



MONTHLY WATER INVENTORY REPORT FOR OHIO

January 2013

<http://www.ohiodnr.gov/tabid/4191/Default.aspx>

Compiled By Scott C. Kirk

Hydrologist
Water Inventory Unit

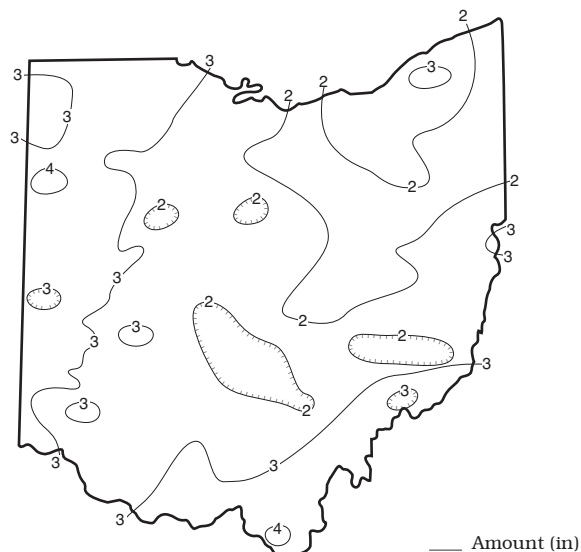
PRECIPITATION during January was generally above normal in western and extreme southeastern Ohio, and below normal in eastern Ohio. The average for the state was 2.55 inches, 0.01 inch below normal. Regional averages ranged from 3.34 inches, 1.30 inches above normal, for the Northwest Region to 1.98 inches, 0.52 inch below normal, for the Central Hills Region. Van Wert (Van Wert County) reported the greatest amount of January precipitation, 4.53 inches. Southpoint (Lawrence County) reported 4.43 inches for the month. Pymatuning Reservoir (Ashtabula County) reported the least amount, 1.15 inches.

Precipitation during January generally fell as rain during the first half of the month and as both rain and snow during the second half. Snowfall for the month was below normal throughout most of the state. The first ten days of the month were rather dry with just a few light showers reported. Widespread precipitation fell across Ohio during January 11-13. Generally, 1-2 inches of rain fell across western Ohio and 0.50-1.0 inch fell across eastern Ohio. The next 11 days were dry with just some light snow showers reported. The only significant precipitation during this period fell across southeastern Ohio on January 15-16 with 0.50-1.0 inch reported. The last week of January was wet throughout the entire state with most of Ohio receiving at least 1 inch of precipitation.

Precipitation for the 2013 water year is above normal throughout most of the state with only the Southwest Region having slightly below normal precipitation. The state average is 12.45 inches, 1.26 inches above normal. Regional averages range from 15.21 inches, 3.03 inches above normal, for the Northeast Region to 10.10 inches, 0.21 inch above normal, for the Northwest Region.

The 2013 calendar year is off to an adequate start as far as precipitation is concerned across most of the state. However, much of eastern Ohio started the year with below normal precipitation. Near-normal precipitation during the next several months will be beneficial in helping replenish the state's water resources.

PRECIPITATION JANUARY

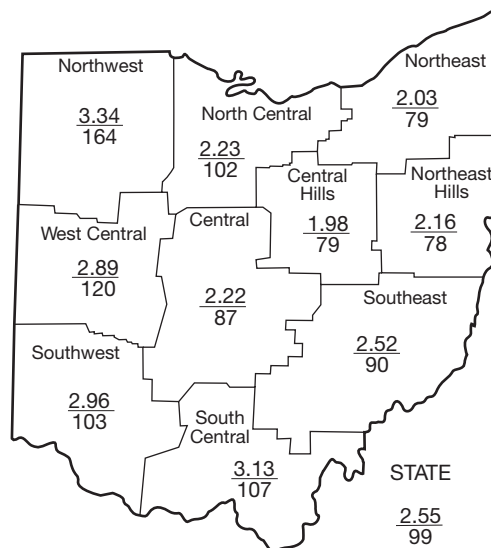


PRECIPITATION

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	+1.30	-0.66	+2.68	-4.04	+14.65	+0.3
North Central	+0.05	-1.89	+5.10	+1.43	+22.68	+3.9
Northeast	-0.53	-1.24	+4.90	+0.30	+23.49	+3.2
West Central	+0.48	-0.66	+3.26	-3.88	+16.20	+1.6
Central	-0.32	-0.67	+1.62	-3.63	+15.69	+1.0
Central Hills	-0.52	-1.30	+2.52	-2.49	+14.58	+2.0
Northeast Hills	-0.60	-1.15	+1.43	-4.24	+12.99	+0.9
Southwest	+0.10	-0.99	-0.36	-7.11	+14.89	+0.0
South Central	+0.21	+1.23	+2.01	-1.07	+18.58	+1.5
Southeast	-0.29	+0.24	+2.51	-1.66	+16.00	+1.8
State	-0.01	-0.71	+2.57	-2.64	+16.97	

*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

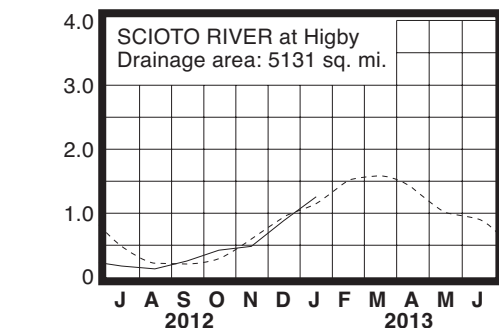
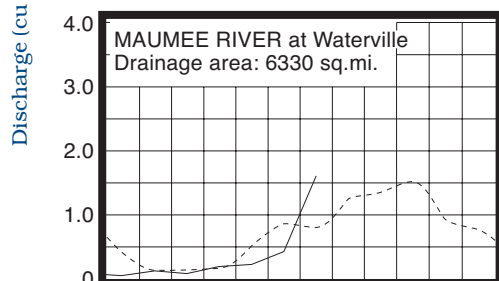
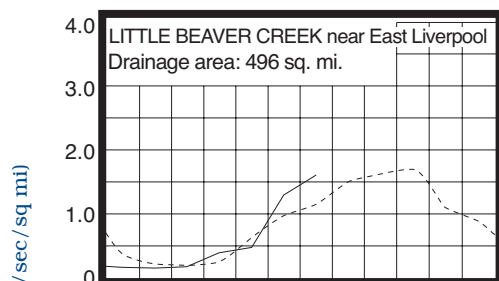
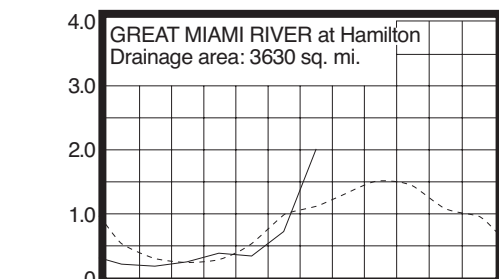
This Month

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	1,712	133	103	108	76
Great Miami River at Hamilton	3,630	7,295	180	93	85	70
Huron River at Milan	371	749	158	115	144	98
Killbuck Creek at Killbuck	464	631	125	107	93	70
Little Beaver Creek near East Liverpool	496	797	140	97	83	60
Maumee River at Waterville	6,330	10,230	203	78	69	55
Muskingum River at McConnelsville	7,422	9,809	119	95	79	64
Scioto River near Prospect	567	1,357	302	140	158	99
Scioto River at Higby	5,131	6,469	109	83	79	69
Stillwater River at Pleasant Hill	503	1,400	320	122	114	64

STREAMFLOW during January was above normal statewide. Flows were high enough to be considered excessive in some basins, mostly in the western half of the state. Flows during January were higher than the December flows throughout nearly all of Ohio.

Flows at the beginning of the month were below normal statewide. Some drainage basins, mainly in western Ohio, recorded their lowest flows for the month during the first eight days of January. Most other drainage basins reached their lowest flows between January 23 and 27. Widespread precipitation during January 11-13 and melting snow increased streamflows. Greatest flows for January were recorded during January 12-15 throughout most of the state. Minor flooding was observed in some areas of northwestern Ohio. A few basins in northeastern Ohio recorded their greatest January flow at the end of the month. Streamflow at the end of January was above normal statewide and excessive in many drainage basins.

MEAN STREAM DISCHARGE

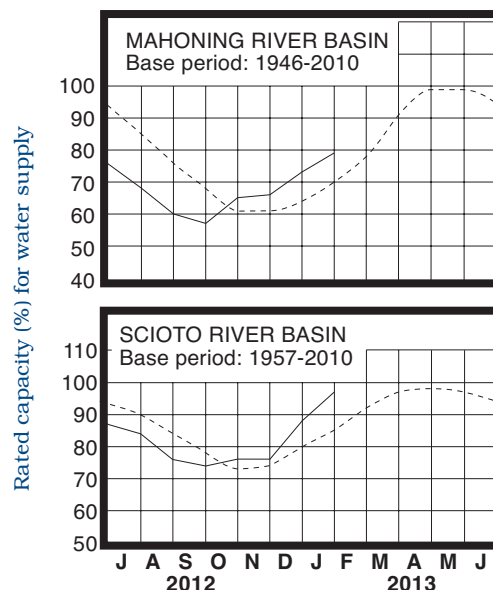


Base period for all streams: 1981-2010

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

Reservoir storage at the end of January in the Mahoning basin index reservoirs was 79 percent of rated capacity for water supply compared with 73 percent for last month and 74 percent for January 2012. Month-end storage in the Scioto basin index reservoirs was 97 percent of rated capacity for water supply compared with 88 percent for both last month and January 2012.

RESERVOIR STORAGE FOR WATER SUPPLY



Normal - - - - Current ———

GROUND-WATER LEVELS

GROUND WATER levels during January rose throughout the state. Net changes from December's levels were greater than usually observed in most aquifers.

Ground water levels rose steadily throughout the month in most aquifers, although levels in a few unconsolidated aquifers were rather stable during the first week, and then began to rise for the remainder of January. Current ground water levels continue to remain lower than they were a year ago ranging from 0.5 foot to 6.5 feet below the January 2012 levels. Ground water storage also continues to remain at below normal levels in most aquifers, but is above normal in some consolidated aquifers in northwestern and southeastern Ohio. Observation well FA-1 near Washington Court House (Fayette County) representing limestone aquifers in south-central and southwestern Ohio, reached a record low-level for January. However, this record was established early in the month, and water levels improved during the remainder of the month. Even though ground water levels remain below normal across most of the state, ground water storage is at adequate levels throughout Ohio. However, near-normal precipitation during the next several months will be needed to provide sustained improvement in ground water storage during the remainder of the 2013 recharge period.

Well	Location
F-1	W. Rushville, Fairfield Co.
Fa-1	Jasper Mill, Fayette Co.
Fr-10	Columbus, Franklin Co.
H-1	Harrison, Hamilton Co.
Hn-2a	Dola, Hardin Co.
Po-124	Freedom, Portage Co.
Tu-1	Strasburg, Tuscarawas Co.

LAKE ERIE level during January was unchanged from the December level. The mean level was 570.28 feet (IGLD-1985), the same as last month and 0.55 foot below normal. This month's mean level is 1.83 feet lower than the January 2012 level and 1.08 feet above Low Water Datum.

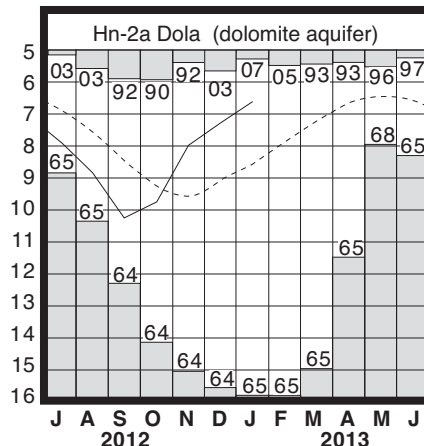
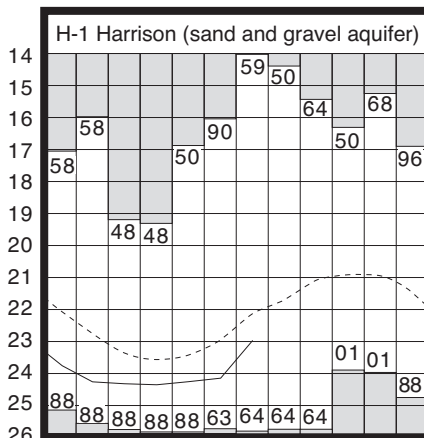
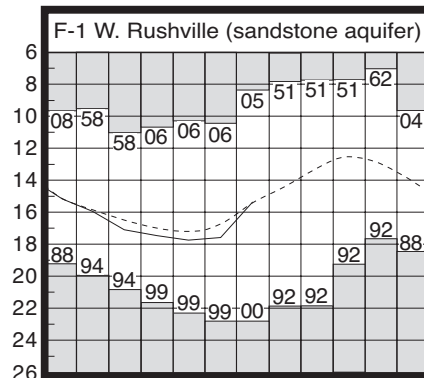
The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during January averaged 3.08 inches, 0.58 inch above normal. For the entire Great Lakes basin, January precipitation averaged 2.78 inches, 0.57 inch above normal.

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 near-normal to as much as 18 inches below the normal seasonal level.

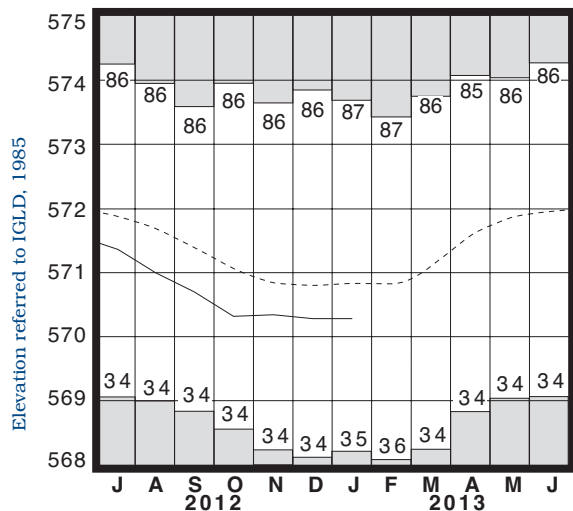
Based on daily lowest level in feet below land-surface datum

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	15.34	+0.15	+2.23	-4.70
Fa-1	Jasper Mill, Fayette Co.	Limestone	13.97	-5.99	+1.45	-6.53
Fr-10	Columbus, Franklin Co.	Gravel	44.15	-0.19	+0.40	-1.74
H-1	Harrison, Hamilton Co.	Gravel	22.98	-0.86	+1.17	-2.27
Hn-2a	Dola, Hardin Co.	Dolomite	6.61	+1.96	+0.68	-0.39
Po-124	Freedom, Portage Co.	Sandstone	77.31	-0.49	+0.02	-1.51
Tu-1	Strasburg, Tuscarawas Co.	Gravel	14.12	-0.94	+0.72	-2.44

GROUND-WATER LEVELS



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 January was above normal in western and extreme southeastern Ohio, and below normal in eastern Ohio. Streamflow was above normal statewide and high enough to be considered excessive in some basins in the western half of the state. Reservoir storage increased and remained above normal in both the Mahoning and Scioto river basins. Ground water levels rose statewide, but remained below normal across most of Ohio. Lake Erie level was unchanged from the December level and was 0.55 foot below the long-term January average.

NOTES AND COMMENTS

Severe Weather Awareness Week

Governor John Kasich has designated the week of March 3-9, 2013 as Ohio's Spring Severe Weather Awareness Week. This year's safety campaign coincides with the Federal Emergency Management Agency's (FEMA) and NOAA's National Severe Weather Preparedness Week. The goal is to better educate people about the hazards of severe weather and to encourage people to have a plan in the event severe weather should occur. Each year the Ohio Committee for Severe Weather Awareness (OCSWA) sponsors two awareness weeks to draw attention to the need to prepare for severe weather. The OCSWA consists of representatives from the National Weather Service, American Red Cross, Emergency Management Association of Ohio, Ohio Citizens Corps, State Fire Marshal's office, Ohio Emergency Management Agency, Ohio Departments of Aging, Education, Health, Mental Health, Insurance, Natural Resources, and Transportation, and the Ohio Insurance Institute. A statewide tornado drill will be conducted on March 6 at 9:50 am. Communities and individuals should use this time to think about what course of action they would take in the event if severe weather was to affect them and their property.

National Ground Water Awareness Week

The week of March 10-16, 2013 is National Ground Water Awareness Week. During this week, Ohioans are urged to learn more about the state's ground water resources, from wise use to protection. The ODNR, Division of Soil and Water Resources, Water Resources Section collects, researches, interprets and disseminates information on 140 ground water observation wells located across the state; produces several types of ground water maps, addressing various aspects of ground water resources in the state including availability, pollution potential and horizontal direction of ground water flow; and collects water use data on all facilities that have the capacity to withdraw over 100,000 gallons of water per day. To learn more about these and other programs at the Division of Soil and Water, please visit their website at: <http://www.ohiodnr.gov/soilandwater/>.

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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Ohio Department of Natural Resources

Division of Soil and Water Resources

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Columbus, Ohio 43229-6693

John Kasich
Governor

James Zehninger
Director

Karl Gebhardt
Chief





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February 2013

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Compiled By Scott C. Kirk

Hydrologist
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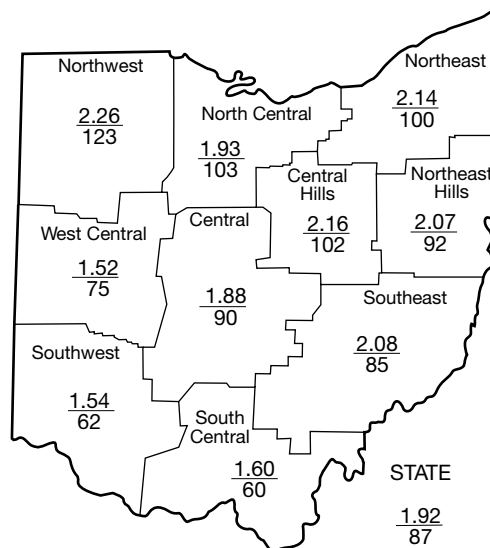
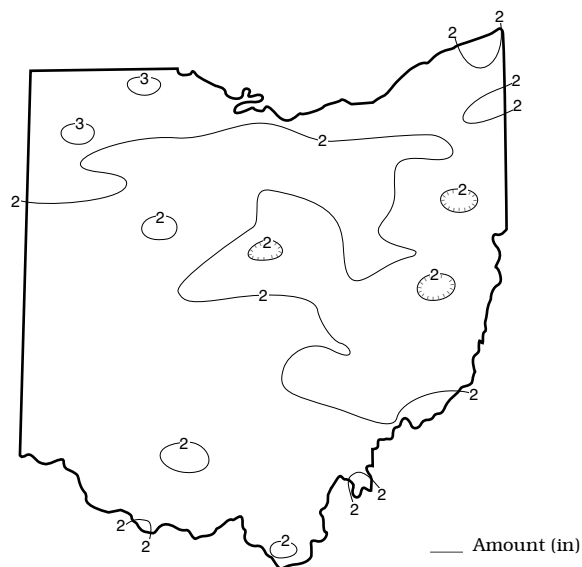
PRECIPITATION during February was below normal throughout most of the state, but above normal across extreme northern Ohio and areas in the east-central part of the state. The average for the state was 1.92 inches, 0.28 inch below normal. Regional averages ranged from 2.26 inches, 0.43 inch above normal, for the Northwest Region to 1.52 inches, 0.51 inch below normal, for the West Central Region. Maumee State Forest (Fulton County) reported the greatest amount of February precipitation, 3.09 inches. Anthony Meldahl Locks and Dam (Clermont County) reported the least amount, 1.00 inch.

Precipitation during February fell as rain and snow. Snow amounts were above normal in the northern half of the state and near normal in the southern half. Precipitation fell over much of the state on about half of the days of the month, but daily amounts were usually on the light side. The month started with snow falling across the state during February 1-5. Snow amounts ranged from 3-10 inches (0.25-0.50 inch liquid precipitation) across much of the state and as much as 16 inches (nearly 1 inch liquid) in the northeastern snowbelt areas. The next two weeks were relatively dry with only a few light rain and snow showers reported. The only significant precipitation during this period occurred on February 8 with around 0.25 inch in northern Ohio and lesser amounts to the south. Light showers during February 19-22 brought another 0.25-0.50 inch of precipitation to much of the state. The most widespread and significant storm of the month occurred during February 26-28 and almost all of the precipitation fell as rain. Most of the state received between 0.75 inch and 1.50 inches of precipitation during this period.

Precipitation for the 2013 water year is above normal across most of the state with only the Southwest Region having below normal precipitation. The state average is 14.36 inches, 0.97 inch above normal. Regional averages range from 17.35 inches, 3.03 inches above normal, for the Northeast Region to 12.36 inches, 0.64 inch above normal, for the Northwest Region.

Precipitation for the 2013 calendar year is below normal throughout most of the state, but above normal in the Northwest and North Central regions. The state average is 4.45 inches, 0.31 inch below normal. Regional averages range from 5.60 inches, 1.73 inches above normal, for the Northwest Region to 3.99 inches, 0.64 inch below normal, for the Central Region.

PRECIPITATION FEBRUARY



Average (in)
Percent of normal

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	+0.43	+1.61	+1.41	-3.53	+12.97	+1.0
North Central	+0.05	+0.23	+5.08	+1.25	+19.92	+3.8
Northeast	0.00	+0.98	+4.72	+0.38	+20.78	+3.1
West Central	-0.51	+1.09	+3.44	-3.57	+12.44	+1.4
Central	-0.21	+1.16	+2.54	-3.23	+13.04	+0.7
Central Hills	+0.05	+0.94	+3.55	-2.13	+12.04	+2.0
Northeast Hills	-0.17	+1.01	+2.08	-3.86	+10.62	+0.9
Southwest	-0.96	+0.37	+0.42	-6.84	+11.46	-0.4
South Central	-1.08	+2.57	+3.12	-1.05	+15.42	+0.6
Southeast	-0.38	+2.47	+2.91	-1.05	+13.51	+1.4
State	-0.28	+1.24	+2.93	-2.36	+14.22	

*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

MEAN STREAM DISCHARGE

This Month

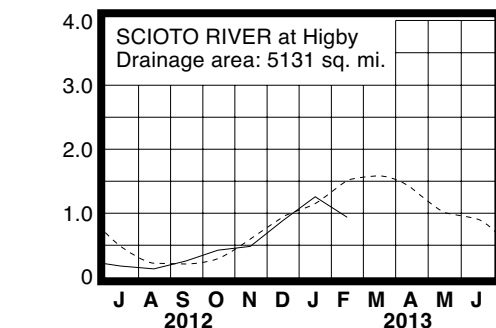
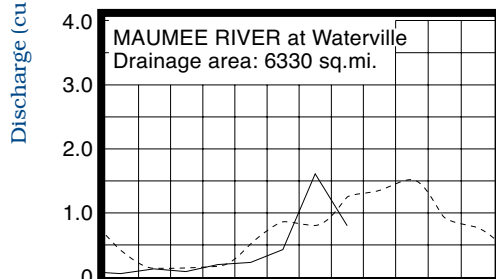
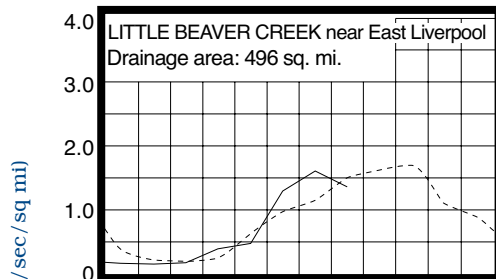
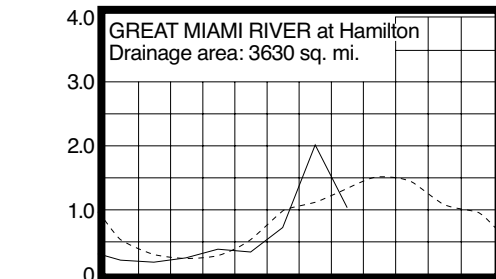
River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	1,342	75	93	104	78
Great Miami River at Hamilton	3,630	3,727	77	93	85	68
Huron River at Milan	371	497	97	96	138	99
Killbuck Creek at Killbuck	464	533	78	92	94	68
Little Beaver Creek near East Liverpool	496	676	91	98	88	61
Maumee River at Waterville	6,330	5,085	64	77	68	53
Muskingum River at McConnelsville	7,422	9,659	76	87	82	62
Scioto River near Prospect	567	577	112	116	143	100
Scioto River at Higby	5,131	4,756	61	76	78	66
Stillwater River at Pleasant Hill	503	432	69	117	105	65

STREAMFLOW during February was below normal throughout most of the state. Flows were low enough to be considered deficient in some basins in south-central Ohio. Flows during February were lower than the flows observed during January statewide.

Streamflow at the beginning of the month was well above normal across most of the state. Areas in northeastern, southwestern and central Ohio had their greatest flows for the month at the start of February. Generally, flows declined steadily throughout most of the month with slight, temporary increases observed following local precipitation. Flows increased statewide during the last three days of the month in response to widespread precipitation. Lowest flows for the month occurred just before this precipitation across most of

Ohio. Greatest flows for the month were observed in northwestern, east-central and southeastern Ohio basins on either February 27 or 28. Flows at the end of the month were above normal statewide.

MEAN STREAM DISCHARGE

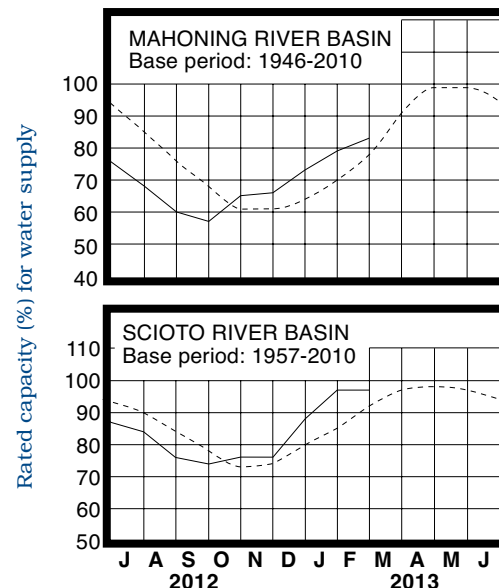


Base period for all streams: 1981-2010

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

Reservoir storage at the end of February in the Mahoning basin index reservoirs was 83 percent of rated capacity for water supply compared with 79 percent for last month and 74 percent for February 2012. Month-end storage in the Scioto basin index reservoirs was 97 percent of rated capacity for water supply compared with the same for last month and 89 percent for February 2012. Surface water supplies are in good shape throughout Ohio.

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 February showed net improvement throughout the state. Net changes from January's levels were less than usually observed in most aquifers, but were greater than usually observed in some consolidated aquifers in southern Ohio. Levels in most consolidated aquifers and deeper unconsolidated aquifers rose steadily throughout the month. Levels in shallower unconsolidated aquifers declined through most of February, and then began to rise near the end of the month in response to widespread precipitation.

Ground water supplies are adequate across Ohio as ground water storage continues to show some improvement throughout the state. However, ground water levels remain below normal across much of the state, although they are above normal in some consolidated aquifers in northwestern and southeastern Ohio. Current ground water levels also continue to remain lower than they were a year ago ranging from 0.25 foot to 3.25 feet below the February 2012 levels. With near-normal precipitation during the next few months, the ground water situation across Ohio should continue to show improvement. However, water supply managers with ground water sources should continue to monitor their situations closely during these next few months.

LAKE ERIE level rose during February. The mean level was 570.41 feet (IGLD-1985), 0.13 foot higher than last month's mean level and 0.42 foot below normal. This month's mean level is 1.67 feet below the February 2012 level and 1.21 feet above Low Water Datum.

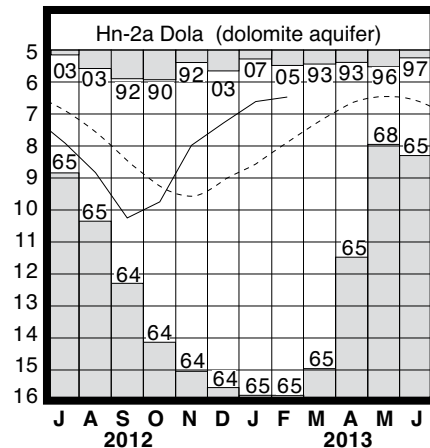
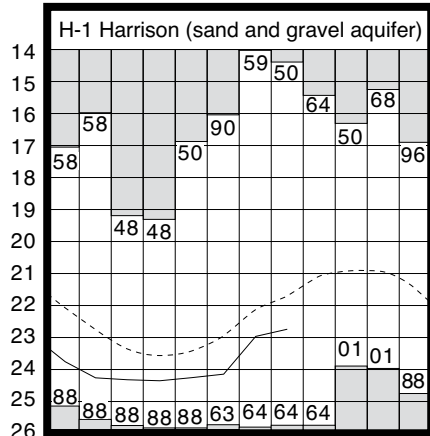
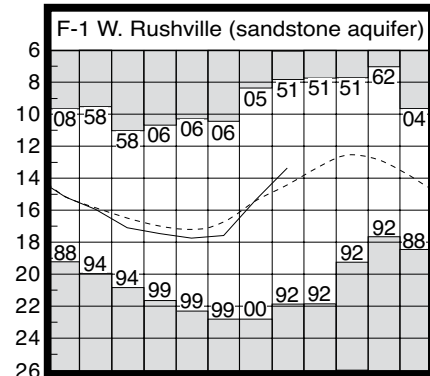
The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during February averaged 2.09 inches, which is normal. For the entire Great Lakes basin, February precipitation averaged 1.77 inches, 0.01 inch below normal.

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 1 inch to as much as 18 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	13.36	+1.04	+1.98	-2.65
Fa-1	Jasper Mill, Fayette Co.	Limestone	10.81	-3.31	+3.16	-3.26
Fr-10	Columbus, Franklin Co.	Gravel	43.71	-0.26	+0.44	-1.73
H-1	Harrison, Hamilton Co.	Gravel	22.75	-1.05	+0.23	-1.58
Hn-2a	Dola, Hardin Co.	Dolomite	6.49	+1.50	+0.12	-0.26
Po-124	Freedom, Portage Co.	Sandstone	77.21	-0.44	+0.10	-1.78
Tu-1	Strasburg, Tuscarawas Co.	Gravel	13.91	-1.35	+0.21	-2.42

GROUND-WATER LEVELS

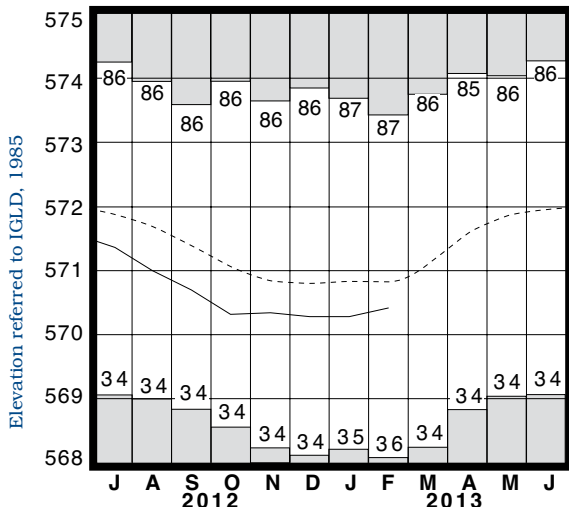
Water level (ft below land surface)



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

Hn-2a, 1955-2010

LAKE ERIE LEVELS



Base period: 1918-2010

Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation during February was below normal across much of the state, but above normal in extreme northern Ohio and areas in east-central Ohio. Streamflow was below normal throughout most of the state. Reservoir storage increased during February and was above normal in both the Mahoning and Scioto river basins. Ground water levels rose statewide, but remained below normal across most of the state. Lake Erie level rose 0.13 foot and was 0.42 foot below the long-term February average.

NOTES AND COMMENTS

Recent Earthquakes Leave Their Mark In Ohio

Recent earthquakes have left their mark on Ohio. On October 27, 2012 at 11:04 p.m. EDT, an earthquake with a magnitude of 7.8 on the open-ended Richter scale struck the island of Moresby of the Haida Gwaii archipelago, located on the north coast of British Columbia in Canada. On January 5, 2013 at 3:58 am EST, an earthquake with a magnitude of 7.5 was centered off the coast of southern Alaska, about 58 miles west of Craig, Alaska. Shock waves radiating from the epicenter of these earthquakes traveled through rock formations and reached Ohio. Seismic waves passing through rock formations cause an alternating compression and expansion of the rock. Water levels in some wells finished in certain rock formations can rise and fall with the passage of these waves. Several wells in Ohio's observation well network respond to Western Hemisphere earthquakes. Minimum Richter scale readings of 6.5 to 7.0, depending on the earthquake's location, are usually necessary for wells in Ohio to show any response. The most sensitive well to these phenomena in Ohio's observation well network is VW-1, located in Van Wert (Van Wert County). Seismic waves from the Haida Gwaii, Canada earthquake caused a 0.63 foot fluctuation of water level in this well. Seismic waves from the Southern Alaska earthquake caused a 0.73 foot fluctuation in VW-1. The most notable fluctuation caused by an earthquake in VW-1 occurred March 27, 1964 when the water level changed 5.8 feet following the Alaskan Good Friday earthquake which had a Richter scale magnitude of 8.4.

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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Ohio Department of Natural Resources

Division of Soil and Water Resources

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John Kasich
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Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

March 2013

<http://www.ohiodnr.gov/tabid/4191/Default.aspx>

Compiled By Scott C. Kirk

Hydrologist
Water Inventory Unit

PRECIPITATION during March was below normal throughout most of the state; only the West Central Region had above normal precipitation. The average for the state was 2.42 inches, 0.80 inch below normal. Regional averages ranged from 3.56 inches, 0.33 inch below normal, for the Southwest Region to 1.13 inches, 1.48 inches below normal, for the Northwest Region. Miamisburg (Montgomery County) reported the greatest amount of precipitation for the month, 5.06 inches. Grand Rapids (Wood County) reported the least amount, 0.37 inches.

Precipitation during March fell as rain and snow. The greatest amounts of precipitation fell in southwestern and south-central Ohio, decreasing to the north and west. Several locations in northwestern Ohio reported less than 1 inch of precipitation for the month. Snowfall was above normal across much of the state, but below normal in northwestern Ohio. Chardon (Geauga County) reported 20 inches of snow for March, about 3 inches above normal. For the season, Chardon has reported 103 inches of snow, which is normal. The month started rather dry with just some light snow showers reported on the first three days. Precipitation during March 4-6 was greatest across the southwestern half of the state with 0.50-0.75 inch reported. Amounts decreased to the north and east to little or no precipitation in northeastern Ohio. Much of this precipitation fell as snow or a wintry mix with 2-8 inches of snow observed. Precipitation during March 11-13 was greatest from Cincinnati to Cleveland. Along this line areas generally received 0.50-1.50 inches of precipitation, while northwest and southeast of this line amounts were much less. Precipitation during March 17-18 was greatest in south-central Ohio, diminishing to the northwest. The southeastern two-thirds of the state received at least 0.50 inch during this period with as much as 2 inches falling at isolated locations, but less than 0.25 inch was reported in northwestern Ohio. Flash flooding was observed in areas of southern Ohio, but was generally confined to low-lying areas and areas with poor drainage. Precipitation during March 24-25 was again greatest in the southwestern half of the state, diminishing to the northeast. Much of this precipitation fell as snow with 3-10 inches falling across most of the state. The month ended with some light showers early on Easter Sunday.

Precipitation for the first half of the 2013 water year is above normal in the North Central, Northeast, West Central, Central, Central Hills and South Central regions, but below normal elsewhere. The state average is 16.80 inches, 0.20 inch above normal. Regional averages range from 19.43 inches, 2.11 inches above normal, for the Northeast Region to 13.49 inches, 0.84 inch below normal, for the Northwest Region (see Precipitation table, departure from normal, past six months column).

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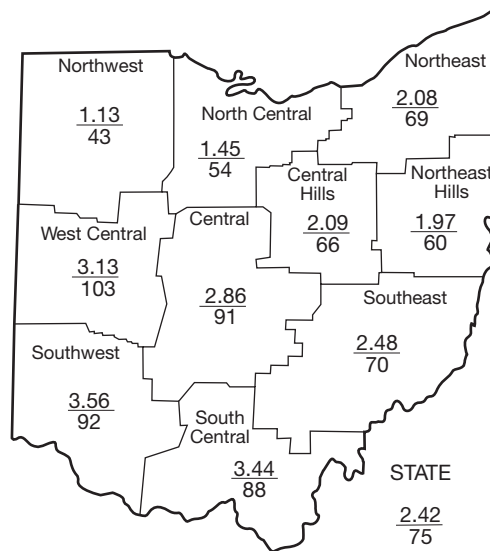
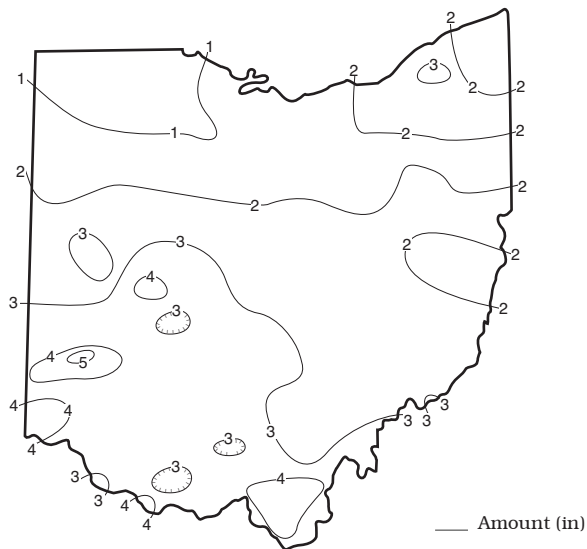
PRECIPITATION

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	-1.48	+0.25	-0.84	-5.16	+11.22	+0.2
North Central	-1.22	-0.87	+1.23	-0.68	+18.15	+2.9
Northeast	-0.92	-1.45	+2.11	-0.71	+17.79	+2.3
West Central	+0.10	+0.07	+0.37	-2.54	+11.33	+1.4
Central	-0.28	-0.92	+0.19	-3.72	+11.58	+1.0
Central Hills	-1.09	-1.56	+0.08	-3.40	+9.74	+1.4
Northeast Hills	-1.32	-2.09	-0.28	-4.82	+7.69	+0.3
Southwest	-0.33	-1.19	-1.63	-6.15	+10.77	+0.0
South Central	-0.45	-1.32	+0.86	-0.97	+13.60	+0.8
Southeast	-1.06	-1.73	-0.10	-2.79	+11.10	+0.8
State	-0.80	-1.08	+0.20	-3.10	+12.29	

*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 MARCH



Average (in)
Percent of normal

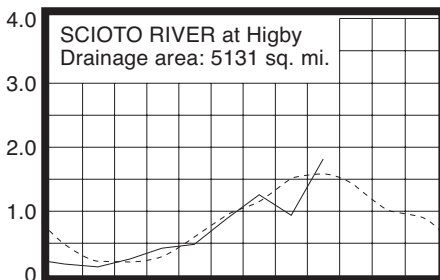
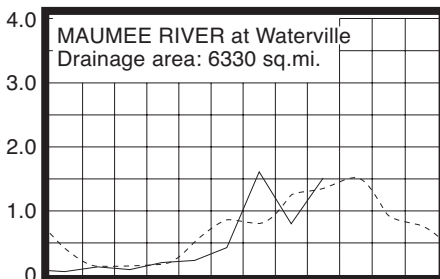
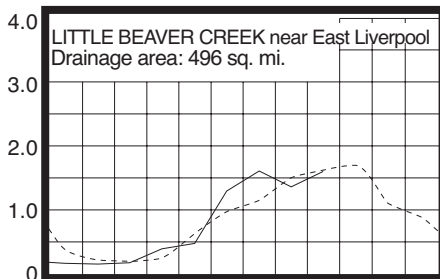
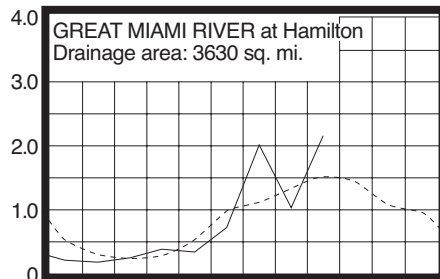
MEAN STREAM DISCHARGE

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	1,386	84	87	100	75
Great Miami River at Hamilton	3,630	7,845	142	112	95	77
Huron River at Milan	371	353	65	85	120	89
Killbuck Creek at Killbuck	464	728	107	87	94	68
Little Beaver Creek near East Liverpool	496	792	99	91	90	59
Maumee River at Waterville	6,330	9,557	112	92	75	53
Muskingum River at McConnellsville	7,422	11,950	98	83	87	61
Scioto River near Prospect	567	1,064	135	117	127	105
Scioto River at Higby	5,131	9,271	114	84	83	69
Stillwater River at Pleasant Hill	503	876	112	119	103	72

MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



Base period for all streams: 1981-2010

STREAMFLOW during March was above normal in western Ohio and below normal in eastern Ohio. Flows during March increased from the February flows throughout most of the state.

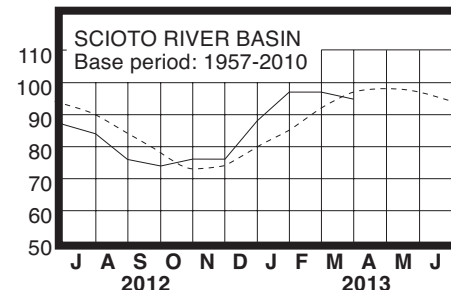
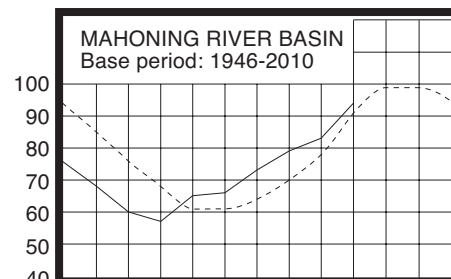
Streamflow at the beginning of the month was above normal statewide. Greatest flows for March occurred at the beginning of the month across northwestern and southeastern Ohio. Generally, flows declined during the first 10 days of March with drainage basins in southwestern and northeastern Ohio recording their lowest flows for the month during this period. Flows increased following melting snow and local precipitation during the next week of March. Drainage basins in central, north-central and southwestern Ohio had their greatest flows just before mid-month

and in east-central and south-central Ohio, during March 19-20. Flows declined during the next week, then increased again in response to the precipitation that fell during March 24-26. Lowest flows for the month occurred just prior to this precipitation in northwestern, central and south-central Ohio drainage basins. Some basins in southeastern Ohio had their lowest flow for March on the last day of the month. Flows at the end of March were above normal from southwestern to northeastern Ohio, but below normal northwest and southeast of this line.

RESERVOIR STORAGE for water supply during March increased in the Mahoning River basin and decreased slightly in the Scioto River basin. Storage remained above normal in the Mahoning River basin, but fell to slightly below normal in the Scioto River basin.

Reservoir storage at the end of March in the Mahoning basin index reservoirs was 94 percent of rated capacity for water supply compared with 83 percent for last month and 87 percent for March 2012. Month-end storage in the Scioto basin index reservoirs was 95 percent of rated capacity for water supply compared with 97 percent for last month and 94 percent for March 2012.

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 net improvement across Ohio. Net changes from February's levels were less than usually observed in most aquifers. Levels in most aquifers in the state rose steadily throughout the month.

Ground water storage continues to show improvement, but remains lower than the levels of a year ago throughout most of the state. Current levels range from slightly lower to more than 2 feet below the levels observed during March 2012. Ground water storage is adequate statewide even though it is below normal across most of the state; however, levels remain above normal in some consolidated aquifers in northwestern and southeastern Ohio. With near-normal precipitation and other climatic conditions during the next few months, ground water storage should remain adequate.

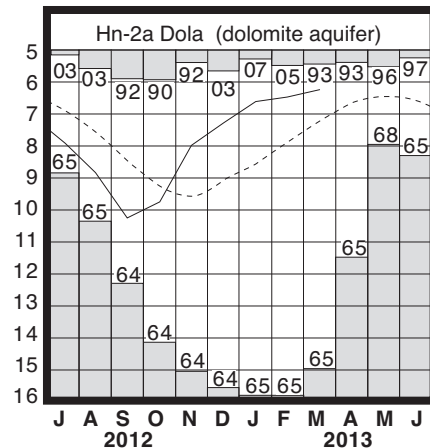
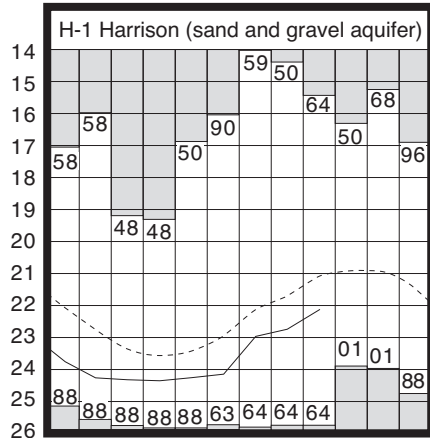
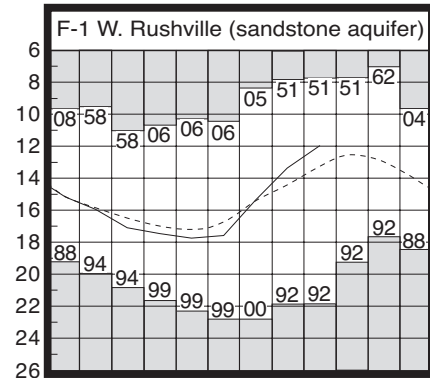
LAKE ERIE level rose during March. The mean level was 570.60 feet (IGLD-1985), 0.19 foot higher than last month's mean level and 0.50 foot below normal. This month's mean level is 1.45 feet below the March 2012 level and 1.40 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during March averaged 1.18 inches, 1.57 inches below normal. For the entire Great Lakes basin, March precipitation averaged 1.29 inches, 0.88 inch below normal. For calendar year 2013 through March, the Lake Erie basin has averaged 6.35 inches, 0.99 inch below normal, while the entire Great Lakes basin has averaged 5.84 inches, 0.32 inch 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 2 inches to as much as 19 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	12.01	+1.22	+1.35	-1.09
Fa-1	Jasper Mill, Fayette Co.	Limestone	9.32	-2.12	+1.49	-1.33
Fr-10	Columbus, Franklin Co.	Gravel	43.33	-0.29	+0.38	-1.67
H-1	Harrison, Hamilton Co.	Gravel	22.11	-1.03	+0.64	-0.07
Hn-2a	Dola, Hardin Co.	Dolomite	6.24	+0.98	+0.25	-0.04
Po-124	Freedom, Portage Co.	Sandstone	76.99	-0.40	+0.22	-2.03
Tu-1	Strasburg, Tuscarawas Co.	Gravel	13.48	-1.58	+0.43	-1.46

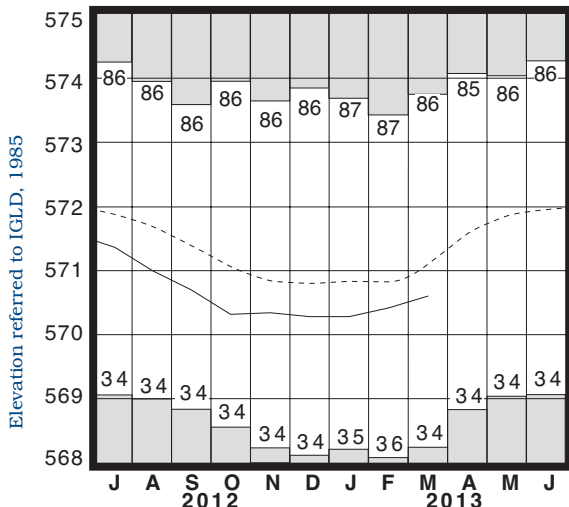
GROUND-WATER LEVELS



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

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

LAKE ERIE LEVELS



Base period: 1918-2010

Record high and low, year of occurrence

Normal - - - - Current - - - -

(Precipitation continued from front)

Precipitation for the 2013 calendar year is below normal throughout most of the state with only the Northwest and West Central regions having above normal precipitation. The state average is 6.90 inches, 1.08 inches below normal. Regional averages range from 8.17 inches, 1.32 inches below normal, for the South Central Region to 5.86 inches, 0.87 inch below normal, for the North Central Region.

SUMMARY

Precipitation during March was below normal throughout most of the state. Streamflow was above normal in western Ohio and below normal in eastern Ohio. Reservoir storage in the Mahoning River basin increased and remained above normal while in the Scioto River basin storage decreased slightly and fell to slightly below normal. Ground water levels rose statewide, but remain below normal across most of the state. Lake Erie level rose 0.19 foot and was 0.50 foot below the long-term March average.

NOTES AND COMMENTS

Reminder: Severe Weather Awareness Week

Governor John Kasich has designated the week of March 3-9, 2013 as Ohio's Spring Severe Weather Awareness Week. The goal is to better educate people about the hazards of severe weather and to encourage people to have a plan in the event severe weather should occur. If you have not done so already, it is not too late for communities and individuals to plan a course of action they would take in the event severe weather was to affect them and their property.

Reminder: National Ground Water Awareness Week

The week of March 10-16, 2013 is National Ground Water Awareness Week. During this week, Ohioans are urged to learn more about the state's ground water resources, from wise use to protection. Approximately 42 percent of Ohioans rely on ground water sources for their domestic water needs. The ODNR, Division of Soil and Water Resources, Water Resources Section collects, researches, interprets and disseminates information on 140 ground water observation wells located across the state; produces several types of ground water maps, addressing various aspects of ground water resources in the state including availability, pollution potential and horizontal direction of ground water flow; and collects water use data on all facilities that have the capacity to withdraw over 100,000 gallons of water per day. To learn more about these and other programs at the Division of Soil and Water, please visit their website at: <http://www.ohiodnr.gov/soilandwater>.

National Flood Awareness Week

The week of March 18-22, 2013 is National Flood Safety Awareness Week. The Federal Emergency Management Agency (FEMA) and National Oceanic and Atmospheric Administration (NOAA) host this safety campaign each March in an attempt to increase the focus on flood prevention and awareness. This year marks the 100 year anniversary of the Great Flood of 1913. This catastrophe, which occurred during March 23-27, 1913, remains the greatest natural disaster in Ohio's history. Not only is this event the deadliest in the state's history, but it is also the largest in extent of destruction across the state. Every river in Ohio flooded as a result of the precipitation that fell during this period. Rainfall amounts of 4 to more than 11 inches fell throughout the entire state. These rains fell on soils already saturated from earlier rains and most streams across the state were running at or near bank full. The resulting floods set record streamflow on numerous streams in the state, record peaks that for many of these streams still stand 100 years later. More than 400 people died and more than 40,000 homes were flooded in Ohio alone. Many of the flood prevention systems and educational efforts that are in place today were created soon after the Great Flood of 1913. From flood control dams built in the state to the knowledge of the hazards of building in a floodplain, much has been done since the flood of 1913 in an effort to reduce or prevent the detrimental impacts of flooding in Ohio and throughout the nation. Yet in spite of all these measures, flooding is an unavoidable occurrence along rivers and streams. That is why it is important to continue to educate and increase awareness about the dangers of flooding.

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:

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Lake Erie level data:

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Palmer Drought Severity Index:

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MONTHLY WATER INVENTORY REPORT FOR OHIO

April 2013

Compiled By Scott C. Kirk

Hydrologist

Water Inventory Unit

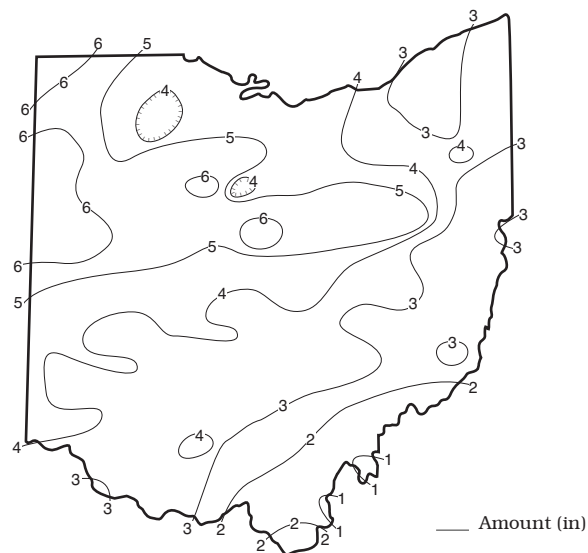
PRECIPITATION during April was above normal in the northern two-thirds of Ohio and below normal in the southern one-third. The average for the state was 3.98 inches, 0.43 inch above normal. Regional averages ranged from 5.11 inches, 1.48 inches above normal, for the West Central Region to 2.13 inches, 1.51 inches below normal, for the South Central Region. Mt. Gilead (Morrow County) reported the greatest amount of April precipitation, 6.98 inches. Racine Locks and Dam (Meigs County) reported the least amount, 0.80 inch.

Most of the precipitation during April fell as rain with only small amounts of snow reported. Little or no precipitation fell throughout the state during the first nine days. The most significant storm for the month occurred during April 10-12. Precipitation was widespread with the greatest amounts of rain falling in the northern half of the state; more than 3 inches were reported at some locations. Flooding was reported in many areas in northern Ohio with areas in northwestern Ohio the hardest hit. Much of southern Ohio reported around 1 inch of rain during this period, but some locations in southeastern Ohio reported only about 0.25 inch. There were several days with precipitation during the next week. Most of the state received between 1 and 2 inches of rain, but lesser amounts fell in northeastern Ohio. Showers crossed the state during April 23-24 with 0.50 to 1.0 inch of rain reported across most of the state, but tapering to around 0.25 inch in parts of southeastern Ohio. Scattered showers and a few thunderstorms during April 28-29 brought 0.25 to 0.50 inch across much of the state, with nearly 1 inch reported in areas of southwestern, central and east-central Ohio.

Precipitation for the 2013 water year is above normal in the northern two-thirds of the state and below normal in the southern one-third. The state average is 20.79 inches, 0.63 inch above normal. Regional averages range from 22.88 inches, 2.14 inches above normal, for the Northeast Region to 18.43 inches, 0.76 inch above normal, for the Northwest Region.

Precipitation for the 2013 calendar year is below normal across most of the state, but is above normal in the northwestern and west-central areas. The average for the state is 10.88 inches, 0.65 inch below normal. Regional averages range from 12.65 inches, 1.55 inches above normal, for the West Central Region to 9.70 inches, 1.42 inches below normal, for the Northeast Region.

PRECIPITATION APRIL

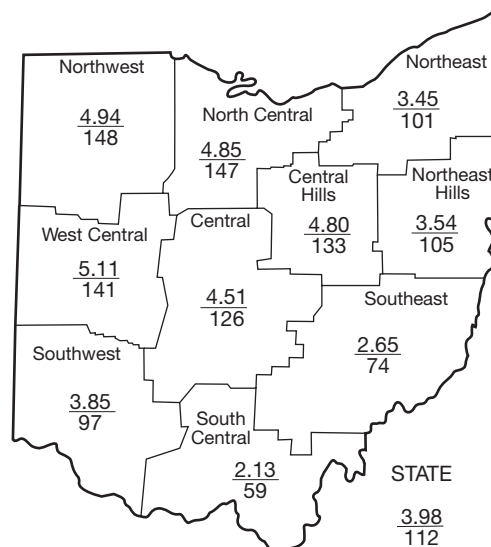


PRECIPITATION

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	+1.60	+0.55	-0.11	-1.63	+9.60	+1.3
North Central	+1.54	+0.51	-1.27	+2.63	+16.62	+3.3
Northeast	+0.03	-0.89	-2.13	+1.53	+14.88	+1.1
West Central	+1.48	+1.07	+0.41	+1.10	+8.80	+1.6
Central	+0.92	+0.43	-0.35	-1.66	+8.66	+0.6
Central Hills	+1.19	+0.15	-1.15	-0.20	+8.61	+0.7
Northeast Hills	+0.17	-1.32	-2.47	-2.84	+5.07	-0.7
Southwest	-0.13	-1.42	-2.41	-4.94	+3.34	-0.5
South Central	-1.51	-3.04	-1.81	-1.40	+5.16	-0.8
Southeast	-0.91	-2.35	-2.11	-1.90	+5.38	-1.0
State	+0.43	-0.64	-1.35	-0.94	+8.60	

*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
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-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	1,025	70	72	86	82
Great Miami River at Hamilton	3,630	8,341	160	114	105	91
Huron River at Milan	371	959	164	96	104	112
Killbuck Creek at Killbuck	464	1,031	145	99	102	80
Little Beaver Creek near East Liverpool	496	887	105	89	92	68
Maumee River at Waterville	6,330	17,640	183	110	98	76
Muskingum River at McConnellsville	7,422	11,400	92	81	87	67
Scioto River near Prospect	567	1,644	194	125	131	129
Scioto River at Higby	5,131	7,673	107	87	85	77
Stillwater River at Pleasant Hill	503	1,221	182	106	112	90

STREAMFLOW during April was above normal across much of the state, but below normal in some eastern Ohio basins. Flows in basins in the western half of the state were high enough to be considered excessive. Flows during April were greater than the March flows throughout most of Ohio, but less in northeastern and southeastern areas of the state.

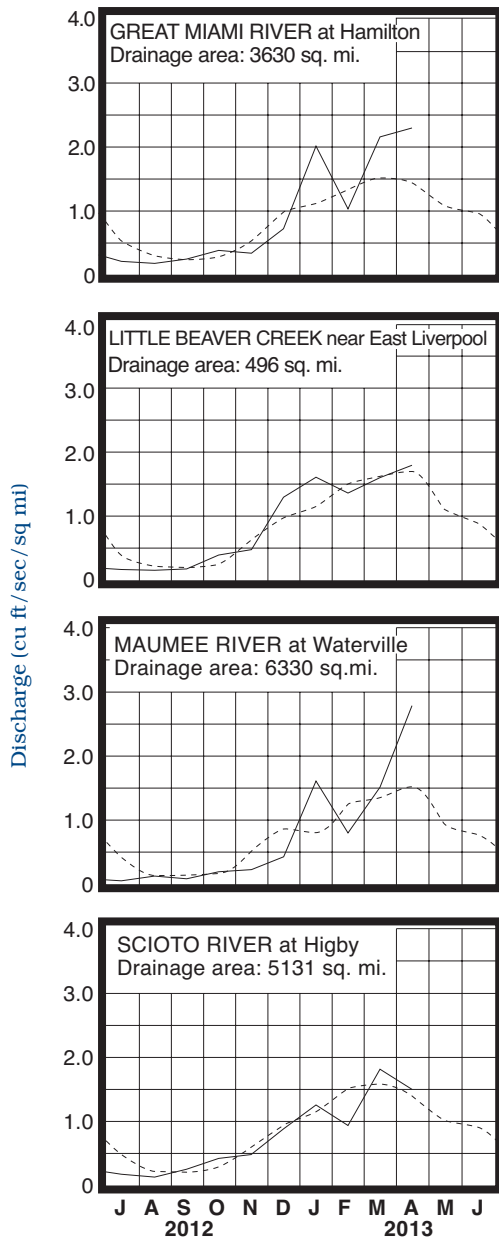
Flows at the beginning of the month were below normal statewide. Flows declined during the first several days of the month as little or no precipitation fell throughout Ohio. Most drainage basins in the state had their lowest flows for the month during the April 8-10 period. Flows increased noticeably after April 10 following widespread precipitation. Greatest flows for April occurred sometime during the April 12-14 period for most areas of the state.

Flooding was common in many areas of northern Ohio during this period. Most of the flooding was minor, but some areas in northwestern Ohio experienced moderate to major flooding. Flows generally declined from these peaks during much of the remainder of the month, except for some temporary increases noted following local precipitation. Flows at the end of April were above normal in western Ohio and below normal in eastern areas of the state.

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

Reservoir storage at the end of April in the Mahoning basin index reservoirs was 100 percent of rated capacity for water supply compared with 94 percent for last month and 84 percent for April 2012. Month-end storage in the Scioto basin index reservoirs was 102 percent of rated capacity for water supply compared with 95 percent for last month and 93 percent for April 2012. Surface water supplies are in good condition throughout the state.

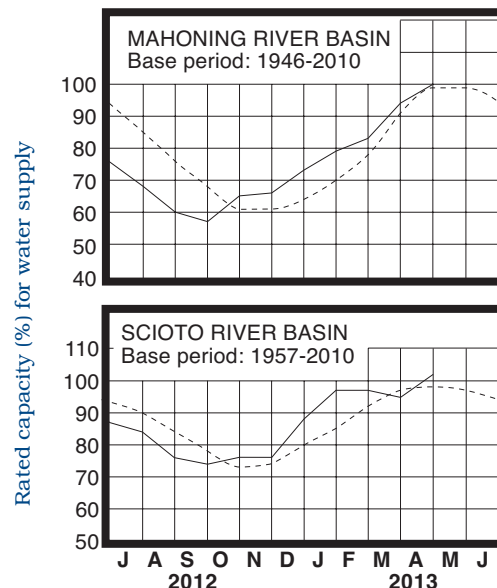
MEAN STREAM DISCHARGE



Base period for all streams: 1981-2010

Normal - - - - Current ———

RESERVOIR STORAGE FOR WATER SUPPLY



GROUND-WATER LEVELS

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

GROUND WATER levels during April showed mixed responses across the state, rising in most aquifers, but declining in some areas where precipitation was near or below normal. April is normally a time when ground water levels rise throughout the state. Net positive changes from last month's levels were less than usually observed in most aquifers. Generally, ground water levels were stable or declined during the first 10 days of the month and then began to rise following widespread precipitation.

Current ground water levels continue to remain lower than they were a year ago in most aquifers, but are higher in a few aquifers, especially in western Ohio. Ground water storage also remains below normal across most of the state with the exception of some consolidated aquifers in northwestern and southeastern Ohio. The greatest departures from normal are found in the southwestern quarter of the state. Even with these below normal levels, ground water supplies are adequate throughout Ohio. Current soil moisture conditions favor continued recharge to ground water supplies across most of the state. The Ohio Agricultural Statistics Service reports that soil moisture near the end of April was rated as being short in 2 percent of the state, adequate in 48 percent of the state and surplus in 50 percent of the state.

LAKE ERIE level rose during April. The mean level was 570.93 feet (IGLD-1985), 0.33 foot higher than last month's mean level and 0.66 foot below normal. This month's mean level is 0.95 foot below the April 2012 level and 1.73 feet above Low Water Datum.

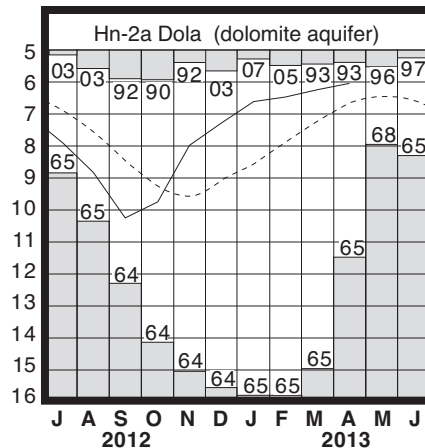
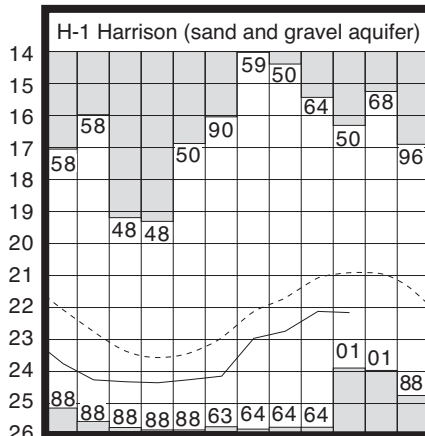
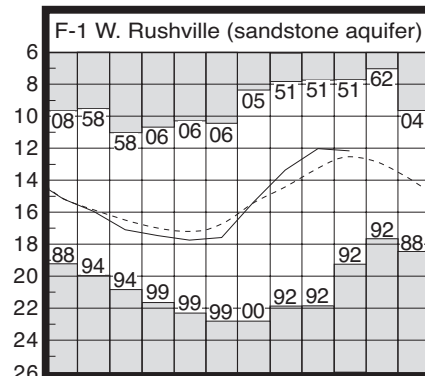
The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during April averaged 4.71 inches, 1.55 inches above normal. For the entire Great Lakes basin, April precipitation averaged 4.02 inches, 1.47 inches above normal. For calendar year 2013 through April, the Lake Erie basin has averaged 11.06 inches, 0.56 inch above normal, while the entire Great Lakes basin has averaged 9.86 inches, 1.15 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 near-normal to as much as 16 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	12.18	+0.33	-0.17	-0.55
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.64	-1.63	+0.68	-0.43
Fr-10	Columbus, Franklin Co.	Gravel	43.10	-0.56	+0.23	-1.60
H-1	Harrison, Hamilton Co.	Gravel	22.17	-1.26	-0.06	+0.45
Hn-2a	Dola, Hardin Co.	Dolomite	6.05	+0.55	+0.19	+0.47
Po-124	Freedom, Portage Co.	Sandstone	76.82	-0.57	+0.17	-2.04
Tu-1	Strasburg, Tuscarawas Co.	Gravel	12.59	-1.08	+0.89	+0.37

GROUND-WATER LEVELS

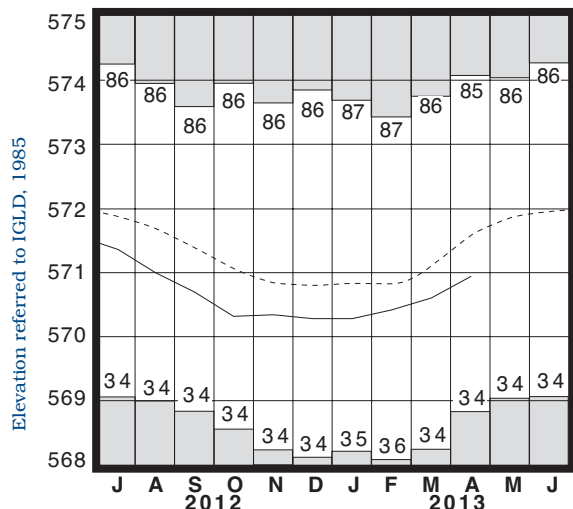
Water level (ft below land surface)



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

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

LAKE ERIE LEVELS



Base period: 1918-2010

Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation during April was above normal in the northern two-thirds and below normal in the southern one-third of Ohio. Streamflow was above normal across much of the state. Reservoir storage improved and was above normal in both the Mahoning and Scioto river basins. Ground water levels rose in most aquifers, but remained below normal throughout much of Ohio. Lake Erie level rose 0.33 foot and was 0.66 foot below the long-term April average.

NOTES AND COMMENTS

2013 Ohio Statewide Floodplain Management Conference Call for Abstracts

You are invited to submit your abstract for the 2013 Ohio Statewide Floodplain Conference to be held August 28-29, 2013 at The Doubletree, Columbus/Worthington, 175 Hutchinson Avenue, Columbus, Ohio 43235. The Ohio Statewide Floodplain Management Conference is an annual training event that focuses on various elements of floodplain management, such as regulations, insurance, mapping, engineering, and natural benefits. The conference is intended to develop and expand the capabilities of floodplain management professionals throughout Ohio. Conference sessions are designed to provide local floodplain managers with information and skills necessary to implement effective floodplain management programs within their respective communities.

The theme of this year's conference "Remembering the Great Flood of 1913 and Planning for the Future-100 Years of Managing Ohio's Floodplains" will commemorate the 100 year anniversary of the Great Flood of 1913. The agenda will include discussions on the historical significance of the Great Flood of 1913 as well as the various aspects of floodplain management that are relevant and innovative today.

The Call for Abstracts is open to anyone interested in making a presentation to this year's conference. Abstracts will be reviewed by the Conference Planning Committee and selected based on content and relevance to floodplain management and associated issues. Abstracts of papers to be presented at the conference must be received by May 31, 2013. The Ohio Floodplain Management Association (OFMA) is seeking presentations that focus on the Great Flood of 1913 and subsequent flood events; National Flood Insurance Program (NFIP); Flood Hazard Mapping; Flood Mitigation; Structural Flood Control (dam, levees, etc.); Data, Engineering and Modeling; Geographic Information Systems (GIS); Water Resources Management; and Education and Outreach. The Call for Abstracts document is available for download at: <http://www.dnr.state.oh.us/Water/tabid/17934/Default.aspx> or <http://www.ofma.org/training-education/call-for-abstracts>. If you have questions or need more information, contact Alicia Silverio at (614) 265-1006 or alicia.silverio@dnr.state.oh.us.

Correction: The percent of normal and percent of normal past 3 months for the Killbuck Creek at Killbuck as shown in the Mean Stream Discharge table in the March 2013 issue of this report were incorrect. The correct percentages are 107 percent for the percent of normal and 87 percent for the percent of normal past 3 months. Please correct your copy or download an updated copy from the Division of Soil and Water Resources web page at: <http://www.dnr.state.oh.us/tabid/4191/Default.aspx>.

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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Ohio Department of Natural Resources

Division of Soil and Water Resources

2045 Morse Road

Columbus, Ohio 43229-6693

John Kasich
Governor

James Zehninger
Director

Karl Gebhardt
Chief





MONTHLY WATER INVENTORY REPORT FOR OHIO

May 2013

Compiled By Scott C. Kirk

Hydrologist

Water Inventory Unit

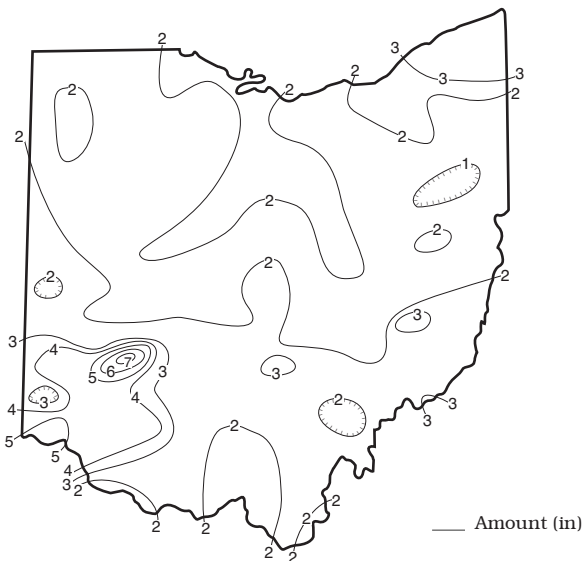
PRECIPITATION during May was below normal across the state with only a few locations in southwestern Ohio having above normal precipitation. The average for the state was 2.14 inches, 1.95 inches below normal. Regional averages ranged from 3.65 inches, 1.00 inch below normal, for the Southwest Region to 1.65 inches, 2.32 inches below normal, for the Northeast Hills Region. This was the sixth driest May on record for the Central Hills Region and the seventh driest for the Northeast Hills Region. Xenia (Greene County) reported the greatest amount of May precipitation, 7.24 inches. North Georgetown (Columbiana County) reported the least amount, 0.97 inch.

Precipitation fell on several days during the month, but rainfall was light on most of these days. Conditions during the first week of May were rather dry in the northern two-thirds of the state. During this same period, showers and thunderstorms brought approximately 0.50-1.0 inch of rain to the southern one-third with areas along the Ohio River in southwestern Ohio receiving 1-2 inches of rain. Precipitation was widespread during May 10-11 with generally 0.50-1.0 inch of rain reported, but less than 0.25 inch fell across much of northwestern Ohio. Scattered showers and storms were common throughout May 15-18 across the southern two-thirds of the state with many areas reporting around 0.50 inch; little or no rain fell in the northern third. Rain fell across most of the state during May 22-24 with 0.25-0.50 inch reported. Scattered showers and thunderstorms during May 27-28 and again on May 31 brought 1-2 inches of rain to much of northern and western Ohio, tapering to less than 0.25 inch across central and southeastern Ohio.

Precipitation for the 2013 water year is below normal throughout most of the state but above normal in the North Central and Northeast regions. The state average is 22.93 inches, 1.32 inches below normal. Regional averages range from 25.02 inches, 0.60 inch above normal, for the Northeast Region to 20.28 inches, 1.10 inches below normal, for the Northwest Region.

Precipitation for the 2013 calendar year is below normal throughout nearly all of Ohio. The state average is 13.02 inches, 2.60 inches below normal. Regional averages range from 15.56 inches, 2.32 inches below normal, for the Southwest Region to 11.39 inches, 4.24 inches below normal, for the Northeast Hills Region.

PRECIPITATION MAY

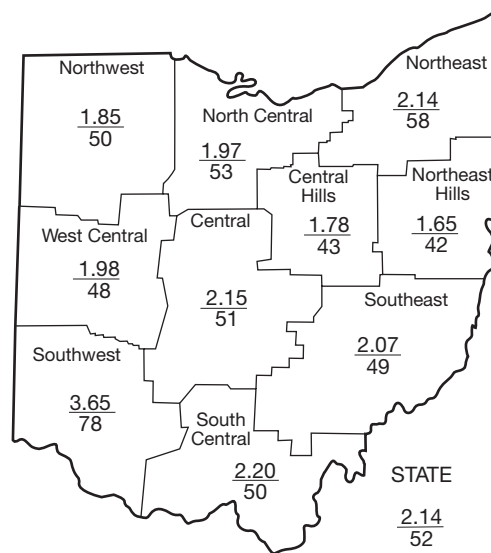


PRECIPITATION

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	-1.86	-1.74	-0.13	-1.96	+3.37	-0.8
North Central	-1.75	-1.43	-0.95	+1.28	+11.29	+0.1
Northeast	-1.54	-2.43	-1.45	+0.88	+9.37	-1.3
West Central	-2.13	-0.55	+0.54	-0.37	+3.87	-1.0
Central	-2.04	-1.40	-0.24	-2.76	+4.29	-1.8
Central Hills	-2.37	-2.27	-1.33	-2.42	+4.35	-1.4
Northeast Hills	-2.32	-3.47	-2.46	-3.73	+1.04	-2.8
Southwest	-1.00	-1.46	-1.09	-5.68	+0.42	-1.8
South Central	-2.24	-4.20	-1.63	-4.52	+0.52	-1.5
Southeast	-2.16	-4.13	-1.66	-4.08	+2.68	-2.0
State	-1.95	-2.32	-1.06	-2.35	+4.10	

*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

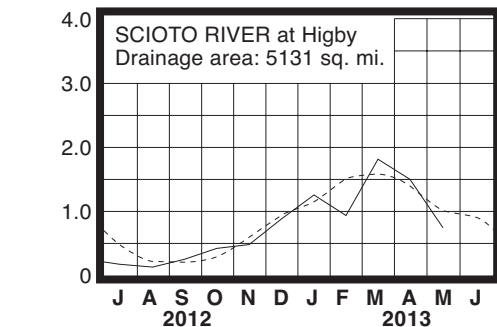
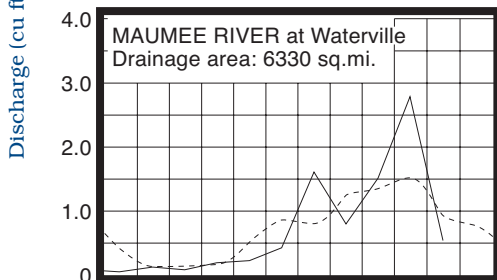
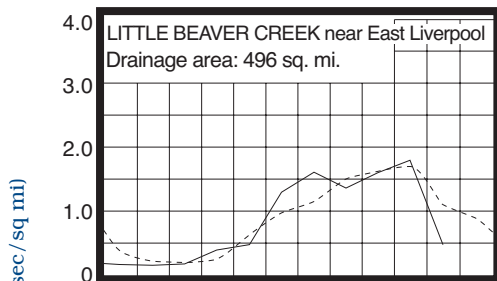
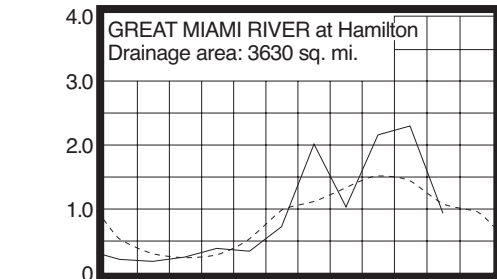
River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	319	52	63	78	81
Great Miami River at Hamilton	3,630	3,375	80	109	102	89
Huron River at Milan	371	116	31	86	91	112
Killbuck Creek at Killbuck	464	327	70	96	94	81
Little Beaver Creek near East Liverpool	496	237	43	77	87	69
Maumee River at Waterville	6,330	3,390	58	110	95	78
Muskingum River at McConnellsville	7,422	5,555	66	76	81	66
Scioto River near Prospect	567	268	59	120	118	118
Scioto River at Higby	5,131	3,852	74	85	81	72
Stillwater River at Pleasant Hill	503	269	53	101	108	89

STREAMFLOW during May was below normal statewide. Flows were low enough to be considered deficient in some basins in west-central and east-central Ohio. May flows were less than the April flows throughout the state.

Flows at the beginning of May were above normal across most of the state and were at their greatest for the month in northwestern, central and southeastern Ohio basins. Flows declined during the first week of the month across most of the state. Flows increased statewide after May 9 following widespread precipitation. Greatest flows occurred as a result of this precipitation on May 11 in basins in southwestern and northeastern Ohio. Flows declined during the next two weeks and were at their lowest around May 26-27 in the northern

one-third and west central areas of the state. Lowest flows across the remainder of Ohio occurred at the end of the month. Flows at the end of May were below normal throughout the state.

MEAN STREAM DISCHARGE

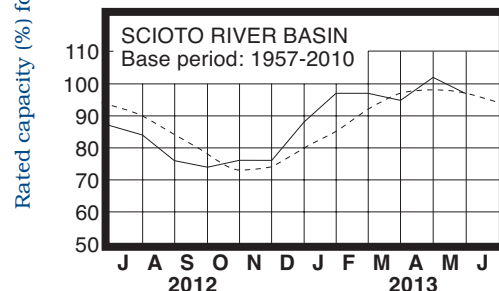
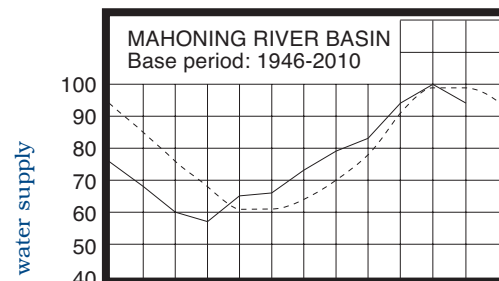


Base period for all streams: 1981-2010

RESERVOIR STORAGE for water supply during May decreased in both the Mahoning and Scioto river basins. Storage fell to below normal in the Mahoning River basin and was at normal in the Scioto river basin.

Reservoir storage at the end of May in the Mahoning basin index reservoirs was 94 percent of rated capacity for water supply compared with 100 percent for last month and 83 percent for May 2012. 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 97 percent for May 2012. Surface water supplies remain at favorable levels throughout Ohio in spite of the below normal precipitation received during May across most of the state.

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 May showed mixed responses throughout Ohio. Generally, levels in deeper aquifers rose slightly for the month while levels in most other aquifers declined.

Ground water levels remain below normal in most aquifers across the state with the exception of a few consolidated aquifers in northwestern Ohio where they are above normal. Most aquifers range from just under 0.25 foot to about 1.25 feet below normal. Water levels are also lower than they were a year ago across much of the state, but are higher in some aquifers, especially in the western half of Ohio.

The 2013 recharge season appears to have ended for most of Ohio. It was not a particularly good recharge season for the state's ground water supplies. After a promising start in October when precipitation was much above normal, cumulative precipitation has been below normal across most of the state the past seven months. In spite of this, ground water supplies are currently adequate throughout the state as we enter the summer high demand period. The Ohio Agricultural Statistics Service reports that soil moisture near the end of May was rated as being short or very short in 22 percent of the state, adequate in 71 percent of the state and surplus in 7 percent of the state. A return to a more normal weather pattern during the summer months would help reduce overall demand on Ohio's ground water supplies.

LAKE ERIE level rose during May. The mean level was 571.19 feet (IGLD-1985), 0.26 foot higher than last month's mean level and 0.66 foot below normal. This month's mean level is 0.56 foot below the May 2012 level and 1.99 feet above Low Water Datum.

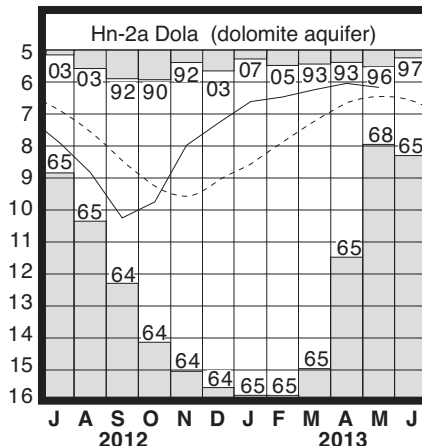
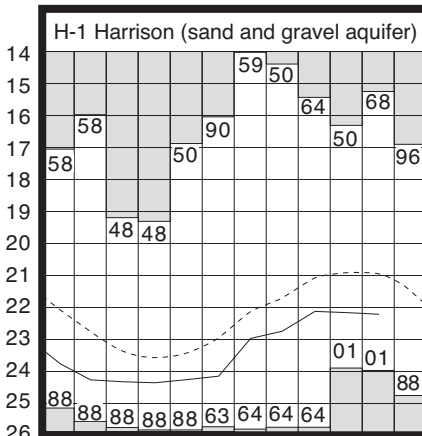
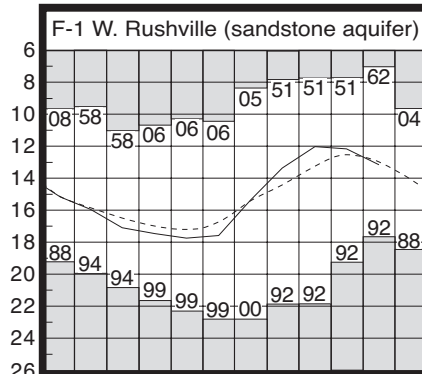
The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during May averaged 2.57 inches, 0.79 inch below normal. For the entire Great Lakes basin, May precipitation averaged 3.47 inches, 0.46 inch above normal. For calendar year 2013 through May, the Lake Erie basin has averaged 13.63 inches, 0.23 inch below normal, while the entire Great Lakes basin has averaged 13.33 inches, 1.61 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 one inch above to as much as 15 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	13.14	-0.20	-0.96	-0.06
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.25	-1.05	+0.39	+0.18
Fr-10	Columbus, Franklin Co.	Gravel	43.03	-0.47	+0.07	-1.09
H-1	Harrison, Hamilton Co.	Gravel	22.21	-1.26	-0.04	-0.28
Hn-2a	Dola, Hardin Co.	Dolomite	6.19	+0.28	-0.14	+0.53
Po-124	Freedom, Portage Co.	Sandstone	76.60	-0.43	+0.22	-1.48
Tu-1	Strasburg, Tuscarawas Co.	Gravel	12.79	-0.94	-0.20	+0.79

GROUND-WATER LEVELS

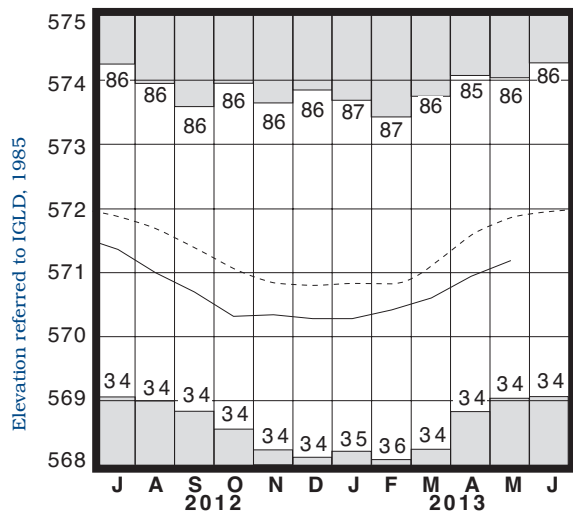
Water level (ft below land surface)



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

Hn-2a, 1955-2010

LAKE ERIE LEVELS



Base period: 1918-2010

Record high and low, year of occurrence

Normal - - - - Current ———

SUMMARY

Precipitation during May was below normal throughout most of the state; only a few locations in southwestern Ohio had above normal precipitation. Streamflow was below normal statewide. Reservoir storage decreased and was below normal in the Mahoning River basin and at normal in the Scioto River basin. Ground water levels showed mixed responses and remained below normal across most of Ohio. Lake Erie level rose 0.26 foot and was 0.66 foot below the long-term May average.

NOTES AND COMMENTS

New Employee Joins WIPP Staff

Mitch Valerio has joined the staff of the Water Inventory and Planning Program (WIPP) this month as an environmental specialist. Mitch previously worked with the Division as a soil scientist. At the WIPP, he will be managing the water withdrawal registration database, as well as mapping and tracking water usage. Mitch has a bachelor's degree in environmental science from The Ohio State University and a master's degree in environmental science from the University of Idaho. Outside of work, Mitch can usually be found outdoors, and keeps busy with his beehives and garden.

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:

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Lake Erie level data:

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Palmer Drought Severity Index:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



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Division of Soil and Water Resources

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Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

June 2013

Compiled By Scott C. Kirk

Hydrologist
Water Inventory Unit

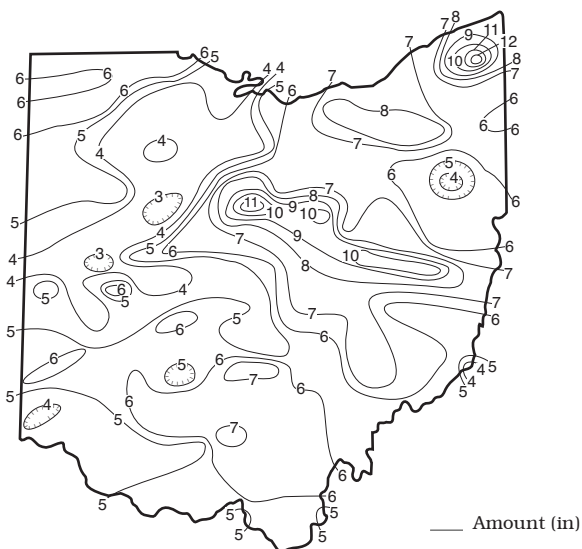
PRECIPITATION during June was above normal across much of Ohio, but below normal in some northwestern and west-central areas of the state. The average for the state was 6.13 inches, 2.22 inches above normal. This was the eleventh wettest June during the past 131 years for the state as a whole. Regional averages ranged from 8.03 inches, 3.99 inches above normal, for the Central Hills Region to 4.15 inches, 0.19 inch above normal, for the West Central Region. This was the wettest June on record for the Northeast Region, the fourth wettest for the Northeast Hills Region, fifth wettest for the Central Hills Region and the eighth wettest for the South Central Region. Dorset (Ashtabula County) reported the greatest amount of June precipitation, 12.41 inches. Kenton (Hardin County) reported the least amount, 2.75 inches.

Precipitation during June fell as showers and thunderstorms with locally severe storms often containing heavy rain. Most of Ohio received rain during June 1-2 with total amounts ranging from 1 to 1.5 inches in the northern half of the state and 0.25 inch or less across the southern half. Storms during June 5-6 produced 0.5 to 1.5 inches of rain in southern and eastern Ohio, but little rain fell in the northwestern quarter of the state during this period. Severe storms impacted Ohio during June 9-13 with most of the state receiving between 1 and 2.5 inches of rain. The strongest storms occurred during June 12-13 with at least four tornadoes confirmed across Ohio. The next nine days of June were drier across most of the state, but widely scattered storms occurred on June 16 and 18. Storms on June 18 brought heavy downpours to areas in southeastern Ohio, resulting in flash flooding in some southeastern counties. The last week of June was wet statewide with showers and thunderstorms occurring daily during June 23-30. Most of the state received at least 1 inch of rain during this period with as much as 4 inches reported at some locations in east central Ohio. Many areas, especially in the eastern half of the state, experienced minor flooding from the excessive rainfall.

Precipitation for the 2013 water year is above normal in the northern half of the state and below normal in the southern half. The state average is 29.06 inches, 0.90 inch above normal. Regional averages range from 32.38 inches, 4.13 inches above normal, for the Northeast Region to 25.49 inches, 0.44 inch above normal, for the Northwest Region.

Precipitation for the 2013 calendar year is above normal in the northern one-third of Ohio and below normal in the southern two-thirds. The state average is 19.16 inches, 0.37 inch below normal. Regional averages range from 20.84 inches, 1.25 inches above normal, for the Central Hills Region to 18.26 inches, 2.39 inches below normal, for the Southeast Region.

PRECIPITATION JUNE

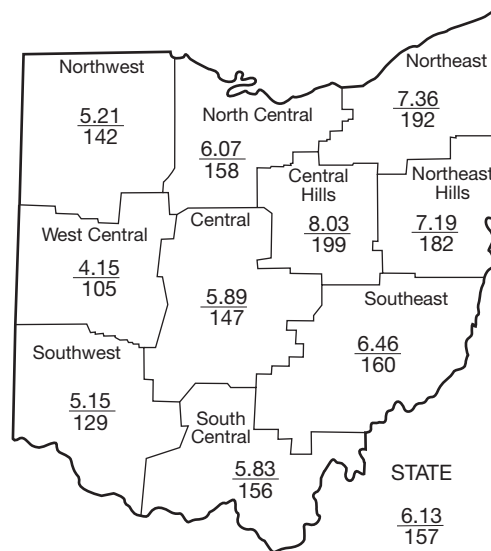


PRECIPITATION

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	+1.54	+1.28	+1.53	+1.68	+6.81	-1.2
North Central	+2.23	+2.02	+1.15	+4.88	+14.55	+0.3
Northeast	+3.53	+2.02	+0.57	+6.28	+13.05	+0.8
West Central	+0.19	-0.46	-0.39	+1.65	+4.85	-1.5
Central	+1.87	+0.75	-0.17	+0.48	+6.39	-1.0
Central Hills	+3.99	+2.81	+1.25	+3.06	+8.43	-0.1
Northeast Hills	+3.23	+1.08	-1.01	+0.94	+3.20	-1.6
Southwest	+1.17	+0.04	-1.15	-2.98	+1.52	-1.9
South Central	+2.10	-1.65	-2.97	-0.94	+2.28	-1.1
Southeast	+2.41	-0.66	-2.39	+0.16	+4.14	-1.4
State	+2.22	+0.70	-0.38	+1.50	+6.50	

*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	1,316	439	85	86	91
Great Miami River at Hamilton	3,630	2,793	80	93	103	92
Huron River at Milan	371	226	74	97	90	115
Killbuck Creek at Killbuck	464	388	114	97	91	85
Little Beaver Creek near East Liverpool	496	240	55	68	81	71
Maumee River at Waterville	6,330	5,814	121	117	103	86
Muskingum River at McConnellsville	7,422	6,813	112	73	78	70
Scioto River near Prospect	567	456	114	117	117	124
Scioto River at Higby	5,131	4,418	94	75	80	77
Stillwater River at Pleasant Hill	503	439	107	97	109	95

STREAMFLOW during June was above normal in the northwestern, northeastern, central and southeastern Ohio drainage basins and below normal in most north-central, southwestern and east-central Ohio drainage basins. A few flows in the northeastern areas of the state were high enough to be considered excessive. June flows were greater than the May flows throughout most of the state.

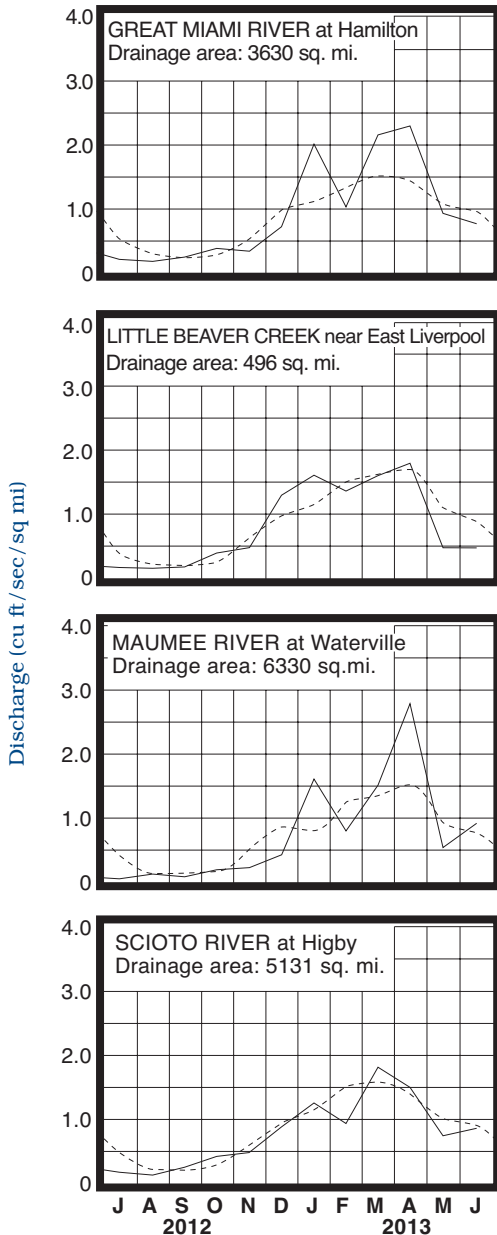
Flows at the beginning of the month were below normal in the southern two-thirds of Ohio and above normal in the northern third. Drainage basins in southeastern Ohio had their lowest flows for the month at the beginning of June. Basins across most of the remainder of the state had their lowest flows for the month during June 24-26. Greatest flows for the month occurred on June 2 in northwestern

Ohio, June 14 in southwestern Ohio and during the last week of June in the central, northeastern and southeastern areas of the state. Minor small stream and urban flooding was reported following some of the local storms, especially during the last week of June. Flows at the end of the month were above normal across most of the state, but below normal in some southwestern Ohio basins.

RESERVOIR STORAGE for water supply during June increased in both the Mahoning and Scioto river basins. Month-end storage was above normal in both basins.

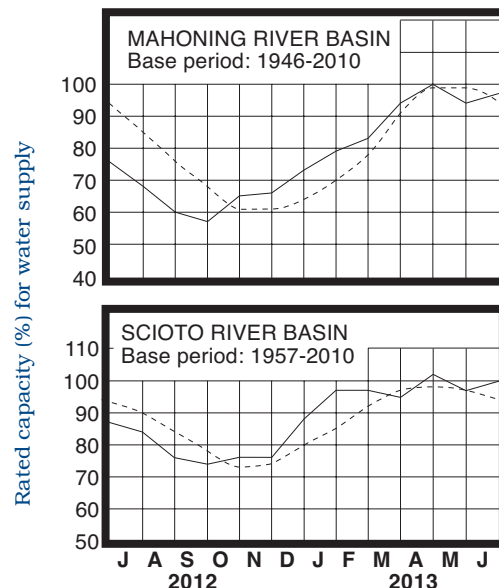
Reservoir storage at the end of June in the Mahoning basin index reservoirs was 97 percent of rated capacity for water supply compared with 94 percent for last month and 76 percent for June 2012. Month-end storage in the Scioto basin index reservoirs was 100 percent of rated capacity for water supply compared with 97 percent for last month and 87 percent for June 2012. Surface water supplies continue to remain in excellent condition throughout Ohio.

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 June declined in most aquifers. Net declines from last month's levels were about equal to the declines usually observed during June. For the most part, ground water levels were rather stable or declined through much of the month; some shallower wells experienced temporary rises following local precipitation. Many aquifers in the state were rising at the end of the month in response to the widespread precipitation that fell during the last week of June.

Ground water storage continues to remain below normal across most of the state with the exception of a few consolidated aquifers in northwestern Ohio where they are slightly above normal. Levels generally range from between 0.5 and 1.5 feet below normal. Current ground water levels are higher than they were a year ago in aquifers in the western half of the state and lower in most aquifers in the eastern half. Ground water supplies remain adequate across the state. The above normal precipitation during June improved soil moisture and lessened overall demand on ground water supplies. Continued near to above normal precipitation during the summer months will benefit the state's ground water situation. However, little if any recharge can normally be expected this time of the year. The Ohio Agricultural Statistics Service reports that soil moisture at the end of June was rated as being short in 5 percent of the state, adequate in 62 percent of the state and surplus in 33 percent of the state.

LAKE ERIE level rose during June. The mean level was 571.62 feet (IGLD-1985), 0.43 foot higher than last month's mean level and 0.33 foot below normal. This month's mean level is 0.03 foot above the June 2012 level and 2.42 feet above Low Water Datum.

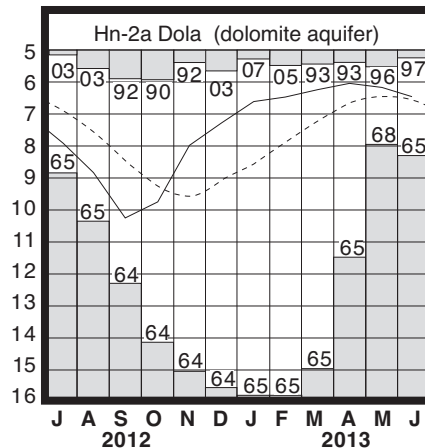
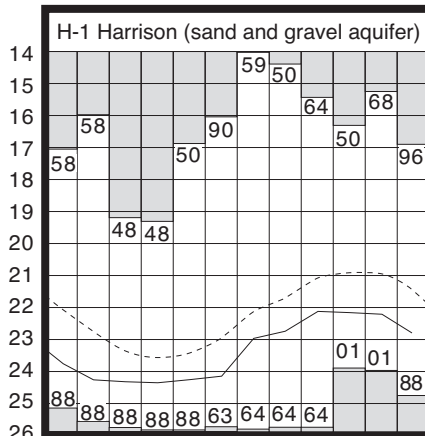
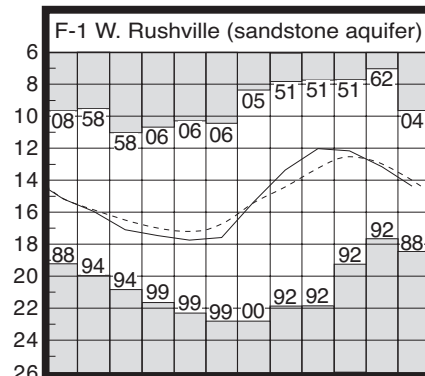
The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during June averaged 4.99 inches, 1.52 inches above normal. For the entire Great Lakes basin, June precipitation averaged 3.55 inches, 0.32 inch above normal. For calendar year 2013 through June, the Lake Erie basin has averaged 18.62 inches of precipitation, 1.29 inches above normal, while the entire Great Lakes basin has averaged 16.88 inches, 1.93 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 3 inches above to as much as 14 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	14.37	-0.37	-1.23	-0.51
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.28	-0.71	-0.03	+0.68
Fr-10	Columbus, Franklin Co.	Gravel	43.42	-0.44	-0.39	-0.40
H-1	Harrison, Hamilton Co.	Gravel	22.80	-1.36	-0.59	+0.19
Hn-2a	Dola, Hardin Co.	Dolomite	6.46	+0.11	-0.27	+0.63
Po-124	Freedom, Portage Co.	Sandstone	76.68	-0.45	-0.08	-1.15
Tu-1	Strasburg, Tuscarawas Co.	Gravel	13.63	-1.29	-0.84	+0.81

GROUND-WATER LEVELS

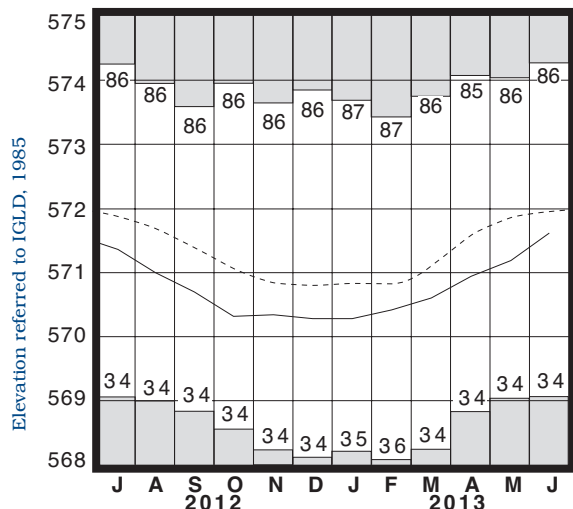
Water level (ft below land surface)



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

Hn-2a, 1955-2010

LAKE ERIE LEVELS



Base period: 1918-2010

Record high and low, year of occurrence

Normal - - - - Current - - - -

SUMMARY

Precipitation was above normal in most areas of the state but below normal in areas of northwestern and west-central Ohio. Streamflow was above normal in northwestern, northeastern, central and southeastern Ohio basins, and below normal elsewhere. Reservoir storage increased and was at above normal levels. Ground water levels declined in most aquifers and remained below normal throughout most of the state. Lake Erie level rose 0.43 foot and was 0.33 foot below the long-term June average.

NOTES AND COMMENTS

Editorial

The purpose of this report is to disseminate current hydrologic data in a timely and brief format. Observation points have been selected which are considered to be sufficiently representative of hydrologic conditions in the state to permit an evaluation of the current water-supply situation. These key observation stations offer the best available data on the basis of accuracy and length of record, minimal artificial effects on data, and availability of records. Data from these stations are collected by various agencies at the end of each month and processed immediately. Because of the time limitations involved, all data presented in this report must be considered preliminary and may be subject to revision before publication in regular form by the agencies involved. The remarks in this report include the writer's opinion of the cause and significance of the phenomena reported. The author is indebted to the various agencies and individuals who make this data available.

More complete and detailed information regarding water resources can be obtained by contacting the Division of Soil and Water Resources or visiting our website at: <http://www.dnr.state.oh.us/tabid/21817/Default.aspx>. Comments and suggestions regarding this report 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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MONTHLY WATER INVENTORY REPORT FOR OHIO

July 2013

Compiled By Scott C. Kirk

Hydrologist
Water Inventory Unit

PRECIPITATION during July was noticeably above normal throughout most of the state with only a few locations, mainly in extreme western Ohio, having below normal precipitation. The state average was 6.90 inches, 2.77 inches above normal. This ranks as the fourth wettest July for the state as a whole in 131 years of record. Regional averages ranged from 8.81 inches, 4.99 inches above normal, for the North Central Region to 5.54 inches, 1.30 inches above normal, for the West Central Region. All 10 of the state's climatic regions ranked in the top 15 wettest July's of record, including the wettest for the North Central Region, second wettest for the Southeast Region, fifth wettest for the Northwest Region and sixth wettest for both the Central and Northeast regions. Marion (Marion County) reported the greatest amount of July precipitation, 13.40 inches, which is about 300 percent of normal. Ft. Recovery (Mercer County) reported the least amount, 2.03 inches.

Precipitation during July fell as showers and thunderstorms, with many storms producing severe weather and locally heavy downpours. Rain fell nearly daily at many locations during the first 11 days of the month. Most of the state received at least 2 inches of rain during this period, but less was reported in west-central and areas of southwestern Ohio. The greatest amount of rain fell in parts of north-central, central and southeastern Ohio where 6-9 inches were reported. Locally severe storms developed during July 8-10 with heavy rain, damaging winds and tornadoes. More than 4.5 inches of rain was reported in areas of central, north-central and southeastern Ohio. Flash flooding occurred at many locations. After a few days of much needed dry weather across most of the state, rain returned on July 19. Storms were common during July 19-24 in many areas of the state with 1-2 inches of rain reported across most of Ohio. Some areas in central, southeastern and northeastern Ohio received as much as 3 inches from these storms and there were unofficial reports of more than 6 inches of rain in parts of Cuyahoga County. The last week of July was drier, but not without precipitation. Showers and scattered storms during July 27-28 and again on July 31 brought more than 0.5 inch of rain from southwestern to northeastern Ohio, but less than 0.5 inch in much of northwestern and southeastern areas of the state. For more information on the storms of July, see Notes and Comments at the end of this report.

Precipitation for the 2013 water year is above normal throughout most of the state; only a few areas, mainly in southwestern Ohio, have slightly below normal precipitation. The state average is 35.97 inches, 3.68 inches above normal. Regional averages range from 39.46 inches,

(continued on back)

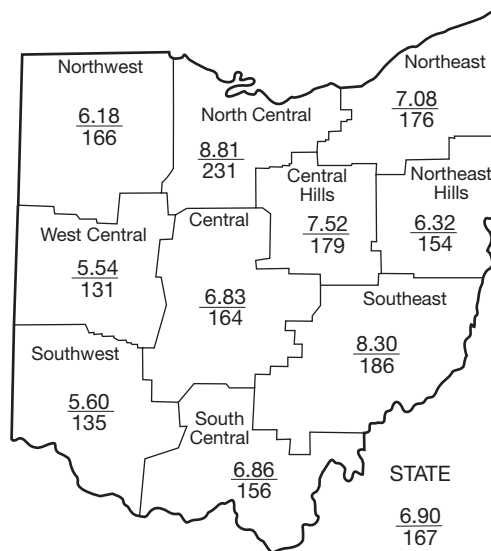
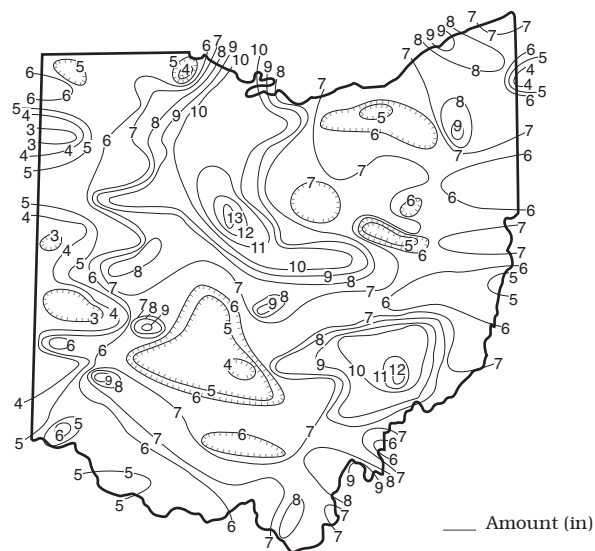
PRECIPITATION

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	+2.45	+2.13	+2.68	+5.36	+10.33	+1.0
North Central	+4.99	+5.47	+5.98	+11.19	+18.14	+3.3
Northeast	+3.05	+5.04	+4.15	+9.05	+16.12	+1.4
West Central	+1.30	-0.64	+0.43	+3.69	+7.66	-1.1
Central	+2.66	+2.49	+2.92	+4.43	+8.39	+0.0
Central Hills	+3.32	+4.94	+5.09	+7.61	+11.91	+0.8
Northeast Hills	+2.22	+3.13	+1.81	+3.24	+5.66	-0.7
Southwest	+1.45	+1.62	+0.20	-0.16	+4.46	-0.9
South Central	+2.45	+2.31	-0.73	+1.28	+5.07	-0.5
Southeast	+3.83	+4.08	+1.73	+4.24	+8.46	+0.8
State	+2.77	+3.04	+2.40	+4.97	+9.59	

*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



Average (in)
Percent of normal

MEAN STREAM DISCHARGE

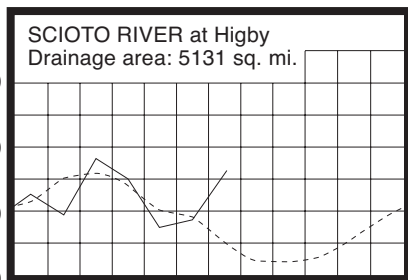
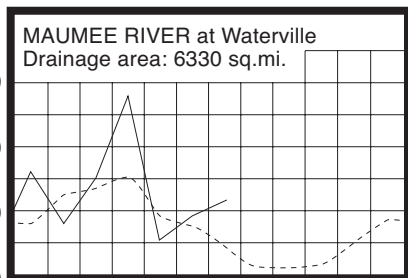
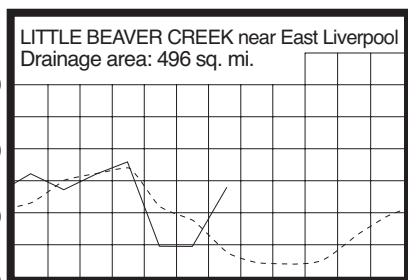
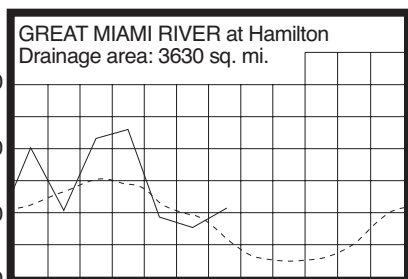
This Month

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	1,581	742	166	98	104
Great Miami River at Hamilton	3,630	3,886	186	80	99	99
Huron River at Milan	371	1,305	1,412	185	125	149
Killbuck Creek at Killbuck	464	1,192	611	154	115	104
Little Beaver Creek near East Liverpool	496	714	382	84	87	80
Maumee River at Waterville	6,330	7,432	281	100	107	97
Muskingum River at McConnelsville	7,422	17,950	387	125	98	86
Scioto River near Prospect	567	1,686	1,047	156	137	152
Scioto River at Higby	5,131	8,340	331	100	92	90
Stillwater River at Pleasant Hill	503	170	80	55	85	97

STREAMFLOW during July was above normal throughout most of the state. The only basins that experienced below normal flows for the month were in the west-central areas of Ohio. Flows were high enough to be considered excessive across most of the state. Flows during July were noticeably greater than the June flows throughout nearly all of Ohio, but were less in west-central areas of the state. Preliminary data indicates that flows across much of Ohio were at near-record July levels. The gauging stations at the Grand River near Painesville, the Huron River at Milan, the Killbuck Creek at Killbuck and the Muskingum River at McConnelsville all recorded their second greatest monthly flow for July. The Scioto River near Prospect recorded its third greatest July flow while the Scioto River at Higby recorded its fourth greatest.

MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



2013

Base period for all streams: 1981-2010

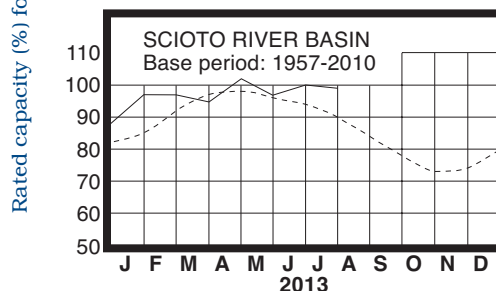
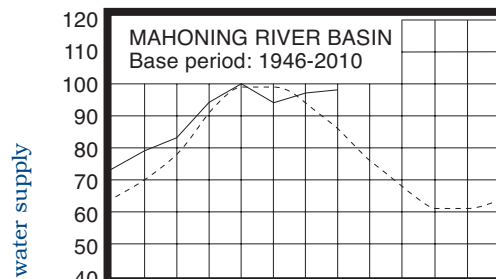
Flows at the beginning of the month were above normal statewide. Drainage basins in the north-central areas of the state recorded their lowest flows for July during the first few days of the month. Most drainage basins throughout the remainder of the state reached their lowest for the month at or near the end of July. Greatest flows for the month occurred on the first day of July in basins in west-central Ohio. Greatest flows across the remainder of the state occurred during July 9-12 following widespread and often heavy rain that fell during July 8-10. Flooding occurred across many areas of the state as a result of excessive rainfall, with basins in north-central, central and southeastern Ohio being hardest hit. Flows decreased from these peaks during the next week, but then increased rapidly from the rains of July 20-24. Many of the flows were excessive with small stream and urban flooding again a problem across many areas of the state following another round of excessive rain. Most drainage basins in eastern Ohio were still flowing at above normal levels at the end of the month, but basins in western Ohio were at below normal flows.

RESERVOIR STORAGE for water supply during July increased slightly in the Mahoning River basin and decreased 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 98 percent of rated capacity for water supply compared with 97 percent for last month and 68 percent for July 2012. Month-end storage in the Scioto basin index reservoirs was 99 percent of rated capacity for water supply compared with 100 percent for last month and 84 percent for July 2012.

As a result of the much above normal precipitation during July, many flood control and recreational reservoirs in the state held back water to minimize potential flooding downstream. Water levels in some reservoirs reached notably high levels, in some cases resulting in flooded roads, and closed campgrounds and beaches.

RESERVOIR STORAGE FOR WATER SUPPLY



2013

Normal - - - - Current ———

GROUND-WATER LEVELS

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

GROUND WATER levels during July rose in many aquifers across the state, and in aquifers where levels declined, the declines were much less than typically observed during the month. July is usually a time when ground water levels decline seasonally throughout Ohio.

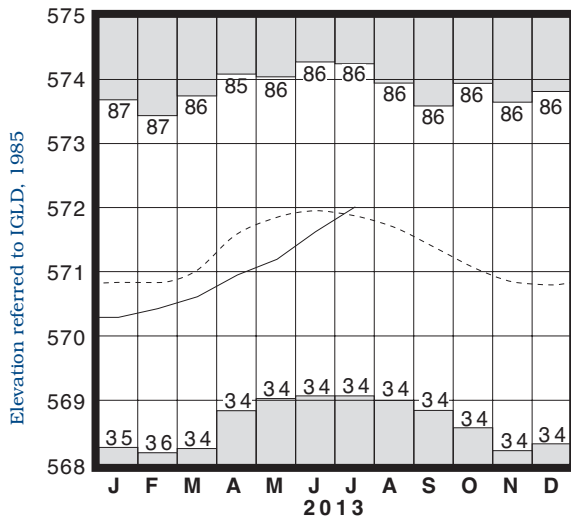
The above normal precipitation across most of the state during the past two months has been beneficial for ground water supplies. In response to the above normal precipitation, many aquifers had unusual net rises during July; five of the seven index observation wells presented in this report were higher during July than the levels observed during June. Only in areas where precipitation was below normal did ground water levels decline steadily and end the month lower than they were during June. Levels in consolidated aquifers in northwestern, eastern and southeastern Ohio, and unconsolidated aquifers in central areas of the state are above normal. However, levels across much of the state remain below normal, although they are much improved from levels recorded one year ago. Current levels are higher than they were during July 2012 throughout nearly the entire state. Ground water storage is in a favorable position and should remain favorable through the remainder of the summer high-use period. The Ohio Agricultural Statistics Service reports that near the end of July, soil moisture was rated as being short in 5 percent of the state, adequate in 71 percent of the state, and surplus in 24 percent of the state.

LAKE ERIE level rose during July. The mean level was 572.01 feet (IGLD-1985), 0.39 foot higher than last month's mean level and 0.13 foot above normal. This month's mean level is 0.68 foot above the July 2012 level and 2.81 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during July averaged 5.04 inches, 1.65 inches above normal. For the entire Great Lakes basin, July precipitation averaged 3.96 inches, 0.80 inch above normal. For calendar year 2013 through July, the Lake Erie basin has averaged 23.66 inches of precipitation, 2.94 inches above normal, while the entire Great Lakes basin has averaged 20.84 inches, 2.73 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 range from near normal to about 3 inches below normal during the next 6 months. Deviations from the anticipated weather patterns could result in the level of Lake Erie ranging from about 7 inches above normal to as much as 14 inches below the normal seasonal level.

LAKE ERIE LEVELS



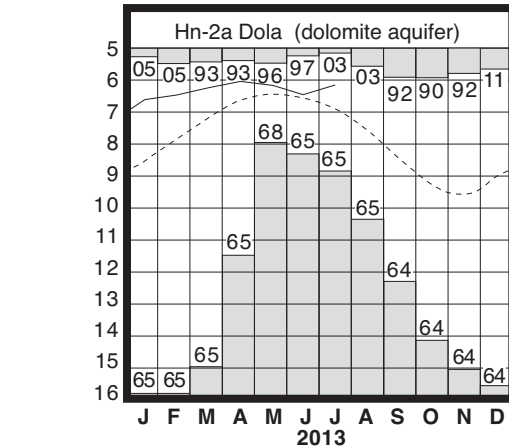
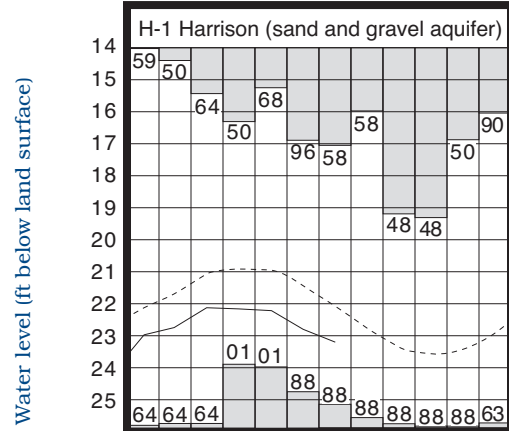
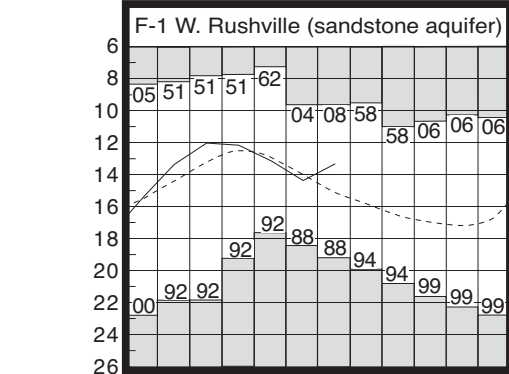
Base period: 1918-2010

■ Record high and low, year of occurrence

Normal - - - - Current ———

GROUND-WATER LEVELS

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	13.31	+1.81	+1.06	+1.85
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.54	-0.48	-0.26	+1.10
Fr-10	Columbus, Franklin Co.	Gravel	43.41	+0.24	+0.01	+0.67
H-1	Harrison, Hamilton Co.	Gravel	23.20	-1.11	-0.40	+0.56
Hn-2a	Dola, Hardin Co.	Dolomite	6.16	+0.74	+0.30	+1.75
Po-124	Freedom, Portage Co.	Sandstone	76.67	-0.22	+0.01	-0.57
Tu-1	Strasburg, Tuscarawas Co.	Gravel	13.54	-0.61	+0.09	+1.62



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

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

Water level (ft below land surface)

(Precipitation continued from front)

7.18 inches above normal, for the Northeast Region to 31.67 inches, 2.89 inches above normal, for the Northwest Region.

Precipitation for the 2013 calendar year is also above normal throughout most of the state; only the South Central Region has below normal precipitation. The average for the state is 26.06 inches, 2.40 inches above normal. Regional averages range from 28.36 inches, 4.57 inches above normal, for the Central Hills Region to 24.32 inches, 0.91 inch above normal, for the West Central Region.

The wet pattern that began during the last week of June continued throughout the month of July. When combined with the June precipitation, the current June-July period was the second wettest for the state during the past 131 years. The state average of 13.03 inches of precipitation is 4.99 inches above normal for the June-July period. In addition, eight of the state's 10 climatic regions ranked in the top 6 wettest June-July period of record, including the wettest for the North Central, Central Hills and Southeast regions. In July alone, several individual stations reported about one-fourth of their normal annual precipitation and a few about one-third. When combined with June's precipitation, a few stations have reported nearly one-half of their normal annual precipitation during the past two months. Preliminary data indicates Dorset (Ashtabula County) has received 21.35 inches of precipitation during the past two months, nearly 13 inches above normal. Other stations reporting more than 20 inches during the past two months are: Galion (Crawford County), 20.17 inches and Marion (Marion County), 20.09 inches. However, not all the precipitation was distributed evenly across the state. A few areas in western Ohio have received below normal rainfall during the past two months. Dayton International Airport (Montgomery County) received 6.70 inches of precipitation during June and July, 1.58 inches below normal.

SUMMARY

Precipitation during July was noticeably above normal throughout most of Ohio with the average of 6.90 inches ranking as the fourth wettest July during the past 131 years. Streamflow was above normal in all drainage basins throughout the state except for basins in west-central Ohio. Flows were high enough to be considered excessive throughout most of the state. Reservoir storage increased slightly in the Mahoning River basin, decreased slightly in the Scioto River basin, and continued to remain above normal in both basins. Ground water storage increased in many aquifers due to the much above normal precipitation. Lake Erie level rose 0.39 foot and was 0.13 foot above the long-term July average.

NOTES AND COMMENTS

Severe Storms Impact Ohio During July

Many areas of Ohio were rocked with severe storms on several days during July. High winds, heavy downpours and tornadoes were associated with many of the storms during July 8-10. More than 4.5 inches of rain was reported in Marion (Marion County), Norwalk (Huron County) Wooster (Wayne County) and New Lexington (Perry County). These rains fell on ground that was already saturated from previous rains. Flooding was widespread across the state with Morrow, Richland and Hancock counties among the hardest hit, but the worst flooding occurred in southeastern Ohio. Perry County was especially hard hit with flooding of homes and businesses in the Corning and Crooksville areas. Ohio Governor John Kasich's request for a Small Business Administration (SBA) disaster declaration was granted for Perry County as well as the contiguous counties of Athens, Fairfield, Hocking, Licking, Morgan and Muskingum. The SBA declaration enables businesses and residents who incurred uninsured losses as a result of these storms in the counties mentioned above to apply for long-term, low-interest loans. The National Weather Service (NWS) confirmed three tornadoes were spawned from the thunderstorms on July 10, although damage was minor. Additional severe storms occurred during July 19-24. Storms on July 20 and 21 were most numerous across northern Ohio. Heavy rains were associated with some of these storms with 1-3 inches common across much of northern Ohio. An area of intense downpours brought unofficial reports of 4 to 6.5 inches of rain in Lake and Cuyahoga counties in a short period of time. Many roads were flooded and thousands of basements in these counties flooded. In the city of Willowick (Lake County) it was reported that more than 5,000 basements were flooded. The NWS confirmed a tornado hit the campus of Ursuline College, located in Pepper Pike near Cleveland (Cuyahoga County) on July 20 and did significant damage to the gymnasium, as well as roof damage to other buildings and tree damage. More heavy rain fell across central Ohio on July 22 with 2-3 inches of rain reported, resulting in flash flooding that closed several roads in Franklin, Delaware and Union counties.

In spite of the problems caused by the excessive amount of rain during July, the above normal precipitation has been beneficial for the state's water resources. The wet conditions have reduced overall demand during the summer high-use period. Ground water storage increased across much of the state during the time of year when ground water levels usually decline statewide. Reservoir storage is in excellent condition throughout the state and Lake Erie level rose to above normal for the first time since April 2012.

ACKNOWLEDGMENTS

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Precipitation data:

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August 2013

Compiled By Scott C. Kirk

Hydrologist, Water Inventory Unit

<http://www.ohiodnr.gov/tabid/4191/Default.aspx>

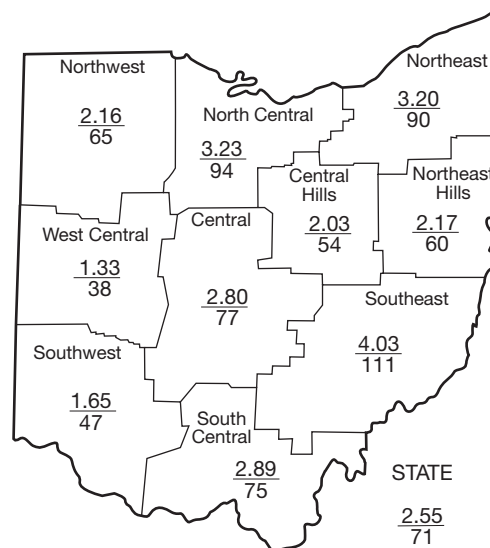
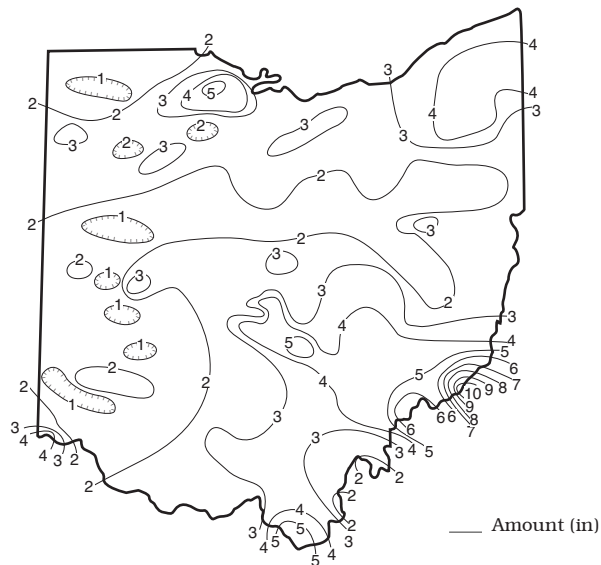
PRECIPITATION for August was below normal throughout most of Ohio; only the Southeast Region had above normal precipitation. The state average was 2.55 inches, 1.03 inches below normal. Regional averages ranged from 4.03 inches, 0.39 inch above normal, for the Southeast Region to 1.33 inches, 2.16 inches below normal, for the West Central Region. This was the sixth driest August on record for the Southwest Region and the eighth driest for the West Central Region. Newport (Washington County) reported the greatest amount of August precipitation, 10.23 inches. Lakeview (Logan County) reported the least amount, 0.67 inch.

Precipitation during August fell as showers and thunderstorms and varied greatly across the state. Most of Ohio received the bulk of the month's precipitation during the first 10 days of the month. Showers and isolated thunderstorms during the first three days of August brought 0.25-0.50 inch across most of the state with 1-2 inches reported in some areas of northwestern Ohio. Showers and storms were widespread during August 7-10 with amounts of between 1 and 2 inches reported at most locations throughout the state. The next two weeks of August were rather dry across most of Ohio with just some light showers reported on a day or two. Several areas reported no rain at all during this period; however, unusually heavy rain fell in parts of southeastern Ohio during August 12-13. Between 2 and 5 inches of rain was observed in areas in Athens, Meigs, Vinton and Washington counties. Rain returned to the state on August 22 and 23 with most areas receiving 0.25 inch or less. However, once again, heavier rain fell across parts of southeastern Ohio with 1-1.5 inches reported. Storms during August 27-28 were heaviest in northern Ohio with 0.50-1.0 inch totals reported, while on August 31 precipitation was heaviest in southern Ohio.

Precipitation for the 2013 water year is above normal throughout most of the state with only the West Central and Southwest regions having below normal precipitation. The state average is 38.52 inches, 2.65 inches above normal. Regional averages range from 42.66 inches, 6.83 inches above normal, for the Northeast Region to 33.83 inches, 1.74 inches above normal, for the Northwest Region.

Precipitation for the 2013 calendar year is above normal in most of northern and southeastern Ohio, and below normal elsewhere. The state average is 28.61 inches, 1.37 inches above normal. Regional averages range from 30.79 inches, 5.93 inches above normal, for the North Central Region to 25.65 inches, 1.25 inches below normal, for the West Central Region.

PRECIPITATION AUGUST



Average (in)
Percent of normal

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	-1.15	+2.84	+1.10	+2.51	+8.05	-0.5
North Central	-0.21	+7.01	+5.58	+10.91	+17.19	+2.6
Northeast	-0.35	+6.23	+3.80	+8.52	+13.87	+0.7
West Central	-2.16	-0.67	-1.22	+2.22	+6.13	-2.3
Central	-0.82	+3.71	+2.31	+4.85	+7.41	-1.6
Central Hills	-1.74	+5.57	+3.30	+6.85	+9.51	-1.1
Northeast Hills	-1.45	+4.00	+0.53	+2.61	+3.10	-2.4
Southwest	-1.83	+0.79	-0.67	-0.25	+3.49	-2.1
South Central	-0.95	+3.60	-0.60	+2.52	+4.35	-1.5
Southeast	+0.39	+6.63	+2.50	+5.41	+8.18	+0.6
State	-1.03	+3.96	+1.64	+4.59	+8.10	

*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

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	376	427	267	107	107
Great Miami River at Hamilton	3,630	1,067	97	91	103	100
Huron River at Milan	371	183	427	258	136	153
Killbuck Creek at Killbuck	464	187	134	180	123	107
Little Beaver Creek near East Liverpool	496	237	214	119	89	82
Maumee River at Waterville	6,330	1,381	163	126	115	97
Muskingum River at McConnelsville	7,422	3,598	164	166	104	88
Scioto River near Prospect	567	229	467	222	151	155
Scioto River at Higby	5,131	1,758	158	131	99	91
Stillwater River at Pleasant Hill	503	43	59	60	88	97

STREAMFLOW during August was above normal throughout most of the state, but below normal in basins in west-central and southwestern Ohio. Flows were high enough to be considered excessive in some basins, mainly in the northeastern areas of the state. Conversely, flows were low enough to be considered deficient in a few basins where precipitation was much below normal, most notably in west-central Ohio. Flows during August were noticeably less than the July flows statewide.

Flows at the beginning of the month were above normal throughout most of the state with just a few basins in western Ohio below normal. Generally, flows declined slowly during the first few days of the month and then increased following some of the month's most

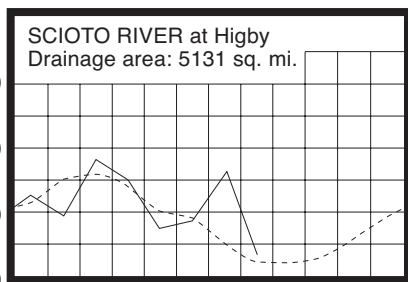
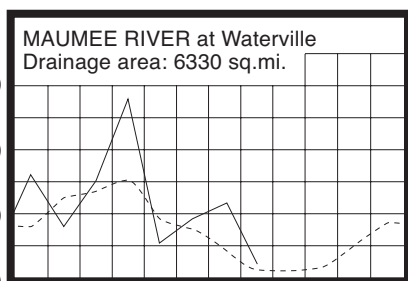
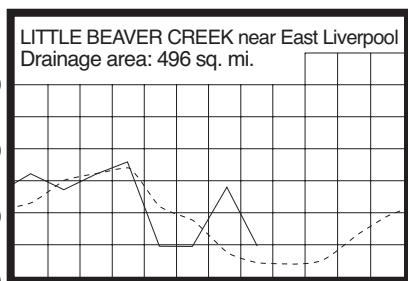
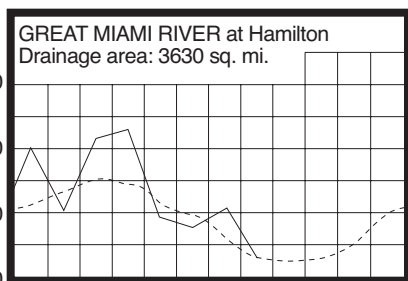
widespread precipitation during August 7-10. As a result, greatest flows for the month occurred during August 8-11 throughout most of the state. A few basins in southeastern Ohio had their greatest flows for the month just after heavy rain fell on August 13. Basins in northeastern Ohio had their greatest flows near the end of the month following local precipitation. Lowest flows for the month occurred during August 21-22 across much of the state, although many basins had their lowest flows for August at or near the end of the month. Flows at the end of August were above normal in eastern Ohio and below normal in western Ohio.

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

Reservoir storage at the end of August in the Mahoning basin index reservoirs was 91 percent of rated capacity for water supply compared with 98 percent for last month and 60 percent for August 2012. Month-end storage in the Scioto basin index reservoirs was 94 percent of rated capacity for water supply compared with 99 percent for last month and 76 percent for August 2012. Surface water supplies are at favorable levels for this time of the year.

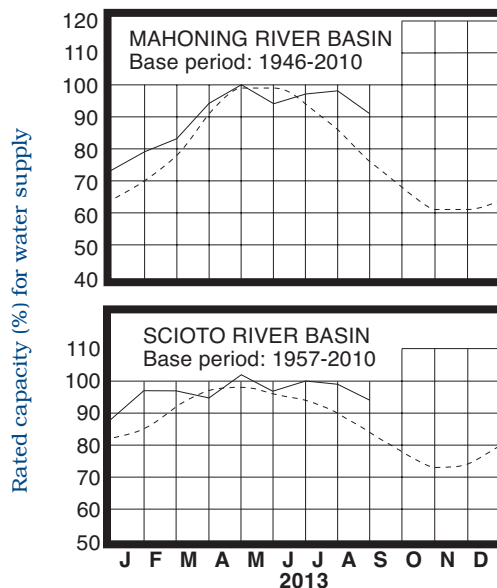
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



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 August declined seasonally across most of the state, but a few aquifers showed a small improvement due to recharge from locally above normal precipitation during July. Net declines during August from July levels were less than normally observed across most areas of the state. Generally, ground water levels in most unconsolidated aquifers and some shallower consolidated aquifers rose following the August 7-10 precipitation and then declined the remainder of the month. Levels in consolidated aquifers tended to steadily decline throughout most of August.

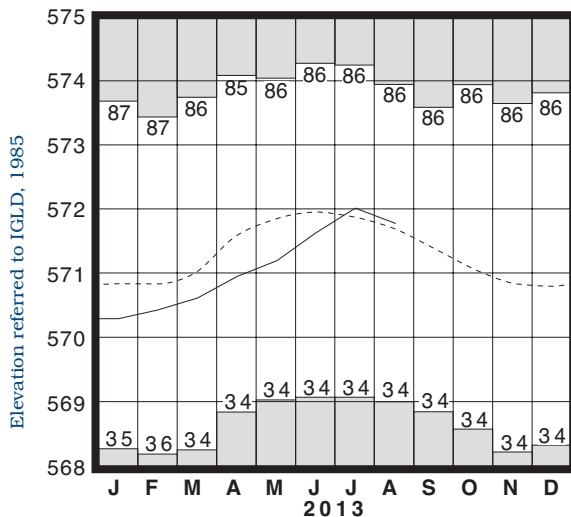
As a result of the above normal precipitation that most of Ohio has received during the summer months, current ground water levels are higher than they were last year at this time throughout most of the state. Ground water levels are also above normal across most of Ohio, but remain below normal in many aquifers in the southwestern quarter of the state where summer precipitation has not been as favorable. The next few months are typically the driest time of the year across the state, thus little or no recharge can be expected during the next two or three months. This is usually the time of year when ground water storage reaches its lowest level for the year. However, with near-normal precipitation during these next few months, ground water supplies should remain favorable throughout the state until the recharge season begins later this year. The Ohio Agricultural Statistics Service reports that soil moisture near the end of August was rated as being short or very short in 29 percent of the state, adequate in 65 percent of the state and surplus in 6 percent of the state.

LAKE ERIE level declined during August. The mean level was 571.78 feet (IGLD-1985), 0.23 foot lower than last month's mean level and 0.09 foot above normal. This month's mean level is 0.78 foot above the August 2012 level and 2.58 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during August averaged 2.65 inches, 0.56 inch below normal. For the entire Great Lakes basin, August precipitation averaged 3.28 inches, 0.14 inch above normal. For calendar year 2013 through August, the Lake Erie basin has averaged 26.31 inches of precipitation, 2.38 inches above normal, while the entire Great Lakes basin has averaged 24.12 inches, 2.87 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 range from near-normal to about 3 inches below normal for the foreseeable future. Deviations from the anticipated weather patterns could result in the level of Lake Erie ranging from about 8 inches above normal to as much as 14 inches below the normal seasonal level.

LAKE ERIE LEVELS

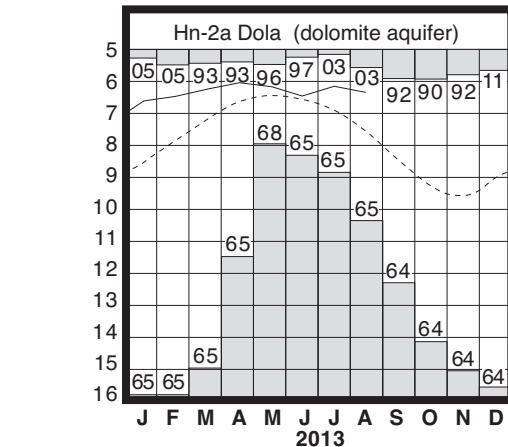
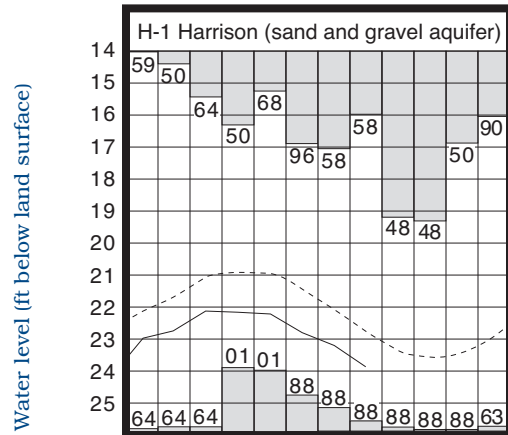
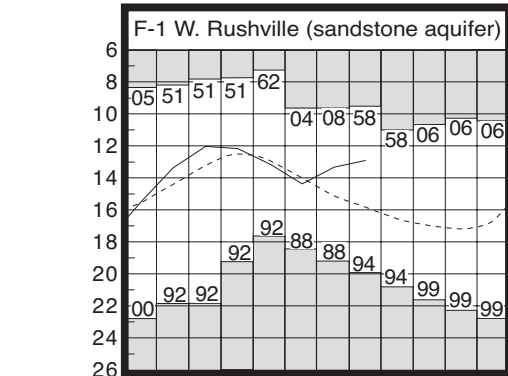


Base period: 1918-2010

Record high and low, year of occurrence

Normal - - - - Current ———

GROUND-WATER LEVELS



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

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

SUMMARY

Precipitation during August was below normal throughout most of Ohio with only the Southeast Region having above normal precipitation. Streamflow was above normal across much of the state, but below normal in west-central and southwestern Ohio basins. Reservoir storage declined seasonally in the Mahoning and Scioto river basins, but remained above normal in both basins. Ground water levels declined seasonally in most aquifers. Declines were less than usually observed during August and ground water levels improved to above normal across much of the state. Lake Erie level declined 0.23 foot and was 0.09 foot above the long-term August average.

NOTES AND COMMENTS

Water Resources Data For Ohio Available On-Line

The Water Resources Division of the U.S. Geological Survey (USGS) recently announced the availability of the following report:

Water Resources Data For The United States, Water Year 2012.

This report contains data from cooperative long-term surface water and ground water networks as well as data collected as part of special short-term projects. Beginning with the 2006 annual report, paper reports are no longer produced. The USGS annual Water Data Report is part of a national web-based product with a "Site Data Sheet" available for each individual station that can be viewed and/or downloaded. Site Data Sheets contain all surface-water, ground-water and/or water-quality data that were collected at a particular site in a given water year. Site Data Sheets for water year 2012 in Ohio have been completed and are available at: <http://wdr.water.usgs.gov/wy2012/search.jsp>. Connecting to this web site will take you directly to the Site Data Sheet search page. Site Data Sheets are indexed by USGS station number and physical location, which includes state, county and hydrologic unit. If you have any questions or comments, please contact James Mangus with the USGS at (614) 430-7727 or e-mail: jpmangus@usgs.gov. Water Resources Data-Ohio reports for water year 2002-2011 can also be accessed online at: <http://wdr.water.usgs.gov/>.

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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Division of Soil and Water Resources

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John Kasich
Governor

James Zehninger
Director

Karl Gebhardt
Chief





MONTHLY WATER INVENTORY REPORT FOR OHIO

September 2013

Compiled By Scott C. Kirk

Hydrologist, Water Inventory Unit

<http://www.ohiodnr.gov/tabid/4191/Default.aspx>

PRECIPITATION during September was below normal throughout most of the state, but above normal in the West Central and Southwest regions. The state average was 2.64 inches, 0.53 inch below normal. Regional averages ranged from 3.41 inches, 0.37 inch above normal, for the Southwest Region to 1.99 inches, 1.21 inches below normal, for the Southeast Region. Springfield North (Clark County) and Xenia (Greene County) reported the greatest amount of September precipitation, 4.68 inches. Zanesville (Muskingum County) reported the least amount, 1.28 inches.

Most of the precipitation fell during the middle of the month as the first ten days and last nine days of September were rather dry across most of the state. Widely scattered showers during the first two days of the month produced some heavy downpours across parts of eastern and southeastern Ohio, but the majority of the state received no rain at all. The first significant precipitation for the month at most locations occurred during September 11-13. Showers and thunderstorms crossed the state with some storms producing heavy downpours. Several areas, especially in the northern half of Ohio, received 0.5-1.0 inch of rain during this period; however, most other locations received less than 0.25 inch. The greatest and most widespread precipitation of the month occurred during September 19-21. Most areas of the state received at least 1 inch of rain from this system with more than 3 inches reported at some locations in southwestern Ohio. The remainder of the month was dry with just some light showers reported near the end of the month, mainly in western Ohio.

Precipitation for the 2013 calendar year is generally above normal in the northern and southeastern areas of the state, and below normal elsewhere. The state average is 31.14 inches, 0.72 inch above normal. Regional averages range from 33.35 inches, 5.24 inches above normal, for the North Central Region to 28.70 inches, 1.06 inches below normal, for the West Central Region.

Precipitation for the 2013 water year was above normal throughout most of the state, but below normal in the West Central and Southwest regions. The state average was 41.09 inches, 2.07 inches above normal. Regional averages ranged from 45.68 inches, 6.10 inches above normal, for the Northeast Region to 36.05 inches, 1.03 inches above normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column). Dorset (Ashtabula County) reported the greatest amount of precipitation for the water year, 59.29 inches. Napoleon (Henry County) reported the least amount of precipitation for the water year, 31.54 inches. An isohyetal map and regional averages with percentages of normal for the 2013 water year appear on the last page of this report.

The 2013 water year started on a positive note as far as water supplies are concerned with above normal precipitation during October. However, November followed with noticeably below normal precipitation; this was the fourth driest

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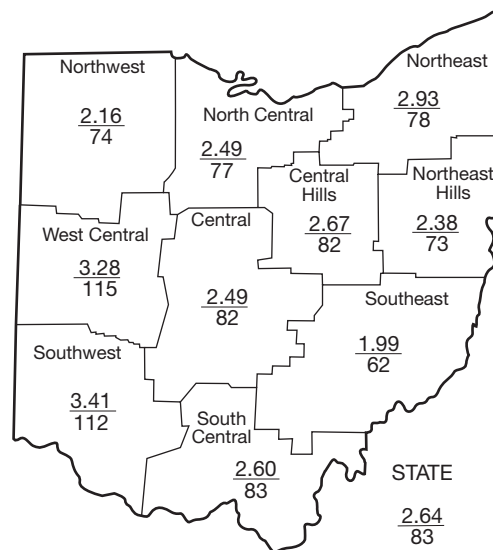
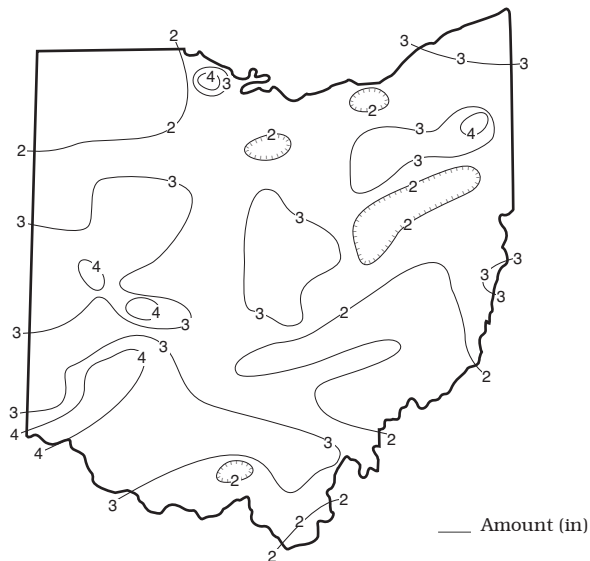
PRECIPITATION

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	-0.77	+0.53	+1.87	+1.03	+3.62	-0.6
North Central	-0.76	+3.96	+6.11	+7.84	+13.54	+2.3
Northeast	-0.82	+1.88	+3.90	+6.10	+10.18	+0.8
West Central	+0.42	-0.44	-0.92	-0.83	+1.53	-1.7
Central	-0.55	+1.19	+1.74	+1.80	+4.47	-1.0
Central Hills	-0.57	+0.98	+3.48	+3.51	+6.72	-1.0
Northeast Hills	-0.87	-0.10	+0.83	+0.55	+0.48	-2.4
Southwest	+0.37	-0.01	+0.02	-1.61	+0.07	-1.4
South Central	-0.53	+0.97	-0.78	+0.03	+1.17	-1.4
Southeast	-1.21	+3.01	+2.35	+2.25	+4.95	-0.5
State	-0.53	+1.19	+1.84	+2.07	+4.65	

*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 SEPTEMBER



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	362	315	253	124	110
Great Miami River at Hamilton	3,630	756	86	101	95	100
Huron River at Milan	371	57	87	377	164	153
Killbuck Creek at Killbuck	464	124	114	224	132	107
Little Beaver Creek near East Liverpool	496	123	122	143	89	83
Maumee River at Waterville	6,330	388	44	128	120	97
Muskingum River at McConnelsville	7,422	1,953	104	191	106	88
Scioto River near Prospect	567	48	146	310	164	150
Scioto River at Higby	5,131	862	80	163	97	91
Stillwater River at Pleasant Hill	503	39	85	37	82	95

STREAMFLOW during September was above normal in the eastern half of the state and below normal in the western half. Flows during September were less than the flows reported during August.

Flows at the beginning of the month were above normal in eastern Ohio and below normal in western Ohio. Generally, streamflow declined during the first 10-12 days of the month and then increased following widespread precipitation that fell during September 11-13. Lowest flows were observed just prior to the arrival of this precipitation. Greatest flows for the month occurred following the September 19-21 precipitation throughout most of the state. Flows declined from these peaks during the remainder of the month and were below normal across most of Ohio at month's end.

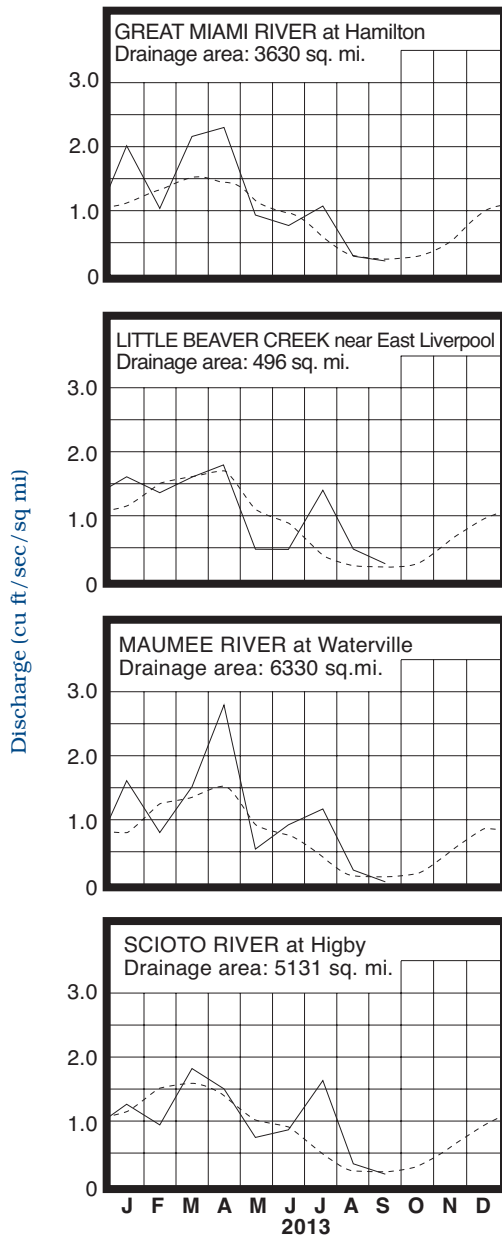
Streamflow for the 2013 water year was generally above normal in southwestern, central, north-central and northeastern Ohio basins, and below normal elsewhere (see Mean Stream Discharge table, past 12 months column). The first four months of the water year had above normal flows across most of the state. Minor flooding was observed in some areas of northwestern Ohio during January. Flows the next four months were mostly below normal as only April had above normal flows throughout most of the state. Minor flooding was reported in areas of southern Ohio during March and in northern Ohio during April with some moderate flooding observed in northwestern Ohio. Flows from June-August were generally above normal across most of the state. Locally heavy downpours during these months caused small stream and urban flooding locally, especially in July. Several gauges recorded near-record flows during July. September flows were above normal in eastern Ohio, but fell to below normal levels across most of the state by the end of the month.

RESERVOIR STORAGE for water supply during September declined seasonally in 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 82 percent of rated capacity for water supply compared with 91 percent for last month and 57 percent for September 2012. Month-end storage in the Scioto basin index reservoirs was 90 percent of rated capacity for water supply compared with 94 percent for last month and 74 percent for September 2012.

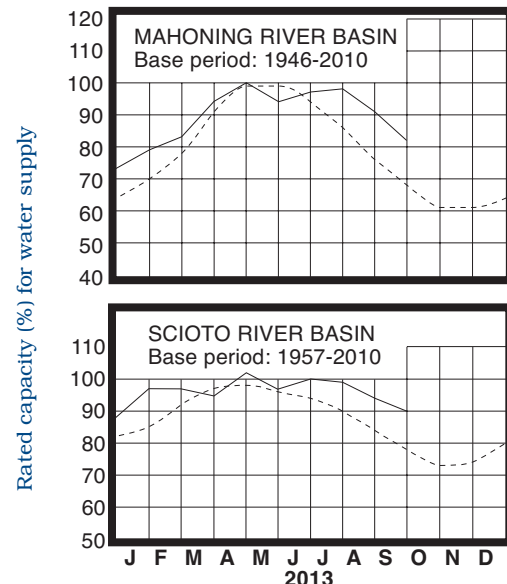
Surface water supplies were favorable during the 2013 water year as storage was near or above normal throughout the year. Above normal precipitation during the summer months resulted in ample streamflow and helped to reduce demand during this high water-use time of the year. As a result of the much above normal precipitation during July, many flood control and recreational reservoirs utilized available storage to minimize downstream flooding. Storage remains above normal at the end of the 2013 water year.

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 September declined in all aquifers throughout the state. Levels generally declined steadily throughout the month except for some temporary rises observed around mid-month in some aquifers. Net declines during September from last month's levels ranged from about normal to more than three times what is normally observed.

Precipitation during June and July was noticeably above normal this year throughout much of Ohio and as a result, ground water levels are higher than those observed last year across most of the state. Ground water levels are below normal in many areas of the state, but continue to be at above normal levels in many aquifers in northwestern, central and southeastern Ohio.

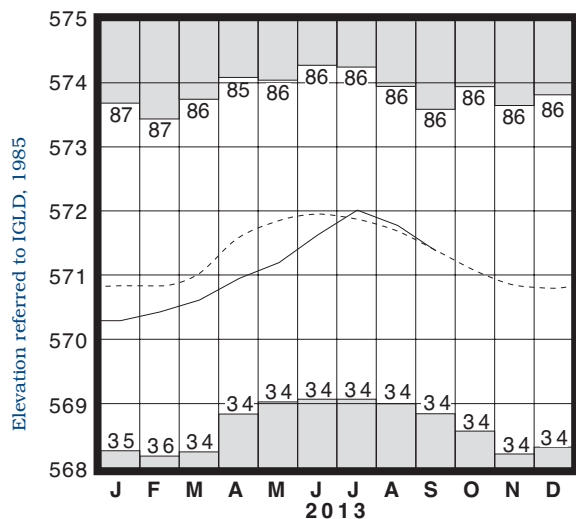
Ground water storage during the 2013 water year was adequate in most areas of Ohio; however, storage in southwestern and northeastern Ohio was below normal throughout most of the year. Noticeably below normal precipitation during November delayed the beginning of any significant recharge to ground water supplies across most of the state. Index observation well Fa-1 near Washington Court House (Fayette County) representing limestone aquifers in south-central and southwestern Ohio, reached a record low level for December and January. Below normal precipitation during the late winter and spring months resulted in ground water levels remaining below normal throughout most of the state; only some consolidated aquifers in northwestern Ohio had above normal levels during this period. Much above normal precipitation during June and July was beneficial for the state's ground water supplies. By the end of August, storage in most aquifers in Ohio had improved to near or above normal levels. However, by the end of September, storage across much of the state was at below normal levels, but remained above normal in aquifers in northwestern, central and southeastern Ohio.

LAKE ERIE level declined during September. The mean level was 571.39 feet (IGLD-1985), which is normal and 0.39 foot lower than last month's mean level. This month's mean level is 0.69 foot above the September 2012 level and 2.19 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during September averaged 2.98 inches, 0.21 inch below normal. For the entire Great Lakes basin, September precipitation averaged 2.78 inches, 0.63 inch below normal. For calendar year 2013 through September, the Lake Erie basin has averaged 29.29 inches of precipitation, 2.17 inches above normal, while the entire Great Lakes basin has averaged 26.90 inches, 2.24 inches above normal.

Lake Erie's level was below normal during the first nine months of the 2013 water year. Following the above normal precipitation that fell across the Great Lakes basin in June and July, the level of Lake Erie rose to above normal during July and remained above normal during August. Lake Erie level declined during September and was at the long-term seasonal average. The USACE reports that based on the current condition of the Great Lakes basin and anticipated weather conditions, the level of Lake Erie should range from near-normal to about 3 inches below normal during the next six months. Deviations from the anticipated weather patterns could result in the level of Lake Erie ranging from about 8 inches above normal to as much as 14 inches below the normal seasonal level.

LAKE ERIE LEVELS

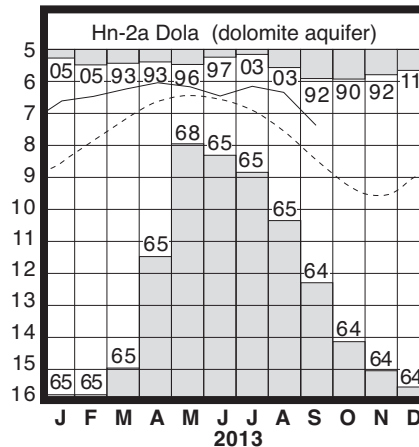
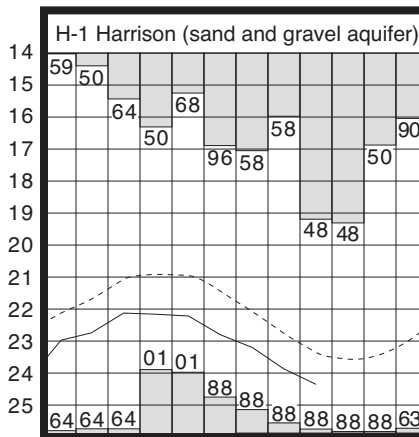
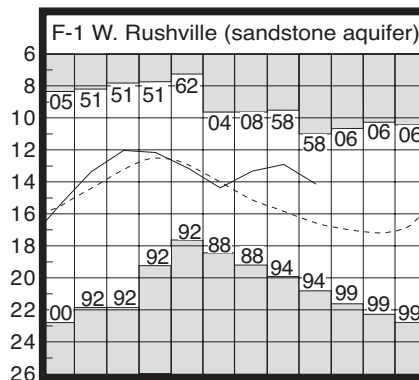


Base period: 1918-2010

Record high and low, year of occurrence

Normal - - - - Current ———

GROUND-WATER LEVELS



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

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

(Precipitation continued from front)

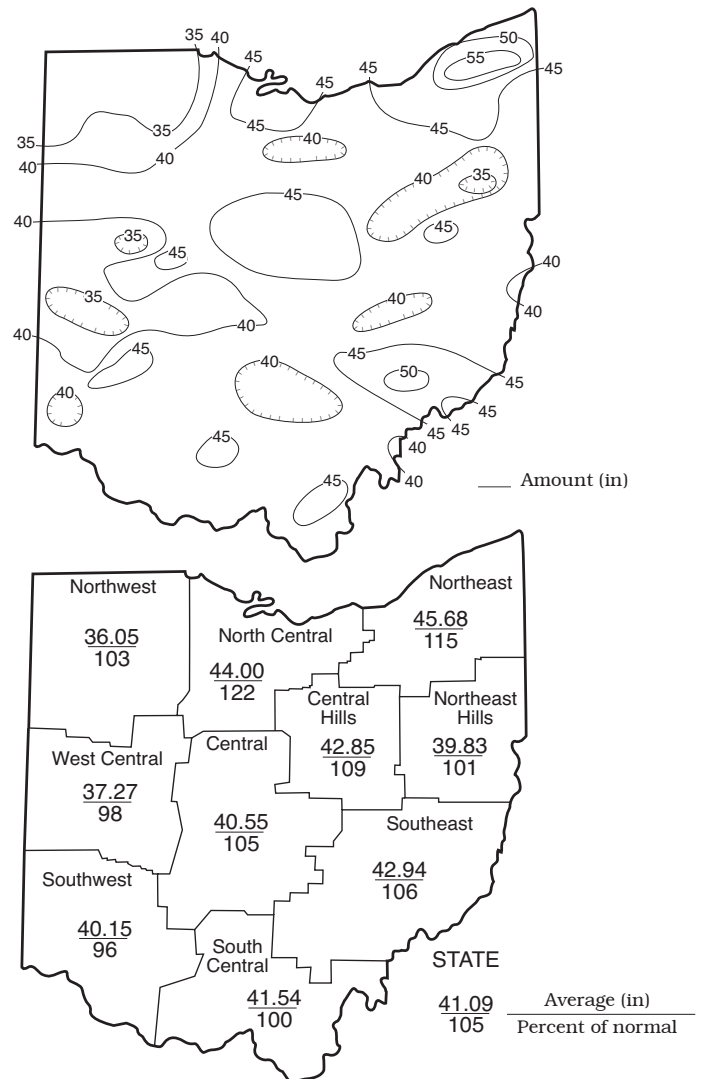
November for the state during the past 130 years. Precipitation was above normal throughout most of Ohio during December and in the western half of the state during January. Below normal precipitation during three of the next four months reduced the rate of recharge to the state's water supplies; only April had above normal precipitation in the northern two-thirds of Ohio. Above normal precipitation across most of the state during June and July greatly benefitted water supplies and resulted in a satisfactory growing season for farmers in most areas of Ohio. This was the wettest June of record for the Northeast Region, and the fourth wettest July for the state during the past 131 years, including the wettest for the North Central Region. Precipitation during the last two months of the water year was below normal throughout most of Ohio.

SUMMARY

Precipitation during September was below normal across most of the state. Streamflow was above normal in eastern Ohio and below normal in western Ohio. Reservoir storage declined but remained above normal in both the Mahoning and Scioto river basins. Ground water levels declined in aquifers throughout the state. Lake Erie level declined 0.39 foot and was at the long-term September average.

Precipitation for the 2013 water year was above normal across most of the state; only the Southwest and West Central regions had below normal precipitation. Streamflow was generally above normal in southwestern, central, north-central and northeastern Ohio basins. Reservoir storage was near or above normal levels during the water year. Lake Erie level was below normal the first nine months of the water year, above normal during July and August, and at the normal seasonal average during September.

PRECIPITATION 2013 WATER YEAR



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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Ohio Department of Natural Resources

Division of Soil and Water Resources

2045 Morse Road

Columbus, Ohio 43229-6693

John Kasich
Governor

James Zehninger
Director

Karl Gebhardt
Chief

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MONTHLY WATER INVENTORY REPORT FOR OHIO

October 2013

Compiled By Scott C. Kirk

Hydrologist, Water Inventory Unit

<http://www.ohiodnr.gov/tabid/4191/Default.aspx>

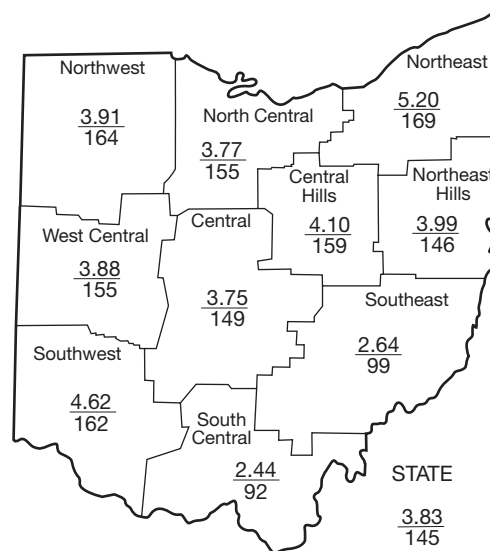
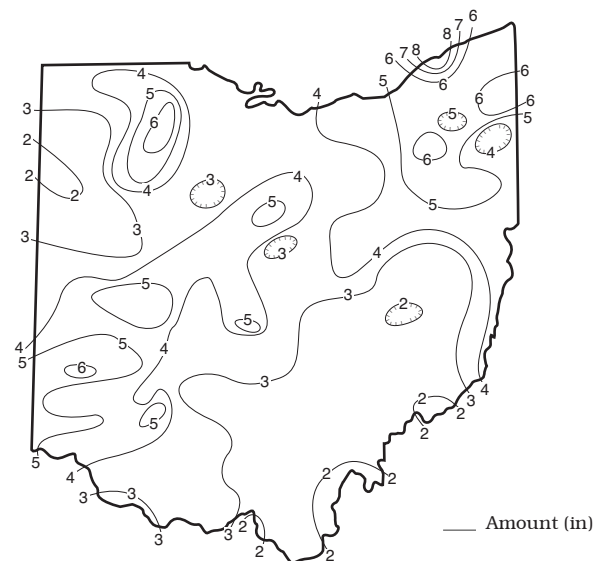
PRECIPITATION during October was above normal throughout most of the state but below normal in the South Central and Southeast regions. The state average was 3.83 inches, 1.19 inches above normal. Regional averages ranged from 5.20 inches, 2.12 inches above normal, for the Northeast Region to 2.44 inches, 0.21 inch below normal, for the South Central Region. Painesville (Lake County) reported the greatest amount of October precipitation, 8.41 inches. Gallipolis Locks and Dam (Gallia County) reported the least amount, 1.65 inches.

The first week of the month was wet and stormy across Ohio. Most of the state received at least 1 inch of precipitation during this period with 2-4 inches reported throughout much of the northwestern two-thirds of Ohio. The heaviest rains occurred on October 5 and 6 and were the result of an approaching cold front and precipitation streaming north from Tropical Storm Karen. More than 3 inches of rain fell in areas in the northwestern two-thirds of the state. Minor urban and small stream flooding was reported at a few locations as a result of this rain. The next week was dry across most of the state with some areas reporting no rain at all. Precipitation occurred on many of the days from October 15-24. Most of the state received between 1 and 1.5 inches of precipitation; however, areas in northwestern Ohio received lesser amounts. Some areas reported the first snow of the season during October 23-24. Although accumulations were generally less than 1 inch, the northeastern Ohio snowbelt reported up to 5 inches of heavy, wet snow. The weight of the snow on trees that still had their leaves toppled trees, broke branches and brought down power lines in the snowbelt counties. Severe storms on the last day of the month brought heavy downpours and high winds to many areas of the state.

Precipitation for the 2013 calendar year is above normal throughout most of the state, but below normal in the South Central Region. The state average is 34.97 inches, 1.91 inches above normal. Regional averages range from 37.70 inches, 4.66 inches above normal, for the Northeast Region to 32.58 inches, 0.31 inches above normal, for the West Central Region.

The 2014 water year (October 1, 2013 to September 30, 2014) is off to a good start as far as precipitation is concerned. The Ohio Agricultural Statistics Service reports that soil moisture near the end of October was 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. Conditions are favorable for water supply replenishment during the 2014 recharge season; however, near normal precipitation and other climatic conditions will be necessary during the next several months.

PRECIPITATION OCTOBER



Average (in)
Percent of normal

PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.) Base period 1961-2010					Palmer Drought Severity Index*
	This Month	3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	+1.52	-0.40	+1.73	+1.68	+3.63	+1.0
North Central	+1.34	+0.31	+5.78	+4.71	+13.00	+3.7
Northeast	+2.12	+0.95	+5.99	+3.95	+9.74	+1.8
West Central	+1.37	-0.37	-1.03	-0.90	+1.72	+0.1
Central	+1.23	-0.24	+2.05	+1.57	+4.13	+0.5
Central Hills	+1.52	-0.82	+3.80	+2.61	+6.11	+0.7
Northeast Hills	+1.25	-1.07	+1.91	-0.56	-0.42	-1.4
Southwest	+1.76	+0.30	+1.91	-0.50	+1.15	+1.0
South Central	-0.21	-1.69	+0.53	-1.34	-1.00	-0.8
Southeast	-0.02	-0.84	+3.24	+1.13	+2.40	+0.3
State	+1.19	-0.39	+2.58	+1.21	+4.02	

*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

MEAN STREAM DISCHARGE

This Month

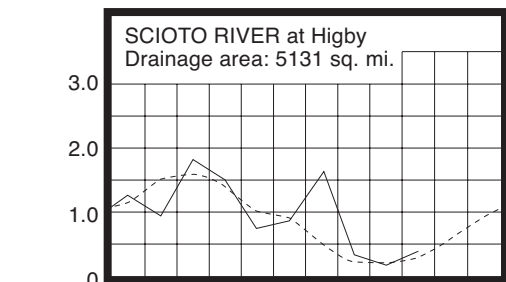
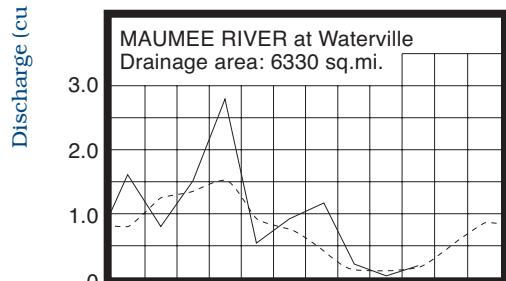
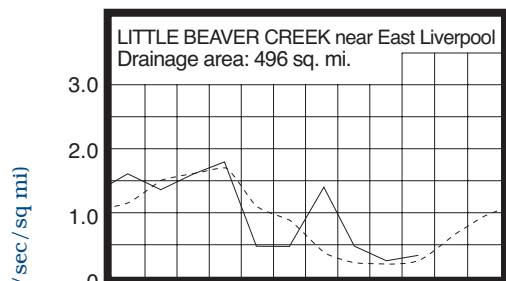
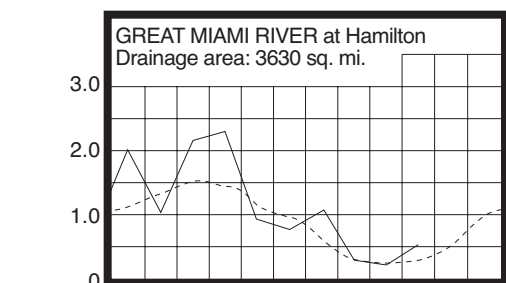
River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	943	352	155	163	107
Great Miami River at Hamilton	3,630	1,909	186	82	80	101
Huron River at Milan	371	213	395	127	173	137
Killbuck Creek at Killbuck	464	235	167	92	126	108
Little Beaver Creek near East Liverpool	496	163	131	73	80	83
Maumee River at Waterville	6,330	1,227	123	49	87	97
Muskingum River at McConnelsville	7,422	2,834	122	74	106	89
Scioto River near Prospect	567	323	926	134	150	145
Scioto River at Higby	5,131	2,010	134	80	94	90
Stillwater River at Pleasant Hill	503	80	98	32	48	92

STREAMFLOW during October was above normal across most of the state. Flows during October were greater than the flows reported during September. Flows in some central Ohio basins were high enough to be considered excessive.

Flows at the beginning of the month were below normal across most of Ohio. Lowest flows for the month occurred during October 1-3 throughout the state. Flows increased as a result of the widespread precipitation during October 3-7. Most drainage basins had their greatest flows for the month during October 7-9 following this precipitation. Flows then declined slowly through the end of the month with some temporary increases noted following local precipitation. At the end of the month, flows were below normal in all

but some of the central and northeastern Ohio drainage basins where they were above normal.

MEAN STREAM DISCHARGE

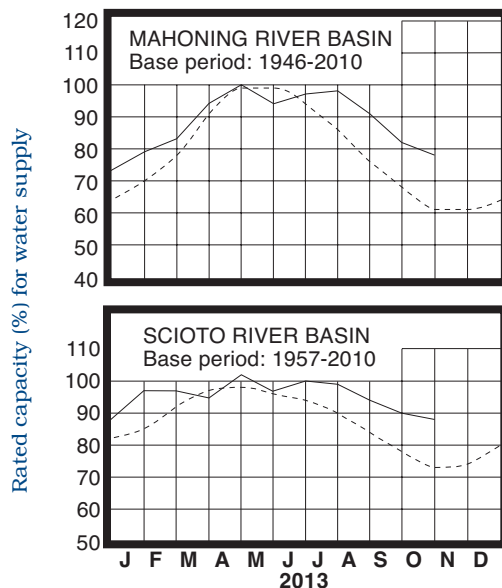


Base period for all streams: 1981-2010

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

Reservoir storage at the end of October in the Mahoning basin index reservoirs was 78 percent of rated capacity for water supply compared with 82 percent for last month and 65 percent for October 2012. Month-end storage in the Scioto basin index reservoirs was 88 percent of rated capacity for water supply compared with 90 percent for last month and 76 percent for October 2012. Surface water supplies are favorable throughout Ohio as the 2014 water year begins.

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 October showed mixed responses across the state, but most aquifers showed net declines for the month. Aquifers showing net rises during the month were generally located in the southwestern quarter of Ohio.

Ground water levels continue to remain below normal across much of the state, but are in better condition at the start of the 2014 water year than they were at the start of the 2013 water year. Ground water levels range from slightly higher than last year's level to more than 3.5 feet higher in some aquifers. The above normal precipitation across most of the state during October has improved soil moisture conditions in many areas of the state and bodes well for improvement to the state's ground water storage during the 2014 recharge season.

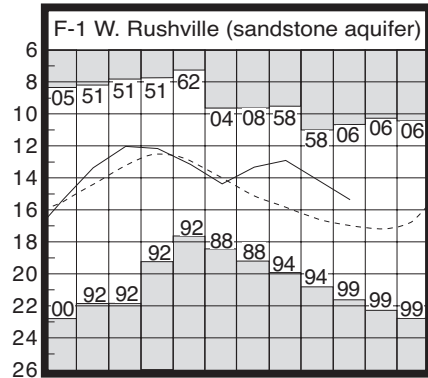
LAKE ERIE level declined during October. The mean level was 571.10 feet (IGLD-1985), 0.29 foot below last month's mean level and 0.04 foot above normal. This month's level is 0.79 foot above the October 2012 level and 1.90 feet above Low Water Datum.

The U.S. Army Corps of Engineers reports that precipitation in the Lake Erie basin during October averaged 4.23 inches, 1.45 inches above normal. For the entire Great Lakes basin, October precipitation averaged 4.05 inches, 1.16 inches above normal. For calendar year 2013 through October, the Lake Erie basin has averaged 33.52 inches, 3.62 inches above normal, while the entire Great Lakes basin has averaged 30.95 inches, 3.40 inches above normal.

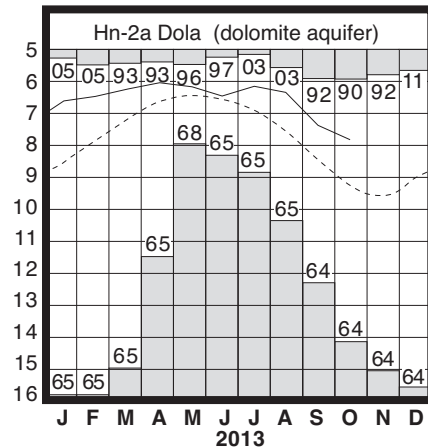
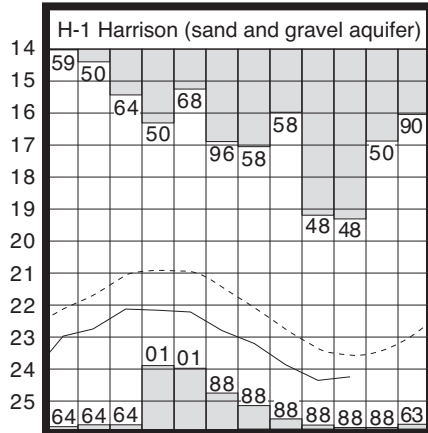
In addition, the USACE reports that based on the current condition of the Great Lakes basin and anticipated weather patterns, the level of Lake Erie should remain near normal for the next six months. Deviations from the anticipated weather patterns could result in the level of Lake Erie ranging from about 8 inches above normal to as much as 13 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	15.36	+1.62	-1.23	+2.09
Fa-1	Jasper Mill, Fayette Co.	Limestone	10.35	-1.01	+0.43	+3.64
Fr-10	Columbus, Franklin Co.	Gravel	44.08	+0.68	+0.17	+0.94
H-1	Harrison, Hamilton Co.	Gravel	24.24	-0.67	+0.09	+0.11
Hn-2a	Dola, Hardin Co.	Dolomite	7.82	+1.43	-0.43	+1.91
Po-124	Freedom, Portage Co.	Sandstone	77.12	-0.07	-0.16	+0.13
Tu-1	Strasburg, Tuscarawas Co.	Gravel	15.29	-1.16	-0.91	+0.45

GROUND-WATER LEVELS



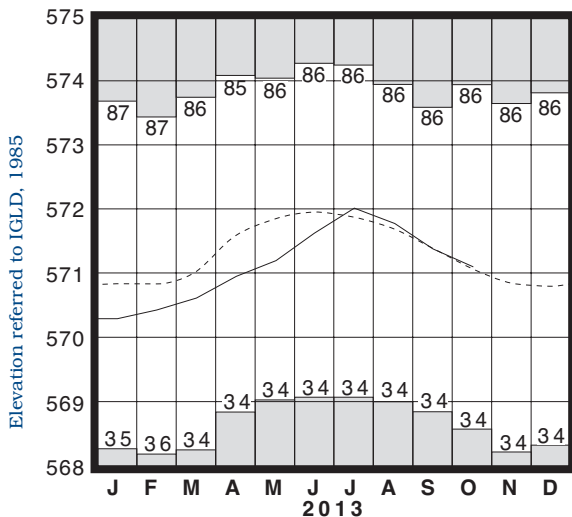
Water level (ft below land surface)



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

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

LAKE ERIE LEVELS



Base period: 1918-2010

Record high and low, year of occurrence

Normal - - - - Current ———

SUMMARY

Precipitation during October was above normal across most of the state, but below normal in the South Central and Southeast regions. Streamflow was above normal throughout most of the state. Reservoir storage declined slightly, but remained at above normal levels. Ground water showed mixed responses and remained below normal across much of the state. Lake Erie level declined 0.29 feet and was 0.04 foot above the long-term October average.

NOTES AND COMMENTS

Ohio Observation Well Network

The Ohio Department of Natural Resources (ODNR), Division of Soil and 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.

Since the beginning of ground water level monitoring in Ohio in 1938, observation wells have been used to monitor an aquifer's response to changing climatic conditions and impacts from man-induced activities. Monitoring and evaluating long-term trends in ground water levels enables water resource professionals to access 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 Soil and Water Resources monitors 138 wells distributed across the state. Once information is gathered from the field 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 138 currently active observation wells, ground water level data from an additional 208 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, 12 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 12 near-real time sites, go to the Division of Water, Water Inventory main page 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 Soil and Water Resources at (614) 265-6740 or e-mail: mike.hallfrisch@dnr.state.oh.us.

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.

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Palmer Drought Severity Index:

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service.



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MONTHLY WATER INVENTORY REPORT FOR OHIO

November 2013

Compiled By Scott C. Kirk

Hydrologist, Water Inventory Unit

<http://www.ohiodnr.gov/tabid/4191/Default.aspx>

PRECIPITATION during November was generally above normal in the eastern half of Ohio and below normal in the western half. The state average was 3.02 inches, 0.06 inch below normal. Regional averages ranged from 3.55 inches, 0.13 inch above normal, for the Northeast Region to 2.21 inches, 0.62 inch below normal, for the Northwest Region. Chardon (Geauga County) reported the greatest amount of November precipitation, 5.78 inches. Bowling Green (Wood County) reported the least amount, 1.01 inches.

Precipitation during November fell as rain and snow. Snow amounts were near or above normal across most of the state with the exception of northwestern Ohio, where very little snow was reported. The month started with several days of precipitation during the first week. Precipitation totals for the period ranged from 0.5 to 1 inch across most of the state; however, areas in northwestern Ohio received less than 0.25 inch during this period. Storms on November 1 were a continuation of the storms that occurred at the end of October. Several storms were severe with four confirmed tornadoes in the west-central and central areas of the state. Rain and snow fell during November 11-12 with 0.25-0.50 inch of precipitation reported across most of the state and around 0.75 inch in the counties bordering Lake Erie in northeastern Ohio. Snow accumulations were light across most of the state, but areas in northeastern Ohio reported 3-5 inches. The heaviest and most widespread precipitation during the month occurred on November 17 with 0.75-1.25 inches reported throughout most of Ohio and more than 2 inches reported in some areas in southwestern Ohio. Some of the storms were severe with several reports of wind damage. Five tornadoes were confirmed in northwestern Ohio; several homes and buildings in the path of these storms were damaged or destroyed. Scattered showers during November 21-22 brought 0.25-0.50 inch to most of the state. A storm system moving through the region during November 25-27 brought precipitation to the southeastern half of the state with amounts generally between 0.25 and 0.50 inch reported; more than 1 inch of rain was reported in extreme eastern and southeastern Ohio. Most of this precipitation fell as snow in southwestern, central and northeastern Ohio with 2-5 inches common and as much as 10 inches observed in northeastern Ohio. Much of northwestern Ohio received little or no precipitation from this storm.

Precipitation for the 2013 calendar year is above normal throughout most of the state; only the South Central Region has received below normal precipitation. The state average is 37.99 inches, 1.86 inches above normal. Regional averages range from 41.25 inches, 4.79 inches above normal, for the Northeast Region to 35.29 inches, which is normal for the West Central Region.

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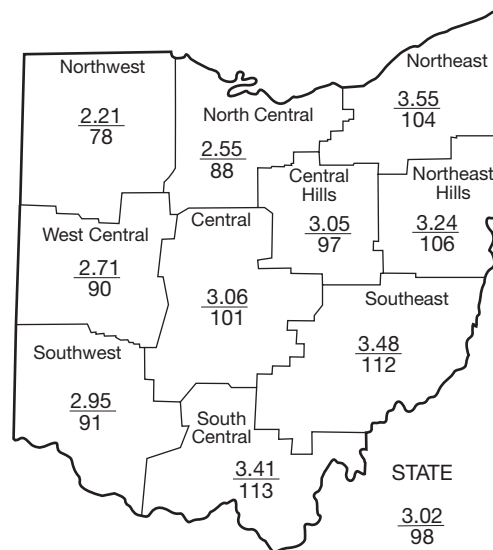
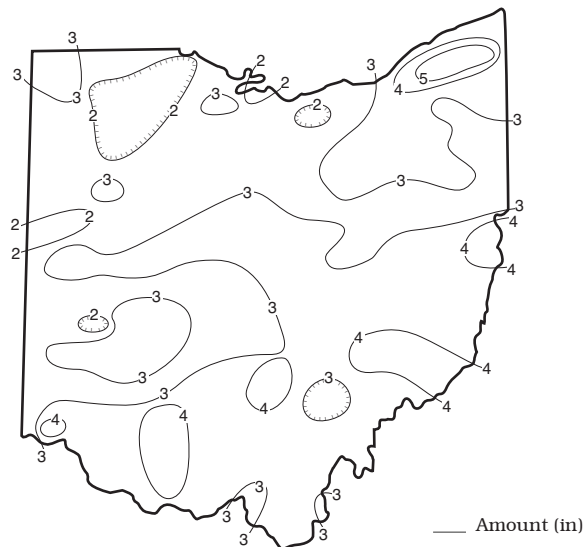
PRECIPITATION

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	-0.62	+0.13	+2.97	+2.90	-0.72	+0.7
North Central	-0.36	+0.22	+7.17	+6.42	+10.21	+3.6
Northeast	+0.13	+1.43	+7.66	+6.30	+8.58	+2.0
West Central	-0.31	+1.48	+0.79	+1.05	-1.40	+0.1
Central	+0.03	+0.71	+4.24	+3.75	+1.96	+0.7
Central Hills	-0.08	+0.87	+6.08	+4.72	+4.27	+0.8
Northeast Hills	+0.18	+0.56	+4.36	+1.95	-1.81	-0.7
Southwest	-0.29	+1.84	+2.62	+1.53	-2.56	+1.3
South Central	+0.38	-0.36	+3.15	+1.46	-3.32	+0.1
Southeast	+0.37	-0.86	+5.77	+4.11	+0.90	+0.8
State	-0.06	+0.60	+4.47	+3.39	+1.58	

*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 NOVEMBER



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	1,459	141	142	188	109
Great Miami River at Hamilton	3,630	2,839	148	98	92	105
Huron River at Milan	371	304	171	139	217	135
Killbuck Creek at Killbuck	464	428	156	116	151	109
Little Beaver Creek near East Liverpool	496	304	97	70	94	84
Maumee River at Waterville	6,330	1,797	55	43	91	98
Muskingum River at McConnelsville	7,422	6,058	117	80	123	89
Scioto River near Prospect	567	516	265	136	188	145
Scioto River at Higby	5,131	3,883	127	95	114	93
Stillwater River at Pleasant Hill	503	213	104	45	53	94

STREAMFLOW during November was above normal throughout most of Ohio, but below normal in the northwestern areas of the state. Flows in some north-central Ohio basins were high enough to be considered excessive. Flows during November were greater than the flows observed during October statewide.

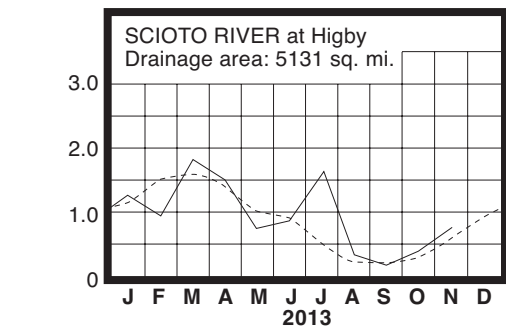
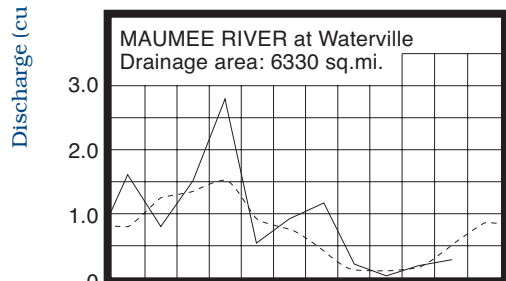
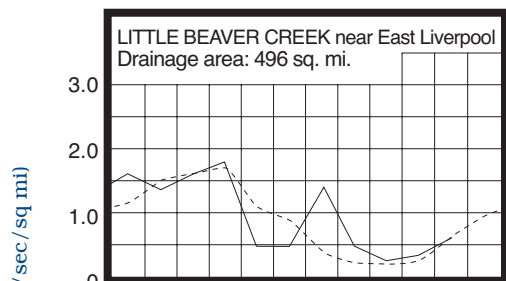
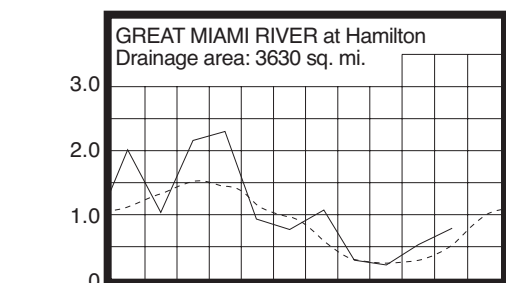
Flows at the beginning of the month were above normal in northeastern, central and southwestern Ohio, and below normal elsewhere. Drainage basins in eastern and southeastern areas of the state had their lowest flows for November during the first few days of the month. Drainage basins in western and south-central areas had their lowest flows near November 16, just prior to the month's most widespread precipitation, while basins in northeastern Ohio had their lowest

flows near the end of the month. Most basins recorded their greatest flows for the month during November 18-20 following the widespread precipitation of November 17. Flows declined from these peaks through the end of the month and were below normal across most of the state at month's end.

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

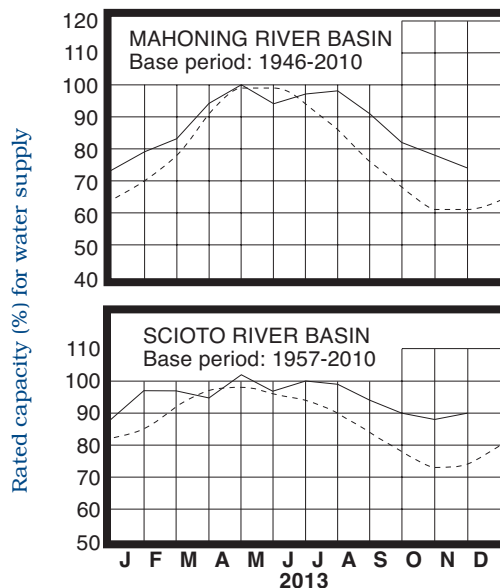
Reservoir storage at the end of November in the Mahoning basin index reservoirs was 74 percent of rated capacity for water supply compared with 78 percent for last month and 66 percent for November 2012. Month-end storage in the Scioto basin index reservoirs was 90 percent of rated capacity for water supply compared with 88 percent for last month and 76 percent for November 2012. Surface water supplies remain in excellent condition 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 November showed some improvement in most aquifers across the state. Generally, levels either were rather stable throughout the month or were stable during the first half of the month and rose slightly during the second half. Positive net changes from last month's levels were noted in several aquifers with less than normal declines observed in most other aquifers.

Although ground water levels continue to remain below normal across much of Ohio, ground water supplies are adequate throughout the state. Current levels are higher than they were a year ago statewide, ranging from about 0.25 foot to more than 5 feet higher than the November 2012 levels. Current conditions favor a beneficial recharge season. The Ohio Agricultural Statistics Service reports that soil moisture near the end of November was rated as being short in 1 percent of the state, adequate in 70 percent of the state, and surplus in 29 percent of the state. Near-normal precipitation and other climatic conditions throughout the current recharge season should provide conditions favorable for the state's ground water supplies.

LAKE ERIE level declined during November. The mean level was 570.77 feet (IGLD-1985), 0.33 foot below last month's mean level and 0.06 foot below normal. This month's level is 0.43 foot above the November 2012 level and 1.57 feet above Low Water Datum.

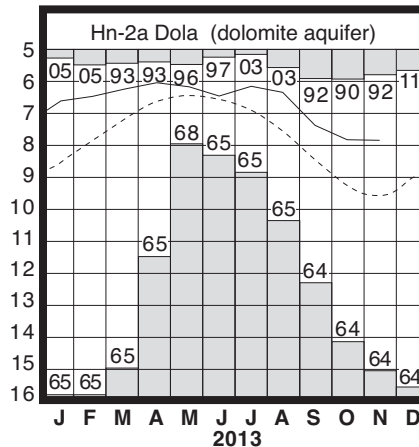
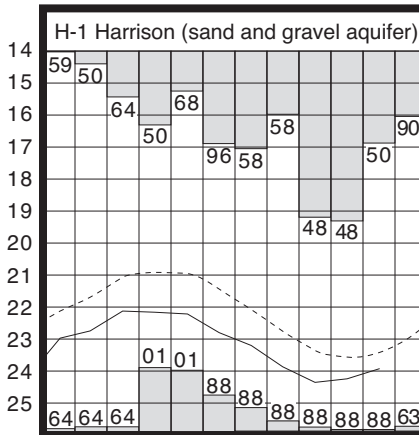
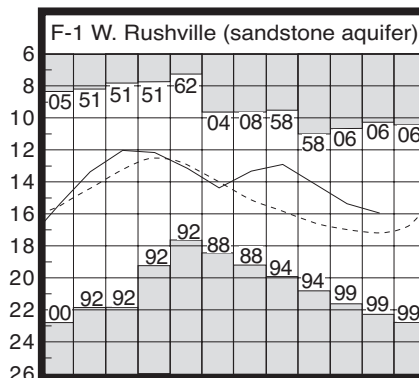
The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during November averaged 1.77 inches, 1.09 inches below normal. For the entire Great Lakes basin, November precipitation averaged 2.53 inches, 0.21 inch below normal. For calendar year 2013 through November, the Lake Erie basin has averaged 35.29 inches of precipitation, 2.53 inches above normal, while the entire Great Lakes basin has averaged 33.48 inches, 3.19 inches above 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 near normal for the foreseeable future. Deviations from the anticipated weather patterns could result in the level of Lake Erie ranging from about 9 inches above normal to as much as 13 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	15.96	+1.23	-0.60	+1.75
Fa-1	Jasper Mill, Fayette Co.	Limestone	9.43	-0.26	+0.92	+5.39
Fr-10	Columbus, Franklin Co.	Gravel	43.80	+0.75	+0.28	+1.13
H-1	Harrison, Hamilton Co.	Gravel	23.92	-0.51	+0.32	+0.35
Hn-2a	Dola, Hardin Co.	Dolomite	7.84	+1.73	-0.02	+0.14
Po-124	Freedom, Portage Co.	Sandstone	77.15	-0.06	-0.03	+0.28
Tu-1	Strasburg, Tuscarawas Co.	Gravel	15.00	-0.84	+0.29	+0.23

GROUND-WATER LEVELS

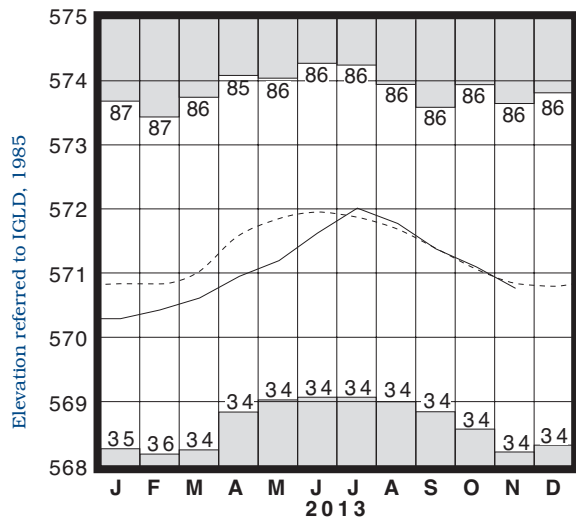
Water level (ft below land surface)



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

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

LAKE ERIE LEVELS



Base period: 1918-2010

Record high and low, year of occurrence

Normal - - - - Current ———

(Precipitation continued from front)

Precipitation for the first two months of the 2014 water year is above normal throughout most of Ohio. The state average is 6.85 inches, 1.13 inches above normal. Regional averages range from 8.75 inches, 2.25 inches above normal, for the Northeast Region to 5.85 inches, 0.17 inch above normal, for the South Central Region.

SUMMARY

Precipitation during November was generally above normal in the eastern half of Ohio and below normal in the western half. Streamflow was above normal throughout most of the state. Reservoir storage declined in the Mahoning River basin, increased in the Scioto River basin, and remained above normal in both basins. Ground water levels showed some improvement in most aquifers, but remained below normal across much of the state. Lake Erie level declined 0.33 foot and was 0.06 foot below the long-term November average.

NOTES AND COMMENTS

Division of Soil and Water Resources Has New Leadership

Ohio Department of Natural Resources (ODNR) director James Zehring recently announced the appointment of Mike Bailey as the new chief of the ODNR Division of Soil and Water Resources (DSWR). Mike had been serving as the deputy chief of the division since 2012. Prior to coming to ODNR, Mike worked at the Ohio Department of Agriculture for eight years. He served as executive director of the Office of Farmland Preservation, where he oversaw the administration of the Clean Ohio Agricultural Easement Purchase Program, the Ohio Agricultural Easement Donation Program and the Ohio Agricultural Security Area Program. Mike also served as the executive director of the Ohio Livestock Care Standards Board. His role included coordinating all the legal, legislative, communications and administrative functions in support of the board's efforts to lead the nation in creating sound and comprehensive standards of care for livestock.

Mr. Bailey has earned both a bachelor's and master's degree in agricultural economics from The Ohio State University. Mike follows Karl Gebhardt who will continue to serve in his role as deputy director for the department. Congratulations to Mike on his appointment as chief of the DSWR.

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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MONTHLY WATER INVENTORY REPORT FOR OHIO

December 2013

Compiled By Scott C. Kirk

Hydrologist, Water Inventory Unit

<http://www.ohiodnr.gov/tabid/4191/Default.aspx>

PRECIPITATION during December was above normal throughout Ohio with only a few scattered locations having below normal precipitation. The state average was 4.15 inches, 1.24 inches above normal. Regional averages ranged from 5.13 inches, 1.98 inches above normal, for the South Central Region to 3.26 inches, 0.63 inch above normal, for the Northwest Region. Waverly (Pike County) reported the greatest amount of December precipitation, 6.79 inches. Wauseon (Fulton County) reported the least amount, 2.46 inches.

Precipitation during December fell as both rain and snow. Most areas reported above normal snow for the month. There was measurable precipitation reported on several days in December, but only a few days had significant amounts of precipitation. Precipitation on December 5 fell as rain, but turned to snow across most of the state on December 6. Precipitation amounts were greatest in extreme southeastern Ohio where more than 2 inches was reported. Amounts decreased to the north and west to less than 0.10 inch in northwestern Ohio. Precipitation on December 14 began as snow, but turned to rain in southern Ohio. Several inches of snow fell across northern Ohio. The greatest amount of precipitation for most areas of Ohio fell as rain during December 20-23. More than 1 inch fell throughout the state with most areas reporting in excess of 2 inches and as much as 3-4 inches at some locations from west-central to north-central Ohio. Runoff from the excessive rain combined with melting snow causing widespread flooding across the state, especially in northern Ohio. Light precipitation fell across the state during the last three days of the month with generally 0.25 inch falling at most locations; however, lesser amounts fell in northwestern areas and more than 0.50 inch was reported across extreme southern and southeastern Ohio.

Precipitation for the first three months of the 2014 water year is above normal statewide. The state average is 10.99 inches, 2.36 inches above normal. Regional averages range from 12.22 inches, 2.60 inches above normal, for the Northeast Region to 9.38 inches, 1.53 inches above normal, for the Northwest Region. The 2014 water year recharge season is off to a good start as far as precipitation is concerned. With near-normal precipitation during the next few months, conditions should favor continued improvement to Ohio's water resources throughout the remainder of the recharge period.

Precipitation for the 2013 calendar year was above normal throughout most of the state with only a few locations in south-central Ohio having below normal precipitation. The state average was 42.14 inches, 3.10 inches above normal. Regional averages ranged from 44.96 inches, 5.38 inches above normal, for the Northeast Region to 38.58 inches, 3.56 inches above normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column). Dorset (Ashtabula County) reported the greatest amount of precipitation for the year, 56.06 inches. North Georgetown (Columbiana County) reported the least amount of precipitation during 2013, 33.56 inches. An isohyetal map

(continued on back)

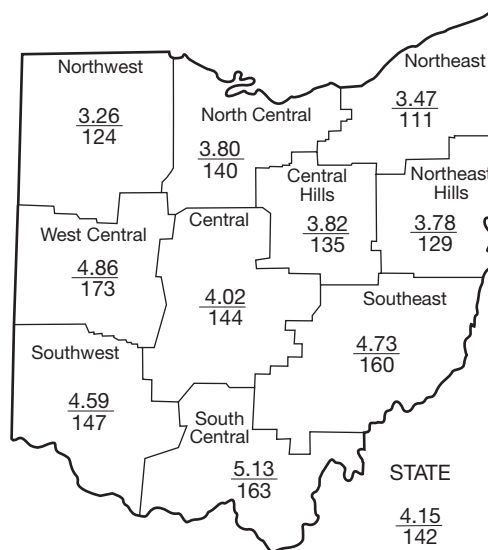
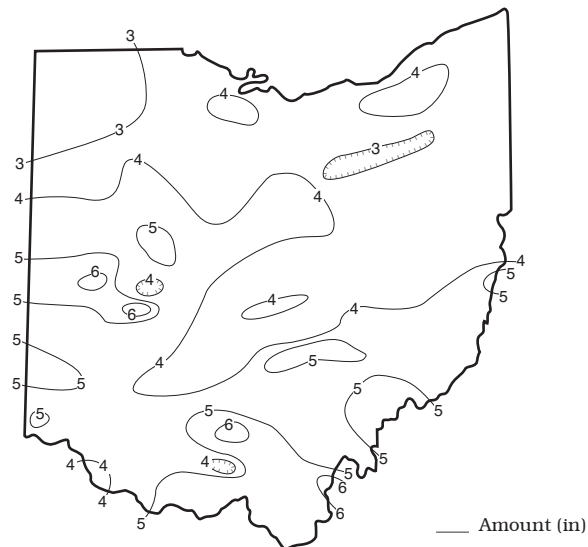
PRECIPITATION

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	+0.63	+1.53	+1.95	+3.56	-1.14	+1.5
North Central	+1.09	+2.07	+6.01	+7.29	+9.92	+4.4
Northeast	+0.35	+2.60	+4.72	+5.38	+7.60	+2.3
West Central	+2.05	+3.11	+2.67	+2.07	-1.58	+1.2
Central	+1.22	+2.39	+3.58	+3.08	+0.96	+1.3
Central Hills	+0.99	+2.43	+3.43	+4.32	+3.20	+1.4
Northeast Hills	+0.86	+2.29	+2.19	+1.03	-1.99	+0.8
Southwest	+1.46	+2.93	+2.92	+1.76	-3.69	+2.0
South Central	+1.98	+2.15	+3.12	0.00	-1.15	+1.4
Southeast	+1.77	+2.12	+5.11	+2.72	+2.33	+1.6
State	+1.24	+2.36	+3.56	+3.10	+1.42	

*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
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 DECEMBER



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	2,041	154	141	165	115
Great Miami River at Hamilton	3,630	10,300	289	177	145	122
Huron River at Milan	371	974	286	195	251	151
Killbuck Creek at Killbuck	464	875	219	154	177	115
Little Beaver Creek near East Liverpool	496	956	204	116	122	88
Maumee River at Waterville	6,330	9,900	181	99	109	109
Muskingum River at McConnelsville	7,422	14,060	158	117	140	93
Scioto River near Prospect	567	1,711	381	214	247	163
Scioto River at Higby	5,131	10,760	223	150	151	103
Stillwater River at Pleasant Hill	503	1,637	474	171	120	115

STREAMFLOW during December was above normal throughout Ohio. Flows were high enough to be considered excessive across most of the state. Flows during December were greater than flows reported during November. Preliminary data indicates that the Great Miami River at Hamilton and the Stillwater River at Pleasant Hill recorded their third highest December flow for their respective periods of record.

Streamflow at the beginning of the month was below normal throughout the state. Drainage basins in eastern and south-central Ohio had their lowest flows for the month at or near the beginning of December. Most of the remainder of the drainage basins in Ohio had their lowest flows between December 10 and 13, but a few basins had slightly lower flows around December 18 and 19. Streamflow increased rapidly as a result of widespread precipitation that fell during December

20-23. Greatest flows for the month were recorded during December 22-25 throughout the state. Flows declined from these peaks through the end of the month, but remained above normal in the southern two-thirds of Ohio while falling to slightly below normal in the northern third.

Streamflow for the 2013 calendar year was above normal throughout most of Ohio with only a few basins in eastern areas of the state having below normal flows (see Mean Stream Discharge table, past 12 months column). Streamflow during January was above normal statewide with minor flooding in northwestern Ohio. Flows during the next five months were mostly below normal as only April and June had above normal flows across much of the state. Some minor flooding occurred in March, April and June. During the second half of the year flows were above normal throughout the state. Major flooding was reported across many areas of the state during July with south-eastern Ohio being hit the hardest. Stream gauging stations indicate that flows across much of the state were at near-record July levels. Minor flooding also occurred during October and December.

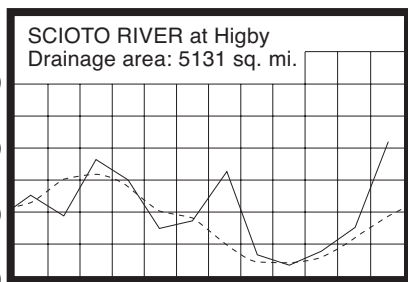
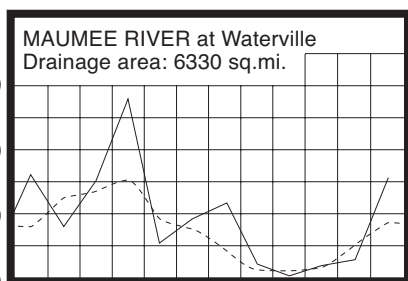
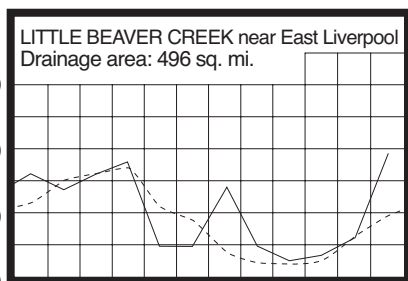
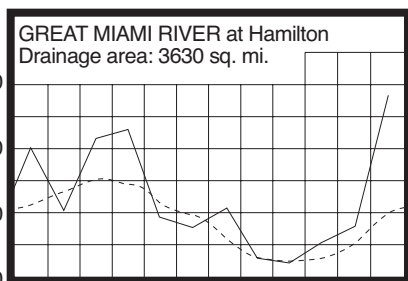
RESERVOIR STORAGE for water supply during December increased in both the Mahoning and Scioto river basins. Storage continued to remain above normal in both basins.

Reservoir storage at the end of December in the Mahoning basin index reservoirs was 79 percent of rated capacity for water supply compared with 74 percent for last month and 73 percent for December 2012. Month-end storage in the Scioto basin index reservoirs was 96 percent of rated capacity for water supply compared with 90 percent for last month and 88 percent for December 2012.

Surface water supplies were adequate throughout the 2013 calendar year. Storage in reservoirs across the state was near or above normal throughout the year. Above normal precipitation during the summer months kept reservoir levels higher than normal and helped reduce the demand for public water supplies. However, many flood control and recreational reservoirs utilized available storage during July as a result of much above normal precipitation that fell during June and July. At the end of the year, surface water supplies are in excellent condition.

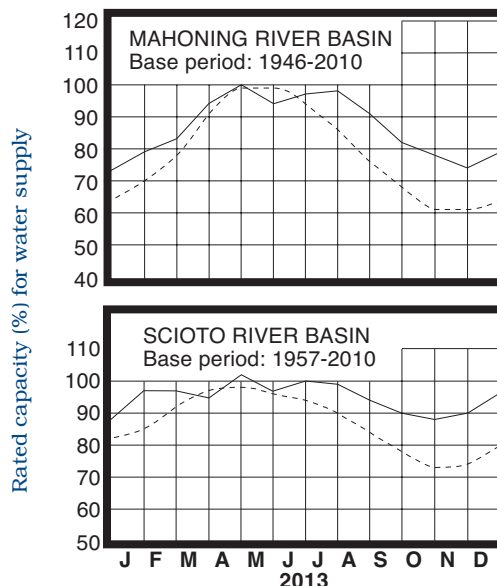
MEAN STREAM DISCHARGE

Discharge (cu ft/sec/sq mi)



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 December rose in aquifers throughout Ohio. Net rises during December were greater than usually expected. Generally, ground water levels rose steadily throughout the month in most consolidated aquifers and deeper unconsolidated aquifers. Levels in shallow, unconsolidated aquifers were rather steady during the first three weeks of December and then responded to widespread precipitation, rising through the end of the month.

The 2014 water year recharge season is off to a good start as far as ground water supplies are concerned. Ground water levels are near or above normal in most aquifers throughout the state and current levels are above last year's levels in most aquifers across Ohio. Some consolidated aquifers of southwestern and south-central Ohio are more than 6.5 feet higher than the December 2012 levels.

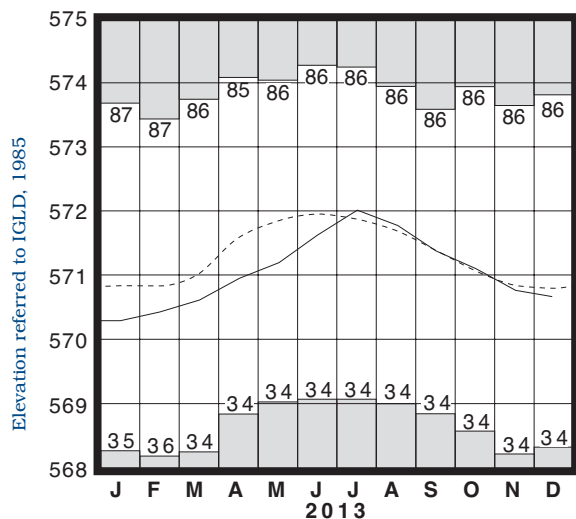
Ground water storage during the 2013 calendar year improved throughout most of Ohio. At the beginning of the year, levels were below normal throughout most of the state and at record-low December levels in some aquifers in south-central and southwestern Ohio. The first five months of 2013 were not particularly favorable for ground water supplies. Precipitation was below normal statewide and ground water levels remained below normal throughout most of the state. The situation began to improve with the above normal precipitation that fell during June across most of Ohio. This was followed by much above normal precipitation during July which provided much needed recharge and reduced demand on the state's ground water supplies. Precipitation during August and September was below normal and ground water levels were still below normal across much of Ohio. Above normal precipitation during the last three months of the year was beneficial for ground water supplies and at the end of the year, ground water levels had improved to above normal throughout most of Ohio. Current levels are also higher than they were at this time last year across nearly the entire state. With near-normal precipitation and other climatic conditions, the outlook for adequate recharge during the next several months is favorable.

LAKE ERIE level declined seasonally during December. The mean level was 570.67 feet (IGLD-1985), 0.10 foot below last month's mean level and 0.13 foot below normal. This month's level is 0.39 foot above the December 2012 level and 1.47 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during December averaged 3.10 inches, 0.44 inch above normal. For the entire Great Lakes basin, December precipitation averaged 1.57 inches, 0.81 inch below normal. For calendar year 2013, the Lake Erie basin averaged 38.39 inches of precipitation, 2.97 inches above normal, while the entire Great Lakes basin averaged 35.05 inches, 2.38 inches above normal.

Lake Erie's level was below normal during the first half of the year. In response to the above normal precipitation that fell in the Great Lakes basin during June and July, the level of Lake Erie rose to above normal during July. The level of Lake Erie was at or slightly above normal during the next three months before falling back below normal during November and December. The USACE predicts that, based on the current condition of the Great Lakes basin and anticipated future weather conditions, the level of Lake Erie should remain near-normal for the next several months.

LAKE ERIE LEVELS



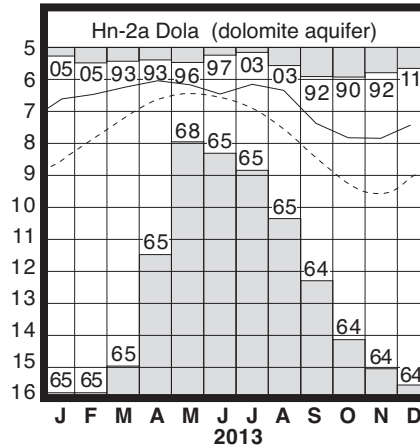
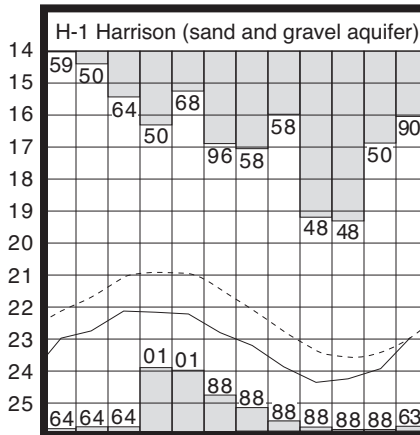
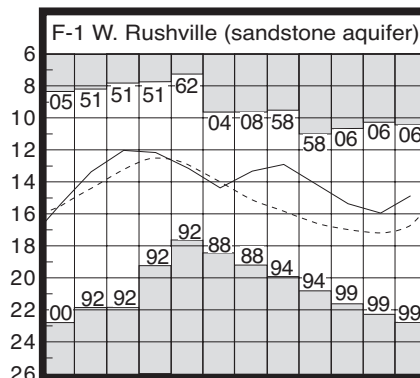
Base period: 1918-2010

Record high and low, year of occurrence

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	14.87	+1.84	+1.09	+2.70
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.67	-0.04	+0.76	+6.75
Fr-10	Columbus, Franklin Co.	Gravel	43.35	+0.89	+0.45	+1.20
H-1	Harrison, Hamilton Co.	Gravel	22.94	+0.01	+0.98	+1.21
Hn-2a	Dola, Hardin Co.	Dolomite	7.42	+1.66	+0.42	-0.13
Po-124	Freedom, Portage Co.	Sandstone	76.95	+0.08	+0.20	+0.38
Tu-1	Strasburg, Tuscarawas Co.	Gravel	14.67	-0.86	+0.33	+0.17

GROUND-WATER LEVELS

Water level (ft below land surface)



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)

and regional averages with percentages of normal precipitation for the 2013 calendar year appear below.

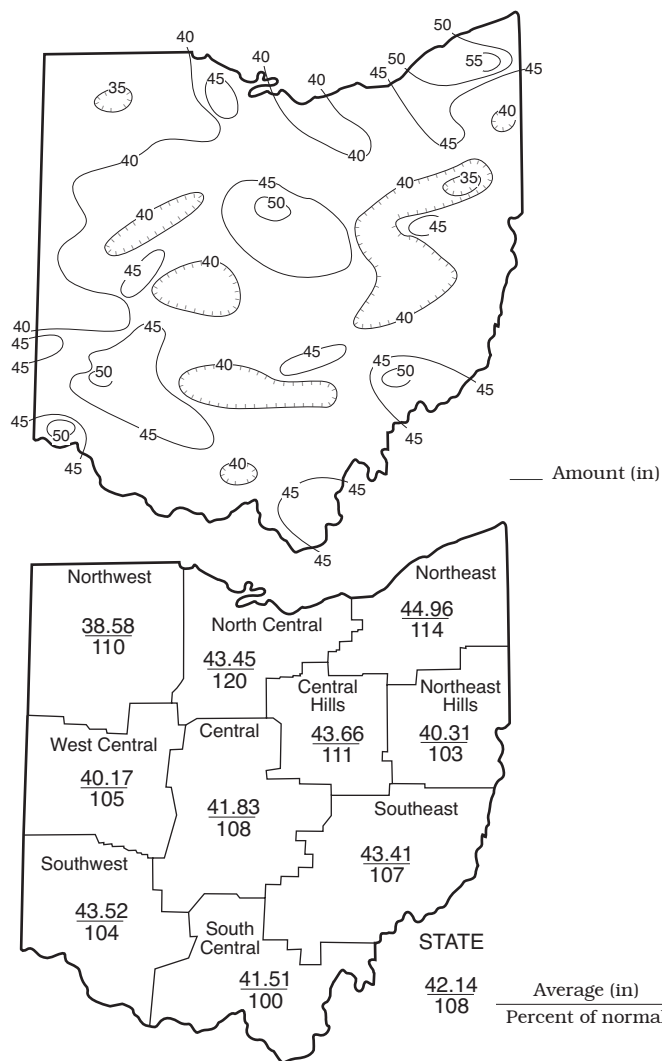
Although precipitation was above normal in western Ohio during January and the northern two-thirds of the state during April, cumulative precipitation during the first five months of the year was below normal. Much above normal precipitation during June and July was beneficial for Ohio's water resources and paved the way for an overall satisfactory growing season for agricultural crops in the state. This June and July period was the second wettest for the state during the past 131 years. August and September precipitation was below normal throughout most of the state. Above normal precipitation during the last three months of the year got the 2014 water supply recharge season off to a good start. At the end of 2013, conditions favor continued improvement in water supplies.

SUMMARY

December precipitation was above normal throughout most of the state. Streamflow was above normal statewide and high enough to be considered excessive across most of Ohio. Reservoir storage increased and remained at above normal levels. Ground water storage increased and was at above normal levels throughout most of the state. Lake Erie level declined 0.10 foot and was 0.13 foot below the long-term December average.

Precipitation for the 2013 calendar year was above normal statewide. Streamflow was above normal in all but a few eastern Ohio drainage basins. Reservoir storage was near or above normal throughout the year. Ground water levels improved and were above normal across most of the state at year's end. Lake Erie was below its long-term average during the first half of 2013, near or above normal from July through October, then slightly below normal during the last two months of the year.

PRECIPITATION 2013 CALENDAR YEAR



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.



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