



MONTHLY WATER INVENTORY REPORT FOR OHIO

July 2006

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

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PRECIPITATION during July was above normal across most of the state, but below normal in parts of southwestern and south-central Ohio. The state average was 5.78 inches, 1.70 inches above normal. For the state as a whole, this was the 10th wettest July during the past 124 years. Regional averages ranged from 8.47 inches, 4.63 inches above normal, for the Northeast Region to 4.49 inches, 0.08 inch above normal, for the South Central Region. This was the 3rd wettest July of record for the Northwest and Northeast regions, the 7th wettest for the Central Hills Region, the 11th wettest for the North Central Region, the 15th wettest for the West Central Region and the 18th wettest for the Northeast Hills Region. Painesville (Lake County) reported the greatest amount of precipitation for July, 14.61 inches. Chardon (Geauga County) reported 14.01 inches. Kings Mills (Warren County) reported the least, 1.98 inches.

Precipitation during July fell as showers and thunderstorms, with many storms producing severe weather and large amounts of precipitation. Most areas of the state received between 1 and 2 inches of rain during the first week of the month. Showers and thunderstorms during July 10-14 brought another 1-2 inches of rain across most of Ohio with many areas, mainly in the northern half of the state, experiencing severe storms that dumped 3-6 inches of rain. Several areas experienced small stream and urban flooding on several days during this period. Showers and thunderstorms during July 21-22 were most numerous in a line from southwestern to northeastern Ohio, where 1-3 inches of rain fell. Some areas of the state once again experienced small stream and urban flooding. Most of northwestern and southeastern Ohio received little or no rain during this period. The most significant weather event of the month occurred during July 27-28 when severe storms brought heavy rain across much of western and northern Ohio. Amounts of 1 to as much as 4 inches of rain were reported across most of this area. Torrential rain in parts of northeastern Ohio brought 5-10 inches of rain, resulting in major flooding across the area (see Notes and Comments on the last page of this report). Generally, less than 0.50 inch of rain was reported across the remainder of the state during this period. Widely scattered showers and thunderstorms on the last 2 days of the month were most numerous across central and northeastern Ohio. Most areas reported less than 0.50 inch of rain with a few locations receiving more than 1 inch from locally heavier downpours.

Precipitation for the 2006 calendar year is above normal across most of the state, but below normal in the South Central and Southeast regions. The average for the state as a whole is 25.34 inches, 1.92 inches above

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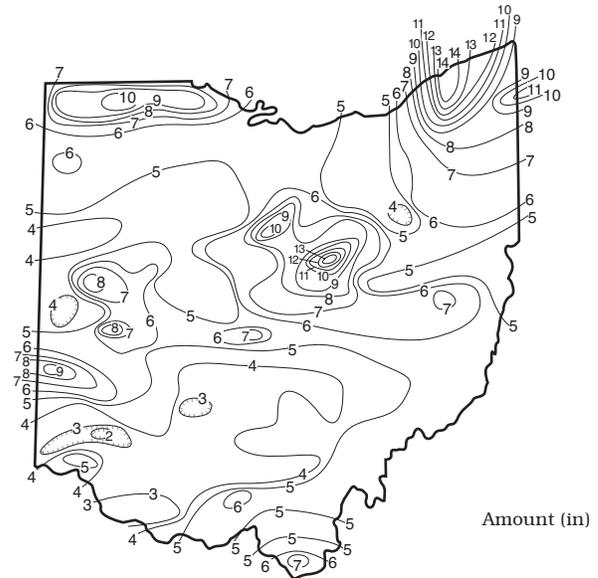
PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.) Base period 1951-2000					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+3.10	+4.80	+2.80	+4.88	+5.82	-0.7
North Central	+1.74	+5.87	+3.78	+6.75	+10.89	+1.0
Northeast	+4.63	+7.94	+6.49	+7.85	+13.70	+3.7
West Central	+1.27	+3.19	+2.37	+7.42	+11.09	+2.5
Central	+0.77	+0.96	-0.09	+3.87	+7.45	-0.9
Central Hills	+2.57	+4.52	+2.32	+5.17	+11.00	+0.6
Northeast Hills	+1.52	+4.66	+1.97	+5.55	+15.47	+0.6
Southwest	+0.79	+1.06	+0.83	+1.46	+0.33	-0.7
South Central	+0.08	-2.31	-4.37	-4.27	-0.74	-3.0
Southeast	+0.55	-0.62	-2.45	+0.09	+11.66	-1.5
State	+1.70	+3.01	+1.37	+3.89	+8.68	

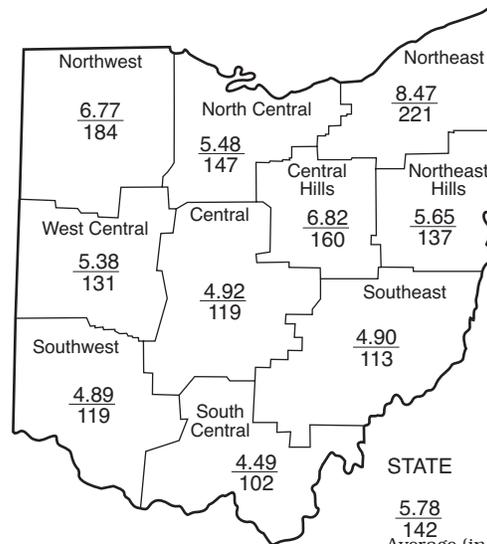
*Above +4 = Extreme Moist Spell
3.0 To 3.9 = Very Moist Spell
2.0 To 2.9 = Unusual Moist Spell
1.0 To 1.9 = Moist Spell
0.5 To 0.9 = Incipient Moist Spell
0.4 To -0.4 = Near Normal

-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

PRECIPITATION JULY



Amount (in)



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	3,171	1,593	280	127	131
Great Miami River at Hamilton	3,630	2,854	152	114	104	112
Huron River at Milan	371	243	227	205	99	113
Killbuck Creek at Killbuck	464	1,142	586	192	109	103
Little Beaver Creek near East Liverpool	496	459	197	99	72	75
Maumee River at Waterville	6,330	4,197	152	120	84	101
Muskingum River at McConnellsville	7,422	11,550	235	193	118	82
Scioto River near Prospect	567	587	369	138	87	120
Scioto River at Higby	5,131	3,015	111	74	70	82
Stillwater River at Pleasant Hill	503	219	135	134	103	113

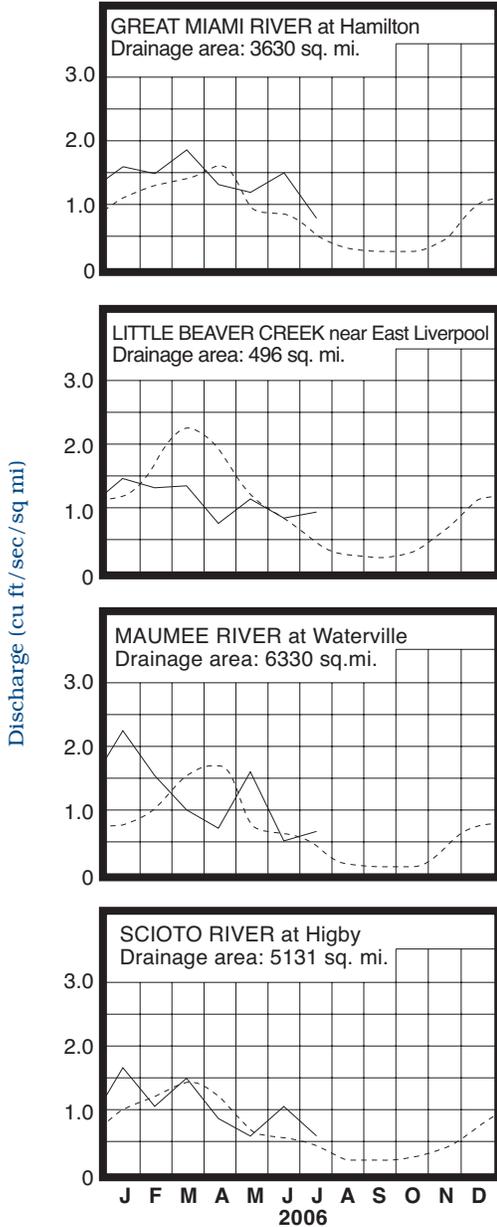
STREAMFLOW during July was above normal statewide. Flows were high enough to be considered excessive in the northeastern two-thirds of the state. Flows during July increased from the June flows across most of eastern and northwestern Ohio, and declined seasonally across the remainder of the state. The mean monthly flow of 3,171 cfs for the Grand River near Painesville (Lake County) was a new record July flow. The Grand River near Painesville also established new records for highest daily mean flow and maximum peak flow, both on July 28. Significant flooding occurred across several areas of the state during the month (see Notes and Comments on the last page of this report).

Flows at the beginning of the month were generally above normal in eastern Ohio and below normal in western Ohio. Flows were declining during the first few days of the month, then increased across the state in response to widespread precipitation that fell during the first week of the month and again near the end of the second week of July. Greatest flows for the month occurred during July 13-17 across northwestern, central and southeastern Ohio. Flows generally declined from these peaks during the next week or so, and then increased in response to widespread and locally heavy rain that fell during July 27-28. Greatest flows for the month occurred during July 28-29 across most of northeastern and southwestern Ohio following this precipitation. Flooding was reported following locally heavy rain across parts of western and northeastern areas of the state. The most significant flooding occurred in northeastern Ohio, where major flooding was reported. Lowest flows for the month fluctuated with local precipitation. Generally, lowest flows for July occurred around July 3-4 in northwestern and south-central Ohio, during July 21-26 in northeastern, central and southwestern Ohio, and at the end of the month in southeastern Ohio. Streamflow was declining at the end of the month, but remained above normal across most of the state.

RESERVOIR STORAGE during July decreased slightly in the Mahoning River basin and increased slightly in the Scioto River basin. Storage remained above normal in both basins.

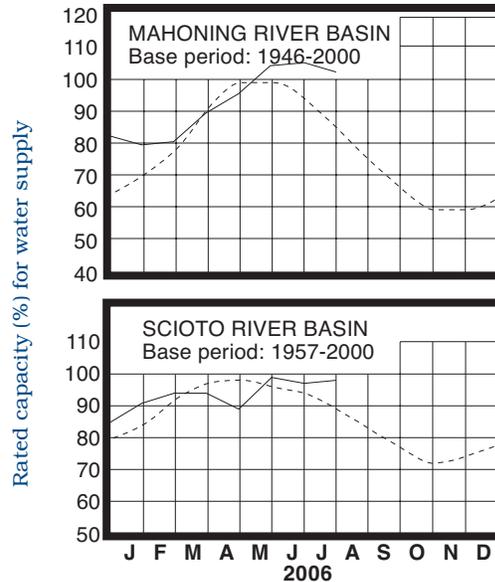
Reservoir storage at the end of July in the Mahoning basin index reservoirs was 102 percent of rated capacity for water supply compared with 105 percent for last month and 88 percent for July 2005. Month-end storage in the Scioto basin index reservoirs was 98 percent of rated capacity for water supply compared with 97 percent for last month and 94 percent for July 2005. Surface water supplies remain favorable across 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 throughout most of the state. Exceptions were noted in some unconsolidated aquifers in northeastern Ohio, where levels rose. Net declines from the June levels were less than usually observed during July across most of the state.

Ground water levels during the month responded favorably to the above normal precipitation that fell across most of Ohio. Generally, levels declined during the first week of July, and then were rather stable or rose slightly during the next 3 weeks. However, aquifer levels in areas that received below normal precipitation during July began to decline after mid-month. Water levels in most aquifers were declining at month's end.

Ground water levels are adequate across the state. Levels are above normal in most aquifers, but remain below normal in aquifers in the southwestern quarter of Ohio. Current levels are higher than they were a year ago across nearly the entire state. Hydrologic and climatic conditions have been favorable for reducing the seasonal demand on both public and private water supplies throughout most of Ohio. With near-normal precipitation and other climatic conditions, ground water supplies should continue to be adequate. The Ohio Agricultural Statistics Service reports that soil moisture near the end of July was short in 9 percent of the state, adequate in 71 percent of the state, and surplus in 20 percent of the state.

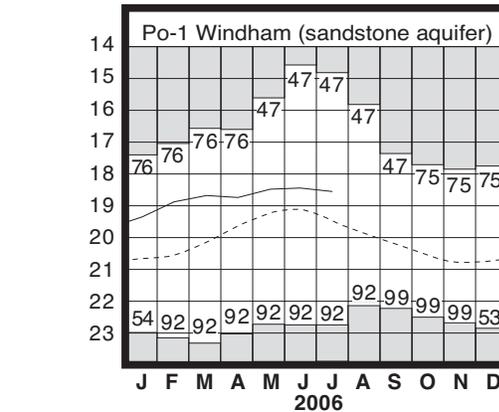
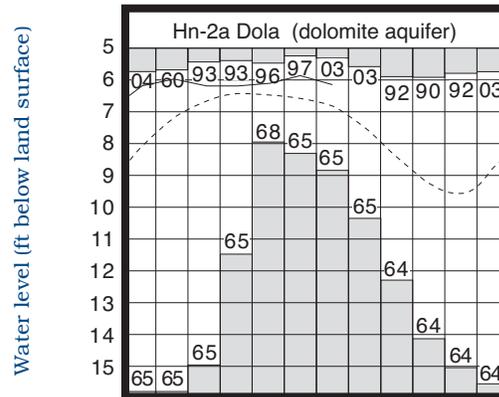
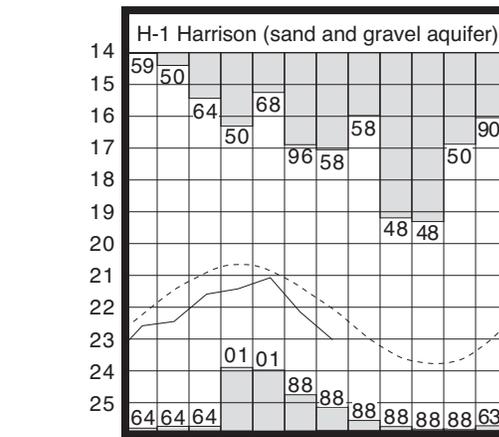
LAKE ERIE LEVEL rose during July. The mean level was 571.82 feet (IGLD-1985), 0.10 foot higher than last month's mean level and 0.10 foot below normal. This month's mean level is 0.20 foot higher than the July 2005 level and 2.62 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during July was 5.58 inches, 2.26 inches above normal. For the entire Great Lakes basin, July precipitation averaged 4.30 inches, 1.16 inches above normal. For calendar year 2006 through July, the Lake Erie basin has averaged 24.02 inches, 3.51 inches above normal, while the entire Great Lakes basin has averaged 19.51 inches, 1.56 inches above 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 5 inches above to as much as 15 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	12.85	+2.57	-0.18	+2.16
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.48	-0.66	-0.03	+0.44
Fr-10	Columbus, Franklin Co.	Gravel	44.42	-1.14	-0.69	-0.86
H-1	Harrison, Hamilton Co.	Gravel	23.04	-0.99	-0.90	+0.16
Hn-2a	Dola, Hardin Co.	Dolomite	6.14	+0.69	-0.27	+0.99
Po-1	Windham, Portage Co.	Sandstone	18.55	+0.94	-0.11	-0.04
Tu-1	Strasburg, Tuscarawas Co.	Gravel	12.25	+0.49	+0.48	+2.05

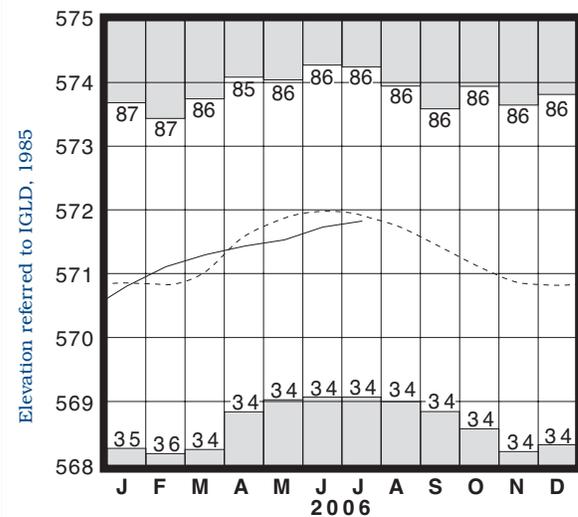
GROUND-WATER LEVELS



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)
normal. Regional averages range from 29.10 inches, 6.80 inches above normal, for the Northeast Region to 22.30 inches, 3.18 inches below normal, for the South Central Region.

Precipitation for the 2006 water year is generally above normal in the northern two-thirds of the state and below normal in the southern third. The average for the state as a whole is 33.52 inches, 1.89 inches above normal. Regional averages range from 37.34 inches, 5.81 inches above normal, for the Northeast Region to 30.18 inches, 3.71 inches below normal, for the South Central Region.

SUMMARY

Precipitation during July was above normal across most of the state, but below normal in parts of southwestern and south-central Ohio. Streamflow was above normal statewide. Reservoir storage decreased slightly in the Mahoning River basin and increased slightly in the Scioto River basin. Storage remained above normal in both basins. Ground water levels declined seasonally across most of the state. Lake Erie level rose 0.10 foot and was 0.10 foot below the long-term July average.

NOTES AND COMMENTS

Severe Storms Leave Their Mark On Ohio

For the second month in a row, severe storms left their mark on Ohio. Severe storms occurred on several days throughout the month, with many areas experiencing high winds, heavy rainfall and tornadoes. Flooding was a constant threat during the month in many areas of the state as heavy rain fell often.

Two periods of storms and floods were especially noteworthy. The first was during July 10-14 as a series of storms, some severe, moved across the state. Heavy rain and high winds were associated with many of these storms. The brunt of the severe weather was across the northern half of the state, where generally 3-6 inches of rain fell. Radar estimates indicate that as much as 8 inches could have fallen at some locations in northern Ohio. One of the hardest hit areas was in Richland, Ashland, Holmes and Knox counties, which had as much as 6.5 inches of rain fall on July 10, with most of that rain falling in a 4-hour period. Major flooding and wind damage occurred throughout this area. Many people had to be evacuated from the rising floodwaters. Two state parks in this area were affected by the storm. Mohican State Park (Ashland County) and Malabar State Park (Richland County) received damage from the high winds and heavy rain that downed trees and flooded buildings. More than 600 people had to be evacuated from the Mohican State Park cottages and campgrounds after the heavy rains caused the Mohican River to rise rapidly. At Malabar Farm State Park several buildings received damage from the water and high winds from the storm. Parts of Mohican State Park and all of Malabar State Park were temporarily closed while repairs and cleanup took place following the storm. Many homes and businesses throughout this area received damage from the storm. Other severe weather during this period occurred across the state. On July 11, strong storms resulted in wind damage and confirmed tornado touchdowns in southwestern Ohio. One tornado in Warren County damaged at least 43 buildings. Heavy rain in northwestern Ohio on July 12 resulted in small stream and urban flooding.

The second significant period was July 27-28. Storms were most numerous across western and northern Ohio. Rain began falling during the morning hours on July 27 and was heavy at times in western and northern Ohio. The rain intensified during the over-night hours of July 27-28 in northeastern Ohio, with 4-8 inches reported in Lake, Geauga, Ashtabula and portions of Cuyahoga counties. The rain fell on already saturated ground from earlier rains. The hardest hit area was centered in Lake County, where nearly 10 inches of rain fell in parts of the county in about a 20-hour period. This would exceed the 1000-year recurrence interval for a 24-hour period. The heavy rain caused the Grand River to quickly rise out of its banks, inundating roads, homes and businesses. The Grand River near Painesville reached a new flood record. The current best estimate is that the peak flow was around 30,000 cfs., which would exceed the 500-year flood level. The previous maximum peak flow observed on the Grand River near Painesville was 18,700 cfs. Rescues and evacuations took place in several communities. Roads and bridges were completely washed away. Storm water drains could not keep up with the magnitude of the rain, which caused basements to flood. The Headlands Beach State Park and the Headlands Dunes State Nature Preserve (Lake County) received so much damage and debris from the flooding that the park will remain closed until further notice. Preliminary damage assessments indicate 113 buildings were destroyed, 73 received major damage, and hundreds of others received minor damage. Total dollar amounts have not yet been determined for damages from this storm, but will run into the millions of dollars in economic loss to both public and private property. President George W. Bush declared the three-county area of Lake, Geauga and Ashtabula a federal disaster area. This makes residents and businesses that suffered damages and losses from flooding eligible for federal assistance. Tragically, at least one person in northeast Ohio was killed as a result of this storm.

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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