



MONTHLY WATER INVENTORY REPORT FOR OHIO

September 2002

<http://www.dnr.state.oh.us/water/pubs/newsltrs/mwirmain.html>

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PRECIPITATION during September was above normal across most of the state, but was below normal in some areas of northwestern Ohio. The average for the state as a whole was 4.11 inches, 1.16 inches above normal. Regional averages ranged from 6.03 inches, 3.16 inches above normal, for the Southwest Region to 2.55 inches, 0.21 inch below normal, for the Northwest Region. For the state as a whole this was the 19th wettest September during the past 120 years. Regionally, this was the 4th wettest September for the Southwest Region and the 8th wettest for the Central Region. Dayton (Montgomery County) reported the greatest amount of September precipitation, 8.41 inches. New Carlisle (Clark County) and Wilmington (Clinton County) reported 8.31 and 8.09 inches, respectively. Elyria (Lorain County) reported the least amount of September precipitation, 1.73 inches.

Many areas of the state received little or no rain during the first half of the month. This, combined with above normal temperatures worsened the drought-like conditions that have been prevalent during most of the summer. The only notable precipitation during this period was on September 3 when a few widely scattered showers and thunderstorms produced 0.25-1.0 inch of rain in some areas of east-central and southeastern Ohio. The second half of the month was much wetter than the first half statewide. Showers and thunderstorms crossing the southeastern two-thirds of the state on September 15 brought 0.25-0.50 inch of rain with a few locations in southwestern and central Ohio receiving more than 1 inch. A period of unsettled weather from September 18-21 brought much needed rain to most of the state. Although the heavier showers and thunderstorms were spotty during this period, 0.50-1.0 inch of rain fell throughout most of the state with isolated areas receiving up to 1.5 inches. The most notable weather event of the month was the remnants of Hurricane Isidore moving through the state. Light rain began early on September 26 in southern Ohio and slowly spread northward eventually covering the entire state. Moderate to heavy rain fell during the late evening of September 26, and in the early morning of September 27. Generally, rain amounts of 1-2 inches fell in the northern half of the state and 2-3 inches fell in the southern half. An area where more than 5 inches fell was reported from southwestern to west-central Ohio. Minor small stream and urban flooding was reported in a few counties in southwestern and west-central Ohio.

Precipitation for the 2002 calendar year is generally below normal in the northern half of the state and above normal in the southern half. The average for the state as a whole is 29.69 inches, 0.12 inch below normal. Regional averages range from 35.49 inches, 3.50 inches above normal, for the Southwest Region to 24.38 inches, 2.31 inches below normal, for the Northwest Region.

Precipitation for the 2002 water year (October 2001-September 2002) was above normal throughout most of the state, but below normal in a few areas of northeastern Ohio. The average for the state as a whole was 40.08 inches, 2.11

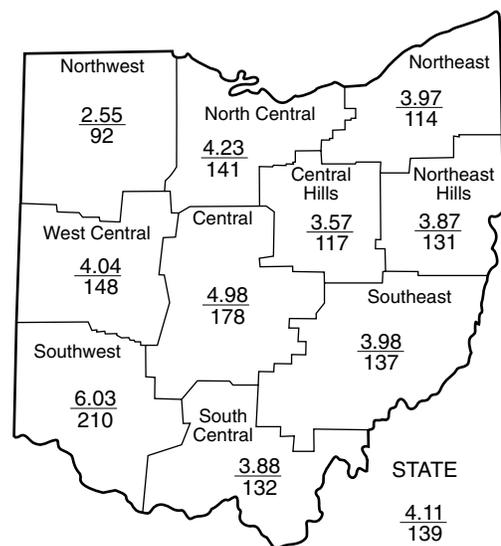
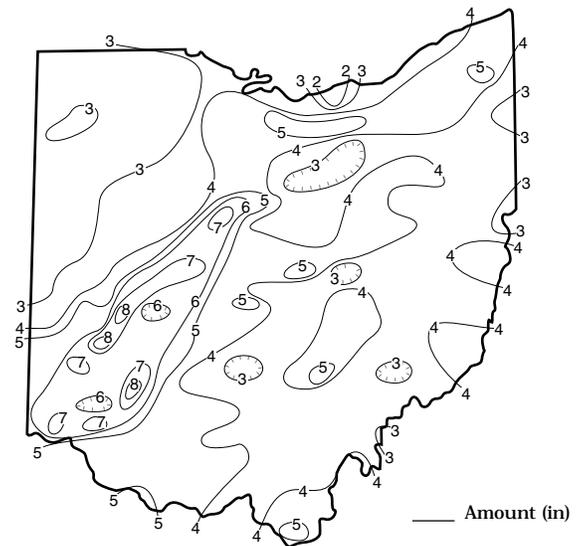
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PRECIPITATION

| Region | This Month | DEPARTURE FROM NORMAL (IN.) Base period 1951-2000 | | | | Palmer Drought Severity Index* |
|-----------------|------------|--|--------|---------|---------|--------------------------------|
| | | Past | | | | |
| | | 3 Mos. | 6 Mos. | 12 Mos. | 24 Mos. | |
| Northwest | -0.21 | -1.98 | -3.06 | +1.18 | -0.13 | -1.8 |
| North Central | +1.23 | -0.66 | -0.06 | +3.65 | -2.77 | -0.7 |
| Northeast | +0.48 | -1.96 | -0.43 | +0.50 | -6.92 | -1.0 |
| West Central | +1.31 | -2.31 | -0.05 | +2.62 | +3.41 | +0.2 |
| Central | +2.19 | +0.23 | +1.71 | +3.03 | +1.50 | +0.1 |
| Central Hills | +0.51 | -2.48 | -0.01 | +1.54 | -5.47 | -1.3 |
| Northeast Hills | +0.91 | -2.88 | -1.31 | -0.86 | -7.68 | -1.9 |
| Southwest | +3.16 | -0.08 | +4.61 | +7.00 | +4.91 | +0.7 |
| South Central | +0.93 | -1.57 | +2.32 | +1.59 | -4.28 | -1.0 |
| Southeast | +1.07 | -2.06 | +0.88 | +0.80 | -1.05 | -1.0 |
| State | +1.16 | -1.58 | +0.46 | +2.11 | -1.85 | |

*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

| River and Location | Drainage Area (Sq. Mi.) | Mean Discharge (CFS) | % of Normal | % of Normal Past | | |
|---|-------------------------|----------------------|-------------|------------------|--------|---------|
| | | | | 3 Mos. | 6 Mos. | 12 Mos. |
| | | | | This Month | | |
| Grand River near Painesville | 685 | 38 | 22 | 10 | 104 | 81 |
| Great Miami River at Hamilton | 3,630 | 1,285 | 132 | 65 | 154 | 145 |
| Huron River at Milan | 371 | 56 | 123 | 18 | 85 | 84 |
| Killbuck Creek at Killbuck | 464 | 67 | 60 | 31 | 100 | 77 |
| Little Beaver Creek near East Liverpool | 496 | 55 | 48 | 26 | 83 | 68 |
| Maumee River at Waterville | 6,330 | 314 | 41 | 24 | 100 | 110 |
| Muskingum River at McConnelsville | 7,422 | 1,061 | 43 | 69 | 172 | 78 |
| Scioto River near Prospect | 567 | 92 | 303 | 24 | 113 | 106 |
| Scioto River at Higby | 5,131 | 1,001 | 75 | 47 | 114 | 94 |
| Stillwater River at Pleasant Hill | 503 | 21 | 35 | 19 | 136 | 135 |

STREAMFLOW during September was below normal across most of the state, but was above normal in southwest, central and north-central Ohio basins. Flows were low enough to be considered deficient through much of the state. Even in areas where monthly flows averaged above normal, streamflow was markedly below normal for most of the month.

Streamflow was below normal statewide at the beginning of September. Flows declined steadily during the first half of the month. Low flows for the month for most of the state occurred between September 12-14. Flows generally increased from September 15-21 as a result of local precipitation during this period. Streamflow increased rapidly in response to precipitation from the remnants of Hurricane Isidore. As a result, greatest flows for the month occurred near or at the end of September

statewide. Minor flooding, mainly in the Montgomery County area, was reported as a result of the heavy rains that occurred on September 26-27. At the end of the month, flows were above normal across the southern half of the state and in some north-central basins, but remained below normal elsewhere.

Streamflow for the 2002 water year was generally above normal in the western half of the state and below normal in the eastern half (see Mean Stream Discharge table, percent of normal, past 12 months column). Flows were above normal during October and high enough to be considered excessive in many basins. Flows in the Maumee River at Waterville and the Stillwater River at Pleasant Hill were the greatest recorded for October. November's flows were above normal in the western half of the state and below normal in the eastern half. Flows were above normal across most of the state during December, but noticeably below normal statewide during January. Flows during February and March were generally above normal in the western half of Ohio and below normal in the eastern half. Heavy rain during March 19-20 resulted in flash flooding in extreme southern Ohio. During April-June, flows were above normal throughout most of the state, but in contrast were noticeably below normal statewide during July and August. September's flows were below normal in much of the state.

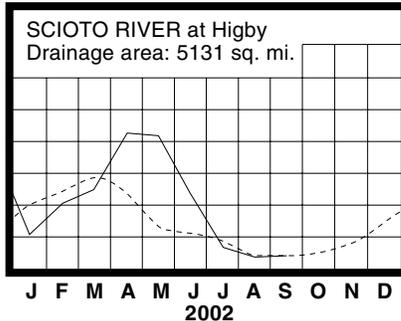
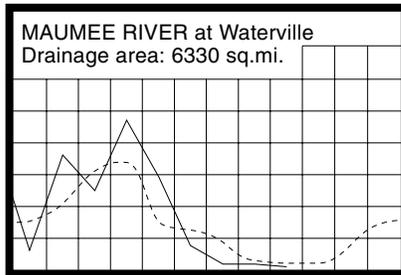
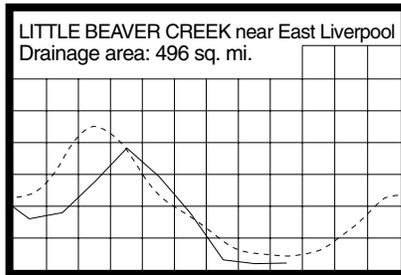
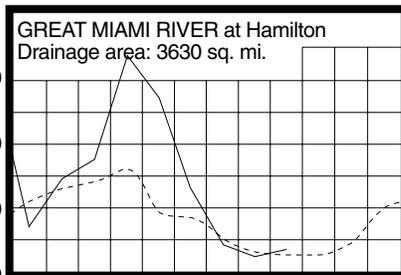
RESERVOIR STORAGE for water supply during September decreased in both the Mahoning and Scioto river basins. Storage at the end of the month was above normal in both basins.

Reservoir storage at the end of September in the Mahoning basin index reservoirs was 70 percent of rated capacity for water supply compared with 76 for last month and 62 percent for September 2001. Month-end storage in the Scioto basin index reservoirs was 78 percent of rated capacity for water supply compared with 81 percent for last month and 79 percent for September 2001.

Surface water supplies were adequate statewide during the 2002 water year. Storage in the Mahoning River basin reservoirs was above normal throughout the water year. Storage in the Scioto River basin was above normal during most of the 2002 water year, but fell to below normal during the late summer.

MEAN STREAM DISCHARGE

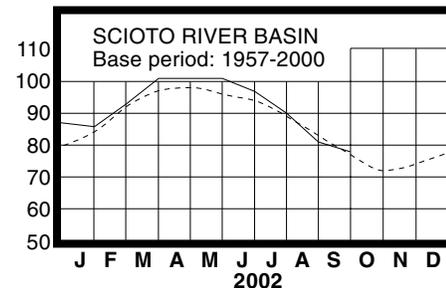
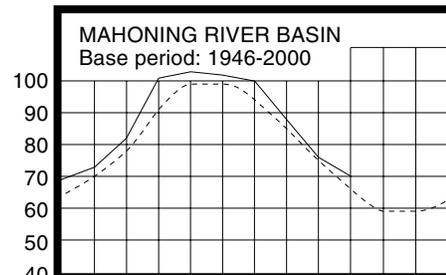
Discharge (cu ft/sec/sq mi)



Base period for all streams: 1971-2000

RESERVOIR STORAGE FOR WATER SUPPLY

Rated capacity (%) 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 seasonally statewide. Levels declined throughout the month in most aquifers. However, levels in some shallow, unconsolidated aquifers rose near the end of September due to the abundant rain that fell near the end of the month. Net declines during September from August's levels were greater than usually observed during September in most aquifers.

The 2002 water year was adequate, but not exceptional, for ground water supplies. Ground water levels at the beginning of the water year were below normal nearly statewide. The recharge season got off to a promising start with above normal precipitation during October-December. However, below normal precipitation during the winter months resulted in a unfavorable environment for sustaining the recharge. Ground water levels remained below normal across most of the state at this time. Above normal precipitation during the late spring was beneficial to ground water supplies across the state, raising ground water levels to above normal in aquifers in the western half of Ohio. However, levels quickly returned to below normal across most of the state as unusually dry conditions prevailed during the summer months. At the end of September levels ranged from slightly below to nearly 3.5 feet below normal. Also, current levels are lower than they were during September 2001 across most of the state. The abundant precipitation that fell near the end of September improved soil moisture. The Ohio Agricultural Statistics Service reports that near the end of September, soil moisture was rated as being short or very short in 59 percent of the state, adequate in 33 percent, and surplus in 8 percent of Ohio. With near normal precipitation and other climatic conditions during the next several months, the prospects for needed recharge will be favorable.

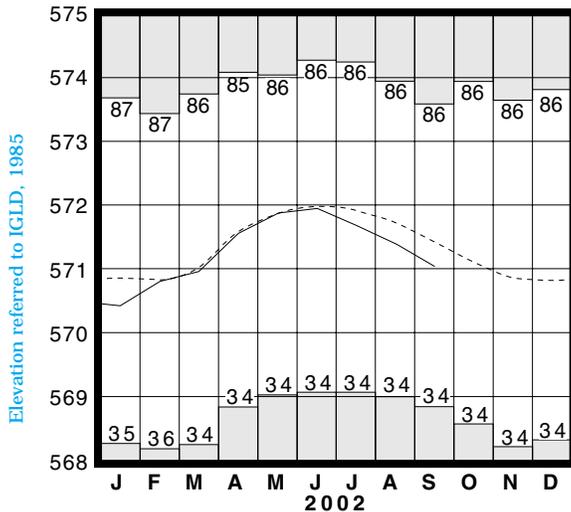
Note: The mean monthly level for observation well H-1 as printed in the August 2002 issue has been revised. The revised mean level is 23.53 feet, which is 0.73 foot lower than the July 2002 level, 0.27 foot lower than the August 2001 level and 0.66 foot below the August normal. The change is reflected in this month's ground water level graph for observation well H-1.

LAKE ERIE level declined during September. The mean level was 571.03 feet (IGLD-1985), 0.36 foot lower than last month's mean level and 0.39 foot below normal. This month's mean level is 0.69 foot higher than the September 2001 level and 1.83 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that September precipitation in the Lake Erie basin averaged 3.22 inches, which is 0.06 inch above normal. The entire Great Lakes basin averaged 2.88 inches of September precipitation, which is 0.53 inch below normal. For calendar year 2002 through September, the Lake Erie basin has averaged 26.60 inches of precipitation, 0.18 inch below normal, while the entire Great Lakes basin has averaged 25.00 inches, which is 0.55 inch above normal.

Lake Erie level began the 2002 water year below normal. October's level was the lowest autumn level since 1966. Monthly levels remained below normal throughout most of the 2002 water year. However, above normal precipitation in the Great Lakes basin early in the 2002 water year helped keep Lake Erie levels above the 2001 water year level.

LAKE ERIE LEVELS



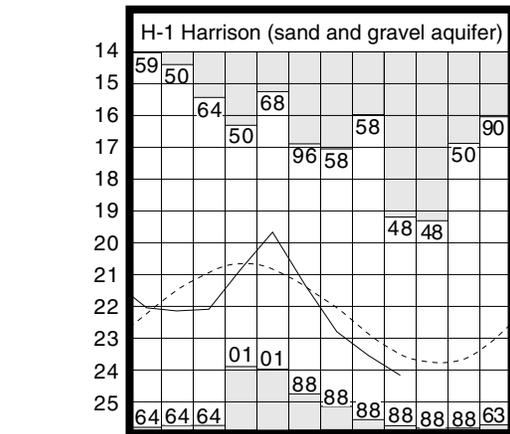
Base period: 1918-2000

□ Record high and low, year of occurrence

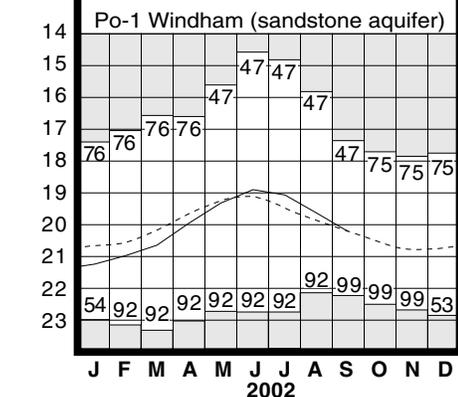
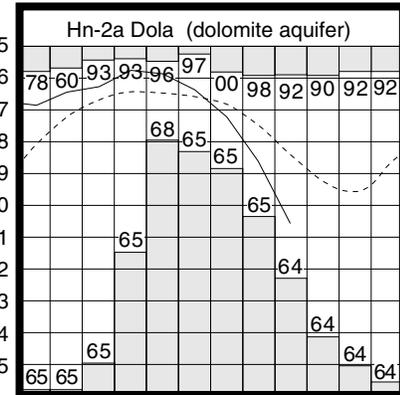
Normal - - - - Current ———

| 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 | 18.03 | -1.07 | -1.13 | +0.17 |
| Fa-1 | Jasper Mill, Fayette Co. | Limestone | 12.24 | -3.47 | -0.35 | -2.60 |
| Fr-10 | Columbus, Franklin Co. | Gravel | 46.75 | -2.46 | -0.58 | -0.27 |
| H-1 | Harrison, Hamilton Co. | Gravel | 24.17 | -0.67 | -0.64 | -0.81 |
| Hn-2a | Dola, Hardin Co. | Dolomite | 10.59 | -2.19 | -1.98 | -2.07 |
| Po-1 | Windham, Portage Co. | Sandstone | 20.22 | -0.01 | -0.60 | +0.93 |
| Tu-1 | Strasburg, Tuscarawas Co. | Gravel | 16.00 | -2.20 | -0.61 | -0.23 |

GROUND-WATER LEVELS



Water level (ft below land surface)



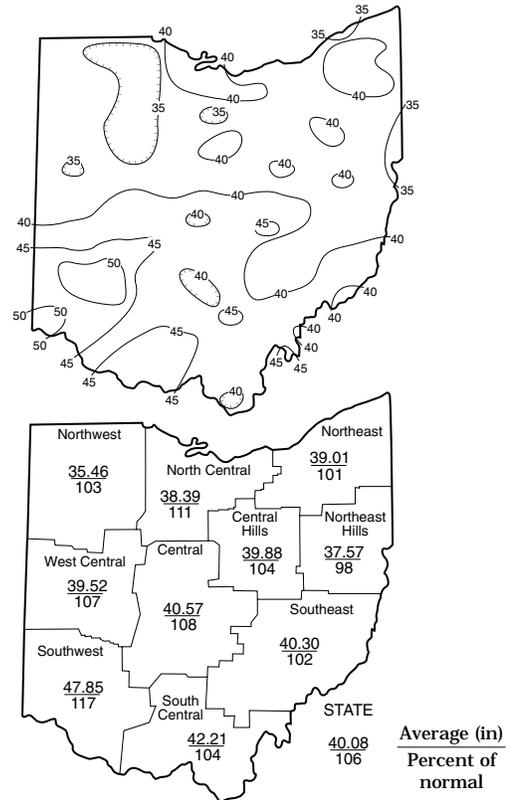
Base periods: H-1, 1951-2000. Hn-2a, 1955-2000.

Po-1, 1947-2000 □ Record high and low, year of occurrence

(Precipitation continued from front)

inches above normal. Regional averages ranged from 47.85 inches, 7.00 inches above normal, for the Southwest Region to 35.46 inches, 1.18 inches above normal, for the Northwest Region (see Precipitation table, departure from normal, past 12 months column). The only region with below normal precipitation was the Northeast Hills Region which received 37.57 inches, 0.86 inch below normal. The 2002 water year got off to a soggy start with notably above normal precipitation during October. For the state as a whole it was the 9th wettest October during the past 119 years. It ranked as the wettest October of record for the Northwest Region and the second wettest for the North Central Region. Precipitation during November and December was generally near or above normal across most of Ohio. Precipitation was below normal throughout most of the state during January. Northern Ohio received above normal precipitation during February, but in the remainder of the state it was notably dry. It was the 10th driest February during the past 107 years for the South Central Region and the 14th driest for the Southeast Region. Above normal precipitation prevailed statewide during spring. This was the 13th wettest spring (March-May) during the past 120 years for the state as a whole. Regionally, 8 of Ohio's 10 climatic regions' spring precipitation totals ranked among the top 20 wettest for the period of record, including the 6th wettest for the Northeast Region and 9th wettest for both the South Central and West Central regions. Conversely, the summer months (June-August) were among the driest on record. It was the 11th driest summer for the state as a whole. Regionally, 8 of Ohio's 10 climatic regions' summer precipitation totals ranked among the top 20 driest for the period of record. The summer's dry pattern continued during the first half of September, but above normal precipitation dominated the second half of the month.

TOTAL PRECIPITATION 2002 WATER YEAR



SUMMARY

Precipitation during September was above normal through most of Ohio, ranking among the wettest Septembers for the West Central and Central regions. Streamflow was below normal across most of the state; however, it was generally above normal in southwest, central and north-central Ohio drainage basins. Reservoir storage decreased in both the Mahoning and Scioto river basins, but was above normal in both basins. Ground water levels declined statewide and were below normal in most aquifers. Lake Erie level declined 0.36 foot and was 0.39 foot below the long-term September average.

Precipitation during the 2002 water year was above normal throughout most of the state, but below normal in some areas of northeastern Ohio. Streamflow was generally above normal in the western half of the state and below normal in the eastern half. Reservoir storage was above normal nearly the entire water year in both the Mahoning and Scioto river basins. Ground water storage was generally below normal for much of the year statewide. Lake Erie level was below normal for most of the 2002 water year, but higher than the 2001 level.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water 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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