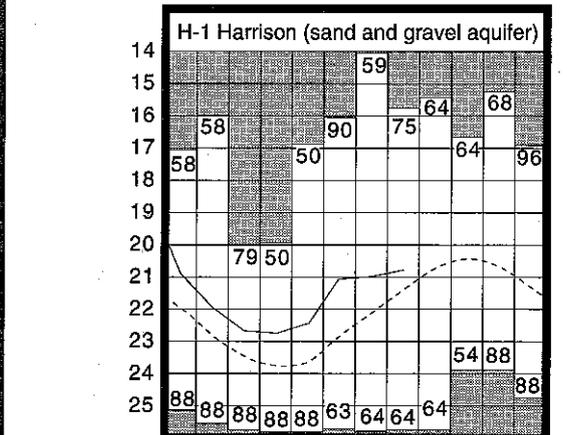
GROUND WATER LEVELS during February showed net rises from last month's levels in most aquifers. Net changes during February from January's levels were less than usually observed across the state. Generally, levels in consolidated aquifers and in deep, unconsolidated aquifers were stable or rose gradually during the month while levels in unconsolidated aquifers rose early in the month following widespread precipitation and then stabilized or declined until just before the end of the month.

Ground water supplies continue to remain adequate throughout Ohio even though levels in some aquifers have fallen to slightly below normal following sub-par precipitation during the past two months in many areas of the state. However, current levels are higher than they were a year ago in most aquifers due to an excellent start of the 1997 water year recharge period. Ground water levels can be expected to continue to improve during the next few months provided climatic and other hydrologic conditions are near normal during this period.

LAKE ERIE rose during February. The mean level was 572.70 feet (IGLD-1985), 0.19 foot above last month's mean level and 2.10 feet above normal. This month's level is 1.57 feet above the February 1996 level and 3.50 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during February averaged 3.7 inches, 1.6 inches above normal. The entire Great Lakes basin averaged 2.5 inches of precipitation during February, 0.7 inch above normal. For calendar year 1997 through February, the Lake Erie basin has averaged 6.1 inches of precipitation, 1.6 inches above normal, and the entire Great Lakes basin has averaged 5.8 inches, 1.9 inches above normal.

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current - - - -



MONTHLY WATER INVENTORY REPORT FOR OHIO

March 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

SUMMARY

Precipitation was above normal throughout the state. Streamflow was above normal throughout the state. Catastrophic flooding occurred in southern Ohio during the first week of the month. Many smaller drainage basins had record daily flows easily exceeding the 100-year flood levels. Reservoir storage remained at above normal seasonal levels. Ground water storage improved and was above normal in most areas of the state. Lake Erie level rose 0.82 foot and was 2.65 feet above the long-term March level.

NOTES AND COMMENTS

HEAVY RAINS CAUSE CATASTROPHIC FLOODING IN SOUTHERN OHIO

Heavy rains during March 1-2 caused flash floods across southern Ohio resulting in more than \$180 million in economic loss to public and private property and tragically claiming three lives. Amounts of up to nearly 12 inches were reported in some areas and many small drainage basins flooded to record levels. Governor Voinovich's request to have 18 Ohio counties declared disaster areas was approved making them eligible for a wide range of federal and state disaster assistance. Those counties are: Adams; Athens; Brown; Clermont; Gallia; Hamilton; Highland; Hocking; Jackson; Lawrence; Meigs; Monroe; Morgan; Pike; Ross; Scioto; Vinton; and Washington.

Rain began falling shortly after midnight on March 1 and continued through mid-morning on March 2. The storm crossed through northern Kentucky and the southern half of Ohio covering a large area with more than 5 inches of rain. The heaviest rain was concentrated in northwestern Kentucky where amounts of nearly 14 inches were reported. In Ohio, the greatest amounts fell in the southern tier of counties, roughly south of a line from southern Clermont County through southern Pike County, across Vinton County, and into Hocking County. This entire area received more than 6 inches of rain. The hardest hit areas were in Adams, Brown, and Scioto counties where from 8 to nearly 12 inches of rain fell. Ripley (Brown County) reported 11.93 inches. Although rain amounts diminished rapidly to the north, 3 inch amounts fell on areas south and east of a line from near Cincinnati up to Licking County and 1 inch amounts from Darke County over to Knox County.

Runoff from this storm quickly brought small streams and rivers out of their banks. Flood levels rose rapidly, quickly inundating surrounding low-lying areas. River levels in many areas were the highest ever observed, easily surpassing 100-year flood elevations. Data is available from four existing stream gauges in the hardest hit areas. The Ohio Brush Creek near West Union (Adams County) gauge peaked at 31.15 feet, easily exceeding the previous peak of 27.91 feet set in March 1964 and the 100-year flood level of 27.35 feet. The Raccoon Creek near Adamsville (Gallia County) gauge peaked at 29.11 feet, passing the previous peak of 28.69 feet set in May 1968 and the 100-year flood level of 28.7 feet. The Shade River near Chester (Meigs County) gauge peaked at 31.38 feet, easily surpassing the previous peak of 27.39 feet set in May 1968 and the 100-year flood level of 28.5 feet. The Whiteoak Creek at Georgetown (Brown County) gauge peaked at 9.4 feet which is slightly less than the 25-year flood level of 9.65 feet and well below the 20.87 feet peak of record.

Rain continued on and off through March 5 with another inch or so falling throughout much of the flood-stricken area. Although this did not contribute to additional flooding in the smaller drainage basins, it did slow the natural stream recession. The flash flooding in these smaller size basins was over, but the tributary creeks and rivers from Ohio, Kentucky, and West Virginia drained into the Ohio River which soon exceeded flood stage. The small basin drainage and the rising Ohio River level created backwater flooding on tributary streams. Flood stages on the Ohio River were exceeded from an area south of Marietta (Washington County) on downstream. The crest moved downstream passing Cincinnati early in the morning on March 6. Although substantially lower than the floods of record, levels in many locations were higher than have been seen in the last 30 to 50 years. At Portsmouth (Scioto County), the Ohio River crested on March 5 at 59.69 feet, about 2.4 feet below the 50-year flood elevation. At Cincinnati, the Ohio River crested on March 6 at 64.70 feet, about 2.4 feet below the 50-year flood elevation.

Nearly 10,700 homes, businesses and public buildings were damaged or affected in some way by the flood waters. At least 700 homes were destroyed. At the end of the month, nearly 10,000 applications have been filed for various types of disaster assistance.

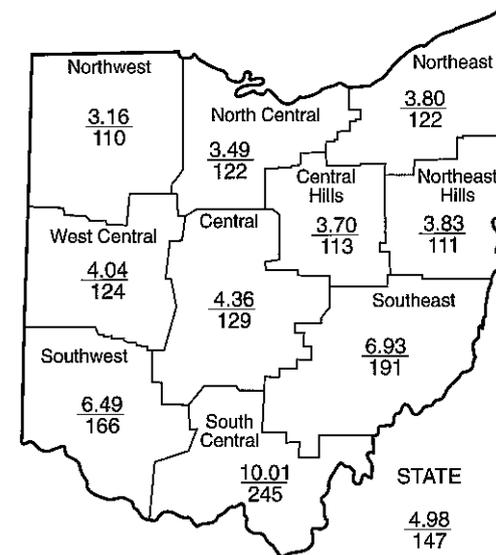
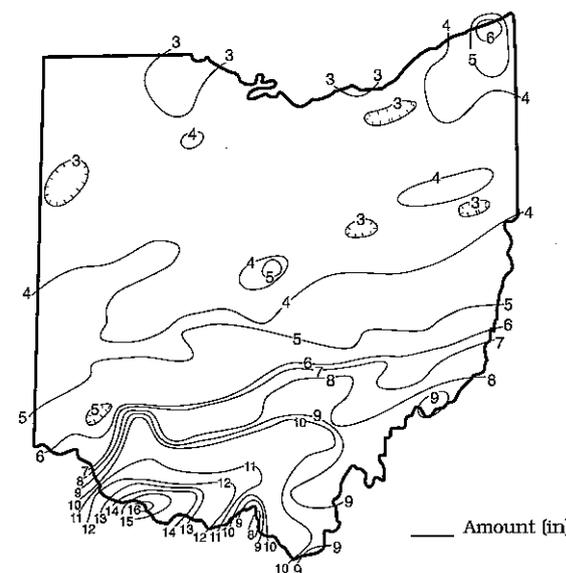
PRECIPITATION during March was above normal throughout the state. The state average was 4.98 inches, 1.60 inches above normal. Regional averages ranged from 10.01 inches, 5.92 inches above normal, for the South Central Region to 3.16 inches, 0.29 inch above normal, for the Northwest Region. This was the wettest March during the past 103 years in the South Central Region. Ripley (Brown County) reported the greatest amount of precipitation for the month, 16.44 inches; West Union (Adams County) reported 14.60 inches. Van Wert (Van Wert County) reported the least amount, 2.50 inches.

Most of the precipitation during March fell as rain. Precipitation fell during every week, but the first half of the month was generally wetter than the second half, especially in the southern half of the state. The month started off with extremely heavy rain falling in southern Ohio on March 1-2. More than 5 inches of rain fell throughout much of south-central and southeastern Ohio with amounts of up to nearly 12 inches reported in portions of Adams, Brown, and Scioto counties. Details about the heavy precipitation and resulting floods is presented under Notes and Comments on the last page of this report. Precipitation amounts diminished rapidly to the north with very little rain falling in the northern one-third of the state. Additional rain fell during the next several days with up to another 1 inch falling in the flood-stricken area by March 6. Rain showers and stronger storms continued to cross the state once or twice a week for the remainder of the month. These storm periods included March 9-10, 13-14, 18-19, 25-26, and 28-29. Precipitation amounts were generally around 0.5 to 0.75 inch during each period, but some locations received 1 inch or more. Many areas in northwestern Ohio reported from 1 to more than 2 inches of precipitation during March 13-14.

Precipitation for the 1997 calendar year is above normal throughout most of Ohio, but slightly below normal in the Central, Central Hills, and Northeast Hills regions. The state average is 9.48 inches, 1.10 inches above normal. Regional averages range from 14.39 inches, 4.15 inches above normal, for the South Central Region to 7.52 inches, 0.86 inch below normal, for the Northeast Hills Region.

Precipitation for the first half of the 1997 water year is above normal throughout the state. The state average is 19.10 inches, 3.15 inches above normal. Regional averages range from 23.54 inches, 5.33 inches above normal, for the South Central Region to 16.68 inches, 1.00 inch above normal, for the Central Region.

PRECIPITATION MARCH 1997



PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.)					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+0.29	+2.27	+3.95	+4.80	+3.01	+2.7
North Central	+0.63	+1.70	+4.30	+9.21	+12.45	+4.1
Northeast	+0.69	+0.34	+4.47	+13.36	+15.23	+4.8
West Central	+0.78	+0.40	+2.75	+10.64	+18.23	+3.5
Central	+0.99	-0.11	+1.00	+8.26	+14.92	+2.8
Central Hills	+0.44	-0.53	+2.35	+8.89	+13.10	+3.1
Northeast Hills	+0.38	-0.86	+1.90	+7.64	+7.59	+2.4
Southwest	+2.57	+1.51	+2.83	+16.16	+23.12	+4.0
South Central	+5.92	+4.15	+5.33	+12.57	+15.50	+3.9
Southeast	+3.31	+2.06	+2.61	+9.01	+12.90	+3.5
State	+1.60	+1.10	+3.15	+10.06	+13.63	

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To 0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District, Palmer Drought Severity Index.
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor
Donald C. Anderson
Director
Michele Willis
Chief
An Equal Opportunity Employer-M/F/H

MEAN STREAM DISCHARGE

River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	This Month		
				% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	2,564	134	125	155	149
Great Miami River at Hamilton	3,630	9,193	155	129	147	192
Huron River at Milan	371	872	125	189	230	192
Killbuck Creek at Killbuck	464	1,164	124	137	200	174
Little Beaver Creek near East Liverpool	496	1,208	102	108	151	131
Maumee River at Waterville	6,330	18,182	142	163	177	156
Muskingum River at McConnellsville	7,422	18,799	116	118	143	149
Scioto River near Prospect	567	1,507	155	132	173	173
Scioto River at Higby	5,131	15,604	170	127	151	185
Stillwater River at Pleasant Hill	503	1,234	149	123	141	166

STREAMFLOW during March was above normal throughout the state. Flows in southern and northwestern Ohio were high enough to be considered excessive. Flows during March increased seasonally from the flows recorded during February in most drainage basins.

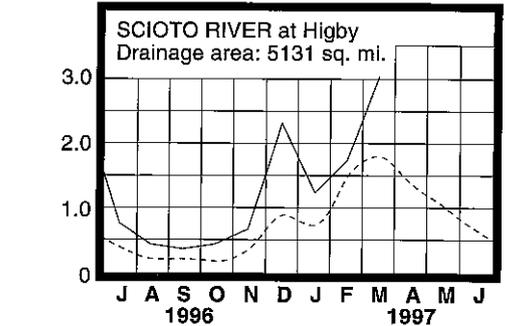
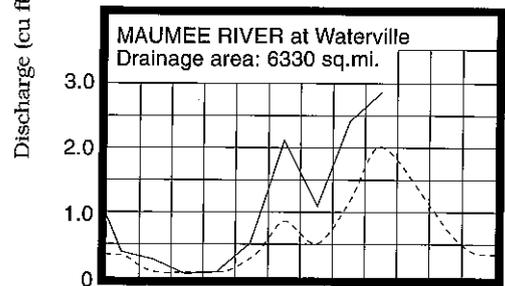
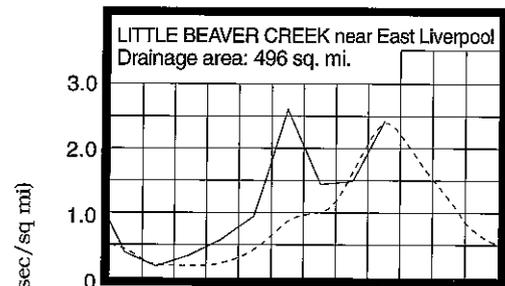
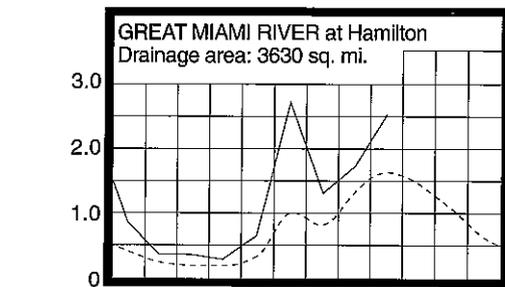
Flows at the beginning of the month were above normal throughout most of the state, but below normal in some drainage basins in eastern Ohio. Greatest flows for the month occurred during March 1-2 in most drainage basins following widespread precipitation which was exceptionally heavy in southern Ohio. Flash flooding, easily exceeding 100-year levels, occurred in extreme southern Ohio with the loss of several lives and millions of dollars in damage to property (see "Heavy Rains Cause Catastrophic Flooding

in Southern Ohio" under Notes and Comments on the last page of this report). Although this storm missed most of northern Ohio, flows were already high at the beginning of the month, still responding to precipitation from storms that crossed the area during the last few days of February. Some basins in eastern Ohio had their greatest flows during March 6-7 following several days with precipitation. Generally, flows remained relatively high during the first half of the month, peaking again around mid-month, and then declining until a few days before the end of the month when flows were at their lowest. Flows increased slightly the last few days of March and had increased enough to be slightly above normal in a few basins in western and north-central Ohio, but were below normal at the end of the month in most areas of the state.

RESERVOIR STORAGE for water supply during March increased in the Mahoning River basin and declined slightly in the Scioto River basin. Storage remained above normal in both basins.

Reservoir storage at the end of March in the Mahoning basin index reservoirs was 95 percent of rated capacity for water supply compared with 88 percent for last month and 98 percent for March 1996. Month-end storage in the Scioto basin index reservoirs was 105 percent of rated capacity for water supply compared with 106 percent for last month and 106 percent for March 1996. Surface water supplies continue to remain in good shape throughout the state.

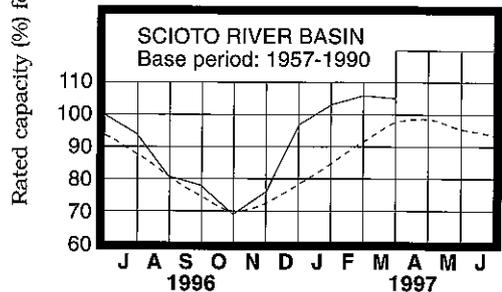
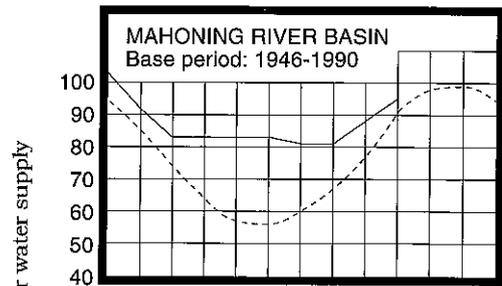
MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

Normal - - - - Current - - - -

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND WATER LEVELS during March showed net rises from last month's levels throughout the state. Net changes during March from February's levels were greater than usually observed in most aquifers. Generally, levels in both consolidated aquifers and deep, unconsolidated aquifers rose gradually throughout the month while levels in shallow, unconsolidated aquifers rose sharply during the early part of the month and then declined during the later part of the month.

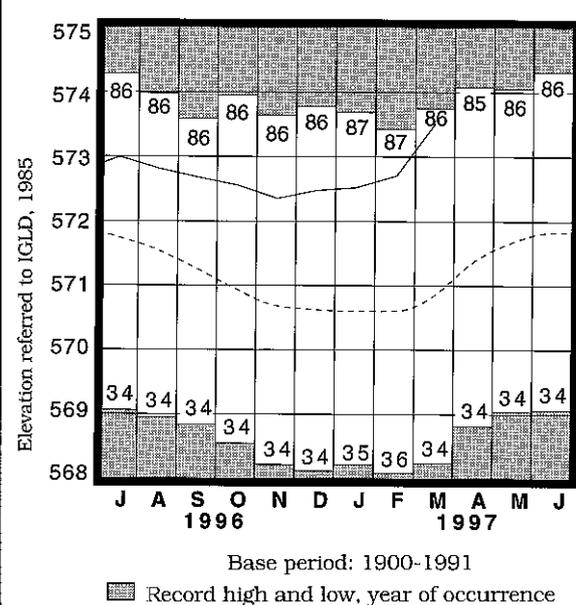
Ground water supplies continue to maintain a favorable position throughout the state. Levels in most aquifers are higher than they were a year ago and are above normal in nearly all aquifers. The above normal precipitation during the first six months of the 1997 water year has been beneficial for ground water supplies (see Precipitation table, departure from normal, past 6 months column). Most aquifers have received an acceptable amount of recharge for the season so far, but additional recharge during the next few months is still needed to maintain these favorable levels.

LAKE ERIE level rose markedly during March. The mean level was 573.52 feet (IGLD-1985), 0.82 foot above last month's mean level and 2.65 feet above normal. This month's level is 2.06 feet above the March 1996 level and 4.32 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during March averaged 3.7 inches, 0.9 inch above normal. The entire Great Lakes basin averaged 2.6 inches of precipitation during March, 0.4 inch above normal. For calendar year 1997 through March, the Lake Erie basin has averaged 9.8 inches of precipitation, 2.5 inches above normal, and the entire Great Lakes basin has averaged 8.3 inches, 2.2 inches above normal.

The U. S. Army Corps of Engineers predicts that, based on the present condition of the lake basin and anticipated future weather conditions, the level of Lake Erie should remain above the long-term average for the next several months. Projected levels are expected to remain below the record-high levels established during the mid 1980s, but could approach these levels if precipitation in the Lake Erie and other Great Lake's basins is noticeably above normal for an extended period.

LAKE ERIE LEVELS at Fairport



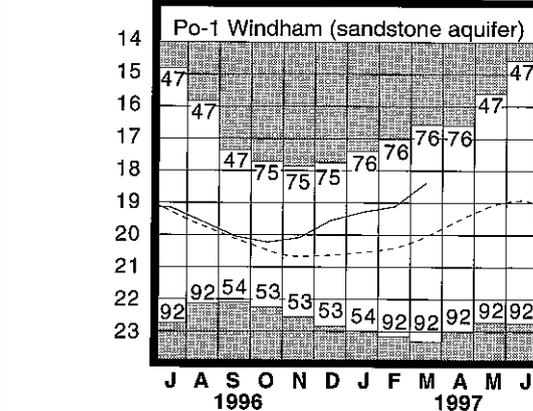
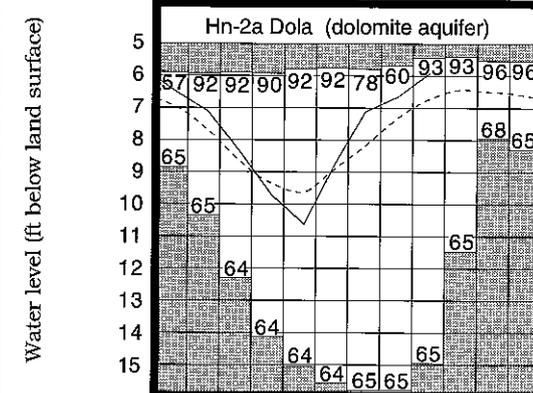
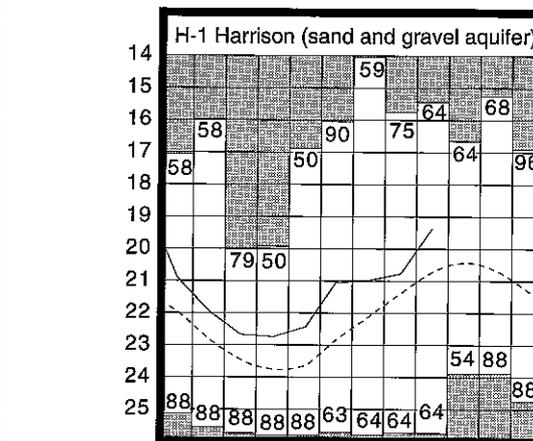
Normal - - - - Current - - - -

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	12.72	+0.59	+1.91	+0.22
Fa-1	Jasper Mill, Fayette Co.	Limestone	6.99	-0.14	+0.37	-0.26
Fr-10	Columbus, Franklin Co.	Gravel	41.22	+1.45	+0.52	+0.23
H-1	Harrison, Hamilton Co.	Gravel	19.37	+1.34	+1.41	+1.83
Hn-2a	Dola, Hardin Co.	Dolomite	5.93	+0.85	+0.73	+0.53
Po-1	Windham, Portage Co.	Sandstone	18.40	+1.63	+0.72	+2.05
Tu-1	Strasburg, Tuscarawas Co.	Gravel	11.93	-0.53	+0.63	+0.87

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990. Po-1, 1947-1990

Normal - - - - Current - - - -



MONTHLY WATER INVENTORY REPORT FOR OHIO

April 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

SUMMARY

Precipitation was noticeably below normal throughout Ohio with the state average of 1.65 inches ranking as the ninth driest April during the past 115 years. Streamflow was below normal throughout the state. Reservoir storage remained at above-normal seasonal levels. Ground water levels declined in shallow aquifers and was stable or rose slightly in deep aquifers. Lake Erie level rose 0.17 foot and was 2.30 feet above the long-term April average.

NOTES AND COMMENTS NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

Ground Water Pollution Potential of Shelby County
by Michael P. Angle

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00.

DIVISION OF WATER PUBLICATIONS DIRECTORIES

Directories of the Division of Water publications are once again available. Two different versions have been prepared. The first, entitled "Current Division of Water Publications," contains a listing of those publications which are currently in print or frequently requested. This version is available at no charge while supplies last. The second, entitled "A Complete List of Division of Water Information and Publications," contains a listing of all Division of Water publications including old and out-of-print material. The complete list presents Division of Water publications both by subject and by geographic area. The complete listing costs \$5.00.

These new publications are available at the Division of Water or can be ordered from the address listed below.

ODNR Division of Water
Water Resources Section
1939 Fountain Square, Building E-1
Columbus, Ohio 43224-1336
Phone (614) 265-6740

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

Postage and Handling Charges

Cost of Publications	Add
under \$10.01	\$2.50
\$10.01 - \$20.00	\$3.75
\$20.01 - \$50.00	\$6.00
\$50.01 - \$100.00	\$8.50
\$100.01 and over	\$10.00

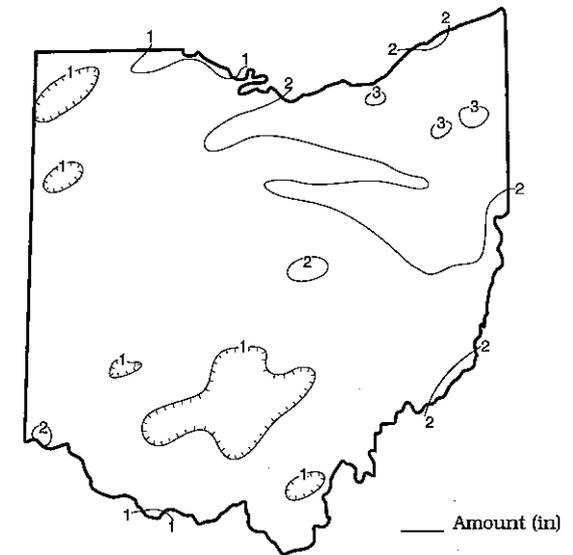
PRECIPITATION during April was noticeably below normal throughout the state. The state average was 1.65 inches, 1.86 inches below normal. This ranks as the ninth driest April during the past 115 years. Regional averages ranged from 2.41 inches, 0.98 inch below normal, for the Northeast Region to 1.22 inches, 2.09 inches below normal, for the Northwest Region. Warren (Trumbull County) reported the greatest amount of precipitation for the month, 3.28 inches. Patriot (Gallia County) reported the least amount, 0.50 inch.

Most of the precipitation during April fell as light rain showers. Although temperatures averaged well below normal throughout the month, snow amounts were nominal statewide. Also, little severe weather was reported, but high winds caused some damage in a few locations. Light showers crossed the state during 5-6 April with 0.25 to 0.50 inch rain amounts reported in most areas. The greatest precipitation for many locations fell during 12-13 April with 0.5 inch amounts falling in western Ohio increasing to more than one inch in the northeastern area of the state. The next two weeks of the month were rather dry with only around 0.25 inch or so of rain falling. Farmers were busy with spring field activities, a big difference from last year when constant rain showers delayed planting. Light showers returned to the state during 27-28 April with 0.25 to 0.5 inch amounts once again reported in most areas of the state.

Precipitation for the 1997 calendar is below normal throughout most of the state, but slightly above normal in the Northwest, North Central, South Central and Southeast regions. The state average is 11.13 inches, 0.76 inch below normal. Regional averages range from 15.76 inches, 1.78 inches above normal, for the South Central Region to 9.35 inches, 2.15 inches below normal, for the Central Hills Region. Many areas of the state have received below normal precipitation during three out of the four months so far in the 1997 calendar year.

Precipitation for the 1997 water year is above normal throughout most of the state with only the Central Region having below normal precipitation. The state average is 20.76 inches, 1.30 inches above normal. Regional averages range from 24.91 inches, 2.96 inches above normal, for the South Central Region to 18.01 inches, 1.33 inches below normal, for the Central Region.

PRECIPITATION APRIL 1997

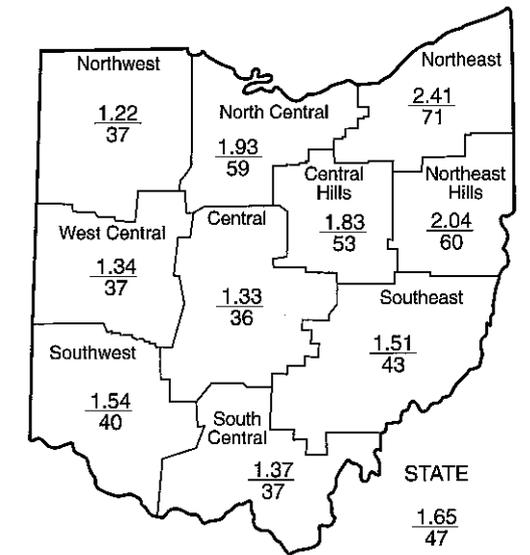


PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.)					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	-2.09	+0.06	+2.07	+2.14	-0.22	+0.8
North Central	-1.32	+0.73	+2.54	+5.79	+9.56	+4.3
Northeast	-0.98	+0.04	+1.77	+10.08	+14.36	+3.7
West Central	-2.24	-1.22	+1.27	+5.14	+15.31	+1.8
Central	-2.33	-1.81	-0.83	+3.40	+12.57	+1.3
Central Hills	-1.62	-1.34	+0.28	+4.53	+11.09	+1.6
Northeast Hills	-1.36	-1.48	-0.16	+5.05	+6.85	+0.8
Southwest	-2.27	-0.28	+1.17	+9.09	+20.64	+2.4
South Central	-2.37	+2.63	+3.38	+9.44	+14.52	+3.3
Southeast	-2.03	+0.47	+0.93	+6.39	+11.87	+1.6
State	-1.86	-0.22	+1.25	+6.11	+11.68	

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

ACKNOWLEDGMENTS

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Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Conservancy District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor

Donald C. Anderson
Director

Michelle Willis
Chief

An Equal Opportunity Employer-M/F/H

MEAN STREAM DISCHARGE

River and Location	Drainage Area (Sq. Mi.)	This Month Mean Discharge (CFS)	% of Normal	% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
				Grand River near Painesville	685	956
Great Miami River at Hamilton	3,630	2,689	51	98	132	172
Huron River at Milan	371	403	78	139	189	179
Killbuck Creek at Killbuck	464	384	51	100	152	166
Little Beaver Creek near East Liverpool	496	528	59	89	123	125
Maumee River at Waterville	6,330	3,689	39	122	143	150
Muskingum River at McConnelsville	7,422	7,178	47	91	119	143
Scioto River near Prospect	567	245	30	93	140	158
Scioto River at Higby	5,131	3,575	51	103	124	173
Stillwater River at Pleasant Hill	503	323	45	92	128	144

STREAMFLOW during April was noticeably below normal throughout the state. Flows in all areas of the state except north-central and extreme north-eastern Ohio were low enough to be considered deficient. Flows during April were noticeably less than the flows observed during March.

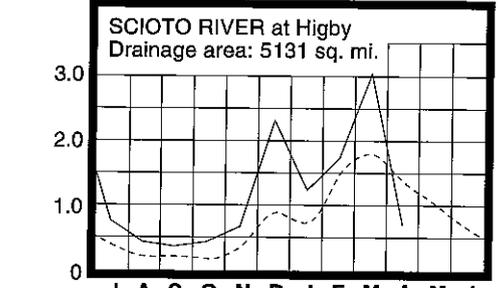
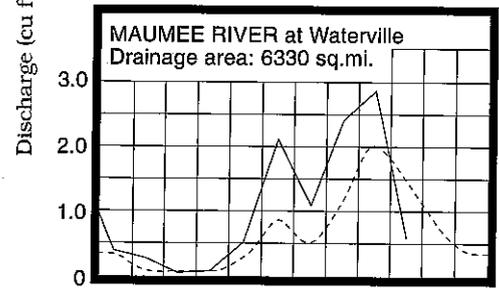
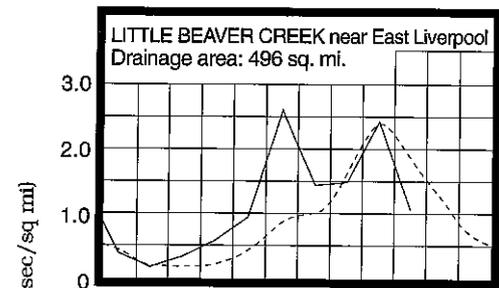
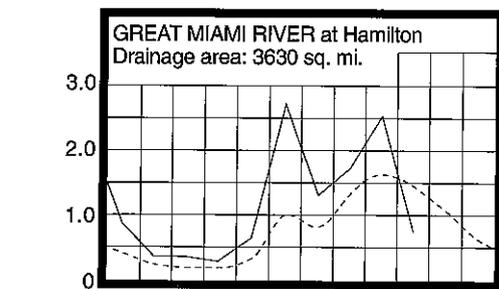
Flows at the beginning of the month were below normal in most areas of the state, but above normal in the drainage basins located in north-central and extreme northeastern Ohio. Most drainage basins in the western half of the state had their greatest flows for April on the first day of the month. Flows declined during the first two weeks of the month with northeastern Ohio streams having their lowest flows on 11 April.

Flows statewide increased following precipitation that fell during 12-13 April. Drainage basins in the eastern half of the state had their greatest flows for the month on 13-14 April following this precipitation. Flows then declined again until a few days before the end of the month. Most areas of the state had their lowest flows for the month around 27 April. Flows at the end of the month were noticeably below normal throughout the state.

RESERVOIR STORAGE for water supply during April increased in the Mahoning River basin and decreased in the Scioto River basin. Storage remained above normal in both basins.

Reservoir storage at the end of April in the Mahoning basin index reservoirs was 101 percent of rated capacity for water supply compared with 95 percent for last month and 117 percent for April 1996. Month-end storage in the Scioto basin index reservoirs was 101 percent of rated capacity for water supply compared with 105 percent for last month and 108 percent for April 1996. Surface water supplies continue to remain in good condition throughout the state.

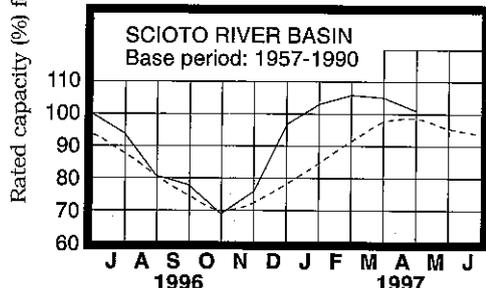
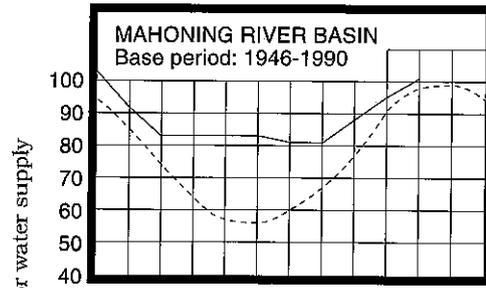
MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

Normal - - - - Current - - - -

RESERVOIR STORAGE FOR WATER SUPPLY



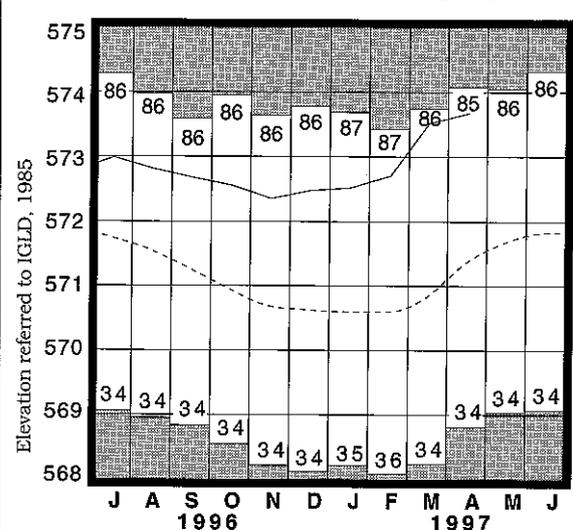
GROUND WATER LEVELS during April showed mixed responses across the state. Levels in shallow, unconsolidated aquifers declined throughout the month in response to the below normal precipitation. Levels in most consolidated and in deep, unconsolidated aquifers were stable or rose slightly during April, still receiving some delayed recharge from the above normal precipitation during March. Typically, levels in all aquifers are continuing to rise during April.

Ground water supplies continue to remain in good condition throughout the state; however, precipitation during April was inadequate to continue the favorable improving trend that has been observed during the past several months. Levels have fallen to below normal in many unconsolidated aquifers, but these can still respond favorably to adequate precipitation during the next month or two. Levels in aquifers across the southern half of the state are now lower than they were a year ago while levels in northern Ohio aquifers continue to remain higher than last year's levels. Adequate precipitation throughout the upcoming growing season and summer high-demand period will help maintain favorable ground water conditions.

LAKE ERIE level rose during April. The mean level was 573.69 feet (IGLD-1985), 0.17 foot above last month's mean level and 2.30 feet above normal. This month's level is 2.00 feet above the April 1996 level and 4.49 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during April averaged 1.7 inches, 1.4 inches below normal. The entire Great Lakes basin averaged 1.5 inches of precipitation during April, 1.0 inch below normal. For calendar year 1997 through April, the Lake Erie basin has averaged 9.9 inches of precipitation, 2.1 inches below normal, and the entire Great Lakes basin has averaged 9.8 inches, 1.2 inches above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

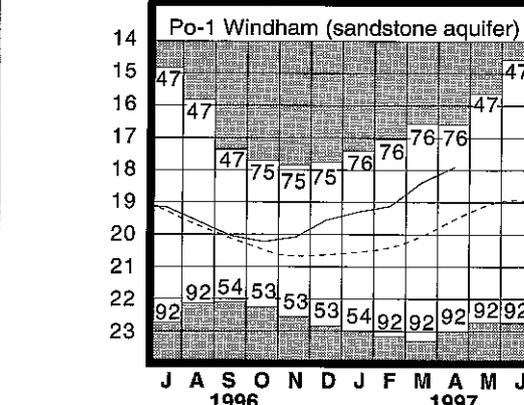
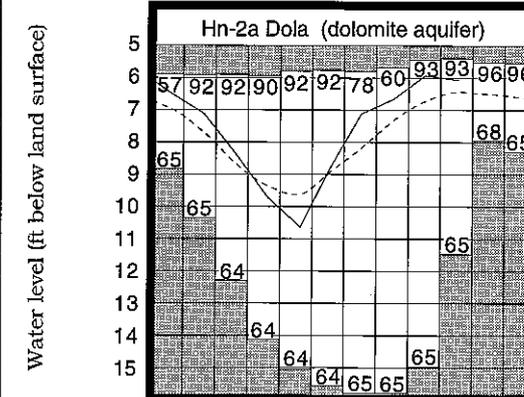
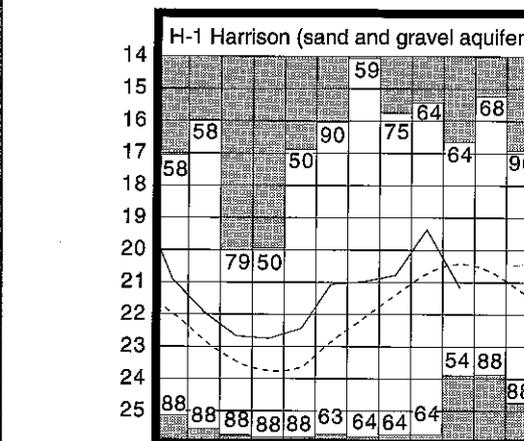
Normal - - - - Current - - - -

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	13.89	-1.46	-1.17	-0.68
Fa-1	Jasper Mill, Fayette Co.	Limestone	7.33	-0.59	-0.34	-0.60
Fr-10	Columbus, Franklin Co.	Gravel	40.94	+1.46	+0.28	-0.09
H-1	Harrison, Hamilton Co.	Gravel	21.18	-0.75	-1.81	-0.38
Hn-2a	Dola, Hardin Co.	Dolomite	6.07	+0.40	-0.14	+0.28
Po-1	Windham, Portage Co.	Sandstone	17.91	+1.61	+0.49	+2.25
Tu-1	Strasburg, Tuscarawas Co.	Gravel	12.60	-1.80	-0.67	+0.24

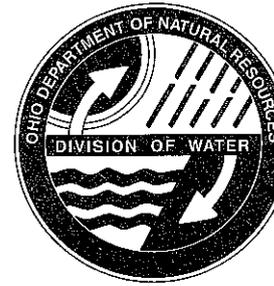
GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current - - - -



MONTHLY WATER INVENTORY REPORT FOR OHIO

May 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

SUMMARY

Precipitation was above normal throughout most of the state, but slightly below normal in the South Central Region. Streamflow was above normal in most areas of the state, but slightly below normal in south-central and southwestern Ohio. Reservoir storage increased and continued to remain at above-normal levels. Ground water levels declined in nearly all aquifers. Lake Erie level was stable and was 2.00 feet above the long-term May average.

NOTES AND COMMENTS

HIGH LEVELS ON LAKE ERIE PROMPT GOVERNOR VOINOVICH TO TAKE ACTION

Concerned that Lake Erie's water level is rising and is expected to be near record-high levels for the foreseeable future, Governor George V. Voinovich has directed the Ohio Department of Natural Resources (ODNR) and the Ohio Emergency Management Agency (Ohio EMA) to take immediate action to deal with an increased threat of flooding and erosion along Ohio's 262-mile Lake Erie coast. These two agencies will coordinate the state's response to this threat by working with coastal residents and local officials. In addition, the Governor has requested assistance from the U. S. Army Corps of Engineers, Buffalo District, asking for the implementation of their "Advanced Measures Assistance" program. Through the "Advanced Measures Assistance" program, the Corps will provide technical support, construct temporary protective measures and supply flood-fighting material and equipment such as sandbags, polyethylene sheeting, pumps, lumber and stone.

Specifically, the Governor directed ODNR and Ohio EMA to: coordinate with local officials and government agencies preparedness and mitigation measures necessary for flood and erosion protection; help identify and prioritize areas most at risk for flooding and erosion and provide information, technical assistance and public outreach; begin a public awareness program to inform coastal residents and local officials about this situation and ways to respond including information about the federal flood insurance program; establish a toll-free help line to provide information on high water levels, coastal erosion, flood protection, erosion control permit requirements and flood insurance (That number is 1-888-644-6267); and to coordinate the permit requirements for construction of coastal protection structures and to expedite the process.

Below normal precipitation during April throughout the Great Lakes basin slowed the rising lake levels, but the biggest threat for flooding and erosion is from storms with high winds that can push the lake level up several feet. Although the current lake level is several inches below the record-high levels reached during the mid-1980s, long-range forecasts indicate that the lake could remain high for the next several years.

OHIO STREAM MANAGEMENT GUIDES NOW AVAILABLE

The Ohio Department of Natural Resources (ODNR) announces the availability of ten facts sheets in a series called "Ohio Stream Management Guides." The series covers a variety of watershed and stream management issues and methods of addressing stream-related problems. More Guides are in production and will be released as they are printed.

Single copies are available free of charge from the ODNR Public Information Center, 1952 Belcher Drive, Building C-1, Columbus, Ohio 43224-1386 614/265-6791. You may also e-mail your inquiries to ODNR at "infomail@dnr.state.oh.us". For more information about the project, call the ODNR, Division of Water at 614/265-6750.

Index to the Ohio Stream Management Guides

An Introduction to Stream Management: An overview of land use and stream resources interactions.

Permit Checklist for Stream Modification Projects: An overview of permits, requirements and consultations for projects in stream environments.

Restoring Streambanks with Vegetation: Planting guide for dormant willow cuttings (or other rapidly-rooting species) to resist streambank erosion.

Trees for Ditches: Guidelines on species selection, planting locations and maintenance to achieve environmental and economic benefits while maintaining drainage capacity.

A Stream Management Model: A walk-through guide to the stream management display and demonstration at the Ohio Farm Science Review's Gwynne Conservation Area.

Biotechnical Projects in Ohio: Maps and briefly describes 52 projects using biotechnical practices. Biotechnical practices use vegetative or other natural materials to achieve stream management objectives, usually erosion control.

Tree Kickers: Construction guidelines for uses hardwood logs anchored to a bank at an angle to "kick" stream flow away from an undercutting problem.

Evergreen Revetments: Construction guidelines for a buffer system made of cut evergreen trees attached to each other and anchored into an eroded streambank.

Who Owns Ohio Streams?: Provides an overview of landowner rights and responsibilities and the authorities and duties of government regarding surface water rights.

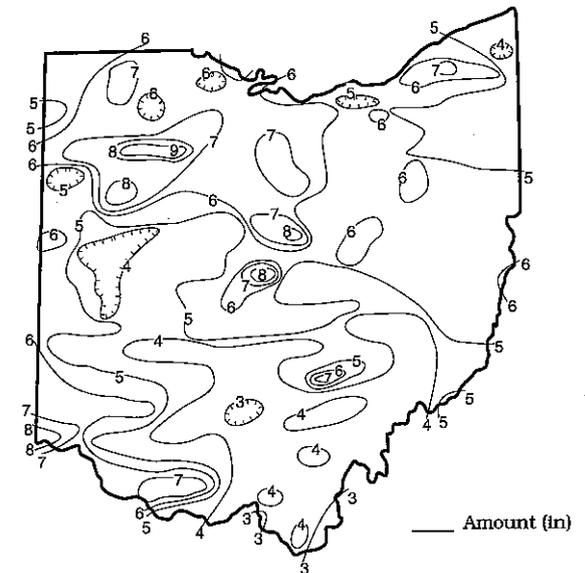
PRECIPITATION during May was above normal throughout most of Ohio, but slightly below normal in the South Central Region. The state average was 5.31 inches, 1.56 inches above normal. Regional averages ranged from 6.98 inches, 3.44 inches above normal, for the Northwest Region to 3.72 inches, 0.21 inch below normal, for the South Central Region. This was the second wettest May during the past 106 years for the Northwest and North Central regions. Findlay (Hancock County) reported the greatest amount of precipitation for the month, 9.40 inches; Ottawa (Putnam County) reported 9.31 inches. Chillicothe (Ross County) reported the least amount of May precipitation, 2.90 inches, the only location reporting less than 3 inches for the month.

Precipitation fell during every week of the month, but the middle of the month was somewhat drier in many areas, especially in the southern half of the state. The month started with heavy rain on May 1-2 throughout the state. Nearly every area received at least 1 inch of much needed rain after a dry April. Southwestern, northwestern and north-central Ohio received in excess of 1.5 inches with some locations reporting more than 2 inches. Scattered showers fell across the state during May 5, 8, and 14 to 16. Generally, about 0.5 to 1 inch fell during the May 5 and 8 period and less than 0.5 inch fell during the May 14 to 16 period. Heavier storms returned to the state during May 18-19 with 0.5 to 1 inch falling in many areas. A few exceptions occurred in extreme southern Ohio, especially in Adams County, where more than 3 inches fell causing localized flash flooding in some areas. The last week of the month was wet in many areas of Ohio. Heavy storms crossed northern and eastern Ohio during May 24-25 with some locations reporting more than 2 inches of rain. Showers from a slow moving storm system began to fall on May 29 and continued to fall on and off for several days. Steady, soaking showers fell throughout May 31 on soils near saturation in some areas of the state. This triggered some flooding which will be reported in the June issue of this publication.

Precipitation for the 1997 calendar year is above normal throughout most of the state, but below normal in the Central, West Central, and Northeast Hills regions. The state average is 16.44 inches, 0.80 inch above normal. Regional averages range from 19.48 inches, 1.57 inches above normal, for the South Central Region to 14.22 inches, 1.12 inches below normal, for the West Central Region.

Precipitation for the 1997 water year is above normal throughout most of the state with only the Central Region having slightly below normal precipitation. The state average is 26.06 inches, 2.85 inches above normal. Regional averages range from 28.63 inches, 2.75 inches above normal, for the South Central Region to 22.70 inches, 0.45 inch below normal, for the Central Region.

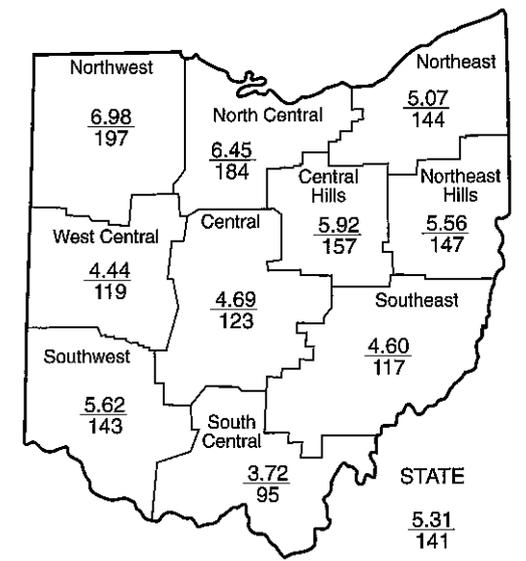
PRECIPITATION MAY 1997



PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.)					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+3.44	+1.64	+4.55	+4.97	+3.02	+3.1
North Central	+2.94	+2.25	+5.07	+8.45	+11.11	+5.3
Northeast	+1.54	+1.25	+2.02	+11.07	+15.06	+4.8
West Central	+0.72	-0.74	+0.92	+2.76	+12.94	+3.5
Central	+0.88	-0.46	-0.57	+0.59	+10.97	+2.8
Central Hills	+2.15	+0.97	+1.94	+5.24	+11.46	+3.6
Northeast Hills	+1.78	+0.80	+0.89	+5.17	+7.23	+2.1
Southwest	+1.70	+2.00	+2.30	+4.72	+17.27	+3.5
South Central	-0.21	+3.34	+2.22	+4.69	+10.91	+2.7
Southeast	+0.66	+1.94	+0.84	+3.27	+9.57	+1.6
State	+1.56	+1.30	+2.02	+5.10	+10.98	+1.6

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



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MEAN STREAM DISCHARGE

River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
				This Month		
Grand River near Painesville	685	1,419	230	119	121	137
Great Miami River at Hamilton	3,630	3,631	93	84	119	136
Huron River at Milan	371	830	310	130	189	179
Killbuck Creek at Killbuck	464	616	124	102	136	144
Little Beaver Creek near East Liverpool	496	818	141	90	123	115
Maumee River at Waterville	6,330	11,084	219	124	149	140
Muskingum River at McConelsville	7,422	10,210	104	87	108	123
Scioto River near Prospect	567	440	105	94	130	131
Scioto River at Higby	5,131	4,737	90	97	120	136
Stillwater River at Pleasant Hill	503	437	113	86	120	119

STREAMFLOW during May was above normal throughout most of the state, but slightly below normal in southwestern and south-central Ohio. Flows in the northern area of the state were high enough to be considered excessive. Flows during May were greater than the flows observed during April, an unusual occurrence.

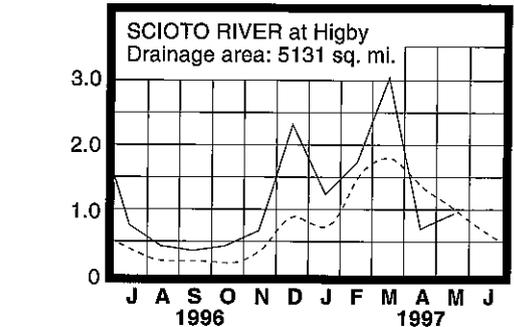
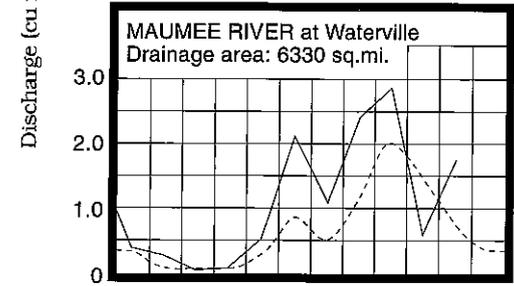
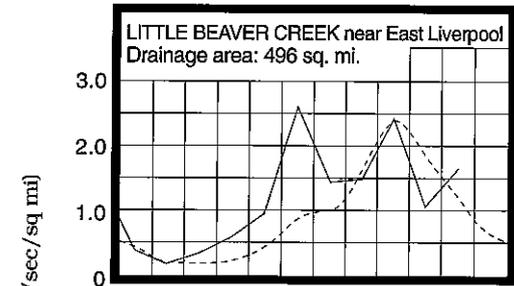
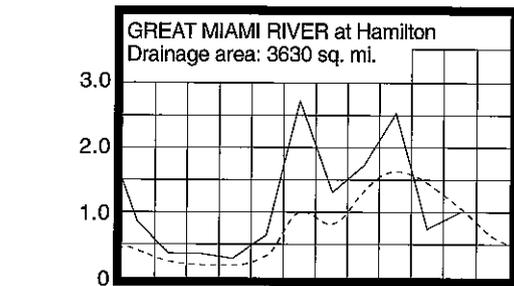
Flows at the beginning of the month were noticeably below normal throughout the state. Most drainage basins had their lowest flows for the month on May 2 although some basins had slightly lower flows around May 18. In southwestern Ohio, the lowest flows occurred on May 24. Flows increased statewide following precipitation during the first week of the month. This rain resulted in the greatest flows for May in the south-central and southwestern areas of the state. Generally,

flows then declined through the third week of the month with slight rises noted after local precipitation. Locally severe storms during May 18-19 in extreme southern Ohio produced flash flooding conditions in portions of Adams County, an area previously hit by the floods of early March 1997. Widespread storms on May 25, especially in the northern half of the state, brought the month's greatest flows to nearly every drainage basin. Heavy rain from a slow moving storm system began falling on May 29-31 and rivers were rising rapidly to noticeably above normal levels in many areas of Ohio at the end of the month. Significant flooding followed these storms which will be summarized in the June issue of this report.

RESERVOIR STORAGE for water supply during May increased sharply in both the Mahoning and Scioto river basin reservoirs. Month-end storage was noticeably above normal in both basins.

Reservoir storage at the end of May in the Mahoning basin index reservoirs was 116 percent of rated capacity for water supply compared with 101 percent for last month and 101 percent for May 1996. Month-end storage in the Scioto basin index reservoirs was 115 percent of rated capacity for water supply compared with 101 percent for last month and 104 percent for May 1996. Surface-water supplies in both on- and off-stream reservoirs are in a favorable position for this time of the year throughout the state. Recreational reservoirs are at or above their normal summer pool elevations.

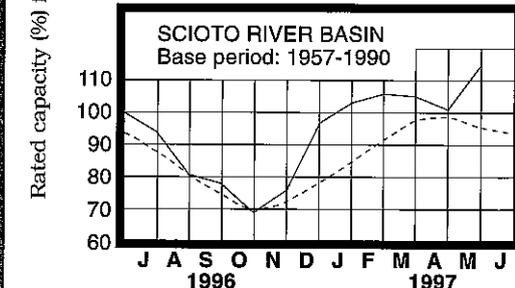
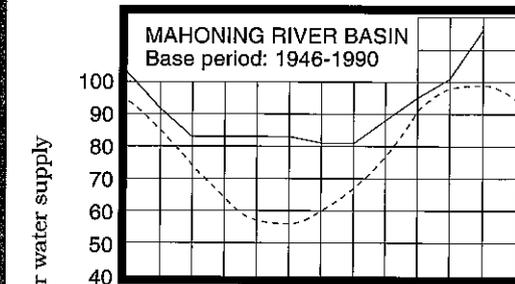
MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

Normal - - - - Current - - - -

RESERVOIR STORAGE FOR WATER SUPPLY



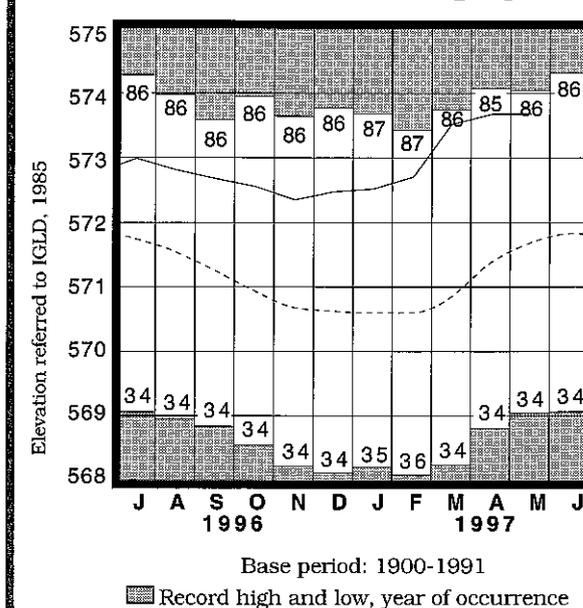
GROUND WATER LEVELS during May declined in most aquifers. A few exceptions were noted in some aquifers in northern Ohio. Generally, levels in aquifers in the southern half of the state declined throughout the month while levels in the northern half of the state declined through just past mid-month and then began to rise.

Ground water levels have fallen to below normal in many aquifers in some southern and eastern areas of the state, but remain above normal throughout most of northern Ohio. In addition, levels in most aquifers are also lower than they were a year ago. Even with these below-normal levels, ground water supplies continue to remain in good condition. Adequate precipitation and below normal temperatures have reduced demand. Abundant precipitation at the end of May should provide for some improvement in ground water supplies during June. At the end of May the Ohio Agricultural Statistics Service reported that soil moisture was rated as being short in 1 percent of the state, adequate in 49 percent of the state, and surplus in 50 percent of the state.

LAKE ERIE level was unchanged during May. The mean level was 573.69 feet (IGLD-1985), the same level as last month and 2.00 feet above the May normal level. This month's level is 1.35 feet above the May 1996 level and 4.49 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during May averaged 5.2 inches, 1.9 inches above normal. The entire Great Lakes basin averaged 3.0 inches of precipitation during May, which is normal. For calendar year 1997 through May, the Lake Erie basin has averaged 16.7 inches of precipitation, 3.0 inches above normal, and the entire Great Lakes basin has averaged 12.8 inches, 1.2 inches above normal.

LAKE ERIE LEVELS at Fairport

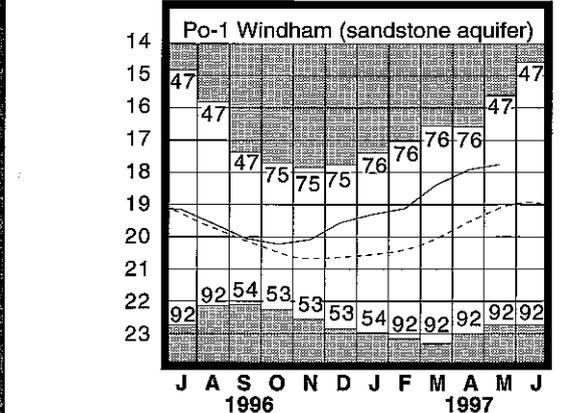
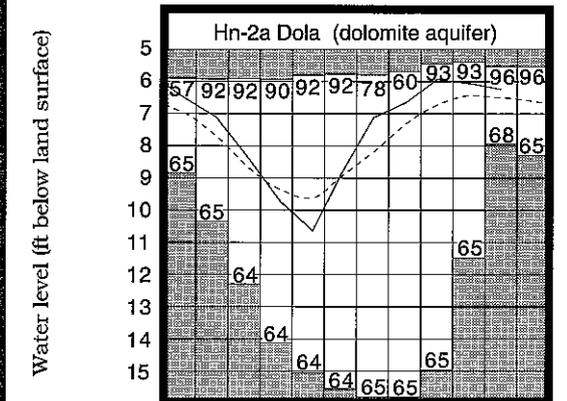
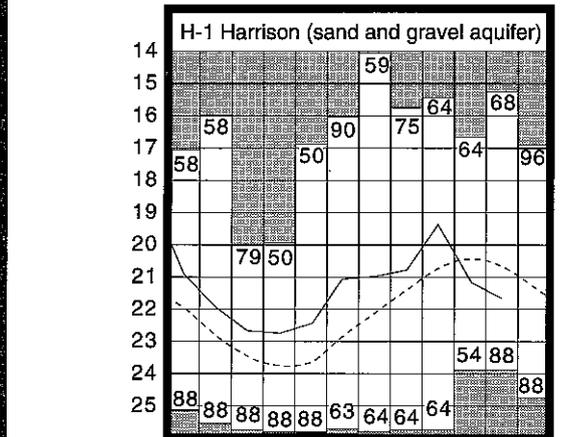


GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	15.74	-3.02	-1.85	-3.95
Fa-1	Jasper Mill, Fayette Co.	Limestone	7.58	-0.56	-0.25	-1.23
Fr-10	Columbus, Franklin Co.	Gravel	41.34	+1.29	-0.40	-1.32
H-1	Harrison, Hamilton Co.	Gravel	21.66	-0.98	-0.48	-4.40
Hn-2a	Dola, Hardin Co.	Dolomite	6.26	+0.27	-0.19	-0.40
Po-1	Windham, Portage Co.	Sandstone	17.77	+1.32	+0.14	+1.77
Tu-1	Strasburg, Tuscarawas Co.	Gravel	12.94	-1.81	-0.34	-1.52

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990. Po-1, 1947-1990
Record high and low, year of occurrence

Normal - - - - Current - - - -



MONTHLY WATER INVENTORY REPORT FOR OHIO

June 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

SUMMARY

Precipitation was above normal throughout most of the state, but below normal in portions of north-central Ohio. Streamflow was noticeably above normal throughout the state with significant flooding during the first week of the month. Reservoir storage declined but remained above normal statewide. Ground water levels in most aquifers showed net improvement and are near or above normal in most areas of the state. Lake Erie level rose to a near-record high and was 2.43 feet above the long-term June average.

NOTES AND COMMENTS

FIELD WORKSHOP ON JOINTS AND FRACTURES IN OHIO TILLS

A one-day field demonstration entitled "Field Workshop on Joints and Fractures in Ohio Tills: Site Investigation Techniques and Field Hydraulic Measurements" is being sponsored by numerous agencies and organizations including the Ohio Academy of Science, the Association of Ohio Pedologists, Bowser-Morner Inc., and Bennett & Williams Environmental Consultants, Inc. In addition, numerous other agencies will be participating including the Ohio Department of Natural Resources Division of Water, The Ohio State University, Indiana University/Indiana Geological Survey, the Natural Resources Conservation Service, and the U.S. Department of Agriculture. The workshop will be held on Thursday, August 28, 1997 from 8 a.m. to 4:15 p.m. at The Ohio State University Molly Caren Agricultural Center near London, Ohio, the site of the annual Farm Science Review.

The workshop will be focusing on joints (fractures) in glacial till and on the latest methodologies for investigating and testing these features. Implications and importance of fractures will also be discussed. Demonstrations will include: (1) several methods of drilling cores, installing monitor wells, and logging and examining core; (2) construction and examination of large test pits; and (3) various resistivity and gamma-logging surveys. There will also be numerous demonstrations on various methods for determining in-field hydraulic conductivity.

The cost to attend the workshop is \$40 (\$25 for students) which will include all hand-out materials and lunch. The number of participants will be limited to about 75 people. For additional information and registration materials contact Scott Brockman, ODNR, Division of Geological Survey at (614)265-7054 or Mike Angle, ODNR, Division of Water (614)265-6895.

NEW PUBLICATIONS

The U.S. Geological Survey, Water Resources Division announces the availability of the following new publications:

Results of the Baseflow Monitoring Program at Wright-Patterson Air Force Base, Ohio, 1993-1994 (U.S. Geological Survey Water-Resources Investigations Report 96-4125)

by Charles W. Schalk, William L. Cunningham, and others

This report summarizes an extensive, supplemental, analytical sampling program to collect geologic and hydrologic data at Wright-Patterson Air Force Base (WPAFB) and the results of an investigation to determine the effects of base activities on regional water quality.

WPAFB is an 8,500-acre facility on the National Priorities List. The sampling program was designed to assess the regional effects of the numerous waste sites located throughout the base. Multiple sampling was done for a broad variety of chemical constituents in the ground water, surface water, and streambed sediments. Results indicate that minimal contamination amounts were found and that, on a regional scale, contamination of waters and sediments on WPAFB is not extensive.

Hydrologic Disturbance and Response of Aquatic Biota in Big Darby Creek Basin, Ohio (U.S. Geological Survey Water Resources Investigations Report 96-4315)

by J. A. Hambrook, G. F. Koltun, B. B. Palcsak, and J. S. Tertuliani

This report discusses the effects of flood-related disturbances on larval aquatic-insect and algal communities at selected locations within the Big Darby Creek Basin.

Big Darby Creek, parts of which have National and State scenic river designation, is one of the most biologically diverse streams of its size in the Nation. The sampling program was designed to assess the washout and recolonization of macroinvertebrates and algae associated with a spring and summer storm. Related factors, such as streamflow magnitude, shear stress, and streambed disturbance were considered when interpreting observed changes in densities and community structure of these organisms.

A limited number of these two new publications are available from the U.S. Geological Survey, Water Resources Division, 975 West Third Avenue, Columbus, Ohio 43224-3192, phone (614) 469-5553.

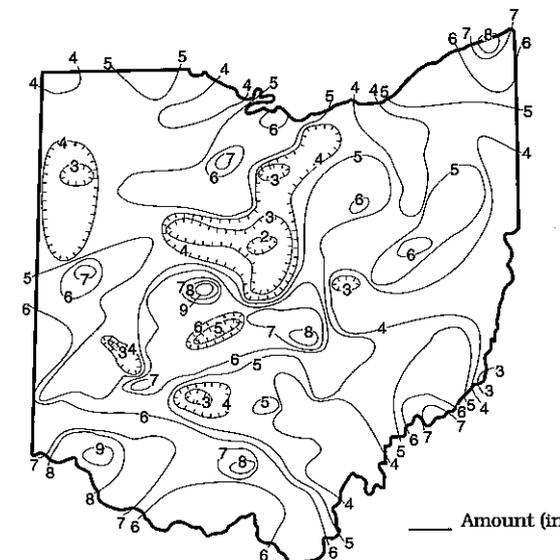
PRECIPITATION during June was above normal throughout most of the state, but below normal in portions of north-central Ohio and in a few other scattered, isolated areas. The state average was 4.99 inches, 1.03 inches above normal. Regional averages ranged from 5.82 inches, 1.76 inches above normal, for the Central Region to 4.24 inches, 0.41 inch above normal, for the Northwest Region. Perrintown (Clermont County) reported the greatest amount of precipitation for the month, 9.57 inches. In the Central Region, Marysville (Union County) reported 9.01 inches and several unofficial observers reported amounts of more than 10 inches at many locations in the central Ohio area. Mt Gilead (Morrow County) reported the least amount of June precipitation, only 1.24 inches. This was the only location reporting less than 2 inches of rain for the month.

June started as May ended with heavy rain falling in many areas of the state. Nearly all areas received at least 1 inch of rain during June 1-2 with some areas receiving more than 5 inches. The heaviest amounts were reported in portions of central and southern Ohio, but some areas in the north-central and northeastern areas of the state also received similar amounts. Significant flooding, especially in the Scioto River basin, resulted from these storms. Flooding was also significant along the Blanchard River and in some of the tributaries that drain directly into the Ohio River or Lake Erie. Rain showers continued on and off throughout the week in some areas. The second week of the month was more typical of June with most areas reporting around 0.5 inch with 1 inch amounts falling at some locations from storms during June 8-9 and 13-14. Stronger storms were more common statewide during June 16-18 with another inch or so falling in most areas of the state and 2 inches at some locations in southwestern Ohio. Many areas received some welcome drying the last ten days of the month. Generally, less than 0.5 inch of rain was reported during this period in most areas, but some locations in northern Ohio received about 1 inch of rain. Overall, temperatures were below normal during the first half of the month but warmed up noticeably during the second half.

Precipitation for the 1997 calendar year is above normal throughout Ohio. The state average is 21.40 inches, 1.80 inches above normal. Regional averages range from 24.22 inches, 2.43 inches above normal, for the South Central Region to 19.76 inches, 0.38 inch above normal, for the West Central Region.

Precipitation for the 1997 water year is above normal throughout Ohio. The state average is 31.02 inches, 3.85 inches above normal. Regional averages range from 33.72 inches, 3.98 inches above normal, for the Southwest Region to 28.59 inches, 1.38 inches above normal, for the Central Region.

PRECIPITATION JUNE 1997

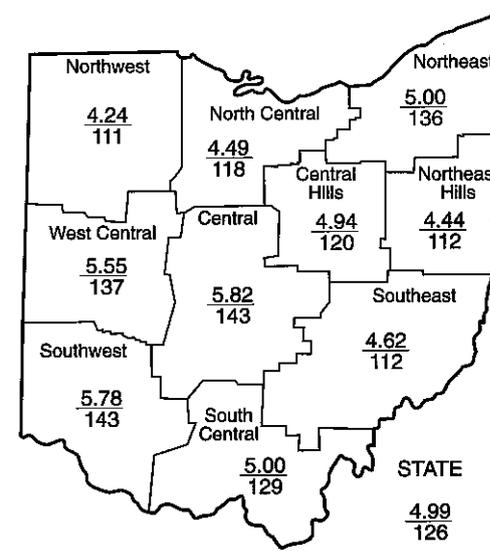


PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.)					Palmer Drought Severity Index*
	This Month	3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+0.41	+1.76	+3.90	+4.58	+3.31	+2.9
North Central	+0.67	+2.29	+4.04	+8.54	+12.45	+4.5
Northeast	+1.32	+1.88	+2.24	+10.73	+16.51	+3.3
West Central	+1.51	-0.03	+0.38	+4.14	+14.13	+2.7
Central	+1.76	+0.37	+0.27	+2.22	+11.17	+1.7
Central Hills	+0.83	+1.34	+0.81	+5.16	+12.12	+2.9
Northeast Hills	+0.48	+0.99	+0.33	+4.21	+7.40	+1.9
Southwest	+1.73	+1.15	+2.66	+4.64	+18.68	+3.2
South Central	+1.12	-1.46	+2.43	+4.31	+11.73	+3.3
Southeast	+0.48	-0.95	+0.87	+2.91	+9.33	+1.7
State	+1.03	+0.73	+1.80	+5.15	+11.71	

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
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ACKNOWLEDGMENTS

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- Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie Level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

- George V. Volnovich
Governor
Donald C. Anderson
Director
Michele Willis
Chief
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MEAN STREAM DISCHARGE

River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
				This Month		
Grand River near Painesville	686	2,135	821	175	131	146
Great Miami River at Hamilton	3,630	8,634	371	107	120	137
Huron River at Milan	371	905	523	208	191	192
Killbuck Creek at Killbuck	464	1,057	402	120	121	148
Little Beaver Creek near East Liverpool	496	977	312	114	116	119
Maumee River at Waterville	6,330	12,813	563	134	152	144
Muskingum River at McConnelsville	7,422	15,940	268	100	109	122
Scioto River near Prospect	567	1,229	462	105	109	143
Scioto River at Higby	5,131	13,950	399	112	118	139
Stillwater River at Pleasant Hill	503	1,557	581	133	130	137

STREAMFLOW during June was noticeably above normal throughout Ohio and high enough to be considered excessive statewide. Flows during June were greater than the flows observed during May. The monthly mean flow of 13,950 cfs for the Scioto River at Higby gauging station was the highest for June for its period of record.

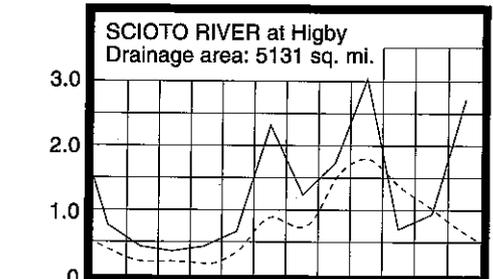
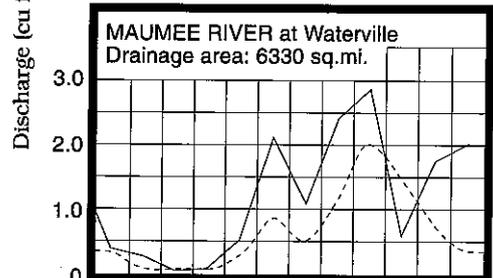
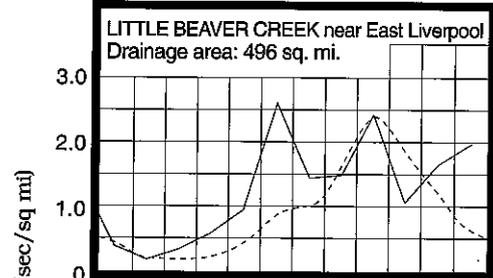
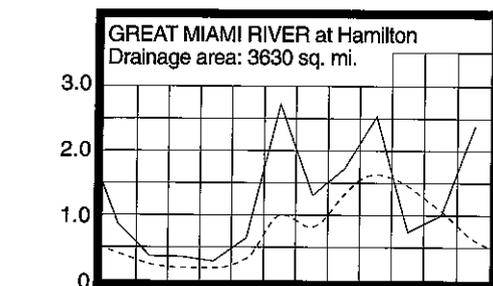
Flows at the beginning of the month were responding to widespread precipitation that fell during the last few days of May and were markedly above normal throughout the state. Heavy rain continued to fall during June 1-2 and flows continued to increase in many areas of the state, especially in central and southern Ohio where significant flooding occurred. Significant flooding also occurred in other areas including the Blanchard River in Hancock and Putnam counties and in

some of the streams that drain directly into Lake Erie or the Ohio River. Drainage basins in southwestern Ohio had their greatest flows for June at the beginning of the month while the greatest flows for the remainder of the state generally occurred on June 3, or a day or two later along the Scioto River in southern Ohio as this floodwater moved downstream. Flows in some streams in the Scioto River basin were the highest in nearly 40 years. Generally, flows declined through the end of the month with slight increases noted after mid-month following some locally heavy precipitation. Lowest flows for June occurred a few days before the end of the month in most drainage basins and at the end of the month in the eastern area of the state. Flows at the end of the month remained above normal statewide.

RESERVOIR STORAGE for water supply during June declined in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of June in the Mahoning basin index reservoirs was 99 percent of rated capacity for water supply compared with 116 percent for last month and 103 percent for June 1996. Month-end storage in the Scioto basin index reservoirs was 102 percent of rated capacity for water supply compared with 115 percent for last month and 100 percent for June 1996. Surface water supplies continue to remain in good condition throughout the state.

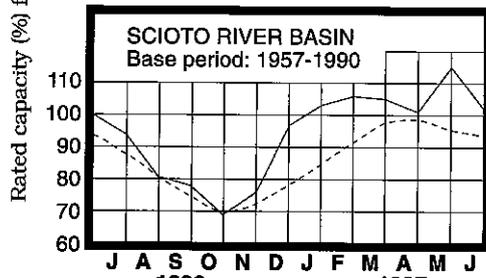
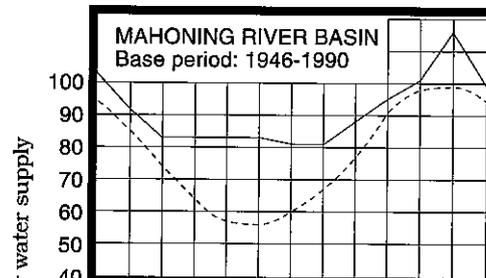
MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

Normal - - - - Current - - - -

RESERVOIR STORAGE FOR WATER SUPPLY



Base period: 1946-1990 (Mahoning), 1957-1990 (Scioto)

GROUND WATER LEVELS during June showed net improvement in most aquifers. A few exceptions were noted in aquifers in the central area of the state. Generally, levels in most aquifers are showing a natural decline during June. Ground water levels in most sand and gravel aquifers rose early in the month and then declined until the end of the month. Consolidated aquifers showed mixed responses with levels in some being stable with slight rises early while others were stable or slowly declined throughout the month. Observation well Hn-2a (near Dola, Hardin County), representing limestone and dolomite aquifers in northwestern Ohio, reached a record-high level during the month.

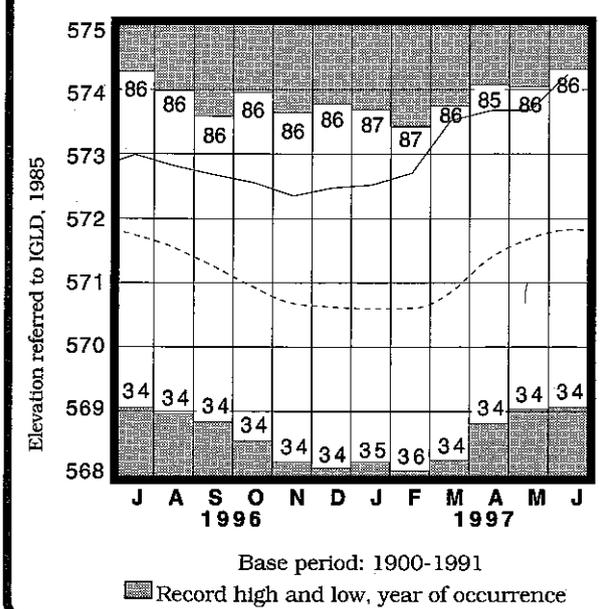
The above normal precipitation during May and June has been beneficial for ground water supplies. Ground water levels are near or above normal in most areas of the state. Although levels are lower than they were a year ago in most aquifers, ground water supplies continue to remain in good condition throughout the state. Hydrologic and climatic conditions have been favorable for reducing the seasonal demand on both public and private water supplies. At the end of June (7-4-97), the Ohio Agricultural Statistics Service reports that soil moisture is rated as being short in 3 percent of the state, adequate in 73 percent of the state, and surplus in 24 percent of the state.

LAKE ERIE level rose to a near-record high during June. The mean level was 574.25 feet (IGLD-1985), 0.56 foot above last month's mean level and 2.43 feet above normal. This month's level is 1.48 feet above the June 1996 level and 5.05 feet above Low Water Datum.

The June 1997 Lake Erie level was only 0.06 foot below the record-high level at Fairport established in June 1986. The U. S. Army Corps of Engineers predicts that, based on the present condition of the lake basin and anticipated future weather conditions, the level of Lake Erie should remain well above the long-term average for the next several months. Projected levels are expected to remain below the record-high levels established during the mid 1980s, but could approach these levels if precipitation in the Lake Erie and other Great Lake's basins is noticeably above normal for an extended period.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during June averaged 3.6 inches, 0.2 inch above normal. The entire Great Lakes basin averaged 3.1 inches of precipitation during June, 0.1 inch below normal. For calendar year 1997 through June, the Lake Erie basin has averaged 18.7 inches of precipitation, 1.6 inches above normal, and the entire Great Lakes basin has averaged 15.9 inches, 1.1 inches above normal.

LAKE ERIE LEVELS at Fairport



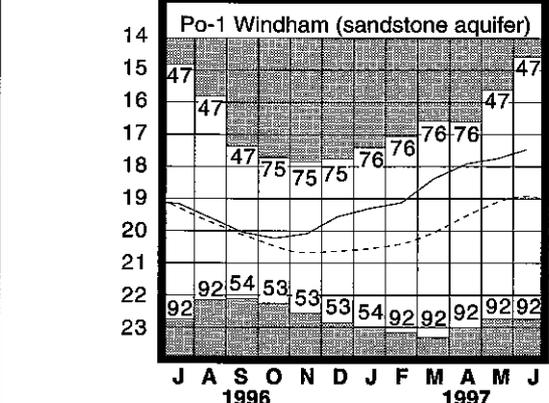
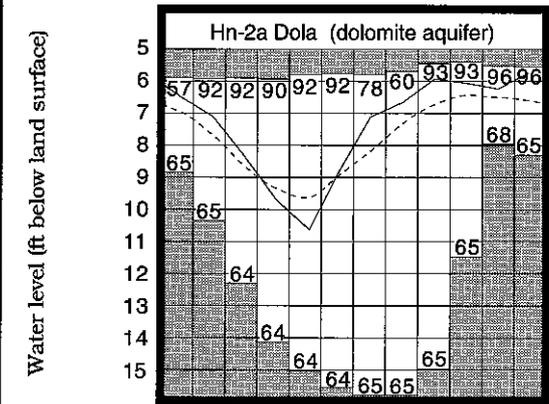
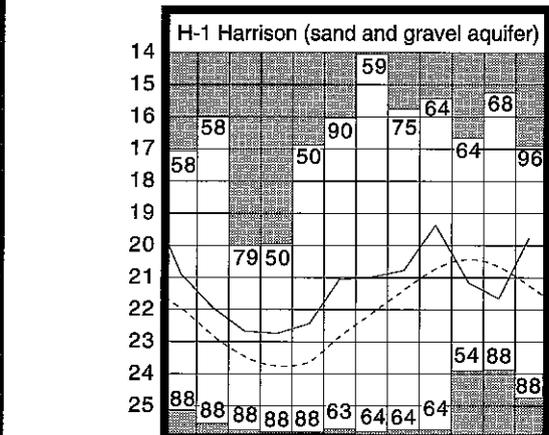
Base period: 1900-1991

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
					This Month	
F-1	W. Rushville, Fairfield Co.	Sandstone	16.30	-2.39	-0.56	-4.23
Fa-1	Jasper Mill, Fayette Co.	Limestone	7.37	-0-	+0.21	-0.96
Fr-10	Columbus, Franklin Co.	Gravel	41.46	+1.59	-0.21	-1.48
H-1	Harrison, Hamilton Co.	Gravel	19.79	+1.51	+1.87	-1.27
Hn-2a	Dola, Hardin Co.	Dolomite	5.77	+0.86	+0.49	+0.03
Po-1	Windham, Portage Co.	Sandstone	17.48	+1.44	+0.29	+1.60
Tu-1	Strasburg, Tuscarawas Co.	Gravel	11.91	-0.02	+1.03	-0.51

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990. Po-1, 1947-1990

Normal - - - - Current - - - -



MONTHLY WATER INVENTORY REPORT FOR OHIO

July 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

SUMMARY

Precipitation was below normal in many areas of the state but above normal in central and northwestern Ohio. Streamflow was above normal in western Ohio and below normal in some eastern areas of the state. Fairfield and Licking counties received disaster declarations following severe flooding on July 27-28. Reservoir storage decreased but remained at above-normal seasonal levels. Ground water levels declined statewide but remain in a favorable position. Lake Erie level declined 0.14 foot and was 2.36 feet above the long-term July average.

NOTES AND COMMENTS

NEW ADMINISTRATIVE ORGANIZATION FOR DIVISION OF WATER

The Division of Water has recently gone through a reorganization. Effective August 3, the three sections of the Division of Water have been combined into two new sections: the Water Resources Section and the Water Engineering and Management Section. The functions from the former Water Planning and Management Section have been split and added to the two new sections. The water planning functions have been added to the Water Resources Section and the Floodplain Management Unit was transferred to the new Water Engineering and Management Section. Mark Ogden, P.E., is the Administrator of the Water Engineering and Management Section. Ted Lozier, P.E., is the Administrator of the Water Resources Section.

The purpose of the reorganization is to increase management efficiency and realign programs in order to enhance interdisciplinary collaboration on our programs. All the current staff and programs have been retained and the Division will provide the same services as before.

COASTWEEKS '97

Coastweeks '97 is Ohio's annual celebration of Lake Erie. This celebration is part of a national three-week celebration of our nations waters and shorelines. It features many activities including clean-ups, hikes, festivals, tours, and many other special programs. These events will be held from August 30 through September 21, 1997 all along Lake Erie's shoreline and on the islands.

Ohio's Coastweeks events are designed to encourage Ohioans of all ages to learn how they can help protect and preserve our Great Lake. In its sixth year, Coastweeks continues to offer many unique educational, environmental, and recreational activities. This year's program focuses on the theme, "I Can Help Lake Erie." People are encouraged to be part of the solution, not the pollution that finds its way into the lake.

Two additional features are also included as part of the Coastweeks activities. One feature is an amateur photography contest. The sixth annual Life on Lake Erie Photo Contest is designed to encourage participants to visit the shorelines of Lake Erie to take photographs and develop a greater appreciation of the lake. Cash prizes will be awarded to the winners.

The other feature is a 3-day Lake Erie environmental program. The Governor's Lake Erie Commission and the International Joint Commission will host the event to be held September 18-20, 1997 at the Great Lakes Science Center in Cleveland.

Everyone is invited to celebrate Lake Erie and participate in the exciting events. For more information about Ohio's Coastweeks '97 including the photography contest and the environmental program, contact the Ohio Lake Erie Office, One Maritime Plaza, Toledo, Ohio 43604-1866, phone: (419) 245-2514, e-mail: oleo@great-lakes.net.

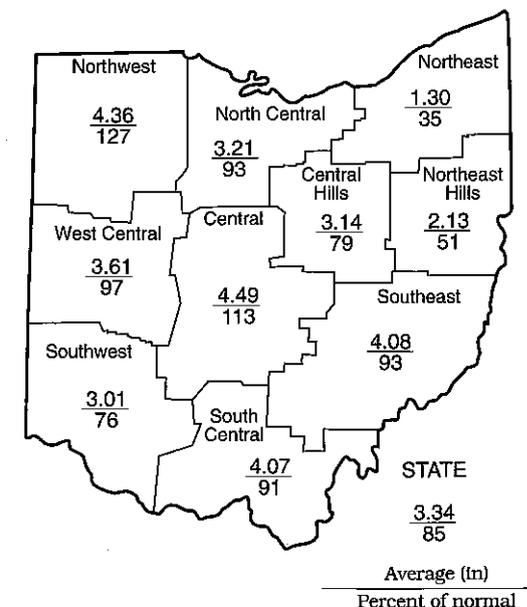
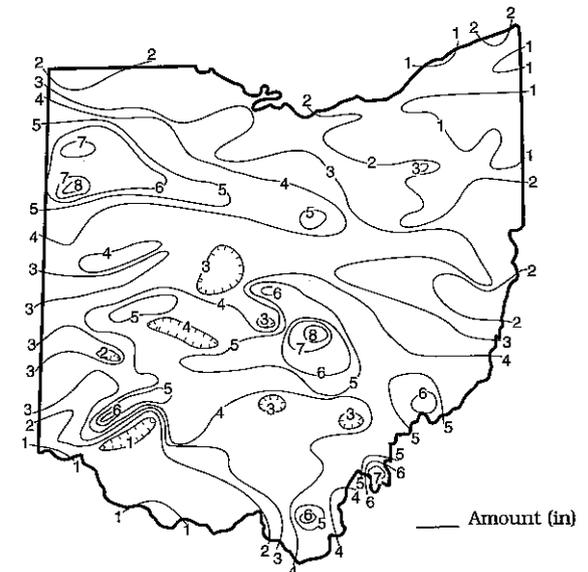
PRECIPITATION during July was slightly below normal throughout most of Ohio, but above normal in the central and northwestern areas of the state. The state average was 3.34 inches, 0.58 inch below normal. Regional averages ranged from 4.49 inches, 0.53 inch above normal, for the Central Region to 1.30 inches, 2.38 inches below normal, for the Northeast Region. This was the third driest July during the past 103 years in the Northeast Region. Buckeye Lake (Licking County) reported the greatest amount of precipitation for the month, 8.86 inches. Also reporting more than 8 inches for the month was Van Wert (Van Wert County) which recorded 8.31 inches. Milford (Clermont County) reported the least amount of precipitation during July, 0.42 inch. A few other locations in southwestern Ohio and numerous locations in northeastern Ohio reported less than 1 inch of rain during July.

Precipitation during July fell as showers and thundershowers with locally severe weather reported in many areas. Most of the precipitation fell during the first and last ten days of the month as the middle of July was rather dry in most locations. Strong storms crossed the southern half of the state during July 1-2 with some areas reporting more than 2 inches of rain. During the next wet period, northwestern Ohio received the most precipitation, more than 2 inches, from storms during July 8-9. Most areas of Ohio reported little if any rain during July 10-20; however, the next ten days were stormy statewide. On and off, scattered showers and storms were widespread throughout the July 21-28 period. The most notable storm occurred during July 26-27 when as much as 8 inches of rain fell over portions of Fairfield and Licking counties. Severe flooding occurred in the South Fork Licking River watershed closing Interstate 70 for nearly two days. These counties received Small Business Administration disaster declarations.

Precipitation for the 1997 calendar year is above normal throughout most of the state, but slightly below normal in the Northeast, Central Hills, and Northeast Hills regions. The state average is 24.74 inches, 1.22 inches above normal. Regional averages range from 28.29 inches, 2.04 inches above normal, for the South Central Region to 22.01 inches, 0.14 inch below normal, for the Northeast Region.

Precipitation for the 1997 water year is above normal throughout Ohio. The state average is 34.36 inches, 3.27 inches above normal. Regional averages range from 37.44 inches, 3.22 inches above normal, for the South Central Region to 32.58 inches, 1.01 inches above normal, for the Northeast Hills Region.

PRECIPITATION JULY 1997



PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.)					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+0.92	+4.77	+4.70	+5.03	+5.88	+3.1
North Central	-0.25	+3.36	+4.14	+8.27	+11.63	+2.6
Northeast	-2.38	+0.48	+0.54	+8.00	+13.58	-0.5
West Central	-0.10	+2.13	+0.90	+2.42	+12.95	+2.1
Central	+0.53	+3.17	+1.43	+2.06	+11.51	+0.8
Central Hills	-0.85	+2.13	+0.77	+4.71	+11.79	+0.9
Northeast Hills	-2.08	+0.27	-1.01	+2.39	+7.07	-0.9
Southwest	-0.96	+2.47	+2.18	+3.41	+18.52	+0.4
South Central	-0.39	+0.52	+2.89	+3.14	+12.85	+1.8
Southeast	-0.29	+0.79	+1.02	+1.15	+10.88	+0.2
State	-0.58	+2.01	+1.76	+4.06	+11.69	

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DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor
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Director
Michele Willis
Chief

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Scioto River near Prospect	567	130	127	179	103	141
Scioto River at Higby	5,131	3,985	200	203	120	139
Stillwater River at Pleasant Hill	503	174	126	237	136	135

STREAMFLOW during July was above normal in the western half of the state and below normal in much of the eastern half. Flows in northwestern and central Ohio were high enough to be considered excessive, while flows in extreme northeastern Ohio were low enough to be considered deficient. Flows during July were markedly less than the extremely high flows recorded during June.

Flows at the beginning of the month were above normal throughout the state. The only exception was in extreme northeastern Ohio where flows were below normal. Most areas had their greatest streamflow for the month during July 1-3 as scattered storms added runoff to streams already flowing at above-normal levels.

Generally, flows declined throughout the month with slight rises noted following local precipitation. Some areas had their highest flows following some of these storm events including northwestern Ohio on July 9-10, and central and north-central Ohio on July 27-28. Severe flooding occurred in Fairfield and Licking counties during July 27-28. These counties received Small Business Administration disaster declarations.

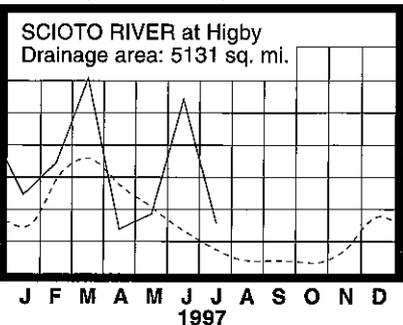
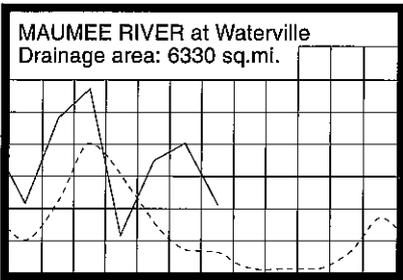
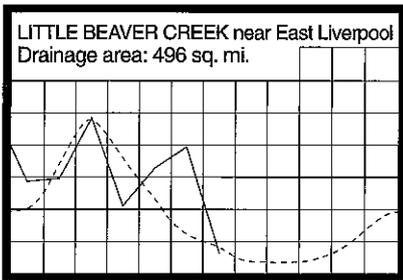
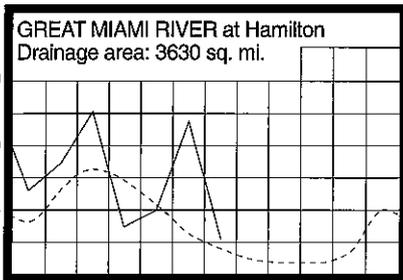
The lowest flows for July occurred during July 21-22 in most drainage basins and at the end of the month in the northeastern area of the state. At the end of July, flows were noticeably below normal throughout the state except in the central Ohio where flows were still above normal due to the flooding of earlier that week.

RESERVOIR STORAGE for water supply declined during July in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of July in the Mahoning basin index reservoirs was 86 percent of rated capacity for water supply compared with 99 percent for last month and 92 percent for July 1996. Month-end storage in the Scioto basin index reservoirs was 97 percent of rated capacity for water supply compared with 102 percent for last month and 94 percent for July 1996. Surface-water supplies continue to remain in good condition throughout most areas of the state.

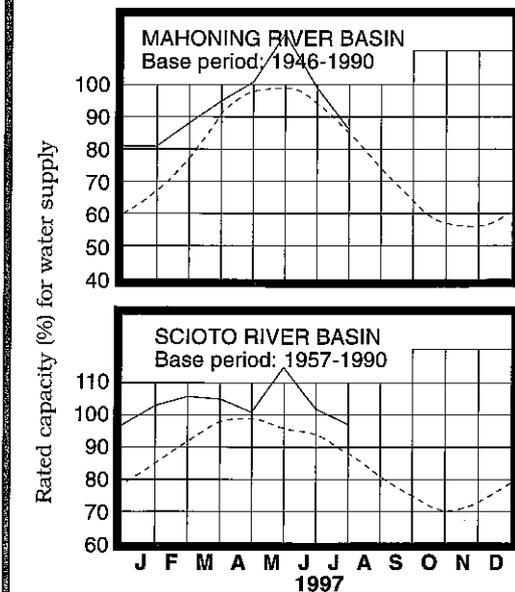
MEAN STREAM DISCHARGE

(4.81 - Off the chart)

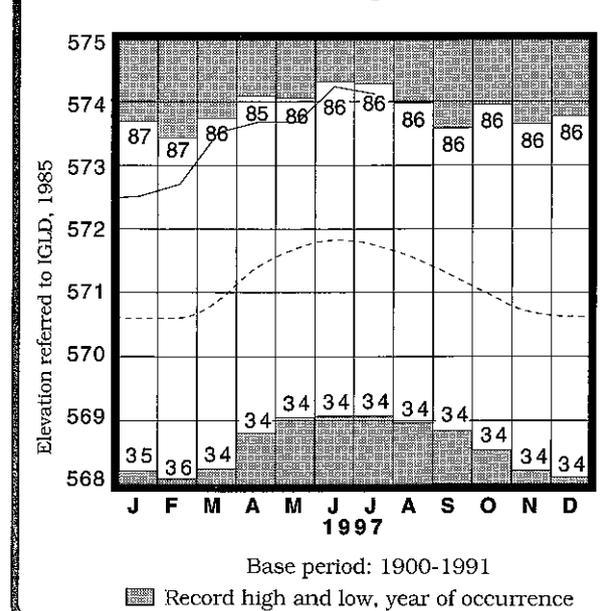


Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



LAKE ERIE LEVELS at Fairport



Base period: 1900-1991
Record high and low, year of occurrence

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	17.40	-2.28	-1.10	-2.72
Fa-1	Jasper Mill, Fayette Co.	Limestone	7.83	-0.03	-0.46	-0.56
Fr-10	Columbus, Franklin Co.	Gravel	42.33	+1.13	-0.87	-0.96
H-1	Harrison, Hamilton Co.	Gravel	21.73	+0.23	-1.94	-0.83
Hn-2a	Dola, Hardin Co.	Dolomite	6.09	+0.86	-0.32	+0.41
Po-1	Windham, Portage Co.	Sandstone	18.25	+1.04	-0.77	+0.91
Tu-1	Strasburg, Tuscarawas Co.	Gravel	13.19	-0.67	-1.28	-0.44

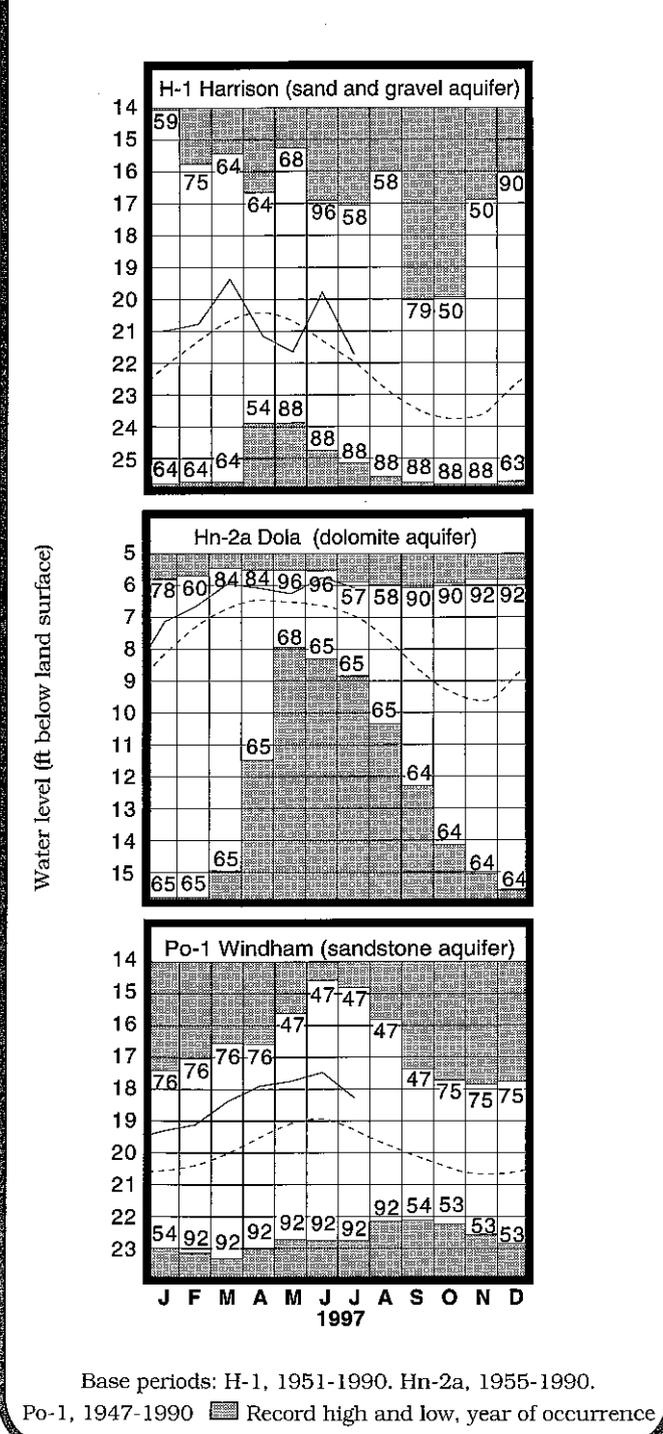
GROUND WATER LEVELS during July declined in all aquifers throughout Ohio. Declines were about what is usually expected during July in the most areas of the state, but were greater than normally expected in northeastern Ohio. Generally, ground levels declined throughout the month with some stabilization or slight rises noted in a few aquifers during the last week.

Ground water levels continue to remain near or above normal in most areas of the state. A few exceptions are noted in some aquifers in eastern Ohio where levels are below normal. Generally, current levels are lower than they were a year ago except in consolidated aquifers in northern Ohio where they are higher. Many areas of Ohio were rather dry during the middle two weeks of July. In spite of this, ground water supplies remain in a favorable position throughout the state. At the end of July, the Ohio Agricultural Statistics Service reports that soil moisture was rated as being short or very short in 33 percent of the state, adequate in 64 percent of the state, and surplus in 3 percent of the state.

LAKE ERIE level declined during July. The mean level was 574.11 feet (IGLD-1985), 0.14 foot below last month's mean level and 2.36 feet above normal. This month's level is 1.14 feet above the July 1996 level and 4.91 feet above Low Water Datum. This month's level was 0.17 foot below the record-high July level at Fairport established in 1986.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during July averaged 2.6 inches, 0.7 inch below normal. The entire Great Lakes basin averaged 2.9 inches of precipitation during July, 0.2 inch below normal. For calendar year 1997 through July, the Lake Erie basin has averaged 21.4 inches of precipitation, 1.0 inch above normal, and the entire Great Lakes basin has averaged 18.9 inches, also 1.0 inch above normal.

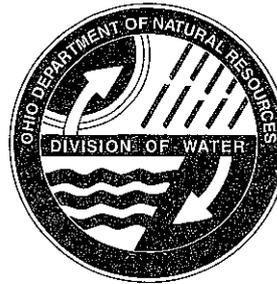
GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990. Po-1, 1947-1990
Record high and low, year of occurrence

Normal - - - - Current - - - -

Normal - - - - Current - - - -



MONTHLY WATER INVENTORY REPORT FOR OHIO

August 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

SUMMARY

Precipitation was above normal throughout most of Ohio. Streamflow was noticeably above normal in all areas of the state except extreme northeastern Ohio where it was below normal. Reservoir storage decreased but remained above normal. Ground water levels declined and remain adequate statewide. Lake Erie level declined 0.42 foot and was 2.13 feet above the long-term August average. Water supplies are in a good position as the end of the summer season nears.

NOTES AND COMMENTS

ODNR'S Strategic Plan For Lake Erie's Coast

The Ohio Department of Natural Resources (ODNR) has identified management of Lake Erie's coast as one of the department's five strategic priorities and has set out to address the coastal issues on a department-wide basis. The first step was the creation of an interdivisional team which investigated and prepared a strategic plan for Lake Erie's coast which has just been completed.

The four goals for ODNR's strategic plan for Lake Erie's coast are: 1) Manage and protect resources; 2) Provide up-to-date technical assistance and information; 3) Build public and private support to protect Ohio's coast; and 4) Provide more consultation and educational resources within the coastal area. Eleven strategies were formulated to address these goals.

The next steps (implementing the plan) are now being coordinated through the Coastal Management Program within the Division of Real Estate and Land Management (REALM). Two printed publications outlining the needs and strategies have been prepared to help educate the public about the unique challenges of the Lake Erie coast: a simple one-color question-and-answer brochure, "What every Citizen Should Know," and a more detailed four-color brochure, "Where the Water Meets the Land...ODNR's Strategic Plan for Lake Erie's Coast."

Copies of the brochure and the strategic plan are available from REALM at 1-888-232-ERIE (3743).

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publication:

Ground Water Pollution Potential of Perry County
by Paul Spahr and Christine Straub

Ground water pollution potential maps are designed to determine an area's relative vulnerability to ground water pollution. The maps can be used as a planning and management tool for administrators, commissioners, zoning boards and others to aid in making educated decisions about local development and siting of land use operations or activities that can affect ground water quality. The system optimizes the use of existing data to rank areas with respect to pollution potential to help direct investigations and resource expenditures and to prioritize protection, monitoring and clean-up efforts.

Mapping an area's potential for ground water pollution is a relatively new idea. These maps use the DRASTIC system as developed for the U.S. Environmental Protection Agency by the National Ground Water Association. DRASTIC values, as shown on the maps, indicate an area's relative vulnerability to contamination through the use of a numerical rating scheme and the mapping of hydrogeologic settings. Low DRASTIC values indicate relatively low potential and high DRASTIC values indicate a high potential for contamination. Areas of similar DRASTIC values are color-coded for ease of interpretation.

Each ground water pollution potential map with its accompanying report costs \$10.00. They can be purchased at or ordered from: ODNR Division of Water, Water Resources Section, 1939 Fountain Square, Building E-1, Columbus, Ohio 43224-1336, phone (614) 265-6740.

Make checks payable to ODNR Division of Water. If publications are ordered through the mail, please be sure to include the correct postage and handling charges as shown below. Payments can also be made with Visa or MasterCard.

The U. S. Geological Survey, Water Resources Division, announces the availability of the following new publication:

Effects of Highway Deicing Chemicals on Shallow Unconsolidated Aquifers in Ohio, Interim Report, 1988-93 (U. S. Geological Survey-Water Resources Investigations Report 97-4027)

by Allison L. Jones and Bernard N. Sroka

This interim report discusses the effects of the application of highway deicing chemicals during winter months on ground-water quality at eight sites throughout Ohio. The sites are located in Ashland, Ashtabula, Champaign, Clark, Lucas, Pickaway, Portage, and Richland counties along major undivided highways where drainage is by open ditches and ground-water flow is approximately perpendicular to the highway. At each location, records of deicer application rates are being kept and apparent movement of deicing chemicals through shallow, unconsolidated aquifers is being monitored by means of periodic measurements of specific conductance and concentrations of dissolved sodium, calcium, and chloride. Evidence indicates that some of the sites are potentially affected by the direct application of deicing chemicals.

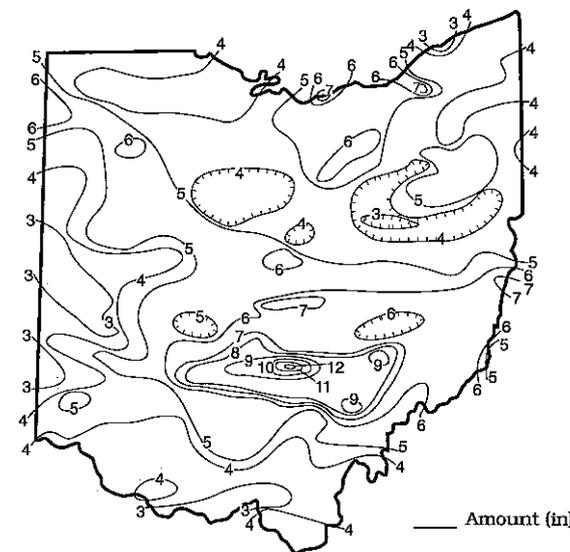
A limited number of this new publication is available from the U. S. Geological Survey, Water Resources Division, 975 West Third Avenue, Columbus, Ohio 43212-3192, phone (614) 469-5553.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service: The Miami Consergency District: U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

PRECIPITATION AUGUST



PRECIPITATION during August was above normal throughout most of the state with only a few locations in western and southern Ohio having below normal rainfall. The state average was 4.86 inches, 1.38 inches above normal. Regional averages ranged from 6.80 inches, 2.96 inches above normal, for the Southeast Region to 3.86 inches, 0.39 inch above normal, for the Southwest region. This was the sixth wettest August during the past 103 years in the Central Region and the seventh wettest in the Southeast Region. Rockbridge (Hocking County) reported the greatest amount of precipitation during August, 12.09 inches. Portsmouth (Scioto County) reported the least amount 2.30 inches.

Precipitation during August fell as showers and thundershowers typical of the season. Most of the precipitation fell during the middle of the month as the first 10 and last 10 days were much drier, although scattered storms during August 3-4 were locally severe with more than 1 inch of rain falling in many areas. Welcome drying occurred during the next several days following these storms, but rain showers returned August 12 and continued falling on and off for the next 10 days. The strongest storms during this period crossed the state during August 16-17. More than 6 inches of rain was reported in some areas of central and southeastern Ohio from these storms. Moderate to locally severe flooding occurred in portions of Athens, Hocking, and Perry counties following these storms. For the entire 10-day period, more than 3 inches fell in most locations from northwestern Ohio down through the central part of the state and into southeastern Ohio. Much needed drying conditions prevailed throughout the state during the last week of the month with only a few light, scattered showers reported with some isolated stronger storms in northern Ohio.

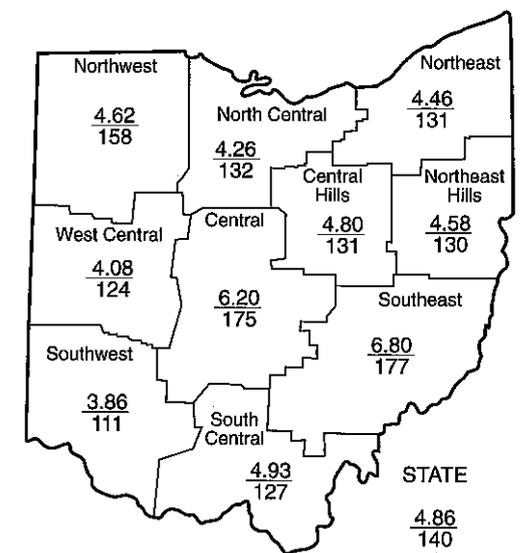
Precipitation for the 1997 calendar year is above normal throughout most of Ohio with only the Northeast Hills Region having slightly below normal precipitation. The state average is 29.59 inches, 2.59 inches above normal. Regional averages range from 33.22 inches, 3.08 inches above normal, for the South Central Region to 26.47 inches, 0.92 inch above normal, for the Northeast region. Precipitation in the Northeast Hills Region averages 26.69 inches, 0.69 inch below normal.

Precipitation for the 1997 water year is above normal throughout Ohio. The state average is 39.22 inches, 4.65 inches above normal. Regional averages range from 42.37 inches, 4.26 inches above normal, for the South Central Region to 37.16 inches, 2.07 inches above normal, for the Northeast Hills Region.

PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.)					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+1.69	+3.02	+4.66	+8.15	+7.22	+3.7
North Central	+1.03	+1.45	+3.75	+11.69	+11.77	+3.5
Northeast	+1.06	0.00	+1.27	+10.10	+15.81	+0.7
West Central	+0.78	+2.19	+1.43	+5.85	+11.33	+2.7
Central	+2.65	+4.94	+4.54	+6.94	+12.07	+2.3
Central Hills	+1.14	+1.12	+2.07	+7.50	+11.42	+2.2
Northeast Hills	+1.06	-0.54	+0.56	+4.71	+8.57	-0.3
Southwest	+0.39	+1.16	+3.15	+5.97	+17.16	+0.9
South Central	+1.04	+1.77	+4.83	+5.66	+12.30	+0.4
Southeast	+2.96	+3.15	+4.77	+6.43	+14.24	+2.5
State	+1.38	+1.83	+3.11	+7.30	+12.21	

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



Average (in)
Percent of normal



Department
of Natural
Resources

DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Volnovich
Governor
Donald C. Anderson
Director
Michele Willis
Chief
An Equal Opportunity Employer-M/F/H

MEAN STREAM DISCHARGE

River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	This Month		
				% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	58	52	196	121	144
Great Miami River at Hamilton	3,630	1,208	130	223	111	134
Huron River at Milan	371	163	340	340	163	198
Killbuck Creek at Killbuck	464	139	109	202	119	147
Little Beaver Creek near East Liverpool	496	160	154	193	102	120
Maumee River at Waterville	6,330	3,589	538	416	162	154
Muskingum River at McConnelsville	7,422	4,393	167	180	106	124
Scioto River near Prospect	567	138	339	267	104	142
Scioto River at Higby	5,131	5,082	434	330	134	144
Stillwater River at Pleasant Hill	503	81	138	349	120	136

STREAMFLOW during August was above normal throughout most of the state, but below normal in extreme northeastern Ohio. Flows in all areas except southwestern and northeastern Ohio were high enough to be considered excessive. The mean flow of 3,589 cfs at the Maumee River at Waterville gauging station was its third greatest flow for August. In addition, the daily mean flow of 19,700 cfs on August 18 was the greatest ever recorded in August at the Waterville gauge. August flows in the western half of Ohio declined seasonally from the flows recorded during July while in the eastern half of the state, August flows were greater than the July flows.

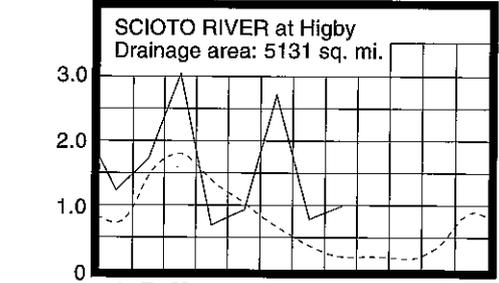
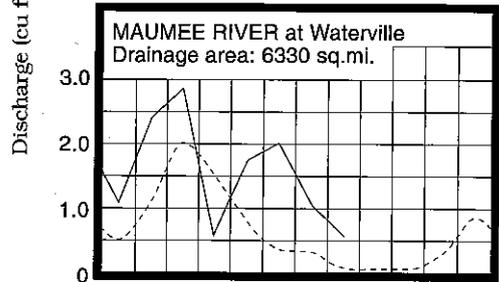
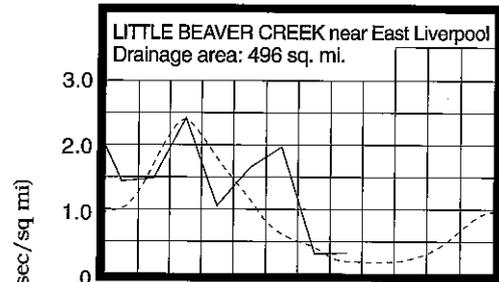
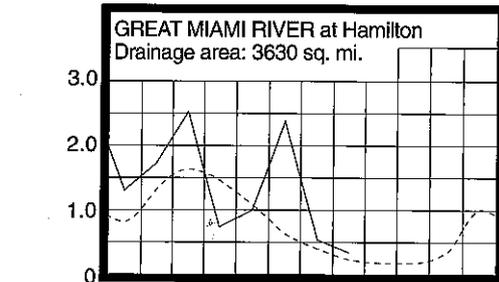
Flows at the beginning of the month were below normal in northeastern Ohio and slightly above normal elsewhere. An exception was in some central and southeastern areas of the state where flows were noticeably above normal, still responding to precipitation that fell just a few days before the end of July. Generally, flows declined until a few days before the middle of the month with the lowest flows for August occurring within a day or two of August 12. Flows increased noticeably after mid-month following several days with widespread precipitation which started on August 12. The greatest flows for the month in nearly all drainage basins occurred on August 18 following strong storms with heavy local precipitation on August 16-17. Moderate to severe flooding occurred in some drainage basins in Athens, Hocking and Perry counties where as much as 6 inches of rain was reported. Flows at the end of the month were above normal throughout most of the state, but below normal in north-central and northeastern Ohio.

Reservoir storage for water supply during August decreased seasonally in the Mahoning basin reservoirs but increased slightly in the Scioto basin reservoirs. Storage remained above normal in both basins. Reservoir storage at the end of August in the Mahoning basin index reservoirs was 78 percent of rated capacity for water supply compared with 86 percent for last month and 83 percent for August 1996. Month-end storage in the Scioto basin index reservoirs was 98 percent of rated capacity for water supply compared with 97 percent for last month and 81 percent for August 1996. Surface-water supplies continue to remain in good condition throughout the state.

Reservoir storage at the end of August in the Mahoning basin index reservoirs was 78 percent of rated capacity for water supply compared with 86 percent for last month and 83 percent for August 1996. Month-end storage in the Scioto basin index reservoirs was 98 percent of rated capacity for water supply compared with 97 percent for last month and 81 percent for August 1996. Surface-water supplies continue to remain in good condition throughout the state.

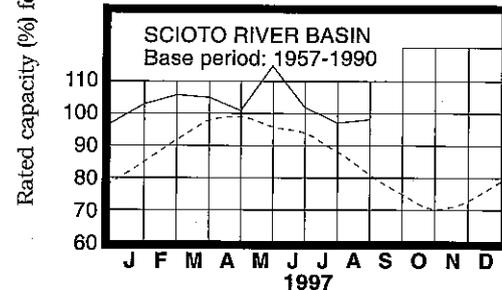
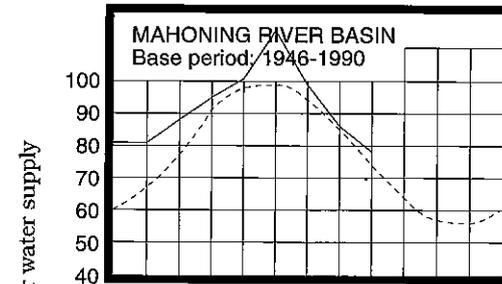
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MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

RESERVOIR STORAGE FOR WATER SUPPLY



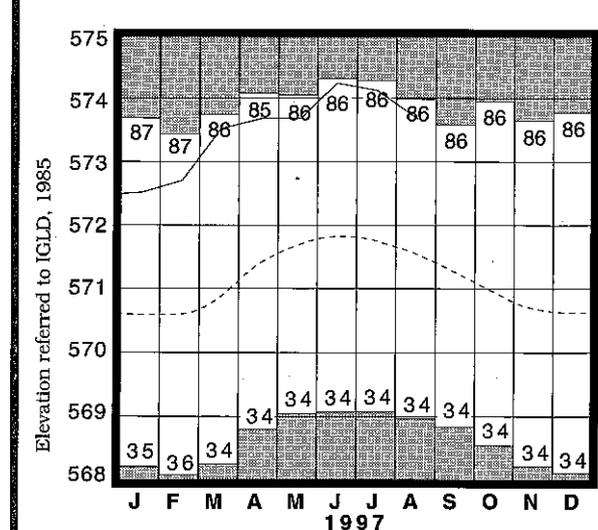
GROUND WATER LEVELS during August declined in all aquifers throughout the state. Ground water levels in some aquifers, especially in northeastern Ohio, declined throughout the month while levels in most aquifers declined during the first half of the month and rose during the second half. Generally, net declines during August were less than usually expected in consolidated aquifers and greater than usually expected in unconsolidated aquifers.

Ground water supplies continue to remain adequate throughout the state even though current levels are lower than they were a year ago in many aquifers. Consolidated aquifers in northern Ohio are an exception where this year's levels are higher than last year's levels. Levels are above normal in most areas of the state, but below normal in some aquifers in eastern Ohio. Most areas of Ohio have had some drying periods during the growing season months but generally, soil moisture has been adequate throughout the period. Near the end of August, the Ohio Agricultural Statistics Service reports that soil moisture was rated as being adequate in 87 percent of the state, short in 3 percent of the state and surplus in 10 percent of the state.

LAKE ERIE level declined during August. The mean level was 573.69 feet (IGLD-1985), 0.42 foot below last month's mean level and 2.13 feet above normal. This month's level is 0.89 foot above the August 1996 level and 4.49 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during August averaged 4.0 inches, 0.8 inch above normal. The entire Great Lakes basin averaged 3.5 inches of precipitation during August, 0.4 inch above normal. For calendar year 1997 through August, the Lake Erie basin has averaged 25.4 inches of precipitation, 1.8 inches above normal, and the entire Great Lakes basin has averaged 22.4 inches, 1.4 inches above normal.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

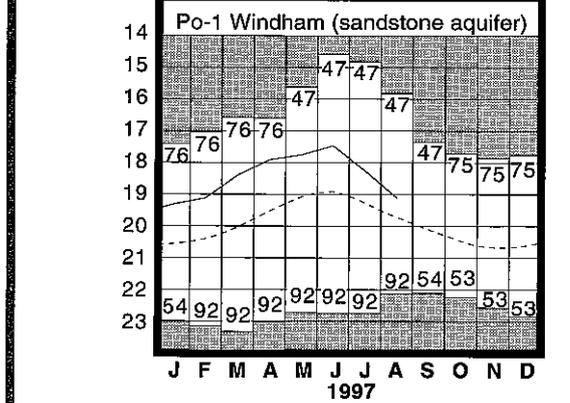
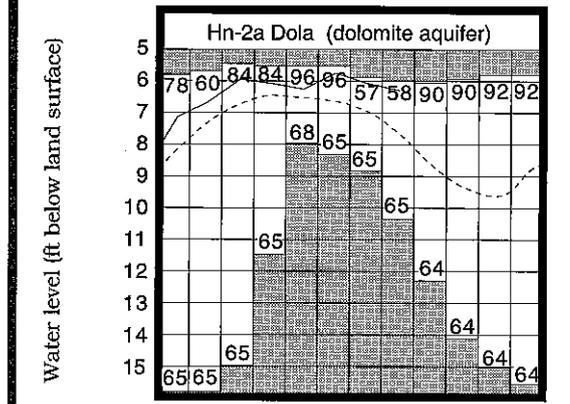
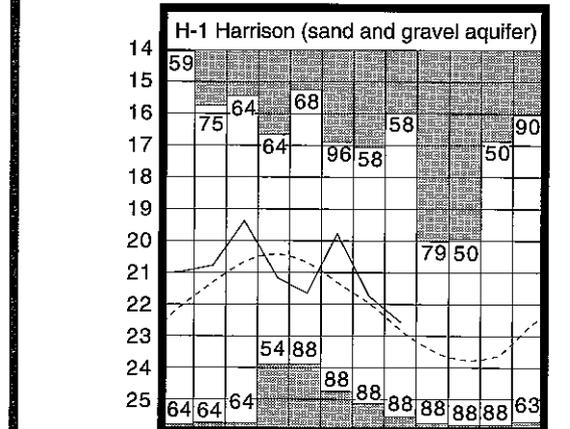
Record high and low, year of occurrence

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	17.68	-1.89	-0.28	-2.59
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.31	-0.03	-0.48	-0.32
Fr-10	Columbus, Franklin Co.	Gravel	42.91	+1.11	-0.58	-0.62
H-1	Harrison, Hamilton Co.	Gravel	22.57	+0.24	-0.84	-0.62
Hn-2a	Dola, Hardin Co.	Dolomite	6.30	+1.36	-0.21	+0.81
Po-1	Windham, Portage Co.	Sandstone	19.11	+0.61	-0.86	+0.49
Tu-1	Strasburg, Tuscarawas Co.	Gravel	14.36	-1.27	-1.17	-0.47

GROUND-WATER LEVELS

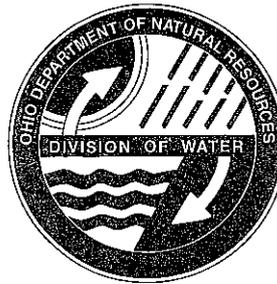


Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 Record high and low, year of occurrence

Normal - - - - Current - - - -

Normal - - - - Current - - - -



MONTHLY WATER INVENTORY REPORT FOR OHIO

September 1997

Compiled By David H. Cashell
Hydrologist
Water Inventory Unit

(continued from front page)

Near-record snow fell in the snowbelt areas east of Cleveland early in November. Precipitation continued to be above normal during December, but fell back to below-normal levels during January with unusually meager amounts of snow reported. February precipitation was above normal across northern Ohio, but continued at below-normal levels in the southern two-thirds of the state. March precipitation was above normal statewide, but unfortunately the month started off with once-in-a-century storms crossing southern Ohio causing catastrophic flooding. The entire state dried out during April with precipitation amounts ranking this as the ninth driest April of record. May was exceptionally wet statewide with some flooding at the end of the month. June rain was above normal, and although there were a few dry areas, especially in north-central Ohio, some areas in central and northwestern Ohio had significant flooding. July was similar to June but with northeastern and southwestern Ohio being the driest areas and localized flooding in central and southeastern Ohio. August precipitation continued this pattern of being wet in most areas but with a few scattered dry areas. More flooding occurred in portions of central and southeastern Ohio. The water year ended as it had started with above normal precipitation in northern Ohio and below normal precipitation in southern Ohio. All in all, the 1997 water year was good for both water supplies and for agriculture.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

Precipitation data:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service; The Miami Conservancy District; U.S. Army Corps of Engineers, Muskingum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Army Corps of Engineers, Detroit District.
Palmer Drought Severity Index:
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.

PRECIPITATION SEPTEMBER

PRECIPITATION during September was below normal in the southern two-thirds of Ohio and above normal in the northern third. The state average was 2.32 inches, 0.68 inch below normal. Regional averages ranged from 4.15 inches, 1.30 inches above normal, for the Northwest Region to 0.95 inch, 2.14 inches below normal, for the Southwest Region. This was the sixth driest September in the Southwest Region during the past 102 years. Wauseon (Fulton County) reported the greatest amount of precipitation for the month, 5.72 inches. Oxford (Butler County) reported the least amount, 0.41 inch.

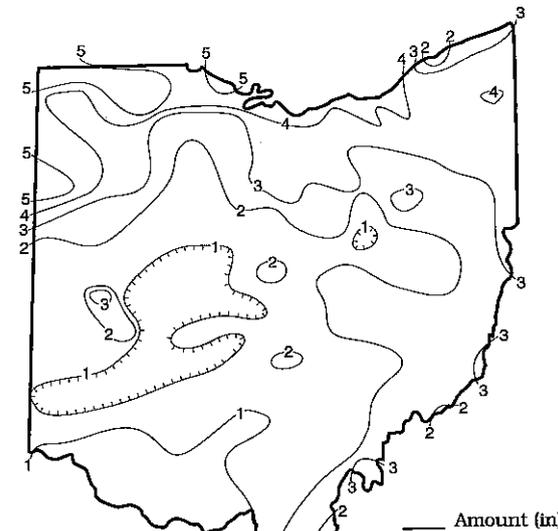
Precipitation during September fell as light showers with only some areas in northern Ohio having stronger storms. The first week of September was rather dry with only a few light scattered showers falling. Heavier showers crossed the state, especially northern Ohio, during September 9-10. Some areas received more than 1.5 inches of rain with amounts tapering to less than 0.5 inch in southern Ohio. More strong storms crossed northern Ohio during September 19-20 with more than 1 inch of rain reported at many locations. Central and southwestern Ohio received very little rain during this period. A few light, scattered showers fell during the remainder of the month, but rain amounts were small.

Precipitation for the 1997 calendar year is above normal in most areas of the state, but slightly below normal in the West Central and Northeast Hills regions. The state average is 31.91 inches, 1.91 inches above normal. Regional averages range from 35.02 inches, 1.70 inches above normal, for the South Central region to 28.83 inches, 0.49 inch below normal, for the West Central Region.

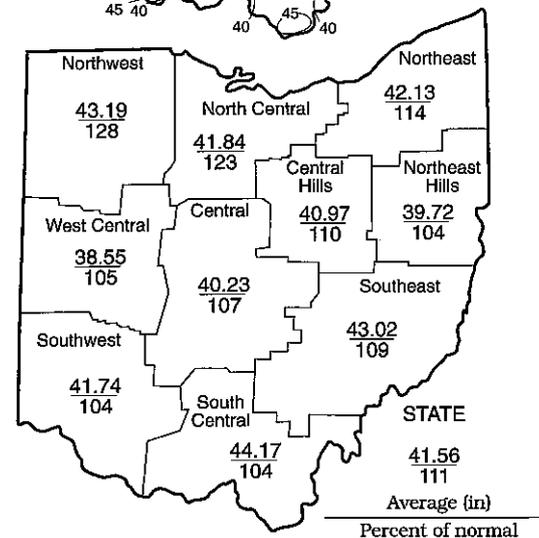
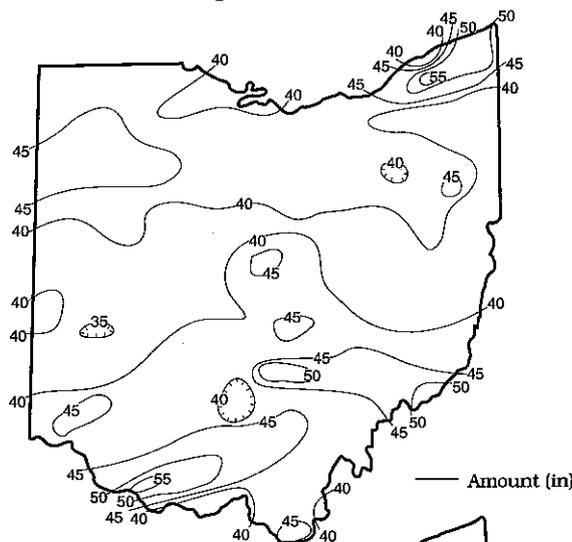
Precipitation for the 1997 water year was above normal throughout most of the state with only a few isolated locations having below normal precipitation. The state average was 41.57 inches, 4.00 inches above normal. Regional averages ranged from 44.17 inches, 2.88 inches above normal, for the South Central Region to 38.55 inches, 1.86 inches above normal, for the West Central Region (see Precipitation table, departure from normal, past 12 months column). Ripley (Brown County) reported the greatest amount of precipitation during the 1997 water year, 56.16 inches. Chardon (Geauga County) reported 55.61 inches, the only other location reporting more than 55 inches. Dayton International Airport (Montgomery County) reported the least amount, 34.49 inches. An isohyetal map and regional averages with percentages of normal precipitation for the 1997 water year appear on the last page of this report.

The 1997 water year started off with below normal precipitation during October except in northeastern Ohio where it was above normal. Conditions changed quickly during November with above normal precipitation recorded statewide.

(continued on back)



Total Precipitation 1997 Water Year



SUMMARY

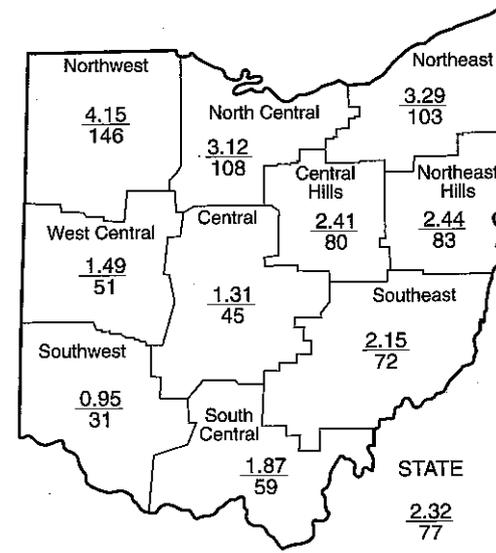
Precipitation during September was above normal in the northern third of the state and below normal in the southern two-thirds. Streamflow was above normal in northwestern, north-central and central Ohio and below normal elsewhere. Reservoir storage decreased but remained at above-normal seasonal levels. Ground water levels declined and are above normal in most aquifers but below normal in some eastern areas of the state. Lake Erie level declined seasonally and was 2.13 feet above the long-term September average.

Precipitation for the 1997 water year was above normal throughout the state. Streamflow was noticeably above normal statewide. Surface-water and ground-water supplies were adequate throughout the year. Lake Erie was near record-high levels during the summer months. The 1997 water year was good for water supplies and agriculture, but also included serious flooding in many areas, most notably in extreme southern Ohio.

PRECIPITATION

Region	This Month	DEPARTURE FROM NORMAL (IN.)				Palmer Drought Severity Index*
		Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+1.30	+3.94	+5.55	+9.37	+10.18	+3.7
North Central	+0.24	+1.08	+3.46	+7.81	+13.92	+3.5
Northeast	+0.11	-1.26	+0.62	+5.16	+17.79	+1.9
West Central	-1.44	-0.66	-0.90	+1.86	+11.48	+1.9
Central	-1.58	+1.45	+1.61	+2.62	+11.82	+2.0
Central Hills	-0.62	-0.21	+1.24	+3.57	+12.97	+1.5
Northeast Hills	-0.50	-1.51	-0.66	+1.69	+9.71	-0.4
Southwest	-2.14	-2.71	-1.39	+1.47	+16.71	-0.1
South Central	-1.31	-0.78	-2.19	+2.88	+12.14	-0.2
Southeast	-0.84	+1.81	+1.15	+3.43	+14.71	+1.7
State	-0.68	+0.12	+0.85	+4.00	+13.18	

*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal
-0.5 To -0.9 = Incipient Drought
-1.0 To -1.9 = Mild Drought
-2.0 To -2.9 = Moderate Drought
-3.0 To -3.9 = Severe Drought
Below -4.0 = Extreme Drought



DIVISION OF WATER
1939 FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

George V. Voinovich
Governor
Donald C. Anderson
Director
Michele Willis
Chief

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MEAN STREAM DISCHARGE

River and Location	Drainage Area (Sq. Mi.)	This Month Mean Discharge (CFS)	% of Normal	% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
				Grand River near Painesville	685	72
Great Miami River at Hamilton	3,630	739	96	115	101	133
Huron River at Milan	371	159	483	214	194	199
Killbuck Creek at Killbuck	464	93	92	95	108	143
Little Beaver Creek near East Liverpool	496	187	203	105	104	120
Maumee River at Waterville	6,330	4,176	658	377	153	160
Muskingum River at McConnellsville	7,422	1,903	97	99	97	123
Scioto River near Prospect	567	25	81	133	108	142
Scioto River at Higby	5,131	2,142	175	214	134	145
Stillwater River at Pleasant Hill	503	51	103	104	119	135

STREAMFLOW during September was slightly below normal in portions of south-western, east-central and extreme north-eastern Ohio and above normal in north-western, north-central and central Ohio. Flows in extreme northeastern Ohio were low enough to be considered deficient while flows in northwestern and north-central Ohio were high enough to be considered excessive.

Flows at the beginning of the month were above normal in most areas of the state with only northeastern Ohio having below normal flows. The lowest flows in September occurred during September 8-9 for drainage basins in northern Ohio and at the end of the month for basins in the southern two-thirds of the state. The greatest flows for September occurred during September 11-12 in the southern Ohio drainage basins and during

September 20-23 in the northern Ohio drainage basins. Flows at the end of the month were below normal in most areas of the state, but above normal in northwestern Ohio.

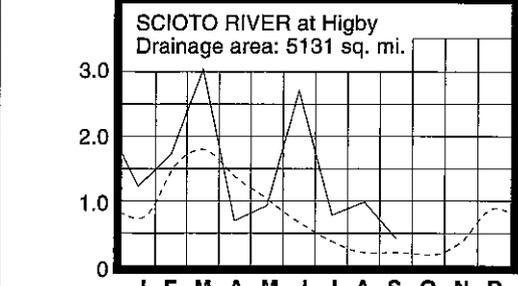
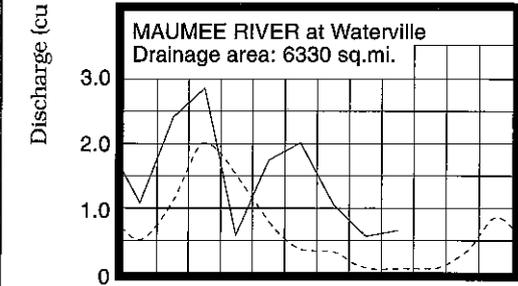
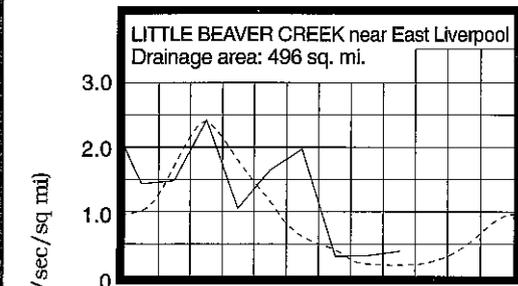
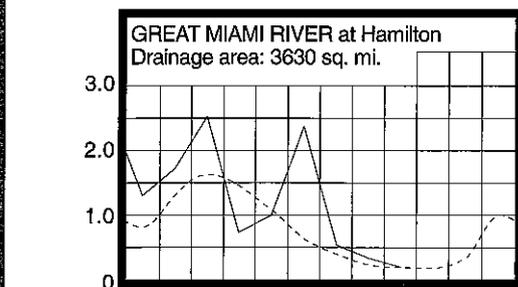
Streamflow during the 1997 water year was above normal throughout the state (see Mean Stream Discharge table, percent of normal past 12 months column). Annual average flows in nearly all drainage basins were high enough to be considered excessive. Flows were above normal statewide during the first half of the water year. Near-record December flows were recorded in many areas of the state. A few areas dried out slightly during February, but heavy storms caused catastrophic flooding in southern Ohio during the first week of March. Although unusually dry conditions during April reduced streamflows to below normal, widespread storms during May and locally severe storms throughout the first half of June caused additional flooding in southern, central and northwestern Ohio. The Scioto River at Higby stream gauging station recorded its highest June flow on record. Portions of northern and eastern Ohio dried out during July and August reducing flows in those areas, but elsewhere flows remained high with additional flooding occurring in central Ohio during July and August. Drier conditions prevailed in the southern half of Ohio during September, but storms crossing northern Ohio kept flows at excessive levels in some drainage basins.

RESERVOIR STORAGE for water supply during September decreased in both the Mahoning and Scioto river basins. Storage remained above normal in both basins.

Reservoir storage at the end of September in the Mahoning basin index reservoirs was 74 percent of rated capacity for water supply compared with 78 percent for last month and 83 percent for September 1996. Month-end storage in the Scioto basin index reservoirs was 86 percent of rated capacity for water supply compared with 98 percent for last month and 78 percent for September 1996.

Surface-water supplies were adequate throughout the 1997 water year. Storage in both on- and off-stream reservoirs was near or above normal throughout the year. Adequate precipitation during the summer months helped to reduce demand during this high water-use season.

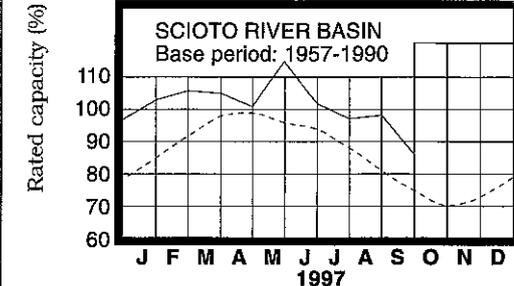
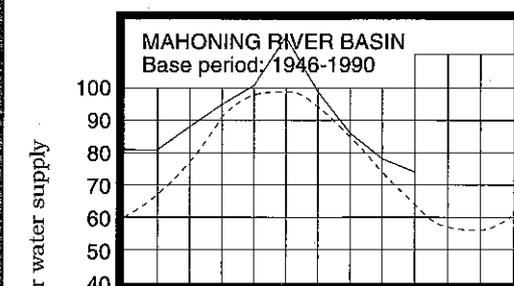
MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

Normal - - - - Current - - - -

RESERVOIR STORAGE FOR WATER SUPPLY



Base period: 1946-1990 (Mahoning), 1957-1990 (Scioto)

GROUND WATER LEVELS during September declined seasonally from last month's levels in most areas of the state. A few exceptions were observed in consolidated aquifers in southeastern Ohio where levels responded to the noticeably above normal precipitation that fell during August. Generally, levels declined during the first half of the month and were stable during the second half. Net declines during September were about what is usually observed in most aquifers.

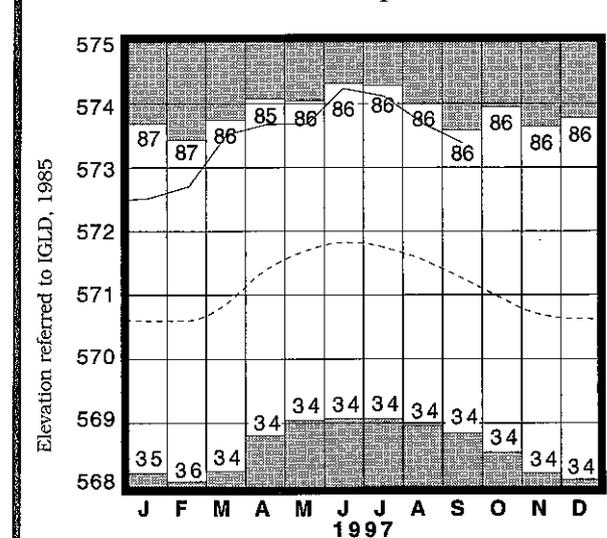
The 1997 water year was generally favorable for ground-water supplies. The water year started with consolidated aquifers at below normal levels and unconsolidated aquifers at above normal levels. Adequate precipitation during November and December soon brought levels in all aquifers up to above normal. Although April was rather dry, precipitation during the recharge period was adequate statewide and ground water supplies were in good condition as the summer season started. Precipitation during the late spring and early summer was abundant in most areas of the state which extended the recharge period in some areas. Although spotty, summer precipitation was abundant in most areas of the state with only northeastern Ohio being rather dry. At the end of the 1997 water year, ground water levels are above normal in most areas of the state, but below normal in some aquifers in eastern Ohio. Current levels are higher than they were a year ago in most consolidated aquifers, but slightly lower than they were a year ago in most unconsolidated aquifers.

LAKE ERIE level declined seasonally during September. The mean level was 573.39 feet (IGLD-1985), 0.30 foot lower than last month's mean level, and 2.13 feet above normal. This month's level is 0.72 foot higher than the September 1996 level and 4.19 feet above Low Water Datum.

The U. S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during September averaged 4.1 inches, 1.0 inch above normal. The entire Great Lakes basin averaged 3.2 inches of precipitation during September, 0.2 inch below normal. For calendar year 1997 through September, the Lake Erie basin has averaged 29.4 inches of precipitation, 2.7 inches above normal, and the entire Great Lakes basin has averaged 25.6 inches, 1.2 inches above normal.

Lake Erie's level remained above normal throughout the 1997 water year. High lake levels were, and still are, a concern as the late spring and early summer levels approached the record-high levels established during the mid 1980s. The U. S. Army Corps of Engineers predicts that, based on the present condition of the lake basin and anticipated future weather conditions, the level of Lake Erie should remain above the long-term average for the foreseeable future.

LAKE ERIE LEVELS at Fairport



Base period: 1900-1991
■ Record high and low, year of occurrence

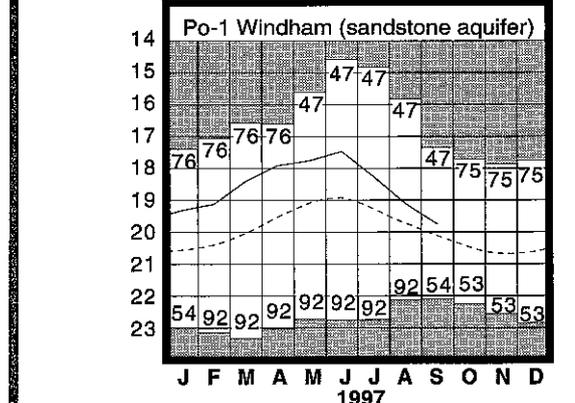
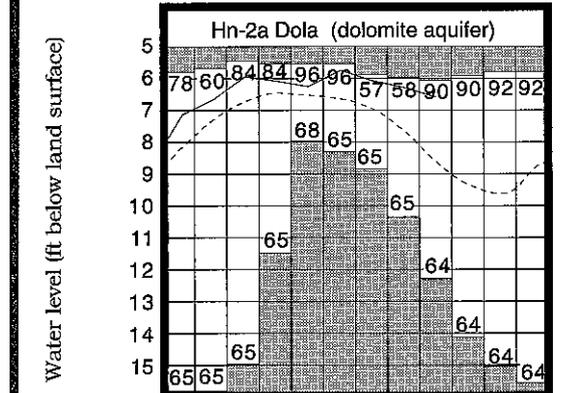
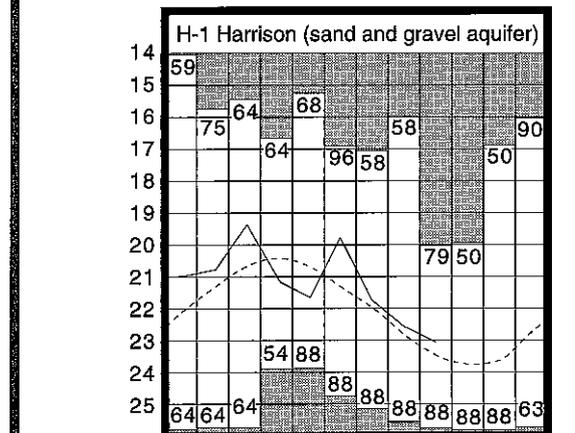
Normal - - - - Current - - - -

GROUND-WATER LEVELS

Based on daily lowest level in feet below land-surface datum

Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	17.47	-1.05	+0.21	-0.51
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.63	+0.04	-0.32	+0.21
Fr-10	Columbus, Franklin Co.	Gravel	43.35	+1.15	-0.44	-0.46
H-1	Harrison, Hamilton Co.	Gravel	23.06	+0.41	-0.49	-0.38
Hn-2a	Dola, Hardin Co.	Dolomite	6.59	+2.02	-0.29	+1.76
Po-1	Windham, Portage Co.	Sandstone	19.75	+0.37	-0.64	+0.28
Tu-1	Strasburg, Tuscarawas Co.	Gravel	15.04	-1.53	-0.68	-0.49

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990. Po-1, 1947-1990
■ Record high and low, year of occurrence

Normal - - - - Current - - - -