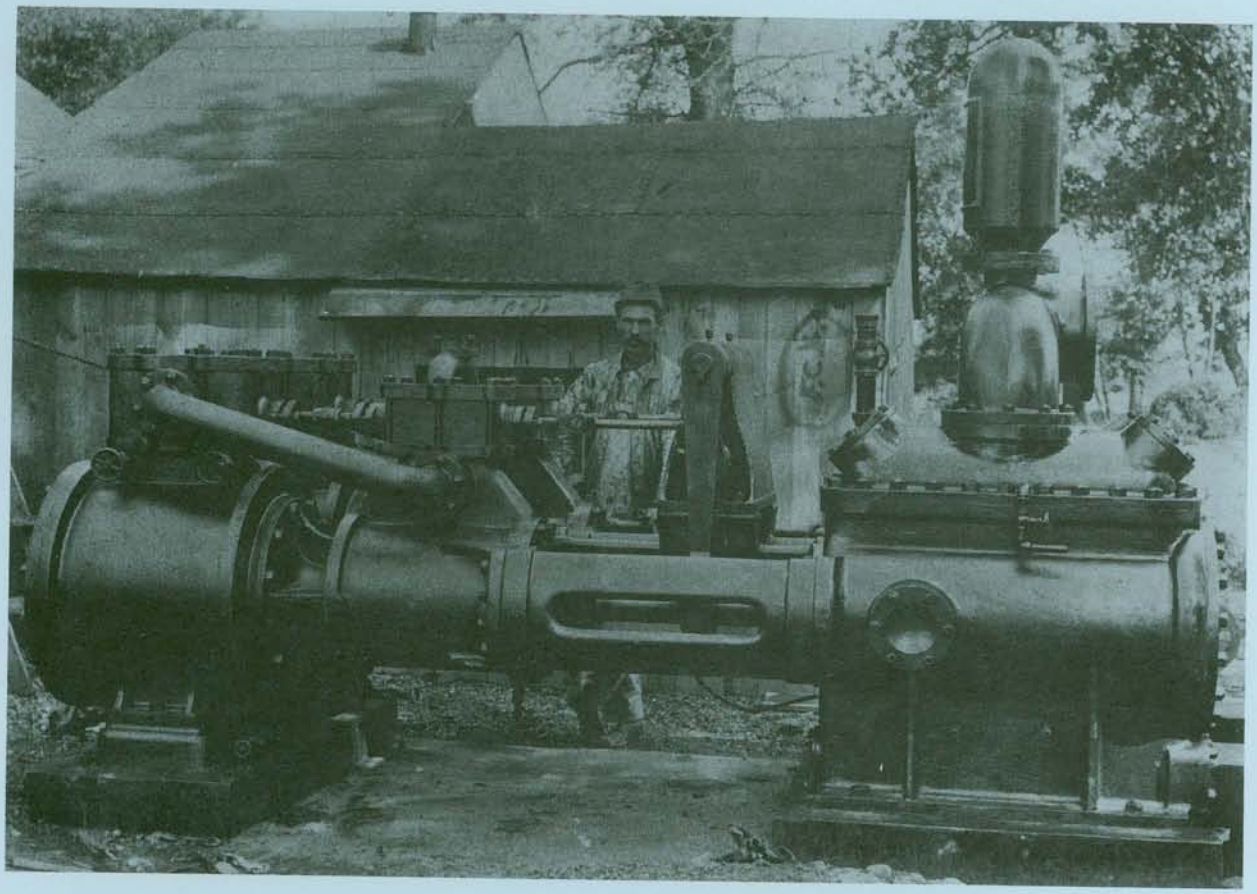
New Jersey Geological Survey
Geological Survey Report GSR 34

GROUND-WATER-WITHDRAWAL AND WATER-LEVEL DATA FOR THE CENTRAL PASSAIC RIVER BASIN, NEW JERSEY, 1898 - 1990



N.J. Department of Environmental Protection and Energy - Division of Science and Research

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Cover illustration: Original pump at the Commonwealth Water Company's Canoe Brook well field in Millburn Township, Essex County, ca. 1900. At that time ground-water levels were above land surface. Photo courtesy of the New Jersey-American Water Company.

New Jersey Geological Survey
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Ground-Water-Withdrawal and Water-Level Data for the Central Passaic River Basin, New Jersey, 1898 - 1990

by
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New Jersey Department of Environmental Protection and Energy
Division of Science and Research
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CONVERSION FACTORS

For the convenience of the reader, units used in this report may be obtained or converted using the following factors:

Multiply	by	to obtain
inch (in.)	25.4	millimeter (mm)
foot (ft.)	0.3048	meter (m)
mile	1.609	kilometer (km)
foot per second (ft./s)	0.3048	meter per second (m/s)
foot per mile	0.189	meter per kilometer (m/km)
square foot ($ft.^2$)	0.0929	square meter (m^2)
million gallons per day (Mgal/d)	0.04381	cubic meters per second (m^3/s)
million gallons per year	1.90	gallons per minute (gpm)
million gallons per year	2,740.	gallons per day (gpd)
million gallons per year	83,333.	gallons per month (gpmo)
million gallons per year	0.00274	million gallons per day (Mgal/d)
cubic feet per second	448.8	gallons per minute (gpm)

Sea level

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

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"It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories instead of theories to suit facts." Sherlock Holmes to Dr. Watson, A Scandal in Bohemia (Sir Arthur Conan Doyle)

GROUND-WATER-WITHDRAWAL AND WATER-LEVEL DATA FOR THE CENTRAL PASSAIC RIVER BASIN, NEW JERSEY 1898-1990

ABSTRACT

This report documents ground-water withdrawals and ground-water levels for the Central Passaic River Basin in northeastern New Jersey. The basin covers an area of approximately 260 square miles, primarily within southeastern Morris and southwestern Essex Counties. It is bounded on the north, east, and south by the Second Watchung Mountain, and on the west by the Ramapo Fault.

Major ground-water withdrawals for municipal use did not begin in the basin until the late 1800's. Data from 238 industrial and municipal wells and well fields show that ground-water withdrawals have risen from about 600 million gallons in 1898 to over 18,000 million gallons in 1990. Based on census data, approximately 9,600 domestic wells produced an estimated 460 million gallons in 1980.

Ground water is withdrawn from an aquifer system consisting of water-bearing zones in both the surficial sediments and the underlying bedrock. The surficial and bedrock aquifers are hydraulically connected.

The surficial aquifer consists primarily of unconsolidated glacial and postglacial sediments, and supplies most of the ground water. In 1990, this aquifer produced well over 15,000 million gallons of water. The most productive water-bearing zones in the surficial aquifer are semiconfined sands and gravels in buried valleys. The bedrock aquifer consists of sedimentary and igneous rocks of the Upper Triassic and Lower Jurassic Brunswick Group. Pumpage is predominantly from sandstone and siltstone formations. A few wells draw water from basalt. Municipal and industrial withdrawals from the bedrock aquifer totaled roughly 3,000 million gallons in 1990.

Hydrographs of 47 observation wells, together with older information from water allocation hearing records, indicate that ground-water levels have declined owing to the increase in pumpage. The hearing records indicate that water levels were above ground surface widely through low lying parts of the basin in the late 1800's. In Millburn Township (the area of most intense ground-water use), levels were approximately 30 feet above land surface in the late 1800's, but were 50 feet below land surface in 1990. As a result, the formerly semiconfined surficial aquifer has been partially dewatered.

INTRODUCTION

PURPOSE AND SCOPE

The purpose of this report is to document ground-water-withdrawal and water-level data from the Central Passaic River Basin (CPRB), New Jersey (fig. 1). The data identify historical trends in ground-water use and allow separation of current pumpage by aquifer and location. Analysis of water levels and pumpage distributions helps delineate the distribution of water-bearing sediments. Understanding their distribution and volume is necessary for mathematical modeling and planning for optimal utilization of the ground-water resources without adverse environmental impacts. Lack of these basic data would doom subsequent analytical studies to exercises in geofantasy.

Ground-water-withdrawal data are from the New Jersey Department of Environmental Protection and Energy (NJDEPE), the United States Geological Survey (USGS)-Water Resources Division, previously published summaries, and interviews with purveyors. Data are for 238 municipal and industrial wells and well fields for calendar years 1898-1990. Ground-water levels were from USGS and NJDEPE records or field measurements by NJGS staff.

This report is part of a series, supported by the Water Bond Issue of 1981, on water resource evaluation for the CPRB (Hoffman, 1989a). The New Jersey Geological Survey plans to publish a report on the hydrogeology of the study area, a map of bedrock topography, and a report on a numerical simulation of ground-water flow paths under historical and projected pumpage. The USGS has recently investigated ground-water quality in the area and will publish a report of its findings.

LOCATION AND EXTENT OF STUDY AREA

The Passaic River and its tributaries drain roughly 930 square miles in northeastern New Jersey and southern New York (fig. 1). The U.S. Army Corps of Engineers (1987) has divided the Passaic River Basin into three sections: the Highland area, the central basin (CPRB), and the lower valley.

The CPRB (fig. 2) is bounded by the Ramapo Fault to the west and the Second Watchung Mountain to the northeast, east, and south. It consists mainly of eastern Morris and western Essex Counties, but also includes parts of Passaic, Somerset and Union Counties (fig. 3). The boundary of the CPRB along the crest of the Second Watchung includes the entire outcrop area of the Towaco Formation, but does not correspond precisely to drainage divides. It includes small parts of the Raritan Basin. Areas within 48 municipalities are included. The Pequannock, Pompton, Ramapo, Rockaway, Wanaque, and Whippany Rivers (figs. 1, 4) are major tributaries which join the Passaic River in the CPRB.

Wells of the New Jersey-American Water Company's Short Hills and Baltusrol well fields and a few wells west of the Ramapo Fault are included in this study even though they lie outside the CPRB boundaries. The Short Hills and Baltusrol fields have been considered part of the CPRB by regulatory and planning authorities, and some of the water they produce is used inside the area. The wells west of the Ramapo Fault are close to the boundary and supply water to the CPRB.

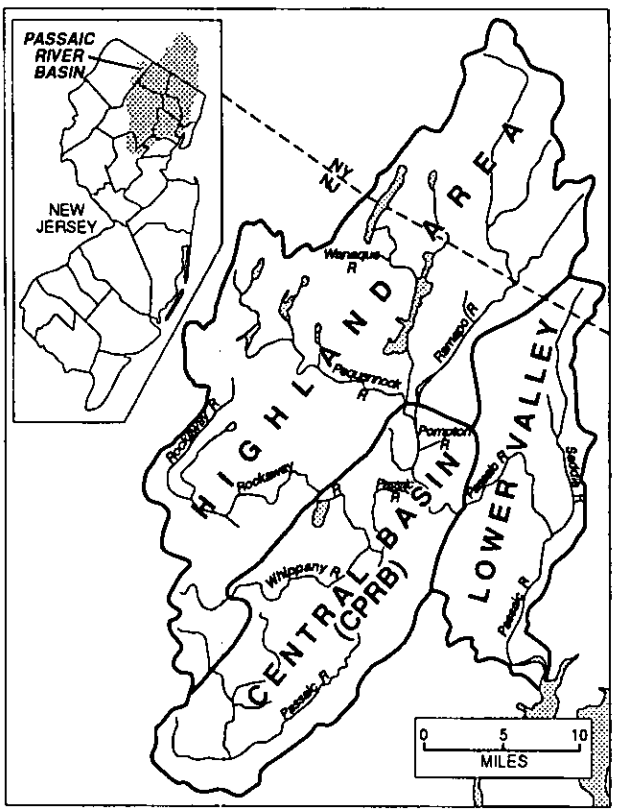


Figure 1. The Passaic River Basin and major subbasins as defined by the U.S. Army Corps of Engineers (1987).

WELL-NUMBERING SYSTEMS

NJDEPE Water Well Permit Numbers:

All wells drilled in New Jersey since 1947 are required by law to be under permit (NJSA 58:4A-5 *et seq.*). The NJDEPE Bureau of Water Allocation assigns and maintains records of all well permits.

The well permit number consists of the number of the New Jersey Topographic Atlas sheet (scale 1:63,360) on which the well lies, followed by a number assigned sequentially for the atlas sheet. For instance, well 25-21689 is the 21,689th well to receive a permit on Atlas Sheet 25. Atlas Sheets 21 through 37 are used for locating wells and assigning permit numbers. The CPRB falls on Atlas Sheets 22, 23, 25, and 26 (fig. 5).

Wells drilled before 1947 or installed without a permit may have been assigned an "artificial well permit number" by the Bureau of Water Allocation. Artificial numbers are assigned as follows:

1) 20 is added to the number of the appropriate atlas sheet.
2) Numbers are assigned sequentially.

For instance, the well permit number 45-00308 refers to the 308th well inventoried by the Bureau of Water Allocation on Atlas Sheet 25 lacking a regular well permit number. Abandoned or sealed wells are not inventoried by the Bureau of Water Allocation.

Problems are often encountered in identifying wells by permit number, especially when researching larger ground water users that have used many production wells drilled at various times. Examples of common problems are:

1) Forgotten well numbers, especially for older wells.
2) Misassigned numbers. For example, permit numbers of a production well and a replacement well at the same site may become mixed up.
3) Name changes. For example, it is common practice to assign a new well a temporary name (such as "test well 1"). A more descriptive local name (such as "Elm Street production well") is assigned later. While pumpage is reported under the new name, the initial temporary name is frequently the only one associated with that permit number in the state's well-permit records.

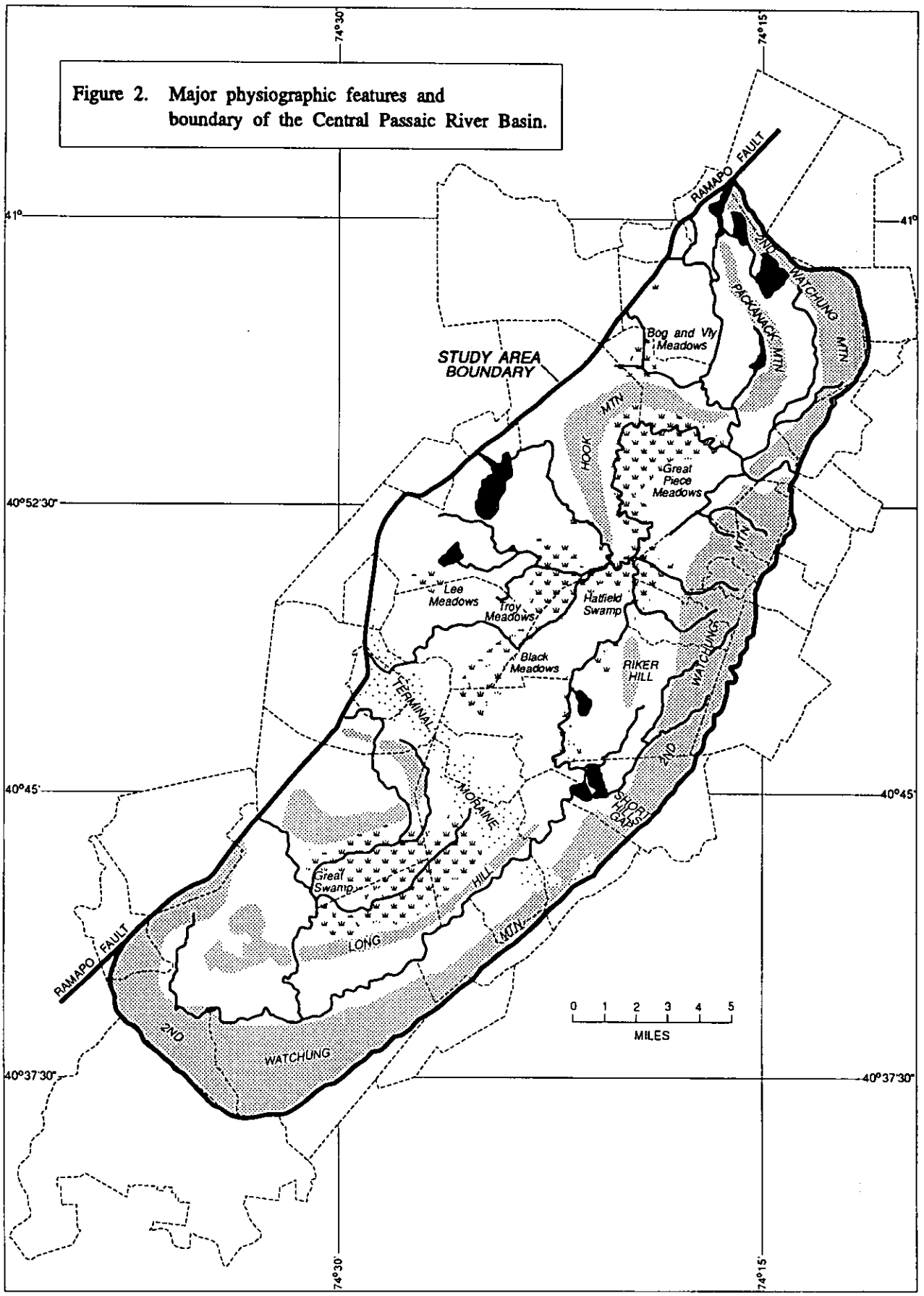


Figure 2. Major physiographic features and boundary of the Central Passaic River Basin.

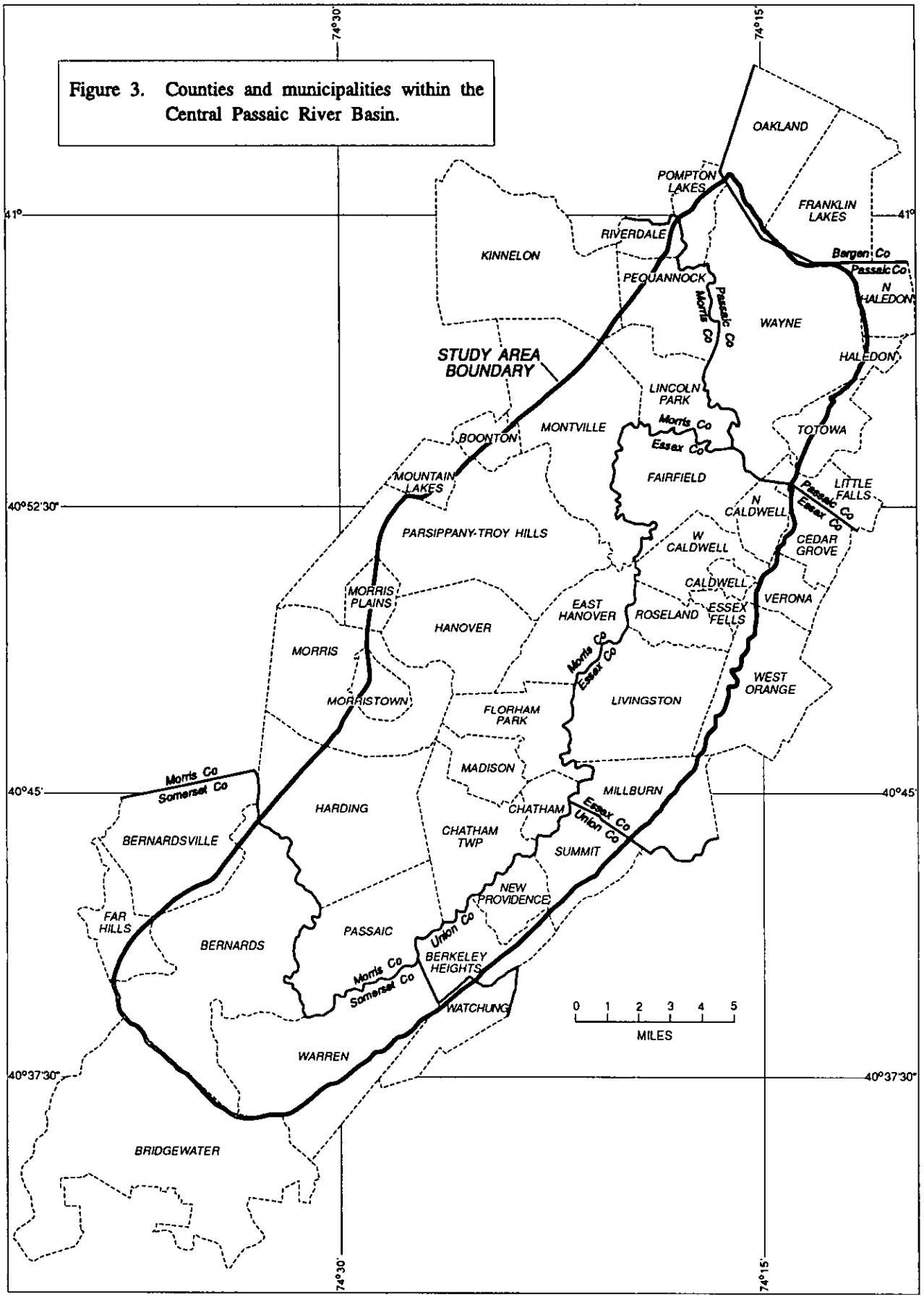


Figure 3. Counties and municipalities within the Central Passaic River Basin.

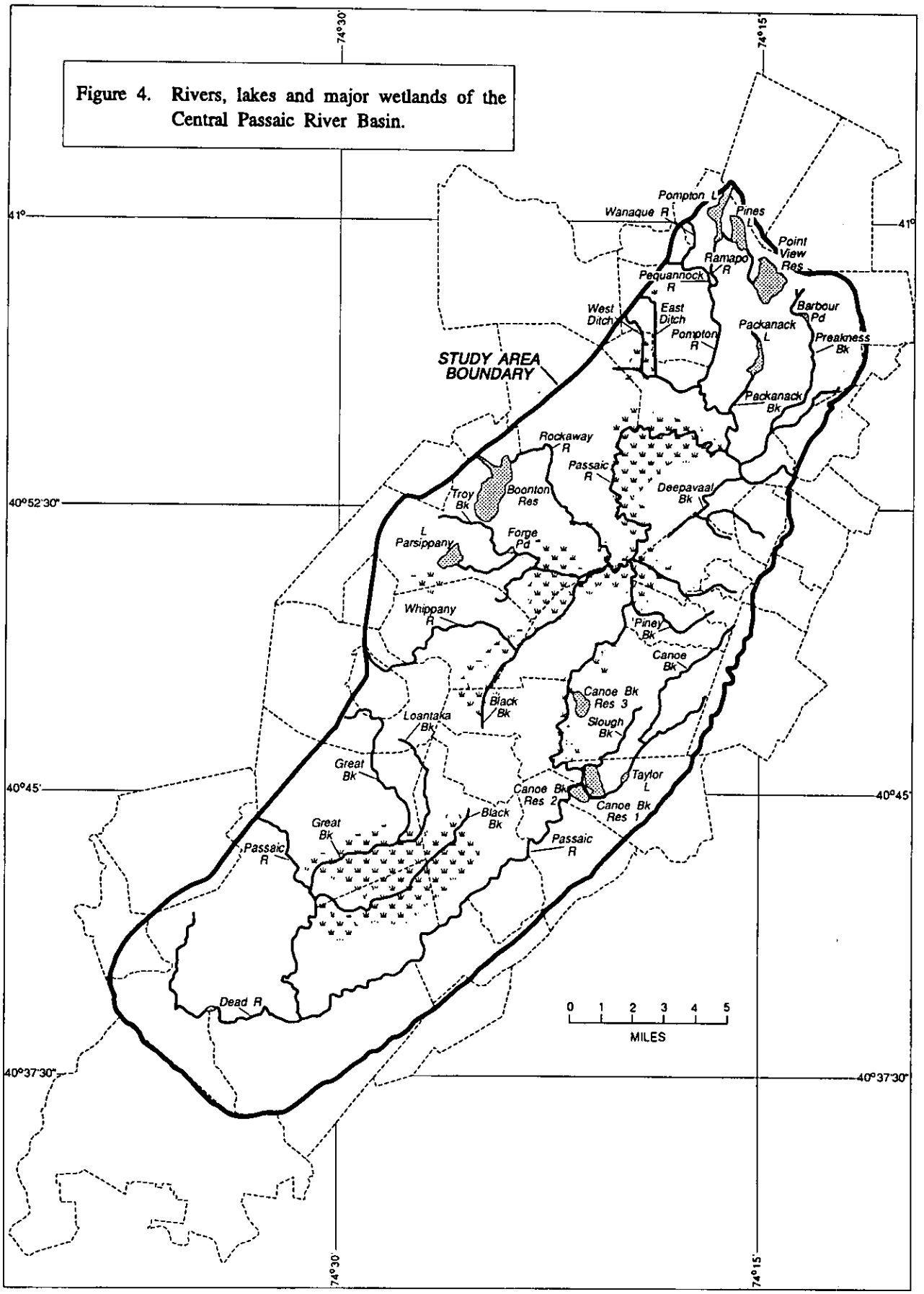


Figure 4. Rivers, lakes and major wetlands of the Central Passaic River Basin.

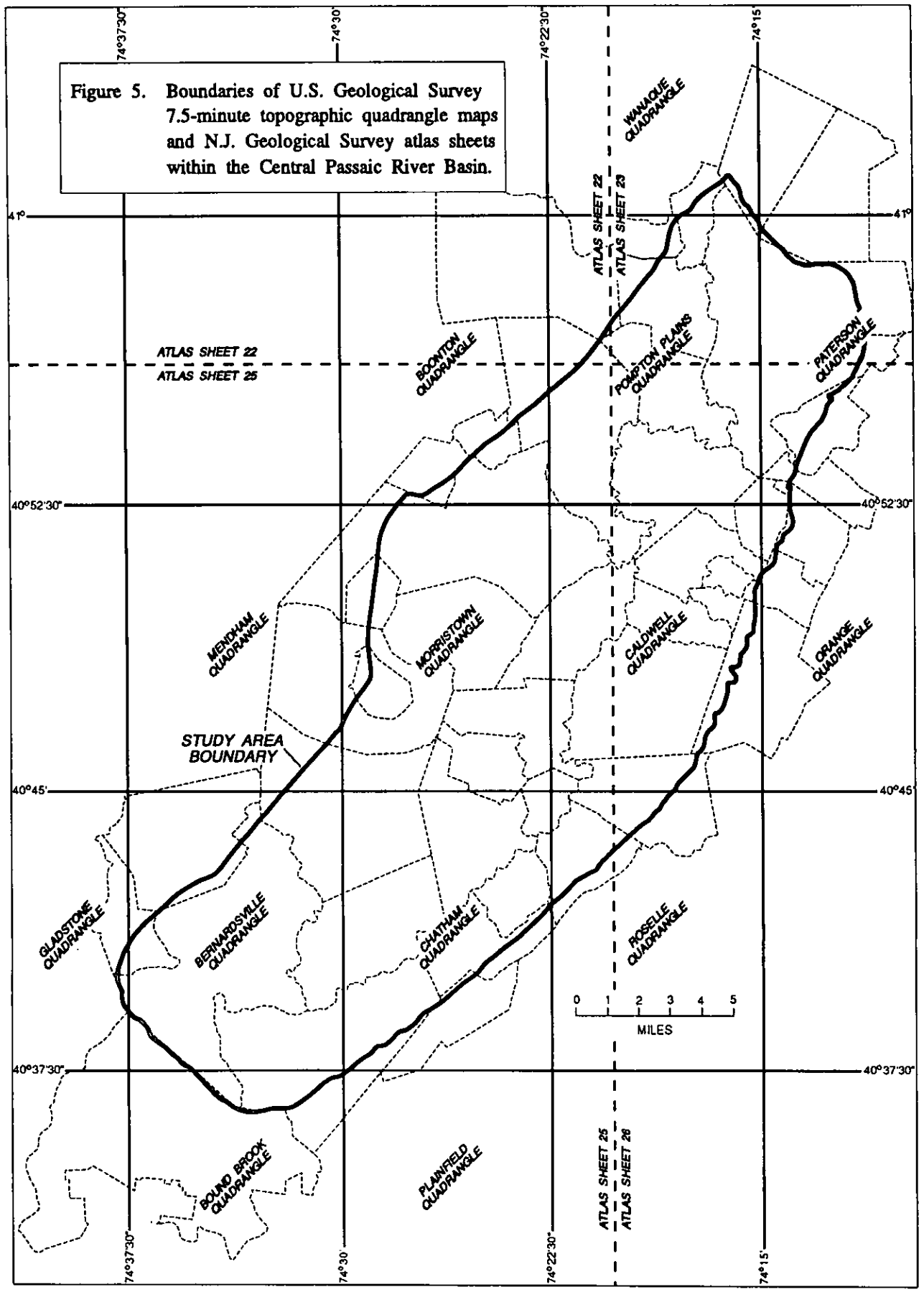


Figure 5. Boundaries of U.S. Geological Survey 7.5-minute topographic quadrangle maps and N.J. Geological Survey atlas sheets within the Central Passaic River Basin.

To overcome problems in matching pumpage records to particular wells, the Bureau of Water Allocation now requires that wells be assigned unique local names and that pumpage be reported by individual well according to permit number.

Ground Water Site Inventory (GWSI) Numbers:

The Ground Water Site Inventory (GWSI) is a data base maintained by the USGS. The GWSI well number consists of a two-digit county code followed by a sequential number. County codes used in this study are:

County	Code
Bergen	03
Essex	13
Morris	27
Passaic	31
Somerset	35
Union	39

As an example, GWSI 390164 is the 164th well inventoried by the USGS in Union County.

The GWSI data base stores site and geologic data for wells, and also some water-use information. In addition, GWSI numbers are used to access data in the following USGS data bases:

1) The Automated Data Processing System (ADAPS), which holds water-level data.
2) The QWDATA database, which holds water-quality data.
3) The State Water Use Data System (SWUDS), which stores ground-water withdrawal data.

These data bases are components of the National Water Information System (NWIS). New Jersey information is maintained by the New Jersey District Office of the USGS. Tables 11 and 12 (at end of report) report GWSI numbers for wells inventoried by the USGS.

Acknowledgments

Mike Bleicher, New Jersey Bureau of Water Allocation, and Dee-Fun Sun Chu and Rich Henne, NJGS, helped significantly in compiling pumpage data. Bill Hutchinson, Southeast Morris County Municipal Utility Authority, and Tony Scillia, East Orange Water Department, provided pumpage data for their systems. Walt Jones, USGS-Water Resources Division, provided USGS water-level data. Scott Stanford, NJGS, and Byron Stone, USGS-Geologic Division, provided invaluable assistance in interpreting glacial and bedrock geology. Salvatore DiBiasse, Madison Water Department, helped with the history of Madison's wells. Mark French, Bill Graff, and Zehdreh Allen-Lafayette, NJGS, produced the maps through the wizardry of GIS. Maria Baratta, NJDEPE Information Resource Center, assisted with retrieval and interpretation of census data. And many thanks to Evelyn Hall and Jeff Kearns, NJGS, for braving heat, cold, wasps, ticks and giant crickets to measure water levels in many inconvenient places.

GROUND-WATER SYSTEM

Two aquifers supply ground water in the Central Passaic River Basin. A bedrock aquifer consists primarily of sedimentary and igneous rocks of the Upper Triassic and Lower Jurassic Brunswick Group (fig. 6, table 1). A surficial aquifer consists primarily of Pleistocene and Holocene glacial and postglacial stratified sediments (table 1) mantling the entire CPRB, but thickest within a series of interconnected buried valleys crossing the study area (fig. 7). A few production wells which withdraw water for use within the study area are drilled in granite and gneiss of Proterozoic age just west of the Ramapo Fault. These are included as noted in "Location and extent of study area."

Of the two aquifers, the surficial is the more productive, but its high-yielding areas are of limited aerial extent. The bedrock aquifer system is far less productive, but underlies the entire area.

The two aquifers are hydraulically connected. Geraghty & Miller, Inc., (1976) showed that in the Canoe Brook buried valley (fig. 7) pumping in one system affected water levels in the other. For overall water-supply purposes, the two aquifers can be considered as forming one aquifer system.

SURFICIAL AQUIFER

Unconsolidated glacial sediments (table 1) mantle most of the CPRB (Darton and others, 1908; Stanford, Witte, and Harper, 1990). The maximum thickness of these sediments in the CPRB, in northeast Morris Township, is more than 300 feet. Postglacial sediments, including sand, gravel, silt and peat, are a minor component overlying the glacial deposits. In some places weathered bedrock, especially weathered conglomerate, may contribute to the total thickness of unconsolidated materials. All unconsolidated materials above unweathered bedrock, where they can produce sufficient ground water to meet a specified need, are considered part of the surficial aquifer.

Table 1. Geologic column for the Central Passaic River Basin

Era	Series	Million years ago	Stratigraphic unit or sediment type[1]		Alternate stratigraphic designation[2]	Thickness[3] (ft., max.)	Lithology[1]	Aquifer
Cenozoic	Holocene	0.016-0.0	alluvial and marsh			alluvial and marsh: 20	sand, gravel, silt, mud, peat	surficial
	Pleistocene	1.0-0.016	stratified drift (includes fluvial, deltaic, lacustrine fan, and lake-bottom sediments)	till (includes terminal moraine and other moraines)		lacustrine fan, delta: 200	sand and gravel	
						fluvial: 30	sand and gravel	
						lake bottom: 200	clay, silt and fine sand	
						moraines: 100?	nonstratified silt, sand, gravel and boulders	
						till: 40	nonstratified silt, sand, gravel and boulders	
Major unconformity								
Mesozoic	Lower Jurassic	208-187	Newark Supergroup, Brunswick Group	Boonton Formation		Brunswick Formation conglomerate	Boonton: 1,640	sandstone, siltstone, shale, conglomerate	bedrock
				Hook Mountain Basalt	Third Watchung Basalt		Hook Mt.: 361	basalt	
				Towaco Formation			Towaco: 1,115	sandstone, siltstone, shale, conglomerate	
				Preakness Basalt	Second Watchung Basalt		Preakness: 984	basalt	
				Feltville Formation			Feltville: 1,969	sandstone, siltstone, shale, conglomerate	
				Orange Mountain Basalt	First Watchung Basalt		Orange Mt.: 656	basalt	
	Upper Triassic	230-208		Passaic Formation			Passaic: 8,760	sandstone, siltstone, shale, conglomerate	
Major unconformity									
Proterozoic	Middle Proterozoic	1600-900	granite, gneiss		Losee Gneiss, Byram Gneiss	not known	hornblende and biotite granite, oligoclase-quartz gneiss	bedrock	

Based on New Jersey Geological Survey, 1990.

[1]Modified from Stanford and others, 1990; Lyttle and Epstein, 1987.

[2]Alternate stratigraphic designations for Mesozoic units from Johnson, 1950, are superceded but commonly used.

[3] Estimated maximum thicknesses for Cenozoic units from Scott Stanford, NJGS, oral communication, 1991. These apply only to the study area. Measured maximum thicknesses for Mesozoic from Lyttle and Epstein, 1987.

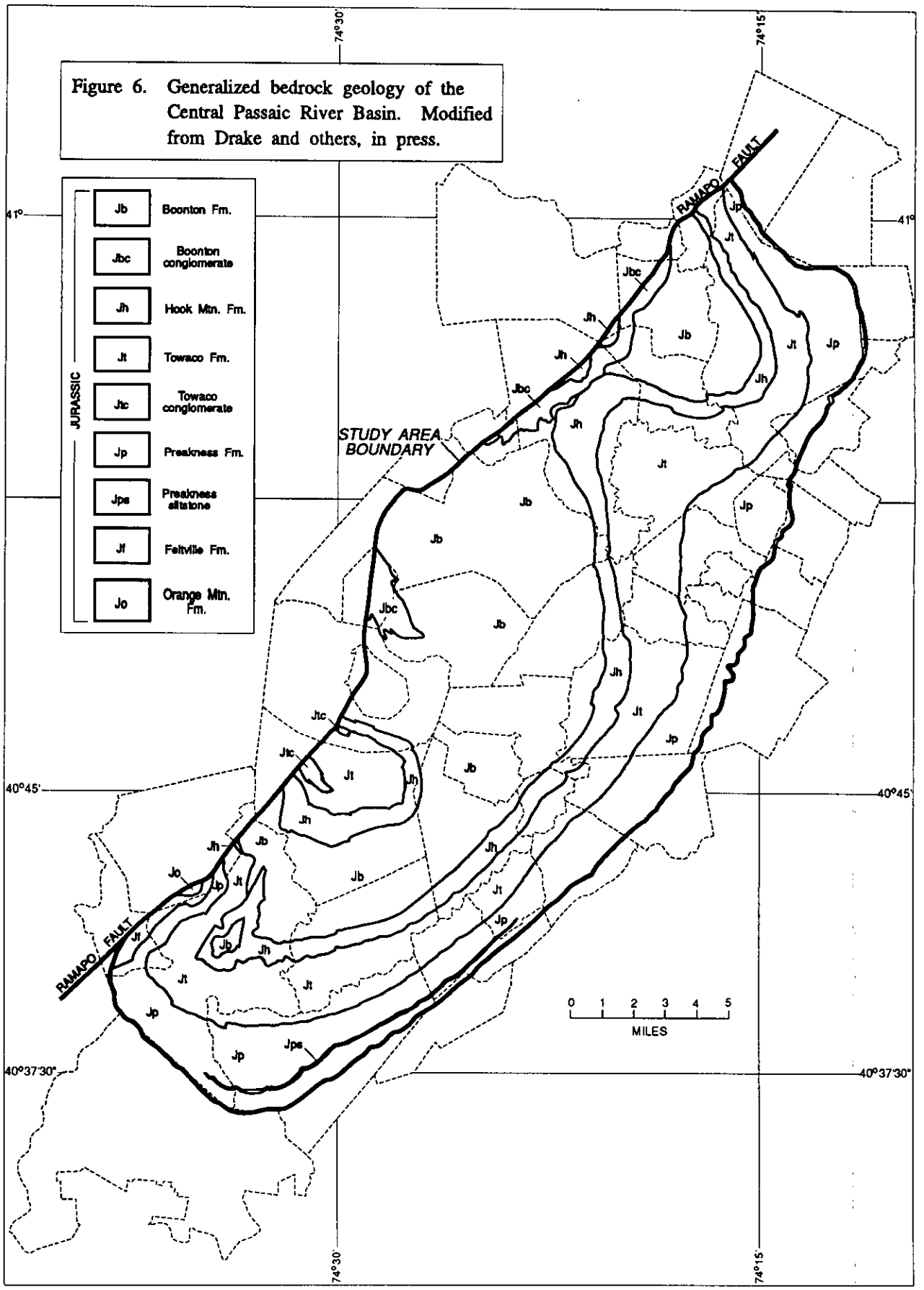


Figure 6. Generalized bedrock geology of the Central Passaic River Basin. Modified from Drake and others, in press.

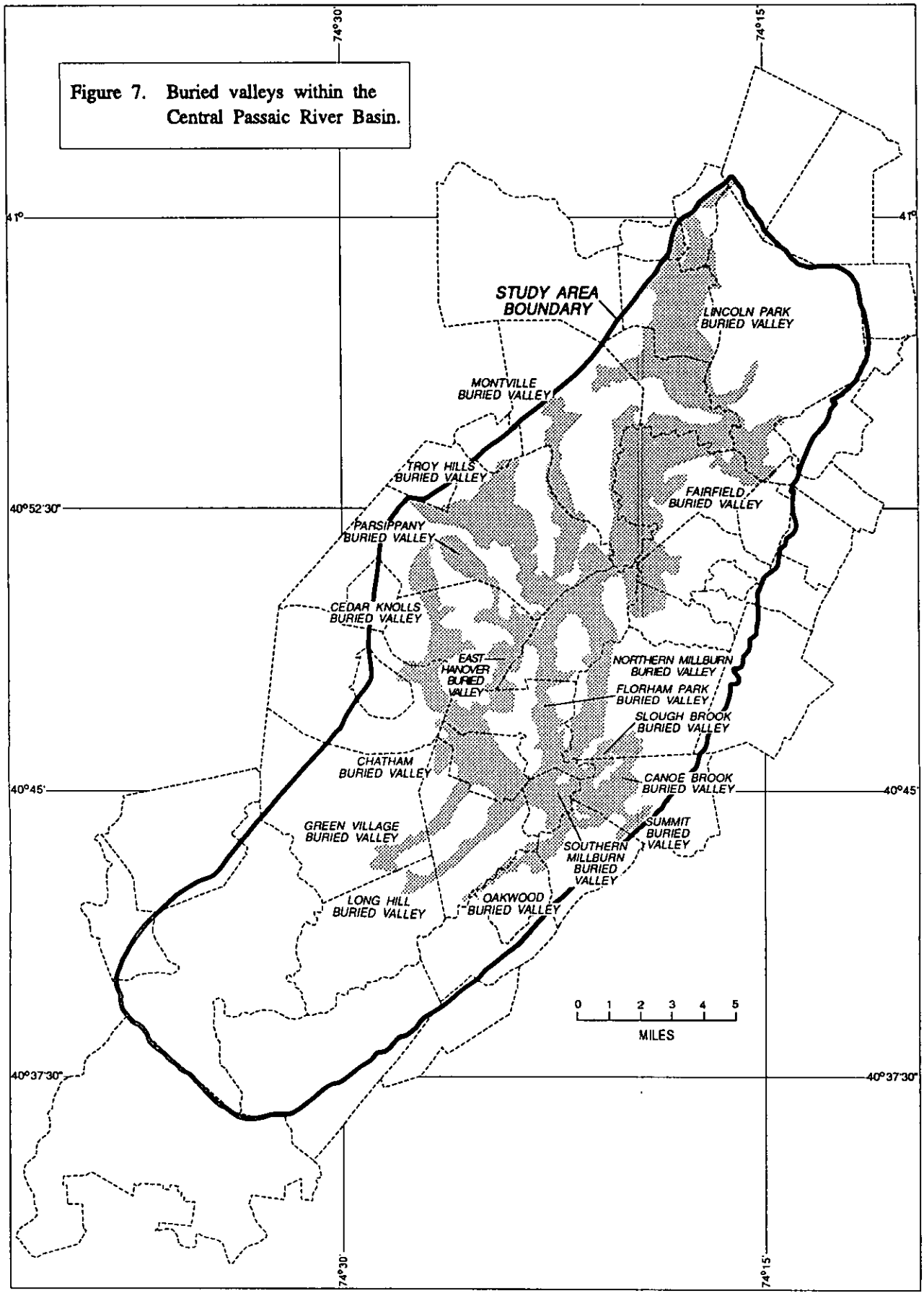


Figure 7. Buried valleys within the Central Passaic River Basin.

The glacial deposits can be subdivided into five types based on depositional environment and composition (Stanford, Witte, and Harper, 1990). They are:

1) deltaic and lacustrine fan sediments
2) fluvial sediments
3) lake-bottom sediments
4) till
5) morainal depostis

Deltaic and lacustrine fan sediments were deposited in glacial lakes, usually near the ice-water contact. They are composed of stratified sands and gravels. Fluvial sediments were deposited by meltwater streams and rivers on alluvial plains or in stream beds. Generally they also consist of stratified sands and gravels. The deltaic and lacustrine fan sediments and the fluvial sediments can be highly productive if thick enough. Together they supply most of the ground water produced within the CPRB.

Lake-bottom sediments are generally made up of stratified clay, silt, and fine-grained sand deposited on the bottoms of glacial lakes. Lake-bottom sediments generally do not yield significant volumes of water and act as a semiconfining unit.

Deltaic and lacustrine fan, fluvial, and lake-bottom sediments can be grouped together as stratified drift.

Till consists of nonstratified and nonsorted material deposited directly by a glacier. It is generally composed of silt, sand, gravel and boulders. Morainal deposits are composed predominantly of till built up along ice margins to form hills and knolls. They may include minor sand and gravel. Till and morainal deposits can be minor local aquifers, or can act as semiconfining units.

Postglacial materials, including alluvial and swamp deposits, overlie the glacial sediments in places. They are composed primarily of sand, gravel, silt, mud, and peat. The postglacial materials are thin and can not yield significant volumes of water. At some locations they may act as a semiconfining unit.

The surficial aquifer is most productive within the buried valleys in the northern two thirds of the study area (fig. 7). Some of the valleys contain semiconfined and unconfined sand and gravel units up to 100 feet thick (Geraghty and Miller, Inc., 1976). Other buried valleys lack these productive water-bearing zones. The three buried valleys south of the terminal moraine (the Green Village, Long Hill and Oakwood buried valleys) and the Fairfield buried valley, north of the moraine, are filled mostly with fine-grained material.

Sands and gravels within the buried valleys are the most productive water-bearing zones within the CPRB, but are by no means the only productive zones within the surficial aquifer. At numerous locations outside the buried valleys, the overburden can support significant pumpage.

BEDROCK AQUIFER

The bedrock aquifer underlies the entire CPRB. It consists of Upper Jurassic and Lower Triassic sedimentary and igneous formations of the Brunswick Group (fig. 6, table 1). A few wells to the west of the Ramapo Fault tap Precambrian rocks of the New Jersey Highlands (plate 1). These wells are outside the CPRB, but are included in this study because of their proximity and because they supply water to the CPRB.

Within the study area, exposed formations of the Brunswick Group are, from oldest to youngest, the Orange Mountain Basalt, Feltville Formation, Preakness Basalt, Towaco Formation, Hook Mountain Basalt, and Boonton Formation (table 1).

An older classification of the bedrock units (Lewis and Kummel, 1912) combines the Boonton, Towaco, Feltville and Passaic Formations and the conglomerates as the Brunswick Formation. The Hook Mountain, Preakness, and Orange Mountain Basalts are combined as the Watchung Basalts. This older usage is still used extensively by well drillers, local and state officials, and others.

The sedimentary units of the Brunswick Group are on the whole more productive than the igneous units, and supply most of the water pumped from the bedrock. But in all of the bedrock units, success can not be predicted in advance of drilling a high-yield well. Locating a productive bedrock well is usually a trial-and-error process involving geological knowledge, hydrogeological insight, and luck.

CONCEPTUAL MODEL OF GROUND-WATER FLOW

A conceptual model of ground-water flow used in the basin by Meisler (1976) and Hoffman (1989b) assumes recharge at higher elevations. Ground water flows steeply downwards, then laterally, to discharge at lower elevations.

In the surficial aquifer, ground-water recharge occurs where sands and gravels are exposed above the water table, or through semiconfining units where the water levels in the aquifer are below the land surface. Ground-water flows to lower-lying, semiconfined portions of the aquifer, then discharges either upwards or to production wells. In the bedrock aquifer, water enters in upland areas and flows toward low lying areas. It discharges upwards through the surficial sediments to the swampy lowlands or moves to wells. Ground water also enters the bedrock where it is covered by surficial deposits if water levels in the overlying deposits are higher than those in the bedrock.

In this report it is assumed that under prepumpage conditions, ground water may have exited the CPRB in three ways: 1) upward flow to the surface followed by evaporation, transpiration or discharge to a surface water body, 2) lateral underground flow (underflow) through unconsolidated sediments along the CPRB boundary, or 3) lateral flow through bedrock (Precambrian rock to the west or basalts to the north, east and south). Under current conditions, a fourth way is by pumpage.

The first of these discharges, upward flow to the land surface was likely the primary destination of ground water under pre-pumpage conditions. Whether or not this is still true is unclear, but upward flow to the land surface has been significantly reduced due to the lowering of water levels by a century of pumping. Ground-water heads are still above land surface in some areas, signifying that the gradient and flow are upwards to the land surface. But, based on Water Allocation Permit hearing records (discussed below), these areas are smaller than before pumpage began. In much of the study area, flow under lowlands is now downwards. A later hydrogeological study of the basin will evaluate the extent of this flow reversal.

The second possible way for ground-water to leave the area, lateral underground flow through unconsolidated sediments, is unlikely. The only stream leaving the area, the Passaic River, flows across a continuous basalt ledge at Little Falls. Elsewhere along the border of the CPRB, significant thicknesses of unconsolidated sediment are in a gap through the First and Second Watchung Mountains at Short Hills (fig. 2), in a gap in the Highlands escarpment between Mountain Lakes and Mt. Tabor, along the Wanaque River and Posts Brook near Pompton Lakes, and along the Ramapo River at Oakland. The gap at Short Hills (fig. 2) is the presumed preglacial surface-water outlet through the Watchung Mountains (Darton and others, 1908). This gap is now filled by Pleistocene morainal material of low hydraulic conductivity (Stanford, Witte, and Harper, 1990). Recent geophysical work shows that the buried bedrock gap is narrow, less than 300 feet wide at its narrowest, and the filling material is about 100 feet thick (Ghatge and Hall, 1991). With the low hydraulic conductivity of the sediment and the small cross-sectional area of the gap, only a small quantity of ground water could exit here annually.

The gap between Mountain Lakes and Mt. Tabor marks the pre-glacial course of the Rockaway River and contains a semi-confined aquifer continous between the upper part of the Rockaway Valley and the CPRB. Water-level measurements in this aquifer demonstrate that flow is into, rather than out of, the CPRB (Schafer and others, 1993).

While it is possible that pumpage along the Post Brook valley or along the Ramapo Valley in Oakland might cause minor local underflow out of the CPRB, in a direction opposite to that of surface drainage, there is no evidence for any such underflow and no reason to believe that it has ever occurred.

The third way for ground-water to leave the area is through bedrock. The basalts and Precambrian crystalline rocks, though, have low permeabilities, and flow paths to potential discharge points are generally several miles long (Gill and Vecchioli, 1965; Ganser, 1987). For these reasons, it can reasonably be assumed that the volume of ground-water outflow through bedrock is a negligible component of the overall ground-water budget.

The fourth way for ground-water to exit the CPRB is by pumpage. Most of the water withdrawn from the aquifers of the CPRB is discharged to surface waters after passing through a sewage treatment plant, or is pumped for export from the basin. In either case only a negligible volume, if any, returns to the aquifers.

Pumpage in the study area has had several effects on ground water. Withdrawals have created significant drawdowns in the surficial aquifer system. As groundwater divides moved away from pumping centers ground-water flow has been re-directed towards these centers. More recharge has been induced into the aquifers, and the discharge has decreased. This report does not examine these phenomena; they will be treated in a following report on the hydrogeology of the study area.

GROUND-WATER WITHDRAWALS

PREVIOUS COMPILATIONS

A variety of studies and projects list ground-water withdrawals from all or part of the Central Passaic River Basin. Private firms, including Geonics, Inc., (1978, 1979a,b) and Geraghty & Miller, Inc. (1976), have documented withdrawals for clients. The USGS-Water Resources Division has conducted a series of investigations including Gill and Vecchioli (1965), Meisler (1976), and Nemickas (1976). The USGS also maintains a computerized file of withdrawal data in its State Water Use Data System. Reports of the New Jersey Department of Environmental Protection and Energy (NJDEPE) and its predecessors include Thompson (1932) and Hoffman (1989b). The Passaic River Coalition also has prepared a hydrogeological report (Van Abs, 1986) that contains withdrawal data.

Bureau of Water Allocation Records

Much of the ground-water-withdrawal data for this report and previous compilations is from NJDEPE Bureau of Water Allocation records, and was gathered under state programs under NJAC 7:19-1,2,3 to ensure responsible development of New Jersey's ground water. Beginning in 1907 with Water Policy Commission regulations, all users capable of withdrawing 100,000 gallons per day or more have been required to obtain water-allocation (diversion) permits (Goldshore, 1983). The Commission heard requests for new or additional sources of ground and surface water for public water supplies.

In 1945, the Commission's functions were transferred to the Water Policy and Supply Council. In 1948, the Council was transferred to the newly-created Department of Conservation and Economic Development. The Department was reorganized in 1970 to become the Department of Environmental Protection. Simultaneously, the Water Policy and Supply Council was abolished and its responsibilities transferred to the Bureau of Water Allocation.

Because of the Bureau of Water Allocation's long history, its records include an abundance of unique withdrawal and water level data, related background data, testimony, and, occasionally, court transcripts.

Ground-water purveyors listed on table 2 are from files of the NJDEPE, Bureau of Water Allocation. Any municipal or industrial ground-water user without a permit would not be represented. However, due to the active permitting and investigating of the NJDEPE, it is believed that no major purveyors are missing.

Bureau of Safe Drinking Water Records

The NJDEPE Bureau of Safe Drinking Water collects information on water quality for municipal and public water purveyors. The public water supply identification numbers assigned by this bureau for CPRB suppliers are included on table 2.

MUNICIPAL AND INDUSTRIAL GROUND-WATER SUPPLIES

Pumpage increases in the Central Passaic River Basin are a response to population increases (table 3), rising per capita use, and industrial and commercial development.

Additional demand and locally concentrated pumpage also comes from the increasing interconnectness of water supply systems within and bordering the CPRB. Because of these interconnections, increase in demand through a wide area may be supplied by an increase in pumpage in a much smaller area. A localized water shortage or emergency in one municipality can generally be met by pumpage from a different municipality.

As an example of interconnectedness, the New Jersey-American Water Company has 20 interconnections with other water departments to facilitate the exchange of water within and outside of the study area (New Jersey-American Water Co., 1989). Additionally, the New Jersey-American service area extends across the CPRB boundaries, and some water pumped from the study area is supplied to outside users. To give a rough impression of the magnitude of the population potentially served by CPRB water, table 4 shows populations for the six counties with areas in the CPRB.

Well information and ground-water-withdrawal data (table 13, at the end of this report) for the Central Passaic River Basin are incomplete. Many owners reported only total pumpage from an entire well field and not a breakdown by individual well. For this reason, table 13 includes entries showing total well field pumpage in addition to entries for each well for some owners. Current state regulations (NJAC 7:19-1,2,3) require reporting on a well-by-well basis.

Pumpage data in table 13 are reported on a yearly basis in millions of gallons. This reflects the way purveyors report pumpages to the NJDEPE. The annual volume could be converted into a monthly or daily

Table 2. Water-allocation permit number, 1990 allocated and actual pumpage, and public-water-supply identification number

Purveyor	Allocation permit number[1]	Public supply number[2]	1990 pumpage (million gallons) allocated	actual	Comments
Allied Corporation	2117P		399.17	257.67	
Amerace (formerly Daven)	2146P		66.96	0.00	Reinjected
AT&T Laboratories	10352W		36.50	0.00	
Automatic Switch	10323W		36.50	0.01	
Boonton Electronics	2333P		107.16	9.83	
Canoe Brook Country Club	10162W		36.50	4.03	Irrigation
Carteret S&L	10395W		36.50	16.00 E[3]	
Cedar Hill Country Club	2265P		60.00	10.53	Irrigation
Chatham Borough	5046	1404001	598.92	380.42	
Chemical Bank (Horizon Bank)	10396W		36.50	4.30	
Ciba-Geigy Corp. Pharm. Div.	2158P		294.62	120.02	
Colony Pool, Chatham Twp.	10248W		36.50	6.82	
East Hanover Township	5072	1410001	837.00	502.69	
East Orange - all well fields	5040, 5041		3960.00	3434.17	Exported
Essex Co. Parks & Rec.	10468W		36.50	0.18 E	
Essex Fells Township	5114, 5115	0706001	1860.00	952.17	
Evans-Shore Const. Co	10322W		36.50	0.00	
Exxon Research & Engineering	2339P		120.00	59.26	
Fairfield Borough	5102	0707001	673.32	281.27	
Fairleigh Dickenson Univ.	none		none	24.00 E	
Fairmount Country Club	2305P		135.60	2.30	Irrigation
Florham Park Water Dept.	5214	1411001	651.00	409.81	
Gates of Heaven Cemetary	none		none	1.00 E	Irrigation
Givaudan Corp (FD&O)	2199P		234.36	138.71	
Jersey Central P&L, Morristown	10180W		36.50	0.00	
Livingston Township	5074	0710001	1785.60	946.27	
M. Polaner, Inc.	10159W		36.50	17.10	
Madison Borough	5069	1417001	1302.00	674.12	
Madison Golf Club	10411W		36.50	1.00 E	Irrigation
Mennen Company	2078P		120.00	27.07	
Montville Township MUA	5180	1425001	1039.00	524.14	
Morris Co. Golf Club	2025P		80.40	8.12	Irrigation
Morristown Memorial Hospital	2196P		300.00	70.00	
Mountain Lakes Water Dept	5238		360.84	247.76	
Mountain Ridge Country Club	2263P		54.00	22.47	Irrigation
NJ-American Passaic Riv., Canoe Brk. fields	5008	0712001	3789.47	2521.84	Some exported
Noe Pierson Corporation	2304P		111.60	28.24	
Orange Products, Inc.	2374P		36.50	39.04	
Packanack Lake Country Club	10488W		36.50	0.07	
Parsippany-Troy Hills W.D.	5236	1429001	3360.00	2432.78	
Pequannock Twp W.D.	5113	1431001	1272.24	555.65	
Pfizer Inc.	2206P		631.80	191.78	
Pompton Lakes Boro MUA	5315	1609001	720.00	446.09	
Preakness Hill Country Club	2297P		343.68	31.43	Irrigation
Precision Rolled Products	10088W		36.50	18.60	
Reheis Chemical Co.	2256P		494.88	202.14	
Reistoflex Corp.	2252P		42.00	0.00	
Riverdale Boro. W.D.	5067	1433001	148.80	79.01	
Sandoz Inc.	2118P		672.00	197.62	
Schering-Plough	10297W		36.50	2.32	
Sisters of Charity, St.Eliz.	10021W	1422001	36.50	22.73	
Southeast Morris County MUA	5264, 5299, 5300	1424001	2592.00	2406.04	
St. Barnabas Med. Center	10157W		36.50	0.00	
Surburban Propane	10015W		36.50	4.75	
Warner Lambert Company	2195P		264.12	72.00	
Wayne Township	5309	1614001	311.04	81.91	

[1]Bureau of Water Allocation, NJDEPE [2] Bureau of Safe Drinking Water, NJDEPE [3] 'E' indicates pumpage value estimated

Table 3. Population served all or in part by ground water from the Central Passaic River Basin

Municipality	Reported population						
	1930[1]	1940[1]	1950[1]	1960[1]	1970[1]	1980[1]	1990[2]
Bergen County							
Franklin Lakes Borough	893	1,203	2,021	3,316	7,550	8,769	9,873
Oakland Borough	735	932	1,817	9,446	14,420	13,443	11,997
Essex County							
Caldwell Borough	5,144	4,932	6,270	6,942	8,677	7,624	7,549
Cedar Grove Township	4,793	5,208	8,022	14,603	15,582	12,600	12,053
Essex Fells Township	1,115	1,466	1,617	2,174	2,541	2,362	2,139
Fairfield Borough	989	1,392	1,906	3,310	6,884	7,987	7,615
Livingston Township	3,476	5,972	9,932	23,124	30,127	28,040	26,609
Millburn Township	8,602	11,652	14,560	18,799	21,089	19,543	18,630
North Caldwell Borough	1,492	1,572	1,781	4,163	6,733	5,832	6,706
Roseland Borough	1,058	1,556	2,019	2,804	4,453	5,330	4,847
Verona Township	7,161	8,957	10,921	13,782	15,067	14,166	13,597
West Caldwell Township	2,911	3,458	4,666	8,314	11,913	11,407	10,422
West Orange Township	24,327	25,662	28,605	39,895	43,715	39,510	39,103
East Orange City	68,020	68,945	79,340	77,259	75,471	77,878	73,552
Morris County							
Boonton Town	6,866	6,739	7,163	7,981	9,261	8,620	8,343
Chatham Borough	3,869	4,888	7,391	9,517	9,566	8,537	8,007
Chatham Township	1,115	2,026	2,825	5,931	8,093	8,883	9,361
East Hanover Township	946	1,579	2,151	4,379	7,734	9,319	9,926
Florham Park Borough	1,269	1,609	2,385	7,222	9,373	9,359	8,521
Hanover Township	2,516	2,812	3,756	9,329	10,700	11,846	11,538
Harding Township	1,206	1,565	1,970	2,683	3,249	3,236	3,640
Kinnelon Borough	428	745	1,350	4,431	7,600	7,770	8,470
Lincoln Park Borough	1,831	2,186	3,376	6,048	9,034	8,806	10,978
Madison Borough	7,481	7,944	10,417	15,122	16,710	15,357	15,850
Montville Township	2,567	3,207	4,159	6,772	11,846	14,290	15,600
Morris Plains Borough	1,713	2,018	2,707	4,703	5,540	5,305	5,219
Morris Township	5,565	6,107	7,432	12,092	18,135	18,486	19,952
Morristown Town	15,197	15,270	17,124	17,712	17,662	16,614	16,189
Mountain Lakes Borough	2,132	2,205	2,806	4,037	4,739	4,153	3,847
Parsippany-Troy Hills Twp.	6,631	10,976	15,290	25,557	55,112	49,868	48,478
Passaic Township	2,149	2,664	3,429	5,537	7,393	7,275	7,826
Pequannock Township	2,104	2,856	5,254	10,553	14,350	13,776	12,844
Riverdale Borough	1,052	1,110	1,352	2,596	2,729	2,530	2,370
Passaic County							
Haledon Borough	4,812	5,303	6,204	6,161	6,767	6,607	6,951
Little Falls Township	5,161	5,368	6,405	9,730	11,727	11,496	11,294
North Haledon Borough	2,157	2,761	3,550	6,026	7,614	8,177	7,987
Pompton Lakes Borough	3,104	3,189	4,654	9,445	11,397	10,660	10,539
Totowa Borough	4,600	5,130	6,045	10,897	11,580	11,448	10,177
Wayne Township	4,469	6,868	11,822	29,353	49,141	46,474	47,025
Somerset County							
Bedminster Township	1,374	1,606	1,613	2,322	2,597	2,469	7,086
Bernards Township	2,293	4,512	7,487	9,018	13,305	12,920	17,199
Bernardsville Borough	3,336	3,405	3,956	5,515	6,652	6,715	6,597
Bridgewater Township	3,352	4,934	8,234	15,789	30,235	29,175	32,509
Far Hills Borough	560	574	600	702	780	677	657
Warren Township	1,399	2,139	3,316	5,386	8,592	9,805	10,830
Watchung Borough	906	1,158	1,818	3,312	4,750	5,290	5,110
Union County							
Berkeley Heights Twp.	1,899	2,194	3,466	8,721	13,078	12,549	11,980
New Providence Borough	1,918	2,374	3,380	10,243	13,796	12,426	11,439
Summit City	14,556	16,165	17,929	23,677	23,620	21,071	19,757
TOTAL:	253,249	289,093	366,293	546,430	708,679	686,480	688,788

Note: Percentage of each township in the Central Passaic River Basin shown in table 7.

[1]US census data reported in NJ Department of Labor, 1984

[2]US census data reported in NJ State League of Municipalities, 1991

Year	Counties					
	Bergen	Essex	Morris	Passaic	Somerset	Union
1880[a]	36,786	189,929	50,861	68,860	27,162	55,571
1890[a]	47,226	256,098	54,101	105,046	28,311	72,467
1900[a]	78,441	359,053	65,156	155,202	32,948	99,353
1910[a]	138,002	512,886	74,704	215,902	38,820	140,197
1920[a]	210,703	652,089	82,694	259,174	47,991	200,157
1930[a]	364,977	833,513	110,445	302,129	65,132	305,209
1940[a]	409,646	837,340	125,732	309,353	74,390	328,344
1950[a]	539,139	905,949	164,371	337,093	99,052	398,138
1960[a]	780,255	923,545	261,620	406,618	143,913	504,255
1970[a]	897,148	932,526	383,454	460,782	198,372	543,116
1980[a]	845,385	851,304	407,630	447,585	203,129	504,094
1990[b]	825,380	778,206	421,353	453,060	240,279	493,819
2000[c]	878,700	795,500	510,500	469,100	261,200	539,700
2010[c]	904,000	762,300	570,500	462,000	285,400	540,000

Table 4. Population trends, Bergen, Essex, Morris, Passaic, Somerset and Union Counties, 1880-2010

Notes: County populations include areas outside of the Central Passaic River Basin

[a]Census data from N.J. Department of Labor, 1984

[b]Census data supplied by Maria Baratta, NJDEPE, Division of Science and Research

[c]Population projections from N.J. Department of Labor, 1985

pumpage rate. These rates, however, would be averages that could significantly differ from actual pumping rates for any particular well or well field for a specific time period.

Some data gaps have been filled by estimating values. Estimated withdrawals, indicated by the suffix "E," were based on linear interpolation.

Values in parentheses are totals based on other entries in table 13. As an example, in 1925 the total pumpage for all East Orange Water Department well fields (index number 55) was 1,360 million gallons. Since this is the sum of three values, it is shown in parentheses. This is the only pumpage reported for that year. Pumpage for the well fields active at the time was estimated based on the ratios among total well-field pumpage reported for later years. Thus, for index numbers 44, 49, and 54 (well-field totals for the Canoe Brook, Dickinson and Slough Brook fields, respectively) the data in table 13 are followed by "E."

Reported pumpage values which appear to be too high or low compared to other reported values from that purveyor are queried. For example, the Essex Fells Water Department (index number 76) reported a total pumpage of 1,280 million gallons in 1952, but only 665 million gallons in 1951 and 748 in 1953. The entry for 1952 is queried.

Individual wells are listed even if no pumpage data are available. This is to emphasize that total pumpage is from distributed sources even though only a summed value may have been reported

Total annual pumpage by the municipal and industrial suppliers in the CPRB (figs. 8, 9, table 5) increased from 603 million gallons in 1898 to 18,487 million gallons in 1990 (table 6). The maximum was 19,348 million gallons in 1988.

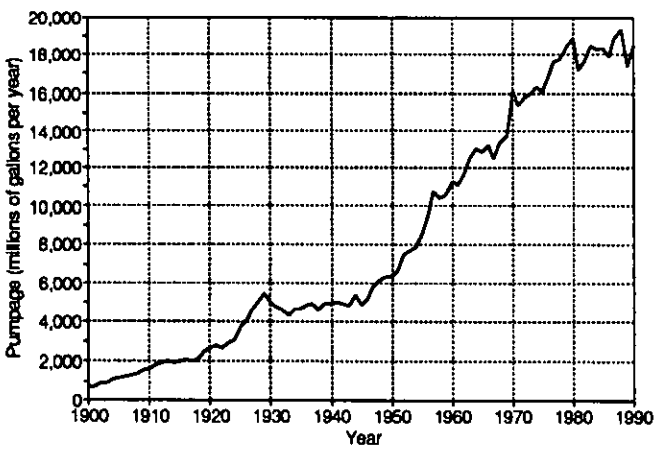


Figure 8. Total municipal and industrial pumpage in the Central Passaic River Basin, 1898-1990

Table 5. Total Municipal and industrial ground-water pumpage, Central Passaic River Basin, 1898-1990

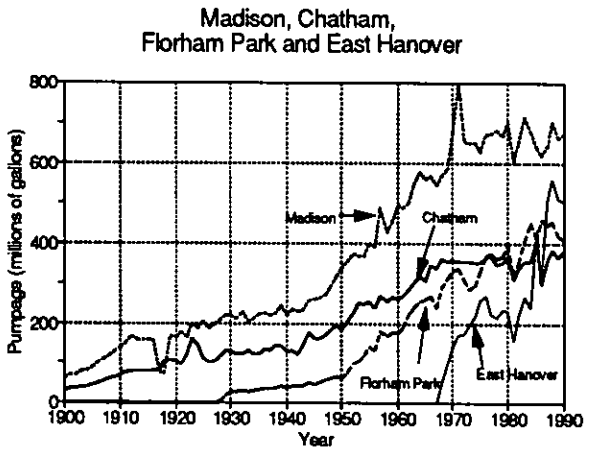
Year	Gallons (millions)	Year	Gallons (millions)
1898	603	1945	5,041
1899	659	1946	5,415
1900	710	1947	5,960
1901	726	1948	6,344
1902	910	1949	6,529
1903	926	1950	6,598
1904	1,100	1951	6,872
1905	1,146	1952	7,669
1906	1,232	1953	7,916
1907	1,321	1954	8,097
1908	1,337	1955	8,747
1909	1,599	1956	9,763
1910	1,651	1957	10,995
1911	1,861	1958	10,615
1912	1,959	1959	10,769
1913	2,100	1960	11,468
1914	1,993	1961	11,334
1915	2,081	1962	11,895
1916	2,129	1963	12,745
1917	2,117	1964	13,237
1918	2,186	1965	13,322
1919	2,528	1966	13,390
1920	2,733	1967	12,665
1921	2,975	1968	13,584
1922	2,837	1969	13,958
1923	3,135	1970	16,281
1924	3,252	1971	15,604
1925	3,795	1972	15,921
1926	4,157	1973	16,179
1927	4,648	1974	16,510
1928	5,109	1975	16,355
1929	5,495	1976	17,182
1930	5,113	1977	17,825
1931	4,716	1978	18,015
1932	4,635	1979	18,835
1933	4,302	1980	19,171
1934	4,668	1981	17,243
1935	4,696	1982	17,679
1936	4,886	1983	18,471
1937	4,910	1984	18,277
1938	4,565	1985	18,384
1939	4,923	1986	17,938
1940	4,964	1987	18,902
1941	5,034	1988	19,348
1942	5,223	1989	17,365
1943	5,046	1990	18,487
1944	5,537		

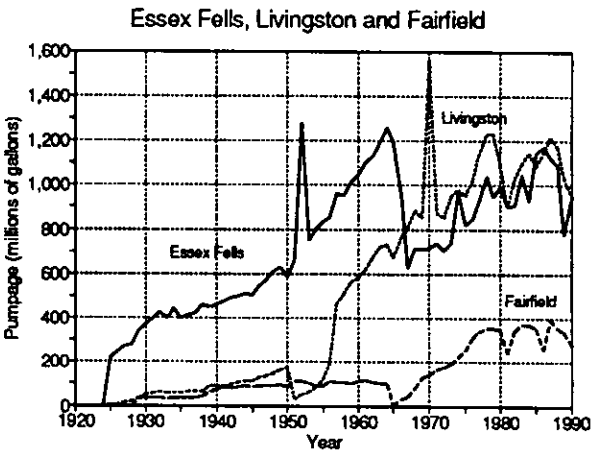
Data primarily from NJDEPE Bureau of Water Allocation files.

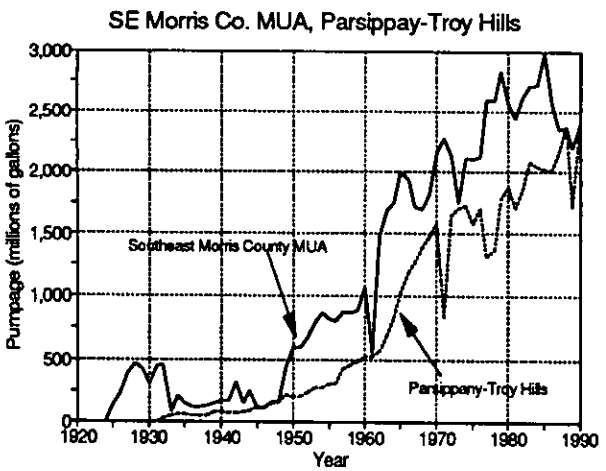
Table 6. Municipal and industrial ground-water pumpage by municipality, Central Passaic River Basin, 1990

Municipality	Gallons (millions)
Essex County	
Essex Fells Township	392.75
Fairfield Borough	292.51
Livingston Township	2,766.52
Millburn Township	3,052.19
Roseland Borough	515.02
West Caldwell Township	72.74
Morris County	
Chatham Borough	380.42
Chatham Township	37.36
East Hanover Township	858.62
Florham Park Borough	1,652.98
Hanover Township	1,941.17
Harding Township	187.75
Madison Borough	677.44
Montville Township	524.14
Morris Plains Borough	134.20
Morris Township	293.35
Morristown Town	172.00
Mountain Lakes Borough	247.76
Parsippany-Troy Hills Township	2,771.87
Pequannock Township	555.65
Riverdale Borough	79.01
Passaic County	
Pompton Lakes Borough	446.09
Wayne Township	113.41
Union County	
Berkeley Heights Township	202.14
Summit City	120.02
TOTAL:	18,487.11

This table includes all reported industrial and municipal ground-water pumpage from the Central Passaic River Basin in 1990. Some water was exported from the basin. Data from NJDEPE Bureau of Water Allocation files.







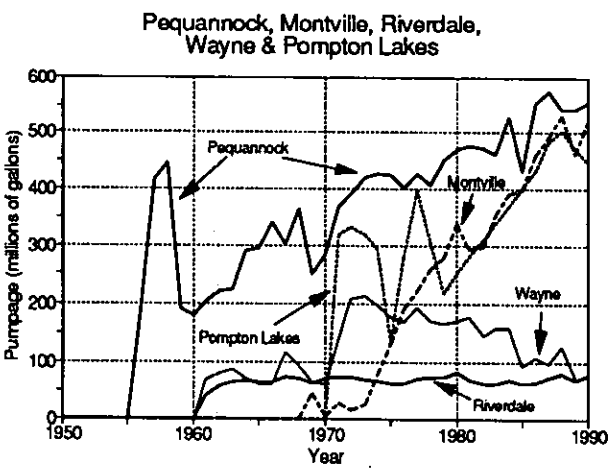


Figure 9. Municipal pumpage in the Central Passaic River Basin, by purveyor.

DOMESTIC GROUND-WATER SUPPLIES

The volume of water supplied yearly by domestic wells in the study area was estimated by multiplying the number of people served by domestic wells by a per person rate of water use.

The number of people served by domestic wells was estimated by multiplying the total number of domestic wells by the number of people per home. (Each well was assumed to serve a single home.) Based on 1980 census data, an estimated 20,400 domestic wells supply water to homes in the municipalities wholly or partially in the CPRB (table 7). Multiplying the number of wells in each municipality by the fraction of the municipality located in the study area results in an estimate of approximately 9,600 domestic wells in the CPRB.

The per person rate of water use was estimated using rates measured in previous studies. From 11 rural homes Siegrist and others (1976) found an average daily use of 42.6 gallons per day per person. These homes reported no irrigation or lawn watering. From 41 urban and suburban areas with significant lawn watering, Linaweaver and others (1967) recommended 100 gallons per day per person as a planning estimate. For this study, a value of 50 gallons per day per person was used to place a lower bound on the volume of water pumped by domestic wells.

Census data from 1990 were used to estimate the number of people per home. The total county population was divided by the total number of housing units to yield an average number of people per home. For the six counties in the study area:

County	Population	Housing units	People/ home
Bergen	825,380	324,817	2.54
Essex	778,206	298,710	2.61
Morris	421,353	155,745	2.71
Passaic	453,060	162,512	2.79
Somerset	240,279	92,653	2.59
Union	493,731	187,033	2.64
Total:	3,212,009	1,221,470	2.63

Total population of the six counties was divided by total number of housing units for an overall estimate of 2.63 people per home.

In summary:

Domestic well pumpage = number of wells
x people per home x rate of use per person
= 9,600 wells x 2.63 people per home x 50 gallons per person per day x 365 days per year
= 460 million gallons per year.

No data are available that would allow a breakdown of domestic pumpage by aquifer.

Table 7. Number of domestic wells in municipalities in the Central Passaic River Basin, 1980

Municipality	Percentage of area in CPRB	Domestic wells (total)[a]
Bergen County		
Franklin Lakes Borough	0.9	0[b]
Oakland Borough	3.6	190
Essex County		
Caldwell Borough	100.0	4
Cedar Grove Township	8.8	14
Essex Fells Township	97.6	0
Fairfield Borough	100.0	1180
Livingston Township	100.0	31b
Millburn Township	55.9	5
North Caldwell Borough	100.0	37
Roseland Borough	100.0	6
Verona Township	3.2	0[b]
West Caldwell Township	99.5	39
West Orange Township	19.2	18
Morris County		
Boonton Town	46.3	596
Chatham Borough	100.0	5
Chatham Township	100.0	93
East Hanover Township	100.0	936
Florham Park Borough	100.0	5
Hanover Township	100.0	36
Harding Township	81.2	809
Kinnelon Borough	0.8	1515
Lincoln Park Borough	100.0	360
Madison Borough	100.0	6
Montville Township		
Morris Plains Borough		
Morris County(cont.)		
Morris Township	39.3	244
Morristown Town	67.8	0
Mountain Lakes Borough	12.9	0
Parsippany-Troy Hills Twp.	79.8	223
Passaic Township	100.0	265
Pequannock Township	82.1	402
Riverdale Borough	17.0	90
Passaic County		
Haledon Borough	13.9	0[b]
Little Falls Township	17.1	35
North Haledon Borough	4.7	1900[b]
Pompton Lakes Borough	58.2	10
Totowa Borough	43.9	11
Wayne Township	99.0	981
Somerset County		
Bedminster Township	0.01	413[b]
Bernards Township	97.9	604
Bernardsville Borough	10.7	592
Bridgewater Township	1.2	4249
Far Hills Borough	30.0	115
Warren Township	79.3	1817
Watchung Borough	8.4	
Union County		
Berkeley Heights Township	80.0	91
New Providence Borough	100.0	7
Summit City	74.9	13

[a] From U.S. 1980 census data unless otherwise noted.

[b] Estimated from data provided by NJDEPE Bureau of Ground-Water Pollution Abatement.

INDUSTRIAL AND PUBLIC SUPPLIES, 1990

Reported industrial and public-supply withdrawals for 1990 (tables 8, 9; figs., 10, 11) are estimates. Users of less than 100,000 gallons per day do not require a NJDEPE water-allocation permit. These users, as well as any missed by the permitting process, are not included in this analysis.

Figures 10 and 11 and table 8 highlight three generalizations regarding major supply wells. The first is that most of the pumpage from the surficial aquifer comes from the buried valleys. This is because outside the buried valleys, the surficial aquifer generally can not supply enough water for large-scale municipal and industrial needs. Vermeule (1905) made this observation shortly after ground-water exploration began in the area.

Secondly, bedrock wells tend to be installed outside buried valleys. This probably reflects a preference of water purveyors for withdrawing water from the more productive surficial aquifer where possible. In fact, most of the pumpage from bedrock came from outside the buried valleys.

Lastly, the most productive surficial wells yield more ground water than the most productive bedrock wells. Exploration for ground water in the central part of the study area has probably defined accurately the relative ability of the aquifers to supply water, and has probably delineated the most productive water-bearing zones.

Of the buried valleys, the Southern Millburn valley supplied the most ground water in 1990: 4,693 million gallons (tables 8, 9). All pumpage from this buried valley was from the surficial aquifer.

Table 8. Municipal and industrial ground-water pumpage by buried valley, Central Passaic River Basin, 1990

Buried valley	Pumpage (million gallons)			Degree of aquifer confinement
	Surficial	Bedrock	Total	
Canoe Brook	710	0	710	partially dewatered [1]
Cedar Knolls	1,666	0	1,666	semiconfined
Chatham	1,382	47	1,429	semiconfined
East Hanover	1,529	0	1,529	semiconfined
Fairfield	123	0	123	semiconfined
Florham Park	0	1	1	semiconfined
Green Village	0	1	1	semiconfined
Lincoln Park	1,356	79	1,435	unconfiined
Long Hill	0	7	7	semiconfined
Montville	0	0	0	semiconfined
Northern Millburn	731	152	883	semiconfined
Oakwood	0	120	120	semiconfined
Parsippany	219	0	219	semiconfined
Slough Brook	0	373	373	partially dewatered [1]
Southern Millburn	4,693	0	4,693	partially dewatered [1]
Troy Hills	2,420	0	2,420	semiconfined
Buried valley totals	**14,826**	**780**	**15,606**	
Outside buried valleys	796	2,084	2,880	variable
Grand totals	15,622	**2,865**	**18,487**	

[1] Surficial sediments are cappped by a semiconfining unit. Water levels have fallen, at least seasonally, below the bottom of this unit, thus partially dewatering the surficial aquifer.

This table includes all reported industrial and municipal ground-water pumpage from the Central Passaic River Basin in 1990. Some water was exported from the basin. Data are from the files of the NJDEPE. Buried valleys are delineated in figure 7.

Table 9. Municipal and industrial ground-water pumpage by buried valley and user, Central Passaic River Basin, 1990

BURIED VALLEYS

Owner	Well number(s) or name(s)	Aquifer	Gallons (millions)
Canoe Brook Buried Valley			
East Orange - Canoe Brook	1-1956,2-1956, 3-1956,4-1956	surficial	709.51
Cedar Knolls Buried Valley			
Parsippany Troy Hills WD	14	surficial	241.21
Southeast Morris Co. MUA	Wing, Todd, Littleton 1&2	surficial	1,424.65
Chatham Buried Valley			
Allied Corporation	Combined	surficial	257.67
Chatham Borough	Combined	surficial	380.42
Sisters of Charity,St. Eliz.	Main	bedrock	22.73
Exxon Res. & Engineering	Combined	surficial	59.26
Fairleigh Dickenson Univ.	Combined	bedrock	24.00
Madison Borough	A,B,C,D,E	surficial	674.12
Morris Co. Golf Club	Combined	surficial	8.12
Schering-Plough	Main	surficial	2.32
East Hanover Buried Valley			
East Hanover Township	2	surficial	268.83
Florham Park Borough	2,3,4	surficial	409.81
Precision Rolled Products	1	surficial	18.60 E[1]
Sandoz	combined	surficial	197.62
Southeast Morris Co. MUA	Black Brk. 1&2	surficial	629.04
Suburban Propane	combined	surficial	4.75
Fairfield Buried Valley			
Fairfield Borough	1,4	surficial	122.85
Florham Park Buried Valley			
Gates of Heaven		bedrock	1.00 E
Green Village Buried Valley			
Madison Golf Club	1	bedrock	1.00 E
Lincoln Park Buried Valley			
Montville Township MUA	Indian Lane 1,2,3	surficial	524.14
Pequannock Township	all wells	surficial	555.65
Pompton Lakes MUA	1,2	surficial	275.79
Riverdale Borough	all wells	bedrock	79.01
Long Hill Buried Valley			
Colony Pool, Chatham Twp.		bedrock	6.82
Northern Millburn Buried Valley			
East Hanover Township	5	surficial	233.86
Givaudan Corp.	all wells	bedrock	138.71
Livingston Township	3,5,6	surficial	496.94

[1]E: estimated

BURIED VALLEYS (cont.)

Owner	Well number(s) or name(s)	Aquifer	Gallons (millions)
Oakwood Buried Valley			
Ciba-Geigy Corp. Pharm. Div.	all wells	bedrock	120.02
Parsippany Buried Valley			
Parsippany Troy Hills WD	12	surficial	26.76
Pfizer Inc.	all wells	surficial	191.78
Slough Brook Buried Valley			
East Orange - Slough Brook	all wells	bedrock	373.44
Southern Millburn Buried Valley			
Canoe Brook Country Club	1	surficial	4.03
East Orange - Braidburn	all wells	surficial	1,098.13
East Orange - Dickinson	all wells	surficial	1,029.56
NJ-American - Canoe Brook	all wells	surficial	1,891.38
NJ-American - Passaic River	all wells	surficial	630.46
Orange Products, Inc.	1	surficial	39.04
Troy Hills Buried Valley			
Boonton Electronics	5	surficial	9.83
Mountain Lakes WD	5	surficial	245.46
Parsippany Troy Hills WD	1A,3,4,4A,8,9,10, 11,13,15,17,18	surficial	2,164.81

SURFICIAL AQUIFER BEYOND BURIED VALLEYS

Owner	Well number(s) or name(s)	Aquifer	Gallons (millions)
Cedar Hill Country Club	all wells	surficial	10.53
Essex Fells Township WD	1A,2,7,14	surficial	245.97
Mennen Company	all wells	surficial	27.07
Pompton Lakes MUA	3	surficial	170.30
Southeast Morris Co. MUA	Sand Springs, Normandy, Morris Plains 1	surficial	270.16
Warner Lambert Company	all wells	surficial	72.00 E

BEDROCK AQUIFER BEYOND BURIED VALLEYS

Owner	Well number(s) or name(s)	Aquifer	Gallons (millions)
Automatic Switch		bedrock	0.01
Carteret S&L		bedrock	16.00
East Orange - Canoe Brook	5-1978, 6-1978	bedrock	223.53
Essex Co. Parks & Rec		bedrock?	0.00
Essex Fells Township	4A,5,6,8,9,10,1, 12,15,16,17	bedrock	706.20
Fairfield Burough	6,8	bedrock	158.42

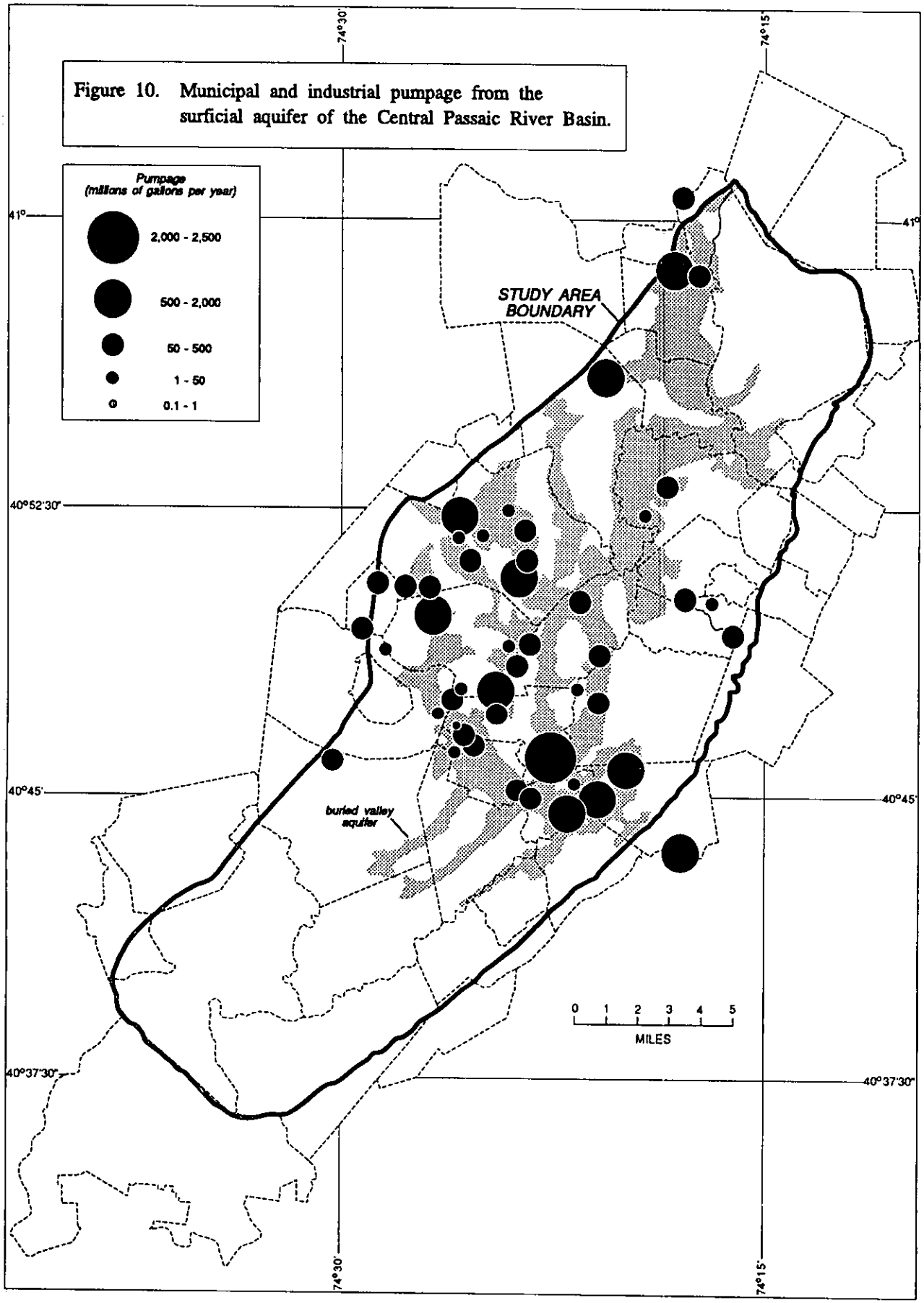


Figure 10. Municipal and industrial pumpage from the surficial aquifer of the Central Passaic River Basin.

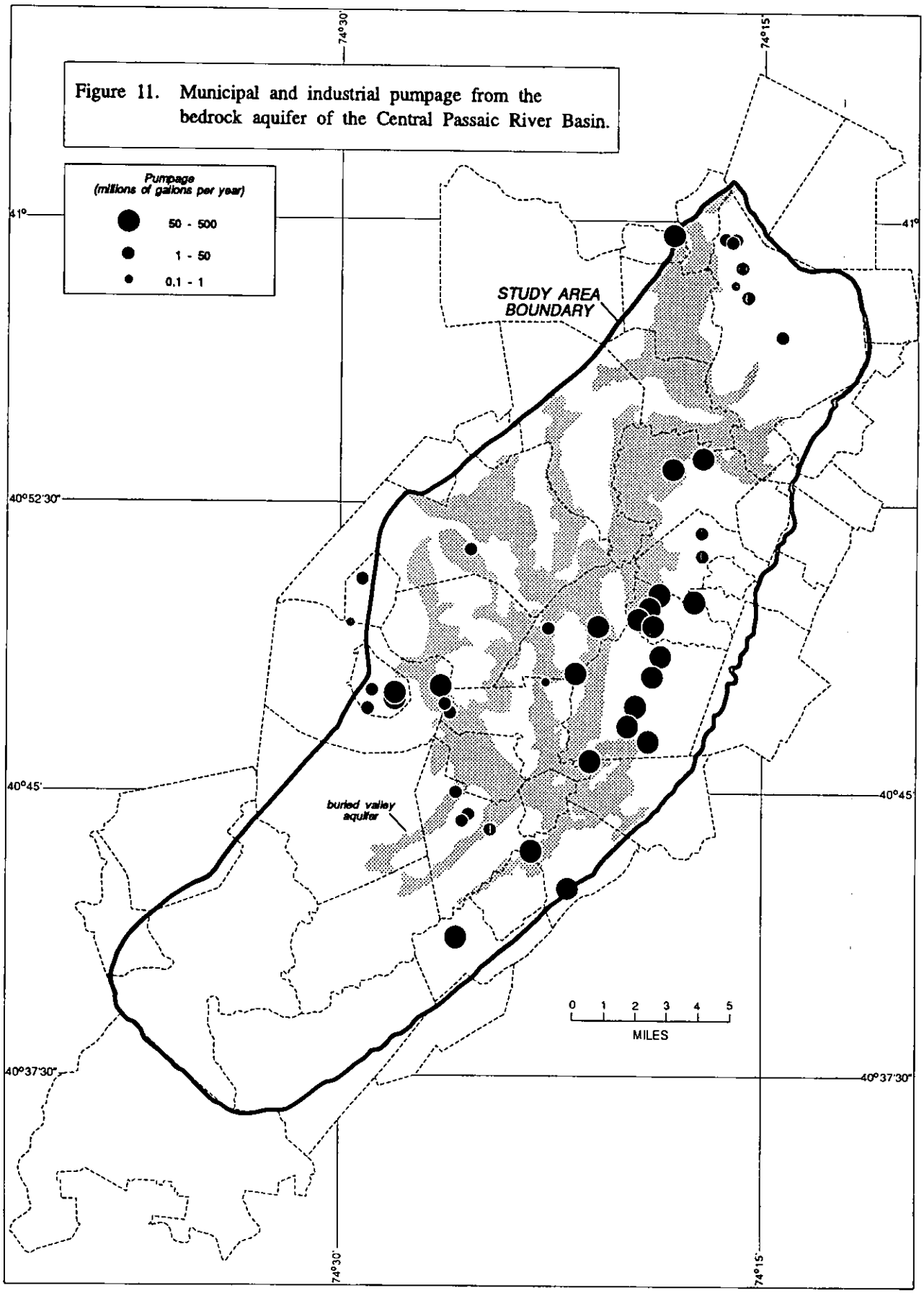


Figure 11. Municipal and industrial pumpage from the bedrock aquifer of the Central Passaic River Basin.

OBSERVED WATER LEVELS

PRE-PUMPAGE LEVELS

Information on pre-pumpage ground-water levels in the Central Passaic River Basin (table 10) is scant. Most of it is from Water Allocation hearing records of the New Jersey Water Policy Commission and the New Jersey Water Policy and Supply Council. Some is anecdotal information from water companies and other sources.

The hearing records indicate that through much of the low-lying portion of the CPRB, ground-water levels were above land surface before withdrawals began. There are records of artesian flow in Lincoln Park Borough, Chatham Borough, Millburn Township, Florham Park Borough, Madison Borough, Parsippany-Troy Hills Township, and Pompton Lakes Borough.

WATER-LEVEL OBSERVATION WELLS AND FLOWING WELLS

Water level records are available for 48 water-level observation wells in the CPRB (figs. 12-19, table 11, plate 1). With the exception of the Slough Brook 6 observation well (no. 39) and the Meeker test well (no. 41), all water-level measurements prior to 1988 are from a statewide USGS-NJDEPE observation well network. The Slough Brook 6 and Meeker records were provided by the East Orange Water Department. Data for 1988 through 1990 are from the New Jersey Geological Survey, the USGS, and several minor sources.

The great majority of the water-level data were obtained by manual measurements. For several wells, water levels were measured for at least part of the period of record at hourly intervals by automatic data recorders. Daily averages are plotted in the hydrographs for these wells. Wells with automatic data recorders for at least part of the period of record are:

Observation well		Dates of ADR
Name	Number	measurement
Briarwood School	14	10/1/72 - 3/17/75
Convent 2	3	4/20/77 - 12/31/90
Convent 3	4	3/2/88 - 3/1/89
Neutral Zone	28	11/3/88 - 6/28/90
USGS TW 4	30	3/21/90 - 1010/90

Neutral Zone Well

The longest running hydrograph is for the Neutral Zone well (no. 56, fig. 15), drilled in the mid-1920's. The Neutral Zone well was drilled in a "neutral zone" in the Canoe Brook buried valley (fig. 7) between well fields operated by the East Orange Water Department and the Commonwealth (now New Jersey-American) Water Company. This neutral zone extended for 500 feet on either side of the property boundary (Roper, 1931). Both water purveyors agreed not to install any production wells in the neutral zone and to vary pumpage from the Canoe Brook well fields based on water levels measured in the Neutral Zone observation well (David Miller, Geraghty & Miller, Inc., oral communication, 1988).

White Oak Ridge shallow and deep wells

The White Oak Ridge shallow (no. 59, fig. 15) and deep (no. 60, fig. 15) monitoring wells were drilled in 1989 to supplement data from the Neutral Zone well. The two White Oak Ridge wells, however, are closer to East Orange's Canoe Brook production wells, and are affected more strongly by pumpage of East Orange wells than by New Jersey-American wells.

Wells drilled in the 1960's

The drought of record in New Jersey occurred from 1961 to 1966 (Anderson and McCall, 1968). In response to dangerously low water supplies, test wells were drilled to locate additional sources of ground water (Vecchioli and Nichols, 1966; Vecchioli, Nichols, and Nemickas, 1967). Many of the wells drilled for these investigations were incorporated into the USGS-NJDEPE observation-well network. Records for these wells thus begin in the mid-1960s.

Wells monitored specifically for this study

Other wells were identified and located in the field as part of this investigation. Water levels in all wells included in this study's observation-well network were measured monthly, if possible. The records are of varying length because some wells were sealed while others were added during the course of the study.

Flowing wells

Flow rates were measured in two flowing wells (fig. 20). Water levels in the aquifers monitored by these wells are above the tops of the well casings. The rate of flow from wells is partially a function of the ground-water level: the higher the hydraulic head the greater the flow rate.

If the casings of these flowing wells were capped or extended above the elevation supported by the ground-water hydraulic head, the wells would not flow, and an accurate measurement of the water level could be made. For example, water levels in the USGS Troy Meadows observation well 2 (no. 14, fig. 19) are as much as 5 feet above land surface. Its casing, however, extends 10 feet above land surface so the well does not flow.

Table 10. Miscellaneous ground-water data

Name	Well no.[1]	Allocation no.[2]	Date	Remarks
Mountain View Water Co.	28	321	1929	Well flows at 3 gpm
Charles N. Evans Dev. Co.	30	98	1917	2 wells drilled, flowing at 67 and 30 gallons per minute (gpm)
(Lincoln Park Water Dept.)		--	1947	Static water level 5 feet below land surface
Lincoln Park Water Dept.	31	1303	1965	3 gpm flow before test; drawdown 100 ft at 3,650 gpm. Private wells nearby went dry during test
Parsippany-Troy Hills	47	244	1926	Static in Kimball well 345 feet above sea level
Water Dept.	49	985	1936	Static in well 2 is 60 feet below land surface
			1958	Static in well 2 is 125 feet below land surface
	59	1072	1966	Well 8-1 had static more than 10 feet above land surface when drilled
	L3	1072	1966	Numerous springs on west edge of Troy Meadows
		1318	1966	A spring that fed Troy Meadows has dried up since the 8 series of wells was installed
Essex Fells Water Dept.	88	539	1945	Static water level in well 8 is 245 feet above sea level
Southeast Morris Co.	100	216	1925	Littleton static close to land surface. Current well field has dried up series of springs
MUA (Morristown		369	1926	Littleton 1 flowed at 200,000 gpd when drilled
Water Dept.)			1930	Littleton 1 static now 18 feet below land surface
	106	696	1949	When Wing well started some domestic wells nearby. Wing static 3 feet below surface
	107	818	1954	Static in Todd is 22 feet below land surface before any pumping
	112	1400	1966	Static in Black Brook 1 is 17 feet below land surface
	174	1368	1966	Static in Overbrook 5 feet below land surface
	176	1320	1966	Static in Turnbull 44 feet below land surface
	177	216	1926	Sand Spring has natural flow of 300,000 gpd (wet month), 200,000 gpd (dry month)
	191	1230	1910	When Normandy wells first drilled, they flowed
			1960	When Allied wells drilled, static in Normandy fell to 7 feet below land surface
Livingston Water Dept.	129	634	1947	Congressional Parkway well has static water level 12.5 feet below land surface
	131	848	1954	Static in test well 3 is 20 feet below land surface
East Orange Water Dept.	157	204	1925?	Water at White Oak Ridge pumping station near surface (35 ft below prepumping levels)
	241	369	1930	Braidburn 1 pump test data: pumpage 980 gpm; drawdown 36 ft; static 46 ft below surface
	242			Braidburn 2 pump test data: pumpage 1150 gpm; drawdown 62 ft; static 10 ft below surface
	243			Braidburn 3 test data: pumpage 1400 gpm; drawdown 47 feet; static slightly above surface
	246	942	1900?	Dickinson wells flowed at surface when first drilled
Madison Water Dept.	209		1912	Static water level in lower sand one to two feet below land surface
		1135	1962	Static in well A 20 feet below land surface
		788	1898	Static water level 199.0 feet above sea level (at original well site?)
			1925	Static water level 192.0 feet above sea level (at original well site?)
			1/53	Static water level 189.5 feet above sea level (at original well site?)
			6/53	Static water level 188.2 feet above sea level (at original well site?)
			1/54	Static water level 188.9 feet above sea level (at original well site?)
			6/54	Static water level 188.0 feet above sea level (at original well site?)
	L7	204	1898	Wells flowed 8 feet above land surface
Chatham Water Dept.	227	204	1897	4 wells drilled; water level 8.7 ft above surface. Wells flowed at 100-150 gpm each
	228	369		
	229	369	1927	From 1927-1931 water levels fell 4 feet
		369	1931	Pumping water levels are from 14 to 19 feet below land surface
		849	1955	Static water level is 8 feet below land surface
New Jersey American	254	200	1933	Static in Kelly 4 is 33 feet below surface (drawdown 30.6 feet at 1050 gpm)
Water Co. (Commonwealth	255	200	1940	Static in Kelly 5 is 48 feet below land surface (specific capacity 44.3 gpm/ft)
Water Co.)	L6	204	1918	In Canoe Brook field all wells have static below surface, but within 13.5 feet of it
			1925	Static water levels about 60 feet lower than prepumping levels
Florham Park Water	L1	243	1926	Replacement well near Smith Spring; flows about 50 gpm
Dept.		756	1953	Static water level is 181.3 feet above sea level in well number 2
		1272	1960	Well flows at surface when pumps are off
		1272	1964	Pumping water level 12.8 feet below land surface
Pompton Lakes Boro	L2	55	1913	Well field is artesian
R.B. MacEwan & Son	L4	216	1926	Flow in Malapardus Brook is more than 600,000 on all but a few days of the year
Lions Head Lake	L5	544	1941	Static water level in well at elevation 347 feet above sea level
Pequannock Water Co.	L8	1251	1965	Static in well 1-67 is 37 ft below surface; static in well 2 is 58 ft below surface

[1]See plate 1. [2]Assigned by Water Policy Commission or Water Policy and Supply Council. On file at NJDEPE Bureau of Water Allocation.

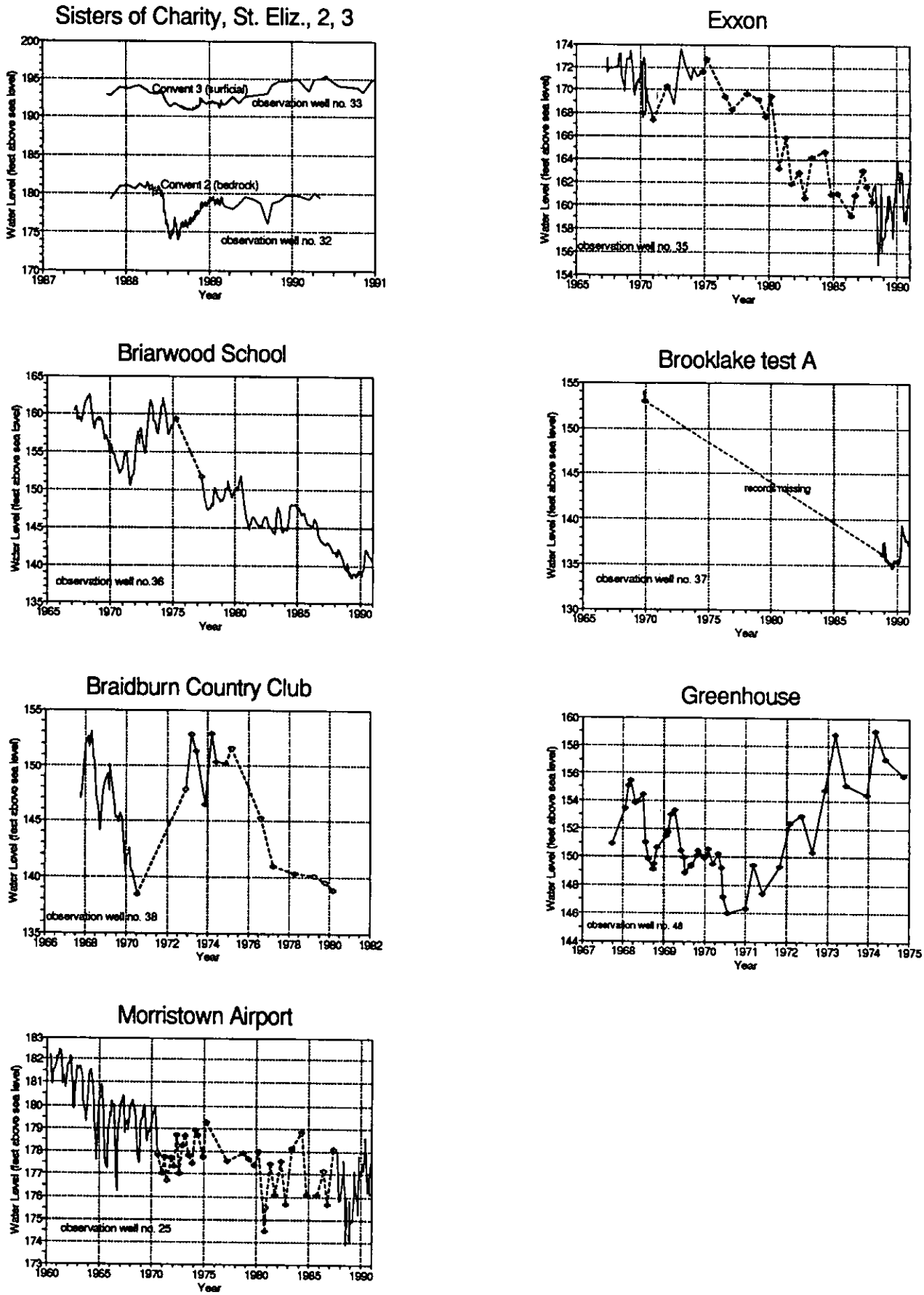
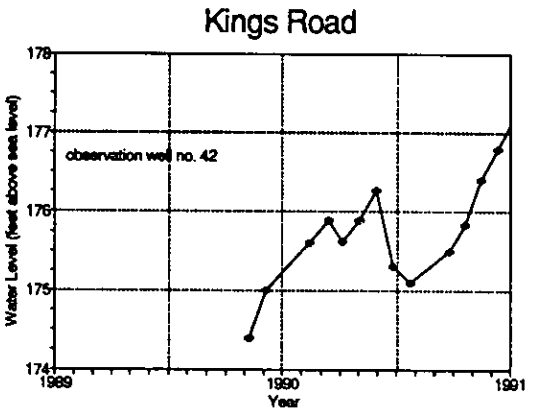
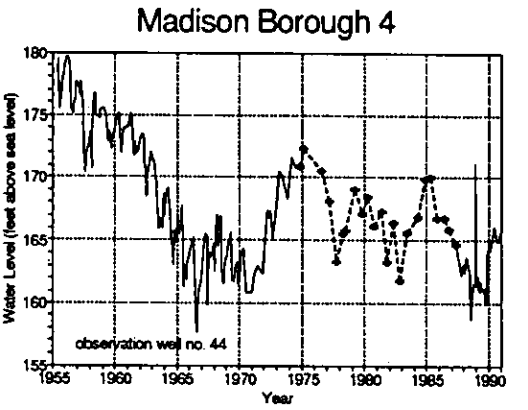
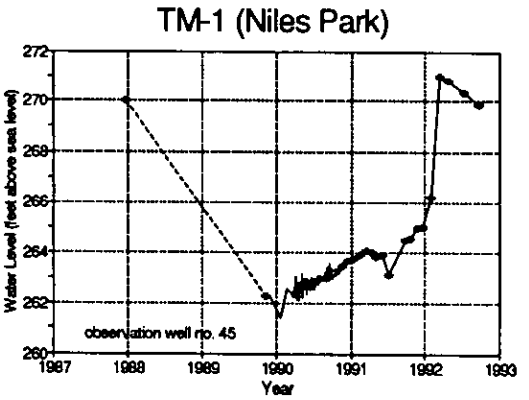
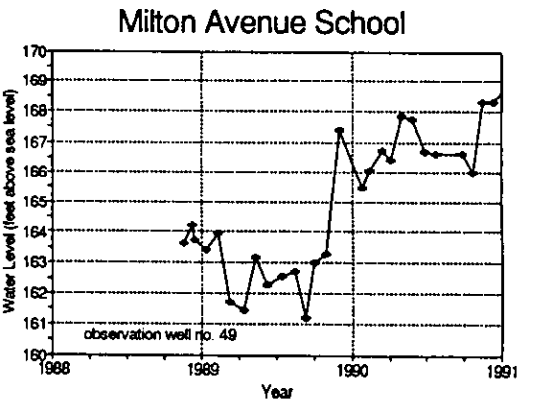


Figure 12. Water levels in observation wells in Florham Park Borough (32, 33, 35, 36, 37, 38 and 48) and Hanover Township (25). Number refers to observation well number on table 11 and plate 1. Dashed line indicates measurement frequency of twice a year or less.









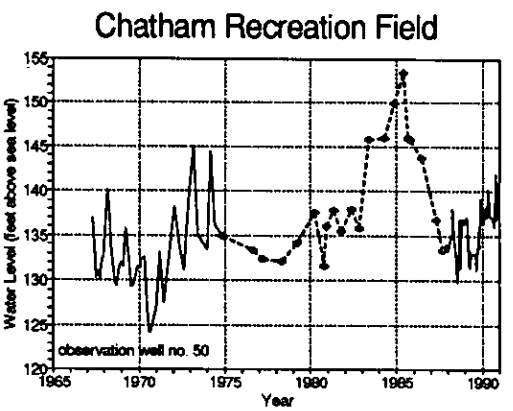
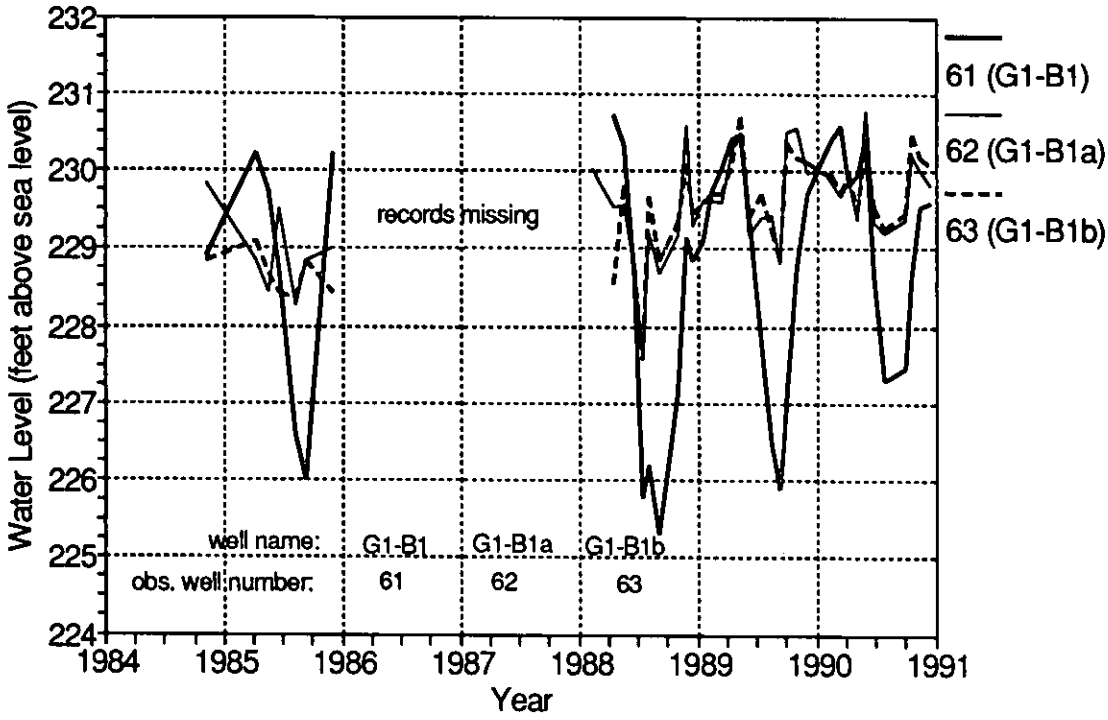


Figure 13. Water levels in observation wells in Madison (42, 44 and 45) and Chatham (49 and 50) Boroughs. Number refers to observation well number on table 11 and plate 1. Dashed line indicates measurement frequency of twice a year or less.



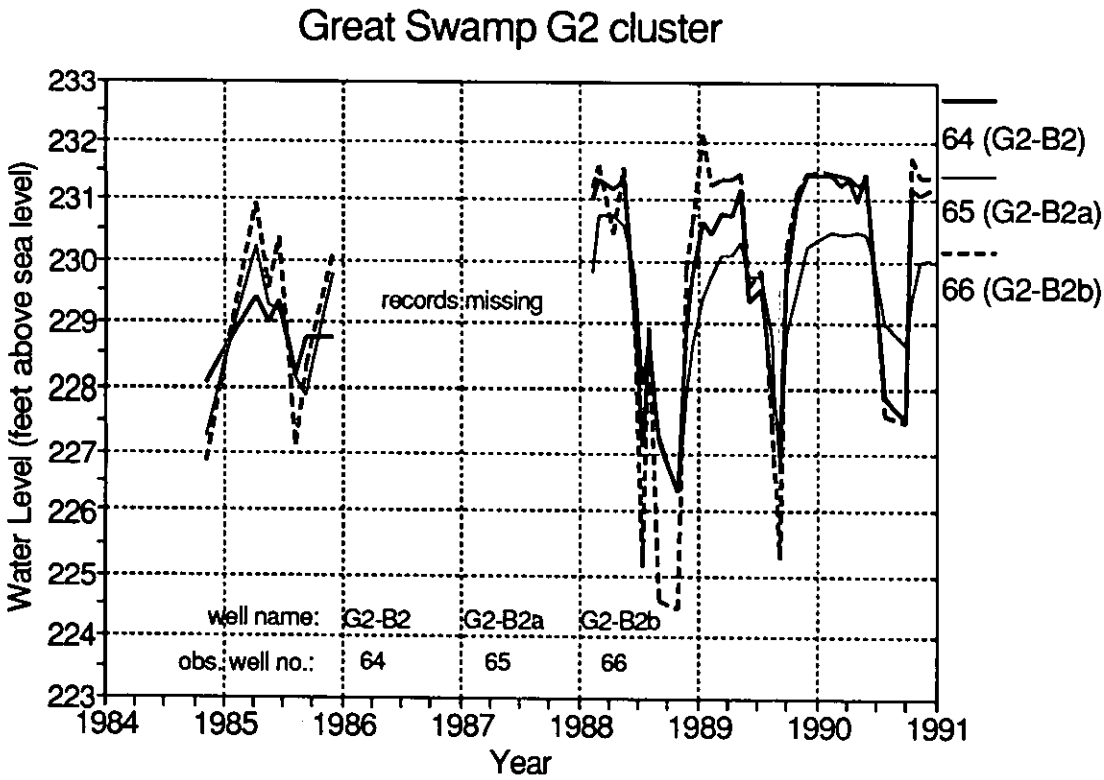
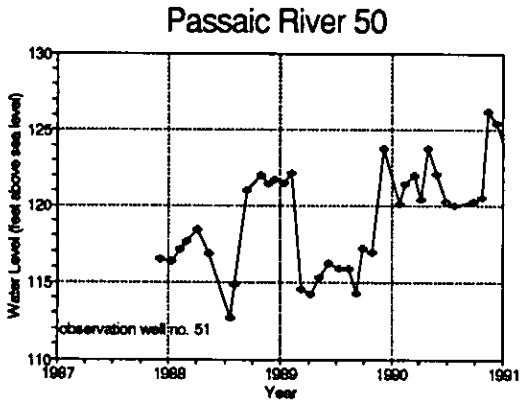
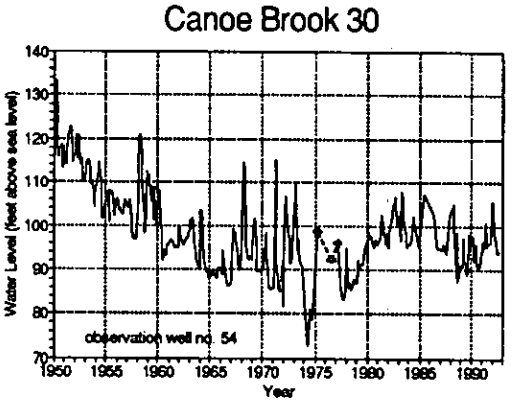
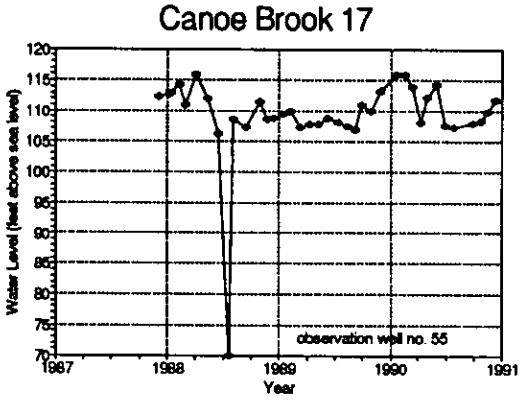
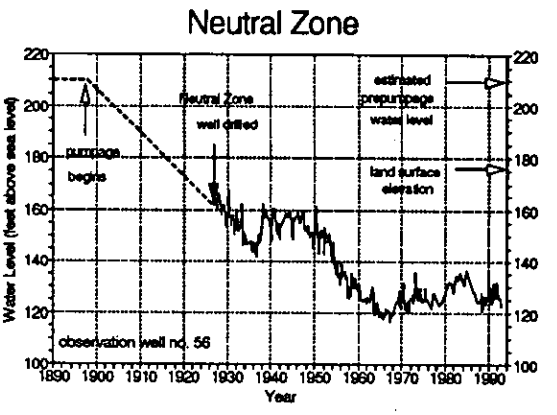


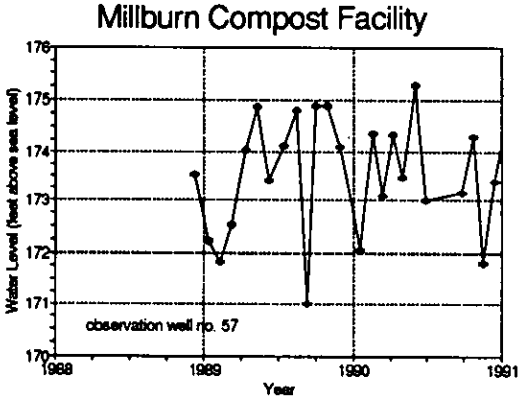
Figure 14. Water levels in observation wells in Harding Township. Number refers to observation well number on table 11 and plate 1.

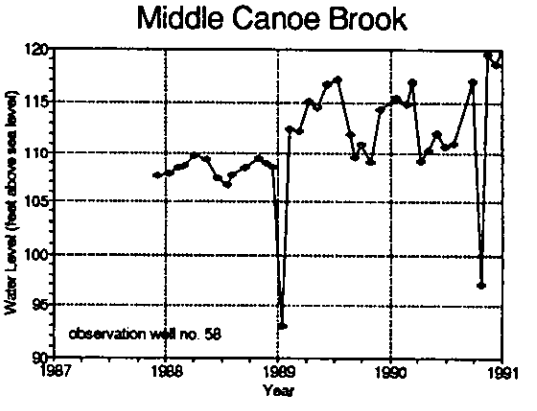


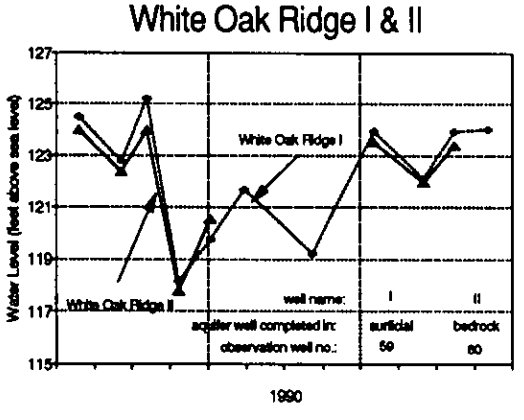












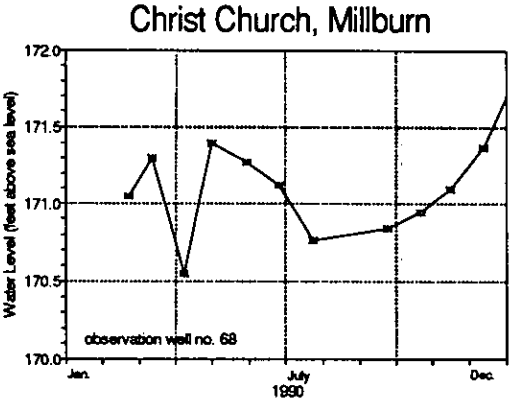


Figure 15. Water levels in observation wells in Millburn Township. Number refers to observation well number on table 11 and plate 1 unless otherwise indicated.

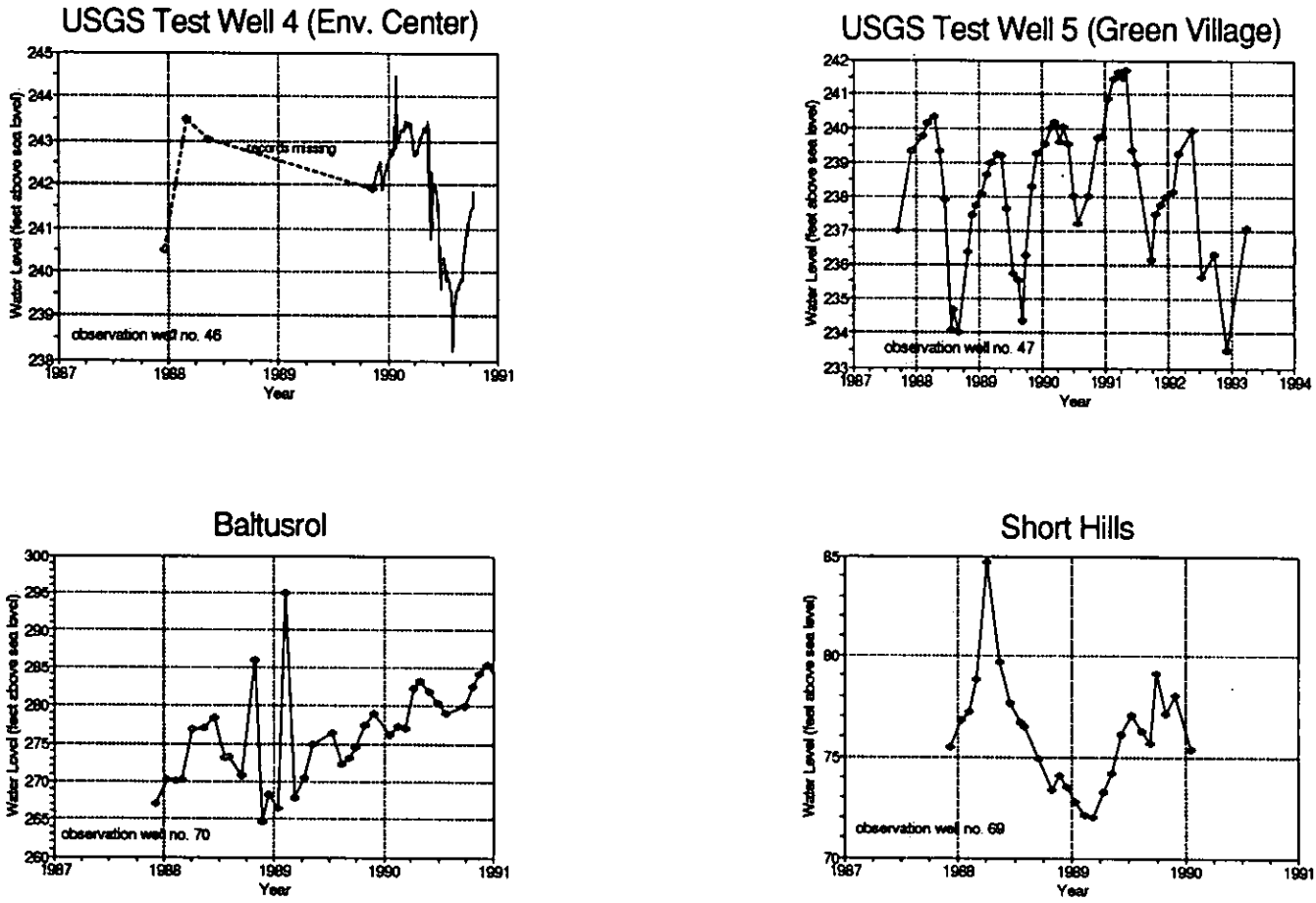
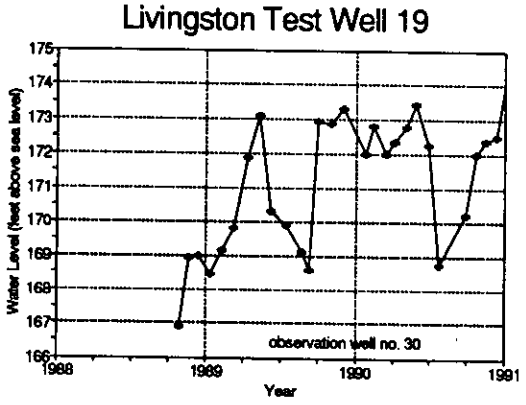
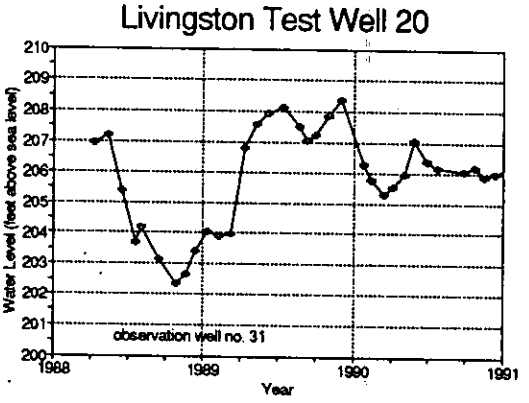
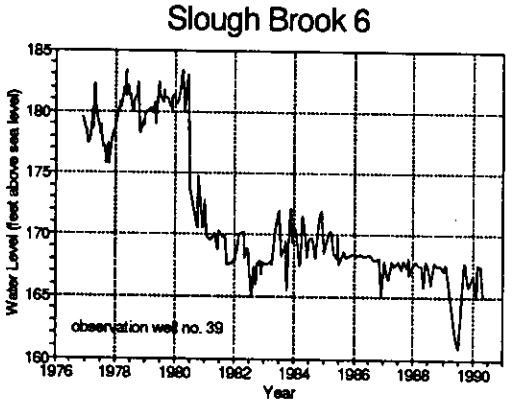
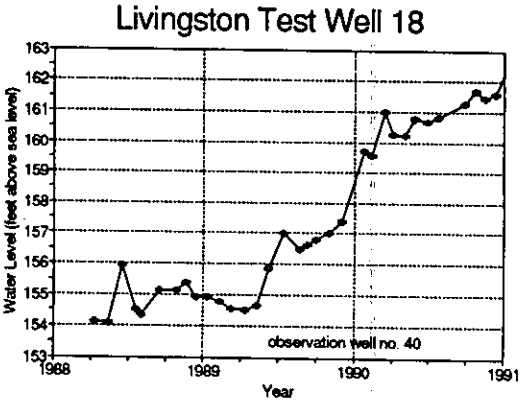


Figure 16. Water levels in observation wells in Chatham Township (46 and 47), Summit City (70), and Springfield Township (69). Number refers to observation well number on table 11 and plate 1. Dashed line indicates measurement frequency of twice a year or less.









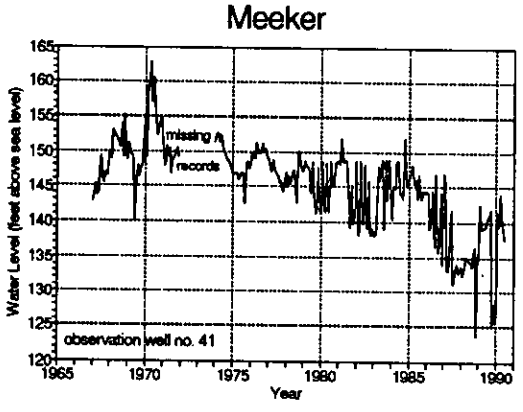
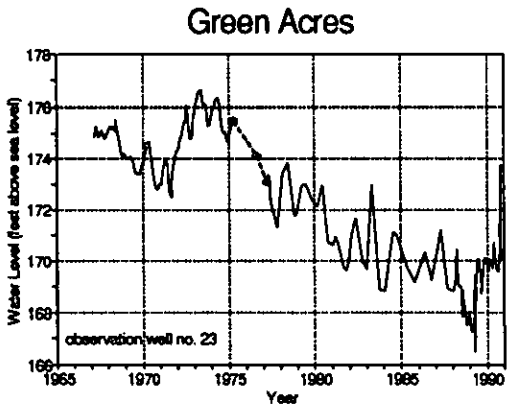
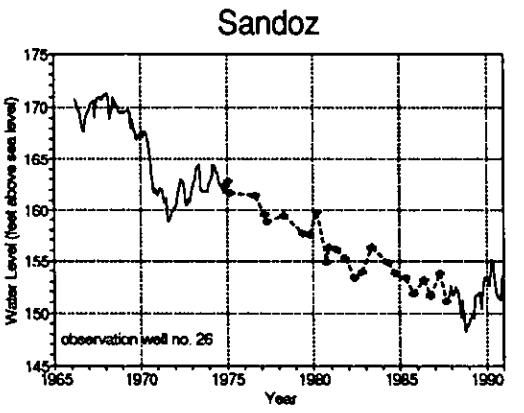
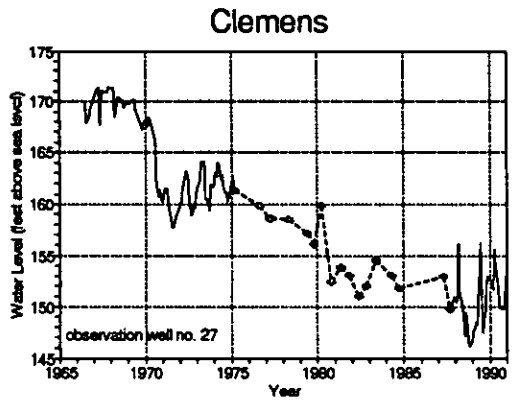
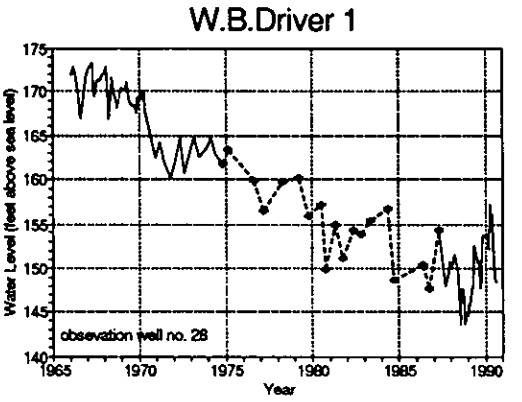


Figure 17. Water levels in observation wells in Livingston Township. Number refers to observation well number on table 11 and plate 1.









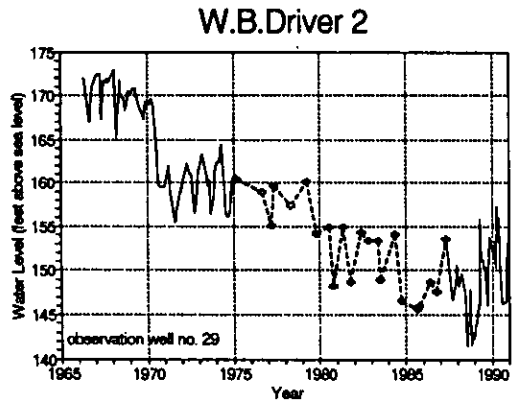
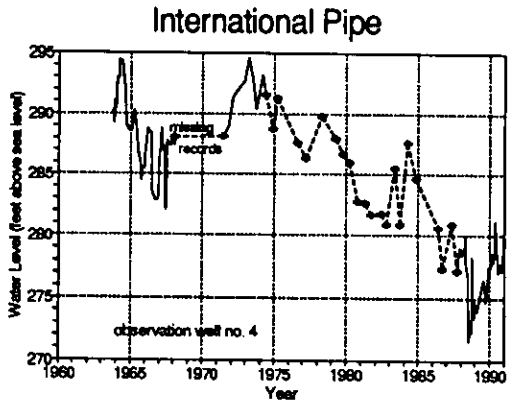
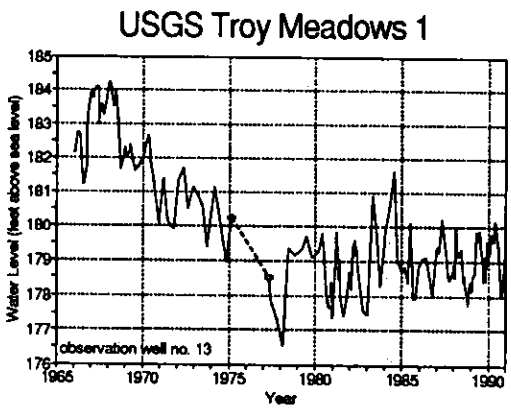
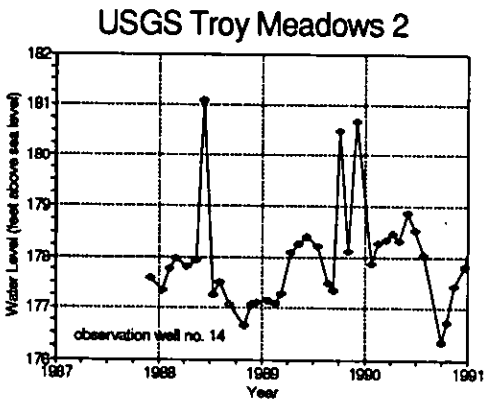
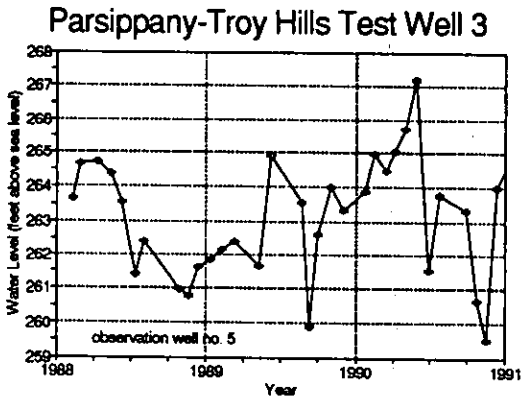


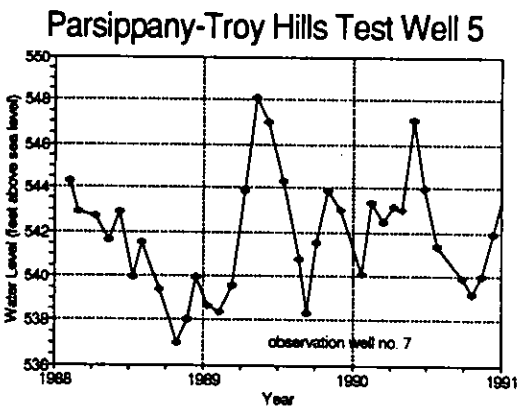
Figure 18. Water levels in observation wells in East Hanover Township. Number refers to observation well number on table 11 and plate 1. Dashed line indicates measurement frequency of twice a year or less.

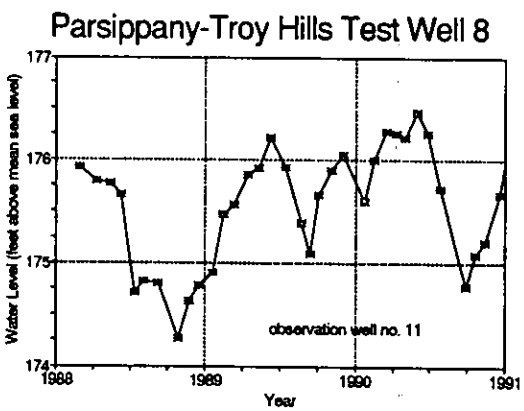


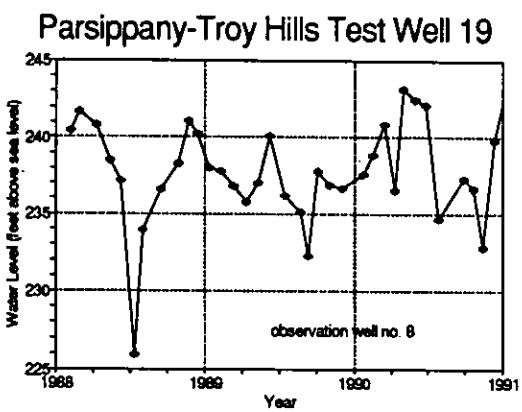












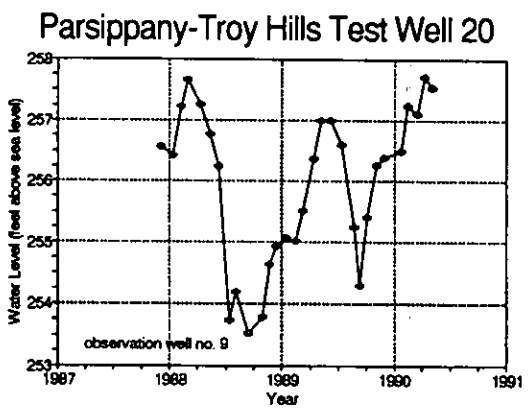
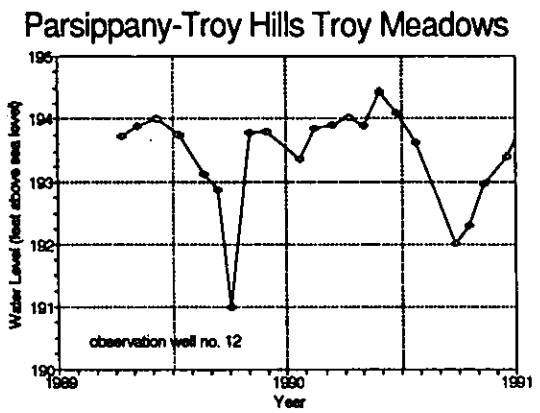


Figure 19. Water levels in observation wells in Parsippany-Troy Hills Township. Number refers to observation well number on table 11 and plate 1. Dashed line indicates measurement frequency of twice a year or less. Figure continued on next page.



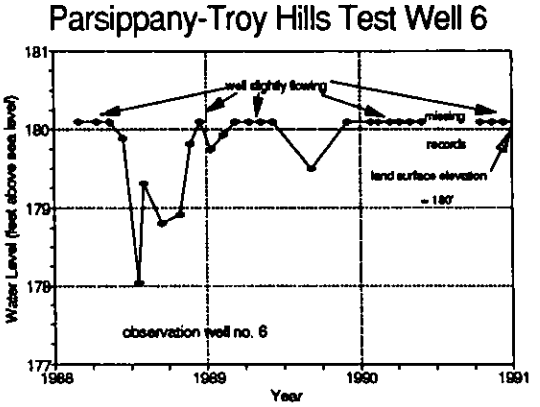
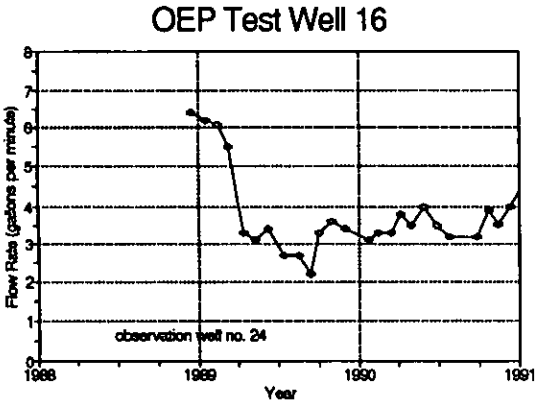


Figure 19 (cont.). Water levels in observation wells in Parsippany-Troy Hills Township. Number refers to observation well number on table 11 and plate 1.



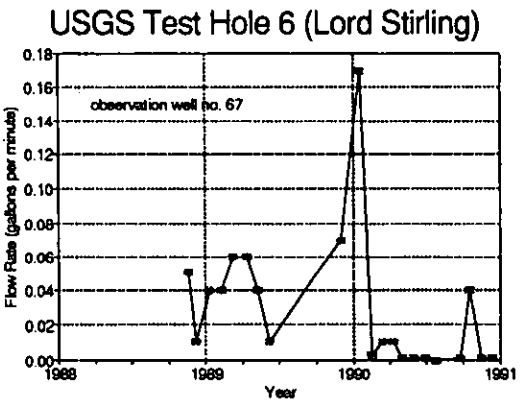


Figure 20. Rates of discharge from flowing wells.

EFFECTS OF PUMPAGE ON WATER LEVELS AND WELL FIELDS

Regional ground-water levels are declining in the CPRB (figs. 12-19, table 11). Hydrographs from observation wells located near pumping centers show long-term declines roughly correlated with increases in pumpage. Water levels fluctuate over time spans as long as several years, but longer records clearly show an overall decline. In several cases, springs are reported to have ceased flowing as pumpage increased nearby.

The declines of water levels and artesian pressures since the turn of the century have had a significant impact on some production wells, especially in the Chatham and Southern Millburn Buried Valleys. The Chatham, Madison, and East Orange Water Departments and the New Jersey-American Water Company have been forced to accommodate declining ground-water levels.

The experience of the Madison Borough Water Department is representative of the experiences of large water purveyors in the basin. The following history is based on records on file with the New Jersey Bureau of Water Allocation (applications 204, 315, 788, 885, and 1135) and information from the Madison Water Department.

Madison installed 5 shallow wells in 1898 and 4 more in 1912. Water initially flowed at 100 to 150 gallons per minute from each well. Static water level was about 8 feet above land surface. The water flowed in open trenches to a central distribution plant built in 1900. From there it was pumped into the borough's water mains. By 1912 water levels had dropped below land surface, and suction pumps were installed to withdraw water.

In 1929 three new wells were drilled to provide more water to support a growing population. This second generation of wells was deeper, but water levels were still close enough to the land surface for suction pumps to withdraw water. Like the earlier wells, these were within a few hundred feet of the water distribution plant.

By the early 1950's, water levels had dropped almost to the level at which suction pumps stop working (about 20 to 25 feet below the level of the pump). During the summer of 1955, the pumps broke suction several times and were unable to deliver water into the borough's distribution mains.

Five new wells (A, B, C, D, and E) were drilled between 1952 and 1956 to replace the older wells. These were spread out in a line about 2 miles long to lessen interference, and were equipped with submersible turbine pumps so that declines in water levels to below the limits of suction pumps would not interfere with pumpage. Between the mid-1950's and the mid-1960's, the new wells came on line one by one. By the late 1950s the older wells were abandoned. The five new wells, Madison's third generation, were still in use in 1990.

In addition to water-level decline (and like some other water companies in the CPRB), the Madison Borough Water Department has experienced ground-water pollution. In 1985 water from well A showed evidence of organic chemical contamination. From 1986 to 1990, well A occasionally showed levels of organic contaminants above the concentrations allowed by state regulations for drinking water (Salvatore DeBiasse, Madison Borough Water Department, oral communication, 1991). Pumpage to the borough's water mains from well A was discontinued during times of impermissible contamination. The other Madison wells have occasionally shown levels of contaminants below state action guidelines. The source of this contamination had not been ascertained at the time of this study

SUMMARY AND CONCLUSIONS

The Central Passaic River Basin is an area of approximately 260 square miles in northeastern New Jersey. It encompasses all or part of 48 municipalities in Bergen, Essex, Morris, Passaic, Somerset, and Union Counties.

Ground water is withdrawn from two aquifers, surficial and bedrock. Annual ground-water withdrawal for municipal and industrial use has increased from 603 million gallons in 1898 to 18,487 million gallons in 1990. Estimated withdrawals from domestic wells are estimated to have been 460 million gallons in 1990.

The surficial aquifer consists of unconsolidated sediments deposited primarily during and after the most recent glacial advance. In 1990, 15,622 million gallons of water was withdrawn from this aquifer, primarily from a series of bedrock depressions termed the buried valleys. Where filled with clean sand and gravel, the buried valleys provide the most productive ground-water supply in the study area.

The bedrock aquifer consists primarily of sedimentary and igneous rocks of the Upper Triassic and Lower Jurassic Brunswick Group. Withdrawals for municipal

and industrial usage from the bedrock aquifer system totaled 2,865 million gallons in 1990.

Water levels have declined significantly near the pumpage centers of the Central Passaic River Basin. In western Millburn Township in Essex County, where the greatest concentration of pumpage is located, water levels have fallen from an estimated 30 feet above land surface in 1898 to 50 feet below land surface in 1990. This decline has partially dewatered the surficial aquifer. Water levels have declined in all wells in the study area for which long-term records are available.

A following study on the hydrogeology of the Central Passaic River Basin will focus on the geologic and hydrologic factors which determine the availability and flow of ground water.

SELECTED REFERENCES

Anderson, P.W., and McCall, J.E., 1968, The effect of drought on stream quality in New Jersey: Journal of the Sanitary Engineering Division, American Society of Civil Engineers Proceedings, v. 94, no. SA 5, p. 779-788.

Darton, N.H., Bayley, W.S., Salisbury, R.D., and Kummel, H.B., 1908, Description of the Passaic quadrangle, New Jersey - New York: New Jersey Geological Survey Geologic Atlas of New Jersey, Folio 1, *and* U.S. Geological Survey Geologic Atlas, Folio 157, 37 p., 5 pls., scale 1:125,000.

Fedosh, M.S., and Smoot, J.P., 1988, A cored stratigraphic section through the northern Newark Basin, New Jersey, *in* Froelich, A.J., and Robinson, G.P., Jr., eds., Studies of the early Mesozoic basins of the eastern United States: U.S. Geological Survey Bulletin 1776, p. 19-24.

Ganser, D.R., 1987, Hydrogeologic characteristics of the Ramapo Fault, northern New Jersey: Ground Water, v. 25, no. 6, p. 664-671.

Geonics, Inc., 1978, An evaluation of ground water resources of the Rockaway River Valley: Clinton, N.J., Geonics, consultant's report prepared for the Town of Boonton, Townships of Boonton, Denville, Montville, and Borough of Mountain Lakes, variously paged.

----- 1979a, Water resource study of the Rockaway Valley, Morris County, New Jersey: Clinton, N.J., Geonics, consultant's report prepared for the Town of Boonton, Townships of Boonton, Denville, Montville, and Borough of Mountain Lakes, variously paged.

----- 1979b, The Towaco Valley aquifer, Montville, New Jersey: Clinton, N.J., Geonics, consultant's report prepared for the Township of Montville, variously paged.

Geraghty & Miller, Inc., 1976, Ground-water conditions, City of East Orange water reserve: Port Washington, N.Y., Geraghty and Miller, consultant's report prepared for City of East Orange, New Jersey, 79 p.

Ghatge, S.L., and Hall, D.W., 1989, Geophysical investigations to determine bedrock topography in the East Hanover-Morristown area, Morris County, New Jersey: New Jersey Geological Survey Report, GSR 17, 24 p., 2 pls.

----- 1991, Bedrock topography map of the Millburn-Springfield area, Essex and Union Counties, New Jersey: New Jersey Geological Survey Geologic Map Series 91-1, scale 1:24,000.

Gill, H.E., and Vecchioli, John, 1965, Availability of ground water in Morris County, New Jersey: N.J. Department of Conservation and Economic Development Special Report 25, 56 p.

Goldshore, Lewis, 1983, The New Jersey water supply handbook: Trenton, New Jersey County and Municipal Government Study Commission, 248 p.

Hoffman, J.L., 1989a, Plan of study for the Central Passaic River Basin hydrogeologic investigation: New Jersey Geological Survey Open-File Report OFR 88-4, 22 p.

----- 1989b, Simulated drawdowns, 1972-1995, in the Pleistocene buried-valley aquifers in southwestern Essex and southeastern Morris Counties, New Jersey: New Jersey Geological Survey Open-File Report OFR 89-1, 26 p.

Johnson, M.E., 1950, Geologic map of New Jersey: N.J. Department of Conservation and Economic Development Atlas of New Jersey, sheet 40, scale 1:250,000 (revised from original by J.V. Lewis and H.B. Kummel, published by N.J. Geological Survey, 1915).

Kummel, H.B., 1940, The geology of New Jersey: N.J. Department of Conservation, Bulletin 50, 203 p. (revised from original by J.V. Lewis and H.B. Kummel, published by N.J. Geological Survey, 1915).

Lacombe, Pierre, and Duran, P.B., 1988, Map of the bedrock-surface topography in parts of the Paterson and Pompton Plains quadrangles, New Jersey: U.S. Geological Survey Water-Resources Investigations Report 88-4061, 1 pl.

----- 1914, The Geology of New Jersey: Geological Survey Bulletin 14, 146 p. (Revised and rewritten as New Jersey Department of Conservation and Development Bulletin 50 by H.B. Kummel, 203 p. in 1940).

Linaweaver, F. P., Jr., Geyer, J.C., and Wolff, J.B., 1967, A study of residential water use. A report prepared for the Technical Studies Program, Federal Housing Adminstration, Dept. of Housing and Urban Development, by the Dept. of Environmental Engineering Sciences, The Johns Hopkins University, Baltimore, 93 p.

Luttrell, G.W., 1989, Stratigraphic nomenclature of the Newark Supergroup of eastern North America: U.S. Geological Survey Bulletin 1572, 136 p.

Lyttle, P.T., and Epstein, J.B., 1987, Geologic map of the Newark 1° by 2° quadrangle, New Jersey, Pennsylvania, and New York: U.S. Geological Survey Miscellaneous Investigations Map I-1715, scale 1:250,000.

Meisler, Harold, 1976, Computer simulation model of the Pleistocene valley-fill aquifer in southwestern Essex and southeastern Morris Counties, New Jersey: U.S. Geological Survey Water-Resources Investigations 76-25, 76 p., 1 pl.

Nemickas, Bronius, 1974, Bedrock topography and thickness of Pleistocene deposits in Union County and adjacent areas, New Jersey: U.S. Geological Survey Miscellaneous Geological Investigations Map I-795, scale 1:24,000.

----- 1976, Geology and ground-water resources of Union County, New Jersey: U.S. Geological Survey Water-Resources Investigations 76-73, 103 p.

New Jersey-American Water Company, 1989, Water for New Jersey: The story of the New Jersey-American Water Company: Short Hills, N.J., 12 p. A pamphlet published for 100th year of operation.

New Jersey Department of Labor, 1984, New Jersey population trends: Division of Planning and Research, 52 p.

----- 1985, Population projections for New Jersey and counties: 1990 to 2020, v. 1: Division of Planning and Research, 48 p.

New Jersey Geological Survey, 1990, Generalized stratigraphic table for New Jersey: Information Circular 1, 1 sheet.

New Jersey State League of Municipalities, 1991, 1991 Municipal Directory: Trenton, 52 p.

New Jersey State Water Policy Commission, 1931, unpublished microfiche records of hearing minutes for application no. 369: on file with the New Jersey Department of Environmental Protection and Energy, Bureau of Water Allocation, variously paged.

Nichols, W.D., 1968, Bedrock topography of eastern Morris and western Essex Counties, New Jersey: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-549, scale 1:24,000.

Roper, R.M., 1931, testimony before the N.J. State Water Policy Commission on February 11, 1931, as part of application no. 369: unpublished microfiche of hearing records on file with the New Jersey Department of Environmental Protection and Energy, Bureau of Water Allocation, variously paged.

Schafer, F.L., Harte, P.T., Smith, J.A., and Kurtz. B.A., 1993, Hydrologic conditions in the upper Rockaway River basin, New Jersey, 1904-86: U.S. Geological Survey Water Resources Investigations Report 91-4196, 103 p.

Siegrist, Robert, Witt, Michael, and Boyle, W.C., 1976, Characteristics of rural household wastewater: Journal of the Environmental Engineering Division, American Socity of Civil Engineers, v. 102, no. EE3, p. 533-548.

Stanford, S.D., Witte, R.W., and Harper, D.P., 1990, Hydrogeologic character and thickness of the glacial sediment of New Jersey: New Jersey Geological Survey Open File Map 3, two sheets, scale 1:100,000.

Thompson, D.G., 1932, Ground water supplies of the Passaic River Valley near Chatham, N.J.: N.J. Department of Conservation and Economic Development Bulletin 38, 51 p.

Stanford, S.D., Witte, R.W., and Harper, D.P., 1990, Hydrogeologic character and thickness of the glacial sediment of New Jersey: New Jersey Geological Survey Open File Map 3, two sheets, scale 1:100,000.

Thompson, D.G., 1932, Ground water supplies of the Passaic River Valley near Chatham, N.J.: N.J. Department of Conservation and Economic Development Bulletin 38, 51 p.

U.S. Army Corps of Engineers, 1987, Flood protection feasibility, mainstem Passaic River, phase 1, general design memorandum, v.1., main report: New York District, variously paged.

Van Abs, D.J., 1986, The buried valley aquifer systems, resources and contamination: Basking Ridge, N.J., Passaic River Coalition, variously paged, 9 pls.

Vecchioli, John, and Nichols, W.D., 1966, Results of the drought-disaster test-drilling program near Morristown, N.J.: NJ. Department of Conservation and Economic Development Water Resources Circular 16, 48 p.

Vecchioli, John, Nichols, W.D., and Nemickas, Bronius, 1967, Results of the second phase of the drought-disaster test-drilling program near Morristown, N.J.: N.J. Department of Conservation and Economic Development Water Resources Circular 17, 23 p.

Vermeule, C.C., 1905, East Orange wells at White Oak Ridge, Millburn Township, New Jersey: New Jersey Geological Survey Annual Report of the State Geologist for the year 1904, p. 255- 263.

Table 11. Records of observation wells

Observation well No.[1]	Name	Permit no.[2]	GWSI no.[3]	Owner	Municipality	County	Latitude/ Longitude	Date drilled	Aquifer[4]	Depth (ft)[5] Original	1991	Screen setting (ft)[6] Top	Bottom	Measuring point Location	Elev.(ft)[7]	Comments
1	Indian Lane TW west	22-12140	--	Montville Township MUA	Montville Township	do	405605 742039	3/9/73	f/d	252	238.5	249	252	do	195.0	
2	Indian Lane TW north	22-21883	--	do	do	do	405610 742017	6/16/83	f/d	92	79.6	--	--	do	190.0	
3	Indian Lane TW south	22-21605	--	do	do	do	405607 742016	8/4/83	f/d	210	--	180	210	do	190.0	
4	International Pipe	25-11377	270022	International Pipe	Parsippany-Troy Hills Twp	do	405208 742638	7/26/63	d	200	--	170	180	top of shelf	353.0	
5	PTH test 3	25-03664	270850	do	do	do	405220 742352	9/1/54	f/d	85	83.9	--	--	do	295.0	
6	PTH test 6	25-03955	270174	Parsippany-Troy Hills WD	Parsippany-Troy Hills Township	do	405140 742106	10/1/54	f/d	86	69.9	75	86	top of casing	180.0	
7	PTH test 5	--	--	do	do	do	405126 742834	--	Ylo	--	114.3	--	--	do	560.0	
8	PTH test 19	25-17435	270047	do	do	do	405021 742653	6/3/74	f/d	109	106.8	89	109	do	270.0	
9	PTH test 20 (Mazda Brook 6")	25-18318	270186	Parsippany-Troy Hills WD	do	do	405121 742432	7/14/76	f/d	100	--	78	100	do	270.0	
10	PTH prod. 20 (Mazda Brk 24")	25-24030?	270185	do	do	do	405121 742432	9/3/83	f/d	134	--	104	134	top of casing	270.0	
11	PTH test 8	--	--	do	do	do	405034 742337	--	f/d	--	70.0	--	--	do	180.0	
12	PTH new test, 21?, Troy Meadows	--	--	Parsippany-Troy Hills WD	Parsippany-Troy Hills Township	Morris	405012 742323	--	f/d	--	85.3	--	--	do	200.0	
13	USGS Troy Meadows 1 (max/min)	25-13413	270020	do	do	do	405026 742323	12/18/65	f/d	89	91.0	79	89	top of shelf	195.4	
14	USGS Troy Meadows 2 (10' tall)	--	270019	do	Parsippany-Troy Hills Township	do	405005 742322	1966	f/d	81	--	71	81	air hole in casing top	187.0	
15	Sharkey's LF, WI-10	25-26367	--	do	do	do	405052 742130	10/18/85	l/t	76	72.2	64	74	do	179.3	
16	Sharkey's LF, WI-5	25-26376	--	do	Parsippany-Troy Hills Township	Morris	405043 742110	9/27/85	l/t	104	96.1	88	98	do	184.2	
17	Sharkey's LF, WI-3	25-26386	--	do	do	do	405043 742056	8/29/85	l/t	67	63.5	54	64	do	174.2	
18	Sharkey's LF, WS-3	25-26387	--	Sharkey Farms Landfill	Parsippany-Troy Hills Township	do	405044 742053	8/21/85	l/t	20	16.4	5	15	do	173.9	

Notes:
[1]Location shown on plate 1.
[2]NJDEPE Bureau of Water Allocation well permit.
[3]GWSI: USGS Ground-Water Site Inventory.
[4]Aquifer (unit screened):
f-fluvial sediments
d-deltaic and lacustrine fan sediments
f/d-either fluvial or deltaic and lacustrine fan sediments, or both
l-lake-bottom sediments
t-till
l/t-either lake-bottom sediments or till, or both
Jb-Boonton Formaton
Jt-Towaco Formation
Jf-Feltville Formation
Ylo-gneiss
[5]Depths: total from land surface.
Original: when drilled, reported with precision shown on well record.
1991: December 1991
[6]Screen setting: depth from land surface, reported with precision shown on original data record
[7]Measuring point elevation: above mean sea level
-- : no data

Table 11. Records of observation wells (cont.)

Observation well No.[1]	Name	Permit no.[2]	GWSI no.[3]	Owner	Municipality	County	Latitude/ Longitude	Date drilled	Aquifer[4]	Depth (ft)[5] Original	1991	Screen setting (ft)[6] Top	Bottom	Measuring point Location	Elev.(ft)[7]	Comments
19	Sharkey's LF, WD-3	25-26385	--	Sharkey Farms Landfill	Parsippany-Troy Hills Township	Morris	405042 742054	8/27/85	l/t	98	92.0	84	94	do	174.8	
20	Sharkey's LF, WS-4	25-26377	--	do	do	do	405034 742056	10/16/85	l/t	17	16.4	5	15	do	176.6	
21	Sharkey's LF, WI-4	25-26388	--	do	do	do	405035 742057	10/16/85	l/t	62	60.0	50	60	do	175.6	
22	Sharkey's LF, WS-5	25-26378	--	do	Livingston Township	Essex	405042 742109	7/1/52	l/t	116	28.7	--	--	do	184.0	
23	Green Acres	25-14145	270006	US Geological Survey	East Hanover Township	do	404937 742201	12/10/66	f/d	104	91.9	94	104	top of casing	184.9	
24	OEP test hole 16	25-14161	270016	US Geological Survey	Hanover Township	do	404821 742723	1/18/67	f/d	85	--	75	85	flowing well	270.0	
25	Morristown Airport	--	270015	do	Hanover Twp	do	404743 742521	1/1/60	f/d	62	54.5	51	62	do	184.0	
26	Sandoz	25-13476	270005	do	do	do	404821 742350	12/30/65	f/d	123	123.2	113	123	do	192.2	
27	Clemens	25-13679	270004	US Geological Survey	East Hanover Township	do	404817 742400	5/18/66	f/d	111.5	92.6	99.5	110.91	top of casing	179.5	
28	W.B.Driver 1	25-13477	270002	do	do	do	404739 742405	1/22/66	f/d	70	--	60	70	top of shelf	185.6	sealed 1990
29	W.B.Driver 2	25-13653	270003	do	do	do	404747 742418	3/19/66	f/d	108	99.2	98	108	top of casing	182.5	
30	Livingston test 19	--	--	do	do	do	404821 742105	1/1/75	Jb	420	94.6	--	--	do	180.0	
31	Livingston test 20/21	--	--	do	do	do	404725 742048	--	f/d	--	59.2	--	--	do	210.0	
32	Sisters of Charity, St. Eliz., Old 2 (bedrock)	--	--	Sisters of Charity	Florham Park Boro	do	404708 742545		Jb	500	--	--	--	top of 3" casing	205.0	sealed 1989
33	Sisters of Charity, St. Eliz., Old 3 (surficial)	--	--	do	do	do	404708 742544	--	f/d	128	--	116	128	air hole in 10" casing	205.0	transfered to NJAm., 1990
34	Linpro, shallow	--	--	Linpro Devel. Corp.	do	do	404706 742544	--	f/d	90	--	77	90	top of PVC casing	205.0	sealed 1988
35	Exxon	25-14150	270014	US Geological Survey	Florham Park Boro	Morris	404704 742452	1/23/67	f/d	130	119.0	110	120	top of shelf	180.0	

Notes:
[1]Location shown on plate 1.
[2]NJDEPE Bureau of Water Allocation well permit.
[3]GWSI: USGS Ground-Water Site Inventory.
[4]Aquifer (unit screened):
f-fluvial sediments
d-deltaic and lacustrine fan sediments
f/d-either fluvial or deltaic and lacustrine fan sediments, or both
l-lake-bottom sediments
t-till
l/t-either lake-bottom sediments or till, or both
Jb-Boonton Formaton
Jt-Towaco Formation
Jf-Feltville Formation
Ylo-gneiss
[5]Depths: total from land surface.
Original: when drilled, reported with precision shown on well record.
1991: December 1991
[6]Screen setting: depth from land surface, reported with precision shown on original data record
[7]Measuring point elevation: above mean sea level
-- : no data

Table 11. Records of observation wells (cont.)

Observation well No.[1]	Name	Permit no.[2]	GWSI no.[3]	Owner	Municipality	County	Latitude/ Longitude	Date drilled	Aquifer[4]	Depth (ft)[5] Original	Depth (ft)[5] 1991	Screen setting (ft)[6] Top	Screen setting (ft)[6] Bottom	Measuring point Location	Measuring point Elev.(ft)[7]	Comments
36	Briarwood School	25-14159	270012	US Geological Survey	Florham Park Boro	do	404641 742258	1/17/67	f/d	125	93.5	100	110	top of shelf	201.0	
37	Brooklake test A	--	--	Florham Park Borough WD	Florham Park Borough	do	404627 742245	--	f/d	--	157.4	--	--	platform ledge	200.0	
38	Braidburn Country Club	25-14147	270010	do	do	do	404609 742245	3/4/67	f/d	124	--	105	115	--		sealed 1980
39	Slough Brook 6	25-16558	--	East Orange City WD	Livingston Township	do	404618 742007	10/26/72	Jt	337	--	--	--	do	240.0	
40	Livingston test 18	--	--	Livingston Township WD	Livingston Township	Essex	404614 741932	--	f/d	--	300	--	--	do	230.0	
41	Meeker test	--	--	do	do	do	404549 741942	--	Jt	--	--	--	--	do	200.0	
42	Kings Road Obs., Madison	25-34869	--	NJDEPE	Madison Borough	do	404517 742455	11/3/89	d	208	131.2	131	161	do	250.0	
43	Madison Public Library	--	--	Madison Borough WD	Madison Borough	Morris	404510 742454	--	d	--	--	--	--	do	260.0	
44	Madison Boro WD 4	--	270017	Madison Borough WD	Madison Boro	do	404508 742401	1926?	f/d	100	76.3	--	--	top of casing	196.9	
45	GS-TM1, USGS (Niles Park)	--	270152	do	Madison Borough	do	404450 742459	8/22/81	d	173	105.1	170	172.5	do	370.0	
46	GS-TH4, USGS (Env. Center)	--	270150	US Geological Survey	Chatham Township	Morris	404350 742515	8/18/81	d	113	--	110	112.5	top of PVC casing	255.0	
47	GS-TH5, USGS (Green Village)	--	270151	US Geological Survey	Chatham Township	Morris	404419 742616	8/25/81	d	92.5	63.0	90	92.5	do	250.0	
48	Greenhouse	25-14145	270008	US Geological Survey	Florham Park Borough	do	404525 742257	12/16/66	f/d	90	--	63	73	--		obstructed 1974
49	Milton Ave. Sch., Chatham	25-04986	--	NJ-Amer. ater Co.	Chatham Borough	Morris	404452 742244	9/1/55	f/d	117.5	115.8	111.66	117.5	top of casing	200.0	
50	Chatham Recreation Field	25-14164	270001	do	Chatham Township	do	404430 742253	1/27/67	f/d	197	152.3	140	150	top of shelf	220.0	
51	Passaic River 50	25-04872	130008	NJ-Amer. Water Co.	Millburn Township	Essex	404423 742220	8/18/55	f/d	118	112.7	88	118	air hole access	170.0	
52	Sheppard Kollock Park Deep (6")	25-37620	--	do	do	do	404419 742223	12/6/90	Jt	242	241.2	189	242	do	190.0	
53	Sheppard Kollock Pk. Shallow (4")	25-37544	--	NJDEPE	Chatham Borough	Morris	404419 742225	12/14/90	f/d	136	134.7	124	134	do	191.1	

Notes:
[1]Location shown on plate 1.
[2]NJDEPE Bureau of Water Allocation well permit.
[3]GWSI: USGS Ground-Water Site Inventory.
[4]Aquifer (unit screened):
f-fluvial sediments
d-deltaic and lacustrine fan sediments
f/d-either fluvial or deltaic and lacustrine fan sediments, or both
l-lake-bottom sediments
t-till
l/t-either lake-bottom sediments or till, or both
Jb-Boonton Formaton
Jt-Towaco Formation
Jf-Feltville Formation
Ylo-gneiss
[5]Depths: total from land surface.
Original: when drilled, reported with precision shown on well record.
1991: December 1991
[6]Screen setting: depth from land surface, reported with precision shown on original data record
[7]Measuring point elevation: above mean sea level
-- : no data

Table 11. Records of observation wells (cont.)

Observation well No.[1]	Name	Permit no.[2]	GWSI no.[3]	Owner	Municipality	County	Latitude/ Longitude	Date drilled	Aquifer[4]	Depth (ft)[5] Original	Depth (ft)[5] 1991	Screen setting (ft)[6] Top	Screen setting (ft)[6] Bottom	Measuring point Location	Measuring point Elev.(ft)[7]	Comments
54	Canoe Brook 30	--	130013	do	Millburn Township	Essex	404453 742115	1/1/25	f/d	130?	300	--	--	top of shelf	176.7	
55	Canoe Brook 17	--	--	do	do	do	404434 742112	--	f/d	109	74.5	89	109	do	180.0	
56	Neutral Zone	--	130014	East Orange City WD	do	do	404447 742044	1/1/25	f/d	--	64.1	--	--	do	182.9	
57	Millburn Compost Facility	--	--	Millburn Township	Millburn Township	Essex	404444 742043	--	t	--	13.4	--	--	top of casing	180.0	
58	Middle Canoe Brook	--	--	do	do	do	404457 742014	--	f/d	--	78.7	--	--	air hole access	180.0	
59	White Oak Ridge Shallow (1st) (surficial)	25-34845	--	do	do	do	404454 742022	11/17/89	f/d	90	85.6	79	84	do	180.0	
60	White Oak Ridge, Deep (2nd) (bedrock)	25-34871	--	do	Millburn Township	Essex	404454 742022	11/14/89	Jt	298	300	112	298	do	180.0	
61	G1-B1	--	--	US Fish, Game & Wildlife Service	Harding Township	do	404312 742957	3/2/84	l	67	61.5	64.5	67	do	232.9	deep
62	G1-B1a	--	--	do	do	do	404312 742957	3/2/84	l	30	30.3	27.5	30	do	232.9	intermediate
63	G1-B1b	--	--	do	do	do	404312 742957	3/2/84	l	15	15.9	12.5	15	do	232.9	shallow
64	G2-B2	--	--	do	do	do	404245 742957	3/9/84	l	87	18.6	84.5	87	do	234.1	deep
65	G2-B2a	--	--	do	do	do	404245 742957	3/9/84	l	30	30.8	27.5	30	do	234.2	intermediate
66	G2-B2b	--	--	do	do	do	404245 742957	3/9/84	l	15	14.4	12.5	15	do	234.3	shallow
67	GS TH 6 (Lord Stirling Obs.)	--	350008	US Geological Survey	Bernards Township	Somerset	404142 743117	9/3/81	l	71.4	70.2	70	71.4	hole in PVC casing top	230.0	usually flowing slightly
68	Christ Church, Millburn	26-16359	--	NJDEPE	Millburn Township	Essex	404350 741934	2/3/90	f/d	200	199.4	162	182	do	290.0	
69	Short Hills Obs.	--	--	do	Springfield Township	Union	404256 741848	--	f/d	--	--	--	--	bottom of slanted pipe	95.0	sealed 1990
70	Baltusrol Obs.	--	--	do	Summit City	do	404202 742130	--	Jf	--	23.5	--	--	rusty pipe in column	295.0	

Notes:
[1]Location shown on plate 1.
[2]NJDEPE Bureau of Water Allocation well permit.
[3]GWSI: USGS Ground-Water Site Inventory.
[4]Aquifer (unit screened):
f-fluvial sediments
d-deltaic and lacustrine fan sediments
f/d-either fluvial or deltaic and lacustrine fan sediments, or both
l-lake-bottom sediments
t-till
l/t-either lake-bottom sediments or till, or both
Jb-Boonton Formaton
Jt-Towaco Formation
Jf-Feltville Formation
Ylo-gneiss
[5]Depths: total from land surface.
Original: when drilled, reported with precision shown on well record.
1991: December 1991
[6]Screen setting: depth from land surface, reported with precision shown on original data record
[7]Measuring point elevation: above mean sea level
-- : no data

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
AT&T Laboratories	1	108		404905	742502	Hanover Twp	Morris	1980	--	--	21-00078	--
Airtron		--	1	--	--	Hanover Twp	Morris	--	--	Qsd	25-21689	--
Airtron		--	2	--	--	Hanover Twp	Morris	10/80	--	Qsd	25-21690	--
Airtron		170	3	404856	742820	Hanover Twp	Morris	--	--	Qsd	--	--
Airtron	2		well field sum									
Allied Corporation	3	183	1	404724	742622	Morris Twp	Morris	5/55	--	Qsd?	25-04286	270213
Allied Corporation	4	184	2	404728	742607	Morris Twp	Morris	5/60	--	Jb?	25-09253	270218
Allied Corporation	5	185	4	404721	742654	Morris Twp	Morris	11/69	--	Qsd	25-15313	270146
Allied Corporation		186	5	404736	742640	Morris Twp	Morris	1/77	--	Qsd	25-18980	270215
Allied Corporation	6	187	10	404725	742611	Morris Twp	Morris	10/81	--	Qsd	25-22302	270026
Allied Corporation		188	11	404734	742615	Morris Twp	Morris	1/80	--	Qsd	--	270218
Allied Corporation	7	189	14	404735	742636	Morris Twp	Morris	--	--	Qsd	25-29037	--
Allied Corporation	8		well field sum									
Amerace (formerly Russelstol Div., Midland Ross.)	9	141	1	404753	742049	Livingston Twp	Essex	1955	--	Jb	25-04151	--
Automatic Switch	10	208		404738	742233	Florham Park Boro	Morris	1958	--	--	25-07639	--
Boonton Electronics	11	77	5	405139	742459	Parsippany-Troy Hills Twp	Morris	1982	--	Qsd	25-25494	--
Brooklawn Farms Water Co. (springs only?)		--		--	--	Parsippany-Troy Hills Twp	Morris	--	--	--	--	--
Canoe Brook Country Club	12	265	1	404423	742115	Millburn Twp	Essex	7/65	--	Qsd	25-12993	--
Carteret S&L	13	173		404729	742833	Morristown Town	Morris	1955	--	--	25-03936	--
Cedar Hill Country Club	14	142	1	404737	742150	Livingston Twp	Essex	--	--	Qsd?	45-00308	--
Cedar Hill Country Club	15	143	2	404753	742150	Livingston Twp	Essex	--	--	Qsd?	45-00309	--
Cedar Hill Country Club	16		well field sum									
Charles Evans Develop. Co. (water company sold to Lincoln Park in 1966; this well listed as Lincoln Park Wenonah well)		30	1	405512	741831	--	--	--	--	--	--	--
Charles Evans Develop. Co.		29	2	405511	741831	Lincoln Park Boro	Morris	1933	1966	Jh?	--	--
Charles Evans Develop. Co.	17		well field sum									
Chatham Borough		226	old well field sum									
Chatham Borough		227	1	404443	742319	Chatham Boro	Morris	1/32	--	Qsd	45-00270	270112
Chatham Borough		228	2	404443	742317	Chatham Boro	Morris	1/32	--	Qsd	45-00271	270113
Chatham Borough		229	3	404445	742319	Chatham Boro	Morris	11/56	--	Qsd	25-05687	270114
Chatham Borough	18		well field sum									
Chemical Bank Co. (formerly Morristown Trust, Horizon Bank)	19	178		--	--	Morristown Town	Morris	6/53	--	--	25-02685	--
Ciba-Geigy Corp., Pharm. Div.	20	266	3	404339	742239	Summit City	Union	7/40	--	Jt	45-00077	390313
Ciba-Geigy Corp., Pharm. Div. (sealed)	21	267	4	404343	742241	Summit City	Union	5/40	--	Jt	45-00078	390316

Notes:

[1] Withdrawal index number: correlates well data with pumpage data.

[2] Production well number: used on plate 1 to indicate location of well.

[3] Local name: name assigned by owner to production well.

[4] "Well field sum" is sum of pumpages, does not represent single well.

[5] Latitude, longitude: degrees, minutes, seconds.

[6] Geologic unit:
Qsd-stratified drift
Jb-Boonton Formation
Jh-Hook Mountain Basalt
Jt-Towaco Formation
Jp-Preakness Basalt
Jf-Feltville Formation
Jo-Orange Mountain Basalt
Ybh-granite
Ylo-gneiss

[7] NJDEPE well permit number: assigned by Bureau of Water Allocation

[8] USGS GWSI number: assigned by USGS to wells in the Ground-Water Site Inventory data base.

--: no data.

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
Ciba-Geigy Corp., Pharm. Div. (sealed)		268	5	404336	742240	Summit City	Union	12/44	--	Jt	45-00079	390314
Ciba-Geigy Corp., Pharm. Div.	22	269	6	404339	742248	Summit City	Union	5/47	--	Jt	45-00080	390315
Ciba-Geigy Corp., Pharm. Div.	23	270	7	404335	742251	Summit City	Union	2/49	--	Jt	25-00354	390312
Ciba-Geigy Corp., Pharm. Div.	24	271	8	404331	742246	Summit City	Union	9/54	--	Jt	25-03305?	390311
Ciba-Geigy Corp., Pharm. Div. (sealed)	25	272	10	404325	742244	Summit City	Union	3/58	--	Jt	25-07298	390308
Ciba-Geigy Corp., Pharm. Div. (sealed)	26	273	12	404324	742250	Summit City	Union	10/59	--	--	25-08681	390309
Ciba-Geigy Corp., Pharm. Div.	27		well field sum									
Cold Water Birch Comm. Assoc. (listed as Wayne Twp. Water Dept. "C")		21	1	405556	741429	Wayne Twp	Passaic	--	--	Jt?	--	--
Colony Pool, Chatham Twp.	28	286		404348	742429	Chatham Twp	Morris	5/69	--	--	25-15137	270034
Commonwealth Light & Water		--	--	--	--	--	--	--	--	--	--	--
East Hanover Township		114	1	404853	742316	East Hanover Twp	Morris	5/83	--	Qsd	25-13672	--
East Hanover Township	29	115	2	404856	742317	East Hanover Twp	Morris	3/87	--	Qsd	25-14205	270147
East Hanover Township		116	3	404940	742245	East Hanover Twp	Morris	11/60	--	Jb	25-09640	270149
East Hanover Township	30	117	5	405002	742126	East Hanover Twp	Morris	8/72	--	Qsd	25-18267	270148
East Hanover Township		118	6	404933	742204	East Hanover Twp	Morris	3/85	--	Qsd	25-25792	--
East Hanover Township	31		well field sum									
East Orange - Braidburn		241	North-1930	404608	742219	Florham Park Boro	Morris	--	--	Qsd	--	--
East Orange - Braidburn		242	Middle-1930	404559	742218	Florham Park Boro	Morris	--	--	Qsd	--	--
East Orange - Braidburn		243	South-1930	404553	742219	Florham Park Boro	Morris	--	--	Qsd	--	--
East Orange - Braidburn	32	233	1-1956	404554	742220	Florham Park Boro	Morris	2/58	--	Qsd	25-07098	270011
East Orange - Braidburn	33	234	2-1956	404603	742222	Florham Park Boro	Morris	1/58	--	Qsd	25-07097	270126
East Orange - Braidburn	34	235	3-1956	404611	742219	Florham Park Boro	Morris	2/58	--	Qsd	25-07096	270009
East Orange - Braidburn	35	236	4-1976	404618	742220	Florham Park Boro	Morris	6/74	--	Qsd	25-17364	270128
East Orange - Braidburn		244	3-1990	404609	742222	Florham Park Boro	Morris	--	--	Qsd	25-37063	--
East Orange - Braidburn	36		well field sum									
East Orange - Canoe Brook	37	157	oldest	404456	742016	Millburn Twp	Essex	--	--	Qsd	--	--
East Orange - Canoe Brook		158	North-1928	404500	742010	Millburn Twp	Essex	--	--	Qsd	--	--
East Orange - Canoe Brook		159	Middle-1928	404457	742012	Millburn Twp	Essex	--	--	Qsd	--	--
East Orange - Canoe Brook		160	South-1928	404454	742016	Millburn Twp	Essex	--	--	Qsd	--	--
East Orange - Canoe Brook	38	144	1-1956	404459	742010	Millburn Twp	Essex	1/30	--	Qsd	25-07102	130047
East Orange - Canoe Brook	39	145	2-1956	404520	742000	Millburn Twp	Essex	3/58	--	Qsd	26-01712	130015
East Orange - Canoe Brook	40	146	3-1956	404535	741949	Livingston Twp	Essex	8/30	--	Qsd	26-01713	130041
East Orange - Canoe Brook	41	147	4-1956	404553	741933	Livingston Twp	Essex	5/58	--	Qsd	26-01714	130042
East Orange - Canoe Brook	42	148	5-1978	404606	741921	Livingston Twp	Essex	8/72	--	Jt	26-04476	130043
East Orange - Canoe Brook	43	149	6-1978	404608	741904	Livingston Twp	Essex	9/72	--	Jt	26-04700	130059
East Orange - Canoe Brook	44		well field sum									
East Orange - Dickinson		245	North-1923	--	--	Livingston Twp	Essex	--	--	Qsd	--	--
East Orange - Dickinson		246	Middle-1923	--	--	Livingston Twp	Essex	--	--	Qsd	--	--
East Orange - Dickinson		247	South-1923	--	--	Livingston Twp	Essex	--	--	Qsd	--	--
East Orange - Dickinson	45	237	1-1956	404545	742219	Livingston Twp	Essex	1/58	--	Qsd	25-07099	130005
East Orange - Dickinson	46	238	2-1956	404537	742221	Livingston Twp	Essex	1/58	--	Qsd	25-07100	130086
East Orange - Dickinson	47	239	3-1956	404538	742209	Livingston Twp	Essex	1/58	--	Qsd	25-07101	130003
East Orange - Dickinson	48	240	4-1986	404535	742159	Livingston Twp	Essex	--	--	Qsd	25-24573	--

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
East Orange - Dickinson		248	1-1990	404546	742218	Livingston Twp	Essex	--	--	Qsd	25-37062	--
East Orange - Dickinson		249	2-1990	404538	742219	Livingston Twp	Essex	--	--	Qsd	25-37061	--
East Orange - Dickinson		250	3-1990	404538	742211	Livingston Twp	Essex	--	--	Qsd	25-37060	--
East Orange - Dickinson	49		well field sum									
East Orange - Slough Brook			old well field sum									
East Orange - Slough Brook	50	152	1-1928	404525	742059	Millburn Twp	Essex	1928	--	Jt	45-00006	130046
East Orange - Slough Brook	51	153	2-1928	404535	742049	Livingston Twp	Essex	1928	--	Jt	45-00007	130045
East Orange - Slough Brook	52	154	3-1928	404539	742046	Livingston Twp	Essex	1928	--	Jt	45-00008	130004
East Orange - Slough Brook	53	155	4-1979	404548	742043	Livingston Twp	Essex	5/77	--	Jt	25-19136	130058
East Orange - Slough Brook		--	5	--	--	Livingston Twp	Essex	6/72	--	Jt	25-16384	--
East Orange - Slough Brook		156	6	404623	742004	Livingston Twp	Essex	10/72	--	Jt	25-16558	--
East Orange - Slough Brook	54		well field sum									
East Orange -all fields	55		well field sum									
Essex Co. Parks & Rec.	56	--		--	--	Essex Fells Twp	Essex	--	--	--	25-17294	--
Essex County Institutions	57		well field sum									
Essex Fells Township	58	80	1A	404953	741715	Essex Fells Twp	Essex	9/27	--	Qsd	46-00200	130001
Essex Fells Township	59	81	2	404902	741633	Essex Fells Twp	Essex	9/40	--	Qsd	46-00201	130071
Essex Fells Township	60	82	4A	405048	741721	West Caldwell Twp	Essex	1/24	--	Jp	46-00207	130083
Essex Fells Township	61	83	4B	405054	741718	West Caldwell Twp	Essex	1/27	--	Jp	46-00208	130084
Essex Fells Township	62	84	4C	405056	741715	West Caldwell Twp	Essex	1/27	--	Jp	46-00209	130085
Essex Fells Township	63	85	5	404942	741708	Essex Fells Twp	Essex	1/29	--	Jp	46-00202	--
Essex Fells Township	64	86	6	404940	741739	Essex Fells Twp	Essex	7/34	--	Jp	46-00203	130072
Essex Fells Township	65	87	7	404947	741755	Roseland Boro	Essex	10/41	--	Qsd	46-00204	130073
Essex Fells Township	66	88	8	404952	741801	West Caldwell Twp	Essex	2/42	--	Jp	46-00205	130002
Essex Fells Township	67	89	9	404955	741747	Essex Fells Twp	Essex	6/46	--	Jp	46-00206	130074
Essex Fells Township	68	90	10	404910	741937	Roseland Boro	Essex	3/52	--	Jt	26-00462	130075
Essex Fells Township	69	91	11	404904	741913	Roseland Boro	Essex	3/54	--	Jt	26-00830	130076
Essex Fells Township	70	92	12	404911	741932	Roseland Boro	Essex	10/53	--	Jt	26-00829	130077
Essex Fells Township	71	93	13	405107	741710	West Caldwell Twp	Essex	8/57	--	Jt	26-01640	130078
Essex Fells Township	72	94	14	404956	741739	Essex Fells Twp	Essex	3/59	--	Qsd	26-01910	130079
Essex Fells Township	73	95	15	404932	741906	Roseland Boro	Essex	10/62	--	Jt	26-02647	130080
Essex Fells Township	74	96	16	404935	741909	Roseland Boro	Essex	10/62	--	Jt	26-02736	130081
Essex Fells Township	75	97	17	404948	741833	Roseland Boro	Essex	3/79	--	Jt	26-04743	130082
Essex Fells Township	76		well field sum									
Essex Fells Township			well field sum									
Evans-Shore Const. Co.	77	--	1	--	--	Livingston Twp	Essex	9/63	--	Qsd	25-16589	--
Evans-Shore Const. (formerly known as Intl. Pipes & Ceramics Co., Interspace, Howard B. Slaney, Identitech?)	78	--	2	--	--	Livingston Twp	Essex	11/63	--	Qsd	25-11584	--

Notes:

[1] Withdrawal index number: correlates well data with pumpage data.

[2] Production well number: used on plate 1 to indicate location of well.

[3] Local name: name assigned by owner to production well.

[4] "Well field sum" is sum of pumpages, does not represent single well.

[5] Latitude, longitude: degrees, minutes, seconds.

[6] Geologic unit:
Qsd-stratified drift
Jb-Boonton Formation
Jh-Hook Mountain Basalt
Jt-Towaco Formation
Jp-Preakness Basalt
Jf-Feltville Formation
Jo-Orange Mountain Basalt
Ybh-granite
Ylo-gneiss

[7] NJDEPE well permit number: assigned by Bureau of Water Allocation

[8] USGS GWSI number: assigned by USGS to wells in the Ground-Water Site Inventory data base.

--: no data.

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
Evans-Shore Const. Co.		--	3	--	--	Livingston Twp	Essex	--	--	Qsd?	--	--
Evans-Shore Const. Co.		--	4	--	--	Livingston Twp	Essex	--	--	Qsd?	--	--
Evans-Shore Const. Co.			well field sum									
Exxon Research & Engineering		200	1	404632	742541	Florham Park Boro	Morris	9/57	--	Qsd	25-06994	270125
Exxon Research & Engineering		201	2	404646	742511	Florham Park Boro	Morris	12/67	--	Qsd	25-14658	270123
Exxon Research & Engineering		202	3	404646	742511	Florham Park Boro	Morris	--	--	Qsd	25-15953	270013
Exxon Research & Engineering	79		well field sum									
Fairfield Borough	80	33	1 (Oak St.)	405258	741827	Fairfield Boro	Essex	7/64	--	Qsd	26-02939	--
Fairfield Borough	81	34	2	405243	741732	Fairfield Boro	Essex	--	--	Jt	25-029407	--
Fairfield Borough	82	35	4	405216	741903	Fairfield Boro	Essex	--	--	Qsd	26-03047	--
Fairfield Borough	83	36	6	405315	741742	Fairfield Boro	Essex	--	--	Jt	26-04269	--
Fairfield Borough	84	37	7	405213	741645	Fairfield Boro	Essex	11/57	--	Jt	26-01701	--
Fairfield Borough	85	38	8	405334	741657	Fairfield Boro	Essex	--	--	Jt	26-04450	--
Fairfield Borough	86	39	9	405222	741824	Fairfield Boro	Essex	12/77	--	Qsd	26-04731	--
Fairfield Borough	87		well field sum									
Fairleigh Dickinson Univ.		196	1	404646	742548	Florham Park Boro	Morris	1/21	--	Jb	--	--
Fairleigh Dickinson Univ.		197	2	404641	742547	Florham Park Boro	Morris	1/22	--	Jb	--	--
Fairleigh Dickinson Univ.		198	3	404636	742546	Florham Park Boro	Morris	--	--	Qsd	25-26568	--
Fairleigh Dickinson Univ.	88		well field sum									
Fairmount Country Club	89	283	1	404415	742519	Chatham Twp	Morris	/61	--	Jb	45-00084	--
Fairmount Country Club	90	284	2	404424	742529	Chatham Twp	Morris	--	--	Jb	25-14786	--
Fairmount Country Club		--	?	--	--	Chatham Twp	Morris	9/60	--	Jb?	25-09502	--
Fairmount Country Club	91		well field sum									
Florham Park Borough		--	1-1942	--	--	Florham Park Boro	Morris	--	--	Qsd?	--	270140
Florham Park Borough	92	204	2	404719	742415	Florham Park Boro	Morris	8/53	--	Qsd	45-00299	270141
Florham Park Borough	93	205	3	404710	742405	Florham Park Boro	Morris	11/64	--	Qsd	25-12424	270142
Florham Park Borough	94	206	4	404707	742426	Florham Park Boro	Morris	8/80	--	Qsd	25-21204	270143
Florham Park Borough	95	203	1-1962	404711	742417	Florham Park Boro	Morris	6/62	--	Qsd	25-10664	--
Florham Park Water Dept	96		well field sum									
Gates of Heaven	97	127		404905	742227	East Hanover Twp	Morris	8/35	--	--	--	--
Givaudan Corp. (formerly known as Fritzche Dodge & Olcott)	98	124	1	404857	742036	East Hanover Twp	Morris	--	--	Jb	25-14708	--
Givaudan Corp.	99	125	2	404900	742037	East Hanover Twp	Morris	--	--	Jb	25-14996	--
Givaudan Corp.	100	126	3	404904	742034	East Hanover Twp	Morris	--	--	Jb	25-17114	--
Givaudan Corp.	101		well field sum									
Greystone Park Psy. Hosp.	102	--	1- test well	--	--	Morris Plains Boro	Morris	--	--	Qsd?	25-14416	--
Greystone Park Psy. Hosp. (well sold to SE Morris Co. MUA in 1989)	103	161	1	404921	742903	Morris Plains Boro	Morris	--	--	Qsd	45-00038	--
Greystone Park Psy. Hosp. (well sold to SE Morris Co. MUA in 1989)	104	162	2	404922	742902	Morris Plains Boro	Morris	--	--	Qsd	45-00039	--
Greystone Park Psy. Hosp. (well sold to SE Morris Co. MUA in 1989)	105	163	3	404922	742900	Morris Plains Boro	Morris	10/59	--	Qsd	25-08493	--
Greystone Park Psy. Hosp. (well sold to SE Morris Co. MUA in 1989)	106	164	4 Davy ?	404923	742859	Morris Plains Boro	Morris	7/16	--	Qsd	25-08827	--
Greystone Park Psy. Hosp.	107	165	5 (2-67)	404940	742940	Parsippany-Troy Hills Twp	Morris	8/67	--	Ylo?	25-14417	--
Greystone Park Psy. Hosp.	108	166	6 (1-67)	404933	742959	Parsippany-Troy Hills Twp	Morris	--	--	Jb	25-14303	--

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
Greystone Park Psy. Hosp.	109		well field sum									
Hanover Greens (now East Hanover 3)		128		404855	742050	East Hanover Twp	Morris	1960	1962?	--	25-09640	270149
Identitech Corp. (formerly known as G.S. Warner Communications	110	--	2	--	--	--	--	--	--	Jb?	--	--
Identitech Corp.	111		1	--	--	--	--	1958?	--	Jb?	25-07920	--
Identitech Corp.			well field sum									
Indian Lake Development Corp.		--		--	--	--	--	--	--	--	--	--
Jersey Central P&L, Morristown	112	180		404658	742705	Morris Twp	Morris	7/64	--	--	25-11968	270209
Lake Parsippany Prop. Assoc.		76	main	405125	742601	Parsippany-Troy Hills Twp	Morris	--	--	Qsd?	--	--
Lincoln Park Water Co.	113		well field sum									
Lincoln Park Water Dept. (bought from Charles M. Evans Dev. Co.)		30	Wenonah	405512	741831	Lincoln Park Boro	Morris	1917?	1966	Jh?	26-03003	270129
Lincoln Park Water Dept		31	Aqueduct Park	405453	741620	Lincoln Park Boro	Morris	--	--	Qsd?	26-03029	270207
Lincoln Park Water Dept (formerly River View Water Co.)		32		405450	741717	Lincoln Park Boro	Morris	1929?	1966	Jt	46-00166	--
Lincoln Park Water Dept		27	#1-old (Mt. View WC)	405523	741848	Lincoln Park Boro	Morris	--	--	Jh?	--	--
Lincoln Park Water Dept		28	#2 old	405527	741906	Lincoln Park Boro	Morris	--	--	Jh?	--	--
Lincoln Park Water Dept		--	3	--	--	Lincoln Park Boro	Morris	--	--	Jh?	--	--
Lincoln Park Water Dept	114		well field sum									
Lions Head Lake Inc. (Listed under current name, Wayne Twp. Water Dept. 5)		14	1	405819	741544	Wayne Twp	Passaic	--	--	--	--	--
Lions Head Lake Inc. (Listed under current name, Wayne Twp. Water Dept. 4)		13	2	405841	741530	Wayne Twp	Passaic	--	--	--	--	--
Livingston Township	115	129	1	404811	741913	Livingston Twp	Essex	11/48	--	Jt	45-00340	130048
Livingston Township	116	130	2	404814	741850	Livingston Twp	Essex	3/55	--	Jt	26-01095	130049
Livingston Township	117	131	3	404839	742048	Livingston Twp	Essex	7/55	--	Qsd	25-04600	130019
Livingston Township	118	132	4	404708	741914	Livingston Twp	Essex	9/55	--	Jt	26-01240	130006
Livingston Township	119	133	5	404836	742051	Livingston Twp	Essex	1/60	--	Qsd	45-00341	130007
Livingston Township	120	134	6	404734	742050	Livingston Twp	Essex	5/66	--	Qsd	25-13584	130022
Livingston Township	121	135	7	404756	742135	Livingston Twp	Essex	1/00	--	Jt	25-12755	130052
Livingston Township	122	136	8	404823	741858	Livingston Twp	Essex	1/67	--	Jt	45-00342	130054
Livingston Township	123	137	9	404801	742129	Livingston Twp	Essex	1/74	--	Jt	25-16551	130055
Livingston Township	124	138	10	404704	741934	Livingston Twp	Essex	6/72	--	Jt	25-16303	130053
Livingston Township	125	139	11	404746	741908	Livingston Twp	Essex	1/72	--	Jt	45-00343	130056
Livingston Township	126	140	12	404633	741954	Livingston Twp	Essex	10/78	--	Jt	25-20463	130038
Livingston Township	127		well field sum									
M. Polaner, Inc.	128	99		404907	741905	Roseland Boro	Essex	2/68	--	--	26-04164	--
Madison Borough Water Dept.		209	old 1	404503	742354	Madison Boro	Morris	--	--	Qsd	--	--

Notes:

[1] Withdrawal index number: correlates well data with pumpage data.

[2] Production well number: used on plate 1 to indicate location of well.

[3] Local name: name assigned by owner to production well.

[4] "Well field sum" is sum of pumpages, does not represent single well.

[5] Latitude, longitude: degrees, minutes, seconds.

[6] Geologic unit:
Qsd-stratified drift
Jb-Boonton Formation
Jh-Hook Mountain Basalt
Jt-Towaco Formation
Jp-Preakness Basalt
Jf-Feltville Formation
Jo-Orange Mountain Basalt
Ybh-granite
Ylo-gneiss

[7] NJDEPE well permit number: assigned by Bureau of Water Allocation

[8] USGS GWSI number: assigned by USGS to wells in the Ground-Water Site Inventory data base.

--: no data.

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
Madison Borough Water Dept.		210	old 2	404505	742353	Madison Boro	Morris	--	--	Qsd	--	--
Madison Borough Water Dept.		211	old 3	404508	742358	Madison Boro	Morris	--	--	Qsd	--	--
Madison Borough Water Dept.		212	old 4	404508	742401	Madison Boro	Morris	<1929	--	Qsd	--	270017
Madison Borough Water Dept.		213	old 5	404509	742401	Madison Boro	Morris	--	--	Qsd	--	--
Madison Borough Water Dept.		214	old 6	404504	742358	Madison Boro	Morris	--	--	Qsd	--	--
Madison Borough Water Dept.		215	old 7	404506	742401	Madison Boro	Morris	--	--	Qsd	--	--
Madison Borough Water Dept.		216	old 8	404510	742405	Madison Boro	Morris	--	--	Qsd	--	--
Madison Borough Water Dept.		217	old 9	404512	742406	Madison Boro	Morris	--	--	Qsd	--	--
Madison Borough Water Dept.		218	old 10	404506	742357	Madison Boro	Morris	1/29	--	Qsd	--	270203
Madison Borough Water Dept.		219	old 11	404511	742401	Madison Boro	Morris	1/29	--	Qsd	--	270204
Madison Borough Water Dept.		220	old 12	404511	742405	Madison Boro	Morris	1/29	--	Qsd	--	270205
Madison Borough Water Dept.	129	221	A	404506	742403	Madison Boro	Morris	11/52	--	Qsd	25-01962	270130
Madison Borough Water Dept.	130	222	B	404512	742415	Madison Boro	Morris	7/55	--	Qsd	25-04207	270131
Madison Borough Water Dept.	131	223	C	404609	742512	Madison Boro	Morris	9/55	--	Qsd	25-04660	270132
Madison Borough Water Dept.	132	224	D	404558	742501	Madison Boro	Morris	6/56	--	Qsd	25-04423	270133
Madison Borough Water Dept.	133	225	E	404458	742349	Madison Boro	Morris	9/55	--	Qsd	25-14041	270134
Madison Borough Water Dept.	134		well field sum									
Madison Golf Club	135	282	1	404451	742540	Madison Boro	Morris	1/66	--	Jb	25-13396	--
Mennen Company		168	1	404850	742822	Morris Twp	Morris	--	--	Qsd	25-01891	--
Mennen Company		169	2	404841	742822	Morris Twp	Morris	--	--	Qsd	25-13682	--
Mennen Company	136		well field sum									
Millington Water Co.	137	293		404014	743132	Passaic Twp	Morris	1909?	1928	--	--	--
Montville Township MUA	138	40	2 (Walnut)	405228	742107	Montville Twp	Morris	12/57	--	Jb	25-06387	270195
Montville Township MUA		41	4 (Lee Ct.)	405321	742111	Montville Twp	Morris	6/83	--	Jb	22-02188	270194?
Montville Township MUA		42	5 (Westminster)	405325	742118	Montville Twp	Morris	--	--	Jb	25-13895	270196?
Montville Township MUA	139	22	7 (Dianne Dr.)	405522	742244	Montville Twp.	Morris	11/85	--	Qsd	26-03474	270056
Montville Township MUA	140	23	8 (MacLeary Rd.)	405520	742302	Montville Twp.	Morris	10/65	--	Qsd	25-13301	270197
Montville Township MUA	141	24	9 (Indian Lane 1)	405605	742037	Montville Twp.	Morris	4/74	--	Qsd	22-13497	270055
Montville Township MUA	142	25	10 (Indian Lane 2)	405603	742039	Montville Twp.	Morris	11/74	--	Qsd	22-13923	270196
Montville Township MUA	143	26	6, 11 (Indian Lane 3)	405606	742020	Montville Twp.	Morris	--	--	Qsd	--	--
Montville Township MUA	144		well field sum	--	--	--	--	--	--	--		
Morris Co. Golf Club	145	181	1	404702	742625	Morris Twp	Morris	5/62	--	Qsd	25-10487	--
Morris Co. Golf Club		182	2	404704	742635	Morris Twp	Morris	4/72	--	Qsd	25-16215	--
Morris Co. Golf Club	146		well field sum									
Morristown Memorial Hospital		172	Madison (no.2)	404720	742754	Morristown Town	Morris	12/59	--	Jb	25-08577	--
Morristown Memorial Hospital		171	Franklin (no.1)	404723	742756	Morristown Town	Morris	3/57	--	Jb	25-05647	--
Morristown Memorial Hospital	147		well field sum									
Mountain Lakes Water Dept	148	46	4	405417	742737	Denville Twp.	Morris	--	--	Qsd	45-00301	270189
Mountain Lakes Water Dept		45	3	405407	742745	Denville Twp.	Morris	--	--	Qsd?	45-00300	270190
Mountain Lakes Water Dept	149	43	Tower Hill 4	405232	742646	Mountain Lakes Boro	Morris	1/22	--	Ylo?	45-00302	270188
Mountain Lakes Water Dept	150	44	5	405258	742728	Mountain Lakes Boro	Morris	1/69	--	Qsd	25-14698	270191
Mountain Lakes Water Dept	151		well field sum									
Mountain Ridge Country Club	152	78	1 (main well ?)	405135	741718	West Caldwell Twp	Essex	--	--	Jt	46-00166	--
Mountain Ridge Country Club	153	79	2 (swamp well ?)	405154	741802	Fairfield Boro	Essex	--	--	Jt	26-02683	--
Mountain Ridge Country Club	154		well field sum									

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
Mountain View Water Co. (bought by Lincoln Pk. Water Dept., 1966, listed under Lincoln Pk., Water Dept. #2 old)	155	28	1	405527	741906	Lincoln Park Boro	Morris	--	--	--	--	--
Mountain Water Co. (bought by Commonwealth Water Co.)		--		--	--	--	--	1890?	1915	--	--	--
Mountainside Water Co. (bought by East Orange Water Dept.)		151	1 (main well ?)	404523	741945	Millburn Twp	Essex	--	--	--	--	--
NJ-American - Baltusrol		274	12	404207	742141	Summit City	Union	--	--	Jf	45-00265	--
NJ-American - Baltusrol		275	14	404205	742146	Summit City	Union	--	--	Jf	45-00266	--
NJ-American - Baltusrol		276	15	404212	742136	Summit City	Union	--	--	Jf	45-00267	--
NJ-American - Baltusrol		277	17	404202	742141	Summit City	Union	--	--	Jf	45-00268	390385
NJ-American - Baltusrol		278	18	404215	742128	Summit City	Union	4/42	--	Jf	45-00269	390305
NJ-American - Baltusrol	156		well field sum									
NJ-American - Canoe Brook		252	K-1	404505	742130	Millburn Twp	Essex	1/26	--	Qsd	45-00260	130062
NJ-American - Canoe Brook		253	K-2	404439	742058	Millburn Twp	Essex	5/25	--	Qsd	45-00261	130063
NJ-American - Canoe Brook		254	K-4	404457	742121	Millburn Twp	Essex	11/38	--	Qsd	45-00262	130061
NJ-American - Canoe Brook		255	K-5	404451	742110	Millburn Twp	Essex	--	--	Qsd	45-00263	130012
NJ-American - Canoe Brook		256	K-6	404431	742118	Millburn Twp	Essex	10/52	6/88	Qsd	25-01944	130064
NJ-American - Canoe Brook		257	Layne D	404446	742115	Millburn Twp	Essex	11/46	--	Qsd	45-00258	130065
NJ-American - Canoe Brook		258	Layne E	404439	742111	Millburn Twp	Essex	1/47	--	Qsd	45-00264	130011
NJ-American - Canoe Brook		259	Continental #1	404459	742141	Millburn Twp	Essex	1/54	6/88	Qsd?	45-00259	130060
NJ-American - Canoe Brook		260	38	404450	742123	Millburn Twp	Essex	1/00	--	Qsd	45-00257	130066
NJ-American - Canoe Brook		261	44	404437	742047	Millburn Twp	Essex	6/53	--	Qsd	25-02577	130067
NJ-American - Canoe Brook		262	46	404433	742104	Millburn Twp	Essex	9/54	--	Qsd	25-03703	130010
NJ-American - Canoe Brook		263	47	404436	742051	Millburn Twp	Essex	12/54	--	Qsd	25-04019	130069
NJ-American - Canoe Brook		264	48	404436	742108	Millburn Twp	Essex	1/55	--	Qsd	25-04100	130070
NJ-American - Canoe Brook	157		well field sum									
NJ-American - Passaic River		230	50	404425	742218	Millburn Twp	Essex	8/55	--	Qsd	25-04872	130008
NJ-American - Passaic River		231	51	404427	742217	Millburn Twp	Essex	9/55	--	Qsd	25-04873	130009
NJ-American - Passaic River		232	52	404423	742218	Millburn Twp	Essex	--	--	Qsd	25-18486	--
NJ-American - Passaic River	158		well field sum									
NJ-American - Short Hills		279	Kelly A	404252	741845	Springfield Twp	Union	--	--	Qsd	46-00109	--
NJ-American - Short Hills		280	Kelly B	404259	741853	Springfield Twp	Union	--	--	Qsd	46-00110	--
NJ-American - Short Hills		281	Kelly C	404304	741841	Millburn Twp	Essex	--	--	Qsd	46-00111	390301
NJ-American - Short Hills	159		well field sum									
NJ-American - all sources	160		well field sum									
Noe Pierson Corp.	161	285	1	404413	742528	Chatham Twp	Morris	--	--	Jb	45-00306	--

Notes:

[1] Withdrawal index number: correlates well data with pumpage data.

[2] Production well number: used on plate 1 to indicate location of well.

[3] Local name: name assigned by owner to production well.

[4] "Well field sum" is sum of pumpages, does not represent single well.

[5] Latitude, longitude: degrees, minutes, seconds.

[6] Geologic unit:
Qsd-stratified drift
Jb-Boonton Formation
Jh-Hook Mountain Basalt
Jt-Towaco Formation
Jp-Preakness Basalt
Jf-Feltville Formation
Jo-Orange Mountain Basalt
Ybh-granite
Ylo-gneiss

[7] NJDEPE well permit number: assigned by Bureau of Water Allocation

[8] USGS GWSI number: assigned by USGS to wells in the Ground-Water Site Inventory data base.

--: no data.

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
Normandy & Whippany Water Co.	162	190		404737	742549	Hanover Twp	Morris	1894	--	--	--	--
Orange Products, Inc.	163	251	1-old	404515	742138	Florham Park Boro	Morris	7/65	--	Qsd	25-12852	--
Packanack Lake Country Club	164	--	Magnolia	--	--	Wayne Twp	Passaic	--	--	Jt?	--	--
Packanack Lake Country Club	165	--	Osborn	--	--	Wayne Twp	Passaic	--	--	Jt?	--	--
Packanack Lake Country Club	166	--	4	--	--	Wayne Twp	Passaic	1962	--	Jt?	26-02682	--
Packanack Lake Country Club		--	1	--	--	Wayne Twp	Passaic	--	--	Jt?	23-01641	--
Packanack Lake Country Club		--	2	--	--	Wayne Twp	Passaic	--	--	Jt?	--	--
Packanack Lake Country Club		--	3	--	--	Wayne Twp	Passaic	--	--	Jt?	23-01910	--
Parsippany Water Co.		--	Kimball well	--	--	Parsippany-Troy Hills Twp	Morris	1926	--	Qsd?	--	--
Parsippany-Troy Hills WD	167	47	1	405215	742538	Parsippany-Troy Hills Twp	Morris	--	--	Qsd	45-00198	--
Parsippany-Troy Hills WD	168	48	1A	405213	742541	Parsippany-Troy Hills Twp	Morris	9/58	--	Qsd	25-07381	270164
Parsippany-Troy Hills WD	169	49	2	405217	742549	Parsippany-Troy Hills Twp	Morris	1/37	--	Qsd	45-00230	270165
Parsippany-Troy Hills WD	170	50	3	405219	742358	Parsippany-Troy Hills Twp	Morris	11/44	--	Qsd	45-00032	270166
Parsippany-Troy Hills WD	171	51	4	405206	742510	Parsippany-Troy Hills Twp	Morris	3/51	--	Qsd	25-00599	270167
Parsippany-Troy Hills WD	172	52	4A	405206	742508	Parsippany-Troy Hills Twp	Morris	5/58	--	Qsd	25-07545	270168
Parsippany-Troy Hills WD	173	53	5-1	405118	742833	Parsippany-Troy Hills Twp	Morris	7/53	--	Pc	--	270169
Parsippany-Troy Hills WD	174	54	5-2	405123	742832	Parsippany-Troy Hills Twp	Morris	3/54	--	Pc	25-03169	270170
Parsippany-Troy Hills WD	175	55	5-3	405124	742833	Parsippany-Troy Hills Twp	Morris	4/54	--	Pc	25-03168	270171
Parsippany-Troy Hills WD	176	56	5-4	405128	742832	Parsippany-Troy Hills Twp	Morris	4/54	--	Pc	25-03167	270172
Parsippany-Troy Hills WD	177	--	5-5	--	--	--	--	--	--	--	--	--
Parsippany-Troy Hills WD	178	57	6	405143	742119	Parsippany-Troy Hills Twp	Morris	12/56	--	Qsd	25-04596	270173
Parsippany-Troy Hills WD	179	58	7	405059	742506	Parsippany-Troy Hills Twp	Morris	12/58	--	Qsd	25-07620	270175
Parsippany-Troy Hills WD	180	59	8-1	405036	742337	Parsippany-Troy Hills Twp	Morris	7/63	--	Qsd	45-00034	270176
Parsippany-Troy Hills WD	181	60	8-2	405035	742336	Parsippany-Troy Hills Twp	Morris	7/63	--	Qsd	45-00035	270177
Parsippany-Troy Hills WD	182	61	8-3	405033	742336	Parsippany-Troy Hills Twp	Morris	7/63	--	Qsd	45-00036	270178
Parsippany-Troy Hills WD	183	62	9	405207	742604	Parsippany-Troy Hills Twp	Morris	9/64	--	Qsd	25-11627	270179
Parsippany-Troy Hills WD	184	63	10	405213	742616	Parsippany-Troy Hills Twp	Morris	9/64	--	Qsd	25-11628	270180
Parsippany-Troy Hills WD	185	64	11	405052	742306	Parsippany-Troy Hills Twp	Morris	3/65	--	Qsd	25-12635	270181
Parsippany-Troy Hills WD	186	65	12	405136	742549	Parsippany-Troy Hills Twp	Morris	1/66	--	Qsd	25-12718	270043
Parsippany-Troy Hills WD	187	66	13	405113	742303	Parsippany-Troy Hills Twp	Morris	6/66	--	Qsd	25-11106	270182
Parsippany-Troy Hills WD	188	67	14	405037	742646	Parsippany-Troy Hills Twp	Morris	1/69	--	Qsd	25-13259	270183
Parsippany-Troy Hills WD	189	68	15	405149	742317	Parsippany-Troy Hills Twp	Morris	1/70	--	Qsd	25-15809	270184
Parsippany-Troy Hills WD		69	16	405225	742356	Parsippany-Troy Hills Twp	Morris	11/73	--	Qsd	25-17118	270044
Parsippany-Troy Hills WD	190	70	17	405216	742540	Parsippany-Troy Hills Twp	Morris	12/75	--	Qsd	25-18849	270045
Parsippany-Troy Hills WD	191	71	18	405208	742606	Parsippany-Troy Hills Twp	Morris	12/76	--	Qsd	25-18850	270046
Parsippany-Troy Hills WD		72	19	405024	742651	Parsippany-Troy Hills Twp	Morris	9/80	--	Qsd	25-21431	270822
Parsippany-Troy Hills WD		73	20	405120	742432	Parsippany-Troy Hills Twp	Morris	--	--	Qsd?	25-27259	--
Parsippany-Troy Hills WD	192		well field sum									
Passaic Township		287	Alex Vernon Rd.	404127	742816	Passaic Twp	Morris	--	--	Jb	25-04545	--
Pequannock Twp Water Dept		8	Prod 1 (T4)	405848	741820	Pequannock Twp	Morris	--	--	Qsd	23-05033	--
Pequannock Twp Water Dept		9	Prod 2 (T3)	405846	741834	Pequannock Twp	Morris	--	--	Qsd	23-05451	271115
Pequannock Twp Water Dept	193		well field sum									
Pfizer Inc. (formerly Sunran)	194	74	1	405105	742510	Parsippany-Troy Hills Twp	Morris	8/57	--	Jb	25-06488	270695
Pfizer Inc.		--	2	--	--	Parsippany-Troy Hills Twp	Morris	9/57	--	Qsd	25-07034	270700
Pfizer Inc.	195	75	3	405108	742517	Parsippany-Troy Hills Twp	Morris	5/64	--	Qsd	25-11876	270848
Pfizer Inc.	196	--	4	--	--	Parsippany-Troy Hills Twp	Morris	--	--	Qsd	45-00256	--
Pfizer Inc.		--	5	--	--	Parsippany-Troy Hills Twp	Morris	5/67	by 1989	Qsd	25-14192	270683

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
Pfizer Inc.	197	--	6	--	--	Parsippany-Troy Hills Twp	Morris	--	--	Qsd?	25-26339?	--
Pfizer Inc.	198		well field sum									
Pine Lakes Corp. (Water system taken over by Wayne WD in 1944; this well is now Wayne 1)		--	1-Bathing Beach	405922	741539	Wayne Twp	Passaic	1932	--	Jt?	43-00073	--
Pine Lakes Corp. (now Wayne 2)		--	2-Cedar Rd.	405915	741546	Wayne Twp	Passaic	1932	--	Jt?	43-00074	--
Pine Lakes Corp. (now Wayne 3)		--	3-Indian Rd.	405924	741604	Wayne Twp	Passaic	1932	--	Jt?	43-00075	--
Pine Lakes Corp.		--	4-Hillside Ave.	--	--	Wayne Twp	Passaic	1932	1944	Jt?	--	--
Pine Lakes Corp.		--	5-Pine Lks. Rd., Brk. Terr.	--	--	Wayne Twp	Passaic	1932	1944	Jt?	--	--
Pompton Lakes		4	old well field	405938	741715	Pompton Lakes Boro	Passaic	--	--	Jt?	--	--
Pompton Lakes Boro MUA	199	1	1	405850	741725	Pompton Lakes Boro	Passaic	10/69	--	Qsd	23-05455	310015
Pompton Lakes Boro MUA	200	2	2	405853	741657	Pompton Lakes Boro	Passaic	11/69	--	Qsd	23-05454	310016
Pompton Lakes Boro MUA	201	3	3	410030	741753	Pompton Lakes Boro	Passaic	4/72	--	Qsd	23-05736	--
Pompton Lakes Boro MUA	202		well field sum									
Preakness Hill Country Club		16	1	405651	741351	Wayne Twp	Passaic	--	--	Jt?	43-00047	--
Preakness Hill Country Club		17	2	405655	741400	Wayne Twp	Passaic	--	--	Jt?	43-00048	--
Preakness Hill Country Club		18	3	405653	741402	Wayne Twp	Passaic	--	--	Jt?	23-04756	--
Preakness Hill Country Club		19	4	405635	741418	Wayne Twp	Passaic	--	--	Jt?	43-00050	--
Preakness Hill Country Club	203		well field sum									
Precision Rolled Products (formerly Amax Speciality Metal)	204	207	1	404754	742408	East Hanover Twp	Morris	10/62	--	Qsd	25-10880	270145
Reheis Chemical Co.		288	1	404056	742556	Berkeley Heights Twp	Union	--	--	Jt	--	390005
Reheis Chemical Co.	205	289	2	404059	742556	Berkeley Heights Twp	Union	2/56	--	Jt	25-04899	390004
Reheis Chemical Co.	206	290	4	404057	742555	Berkeley Heights Twp	Union	12/65	--	Jt	25-13038	390006
Reheis Chemical Co.	207	291	5	404101	742609	Berkeley Heights Twp	Union	--	--	Jt	25-20573	390008
Reheis Chemical Co.	208		well field sum									
Resistoflex Corp. (formerly Woodland Assoc.)	209	98	1	404942	741757	Roseland Boro	Essex	3/68	--	Jp	26-04122	--
Riverdale Boro Water Dept		5	1	405930	741755	Riverdale Boro	Morris	10/59	--	Jb	23-02497	--
Riverdale Boro Water Dept		6	2	405927	741755	Riverdale Boro	Morris	1/64	--	Jb	23-03858	--
Riverdale Boro Water Dept		7	3	405929	741752	Riverdale Boro	Morris	8/72	--	Jb	23-05762	--
Riverdale Boro Water Dept	210		well field sum									
River View Water Co. (Company sold to Lincoln Park WD, listed under Lincoln Park Water Dept.)		32	main	405450	741717	Lincoln Park Boro	Morris	--	--	Jh?	--	--
Sandoz Inc.	211	119	1	404836	742336	East Hanover Twp	Morris	8/47	--	Qsd	45-00044	270118
Sandoz Inc.	212	120	2	404832	742336	East Hanover Twp	Morris	9/47	--	Qsd	45-00045	270119
Sandoz Inc.	213	121	3	404825	742337	East Hanover Twp	Morris	3/50	--	Qsd	25-00635	270120

Notes:

[1] Withdrawal index number: correlates well data with pumpage data.

[2] Production well number: used on plate 1 to indicate location of well.

[3] Local name: name assigned by owner to production well.

[4] "Well field sum" is sum of pumpages, does not represent single well.

[5] Latitude, longitude: degrees, minutes, seconds.

[6] Geologic unit:
Qsd-stratified drift
Jb-Boonton Formation
Jh-Hook Mountain Basalt
Jt-Towaco Formation
Jp-Preakness Basalt
Jf-Feltville Formation
Jo-Orange Mountain Basalt
Ybh-granite
Ylo-gneiss

[7] NJDEPE well permit number: assigned by Bureau of Water Allocation

[8] USGS GWSI number: assigned by USGS to wells in the Ground-Water Site Inventory data base.

--: no data.

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
Sandoz Inc.	214	122	4	404816	742338	East Hanover Twp	Morris	8/66	--	Qsd	25-13934	270121
Sandoz Inc.	215	123	5	404821	742346	East Hanover Twp	Morris	10/66	--	Qsd	25-13935	270122
Sandoz Inc.	216		well field sum									
Schering-Plough, Inc.	217	199		404604	742604	Madison Boro	Morris	8/81	--	--	25-23876?	--
Sisters of Charity, St. Eliz.		192	old 1	404707	742548	Florham Park Boro	Morris	--	--	Jb	--	--
Sisters of Charity, St. Eliz.		193	old 2	404708	742545	Florham Park Boro	Morris	--	--	Jb	--	271110
Sisters of Charity, St. Eliz.		194	old 3	404710	742543	Florham Park Boro	Morris	--	--	Qsd	--	271111
Sisters of Charity, St. Eliz.		195	main well	404701	742556	Florham Park Boro	Morris	1982	--	Jb	25-22434	271109
Sisters of Charity, St. Eliz.	218		well field sum									
Southeast Morris County MUA	219	176	Tumbull	404709	742757	Morristown Town	Morris	12/65	--	Jb	25-13439	270161
Southeast Morris County MUA	220	174	Overlook	404708	742902	Morristown Town	Morris	66?	--	Jb	25-13593	270157
Southeast Morris County MUA	221	175	Lidgerwood 5	404706	742839	Morristown Town	Morris	11/67	--	Jb	25-14520	270153
Southeast Morris Co. MUA (spring)		--	Sand Springs	--	--	Harding Twp	Morris	1885	1943	Qsd?	--	--
Southeast Morris County MUA	222	177	Sand Springs well	404544	743017	Harding Twp	Morris	9/42	--	Qsd?	45-00350	270158
Southeast Morris County MUA	223	106	Wing	404954	742640	Hanover Twp	Morris	7/48	--	Qsd	25-00048	270162
Southeast Morris County MUA	224	107	Todd	404951	742632	Hanover Twp	Morris	12/54	--	Qsd	25-03527	270160
Southeast Morris County MUA	225	191	Normandy	404735	742550	Hanover Twp	Morris	12/46	--	Qsd	45-00351	270156
Southeast Morris County MUA	226	112	Blck Brk 1	404802	742416	Hanover Twp	Morris	5/67	--	Qsd	25-14181	270077
Southeast Morris County MUA	227	113	Blck Brk 2	404748	742428	Hanover Twp	Morris	4/68	--	Qsd	25-14182	270078
Southeast Morris County MUA	228	167	Shongum	404924	742924	Morris Twp	Morris	1/68	--	Jb	25-14034	270159
Southeast Morris County MUA	229	100	Littleton 1	405018	742738	Parsippany-Troy Hills Twp	Morris	1/27	--	Qsd	45-00316	270154
Southeast Morris County MUA	230	101	Littleton 2	405016	742745	Parsippany-Troy Hills Twp	Morris	12/39	--	Qsd	45-00317	270155
Southeast Morris County MUA	231		Littleton field sum	--	--	Parsippany-Troy Hills Twp	Morris	--	--	--	--	--
Southeast Morris County MUA	232	179	Moore Estates	404619	742648	Morris Twp	Morris	1991?	--	Qsd	25-33503	--
Southeast Morris County MUA	233		well field sum									
St. Barnabas Medical Center	234	150	1	404553	741815	Livingston Twp	Essex	5/61	--	Jt	26-02327	130040
Stirling Water Co.	235	292		404021	742948	Passaic Twp	Morris	1925?	1928?	--	--	--
Surburban Propane		111	3	404857	742404	Hanover Twp	Morris	9/63	--	Qsd	25-11349	--
Surburban Propane		110	2	404855	742359	Hanover Twp	Morris	3/53	--	Qsd	25-02425	--
Surburban Propane		109	1	404854	742359	Hanover Twp	Morris	--	--	Qsd	--	--
Surburban Propane	236		well field sum									
Talbot & Butler		--		--	--	--	--	--	--	--	--	--
Warner Lambert Co.	237	102	3	405021	742847	Morris Plains Boro	Morris	8/50	--	Pc	25-00695	270227
Warner Lambert Co.	238	103	4	405022	742832	Morris Plains Boro	Morris	5/54	--	Qsd	25-03447	270228
Warner Lambert Co.		104	5	405025	742826	Morris Plains Boro	Morris	1/57	--	Qsd	25-04271	270229
Warner Lambert Co.	239	105	6	405032	742821	Morris Plains Boro	Morris	1/57	--	Qsd	25-04274	270230
Warner Lambert Co.	240		well field sum									
Wayne Twp Water Dept. (Pine Lakes)	241	10	1	405922	741539	Wayne Twp	Passaic	--	--	Jt	23-04769	310021
Wayne Twp Water Dept. (Basalm Road)	242	11	2	405915	741546	Wayne Twp	Passaic	--	--	Jt	43-00074	310023?
Wayne Twp Water Dept. (Greenknolls)	243	12	3	405924	741604	Wayne Twp	Passaic	--	--	Jt	43-00075	310024?
Wayne Twp Water Dept. (Woodhaven)	244	13	4	405841	741530	Wayne Twp	Passaic	1954	1960?	Jt	23-01218	310028?
Wayne Twp Water Dept. (Allwood)	245	14	5	405819	741544	Wayne Twp	Passaic	1941?	1960?	Jt	43-00077	310025?

Table 12. Partial well records and withdrawal data for production wells and well fields in the Central Passaic River Basin (cont.)

Owner	Withdrawal index no.[1]	Production well no.[2]	Local name or number[3,4]	Latitude[5]	Longitude[5]	Municipality	County	Pumping dates From	Pumping dates To	Geologic unit[6]	NJDEPE permit no.[7]	USGS GWSI no.[8]
Wayne Twp Water Dept. (Schuylercroft School (Valhalla Way))	246	15	6	405754	741519	Wayne Twp	Passaic	--	--	Jt	43-00078	310022?
Wayne Twp Water Dept.		--	Wilson Ave.	--	--	--	--	--	~1966	Jt?	--	--
Wayne Twp Water Dept.		--	Preakness Park	--	--	--	--	--	<1966	Jt?	--	--
Wayne Twp Water Dept.		--	Alps Rd.	--	--	--	--	--	<1966	Jt?	--	--
Wayne Twp Water Dept. (Wilson Ave. Comm. Assoc.)		20	"B"	405618	741434	Wayne Twp	Passaic	--	~1966	Jt?	--	--
Wayne Twp Water Dept. (Cold White Birch Comm. Assoc.)		21	"C"	405556	741429	Wayne Twp	Passaic	--	--	Jt?	--	--
Wayne Twp Water Dept.	247		well field sum									
Wilson Ave. Comm. Assoc. (sold to Wayne Twp. Water Dept., listed under Wayne Twp. Water Dept. "B" Wayne "B")		20	1	405618	741434	Wayne Twp	Passaic	--	--	--	--	--

Notes:

[1] Withdrawal index number: correlates well data with pumpage data.

[2] Production well number: used on plate 1 to indicate location of well.

[3] Local name: name assigned by owner to production well.

[4] "Well field sum" is sum of pumpages, does not represent single well.

[5] Latitude, longitude: degrees, minutes, seconds.

[6] Geologic unit:
Qsd-stratified drift
Jb-Boonton Formation
Jh-Hook Mountain Basalt
Jt-Towaco Formation
Jp-Preakness Basalt
Jf-Feltville Formation
Jo-Orange Mountain Basalt
Ybh-granite
Ylo-gneiss

[7] NJDEPE well permit number: assigned by Bureau of Water Allocation

[8] USGS GWSI number: assigned by USGS to wells in the Ground-Water Site Inventory data base.

--: no data.

Table 13. Withdrawal data for production wells and well fields

Index #	Well #	Owner and local name or number
1	108	AT&T Laboratories
2		Airtron (well field summary)
3	183	Allied Corporation 1
4	184	Allied Corporation 2
5	185	Allied Corporation 4
6	187	Allied Corporation 10
7	189	Allied Corporation 14
8		Allied Corporation (well field summary)
9	141	Amerace 1
10	208	Automatic Switch
11	77	Boonton Electronics 5
12	265	Canoe Brook Country Club 1
13	173	Carteret S&L
14	142	Cedar Hill Country Club 1
15	143	Cedar Hill Country Club 2
16		Cedar Hill Country Club (well field summary)
17		Charles Evens Dev. Co. (well field summary)
18		Chatham Borough (well field summary)
19	178	Chemical Bank

WITHDRAWAL (million gallons/year)

YEAR	Index number																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.00 E	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.00 E	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.00 E	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.00 E	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.00 E	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.00 E	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40.00 E	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45.00 E	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50.00 E	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55.00 E	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60.00 E	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65.00 E	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70.00 E	-
1911	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	75.00 E	-
1912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.00 E	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.00 E	-
1914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.00 E	-
1915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.00 E	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.00 E	-
1917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	80.71	-
1918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	103.58	-
1919	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	106.20	-
1920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	104.87	-
1921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	94.01	-
1922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	121.37	-
1923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	160.81	-
1924	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	143.33	-
1925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	111.70	-
1926	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	99.43	-
1927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	105.73	-
1928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	115.08	-
1929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	130.96	-
1930	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	129.38	-
1931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	122.87	-
1932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	121.65	-
1933	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	131.59	-
1934	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	120.34	-
1935	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	122.51	-
1936	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	134.28	-
1937	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	132.93	-
1938	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	143.42	-
1939	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	145.02	-

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.13	128.82	-
1941	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	130.89	-
1942	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	122.21	-
1943	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	145.10	-
1944	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	177.48	-
1945	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	162.55	-
1946	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	160.54	-
1947	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.05	172.07	-
1948	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.80	184.09	-
1949	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.80	197.13	-
1950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.80	185.79	-
1951	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.80	204.83	-
1952	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.80	227.52	-
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.80	250.50	-
1954	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.80	248.59	-
1955	-	-	-	-	-	-	-	-	25.00 E	-	-	-	2.00 E	-	-	-	1.80	254.56	-
1956	-	-	-	-	-	-	-	-	25.00 E	-	-	-	2.00 E	-	-	-	1.80	239.34	-
1957	-	-	-	-	-	-	-	-	25.00 E	-	-	-	2.00 E	-	-	-	1.80	269.71	-
1958	-	-	-	-	-	-	-	-	25.00 E	1.00 E	-	-	2.00 E	-	-	-	2.19	255.59	-
1959	-	-	-	-	-	-	-	-	25.00 E	1.00 E	-	-	2.00 E	-	-	-	2.38	267.26	-
1960	-	-	-	-	-	-	-	90.00 E	25.00 E	1.00 E	-	-	2.00 E	-	-	-	3.11	260.41	-
1961	-	-	-	-	-	-	-	90.00 E	25.00 E	1.00 E	-	-	2.00 E	-	-	-	4.20	268.92	-
1962	-	-	-	-	-	-	-	90.00 E	25.00 E	1.00 E	-	-	2.00 E	-	-	-	5.64	283.85	-
1963	-	-	-	-	-	-	-	90.00 E	25.00 E	1.00 E	-	-	2.00 E	-	-	-	6.59	300.53	-
1964	-	-	-	-	-	-	-	90.00 E	25.00 E	1.00 E	-	-	2.00 E	-	-	-	7.68	319.68	-
1965	-	-	-	-	-	-	-	94.00 E	25.00 E	1.00 E	-	3.90 E	2.00 E	-	-	-	6.95	306.93	-
1966	-	-	-	-	-	-	-	94.00 E	25.00 E	1.00 E	-	3.90 E	2.00 E	-	-	-	7.76	346.69	-
1967	-	-	-	-	-	-	-	94.00 E	25.00 E	1.00 E	-	3.90 E	2.00 E	-	-	-	-	335.76	-
1968	-	-	-	-	-	-	-	94.00 E	25.00 E	1.00 E	-	3973.514 ?	2.00 E	-	-	-	-	362.92	-
1969	-	-	-	-	-	-	-	94.00 E	25.00 E	1.00 E	-	3.92	2.00 E	-	-	-	-	354.92	-
1970	-	-	20.06	0.00	0.00	-	-	(20.06)	25.00 E	1.00 E	-	4.77	2.00 E	-	-	-	-	359.97	-
1971	-	-	15.56	106.42	28.02	-	-	(123.03)	25.00 E	1.00 E	-	7.70 E	2.00 E	-	-	-	-	355.75	-
1972	-	-	5.50	73.62	20.52	-	-	(99.60)	25.00 E	1.00 E	-	7.70 E	2.00 E	-	-	-	-	356.48	-
1973	-	-	0.00	87.73	21.23	-	-	(108.95)	25.00 E	1.00 E	-	7.58	2.00 E	-	-	-	-	355.72	-
1974	-	-	0.00	77.48	29.65	-	-	(103.04)	25.00 E	1.00 E	-	10.44	2.00 E	-	-	-	-	352.30	-
1975	-	-	3.75	72.66	42.87	-	-	(119.28)	25.00 E	1.00 E	-	4.62	2.00 E	-	-	-	-	351.33	-
1976	-	-	-	125.29	6.19	-	-	(131.60)	25.00 E	1.00 E	-	7.14	2.00 E	-	-	-	-	364.87	-
1977	-	-	16.31	130.09	51.32	-	-	(197.78)	25.00 E	1.00 E	-	5.98	2.00 E	-	-	-	-	372.95	-
1978	-	-	32.79	150.00	84.53	-	-	(267.31)	25.00 E	1.00 E	-	8.15	2.00 E	-	-	-	-	348.58	-
1979	-	-	30.66	147.43	91.20	-	-	(269.47)	25.00 E	1.00 E	-	5.16	2.00 E	-	-	-	-	352.80	-
1980	0.00	-	28.06	182.66	79.47	-	-	(290.19)	21.12	2.09	-	14.76	2.44	-	-	-	-	368.88	-
1981	0.00	-	27.46	194.90	67.41	-	-	(289.77)	23.17	0.42	-	6.61	1.79	-	-	-	-	308.35	-
1982	0.00	-	23.30	123.80	85.00	39.90	-	(272.0)	22.83	0.81	75.00 E	8.30	1.41	-	-	-	-	335.99	-
1983	0.00	-	30.40	108.70	81.70	103.90	-	(324.7)	20.01	1.50	75.00 E	7.63	1.00 E	-	-	-	-	355.43	-
1984	0.00	-	38.70	107.10	65.90	96.30	-	(308.0)	22.63	0.58	75.00 E	5.38	0.03	-	-	5.70	-	357.06	0.29
1985	0.00	-	36.40	107.20	77.50	73.00	-	(294.1)	19.98	0.31	75.00 E	5.84	24.43	-	-	9.63	-	(409.69)	0.29
1986	0.00	-	40.07	113.23	6.88	47.77	-	(207.95)	19.43	0.38	75.00 E	8.87	26.51	3.46	-	-	-	(298.54)	0.29
1987	0.00	-	35.40	115.04	0.00	74.37	-	(224.81)	12.74	0.62	75.20	8.00 E	23.96	1.49	9.47	(10.961)	-	359.55	0.29
1988	0.00	-	29.80	100.61	0.00	76.32	46.86	(253.58)	22.02	0.30	52.19	12.93	24.81	5.13	8.86	(13.995)	-	(384.30)	0.29
1989	0.00	-	28.58	102.74	0.00	67.84	44.42	(243.59)	23.87	0.06	18.12	3.88	16.68	2.26	8.89	(11.15)	-	(366.71)	0.29
1990	0.00	-	30.14	118.54	0.00	62.08	46.92	(257.671)	15.44	0.01	9.83	4.03	16.00 E	0.16	10.37	(10.53)	-	(380.42)	4.30

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
20	266	Ciba-Geigy Corp., Pharm. Div. 3
21	267	Ciba-Geigy Corp., Pharm. Div. 4
22	269	Ciba-Geigy Corp., Pharm. Div. 6
23	270	Ciba-Geigy Corp., Pharm. Div. 7
24	271	Ciba-Geigy Corp., Pharm. Div. 8
25	272	Ciba-Geigy Corp., Pharm. Div. 10
26	273	Ciba-Geigy Corp., Pharm. Div. 12
27		Ciba-Geigy Corp., Pharm. Div. (well field summary)
28	286	Colony Pool, Chatham Twp.
29	115	East Hanover Township 2
30	117	East Hanover Township 5
31		East Hanover Township (well field summary)
32	233	East Orange - Braidburn 1-1956
33	234	East Orange - Braidburn 2-1956
34	235	East Orange - Braidburn 3-1956
35	236	East Orange - Braidburn 4-1976
36		East Orange - Braidburn (well field summary)
37	157	East Orange - Canoe Brook Oldest
38	144	East Orange - Canoe Brook 1-1956
39	145	East Orange - Canoe Brook 2-1956

WITHDRAWAL (million gallons/year)

YEAR	Index number																			
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400.00 E	-	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	450.00 E	-	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500.00 E	-	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500.00 E	-	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	600.00 E	-	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	600.00 E	-	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	700.00 E	-	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	730.00	-	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	900.00 E	-	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	900.00 E	-	-
1911	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000.00 E	-	-
1912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1924	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1926	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1930	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1933	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1934	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1935	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1936	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1937	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1938	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1939	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800.00 E	-	-	-

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
1940	-	-	-	-	-	-	-	10.00 E	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1941	-	-	-	-	-	-	-	20.00 E	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1942	-	-	-	-	-	-	-	30.00 E	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1943	-	-	-	-	-	-	-	40.00 E	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1944	-	-	-	-	-	-	-	50.00 E	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1945	-	-	-	-	-	-	-	60.00	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1946	-	-	-	-	-	-	-	70.00 E	-	-	-	-	-	-	-	-	800.00 E	-	-	-
1947	-	-	-	-	-	-	-	80.00 E	-	-	-	-	-	-	-	-	838.61	-	-	-
1948	-	-	-	-	-	-	-	90.00 E	-	-	-	-	-	-	-	-	1016.49	-	-	-
1949	-	-	-	-	-	-	-	100.00 E	-	-	-	-	-	-	-	-	1083.70	-	-	-
1950	-	-	-	-	-	-	-	110.00 E	-	-	-	-	-	-	-	-	581.11	-	-	-
1951	-	-	-	-	-	-	-	120.00 E	-	-	-	-	-	-	-	-	763.74	-	-	-
1952	-	-	-	-	-	-	-	130.00 E	-	-	-	-	-	-	-	-	568.69	-	-	-
1953	-	-	-	-	-	-	-	140.00 E	-	-	-	-	-	-	-	-	708.22	-	-	-
1954	-	-	-	-	-	-	-	150.00 E	-	-	-	-	-	-	-	-	646.13	-	-	-
1955	-	-	-	-	-	-	-	165.88	-	-	-	-	-	-	-	-	795.51	-	-	-
1956	-	-	-	-	-	-	-	203.82	-	-	-	-	-	-	-	-	793.32	-	-	-
1957	-	-	-	-	-	-	-	206.34	-	-	-	-	-	-	-	-	785.19 E	-	-	-
1958	-	-	-	-	-	-	-	200.51	-	-	-	-	-	-	-	-	758.04 E	-	-	-
1959	-	-	-	-	-	-	-	215.70	-	-	-	-	-	-	-	-	741.96 E	-	-	-
1960	-	-	-	-	-	-	-	221.10	-	-	-	-	-	-	-	-	735.27 E	-	-	-
1961	11.08	1.06	21.73	47.34	82.84	43.39	36.14	(243.58)	-	-	-	-	-	-	-	-	781.11 E	-	-	-
1962	0.00	1.49	47.79	57.40	45.77	54.14	36.95	(243.54)	-	-	-	-	195.85	217.49	192.31	-	(605.65)	-	212.09	319.41
1963	0.00	15.08	47.22	45.74	31.68	57.98	28.09	(225.79)	-	-	-	-	274.40	251.44	335.25	-	(861.09)	-	220.60	170.32
1964	0.00	13.95	72.78	33.48	40.19	62.04	27.88	(250.32)	-	-	-	-	264.28	311.91	363.69	-	(939.88)	-	225.58	171.62
1965	0.00	15.29	57.10	32.99	61.61	60.06	40.58	0.00	0.00	-	-	-	176.06	364.16	374.93	-	(915.15)	-	81.12	245.80
1966	0.00	9.38	49.03	27.49	54.44	62.45	57.59	(260.37)	-	-	-	-	188.14	398.31	447.16	-	(1033.61)	-	27.48	298.15
1967	0.00	23.00	26.14	26.49	47.16	83.37	75.96	(282.12)	-	-	-	-	213.37	308.53	397.33	-	(919.23)	-	61.82	342.79
1968	0.00	19.46	31.76	25.81	45.33	81.87	94.25	(298.48)	-	-	-	49.70	186.39	366.28	389.36	-	(942.03)	-	171.05	330.59
1969	5.78	24.24	32.28	15.95	56.03	70.43	81.43	(286.13)	-	-	-	95.73	160.79	431.00	457.88	-	(1049.67)	-	138.19	228.44
1970	27.80	5.16	55.43	28.51	61.05	63.09	35.65	(276.69)	6.80 E	-	-	136.56	431.55	307.20	531.14	-	(1269.89)	-	84.78	167.62
1971	53.50	0.00	69.40	14.59	74.30	27.94	44.73	(284.45)	6.80 E	-	-	172.60	423.17	267.37	484.55	-	(1175.09)	-	115.34	275.16
1972	53.39	0.00	75.27	21.72	98.87	17.30	31.17	(297.72)	6.80 E	-	-	175.41	440.66	240.74	453.87	-	(1135.27)	-	99.99	274.10
1973	46.15	0.00	56.24	60.74	74.51	9.17	29.22	(276.03)	6.80 E	-	-	195.10	181.88	426.42	381.67	-	(989.97)	-	110.14	301.23
1974	15.88	0.00	56.49	31.58	28.63	4.03	16.16	(152.77)	6.80 E	-	-	217.70	157.39	425.18	305.66	-	(888.23)	-	198.22	316.56
1975	-	-	-	-	-	-	-	225.78	6.80 E	191.67	64.09	(255.77)	312.99	312.37	467.18	-	(1092.54)	-	183.02	301.82
1976	-	-	-	-	-	-	-	195.60	6.80 E	238.07	31.79	(269.86)	384.89	412.63	314.59	168.91	(1281.02)	-	203.57	282.00
1977	-	-	-	-	-	-	-	149.19	6.80 E	138.41	86.25	(224.66)	384.91	420.46	158.34	367.31	(1331.02)	-	129.49	273.74
1978	-	-	-	-	-	-	-	108.85	6.80 E	85.17	130.27	(215.44)	473.60	311.54	183.04	312.63	(1280.81)	-	220.58	228.72
1979	-	-	-	-	-	-	-	170.66	6.85	73.77	161.98	(235.75)	408.84	319.87	186.64	327.66	(1243.01)	-	209.14	288.32
1980	-	-	-	-	-	-	-	200.00 E	6.82	60.70	170.30	(231.00)	453.85	347.97	139.08	417.52	(1358.42)	-	159.81	218.61
1981	-	-	-	-	-	-	-	205.83	6.82	9.42	146.40	(155.82)	272.22	265.04	226.69	284.16	(1048.11)	-	150.07	272.44
1982	-	-	-	-	-	-	-	206.34	6.82	101.00	119.90	(220.90)	300.64	260.84	202.68	310.48	(1074.64)	-	169.39	290.70
1983	-	-	-	-	-	-	-	200.51	6.82	109.00	157.70	(266.70)	317.78	316.53	201.00	302.26	(1137.57)	-	178.91	316.53
1984	-	-	-	-	-	-	-	215.70	6.82	57.00	183.90	(240.90)	367.96	420.50	119.91	342.74	(1251.11)	-	180.15	207.42
1985	-	-	-	-	-	-	-	221.10	6.82	208.93	222.98	(431.91)	327.85	324.39	267.10	244.81	(1164.15)	-	275.07	150.58
1986	-	-	-	-	-	-	-	117.59	6.82	148.00	159.33	(307.33)	408.94	338.21	197.21	209.19	(1153.55)	-	274.16	199.05
1987	-	-	-	-	-	-	-	117.46	6.82	324.40	186.57	(510.98)	439.22	362.78	188.68	305.81	(1296.49)	-	264.75	308.75
1988	-	-	-	-	-	-	-	143.53	6.82	324.40	233.97	(558.37)	388.76	220.57	290.90	455.15	(1355.38)	-	264.82	297.33
1989	-	-	-	-	-	-	-	171.36	6.82	290.79	220.32	(511.11)	350.27	341.67	362.24	345.34	(1399.52)	-	253.75	104.54
1990	-	-	-	-	-	-	-	120.02	6.82	218.77	233.86	(502.69)	134.12	337.58	229.85	396.58	(1098.13)	-	159.63	273.14

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
40	146	East Orange - Canoe Brook 3-1956
41	147	East Orange - Canoe Brook 4-1956
42	148	East Orange - Canoe Brook 5-1978
43	149	East Orange - Canoe Brook 6-1978
44		East Orange - Canoe Brook (well field summary)
45	237	East Orange - Dickinson 1-1956
46	238	East Orange - Dickinson 2-1956
47	239	East Orange - Dickinson 3-1956
48	240	East Orange - Dickinson 4-1986
49		East Orange - Dickinson (well field summary)
50	152	East Orange - Slough Brook 1-1928
51	153	East Orange - Slough Brook 2-1928
52	154	East Orange - Slough Brook 3-1928
53	155	East Orange - Slough Brook 4-1979
54		East Orange - Slough Brook (well field summary)
55		East Orange - all fields (well field summary)
56		Essex Co. Parks & Rec.
57		Essex County Institutions (well field summary)
58	80	Essex Fells Township 1A
59	81	Essex Fells Township 2

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
1898	-	-	-	-	(400)	-	-	-	-	-	-	-	-	-	-	(400)	-	-	-	-
1899	-	-	-	-	(450)	-	-	-	-	-	-	-	-	-	-	(450)	-	-	-	-
1900	-	-	-	-	(500)	-	-	-	-	-	-	-	-	-	-	(500)	-	-	-	-
1901	-	-	-	-	(500)	-	-	-	-	-	-	-	-	-	-	(500)	-	-	-	-
1902	-	-	-	-	(600)	-	-	-	-	-	-	-	-	-	-	(600)	-	-	-	-
1903	-	-	-	-	(600)	-	-	-	-	-	-	-	-	-	-	(600)	-	-	-	-
1904	-	-	-	-	(700)	-	-	-	-	-	-	-	-	-	-	(700)	-	-	-	-
1905	-	-	-	-	(730)	-	-	-	-	-	-	-	-	-	-	(730)	-	-	-	-
1906	-	-	-	-	(800)	-	-	-	-	-	-	-	-	-	-	(800)	-	-	-	-
1907	-	-	-	-	(800)	-	-	-	-	-	-	-	-	-	-	(800)	-	-	-	-
1908	-	-	-	-	(800)	-	-	-	-	-	-	-	-	-	-	(800)	-	-	-	-
1909	-	-	-	-	(900)	-	-	-	-	-	-	-	-	-	-	(900)	-	-	-	-
1910	-	-	-	-	(900)	-	-	-	-	-	-	-	-	-	-	(900)	-	-	-	-
1911	-	-	-	-	(1000) E	-	-	-	-	-	-	-	-	-	-	(1000)	-	-	-	-
1912	-	-	-	-	900.00 E	-	-	-	-	-	-	-	-	-	100.00 E	(1000.00)	-	-	-	-
1913	-	-	-	-	1000.00 E	-	-	-	-	-	-	-	-	-	100.00 E	(1100.00)	-	-	-	-
1914	-	-	-	-	1000.00 E	-	-	-	-	-	-	-	-	-	100.00 E	(1100.00)	-	-	-	-
1915	-	-	-	-	1100.00 E	-	-	-	-	-	-	-	-	-	100.00 E	(1200.00)	-	-	-	-
1916	-	-	-	-	1100.00 E	-	-	-	-	-	-	-	-	-	100.00 E	(1200.00)	-	-	-	-
1917	-	-	-	-	1100.00 E	-	-	-	-	-	-	-	-	-	100.00 E	(1200.00)	-	-	-	-
1918	-	-	-	-	1141.00 E	-	-	-	-	-	-	-	-	-	100.00 E	(1241.00)	-	-	-	-
1919	-	-	-	-	1141.00 E	-	-	-	-	-	-	-	-	-	100.00 E	(1241.00)	-	-	-	-
1920	-	-	-	-	1178.38 E	-	-	-	-	-	-	-	-	-	100.00 E	(1278.38)	-	-	-	-
1921	-	-	-	-	1178.38 E	-	-	-	-	-	-	-	-	-	100.00 E	(1278.38)	-	-	-	-
1922	-	-	-	-	1178.38 E	-	-	-	-	-	-	-	-	-	100.00 E	(1278.38)	-	-	-	-
1923	-	-	-	-	983.00 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1283.00)	-	-	-	-
1924	-	-	-	-	1002.00 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1302.00)	-	-	-	-
1925	-	-	-	-	1060.00 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1360.00)	-	-	-	-
1926	-	-	-	-	1121.20 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1421.20)	-	-	-	-
1927	-	-	-	-	1157.10 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1457.10)	-	-	-	-
1928	-	-	-	-	1246.70 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1546.70)	-	-	-	-
1929	-	-	-	-	1374.30 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1674.30)	-	-	-	-
1930	-	-	-	-	598.60 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1698.60)	-	-	-	-
1931	-	-	-	-	608.70 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1708.70)	-	-	-	-
1932	-	-	-	-	624.10 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1724.10)	-	-	-	-
1933	-	-	-	-	585.50 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1685.50)	-	-	-	-
1934	-	-	-	-	656.00 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1756.00)	-	-	-	-
1935	-	-	-	-	671.20 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1771.20)	-	-	-	-
1936	-	-	-	-	776.40 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1876.40)	-	-	-	-
1937	-	-	-	-	793.10 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1893.10)	-	-	-	-
1938	-	-	-	-	775.60 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1875.60)	-	-	-	-
1939	-	-	-	-	823.80 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1923.80)	-	-	-	-

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
1940	-	-	-	-	849.60 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1946.60)	-	-	-	-
1941	-	-	-	-	871.60 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1971.60)	-	-	-	-
1942	-	-	-	-	807.70 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1907.70)	-	268.93	-	-
1943	-	-	-	-	857.00 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(1957.00)	-	265.33	-	-
1944	-	-	-	-	918.70 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(2018.70)	-	194.90	-	-
1945	-	-	-	-	1000.20 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(2100.20)	-	167.40	-	-
1946	-	-	-	-	1067.60 E	-	-	-	-	200.00 E	-	-	-	-	100.00 E	(2167.60)	-	198.31	-	-
1947	-	-	-	-	837.52	-	-	-	-	557.01	-	-	-	-	100.00 E	(2233)	-	201.21	-	-
1948	-	-	-	-	754.24	-	-	-	-	340.41	-	-	-	-	155.23	(2266)	-	214.45	-	-
1949	-	-	-	-	828.75	-	-	-	-	202.35	-	-	-	-	184.45	(2299)	-	208.89	-	-
1950	-	-	-	-	760.82	-	-	-	-	657.82	-	-	-	-	101.54	(2101)	-	194.39	-	-
1951	-	-	-	-	715.16	-	-	-	-	596.09	-	-	-	-	147.93	(2223)	-	229.98	-	-
1952	-	-	-	-	855.05	-	-	-	-	722.10	-	-	-	-	188.10	(2334)	-	196.74	-	-
1953	-	-	-	-	813.78	-	-	-	-	738.17	-	-	-	-	213.67	(2474)	-	212.26	-	-
1954	-	-	-	-	767.03	-	-	-	-	826.20	-	-	-	-	221.71	(2461)	-	218.20	-	-
1955	-	-	-	-	741.46	-	-	-	-	743.28	-	-	-	-	250.56	(2531)	-	218.35	-	-
1956	-	-	-	-	643.57	-	-	-	-	816.33	-	-	-	-	253.12	(2506)	-	226.19	-	-
1957	-	-	-	-	785.19 E	-	-	-	-	785.19 E	-	-	-	-	261.73 E	(2617.3)	-	232.59	-	-
1958	-	-	-	-	758.04 E	-	-	-	-	758.04 E	-	-	-	-	252.68 E	(2526.8)	-	215.61	-	-
1959	-	-	-	-	741.96 E	-	-	-	-	741.96 E	-	-	-	-	247.32 E	(2473.2)	-	213.83	-	-
1960	-	-	-	-	735.27 E	-	-	-	-	735.27 E	-	-	-	-	245.09 E	(2450.9)	-	230.79	-	-
1961	-	-	-	-	781.11 E	-	-	-	-	781.11 E	-	-	-	-	260.37 E	(2603.7)	-	248.73	-	-
1962	330.20	265.94	-	-	(1127.64)	324.94	174.95	336.47	-	(836.36)	5.53	14.97	3.57	-	(24.07)	(2593.72)	-	236.30	-	-
1963	211.13	218.72	-	-	(820.77)	282.15	244.77	354.71	-	(881.63)	1.88	7.75	44.42	-	(54.05)	(2617.54)	-	229.04	-	-
1964	229.70	244.91	-	-	(871.81)	300.88	194.50	320.55	-	(815.93)	2.25	0.65	65.12	-	(68.02)	(2695.64)	-	200.65	-	-
1965	212.31	102.11	-	-	(641.34)	378.65	156.54	388.62	-	(923.81)	22.86	1.57	82.88	-	(107.31)	(2587.61)	-	184.84	-	-
1966	264.59	0.84	-	-	(591.06)	397.65	120.82	468.31	-	(986.78)	56.94	0.73	93.02	-	(150.69)	(2762.14)	-	162.49	-	-
1967	289.36	2.68	-	-	(696.65)	336.68	178.34	379.21	-	(894.23)	56.96	1.47	86.42	-	(144.85)	(2654.96)	-	188.72	-	-
1968	242.47	115.77	-	-	(859.88)	371.48	165.80	387.92	-	(925.20)	52.22	0.90	87.86	-	(140.98)	(2868.09)	-	213.33	-	-
1969	199.94	211.89	-	-	(778.46)	461.75	115.45	419.21	-	(996.41)	48.46	0.46	77.92	-	(126.84)	(2951.38)	-	187.11	-	-
1970	152.29	163.99	-	-	(568.68)	462.44	165.32	575.96	-	(1203.72)	43.29	2.80	66.98	-	(113.07)	(3155.36)	-	213.20	-	-
1971	184.05	257.98	-	-	(832.53)	438.01	83.91	483.78	-	(1005.70)	45.61	2.85	74.67	-	(123.13)	(3136.45)	-	194.26	54.52	44.15
1972	244.30	277.73	-	-	(896.12)	428.07	86.83	502.91	-	(1017.81)	50.57	8.38	78.14	-	(137.09)	(3186.29)	-	196.50	54.25	33.64
1973	299.50	306.81	-	-	(1017.68)	429.71	76.36	506.91	-	(1012.98)	52.44	4.01	142.21	-	(198.66)	(3219.29)	-	191.55	81.22	28.46
1974	366.41	296.26	-	-	(1177.45)	387.85	31.44	530.33	-	(949.62)	50.06	14.05	75.73	-	(139.84)	(3155.14)	-	211.51	64.33	33.71
1975	279.13	274.84	-	-	(1038.81)	298.96	13.02	808.60	-	(1120.58)	54.80	27.33	99.25	-	(181.38)	(3433.31)	-	200.68	45.97	63.69
1976	297.98	225.85	-	-	(1009.40)	385.14	37.72	625.74	-	(1048.60)	55.19	24.93	83.46	-	(163.58)	(3502.60)	-	191.67	49.31	80.66
1977	240.47	174.21	-	-	(817.91)	442.48	121.79	485.52	-	(1049.79)	46.04	31.25	71.18	-	(148.47)	(3347.19)	-	191.60	43.39	64.82
1978	174.73	147.43	-	-	(771.46)	487.47	39.71	566.55	-	(1093.73)	39.66	56.76	67.10	-	(163.52)	(3309.52)	-	190.15	57.14	63.99
1979	213.83	70.75	103.01	36.77	(921.82)	501.46	82.72	611.90	-	(1196.08)	66.79	31.50	87.46	46.88	(232.63)	(3593.54)	-	209.87	44.25	18.77
1980	207.43	43.91	188.65	27.49	(845.90)	453.93	37.92	574.32	-	(1066.17)	105.27	78.89	79.16	118.55	(381.87)	(3652.36)	-	220.94	-	-
1981	156.18	28.01	169.27	6.36	(782.33)	491.65	47.22	537.91	-	(1076.78)	124.68	40.66	38.25	81.63	(285.22)	(3192.44)	-	-	67.66	33.57
1982	231.82	17.05	172.44	4.79	(886.19)	487.98	40.26	562.01	-	(1090.25)	84.25	44.04	45.61	69.84	(243.74)	(3294.82)	-	-	59.21	0.27
1983	201.24	2.08	160.29	4.12	(863.17)	468.66	71.23	580.67	-	(1120.56)	77.07	54.36	36.13	109.80	(277.36)	(3398.66)	-	-	64.96	41.15
1984	203.56	99.11	138.90	31.79	(860.93)	477.06	25.92	580.14	-	(1083.12)	79.64	67.73	5.92	95.69	(248.98)	(3444.14)	-	-	-	-
1985	86.40	199.63	165.27	53.84	(930.79)	437.70	14.35	541.61	-	(993.66)	98.71	70.04	3.40	100.00	(272.15)	(3360.75)	-	-	-	-
1986	48.13	161.19	141.08	36.54	(860.15)	232.58	150.85	210.90	162.49	(756.82)	79.58	40.50	23.98	94.60	(238.66)	(3009.18)	-	-	-	-
1987	88.65	88.00	161.02	49.06	(960.23)	172.34	197.27	219.78	306.14	(895.53)	98.79	46.03	77.86	118.68	(341.36)	(3493.61)	0.72	-	-	90.341
1988	122.72	0.39	175.89	35.85	(897.00)	242.06	145.01	371.55	346.70	(1105.32)	102.88	66.05	70.80	94.30	(334.03)	(3691.73)	0.72	-	70.88	90.34
1989	116.43	141.18	162.94	44.44	(823.28)	241.68	0.46	375.55	132.43	(750.12)	110.26	52.99	55.90	131.41	(350.56)	(3323.48)	0.18	-	57.93	65.77
1990	151.31	125.43	169.28	54.25	(933.04)	284.12	113.80	315.80	315.84	(1029.56)	93.55	55.30	70.28	154.31	(373.44)	(3434.17)	0.18 E	-	37.71	89.08

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
60	82	Essex Fells Township 4A
61	83	Essex Fells Township 4B
62	84	Essex Fells Township 4C
63	85	Essex Fells Township 5
64	86	Essex Fells Township 6
65	87	Essex Fells Township 7
66	88	Essex Fells Township 8
67	89	Essex Fells Township 9
68	90	Essex Fells Township 10
69	91	Essex Fells Township 11
70	92	Essex Fells Township 12
71	93	Essex Fells Township 13
72	94	Essex Fells Township 14
73	95	Essex Fells Township 15
74	96	Essex Fells Township 16
75	97	Essex Fells Township 17
76		Essex Fells Township (well field summary)
77		Evans-Shore Const. Co. 1
78		Evans-Shore Const. Co. 2
79		Exxon Research & Engineering (well field summary)

WITHDRAWAL (million gallons/year)

YEAR	Index number																			
	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1911	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1924	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	219.56	-	-	-
1926	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	245.97	-	-	-
1927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	272.20	-	-	-
1928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	279.12	-	-	-
1929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	342.69	-	-	-
1930	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	375.92	-	-	-
1931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400.02	-	-	-
1932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	429.80	-	-	-
1933	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	403.87	-	-	-
1934	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	442.71	-	-	-
1935	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	403.82	-	-	-
1936	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	414.51	-	-	-
1937	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	421.94	-	-	-
1938	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	459.97	-	-	-
1939	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	451.07	-	-	-

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
1940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	459.86	-	-	-
1941	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	479.10	-	-	-
1942	-	-	-	-	-	64.12	0	-	-	-	-	-	-	-	-	-	495.53	-	-	-
1943	-	-	-	-	-	45.99	9.65	-	-	-	-	-	-	-	-	-	499.94	-	-	-
1944	-	-	-	-	-	69.2	45.37	-	-	-	-	-	-	-	-	-	512.69	-	-	-
1945	-	-	-	-	-	61.04	44.07	-	-	-	-	-	-	-	-	-	505.82	-	-	-
1946	-	-	-	-	-	74.72	13.77	-	-	-	-	-	-	-	-	-	546.99	-	-	-
1947	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	570.38	-	-	-
1948	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	609.69	-	-	-
1949	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	628.98	-	-	-
1950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	591.05	-	-	-
1951	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	665.20	-	-	-
1952	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1280.91 ?	-	-	-
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	748.06	-	-	-
1954	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	805.44	-	-	-
1955	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	836.98	-	-	-
1956	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	854.51	-	-	-
1957	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	964.30	-	-	-
1958	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	950.27	-	-	-
1959	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1012.16	-	-	-
1960	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1048.76	-	-	-
1961	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1101.59	-	-	-
1962	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1128.86	-	-	-
1963	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1196.29	-	-	-
1964	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1260.27	-	-	-
1965	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1193.41	-	-	-
1966	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	942.61	-	-	-
1967	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	626.33	-	-	-
1968	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	713.69	-	-	-
1969	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	712.18	-	-	-
1970	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	717.57	-	-	-
1971	0.00	-	-	135.39	42.46	48.90	77.99	2.65	52.87	85.83	62.71	0.00	86.89	24.03	21.68	-	(740.06)	-	-	-
1972	0.00	-	-	137.94	35.27	46.13	67.02	10.82	53.84	56.53	80.65	0.00	97.28	20.14	7.93	-	(701.41)	-	-	-
1973	13.78	-	-	144.61	32.11	69.47	87.73	1.47	59.84	61.94	63.90	-	92.19	2.99	0.70	-	(740.42)	-	-	-
1974	90.42	-	-	170.99	92.44	100.16	84.46	3.67	55.51	61.98	92.59	-	98.34	9.41	8.56	-	(966.57)	-	-	-
1975	18.50	-	-	150.16	61.91	109.62	75.10	1.60	63.67	60.54	65.28	-	87.66	7.71	6.68	-	(818.07)	-	-	-
1976	12.20	-	-	145.42	61.81	67.89	86.22	1.88	51.11	75.27	84.35	-	85.87	20.39	21.46	-	(843.83)	-	-	-
1977	19.97	-	-	162.53	71.82	104.53	66.44	5.49	80.05	83.98	65.79	-	65.43	47.54	45.76	-	(927.53)	-	-	-
1978	6.44	-	-	155.28	145.46	98.91	82.28	12.16	74.30	79.41	92.74	-	87.10	37.80	44.22	-	(1037.22)	-	-	-
1979	4.21	-	-	139.94	103.52	85.67	88.04	15.76	95.67	106.88	61.65	-	91.36	47.79	41.35	-	(944.85)	-	-	-
1980	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	988.15	-	-	-
1981	-	-	-	79.39	79.42	60.51	29.44	5.96	76.75	68.26	-	0.00	74.79	15.90	37.78	272.67	(902.09)	-	-	-
1982	4.26	-	-	101.35	95.29	71.00	58.34	14.16	52.18	71.04	42.36	0.00	-	22.81	34.61	280.77	(907.63)	-	-	-
1983	26.92	-	-	83.60	60.81	50.06	68.57	40.81	83.56	69.15	43.03	0.00	52.77	25.92	28.28	304.42	(1043.99)	-	-	-
1984	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	933.54	-	-	-
1985	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1145.51	-	-	-
1986	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1175.13	0.26	-0.26	23.98
1987	-	-	-	-	-	-	-	-	0.155	-	-	-	-	-	-	-	1123.15	0.26	-0.26	53.12
1988	-	-	-	163.10	89.24	48.81	0.38	16.21	-	83.17	0.19	-	145.90	28.05	38.17	317.55	(1091.99)	0.26	-0.26	54.33
1989	3.34	0.00	0.00	104.79	67.32	0.70	0.00	10.78	-	50.90	0.00	-	84.33	44.05	57.87	230.31	(778.10) ?	0.26	-0.26	-52.69
1990	3.62	0.00	0.00	107.59	53.22	52.44	57.88	38.41	16.92	55.76	88.93	-	66.74	36.81	39.18	207.88	(952.17)	0.26	-0.26	(59.26)

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
80	33	Fairfield Borough 1 (Oak St.)
81	34	Fairfield Borough 2
82	35	Fairfield Borough 4
83	36	Fairfield Borough 6
84	37	Fairfield Borough 7
85	38	Fairfield Borough 8
86	39	Fairfield Borough 9
87		Fairfield Borough (well field summary)
88		Fairleigh Dickinson Univ. (well field summary)
89	283	Fairmount Country Club 1
90	284	Fairmount Country Club 2
91		Fairmount Country Club (well field summary)
92	204	Florham Park Borough 2
93	205	Florham Park Borough 3
94	206	Florham Park Borough 4
95	203	Florham Park Borough 1-1962
96		Florham Park Water Dept. (well field summary)
97	127	Gates of Heaven
98	124	Givaudan Corp. 1
99	125	Givaudan Corp. 2

WITHDRAWAL (million gallons/year)

YEAR	Index number																			
	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1911	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1924	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1926	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.93	-	-	-
1929	-	-	-	-	-	-	-	33.53	-	-	-	-	-	-	-	-	15.95	-	-	-
1930	-	-	-	-	-	-	-	35.35	-	-	-	-	-	-	-	-	26.40	-	-	-
1931	-	-	-	-	-	-	-	35.13	-	-	-	-	-	-	-	-	26.93	-	-	-
1932	-	-	-	-	-	-	-	35.00	-	-	-	-	-	-	-	-	31.10	-	-	-
1933	-	-	-	-	-	-	-	34.00	-	-	-	-	-	-	-	-	27.68	-	-	-
1934	-	-	-	-	-	-	-	37.35	-	-	-	-	-	-	-	-	29.28	-	-	-
1935	-	-	-	-	-	-	-	36.67	-	-	-	-	-	-	-	-	31.48	-	-	-
1936	-	-	-	-	-	-	-	38.09	-	-	-	-	-	-	-	-	35.62	1.00 E	-	-
1937	-	-	-	-	-	-	-	37.09	-	-	-	-	-	-	-	-	36.88	1.00 E	-	-
1938	-	-	-	-	-	-	-	40.71	-	-	-	-	-	-	-	-	36.26	1.00 E	-	-
1939	-	-	-	-	-	-	-	66.99	-	-	-	-	-	-	-	-	40.25	1.00 E	-	-

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
1940	-	-	-	-	-	-	-	72.04	-	-	-	-	-	-	-	-	37.02	1.00 E	-	-
1941	-	-	-	-	-	-	-	85.02	-	-	-	-	-	-	-	-	41.91	1.00 E	-	-
1942	-	-	-	-	-	-	-	83.45	-	-	-	-	-	-	-	-	41.92	1.00 E	-	-
1943	-	-	-	-	-	-	-	85.78	-	-	-	-	-	-	-	-	42.02	1.00 E	-	-
1944	-	-	-	-	-	-	-	90.66	-	-	-	-	-	-	-	-	51.60	1.00 E	-	-
1945	-	-	-	-	-	-	-	88.64	-	-	-	-	-	-	-	-	45.41	1.00 E	-	-
1946	-	-	-	-	-	-	-	91.50	-	-	-	-	-	-	-	-	52.70	1.00 E	-	-
1947	-	-	-	-	-	-	-	90.80	-	-	-	-	-	-	-	-	58.80	1.00 E	-	-
1948	-	-	-	-	-	-	-	91.83	-	-	-	-	-	-	-	-	60.93	1.00 E	-	-
1949	-	-	-	-	-	-	-	98.54	-	-	-	-	-	-	-	-	67.67	1.00 E	-	-
1950	-	-	-	-	-	-	-	89.87	-	-	-	-	-	-	-	-	62.18	1.00 E	-	-
1951	-	-	-	-	-	-	-	112.22	-	-	-	-	-	-	-	-	77.81	1.00 E	-	-
1952	-	-	-	-	-	-	-	114.19	-	-	-	-	-	-	-	-	96.75	1.00 E	-	-
1953	-	-	-	-	-	-	-	104.81	-	-	-	-	-	-	-	-	104.78	1.00 E	-	-
1954	-	-	-	-	-	-	-	93.59	-	-	-	-	-	-	-	-	118.86	1.00 E	-	-
1955	-	-	-	-	-	-	-	93.31	-	-	-	-	-	-	-	-	139.24	1.00 E	-	-
1956	-	-	-	-	-	-	-	113.18	-	-	-	-	-	-	-	-	133.39	1.00 E	-	-
1957	-	-	-	-	-	-	-	109.93	-	-	-	-	-	-	-	-	180.33	1.00 E	-	-
1958	-	-	-	-	-	-	-	111.52	-	-	-	-	-	-	-	-	169.18	1.00 E	-	-
1959	-	-	-	-	-	-	-	104.29	-	-	-	-	-	-	-	-	176.94	1.00 E	-	-
1960	-	-	-	-	-	-	-	116.68	24.00 E	-	-	-	-	-	-	-	178.74	1.00 E	-	-
1961	-	-	-	-	-	-	-	118.85	24.00 E	-	-	-	-	-	-	-	188.49	1.00 E	-	-
1962	-	-	-	-	-	-	-	111.30	24.00 E	-	-	-	-	-	-	-	225.27	1.00 E	-	-
1963	-	-	-	-	-	-	-	100.00 E	24.00 E	-	-	-	-	-	-	-	238.97	1.00 E	-	-
1964	-	-	-	-	-	-	-	100.00 E	24.00 E	-	-	-	-	-	-	-	254.27	1.00 E	-	-
1965	-	-	-	-	-	-	-	0.84 ?	24.00 E	-	-	-	-	-	-	-	261.62	1.00 E	-	-
1966	-	-	-	-	-	-	-	31.13 ?	24.00 E	-	-	-	-	-	-	-	270.19	1.00 E	-	-
1967	-	-	-	-	-	-	-	43.74 ?	24.00 E	-	-	-	100.55	13.19	-	127.09	(240.82)	1.00 E	-	-
1968	-	-	-	-	-	-	-	83.46	24.00 E	-	-	-	-	-	-	-	289.31	1.00 E	-	-
1969	-	-	-	-	-	-	-	132.58	24.00 E	-	-	23.30	-	-	-	-	311.92	1.00 E	-	-
1970	-	-	-	-	-	-	-	142.55	24.00 E	-	-	34.56	-	-	-	-	333.21	1.00 E	1.01	33.43
1971	35.38	22.81	31.50	44.76	30.04	-	-	(164.49)	24.00 E	17.66	12.20	(29.86)	-	-	-	-	335.71	1.00 E	9.49	61.63
1972	25.93	15.38	26.68	41.01	66.25	-	-	(175.24)	24.00 E	-	-	30.00 E	-	-	-	-	309.82	1.00 E	-	-
1973	33.06	18.41	28.58	43.04	69.01	-	-	(192.10)	24.00 E	-	-	30.00 E	-	-	-	-	286.82	1.00 E	-	-
1974	39.34	19.06	36.67	47.84	79.45	-	-	(222.36)	24.00 E	-	-	30.00 E	-	-	-	-	294.23	1.00 E	-	-
1975	35.18 ?	15.85 ?	33.48 ?	20.06 ?	84.54 ?	-	-	249.96 ?	24.00 E	-	-	30.00 E	-	-	-	-	328.91	1.00 E	-	-
1976	9.79 ?	0.46 ?	9.75 ?	3.18 ?	20.38 ?	-	-	313.40 ?	24.00 E	13.49	3.58	(17.07)	-	-	-	-	370.30	1.00 E	-	-
1977	16.58 ?	10.68 ?	11.42 ?	13.69 ?	28.52 ?	-	-	338.69 ?	24.00 E	-	-	30.00 E	-	-	-	-	375.04	1.00 E	-	-
1978	62.05 ?	17.10 ?	40.52 ?	59.38 ?	109.21 ?	-	-	354.94 ?	24.00 E	-	-	30.00 E	-	-	-	-	362.68	1.00 E	-	-
1979	69.66 ?	14.15 ?	36.20 ?	49.43 ?	111.22 ?	-	-	358.41 ?	24.00 E	-	-	30.00 E	-	-	-	-	367.58	1.00 E	-	-
1980	70.35	13.03	38.26	51.49	92.60	65.47	19.22	(350.42)	24.00 E	-	-	40.37	-	-	-	-	397.04	1.00 E	-	-
1981	55.83	19.44	30.21	44.82	11.03	58.36	20.68	(240.36) ?	24.00 E	-	-	30.00 E	-	-	-	-	320.38	1.00 E	-	-
1982	94.33	0.97	49.62	71.84	-	92.21	35.61	(344.56)	24.00 E	-	-	30.00 E	-	-	-	-	353.89	1.00 E	-	-
1983	94.43	-	53.60	89.87	-	103.44	33.80	(375.14)	24.00 E	-	-	30.00 E	-	-	-	-	405.05	1.00 E	-	-
1984	102.42	-	55.05	86.83	-	107.54	22.04	(373.87)	24.00 E	-	-	30.00 E	-	-	-	-	453.84	1.00 E	-	-
1985	109.39	-	53.01	76.23	0.00	93.59	25.08	(357.30)	24.00 E	-	-	30.00 E	51.72	0.62	356.59	-	(408.93)	1.00 E	4.40	75.26
1986	110.32	-	53.96	-	-	91.31	-	(255.59)	24.00 E	27.53	14.22	(41.75)	105.09	2.61	348.27	-	(455.97)	1.00 E	4.83	79.50
1987	107.03	-	64.47	97.74	-	97.72	30.09	(397.05)	24.00 E	-	-	30.00 E	37.13	0.38	408.94	-	(446.45)	1.00 E	0.00	84.38
1988	112.69	-	53.50	89.34	-	98.32	7.11	(360.96)	24.00 E	-	-	30.00 E	72.78	1.69	380.96	-	(455.43)	1.00 E	0.00	103.38
1989	103.93	-	44.48	85.89	-	102.75	5.24	(342.29)	24.00 E	-	-	30.00 E	44.78	0.32	373.89	-	(418.98)	1.00 E	0.00	91.20
1990	92.04	-	30.81	60.64	-	97.78	0.00	(281.27)	24.00 E	-	-	2.30	16.31	4.90	388.60	-	(409.81)	1.00 E	0.00	88.85

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
100	126	Givaudan Corp. 3
101		Givaudan Corp (well field summary)
102		Greystone Park Psy. Hosp. 1-test well
103	161	Greystone Park Psy. Hosp. 1
104	162	Greystone Park Psy. Hosp. 2
105	163	Greystone Park Psy. Hosp. 3
106	164	Greystone Park Psy. Hosp. 4 (Davy well ?)
107	165	Greystone Park Psy. Hosp. 5 (2-67)
108	166	Greystone Park Psy. Hosp. 6 (1-67)
109		Greystone Park Psy. Hosp. (well field summary)
110		Identitech Corp. 2
111		Identitech Corp. 1
112	180	Jersey Central P&L, Morristown
113		Lincoln Park Water Co. (well field summary)
114		Lincoln Park Water Dept. (well field summary)
115	129	Livingston Township 1
116	130	Livingston Township 2
117	131	Livingston Township 3
118	132	Livingston Township 4
119	133	Livingston Township 5

WITHDRAWAL (million gallons/year)

YEAR	Index number																			
	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1911	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1924	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.62	-	-	-	-	-
1926	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.11	-	-	-	-	-
1927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.27	-	-	-	-	-
1928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.77	-	-	-	-	-
1929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.93	-	-	-	-	-
1930	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.00	-	-	-	-	-
1931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.47	-	-	-	-	-
1932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.91	-	-	-	-	-
1933	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.30	-	-	-	-	-
1934	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.25	-	-	-	-	-
1935	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.03	-	-	-	-	-
1936	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.95	-	-	-	-	-
1937	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.87	-	-	-	-	-
1938	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.14	-	-	-	-	-
1939	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.61	-	-	-	-	-

E: estimated; ?: questionable value; (): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119
1940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.58	-	-	-	-	-
1941	-	-	-	-	-	-	-	-	-	-	-	-	-	0.90	13.87	-	-	-	-	-
1942	-	-	-	-	-	-	-	-	-	-	-	-	-	0.90	14.71	-	-	-	-	-
1943	-	-	-	-	-	-	-	-	-	-	-	-	-	0.92	14.05	-	-	-	-	-
1944	-	-	-	-	-	-	-	-	-	-	-	-	-	1.01	12.63	-	-	-	-	-
1945	-	-	-	-	-	-	-	-	-	-	-	-	-	1.01	13.21	-	-	-	-	-
1946	-	-	-	-	-	-	-	-	-	-	-	-	-	1.00	12.85	-	-	-	-	-
1947	-	-	-	-	-	-	-	-	-	-	-	-	-	1.07	13.06	-	-	-	-	-
1948	-	-	-	-	-	-	-	-	-	-	-	-	-	1.14	0.00	-	-	-	-	-
1949	-	-	-	-	-	-	-	-	-	-	-	-	-	1.14	12.43	-	-	-	-	-
1950	-	-	-	-	-	-	-	-	-	-	-	-	-	1.14	14.17	-	-	-	-	-
1951	-	-	-	-	-	-	-	-	-	-	-	-	-	1.15	14.02	33.48 ?	-	-	-	-
1952	-	-	-	-	-	-	-	-	-	-	-	-	-	1.20	0.00	50.58	-	-	-	-
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	1.24	0.00	65.42	-	-	-	-
1954	-	-	-	-	-	-	-	-	-	-	-	-	-	1.32	0.00	85.07	-	-	-	-
1955	-	-	-	-	-	-	-	-	-	-	-	-	-	1.36	0.00	70.73	53.51	-	-	-
1956	-	-	-	-	-	-	-	-	-	-	-	-	-	1.39	0.00	69.38	58.94	63.85	-	-
1957	-	-	-	-	-	-	-	-	-	-	-	-	-	1.44	0.00	54.74	60.86	350.08	0.08	-
1958	-	-	-	-	-	-	-	-	-	-	-	-	-	1.44	0.00	45.02	30.27	379.53	55.18	-
1959	-	-	-	-	-	-	-	-	-	-	-	-	-	1.44	0.00	55.15	12.75	451.82	44.15	-
1960	-	-	-	-	-	-	-	-	-	-	-	-	-	1.44	0.00	74.15	1.60	497.37	7.15	-
1961	-	-	-	-	-	-	-	-	-	-	-	-	-	1.44	0.00	80.29	0.00	512.62	0.00	-
1962	-	-	-	-	-	-	-	-	-	-	-	-	-	1.52	0.00	60.57	4.26	465.66	9.72	-
1963	-	-	-	-	-	-	-	-	-	-	-	-	-	1.52	0.00	45.63	6.41	476.63	30.61	-
1964	-	-	-	-	-	-	-	-	-	-	-	-	-	1.52	64.25	56.49	19.55	352.56	50.91	-
1965	-	-	-	-	-	-	-	-	-	-	-	-	-	1.52	0.00	54.50	14.00	344.37	129.81	-
1966	-	-	-	-	-	-	-	-	-	-	-	-	-	1.52	41.54	-	-	-	-	-
1967	-	-	-	-	-	-	-	-	-	-	-	-	-	1.52	71.56	-	-	-	-	-
1968	-	-	-	-	-	-	-	-	-	-	-	-	-	2.24	58.99	-	-	-	-	-
1969	-	-	-	-	-	-	-	-	-	-	-	-	-	2.24	71.45	-	-	-	-	-
1970	-	(34.44)	-	-	-	-	-	-	-	-	-	-	-	2.24	70.63	-	-	-	-	-
1971	-	(71.11)	-	-	-	-	-	-	-	345.70	-	-	-	-	65.55	49.53	88.35	271.67	60.14	181.03
1972	-	98.80	-	-	-	-	-	-	-	319.93	-	-	-	-	67.31	51.03	79.08	132.85	101.31	193.20
1973	-	136.16	-	-	-	-	-	-	-	300.11	-	-	-	-	70.81	49.91	94.41	133.72	114.24	140.04
1974	-	131.17	-	-	-	-	-	-	-	275.34	-	-	-	-	74.30	37.80	82.67	135.71	98.79	173.76
1975	-	123.27	-	-	-	-	-	-	-	258.20	-	-	-	-	67.55	43.87	87.27	139.38	37.32	120.24
1976	-	178.12	-	-	-	-	-	-	-	256.22	-	-	-	-	69.97	36.62	86.32	184.21	74.01	147.25
1977	-	210.93	-	-	-	-	-	-	-	251.50	-	-	-	-	-	14.96	56.66	254.10	131.83	220.47
1978	-	181.98	-	-	-	-	-	-	-	257.07	-	-	-	-	-	28.48	71.56	247.80	129.01	259.00
1979	-	149.63	-	-	-	-	-	-	-	208.88	-	-	-	-	-	34.46	65.99	226.05	115.83	279.40
1980	-	124.09	-	-	29.69	92.71	-	43.46	19.29	(185.14)	-	-	0.30	-	-	31.65	37.84	258.60	112.85	110.47
1981	-	124.82	31.22	25.80	23.24	69.31	0.00	-	19.45	(169.01)	-	-	0.01	-	-	0.00	59.27	155.17	44.89	157.16
1982	-	121.45	17.99	33.02	29.07	70.06	0.00	-	20.97	(171.11)	-	-	-	-	-	0.00	54.19	155.53	81.61	122.09
1983	-	94.12	0.56	15.45	0.38	155.92	-	-	0.40	(172.70)	-	-	-	-	-	0.00	77.83	220.18	67.84	224.73
1984	-	80.50	-	29.70	3.80	156.18	-	-	-	(189.68)	-3.85	3.85	-	-	-	0.00	74.18	108.70	76.23	275.60
1985	28.53	(108.19)	-	28.55	41.79	128.04	-	-	15.20	(213.57)	-3.74	3.74	-	-	-	29.18	0.24	317.59	80.54	149.51
1986	28.47	(110.80)	21.63	30.82	43.50	85.26	-	-	28.20	(209.41)	-	-	0.53	-	-	40.30	62.50	244.91	23.23	191.41
1987	29.99	(114.37)	-	25.15	37.63	12.86	-	37.09	26.43	(139.15)	-	-	2.48	-	-	40.02	75.98	192.20	108.46	210.27
1988	40.26	(143.64)	-	-	-	-	-	-	-	-	-	-	0.00	-	-	35.81	57.35	211.37	84.68	229.00
1989	43.96	(135.16)	-	-	-	-	-	-	-	-	-	-	0.00	-	-	36.01	66.57	164.38	80.92	201.98
1990	49.86	(138.71)	-	-	-	-	-	-	-	-	-	-	0.00	-	-	20.86	92.72	319.80	1.02	108.55

E: estimated; ?: questionable value; (): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
120	134	Livingston Township 6?
121	135	Livingston Township 7
122	136	Livingston Township 8
123	137	Livingston Township 9
124	138	Livingston Township 10
125	139	Livingston Township 11
126	140	Livingston Township 12

Index #	Well #	Owner and local name or number
127		Livingston Township (well field summary)
128	99	M. Polaner, Inc.
129	221	Madison Borough Water Dept. A
130	222	Madison Borough Water Dept. B
131	223	Madison Borough Water Dept. C
132	224	Madison Borough Water Dept. D
133	225	Madison Borough Water Dept. E

Index #	Well #	Owner and local name or number
134		Madison Borough Water Dept. (well field summary)
135	282	Madison Golf Club 1
136		Mennen Company (well field summary)
137	293	Millington Water Co.
138	40	Montville Township MUA 2 (Walnut)
139	22	Montville Township MUA 7 (Dianne Dr.)

WITHDRAWAL (million gallons/year)

YEAR	Index number																			
	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54.79	-	-	-	-	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60.00 E	-	-	-	-	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60.00 E	-	-	-	-	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70.00 E	-	-	-	-	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70.00 E	-	-	-	-	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.00 E	-	-	-	-	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	80.00 E	-	-	-	-	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90.00 E	-	-	-	-	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.00 E	-	-	-	-	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110.00 E	-	-	-	-	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	120.00 E	-	-	-	-	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	130.00 E	-	-	-	-	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140.00 E	-	-	-	-	-
1911	-	-	-	-	-	-	-	-	-	-	-	-	-	-	150.00 E	-	-	-	-	-
1912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	168.02	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160.00 E	-	-	-	-	-
1914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160.00 E	-	-	-	-	-
1915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160.00 E	-	-	-	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160.00 E	-	-	-	-	-
1917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	78.26	-	-	-	-	-
1918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72.60	-	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-	-	-	-	-	167.33	-	-	-	-	-
1920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	164.42	-	-	-	-	-
1921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	176.84	-	-	-	-	-
1922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	165.75	-	-	-	-	-
1923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	198.95	-	-	-	-	-
1924	-	-	-	-	-	-	-	-	-	-	-	-	-	-	187.49	-	-	-	-	-
1925	-	-	-	-	-	-	-	1.64	-	-	-	-	-	-	204.03	-	-	-	-	-
1926	-	-	-	-	-	-	-	4.98	-	-	-	-	-	-	187.30	-	-	-	-	-
1927	-	-	-	-	-	-	-	15.55	-	-	-	-	-	-	198.88	-	-	1.19	-	-
1928	-	-	-	-	-	-	-	20.74	-	-	-	-	-	-	209.87	-	-	2.79	-	-
1929	-	-	-	-	-	-	-	35.51	-	-	-	-	-	-	219.63	-	-	-	-	-
1930	-	-	-	-	-	-	-	52.43	-	-	-	-	-	-	222.31	-	-	-	-	-
1931	-	-	-	-	-	-	-	59.09	-	-	-	-	-	-	212.92	-	-	-	-	-
1932	-	-	-	-	-	-	-	63.99	-	-	-	-	-	-	229.76	-	-	-	-	-
1933	-	-	-	-	-	-	-	58.53	-	-	-	-	-	-	206.56	-	-	-	-	-
1934	-	-	-	-	-	-	-	59.75	-	-	-	-	-	-	213.04	-	-	-	-	-
1935	-	-	-	-	-	-	-	56.15	-	-	-	-	-	-	225.37	-	-	-	-	-
1936	-	-	-	-	-	-	-	66.64	-	-	-	-	-	-	227.61	-	-	-	-	-
1937	-	-	-	-	-	-	-	68.18	-	-	-	-	-	-	219.90	-	-	-	-	-
1938	-	-	-	-	-	-	-	64.96	-	-	-	-	-	-	223.49	-	-	-	-	-
1939	-	-	-	-	-	-	-	93.24	-	-	-	-	-	-	243.78	-	-	-	-	-

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year)																		
	Index number																		
	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139
1940	-	-	-	-	-	-	-	91.14	-	-	-	-	-	-	219.22	-	-	-	-	-
1941	-	-	-	-	-	-	-	94.97	-	-	-	-	-	-	235.15	-	-	-	-	-
1942	-	-	-	-	-	-	-	98.72	-	-	-	-	-	-	228.38	-	-	-	-	-
1943	-	-	-	-	-	-	-	111.90	-	-	-	-	-	-	233.22	-	-	-	-	-
1944	-	-	-	-	-	-	-	116.27	-	-	-	-	-	-	257.48	-	-	-	-	-
1945	-	-	-	-	-	-	-	117.12	-	-	-	-	-	-	260.54	-	-	-	-	-
1946	-	-	-	-	-	-	-	132.01	-	-	-	-	-	-	264.41	-	-	-	-	-
1947	-	-	-	-	-	-	-	138.59	-	-	-	-	-	-	271.76	-	-	-	-	-
1948	-	-	-	-	-	-	-	145.39	-	-	-	-	-	-	291.25	-	-	-	-	-
1949	-	-	-	-	-	-	-	167.64	-	-	-	-	-	-	319.11	-	-	-	-	-
1950	-	-	-	-	-	-	-	176.11	-	-	-	-	-	-	338.13	-	-	-	-	-
1951	-	-	-	-	-	-	-	(33.48) ?	-	-	-	-	-	-	356.58	-	-	-	-	-
1952	-	-	-	-	-	-	-	(50.58) ?	-	-	-	-	-	-	375.40	-	-	-	-	-
1953	-	-	-	-	-	-	-	(65.42) ?	-	-	-	-	-	-	366.97	-	-	-	-	-
1954	-	-	-	-	-	-	-	(85.07) ?	-	-	-	-	-	-	367.75	-	-	-	-	-
1955	-	-	-	-	-	-	-	(124.23)	-	-	-	-	-	-	400.72	-	-	-	-	-
1956	-	-	-	-	-	-	-	(192.16)	-	-	-	-	-	-	390.19	-	-	-	-	-
1957	-	-	-	-	-	-	-	(465.77)	-	-	-	-	-	-	488.10	-	-	-	-	-
1958	-	-	-	-	-	-	-	(510.00)	-	-	-	-	-	-	428.66	-	-	-	-	-
1959	-	-	-	-	-	-	-	(563.87)	-	-	-	-	-	-	452.96	-	-	-	-	-
1960	-	-	-	-	-	-	-	(580.26)	-	-	-	-	-	-	495.42	-	-	-	-	-
1961	32.76	-	-	-	-	-	-	(625.68)	-	-	-	-	-	-	488.96	-	-	-	-	-
1962	135.45	-	-	-	-	-	-	(675.66)	-	-	-	-	-	-	502.24	-	-	-	-	-
1963	160.07	-	-	-	-	-	-	(719.35)	-	-	-	-	-	-	548.74	-	-	-	-	-
1964	251.10	-	-	-	-	-	-	(730.61)	-	-	-	-	-	-	577.64	-	-	-	-	-
1965	128.36	-	-	-	-	-	-	(671.04)	-	-	-	-	-	-	559.64	-	-	-	-	-
1966	-	-	-	-	-	-	-	770.77	-	-	-	-	-	-	568.21	-	-	-	-	-
1967	-	-	-	-	-	-	-	806.42	-	-	-	-	-	-	542.92	1.00 E	-	-	-	-
1968	-	-	-	-	-	-	-	885.34	-	-	-	-	-	-	569.72	1.00 E	-	-	-	-
1969	-	-	-	-	-	-	-	851.46	-	-	-	-	-	-	583.82	1.00 E	-	-	-	-
1970	-	-	-	-	-	-	-	1557.33 ?	16.06	-	-	-	-	-	671.89	1.00 E	-	-	-	-
1971	53.05	132.65	35.99	-	-	-	-	(872.40)	19.49	93.65	142.11	131.32	117.04	314.65	(798.76) ?	1.00 E	-	-	-	-
1972	59.33	121.70	113.50	-	-	-	-	(852.00)	22.20	-	-	-	-	-	654.10	1.00 E	-	-	-	-
1973	56.85	146.93	135.01	-	-	83.05	-	(954.16)	22.19	-	-	-	-	-	652.48	1.00 E	-	-	-	-
1974	71.00	91.34	117.11	-	71.17	98.88	-	(978.24)	22.65	-	-	-	-	-	651.86	1.00 E	-	-	-	-
1975	60.50	126.13	77.56	106.24	66.85	84.70	-	(950.06)	-	-	-	-	-	-	627.07	1.00 E	-	-	-	-
1976	56.63	116.96	102.09	105.07	46.59	66.73	-	(1022.47)	22.43	-	-	-	-	-	674.37	1.00 E	-	-	-	-
1977	74.62	69.20	104.00	121.18	54.10	28.86	-	(1129.98)	22.30	-	-	-	-	-	673.71	1.00 E	-	-	-	-
1978	48.30	93.01	118.89	109.50	40.93	88.33	-	(1234.81)	21.94	122.02	200.11	103.68	83.35	173.93	(683.08)	1.00 E	-	-	19.30	-
1979	54.26	114.34	146.00	108.70	31.64	58.65	-	(1235.32)	21.86	108.17	146.64	136.90	126.94	149.76	(668.42)	1.00 E	-	-	15.60	-
1980	38.33	65.00	87.10	215.22	8.38	86.33	35.19	(1086.96)	23.06	92.65	182.31	89.06	150.44	188.58	(703.05)	2.69	42.36	-	10.64	-
1981	33.26	94.80	48.46	132.65	0.42	111.30	66.96	(904.33)	23.34	59.54	183.48	87.83	71.24	204.28	(606.37)	1.00 E	40.92	-	30.90	-
1982	40.14	81.04	102.99	185.99	58.87	80.20	69.30	(1031.95)	26.06	76.93	161.88	112.29	97.60	203.33	(652.04)	1.00 E	32.69	-	16.29	-
1983	31.82	54.85	71.55	193.18	38.91	46.97	66.82	(1094.67)	26.55	109.98	208.94	104.58	131.82	161.69	(717.01)	1.00 E	17.98	-	22.16	-
1984	66.22	60.43	114.42	178.60	40.67	59.72	91.15	(1145.93)	36.45	30.54	94.95	155.20	149.74	250.86	(681.29)	1.00 E	25.51	-	18.07	-
1985	31.37	37.38	90.07	154.98	52.77	60.49	76.34	(1080.46)	34.53	56.54	63.63	145.45	134.65	238.72	(639.00)	1.27	26.59	-	17.52	-
1986	50.13	59.74	117.94	182.81	43.92	44.00	84.68	(1145.58)	40.12	59.96	27.95	177.74	151.43	201.96	(619.04)	1.00 E	33.67	-	6.78	-
1987	34.28	97.88	110.26	186.06	41.77	35.65	86.04	(1218.84)	36.29	24.01	0.83	23.60	221.21	373.14	(642.79)	1.33	29.36	-	0.10	-
1988	40.26	52.91	96.82	183.58	68.43	35.21	76.70	(1172.10)	21.84	0.00	0.00	203.91	35.44	466.07	(705.42)	1.00 E	26.44	-	0.00	-
1989	0.00	37.75	104.05	187.12	23.94	53.15	80.01	(1035.88)	17.98	0.51	15.12	182.75	17.16	444.64	(660.18)	1.00 E	22.51	-	0.00	0.00
1990	68.59	13.47	1.57	93.95	59.05	88.62	78.07	(946.27)	17.10	0.00	0.00	437.27	0.00	236.85	(674.12)	1.00 E	27.07	-	0.00	0.00

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
140	23	Montville Township MUA 8 (MacLeary Rd.)
141	24	Montville Township MUA 9 (Indian Lane 1)
142	25	Montville Township MUA 10 (Indian Lane 2)
143	26	Montville Township MUA 11 (Indian Lane 3)
144		Montville Township MUA (well field summary)
145	181	Morris Co. Golf Club 1
146		Morris Co. Golf Club (well field summary)
147		Morristown Memorial Hospital (well field summary)
148	46	Mountain Lakes Water Dept. 4
149	43	Mountain Lakes Water Dept.Tower Hill 4
150	44	Mountain Lakes Water Dept. 5
151		Mountain Lakes Water Dept. (well field summary)
152	78	Mountain Ridge Country Club 1 (main well ?)
153	79	Mountain Ridge Country Club 2 (swamp well ?)
154		Mountain Ridge Country Club (well field summary)
155	27	Mountain View Water Co. 1 (now Lincoln Park)
156		NJ-American - Baltusrol (well field summary)
157		NJ-American - Canoe Brook (well field summary)
158		NJ-American - Passaic River (well field summary)
159		NJ-American - Short Hills (well field summary)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.00 E	-	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.00 E	-	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.00 E	-	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.00 E	-	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	182.50	-	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	182.50	-	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	256.20	-	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	255.50	-	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	255.50	-	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	328.50	-	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	329.40	-	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	474.50	-	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	511.00	-	-
1911	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	584.00	-	-
1912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	658.80	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	693.50	-	-
1914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	576.70	-	-
1915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	598.60	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	618.54	-	-
1917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	657.00	-	-
1918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	664.30	-	-
1919	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	954.86	-	-
1920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1118.30	-	-
1921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	79.68	1280.35	-	-
1922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	322.93	1117.47	-	-
1923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	327.07	1294.10	-	-
1924	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	330.61	1435.68	-	-
1925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	401.04	1704.16	-	-
1926	-	-	-	-	-	-	-	-	-	-	-	39.24	-	-	-	-	442.05	1870.14	-	-
1927	-	-	-	-	-	-	-	-	-	-	-	47.21	-	-	-	-	444.94	2083.00	-	-
1928	-	-	-	-	-	-	-	-	-	-	-	49.93	-	-	-	-	473.45	2331.80	-	-
1929	-	-	-	-	-	-	-	-	-	-	-	45.12	-	-	-	-	610.42	2492.35	-	-
1930	-	-	-	-	-	-	-	-	-	-	-	51.63	-	-	-	-	560.97	2112.35	-	509.00
1931	-	-	-	-	-	-	-	-	-	-	-	43.70	-	-	-	-	427.34	1638.97	-	790.00
1932	-	-	-	-	-	-	-	-	-	-	-	53.64	-	-	-	-	392.82	1437.86	-	785.00
1933	-	-	-	-	-	-	-	-	-	-	-	43.12	-	-	-	-	580.77	1569.83	-	442.00
1934	-	-	-	-	-	-	-	-	-	-	-	45.26	-	-	-	-	638.76	1672.30	-	396.00
1935	-	-	-	-	-	-	-	-	-	-	-	46.72	-	-	-	-	588.81	1773.36	-	402.00
1936	-	-	-	-	-	-	-	-	-	-	-	43.61	-	-	-	-	641.43	1848.79	-	530.00
1937	-	-	-	-	-	-	-	-	-	-	-	44.85	-	-	-	10.95	617.79	1848.79	-	563.00
1938	-	-	-	-	-	-	-	-	-	-	-	44.77	-	-	-	-	635.68	1478.08	-	788.00
1939	-	-	-	-	-	-	-	-	-	-	-	48.23	-	-	-	-	543.64	1664.45	-	700.00 E

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
1940	-	-	-	-	-	-	-	-	-	-	-	48.71	-	-	-	-	492.54	1655.81	-	700.00 E
1941	-	-	-	-	-	-	-	-	-	-	-	47.68	-	-	-	-	527.52	1641.78	-	700.00 E
1942	-	-	-	-	-	-	-	-	-	-	-	45.63	-	-	-	-	618.80	1480.26	-	700.00 E
1943	-	-	-	-	-	-	-	-	-	-	-	47.81	-	-	-	-	592.32	1353.32	-	700.00 E
1944	-	-	-	-	-	-	-	-	-	-	-	52.69	-	-	-	-	565.86	1643.93	-	700.00 E
1945	-	-	-	-	-	-	-	-	-	-	-	52.70	-	-	-	-	436.61	1210.72	-	720.00 E
1946	-	-	-	-	-	-	-	-	-	-	-	55.47	-	-	-	-	565.18	1408.26	-	760.00 E
1947	-	-	-	-	-	-	-	-	-	-	-	58.81	-	-	-	-	580.36	1641.05	-	800.00 E
1948	-	-	-	-	-	-	-	-	-	-	-	60.28	-	-	-	-	653.73	1981.71	-	840.00 E
1949	-	-	-	-	-	-	-	-	-	-	-	70.00	-	-	-	-	808.97	1671.05	-	880.00 E
1950	-	-	-	-	-	-	-	-	-	-	-	70.57	-	-	-	-	511.12	1837.55	-	920.00 E
1951	-	-	-	-	-	-	-	-	-	-	-	77.42	-	-	-	-	481.38	1915.59	-	960.00 E
1952	-	-	-	-	-	-	-	-	-	-	-	82.79	-	-	-	-	519.15	1825.01	0.00	1000.00 E
1953	-	-	-	-	-	-	-	-	-	-	-	84.19	-	-	-	-	512.90	2269.33	0.00	1040.00 E
1954	-	-	-	-	-	-	-	-	-	-	-	95.87	-	-	-	-	394.36	2272.58	0.00	1080.00 E
1955	-	-	-	-	-	-	-	-	-	-	-	106.94	-	-	-	-	413.63	2723.85	0.00	1120.00 E
1956	-	-	-	-	-	-	-	-	-	-	-	83.59	-	-	-	-	407.24	2406.42	1080.41	1207.99
1957	-	-	-	-	-	-	-	-	-	-	-	105.70	-	-	-	-	423.68	2595.35	1003.20	1146.85
1958	-	-	-	-	-	-	-	-	-	-	-	111.16	-	-	-	-	660.61	2304.64	1020.14	965.09
1959	-	-	-	-	-	-	-	-	-	-	-	114.25	-	-	-	-	135.21	2421.16	1151.79	1139.08
1960	-	-	-	-	-	-	-	70.00 E	-	-	-	118.27	-	-	-	-	157.66	2629.92	1145.59	1149.89
1961	-	-	-	-	-	-	-	70.00 E	-	-	-	123.73	-	-	-	-	48.46	2569.59	1126.43	1147.49
1962	-	-	-	-	-	-	-	70.00 E	-	-	-	140.52	-	-	-	-	107.61	2247.28	820.95	1148.41
1963	-	-	-	-	-	-	-	70.00 E	-	-	-	141.98	-	-	-	-	324.67	2306.14	1101.01	1071.02
1964	-	-	-	-	-	-	-	70.00 E	-	-	-	145.78	-	-	-	-	600.57	2230.72	1116.93	1084.73
1965	-	-	-	-	-	-	-	70.00 E	-	-	-	137.54	-	-	-	-	471.83	2358.88	1084.25	1057.89
1966	-	-	-	-	-	-	-	70.00 E	-	-	-	142.31	-	-	-	-	507.04	2240.98	995.02	1054.09
1967	-	-	-	-	-	-	-	70.00 E	-	-	-	142.79	-	-	-	-	573.35	2008.69	909.45	1123.15
1968	-	-	-	-	-	-	-	70.00 E	-	-	-	155.14	-	-	-	-	555.16	2023.07	942.99	1125.97
1969	-	-	-	-	44.65	-	-	70.00 E	-	-	-	142.56	-	-	-	-	633.20	2032.37	990.11	1055.02
1970	-	-	-	-	4.77	-	-	70.00 E	-	-	-	158.92	-	-	-	-	568.55	2256.93	1406.66	963.89
1971	-	-	-	-	27.68	-	-	70.00 E	-	-	-	159.23	-	-	-	-	607.73	2128.88	973.00	1065.54
1972	-	-	-	-	13.78	-	-	70.00 E	-	-	-	162.01	-	-	-	-	703.35	1913.39	944.62	873.76
1973	-	-	-	-	24.92	-	-	70.00 E	-	-	-	163.02	-	-	-	-	604.08	2191.44	1000.86	1023.56
1974	-	-	-	-	78.32	-	-	70.00 E	-	-	-	169.68	-	-	-	-	485.44	2204.04	891.07	944.88
1975	-	-	-	-	133.18	-	-	70.00 E	-	-	-	166.11	-	-	-	-	738.51	1948.80	1105.28	1077.58
1976	-	-	-	-	189.47	-	-	70.00 E	-	-	-	192.73	-	-	-	-	641.38	2087.02	862.19	1096.63
1977	-	-	-	-	220.40	-	-	70.00 E	-	-	-	186.07	-	-	-	-	513.41	2050.69	1088.40	1045.94
1978	-	116.32	122.85	-	(258.47)	-	-	70.00 E	-	-	-	179.91	-	-	-	-	649.35	2176.87	1060.65	1046.31
1979	-	22.82	238.72	-	(277.14)	-	-	70.00 E	-	-	-	213.88	-	-	-	-	396.81	2192.24	971.15	1044.80
1980	-	122.37	207.01	-	(340.02)	-	-	27.63	27.13	7.92	196.07	(231.12)	-	-	-	-	400.00 E	2232.00	982.10	1000.00 E
1981	-	40.74	222.63	-	(294.27)	-	-	72.48	9.77	3.16	190.31	(203.24)	-	-	-	-	400.00 E	2137.00	907.00	1000.00 E
1982	-	194.78	84.65	-	(295.71)	-	-	70.00 E	20.54	1.60	216.05	(238.20)	-	-	-	-	400.00 E	1901.50 E	793.19 E	904.98 E
1983	-	292.93	39.09	-	(354.17)	-	-	70.00 E	-	0.25	193.80	(194.05)	4.04	0.91	-	-	400.00 E	1953.65 E	722.16 E	991.60 E
1984	-	320.28	53.45	-	(391.80)	0.00	-	70.00 E	-	0.38	216.69	(217.08)	-	-	13.13	-	400.00 E	1544.39	513.92	942.15
1985	-	315.70	65.53	-	(398.75)	2.50	-	43.44	-	0.78	221.33	(222.11)	-	-	17.05	-	400.00 E	1458.74	350.16	983.54
1986	-	271.19	80.92	99.37	(458.25)	-	-	87.79	-	0.57	238.13	(238.70)	14.80	3.70	-	-	400.00 E	1574.43	677.16	863.84
1987	-	164.72	99.04	227.73	(491.59)	-	7.70	90.10	4.47	1.62	249.89	(255.98)	10.63	2.90	-	-	483.00	1521.89	830.88	733.76
1988	-	256.11	139.38	136.49	(531.98)	-	13.90	80.19	19.51	0.89	254.34	(274.73)	5.60	0.00	27.92	-	475.10	1559.37	660.03	1009.93
1989	0.00	316.75	28.98	116.31	(462.04)	-	7.77	67.73	1.94	0.47	185.46	(187.86)	-	-	22.69	-	487.24	1800.40	699.21	1047.70
1990	0.00	365.45	115.40	43.29	(524.14)	2.26	(8.12)	70.00	2.02	0.28	245.46	(247.76)	-	-	22.47	-	410.50	1891.38 E	630.46 E	874.14

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
160		NJ-American - all sources (well field summary)
161	285	Noe Pierson Corp. 1
162	190	Normandy & Whippany Water Co.
163	251	Orange Products, Inc. 1-Old
164		Packanack Lake Country Club, Magnolia
165		Packanack Lake Country Club, Osborn
166		Packanack Lake Country Club 4
167	47	Parsippany-Troy Hills WD 1
168	48	Parsippany-Troy Hills WD 1A
169	49	Parsippany-Troy Hills WD 2
170	50	Parsippany-Troy Hills WD 3
171	51	Parsippany-Troy Hills WD 4
172	52	Parsippany-Troy Hills WD 4A
173	53	Parsippany-Troy Hills WD 5-1
174	54	Parsippany-Troy Hills WD 5-2
175	55	Parsippany-Troy Hills WD 5-3
176	56	Parsippany-Troy Hills WD 5-4
177		Parsippany-Troy Hills WD 5-5
178	57	Parsippany-Troy Hills WD 6
179	58	Parsippany-Troy Hills WD 7

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179
1898	(100.00) E	-	18.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1899	(100.00) E	-	19.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1900	(100.00) E	-	20.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1901	(100.00) E	-	21.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1902	(182.50)	-	22.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1903	(182.50)	-	23.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1904	(256.20)	-	24.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1905	(255.50)	-	25.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1906	(255.50)	-	26.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1907	(328.50)	-	27.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1908	(329.40)	-	28.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1909	(474.50)	-	29.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1910	(511.00)	-	30.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1911	(584.00)	-	31.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	(658.80)	-	32.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1913	(693.50)	-	33.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	(576.70)	-	34.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1915	(598.60)	-	35.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1916	(618.54)	-	36.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1917	(657.00)	-	37.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1918	(664.30)	-	38.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1919	(954.86)	-	39.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1920	(1118.30)	-	40.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1921	(1360.03)	-	41.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1922	(1440.40)	-	42.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1923	(1621.17)	-	43.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1924	(1766.29)	-	44.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1925	(2105.20)	-	45.00 E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1926	(2312.19)	-	47.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1927	(2527.94)	-	53.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1928	(2805.25)	-	54.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1929	(3102.76)	-	59.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1930	(3182.32)	-	76.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1931	(2856.31)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1932	(2615.68)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1933	(2592.60)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1934	(2707.06)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1935	(2764.17)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1936	(3020.22)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1937	(3029.58)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1938	(2901.76)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1939	(2908.09) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179
1940	(2848.36) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1941	(2869.30) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1942	(2799.06) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1943	(2645.64) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1944	(2909.79) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1945	(2367.33) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1946	(2733.44) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1947	(3021.42) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1948	(3475.44) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1949	(3360.01) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1950	(3268.66) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1951	(3356.97) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1952	(3344.16) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1953	(3822.23) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1954	(3746.94) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1955	(4257.48) E	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1956	(5102.05)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1957	(5169.09)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1958	(4950.47)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1959	(4847.24)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1960	(5083.07)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1961	(4891.97)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1962	(4324.25)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1963	(4802.85)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1964	(5032.95)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1965	(4972.85)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1966	(4797.14)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1967	(4614.63)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1968	(4647.18)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1969	(4710.70)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1970	(5196.03)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1971	(4775.16)	-	-	-	-	-	-	21.20	11.46	17.34	60.71	37.15	64.45	11.83	9.04	10.59	14.80	14.59	40.31	-
1972	(4435.11)	-	-	-	-	-	-	21.22	12.14	41.32	165.36	74.08	137.60	20.59	20.15	26.70	19.58	26.24	82.78	-
1973	(4819.93)	-	-	-	-	-	-	-	-	11.30	138.99	63.58	108.68	11.13	10.75	7.68	10.29	11.40	65.42	0.82
1974	(4525.43)	-	-	-	-	-	-	0.00	9.59	19.26	47.97	63.56	114.14	13.13	14.04	0.00	13.32	16.65	70.92	0.00
1975	(4870.17)	-	-	-	-	-	-	0.00	27.56	8.76	32.49	44.48	62.92	14.37	14.80	0.00	16.92	24.42	69.11	2.65
1976	(4687.22)	-	-	-	-	-	-	0.00	56.60	9.34	17.96	66.88	107.76	10.38	10.66	0.00	14.25	21.19	56.64	0.00
1977	(4698.44)	-	-	-	-	-	-	0.00	117.00	8.29	25.12	63.99	77.67	0.00	0.00	0.00	0.00	0.00	16.90	0.00
1978	(4933.17)	-	-	-	-	-	-	0.00	81.04	8.85	23.95	33.88	101.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1979	(4605.00)	-	-	-	-	-	-	0.00	80.76	4.15	18.64	41.80	109.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1980	(4614.10)	-	-	68.57	-	-	49.03	0.00	83.19	0.00	27.59	52.20	191.63	-	-	-	-	-	0.00	0.00
1981	(4444.00)	-	-	60.76	-	-	47.27	0.00	64.89	0.00	15.50	36.31	170.40	-	-	-	-	-	0.00	0.00
1982	(3999.67)	-	-	48.26	-	-	-	0.00	61.22	-	40.37	41.93	218.13	-	-	-	-	-	-	0.00
1983	(4067.41)	-	-	2.76	-	-	-	0.00	90.77	-	46.85	48.11	309.25	-	-	-	-	-	-	78.64
1984	(3400.46)	-	-	43.32	-	-	-	0.00	83.53	-	24.31	33.11	245.79	-	-	-	-	-	-	126.21
1985	(3192.44)	35.08	-	1.73	-	-	-	0.00	112.44	-	26.23	20.95	242.23	-	-	-	-	-	-	114.49
1986	(3515.44)	29.19	-	35.00 E	0.06	0.07	-	0.00	122.92	-	31.56	20.10	205.57	-	-	-	-	-	-	49.98
1987	(3569.53)	27.96	-	35.00 E	0.05	0.06	-	0.00	143.10	-	30.68	20.40	308.63	0.00	0.00	0.00	0.00	0.00	0.00	46.84
1988	(3704.42)	143.10	-	35.00 E	0.05	0.06	-	0.00	147.22	-	22.66	27.82	339.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1989	(4034.555)	23.28	-	35.00 E	0.04	0.04	-	-	142.39	-	22.78	10.42	393.01	0.00	0.00	0.00	0.00	0.00	0.00	10.96
1990	(3806.48)	28.24	-	0.00	0.03	0.04	-	0.00	114.41	0.00	43.19	12.75	414.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
180	59	Parsippany-Troy Hills WD 8-1
181	60	Parsippany-Troy Hills WD 8-2
182	61	Parsippany-Troy Hills WD 8-3
183	62	Parsippany-Troy Hills WD 9
184	63	Parsippany-Troy Hills WD 10
185	64	Parsippany-Troy Hills WD 11
186	65	Parsippany-Troy Hills WD 12
187	66	Parsippany-Troy Hills WD 13
188	67	Parsippany-Troy Hills WD 14
189	68	Parsippany-Troy Hills WD 15
190	70	Parsippany-Troy Hills WD 17
191	71	Parsippany-Troy Hills WD 18
192		Parsippany-Troy Hills WD (well field summary)
193		Pequannock Twp Water Dept. (well field summary)
194	74	Pfizer Inc. 1
195	75	Pfizer Inc. 3
196		Pfizer Inc. 4
197		Pfizer Inc. 6
198		Pfizer Inc. (well field summary)
199	1	Pompton Lakes Boro MUA 1

WITHDRAWAL (million gallons/year)

YEAR	Index number																			
	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1911	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1924	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1926	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1930	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1933	-	-	-	-	-	-	-	-	-	-	-	-	33.00	-	-	-	-	-	-	-
1934	-	-	-	-	-	-	-	-	-	-	-	-	44.00	-	-	-	-	-	-	-
1935	-	-	-	-	-	-	-	-	-	-	-	-	55.25	-	-	-	-	-	-	-
1936	-	-	-	-	-	-	-	-	-	-	-	-	53.39	-	-	-	-	-	-	-
1937	-	-	-	-	-	-	-	-	-	-	-	-	50.75	-	-	-	-	-	-	-
1938	-	-	-	-	-	-	-	-	-	-	-	-	51.40	-	-	-	-	-	-	-
1939	-	-	-	-	-	-	-	-	-	-	-	-	48.45	-	-	-	-	-	-	-
													74.56							

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199
1940	-	-	-	-	-	-	-	-	-	-	-	-	80.03	-	-	-	-	-	-	-
1941	-	-	-	-	-	-	-	-	-	-	-	-	74.19	-	-	-	-	-	-	-
1942	-	-	-	-	-	-	-	-	-	-	-	-	67.32	-	-	-	-	-	-	-
1943	-	-	-	-	-	-	-	-	-	-	-	-	83.47	-	-	-	-	-	-	-
1944	-	-	-	-	-	-	-	-	-	-	-	-	90.13	-	-	-	-	-	-	-
1945	-	-	-	-	-	-	-	-	-	-	-	-	123.66	-	-	-	-	-	-	-
1946	-	-	-	-	-	-	-	-	-	-	-	-	120.96	-	-	-	-	-	-	-
1947	-	-	-	-	-	-	-	-	-	-	-	-	148.70	-	-	-	-	-	-	-
1948	-	-	-	-	-	-	-	-	-	-	-	-	162.18	-	-	-	-	-	-	-
1949	-	-	-	-	-	-	-	-	-	-	-	-	219.71	-	-	-	-	-	-	-
1950	-	-	-	-	-	-	-	-	-	-	-	-	201.98	-	-	-	-	-	-	-
1951	-	-	-	-	-	-	-	-	-	-	-	-	209.85	-	-	-	-	-	-	-
1952	-	-	-	-	-	-	-	-	-	-	-	-	240.05	-	-	-	-	-	-	-
1953	-	-	-	-	-	-	-	-	-	-	-	-	276.10	-	-	-	-	-	-	-
1954	-	-	-	-	-	-	-	-	-	-	-	-	281.42	-	-	-	-	-	-	-
1955	-	-	-	-	-	-	-	-	-	-	-	-	308.88	-	-	-	-	-	-	-
1956	-	-	-	-	-	-	-	-	-	-	-	-	312.82	193.89	-	-	-	-	-	-
1957	-	-	-	-	-	-	-	-	-	-	-	-	437.79	415.74 ?	-	-	-	-	-	-
1958	-	-	-	-	-	-	-	-	-	-	-	-	466.85	445.84 ?	-	-	-	-	-	-
1959	-	-	-	-	-	-	-	-	-	-	-	-	495.65	189.32	-	-	-	-	-	-
1960	-	-	-	-	-	-	-	-	-	-	-	-	527.56	178.44	-	-	-	-	-	-
1961	-	-	-	-	-	-	-	-	-	-	-	-	528.41	202.18	-	-	-	-	-	-
1962	-	-	-	-	-	-	-	-	-	-	-	-	573.09	220.27	-	-	-	-	-	-
1963	-	-	-	-	-	-	-	-	-	-	-	-	699.74	222.06	-	-	-	-	-	-
1964	-	-	-	-	-	-	-	-	-	-	-	-	835.25	290.78	-	-	-	-	-	-
1965	-	-	-	-	-	-	-	-	-	-	-	-	1019.10	295.09	-	-	-	-	-	-
1966	-	-	-	-	-	-	-	-	-	-	-	-	1192.74	340.54	-	-	-	-	-	-
1967	-	-	-	-	-	-	-	-	-	-	-	-	1262.05	302.11	-	-	-	-	-	-
1968	-	-	-	-	-	-	-	-	-	-	-	-	1384.16	364.99	-	-	-	-	-	-
1969	-	-	-	-	-	-	-	-	-	-	-	-	1472.53	249.65	-	-	-	-	-	-
1970	-	-	-	-	-	-	-	-	-	-	-	-	1583.88	285.53	-	-	-	-	-	-
1971	54.19	64.35	104.26	57.45	21.75	55.02	37.63	128.92	-	-	-	-	(837.03) ?	368.95	-	-	-	-	-	-
1972	74.77	107.19	210.54	118.16	29.49	84.38	80.93	250.26	46.97	-	-	-	(1650.42)	391.78	-	-	-	-	-	172.05
1973	80.21	185.98	244.56	132.89	46.36	61.52	105.47	200.09	162.64	50.84	-	-	(1710.57)	419.39	-	-	-	-	-	164.81
1974	102.92	176.07	276.67	137.72	53.33	48.23	120.56	199.04	152.25	80.18	-	-	(1729.53)	426.29	-	-	-	-	-	167.38
1975	105.29	193.25	278.58	191.40	41.54	48.26	50.50	219.52	80.62	50.28	-	-	(1577.71)	425.00	-	-	-	-	-	76.10
1976	91.10	197.68	282.97	287.62	42.95	44.57	38.94	223.13	80.55	41.81	-	-	(1702.97)	402.36	-	-	-	-	-	153.40
1977	61.10	151.62	236.59	161.35	33.27	23.57	26.29	170.33	119.33	26.93	-	-	(1319.34)	425.61	-	-	-	-	-	230.89
1978	84.64	137.23	232.15	208.19	37.23	43.18	49.51	149.16	147.18	39.14	-	-	(1376.65)	406.91	-	-	-	-	-	187.91
1979	111.98	180.44	309.29	223.02	51.21	60.17	83.71	213.80	201.57	48.76	34.24	-	(1772.60)	449.39	-	-	-	-	-	132.85
1980	110.20	175.07	302.16	167.25	55.67	38.36	47.11	219.32	213.01	50.64	102.99	45.24	(1881.61)	469.61	-	-	-	-	351.90	-
1981	106.38	173.33	302.52	141.42	47.53	33.20	34.17	203.19	130.30	40.77	100.90	107.58	(1708.39)	477.37	-	-	-	-	477.30	-
1982	110.52	182.71	321.71	111.46	52.71	25.29	38.33	179.00	161.07	56.86	147.81	113.50	(1862.61)	471.85	-	-	-	-	473.00	-
1983	99.68	152.00	318.55	98.66	56.44	24.01	50.76	159.65	197.35	59.01	133.23	157.07	(2080.01)	461.75	-	-	-	-	461.70	-
1984	101.84	169.52	306.98	93.08	61.33	24.60	27.43	194.66	242.13	58.51	122.38	128.39	(2043.79)	530.11	-	-	-	-	530.10	-
1985	103.92	201.71	325.32	72.71	57.85	3.15	21.85	184.11	261.61	50.99	109.33	116.93	(2025.81)	429.79 ?	-	-	-	-	459.80	-
1986	88.65	212.40	325.01	90.49	61.34	0.28	30.49	175.93	249.74	55.64	158.08	137.80	(2015.96)	553.20	-	-	-	-	333.00 E	-
1987	57.37	203.03	304.94	126.87	66.62	1.05	43.68	190.79	207.48	67.89	168.35	177.66	(2165.38)	575.62	-	-	-	-	206.26	132.97
1988	47.22	203.49	314.78	134.01	95.75	2.01	39.43	187.20	240.54	73.97	241.63	263.54	(2380.37)	543.86	-	-	-	-	209.46	148.30
1989	0.00	0.00	0.00	102.19	81.96	9.38	27.94	175.15	152.58	74.67	255.69	257.49	(1716.62)	543.69	2.98	102.88	41.59	113.28	(260.72)	141.42
1990	141.09	154.70	261.31	68.88	69.77	24.71	26.76	168.03	104.28	69.27	278.20	344.07	(2432.78)	555.65	14.71	51.50	12.30	113.27	(191.78)	136.56

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
200	2	Pompton Lakes Boro MUA 2
201	3	Pompton Lakes Boro MUA 3
202		Pompton Lakes Boro MUA (well field summary)
203		Preakness Hill Country Club (well field summary)
204	207	Precision Rolled Products 1
205	289	Reheis Chemical Co. 2
206	290	Reheis Chemical Co. 4
207	291	Reheis Chemical Co. 5
208		Reheis Chemical Co. (well field summary)
209	98	Resistoflex Corp. 1
210		Riverdale Boro Water Dept (well field summary)
211	119	Sandoz Inc. 1
212	120	Sandoz Inc. 2
213	121	Sandoz Inc. 3
214	122	Sandoz Inc. 4
215	123	Sandoz Inc. 5
216		Sandoz Inc. (well field summary)
217		Sisters of Charity, St. Eliz. (well field summary)
218	199	Schering-Plough, Inc.
219	176	Southeast Morris County MUA Turnbull

WITHDRAWAL (million gallons/year)

YEAR	Index number																			
	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1911	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1914	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1917	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1918	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1920	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1924	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1926	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1927	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1928	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1930	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1931	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1933	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1934	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-
1935	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1936	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1937	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1938	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1939	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219
1940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1941	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1942	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1943	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1944	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1945	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1946	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1947	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1948	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1949	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1951	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1952	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1953	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1954	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1955	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1956	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1957	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1958	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1959	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1960	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.00 E	-
1961	-	-	-	-	-	-	-	-	-	-	41.54	-	-	-	-	-	-	-	20.00 E	-
1962	-	-	-	-	47.00 E	-	-	-	-	-	57.38	-	-	-	-	-	-	-	20.00 E	-
1963	-	-	-	-	47.00 E	-	-	-	-	-	65.97	-	-	-	-	-	-	-	20.00 E	-
1964	-	-	-	-	47.00 E	-	-	-	-	-	67.69	-	-	-	-	-	-	-	20.00 E	-
1965	-	-	-	-	42.00 E	-	-	-	-	-	66.36	-	-	-	-	-	-	-	20.00 E	-
1966	-	-	-	-	42.00 E	-	-	-	-	-	66.25	-	-	-	-	-	-	-	20.00 E	-
1967	-	-	-	-	42.00 E	-	-	-	-	-	73.19	8.394 ?	0 ?	28.08 ?	-	-	78.47	-	-	-
1968	-	-	-	-	42.00 E	-	-	-	-	-	71.47	78.46	11.33	108.19	-	-	(197.97)	-	20.00 E	-
1969	-	-	-	-	42.00 E	-	-	-	-	-	63.64	63.65	63.78	72.08	37.30	23.75	(260.55)	-	20.00 E	-
1970	-	-	-	-	67.00 E	-	-	-	-	-	71.66	80.37	39.79	138.15	67.96	34.27	(360.55)	-	20.00 E	-
1971	-	-	318.60	-	67.00 E	-	-	-	-	-	75.19	17.89	28.28	97.23	137.55	77.41	(358.35)	-	20.00 E	14.53
1972	160.01	-	(332.06)	-	67.00 E	-	-	-	-	-	73.23	3.61	28.85	74.88	119.42	129.29	(356.05)	-	20.00 E	7.91
1973	153.87	-	(318.68)	-	67.00 E	-	-	-	-	-	69.64	0.00	8.09	111.90	111.10	161.80	(392.89)	-	20.00 E	10.23
1974	127.77	0.37	(295.15)	-	67.00 E	-	-	-	-	-	66.82	1.05	35.65	105.85	51.03	101.60	(295.18)	-	20.00 E	10.73
1975	58.76	90.92	(225.78)	-	61.00 E	-	-	-	-	-	63.11	0.83	21.25	59.60	36.70	81.43	(199.80)	-	20.00 E	49.28
1976	125.38	107.41	(278.78)	-	61.00 E	-	-	-	-	-	63.11	-	-	-	-	-	387.28	-	20.00 E	0.00
1977	168.14	9.64	(399.02)	-	61.00 E	-	-	-	-	-	71.50	-	-	-	-	-	358.94	-	20.00 E	0.29
1978	117.79	98.18	(305.69)	-	61.00 E	-	-	-	-	-	75.09	-	-	-	-	-	352.20	-	20.00 E	52.05
1979	83.17	180.23	(396.25)	-	61.00 E	-	-	-	-	-	74.92	-	-	-	-	-	337.45	-	20.00 E	89.99
1980	-	-	250.00 E	-	29.00 E	-	-	-	-	35.13	83.20	-	-	-	-	-	272.70	-	20.00 E	-
1981	-	-	280.00 E	-	29.00 E	-	-	-	-	34.78	70.00 E	-	-	-	-	-	148.50	-	20.00 E	-
1982	-	-	310.00 E	-	19.00 E	-	-	-	-	34.21	62.31	-	-	-	-	-	123.90	-	20.00 E	-
1983	-	-	340.00 E	5.13	2.18	-	-	-	-	29.33	62.69	-	-	-	-	-	152.30	0.00	23.23	-
1984	-	-	370.00 E	-	116.00	-	-	-	-	30.40	68.26	-	-	-	-	-	152.30	2.53	22.46	-
1985	-	-	400.00 E	16.34	116.00 E	-	-	-	-	27.98	63.25	-	-	-	-	-	142.40	1.57	20.98	
1986	-	-	430.00 E	10.79	100.00 E	-	-	-	-	28.20	65.53	-	-	-	-	-	140.40	1.72	21.79	7.45
1987	143.56	206.02	(482.56)	7.36	28.14	53.80	121.12	6.49	(181.42)	9.83	74.92	-	-	-	-	-	170.00	2.42	18.16	49.74
1988	132.92	223.06	(504.28)	20.04	18.08	63.83	93.87	57.91	(215.61)	0.00	79.62	-	-	-	-	-	172.00	3.71	19.13	34.77
1989	132.03	198.83	(472.27)	25.75	22.51	57.75	74.14	48.20	(180.09)	0.00	69.12	-	-	-	-	-	176.78	1.83	19.09	13.75
1990	139.23	170.30	(446.09)	31.43	18.60	68.85	63.68	69.61	(202.14)	0.00	79.01	-	-	72.09	72.37	53.16	(197.62)	2.32	22.73	35.70

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
220	174	Southeast Morris County MUA Overlook
221	175	Southeast Morris County MUA Lidgerwood 5
222	177	Southeast Morris County MUA Sand Springs well
223	106	Southeast Morris County MUA Wing
224	107	Southeast Morris County MUA Todd
225	191	Southeast Morris County MUA Normandy
226	112	Southeast Morris County MUA Black Brook 1
227	113	Southeast Morris County MUA Black Brook 2
228	167	Southeast Morris County MUA Shongum
229	100	Southeast Morris County MUA Littleton 1
230	101	Southeast Morris County MUA Littleton 2
231		Southeast Morris County MUA Littleton (well field summary)
232	179	Southeast Morris County MUA Moore Estates
233		Southeast Morris County MUA (well field summary)
234	150	St. Barnabas Medical Center 1
235	292	Stirling Water Co.
236		Surburban Propane (well field summary)
237	102	Warner Lambert Co. 3
238	103	Warner Lambert Co. 4
239	105	Warner Lambert Co. 6

WITHDRAWAL (million gallons/year)

YEAR	Index number																			
	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
1898	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1902	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1903	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1904	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1907	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1911	-	-	-	-	-	-	-	-	-	-	-	20.70	-	-	-	-	-	-	-	-
1912	-	-	-	-	-	-	-	-	-	-	-	19.81	-	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-	-	-	-	33.89	-	-	-	-	-	-	-	-
1914	-	-	-	-	-	-	-	-	-	-	-	42.20	-	-	-	-	-	-	-	-
1915	-	-	-	-	-	-	-	-	-	-	-	7.01	-	-	-	-	-	-	-	-
1916	-	-	-	-	-	-	-	-	-	-	-	34.38	-	-	-	-	-	-	-	-
1917	-	-	-	-	-	-	-	-	-	-	-	55.07	-	-	-	-	-	-	-	-
1918	-	-	-	-	-	-	-	-	-	-	-	57.29	-	-	-	-	-	-	-	-
1919	-	-	-	-	-	-	-	-	-	-	-	10.01	-	-	-	-	-	-	-	-
1920	-	-	-	-	-	-	-	-	-	-	-	18.00	-	-	-	-	-	-	-	-
1921	-	-	-	-	-	-	-	-	-	-	-	94.80	-	-	-	-	-	-	-	-
1922	-	-	-	-	-	-	-	-	-	-	-	102.93	-	-	-	-	-	-	-	-
1923	-	-	-	-	-	-	-	-	-	-	-	146.43	-	-	-	-	-	-	-	-
1924	-	-	5.48	-	-	-	-	-	-	-	-	125.36	-	-	-	-	-	-	-	-
1925	-	-	9.14	-	-	-	-	-	-	-	-	124.54	-	(133.68)	-	-	-	-	-	-
1926	-	-	157.68 ?	-	-	-	-	-	-	-	-	-	-	226.30	-	-	-	-	-	-
1927	-	-	-	-	-	-	-	-	-	-	-	-	-	393.90	-	4.79	-	-	-	-
1928	-	-	-	-	-	-	-	-	-	-	-	-	-	468.80	-	11.18	-	-	-	-
1929	-	-	-	-	-	-	-	-	-	-	-	-	-	428.90	-	-	-	-	-	-
1930	-	-	-	-	-	-	-	-	-	-	-	-	-	313.90	-	-	-	-	-	-
1931	-	-	-	-	-	-	-	-	-	-	-	-	-	449.70	-	-	-	-	-	-
1932	-	-	-	-	-	-	-	-	-	-	-	-	-	457.20	-	-	-	-	-	-
1933	-	-	-	-	-	-	-	-	-	-	-	-	-	79.00	-	-	-	-	-	-
1934	-	-	-	-	-	0.00	0.00	0.00	-	-	-	-	-	215.20	-	-	0.00	-	0.00	-
1935	-	-	-	-	-	-	-	-	-	-	-	-	-	153.80	-	-	-	-	-	-
1936	-	-	-	-	-	-	-	-	-	-	-	-	-	124.50	-	-	-	-	-	-
1937	-	-	-	-	-	-	-	-	-	-	-	-	-	123.40	-	-	-	-	-	-
1938	-	-	-	-	-	-	-	-	-	-	-	-	-	126.10	-	-	-	-	-	-
1939	-	-	-	-	-	-	-	-	-	-	-	-	-	149.00	-	-	-	-	-	-

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

YEAR	WITHDRAWAL (million gallons/year) Index number																			
	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
1940	-	-	-	-	-	-	-	-	-	-	-	-	-	169.10	-	-	-	-	-	-
1941	-	-	-	-	-	-	-	-	-	-	-	-	-	175.40	-	-	-	-	-	-
1942	-	-	-	-	-	-	-	-	-	-	-	-	-	315.90	-	-	-	-	-	-
1943	-	-	-	-	-	-	-	-	-	-	-	-	-	144.70	-	-	-	-	-	-
1944	-	-	28.61	-	-	21.50	-	-	-	-	-	195.77	-	(245.89)	-	-	-	-	-	-
1945	-	-	40.25	-	-	22.32	-	-	-	-	-	48.36	-	(110.92)	-	-	-	-	-	-
1946	-	-	42.92	-	-	23.39	-	-	-	-	-	44.31	-	(110.62)	-	-	-	-	-	-
1947	-	-	64.68	-	-	39.70	-	-	-	-	-	54.46	-	(158.84)	-	-	-	-	-	-
1948	-	-	67.35	-	-	45.64	-	-	-	-	-	49.04	-	(162.04)	-	-	-	-	-	-
1949	-	-	68.18	270.57	-	56.28	-	-	-	-	-	49.90	-	(444.92)	-	-	-	-	-	-
1950	-	-	53.89	435.37	-	41.96	-	-	-	-	-	69.37	-	(600.58)	-	-	-	-	-	-
1951	-	-	40.61	453.30	-	56.29	-	-	-	-	-	58.10	-	(608.30)	-	-	-	-	-	-
1952	-	-	88.68	460.94	-	80.75	-	-	-	-	-	61.05	-	(691.41)	-	-	-	-	-	-
1953	-	-	87.35	445.96	-	92.41	-	-	-	-	-	169.72	-	(795.43)	-	-	-	-	-	-
1954	-	-	63.11	293.77	-	67.16	-	-	-	-	-	171.60	-	(595.63)	-	-	-	-	-	-
1955	-	-	-	-	-	-	-	-	-	-	-	-	-	817.10	-	-	-	-	-	-
1956	-	-	-	-	-	-	-	-	-	-	-	-	-	800.80	-	-	-	-	-	-
1957	-	-	-	-	-	-	-	-	-	-	-	-	-	876.60	-	-	-	-	-	-
1958	-	-	-	-	-	-	-	-	-	-	-	-	-	870.50	-	-	-	-	-	-
1959	-	-	-	-	-	-	-	-	-	-	-	-	-	888.90	-	-	-	-	-	-
1960	-	-	-	-	-	-	-	-	-	-	-	-	-	1072.90	-	-	-	-	-	-
1961	-	-	-	-	-	-	-	-	-	-	-	-	-	569.80 ?	-	-	-	-	-	-
1962	-	-	-	-	-	-	-	-	-	-	-	-	-	1491.20	-	-	-	-	-	-
1963	-	-	-	-	-	-	-	-	-	-	-	-	-	1682.10	-	-	-	-	-	-
1964	-	-	287.25	818.73	355.52	96.68	-	-	-	-	-	203.53	-	(1761.70)	-	-	-	-	-	-
1965	-	-	-	-	-	-	-	-	-	-	-	-	-	1998.90	-	-	-	-	-	-
1966	-	-	-	-	-	-	-	-	-	-	-	-	-	1927.20	0.41	-	-	-	-	-
1967	-	-	-	-	-	-	-	-	-	-	-	-	-	1717.50	0.48	-	-	-	-	-
1968	-	-	-	-	-	-	-	-	-	-	-	-	-	1700.20	0.69	-	-	-	-	-
1969	-	-	-	-	-	-	-	-	-	-	-	-	-	1812.70	0.52	-	-	-	-	-
1970	-	-	-	-	-	-	-	-	-	-	-	-	-	2150.50	0.52	-	-	-	-	-
1971	6.01	27.73	227.07	951.85	267.10	12.69	407.24	140.67	4.62	-	-	218.97	-	(2278.47)	0.42	-	-	-	-	-
1972	2.30	11.99	159.90	856.51	291.97	-	270.61	276.73	49.43	-	-	203.60	-	(2130.93)	0.51	-	-	-	-	-
1973	2.95	14.16	78.12	651.01	202.80	27.02	306.90	265.25	27.97	-	-	158.08	-	(1744.49) ?	-	-	-	-	-	-
1974	2.14	24.71	149.43	840.14	295.41	0.00	242.05	356.49	64.84	-	-	123.73	-	(2109.67)	-	-	-	-	-	-
1975	24.83	88.54	130.22	585.77	288.30	27.43	328.46	398.89	71.92	-	-	108.42	-	(2102.04)	-	-	-	-	-	-
1976	0.00	27.78	121.83	802.86	327.26	0.00	496.07	126.75	85.70	-	-	134.82	-	(2123.07)	-	-	-	-	-	-
1977	0.00	15.21	150.01	986.16	273.81	11.43	281.30	496.44	88.90	-	-	287.33	-	(2590.87)	-	-	-	-	-	-
1978	52.61	92.11	215.41	769.02	338.28	0.00	321.96	377.48	88.80	-	-	277.57	-	(2585.30)	-	-	-	-	-	-
1979	104.00	180.02	292.10	820.88	325.47	21.97	336.88	347.64	83.91	-	-	226.10	-	(2828.96)	-	-	-	-	-	-
1980	-	-	-	-	-	-	285.2 ?	270.2 ?	-	-	-	-	-	2561.27	7.30	-	1.50	-	-	-
1981	-	-	-	-	225	0.00 ?	410.8 ?	503 ?	-	-	-	-	-	2436.93	8.60	-	5.00 E	-	-	-
1982	-	-	-	-	-	-	465.4 ?	484.6 ?	-	-	-	-	-	2616.02	8.04	-	5.00 E	-	-	-
1983	-	-	-	-	-	-	365.05 ?	422.7 ?	-	-	-	-	-	2710.06	8.26	-	4.80	-	-	-
1984	-	-	-	-	-	109 ?	264.7 ?	360.8 ?	-	-	-	-	-	2713.25	0.02	-	4.80	-	20.98	83.94
1985	-	-	-	-	-	39.1 ?	100	108	-	-	-	-	-	2983.95	0.02	-	4.80	-	47.83	109.33
1986	-	45.76	140.18	1073.02	312.69	150.32	338.21	404.01	14.64	56.88	29.52	-	-	(2573.17)	0.02	-	5.00 E	-	128.16	104.78
1987	-	36.77	120.09	885.31	345.46	81.60	364.41	363.56	6.45	61.54	30.09	-	-	(2345.01)	0.00	-	5.00 E	7.30	92.06	65.30
1988	-	36.77	118.29	883.93	341.57	102.30	380.30	367.75	0.48	59.96	34.02	-	-	(2360.13)	4.82	-	4.75	6.78	62.85	45.40
1989	-	80.81	160.70	903.83	342.34	15.72	295.65	282.57	0.31	-	-	97.31	-	(2193.00)	4.57	-	4.75	4.66	31.19	65.67
1990	-	46.00	187.75	862.95	424.22	20.21	304.75	324.29	0.49	-	-	137.48	-	(2406.04)	0.00	-	4.75	?	?	?

E: estimated; ?: questionable value; ( ): summed

Table 13. Withdrawal data for production wells and well fields (cont.)

Index #	Well #	Owner and local name or number
240		Warner Lambert Co. (well field summary)
241	10	Wayne Twp.Water Dept. 1
242	11	Wayne Twp Water Dept. 2
243	12	Wayne Twp Water Dept. 3
244	13	Wayne Twp Water Dept. 4
245	14	Wayne Twp Water Dept. 5
246	15	Wayne Twp Water Dept. 6
247		Wayne Twp Water Dept. (well field summary)

WITHDRAWAL (million gallons/year)

YEAR	Index number							
	240	241	242	243	244	245	246	247
1898	-	-	-	-	-	-	-	-
1899	-	-	-	-	-	-	-	-
1900	-	-	-	-	-	-	-	-
1901	-	-	-	-	-	-	-	-
1902	-	-	-	-	-	-	-	-
1903	-	-	-	-	-	-	-	-
1904	-	-	-	-	-	-	-	-
1905	-	-	-	-	-	-	-	-
1906	-	-	-	-	-	-	-	-
1907	-	-	-	-	-	-	-	-
1908	-	-	-	-	-	-	-	-
1909	-	-	-	-	-	-	-	-
1910	-	-	-	-	-	-	-	-
1911	-	-	-	-	-	-	-	-
1912	-	-	-	-	-	-	-	-
1913	-	-	-	-	-	-	-	-
1914	-	-	-	-	-	-	-	-
1915	-	-	-	-	-	-	-	-
1916	-	-	-	-	-	-	-	-
1917	-	-	-	-	-	-	-	-
1918	-	-	-	-	-	-	-	-
1919	-	-	-	-	-	-	-	-
1920	-	-	-	-	-	-	-	-
1921	-	-	-	-	-	-	-	-
1922	-	-	-	-	-	-	-	-
1923	-	-	-	-	-	-	-	-
1924	-	-	-	-	-	-	-	-
1925	-	-	-	-	-	-	-	-
1926	-	-	-	-	-	-	-	-
1927	-	-	-	-	-	-	-	-
1928	-	-	-	-	-	-	-	-
1929	-	-	-	-	-	-	-	-
1930	-	-	-	-	-	-	-	-
1931	-	-	-	-	-	-	-	-
1932	-	-	-	-	-	-	-	-
1933	-	-	-	-	-	-	-	-
1934	0.00	-	-	-	-	-	-	-
1935	-	-	-	-	-	-	-	-
1936	-	-	-	-	-	-	-	-
1937	-	-	-	-	-	-	-	-
1938	-	-	-	-	-	-	-	-
1939	-	-	-	-	-	-	-	-
1940	-	-	-	-	-	-	-	-
1941	-	-	-	-	-	-	-	-
1942	-	-	-	-	-	-	-	-
1943	-	-	-	-	-	-	-	-
1944	-	-	-	-	-	-	-	-

WITHDRAWAL (million gallons/year)

YEAR	Index number							
	240	241	242	243	244	245	246	247
1945	-	-	-	-	-	-	-	-
1946	-	-	-	-	-	-	-	-
1947	-	-	-	-	-	-	-	-
1948	-	-	-	-	-	-	-	-
1949	-	-	-	-	-	-	-	-
1950	-	-	-	-	-	-	-	-
1951	-	-	-	-	-	-	-	-
1952	-	-	-	-	-	-	-	-
1953	-	-	-	-	-	-	-	-
1954	-	-	-	-	-	-	-	-
1955	-	-	-	-	-	-	-	-
1956	-	-	-	-	-	-	-	-
1957	-	-	-	-	-	-	-	-
1958	-	-	-	-	-	-	-	-
1959	-	-	-	-	-	-	-	-
1960	-	-	-	-	-	-	-	-
1961	-	-	-	-	-	-	-	70.36
1962	-	-	-	-	-	-	-	81.50
1963	-	-	-	-	-	-	-	86.64
1964	-	-	-	-	-	-	-	70.81
1965	-	-	-	-	-	-	-	61.73
1966	-	7.49	16.31	11.85	25.03	0.23	-	(60.91)
1967	-	28.99	17.14	20.15	50.70	-	-	(116.98)
1968	-	-	28.84	20.04	44.41	-	-	(93.29)
1969	-	-	6.178 ?	-	9.916 ?	65.69 ?	65.69 ?	65.69 ?
1970	-	-	-	-	-	-	-	61.25 ?
1971	-	35.29	7.68	1.70	19.77	42.87	34.17	(141.48)
1972	-	51.14	18.89	31.66	40.18	29.57	37.10	(208.55)
1973	-	46.69	24.75	35.42	38.05	29.33	36.56	(210.80)
1974	-	52.81	14.01	30.11	26.62	39.21	34.24	(197.00)
1975	-	53.79	0.00	29.01	31.96	2.14	61.04	(177.94)
1976	-	46.21	9.01	22.59	33.90	31.49	23.90	(167.11)
1977	278.40	42.00	24.19	24.57	33.60	36.44	29.94	(190.74)
1978	169.52	38.66	11.12	22.21	29.89	34.66	34.78	(171.32)
1979	145.57	40.26	3.65	22.87	33.42	33.84	32.35	(166.39)
1980	149.51	-	-	-	-	-	-	170.00 E
1981	92.65	33.72	18.90	34.31	29.42	34.51	25.87	(176.74)
1982	59.00 E	36.36	13.83	35.39	16.51	27.27	17.86	(147.20)
1983	26.13	30.12	19.30	47.98	28.09	16.58	18.58	(160.66)
1984	(104.92)	29.96	12.76	29.41	37.33	35.13	13.98	(158.57)
1985	(157.16)	0.00	15.37	18.22	33.44	24.44	2.61	(94.07)
1986	(232.94)	16.96	10.08	19.58	33.23	14.86	13.17	(107.88)
1987	(164.66)	23.93	16.48	0.00	25.56	18.87	11.98	(96.81)
1988	(115.02)	27.71	10.99	10.77	25.00	28.75	25.48	(128.70)
1989	(101.52)	12.25	0.09	10.87	29.58	18.46	1.97	(73.22)
1990	72.00 E	37.88	7.54	4.05	16.99	0.56	14.89	(81.91)

E: estimated; ?: questionable value; ( ): summed

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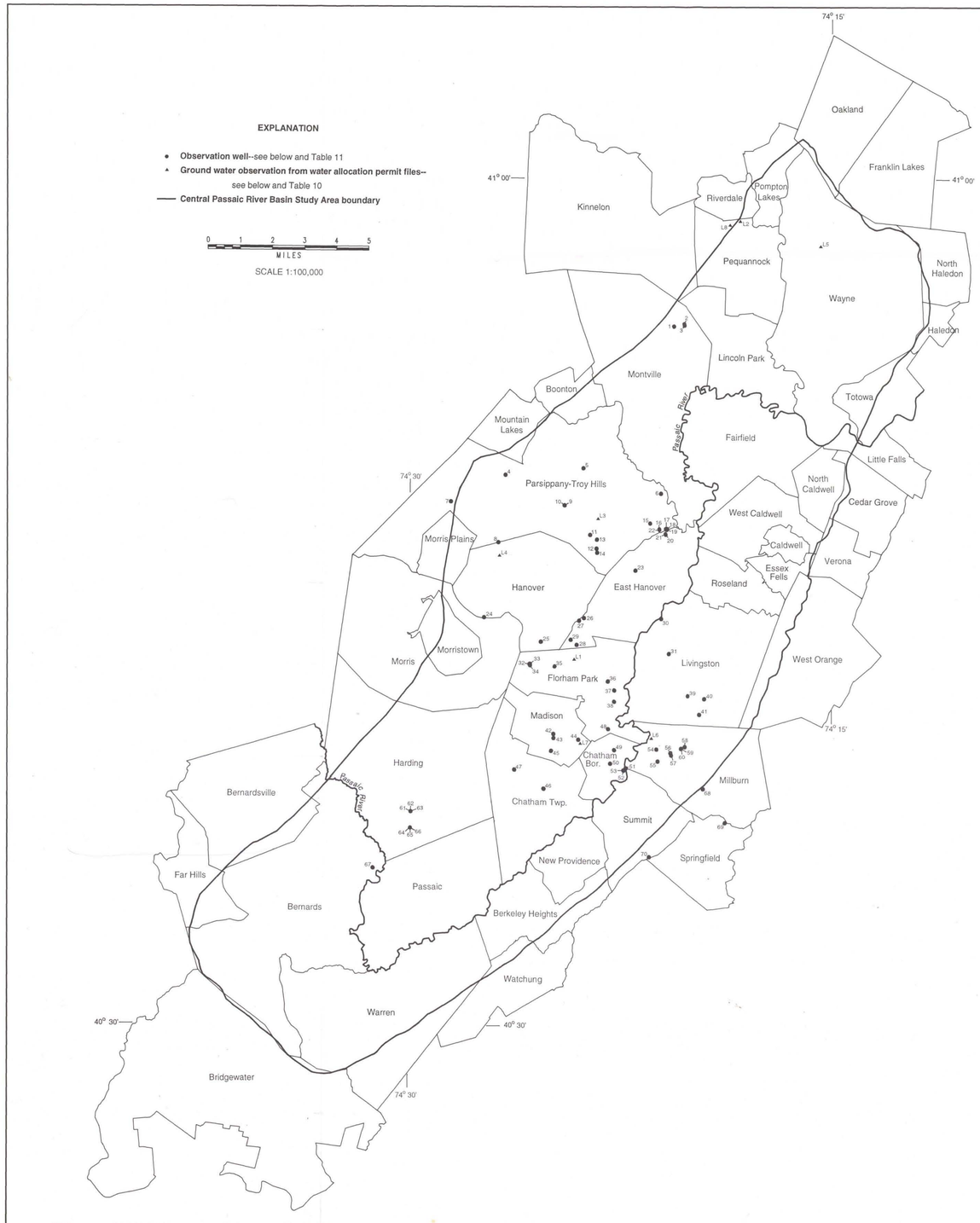

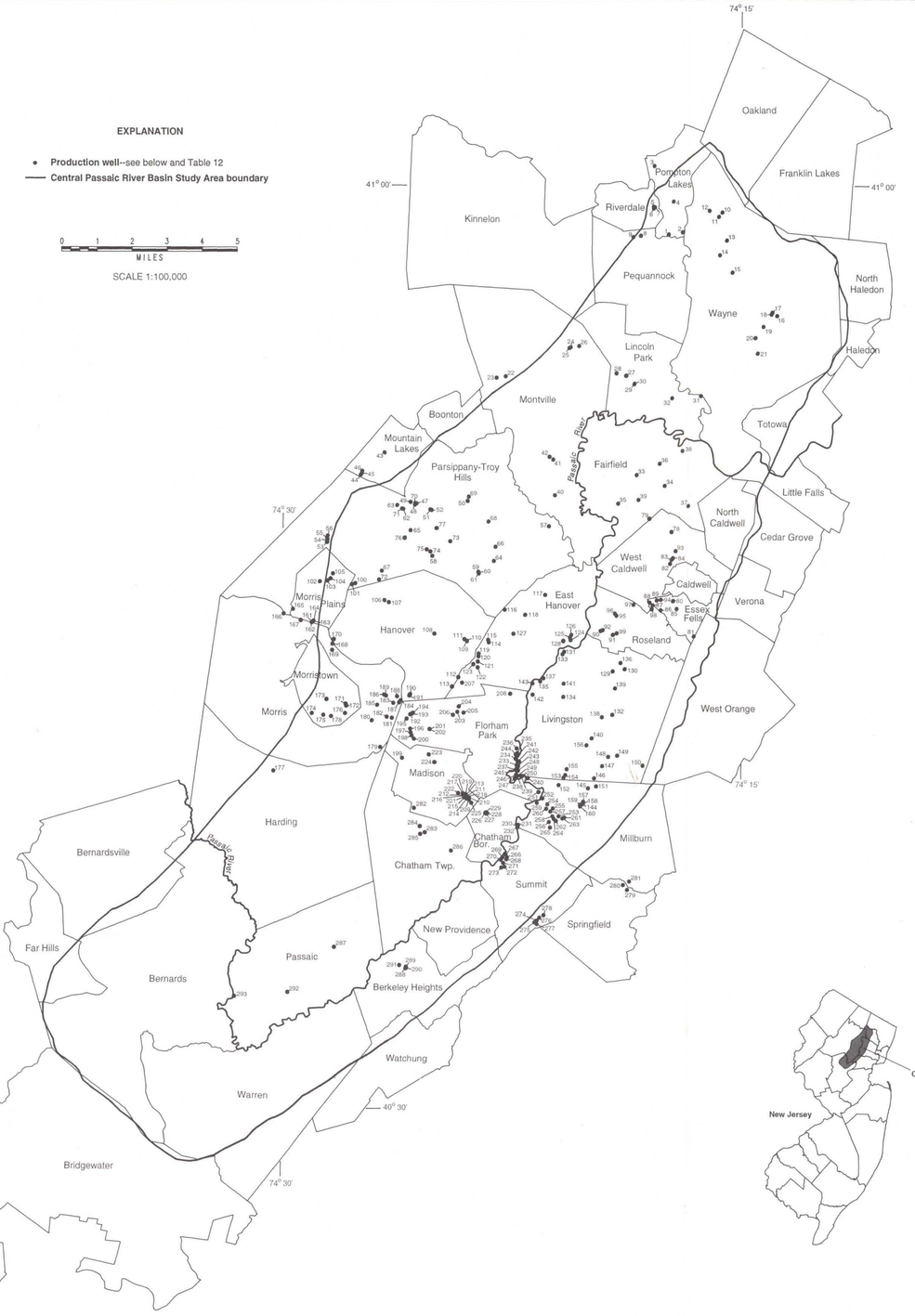

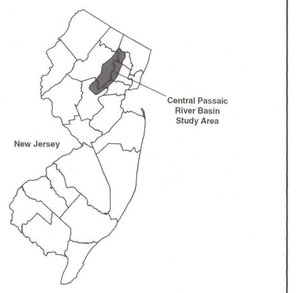

Well No.	Observation Well Name
1	Indian Lane test well west
2	Indian Lane test well north
3	Indian Lane test well south
4	International Pipe
5	PTH test 3
6	PTH test 4
7	PTH test 5
8	PTH test 19
9	PTH test 20 (Mazda Brook 6")
10	PTH production 20 (Mazda Brook 24")
11	PTH test 8
12	PTH new test 21 (Troy Meadows)
13	USGS Troy Meadows 1
14	USGS Troy Meadows 2
15	Sharkey's Landfill, WI-10
16	Sharkey's Landfill, WI-5
17	Sharkey's Landfill, WI-3
18	Sharkey's Landfill, WS-3
19	Sharkey's Landfill, WD-3
20	Sharkey's Landfill, WS-4
21	Sharkey's Landfill, WI-4
22	Sharkey's Landfill, WS-5
23	Green Acres
24	OEP test hole 16
25	Morristown Airport
26	Sandoz
27	Clemens
28	W.B. Driver 1
29	W.B. Driver 2
30	Livingston test 19
31	Livingston test 20/21
32	Sisters of Charity, St. Eliz., old 2
33	Sisters of Charity, St. Eliz., old 3
34	Linpro, shallow
35	Exxon
36	Briarwood School
37	Brooklake test well A
38	Braidburn Country Club
39	Slough Brook 6
40	Livingston test 18

Well No.	Observation Well Name
41	Meeker test well
42	Kings Road observation well, Madison
43	Madison Public Library
44	Madison Borough WD 4
45	GS-TM1, USGS (Niles Park)
46	GS-TH4, USGS (Env. Center)
47	GS-TH5, USGS (Green Village)
48	Greenhouse
49	Milton Ave. School, Chatham
50	Chatham Recreation Field
51	Passaic River 50
52	Sheppard Kollock Park deep (6")
53	Sheppard Kollock Park shallow (4")
54	Canoe Brook 30
55	Canoe Brook 17
56	Neutral Zone
57	Millburn Compost Facility
58	Middle Canoe Brook
59	White Oak Ridge, shallow (1st)
60	White Oak Ridge, deep (2nd)
61	G1-B1, Great Swamp
62	G1-B1a, Great Swamp
63	G1-B1b, Great Swamp
64	G2-B2, Great Swamp
65	G2-B2a, Great Swamp
66	G2-B2b, Great Swamp
67	GS TH 6 (Lord Stirling observation well)
68	Christ Church, Millburn
69	Short Hills observation well
70	Baltusrol observation well

Ground Water Observations from Water Allocation Permit Files	
Location No.	Permittee
L1	Florham Park Water Dept.
L2	Pompton Lakes Boro Water Dept.
L3	Parsippany-Troy Hills Water Dept.
L4	R.B. MacEwan & Son
L5	Lions Head Lake
L6	New Jersey American Water Co. (Commonwealth Water Co.)
L7	Madison Water Dept.
L8	Pequannock Water Dept.

Well No.	Production Well Name
1	Pompton Lakes Boro MUA 1
2	Pompton Lakes Boro MUA 2
3	Pompton Lakes Boro MUA 3
4	Pompton Lakes old well field
5	Riverdale Boro Water Dept 1
6	Riverdale Boro Water Dept 2
7	Riverdale Boro Water Dept 3
8	Pequannock Township Water Dept Prod 1 (T4)
9	Pequannock Township Water Dept Prod 2 (T3)
10	Wayne Twp Water Dept. 1
11	Wayne Twp Water Dept. 2
12	Wayne Twp Water Dept. 3
13	Wayne Twp Water Dept. 4
14	Wayne Twp Water Dept. 5
15	Wayne Twp Water Dept. 6
16	Preakness Hill Country Club 1
17	Preakness Hill Country Club 2
18	Preakness Hill Country Club 3
19	Preakness Hill Country Club 4
20	Wayne Twp Water Dept. "B"
21	Wayne Twp Water Dept. "C"
22	Montville Township MUA 7 (Dianne Dr.)
23	Montville Township MUA 8 (MacLeary Rd.)
24	Montville Township MUA 9 (Indian Lane 1)
25	Montville Township MUA 10 (Indian Lane 2)
26	Montville Township MUA 11 (Indian Lane 3)
*27	Lincoln Park Water Dept 1 old (Mtn. View WC)
28	Lincoln Park Water Dept 2 old
29	Charles Evens Development Co. 2
*30	Lincoln Park Water Dept Wennoah
*31	Lincoln Park Water Dept Aqueduct Park
32	Lincoln Park Water Dept
33	Fairfield Borough1 (Oak St.)
34	Fairfield Borough 2
35	Fairfield Borough 4
36	Fairfield Borough 6
37	Fairfield Borough 7
38	Fairfield Borough 8
39	Fairfield Borough 9
40	Montville Township MUA 2 (Walnut)

Well No.	Production Well Name
41	Montville Township MUA 4 (Lee Ct.)
42	Montville Township MUA 5 (Westminster)
43	Mountain Lakes Water Dept Tower Hill 4
44	Mountain Lakes Water Dept 5
45	Mountain Lakes Water Dept 3
46	Mountain Lakes Water Dept 4
*47	Parsippany-Troy Hills WD 1
48	Parsippany-Troy Hills WD 1A
*49	Parsippany-Troy Hills WD 2
50	Parsippany-Troy Hills WD 3
51	Parsippany-Troy Hills WD 4
52	Parsippany-Troy Hills WD 4A
53	Parsippany-Troy Hills WD 5-1
54	Parsippany-Troy Hills WD 5-2
55	Parsippany-Troy Hills WD 5-3
56	Parsippany-Troy Hills WD 5-4
57	Parsippany-Troy Hills WD 6
58	Parsippany-Troy Hills WD 7
*59	Parsippany-Troy Hills WD 8-1
60	Parsippany-Troy Hills WD 8-2
61	Parsippany-Troy Hills WD 8-3
62	Parsippany-Troy Hills WD 9
63	Parsippany-Troy Hills WD 10
64	Parsippany-Troy Hills WD 11
65	Parsippany-Troy Hills WD 12
66	Parsippany-Troy Hills WD 13
67	Parsippany-Troy Hills WD 14
68	Parsippany-Troy Hills WD 15
69	Parsippany-Troy Hills WD 16
70	Parsippany-Troy Hills WD 17
71	Parsippany-Troy Hills WD 18
72	Parsippany-Troy Hills WD 19
73	Parsippany-Troy Hills WD 20
74	Pfizer Inc. 1
75	Pfizer Inc. 3
76	Lake Parsippany Prop. Assoc. main
77	Boonton Electronics 5
78	Mountain Ridge Country Club 1 (main well ?)
79	Mountain Ridge Country Club 2 (swamp well ?)
80	Essex Fells Township 1A

Well No.	Production Well Name
81	Essex Fells Township 2
82	Essex Fells Township 4A
83	Essex Fells Township 4B
84	Essex Fells Township 4C
85	Essex Fells Township 5
86	Essex Fells Township 6
87	Essex Fells Township 7
*88	Essex Fells Township 8
89	Essex Fells Township 9
90	Essex Fells Township 10
91	Essex Fells Township 11
92	Essex Fells Township 12
93	Essex Fells Township 13
94	Essex Fells Township 14
95	Essex Fells Township 15
96	Essex Fells Township 16
97	Essex Fells Township 17
98	Resistoflex Corp. 1
99	M. Polaner, Inc.
*100	Southeast Morris County MUA Littleton 1
101	Southeast Morris County MUA Littleton 2
102	Warner Lambert Co. 3
103	Warner Lambert Co. 4
104	Warner Lambert Co. 5
105	Warner Lambert Co. 6
*106	Southeast Morris County MUA Wing
*107	Southeast Morris County MUA Todd
108	AT&T Laboratories
109	Suburban Propane 1
110	Suburban Propane 2
111	Suburban Propane 3
*112	Southeast Morris County MUA Black Brook 1
113	Southeast Morris County MUA Black Brook 2
114	East Hanover Township 1
115	East Hanover Township 2
116	East Hanover Township 3
117	East Hanover Township 5
118	East Hanover Township 6
119	Sandoz Inc. 1
120	Sandoz Inc. 2

Well No.	Production Well Name
121	Sandoz Inc. 3
122	Sandoz Inc. 4
123	Sandoz Inc. 5
124	Givaudan Corp. 1
125	Givaudan Corp. 2
126	Givaudan Corp. 3
127	Gates of Heaven
128	Hanover Greens
*129	Livingston Township 1
130	Livingston Township 2
*131	Livingston Township 3
132	Livingston Township 4
133	Livingston Township 5
134	Livingston Township 6 ?
135	Livingston Township 7
136	Livingston Township 8
137	Livingston Township 9
138	Livingston Township 10
139	Livingston Township 11
*140	Livingston Township 12
141	Ameraze 1
142	Cedar Hill Country Club 1
143	Cedar Hill Country Club 2
144	East Orange - Canoe Brook 1-1956
145	East Orange - Canoe Brook 2-1956
146	East Orange - Canoe Brook 3-1956
147	East Orange - Canoe Brook 4-1956
148	East Orange - Canoe Brook 5-1978
149	East Orange - Canoe Brook 6-1978
150	St. Barnabas Medical Center 1
151	Mountainside Water Co.
152	East Orange - Slough Brook 1-1928
153	East Orange - Slough Brook 2-1928
154	East Orange - Slough Brook 3-1928
155	East Orange - Slough Brook 4-1979
156	East Orange - Slough Brook 6
*157	East Orange - Canoe Brook oldest
158	East Orange - Canoe Brook North - ca. 1928
159	East Orange - Canoe Brook Middle - ca. 1928
160	East Orange - Canoe Brook South - ca. 1928

Well No.	Production Well Name
161	Greystone Park Psy. Hosp. 1
162	Greystone Park Psy. Hosp. 2
163	Greystone Park Psy. Hosp. 3
164	Greystone Park Psy. Hosp. 4 (Davy well?)
165	Greystone Park Psy. Hosp. 5 (2-67)
166	Greystone Park Psy. Hosp. 6 (1-67)
167	Southeast Morris County MUA Shongum
168	Mennen Company 1
169	Mennen Company 2
170	Airtron 3
171	Morristown Memorial Hospital Franklin (no.1)
172	Morristown Memorial Hospital Madison (no.2)
173	Carteret S&L
*174	Southeast Morris County MUA Overlook
175	Southeast Morris County MUA Lidgewood 5
*176	Southeast Morris County MUA Turnbull
*177	Southeast Morris County MUA Sand Springs well
178	Chemical Bank
179	Southeast Morris County MUA Moore Estates
180	Jersey Central P&L, Morristown
181	Morris Co. Golf Club 1
182	Morris Co. Golf Club 2
183	Allied Corporation 1
184	Allied Corporation 2
185	Allied Corporation 4
186	Allied Corporation 5
187	Allied Corporation 10
188	Allied Corporation 11
189	Allied Corporation 14
190	Normandy & Whippany Water Co.
*191	Southeast Morris County MUA Normandy
192	Sisters of Charity, St. Eliz. old 1
193	Sisters of Charity, St. Eliz. old 2
194	Sisters of Charity, St. Eliz. old 3
195	Sisters of Charity, St. Eliz. main well
196	Fairleigh Dickinson Univ. 1
197	Fairleigh Dickinson Univ. 2
198	Fairleigh Dickinson Univ. 3
199	Schering-Plough, Inc.
200	Exxon Research & Engineering 1

Well No.	Production Well Name
201	Exxon Research & Engineering 2
202	Exxon Research & Engineering 3
203	Florham Park Borough 1-1962
204	Florham Park Borough 2
205	Florham Park Borough 3
206	Florham Park Borough 4
207	Precision Rolled Products 1
208	Automatic Switch
209	Madison Borough Water Dept. old 1
210	Madison Borough Water Dept. old 2
211	Madison Borough Water Dept. old 3
212	Madison Borough Water Dept. old 4
213	Madison Borough Water Dept. old 5
214	Madison Borough Water Dept. old 6
215	Madison Borough Water Dept. old 7
216	Madison Borough Water Dept. old 8
217	Madison Borough Water Dept. old 9
218	Madison Borough Water Dept. old 10
219	Madison Borough Water Dept. old 11
220	Madison Borough Water Dept. old 12
221	Madison Borough Water Dept. A
222	Madison Borough Water Dept. B
223	Madison Borough Water Dept. C
224	Madison Borough Water Dept. D
225	Madison Borough Water Dept. E
226	Chatham Borough old well field sum
*227	Chatham Borough 1
*228	Chatham Borough 2
*229	Chatham Borough 3
230	NJ-American - Passaic River 50
231	NJ-American - Passaic River 51
232	NJ-American - Passaic River 52
233	East Orange - Braidburn 1-1956
234	East Orange - Braidburn 2-1956
235	East Orange - Braidburn 3-1956
236	East Orange - Braidburn 4-1976
237	East Orange - Dickinson 1-1956
238	East Orange - Dickinson 2-1956
239	East Orange - Dickinson 3-1956
240	East Orange - Dickinson 4-1986

Well No.	Production Well Name
*241	East Orange - Braidburn North - 1930
*242	East Orange - Braidburn Middle - 1930
*243	East Orange - Braidburn South - 1930
244	East Orange - Braidburn 3 - 1990
245	East Orange - Dickinson North - 1923
*246	East Orange - Dickinson Middle - 1923
247	East Orange - Dickinson South - 1923
248	East Orange - Dickinson 1 - 1990
249	East Orange - Dickinson 2 - 1990
250	East Orange - Dickinson 3 - 1990
251	Orange Products, Inc. 1-old
252	NJ-American - Canoe Brook K-1
253	NJ-American - Canoe Brook K-2
*254	NJ-American - Canoe Brook K-4
*255	NJ-American - Canoe Brook K-5
256	NJ-American - Canoe Brook K-6
257	NJ-American - Canoe Brook (Layne D)
258	NJ-American - Canoe Brook (Layne E)
259	NJ-American - Canoe Brook Continental 1
260	NJ-American - Canoe Brook 38
261	NJ-American - Canoe Brook 44
262	NJ-American - Canoe Brook 46
263	NJ-American - Canoe Brook 47
264	NJ-American - Canoe Brook 48
265	Canoe Brook Country Club 1
266	Ciba-Geigy Corp., Pharm. Div. 3
267	Ciba-Geigy Corp., Pharm. Div. 4
268	Ciba-Geigy Corp., Pharm. Div. 5
269	Ciba-Geigy Corp., Pharm. Div. 6
270	Ciba-Geigy Corp., Pharm. Div. 7
271	Ciba-Geigy Corp., Pharm. Div. 8
272	Ciba-Geigy Corp., Pharm. Div. 10
273	Ciba-Geigy Corp., Pharm. Div. 12
274	NJ-American - Baltusrol 12
275	NJ-American - Baltusrol 14
276	NJ-American - Baltusrol 15
277	NJ-American - Baltusrol 17
278	NJ-American - Baltusrol 18
279	NJ-American - Short Hills Kelly A
280	NJ-American - Short Hills Kelly B
281	NJ-American - Short Hills Kelly C
282	Madison Golf Club 1
283	Fairmount Country Club 1
284	Fairmount Country Club 2
285	Noe Pierson Corp. 1
286	Colony Pool, Chatham Twp.
287	Passaic Township Alex Vernon Rd.
288	Reheis Chemical Co. 1
289	Reheis Chemical Co. 2
290	Reheis Chemical Co. 4
291	Reheis Chemical Co. 5
292	Stirling Water Co.
293	Millington Water Co.

* additional data on Table 11
? identity of well uncertain

PLATE 1: Observation wells and ground water observation locations (left) and production wells (right) in the study area.

Cartography by Z. Allen-Lafayette

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