



MONTHLY WATER INVENTORY REPORT FOR OHIO

August 2009

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

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Hydrologists
Water Inventory Unit

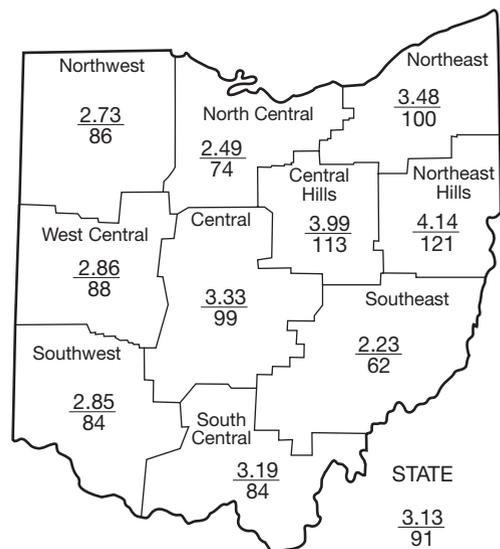
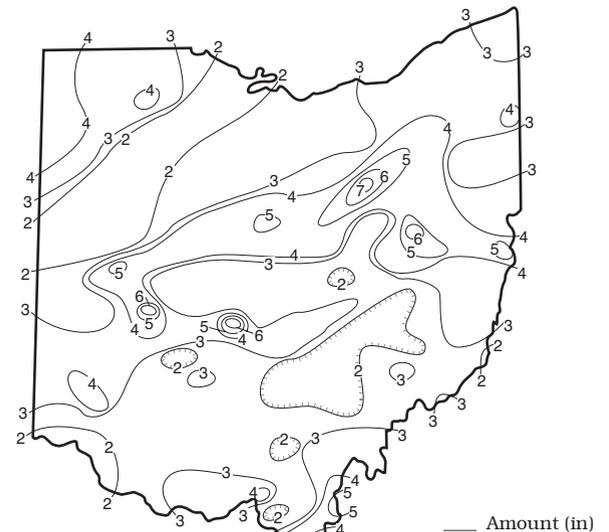
PRECIPITATION during August was generally below normal throughout most of Ohio, but above normal in the Central Hills and Northeast Hills regions and a few other scattered locations across the state. The state average was 3.13 inches, 0.31 inch below normal. Regional averages ranged from 4.14 inches, 0.71 inch above normal, for the Northeast Hills Region to 2.23 inches, 1.35 inches below normal, for the Southeast Region. Wooster (Wayne County) reported the greatest amount of August precipitation, 7.10 inches. Lima (Allen County) reported the least amount, 1.13 inches.

Precipitation during August fell in a typical summer pattern ranging from light showers to heavy downpours. Light showers fell across much of Ohio during the first 4 days of August, but most of the state received less than 0.25 inch of rain during this period. Stronger storms crossed through southwestern Ohio on August 3 with 1-2 inches reported across the region. Some local flooding occurred as a result of this rain. The following week was dry with little or no rain falling throughout most of the state. Widely scattered showers and thunderstorms returned to the state during August 10-11. Although most of the state received less than 0.25 inch of rain, a few locations received 1-2 inches from heavier downpours with radar estimates of more than 3 inches at isolated locations in east-central Ohio. Through the first half of August, there were many locations that had reported less than 0.5 inch of precipitation. The most widespread precipitation of the month occurred during a period of unsettled weather that persisted during August 17-21. Numerous showers and thunderstorms occurred during this period with much of the state reporting 0.5-2.0 inches of rain with a few reports of more than 3 inches falling in northwestern and central Ohio. However, once again there were areas of the state that missed most of these storms and reported less than 0.25 inch during this period. The remainder of the month was rather dry across much of the state with several areas receiving little or no rain. However, isolated, slow moving storms during August 27-29 brought 0.5-2.5 inches of rain to an area extending from west central to northeastern Ohio. The most notable storm during this period occurred on August 28 when torrential rain fell across portions of southern Franklin and northern Pickaway counties and extending into areas of Licking and Fairfield counties with 2-3 inches of rain reported in a short period of time with unofficial reports of more than 5 inches falling at a few locations. Many roads throughout the area were temporarily impassable due to high water from the excessive rain.

Precipitation for the 2009 water year is below normal across much of the state, but above normal in the northern one-third and South Central Region. The average for the state is 34.86 inches, 0.21 inch below normal. Regional averages

(continued on back)

PRECIPITATION AUGUST



Average (in)
Percent of normal

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	-0.46	-1.81	+0.49	+3.22	+10.07	+0.3
North Central	-0.86	-1.27	+0.19	+3.09	+11.44	+0.6
Northeast	-0.01	+0.80	+0.67	+3.73	+14.86	-0.5
West Central	-0.38	-0.55	-1.65	-2.63	+7.49	-1.1
Central	-0.04	+0.78	-1.38	-2.17	+6.62	-0.5
Central Hills	+0.47	-0.84	-1.75	-1.48	+4.18	-0.5
Northeast Hills	+0.71	+0.57	-2.24	-1.99	+3.43	-1.6
Southwest	-0.56	+1.12	-1.12	-4.31	+6.25	+0.3
South Central	-0.59	+1.73	+1.77	-0.38	+9.01	-0.3
Southeast	-1.35	-1.50	-1.95	-2.73	+6.15	-1.2
State	-0.31	-0.10	-0.70	-0.57	+7.94	

*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	102	116	56	79	112
Great Miami River at Hamilton	3,630	1,373	119	73	81	78
Huron River at Milan	371	21	23	38	85	128
Killbuck Creek at Killbuck	464	159	113	44	60	65
Little Beaver Creek near East Liverpool	496	143	105	73	71	76
Maumee River at Waterville	6,330	1,097	113	62	115	112
Muskingum River at McConnelsville	7,422	2,127	73	69	91	63
Scioto River near Prospect	567	60	133	39	59	65
Scioto River at Higby	5,131	1,647	125	60	57	58
Stillwater River at Pleasant Hill	503	66	93	57	87	78

STREAMFLOW during August was above normal across much of the state, but below normal in north-central, west-central and southeastern Ohio. Flows were low enough to be considered deficient in basins in north-central Ohio. August flows in most drainage basins declined seasonally from those flows recorded during July. Exceptions were noted in areas where July flows were unusually low and August flows were greater.

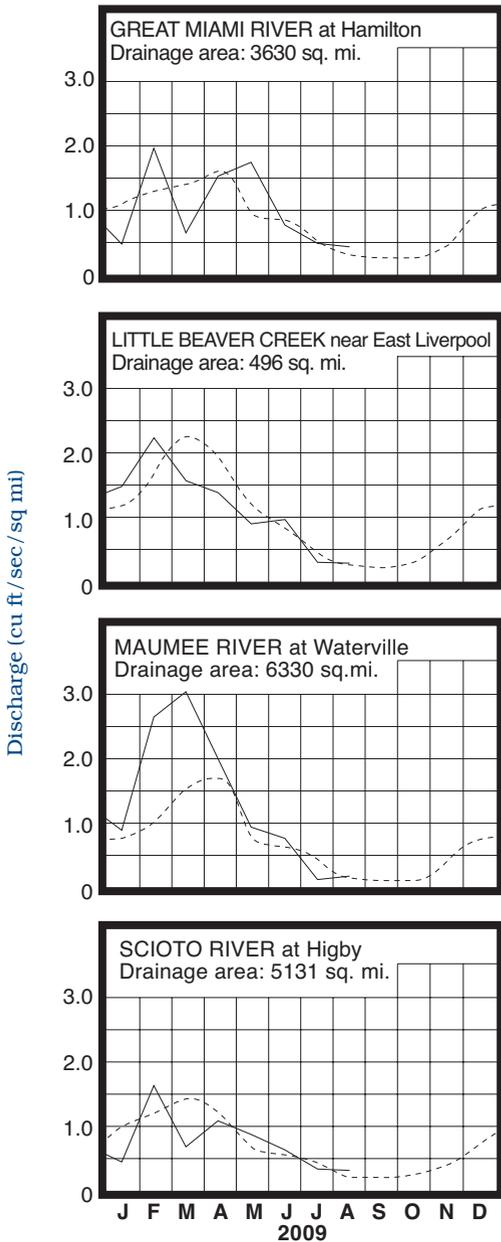
Flows at the beginning of the month were generally above normal throughout much of the state. Greatest flows for the month occurred at the beginning of August across west-central, south-central and northeastern Ohio as these areas were still influenced by the precipitation that fell late in July. Greatest flows across southwestern Ohio occurred on August 5, following the heavy rain that fell on August 4. Generally, the remainder

of the state experienced their greatest flows for the month near the end of August. Low flows for the month varied across the state. However, the majority of the month's low flows occurred between August 17 and 20. Some basins in areas of southwestern and northeastern Ohio recorded their lowest flows on August 27. Streamflow at the end of the month was generally above normal in the southern two-thirds and below normal in the northern one-third of the state.

RESERVOIR STORAGE for water supply during August decreased in both the Mahoning and Scioto river basins. At the end of the month, storage remained above normal in both basins.

Reservoir storage at the end of August in the Mahoning basin index reservoirs was 83 percent of rated capacity for water supply compared with 91 percent for last month and 88 percent for August 2008. Month-end storage in the Scioto basin index reservoirs was 94 percent of rated capacity for water supply compared with 95 percent for last month and 86 percent for August 2008. Surface water supplies remain in good condition across the state.

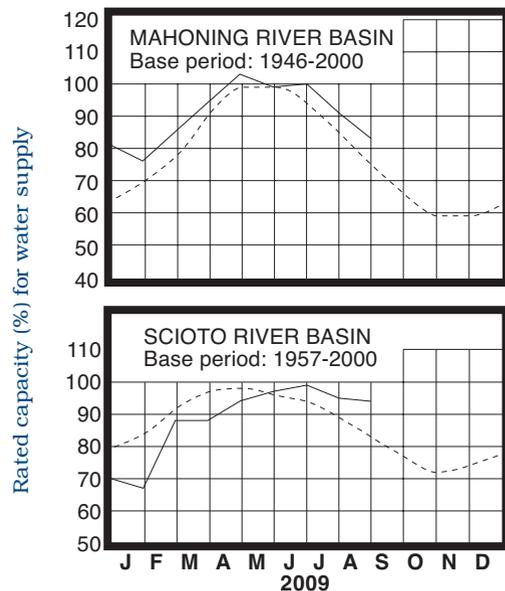
MEAN STREAM DISCHARGE



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 August showed net declines in most aquifers in the state, but a few aquifers in southwestern Ohio showed some positive net improvement as a result of this month's precipitation and precipitation that fell during the last 10 days of July. Generally, ground water levels in most aquifers declined steadily throughout the month. A few exceptions were noted in aquifers in southwestern Ohio where levels rose during the first week of August, then steadily declined the remainder of the month. Also, a few shallower aquifers rose late in the month in response to locally heavy rainfall.

Ground water supplies continue to remain adequate throughout much of the state. Levels in most aquifers are below normal except in some consolidated aquifers in eastern Ohio where levels have remained above normal for the past several months. Current levels are lower than they were a year ago in most aquifers, but are above last year's levels in aquifers in southwestern Ohio. Ground water levels typically decline through the end of the water year. With near-normal precipitation, ground water supplies would be expected to begin to rebound during the first few months of the 2010 water year. Near the end of August, the Ohio Agricultural Statistics Service reports that topsoil moisture was rated as being short or very short in 26 percent of the state, adequate in 68 percent of the state, and surplus in 6 percent of the state.

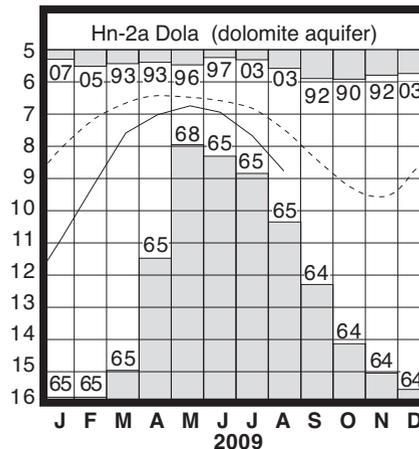
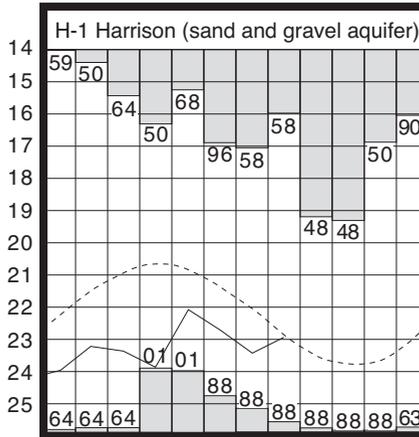
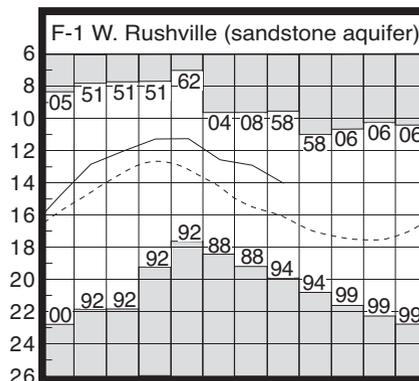
LAKE ERIE level declined during August. The mean level was 572.01 feet (IGLD-1985), 0.23 foot lower than last month's mean level and 0.29 foot above normal. This month's mean level is 0.36 foot higher than the August 2008 level and 2.81 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during August averaged 3.34 inches, 0.15 inch above normal. For the entire Great Lakes basin, August precipitation averaged 4.05 inches, 0.90 inch above normal. For calendar year 2009 through August, the Lake Erie basin has averaged 27.12 inches, 3.31 inches above normal, while the entire Great Lakes basin has averaged 22.44 inches, 1.26 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 above normal for the foreseeable future. Deviations from the anticipated weather patterns could result in the level of Lake Erie ranging from as much as 13 inches above normal to around 8 inches below the normal seasonal level.

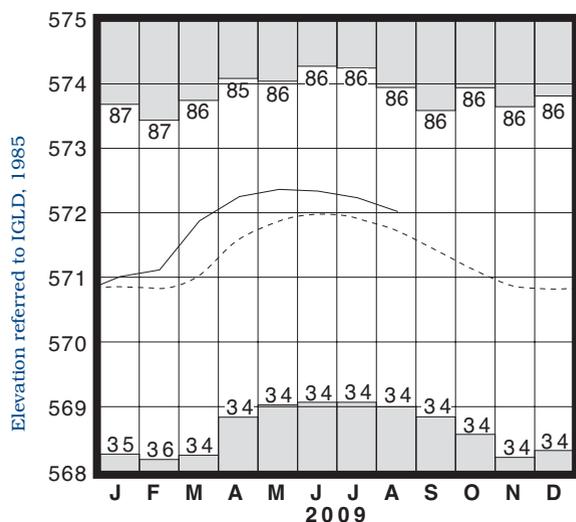
Index Well	Location	Aquifer	Mean This Month	Departure From Normal	Change in feet from:	
					Last Month	Year Ago
F-1	W. Rushville, Fairfield Co.	Sandstone	14.05	+1.99	-1.15	-1.45
Fa-1	Jasper Mill, Fayette Co.	Limestone	8.48	-0.16	-0.04	+0.81
Fr-10	Columbus, Franklin Co.	Gravel	45.34	-1.54	-0.33	-0.77
H-1	Harrison, Hamilton Co.	Gravel	22.94	-0.07	+0.47	+0.23
Hn-2a	Dola, Hardin Co.	Dolomite	8.77	-1.28	-1.08	-1.12
Po-124	Freedom, Portage Co.	Sandstone	76.82	+1.14	-0.44	-0.42
Tu-1	Strasburg, Tuscarawas Co.	Gravel	15.53	-2.12	-0.55	-1.19

GROUND-WATER LEVELS



Base periods: F-1, 1947-2000 H-1, 1951-2000.
Hn-2a, 1955-2000

LAKE ERIE LEVELS



Base period: 1918-2000

■ Record high and low, year of occurrence

Normal - - - - Current ———

(Precipitation continued from front)

range from 39.41 inches, 1.74 inches above normal for the South Central Region to 32.28 inches, 1.89 inches below normal, for the West Central Region.

Precipitation for the 2009 calendar year is also below normal across much of the state, but above normal in the northern one-third and South Central Region. The average for the state is 25.88 inches, 0.98 inch below normal. Regional averages range from 30.43 inches, 1.17 inches above normal, for the South Central Region to 23.94 inches, 2.37 inches below normal, for the West Central Region.

SUMMARY

Precipitation during August was generally below normal throughout most of Ohio, but above normal in the Central Hills and Northeast Hills regions and a few other scattered locations. Streamflow was above normal across much of the state. Reservoir storage for water supply decreased in the Mahoning and Scioto river basins, but remained above normal in both basins. Ground water storage declined across most of Ohio and remained below normal throughout most of the state. Lake Erie level declined 0.23 foot and was 0.29 foot above the long-term August average.

NOTES AND COMMENTS

The Passing of Two Former Division of Water Employees

It is with great sadness that we report that Leonard Harstine and Arthur Woldorf, longtime ODNR, Division of Water (DOW) employees, recently passed away. Both Leonard and Arthur retired from the DOW on July 31, 1988.

Leonard Harstine was born on September 24, 1928 on the family farm near New Philadelphia, Ohio. He attended The Ohio State University and received a BS degree in Agriculture in 1951. After working for a few years for Shoe Corporation of America, he began his career at the DOW in 1959. Leonard worked for the DOW for 29 years as a hydrologist and was the supervisor of the Water Inventory Unit for more than half of his career where he oversaw the operation and management of Ohio's observation well network. For 25 years, he was the author or co-author of this report, the "Monthly Water Inventory Report For Ohio." His work also involved many special projects and ground water investigations, and the preparation of several publications. Leonard passed away on August 29, 2009.

Arthur Woldorf was born on March 24, 1930 in Wheeling, W.Va. Art graduated from The Ohio State University and worked for 30 years for the ODNR, Division of Water. As supervisor of the Water Planning Unit, he was responsible for the development of Ohio's regional water supply plans. His expertise also included water law, small watershed development, and the development of rural water supplies. Art passed away on August 12, 2009.

Potentiometric Surface Maps Now Available

Six new GIS produced PDF maps are now available from the ODNR, Division of Soil and Water Resources website at: www.ohiodnr.gov/tabid/3623/default.aspx. The newly added maps are for Allen, Champaign, Delaware, Henry, Ottawa and Putnam counties. ArcView Shape files of these counties will be added to the site in the coming weeks.

A potentiometric surface map is a contour map that represents the top of the ground water surface in an aquifer. The contour lines illustrate the potentiometric surface much like the contour lines of a topographic map represent a visual model of the ground surface. Potentiometric surface maps are being created for bedrock (consolidated formations) and sand & gravel (unconsolidated formations) aquifers. County-based maps are available as PDF images and as GIS ArcView Shape files.

Potentiometric surface maps can be used to determine the direction and gradient of ground water flow, to determine ground water recharge and discharge areas, and as input data into ground water modeling programs. These maps can also be used to assist in preparing water resources plans and technical studies, in the mapping of stress areas, and in possible ground water diversion issues. Since these maps were created using existing data collected over a fifty-year period, field verification of the ground water flow direction should be conducted before the drilling of monitoring wells to satisfy compliance monitoring. If you have any questions concerning these maps, please contact Jim Raab at jim.raab@dnr.state.oh.us or (614) 265-6747.

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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