



# MONTHLY WATER INVENTORY REPORT FOR OHIO

July 2005

<http://www.dnr.state.oh.us/water/pubs/newsltrs/mwirmain.htm>

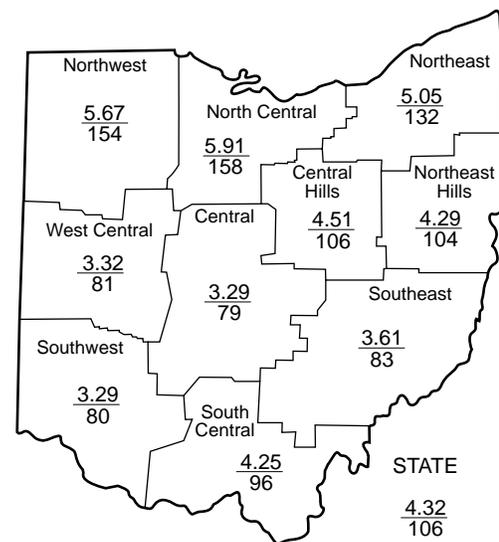
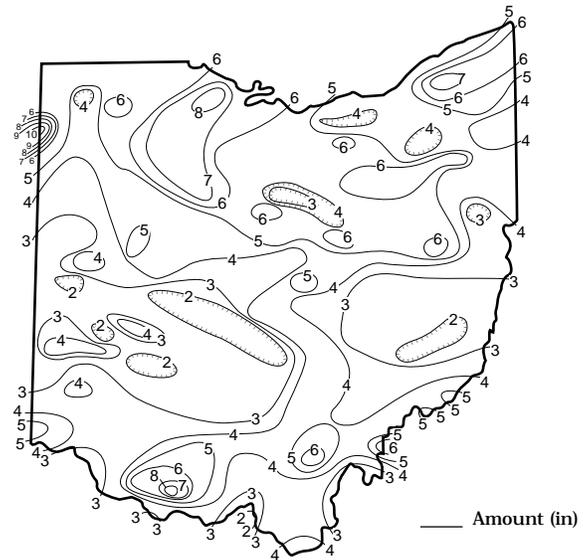
Compiled By David H. Cashell and Scott Kirk

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Water Inventory Unit

**PRECIPITATION** during July varied greatly across the state, but generally was above normal in the northern half of Ohio and below normal in the southern half. The average for the state as a whole was 4.32 inches, 0.24 inch above normal. Regional averages ranged from 5.91 inches, 2.17 inches above normal, for the North Central Region to 3.29 inches for both the Central and Southwest regions, 0.86 inch and 0.81 inch below normal, respectively. Regionally, this was the 7<sup>th</sup> wettest July during the past 111 years for the Northwest Region, tied for the 8<sup>th</sup> wettest for the North Central Region and 16<sup>th</sup> wettest for the Northeast Region. Hicksville (Defiance County) reported the greatest amount of July precipitation, 10.28 inches. Xenia (Greene County) reported the least amount, 1.40 inches.

Precipitation during July fell as showers and thunderstorms with locally severe weather reported in many areas. The month started off rather dry with some locations receiving little or no rain during the first 11 days of the month. Many stations reported rain on the first day of July, most of which actually fell late on June 30. Widely scattered showers and thunderstorms during July 5 brought 0.25-0.50 inch of rain to some locations with as much as 1 inch reported in isolated areas of northeastern Ohio. Remnants from Hurricane Dennis moved into the state around July 12 and during the next week brought hit and miss showers across Ohio. While most of the state received some rain from this system, the greatest amounts of rain, generally 1-3 inches, fell across northern and extreme southeastern Ohio. After the passage of this system, a typical summer pattern of widely scattered showers and thunderstorms existed during the following week, with the greatest amount of rain, generally 2-4 inches, falling across northern and eastern Ohio. The heaviest rains during this period occurred during July 25-27 as strong storms brought some relief to the hot and humid conditions prevailing across the state. Storms on July 25 were most numerous from northwestern to southeastern Ohio with some of these storms containing heavy rain and damaging winds. Severe storms on July 26-27 were confined to mainly northern Ohio and were accompanied by heavy rain, damaging winds and isolated reports of hail. However, there was little relief for the southwestern quarter of the state during this period as much of the area received less than 0.25 inch of rain. These unusually dry conditions combined with similar conditions that existed the prior two months have adversely affected the condition of the crops in that region of Ohio. According to the Palmer Drought Severity Index, the Central, Southwestern and South Central regions of Ohio were classified as being in a moderate drought near the end of July.

## PRECIPITATION JULY



## PRECIPITATION (continued on back)

Region	This Month	DEPARTURE FROM NORMAL (IN.) Base period 1951-2000				Palmer Drought Severity Index*
		Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+2.00	-2.09	-3.28	+1.21	+6.23	-0.9
North Central	+2.17	-1.35	-0.86	+4.15	+13.08	-0.7
Northeast	+1.21	-1.38	-0.34	+5.83	+14.15	-0.4
West Central	-0.79	-3.91	-4.04	+3.43	+13.57	-1.5
Central	-0.86	-4.28	-4.44	+3.89	+17.30	-2.2
Central Hills	+0.26	-2.37	-2.90	+6.43	+18.76	+0.2
Northeast Hills	+0.16	-3.50	-3.36	+10.16	+24.30	-0.9
Southwest	-0.81	-4.61	-5.85	-1.18	+4.89	-2.0
South Central	-0.16	-4.27	-4.45	+3.67	+11.28	-2.9
Southeast	-0.74	-4.27	-3.27	+11.38	+24.49	-0.9
State	+0.24	-3.21	-3.29	+4.89	+14.76	

\*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

## MEAN STREAM DISCHARGE

This Month

River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	510	256	73	116	145
Great Miami River at Hamilton	3,630	1861	99	69	89	128
Huron River at Milan	371	85	79	36	118	184
Killbuck Creek at Killbuck	464	191	98	74	98	130
Little Beaver Creek near East Liverpool	496	153	66	65	92	170
Maumee River at Waterville	6,330	1,559	56	45	74	116
Muskingum River at McConnellsville	7,422	2,954	60	110	149	146
Scioto River near Prospect	567	109	69	39	83	142
Scioto River at Higby	5,131	1,729	63	64	107	157
Stillwater River at Pleasant Hill	503	149	92	52	87	134

**STREAMFLOW** during July was below normal across most of the state, but above normal in some northeastern Ohio basins. Generally, July flows declined seasonally from those flows recorded during June in the southern two-thirds of the state, but increased from the June flows in the northern third.

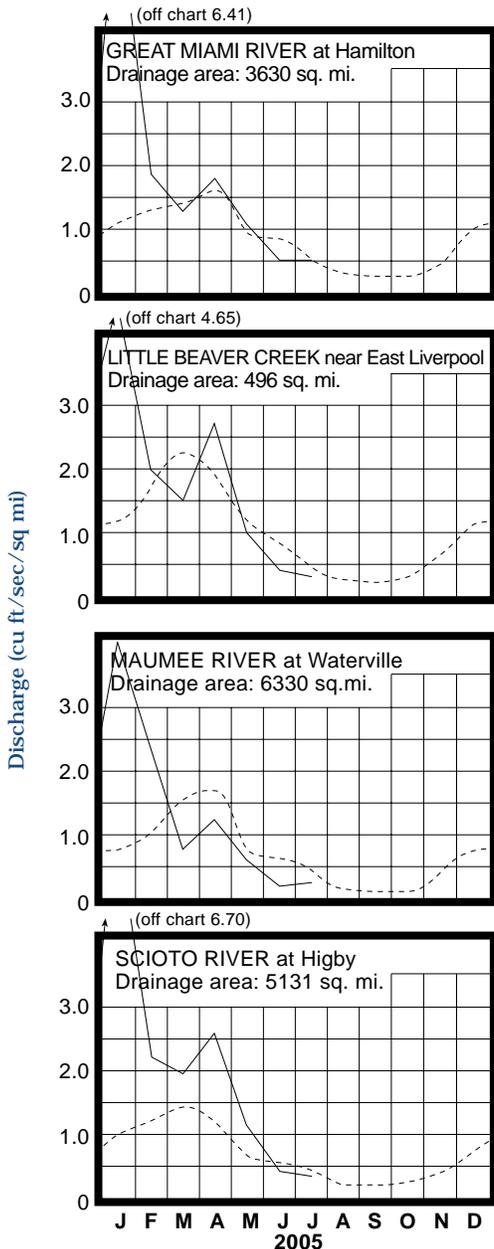
Flows at the beginning of the month were above normal across much of the state, but below normal in many northwestern and southeastern Ohio basins. Greatest flows for the month in the southwestern quarter of the state occurred at the beginning of July. Flows declined during the first 2 weeks of the month except for some temporary increases noted following local precipitation

around July 5. Drainage basins in northern and most of eastern Ohio had their lowest flows for the month just prior to the arrival of the remnants from Hurricane Dennis, generally around July 12-13. Flows increased statewide during the next week. Following these increases, flows declined the remainder of the month across the southwestern quarter of Ohio to their lowest flows for the month, reflecting the below normal precipitation that the region received. In northern Ohio and most of eastern Ohio, flows increased rapidly on July 26-29 as numerous storms moved across the area during July 25-27. Greatest flows for the month across this area occurred during July 27-29. The heaviest rains occurred in northern Ohio resulting in minor lowland and urban flooding. Flows at the end of July were below normal across most of the state, but above normal in some northeastern Ohio basins.

**RESERVOIR STORAGE** during July decreased in both the Mahoning and Scioto river basins. Storage remains above normal in the Mahoning basin index reservoirs and slightly below normal in the Scioto basin index reservoirs.

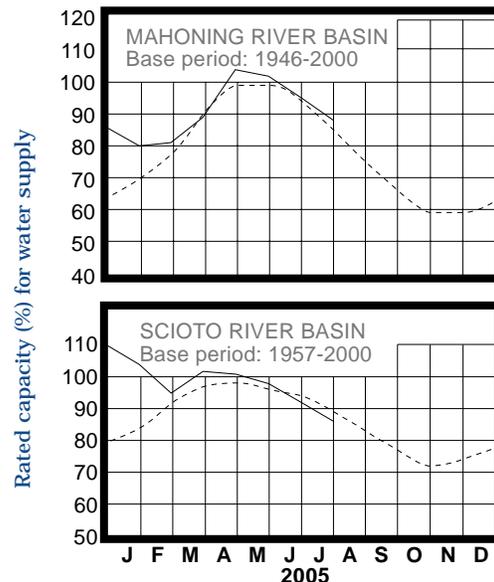
Reservoir storage at the end of July in the Mahoning basin index reservoirs was 88 percent of rated capacity for water supply, compared with 95 percent for last month and 97 percent for July 2004. Month-end storage in the Scioto basin index reservoirs was 86 percent, compared with 92 percent for last month and 94 percent for July 2004. Surface water supplies remain adequate throughout the state.

### MEAN STREAM DISCHARGE



Base period for all streams: 1971-2000

### RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current ———

## GROUND-WATER LEVELS

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

**GROUND WATER** levels during July declined seasonally statewide. Except for slight, temporary rises noted in some aquifers around mid-month and again near the end of the 4<sup>th</sup> week of July following precipitation, levels steadily declined throughout the month.

In spite of the recent dry conditions that have prevailed across some areas of the state, ground water supplies remain adequate throughout Ohio. Levels in most aquifers are below normal, but remain above normal in some consolidated aquifers in the eastern half of the state. Current levels range from about 0.5 foot higher to more than 3 feet lower than they were a year ago. Little if any improvement to ground water storage is normally expected during the next few months. However, with near-normal precipitation and other climatic conditions, ground water supplies should continue to be adequate across Ohio during the coming months. The Ohio Agricultural Statistics Service reports that near the end of July soil moisture was rated as being short or very short in 38 percent of the state, adequate in 57 percent of the state and surplus in 5 percent of the state.

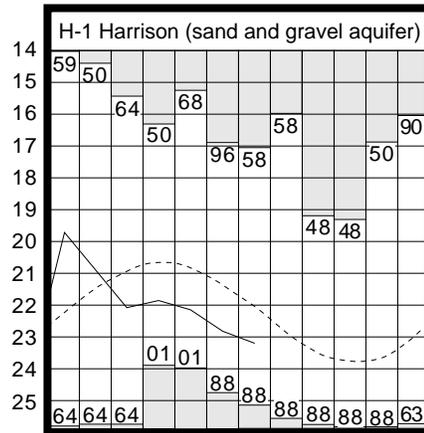
**LAKE ERIE** level declined during July. The mean level was 571.62 feet (IGLD-1985), 0.30 foot lower than last month's mean level and 0.30 foot below normal. This month's mean level is 0.36 foot lower than the July 2004 level and 2.42 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during July averaged 4.03 inches, which is 0.71 inch above normal. For the entire Great Lakes basin, July precipitation averaged 2.58 inches, which is 0.56 inch below normal. For calendar year 2005 through July, the Lake Erie basin has averaged 18.85 inches, 1.66 inches below normal, while the entire Great Lakes basin has averaged 15.02 inches, 2.93 inches below normal.

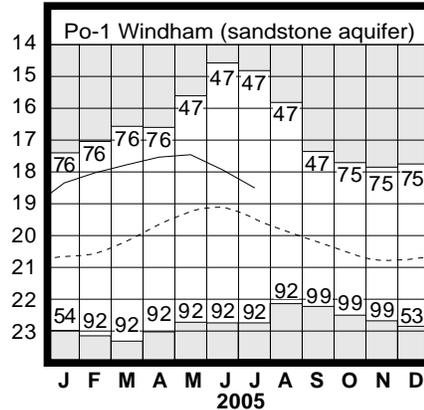
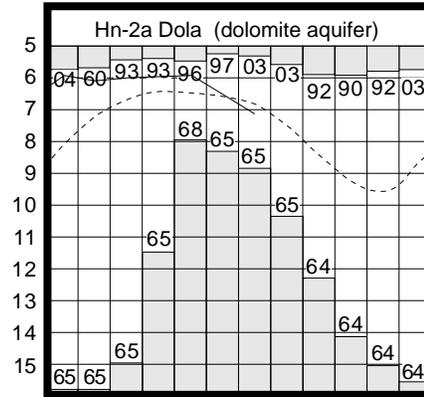
In addition, the USACE reports that based on the current condition of the Great Lakes basin and anticipated weather conditions, the level of Lake Erie should remain below normal for the foreseeable future. Deviations from the anticipated weather patterns could result in the level of Lake Erie ranging from about 4 inches above to as much as 17 inches below the normal seasonal average.

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	15.01	+0.41	-1.61	-2.69
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.92	-1.10	-0.35	-0.24
Fr-10	Columbus, Franklin Co.	Gravel	43.56	-0.28	-0.48	+0.57
H-1	Harrison, Hamilton Co.	Gravel	23.20	-1.15	-0.39	-0.07
Hn-2a	Dola, Hardin Co.	Dolomite	7.13	-0.30	-0.62	-1.10
Po-1	Windham, Portage Co.	Sandstone	18.51	+0.98	-0.58	-0.71
Tu-1	Strasburg, Tuscarawas Co.	Gravel	14.30	-1.56	-0.95	-3.11

## GROUND-WATER LEVELS

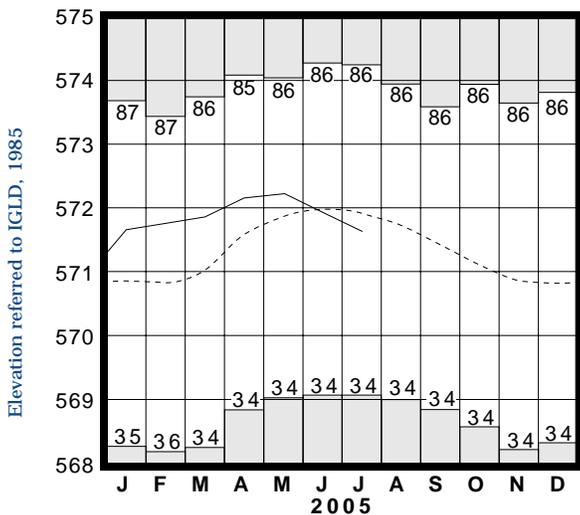


Water level (ft below land surface)



Base periods: H-1, 1951-2000. Hn-2a, 1955-2000.  
Po-1, 1947-2000 □ Record high and low, year of occurrence

## LAKE ERIE LEVELS



Base period: 1918-2000  
□ Record high and low, year of occurrence

Normal - - - - Current ———

*(Precipitation continued from front)*

Precipitation for the 2005 calendar year is above normal across most of the state, but below normal in southwestern and south-central Ohio. The average for the state as a whole is 24.67 inches, 1.25 inches above normal. Regional averages range from 26.46 inches, 1.73 inches above normal, for the Southeast Region to 20.98 inches, 0.24 inch above normal, for the Northwest Region.

Precipitation for the 2005 water year is above normal nearly statewide, but slightly below normal in south-central Ohio. The average for the state as a whole is 34.34 inches, 2.71 inches above normal. Regional averages range from 36.43 inches, 3.42 inches above normal, for the Southeast Region to 29.14 inches, 0.81 inch above normal, for the Northwest Region.

#### SUMMARY

Precipitation during July was generally above normal in the northern half of Ohio and below normal in the southern half. Streamflow was below normal across most of the state. Reservoir storage decreased in both the Mahoning and Scioto river basins. Storage remains above normal in the Mahoning basin index reservoirs and slightly below normal in the Scioto basin index reservoirs. Ground water levels declined statewide. Lake Erie level declined 0.30 foot and was 0.30 foot below the long-term July average.

#### NOTES AND COMMENTS

##### Salt Fork Lake Dam Update

Consultants hired by ODNR to evaluate the overall safety of the Salt Fork Lake Dam (Guernsey County) have determined that the dam's toe drain system, which collects the seepage through and under the dam, is not functioning properly and needs to be replaced. The malfunctioning drainage system is the cause of boils found at the toe of the dam in February. ODNR hopes to begin repairs at the site as soon as October, with a completion date sometime in the spring 2006, weather permitting. The water level at Salt Fork Lake has been lowered to 5 feet below normal summer pool and will be maintained at that level through next spring as repairs are made to the dam. The lowered pool level helps to ensure that no additional boils will arise in the area of the dam's toe during construction. Daily monitoring of the dam, including visual inspections and instrument readings, continues. Piezometers that have been installed in the dam and its toe have helped to provide engineers with information to use in evaluating seepage and the stability of the dam and its foundation.

Naturally occurring ground water in the area of the dam is believed to be the cause of additional boils found 700 feet downstream of the dam in the outlet channel in June. Consultants are confident that those boils are unrelated to the dam and pose no threat. Last month, a rock structure was constructed in the outlet channel and has succeeded in controlling boils.

##### Potentiometric Surface Maps Now Available for Northeast Ohio

Ground water potentiometric surface (water level) maps for nine counties in northeast Ohio are now available from the Division of Water website at: <http://www.dnr.state.oh.us/water/gwpsurface/>. The counties are Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, Trumbull and Wayne. In addition, mapping is in progress for Columbiana, Huron, Richland and Summit counties.

A potentiometric surface map is a contour map that represents the top of the ground water surface in an aquifer. The contour lines illustrate the potentiometric surface much like the contour lines of a topographic map represent a visual model of the ground surface. Potentiometric surface maps are being created for bedrock (consolidated formations) and sand & gravel (unconsolidated formations) aquifers. County-based maps are available as PDF images and as GIS ArcView Shape files.

Ohio's potentiometric surface mapping program began in the late 1990s. Potentiometric surface maps can be used to determine the direction and gradient of ground water flow, determine ground water recharge and discharge areas, and as input data into ground water modeling programs. These maps can also be used to assist in preparing water resource plans and technical studies, the mapping of stress areas, and in possible ground water diversion issues. Since these maps were created using existing data collected over a fifty-year period, field verification of the ground water flow direction should be conducted before the drilling of monitoring wells to satisfy compliance monitoring. If you have any questions concerning these maps, please contact Jim Raab at [jim.raab@dnr.state.oh.us](mailto:jim.raab@dnr.state.oh.us) or at (614) 265-6747.

#### 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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