



# Happy 1954 60 years 2014 Anniversary

## MONTHLY WATER INVENTORY REPORT FOR OHIO

March 2014

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Hydrologist, Water Inventory Unit

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

**PRECIPITATION** during March was below normal throughout Ohio with only a few scattered locations having slightly above normal precipitation. The state average was 2.05 inches, 1.17 inches below normal. Regional averages ranged from 1.33 inches, 1.28 inches below normal, for the Northwest Region to 2.64 inches, 1.25 inches below normal, for the Southwest Region. Franklin (Warren County) reported the greatest amount of March precipitation, 3.06 inches. Wauseon (Fulton County) reported the least amount, 0.80 inch.

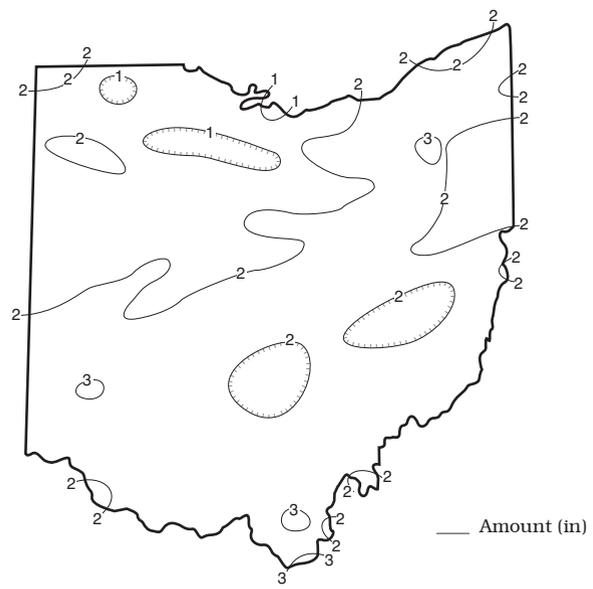
Precipitation during March fell as rain and snow. Generally, snowfall for the month was above normal in northern Ohio and near normal elsewhere. Some areas of the state set new snowfall records for the season while other areas are approaching record snow totals. Toledo Express Airport (Lucas County) recorded 85.3 inches of snow so far this winter, breaking the old record of 73.1 inches set during the winter of 1977-78. Chardon (Geauga County) received 141.5 inches of snow, 20 inches short of its record snow total established during the winter of 1959-60.

During the first three days of the month, the northern half of the state received light snow while southern Ohio received rain and snow. Precipitation amounts in extreme southern Ohio were around 1 inch; amounts decreased rapidly to the north with most of the northern two-thirds of the state receiving 0.25 inch or less. The next 10 days were rather dry with just some light snow reported across northern Ohio on March 8. Precipitation on March 12 was widespread with rain and snow reported in northern Ohio and mainly rain in southern Ohio. Most areas of the state received between 0.50 and 1 inch of precipitation from this storm. Light rain fell across most of the state on March 19 with around 0.25 inch reported, but little or no rain fell in northwestern Ohio. After a few dry days, precipitation returned to the state on March 25 and fell on and off through March 29 with the greatest amounts falling on March 29. Most of the state received 0.5 to 1 inch during this period, but less than 0.25 inch fell across much of northwestern Ohio.

Precipitation for the first half of the 2014 water year is above normal statewide. The average for the state is 17.78 inches, 1.18 inches above normal. Regional averages range from 19.82 inches, 1.34 inches above normal, for the Southwest Region to 16.06 inches, 1.73 inches above normal, for the Northwest Region (see Precipitation table, departure from normal, past 6 months column).

Precipitation for the 2014 calendar year is below normal throughout most of the state with only the Northwest Region having above normal precipitation. The state average is 6.80 inches, 1.18 inches below normal. Regional averages range from 8.15 inches, 1.34 inches below normal, for the South Central Region to 5.97 inches, 0.76 inch below normal, for the North Central Region (see Precipitation table, departure from normal, past 3 months column).

### PRECIPITATION MARCH

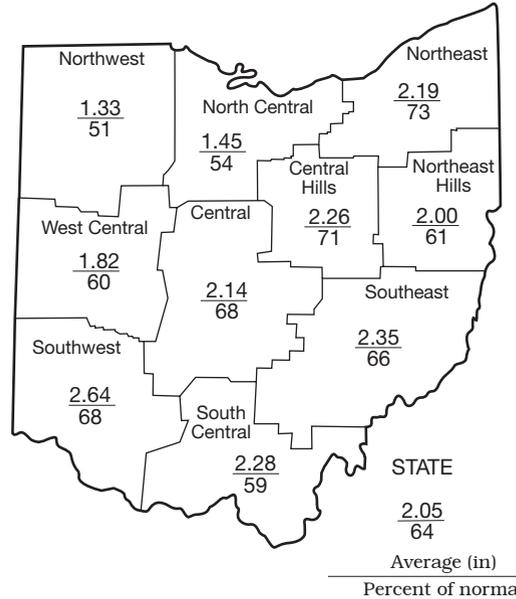


### PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.) Base period 1961-2010					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	-1.28	+0.20	+1.73	+3.53	-1.63	+0.6
North Central	-1.22	-0.76	+1.31	+7.40	+7.22	+2.9
Northeast	-0.81	-0.88	+1.72	+5.86	+5.24	+0.4
West Central	-1.21	-1.16	+1.95	+1.05	-1.77	-0.2
Central	-1.00	-1.46	+0.93	+2.67	-1.18	-0.3
Central Hills	-0.92	-1.63	+0.80	+4.30	+0.85	-0.4
Northeast Hills	-1.29	-2.09	+0.20	+1.03	-3.79	-0.7
Southwest	-1.25	-1.59	+1.34	+1.36	-4.79	+0.4
South Central	-1.61	-1.34	+0.81	+0.03	-0.99	-0.6
Southeast	-1.19	-1.12	+1.00	+3.33	+0.54	-0.3
State	-1.17	-1.18	+1.18	+3.04	-0.06	

\*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	1,798	109	82	105	113
Great Miami River at Hamilton	3,630	4,567	83	102	127	118
Huron River at Milan	371	1,112	203	149	163	181
Killbuck Creek at Killbuck	464	526	78	78	103	112
Little Beaver Creek near East Liverpool	496	645	81	89	98	88
Maumee River at Waterville	6,330	16,590	194	125	116	122
Muskingum River at McConnelsville	7,422	8,905	73	81	94	92
Scioto River near Prospect	567	521	66	87	128	150
Scioto River at Higby	5,131	4,709	58	79	101	101
Stillwater River at Pleasant Hill	503	420	54	87	115	102

**STREAMFLOW** during March was generally above normal in the northern one-third of the state and below normal in the southern two-thirds of Ohio. Flows in areas of northern Ohio were high enough to be considered excessive. Conversely, flows in areas of east central and southeastern Ohio were low enough to be considered deficient. Flows in most areas of central and southern Ohio during March were less than the flows observed during February, but flows were greater across the northern one-third.

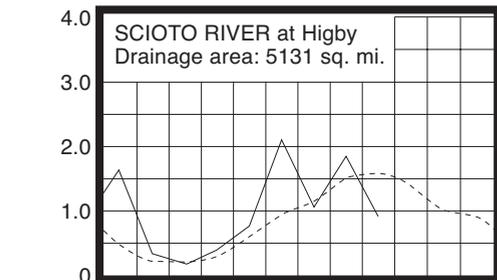
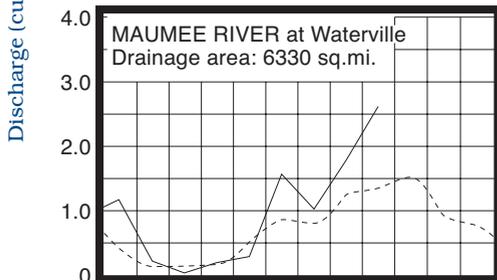
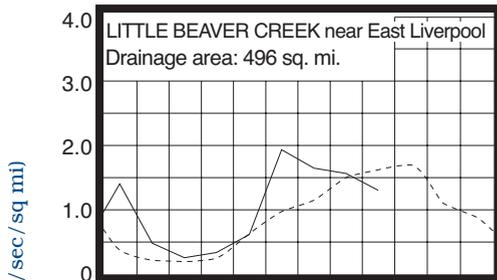
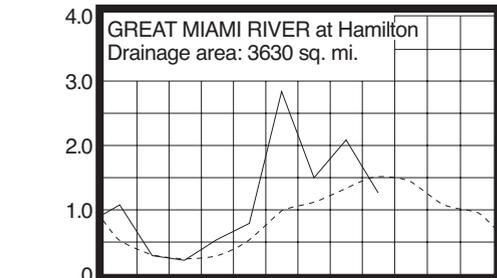
Flows at the beginning of March were below normal across much of the state, but above normal in northern and some southeastern Ohio basins. Flows generally decreased during the first 10 days of March; many basins in eastern, southeastern and northwestern Ohio had their lowest flows for the month during this period. Flows increased following precipitation that fell on March 12

with most drainage basins in Ohio having their greatest March flows during March 13-16. Minor flooding was observed along some northeastern Ohio streams as a result of the March 12 precipitation and ice jams. After these peaks, flows declined during the next two weeks, except for some temporary increases observed around March 21 and 22. Lowest flows for the month were established across most of the southwestern quarter of the state and north-central Ohio during March 27-29. Flows increased during the last few days of the month across most of the state, but continued to decline through month's end in northwestern Ohio basins due to lack of precipitation in that area of the state. Greatest flows occurred near or at the end of the month in some southwestern and east-central Ohio basins. Flows at the end of March were above normal in eastern and southern Ohio, but below normal in the northwestern quarter of the state.

**RESERVOIR STORAGE** for water supply during March increased in both the Mahoning and Scioto river basins. Storage remained above normal in the Mahoning basin reservoirs and was at normal in the Scioto basin reservoirs.

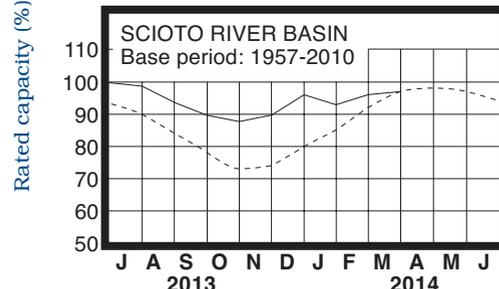
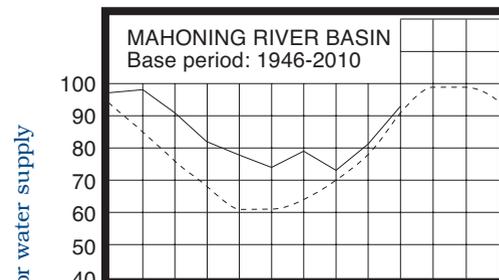
Reservoir storage at the end of March in the Mahoning basin index reservoirs was 93 percent of rated capacity for water supply compared with 81 percent for last month and 94 percent for March 2013. Month-end storage in the Scioto basin index reservoirs was 97 percent of rated capacity for water supply compared with 96 percent for last month and 95 percent for March 2013. Surface water supplies continue to remain in good shape throughout the state.

## MEAN STREAM DISCHARGE



Base period for all streams: 1981-2010

## 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 March showed some improvement in most aquifers in Ohio. Net rises during March from the February levels were less than usually observed. Levels in most aquifers were rather steady during the month with some temporary rises noted around mid-month and again near the end of the month.

Below normal precipitation across most of Ohio during the first three months of 2014 and frozen soils during much of this period has resulted in recharge rates that have been less than normal. Thus, although ground water supplies remain adequate statewide, current levels are below normal in most aquifers throughout the state. Also, current levels are still higher than they were at this time last year across much of the state, but have fallen below last year's level in several aquifers in Ohio. Conditions across the state continue to be favorable for additional improvement to Ohio's ground water storage. With near-normal precipitation and other climatic conditions there is still the opportunity for significant recharge during the next two months.

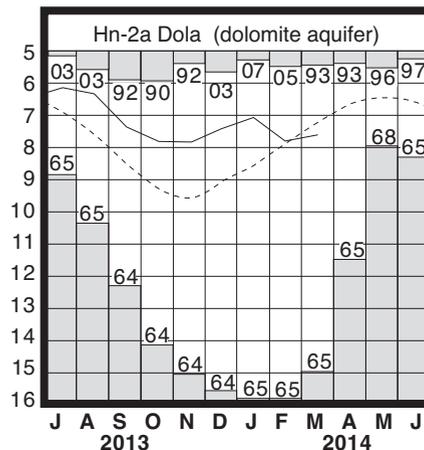
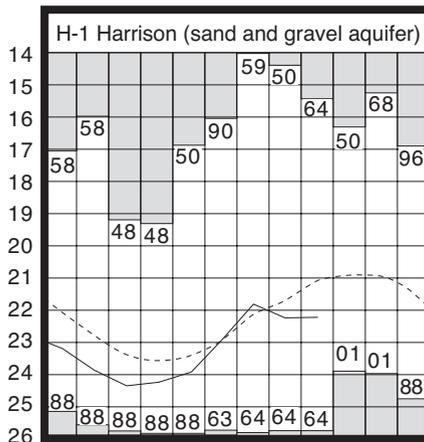
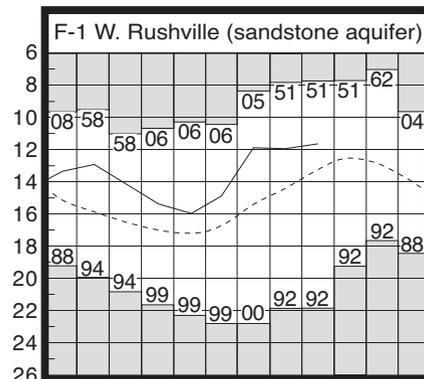
**LAKE ERIE** level rose during March. The mean level was 570.83 feet (IGLD-1985), 0.16 foot above last month's mean level and 0.27 foot below normal. This month's level is 0.23 foot above the March 2013 level and 1.63 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during March averaged 1.50 inches, 1.26 inches below normal. For the entire Great Lakes basin, March precipitation averaged 1.59 inches, 0.57 inch below normal. For calendar year 2014 through March, precipitation in the Lake Erie basin has averaged 6.14 inches, 1.20 inches below normal while precipitation in the entire Great Lakes basin has averaged 4.73 inches, 1.41 inches 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 below normal for the foreseeable future. Deviations from the anticipated weather patterns could result in the level of Lake Erie ranging from about 6 inches above normal to as much as 12 inches below the normal seasonal level.

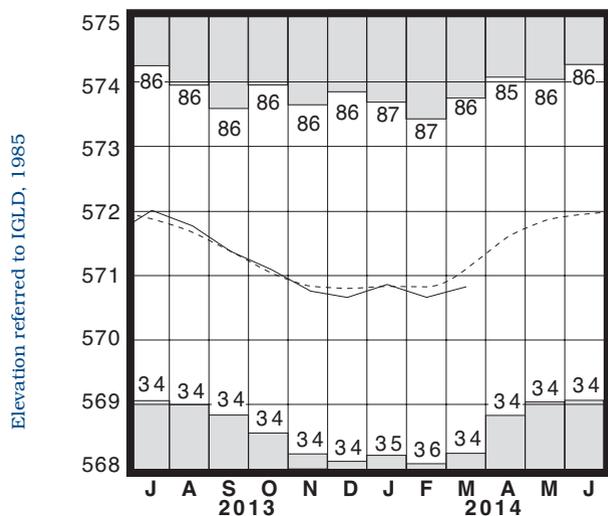
Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	11.64	+1.59	+0.33	+0.37
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.83	-1.63	+0.12	+0.49
Fr-10	Columbus, Franklin Co.	Gravel	42.31	+0.73	+0.18	+1.02
H-1	Harrison, Hamilton Co.	Gravel	22.22	-1.14	+0.01	-0.11
Hn-2a	Dola, Hardin Co.	Dolomite	7.61	-0.39	+0.19	-1.37
Po-124	Freedom, Portage Co.	Sandstone	77.03	-0.44	-0.06	-0.04
Tu-1	Strasburg, Tuscarawas Co.	Gravel	13.24	-1.34	+0.42	+0.24

## GROUND-WATER LEVELS



Water level (ft below land surface)

## LAKE ERIE LEVELS



Base period: 1918-2010

■ Record high and low, year of occurrence

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

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

Normal - - - - Current \_\_\_\_\_

## SUMMARY

Precipitation during March was below normal statewide. Streamflow was generally above normal in the northern one-third of the state and below normal elsewhere. Reservoir storage increased and was near to above normal across Ohio. Ground water levels rose in most aquifers, but storage has fallen to below normal across most of the state. Lake Erie level rose 0.16 foot and was 0.27 foot below the long-term March average.

## NOTES AND COMMENTS

### MWIR CELEBRATES 60 YEARS OF PUBLICATION

March 2014 marks the 60th anniversary of the "Monthly Water Inventory Report For Ohio" (MWIR). The report, first published in March 1954, was originally titled "Monthly Summary of Ground Water Levels in Index Wells in Ohio." In January 1955, the name was changed to the "Monthly Index of Conditions Affecting Water Supply," and in January 1973, the current title was unveiled.

For the past 60 years the MWIR has disseminated current hydrologic, and other pertinent data, in a timely and brief format which sufficiently represents current water conditions, permitting evaluation of the statewide water supply situation. Several key observation points, often referred to as index stations, offer the best available data based on accuracy, length of record, minimal artificial effects on data and availability of records. In many cases, the same observation points, or stations, have been used during the past 60 years, providing for consistency and reliability of the data included in the report. Data from these stations are collected monthly by various federal and state agencies, processed immediately and made available to the ODNR-Division of Soil and Water Resources. It is through these cooperative efforts and long-term partnerships that the MWIR has been able to endure and provide this wealth of timely information to citizens, water managers, government agencies, consulting companies, educators, students and many others.

A major factor in the success of the MWIR is in the presentation. The information is presented in a brief, concise and consistent manner in the format of a technical report as opposed to a newsletter. The type of information used in the MWIR is standardized from issue to issue. The graphical presentation of the data allows for a quick evaluation of current conditions, and also provides for an easy comparison with normal and historic records, and recent conditions and trends. Although the author may include opinions of the cause and significance of the reported information, the data allows for the reader to make an independent evaluation of the current conditions. The Notes and Comments section of the MWIR allows the author some flexibility from the standard format to bring attention to various hydrologic or ODNR-related items.

It takes the combined efforts of many people and agencies for the publication of the MWIR. Special cooperation with people from the U.S. Geological Survey (USGS), National Weather Service, U.S. Army Corps of Engineers, Miami Conservancy District, many past and present employees of ODNR and others who have assisted in the production of this report have helped make these past 60 years of publication possible. Support from administrations from the Division of Soil and Water Resources (DSWR), Ohio Department of Natural Resources and past Division of Water have been instrumental in the ongoing success of this report. Special thanks to Dave Orr, the DSWR Electronic Design Specialist, for helping in the publication of the MWIR for the past 25 years; and to Steve Vivian, recently retired from the USGS, for many years of providing data for the report and always lending a helping hand whenever needed.

Throughout the 60 years of publication of the MWIR, there have been just four authors. Paul Kaser is the person responsible for originating and developing the idea of the MWIR. Paul was a long time Division of Water (now Division of Soil and Water Resources) employee who was instrumental in developing and managing the ground water observation well monitoring program in Ohio for many years. He also authored several reports that presented and analyzed the data from this statewide network. It was through these experiences that in 1954 Paul conceived the idea to publish a monthly report that presented in brief form hydrologic data from across the state. Paul authored the report from March 1954 through mid-1966. Paul retired in the early 1970s and moved to Arizona where he lived until his death in October 1996. Leonard Harstine, who took over authorship in 1966, has the distinction of having the longest tenure as author of the MWIR. Leonard was the author into 1987 and was responsible for redesigning the report to a smaller format, similar to the current design. Leonard retired from ODNR in 1988 and continued to live in Columbus until his passing in August 2009. Dave Cashell became author of the MWIR in 1987. Dave oversaw the redesign of the MWIR in 1989 to the current format, a somewhat larger version that allowed for additional data and statistics to be included in each issue. Dave authored the report until the end of 2004. Dave began his career at ODNR in January 1979 and retired from the Department on February 1, 2010. He remained a major contributor to the production of the MWIR until his retirement. Dave continues to reside in the central Ohio area. The current author is Scott Kirk. Scott has been with ODNR since March 1980. Scott has been instrumental in the preparation of the report since 2001 and assumed full duties of authoring the report in January 2005.

Many thanks also go to all the readers who have taken an interest in the data and information we provide in the MWIR. It is for you that the MWIR is produced and a main reason the MWIR has survived the past 60 years. With your continued interest the MWIR will continue to provide current hydrologic data and information for years to come. Past reports from January 1976 to the present, may be found on the Division's webpage at: <http://soilandwater.ohiodnr.gov/>. And as always, questions, comments and suggestions are always welcome.

## 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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