



# MONTHLY WATER INVENTORY REPORT FOR OHIO

September 1998

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

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**PRECIPITATION** during September was noticeably below normal throughout most of the state with only a few areas in southeastern and extreme northeastern Ohio having above normal precipitation. The state average was 1.32 inches, 1.68 inches below normal. This ranks as the seventh driest September for the state as a whole during the past 116 years. Regional averages ranged from 2.55 inches, 0.44 inch below normal, for the Southeast Region to 0.96 inch for both the Northwest and West Central regions, 1.89 inches and 1.97 inches below normal, respectively. Regions ranking in the top ten driest Septembers of record were: North Central, fifth driest; Northwest, sixth driest; Central Hills and South Central, eighth driest; Northeast Hills and West Central, ninth driest; and Southwest, tenth driest. McConnelsville (Morgan County) reported the greatest amount of precipitation for the month, 4.67 inches. Germantown (Montgomery County) reported the least amount, a scant 0.19 inch.

Precipitation during September fell as scattered showers. At most locations the first half of the month was much drier than the second half. Some spotty showers fell during September 6-8 with the greatest amounts of up to 0.75 inch reported in northern Ohio. More widespread storms supplying much-needed rain returned to the state starting on September 17-18 and continued on and off through September 24. Most areas of the state received around 0.5 inch of rain from these storms, but some areas in southeastern and extreme northeastern Ohio reported up to 2.5 inches. Additional light, scattered showers fell during September 27-29 with rain amounts of generally less than 0.5 inch reported in most areas, but amounts of more than 1 inch fell at some localized areas in central and east-central Ohio counties.

Precipitation for the 1998 calendar year is above normal throughout Ohio. The state average is 33.53 inches, 3.53 inches above normal. Regional averages range from 37.11 inches, 3.79 inches above normal, for the South Central Region to 29.32 inches, 0.59 inch above normal, for the Northeast Region.

Precipitation for the 1998 water year was above normal throughout most of the state with only the Central and Northeast regions having slightly below normal precipitation. The average for the state as a whole was 39.87 inches, 2.30 inches above normal. Regional averages ranged from 43.63 inches, 2.34 inches above normal, for the South Central Region to 36.32 inches, 0.65 inch below normal, for the Northeast Region (see Precipitation table, departure from normal, past 12 months column). Beverly (Washington County) reported the greatest amount of precipitation for the water year, 50.27 inches. Westlake (Cuyahoga County) reported the least amount, 31.08 inches. An isohyetal map and regional averages with percentages of normal precipitation for the 1998 water year appear on the last page of this report.

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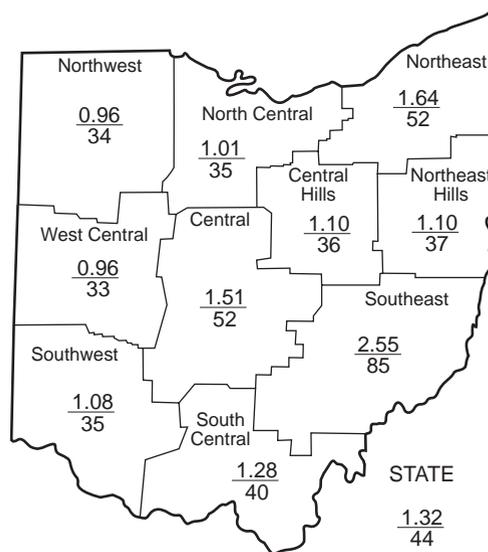
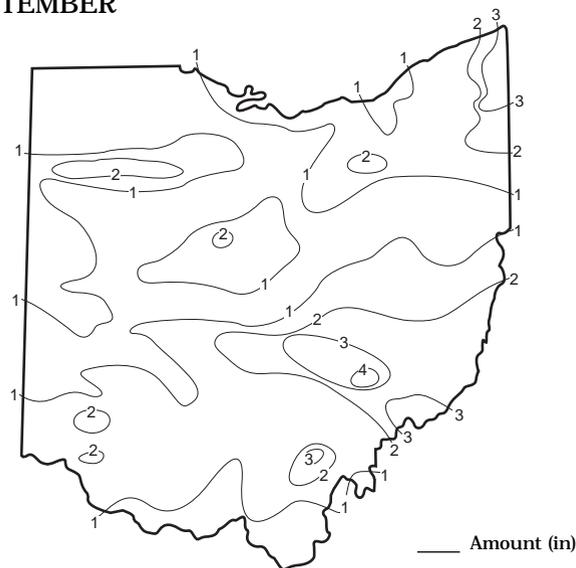
## PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.)					Palmer Drought Severity Index*
	This Month	Past				
		3 Mos.	6 Mos.	12 Mos.	24 Mos.	
Northwest	-1.89	+3.02	+3.49	+4.74	+14.11	+0.4
North Central	-1.87	+1.43	+3.64	+4.97	+12.99	-0.2
Northeast	-1.54	-1.68	-0.04	-0.65	+4.39	-3.3
West Central	-1.97	0	+4.46	+2.52	+4.38	-0.9
Central	-1.38	-3.85	+1.61	-0.26	+2.33	-1.8
Central Hills	-1.93	-2.31	+2.19	+0.57	+3.85	-0.8
Northeast Hills	-1.84	-1.64	+3.58	+2.93	+4.71	-3.5
Southwest	-2.01	-3.43	+5.21	+2.17	+3.64	-1.4
South Central	-1.90	-4.53	+3.14	+2.34	+5.17	-1.7
Southeast	-0.44	-3.92	+4.06	+3.69	+7.19	-2.1
State	-1.68	-1.69	+3.13	+2.30	+6.27	

\*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

# MEANSTREAMDISCHARGE

River and Location	Drainage Area (Sq. Mi.)	This Month		% of Normal Past		
		Mean Discharge (CFS)	% of Normal	3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	27	12	9	79	79
Great Miami River at Hamilton	3,630	605	79	181	162	118
Huron River at Milan	371	46	140	565	216	173
Killbuck Creek at Killbuck	464	121	120	218	122	93
Little Beaver Creek near East Liverpool	496	78	85	125	116	109
Maumee River at Waterville	6,330	990	156	393	136	141
Muskingum River at McConnelsville	7,422	2,051	104	203	137	116
Scioto River near Prospect	567	17	55	258	125	103
Scioto River at Higby	5,131	700	57	172	157	125
Stillwater River at Pleasant Hill	503	35	71	331	164	107

**STREAMFLOW** during September was below normal in many areas of the state, but above normal in northwestern, north-central, and east-central Ohio drainage basins. Flows in northwestern and north-central Ohio reflect the exceptionally high flows at the beginning of the month which were still receding following extremely heavy rain in that area during the last week of August. September flows were low enough to be considered deficient in central, south-central and extreme northeastern Ohio. Flows in September were significantly less than those in August.

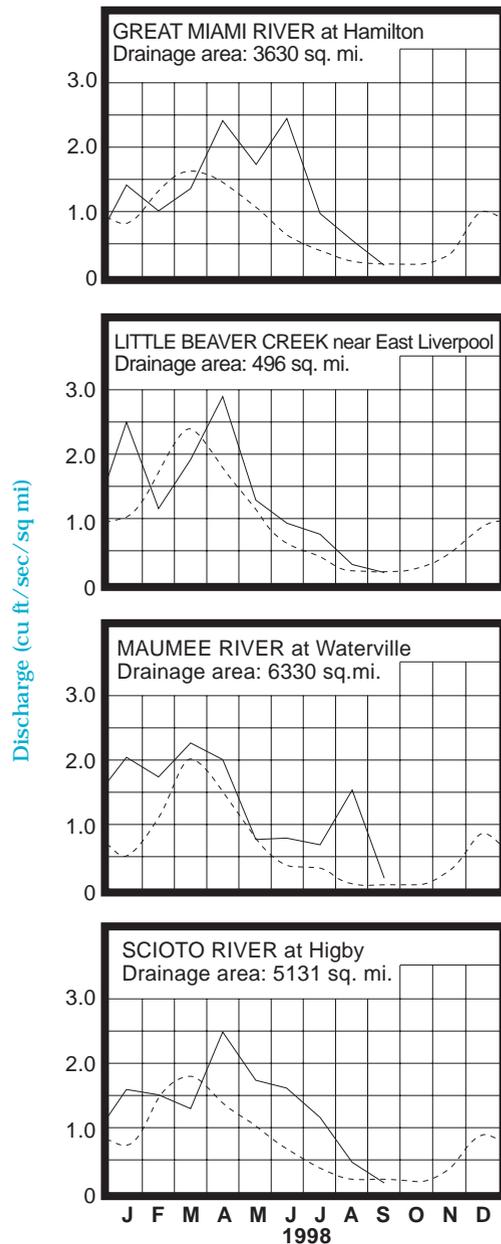
Flows at the beginning of the month were above normal in the northern and eastern areas of the state and below normal in central, southwestern and extreme northeastern Ohio. Generally, flows declined throughout the month with some increases noted after precipitation, especially after that which fell during September 20-24. Drainage basins in northern and eastern Ohio had their greatest September flows at the beginning of the month while elsewhere, the greatest flows were during September 22-24 following the month's greatest precipitation. The lowest flows for September were generally at the end of the month in northern Ohio and during September 17-20 in central and southern Ohio. At the end of September flows were noticeably below normal throughout the state.

Streamflow during the 1998 water year was above normal in most areas of the state, but below normal in a few areas including extreme northeastern Ohio (see Mean Stream Discharge table, percent of normal, past 12 months column). Although flows varied across the state during most months, flows were generally below normal during the first half of the water year and above normal during the second half. Some flooding occurred during January in southeastern Ohio, enhanced by ice jams, and during April in southwestern Ohio. Major flooding occurred during the last week of June in portions of central, eastern and southeastern Ohio. Tragically, the loss of 11 lives was attributed to these storms and floods as well as an estimated \$180 million damage. Twenty-three Ohio counties received disaster declarations. Flooding also occurred during the last week of August in north-central and northwestern Ohio.

**RESERVOIR STORAGE** for water supply during September decreased in both the Mahoning and Scioto river basins. Storage remained above normal in the Mahoning basin reservoirs, but fell to slightly below-normal levels in the Scioto basin reservoirs. Reservoir storage at the end of September in the Mahoning basin index reservoirs was 74 percent of rated capacity for water supply compared with 82 percent for last month and 74 percent for September 1997. Month-end storage in the Scioto basin index reservoirs was 72 percent of rated capacity for water supply compared with 87 percent for last month and 86 percent for September 1997.

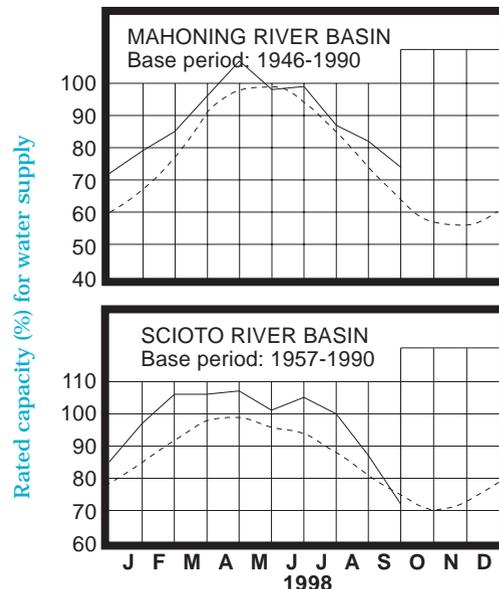
Surface-water supplies were adequate statewide during the 1998 water year. Storage in both on- and off-stream reservoirs remained near or above the normal seasonal levels throughout the water year. Although many areas of the state were rather dry at the end of the water year, adequate precipitation and above normal streamflows during the late spring and early summer months kept water-supply reservoirs near capacity. This also helped reduce demand during the early growing season and high water-use period.

## MEAN STREAM DISCHARGE



Base period for all streams: 1961-1990

## RESERVOIR STORAGE FOR WATER SUPPLY



## GROUND-WATER LEVELS

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

**GROUND WATER LEVELS** during September declined in all aquifers across the state. Declines were greater than usually observed in the southern half of the state and near the norm in the northern half. Levels declined steadily throughout the month, but stabilized in many aquifers during the last week.

Ground water levels are now lower than they were a year ago in nearly all aquifers. Current levels are also below normal in most areas of the state. The exception is in consolidated aquifers in northwestern Ohio where precipitation was greater than average during the summer months and levels remained above normal. In spite of recent dry conditions, ground water supplies remain adequate throughout the state. Although current conditions are not favorable for recharge, adequate precipitation during the next several months would improve that situation. The Ohio Agricultural Statistics Service reports that at the end of September (October 2) soil moisture was rated as being short or very short in 65 percent of the state, adequate in 34 percent of the state and surplus in 1 percent of the state.

The 1998 water year was generally favorable for ground water supplies. Early season dryness slowed the start of the recharge period, but the middle of the water year had more than adequate precipitation to replenish aquifers and maintain near or above normal levels. Although the past couple of months have been somewhat dry in many areas of the state and levels have fallen accordingly, ground water supplies remained adequate at the end of the water year.

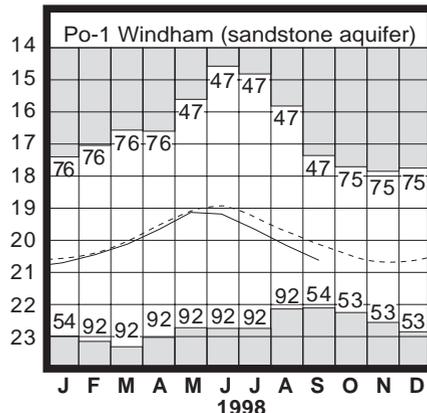
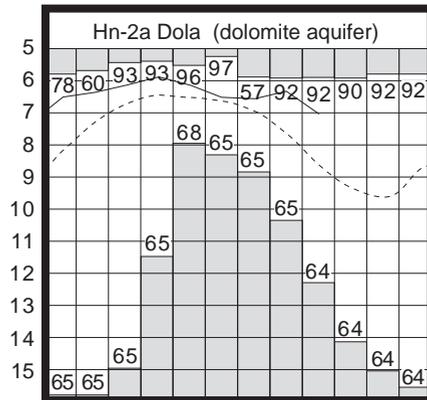
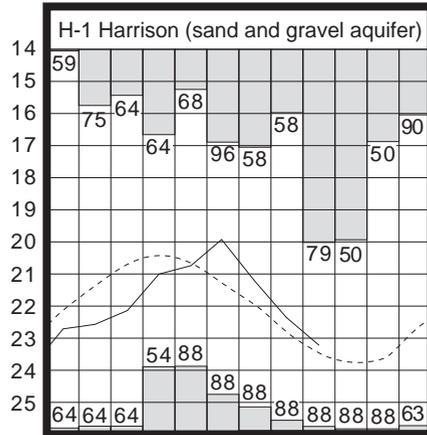
**LAKE ERIE** level declined during September. The mean level was 572.44 feet (IGLD-1985), 0.46 foot lower than last month's mean level and 1.18 feet above normal. This month's level is 0.95 foot lower than the September 1997 level and 3.24 feet above Low Water Datum.

The U. S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during September averaged 1.8 inches, 1.3 inches below normal. The entire Great Lakes basin averaged 3.1 inches of precipitation during September, 0.3 inch below normal. For calendar year 1998 through September, the Lake Erie basin has averaged 28.1 inches of precipitation, 1.4 inches above normal, and the entire Great Lakes basin has averaged 23.9 inches, 0.5 inch below normal.

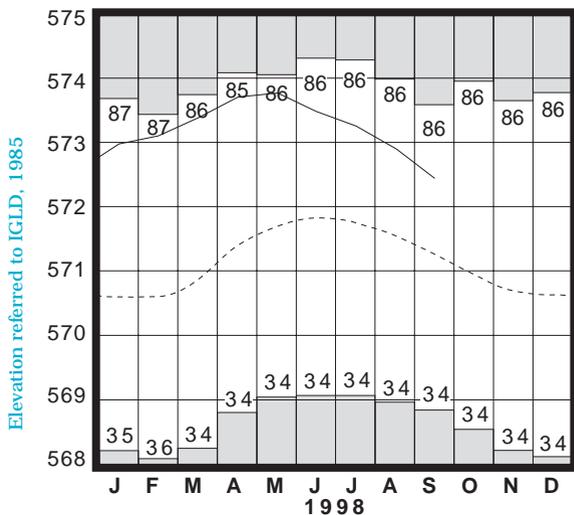
Lake Erie's level remained above normal throughout the 1998 water year. Although levels are lower than they have been during the past 2 years, the USACE predicts that levels will continue to remain above the long-term average for the foreseeable future. This prediction is based on the current condition of the Great Lakes basin and anticipated future weather conditions.

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	18.06	-1.64	-1.14	-0.59
Fa-1	Jasper Mill, Fayette Co.	Limestone	9.84	-1.17	-1.30	-1.21
Fr-10	Columbus, Franklin Co.	Gravel	44.74	-0.24	-0.93	-1.39
H-1	Harrison, Hamilton Co.	Gravel	23.21	+0.26	-0.88	-0.15
Hn-2a	Dola, Hardin Co.	Dolomite	7.04	+1.57	-0.70	-0.45
Po-1	Windham, Portage Co.	Sandstone	20.61	-0.49	-0.45	-0.86
Tu-1	Strasburg, Tuscarawas Co.	Gravel	13.72	-0.21	-0.34	+1.32

## GROUND-WATER LEVELS



### LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

■ Record high and low, year of occurrence

Base periods: H-1, 1951-1990. Hn-2a, 1955-1990.

Po-1, 1947-1990 ■ Record high and low, year of occurrence

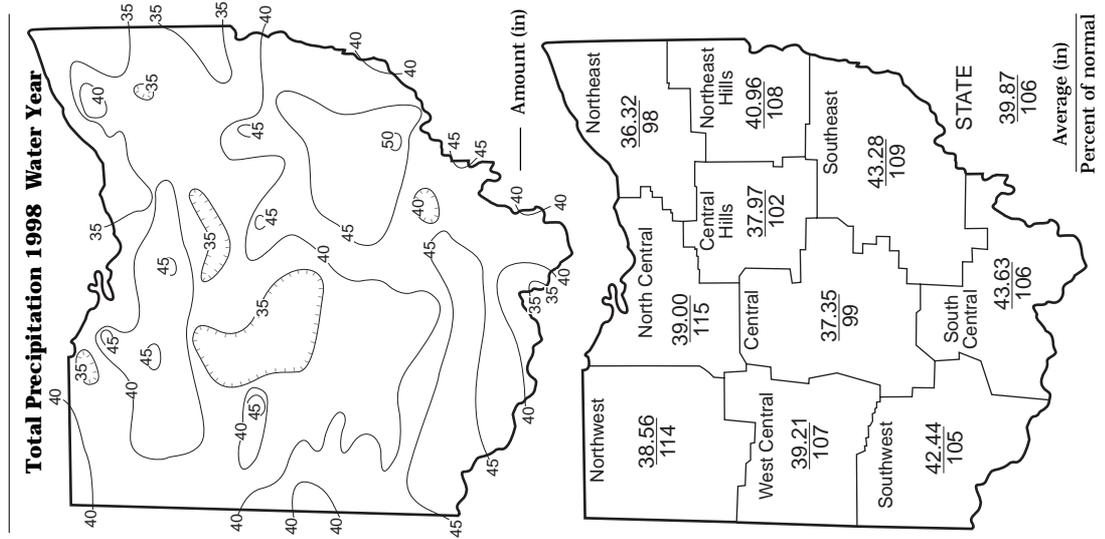
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The 1998 water year started rather dry with most areas of the state having below normal precipitation during October, November, and December. January and February precipitation was generally above normal. Most of the precipitation that fell during the winter months fell as rain with snowfall for the season averaging noticeably below normal throughout the state. March was rather dry in most areas of the state, but April was wet, especially in southwestern and northeastern Ohio, and ranked as the seventh wettest April of record. Some welcomed drying occurred during May in many areas of the state, especially during the second half of the month, but southwestern Ohio continued to be wet. June saw record and near-record precipitation, ranking it as the second wettest of record, accompanied by catastrophic flooding in southeastern Ohio. The eastern half of the state dried during July, but the western half continued to be wet. The southern half of the state continued to be dry during August, but the northern half of the state, especially north-central and northwestern Ohio, received heavy rain from a slow-moving storm system. The entire state received below normal precipitation during September. All things considered, the 1998 water year was adequate for both water supplies and agriculture.

#### SUMMARY

Precipitation was below normal throughout the state. The state average of 1.32 inches ranks as the seventh driest September during the past 116 years. Streamflow was below normal in most areas, but remained above normal in northwestern Ohio where flows were exceptionally high in August. Reservoir storage declined and ranged from slightly above to slightly below normal. Ground water levels declined and are below normal in most aquifers. Lake Erie level declined 0.46 foot and was 1.18 feet above the long-term September average.

Precipitation for the 1998 water year was above normal throughout most of the state, but slightly below normal in central and northeastern Ohio. Catastrophic flooding occurred during late June in eastern Ohio. Both surface and ground water supplies were adequate throughout the year.



## 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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