

ODNR

OHIO DEPARTMENT OF
NATURAL RESOURCES

DIVISION OF WATER

Richard F. Celeste

Governor

Lt. Gov. Myrl H. Shoemaker

Director



JANUARY 1985

MONTHLY WATER INVENTORY REPORT FOR OHIO

Compiled by Leonard J. Harstine

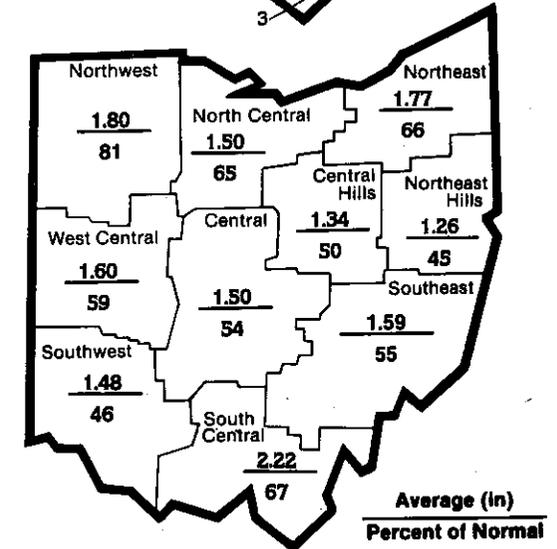
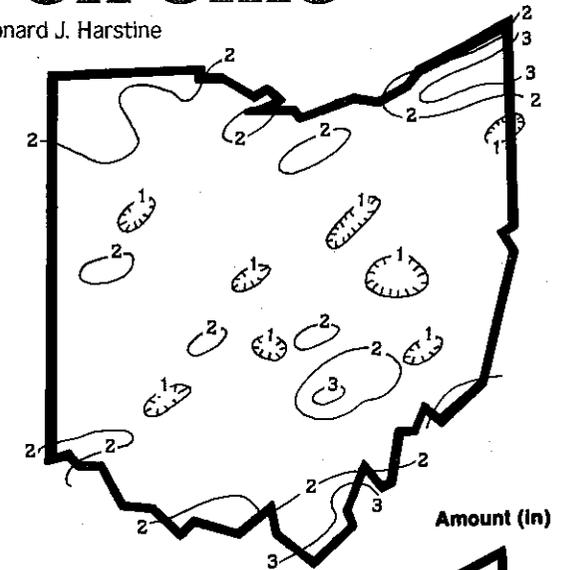
PRECIPITATION for January was noticeably below normal throughout the state. The average for the state as a whole was 1.61 inches, 1.15 inches below normal. Regional averages ranged from 2.22 inches, 1.07 inches below normal, for the South Central region to 1.26 inches, 1.54 inches below normal, for the Northeast Hills region. Departures from normal ranged from 0.43 inch below normal for the Northwest region to 1.75 inches below normal for the Southwest region. Gallipolis Locks and Dam, Gallia County, reported the greatest amount of precipitation for the month, 3.96 inches and Lithopolis, Fairfield County, reported the least amount, 0.72 inch.

The bulk of the month's precipitation came in the form of snow during the last three weeks. Although the water content was not high, most areas of the state experienced near record amounts of snowfall, with the exception of the 1978 blizzard when nearly twice as much snow fell during the month. Many areas reported in excess of 15 inches of snow for the month, of which most remained frozen on the ground at the month end. However, the density was generally lower than that usually observed; thus the water content of snow on the ground is estimated to average about 1 inch or less for most areas of the state.

Near-blizzard conditions were experienced in the Central Ohio area on Friday the 25th with winds up to 50 miles per hour and much blowing and drifting. This was followed by record low temperatures on Sunday the 27th, ranging between 18 to 25 degrees below zero (F) at many locations throughout the state. For the most part it was a cold and snowy month.

Cumulative precipitation for the first four months of the 1985 water year remains above normal throughout the state with one exception: the Northeast Hills region where it is 0.25 inch below normal. The average for the state as a whole is 11.36 inches, 1.10 inches above normal. Regional averages range from 13.55 inches, 2.37 inches above normal, for the South Central region to 9.58 inches, 0.16 inch above normal, for the Northwest region. Since most of January's precipitation remains frozen on the ground, the effect of the below normal precipitation cannot be evaluated at this time.

Errata: The report of last month's maximum precipitation, 7.24 inches at Painesville, was in error; the precipitation there was 3.91 inches. The greatest precipitation for December was 5.55 inches at Chardon, Geauga County.



SUMMARY

Precipitation for January was noticeably below normal throughout the state. Streamflow and ground-water storage are about normal, while reservoir storage is below normal for most areas of the state. Lake Erie level rose significantly and remained noticeably above normal, as has been the case for the past 13 years. Despite the fact that most of the month's recharge remains frozen on the ground, the water supply situation remains favorable throughout the state.

NOTES AND COMMENTS

Roy Winkle, deputy chief for engineering in the Division of Water, retired Jan. 31 after 26 years of service to the Department of Natural Resources. From 1954 to 1959 he was an engineer for the U.S. Soil Conservation Service in southeast and northeast Ohio. In 1959, he joined the division and was assigned to work with the Maumee Conservancy District in Defiance. Early in the 1960s, Winkle returned to Columbus to work on numerous floodplain management, flood control, and drainage projects for the division. From 1971 through 1975, he served as chief of the Division of Water and was instrumental in developing Ohio's dam safety program.

Winkle, a native of Brown County, graduated from The Ohio State University in agricultural engineering and is a registered professional engineer. He and his wife, Gloria, reside in Worthington.

WATER ADVISORY COUNCIL HOLDS FIRST MEETING

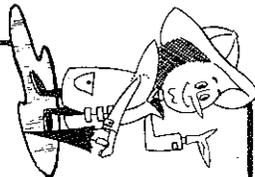
The Ohio Water Advisory Council held its first meeting Jan. 29 at the Department of Natural Resources, Columbus. All seven members attended and chose Bayliss L. (Rock) Prater, Melmore, and Marquita McLean, Cincinnati, as chairman and vice chairman respectively. Other members attending were Alexandra W. (Sandy) Buchanan, Columbus; George H. Mayhew, Massillon; Lloyd E. Overly, Chillicothe; James L. Rozelle, Centerville; and Karl M. Schurr, Bowling Green.

The council, created by Am. Sub. S.B. 360, will deliberate water management concerns and will provide advice to the Division of Water. The council will meet next in May.

ACKNOWLEDGEMENTS

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



ODNR
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DIVISION OF WATER
FOUNTAIN SQUARE
COLUMBUS, OHIO 43224



FEBRUARY 1985

Richard F. Celeste
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OHIO DEPARTMENT OF
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DIVISION OF WATER

MONTHLY WATER INVENTORY REPORT FOR OHIO

Compiled by Leonard J. Harstine

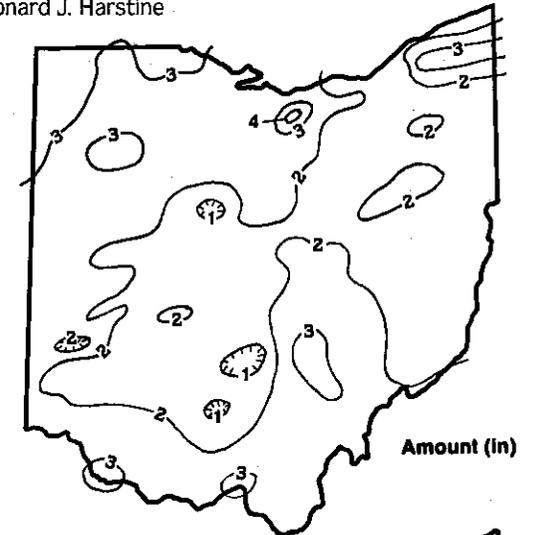
PRECIPITATION for February was below normal for most of the state; exceptions were in the Northwest and North Central regions where it was above normal. Precipitation for the state as a whole averaged 2.17 inches, 0.12 inch below normal. Regional averages ranged from 3.09 inches, 1.23 inches above normal, for the Northwest region to 1.72 inches, 0.58 inch below normal, for the Northeast Hills region. Clarksfield, Huron County, reported the greatest amount of precipitation for the month, 4.41 inches, and Circleville, Pickaway County, reported the least amount, 0.74 inch.

The bulk of the month's precipitation came in the form of snow during the first three weeks. The state experienced a heavy snowstorm on the 12th and 13th which produced from 12 to 15 inches in some areas of southeastern Ohio. When added to the above normal snowfall in January, the February storm left an unusual amount of snow on the ground throughout the state.

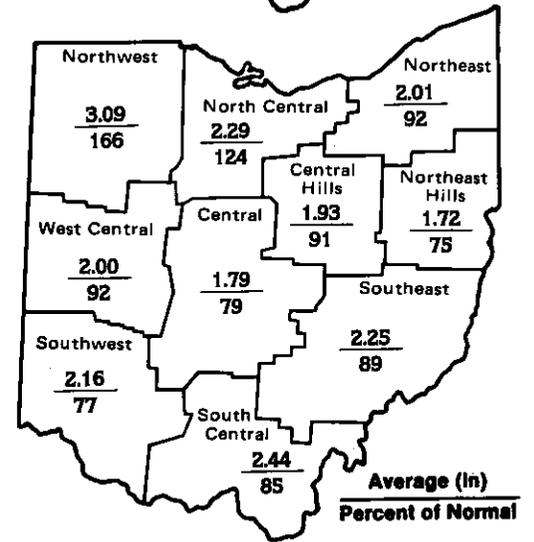
Then came the THAW! We generally experience a thaw in the latter part of January, but this year it started around the 18th of February and was accompanied by sizeable amounts of rain on the 22nd. The resulting runoff throughout the state produced widespread minor flooding as well as some major flooding in the northwest and north central portions augmented by ice jamming. The thaw also provided for substantial recharge to water supplies throughout the state. However, the total effects of this recharge cannot be evaluated until sometime in March.

Cumulative precipitation for the first two months of the 1985 calendar year continues to be below normal throughout most of the state. The only exception is in the Northwest region where it remains above normal. The average for the state as a whole is 3.78 inches, 1.27 inches below normal. Regional averages range from 4.89 inches, 0.80 inch above normal, for the Northwest region to 2.98 inches, 2.12 inches below normal, for the Northeast Hills region.

Cumulative precipitation for the first five months of the 1985 water year continues to be above normal throughout most of the state; the only exception being the Northeast Hills region where it remains 0.83 inches below normal. Regional averages range from 15.99 inches, 1.94 inches above normal, for the South Central region to 11.90 inches, 0.85 inch above normal, for the North Central.



Amount (in)



Average (in)
Percent of Normal

receive substantial recharge from the snowmelt and added precipitation. The net result should be continued improvement in the ground-water supply situation during the remaining months of the recharge season.

SUMMARY

Precipitation for February was slightly below normal throughout the state. The usual "January thaw" came in the latter part of February. The resulting runoff produced minor flooding in many areas and major flooding in the northwest, and significant increases in reservoir storage. The resulting recharge is expected to improve ground-water storage in the ensuing month. Lake Erie level continues to rise, producing near-record high levels which may cause some shore erosion problems this summer.

NOTES AND COMMENTS

HIGH COURT CHANGES APPROACH TO GROUND WATER

In 1982, 26 property owners in Franklin County filed suit against American Aggregates Corp., claiming that ground-water pumping at the firm's limestone quarries had affected their home water wells.

Lower courts, based upon Ohio's long-standing common law rule (*Frazier V. Brown—1861*), decided in favor of American Aggregates. Under this standard, a property owner cannot be sued for dewatering a neighbor's well as long as there was no malicious intent. However, in December 1984, the Ohio Supreme Court reversed the decision of the Court of Appeals and stated that the case should be returned to the lower court and judged on the doctrine of "reasonable use."

This is a radically different doctrine for resolving ground-water disputes in Ohio. The Supreme Court did not provide a definition of "reasonable use" and undoubtedly this issue will be cause for many legal actions in the future.

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

THE GROUND-WATER RESOURCE OF LAWRENCE AND GALLIA COUNTIES by James J. Schmidt.

THE GROUND-WATER RESOURCES OF MORGAN AND WASHINGTON COUNTIES by Alfred C. Walker.

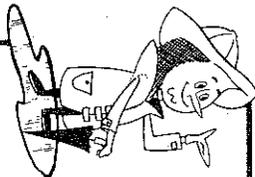
These maps are two of a series which have been completed for 47 counties in the state thus far. The maps are designed as a guide to locating new ground-water supplies or as an aid for planning the expansion of present water supply systems. They will be useful to homeowners, ground-water consultants, engineers, regional planners and developers.

The maps are available for \$2.50 each plus \$.14 tax and \$.75 mailing charge from the Publications Center, Ohio Department of Natural Resources, Fountain Square, Bldg. B-1, Columbus, Ohio 43224. Checks or money orders should be made payable to the ODNR Publications Center.

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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.



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MARCH 1985

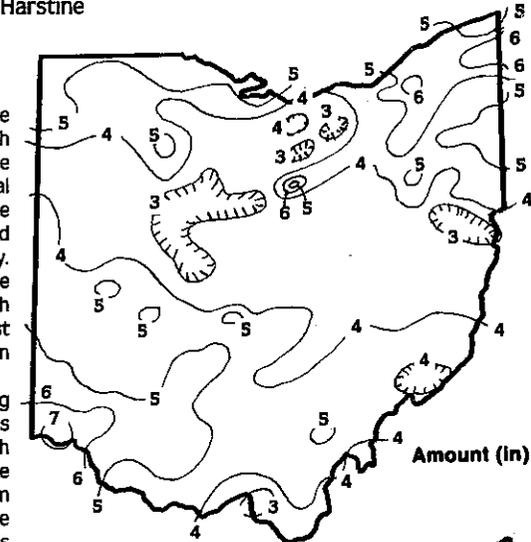
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DIVISION OF WATER

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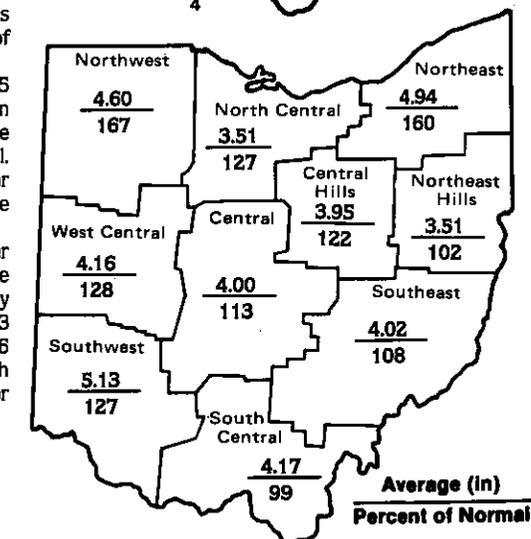


PRECIPITATION for March was above normal throughout most of the state for the first time this year; the only exception was in the South Central region where it was slightly below normal. The average for the state as a whole was 4.20 inches, 0.79 inch above normal. Regional averages ranged from 5.13 inches, 1.10 inches above normal, for the Southwest region to 3.51 inches for both the North Central and Northeast Hill regions, 0.74 inch and 0.08 inch above normal respectively. Departures from normal for the month ranged from 1.86 inches above normal for the Northeast region to 0.06 inch below normal for the South Central region. Fernbank, Hamilton County, reported the greatest amount of precipitation for the month, 7.14 inches, and Marion, Marion County, reported the least amount, 2.02 inches.

Although there were measureable amounts of precipitation during every week of the month, generally more than half of the month's precipitation fell on the last three days. Heavy storms occurred in both the northeast and southwest portions of the state on the night of the 28th. This March will be remembered for having a near-record minimum amount of snow in most areas. Water supplies benefitted greatly in the first half of the month from the delayed recharge from last month's snowmelt and continued benefits should be forthcoming from the end of the month precipitation.

Cumulative precipitation for the first three months of the 1985 calendar year continues to be below normal in the central and southern portions of the state and above normal in the northern portion. The average for the state as a whole is 7.94 inches, 0.52 inch below normal. Regional averages range from 9.50 inches, 2.65 inches above normal, for the Northwest region to 6.43 inches, 2.10 inches below normal for the Northeast Hills region.

Cumulative precipitation for the first six months of the 1985 water year remains noticeably above normal for most areas of the state; the only exception is in the Northeast Hills region where it remains slightly below normal. The average for the state as a whole is 17.69 inches, 1.73 inches above normal. Regional averages range from 20.59 inches, 2.56 inches above normal, for the Southwest region to 15.37 inches, 0.81 inch below normal, for the Northeast Hills region. Cumulative precipitation for the Northwest region is 3.24 inches above normal.



SUMMARY

Precipitation for March was above normal throughout the state for the first time this year. Reservoir storage, stream-flow and ground-water storage are near normal in most areas. Lake Erie mean level rose markedly and is near a record high for the month.

NOTES AND COMMENTS

LAKE ERIE LEVEL NEAR RECORD HIGH

Lake Erie water levels have been noticeably above normal for the past several years. During the last six months the lake level has remained unusually high and in the past month it rose to a near-record high for the second time in 12 years. The level March 31 was 573.30 feet above IGLD (1955), approaching the all-time daily high level of 573.82 feet in June 1973.

The high lake levels have resulted from above-normal precipitation over the entire Great Lakes basin since 1970. Annual precipitation has been noticeably above normal in 10 of the past 12 years. Surpluses in precipitation for the Lake Erie basin have ranged from 1.67 inches above normal in 1976 to 5.51 inches above normal for 1981. Cumulative precipitation for the past four years has been 13.27 inches above normal. This prolonged period of above-normal precipitation has not allowed the lake level to decline to more normal levels. Instead, it has resulted in near-record high levels in four of the five Great Lakes.

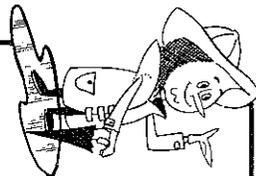
These high lake levels alone are enough to produce severe problems along the shoreline of the lake. During severe storm events, increased shore erosion and inundation of low-lying properties along the lake are caused by high wave action from strong winds. Compounding the problem is the fact that Lake Erie lies on a southwest-northeast axis, the direction of prevailing winds. Strong winds along this axis will produce considerable shifting and building up of lake water to one end of the lake or the other. During storm events with sustained high winds from the northeast, a tremendous buildup of water occurs in the Toledo area of the lake and produces levels 2 to 5 feet above the current mean level. During these periods, wave action causes severe damage to the shoreline areas.

During the periods of low lake levels in the 30s and the 60s, considerable development took place close to the shoreline without considering that lake levels would eventually rise to higher levels. Because of this development, millions of dollars of damage to property has occurred during the past 15 years as a result of the higher lake levels. Continued higher lake levels will result in these damages being multiplied many times over during ensuing months.

ACKNOWLEDGEMENTS

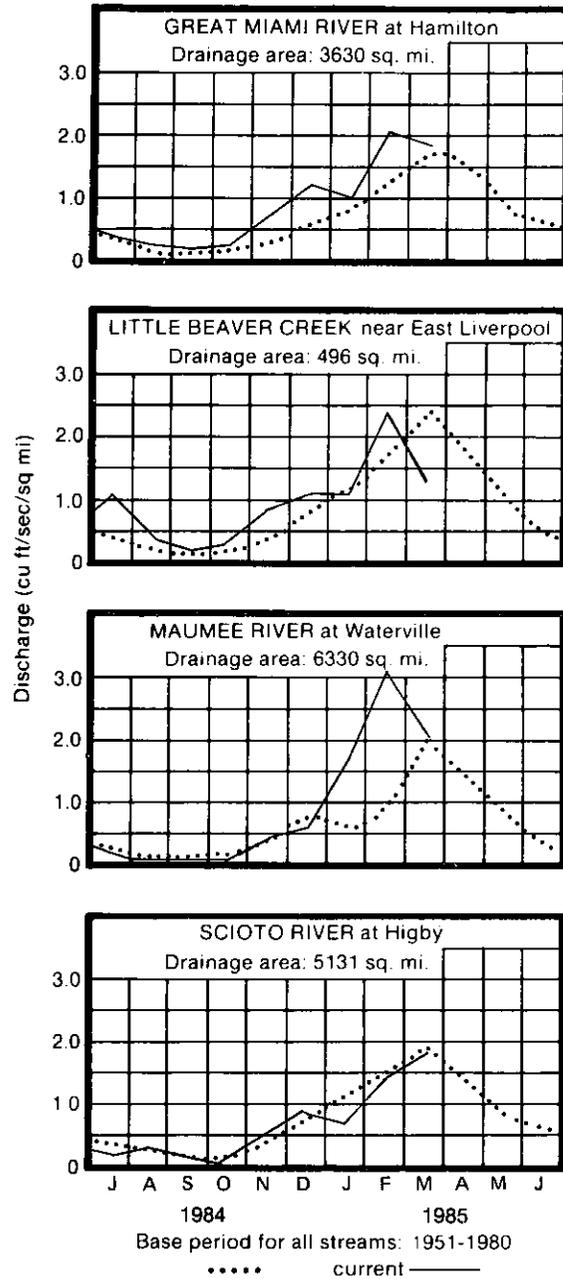
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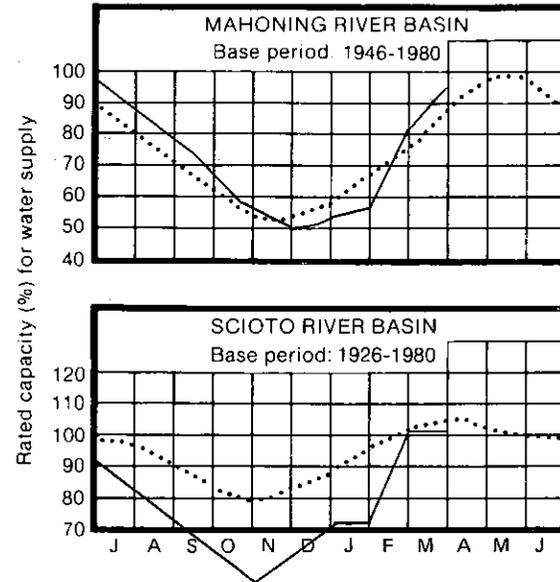


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MEAN STREAM DISCHARGE



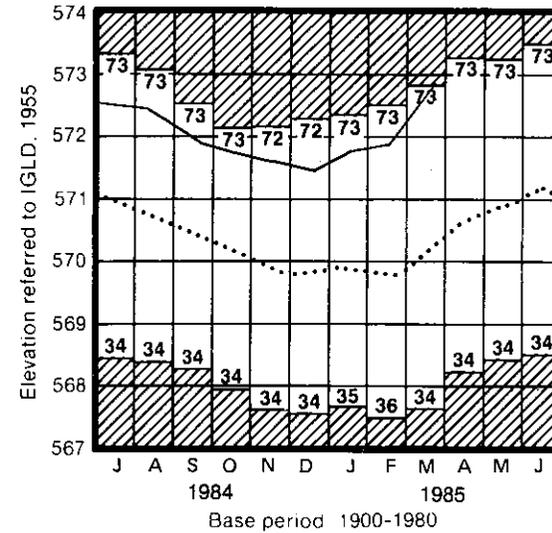
RESERVOIR STORAGE FOR WATER SUPPLY



RESERVOIR STORAGE for water supply for March increased significantly in the Mahoning River basin and showed only slight increases in the Scioto River basin. Storage in both basins showed noticeable increases during the last two days of the month in response to the heavy rains the 28th and 29th. Reservoir storage was above normal in the Mahoning River basin and slightly below normal in the Scioto River basin. Reservoir storage at the month end for the Mahoning basin index reservoirs was 96 percent of rated capacity for water supply compared to 81 percent for last month and 101 percent for March 1984. Storage at the month end for the Scioto basin index reservoirs was 102 percent of rated capacity for water supply compared to 101 percent for last month and 106 percent for March 1984. Upground reservoirs for water supply are reported to be full at the month end.

STREAMFLOW for March declined during the month and was generally about normal. Flows were generally excessive during the first half of the month as a result of the heavy runoff during the last 10 days of February, but decreased and were deficient during the last half. Mean discharge and percent of normal at the index gaging stations were: Great Miami River, 6,642 cfs, 109 percent; Little Beaver Creek, 663 cfs, 55 percent; Maumee River, 13,615 cfs, 107 percent; Scioto River, 9,435 cfs, 97 percent. Cumulative runoff and departures from normal for the first six months of the 1985 water year at the index gaging stations were: Great Miami River, 7.99 inches, 1.76 inches above normal; Little

LAKE ERIE LEVELS

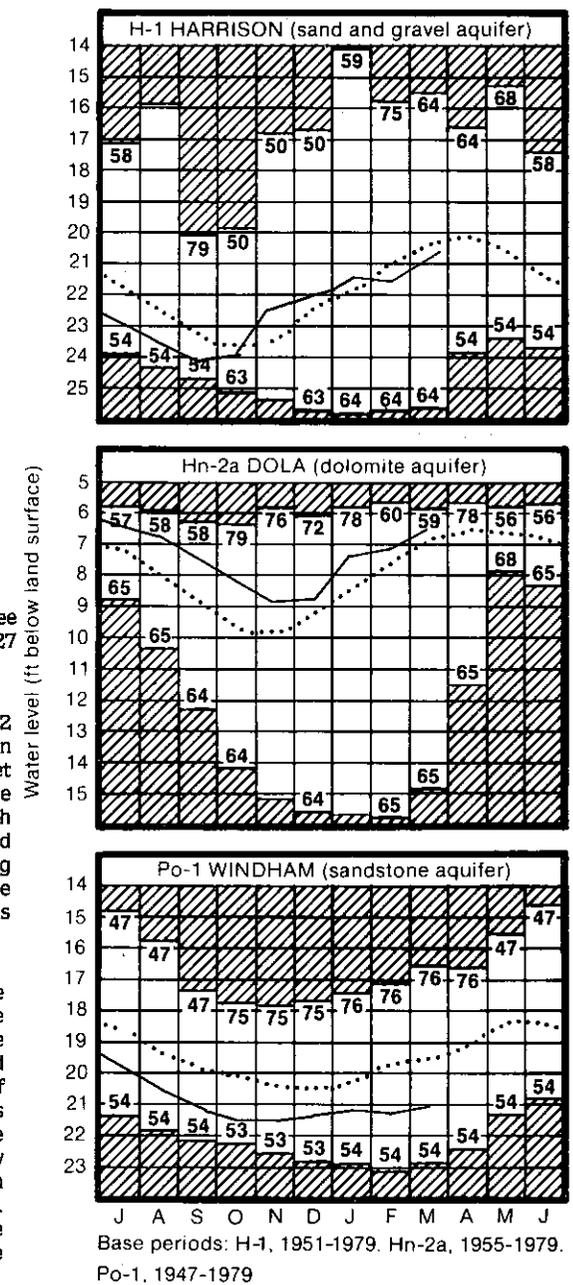


Beaver Creek, 7.84 inches, 0.43 inch below normal; Maumee River, 9.11 inches, 2.80 inches above normal; Scioto River, 6.27 inches, 0.46 inch below normal.

LAKE ERIE level rose markedly during March and was only 0.02 foot below the record-high mean set for March in 1973. The mean level for March was 572.86 feet above IGLD (1955), 104 feet above last month's mean level and 2.81 feet above normal. The mean level is 0.81 foot above the mean level observed for March 1984 and 4.26 feet above Low Water Datum. The near-record high lake level has already caused considerable problems along the shoreline and promises to produce more problems in the ensuing months. **Note:** Further discussion of the high lake levels appears on the last page of this report.

GROUND-WATER LEVELS for March rose throughout the month in consolidated aquifers in response to delayed recharge from last month's thaw while in unconsolidated aquifers they rose during the first half of the month and declined during the second half. Water levels showed a net rise for the month in all areas of the state. Ground-water levels were noticeably above those levels observed last month; however, they were generally below those levels observed for March 1984. Ground-water levels are generally below normal for most areas of the state, the exception being in the northwest portion of the state where they are above normal. Ground-water storage remains satisfactory throughout the state and continued improvements should be forthcoming during the remainder of the recharge season.

GROUND-WATER LEVELS





Richard F. Celeste
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APRIL 1985

MONTHLY WATER INVENTORY REPORT FOR OHIO

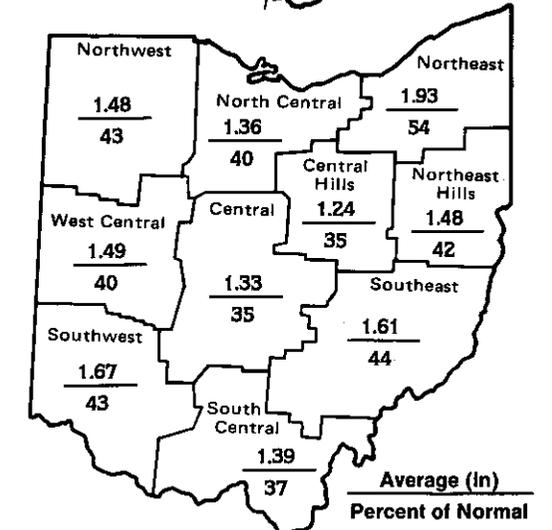
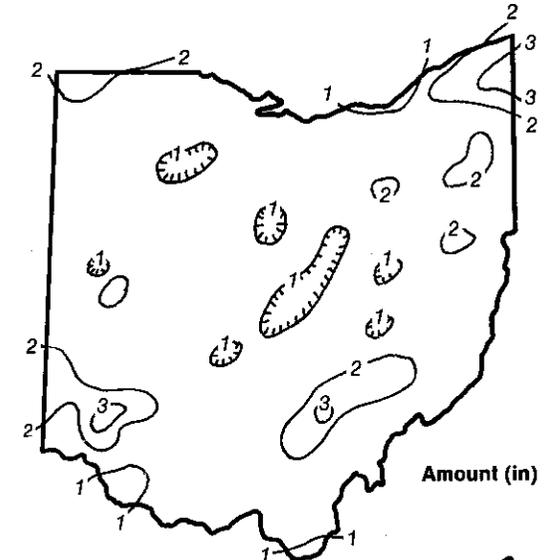
Compiled by Leonard J. Harstine

PRECIPITATION for April fell markedly below normal throughout the state. The average for the state as a whole was 1.50 inches, 2.12 inches below normal—the third lowest state average for April in this century. Previous record lows occurred in both April 1915 and 1962 (1.43 inches). Regional averages ranged from 1.93 inches, 1.63 inches below normal, for the Northeast region to 1.24 inches, 2.33 inches below normal, for the Central Hills region. The Central region showed the greatest departure, 2.46 inches below normal. Andover, Ashtabula County, reported the greatest amount of precipitation for the month, 3.97 inches, and Norwich, Muskingum County, reported the least amount, 0.41 inch.

The bulk of the month's precipitation fell during the first 15 days while generally only small amounts of 0.10 inch or less were recorded in the last 15 days. Generally, most of the state received between 1 and 2 inches of precipitation for the month. Exceptions of 2 inches or more were observed at several locations in the northwest, northeast and the southwest. A few isolated stations reported less than 1 inch; however, no reports of record low amounts were reported, although the 0.41 inch at Norwich is probably a record for that station which does not have a long record. The effects of the extremely low precipitation for April cannot be determined at this time. However, it could have a serious effect on the water supply situation as the summer progresses.

Cumulative precipitation for the first four months of the 1985 calendar year continues to be noticeably below normal for most areas of the state; the only exception is in the Northwest region where it is above normal. The average for the state as a whole is 9.44 inches, 2.64 inches below normal. Regional averages range from 10.98 inches, 0.72 inch above normal, for the Northwest region to 7.91 inches, 4.11 inches below normal, for the Northeast Hills region.

Cumulative precipitation for the first seven months of the 1985 water year remains above normal for the Northwest, Northeast, West Central and Southwest regions and is below normal in the remaining six regions. The average for the state as a whole is 19.19 inches, 0.39 inch below normal. Regional averages range from 22.26 inches, 0.39 inch above normal, for the Southwest region to 16.78 inches, 0.43 inch below normal, for the North Central region. Departures from normal range from 1.31 inches above normal for the Northwest region to 2.82 inches below normal for the Northeast Hills region.



NOTES AND COMMENTS

NEW PUBLICATIONS

The Division of Water announces the availability of the following new publications:

THE GROUND-WATER RESOURCES OF CHAMPAIGN COUNTY by James J. Schmidt.

THE GROUND-WATER RESOURCES OF JACKSON AND VINTON COUNTIES by Alfred C. Walker.

The Water Inventory Section of the ODNr's Division of Water has produced ground-water resource maps for 50 of Ohio's 88 counties in a continuing program to map the entire state. Staff geologists, who have had many years of experience with interpreting the hydrogeology of the state, prepare these maps of regional ground-water characteristics based on interpretations of water well drilling records and the area's geology. The maps include well log data for many point locations which are representative of the specific areas. The maps also have detailed information normally shown on topographic maps such as elevation contours, streams, roads, towns and cities.

These maps can help interested parties find the quantity of water desired. They can be used to locate new ground-water supplies or as an aid for planning the expansion of present water supply systems. They will be useful to homeowners, ground-water consultants, engineers, regional planners and developers.

Maps have been published for the following counties: Allen, Ashland, Ashtabula, Auglaize, Clark, Columbiana, Crawford, Cuyahoga, Defiance, Delaware, Fairfield, Franklin, Gallia, Geauga, Hancock, Hardin, Harrison, Henry, Holmes, Knox, Lake, Lawrence, Licking, Logan, Lorain, Mahoning, Marion, Medina, Mercer, Miami, Morgan, Morrow, Pickaway, Portage, Richland, Ross, Sandusky, Seneca, Shelby, Stark, Summit, Trumbull, Union, Van Wert, Washington, Wayne and Wyandot.

The maps are available for \$3.50 each plus \$.20 tax and \$1.25 mailing charge from the Publications Center, Ohio Department of Natural Resources, Fountain Square, Bldg. B-1, Columbus, Ohio 43224. Checks or money orders should be made payable to the ODNr Publications Center.

DELTA RESERVOIR DEDICATED

April 28 William M. Denihan, assistant director, Ohio Department of Natural Resources, representing Ohio Department of Natural Resources Director Lt. Gov. Myrl H. Shoemaker joined with Bernard Spangler, Mayor of Delta, and other elected officials to dedicate the jointly funded multipurpose, off-stream reservoir that will serve the eastern Fulton County area. Delta's new upground reservoir contains 400 million gallons of water pumped from nearby Bad Creek. The surface area, which is 50 acres, with boat launching facilities, a parking area and potable water should provide an enviable mecca for public recreation. The water supply, which more than quadruples the water previously available to the area, should result in an incentive for favorable economic development for the area.

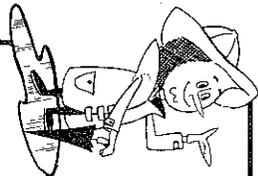
We join Assistant Director Denihan in congratulating the citizens of Delta on their farsightedness and perseverance to realize the completion of this fine water development project. This is the 10th off-stream reservoir recommended in the Northwest Ohio Water Development Plan to be completed with state and local funding arrangements.

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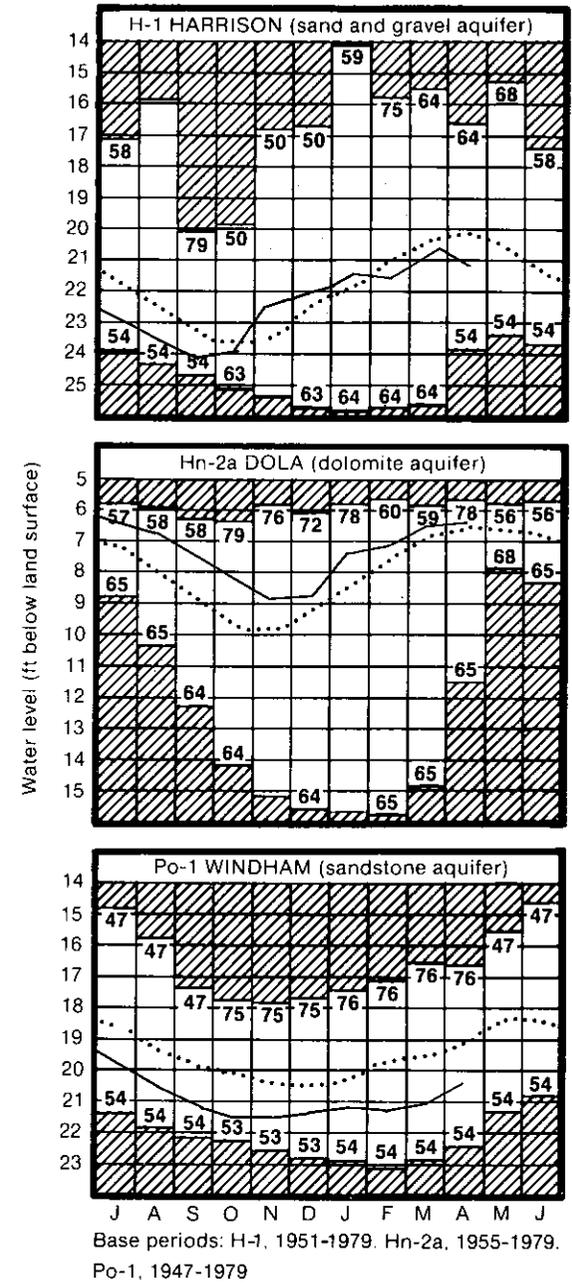
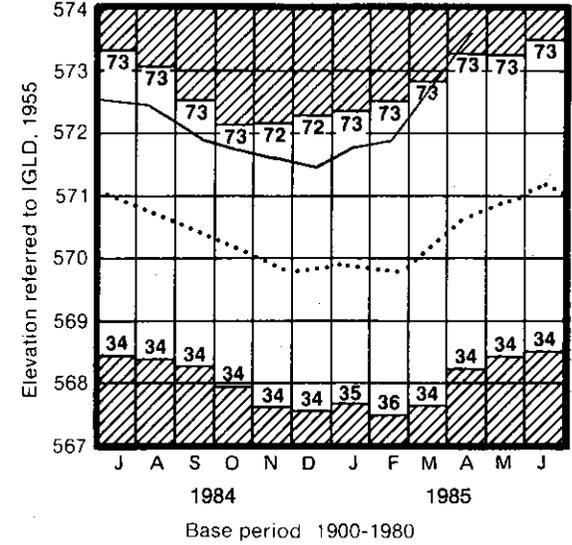
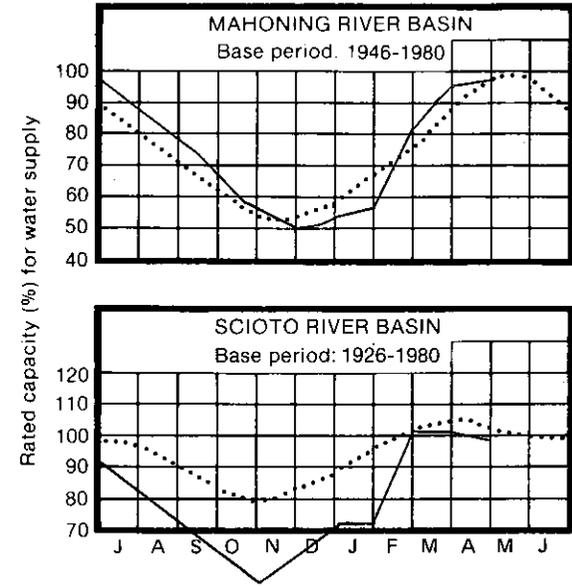
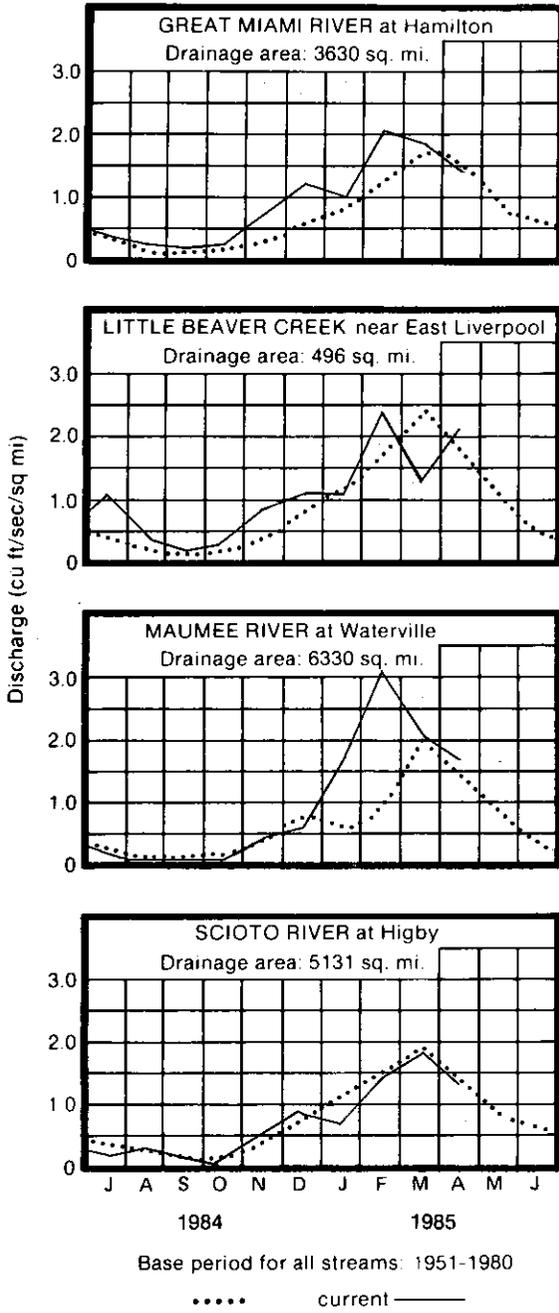
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MEAN STREAM DISCHARGE

RESERVOIR STORAGE FOR WATER SUPPLY

LAKE ERIE LEVELS

GROUND-WATER LEVELS



RESERVOIR STORAGE for April increased slightly and remained above normal in the Mahoning River basin and decreased slightly to remain below normal in the Scioto River basin. The heavy rains at the end of March helped maintain the near-normal storage in both index basins. Reservoir storage at the month end for the Mahoning basin index reservoirs was 98 percent of rated capacity for water supply compared to 96 percent for last month and 99 percent for April 1984. Storage at the month end for the Scioto basin index reservoirs was 99 percent of rated capacity for water supply compared to 102 percent for both last month and April 1984.

STREAMFLOW for April was near normal throughout the state. Flows throughout the state were excessive during the first 10 days in response to the heavy rains during the last three days of March. Following this, flows throughout the state decreased because of the lack of precipitation and were deficient during the last 10 to 15 days of the month. Flows at the month end equalled those usually observed in June. Mean discharge and percent of normal at the index gaging stations were: Great Miami River, 5,149 cfs, 92 percent; Little Beaver Creek, 1,001 cfs, 109 percent; Maumee River, 10,658 cfs, 113 percent; Scioto River, 6,784 cfs, 91 percent.

LAKE ERIE rose significantly and set a record high monthly mean level for April. The mean level for April was 573.50 feet (IGLD 1955), 0.20 foot above the previous record set for April 1973 and only 0.01 foot below the all-time high set in June 1973. The lake level is 0.64 foot above last month's mean level, 2.89 feet above normal, 1.17 feet above the level observed for April 1984 and 4.90 feet above Low Water Datum. These high lake levels, discussed extensively in last month's report, may cause considerable problems along the lakeshore in the ensuing months.

GROUND-WATER LEVELS for April showed normal rises in consolidated aquifers, while in unconsolidated aquifers water levels rose during the first 10 days and declined throughout the remainder of the month. Water levels throughout most of the state showed net rises for the month despite the lack of recharge; the only exception was observation well H-1 near Harrison, Hamilton County, which showed a net decline for the month. Water levels throughout the state remained below those levels observed in April 1984. The below-normal groundwater levels have only two exceptions: observation wells Hn-2a at Dola, Hardin County, and Fr-10 at Columbus OSU Farms, Franklin County, where water levels have been above normal for the water year thus far.

The below-normal precipitation for April precludes any expectation for much improvement in the ground-water storage situation during the current recharge season. Therefore, it can be expected that the below-normal ground-water levels, which generally decline throughout the summer months, may possibly approach record-low levels by the end of the water year. It would be wise for those depending on ground water for their water supplies to monitor their situations closely and plan accordingly.

SUMMARY

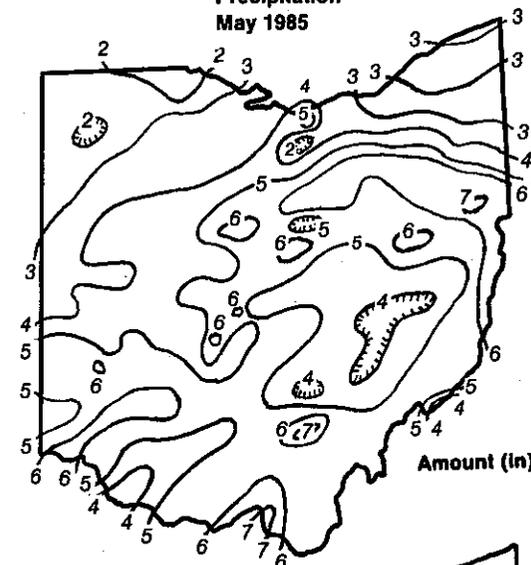
Precipitation for April was noticeably below normal and was the third lowest of record for April in this century. Streamflow and reservoir storage remained about normal while ground-water storage was generally below normal. The water supply situation remains favorable throughout the state despite the near record low precipitation. However, the lack of precipitation this month may have a dramatic effect on the water supply situation during the ensuing months.

May 1985

DIVISION OF WATER

MONTHLY WATER INVENTORY REPORT FOR OHIO

Precipitation
May 1985

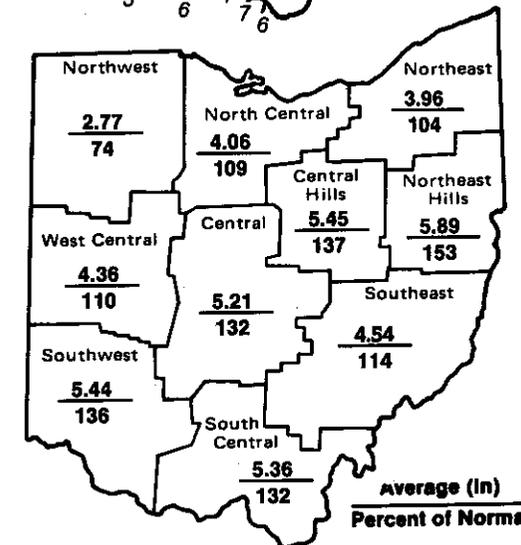


PRECIPITATION for May was above normal throughout most of the state; the only exception was in the Northwest region where it was below normal. The average for the state as a whole was 4.70 inches, 0.79 inch above normal. Regional averages ranged from 5.89 inches, 2.04 inches above normal, for the Northeast Hills region to 2.77 inches, 0.97 inch below normal, for the Northwest region. McArthur, Vinton County, reported the greatest amount of precipitation for the month, 7.47 inches, and Defiance, Defiance County, reported the least amount, 1.89 inches.

Substantial amounts of precipitation fell during every week of the month. The precipitation occurred mostly as thunderstorms with great variations in amounts. A severe storm pattern passed through the state on the evening of the 31st producing devastating tornadoes in Ashtabula, Columbiana, Licking and Trumbull counties. The distribution of precipitation followed the general pattern for the state being heaviest in the south-southeast and diminishing toward the north-northwest. The above-normal precipitation in May was beneficial to both water supplies and agriculture. It produced noticeable recharge to water supplies in May which improved the current water supply situation, which remains favorable throughout the state. However, if precipitation should be noticeably deficient during the summer months, the water supply situation could change.

Cumulative precipitation for the first five months of the 1985 calendar year remains below normal throughout the state. The average for the state as a whole is 14.14 inches, 1.85 inches below normal. Regional averages range from 15.78 inches, 2.12 inches below normal, for the Southwest region to 12.73 inches, 1.30 inches below normal, for the North Central region. Departures from normal ranged from 2.78 inches below normal for the Southeast region to 0.25 inch below normal for the Northwest region.

Cumulative precipitation for the 1985 water year improved slightly in response to the above normal precipitation in May and was above normal for most of the state; exceptions were in the North Central and Northeast Hills regions where it remains below normal. The average for the state as a whole is 23.89 inches, 0.40 inch above normal. Regional averages range from 27.70 inches, 1.83 inches above normal, for the Southwest region to 20.84 inches, 0.08 inch below normal, for the North Central region.



SUMMARY

Precipitation for May was above normal for most of the state. Devastating tornadoes occurred on the 31st in Ashtabula, Columbiana, Licking and Trumbull counties. Reservoir storage remains near normal throughout the state while streamflow was above normal in the central, southwest and south central portions of the state and noticeably below normal elsewhere. Ground-water storage was above normal in consolidated aquifers and below normal in unconsolidated aquifers. Lake Erie level declined slightly, but set a record high for the second consecutive month.

NOTES AND COMMENTS

Synopsis of data sources for this report:

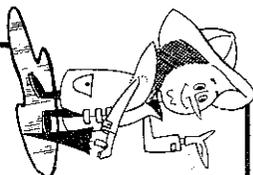
PRECIPITATION data used in this report in addition to that collected by the Ohio Department of Natural Resources Division of Water are furnished by the following organizations: U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Weather Service Flood Forecasting Center at Cleveland Hopkins Airport; Charleston, W.Va.; Ann Arbor, Mich.; Pittsburgh, Pa.; Louisville, Ky.; and the NOAA River Forecast Center at Cincinnati; the NOAA First Order weather stations at Akron-Canton Airport, Cincinnati Airport at Covington, Ky.; Columbus Airport, Dayton Airport, Toledo Express Airport and Youngstown Airport; and numerous local National Weather Service observers who mail their reports directly to a central collection center at Ashville, N.C. Additional data are also provided by the following: the Northeast Ohio Sewer District, Cleveland; the Agricultural Weather Center at Purdue University, West Lafayette, Ind.; the Miami Conservancy District at Dayton; and the U.S. Army Corps of Engineers, Muskingum area at Dover, Pittsburgh District, Pittsburgh, Pa.; Huntington District, Huntington, W.Va.; and Corps of Engineers River Forecast Center at Cincinnati.

These data are used for drawing the isohyetal map and in computing the regional averages published on the first page of this report. Percent of normal data are based on normals for climatic divisions as published by the U.S. Department of Commerce in its publication, "Climatology of the United States No. 85," Monthly Averages of Temperature and Precipitation for State Climatic Divisions 1941-70.

ACKNOWLEDGEMENTS

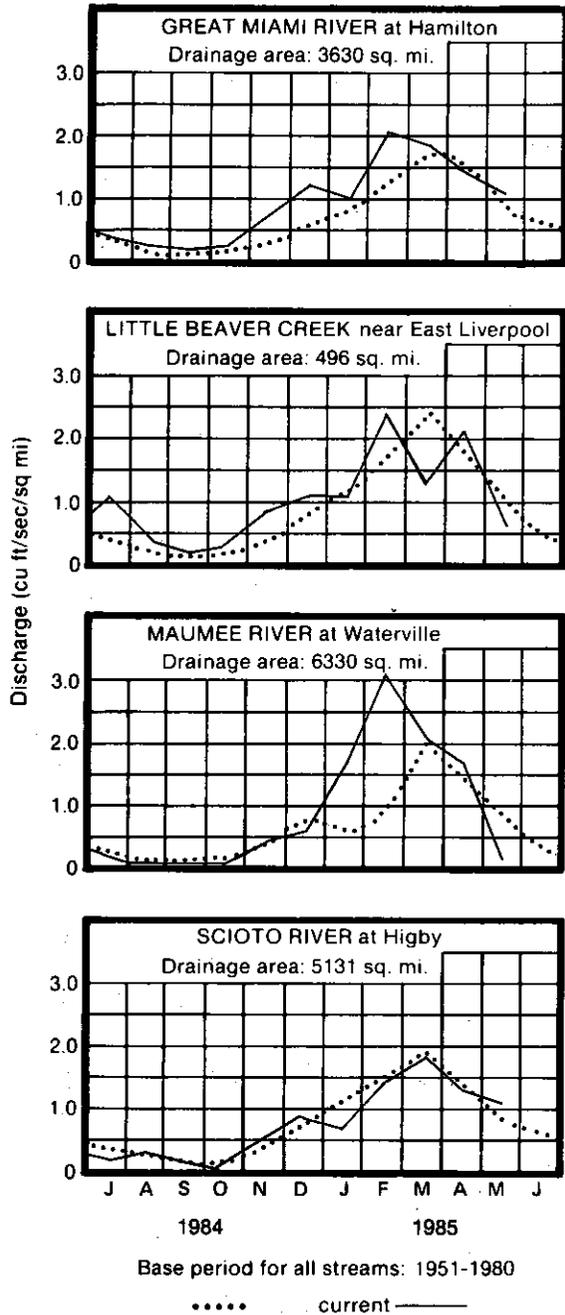
This report has been compiled from Division of Water data and from information supplied by the following:

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.

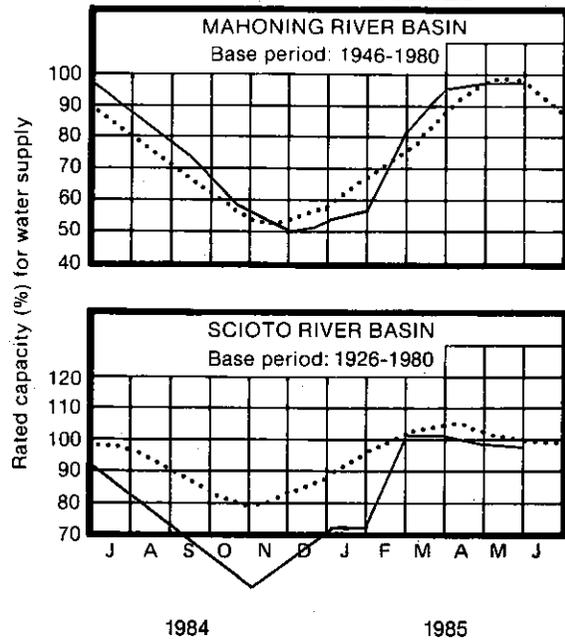


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MEAN STREAM DISCHARGE



RESERVOIR STORAGE FOR WATER SUPPLY

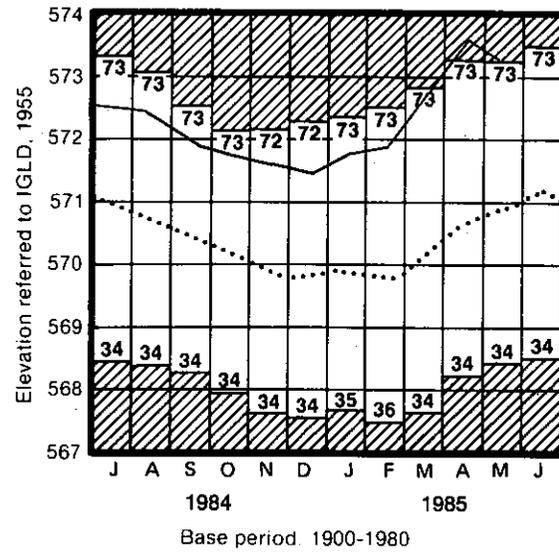


RESERVOIR STORAGE for water supply for May remained the same as last month in both the Mahoning River and the Scioto River basins and was slightly below normal. The above-normal precipitation in May in both basins helped to maintain these near-normal storages. Reservoir storage at the month end for the Mahoning basin index reservoirs was 98 percent of rated capacity for water supply compared to the same for last month and 101 percent for May 1984. Storage at the month end for the Scioto basin index reservoirs was 98 percent of rated capacity for water supply compared to 99 percent for last month and 102 percent for May 1984.

STREAMFLOW for May was nearly normal for the central, southwest and south central portions of the state and noticeably below normal elsewhere. Flows for the Little Beaver Creek and the Maumee River were deficient at the beginning of the month due to the below normal precipitation in April and continued to be deficient throughout most of May even though precipitation was at or above normal. Generally, flows for May were more like those usually expected in June in most areas of the state.

Mean discharge and percent of normal at the index gaging stations were: Great Miami River, 3,986 cfs, 129 percent; Little Beaver Creek, 282 cfs, 49 percent; Maumee River, 1,255 cfs, 25 percent; Scioto River, 5,742 cfs, 122 percent.

LAKE ERIE LEVELS

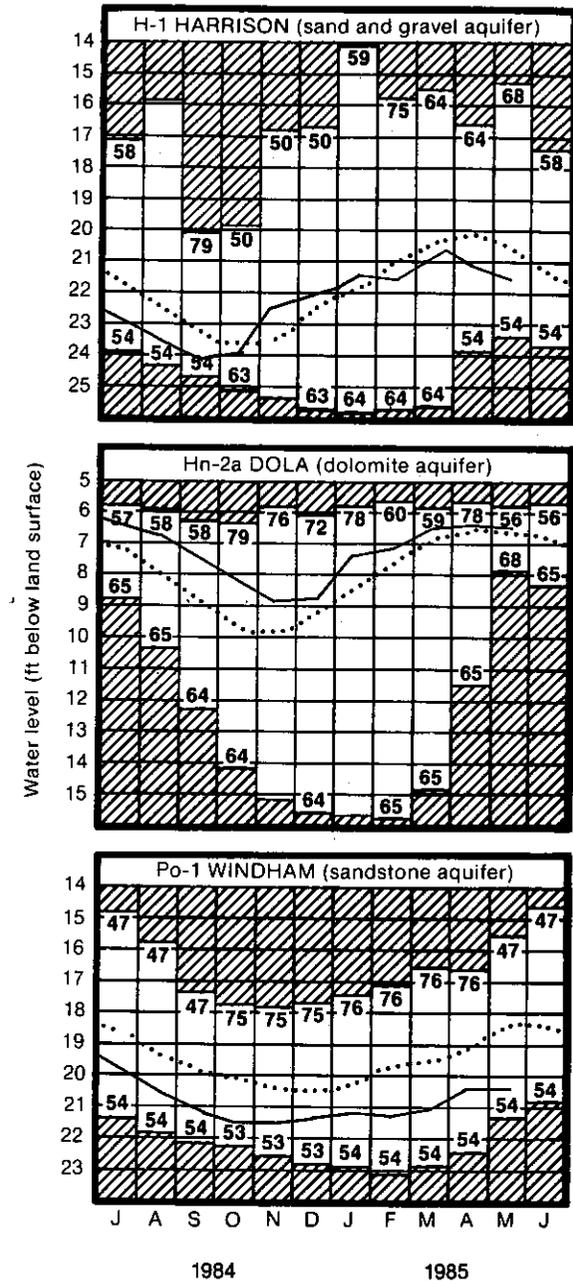


LAKE ERIE level declined slightly during the month, but set a new record high monthly mean level for May. This is the second consecutive month that a new monthly high record has been established. The mean level for May was 573.29 feet (IGLD 1955), 0.21 foot below last month's mean level and 2.37 feet above normal. The lake level is 1.05 feet above the level observed for May 1984 and 4.69 feet above Low Water Datum. The lake level is expected to be near record highs through September.

GROUND-WATER LEVELS for May showed moderate declines during the month in most areas of the state. This indicates that substantial recharge to ground-water storage resulted from the above normal precipitation. However, net declines from last month's levels were generally greater than those usually observed. Ground-water levels throughout the state were below those levels observed last month and for May 1984. Water levels are above normal in consolidated aquifers and below normal in unconsolidated aquifers. The water level in observation well Tu-1 at Strasburg, Tuscarawas County, is near the record low mark; however, in this case it has not reached a critical level.

Ground-water storage in general remains favorable for most areas of the state. The above normal precipitation this month produced sufficient recharge in most cases; thus, storage at the month end was about the same as that observed at the beginning of the month.

GROUND-WATER LEVELS



Base periods: H-1, 1951-1979. Hn-2a, 1955-1979. Po-1, 1947-1979



Richard F. Celeste
Governor

Joseph J. Sommer
Director



June 1985

DIVISION OF WATER

MONTHLY WATER INVENTORY REPORT FOR OHIO

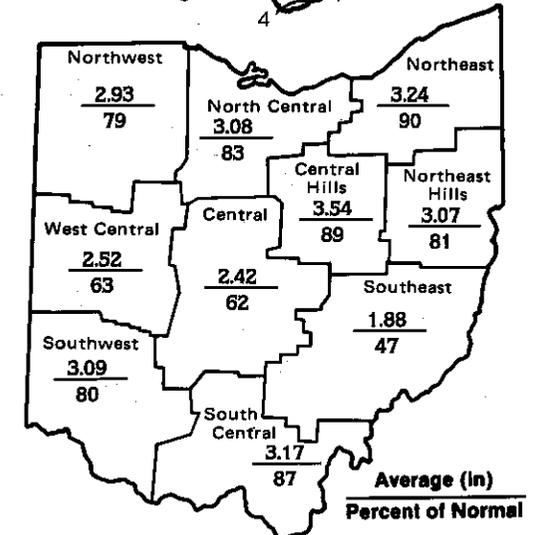
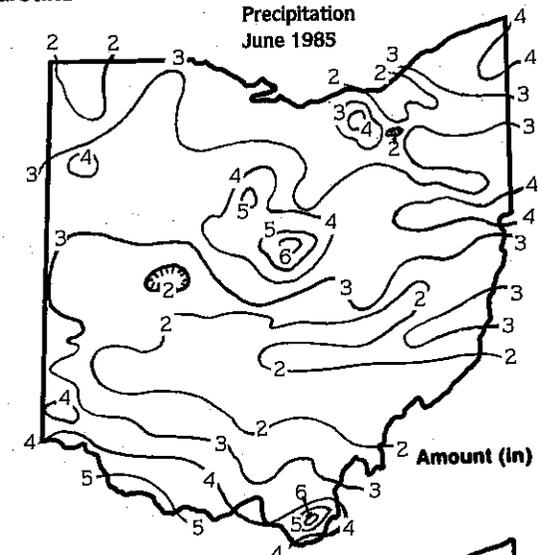
Compiled by Leonard J. Harstine

PRECIPITATION for June was noticeably below normal throughout the state. The average for the state as a whole was 2.89 inches, 0.93 inch below normal. Regional averages ranged from 3.54 inches, 0.44 inch below normal, for the Central Hills region to 1.88 inches, 2.10 inches below normal, for the Southeast region. Fredericktown, Knox County, reported the greatest amount for the month, 6.20 inches, and Arnesville, Athens County, reported the least amount, 1.29 inches.

The bulk of the month's precipitation fell during the first three weeks in the form of light thundershowers; the only exception was in the southern portion of the state where a storm produced about 0.5 inch of rain over a narrow path from Cincinnati to Gallipolis on the 30th. Greatest amounts of precipitation for the month occurred in the northeast and southwestern portions of the state which reported amounts from 3 to 6 inches. Most areas of the state received between 2 and 3 inches and a sizeable portion of the south central portion received between 1 and 2 inches. The generally dry weather conditions were accompanied by below-normal temperatures which tended to relieve the stress on agriculture, but gave little assistance to the water supply situation.

Cumulative precipitation for the first six months of the 1985 calendar year continues to be below normal throughout the state. The average for the state as a whole is 17.03 inches, 2.78 inches below normal, for the Southwest region to 15.81 inches, 1.92 inches below normal, for the North Central region. Departures from normal range from 4.88 inches below normal for the Southeast region to 1.05 inches below normal for the Northwest region.

For the first time in nine months, cumulative precipitation for the 1985 water year is generally below normal for most areas of the state; the only exceptions are in the Northeast, Southwest and South Central regions where it continues to be above normal. The average for the state as a whole is 26.78 inches, 0.53 inch below normal. Regional averages range from 30.79 inches, 1.05 inches above normal, for the Southwest region to 23.92 inches, 0.70 inch below normal, for the North Central region.



SUMMARY

Precipitation for June was noticeably below normal throughout the state. Streamflow, reservoir storage and ground-water storage in general showed normal declines but remained favorable in most areas of the state. Lake Erie level declined slightly but is expected to remain at its critically high level for the next several months.

NOTES AND COMMENTS

James J. Schmidt, an outstanding hydrogeologist with the Division of Water for almost 34 years, retired at the end of June. Schmidt, well known throughout the state for his expertise on ground-water geology, has prepared numerous publications on ground-water resources for many areas of the state. His publication, Bulletin 30, "Ground-Water Resources of Franklin County," is highly regarded among his colleagues. He also published 27 of the 52 county ground-water resources maps in a program to map the ground-water resources of Ohio by counties. Personnel of the Division of Water, along with his many friends and associates, wish him the best of everything in his retirement years.

NEW PUBLICATION

The Division of Water announces the availability of the following new publication:

THE GROUND-WATER RESOURCES OF ATHENS AND MEIGS COUNTIES by James J. Schmidt.

The Water Inventory Section of ODNR's Division of Water has produced ground-water resources maps for 52 of Ohio's 88 counties in a continuing program to map the entire state. Staff geologists, who have had many years of experience with interpreting the hydrogeology of the state, prepare these maps of regional ground-water characteristics based on interpretations of water well drilling records and the area's geology. The maps include well log data for many point locations which are representative of the specific areas. The maps also have detailed information normally shown on topographic maps such as elevation contours, streams, roads, towns and cities.

These maps can help interested parties find the quantity of water desired. They can be used to locate new ground-water supplies or as an aid for planning the expansion of present water supply systems. They will be useful to homeowners, ground-water consultants, engineers, regional planners and developers. A list of the counties for which maps are available was published in the May issue of this report.

The maps are available for \$3.50 each plus \$20 tax and \$1.25 mailing charge from the Publications Center, Ohio Department of Natural Resources, Fountain Square, Bldg. B-1, Columbus, Ohio 43224. Checks or money orders should be made payable to the ODNR Publications Center.

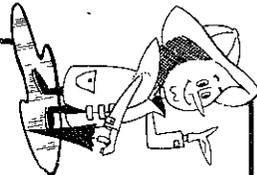
Synopsis of data sources for this report:

RESERVOIR STORAGE data are collected from various cooperating agencies by the U.S. Geological Survey, Water Resources Division, and furnished by them for this report. Base data are the total acre-feet of water contained in several storage reservoirs on the last day of each month in (1) the Mahoning River basin and (2) the Scioto River basin. These data are shown graphically in this report in percent of rated capacity for water supply. The rated capacities at the spillway level as used in this report represent 25 years of record for the Mahoning River basin index reservoirs and 45 years of record for the Scioto River basin index reservoirs.

ACKNOWLEDGEMENTS

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.



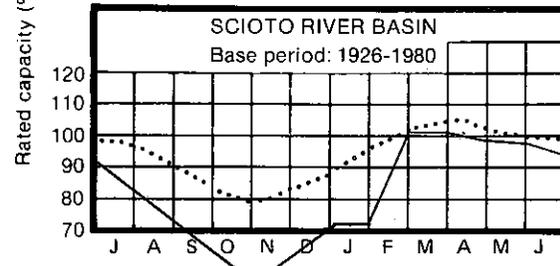
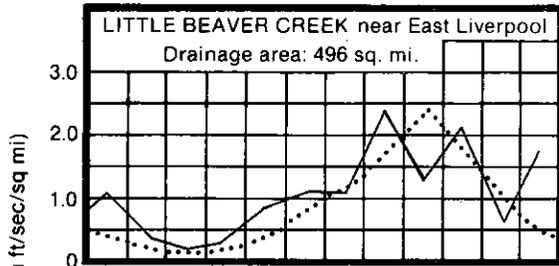
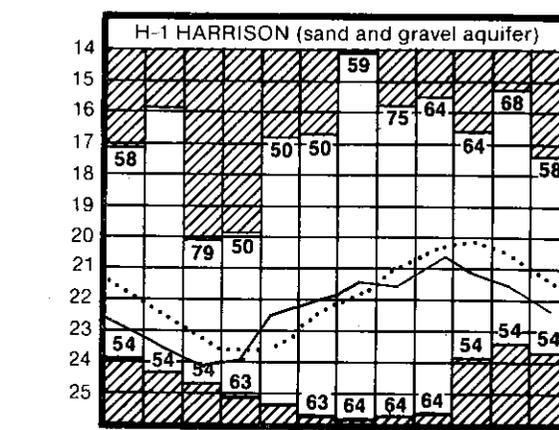
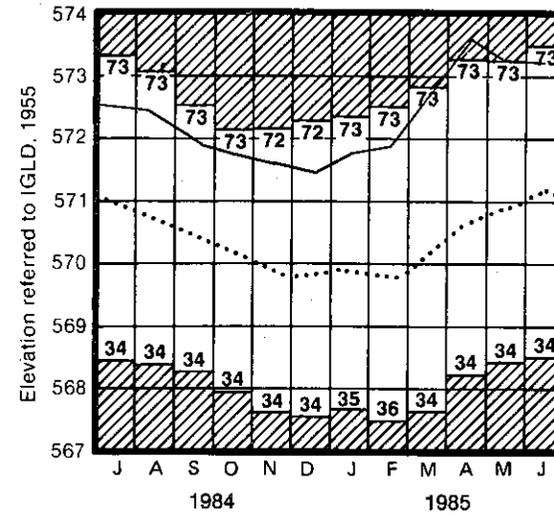
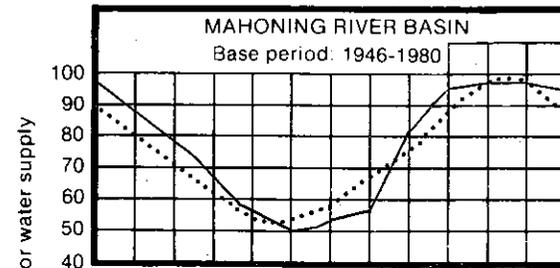
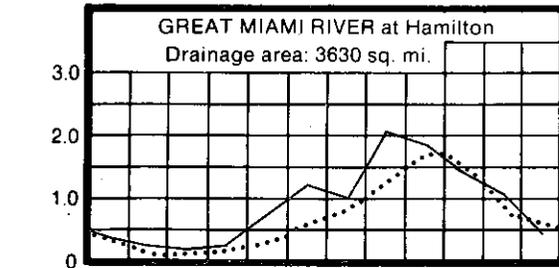
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MEAN STREAM DISCHARGE

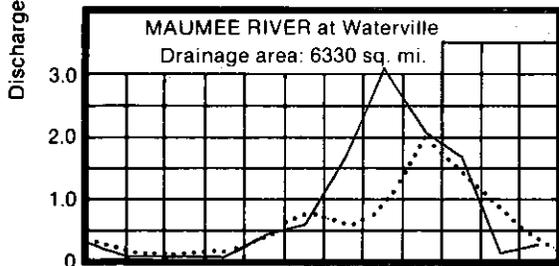
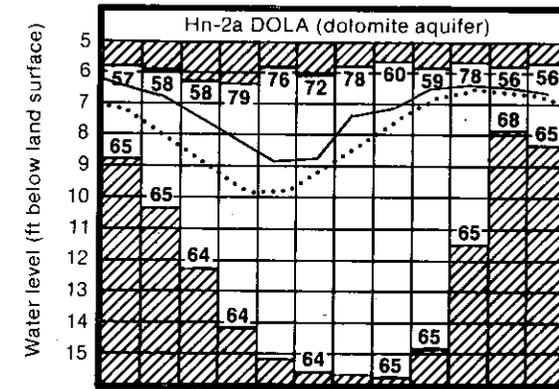
RESERVOIR STORAGE FOR WATER SUPPLY

LAKE ERIE LEVELS

GROUND-WATER LEVELS

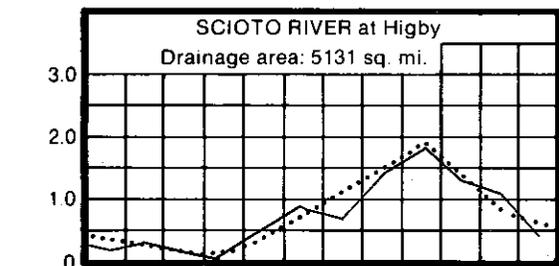
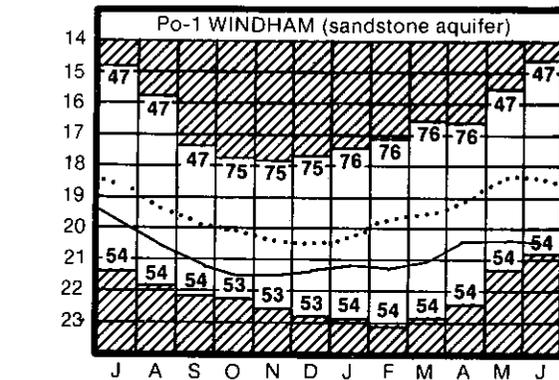


Base period 1900-1980



RESERVOIR STORAGE for water supply for June decreased slightly and was above normal for the Mahoning River basin while storage in the Scioto River basin declined moderately and remained below normal. Reservoir storage continues to be favorable throughout the state. Reservoir storage at the month end for the Mahoning basin index reservoirs was 95 percent of rated capacity for water supply compared to 98 percent for last month and 97 percent for June 1984. Storage at the month end for the Scioto basin index reservoirs was 92 percent of rated capacity for water supply compared to 98 percent for last month and 93 percent for June 1984.

LAKE ERIE level declined slightly during June and was 0.33 foot below the all time high level observed in June 1973 after recording new record high levels for both April and May. The mean level for June was 573.18 feet (IGLD 1955), 0.11 foot below last month's mean level and 2.13 feet above normal. The lake level is 0.63 foot above the level observed for June 1984 and 4.58 feet above Low Water Datum.



STREAMFLOW for June was normal for most areas of the state; the only exception was in the northeast where it was noticeably above normal. Although flows throughout the state were noticeably above normal at the beginning of the month and continued to be near normal for most of the month, they were noticeably below normal at the month end. Mean discharge and percent of normal at the index gaging stations were: Great Miami River, 1,584 cfs, 73 percent; Little Beaver Creek, 854 cfs, 288 percent; Maumee River, 2,197 cfs, 100 percent; Scioto River, 2,394 cfs, 79 percent.

GROUND-WATER LEVELS for June showed normal declines throughout most areas of the state. Net declines from last month's levels were nearly normal also. Ground-water levels throughout the state are below those levels observed last month and for June 1984; the only exception is observation well H-2 near Harrison, Hamilton County, where the water level is slightly above that observed at this time last year. Ground-water levels in general continue to be noticeably below normal in unconsolidated sand and gravel aquifers and above normal in consolidated rock aquifers. One exception is in observation well Po-1 at Windham, Portage County, representing a consolidated sandstone aquifer where the water level has been noticeably below normal for the past several years. Generally, ground-water storage for water supply remains favorable throughout the state.

Base period for all streams: 1951-1980

..... current ———

Base periods: H-1, 1951-1979. Hn-2a, 1955-1979. Po-1, 1947-1979

DIVISION OF WATER

MONTHLY WATER INVENTORY REPORT FOR OHIO

Compiled by Leonard J. Harstine

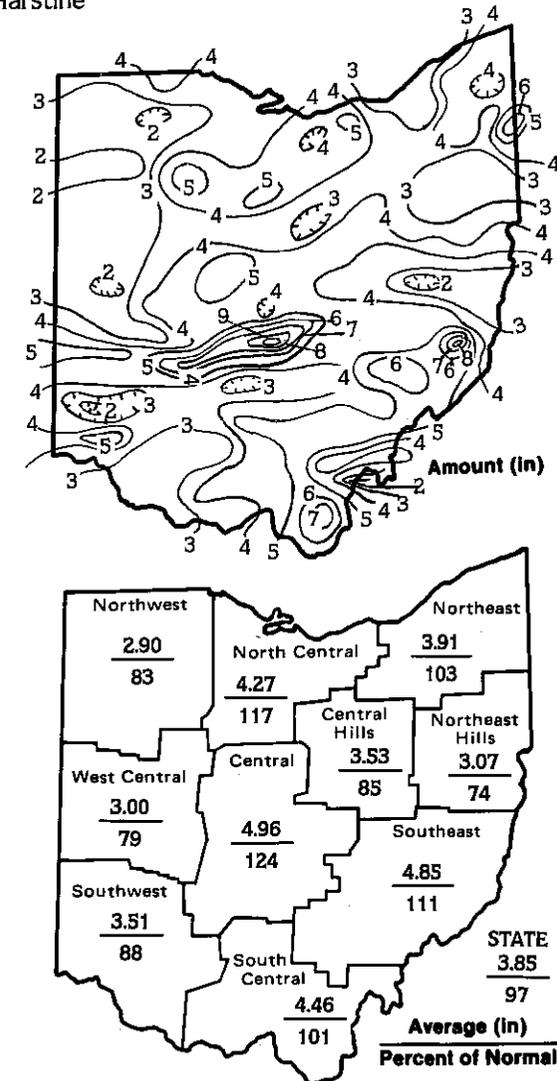
PRECIPITATION for July was generally above normal in the central and southeastern portions of the state and below normal elsewhere. The average for the state as a whole was 3.85 inches, 0.13 inch below normal. Regional averages ranged from 4.96 inches, 0.96 inch above normal, for the Central region to 2.90 inches, 0.61 inch below normal, for the Northwest region. Columbus (Parsons Avenue water treatment plant), Franklin County, reported the greatest amount of precipitation for the month, 9.46 inches, of which 5.70 inches fell in less than 12 hours on the 15th. Gallipolis, Gallia County, reported the least amount for the month, 1.74 inches.

The bulk of the month's precipitation was produced by local thunderstorms, some of which were extremely heavy and isolated throughout the state. It is significant to note that a number of storms producing from 5.0 to 6.5 inches of rain in 6- to 12-hour periods occurred at locations other than the National Weather Service observation stations. Storms producing more than 5.0 inches of precipitation were reported on July 1 at: Winton Woods Lake in northwest Cincinnati, Hamilton County; and Trotwood near Dayton, Montgomery County. The U.S. Army Corps of Engineers reports that 5.05 inches fell in one hour and 45 minutes at the Winton Woods Lake area. July 5, an intense storm produced 3.5 to 4 inches in a narrow band from Ingomar, Preble County to Dayton, Montgomery County in a two-hour period. Heavy storms the night of the 14th were reported at: Columbus, Reynoldsburg, Gahanna, and other areas in southeast Franklin County; Youngstown Airport and Niles area, Trumbull County; and Rokeby Lock and other areas in Morgan and Noble counties. Storms of these magnitudes have a recurrence of about one in 200 to 300 years or more.

These heavy storms have very little effect on the overall water supply situation. In general, the water supply situation showed no significant gains in most areas of the state but continues to be favorable.

Cumulative precipitation for the first seven months of the 1985 calendar year continues to be below normal throughout the state. The average for the state as a whole is 20.88 inches, 2.91 inches below normal. Regional averages range from 23.07 inches, 3.21 inches below normal, for the South Central region to 19.12 inches, 4.54 inches below normal, for the West Central region.

Cumulative precipitation for the 1985 water year is above normal for the Northeast, Northeast Hills and South Central regions and below normal elsewhere. The average for the state as a whole is 30.63 inches, 0.66 inch below normal. This is the second consecutive month for which cumulative precipitation has been below normal for this water year. Regional averages range from 34.40 inches, 0.23 inch above normal, for the South Central region to 27.36 inches, 1.07 inches below normal, for the Northwest region. Departures from normal range from 0.55 inch above normal for the Southwest region to 2.58 inches below normal for the Central Hills region.



SUMMARY

Precipitation for July was generally below normal throughout the state. Reservoir storage is above normal in the northeast and below normal in the central portion of the state. Streamflow remains about normal and ground-water storage is generally above normal in consolidated aquifers and below normal in unconsolidated aquifers. Lake Erie level declined slightly but continues to be markedly above normal. The water supply situation continues to be favorable throughout the state despite the below normal precipitation.

STREAMFLOW data are furnished by the U.S. Geological Survey, Water Resources Division, Columbus, Ohio. These data are for the following four key stream-gaging stations: (1) the Great Miami River at Hamilton, (2) the Little Beaver Creek near East Liverpool, (3) the Maumee River at Waterville, (4) the Scioto River at Higby. Mean discharge and percent of normal at the index gaging stations are reported on a monthly basis in the text of this report. Discharge in cubic feet per second per square mile of drainage area above the index gaging station is presented in graphical form in this report.

Since 1907, flow in the Scioto River has become increasingly affected by the construction of reservoirs on the main stem and several of its tributaries. The reservoirs and year completed are: Griggs, 1907; O'Shaughnessy, 1925; Delaware, 1951; Hoover, 1955; Deer Creek, 1968; Paint Creek, 1974; and Alum Creek, 1975. Normals as used in this report are based on the median for the reference period 1951-1980. More detailed data on streamflow records throughout the state can be obtained by contacting the U.S. Geological Survey, Water Resources Division, 975 W. Third Ave., Columbus, Ohio 43212. (Phone 614-469-5553).

NEW HYDROGEOLOGISTS ADDED TO STAFF

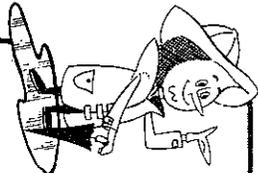
The Ohio Department of Natural Resources, Division of Water, Water Inventory Section, has added two hydrogeologists to its expanding staff. Mike Halffrisch, who hails from Stephenson, MI., is a graduate of Michigan Technological University and is completing graduate work at the University of Toledo. He joined the staff about a year ago. Don Calhoun III, a native of Columbus, Ohio, and a graduate of Ohio State University, comes to us with three years' experience as a geologist with other government and private agencies. Calhoun will be working to improve relations with drilling contractors in Ohio.

The division plans to increase its activities in ground-water investigation and mapping the ground-water resources of the state and educating the public on ground water in Ohio. The hydrogeologists strive to provide expert advice on ground-water availability and expected yields from the diversified aquifers of the state. Ground-water resources maps are available for 52 of Ohio's 88 counties for \$4.95 including tax and mailing charges from the ODNR Publications Center, Fountain Square, Columbus, Ohio 43224.

ACKNOWLEDGEMENTS

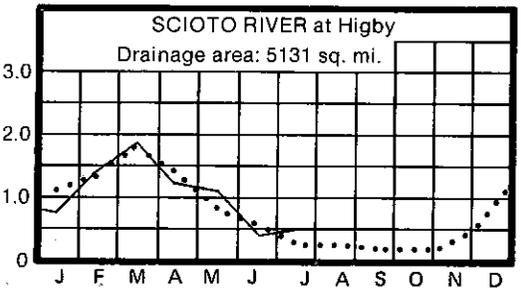
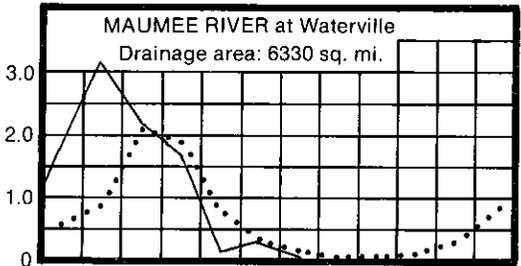
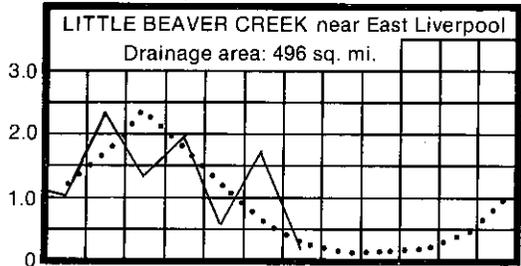
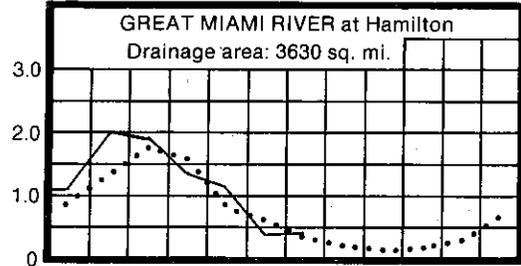
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 - U.S. Geological Survey, Water Resources Division.
 - Lake Erie level data:
 - U.S. Corps of Engineers, Detroit District.



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COLUMBUS, OHIO 43224

MEAN STREAM DISCHARGE

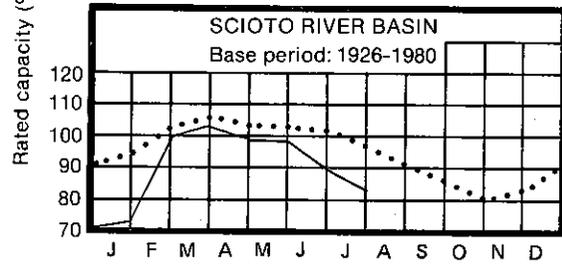
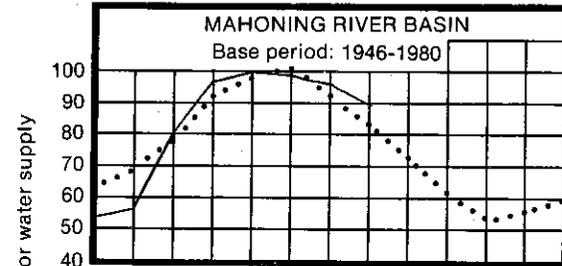


1985

Base period for all streams: 1951-1980

..... current ———

RESERVOIR STORAGE FOR WATER SUPPLY



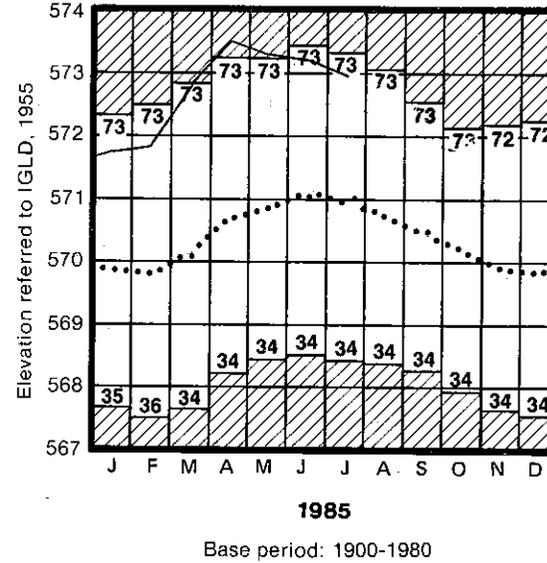
1985

RESERVOIR STORAGE for water supply declined but remained above normal in the Mahoning River basin and was below normal in the Scioto River basin. Thus far, reservoir storage for water supply continues to be favorable throughout the state. Reservoir storage at the month end for the Mahoning basin index reservoirs was 89 percent of rated capacity for water supply compared to 95 percent for last month and 89 percent for July 1984. Storage at the month end for the Scioto basin index reservoirs was 84 percent of rated capacity for water supply compared to 92 percent for last month and 82 percent for July 1984.

STREAMFLOW for July continues to be normal for most areas of the state; the only exception is in the northwest where it is slightly deficient. The Miami Conservancy District reports that the storm at Trotwood on July 1 resulted in the second highest stage of record, 12 feet, on Wolf Creek near Dayton. It also reported that the July 5 storm resulted in the third highest peak stage/discharge for Bear Creek near Ellerton.

Mean discharge and percent of normal at the index gaging stations were: Great Miami River, 1,511 cfs, 112 percent; Little Beaver Creek, 175 cfs, 83 percent; Maumee River, 739 cfs, 55 percent; Scioto River, 2,340 cfs, 139 percent.

LAKE ERIE LEVELS

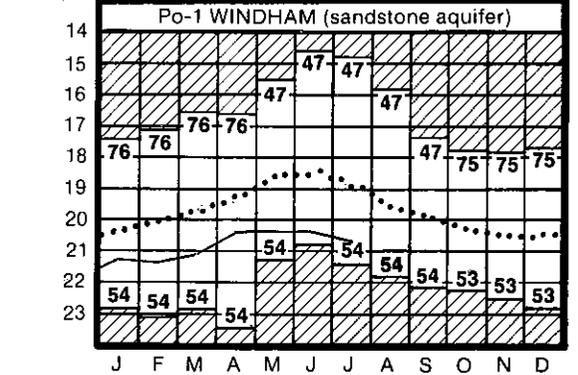
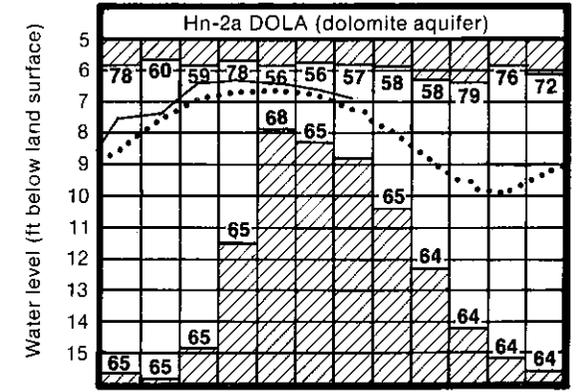
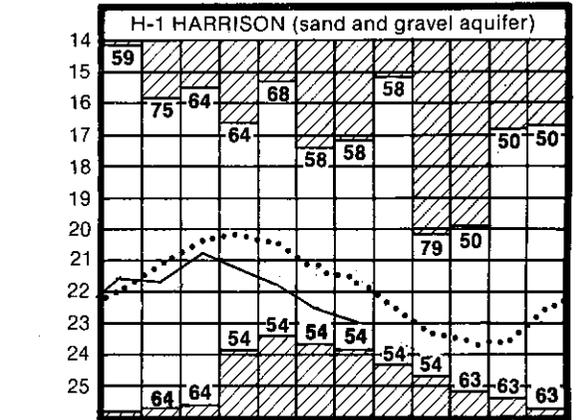


1985
Base period: 1900-1980

LAKE ERIE level declined slightly for the third consecutive month and was only 0.34 foot below the record high for July set in 1973. The mean level for July was 573.00 feet (IGLD 1955), 0.18 foot below last month's mean level, and 2.00 feet above normal. The lake level is 0.53 foot above the level observed for July 1984 and 4.40 feet above Low Water Datum.

GROUND-WATER LEVELS for July declined throughout the state. Net declines from last month's levels were about the same as those usually observed for July. Ground-water levels are below those levels observed for July 1984 and generally above normal in consolidated aquifers and noticeably below normal in unconsolidated aquifers. Although ground-water levels are noticeably below normal in some areas, ground-water storage for water supply continues to be favorable throughout the state.

GROUND-WATER LEVELS



1985

Base periods: H-1, 1951-1979. Hn-2a, 1955-1979. Po-1, 1947-1979

MONTHLY WATER INVENTORY REPORT FOR OHIO

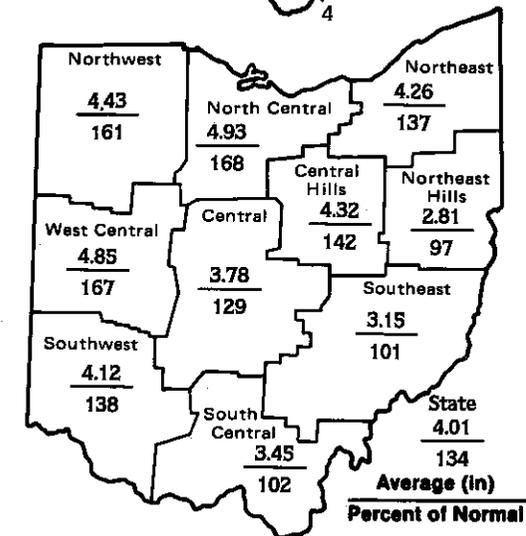
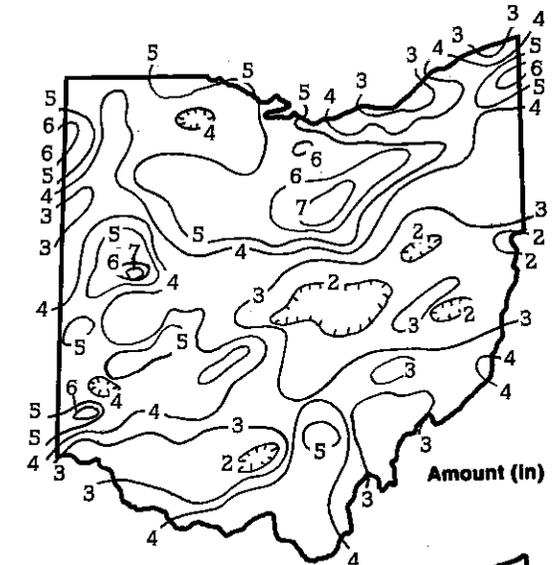
Compiled by Leonard J. Harstine

PRECIPITATION for August was above normal throughout most of the state; the only exception was in the Northeast Hills region where it was slightly below normal. The average for the state as a whole was 4.01 inches, 1.01 inches above normal. Regional averages ranged from 4.93 inches, 1.99 inches above normal, for the North Central region to 2.81 inches, 0.08 inch below normal, for the Northeast Hills region. Charles Mill Lake near Lucas, Richland County, reported the greatest amount of precipitation for the month, 7.86 inches; other stations reporting more than 7 inches were Ashland, Ashland County, 7.23 inches and Sidney, Shelby County, 7.45 inches. Alexandria, Licking County, reported the least amount for the month, 1.28 inches.

Precipitation for August came mostly in the form of widely scattered thunderstorms throughout the state. The bulk of the month's precipitation was produced by heavy storms on the 8th, 14th, 25th and 30th. Precipitation was generally heaviest north of a line running from Cincinnati through Columbus to Youngstown, with amounts ranging from 3.5 to almost 8 inches. Several areas in the western and north central portion of the state received more than 5.5 inches of precipitation, while a large area in the central portion received less than 2.0 inches. The above-normal precipitation in August helped to alleviate some of the stress on the overall water supply situation. Although there have been some reports of springs and marginal wells drying up, the water supply situation as a whole remains favorable throughout the state.

Cumulative precipitation is generally above normal in the northern portion of the state for the first time this year and continues to be below normal in the central and southern portions. The average for the state as a whole is 24.89 inches, 1.90 inches below normal. Regional averages range from 26.52, 3.14 inches below normal, for the South Central region to 22.75 inches, 3.95 inches below normal, for the Northeast Hills region. Departures from normal for the calendar year range from 0.69 inch above normal for the North Central region to 4.37 inches below normal for the Southeast region.

Cumulative precipitation for the 1985 water year is generally above normal for most areas of the state; exceptions are in the Northeast Hills and Southeast region where it continues to be below normal. The average for the state as a whole is 34.64 inches, 0.35 inch above normal. Regional averages range from 38.42 inches, 1.69 inches above normal, for the Southwest region to 31.69 inches, 2.66 inches below normal, for the Northeast Hills region.



SUMMARY

Precipitation for August was above normal for most of the state. Reservoir storage and streamflow continued to be near normal for most areas of the state, while ground-water storage was generally below normal. Lake Erie level declined but remained at a near record high level as has been the case for the past several months. The water supply situation continues to be favorable for most areas of the state.

**NOTES AND COMMENTS
OHIO WATER ADVISORY COUNCIL UPDATE**

The Ohio Water Advisory Council, established over a year ago by the General Assembly, has held three meetings this year, with its final meeting of 1985 scheduled for Nov. 13. During the Aug. 12 meeting at the Ohio State Fairgrounds, the council considered reports from two committees. The Water Well Data Management Committee, which is chaired by council member Dr. George Mayhew, has been looking into data storage and retrieval systems for the well logs that the Division of Water must keep on file. The committee decided that a microfilm storage system was the best means for dealing with well logs, in conjunction with a personal computer for recall of the data. Cost estimates for microfilming 1985 and future well logs have been determined. It is hoped all well logs will be computerized sometime in the future. Funding for this important activity is being sought from various sources.

The second committee, the Water Publications Committee, chaired by council member Marquita McLean, has been reviewing all water-related publications of state agencies. The committee report stressed the importance of a publication on the status of water in Ohio and suggested that inter-agency cooperation in producing such a publication would be important. The committee's next task is to look at the various sources of visual material on water in the state.

Council Chairman Bayliss L. "Rock" Prater asked the two committees to continue their work in these important areas.

GROUND-WATER RIGHTS SEMINAR SCHEDULED

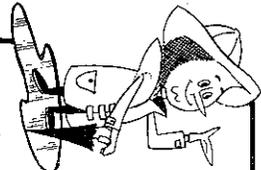
The Ohio Supreme Court recently reversed Ohio's long-standing rule that gave unlimited rights to landowners to withdraw ground water. The new rule, based on a "reasonable share" premise, remains largely undefined. Under the joint sponsorship of the Ohio Department of Natural Resources, the Water Management Association of Ohio, the Ohio State Bar Association, the National Water Well Association and the Ohio Alliance for the Environment, an all-day seminar will be held to seek mutual agreement on interpretation of the new ruling. Panelists will include representation from the Supreme Court, the Ohio State Bar Association, a well driller, and others. Dr. George Mayhew, president of the Ohio Drilling Company, will address the subject: "Defining, Computing and Claiming a Reasonable Share of Water." Questions and audience participation will be welcomed.

The seminar will be held Wednesday, Sept. 25, at the Hyatt Regency Columbus beginning at 9:30 a.m. Details about the seminar can be obtained from Al Walker, (614) 265-6744, or Art Woldorf, (614) 265-6757, ODNR Division of Water.

ACKNOWLEDGEMENTS

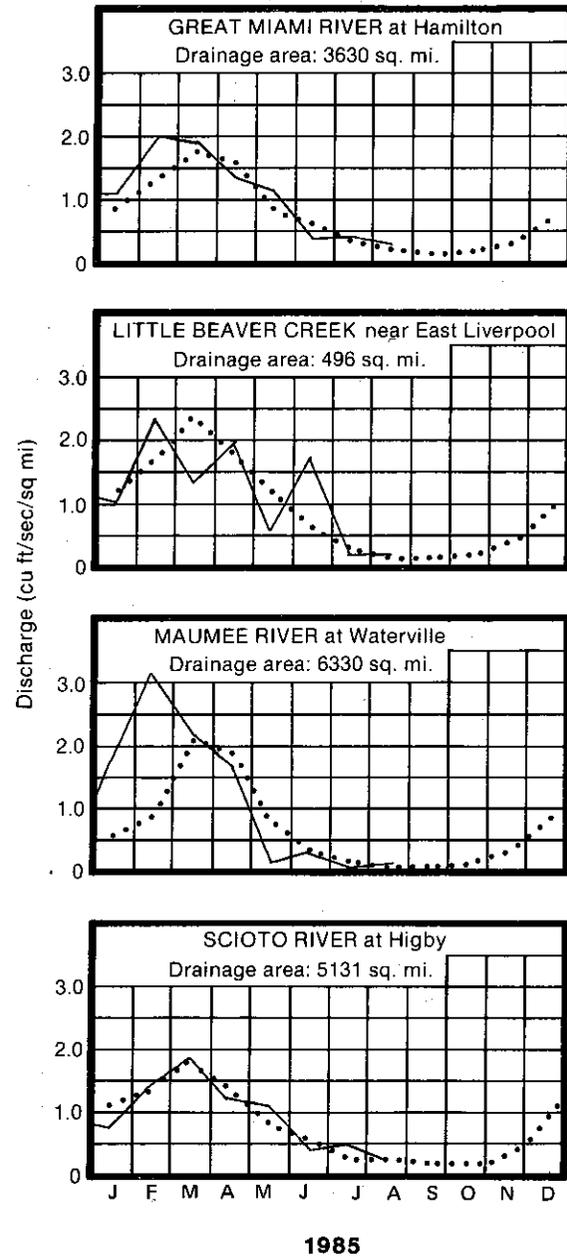
This report has been compiled from Division of Water data and from information supplied by the following:

- 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.

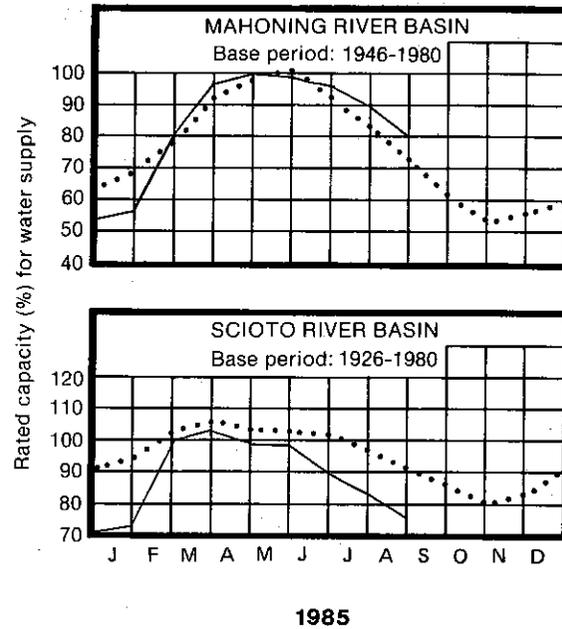


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FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

MEAN STREAM DISCHARGE



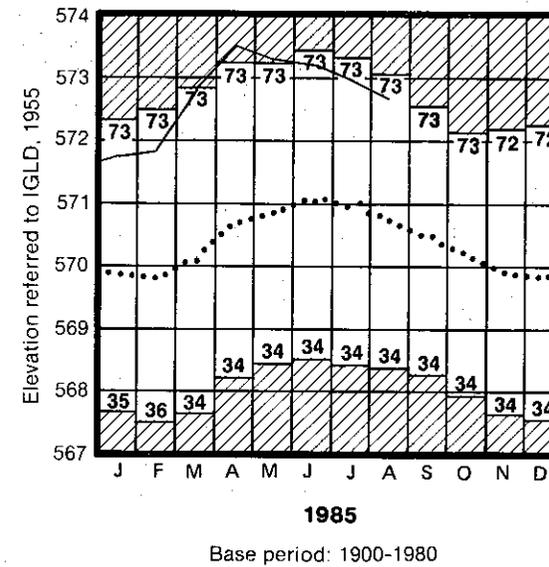
RESERVOIR STORAGE FOR WATER SUPPLY



RESERVOIR STORAGE for water supply showed normal declines for August in both the Mahoning River and the Scioto River basins. Storage remained above normal in the Mahoning River basin while it was noticeably below normal for the Scioto River basin. Reservoir storage for water supply continues to be favorable throughout the state. Reservoir storage at the month end for the Mahoning basin index reservoirs was 80 percent of rated capacity for water supply compared to 89 percent for last month and 79 percent for August 1984. Storage at the month end for the Scioto basin index reservoirs was 75 percent of rated capacity for water supply compared to 84 percent for last month and 72 percent for August 1984.

STREAMFLOW for August was normal throughout the state. Flows in the northern portion of the state showed slight improvements in response to the above-normal precipitation. Mean discharge and percent of normal at the index gaging stations were: Great Miami River, 1,009 cfs, 132 percent; Little Beaver Creek, 136 cfs, 124 percent; Maumee River, 857 cfs, 140 percent; and Scioto River, 956 cfs, 78 percent.

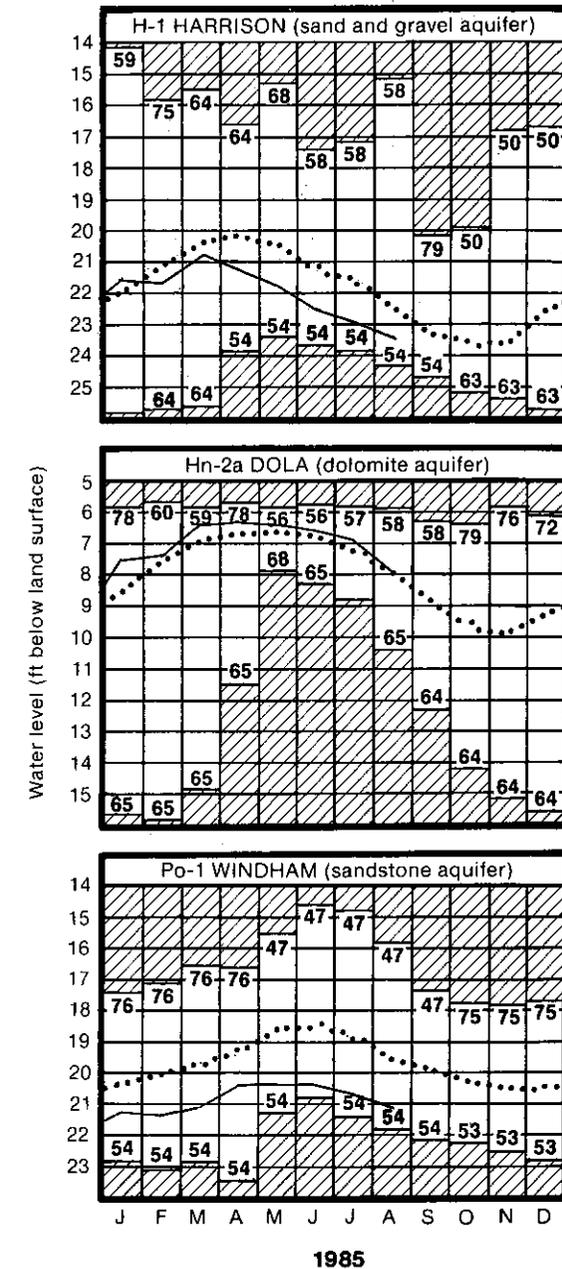
LAKE ERIE LEVELS



LAKE ERIE level continues to decline but is still only 0.36 foot below the record high level for August set in 1973. The mean level for August was 572.67 feet (IGLD 1955), 0.33 foot below last month's mean level and 1.86 feet above normal. The lake level is 0.40 foot above the level observed for August 1984 and 4.07 feet above Low Water Datum.

GROUND-WATER LEVELS for August showed noticeable declines throughout the state. Declines in consolidated aquifers were greater as a result of a delayed effect of the previous month's low precipitation. Net declines from last month's levels were less than usually observed. Generally, ground-water levels in consolidated aquifers are above those levels observed last year while they are noticeably below those levels in unconsolidated aquifers. An exception to this is in observation well H-1 near Harrison, Hamilton County, representing an unconsolidated aquifer where the water level is slightly above the level observed last year. Ground-water levels are generally below normal throughout the state except for observation wells Fa-1 near Washington C.H., Fayette County, and Fr-10 at OSU Farms, Franklin County, where the ground-water levels have been slightly above normal for several months. Ground-water storage for water supply remains favorable throughout most of the state.

GROUND-WATER LEVELS



SEPTEMBER 1985

DIVISION OF WATER

MONTHLY WATER INVENTORY REPORT FOR OHIO

Compiled by Leonard J. Harstine

PRECIPITATION

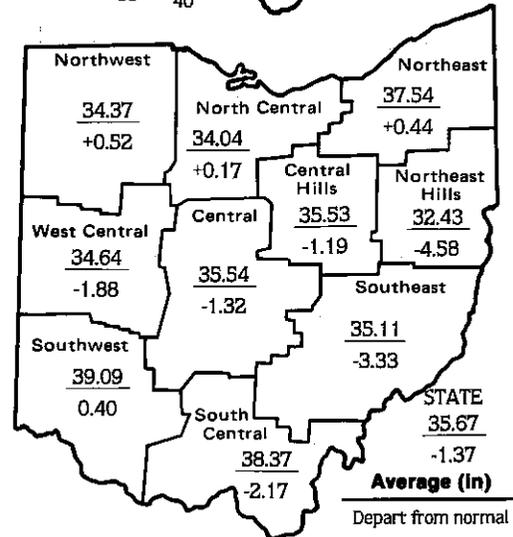
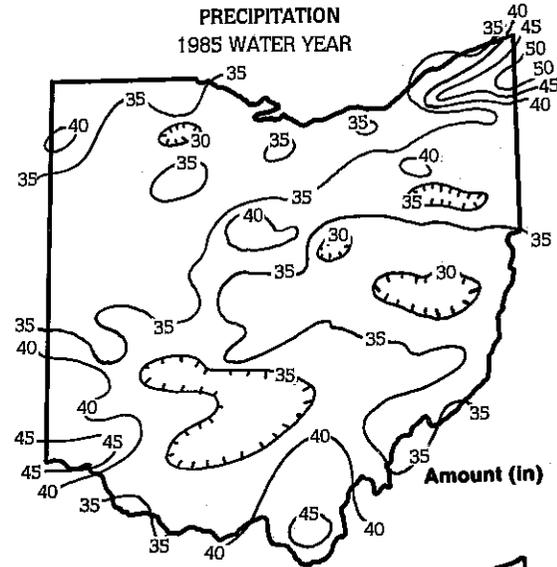
SEPTEMBER
1985

NOTES AND COMMENTS

MEXICO CITY EARTHQUAKE MAKES ITS MARK IN OHIO

The great Mexico City earthquake on Sept. 19, which measured 8.1 on the Richter scale, left its mark on the ground-waters of Ohio. Shock waves from an earthquake passing through the earth's crust compresses the aquifer causing water levels to fluctuate.

Observation well Vw-1 at the Marsh Foundation in Van Wert County showed a fluctuation of 0.5 foot. This compares to a fluctuation of 5.8 feet in the same well in response to the 1964 Anchorage, Alaska, quake that measured 8.4 on the Richter scale. The aftershock on the following day also recorded a fluctuation of 0.15 foot. Observation well DI-3 at Delaware Dam also registered the recent quake. During the past 40 years earthquakes have registered in numerous wells throughout the state.



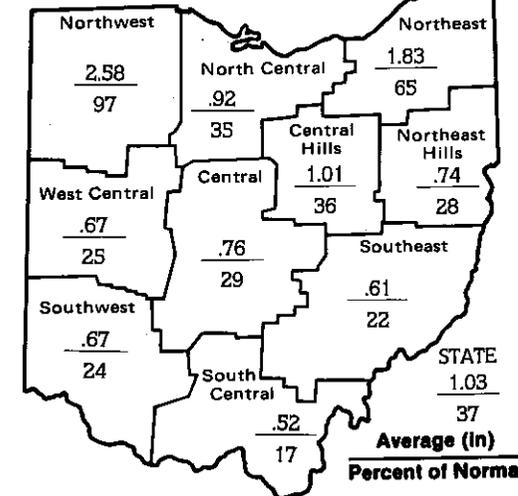
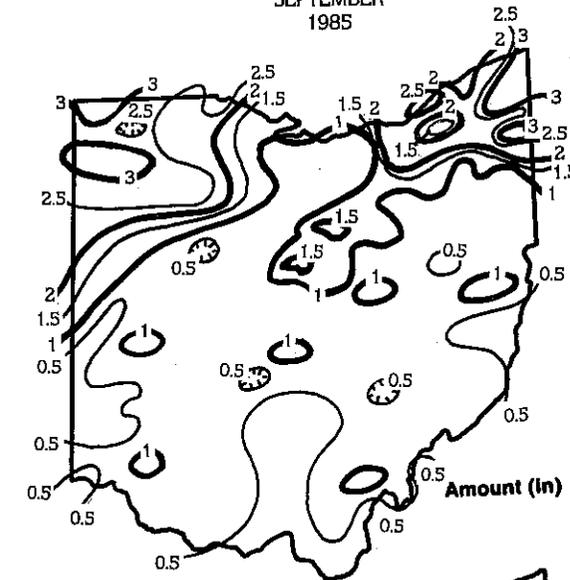
PRECIPITATION for September was below normal for most of Ohio; only a few stations in the northwestern and northeastern areas of the state reported amounts above normal for the month. This was the third driest September in this century and the fourth driest in 100 years. The average for the state as a whole was 1.03 inches, 1.72 inches below normal. Regional averages ranged from 2.58 inches, 0.08 inch below normal, for the Northwest region to 0.52 inch, 2.47 inches below normal, for the South Central region. Hicksville, Defiance County, reported the greatest amount of precipitation for the month, 3.54 inches and Belleville Locks and Dam near Reedsville, Meigs County, reported the least amount, 0.20 inch.

Generally, except for the northern portion of the state, the bulk of the month's precipitation came during the last week of the month. The northern portion of the state also received substantial amounts of precipitation during the first and second weeks of the month. Very little precipitation fell during the third week. More than two-thirds of the state received less than 1 inch of precipitation for the month. Despite the fact that it was a dry September, the water supply situation remained favorable throughout the state.

Cumulative precipitation for the 1985 calendar year continues to be below normal throughout the state. The average for the state as a whole is 25.92 inches, 3.62 inches below normal. Regional averages range from 27.17 inches, 4.35 inches below normal, for the Southwest region to 23.49 inches, 5.87 inches below normal, for the Northeast Hills region. Departures from normal range from 6.49 inches below normal for the Southeast region to 0.07 inch below normal for the Northwest region.

Precipitation for the 1985 water year was above normal for the northern portion of the state and below normal for the central and southern portion. The average for the state as a whole was 35.67 inches, 1.37 inches below normal. Regional averages range from 39.09 inches, 0.04 inch below normal, for the Southwest region to 32.43 inches, 4.58 inches below normal, for the Northeast Hills region. Andover, Ashtabula County, reported the greatest amount of precipitation for the water year, 50.54 inches, and Newcomerstown, Tuscarawas County, reported the least amount, 26.78 inches. An isohyetal map of regional averages and departures from normal for the 1985 water year appears on the last page of this report.

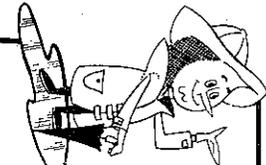
The water supply situation was generally favorable throughout the state during the 1985 water year despite the fact that precipitation was below normal in six of the 12 months. Precipitation for the first six months, the nominal water supply recharge period, was above normal and below normal for the last six months, the nominal water supply depletion period. Even though the central and southern portions of the state experienced extremely dry periods during the summer months, agriculture and water supplies did not appear to be affected seriously.



ACKNOWLEDGEMENTS

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.



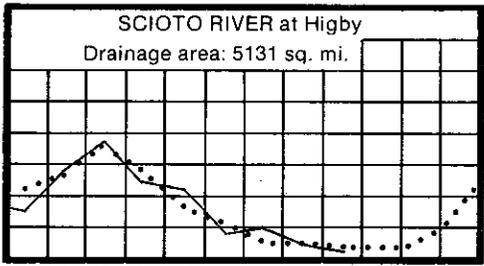
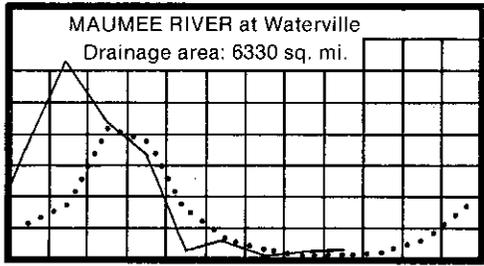
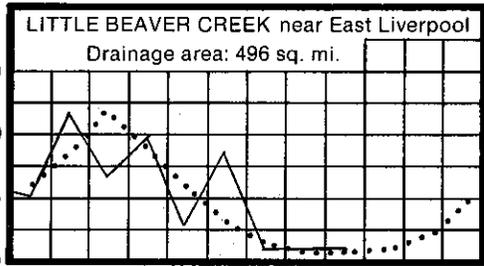
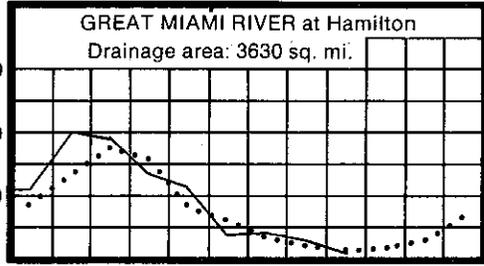
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MEAN STREAM DISCHARGE

RESERVOIR STORAGE FOR WATER SUPPLY

LAKE ERIE LEVELS

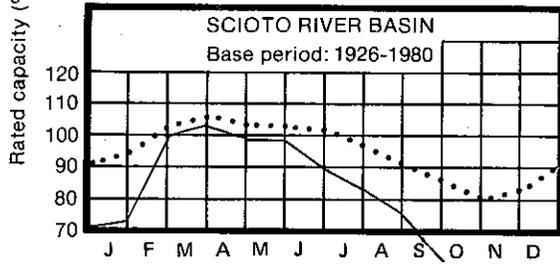
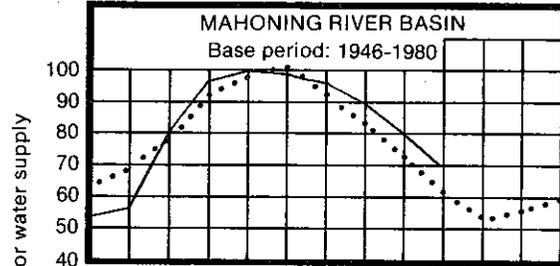
GROUND-WATER LEVELS



1985

Base period for all streams: 1951-1980

..... current ———

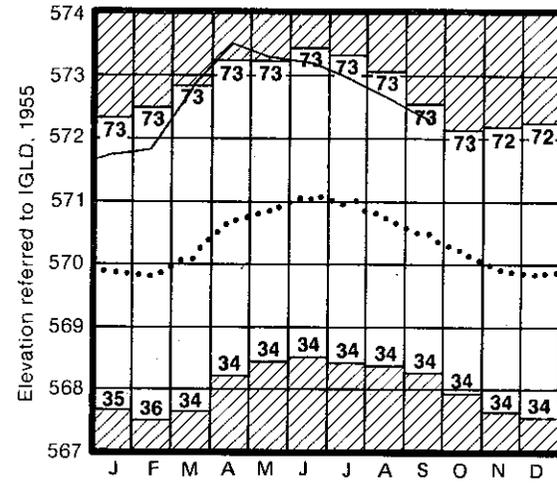


1985

RESERVOIR STORAGE for water supply for September declined in both the Mahoning River and the Scioto River basin reservoirs. Storage in the Mahoning basin remained above normal while it was noticeably below normal in the Scioto basin. Reservoir storage at the month end for the Mahoning basin index reservoirs was 69 percent of rated capacity for water supply compared to 80 percent for last month and 69 percent for September 1984. Storage at the month end for the Scioto basin index reservoirs was 63 percent of rated capacity for water supply compared to 75 percent for last month and 63 percent for September 1984. It is significant to note that reservoir storage for water supply in both index basins was the same at the end of the 1984 water year as it was at the beginning of the year. Reservoir storage for water supply remained favorable throughout the water year despite the noticeable deficiency in precipitation since January.

STREAMFLOW for September was generally normal throughout the state; the only exception was the Maumee River at Waterville where streamflow was excessive for the month in response to above normal precipitation in the drainage basin. Mean discharge and percent of normal at the index gaging stations for the 1985 water year was: Great Miami River, 560 cfs, 84 percent; Little Beaver Creek, 82.9 cfs, 105 percent; Maumee River, 938 cfs, 241 percent; and Scioto River, 595 cfs, 57 percent.

Streamflow was near normal during the 1985 water year throughout the state. Mean discharge and percent of normal at the index gaging stations for the 1985 water year was: Great Miami River, 3,289 cfs, 101 percent; Little Beaver Creek, 496 cfs, 89 percent; Maumee River, 5,642 cfs, 110 percent; and Scioto River, 3,951 cfs, 85 percent.



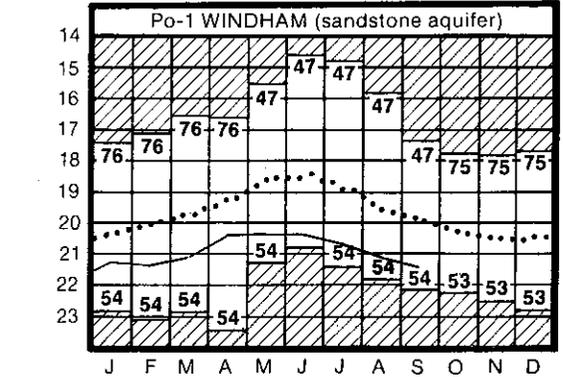
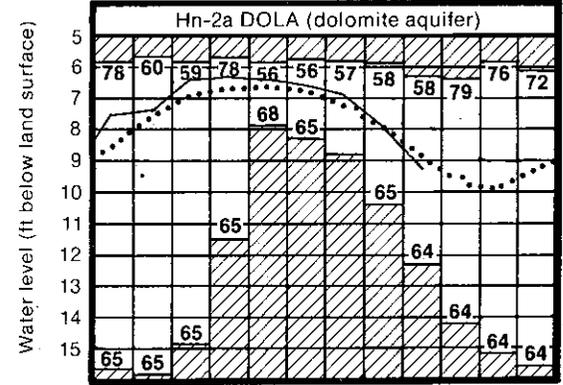
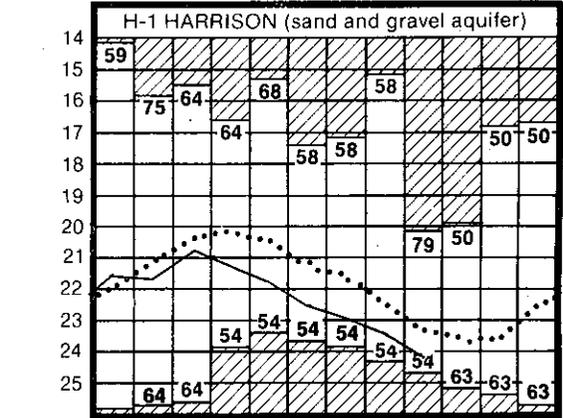
1985

Base period: 1900-1980

LAKE ERIE mean level for September was 572.43 feet (IGLD 1955), 0.24 foot below last month's mean level and 1.91 feet above normal. The lake level is 0.46 foot above the level observed for September 1984 and 3.83 feet above Low Water Datum. The lake level was markedly above normal throughout the 1985 water year, setting new record highs for both April and May.

GROUND-WATER LEVELS for September declined throughout the state. Net declines from last month's mean levels were generally equal to that usually observed, except in consolidated aquifers. Ground-water levels were below those levels observed in September 1984 throughout the state; the only exception is in observation well F-1 at West Rushville, Fairfield County. Water levels are noticeably below normal in most areas of the state, with the exception of observation wells Fa-1 near Washington C.H. and Fr-10 at OSU Farms in Columbus. Observation well Tu-1 at Strasburg, Tuscarawas County, set a record low for September for the period beginning in 1946.

Ground-water levels, which were noticeably below normal at the beginning of the water year, rose significantly during the recharge season in response to above normal precipitation. At the end of the recharge season water levels had recovered to normal. However, the declines were just as pronounced during the last six months, the nominal discharge period. Thus, water levels were about the same at the end as was observed at the beginning of the water year. The ground-water storage situation continues to be favorable for most areas in the state despite the droughty conditions.



1985

Base periods: H-1, 1951-1979. Hn-2a, 1955-1979. Po-1, 1947-1979

DIVISION OF WATER

MONTHLY WATER INVENTORY REPORT FOR OHIO

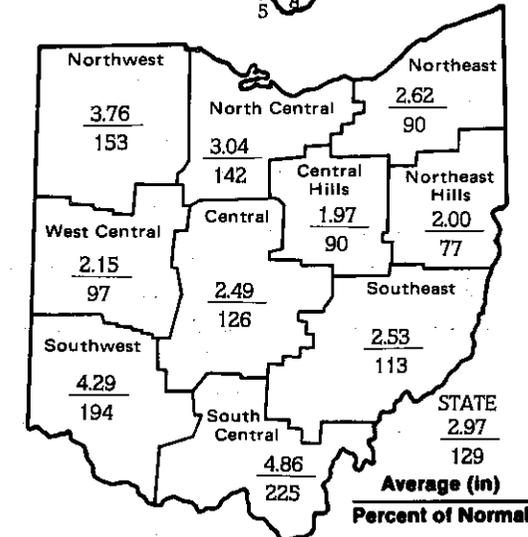
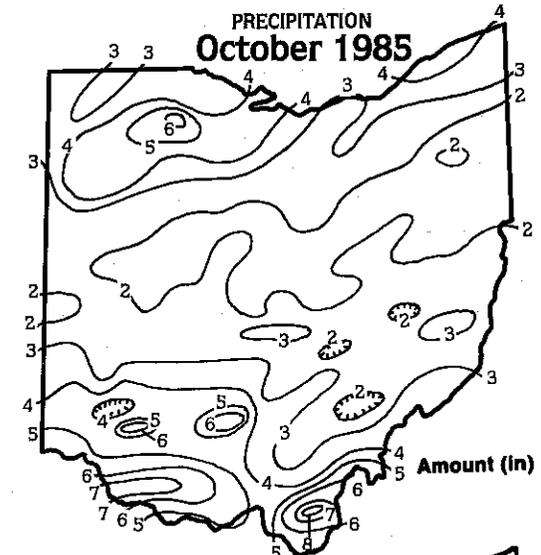
Compiled by Leonard J. Harstine and David H. Cashell

PRECIPITATION for October was above normal for most of the state; exceptions were in the Northeast, Central Hills, Northeast Hills and West Central regions where it was slightly below normal. The average for the state as a whole was 2.97 inches, 0.66 inch above normal. Regional averages ranged from 4.86 inches, 2.70 inches above normal, for the South Central region to 1.97 inches, 0.23 inch below normal, for the Central Hills region. Waterloo, Lawrence County, reported the greatest amount of precipitation for the month, 8.24 inches, and LaRue, Marion County, reported the least amount for the month, 1.02 inches.

There was a substantial amount of precipitation during every week of the month. Precipitation was heaviest in the lower reaches of the Ohio River valley where amounts of 4 to 5 inches fell in a 24-hour period on the 20th and 21st at various locations. More than three-fourths of the state received between 1 and 4 inches of precipitation for the month. Areas in the northeast, northwest and southern parts of the state received in excess of 4 inches. Although there were ample amounts of precipitation this month, thus far it was not enough to produce noticeable recharge to water supplies. However, with soil moisture requirements replenished, there should be substantial recharge to water supplies in the ensuing months if precipitation continues to be near normal.

Cumulative precipitation for the 1985 calendar year continues to be noticeably below normal for most of the state; the only exception is the Northwest region where precipitation is above normal. The average for the state as a whole is 28.89 inches, 2.96 inches below normal. Regional averages range from 31.90 inches, 2.91 inches below normal, for the South Central region to 25.49 inches, 6.47 inches below normal, for the Northeast Hills region. The Southeast region also shows a substantial departure being 6.19 inches below normal.

This is the first month of the 1986 water year which began Oct. 1, 1985, and ends Sept. 30, 1986. The water year is a common reference period for both surface water and ground-water supplies. October is considered the beginning of the recharge season for water supplies. Thus, with precipitation above normal throughout most of the state, it is a good beginning for the 1986 recharge season.



SUMMARY

Precipitation was above normal throughout most of the state for the first month of the 1986 water year. Streamflow was near normal while reservoir storage and ground-water storage was generally below normal. Lake Erie level declined and was only 0.10 foot below the record low set for October in 1973. The water supply situation continues to be favorable throughout the state.

NOTES AND COMMENTS

GROUND-WATER LEVEL data are derived from seven index wells selected from approximately 110 ground-water level observation wells operated by the Ohio Department of Natural Resources Division of Water. These key observation wells represent all types of aquifers common to Ohio. Water levels in these key wells change mainly in response to natural hydrologic factors affecting ground-water storage. These levels, therefore, reflect the relative natural storage of ground water and current replenishment or depletion. In this respect, these levels are considered to be typical of ground-water conditions in the state.

Space does not allow presentation of the data for all seven wells; data for key wells representing the three principal types of water-bearing formations are presented graphically in this report. However, the discussion of ground-water levels in this report is based on generalizations from the records for all seven index wells. Basic data are the monthly averages of the lowest daily observed water levels in each observation well. Normals are averages for the respective base periods of record.

KEY GROUND-WATER OBSERVATION WELLS

Index well	Location (county)	Depth (ft)	Aquifer	Base period*
F-1	Fairfield	74	Sandstone	1947-79
Fa-1	Fayette	78	Limestone	1947-79
Fr-10	Franklin	75	Gravel	1947-79
H-1	Hamilton	124	Gravel	1951-79
Hn-2a	Hardin	51	Dolomite	1955-79
Po-1	Portage	55	Sandstone	1944-79
Tu-1	Tuscarawas	23	Gravel	1947-79

*Water years, both dates are inclusive.

ACKNOWLEDGEMENTS

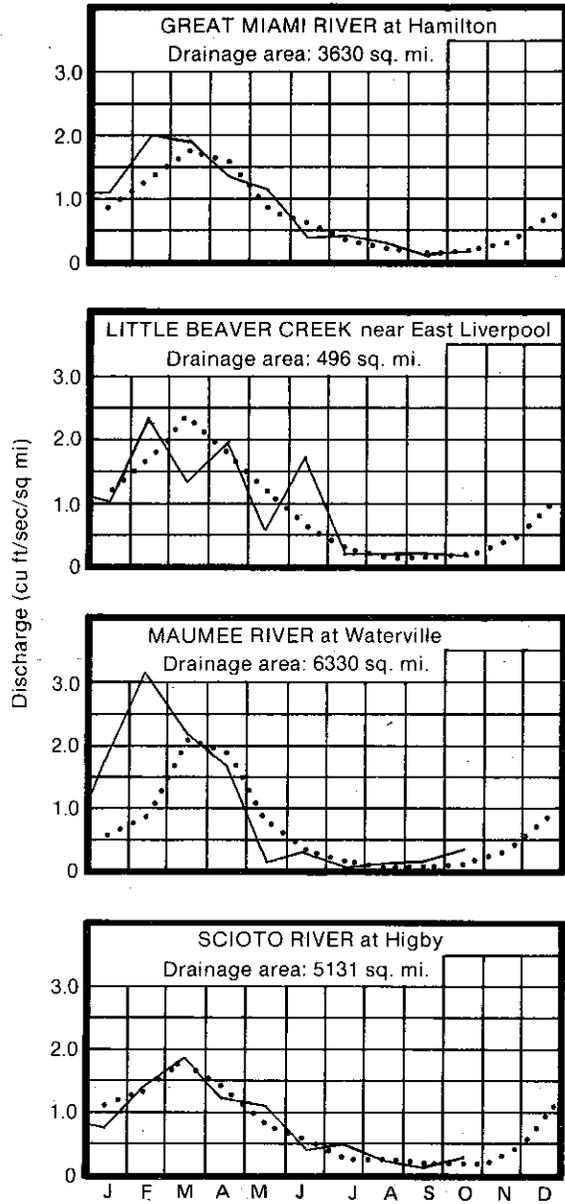
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- Streamflow and reservoir storage data:
 - U.S. Geological Survey, Water Resources Division.
- Lake Erie level data:
 - U.S. Corps of Engineers, Detroit District.



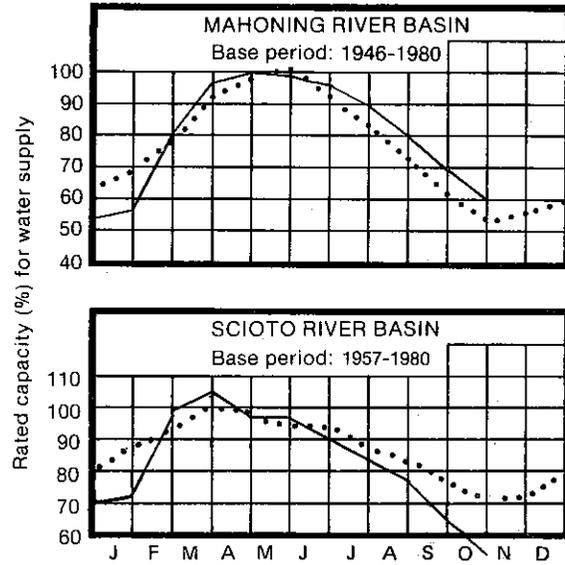
DIVISION OF WATER
FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

MEAN STREAM DISCHARGE



1985

RESERVOIR STORAGE FOR WATER SUPPLY



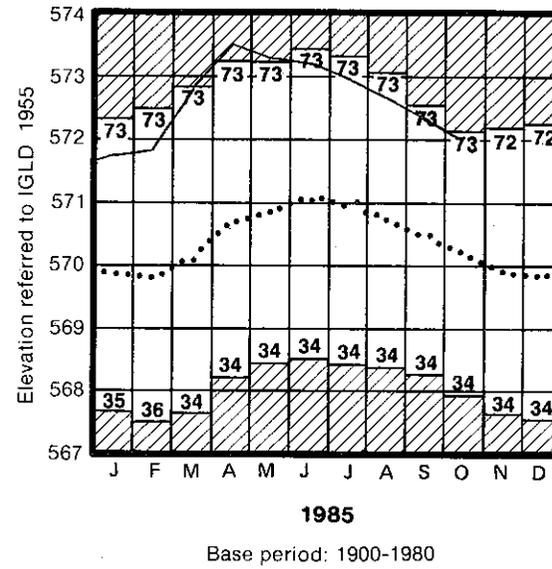
1985

RESERVOIR STORAGE for water supply for October continued to decrease in both the Mahoning River and the Scioto River basins. Storage remained above normal in the Mahoning basin reservoirs and noticeably below normal in the Scioto basin reservoirs. Reservoir storage at the month end for the Mahoning basin index reservoirs was 61 percent of rated capacity for water supply compared to 69 percent for last month and 56 percent for October 1984. Storage at the month end for the Scioto basin index reservoirs was 53 percent of rated capacity for water supply compared to 63 percent for last month and 54 percent for October 1984.

NOTE: Normals for the Scioto basin reservoir storage have been revised to include only that period of record from 1957 through 1980 when all the index reservoirs were being used. This represents more fairly the true picture of the current situation of reservoir storage in the Scioto basin.

STREAMFLOW for October was normal throughout most of the state except in the northwest where it was markedly above normal in response to above normal precipitation in the last half of the month. Mean discharge and percent of normal at the index gaging stations were: Great Miami River, 652 cfs, 96 percent; Little Beaver Creek, 75.5 cfs, 69 percent; Maumee River, 2,205 cfs, 397 percent; and Scioto River, 850 cfs, 112 percent.

LAKE ERIE LEVELS

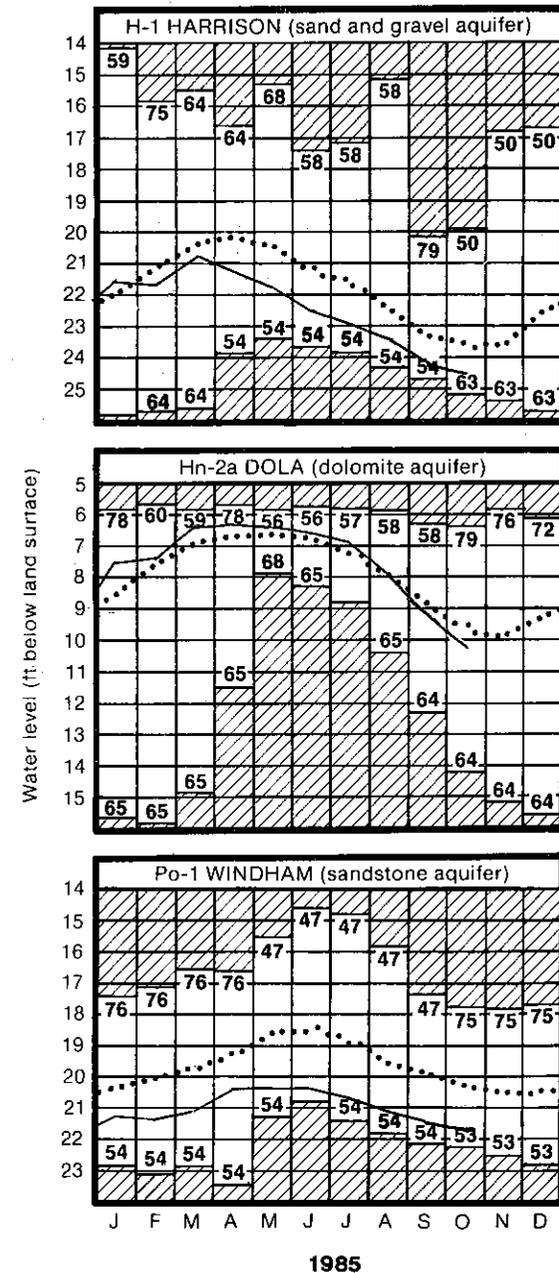


LAKE ERIE level declined and was only 0.10 foot below the record high set for October in 1973. The mean level for October was 572.04 feet (IGLD 1955), 0.39 foot below last month's mean level and 1.84 feet above normal. The lake level is 0.28 foot above the level observed for October 1984 and 3.44 feet above Low Water Datum.

GROUND-WATER LEVELS for October continued to decline throughout most of the state except in the southwest where they rose in response to recharge from above normal precipitation during the last half of the month. Net declines from last month's levels were generally about normal except for observation well Fr-10 at OSU Farms in Columbus, which showed a net rise for the month. Water levels throughout the state are generally below normal and below those levels observed for October 1984. This is primarily due to the continued drought conditions which have prevailed during the past three years.

The water level in observation well Tu-1 near Strasburg, Tuscarawas County, recorded an all-time record low level in October as a result of continued precipitation deficiencies in that area. Even though water levels are at record lows in this area, it does not create any serious problems for water supplies. Ground-water storage should begin to show signs of recharge and improve in the near future.

GROUND-WATER LEVELS





Richard F. Celeste
Governor

Joseph J. Sommer
Director



NOVEMBER 1985

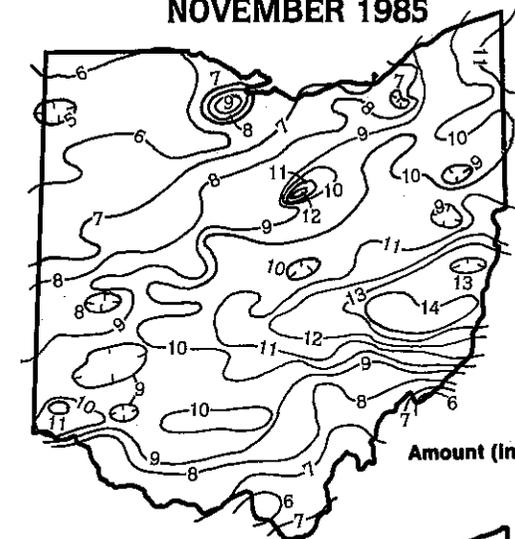
DIVISION OF WATER

MONTHLY WATER INVENTORY REPORT FOR OHIO

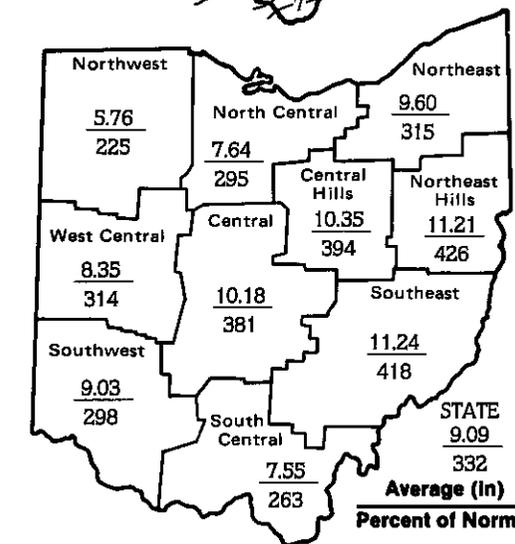
Compiled by Leonard J. Harstine and David H. Cashell

PRECIPITATION

NOVEMBER 1985



Amount (In)



PRECIPITATION set an all-time record for November for the state and the second greatest amount for any month in this century. Many NOAA-National Weather Bureau stations in the state set new records. The average for the state as a whole was 9.09 inches, 6.35 inches above normal. January 1937 holds the all-time record with 9.91 inches. Regional averages range from 11.24 inches, 8.55 inches above normal, for the Southeast region, to 5.76 inches, 3.20 inches above normal, for the Northwest region. Barnesville, Belmont County, reported the greatest amount of precipitation for the month, 14.96 inches, and Hicksville, Defiance County, reported the least amount, 4.94 inches. Other stations reporting more than 14 inches were Cambridge and Senecaville Dam in Guernsey County and Norwich, Muskingum County. One of our amateur observers in Grove City, Franklin County, also reported more than 14 inches.

The least one can say about November 1985 is: "IT WAS WET." The records show that there was rain or traces of rain somewhere in the state on every day of the month except the 23rd. Most generally, daily amounts were moderate to about 1 inch, while 1 to 2 inches were received 9 or 10 days of the month. Heaviest precipitation occurred through the central portion of the state diminishing in amounts to the northwest and southeast. An area from just east of Zanesville, Muskingum County, to the Ohio River, received the greatest amounts, which were in excess of 14 inches. It was in this area that heavy mud slides occurred on State Route 7 along the Ohio River. The heavy rains were a real harbinger of enhanced water supplies throughout the state.

Cumulative precipitation for the 1985 calendar year was above normal throughout the state for the first time. The average for the state as a whole is 37.98 inches, 3.39 inches above normal. Regional averages range from 40.49 inches, 3.73 inches above normal, for the Southwest region to 35.14 inches, 0.98 inch above normal, for the West Central region. The Northwest, North Central, Northeast and Central Hills regions all showed departures from normals ranging from 4.23 to 5.47 inches above normal for the calendar year thus far.

Cumulative precipitation for the first two months of the 1986 water year is markedly above normal throughout the state. The average for the state as a whole is 12.06 inches, 7.01 inches above normal. Regional averages range from 13.77 inches, 8.85 inches above normal, for the Southeast region to 9.52 inches, 4.51 inches above normal, for the Northwest region. The new recharge season for water supplies is off to an excellent start.

SUMMARY

November 1985 proved to be the wettest November of record for the state as a whole and the second wettest month in this century. Many records for precipitation at National Weather stations were set and record-high flows were observed for many streams in the state. Precipitation for the state as a whole was markedly above normal as were streamflows and reservoir storages. Ground-water storage increased considerably and is generally above normal throughout the state. Lake Erie level rose markedly and set a new record high for November. Thus, the water supply situation has improved tremendously throughout the state.

NOTES AND COMMENTS

DIVISION OF WATER NAMES NEW ASSISTANT CHIEF

Robert L. Goettmoeller, chief of the Division of Water, announces the appointment of William G. Mattox as assistant chief. Mattox joined the Department of Natural Resources in 1972 and the Division of Water in 1975 as deputy chief for water planning and policy. Mattox holds degrees in geography from Dartmouth College (A.B.) and McGill University, Montreal, (M.A., Ph.D.). Before joining ODNR, Mattox was director of McGill University Sub-arctic Research Laboratory in Labrador-Ungava, where he led a research program in snow, ice, permafrost and other water-related problems. After four years in Labrador, Mattox moved to Copenhagen, Denmark, as a fellow of the Institute of Current World Affairs where he studied economic development in Greenland, northern Scandinavia and the Soviet Union. He currently directs a study of the population of peregrine falcons in Greenland, where his teams have monitored the effects of environmental pollutants on this sensitive biologic indicator species for the past 14 years.

NEW HYDROGEOLOGISTS ADDED TO STAFF

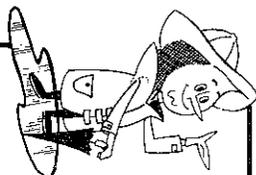
The Division of Water, Water Inventory Section, has added two new hydrogeologists to its staff. James M. Rabb, who hails from Toledo, is a graduate of University of Toledo (B.S.) and Michigan State University (M.A.). He joined the staff Nov. 12 and will be assisting in public information on ground-water resources.

Douglas J. Barber, of Stow, is a graduate of Kent State University (B.S.) and joined the staff Dec. 9. He will assist with well log locating.

ACKNOWLEDGEMENTS

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.



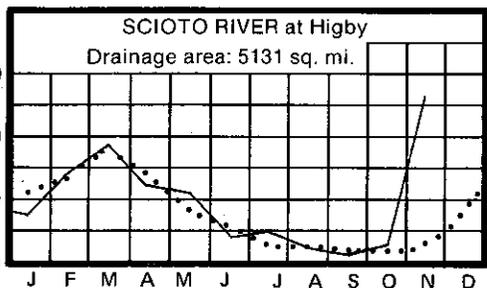
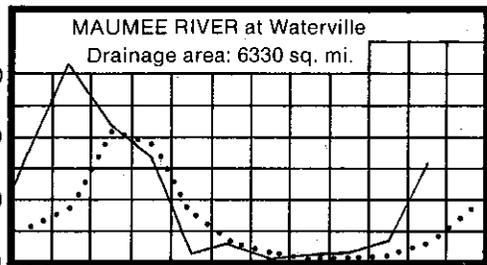
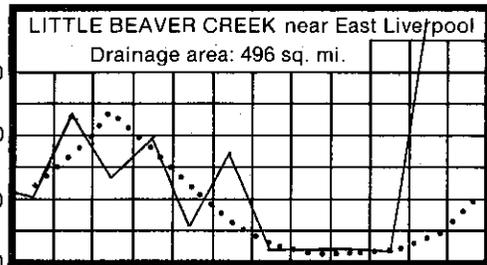
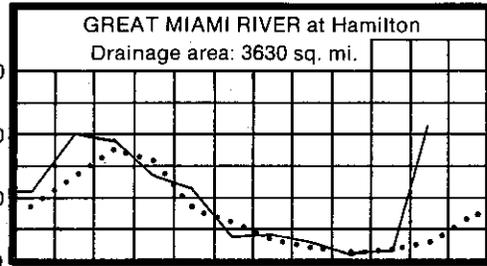
ODNR
OHIO DEPARTMENT OF
NATURAL RESOURCES
DIVISION OF WATER
FOUNTAIN SQUARE
COLUMBUS, OHIO 43224

MEAN STREAM DISCHARGE

RESERVOIR STORAGE FOR WATER SUPPLY

LAKE ERIE LEVELS

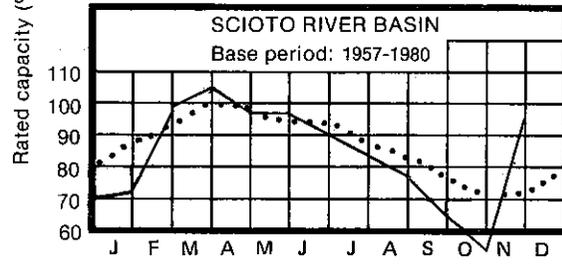
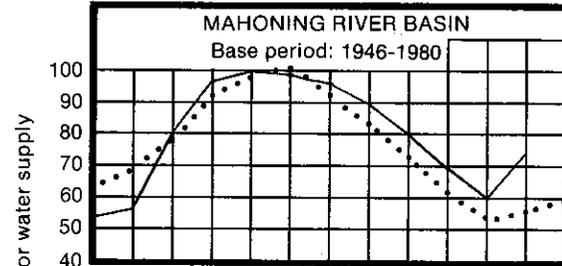
GROUND-WATER LEVELS



1985

Base period for all streams: 1951-1980

..... current ———

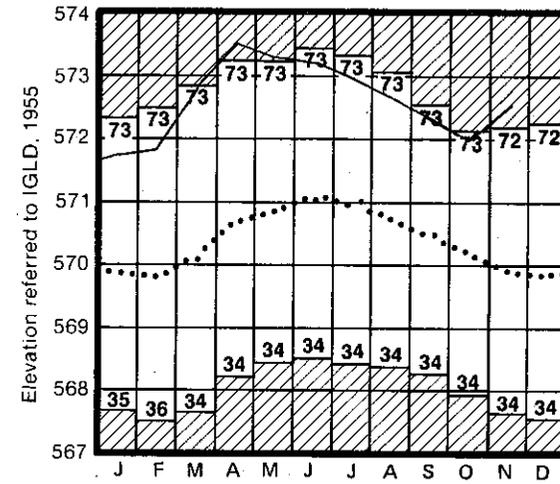


1985

RESERVOIR STORAGE for water supply increased markedly and was noticeably above normal in both the Mahoning River and the Scioto River basins as a result of the excessive precipitation. The increases in storages were unusually significant because most reservoirs were low at the end of October due to the droughty conditions that had persisted throughout the year. Reservoir storage at the month end for the Mahoning basin index reservoirs was 74 percent of rated capacity for water supply compared to 61 percent for last month and 50 percent for November 1984. Storage at the month end for the Scioto basin index reservoirs was 95 percent of rated capacity for water supply compared to 53 percent for last month and 61 percent for November 1984.

STREAMFLOW for November was excessive throughout the state as a result of the record-breaking precipitation. Many records for November maximum monthly mean discharge and maximum daily flows were exceeded. Although extensive flooding occurred in low-lying areas throughout the state, no serious situations were reported. This can be attributed mainly to the fact that streamflows were at low levels at the beginning of the month because of droughty conditions that existed in the preceding months.

The mean discharge and percent of normal at the index stations were: Great Miami River, 7,685 cfs, 699 percent; Little Beaver Creek, 1,902 cfs, 942 percent; Maumee River, 9,822 cfs, 608 percent; and Scioto River, 13,510 cfs, 832 percent. The mean discharge for the Great Miami River (7,685 cfs) was the second highest November flow recorded for the period of record beginning in 1907 and a record high daily flow (31,900 cfs) was recorded on the 28th, exceeding the previous November record (39,600 cfs) set in 1979. The mean discharge for the Little Beaver Creek (1,902 cfs) was the highest November flow for the period of record beginning in 1915; the previous November record (1,164 cfs) was set in 1926. The mean

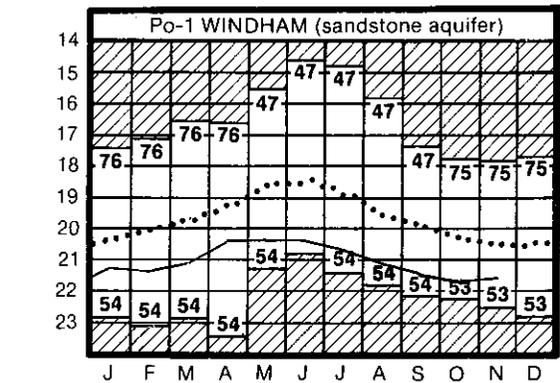
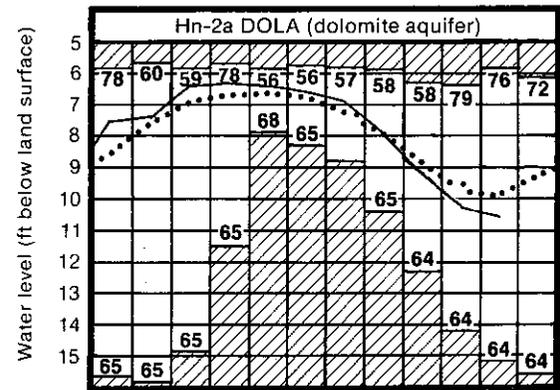
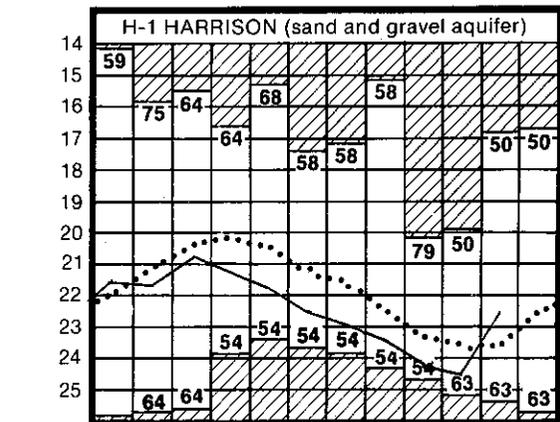


Base period: 1900-1980

discharge for the Maumee River (9,822 cfs) was the second highest November flow for the period of record beginning in 1921; the record (18,750 cfs) was set in 1972. The mean discharge for the Scioto River (13,510 cfs) was the second highest November flow for the period of record beginning in 1930; the November record (15,460 cfs) was set in 1972. A November record high daily flow (34,000 cfs) was recorded on the 29th for the Scioto River; the previous record was (31,600 cfs) in November 1973.

LAKE ERIE level rose markedly and set a new record-high monthly mean level for November. The mean level for November was 572.56 feet (IGLD 1955), 0.39 foot above the previous November record set in 1972 and 0.95 foot below the all-time record high set in June 1973. The lake level is 0.52 feet above last month's mean level, 2.64 feet above normal, 1.00 foot above the level observed for November 1984, and 3.96 feet above Low Water Datum.

GROUND-WATER LEVELS for November rose markedly throughout the state in response to excellent recharge from the excessive precipitation. Rises in water levels during the month were the greatest ever observed for November; previous record rises for November were observed in 1972. However, net changes in water levels from October levels were slightly less than those observed in 1972. Water levels in all the index wells were noticeably higher than those levels observed last month; the only exception was in observation well Hn-2a near Dola, Hardin County, which represents a limestone aquifer in which delayed recharge is expected. Water levels are generally above normal and above those levels observed for November 1984; exceptions are in consolidated aquifers where delayed recharge is expected. Generally, water levels in most wells were still rising at the month's end, indicating that considerably more recharge can be expected from the month's precipitation. Usually, net recharge to ground-water storage does not begin to show up until December. Thus, the new recharge season is off to an early start.



1985

Base periods: H-1, 1951-1979. Hn-2a, 1955-1979. Po-1, 1947-1979

DIVISION OF WATER

**MONTHLY WATER INVENTORY
REPORT FOR OHIO**

Compiled by Leonard J. Harstine and David H. Cashell

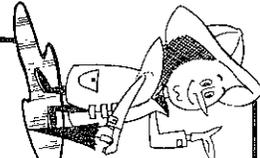
SUMMARY

Precipitation for December was below normal for most of the state. Streamflow continued to be excessive for the second consecutive month while reservoir storage and ground-water storage was above normal throughout the state. Lake Erie level set a new record high for December. This is the fourth month for which a new record was set in 1985. The water supply situation improved significantly during the first three months of the new water year. However, continued improvements will depend on recharge conditions during the remaining four months of the recharge season.

ACKNOWLEDGEMENTS

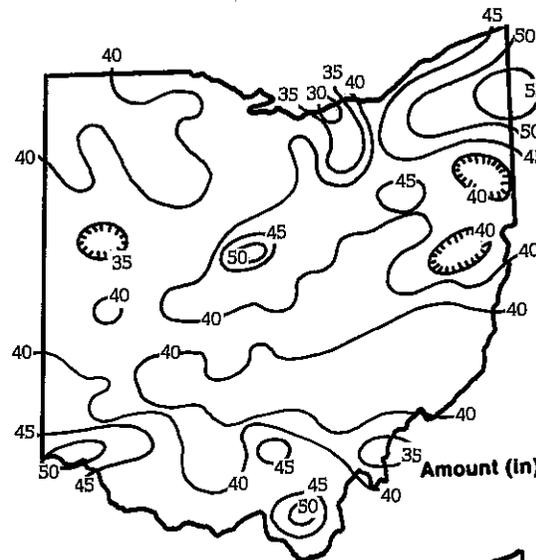
This report has been compiled from Division of Water data and from information supplied by the following:

- 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, Muskogum Area.
Streamflow and reservoir storage data:
U.S. Geological Survey, Water Resources Division.
Lake Erie level data:
U.S. Corps of Engineers, Detroit District.



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

PRECIPITATION 1985 CALENDAR YEAR



Northwest 38.02 +4.17	North Central 38.79 +4.92	Central Hills 40.75 +4.03	Northeast 43.06 +5.96
West Central 37.62 +1.10	Central 40.14 +3.28	Northeast Hills 38.90 +1.89	Southeast 40.12 +1.68
Southwest 42.15 +2.66	South Central 41.00 +0.46	STATE 40.06 +3.02	
Average (in)			
Departure from normal			

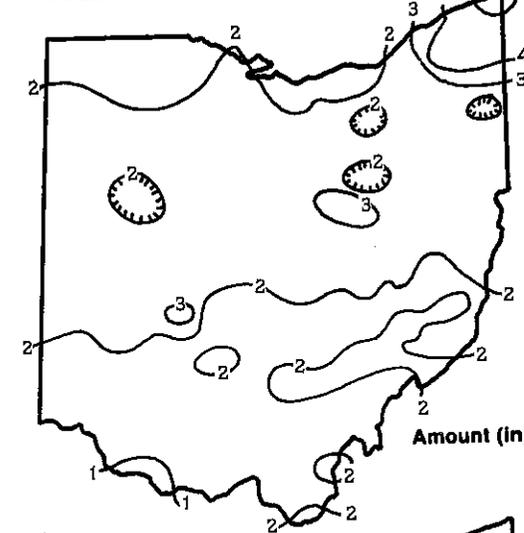
PRECIPITATION for December was below normal for most of the state; exceptions were in the North Central, Northeast and West Central regions where precipitation was slightly above normal. The average for the state as a whole was 2.08 inches, 0.37 inch below normal. Regional averages ranged from 2.99 inches, 0.49 inch above normal, for the Northeast region to 1.55 inches, 1.31 inches below normal, for the South Central region. Ashtabula, Ashtabula County, reported the greatest amount of precipitation for the month, 5.00 inches, and Anthony Meldahl Locks and Dam, Clermont County, reported the least amount, 0.68 inch.

Moderate to minimal amounts of precipitation fell during every week of the month in most areas of the state. Generally, half of the state south of a line running from Dayton through Columbus to Steubenville on the Ohio River received less than 2 inches, and the area north of that line received more than 2 inches. Exceptions were in the northwest which received less than 2 inches and in the northeast snowbelt area where 3 to 5 inches were observed. Chardon, Geauga County, reported 38.1 inches of snow for the month, about 15 inches above the normal for December. The greatest amount of snow reported by Chardon for the period of record beginning in 1946 was 69.5 inches in December 1962. The below normal precipitation in December was a welcome relief from the record-breaking precipitation of November, but it had little effect on the current water supply situation.

Precipitation for the 1985 calendar year was above normal throughout the state despite precipitation remaining below normal for most of the state through October. The above-normal precipitation for the year resulted almost completely from the record-breaking amounts that fell in November. The 1985 average for the state as a whole was 40.06 inches, 3.02 inches above normal. Regional averages ranged from 43.06 inches, 5.96 inches above normal, for the Northeast region to 38.02 inches, 4.17 inches above normal, for the Northwest region. Departures from normal ranged from 0.46 inches above normal for the South Central region to 5.96 inches above normal for the Northeast region. Andover, Ashtabula County, reported the greatest amount of precipitation for the year, 59.16 inches, and Westlake, a suburb on Cleveland's west side, reported the least amount for the year, 29.89 inches. An isohyetal map and regional averages and departures from normal appear on the back page of this report.

Cumulative precipitation for the first three months of the 1986 water year is noticeably above normal throughout the state. The average for the state as a whole is 14.14 inches, 6.64 inches above normal. Regional averages range from 15.91 inches, 8.26 inches above normal, for the Northeast Hills region to 11.43 inches, 4.24 inches above normal, for the Northwest region.

PRECIPITATION DECEMBER 1985



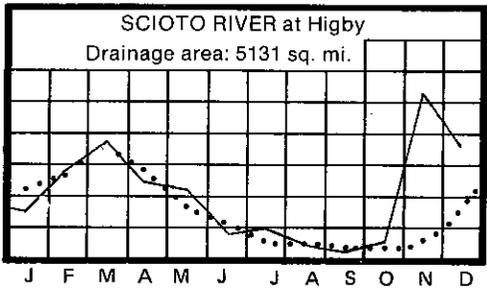
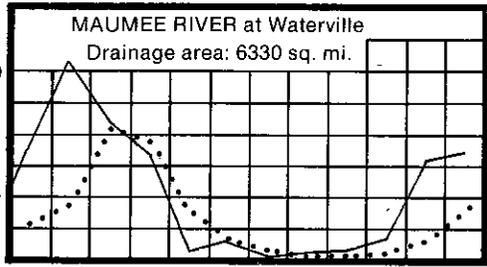
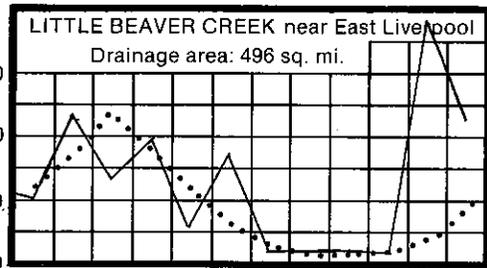
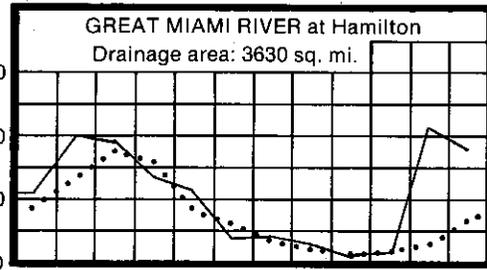
Northwest 1.91 88	North Central 2.18 101	Northeast 2.99 120
West Central 2.48 105	Central 2.14 91	Northeast Hills 2.20 91
Southwest 1.66 61	South Central 1.55 54	Southeast 1.89 74
STATE 2.08 85		
Average (in)		
Percent of Normal		

MEAN STREAM DISCHARGE

RESERVOIR STORAGE FOR WATER SUPPLY

LAKE ERIE LEVELS

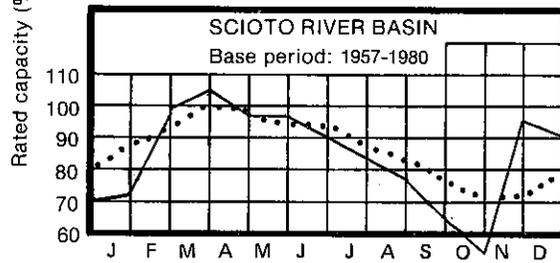
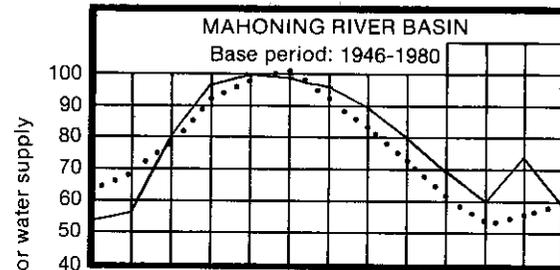
GROUND-WATER LEVELS



1985

Base period for all streams: 1951-1980

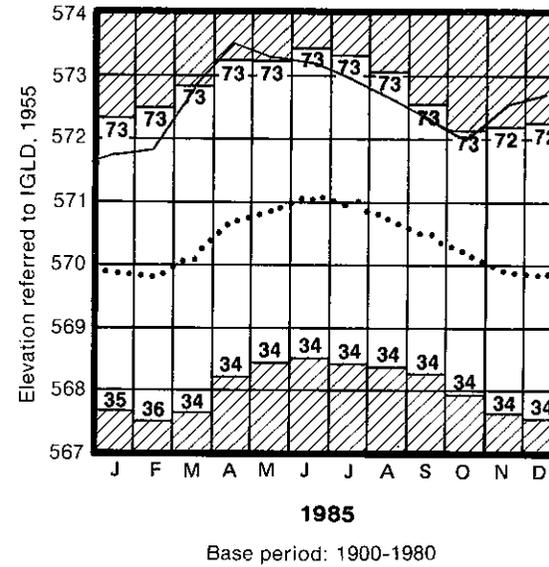
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1985

RESERVOIR STORAGE for water supply for December showed unusual declines in both the Mahoning River and the Scioto River basins from the high storages observed at the end of November. Reservoir storage for the Mahoning River basin fell to near normal while in the Scioto River basin it remained noticeably above normal. Reservoir storage at the month end for the Mahoning basin index reservoirs was 58 percent of rated capacity for water supply compared to 74 percent for last month and 54 percent for December 1984. Storage at the month end for the Scioto basin index reservoirs was 91 percent of rated capacity for water supply compared to 95 percent for last month and 70 percent for December 1984.

STREAMFLOW for December declined slightly but remained excessive throughout the state despite the below-normal precipitation. Flow in the Maumee River showed a slight increase from last month. Mean discharge and percent of normal at the index stations were: Great Miami River, 6,535 cfs, 275 percent; Little Beaver Creek, 1,127 cfs, 242 percent; Maumee River, 10,440 cfs, 235 percent; and Scioto River, 9,674 cfs, 239 percent. Cumulative runoff and departures from normal for the first three months of the 1986 water year are: Great Miami River, 4.36 inches, 2.84 inches above normal; Little Beaver Creek, 7.07 inches, 5.37 inches above normal; Maumee River, 3.99 inches, 2.41 inches above normal; and Scioto River, 5.27 inches, 3.81 inches above normal.

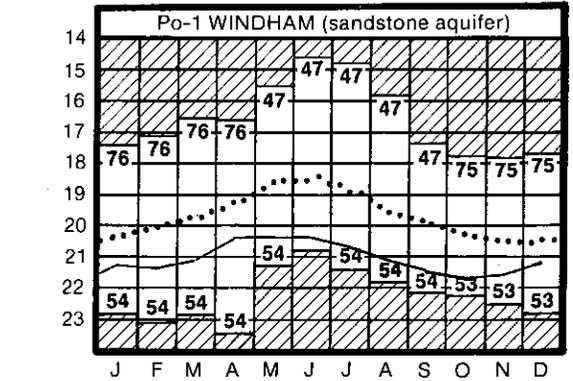
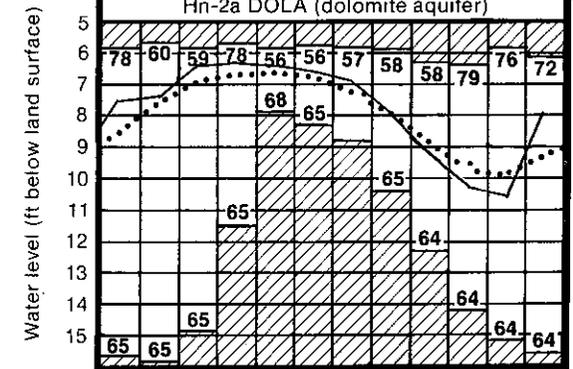
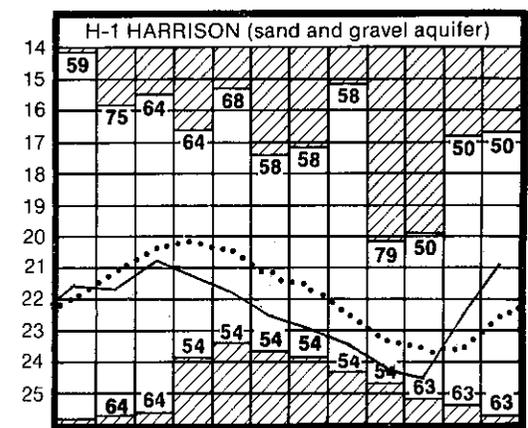


1985
Base period: 1900-1980

LAKE ERIE mean level rose slightly and set a new monthly high for December. This was the second consecutive month for which a new record high level was set and the fourth time a new record high was set in 1985; previous new record highs this year were set for April, May and November. A storm Dec. 2 set an all-time, short-term peak at the east end of the lake, 580.65 feet (IGLD), 1.44 feet above the previous record set April 6, 1979. The water level that day at Toledo was 564.79 (IGLD), or about a 16-foot difference from the east end of the lake.

The mean level for December was 572.74 feet (IGLD 1955), 0.39 foot above the previous record set in 1972 and 0.77 foot below the all-time record high set in June 1973. The lake level is 0.18 foot above last month's mean level, 2.89 feet above normal, 1.32 feet above the level observed for December 1984 and 4.14 feet above Low Water Datum.

GROUND-WATER LEVELS for December continued to rise significantly in consolidated aquifers in response to delayed recharge from last month's excessive precipitation, while levels in unconsolidated aquifers declined slightly. Ground-water levels throughout the state showed a net rise from last month's mean levels and were noticeably above those levels observed for December 1984. Water levels throughout the state are above normal for the first time in six months or more. The water levels in some unconsolidated aquifers are above normal for the first time in nearly two years or more. The only exception is observation well PO-1 at Windham, Portage County, where the water level continues to be below normal. However, it is slightly higher than it was at this time last year. Although the ground-water storage situation has improved considerably, further improvements will depend on continued recharge from ample precipitation during the next four months.



1985

Base periods: H-1, 1951-1979. Hn-2a, 1955-1979. Po-1, 1947-1979