MONTHLY WATER INVENTORY REPORT FOR OHIO

June 2016

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http://water.ohiodnr.gov/water-use-planning/water-inventory-levels

PRECIPITATION during June was below normal throughout much of the state, but above normal in parts of southern and northwestern Ohio. The state average was 3.13 inches, 0.78 inch below normal. Regional averages ranged from 4.83 inches, 1.10 inches above normal, for the South Central Region to 2.37 inches for both the Northeast and Northeast Hills regions, which are 1.46 inches and 1.59 inches below normal, respectively. The Westerville Water Plant (Franklin County) reported the greatest amount of June precipitation, 8.63 inches. Millersburg (Holmes County) reported the least amount, 1.14 inches.

Precipitation during June fell in a typical summer pattern of showers and thunderstorms, with some of these storms locally severe and accompanied by heavy downpours. Precipitation during the first week of the month averaged between 0.50 and 0.75 inch across much of the state, but scattered locations throughout the state received more than 1 inch and areas in southeastern Ohio reported more than 3 inches of rain. Locally severe storms on June 4 brought heavy downpours to many areas and a small tornado that briefly touched down in Franklin County. The second week was rather dry across most of the state with most areas reporting less than 0.25 inch and some areas reporting no rain at all. An exception was in areas of southwestern Ohio on June 10, when storms brought as much as 1 inch to some locations. Conditions on most days during the third week remained rather dry, but storms on June 15 and 16 brought heavy downpours to many areas with several locations in northern and extreme south-central Ohio reporting more than 1 inch. Showers and thunderstorms moved across the state during June 22-24. Many of these storms were severe with very heavy rain and at least two tornadoes, one in Fayette County and another that moved through Clinton and Warren counties. The greatest amounts of rain occurred in a line from northwest to southeast Ohio with amounts of 1-3 inches along this line and 3-5 inches in areas in Delaware, Licking, Muskingum and Morgan counties. Flooding occurred at several locations along this line. However, areas in west-central and northeastern Ohio missed out on most of this rain. The last several days were dry across much of the state, but scattered storms on June 27 produced 0.25-.50 inch of rain in areas of the northwestern half of Ohio with local amounts of 1.5 inches reported.

Precipitation for the 2016 water year is below normal across much of Ohio, but above normal in the Central, Southwest and South Central regions. The average for the state is 27.76 inches, 0.40 inch below normal. Regional averages range from 31.78 inches, 0.69 inch above normal, for the Southwest Region to 24.52 inches, 0.53 inch below normal, for the Northwest Region.

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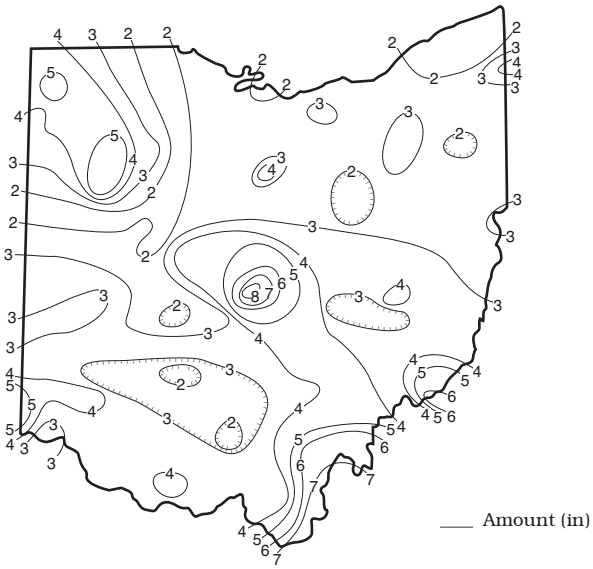
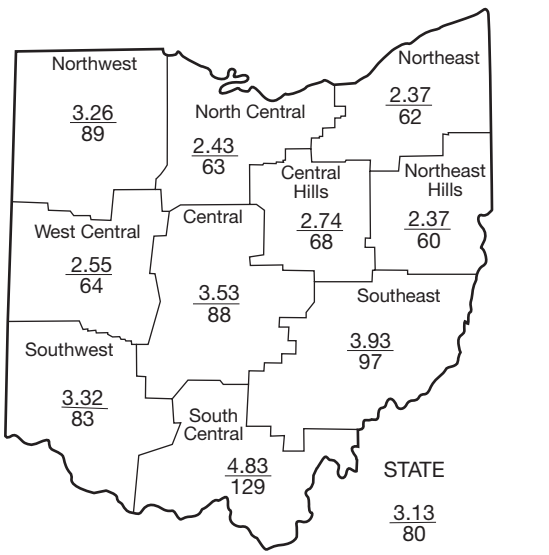
PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.) Base period 1961-2010					Palmer Drought Severity Index*
	This Month	Past 3 Mos.	Past 6 Mos.	Past 12 Mos.	Past 24 Mos.	
Northwest	-0.41	-1.28	-0.09	+0.88	+4.17	-1.6
North Central	-1.41	-1.47	-0.14	-0.36	-1.34	-2.0
Northeast	-1.46	-2.12	-0.54	-3.39	+2.33	-2.7
West Central	-1.41	-3.74	-2.89	-0.82	-0.31	-2.2
Central	-0.49	-1.43	-0.64	-0.92	-2.67	-2.5
Central Hills	-1.30	-1.53	-0.89	-3.38	-2.58	-2.5
Northeast Hills	-1.59	-1.86	-1.75	-4.86	-0.60	-3.4
Southwest	-0.66	-2.13	-1.79	+0.73	+1.29	-1.7
South Central	+1.10	+0.31	-0.09	+1.94	+2.98	-2.2
Southeast	-0.12	+0.18	-0.21	-1.27	+0.14	-2.6
State	-0.78	-1.52	-0.91	-1.16	+0.31	

*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 JUNE





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	83.5	28	63	83	83
Great Miami River at Hamilton	3,630	1,547	44	64	97	122
Huron River at Milan	371	67	22	102	96	113
Killbuck Creek at Killbuck	464	140	41	87	88	87
Little Beaver Creek near East Liverpool	496	202	46	81	97	86
Maumee River at Waterville	6,330	3,359	70	88	87	108
Muskingum River at McConnelsville	7,422	3,584	59	82	86	78
Scioto River near Prospect	567	704	176	83	96	116
Scioto River at Higby	5,131	4,087	87	85	102	114
Stillwater River at Pleasant Hill	503	145	35	48	84	118

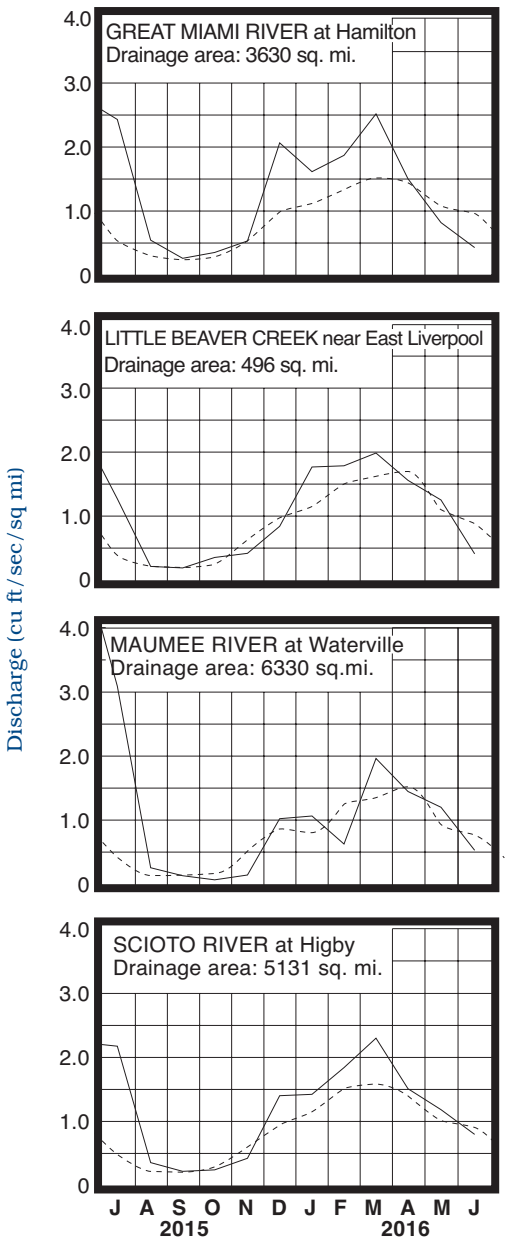
STREAMFLOW during June was noticeably below normal throughout most of the state. The exception was in the central part of the state where flows were above normal. Flows across much of Ohio were low enough to be considered deficient. Streamflow in most areas of the state during June were less than the flows during May.

Flows at the beginning of the month were below normal statewide. Lowest flows for the month were established near the beginning of June in basins in northwestern Ohio. Other low flows were observed around June 22 in basins from north-central to south-central Ohio and in basins in southeastern Ohio. Low flows across the remainder of the state occurred at the end of the month. Greatest flows for June were established in southwestern Ohio during the first week in response to precipitation. Basins in west-central and northeastern Ohio had their greatest flows between June 16 and 18. The remainder and majority of the state established their greatest flows for the month following the June 22-24 rainfall, generally between June 23 and 26. Some flooding was observed during this period as a result of excessive rain in areas from Paulding County in northwestern Ohio to Morgan County in southeastern Ohio, but the flooding was generally minor. Streamflow at the end of the month was below normal across most of the state, but was above normal in some basins in the central part of Ohio.

RESERVOIR STORAGE for water supply during June declined in the Mahoning River basin and increased slightly in the Scioto River basin. Month-end storage was below normal in the Mahoning basin and above normal in the Scioto basin.

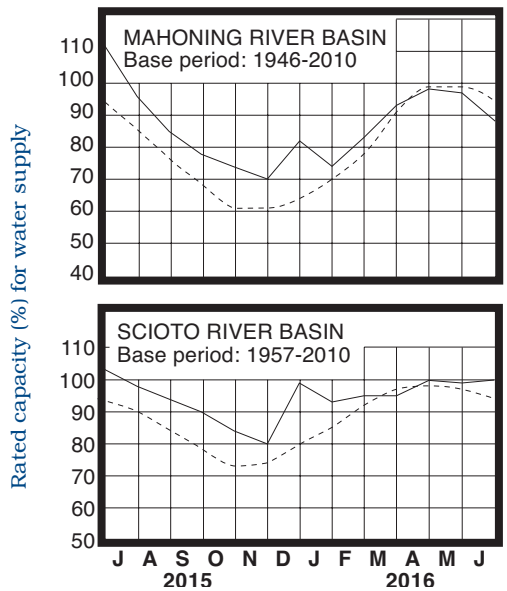
Reservoir storage at the end of June in the Mahoning basin index reservoirs was 88 percent of rated capacity for water supply compared with 97 percent for last month and 112 percent for June 2015. Month-end storage in the Scioto basin index reservoirs was 100 percent of rated capacity for water supply compared with 99 percent for last month and 103 percent for June 2015. Surface water supplies remain in good shape statewide in spite of the below normal rainfall and reduced streamflow that most of the state experienced.

MEAN STREAM DISCHARGE



Base period for all streams: 1981-2010

RESERVOIR STORAGE FOR WATER SUPPLY



Normal – – – – Current ———

GROUND-WATER LEVELS

GROUND WATER levels during June declined in most aquifers throughout the state. Net declines during June were greater than usually observed in most aquifers. Ground water levels were rather stable or declined steadily throughout the month in most aquifers. A few exceptions were noted in some shallow aquifers where levels rose slightly during the last week of June.

Ground water supplies are below normal throughout most of the state with only a few exceptions observed in some aquifers in central and southeastern Ohio. Current levels are also lower than they were during June 2015 across much of the state, reflecting the recent dry conditions many areas of the state have experienced. Only a few aquifers in central and southwestern Ohio have water levels that are slightly higher than they were at this time last year.

In spite of the below normal precipitation of the past two months and ground water supplies falling to below normal across most of the state, ground water supplies remain adequate throughout the state. Precipitation during the last week of June helped improve soil moisture. The Ohio Agricultural Statistics Service reported that near the end of June, soil moisture was rated as being short or very short in 26 percent of the state, adequate in 64 percent of the state and surplus in 10 percent of the state. Even with near-normal precipitation and other climatic conditions during the next several months, little recharge can be expected. However, these conditions would help reduce the overall demand on ground water supplies during the summer high-use period.

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

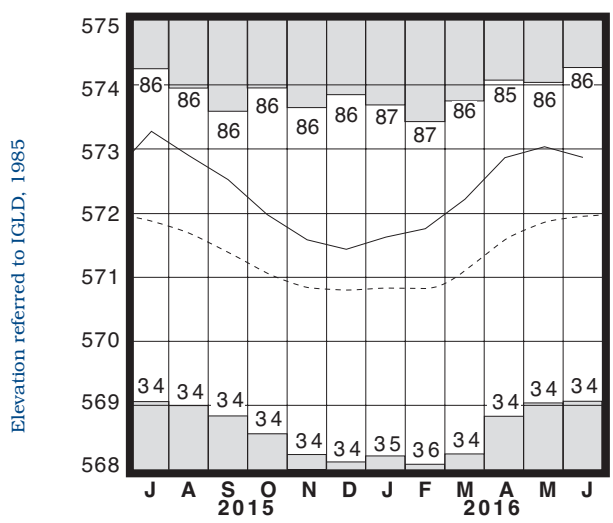
Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	13.54	+0.46	-1.49	-0.47
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.61	-1.04	-0.33	+0.22
Fr-10	Columbus, Franklin Co.	Gravel	41.88	+1.10	-0.52	+0.33
H-1	Harrison, Hamilton Co.	Gravel	22.92	-1.48	-0.73	-0.49
Hn-2a	Dola, Hardin Co.	Dolomite	6.84	-0.27	-0.43	-0.29
Po-124	Freedom, Portage Co.	Sandstone	76.98	-0.75	-0.16	-0.63
Tu-1	Strasburg, Tuscarawas Co.	Gravel	13.45	-1.11	-1.40	-0.63

LAKE ERIE level declined during June. The mean level was 572.87 feet (IGLD-1985), 0.16 foot below last month's level and 0.92 foot above normal. This month's level is 0.27 foot above the June 2015 level and 3.67 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during June averaged 2.43 inches, 1.03 inches below normal. Precipitation in the entire Great Lakes basin during June was 2.64 inches, 0.59 inch below normal. For calendar year 2016 through June, precipitation in the Lake Erie basin has averaged 16.13 inches, 1.24 inches below normal, while the entire Great Lakes basin has averaged 14.83 inches, 0.13 inch below normal.

In addition, the USACE reports that based on the current condition of the Great Lakes basin and anticipated weather patterns, the level of Lake Erie should remain above normal for the foreseeable future. Deviations from the anticipated weather patterns could result in the level of Lake Erie ranging from near normal to as much as 20 inches above the normal seasonal average.

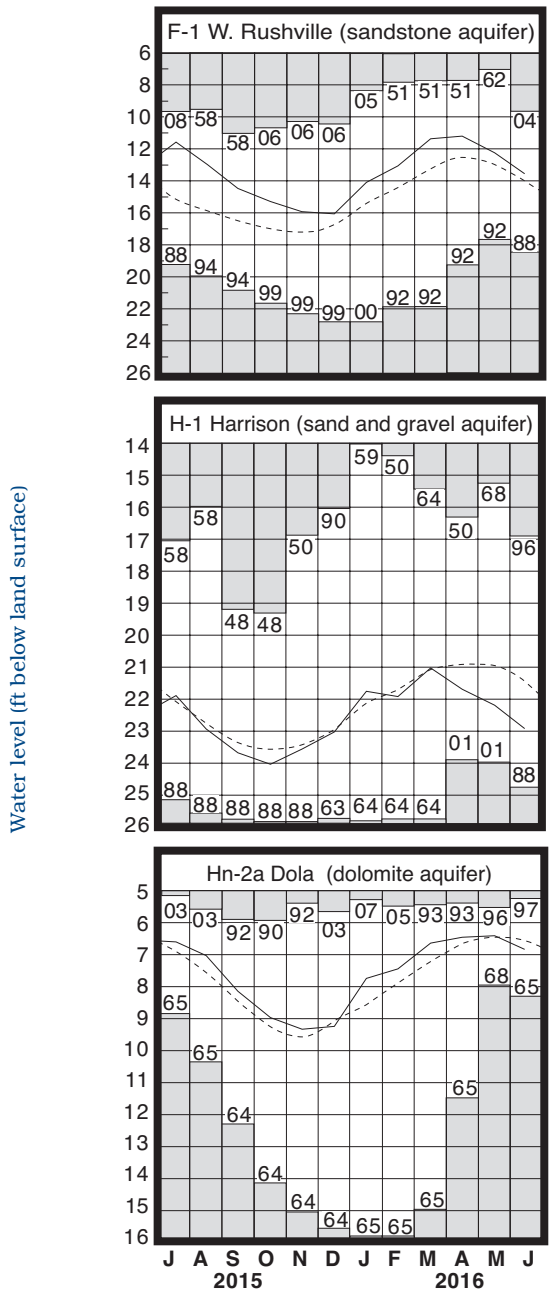
LAKE ERIE LEVELS



Base period: 1918-2010

Record high and low, year of occurrence

GROUND-WATER LEVELS



Base periods: F-1, 1947-2010; H-1 1951-2010.

Hn-2a, 1955-2010 Record high and low, year of occurrence

Normal – – – – Current ———

(Precipitation continued from front)

Precipitation for the first half of the 2016 calendar year is below normal throughout most of Ohio. The state average is 18.61 inches, 0.91 inch below normal. Regional averages range from 21.21 inches, 0.09 inch below normal, for the South Central Region to 16.28 inches, 2.89 inches below normal, for the West Central Region (see Precipitation table, departure from normal, past six months column).

SUMMARY

June precipitation was below normal throughout much of the state, but above normal in parts of southern and northwestern Ohio. Streamflow was below normal across most of the state and was low enough to be considered deficient in much of Ohio. Reservoir storage declined in the Mahoning River basin and increased slightly in the Scioto River basin. Ground water levels declined statewide and are below normal across most of the state. Lake Erie level declined 0.16 foot and was 0.92 foot above the long-term June average.

NOTES AND COMMENTS

Ohio Observation Well Network

The Ohio Department of Natural Resources (ODNR), Division of Water Resources, Water Resources Section is responsible for collecting, researching, interpreting and disseminating hydrologic and ground water resource information for the state of Ohio. An important component of this program is the Ohio Observation Well Network. The Ohio Observation Well Network characterizes Ohio's ground water resources through monitoring and evaluating both short- and long-term trends in ground water level fluctuations throughout the state's various aquifer systems.

Observation wells have been used to monitor an aquifer's response to changing climatic conditions and impacts from man-induced activities since ground water level monitoring in Ohio began in 1938. Monitoring and evaluating long-term trends in ground water levels enables water resource professionals to access information on the availability and annual replenishment of ground water supplies. The Ohio Observation Well Network is a tool that professionals use to determine the availability of ground water supplies, thus promoting wise management and efficient use of this valuable resource. Currently, the Division of Water Resources monitors 139 wells distributed across the state. Once field information is gathered from each observation well, it is reviewed and verified for accuracy. The data is then made available on-line through the Division's web page. The web site allows the user to view and/or retrieve data from the Ohio Observation Well Network database. Several options are provided that offer a wide range of flexibility in viewing and/or retrieving current and historical data. Statistical and water quality data are also available through the web site. In addition to the 139 currently active observation wells, ground water level data from an additional 205 historic/inactive observation wells is also available. To visit this web site, go to www.dnr.state.oh.us/water/waterobs/default.asp.

The Ohio Observation Well Network is a successful example of local, state, federal and private partnerships. The U.S. Geological Survey (USGS) has been a cooperative partner with the ODNR since the establishment of the network. As part of that cooperative effort, 15 of the observation wells have been equipped with automated equipment, providing near-real time ground water level information that can be accessed through the division's web site. To view data from the 15 near-real time sites, go to the Division of Water Resources, select Water Use and Planning, Water Inventory and Levels, and click on "USGS Near real time data for select observation wells."

For more information about Ohio's Observation Well Network, contact the Division of Water Resources at (614) 265-6740 or e-mail: mike.hallfrisch@dnr.state.oh.us.

ACKNOWLEDGMENTS

This report has been compiled from Division 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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