

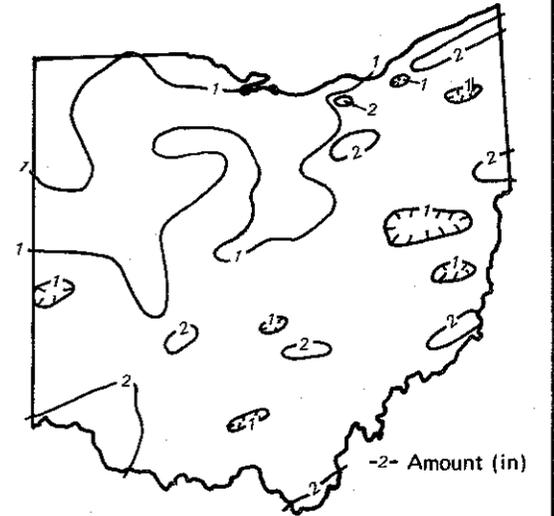


monthly water inventory report for ohio

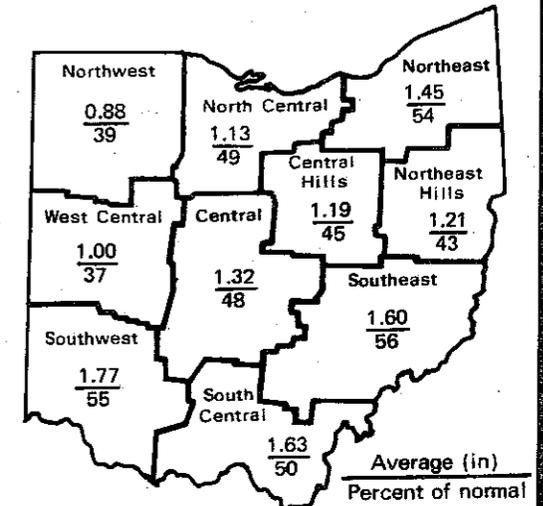
Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for January was below normal throughout the state; this was the third consecutive month for which precipitation has been markedly below normal for the state as a whole. The average for the state as a whole was 1.32 inches, 1.44 inches below normal. Regional averages ranged from 1.77 inches, 1.46 inches below normal, for the Southwest region to 0.88 inch, 1.35 inches below normal, for the Northwest region. Departures from normal ranged from 1.70 inches below normal for the West Central region to 1.19 inches below normal for the North Central region. Kings Mills, Warren County, reported the greatest amount of precipitation, 2.85 inches, for the month, and Plymouth, Richland County, reported the least amount, 0.17 inch. About two-thirds of the state received between 1.0 and 2.0 inches of precipitation; the remaining one-third, located generally in the northwest and north-central portions of the state, received less than 1.0 inch. A few stations in the southern and northeastern areas of the state received more than 2.0 inches. Most of the precipitation throughout the state remained frozen on the ground at the month end. Grant Vaughn, hydrologist with the National Weather Service Forecasting Office for Ohio, reports that there was an average of 20 inches of snow on the ground in northeastern Ohio at the month end.



Precipitation is below normal throughout the state for the first four months of the 1977 water year. The average for the state as a whole is 5.97 inches, 4.29 inches below normal. Regional averages range from 7.62 inches, 2.75 inches below normal, for the Southeast region to 4.48 inches, 4.94 inches below normal, for the Northwest region. Departures from normal range from 5.14 inches below normal for the West Central region to 2.75 inches below normal for the Southeast region. The below-normal precipitation during the first four months of the 1977 recharge period along with the markedly below-normal temperatures in January have precluded any expectations for recharge thus far.



DIVISION OF WATER

Wayne S. Nichols, Chief

SUMMARY

The water-supply situation is rather uncertain and critical in some areas of the state. The situation has been affected tremendously by the continued lack of precipitation and the below-normal temperatures; many record-low temperatures were recorded in January. Mason Bennis, meteorologist-in-charge at the Port Columbus National Weather Service Office, reports that this was the coldest January on record for Columbus since the beginning of record in 1878. Temperatures were below freezing from December 28, 1976, through February 3, 1977, and were below 0 degrees F. on 14 days in January. Precipitation was noticeably below normal throughout the state for the third consecutive month. Streamflow was deficient, reservoir storage was noticeably low, and ground-water levels were noticeably below normal in most areas of the state. Lake Erie level declined and was the lowest since November 1968.

NOTES AND COMMENTS

Ground-water levels throughout the state are generally below normal and 2 to 5 feet below those levels observed in January 1976. Although the situation is not critical, marginal wells in some areas of the state have required deepening or replacement because of deficient recharge. Both homeowners and municipalities depending on ground-water supplies should take note and adopt plans for conservation measures *now*, to prevent serious problems in the future.

OHIO DISASTER SERVICES AGENCY

The Ohio Disaster Services Agency, under the direction of Major General James Clem, Adjutant General in command of the Ohio National Guard, is prepared to assist local governments unable to cope with extreme emergency situations threatening the lives and welfare of Ohio's citizens. Assistance is currently being given to several communities whose water supplies are nearly exhausted as a result of current drought conditions. The agency is concerned that a sudden warming trend accompanied by heavy rainfall could lead to serious flood and ice problems and is taking steps to be fully prepared for such an emergency. Local heads of government wanting to inquire about assistance should contact their County Disaster Services Agency Coordinator or they may call the Ohio Disaster Services Agency at (614) 466-5446.

ACKNOWLEDGMENTS

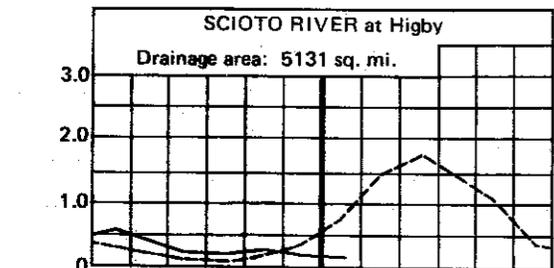
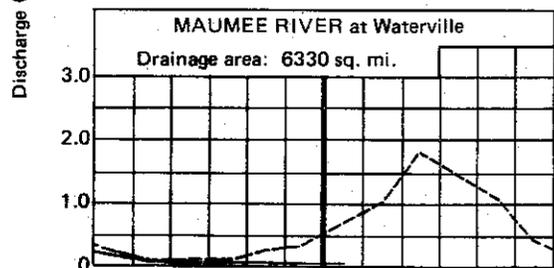
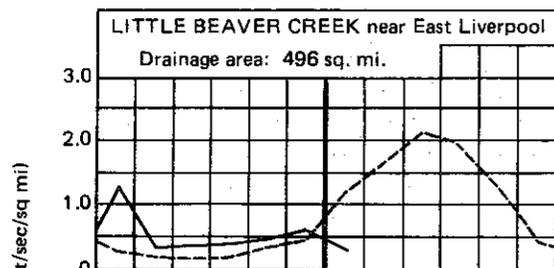
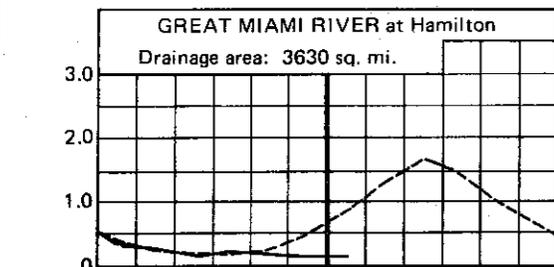
This report has been compiled from Division of Water data and from information supplied by the following:

- Precipitation data:
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 Streamflow and reservoir storage data:
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 Lake Erie level data:
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 Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.



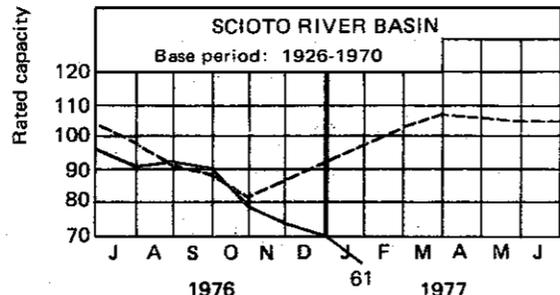
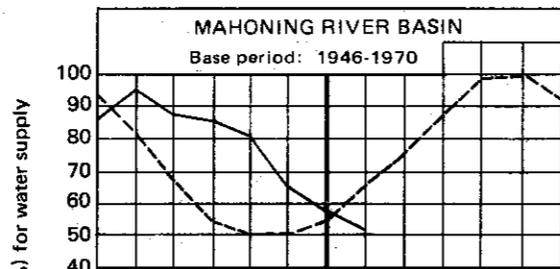
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 DIVISION OF WATER
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 COLUMBUS, OHIO 43224

MEAN STREAM DISCHARGE



Base period for all streams: 1941-1970

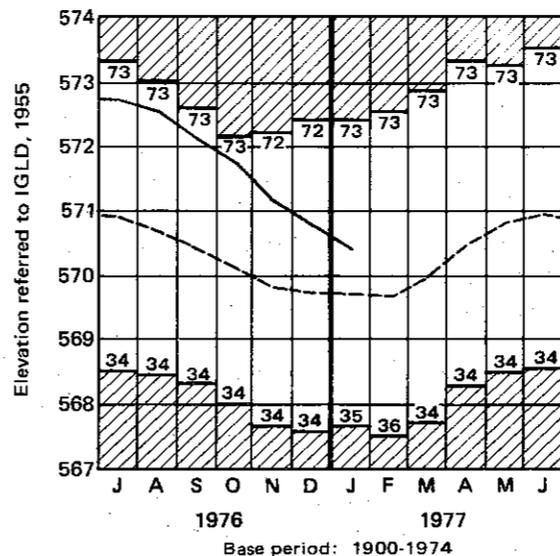
RESERVOIR STORAGE FOR WATER SUPPLY



RESERVOIR STORAGE for water supply in both index basins showed unusual declines for the fourth consecutive month in response to continued below-normal precipitation. Storage in the Mahoning basin index reservoirs was below normal for the first time since July 1976 and was the lowest month-end storage observed since November 1971. Storage in the Scioto basin index reservoirs was below normal for the fourth consecutive month and was also the lowest month-end storage observed since November 1971. The below-normal temperatures and deficient precipitation have created many problems for those who depend on reservoirs for water supplies.

STREAMFLOW for January was noticeably deficient throughout the state. The flows in streams were greatly affected by ice. Grant Vaughn, hydrologist with the National Weather Service Forecasting Office for Ohio, reports that ice on streams is generally 6 to 15 inches thick. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 456 cfs, 16 percent; Little Beaver Creek, 142 cfs, 25 percent; Maumee River, 261 cfs, 6 percent; Scioto River, 670 cfs, 18 percent. Runoff for the water year thus far is markedly deficient throughout most of the state. Cumulative runoff and departures from normal for the index gaging stations are as follows: Great Miami River, 0.73 inch, 1.21 inches below normal; Little Beaver Creek, 1.98 inches, 0.38 inch below normal; Maumee River, 0.24 inch, 1.91 inches below normal; Scioto River, 0.99 inch, 1.13 inches below normal.

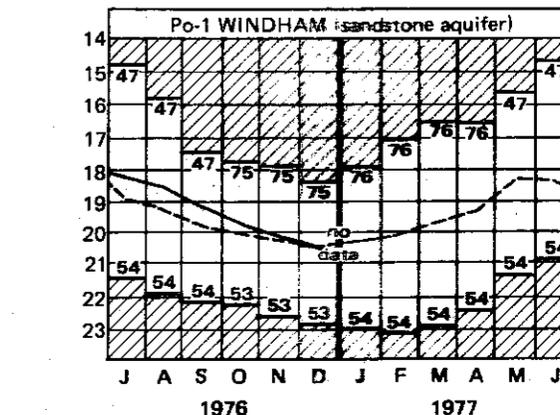
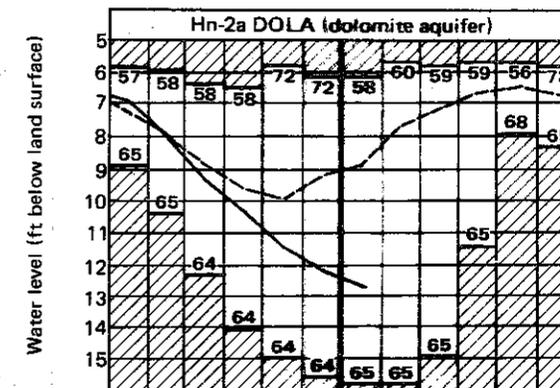
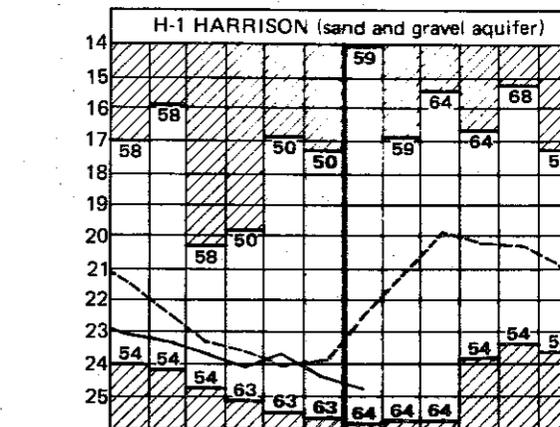
LAKE ERIE LEVELS



LAKE ERIE level declined for the eighth consecutive month. The mean level for January was 570.43 feet above IGLD (1955), 0.36 foot below last month's mean level and 0.72 foot above normal. The lake level is 1.27 feet below the level observed for January 1976 and 1.83 feet above Low Water Datum. The lake level in January was the lowest it has been for any month since November 1968.

GROUND-WATER LEVELS throughout the state in general continued to show unusual declines during January in response to the extremely poor recharge conditions. Levels were generally noticeably below normal; the only exceptions were in the consolidated-rock aquifers in the northeast portion of the state. Water levels in all index wells are below those levels observed last month and noticeably below those levels observed for January 1976. The ground-water supply situation is becoming crucial in some areas of the state. Continued lack of recharge to the aquifers will compound the current problems. (Because of the extreme weather conditions, no data were collected at the month end in northeastern Ohio.)

GROUND-WATER LEVELS



Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964



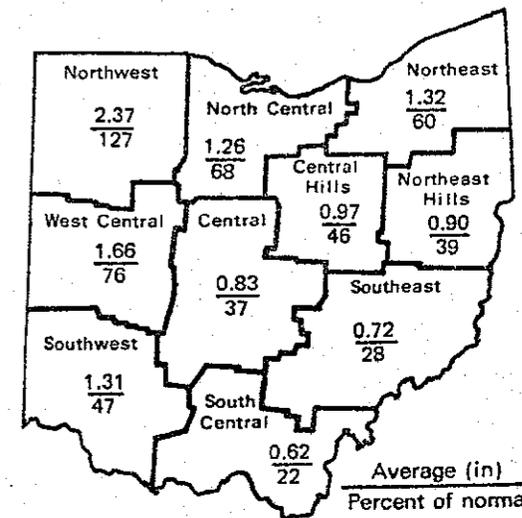
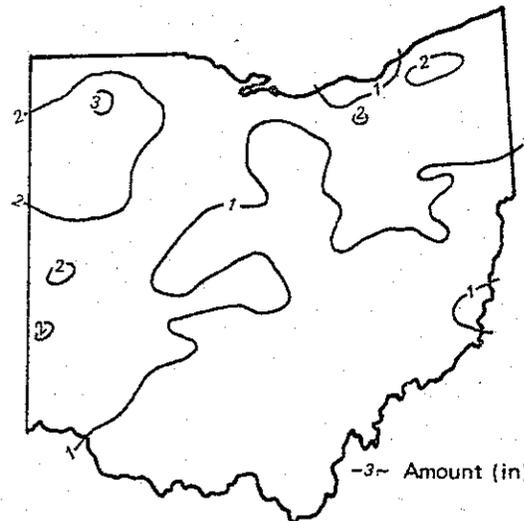
monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for February was noticeably below normal throughout the state; the only exception was the Northwest region, where precipitation was above normal. This is the fourth consecutive month for which precipitation has been noticeably below normal throughout the state. The average for the state as a whole was 1.20 inches, 1.09 inches below normal. Regional averages ranged from 2.37 inches, 0.51 inch above normal, for the Northwest region to 0.62 inch, 2.25 inches below normal, for the South Central region. Napoleon, Henry County, reported the greatest amount of precipitation, 3.18 inches, for the month, and Bourneville, Ross County, reported the least amount, 0.38 inch. Most of the state south and east of a line running from Cincinnati through Columbus to Youngstown and a large portion of the North Central region received less than 1.0 inch of precipitation for the month. A large area of the remainder of the state received between 1.0 and 2.0 inches. The Northwest region and a few stations in other areas of the state received between 2.0 and 3.0 inches. Only one station (Napoleon) reported more than 3.0 inches. A warming trend beginning about the middle of February allowed the heavy snow cover, which had been on the ground since early in January, to melt without any appreciable additional precipitation. By the end of the month most of the heavy snow cover had disappeared, thus reducing the threat of a serious flood. Precipitation for the first two months of the 1977 calendar year averaged 2.52 inches, 2.53 inches below normal. Regional averages ranged from 3.25 inches, 0.84 inch below normal, for the Northwest region to 2.11 inches, 2.99 inches below normal, for the Northeast Hills region. Departures from normal ranged from 3.91 inches below normal for the South Central region to 0.84 inch below normal for the Northwest region.

Precipitation is markedly below normal throughout the state for the first five months of the 1977 water year. The average for the state as a whole is 7.17 inches, 5.38 inches below normal. Regional averages range from 8.34 inches, 4.56 inches below normal, for the Southeast region to 6.13 inches, 4.92 inches below normal, for the North Central region. Regional deficiencies range from 6.35 inches below normal for the Southwest region to 4.43 inches below normal for the Northwest region. The below-normal precipitation for the first five months of the current water year has resulted in drought conditions throughout the state insofar as water supplies are concerned. Some recharge to water supplies was evident during the last few days of February in response to the melting snow and precipitation on February 26 and 27.



SUMMARY

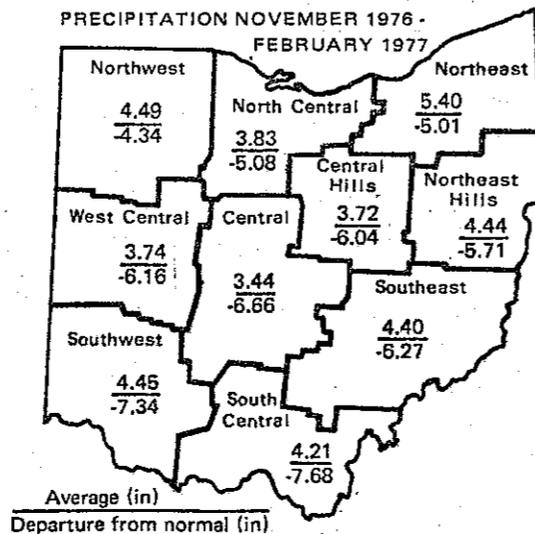
The water-supply situation continues to be uncertain. The lack of precipitation throughout the state for the fourth consecutive month is slowly depreciating our water supplies (see Notes and Comments). Precipitation for February was noticeably below normal throughout the state; the only exception was the Northwest region, where precipitation was slightly above normal. Reservoir storage, streamflow, and ground-water levels remain markedly below normal. Observation well Tu-1 at Strasburg, Tuscarawas County, recorded an all-time record-low level for the period of record, which began in 1946. Lake Erie level declined slightly and was the lowest since November 1967.

NOTES AND COMMENTS

PRECIPITATION DEFICIENT THROUGHOUT STATE

The deficient precipitation which has persisted throughout the state for the past four months continues to have its effect on water supplies in Ohio. The map below shows total precipitation by region and the departures from normal. Regional departures from normal for the four months, November and December 1976 and January and February 1977, range from 4.34 inches below normal for the Northwest region to 7.68 inches below normal for the South Central region. These deficiencies have occurred during the crucial months of the nominal ground-water recharge period. There are only two more months remaining during the current water year in which we can expect substantial recharge to occur. Many reports of seriously low water levels and dry wells have been reported during the past month. This has been especially true in areas where only marginal water supplies are available from ground water. It is advised that those with marginal water supplies examine their resources and begin adopting conservation measures now. Conservation of our resources benefits everyone. By managing our water supplies properly now, we will be better prepared for greater shortages if they should develop in the future.

PRECIPITATION NOVEMBER 1976 - FEBRUARY 1977



ACKNOWLEDGMENTS

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- 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. Corps of Engineers, Detroit District.
- Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.



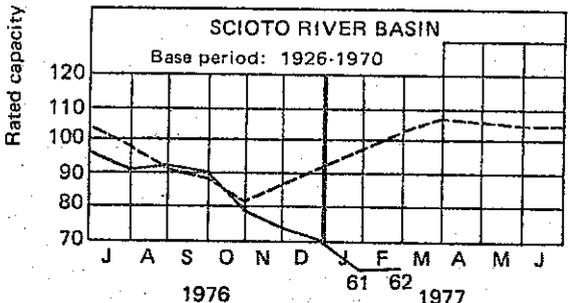
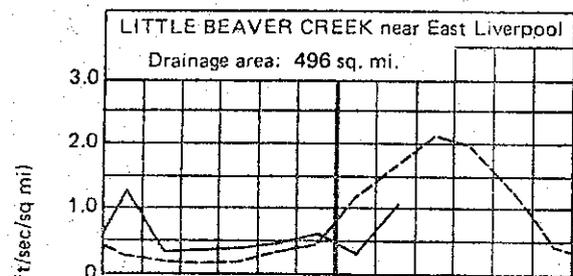
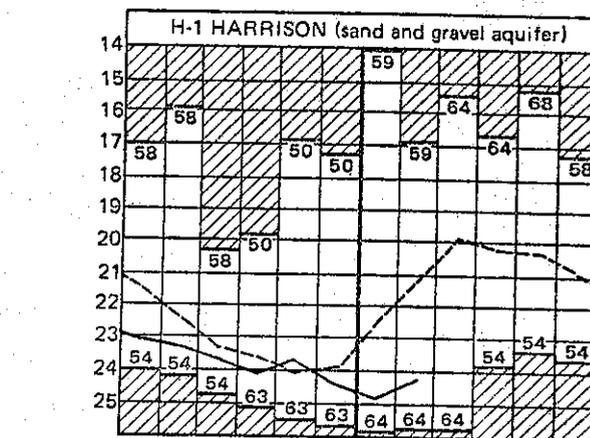
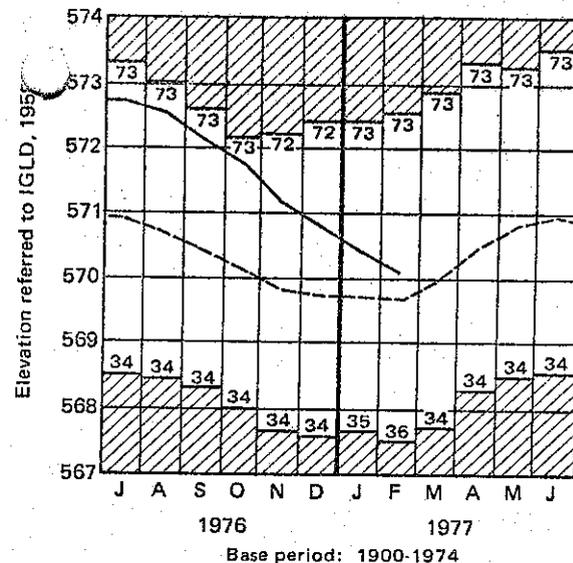
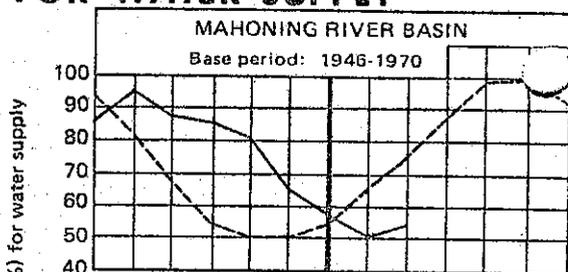
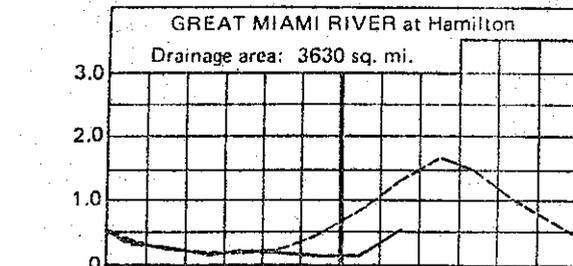
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MEAN STREAM DISCHARGE

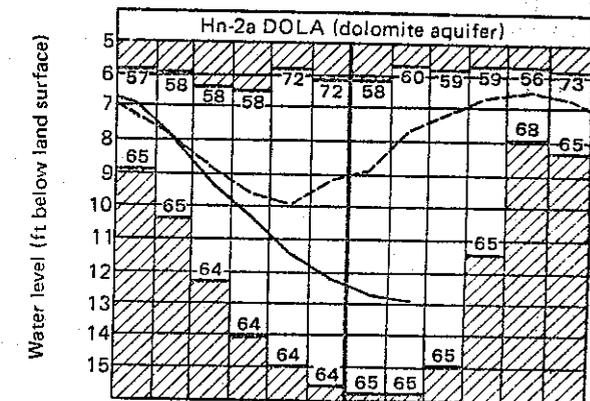
RESERVOIR STORAGE FOR WATER SUPPLY

LAKE ERIE LEVELS

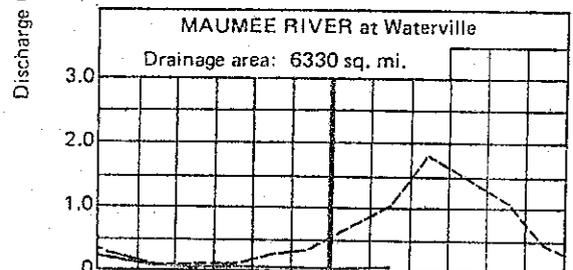
GROUND-WATER LEVELS



LAKE ERIE level declined during February for the ninth consecutive month. The mean level for the month was 570.21 feet above IGLD (1955), 0.22 foot below last month's mean level and 0.52 foot above normal. The lake level is 1.54 feet below the level observed for February 1976 and 1.61 feet above Low Water Datum. The lake level in February was the lowest it has been for any month since November 1967.

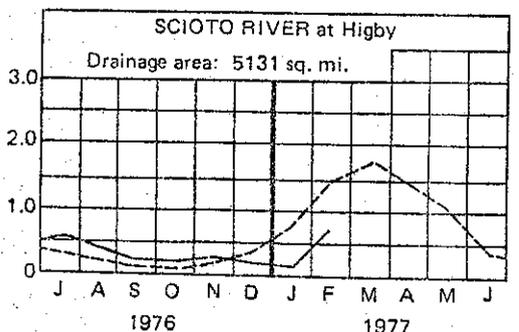
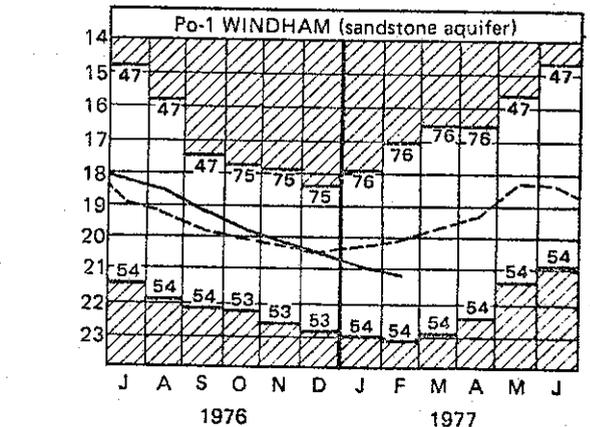


RESERVOIR STORAGE for water supply showed only slight improvement during February. Storage in the Mahoning basin index reservoirs increased slightly and was 55 percent of rated capacity for water supply. This was only slightly above the month-end storage for last month and noticeably below that storage observed for February 1976. Storage in the Scioto basin index reservoirs was 62 percent of rated capacity, an increase of only 1 percent above the storage observed last month and markedly below the storage observed for February 1976. Thus far, there has not been substantial runoff in the drainage areas above the reservoirs to produce a significant increase in storage.



STREAMFLOW for February increased slightly throughout the state but remained deficient in the western and central portions of the state; streamflow was normal in the northeastern portion. A warming trend during the last week of February and release of water from some reservoirs resulted in higher stages on streams throughout the state for the last few days of the month. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Little Beaver Creek, 521 cfs, 63 percent; Great Miami River, 2,052 cfs, 42 percent; Maumee River, 527 cfs, 8 percent; Scioto River, 3,576 cfs, 46 percent. It is interesting to note that the mean discharge for the Maumee River was 8 percent of normal this month compared to 488 percent of normal for February 1976.

GROUND-WATER LEVELS throughout the state continued to decline through most of February with some signs of recharge during the last week of the month. Only two of the key index wells recorded net rises for the month: observation wells H-1 at Harrison, Hamilton County, and Tu-1 at Strasburg, Tuscarawas County. However, observation well Tu-1 also recorded an all-time record-low level during the month. Ground-water levels in general remained 2 to 5 feet below normal and were 3 to 6 feet below those levels observed for February 1976. Those wells representing unconsolidated aquifers adjacent to streams showed noticeable rises in response to recharge during the last week of the month. The drought conditions which now exist throughout the state have caused numerous water-supply problems. Reports of seriously low water levels and dry wells in many areas of the state have been received during the month.



Base period for all streams: 1941-1970

normal - - - - - current - - - - -

Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964



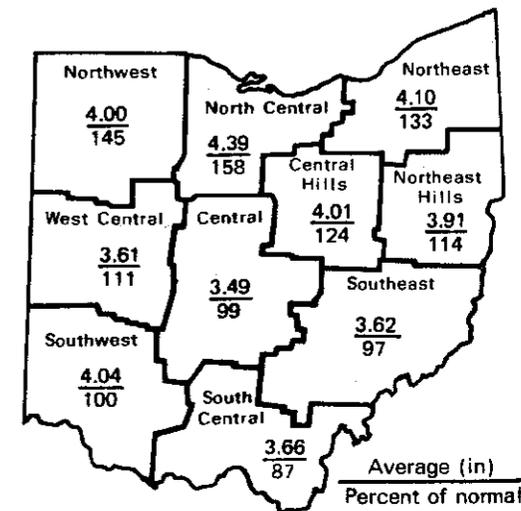
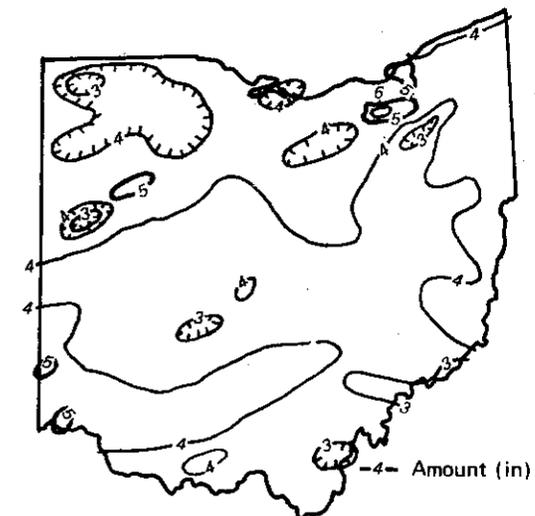
monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for March was above normal for most of the state for the first time in five months; the only exceptions were the Central, South Central, and Southeast regions, where precipitation was slightly below normal. The average for the state as a whole was 3.88 inches, 0.47 inch above normal. Regional averages ranged from 4.39 inches, 1.62 inches above normal, for the North Central region to 3.49 inches, 0.04 inch below normal, for the Central region. North Royalton, a suburb of Cleveland, Cuyahoga County, reported the greatest amount of precipitation, 6.12 inches, for the month, and Stryker, Williams County, reported the least amount, 2.59 inches. There were appreciable amounts of precipitation during every week of the month. The precipitation was generally of moderate intensity, which was most beneficial for recharge to water supplies. Precipitation for the first three months of the 1977 calendar year remains below normal throughout the state; the only exception is the Northwest region, where precipitation is slightly above normal. The average for the calendar year thus far for the state as a whole is 6.40 inches, 2.06 inches below normal. Regional averages range from 7.25 inches, 0.40 inch above normal, for the Northwest region to 5.64 inches, 2.92 inches below normal, for the Central region. Precipitation for the southern portion of the state shows the greatest deficiency. Totals and departures from normal for the three months are: Southwest region, 7.12 inches, 2.94 inches below normal; South Central region, 5.91 inches, 4.48 inches below normal; Southeast region, 5.94 inches, 3.20 inches below normal.

Precipitation remains noticeably below normal throughout the state for the first six months of the 1977 water year. The average for the state as a whole is 11.05 inches, 4.91 inches below normal. Regional averages range from 12.03 inches, 4.38 inches below normal, for the Northeast region to 9.67 inches, 5.94 inches below normal, for the Central region. Departures from normal range from 6.41 inches below normal for the South Central region to 3.19 inches below normal for the Northwest region. It is difficult to determine at this time what effect these deficiencies may have on the overall water-supply situation during the remainder of the current water year.



DIVISION OF WATER

Wayne S. Nichols, Chief

SUMMARY

The water-supply situation improved markedly during March in response to improved recharge conditions. Precipitation was generally above normal throughout the state. Streamflow, reservoir storage, and ground-water storage showed marked improvements for the first time in five months. Lake Erie level rose for the first time in 10 months.

NOTES AND COMMENTS

A faucet dripping at the rate of one drop per second equals four gallons of water wasted each day. This is a total of 1,460 gallons of water wasted each year. If this water enters a waste-treatment system, there are 1,460 gallons more to be treated. Both systems require energy. Have you checked your faucets lately?

RECENT PUBLICATIONS OF THE DIVISION OF GEOLOGICAL SURVEY

- Geological Note 3. *Potential natural gas resources in the Devonian shales in Ohio*, by A. Janssens and Wallace de Witt, Jr. 12 p., 10 figs., 2 tables, 1 pl. \$1.25 plus 5 cents tax in Ohio plus 13 cents mailing charge.
- Geological Note 4. *Coal resources of a portion of the Pawpaw Creek watershed, Monroe, Noble, and Washington Counties*, by Richard A. Struble, Horace R. Collins, and Richard M. DeLong. 16 p., 8 figs., 8 tables. \$0.75 plus 4 cents tax in Ohio plus 8 cents mailing charge.

These publications are available from the Division of Geological Survey, Ohio Department of Natural Resources, Building B, Fountain Square, Columbus, Ohio 43224.

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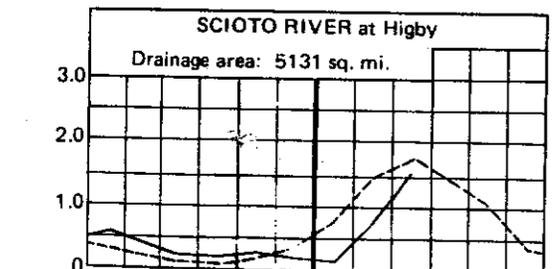
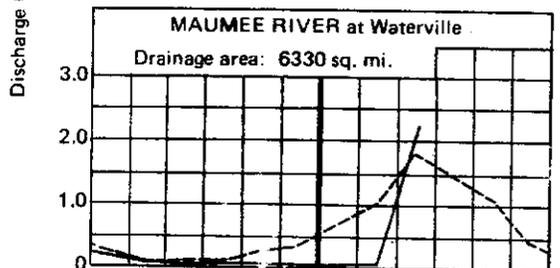
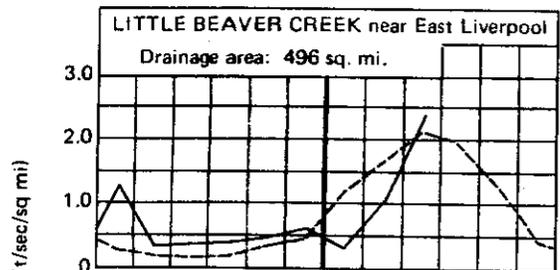
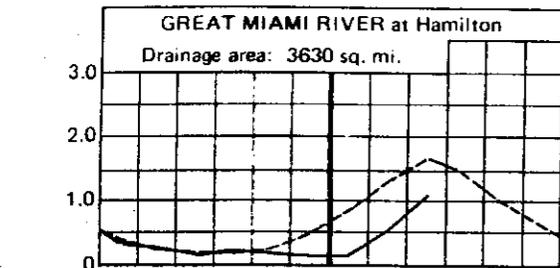
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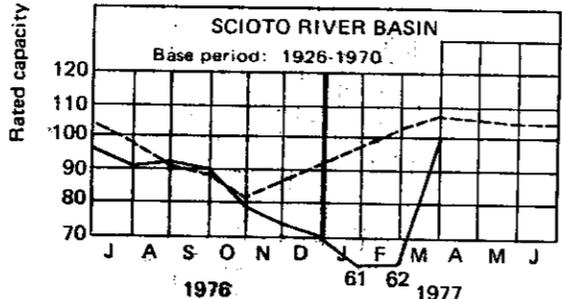
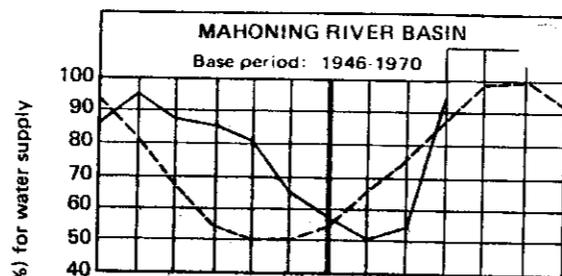
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MEAN STREAM DISCHARGE



Base period for all streams: 1941-1970

RESERVOIR STORAGE FOR WATER SUPPLY

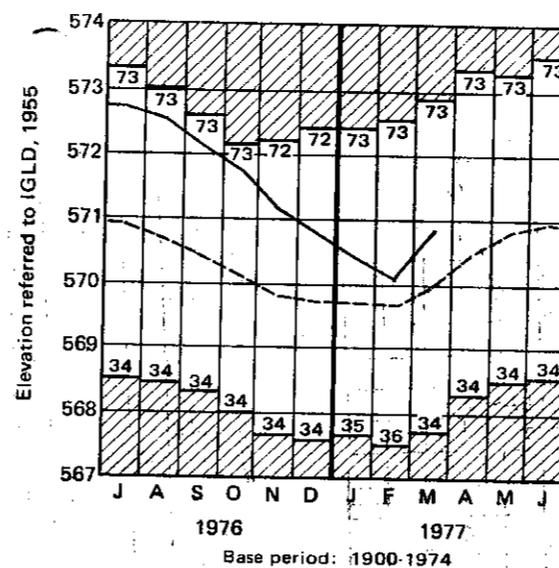


RESERVOIR STORAGE for water supply improved markedly throughout the state during March in response to the above-normal precipitation. Storage was slightly above normal in the Mahoning basin and slightly below normal in the Scioto basin. Reservoir storage at the month end for the Mahoning basin index reservoirs was 95 percent of rated capacity for water supply compared to 57 percent for last month and 94 percent for March 1976. Reservoir storage for the Scioto basin index reservoirs was 100 percent of rated capacity for water supply compared to 62 percent for last month and 111 percent for March 1976.

STREAMFLOW for March was normal throughout the state. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 3,869 cfs, 64 percent; Little Beaver Creek, 187 cfs, 117 percent; Maumee River, 14,110 cfs, 124 percent; Scioto River, 7,924 cfs, 89 percent.

normal----- current-----

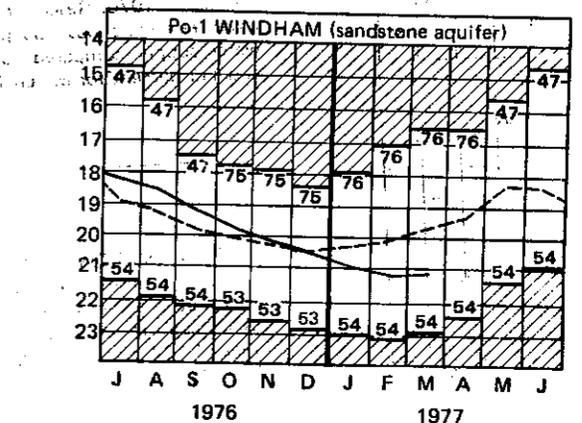
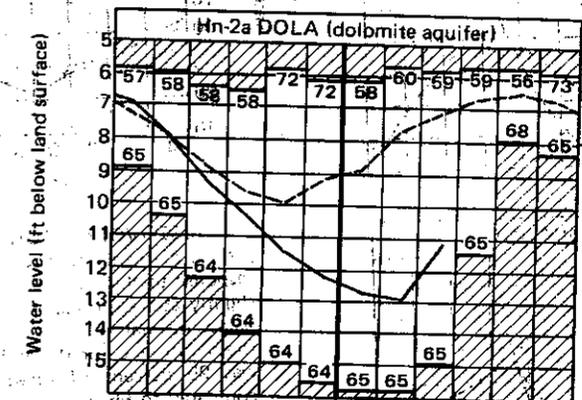
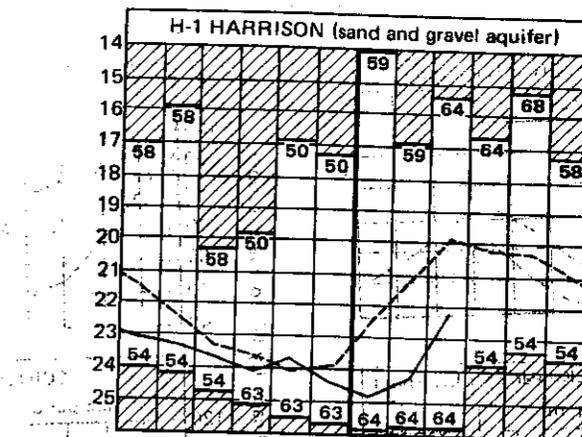
LAKE ERIE LEVELS



LAKE ERIE level showed a normal rising trend during March. The mean level for the month was 570.83 feet above IGLD (1955), 0.62 foot above last month's mean level and 0.91 foot above normal. The lake level is 1.97 feet below the level observed for March 1976 and 2.23 feet above Low Water Datum.

GROUND-WATER LEVELS showed significant rises during March in response to excellent recharge conditions due to thawing in the early part of the month and above-normal precipitation throughout the month. Net rises in wells in most areas of the state were more than twice that normally observed for March and more like rises generally observed in January or February. However, ground-water levels were markedly below those levels observed for March 1976 and generally 1 to 5 feet below normal. The water-supply situation insofar as ground-water storage is concerned still remains rather uncertain. Those who depend on ground-water supplies should examine their resources and implement conservation measures now to avoid serious problems in the future.

GROUND-WATER LEVELS



Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964



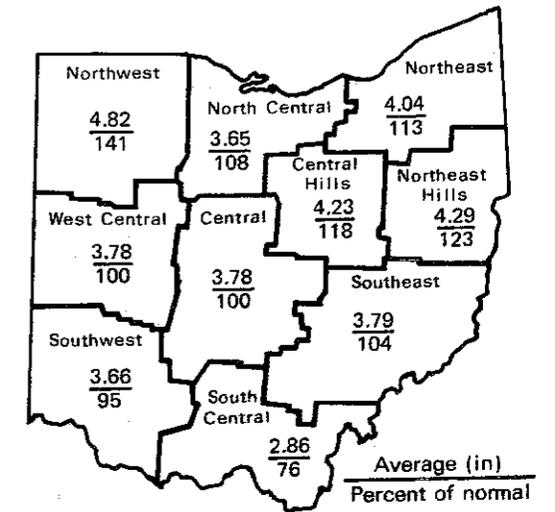
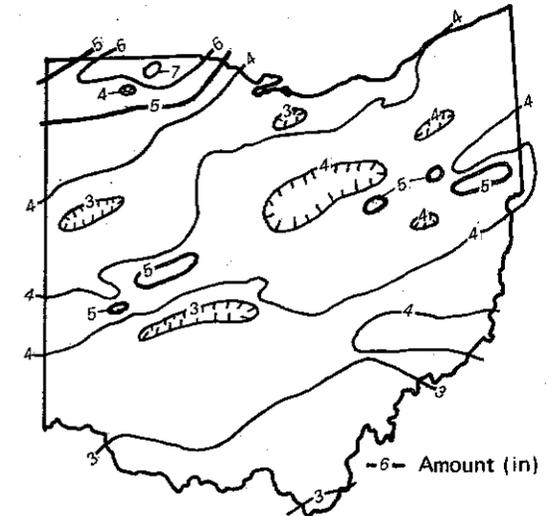
monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for April was above normal for most of the state for the second consecutive month; the only exceptions were the Central, Southwest, and South Central regions. Precipitation for the Central and South Central regions has been below normal for the past six consecutive months. The average for the state as a whole was 3.89 inches, 0.27 inch above normal. Regional averages ranged from 4.82 inches, 1.41 inches above normal, for the Northwest region to 2.86 inches, 0.89 inch below normal, for the South Central region. Wauseon, Fulton County, reported the greatest amount of precipitation, 7.08 inches, for the month, and St. Marys, Auglaize County, reported the least amount, 2.01 inches. Generally, the bulk of the month's precipitation occurred during the first, third, and fourth weeks. The greater portion of the state received between 3.0 and 5.0 inches of precipitation. The northwest corner of the state north of Defiance and Bowling Green and isolated stations in the central portion received in excess of 5.0 inches; the southern portion of the state received less than 3.0 inches. Heavy rains across northwestern Ohio on April 22 and 23 produced 3.88 inches of precipitation during a 24-hour period at Stryker, in Williams County. The average for the first four months of the 1977 calendar year for the state as a whole is 10.29 inches, 1.79 inches below normal. Regional averages range from 12.07 inches, 1.81 inches above normal, for the Northwest region to 8.77 inches, 5.37 inches below normal, for the South Central region.

Precipitation remains noticeably below normal throughout the state for the first seven months of the 1977 water year. The average for the state as a whole is 14.94 inches, 4.64 inches below normal. Regional averages range from 16.07 inches, 3.90 inches below normal, for the Northeast region to 13.45 inches, 5.95 inches below normal, for the Central region. Departures from normal range from 7.30 inches below normal for the South Central region to 1.78 inches below normal for the Northwest region. The above-normal precipitation in March and April was most beneficial to water supplies; however, its effects on ground-water storage may be very limited.



DIVISION OF WATER

Wayne S. Nichols, Chief

SUMMARY

The water-supply situation, in response to above-normal precipitation during the past two months, has improved markedly insofar as reservoir storage is concerned. Ground-water supplies, although improved, still maintain a degree of uncertainty. Precipitation was generally slightly above normal throughout the state. Streamflow, reservoir storage, and ground-water storage recorded marked improvements for the month. Lake Erie level rose for the second consecutive month and was above normal, but was noticeably lower than the level observed for April 1976.

NOTES AND COMMENTS

WATER MANAGEMENT OF OHIO GROUND-WATER SYMPOSIUM JULY 12-13, 1977

The Water Management Association of Ohio will sponsor a Ground-Water Symposium at the Neil House Motor Hotel, Columbus, Ohio, on July 12 and 13, 1977. Subjects to be discussed are: the interrelationship of surface water and ground water in Ohio; the Ohio legislative ground-water study findings and recommendations; current proposed ground-water legislation; the national ground-water picture and how it is related to Ohio. The symposium will feature leading state and federal ground-water officials. For complete information and advance registration contact Mr. L. Bennett Coy, 38 E. Monument Avenue, Dayton, Ohio 45402.

NEW PUBLICATION OF THE DIVISION OF GEOLOGICAL SURVEY

Mineral industries map of Ohio, compiled by Susan L. Duffield. Map, one sheet, scale 1:500,000 (1 inch equals about 8 miles), 1977. \$1.00 plus 4 cents tax in Ohio and 10 cents mailing charge. Map will be sent folded unless 50 cents is added to the order for mailing in a tube.

Map shows approximate locations of underground and surface coal mines reporting production of 5,000 tons or more during 1974 and approximate locations of gypsum, limestone, salt, sand and gravel, sandstone, and shale or clay mines and quarries in Ohio in 1974. Information based on the 1974 Ohio Division of Mines Report.

This publication is available from the Division of Geological Survey, Ohio Department of Natural Resources, Building B, Fountain Square, Columbus, Ohio 43224.

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:

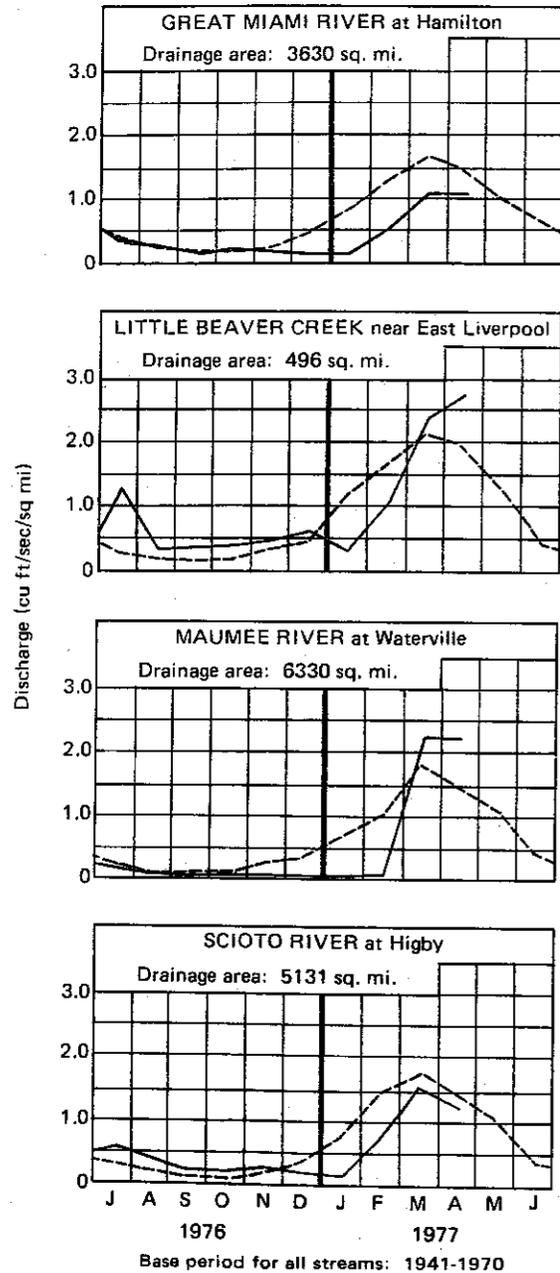
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Corps of Engineers, Detroit District.

Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.

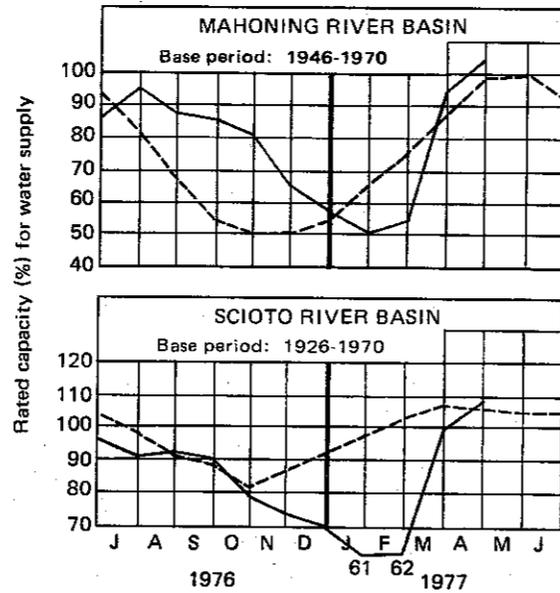


OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER
FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

MEAN STREAM DISCHARGE



RESERVOIR STORAGE FOR WATER SUPPLY

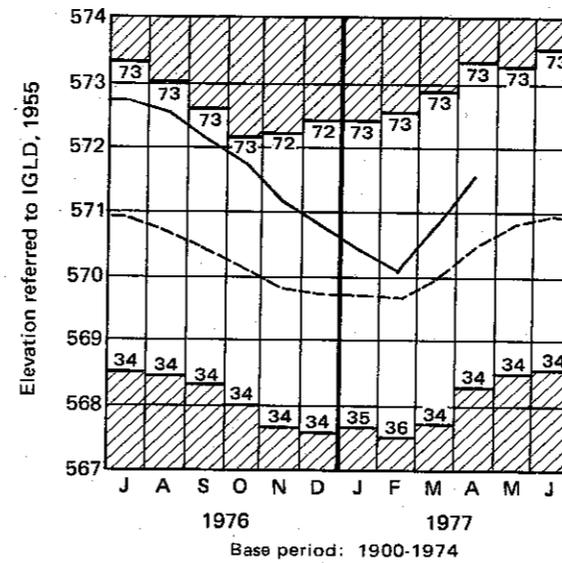


RESERVOIR STORAGE for water supply for April was above normal in both the Mahoning River basin and the Scioto River basin index reservoirs. Reservoir storage at the month end for the Mahoning basin index reservoirs was 104 percent of rated capacity for water supply compared to 95 percent for last month and 97 percent for April 1976. Reservoir storage for the Scioto basin index reservoirs was 108 percent of rated capacity for water supply compared to 100 percent for last month and 102 percent for April 1976. Insofar as water supplies are concerned, reservoir storage probably showed the greatest improvement as a result of the above-normal precipitation in March and April.

STREAMFLOW for April was excessive in the northwestern and the eastern portions of the state and slightly below normal elsewhere. The heavy rains of April 22 and 23 caused minor flooding in northwestern Ohio. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 4,138 cfs, 80 percent; Little Beaver Creek, 1,346 cfs, 148 percent; Maumee River, 13,980 cfs, 154 percent; Scioto River 6,466 cfs, 87 percent.

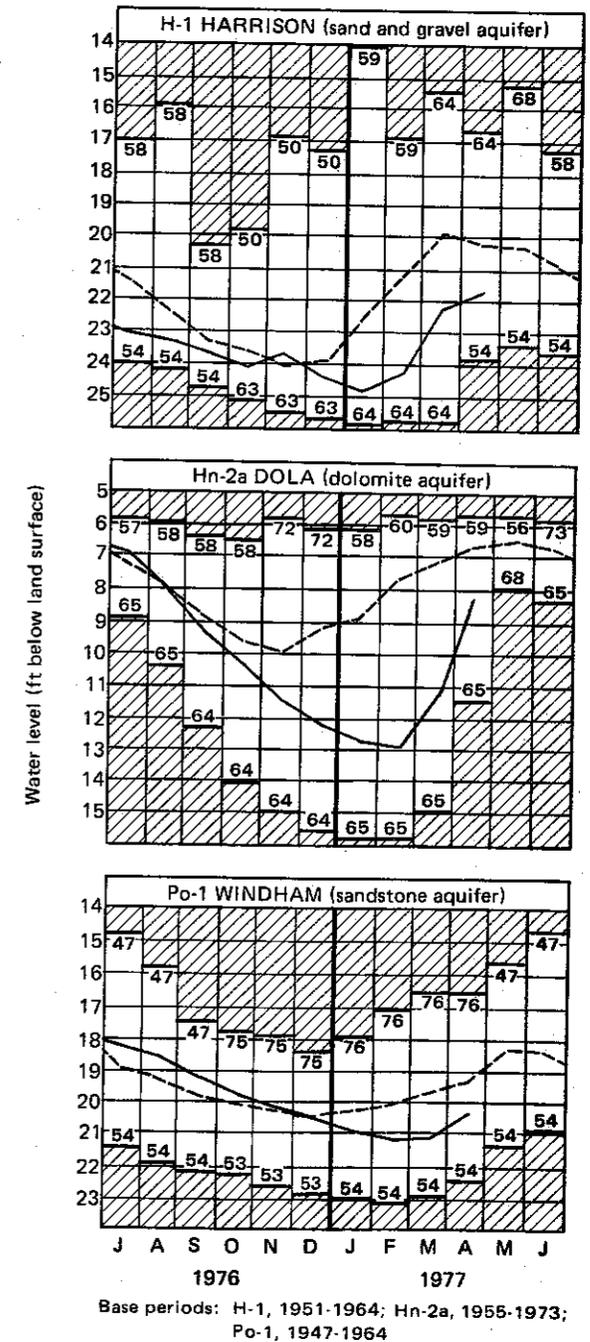
normal----- current——

LAKE ERIE LEVELS



LAKE ERIE level rose during April. The mean level for the month was 571.52 feet above IGLD (1955), 0.69 foot above last month's mean level and 1.04 feet above normal. The lake level is 1.35 feet below the level observed for April 1976 and 2.92 feet above Low Water Datum.

GROUND-WATER LEVELS



GROUND-WATER LEVELS showed significant rises during April but remained noticeably below normal. The only exception was observation well Fr-10, on the Ohio State University Farms, Columbus, Franklin County; the water level in this well has been noticeably above normal since January 1973. Ground-water levels generally remained below those levels observed for April 1976 and 1 to 3 feet below normal. The ground-water supply situation still remains rather uncertain. Those who depend on ground water should be aware of the conditions in their respective areas.



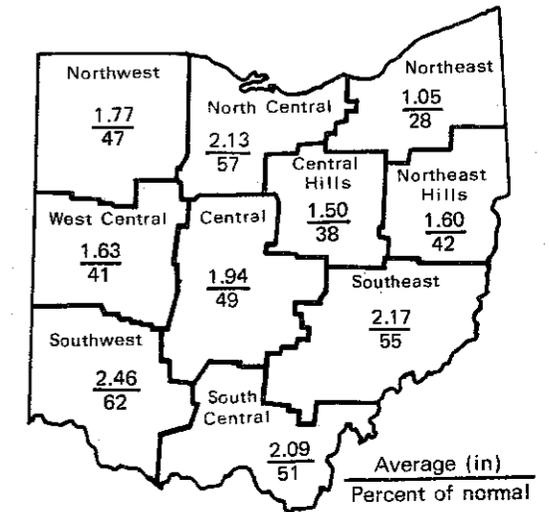
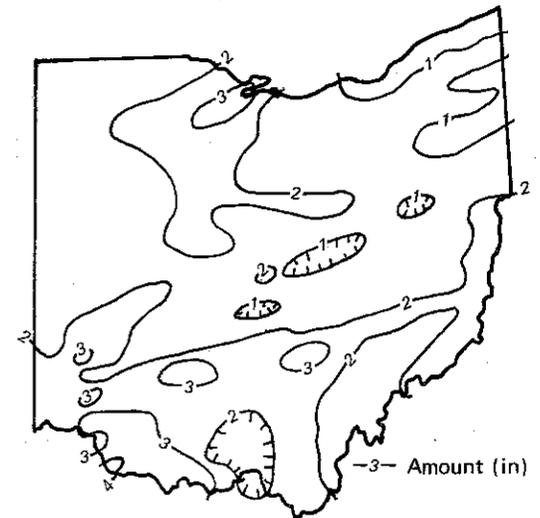
monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for May was markedly below normal throughout the state. The average for the state as a whole was 1.83 inches, 2.08 inches below normal. Regional averages ranged from 2.46 inches, 1.54 inches below normal, for the Southwest region to 1.05 inches, 2.76 inches below normal, for the Northeast region. Generally, the bulk of the precipitation occurred during the first week of the month; a storm on the 23rd produced nominal amounts of precipitation throughout many areas of the state. Captain Anthony Meldahl Dam on the Ohio River at Neville, Clermont County, reported the greatest amount of precipitation, 4.21 inches, for the month, and Beach City Dam, Tuscarawas County, reported the least amount, 0.64 inch. The greater portion of the northern two-thirds of the state and areas in the south-central and southeastern portions received between 1 and 2 inches of precipitation for the month. An area along Lake Erie from Elyria (Lorain County) to Conneaut (Ashtabula County) and several areas in the central and northeastern portions of the state received less than 1 inch. The southern third of the state generally received between 2 and 3 inches; a small area in the southwest and other isolated locations received in excess of 3 inches for the month. May proved to be very dry throughout the state during the last three weeks of the month insofar as agriculture is concerned. Precipitation for the first five months of the 1977 calendar year for the state as a whole averaged 12.12 inches, 3.87 inches below normal. Regional averages ranged from 13.84 inches, 0.16 inch below normal, for the Northwest region to 10.86 inches, 7.35 inches below normal, for the South Central region.

Precipitation is markedly below normal throughout the state for the first eight months of the 1977 water year (see map of precipitation and departures from normal for the water year under Notes and Comments). The average for the state as a whole is 16.77 inches, 6.72 inches below normal. Regional averages range from 17.92 inches, 6.32 inches below normal, for the Southeast region to 15.39 inches, 7.96 inches below normal, for the Central region. Departures from normal range from 3.75 inches below normal for the Northwest region to 9.28 inches below normal for the South Central region. The below-normal precipitation for the first eight months of the current water year has resulted in drought conditions throughout the state insofar as ground-water supplies are concerned.

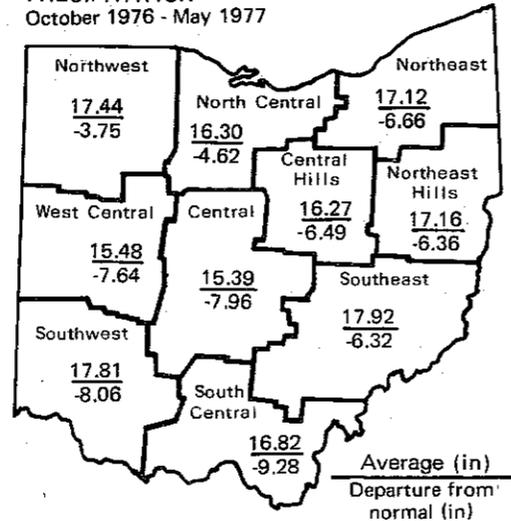


SUMMARY

The water-supply situation, although not serious at the present time, is rather uncertain, and a continuation of the current drought conditions could produce serious problems later this summer. Precipitation was markedly below normal for May. Reservoir storage and streamflow, although favorable, were beginning to be affected by the lack of precipitation by the month end. The ground-water storage situation is in a precarious position for the beginning of the nominal ground-water depletion season. Lake Erie level rose and remained noticeably above normal for the month.

NOTES AND COMMENTS

PRECIPITATION October 1976 - May 1977



STATE WATER QUALITY MANAGEMENT PLANS

Section 208 of the 1972 Federal Water Pollution Control Act Amendments requires that plans be drawn up for each river basin in the state to determine how water quality will be managed. These plans, called Water Quality Management Plans (or "208" plans), identify sources of pollution within each river basin area, evaluate the problems, and come up with specific pollution-abatement practices.

Citizens with differing backgrounds and interests are being urged to serve on Citizen/Technical Advisory Committees and work with the Ohio Environmental Protection Agency to make sure that their community interests will be represented in the final plan, which must be completed by November 1978. For more information on scheduled monthly meetings contact: Ms. Mary Mariani, Public Involvement Coordinator, Ohio EPA, 361 East Broad Street, 8th Floor, Columbus, Ohio 43216.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

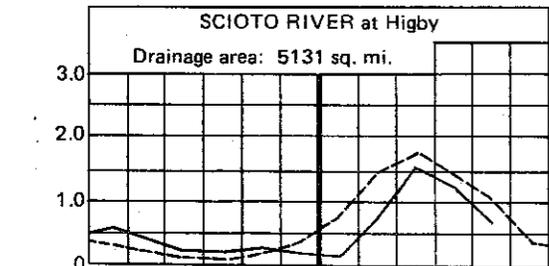
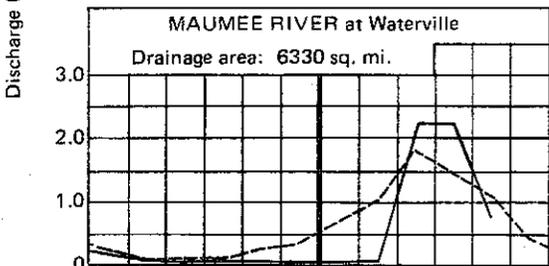
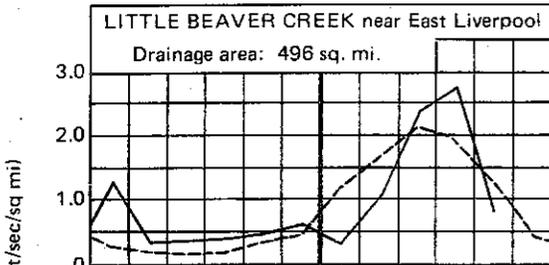
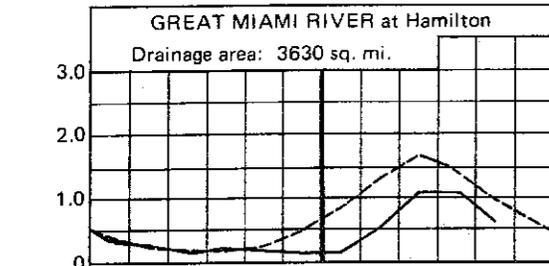
Precipitation data:

- 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. Department of Commerce, NOAA-National Ocean Survey, Lake Survey Center, Detroit, Michigan.



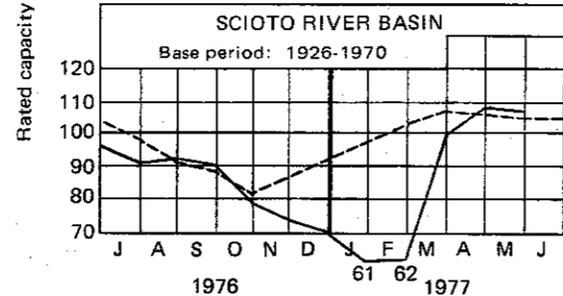
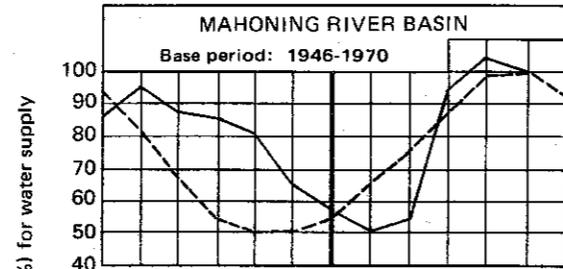
OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER
FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

MEAN STREAM DISCHARGE



Base period for all streams: 1941-1970

RESERVOIR STORAGE FOR WATER SUPPLY

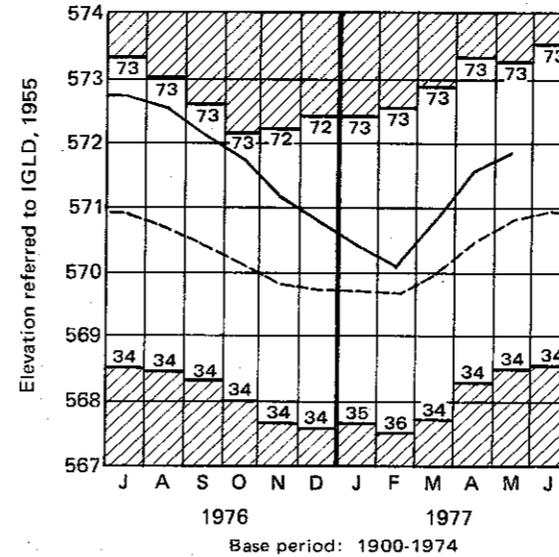


RESERVOIR STORAGE for water supply for May was at or slightly above normal in both the Mahoning River basin and the Scioto River basin index reservoirs. Reservoir storage at the month end for the Mahoning basin index reservoirs was 99 percent of rated capacity for water supply compared to 104 percent for last month and 92 percent for May 1976. Reservoir storage for the Scioto basin index reservoirs was 107 percent of rated capacity for water supply compared to 108 percent for last month and 94 percent for May 1976. Reservoir storage has remained very favorable despite the deficient precipitation.

STREAMFLOW for May was normal throughout the state. However, streamflows which were generally excessive at the beginning of the month declined during the month and were deficient at the month end as a result of the below-normal precipitation. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 2,083 cfs, 61 percent; Little Beaver Creek, 397 cfs, 64 percent; Maumee River, 4,760 cfs, 72 percent; Scioto River, 3,296 cfs, 58 percent. Runoff for the water year thus far is noticeably below normal in the central and southwestern portions of the state and about normal elsewhere. Cumulative runoff and departures from normal for the index gaging stations are as follows: Great Miami River, 4.48 inches, 3.45 inches below normal; Little Beaver Creek, 9.78 inches, 0.18 inch below normal; Maumee River, 6.23 inches, 2.12 inches below normal; Scioto River, 5.65 inches, 3.97 inches below normal.

normal----- current——

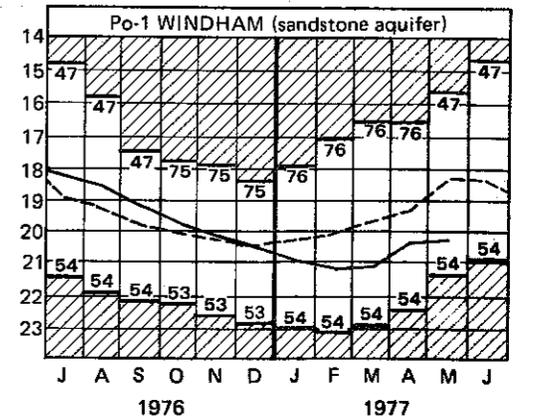
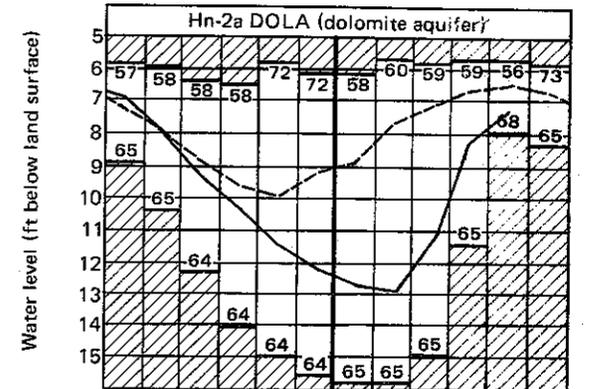
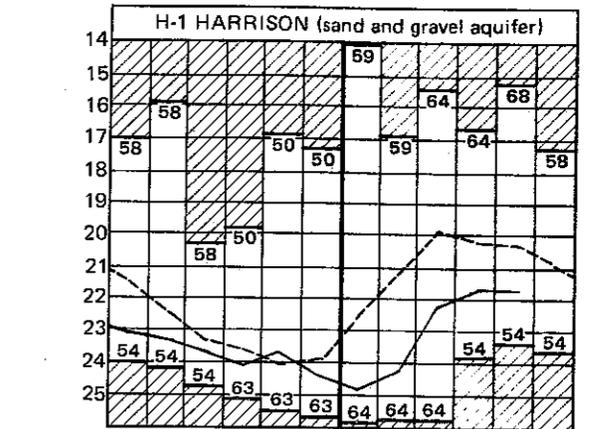
LAKE ERIE LEVELS



LAKE ERIE level continued to rise during May for the third consecutive month. The mean level for the month was 571.87 feet above IGLD (1955), 0.35 foot above last month's mean level and 1.07 feet above normal. The lake level is 1.05 feet below the level observed for May 1976 and 3.27 feet above Low Water Datum.

GROUND-WATER LEVELS generally rose during the first half of May and leveled off or declined during the last half of the month in response to the lack of recharge. Water levels in most wells representing consolidated rock aquifers showed net rises for the month, whereas net declines were observed in wells representing unconsolidated aquifers. On May 31 the water level in observation well Tu-1 near Strasburg, Tuscarawas County, fell to a record low for May for the period of record beginning in 1946. Ground-water levels throughout the state are generally 2 to 4 feet below normal. This is primarily due to the lack of recharge during the first five months of the nominal recharge period of the current water year. Recharge began late in February and ended early in May. As a result, ground-water levels are generally below normal throughout the state for the beginning of the ground-water depletion period. Although the situation is not serious at the present time, continuation of the drought conditions could have serious effects on the water-supply situation later this year. It would be wise for those depending on ground water to be fully aware of their individual situations and be prepared to introduce conservation measures.

GROUND-WATER LEVELS



Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964



DNR

DEPARTMENT OF NATURAL RESOURCES

James A. Rhodes Governor Robert W. Teater Director

JUNE 1977

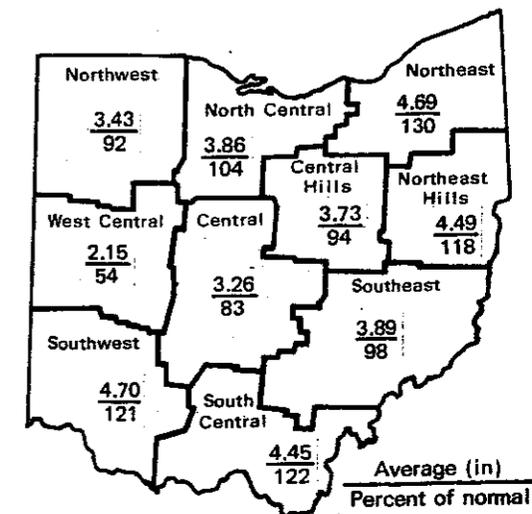
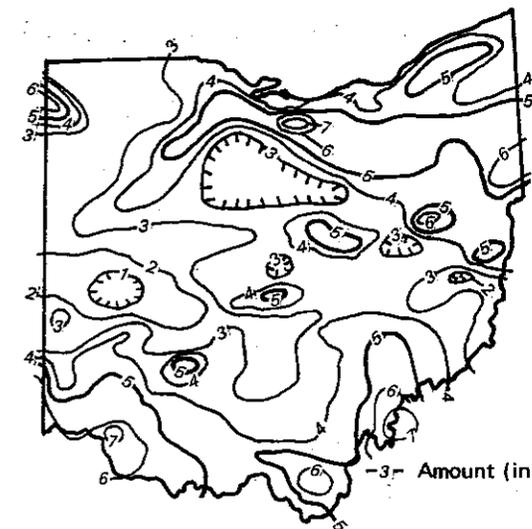
monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for June was generally above normal in the northern and southern parts of the state and below normal in the central part. The average for the state as a whole was 3.87 inches, 0.05 inch above normal. Regional averages ranged from 4.70 inches, 0.83 inch above normal, for the Southwest region to 2.15 inches, 1.82 inches below normal, for the West Central region. Norwalk, Huron County, reported the greatest amount of precipitation, 7.57 inches, for the month, and Piqua, Miami County, reported the least amount, 0.68 inch. There was precipitation in most areas of the state during every week of the month. The bulk of the precipitation was in the form of very isolated, local thundershowers. Amounts varied widely throughout the state; however, greatest amounts were received in the northeastern and southwestern portions of the state. Other stations reporting more than 7 inches for the month were Belleville Lock and Dam, Meigs County, and Perintown, Clermont County. Precipitation for the first six months of the 1977 calendar year for the state as a whole averages 15.99 inches, 3.82 inches below normal. Regional averages range from 17.94 inches, 3.83 inches below normal, for the Southwest region to 13.83 inches, 6.02 inches below normal, for the West Central region. Departures from normal for the calendar year thus far range from 6.54 inches below normal for the South Central region to 0.46 inch below normal for the Northwest region.

Precipitation for the first nine months of the 1977 water year remains significantly below normal throughout the state. The average for the state as a whole is 20.64 inches, 6.67 inches below normal. Regional averages range from 22.51 inches, 7.23 inches below normal, for the Southwest region to 17.63 inches, 9.46 inches below normal, for the West Central region. Departures from normal for the water year range from 9.46 inches below normal for the West Central region to 4.05 inches below normal for the Northwest region. Both water supply and agriculture received some benefits from the widespread precipitation during the month.



DIVISION OF WATER

Wayne S. Nichols, Chief

SUMMARY

The water-supply situation still remains rather uncertain despite the fact that precipitation for June was at or above normal in most areas of the state. Reservoir storage, streamflow, and ground-water storage are generally noticeably below normal. Lake Erie level declined and was less than 1 foot above normal for June.

NOTES AND COMMENTS

GROUND-WATER MANAGEMENT BILL PASSES

Amended House Bill 522, recently passed by the Ohio Legislature, directs the Ohio Department of Natural Resources, Division of Water to hold public hearings to assist in settling ground-water disputes when requested by local elected officials. Although the hearing recommendations would not be legally binding, they would weigh heavily in resolving conflicts between ground-water users. This is considered to be an important step toward improving ground-water management in Ohio.

NEW PUBLICATIONS OF THE DIVISION OF GEOLOGICAL SURVEY

- Report of Investigations No. 100. *Silurian rocks in the subsurface of northwestern Ohio*, by Adriaan Janssens. 96 p., 26 figs., 1977. \$3.00 plus 12 cents tax in Ohio plus 30 cents mailing charge.
- Report of Investigations No. 101. *Glacial geology of Ashland County, Ohio*, by George W. White. Map, one sheet with text, 1977. \$3.00 plus 12 cents tax in Ohio plus 30 cents mailing charge.

These publications are available from the Division of Geological Survey, Ohio Department of Natural Resources, Fountain Square, Building B, Columbus, Ohio 43224.

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- Streamflow and reservoir storage data: U.S. Geological Survey, Water Resources Division.
- Lake Erie level data: U.S. Department of Commerce, NOAA-National Ocean Survey, Lake Survey Center, Detroit, Michigan.
- Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.



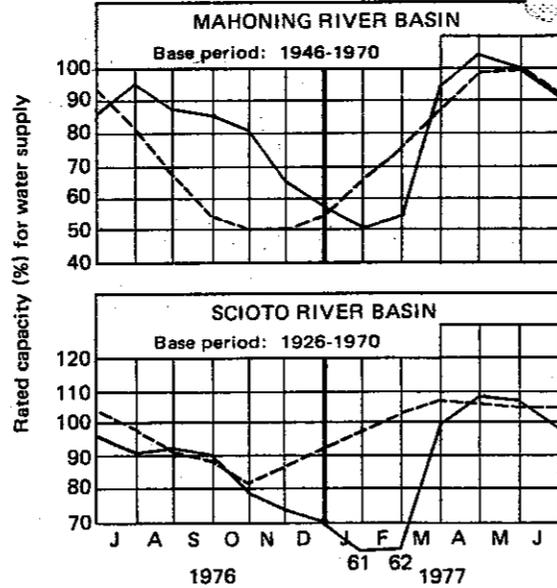
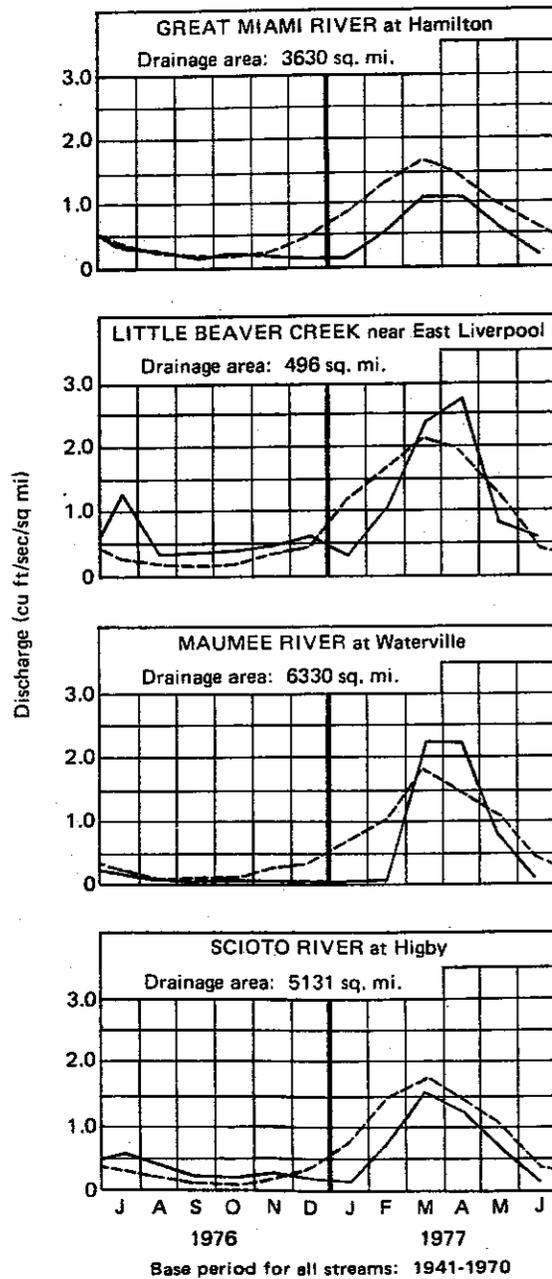
OHIO DEPARTMENT OF NATURAL RESOURCES
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MEAN STREAM DISCHARGE

RESERVOIR STORAGE FOR WATER SUPPLY

LAKE ERIE LEVELS

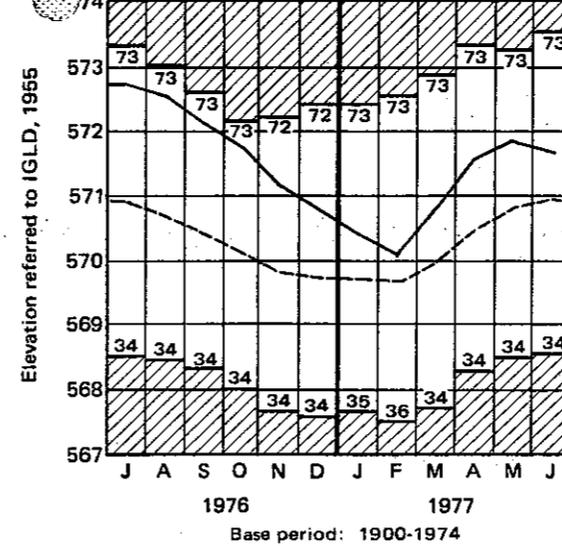
GROUND-WATER LEVELS



RESERVOIR STORAGE for water supply for June was below normal in both the Mahoning River basin and the Scioto River basin index reservoirs at the month end. Storage in the Mahoning basin index reservoirs was 91 percent of rated capacity for water supply compared to 99 percent for last month and 86 percent for June 1976. Storage in the Scioto basin index reservoirs was 98 percent of rated capacity for water supply compared to 107 percent for last month and 97 percent for June 1976.

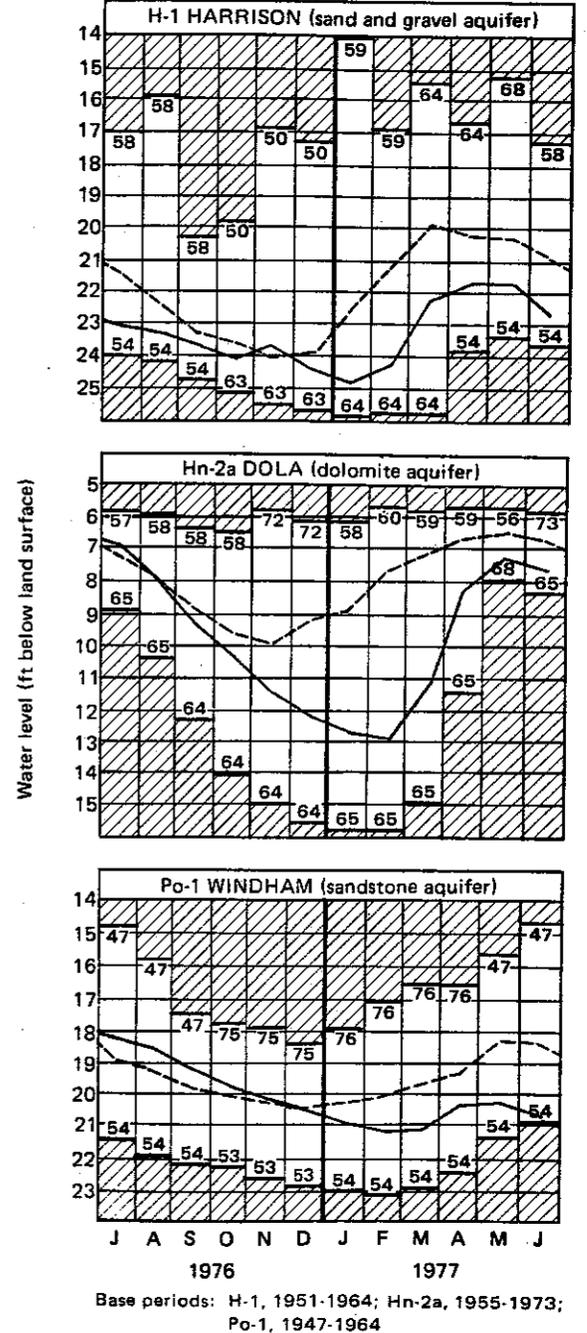
STREAMFLOW for June was generally below normal throughout the state. Flow at three of the key index gaging stations was deficient for the month; only Little Beaver Creek showed above-normal flow for the month. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 753 cfs, 35 percent; Little Beaver Creek, 298 cfs, 135 percent; Maumee River, 620 cfs, 24 percent; Scioto River, 1,025 cfs, 50 percent. Runoff for the month was generally less than half that normally expected during June. Cumulative runoff and departures from normal for the first nine months of the 1977 water year for the index gaging stations are as follows: Great Miami River, 4.71 inches, 3.89 inches below normal; Little Beaver Creek, 10.45 inches, 0.01 inch below normal; Maumee River, 6.34 inches, 3.04 inches below normal; Scioto River, 5.87 inches, 4.91 inches below normal.

normal - - - - - current - - - - -



LAKE ERIE level declined during the month and was less than 1 foot above normal for June. The mean level for the month was 571.67 feet above IGLD (1955), 0.20 foot below last month's mean level and 0.73 foot above normal. The lake level is 1.12 feet below the level observed for June 1976 and 3.07 feet above Low Water Datum. The lake level is now 1.84 feet below the highest monthly level ever observed for the period of record (1860-1977) set in June 1973.

GROUND-WATER LEVELS in general are noticeably below normal throughout the state; the only exception is index well Fr-10 (Columbus, Franklin County), which has been noticeably above normal for the entire water year thus far. Generally, ground-water levels showed normal declines for June. Ground-water levels in the northeast and southwest areas of the state approached near record-low levels for June. It is rather phenomenal that the water level in observation well Po-1 at Windham, Portage County, is at a near record low for June, for this same well had record-high levels in the early part of 1976. Thus far, ground-water storage has not benefited from the above-normal precipitation during June. The ground-water supply situation still remains rather uncertain.





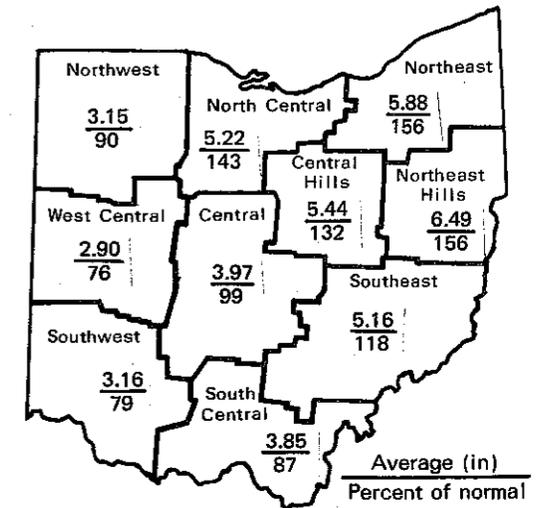
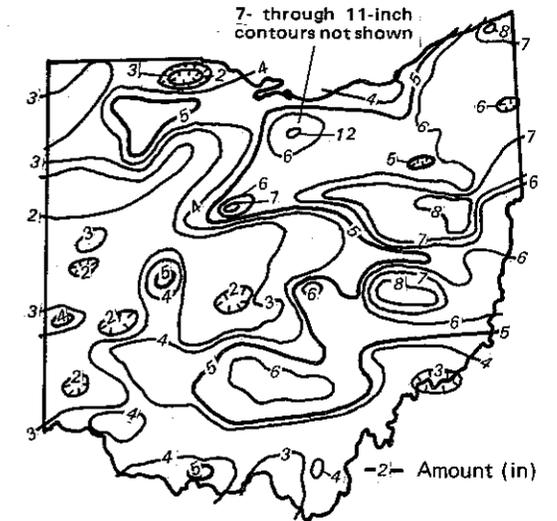
monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for July was generally above normal in the north-central and eastern portions of the state and below normal in the western and south-central portions. The average for the state as a whole was 4.52 inches, 0.54 inch above normal. Regional averages ranged from 6.49 inches, 2.34 inches above normal, for the Northeast Hills region to 2.90 inches, 0.91 inch below normal, for the West Central region. Norwalk, Huron County, reported the greatest amount of precipitation, 12.71 inches, for the month, and Rockford, Mercer County, reported the least amount, 1.06 inches. Generally there was precipitation in most areas of the state during every week of the month. The bulk of the precipitation was in the form of very isolated, local thundershowers. However, some widespread heavy showers occurred several times during the month. A storm on July 4-5 produced as much as 6 inches of precipitation at Milan, Erie County; another storm on the 19th and 20th produced between 4 and 5 inches on the north side of Wooster, Wayne County. Precipitation for the 1977 calendar year thus far averages 20.51 inches, 3.28 inches below normal. Regional averages range from 22.89 inches, 0.92 inch below normal, for the Northeast Hills region to 16.73 inches, 6.93 inches below normal, for the West Central region. Departures from normal range from 7.12 inches below normal for the South Central region to 0.26 inch above normal for the North Central region.

Precipitation for the first ten months of the 1977 water year remains noticeably below normal for most regions of the state. The average for the state as a whole is 25.16 inches, 6.13 inches below normal. Regional averages range from 28.58 inches, 2.88 inches below normal, for the Northeast Hills region to 20.53 inches, 10.37 inches below normal, for the West Central region. The above-normal precipitation throughout most of the state for July was most beneficial to agriculture and also produced some relief to water supplies.



DIVISION OF WATER

Wayne S. Nichols, Chief

SUMMARY

The water-supply situation has improved somewhat in most areas of the state as a result of the above-normal precipitation in the past two months. However, the situation still remains serious in the central and south-western areas of the state. Precipitation was near or above normal in July for most of the state for the second consecutive month. Reservoir storage, stream-flow, and ground-water storage improved in the northern and eastern areas of the state and remained noticeably below normal elsewhere. Lake Erie level rose slightly during July.

NOTES AND COMMENTS

NEW PUBLICATION: FLOODS IN OHIO—MAGNITUDE AND FREQUENCY

The Division of Water announces the publication of Bulletin No. 45, *Floods in Ohio—magnitude and frequency*, by Earl E. Webber and William P. Bartlett, Jr., of the U.S. Geological Survey. This bulletin will provide engineers and planners with the latest hydrologic information for determining frequency of flooding along Ohio streams. Flood records from 215 gaging stations operated by the U.S. Geological Survey through cooperative agreements with various local, state, and federal agencies were analyzed statistically to estimate frequency and occurrence. Techniques based on relationships between flood magnitude and various meteorologic basin characteristics are presented for use in estimating flood magnitudes with recurrence intervals of 2 to 100 years on unengaged, unregulated basins ranging in size from 0.01 to 7,400 square miles. Bulletin No. 45 may be purchased from Publications, Division of Geological Survey, Ohio Department of Natural Resources, Fountain Square, Building B, Columbus, Ohio 43224. Cost is \$2.50 plus 10 cents tax in Ohio and 25 cents mailing charge.

ACKNOWLEDGMENTS

This report has been compiled from Division of Water data and from information supplied by the following:

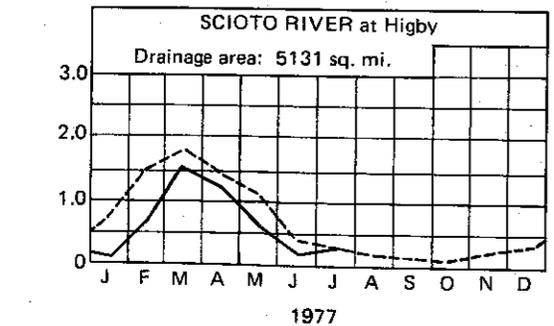
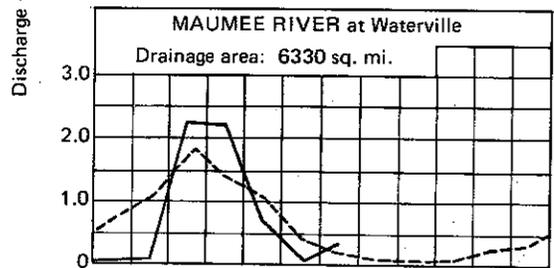
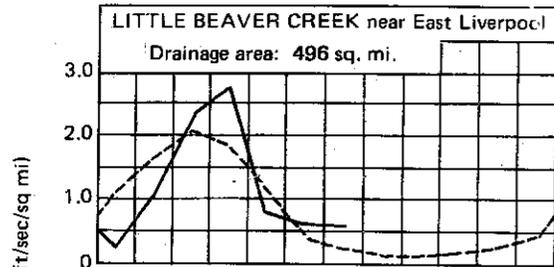
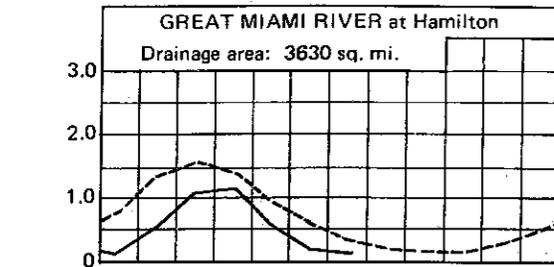
Precipitation data:

- 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. Department of Commerce, NOAA-National Ocean Survey, Lake Survey Center, Detroit, Michigan.
- Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.



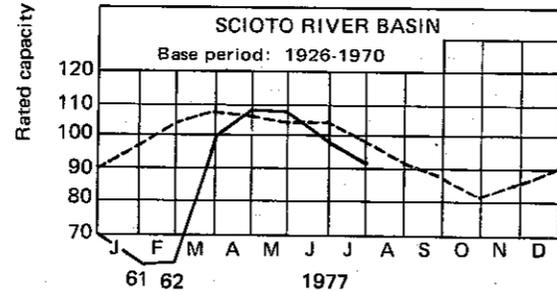
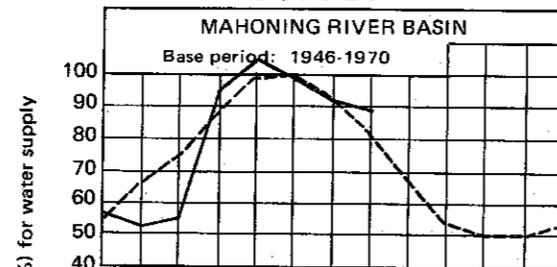
OHIO DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WATER
FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

MEAN STREAM DISCHARGE



Base period for all streams: 1941-1970

RESERVOIR STORAGE FOR WATER SUPPLY

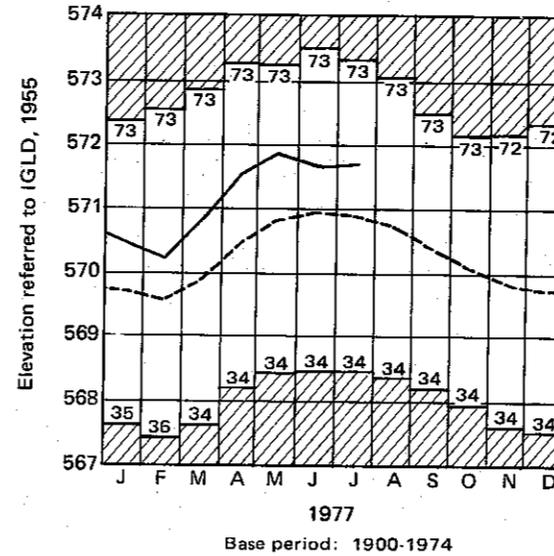


RESERVOIR STORAGE for water supply for July was above normal in the Mahoning River basin and below normal in the Scioto River basin index reservoirs. Storage in the Mahoning basin index reservoirs was 89 percent of rated capacity for water supply compared to 91 percent for last month and 96 percent for July 1976. Storage in the Scioto basin index reservoirs was 92 percent of rated capacity for water supply compared to 98 percent for last month and 91 percent for July 1976.

STREAMFLOW for July was excessive in the northeastern part of the state, deficient in the south-central and southwestern parts, and normal elsewhere. The heavy rains of the 20th caused some flooding at Wooster, Wayne County. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 659 cfs, 49 percent; Little Beaver Creek, 267 cfs, 234 percent; Maumee River, 1,970 cfs, 147 percent; Scioto River, 1,199 cfs, 76 percent. Streamflow at the month end was about normal throughout the state.

normal----- current——

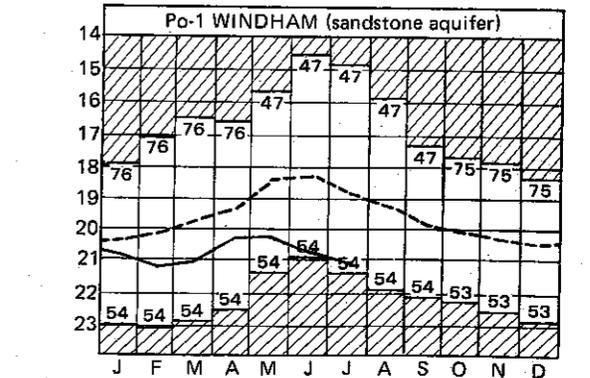
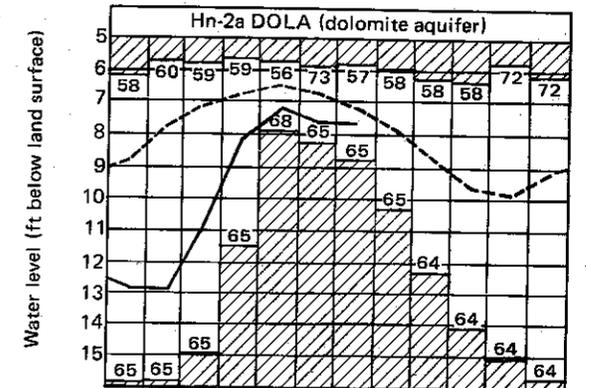
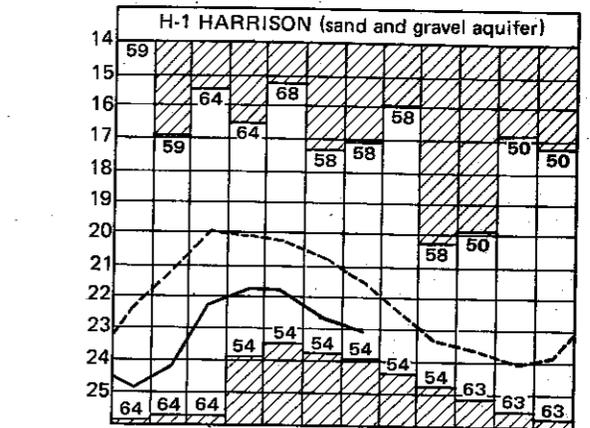
LAKE ERIE LEVELS



LAKE ERIE mean level for July was 571.70 feet above IGLD (1955), 0.03 foot above last month's mean level and 0.80 foot above normal. The lake level is 1.07 feet below the level observed for July 1976 and 3.10 feet above Low Water Datum.

GROUND-WATER LEVELS throughout the state continue to be noticeably below normal. However, declines for July were not as great as normally expected; this indicates that some beneficial effects to ground-water storage resulted from the above-normal precipitation during the past two months. Ground-water levels in the central and southwestern portions of the state showed the greatest declines in response to the continued deficiency in precipitation in those areas. The water level in observation well F-1 at West Rushville, Fairfield County, fell to a record low for July for the period of record beginning in 1946. This well represents a consolidated-rock aquifer and is in an area which has had continued deficient precipitation for the past two years. Observation well Tu-1 near Strasburg, Tuscarawas County, representing an unconsolidated aquifer, had near record-low levels last month but showed significant rises this month in response to excessive precipitation in that area. Although encouraging in some areas of the state, the ground-water storage situation still remains rather uncertain in most areas of the state.

GROUND-WATER LEVELS



Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964



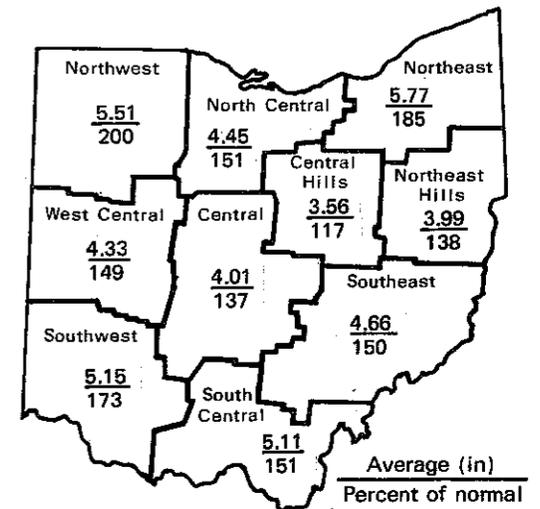
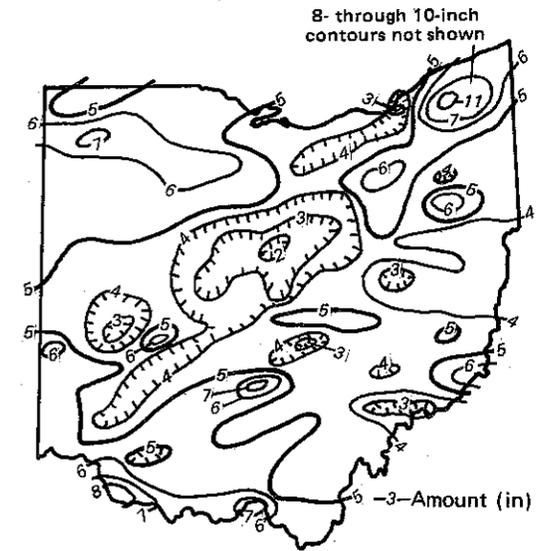
monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for August was above normal throughout the state. The average for the state as a whole was 4.65 inches, 1.65 inches above normal. This is the third consecutive month for which precipitation for the state as a whole has been above normal. Regional averages ranged from 5.77 inches, 2.65 inches above normal, for the Northeast region to 3.56 inches, 0.52 inch above normal, for the Central Hills region. Chardon, Geauga County, reported the greatest amount of precipitation, 11.22 inches, for the month, and Mt. Gilead, Morrow County, reported the least amount, 1.85 inches. Generally there were sizeable amounts of precipitation during every week of the month at many locations throughout the state. Precipitation was in the form of extremely localized thunderstorms, which are common during the hot summer months. Precipitation in the northeastern portion of the state was excessive; Chardon reported 3.7 inches of precipitation between 7 and 9 p.m. on August 11. Although regional averages throughout the state were above normal, precipitation was below normal for a large area in the central portion of the state, including areas in Union, Marion, Delaware, Morrow, and Knox Counties, and in Miami County. Precipitation for the first eight months of the 1977 calendar year averaged 25.16 inches, 1.63 inches below normal. Regional averages ranged from 28.30 inches, 2.49 inches above normal, for the Northeast region to 21.06 inches, 5.50 inches below normal, for the West Central region. The above-normal precipitation during the month was most beneficial to agriculture.

Precipitation for the first eleven months of the 1977 water year remains below normal throughout the state. The average for the state as a whole is 29.81 inches, 4.48 inches below normal. Regional averages range from 33.46 inches, 0.82 inch below normal, for the Northeast region to 24.86 inches, 8.94 inches below normal, for the West Central region. It is rather difficult at this time to determine what effect the above-normal precipitation for the past three months may have on the water-supply situation during the next few months.



SUMMARY

The water-supply situation showed very little improvement through August despite above-normal precipitation in most areas of the state during the past two or three months. Precipitation was noticeably above normal for August. Reservoir storage and streamflow were generally at or above normal for the month; ground-water storage in general was noticeably below normal. Lake Erie level declined slightly and remained less than 1 foot above normal for the third consecutive month.

NOTES AND COMMENTS

PUBLICATION ANNOUNCEMENT: INVENTORY OF MUNICIPAL WATER-SUPPLY SYSTEMS, BY COUNTY, OHIO

The Division of Water announces the publication of Water Inventory Report No. 24, *Inventory of municipal water-supply systems, by county, Ohio*, by Anthony R. Rudnick. This publication provides information on Ohio's 629 municipal water-supply facilities publicly or privately owned and operated in 88 counties. These facilities supply about 1.25 billion gallons of water daily to 8.5 million people in Ohio. Owner, population served, source and capacity of water supply, plant capacity, output, industrial use, per capita daily use, and type of treatment are listed. The report also includes plans for improvements and phone numbers for emergency contact purposes.

The report will be a valuable reference for regional and contingency planners, consulting engineers, sanitary engineers, water superintendents, and federal, state, and local officials.

Water Inventory Report No. 24 may be purchased from Publications, Division of Geological Survey, Ohio Department of Natural Resources, Fountain Square, Building B, Columbus, Ohio 43224. Cost is \$2.00 plus 8 cents sales tax in Ohio and 35 cents mailing charge.

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. Department of Commerce, NOAA-National Ocean Survey, Lake Survey Center, Detroit, Michigan.
- Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.



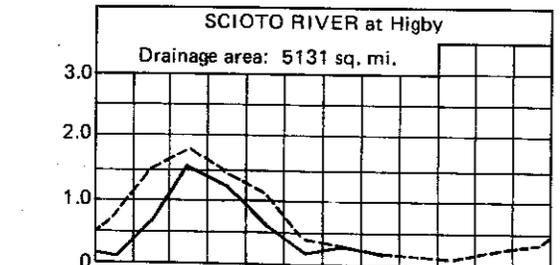
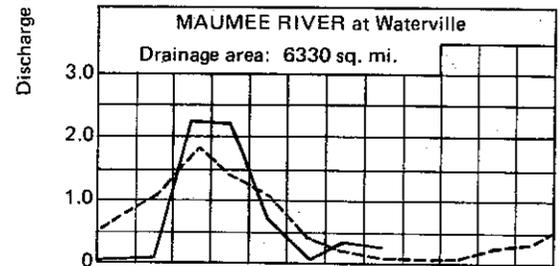
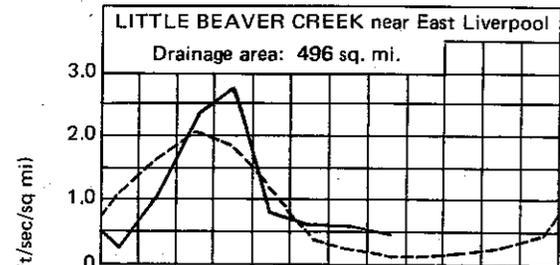
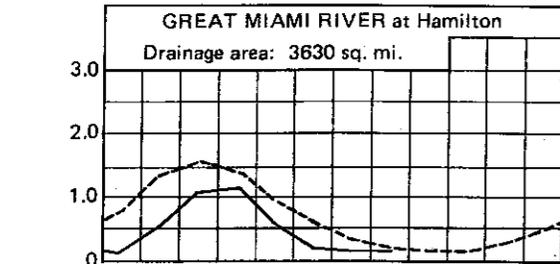
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COLUMBUS, OHIO 43224

MEAN STREAM DISCHARGE

RESERVOIR STORAGE FOR WATER SUPPLY

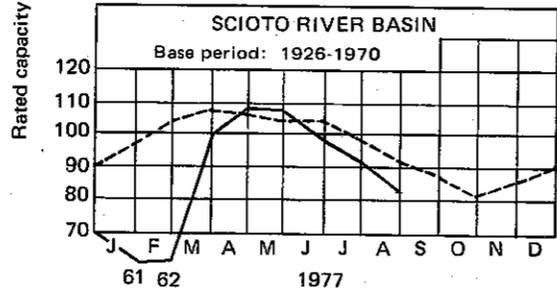
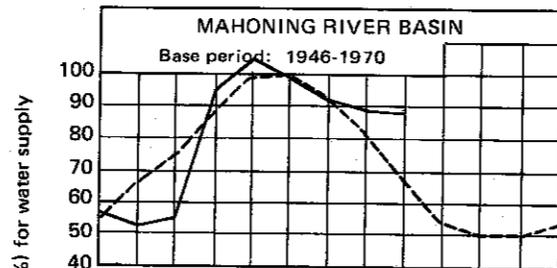
LAKE ERIE LEVELS

GROUND-WATER LEVELS



1977

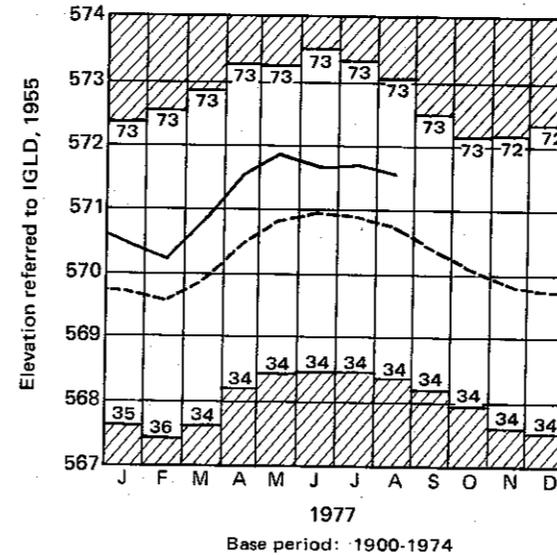
Base period for all streams: 1941-1970



RESERVOIR STORAGE for water supply for August was noticeably above normal in the Mahoning River basin and below normal in the Scioto River basin index reservoirs. Storage in the Mahoning basin index reservoirs was 88 percent of rated capacity for water supply compared to 89 percent for last month and 88 percent for August 1976. Storage in the Scioto basin index reservoirs was 83 percent of rated capacity for water supply compared to 92 percent for last month and 92 percent for August 1976. Storage in the Scioto basin index reservoirs is slightly lower because the water level in one of the index reservoirs is being held at a lower level for shoreline repairs. Storage in upground reservoirs is reported to be about normal for this time of year.

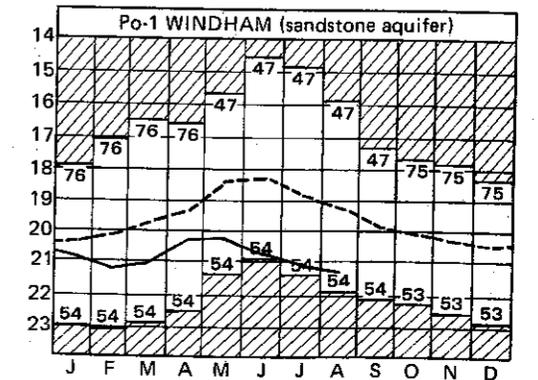
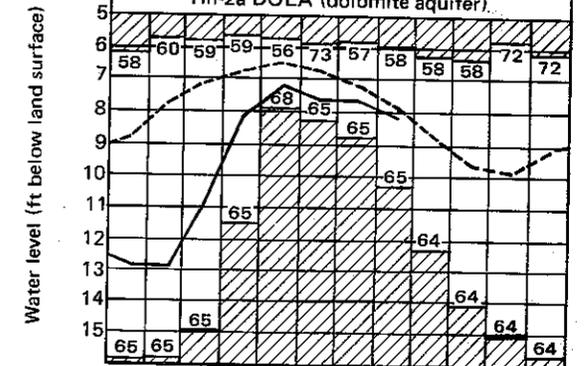
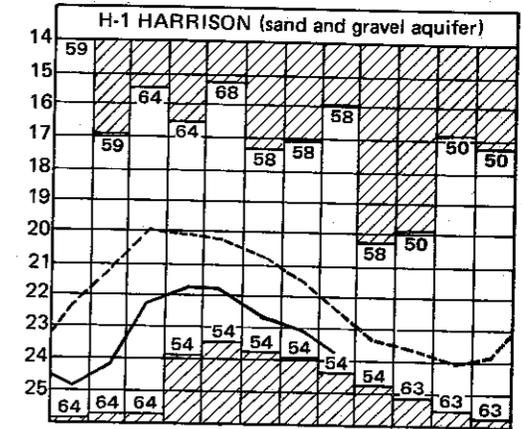
STREAMFLOW for August was at or above normal throughout most of the state. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 655 cfs, 84 percent; Little Beaver Creek, 236 cfs, 345 percent; Maumee River, 1,449 cfs, 244 percent; Scioto River, 993 cfs, 110 percent. Flows at the month end were about normal throughout the state.

normal----- current——



LAKE ERIE mean level for August was 571.53 feet above IGLD (1955), 0.15 foot below last month's mean level and 0.82 foot above normal. The lake level is 1.06 feet below the level observed for August 1976 and 2.93 feet below Low Water Datum. (Correction: Lake Erie mean level reported for July 1977 should have been 571.68 feet above IGLD.)

GROUND-WATER LEVELS in general showed normal declines for August despite the above-normal precipitation during the past two or three months. Water levels in the key index wells ranged from 0.5 foot above normal to 3.0 feet below normal for August. The water level in observation well F-1 at West Rushville, Fairfield County, fell to a record monthly low for the second consecutive month for the period of record beginning in 1946. The continued steady declines during August indicate that thus far there has been very little if any recharge to ground water as a result of the above-normal precipitation. It is still too early to determine if water supplies will show any beneficial effects from the above-normal precipitation during the past few months.



Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964



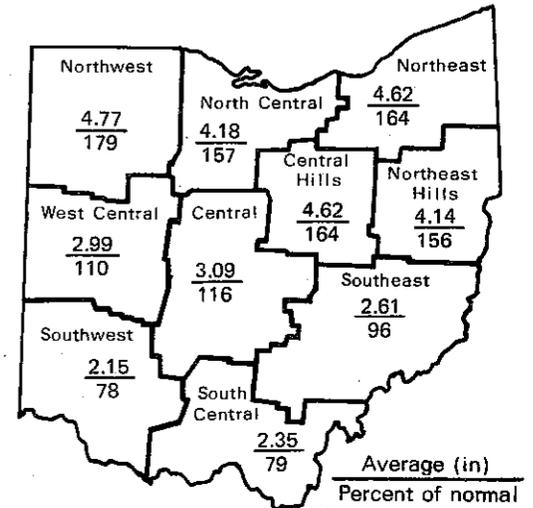
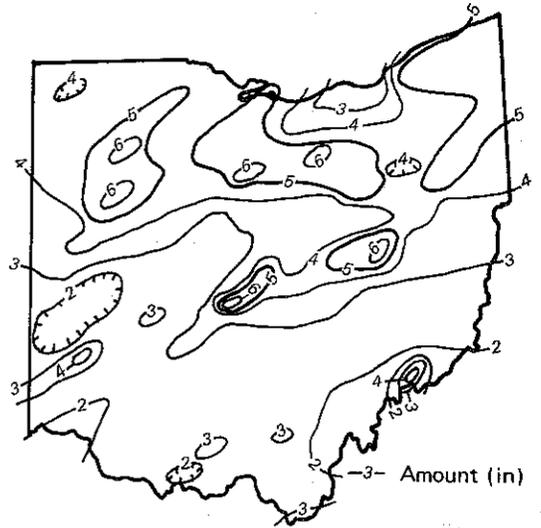
monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for September was above normal throughout most of the state; the only exceptions were the Southwest, South Central, and Southeast regions. The average for the state as a whole was 3.55 inches, 0.80 inch above normal. This is the fourth consecutive month for which precipitation for the state as a whole has been above normal. Regional averages ranged from 4.77 inches, 2.11 inches above normal, for the Northwest region to 2.15 inches, 0.61 inch below normal, for the Southwest region. The U.S. Hydrologic Experiment Station, Cöshocton County, reported the greatest amount of precipitation, 6.86 inches, for the month, and Fernbank, Hamilton County, reported the least amount, 1.17 inches. The bulk of the month's precipitation in the northern portion of the state occurred during the first three weeks of the month; in the southern portion of the state there was no significant precipitation during the first week. Unusually large amounts in the northern portion of the state were the result of very localized thunderstorms. The above-normal precipitation in the northern portion of the state provided some recharge to ground-water storage, especially in the unconsolidated sand and gravel aquifers. Precipitation for the first nine months of the 1977 calendar year averaged 28.71 inches, 0.83 inch below normal. Regional averages ranged from 32.92 inches, 4.29 inches above normal, for the Northeast region to 24.05 inches, 5.23 inches below normal, for the West Central region.

Precipitation for the 1977 water year, October 1, 1976, to September 30, 1977, was noticeably below normal for most of the state; the only exceptions were the Northwest, North Central, and the Northeast regions, where precipitation for the water year was slightly above normal. The average for the state as a whole for the water year was 33.36 inches, 3.68 inches below normal. Regional averages ranged from 38.08 inches, 0.98 inch above normal, for the Northeast region to 27.85 inches, 8.67 inches below normal, for the West Central region. A map showing the regional averages for the 1977 water year and their departures from normal appears on the last page of this report. Precipitation for the state as a whole during the first six months of the water year, the nominal recharge period, was 4.91 inches below normal; during the nominal water-supply depletion period precipitation was 1.23 inches above normal. Because of the lack of recharge during the first five months of the nominal recharge period, the state's water supplies continued to decline through February. Thus, the water-supply recharge season was very short and water supplies were generally noticeably below normal at the end of the recharge season. Although precipitation was slightly above normal during the remainder of the water year, the water-supply situation at the end of the water year in general remains rather uncertain.



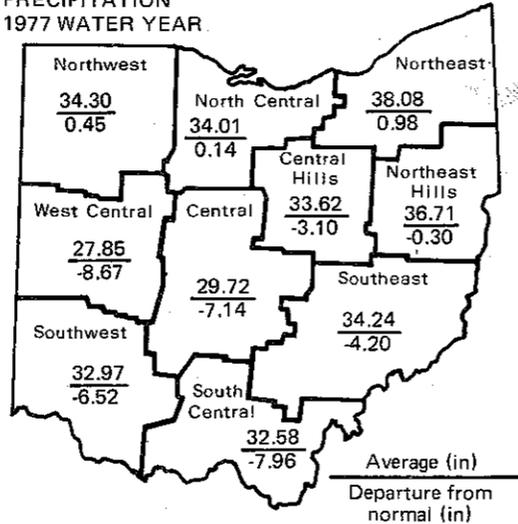
DIVISION OF WATER

Wayne S. Nichols, Chief

SUMMARY

The water-supply situation at the end of the 1977 water year continues to hold a considerable degree of uncertainty throughout the state. Despite the fact that precipitation has been above normal for much of the state during the past four months, one could not expect, nor has there been, any significant recharge to water supplies in many areas of the state. Precipitation was slightly above normal for September. Streamflow and reservoir storage were generally above normal in the northern portion of the state and below normal in the southern portion. Ground-water storage was near normal in some areas of the northern portion of the state and noticeably below normal in the southern portion. Lake Erie level declined only slightly and remained about 1 foot above normal for the fourth consecutive month.

PRECIPITATION 1977 WATER YEAR



NOTES AND COMMENTS

RECENT PUBLICATION OF THE DIVISION OF GEOLOGICAL SURVEY

Report of Investigations No. 102, *Sediment-load measurements along the United States shore of Lake Erie*, by Charles H. Carter. 24 p., 2 figs., 11 tables, 3 appendixes, 1977. \$1.00 plus 4 cents tax in Ohio plus 10 cents mailing charge.

Based on recession-rate measurements, recession volumes were calculated for the Michigan, Ohio, Pennsylvania, and New York portions of the Lake Erie shore. Sediment load for the Canadian shore also is discussed. Mineralogy and geochemistry of the shore deposits (20 sample stations) and detailed recession data are included in the appendixes.

CORRECTION: The price given in the August water inventory report for the publication, *Inventory of municipal water-supply systems, by county, Ohio*, was incorrect. The correct price is \$2.50 plus 10 cents tax in Ohio and 35 cents mailing charge.

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. Corps of Engineers, Detroit District.

Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.



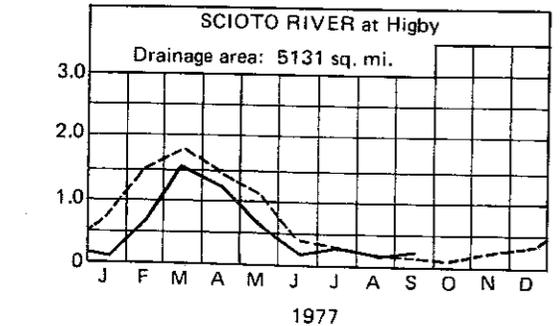
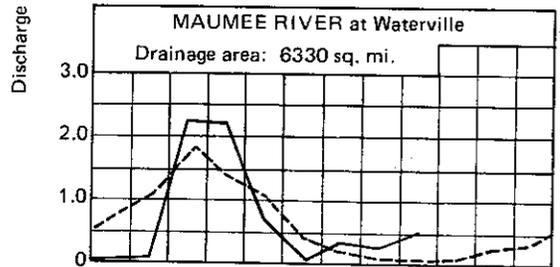
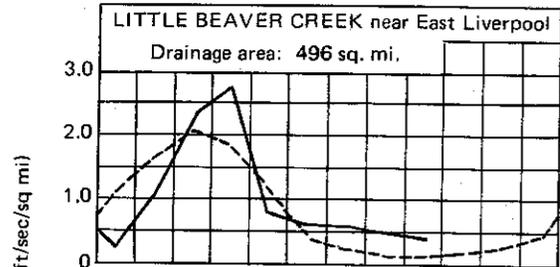
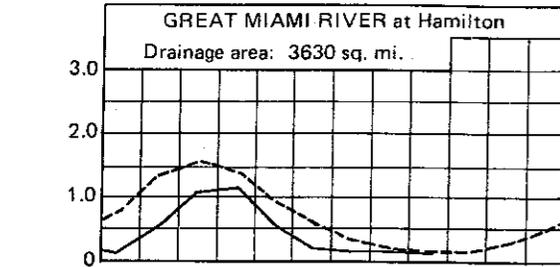
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MEAN STREAM DISCHARGE

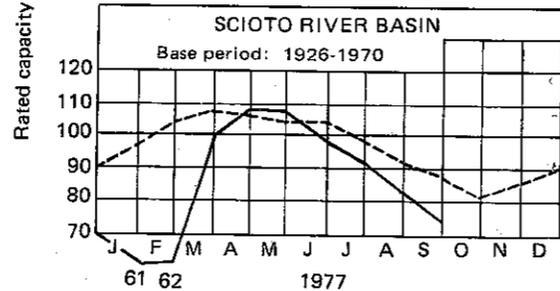
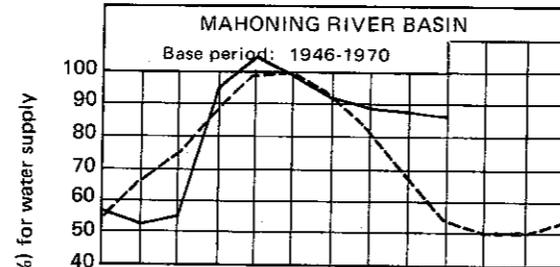
RESERVOIR STORAGE FOR WATER SUPPLY

LAKE ERIE LEVELS

GROUND-WATER LEVELS

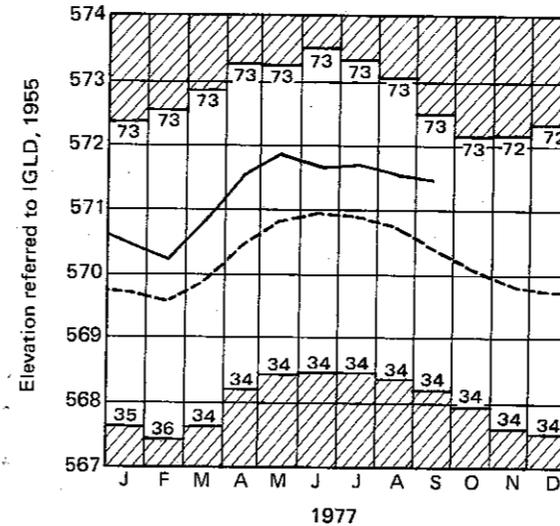


Base period for all streams: 1941-1970



RESERVOIR STORAGE for water supply for September continued to be noticeably above normal in the Mahoning River basin and below normal in the Scioto River basin index reservoirs. Storage in the Mahoning basin index reservoirs was 86 percent of rated capacity for water supply compared to 88 percent for last month and 86 percent for September 1976. Storage in the Scioto basin index reservoirs was 75 percent of rated capacity for water supply compared to 83 percent for last month and 90 percent for September 1976. Reservoir storage for water supply, which was generally very uncertain during the first five months of the water year, is considered to be favorable at the end of the water year.

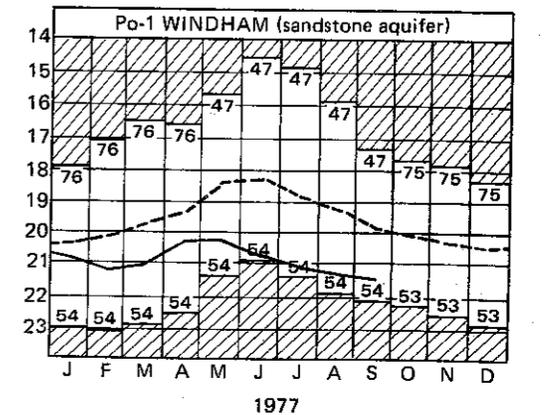
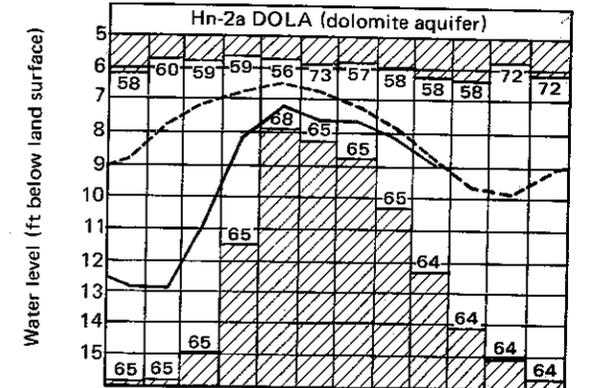
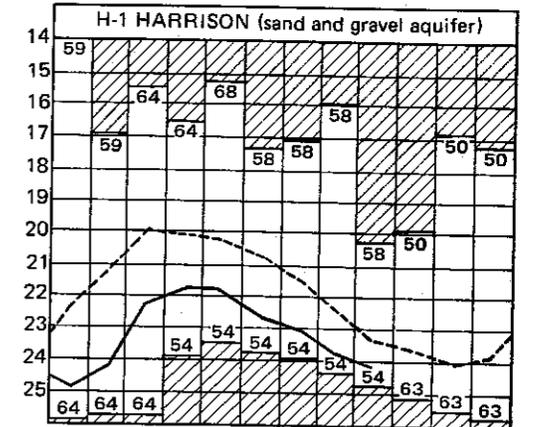
STREAMFLOW for September was excessive in the northern portion of the state and normal in the southern portion. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 619 cfs, 102 percent; Little Beaver Creek, 205 cfs, 337 percent; Maumee River, 3,200 cfs, 863 percent; Scioto River, 1,085 cfs, 180 percent. Streamflow for the 1977 water year was generally below normal in the western and southern portions of the state and above normal in the northern and eastern portions. Flows throughout the state were noticeably deficient in December 1976 and January and February 1977 as a result of the extreme cold and general lack of precipitation. Mean discharge and percent of normal for the water year at the index gaging stations were as follows: Great Miami River, 1,421 cfs, 43 percent; Little Beaver Creek, 442 cfs, 102 percent; Maumee River, 3,509 cfs, 72 percent; Scioto River, 2,492 cfs, 55 percent.



LAKE ERIE mean level for September was 571.50 feet above IGLD (1955), 0.03 foot below last month's mean level and 1.09 feet above normal. The lake level is 0.63 foot below the level observed for September 1976 and 2.90 feet above Low Water Datum.

GROUND-WATER LEVELS in general showed net declines for September; however, the declines were only about half that usually experienced in September. Ground-water levels in unconsolidated aquifers declined during the first half of the month and rose in response to increased precipitation during the last half of the month, resulting in slightly higher levels at the month end. The only exception was in the southwestern portion of the state, where precipitation was below normal. Ground-water levels in consolidated rock aquifers continued to decline and were slightly lower at the month end. Ground-water levels are noticeably low in most areas of the state; the only exceptions are in the Northwest region and in observation well Fr-10 at Columbus, Franklin County, where precipitation was markedly above normal during the past two months. The water level in observation well F-1 at West Rushville, Fairfield County, fell to a record monthly low for the third consecutive month for the period of record beginning in 1946. Water levels in observation wells Fa-1 near Washington Court House, Fayette County, and H-1 near Harrison, Hamilton County, also in the southern portion of the state, showed near record-low levels for the month. Water levels in general were about normal to 3.0 feet below normal at the end of the water year. The ground-water situation during the entire 1977 water year was very uncertain owing to lack of sufficient recharge during the first five months of the nominal recharge period. The ground-water storage situation in the southern portion of the state still remains very uncertain.

-- current



Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964



monthly water inventory report for ohio

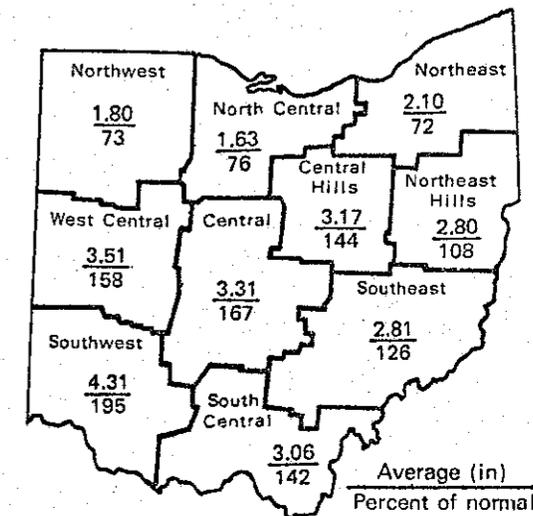
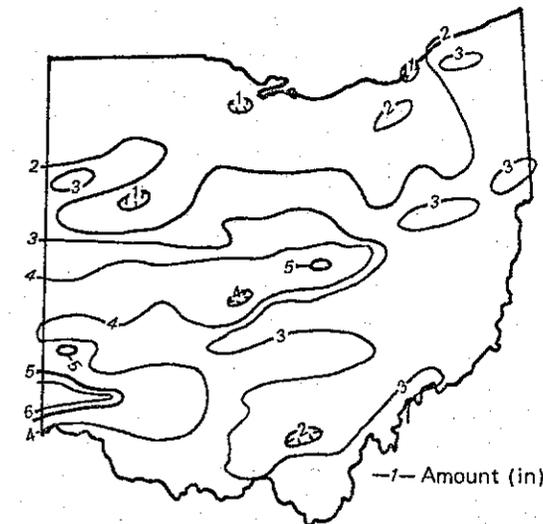
Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for October was above normal throughout most of the state; the only exceptions were the Northwest, North Central, and Northeast regions, where precipitation was below normal. The average for the state as a whole was 2.85 inches, 0.54 inch above normal. Regional averages ranged from 4.31 inches, 2.10 inches above normal, for the Southwest region to 1.63 inches, 0.51 inch below normal, for the North Central region. Hamilton, Butler County, reported the greatest amount of precipitation, 6.49 inches, for the month, and Lima, Allen County, reported the least amount, 0.95 inch. Generally precipitation was below normal in the northern portion of the state north of a line running through St. Mary's, Marion, Canton, and Youngstown; precipitation for most stations in this area was less than 2.0 inches. The remainder of the state received between 2.0 and 4.0 inches of precipitation, except for an area in the southwestern portion of the state north of Cincinnati, where precipitation exceeded 4.0 inches. Both Hamilton, Butler County, and Kings Mills, Warren County, received in excess of 6.0 inches. The bulk of the precipitation in this area was produced by an unusually heavy thunderstorm in the southern and central portions of the state on the morning of October 1st. As much as 5.0 inches of rain was reported in the Hamilton area, and amounts exceeding 3.0 inches were reported in the north and northwestern sections of Columbus, Franklin County. A tornado touched down in the northern section of Cincinnati during this storm. The tornado, which occurred early in the morning, was not only considered unusual for this time of year but also for the time of day. Generally there was no significant precipitation in the last half of the month. Precipitation for the first ten months of the 1977 calendar year averaged 31.56 inches, 0.29 inch below normal. Regional averages ranged from 35.02 inches, 3.47 inches above normal, for the Northeast region to 27.56 inches, 3.94 inches below normal, for the West Central region.

October is the first month of the 1978 water year, which began October 1, 1977, and ends September 30, 1978. Precipitation this month was above normal for

Continued on back page.



DIVISION OF WATER

Wayne S. Nichols, Chief

PRECIPITATION—Continued

most of the state; this is the fifth consecutive month for which precipitation for the state as a whole has been above normal. As a result, noticeable recharge to ground-water supplies, especially in the unconsolidated sand and gravel aquifers adjacent to streams, was observed in most areas of the state during the first half of the month. This augurs well for continued recharge to water supplies if precipitation continues to be at or above normal in succeeding months.

SUMMARY

The water-supply situation throughout the state showed significant improvements during October. Precipitation was generally above normal. Reservoir storage, streamflow, and ground-water storage showed marked improvements in most areas of the state. Lake Erie level declined slightly for the fourth consecutive month.

NOTES AND COMMENTS

RECENT PUBLICATION OF THE DIVISION OF GEOLOGICAL SURVEY

Educational Leaflet No. 10. *Geology in land-capability analysis*, by Ronald D. Stieglitz, Michael L. Couchot, and Robert G. Van Horn. Folded leaflet, illustrated, 1977.

This pamphlet discusses the role of geology and the geologist in land-use planning and emphasizes the need for and applicability of geologic data in land-capability studies. The leaflet is highlighted with numerous color photographs as well as color illustrations of Bethlehem Township, Stark County, as an example of the detailed mapping and inventory studies done by the Division of Geological Survey. Bethlehem Township is featured because it contains both glaciated and unglaciated areas and has a diversity of materials. Various geologic conditions in the township are outlined in maps of bedrock geology, glacial geology, surficial materials, sand and gravel resources, thickness of unconsolidated materials, and suitability for sanitary landfill.

Educational Leaflet No. 10 is available from the Division of Geological Survey, Ohio Department of Natural Resources, Bldg. B, Fountain Square, Columbus, Ohio 43224. There is no charge for this publication, but 15 cents is requested for postage and handling when ordering by mail.

Publications of other divisions of the Ohio Department of Natural Resources also are available at the offices of the Division of Geological Survey. Publications lists for the Divisions of Geological Survey, Lands and Soil, Water, and Wildlife are available free of charge, but please include 15 cents for postage and handling.

ACKNOWLEDGMENTS

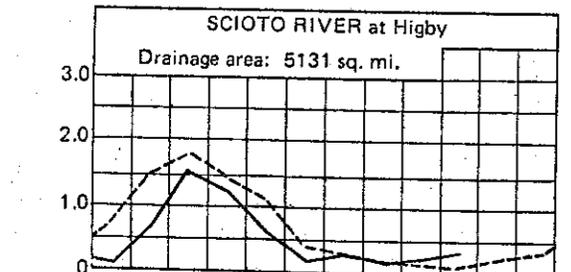
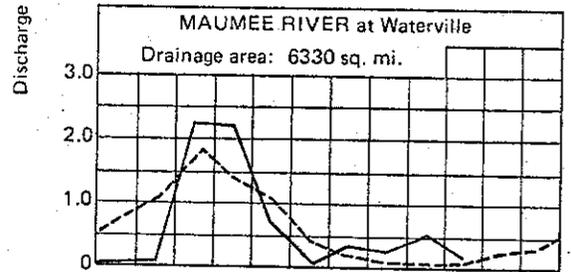
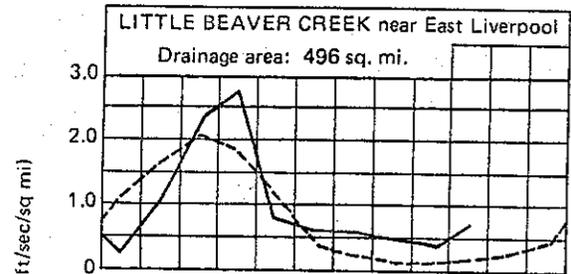
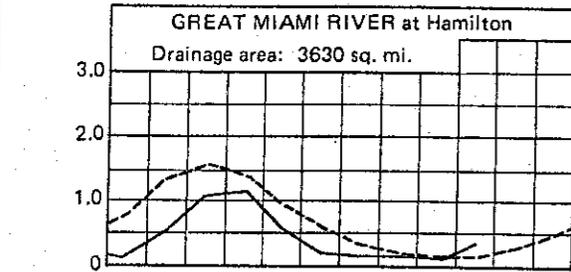
This report has been compiled from Division of Water data and from information supplied by the following:

- 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. Corps of Engineers, Detroit District.
- Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.



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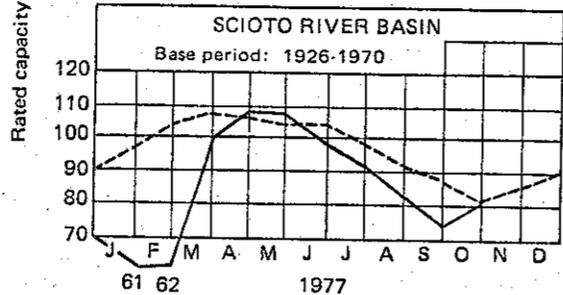
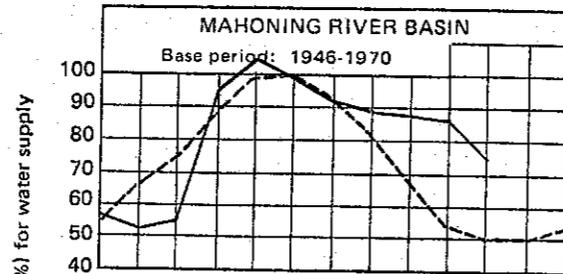
MEAN STREAM DISCHARGE



1977

Base period for all streams: 1941-1970

RESERVOIR STORAGE FOR WATER SUPPLY

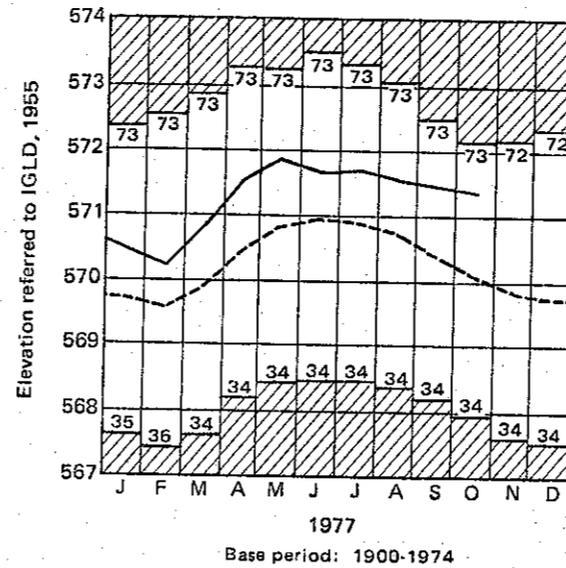


RESERVOIR STORAGE for water supply for October declined sharply in the Mahoning River basin index reservoirs and rose significantly in the Scioto River basin index reservoirs. Storage in the Mahoning basin index reservoirs was 75 percent of rated capacity for water supply compared to 86 percent for last month and 81 percent for October 1976. Storage in the Scioto basin index reservoirs was 81 percent of rated capacity for water supply compared to 75 percent for last month and 79 percent for October 1976.

STREAMFLOW for October was normal in the northwestern portion of the state and noticeably above normal elsewhere. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 1,198 cfs, 201 percent; Little Beaver Creek, 354 cfs, 468 percent; Maumee River, 1,169 cfs, 230 percent; Scioto River, 1,666 cfs, 286 percent. It is apparent that streamflow has benefited from the above-normal precipitation in most of the state during the past five months.

normal----- current——

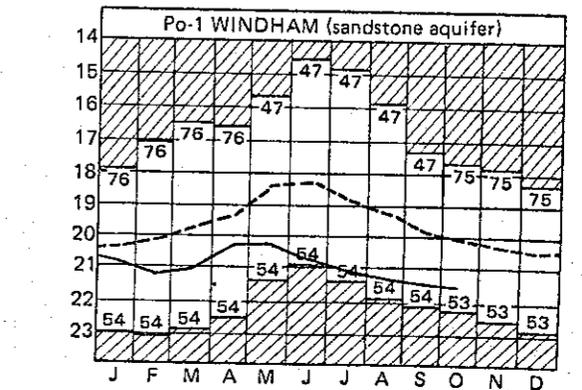
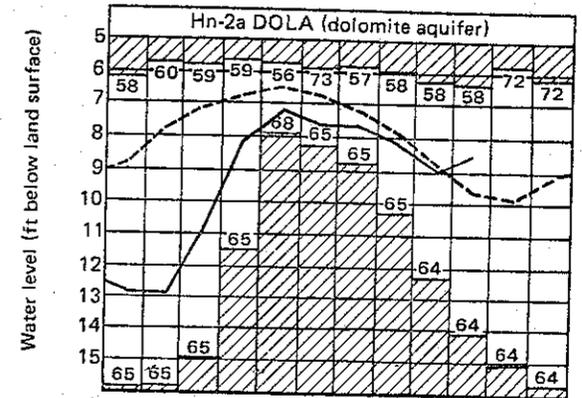
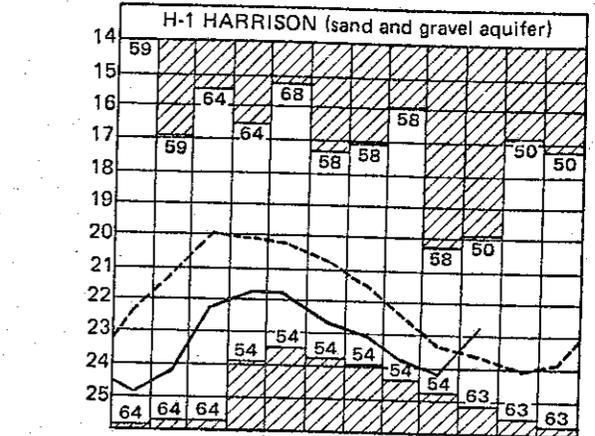
LAKE ERIE LEVELS



LAKE ERIE mean level for October was 571.36 feet above IGLD (1955), 0.14 foot below last month's mean level and 1.27 feet above normal. The lake level is 0.38 foot below the level observed for October 1976 and 2.76 feet above Low Water Datum.

GROUND-WATER LEVELS generally showed net rises in October in response to recharge from the above-normal precipitation in September and the first half of October. Only one key index observation well, Po-1 at Windham, Portage County, showed a continued decline for the month. Water levels in many of the observation wells showed marked rises in response to recharge during the first half of the month but were declining at the month end. In general the water levels in unconsolidated sand and gravel aquifers have risen to above-normal levels, and water levels in consolidated rock aquifers continue to be noticeably below normal. However, consolidated rock aquifers are generally slower in responding to recharge. The above-normal precipitation in the southern portion of the state during the first two weeks of the month was most beneficial to water supplies in that area. The water level in observation well H-1 near Harrison, Hamilton County, had been at near-record-low levels for several months, but rose significantly in October and was noticeably above normal at the month end. The water-supply situation insofar as ground-water supplies are concerned improved significantly during the month.

GROUND-WATER LEVELS



1977

Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964



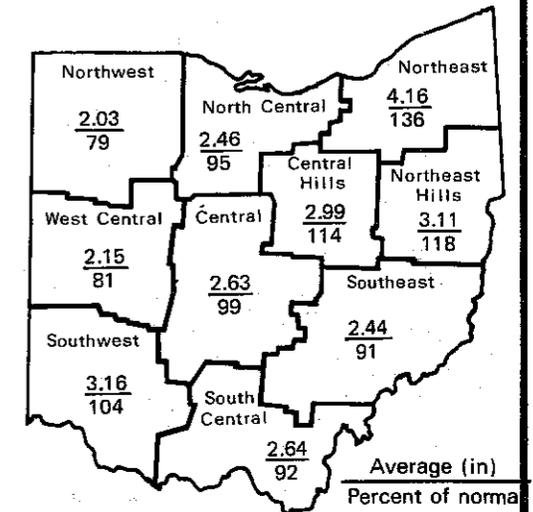
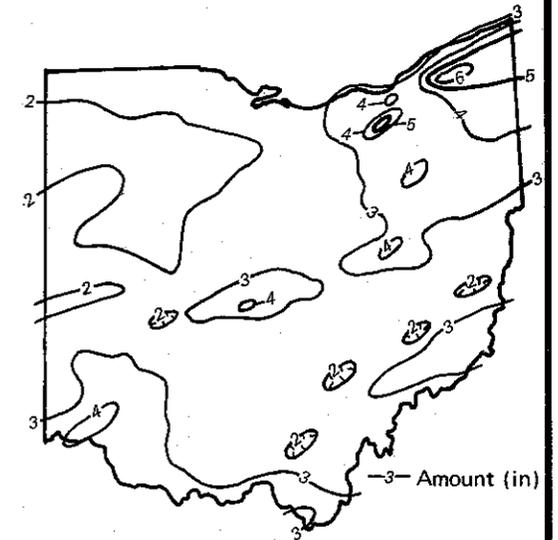
monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

PRECIPITATION for November was generally below normal for most of the state; the only exceptions were the Northeast, Central Hills, Northeast Hills, and the Southwest regions, where precipitation was above normal. Although six of the ten regions recorded below-normal precipitation for the month, the average for the state as a whole was 2.78 inches, 0.04 inch above normal. This is the sixth consecutive month for which precipitation for the state as a whole has been above normal. Regional averages ranged from 4.16 inches, 1.11 inches above normal, for the Northeast region to 2.03 inches, 0.53 inch below normal, for the Northwest region. Chardon, Geauga County, reported the greatest amount of precipitation, 6.03 inches, for the month, and Findlay, Hancock County, reported the least amount, 1.34 inches. Precipitation for the month was generally above normal in an area extending across the state from southwest to northeast and was heaviest in the snowbelt area east of Cleveland. Areas to the northwest and southeast were generally below normal. There was measurable precipitation somewhere in the state during every week of the month; the first snow for the season was observed throughout the state on November 10th. Chardon, Geauga County, reported 22.5 inches of snow for the month; this is nearly twice that normally observed for November. Precipitation for the first 11 months of the 1977 calendar year averaged 34.34 inches, 0.25 inch below normal. Regional averages ranged from 39.18 inches, 4.58 inches above normal, for the Northeast region to 29.71 inches, 4.45 inches below normal, for the West Central region. Although there are sizeable deficiencies of precipitation in some regions of the state, precipitation for the calendar year thus far is greater than 85 percent of normal in all areas of the state.

Precipitation for the first two months of the 1978 water year for the state as a whole averages 5.63 inches, 0.58 inch above normal. Regional averages range from 7.47 inches, 2.23 inches above normal, for the Southwest region to 3.83 inches, 1.18 inches below normal, for the Northwest region. The above-normal precipitation throughout most of the state during the past several months has resulted in extremely good conditions for recharge to ground-water storage during the current recharge season.



DIVISION OF WATER

Wayne S. Nichols, Chief

SUMMARY

The water-supply situation has showed marked improvements during the first two months of the 1978 water year. Precipitation in November was above normal for the state as a whole for the sixth consecutive month. In general, reservoir storage, streamflow, and ground-water storage have made significant gains. Lake Erie recorded a normal decline for November.

NOTES AND COMMENTS

DAM SAFETY IS PRIORITY PROGRAM

A series of tragic dam failures in the United States in recent years has made dam-inspection programs a matter of national concern. The U.S. Congress this year appropriated \$15 million to the U.S. Army, Corps of Engineers to begin a pilot dam-inspection program. The Ohio Division of Water is responsible for Ohio's Dam Safety Program and will be cooperating with the Corps of Engineers in completing inspections of all high-hazard nonfederal dams in the state. The term "high-hazard" does not mean that these dams are unsafe, but that a failure would result in substantial loss of life and damage to property. The Division of Water already has completed inspection of nearly half of the 223 dams in Ohio listed as high-hazard. If you have questions regarding the Dam Safety Program please contact the Ohio Department of Natural Resources, Division of Water, Dam Permits and Inspection Section, Fountain Square, Building E, Columbus, Ohio 43224 or phone 614-466-2646.

OHIO DEPARTMENT OF NATURAL RESOURCES
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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. Corps of Engineers, Detroit District.

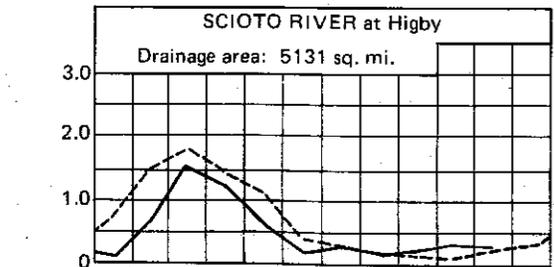
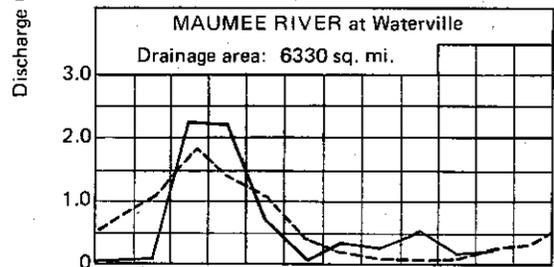
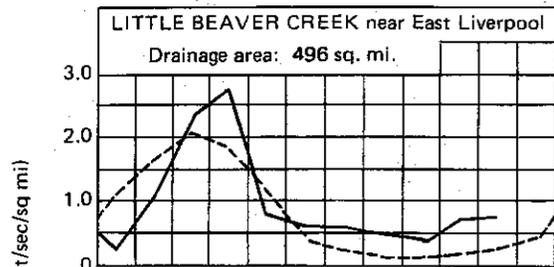
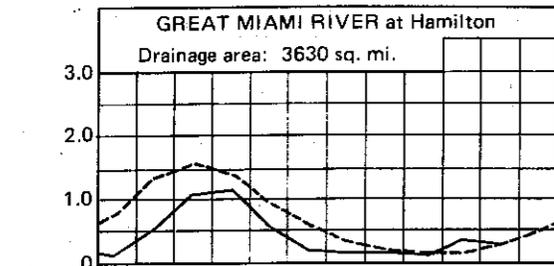
Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.

MEAN STREAM DISCHARGE

RESERVOIR STORAGE FOR WATER SUPPLY

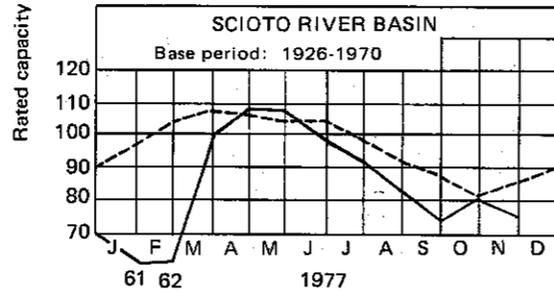
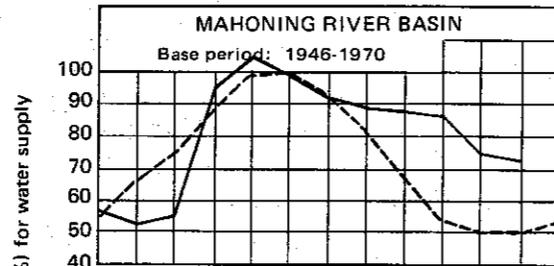
LAKE ERIE LEVELS

GROUND-WATER LEVELS



1977

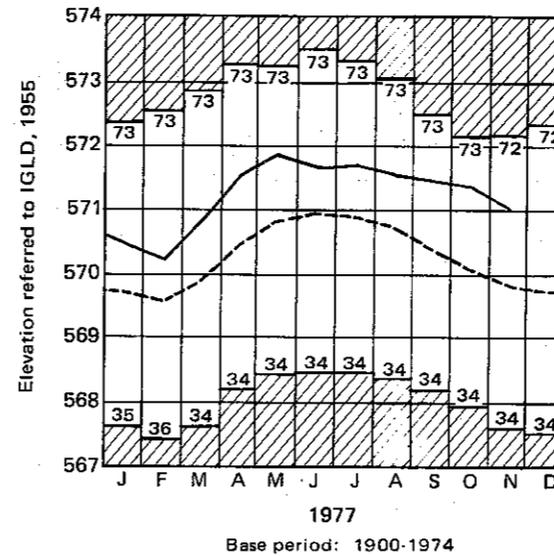
Base period for all streams: 1941-1970



RESERVOIR STORAGE for water supply for November declined in both the Mahoning River basin and the Scioto River basin index reservoirs. Storage in the Mahoning River basin remained noticeably above normal, but storage in the Scioto River basin was below normal at the month end. Storage in the Mahoning basin index reservoirs was 73 percent of rated capacity for water supply compared to 75 percent for last month and 65 percent for November 1976. Storage in the Scioto basin index reservoirs was 76 percent of rated capacity for water supply compared to 81 percent for last month and 74 percent for November 1976.

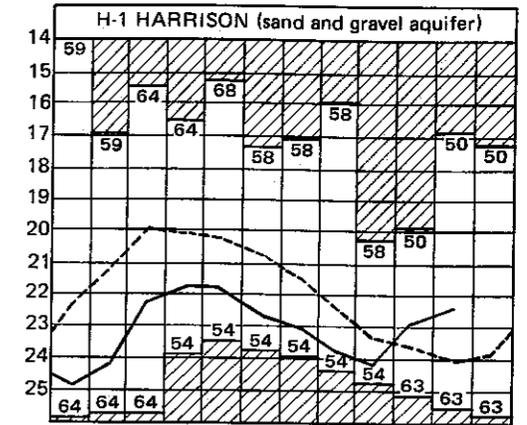
STREAMFLOW for November was excessive in the northeast and normal elsewhere. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 1,083 cfs, 108 percent; Little Beaver Creek, 366 cfs, 252 percent; Maumee River, 1,504 cfs, 96 percent; Scioto River, 1,394 cfs, 123 percent. Runoff for the respective drainage areas was above normal for the first two months of the 1978 water year.

normal----- current———

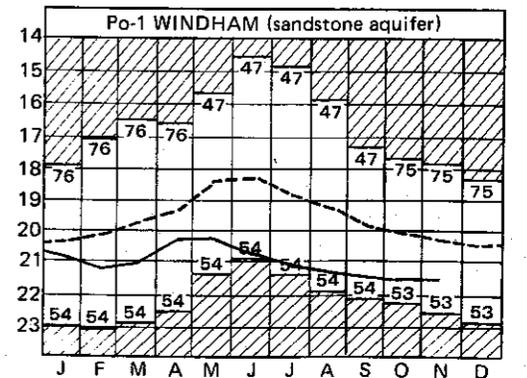
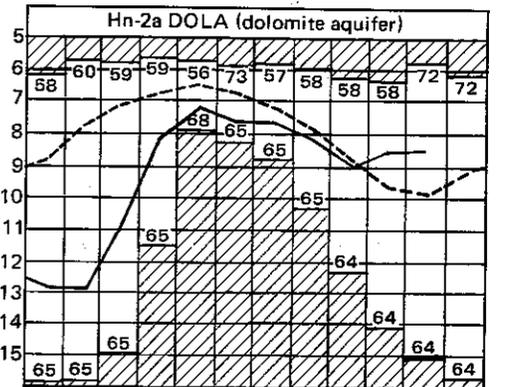


LAKE ERIE mean level declined for November and was 571.02 feet above IGLD (1955), 0.34 foot below last month's mean level and 1.20 feet above normal. The lake level is 0.17 foot below the level observed for November 1976 and 2.42 feet above Low Water Datum. Low Water Datum is the plane on each lake to which Lake Survey chart depths and federal navigation-improvement depths are referred. Low Water Datum for Lake Erie is 568.60 feet above IGLD (1955).

GROUND-WATER LEVELS throughout the state rose in response to the excellent recharge conditions resulting from the above-normal precipitation during the past several months. Water levels in consolidated rock aquifers have just begun to show rises in response to delayed recharge; this is the normal pattern in these aquifers. However, water levels in these aquifers in general still remain below normal throughout the state. Water levels in unconsolidated sand and gravel aquifers rose significantly for the second consecutive month in response to the excellent recharge conditions and were noticeably above normal for November. Ground-water recharge is off to an early start for the 1978 recharge season. Thus far, conditions are excellent for good recharge to ground-water storage during the remaining four or five months of the nominal recharge season.



Water level (ft below land surface)



Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964



monthly water inventory report for ohio

Compiled by Leonard J. Harstine

PRECIPITATION

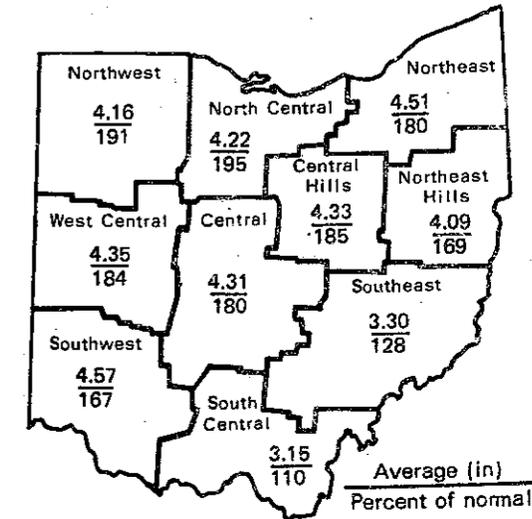
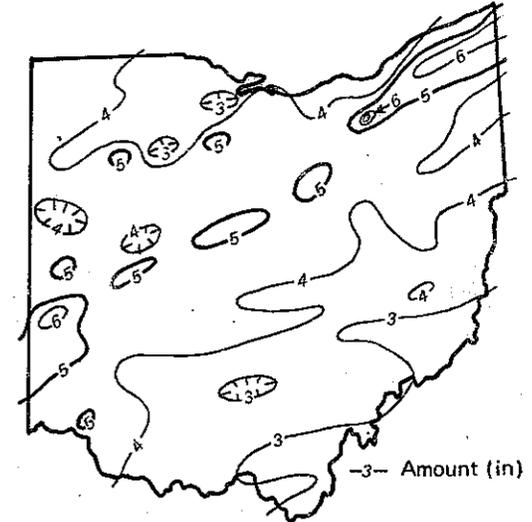
PRECIPITATION for December was markedly above normal throughout most of the state. The average for the state as a whole was 4.10 inches, 1.65 inches above normal. This is the seventh consecutive month for which precipitation for the state as a whole has been above normal. Regional averages ranged from 4.57 inches, 1.84 inches above normal, for the Southwest region to 3.15 inches, 0.29 inch above normal, for the South Central region. North Royalton, Cuyahoga County, reported the greatest amount of precipitation, 7.24 inches, for the month, and Willow Island Lock and Dam, Washington County, reported the least amount, 2.11 inches. There was precipitation on 10 or more days during the month throughout most of the state. Nearly half of this came in the form of snow. Snowfall in the northeastern portion of the state was excessive; Chardon, Geauga County, reported 45.6 inches for the month, twice that normally observed for December. Chardon has had nearly 6 feet of snow thus far this season, twice that normally expected. The above-normal precipitation in December provided excellent recharge to the state's water supplies.

Precipitation for the 1977 calendar year was above normal for most of the state; the only exceptions were the West Central, Central, South Central, and Southeast regions, where precipitation for the year was below normal. The average for the state as a whole was 38.44 inches, 1.40 inches above normal. An isohyetal map and regional averages and departures from normal for the 1977 calendar year appear on the last page of this report. Regional averages ranged from 43.69 inches, 6.59 inches above normal, for the Northeast region to 34.06 inches, 2.46 inches below normal, for the West Central region. Precipitation for the South Central region was 35.47 inches, 5.07 inches below normal. Chardon, Geauga County, reported the greatest amount of precipitation, 60.34 inches, 16.50 inches above normal, for the year, and St. Marys, Auglaize County, reported the least amount, 29.58 inches, 4.59 inches below normal. This has been a rather phenomenal year insofar as precipitation is concerned. Precipitation for the first six months of the year was below normal and the state was experiencing severe drought conditions. By June, precipitation was below normal throughout the state and the water-supply situation was looking rather bleak. However, things began to improve month by month as precipitation was above normal for each of the last six months of the year. By the year end, only a few areas of the state showed below-normal precipitation. Recharge conditions were excellent and by the end of the year the water-supply situation had improved markedly. In the southwestern portion of the state the water-supply situation at the year's end was equal to that normally observed at the end of the nominal recharge period.

Precipitation for the first three months of the 1978 water year is above normal throughout the state. The average for the state as a whole is 9.73 inches, 2.23 inches above normal. Regional averages range from 12.04 inches, 4.07 inches above normal, for the Southwest region to 7.99

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DIVISION OF WATER



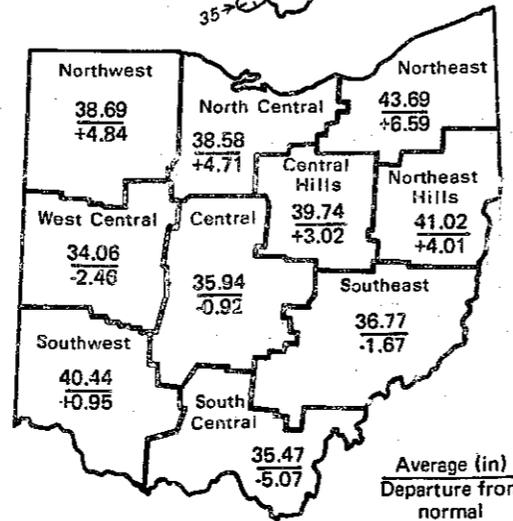
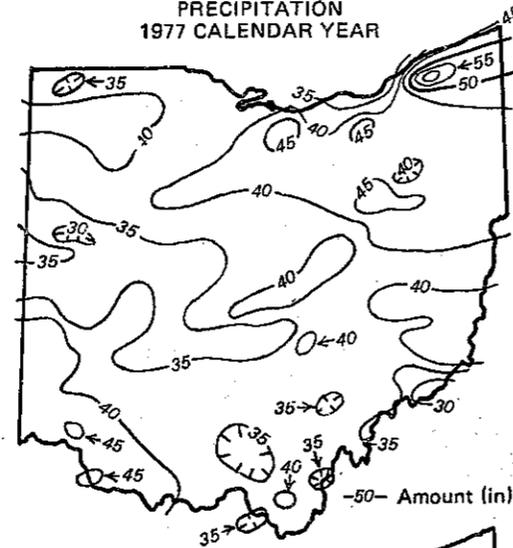
PRECIPITATION—continued

inches, 0.80 inch above normal, for the Northwest region. The above-normal precipitation in the past several months has resulted in excellent recharge to water supplies during the first three months of the 1978 recharge season.

SUMMARY

The water-supply situation at the end of 1977 was most favorable compared to the adverse uncertainties observed at the beginning of the year. Precipitation for December was noticeably above normal throughout the state. Streamflow, reservoir storage, and ground-water storage showed marked improvements during the month in response to the above-normal precipitation. Lake Erie level showed an unusually early rising trend during December in response to the above-normal precipitation in the Great Lakes drainage basin during the past several months.

PRECIPITATION 1977 CALENDAR YEAR



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ACKNOWLEDGMENTS

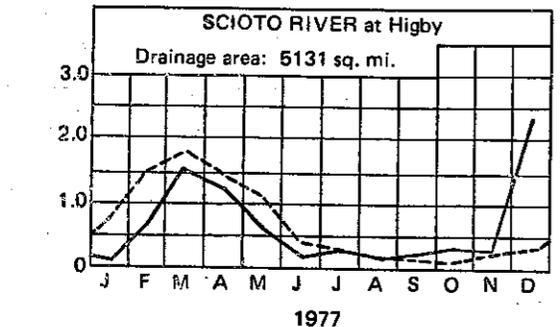
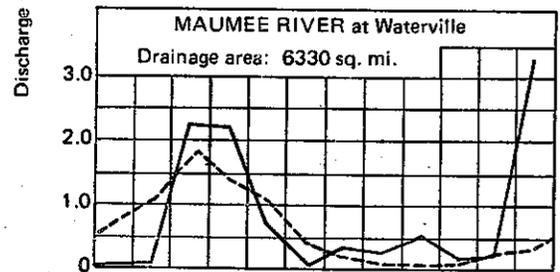
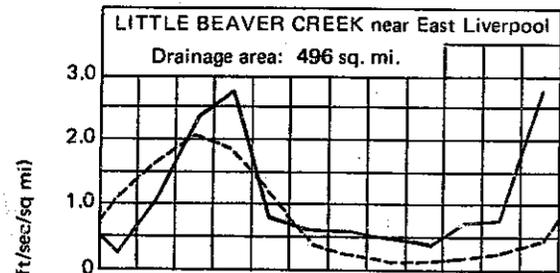
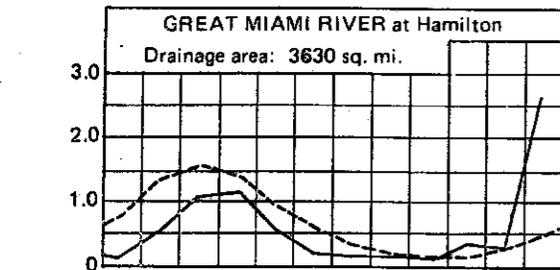
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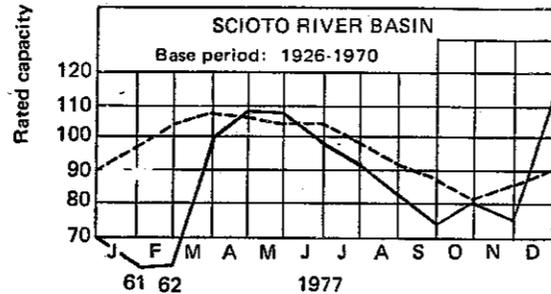
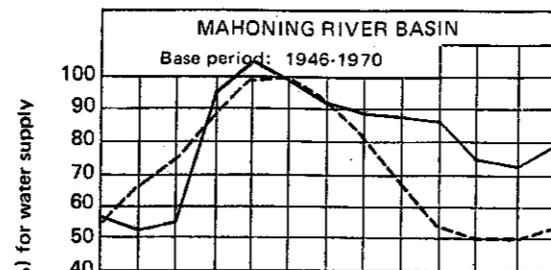
Editing, cartography, and production by staff of the Division of Geological Survey, Ohio Department of Natural Resources.

MEAN STREAM DISCHARGE



Base period for all streams: 1941-1970

RESERVOIR STORAGE FOR WATER SUPPLY

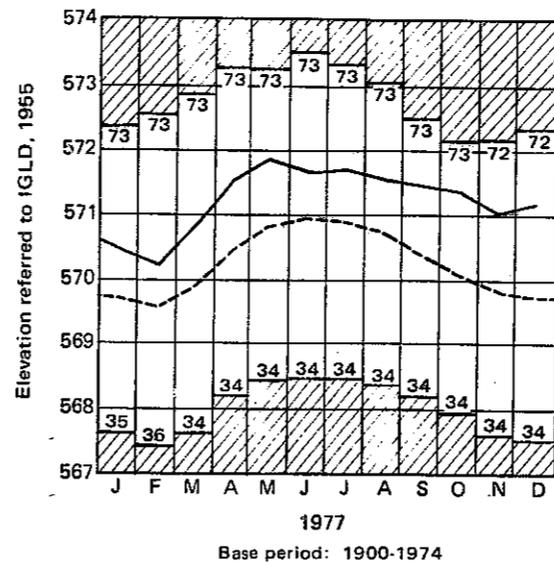


RESERVOIR STORAGE for water supply in both the Mahoning River basin and the Scioto River basin increased during December and was noticeably above normal at the month end. Storage in the Mahoning basin index reservoirs showed a normal increase for the month and was 79 percent of rated capacity for water supply compared to 73 percent for last month and 58 percent for December 1976. Storage in the Scioto basin index reservoirs showed a marked increase during the month and was 112 percent of rated capacity for water supply compared to 76 percent for last month and 70 percent for December 1976. Reservoir storage throughout the state has increased significantly during the past several months in response to the above-normal precipitation and holds a very favorable position at the year end.

STREAMFLOW for December was excessive throughout the state as a result of the above-normal precipitation. Some minor flooding occurred in the northern portion of the state between December 18 and 21. Mean monthly discharges at the index gaging stations were markedly high for December: the Great Miami River was the highest ever observed for December for the period of record beginning in 1927; Little Beaver Creek was 5th highest since 1916; Maumee River was 2nd highest since 1899; Scioto River was 3rd highest since 1931. Records for mean daily discharges were not exceeded. Mean discharge and percent of normal for the month at the index gaging stations were as follows: Great Miami River, 9,349 cfs, 577 percent; Little Beaver Creek, 1,372 cfs, 579 percent; Maumee River, 20,836 cfs, 923 percent; Scioto River, 12,049 cfs, 720 percent. Flows at month end were normal throughout the state.

normal----- current——

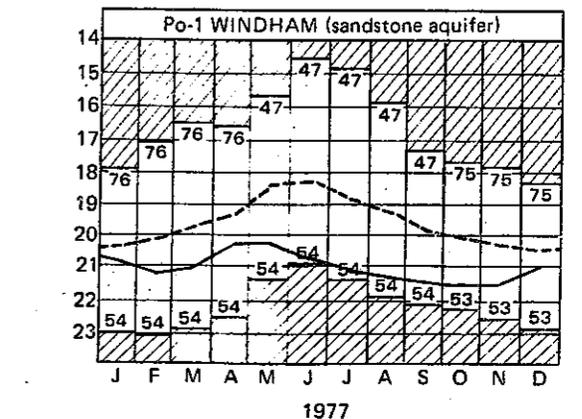
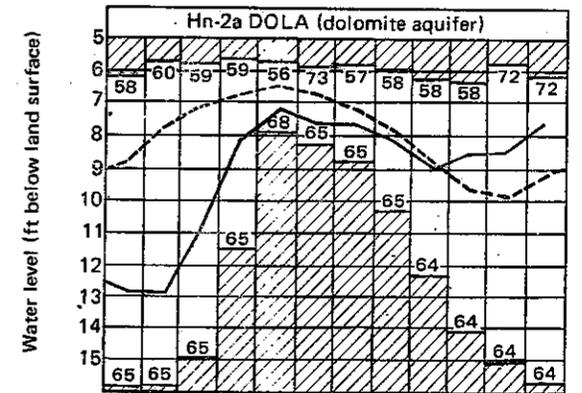
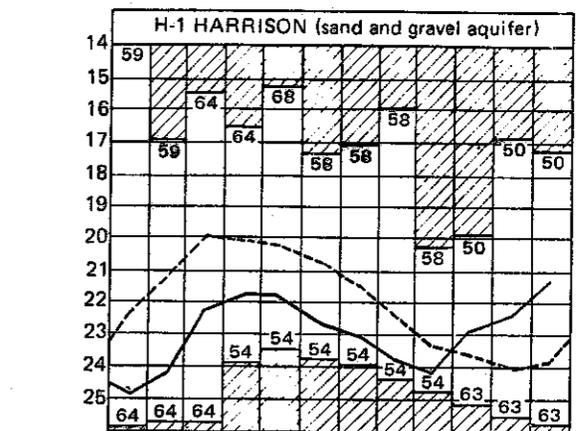
LAKE ERIE LEVELS



LAKE ERIE mean level showed an unusual rise for the month in response to unusually high precipitation in the drainage basin. The mean level for December was 571.18 feet above IGLD (1955), 0.16 foot above last month's mean level and 1.43 feet above normal. The lake level is 0.39 foot above the level observed for December 1976 and 2.58 feet above Low Water Datum. The Great Lakes Commission reports that precipitation over the entire Great Lakes basin (300,000 square miles) averaged 28.92 inches for the first nine months of 1977 and that this was an all-time record high since 1900; precipitation for the Lake Erie basin for the nine-month period was 33.05 inches, only slightly above normal.

GROUND-WATER LEVELS rose significantly in all areas of the state during December in response to the excellent recharge conditions produced by the above-normal precipitation during the past several months. The low intensity and widespread distribution of the rain and the slow melting of the heavy snowfall during the first half of December was most beneficial in producing this excellent recharge. Ground-water levels in most areas of the state are above normal; the only exceptions are in the consolidated-rock aquifers in the northeast portion of the state. Index well Po-1, at Windham, Portage County, remains slightly below normal. Ground-water levels in the unconsolidated sand and gravel aquifers in the southwestern portion of the state are at levels normally observed at the peak of the nominal recharge period. Thus the ground-water storage situation is very favorable at the year end in contrast to the adverse situation observed at the beginning of the year.

GROUND-WATER LEVELS



Base periods: H-1, 1951-1964; Hn-2a, 1955-1973; Po-1, 1947-1964