MONTHLY WATER INVENTORY REPORT FOR OHIO

December 1998

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

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PRECIPITATION during December was below normal for most of the state, but slightly above normal in portions of central and southwestern Ohio. The state average was 2.07 inches, 0.51 inch below normal. Regional averages ranged from 2.96 inches, 0.14 inch above normal, for the Southwest Region to 0.84 inch, 1.47 inches below normal, for the Northwest Region. This ranks as the ninth driest December for the Northwest Region during the past 104 years. Cincinnati-Fernbank (Hamilton County) reported the greatest amount of precipitation for the month, 4.19 inches. Both Bowling Green (Wood County) and Toledo Express Airport (Lucas County) reported the least amount, 0.61 inch.

Precipitation during December fell in the form of both rain and snow. Snow totals were below normal throughout the state with the greatest amounts reported in the snowbelt counties of northeast Ohio. Chardon (Geauga County) received 17.6 inches of snow during the month, about 9 inches below normal. The first three weeks of December were rather dry across the state with scattered light precipitation, occurring mainly on or around December 7-8 and December 16-17, accumulating to less than 0.25 inch in northwestern Ohio ranging to slightly more than 0.5 inch at most other locations. Many areas of the state reported their first measurable snow of the season during December 16-17. The heaviest and most widespread precipitation for the month occurred on December 21-22. Areas from southwestern to central Ohio received the greatest amounts of rain ranging from 2 to 3 inches with as much as 3.5 inches reported locally. Most other areas of the state received between 1 and 2 inches of rain during this storm, with amounts tapering to around 0.5 inch in extreme northwestern and southeastern Ohio. Dry conditions again prevailed across the state during the next week. Light precipitation fell during December 29-31 across the state, most of which was in the form of snow.

Precipitation for the 1999 water year is below normal across much of the state, but slightly above normal in the Central, Central Hills and Northeast Hills regions. The average for the state as a whole is 6.75 inches, 0.82 inch below normal. Regional averages range from 8.17 inches, 0.02 inch below normal, for the Southwest Region to 4.64 inches, 2.21 inches below normal, for the North Central Region.

Precipitation for the 1998 calendar year was above normal statewide except in the Northeast Region where it was slightly below normal. The state average was 40.33 inches, 2.76 inches above normal. Regional averages ranged from 44.32 inches, 3.03 inches above normal, for the South Central Region to 36.20 inches, 0.77 inch below normal, for the Northeast Region (see Precipitation table, departure from normal, past 12 months column). Cheviot (Hamilton County) reported the greatest amount of precipitation for the year, 50.30 inches. Other stations

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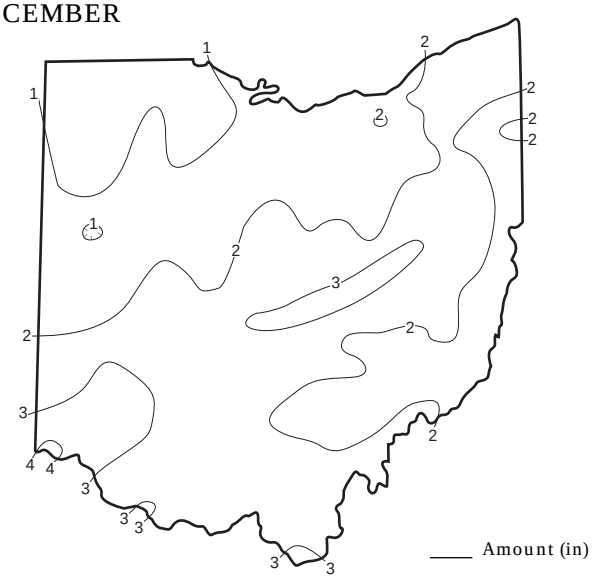
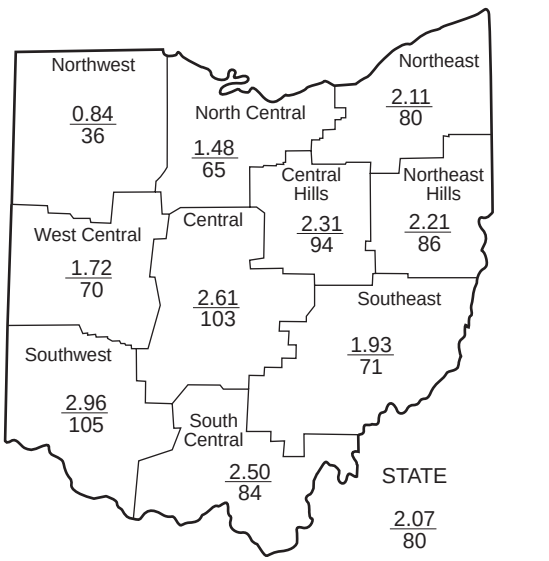
PRECIPITATION

Region	DEPARTURE FROM NORMAL (IN.) This Month	Past 3 Mos.	Past 6 Mos.	Past 12 Mos.	Past 24 Mos.	Palmer Drought Severity Index*
Northwest	-1.47	-2.30	+0.94	+3.90	+10.35	+1.2
North Central	-0.80	-2.21	-0.78	+3.87	+8.08	-0.7
Northeast	-0.53	-1.30	-3.04	-0.77	-1.10	-1.1
West Central	-0.75	-1.38	-1.38	+2.90	+0.65	+0.8
Central	+0.08	+0.17	-3.73	+0.67	+1.34	+0.1
Central Hills	-0.16	+0.45	-1.80	+2.55	+1.41	+0.9
Northeast Hills	-0.37	+0.08	-1.36	+3.99	+2.01	+1.5
Southwest	+0.14	-0.02	-3.45	+3.66	+2.48	+0.5
South Central	-0.46	-0.70	-5.29	+3.03	+3.23	+0.4
Southeast	-0.79	-0.94	-4.83	+3.82	+5.71	-0.3
State	-0.51	-0.82	-2.48	+2.76	+3.41	

*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 DECEMBER





MEAN STREAM DISCHARGE

This Month

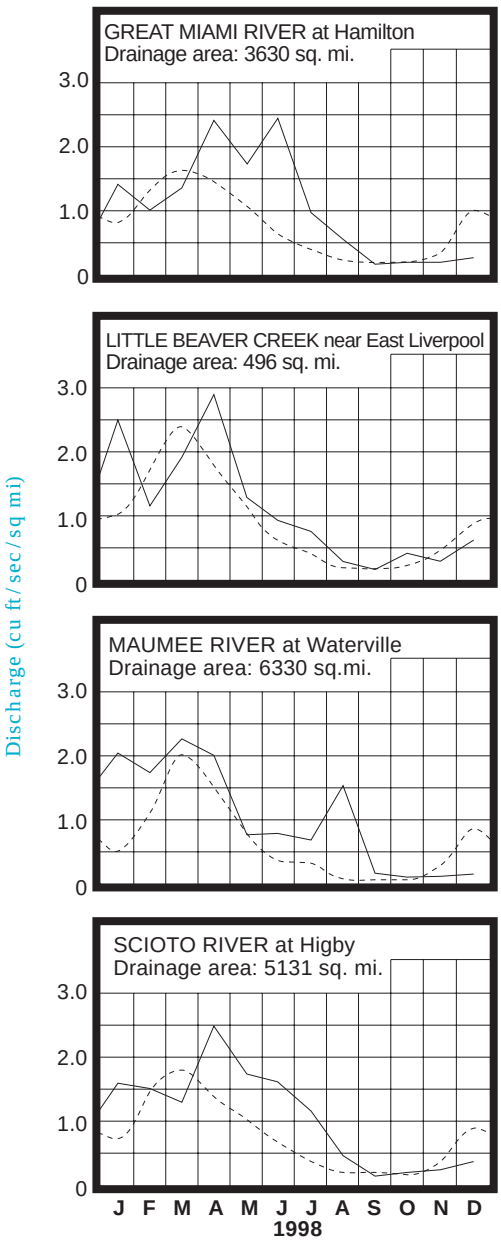
River and Location	Drainage Area (Sq. Mi.)	Mean Discharge (CFS)	% of Normal	% of Normal Past		
				3 Mos.	6 Mos.	12 Mos.
Grand River near Painesville	685	152	9	8	9	67
Great Miami River at Hamilton	3,630	976	27	42	82	117
Huron River at Milan	371	88	59	40	183	161
Killbuck Creek at Killbuck	464	214	57	77	117	94
Little Beaver Creek near East Liverpool	496	306	69	89	86	105
Maumee River at Waterville	6,330	936	17	27	130	125
Muskingum River at McConnelsville	7,422	4,834	68	79	125	117
Scioto River near Prospect	567	41	16	20	72	99
Scioto River at Higby	5,131	1,900	41	56	98	116
Stillwater River at Pleasant Hill	503	75	19	30	105	105

STREAMFLOW for December was noticeably below normal throughout the state. Flows were low enough to be considered deficient in many basins in the northern half of Ohio. December flows were greater than the flows recorded in November.

Flows were below normal statewide at the beginning of the month. Lowest flows for the month occurred between December 13-17 in most areas of the state. However, lowest flows in some basins in northwestern Ohio occurred around December 7. Greatest flows for the month occurred during December 22-25 in nearly all drainage basins in response to the greatest and most widespread precipitation of the month. Flows were declining in most basins at the end of the month and were below normal statewide.

Streamflow during the 1998 calendar year was above normal in most areas of the state, but below normal in a few locations especially in extreme northeastern Ohio where flows were below normal in 10 months during 1998 (see Mean Stream Discharge table, percent of normal, past 12 months column). The year began with above normal flows statewide during January. Flows during February and March were below normal in most areas of the state, except in northwest and north-central Ohio where they were above normal. Above normal flows returned in April for nearly all of Ohio and stayed that way through May. Streamflow for June was noticeably above normal in all drainage basins except those in extreme northeastern Ohio. Strong storms with torrential rain during the last week of June caused major flooding in portions of central, eastern and southeastern Ohio. Twenty-three Ohio counties received disaster declarations and tragically, 12 people lost their lives as a result of these storms and floods. Flows during July and August remained above normal in nearly all basins in the state. September flows declined to below-normal levels in many parts of Ohio in response to below normal precipitation. Wetter conditions contributed to slightly higher flows in most drainage basins during October as compared to September observations, but the flows in many basins remained below normal. Below normal precipitation in November and December resulted in below normal flows in most drainage basins in the state during these months.

MEAN STREAM DISCHARGE

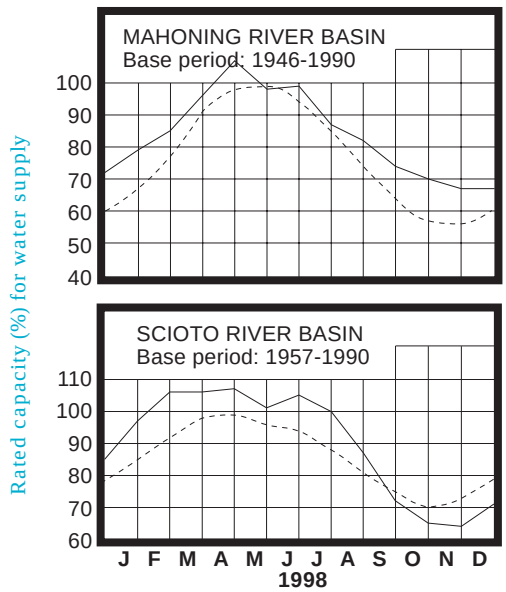


Base period for all streams: 1961-1990

RESERVOIR STORAGE for water supply during December was unchanged in the Mahoning River basin and increased in the Scioto River basin. Storage remained above normal in the Mahoning basin index reservoirs and below normal in the Scioto basin index reservoirs. Reservoir storage at the end of December in the Mahoning basin index reservoirs was 67 percent of rated capacity for water supply compared with the same for last month and 72 percent for December 1997. Month-end storage in the Scioto basin index reservoirs was 71 percent of rated capacity for water supply compared with 64 percent for last month and 85 percent for December 1997.

Surface water supplies were adequate throughout the 1998 calendar year. Storage in the Mahoning River basin was above or near normal all year. Storage in the Scioto River basin was above normal during the first eight months of the year, but fell to slightly below normal in September and remained below normal through the end of the year. Surface water supplies are adequate statewide at the end of the year.

RESERVOIR STORAGE FOR WATER SUPPLY



Normal _ _ _ _ Current ———

GROUND-WATER LEVELS

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

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	18.71	-1.86	+0.06	-0.69
Fa-1	Jasper Mill, Fayette Co.	Limestone	10.93	-2.77	-0.23	-3.21
Fr-10	Columbus, Franklin Co.	Gravel	44.45	-0.35	+0.34	-1.45
H-1	Harrison, Hamilton Co.	Gravel	24.04	-1.22	-0.45	-0.12
Hn-2a	Dola, Hardin Co.	Dolomite	9.46	-0.52	-0.64	-2.12
Po-1	Windham, Portage Co.	Sandstone	21.67	-1.06	-0.27	-0.84
Tu-1	Strasburg, Tuscarawas Co.	Gravel	15.32	-2.04	-0.21	+0.60

GROUND WATER LEVELS during December declined contra-seasonally in nearly all aquifers across the state. A few exceptions were observed in central Ohio where ground water levels in some aquifers remained steady or rose slightly during the month. Generally, levels slowly declined in most aquifers during the first three weeks of December and then rose the last week of the month in response to the widespread precipitation of December 21-22. However, levels in some aquifers were again declining by the end of the month.

Ground water levels are lower than they were a year ago in most aquifers. Current levels are also below normal in nearly all aquifers across the state. Ground water levels are being affected by the recent dry conditions and lack of recharge throughout the state. Water supply managers with ground water sources should monitor their situations closely throughout the recharge season.

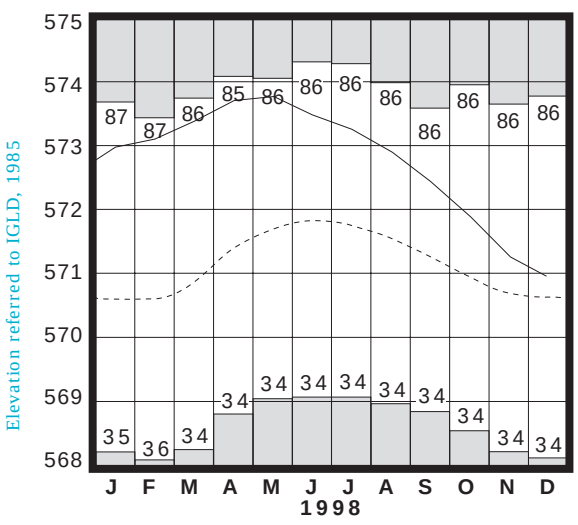
Ground water supplies were generally favorable during the 1998 calendar year. From January to July ground water levels were above or near normal in most aquifers in the state. With below normal precipitation starting in July in the eastern two-thirds of Ohio, the southern half of the state in August, and more recently statewide, ground water levels began to decline at a rate greater than usually observed beginning in August and continuing through the end of the year. With little or no recharge during the past few months, ground water levels are now below normal in most aquifers across the state as 1998 comes to a close. A return to more normal climatic conditions would be favorable to the replenishment of Ohio's aquifers during this recharge season.

LAKE ERIE level declined during December. The mean level was 570.96 feet (IGLD-1985), 0.30 foot lower than last month's mean level and 0.33 foot above normal. This month's level is 1.61 feet lower than the December 1997 level and 1.76 feet above Low Water Datum.

The U.S. Army Corps of Engineers (USACE) reports that precipitation in the Lake Erie basin during December averaged 1.7 inches, 0.9 inch below normal. The entire Great Lakes basin averaged 1.8 inches of precipitation during December, 0.8 inch below normal. For calendar year 1998, the Lake Erie basin averaged 33.5 inches of precipitation, 1.5 inches below normal, and the entire Great Lakes basin averaged 31.2 inches, 1.4 inches below normal.

Lake Erie's level remained above normal throughout the 1998 calendar year. After peaking in May at 573.79 feet (IGLD-1985), Lake Erie's mean level declined 2.83 feet by the end of the year. This is nearly three times the normally observed decline. 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 near to slightly above the long-term average for the foreseeable future.

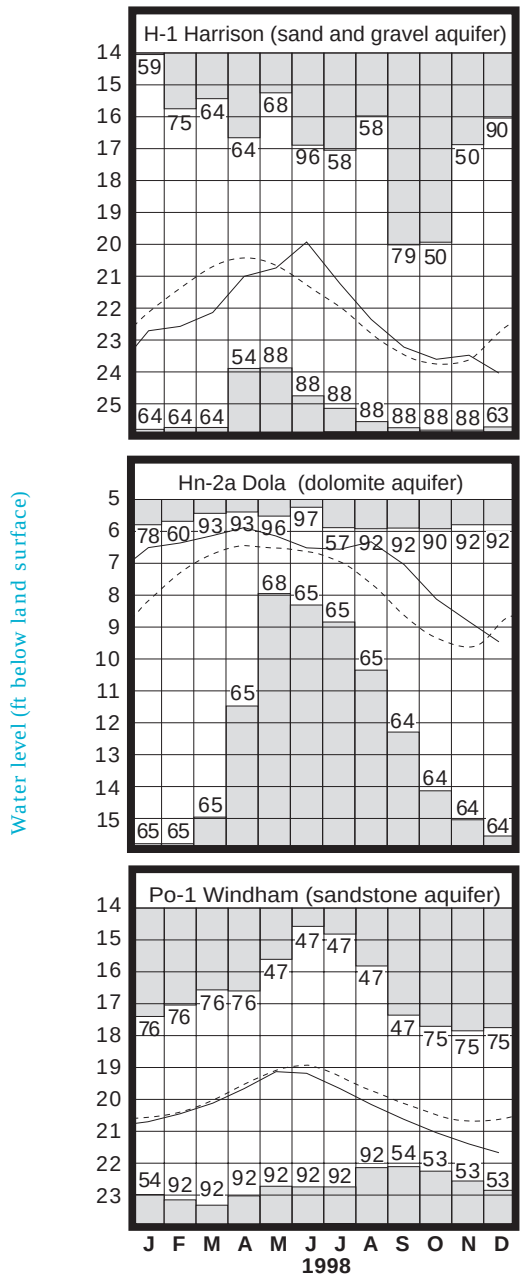
LAKE ERIE LEVELS at Fairport



Base period: 1900-1991

Record high and low, year of occurrence

GROUND-WATER LEVELS



Base periods: H-1, 1951-1990. Hn-2a, 1955-1990. Po-1, 1947-1990

Record high and low, year of occurrence

Normal – – – – Current ———

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reporting more than 50 inches of precipitation for the year were Ripley (Brown County), 50.17 inches, and Beverly (Washington County), 50.21 inches. Painesville (Lake County) reported the least amount of precipitation, 31.02 inches. An isohyetal map and regional averages with percentages of normal precipitation for the 1998 calendar year appear below.

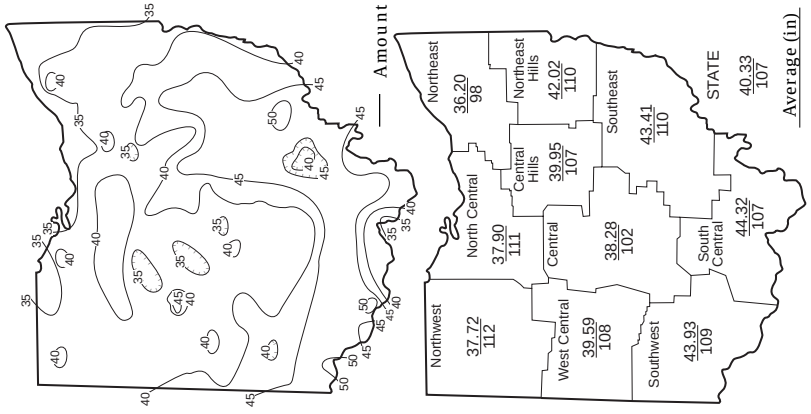
The 1998 calendar year started off with generally above normal precipitation during January and February. Most of the precipitation during these month's fell in the form of rain as snowfall was noticeably below normal during the winter of 1998. March was rather dry in most areas of the state, but wet conditions returned in April, especially in southwestern and northeastern Ohio, and ranked as the seventh wettest April during the past 116 years. May was rather dry in many areas, but conditions remained wet in the southern sections of Ohio. June saw noticeably above normal precipitation statewide, ranking it as the second wettest of record. Torrential rains in the southern one-third of the state during June resulted in catastrophic flooding in southeastern Ohio. Beverly (Washington County) reported 15.86 inches of rain during the month with unofficial amounts of greater than 20 inches reported from this region. July precipitation was below normal in the eastern half of the state, but continued wet in the western half. The southern half of the state was dry in August, but the northern half, especially north-central and northwestern Ohio, received heavy rains. Unusually dry conditions were prevalent across the entire state during September. Precipitation was above normal in most areas during October. Below normal precipitation was reported statewide during November and throughout most areas in December. The 1998 calendar year as a whole was adequate for water supplies, but the below normal conditions of the last few months of the year, should they continue, would not be especially favorable for the recharge to water supplies.

SUMMARY

December precipitation was below normal for most of the state, but slightly above normal in many locations in central and southwestern Ohio. Streamflow increased seasonally, but was below normal statewide. Reservoir storage was unchanged in the Mahoning River basin and remained above normal. Reservoir storage increased in the Scioto River basin but was slightly below normal. Ground water levels declined in nearly all aquifers and are below normal statewide. Lake Erie level declined 0.30 foot and was 0.33 foot above the long-term December average.

Precipitation during the 1998 calendar year was above normal for nearly all of the state, but below normal in northeastern Ohio. Streamflow was generally above normal in most areas, except in northeastern Ohio where it was below normal. Reservoir storage was adequate during the year. Ground water supplies were adequate throughout 1998, but had declined to below normal levels in nearly all aquifers in the state by the end of the year. Lake Erie was above the long-term average level throughout the year, yet declined noticeably during the second half.

TOTAL PRECIPITATION 1998 CALANDER 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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