



# MONTHLY WATER INVENTORY REPORT FOR OHIO

December 2012

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

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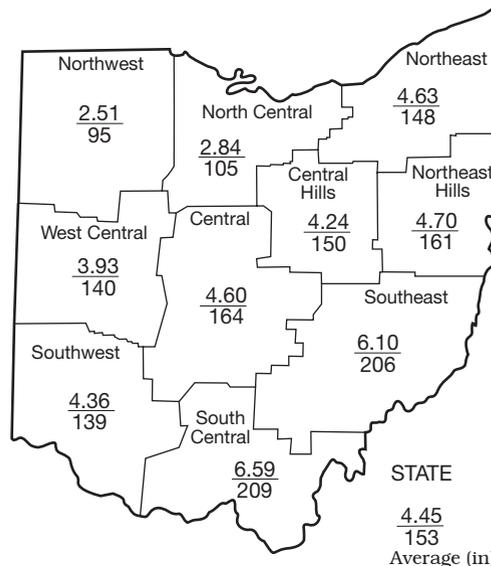
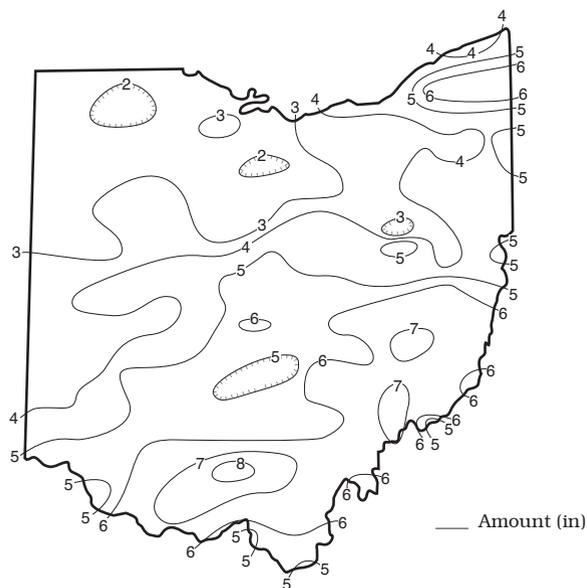
**PRECIPITATION** during December was above normal throughout most of the state; only the Northwest Region had below normal precipitation. The average for the state was 4.45 inches, 1.54 inches above normal. This was the seventh wettest December during the past 130 years for the state as a whole. Regional averages ranged from 6.59 inches, 3.44 inches above normal, for the South Central Region to 2.51 inches, 0.12 inch below normal, for the Northwest Region. Six of the state's ten climatic regions ranked in the top ten wettest December's of record including the third wettest for the Southeast Region and the fourth wettest for both the South Central and Northeast Hills regions. Piketon (Pike County) reported the greatest amount of December precipitation, 8.72 inches. Grand Rapids (Wood County) reported the least amount, 1.29 inches.

Precipitation during December generally fell as rain during the first 20 days and as snow the last 11 days. Snowfall was above normal throughout most of Ohio. The greatest amount of precipitation for the month fell as rain during December 2-10. Most areas recorded more than 1.5 inches of rain during this period with areas in southern Ohio reporting more than 3 inches; much of northwestern Ohio received less than 1 inch. Conditions were rather dry during the next week across the state. Precipitation re-entered Ohio on December 17. The precipitation started as rain but changed to snow on December 21 as colder temperatures moved into the state. Most areas reported at least 1 inch of precipitation during this period. Precipitation fell nearly every day during December 26-31, mostly falling as snow in northern and central Ohio, and as rain and snow in southern Ohio. Precipitation amounts during this period were between 1 and 1.5 inches across most of the state, but less than 0.5 inch in northwestern Ohio. More than 1 foot of snow was reported in much of northern and central Ohio during the last 11 days of the month; lesser amounts were reported in southern Ohio. Several inches of snow remained on the ground at month's end as below normal temperatures continued across the state.

Precipitation for the first three months of the 2013 water year is above normal throughout most of Ohio with only the Northwest and Southwest regions having below normal precipitation. The state average is 9.91 inches, 1.28 inches above normal. Regional averages range from 13.18 inches, 3.56 inches above normal, for the Northeast Region to 6.76 inches, 1.09 inches below normal, for the Northwest Region.

Precipitation for the 2012 calendar year was below normal throughout most of Ohio with only the North Central and Northeast regions having above normal precipitation. The state average was 37.30 inches, 1.72 inches below normal. Regional averages ranged from 41.80 inches, 2.22 inches above normal, for the Northeast Region to 30.30 inches, 4.72 inches below normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column). Chardon (Geauga County) reported the greatest amount of precipitation for the year, 49.88 inches. Napoleon (Henry County) reported the

## PRECIPITATION DECEMBER



(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	-0.12	-1.09	+0.15	-4.72	+12.78	-0.9
North Central	+0.13	+2.10	+3.73	+2.13	+21.90	+4.0
Northeast	+1.51	+3.56	+5.71	+2.22	+23.34	+4.0
West Central	+1.12	+0.30	+2.04	-3.58	+14.59	+1.3
Central	+1.80	+1.11	+0.65	-2.12	+14.69	+1.2
Central Hills	+1.41	+1.64	+1.81	-1.12	+14.02	+2.9
Northeast Hills	+1.78	+1.81	+1.95	-3.02	+12.45	+1.4
Southwest	+1.23	-0.44	-1.83	-5.45	+13.41	+0.2
South Central	+3.44	+2.18	+2.03	-1.15	+17.22	+1.9
Southeast	+3.14	+1.63	+2.55	-0.39	+15.38	+2.5
State	+1.54	+1.28	+1.88	-1.72	+15.97	

\*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

## 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	1,350	102	121	97	80
Great Miami River at Hamilton	3,630	2,610	73	61	53	78
Huron River at Milan	371	341	100	203	136	103
Killbuck Creek at Killbuck	464	511	128	109	76	78
Little Beaver Creek near East Liverpool	496	641	137	87	63	66
Maumee River at Waterville	6,330	2,714	50	41	34	57
Muskingum River at McConnelsville	7,422	10,180	114	93	67	70
Scioto River near Prospect	567	639	142	150	121	100
Scioto River at Higby	5,131	4,501	93	82	65	79
Stillwater River at Pleasant Hill	503	416	121	70	57	58

**STREAMFLOW** during December was above normal in most drainage basins, but below normal in the northwestern and southwestern areas of the state. Flows during December increased seasonally from the November flows in most areas of Ohio.

Flows at the beginning of the month were below normal statewide. Lowest flows for December occurred at or near the beginning of the month. Flows increased during the first 11 days of the month as a result of widespread rains that fell across the state. Greatest flows for the month occurred on December 11 in the eastern one-third of Ohio. Flows decreased from these peaks during the next week before increasing again in response to the December 17-21 precipitation. Greatest flows for the month occurred around December 21-22 in the western two-thirds of the state. Flows decreased from these peaks and were

below normal at month's end.

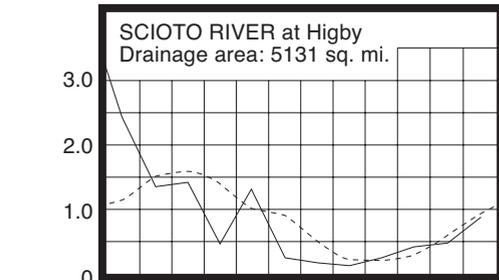
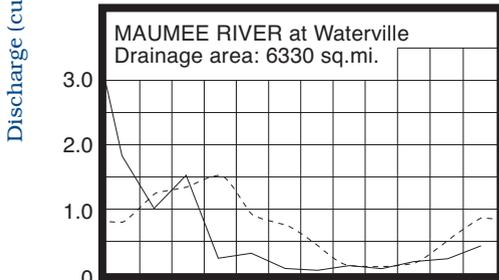
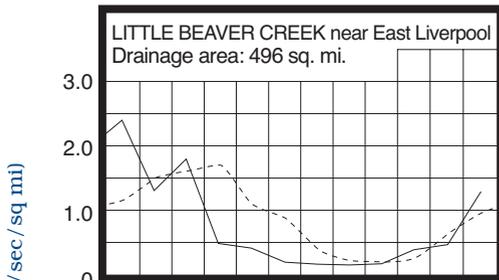
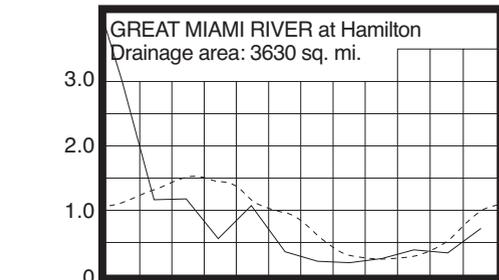
Streamflow for the 2012 calendar year was below normal across most of the state (see Mean Stream Discharge table, percent of normal, past 12 months column). Flows during January were above normal and high enough to be considered excessive with some minor flooding reported. Flows were below normal during February, while during March flows were above normal across much of the state. From April through August, streamflow was below normal as drought-like conditions impacted the state. Many flows during this period were low enough to be considered deficient with some locations recording record or near-record low monthly flows during April, June and July. Generally, flows were above normal across much of the state during the fall months as above normal precipitation fell in three of the last four months of the year. However, at the end of the year, streamflow had declined to below normal statewide.

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

Reservoir storage at the end of December in the Mahoning basin index reservoirs was 73 percent of rated capacity for water supply compared with 66 percent for last month and 73 percent for December 2011. Month-end storage in the Scioto basin index reservoirs was 88 percent of rated capacity for water supply compared with 76 percent for last month and 83 percent for December 2011.

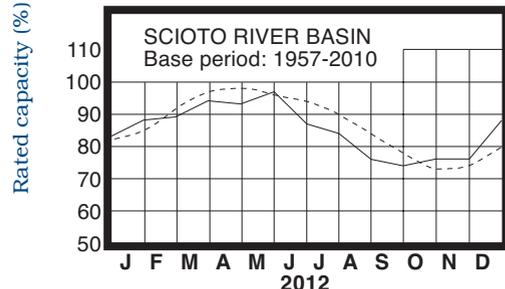
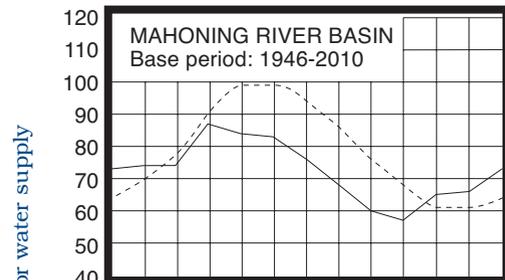
Surface water supplies were adequate in most areas of the state in spite of the drought-like conditions that existed during much of 2012. Reservoir storage was near or above normal during the winter but fell to below normal levels during March. Reservoir storage remained below normal until early autumn when above normal precipitation and streamflow during October brought storage up to above normal levels. Reservoir storage in both the Mahoning and Scioto river basins remained at above normal levels through the end of the 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 December rose in most aquifers across Ohio. Levels in most aquifers rose steadily throughout the month, although a few aquifers had begun to decline slightly at months end. Exceptions were noted in some consolidated aquifers where levels were steady or declining slightly during the first half of the month, then rose during the second half.

The 2012 calendar year was not favorable for ground water supplies. Although ground water supplies were adequate during the year in most areas of the state, levels in some aquifers fell to record or near record low levels. Ground water levels were above normal at the start of the 2012 calendar year. However, recharge during the winter and spring months of 2012 was less than usually expected due to below normal precipitation. Persistent below normal precipitation continued through August and temperatures were much above normal during the spring and summer months. This contributed to a sharp decline in ground water levels. By early summer, ground water had fallen to below normal levels throughout most of the state. Levels continued to decline seasonally throughout summer and early autumn. Observation well Tu-1 near Strasburg (Tuscarawas County), representing sand and gravel aquifers in eastern Ohio, reached a record low level for July. Noticeably below normal precipitation during November delayed the start of any significant recharge to ground water supplies across most of the state. Ground water levels responded favorably to the above normal precipitation during December. However, at the end of the year, most ground water levels remain below normal, exceeding 6 feet below normal in some areas. 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. Current ground water levels are also lower than they were a year ago, ranging from about 1 foot to more than 8 feet lower than the December 2011 levels. Water supply managers with ground water sources should closely monitor their situations throughout the current recharge season.

**LAKE ERIE** level declined during December. The mean level was 570.28 feet (IGLD-1985), 0.06 foot lower than last month's mean level and 0.52 foot below normal. This month's mean level is 1.90 feet lower than the December 2011 level and 1.08 feet above Low Water Datum.

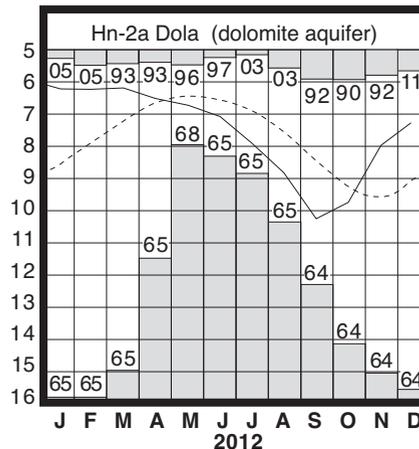
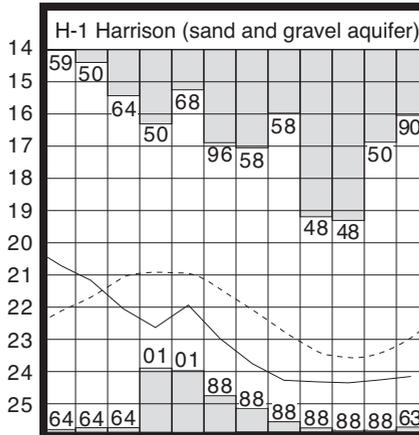
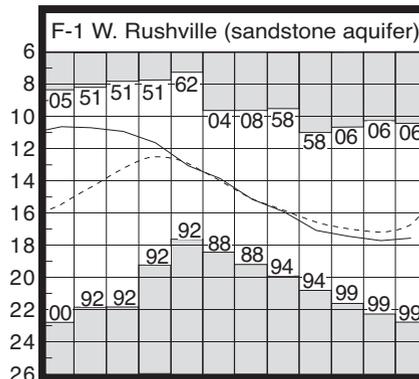
The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during December averaged 2.65 inches, 0.02 inch below normal. For the entire Great Lakes basin, December precipitation averaged 2.16 inches, 0.22 inch below normal. For calendar year 2012, the Lake Erie basin averaged 31.12 inches of precipitation, 4.30 inches below normal, while the entire Great Lakes basin averaged 29.26 inches, 3.37 inches below normal.

Lake Erie level was above normal during the first four months of the 2012 calendar year. The combination of below normal precipitation and above normal temperatures resulted in the level of Lake Erie dropping below normal during May. The lake level remained below normal throughout the remainder of the calendar year. 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 below normal for the foreseeable future.

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	17.57	-0.86	+0.14	-6.48
Fa-1	Jasper Mill, Fayette Co.	Limestone	15.42	-6.79	-0.60	-8.23
Fr-10	Columbus, Franklin Co.	Gravel	44.55	-0.31	+0.38	-1.52
H-1	Harrison, Hamilton Co.	Gravel	24.15	-1.20	+0.12	-4.05
Hn-2a	Dola, Hardin Co.	Dolomite	7.29	+1.79	+0.69	-1.32
Po-124	Freedom, Portage Co.	Sandstone	77.33	-0.30	+0.10	-1.06
Tu-1	Strasburg, Tuscarawas Co.	Gravel	14.84	-1.03	+0.39	-2.92

## GROUND-WATER LEVELS

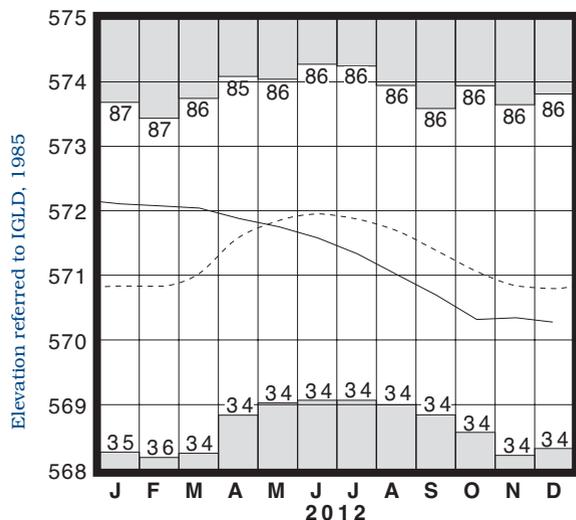
Water level (ft below land surface)



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)  
 least amount of precipitation during 2012, 23.47 inches. An isohyetal map and regional averages with percentages of normal precipitation for the 2012 calendar year appear below.

Precipitation during the 2012 calendar year was generally above normal during January, below normal during February and above normal in the north-eastern half of Ohio during March. From April through August, precipitation was below normal statewide with much of the state experiencing moderate to severe drought conditions. In addition, temperatures were above normal during much of this period. Agriculture was adversely impacted by the hot, dry conditions. April was the driest on record for the Northeast Region. A line of severe storms moved through the state on June 29 with heavy rains and damaging winds, leaving a path of extensive damage across many areas of Ohio. Above normal precipitation during September and October eased the drought-like conditions; this was the wettest October on record for the North Central Region and the second wettest for the Northeast Region. However, dry conditions returned during November as precipitation amounts were noticeably below normal. This was the fourth driest November on record for the state as a whole and the driest for the Southeast Region. The year ended with above normal precipitation throughout most of Ohio during December.

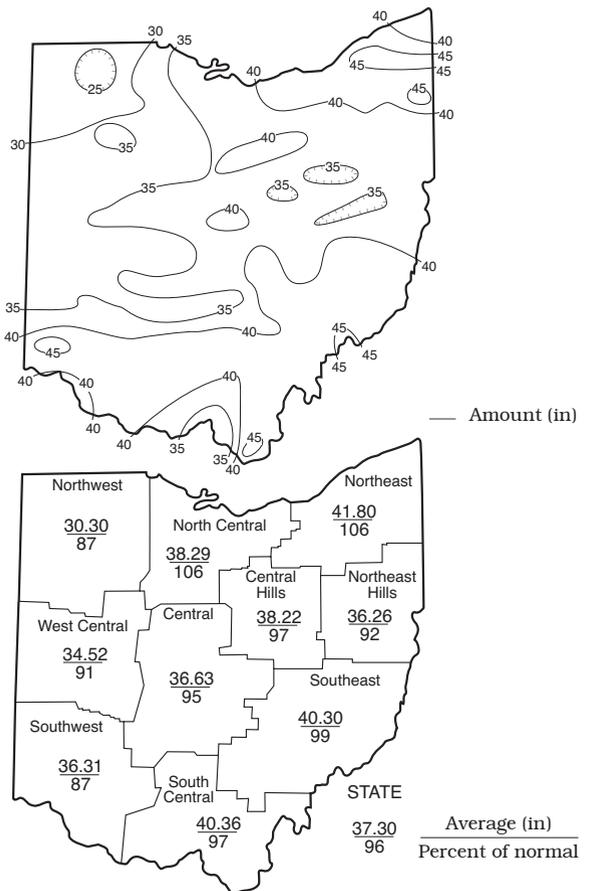
**SUMMARY**

Precipitation and streamflow during December were above normal throughout most of Ohio. Reservoir storage increased and was above normal. Ground water levels rose in most aquifers, but remained below normal in most aquifers. Lake Erie level declined 0.06 foot and was 0.52 foot below the long-term December average.

The 2012 calendar year was not especially good for water supplies due to the drought-like conditions that existed for much of the year. Precipitation for the 2012 calendar year was below normal in all but the North Central and Northeast regions. Streamflow was below normal throughout most of the state. Surface water supplies were below normal during much of the year, but increased to above normal during early autumn. Ground water supplies were adequate, but below normal during most of the year. Lake Erie was at below normal levels during the last eight months of the year.

**Note:** The mean monthly level for observation well FR-10 as printed in the November 2012 issue has been revised. The revised mean level is 44.93 feet, which is 0.38 foot below the November normal, 0.09 foot higher than the October 2012 level and 1.29 feet lower than the November 2011 level. Revisions have been made to the Ground Water Levels table on the Division of Soil and Water Resources web page.

**PRECIPITATION 2012 CALENDAR 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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