HYDROLOGIC APPRAISAL OF THE WATER RESOURCES OF THE HOMER-PREBLE VALLEY, NEW YORK

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations 78-94
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1978

UNITED STATES DEPARTMENT OF THE INTERIOR

CECIL D. ANDRUS, Secretary

GEOLOGICAL SURVEY

H. William Menard, Director

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Albany, New York 12201

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FACTORS FOR CONVERTING U.S. CUSTOMARY UNITS TO

INTERNATIONAL SYSTEM (SI) UNITS

Multiply U.S. Customary	By	To obtain SI units
	Length	
inch (in)	25.4	millimeter (mm)
feet (ft)	.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
square mile (mi^2)	2.590	square kilometer (km^2)
	Flow	
cubic feet per second (ft^3/s)	.02832	cubic meters per second (m^3/s)
gallons per minute (gal/min)	.06309	liters per second (L/s)
million gallons per day (Mgal/d)	43.81	liters per second (L/s)
gallons per day per foot [(gal/d)/ft]	.00014	liters per second per meter [(L/s)/m]
	Hydraulic Units	
feet squared per day (ft^2/d)	.0929	meters squared per day (m^2/d)
feet per day (ft/d)	.3048	meters per day (m/d)
feet per mile (ft/mi)	.1894	meters per kilometer (m/km)
	Volume	
cubic feet (ft^3)	.02832	cubic meter (m^3)

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ABSTRACT

Water resources of Homer-Preble valley, 1 to 2 miles wide and 9 miles long, in central New York, were appraised because the area is expected to undergo considerable residential development in the near future. The main source of water supply to the residents of the area is the glacial-outwash aquifer. Data indicate that additional pumpage of 5 million to 10 million gallons per day from the aquifer would not seriously reduce the quantity and quality of the water supply. Water-quality analyses indicate that ground water and surface water in the valley are suitable for most uses and generally meet State standards for source waters for drinking.

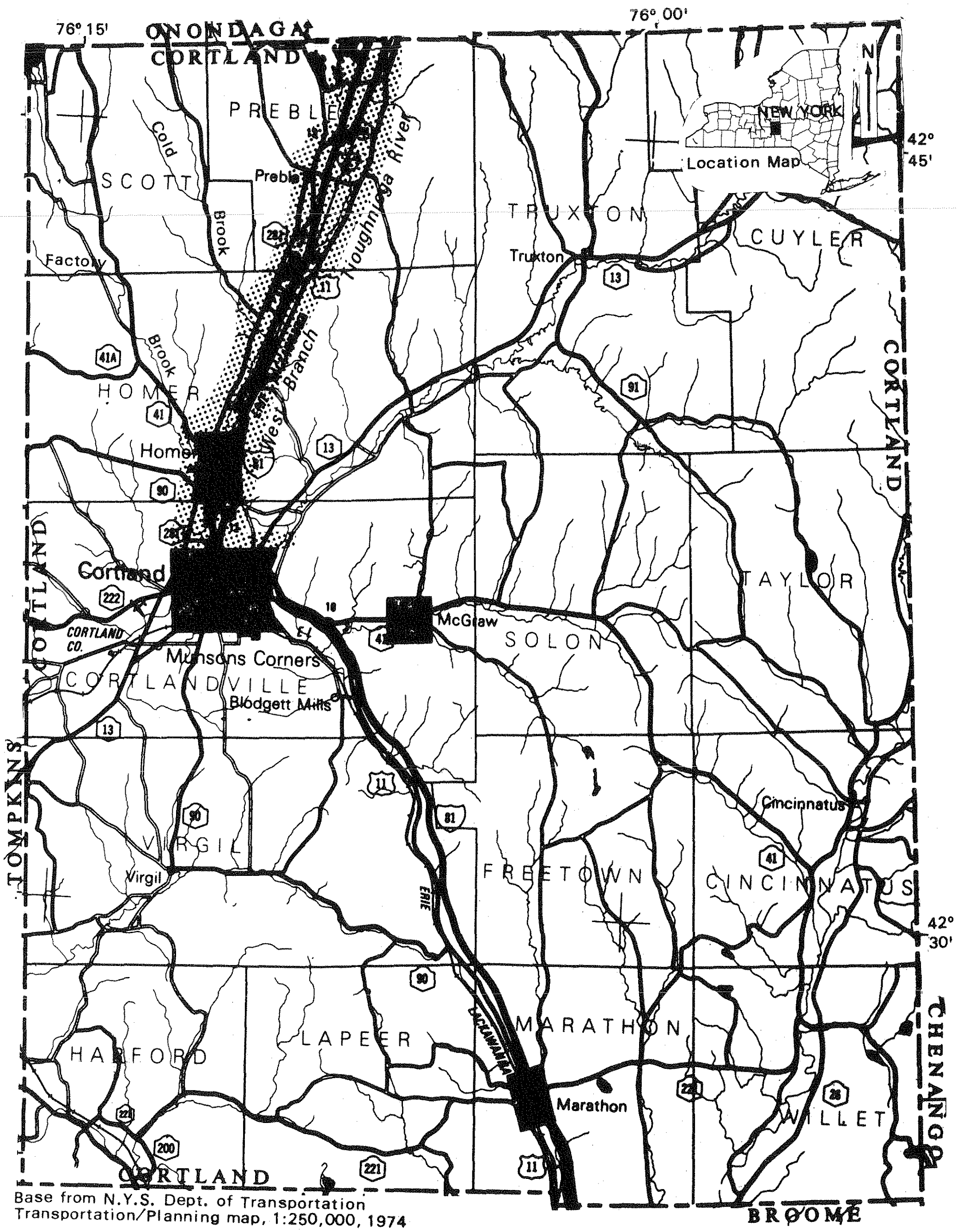

Figure 1.--Location and major geographic features of Homer-Preble valley, Cortland County, New York.

INTRODUCTION

The Homer-Preble valley, in Cortland County, N.Y., is a rural agricultural area that is expected to experience a considerable population increase in the near future. Cortland County planners are concerned that overdevelopment or unwise land use may lower water levels or contaminate water supplies.

Although surface water is abundant in Homer-Preble valley, most of the water supply is obtained from shallow wells throughout the valley. The daily water demand in 1970 by the villages of Homer and Preble averaged 0.800 Mgal/d and 0.005 Mgal/d, respectively (Stearns and Wheler, 1970). The present (1977) average water demand in the Homer-Preble valley is estimated from population projections to be between 1.0 Mgal/d and 1.5 Mgal/d (Stearns and Wheler, 1970).

This study was done in cooperation with the Cortland County Health Department as part of the Areawide Waste-Treatment Management Plan, Section 208, of the Federal Water Quality Pollution Act. It complements two other more detailed studies of the adjacent Otter-Creek Dry Creek basin (Buller, Nichols, and Harsh, 1978; Cosner and Harsh, 1978).

Location and Description of Study Area

The Homer-Preble valley, immediately north of the city of Cortland and extending from Homer to Preble (fig. 1), is 9 mi long and 1 to 2 mi wide. The valley contains several new housing developments. The West Branch Tioughnioga River flows southward through several lakes and marshes in the valley; Factory Brook and Cold Brook are its major tributaries (fig. 1). The land is mainly agricultural, and much is used for dairy farming.

Previous Investigations

Several published studies of the water resources and geology of the central New York region include information on the valley (Asselstine, 1946; Hollyday, 1969; Weist and Giese, 1969; and MacNish, Randall, and Ku, 1969). The valley is included in a water-supply study of Cortland County by Stearns and Wheler (1970). Hydrologic characteristics of the area are described in Harsh and Lamonica (1974); the observation wells installed during that investigation were used also in the present study. Hydrologic data on the valley are presented in Shindel, Buller, and Johnston (1977).

Purpose and Scope

The water resources were investigated to provide hydrologic and water-quality data for use in developing land-management programs. Specific objectives of the study were to:

1. Define the water resources within the valley and determine their ability to meet additional demands;

2. Determine present water-quality conditions and sources of contamination;

3. Provide a data base against which future water-quality data may be compared.

Data were collected from May 1976 to September 1977. Ground-water and surface-water samples were collected to evaluate the quality of water, and water levels in wells were measured periodically to help define the ground-water hydrology. The stream-gaging station West Branch Tioughnioga River at Homer was the main source of surface-water data. A well inventory was made to identify pumping centers and to locate wells that could be used for water-level measurement and sampling. Three new observation wells were installed to provide additional data-collection sites; two were drilled to bedrock to help delineate the extent of the aquifer. Locations of wells and gaging stations are shown in figure 2; well information is given in table 1.

HYDROGEOLOGY AND WATER AVAILABILITY

The Cortland area has undergone continental glaciation, and the land surface bears the marks of glacial sculpturing and deposition. Most of the valley floors are filled with stratified proglacial deposits composed of (1) highly permeable outwash sand and gravel deposited by glacial melt water, and (2) relatively impermeable lacustrine silt and clay deposited by glacial lakes. The upland areas and valley sides are generally covered with till, which in this basin is an unstratified mixture of dense clay and boulders. The till deposits were formed from lodgment or ablation of sediments from glaciers as the ice advanced or receded.

Bedrock in the Cortland area consists of nearly flat-lying shale and sandstone. The Homer-Preble valley occupies a preglacial bedrock valley that was extensively eroded and then partly filled with glacial deposits (fig. 2). The logs of the wells drilled to bedrock (wells CT 17 and CT 19, table 2) indicate that glacial deposits are at least 200 ft thick in the central part of the valley. Figures 3 and 4 are geologic sections that show the relations of the glacial deposits along and across the valley; locations of these sections (A-A' and B-B') are shown in figure 2.

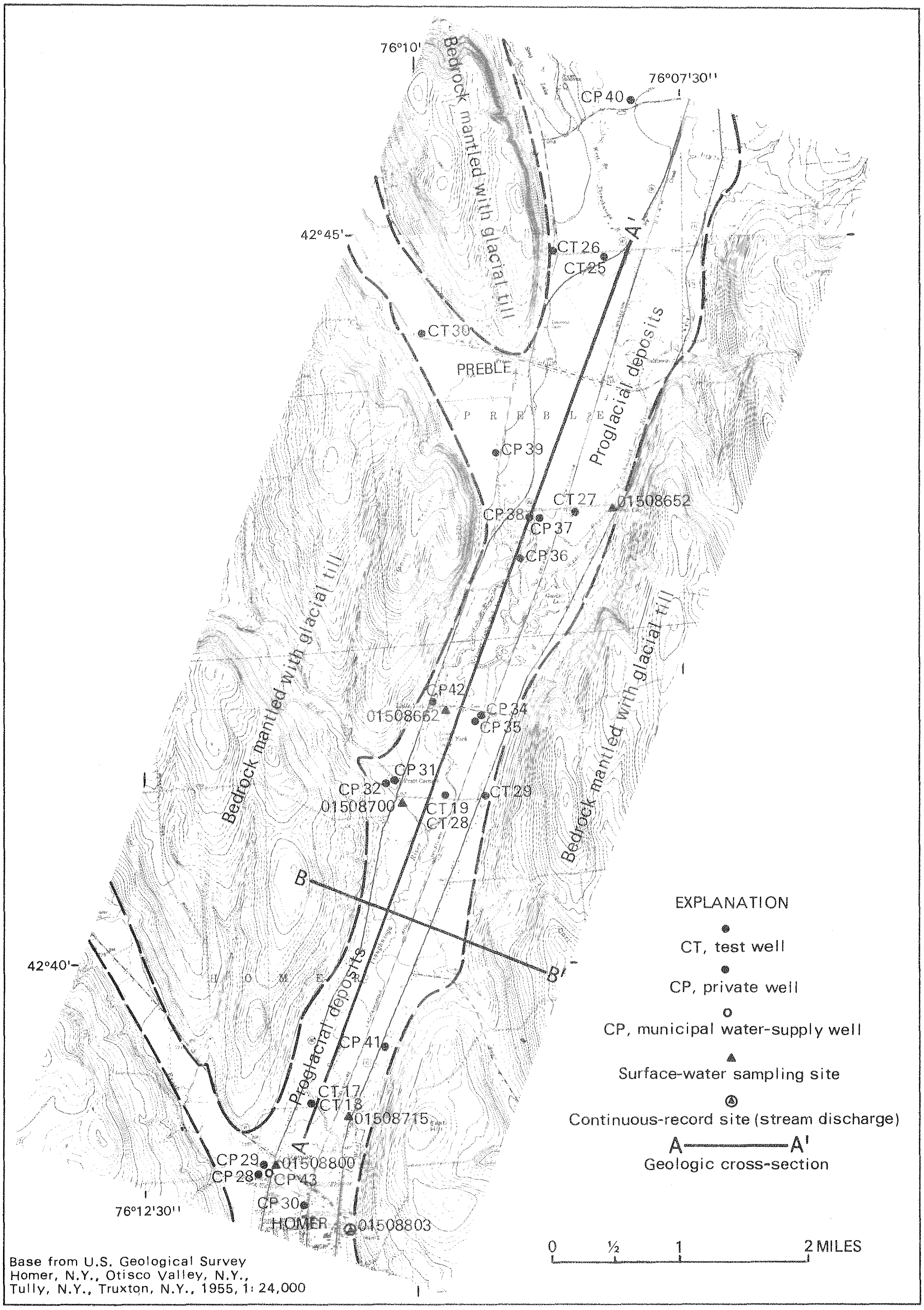

Figure 2.--Data-collection sites and geology of Homer-Preble valley.

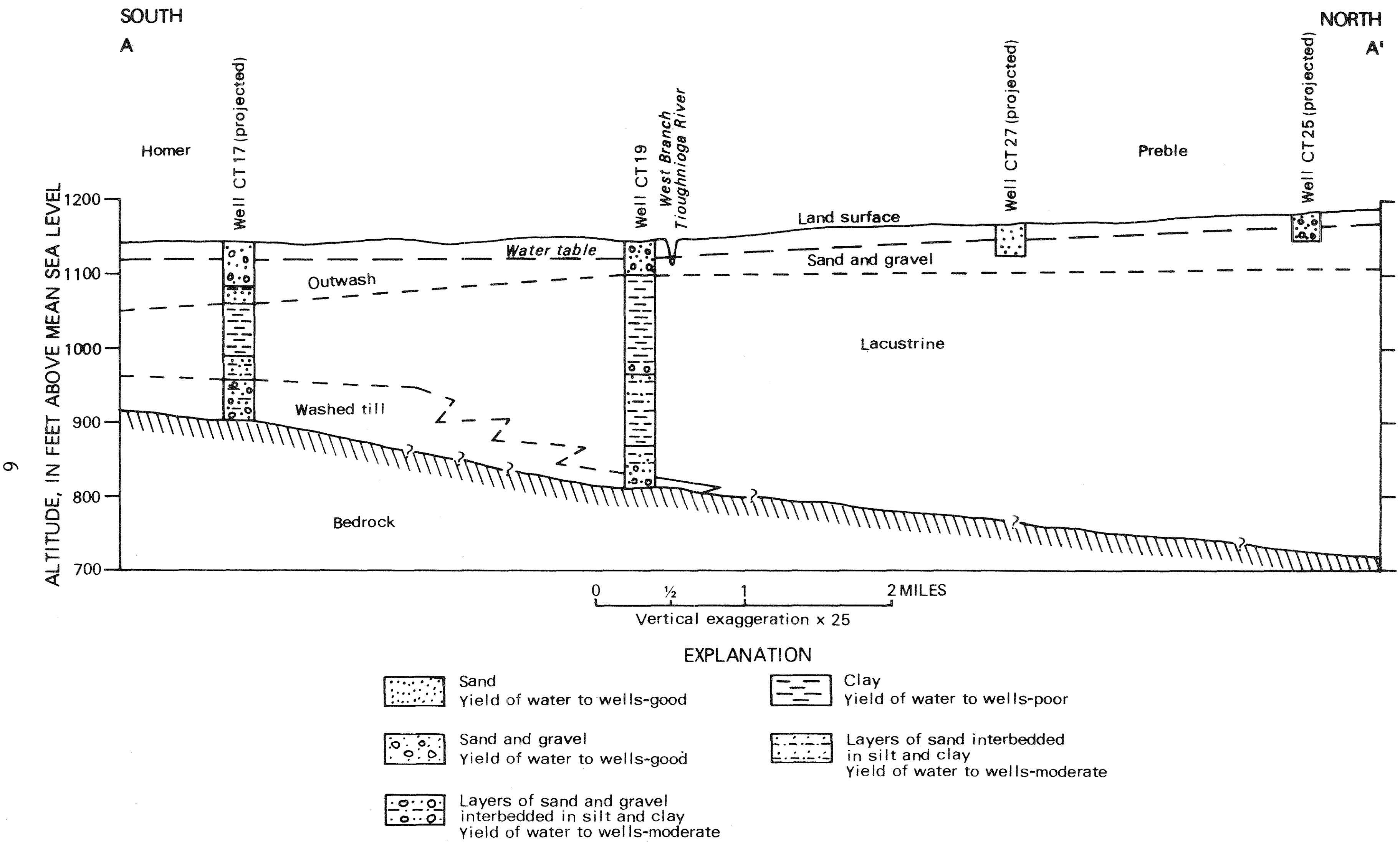

Figure 3.--Geologic section along length of Homer-Preble valley.

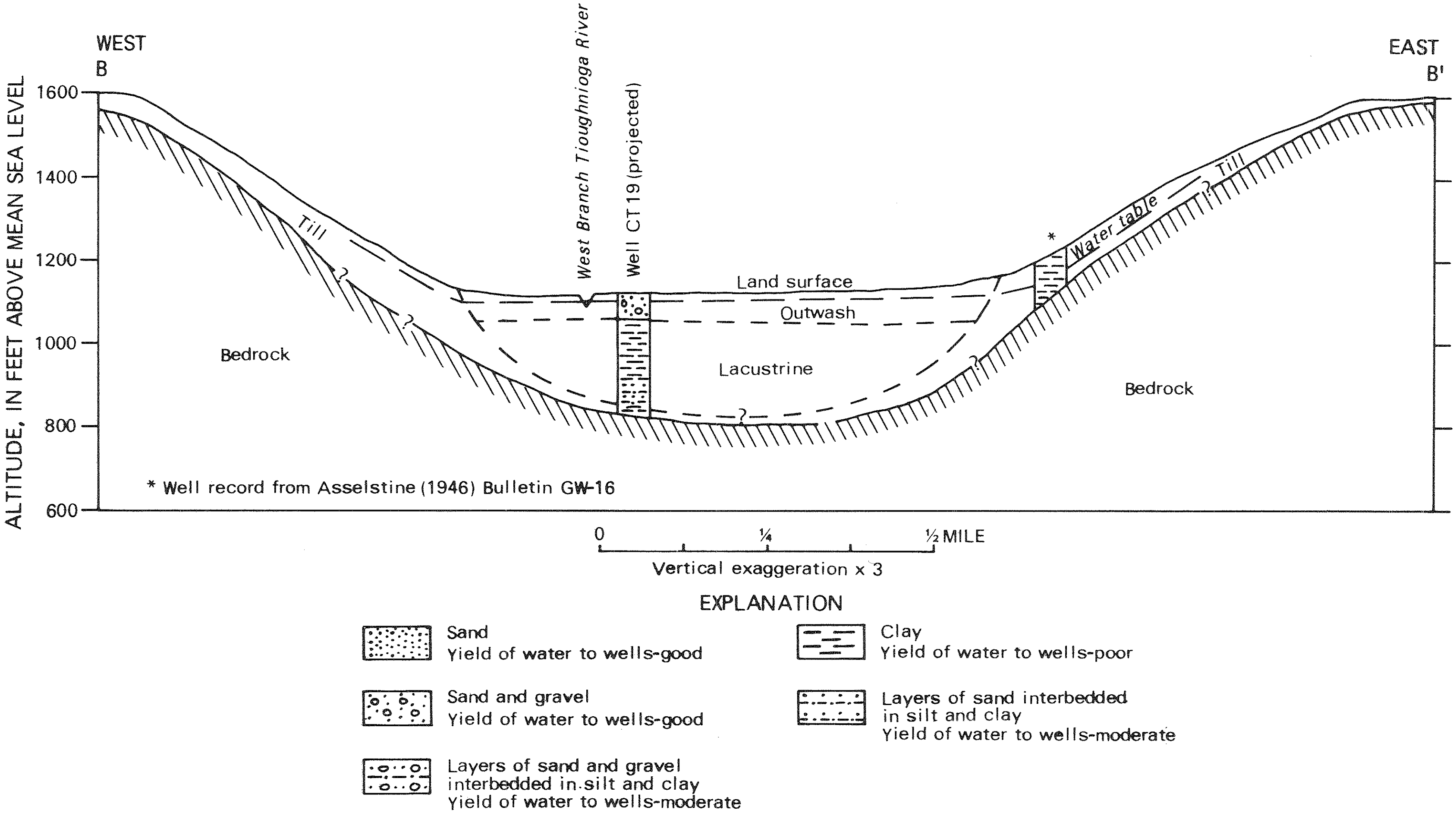

Figure 4.--Geologic section across center of Homer-Preble valley.

The surface outwash deposits in the bedrock valley form the major aquifer. As indicated in figures 3 and 4, thick clay deposits underlie the aquifer about 60 ft below land surface. Well logs (table 2) indicate water-yielding material also at depths of 180 to 240 ft below land surface at well CT 17; however, at well CT 19, only a thin water-yielding zone is indicated beneath the clay layer. Wells in the valley are generally less than 40 ft deep, and most penetrate sufficient sand and gravel zones to yield ample quantities of water (greater than 150 gal/min). Most wells in the upland areas are drilled into bedrock, where fracture zones generally yield sufficient quantities of water (20-50 gal/min) for domestic supplies.

Depths to water ranged from 2 to 25 ft below land surface but were generally less than 15 ft (table 3). Seasonal fluctuations of water levels during the period of record did not exceed 10 ft and at most wells were less than 6 ft. Figure 5 shows the hydrograph for well CT 37 and the record of precipitation at Cortland from May 1976 through September 1977 (National Oceanic and Atmospheric Administration, 1976, 1977). These graphs indicate a steady decline in water levels from November 1976 through February 1977, when below-freezing temperatures prevented normal recharge to the aquifer.

Figure 6 shows a long-term hydrograph of a well at the Cortland Municipal Water Works. This hydrograph shows that recharge is normally greatest during late fall and early winter, when evapotranspiration is minimal. Once the soil becomes extensively frozen, recharge is diminished, and water levels decline.

The saturated thickness of the glacial outwash aquifer averages 40 ft. Depth from land surface to the water table averages 15 ft, and depth from land surface to base of the aquifer averages 55 ft. The total volume of water stored in the aquifer is estimated to be 13 billion gallons, on the basis of a 40-ft saturated thickness, an area of 8 mi^2, and 20-percent pore space. However, the amount of stored water available for withdrawal is approximately 30 percent of this amount, or 4 billion gallons, as a result of water retention by sediment particles. Well logs indicate that additional water is available from deeper aquifers, but the extent of these aquifers is not known.

Streamflow measurements of the West Branch Tioughnioga River show that at flow durations greater than 35 percent (flows that are exceeded 35 percent of the time or more), the river generally gains in flow along the entire reach within the study area (U.S. Geological Survey, 1975, 1976). This indicates that water is discharged to the stream from the aquifer except during periods of high flow, when water from the stream seeps into the aquifer. Figure 7 shows the potentiometric surface on May 25, 1977, and the general direction of ground-water movement within the valley on that date. This pattern is representative of ground-water movement in the valley during most of the year; that is, water moves generally transverse to the valley, from the uplands to the streams and lakes,

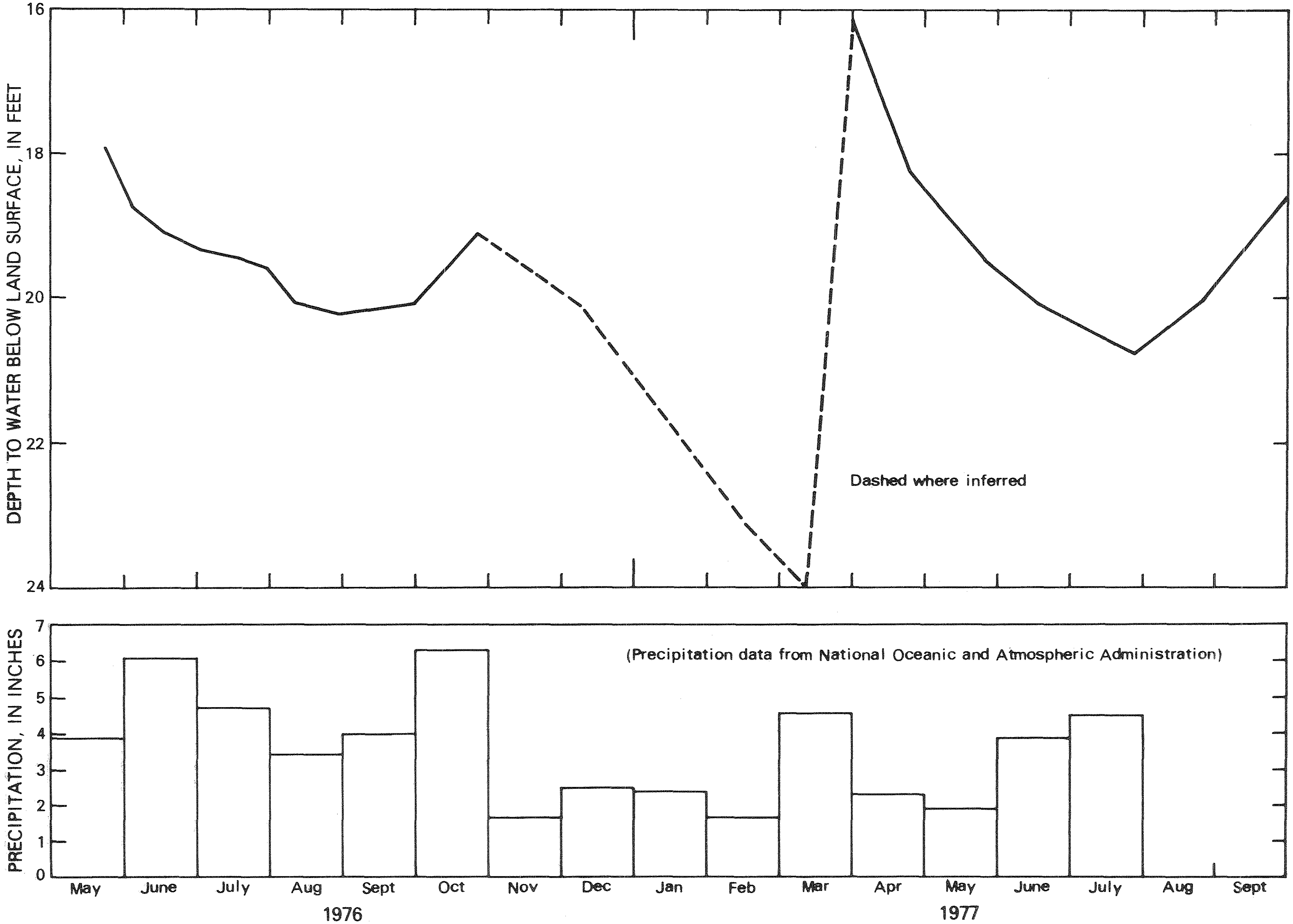

Figure 5.--Hydrograph of well CP 37 and graph of precipitation at Cortland, 1976-77.

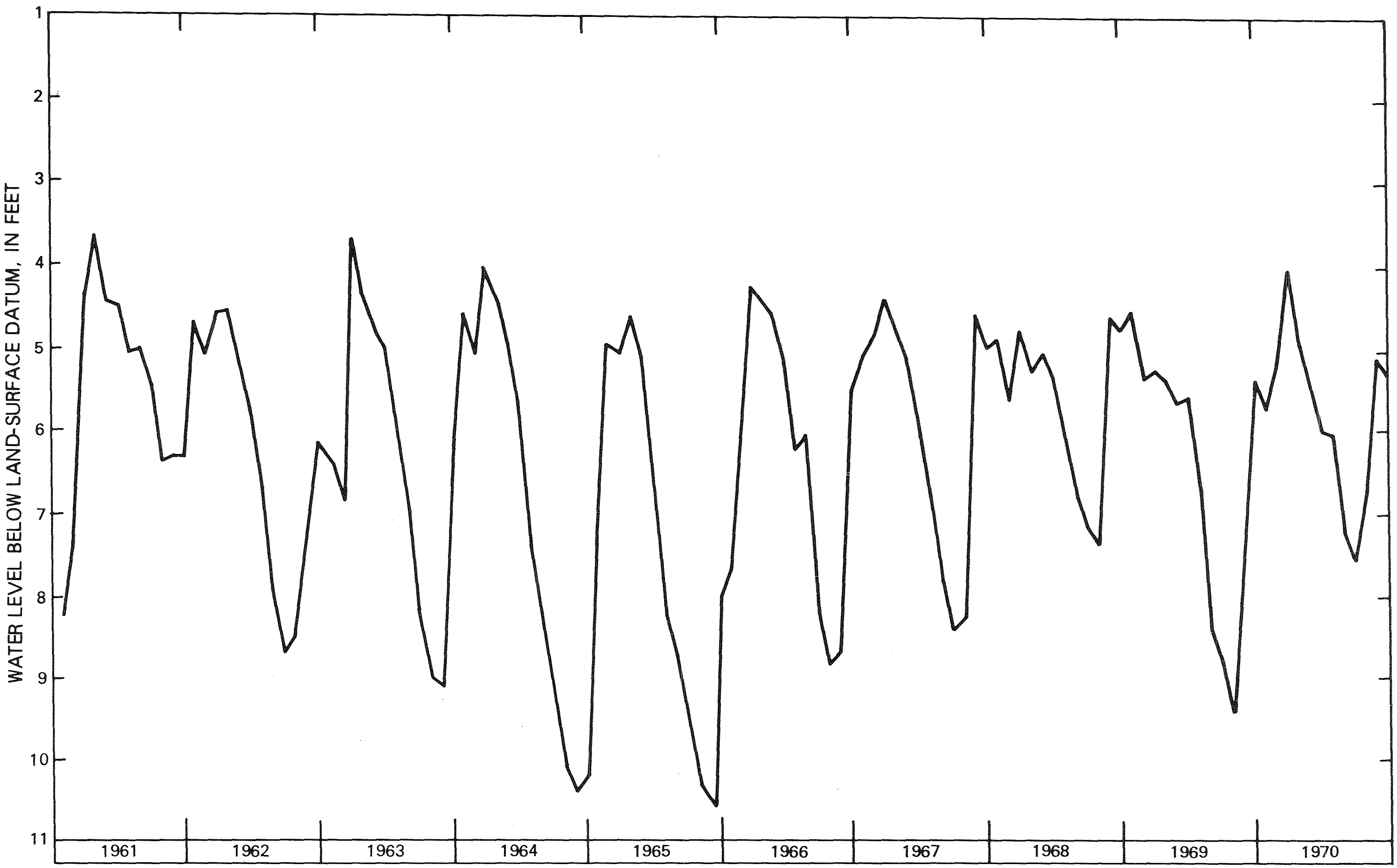

Figure 6.--Hydrograph of well at Cortland Municipal Water Works, 1961-1970.

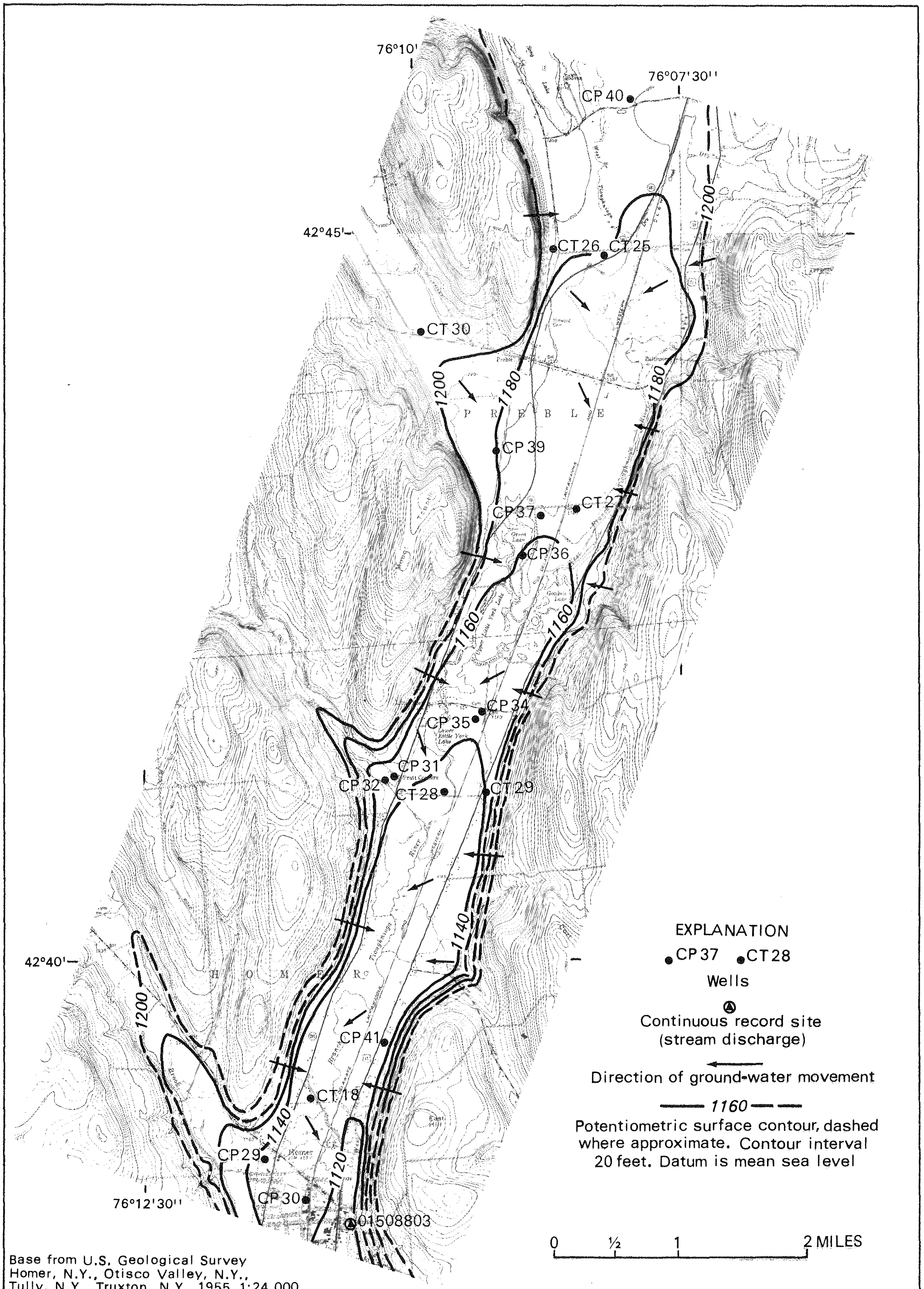

Figure 7.--Potentiometric surface of Homer-Preble aquifer, May 25, 1977 and direction of ground-water movement.

then southward out of the valley as surface flow in the West Branch Tioughnioga River. Only during high flow (less than 35-percent flow duration) would this pattern vary significantly; streams would then discharge to the aquifer, and ground-water mounds would form adjacent to the stream banks.

Ground-water outflow to the streams is relatively stable and usually provides continuous flow. When ground-water discharge is the main source of streamflow, the stream is considered to be at base flow (periods preceded by 48 to 72 hours during which runoff did not contribute to streamflow). Most of the ground-water movement is toward the river; therefore, the base-flow rate of the river is an indicator of the volume of ground-water outflow. The continuous-gaging station West Branch Tioughnioga River at Homer is the source of the base-flow data used in this study. Table 4 shows the daily discharge of the West Branch Tioughnioga River at Homer during the water year October 1975 to September 1976. The lowest discharge (40 ft^3/s) during this water year was on September 9 and 10. The 7-day, 10-year low flow at this site is estimated from long-term records of gaging stations at Cortland and Cincinnatus to be 10 ft^3/s. (A 7-day, 10-year low flow is an average minimum flow for 7 consecutive days at a 10-year recurrence interval.) Therefore, a flow of 10 ft^3/s (6.5 Mgal/d) for 7 consecutive days would be expected only once every 10 years and represents the approximate minimum ground-water outflow from the valley through the river system.

Ground-water recharge in New York (excluding Long Island) is estimated to average 500,000 $(gal/d)/mi^2$ in sand and gravel deposits and from 10,000 to 100,000 $(gal/d)/mi^2$ in till (Heath, 1964). Total recharge to the West Branch Tioughnioga River basin would therefore be 5 Mgal/d to 10 Mgal/d at a recharge rate of 500,000 $(gal/d)/mi^2$ to the 8-mi^2 aquifer area, and 10,000 to 100,000 $(gal/d)mi^2$ to the 40-mi^2 till-covered area. This rate closely approximates the base-flow rate of 6.5 Mgal/d determined above.

A question of major concern in the valley is how much additional water can be withdrawn from the aquifer without seriously affecting areal hydrology. The amount of water that could be safely withdrawn depends to a great extent on the amount of pumped water that is returned to the aquifer. A municipality that withdraws ground water and is served by a central water-distribution and sewer system that discharges into a stream may not return much water to the aquifer. However, if the water supply is used by a population served by septic systems or if it is used for irrigation, a large percentage, possibly as much as 70 percent, is returned to the aquifer.

Another integral factor is the distribution of pumping centers. Heavy pumping in a small area would cause substantial lowering of water levels and possible reduction of well yields in the immediate area, whereas even distribution of pumping would have a lesser effect on water levels.

The valley aquifer could probably sustain an additional withdrawal of 5 Mgal/d to 10 Mgal/d without causing a significant decline in ground-water levels or a serious reduction in surface-water flow, as long as withdrawals were distributed evenly within the valley. This projection is based on the calculated base flow of West Branch Tioughnioga River and the estimated recharge rates in the basin. It is likely that much of the additional water pumped would be returned to the aquifer and that the margin of safety for ground-water withdrawal would therefore be increased.

WATER QUALITY

The widespread use of chemicals by industry, agriculture, and municipalities may adversely affect the quality of both surface water and ground water. A gradual change in the water quality of the Cortland area is indicated by chemical data from well-water samples collected at the Cortland Municipal Water Works (Buller, Nichols, and Harsh, 1978). The data indicate that from 1930 to 1970, hardness and concentrations of chloride and nitrate in the water have gradually increased. Analyses of historical ground-water data from Homer Water Works also show a trend of increased chloride concentrations (Stearns and Wheler, 1970).

Samples of surface water and ground water were collected in February, April, and August 1977. Most ground-water samples were collected at 20- to 35-ft depths and are representative of water in the upper outwash deposits. Concentrations of the major chemical constituents of the samples are given in tables 5 and 6. These data are stored in computer files of the U.S. Geological Survey in Albany, N.Y. and Reston, Va. Analytical results indicate that the surface water and ground water are similar in chemical composition and that water in the surficial sand and gravel deposits is fairly uniform in quality. The ground water is typical of most natural water in central New York in that it is relatively hard and has dissolved-solids concentrations near 200 mg/L or higher.

Calcium-magnesium carbonate is the predominant mineral constituent of water in the aquifer. Dissolved-solids concentrations ranged from 70 to 480 mg/L; the highest concentrations were in ground-water samples from the central part of the valley.

Chloride concentrations in samples from the Homer Water Works (well CP 43) have increased about fourfold (from 4 to 15 mg/L) since 1955 (Stearns and Wheler, 1970). Samples from wells CT 18, CT 29, CP 30, and CP 34 had elevated chloride concentrations (48-110 mg/L). Well CP 30 is near a road-salt storage location; wells CT 18, CT 29, and CP 34 may receive chloride from septic systems and road salt. All chloride concentrations were well below the recommended limit of 250 mg/L (New York State Department of Health, 1971).

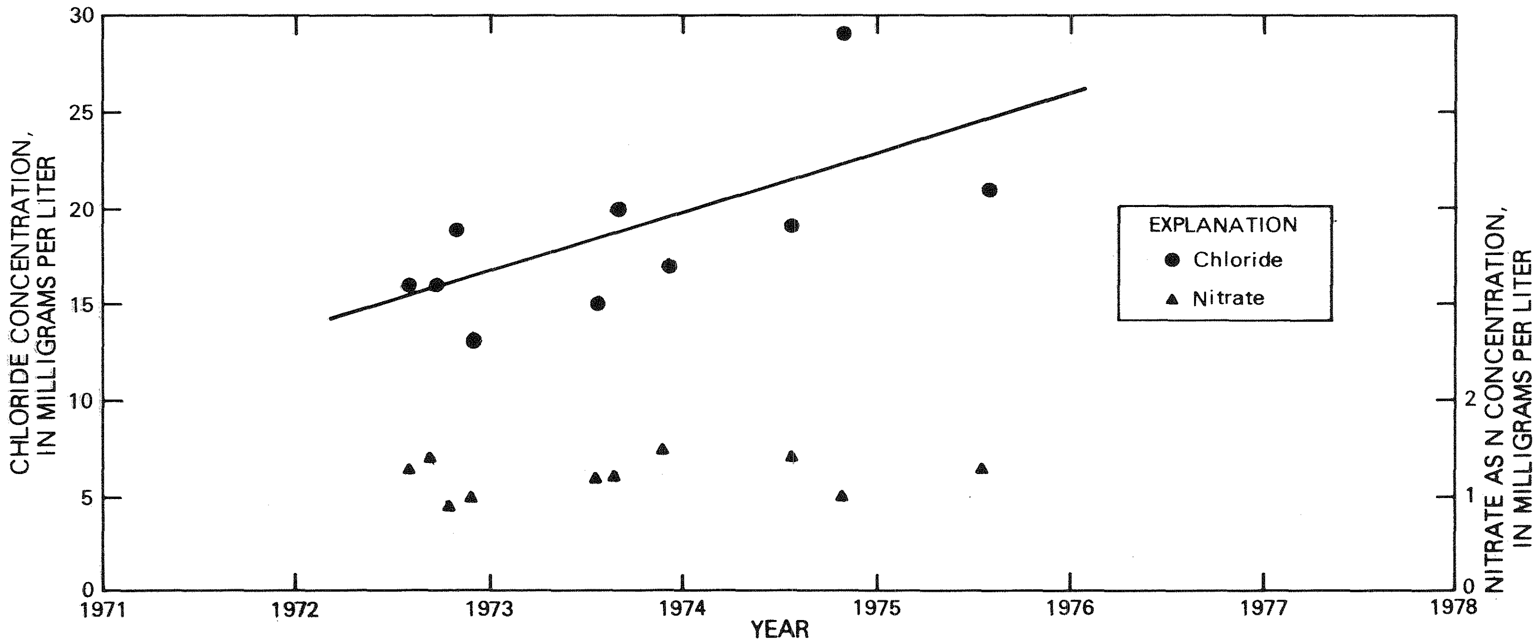

Figure 8.--Chloride and nitrate concentrations, West Branch Tioughnioga River at Homer, station 01508803, 1971-1978.

Several wells had elevated nitrate concentrations of nearly 7 mg/L as N; the recommended limit is 10 mg/L as N (New York State Department of Health, 1971). Agricultural fertilizer is a probable source of nitrate in the ground water, but septic systems may also be a source of nitrate in nearby wells. Data on samples from Homer Water Works since 1955 (Stearns and Wheler, 1970) indicate that nitrate levels have not changed significantly during the period of record.

Figure 8 shows chloride and nitrate concentrations of samples collected from West Branch Tioughnioga River at Homer (station 01508803). Data in figure 8 were obtained at discharges greater than 50-percent duration to reflect base-flow conditions, when dilution is minimal and chemical concentrations are, therefore, highest. Figure 8 shows a slight increasing trend in chloride concentrations from 1971-76 but shows no change in nitrate concentrations.

Trace-metal concentrations in a sample from well CT 18 (table 7) were below recommended limits for source waters for drinking (New York State Department of Health, 1971). Pesticide analyses of samples from wells CT 18 and CT 30 showed zero concentrations (table 7). Pesticide chemicals tend to be adsorbed by clay particles and are therefore likely to be removed before reaching the water table. Included in the pesticide analyses were PCB's and PCN's (polychlorinated biphenyls and polychlorinated napthalenes), which are industrial chemicals similar in structure to pesticides.

Dissolved-oxygen concentrations in the West Branch Tioughnioga River and its tributaries were near or above saturation, which indicates that oxygen-consuming substances are not entering surface waters in substantial amounts. Water-quality data show that ground water and surface water are of acceptable quality for most uses and generally meet State standards for source waters for drinking. Many of the well sites are near roadways or septic systems and may, therefore, give a somewhat exaggerated indication of general chloride and nitrate concentrations in the aquifer. Periodic monitoring of water quality at critical sites would indicate changes in water quality.

SUMMARY

The major source of ground water in the Homer-Preble valley is the surficial outwash deposits. The general direction of ground-water flow is from the valley sides to the West Branch Tioughnioga River, where ground water discharges to the stream. Current pumpage is estimated to be between 1.0 Mg/d and 1.5 Mgal/d. Estimates of West Branch Tioughnioga River low flows and recharge rates within the basin indicate that withdrawal of an additional 5 Mgal/d to 10 Mgal/d should not adversely effect the hydrology of the basin. A deeper aquifer is present beneath the glacial-lake deposits, but little is known of its potential.

Sample analyses indicate that ground water and surface water are of acceptable chemical quality for most uses and generally meet State standards for source waters for drinking. Some samples had elevated chloride and nitrate concentrations. Storage and application of road salt and effluent from septic systems are likely sources of chloride, whereas agricultural fertilizer and septic systems are likely sources of nitrate. Trace-metal analyses indicate low concentrations of these substances in ground water. Pesticide analyses showed these concentrations to be below detection levels in ground water.

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TABLES 1-7

Table 1.--Record of wells, West Branch Tioughnioga River basin

Local well number	Latitude °	'	"	Longitude °	'	"	Owner or name of well	Driller	Date completed	Land surface[1/] (ft)	Use of well[2/]	Depth of well (ft)
CT 17	42	39	03	76	10	57	Cortland County	Randolph	08-06-76	1141.2	0	240
CT 18	42	39	03	76	10	57	Do.	Do.	08-16-76	1141.3	0	30
CT 19	42	41	08	76	09	40	Do.	Do.	08-31-76	1146.8	0	341
CT 25	42	44	51	76	08	19	Do.	Do.	11 -- 73	1185.5	0	30
CT 26	42	44	53	76	08	40	Do.	Do.	11 -- 73	1190.2	0	35
CT 27	42	43	06	76	08	34	Do.	Do.	11 -- 73	1186.5	0	35
CT 28	42	41	08	76	09	40	Do.	Do.	11 -- 73	1147.0	0	35
CT 29	42	41	12	76	09	21	Do.	Do.	11 -- 73	1159.8	0	35
CT 30	42	44	16	76	09	47	Do.	Do.	11 -- 73	1221.7	0	30
CP 28	42	38	34	76	11	23	Homer Water Works	Stewart Bros.	-- 55	1147.2	0	64
CP 29	42	38	36	76	11	24	Homer Water Works	--	--	1140.4	0	60
CP 30	42	38	22	76	11	01	Stafford Coal Co.	Randolph	12-09-66	1135.1	0	21
CP 31	42	41	14	76	10	10	J. Pratt	--	--	1159.4	0	20
CP 32	42	41	15	76	10	13	J. Pratt	--	--	1161.1	0	14
CP 34	42	41	41	76	09	23	J. Long	--	--	1157.3	0	18
CP 35	42	41	41	76	09	23	J. Long	--	--	1157.1	0	17
CP 36							Cortland County	--	--	--	-	--
CP 37	42	43	05	76	08	50	--	--	--	1185.4	0	38
CP 38	42	43	05	76	08	50	H. Hallstead	--	--	1185	D	20
CP 39	42	43	27	76	09	13	W. Underwood	--	--	1200.6	D	29
CP 40	42	45	52	76	07	58	J. Knapp	--	--	1200.2	0	23
CP 41	42	39	28	76	10	17	Pine Hill Trailer Court	Randolph	12-07-65	1135.3	0	123
CP 42	42	41	49	76	09	49	Bob Bell	--	--	1160	D	22
CP 43	42	38	34	76	11	23	Homer Water Works	Barber and Stewart	1903, 1937	1147	W	60, 60 72, 85

1/ above mean sea level

2/ D domestic
O observation
W municipal water supply

3/ feet below land surface

Table 1.--Record of wells, West Branch Tioughnioga River basin (Continued)

Local well number	Casing record			Screened Interval			Remarks
	Diameter (in.)	Depth[3/] From	Depth[3/] To	Diameter (in.)	Depth[3/] From	Depth[3/] To	
CT 17	6.0	0	240	6.0	230	240	--
CT 18	6.0	0	30	6.0	20	30	--
CT 19	6.0	0	331	6.0	331	341	--
CT 25	1.75	0	27	1.75	27	30	--
CT 26	1.75	0	32	1.75	32	35	--
CT 27	1.75	0	32	1.75	32	35	--
CT 28	1.75	0	32	1.75	32	35	--
CT 29	1.75	0	32	1.75	32	35	--
CT 30	1.75	0	27	1.75	27	30	--
CP 28	2.0	0	60	2.0	60	64	--
CP 29	2.0	0	56	2.0	56	60	--
CP 30	2.0	0	19	1.25	19	21	--
CP 31	1.25	0	18	--	18	20	--
CP 32	1.25	0	12	--	12	14	--
CP 34	1.25	0	16	--	16	18	--
CP 35	1.25	0	17	--	--	--	--
CP 36	--	-	--	--	--	--	Borehole for highway
CP 37	6.0	0	38	--	--	--	For trailer supply, abandoned
CP 38	--	-	--	--	--	--	Hand-driven well
CP 39	--	-	--	--	--	--	Stone-lined well
CP 40	--	-	--	--	--	--	For trailer supply, abandoned
CP 41	6.0	0	123	--	--	--	Trailer court, supply well, abandoned
CP 42	--	-	--	--	--	--	--
CP 43	6.0 12.0	0 0	57 51	6.0 12.0	57 51	72 83	Multiwells connected to one intake

Table 2.--Geologic logs of wells CT 17 and CT 19

Material	Thickness (feet)	Depth (feet below land surface)
WELL CT 17		
Sand and gravel; well began to yield water at 25 feet below land surface	55	55
Clay, gray; no water yield	5	60
Sand, fine to medium, and clay; very little water yield	15	75
Clay, gray; no water yield	74	149
Clay, sand and gravel; no water yield	40	189
Silt, sand and gravel; water yielding	24	213
Clay, sand and gravel; water yielding	21	234
Bedrock, shale	--	--

Material	Thickness (feet)	Depth (feet below land surface)
WELL CT 19		
Sand, fine to coarse, and gravel; well began to yield water at 20 feet below land surface.	37	37
Clay, fine sand, some gravel; little water yield	18	55
Clay, gray; no water yield	116	171
Clay, silty; no water yield	44	215
Silt, sand, sand and gravel; no water yield	38	253
Clay, silt, sand and gravel; no water yield	17	270
Clay, silt and sand; no water yield	30	300
Clay, silt, sand and gravel; no water yield	24	324
Sand, coarse, and gravel; water yielding	12	336
Bedrock, shale	--	--

Table 3.--Water levels in wells in Homer-Preble valley

[Depths are in feet below land surface]

Well CT 17		Well CT 18		Well CT 19	
Date	Depth to water	Date	Depth to water	Date	Depth to water
10-26-76	17.18	10-26-76	17.56	10-26-76	21.31
12-09-76	18.51	12-09-76	16.47	12-09-76	20.27
3-31-77	13.97	3-31-77	15.93	2-15-77	19.00
4-25-77	16.38	4-13-77	17.33	3-31-77	17.59
5-25-77	17.39	4-25-77	17.68	4-25-77	16.94
6-22-77	18.00	5-25-77	18.48	5-25-77	16.37
7-27-77	18.29	6-22-77	18.92	6-22-77	15.98
8-25-77	18.18	7-27-77	19.12	7-27-77	15.53
9-30-77	13.32	8-25-77	18.92	8-25-77	15.20
		9-30-77	16.01	9-30-77	14.68
Highest	13.32	Highest	15.93	Highest	14.68
Lowest	18.51	Lowest	19.12	Lowest	21.31

Well CT 25		Well CT 26		Well CT 27	
Date	Depth to water	Date	Depth to water	Date	Depth to water
5-25-76	4.95	5-25-76	7.52	5-25-76	17.62
6-03-76	5.20	6-03-76	8.03	6-03-76	18.08
6-16-76	5.45	6-16-76	8.62	6-11-76	18.76
7-01-76	5.38	7-01-76	8.56	7-01-76	19.05
7-16-76	5.00	7-16-76	7.60	7-20-76	19.10
7-29-76	5.50	7-29-76	8.60	7-29-76	19.30
8-11-76	5.69	8-11-76	8.65	8-11-76	20.25
8-30-76	5.59	8-30-76	8.90	8-30-76	20.00
9-28-76	5.62	9-28-76	9.16	9-28-76	20.42
10-26-76	4.98	10-26-76	8.00	10-26-76	18.82
12-09-76	5.53	12-09-76	8.77	12-09-76	19.80
2-15-77	6.03	2-15-77	9.38	2-15-77	20.65
2-25-77	5.38	2-25-77	9.05	2-25-77	20.54
3-31-77	4.08	3-31-77	6.03	3-31-77	15.98
4-14-77	4.99	4-14-77	7.65	4-12-77	16.73
4-25-77	4.85	4-25-77	7.90	4-12-77	18.03
5-25-77	5.38	5-25-77	8.53	5-25-77	19.20
6-22-77	5.70	6-22-77	8.94	6-22-77	19.77
7-27-77	5.92	7-27-77	9.23	7-27-77	20.50
8-25-77	5.89	8-25-77	9.26	8-25-77	20.79
9-30-77	4.50	9-30-77	6.97	9-30-77	18.18
Highest	4.08	Highest	6.03	Highest	15.98
Lowest	6.03	Lowest	9.38	Lowest	20.79

Table 3.--Water levels in wells in Homer-Preble valley (Continued)

[Depths are in feet below land surface]

Well CT 28		Well CT 29		Well CT 30	
Date	Depth to water	Date	Depth to water	Date	Depth to water
5-25-76	8.05	5-25-76	16.45	5-25-76	4.87
6-03-76	8.33	6-03-76	17.70	6-03-76	6.13
6-06-76	8.65	6-16-76	18.66	6-16-76	8.60
7-01-76	8.30	7-01-76	18.25	7-01-76	9.77
7-16-76	8.20	7-20-76	17.49	7-16-76	8.95
7-29-76	8.15	7-29-76	17.70	7-29-76	9.67
8-11-76	8.07	8-11-76	18.81	8-11-76	11.32
8-30-76	7.95	8-30-76	19.39	8-30-76	12.70
9-29-76	7.65	9-28-76	19.38	9-28-76	12.83
10-26-76	7.44	10-26-76	16.90	10-26-76	8.28
12-09-76	7.23	12-09-76	18.80	12-09-76	9.12
2-15-77	7.34	3-31-77	14.00	3-31-77	2.57
2-24-77	7.62	4-12-77	16.54	4-13-77	4.49
3-31-77	7.63	4-25-77	18.07	4-25-77	6.23
4-25-77	7.80	5-25-77	18.70	5-25-77	8.58
5-25-77	7.82	6-22-77	19.25	6-22-77	11.51
6-22-77	7.73	7-27-77	19.39	7-27-77	14.20
7-27-77	7.62	8-25-77	19.39	8-25-77	15.53
8-25-77	7.55	9-30-77	14.02	9-30-77	4.50
9-30-77	7.35				
Highest	7.23	Highest	14.00	Highest	2.57
Lowest	8.65	Lowest	19.39	Lowest	15.53

Well CP 28 (pumping well nearby)

Date		Depth to water	Date		Depth to water
2-20-76	pumping	23.17	2-15-77		23.88
6-03-76	pumping	26.32	3-31-77	pumping	24.27
6-16-76		21.65	4-25-77		19.43
7-01-76		19.20	5-25-77	pumping	28.93
7-16-76	pumping	24.92	6-22-77		21.70
7-29-76		19.78	7-27-77		21.20
8-11-76	pumping	26.74	8-25-77	pumping	28.91
8-30-76	pumping	28.99	9-30-77		16.30
9-29-76	pumping	28.40			
10-26-76	pumping	25.14	Highest not pumping		16.30
12-09-76		21.65	Lowest not pumping		23.88

Table 3.--Water levels in wells in Homer-Preble valley (Continued)

[Depths are in feet below land surface]

Well CP 29		Well CP 30		Well CP 31	
Date	Depth to water	Date	Depth to water	Date	Depth to water
2-20-76	6.94	6-03-76	10.55	5-25-76	9.84
6-03-76	9.74	6-16-76	11.26	6-03-76	10.70
6-16-76	11.47	7-01-76	10.51	6-16-76	11.80
7-01-76	8.68	7-20-76	10.25	7-01-76	10.62
7-16-76	8.29	7-29-76	10.85	7-16-76	10.00
7-29-76	9.57	8-11-76	11.31	7-29-76	11.25
8-11-76	10.30	8-30-76	12.28	8-11-76	11.92
8-30-76	12.17	9-29-76	12.33	8-30-76	11.15
9-29-76	11.80	10-26-76	10.36	9-29-76	11.97
10-26-76	9.02	12-09-76	11.55	10-26-76	9.98
12-09-76	11.53	12-15-76	12.47	12-09-76	11.13
2-05-77	13.87	3-03-77	8.67	12-15-76	11.63
3-31-77	6.17	4-14-77	10.19	3-31-77	8.20
4-25-77	7.92	4-25-77	10.40	4-25-77	10.40
5-25-77	10.37	5-25-77	11.33	5-25-77	11.00
6-22-77	11.47	6-22-77	11.93	6-22-77	11.45
7-27-77	10.64	7-27-77	12.24	7-27-77	11.41
8-25-77	10.89	8-25-77	12.09	8-25-77	11.03
9-30-77	6.07	9-30-77	8.75	9-30-77	8.40
Highest	6.07	Highest	8.67	Highest	8.20
Lowest	13.87	Lowest	12.47	Lowest	11.97

Well CP 32		Well CP 34		Well CP 35	
Date	Depth to water	Date	Depth to water	Date	Depth to water
5-25-76	9.20	5-25-76	12.12	5-25-76	12.02
6-03-76	9.96	6-03-76	12.72	6-03-76	12.59
6-16-76	11.06	6-16-76	13.40	6-16-76	12.70
7-01-76	9.84	7-01-76	13.00	7-01-76	12.93
7-20-76	9.45	7-16-76	12.55	7-16-76	12.35
7-29-76	10.36	7-29-76	13.15	7-29-76	13.00
8-11-76	11.21	8-11-76	13.50	8-11-76	13.32
8-30-76	11.56	8-30-76	13.82	8-30-76	13.70
9-29-76	11.19	9-28-76	13.83	9-28-76	13.64
10-26-76	9.21	10-26-76	12.34	10-26-76	12.21
12-09-76	10.21	12-09-76	13.00	12-09-76	13.45
2-15-77	10.84	2-15-77	14.07	3-31-77	10.80
3-31-77	7.51	3-31-77	10.94	4-14-77	12.15
4-25-77	9.49	4-14-77	12.29	4-25-77	12.69
5-25-77	10.05	4-25-77	12.80	5-25-77	13.18
6-22-77	10.53	5-25-77	13.31	6-22-77	13.44
7-27-77	10.46	6-22-77	13.57	7-27-77	13.60
8-25-77	10.13	7-27-77	13.70	8-25-77	13.66
9-30-77	7.88	8-25-77	13.72	9-30-77	10.50
		9-30-77	10.70		
Highest	7.51	Highest	10.70	Highest	10.50
Lowest	11.56	Lowest	14.07	Lowest	13.70

Table 3.--Water levels in wells in Homer-Preble valley (Continued)

[Depths are in feet below land surface]

Well CP 36		Well CP 37		Well CP 39	
Date	Depth to water	Date	Depth to water	Date	Depth to water
6-10-76	8.25	5-25-76	17.97	5-25-76	16.09
7-01-76	7.92	6-03-76	18.15	6-03-76	17.20
7-16-76	7.95	6-16-76	19.08	6-16-76	18.65
7-29-76	7.92	7-01-76	19.39	7-01-76	20.25
8-11-76	8.04	7-16-76	19.42	7-20-76	19.70
8-30-76	8.10	7-29-76	19.60	7-29-76	20.50
9-29-76	8.15	8-11-76	20.11	8-11-76	21.45
10-20-76	7.92	8-30-76	20.22	8-30-76	22.60
12-09-76	7.69	9-29-76	20.10	9-28-76	22.29
2-15-77	8.12	10-26-76	19.13	10-26-76	19.08
3-31-77	7.67	12-09-76	20.08	12-09-76	22.06
4-14-77	7.50	2-15-77	23.15	2-15-77	24.68
4-25-77	8.62	3-31-77	16.17	3-31-77	11.63
5-25-77	8.21	4-25-77	18.24	4-25-77	17.90
6-22-77	8.23	5-25-77	19.45	5-25-77	20.30
7-27-77	8.29	6-22-77	20.05	6-22-77	22.07
8-25-77	8.44	7-27-77	20.73	7-27-77	24.10
9-30-77	8.12	8-25-77	20.00	8-25-77	25.01
		9-30-77	18.59	9-30-77	16.62
Highest	7.50	Highest	16.17	Highest	11.63
Lowest	8.62	Lowest	23.15	Lowest	25.01

Well CP 40		Well CP 41	
Date	Depth to water	Date	Depth to water
5-25-76	7.62	7-01-76	8.95
6-03-76	8.25	7-20-76	8.37
6-16-76	8.60	7-29-76	9.38
7-01-76	9.04	8-11-76	9.86
7-20-76	8.80	8-30-76	10.35
7-29-76	9.00	9-28-76	10.16
8-11-76	9.70	10-26-76	8.25
8-30-76	9.50	12-09-76	9.48
9-28-76	9.49	2-15-77	10.05
10-26-76	8.28	3-31-77	6.47
12-09-76	9.26	4-25-77	8.67
3-31-77	6.80	5-25-77	9.68
4-25-77	7.91	6-22-77	10.32
5-25-77	8.58	7-27-77	10.58
6-22-77	9.36	8-25-77	10.35
7-27-77	9.99	9-30-77	6.76
8-25-77	10.07		
9-30-77	7.77		
Highest	6.80	Highest	6.47
Lowest	10.07	Lowest	10.58

Table 4.--Discharge, West Branch Tioughnioga River at Homer, station 01508803, October 1975 to September 1976

[From U.S. Geological Survey, 1977, Water Resources Data for New York, Water Year 1976, Volume 1, New York excluding Long Island: U.S. Geological Survey Water-data Report NY-76-1, p. 244.]

LOCATION.--Lat 42°38'13", long 76°10'37", Cortland County, Hydrologic Unit 02050102, on left bank at downstream side of bridge on Wall Street at Homer and 3.4 mi (5.5 km) upstream from confluence with East Branch. Water-quality sampling site at discharge station.

DRAINAGE AREA.--71.5 mi^2 (185 km^2).

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--November 1966 to September 1968, October 1972 to current year.

REVISED RECORDS.--WRD NY 1974: 1973 (P).

GAGE.--Water-stage recorder. Datum of gage is 1,114.81 ft (339.794 m) above mean sea level. Prior to Oct. 1, 1968, water-stage recorder at bridge on Water Street 500 ft (152 m) upstream at same datum.

REMARKS.--Records good except those for winter periods, which are fair. A constant 2.8 ft^3/s (0.079 m^3/s) is diverted for manufacturing purposes from Gate House Pond upstream from station into Onondaga Creek basin (St. Lawrence River basin).

AVERAGE DISCHARGE.--5 years (1968, 1973-76), 139 ft^3/s (3.936 m^3/s), 26.40 in/yr (671 mm/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,770 ft^3/s (50.1 m^3/s) Apr. 4, 1974, gage height, 7.22 ft (2.201 m); minimum discharge, 9.6 ft^3/s (0.27 m^3/s) Nov. 22, 1966, gage height, 1.98 ft (0.604 m) at site then in use; minimum gage height, 1.14 ft (0.347 m) Sept. 3, Oct. 27, 28, 1973.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 23, 1972, reached a stage of 7.46 ft (2.274 m) (8.05 ft or 2.454 m at Water Street site), from floodmarks, discharge, about 1,900 cfs (53.8 m^3/s); flood of Mar. 5, 1964 was considerably higher (discharge not determined).

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 650 ft^3/s or 18.4 m^3/s (revised) and maximum (*):

Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)	Date	Time	Discharge (ft^3/s)	Discharge (m^3/s)	Gage height (ft)	Gage height (m)
Feb. 19	0930	859	24.3	5.14	1.567	Mar. 1	0630	887	25.1	5.22	1.591
Feb. 22	1530	*1,110	31.4	*5.82	1.774	Mar. 3	1500	1,040	29.5	5.66	1.725
Feb. 27	0730	744	21.1	4.78	1.457	Apr. 16	1500	880	24.9	5.20	1.585

Minimum discharge, 40 ft^3/s (1.13 m^3/s) Sept. 9, 10, gage height, 1.50 ft (0.457 m).

Table 4.--Discharge, West Branch Tioughnioga River at Homer, station 01508803, October 1975 to September 1976 (Continued)

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	191	79	137	110	120	740	322	355	159	168	111	57
2	207	76	125	100	110	597	285	397	154	117	95	60
3	182	77	119	96	100	851	251	348	136	103	85	53
4	158	95	114	92	100	814	227	307	126	92	80	49
5	143	85	110	84	94	804	199	270	120	83	75	59
6	131	77	147	82	86	740	188	241	114	75	72	53
7	119	74	149	90	84	584	177	237	126	71	85	46
8	110	77	123	82	84	500	168	222	112	96	105	44
9	102	75	129	78	82	420	159	203	103	129	99	41
10	96	81	235	76	80	370	151	188	92	85	91	108
11	93	90	186	76	88	340	148	185	93	77	83	93
12	92	87	167	74	96	300	142	220	92	193	77	89
13	88	168	158	82	86	285	138	186	87	302	73	73
14	89	146	168	72	82	265	130	171	83	372	76	64
15	85	137	171	84	78	247	127	168	85	265	99	59
16	88	138	186	84	110	229	507	159	81	220	92	58
17	83	137	158	76	402	215	425	151	95	205	80	79
18	156	129	140	74	543	203	355	154	85	173	72	75
19	137	123	100	72	794	208	307	170	77	153	58	71
20	159	119	110	70	636	257	259	512	239	136	63	64
21	156	176	100	68	530	322	231	385	182	129	60	66
22	137	170	100	66	871	350	227	310	153	118	58	59
23	123	147	100	64	692	278	217	268	129	108	55	57
24	114	138	84	60	558	257	199	235	115	105	62	55
25	108	132	86	66	510	237	340	220	114	96	49	51
26	104	126	110	74	528	222	515	231	99	89	49	54
27	98	135	140	120	692	211	465	208	89	87	51	120
28	93	135	120	160	616	217	497	185	87	85	67	96
29	89	123	100	140	520	198	505	170	87	84	84	88
30	87	122	96	120	---	183	410	159	108	100	72	81
31	81	---	110	110	---	174	---	154	---	91	63	---
TOTAL	3699	3474	4078	2702	9372	11618	8271	7369	3422	4207	2341	2022
MEAN	119	116	132	87.2	323	375	276	238	114	136	75.5	67.4
MAX	207	176	235	160	871	851	515	512	239	372	111	120
MIN	81	74	84	60	78	174	127	151	77	71	49	41
CFSM	1.66	1.62	1.85	1.22	4.52	5.24	3.86	3.33	1.59	1.90	1.06	.94
IN.	1.92	1.81	2.12	1.41	4.88	6.04	4.30	3.83	1.78	2.19	1.22	1.05

CAL YR 1975 TOTAL 53502 MEAN 147 MAX 957 MIN 20 CFSM 2.06 IN 27.84
WTR YR 1976 TOTAL 62575 MEAN 171 MAX 871 MIN 41 CFSM 2.39 IN 32.56

Table 5.--Concentrations of major chemical constituents of ground-water and surface-water samples from Homer-Preble valley, 1976-77

[Concentrations in milligrams per liter]

Sampling site	Sampling depth (ft)	Date of collection	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrite as N	Nitrate as N	Phosphorus as P	Hardness (Ca, Mg)	Noncarbonate hardness	Dissolved solids, calculated from determined constituents	Specific conductance (µmho/cm at 25°C)	pH	Temperature °C	Dissolved oxygen mg/L	Dissolved oxygen, percent saturation
WELLS																				
CT 18	20-30	9-28-76	81	16	22	1.2	260	15	48	.00	6.3	-	270	55	317	580	7.4	11.0	-	-
		4-13-77	82	17	22	1.1	260	17	49	.01	6.3	.03	280	62	322	650	7.0	10.0	-	-
		8-03-77	-	-	-	-	-	-	53	.01	6.6	-	-	-	-	550	7.2	11.0	-	-
CT 25	27-30	2-25-77	64	17	3.4	0.8	244	20	9.5	.00	1.9	.00	230	30	237	420	7.0	9.0	-	-
		4-14-77	-	-	-	-	-	-	6.0	-	1.7	-	-	-	-	450	7.7	11.0	-	-
		8-03-77	-	-	-	-	-	-	7.6	.00	1.8	-	-	-	-	350	7.4	10.0	-	-
CT 26	32-35	2-25-77	49	9.8	3.7	1.0	160	18	7.3	.00	1.9	.00	160	31	170	325	7.7	9.0	-	-
		4-14-77	-	-	-	-	-	-	7.0	-	3.1	-	-	-	-	380	7.5	10.0	-	-
		8-03-77	-	-	-	-	-	-	5.8	.00	2.2	-	-	-	-	300	7.4	10.0	-	-
CT 27	32-35	4-12-77	73	21	12	0.7	270	18	15	.01	6.9	.02	270	47	280	600	7.3	11.0	-	-
CT 29	32-35	4-12-77	58	11	2.7	2.3	200	12	7.7	.01	5.0	.03	190	26	198	440	7.2	10.0	-	-
		8-03-77	-	-	-	-	-	-	76	.00	6.2	-	-	-	-	530	7.2	10.0	-	-
CT 30	27-30	4-13-77	61	19	3.7	1.0	230	18	9.8	.01	5.2	.03	230	42	231	490	7.2	8.0	-	-
		8-03-77	-	-	-	-	-	-	9.0	.00	5.9	-	-	-	-	400	7.4	10.0	-	-
CP 30	19-21	2-25-77	110	16	50	1.1	314	36	110	.00	2.0	.00	340	83	479	880	6.9	9.0	-	-
		4-14-77	-	-	-	-	-	-	40	-	3.6	-	-	-	-	620	7.5	9.0	-	-
		8-03-77	-	-	-	-	-	-	82	.00	3.8	-	-	-	-	600	7.2	11.0	-	-
CP 34	16-18	4-14-77	68	19	28	0.7	230	17	73	.01	1.6	.02	250	59	320	640	7.4	10.0	-	-
CP 38	15-20	2-25-77	72	19	3.1	1.1	261	19	7.6	.00	5.0	.01	260	44	255	500	7.5	-	-	-
CP 39	20-49	2-25-77	-	-	-	-	-	-	6.2	.00	3.7	.00	-	-	-	340	7.6	-	-	-
CP 42	15-22	2-25-77	50	8.3	7.1	1.5	182	14	6.3	.00	.9	.00	160	10	178	340	7.6	-	-	-
CP 43	60-85	2-24-77	55	10	4.5	0.8	169	20	10	.00	3.0	.00	180	40	186	-	6.5	-	-	-
		4-14-77	-	-	-	-	-	-	22	-	3.5	-	-	-	-	430	7.6	11.0	-	-

Table 5.--Concentrations of major chemical constituents of ground-water and surface-water samples from Homer-Preble valley, 1976-77 (Continued)

[Concentrations in milligrams per liter]

SURFACE-WATER STATIONS2/

Sampling site	Sampling depth (ft)	Date of collection	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrite as N	Nitrate as N	Phosphorus as P	Hardness (Ca, Mg)	Noncarbonate hardness	Dissolved solids, calculated from determined constituents	Specific conductance (umho/cm at 25°C)	pH	Temperature °C	Dissolved oxygen mg/L	Dissolved oxygen, percent saturation
			Constituent or characteristic																	
01508652	-	4-12-77	54	14	10	1.2	210	14	23	-	1.3	-	190	20	220	430	7.1	14.0	8.9	87
		8-05-77	-	-	-	-	-	-	-	.02	1.4	-	-	-	-	400	-	17.0	8.9	94
01508662	-	4-12-77	53	14	9.5	1.1	190	15	22	-	1.6	-	190	34	210	420	7.6	11.0	12.0	110
		8-05-77	-	-	-	-	-	-	-	.02	.50	-	-	-	-	320	-	24.0	11.5	135
01508700	-	4-14-77	21	3.5	2.2	0.6	65	9.2	6.6	-	.85	-	67	14	76	160	7.9	11.0	13.0	120
		8-05-77	-	-	-	-	-	-	-	.00	.39	-	-	-	-	200	-	20.0	8.1	89
01508715	-	4-12-77	48	12	9.1	1.1	170	13	21	-	1.6	-	170	30	190	370	7.5	13.0	10.2	97
		8-05-77	-	-	-	-	-	-	-	.01	.94	-	-	-	-	350	-	20.0	8.0	98
01508800	-	4-14-77	-	-	-	-	-	-	7.0	-	3.0	-	-	-	-	320	8.3	13.0	12.5	120
		8-05-77	-	-	-	-	-	-	-	.01	2.8	-	-	-	-	330	-	17.5	9.9	104
01508803	-	4-12-77	-	-	-	-	-	-	16	-	1.9	-	-	-	-	370	7.5	14.0	12.6	124
		8-05-77	-	-	-	-	-	-	-	.01	1.1	-	-	-	-	350	-	21.0	8.0	90

1/ Analyses by U.S. Geological Survey, Albany, N.Y.

2/ 01508652 West Branch Tioughnioga River near Preble, N.Y.
01508662 West Branch Tioughnioga River at Little York Crossing, N.Y.
01508700 Cold Brook at Pratt Corners, N.Y.
01508715 West Branch Tioughnioga River near Homer, N.Y.
01508800 Factory Brook near Homer, N.Y.
01508803 West Branch Tioughnioga River at Homer, N.Y.

Table 6.--Chemical and biological analyses of samples from West Branch Tioughnioga River at Homer, station 01508803, October 1975 to September 1976

[From U.S. Geological Survey, 1977, Water Resources Data for New York, Water Year 1976, Volume 1, New York excluding Long Island: U.S. Geological Survey Water-data Report NY-76-1, p. 245]

WATER QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TIME	INSTANTANEOUS DISCHARGE (CFS)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	DISSOLVED OXYGEN (MG/L)	PERCENT SATURATION	IMMEDIATE COLIFORM (COL. PER 100 ML)	FECAL COLIFORM (COL. PER 100 ML)
OCT 07...	1200	124	372	7.5	12.0	9.1	84	B1900	78
JAN 21...	1300	68	450	7.9	.0	12.4	85	87	26
FEB 14...	1130	74	430	7.6	.0	12.6	86	400	--
APR 06...	1130	196	310	7.3	7.5	9.4	78	B160	86
AUG 03...	1130	67	394	7.3	17.0	8.4	87	630	B140

DATE	STREPTOCOCCI (COLONIES PER 100 ML)	HARDNESS (CA,MG) (MG/L)	NONCARBONATE HARDNESS (MG/L)	DISSOLVED CALCIUM (CA) (MG/L)	DISSOLVED MAGNESIUM (MG) (MG/L)	DISSOLVED SODIUM (NA) (MG/L)	DISSOLVED POTASSIUM (K) (MG/L)	BICARBONATE (HCO3) (MG/L)	CARBONATE (CO3) (MG/L)
OCT 07...	47	160	20	43	12	8.9	1.3	167	0
JAN 21...	81	180	26	50	14	8.4	1.0	191	0
FEB 14...	--	170	18	49	12	10	1.1	187	0
APR 06...	85	150	17	44	10	8.0	.9	164	0
AUG 03...	100	160	17	46	12	9.3	.9	179	0

DATE	ALKALINITY AS CACO3 (MG/L)	DISSOLVED SULFATE (SO4) (MG/L)	DISSOLVED CHLORIDE (CL) (MG/L)	DISSOLVED FLUORIDE (F) (MG/L)	DISSOLVED SILICA (SIO2) (MG/L)	DISSOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L)	TOTAL NITRITE PLUS NITRATE (N) (MG/L)	TOTAL IRON (FE) (UG/L)	TOTAL MANGANESE (MN) (UG/L)
OCT 07...	137	16	17	.0	4.6	185	1.3	140	40
JAN 21...	157	19	17	.1	4.9	209	2.0	150	20
FEB 14...	153	15	21	.1	4.9	205	2.0	130	20
APR 06...	135	18	17	.1	2.7	182	1.7	160	20
AUG 03...	147	17	17	.1	4.0	195	1.1	150	20

B Results based on colony count outside the acceptable range (non-ideal colony count).

Table 7.--Trace-metal concentrations of ground water, well CT 18, and pesticide concentrations, wells CT 18 and CT 30, April 13, 1977

Sampling depths 20-30 feet below land surface.
Analysis by U.S. Geological Survey, Albany, N.Y.
[Concentrations in micrograms per liter]

Trace metals	Concentrations	Trace metals	Concentrations
Arsenic (As)	0	Lithium (Li)	0
Barium (Ba)	100	Manganese (Mn)	10
Boron (B)	80	Mercury (Hg)	<0.5
Chromium (Cr)	10	Nickel (Ni)	16
Copper (Cu)	0	Strontium (Sr)	140
Iron (Fe)	10	Vanadium (V)	0
Lead (Pb)	4	Zinc (Zn)	10

Analytical determinations were made for the pesticides indicated below. Concentrations for all determintations were reported as zero; that is, all concentrations were below the detection limits of the analytical methods used.

Aldrin	Dieldrin	Lindane
Chlordane	Endosulfan	PCB
DDD	Endrin	PCN
DDE	Hept Epox	Perthane
DDT	Heptachlor	Toxaphene