

GROUND-WATER DATA FOR
WEST VIRGINIA, 1974-84

By F. M. Taylor and M. T. Rosier

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FACTORS FOR CONVERTING INCH-POUND UNITS TO METRIC UNITS

<u>Multiply inch-pound unit</u>	<u>By</u>	<u>To obtain metric unit</u>
inch (in.)	25.40	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
gallon per minute (gal/min)	0.06308	liter per second (L/s)
million gallons per day (Mgal/d)	0.04381	cubic meter per second (m ³ /s)
	43.81	liter per second (L/s)

GROUND-WATER DATA FOR WEST VIRGINIA, 1974-84

By F. M. Taylor and M. T. Rosier

ABSTRACT

Ground-water investigations began in West Virginia in 1941. As an aid to development and management of the State's water resources, the U.S. Geological Survey, in cooperation with the West Virginia Geological and Economic Survey, maintains a network of about 30 observation wells throughout the State. Some wells are equipped with continuous water-level recorders; and some are measured manually on a daily, weekly, monthly, or semiannual basis.

This report presents the water-level data that were collected from 1974-83 at 31 observation wells. Chemical data were collected for 17 of these wells, primarily in 1984. This report also presents a map showing locations of the observation wells, a description of each well and supplementary information, 1-year and 10-year hydrographs, and tables of chemical data.

1.0 INTRODUCTION

Ground-water investigations began in West Virginia in 1941. The U.S. Geological Survey and the West Virginia Geological and Economic Survey entered into a cooperative program whereby the basic data and interpretive information on ground-water resources are collected and disseminated by the U.S. Geological Survey as an aid to development and management of the State's water resources. Principal users of the information are government agencies; municipalities; and industrial, agricultural, and private water users.

A network of more than 30 selected observation wells is maintained throughout the State to measure fluctuations in ground-water levels. These measurements serve as an index of, and indicate changes in, the amount of ground water in storage throughout the year. A few of the wells are equipped with automatic recorders to provide a continuous record of ground-water levels. Other wells are periodically measured manually. The water from some wells is sampled and analyzed periodically for chemical constituents.

Ground-water-level data have been collected in West Virginia for about 45 years. Since 1972, these water-level data appear annually in the U.S. Geological Survey publication "Water Resources Data for West Virginia." The data are also being stored in U.S. Geological Survey computer files. Prior to 1972, the data were published in U.S. Geological Survey Water-Supply Papers.

As water problems become increasingly complex, and water-data users become more numerous, basic hydrologic information becomes more vital for current and future planning. The purpose of this report is to increase availability of this information. The report presents water-level and water-quality data from wells throughout West Virginia, (fig. 1.0-1) arranged by county. The information is presented in two-page units: The left page consists of text, which summarizes the information for a well; the right page consists of one or two hydrographs. Daily noon hydrographs show water-level fluctuations and trends for the 1983 calendar year. Monthly hydrographs show water-level fluctuations and trends for the 1974 to 1983 calendar years, where data are available. Stratigraphic nomenclature used in this report follows the usage of the West Virginia Geological and Economic Survey and does not necessarily conform to that used by the U.S. Geological Survey.

Water-level fluctuations in the observation wells reflect changes in storage and other changes in ground-water reservoirs or aquifers. Changes in water level, whether of short or long duration, generally occur as a result of recharge to and discharge from the ground-water reservoir. Infiltration of precipitation and surface water are the main sources of recharge. Flow from the aquifer to streams and springs, direct ground-water evapotranspiration, and pumping are the main sources of discharge.

Hydrographs in this report are for a 10-year period (1974-83). All data for the period of record for each well in this report are available from published reports or from the files of the U.S. Geological Survey.

Records of all water-level measurements made in these and other observation wells may be obtained upon request from the U.S. Geological Survey, Water Resources Division, 603 Morris Street, Charleston, WV 25301.

The authors appreciate the assistance of Paul Queen, West Virginia Geological and Economic Survey, for designing the cover, and Harry L. Armentrout, U.S. Geological Survey, for pumping and sampling wells.

2.0 CHANGES IN WATER LEVELS, 1974-83

2.1 Berkeley County

2.1.1 Martinsburg well

392725077582401. Local number, 20-5-7.

LOCATION.--Lat 39°27'25", long 77°58'24", Hydrologic Unit 02070004, at John Street and Porter Avenue, Martinsburg.

Owner: Martinsburg Mills, Inc.

AQUIFER.--Beekmantown Group of Lower Ordovician age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 8 in., depth 250 ft, cased with steel to 10 ft.

DATUM.--Land-surface datum is about 445 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top edge of recorder shelter base, 3.3 ft above land-surface datum.

PERIOD OF RECORD.--November 1956 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 23.00 ft, estimated, below land-surface datum, June 24, 1972; lowest, 68.45 ft below land-surface datum, Dec. 7, 1969.

SUPPLEMENTARY INFORMATION

This well is located in a valley beside a factory and taps a limestone aquifer. Rapid rises in water level in the well reflect the entrance of water into the cavernous limestone terrain. During 1983, the water level rose from a low of 56.26 feet in January to a high of 34.48 feet in June corresponding to a period of increased precipitation. The highest water level coincides with heavy rainfall from tropical storm Agnes in June, 1972. The lowest water level, which occurred in December, 1969, followed a drought in the summer of 1969.

The water-level average for 1983 was 43.91 feet or 0.05 foot lower than the average for 1982.

MARTINSBURG WELL
392725077582401

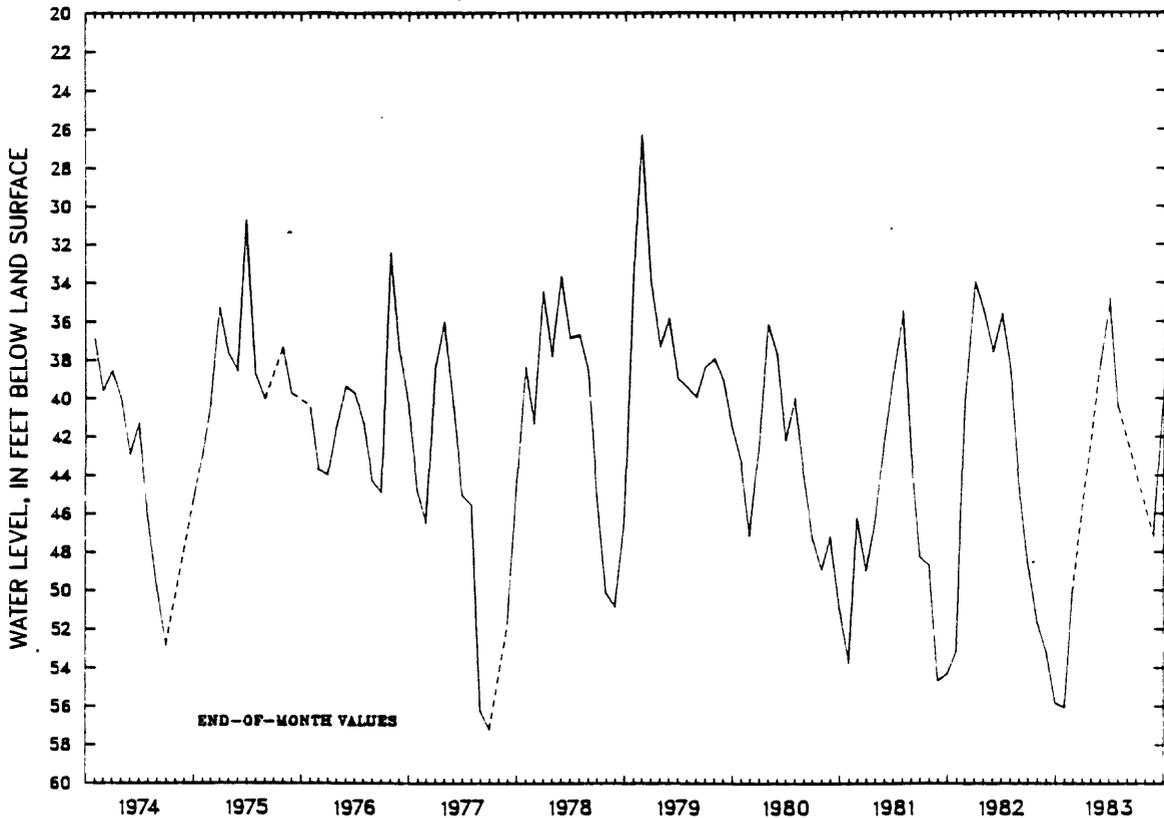
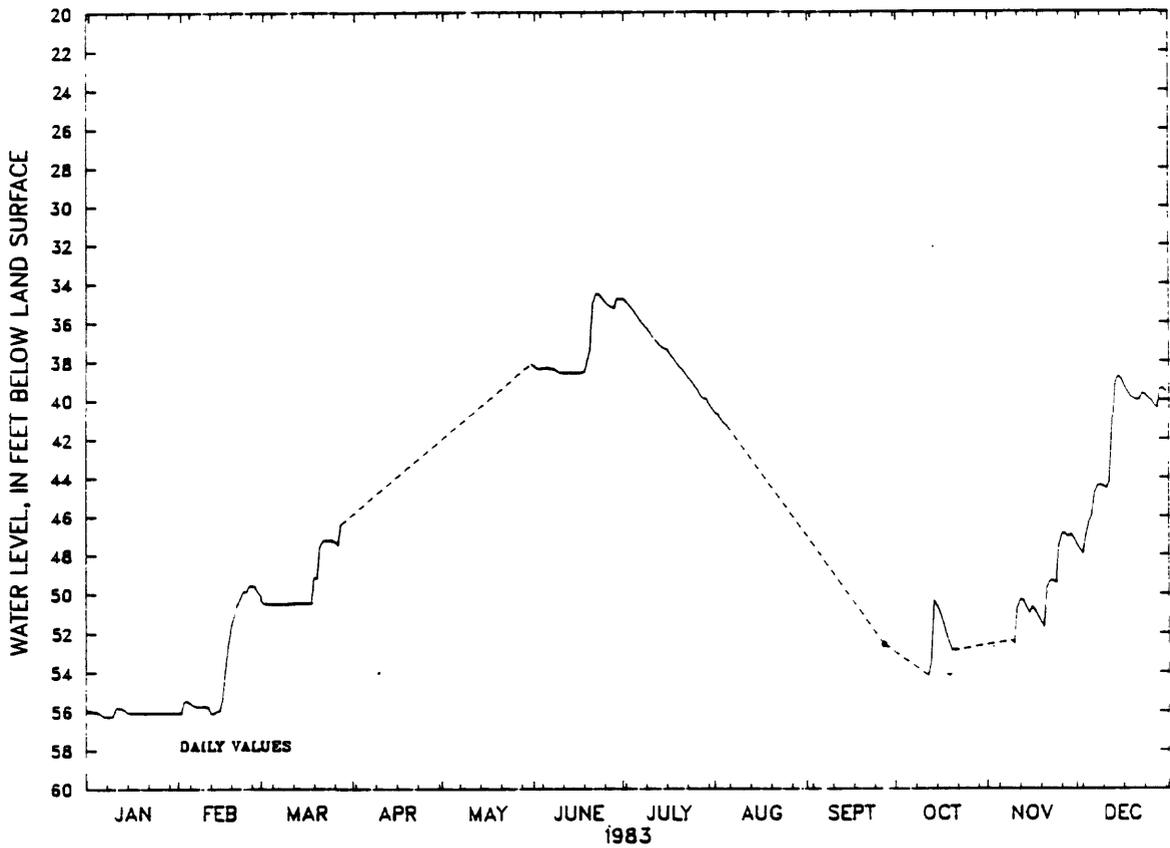


Figure 2.1.1-1.--Water-level fluctuations in the Martinsburg well, Berkeley County.

2.2 Braxton County

2.2.1 Cunningham well

384003080462601. Local number, 34-2-15.

LOCATION.--Lat 38°40'03", long 80°46'26", Hydrologic Unit 05050007, at Kanawha Street, Gassaway.

Owner: Claude Cunningham.

AQUIFER.--Conemaugh Group of Upper Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 100 ft, cased with steel.

DATUM.--Land-surface datum is about 1,100 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.92 ft above land-surface datum.

PERIOD OF RECORD.--August 1971 to current year (weekly water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 72.28 ft below land-surface datum, Mar. 7, 1973; lowest measured, 74.88 ft below land-surface datum, Aug. 11, 1971.

SUPPLEMENTARY INFORMATION

This is a hillside well drilled into coal-bearing rocks. The aquifer consists of cyclic sequences of shale, siltstone, and sandstone.

The water level is consistently higher in the spring and lower in the fall. Recorded water levels for the period of record have fluctuated only 2.60 feet.

The average water level for 1983 was 73.50 feet or .01 foot lower than the average level for 1982.

CUNNINGHAM WELL
384003080462601

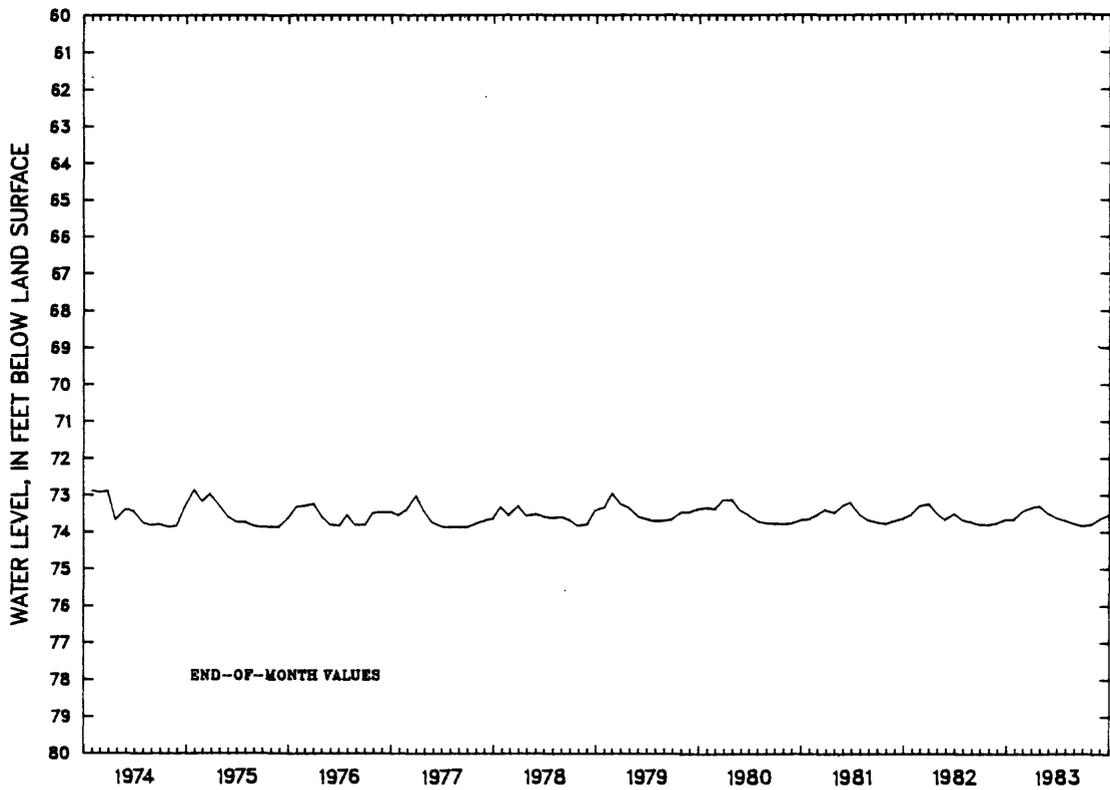
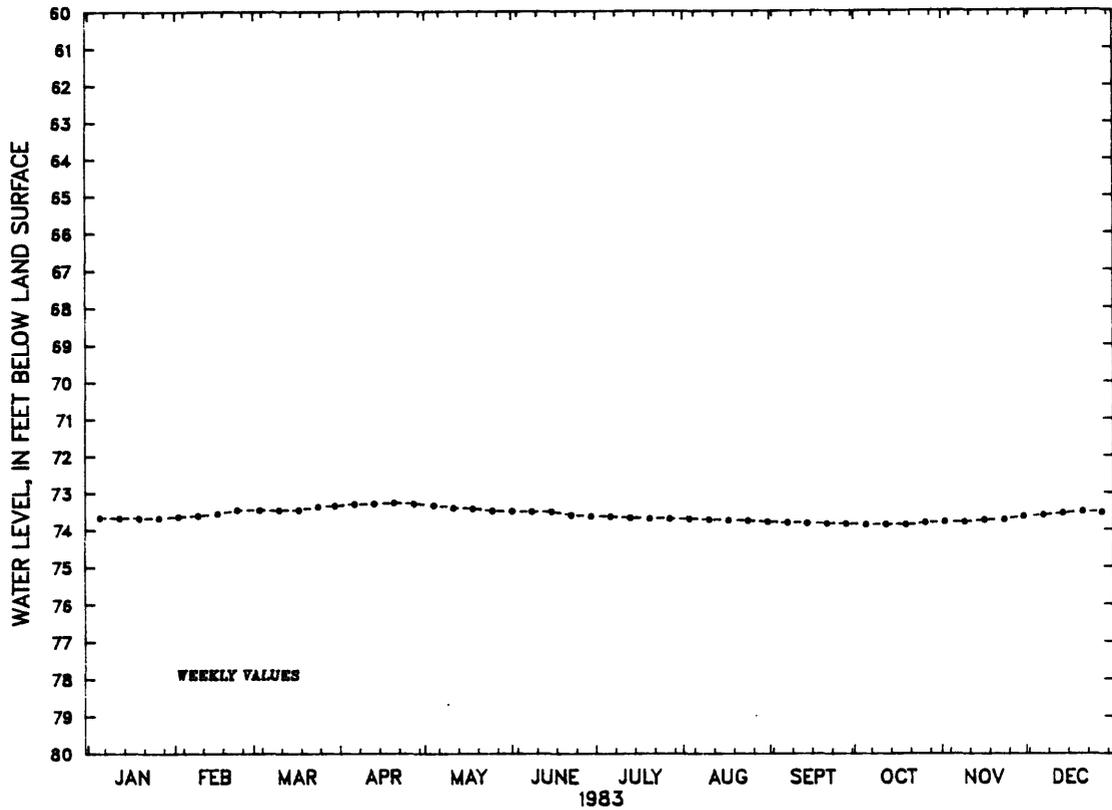


Figure 2.2.1-1.--Water-level fluctuations in the Cunningham well, Braxton County.

2.3 Brooke County

2.3.1 Bethany well

401216080362703. Project number P-1.

LOCATION.--Lat 40°12'16", long 80°36'27", Hydrologic Unit 05030106, about 2.5 mi west of Bethany on hilltop about 1,700 ft west of Buffalo Creek.

Owner: C. E. Reeves.

AQUIFER.--Waynesburg coal in the Monongahela Group of Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 50.5 ft, cased with steel to 46.5 ft.

DATUM.--Land-surface datum is about 1,150 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.2 ft above land-surface datum.

REMARKS.--Aquifer test data available.

PERIOD OF RECORD.--July 1982 to August 1982 (periodic water-level measurements), August 1982 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 35.01 ft below land-surface datum, Apr. 10, 1983; lowest, 41.48 ft below land-surface datum, Nov. 7, 1982 (42.83 ft on Sept. 22, 1982, result of recharge test).

SUPPLEMENTARY INFORMATION

This well, which was originally a project well, is located on a hilltop in a well test field. The aquifer consists of nonmarine cyclic sequences of sandstone, siltstone, red and gray shale, limestone, and coal.

Precipitation is the main factor affecting the water level in this well which is drilled into coal-bearing rocks.

An aquifer test was performed in 1982 using four observation wells. The transmissivity in the Waynesburg coal was 25 to 55 ft²/day, and the storage coefficient was 1.0 X 10⁻⁴ to 1.4 X 10⁻³. Trace metal chemical data are available for 1982 and 1983 in the files of the U.S. Geological Survey. A water-level hydrograph is also available for a nearby test well which is open only to the rock above the Waynesburg coal.

The well was pumped and sampled for chemical quality in September 1982, May 1983, and November 1984. The specific capacity was 0.16 (gal/min)/ft (pumped 3 min.) in November 1984, computed from recovery data.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
Sept, 1982							
16...	1045	680	7.4	14.0	83	34	9.5
May, 1983							
10...	1315	500	8.4	11.0	84	34	9.9
Nov., 1984							
09...	1010	630	7.5	10.0	80	33	8.4
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
Sept, 1982							
16...	--	18	31	.20	--	<.10	
May, 1983							
10...	--	22	2.6	.20	--	<.10	
Nov., 1984							
09...	331	20	2.5	.10	376	<.10	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
Sept, 1982							
16...	--	<.010	--	<3	--	46	
May, 1983							
10...	--	<.010	--	1000	--	61	
Nov., 1984							
09...	.80	<.010	1300	400	110	57	

BETHANY WELL
401216080362703

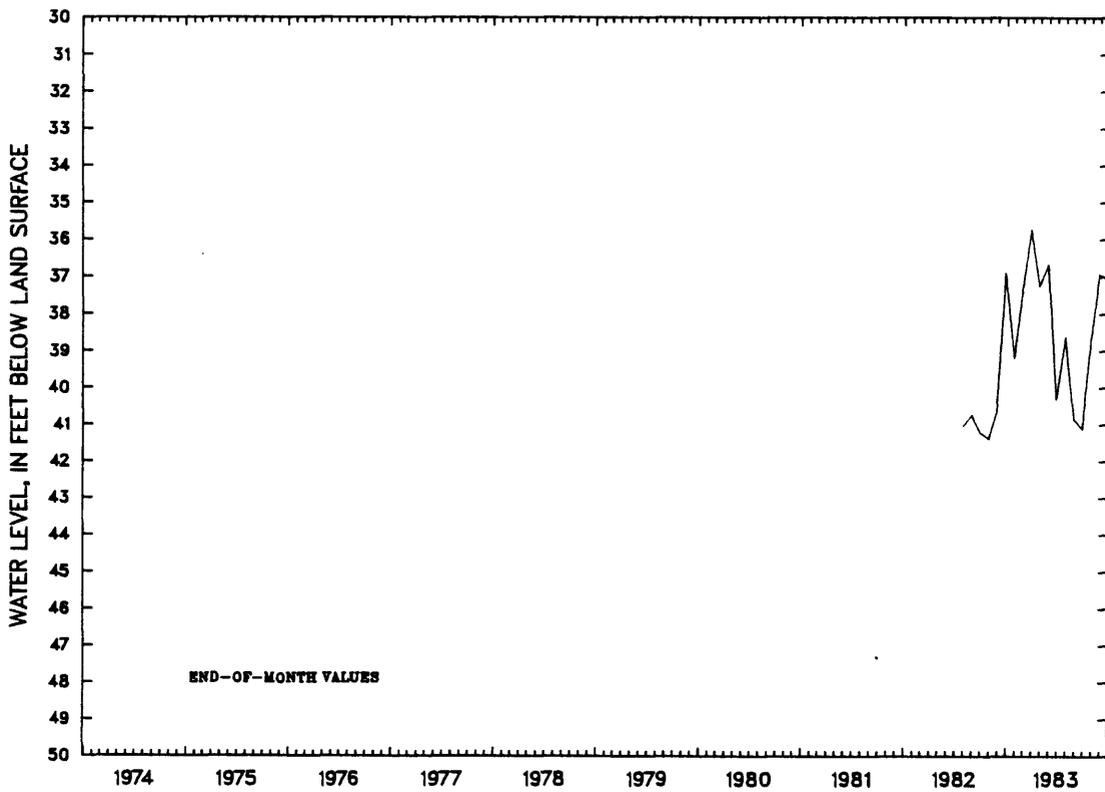
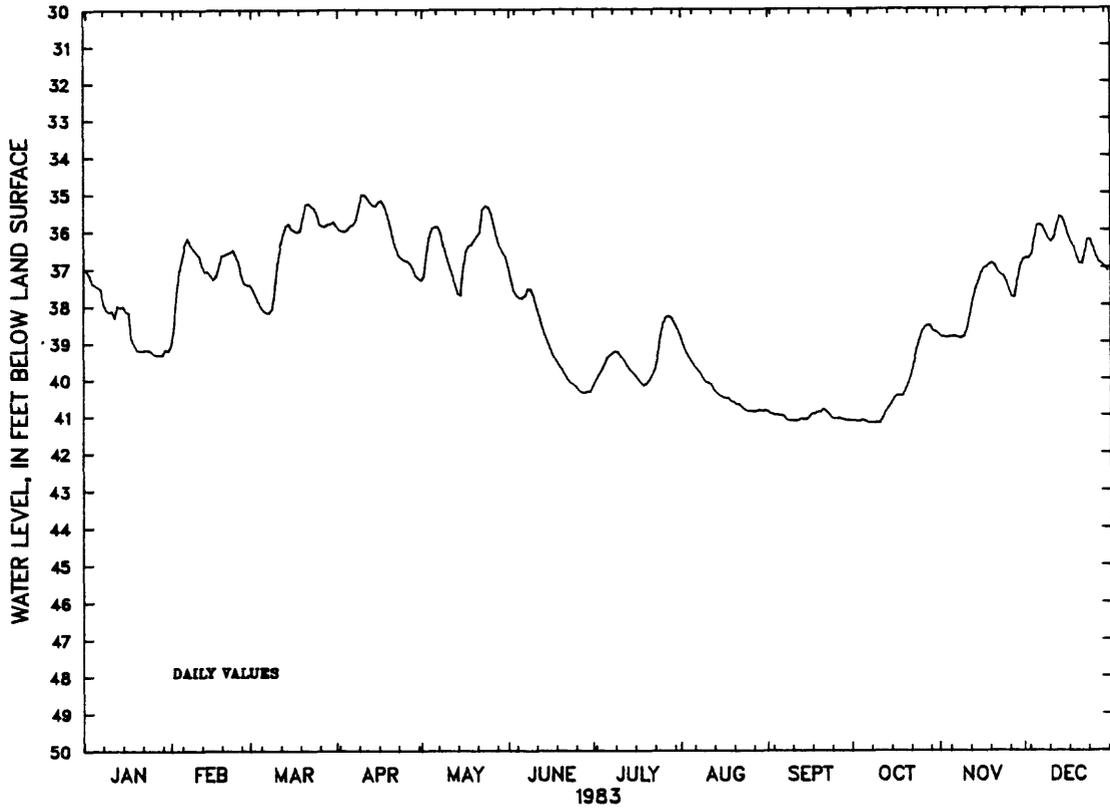


Figure 2.3.1-1.--Water-level fluctuations in the Bethany well, Brooke County.

2.4 Gilmer County

2.4.1 Glenville well

385604080495901. Local number, 33-3-1.

LOCATION.--Lat 38°56'04", long 80°49'59", Hydrologic Unit 05030203, at Glenville State College Campus, Glenville.

Owner: Glenville State College.

AQUIFER.--Conemaugh Group of Upper Pennsylvanian age.

WELL CHARACTERISTICS.--Dug unused water-table well, diameter 3 ft, depth 25 ft, cased with concrete tile.

DATUM.--Land-surface datum is about 820 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of concrete cover at land-surface datum.

REMARKS.--West Virginia index well.

PERIOD OF RECORD.--October 1953 to current year (weekly water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.58 ft below land-surface datum, Jan. 26, 1958; lowest measured, 18.75 ft below land-surface datum, Nov. 30, 1953.

SUPPLEMENTARY INFORMATION

This well is centrally located in the State and is a dug, hilltop well in an aquifer generally comprised of red and gray shale, siltstone, sandstone, and thin beds of limestones and coals. It has been used as the U.S. Geological Survey Federal Index Well since October 1962. A report, comparing water levels with previous years' records, is sent to the U.S. Geological Survey "Water Resources Review" each month.

The water levels for the period of record have varied only 5.17 feet between a high of 13.58 feet and a low of 18.75 feet. Recharge from precipitation accounts for the water level rises, and evapotranspiration and ground-water discharge cause water levels to decline.

The average water level for 1983 was 16.81 feet or 0.03 foot higher than the average for 1982.

The well was pumped and sampled for chemical quality in June and again in October 1984. The recovery rate of this well was extremely slow. No specific capacity data are available.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
June, 1984							
05...	1030	515	7.4	16.5	46	16	24
Oct. 26...	0930	510	8.0	11.5	40	15	24
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride dissolved (mg/L as Cl)	Fluoride dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
June, 1984							
05...	80	59	76	.20	313	1.1	
Oct. 26...	--	49	66	.10	265	.92	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
June, 1984							
05...	.30	<.010	490	25	10	10	
Oct. 26...	.30	.020	750	190	30	14	

GLENVILLE WELL
385604080495901

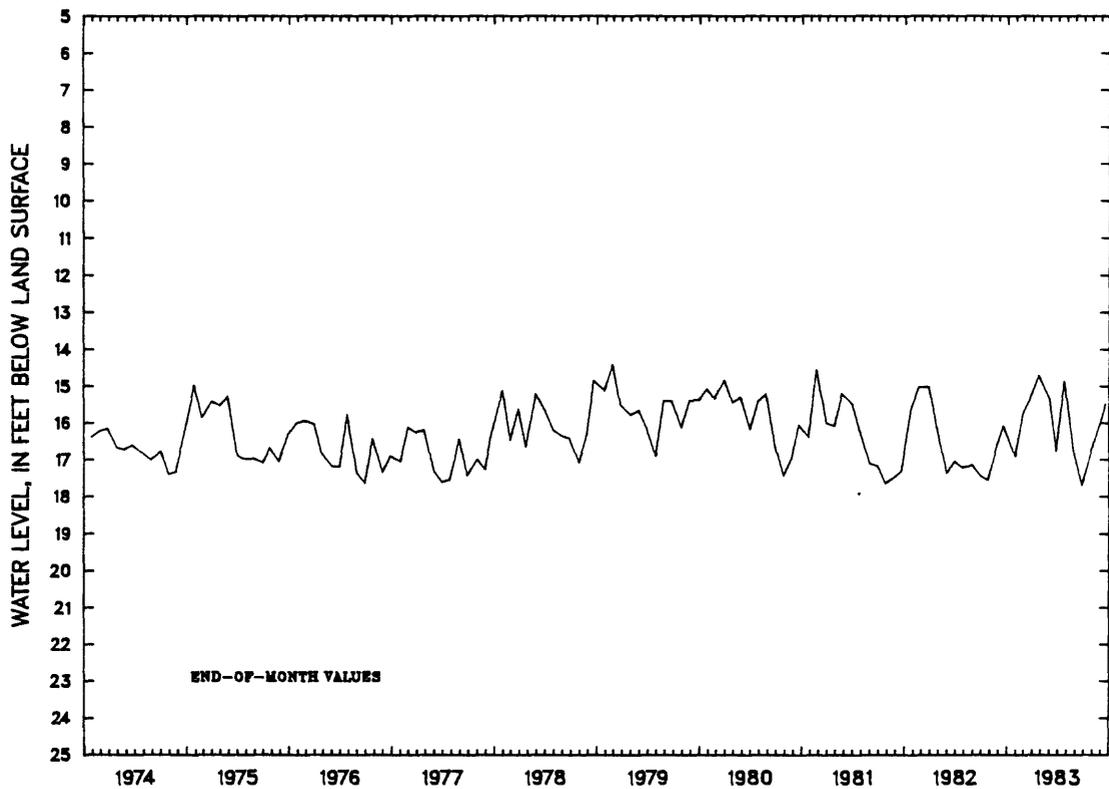
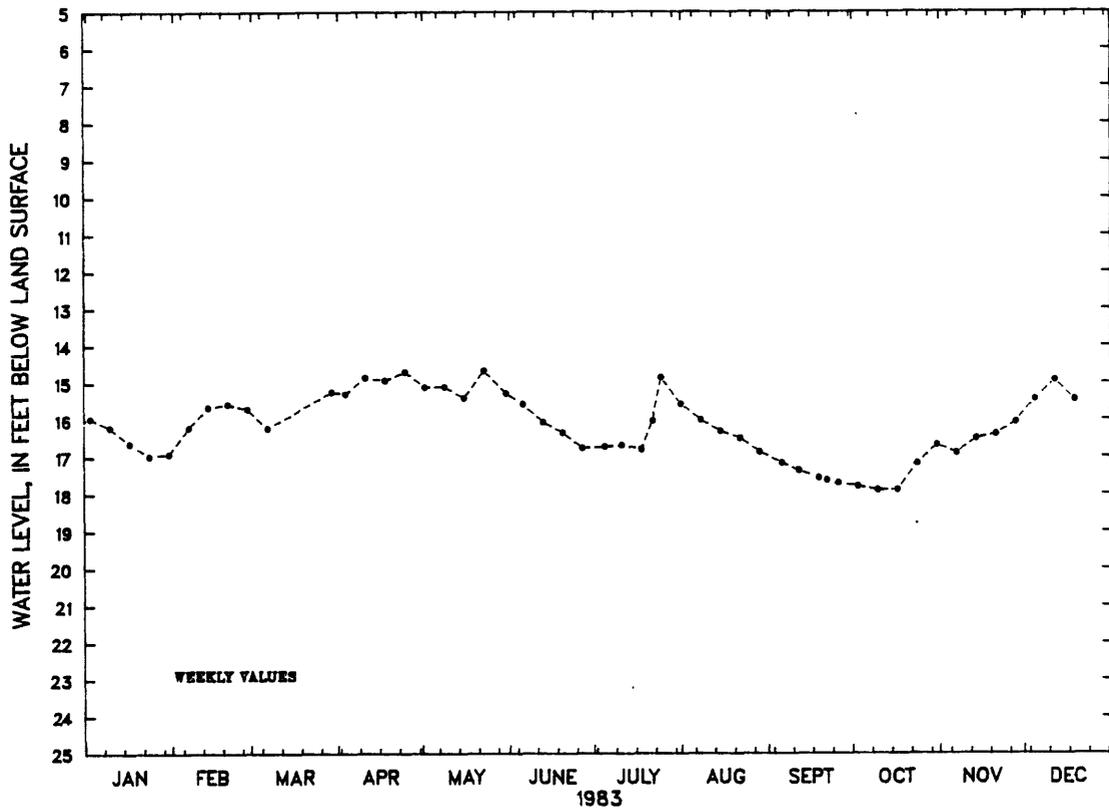


Figure 2.4.1-1.--Water-level fluctuations in the Glenville well, Gilmer County.

2.5 Grant County

2.5.1 Mount Storm well

391652079181401.

LOCATION.--Lat 39°16'52", long 79°18'14", Hydrologic Unit 02070002, about 200 ft north of U.S. Route 50, about 3.5 mi west of Mount Storm.

Owner: Buffalo Coal Company.

AQUIFER.--Thin bed of coal in the Conemaugh Group of Upper Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 24 ft, cased with plastic to 23 ft.

DATUM.--Land-surface datum is about 2,890 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top edge of recorder shelter base, 1.5 ft above land-surface datum.

REMARKS.--Well is near active surface mine.

PERIOD OF RECORD.--June 1978 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.33 ft below land-surface datum, Mar. 11-15, 1979; lowest 21.24 ft below land-surface datum, Nov. 28, 29, 1982.

SUPPLEMENTARY INFORMATION

This well is located on a hillside near a strip mine and taps an aquifer of red and gray shale, siltstone, sandstone, and thin beds of limestone and coal.

The lowering of water levels which occurred in 1981 and continued through 1983 (see fig. 2.5.1-1), was probably related to blasting and nearby stripmining. Stripmining in this area continues along with backfilling. Precipitation is the source of recharge affecting the well.

The water-level average for 1983 was 11.76 feet or 0.77 foot below the average for 1982.

The well was pumped and sampled for chemical quality in May and again in October 1984. The recovery rate was very slow. The specific capacity was 0.09 (gal/min)/ft (pumped 2 min.) in October as computed from the recovery data.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
May , 1984							
29...	1330	146	6.9	11.0	18	5.8	.70
Oct.							
22...	1100	140	6.1	17.0	16	5.8	.80
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
May , 1984							
29...	E60	18	2.5	.20	102	--	
Oct.							
22...	56	9.7	1.5	.10	96	<.10	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
May , 1984							
29...	--	--	--	24	4100	1300	
Oct.							
22...	.80	<.010	--	470	2100	1100	

MOUNT STORM WELL
391662079181401

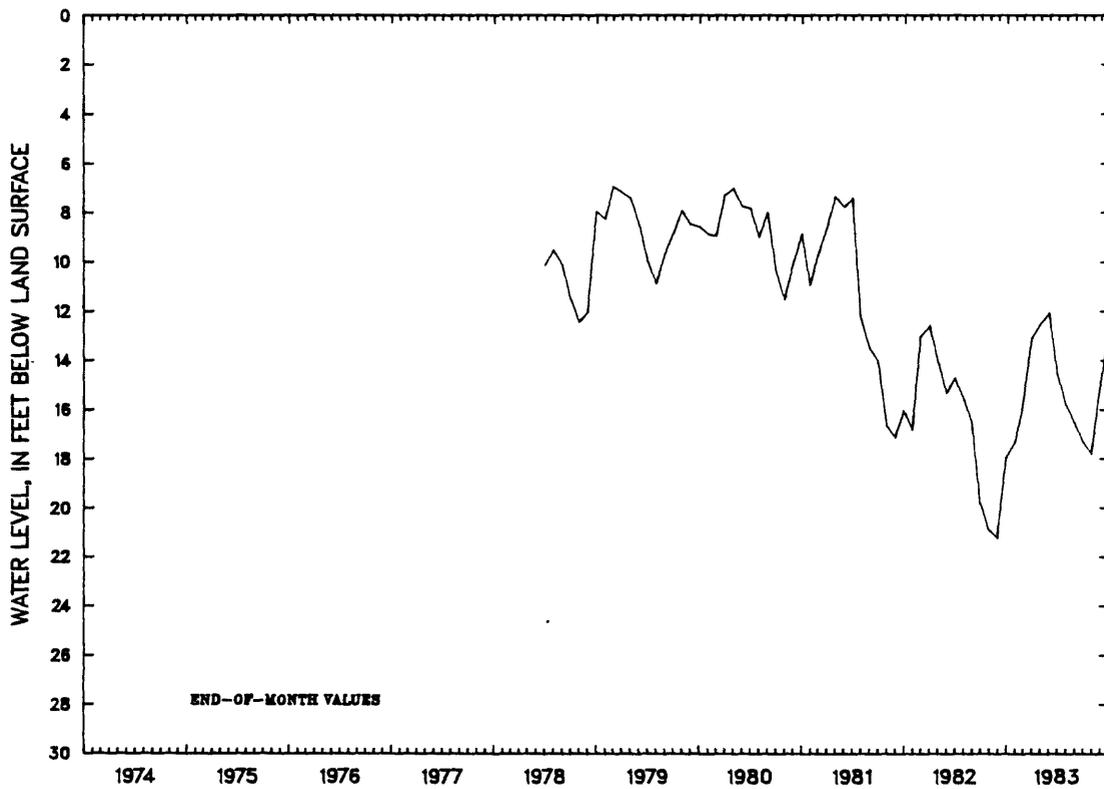
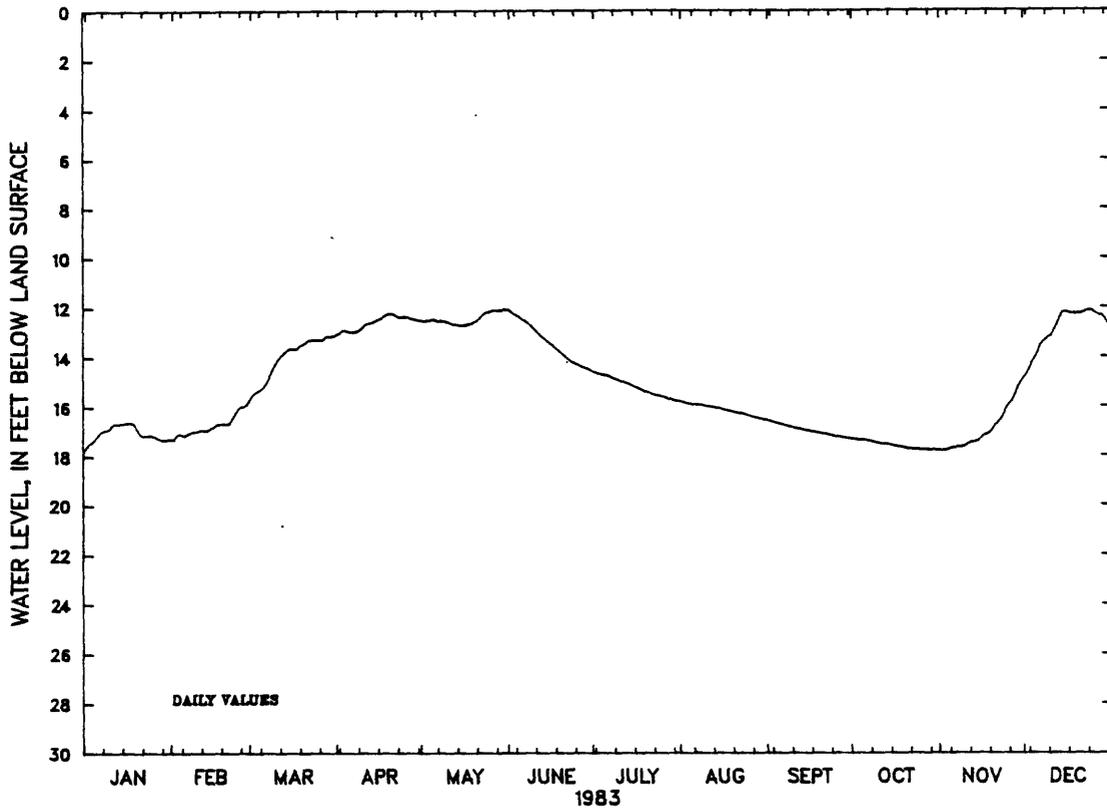


Figure 2.5.1-1.--Water-level fluctuations in the Mount Storm well, Grant County.

2.6 Greenbrier County

2.6.1 Rainelle well

375747080465901. Project number, M005.

LOCATION.--Lat 37°57'47", long 80°46'59", Hydrologic Unit 05050005, 0.4 mi southwest on Rt. 20 from the junction of U.S. Route 60 and State Route 20 in Rainelle.

Owner: Chesapeake and Ohio Railroad.

AQUIFER.--Bluestone and Princeton Formations of Upper Mississippian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 10.5 in., depth 119 ft, cased with galvanized iron to 59.5 ft.

DATUM.--Land-surface datum is about 2,380 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 4.5 ft below land-surface datum.

PERIOD OF RECORD.--January 1980 to October 1982 (periodic water-level measurements), October 1982 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water-level, 19.65 ft below land-surface datum, Dec. 19, 1982; lowest, 27.35 ft below land-surface datum, Sept. 29, 1983.

SUPPLEMENTARY INFORMATION

This well, which was formerly a project well, is located in a valley and taps an aquifer of mostly red, green, and medium-gray shale and sandstone.

The recharge spike which occurred at the end of July 1983 was due to heavy precipitation. The water level ranged from a high of 19.65 feet in December 1982 to a low of 27.35 feet in September 1983. By December 1983 the level had recovered to 20.76 feet, which was 1.11 feet below the level at the end of 1982.

A pump test was done on this well in December 1981.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
Dec., 1981 18...	1200	310	7.3	10.5	27	4.2	17
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
Dec., 1981 18...	150	3.4	4.9	.10	184	.04	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
Dec., 1981 18...	.020	--	--	36	--	210	

RAINELLE WELL
375747080465901

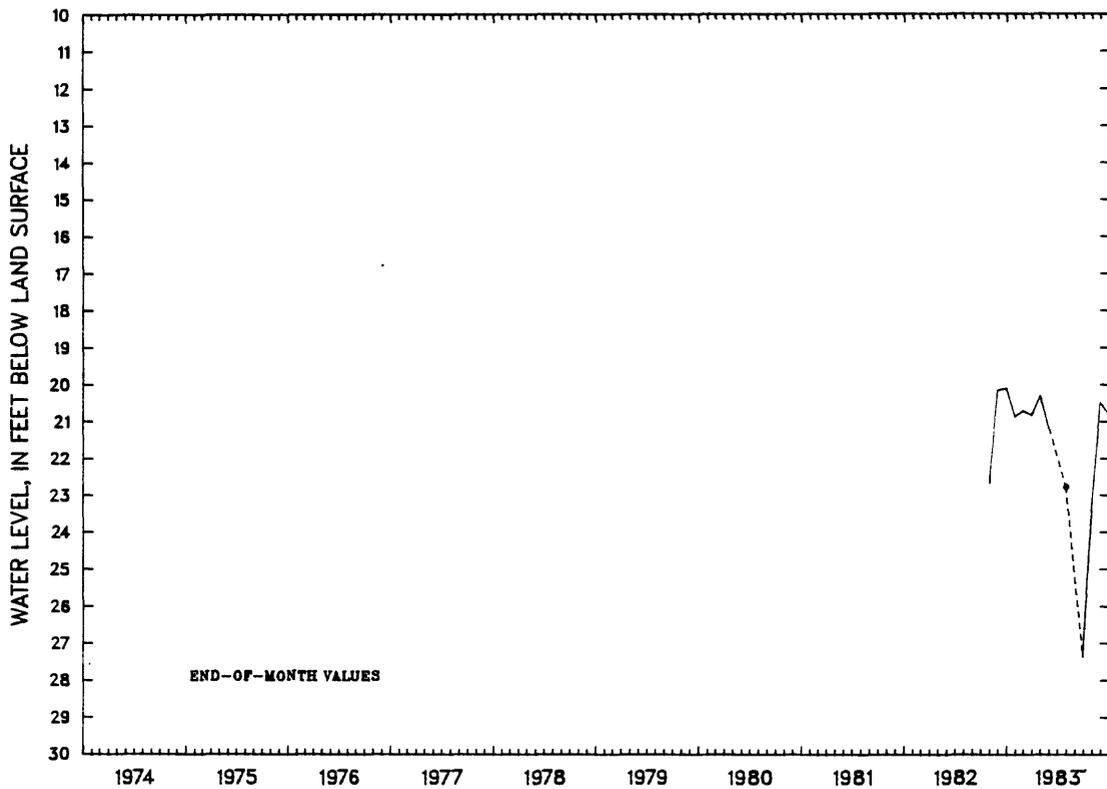
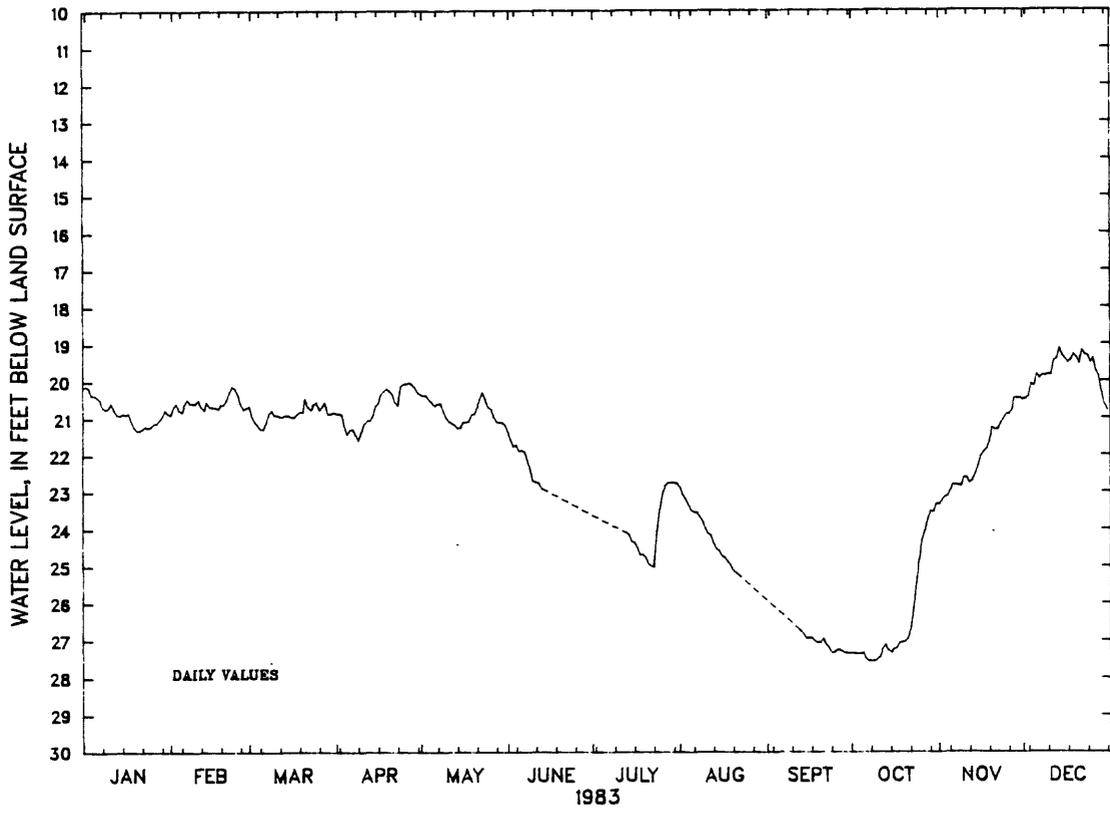


Figure 2.6.1-1.--Water-level fluctuations in the Rainelle well, Greenbrier County.

2.6 Greenbrier County (continued)

2.6.2 White Sulphur Springs well

374804080174001. Local number, 45-8-2.

LOCATION.--Lat 37°48'04", long 80°17'40", Hydrologic Unit 05050003, at Fish Culture Station, U.S. Fish and Wildlife Service Hatchery, White Sulphur Springs. Owner: U.S. Government.

AQUIFER.--Marcellus Formation and Harrell Shale of Devonian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 61 ft, cased with steel.

DATUM.--Land-surface datum is about 1,875 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.9 ft above land-surface datum.

PERIOD OF RECORD.--November 1953 to current year (weekly water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.80 ft below land-surface datum, Mar. 16, 1955; lowest measured, 14.82 ft below land-surface datum, Aug. 29, 1981.

SUPPLEMENTARY INFORMATION

This well is located in a valley at the U.S. Fish Hatchery and taps an aquifer of mostly limestone and shale.

There has been a general downward trend of water level for the entire period of record. The extreme record-low water level of 14.82 feet in August 1981, and another sharp drop to a level of 14.41 feet in September 1983 were caused by pumping this well and adjacent wells during dry periods to supplement the water supply at the Fish Hatchery. The ten-year hydrograph reflects the drawdown due to pumping at the fish hatchery during the dry season for several years.

The average water level for 1983 was 5.14 feet or 0.04 foot lower than the average for 1982.

WHITE SULPHUR SPRINGS WELL
374804080174001

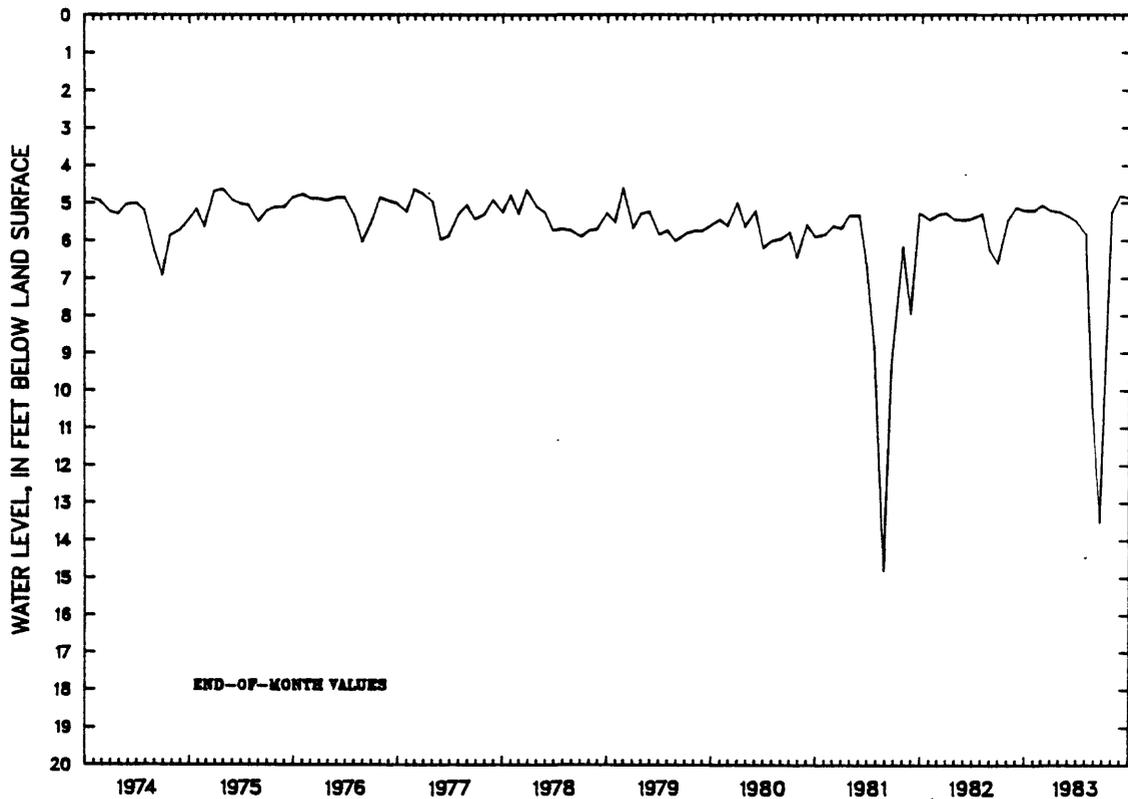
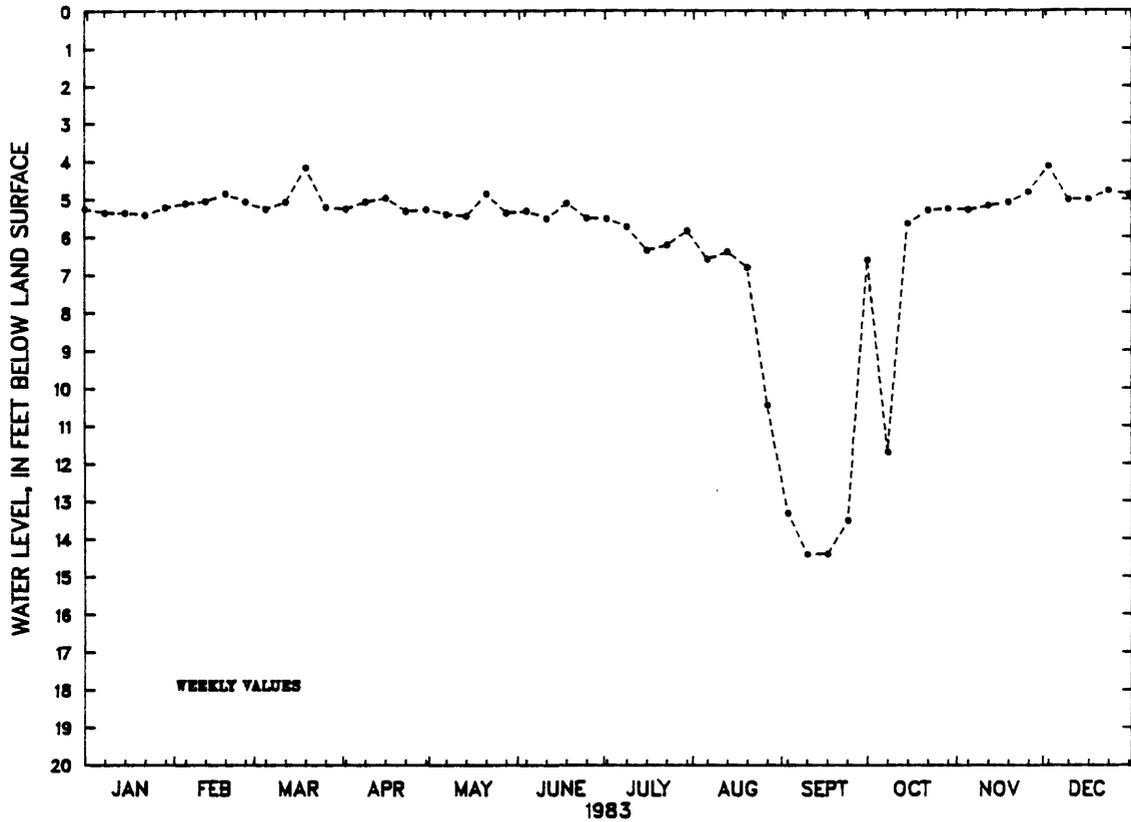


Figure 2.6.2-1.--Water-level fluctuations in the White Sulphur Springs well, Greenbrier County.

2.7 Hampshire County

2.7.1 Pepper-Hott well

391257078404601. Local number, 23-6-46.

LOCATION.--Lat 39°12'57", long 78°40'46", Hydrologic Unit 02070003, about 4 mi south of Augusta on State Route 7.

Owner: Loring Hott.

AQUIFER.--Hampshire Formation of Upper Devonian age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 24 ft, cased with tile.

DATUM.--Land-surface datum is about 1,400 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing at land-surface datum.

REMARKS.--Plastic liner inserted in well Mar. 9, 1982, to eliminate float hanging.

PERIOD OF RECORD.--February 1972 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 0.30 ft below land-surface datum, Sept. 25, 1975; lowest, 16.69 ft, estimated, below land-surface datum, July 15, 1973.

SUPPLEMENTARY INFORMATION

This well is located on a hillside in an open field beside an abandoned farmhouse. There is poor drainage, and the aquifer consists of siltstone.

The water level rises quickly with heavy rains, and since the top of the casing is at land surface, runoff may at times enter the top of the well. The hydrograph reflects the effect of precipitation on the water level. In 1976, which was dryer than normal, there was a constant drop in water level from January to June. The extended period of lost record from 1980 to 1983 was due to equipment malfunction.

The average water level for 1983 was 9.58 feet or 0.10 foot below the average level in 1982.

The well was pumped and sampled for chemical quality in June and again in October 1984. The recovery rate was very slow, and no specific capacity data are available.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
June, 1984							
06...	1230	73	6.6	29.0	7.3	1.9	3.6
Oct. 18...	1330	143	6.6	25.0	19	4.4	3.3
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
June, 1984							
06...	26	7.8	2.5	.10	72	<.10	
Oct. 18...	51	15	4.5	<.10	104	1.4	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
June, 1984							
06...	.30	<.010	1100	79	70	52	
Oct. 18...	.50	.030	5800	16	250	39	

PEPPER-HOTT WELL
391257078404601

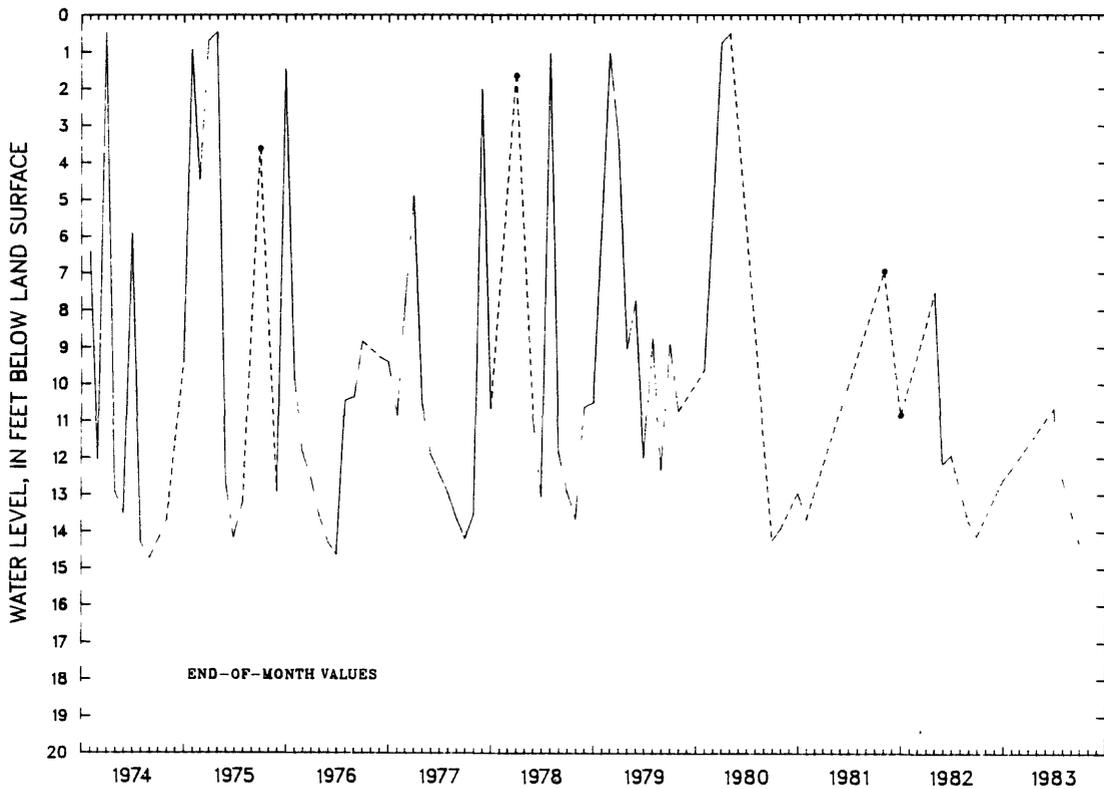
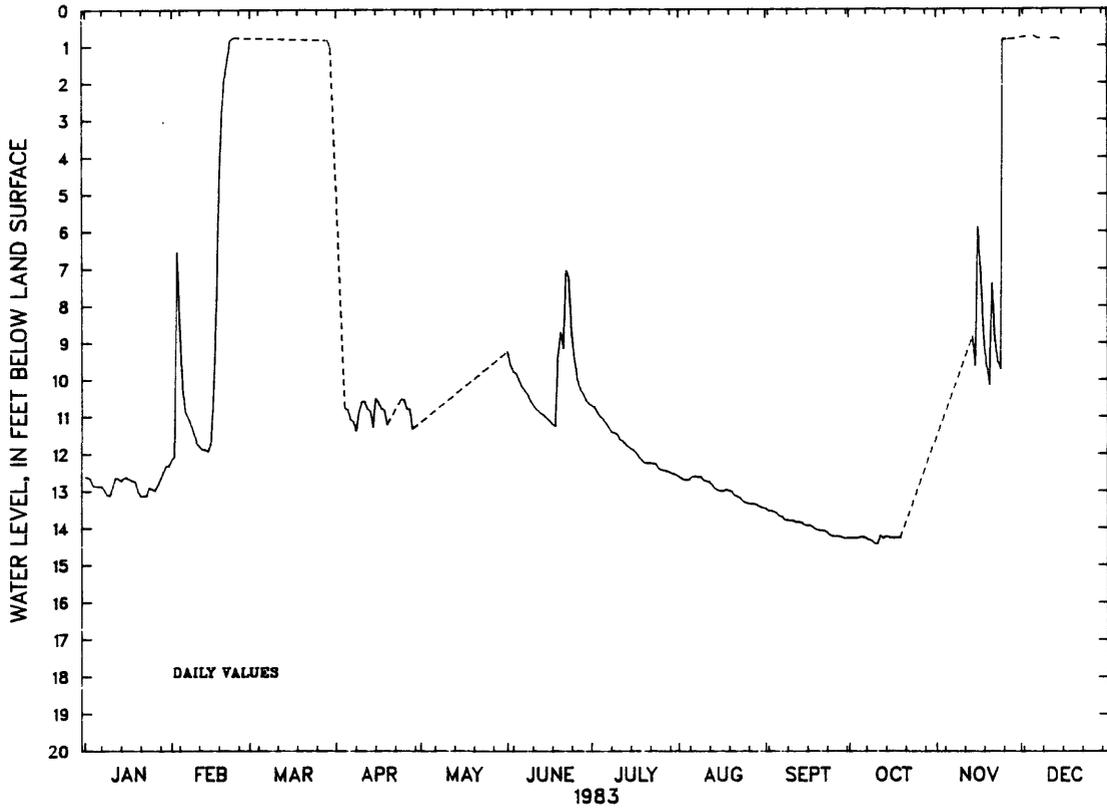


Figure 2.7.1-1.---Water-level fluctuations in the Pepper-Hott well, Hampshire County.

2.8 Hardy County

2.8.1 Trout Pond well

385714078441301. Local number, 25-4-5.

LOCATION.--Lat 38°57'14", long 78°44'13", Hydrologic Unit 02070003, about 3 mi east of Lost River near entrance to Trout Pond Recreation Area.

Owner: U.S. Forest Service.

AQUIFER.--Helderberg Group of Lower Devonian age and Tonoloway Formation of Upper Silurian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 460 ft, cased with steel to 190 ft.

DATUM.--Land-surface datum is about 1,920 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of well casing, 0.9 ft above land-surface datum.

PERIOD OF RECORD.--March 1968 to November 1976 (water-level recorder), November 1976 to current year (periodic water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 263.00 ft, estimated, below land-surface datum, July 15, 1972; lowest, 274.35 ft below land-surface datum, Sept. 12, 1983.

SUPPLEMENTARY INFORMATION

This well is located on a hillside in a remote forested recreation area. This aquifer consists of limestone and the well has a rapid response to recharge from precipitation.

Water levels were very high in 1980 and dropped in 1981 to a record low of 274.35 feet in September 1983. This was probably due to very dry weather during 1982 and 1983. The record-high water level of 263.00 feet that July 1972 was caused by recharge from rainfall produced by Hurricane Agnes.

The average water level of 271.12 feet was the same for both 1982 and 1983.

TROUT POND WELL
385714078441301

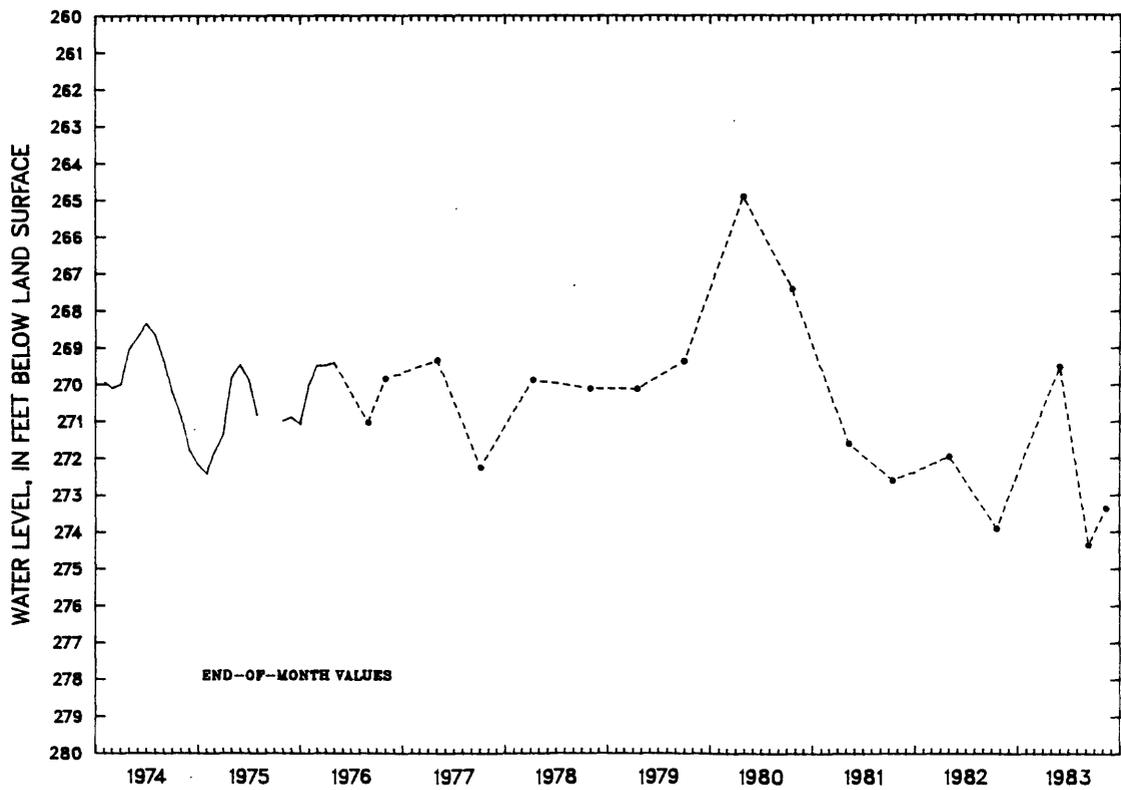
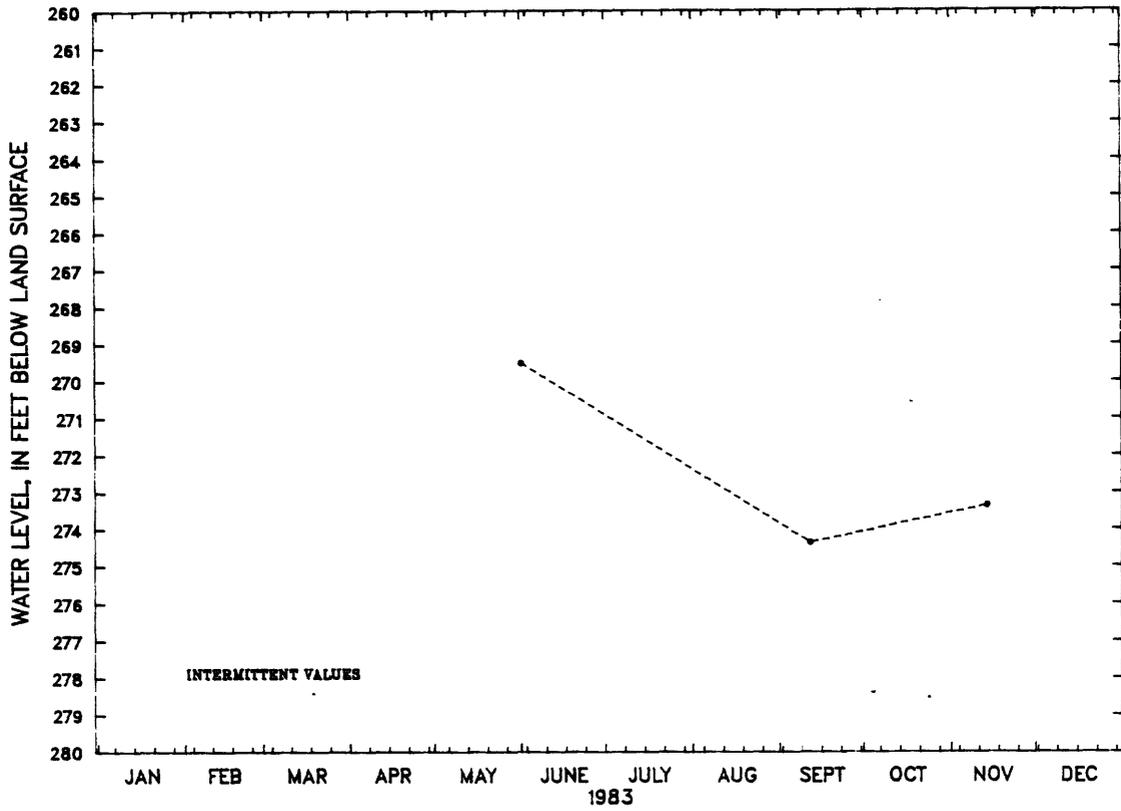


Figure 2.8.1-1.--Water-level fluctuations in the Trout Pond well,
Hardy County.

2.9 Lewis County

2.9.1 Jackson's Mill well

390553080280802. Local number, 16-1-9.

LOCATION.--Lat 39°05'53", long 80°28'08", Hydrologic Unit 05020002, at Jackson's Mill State 4-H Camp, Jackson's Mill.

Owner: West Virginia University.

AQUIFER.--Conemaugh Group of Upper Pennsylvanian age and Allegheny Formation of Middle Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 12 in., depth 122 ft, cased.

DATUM.--Land-surface datum is about 1,020 ft above National Geodetic Vertical Datum of 1929. Measuring point: Drilled hole in steel plate covering casing of West Fork River.

REMARKS.--Water level affected by stage of West Fork River.

PERIOD OF RECORD.--May 1961 to May 1976 (weekly water-level measurements), October 1977 to current year (periodic water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 8.88 ft below land-surface datum, Dec. 30, 1969; lowest measured, 24.80 ft below land-surface datum, Oct. 6, 1977.

SUPPLEMENTARY INFORMATION

This well is located in a flat valley at the Jackson's Mill State 4-H Camp. The aquifer consists of mainly shale, siltstone, sandstone, limestone, and coal.

In December 1969 the water level rose sharply to a record high of 8.88 feet after recharge from heavy precipitation in the form of snow and a rise in air temperature which caused snowmelt.

The average water level for 1983 was 21.49 feet or 0.01 foot above the average level in 1982.

JACKSON'S MILL WELL
390553080230802

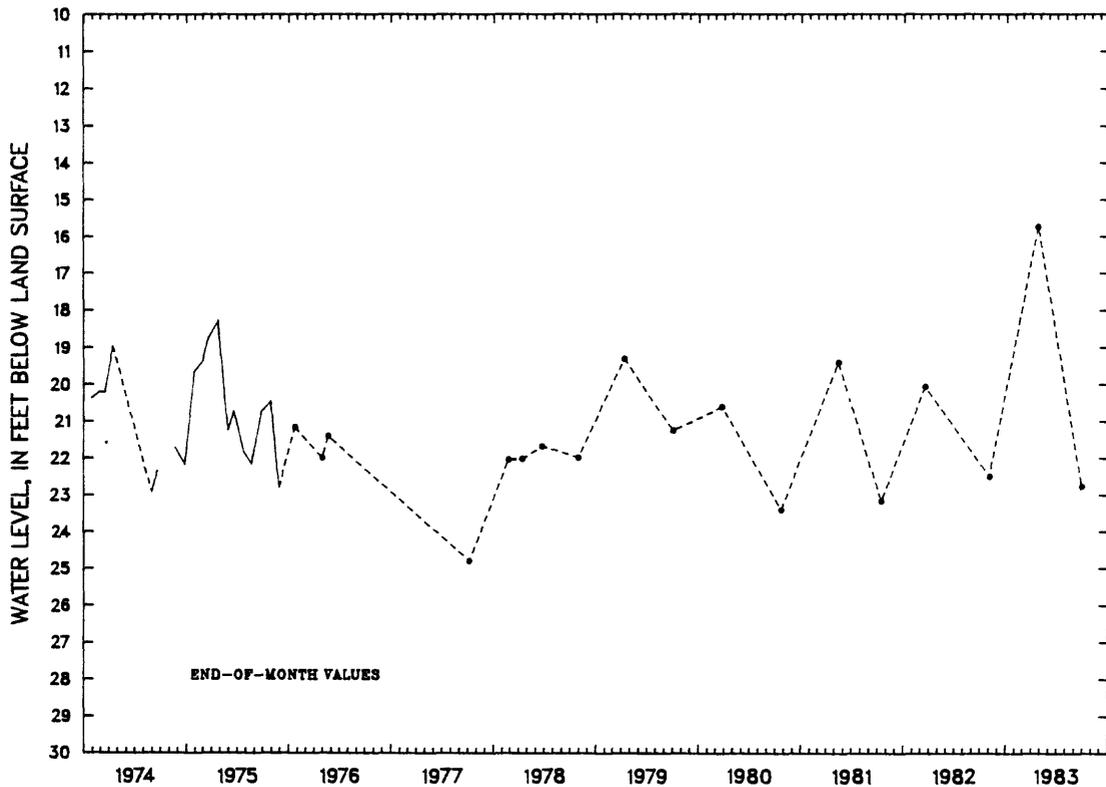
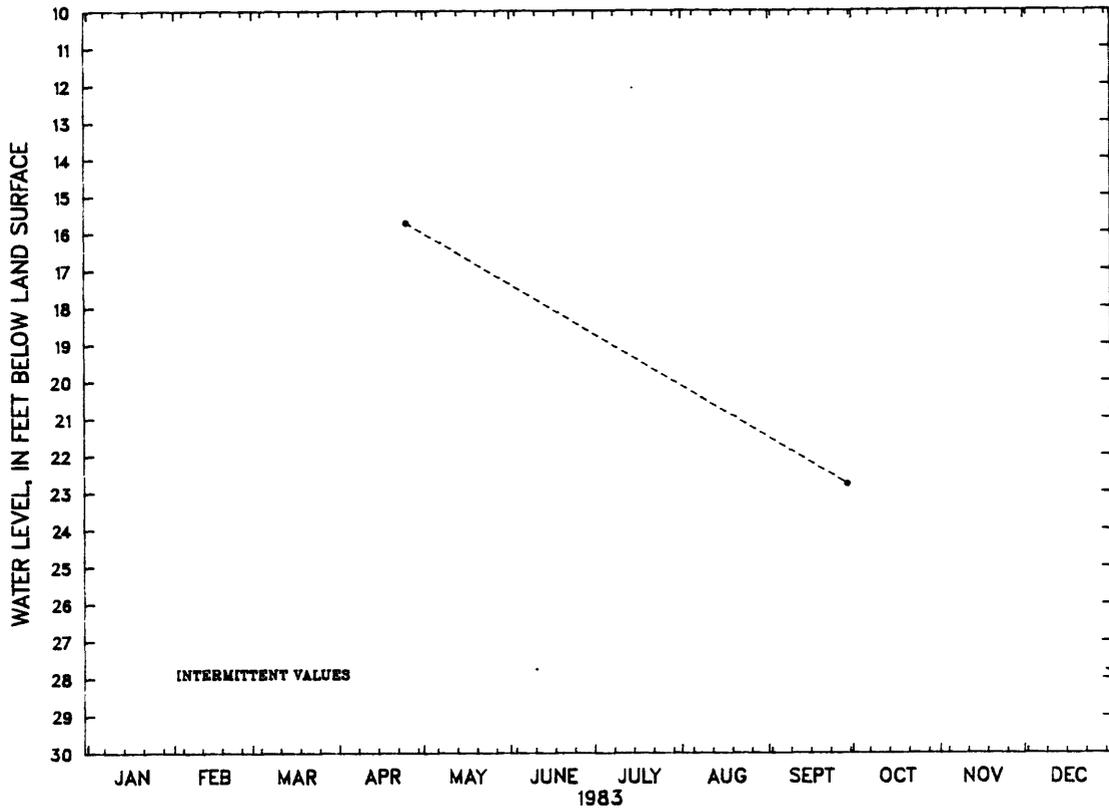


Figure 2.9.1-1.--Water-level fluctuations in the Jackson's Mill well, Lewis County.

2.9 Lewis County (continued)

2.9.2 Brownsville well

390008080283401. Project number, SJ4.

LOCATION.--Lat 39°00'08", long 80°28'34", Hydrologic Unit 05020002, about 75 ft northeast of County Route 30 bridge across West Fork River at Brownsville.

Owner: U.S. Geological Survey.

AQUIFER.--Monongahela Group of Upper Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 102 ft, cased with galvanized iron to 18 ft.

DATUM.--Land-surface datum is about 1,026 ft National Geodetic Vertical Datum of 1929. Measuring point: Three hacksaw marks on top of casing.

PERIOD OF RECORD.--March to May 1982 (periodic water-level measurements), May 1982 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 5.01 ft below land-surface datum, Dec. 1, 1982; lowest, 12.45 ft below land-surface datum, Sept. 30, 1983.

SUPPLEMENTARY INFORMATION

This well is located in a valley just above the construction area of the Stonewall Jackson Dam. The aquifer consists of mainly sandstone, siltstone, shale, limestone, and coal.

The well was drilled in 1981 as a project well and was transferred to the observation system in 1982. Construction on the Stonewall Jackson Dam along with fairly dry weather conditions probably caused the two-foot drop in water level in September and October 1983.

The well was pumped and sampled for chemical quality in June and again in October 1984. The recovery rate was good. The specific capacity was 3.5 (gal/min)/ft as determined from a two-hour test in 1982.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
June, 1984							
05...	1345	212	5.3	13.0	17	6.1	6.4
Oct.							
15...	1345	226	4.5	16.0	16	6.4	8.2
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
June, 1984							
05...	5	73	3.1	.20	183	1.4	
Oct.							
15...	--	74	8.3	.10	148	1.4	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
June, 1984							
05...	.30	<.010	2100	48	540	520	
Oct.							
15...	.30	<.010	6500	380	660	640	

2.10 Marion County

2.10.1 Farmington Deep well

393101080150501.

LOCATION.--Lat 39°31'01", long 80°15'05", Hydrologic Unit 05020003, about 1,250 ft north of State Route 91 and 100 ft west of State Route 15 in Farmington.

Owner: State of West Virginia.

AQUIFER.--Open to a mine in Pittsburgh coal, Member of the Monongahela Group of Upper Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in, depth 266 ft, cased with steel to 252 ft.

DATUM.--Land-surface datum is about 970 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of steel plate at land-surface datum.

REMARKS.--Well formerly used by U.S. Bureau of Mines to backfill abandoned mine with shale slurry. Water level affected by mine pumpage.

PERIOD OF RECORD.--April to December 1978 (periodic water-level measurements), December 1978 to current year (daily water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 168.34 ft below land-surface datum, Sept. 5, 11, 1983; lowest measured, 219.47 ft below land-surface datum, May 12, 1978.

SUPPLEMENTARY INFORMATION

This is a valley well in the town of Farmington. The well is open to an abandoned mine in the Pittsburgh coal. The aquifer consists of mainly coal, limestone, shale, siltstone, and sandstone. In 1978, ground-up shale slurry was pumped into the abandoned mine through wells in the vicinity of the observation well (Hobba, 1981, p. 62). This backfilling operation was to prevent further subsidence beneath the town of Farmington.

There was a rapid rise in water level from 1978-1980, and it continued with gradual rise from 1981-1983, probably due to backfilling the mine. Notice that the 1983 hydrograph is lowest in the spring and highest in the late summer. This is nearly the reverse of a hydrograph reflecting natural water levels that are unaffected by mining. This water level pattern may be affected by pumping from hydraulically connected coal mines.

The average water level for 1983 was 180.81 feet or 2 feet above the average level in 1982.

Recovery tests on two nearby wells in 1979 showed a transmissivity of 7 ft²/day for the rocks above the Pittsburgh coal. One well is 98 feet deep and the other well is about 145 feet deep.

FARMINGTON DEEP WELL
393101080150501

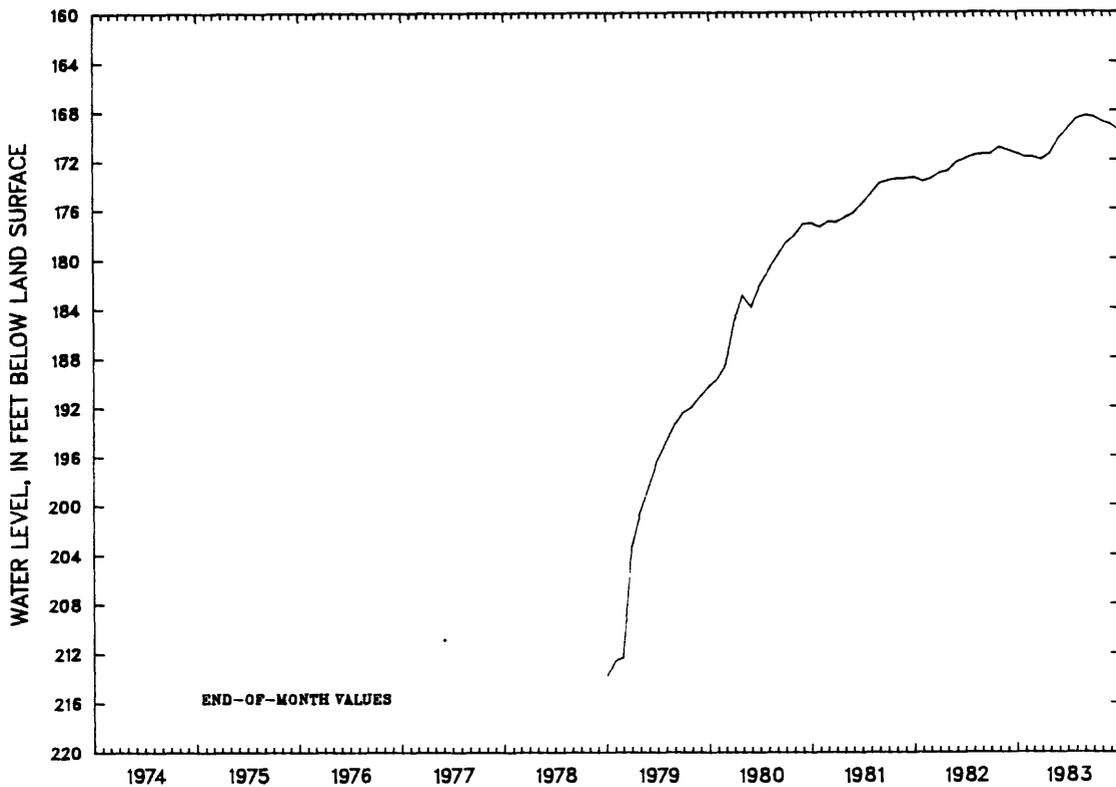
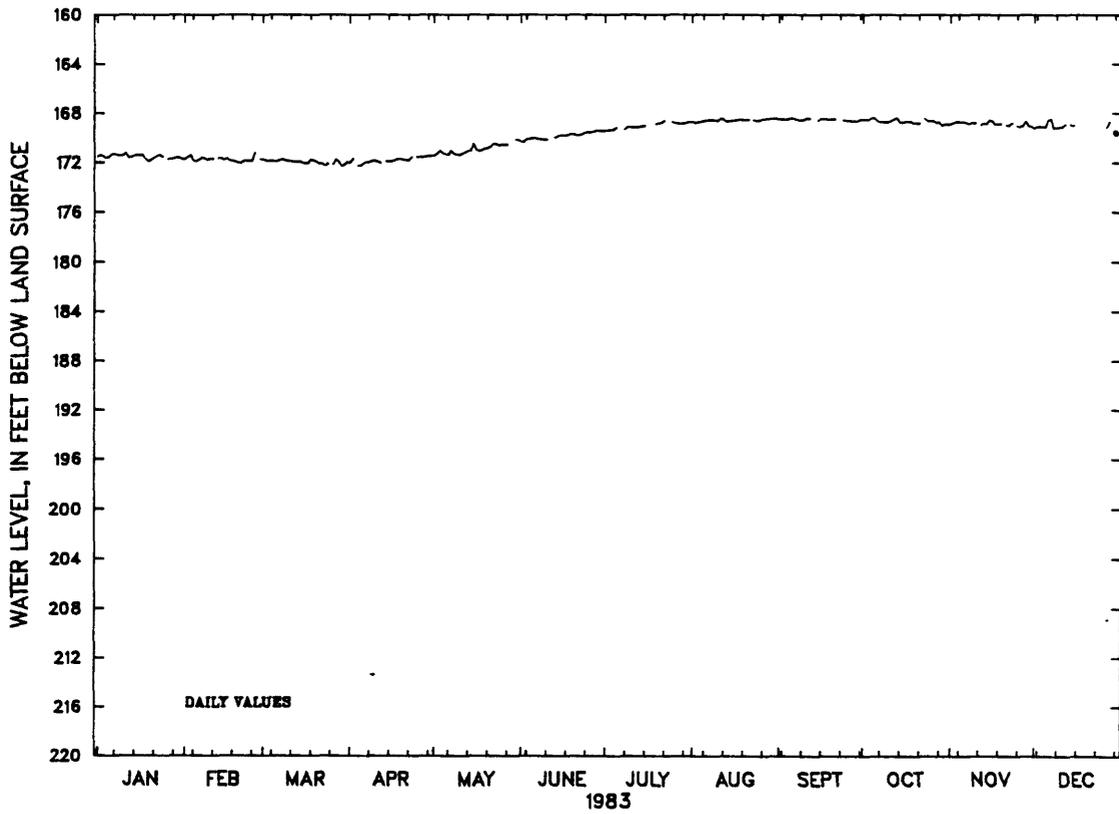


Figure 2.10.1-1.--Water-level fluctuations in the Farmington Deep well, Marion County.

2.10 Marion County (continued)

2.10.2 White well

393057080161901.

LOCATION.--Lat 39°30'57", long 80°16'19", Hydrologic Unit 05020003, on State Route 250/9, 1.2 mi west of Farmington.

Owner: Richard White.

AQUIFER.--Dunkard Group of Pennsylvanian and Permian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 74 ft, cased with steel to 6 ft.

DATUM.--Land-surface datum is about 1,140 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, flush with instrument shelf 0.3 ft above land-surface datum.

PERIOD OF RECORD.--June to December 1977 (periodic water-level measurements), December 1977 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 12.89 ft below land-surface datum, Jan. 26, 1978; lowest, 55.64 ft below land-surface datum, Sept. 30, 1983.

SUPPLEMENTARY INFORMATION

This well is located on a hilltop and taps an aquifer of sandstone, siltstone, red and gray shale, and limestone.

Water levels rise rapidly in response to rainfall but then also decline rapidly. The long-term water-level trend is generally downward. Both responses may be due to an increased number of rock fractures caused by subsidence in an abandoned coal mine in the Pittsburgh coal which lies about 400 feet beneath the bottom of this well (Hobba, 1981, p. 70).

An injection permeability test in 1979 indicated a transmissivity of 0.2 ft²/day, and hydraulic conductivity values of 0.0045 and 0.0062 ft/day. It also indicated that the rock is highly fractured between 6 and 25 feet.

The average water level for 1983 was 42.67 feet or 2.81 feet above the average level in 1982.

WHITE WELL
393057080161901

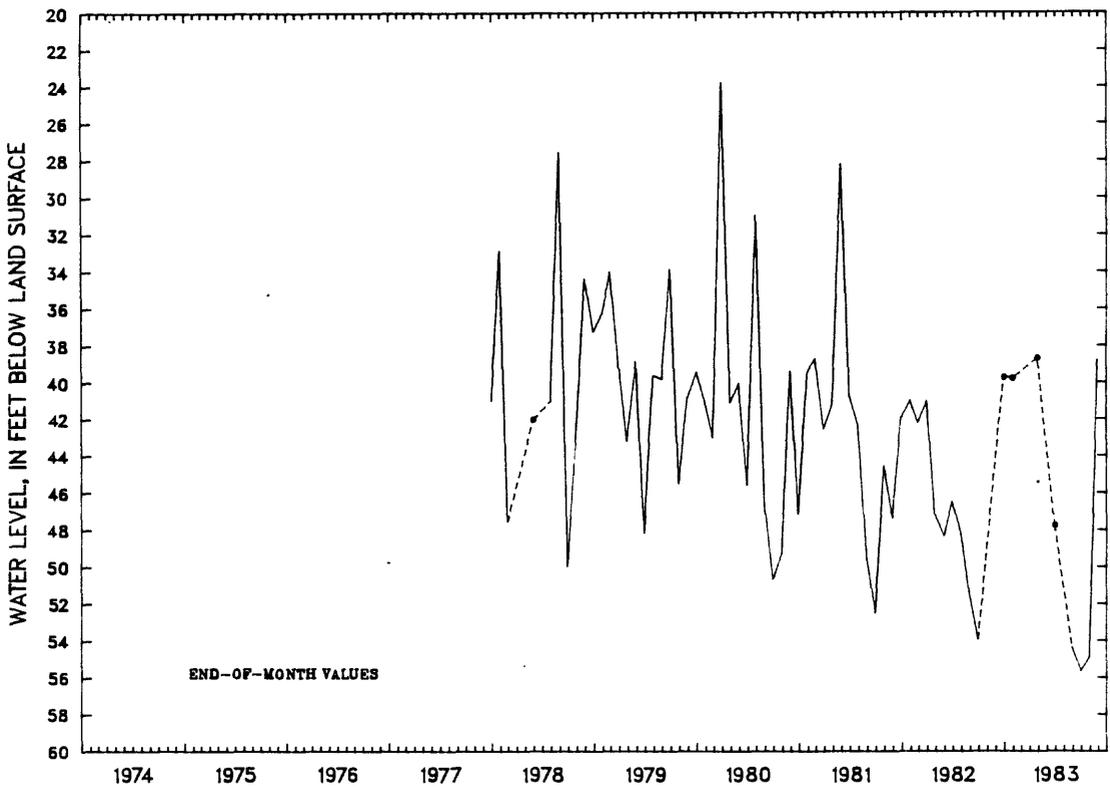
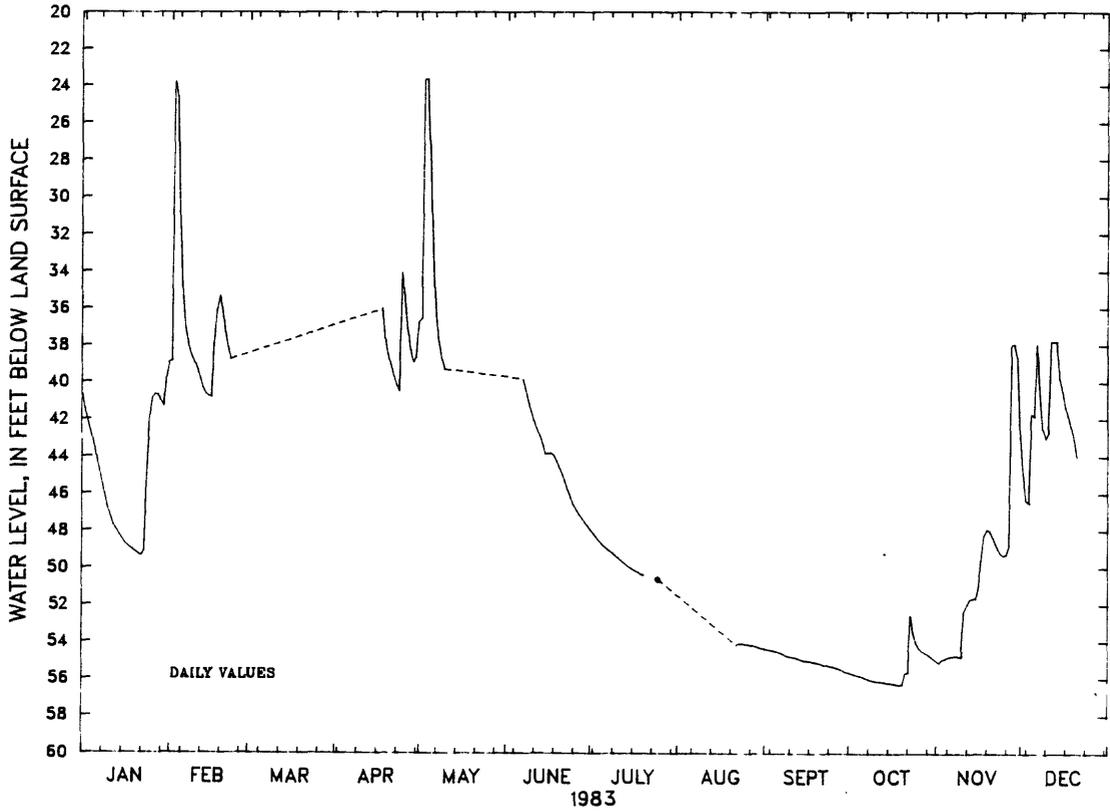


Figure 2.10.2-1.--Water-level fluctuations in the White well, Marion County.

2.11 Mason County

2.11.1 Point Pleasant well

385451082062001. Local number, 38-3-54.

LOCATION.--Lat 38°54'51", long 82°06'20", Hydrologic Unit 05030202, about 0.5 mi east of intersection of State Route 62 and Secondary State Route 13.

Owner: West Virginia University Ohio Valley Agricultural Experiment Station. AQUIFER.--Conemaugh Group of Upper Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 131 ft, cased with steel to 60 ft.

DATUM.--Land-surface datum is about 615 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 3.0 ft above land-surface datum.

PERIOD OF RECORD.--November 1959 to January 1960 (weekly water-level measurements), January 1960 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 23.26 ft below land-surface datum, Aug. 22-25, 1980; lowest, 26.20 ft below land-surface datum, Jan. 1, 1966.

SUPPLEMENTARY INFORMATION

This well is located on valley farmland owned by the West Virginia University Ohio Valley Agricultural Experiment Station. The aquifer consists of cyclic sequences of mostly red and gray shale, siltstone, sandstone, and thin beds of limestone and coal.

In the spring of 1972 there was a sharp rise in water level, and then the water level fluctuated between about 23 and 25 feet below land surface until the fall of 1978. After another rise, the water level fluctuated between 23 and 24 feet until the fall of 1980. Since that time there has been a general downward trend in water level to 1983.

The average water level for 1983 was 24.92 feet or 0.01 foot below the average level in 1982.

The well was pumped and sampled in May and October 1984; recovery was very slow. No specific capacity data are available.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
May, 1984							
02...	1350	500	7.6	15.0	10	1.8	100
Oct. 29...	1305	465	--	15.5	10	2.0	96
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
May, 1984							
02...	210	16	32	.90	329	<.10	
Oct. 29...	--	12	28	.90	277	<.10	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
May, 1984							
02...	1.1	.010	2600	83	130	78	
Oct. 29...	.30	<.010	3000	18	120	110	

POINT PLEASANT WELL
385451082062001

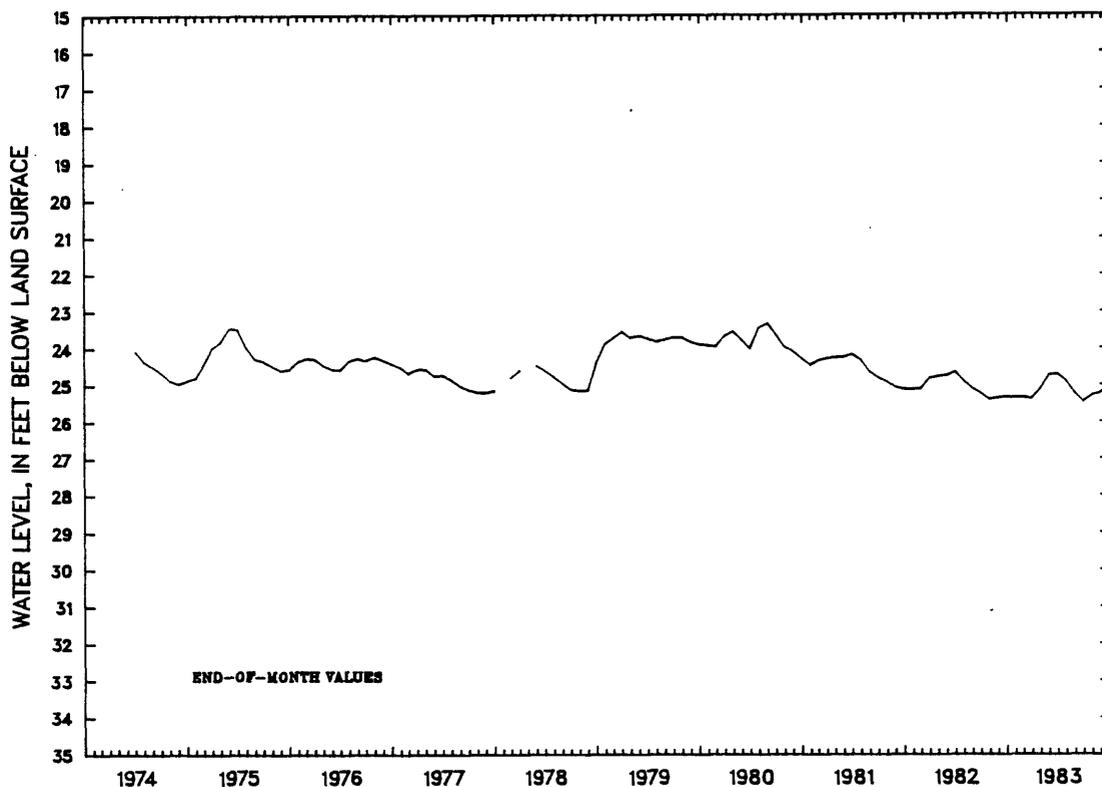
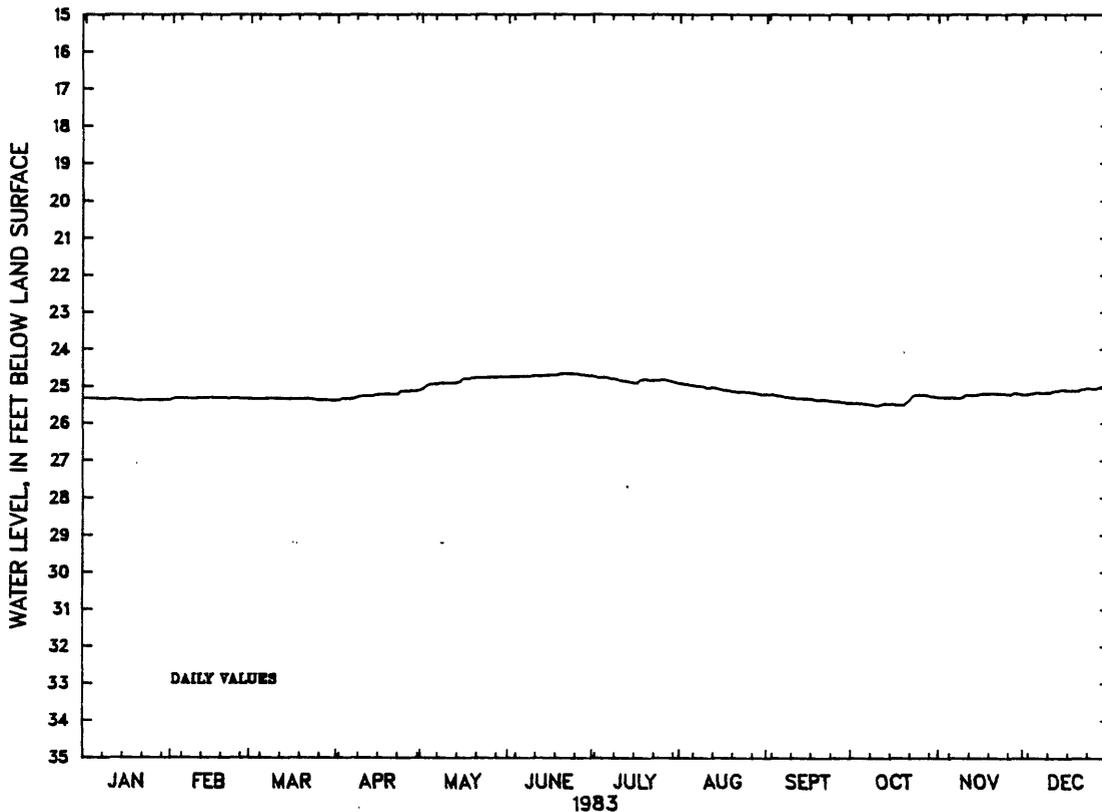


Figure 2.11.1-1.--Water-level fluctuations in the Point Pleasant well, Mason County.

2.12 Mercer County

2.12.1 Princeton well

372149081055001. Local number, 48-5-1.

LOCATION.--Lat 37°21'49", long 81°05'50", Hydrologic Unit 05050002, at Princeton Water Service, Company No. 1 well, Princeton.

Owner: West Virginia Service Company.

AQUIFER.--Hinton Formation of Upper Mississippian age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 249 ft, cased.

DATUM.--Land-surface datum is about 2,387 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing extension, 5.50 ft above land-surface datum. Prior to September 1975, measuring point was top of casing at land-surface datum.

REMARKS.--Water level affected by nearby pumping. Well flows at times. Some geophysical well logs are available for this well.

PERIOD OF RECORD.--March 1960 to current year (weekly water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.0 feet flowing at land-surface datum, many days since 1968; lowest measured, 90.58 ft below land-surface datum, Dec. 10, 1969.

REVISED RECORDS.--WDR WV-79-1: 1977-78 (water levels).

SUPPLEMENTARY INFORMATION

This well is located in a flat valley in the commercial section of Princeton along the highway. The aquifer consists of sandstone and shale.

Before 1968 the water level remained below land surface. Beginning in 1968 the water was flowing from this artesian well most of the time, except when nearby wells were pumped and during dry periods. The low for period of record in December 1969 was related to pumping. In September 1975 the land surface around the well was raised by filling with rock and soil. This made the top of casing 5.5 feet below the new land surface in a brick-lined manhole. Some fluctuations of water level are now caused by the entrance of surface water into the top of the well and the pumping of nearby public supply wells which occasionally are used for the city of Princeton. The drop in water level in 1977 was due to pumping of nearby wells. (In November 1985 the casing was extended to the new land surface.)

The well was pumped and sampled for water quality in July and in October 1984. The recovery rate was good. The specific capacity was 1.16 (gal/min)/ft (pumped 10 min.) in October, as computed from the recovery data. When pumped and sampled in July some surface water was running into the well.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (stand-ard units)	Temperature (deg C)	Calcium dis-solved (mg/L as Ca)	Magne-sium, dis-solved (mg/L as Mg)	Sodium dis-solved (mg/L as Na)
July 1984							
11...	1210	640	9.4	14.0	8.1	1.1	110
Oct.							
31...	1025	580	9.2	12.0	12	1.6	110
Date	Alka-linity field (mg/L as CaCO ₃)	Sulfate dis-solved (mg/L as SO ₄)	Chlo-ride, dis-solved (mg/L as Cl)	Fluo-ride, dis-solved (mg/L as F)	Solids residue at 180 deg C dis-solved (mg/L)	Nitro-gen, NO ₂ +NO ₃ dis-solved (mg/L as N)	
July 1984							
11...	305	23	22	.20	116	<.10	
Oct.							
31...	248	27	18	.20	303	<.10	
Date	Nitro-gen, ammo-nia + organic dis. (mg/L as N)	Phos-phorus, ortho, dis-solved (mg/L as P)	Iron, total recov-erable (ug/L as Fe)	Iron, dis-solved (ug/L as Fe)	Manga-nese, total recov-erable (ug/L as Mn)	Manga-nese, dis-solved (ug/L as Mn)	
July 1984							
11...	2.0	.020	30000	61	1500	44	
Oct.							
31...	.50	.050	11000	35	650	97	

PRINCETON WELL
372149081055001

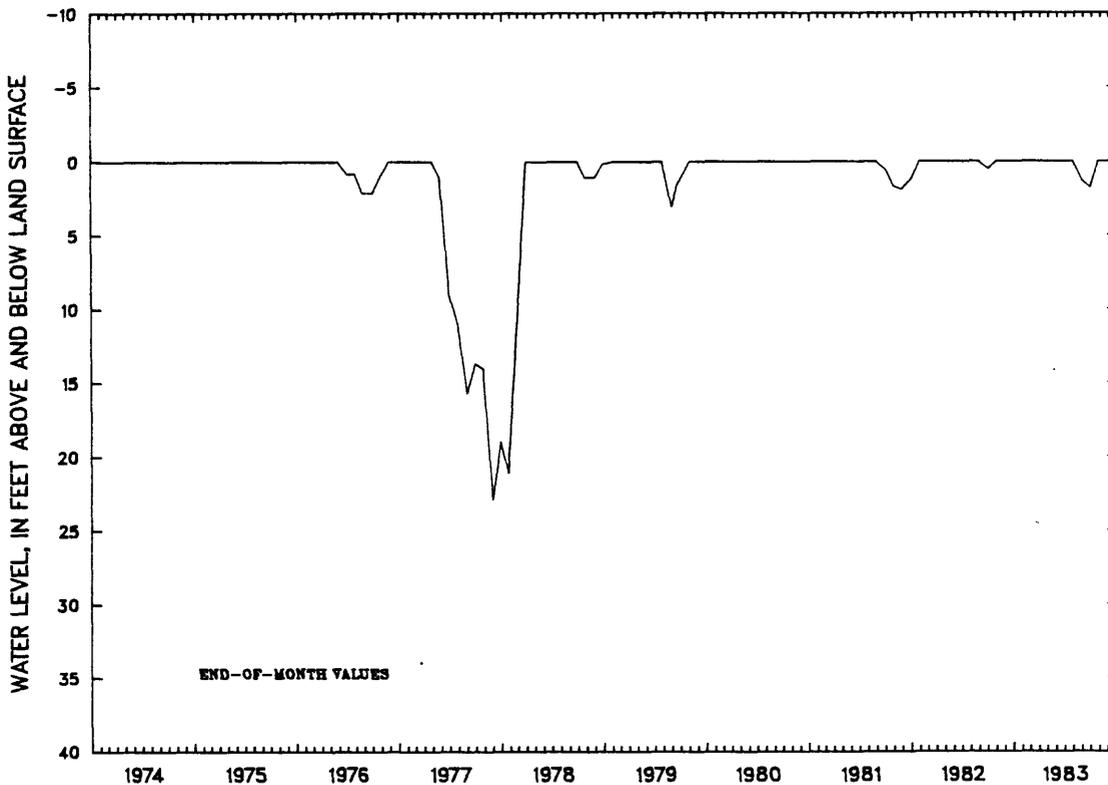
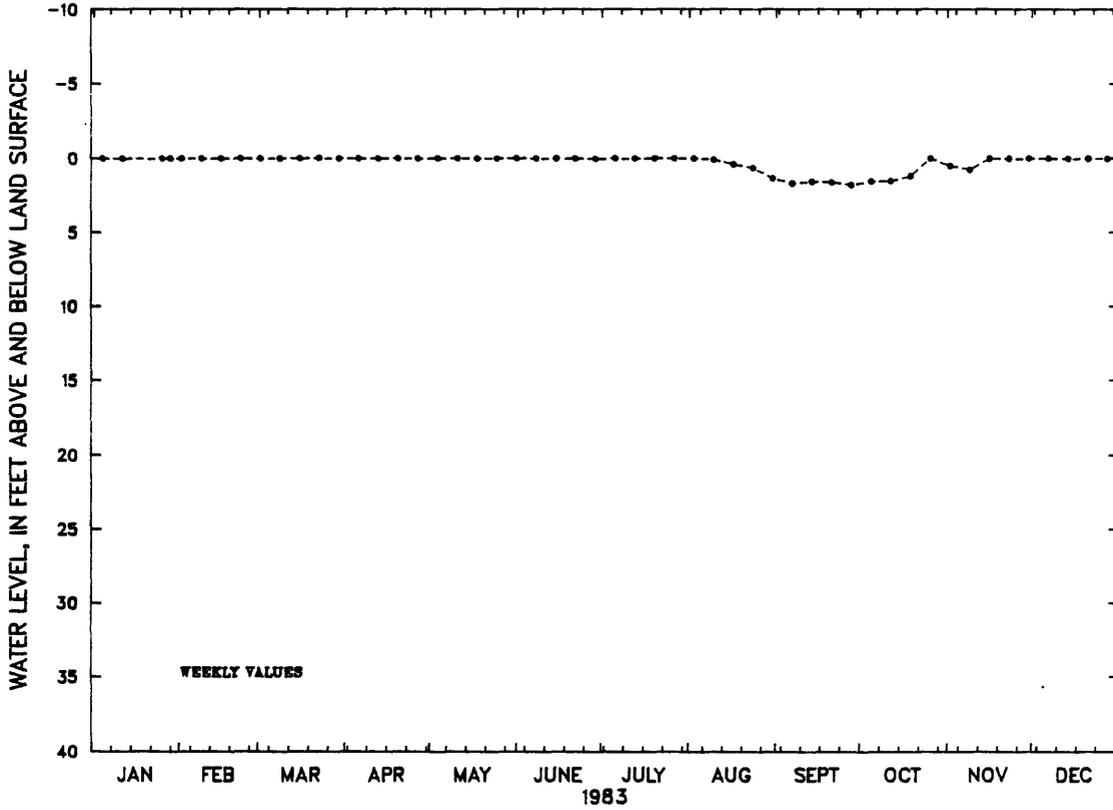


Figure 2.12.1-1.--Water-level fluctuations in the Princeton well, Mercer County.

2.13 Mineral County

2.13.1 Elk Garden well

392114079081101. Local number, 22-5-23.

LOCATION.--Lat 39°21'14", long 79°08'11", Hydrologic Unit 02070002, 2.2 mi north of U.S. Route 50 on State Route 42 at Sulphur City near Elk Garden.

Owner: Gerald Whisner.

AQUIFER.--Conemaugh Group of Upper Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 37 ft, cased with steel.

DATUM.--Land-surface datum is about 2,480 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 0.7 ft above land-surface datum.

REMARKS.--Well flows at times. Water level affected by nearby pumpage at times. Well depth 6 ft, Oct. 24, 1980.

PERIOD OF RECORD.--August 1968 to October 1976 (weekly water-level measurements), May 1977 to current year (periodic water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.69 ft above land-surface datum, many days since 1968; lowest measured, 10.81 ft below land-surface datum, Oct. 29, 1968.

SUPPLEMENTARY INFORMATION

This well is located in a relatively flat mountain-top area. The aquifer consists of cyclic sequences of red and gray shale, siltstone, sandstone, and thin beds of limestone and coal.

The water level in this well is above land surface much of the time, and the water level is affected by pumping from a nearby dug well.

The average water level for 1983 was -1.28 feet or 0.01 foot below the average level in 1982.

The well was pumped and sampled for chemical quality in April 1969. No specific capacity data are available.

WATER-QUALITY DATA

Date	Specific conductance (umhos)	pH (standard units)	Calcium dissolved (mg/L as Ca)	Magnesium dissolved (mg/L as Mg)	Bicarbonate (mg/L as HCO ₃)	Potassium dissolved (mg/L as K)
Apr., 1969 16...	250	7.3	28	4.8	55	2.3
Date	Sulfate dissolved (mg/L as SO ₄)	Chloride dissolved (mg/L as Cl)	Fluoride dissolved (mg/L as F)	Silica dissolved (mg/L as SiO ₂)	Nitrogen, nitrate total (mg/L as NO ₃)	
Apr., 1969 16...	34	36	.20	6.7	2.6	

ELK GARDEN WELL
392114079081101

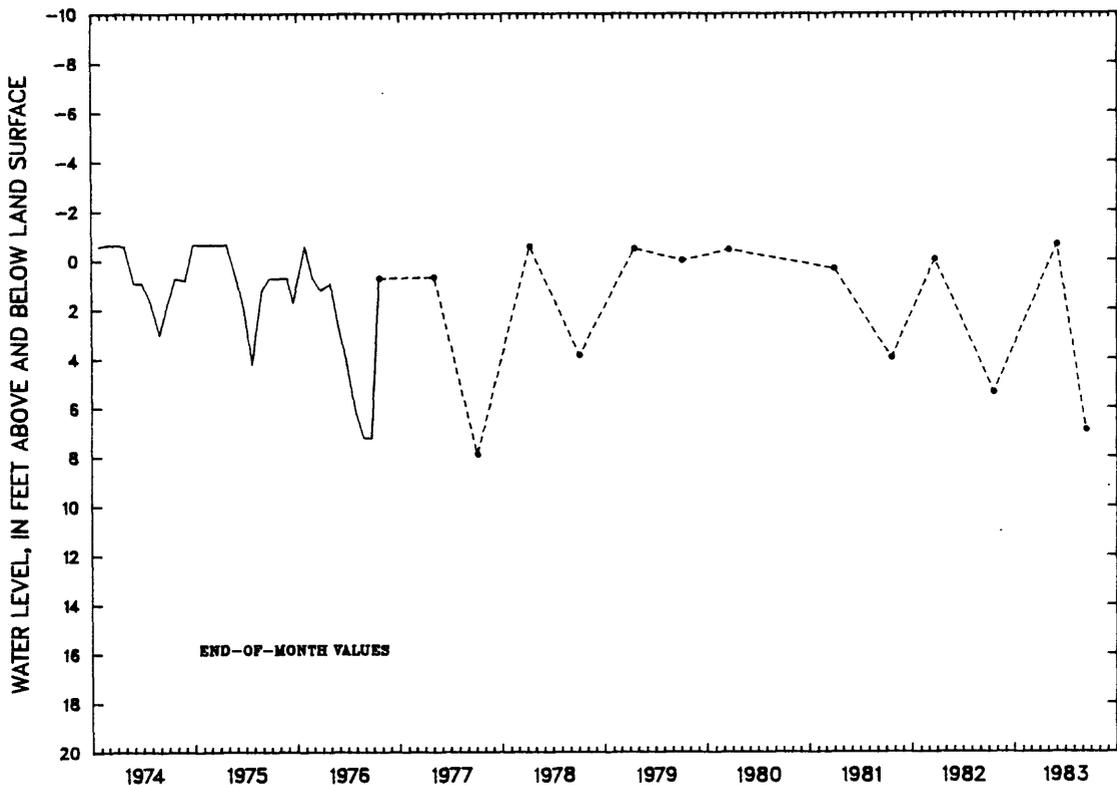
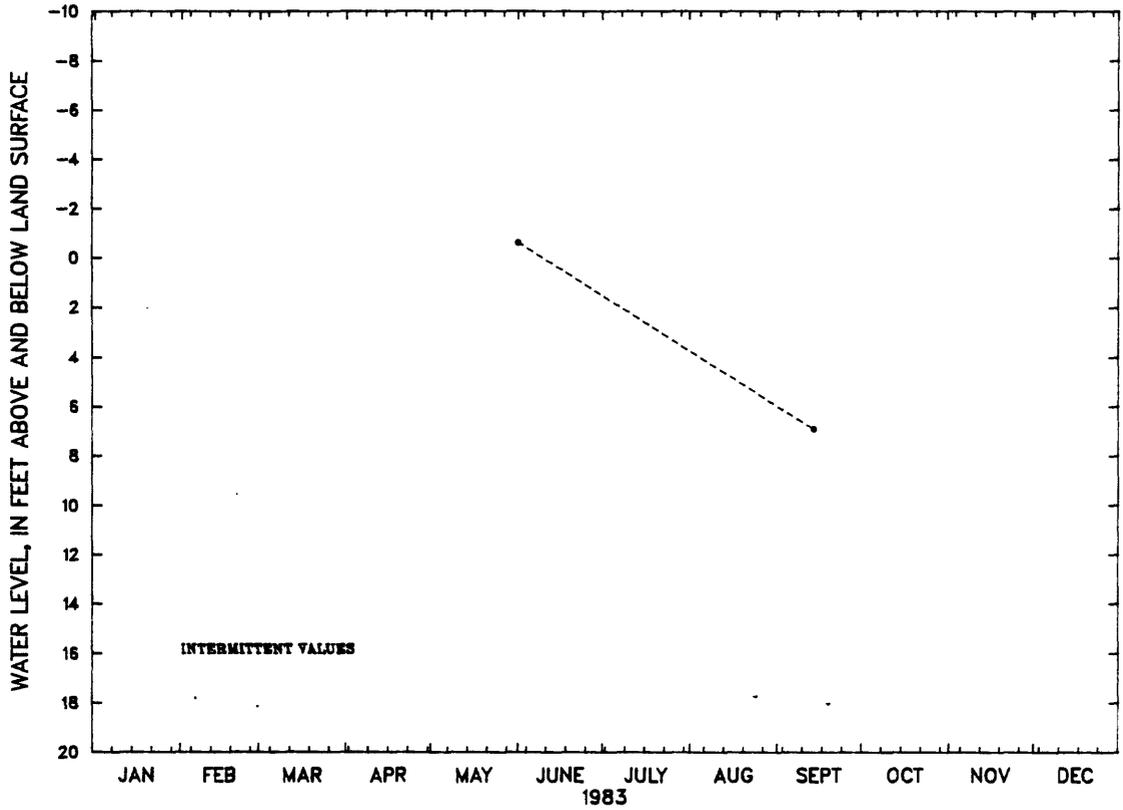


Figure 2.13.1-1.--Water-level fluctuations in the Elk Garden well, Mineral County.

2.14 Mingo County

2.14.1 R. D. Bailey well

373554081493401.

LOCATION.--Lat 37°35'54", long 81°49'34", Hydrologic Unit 05070101, downstream of toe of R. D. Bailey Dam northeast of Justice.

Owner: U.S. Army Corps of Engineers.

AQUIFER.--New River Formation of Lower Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 8 in., depth 66 ft, cased with steel.

DATUM.--Land-surface datum is about 920 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top edge of recorder shelter base, flush with top of casing, 1.0 ft above land-surface datum.

PERIOD OF RECORD.--March to June 1980 (periodic water-level measurements), June 1980 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 31.30 ft below land-surface datum, June 8, 1981; lowest, 44.29 ft below land-surface datum, Oct. 6, 1982.

SUPPLEMENTARY INFORMATION

This well is located in a valley at the base of the R. D. Bailey Dam. The aquifer is composed of sandstone, shale, siltstone, and coal.

Water-level fluctuations occurring in the well since 1982 mainly reflect regulation of water level in the dam. The record low which occurred in October 1982 coincides with a period of reduced precipitation.

The average water level for 1983 was 36.80 feet or 0.39 foot above the average level in 1982.

R. D. BAILEY DAM WELL
373554081493401

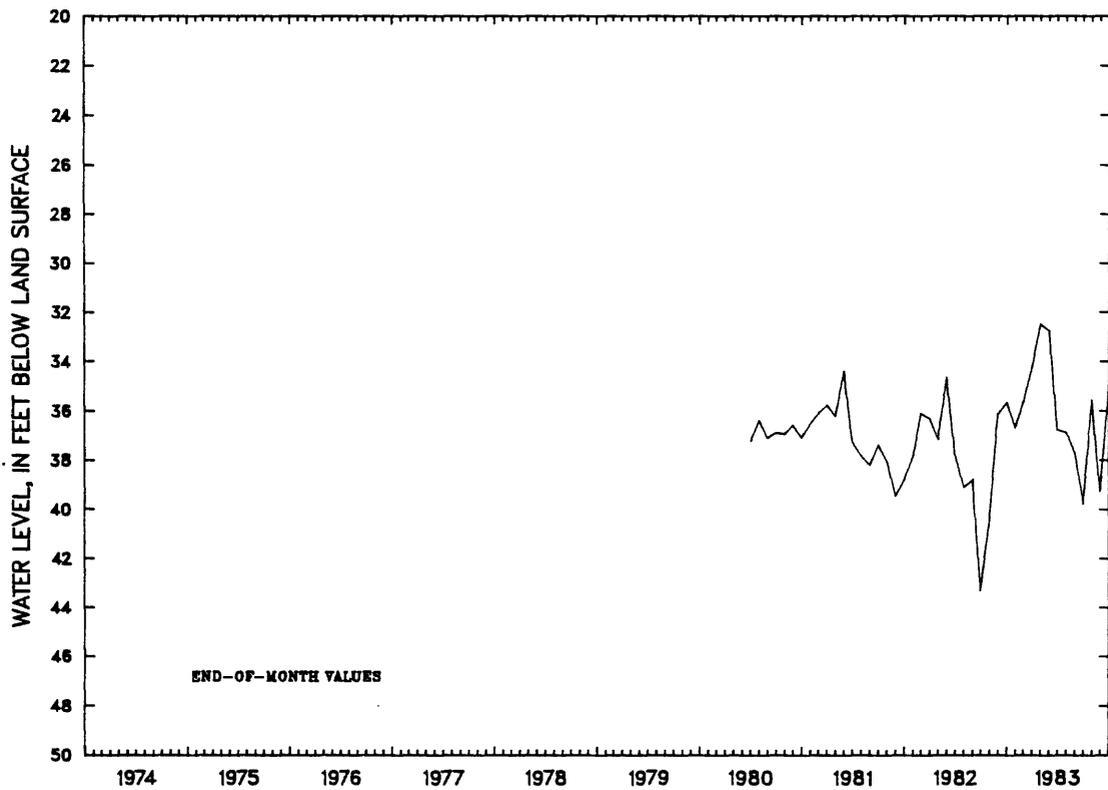
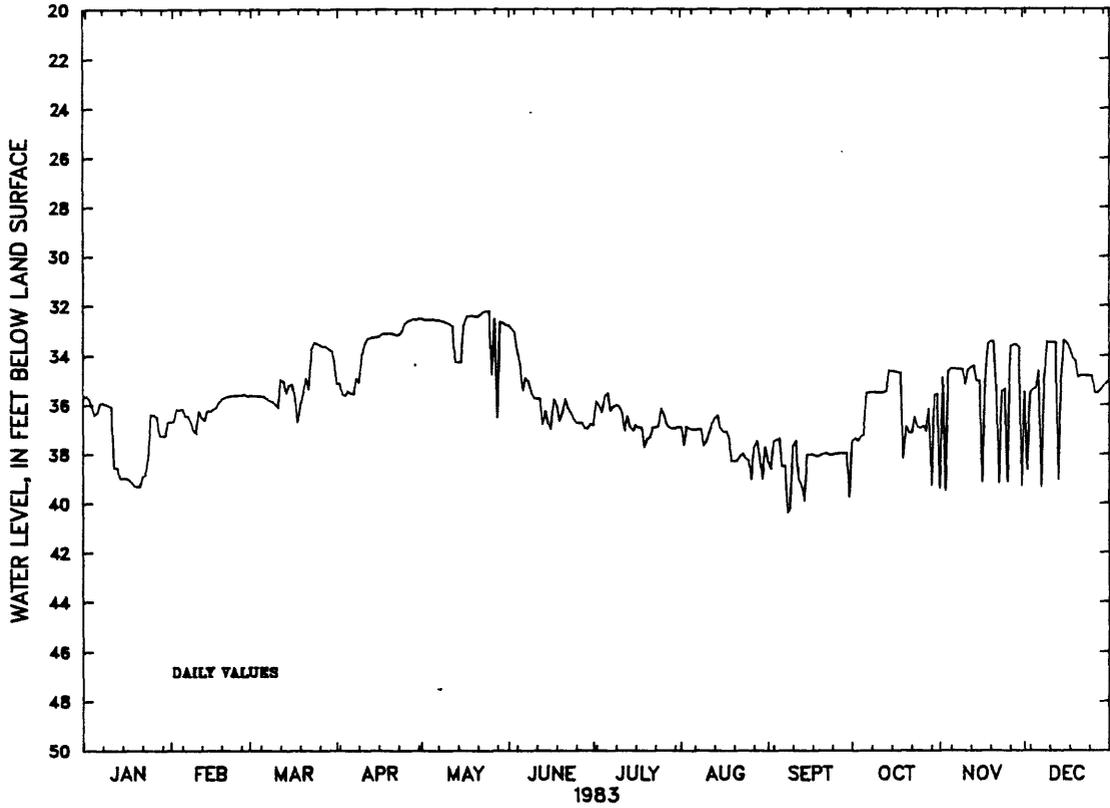


Figure 2.14.1-1.--Water-level fluctuations in the R. D. Bailey Dam well, Mingo County.

2.15 Monongalia County

2.15.1 Wadestown well

394006080194801. Local number, 9-1-47.

LOCATION.--Lat 39°40'06", long 80°19'48", Hydrologic Unit 05020005, 1 mi east of Wadestown on State Route 7.

Owner: Howard Shriver.

AQUIFER.--Dunkard Group of Pennsylvanian and Permian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 65 ft, cased with steel.

DATUM.--Land-surface datum is about 1,060 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.2 ft above land-surface datum.

PERIOD OF RECORD.--July 1971 to current year (weekly water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.10 ft below land-surface datum, Apr. 26, 1983; lowest measured, 11.35 ft below land-surface datum, Aug. 6, 1971.

SUPPLEMENTARY INFORMATION

This well is located beside the owner's residence in a valley with undulating terrain. The aquifer consists of mostly sandstone, siltstone, red and gray shale, limestone, and coal.

There have been no major water-level fluctuations in this well. The long-term trend has been fairly constant except the average water levels for 1975 and 1981-83 are perhaps 0.75 foot higher than for the rest of this ten-year period. The water level fluctuates between 5 feet and 11 feet below land surface.

The average water level for 1983 was 7.30 feet, or 0.12 foot above the average level in 1982. The average water level between 1975 and 1980 was 7.56 feet or 0.16 foot lower than the average for 1981-83.

A sample of water collected from this well was analyzed for chemical quality in July 1984 when the water level was 6.41 feet below land surface. No specific capacity data are available.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
July, 1984							
09...	1130	1050	8.6	12.0	14	3.1	260
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
July, 1984							
09...	493	9.6	96	1.5	190	<.10	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
July, 1984							
09...	.10	.020	700	9	130	100	

WADESTOWN WELL
394006080194801

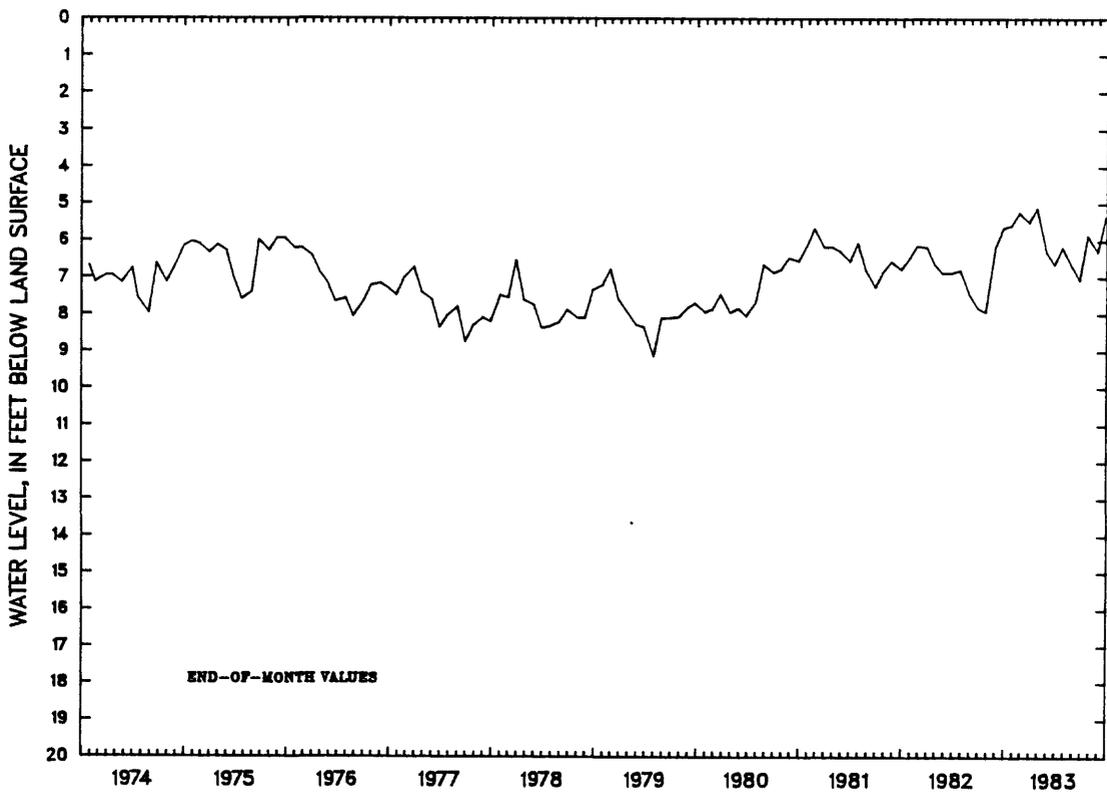
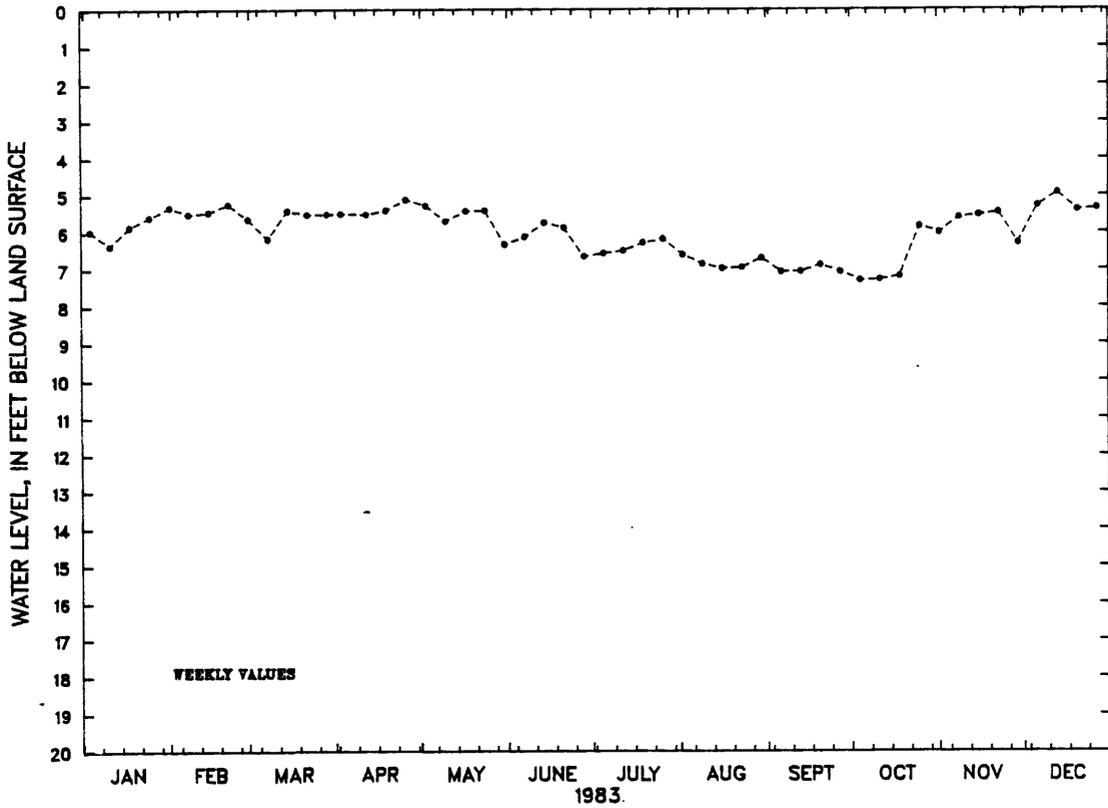


Figure 2.15.1-1.--Water-level fluctuations in the Wadestown well, Monongalia County.

2.15 Monongalia County (continued)

2.15.2 Halleck well

392923079571801. Local number, 9-7-33.

LOCATION.--Lat 39°29'23", long 79°57'18", Hydrologic Unit 05020003, 1 mi northwest of Halleck on Secondary State Route 79.

Owner: Paul H. Price.

AQUIFER.--Buffalo-Mahoning Sandstone Member of Conemaugh Group of Upper Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 141 ft, cased with steel to 21 ft.

DATUM.--Land-surface datum is about 1,850 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, flush with shelter floor, 0.35 ft above land-surface datum.

PERIOD OF RECORD.--March 1953 to May 1961 (monthly water-level measurements), May 1961 to May 1962 (water-level recorder), May 1962 to September 1978 (monthly water-level measurements), September 1978 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 40.95 ft below land-surface datum, Jan. 4, 1960; lowest measured, 80.57 ft below land-surface datum, Oct. 25, 1973.

SUPPLEMENTARY INFORMATION

This well is located on a wooded hilltop. The aquifer consists primarily of sandstone.

The level in this well has trended upward from 1974-82 with annual fluctuations of about 30 feet. Precipitation causes rapid rises in water level, and fast draining along mine-subsidence fractures may cause the rapid drops in water level.

The average water level for 1983 was 62.32 feet, showing a decline of 0.05 foot from the average level in 1982.

HALLECK WELL
392923079571801

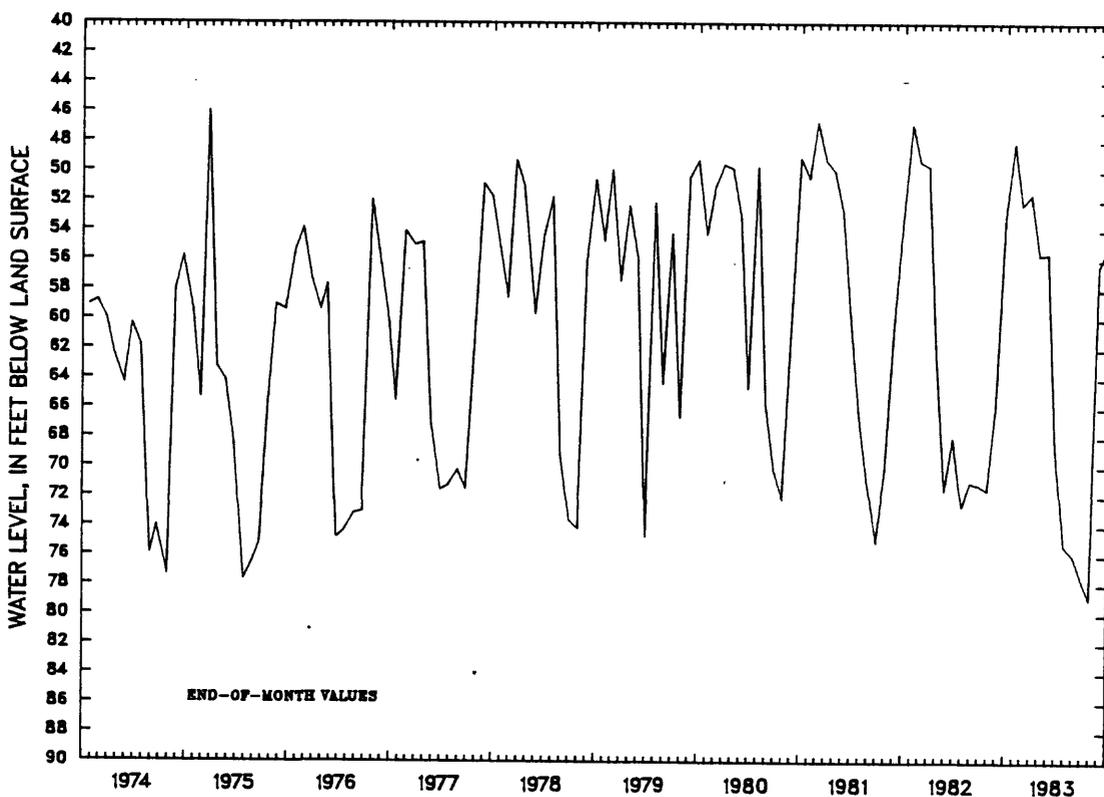
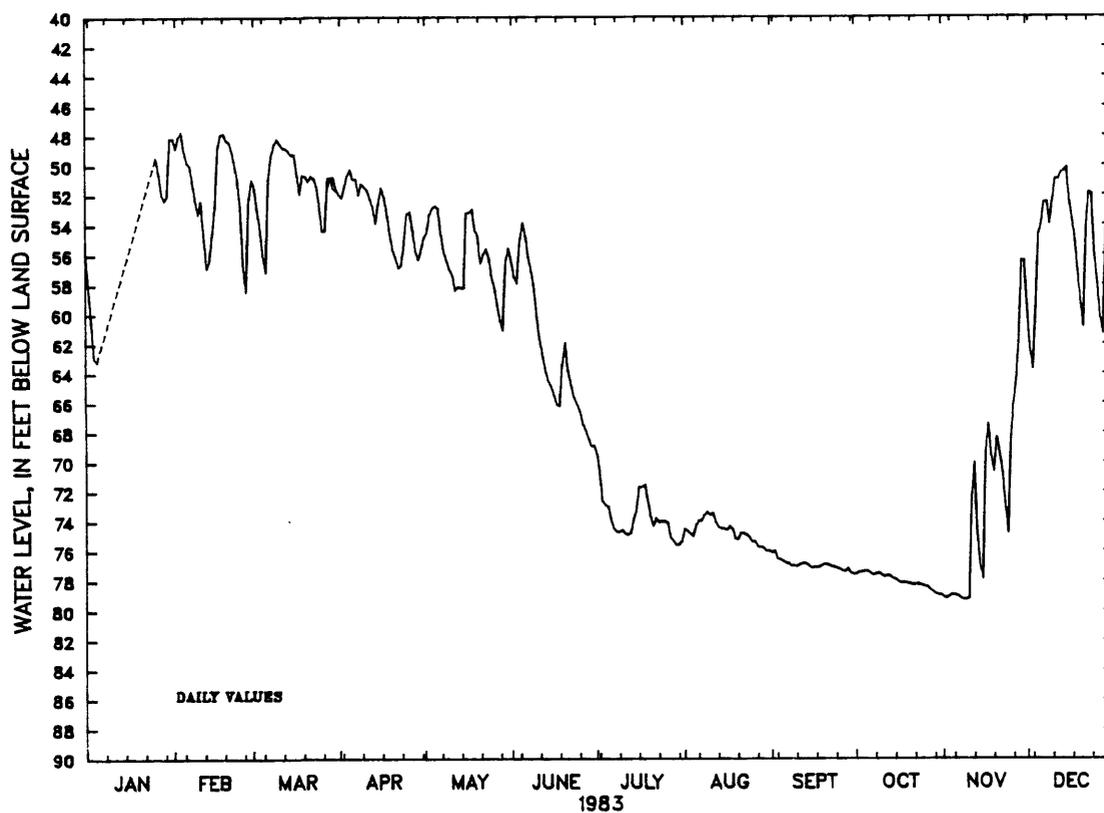


Figure 2.15.2-1.—Water-level fluctuations in the Halleck well, Monongalia County.

2.16 Morgan County

2.16.1 Cacapon well

393043078174001. Local number, 19-5-14.

LOCATION.--Lat 39°30'43", long 78°17'40", Hydrologic Unit 02070004, in Cacapon State Park south of Berkeley Springs on U.S. Route 522.

Owner: West Virginia Department of Natural Resources.

AQUIFER.--Tonoloway Formation of Upper Silurian age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 8 in., reported depth 250 ft, cased with steel to 33 ft.

DATUM.--Land-surface datum is about 875 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top edge of recorder shelter base, 1.1 ft above land-surface datum. Prior to Aug. 16, 1977, measuring point was 1.2 ft above land-surface datum.

PERIOD OF RECORD.--July 1971 to July 1973, November 1974 to March 1975 (weekly water-level measurements), July 1976 to August 1977 (monthly water-level measurements), August 1977 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 29.14 ft below land-surface datum, May 21, 1980; lowest measured, 37.80 ft below land-surface datum, Sept. 8, 1971.

SUPPLEMENTARY INFORMATION

This well is one of several wells located in a flat valley on the golf course of the Cacapon State Park. The aquifer consists of limestone. The other nearby wells are used for irrigating the golf course, and the observation well is affected by this pumpage. The sharp drop in water level in November 1976 was probably due to irrigation pumpage.

The average water level for 1983 was 33.58 feet or only 0.05 foot higher than the average level in 1982.

The well was pumped and sampled for chemical quality in June and again in October 1984. A specific capacity of 5.36 (gal/min)/ft (pumped 15 min.) was computed from the June recovery data.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
June, 1984							
06...	1730	580	7.4	13.5	77	17	1.4
Oct.							
17...	1200	540	7.0	12.0	79	17	1.6
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride dissolved (mg/L as Cl)	Fluoride dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
June, 1984							
06...	251	33	4.5	.10	355	.33	
Oct.							
17...	220	33	7.2	<.10	316	.90	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
June, 1984							
06...	.30	.020	140	9	<10	2	
Oct.							
17...	.40	--	900	11	10	4	

CACAPON WELL
393043078174001

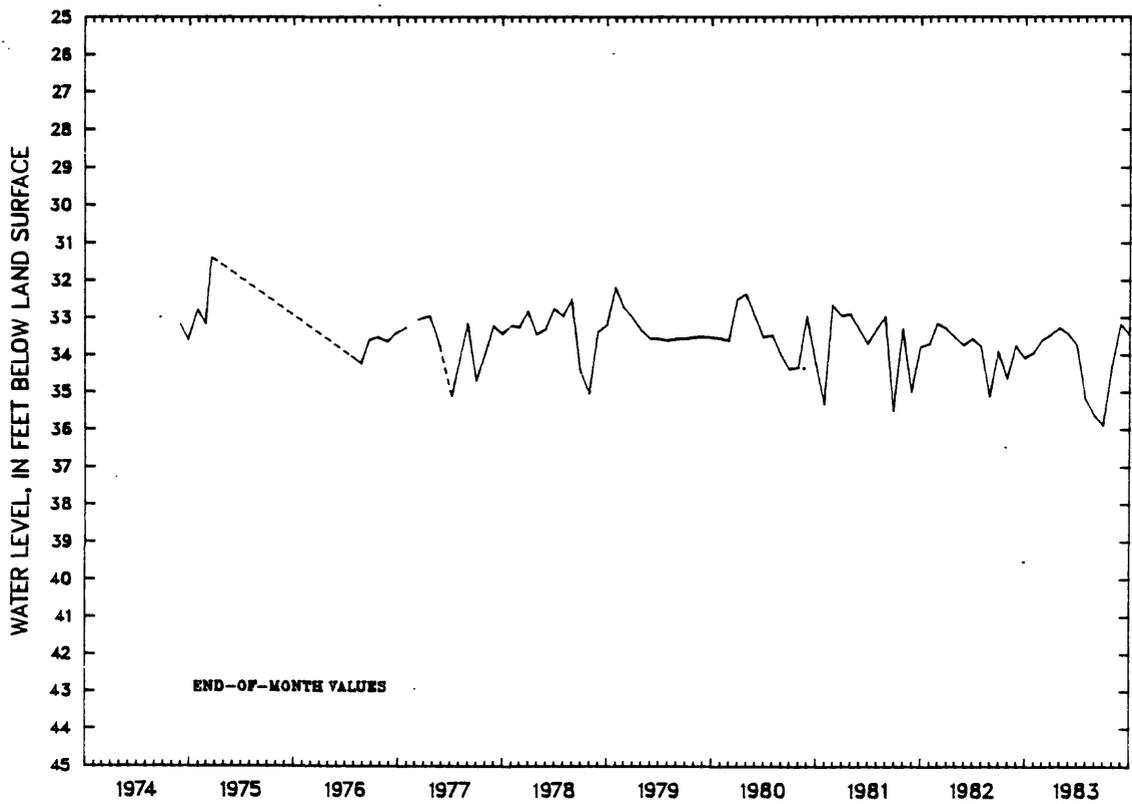
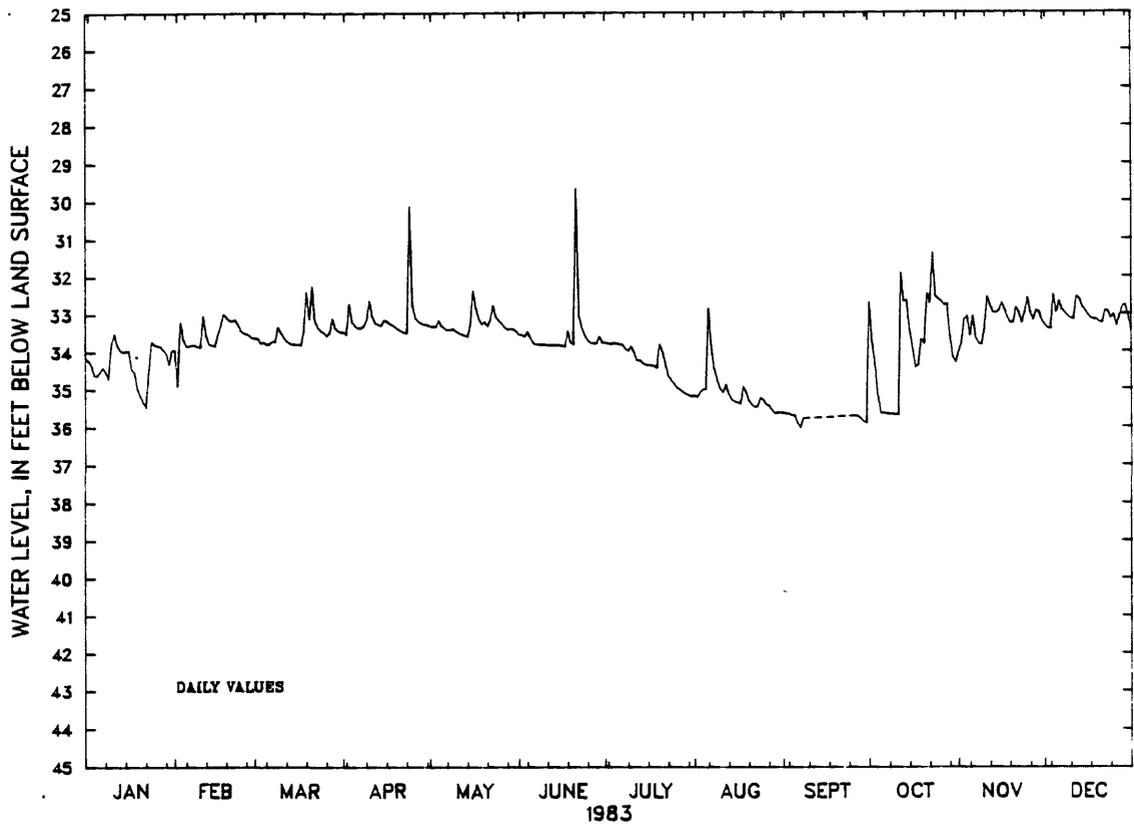


Figure 2.16.1-1.--Water-level fluctuations in the Cacapon well, Morgan County.

2.17 Nicholas County

2.17.1 Belva well

381513081094201. Project number, T-2.

LOCATION.--Lat 38°15'13", long 81°09'42", Hydrologic Unit 05050005, about 3 mi east of Belva and Route 16 on left of Secondary Route 20/21.

Owner: Burt Whiston.

AQUIFER.--Kanawha Formation of Lower Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 95 ft, cased with galvanized iron to 13 ft.

DATUM.--Land-surface datum is 742.6 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 2.00 ft below land-surface datum.

PERIOD OF RECORD.--July to October 1982 (periodic water-level measurements), October 1982 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level 2.52 ft below land-surface datum, Apr. 25, 1983; lowest 11.73 ft below land-surface datum, Sept. 29, 1983.

SUPPLEMENTARY INFORMATION

This well is located in a valley near a stream. The aquifer consists of 50 percent sandstone and various amounts of shale, siltstone, and coal.

The water-level record began in July 1982. Thus, there is not enough record to compare yearly averages or detect any long-term trend. Water level in the well is affected by the high water level in the stream.

The well was pumped and sampled for chemical quality in July and again in October 1984. The recovery rate was slower in July than it was in October even though the water level was higher in October. A specific capacity of 6.10 (gal/min)/ft (pumped 15 min.) was computed from the July recovery data. Previous aquifer test data are available in files of the U.S. Geological Survey.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (stand-ard units)	Temperature (deg C)	Calcium dis-solved (mg/L as Ca)	Magne-sium, dis-solved (mg/L as Mg)	Sodium dis-solved (mg/L as Na)
July, 1984							
10...	1350	313	7.8	15.0	25	8.3	24
Oct.							
30...	1145	383	7.1	14.0	.00	.00	.00
Date	Alka-linity field (mg/L as CaCO ₃)	Sulfate dis-solved (mg/L as SO ₄)	Chlo-ride, dis-solved (mg/L as Cl)	Fluo-ride, dis-solved (mg/L as F)	Solids residue at 180 deg C dis-solved (mg/L)	Nitro-gen, NO ₂ +NO ₃ dis-solved (mg/L as N)	
July, 1984							
10...	106	21	21	.20	180	<.10	
Oct.							
30...	121	61	12	.10	237	<.10	
Date	Nitro-gen, am-moniam + organic dis-solved (mg/L as N)	Phos-phorus, ortho, dis-solved (mg/L as P)	Iron, total recov-erable (ug/L as Fe)	Iron, dis-solved (ug/L as Fe)	Manga-nese, total recov-erable (ug/L as Mn)	Manga-nese, dis-solved (ug/L as Mn)	
July, 1984							
10...	--	.020	440	350	100	91	
Oct.							
30...	.30	<.010	2100	0	160	0	

BELVA WELL
381513081094201

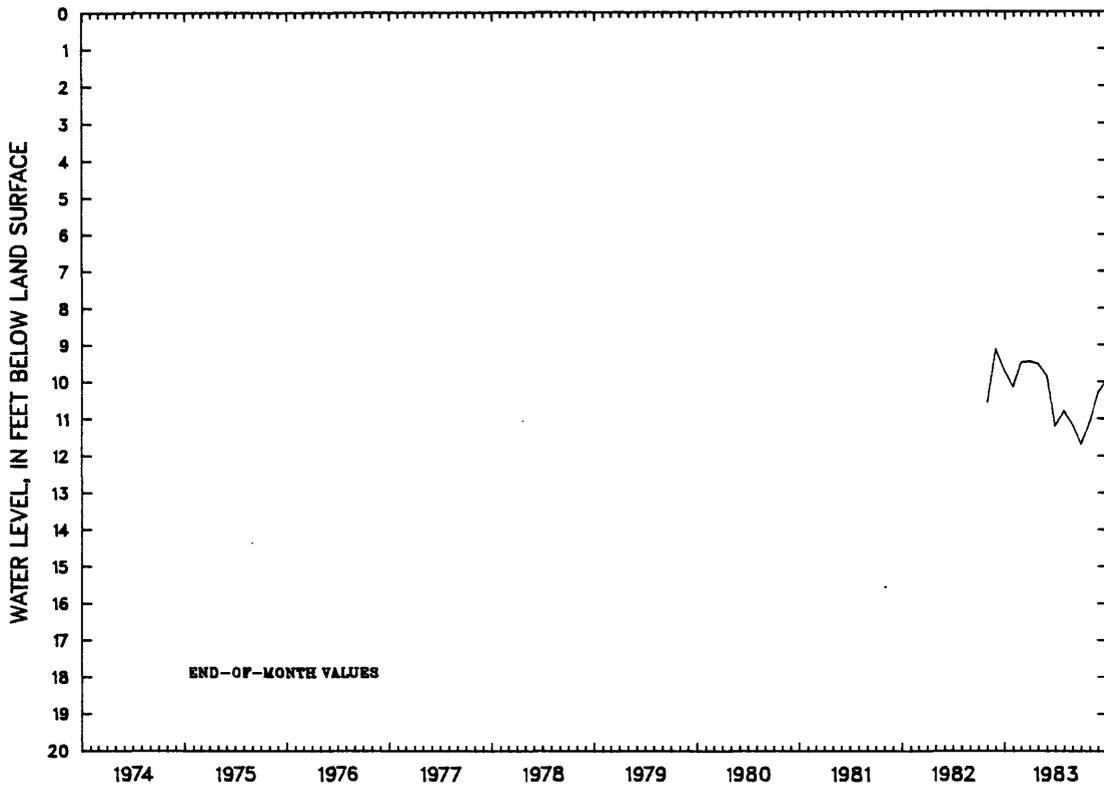
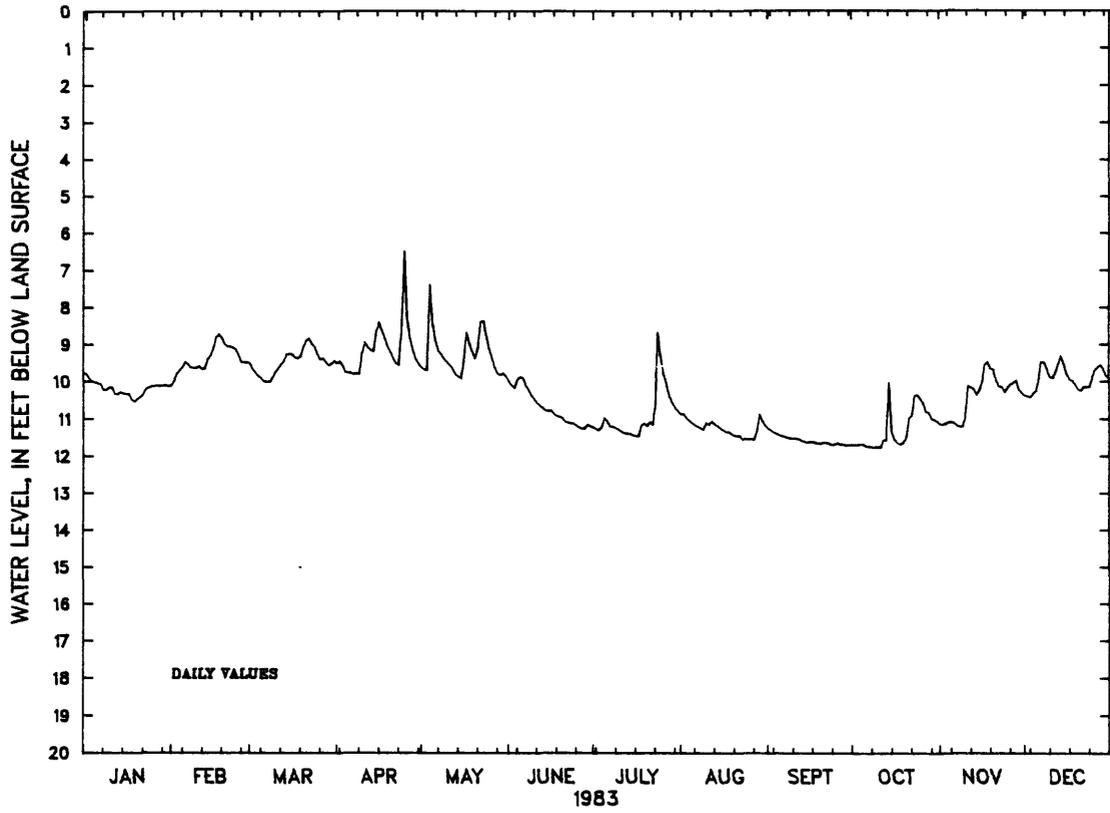


Figure 2.17.1-1.--Water-level fluctuations in the Belva well, Nicholas County.

2.18 Pocahontas County

2.18.1 Droop Mountain well

380653080155301 (revised).

LOCATION.--Lat 38°06'53", long 80°15'53", Hydrologic Unit 05050003, in Droop Mountain State Park north of Droop on U.S. Route 219.

Owner: West Virginia Department of Natural Resources.

AQUIFER.--Mauch Chunk Group of Upper Mississippian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 86 ft, cased with steel.

DATUM.--Land-surface datum is about 3,000 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top edge of recorder shelter base at land-surface datum. May 28, 1980, to July 7, 1983, measuring point 0.65 ft above land-surface datum. Prior to May 28, 1980, measuring point was top of casing at land-surface datum.

PERIOD OF RECORD.--December 1970 to January 1976 (weekly water-level measurements), April 1978 to May 1980 (periodic water-level measurements), May 1980 to January 1982 (water-level recorder). May 1982 to current year (water-level recorder). Published as local well number "44-4-1", 1973-78.

REVISED RECORDS.--WDR WV-79-1: Well location, well characteristics, and water levels. WDR WV-83-1: Station identification number and lowest water level.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 62.86 ft below land-surface datum, May 30, 1982; lowest, 70.12 ft (revised) below land-surface datum, Sept. 4, 1983.

REVISIONS.--Water levels for December 1970 to 1982 for this well were published under well location number 380634080164801 which is at a different location. Consequently, the lowest water level for this well (380653080155301), 70.12 ft below land-surface datum, was recomputed. Water-level reading 79.23 ft below land-surface datum, Oct. 1, 1970, for well number 380634080164801 is still correct and is the only water-level data available for that well.

SUPPLEMENTARY INFORMATION

This well is located on a remote hilltop in rough terrain. The aquifer is a mixture of red, green, and medium-gray shale and sandstone, with a few thin beds of limestone.

The ten-year record shows no major trend in water level. The water level has ranged between 65 feet and 70 feet below land surface. The 1983 water-level fluctuations are typical of wells on hilltop or hillsides; the highest water level is in the spring of the year. The water then drains from the rocks to streams throughout the summer and fall months, with occasional spikes of recharge. The lowest water level occurs in September or October.

The average water level for 1983 was 68.35 feet or 0.13 foot higher than the average level in 1982.

The well was pumped and sampled for chemical quality in June and again in October 1984. The recovery rate was very slow. No specific capacity data are available.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
June, 1984							
04...	1230	525	7.6	16.5	75	23	3.0
Oct.							
25...	1130	500	7.3	13.0	67	23	2.8
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
June, 1984							
04...	268	28	1.7	.20	365	.14	
Oct.							
25...	130	36	4.6	.10	316	.17	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
June, 1984							
04...	1.1	.220	3900	140	190	120	
Oct.							
25...	.90	.010	1800	120	110	78	

DROOP MOUNTAIN WELL
380653080155301

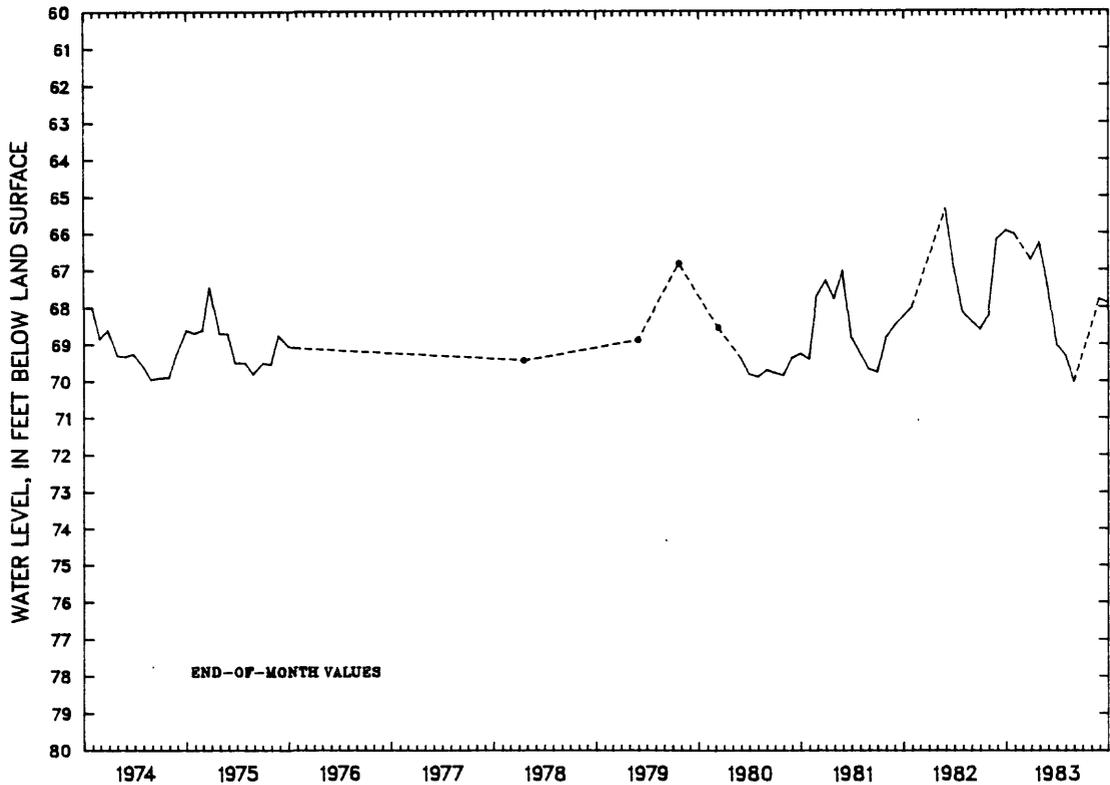
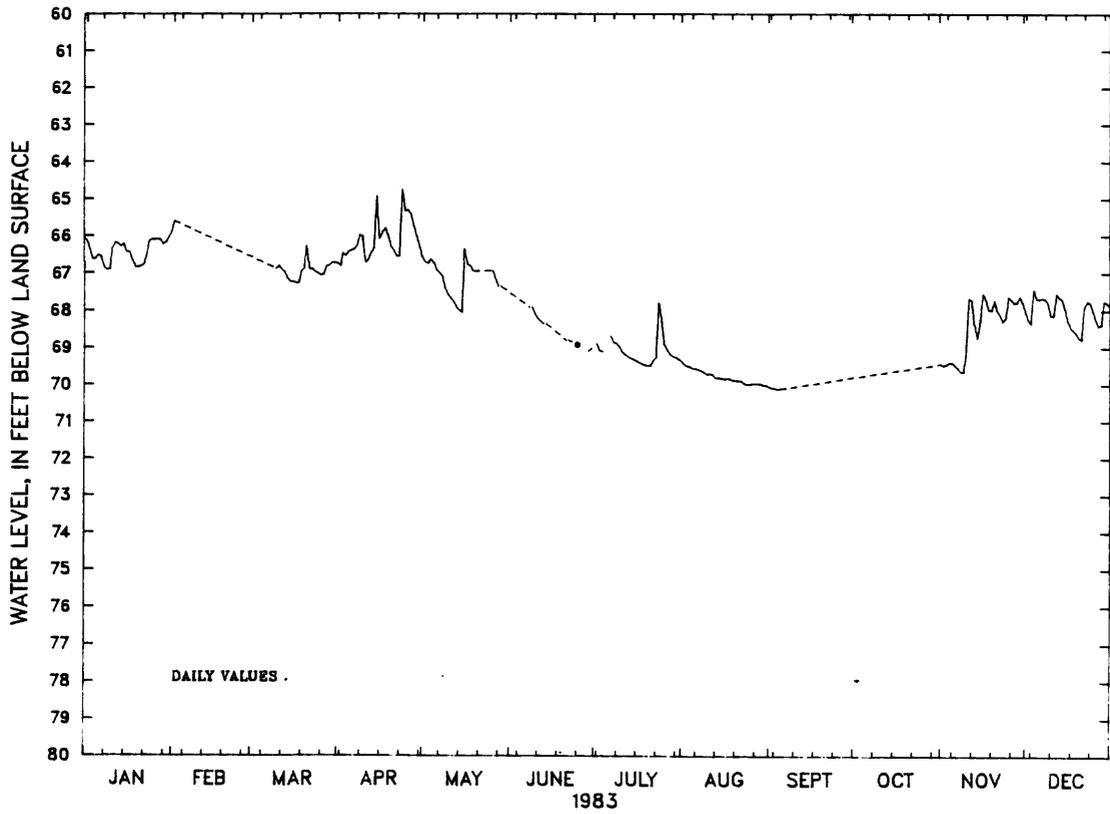


Figure 2.18.1-1.--Water-level fluctuations in the Droop Mountain well, Pocahontas County.

2.19 Preston County

2.19.1 Masontown well

393306079474501. Local number, 11-3-8.

LOCATION.--Lat 39°33'06", long 79°47'45", Hydrologic Unit 05020003, East Depot Street, Masontown.

Owner: G. E. Lemmons.

AQUIFER.--Pottsville Group of Lower Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled domestic artesian well, diameter 8 in., depth 785 ft, cased to 350 ft, perforated at or near Upper Freeport coal.

DATUM.--Land-surface datum is about 1,770 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of extended casing, 3.53 ft above land-surface datum. Prior to July 1978 measuring point was 3.0 ft below land-surface datum.

PERIOD OF RECORD.--July 1941 to July 1946 (weekly water-level measurements), July 1946 to October 1948 (water-level recorder), October 1948 to October 1950 (weekly water-level measurements), October 1950 to current year (monthly water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 7.15 ft below land-surface datum, Jan. 20, 1947; lowest measured, 108 ft below land-surface datum, Feb. 3, 1959.

SUPPLEMENTARY INFORMATION

This hillside well is located in town beside the owner's residence. The aquifer consists of mainly sandstones and shales.

Coal mining affected the well in 1957 and 1958 (see Friel and others, 1967, p. 99). The water level dropped from about 20 feet in 1957 to a record low of 108 feet below land surface in February 1959. The water level stayed at about 100 feet until 1965. In February 1965 the water level began recovering and gradually recovered to 65 feet in 1974. The water level fluctuated around 65 feet until July 1984 when the water level rose to about 45 feet. This recent rise in water level may have resulted from caved-in portions of the well between the bottom and the end of the casing. During dry periods the lower water level might result from leakage downward around caved-in sections.

The yearly average water level for 1983 and 1982 was 66.74 feet.

MASONTOWN WELL
393306079474501

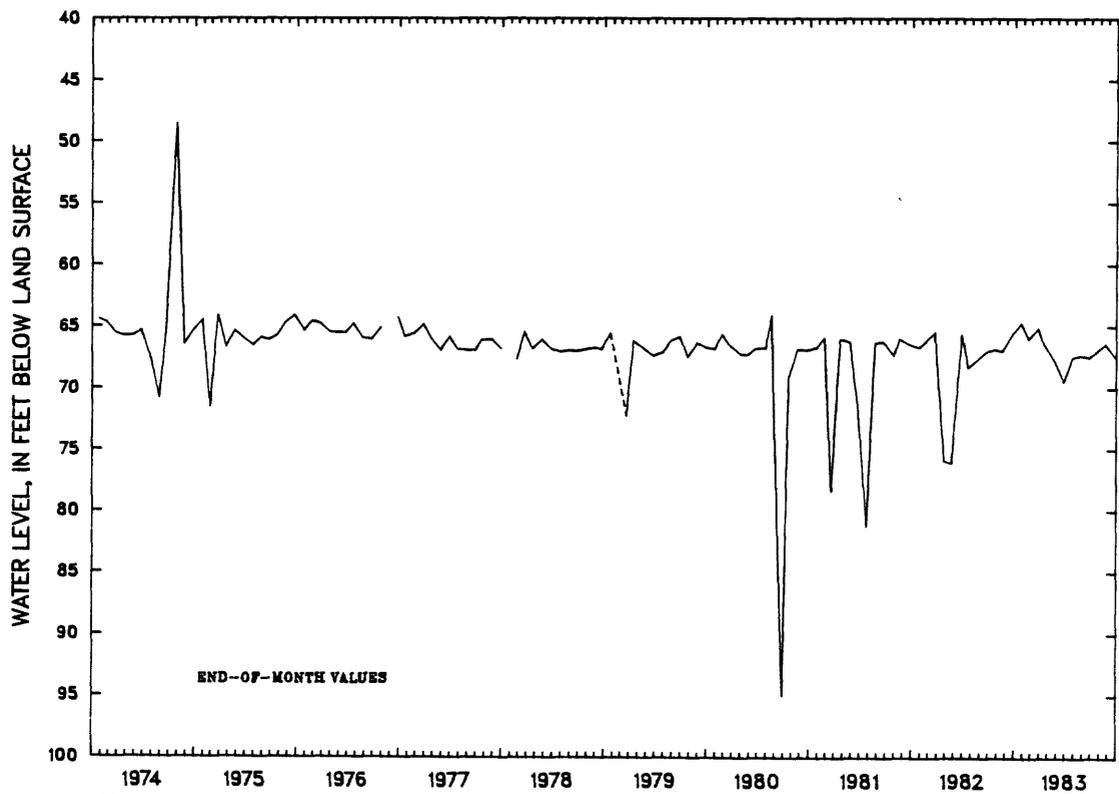
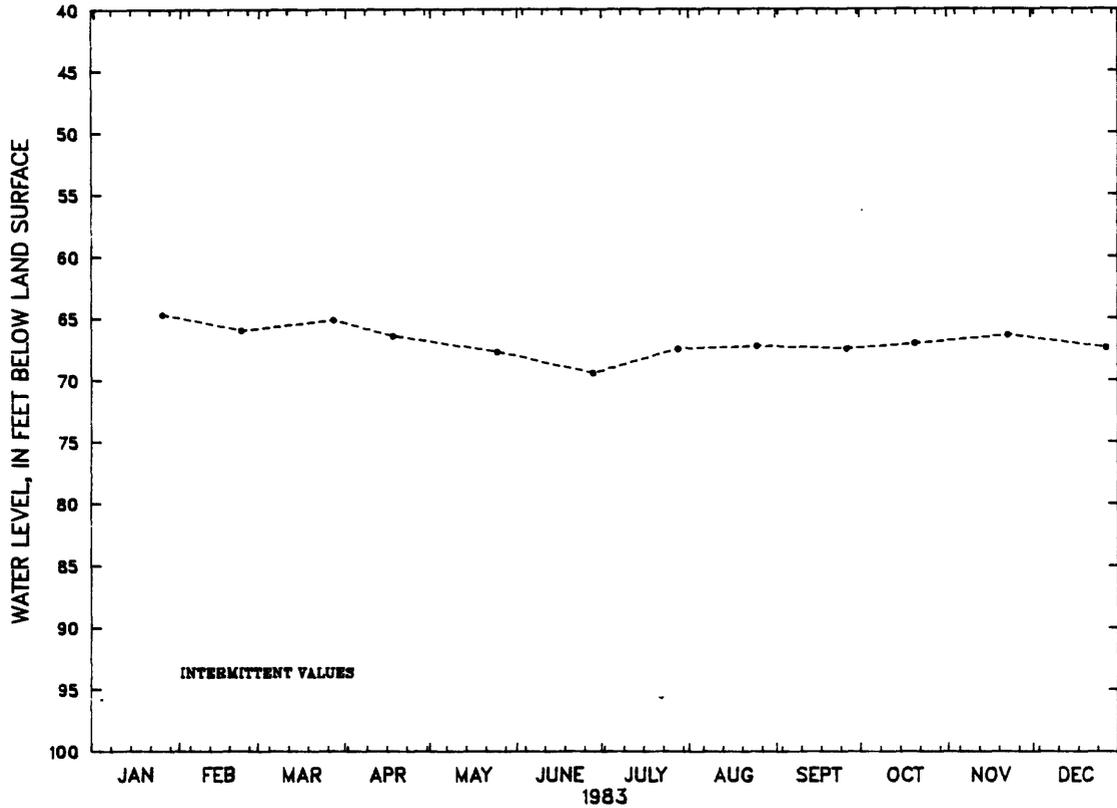


Figure 2.19.1-1.--Water-level fluctuations in the Masontown well, Preston County.

2.20 Randolph County

2.20.1 Coalton well

385341079575401. Local number, 18-3-110.

LOCATION.--Lat 38°53'41", long 79°57'54", Hydrologic Unit 05020001, 0.2 mi east of Coalton High School, Coalton.

Owner: Presbyterian Church.

AQUIFER.--Homewood Sandstone Member of Kanawha Formation of Lower Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled exploratory water-table well, diameter 6 in., depth 155 ft, cased to 18 ft.

DATUM.--Land-surface datum is 2,171 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 1.60 ft above land-surface datum. Prior to Jan. 4, 1983, measuring point was 2.45 ft above land-surface datum.

REMARKS.--Water level affected by nearby pumping.

PERIOD OF RECORD.--December 1966 to October 1967 (monthly water-level measurements), July 1968 to January 1977 (water-level recorder), January 1977 to current year (periodic water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.85 ft below land-surface datum, Dec. 12, 1966; lowest, 23.35 ft below land-surface datum, Oct. 28, 1971.

SUPPLEMENTARY INFORMATION

This well is located in a flat valley. The aquifer consists primarily of sandstone.

There are natural variations in water level throughout the period of record; however, infrequent pumping from nearby shallow wells and abandoned deep wells affects the water level. Prior to 1977 this pumpage caused the water level to drop by as much as 4 feet in about 24 hours. The water level fluctuated less than 10 feet between 1974 and 1983.

The average water level for 1983 and 1982 was 13.87 feet.

The well was pumped and sampled for chemical quality in June and in October 1984. The recovery rate was rapid. The specific capacity was 0.42 (gal/min)/ft (pumped 16 min.) in June, and 0.49 (gal/min)/ft (pumped 10 min.) in October as computed from the recovery data.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
June, 1984							
01...	1230	125	6.6	10.5	9.3	4.5	.70
Oct.							
19...	1230	150	6.0	11.5	9.3	4.5	.80
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride dissolved (mg/L as Cl)	Fluoride dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
June, 1984							
01...	E30	16	1.0	.10	66	.64	
Oct.							
19...	E45	16	.80	<.10	63	<.10	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
June, 1984							
01...	.40	<.010	15000	7	340	320	
Oct.							
19...	.30	<.010	13000	9000	360	330	

COALTON WELL
385341079575401

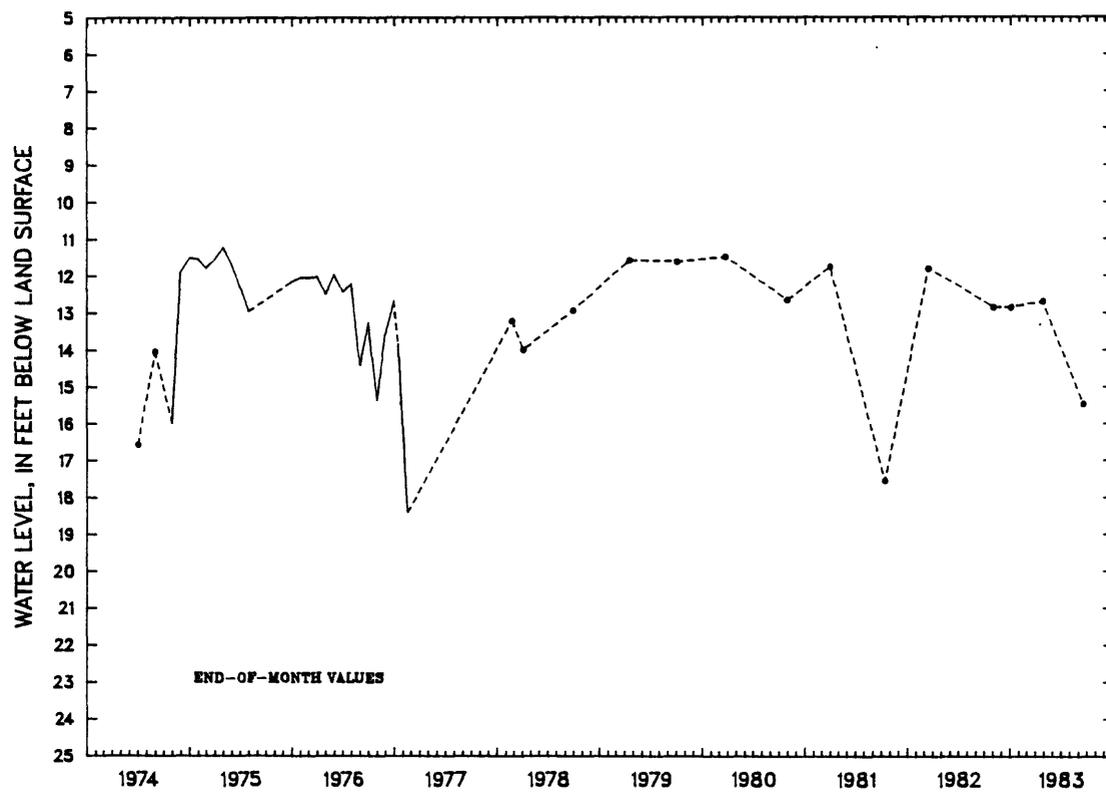
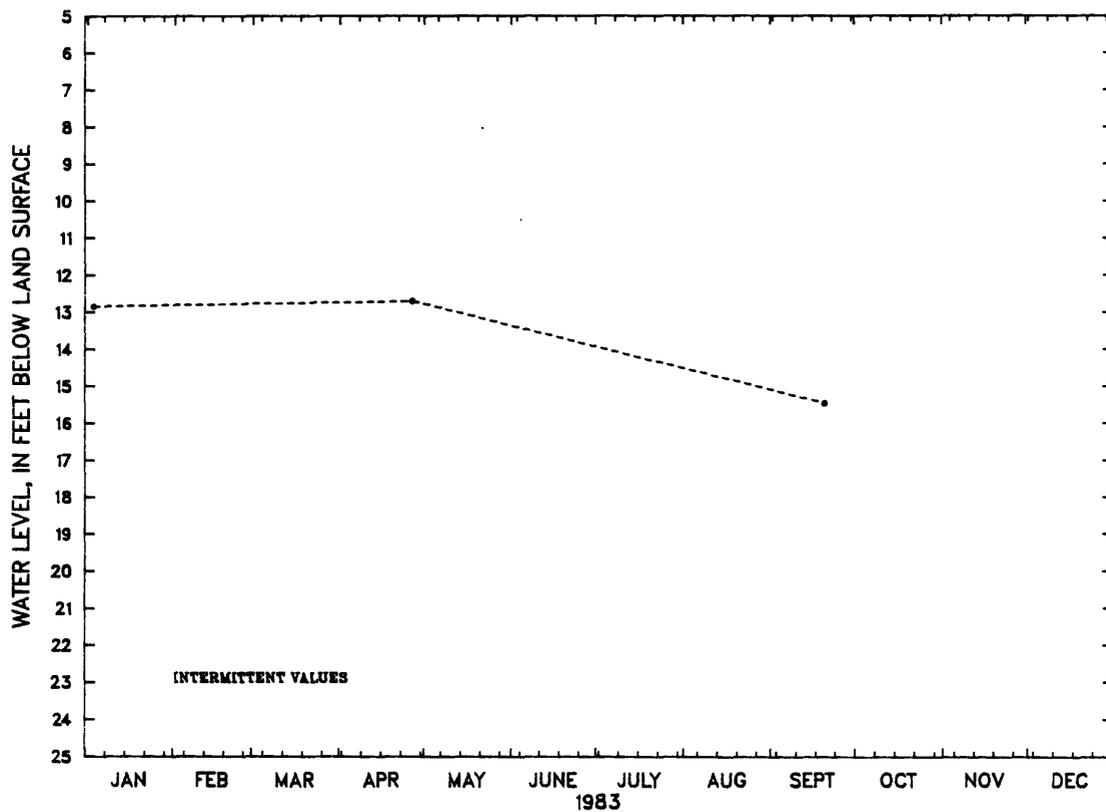


Figure 2.20.1-1.--Water-level fluctuations in the Coalton well, Randolph County.

2.20 Randolph County (continued)

2.20.2 Beverly well

385100079522901. Project number, H-63.
 LOCATION.--Lat 38°51'00", long 79°52'29", Hydrologic Unit 05020001, 1800 ft west of U.S. Route 250 and 0.6 mi north of intersection of State Route 33 and U.S. Route 250, at Beverly.
 Owner: Edsel Lucas.
 AQUIFER.--Shale of Upper-Middle Devonian age.
 WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 98 ft, cased with plastic to 14 ft.
 DATUM.--Land-surface datum is about 1940 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top edge of recorder shelter base, flush with top of casing 3.0 ft above land-surface datum.
 REMARKS.--U.S. Geological Survey Test Well No. 2. Geologic log and aquifer test data available. At times, water level affected by stage of Tygart Valley River. Digital processing ceased Sept. 30, 1982. Recorder removed Oct. 19, 1982. Converted to semi-annual measurements.
 PERIOD OF RECORD.--November 1978 to November 1979 (periodic water-level measurements), November 1979 to October 1982 (water-level recorder), October 1982 to current year (periodic water-level measurements).
 EXTREMES FOR PERIOD OF RECORD.--Highest water level, 3.00 ft above land-surface datum, Mar. 20, 1982; lowest, 3.24 ft below land-surface datum, Sept. 20, 1983.

SUPPLEMENTARY INFORMATION

This well is located in a flat, swampy, floodplain. The aquifer consists of shale which lies beneath 13-14 feet of silt, sand, and gravel; and the water table lies one or two feet below land surface.

At times the water level is affected by river stage. The well was converted to semi-annual readings in 1982, and the manual measurement made in September 1983 after extremely dry weather is the lowest for the period of record.

In 1978 an aquifer test was performed using two observation wells. Transmissivity ranged from 185 to 195 ft²/d, and storage coefficient from .0003 to .0008. Specific capacity was 0.62 (gal/min)/ft.

The well was pumped and sampled for chemical quality in June and in October 1984. The specific capacity was 0.54 (gal/min)/ft (pumped 15 min.) in June and 0.54 (gal/min)/ft (pumped 10 min.) in October as computed from the recovery data. Geologic log and aquifer test data are available in an unpublished report by Hobba, 1980.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (stand-ard units)	Temperature (deg C)	Calcium dis-solved (mg/L as Ca)	Magne-sium, dis-solved (mg/L as Mg)	Sodium dis-solved (mg/L as Na)
June, 1984							
01...	1000	240	7.0	11.0	21	6.1	10
Oct. 19...	1015	240	6.4	15.0	21	6.2	11
Date	Alka-linity field (mg/L as CaCO ₃)	Sulfate dis-solved (mg/L as SO ₄)	Chlo-ride, dis-solved (mg/L as Cl)	Fluo-ride, dis-solved (mg/L as F)	Solids residue at 180 deg C dis-solved (mg/L)	Nitro-gen, NO ₂ +NO ₃ dis-solved (mg/L as N)	
June, 1984							
01...	91	16	3.0	.10	199	<.10	
Oct. 19...	125	1.3	.40	<.10	168	<.10	
Date	Nitro-gen, am-monia + organic dis-solved (mg/L as N)	Phos-phorus, ortho, dis-solved (mg/L as P)	Iron, total recov-erable (ug/L as Fe)	Iron, dis-solved (ug/L as Fe)	Manga-nese, total recov-erable (ug/L as Mn)	Manga-nese, dis-solved (ug/L as Mn)	
June, 1984							
01...	1.2	<.010	30000	15000	820	520	
Oct. 19...	.80	.370	20000	17000	630	550	

BEVERLY WELL
385100079522901

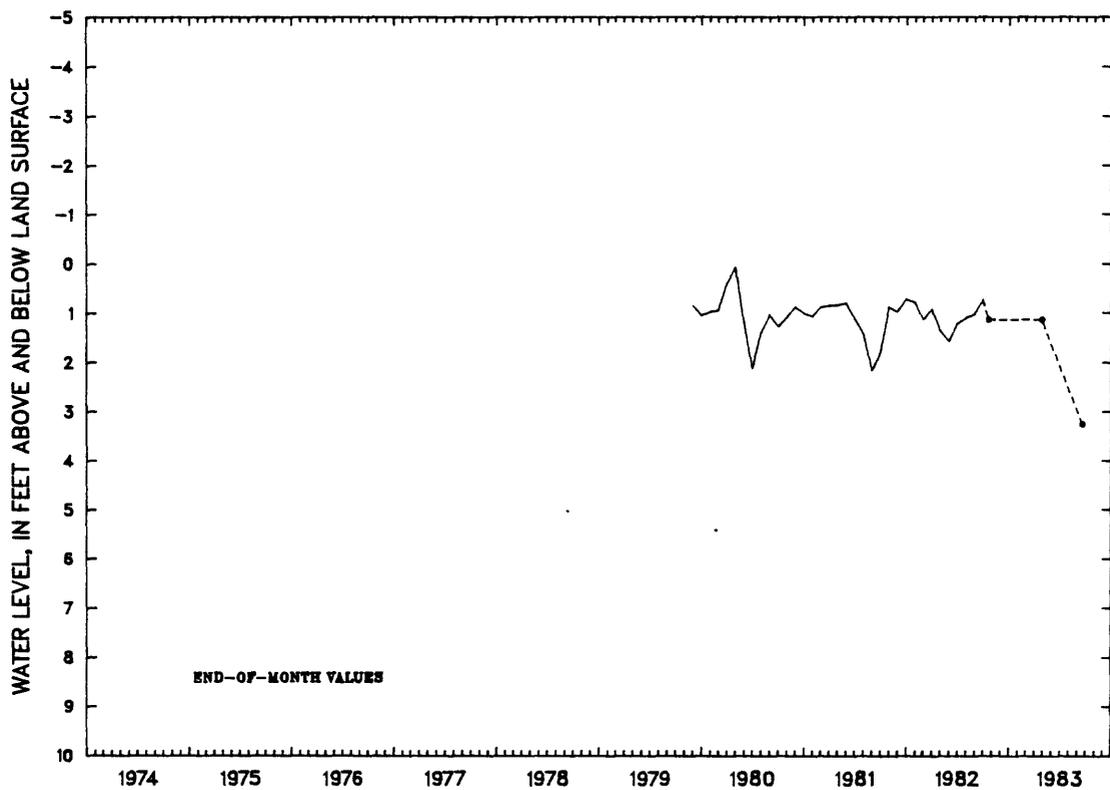
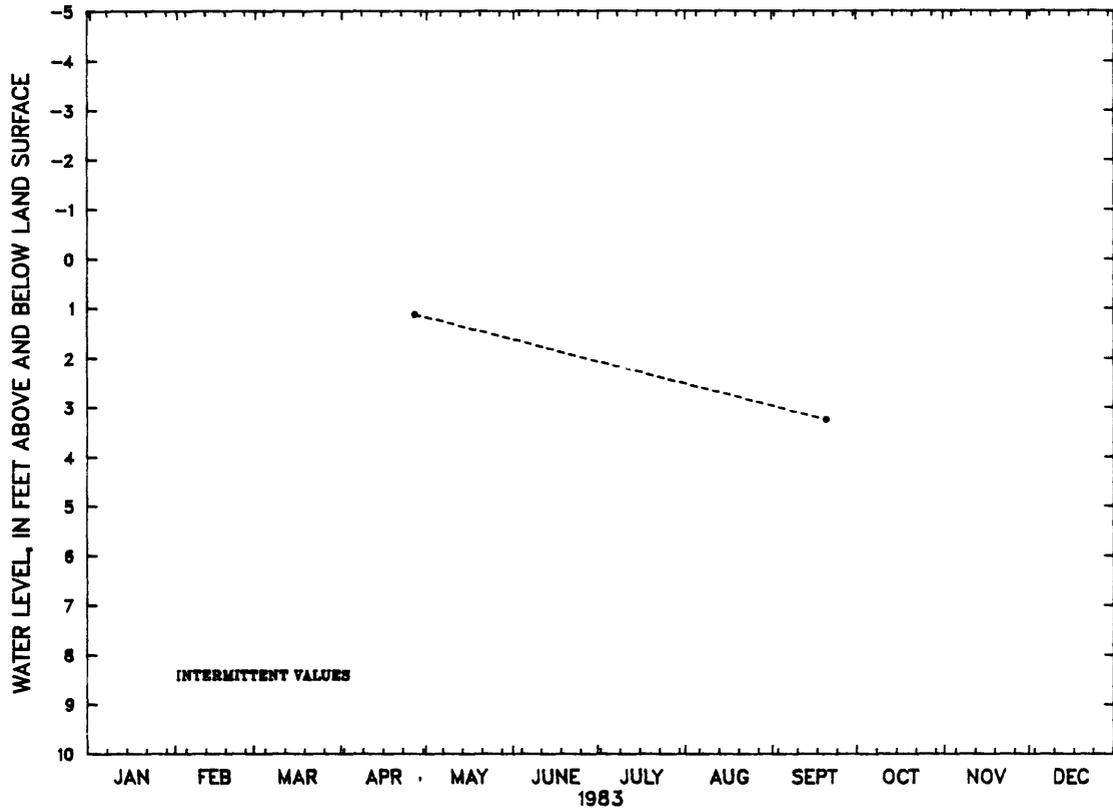


Figure 2.20.2-1.—Water-level fluctuations in the Beverly well, Randolph County.

2.21 Ritchie County

2.21.1 Harrisville well

391226081024901. Local number, 28-3-3.

LOCATION.--Lat 39°12'26", long 81°02'49", Hydrologic Unit 05030203, at Stout and East South Street, Harrisville.

Owner: Terry Stonestreet.

AQUIFER.--Dunkard Group of Pennsylvanian and Permian age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 6 in., depth 118 ft, cased with steel.

DATUM.--Land-surface datum is about 840 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.2 ft above land-surface datum.

REMARKS.--Formerly public-supply well.

PERIOD OF RECORD.--August 1966 to October 1966 (weekly water-level measurements), April 1968 to September 1975 (water-level recorder), October 1975 to July 1976 (monthly water-level measurements), July 1976 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 17.46 ft below land-surface datum, Jan. 25, 1978; lowest measured, 21.80 ft below land-surface datum, Sept. 7, 1966.

SUPPLEMENTARY INFORMATION

This well is located on a hilltop. The aquifer consists of sandstone, siltstone, red and gray shale, limestone, and coal.

The water level in this well gradually rose from 1966 to 1969. It remained fairly constant from 1969 to 1983 fluctuating only 1.5 to 2.0 ft annually. The water level dropped during the summer of 1983 probably as a result of very dry weather conditions.

The average water level for 1983 was 19.20 feet or 0.02 foot lower than the average level in 1982.

HARRISVILLE WELL
391226081024901

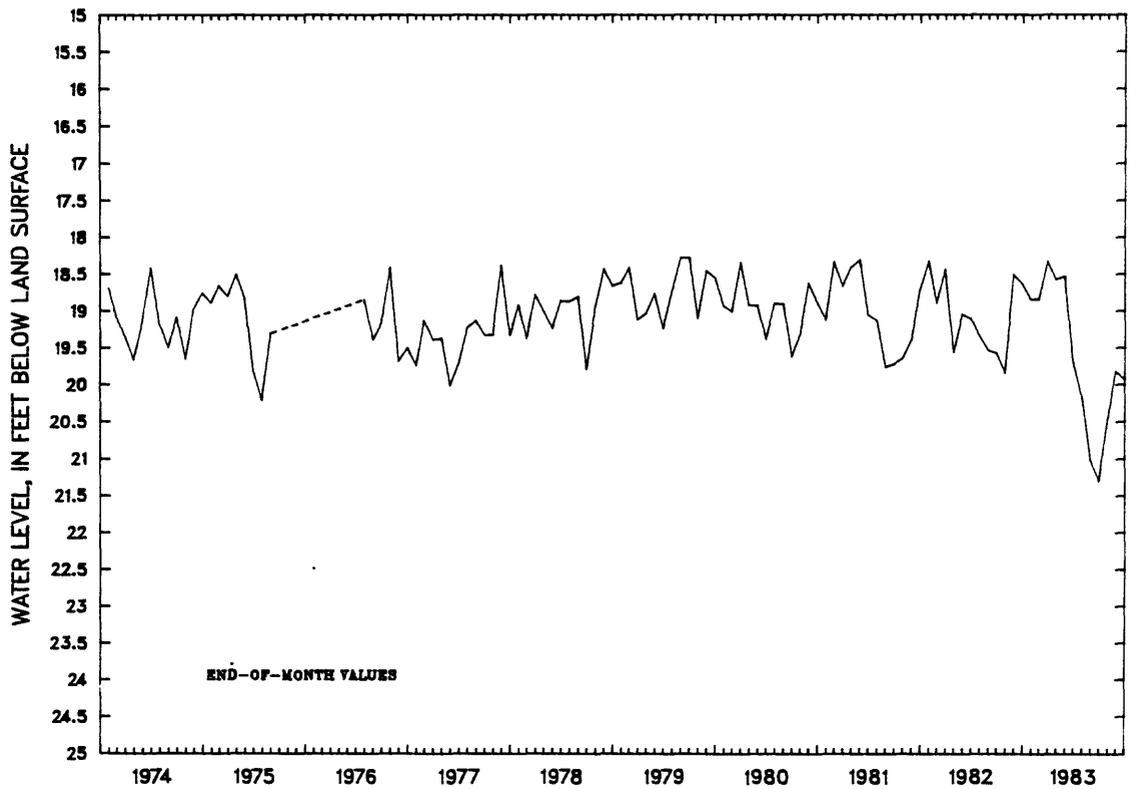
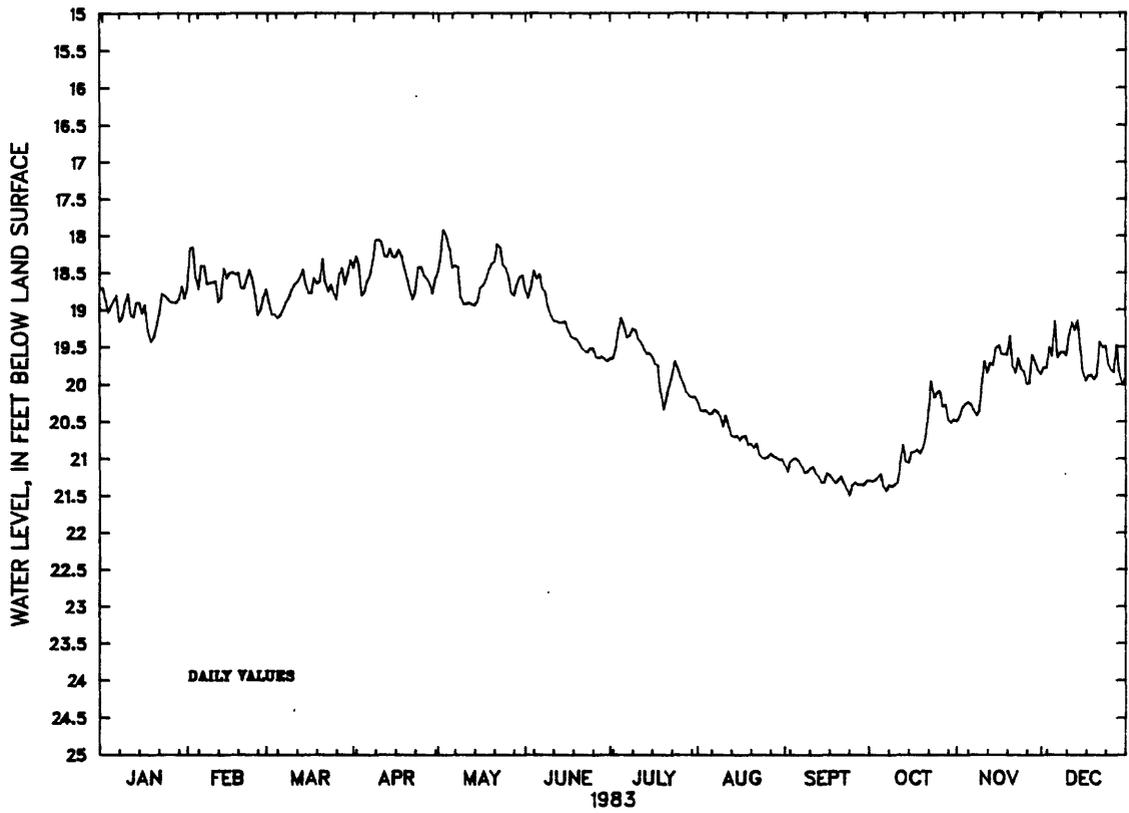


Figure 2.21.1-1.--Water-level fluctuations in the Harrisville well, Ritchie County.

2.22 Tucker County

2.22.1 Canaan well

390135079275601. Local number, 15-6-17.

LOCATION.--Lat 39°01'35", long 79°27'56", Hydrologic unit 05020004, at Canaan Valley State Park off W. Va. State Route 32.

Owner: West Virginia Department of Natural Resources.

AQUIFER.--Pocono Group of Lower Mississippian age.

WELL CHARACTERISTICS.--Drilled unused artesian well, diameter 8 in., depth 281 ft, cased with steel.

DATUM.--Land-surface datum is about 3275 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of recorder shelter base, 1.6 ft above land-surface datum. Prior to May 29, 1980, measuring point was top of casing, 1.55 ft above land-surface datum.

PERIOD OF RECORD.--June 1971 to December 1975 (weekly water-level measurements), April 1978 to May 1980 (periodic water-level measurements), May 1980 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 6.72 ft below land-surface datum, June 6, 7, 1981; lowest measured, 11.54 ft below land-surface datum, July 19, 1971.

SUPPLEMENTARY INFORMATION

This well is located in the side of a broad upland valley near a golf course. The aquifer consists of sandstone with some shale.

There is no unusual long-term variation in water level which annually fluctuates about five feet throughout the period of record. Recharge peaks during the summer are probably due to heavy rains.

The average water level for 1983 was 9.66 feet, only 0.02 foot higher than the average level in 1982.

The well was pumped and sampled for chemical quality in May and in October 1984. The specific capacity was 0.46 (gal/min)ft (pumped 15 min.) in October as computed from the recovery data.

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
May , 1984							
30...	1345	208	8.3	8.5	15	7.6	14
Oct.							
22...	1545	218	7.9	9.0	15	8.0	14
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
May , 1984							
30...	93	9.1	1.7	.20	153	1.9	
Oct.							
22...	85	8.4	1.5	.10	112	.39	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
May , 1984							
30...	.50	<.010	230	26	10	5	
Oct.							
22...	.20	.020	500	10	10	4	

CANAAN WELL
390135079275601

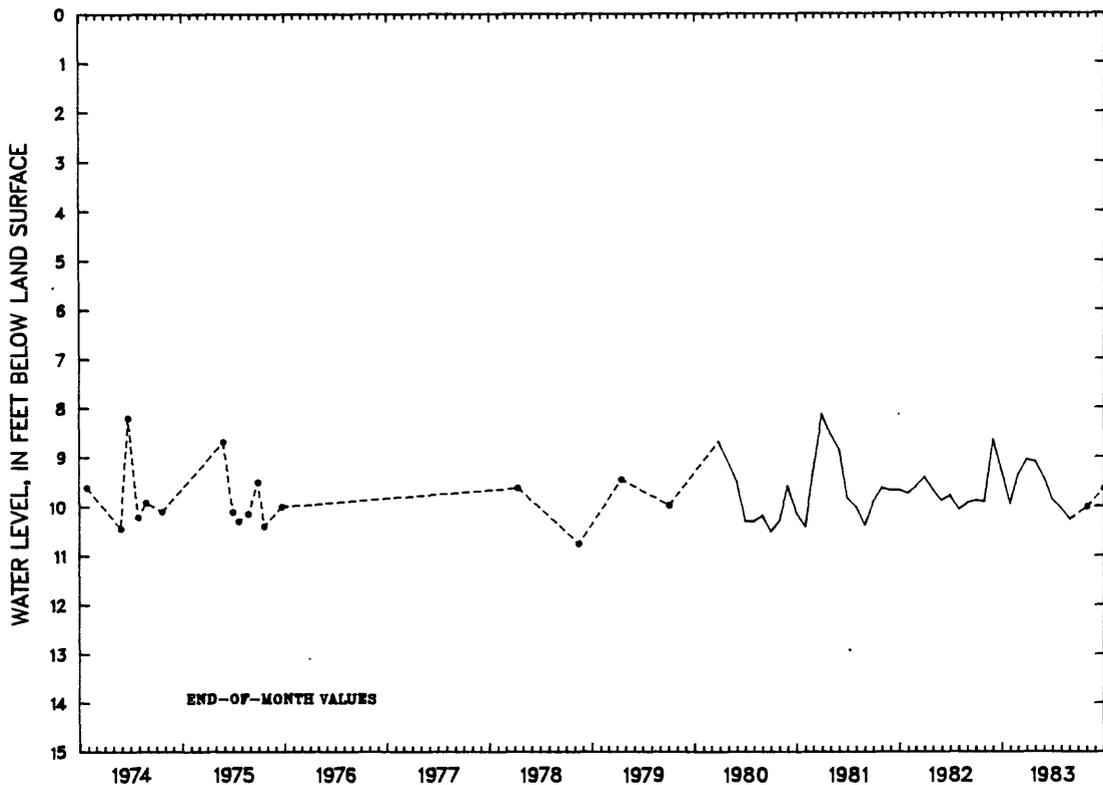
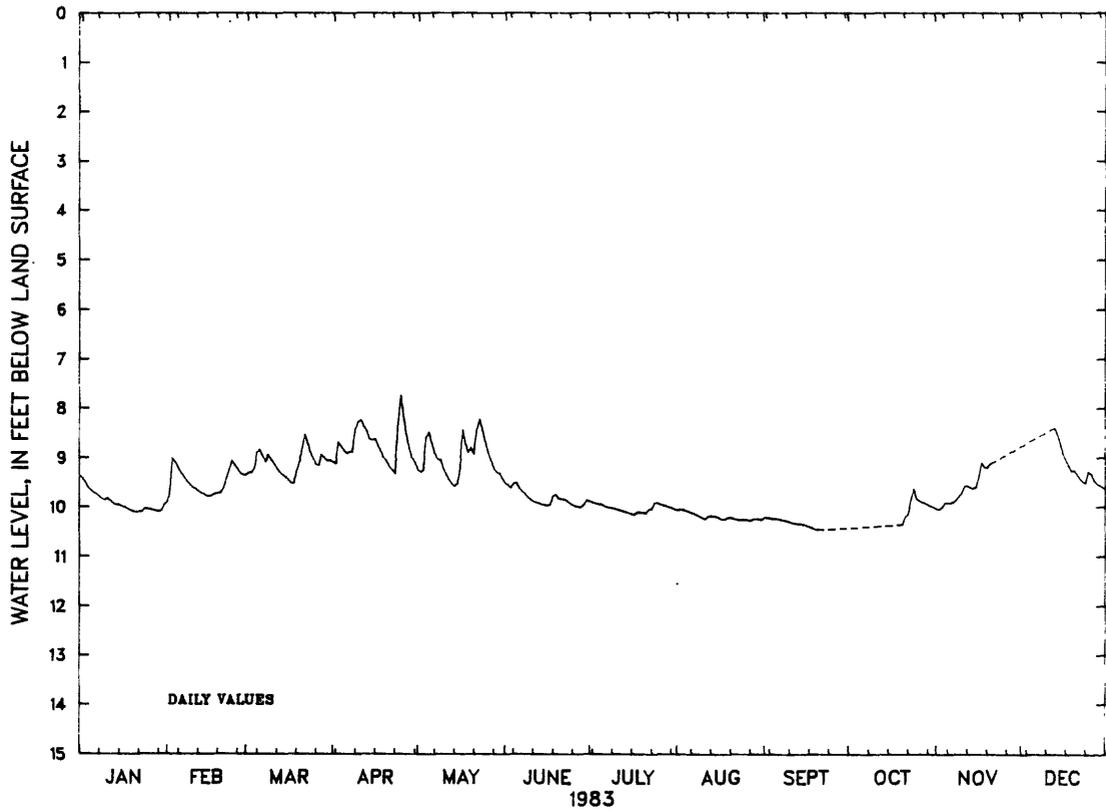


Figure 2.22.1-1.--Water-level fluctuations in the Canaan well, Tucker County.

2.23 Wayne County

2.23.1 Cabwaylingo well

375827082211501. Local number, 50-6-5.

LOCATION.--Lat 37°58'27", long 82°21'15", Hydrologic Unit 05090102, on Cabwaylingo State Forest on Secondary State Route 35.

Owner: West Virginia Department of Natural Resources.

AQUIFER.--Kanawha Formation of Lower Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 119 ft, cased with steel to 10 ft.

DATUM.--Land-surface datum is about 740 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing cover, 1.33 ft above land-surface datum. Prior to Nov. 27, 1979, measuring point was top of casing, 1.30 ft above land-surface datum.

PERIOD OF RECORD.--May 1971 to current year (weekly water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 27.67 ft below land-surface datum, May 24 and June 1, 1983; lowest measured, 32.17 ft below land-surface datum, July 21, 1982.

SUPPLEMENTARY INFORMATION

This well is located in a flat valley in a State forest. The aquifer is generally comprised of sandstone, shale, siltstone, and coal.

The water levels are fairly constant throughout the period of record and seldom fluctuate more than 2 feet annually; however, since 1980 the water level fluctuations have been more drastic. The water level in the summer of 1982 is lower than normal corresponding to dry periods, but returns to normal range in 1983.

The average water level for 1983 was 29.25 feet or 0.02 foot higher than the average level in 1982.

CABWAYLINGO WELL
375827082211501

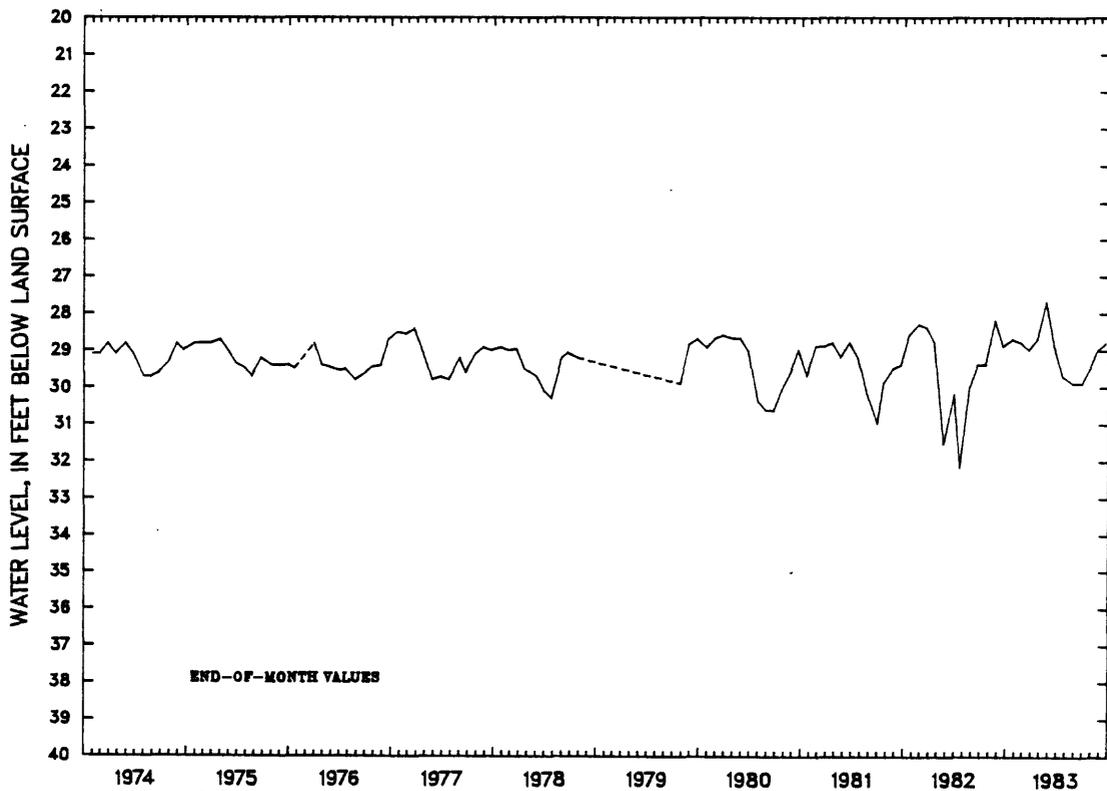
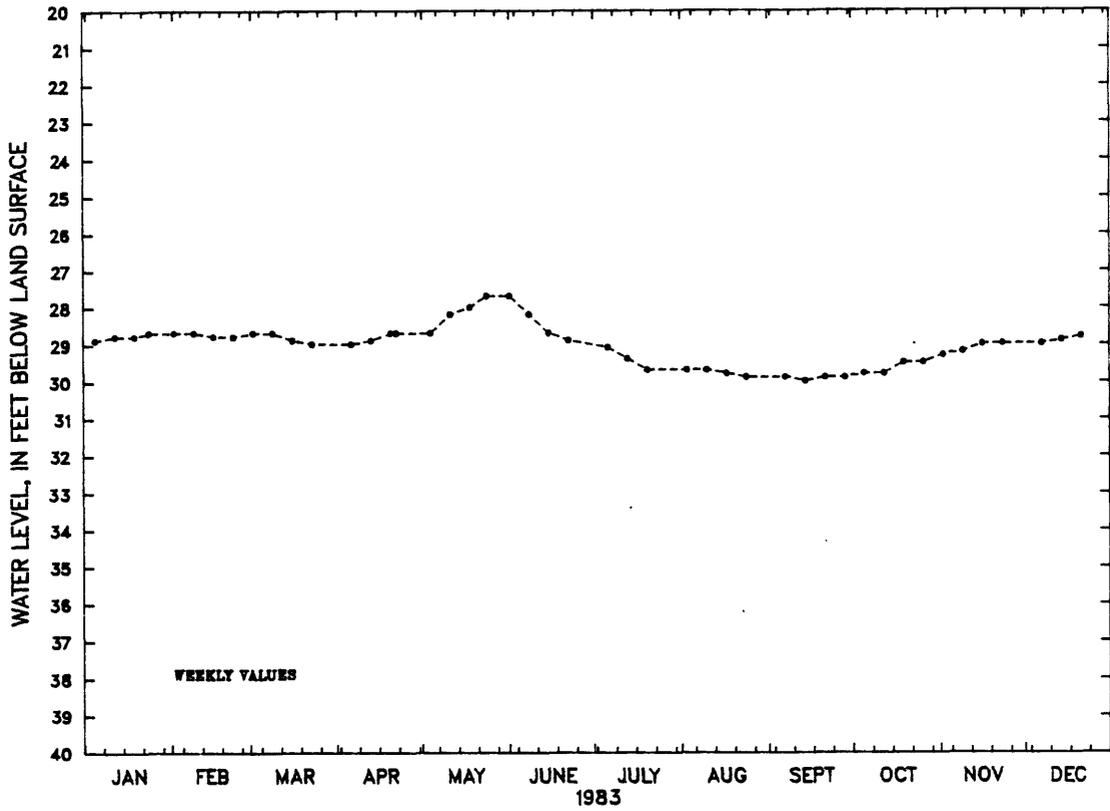


Figure 2.23.1-1.---Water-level fluctuations in the Cabwaylingo well, Wayne County.

2.24 Webster County

2.24.1 Bishop Knob well

382008080292801. Project number, M006.

LOCATION.--Lat 38°20'08", long 80°29'28", Hydrologic Unit 05050005, at Bishop Knob Campground about 0.5 mi from junction of U.S. Forest Service Roads 81 and 83 and about 4 mi from Dyer.

Owner: U.S. Forest Service.

AQUIFER.--Kanawha Formation of Lower Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 80 ft, cased with galvanized iron to 60 ft.

DATUM.--Land-surface datum is about 3100 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of extended casing, 2.00 ft above land-surface datum.

PERIOD OF RECORD.--March 1980 to October 1982 (periodic water-level measurements), October 1982 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water-level, 21.50 ft below land-surface datum, Dec. 5, 1982; lowest, 26.78 ft below land-surface datum, Sept. 29, 30, 1983.

SUPPLEMENTARY INFORMATION

This well is located on a hilltop in a remote area and taps an aquifer comprised of sandstone, shale, siltstone, and coal.

BISHOP KNOB WELL
382008080292801

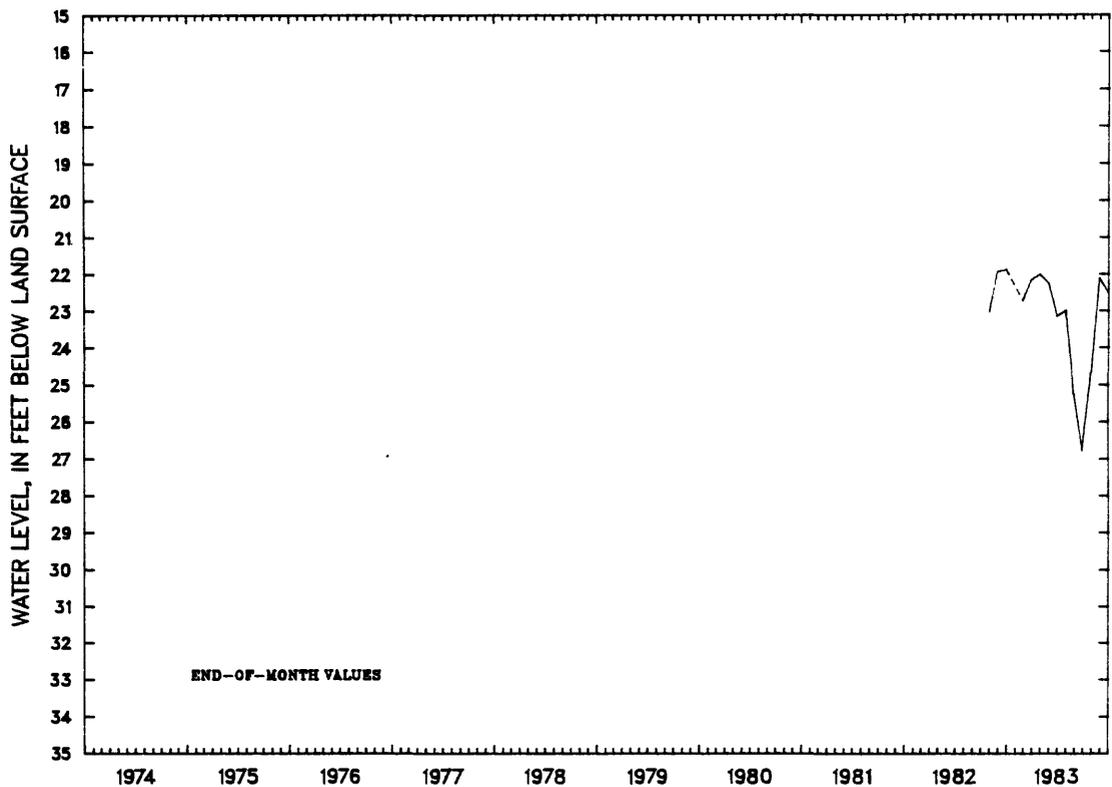
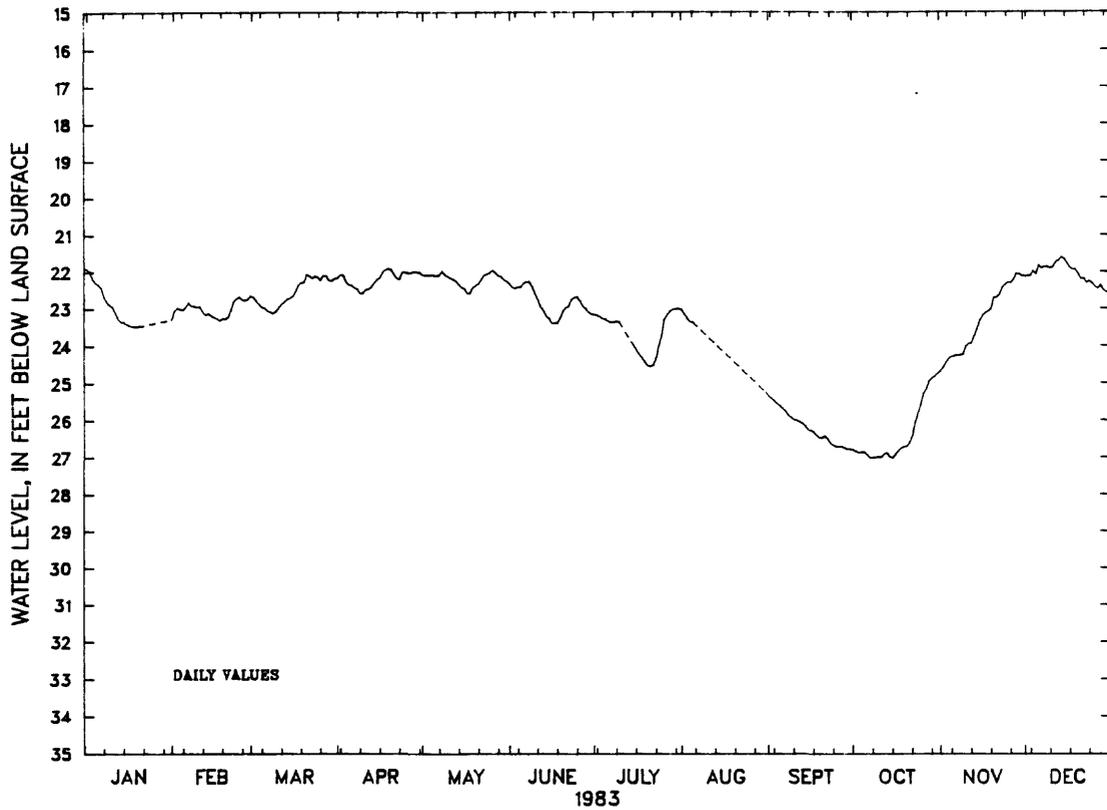


Figure 2.24.1-1.--Water-level fluctuations in the Bishop Knob well, Webster County.

2.25 Wetzel County

2.25.1 Lewis-Wetzel PHA well

392858080373401. Local number, 6-6-8.

LOCATION.--Lat 39°28'58", long 80°37'34", Hydrologic Unit 05030201, on Secondary Route 82 in Lewis-Wetzel Public Hunting Area near Jacksonburg.

Owner: West Virginia Department of Natural Resources.

AQUIFER.--Dunkard Group of Pennsylvanian and Permian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 76 ft, cased with steel.

DATUM.--Land-surface datum is about 890 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing, 1.1 ft above land-surface datum.

PERIOD OF RECORD.--September 1971 to current year (weekly water-level measurements).

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.10 ft below land-surface datum, Nov. 28, 1973; lowest measured, 20.90 ft below land-surface datum, Oct. 5, 1977.

SUPPLEMENTARY INFORMATION

This well is located on the hillside of a small valley in a public hunting area. The aquifer is comprised primarily of sandstone, siltstone, red and gray shale, limestone, and coal.

The wide range in water levels throughout the period of record indicate that the water table responds quickly to rainfall and runoff.

The average water level for 1983 was 14.24 feet or 0.05 foot below the level in 1982.

LEWIS-WETZEL PHA WELL
392858080373401

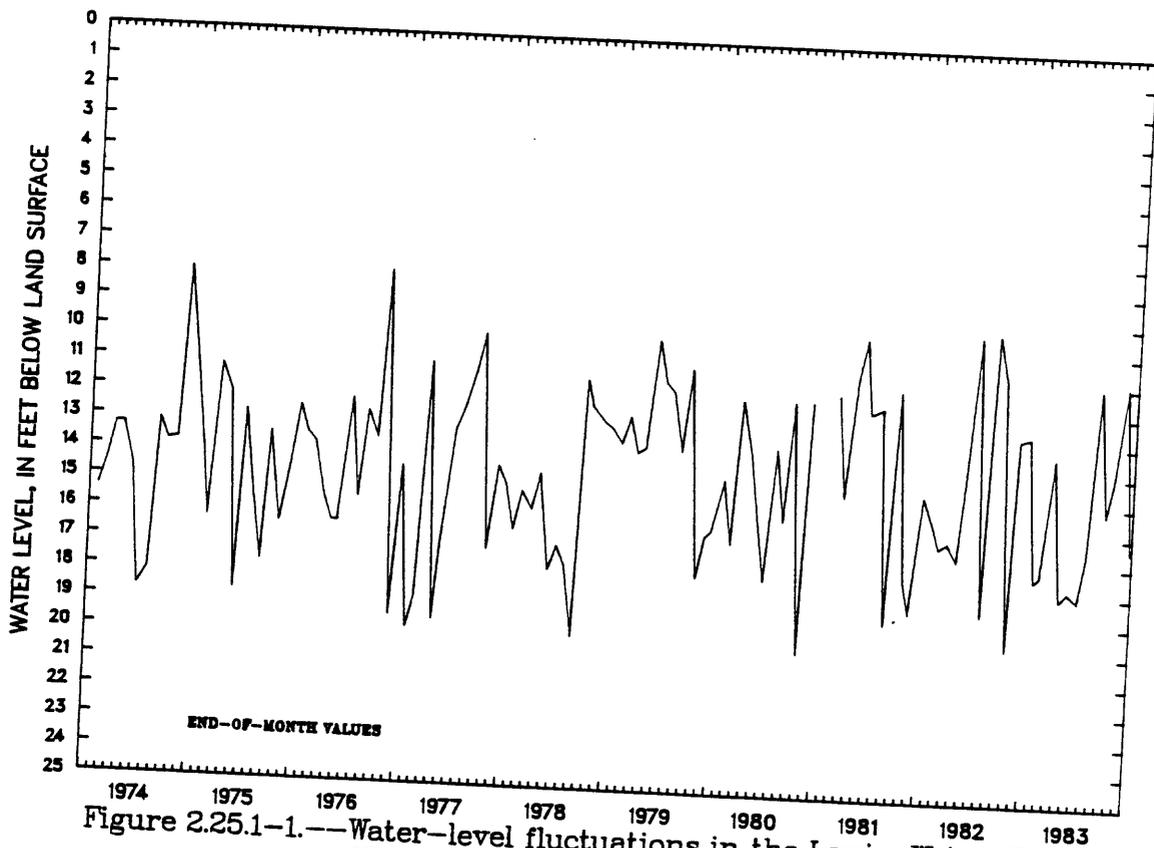
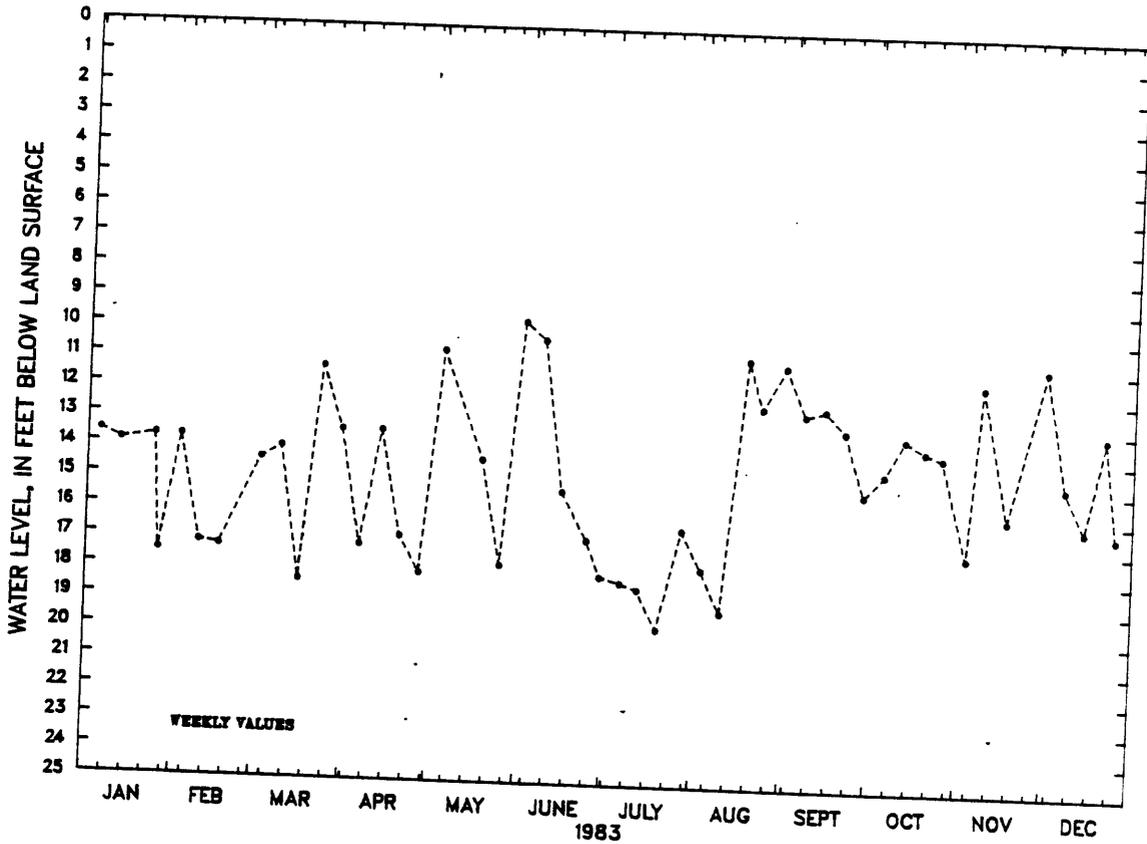


Figure 2.25.1-1.--Water-level fluctuations in the Lewis-Wetzel PHA well, Wetzel County.

2.26 Wyoming County

2.26.1 Twin Falls well

373839081255201. Local number, 54-2-12.

LOCATION.--Lat 37°38'39", long 81°25'52", Hydrologic Unit 05070101, at Twin Falls State Park.

Owner: U.S. Geological Survey.

AQUIFER.--New River Formation of Lower Pennsylvanian age.

WELL CHARACTERISTICS.--Drilled unused water-table well, diameter 6 in., depth 80 ft, cased with steel to 28 ft.

DATUM.--Land-surface datum is about 2015 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of recorder shelter floor, 2.62 ft above land-surface datum.

REMARKS.--Aquifer test data available. Water-level record affected by nearby pumping at times.

PERIOD OF RECORD.--December 1976 to February 1977 (periodic water-level measurements), February 1977 to current year (water-level recorder).

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 19.19 ft below land-surface datum, Mar. 13, 1980; lowest, 41.12 ft below land-surface datum, Nov. 14, 1978.

SUPPLEMENTARY INFORMATION

This well is located in a flat valley on a State Park golf course. The aquifer is comprised of sandstone, shale, siltstone, and coal.

Since 1976 the hydrograph shows a slight decline in overall water level. The autumns of 1978 and 1983 show the lowest water level for the period of record. The low level is probably due to very dry weather and the lowering of the water level by pumpage from other nearby wells for irrigating the golf course.

The water-level average for 1983 was 26.25 feet or 0.51 foot lower than the average in 1982.

The well was pumped and sampled for chemical quality in July and again in October 1984. No specific capacity data are available, but numerous aquifer tests were performed on other wells in this State Park as part of another hydrologic study (Wyrick and Borchers, 1981).

WATER-QUALITY DATA

Date	Time	Specific conductance (umhos)	pH (standard units)	Temperature (deg C)	Calcium dissolved (mg/L as Ca)	Magnesium, dissolved (mg/L as Mg)	Sodium dissolved (mg/L as Na)
July, 1984							
10...	1740	305	6.8	15.0	18	5.5	3.7
Oct.							
30...	1440	275	6.3	13.0	17	5.2	3.7
Date	Alkalinity field (mg/L as CaCO ₃)	Sulfate dissolved (mg/L as SO ₄)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids residue at 180 deg C dissolved (mg/L)	Nitrogen, NO ₂ +NO ₃ dissolved (mg/L as N)	
July, 1984							
10...	66	63	1.1	.10	57	<.10	
Oct.							
30...	57	64	1.0	.10	123	<.10	
Date	Nitrogen, ammonia + organic dis. (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)	Iron, total recoverable (ug/L as Fe)	Iron, dissolved (ug/L as Fe)	Manganese, total recoverable (ug/L as Mn)	Manganese, dissolved (ug/L as Mn)	
July, 1984							
10...	1.1	<.010	30000	32000	6500	670	
Oct.							
30...	.40	<.010	33000	25000	570	540	

TWIN FALLS WELL
373839081255201

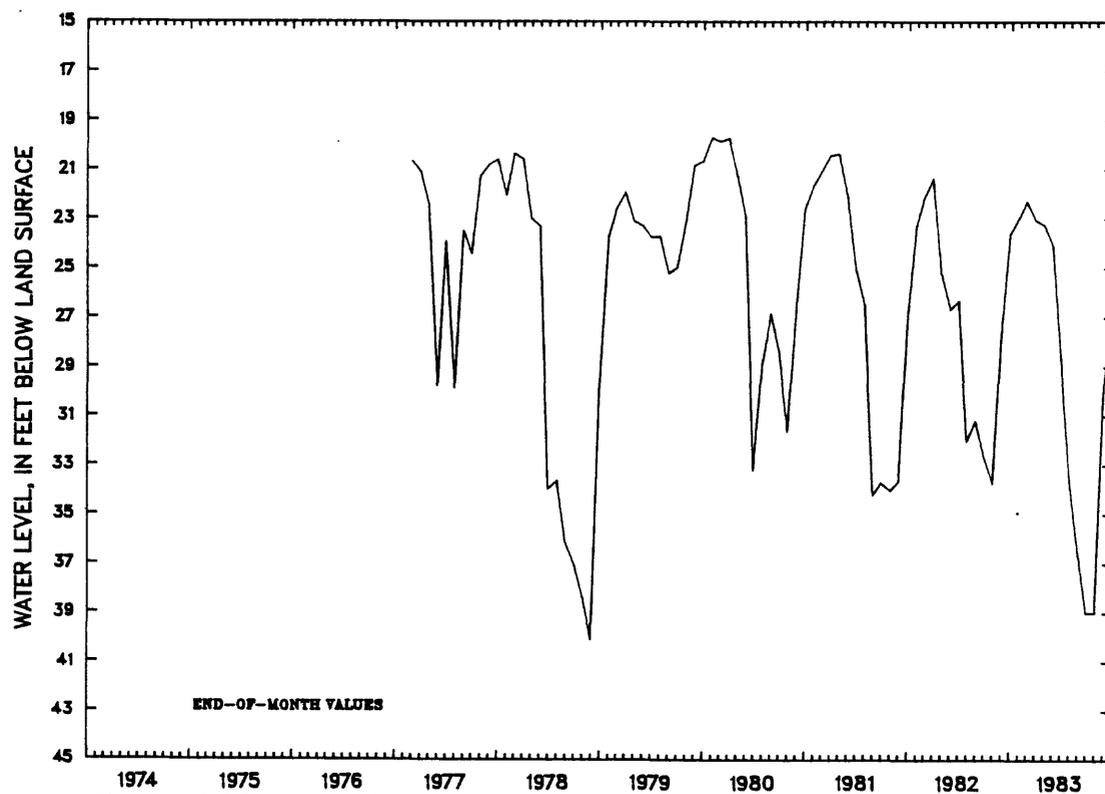
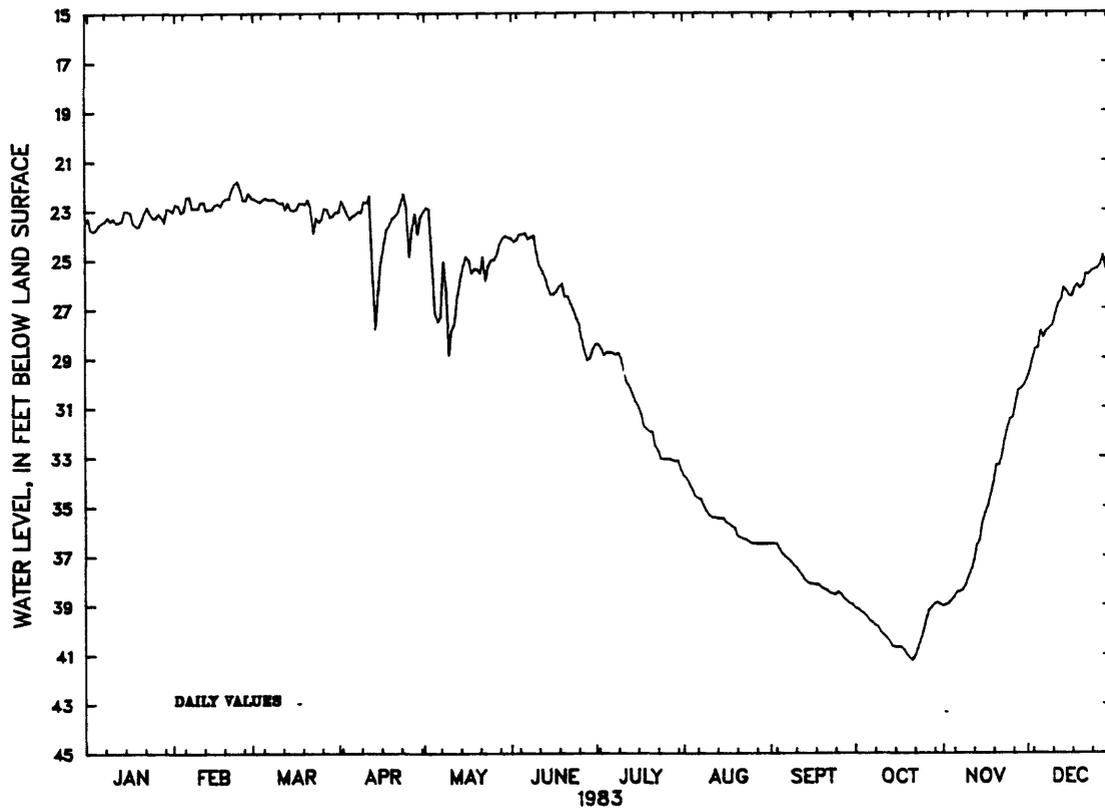


Figure 2.26.1-1.--Water-level fluctuations in the Twin Falls well, Wyoming County.

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