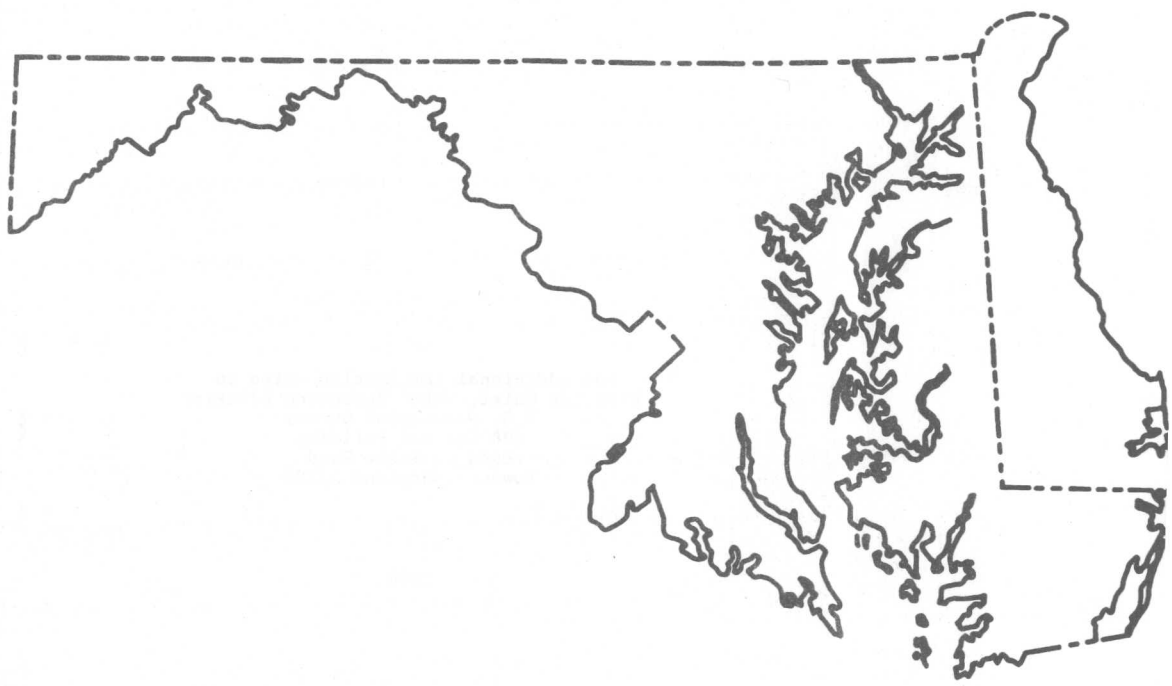
Water Resources Data Maryland and Delaware Water Year 1993

Volume 2. Ground-Water Data

by M.J. Smigaj, R.W. Saffer, and J.L. Tegeler



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT MD-DE-93-2
Prepared in cooperation with the States of Maryland and Delaware
and with other agencies

UNITED STATES DEPARTMENT OF THE INTERIOR

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1993

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50272 – 101

REPORT DOCUMENTATION PAGE	1. REPORT NO. USGS/WRD/HD-93/279	2.	3. Recipient's Accession No.

4. Title and Subtitle

Water Resources Data - Maryland and Delaware, Water Year 1993
Volume 2. Ground-Water Data

5. Report Date
APRIL 1994

6.

7. Author(s)
M.J. Smigaj, R.W. Saffer, and J.L. Tegeler

8. Performing Organization Rept. No.
USGS-WDR-MD-DE-93-2

9. Performing Organization Name and Address

U.S. Geological Survey, Water Resources Division
208 Carroll Building
8600 LaSalle Road
Towson, Maryland 21286

10. Project/Task/Work/Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address

U.S. Geological Survey, Water Resources Division
208 Carroll Building
8600 LaSalle Road
Towson, Maryland 21286

13. Type of Report & Period Covered
Annual - Oct. 1, 1992 to Sept. 30, 1993

14.

15. Supplementary Notes

Prepared in cooperation with the states of Maryland and Delaware and with other agencies.

16. Abstract (Limit: 200 words)

Water resources data for the 1993 water year for Maryland and Delaware consist of records of water levels and water quality of ground-water wells. This report (Volume 2. Ground-Water Data) contains water levels at 365 observation wells, discharge records for 5 springs and water quality at 151 wells. Locations of ground-water level wells are shown on figures 3 and 4. The data in this report represents that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State, local, and Federal agencies in Maryland and Delaware.

17. Document Analysis a. Descriptors
*Maryland, *Delaware, * Hydrologic data, *Ground water, *Water quality, Water levels, Water analyses, Chemical analyses, Water temperatures, Sampling sites.

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement: No restriction on distribution. This report may be purchased from: National Technical Information Service Springfield, VA 22161

19. Security Class (This Report) UNCLASSIFIED

20. Security Class (This Page) UNCLASSIFIED

21. No. of Pages 565

22. Price

(See ANSI-Z39.18) See Instructions on Reverse

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

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HARFORD COUNTY
Spring 394153076325701 Local number HA Aa 9 37
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WATER RESOURCES DATA - MARYLAND AND DELAWARE, 1993

VOLUME 2. GROUND-WATER DATA

INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of Maryland and Delaware each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled **"Water Resources Data - Maryland and Delaware."**

This series of annual reports for Maryland and Delaware began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report format was changed to present, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels. In the 1989 water year, the report format was changed to two volumes. Both volumes contained data on quantities of surface water, quality of surface and ground water, and ground-water levels. Volume 1 contained data on the Atlantic Slope Basins (Delaware River thru Patuxent River) and Volume 2 contained data on the Monongahela and Potomac River basins. Beginning with the 1991 water year, Volume 1 contains all information on quantities of surface water and surface-water-quality data and Volume 2 contains ground-water levels and ground-water-quality data.

This report is Volume 2 in our 1993 series and includes records of water levels and water quality of ground-water wells and springs. It contains records for water levels at 365 observation wells, discharge data for 5 springs, and water quality at 151 wells. Location of ground-water level wells are shown on figures 3 and 4. These data represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in Maryland and Delaware.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for Maryland and Delaware were published in U.S. Geological Survey Water-Supply Papers. Data on water levels for the 1935 through 1974 water years were published under the title **"Ground-Water Levels in the United States."** The above mentioned Water-Supply Papers may be consulted in the libraries of the principal cities of the United States and may be purchased from Books and Open-File Reports Section, Federal Center, Bldg. 41, Box 25425, Denver, CO 80225.

Publications similar to this report are published annually by the Geological Survey for all States. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this volume is identified as **"U.S. Geological Survey Water-Data Report MD-DE-93-2."** For archiving and general distribution, the reports for 1971-74 water years also are identified as water-data reports. These water-data reports are for sale in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. Beginning with the 1991 water year, all water-data reports will also be available on Compact Disc - Read Only Memory **(CD-ROM)**. All data reports published for the current water year for the entire Nation, including Puerto Rico and the Trust Territories, will be reproduced on a single **CD-ROM** disc.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephone (410) 828-1535. A limited number of **CD-ROM** discs will be available for sale by the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, Colorado 80225.

COOPERATION

The U.S. Geological Survey and agencies of the State of Maryland have had cooperative agreements for the collection of water-resource records from 1896 to 1909 and since 1924. Similar cooperative agreements have existed between the Survey and agencies of the State of Delaware, since 1943. Organizations that assisted in collecting the data in this report through cooperative agreements with the Survey are:

Maryland Geological Survey, E. T. Cleaves, Director.

Delaware Geological Survey, R. R. Jordan, State Geologist.

Maryland Department of Environment; Chesapeake Bay and
Special Projects Program, R. M. Summers, Division Chief.

U.S. Army, Aberdeen Proving Ground, Support Activity, Enviromental Management Division.

U.S. Navy, Naval Ordnance Station, Indian Head.

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MARYLAND:
SOMERSET COUNTY
Well 380920075420501 Local number SO Ce 98.....538-539
TALBOT COUNTY
Well 384643076043801 Local number TA Ce 7..... 540
WASHINGTON COUNTY
Well 394149078052801 Local number WA Ad 101.....541-544
Well 394115077461501 Local number WA Ah 63.....541-544
Well 394219077335301 Local number WA Ak 99.....541-544
Well 393815077353001 Local number WA Bj 51.....541-544
Well 393419077405901 Local number WA Ci 168.....541-544
Well 393210077392901 Local number WA Cj 132.....541-544
Spring 392836077442701 Local number WA Di 103.....541-544
WICOMICO COUNTY
Well 382329075412002 Local number WI Cd 71..... 545
Well 382150075352101 Local number WI Ce 13..... 545
WORCESTER COUNTY
Well 382632075031901 Local number WO Ah 34.....546-549
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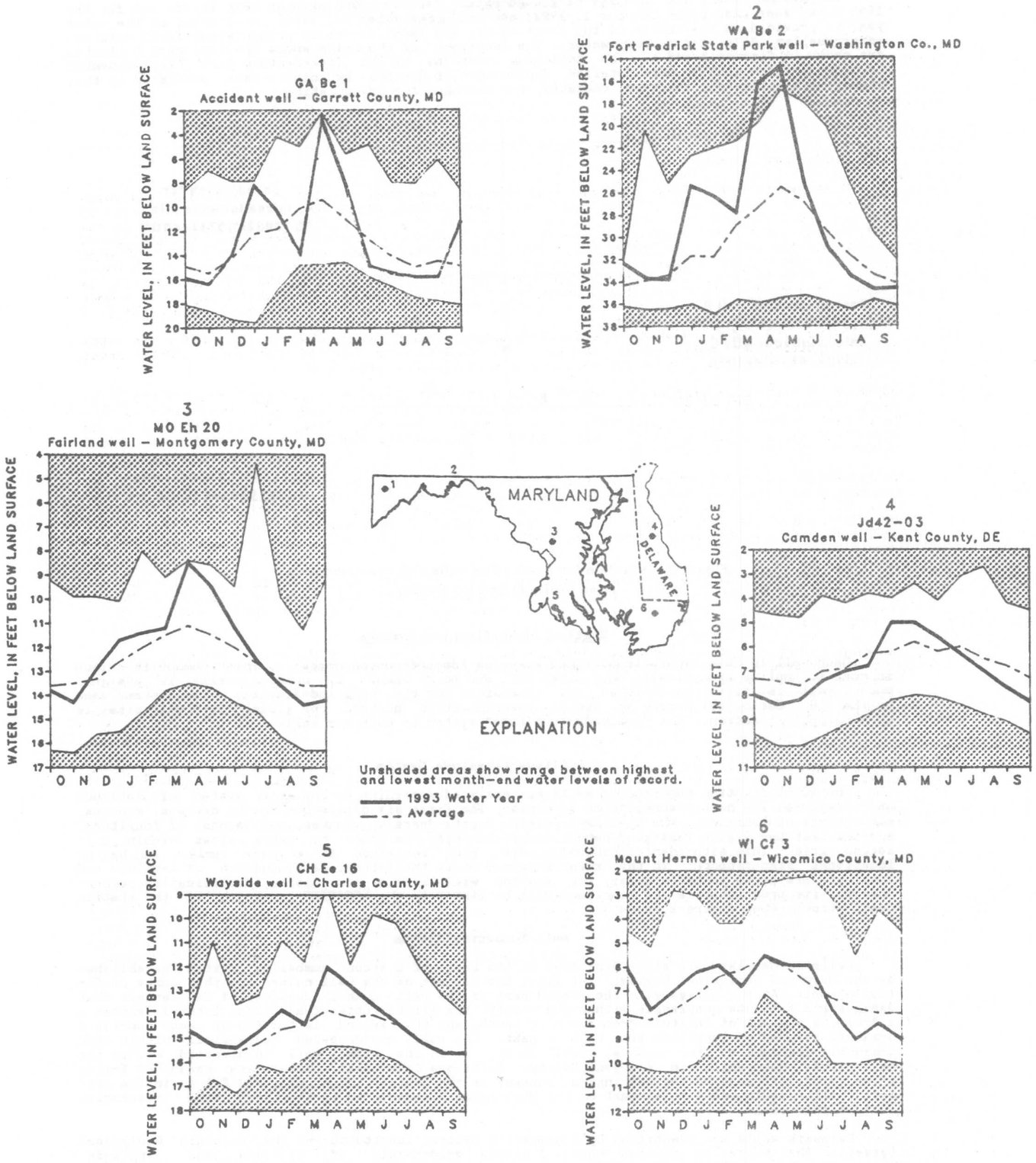


Figure 1.––Monthly ground–water levels at key observation wells.

The following organizations aided in collecting records:

Delaware: State Department of Natural Resources and Environmental Control,
Water Resources Agency for New Castle County.

Organizations that provided data are acknowledged in station descriptions.

SUMMARY OF HYDROLOGIC CONDITIONS

Ground-Water Levels

Ground-water levels in water-table and artesian observation wells in Maryland and Delaware fluctuate with response to precipitation and ground-water withdrawal. Water-table levels in Maryland and Delaware were above average at the beginning of the 1993 water year with levels declining slightly until March (fig. 1). With heavy rains and several major snowstorms that moved across the east coast during the winter, most of the water-table observation wells recorded peak levels for the months of March, April, and May. Many of these levels were record-high water levels. With an historic amount of precipitation for anyone month in the bi-State region, in March. The middle of spring was the beginning of a drought period that lasted through the summer months and ended when heavy rainstorms arrived the last 2 -weeks of September. The water year ended at normal water-table levels.

In the bi-State areas where ground-water artesian aquifers are the main source for municipal water supplies, the water levels continued to decline for most of the area. Water-level conditions are summarized below for each of the physiographic provinces:

Appalachian Plateau.--Water-table levels were above normal at the beginning of the 1993 water year, reaching peak levels in March. Several observation wells recorded record-high water levels. These high water levels quickly fell to below normal levels by June, due to the late spring drought which lasted through the summer. Late September rains accounted for normal water-table levels at the end of the water year.

Valley and Ridge.-- Water-table levels were above normal at the beginning of the 1993 water year, reaching peak levels in March. Several observations wells recorded record-high water levels. Well WA Be 2, a long-term observation well with water-level data starting December 1949, surpassed a previous high level by almost 2 feet. Water-table levels began dropping in April and continued dropping through the remainder of the water year. However, water levels remained above normal throughout the water year.

Blue Ridge.-- Water-table levels were at normal levels at the beginning of the water year but sharply rose in December. These levels dropped during January and February, peaking in March. Water levels dropped throughout the remainder of the water year, but began rising near the end of September due to heavy rains.

Piedmont.-- Water-table levels were above normal at the beginning of the water year, and rose to record-high levels in April throughout most of the Piedmont. These levels declined throughout the remainder of the water year until the middle of September, when heavy rains fell accounting for a rise in water levels. Water levels in the Triassic limestone valley of Montgomery and Frederick Counties rose to record levels in April and declined to normal levels by the end of the water year. Water levels in the Poolsville area of Montgomery County, affected by ground-water withdrawals, recorded record-low levels in September.

Coastal Plain.-- Water-table levels on the western shore of the Chesapeake Bay were at normal to above-normal levels at the beginning of the water year. The water levels rose through January with a slight drop in February, and then rose sharply in March with a gradual decline through the end of the water year where levels remained above normal. Water-table levels on the Eastern Shore, or the Delmarva Penninsula, peaked in January, except those near the western boundary of the Chesapeak Bay. Those wells peaked in March like most of the bi-State area. Water-table levels were either normal or slightly above normal at the end of the water year even though this region received less precipitation than the rest of the bi-State area.

Artesian aquifers (identified in parenthesis), however, continued to decline in the following areas of Maryland because of increased ground-water withdrawals: Annapolis and vicinity (Magothy, Patapsco), Cecilton (Potomac), Charlotte Hall (Aquia), Glen Burnie (Patuxent), Kent Island (Aquia), La Plata (Patapsco), Leonardtown (Aquia), Lexington Park (Aquia), Ocean City (Manokin), Potomac Heights (Patuxent), Prince Frederick (Aquia), St. Charles (Patapsco, Patuexnt), Solomons Island (Aquia), southern Anne Arundel County (Aquia), Vienna (Beaverdam), and Waldorf (Magothy, Patapsco).

Records of Ground-Water Levels

Water-level data from the Maryland and Delaware Observation-Well Networks and observation wells from 10 ground-water projects are reported. These data are intended to provide historical water-level information for ground-water management and identify ground-water conditions in project areas. The observation well networks were established to observe ground-water level fluctuations through time and to identify areas of man-induced stress on the ground-water flow system. The locations of these observation wells in Maryland and Delaware are shown in figure 3. The locations of project wells are shown in figure 4.

Data Collection and Computation

Measurements of water levels are made in many types of water wells under various conditions. These methods of measurement are standardized to incorporate continuous precision. The equipment and measuring techniques used at each observation well ensures that the measurements at each well are of consistent accuracy and reliability.

The water-level data tables and hydrographs are presented in alphabetical order by counties. The primary identification number is the state well number that appears in the upper left hand corner (see Latitude-Longitude System section on page 5). The secondary identification number is the 15-digit number.

Water levels are measured manually by steel tape or by an electric sensing device approximately every 4 to 6 weeks; some wells are equipped with contiuous graph or punch tape water-level recorders to observe daily fluctuations. The water levels are reported to the nearest hundreth of a foot above or below land-surface datum **(lsd)** or sea level. Land-surface datum is a datum plane that is approximately at land surface at each well. The elevation of the land-surface datum and the height of the measuring point **(MP)** above or below land-surface datum is given in each well description. Water levels for wells equipped with graphic or digital recorders report the daily maximum and minimum values.

Data Presentation

A description of each observation well precedes the water-level tables and hydrographs. The following information is given in the description:

WELL NUMBER.--(See Latitude -Longitude System section on page 4.)

SITE ID.--A 15-digit number: the first 6 digits are the latitude, the next 7 digits are the longitude, and the last 2 digits refer to the sequence number for identifying one or more wells at a particular latitude and longitude. The site ID is the best location at the time of inventory. The actual latitude and longitude may be slightly different as a result of more up-to-date knowledge of location. The site ID is basically used as an identification number and not an exact location.

PERMIT NUMBER.--The permit number is the state permit number required for drilling wells in Maryland and Delaware. Upon completion of the well, the driller must submit a completion report which documents specific data on the construction of the well.

LOCATION.--The location is the latitude and longitude in the appropriate designation of degrees, minutes, and seconds. The hydrologic unit is a code for the river basin where the well is located (U.S. Geological Survey, 1974: Hydrologic Unit Map). Also a brief local description of the location is given along with the well-owner's name.

AQUIFER.--The aquifer is the geologic formation from which the well receives its water supply. Each aquifer is identified by its geologic age and its U. S. Geological Survey data base system code.

WELL CHARACTERISTICS.--This describes the type of well, the physical characteristics of the well, and the known construction information.

INSTRUMENTATION.--This provides information on the frequency of measurement of water levels and the equipment used.

DATUM.--This lists the altitude of land surface above sea level at the well to the nearest 10 feet as determined from a 7-1/2 minute quadrangle topographic map, or to the nearest hundreth of a foot as determined from surveying. The measuring point **(MP)** is the distance above or below the land surface at the point, at which the measurements are made.

REMARKS.--This section gives important miscellaneous data relevant to the well site.

PERIOD OF RECORD.--The period of record lists the beginning and ending month and year of water-level record or **"current year"** if the records are to be continued into the following year.

EXTREMES FOR PERIOD OF RECORD.--The extremes for period identify the date or dates of highest and lowest water-level measurements.

EXPLANATION OF THE RECORDS

The ground-water and quality-of-ground-water records published in this report are for the 1993 water year that began October 1, 1992, and ended September 30, 1993. A calendar of the water year is provided on the inside of the front cover. The records contain ground-water-level data and water-quality data for ground water. The locations of the wells where the data were collected are shown in figures 3 and 4. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

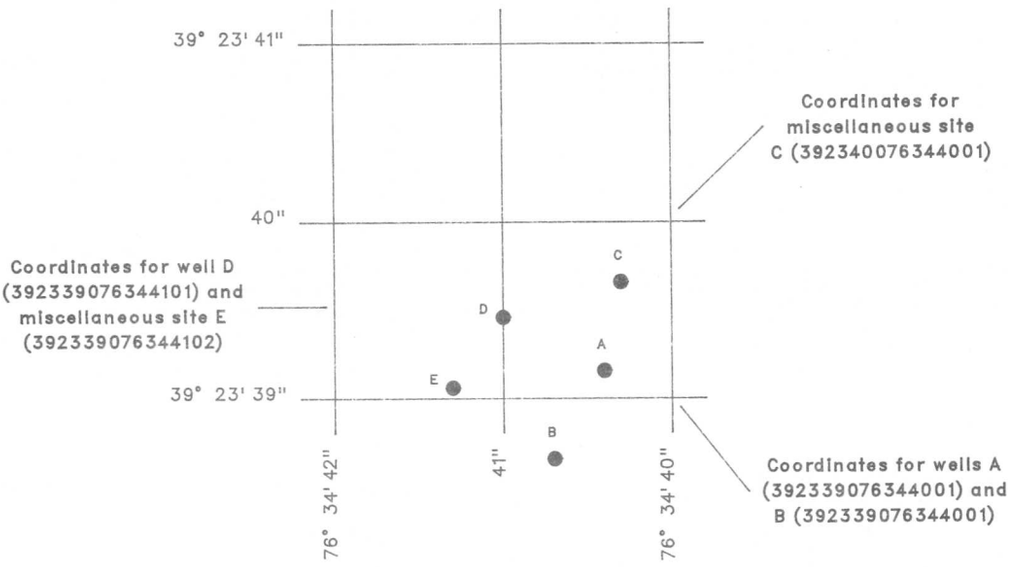


Figure 2.--System for numbering wells and miscellaneous sites (latitude and longitude)

Station Identification Numbers

Each well in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given well and to no other. The number usually is assigned when a well is first established and is etained for that well indefinitely. The systems used by the U.S. Geological Survey to assign identification numbers for ground-water well sites is on geographic location. The **"latitude-longitude"** system is used for wells.

Latitude-Longitude System

The identification numbers for wells are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a 1-second grid. This site-identification number, once assigned, is a pure number and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the **LOCATION** paragraph of the station description. (See figure 2 above.)

Well Numbering System

Wells in Maryland are also identified on the basis of a second numbering system established by the Maryland Geological Survey. The first two letters of the well number are the county prefix (for example, AL for Allegany). The second part of the well number consists of two letters that designate a 5-minute quadrangle within the county; the first letter (a capital letter) denotes a a 5-minute segment of latitude from north to south, and the second letter (lower case) denotes a 5-minute segment of longitude from west to east. The wells are numbered sequentially within each 5-minute quadrangle. For example, well AL Ah 1 is the first well inventoried within the Ah 5-minute quadrangle in Allegany County. Baltimore City well numbers are based on 1-mile grids, with reference to the Washington Monument as the center. Thus, well 7S4E-1 is in the grid cell 7 miles south and 4 miles east of the Washington Monument and is the first well inventoried in that grid cell.

Delaware wells are identified by a numbering system instituted by the Delaware Geological Survey. The State is divided into 5-minute quadrangels of latitude and longitude. The quadrangles are lettered north to south with capital letters. Each 5-minute quadrangle is further subdivided into 25 1-minute blocks which are numbered from north to south from 1 to 5 and are numbered in the sequence in which they are inventoried. The identity of a well is established by prefixing the sequence number with an upper and lower case letter followed by two numbers to designate the 5-minute and 1-minute blocks, respectively, in which the well is located. For example, well number Cb41-03 is the third well to be scheduled in the 1-minute block 41 that has coordinate "Cb41".

Remark Codes

The following remark codes may appear with the water-quality data in this report:

PRINTED OUTPUT	REMARK
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted)
D	Biological organism count equal to or greater than 15 percent (dominant)
&	Biological organism estimated as dominant

ACCESS TO WATSTORE DATA

The U.S. Geological Survey is the principal Federal water-data agency and, as such, collects and disseminates about 70 percent of the water data currently being used by numerous State, local, private, and other Federal agencies to develop and manage our water resources. As part of the Geological Survey's program of releasing water data to the public, a large-scale computerized system has been developed for the storage and retrieval of water data collected through its activities. The National **WAT**er Data **STO**rage and **RE**trieval System **(WATSTORE)** was established in 1972 to provide an effective and efficient means for the processing and maintenance of water data collected through the activities of the U.S. Geological Survey and to facilitate release of the data to the public. A variety of useful products, ranging from data tables to complex statistical analyses such as Log Pearson Type III, can be produced using **WATSTORE**. The system resides on the central computer facilities of the U.S. Geological Survey at its National Center in Reston, Virginia, and consists of related files and data bases.

* **Station Header File** - Contains descriptive information on more than 440,000 sites throughout the United States and its territories where the U.S. Geological Survey collects or has collected data.

* **Daily Values File** - Contains more than 220 million daily values of stream flows, stages, reservoir contents, water temperature, specific conductance, sediment concentrations, sediment discharges, and ground-water levels.

* **Peak Flow File** - Contains approximately 500,000 maximum (peak) streamflow and gage-height values at surface-water sites.

* **Water Quality File** - Contains approximately 2 million analyses of water samples that describe the chemical, physical, biological, radio-chemical characteristics of both surface and ground water.

* **Ground-Water Site Inventory Data Base** - Contains inventory data for more than 900,000 well, springs, and other sources of ground water. The data includes site location, geohydrologic characteristics, well-construction history, and one-time field measurements such as water temperature.

In 1976, the U.S. Geological Survey opened **WATSTORE** to the public for direct access. The signing of a Memorandum of Agreement with the Survey is required to obtain direct access to **WATSTORE**. THe system can be accessed either synchronously or asynchronously. The requestor will be expected to pay all computer costs he/she incurs. Direct access may be obtained by contacting:

U.S. Geological Survey
National Water Data Exchange
421 USGS National Center
Reston, Virginia 22092

In addition to providing direct accesss to **WATSTORE**, data can be provided in various machine-readable formats on magnetic tape or 5-1/4 inch floppy disk; and, as noted in the introduction, on **CD-ROM** discs. Beginning with the 1991 water year, all water-data reports will also be available on Compact Disc - Read Only Memory (**CD-ROM**). All data reports published for the current water year for the entire Nation, including Puerto Rico and the Trust Territories, will be reproduced on a single **CD-ROM** disc. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division's District offices. (See address on the back of the title page.) A limited number of **CD-ROM** discs will be available for sale by the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, Colorado 80225.

Spring Discharge Tables

A table of discharge in gallons per minute follows the station description for each spring. The data appears in a tabling format of date and discharge. The data are measured volumetrically or by use of a flow meter.

Water-Level Tables

A table of water levels follows the station description for each well. Water levels are reported in either of the following table formats:

Hand-held measurements.--If the data are collected by hand held measurements, the data appears in a tabling format of date and water level with the datum in reference to land surface. These values are reported to the nearest hundredth of a foot.

Recorder.--Water levels are presented in a two page 6-month format by water year with columns for daily maximums and minimums. These data are reported in reference to either land surface or sea level datum. The daily maximum column for land surface data represents the lowest daily water level recorded. The daily minimum column for land surface data represents the highest water level recorded. For sea level data, the daily maximum column represents highest daily water level recorded. The daily minimum column represents the lowest daily water level recorded. Missing data are represented by dashes in the table.

Hydrographs

The hydrographs are a graphic display of water level fluctuations over a period of time. In this report a 5-year hydrograph is shown starting October 1, 1988 through September 30, 1993. Those hydrographs which display hand measured values are referenced to land surface datum. Each measurement is indicated by a circle and connected with a dashed line to indicate the trend from one measurement to the next. The trend line should be interpreted as a general direction of water level movement. Actual water levels may deviate from this line. The trend line is not drawn if the measurements are greater than 60 days apart. Recorder data are graphed as a continuous line using the lowest water level recorded for each day. Missing data are indicated by a blank space. Missing data result from recorder malfunctions, battery or clock failures, and mechanical problems related to the response of water level movement in a well.

Records of Ground-Water Quality

Records of ground-water quality in this report differ from other types of records in that, for most sampling sites, they consist of only one set of measurements for the water year. The quality of ground water ordinarily changes only slowly; therefore, for most general purposes, one annual sampling, or only a few samples taken at infrequent intervals during the year, is sufficient. Frequent measurement of the same constituents is not necessary unless one is concerned with a particular problem, such as monitoring for trends in nitrate or chloride concentrations. In the special cases where the quality of ground water may change more rapidly, more frequent measurements are made to identify the nature of the changes.

Data Collection and Computation

The records of ground-water quality in this report were obtained mostly as a part of special studies in specific areas. Consequently, a number of chemical analyses are presented for some counties but none are presented for others. As a result, the records for this year, by themselves, do not provide a balanced view of ground-water quality Statewide. Such a view can be attained only by considering records for this year in context with similar records obtained for these and other counties in earlier years.

Most methods for collecting and analyzing water samples are described in the **"U.S. Geological Survey Techniques of Water-Resources Investigations"** manuals listed at the end of the introductory text. The values reported in this report represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. All samples were obtained by trained personnel. The wells sampled were pumped long enough to assure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possibly metal, comprising the casings.

Data Presentation

The records of ground-water quality are published in a section titled **QUALITY OF GROUND WATER** immediately following the ground-water-level records. Data for quality of ground water are listed alphabetically by County, and are identified by well or spring number **(Well Number)**. The prime identification number for wells or springs sampled is the 15-digit **(site ID)** number derived from the latitude-longitude locations. The site ID includes a two digit sequence number for use at locations having multiple sites. No descriptive statements are given for ground-water-quality records; however, the well number, depth of well, date of sampling, and other pertinent data are given in the table containing the chemical analyses of the ground water.

Chlorophyll refers to the green pigments of plants. Chlorophyll a and b are the two most common green pigments in plants.

Color unit is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Dissolved refers to that material in a representative water sample which passes through a 0.45 um membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved-solids concentration of water is determined either analytically by the **"residue-on-evaporation"** method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate ($CaCO_3$).

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

Land-surface datum (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

Measuring point (MP) is an arbitrary permanent reference point from which the distance to the water surface in a well is measured to obtain the water level.

Metamorphic stage refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic stages of insects are egg-larva-adult or egg-nymph-adult.

Methylene blue active substances (MBAS) are apparent detergents. The determination depends on the formation of a blue color when methylene blue dye reacts with synthetic anionic detergent compounds.

Micrograms per gram (ug/g) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per liter (UG/L, ug/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represents the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in mg/L and is based on the mass of dry sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called **"Sea Level Datum of 1929"** or **"mean sea level"** in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

Organism is any living entity.

Organism count/area refers to the number of organisms collected and enumerated in a sample and adjusted to the number per area habitat, usually square meter (m^2), acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.

Total organism count is the total number of organisms collected and enumerated in any particular sample.

DEFINITION OF TERMS

Terms related to water-quality and other hydrologic data, as used in this report, are defined below. See also table for converting English units to International System **(SI)** Units on the inside of the back cover.

Adenosine triphosphate (ATP) is an organic, phosphate-rich, compound important in the transfer of energy in organisms. Its central role in living cells makes it an excellent indicator of the presence of living material in water. A measure of **ATP** therefore provides a sensitive and rapid estimate of biomass. **ATP** is reported in micrograms per liter of the original water sample.

Algae are mostly aquatic single-celled, colonial, or multi-celled plants, containing chlorophyll and lacking roots, stems, and leaves.

Algal growth potential (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quanities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35°C. In the laboratory these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C plus or minus 1.0°C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms that produce blue colonies within 24 hours when incubated at 44.5°C plus or minus 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as Gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C plus or minus 1.0°C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by micro-organisms, such as bacteria.

Biomass is the amount of living matter present at any given time, expressed as the mass per unit area or volume of habitat.

Ash mass is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500°C for 1 hour. The ash mass values of zooplankton and phytoplankton are expressed in grams per cubic meter (g/m^3), and periphyton and benthic organisms in grams per square mile (g/m^2).

Dry mass refers to the mass of residue present after drying in an oven at 105°C for zooplankton and periphyton, until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry-mass values are expressed in the same units as ash mass.

Organic mass or volatile mass of the living substance is the difference between the dry mass and ash mass and represents the actual mass of the living matter. The organic mass is expressed in the same units as for ash mass and dry mass.

Wet mass is the mass of living matter plus contained water.

Cells/volume refers to the number of cells of any organism which is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample, usually milliliters (mL) or liters (L).

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

Milligrams of carbon per area or volume per unit time [mg C/(m^2.time)] for periphyton and macrophytes and [mg C/(m^3.time)] for phytoplankton are units for expressing primary productivity. They define the amount of carbon dioxide consumed as measured by radioactive carbon (carbon 14). The carbon 14 method is of greater sensitivity than the oxygen light and dark bottle method and is preferred for use in unenriched waters. Unit time may be either the hour or day, depending on the incubation period.

Milligrams of oxygen per area or volume per unit time [mg O_2/(m^2.time)] for periphyton and macrophytes and [mg O_2/(m^3.time)] for phytoplankton are the units for expressing primary productivity. They define production and respiration rates as estimated from changes in the measured dissolved-oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period.

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Sea level: In this report **"sea level"** refers to the National Geodetic Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the **"total"** amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of **"suspended, recoverable"** constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) **dissolved** and (2) **total recoverable** concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45 um membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as **"suspended, total."**

Determinations of **"suspended, total"** constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) **dissolved** and (2) **total** concentrations of the constituent.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchial scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, **Hexagenia limbata**, is the following:

Kingdom	Animal
Phylum	Arthropoda
Class	Insecta
Order	Ephemeroptera
Family	Ephemeridae
Genus	Hexagenia
Species	Hexagenia limbata

Parameter Code is a 5-digit number used in the U.S. Geological Survey computerized data system, **WATSTORE**, to uniquely identify a specific constituent. The codes used in **WATSTORE** are the same as those used in the U.S. Environmental Protection Agency data system, **STORET**. The Environmental Protection Agency assigns and approves all requests for new codes.

Partial-record station is a particular site where limited water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentaiton methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification used in this report agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

Classification	Size (mm)	Method of analysis
Clay.....	0.00024 - 0.004	Sedimentation
Silt.....	.004 - .062	Sedimentation
Sand.....	.062 - 2.0	Sedimentation or sieve
Gravel.....	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic matter is removed, and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native-water analysis.

Percent composition is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, mass, or volume.

Periphyton is the assemblage of microorganisms attached to and living upon submerged solid surfaces. While primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms.

Pesticides are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{10} radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Plankton is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers.

Phytoplankton is the plant part of the plankton. They are usually microscopic and their movement is subject to the water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials to the surrounding water, the phytoplankton have a profound effect upon the quality of the water. They are the primary food producers in the aquatic environment and are commonly known as algae.

Blue-green algae are a group of phytoplankton organisms having a blue pigment, in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water.

Diatoms are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Green algae have chlorophyll pigments similar in color to those of higher green plants. Some forms produce algae mats or floating "**moss**" in lakes. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and are often large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photosynthetic and chemosynthetic activity of producer organisms (chiefly, green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated by the plants (carbon method).

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

1-D1. **Water temperature--influential factors, field measurements, and data presentation**, by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.

1-D2. **Guidelines for collection and field analysis of ground-water samples for selected unstable constituents**, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.

2-D1. **Application of surface geophysics to ground-water investigations**, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.

2-D2. **Application of seismic-refraction techniques to hydrologic studies**, by F. P. Haeni: USGS--TWRI Book 2, Chapter d2. 1988. 86 pages.

2-E1. **Application of borehole geophysics to water-resources investigations**, by W. S. Keys, and L. M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.

2-E2. **Borehole geopphysics applied to ground-water investigations**, by W. S. Keys: USGS--TWRI Book 2, Chapter E2. 1990. 150 pages.

2-F1. **Application of drilling, coring, and sampling techniques to test holes and wells**, by Eugene Shuter, and Warren E. Teasdale: USGS-TWRI Book 2, Chapter F1. 1989. 97 pages.

3-A1. **General field and office procedures for indirect discharge measurements**, by M. A. Benson, and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.

3-A2. **Measurement of peak discharge by the slope-area method**, by Tate Dalrymple, and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.

3-A3. **Measurement of peak discharge at culverts by indirect methods**, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.

3-A4. **Measurement of peak discharge at width contractions by indirect methods**, by H. F. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.

3-A5. **Measurement of peak discharge at dams by indirect methods**, by Harry Hulsing: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.

3-A6. **General procedure for gaging streams**, by R. W. Carter, and Jacob Dividian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.

3-A7. **Stage measurements at gaging stations**, T. J. Buchanan, and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.

3-A8. **Discharge measurements at gaging stations**, by T. J. Buchanan, and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.

3-A9. **Measurement of time of travel and dispersion in streams by dye tracing**, by F. A. Kilpatrick, and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1989. 27 pages.

3-A10. **Discharge ratings at gaging stations**, E. J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.

3-A11. **Measurement of discharge by moving-boat method**, by G. F. Smoot, and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.

3-A12. **Flurometric procedures for dye tracing**, by J. F. Wilson, Jr., E. D. Cobb, and F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A12. 1986. 41 pages.

3-A13. **Computation of continuous records of streamflow**, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.

3-A14. **Use of flumes in measuring discharge**, by F. A. Kilpatrick, and V. R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.

3-A15. **Computation of water-surface profiles in open channels**, by Jacob Davidian: USGS--TWRI Book 3, Chapter A15. 1984. 48 pages.

3-A16. **Measurement of discharge using tracers**, by F. A. Kilpatrick, and E. D. Cobb: USGS--TWRI Book 3, Chapter A16. 1985. 52 pages.

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Total is the total amount of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as **"total."** (Note that the word **"total"** does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determined all of the constituent in the sample.)

Total, recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the **"total"** amount (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Water year in Geological Survey reports dealing with surface-water supply is the 12-month period October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1985, is called the "1985 water year."

WDR is used as an abbreviation for **"Water-Data Report"** in the **REVISED RECORDS** paragraph to refer to State annual hydrologic-data reports (WRD was used as an abbreviation for **"Water-Resources Data"** in reports published prior to 1976).

WSP is used as an abbreviaton for **"Water-Supply Paper"** in reference to previously published reports.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

7-C1 **Finite difference model for aquifer simulation in two dimensions with results of numerical experiments**, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.

7-C2. **Computer model of two-dimensional solute transport and dispersion in ground water**, by L. F. Konikow, and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.

7-C3. **A model for simulation of flow in singular and interconnected channels**, by R. W. Schaffrannek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.

8-A1. **Methods of measuring water levels in deep wells**, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.

8-A2. **Installation and service manual for U. S. Geological Survey manometers**, by J. D. Craig: USGS--TWRI Book 8, Chapter A2. 1983. 57 pages.

8-B2. **Calibration and maintenance of vertical-axis type current meters**, by G. F. Smoot, and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.

PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

3-A17. **Acoustic velocity meter systems**, by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 pages.

3-A18. **Determination of stream reaeration coefficients by use of tracers**, by F. A. Kilpatrick, R. E. Rathbun, N. Yotsukura, G. W. Parker, and L. L. Delong: USGS-TWRI Book 3, Chapter 18A. 1989. 52 pages.

3-A19. **Levels of streamflow gaging stations**, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A19. 1990. 27 pages.

3-B1. **Aquifer-test design, observation, and data analysis**, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.

3-B2. **Introduction to ground-water hydraulics, a programmed text for self-instruction**, by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.

3-B3. **Type curves for selected problems of flow to wells in confined aquifers**, by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.

3-B4. **Regression modeling of ground-water flow**, by Richard L. Cooley, and Richard L. Naff: USGS--TWRI Book 3, Chapter B4. 1990. 232 pages.

3-B5. **Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems --An introduction**, by O. L. Franke, T. E. Reilly, and G. D. Bennett: USGS--TWRI Book 3, Chapter B5. 1987. 15 pages.

3-B6. **The principle of superposition and its application in ground-water hydraulics**, by T. E. Reilly, O. L. Franke, and G. D. Bennett: USGS--TWRI Book 3, Chapter B6. 1987. 28 pages.

3-C1. **Fluvial sediment concepts**, by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.

3-C2. **Field methods of measurement of fluvial sediment**, by H. P. Guy, and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.

3-C3. **Computation of fluvial-sediment discharge**, by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.

4-A1. **Some statistical tools in hydrology**, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.

4-A2. **Frequency curves**, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.

4-B1. **Low-flow investigations**, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.

4-B2. **Storage analyses for water supply**, by H. C. Riggs, and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.

4-B3. **Regional analyses of streamflow characteristics**, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.

4-D1. **Computation of rate and volume of stream depletion by wells**, by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.

5-A1. **Methods for determination of inorganic substances in water and fluvial sediments**, by M. J. Fishman, and L. C. Friedman: USGS--TWRI Book 5, Chapter A1. 1989. 545 pages.

5-A2. **Determination of minor elements in water by emission spectroscopy**, by P. R. Barnett, and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.

5-A3. **Methods for determination of organic substances in water** and fluvial sediments, by R. L. Wershaw, M. J. Fishman, R. R. Grabbe, and L. E. Lowe: USGS--TWRI Book 5, Chapter A3. 1987. 80 pages.

5-A4. **Methods for collection and analysis of aquatic biological and microbiological samples**, by L. J. Britton, and P. E. Greeson, editors: USGS--TWRI Book 5, Chapter A4. 1989. 363 pages.

5-A5. **Methods for determination of radioactive substances in water and fluvial sediments**, by L. L. Thatcher, V. J. Janzer, and K. W. Edwards: USGS--TWRI Book 5, Chapter A5. 1977. 95 pages.

5-A6. **Quality assurance practices for the chemical and biological analyses of water and fluvial sediments**, by L. C. Friedman and D. E. Erdmann: USGS--TWRI Book 5, Chapter A6. 1982. 181 pages.

5-C1. **Laboratory theory and methods for sediment analysis**, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.

6-A1. **A modular three-dimensional finite-difference ground-water flow model**, by M. G. McDonald, and A. W. Harbaugh: USGS--TWRI Book 6, Chapter A1. 1988. 586 pages.

6-A3. **A modular finite-element model (MODFE) for areal and axisymetric ground-water-flow problems, Part 1: Model Description and User's Manual**, by L. J. Torak: USGS--TWRI Book 6, Chapter 3. 1993. 136 pages.

6-A4. **A modular finite-element model (MODFE) for areal and axisymetric ground-water-flow problems, Part 2: Derivation of finite-element, equations and comparisons with analytical solutions**, by R> L> Cooley: USGS-TWRI Book 6, Chapter A4. 1992. 108 pages.

6-A5. **A modular finite-element model (MODFE) for areal and axisymetric ground-water-flow problems, Part 3: Design philosophy and programming details**, by L. J. Torak: USGS--TWRI Book 6, Chapter A5. 1993. 243 pages.

Water-table, surface-drainage and engineering soils map of the Lewes area, Delaware,
by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 103. 1964.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Seaford West area, Delaware,
by D.H. Boggess, J.K. Adams, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 105. 1964.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Seaford East area, Delaware,
by D.H. Boggess, J.K. Adams, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 106. 1964.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Georgetown quadrangle, Delaware,
by D.H. Boggess, J.K. Adams, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 107. 1964.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Harbeson quadrangle, Delaware,
by D.H. Boggess, J.K. Adams, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 108. 1964.
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Water-table, surface-drainage and engineering soils map of the Rehoboth Beach area, Delaware,
by D.H. Boggess, J.K. Adams, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 109. 1964.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Frankford area, Delaware,
by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 119. 1964.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Trap Pond area, Delaware,
by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 120. 1964.
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Water-table, surface-drainage and engineering soils map of the Millsboro area, Delaware,
by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 121. 1964.
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Water-table, surface-drainage and engineering soils map of the Bethany Beach area, Delaware,
by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 122. 1964.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Laurel area, Delaware,
by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 123. 1964.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Marydel area, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 132. 1964-65.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Milford quadrangle, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 133. 1964-65.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Little Creek quadrangle, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 134. 1964-65.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Burrsville area, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 135. 1964-65.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Harrington quadrangle, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 136. 1964-65.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Mispillion River, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 137. 1964-65.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Kenton area, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 138. 1964-65.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Dover quadrangle, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 139. 1964-65.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Frederica area, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 140. 1964-65.
1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Wyoming quadrangle, Delaware,
by D.H. Boggess, C.F. Davis, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 141. 1964-65.
1 map. scale 1:24,000.

SELECTED U.S. GEOLOGICAL SURVEY REPORTS ON GROUND-WATER RESOURCES IN DELAWARE

Listed below is a selection of reports on ground-water resources in Delaware which are available through the U.S. Geological Survey, Book and Open-File Reports, Federal Center, Building 41, Box 25425, Denver, Colorado 80225.

Professional Papers

Structural and stratigraphic frameworks and spatial distribution of the permeability of the Atlantic Coastal Plain, New York to North Carolina, by P.M. Brown, J.A. Miller, and F.M. Swain: U.S. Geological Survey Professional Paper No. 796. 1972.

Water resources of the Delmarva Peninsula, by E.M. Cushing, I.H. Kantrowitz, and K.R. Taylor: U.S. Geological Survey Professional Paper No. 822. 1972. 58 pages.

Hydrogeologic framework of the Coastal Plain sediments in Maryland, Delaware, and the District of Columbia, as developed for the Northern Atlantic Regional Aquifer Systems Analysis (RASA), by D.A. Vroblesky, and W.B. Fleck: U.S. Geological Survey Professional Paper No. 1404-E. 1989. 45 pages.

Simulation of the ground-water flow system of the Coastal Plain sediments, Maryland, Delaware, and the District of Columbia, by W.B. Fleck, and D.A. Vroblesky: U.S. Geological Survey Professional Paper No. 1404-J. 1992.

Water-Supply Papers

Beach-area water supplies between Ocean City, Maryland, and Rehobeth Beach, Delaware, by T.H. Slaughter: U.S. Geological Survey Water-Supply Paper No. 1619-T. 1962.

Ground-water resources of southern New Castle County, Delaware, by D.R. Rima, O.J. Coskery, and P.W. Anderson: U.S. Geological Survey Water-Supply Paper No. 1756. 1964.

Ground-water-quality assessment of the Delmarva Peninsula, Delaware, Maryland, and Virginia: Analysis of available water-quality data through 1987, by P.A. Hamilton, and R.J. Shedlock: U.S. Geological Survey Water-Supply Paper No. 2355-B. 1989, 186 pages.

Hydrologic Investigation Atlases

Water-table, surface-drainage, and engineering soils map of the St. Georges area, Delaware, by J.K. Adams, and, D.H. Boggess: U.S. Geological Survey Hydrologic Investigation Atlas No. 60. 1963. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Newark area, Delaware, by D.H. Boggess, and J.K. Adams: U.S. Geological Survey Hydrologic Investigation Atlas No. 64. 1963. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Wilmington area, Delaware, by J.K. Adams, and D.H. Boggess: U.S. Geological Survey Hydrologic Investigation Atlas No. 79. 1964. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Taylors Bridge area, Delaware, by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 80. 1964. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Smyrna area, Delaware, by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 81. 1964. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Middletown area, Delaware, by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 82. 1964. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Clayton area, Delaware, by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 83. 1964. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Sharptown area, Delaware, by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 84. 1964. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Greenwood quadrangle, Delaware, by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 99. 1964. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Hickman area, Delaware, by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 100. 1964. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Ellendale quadrangle, Delaware, by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 101. 1964. 1 map. scale 1:24,000.

Water-table, surface-drainage and engineering soils map of the Milton quadrangle, Delaware, by J.K. Adams, D.H. Boggess, and others: U.S. Geological Survey Hydrologic Investigation Atlas No. 102. 1964. 1 map. scale 1:24,000.

Geology and ground water, University of Delaware, Newark, Delaware, by K.D. Woodruff, J.C. Miller, R.R. Jordan, N. Spoljaric and T.E. Pickett: Delaware Geological Survey Report of Investigation No. 18. 1972. 40 pages.

Configuration on the base and thickness of the unconfined aquifer in southeastern Sussex County, Delaware, by J.M. Denver: Delaware Geological Survey Report of Investigation No. 20. 1983. 12 pages.

Hydrogeology of selected sites in the greater Newark area, Delaware, by J.H. Talley: Delaware Geological Survey Report of Investigation No. 22. 1974. 61 pages.

Relation of ground water to surface water in four small basins of the Delaware Coastal Plain, by R.H. Johnston: Delaware Geological Survey Report of Investigation No. 24. 1976. 56 pages.

Hydraulic characteristics of the Piney Point aquifer and overlying confining bed near Dover, Delaware, by P.P. Leahy: Delaware Geological Survey Report of Investigation No. 26. 1976. 24 pages.

Ground-water investigations in the Delaware Piedmont for the City of Newark, 1976, by W.F. Hahn: Delaware Geological Survey Report of Investigation No. 27. 1977. 26 pages

Well and aquifer tests, Laird Tract well field, Newark, Delaware, by J.H. Talley, and W.F. Hahn: Delaware Geological Survey Report of Investigation No. 28. 1978. 26 pages.

Digital model of the Piney Point aquifer in Kent County, Delaware, by P.P. Leahy: Delaware Geological Survey Report of Investigation No. 29. 1979. 81 pages.

Ground-water levels in Delaware, July, 1966-December, 1977, by J.H. Talley: Delaware Geological Survey Report of Investigation No. 30. 1979. 50 pages.

Hydrology of the Manokin, Ocean City, and Pokomoke aquifers of southeastern Delaware, by A.L. Hodges: Delaware Geological Survey Report of Investigation No. 38. 1983. 60 pages.

Sodium concentrations in water from the Piney Point Formation, Dover area, Delaware, by N. Spoljaric: Delaware Geological Survey Report of Investigation No. 40. 1986. 14 pages.

Hydrogeology and geochemistry of the unconfined aquifer, west-central and southwestern Delaware, by J.M. Denver: Delaware Geological Survey Report of Investigation No. 41. 1986. 100 pages.

Estimate of direst discharge of fresh ground water to Rehoboth and Indian River Bays, by A.S. Andres: Delaware Geological Survey Report of Investigation No. 43. 1987. 37 pages.

Ground-water levels in Delaware, January 1978-December 1987, by J.H. Talley: Delaware Geological Survey Report of Investigation No. 44. 1988. 58 pages.

Effects of agricultural practices and septic-system effluent on the quality of water in the unconfined aquifer in parts of eastern Sussex County, Delaware, by J.M. Denver: Delaware Geological Survey Report of Investigation No. 45. 1989. 66 pages.

Results of the coastal Sussex County, Delaware, ground-water quality survey, by A.S. Andres: Delaware Geological Survey Report of Investigation No. 49. 1991. 28 pages.

Herbicides in shallow ground-water at two agriculture sites in Delaware, by J.M. Denver: Delaware Geological Survey Report of Investigation No. 51. 1993. 28 pages.

Bulletin

Ground-water problems in highway construction and maintenance, by W.C. Rasmussen, and L.B. Haigler: Delaware Geological Survey Bulletin No. 1. 1953. 24 pages.

Geology and ground-water resources of the Newark area, Delaware, by J.J. Groot, and W.C. Rasmussen: Delaware Geological Survey Bulletin No. 2. 1954. 133 pages.

Preliminary report on the geology and ground-water resources of Delaware, by I.W. Marine, and W.C. Rasmussen: Delaware Geological Survey Bulletin No. 4. 1955. 336 pages.

Ground-water resources of southern New Castle County, Delaware, by D.R. Rima, O.J. Coskery, and P.W. Anderson: Delaware Geological Survey Bulletin No. 11. 1964. 54 pages.

Geology, hydrology and geophysics of Columbia sediments in the Middletown-Odessa area, Delaware, by N. Spoljaric, and K.D. Woodruff:Delaware Geological Survey Bulletin No. 14. 1973. 78 pages.

Hydrology of the Columbia (Pleistocene) deposits of Delaware, by R.H. Johnston: Delaware Geological Survey Bulletin No. 14. 1973. 7 pages.

Open File Reports

A preliminary report on nitrate contamination of shallow ground waters in Delaware, by J.C. Miller: Delaware Geological Survey Open File Report No. 1. 1971. 7 pages.

Geologic and Hydrologic aspects of landfills, by N. Spoljaric, and J.H. Talley: Delaware Geological Survey Open File Report No. 16. 1982. 22 pages.

Water-Resources Investigations Report

Ground-water temperature of the Wyoming quadrangle in central Delaware, with application to ground-water-source heat pumps, by A.L. Hodges, Jr.: U.S. Geological Survey Water-Resources Investigations Report No. 82-53. 1983. 29 pages.

Simulated ground-water flow in the Potomac aquifers, New Castle County, Delaware, by M.M. Martin: U.S. Geological Survey Water-Resources Investigations Report No. 84-4007.

Hydrogeology, degradation of groundwater quality, and simulation of infiltration from the Delaware River into the Potomac aquifers, northern Delaware, by S.W. Phillips: U.S. Geological Survey Water-Resources Investigations Report No. 87-4185. 1988. 86 pages.

Water levels, chloride concentrations, and pumpage in the Coastal aquifers of Delaware and Maryland, by D.J. Phelan: U.S. Geological Survey Water-Resources Investigations Report No. 87-4229. 1988. 106 pages.

Open-File Reports

Availability of ground water on the Delmarva Peninsula, by A.J. Hodges, Jr.: U.S. Geological Survey Open-File Report No. 77-759. 1978. 6 pages.

Hydrologic data for the Potomac Formation in New Castle County, Delaware, by M.M. Martin: U.S. Geological Survey Open-File Report No. 81-916. 1982. 148 pages.

Ground-water-quality data for the Atlantic Coastal Plain, Delaware, Maryland, Virginia, and North Carolina, by L.L. Knobel: U.S. Geological Survey Open-File Report No. 85-154. 1986. 84 pages.

Ground-water quality assessment of the Delmarva Peninsula, Delaware, Maryland, and Virginia, project description, by L.J. Bachman, R.J. Shedlock, and P.J. Phillips: U.S. Geological Survey Open-File Report No. 87-112. 1988. 18 pages.

Groundwater assessment of the Delmarva Peninsula, Delaware, Maryland, and Virginia: Analysis of available water-quality data through 1987, by P.A. Hamilton, R.J. Shedlock, and P.J. Phillips: U.S. Geological Survey Open-File Report No. 89-34. 1990. 71 pages.

Distribution of dissolved atrazine and two metabolites in the confined aquifer, southeastern Delaware, by J.M. Denver, and M.W. Sandstrom: U.S. Geological Survey Open-File Report No. 91-88. 1992. 48 pages.

Water quality assessment of the Delmarve Peninsula, Delaware, Maryland and Virginia -- Effects of agriculture activities on and distribution of, nitrate and other inorganic constituents in surficial aquifers, by P.A. Hamilton, J.M. Denver, P.J. Phillips, and R.J. Shedlock: U.S. Geological Survey Open-File Report No. 93-40. 1993. 87 pages.

Unnumbered Reports

A summary of geologic and hydrologic data from an exploratiry well drilled near Greenwood, Delaware; U.S. Geological Survey. 1971. 18 pages.

SELECTED DELAWARE GEOLOGICAL SURVEY REPORTS ON GROUND-WATER RESOURCES IN DELAWARE

Listed below is a selection of reports on ground-water resources in Delaware which are available through the Delaware Geological Survey, by writing: Publications, Delaware Geological Survey, University of Delaware, Newark, DE 19716-7501.

Report of Investigations

High-capacity test well developed at the Dover Air Force Base, by W.C. Rasmussen, J.J. Groot, and A.J. Depman: Delaware Geological Survey Report of Investigation No. 2. 1958. 36 pages.

Wells for the observation of chloride and water levels in aquifers that cross the Chesapeake and Delaware Canal, by W.C. Rasmussen, J.J. Groot, and N.H. Beamer: Delaware Geological Survey Report of Investigation No. 3. 1958. 22 pages.

Ground-water levels in Delaware, January 1962-June 1966, by K.D. Woodruff: Delaware Geological Survey Report of Investigation No. 9. 1967. 28 pages.

The Occurrence of saline ground-water in Delaware aquifers, by K.D. Woodruff: Delaware Geological Survey Report of Investigation No. 13. 1969. 45 pages.

General ground-water quality in fresh-aquifers of Delaware, by K.D. Woodruff: Delaware Geological Survey Report of Investigation No. 15. 1970. 32 pages.

Ground-water geology of the Delaware Atlantic seashore, by J.C. Miller: Delaware Geological Survey Report of Investigation No. 17. 1971. 33 pages.

Conceptulization and analysis of ground-water flow system in the Coastal Plain of Virginia and adjacent parts of Maryland and North Carolina, by J.F. Harsh: U.S. Geological Survey Professional Paper No. 1404-F. 1990. 100 pages.

Simulation of the ground-water flow system in the Coastal Plain sediments, Maryland, Delaware, and the District of Columbia, by W.B. Fleck, and D.A. Vroblesky: U.S. Geological Survey Professional Paper No. 1404-J. 1992.

Water-Supply Papers

Water resourceses of the Baltimore area, Maryland, by E.G. Otton, R.O.R. Martin and W.H. Durum: U. S. Geological Survey Water-Supply Paper No. 1499-F. 1964.

Beach-area water supplies between Ocean City, Maryland, and Rehobeth Beach, Delaware, by T.H. Slaughter: U. S. Geological Survey Water-Supply Paper No. 1619-T. 1962.

Ground-Water-Quality assesment of the Delmarva Peninsula, Delaware, Maryland, and Virginia: Analysis of available water-quality data through 1987, by P.A. Hamilton, and R.J. Shedlock: U. S. Geological Survey Water-Supply Paper No. 2355-B. 1989. 186 pages.

Hydrologic Investigation Atlas

Water resources of southern Maryland, by J.M. Weigle, W.E. Webb, and R.A. Gardner: U.S. Geological Survey Hydrologic Investigation Atlas No. 365. 1970.

Water-Resources Investigations Report

Ground Water in the Piedmont Upland of Central Maryland, by C. A. Richardson: U. S. Geological Survey Water-Resources Investigations No. 80-18. 1980. 42 pages.

The difference between the potentiometric surface of the Magothy aquifer of September 1982 in southern Maryland, F.K. Mack, J.C. Wheeler, S.E. Curtin and D.C. Andreasen: U. S. Geological Survey Water-Resources Investigations Report No. 83-4282. 1983. 1 sheet.

The difference between the potentiometric surfaces of the Magothy aquifer of September 1975 and September 1982 in southern Maryland, F.K. Mack, J.C. Wheeler, S.E. Curtin and D.C. Andreasen: U. S. Geological Survey Water-Resources Investigations Report No. 83-4283. 1983. 1 sheet.

Nitrate in the Columbia Aquifer, Central Delmarva Peninsula, Maryland, by L. J. Bachman: U. S. Geological Survey Water-Resources Investigations Report No. 84-4322. 51 pages.

The potentiometric surface of the Magothy aquifer in southern Maryland, September 1983, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U. S. Geological Survey Water-Resources Investigations Report No. 85-4000. 1985. 1 sheet.

The potentiometric surface of the Magothy aquifer in southern Maryland, September 1984, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U. S. Geological Survey Water-Resources Investigations Report No. 85-4003. 1985. 1 sheet.

Hydrogeology and water quality of the Catoctin Mountain National Park area, Frederick County, Maryland, by T.J. Trombley: U. S. Geological Survey Water-Resources Investigations Report No. 85-4241. 1985. 41 pages.

The difference between the potentiometric surfaces of the Magothy aquifer of September 1982 and September 1984 in southern Maryland, by F.K. Mack, J.C. Wheeler, S.E. Curtin and D.C. Andreasen: U. S. Geological Survey Water-Resources Investigations Report No. 85-4337. 1985. 1 sheet.

Preliminary map showing the potentiometric surface of the Aquia aquifer in southern Maryland, September 1984, by F.K. Mack, J.C. Wheeler, S.E. Curtin and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 85-4338. 1985. 1 sheet.

Preliminary map showing the difference between the potentiometric surfaces of the Aquia aquifer of September 1982 and September 1984 in southern Maryland, by F.K. Mack, J.C. Wheeler, S.E. Curtin and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 85-4339. 1985. 1 sheet.

Reconnaissance of the groundwater, surface-water system in the Zekiah swamp Run Basin, Charles and Prince Georges Counties, Maryland, by H.T. Hopkins, G.T. Fisher, and L.J. McGreevy: U.S. Geological Survey Water-Resources Investigations Report No. 86-4097. 1986. 49 pages.

The Potentiometric surfaces of the Magothy aquifer in southern Maryland, during the fall of 1986, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 87-4025. 1987. 1 sheet.

The Potentiometric surface of the Magothy aquifer in southern Maryland, September 1985, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 87-4029. 1987. 1 sheet.

The Potentiometric surfaces of the Aquia aquifer in southern Maryland, during the fall of 1986, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 87-4214. 1987. 1 sheet.

Ground-water availability in southern New Castle County, Delaware, by J.J. Groot, P.M. Demicco, and P.J. Cherry: Delaware Geological Survey Open File Report No. 23. 1983. 20 pages.

Saturated thickness of the water-table aquifer in southern New Castle County, Delaware, by J.J. Groot, P.M. Demicco, and P.J. Cherry: Delaware Geological Survey Open File Report No. 24. 1983. 1 map.

Saturated thickness of the Columbia Formation in southern New Castle County, Delaware, by J.J. Groot, P.M. Demicco, and P.J. Cherry: Delaware Geological Survey Open File Report No. 25. 1983. 1 map.

Salinity distribution and ground-water circulation beneath the Coastal Plain of Delaware and the adjacent Continental Shelf, by J.J. Groot: Delaware Geological Survey Open File Report No. 26. 1983. 24 pages.

Potential for ground-water recharge in the Coastal Plain of New Castle County, Delaware, sheet 1, Northern New Castle County (1983); 2 sheets, **Chesapeake and Delaware Canal are (1985),** by S. Petty, W.D. Miller, and B.A. Lanan; K.D. Woodruff, editor: Delaware Geological Survey Open File Report No. 28. maps with discussion. scale 1:24,000.

Source of ground-water contamination, by J.H. Talley: Delaware Geological Survey Open File Report No. 29. 1985. 20 pages.

Ground-water level and chemistry data from coastal Sussex County, Delaware, Ground-water quality survey, by A.S. Amdres: Delaware Geological Survey Open File Report No. 33. 1991. 31 pages.

Methodology for mapping ground-water recharge area in Delaware's Coastal Plain, by A.S. Andres: Delaware Geological Survey Open File Report No. 34. 1991. 18 pages. (reprinted 1992).

Estimate of nitrate flux to Rehoboth and Indian River Bays, Delaware through direst discharge of ground-water, by A.S. Andres: Delaware Geological Survey Open File Report No. 35. 1992. 36 pages.

Water Level Reports

Water levels and aretsian pressures in Delaware-1952, by I.W. Marine: Delaware Geological Survey Water Level Report No. 1. 1954. 11 pages.

Water levels and aretsian pressures in Delaware-1953, by D.H. Boggess, and O.J. Coskery: Delaware Geological Survey Water Level Report No. 2. 1954. 10 pages.

Water levels and aretsian pressures in Delaware-1954, by D.H. Boggess, and O.J. Coskery: Delaware Geological Survey Water Level Report No. 3. 1955. 10 pages.

Water levels and aretsian pressures in Delaware-1955, by O.J. Coskery: Delaware Geological Survey Water Level Report No. 4. 1956. 10 pages.

Water levels in Delaware-1956, by O.J. Coskery Delaware Geological Survey Water Level Report No. 5. 1958. 21 pages.

Water levels in Delaware-1957, by O.J. Coskery Delaware Geological Survey Water Level Report No. 6. 1961. 22 pages.

Water levels in Delaware-1958, by O.J. Coskery Delaware Geological Survey Water Level Report No. 7. 1961. 17 pages.

SELECTED U.S.GEOLOGICAL SURVEY REPORTS ON GROUND-WATER RESOURCES IN MARYLAND

Listed below is a selection of reports on ground-water resources in Maryland which are available through the U.S. Geological Survey, Book and Open-File Reports, Federal Center, Building 41, Box 25425, Denver, Colorado 80225.

Professional Papers

Hydrochemical facies and ground-water flow patterns in northern part of Atlantic Coastal Plain, by William Back: U.S. Geological Survey Professional Paper No. 498-A. 1966.

Relationships of fresh and salty ground water in the northern Atlantic Coastal Plain of the United States, in Geological Survey Research, by J.E. Upson: U.S. Geological Survey Professional Paper No. 550-C. 1966. p. C235-C243.

Structural and stratigraphic framworks and spatial distribution of the permeability of the Atlantic Coastal Plain, New York to North Carolina, by P.M. Brown, J.A. Miller, and F.M. Swain: U.S. Geological Survey Professional Paper No. 796. 1972.

Summary appraisals of the Nation's ground-water resources Mid-Atlantic Region, by Allen Sinnott, and E.M. Cushing: U.S. Geological Survey Professional Paper No. 813-I. 1976.

Water Desources of the Delmarva Peninsula, by E.M. Cushing, I.H. Kantrowitz, and K.R. Taylor: U.S. Geological Survey Professional Paper No. 822. 1973. 58 pages.

Hydrogeologic framework of the Coastal Plain sediments in Maryland, Delaware and the District of Columbia, as developed for the Northern Atlantic Region Aquifer Systems Analysis (RASA), U.S. Geological Survey, by D.A. Vroblesky, and W.B. Fleck: U.S. Geological Survey Professional Paper No. 1404-E. 1989. 45 pages.

Availability of ground water in Montgomery County, Maryland, by C.A. Richardson: U.S. Geological Survey Open-File Report No. 76-882. 1976. 6 pages. 1 plate.

Westminister quadrangle: Hydrogeologic atlas, by E.G. Otton: U.S. Geological Survey Open-File Report No. 77-793.

New Windsor quadrangle: Hydrogeologic atlas, by E. G. Otton: U.S. Geological Survey Open-File Report No. 78-769. 1978

Map showing the potentiometric surface of the Magothy aquifer in southern Maryland, September 1977, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 78-999. 1978. 1 sheet.

Finksburg quadrangle, Maryland, by J.F. Williams III: U.S. Geological Survey Open-File Report No. 79-1536. 1979. 50 pages.

Hampstead quadrangle, Maryland: Hydrogeology, by M.T. Duigon: U.S. Geological Survey Open-File Report No. 80-561. 1980. 50 pages.

Map showing the potentiometric surface of the Magothy aquifer in southern Maryland, September 1979, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 80-959. 1980. 1 sheet.

Hereford quadrangle, Maryland: Hydrogeology, by M.T. Duigon: U.S. Geological Survey Open-File Report No. 80-962. 1980. 50 pages.

Reisterstown quadrangle, Maryland: Hydrogeology, by M.T. Duigon: U.S. Geological Survey Open-File Report No. 80-1009. 1980. 55 pages.

Lineboro quadrangle, Maryland: Hydrogeology, by M.T. Duigon: U.S. Geological Survey Open-File Report No. 80-1010. 1980. 50 pages.

Ellicott City quadrangle, Maryland: Hydrogeology, by M.T. Duigon: U.S. Geological Survey Open-File Report No. 80-1011. 1980. 56 pages.

New Freedom quadrangle, Maryland: Hydrogeology, by M.T. Duigon: U.S. Geological Survey Open-File Report No. 80-1012. 1980. 54 pages.

Hydrogeologic Atlas, Union Bridge and Woodsboro quadrangles, Carroll County, Maryland, by J.M. Weigle: U.S. Geological Survey Open-File Report No. 80-1013. 1981. 10 pages.

Hydrogeologic Atlas, Taneytown and Emmitsburg quadrangles, Carroll County, Maryland, by J.M. Weigle: U.S. Geological Survey Open-File Report No. 80-1014. 1981. 40 pages.

Hydrogeologic Atlas, Littlestown quadrangle, Carroll County, Maryland, by J.M. Weigle: U.S. Geological Survey Open-File Report No. 80-1015. 1981. 44 pages.

Phoenix quadrangle, Baltimore and Harford counties, Maryland: Hydrogeology, by E.G. Otton: U.S. Geological Survey Open-File Report No. 81-65. 1982. 46 pages.

Map showing the potentiometric surface of the Magothy aquifer in southern Maryland, September 1979, by F.J. Chapelle, D.D. Drummond, and Tracey Curley: U.S. Geological Survey Open-File Report No. 81-416. 1982. 1 sheet.

Map showing how the potentiometric surface of the Magothy aquifer of August 1980 differed from the potentiometric surface of September 1977, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 81-631. 1982. 1 sheet.

Map showing the potentiometric surface of the Magothy aquifer of September 1979 differed from the potentiometric surface of September 1977, in Maryland, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 81-632. 1982. 1 sheet.

Map showing the potentiometric surface of the Magothy aquifer, in southern Maryland, August 1980, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 81-633. 1982. 1 sheet.

Map showing the potentiometric surface of the Magothy aquifer, in southern Maryland, September 1981, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 82-257. 1983. 1 sheet.

The difference between the potentiometric surface of the Magothy aquifer of September 1975, and September 1981 in southern Maryland, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 82-339. 1983. 1 sheet.

Preliminary analysis of geohydrologic data from the test wells drilled near Chester, on Kent Island, Queen Annes County, Maryland, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 82-854. 1983. 33 pages.

Water level declines in the Magothy aquifer in southern Maryland related to increase in pumpage, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 82-919. 1983. 29 pages.

The difference between the potentiometric surface of the Aquia aquifer of September 1975 and September 1981 in southern Maryland, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 83-339. 1984. 1 sheet.

Map showing the potentiometric surface of the Aquia aquifer in southern Maryland, September 1982, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 83-929. 1984. 1 sheet.

Difference between the potentiometric surfaces of the Aquia aquifer in spring of 1979 and fall of 1986 in southern Maryland, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 87-4215. 1987. 1 sheet.

Potentiometric surfaces of the Magothy aquifer in southern Maryland, during the fall of 1986, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 87-4016. 1987. 1 sheet.

Difference between the potentiometric surfaces of the Magothy aquifer in the fall of 1975 and fall of 1986 in southern Maryland, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 87-4217. 1987. 1 sheet.

Water Levels, chloride concentrations, and pumpage in the coastal aquifers of Maryland and Delaware, by D. J. Phelan: U.S. Geological Survey Water-Resources Investigations Report No. 87-4229. 1987. 106 pages.

Potentiometric surface of the Aquia aquifer in southern Maryland during the fall of 1987, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 89-4012. 1989. 1 sheet.

Potentiometric surface of the Magothy aquifer in southern Maryland, during the fall of 1987, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 89-4013. 1989. 1 sheet.

Hydrogeology of the Canal Creek area of Aberdeen Proving Ground Maryland, by J.P. Oliveros, and D.A. Vroblesky: U.S. Geological Survey Water-Resources Investigations Report No. 89-4013. 1989. 50 pages.

Inorganic and organic groundwater chemistry in the Canal Creek area of Aberdeen Proving Ground, Maryland, by M.M. Lorah, and D.A. Vroblesky: U.S. Geological Survey Water-Resources Investigations Report No. 89-4022. 1989. 97 pages.

Change in potentiometric surfaces of the Magothy aquifer in southern Maryland, from the fall of 1986 to the fall of 1988, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 90-4037. 1990. 1 sheet.

Change in potentiometric surfaces of the Magothy aquifer in southern Maryland, from the fall of 1986 to the fall of 1988, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 90-4038. 1990. 1 sheet.

The difference between the potentiometric surface of the Magothy aquifer of September 1986 and September 1988 in southern Maryland, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 90-4039. 1990. 1 sheet.

Potentiometric surface of the Magothy aquifer in southern Maryland, during September 1988, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 90-4040. 1990. 1 sheet.

Preliminary assessment of the geologic framework, hydrogeology, and groundwater quality of the Potomac Group aquifer system, northwestern Charles County, Maryland, by S.N. Hiortdahl: U.S. Geological Survey Water-Resources Investigations Report No. 91-4059. (in press).

Potentiometric surface of the Magothy aquifer in southern Maryland, during September 1989, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 91-4093. 1991. 1 sheet.

Potentiometric surface of the Aquia aquifer in southern Maryland, September 1989, by F.K. Mack, J.C. Wheeler, C.E. Curtin, and D.C. Andreasen: U.S. Geological Survey Water-Resources Investigations Report No. 91-4094. 1991. 1 sheet.

Water withdrawal and use in Maryland, 1988-89, by J.C. Wheeler: U.S. Geological Survey Water-Resources Investigations Report No. 91-4179. 1992. 40 pages.

Hydrologic and soil gas at J-Field, Aberdeen Proving Ground, Maryland, by W.B. Hughes: U.S. Geological Survey Water-Resources Investigations Report No. 92-4087. 1992. 83 pages.

Water withdrawal and use in Maryland, 1990-91, by J.C. Wheeler: U.S. Geological Survey Water-Resources Investigations Report No. 93-4225. 1993.

Open-File Reports

Enviromental geohydrology folio no. 1, White Marsh 7-1/2 minute quadrangle, Maryland, by E.G. Otton: U.S. Geological Survey Open-File Report No. 74-737, 1974. 4 pages.

Areas of shallow water table, Prince Georges County, Maryland, by C.A. Richardson: U.S. Geological Survey Open-File Report No. 76-194. 1976 2 pages. 1 plate.

Availability of ground water in Prince Georges County, Maryland, by C.A. Richardson: U.S. Geological Survey Open-File Report No. 76-197. 1976. 6 pages. 4 plates.

Preliminary analysis of geohydrologic data from test wells drilled near Chalk Point, Prince Georges County, Maryland, by F.K. Mack: U.S. Geological Survey Open-File Report No. 76-322. 1976. 31 pages.

Approximate depth to water table, Montgomery County, Maryland, by C.A. Richardson: U.S. Geological Survey Open-File Report No. 76-881. 1976. 2 pages. 1 plate.

SELECTED MARYLAND GEOLOGICAL SURVEY REPORTS ON GROUND-WATER RESOURCES IN MARYLAND

Listed below is a selection of reports on ground-water resources in Maryland which are available through the Maryland Geological Survey, 2300 St. Paul Street, Baltimore, Maryland 21218.

Basic Data Reports

Records of wells and springs in Baltimore County, Maryland, by C.P. Laughlin: Maryland Geological Survey Basic Data Report No. 1. 1966. 406 pages.

Records of wells and springs, chemical analysis, and selected well logs in Charles County, Maryland, by T.H. Slaughter and C.P. Laughlin: Maryland Geological Survey Basic Data Report No. 2. 1966. 93 pages.

Hydrogeologic data from the Janes Island State Park test well (1,514 Feet), Somerset County, Maryland, by H.J. Hansen: Maryland Geological Survey Basic Data Report No. 3. 1967. 24 pages.

Southern Maryland - Records of selected wells, water levels, and chemical analysis of water, by J.M. Weigle and W.F. Webb: Maryland Geological Survey Basic Data Report No. 4. 1970. 48 pages.

Deep wells of Maryland, by Jonathan Edwards, Jr.: Maryland Geological Survey Basic Data Report No. 5. 1970. 160 pages.

Worcester County ground-water information: Well records, chemical quality data, and pumpage, by R.C. Lucas: Maryland Geological Survey Basic Data Report No. 6. 1972. 90 pages.

Harford County ground-water information: Selected well records, chemical quality data, and pumpage, by L.J. Nutter and M.J. Smigaj: Maryland Geological Survey Basic Data Report No. 7. 1975. 89 pages.

Anne Arundel County ground-water information: Selected well records, chemical-quality data, pumpage, appropriation data, and selected well logs, by R.C. Lucas: Maryland Geological Survey Basic Data Report No. 8. 1976. 149 pages.

Maryland ground-water information: chemical quality data, by R.S. Woll: Maryland Geological Survey Basic Data Report No. 10. 1978. 125 pages.

Garrett County water-well records, chemical-quality data, ground-water use, coal test-hole, and surface-water data, by L.J. Nutter, L.L. Knobel, and M.J. Smigaj, **with a section on gas-well records compiled** by K.A. Schwarz, and Jonathan Edwards, Jr.: Maryland Geological Survey Basic Data Report No. 11. 1980. 102 pages.

Carroll County ground-water information: Well records, chemical-quality data, by J.T. Hilleary, and J.M. Weigle: Maryland Geological Survey Basic Data Report No. 12. 1981. 252 pages.

Prince George's County ground-water information: Well records, chemical-quality data, pumpage, appropriation data, observation well records, and well logs, by M.D. Tompkins: Maryland Geological Survey Basic Data Report No. 13. 1983. 160 pages.

Records of selected wells, Calvert and St. Mary's Counties, Maryland, by D.D. Drummond: Maryland Geological Survey Basic Data Report No. 14. 1984. 117 pages.

Ground-water and surface-water data Frederick County, Maryland, by J.R. Dine, M.D. Tompkins, and M.T. Duigon: Maryland Geological Survey Basic Data Report No. 15. 1985. 240 pages.

Hydrologic data for Cecil County, Maryland, by R. E. Willey, R. A. McGregor, J. de Grouchy, and M.D. Tompkins: Maryland Geological Survey Basic Data Report No. 16. 1987. 150 pages.

Ground-water levels from the Maryland observation-well network, 1943-86, by M.J. Smigaj, and R.G. Davis, Jr: Maryland Geological Survey Basic Data Report No. 17. 1987. 234 pages.

Ground-water and surface-water data for Washington County, Maryland, by M.T. Duigon, J.R. Dine, and M.D. Tompkins: Maryland Geological Survey Basic Data Report No. 18. 1989. 273 pages.

Ground-water and surface-water data for Howard County, Maryland, by J.R. Dine, J.C. Adamski, and M.D. Tompkins: Maryland Geological Survey Basic Data Report No. 19. 1992. 240 pages.

Bulletins

Geology and ground-water resources of the Baltimore Area, by R.R. Bennett, and R.R. Meyer: Department of Geology, Mines and Water Resources Bulletin No. 4. 1952. 573 pages.

Water resources of Anne Arundel County, by V.R. Bennion and J.W. Brookhart: Department of Geology, Mines and Water Resources Bulletin No. 5. 1949. 149 pages.

Water resources of Calvert County, by V.R. Bennion, D.F. Dougherty, and R.M. Overbeck: Department of Geology, Mines and Water Resources Bulletin No. 8. 1951. 100 pages.

Geology and water resources of Prince George's County, by C.W. Cooke, R.O.R. Martin, and Gerald Meyer: Department of Geology, Mines and Water Resources Bulletin No. 10. 1952. 270 pages.

Water resources of St. Mary's County, by R.O.R. Martin, and H.F. Ferguson: Department of Geology, Mines and Water Resources Bulletin No. 11. 1953. 195 pages.

Preliminary map showing the difference between the potentiometric surfaces of the Aquia aquifer of April 1979 and September 1982 in southern Maryland, by F.K. Mack, J.C. Wheeler, and S.E. Curtin: U.S. Geological Survey Open-File Report No. 83-930. 1984. 1 sheet.

Hydrologic data: South branch Casselman River, Garrett County, and Marsh Run, Washington County, Maryland, by J.T. Hilleary: U.S. Geological Survey Open-File Report No. 84-426. 1985. 63 pages.

Ground-water-quality data for the Atlantic Coastal Plain, Delaware, Maryland, Virginia, and North Carolina, by L.L. Knobel: U.S. Geological Survey Open-File Report No. 85-154. 1986. pp. 42-55.

Ground-water quality assessmeent of the Delmarva Peninsula, Delaware, Maryland, and Virginia, by L.J. Bachman, R.J. Shedlock, and P.J. Phillips: U.S. Geological Survey Open-File Report No. 87-112. 1988. 18 pages.

Groundwater use in the Coastal Plain of Maryland, 1900-1980, by J.C. Wheeler, and F.W. Wilde: U.S. Geological Survey Open-File Report No. 87-540. 1988. 173 pages.

Maryland and the District of Columbia ground-water quality, by J.C. Wheeler: U.S. Geological Survey Open-File Report No. 87-0730. 1988. 10 pages.

Ground-water quality assessment of the Delmarva Peninsula, Delaware, Maryland, and Virginia, project description, by L.J. Bachman, R.J. Shedlock, and P.J. Phillips: U.S. Geological Survey Open-File Report No. 87-112. 18 pages.

Water withdrawal and use in Maryland, by J.C. Wheeler: U.S. Geological Survey Open-File Report No. 88-714. 1989. 30 pages.

Groundwater assessment of the Delmarva Peninsula, Delaware, Maryland, and Virginia: Analysis of available water-quality data through 1987, by P.A. Hamilton, R.J. Shedlock, and P.J. Phillips: U.S. Geological Survey Open-File Report No. 89-34. 1990. 71 pages.

Hydrogeologic and chemical data for the O-Field area, Aberdeen Proving Ground, Maryland, by D.A. Vroblesky, and P.R. Nemoff: U.S. Geological Survey Open-File Report No. 89-238. 1990. 70 pages.

Hydrogeologic data for Canal Creek area of Aberdeen Proving Ground, Maryland, by J.P. Oliveros, and Patrice Gernhardt: U.S. Geological Survey Open-File Report No. 89-387. 1990. 71 pages.

Hydrogeologic data for Carroll Island, Aberdeen Proving Ground, Maryland, by L.K. Ham, L.N. Sears, S.W. Phillips, and F.T. Tenbus: U.S. Geological Survey Open-File Report No. 89-388. 1990. 105 pages.

Groundwater, surface-water, and bottom-sediments effects of selected remedial actions in the O-Field area of Aberdeen Proving Ground, Maryland, by D.A Vroblesky, M.M. Lorah, and J.P. Oliveros: U.S. Geological Survey Open-File Report No. 89-399. 1990. 162 pages.

Study approach for the hydrogeologic assessment of Carroll Island and Graces Quarters, Aberdeen Proving Ground, Maryland, by F.J. Tenbus, and S.W. Phillips: U.S. Geological Survey Open-File Report No. 90-181. 1991. 68 pages.

Water withdrawal and use in Maryland, by J.C. Wheeler: U.S. Geological Survey Open-File Report No. 90-572. 1991. 28 pages.

Water quality assessment of the Delmarve Peninsula, Delaware, Maryland and Virginia -- Effects of agriculture activities on and distribution of, nitrate and other inorganic constituents in surficial aquifers, by P.A. Hamilton, J.M. Denver, P.J. Phillips, and R.J. Shedlock: U.S. Geological Survey Open-File Report No. 93-40. 1993. 87 pages.

Unnumbered Reports

Geophysical cross-section of the Cretaceous sediments of southern Maryland: U.S. Geological Survey. 1968. 46 pages

Preliminary results of an exploratory water well at Ocean City, Maryland: U.S. Geological Survey. 1969. 18 pages.

Geologic and hydrologic data from a test well drilled near Chestertown, Maryland: U.S. Geological Survey. 1971. 20 pages.

Enviromental geohydrology, Cockeysville quadrangle 6, by E.G. Otton: U.S. Geological Survey. 1975. 4 pages.

Miscellaneous Maps

Water resources of Southern Maryland, by J.M. Weigle, W.E. Webb, and R.A. Gardner: U.S. Geological Survey Miscellaneous Maps No. HA-365. 1970. 3 sheets.

Hydrogeology of the Triassic Rocks of Maryland, by L.J. Nutter: Maryland Geological Survey Report of Investigations No. 26. 1975. 37 pages.

Digital simulation and prediction of water levels in the Magothy aquifer in southern Maryland, by F.K. Mack, and R.J. Mandle: Maryland Geological Survey Report of Investigations No. 28. 1977. 42 pages.

Simulated changes in water level in the Piney Point aquifer in Maryland, by J.F. Williams: Maryland Geological Survey Report of Investigations No. 31. 1979. 50 pages.

A quasi three-dimensional finite-difference ground-water flow model with a field application, by Grufron Achmad, and J.M. Weigle: Maryland Geological Survey Report of Investigations No. 33. 1979. 58 pages.

The Availability in ground water in western Montgomery County, Maryland, by E.G. Otton: Maryland Geological Survey Report of Investigations No. 34. 1981. 76 pages.

Geohydrology of the fresh aquifer system in the vicinity of Ocean City, Maryland with a section on simulated Water-Level Changes, by J.M. Weigle, and Grufron Achmad: Maryland Geological Survey Report of Investigations No. 37. 1982. 55 pages.

Hydrogeology, digital simulation, and geochemistry of the Aquia and Piney Point-Nanjemoy aquifer system in Southern Maryland, by F.H. Chapelle, and D.D. Drummond: Maryland Geological Survey Report of Investigations No. 38. 1983. 100 pages.

Hydrogeology of the upper Chesapeake Bay area Maryland, with emphasis on aquifers of the Potomac Group, by E.G. Otton, and R.J. Mandle: Maryland Geological Survey Report of Investigations No. 39. 1984. 62 pages.

The Columbia aquifer of the Eastern Shore of Maryland. Part 1: Hydrogeology, by L.J. Bachman, 1984. 34 pages. **Part 2: Selected water-well records, chemical analysis, water-level measurements, lithologic logs, and geophysical logs,** by J.M. Wilson, 1984. 110 pages: Maryland Geological Survey Report of Investigations No. 40.

First report on the hydrologic effects of underground coal mining in southern Garrett County, Maryland, by M.T. Duigon, and M.J. Smigaj: Maryland Geological Survey Report of Investigations No. 41. 1985. 99 pages.

Hydrologic and mining data from an area of underground coal mining in Garrett County, Maryland, by S. N. Hiortdahl: Maryland Geological Survey Report of Investigations No. 41-A. 1988. 81 pages.

Maryland springs - Their physical, thermal, and chemical characteristics, by E. G. Otton, and J. T. Hilleary: Maryland Geological Survey Report of Investigations No. 44. 1985. 151 pages.

Hydrogeology, digital solute-transport simulation, and geochemistry of the Lower Cretaceous aquifer system near Baltimore, Maryland, by F.H. Chapelle: Maryland Geological Survey Report of Investigations No. 43. 1985. 120 pages.

Simulation of ground-water flow and base flow in weathered crystalline rock, Upper Cattail Creek, Howard County, Maryland, by R.E. Willey, and Grufron Achmad: Maryland Geological Survey Report of Investigations No. 45. 1986. 68 pages.

Evaluation of the water-supply potential of aquifers in the Potomac Group of Anne Arundel County, Maryland, by F.K. Mack, and Grufron Achmad: Maryland Geological Survey Report of Investigations No. 46. 1986. 111 pages.

Ground-water in the coastal plain, Harford County, Maryland, by David Drummond: Maryland Geological Survey Report of Investigations No. 50. 1988.

Hydrogeology, brackish-water occurrence, and simulation of flow and brackish-water movement in the Aquia aquifer in the Kent Island area, Maryland, by D.D. Drummond: Maryland Geological Survey Report of Investigations No. 51. 1988. 131 pages.

Geology and hydrologic assessment of Coastal Plain aquifers in the Waldorf area, Charles County, Maryland, by J.M. Wilson, and W.B. Fleck: Maryland Geological Survey Report of Investigations No. 53. 1990. 138 pages.

Simulated hydrologic effects of the development of the Patapsco aquifer system in Glen Burnie, Anne Arundel County, Maryland, by Grufron Achmad: Maryland Geological Survey Report of Investigations No. 54. 1991, 96 pages.

Effects of development and novel construction techniques on yield of water well drilled in crystalline rock, Westminster, Maryland, by M. T. Duigon: Maryland Geological Survey Report of Investigations No. 56. 1992. 53 pages.

Hydrogeologic framework and the distribution and movement of brackish water in the Ocean City - Manokin Aquifer system at Ocean City, Maryland, by Grufron Achmad and J. M. Wilson: Maryland Geological Survey Report of Investigations No. 57. 1993. 125 pages.

Hydrogeology, water-supply potential, and water quality of the Coastal Plain aquifers of Harford County, Maryland, by D. D. Drummond and J. D. Blomquist: Maryland Geological Survey Report of Investigations No. 58. 1993. 160 pages.

Open-File Reports

Hydrogeology

Availability of ground water for urban and industrial development in upper Montgomery County, Maryland, by P.M. Johnston, and E.G. Otton: Maryland Geological Survey Open-File Report No. 63-02-1. 1963. 47 pages.

Geology and water resources of Garrett County, by T.W. Amsden, R.M. Overbeck, and R.O.R. Martin: Department of Geology, Mines and Water Resources Bulletin No. 13. 1954. 349 pages.

Water resources of Howard and Montgomery Counties, by R.J. Dingman, Gerald Meyer, and R.O.R. Martin: Department of Geology, Mines and Water Resources Bulletin No. 14. 1954. 260 pages.

Ground-water resources of the southern Maryland Coastal Plain, by E.G. Otton: Department of Geology, Mines and Water Resources Bulletin No. 15. 1955. 347 pages.

Water resources of Somerset, Wicomico, and Worcester Counties, by W.C. Rasmussen, T.H. Slaughter, and A.E. Hulme, **with a section on the Salisbury area,** by R.R. Meyer and R.R. Bennett: Department of Geology, Mines and Water Resources Bulletin No. 16. 1955. 535 pages.

Water resources of Baltimore and Harford Counties, by R.J. Dingman, H.F. Ferguson, and R.O.R. Martin: Department of Geology, Mines and Water Resources Bulletin No. 17. 1956. 465 pages.

Water resources of Caroline, Dorchester, and Talbot Counties, by W.C. Rasmussen, T.C. Slaughter A.E. Hulme, and J.J. Murphy: Department of Geology, Mines and Water Resources Bulletin No. 18. 1957. 465 pages.

Water resources of Cecil, Kent, and Queen Anne's Counties, by R.M. Overbeck, T.C. Slaughter, and A.E. Hulme: Department of Geology, Mines and Water Resources Bulletin No. 21. 1958. 478 pages.

Water resources of Carroll and Frederick Counties, by Gerald Meyer and R.M. Beall: Department of Geology, Mines and Water Resources Bulletin No. 22. 1958. 355 pages.

Water resources of Allegany and Washington Counties, by T.H. Slaughter, and J.M. Darling: Department of Geology, Mines and Water Resources Bulletin No. 24. 1962. 408 pages.

Ground-water supplies for industrial and urban development in Anne Arundel County, by F.K. Mack, and C.A. Richardson: Department of Geology, Mines and Water Resources Bulletin No. 26. 1962. 90 pages.

Ground water in Prince George's County, by F.K. Mack: Maryland Geological Survey Bulletin No. 29. 1966 101 pages.

Availability of ground water in Charles County, by T.H. Slaughter, E.G. Otton, and C.P. Laughlin: Maryland Geological Survey Bulletin No. 30. 1968. 101 pages.

Geohydrology of channel-fill deposits near Salisbury, Maryland, by F.K. Mack, W.O. Thomas, and J.M. Weigle: Maryland Geological Survey Bulletin No. 31. 1972. 124 pages.

Ground-water resources in Harford County, by L.J. Nutter: Maryland Geological Survey Bulletin No. 33. 1977. 44 pages.

Water resources of Frederick County, Maryland, by M.T. Duigon, and J.R. Dine: Maryland Geological Survey Bulletin No. 33. 1987. 102 pages.

Water resources and estimated effects of ground-water development, Cecil County, Maryland, by E.G. Otton, R.E. Willey, R.A. McGregor, Grufron Achmad, S.N. Hiortdahl, and J.M. Gerhart: Maryland Geological Survey Bulletin No. 34. 1988. 133 pages.

Hydrogeology and ground-water of Somerset County, Maryland, by W.H. Werkheiser: Maryland Geological Survey Bulletin No. 35. 1990. 156 pages.

Water resources of Washington County, by M.T. Duigon, and J.R. Dine: Maryland Geological Survey Bulletin No. 36. 1991. 126 pages.

Report of Investigations

Water resources of the Salisbury area, Maryland, by D.H. Boggess, and S.G. Heidel: Maryland Geological Survey Report of Investigations No. 3. 1968. 69 pages.

Ground-water occurrence in the Maryland Piedmont, by L.J. Nutter, and E.G. Otton: Maryland Geological Survey Report of Investigations No. 10. 1969. 56 pages.

Water resources of Dorchester and Talbot Counties, Maryland with special emphasis on the ground-water potential of the Cambridge and Easton areas, by F.K. Mack, W.E. Webb, and R.A. Gardner: Maryland Geological Survey Report of Investigations No. 17. 1971. 107 pages.

Solid-waste disposal in the geohydrologic environment of Maryland, by E.G. Otton: Maryland Geological Survey Report of Investigations No. 18. 1972. 59 pages.

Hydrogeology of the carbonate rocks, Frederick and Hagerstown valleys, Maryland, by L.J. Nutter: Maryland Geological Survey Report of Investigations No. 19. 1973. 70 pages.

Hydrogeology of the formation and neutralization of acid water draining from underground coal mines of western Maryland, by E.F. Holiday, and S.W. McKenzie: Maryland Geological Survey Report of Investigations No. 20. 1973. 50 pages.

An evaluation of the Magothy Aquifer in the Annapolis Area, Maryland, by F.K. Mack: Maryland Geological Survey Report of Investigations No. 22. 1974. 75 pages.

Availability of fresh ground water in northern Worcester County, Maryland, with Special Emphasis on the Ocean City area, by J.M. Weigle: Maryland Geological Survey Report of Investigations No. 24. 1974. 64 pages.

Hydrogeologic Atlas Hampstead Quadrangle, Carroll County, Maryland, by M.T. Duigon: Maryland Geological Survey Quadrangle Atlas No. 12. 1981. 5 maps.

Hydrogeologic Atlas Lineboro Quadrangle, Carroll County, Maryland, by M.T. Duigon, E.G. Otton, and J.T. Hilleary: Maryland Geological Survey Quadrangle Atlas No. 13. 1981. 5 maps.

Hydrogeologic Atlas Littlestown Quadrangle, Carroll County, Maryland, by J.M. Weigle, and J.T. Hilleary: Maryland Geological Survey Quadrangle Atlas No. 14. 1981. 5 maps.

Hydrogeologic Atlas Manchester Quadrangle, Carroll County, Maryland, by E.G. Otton: Maryland Geological Survey Quadrangle Atlas No. 15. 1981. 5 maps.

Hydrogeologic Atlas Taneytown-Emmitsburg Quadrangles, Carroll County, Maryland, by J.M. Weigle: Maryland Geological Survey Quadrangle Atlas No. 16. 1981. 5 maps.

Hydrogeologic Atlas Union Bridge-Woodsboro Quadrangles, Carroll County, Maryland, by J.M. Weigle: Maryland Geological Survey Quadrangle Atlas No. 17. 1981. 5 maps.

Hydrogeologic Atlas Hereford Quadrangle, Baltimore County, Maryland, by M.T. Duigon, and J.T. Hilleary: Maryland Geological Survey Quadrangle Atlas No. 18. 1981. 5 maps.

Hydrogeologic Atlas Finksburg Quadrangle, Carroll County, Maryland, by J.F. Williams: Maryland Geological Survey Quadrangle Atlas No. 19. 1981. 5 maps.

Hydrogeologic Atlas New Freedom Quadrangle, Baltimore County, Maryland, by M.T. Duigon: Maryland Geological Survey Quadrangle Atlas No. 20. 1983. 5 maps.

Hydrogeologic Atlas Ellicott City Quadrangle, Baltimore and Howard Counties, Maryland, by M.T. Duigon: Maryland Geological Survey Quadrangle Atlas No. 21. 1983. 5 maps.

Hydrogeologic Atlas Phoenix Quadrangle, Baltimore and Harford Counties, Maryland, by E.G. Otton: Maryland Geological Survey Quadrangle Atlas No. 22. 1983. 5 maps.

Hydrogeologic Atlas Norrisville Quadrangle, Baltimore and Harford Counties, Maryland, by E.G. Otton: Maryland Geological Survey Quadrangle Atlas No. 23. 1983. 5 maps.

SELECTED U.S.GEOLOGICAL SURVEY REPORTS ON GROUND-WATER RESOURCES IN THE DISTRICT OF COLUMBIA

Listed below is a selection of reports on ground-water resources in Washington, D. C. which are available through the U.S. Geological Survey, Book and Open-File Reports, Federal Center, Building 41, Box 25425, Denver, Colorado 80225.

Water-Supply Paper

Geology and ground-water resources of Washington, D.C., and vicinity, by P. M. Johnston, with a section on Chemical quality of the water, by D. E. Weaver and Leonard Siu: U.S. Geological Survey Water-Supply Paper 1776. 1964. 133 pages.

Open-File Report

Maryland and the District of Columbia ground-water quality, by J.C. Wheeler: U.S. Geological Survey Open-File Report No. 87-0730. 1988. 10 pages.

Ground-water aquifers and mineral commodities of Maryland, Prepared in cooperation with the Maryland Department of State Planning: Maryland Geological Survey Open-File Report No. 69-06-1. 1969. 36 pages.

A User's guide for the Artesian aquifers of the Maryland Coastal Plain. Part One: Introductory definitions and examples. 86 pages. **Part Two: Aquifer characteristics.** by H.J. Hansen: Maryland Geological Survey Open-File Report No. 72-02-01. 1972. 123 pages.

Geologic and hydrologic data from two core holes drilled through the Aquia Formation (Eocene-Paleocene) in Prince George's and Queen Anne's Counties, Maryland, by H.J. Hansen: Maryland Geological Survey Open-File Report No. 77-02-1. 1977. 77 pages.

Waste Gate Formation. Part One: Hydrogeologic framework and potential utilization of the brine aquifers of the Waste Gate Formation, a new unit of the Potomac Group underlying the Delmarva Peninsula, by H.J. Hansen, 1982. 50 pages. **Part Two: Palynology of the continental Cretaceous sediments, Crisfield geothermal test well, eastern Maryland,** by J.A. Doyle: Maryland Geological Survey Open-File Report No. 82-02-1. 1982. 37 pages.

Summary of hydrogeologic data from a deep (2,678 Ft.) well at Lexington Park, St. Mary's County, Maryland, by H.J. Hansen, and J.M. Wilson: Maryland Geological Survey Open-File Report No. 84-02-1. 1984. 61 pages.

Stratigraphy, hydrogeology, and water chemistry of the Cretaceous aquifers of the Waldorf/La Plata Area, Charles County, Maryland, by J.M. Wilson: Maryland Geological Survey Open-File Report No. 86-02-2. 1986. 66 pages.

Summary of hydrogeologic data from a test well (1,725 Ft.) drilled in Tuckahoe State Park, Queen Anne's County, Maryland, by D.C. Andreasen, and H.J. Hansen: Maryland Geological Survey Open-File Report No. 87-02-3. 1987. 47 pages.

Selected geohydrologic characteristics of the Patapsco aquifers at Chalk Point, Prince George's County, by F.K. Mack: Maryland Geological Survey Open-File Report No. 88-02-4. 1988. 36 pages.

Hydrogeology and stratigraphy of a 1,515-Foot test Wwll drilled near Princess Anne, Somerset County, Maryland, by H.J. Hansen, and J.M. Wilson: Maryland Geological Survey Open-File Report No. 91-02-5. 1990. 59 pages.

Geohydrologic data for the Coastal Plain sediments underlying Broadneck peninsula, Anne Arundel County, Maryland, by F.K. Mack, and D.C. Andreasen: Maryland Geological Survey Open-File Report No. 92-02-6. 1991. 76 pages.

Information Circulars

The Electric Log: Geophysic's contribution to ground-water prospecting and evaluation, by H.J. Hansen: Maryland Geological Survey Information Circular No. 4. 1967. 11 pages.

Well yields in the bedrock aquifers of Maryland, by L.J. Nutter: Maryland Geological Survey Information Circular No. 16. 1974. 24 pages.

A digital simulation model of the Aquia aquifer in southern Maryland, by G.W. Kapple, and H.J. Hansen: Maryland Geological Survey Information Circular No. 20. 1976. 34 pages.

Hydrogeologic characteristics of the Waste Gate Formation, A new subsurface unit of the Potomac Group underlying the eastern Delmarva Peninsula, by H.J. Hansen: Maryland Geological Survey Information Circular No. 39. 1984. 24 pages.

Maps

Quadrangle Atlases

Cockeysville Quadrangle: Geology, hydrology, and mineral resources, by E.G. Otton, E.T. Cleaves, W.P. Crowley, K.R. Kuff, and Jurgen Reinhardt: Maryland Geological Survey Quadrangle Atlas No. 3. 1975. 8 maps.

White Marsh Quadrangle: Geology, hydrology, and mineral resources, by E.T. Cleaves, K.R. Kuff, W.P. Crowley, and Jurgen Reinhardt: Maryland Geological Survey Quadrangle Atlas No. 4. 1979. 3 maps. Five other maps for this atlas are available for inspection at MGS: by E.T. Cleaves, and E.G. Otton.

Jarrettsville Quadrangle hydrogeology, by L.J. Nutter: Maryland Geological Survey Quadrangle Atlas No. 5. 1977. 4 maps.

Bel Air Quadrangle hydrogeology, by L.J. Nutter: Maryland Geological Survey Quadrangle Atlas No. 6. 1977. 4 maps.

Hydrogeologic Atlas, Reisterstown Quadrangle, Baltimore County, Maryland, by M.T. Duigon, and W.P. Crowley: Maryland Geological Survey Quadrangle Atlas No. 7. 1983. 6 maps.

Hydrogeologic Atlas Westminster Quadrangle, Carroll County, Maryland, by E.G. Otton: Maryland Geological Survey Quadrangle Atlas No. 9. 1979. 5 maps.

Hydrogeologic Atlas Winfield Quadrangle, Carroll County, Maryland, by E.G. Otton: Maryland Geological Survey Quadrangle Atlas No. 10. 1980. 5 maps.

Hydrogeologic Atlas New Windsor Quadrangle, Carroll County, Maryland, by E.G. Otton: Maryland Geological Survey Quadrangle Atlas No. 11. 1980. 5 maps.


77°
76°
39°
38°
PENNSYLVANIA
NEW JERSEY
DELAWARE
MARYLAND
VIRGINIA
WEST VIRGINIA
DELAWARE BAY
CHESAPEAKE BAY
ATLANTIC OCEAN
BALTIMORE
WASHINGTON DC
ANNAPOLIS
DOVER
Rockville
Towson
Ellicott City
Upper Marlboro
Westminster
Frederick
Elkton
Chestertown
Centreville
Denton
Easton
Georgetown
Rehoboth Beach
Salisbury
Ocean City
Princess Anne
Snow Hill
Crisfield
Leonardtown
Prince Frederick
Cambridge
LaPlata
FR AF 27
FR Bd 96
CL Ad 47
CL Bf 184
CL Bf 1
FR Cg 1
FR Dd 178
FR Dl 35
FR Eh 1
CL Ec 75
HO Bd 1
MO Cb 26
MO Cc 14
MO Dc 59
MO Db 68
MO Ec 10
HO Ce 38
MO Eh 20
PG Bc 16
AA Cb 1
PG Db 3
PG Da 21
PG Fb 36
PG Fc 17
PG Fd 41
CH Bg 13
CH Be 57, 60
CH Bf 134, 158
CH Bf 133, 157
CH Cb 7
CH Cf 33
CH Bf 146, 151
CH De 45
CH Dd 38
CH Dd 33
CH Ee 90
CH Ee 16
SM Bb 15, 22
SM Dd 50
SM Dl 66
SM Dl 71
SM Dl 84
SM Dd 46, 49, 62, 63
SM Eg 27
SM El 80
SM Fg 45
SM Fe 30, 31
SM Gh 11
CA Bb 27, 28
CA Cc 18
CA Cg 57
CA Db 47
CA Db 65, 66, 67
CA Dc 35
CA Fd 51, 54
CA Fe 22
CA Fc 13
CA Gd 6
AA Fd 43
AA Cg 25
AA Ed 45
AA Cc 40
AA Cf 98, 99
AA De 140, 144
AA Bd 158
AA Bd 159
AA Bd 156
AA Bd 91
AA Ac 11
AA Ad 90, 102, 104, 108, 110
AA Bf 103
AA Ea 78, 81
QA Ea 79, 80
QA Eb 110-113
QA Fc 7
QA Eb 155
QA Eb 156, 157
QA Ec 1
QA Ei 29
QA Db 30, 32
QA Db 34, 37
QA Db 35
KE Db 40
KE Ac 20
KE Be 55
KE Be 43
KE Bg 33, 34
KE Cd 44
KE Cb 36
QA Be 15-17
QA Cg 1
CO Bc
CO Bd 53
CO Dc 129
CO Dd 47
Md22-01
Mc51-01
TA Bf 73, 74
TA Cc 35
TA Ce 7
TA Cc 36
DO Ce 5
DO Ce 15
DO Bg 59
DO Ce 88
DO Ce 21
DO Ce 78
DO Cd 1
DO Db 18
DO Db 17
DO Db 19
HA Aa 9
HA Bd 31
HA Dd 91, 92
HA De 197, 198
HA De 195
HA De 66
HA Dd 106
HA Ca 23
HA Ce 21
HA Dd 89
HA Ed 47, 48, 49
HA De 151
HA De 181, 182, 183
HA Ec 11
HA Ec 46, 47
HA Ed 24
BA Cd 26
BA De 444
BA Ec 43
BA Ea 18
BA Fe 19
BA Gf 11
BA Gf 168
BA Gf 178
AA Bf 3
5S2E- 24
3S2E- 5
5S2E- 1
5S2E- 46
CE Be 73, 74
CE Cd 51, 52
CE Ce 54
CE Bf 81, Db24-17
Db15-05
33-17, 18, 19
CE Bf 82
Bc34-05, 06
Db33-17, 18, 19
Eb23-22, 23, 24, 25
CE Cd 53
CE Ce 55
CE Ce 56
CE Ee 29
CE Db 81
HD14-01
Jd42-03
Ng11-01
Nc45-01
Nf44-01
Ni52-11, 12
Oi24-06
Oh54-01, 02
Pf24-02, 03
Qe44-01
Qh54-04, -07
Rj22-05, 06, 07, 08
Qj32-17
WI Ce 204
WI Cf 147
WI Cg 20
WI Ce 13
WI Cf 3
WO Bg 1
WO De 36
WO Dg 21
SO Be 42
SO Ce 42
SO Cf 2
WO Dd 7
WO Fb 2

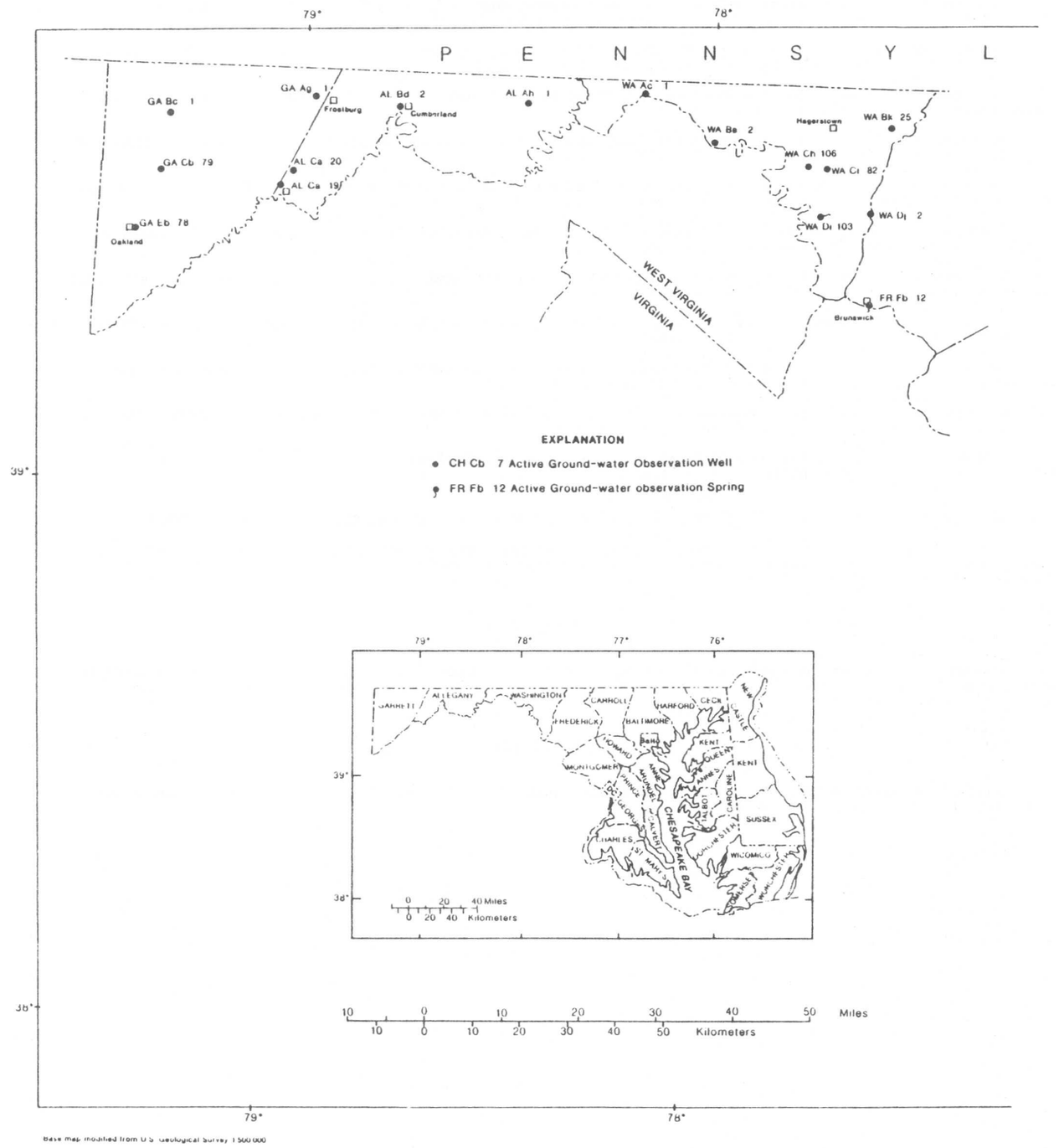
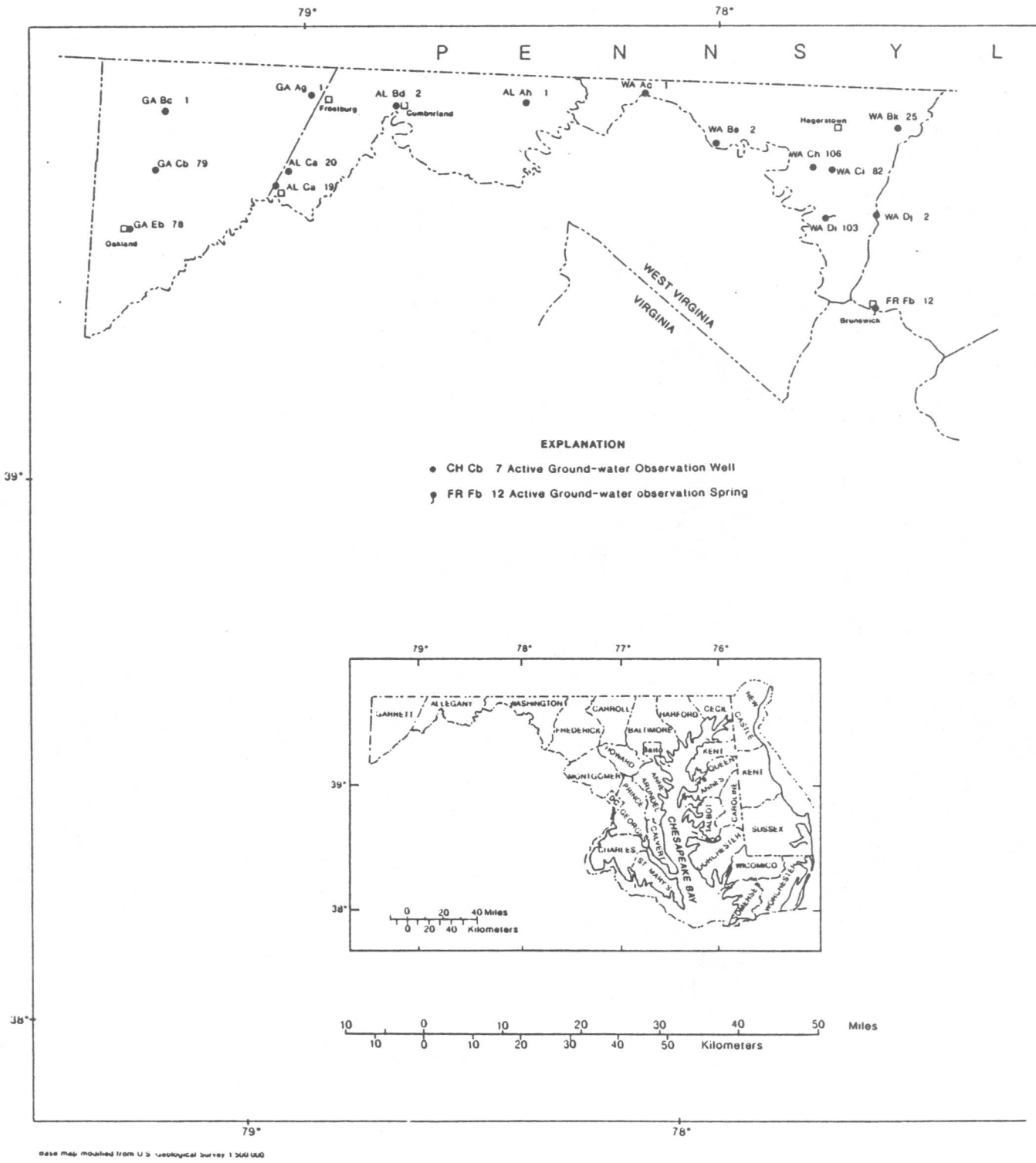


Figure 3. Location of Maryland and Delaware ground-water network observation wells and springs.


77°
76°
V A N I A
NEW JERSEY
DELAWARE BAY
ATLANTIC OCEAN
CHESAPEAKE BAY
39°
38°
BALTIMORE
WASHINGTON DC
ANNAPOLIS
DOVER
Frederick
Westminster
Towson
Ellicott City
Rockville
Upper Marlboro
Prince Frederick
LaPlata
Leonardtown
Cambridge
Easton
Centreville
Chestertown
Denton
Elkton
Salisbury
Princess Anne
Snow Hill
Crisfield
Georgetown
Rehoboth Beach
Ocean City
FR AF 27
FR Bd 96
CL Ad 47
CL Bl 184
CL Bl 1
FR Cg 1
FR Dd 178
FR Dl 35
FR Eh 11
CL Ec 75
MO Cb 26
MO Cc 14
MO Dc 59
MO Db 68
MO Ec 10
MO Eh 20
HO Bd 1
HO Ce 38
BA Cd 26
BA Dc 444
BA Ea 18
BA Ec 43
5S2E- 24
3S2E- 5
5S5E- 1
3S5E- 46
BA Fe 19
BA Gl 11
BA Gl 168
BA Gl 178
AA Ac 11
AA Ad 90, 102, 104, 108 110
AA Ad 29
AA Bd 91
AA Bd 156
AA Bd 158
AA Bd 159
AA Cb 1
AA Cc 40
AA Cl 98, 99
AA De 140, 144
AA Cg 25
AA Ed 45
AA Fd 43
PG Bc 16
PG Dl 3
PG De 21
PG Fb 36
PG Fc 17
PG Fd 41
CH Bg 13
CH Bl 134, 158
CH Be 57, 60
CH Bl 133, 157
CH Cb 7
CH Bl 146, 151
CH Cl 33
CH De 45
CH Dd 38
CH Dd 33
CH Ee 90
CH Ee 18
SM Bb 15, 22
SM Dd 50
SM Dl 66
SM Dl 71
SM Dl 84
SM Eg 27
SM Dd 46, 49, 62, 63
SM El 80
SM Fg 45
SM Fe 30, 31
SM Gh 11
CA Bb 27, 28
CA Cc 18
CA Bg 12
CA Cc 57
CA Db 47
CA Db 65, 66, 67
CA Dc 35
CA Fd 51, 54
CA Fc 13
CA Fe 22
CA Gd 6
HA Aa 9
HA Bd 31
HA Dd 91, 92
HA De 197, 198
HA Dd 106
HA Ca 23
HA De 195
HA De 66
BA Ce 21
HA Dd 89
HA Ed 47, 48, 49
HA De 151
HA De 181, 182, 183
HA Ec 11
HA Ec 46, 47
HA Ed 24
CE Cd 51, 52
CE Be 73, 74
CE Cc 40
CE Ce 54
CE Cd 53
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CE Ce 56
CE Db 81
CE Ee 29
CE Bl 81
Db24-17
Dc34-05, 06
Db15-05, 33-17, 18, 19
CE Bl 82
Eb23-22, 23, 24, 25
KE Ac 20
KE Be 55
KE Be 43
KE Cd 44
KE Cb 36
KE Bg 33, 34
KE Db 40
QA Be 15-17
QA Cg 1
QA Db 35
QA Db 34, 37
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QA Eb 155
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QA Ea 78, 81
AA Dl 103
QA Fc 7
QA Ec 1
QA El 29
TA Bl 73, 74
TA Cc 35
TA Ce 7
TA Cc 36
QA Eb 110-113
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DO Ce 15
DO Bg 59
DO Ce 88
DO Ce 21
DO Ce 78
DO Cd 1
DO Db 18
DO Db 17
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Jd42-03
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CO Bd 53
CO Dc 129
Md22-01
Mc51-01
Nc45-01
Ng11-01
Nl44-01
Nl52-11, 12
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Oh54-01, 02
Pl24-02, 03
Qe44-01
Qh54-04, -07
Rl22-05, 06, 07, 08
Oj32-17
WI Ce 204
WI Cl 147
WI Cg 20
WI Ce 13
WI Cl 3
WO Bg 1
WO De 36
WO Dg 21
SO Be 42
SO Ce 42
SO Cl 2
WO Dd 7
WO Fb 2



Base map modified from U.S. Geological Survey 1:500,000

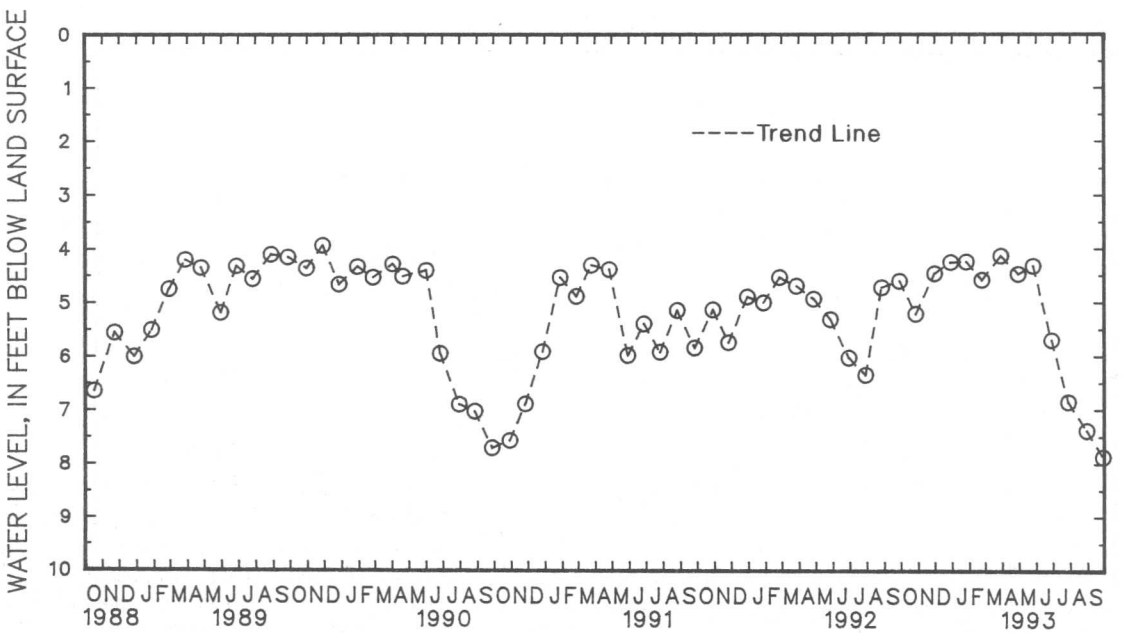
Figure 4. Location of Maryland project ground-water observation wells.

WELL NUMBER.--WI Cg 20. SITE ID.--382329075263701.
LOCATION.--Lat 38°23'29", long 75°26'37", Hydrologic Unit 02060009, 1.45 mi east of Parsonsburg, south of MD Rt. 346.
Owner: Maryland State Highway Administration.
AQUIFER.--Parsonsburg Sand of Pleistocene age. Aquifer code: 112PRBG.
WELL CHARACTERISTICS.--Driven, unused, water-table well, depth 25 ft, casing diameter 1.25 in., to unknown depth.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 68 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 2 in. sleeve, 0.17 ft above land surface.
REMARKS.--Maryland Water-Level Network observation well.
PERIOD OF RECORD.--August 1949 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.84 ft below land surface, Jan. 31, 1950; lowest measured, 8.68 ft below land surface, Oct. 10, 1980.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 27	5.21	DEC 29	4.25	FEB 23	4.58	APR 29	4.47	JUN 28	5.70	AUG 30	7.39
NOV 30	4.46	JAN 26	4.24	MAR 29	4.13	MAY 26	4.32	JUL 28	6.86	SEP 28	7.88

WATER YEAR 1993 HIGHEST 4.13 MAR 29, 1993 LOWEST 7.88 SEP 28, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

GROUND-WATER SPRING DISCHARGE

MARYLAND

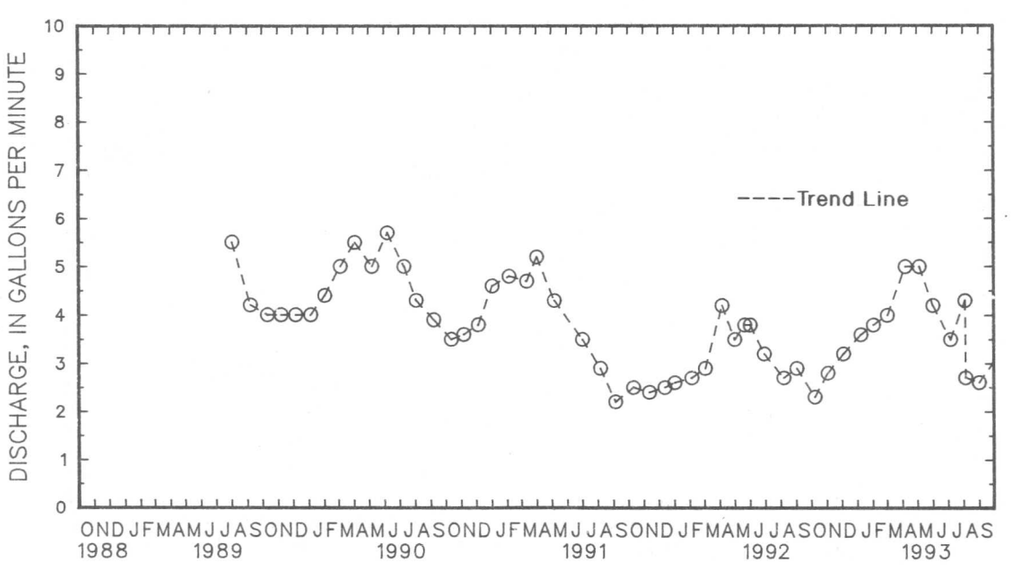
CECIL COUNTY

SPRING NUMBER.--CE Cc 40. SITE ID.--393459076045001.
LOCATION.--Lat 39°34'59", long 76°04'50", Hydrologic Unit 02050306, 0.1 mi north of intersection of Cokesbury and St. Marks Church Rd., 0.8 mi northeast of Perryman.
Owner: John McMullen.
AQUIFER.--James Run Formation, Frenchtown Member of Paleozoic age. Aquifer code: 300JMSR.
SPRING IMPROVEMENTS.--2 in. outflow pipe.
INSTRUMENTATION.--Monthly volumetric measurements by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 180 ft above National Geodetic Vertical Datum of 1929, from topographic map.
REMARKS.--Maryland Water-Level and Water Quality Network observation spring. Temperatures are available.
PERIOD OF RECORD.--April 1981, August 1989 to current year.
EXTREMES FOR PERIOD OF RECORD.--Maximum discharge measured, 5.7 gal/min, June 7, 1990; minimum discharge measured, 2.2 gal/min, Sept. 5, 1991.

DISCHARGE, IN GALLONS PER MINUTE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	DISCHARGE	DATE	DISCHARGE	DATE	DISCHARGE	DATE	DISCHARGE	DATE	DISCHARGE
OCT 8	2.3	JAN 8	3.6	APR 7	5.0	JUN 1	4.2	AUG 5	2.7
NOV 3	2.8	FEB 2	3.8	MAY 5	5.0	JUL 6	3.5	SEP 1	2.6
DEC 4	3.2	MAR 2	4.0						

WATER YEAR 1993 MAXIMUM 5.0 APR 7, and MAY 5, 1992 MINIMUM 2.3 OCT 8, 1992



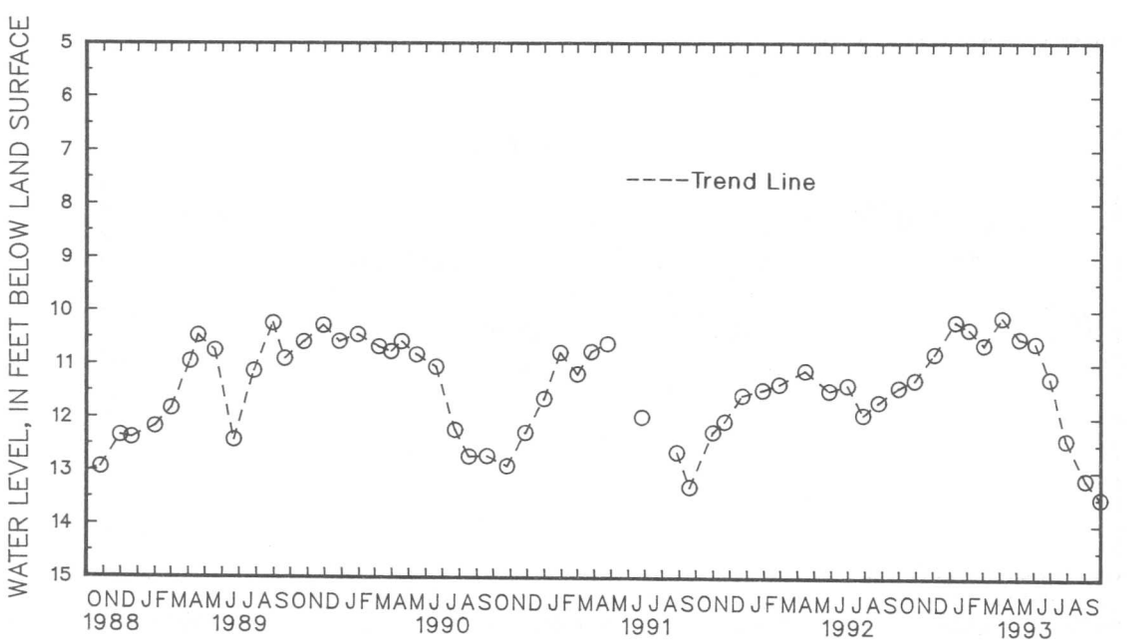
5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Ae 24. SITE ID.--382621075174202. PERMIT NUMBER.--WO-73-0512.
LOCATION.--Lat 38°26'21", long 75°17'42", Hydrologic Unit 02060009, 2.75 mi north of Whaleysville.
Owner: U.S. Geological Survey.
AQUIFER.--Ocean City aquifer of Miocene age. Aquifer code: 122OCNC.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 200 ft; casing diameter 4 in., to 190 ft; screen diameter 2 in. from 190 to 200 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 40 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 4 in. coupling, 4.4 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well.
PERIOD OF RECORD.--October 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.49 ft below land surface, May 31, 1978; lowest measured, 15.06 ft below land surface, Nov. 24, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	11.29	JAN 11	10.20	MAR 3	10.63	MAY 6	10.51	JUN 30	11.26	SEP 2	13.15
DEC 4	10.80	FEB 4	10.34	APR 5	10.12	JUN 4	10.60	JUL 29	12.41	29	13.50

WATER YEAR 1993 HIGHEST 10.12 APR 5, 1993 LOWEST 13.50 SEP 29, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

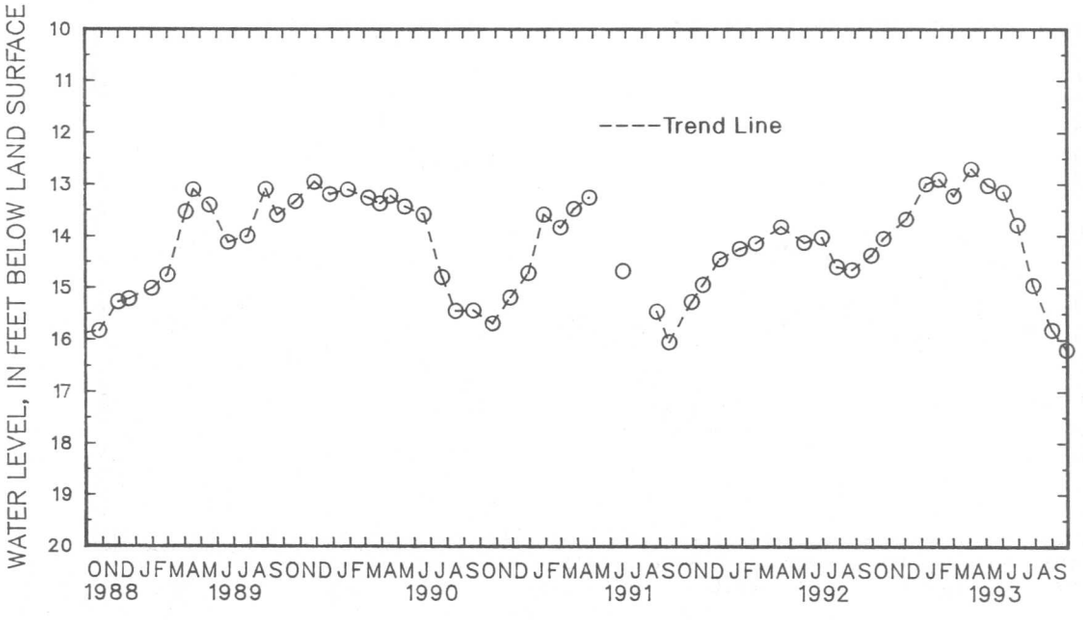
WORCESTER COUNTY

WELL NUMBER.--WO Ae 23. SITE ID.--382621075174201. PERMIT NUMBER.--WO-73-0513.
LOCATION.--Lat 38°26'21", long 75°17'42", Hydrologic Unit 02060009, 2.75 mi north of Whaleysville.
Owner: U.S. Geological Survey.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 280 ft; casing diameter 4 in., to 270 ft; screen diameter 4 in. from 270 to 280 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 40 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 4 in. coupling, 3.52 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well.
PERIOD OF RECORD.--October 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.85 ft below land surface, Dec. 16, 1975; lowest measured, 17.40 ft below land surface, Oct. 29, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 23	14.05	JAN 11	12.99	MAR 3	13.22	MAY 6	13.02	JUN 30	13.79	SEP 2	15.82
DEC 4	13.67	FEB 4	12.90	APR 5	12.70	JUN 4	13.15	JUL 29	14.96	29	16.20

WATER YEAR 1993 HIGHEST 12.70 APR 5, 1993 LOWEST 16.20 SEP 29, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Ah 6. SITE ID.--382632075031801. PERMIT NUMBER.--WO-70-0009.
LOCATION.--Lat 38°26'32", long 75°03'18", Hydrologic Unit 02060010, at east end of 137th St., Ocean City.
Owner: U.S. Geological Survey.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 357 ft; casing diameter 4 in., to 347 ft; screen diameter 4 in. from 347 to 357 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel. Equipped with digital water-level recorder--15-minute recording interval, March 1985 to current year.
DATUM.--Elevation of land surface is 6.35 ft above National Geodetic Vertical Datum of 1929.
Measuring point: Top of shelter floor, 3.27 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping. Missing data due to recorder malfunction.
PERIOD OF RECORD.--June 1972 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.48 ft above land surface, March 27, 1973; lowest measured, 52.46 ft below land surface, July 24, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	---	---	---	---	15.56	14.81	14.71	13.23	15.84	7.91	---	---
2	---	---	---	---	14.91	11.03	15.04	14.20	11.17	7.87	---	---
3	---	---	---	---	15.02	10.54	14.86	14.15	11.66	7.20	---	---
4	---	---	---	---	14.82	10.61	14.71	12.77	---	---	---	---
5	---	---	---	---	15.23	11.61	14.02	9.83	---	---	---	---
6	---	---	---	---	15.14	11.35	12.29	9.14	---	---	---	---
7	---	---	---	---	15.38	14.09	12.29	9.02	---	---	---	---
8	---	---	16.56	14.53	15.38	9.98	12.01	9.58	---	---	---	---
9	---	---	16.65	15.57	14.67	9.41	11.77	7.54	---	---	14.53	10.96
10	---	---	16.76	15.11	14.35	8.46	9.97	8.13	---	---	12.61	9.68
11	---	---	16.56	14.36	11.88	6.96	9.83	8.14	---	---	18.20	9.26
12	---	---	16.72	15.32	12.67	7.92	9.90	7.69	---	---	18.05	9.66
13	---	---	16.25	15.08	12.58	8.41	9.93	7.77	---	---	18.13	8.76
14	---	---	16.48	14.43	13.30	9.15	9.92	7.74	---	---	19.59	8.55
15	---	---	16.45	15.26	13.39	8.50	9.88	6.95	---	---	19.63	10.79
16	29.56	21.77	16.55	15.54	13.96	9.40	9.91	9.11	---	---	14.95	10.81
17	29.77	28.64	16.31	14.28	13.83	8.76	9.93	9.47	---	---	14.16	9.46
18	29.61	28.51	15.62	11.32	11.03	8.68	9.94	9.88	---	---	12.83	8.77
19	29.17	28.09	15.56	11.25	9.90	8.48	9.94	8.48	---	---	16.27	8.43
20	---	---	15.37	13.31	14.05	9.31	9.83	8.24	---	---	16.60	10.09
21	---	---	15.86	14.33	14.31	8.63	9.94	8.16	---	---	18.59	10.58
22	---	---	15.86	13.50	14.32	10.74	9.95	9.75	---	---	15.75	10.72
23	---	---	15.88	11.01	13.37	12.80	9.95	9.75	---	---	12.76	8.74
24	---	---	15.13	10.18	13.77	12.31	9.97	9.77	---	---	14.97	8.63
25	---	---	14.65	10.25	13.53	8.71	9.98	9.77	---	---	16.84	7.76
26	---	---	14.42	10.57	13.22	7.91	17.97	8.76	---	---	14.40	9.65
27	---	---	15.11	14.01	14.34	13.17	17.97	9.23	---	---	17.50	9.20
28	---	---	15.23	12.85	13.68	9.74	15.84	7.82	---	---	12.58	9.49
29	---	---	15.46	14.62	13.69	9.98	16.05	9.23	---	---	13.85	9.73
30	17.67	15.48	15.80	14.94	13.67	9.45	16.04	16.03	---	---	13.38	9.70
31	---	---	---	---	13.32	9.73	16.62	9.48	---	---	10.94	7.50
MONTH	29.77	15.48	16.76	10.18	15.56	6.96	17.97	6.95	15.84	7.20	19.63	7.50

GROUND-WATER LEVELS

MARYLAND--Continued

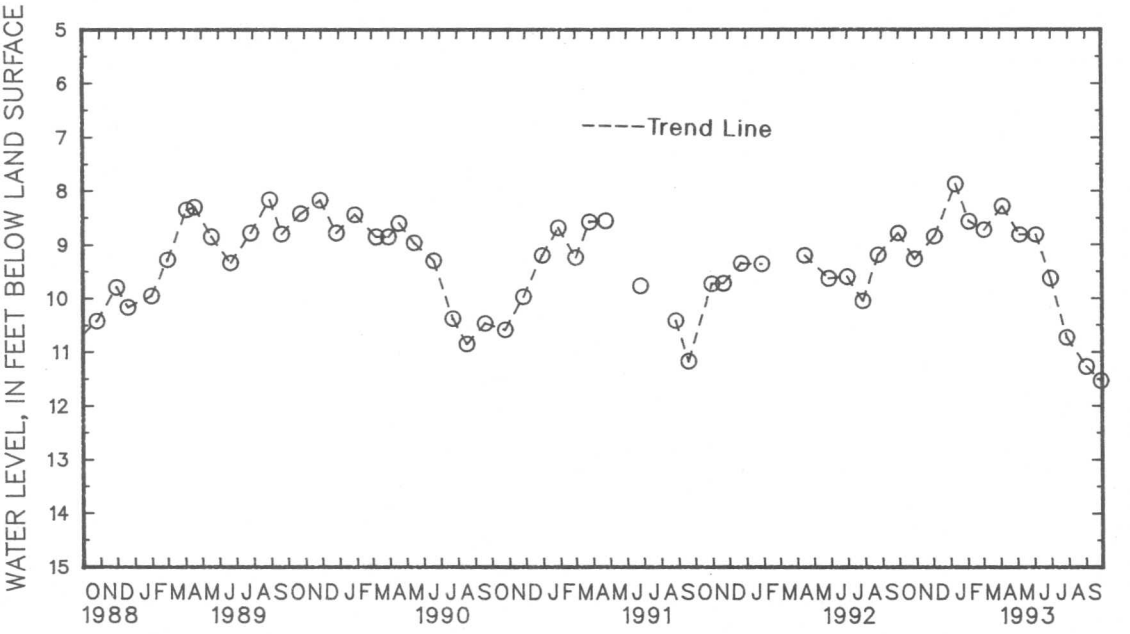
WORCESTER COUNTY--Continued

WELL NUMBER.--WO Ae 25. SITE ID.--382621075174203. PERMIT NUMBER.--WO-73-0514.
LOCATION.--Lat 38°26'21", long 75°17'42", Hydrologic Unit 02060009, 2.75 mi north of Whaleysville.
Owner: U.S. Geological Survey.
AQUIFER.--Pocomoke aquifer of Miocene age. Aquifer code: 122PCMK.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 118 ft; casing diameter 4 in., to 108 ft; screened diameter 2 in. from 108 to 118 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 40 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 4 in. coupling, 3.6 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well.
PERIOD OF RECORD.--October 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 7.79 ft below land surface, Nov. 20, 1975; lowest measured, 12.96 ft below land surface, Oct. 1 and 29, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	9.27	JAN 11	7.87	MAR 3	8.72	MAY 6	8.81	JUN 30	9.63	SEP 2	11.28
DEC 4	8.84	FEB 4	8.56	APR 5	8.28	JUN 4	8.81	JUL 29	10.74	28	11.54

WATER YEAR 1993 HIGHEST 7.87 JAN 11, 1993 LOWEST 11.54 SEP 28, 1993



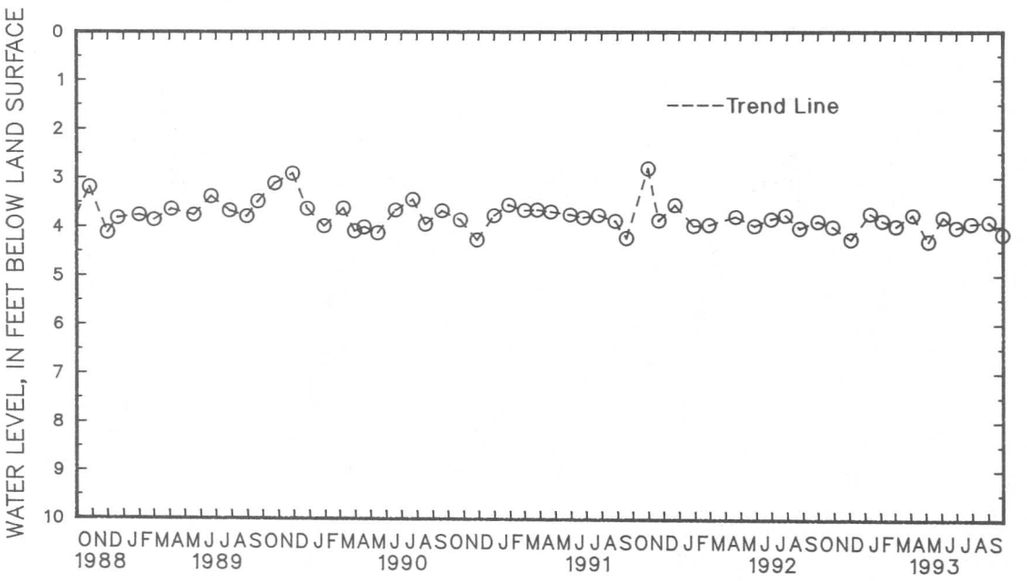
5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Ah 35. SITE ID.--382635075030601. PERMIT NUMBER.--WO-73-0516.
LOCATION.--Lat 38°26'35", long 75°03'06", Hydrologic Unit 02060010, at east end of 137th St., Ocean City.
Owner: U.S. Geological Survey.
AQUIFER.--St. Marys Formation of Middle Miocene age. Aquifer code: 122SMRS.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 726 ft; casing diameter 4 in., to 716 ft; screen diameter 2 in. from 716 to 726 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 13.99 ft above National Geodetic Vertical Datum of 1929.
Measuring point: Top of 4 in. coupling, 3.7 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels may be affected by nearby pumping.
PERIOD OF RECORD.--October 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.90 ft below land surface, March 10, 1976; lowest measured, 10.26 ft below land surface, Oct. 28, 1975.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	4.01	JAN 11	3.74	MAR 3	4.00	MAY 6	4.31	JUN 30	4.03	SEP 2	3.92
DEC 4	4.27	FEB 4	3.89	APR 5	3.77	JUN 4	3.82	JUL 29	3.95	29	4.17

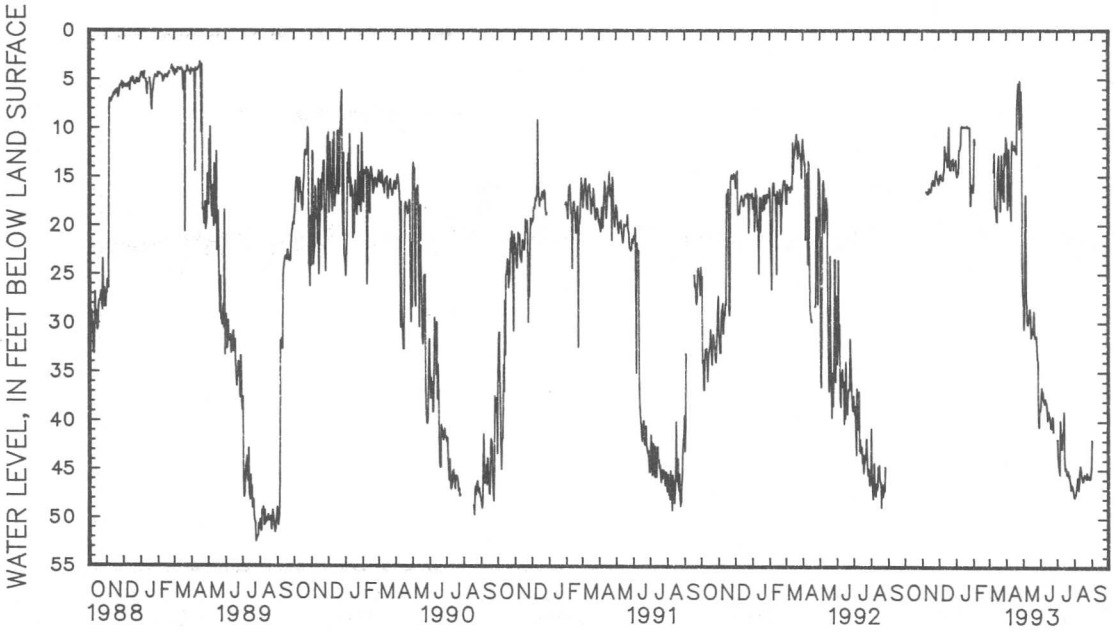
WATER YEAR 1993 HIGHEST 3.74 JAN 11, 1993 LOWEST 4.31 MAY 6, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	11.48	8.72	27.78	13.93	38.53	25.17	41.90	21.92	47.83	34.35	41.94	22.91
2	12.34	7.46	30.71	27.22	37.61	25.12	43.78	30.45	47.55	46.13	---	---
3	18.39	9.05	29.17	11.69	36.67	23.46	44.52	31.53	47.53	34.98	---	---
4	14.72	9.68	18.46	10.84	37.36	25.45	45.10	41.30	47.03	37.78	---	---
5	12.21	9.53	16.88	10.72	37.04	24.59	45.48	32.07	46.61	32.97	---	---
6	14.92	9.32	27.51	11.19	37.89	36.68	39.94	29.61	45.83	44.45	---	---
7	17.95	8.12	28.36	26.36	37.89	31.97	41.66	30.05	46.30	44.64	---	---
8	17.32	9.47	29.77	26.62	38.23	32.29	41.97	38.49	47.05	45.38	---	---
9	19.47	9.63	30.19	28.16	37.79	20.92	42.85	29.51	46.44	45.16	---	---
10	12.03	9.53	30.06	27.79	38.08	36.98	41.85	24.57	45.16	34.93	---	---
11	11.31	9.53	29.21	27.80	38.15	37.38	41.10	27.60	44.65	38.13	---	---
12	12.00	9.85	29.53	28.15	38.70	37.44	41.50	28.67	45.01	34.79	---	---
13	12.17	9.97	28.64	26.97	39.92	38.70	39.04	27.35	45.60	35.94	---	---
14	11.81	8.21	29.33	26.55	39.30	22.84	44.22	26.88	45.87	44.16	---	---
15	11.82	9.76	31.55	28.85	39.06	22.29	44.98	32.19	46.13	36.55	---	---
16	12.30	9.96	31.21	29.82	39.57	18.38	44.83	24.90	46.13	44.38	---	---
17	12.08	10.12	30.69	29.20	39.50	17.91	45.05	43.26	45.97	40.51	---	---
18	12.38	10.44	30.54	26.58	39.90	19.03	45.48	43.69	45.51	43.64	---	---
19	12.64	7.62	31.07	28.48	40.67	38.70	45.48	37.38	45.63	43.52	---	---
20	7.98	5.96	28.87	27.13	40.70	39.27	45.12	43.60	45.56	43.71	---	---
21	6.58	4.83	31.22	28.87	40.75	31.65	45.64	43.79	45.58	43.95	---	---
22	5.48	4.30	31.58	29.97	39.59	31.63	45.52	43.50	45.89	44.31	---	---
23	5.47	4.29	31.56	30.40	39.65	38.69	46.01	44.11	45.34	44.12	---	---
24	10.15	4.40	31.42	29.16	41.05	38.82	46.28	44.72	45.84	44.44	---	---
25	5.16	3.97	32.25	30.49	---	---	47.02	45.21	45.64	35.50	---	---
26	9.91	3.96	33.77	31.16	---	---	46.55	45.19	45.61	44.34	---	---
27	6.26	3.56	33.87	31.53	---	---	46.56	37.55	45.83	44.57	---	---
28	8.52	4.96	39.87	31.72	---	---	46.71	45.11	45.91	44.16	---	---
29	24.13	7.19	40.57	34.75	---	---	47.03	45.18	45.80	44.12	---	---
30	26.95	8.81	38.96	37.89	---	---	47.23	45.16	45.27	25.88	16.23	15.44
31	---	---	38.92	37.60	---	---	47.76	45.80	44.78	36.43	---	---
MONTH	26.95	3.56	40.57	10.72	41.05	17.91	47.76	21.92	47.83	25.88	41.94	15.44
YEAR	47.83	3.56										

Daily Low Water Levels



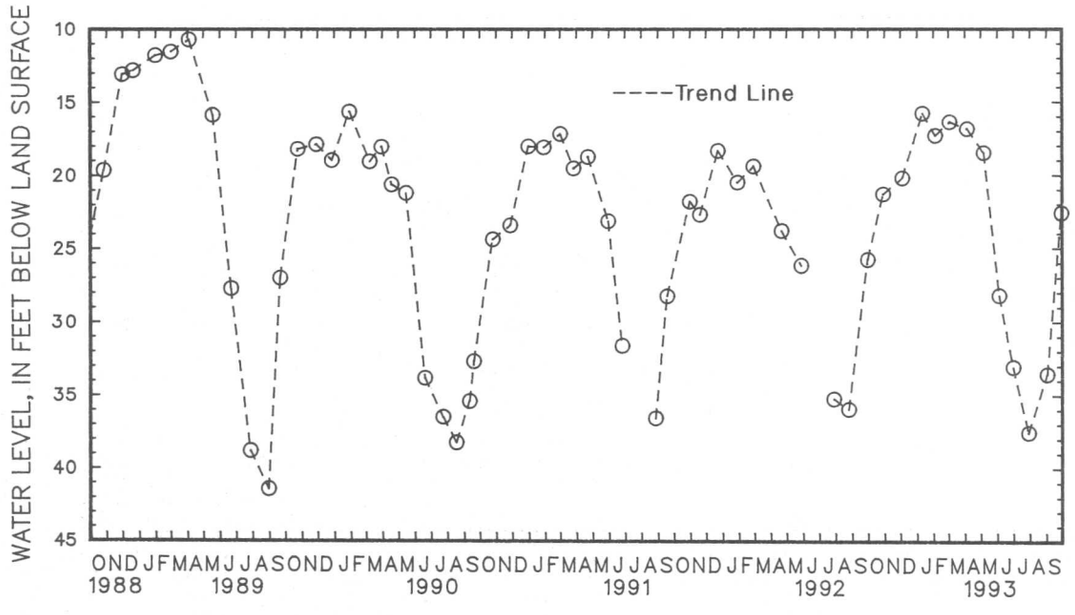
5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Ah 37. SITE ID.--382635075030603. PERMIT NUMBER.--WO-73-0517.
LOCATION.--Lat 38°26'35", long 75°03'06", Hydrologic Unit 02060010, at east end of 137th St., Ocean City.
Owner: U.S. Geological Survey.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 478 ft; casing diameter 4 in., to 468 ft; screen diameter 2 in. from 468 to 478 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 13.89 ft above National Geodetic Vertical Datum of 1929.
Measuring point: Top of 4 in. casing, 2.75 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping.
PERIOD OF RECORD.--October 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.58 ft below land surface, Feb. 10, 1977; lowest measured, 41.42 ft below land surface, Aug. 30, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	21.27	JAN 11	15.77	MAR 3	16.36	MAY 6	18.47	JUN 30	33.08	SEP 2	33.56
DEC 4	20.18	FEB 4	17.29	APR 5	16.83	JUN 4	28.21	JUL 29	37.56	29	22.57

WATER YEAR 1993 HIGHEST 15.77 JAN 11, 1993 LOWEST 37.56 JUL 29, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

GROUND-WATER LEVELS

MARYLAND--Continued

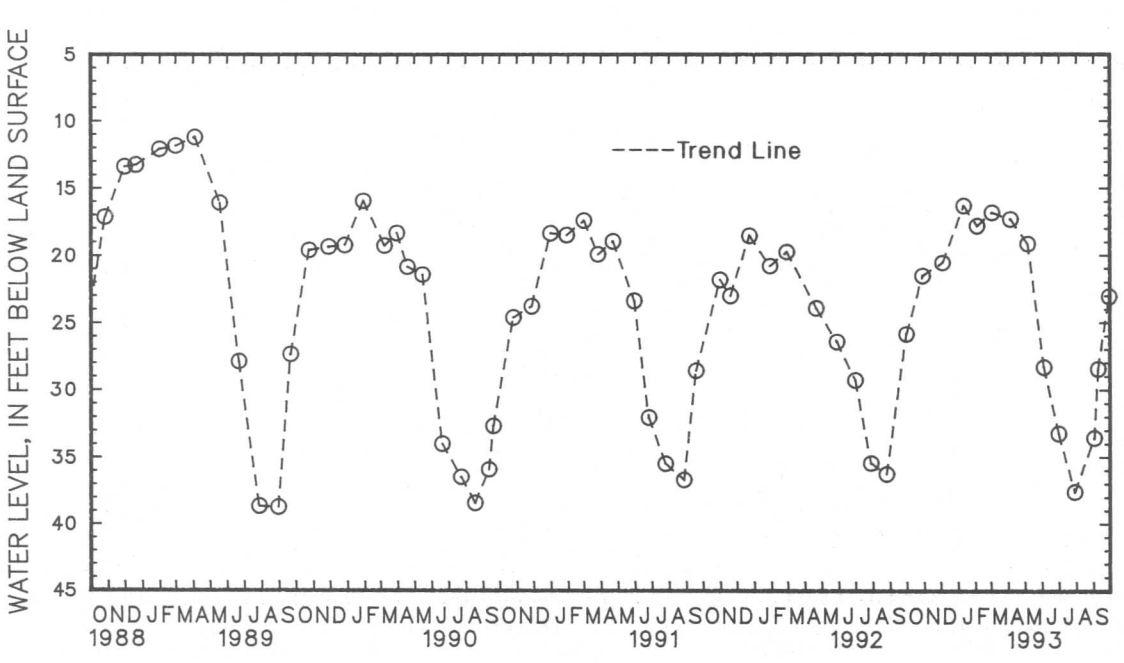
WORCESTER COUNTY--Continued

WELL NUMBER.--WO Ah 36. SITE ID.--382635075030602. PERMIT NUMBER.--WO-73-0518.
LOCATION.--Lat 38°26'35", long 75°03'06", Hydrologic Unit 02060010, at east end of 137th St., Ocean City.
Owner: U.S. Geological Survey.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 430 ft; casing diameter 4 in., to 420 ft; screen diameter 2 in. from 420 to 430 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 14.32 ft above National Geodetic Vertical Datum of 1929.
Measuring point: Top of 4 in. coupling, 1.08 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping.
PERIOD OF RECORD.--October 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 9.61 ft below land surface, April 18, 1984; lowest measured, 38.75 ft below land surface, Aug. 30, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	21.53	FEB 4	17.80	MAY 6	19.13	JUL 29	37.62	SEP 29	23.04
DEC 4	20.56	MAR 3	16.81	JUN 4	28.36	SEP 2	33.57		
JAN 11	16.31	APR 5	17.30	30	33.26	9	28.45		

WATER YEAR 1993 HIGHEST 16.31 JAN 11, 1993 LOWEST 37.62 JUL 29, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

GROUND-WATER LEVELS

MARYLAND--Continued

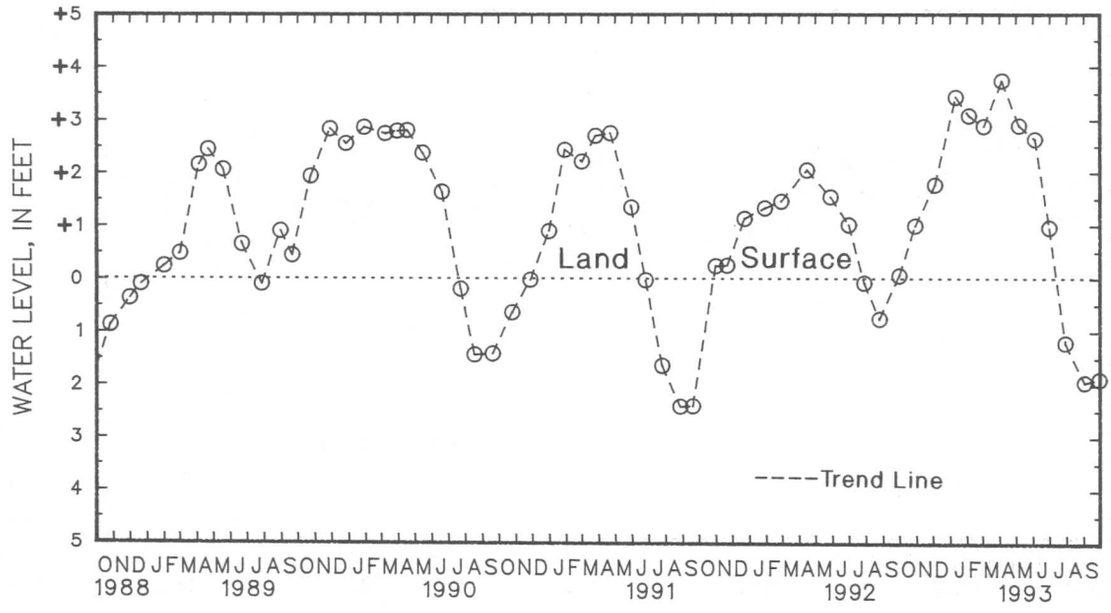
WORCESTER COUNTY--Continued

WELL NUMBER.--WO Bg 15. SITE ID.--382359075094501. PERMIT NUMBER.--WO-68-0066.
LOCATION.--Lat 38°23'59", long 75°09'45", Hydrologic Unit 02060010, south side of Beauchamp Rd. at Ocean Pines.
Owner: Ocean Pines.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 318 ft; casing diameter 6 in., to 288 ft; screen diameter 6 in. from 288 to 318 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 7 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 6 in. casing, 5.94 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels may be affected by nearby pumping.
PERIOD OF RECORD.--September 1970 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.13 ft above land surface, Feb. 29, 1972; lowest measured, 3.00 ft below land surface, Sept. 5, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
(READINGS ABOVE LAND SURFACE INDICATED BY "+")

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	+1.00	JAN 11	+3.44	MAR 3	+2.89	MAY 6	+2.90	JUN 30	+.96	SEP 2	1.95
DEC 4	+1.78	FEB 4	+3.09	APR 5	+3.75	JUN 4	+2.64	JUL 29	1.21	29	1.89

WATER YEAR 1993 HIGHEST +3.75 APR 5, 1993 LOWEST 1.95 SEP 2, 1993



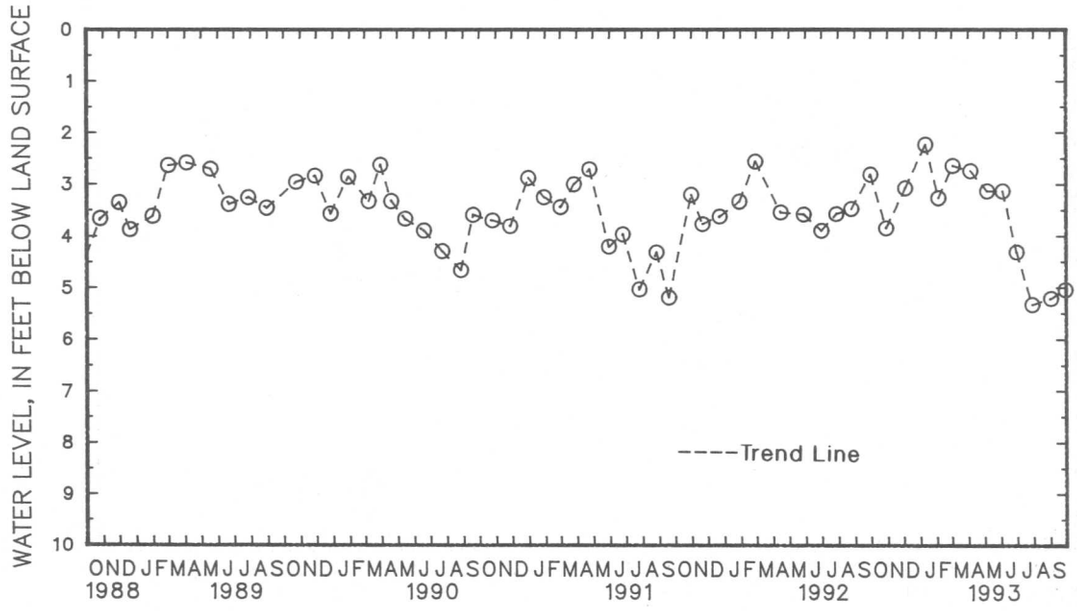
5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Bg 1. SITE ID.--382022075072401.
LOCATION.--Lat 38°20'22", long 75°07'24", Hydrologic Unit 02060010, 0.4 mi east of Herring Creek on U.S. Rt. 50.
Owner: MD State Highway Administration.
AQUIFER.--Sinepuxent Formation of Pleistocene age. Aquifer code: 112SNPX.
WELL CHARACTERISTICS.--Driven, water-table well, depth 14 ft; casing diameter 1.25 in., to 14 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 10 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of casing, 0.25 ft above land surface.
REMARKS.--Maryland Water-Level Network observation well.
PERIOD OF RECORD.--August 1949 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.41 ft below land surface, March 8, 1962; lowest measured, 8.61 ft below land surface, May 14, 1986.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	3.85	JAN 11	2.23	MAR 3	2.64	MAY 6	3.13	JUN 30	4.32	SEP 2	5.22
DEC 4	3.07	FEB 4	3.26	APR 5	2.74	JUN 4	3.13	JUL 29	5.34	29	5.05

WATER YEAR 1993 HIGHEST 2.23 JAN 11, 1993 LOWEST 5.34 JUL 29, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

GROUND-WATER LEVELS

MARYLAND--Continued

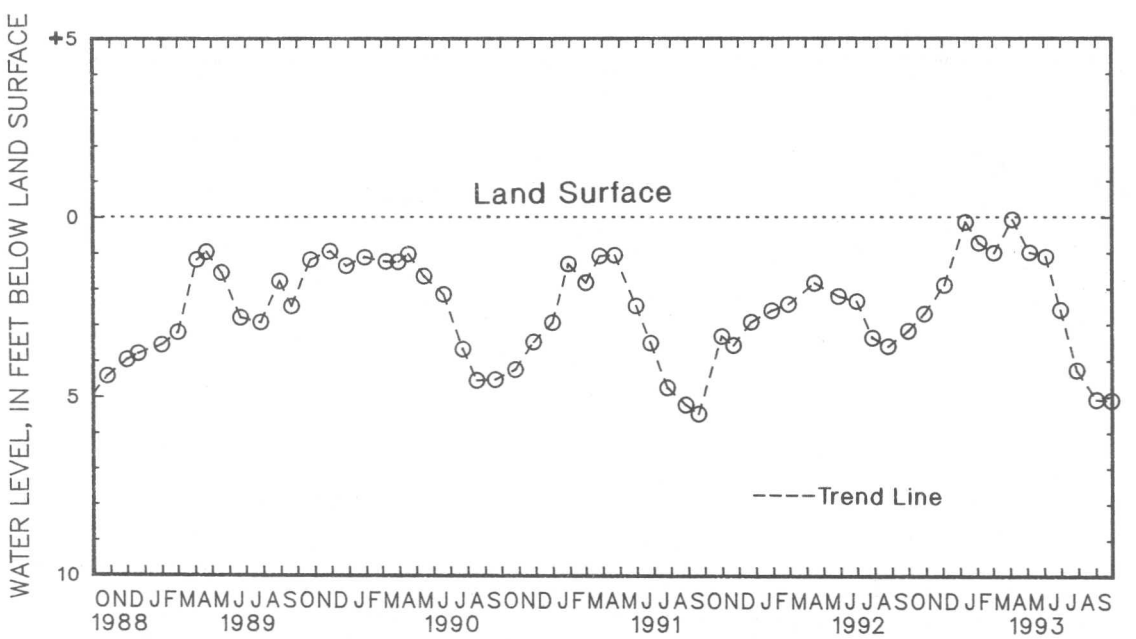
WORCESTER COUNTY--Continued

WELL NUMBER.--WO Bg 46. SITE ID.--382358075094502 PERMIT NUMBER.--WO-68-0066
LOCATION.--Lat 38°23'58", long 75°09'45", Hydrologic Unit 02060010, south side of Beauchamp Rd. at Ocean Pines.
Owner: Ocean Pines
AQUIFER.--Pocomoke aquifer of Miocene age. Aquifer code: 122PCMK.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 199.5 ft; casing diameter 6 in., to 53.6 ft; casing diameter 4 in. from 53.6 to 164.2 ft and from 194.5 to 199.5 ft; screen diameter 6 in. from 164.2 to 194.55 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 10 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 2 in. coupling, 2.5 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels maybe affected by nearby pumping.
PERIOD OF RECORD.--October 1970 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.22 ft above land surface, April 27, 1983; lowest measured, 5.74 ft below land surface, Aug. 26, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	2.69	JAN 11	.13	MAR 3	.99	MAY 6	.98	JUN 30	2.59	SEP 2	5.08
DEC 4	1.89	FEB 4	.71	APR 5	.06	JUN 4	1.10	JUL 29	4.27	29	5.10

WATER YEAR 1993 HIGHEST .06 APR 5, 1993 LOWEST 5.10 SEP 29, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

GROUND-WATER LEVELS

MARYLAND--Continued

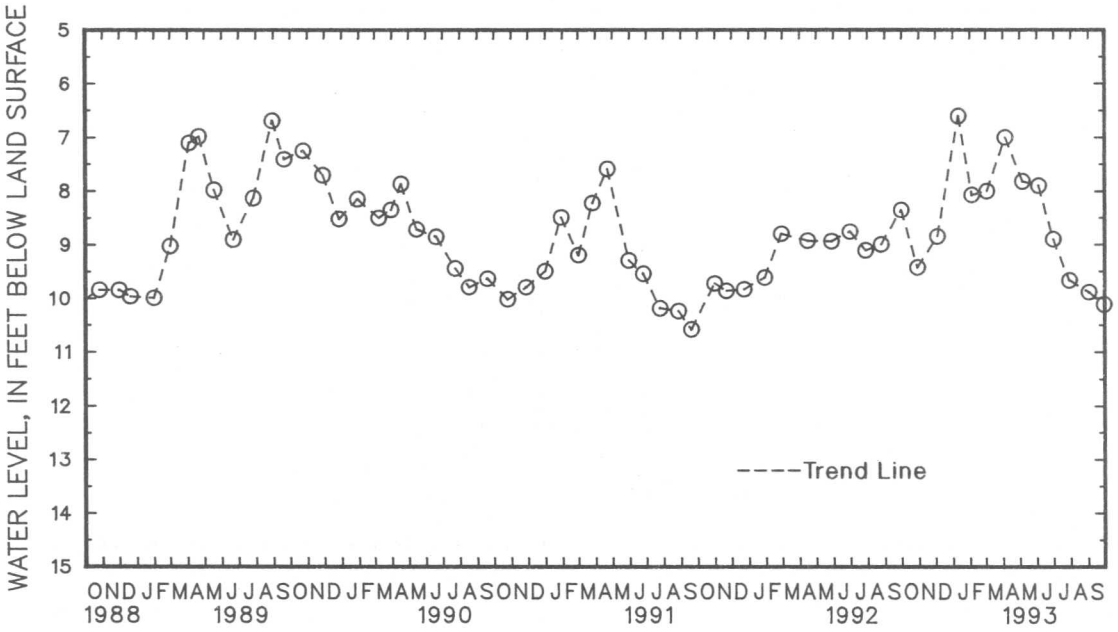
WORCESTER COUNTY--Continued

WELL NUMBER.--WO Bg 45. SITE ID.--382358075094501. PERMIT NUMBER.--WO-68-0066.
LOCATION.--Lat 38°23'58", long 75°09'45", Hydrologic Unit 02060010, south side of Beauchamp Rd. at Ocean Pines.
Owner: Ocean Pines.
AQUIFER.--Beaverdam Sand of Pliocene age. Aquifer code: 121BVDM.
WELL CHARACTERISTICS.--Drilled, observation well, depth 77 ft; casing diameter 2 in., to 56 ft; screen diameter 3 in. from 56 to 77 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 10 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 2 in. casing, 1.6 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well.
PERIOD OF RECORD.--October 1970 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.22 ft below land surface, Jan. 8, 1971; lowest measured, 10.59 ft below land surface, Sept. 19, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	9.43	JAN 11	6.60	MAR 3	8.00	MAY 6	7.82	JUN 30	8.91	SEP 2	9.90
DEC 4	8.85	FEB 4	8.07	APR 5	7.00	JUN 4	7.90	JUL 29	9.68	29	10.13

WATER YEAR 1993 HIGHEST 6.60 JAN 11, 1993 LOWEST 10.13 SEP 29, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

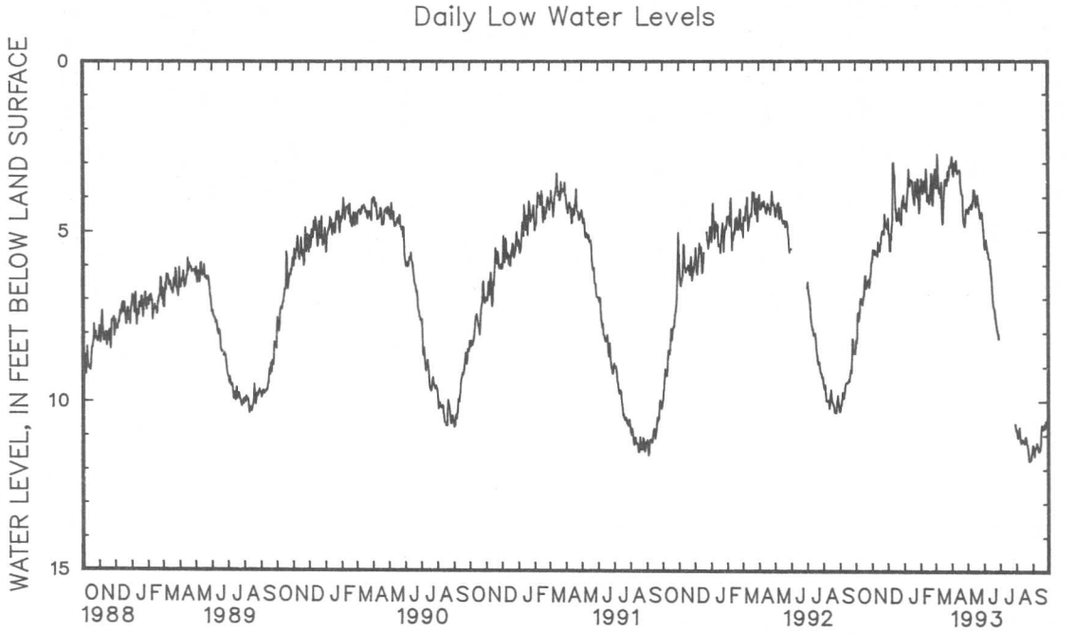
GROUND-WATER LEVELS

MARYLAND--Continued

WORCESTER COUNTY--Continued

WO Bg 47--Continued

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	2.97	2.26	4.35	3.76	5.14	4.43	---	---	10.87	10.10	11.30	10.74
2	2.81	2.03	4.45	3.90	5.39	4.66	---	---	10.85	10.18	11.31	10.76
3	3.11	2.33	4.46	3.78	5.51	4.78	---	---	10.99	10.24	11.39	10.76
4	3.31	2.76	4.30	3.56	5.43	4.56	---	---	11.08	10.40	11.61	10.97
5	3.37	2.46	4.32	3.57	5.26	4.40	---	---	11.04	10.48	11.40	10.82
6	3.07	2.21	4.28	3.50	5.41	4.41	---	---	11.03	10.14	11.37	10.74
7	3.00	2.24	4.28	3.54	5.53	4.76	---	---	10.78	10.11	11.37	10.78
8	3.16	2.25	4.22	3.53	5.63	4.85	---	---	11.04	10.38	11.37	10.68
9	3.21	2.43	4.33	3.50	5.63	5.00	---	---	11.18	10.68	11.24	10.55
10	2.93	2.39	4.25	3.71	5.80	5.11	---	---	11.23	10.68	11.30	10.61
11	3.22	2.32	4.13	3.47	5.82	5.31	---	---	11.19	10.58	11.36	10.74
12	3.31	2.56	4.08	3.62	5.83	5.36	---	---	11.13	10.46	11.46	10.75
13	3.25	2.75	3.79	3.27	5.99	5.47	---	---	11.16	10.44	11.48	10.80
14	3.23	2.62	3.79	3.26	6.19	5.73	---	---	11.17	10.43	11.46	10.75
15	3.22	2.70	3.89	3.35	6.38	5.85	---	---	11.20	10.43	11.42	10.74
16	3.20	2.64	4.18	3.66	6.61	6.06	---	---	11.25	10.49	11.30	10.33
17	3.27	2.75	4.27	3.72	6.85	6.23	---	---	11.22	10.45	10.88	10.01
18	3.61	3.11	4.20	3.53	7.06	6.40	---	---	11.10	10.25	10.71	9.95
19	3.76	3.22	4.00	3.28	7.23	6.56	---	---	11.05	10.26	10.73	9.96
20	3.89	3.32	3.94	3.19	7.28	6.52	---	---	11.13	10.37	10.83	10.04
21	3.92	3.20	4.11	3.31	7.32	6.54	---	---	11.26	10.56	10.77	10.08
22	3.94	3.25	4.23	3.44	7.43	6.64	---	---	11.29	10.58	10.81	10.03
23	4.54	3.47	4.34	3.53	7.57	6.75	---	---	11.38	10.73	10.69	9.98
24	4.74	3.95	4.51	3.71	7.70	7.01	---	---	11.54	10.87	10.79	10.03
25	4.80	3.98	4.61	3.85	7.81	7.12	---	---	11.74	11.04	10.75	10.04
26	4.86	4.15	4.53	3.97	7.92	7.30	---	---	11.76	11.01	10.60	9.99
27	4.73	4.13	4.52	3.92	8.01	7.43	---	---	11.71	10.97	10.61	10.02
28	4.47	3.91	4.44	3.92	8.05	7.44	---	---	11.73	11.02	10.70	10.21
29	4.35	3.78	4.48	3.94	8.18	7.49	---	---	11.69	10.95	10.72	9.96
30	4.35	3.80	4.75	4.04	---	---	10.68	9.93	11.57	10.86	10.35	9.55
31	---	---	4.95	4.25	---	---	10.79	10.07	11.50	10.79	---	---
MONTH	4.86	2.03	4.95	3.19	8.18	4.40	10.79	9.93	11.76	10.10	11.61	9.55
YEAR	11.76	1.67										



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Bg 47. SITE ID.--382325075063301. PERMIT NUMBER.--WO-73-0521.
LOCATION.--Lat 38°23'25", long 75°06'33", Hydrologic Unit 02060010, at intersection of MD Rt. 90 and Isle of Wight Rd., Isle of Wight.
Owner: U.S. Geological Survey.
AQUIFER.--Ocean City aquifer of Miocene age. Aquifer code: 122OCNC.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 268 ft; casing diameter 4 in., to 258 ft; screen diameter 4 in. from 258 to 268 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel. Equipped with digital water-level recorder--60-minute recording interval from July 1985 to current year.
DATUM.--Elevation of land surface is 5 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring Point: Top of recorder shelf, 4.07 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping. Missing data due to recorder malfunction.
PERIOD OF RECORD.--September 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.67 ft below land surface, March 13 and 14, 1992; lowest measured, 12.72 ft below land surface, Aug. 26, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	8.44	7.66	5.88	5.27	4.91	4.31	4.30	3.33	3.79	3.03	3.18	2.74
2	8.22	7.48	5.77	5.06	4.60	3.93	4.30	3.85	3.67	2.99	3.71	2.65
3	8.29	7.72	5.54	4.99	5.06	4.13	4.29	3.77	3.46	2.59	3.72	3.14
4	8.15	7.29	5.55	5.05	5.06	4.41	4.20	3.60	3.74	2.95	3.72	2.13
5	7.44	6.56	5.58	5.02	5.56	4.61	4.31	3.53	3.88	3.10	2.72	2.02
6	7.41	6.89	5.55	5.08	5.57	4.74	4.40	3.62	3.87	2.97	3.07	2.33
7	7.65	7.09	5.67	5.06	5.13	4.57	4.07	3.13	3.55	2.78	3.53	2.87
8	7.57	6.97	5.61	4.94	5.22	4.43	3.86	2.95	3.52	2.87	3.73	3.07
9	7.38	6.59	5.64	4.94	4.84	3.94	3.65	2.63	3.63	2.94	3.87	3.15
10	7.04	6.52	5.69	4.96	4.67	2.75	3.19	2.38	3.82	3.07	3.84	2.84
11	6.99	6.35	5.59	4.87	3.01	1.93	3.52	2.69	3.84	3.17	3.75	2.81
12	7.06	6.42	5.72	4.82	2.98	2.10	3.66	3.05	3.17	2.34	4.00	3.21
13	7.14	6.55	5.31	4.77	3.27	2.52	3.49	2.82	3.49	2.16	3.56	1.67
14	7.17	6.46	5.57	4.96	3.37	2.62	3.49	2.82	4.11	3.17	4.39	1.67
15	7.04	6.33	5.49	4.74	3.93	2.94	3.49	2.86	4.10	3.50	4.79	4.32
16	6.94	6.16	5.57	4.87	4.35	3.57	3.54	2.93	3.94	3.22	4.74	4.06
17	6.91	6.09	5.37	4.79	4.34	3.76	3.54	2.76	4.04	3.37	4.25	3.47
18	6.71	5.85	5.36	4.67	4.68	3.92	3.91	3.06	4.18	3.64	3.90	3.28
19	6.33	5.74	5.11	4.42	4.68	4.02	4.00	3.38	4.10	3.44	3.64	3.03
20	6.31	5.68	5.01	4.34	4.47	3.68	4.14	3.49	3.86	3.07	3.48	2.92
21	6.69	6.05	4.97	4.29	4.64	4.00	4.21	3.27	3.63	2.82	3.60	3.14
22	6.66	5.97	5.06	4.35	4.65	3.86	3.54	2.76	3.30	2.74	3.64	3.15
23	6.53	5.90	5.07	4.30	4.31	3.49	3.73	3.11	3.65	2.81	3.65	3.00
24	6.49	5.85	5.07	4.07	4.53	3.60	3.76	3.08	4.21	3.40	3.45	2.79
25	6.60	5.83	4.49	3.66	4.70	4.03	3.90	3.19	4.23	3.62	3.25	2.70
26	6.44	5.70	4.71	3.89	4.71	4.17	3.98	3.21	3.89	3.12	3.50	2.70
27	6.66	5.92	4.73	4.06	4.79	4.05	3.46	2.85	3.36	2.94	3.36	2.74
28	6.52	5.72	4.84	4.17	4.26	3.69	3.47	2.98	3.33	2.67	3.17	2.62
29	6.34	5.63	4.79	4.13	4.10	3.53	4.09	3.16	---	---	3.09	2.55
30	6.24	5.51	4.91	4.37	4.10	3.65	4.45	3.72	---	---	3.12	2.43
31	5.95	5.20	---	---	3.94	3.41	4.32	3.63	---	---	3.08	2.47
MONTH	8.44	5.20	5.88	3.66	5.57	1.93	4.45	2.38	4.23	2.16	4.79	1.67

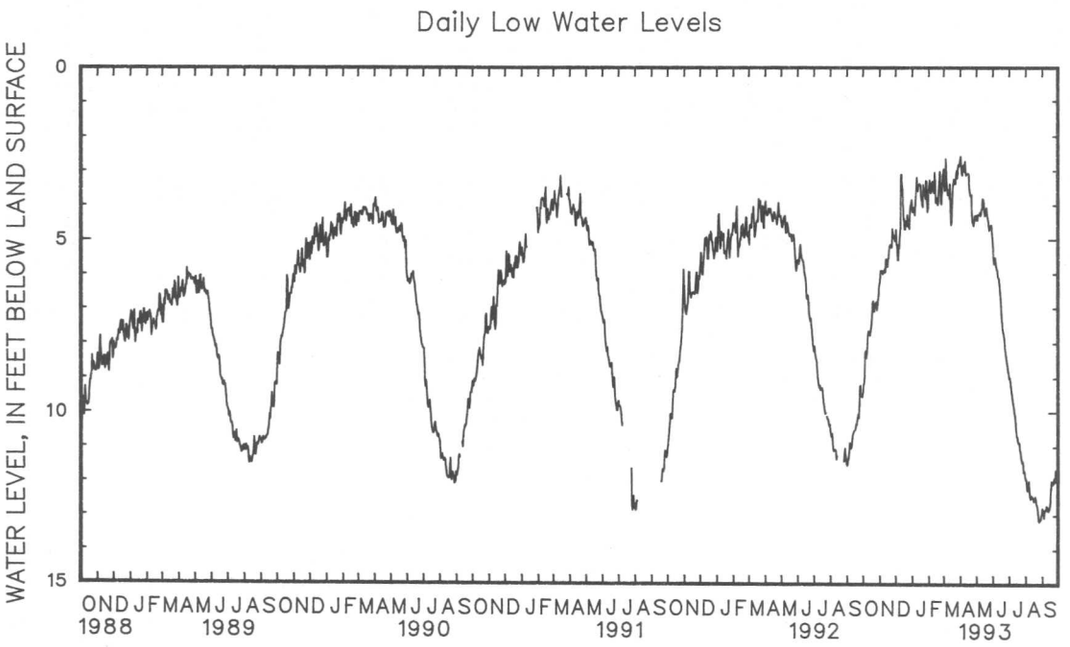
GROUND-WATER LEVELS

MARYLAND--Continued

WORCESTER COUNTY--Continued

WO Bg 48--Continued

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	2.68	2.10	4.42	3.90	5.15	4.55	9.02	8.37	11.96	11.35	12.79	12.31
2	2.58	1.88	4.43	3.95	5.52	4.92	9.00	8.35	11.97	11.43	12.84	12.36
3	2.91	2.01	4.43	3.83	5.71	5.10	9.09	8.49	12.14	11.51	12.88	12.37
4	3.07	2.59	4.28	3.63	5.70	4.95	9.23	8.57	12.27	11.67	13.06	12.55
5	3.12	2.38	---	---	5.54	4.78	9.36	8.69	12.24	11.77	12.89	12.39
6	2.88	2.15	---	---	5.67	4.81	9.47	8.80	12.25	11.46	12.84	12.30
7	2.82	2.18	4.27	3.64	5.79	5.11	9.61	8.96	12.01	11.44	12.84	12.32
8	2.96	2.19	4.21	3.61	5.87	5.21	9.72	9.19	12.30	11.70	12.84	12.25
9	3.02	2.34	4.29	3.60	5.89	5.35	9.79	9.30	12.45	12.02	12.72	12.11
10	2.73	2.28	4.25	3.76	6.08	5.41	9.89	9.43	12.51	12.03	12.74	12.14
11	3.03	2.21	4.12	3.58	6.12	5.70	10.03	9.61	12.49	11.96	12.80	12.27
12	3.12	2.46	4.09	3.69	6.15	5.77	10.10	9.70	12.43	11.85	12.86	12.26
13	3.09	2.65	3.81	3.40	6.31	5.86	10.29	9.83	12.46	11.87	12.85	12.28
14	3.09	2.56	3.83	3.38	6.51	6.09	10.52	10.00	12.49	11.85	12.81	12.21
15	3.09	2.65	3.93	3.47	6.72	6.27	10.69	10.13	12.52	11.87	12.74	12.16
16	3.07	2.57	4.18	3.73	6.94	6.50	10.72	10.12	12.58	11.94	12.63	11.79
17	3.13	2.66	4.30	3.83	7.18	6.68	10.82	10.16	12.56	11.90	12.22	11.47
18	3.45	3.03	4.27	3.70	7.40	6.86	10.89	10.21	12.48	11.76	12.01	11.37
19	3.61	3.16	4.11	3.50	7.61	7.00	10.88	10.20	12.45	11.79	12.01	11.36
20	3.71	3.24	4.07	3.44	7.69	7.04	10.90	10.25	12.53	11.88	12.09	11.43
21	3.71	3.09	4.24	3.57	7.74	7.06	11.08	10.30	12.66	12.04	12.02	11.44
22	3.70	3.19	4.35	3.68	7.87	7.17	11.13	10.52	12.71	12.11	12.05	11.39
23	4.28	3.41	4.44	3.76	8.06	7.33	11.25	10.65	12.79	12.24	11.92	11.31
24	4.48	3.84	4.60	3.88	8.23	7.63	11.37	10.84	12.95	12.40	11.98	11.35
25	4.52	3.84	4.72	4.04	8.35	7.77	11.46	10.95	13.14	12.57	11.92	11.33
26	4.59	3.99	4.67	4.19	8.46	7.94	11.43	10.85	13.17	12.56	11.69	10.97
27	4.50	3.90	4.66	4.15	8.58	8.10	11.53	11.02	13.11	12.50	11.72	11.24
28	4.31	3.76	4.58	4.14	8.66	8.14	11.74	11.08	13.12	12.55	11.84	11.37
29	4.31	3.86	4.58	4.11	8.81	8.22	11.70	11.04	13.10	12.49	11.86	11.23
30	4.29	3.81	4.79	4.20	8.87	8.31	11.75	11.13	13.00	12.21	11.55	10.82
31	---	---	4.95	4.38	---	---	11.88	11.30	12.94	12.34	---	---
MONTH	4.59	1.88	4.95	3.38	8.87	4.55	11.88	8.35	13.17	11.35	13.06	10.82
YEAR	13.17	1.59										



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

GROUND-WATER LEVELS

MARYLAND--Continued

WORCESTER COUNTY--Continued

WELL NUMBER.--WO Bg 48. SITE ID.--382325075063302. PERMIT NUMBER.--WO-73-0522.
LOCATION.--Lat 38°23'25", long 75°06'33", Hydrologic Unit 02060010, at intersection of MD Rt. 90 and Isle of Wight Rd., Isle of Wight.
Owner: U.S. Geological Survey.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 420 ft; casing diameter 4 in., to 410 ft; screen diameter 4 in. from 410 to 420 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel. Equipped with digital water-level recorder--60-minute recording interval from July 1985 to current year.
DATUM.--Elevation of land surface is 5 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder shelf, 3.87 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping. Missing data due to recorder malfunctions.
PERIOD OF RECORD.--September 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.59 ft below land surface, March 13 and 14, 1993; lowest measured, 13.17 ft below land surface, Aug. 26, 1993.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	9.43	8.75	6.26	5.75	5.01	4.51	4.17	3.30	3.57	2.92	2.94	2.56
2	9.19	8.53	6.13	5.52	4.71	4.13	4.19	3.80	3.45	2.89	3.41	2.48
3	9.16	8.66	5.91	5.44	5.14	4.31	4.18	3.73	3.26	2.52	3.56	2.96
4	8.97	8.21	5.91	5.48	5.14	4.57	4.06	3.54	3.52	2.84	3.55	2.11
5	8.27	7.44	5.90	5.44	5.58	4.70	4.19	3.47	3.63	2.98	2.65	2.00
6	8.21	7.74	5.91	5.52	5.59	4.84	4.27	3.61	3.60	2.86	3.02	2.30
7	8.41	7.96	5.99	5.49	5.15	4.67	3.99	3.18	3.34	2.69	3.40	2.83
8	8.32	7.81	5.92	5.36	5.23	4.56	3.77	2.98	3.30	2.74	3.56	3.02
9	8.12	7.39	5.92	5.35	4.87	4.09	3.57	2.68	3.44	2.83	3.69	3.12
10	7.76	7.27	5.95	5.34	4.67	2.89	3.18	2.47	3.60	2.97	3.67	2.77
11	7.65	7.09	5.85	5.24	3.12	2.13	3.44	2.72	3.63	3.04	3.56	2.76
12	7.67	7.14	5.93	5.13	3.09	2.31	3.57	3.04	3.04	2.28	3.80	3.12
13	7.72	7.21	5.56	5.08	3.39	2.74	3.40	2.80	3.27	2.08	3.38	1.59
14	7.77	7.17	5.78	5.26	3.51	2.84	3.40	2.81	3.92	3.03	4.13	1.59
15	7.66	7.05	5.72	5.07	4.01	3.13	3.37	2.84	3.90	3.41	4.57	4.10
16	7.54	6.86	5.77	5.17	4.41	3.71	3.40	2.88	3.78	3.11	4.51	3.90
17	7.45	6.76	5.55	5.06	4.39	3.88	3.40	2.72	3.88	3.26	4.02	3.29
18	7.23	6.49	5.53	4.94	4.69	4.03	3.78	3.02	3.97	3.53	3.66	3.14
19	6.82	6.30	5.30	4.69	4.69	4.12	3.86	3.34	3.92	3.24	3.42	2.90
20	6.79	6.23	5.18	4.63	4.46	3.77	3.99	3.44	3.57	2.89	3.24	2.76
21	7.08	6.55	5.14	4.57	4.59	4.08	4.04	3.20	3.34	2.62	3.32	2.94
22	7.08	6.50	5.21	4.61	4.59	3.92	3.39	2.70	3.01	2.54	3.36	2.96
23	6.93	6.38	5.20	4.55	4.27	3.55	3.53	3.00	3.36	2.62	3.37	2.81
24	6.86	6.32	5.21	4.33	4.44	3.63	3.57	3.00	3.92	3.18	3.17	2.61
25	6.93	6.30	4.67	3.94	4.61	4.04	3.71	3.09	3.96	3.42	2.99	2.51
26	6.82	6.19	4.84	4.12	4.58	4.15	3.80	3.10	3.63	2.93	3.20	2.51
27	7.04	6.44	4.85	4.31	4.68	4.01	3.28	2.76	3.11	2.77	3.09	2.01
28	6.91	6.24	4.96	4.40	4.18	3.66	3.29	2.87	3.07	2.65	2.88	2.40
29	6.75	6.12	4.91	4.36	3.99	3.49	3.89	3.02	---	---	2.81	2.36
30	6.63	6.00	5.02	4.58	3.97	3.58	4.19	3.58	---	---	2.86	2.25
31	6.33	5.70	---	---	3.83	3.38	4.08	3.45	---	---	2.82	2.01
MONTH	9.43	5.70	6.26	3.94	5.59	2.13	4.27	2.47	3.97	2.08	4.57	1.59

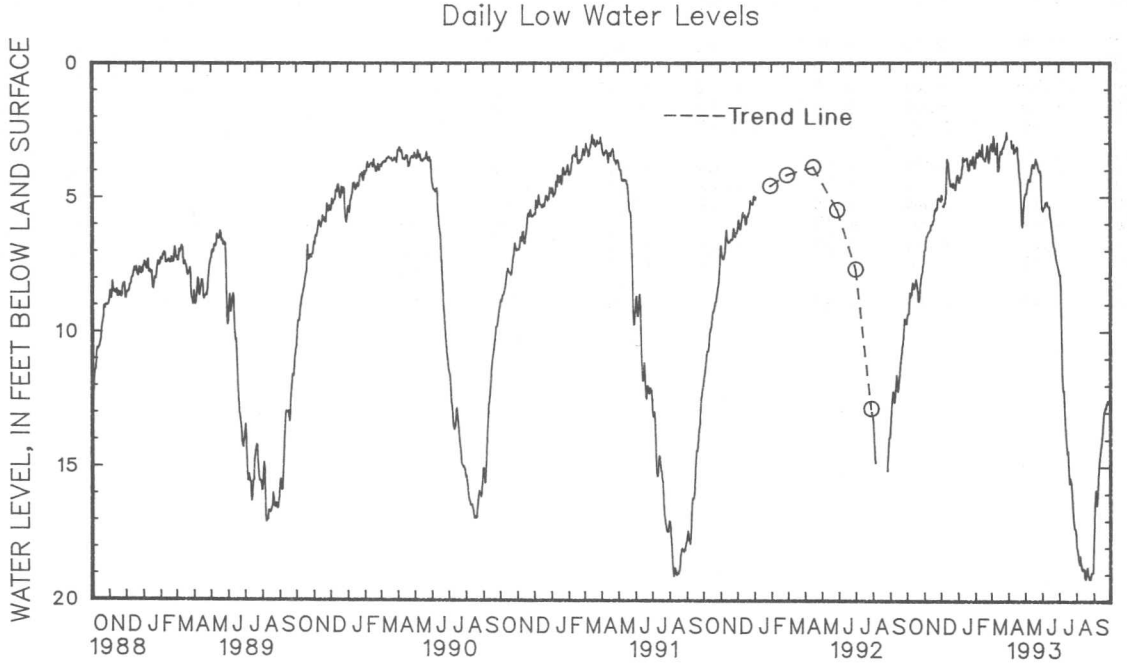
GROUND-WATER LEVELS

MARYLAND--Continued

WORCESTER COUNTY--Continued

WO Bg 49--Continued

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	---	---	4.90	4.80	5.48	5.37	7.93	7.71	18.00	17.55	17.35	16.60
2	---	---	4.89	4.76	5.52	5.33	7.91	7.75	18.05	17.86	16.60	16.05
3	---	---	4.87	4.65	5.42	5.32	8.32	7.78	18.21	18.00	16.05	15.75
4	---	---	4.70	4.49	---	---	9.32	8.32	18.42	18.15	15.87	15.75
5	---	---	4.51	4.35	5.38	5.06	10.49	9.32	18.51	18.42	16.16	15.77
6	2.90	2.81	4.43	4.27	5.24	5.05	11.65	10.49	18.61	18.28	16.41	16.15
7	3.16	2.87	4.34	4.24	5.21	5.09	12.05	11.65	18.32	18.25	16.15	15.73
8	3.14	3.03	4.37	4.21	5.26	5.12	12.22	12.04	18.57	18.31	15.73	15.28
9	3.18	2.99	4.33	4.18	5.20	5.11	12.22	12.04	18.64	18.55	15.28	14.90
10	3.05	2.94	4.41	4.20	5.34	5.13	12.70	12.22	18.79	18.63	14.92	14.66
11	3.37	3.01	4.20	4.09	5.36	5.24	13.20	12.70	18.83	18.59	14.71	14.51
12	3.35	3.27	4.12	3.91	5.36	5.25	13.59	13.20	18.79	18.57	14.51	14.30
13	3.30	3.21	3.91	3.77	5.39	5.27	13.94	13.59	18.79	18.59	14.30	14.12
14	3.23	3.11	3.80	3.70	5.63	5.39	14.27	13.94	18.81	18.64	14.16	13.95
15	3.20	3.09	3.78	3.70	5.80	5.62	14.52	14.27	19.10	18.77	13.95	13.78
16	3.14	2.96	3.86	3.74	5.91	5.70	14.44	14.34	19.15	19.07	13.78	13.42
17	3.18	2.95	3.91	3.78	6.05	5.81	14.92	14.40	19.15	18.88	13.42	13.07
18	3.52	3.18	3.82	3.64	6.21	5.95	15.33	14.92	18.98	18.66	13.16	12.91
19	3.64	3.52	3.72	3.50	6.40	6.14	15.62	15.31	18.78	18.61	12.96	12.84
20	4.03	3.64	3.58	3.46	6.68	6.40	15.45	15.30	18.74	18.61	12.93	12.82
21	4.24	4.03	3.66	3.47	6.83	6.64	15.52	15.34	19.02	18.65	12.82	12.70
22	4.44	4.17	3.73	3.56	6.89	6.68	15.63	15.34	19.05	18.95	12.83	12.62
23	4.90	4.43	3.79	3.65	7.00	6.80	15.94	15.59	19.15	18.95	12.67	12.53
24	5.39	4.90	3.92	3.72	7.15	6.95	16.30	15.94	19.15	18.93	12.68	12.49
25	6.03	5.37	3.99	3.83	7.33	7.09	16.70	16.30	19.17	18.99	12.57	12.46
26	6.12	5.97	4.05	3.94	7.42	7.25	16.98	16.65	19.06	18.84	12.62	12.49
27	5.97	5.48	4.06	3.94	7.51	7.36	17.16	16.98	18.95	18.77	12.65	12.59
28	5.48	5.16	4.04	3.95	7.61	7.44	17.28	17.11	18.94	18.88	12.67	12.58
29	5.16	5.00	4.18	3.92	7.71	7.54	17.29	17.22	18.93	18.83	12.63	12.46
30	5.00	4.87	4.93	4.18	7.77	7.61	17.35	17.19	18.91	18.10	12.48	12.20
31	---	---	5.42	4.93	---	---	17.55	17.30	18.10	17.35	---	---
MONTH	6.12	2.81	5.42	3.46	7.77	5.05	17.55	7.71	19.17	17.35	17.35	12.20
YEAR	19.17	2.42										



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Bg 49. SITE ID.--382038075065901. PERMIT NUMBER.--WO-73-0520.
LOCATION.--Lat 38°20'38", long 75°06'59", Hydrologic Unit 020060010, near Keyser Point Rd., West Ocean City.
Owner: U.S. Geological Survey.
AQUIFER.--Ocean City aquifer of Miocene age. Aquifer code: 122OCNC.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 243 ft; casing diameter 4 in., to 233 ft; screen diameter 4 in. from 233 to 243 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
Equipped with digital water-level recorder--60-minute recording interval, May 1985 to current year.
Periodic measurements with chalked steel tape October 1975 to May 1985.
DATUM.--Elevation of land surface is 10 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring Point: Top of recorder shelf, 4.4 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network. Water levels affected by nearby pumping.
Missing data due to recorder malfunction.
PERIOD OF RECORD.--October 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.42 ft below land surface, March 12, 1993; lowest measured, 24.84 ft below land surface, Aug. 16, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	9.46	9.30	6.99	6.88	5.14	4.93	4.28	4.02	3.73	3.41	3.02	2.94
2	9.37	9.20	6.95	6.67	4.93	4.77	4.44	4.27	3.49	3.33	3.16	2.88
3	9.33	9.24	6.67	6.48	5.07	4.79	4.45	4.29	3.35	3.17	3.26	3.12
4	9.32	8.92	6.53	6.41	---	---	4.31	4.20	3.47	3.27	3.28	2.65
5	8.92	8.46	6.45	6.33	5.33	5.00	4.25	4.05	3.50	3.40	2.73	2.52
6	8.57	8.50	6.44	6.34	5.35	5.19	4.27	4.14	3.49	3.30	2.84	2.59
7	8.71	8.56	6.37	6.29	5.23	5.15	4.16	3.92	3.34	3.17	3.11	2.84
8	8.63	8.58	6.33	6.24	5.24	5.04	3.95	3.72	3.24	3.15	3.21	3.08
9	8.63	8.32	6.29	6.22	5.06	4.84	3.84	3.46	3.31	3.21	3.39	3.18
10	8.33	8.20	6.28	6.18	4.87	4.05	3.51	3.34	3.43	3.26	3.39	3.10
11	8.20	8.06	6.22	6.09	4.05	3.49	3.65	3.40	3.47	3.34	3.34	2.69
12	8.34	8.10	6.20	5.96	3.59	3.36	3.65	3.57	3.34	2.85	2.98	2.42
13	8.40	8.30	6.03	5.92	3.67	3.53	3.61	3.46	3.04	2.69	4.03	2.98
14	8.39	8.21	6.04	5.95	3.73	3.59	3.59	3.51	3.49	3.04	4.02	3.90
15	8.26	8.14	6.00	5.85	4.01	3.70	3.58	3.47	3.57	3.45	3.90	3.54
16	8.17	8.00	6.00	5.87	4.31	4.01	3.55	3.47	3.55	3.33	3.54	3.41
17	8.07	7.92	5.89	5.79	4.35	4.25	3.55	3.41	3.58	3.34	3.41	3.29
18	8.17	8.00	5.85	5.58	4.57	4.34	3.77	3.53	3.65	3.53	3.30	3.24
19	8.34	8.02	5.62	5.46	4.58	4.51	3.97	3.74	3.65	3.46	3.39	3.27
20	8.49	8.34	5.48	5.38	4.51	4.34	4.00	3.87	3.48	3.27	3.38	3.19
21	8.87	8.49	5.51	5.35	4.61	4.49	3.98	3.73	3.34	3.06	3.21	3.06
22	8.88	8.75	5.41	5.35	4.63	4.46	3.73	3.46	3.09	2.98	3.16	3.01
23	8.80	8.55	5.46	5.28	4.48	4.28	3.62	3.53	3.21	3.00	3.17	3.06
24	8.55	8.25	5.40	5.11	4.53	4.27	3.65	3.51	3.56	3.21	3.07	2.92
25	8.25	7.96	5.11	4.90	4.61	4.51	3.78	3.52	3.71	3.56	2.97	2.84
26	8.02	7.81	5.05	4.87	4.66	4.55	3.78	3.57	3.57	3.25	2.92	2.76
27	7.89	7.74	5.03	4.89	4.73	4.55	3.57	3.37	3.25	3.08	2.87	2.76
28	7.82	7.53	5.06	4.99	4.55	4.37	3.49	3.38	3.08	2.96	2.84	2.48
29	7.59	7.38	5.06	4.94	4.37	4.18	3.70	3.43	---	---	2.59	2.44
30	7.47	7.20	5.14	5.01	4.21	4.16	3.91	3.70	---	---	2.82	2.56
31	7.20	6.98	---	---	4.18	4.07	3.91	3.72	---	---	---	---
MONTH	9.46	6.98	6.99	4.87	5.35	3.36	4.45	3.34	3.73	2.69	4.03	2.42

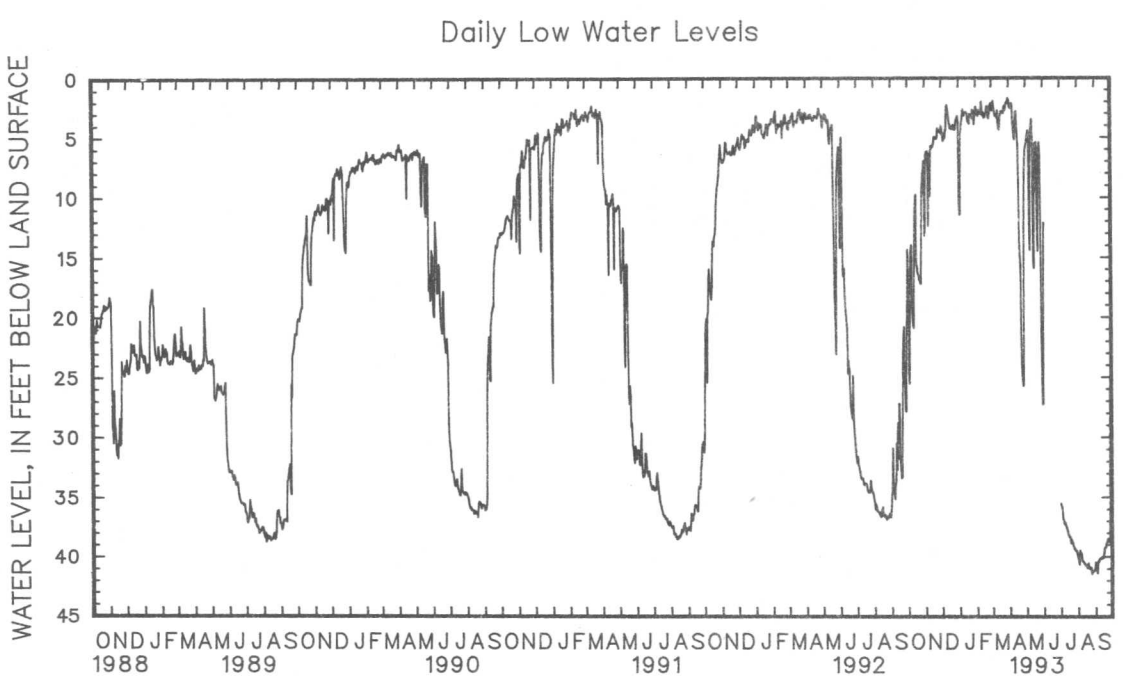
GROUND-WATER LEVELS

MARYLAND--Continued

WORCESTER COUNTY--Continued

WO Bh 31--Continued

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	1.69	.98	5.94	4.96	27.27	14.51	35.56	34.49	40.15	38.93	40.50	39.31
2	1.81	.64	5.62	4.44	14.62	11.38	35.69	34.53	40.29	39.07	40.66	39.60
3	2.35	.89	5.35	3.91	12.16	10.21	35.85	34.77	40.64	38.79	40.70	39.62
4	2.48	1.33	4.90	3.40	---	---	36.30	35.05	39.49	37.98	41.37	40.11
5	2.54	1.07	4.72	3.24	---	---	36.84	35.52	39.80	38.65	40.56	39.60
6	2.28	.69	4.45	2.97	---	---	36.93	35.77	39.69	38.68	40.37	39.54
7	2.12	.79	5.40	3.28	---	---	37.27	35.84	39.81	38.67	40.40	39.27
8	2.30	1.02	12.09	3.50	---	---	37.13	36.16	40.37	39.23	40.20	39.23
9	3.81	1.28	14.45	5.02	---	---	37.16	36.24	40.34	39.36	40.13	39.18
10	4.31	2.83	5.49	3.53	---	---	37.35	36.35	40.46	39.64	40.11	39.20
11	4.92	3.28	4.27	3.41	---	---	37.49	36.60	40.56	39.72	40.16	38.97
12	5.19	3.37	4.03	2.97	---	---	37.68	36.75	40.54	39.69	40.06	38.97
13	3.62	2.59	3.49	2.70	---	---	37.83	36.86	40.72	39.75	40.12	38.83
14	2.92	2.22	4.87	2.52	---	---	38.05	37.08	40.73	39.39	40.08	38.85
15	2.80	2.02	15.41	4.44	---	---	38.20	37.20	40.71	39.21	40.08	38.81
16	4.27	1.97	15.92	7.41	---	---	38.37	37.18	40.75	39.49	39.75	38.13
17	5.13	3.80	8.21	4.94	---	---	38.33	37.25	40.93	39.46	39.26	37.73
18	5.51	4.57	5.47	3.81	---	---	38.43	37.31	40.70	39.29	39.26	37.82
19	8.77	3.60	7.64	3.12	---	---	38.87	37.36	40.57	35.65	39.22	37.90
20	13.92	8.58	9.52	3.17	---	---	38.60	37.15	40.97	39.38	38.94	37.60
21	14.92	13.38	5.40	3.44	---	---	38.87	37.44	40.88	39.48	38.78	37.61
22	15.65	14.49	12.72	5.27	---	---	38.84	37.55	40.99	39.66	38.63	37.46
23	22.32	15.49	14.53	8.17	---	---	39.10	37.76	41.07	39.79	38.49	37.56
24	24.22	22.32	8.58	5.41	---	---	39.17	37.91	40.95	39.97	38.59	37.59
25	25.07	23.43	6.12	4.57	---	---	39.36	37.95	41.41	40.30	38.76	37.73
26	25.79	24.27	5.42	4.13	---	---	39.35	38.02	41.30	39.87	38.70	37.67
27	25.65	12.46	6.50	4.10	---	---	39.48	38.36	41.19	40.02	38.47	26.60
28	12.46	8.08	10.06	5.73	---	---	39.55	38.21	41.19	40.20	26.74	24.20
29	8.12	6.61	21.18	9.48	---	---	39.52	38.23	41.20	40.04	24.73	22.56
30	6.76	5.74	25.03	20.60	---	---	39.66	38.32	41.20	40.13	23.16	21.43
31	---	---	27.32	24.36	---	---	39.96	38.79	40.99	39.57	---	---
MONTH	25.79	.64	27.32	2.52	27.27	10.21	39.96	34.49	41.41	35.65	41.37	21.43
YEAR	41.41	.55										



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Bh 31. SITE ID.--382215075041801. PERMIT NUMBER.--WO-04-9586.
LOCATION.--Lat 38°22'15", long 75°04'18", Hydrologic Unit 020060010, at 44th St, Ocean City.
Owner: Town of Ocean City.
AQUIFER.--Ocean City aquifer of Miocene age. Aquifer code: 122OCNC.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 278 ft; casing diameter 4 in., to 263 ft; screen diameter 3 in. from 263 to 278 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel. Periodic measurements with chalked steel tape September 1970 to May 1985. Equipped with digital water-level recorder--60-minute recording interval, May 1985 to current year.
DATUM.--Elevation of land surface is 5.59 ft above National Geodetic Vertical Datum of 1929.
Measuring Point: Top of recorder shelf, 3.47 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping.
PERIOD OF RECORD.--September 1970 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.55 ft below land surface, March 13, 1993; lowest measured, 51.03 ft below land surface, July 27, 1986.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	14.34	12.42	13.22	6.07	4.55	3.92	3.62	2.33	2.72	1.94	2.11	1.38
2	16.82	12.34	11.75	6.09	4.11	3.34	10.37	2.87	2.42	1.68	2.72	1.33
3	24.89	16.73	6.64	5.84	4.72	3.49	11.49	10.01	2.74	1.37	2.74	1.83
4	25.57	19.79	6.23	5.55	4.64	3.84	11.39	4.22	3.06	1.68	2.50	.87
5	19.79	15.20	6.19	5.27	5.26	4.00	4.67	3.52	3.09	1.78	1.93	.70
6	15.25	13.76	6.14	5.30	5.20	4.17	4.44	3.08	3.20	1.55	2.50	.93
7	14.36	13.28	6.15	5.18	4.97	3.92	3.87	2.37	2.70	1.34	2.77	1.50
8	13.96	12.83	12.42	5.00	4.99	3.69	3.58	2.03	2.79	1.44	2.99	1.74
9	19.08	12.50	6.95	5.51	4.47	3.05	3.22	1.59	2.86	1.54	3.20	1.84
10	20.25	12.84	6.38	5.13	4.30	1.85	2.65	1.27	3.03	1.82	3.22	1.45
11	20.75	19.47	9.90	4.91	2.44	.98	3.03	1.76	3.04	1.42	3.08	1.59
12	20.88	15.23	6.27	4.93	2.28	.92	3.16	2.04	1.96	.80	3.36	2.02
13	15.23	11.57	5.71	4.67	2.50	1.29	2.92	1.83	2.50	.74	2.76	.55
14	11.91	9.95	5.88	4.80	2.67	1.44	2.89	1.82	3.15	1.86	3.86	.59
15	10.55	9.15	5.71	4.49	3.33	1.86	2.90	1.88	3.04	2.20	4.26	3.39
16	9.79	8.48	5.74	4.63	3.84	2.58	2.87	1.97	2.92	2.01	4.36	3.25
17	15.63	8.57	5.56	4.57	3.84	2.86	2.98	1.71	3.34	2.08	3.47	2.57
18	15.71	9.27	5.40	4.34	4.24	3.01	3.50	2.10	3.35	2.32	3.14	2.16
19	16.23	11.70	4.97	3.99	4.09	3.17	3.69	2.46	3.18	2.13	2.83	1.90
20	16.43	10.53	4.96	3.87	4.28	2.78	3.75	2.58	3.00	1.77	2.79	1.77
21	16.53	9.55	5.06	3.81	4.31	3.14	3.85	2.44	2.73	1.54	2.88	2.02
22	16.88	15.66	5.06	3.81	4.33	2.94	3.04	1.75	2.38	1.37	2.91	2.04
23	16.86	10.91	5.10	3.73	3.96	2.56	3.18	2.14	2.77	1.61	2.95	1.89
24	17.18	15.57	4.97	3.44	4.06	2.49	3.20	2.08	3.35	2.44	2.71	1.55
25	17.22	11.42	4.24	2.88	4.33	3.16	3.33	2.42	3.40	2.31	2.37	1.46
26	13.88	8.81	4.51	3.16	4.35	3.28	3.39	2.15	3.03	1.62	2.69	1.63
27	9.60	7.89	4.42	3.30	4.36	3.17	2.70	1.74	2.28	1.37	2.52	1.36
28	8.62	7.19	4.49	3.44	3.75	2.78	2.73	1.90	2.25	1.34	2.23	1.27
29	7.98	6.73	4.40	3.41	3.48	2.58	3.34	2.16	---	---	2.08	1.19
30	7.54	6.35	4.57	3.73	3.47	2.73	3.89	2.78	---	---	2.09	1.14
31	6.96	5.81	---	---	3.22	2.43	3.29	2.67	---	---	2.09	1.15
MONTH	25.57	5.81	13.22	2.88	5.26	.92	11.49	1.27	3.40	.74	4.36	.55

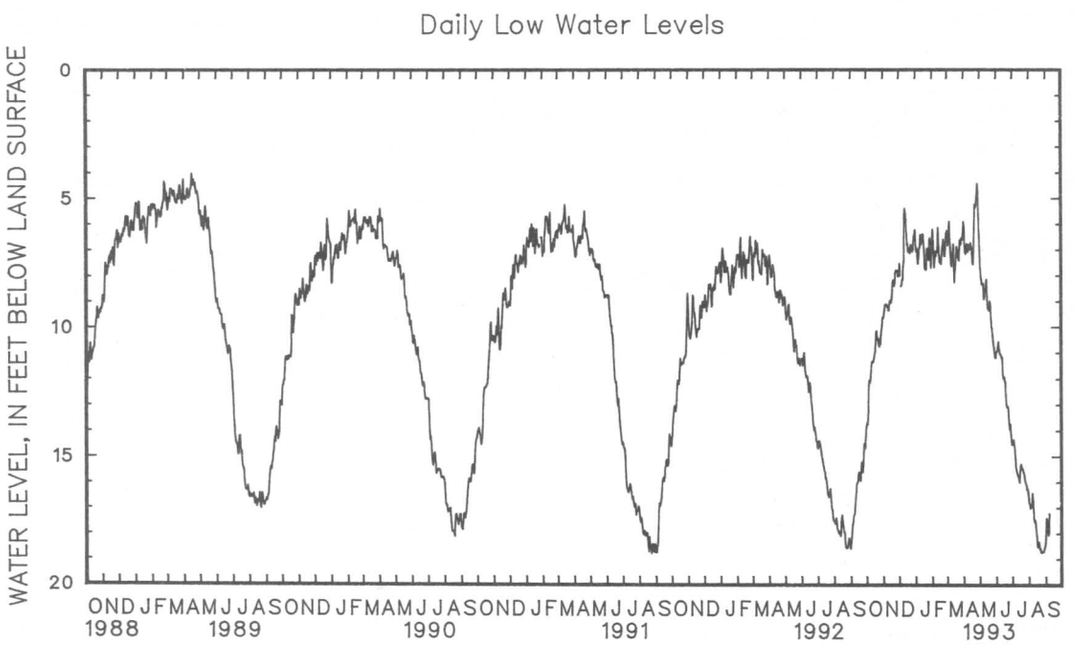
GROUND-WATER LEVELS

MARYLAND--Continued

WORCESTER COUNTY--Continued

WO Bh 34--Continued

DAY	APRIL MAX	APRIL MIN	MAY MAX	MAY MIN	JUNE MAX	JUNE MIN	JULY MAX	JULY MIN	AUGUST MAX	AUGUST MIN	SEPTEMBER MAX	SEPTEMBER MIN
1	5.90	5.17	6.96	5.57	10.97	9.72	14.49	13.32	16.81	15.75	18.13	16.65
2	6.08	4.97	7.71	6.29	10.96	9.73	14.41	13.17	16.84	15.91	17.41	16.53
3	6.80	5.24	7.99	6.88	10.91	9.62	14.36	13.16	17.01	15.98	17.43	16.50
4	7.10	5.90	8.17	6.89	10.75	9.45	14.50	13.48	17.00	16.10	17.81	16.82
5	7.15	5.81	8.34	7.03	10.59	9.29	14.72	13.68	16.98	16.17	17.98	17.18
6	7.01	5.55	8.36	7.07	10.83	9.66	15.07	13.92	16.92	15.58	18.05	17.23
7	6.75	5.36	8.37	7.14	10.98	9.99	15.41	14.34	16.43	15.59	18.00	16.95
8	6.90	5.69	8.32	7.28	11.06	10.00	15.50	14.66	16.73	15.91	17.23	16.19
9	7.07	5.78	8.92	7.40	11.06	10.19	15.59	14.80	17.08	16.27	---	---
10	6.79	5.68	8.82	7.70	11.13	10.25	15.68	15.00	17.43	16.70	---	---
11	6.94	5.68	8.63	7.69	11.21	10.51	15.74	15.06	17.54	16.80	---	---
12	6.98	6.01	8.58	7.87	11.19	10.60	15.81	15.10	17.49	16.68	---	---
13	6.91	6.16	8.32	7.63	11.80	10.81	15.92	15.15	17.62	16.75	---	---
14	6.72	6.05	8.17	7.27	11.99	11.26	16.02	15.02	17.90	16.91	---	---
15	6.86	6.02	8.82	7.72	11.93	11.09	15.60	14.55	18.09	17.02	---	---
16	6.89	6.22	9.27	8.43	11.96	11.10	15.36	14.26	18.44	17.29	---	---
17	7.21	6.31	9.29	8.44	12.10	11.14	15.30	14.18	18.51	17.27	---	---
18	7.50	6.69	9.35	8.25	12.14	11.23	15.43	14.22	18.39	17.01	---	---
19	7.55	6.46	9.21	8.22	12.64	11.68	15.51	14.31	18.32	17.10	---	---
20	7.06	5.56	9.01	7.66	13.01	11.90	15.49	14.27	18.46	17.31	---	---
21	6.22	4.61	9.20	8.22	13.11	12.07	15.61	14.50	18.60	17.35	---	---
22	5.23	4.16	9.68	8.66	13.07	11.91	15.67	14.66	18.59	17.43	---	---
23	5.34	4.26	10.02	9.03	13.13	12.01	15.78	14.73	18.70	17.65	---	---
24	5.30	4.12	10.05	9.01	13.40	12.22	15.94	14.91	18.73	17.74	---	---
25	5.05	4.00	10.36	9.07	13.75	12.58	16.04	15.09	18.71	17.77	---	---
26	4.84	3.84	10.55	9.42	13.95	12.98	16.08	15.08	18.71	17.75	---	---
27	4.41	3.52	10.75	9.67	13.76	12.81	16.17	15.26	18.72	17.77	---	---
28	4.75	3.51	10.82	9.88	14.11	12.94	16.30	15.20	18.69	17.62	---	---
29	5.67	4.15	11.07	10.10	14.39	13.38	16.27	15.17	18.60	17.61	---	---
30	6.34	5.07	11.18	10.27	14.54	13.44	16.37	15.33	18.53	17.50	14.56	13.29
31	---	---	11.20	10.05	---	---	16.59	15.58	18.41	17.41	---	---
MONTH	7.55	3.51	11.20	5.57	14.54	9.29	16.59	13.16	18.73	15.58	18.13	13.29
YEAR	18.73	3.51										



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Bh 34. SITE ID.382443075033501. PERMIT NUMBER.--WO-04-9588.
LOCATION.--Lat 38°24'43", long 75°03'35", Hydrologic Unit 02060010, north side of 100th St., 0.2 mi west of MD Rt. 528, Ocean City.
Owner: Town of Ocean City.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 353 ft; casing diameter 4 in., to 316.2 ft, casing diameter 2.5 in. from 316.2 to 337 ft; screen diameter 2.5 in.(?) from 337 to 353 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel. Equipped with digital water-level recorder--60-minute recording interval April 1985 to current year. Prior to April 1985, periodic measurements with chalked steel tape.
DATUM.--Elevation of land surface is 4 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of recorder shelf, 2.86 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping. Missing data due to recorder malfunction.
PERIOD OF RECORD.--December 1972 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.54 ft above land surface, March 27, 1973; lowest measured, 18.73 ft below land surface, Aug. 24, 1993.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

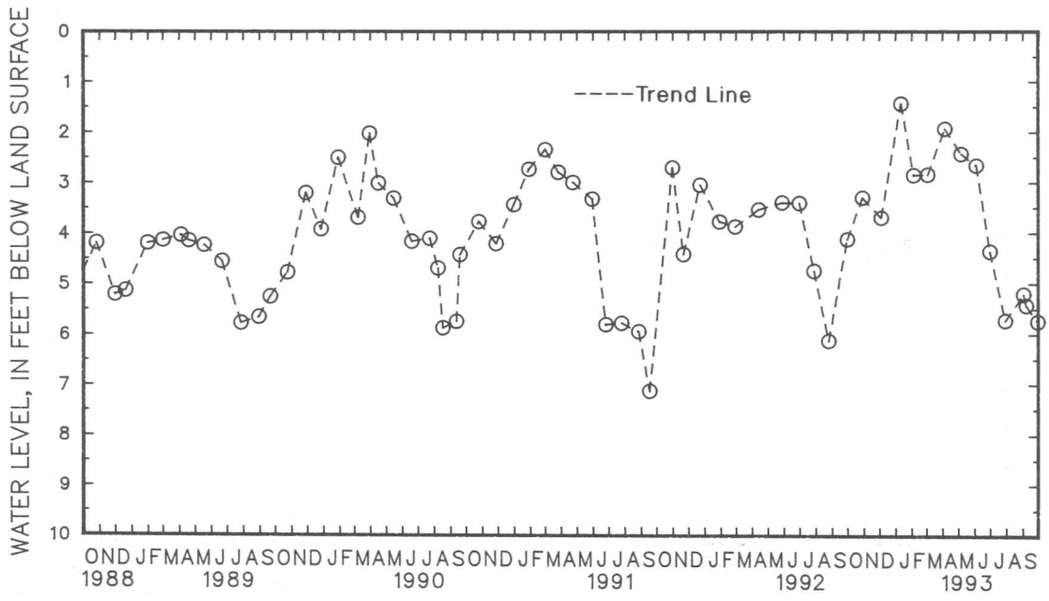
DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	13.75	12.67	9.64	8.92	7.99	7.16	6.81	5.55	6.60	5.97	6.24	5.54
2	13.68	12.82	9.55	8.73	7.51	6.82	7.03	6.24	6.20	5.66	6.80	5.53
3	13.75	12.93	9.37	8.67	7.98	7.30	6.92	6.35	6.62	5.59	6.65	5.99
4	13.32	12.23	9.14	8.50	---	---	7.03	6.14	7.18	5.78	6.44	4.79
5	12.23	11.13	9.11	8.38	8.39	7.29	7.52	6.17	7.68	6.06	5.89	4.61
6	12.05	11.33	9.12	8.42	8.34	7.44	7.52	6.34	7.33	5.99	6.57	4.91
7	12.13	11.35	9.09	8.24	8.16	7.18	7.22	5.83	7.06	5.80	6.86	5.62
8	12.03	11.12	9.16	8.20	8.16	7.00	6.93	5.55	7.22	5.78	7.16	5.98
9	11.76	10.72	9.21	8.17	7.66	6.37	6.89	5.28	7.04	5.78	7.57	6.26
10	11.45	10.58	9.17	8.15	7.44	5.23	6.41	5.08	7.07	5.94	7.62	5.76
11	11.33	10.35	9.33	8.09	5.65	4.12	6.77	5.55	7.03	5.60	7.09	5.87
12	11.32	10.32	9.33	8.13	5.39	4.11	6.76	5.46	6.11	5.14	7.27	6.12
13	11.34	10.39	9.07	8.05	5.57	4.40	6.40	5.37	6.79	4.98	6.77	4.84
14	11.28	10.27	8.97	8.10	5.82	4.55	6.55	5.45	7.21	6.14	7.70	4.84
15	11.15	10.16	9.04	7.89	6.34	5.04	6.38	5.49	7.46	6.50	8.28	7.44
16	11.01	9.96	9.02	8.06	6.79	5.67	6.68	5.63	7.38	6.51	7.84	7.23
17	10.98	9.84	8.91	8.00	6.75	5.84	7.01	5.70	7.51	6.53	7.56	6.59
18	10.69	9.61	8.70	7.46	7.04	6.00	7.69	6.28	7.54	6.51	7.21	6.23
19	10.20	9.34	8.26	7.20	6.91	6.08	7.75	6.65	7.21	6.21	6.86	6.00
20	10.15	9.21	8.17	7.11	7.04	5.69	7.77	6.63	6.93	5.90	6.98	5.89
21	10.48	9.60	8.31	7.17	7.10	6.04	7.75	6.37	6.82	5.78	7.15	6.32
22	10.42	9.46	8.39	7.17	7.11	5.88	6.93	5.64	6.59	5.65	7.31	6.53
23	10.61	9.50	8.29	6.94	6.79	5.47	6.93	5.96	6.80	5.89	7.39	6.17
24	10.70	9.55	7.86	6.51	6.84	5.46	7.05	6.10	7.22	6.18	6.98	5.86
25	10.76	9.50	7.79	6.29	6.94	6.02	7.38	6.50	7.23	6.26	6.62	5.49
26	10.47	9.22	7.78	6.65	7.05	6.06	7.39	6.22	6.91	5.83	6.78	5.67
27	10.65	9.38	7.80	6.76	6.98	6.06	6.62	5.65	6.35	5.54	6.74	5.62
28	10.32	9.11	7.79	6.90	6.65	5.79	6.53	5.80	6.32	5.44	6.54	5.62
29	10.10	9.03	8.00	6.95	6.43	5.66	6.99	6.00	---	---	6.55	5.73
30	9.93	8.91	8.02	7.28	6.42	5.82	7.69	6.53	---	---	6.59	5.70
31	9.63	8.74	---	---	6.22	5.56	7.10	6.39	---	---	6.27	5.68
MONTH	13.75	8.74	9.64	6.29	8.39	4.11	7.77	5.08	7.68	4.98	8.28	4.61

WELL NUMBER.--WO Bh 85. SITE ID.--382215075041902. PERMIT NUMBER.--WO-73-0094.
LOCATION.--Lat 38°22'15", long 75°04'19", Hydrologic Unit 02060010, west end of 44th St., Ocean City.
Owner: U.S. Geological Survey.
AQUIFER.--Pocomoke aquifer of Miocene age. Aquifer code: 122PCMK.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 195 ft; casing diameter 4 in., to 190 ft; screen diameter 4 in. from 190 to 195 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 5 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 4 in. coupling, 1.78 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels maybe affected by seasonal pumping.
PERIOD OF RECORD.--April 1973 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.43 ft below land surface, Jan. 11, 1993; lowest measured, 7.48 ft below land surface, Sept. 15, 1986.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	3.29	FEB 4	2.85	MAY 6	2.43	JUL 29	5.73	SEP 29	5.75
DEC 4	3.69	MAR 3	2.84	JUN 4	2.66	SEP 2	5.21		
JAN 11	1.43	APR 5	1.93	30	4.37	7	5.43		

WATER YEAR 1993 HIGHEST 1.43 JAN 11, 1993 LOWEST 5.75 SEP 29, 1993



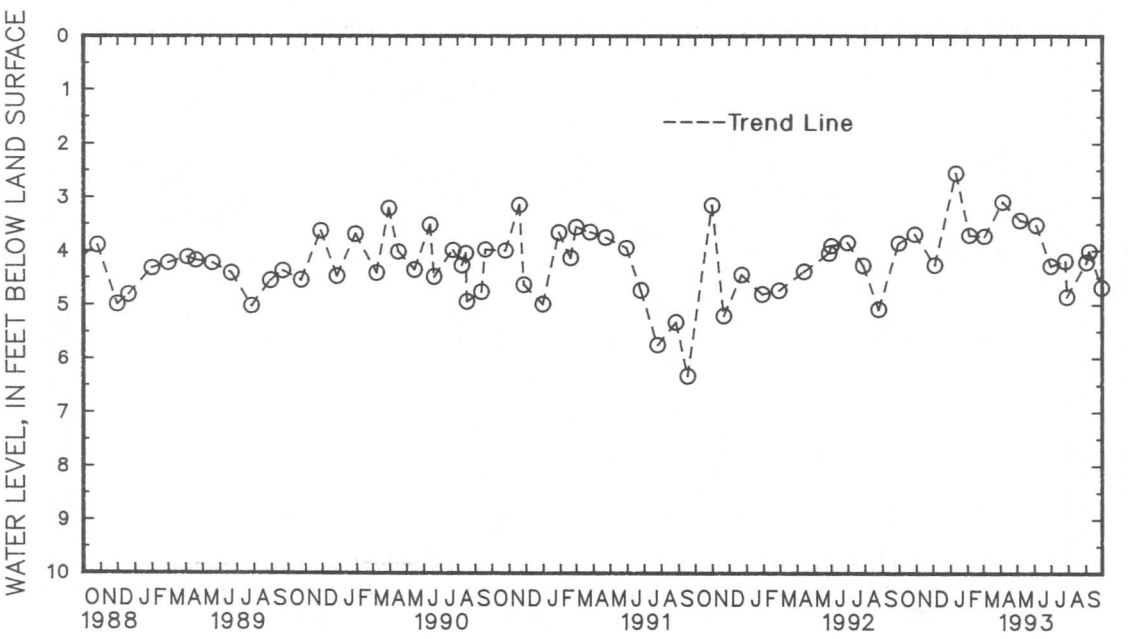
5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Bh 84. SITE ID.--382215075041901. PERMIT NUMBER.--WO-73-0095.
LOCATION.--Lat 38°22'15", long 75°04'19", Hydrologic Unit 02060010, west end of 44th St., Ocean City.
Owner: U.S. Geological Survey.
AQUIFER.--Columbia aquifer of Pleistocene age. Aquifer code: 122CLMB.
WELL CHARACTERISTICS.--Drilled, observation, water-table well, depth 89 ft; casing diameter 4 in., to 84 ft; screen diameter 4 in. from 84 to 89 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 5 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 4 in. coupling, 2.55 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well.
PERIOD OF RECORD.--April 1973 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.55 ft below land surface, Sept. 11, 1993; lowest measured, 6.34 ft below land surface, Sept. 17, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	3.69	FEB 4	3.71	MAY 6	3.43	JUL 27	4.20	SEP 7	4.02
DEC 4	4.27	MAR 3	3.73	JUN 4	3.52	29	4.86	29	4.69
JAN 11	2.55	APR 5	3.09	30	4.29	SEP 2	4.22		

WATER YEAR 1993 HIGHEST 2.55 JAN 11, 1993 LOWEST 4.86 JUL 29, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

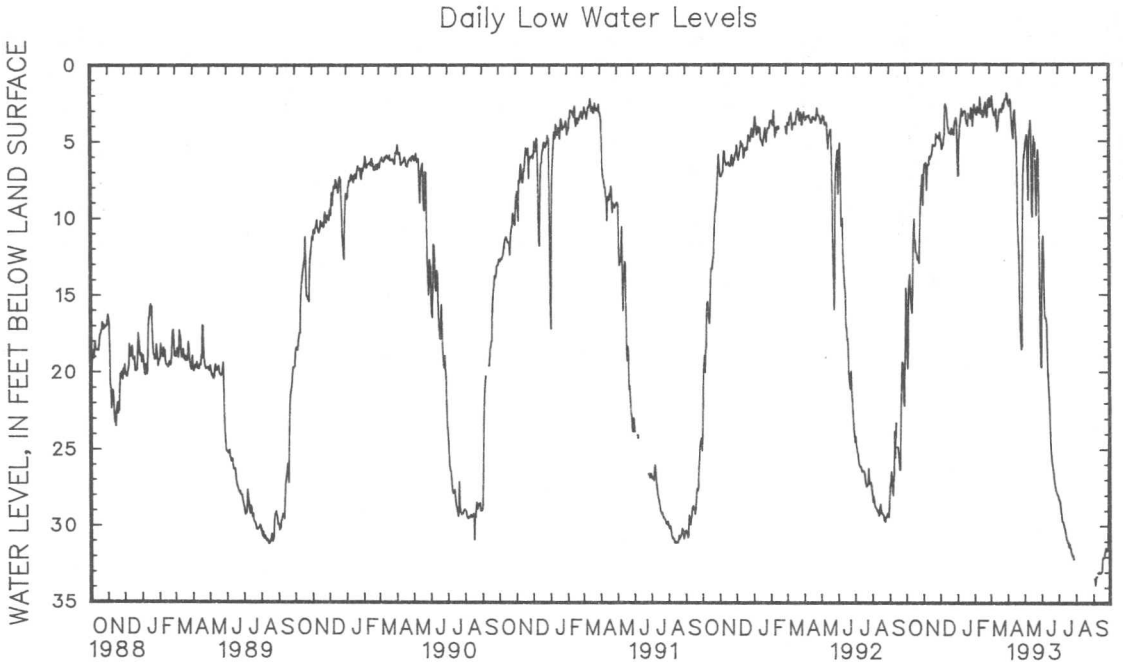
GROUND-WATER LEVELS

MARYLAND--Continued

WORCESTER COUNTY--Continued

WO Bh 89--Continued

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	1.89	1.22	6.07	5.14	19.71	13.69	28.25	27.16	---	---	---	---
2	1.99	.89	5.80	4.65	13.88	10.93	28.29	27.17	---	---	---	---
3	2.51	1.14	5.48	4.14	11.64	9.84	28.44	27.40	---	---	33.42	32.52
4	2.62	1.62	5.03	3.66	11.16	9.73	28.78	27.86	---	---	33.83	32.90
5	2.71	1.33	4.85	3.50	12.79	10.96	29.18	28.21	---	---	33.44	32.53
6	2.45	.97	4.59	3.23	15.32	12.79	29.41	28.47	---	---	33.29	32.45
7	2.29	1.05	5.10	3.49	16.51	14.57	29.69	28.52	---	---	33.28	32.37
8	2.48	1.28	6.68	3.69	16.49	15.42	29.70	28.86	---	---	---	---
9	3.49	1.45	8.84	5.15	16.60	15.57	29.77	28.96	---	---	33.01	32.14
10	3.95	2.51	5.57	3.77	16.90	15.88	29.92	29.10	---	---	33.06	32.12
11	4.52	2.99	4.40	3.65	18.52	16.29	30.09	29.35	---	---	32.96	32.07
12	4.80	3.57	4.18	3.21	20.15	18.45	30.22	29.52	---	---	33.04	32.01
13	3.73	2.86	3.67	2.96	20.97	19.85	30.41	29.70	---	---	33.06	32.03
14	3.10	2.45	4.51	2.79	21.60	20.57	30.67	29.92	---	---	33.03	31.88
15	2.98	2.27	9.39	4.14	22.61	19.75	30.91	30.01	---	---	32.99	31.82
16	3.92	2.22	9.93	6.95	23.95	22.47	30.93	30.00	---	---	32.90	31.19
17	4.72	3.50	8.14	5.11	24.67	23.63	31.08	29.97	---	---	32.16	30.75
18	5.11	4.28	5.59	4.04	25.27	24.39	31.08	30.02	---	---	32.03	30.76
19	7.09	3.75	4.63	3.22	25.72	24.75	31.34	30.13	---	---	32.04	30.81
20	10.47	7.04	5.51	3.44	26.02	24.94	31.17	30.01	---	---	31.95	30.73
21	11.57	10.47	5.11	3.71	26.33	25.27	31.40	30.28	---	---	31.71	30.69
22	12.31	11.27	8.06	4.93	26.55	25.50	31.45	30.34	---	---	31.57	30.53
23	15.02	12.07	9.88	7.77	26.95	25.74	31.67	30.53	---	---	31.43	30.52
24	17.02	15.02	8.15	5.58	27.24	26.08	31.81	30.78	---	---	31.52	30.55
25	17.96	16.23	6.23	4.81	27.46	26.38	31.94	30.93	---	---	31.59	30.66
26	18.54	17.11	5.58	4.40	27.68	26.74	31.91	30.92	---	---	31.55	30.67
27	18.37	12.45	6.16	4.36	27.77	26.89	32.09	31.17	---	---	31.41	25.63
28	12.45	8.24	8.51	5.44	27.92	26.94	32.14	31.13	---	---	25.72	23.28
29	8.24	6.82	13.99	8.01	27.96	26.97	---	---	---	---	23.74	21.66
30	6.85	5.90	17.50	13.88	28.04	27.05	---	---	---	---	22.18	20.51
31	---	---	19.68	17.21	---	---	---	---	---	---	---	---
MONTH	18.54	.89	19.68	2.79	28.04	9.73	32.14	27.16	---	---	33.83	20.51
YEAR	33.83	.79										



5 YEAR HYDROGRAPH

OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

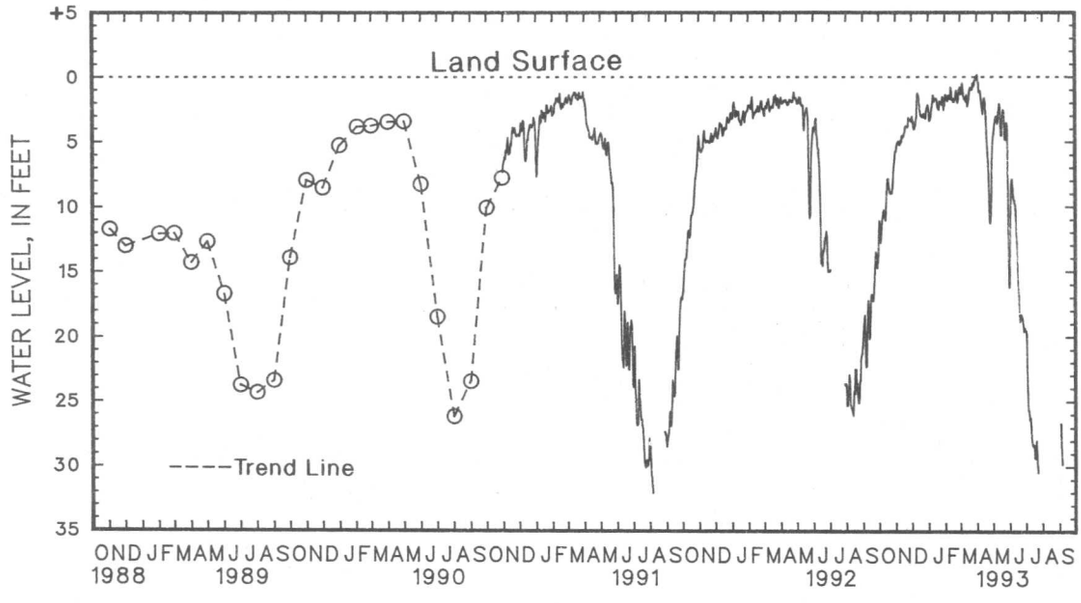
WELL NUMBER.--WO Bh 89. SITE ID.--382215075041903 PERMIT NUMBER.--WO-81-1497.
LOCATION.--Lat 38°22'15", long 75°04'19", Hydrologic Unit 020060010, at 44th St, Ocean City.
Owner: Town of Ocean City.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 500 ft; casing diameter 4 in., to 388 ft; screen diameter 4 in. from 388 to 500 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel. Equipped with digital water-level recorder--60-minute recording interval, October 1986 to current year.
DATUM.--Elevation of land surface is 5.59 ft above National Geodetic Vertical Datum of 1929.
Measuring Point: Top of recorder shelf, 2.90 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping. Missing data due to recorder malfunction.
PERIOD OF RECORD.--October 1986 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 0.79 ft below land surface, March 13, 1993; lowest recorded, 39.83 ft below land surface, Aug. 6, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	14.58	12.81	9.16	6.32	4.82	4.13	3.84	2.65	2.88	2.16	2.19	1.43
2	15.36	12.70	7.84	6.37	4.39	3.69	6.12	3.16	2.61	1.90	2.75	1.93
3	18.99	15.30	6.98	6.01	4.97	3.83	7.28	5.86	2.85	1.57	---	---
4	19.77	18.25	6.51	5.87	4.90	4.17	7.25	4.44	3.16	1.88	2.70	1.06
5	18.25	14.92	6.48	5.62	5.49	4.34	4.88	3.76	3.18	1.99	2.04	.90
6	14.96	13.54	6.41	5.65	5.47	4.49	4.63	3.34	3.28	1.76	2.56	1.12
7	14.07	13.07	6.42	5.55	5.20	4.25	4.04	2.65	2.79	1.55	2.87	1.70
8	13.67	12.62	8.20	5.26	5.23	4.05	3.75	2.31	2.88	1.66	3.08	1.96
9	14.55	12.29	7.16	5.85	4.74	3.41	3.40	1.88	2.95	1.74	3.30	2.06
10	15.30	12.56	6.64	5.49	4.55	2.27	2.84	1.58	3.12	1.99	3.32	1.68
11	15.87	14.83	6.52	5.26	2.76	1.38	3.20	2.04	3.13	1.63	3.19	1.76
12	16.16	14.92	6.51	5.28	2.59	1.28	3.34	2.29	2.08	.97	3.48	2.21
13	14.92	11.82	5.96	5.03	2.77	1.64	3.09	2.08	2.58	.92	2.91	.79
14	12.11	10.29	6.15	5.15	2.93	1.79	3.06	2.08	3.21	2.01	3.98	.83
15	10.81	9.53	5.97	4.85	3.55	2.20	3.06	2.12	3.12	2.35	4.37	3.59
16	10.05	8.86	5.99	4.97	4.05	2.89	3.03	2.21	3.03	2.18	4.11	3.46
17	11.53	8.91	5.83	4.92	4.07	3.17	3.14	1.96	3.41	2.23	3.71	2.80
18	11.47	9.59	5.68	4.69	4.45	3.32	3.65	2.34	3.42	2.48	3.32	2.41
19	12.17	11.14	5.24	4.37	4.36	3.48	3.83	2.69	3.26	2.03	3.01	2.14
20	12.22	10.93	5.22	4.24	4.48	3.09	3.87	2.83	2.81	1.93	2.91	2.01
21	12.35	9.84	5.29	4.18	4.50	3.46	3.99	2.69	2.69	1.62	3.03	2.26
22	12.67	11.58	5.30	4.16	4.54	3.25	3.19	2.02	2.48	1.52	3.08	2.29
23	12.68	10.96	5.32	4.10	4.17	2.89	3.33	2.39	3.23	1.76	3.11	2.14
24	12.77	11.49	5.22	3.83	4.29	2.81	3.35	2.32	3.44	2.57	2.88	1.81
25	12.92	11.56	4.51	3.28	4.51	3.46	3.47	2.67	3.35	2.45	2.56	1.71
26	11.56	9.09	4.77	3.55	4.56	3.60	3.54	2.38	2.85	1.78	2.86	1.82
27	9.80	8.22	4.69	2.99	4.58	3.49	2.86	1.98	2.31	1.45	2.71	1.62
28	8.86	7.53	4.74	3.80	3.97	3.09	2.89	2.13	2.30	1.49	2.41	1.03
29	8.24	7.07	4.66	3.76	3.71	2.90	3.48	2.37	---	---	2.27	1.49
30	7.80	6.70	4.82	4.06	3.70	3.03	3.99	2.95	---	---	2.28	1.38
31	7.21	6.15	---	---	3.47	2.73	3.49	2.87	---	---	2.28	1.40
MONTH	19.77	6.15	9.16	2.99	5.49	1.28	7.28	1.58	3.44	.92	4.37	.79

DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	APRIL		MAY		JUNE		JULY		AUGUST		SEPTEMBER	
1	-.13	-.60	4.75	4.00	16.21	12.27	19.58	18.77	---	---	---	---
2	-.18	-.89	4.40	3.55	12.27	9.10	19.81	18.81	---	---	---	---
3	.28	-.69	4.06	3.06	9.35	7.73	22.30	19.76	---	---	26.70	26.01
4	.41	-.24	3.60	2.58	8.14	6.96	24.20	22.30	---	---	28.49	26.36
5	1.14	-.23	3.32	2.39	7.85	6.96	25.66	24.20	---	---	29.33	28.49
6	1.06	.04	3.07	2.10	8.53	7.37	25.72	24.74	---	---	29.79	27.60
7	1.03	.23	3.08	2.23	9.18	8.22	26.11	24.94	---	---	---	---
8	1.22	.42	3.05	2.28	9.43	8.60	26.40	25.54	---	---	---	---
9	1.64	.51	3.61	2.32	9.51	8.82	26.25	25.22	---	---	---	---
10	2.01	1.00	3.45	2.38	9.74	9.01	26.84	25.79	---	---	---	---
11	2.57	1.41	2.74	2.26	9.89	9.32	27.53	26.66	---	---	---	---
12	2.85	2.03	2.55	1.86	10.63	9.69	28.11	27.32	---	---	---	---
13	2.32	1.67	2.06	1.64	12.04	10.46	28.31	27.41	---	---	---	---
14	1.74	1.36	2.30	1.42	12.70	12.04	28.43	27.66	---	---	---	---
15	1.61	1.15	3.73	2.09	14.40	12.09	28.32	25.94	---	---	---	---
16	1.91	1.08	4.50	3.61	15.67	14.40	28.33	26.75	---	---	---	---
17	2.56	1.67	4.50	3.16	16.35	15.55	29.30	28.33	---	---	---	---
18	3.01	2.36	3.46	2.39	16.87	16.24	29.32	28.17	---	---	---	---
19	3.95	2.46	2.74	1.85	18.47	16.72	29.37	26.50	---	---	---	---
20	4.99	3.90	2.55	1.76	18.86	18.19	28.00	26.11	---	---	---	---
21	5.80	4.99	2.70	2.00	18.64	17.67	28.99	27.93	---	---	---	---
22	6.42	5.60	3.59	2.54	18.30	17.59	29.97	28.84	---	---	---	---
23	7.53	6.28	4.76	3.44	18.46	17.75	30.43	29.55	---	---	---	---
24	9.49	7.46	4.84	3.62	18.63	17.92	---	---	---	---	---	---
25	11.12	9.49	4.02	3.08	18.80	18.05	---	---	---	---	---	---
26	11.29	10.35	3.54	2.76	19.15	18.31	---	---	---	---	---	---
27	10.71	9.26	3.62	2.71	19.60	18.85	---	---	---	---	---	---
28	9.26	6.71	4.38	3.17	19.37	18.70	---	---	---	---	---	---
29	6.71	5.47	8.96	4.05	19.42	18.67	---	---	---	---	---	---
30	5.47	4.70	14.20	8.96	---	---	---	---	---	---	20.61	19.28
31	---	---	16.25	14.20	---	---	---	---	---	---	---	---
MONTH	11.29	-.89	16.25	1.42	19.60	6.96	30.43	18.77	---	---	29.79	19.28
YEAR	30.43	-.89										

Daily Low Water Levels



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Bh 98. SITE ID.--382127075043802. PERMIT NUMBER.--WO-81-1822.
LOCATION.--Lat 38°21'27", long 75°04'38", Hydrologic Unit 02060010, at 28th Street Park, Ocean City.
Owner: Town of Ocean City.
AQUIFER.--Ocean City aquifer of Miocene age. Aquifer code: 122OCNC.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 275 ft; casing diameter 4 in., to 255 ft; screen diameter 4 in. from 255 to 275 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel, from January 1988 to October 1990. Equipped with digital water-level recorder--60-minute recorder interval from November 1990 to current year.
DATUM.--Elevation of land surface is 5 ft above National Geodetic Vertical Datum of 1929.
Measuring Point: Top of casing, 2.52 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping.
Missing data due to recorder malfunction.
PERIOD OF RECORD.--January 1988 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.89 ft above land surface, April 2, 1993; lowest measured, 35.70 ft below land surface, Aug. 1, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
(READINGS ABOVE LAND SURFACE INDICATED BY "-")

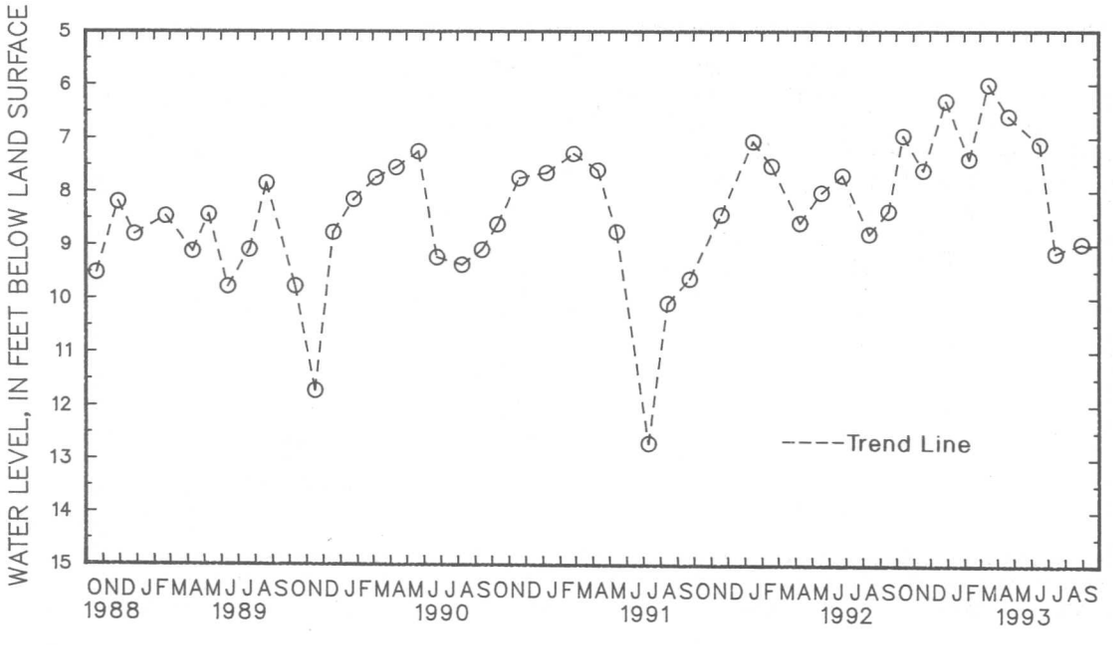
DAY	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
	OCTOBER		NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
1	11.99	10.65	5.69	5.01	3.40	3.06	2.44	1.57	1.67	1.05	.78	.37
2	11.11	10.19	5.70	5.03	3.06	2.53	2.75	2.02	1.34	.83	1.26	.29
3	12.27	11.08	5.30	4.86	3.49	2.62	3.38	2.49	1.44	.54	1.31	.75
4	12.76	12.22	5.09	4.63	3.45	2.95	3.34	2.85	1.73	.80	1.21	-.09
5	12.38	11.27	5.05	4.42	4.01	3.10	3.20	2.45	1.75	.95	.48	-.25
6	11.49	10.66	4.94	4.41	4.00	3.26	3.07	2.18	1.84	.73	.94	-.09
7	11.02	10.39	4.95	4.36	3.75	3.10	2.60	1.61	1.39	.55	1.24	.45
8	10.76	10.04	5.14	4.17	3.76	2.92	2.30	1.29	1.43	.63	1.49	.75
9	10.40	9.72	5.21	4.46	3.31	2.37	1.96	.82	1.49	.66	1.68	.85
10	10.26	9.61	5.05	4.27	3.10	1.34	1.43	.59	1.67	.85	1.70	.55
11	10.55	9.89	4.88	4.11	1.54	.54	1.72	.94	1.67	.64	1.59	.58
12	10.87	10.21	4.97	4.09	1.25	.37	1.88	1.20	.79	-.07	1.86	.96
13	11.04	9.75	4.52	3.88	1.38	.65	1.69	1.02	1.10	-.13	1.37	-.32
14	9.94	8.65	4.64	3.97	1.52	.78	1.66	1.00	1.75	.79	1.69	-.32
15	8.98	8.01	4.51	3.73	2.08	1.08	1.66	1.04	1.69	1.19	2.24	1.52
16	8.36	7.46	4.52	3.82	2.59	1.72	1.66	1.11	1.65	1.02	1.96	1.59
17	7.90	7.04	4.33	3.74	2.64	2.03	1.74	.91	1.90	1.01	1.75	.88
18	7.83	7.08	4.24	3.57	2.99	2.17	2.18	1.22	1.91	1.30	1.27	.57
19	8.37	7.43	3.85	3.21	2.94	2.36	2.36	1.56	1.80	1.14	.93	.35
20	8.64	7.95	3.77	3.10	3.00	2.04	2.45	1.71	1.62	.81	.80	.21
21	8.82	8.17	3.82	3.05	3.07	2.34	2.52	1.56	1.37	.58	.88	.42
22	8.96	8.30	3.84	3.06	3.09	2.21	1.87	1.01	1.05	.43	.95	.46
23	8.96	8.25	3.86	3.00	2.90	1.97	1.89	1.26	1.36	.60	.96	.35
24	8.86	8.13	3.76	2.73	2.83	1.85	1.95	1.25	1.91	1.19	.80	.04
25	8.95	8.02	3.13	2.27	3.09	2.39	2.04	1.46	1.98	1.22	.48	-.09
26	8.62	7.54	3.31	2.49	3.15	2.51	2.12	1.29	1.69	.71	.69	-.05
27	8.05	6.93	3.27	2.60	3.19	2.39	1.55	.91	1.01	.41	.59	-.17
28	7.32	6.36	3.30	2.68	2.66	2.04	1.53	1.00	.91	.36	.31	-.25
29	6.77	5.96	3.26	2.64	2.39	1.83	2.05	1.21	---	---	.17	-.32
30	6.39	5.60	3.39	2.89	2.35	1.90	2.55	1.74	---	---	.16	-.42
31	5.87	5.09	---	---	2.16	1.68	2.20	1.67	---	---	.15	-.41
MONTH	12.76	5.09	5.70	2.27	4.01	.37	3.38	.59	1.98	-.13	2.24	-.42

WELL NUMBER.--WO Dd 7. SITE ID.--381037075234301.
LOCATION.--Lat 38°10'37", long 75°23'43", Hydrologic Unit 02060009, near intersection of Green and Commerce Sts., Snow Hill.
Owner: City of Snow Hill.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, unused, artesian well, depth 290 ft; casing diameter 6 in.; casing length unknown.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 13 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of casing extension, 0.40 ft below land surface.
REMARKS.--Maryland Water-Level Network observation well. Water levels affected by nearby pumping.
PERIOD OF RECORD.--July 1958 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.63 ft below land surface, March 8, 1962; lowest measured, 38.02 ft below land surface, Sept. 17, 1970.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 13	6.95	DEC 29	6.30	MAR 16	6.00	JUN 16	7.12	AUG 30	8.99
NOV 18	7.60	FEB 9	7.39	APR 21	6.59	JUL 14	9.16		

WATER YEAR 1993 HIGHEST 6.00 MAR 16, 1993 LOWEST 9.16 JUL 14, 1993



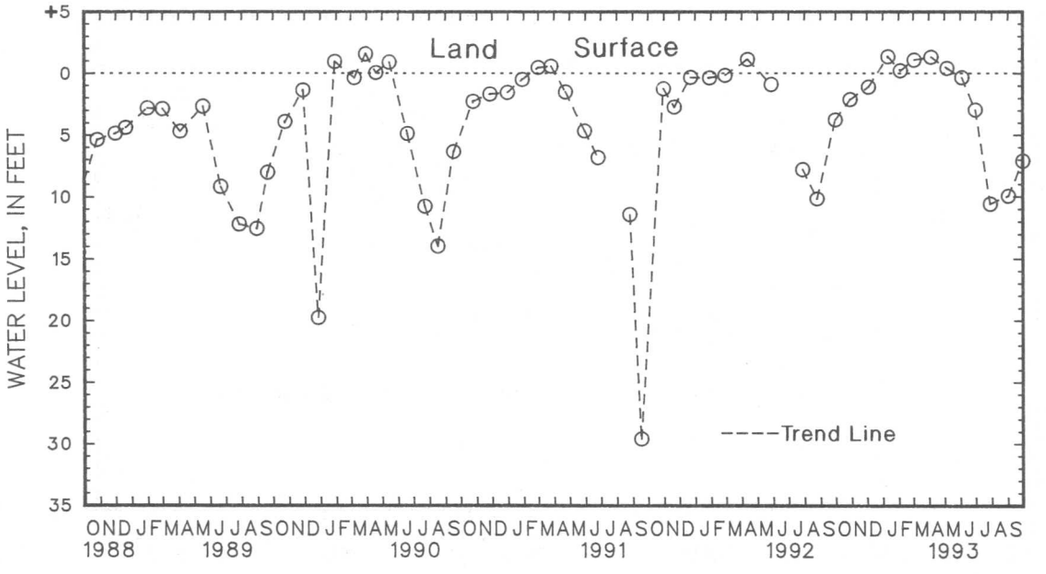
5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Cg 72. SITE ID.--381939075052101. PERMIT NUMBER.--WO-73-1304.
LOCATION.--Lat 38°19'39", long 75°05'21", Hydrologic Unit 02060010, at South Division St., Ocean City.
Owner: Town of Ocean City.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 450 ft; casing diameter 4 in., to 384 ft, 394 to 404 ft, and 424 to 445 ft; screen diameter 4 in. from 384 to 394 ft, 404 to 424 ft, and 445 to 450 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 5 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 6 in. flange, 3.2 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping.
PERIOD OF RECORD.--January 1985 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 1.58 ft above land surface, March 30, 1990, lowest measured, 29.85 ft below land surface, July 14, 1986.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
(READINGS ABOVE LAND SURFACE INDICATED BY "+")

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	2.10	JAN 11	+1.37	MAR 3	+1.10	MAY 6	+.42	JUN 30	2.95	SEP 2	9.98
DEC 4	1.09	FEB 4	+.23	APR 5	+1.33	JUN 4	.33	JUL 29	10.63	30	7.11

WATER YEAR 1993 HIGHEST +1.37 JAN 11, 1993 LOWEST 10.63 JUL 29, 1993



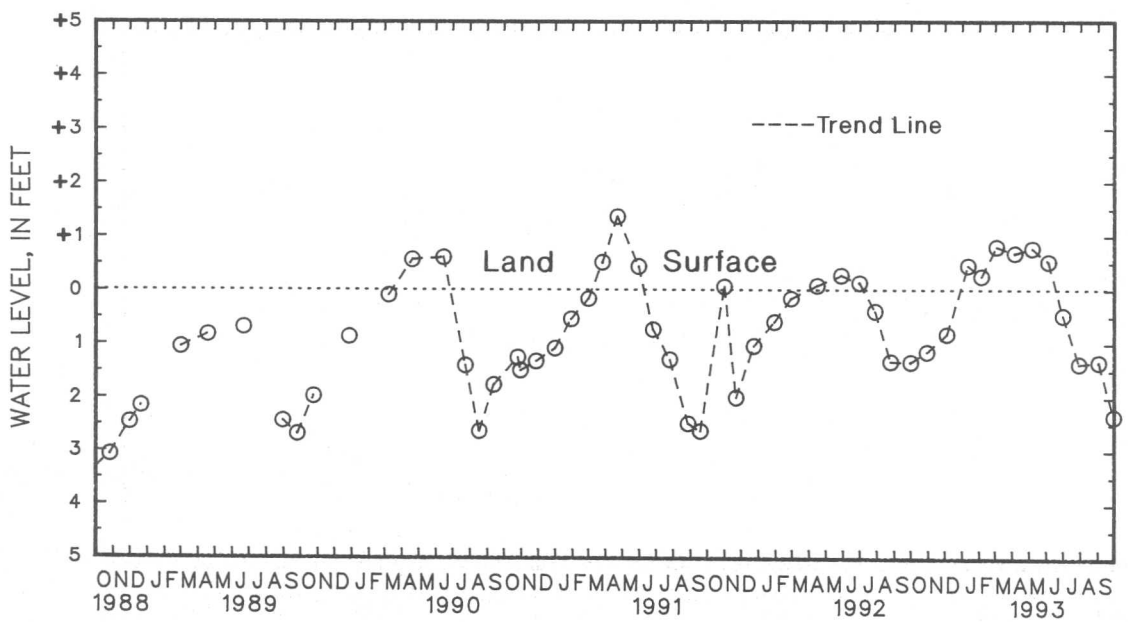
5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WELL NUMBER.--WO Dg 21. SITE ID.--381427075081102. PERMIT NUMBER.--WO-73-0519.
LOCATION.--Lat 38°14'27", long 75°08'11", Hydrologic Unit 020060010, at Assateague Island State Park.
Owner: U.S. Geological Survey.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 310 ft; casing diameter 4 in., to 300 ft; screen diameter 2 in. from 300 to 310 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel, November 1990 to current year. Periodic measurements with chalked steel tape October 1975, to April 1985. Equipped with digital water-level recorder--60-minute recording interval, April 1985 to October 1990.
DATUM.--Elevation of land surface is 6 ft above National Geodetic Vertical Datum of 1929, from topographic map. Measuring point: Top of recorder shelf, 4.06 ft above land surface.
REMARKS.--Ocean City ground-water monitoring network well. Water levels affected by nearby pumping.
PERIOD OF RECORD.--October 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level recorded, 1.37 ft above land surface, April 22, 1991; lowest recorded, 5.25 ft below land surface, Aug. 25, 1986.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993
(READINGS ABOVE LAND SURFACE INDICATED BY "+")

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 29	1.15	JAN 11	+.46	MAR 3	+.81	MAY 6	+.78	JUN 30	.47	SEP 2	1.34
DEC 4	.82	FEB 4	+.26	APR 5	+.69	JUN 4	+.53	JUL 29	1.37	29	2.35

WATER YEAR 1993 HIGHEST +.81 MAR 3, 1993 LOWEST 2.35 SEP 29, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

GROUND-WATER LEVELS

MARYLAND--Continued

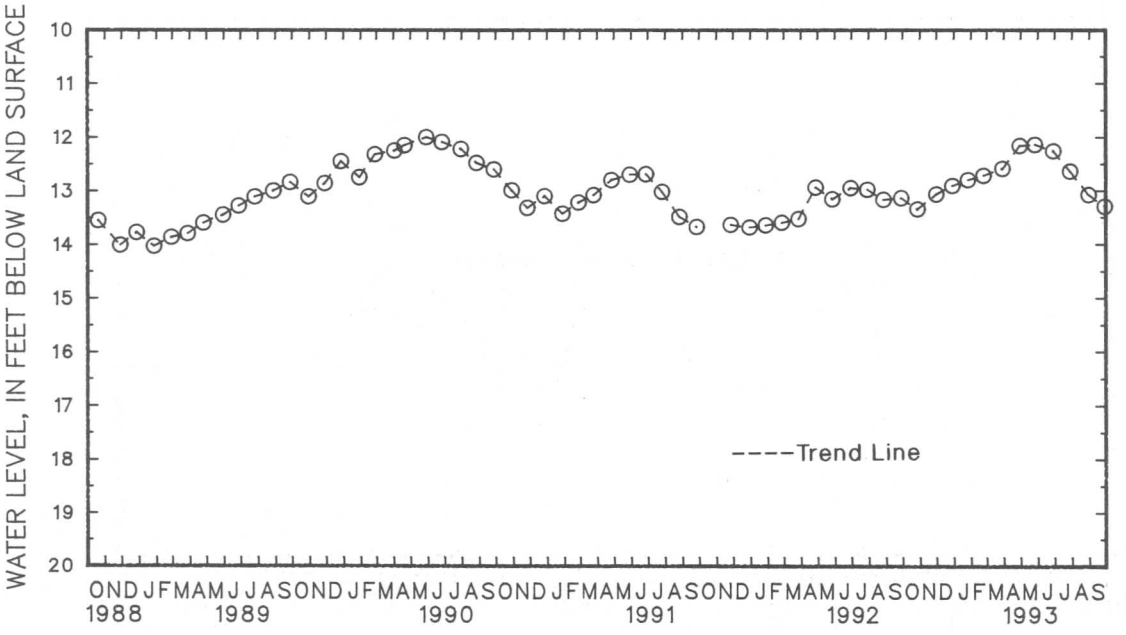
WORCESTER COUNTY--Continued

WELL NUMBER.--WO De 36. SITE ID.--381457075174101. PERMIT NUMBER.--WO-73-0515.
LOCATION.--Lat 38°14'57", long 75°17'41", Hydrologic Unit 02060010, at Newark.
Owner: U.S. Geological Survey.
AQUIFER.--Manokin aquifer of Miocene age. Aquifer code: 122MNKN.
WELL CHARACTERISTICS.--Drilled, observation, artesian well, depth 330 ft; casing diameter 4 in., to 320 ft; screen diameter 2 in. from 320 to 330 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 30 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 4 in. coupling, 1.84 ft above land surface.
REMARKS.--Maryland Water-Level Network observation well.
PERIOD OF RECORD.--September 1975 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 11.62 ft below land surface, May 20, 1976, lowest measured, 14.75 ft below land surface, Oct. 22, 1975.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 27	13.35	DEC 29	12.91	FEB 23	12.72	APR 29	12.16	JUN 28	12.26	AUG 30	13.08
NOV 30	13.07	JAN 26	12.80	MAR 29	12.59	MAY 26	12.14	JUL 28	12.64	SEP 28	13.30

WATER YEAR 1993 HIGHEST 12.14 MAY 26, 1993 LOWEST 13.35 OCT 27, 1992



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

GROUND-WATER QUALITY RECORDS

REMARK CODES

The following remark codes may appear with the water-quality data in this section:

PRINTED OUTPUT	REMARK
E	Estimated value.
>	Actual value is known to be greater than the value shown.
<	Actual value is known to be less than the value shown.
K	Results based on colony count outside the acceptance range (non-ideal colony count).
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted).
D	Biological organism count egual to or greater than 15 percent (dominant).
&	Biological organism estimated as dominant.

Dissolved Trace-Element Concentrations

NOTE--Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter (ug/L) level. Recent evidence, mostly from large rivers, indicates that actual dissolved-phase concentrations for a number of trace elments are within the range of 10's to 100's of nanograms per liter (ng/L). Presen data above the ug/L level should be viewed with caution. Such data may actually represent elevated environmental concentrations from natural or human causes; however, these data could reflect contamination introduced during sampling, processing, or analysis. To confidently produce dissolved trace-element data with insignificant contamination, the U.S. Geological Survey will begin using new trace-element protocols in water year 1994.

MBAS

NOTE--MBAS determinations made from January 1, 1970 through August 29, 1993, at the National Water Quality Laboratory in Denver (Analyzing Agency Code 80020) are positively biased. These data can be corrected on the basis of the following equation, if concentrations of dissolved nitrate plus nitrite, as nitrogen, and dissolved chloride, determined concurrently with the MBAS data, are applied:

MBASCOR = M - 0.0088N - 0.00019C

where:

MBASCOR = corrected MBAS concentration, in mg/L;
M = reported MBAS concentration, in mg/L;
N = dissolved nitrate plus nitrite, as nitrogen, concentration, in mg/L; and
C= dissolved chloride concentration, in mg/L.

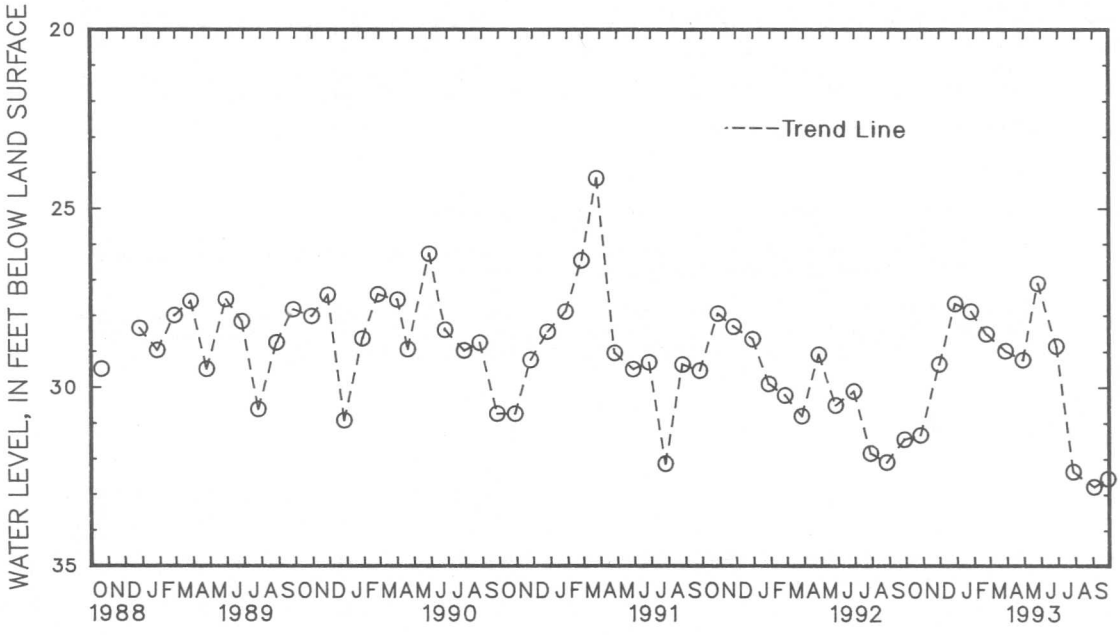
The detection limit of the new method is 0.02 mg/L, whereas the detection limit for the old method was 0.01 mg/L. A detection limit of 0.02 mg/L should be used with corrected MBAS data from January 1, 1970 through August 29, 1993.

WELL NUMBER.--WO Fb 2. SITE ID.--380408075335701.
LOCATION.--Lat 38°04'08", long 75°33'57", Hydrologic Unit 02060009, near 7th and Young Sts., Pocomoke City.
Owner: Pocomoke City.
AQUIFER.--Pocomoke aquifer of Miocene age. Aquifer code: 122PCMK.
WELL CHARACTERISTICS.--Drilled, unused, artesian well, depth 130 ft; casing diameter 16 in., to 100 ft; casing diameter 10 in., to 100 ft; screen diameter 9.5 in. from 100 to 130 ft.
INSTRUMENTATION.--Monthly measurements with chalked steel tape by U.S. Geological Survey personnel.
DATUM.--Elevation of land surface is 15 ft above National Geodetic Vertical Datum of 1929, from topographic map.
Measuring point: Top of 1.5 in. casing extension, 3.40 ft above land surface.
REMARKS.--Maryland Water-Level Network observation well. Water level reported 30 ft below land surface, Oct. 3, 1947; water levels may be affected by nearby pumpage.
PERIOD OF RECORD.--January 1953 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.61 ft below land surface, Feb. 20, 1953; lowest measured, 49.70 ft below land surface, July 1, 1954.

WATER LEVEL, IN FEET BELOW LAND SURFACE, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 27	31.34	DEC 29	27.67	FEB 23	28.51	APR 29	29.23	JUN 28	28.85	SEP 3	32.78
NOV 30	29.35	JAN 26	27.88	MAR 29	28.98	MAY 26	27.10	JUL 28	32.36	28	32.55

WATER YEAR 1993 HIGHEST 27.10 MAY 26, 1993 LOWEST 32.78 SEP 3, 1993



5 YEAR HYDROGRAPH
OCTOBER 1, 1988 THROUGH SEPTEMBER 30, 1993

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

WICOMICO COUNTY, MARYLAND

WELL NUMBER	DATE	TIME	STATION NUMBER	GEO-LOGIC UNIT	SITE	SAM-PLING METHOD, CODES	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET)	DEPTH OF WELL, TOTAL (FEET)	DEPTH TO TOP OF SAMPLE INTER-VAL (FT)
WI Cd 71	07-28-93	1130	382329075412002	112CLMB	GW	4040	5.15	18.00	15
WI Ce 13	07-27-93	0900	382150075352101	112BVDM	GW	4040	3.13	65.00	45

WELL NUMBER	DEPTH TO BOT-TOM OF SAMPLE INTER-VAL (FT)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	TEMPER-ATURE AIR (DEG C)	OXYGEN, DIS-SOLVED (MG/L)	CALCIUM DIS-SOLVED (MG/L AS CA)
WI Cd 71	18	35.0	50	0.5	51	5.0	15.5	31.0	2.8	1.5
WI Ce 13	65	7.0	--	0.6	142	5.8	16.5	26.5	4.2	7.2

WELL NUMBER	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WAT WH TOT IT FIELD MG/L AS CACO3	BICAR-BONATE WATER WH IT FIELD MG/L AS HCO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)
WI Cd 71	1.3	3.6	1.4	2	2	9.9	4.4	<0.10	12	32
WI Ce 13	2.1	12	1.9	14	17	6.3	12	<0.10	27	118

WELL NUMBER	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS DIS-SOLVED (MG/L AS P)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)
WI Cd 71	--	<0.010	0.099	<0.010	<0.010	<0.010	<0.010	<10	4
WI Ce 13	5.78	0.020	5.80	0.020	<0.010	<0.010	<0.010	2400	460

WELL NUMBER	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	CARBON, ORGANIC TOTAL (MG/L AS C)	HARD-NESS TOTAL (MG/L AS CACO3)	PCN DISSOLV (UG/L)	ALDRIN, DIS-SOLVED (UG/L)	CHLOR-DANE, DIS-SOLVED (UG/L)	DDD, DIS-SOLVED (UG/L)	DDE, DIS-SOLVED (UG/L)
WI Cd 71	<10	4	0.8	9	--	--	--	--	--
WI Ce 13	80	68	0.3	27	<0.10	<0.01	<0.1	<0.01	<0.01

WELL NUMBER	DDT, DIS-SOLVED (UG/L)	DI-AZINON, DIS-SOLVED (UG/L)	DI-ELDRIN DIS-SOLVED (UG/L)	ENDO-SULFAN DISSOLV (UG/L)	ENDRIN, DIS-SOLVED (UG/L)	ETHION DISSOLV (UG/L)	HEPTA-CHLOR, DIS-SOLVED (UG/L)	HEPTA-CHLOR EPOXIDE DIS-SOLVED (UG/L)	LINDANE DIS-SOLVED (UG/L)
WI Cd 71	--	--	--	--	--	--	--	--	--
WI Ce 13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

WELL NUMBER	MALA-THION, DIS-SOLVED (UG/L)	METH-OXY-CHLOR DISSOLV (UG/L)	METHYL PARA-THION, DIS-SOLVED (UG/L)	MIREX, DIS-SOLVED (UG/L)	PARA-THION, DIS-SOLVED (UG/L)	PCB, DIS-SOLVED (UG/L)	PER-THANE DISSOLV (UG/L)	TOX-APHENE, DIS-SOLVED (UG/L)	TRI-THION DISSOLV (UG/L)
WI Cd 71	--	--	--	--	--	--	--	--	--
WI Ce 13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	<0.10	<1.0	<0.01

Geologic unit (aquifer): 112BVDM - Beaverdam Sand
112CLMB - Columbia Group

Site type: GW - Groundwater

Sampling method: 4040 - Submersible pump

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

NEW CASTLE COUNTY, DELAWARE

WELL NUMBER	DATE	TIME	STATION NUMBER	GEO-LOGIC UNIT	SITE	SAM-PLING METHOD, CODES	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET)	DEPTH OF WELL, TOTAL (FEET)	DEPTH TO TOP OF SAMPLE INTER-VAL (FT)
Bb25-28	09-22-93	1530	394835075401501	300WSCK	GW	4040	--	220.00	--
Bc21-07	09-22-93	1141	394826075391601	300WSCK	GW	4040	5.81	205.00	--
Bc21-09	09-30-93	1208	394841075392001	300WSCK	GW	4040	4.62	260.00	--
Bc34-14	09-20-93	1514	394754075365101	300WSCK	GW	4040	28.90	312.00	--
	09-30-93	1530		300WSCK	GW	4040	28.06	300.00	--
Bc42-22	09-28-93	1308	394612075384501	300WSCK	GW	4040	25.53	175.00	--
Cc11-16	09-29-93	1419	394407075390901	300WLMG	GW	4040	12.35	100.00	--
Eb44-19	11-09-92	1030	393156075413101	211MLRL	GW	4040	38.15	45.00	40
Ec41-16	11-09-92	1330	393112075392701	211MLRL	GW	4040	15.40	44.00	39
Fb34-21	11-03-92	1400	392704075413301	125RCCS	GW	4040	31.50	72.00	67
Fb34-22	11-04-92	1030	392704075413302	125RCCS	GW	4040	31.39	40.00	35
Fb42-06	11-02-92	1120	392657075434702	125RCCS	GW	4040	14.08	71.00	66
Fb42-07	11-03-92	1050	392657075434701	125RCCS	GW	4040	14.25	40.00	35
Fc12-20	11-09-92	1530	392931075380602	125RCCS	GW	4040	24.06	35.00	30
Fc21-12	11-04-92	1500	392846075390701	125RCCS	GW	4040	29.68	65.00	60
Fc21-13	11-04-92	1330	392846075390702	125RCCS	GW	4040	28.68	40.00	35

	DEPTH TO BOT-TOM OF SAMPLE INTER-VAL (FT)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD)	PUMP OR FLOW PERIOD PRIOR TO SAM-PLING (MIN)	FLOW RATE, INSTAN-TANEOUS (G/M)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	TEMPER-ATURE AIR (DEG C)	OXYGEN, DIS-SOLVED (MG/L)	CALCIUM DIS-SOLVED (MG/L AS CA)
Bb25-28	--	230	60	7.6	286	7.0	13.0	19.0	0.4	34
Bc21-07	--	10.0	34	6.1	168	8.2	14.5	18.5	3.0	22
Bc21-09	--	201	22	12	274	7.0	13.0	14.0	3.8	37
Bc34-14	--	321	39	7.9	344	6.1	13.5	15.5	0.4	42
	--	355	30	5.9	145	7.0	13.0	12.5	0.6	14
Bc42-22	--	237	36	9.5	184	6.0	13.0	19.0	1.6	16
Cc11-16	--	140	29	4.4	184	6.4	14.0	18.0	5.2	13
Eb44-19	45	65.0	20	1.5	312	6.1	9.0	12.0	8.2	42
Ec41-16	44	50.0	36	1.3	328	7.7	13.5	6.0	8.7	58
Fb34-21	72	60.0	70	0.1	128	5.8	15.5	24.5	6.0	7.8
Fb34-22	40	60.0	18	0.3	340	5.8	14.5	15.5	10.5	11
Fb42-06	71	60.0	27	1.2	173	6.6	13.5	10.0	0.5	11
Fb42-07	40	60.0	25	0.5	137	6.6	14.5	21.0	2.6	9.8
Fc12-20	35	40.0	6	1.2	166	5.2	15.0	6.0	8.4	10
Fc21-12	65	40.0	53	0.3	109	5.5	15.0	16.0	4.4	7.9
Fc21-13	40	40.0	18	0.3	446	5.1	14.0	16.0	E10.8	28

Geologic unit (aquifer): 125RCCS - Rancocas Formation
211MLRL - Mount Laurel Sand
300WLMG - Wilmington Complex
300WSCK - Wissahickon Formation

Site type: GW - Groundwater

Sampling method: 4040 - Submersible pump

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

WORCESTER COUNTY, MARYLAND--Continued

WELL NUMBER	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	PHOS-PHORUS TOTAL (MG/L AS P)	PHOS-PHORUS DIS-SOLVED (MG/L AS P)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)
WO Ah 34	34	270	--	--	--	--	--	--	--	11000
WO Ah 36	33	406	--	--	--	--	--	--	--	13000
WO Bf 87	10	196	<0.010	14.0	0.020	0.160	<0.010	<0.010	30	7
WO Bh 28	34	452	--	--	--	--	--	--	--	6300
WO Bh 34	34	132	--	--	--	--	--	--	--	14000
WO Bh 84	35	222	0.020	<0.050	0.450	0.260	0.240	0.260	5700	5300
	35	212	--	--	--	--	--	--	--	5900
WO Bh 85	33	224	--	--	--	--	--	--	--	4800
WO Bh 88	31	294	--	--	--	--	--	--	--	5700
WO Bh 89	31	998	--	--	--	--	--	--	--	7200
WO Bh 97	33	218	--	--	--	--	--	--	--	9400
WO Bh 98	29	240	--	--	--	--	--	--	--	1400
WO Cc 3	21	42	<0.010	0.087	<0.010	0.690	<0.010	<0.010	80	80
WO Cg 75	29	256	--	--	--	--	--	--	--	6200

WELL NUMBER	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	CARBON, ORGANIC TOTAL (MG/L AS C)	HARD-NESS TOTAL (MG/L AS CACO3)	1,2,3-TRI-CHLORO BENZENE WAT, WH REC (UG/L)	BROMO-BENZENE WATER, WHOLE, TOTAL (UG/L)	BROMO-FORM TOTAL (UG/L)	BENZENE TOTAL (UG/L)	CARBON-TETRA-CHLO-RIDE TOTAL (UG/L)	CHLORO-BENZENE TOTAL (UG/L)
WO Ah 34	--	120	--	73	--	--	--	--	--	--
WO Ah 36	--	130	--	87	--	--	--	--	--	--
WO Bf 87	<10	3	0.6	110	--	--	--	--	--	--
WO Bh 28	--	130	--	110	--	--	--	--	--	--
WO Bh 34	--	110	--	63	--	--	--	--	--	--
WO Bh 84	100	79	2.4	76	--	--	--	--	--	--
	--	77	--	84	--	--	--	--	--	--
WO Bh 85	--	88	--	95	--	--	--	--	--	--
WO Bh 88	--	140	--	84	--	--	--	--	--	--
WO Bh 89	--	130	--	240	--	--	--	--	--	--
WO Bh 97	--	140	--	75	--	--	--	--	--	--
WO Bh 98	--	30	--	150	--	--	--	--	--	--
WO Cc 3	<10	9	0.4	8	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
WO Cg 75	--	180	--	59	--	--	--	--	--	--

WELL NUMBER	CHLORO-DI-BROMO-METHANE TOTAL (UG/L)	CHLORO-FORM TOTAL (UG/L)	CHLORO-ETHANE TOTAL (UG/L)	CIS 1,3-DI-CHLORO-PROPENE TOTAL (UG/L)	DIBROMO CHLORO-PROPANE WATER WHOLE TOT.REC (UG/L)	DI-BROMO-METHANE WATER WHOLE RECOVER (UG/L)	DI-CHLORO-BROMO-METHANE TOTAL (UG/L)	DI-CHLORO-DI-FLUORO-METHANE TOTAL (UG/L)	ETHYL-BENZENE TOTAL (UG/L)	FREON-113 WATER UNFLTRD REC (UG/L)
WO Ah 34	--	--	--	--	--	--	--	--	--	--
WO Ah 36	--	--	--	--	--	--	--	--	--	--
WO Bf 87	--	--	--	--	--	--	--	--	--	--
WO Bh 28	--	--	--	--	--	--	--	--	--	--
WO Bh 34	--	--	--	--	--	--	--	--	--	--
WO Bh 84	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
WO Bh 85	--	--	--	--	--	--	--	--	--	--
WO Bh 88	--	--	--	--	--	--	--	--	--	--
WO Bh 89	--	--	--	--	--	--	--	--	--	--
WO Bh 97	--	--	--	--	--	--	--	--	--	--
WO Bh 98	--	--	--	--	--	--	--	--	--	--
WO Cc 3	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
WO Cg 75	--	--	--	--	--	--	--	--	--	--

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

WORCESTER COUNTY, MARYLAND

WELL NUMBER	DATE	TIME	STATION NUMBER	GEOLOGIC UNIT	SITE	SAMPLING METHOD, CODES	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET)	DEPTH OF WELL, TOTAL (FEET)	DEPTH TO TOP OF SAMPLE INTERVAL (FT)
WO Ah 34	09-09-93	1145	382632075031901	122MNKN	GW	4040	--	450.00	350
WO Ah 36	09-09-93	1300	382635075030602	122MNKN	GW	4040	--	430.00	420
WO Bf 87	07-27-93	1630	382332075141802	112BVDM	GW	4040	6.39	18.00	15
WO Bh 28	09-08-93	1000	382214075041901	122OCNC	GW	4040	--	294.00	248
WO Bh 34	09-09-93	0930	382443075033501	122MNKN	GW	4040	--	353.00	337
WO Bh 84	07-26-93	1530	382215075041901	112CLMB	GW	4040	4.20	89.00	84
	09-07-93	1315		112CLMB	GW	4030	4.02	89.00	84
WO Bh 85	09-07-93	1400	382215075041902	122PCMK	GW	4030	5.43	195.00	190
WO Bh 88	09-07-93	1100	382041075045301	122MNKN	GW	4040	--	445.00	362
WO Bh 89	09-08-93	1130	382215075041903	122MNKN	GW	4040	33.11	500.00	388
WO Bh 97	09-08-93	1600	382127075043803	122MNKN	GW	4040	23.12	445.00	370
WO Bh 98	09-08-93	1800	382127075043802	122OCNC	GW	4040	--	310.00	255
WO Cc 3	07-27-93	1330	381543075273802	112CLMB	GW	4040	4.50	17.00	18
WO Cg 75	09-07-93	1000	381939075052102	122MNKN	GW	4040	--	433.00	367

WELL NUMBER	DEPTH TO BOTTOM OF SAMPLE INTERVAL (FT)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD)	PUMP OR FLOW PERIOD PRIOR TO SAMPLING (MIN)	FLOW RATE, INSTANTANEOUS (G/M)	SPECIFIC CONDUCTANCE (US/CM)	PH WATER WHOLE FIELD (STANDARD UNITS)	TEMPERATURE WATER (DEG C)	TEMPERATURE AIR (DEG C)	OXYGEN, DISSOLVED (MG/L)	CALCIUM DISSOLVED (MG/L AS CA)
WO Ah 34	450	5.0	20	1500	499	6.8	17.0	--	--	21
WO Ah 36	440	15.4	105	8.0	759	6.7	17.0	--	--	24
WO Bf 87	18	33.0	45	0.5	331	5.6	18.0	31.0	7.1	21
WO Bh 28	294	5.0	--	1500	861	6.6	17.0	--	--	18
WO Bh 34	353	4.0	120	8.0	227	7.0	17.0	--	--	15
WO Bh 84	89	5.0	--	0.7	379	6.9	17.0	26.0	0.3	15
	89	5.0	25	48	362	6.7	16.5	--	--	17
WO Bh 85	195	5.0	40	16	406	6.5	17.0	--	--	15
WO Bh 88	442	8.0	60	--	537	6.7	18.0	--	--	14
WO Bh 89	500	5.0	120	8.0	1880	7.1	17.5	--	--	28
WO Bh 97	440	6.0	130	8.0	406	7.0	17.5	--	--	14
WO Bh 98	310	5.0	120	8.0	413	7.4	17.0	--	--	36
WO Cc 3	21	30.0	44	0.5	54	5.4	15.0	28.5	0.4	1.6
WO Cg 75	427	5.0	60	1500	461	6.6	17.5	--	--	9.6

WELL NUMBER	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY WAT WH TOT IT FIELD MG/L AS CACO3	BICARBONATE WATER WH IT FIELD MG/L AS HCO3	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	BROMIDE DISSOLVED (MG/L AS BR)
WO Ah 34	4.9	57	3.8	105	128	0.30	86	0.10	0.29
WO Ah 36	6.5	100	4.9	143	174	<0.10	160	0.10	0.43
WO Bf 87	15	9.6	2.5	8	10	32	33	<0.10	--
WO Bh 28	17	120	9.4	140	171	0.80	190	0.20	0.56
WO Bh 34	6.2	12	4.5	101	123	0.10	12	0.10	0.080
WO Bh 84	9.4	31	13	123	150	0.30	39	0.20	--
	10	32	12	127	155	<0.10	41	0.10	0.30
WO Bh 85	14	39	9.6	133	162	<0.10	44	0.20	0.17
WO Bh 88	12	76	8.4	119	133	0.10	96	0.20	0.39
WO Bh 89	42	270	2.2	204	249	6.2	500	0.20	1.4
WO Bh 97	9.7	36	10	113	139	0.30	58	0.20	0.30
WO Bh 98	14	22	9.7	179	218	<0.10	24	0.20	0.060
WO Cc 3	0.96	5.3	1.2	7	9	4.6	6.6	<0.10	--
WO Cg 75	8.6	72	6.5	114	148	0.20	72	0.30	0.38

Geologic unit (aquifer):
112BVDM - Beaverdam Sand
112CLMB - Columbia Group
122MNKN - Manokin Aquifer
122OCNC - Ocean City Aquifer
122PCMK - Pocomoke Aquifer

Site type: GW - Groundwater

Sampling method:
4030 - Suction pump
4040 - Submersible pump

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

WORCESTER COUNTY, MARYLAND--Continued

WELL NUMBER	ETHANE, 1112-TETRA-CHLORO-WAT UNF REC (UG/L)	1,2-DIBROMO ETHANE WATER WHOLE TOTAL (UG/L)	BENZENE O-CHLORO-WATER UNFLTRD REC (UG/L)	1,2-DI-CHLORO-ETHANE TOTAL (UG/L)	1,2-DI-CHLORO-PROPANE TOTAL (UG/L)	1,2-TRANSDI CHLORO-ETHENE TOTAL (UG/L)	123-TRI CHLORO-PROPANE WATER WHOLE TOTAL (UG/L)	BENZENE 1,2,4-TRI-CHLORO-WAT UNF REC (UG/L)	1,3-DI-CHLORO-PROPANE WAT. WH TOTAL (UG/L)
WO Ah 34	--	--	--	--	--	--	--	--	--
WO Ah 36	--	--	--	--	--	--	--	--	--
WO Bf 87	--	--	--	--	--	--	--	--	--
WO Bh 28	--	--	--	--	--	--	--	--	--
WO Bh 34	--	--	--	--	--	--	--	--	--
WO Bh 84	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
WO Bh 85	--	--	--	--	--	--	--	--	--
WO Bh 88	--	--	--	--	--	--	--	--	--
WO Bh 89	--	--	--	--	--	--	--	--	--
WO Bh 97	--	--	--	--	--	--	--	--	--
WO Bh 98	--	--	--	--	--	--	--	--	--
WO Cc 3	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
WO Cg 75	--	--	--	--	--	--	--	--	--

WELL NUMBER	BENZENE 1,3-DI-CHLORO-WATER UNFLTRD REC (UG/L)	BENZENE 1,4-DI-CHLORO-WATER UNFLTRD REC (UG/L)	2-CHLORO-ETHYL-VINYL-ETHER TOTAL (UG/L)	2,2-DI CHLORO-PRO-PANE WAT, WH TOTAL (UG/L)	ACRO-LEIN TOTAL (UG/L)	ACRYLO-NITRILE TOTAL (UG/L)	CIS-1,2-DI-CHLORO-ETHENE WATER TOTAL (UG/L)	HEXA-CHLORO-BUT-ADIENE TOTAL (UG/L)	NAPHTH-ALENE TOTAL (UG/L)
WO Ah 34	--	--	--	--	--	--	--	--	--
WO Ah 36	--	--	--	--	--	--	--	--	--
WO Bf 87	--	--	--	--	--	--	--	--	--
WO Bh 28	--	--	--	--	--	--	--	--	--
WO Bh 34	--	--	--	--	--	--	--	--	--
WO Bh 84	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
WO Bh 85	--	--	--	--	--	--	--	--	--
WO Bh 88	--	--	--	--	--	--	--	--	--
WO Bh 89	--	--	--	--	--	--	--	--	--
WO Bh 97	--	--	--	--	--	--	--	--	--
WO Bh 98	--	--	--	--	--	--	--	--	--
WO Cc 3	<3.0	<3.0	<3.0	<3.0	<20	<20	<3.0	<3.0	<3.0
WO Cg 75	--	--	--	--	--	--	--	--	--

WATER-QUALITY DATA, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

WORCESTER COUNTY, MARYLAND--Continued

WELL NUMBER	ISO-PROPYL-BENZENE WATER WHOLE REC (UG/L)	MESIT-YLENE WATER UNFLTRD REC (UG/L)	METHANE BROMO CHLORO-WAT UNFLTRD REC (UG/L)	METHYL-BROMIDE TOTAL (UG/L)	METHYL-CHLO-RIDE TOTAL (UG/L)	METHYL-ENE CHLO-RIDE TOTAL (UG/L)	BENZENE N-BUTYL WATER UNFLTRD REC (UG/L)	BENZENE N-PROPY WATER UNFLTRD REC (UG/L)	O-CHLORO-TOLUENE WATER WHOLE TOTAL (UG/L)	P-ISO-PROPYL-TOLUENE WATER WHOLE REC (UG/L)
WO Ah 34	--	--	--	--	--	--	--	--	--	--
WO Ah 36	--	--	--	--	--	--	--	--	--	--
WO Bf 87	--	--	--	--	--	--	--	--	--	--
WO Bh 28	--	--	--	--	--	--	--	--	--	--
WO Bh 34	--	--	--	--	--	--	--	--	--	--
WO Bh 84	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
WO Bh 85	--	--	--	--	--	--	--	--	--	--
WO Bh 88	--	--	--	--	--	--	--	--	--	--
WO Bh 89	--	--	--	--	--	--	--	--	--	--
WO Bh 97	--	--	--	--	--	--	--	--	--	--
WO Bh 98	--	--	--	--	--	--	--	--	--	--
WO Cc 3	<3.0	<3.0	<3.00	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
WO Cg 75	--	--	--	--	--	--	--	--	--	--

WELL NUMBER	TOLUENE P-CHLOR WATER UNFLTRD REC (UG/L)	PSEUDO-CUMENE WATER UNFLTRD REC (UG/L)	BENZENE SEC BUTYL-WATER UNFLTRD REC (UG/L)	STYRENE TOTAL (UG/L)	BENZENE TERT-BUTYL-WATER UNFLTRD REC (UG/L)	METHYL ETHER TERT-BUTYL WAT UNF REC (UG/L)	TETRA-CHLORO-ETHYL-ENE TOTAL (UG/L)	TRI-CHLORO-FLUORO-METHANE TOTAL (UG/L)	TOLUENE TOTAL (UG/L)	TRANS-1,3-DI-CHLORO-PROPENE TOTAL (UG/L)
WO Ah 34	--	--	--	--	--	--	--	--	--	--
WO Ah 36	--	--	--	--	--	--	--	--	--	--
WO Bf 87	--	--	--	--	--	--	--	--	--	--
WO Bh 28	--	--	--	--	--	--	--	--	--	--
WO Bh 34	--	--	--	--	--	--	--	--	--	--
WO Bh 84	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
WO Bh 85	--	--	--	--	--	--	--	--	--	--
WO Bh 88	--	--	--	--	--	--	--	--	--	--
WO Bh 89	--	--	--	--	--	--	--	--	--	--
WO Bh 97	--	--	--	--	--	--	--	--	--	--
WO Bh 98	--	--	--	--	--	--	--	--	--	--
WO Cc 3	<3.0	<3.0	<3.0	<3.0	<3.0	<5.0	<3.0	<3.0	<3.0	<3.0
WO Cg 75	--	--	--	--	--	--	--	--	--	--

WELL NUMBER	TRI-CHLORO-ETHYL-ENE TOTAL (UG/L)	VINYL CHLO-RIDE TOTAL (UG/L)	XYLENE WATER UNFLTRD REC (UG/L)	1,1-DI-CHLORO-ETHANE TOTAL (UG/L)	1,1-DI CHLORO-ETHYL-ENE TOTAL (UG/L)	PRO-PENE, WAT, WH TOTAL (UG/L)	1,1,1-TRI-CHLORO-ETHANE TOTAL (UG/L)	1,1,2-TRI-CHLORO-ETHANE TOTAL (UG/L)	ETHANE, 1,1,2,2 TETRA-CHLORO-WAT UNF REC (UG/L)
WO Ah 34	--	--	--	--	--	--	--	--	--
WO Ah 36	--	--	--	--	--	--	--	--	--
WO Bf 87	--	--	--	--	--	--	--	--	--
WO Bh 28	--	--	--	--	--	--	--	--	--
WO Bh 34	--	--	--	--	--	--	--	--	--
WO Bh 84	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
WO Bh 85	--	--	--	--	--	--	--	--	--
WO Bh 88	--	--	--	--	--	--	--	--	--
WO Bh 89	--	--	--	--	--	--	--	--	--
WO Bh 97	--	--	--	--	--	--	--	--	--
WO Bh 98	--	--	--	--	--	--	--	--	--
WO Cc 3	<3.0	<1.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
WO Cg 75	--	--	--	--	--	--	--	--	--

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