



MONTHLY WATER INVENTORY REPORT FOR OHIO

December 2010

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

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PRECIPITATION during December was below normal throughout most of the state, but above normal in the Northeast Region. The state average was 2.04 inches, 0.72 inch below normal. Regional averages ranged from 3.18 inches, 0.27 inch above normal, for the Northeast Region to 1.11 inches, 1.35 inches below normal, for the Northwest Region. Painesville (Lake County) reported the greatest amount of December precipitation, 5.66 inches. Ottawa (Putnam County) reported the least amount, 0.47 inch. Several areas in northwestern Ohio reported less than 1 inch of precipitation for the month.

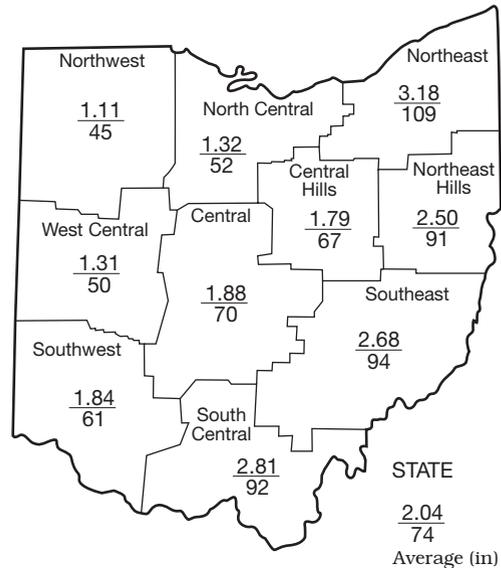
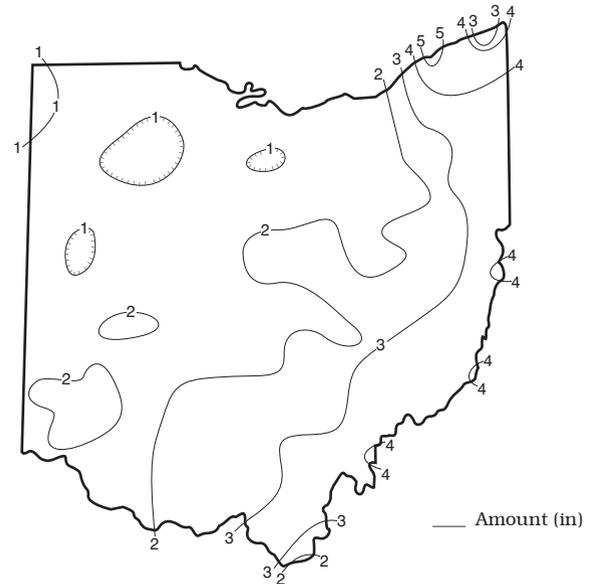
Precipitation during December fell as both rain and snow with temperatures averaging well below normal. Snow amounts for the month were above normal throughout most of Ohio with the greatest amounts reported in the snowbelt counties of northeastern Ohio. Chardon (Geauga County) received 49 inches of snow for the month, nearly twice the average amount. Precipitation fell on most days during the first half of the month. Rain on December 1 turned to snow before the end of the day as cold temperatures moved into the state. Light snow fell throughout the state nearly each day during December 2-10, but only small amounts of precipitation were recorded. Exceptions were in the snowbelt counties of northeastern Ohio where heavy snow fell on several days during this period. The most significant precipitation of the month occurred during December 11-13. Precipitation began as rain on December 11 but changed to snow on December 12 as cold temperatures returned to the state following a brief thaw. The snow continued through December 13 with several inches reported across most of Ohio. Total amounts of precipitation (liquid, melted) during this period were generally 0.50-1.0 inch with a few locations receiving more than 1 inch. The second half of the month was much drier than the first half. The cold temperatures continued and most of the precipitation that occurred fell as snow. Accumulations were generally small with the greatest amounts falling across southern Ohio. With the below normal temperatures the snow on the ground remained, providing a white Christmas across the state this year. Temperatures moderated at the end of the month and light rain fell across Ohio during December 30-31.

Precipitation during the first 3 months of the 2011 water year is generally above normal in eastern Ohio and below normal in western Ohio. The state average is 8.24 inches, 0.03 inch above normal. Regional averages range from 10.83 inches, 1.60 inches above normal, for the Northeast Region to 6.08 inches, 1.51 inches below normal, for the Northwest Region.

Precipitation for the 2010 calendar year was below normal throughout most of Ohio but above normal in the northeastern and south-central areas of the state. The state average was 37.28 inches, 0.74 inch below normal. Regional averages ranged from 42.84 inches, 2.22 inches above normal, for the South Central Region to 32.98 inches, 1.30 inches below normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column).

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PRECIPITATION DECEMBER



PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.) Base period 1951-2000					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	-1.35	-1.51	-4.74	-1.30	-0.51	-0.4
North Central	-1.22	+0.46	-0.86	+0.89	-0.50	+1.4
Northeast	+0.27	+1.60	+0.48	+0.89	+1.41	+1.6
West Central	-1.33	-0.21	-2.74	-1.83	-4.70	+0.6
Central	-0.79	-0.05	-1.63	-1.27	-2.10	+0.7
Central Hills	-0.90	+0.20	-2.06	-1.06	-2.77	+0.6
Northeast Hills	-0.25	+0.68	-1.86	-0.36	-4.96	+1.0
Southwest	-1.19	-0.62	-4.70	-4.95	-6.16	-0.2
South Central	-0.23	-0.24	-1.17	+2.22	+3.86	+0.9
Southeast	-0.16	-0.06	-1.72	-0.85	-3.44	+0.9
State	-0.72	+0.03	-2.09	-0.74	-1.98	

*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	1,494	109	81	68	87
Great Miami River at Hamilton	3,630	1,795	49	46	53	92
Huron River at Milan	371	153	63	68	51	70
Killbuck Creek at Killbuck	464	377	90	63	61	82
Little Beaver Creek near East Liverpool	496	625	111	71	62	102
Maumee River at Waterville	6,330	1,202	25	20	28	84
Muskingum River at McConnelsville	7,422	6,435	59	94	91	70
Scioto River near Prospect	567	295	110	46	46	78
Scioto River at Higby	5,131	2,077	45	34	40	79
Stillwater River at Pleasant Hill	503	212	57	37	40	93

STREAMFLOW during December was below normal throughout most of the state, but above normal in some central and northeastern Ohio basins. Flows were low enough to be considered deficient across areas of northwestern and south-central Ohio. Flows during December were seasonally greater than the November flows throughout most of the state.

Flows at the beginning of the month were above normal across most of the state as streamflow responded to runoff from the precipitation that fell at the end of November and the first day of December. Greatest flows for the month occurred within the first three days of the month throughout the state. Flows declined from these peaks until just before mid-month, then increased in response to runoff from precipitation and melting snow. Flows again declined following these increases as drier and colder weather prevailed, reducing runoff.

Flows declined until late in the month and were at their lowest for the month during December 27-29. Flows began to increase at the end of the month in response to precipitation and melting snow, but remained at below-normal levels in all areas except northeastern Ohio.

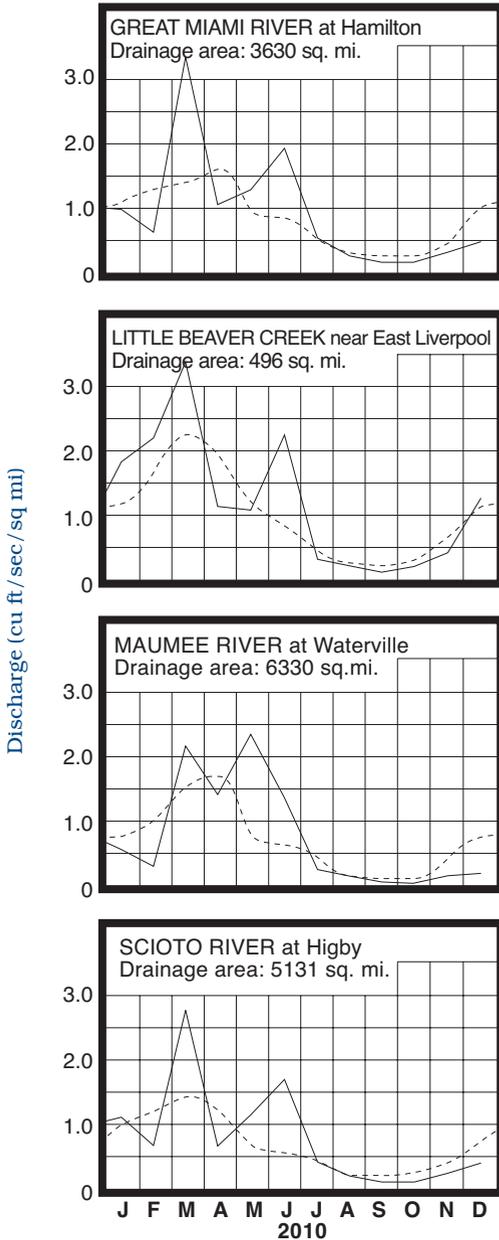
Streamflow for the 2010 calendar year was below normal throughout most of the state (see Mean Stream Discharge table, percent of normal, past 12 months column). Streamflow was below normal across much of Ohio during January and February. Flows increased during March to above normal statewide and were high enough to be considered excessive due to rain and melting snow. Below normal precipitation resulted in below normal streamflow during April. Flows during May and June were above normal and high enough to be considered excessive across much of Ohio. July flows were below normal throughout much of the state, but above normal in central and southwestern Ohio. Locally severe flooding occurred from Clermont County east to Lawrence County following heavy rain that fell during July 20-21. Flows were generally below normal during the second half of the year. Many flows during this period were low enough to be considered deficient as below normal precipitation persisted throughout most of the state.

RESERVOIR STORAGE for water supply during December was unchanged in the Mahoning River basin and increased slightly in the Scioto River basin. Storage at the end of the month was above normal in the Mahoning basin and below normal in the Scioto basin.

Reservoir storage at the end of December in the Mahoning basin index reservoirs was 73 percent of rated capacity for water supply compared with the same for last month and 76 percent for December 2009. Month-end storage in the Scioto basin index reservoirs was 74 percent of rated capacity for water supply compared with 72 percent for last month and 81 percent for December 2009.

Surface-water supplies were adequate during the 2010 calendar year. Storage was near or above normal throughout most of the year, although levels in the Scioto River basin fell to below normal during the autumn months. Above normal rainfall and streamflow during May and June helped lessen the impact on surface water supplies during the high-use summer season.

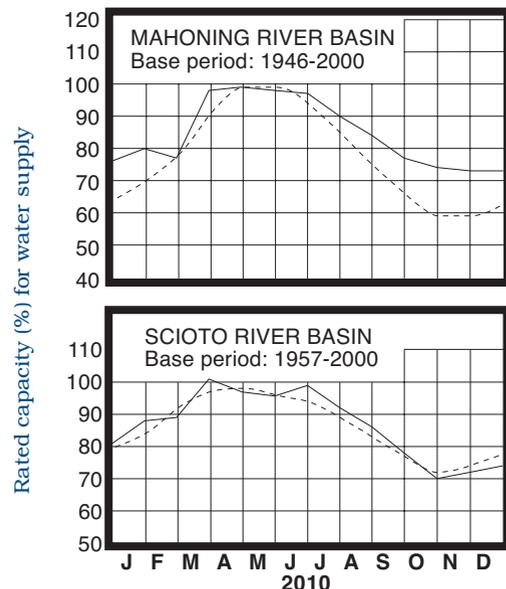
MEAN STREAM DISCHARGE



Base period for all streams: 1971-2000

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 December rose statewide. Net rises in ground water levels from the November levels in most aquifers were greater than usual. Levels in most consolidated aquifers rose slowly throughout most of the month. Levels in unconsolidated aquifers rose during the first 2 weeks of December then declined until just before the end of the month when levels began to rise again in response to precipitation and melting snow.

Ground water supplies during 2010 were adequate throughout most of the state in spite of being below normal the entire year in most aquifers. The calendar year began with ground water storage at below normal levels throughout most of the state with only some aquifers in eastern Ohio being above normal. Recharge during winter and early spring was less than normal due to the combined effects of below normal precipitation during January-April and frozen soils during much of the winter. Above normal precipitation that fell in May and June benefitted ground water supplies across the state and reduced demand on Ohio's ground water resources. However, conditions were again rather dry during the second half of the year, and ground water levels responded accordingly. At the end of the 2010 calendar year, ground water levels remained below normal in most aquifers, except in some of the consolidated aquifers in eastern Ohio. Also, levels at the end of the calendar year were lower than they were at the beginning of the year in most aquifers, but were higher in a few northern Ohio aquifers. Near-normal precipitation and other climatic conditions during the next several months will be necessary for this to be a favorable recharge season.

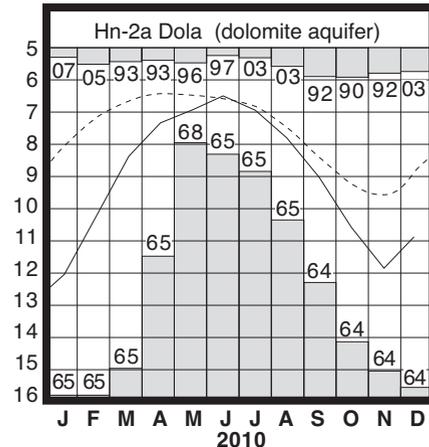
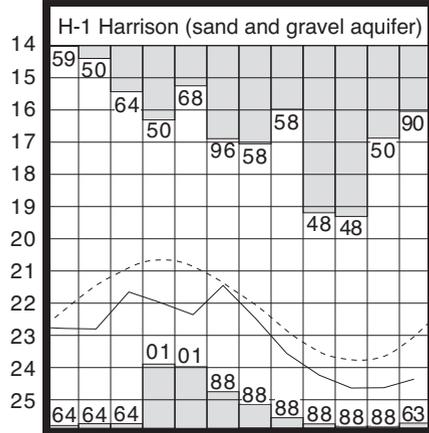
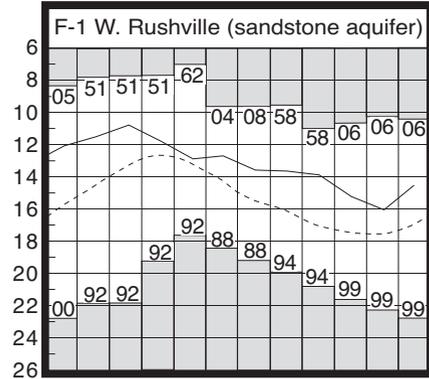
LAKE ERIE level declined during December. The mean level was 570.41 feet (IGLD-1985), 0.06 foot lower than last month's mean level and 0.42 foot below normal. This month's mean level is 0.56 foot lower than the December 2009 level and 1.21 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during December averaged 1.57 inches, 1.06 inches below normal. For the entire Great Lakes basin, December precipitation averaged 1.29 inches, 1.05 inches below normal. For calendar year 2010, the Lake Erie basin averaged 34.53 inches, 0.74 inch below normal, while the entire Great Lakes basin averaged 29.48 inches, 3.04 inches below normal.

Lake Erie's mean level was below normal throughout the 2010 calendar year. 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 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	14.52	+2.57	+1.53	-1.32
Fa-1	Jasper Mill, Fayette Co.	Limestone	11.46	-3.27	+0.99	-3.13
Fr-10	Columbus, Franklin Co.	Gravel	43.65	-1.16	+0.31	+0.05
H-1	Harrison, Hamilton Co.	Gravel	24.36	-1.32	+0.26	-1.64
Hn-2a	Dola, Hardin Co.	Dolomite	10.89	-2.01	+0.96	+2.05
Po-124	Freedom, Portage Co.	Sandstone	77.73	+0.68	+0.12	-1.01
Tu-1	Strasburg, Tuscarawas Co.	Gravel	14.54	-1.05	+0.97	+1.89

GROUND-WATER LEVELS

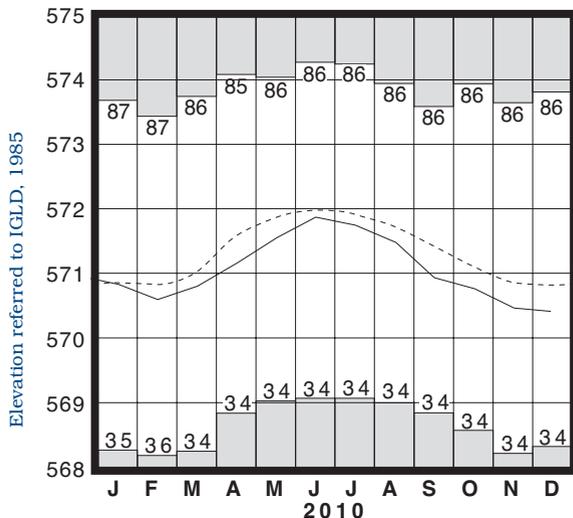


Water level (ft below land surface)

Base periods: F-1, 1947-2000 H-1, 1951-2000.

Hn-2a, 1955-2000 ■ Record high and low, year of occurrence

LAKE ERIE LEVELS



Base period: 1918-2000

■ Record high and low, year of occurrence

Normal - - - - Current ———

(Precipitation continued from front)

An isohyetal map and regional averages with percentages of normal precipitation for the 2010 calendar year appear below. South Point (Lawrence County) reported the greatest amount of precipitation for the year, 53.24 inches. Bowling Green (Wood County) reported the least amount of precipitation during 2010, 29.70 inches.

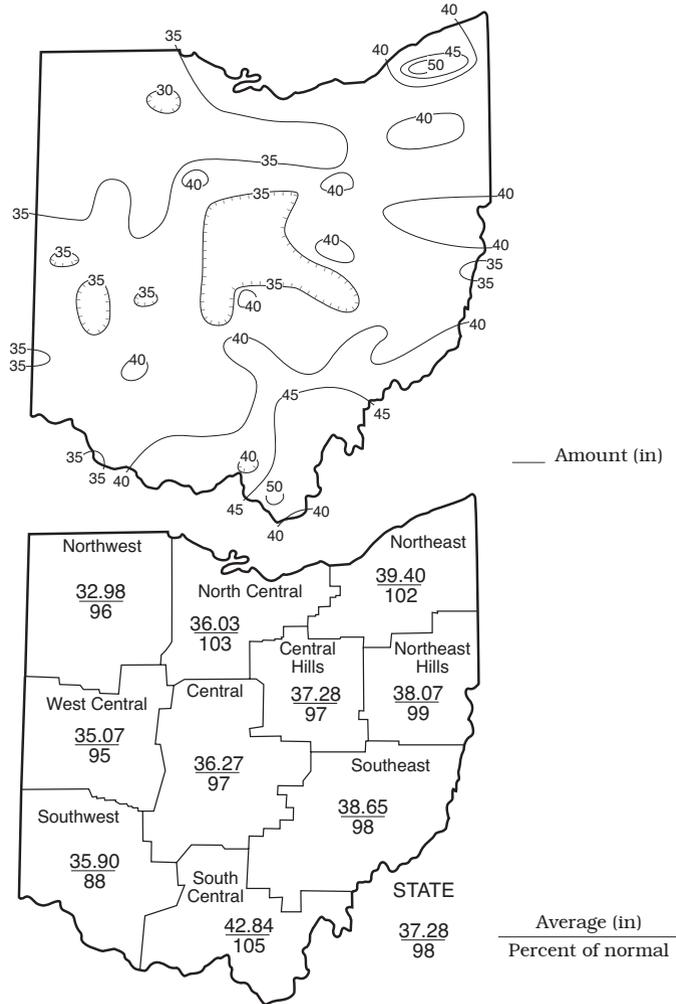
Precipitation during the 2010 calendar year was generally below normal during the first 4 months of the year. Above normal precipitation during May and June was beneficial for the state's water supplies. This was the 5th wettest June during the past 128 years for the state as a whole. Precipitation during July was below normal across much of the state, but was above normal in areas of northeastern and southeastern Ohio. Heavy rain on July 20-21 resulted in severe flooding in areas of southern Ohio. Precipitation during August-October was below normal. However, severe storms during September and October brought brief heavy rain and several tornadoes across areas of the state, causing considerable damage. Precipitation during November was above normal, followed by below normal precipitation in December.

SUMMARY

Precipitation during December was below normal throughout most of the state, but above normal in the Northeast Region. Streamflow was below normal in all but central and northeastern Ohio basins. Reservoir storage remained above normal in the Mahoning River basin and below normal in the Scioto River basin. Ground Water storage increased but remains below normal across much of the state. Lake Erie level declined 0.06 foot and was 0.42 foot below the long-term December average.

Precipitation for the 2010 calendar year was below normal throughout most of Ohio, but above normal in northeastern and southeastern areas of the state. Streamflow for the year was below normal in nearly all drainage basins. Reservoir storage was near or above normal most of the year, but fell to below normal in the Scioto River basin during the autumn months. Ground water supplies were adequate, but remained below normal the entire year in most aquifers. Lake Erie was at below normal levels throughout the year.

PRECIPITATION 2010 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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