INFORMATION ON HYDROLOGIC AND PHYSICAL PROPERTIES OF WATER TO ASSESS TRANSIENT HYDROLOGY OF THE MILFORD-SOUHEGAN GLACIAL-DRIFT AQUIFER, MILFORD, NEW HAMPSHIRE

By Philip T. Harte, Robert J. Flynn, Richard G. Kiah, Timothy Severance, and Michael F. Coakley

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CONVERSION FACTORS

Multiply	By	To Obtain
	Length	
inch (in)	25.4	millimter
foot (ft)	0.3048	meter
mile (mi)	1.609	kilometer
	Area	
square mile (mi^2)	2.590	square kilometer
	Volume	
cubic feet per second (ft^3/s)	0.02832	cubic meter per second
gallon (gal)	3.785	liter
million gallons(Mgal)	3,785	cubic meter
	Flow	
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
cubic foot per second per square mile [$(ft^3/s)/mi^2$)]	0.01093	cubic meter per second per square kilometer
gallon per minute (gal/min)	0.06309	liter per second
million gallons per day (Mgal/d)	0.04381	cubic meter per second
	Hydraulic Conductivity	
foot per day (ft/d)	0.3048	meter per day
	Transmissivity	
cubic foot per day (ft^3/day)	0.09290	cubic meter per day

Sea Level: In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929. Abbreviated water-quality units used in this report: Specific conductance is measured in microsiemens per centimeter (µS/cm) at 25 degrees Celsius (°C). Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens). Water temperature in degrees Celsius (C) can be converted to degrees Fahrenheit (F) by use of the following equation:

$°F = 1.8\ (°C) + 32$

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ABSTRACT

The Milford-Souhegan glacial-drift (MSGD) aquifer, in southcentral New Hampshire, is an important source of industrial, commercial, and domestic water use providing more than 2.7 million gallons of water per day in 1994. A large volatile organic contaminant plume (approximately 0.5 square miles in area) covers the southwestern half of the MSGD aquifer and threatens present ground-water usage. As a result, the southwestern half of the MSGD aquifer has been designated a Superfund site and named after a former municipal water-supply well (Savage Well) that was discontinued because of contamination.

A 3-year study by the U.S. Geological Survey and the U.S. Environmental Protection Agency began in January 1994 to examine the temporal variability of ground-water flow in the contaminant plume and adjacent areas of the southwestern part of the MSGD aquifer. This report summarizes data from April 1994 to September 1995 in support of this effort.

Data presented in this report include continuous measurements of river stage at 3 gaging stations and periodic measurements of river stage at 5 additional stations; one set of streamflow discharge measurements at up to 20 sites during high-flow conditions, called the high-flow synoptic, monthly streamflow measurements at up to 8 sites; computation of continuous streamflow at 3 stations; biweekly measurements of ground-water levels at 87 wells; continuous measurements of ground-water levels at 5 wells; and ground-water levels from the high-flow synoptic at 115 wells. Physical data (specific conductance and temperature) were collected continuously at five sites to reveal surface- and ground-water interactions. Collectively, these data were assessed for temporal and spatial variations and also compared to two data sets from previous U.S. Geological Survey studies of the aquifer.

The aquifer is typical of other permeable glacial-drift aquifers in that a good hydraulic connection is present between surface and ground waters, which allows rapid exchange of surface and ground waters. Data from this study on river stages, riverbed water levels, and ground-water levels adjacent to rivers showed fluctuations similar in magnitude and timing. River stages and ground-water levels fluctuated by about 5 feet in most areas not affected by ground-water withdrawals. Physical data

showed trends in specific conductance that were similar at river-gaging stations and at adjacent wells that were unaffected by chemicals from road salt. Physical data also showed that water temperatures were largely affected by thermal conduction and ground-water temperatures lagged behind surface-water temperatures by 3 to 6 months. This lag in water temperatures allows for identification of ground-water discharge areas to rivers.

Large seasonal changes in ground-water flow occurred near rivers and areas of large ground-water withdrawals. Near the upstream reaches of the Souhegan River, which is the source of the large tetrachloroethylene (PCE) volatile organic plume, the river recharges the aquifer and seasonal river leakage roughly varied by one order of magnitude with a maximum leakage of 30 cubic feet per second. In the same area, surface and ground-water gradients between the river and aquifer varied by a factor of four, the direction of maximum ground-water gradients varied by 51 degrees, and the magnitudes of maximum ground-water gradients varied by 45 percent. Near the confluence of two rivers (Souhegan River and Purgatory Brook), maximum ground-water gradients varied in direction by 144 degrees, indicating that ground-water discharge oscillated between the Souhegan River and Purgatory Brook. Near the State Fish Hatchery wells, withdrawing about 2.3 Mgal/d, ground-water gradients changed by a factor of four as the result of seasonal trends in ground-water recharge and withdrawals.

Transient seasonal conditions, which cause changes in ground-water hydraulic gradients through the aquifer, partly explain the lateral distribution of contaminants found in the aquifer. Ground-water hydraulic gradients along the longitudinal axis of the plume showed a fairly constant gradient that averaged 0.0747 foot per foot with a standard deviation of 0.0014. Magnitudes of ground-water hydraulic gradients transverse to the plume averaged 0.0176 foot per foot with a standard deviation of 0.0027, almost twice the standard deviation of the longitudinal gradient.

Physical data collected at three river-gaging stations and three wells open to the aquifer showed that specific conductance was highest at the discharge ditch ranging from 300 to 600 microsiemens per centimeter (μS/cm) at 25 degrees Celsius (°C) and the least in samples from wells ranging from 75 to 200 μS/cm. Specific conductances were highest in winter and spring and lowest in the fall. Water temperatures varied from 0 to 24 °C at the three river-gaging stations and from 8 to 16°C at the three wells.

INTRODUCTION

The Milford-Souhegan glacial-drift (MSGD) aquifer, in southcentral New Hampshire (fig. 1), is an important source of industrial, commercial, and domestic water use accounting for more than 2.7 Mgal/d in 1994. Until it was found to contain high concentrations of volatile organic compounds (VOC's) in the early 1980's, the MSGD aquifer was also an important source of drinking water from two former municipal supply wells (the Savage and Keyes wells). Subsequent to contamination, local, State and Federal agencies initiated geohydrologic studies to characterize this glacial-drift river-valley aquifer and delineate the extent of contamination. In 1989, a large VOC plume was found to cover the southwestern half of the MSGD aquifer (HMM Associates, 1989). In 1997, the large VOC plume still threatens present ground-water usage at State and commercial fish hatcheries (fig. 2). The primary source of contamination appears to be a discontinued tool company (fig. 2) that discharged wastes into the subsurface for many years until the early 1980's (HMM Associates, 1989). Although discharges have ceased, the underlying sediments, and the immersible pockets of VOC's beneath the site continue to contaminate the ground water flowing across the area.

Although some information is available on contaminant distribution, general patterns of ground-water flow and preliminary estimates of bulk-fluid-flow data are insufficient to be used to design effective remedial schemes to reduce or eliminate the contaminant plume. Previous data-collection efforts in the MSGD aquifer have not adequately addressed the variability of hydrologic conditions on the basis of seasonal and annual differences in ground-water

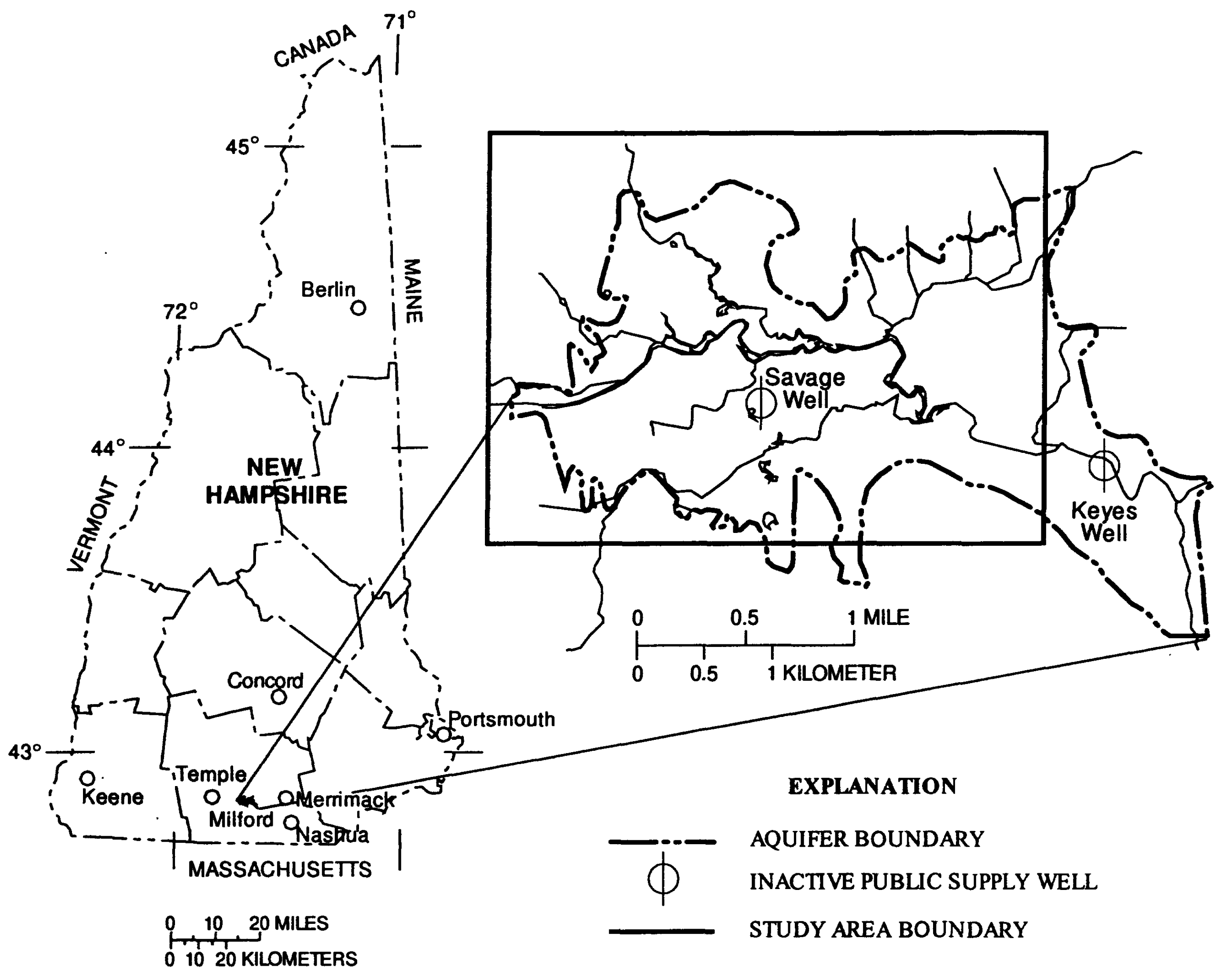

Figure 1. Location of the Milford-Souhegan glacial-drift aquifer, Milford, New Hampshire.

recharge and discharge. Previous data on ground-water levels, river stage, and streamflow were collected primarily during low recharge periods and over short intervals of time without consideration to seasonal, annual, and long-term conditions. A cost-effective remedial design requires information on the transient nature of the ground-water system to improve rate estimates of contaminant transport, and to assess the feasibility of pump-and-treat technology.

A 3-year study by the U.S. Geological Survey (USGS) and the U.S. Environmental Protection Agency (USEPA) began in January 1994 to increase the understanding of transient hydrologic conditions in the aquifer. The primary objective of this study is to evaluate the effect of temporal changes in recharge, discharge, and ground-water withdrawals on contaminant transport. Specific objectives include:

(1) Determine the temporal variability of ground-water-flow directions.

(2) Determine the temporal variability of surface and ground-water interactions between the Souhegan River and the glacial-drift aquifer.

(3) Construct detailed numerical ground-water-flow models to use in remedial design.

(4) Identify flow paths to pumped wells by use of ground-water-flow models and chemical data collected in the field.

Purpose and Scope

This report summarizes the results of surface- and ground-water data collected from April 1994 to September 1995 and describes the temporal variability of hydrologic conditions in the MSGD aquifer.

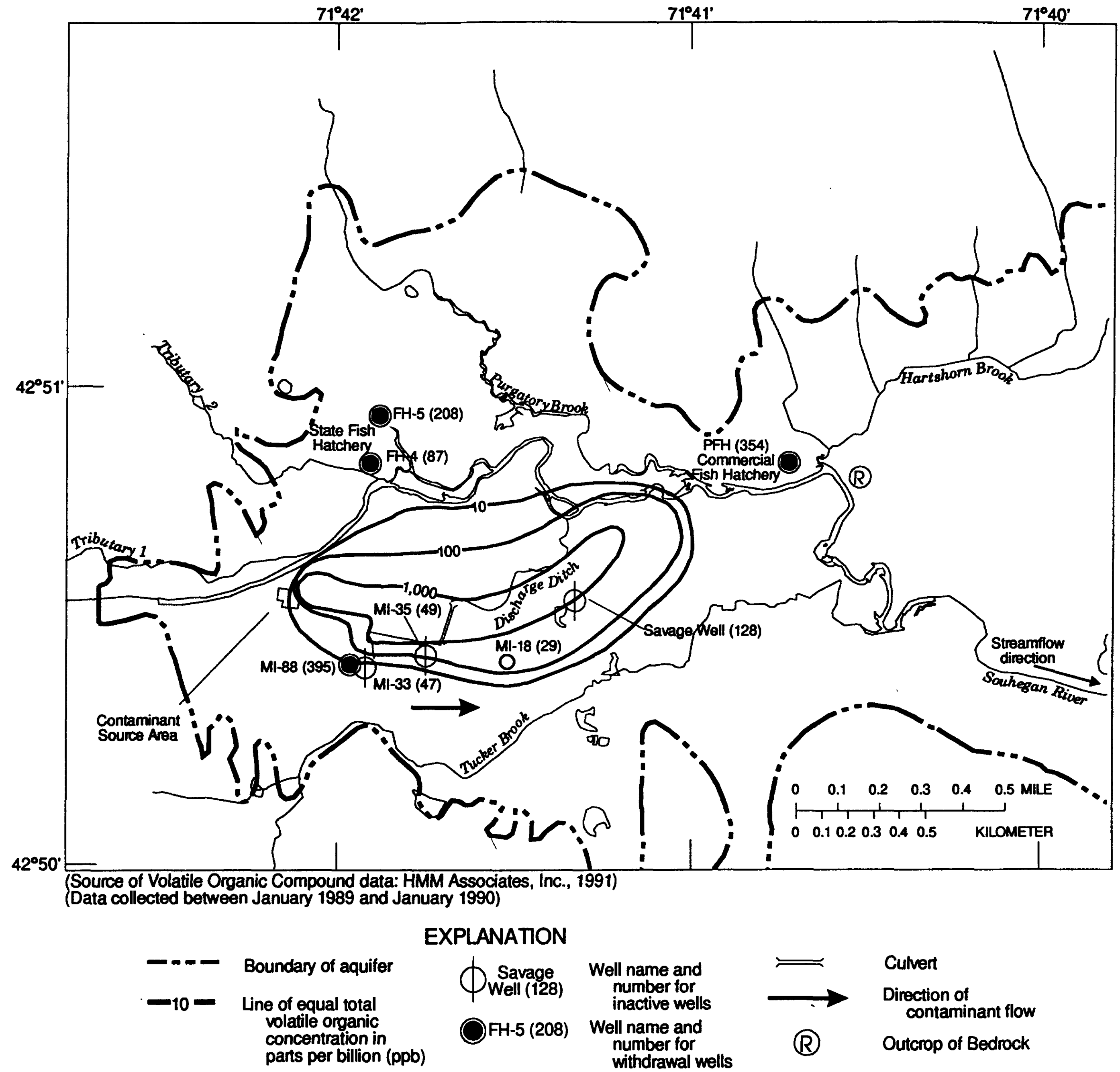

Figure 2. Extent of contaminant plume of total volatile organic compounds in the the Milford-Souhegan glacial-drift aquifer, Milford, New Hampshire.

However, most data were collected from April 1994 to July 1995. Data presented in this report include continuous measurements of river stage and discharge at 3 gaging stations and periodic measurements of river stage at 5 stations, streamflow discharge measurements at 20 sites during high-flow conditions (called a high-flow synoptic), monthly streamflow measurements at 8 sites, biweekly measurements of ground-water levels at 87 wells, continuous measurements of ground-water levels at 5 wells, and a single measurement of ground-water levels at 115 wells during the high-flow synoptic. Physical data (specific conductance and temperature) were collected continuously at five sites to identify patterns of surface- and ground-water interaction.

Data from this study are compared to data previously collected to reference hydrologic conditions during 1994 and 1995 to long-term conditions. Data referenced from previous works include streamflow and ground-water levels collected from 1988 to 1990 by the USGS.

Description of Study Area

The focus of data collection and study is the delineated western part of the MSGD aquifer (fig. 1), which contains the contaminant plume (fig. 2). Because the MSGD extends beyond the western part of the Milford-Souhegan River Valley, however, selected data were also collected in the eastern part of the valley. This section describes the characteristics of the entire valley with an emphasis on the western part.

The MSGD aquifer is defined as the entire sequence of unsaturated and saturated alluvium, glacial drift, and other unconsolidated deposits above the bedrock surface in the Souhegan River valley in Milford, New Hampshire (fig. 1). The aquifer consists primarily of stratified sand and gravel with some basal till and is overlain in places by recent alluvium. The maximum saturated thickness of the aquifer exceeds 100 ft on the eastern side, but generally ranges from 0 to 60 ft. Laterally, the aquifer is bounded by till-covered bedrock uplands.

The Souhegan River valley in the Milford area slopes gently by 12 ft/mi along the river. Land-surface elevations range from 230 to 280 ft in the area. The land is drained by the Souhegan River and its tributaries, including Tucker, Purgatory, Great , and Hartshorn Brooks, and a number of small, unnamed streams. A discharge ditch drains processed waters from several manufacturing companies in the southwestern part of the study area.

Land use is predominantly industrial in the southwestern part of the study area, agricultural in the central and northwestern areas, and residential to commercial elsewhere. The contaminant plume underlies a large agricultural and industrial section in in the center of the study area (fig. 2).

Ground-water withdrawals are primarily used for commercial and industrial purposes (table 1). Withdrawal wells include two wells for the State Fish Hatchery in the northwestern part of the study area (well numbers 87 and 208; fig. 2), a well at a commercial fish hatchery in the central to eastern part of the study area (well number 354; fig. 2), and a well for an industrial and manufacturing complex in the southwestern part of the study area (well number 395; fig. 2).

Previous Investigations

Previous studies of the MSGD aquifer include a surficial map of geologic deposits (Koteff, 1970), and work done to characterize the subsurface geology and contaminant distribution through test drilling, water-quality sampling, and surface geophysical surveys by the New Hampshire Water Supply and Pollution Control Division of the New Hampshire Department of Environmental Services (NHDES), (1985), and HMM Associates (1989, 1991).

Previous information on hydrologic conditions has been limited to discrete sampling events that do not show the temporal variability of hydrologic conditions, (HMM Associates, 1989, 1991; Harte and Mack, 1992; Olimpio and Harte, 1994). Harte and Mack (1992)

Table 1. Ground-water withdrawals from currently used (1997) commercial and industrial water-supply wells, Milford, New Hampshire

Well name	Well number used in this report (plate 1)	Depth of well, in feet below land surface	Average daily withdrawals in 1994, in millions of gallons per day	Average daily withdrawals in 1995, in millions of gallons per day
State of New Hampshire Fish Hatchery (well FH-5)	208	65	1.05	1.10
State of New Hampshire Fish Hatchery well (FH-4)	87	42	1.26	1.19
Industrial production well (MI-88)	395	42	.25	.25
Industrial production well (MI-33)	47	60	0	0
Commercial Fish Hatchery well (PFH)	354	40	.22	.14

showed that selected reaches of the Souhegan River and its tributaries interact with the ground-water system by recharging the MSGD aquifer. Other stream reaches receive discharge from the ground-water system. Understanding the distribution of recharging and discharging stream reaches is important in determining the flow and fate of contaminants moving with ground water. Although some information on the patterns of recharge and discharge were available prior to this study, it was not known if these patterns varied with time.

Investigations of ground-water quality focused on describing the extent of contaminants in the subsurface during synoptic events (HMM Associates, 1989, 1991). The distribution of contaminants from one such synoptic event in 1989 is shown in fig. 2. Temporal changes in water chemistry and physical water properties over an annual hydrologic cycle have not been described.

Hydrologic Conditions

Monthly precipitation totals for 1994 and 1995, collected by the National Oceanic and Atmospheric Administration climatological station in Milford, indicate annual precipitation in 1994 was 2.48 in. above long-term averages and annual precipitation in 1995 was 2.99 in. below long-term averages (table 2). Streamflow and ground-water levels for the region of southern New Hampshire were also above average in 1994 but below average in 1995 (table 2) (Toppin and others, 1994; Hammond and others, 1995).

Above-average air temperatures in December 1994 and the winter of 1995 caused atypically high streamflow and ground-water levels, which are discussed in the "Results of Hydrologic Data Collection" section of this report. For example, above-average streamflow and ground-water levels in December 1994 were caused by unseasonably warm temperatures and runoff from snowmelt and rain. Later during the spring of 1995, the lack of an appreciable snowpack resulted in below-average streamflow and ground-water levels.

A comparison of noncontinuous monthly ground-water levels in the USGS long-term observation well MI-18 in Milford (well number 29 in this report; identified as MOW-36 in a previous report by Harte and Mack, 1992) revealed that the arithmetic-mean water level (7.16 ft below the land surface) for 1994-95 was 1.19 ft above the long-term arithmetic-mean water level

Table 2. Monthly precipitation for 1994 and 1995, and comparison to long-term monthly averages, Milford, New Hampshire

[Values in inches from climatological station at Milford. Source of data is from the National Oceanic and Atmospheric Administration (NOAA). Average precipitation based on records from 1951–80]

Month in 1994	Precipitation	Deviation from average precipitation	Month in 1995	Precipitation	Deviation from average precipitation
January	4.95	1.16	January	3.82	0.03
February	1.54	-1.73	February	2.99	-.28
March	5.99	2.04	March	1.97	-1.98
April	2.54	-1.18	April	2.03	-1.69
May	5.07	1.43	May	3.23	-.41
June	1.77	-1.77	June	1.78	-1.76
July	4.33	1.20	July	3.53	.40
August	4.89	1.21	August	2.35	-1.33
September	5.82	2.29	September	2.53	-1.00
October	.61	-3.21	October	8.23	4.41
November	3.87	-.62	November	6.74	2.25
December	6.10	1.66	December	2.81	-1.63
Total	47.48	2.48	Total	42.01	-2.99

Table 3. Comparison of ground-water levels from long-term monitoring well MI-18 (well number 29) with precipitation and ground-water withdrawals from nearby wells, Milford, New Hampshire

[Location of well MI-18 (well number 29) is found on plate 1; Mgal/d, million gallons per day]

Period of comparison	Average depth of water levels for period of record, in feet below land surface	Standard deviation of water levels, in feet	Average annual precipitation for period of record, in inches	Average daily ground-water withdrawals for period of record, in Mgal/d
1962-65	9.10	1.55	31.79	0.209
1966-73	8.84	1.31	45.50	.570
1974-83	8.37	1.20	47.63	.720
1984-89	7.66	.75	47.83	.512
1990-95	6.98	.68	48.25	.246

for the period of record (1962-95). However, water levels in this well were probably affected by historical variations of ground-water withdrawals in the aquifer, which have decreased since 1984.

Withdrawal effects on water-level changes are noticeable when comparing pre- and post-1984 water levels (fig. 3 and table 3). Long-term water levels for MI-18 are shown in figure 3. A comparison of historical mean water levels, ground-water withdrawals, and precipitation is given in table 3 for periods corresponding to historical changes in ground-water withdrawals in the aquifer. The grouping of water levels by withdrawals allows for a simple comparison of the effects of precipitation and withdrawals on water levels. During 1962-65 and 1990-95, the amount of withdrawals were similar but average annual precipitation was different. Average annual precipitaion was approximately 50 percent greater in 1990-95 than in 1962-65 and, as a result, average water levels were 2.12 ft higher in 1990-95 than water levels in 1962-65. In contrast, 1974-83 and 1984-89 had similar average annual precipitation but different withdrawals. Average daily ground-water withdrawals were approximately 34 percent greater in 1974-83 than in 19-1989 and, as a result, average water levels were 0.71 ft lower in 1974-83 than in 1984-89.

A two-sample Wilcoxon rank sum test (Wilcoxon, 1945), also called the Mann-Whitney test, was used to

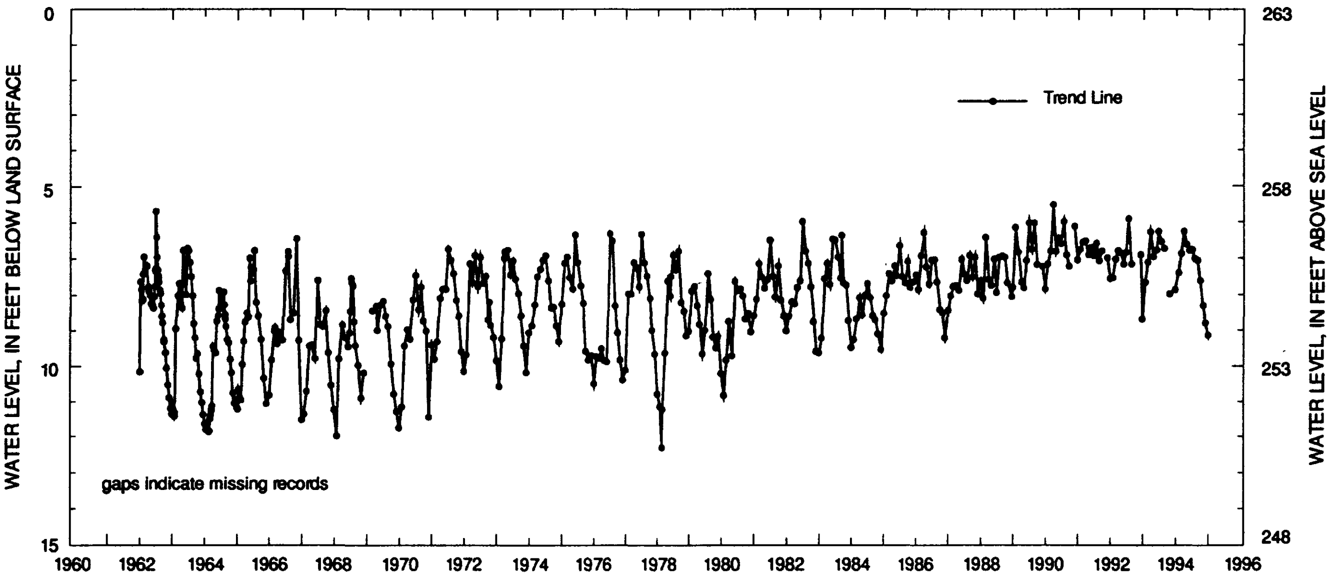

Figure 3. Ground-water levels from a long-term observation well (MI-18; well number 29), Milford, New Hampshire.

determine the significance of differences in the 1974-83 and 1984-89 ground-water levels. Test results indicate water levels are significantly different between the 1974-83 and 1984-89 periods at a 99.98 percent confidence level, which indicates that withdrawals affect ground-water levels in the well.

In order to describe hydrologic conditions present during the 1994-95 study, and during periods when data were collected in Milford for previous USGS studies (Harte and Mack, 1992; Olimpio and Harte, 1994), measurements taken at Milford were referenced to streamflow-duration data from three long-term (greater than 20 years) streamflow gaging stations located outside of the study area (table 4). This technique was used because (1) ground-water levels from the long-term observation well MI-18 appear to be affected by withdrawals, and (2) streamflow gaging on the Souhegan River in Milford has not been done long enough to generate reliable streamflow durations. Referenced gaging stations are on the Souhegan River at Merrimack, N.H. (171 mi^2 drainage area), Stony Brook near Temple, N.H. (3.6 mi^2 drainage area), and the Soucook River near Concord, N.H. (81.9 mi^2 drainage area). Hydrogeologic conditions at these stations are diverse enough to include similar conditions found at Milford. For example, Stony Brook, which has a small drainage area, is responsive to small amounts of precipitation, whereas the other two stations on the Soucook River near Concord and Stony Brook at Merrimack, are less sensitive to small amounts of precipitation (less than 1 in.).

The streamflow-duration data provided in table 4 indicate a relation between the daily discharge of the three reference gaging stations for the days when measurements were collected in Milford with the historical distribution of daily means from the same

Table 4. Streamflow-duration data for daily discharges at three reference streamflow gaging stations for days when measurements were taken in Milford, New Hampshire

[-- no data; figure 1 shows the location of towns for the following gaging stations: Stony Brook near Temple, N.H. (01093800) drainage area is 3.6 mi^2, Souhegan River near Merrimack, N.H. (01094000) drainage area is 171 mi^2, and Soucook River near Concord, N.H. (01089100) drainage area is 81.9 mi^2]

Date	Percent of recurrence interval			Average	Date	Percent of recurrence interval			Average
	Stony Brook	Souhegan River	Soucook River			Stony Brook	Souhegan River	Soucook River	
6/14/88	80	--	86	83	9/12/94	87	84	99	90
9/17/88	81	--	88	85	9/26/94	42	23	84	50
10/3/88	79	--	93	86	9/29/94	30	22	73	42
10/13/88	71	--	82	77	10/11/94	59	67	--	63
11/1/88	27	-	81	54	10/24/94	59	61	--	60
10/18/90	54	--	16	35	11/7/94	53	74	--	64
10/21/90	43	--	2	23	11/21/94	60	77	--	69
10/22/90	46	--	3	25	11/22/94	37	65	--	51
4/12/94	10	--	6	8	12/5/94	7	33	--	20
4/13/94	4	--	7	6	12/19/94	--	31	--	31
4/14/94	4	--	3	4	1/3/95	--	--	25	25
6/16/94	73	--	72	73	3/13/95	25	14	--	20
6/21/94	81	--	88	85	3/27/95	40	23	--	32
7/5/94	92	--	92	92	4/10/95	48	36	40	41
7/15/94	88	--	96	92	4/24/95	47	33	33	38
7/20/94	90	37	97	75	5/8/95	69	57	67	64
8/1/94	86	25	88	55	5/22/95	50	39	47	45
8/15/94	89	32	97	73	6/5/95	39	25	62	42
8/24/94	64	14	88	55	6/28/95	--	85	97	91
8/29/94	81	27	98	69	8/3/95	90	89	--	90

stations and is listed as the percent of time that the historical daily means have been greater than the daily discharge. Above-average hydrologic conditions were present in Milford on days when the average streamflow durations from referenced stations were low (less than 35). Average hydrologic conditions were present when medium streamflow duration values (35 to 65) were present at reference stations, and below-average conditions were present when high duration values (greater than 65) occured.

The collection of streamflow data in the study area was done under a wide range of hydrologic conditions, as indicated in table 4. Above average hydrologic conditions are represented by measurements taken April 12-14, 1994, at Milford; the streamflow of daily discharges at two of the three reference stations range from 3 to 10 percent with an average of 6 percent. Average hydrologic conditions are represented by measurements taken during the period of April 10 to June 5, 1995, at Milford; streamflow at the three reference stations ranges from 12 to 68 percent with an average of 44 percent. Below average hydrologic conditions are represented by measurements taken in 1988 excluding November 1, 1988, and measurements taken from June 28 to September 14, 1995; streamflow at the three stations ranges from 71 to 93 percent with an average of 83 percent for 1988, and streamflow ranges from 85 to 97 percent with an average of 93 percent for 1995.

In conclusion, precipitation, ground-water levels, and streamflow-duration data can be used to describe the hydrologic conditions in Milford during 1994-95. Annual precipitation in 1994 was 9 percent above the average annual precipitation from 1962-95 and annual precipitation in 1995 was 20 percent below for the same period of record. Ground-water levels from the long-term observation well (MI-18, well number 29) were above average for 1994 and 1995 but the effects of historical withdrawals in the aquifer must be considered. Streamflow durations at the three reference stations averaged 56 percent during 1994-95, which suggests that flows were normal. Therefore, hydrologic conditions in 1994-95 were probably normal and, based on long-term precipitation data, precipitation was slightly above normal in 1994 and slightly below normal in 1995.

Acknowledgments

The study of the Milford-Souhegan glacial-drift aquifer is a collaborative effort between Federal, State, and local governments, and private companies and individuals. Biweekly ground-water levels and equipement for monitoring surface-water data were provided by New Hampshire Department of Environmental Services and Environmental Sciences and Engineering, Inc. of Amherst, New Hampshire. The authors wish to thank Wayne Ives and Sharon Perkins of the New Hampshire Department of Environmental Services for collecting ground-water level data as part of the biweekly network monitoring described in this report. The authors also appreciate access to private lands that was given by the owners.

METHODS

Data-collection methods were designed to provide information on the temporal and spatial variability of hydrologic conditions in the MSGD aquifer, in particular, the variability of ground-water levels and the interaction of surface and ground waters. Both hydrologic and physical data were collected. Hydrologic data include measurements of river stage, riverbed water levels, streamflow, and ground-water levels. Physical data include measurements of specific conductance and temperature. Continuous measurements of river stage, riverbed water levels, ground-water levels, specific conductance, and water temperature were made every 15 minutes by electronic sensors and data loggers. Instantaneous measurements of these hydrologic data were also made manually by separate instruments once every 2 weeks (biweekly) or once a month to validate the continuous readings. Manual or noncontinuous measurements were also used to augment spatial coverage of continuous-measurement sites. Comprehensive synoptic measurements of streamflow and ground-water levels were done during high-flow conditions in April 1994.

River stages, riverbed water levels, and ground-water levels are referenced to sea level. Measurement points were surveyed to nearby USGS geodetic benchmarks by the USGS NH/VT District, and private contractors.

Surface Water

Surface water was monitored at over 40 gaging stations throughout the study area. Locations of gaging stations are shown in figure 4. Gaging stations are classified according to frequency of sampling, whether continuous or noncontinuous (manual), and whether the type of measurement is hydrologic (stage, discharge) or physical. Continuous gaging stations provided hydrologic and physical data. Noncontinuous gages were used primarily for hydrologic data collection.

A diagram of a continuous surface-water gaging station is shown in figure 5. The gaging station consists of an inside, large-diameter, riverbed-stilling well, opened 1 ft below the river bottom, and an outside river pipe that is directly connected to the river. To prevent ice formation during winter months, outside river pipes were installed with a gas bubbler system (not shown).

Measurements of river stage were made with a pressure transducer housed in the river pipe, and measurements of riverbed water levels were made with a potentiometer and attached float and weight in the well open to the riverbed. Concurrent measurements of river stage and riverbed water levels allow for an evaluation of hydraulic connection through the riverbed. Pressure transducers recorded the height of water column in pounds per square inch (psi) above a pressure intake opening in the transducer. Potentiometers recorded the depth of water level in feet below a known measurement point.

Hydrologic Data

River stages were monitored continuously at three gaging stations, WLR-1 and WLR-5 on the Souhegan River, and WLR-4 on the discharge ditch. Pressure transducers and potentiometers were used to take measurements every 15 minutes and electronic data loggers stored the readings.

Continuous measurements of river stage from pressure transducers were calibrated against periodic river stage readings from river staff gages and against

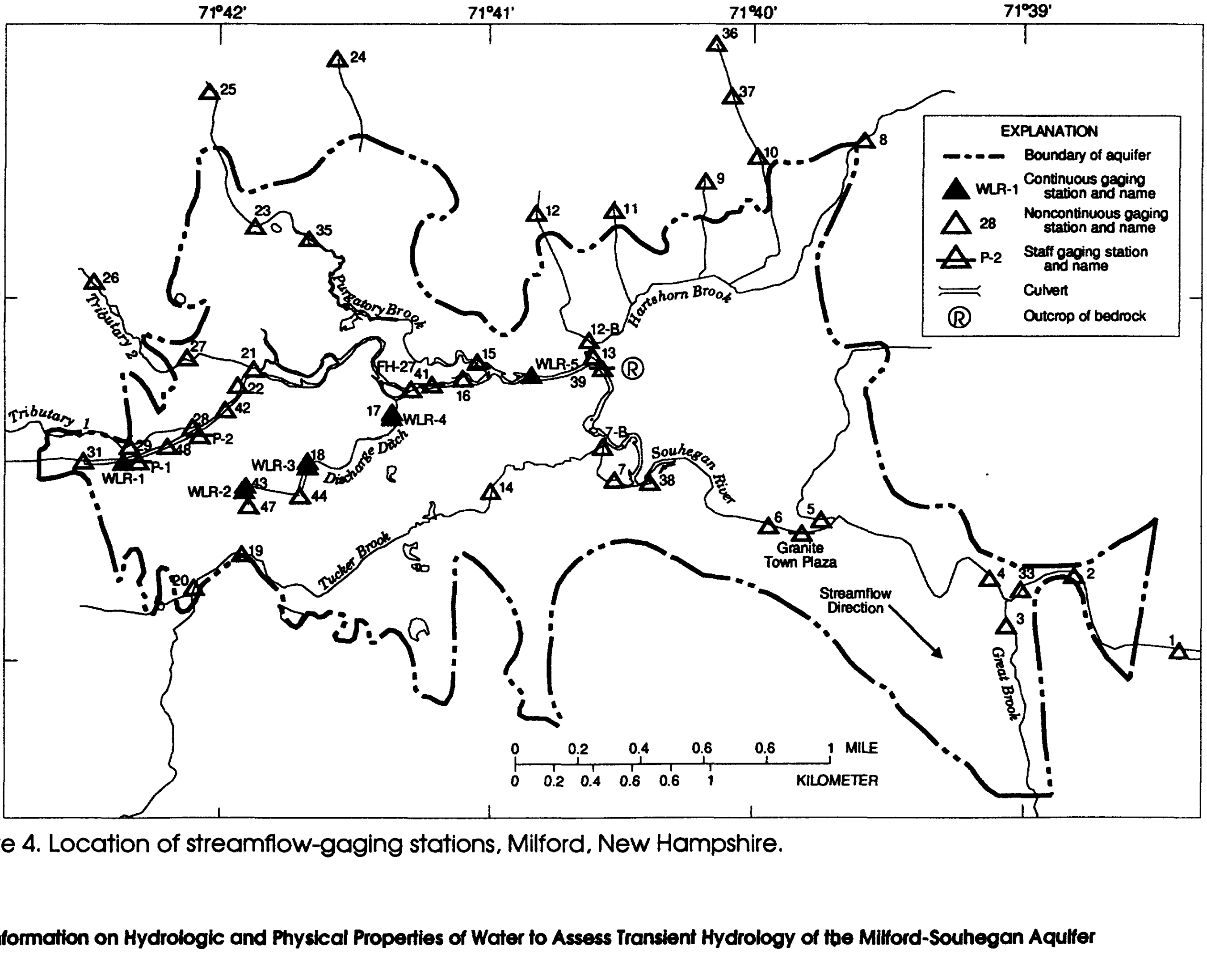

Figure 4. Location of streamflow-gaging stations, Milford, New Hampshire.

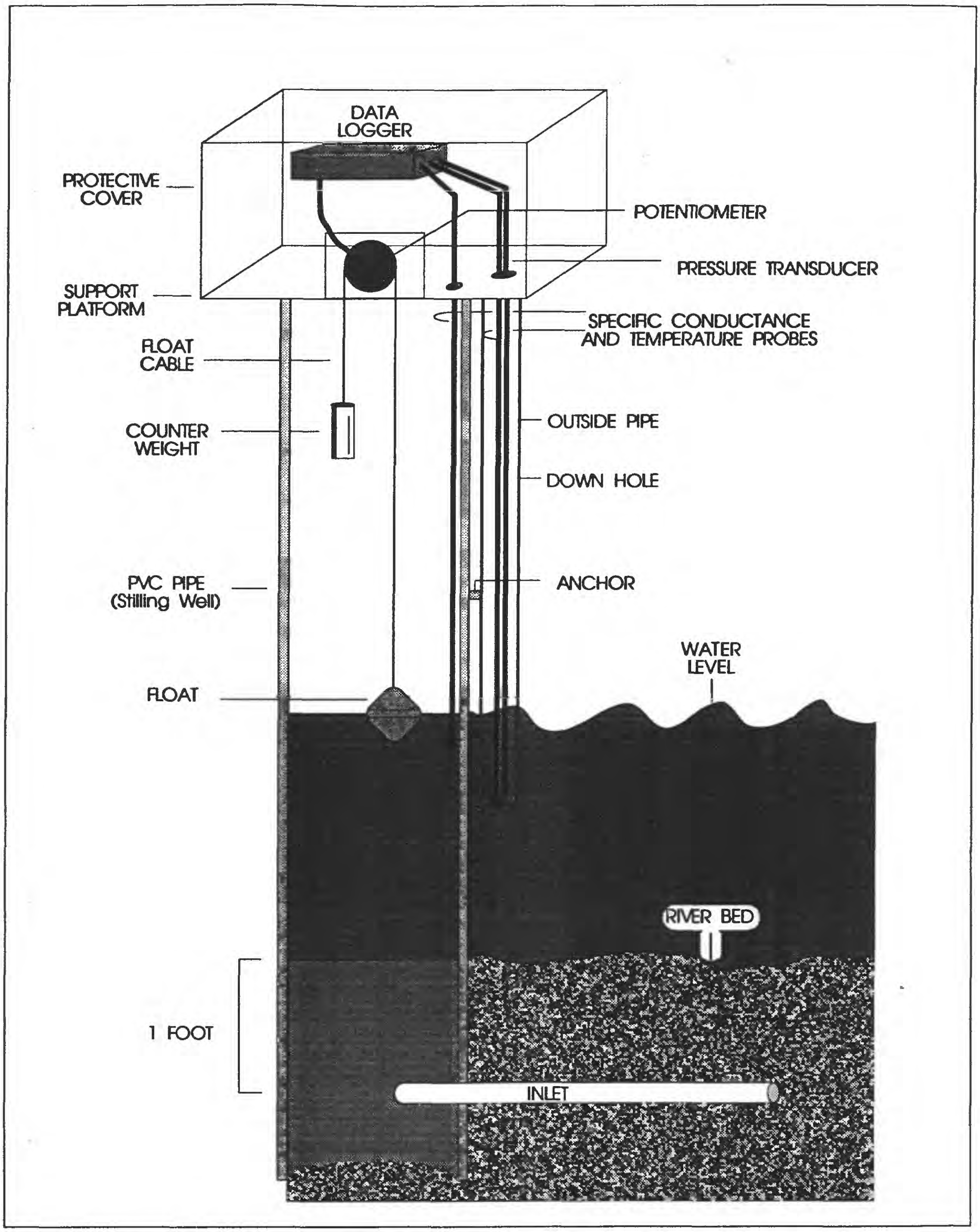

Figure 5. Construction and instrumentation of a continuous streamflow-gaging station, Milford, New Hampshire.

the depth to water from a known datum point on top of the river pipe. Pressure-transducer readings were not adjusted in the field but corrected using a linear relation between instantaneous readings of psi from the transducer and periodic manual measurements of river stage. The linear equation generated a root mean square (rms) between continuous psi readings and periodic measurements of 0.958 for gage WLR-1, 0.994 for gage WLR-5, and 0.966 for gage WLR-4.

Continuous-riverbed water levels from potentiometers were checked biweekly to monthly for accuracy against periodic measurements made with electric water-level probes from known datum points. If a discrepancy exceeded 0.05 ft between the instantaneous reading of the continuous sensor (potentiometer) (fig. 5) and the periodic measurement, continuous readings were adjusted to match the periodic measurement. When corrections were made, continuous readings were later corrected for the time period over which the error occurred. A linear, time-weighted equation was used to adjust continuous readings.

Noncontinuous measurements of river stage were obtained from seven staff gages installed on river banks and used to measure stage to the nearest 0.01 ft. Staff gages were leveled to nearby USGS geodetic benchmarks to compute the altitude of the river stage above mean sea level. River staff gages were positioned adjacent to nearby ground-water wells.

Discharge measurements of streamflow were made at 20 sites during high-flow conditions in April 1994 (high-flow synoptic event) and up to 8 sites on a monthly frequency from June 1994 through the summer of 1995. Measurements of discharge were made with current meters by methods adopted by the USGS as described in standard textbooks, (Kantz, 1982a), and the USGS Techniques of Water-Resources Investigations (Coakley and others, 1997, p. 30-31). Methods used are consistent with the American Society for Testing and Materials standards.

At continuous river gages, WLR-1 and WLR-5 on the Souhegan River, and WLR-4 on the discharge ditch, stage-discharge relations were established to generate a continuous record of streamflow. Discharge relations were computed using the following methods, as described by Toppin and others (1995). In computing discharge records, results of individual measurements were plotted against the corresponding stages, and stage-discharge relation curves were then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements were prepared. Stage-discharge and riverbed water-level-discharge relation curves were also prepared. To define extremes of discharge outside the range of the current-meter measurements, the curves were extended by transforming the curve to a straight line on a logarithmic-scale plot and extending the straight line to discharges above and below the measured values.

Daily mean discharge was computed by applying each recorded stage in the day to the rating table and computing the mean from the sum of the specific discharges. During the winter, backwater from ice partially obscured the stage-discharge relation at gaging stations; therefore, daily mean discharges were estimated from other information such as temperature and precipitation records, observations of the river channel, and records from other stations in the same or nearby basins for comparable periods.

Daily mean discharges were estimated during periods when no gage heights were obtained, or the recorded gage heights were inaccurate; examples include periods when the recorder stopped or otherwise failed to operate properly, the water level dropped below the measuring level of the sensor, or the float was frozen in the riverbed well. For such periods, the daily discharges were estimated from the previous or subsequent recorded range in stage, discharge measurements, weather records, and comparison with other station records from the same (Souhegan River at Merrimack) or nearby basins. For both WLR-1 and WLR-5, a strong statistical relation is present between the discharges at WLR-1 and WLR-5 and the index stations. The coefficients of determination (r^2) between the index stations and either WLR-1 or WLR-5 were greater than 0.995, with a low standard error of less than 0.04, from the multiple regression analysis. At sites with riverbed water levels, the daily mean discharges were obtained from the relation of water levels to discharge.

Accurate computations of continuous streamflow depend primarily on (1) the accuracy of measurements of stage, measurements of discharge, and interpretation of records (Toppin and others, 1994); and (2) the stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements. Different accuracies may be attributed to different parts of a given record.

An important component of computing continuous streamflows is the accuracy of the discharge measurement; discharge measurements are rated during the measurement as excellent, good, fair, and poor. An excellent rating means that about 95 percent of the daily discharges are within 5 percent of their true values; "good," within 10 percent; "fair," within 15 percent; and greater than 15 percent are rated "poor". Dishcarge measurements on the Souhegan River for stations

WLR-1 and WLR-5 were rated excellent to good. Discharge measurements on the drainage ditch were rated good to fair.

A good stage-discharge relation is available for stations WLR-1 and WLR-5 on the Souhegan, but a poor relation is available for station WLR-4 on the discharge ditch. Continuous streamflows computed for the Souhegan River are believed to be accurate to within 5 percent of their true value. Computation of continuous streamflow computed for the discharge ditch was not possible because of the poor relation between recorded stage and measured discharge because of heavy vegetation growth in the ditch.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft^3/s; to the nearest tenth for values between 1.0 and 10 ft^3/s; to whole numbers for values between 10 and 1,000 ft^3/s; and to 3 significant figures for values more than 1,000 ft^3/s. The number of significant figures used is based solely on the magnitude of the discharge value.

Physical Data

Specific conductance and temperature of river waters and riverbed waters were collected continuously, every 15 minutes, at the same stations (WLR-1, WLR-5, and WLR-4) where continuous river stages and riverbed water levels were collected. These parameters were measured by use of water-quality sensors designed by the USGS and recorded concurrently on the same data loggers used to measure river stage and riverbed water levels. Air temperatures were also measured by use of thermistors connected to the data loggers for comparison and possible correlation with water temperatures.

Continuous specific-conductance and temperature measurements were checked biweekly or monthly by comparison with readings from manually operated water-quality instruments. Water-quality sensors were also periodically checked against known standards to ensure correct readings.

Standards of specific conductance were selected to bracket representative ranges of observed field concentrations and included buffer concentrations of 50, 250, and 500 μS/cm at 25°C. For river waters, the manually operated sensors were placed on the outside of the river pipe and readings were compared to continuous readings. For riverbed waters, the manually operated sensors were lowered down the stilling well to obtain readings.

Unlike measurements of river stage and riverbed water levels, continuous values of specific conductance were not adjusted to manual readings if differences were present. This is because specific conductance measurements are subjected to greater error than measurements of hydraulic head. However, a long-term comparison of continuous specific conductance values with manual values was done to evaluate the relative reliability of continuous specific-conductance sensors. If three or more manual readings differed from the continuous reading by more than 10 percent, the probe for the continuous specific-conductance sensor was cleaned with soap; this typically corrected the problem. For this report, reported values of specific conductance are accurate to at least 50 μS/cm.

Continuous measurements of water temperature were also not adjusted to discrete readings if discrepancies were present. Water temperature values are more accurate than specific conductance. Differences between continuous and manual values were estimated to be less than approximately 5 percent of continuous readings. For this report, water temperatures have an accuracy of at least 5°C.

Continuous measurements of air temperature were checked against thermometers. Like comparison of water temperatures, differences between continuous values and periodic measurements were small.

Ground Water

Information on ground-water flow was collected from wells distributed throughout the aquifer (figs. 6 and 7 and plate 1), including the location of observation wells, pumping wells and unused withdrawal wells. Observation wells are classified according to frequency of measurement, and include continuous and noncontinuous wells. At three of the five continuously measured wells [P-1 (well number 335), P-2 (336), and MW-2A (310)], hydrologic (water levels) and physical data were collected. At the other two continuously measured wells [MW-5B (213) and MI-18 (29)], only hydrologic data were collected (fig. 6). Noncontinuous recording observation wells are further classified between wells measured biweekly or as part of the high-flow synoptic. Biweekly measured wells are shown in

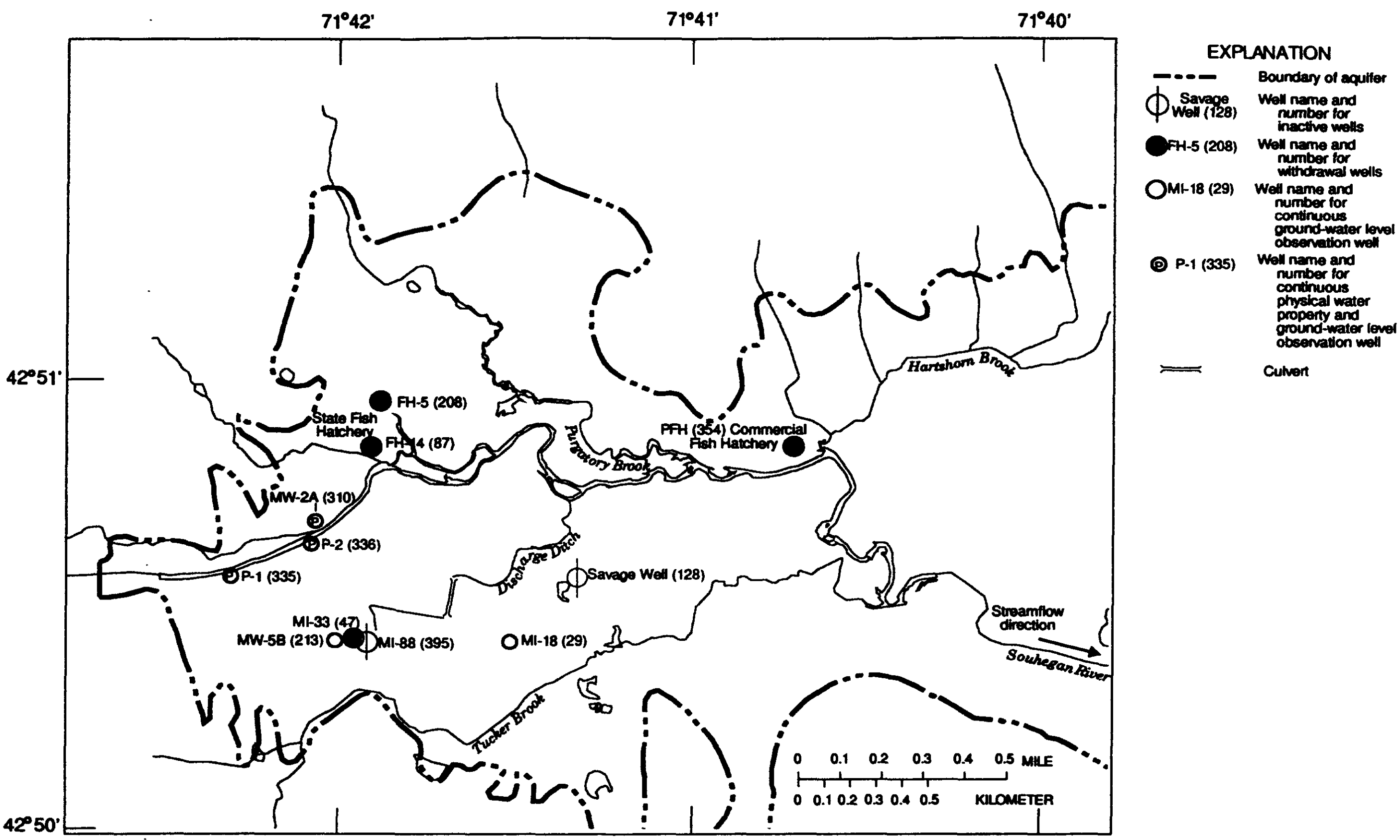

Figure 6. Location of continuous physical water-property and ground-water observation wells, Milford, New Hampshire.

figure 7. Wells measured during the synoptic are in plate 1. Well construction data are given in Appendix 1.

The design of multi-property (water levels, specific conductance, and temperature), continuously monitored ground-water wells is shown in figure 8. The use of multiple probes within small, 2-in diameter wells was made possible by inserting several smaller diameter pipes inside the two-inch well and hanging the probes inside the smaller diameter pipes. These smaller pipes prevented entanglement and interference of the multiple probes inside the well. Access tubes were inserted to allow for manual measurements of water levels and withdrawals of water (see section on physical data). Probes that measured physical water properties were placed near the screen to ensure that readings represented aquifer water and not stagnant borehole water.

Hydrologic Data

Continuous measurements of ground-water levels were made with potentiometers and attached floats and counterweights at wells P-1, P-2 and MI-18, and pressure transducers at wells MW-2A, and MW-5B. Procedures for calibration were the same as for river stage and riverbed water levels.

Measurements made with potentiometers in 2-in diameter wells (P-1 and P-2) were difficult to obtain because of friction between the attached float and weight and the inside of the inner, small-diameter pipe housing the float and weight (fig. 8). Differences between continuous and manual measurements were up to 0.3 ft. Corrections were made in the field if differences exceeded 0.05 ft, as were found with continuous riverbed water levels. In cases where corrections were made, a linear time-weighted equation was applied to adjust the continuous readings to match the manual measurements over the period between the previous visit and the current visit.

Continuous ground-water-level measurements at well MW-5B were made with a pressure transducer and data logger. These data were collected by a private consulting company (Allise deSmet, Environmental Science and Engineering, Inc., written commun., 1995).

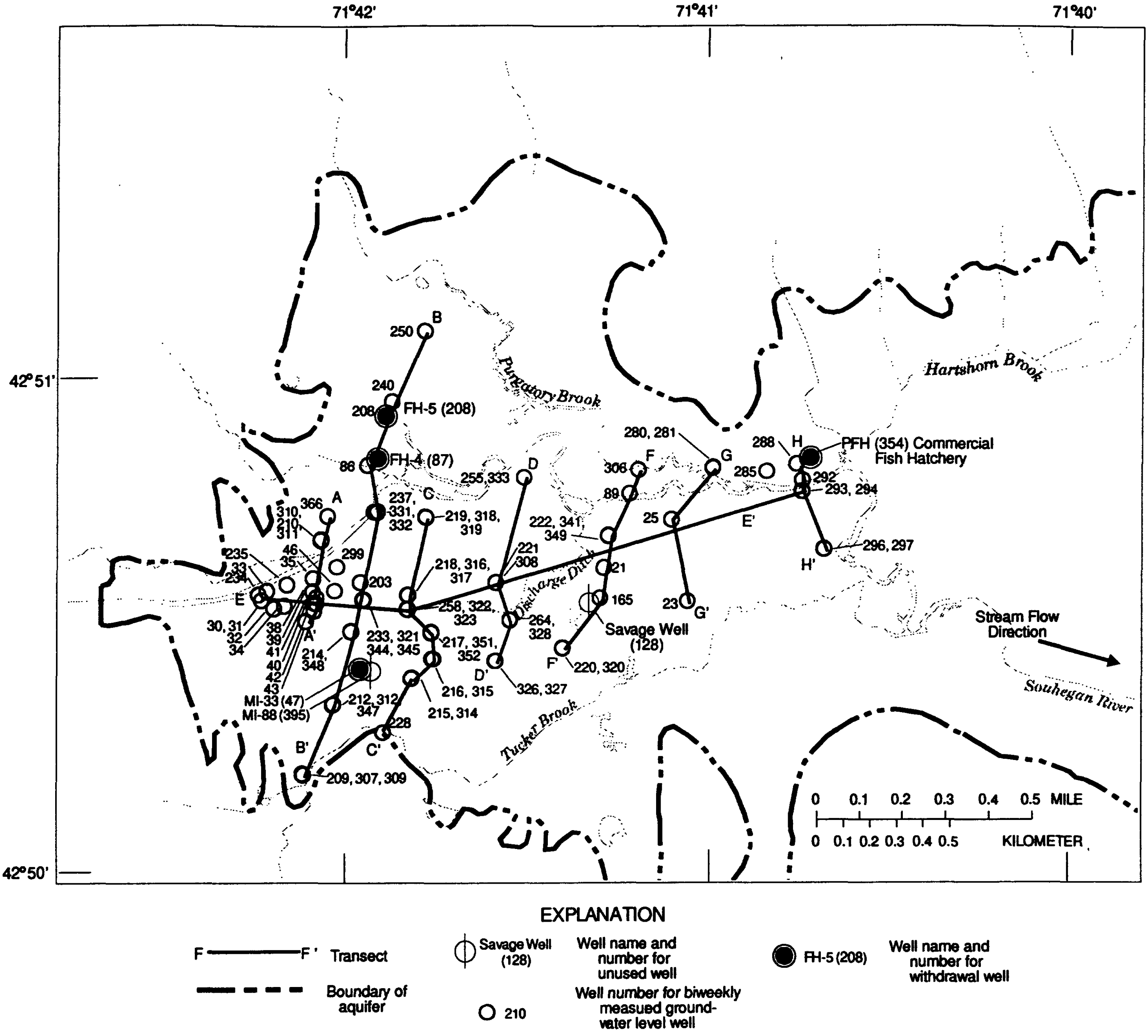

Figure 7. Location of biweekly measured ground-water level wells, Milford, New Hampshire.

Manual measurements of ground-water levels were collected biweekly for 1 year at 87 wells by personel at NHDES and ESE, Inc. Well locations were chosen along transects of the aquifer (fig. 7). These data were used to compute transient hydraulic gradients across transects of the MSGD. Biweekly hydraulic gradients were computed from wells located at the end of the transect unless the direction of the gradient changed along the transect at any given time. If the gradient changed direction along the transect, the transect was divided into segments that had uniform directional gradients, and water levels from wells at the boundaries of the segments were used to compute gradients. Transects were located throughout the contaminant plume and other critical areas of the ground-water-flow field and are labeled alphabetically from west to east for quick reference.

Hydraulic gradients along transects primarily represent apparent gradients and not maximum gradients because the transect may not be aligned with the maximum potential slope of the water table. To

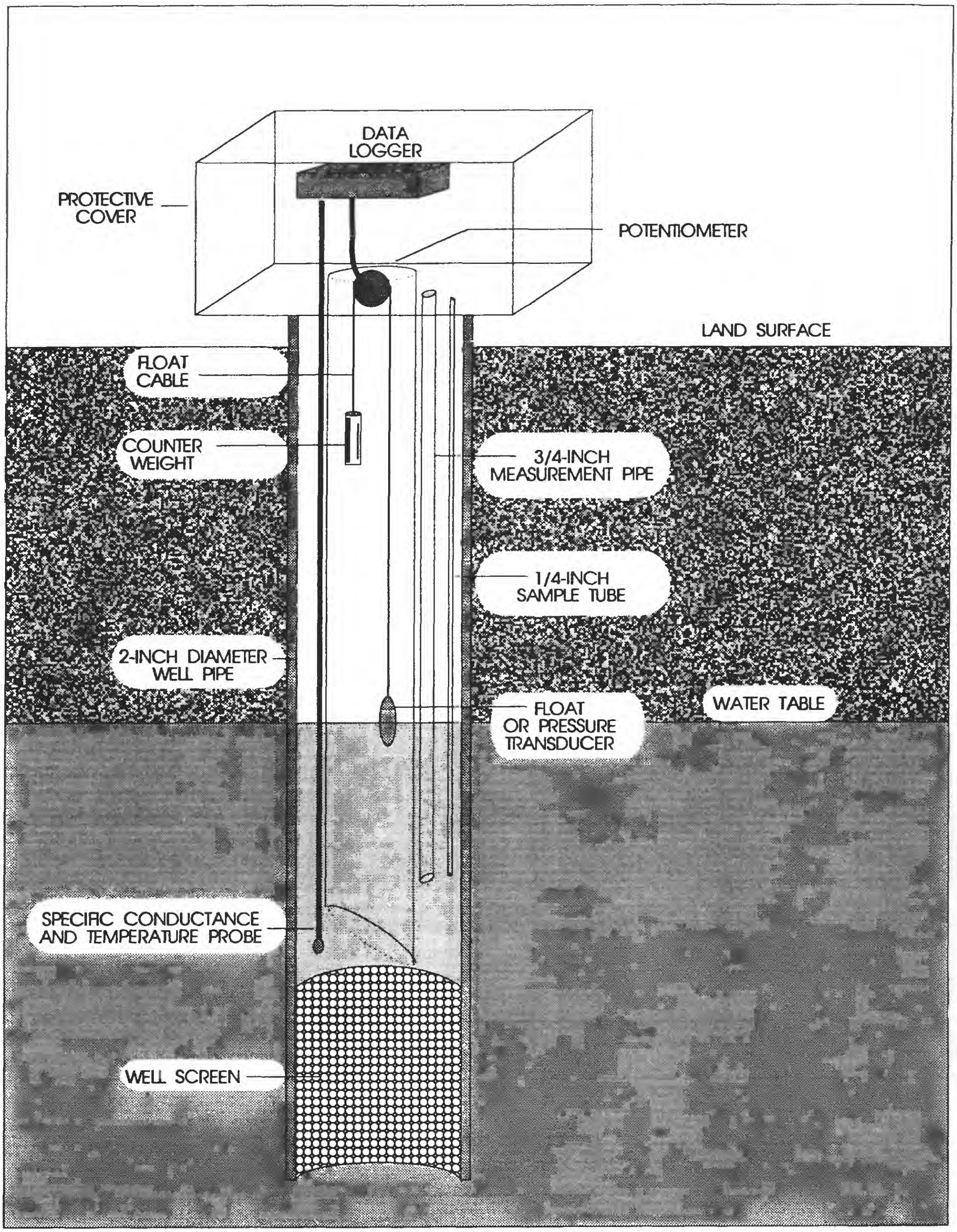

Figure 8. Construction and instrumentation fo continuous ground-water observation wells, Milford, New Hampshire.

approximate maximum gradients more closely, gradients were computed by a three-point planar solution (Marschak and Mitra, 1988) through triangular grouping of wells. Although this technique is an improvement in measuring gradients in the aquifer, and determining the direction of maximum gradient, the direction of maximum hydraulic gradient may not coincide with the primary direction of ground-water flow if the aquifer is anisotropic. Horizontal anisotropy has not been clearly demonstrated in the western part of the aquifer; therefore, it is reasonable to assume that primary flow direction is aligned with the direction of maximum slope.

Manual measurements of ground-water levels also were made at 115 wells during high-flow conditions (high-flow synoptic) in April 1994 (pl. 1). Measurements made during the high-flow synoptic were compared to previous synoptic events in October 1988 and 1990.

Physical Data

Data for physical properties— specific conductance and temperature of ground waters— were collected continuously, every 15 minutes, at three wells (P-1, P-2, and MW-2A). Physical properties were measured by the same type of sensors used at surface-water sites.

The procedure for checking continuous physical properties at wells was difficult because of the small diameter of these wells (2 inches). Water samples were withdrawn by use of a peristaltic pump so that manual measurements of specific conductance and water temperature could be made. Wells were pumped during the interval between automated 15-minute recordings of water levels so as not to affect the operations of the sensors. Methods of checking continuous values of specific conductance and temperature followed the same protocols used at surface-water sites.

Surface-Water and Ground-Water Interactions

The surface- and ground-water data network was also designed to collect information on the interactions between surface and ground water. These interactions include (1) continuous and manual measurements of river stage, riverbed water levels, and adjacent ground-water levels to compute hydraulic gradients between surface and ground waters; (2) continuous measurements of specific conductance and temperature to identify chemical signatures and transport directions between surface and ground waters; and (3) streamflow measurements along stream reaches to identify river seepage and ground-water recharge and discharge patterns.

Streamflow data were used to estimate mean ground-water discharge and relative contributions of ground water to streamflow, called base flow. The percentage of base flow at WLR-5 was computed by methods described by Rutledge (1993, p. 33-39).

RESULTS OF HYDROLOGIC DATA COLLECTION

Hydrologic data presented in the report include graphs of daily averages of continuously measured river stages and riverbed water levels, streamflow discharges, and continuously and biweekly measured ground-water levels. Tables of manual measurements of river stages, streamflow, and ground-water levels are also provided. Instantaneous readings from continuous data are not reported but are available from the USGS upon request.

Surface Water

River stages ranged from 5 ft at WLR-1 to 7 ft at WLR-5 on the Souhegan River but fluctuated less than 2 ft at WLR-4 on the discharge ditch (fig. 9). River-channel geometry probably plays a role in the variability of river-stage fluctuations between WLR-1 and WLR-5. At WLR-1, the broad river channel probably minimizes stage fluctuations. At WLR-5, the river channel is confined within deeply incised banks, which probably accounts for the fact that stage fluctuations are greater at WLR-5 than at WLR-1. At WLR-4 on the discharge ditch, streamflow is fed primarily by processed waters from an industrial facility. The constant flow of these waters minimizes river-stage fluctuations. At all three continuous gaging stations (WLR-1, -4, -5), riverbed water levels mimic river stages. In December 1994, maximum river stages and riverbed water levels might have been the result of snowmelt caused by above-average precipitation and unseasonably warm temperatures. River-stage data from manual measurements are given in appendix 2.

Daily mean discharge ranged from approximately 15 ft^3/s in July 1994 to more than 1,500 ft^3/s in December 1994 on the Souhegan River at gaging stations WLR-1 and WLR-5 (fig. 10). Streamflow at the upstream gage WLR-1 and the downstream gage WLR-5 are similar, with WLR-5 having slightly greater discharge rates than WLR-1. A continuous streamflow discharge record could not be generated for gaging station WLR-4 because of a poor relation between stage and discharge. This relation is attributed to the effect of vegetative growth and the creation of variable backwater conditions in the discharge ditch.

Manual discharge measurements of streamflow indicate that the Souhegan River gains from about 1 and

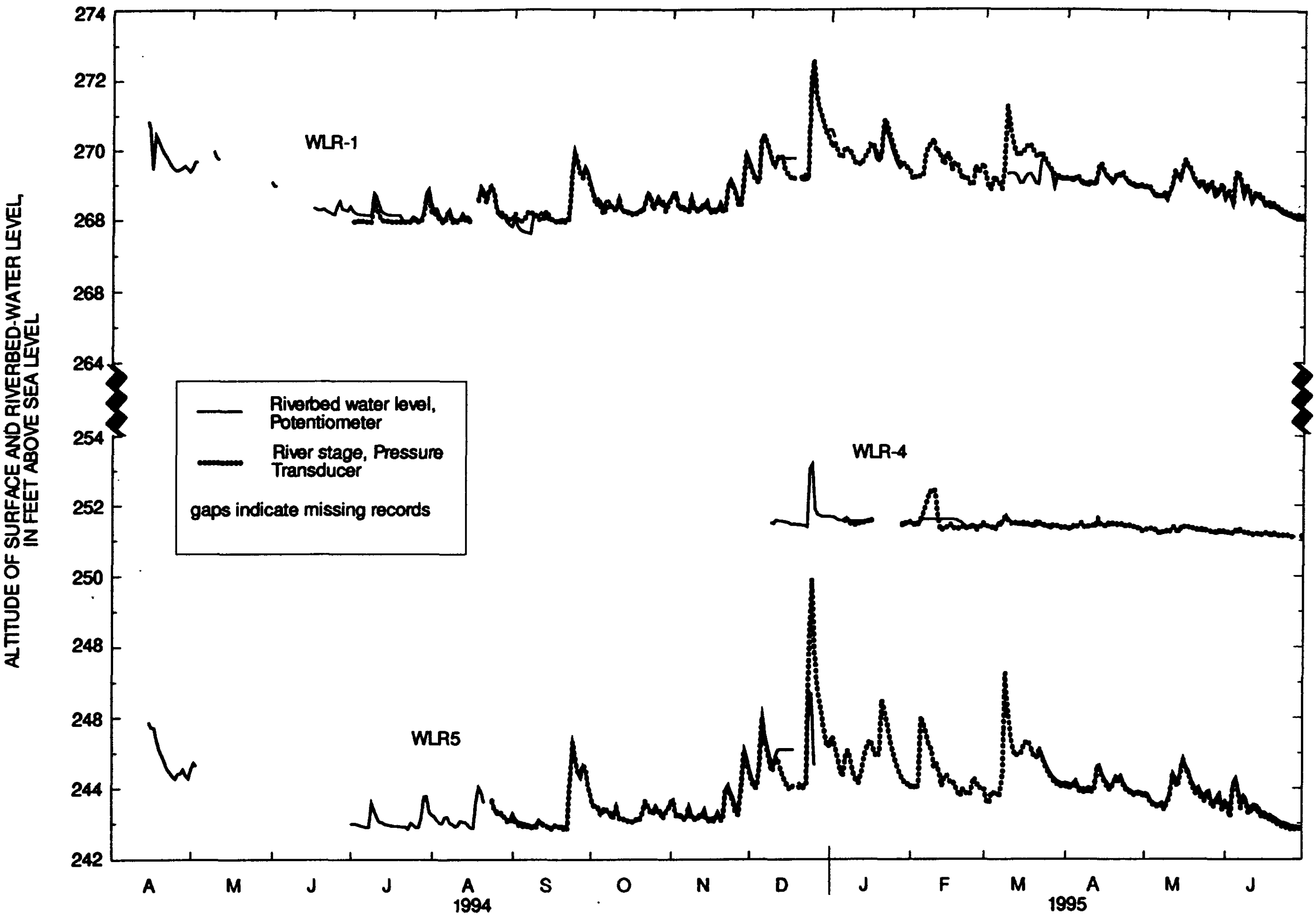

Figure 9. River stage and riverbed water levels at streamflow-gaging stations WLR-1, WLR-5, and WLR-4, Milford, New Hampshire.

1/2 to 30 ft^3/s between gaging stations WLR-1 and WLR-5 (table 5) during streamflow discharges of several tens to several hundred cubic feet per second. On October 11, 1994, the Souhegan River lost 11.2 ft^3/s during a moderate streamflow regime; index stations had an average streamflow duration of 74 percent on October 11, 1994 (table 4). Streamflow in the discharge ditch was generally less than 1 ft^3/s.

Transient variations in streamflow gains/losses along four river reaches were investigated by computing the change in discharge between an upstream and corresponding downstream measurement station (two reaches each on the Souhegan River and discharge ditch (figs. 11 and 12). Net streamflow gains and losses of a river reach were computed by subtracting discharge measured at a downstream station from a discharge measured at its corresponding upstream station. The length of each river reach is approximately 1,000 ft, as defined by the location of the coupled measurement stations. Successive discharge measurements of coupled upstream and downstream stations took about 3 hours and were done on days reported in table 5. Investigative reaches and coupled measurement stations on the Souhegan River include WLR-1 and P-2, WLR-5 and station 39 (by an outcropping of bedrock) (fig. 4). Coupled measurement stations on the discharge ditch are between WLR-2 and WLR-3, and between WLR-3 and WLR-4. A streamflow loss is indicated on the graph (figs. 11 and 12) by a positive change in discharge and streamflow gain by a negative change in discharge. The magnitude of discharge at station WLR-5 is shown in figure 11c for comparison to coupled measurements on the Souhegan River. The magnitude of discharge at station WLR-3 is shown in figure 12c for comparison to coupled measurements on the discharge ditch. An evaluation of the relative amount of streamflow gain/loss per total

Table 5. Streamflow discharge from monthly measurements for selected streamflow-gaging stations, Milford, New Hampshire

[Locations for selected gaging-station sites are shown in figure 4. (WLR-1), continuous gaging station; (P-2), staff gaging station; (6), noncontinuous gaging station. Stage in feet above sea level; discharge in cubic feet per second; --, no data]

Date	(WLR-1) Souhegan River			(P-2) Souhegan River			(WLR-5) Souhegan River			(39) Souhegan River		
	Time	Stage	Discharge	Time	Stage	Discharge	Time	Stage	Discharge	Time	Stage	Discharge
June 16, 1994	1215	268.37	42.2	1300	--	40.8	1350	--	46.7	--	--	--
July 20, 1994	0750	267.97	15.4	0900	261.38	15.9	1020	242.94	18.5	--	--	--
August 24, 1994	0740	269.06	139	0900	262.43	143	1000	244.08	150	--	--	--
Sept 29, 1994	0840	269.52	236	1040	262.84	224	1210	244.62	234	--	--	--
	0940	269.46	236	--	--	--	--	--	--	--	--	--
Oct 11, 1994	1110	268.84	88.3	1200	262.00	65.0	1250	243.71	77.1	1335	234.51	71.2
Nov 22, 1994	1030	269.02	131	1110	262.33	117	1200	244.08	135	1245	235.00	151
Dec 12, 1994	0910	269.39	164	1005	262.52	156	1050	244.26	189	1145	235.21	196
Jan 18 1995	0945	270.08	393	--	--	--	--	--	--	--	--	--
Jan 26, 1995	0725	269.79	297	0825	263.11	285	0935	244.93	336	--	--	--
Feb 27, 1995	1000	269.45	133	1100	265.93	134	1320	244.30	161	1400	235.52	169
March 27, 1995	0915	269.38	196	1000	262.70	189	1100	244.46	226	1150	235.41	234
April 24, 1995	0815	269.09	141	0850	262.47	147	0930	244.15	167	1115	235.14	178
May 22 1995	0800	269.01	129	0845	262.33	121	0930	244.00	139	1115	235.03	160
June 28, 1995	0800	268.07	17.8	0850	261.53	19.5	1030	243.02	21.5	1115	233.87	23.0
Aug 03, 1995	0900	268.15	23.4	945	261.63	22.5	1030	243.07	25.5	1115	233.92	26.1
Sept 14, 1995	0915	--	5.10	1000	--	4.58	1055	--	6.71	1140	--	6.85

Date	(6) Souhegan River			(WLR-2) Discharge Ditch			(WLR-3) Discharge Ditch			(WLR-4) Discharge Ditch		
	Time	Stage	Discharge	Time	Stage	Discharge	Time	Stage	Discharge	Time	Stage	Discharge
June 16, 1994	--	--	--	1100	262.43	0.354	1005	255.94	0.505	0920	251.08	0.283
July 20, 1994	--	--	--	1210	262.45	.540	1315	255.92	.450	1415	251.54	.140
Aug 24, 1994	--	--	--	1200	262.46	.674	1240	255.88	.540	1315	251.31	.484
Sept 29, 1994	--	--	--	1315	262.46	.540	1355	255.94	.500	1420	251.44	.390
Oct 11, 1994	--	--	--	0750	262.45	.418	0910	256.10	.441	1025	251.36	.218
Nov 22, 1994	--	--	--	0750	262.44	.397	0945	256.10	.413	0855	251.36	.249
Dec 19, 1994	--	--	--	0745	262.42	.363	850	256.05	.493	0820	251.54	.302
Jan 18, 1995	--	--	--	0740	262.44	.438	0850	256.09	.486	0820	251.62	.661
Jan 26, 1995	--	--	--	--	--	--	--	--	--	--	--	--
June 16, 1994	--	--	--	1100	262.43	.354	1005	255.94	.505	0920	251.08	.283
July 20, 1994	--	--	--	1210	262.45	.540	1315	255.92	.450	1415	251.54	.140
Aug 24, 1994	--	--	--	1200	262.46	.674	1240	255.88	.540	1315	251.31	.484
Sept 29, 1994	--	--	--	1315	262.46	.540	1355	255.94	.500	1420	251.44	.390
Oct 11, 1994	--	--	--	0750	262.45	.418	0910	256.10	.441	1025	251.36	.218
Nov 22, 1994	--	--	--	0750	262.44	.397	0945	256.10	.413	0855	251.36	.249
Dec 19, 1994	--	--	--	0745	262.42	.363	850	256.05	.493	0820	251.54	.302
Feb 27, 1995	--	--	--	0720	262.54	.338	0855	256.04	.407	0820	251.39	.176
March 27, 1995	--	--	--	0745	262.54	.305	0845	256.02	.443	0825	251.44	.428
April 24, 1995	--	--	--	0745	262.56	.339	0835	256.01	.438	0710	251.48	.309
May 22, 1995	--	--	--	0650	262.55	.323	0740	256.00	.357	0720	251.34	.398
June 28, 1995	0935	--	21.9	0625	262.59	.376	0730	256.04	.402	0710	251.07	.211
Aug 3, 1995	0815	--	27.8	0655	262.57	.405	0845	256.28	.385	0725	251.16	.157
Sept 14, 1995	0740	--	7.52	0705	--	.431	0840	--	.358	--	--	--

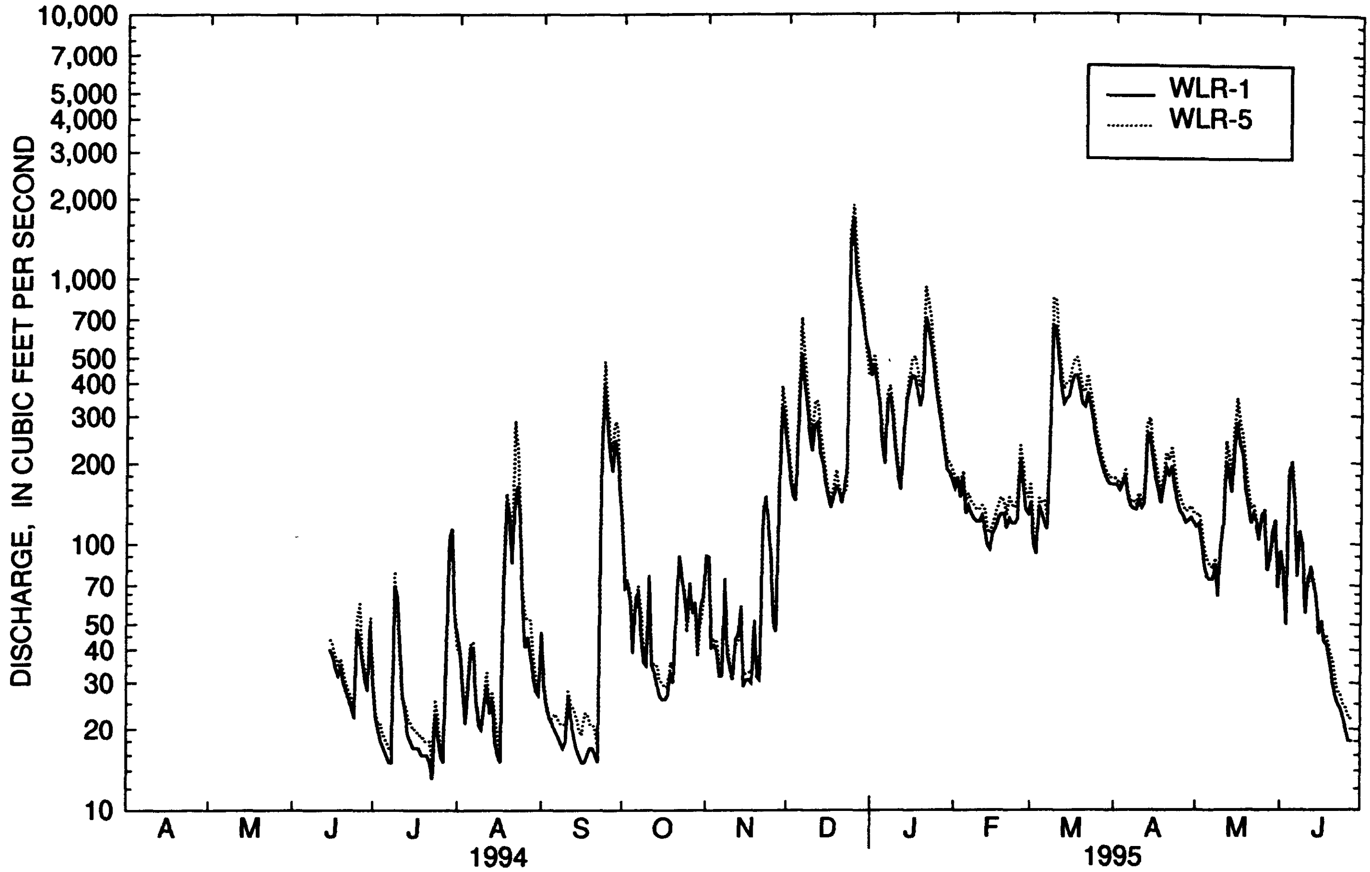

Figure 10. Daily mean discharge fort streamflow-gaging stations WLR and WLR-5, Milford, New Hampshire.

streamflow can be done if the change in discharge is compared to magnitude of discharge.

All reaches show fluctuations or transient shifting between streamflow gain and loss (figs. 11 and 12) but results also show that each reach is predominantly a gaining reach or a losing reach. Predominantly losing reaches include the upstream reach[1] between WLR-1 and P-2 on the Souhegan River and along the downstream reach between WLR-3 and WLR-4 on the discharge ditch; a majority of measurements show a net decrease in discharge from the upstream to the downstream station. Conversely, predominantly gaining reaches include the downstream reach between WLR-5 and station 39 on the Souhegan River and along the upstream reach between WLR-2 and WLR-3 on the discharge ditch; a majority of measurements show a net increase in discharge from the upstream to the downstream station. The magnitude of total discharge seems to have had no effect on whether a reach shifts between a losing or gaining reach.

In general, net discharge along the upstream reach of the Souhegan River, between WLR-1 and P-2, averages a streamflow loss of 4.9 ft^3/s, whereas net discharge along the downstream reach of the Souhegan River, between WLR-5 and station 39, averages a streamflow gain of 6.8 ft^3/s (fig. 11). Streamflow losses were at a maximum during the fall of 1994 and winter of 1994-95 along the upper reach between WLR-1 and P-2 (fig. 11). On the discharge ditch, net discharge along the upstream reach, between WLR-2 and WLR-3, averages a 0.03 ft^3/s streamflow gain, whereas net discharge along the downstream reach between WLR-3 and WLR-4 averages a streamflow loss of 0.15 ft^3/s.

Although the tendency of a reach to lose or gain is apparently unaffected by the magnitude of streamflow, the magnitude that a reach loses or gains is nevertheless partly affected by the limits of total streamflow through a reach. This is important because the potential amount of available gain or loss will increase with increasing

[1]The upstream reach of the Souhegan River in Milford is a transition zone between a narrow confined valley in the town of Wilton to a wide open valley in Milford. The transition is marked by an increase in the transmissivity of valley sediments from the narrow to wide valley, which facilitates streamflow loss.

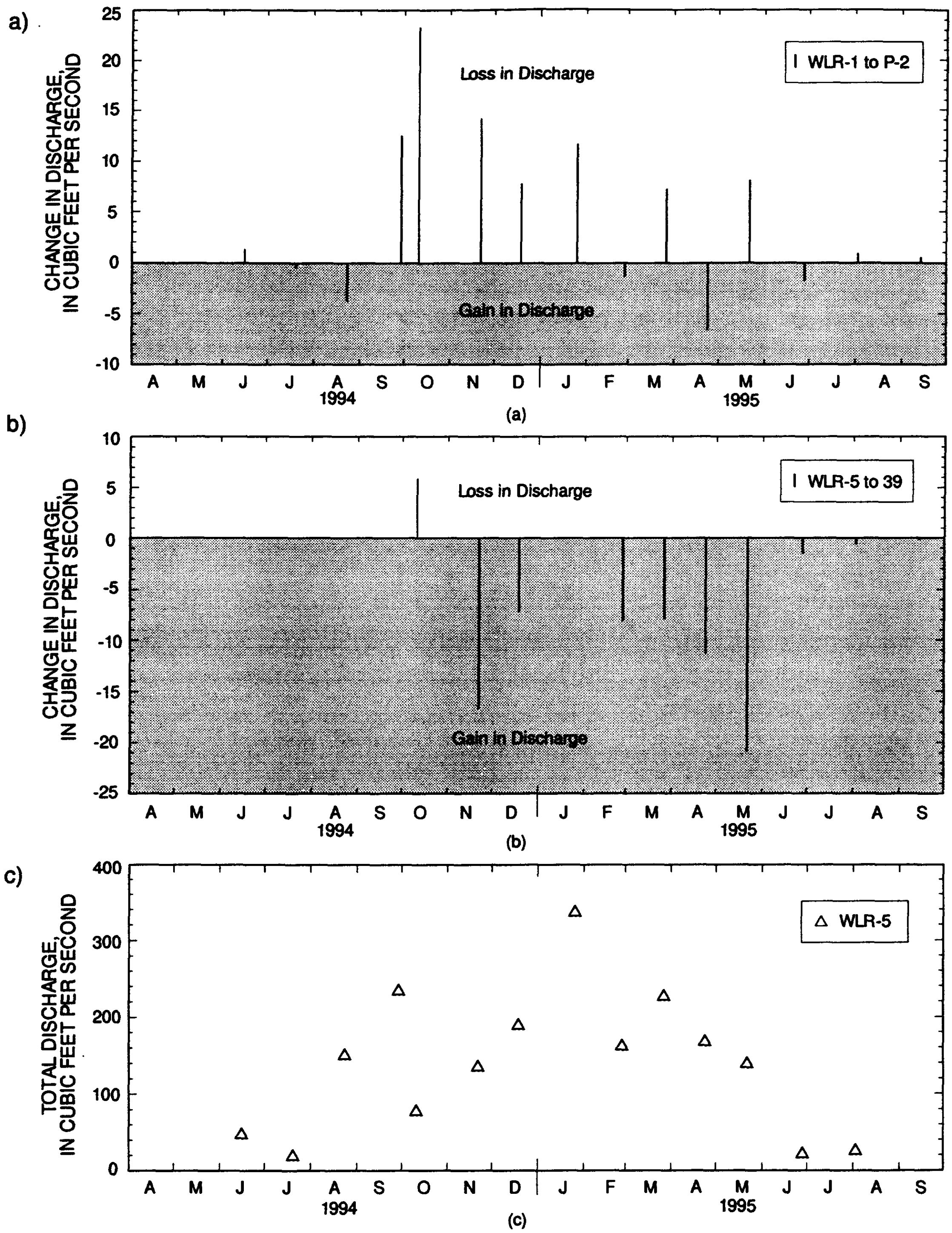

Figure 11. Change in streamflow-discharge in the Souhegan River in Milford, New Hampshire between: (a) WLR-1 and P-2, (b) WLR-5 and station 39, and (c) streamflow discharge at WLR-5.

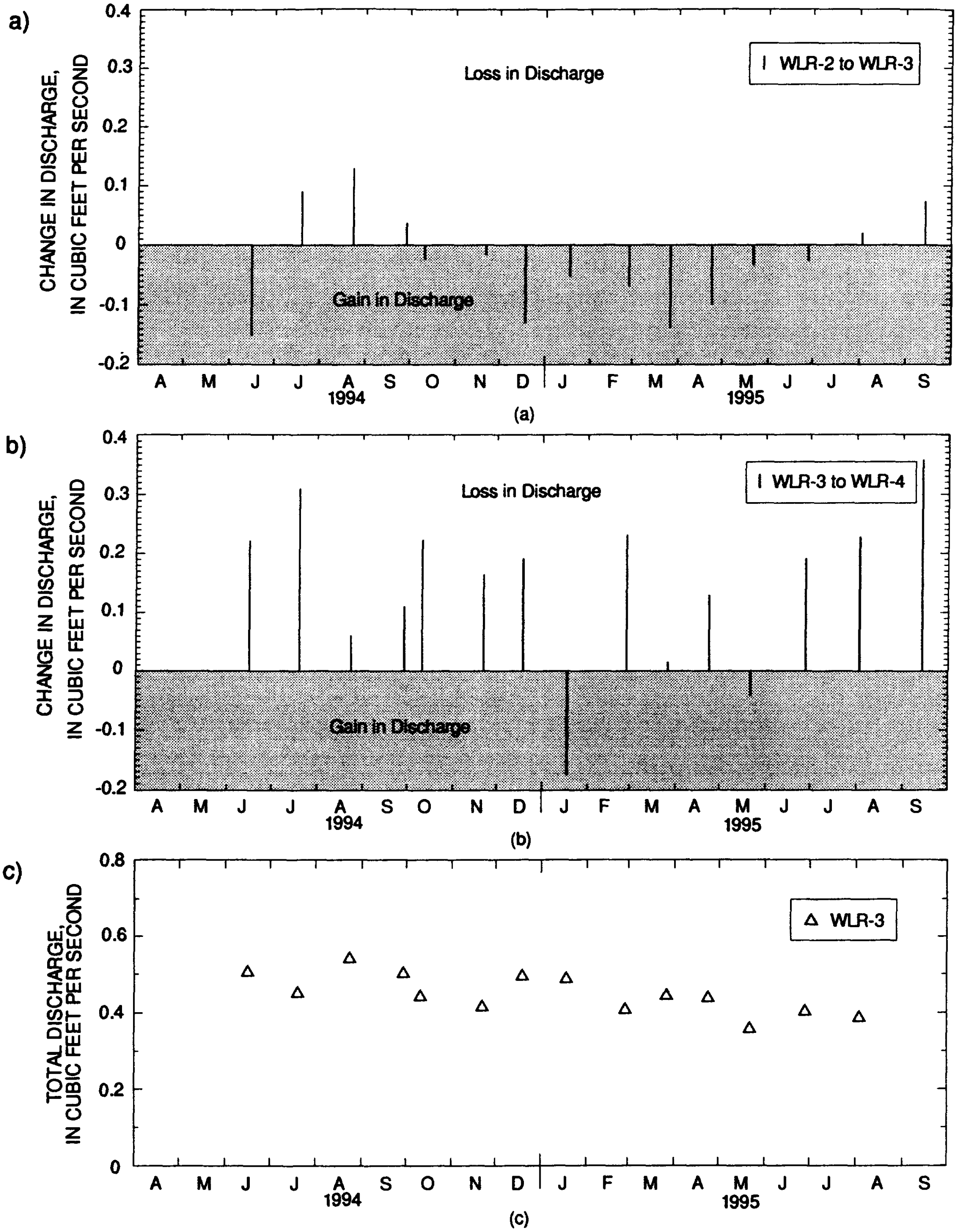

Figure 12. Change in streamflow-discharge in the discharge ditch in Milford, New Hampshire between: (a) WLR-2 and WLR-3, (b) WLR-3 and WLR-4, and (c) streamflow discharge at WLR-3.

streamflow. For example, along the upstream reach of the Souhegan River between WLR-1 and P-2, the highest observed streamflow loss accompanied the highest streamflow during the fall and winter of 1994-95. Although the maximum potential loss or gain occurs during the highest discharge, a nonlinear relation is present between the actual amount of loss or gain and available streamflow. A good example is provided by the measurements from October 11, 1994, when streamflow loss (23.3 ft^3/s) and the percent of total streamflow loss (26 percent) were highest; the latter occurred on January 26, 1995, with a measured discharge of 297 ft^3/s at WLR-1 and a loss of 12 ft^3/s along the upper reach between WLR-1 and P-2 (a loss per streamflow ratio of 0.04 percent).

Although some clear tendencies are present for the investigated reaches, several factors must be recognized that can complicate the analysis of streamflow gains and losses. The first factor is inaccuracy in computed discharges, gains, and losses. The computed net gain or loss between two coupled stations is subject to a potential error of 10 percent for two excellent-rated measurements (5 percent each). Therefore, confidence that computed gains/losses are actual and not a function of measurement inaccuracies must be partly dependent on whether computed gains/losses exceed the 10 percent criteria for excellent-rated measurements, which applies to reaches on the Souhegan River, and 20 percent for good- to fair- rated measurements, which applies to reaches on the discharge ditch. Twenty percent of the computed gains/losses exceed the 10 percent criteria for the measurements on the Souhegan River (between WLR-1 and P-2, and between WLR-5 and station 39), and 33 and 66 percent of the computed gains/losses exceed the 20 percent criteria on the discharge ditch (between WLR-2 and WLR-3, and between WLR-3 and WLR-4). Of the 20 percent for measurements taken on the Souhegan River, losses only were computed for the upper reach (between WLR-1 and P-2) and gains only were computed for the downstream reach (between WLR-5 and station 39).

The second factors are time-dependent river-aquifer processes. Different river-aquifer processes occur at different times of the year because of climatic conditions and result in a non-linear system response. For example, some measurements were made during dry, low-flow conditions when ground-water recharge or discharge is the primary factor in gains or losses. During high-flow periods, processes such as overland runoff, interflow, and bank storage may affect streamflow gains or losses.

The last factor is variablity of streamflow during the time measurements were taken. Typically, it took 3 hours to measure discharge at two coupled stations. If variations in streamflow during the measurement exceeded the actual gain/loss along the river reach, then the computed gain/loss values reflect a time-series analysis of streamflow changes instead of streamflow gains/losses along a reach at a specified time. These three factors may account for the apparent oscillations between losing and gaining for the investigated reaches. Therefore, it is conceivable that reaches are consistently losing or gaining.

Data from this study showed that the upper reaches of the Souhegan River had streamflow losses during a range of streamflow conditions and not just during low-flow conditions, as was the focus of previous investigations (Harte and Mack, 1992). The magnitudes of streamflow losses/gains on the Souhegan River were generally greater when the average streamflow from the index stations (Stony Brook at Temple, Souhegan River at Merrimack, and Soucook River at Concord) was less than 70 percent exceedance (tables 4 and 5). Again, previous studies focused on measurements of streamflow losses/gains during low-flow conditions when streamflow durations were greater than 70 percent; therefore, streamflow losses/gains were underestimated.

Streamflow losses on the discharge ditch between stations WLR-3 and WLR-4 were generally less than those reported previously. Losses reached their minimum during fall and winter.

The areal pattern of losing and gaining streamflow reaches for the high-flow synoptic (table 6) is shown in figure 13c, along with patterns for low-flow conditions (figs. 13a and 13b) from previous studies (Olimpio and Harte, 1994). During high-flow conditions, it was not possible to determine gains and losses on the main stem of the Souhegan River because of inaccuracies associated with taking discharge measurements during high-flow conditions. However, patterns of gain and loss were delineated on tributaries with relatively low discharges. A losing reach was measured on the unnamed tributary next to the State Fish Hatchery withdrawal wells during the high-flow synoptic. Reaches on Tucker Brook and the discharge ditch showed gains. One reach on Purgatory Brook showed a

Table 6. Streamflow measurements from high-flow synoptic gaging stations, April 1994, Milford, New Hampshire

[Stage in feet above sea level; discharge in cubic feet per second; --, no data]

Site (figure 4)	Stream or river	April 12, 1994		April 13, 1994		April 14, 1994		
		Discharge	Time	Discharge	Time	Discharge	Time	Stage
3	Great Brook	--	--	--	--	56.0	1505	--
7B	Tucker Brook	--	--	13.9	1015	--	--	--
14	Tucker Brook	--	--	12.2	1050	--	--	--
15	Purgatory Brook	--	--	66.2	1320	--	--	--
17	Discharge Ditch	0.800	1445	--	--	--	--	--
18	Discharge Ditch	.664	1400	--	--	--	--	--
20	Tucker Brook	--	--	13.8	0945	--	--	--
21	Souhegan River	--	--	5.68	1500	--	--	--
23	Purgatory Brook	--	--	59.6	1205	--	--	--
24	(no name)	.33	1632	--	--	.33	1632	--
25	Purgatory Brook	--	--	53.4	1255	--	--	--
26	Tributary 2	--	--	7.00	1500	--	--	--
27	Tributary 2	--	--	7.27	1430	--	--	--
29	Tributary 1	--	--	3.53	1645	--	--	--
[1]30	Tributary 1	--	--	2.84	1625	--	--	--
33	Souhegan River	688	1330	--	--	--	--	--
43	Discharge Ditch	.436	1205	--	--	--	--	--
44	Discharge Ditch	.491	1235	--	--	--	--	--
47	Discharge Ditch	.200	--	--	--	--	--	--
48	Souhegan River	569	0950	--	--	704	1015	--
WLR-5	Souhegan River	--	--	--	--	812	1220	246.42
		--	--	--	--	847	1420	246.39

[1]Station 30 is not shown on figure 4 but is located 2,000 feet upstream of gaging station 29.

gain of about 7 ft^3/s (approximately 12 percent of streamflow). A large reach of losing streamflow from the upstream reaches of the Souhegan River past the State Fish Hatchery wells was mapped during moderate and low streamflow (figs. 13a and 13b). The State Fish Hatchery well FH-4 (well number 87) induces large amounts of losing discharge and river infiltration to the aquifer (figs. 2, 13a, and 13b).

Ground Water

Ground-water levels from five continuously measured wells (July 1994 to July 1995) fluctuated up to 5 feet and responded similarly to hydrologic conditions (fig. 14). Water levels in all five wells rose to a maximum in December 1994 and were at a minimum during summer 1994. Ground-water data collected after July 1995 (not included in this report) show that water levels were lower than levels in the summer of 1994.

Ground-water levels from biweekly measurements (June 1994 to June 1995) were also at a maximum in December 1994 (appendixes 3 and 4) except at FH-5-OBS1 (well number 240), which showed maximum water levels in June 1994. Well FH-5-OBS1 is 10 ft away from the State Fish Hatchery withdrawal well FH-5 (well number 208), and water levels at FH5-OBS1 are affected by variations in withdrawals at FH-5. In June 1994, withdrawals were temporarily stopped, which caused water levels to rise in well FH-5-OBS1 (Tom Givetz, New Hampshire Fish and Game, oral commun., 1997). Minimum water levels also were recorded in summer 1994. Because of the below average precipitation in the summer of 1995 (National Oceanic and Atmospheric Administration, written commun., 1995), water levels in late summer of 1995 were below those from the previous summer (P.T. Harte, U.S. Geological Survey, written commun., 1995).

Ground-water levels from biweekly measurements showed greatest fluctuations near areas

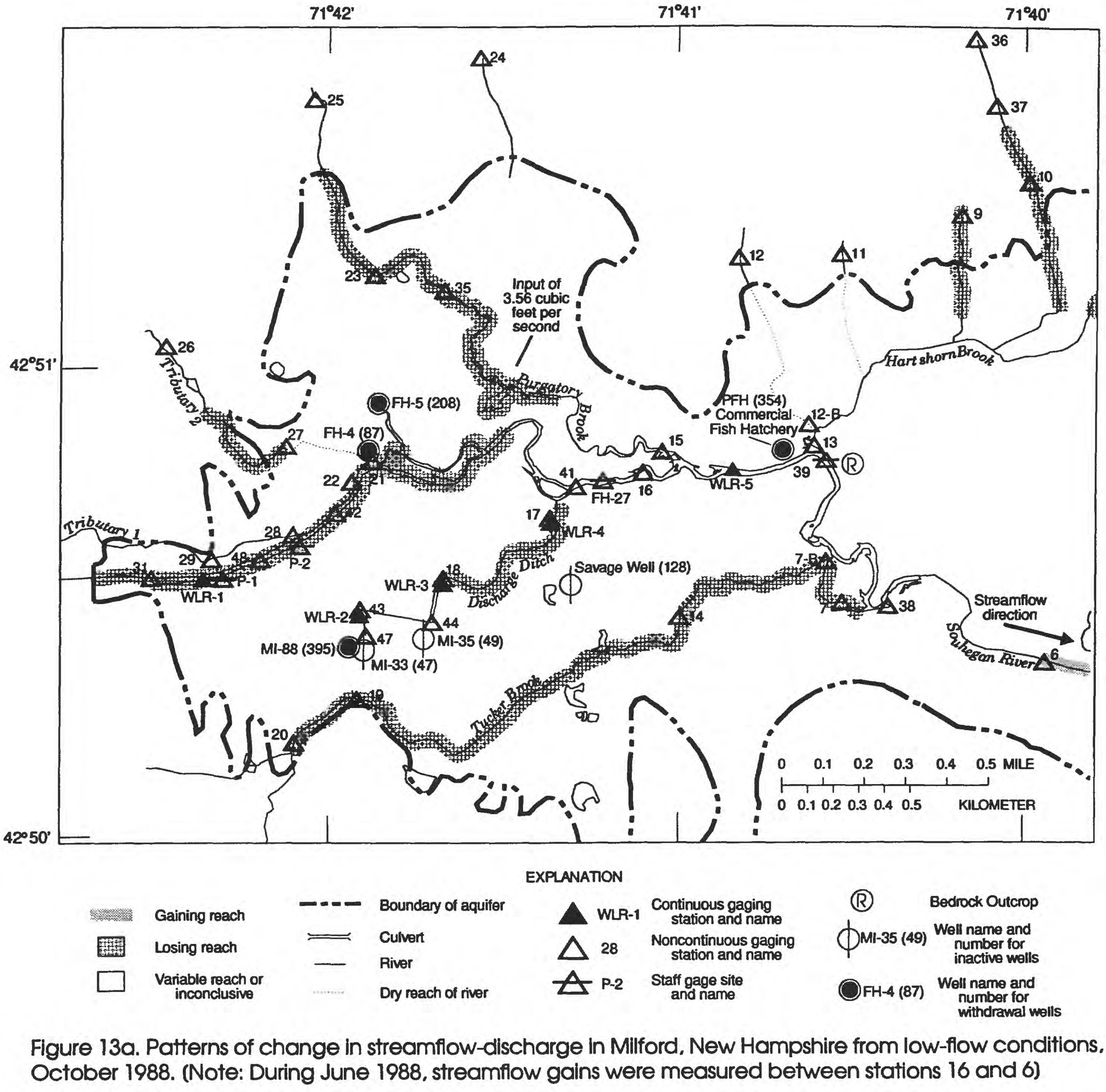

Figure 13a. Patterns of change in streamflow-discharge in Milford, New Hampshire from low-flow conditions, October 1988. (Note: During June 1988, streamflow gains were measured between stations 16 and 6)

of ground-water withdrawals (table 7; appendixes 3 and 4). A maximum fluctuation of 16.47 ft was measured at an observation well (FH-5-OBS1; well number 240) adjacent to the State Fish Hatchery withdrawal well, FH-5 (fig. 7; well number 208). Fluctuations of this magnitude are caused by the expansion and contraction of the cone of depression around the withdrawal well. The expansion and contraction of the cone of depression is caused by variations in withdrawals and in ground-water recharge. Observations of water levels in well FH-5 during withdrawals show quick response to recharge from precipitation (Tom Givetz, New Hampshire Fish and Game, oral commun., 1997). Most ground-water levels fluctuated between 2 and 5 ft (60 out of 87 wells). Ground-water levels fluctuated the least, less than 2 ft, in wells located in the central part of

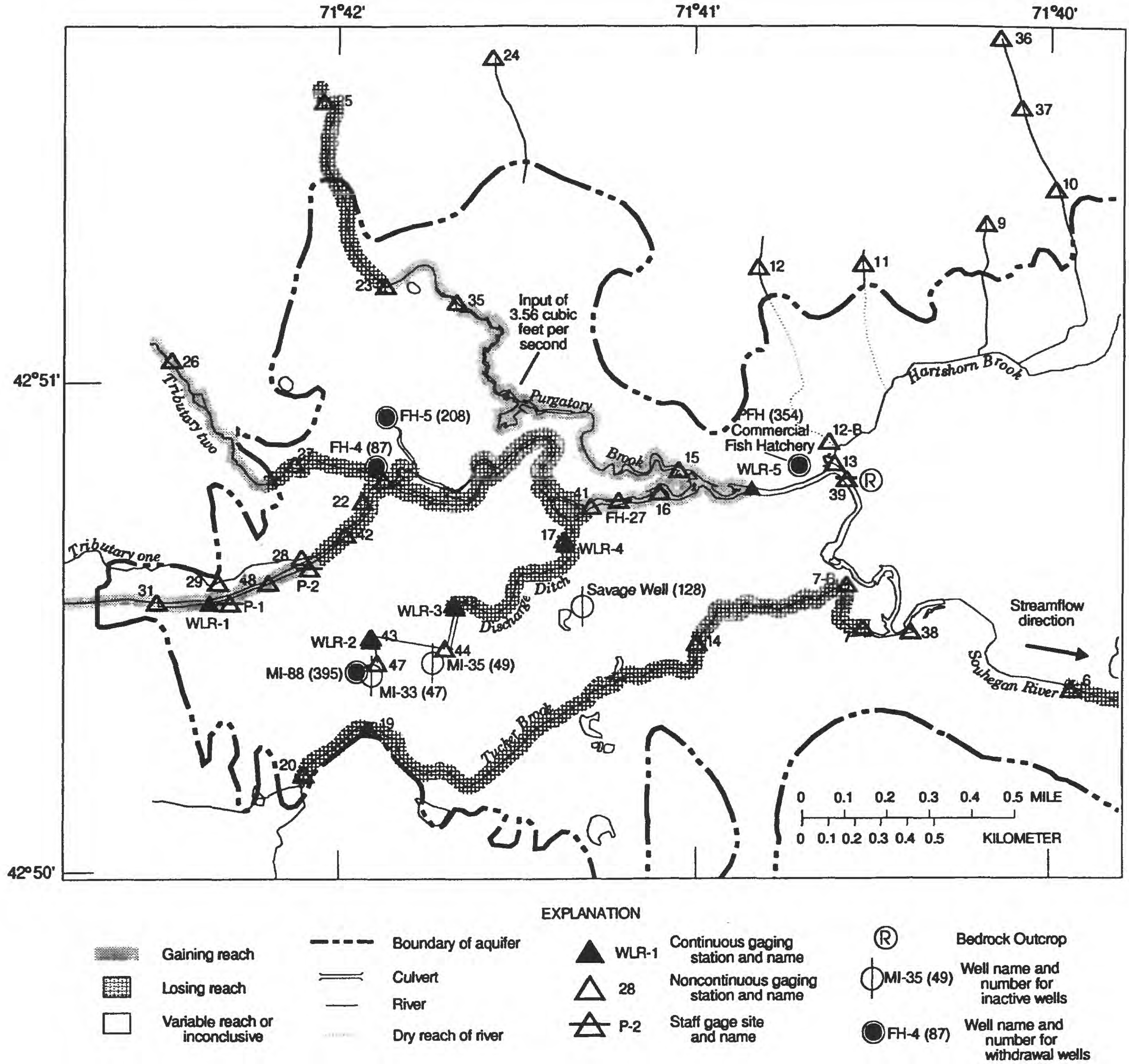

Figure 13b. Patterns of change in streamflow-discharge in Milford, New Hampshire from medium-flow conditions, October 1990.

the MSGD plume (fig. 2). The central part of the contaminant plume is centrally located between a recharge zone at the upper reaches of the Souhegan River and a discharge zone at the middle reaches of the Souhegan River. The central zones of a flow system typically have the least fluctuations of water levels (Toth, 1962). In recharge zones, ground-water levels are affected by variations in recharge to the aquifer from river leakage and precipitation recharge. In discharge zones, ground-water levels are affected by the amount of river-stage fluctuations; therefore, where river-stage fluctuations increase, so will fluctuations increase in ground-water levels.

Vertical hydraulic gradients seem to be relatively constant throughout the year. Water levels at well clusters (wells grouped together and screened at different depths) closely followed each other (appendix

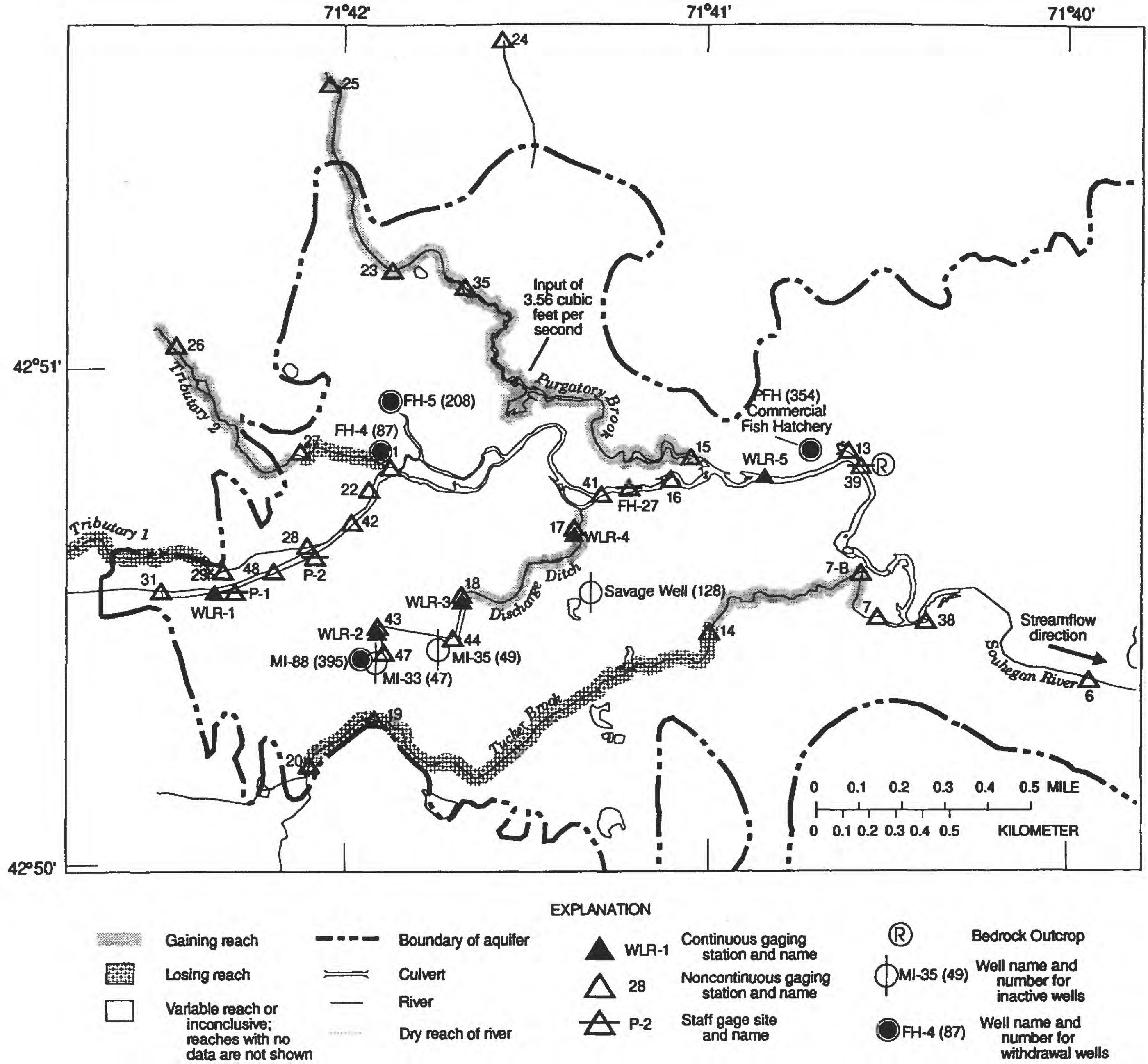

Figure 13c. Patterns of change in streamflow-discharge in Milford, New Hampshire from high-flow conditions, April 1994.

4), and generally maintain a consistent head difference.

Apparent hydraulic gradients computed along transects from biweekly measurements of water levels show transient variations in gradients throughout the period of measurement (June 1994 to June 1995). Gradients along some transects varied more than others (fig. 15). Transects that extend closest to the till-aquifer boundary (fig. 7, B'-B, and C-C'), showed larger ranges in hydraulic gradients than other transects. Hydraulic gradients along E-E', which correspond to the longitudinal axis of the plume, were fairly constant (0.075 ft/ft) except in December 1994. Hydraulic gradients along transects parallel to the plume were appreciably less but varied more than longitudinal hydraulic gradients. The variation in transverse hydraulic gradients from seasonal variations throughout

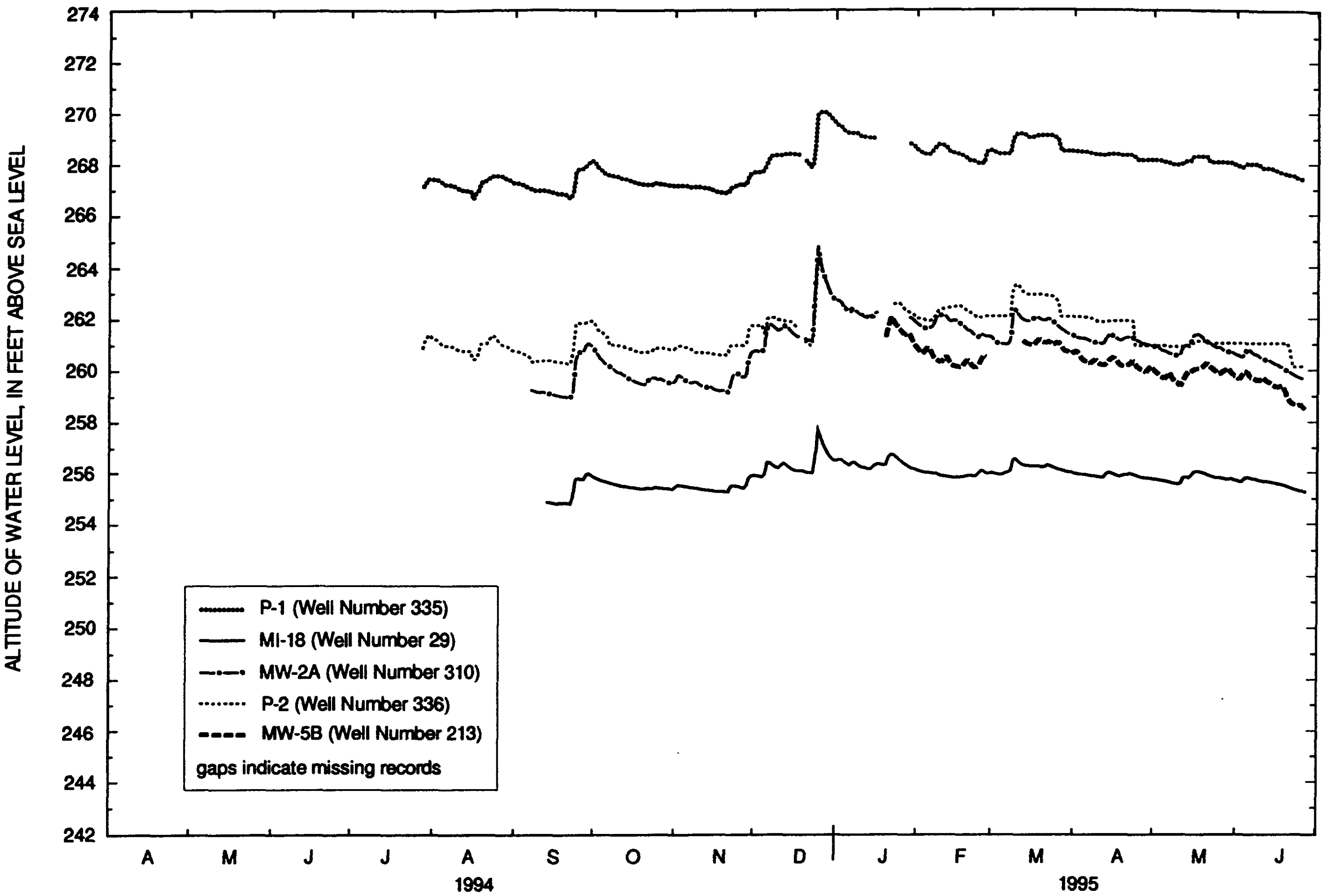

Figure 14. Continuous daily mean ground-water levels for wells P-1, P-2, MI-18, MW-2A, and MW-5B in Milford, New Hampshire.

the year has probably enhanced lateral disbursement of contaminants.

The fluctuation in direction of hydraulic gradients along F'-F between MW-33 and FH-27, near the confluence of Purgatory Brook and the Souhegan River, may partly explain distribution of contaminants in this area (fig. 2). The direction of hydraulic gradients changed direction with gradients sloping toward Purgatory Brook most of the year. For the remaining part of the year, gradients sloped toward the Souhegan River. The contaminant plume appears to be affected by the predominant direction of the gradient and is heading northeasterly toward Purgatory Brook (fig. 2).

Maximum ground-water hydraulic gradients (table 8) from triangular grouping of wells, or three-point planar solution of water levels, showed the largest seasonal variability in the direction of maximum gradient and magnitude of slope in areas adjacent to losing river reaches by the contaminant source area (fig. 16; triangles A, B, and C), by ground-water withdrawals (fig. 16; triangles D and M), and by the leading edge of the contaminant plume (fig. 16; triangles J and E). Most variability is attributed to areal and temporal differences in river fluctuations and variations in source areas to withdrawal wells as the result of variations in withdrawals and seasonal recharge. River-stage fluctuations adjacent to well P-2 (well number 336) were 0.5 ft greater than river-stage fluctuations adjacent to well P-1 (well number 335) over the same time period; this difference in fluctuation caused directional changes in maximum gradients for triangles A and B. Seasonal variations in ground-water withdrawals and recharge caused the expansion and contraction of the cone of depression around the withdrawal wells. Maximum gradient changes resulted in triangle D, which contains the State Fish Hatchery withdrawal wells (well numbers 208 and 87).

Table 7. Ground-water-level fluctuations for wells measured biweekly (June 1994–June 1995), Milford, New Hampshire

[Fluctuations in feet; incomplete data for wells: MW-16R, P-2, MI-19, MW-15A, MW-15B, HM-1, MI-32, MI-21A, MI-27, MW-21, MI-20A, PZ-1003, MW-2A, P-16. Well locations are shown on plate 1]

Well Number	Well name	Fluctuation
Water-level fluctuations greater than 5 feet		
240	FH-5-OBS1	16.47
86	FH-13-OBS1	13.52
348	MW-6A	5.10
Water-level fluctuations between 4 and 5 feet		
228	MW-3	4.02
23	MI-10	4.31
306	FH-27	4.06
318	MW-11A	4.16
311	MW-2R	4.10
366	MW-30	4.59
Water-level fluctuations between 3 and 4 feet		
307	MW-1A	3.23
209	MW-1C	3.27
25	MI-12	3.71
212	MW-4B	3.85
312	MW-4A	3.86
347	MW-4R	3.86
292	FH-30	3.10
214	MW-6B	3.76
314	MW-7A	3.71
215	MW-7B	3.49
315	MW-8A	3.06
35	MI-22	3.99
38	MI-24	3.41
40	MI-25	3.90
42	MI-27	3.78
43	MI-28	3.78
316	MW-10A	3.22
203	MI-63	3.62
317	MW-10B	3.21
218	MW-10C	3.00
210	MW-2B	3.71
319	MW-11B	3.92
219	MW-11R	3.61
233	MW-16A	3.59
321	MW-16B	3.58
344	MW-16C	3.47
288	PFH (OBS6)	3.01
258	MW-17A	3.17

Well Number	Well name	Fluctuation
Water-level fluctuations between 3 and 4 feet		
322	MW-17B	3.18
323	MW-17C	3.16
285	SPZ-1	3.97
279	SPZ-2	3.42
296	MW-32A	3.07
297	MW-32B	3.08
Water-level fluctuations between 2 and 3 feet		
309	MW-1B	2.16
21	MI-7	2.41
169	MI-4	2.27
30	MI-19	2.90
31	MI-20	2.48
216	MW-8B	2.91
351	MW-9A	2.64
41	MI-26	2.25
352	MW-9B	2.42
217	MW-9C	2.41
220	MW-12A	2.04
320	MW-12B	2.04
349	MW-14A	2.24
341	MW-14B	2.37
281	MW-34	2.34
222	MW-14R	2.01
326	MW-19A	2.36
327	MW-19B	2.17
293	MW-22A	2.63
294	MW-22B	2.63
Water-level fluctuations less than 2 feet		
308	MW-13A	1.66
221	MW-13B	1.64
225	MW-28	1.64
306	MW-33	1.79
264	MW-20A	1.49
328	MW-20B	1.50
255	MW-24A	1.78
333	MW-24B	1.75

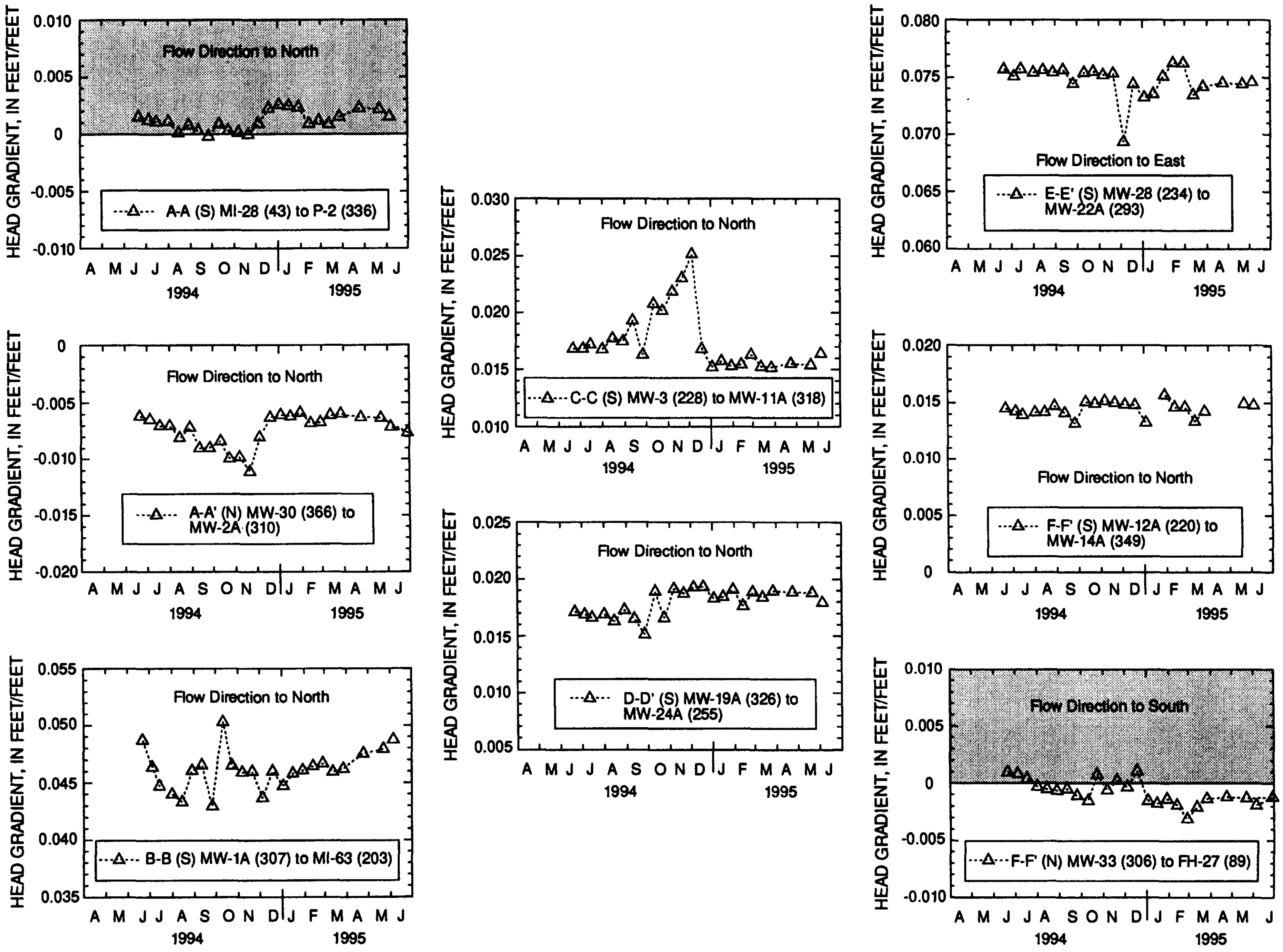

Figure 15. Apparent ground-water hydraulic gradients along transects in the Milford-Souhegan glacial-drift aquifer, Milford, New Hampshire.

Table 8. Summary statistics on direction of maximum ground-water hydraulic gradients, and magnitude of slope of gradient from triangular grouping of wells, Milford, New Hampshire

[Triangles listed from maximum to minimum changes in direction and slope. Triangle locations are shown in figure 16.]

Direction of maximum ground-water gradient			Slope of maximum ground-water gradient		
Triangle	Mean direction, in degrees from true north	Standard deviation	Triangle	Mean slope, in feet per feet	Standard deviation
M	86.3	50.9	D	0.537	0.113
J	77.2	33.9	B	.429	.084
B	131.5	4.3	M	.206	.078
D	11.0	9.4	A	.401	.056
H	52.3	5.6	J	.131	.032
E	86.8	5.1	E	.207	.026
C	75.5	4.3	N	.223	.020
A	125.4	4.1	H	.258	.018
N	82.0	3.2	K	.184	.011
G	67.9	2.9	G	.142	.008
I	31.2	2.5	I	.177	.007
K	52.8	2.2	F	.196	.007
F	48.9	2.1	L	.191	.006
L	53.8	1.6	C	.273	.003

Changes in altitude of the water-table surface appear largest near the edges of the till-aquifer boundary between low-flow (figs. 17a and 17b) and high-flow synoptic (fig. 17c) measurements. Ground-water levels for synoptic events are given in appendix 5. Water-table surface increased by more than 5 ft along edges of the aquifer, as noted by the position of the 260-foot contour (fig. 17). These results support results of computed gradients from biweekly wells that show greater variability along the edges of the aquifer.

The average difference between ground-water levels from the three synoptic events is shown in table 9 and indicates that the ground-water levels for high-flow conditions average 4 ft higher than ground-water levels for low-flow conditions. Differences in water level were at a maximum at FH-5-OBS1 (well number 240) adjacent to the State Fish Hatchery withdrawal well (well number 208).

Comparison of biweekly (June 1994 to June 1995) and continuous water-level (June 1994 to July 1995) data with water levels measured during synoptic events provide some understanding of hydrologic conditions at the time of measurement of each data set. High water levels were observed during the April 1994 synoptic event, exceeding those measured during biweekly measurements (June 1994 to June 1995) and previous synoptic water levels in October 1988 and 1990. The mean water level for biweekly measurements is about 1 ft higher than the October 1988 synoptic (tables 9 and 10) and about 0.5 ft higher than the October 1990 synoptic (table 10). The October 1988 synoptic values are comparable to minimum water levels from biweekly measurements (appendix 3).

Surface-Water and Ground-Water Interactions

River stages and ground-water levels similarly respond to seasonal climatic trends but slightly differ in response to individual climatic events, such as rainstorms. River stage at gaging station WLR-1 and ground-water levels at nearby well P-1 (well number

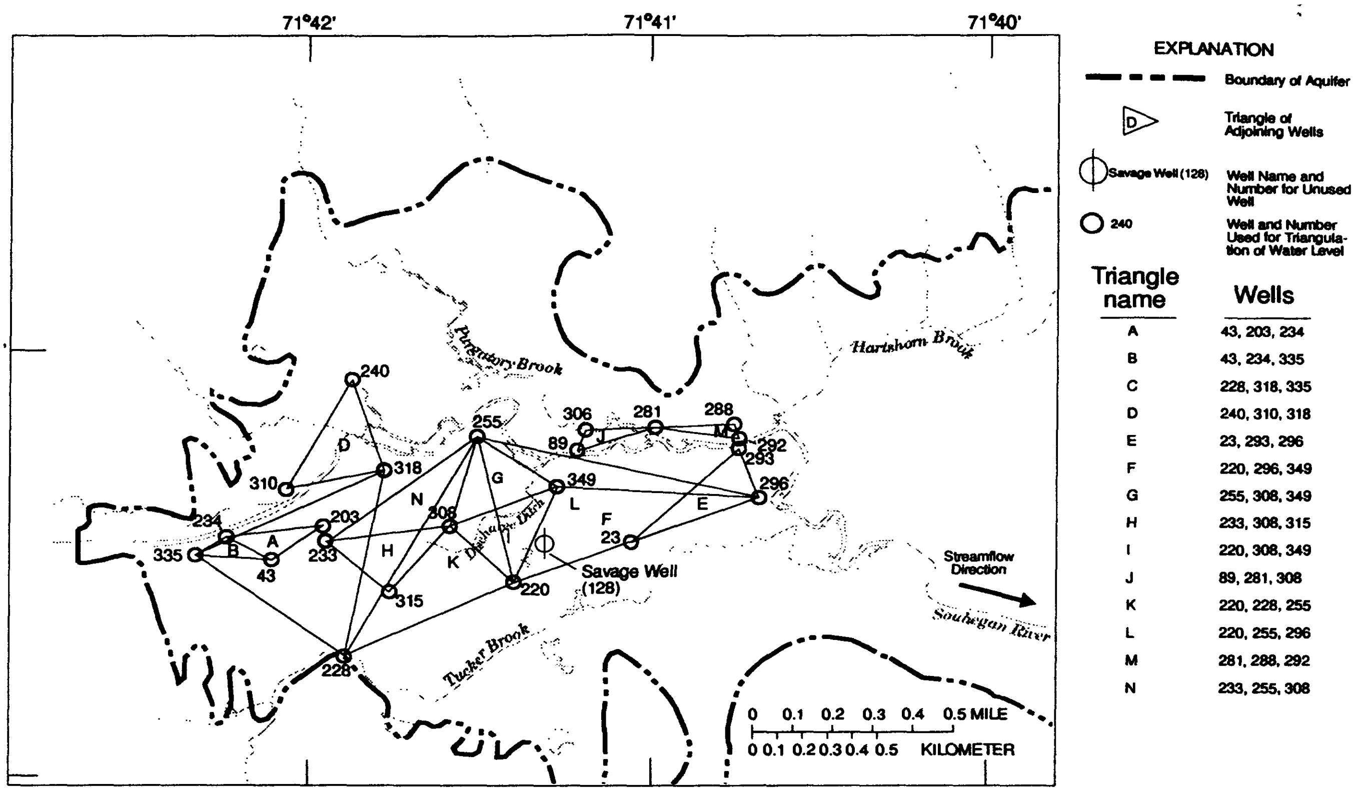

Figure 16. Triangular grouping of biweekly measured wells for determination of true ground-water-hydraulic gradients, Milford, New Hampshire.

335) show similar responses (fig. 18). Ground-water levels fluctuated slightly less and were less sensitive to short-term (few days) climate changes than river stage on the Souhegan River.

It is difficult to determine whether ground-water levels are responding to river-stage fluctuations or are responding to the same climatic event that caused river stage changes. Precipitation events, which cause increases in stage and ground-water levels, or dry periods, which cause decreases in stage and water levels, may simultaneously affect river stage and ground-water levels. Therefore, it is unclear if ground-water levels are responding to changes in river stage or the precipitation event. However, ground-water levels are probably responding to the climatic event or seasonal period itself, as well as fluctuations in river stage. On several occasions, hydroelectric operations upstream of the study area caused short-term river-stage fluctuations over several hours during dry periods. Continuous recordings of ground-water levels at wells adjacent to the river showed a 10 percent change in ground-water levels relative to change in river stage during periods of change in river stage from upstream hydroelectric operations.

Directions in hydraulic gradients between river stages and adjacent ground-water levels were fairly constant (fig. 19). Sites where ground-water levels are lower than surface-water levels have negative hydraulic gradients and, conversely, sites where ground-water levels are more than river stage have positive hydraulic gradients. Negative gradients indicate a potential recharge to the aquifer. Either negative or positive gradients are maintained at all sites for the period measured (fig. 19).

At locations where the river loses water to the aquifer (P-1,P-2, and MW-2A), gradients were at a maximum (0.04 ft/ft) in November and December 1994 and at a minimum value (0.004 ft/ft) in April 1995. At most locations where the river gains ground water (MW-22A, FH-27, and SPZ-2), maximum gradients (0.045 ft/ft) occurred in September 1994 and minimum gradients (0.0 ft/ft) in October-November 1994. The variability of hydraulic gradients at losing or gaining sections of the river is attributed to differences in response times of surface and ground waters to inputs of water from precipitation or snowmelt. At river losing locations, river stages can rise more quickly than ground waters and cause an increase in surface to

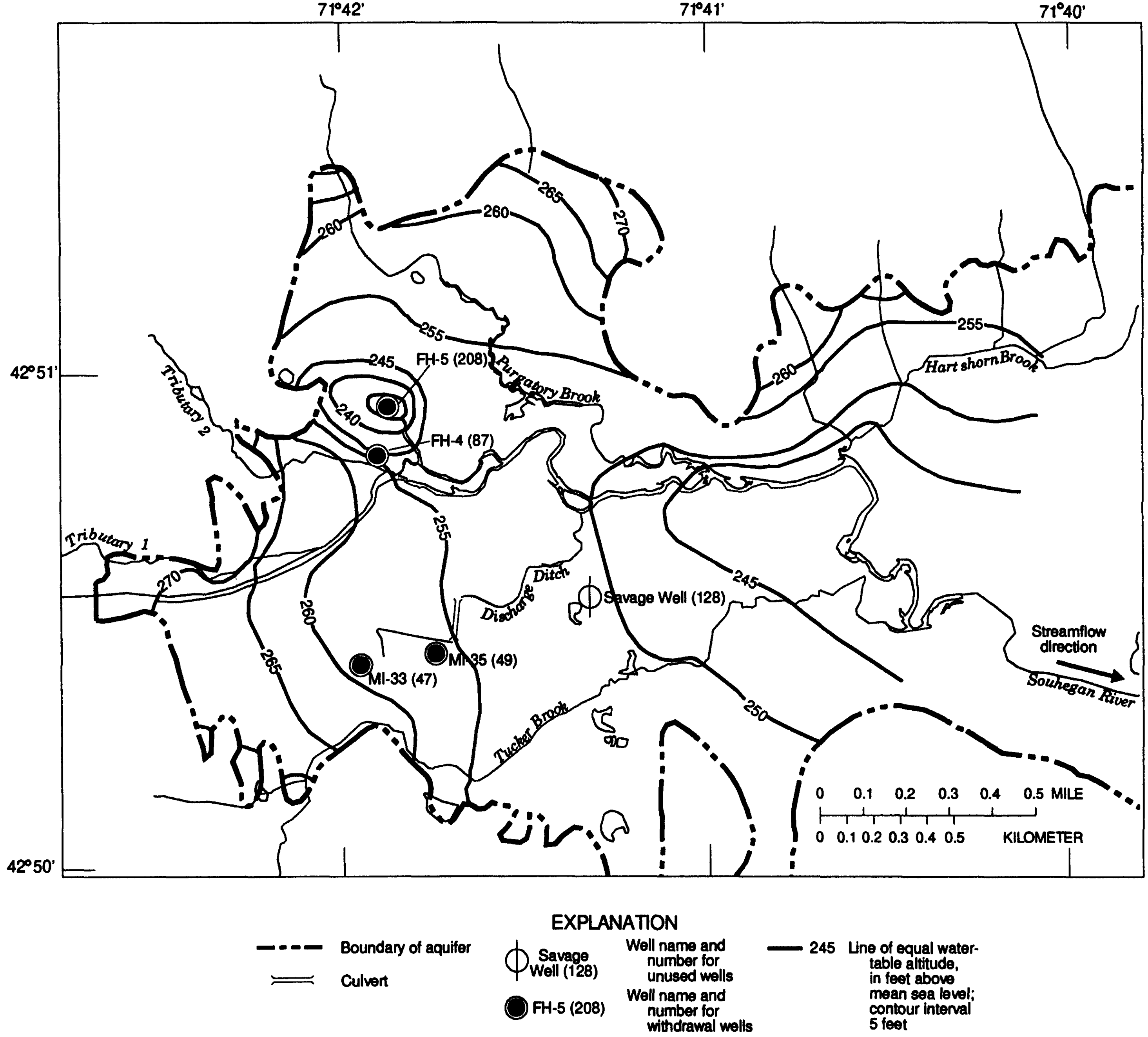

Figure 17a. Contours of the water-table surface in the Milford-Souhegan glacial-drift aquifer, Milford, New Hampshire for October 1988.

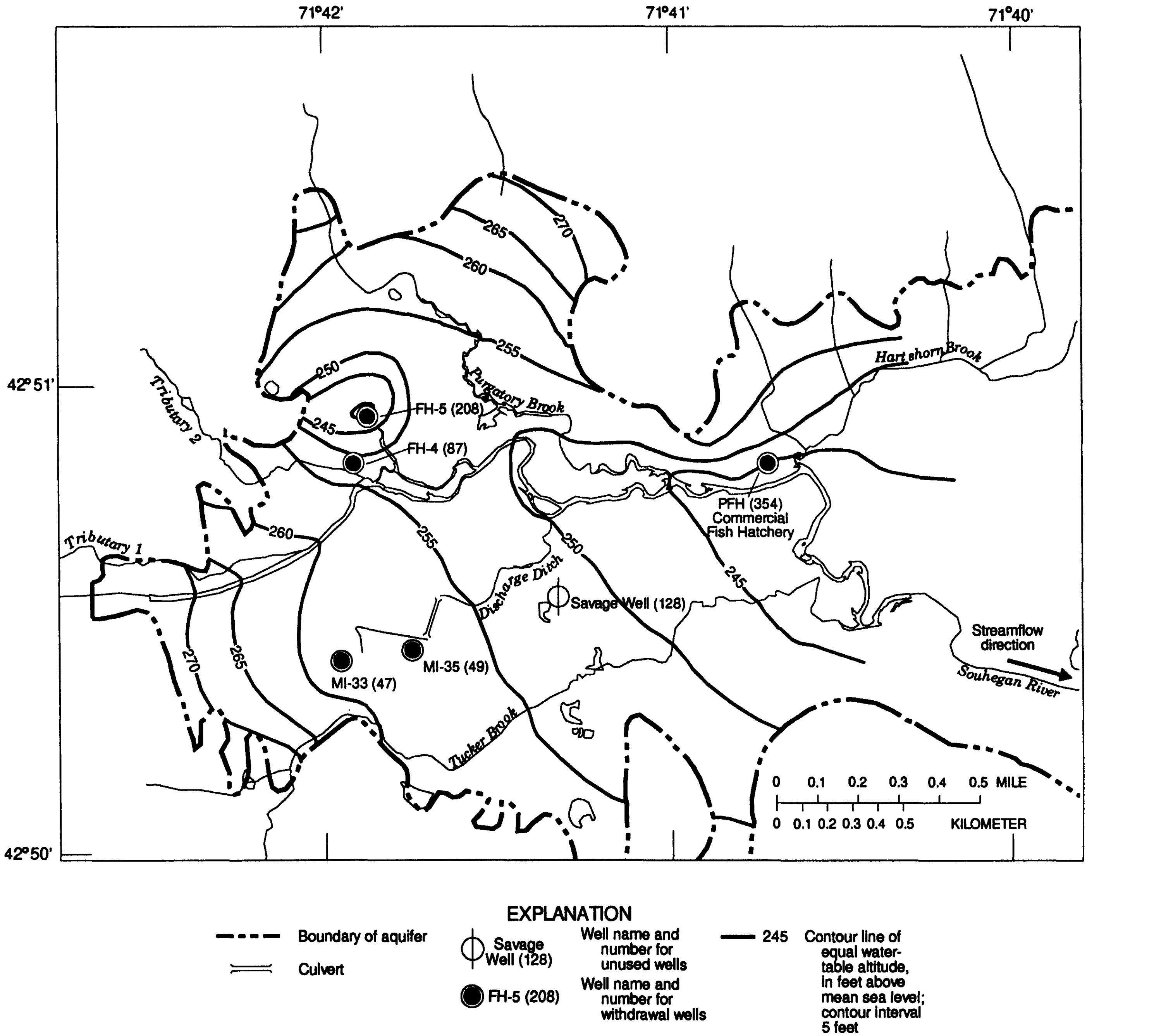

Figure 17b. Contours of the water-table surface in the Milford-Souhegan glacial-drift aquifer, Milford, New Hampshire for October 1990.

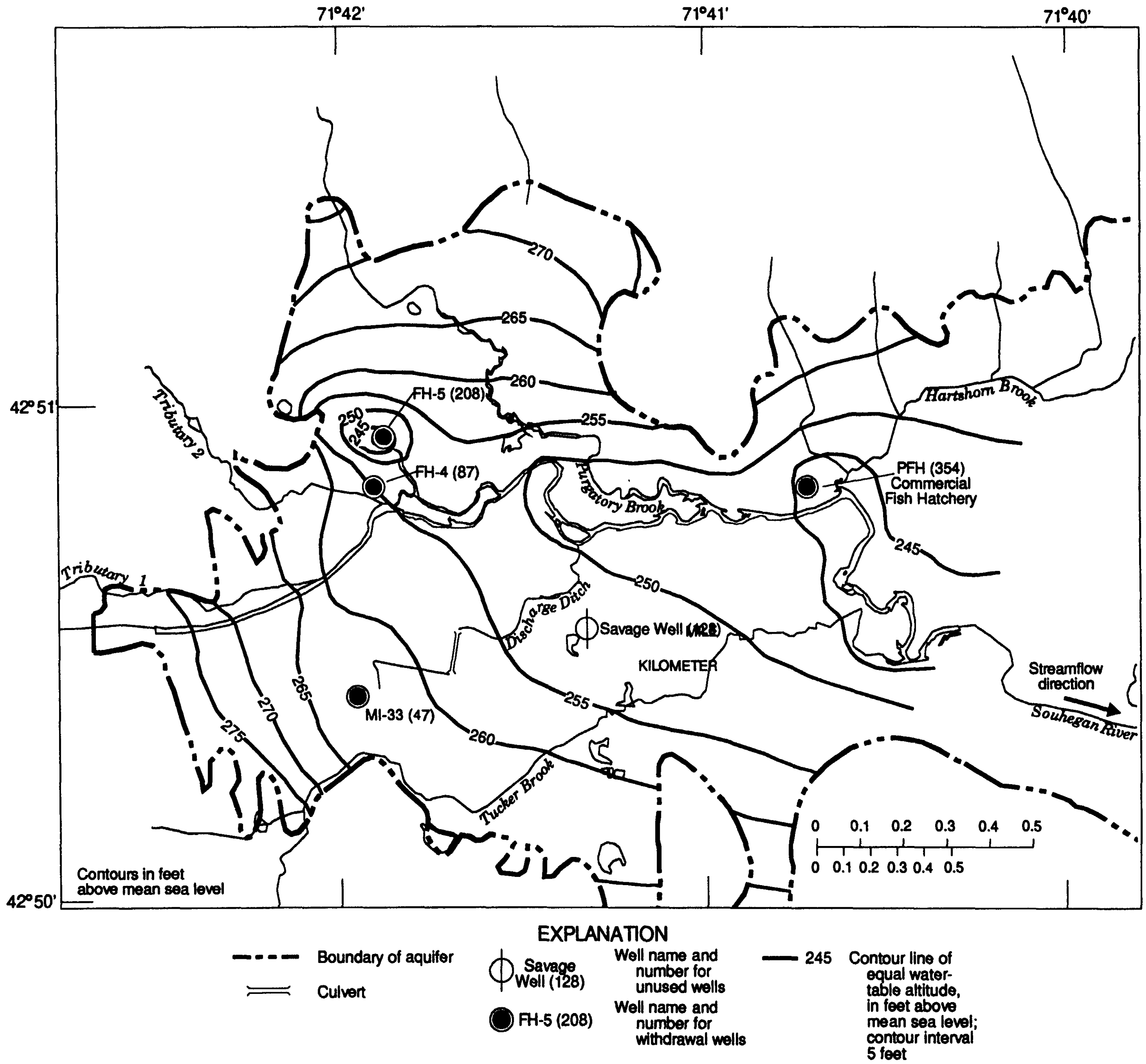

Figure 17c. Contours of the water-table surface in the Milford-Souhegan glacial-drift aquifer, Milford, New Hampshire for April, 1994.

Table 9. Summary of differences in ground-water levels between synoptic events in October 1988, October 1990, and April 1994, Milford, New Hampshire

[All units in feet. Negative value indicates water level is greater than previous water level]

	Difference in ground-water levels between		
	October 1988 and October 1990	October 1988 and April 1994	October 1990 and April 1994
Number of wells	28	29	75
Mean difference of water levels	-.82	-3.97	-2.65
Standard deviation of water levels	1.60	3.08	1.45
Minimum water-level difference	3.18 (at FH-13-OBS)	-.49 (at MI-19)	-.6 (at MI-19)
Maximum water-level difference	-7.26 (at FH-5-OBS1)	-15.23 (at FH-5-OBS1)	-7.97 (at FH-5-OBS1)

ground-water hydraulic gradients during periods of heavy precipitation or snowmelt such as in December 1994. At locations where the river gains ground water, surface waters recede more quickly than ground waters and, therefore, increase surface to ground water hydraulic gradients during dry periods following precipitation; this took place in October 1994 after a rainstorm in September 1994.

Variations in hydraulic gradients between surface and ground water were largest at river gage FH-27 (fig. 4). Large gradient changes are supported by ground water hydraulic gradients in this area that show large directional movement of maximum hydraulic gradients.

Hydraulic gradients provide important insight into river-aquifer interactions and data can show patterns of aquifer recharge and discharge from and to rivers. The direction of hydraulic gradients for the MSGD study area are fairly constant throughout the year. Therefore, estimates of streamflow gains and losses from coupled discharge measurements of gaging stations are not affected by changes in the direction of ground-water flow between surface and ground waters but are possibly affected by changes in the magnitude of aquifer recharge or discharge and factors such as (1) accuracies in measurements of discharge, (2) the relative magnitude of streamflow, and (3) climatic/seasonal changes in streamflow processes (interflow and surface runoff).

Base flow composed 71 percent of total streamflow at WLR-5 from July 1994 to September 1995 based on estimates of base flow from hydrograph separation techniques (Albert Rutledge, U.S. Geological Survey, written commun., 1994). The average rate of base flow or ground-water contribution to streamflow can be used to interpret percent of aquifer discharge from average streamflow gains reported on the Souhegan River between stations WLR-5 and station 39 (fig. 11). The average aquifer discharge between WLR-5 and station 39 is 4.8 ft^3/s or 71 percent of the average measured gain of 6.8 ft^3/s. Whereas, the base-flow component of streamflow must be factored in to interpret the amount of aquifer discharge from measured streamflow gains, the base flow is not a factor in losing reaches in interpreting the amount of aquifer recharge from measured streamflow losses. In the latter, all streamflow loss contributes to aquifer recharge because flow reversals from temporary bank storage were not detected.

RESULTS OF PHYSICAL WATER-PROPERTY DATA COLLECTION

Graphs of daily mean specific conductance and water temperature from continuously measured sites are presented in this report. Instantaneous readings of

Table 10. Difference between October 1990 synoptic ground-water levels and the arithmetic mean of ground-water levels from biweekly measurements (June 1994–June 1995), Milford, New Hampshire

[All units are in feet; altitude of water level in feet above sea level; positive value indicates 1990 water level is higher than the mean water level]

Well name (plate 1)	Well number	Altitude of ground-water level from October 1990	Arithmetic mean of ground-water level from biweekly measurements	Difference in ground-water level between October 1990 and biweekly mean
			June 1994-95	
MW-1B	309	272.09	271.62	0.47
MI-7	21	250.78	250.77	.01
MI-4	165	251.99	251.98	.01
MW-3	228	261.04	261.43	-.39
MI-10	23	249.12	248.90	.22
MI-12	25	247.46	247.50	-.04
MW-4A	312	260.56	261.63	-1.07
MW-4B	212	260.69	261.79	-1.10
FH-5obs1	240	240.13	244.64	-4.51
FH-13obs1	86	249.88	252.65	-2.77
MW-6A	348	258.81	260.00	-1.19
FH-27	306	245.90	247.64	-1.74
MW-6B	214	258.83	259.82	-.99
MW-7A	314	258.38	259.18	-.79
MW-7B	215	258.34	259.27	-.93
MW-8A	315	257.56	258.29	-.73
MW-8B	216	257.53	258.13	-.60
MI-28	43	261.23	262.24	-1.01
MW-10A	316	256.86	257.72	-.86
MW-10B	317	256.49	257.34	-.85
MW-10C	218	257.17	258.01	-.84
MW11A	318	255.98	255.98	0
MW-2B	210	260.06	260.54	-.48
MW-11B	319	255.88	255.87	.01
MW-11R	219	254.72	254.90	-.18
MW-16A	233	258.48	259.34	-.86
MW-16B	321	258.57	259.46	-.89
MW-12A	220	253.51	253.70	-.19
MW-12B	320	253.31	253.70	-.39
MW-16C	344	258.67	259.50	-.83
MW-13A	308	252.84	252.93	-.09
MW-13B	221	254.45	254.79	-.34
MW-28	225	264.80	266.89	-2.09
MW-14B	341	248.78	249.42	-.64
MW-33	306	246.54	247.37	-.83
MW-34	281	245.53	245.67	-.14
MW-17A	258	257.72	258.53	-.81
MW-17B	322	257.76	258.53	-.77
MW-17C	323	257.69	258.46	-.77
SPZ-1	285	252.55	253.35	-.80
MW-19A	326	255.90	255.94	-.04
MW-19B	327	255.87	255.99	-.12
MW-20A	264	254.98	255.13	-.15
MW-20B	328	254.73	255.11	-.38
MW-22A	293	243.82	243.53	.29
MW-22B	294	243.82	243.50	.32
MW-24A	255	250.56	250.93	-.39
MW-24B	333	250.62	250.95	-.33
MW-32A	296	243.60	242.71	.89
MW-32B	297	243.67	242.79	.88
TOTAL	–	–	–	-.59

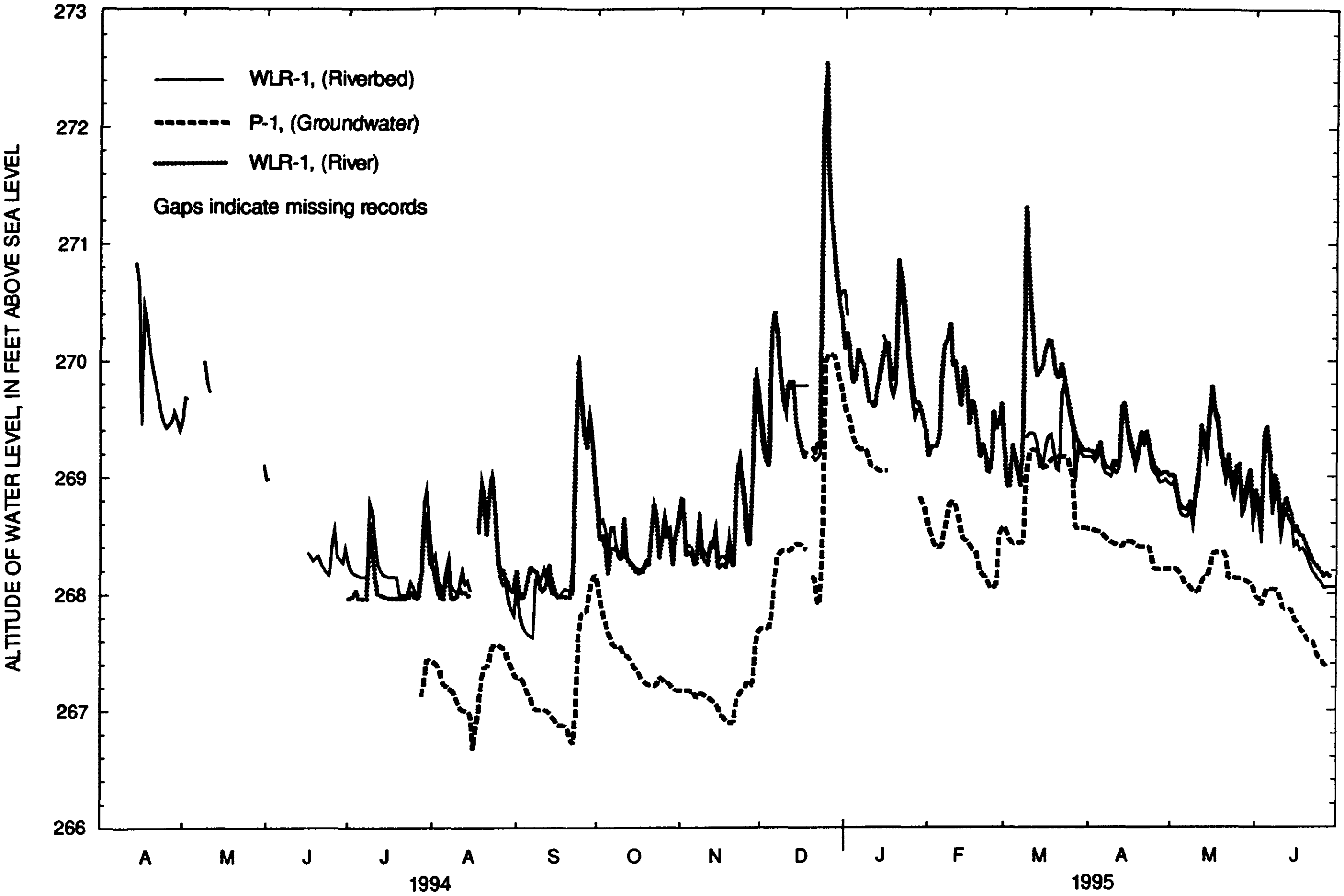

Figure 18. Continuous daily mean river stage and riverbed water levels for streamflow-gaging station WLR-1, and ground-water level for well P-1, Milford, New Hampshire.

continuous data are not reported but are available upon request.

Surface Water

Specific conductance and water temperature were measured for surface water at streamflow-gaging stations WLR-1 and WLR-5 on the Souhegan River and WLR-4 on the discharge ditch. The range in data are plotted in hydrographs and for riverbed waters in figure 20.

Specific conductances of river water range from 50 to 500 µS/cm on the Souhegan River and 300 to 600 µS/cm on the discharge ditch. Specific conductance of riverbed water was less variable; however, trends in specific conductances of riverbed water generally followed trends of river water. At WLR-5, upward and downward inflections of changes in specific conductance of riverbed water appear to lag about a day behind river water (fig. 20).

Water temperatures of the Souhegan River ranged from 0°C in winter to 24°C in summer. Temperatures of water in the discharge ditch were higher on average than water in the Souhegan River. The discharge ditch carries primarily processed waters from two industrial facilities. Riverbed water temperatures varied less than those of river waters.

Water temperatures of the discharge ditch showed greater variation in daily means than on the Souhegan River. This could be because of variations in processed waters from manufacturing discharges to the ditch.

Ground Water

Specific conductance and water temperature were measured for ground water at stations P-1, P-2, and MW-2A, in western part of the MSGD by the Souhegan River (fig. 21). Both physical properties are affected by the location and depth of well screens.

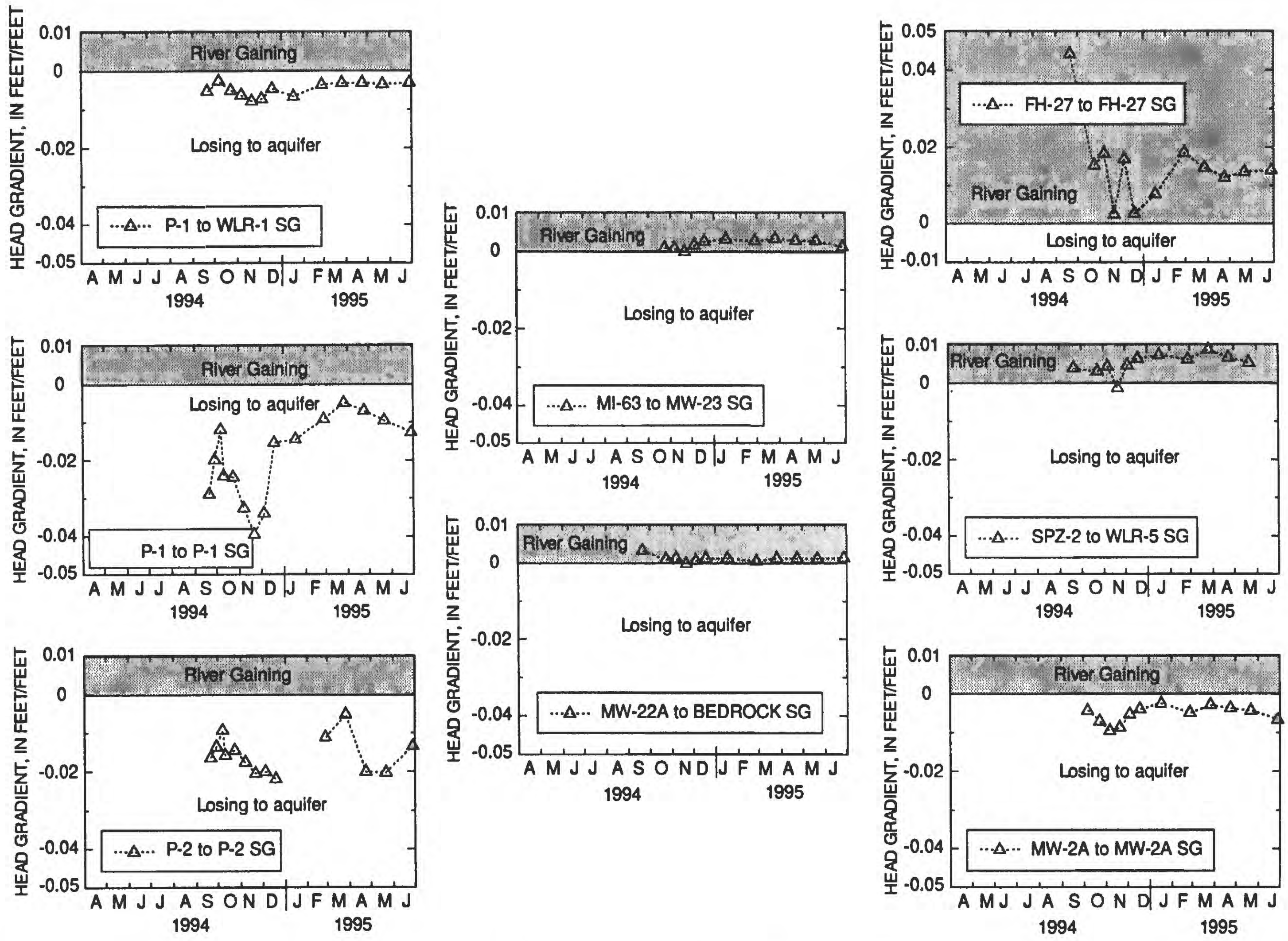

Figure 19. Magnitude and direction of hydraulic gradients between surface and ground waters at river gages on the Souhegan River and adjacent ground-water level measurement wells, Milford, New Hampshire.

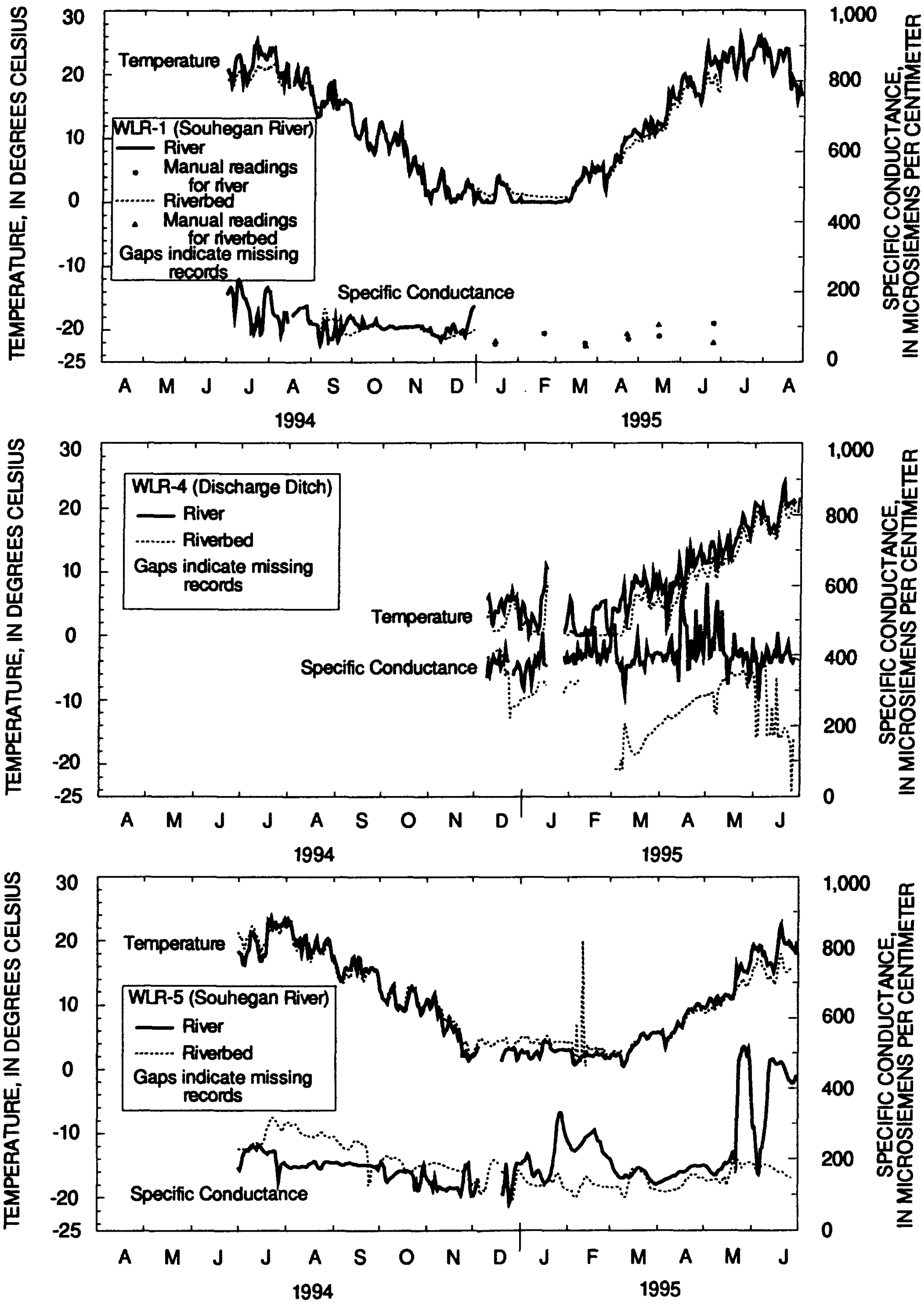

Figure 20. Daily mean specific conductance and temperature of waters for streamflow-gaging stations WLR-1, WLR-4, and WLR-5, Milford, New Hampshire.

Specific conductances of ground water ranged from 75 to 200 µS/cm at wells P-1 (well number 335), P-2 (well number 336), and MW-2A (well number 310) (fig. 21). Specific conductance values at well P-1 showed greater variability and higher values in winter than wells P-2 and MW-2A. Well P-1 is adjacent to Route 101A and is probably affected by runoff of road de-icing chemicals.

Water temperatures ranged from 8°C to 16°C. Water temperatures fluctuate as the result of seasonal differences in air temperature and follow a cosine curve function. Differences in maximum and minimum temperatures at sites are the result of different probe locations and the depth of the well screen interval below land surface. At the shallowest well (P-1), the screen interval was 13.9 to 14.9 ft below land surface, and maximum and minimum water temperatures were recorded earliest in the year, late August and April, respectively. At the middle well depth (P-2), the screen interval was 17.0 to 18.0 ft below land surface, and maximum and minimum water temperatures were recorded about 1 month later than P-1. At the deepest well (MW-2A), the screen interval was 29.0 to 39.0 ft below land surface, and maximum and minimum water temperatures were recorded last, about 3 months after P-1. In addition to increased lag time, the amplitude or difference between maximum and minimum temperatures decreased with depth.

Surface-Water and Ground-Water Interactions

Graphs of specific conductance and water temperatures are shown for gaging station WLR-1 on the Souhegan River with adjacent ground-water wells (fig. 21). These wells were compared to gain some understanding of the effect of surface and ground-water interactions.

By comparing the specific conductance of surface and ground water, an apparent relation emerges between surface water at gaging station WLR-1 and ground water at well P-2 but not between WLR-1 and P-1. For example, water at both WLR-1 and P-2 show a small decline in specific conductances in March 1995 followed by a rise in specific conductances in April 1995; however, specific conductances at P-1 react independently from WLR-1 and P-2. Water at well P-1 appears to be affected by periodic road de-icing chemicals in cold months, whereas, water at WLR-1 and P-2 were apparently unaffected by road de-icing chemicals. The similarity in specific conductance of water at WLR-1 and P-2 and dissimilarity at WLR-1 and P-1 suggest waters from P-2 are recharged from the Souhegan River near WLR-1 but waters from P-1 are probably recharged further upstream given the predominant ground-water hydraulic gradients in the area, which are 30 to 45 degrees from the tangent line of the river.

A comparison of water temperatures for surface and ground water shows approximately a 6-month lag between frequency of maximum and minimum water temperatures (fig. 21). The lag time between surface and ground water is beneficial in mapping areas of ground-water discharge to the Souhegan River. In the summer, cool ground water discharges to the river and decreases the river temperatures. In the winter, the converse is true. Spot measurements of river-water temperatures along the Souhegan River on June 30, 1995, (unpublished data available upon request from the USGS) showed a drop in temperature between gaging station 22 and station 41 (fig. 4). The reach of the Souhegan River between these two stations is a transition zone between losing streamflow and gaining streamflow.

SUMMARY AND CONCLUSIONS

This report summarizes one and a half years of surface and ground-water data that was collected from April 1994 to September 1995 during a period that represented near normal rates of precipitation and streamflow in Milford, N.H. These data were collected to understand the temporal variability of hydrologic conditions in the Milford-Souhegan glacial-drift (MSGD) aquifer. Data collected and presented in this report include river stages, riverbed water levels, streamflow, ground-water levels, and temperature and specific conductance. This report is part of a 3-year study by the U.S. Geological Survey and the U.S. Environmental Protection Agency to help understand the temporal variability of ground-water flow in the MSGD aquifer and the effect of flow on contaminant transport.

The MSGD aquifer is typical of other permeable, glacial-drift aquifers with a good hydraulic connection between surface and ground water. Data on river stages, riverbed water levels, and ground-water levels adjacent to rivers indicate that the hydrologic system acts in

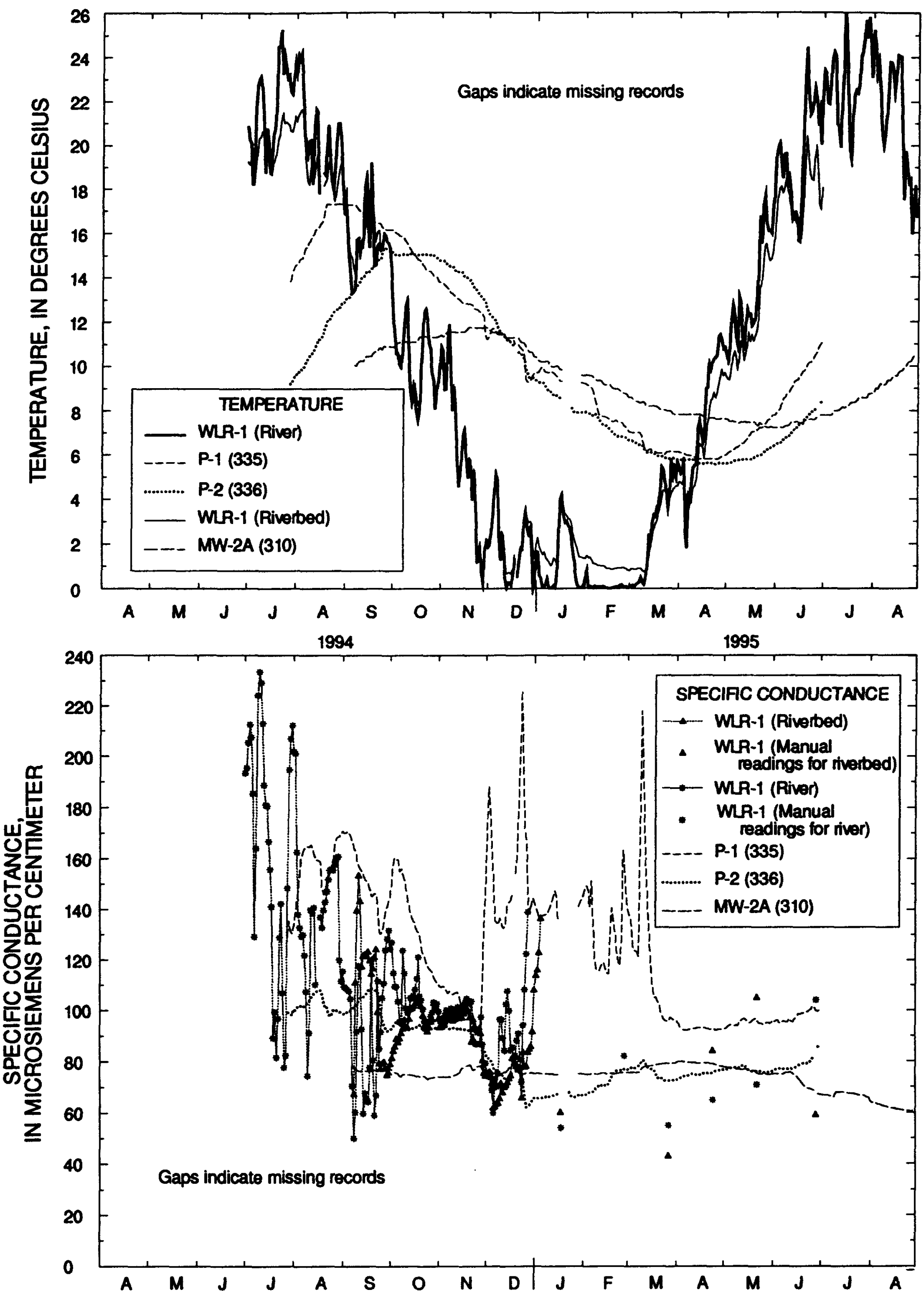

Figure 21. Daily mean specific conductance and temperature of waters for streamflow-gaging station WLR-1 and observation wells P-1, P-2, and MW-2A, Milford, New Hampshire.

unison because of the good hydraulic connection between surface and ground water and because soil and water-table conditions allow precipitation to quickly infiltrate and recharge the water table.

River stages fluctuated nonuniformly on the Souhegan River and its tributaries. River stage fluctuated between 5 and 7 ft on the Souhegan River. Riverbed water levels mimic river stages.

Streamflow varied from 15 to 1,500 ft^3/s in the Souhegan River but discharge did not exceed 100 ft^3/s in the tributaries. Base flow composes about 71 percent of total streamflow. Streamflow was relatively constant ranging from 0.14 to 0.8 ft^3/s in the industrial discharge ditch that is fed by industrial processed waters.

On the Souhegan River, streamflow gains and loses water as determined from differences in streamflow at reaches between two successive gaging stations, called reaches. The upstream reach averaged a 4.8 ft^3/s loss (0.0045 ft^3/s per length in stream) with a maximum loss of 23 ft^3/s. The downstream reach averaged 6.8 ft^3/s gain (0.0063 ft^3/s per length in stream) with a maximum gain of 21 ft^3/s. Streamflow losses were greater in the fall and winter than in the spring and summer and gains were greater in the winter and spring. Compared to previous studies that investigated streamflow gains/losses during low-flow conditions (streamflow duration greater than 70 percent), this study showed large gains/losses when flow streamflow duration was less than 70 percent.

Ground-water levels generally fluctuated less than 5 ft at most wells, which corresponds to the range of river-stage fluctuations found along much of the Souhegan River. Maximum fluctuations of up to 16.47 ft were found at observation wells near the State Fish Hatchery withdrawal wells. The combined effect of seasonal patterns in withdrawals and recharge caused a large expansion and contraction of the cone of depression around the withdrawal well.

Apparent ground-water hydraulic gradients from shallow wells along transects through the plume showed a fairly constant longitudinal gradient that averaged 0.0757 ft/ft with a standard deviation of 0.0014. Seasonal variations in apparent ground-water hydraulic gradients varied when perpendicular to the plume. Ground-water hydraulic gradients averaged 0.0176 with a standard deviation of 0.0027, almost twice the standard deviation of the longitudinal gradient.

Computations of maximum ground-water gradients from three-point planar solutions, which differ in orientation from apparent gradients, showed the largest variability near rivers and withdrawal wells. Directional changes in maximum gradients were largest and ranged by 144 degrees near the confluence of two rivers (Souhegan River and Purgatory Brook) where the contaminant plume has migrated, abetted by the large directional change in this area. Other areas of large directional change include (1) near the upstream reach of the Souhegan River by the contaminant source area, ranged by 51 degrees, and (2) near the State Fish Hatchery withdrawal wells, ranged by 49 degrees. Remaining areas ranged from 5 to 28 degrees. The largest change in slope of maximum gradients occurred near State Fish Hatchery wells and ranged from 0.202 to 0.723 ft/ft. Other areas of large change in slope of maximum gradients include same areas where large directional changes resulted in maximum gradients. Near the source area of the plume, gradients ranged from 0.313 to 0.567 ft/ft. Near the confluence of the Souhegan River and Purgatory Brook, gradients ranged from 0.113 to 0.423 ft/ft. Most other areas had less than a 40-percent change in maximum gradients.

Transient variations in ground-water gradients are also evident when comparing water-table maps from two low-flow and one high-flow synoptic. During a high precipitation and high ground-water recharge in April 1994 (high-flow synoptic), water-table contours shifted northward on the southern flank of the plume compared to low recharge periods. This indicates a partial shifting of flow from a easterly direction during low precipitation and low ground-water recharge periods to a more northward direction during high recharge periods. Some northward shifting must be caused by long-term variations in ground-water withdrawals in the aquifer. These withdrawals have decreased at the two industrial wells, from 0.83 ft^3/s in October 1988 to 0.38 ft^3/s in April 1994. Withdrawals have increased at the commercial state fish hatcheries, from 3.41 ft^3/s in October 1988 to 4.06 ft^3/s in April 1994.

Hydraulic gradients between river stages and adjacent shallow ground-water levels were consistent in maintaining either positive (potential streamflow loss) or negative (potential streamflow gain) gradients. This indicates that direction of flow between surface and ground waters is consistent throughout the year. Gradients varied by one order of magnitude from 0.004

to 0.04 ft/ft. The relative quickness of response of the aquifer and river to climatic events dictated the occurrence of maximum and minimum gradients. At locations where the river lost water to the aquifer, maximum gradients occurred during rising river stages because the river reacts more quickly to climatic events like precipitation or snowmelt than do ground-water levels in the aquifer. At locations where the river gained water, maximum gradients occurred during declining river stages again because the river reacts more quickly to the absence of precipitation or snowmelt.

Physical data collected at three surface-water stations and three ground-water wells show that specific conductance was highest on the discharge ditch ranging from 300 to 600 μS/cm and the least in ground-water wells ranging from 75 to 200 μS/cm. Specific conductances were highest in winter and spring and lowest in the fall. Water temperatures varied from 0 to 24°C at the three surface-water sites and 8 to 16°C at the three ground-water wells. Water temperature showed a lag time associated with heating and cooling of waters from surface to ground water at depth probably from thermal conduction.

The data collected on transient hydrologic conditions in Milford was used to describe the dynamics of ground-water flow in glacial-drift river-valley aquifers. Understanding surface and ground-water interactions is important in evaluating ground-water recharge and discharge patterns at Milford and other similar sites. In this study, directions of hydraulic gradients did not change at seven coupled surface and ground-water measurement sites; however, near a confluence between two rivers, fluctuations in river stage between the two rivers produced variations in ground-water discharge patterns. Variations in ground-water hydraulic gradients from seasonal recharge and river-stage fluctuations may explain the distribution of volatile organic contaminants found in the aquifer. Additional data collection, in conjunction with a single measurement of ground-water levels, allows for a more thorough understanding of the effect of physical-flow processes on contaminant distribution. Lastly, ground-water flow is most variable near ground-water recharge and discharge boundaries, such as rivers and withdrawal wells and, therefore, it is important to collect transient data in those areas.

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APPENDIX 1

Appendix 1. Information on well construction for selected wells in Milford, New Hampshire
[altitude in feet above sea level; depth in feet below land surface; --, no data]

Well number on plate 1	Well name	Altitude of		Depth				
		measurement point	land surface	of well	to top of screen	to bottom of screen	to refusal	to bedrock
1	KEYES-1	250.71	248.7	55.0	53.0	55.0	--	85.00
2	KEYES-2D	248.61	246.6	56.5	54.5	56.5	--	--
3	KEYES-3D	246.84	244.8	50.7	48.7	50.7	--	--
4	KEYES-4D	245.28	243.3	51.9	49.9	51.9	--	--
5	LW-01D	--	264.8	110.0	100.0	110.0	--	114.30
6	LW-02D	245.66	243.1	55.0	45.0	55.0	--	62.50
7	LW-03D	251.14	247.3	54.5	44.5	54.5	--	80.20
8	LW-04D	246.43	243.4	50.0	40.0	50.0	--	80.00
9	MOW-33	--	260.0	70.0	60.0	70.0	--	56.00
10	GW-02D	--	255.4	29.0	19.0	29.0	--	34.00
11	GW-03D	--	252.4	38.0	28.0	38.0	--	23.50
12	GW-04D	--	255.6	31.5	21.5	31.5	--	19.00
13	GW-05D	--	261.0	33.0	23.0	33.0	--	33.00
14	RFW-1	--	255.7	28.0	8.0	28.0	28.00	--
15	RFW-2	253.87	253.8	35.0	10.0	35.0	35.00	--
16	RFW-3	253.51	253.5	43.0	13.0	43.0	43.00	--
17	RFW-4	252.15	251.6	16.0	6.0	16.0	16.00	--
18	PA-1	--	255.1	8.7	--	8.7	--	--
19	PA-2	--	254.9	8.7	--	8.7	--	--
20	PA-3	--	255.3	7.8	--	7.8	--	--
21	MI-7	256.68	253.2	37.8	--	31.0	--	--
22	MI-8	265.95	262.6	--	--	--	--	--
23	MI-10	255.12	252.2	45.8	44.0	47.0	--	58.50
24	MI-11	254.52	252.1	55.5	40.0	56.0	63.00	--
25	MI-12	253.26	251.5	38.1	43.0	49.0	50.00	--
26	MI-15	265.17	264.7	--	--	--	--	--
27	MI-16	--	269.1	--	--	--	--	--
29	MI-18	264.42	262.4	--	--	11.0	--	--
30	MI-19 (Bedrock)	277.50	275.6	80.0	65.0	80.0	--	63.50
31	MI-20	277.47	275.6	40.0	10.0	40.0	--	63.50
32	MI-20A	--	274.7	14.8	--	14.8	--	--
33	MI-21	--	273.0	40.0	15.0	40.0	--	53.00
34	MI-21A	--	270.0	--	--	--	--	--
35	MI-22	272.34	270.0	114.0	99.0	114.0	--	94.00
36	MI-22A	--	270.1	11.7	--	11.7	--	--
37	MI-23	--	270.0	75.0	10.0	75.0	--	94.00
38	MI-24	273.41	270.7	85.0	10.0	85.0	--	96.00
39	MI-24A	--	272.0	14.0	--	14.0	--	--
40	MI-25	272.35	270.1	111.0	101.8	111.0	--	105.00
41	MI-26	272.35	270.1	88.0	8.0	88.0	--	105.00
42	MI-27	273.43	270.7	78.0	13.0	78.0	--	88.00
43	MI-28	271.85	270.3	55.0	35.0	55.0	56.00	--
44	MI-30	269.35	265.7	72.0	27.0	72.0	75.00	--
45	MI-31	267.23	266.1	54.0	36.0	54.0	--	--
46	MI-32	273.36	270.2	75.0	30.0	75.0	--	95.00
47	MI-33	265.90	268.2	60.0	50.0	60.0	60.00	--
49	MI-35	263.20	262.2	55.0	--	55.0	--	--
50	MI-36	270.51	269.9	12.7	--	12.5	--	--

Appendix 1. Information on well construction for selected wells in Milford, New Hampshire--Continued
[altitude in feet above sea level; depth in feet below land surface; --, no data]

Well number on plate 1	Well name	Altitude of measurement point	Altitude of land surface	Depth of well	Depth to top of screen	Depth to bottom of screen	Depth to refusal	Depth to bedrock
51	MI-37	272.60	270.4	12.8	--	12.5	--	--
52	MI-38	--	270.0	11.9	--	--	--	--
54	MI-41	260.12	258.7	20.0	--	20.0	--	--
55	MI-42	258.51	257.2	20.0	--	20.0	--	--
56	MI-43	258.82	257.3	20.0	--	20.0	--	--
57	MOW-63	--	270.0	62.0	53.0	62.0	65.00	--
58	MI-44	260.60	259.2	20.0	--	20.0	--	--
59	MI-45	--	264.9	--	--	--	--	--
60	MI-46	--	267.3	--	--	--	--	--
61	MI-47	--	270.0	--	--	--	--	--
62	MI-48	--	264.1	--	--	--	--	--
63	--	--	282.4	--	--	--	--	--
64	--	--	265.3	--	--	--	--	--
65	P-03	263.27	261.3	--	--	--	--	--
66	--	--	270.0	--	--	--	--	--
67	--	--	250.0	--	--	--	--	--
68	--	--	267.9	--	--	--	--	--
69	--	--	266.3	--	--	--	--	--
70	--	--	264.1	--	--	--	--	--
71	--	--	264.0	--	--	--	--	--
72	MI-62	--	260.0	58.0	17.0	58.0	--	60.70
73	MI-64	--	259.9	--	--	--	--	--
74	MOW-35	--	260.0	--	--	--	59.00	--
75	MOA-1	--	239.5	--	--	--	74.00	--
76	MOA-2	--	244.6	--	--	--	--	--
77	MOA-3	--	241.1	--	--	--	52.00	--
78	MOA-4	--	249.5	38.0	33.0	38.0	54.00	--
79	--	--	350.0	--	--	--	--	--
80	--	--	--	--	--	--	--	--
81	--	--	239.2	--	--	--	--	26.00
82	--	--	240.0	--	--	--	--	23.00
83	--	--	240.9	--	--	--	--	--
84	#226inSurv	262.51	261.7	66.0	51.0	66.0	--	60.00
85	FH-15	265.72	265.1	38.0	18.0	38.0	--	--
86	FH-13	269.03	260.0	43.0	33.0	43.0	--	--
87	FH-14	263.53	262.2	42.0	32.0	42.0	--	--
88	FH-16	262.99	261.0	26.0	--	--	--	--
89	FH-27	251.45	251.3	41.0	36.0	41.0	--	--
90	FH-22	252.64	253.1	29.0	24.0	29.0	--	--
91	FH-24	253.27	251.6	29.0	24.0	29.0	--	--
92	FH-25	251.63	252.1	28.0	23.0	28.0	--	--
93	FH-23	253.70	252.0	25.0	22.0	25.0	--	--
94	FH-21	251.63	252.1	26.0	21.0	26.0	--	--
95	FH85-8A	--	260.0	26.0	20.0	26.0	--	--
96	FH1974	--	254.5	--	--	--	--	--
97	B1	--	269.9	43.0	--	--	43.0	--
98	B3	--	269.3	33.8	--	--	33.8	--
99	B4	--	270.0	54.5	--	--	54.5	--

Appendix 1. Information on well construction for selected wells in Milford, New Hampshire--Continued
[altitude in feet above sea level; depth in feet below land surface; --, no data]

Well number on plate 1	Well name	Altitude of		Depth				
		measurement point	land surface	of well	to top of screen	to bottom of screen	to refusal	to bedrock
100	B6	--	269.0	26.2	--	--	--	26.20
101	B8	--	269.7	26.0	--	--	--	--
102	B9	--	275.3	40.3	--	--	--	--
103	B11	--	275.0	38.0	--	--	--	--
104	B12	--	275.4	48.4	--	--	--	--
105	--	--	--	--	--	--	--	--
106	--	--	--	--	--	--	--	--
107	--	--	349.2	--	--	--	--	--
108	--	--	--	--	--	--	--	--
109	--	--	349.3	--	--	--	--	--
110	--	--	--	--	--	--	--	--
111	--	--	--	--	--	--	--	--
113	--	--	--	--	--	--	--	--
115	--	--	295.9	--	--	--	--	--
117	--	--	--	--	--	--	--	--
118	--	--	--	--	--	--	--	--
119	--	--	--	--	--	--	--	--
120	--	--	--	--	--	--	--	--
121	--	--	--	--	--	--	--	--
122	WW-125	--	269.0	--	--	--	--	--
123	GW-01S	--	256.1	26.0	6.0	16.0	--	--
124	GW-01D	--	256.5	76.4	60.0	70.0	--	56.00
125	GW-01M	--	256.7	41.0	30.0	40.0	--	--
126	KEYES	--	240.1	60.0	50.0	60.0	--	--
127	HAYWOOD	--	256.3	--	--	--	--	--
128	Savage Well	--	261.0	45.0	35.0	45.0	--	--
129	KEYES 1	--	241.7	50.0	41.0	50.0	--	50.00
130	KEYES 2	--	240.5	60.0	52.0	60.0	--	65.00
131	KEYES 3	--	240.3	50.0	42.0	50.0	--	52.00
132	POTTER 1D	253.75	251.8	57.0	55.0	57.0	80.00	--
133	POTTER 2D	255.77	253.8	58.0	56.0	58.0	--	--
134	POTTER 3D	255.67	253.7	58.0	56.0	58.0	--	--
135	FORD 34	--	241.4	50.0	40.0	50.0	50.00	--
136	FORDobs3	249.06	247.1	46.0	46.0	46.0	--	46.00
137	FORD 33	--	240.0	40.0	40.0	40.0	--	42.00
138	FORD 32	--	240.0	42.0	32.0	42.0	--	42.00
139	FORD 1	--	239.8	50.0	35.0	50.0	--	50.00
140	FORD 5	--	241.7	35.0	35.0	35.0	--	35.00
141	FORD 4	--	245.3	45.0	45.0	45.0	--	47.00
142	KEYES 2S	248.45	246.1	20.0	18.0	20.0	--	--
143	KEYES 3S	247.67	246.0	18.6	16.6	18.6	--	--
144	KEYES 4S	245.28	244.3	16.4	14.4	16.4	--	53.00
145	POTTER 1S	253.76	252.0	17.0	16.0	17.0	80.00	--
146	POTTER 2S	255.79	253.7	20.0	18.0	20.0	--	--
147	POTTER 3S	255.66	253.7	19.0	17.0	19.0	--	--
148	LW-01M	--	265.1	52.6	42.6	52.6	--	--
149	LW-01S	--	265.2	35.6	25.6	35.6	--	--

Appendix 1. Information on well construction for selected wells in Milford, New Hampshire--Continued
[altitude in feet above sea level; depth in feet below land surface; --, no data]

Well number on plate 1	Well name	Altitude of		Depth				
		measurement point	land surface	of well	to top of screen	to bottom of screen	to refusal	to bedrock
150	LW-02S	245.91	243.4	14.0	4.0	14.0	--	--
151	LW-03S	250.44	250.0	19.0	9.0	19.0	--	--
152	LW-04S	246.46	244.8	15.0	5.0	15.0	--	--
153	MOW-38	--	262.7	40.0	30.0	40.0	41.00	--
154	MOW-32	--	261.8	16.0	6.0	16.0	20.00	--
155	GW-02S	--	255.1	16.0	6.0	16.0	--	--
156	GW-03S	--	252.4	18.4	8.4	18.4	--	--
157	GW-04S	--	255.6	15.4	5.4	15.4	--	--
158	GW-05S	--	264.2	17.0	7.0	17.0	--	--
160	HAMP B1	--	266.3	20.0	10.0	20.0	--	--
161	HAMPB-2	--	271.1	20.0	10.0	20.0	--	--
162	HAMPB3	--	258.9	30.0	20.0	30.0	--	--
163	MI-2	253.94	252.9	49.0	42.0	47.0	--	--
164	MI-3	257.28	254.5	49.0	44.0	49.0	--	--
165	MI-4	257.49	255.0	48.0	39.0	49.0	--	--
166	MI-5	255.89	255.2	49.0	39.0	49.0	--	--
167	MI-6	255.66	255.1	--	--	--	--	--
168	MI-6A	--	259.5	--	--	--	--	--
169	MI-9	265.05	263.8	--	--	--	--	--
170	MI-14	--	260.0	--	--	--	--	--
171	MI-29	269.63	268.5	51.5	31.5	51.5	51.50	--
172	MI-40	257.40	256.1	--	--	--	--	--
173	H12-71	--	250.0	36.0	36.0	36.0	--	36.00
174	H11-71	--	241.6	35.0	25.0	35.0	--	39.00
175	H9-71	--	250.8	25.0	20.0	25.0	--	28.50
176	H8-71	--	250.0	25.0	20.0	25.0	--	32.00
177	H6-71	--	249.5	16.0	16.0	16.0	--	16.00
178	H7-71	--	246.9	15.0	15.0	15.0	--	15.00
179	H10-71	--	250.9	28.0	18.0	28.0	--	34.00
180	H5-71	--	250.5	28.0	23.0	28.0	--	31.00
181	--	--	247.2	--	--	--	--	25.00
182	--	--	266.9	--	--	--	--	20.00
183	B-61	--	239.9	--	--	--	--	23.00
184	--	--	260.7	--	--	--	--	--
185	--	--	229.6	--	--	--	--	--
186	--	--	230.1	--	--	--	--	--
187	--	--	220.0	--	--	--	--	--
188	MOA-25	--	262.0	60.0	50.0	60.0	72.00	--
189	MOA-35	--	265.2	--	--	--	12.00	--
190	MOA-37	--	260.0	--	--	--	13.00	--
191	MOA-38	--	270.0	--	--	--	14.00	--
192	--	--	266.7	--	--	--	--	12.00
193	MOW-15	--	260.0	--	--	--	--	--
194	MOW-58	--	268.7	63.0	54.0	63.0	76.00	--
195	MOW-64	--	260.0	49.0	41.0	49.0	76.00	--
196	MOW-65	--	260.0	62.0	54.0	62.0	73.00	--
197	MOW-66	--	252.8	33.0	27.0	33.0	37.00	--

Appendix 1. Information on well construction for selected wells in Milford, New Hampshire--Continued
[altitude in feet above sea level; depth in feet below land surface; --, no data]

Well number on plate 1	Well name	Altitude of		Depth				
		measurement point	land surface	of well	to top of screen	to bottom of screen	to refusal	to bedrock
198	MOW-67	--	249.8	43.0	37.0	43.0	45.00	--
199	MOW-68	--	245.0	42.0	36.0	42.0	53.00	--
200	MOW-25	--	259.7	--	--	--	4.00	--
201	MOW-26	--	260.0	--	--	--	14.00	--
202	MOW-19	--	260.8	--	--	--	--	--
203	MI-63	267.64	266.6	64.0	24.0	64.0	--	--
204	MI-13	251.42	249.6	18.0	12.0	18.0	33.00	--
205	HAMP-GW4	--	270.5	--	--	--	--	--
206	RB-39	--	262.5	--	--	--	--	--
207	RB-38	--	259.7	13.0	--	--	--	--
208	FH-5	263.00	268.0	65.0	50.0	65.0	--	--
209	MW-1C	281.28	279.5	61.1	51.1	61.1	--	62.00
210	MW-2B	269.19	266.4	80.7	70.7	80.7	--	--
212	MW-4B	268.59	266.7	55.8	45.8	55.8	--	43.20
213	MW-5B	269.61	267.6	60.4	50.4	60.4	--	61.35
214	MW-6B	268.95	267.1	66.8	56.8	66.8	--	69.40
215	MW-7B	264.29	262.5	55.6	45.6	55.6	--	58.60
216	MW-8B	263.80	261.8	67.0	57.0	67.0	--	90.00
217	MW-9C	268.09	266.3	90.0	79.0	90.0	--	94.00
218	MW-10C	264.74	262.8	91.5	81.5	91.5	--	91.60
219	MW-11R	262.47	261.0	64.0	52.0	64.0	--	65.00
220	MW-12A	265.96	264.0	34.8	25.0	35.0	--	--
221	MW-13B	259.35	257.9	58.0	48.0	58.0	--	64.00
222	MW-14R	255.50	253.8	108.8	50.0	60.0	--	60.00
223	MW-15A	258.53	256.8	27.5	12.5	27.5	--	--
225	MW-26	271.11	268.7	13.0	3.0	13.0	--	--
226	MW-25	273.12	270.5	12.0	4.0	12.0	--	--
228	MW-3	270.54	268.7	34.1	11.5	21.5	--	21.50
231	MW-18A	269.78	267.9	82.0	44.5	54.5	--	--
233	MW-16A	270.12	267.5	26.9	16.9	26.9	--	--
234	MW-28	275.42	276.0	15.0	5.0	15.0	--	--
235	MW-27	275.78	273.8	15.3	5.0	15.0	--	--
237	MW-23A	267.51	265.4	30.0	20.0	30.0	--	--
240	FH-10(FH-5-OBS1)	268.01	267.3	63.0	58.0	63.0	--	--
242	FH-9	269.83	268.3	52.0	--	52.0	--	--
244	RW6	--	--	--	--	--	--	--
245	RW3	--	-2.0	420.0	111.0	420.0	--	--
247	RW1	--	-2.0	340.0	59.0	340.0	--	--
248	RW2	--	--	--	--	--	--	--
249	CASSSARINO	--	267.9	12.5	--	12.5	--	--
250	SPZ-1	259.17	257.4	7.0	2.0	7.0	--	--
251	SP-7	258.66	258.2	9.5	4.5	9.5	--	--
252	SP-6	261.05	260.0	8.0	3.0	8.0	--	--
255	MW-24A	259.67	257.1	29.5	19.5	29.5	--	--
258	MW-17A	267.05	264.4	29.8	19.8	29.8	--	--
262	MW-29	260.90	260.4	14.5	2.5	12.5	--	--
264	MW-20A	263.23	260.8	25.2	15.2	25.2	--	--

Appendix 1. Information on well construction for selected wells in Milford, New Hampshire--Continued
[altitude in feet above sea level; depth in feet below land surface; --, no data]

Well number on plate 1	Well name	Altitude of		Depth				
		measurement point	land surface	of well	to top of screen	to bottom of screen	to refusal	to bedrock
267	SP-4	258.63	257.1	7.5	2.5	7.5	--	--
268	SP-3	256.30	255.3	9.5	4.5	9.5	--	--
269	P-9A	254.73	253.1	8.0	7.0	8.0	--	--
270	P-9B	255.01	252.6	10.2	9.2	10.2	--	--
271	P-15	252.08	251.4	8.0	7.0	8.0	--	--
273	HP-1	254.51	252.3	6.0	1.0	6.0	--	--
274	HP-2	253.24	251.0	6.5	1.5	6.5	--	--
275	HP-3	253.53	251.1	6.5	1.5	6.5	--	--
276	P-10	252.70	250.4	8.5	7.5	8.5	--	--
277	P-11	254.54	252.5	8.5	7.5	8.5	--	--
278	MW-21A	261.27	259.2	13.8	3.8	13.8	--	--
279	SP-2	251.94	249.9	6.0	1.0	6.0	--	--
280	P-16	260.43	258.3	13.0	12.0	13.0	--	--
281	MW-34	260.91	258.5	19.6	9.5	19.5	--	20.50
282	P-17A	252.54	250.6	9.0	8.0	9.0	--	--
283	P-17B	253.66	252.6	13.0	12.0	13.0	--	--
284	FERGUSON	280.08	278.3	23.0	--	23.0	--	--
285	SPZ-2	252.23	250.2	8.5	3.5	8.5	--	--
287	GORMAN	271.45	270.4	22.0	--	22.0	--	--
288	FH-28 (PFH-OBS6)	248.81	248.1	23.0	--	23.0	--	--
289	FH-29	250.07	247.8	33.9	--	33.9	--	--
290	SP-18	250.17	248.2	7.5	4.5	7.5	--	--
291	SP-11	249.67	247.7	9.5	8.5	9.5	--	--
292	FH-30	250.69	248.3	23.0	--	23.0	--	--
293	MW-22A	252.52	250.2	23.3	13.8	23.8	--	--
294	MW-22B	252.77	250.1	43.7	33.5	43.5	--	47.00
295	P-13	250.84	248.3	8.5	7.5	8.5	--	--
296	MW-32A	250.46	247.9	17.7	7.0	17.0	--	--
297	MW-32B	251.23	248.3	41.3	31.8	41.8	--	43.50
299	HM-1	262.88	269.2	62.3	52.3	62.3	--	--
301	FH-11	268.08	267.4	62.0	--	62.0	--	--
302	FH-19	256.17	--	--	--	--	--	--
304	SP-5	257.07	255.3	7.5	2.5	7.5	--	--
305	FH-18	255.01	--	--	--	--	--	--
306	MW-33	253.89	251.8	53.1	41.5	51.5	--	52.50
307	MW-1A	281.26	279.7	17.0	5.0	17.0	--	--
308	MW-13A	258.04	257.9	33.9	23.9	33.9	--	--
309	MW-1B	281.38	279.5	45.4	35.4	45.4	--	--
310	MW-2A	269.32	266.6	41.0	29.0	39.0	--	--
311	MW-2R	268.95	266.2	164.0	134.0	164.0	--	115.50
312	MW-4A	268.34	266.5	29.7	19.7	29.7	--	--
313	MW-5A	269.71	267.6	40.0	28.0	38.0	--	--
314	MW-7A	264.40	262.3	13.2	3.2	13.2	--	--
315	MW-8A	263.91	262.0	20.0	4.5	16.5	--	--
316	MW-10A	263.77	262.2	29.0	19.0	29.0	--	--
317	MW-10B	263.55	262.2	54.0	44.0	54.0	--	--
318	MW-11A	262.78	260.9	30.5	20.5	30.5	--	--

Appendix 1. Information on well construction for selected wells in Milford, New Hampshire--Continued
[altitude in feet above sea level; depth in feet below land surface; --, no data]

Well number on plate 1	Well name	Altitude of		Depth				
		measurement point	land surface	of well	to top of screen	to bottom of screen	to refusal	to bedrock
319	MW-11B	262.83	261.0	64.3	52.3	64.3	--	--
320	MW-12B	265.61	264.0	66.0	56.0	66.0	--	66.00
321	MW-16B	269.87	267.6	49.6	39.6	49.6	--	--
322	MW-17B	267.06	264.6	62.7	52.4	62.4	--	--
323	MW-17C	267.28	264.7	95.0	85.0	95.0	--	99.30
324	MW-18B	270.30	268.0	90.8	72.0	82.0	--	82.00
326	MW-19A	263.68	261.6	33.5	23.5	33.5	--	--
327	MW-19B	263.44	260.9	49.0	39.0	49.0	--	35.00
328	MW-20B	263.03	260.7	61.5	35.0	45.0	--	47.50
329	MW-21B	261.77	259.3	30.0	20.0	30.0	--	--
330	MW-21C	261.34	259.4	54.4	44.1	54.1	--	63.75
331	MW-23B	267.40	265.3	99.0	48.0	58.0	--	--
332	MW-23C	267.34	265.3	99.0	84.3	94.3	--	106.00
333	MW-24B	259.39	256.8	41.0	31.0	41.0	--	40.50
334	MW-31	251.87	250.1	--	--	--	--	--
335	P-1	279.26	276.6	14.9	13.9	14.9	--	--
336	P-2	271.32	268.6	18.0	17.0	18.0	--	--
337	WLR4	257.38	251.3	4.4	4.0	5.0	--	--
338	P-14	248.69	246.7	8.0	7.0	8.0	--	--
339	SP-9	261.16	259.4	6.5	1.5	6.5	--	--
340	SP-10	263.92	262.4	6.0	1.0	6.0	--	--
341	MW-14B	255.13	253.3	59.6	50.0	60.0	--	--
342	MW-15B	258.61	257.0	39.4	29.4	36.4	--	27.50
344	MW-16C	269.74	267.4	83.2	73.2	83.2	--	87.50
345	MW-16R	--	--	--	--	--	--	87.50
347	MW4R	267.94	266.4	98.0	64.0	98.0	--	45.00
348	MW-6A	269.11	267.0	20.0	8.0	20.0	--	--
349	MW-14A	254.65	253.4	29.0	19.0	29.0	--	--
351	MW-9A	267.76	266.1	40.7	30.7	40.7	--	--
352	MW-9B	267.87	266.1	68.2	58.2	68.2	--	--
353	FH-17	272.44	--	--	--	--	--	--
354	PFH production Well	251.68	249.2	40.0	30.0	40.0	--	--
356	--	250.05	247.4	--	--	--	--	--
357	--	249.97	247.4	--	--	--	--	--
358	--	250.03	247.2	--	--	--	--	--
359	--	249.86	248.5	24.8	--	24.8	--	--
360	--	251.03	247.1	34.5	--	34.5	--	--
361	P-12	--	-2.0	10.0	9.0	10.0	--	--
362	USGS-DISK	250.02	--	--	--	--	--	--
364	--	264.93	262.5	--	--	--	--	--
365	MW-15R	--	--	--	--	--	--	--
366	MW-30	--	--	--	--	--	--	--
367	M261942	--	--	--	--	--	--	--
368	BMc821934	--	--	--	--	--	--	--
369	FHwoods	266.46	266.1	--	--	--	--	--
374	FH-26	--	--	--	--	--	--	--
375	Well near FH19	--	--	--	--	--	--	--

APPENDIX 2

Appendix 2. River stage from staff gages on the Souhegan River and tributaries in Milford, New Hampshire

[Positive gage readings greater than measuring point; negative values less than measuring point; Observed means are from all water surface elevations shown; Water surface elevations are instantaneous; M.P., measuring point; ft, feet; Elev., elevation]

Well Number	M.P. Elev. (ft)	Gage Read-ing	Water Surface Elev. (ft)	Measure Date	Observed Mean (ft)	Well Number	M.P. Elev. (ft)	Gage Reading (ft)	Water Surface Elev. (ft)	Measure Date	Observed Mean (ft)
WLR-1						WLR2					
(391)	269.23	-0.30	268.93	10/18/90	269.29	(392)				10/18/90	262.47
	269.23	-0.20	269.03	10/19/90						10/19/90	
	269.23	1.88	271.11	04/05/94						04/05/94	
	269.23	1.83	271.06	04/05/94						04/05/94	
	269.23	1.35	270.58	04/12/94			262.85	-0.38	262.47	04/12/94	
	269.23	1.28	270.51	04/13/94						04/13/94	
	269.23	1.66	270.89	04/14/94						04/14/94	
	269.23	0.22	269.45	05/04/94						05/04/94	
	269.23	1.21	270.44	05/09/94						05/09/94	
	269.23	0.24	269.47	05/14/94						05/14/94	
	269.23	-0.86	268.37	06/16/94						06/16/94	
	269.23	-1.20	268.03	07/20/94			262.85	-0.40	262.45	07/20/94	
				08/24/94			262.85	-0.39	262.46	08/24/94	
	269.23	-1.15	268.08	09/21/94						09/21/94	
				09/29/94			262.85	-0.39	262.46	09/29/94	
	269.23	-0.96	268.26	10/07/94						10/07/94	
				10/11/94			262.85	-0.40	262.45	10/11/94	
	269.23	-0.63	268.56	10/24/94						10/24/94	
	269.23	-0.89	268.34	11/07/94						11/07/94	
	269.23	-0.49	268.74	11/08/94						11/08/94	
	269.23	-0.89	268.34	11/21/94						11/21/94	
	269.23	-0.17	269.06	11/22/94						11/22/94	
	269.23	0.36	269.59	12/05/94						12/05/94	
	269.23	1.30	270.53	12/06/94						12/06/94	
	269.23	1.24	270.47	''						''	
	269.23	0.09	269.32	12/19/94						12/19/94	
	269.23	1.20	270.43	01/18/95						01/18/95	
	269.23	0.58	269.81	01/26/95						01/26/95	
	269.23	0.22	269.45	02/27/95			262.85	-0.31	262.54	02/27/95	
	269.23	0.24	269.47	02/27/95						02/27/95	
	269.23	0.72	269.95	03/22/95						03/22/95	
	269.23	0.18	269.41	03/27/95						03/27/95	
	272.41	-3.25	269.16	04/24/95						04/24/95	
	272.41	-3.24	269.17	05/22/95						05/22/95	
	272.41	-4.34	268.07	06/28/95						06/28/95	
	272.41	-4.45	267.96	08/01/95						08/01/95	
	272.41	-4.27	268.14	08/03/95						08/03/95	
	272.41	-4.46	267.95	08/29/95						08/29/95	
	272.41	4.60	267.81	09/29/95						09/14/95	
	272.41	4.51	267.90	09/27/95						09/27/95	
WLR3						WLR4					
(65)	255.16	0.86	256.02	02/02/89	255.87	(337)				02/02/89	251.34
	255.16	0.85	256.01	02/03/89			250.78	0.54	251.32	02/03/89	
	255.16	0.53	255.69	04/14/89			250.78	0.47	251.25	04/14/89	
	255.16	0.54	255.70	04/21/89			250.78	0.54	251.32	04/21/89	
	255.16	0.52	255.68	04/28/89			250.78	0.42	251.20	04/28/89	
	255.16	0.58	255.74	05/12/89			250.78	0.63	251.41	05/12/89	
	255.16	0.54	255.70	06/16/89			250.78	0.45	251.23	06/16/89	
	255.16	0.50	255.66	08/24/89			250.78	0.40	251.18	08/24/89	
	255.16	0.44	255.60	09/28/89			250.78	0.26	251.04	09/28/89	
	255.16	0.50	255.66	10/16/89			250.78	0.32	251.10	10/16/89	
	255.16	0.88	256.04	04/12/94			250.78	0.81	251.59	04/12/94	
	255.16	0.88	256.04	04/13/94						04/13/94	
	255.16	0.78	255.94	06/16/94			250.78	0.30	251.08	06/16/94	
	255.16	0.76	255.92	07/20/94			250.78	1.27	252.05	07/20/94	
	255.16	0.72	255.88	08/24/94			250.78	0.53	251.31	08/24/94	
	255.16	0.78	255.94	09/29/94			250.78	0.66	251.44	09/29/94	
	255.16	0.94	256.10	10/11/94			250.78	0.58	251.36	10/11/94	
				12/19/94			250.78	0.75	251.53	12/19/94	
				01/18/95			250.78	0.84	251.62	01/18/95	
	255.16	0.94	256.10	01/26/95			250.78	0.86	251.64	01/26/95	
	255.16	0.88	256.04	02/27/95			250.78	0.61	251.39	02/27/95	
				02/27/95			250.78	0.66	251.44	02/27/95	
				03/22/95			250.78	0.78	251.56	03/22/95	
				03/27/95			250.78	0.68	251.46	03/27/95	
	255.16	0.86	256.02	04/24/95			250.78	0.70	251.48	04/24/95	
				05/22/95			250.78	0.56	251.34	05/22/95	
				06/28/95			250.78	0.34	251.12	06/28/95	

Appendix 2. River stage from staff gages on the Souhegan River and tributaries in Milford, New Hampshire --Continued

[Positive gage readings greater than measuring point; negative values less than measuring point; Observed means are from all water surface elevations shown; Water surface elevations are instantaneous; M.P., measuring point; ft, feet; Elev., elevation]

Well Number	M.P. Elev. (ft)	Gage Read-ing	Water Surface Elev. (ft)	Measure Date	Observed Mean (ft)	Well Number	M.P. Elev. (ft)	Gage Reading (ft)	Water Surface Elev. (ft)	Measure Date	Observed Mean (ft)
				08/01/95			250.78	0.33	251.11	08/01/95	
				08/03/95			250.78	0.34	251.12	08/03/95	
				08/29/95			250.78	0.14	250.92	08/29/95	
				09/14/95			DRY			09/14/95	
				09/27/95			250.78	0.01	250.79	09/27/95	
WLR5						P-1					
(393)				02/02/89	244.09	(335)				02/02/89	268.42
			243.45	10/22/90						10/22/90	
			243.46	04/05/94						04/05/94	
	246.87	-2.54	244.33	04/12/94						04/12/94	
			247.12	04/14/94						04/14/94	
			243.85	06/16/94						06/16/94	
			242.56	07/20/94						07/20/94	
			243.99	08/24/94						08/24/94	
				09/08/94			267.17	0.68	267.85	09/08/94	
	245.24	-2.32	242.92	09/21/94			267.17	0.66	267.83	09/21/94	
				09/22/94			267.17	0.61	267.78	09/22/94	
	245.24	-2.29	242.95	09/29/94						09/29/94	
	245.24	-1.88	243.36	10/07/94			267.17	0.84	268.01	10/07/94	
				10/08/94			267.17	0.85	268.02	10/08/94	
	245.24	1.32	246.56	10/11/94						10/11/94	
	245.24	-1.63	243.61	10/24/94			267.17	1.05	268.22	10/24/94	
				10/25/94			267.17	1.05	268.22	10/25/94	
	245.24	-2.08	243.16	11/07/94			267.17	0.86	268.03	11/07/94	
	245.24	-1.38	243.86	11/08/94			267.17	1.20	268.37	11/08/94	
	245.24	-2.11	243.13	11/21/94			267.17	0.88	268.05	11/21/94	
	245.24	-1.25	243.99	11/22/94			267.17	1.38	268.55	11/22/94	
	245.24	-1.22	244.02	12/05/94			268.91	0.13	269.03	12/05/94	
	245.24	0.80	246.04	12/06/94			267.17	2.66	269.83	12/06/94	
	245.24	-1.05	244.19	12/19/94			267.17	1.57	268.74	12/19/94	
	245.24	-0.05	245.19	01/18/95			268.91	0.39	269.29	01/18/95	
	245.24	-0.40	244.84	01/26/95			268.91	0.22	269.12	01/26/95	
	245.24		244.22	02/27/95						02/27/95	
	245.24	1.00	244.24	02/27/95			268.91	0.01	268.91	02/27/95	
	245.24	9.07	245.86	03/22/95			271.89	-2.56	269.34	03/22/95	
	245.24	-0.88	246.12	03/27/95			267.17	1.61	268.78	03/27/95	
	245.24	-1.20	246.44	04/24/95			267.17	1.46	268.63	04/24/95	
	245.24	-1.17	246.41	05/22/95			267.17	1.48	268.65	05/22/95	
				06/28/95			268.91	-1.15	267.75	06/28/95	
	245.24	-2.37	247.61	08/01/95			267.17	0.52	267.69	08/01/95	
	245.24	-2.20	247.44	08/03/95			267.17	0.65	267.82	08/03/95	
	245.24	-2.35	247.59	08/29/95			267.17	0.48	267.65	08/29/95	
	245.24	-2.50	247.74	09/14/95			268.91	-1.38	267.52	09/14/95	
	245.24	-2.45	247.69	09/27/95			268.91	-1.27	267.63	09/27/95	
P-2						MW-2A					
(336)				02/02/89	262.40	(310)				02/02/89	262.34
	270.65	-7.15	263.50	04/13/94						04/13/94	
	270.65	-7.15	263.50	04/14/94						04/14/94	
	270.65	-7.92	262.73	05/05/94						05/05/94	
	270.65	-6.69	263.96	05/09/94						05/09/94	
			DRY	06/17/94						06/17/94	
	260.11	1.32	261.43	09/08/94						09/08/94	
	260.11	1.29	261.40	09/21/94						09/21/94	
	260.11	1.29	261.40	09/22/94						09/22/94	
	260.11	1.52	261.63	10/07/94						10/07/94	
	260.11	1.52	261.63	10/08/94						10/08/94	
	260.11	1.80	261.91	10/24/94						10/24/94	
	260.11	1.80	261.91	10/25/94						10/25/94	
	260.11	1.57	261.68	11/07/94						11/07/94	
	260.11	1.94	262.05	11/08/94						11/08/94	
	260.11	1.54	261.65	11/21/94			265.64	-4.27	261.37	11/21/94	
	260.11	2.22	262.33	11/22/94			265.64	-3.49	262.15	11/22/94	
				12/05/94			265.64	-3.29	262.35	12/05/94	
	260.11	3.92	264.03	12/06/94			265.64	-1.92	263.72	12/06/94	
	262.65	0.02	262.67	12/19/94			265.64	-3.18	262.46	12/19/94	
	262.65	0.74	263.39	01/18/95			265.64	-2.50	263.14	01/18/95	
	262.65	0.51	263.16	01/26/95			265.64	-2.68	262.96	01/26/95	
	260.11	2.81	262.92	02/27/95						02/27/95	

Appendix 2. River stage from staff gages on the Souhegan River and tributaries in Milford, New Hampshire.—Continued

[Positive gage readings greater than measuring point; negative values less than measuring point; Observed means are from all water surface elevations shown; Water surface elevations are instantaneous; M.P., measuring point; ft, feet; Elev., elevation]

Well Number	M.P. Elev. (ft)	Gage Read-ing	Water Surface Elev. (ft)	Measure Date	Observed Mean (ft)	Well Number	M.P. Elev. (ft)	Gage Reading (ft)	Water Surface Elev. (ft)	Measure Date	Observed Mean (ft)
	260.11	2.82	262.93	02/27/95			265.64	-2.82	262.82	02/27/95	
	260.11	3.28	263.39	03/22/95			265.64	-2.50	263.14	03/22/95	
	262.65	-0.08	262.57	03/27/95			265.64	-3.11	262.53	03/27/95	
				04/10/95						04/10/95	
	260.11	2.41	262.52	04/24/95			265.64	-3.30	262.34	04/24/95	
	260.11	2.43	262.54	05/22/95			265.64	-3.27	262.37	05/22/95	
	260.11	1.48	261.59	06/28/95			265.64	-4.00	261.64	06/28/95	
	260.11	1.33	261.44	08/01/95			265.64	-4.36	261.28	08/01/95	
	260.11	1.56	261.67	08/03/95			265.64	-4.08	261.56	08/03/95	
	260.11	1.29	261.40	08/29/95			265.64	-4.27	261.37	08/29/95	
	260.11	1.12	261.23	09/14/95			265.64	-4.46	261.18	09/14/95	
	260.11	1.28	261.39	09/27/95			265.64	4.29	261.35	09/27/95	
MW-23						FH-27					
(237)				02/02/89	258.56	(89)				02/02/89	247.15
	261.18	-3.13	258.05	09/21/94			245.57	0.66	246.23	09/21/94	
	261.18	-2.65	258.53	10/24/94						10/24/94	
	261.18	-2.56	258.62	11/07/94			245.57	0.83	246.40	11/07/94	
	261.18	-2.60	258.57	11/08/94					245.57	11/08/94	
	261.18	-2.88	258.29	11/21/94			245.57	0.82	246.39	11/21/94	
	261.18	-2.23	258.95	11/22/94			245.57	1.52	247.09	11/22/94	
	261.18	-2.25	258.93	12/05/94					245.57	12/05/94	
	257.83	2.30	260.13	12/06/94			245.57	3.34	248.91	12/06/94	
				''					245.57	''	
	261.18	-2.19	258.99	12/19/94			245.57	1.78	247.35	12/19/94	
	257.83	1.47	259.30	01/18/95			245.57	2.76	248.33	01/18/95	
	261.18	-2.05	259.13	01/26/95			245.57	2.30	247.87	01/26/95	
	261.18	-2.39	258.79	02/27/95			245.57	1.93	247.50	02/27/95	
				03/13/95			245.57	2.33	247.90	03/13/95	
	261.18	-1.48	259.70	03/22/95			245.57	2.55	248.12	03/22/95	
	261.18	-2.46	258.72	03/27/95			245.57	1.88	247.45	03/27/95	
				04/10/95			245.57	1.62	247.19	04/10/95	
	261.18	-2.60	258.58	04/24/95			245.57	1.64	247.21	04/24/95	
	261.18	-2.57	258.61	05/22/95						05/22/95	
	261.18	-3.92	257.26	06/28/95			245.57	0.70	246.27	06/28/95	
				08/01/95			245.57	0.66	246.23	08/01/95	
	261.18	-3.89	257.29	08/03/95			245.57	0.76	246.33	08/03/95	
	257.83	-0.88	256.95	09/14/95			245.57	0.55	246.12	09/14/95	
	257.83	-0.81	257.02	09/27/95			245.57	0.60	246.17	09/27/95	
39-B				02/03/89							
(390)				04/14/89							
	239.39	1.17	240.56	09/21/94							
	239.39	1.86	241.25	10/11/94							
	239.39	1.88	241.27	10/24/94							
	239.39	1.51	240.90	11/07/94							
	239.39	1.46	240.85	11/21/94							
	239.39	2.46	241.85	11/22/94							
	239.39	2.47	241.86	12/05/94							
	239.39	2.40	243.79	12/06/94							
	239.39	2.56	241.95	12/19/94							
	239.39	3.44	242.83	01/18/95							
	239.39	3.18	242.57	01/26/95							
	239.39	2.88	242.27	02/27/95							
	239.39	3.52	242.91	03/22/95							
	239.39	2.80	242.19	03/27/95							
	239.39	2.49	241.88	04/24/95							
	239.39	2.51	241.90	05/22/95							
	239.39	1.10	240.49	08/01/95							
	239.39	1.30	240.69	08/03/95							
	239.39	0.94	240.33	09/14/95							
	239.39	1.03	240.42	09/27/95							

APPENDIX 3

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Elevation (ft)	Measure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Elevation (ft)	Measure date	Observed mean
MW-1A	281.26	7.26	274.00	06/21/94	273.62	MW-1B	281.38	9.79	271.59	06/21/94	271.62
(307)		8.19	273.07	07/05/94		(309)		10.35	271.03	07/05/94	
		8.85	272.41	07/15/94				10.68	270.70	07/15/94	
		8.92	272.34	08/01/94				10.58	270.80	08/01/94	
		9.82	271.44	08/15/94				11.20	270.18	08/15/94	
		8.31	272.95	08/29/94				10.27	271.11	08/29/94	
		8.95	272.31	09/12/94				10.79	270.59	09/12/94	
		9.14	272.12	09/26/94				10.10	271.28	09/26/94	
		7.90	273.36	10/11/94				10.06	271.32	10/11/94	
		8.58	272.68	10/24/94				10.41	270.97	10/24/94	
		8.93	272.33	11/08/94				10.64	270.74	11/08/94	
		9.30	271.96	11/22/94				10.95	270.43	11/22/94	
		8.57	272.69	12/05/94				10.12	271.26	12/05/94	
		7.01	274.25	12/19/94				9.36	272.02	12/19/94	
		6.07	275.19	01/03/95				8.52	272.86	01/03/95	
		6.24	275.02	01/16/95				8.72	272.66	01/16/95	
		6.20	275.06	01/30/95				8.69	272.69	01/30/95	
		6.73	274.53	02/13/95				9.18	272.20	02/13/95	
		6.85	274.41	02/27/95				9.16	272.22	02/27/95	
		6.33	274.93	03/13/95				8.75	272.63	03/13/95	
		6.53	274.73	03/27/95				8.97	272.41	03/27/95	
		6.82	274.44	04/10/95				9.28	272.10	04/10/95	
		6.72	274.54	04/24/95				9.22	272.16	04/24/95	
		6.96	274.30	05/08/95				9.50	271.88	05/08/95	
		6.68	274.58	05/22/95				9.26	272.12	05/22/95	
		6.76	274.50	06/05/95				9.30	272.08	06/05/95	
MI-7	256.68	6.28	250.40	06/21/94	250.77	MI-4	257.49	6.71	250.78	06/21/94	251.98
(21)		6.90	249.78	07/05/94		(165)		6.51	250.98	07/05/94	
		7.10	249.58	07/15/94				6.74	250.75	07/15/94	
		6.91	249.77	08/01/94				6.10	251.39	08/01/94	
		6.97	249.71	08/15/94				6.45	251.04	08/15/94	
		6.34	250.34	08/29/94				5.85	251.64	08/29/94	
		6.84	249.84	09/12/94				6.48	251.01	09/12/94	
		5.58	251.10	09/26/94				5.04	252.45	09/26/94	
		6.20	250.48	10/11/94				5.64	251.85	10/11/94	
		6.27	250.41	10/24/94				5.73	251.76	10/24/94	
		6.33	250.35	11/08/94				5.80	251.69	11/08/94	
		6.58	250.10	11/22/94				5.93	251.56	11/22/94	
		4.77	251.91	12/05/94				4.47	253.02	12/05/94	
		5.42	251.26	12/19/94				4.80	252.69	12/19/94	
		4.69	251.99	01/03/95				4.32	253.17	01/03/95	
		4.97	251.71	01/16/95				4.57	252.92	01/16/95	
		5.32	251.36	01/30/95				4.85	252.64	01/30/95	
		5.72	250.96	02/13/95				5.24	252.25	02/13/95	
		5.65	251.03	02/27/95				5.53	251.96	02/27/95	
		4.87	251.81	03/13/95				4.48	253.01	03/13/95	
		5.28	251.40	03/27/95				4.84	252.65	03/27/95	
		5.73	250.95	04/10/95				5.20	252.29	04/10/95	
		5.13	251.55	04/24/95				5.64	251.85	04/24/95	
		6.16	250.52	05/08/95				5.64	251.85	05/08/95	
		5.73	250.95	05/22/95				5.23	252.26	05/22/95	
		5.85	250.83	06/05/95				5.37	252.12	06/05/95	
MW-1C	281.28	12.77	268.56	06/21/94	268.46	MW-3	270.54	9.54	261.00	06/21/94	261.43
(209)		13.29	268.04	07/05/94		(228)		9.81	260.73	07/05/94	
		13.61	267.72	07/15/94				10.04	260.50	07/15/94	
		13.49	267.84	08/01/94				9.67	260.87	08/01/94	
		14.17	267.16	08/15/94				10.33	260.21	08/15/94	
		13.36	267.97	08/29/94				9.73	260.81	08/29/94	
		13.93	267.40	09/12/94				10.23	260.31	09/12/94	
		12.92	268.41	09/26/94				8.99	261.55	09/26/94	
		13.18	268.15	10/11/94				9.52	261.02	10/11/94	
		13.50	267.83	10/24/94				9.47	261.07	10/24/94	
		14.73	266.60	11/08/94				9.50	261.04	11/08/94	
		14.10	267.23	11/22/94				9.74	260.80	11/22/94	
		13.09	268.24	12/05/94				6.31	264.23	12/05/94	
		12.50	268.83	12/19/94				8.58	261.96	12/19/94	
		11.46	269.87	01/03/95				8.03	262.51	01/03/95	
		11.66	269.67	01/16/95				8.18	262.36	01/16/95	
		11.74	269.59	01/30/95				8.59	261.95	01/30/95	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		12.25	269.08	02/13/95				9.00	261.54	02/13/95	
		12.28	269.05	02/27/95				8.77	261.77	02/27/95	
		11.78	269.55	03/13/95				8.47	262.07	03/13/95	
		12.08	269.25	03/27/95				8.79	261.75	03/27/95	
		12.43	268.90	04/10/95				9.03	261.51	04/10/95	
		12.41	268.92	04/24/95				9.02	261.52	04/24/95	
		12.78	268.55	05/08/95				9.44	261.10	05/08/95	
		12.52	268.81	05/22/95				9.19	261.35	05/22/95	
		12.58	268.75	06/05/95				8.99	261.55	06/05/95	
MI-10	255.12	6.85	248.27	06/21/94	248.90	MI-12	253.26	6.63	246.63	06/21/94	247.50
(23)		7.08	248.04	07/05/94		(25)		6.82	246.44	07/05/94	
		7.42	247.70	07/15/94				6.96	246.30	07/15/94	
		6.78	248.34	08/01/94				7.59	245.67	08/01/94	
		7.18	247.94	08/15/94				--	--	08/15/94	
		6.48	248.64	08/29/94				--	--	08/29/94	
		7.10	248.02	09/12/94				6.71	246.55	09/12/94	
		5.35	249.77	09/26/94				5.15	248.11	09/26/94	
		6.40	248.72	10/11/94				6.22	247.04	10/11/94	
		6.42	248.70	10/24/94				6.27	246.99	10/24/94	
		6.60	248.52	11/08/94				6.43	246.83	11/08/94	
		6.92	248.20	11/22/94				--	--	11/22/94	
		4.50	250.62	12/05/94				3.88	249.38	12/05/94	
		5.49	249.63	12/19/94				5.45	247.81	12/19/94	
		4.63	250.49	01/03/95				4.18	249.08	01/03/95	
		4.02	251.10	01/16/95				4.54	248.72	01/16/95	
		5.60	249.52	01/30/95				5.26	248.00	01/30/95	
		7.05	247.62	02/13/95				5.56	247.70	02/13/95	
		8.33	246.79	02/27/95				5.50	247.76	02/27/95	
		4.82	250.30	03/13/95				4.55	248.71	03/13/95	
		5.58	249.54	03/27/95				5.20	248.06	03/27/95	
		6.01	249.11	04/10/95				5.78	247.48	04/10/95	
		5.95	249.17	04/24/95				5.67	247.59	04/24/95	
		6.68	248.44	05/08/95				6.29	246.97	05/08/95	
		6.02	249.10	05/22/95				5.79	247.47	05/22/95	
		6.00	249.12	06/05/95				6.00	247.26	06/05/95	
MW-4A	268.34	7.00	261.34	06/21/94	261.63	MW-4B	268.59	7.11	261.48	06/21/94	261.79
(312)		7.25	261.09	07/05/94		(212)		7.37	261.22	07/05/94	
		7.35	260.99	07/15/94				7.47	261.12	07/15/94	
		7.42	260.92	08/01/94				7.55	261.04	08/01/94	
		8.23	260.11	08/15/94				8.37	260.22	08/15/94	
		7.45	260.89	08/29/94				7.58	261.01	08/29/94	
		8.22	260.12	09/12/94				8.37	260.22	09/12/94	
		7.03	261.31	09/26/94				7.17	261.42	09/26/94	
		7.33	261.01	10/11/94				7.43	261.16	10/11/94	
		7.73	260.61	10/24/94				7.87	260.72	10/24/94	
		7.82	260.52	11/08/94				7.96	260.63	11/08/94	
		8.22	260.12	11/22/94				8.37	260.22	11/22/94	
		7.10	261.24	12/05/94				7.25	261.34	12/05/94	
		6.21	262.13	12/19/94				6.35	262.24	12/19/94	
		4.37	263.97	01/03/95				4.52	264.07	01/03/95	
		5.00	263.34	01/16/95				5.19	263.40	01/16/95	
		5.25	263.09	01/30/95				5.37	263.22	01/30/95	
		6.04	262.30	02/13/95				6.22	262.37	02/13/95	
		5.96	262.38	02/27/95				5.15	263.44	02/27/95	
		5.34	263.00	03/13/95				5.47	263.12	03/13/95	
		5.62	262.72	03/27/95				5.74	262.85	03/27/95	
		6.45	261.89	04/10/95				6.38	262.21	04/10/95	
		6.25	262.09	04/24/95				6.37	262.22	04/24/95	
		6.80	261.54	05/08/95				6.89	261.70	05/08/95	
		6.46	261.88	05/22/95				6.57	262.02	05/22/95	
		6.58	261.76	06/05/95				6.69	261.90	06/05/95	
FH-5(obs)	268.01	13.73	254.28	06/21/94	244.64	FH-13(OBS)	269.03	15.25	253.78	06/21/94	252.65
(240)		19.81	248.20	07/05/94		(86)		16.32	252.71	07/05/94	
		22.12	245.89	07/15/94				17.65	251.38	07/15/94	
		23.05	244.96	08/01/94				16.91	252.12	08/01/94	
		27.50	240.51	08/15/94				20.30	248.73	08/15/94	
		25.32	242.69	08/29/94				18.39	250.64	08/29/94	
		28.95	239.06	09/12/94				22.52	246.51	09/12/94	
		24.73	243.28	09/26/94				15.44	253.59	09/26/94	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Elevation (ft)	Measure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Elevation (ft)	Measure date	Observed mean
		26.64	241.37	10/11/94				19.99	249.04	10/11/94	
		29.02	238.99	10/24/94				22.11	246.92	10/24/94	
		29.22	238.79	11/08/94				23.62	245.41	11/08/94	
		30.20	237.81	11/22/94				25.49	243.54	11/22/94	
		23.00	245.01	12/05/94				16.03	253.00	12/05/94	
		21.76	246.25	12/19/94				13.80	255.23	12/19/94	
		19.79	248.22	01/03/95				11.97	257.06	01/03/95	
		20.17	247.84	01/16/95				12.21	256.82	01/16/95	
		21.20	246.81	01/30/95				12.95	256.08	01/30/95	
		22.52	245.49	02/13/95				14.00	255.03	02/13/95	
		22.24	245.77	02/27/95				14.00	255.03	02/27/95	
		21.44	246.57	03/13/95				12.83	256.20	03/13/95	
		21.78	246.23	03/27/95				13.30	255.73	03/27/95	
		22.72	245.29	04/10/95				14.05	254.98	04/10/95	
		22.40	245.61	04/24/95				13.72	255.31	04/24/95	
		22.30	245.71	05/08/95				14.97	254.06	05/08/95	
		23.54	244.47	05/22/95				14.04	254.99	05/22/95	
		22.55	245.46	06/05/95				13.96	255.07	06/05/95	
MW-4R	267.94	6.39	261.55	06/21/94	261.85	MW-6A	269.11	9.52	259.59	06/21/94	260.00
(347)		6.55	261.39	07/05/94		(348)		9.63	259.48	07/05/94	
		6.55	261.39	07/15/94				9.82	259.29	07/15/94	
		6.82	261.12	08/01/94				9.82	259.29	08/01/94	
		7.65	260.29	08/15/94				--	--	08/15/94	
		6.86	261.08	08/29/94				9.94	259.17	08/29/94	
		7.65	260.29	09/12/94				10.80	258.31	09/12/94	
		6.45	261.49	09/26/94				9.90	259.21	09/26/94	
		6.75	261.19	10/11/94				9.86	259.25	10/11/94	
		7.15	260.79	10/24/94				10.32	258.79	10/24/94	
		7.25	260.69	11/08/94				10.41	258.70	11/08/94	
		7.65	260.29	11/22/94				10.79	258.32	11/22/94	
		6.56	261.38	12/05/94				9.40	259.71	12/05/94	
		5.66	262.28	12/19/94				8.62	260.49	12/19/94	
		3.79	264.15	01/03/95				7.06	262.05	01/03/95	
		4.34	263.60	01/16/95				5.70	263.41	01/16/95	
		4.65	263.29	01/30/95				7.74	261.37	01/30/95	
		5.41	262.53	02/13/95				8.58	260.53	02/13/95	
		5.37	262.57	02/27/95				8.60	260.51	02/27/95	
		4.73	263.21	03/13/95				7.93	261.18	03/13/95	
		5.02	262.92	03/27/95				8.18	260.93	03/27/95	
		5.63	262.31	04/10/95				8.83	260.28	04/10/95	
		5.63	262.31	04/24/95				8.79	260.32	04/24/95	
		6.20	261.74	05/08/95				9.36	259.75	05/08/95	
		5.78	262.16	05/22/95				8.92	260.19	05/22/95	
		5.97	261.97	06/05/95				9.18	259.93	06/05/95	
FH 27	251.45	6.32	247.09	06/21/94	247.64	FH 30	250.69	7.90	242.79	06/21/94	243.39
(89)		6.27	247.14	07/05/94		(292)		7.65	243.04	07/05/94	
		6.60	246.81	07/15/94				8.28	242.41	07/15/94	
		6.35	247.06	08/01/94				7.55	243.14	08/01/94	
		6.62	246.79	08/15/94				8.27	242.42	08/15/94	
		6.30	247.11	08/29/94				7.97	242.72	08/29/94	
		6.56	246.85	09/12/94				8.28	242.41	09/12/94	
		5.27	248.14	09/26/94				6.88	243.81	09/26/94	
		5.57	247.84	10/11/94				7.89	242.80	10/11/94	
		4.01	247.44	10/24/94				7.80	242.89	10/24/94	
		4.25	247.20	11/08/94				8.24	242.45	11/08/94	
		4.25	247.20	11/22/94				8.11	242.58	11/22/94	
		3.56	247.89	12/05/94				7.33	243.36	12/05/94	
		3.98	247.47	12/19/94				7.18	243.51	12/19/94	
		2.56	248.89	01/03/95				5.18	245.51	01/03/95	
		2.78	248.67	01/16/95				5.98	244.71	01/16/95	
		3.33	248.12	01/30/95				6.41	244.28	01/30/95	
		3.49	247.96	02/13/95				6.77	243.92	02/13/95	
		3.14	248.31	02/27/95				7.03	243.66	02/27/95	
		2.72	248.73	03/13/95				6.10	244.59	03/13/95	
		3.36	248.09	03/27/95				6.59	244.10	03/27/95	
		3.81	247.64	04/10/95				7.21	243.48	04/10/95	
		3.71	247.74	04/24/95				7.16	243.53	04/24/95	
		4.17	247.28	05/08/95				7.59	243.10	05/08/95	
		3.79	247.66	05/22/95				7.37	243.32	05/22/95	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		3.75	247.70	06/05/95				7.07	243.62	06/05/95	
MW-6B	268.95	9.53	259.42	06/21/94	259.82	MW-7A	264.4	5.70	258.70	06/21/94	259.18
(214)		9.62	259.33	07/05/94		(314)		5.87	258.53	07/05/94	
		9.85	259.10	07/15/94				5.96	258.44	07/15/94	
		9.81	259.14	08/01/94				5.78	258.62	08/01/94	
		10.76	258.19	08/15/94				6.65	257.75	08/15/94	
		9.89	259.06	08/29/94				5.84	258.56	08/29/94	
		10.76	258.19	09/12/94				6.62	257.78	09/12/94	
		9.82	259.13	09/26/94				5.57	258.83	09/26/94	
		9.82	259.13	10/11/94				5.70	258.70	10/11/94	
		10.26	258.69	10/24/94				6.00	258.40	10/24/94	
		10.35	258.60	11/08/94				6.06	258.34	11/08/94	
		10.75	258.20	11/22/94				6.43	257.97	11/22/94	
		9.38	259.57	12/05/94				5.50	258.90	12/05/94	
		8.58	260.37	12/19/94				4.50	259.90	12/19/94	
		7.00	261.95	01/03/95				2.94	261.46	01/03/95	
		5.67	263.28	01/16/95				3.60	260.80	01/16/95	
		7.73	261.22	01/30/95				4.09	260.31	01/30/95	
		8.53	260.42	02/13/95				4.76	259.64	02/13/95	
		8.52	260.43	02/27/95				4.88	259.52	02/27/95	
		7.89	261.06	03/13/95				3.79	260.61	03/13/95	
		8.11	260.84	03/27/95				4.33	260.07	03/27/95	
		8.78	260.17	04/10/95				4.83	259.57	04/10/95	
		8.75	260.20	04/24/95				4.84	259.56	04/24/95	
		9.30	259.65	05/08/95				5.45	258.95	05/08/95	
		8.87	260.08	05/22/95				4.93	259.47	05/22/95	
		9.12	259.83	06/05/95				5.05	259.35	06/05/95	
MI 19	277.5	12.34	265.16	06/21/94	265.57	MI 20	277.47	12.17	265.30	06/21/94	265.84
(30)		12.46	265.04	07/05/94		(31)		12.34	265.13	07/05/94	
		12.73	264.77	07/15/94				12.41	265.06	07/15/94	
		12.64	264.86	08/01/94				12.18	265.29	08/01/94	
		13.06	264.44	08/15/94				12.44	265.03	08/15/94	
		12.61	264.89	08/29/94				12.16	265.31	08/29/94	
		13.14	264.36	09/12/94				12.52	264.95	09/12/94	
		12.41	265.09	09/26/94				11.43	266.04	09/26/94	
		12.53	264.97	10/11/94				12.08	265.39	10/11/94	
		12.67	264.83	10/24/94				12.13	265.34	10/24/94	
		12.86	264.64	11/08/94				12.36	265.11	11/08/94	
		13.11	264.39	11/22/94				12.45	265.02	11/22/94	
		12.36	265.14	12/05/94				11.82	265.65	12/05/94	
		11.60	265.90	12/19/94				11.43	266.04	12/19/94	
		10.24	267.26	01/03/95				10.04	267.43	01/03/95	
		10.57	266.93	01/16/95				10.42	267.05	01/16/95	
		10.49	267.01	01/30/95				10.53	266.94	01/30/95	
		10.89	266.61	02/13/95				10.71	266.76	02/13/95	
		11.29	266.21	02/27/95				11.18	266.29	02/27/95	
		10.87	266.63	03/13/95				10.56	266.91	03/13/95	
		10.99	266.51	03/27/95				10.90	266.57	03/27/95	
		11.43	266.07	04/10/95				11.47	266.00	04/10/95	
		11.48	266.02	04/24/95				11.44	266.03	04/24/95	
		11.85	265.65	05/08/95				11.85	265.62	05/08/95	
		11.68	265.82	05/22/95				11.58	265.89	05/22/95	
		11.84	265.66	06/05/95				11.67	265.80	06/05/95	
MW-7B	264.29	5.48	258.81	06/21/94	259.27	MW-8A	263.91	6.10	257.81	06/21/94	258.29
(215)		5.63	258.66	07/05/94		(315)		6.23	257.68	07/05/94	
		5.73	258.56	07/15/94				6.40	257.51	07/15/94	
		5.55	258.74	08/01/94				6.15	257.76	08/01/94	
		6.44	257.85	08/15/94				6.81	257.10	08/15/94	
		5.62	258.67	08/29/94				6.17	257.74	08/29/94	
		6.42	257.87	09/12/94				6.81	257.10	09/12/94	
		5.30	258.99	09/26/94				5.94	257.97	09/26/94	
		5.48	258.81	10/11/94				6.04	257.87	10/11/94	
		5.76	258.53	10/24/94				6.29	257.62	10/24/94	
		5.82	258.47	11/08/94				6.30	257.61	11/08/94	
		6.20	258.09	11/22/94				6.67	257.24	11/22/94	
		5.32	258.97	12/05/94				3.75	260.16	12/05/94	
		4.31	259.98	12/19/94				5.11	258.80	12/19/94	
		2.95	261.34	01/03/95				4.23	259.68	01/03/95	
		3.45	260.84	01/16/95				4.51	259.40	01/16/95	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		3.91	260.38	01/30/95				4.82	259.09	01/30/95	
		4.59	259.70	02/13/95				5.34	258.57	02/13/95	
		4.47	259.82	02/27/95				5.18	258.73	02/27/95	
		3.80	260.49	03/13/95				4.79	259.12	03/13/95	
		4.15	260.14	03/27/95				5.03	258.88	03/27/95	
		4.64	259.65	04/10/95				5.40	258.51	04/10/95	
		4.64	259.65	04/24/95				5.37	258.54	04/24/95	
		5.26	259.03	05/08/95				5.81	258.10	05/08/95	
		4.74	259.55	05/22/95				5.42	258.49	05/22/95	
		4.88	259.41	06/05/95				5.56	258.35	06/05/95	
MI 22	271.58	10.40	261.18	06/21/94	261.68	MI 24	272.27	11.69	260.58	06/21/94	260.97
(35)		10.62	260.96	07/05/94		(38)		11.90	260.37	07/05/94	
		10.75	260.83	07/15/94				12.09	260.18	07/15/94	
		10.48	261.10	08/01/94				11.89	260.38	08/01/94	
		11.00	260.58	08/15/94				12.53	259.74	08/15/94	
		10.54	261.04	08/29/94				11.98	260.29	08/29/94	
		11.08	260.50	09/12/94				12.67	259.60	09/12/94	
		9.74	261.84	09/26/94				11.52	260.75	09/26/94	
		10.37	261.21	10/11/94				11.89	260.38	10/11/94	
		10.59	260.99	10/24/94				12.22	260.05	10/24/94	
		10.88	260.70	11/08/94				12.44	259.83	11/08/94	
		12.12	259.46	11/22/94				12.73	259.54	11/22/94	
		9.92	261.66	12/05/94				11.53	260.74	12/05/94	
		9.41	262.17	12/19/94				10.79	261.48	12/19/94	
		8.13	263.45	01/03/95				9.32	262.95	01/03/95	
		8.51	263.07	01/16/95				9.87	262.40	01/16/95	
		8.67	262.91	01/30/95				9.89	262.38	01/30/95	
		8.89	262.69	02/13/95				10.45	261.82	02/13/95	
		9.32	262.26	02/27/95				10.72	261.55	02/27/95	
		8.67	262.91	03/13/95				9.99	262.28	03/13/95	
		9.03	262.55	03/27/95				10.29	261.98	03/27/95	
		9.54	262.04	04/10/95				10.91	261.36	04/10/95	
		9.48	262.10	04/24/95				10.86	261.41	04/24/95	
		9.98	261.60	05/08/95				11.36	260.91	05/08/95	
		9.59	261.99	05/22/95				10.99	261.28	05/22/95	
		9.63	261.95	06/05/95				11.15	261.12	06/05/95	
MW-8B	263.8	7.17	256.63	06/21/94	258.13	MW-9A	267.76	10.27	257.49	06/21/94	257.91
(216)		6.22	257.58	07/05/94		(351)		10.43	257.33	07/05/94	
		6.35	257.45	07/15/94				10.52	257.24	07/15/94	
		6.10	257.70	08/01/94				10.35	257.41	08/01/94	
		6.76	257.04	08/15/94				10.97	256.79	08/15/94	
		6.07	257.73	08/29/94				10.34	257.42	08/29/94	
		6.74	257.06	09/12/94				11.00	256.76	09/12/94	
		5.87	257.93	09/26/94				10.19	257.57	09/26/94	
		5.99	257.81	10/11/94				10.23	257.53	10/11/94	
		6.23	257.57	10/24/94				10.54	257.22	10/24/94	
		6.37	257.43	11/08/94				10.60	257.16	11/08/94	
		6.58	257.22	11/22/94				10.90	256.86	11/22/94	
		4.50	259.30	12/05/94				9.69	258.07	12/05/94	
		5.07	258.73	12/19/94				9.24	258.52	12/19/94	
		4.26	259.54	01/03/95				8.36	259.40	01/03/95	
		4.50	259.30	01/16/95				8.71	259.05	01/16/95	
		4.82	258.98	01/30/95				8.90	258.86	01/30/95	
		5.33	258.47	02/13/95				9.42	258.34	02/13/95	
		5.20	258.60	02/27/95				9.30	258.46	02/27/95	
		4.77	259.03	03/13/95				8.88	258.88	03/13/95	
		5.02	258.78	03/27/95				9.12	258.64	03/27/95	
		5.36	258.44	04/10/95				9.52	258.24	04/10/95	
		5.35	258.45	04/24/95				9.48	258.28	04/24/95	
		5.76	258.04	05/08/95				9.94	257.82	05/08/95	
		5.42	258.38	05/22/95				9.58	258.18	05/22/95	
		5.55	258.25	06/05/95				9.74	258.02	06/05/95	
MI 25	272.35	10.97	261.15	06/21/94	261.43	MI 26	272.35	DRY	--	06/21/94	262.35
(40)		11.34	260.78	07/05/94		(41)		DRY	--	07/05/94	
		11.51	260.61	07/15/94				DRY	--	07/15/94	
		11.32	260.80	08/01/94				DRY	--	08/01/94	
		12.02	260.10	08/15/94				DRY	--	08/15/94	
		11.37	260.75	08/29/94				DRY	--	08/29/94	
		12.17	259.95	09/12/94				DRY	--	09/12/94	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		11.10	261.02	09/26/94				DRY	--	09/26/94	
		11.30	260.82	10/11/94				DRY	--	10/11/94	
		11.72	260.40	10/24/94				DRY	--	10/24/94	
		11.91	260.21	11/08/94				DRY	--	11/08/94	
		12.25	259.87	11/22/94				DRY	--	11/22/94	
		11.05	261.07	12/05/94				DRY	--	12/05/94	
		10.24	261.88	12/19/94				10.29	262.02	12/19/94	
		8.71	263.41	01/03/95				8.71	263.60	01/03/95	
		9.28	262.84	01/16/95				9.31	263.00	01/16/95	
		9.20	262.92	01/30/95				9.28	263.03	01/30/95	
		9.84	262.28	02/13/95				9.97	262.34	02/13/95	
		10.07	262.05	02/27/95				10.17	262.14	02/27/95	
		8.35	263.77	03/13/95				9.45	262.86	03/13/95	
		9.70	262.42	03/27/95				9.72	262.59	03/27/95	
		10.33	261.79	04/10/95				10.39	261.92	04/10/95	
		10.30	261.82	04/24/95				10.23	262.08	04/24/95	
		10.69	261.43	05/08/95				10.96	261.35	05/08/95	
		10.45	261.67	05/22/95				10.37	261.94	05/22/95	
		10.64	261.48	06/05/95				10.57	261.74	06/05/95	
MW-9B	267.87	10.35	257.52	06/21/94	257.92	MW-9C	268.09	10.70	257.39	06/21/94	257.78
(352)		10.49	257.38	07/05/94		(217)		11.00	257.09	07/05/94	
		10.61	257.26	07/15/94				10.95	257.14	07/15/94	
		10.40	257.47	08/01/94				10.75	257.34	08/01/94	
		11.00	256.87	08/15/94				11.35	256.74	08/15/94	
		10.40	257.47	08/29/94				10.74	257.35	08/29/94	
		11.02	256.85	09/12/94				11.37	256.72	09/12/94	
		10.21	257.66	09/26/94				10.55	257.54	09/26/94	
		10.29	257.58	10/11/94				10.65	257.44	10/11/94	
		10.96	256.91	10/24/94				10.92	257.17	10/24/94	
		10.63	257.24	11/08/94				10.98	257.11	11/08/94	
		10.70	257.17	11/22/94				11.27	256.82	11/22/94	
		9.66	258.21	12/05/94				10.03	258.06	12/05/94	
		9.38	258.49	12/19/94				9.72	258.37	12/19/94	
		8.60	259.27	01/03/95				8.96	259.13	01/03/95	
		8.85	259.02	01/16/95				9.20	258.89	01/16/95	
		9.08	258.79	01/30/95				9.42	258.67	01/30/95	
		9.56	258.31	02/13/95				9.92	258.17	02/13/95	
		9.47	258.40	02/27/95				9.85	258.24	02/27/95	
		9.05	258.82	03/13/95				9.41	258.68	03/13/95	
		9.28	258.59	03/27/95				9.64	258.45	03/27/95	
		9.67	258.20	04/10/95				10.02	258.07	04/10/95	
		9.59	258.28	04/24/95				9.95	258.14	04/24/95	
		10.03	257.84	05/08/95				10.39	257.70	05/08/95	
		9.69	258.18	05/22/95				10.03	258.06	05/22/95	
		9.85	258.02	06/05/95				10.19	257.90	06/05/95	
MI 27	273.08	11.94	261.14	06/21/94	261.42	MI 28	271.85	9.77	262.08	06/21/94	262.24
(42)		12.24	260.84	07/05/94		(43)		10.17	261.68	07/05/94	
		12.44	260.64	07/15/94				10.40	261.45	07/15/94	
		12.26	260.82	08/01/94				10.27	261.58	08/01/94	
		13.00	260.08	08/15/94				10.99	260.86	08/15/94	
		12.35	260.73	08/29/94				10.35	261.50	08/29/94	
		13.15	259.93	09/12/94				11.16	260.69	09/12/94	
		12.06	261.02	09/26/94				10.11	261.74	09/26/94	
		12.25	260.83	10/11/94				10.26	261.59	10/11/94	
		12.69	260.39	10/24/94				10.72	261.13	10/24/94	
		12.88	260.20	11/08/94				10.92	260.93	11/08/94	
		13.34	259.74	11/22/94				11.26	260.59	11/22/94	
		12.00	261.08	12/05/94				10.05	261.80	12/05/94	
		11.15	261.93	12/19/94				9.15	262.70	12/19/94	
		9.56	263.52	01/03/95				7.48	264.37	01/03/95	
		10.15	262.93	01/16/95				8.05	263.80	01/16/95	
		10.12	262.96	01/30/95				8.00	263.85	01/30/95	
		10.82	262.26	02/13/95				8.76	263.09	02/13/95	
		11.01	262.07	02/27/95				8.88	262.97	02/27/95	
		10.30	262.78	03/13/95				8.21	263.64	03/13/95	
		10.55	262.53	03/27/95				8.44	263.41	03/27/95	
		11.19	261.89	04/10/95				9.07	262.78	04/10/95	
		11.19	261.89	04/24/95				9.12	262.73	04/24/95	
		11.65	261.43	05/08/95				9.61	262.24	05/08/95	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		11.32	261.76	05/22/95				9.28	262.57	05/22/95	
		11.50	261.58	06/05/95				9.50	262.35	06/05/95	
MW-10A	264.48	6.48	258.00	06/21/94	258.43	MW-10B	264.61	6.61	258.00	06/21/94	258.40
(316)		6.67	257.81	07/05/94		(317)		6.80	257.81	07/05/94	
		6.80	257.68	07/15/94				6.93	257.68	07/15/94	
		6.64	257.84	08/01/94				6.77	257.84	08/01/94	
		7.32	257.16	08/15/94				7.45	257.16	08/15/94	
		6.65	257.83	08/29/94				6.78	257.83	08/29/94	
		7.40	257.08	09/12/94				7.53	257.08	09/12/94	
		6.60	257.88	09/26/94				6.71	257.90	09/26/94	
		6.58	257.90	10/11/94				6.71	257.90	10/11/94	
		7.00	257.48	10/24/94				7.12	257.49	10/24/94	
		7.09	257.39	11/08/94				7.23	257.38	11/08/94	
		7.45	257.03	11/22/94				7.60	257.01	11/22/94	
		6.05	258.43	12/05/94				6.21	258.40	12/05/94	
		5.41	259.07	12/19/94				5.55	259.06	12/19/94	
		4.23	260.25	01/03/95				4.39	260.22	01/03/95	
		4.71	259.77	01/16/95				4.85	259.76	01/16/95	
		4.81	259.67	01/30/95				4.95	259.66	01/30/95	
		5.48	259.00	02/13/95				5.63	258.98	02/13/95	
		5.49	258.99	02/27/95				5.62	258.99	02/27/95	
		4.87	259.61	03/13/95				5.00	259.61	03/13/95	
		5.13	259.35	03/27/95				5.28	259.33	03/27/95	
		5.71	258.77	04/10/95				5.83	258.78	04/10/95	
		4.91	259.57	04/24/95				5.75	258.86	04/24/95	
		6.13	258.35	05/08/95				6.22	258.39	05/08/95	
		5.74	258.74	05/22/95				5.86	258.75	05/22/95	
		6.02	258.46	06/05/95				6.16	258.45	06/05/95	
MI 63	267.64	7.64	260.00	06/21/94	260.38	MW-2A	268.85	8.82	260.03	06/21/94	260.43
(203)		7.84	259.80	07/05/94		(310)		9.12	259.73	07/05/94	
		7.99	259.65	07/15/94				9.33	259.52	07/15/94	
		7.83	259.81	08/01/94				8.97	259.88	08/01/94	
		8.52	259.12	08/15/94				9.55	259.30	08/15/94	
		7.86	259.78	08/29/94				9.01	259.84	08/29/94	
		8.65	258.99	09/12/94			269.32	10.36	258.96	09/12/94	
		7.73	259.91	09/26/94				8.86	260.46	09/26/94	
		8.79	258.85	10/11/94				9.66	259.66	10/11/94	
		8.27	259.37	10/24/94				9.88	259.44	10/24/94	
		8.44	259.20	11/08/94				10.50	258.82	11/08/94	
		8.83	258.81	11/22/94				10.13	259.19	11/22/94	
		7.38	260.26	12/05/94				8.89	260.43	12/05/94	
		6.55	261.09	12/19/94				8.37	260.95	12/19/94	
		5.21	262.43	01/03/95				6.98	262.34	01/03/95	
		5.72	261.92	01/16/95				7.22	262.10	01/16/95	
		5.76	261.88	01/30/95				7.61	261.71	01/30/95	
		6.40	261.24	02/13/95				7.69	261.63	02/13/95	
		6.60	261.04	02/27/95				8.30	261.02	02/27/95	
		5.85	261.79	03/13/95				7.66	261.66	03/13/95	
		6.14	261.50	03/27/95				7.99	261.33	03/27/95	
		6.80	260.84	04/10/95				8.56	260.76	04/10/95	
		6.74	260.90	04/24/95				8.43	260.89	04/24/95	
		7.26	260.38	05/08/95				9.00	260.62	05/08/95	
		6.82	260.82	05/22/95				8.59	260.73	05/22/95	
		7.15	260.49	06/05/95				8.82	260.50	06/05/95	
MW-10C	264.74	7.12	257.62	06/21/94	258.01	MW-11A	262.78	7.03	255.75	06/21/94	255.98
(218)		7.31	257.43	07/05/94		(318)		7.30	255.48	07/05/94	
		7.41	257.33	07/15/94				7.65	255.13	07/15/94	
		7.23	257.51	08/01/94				7.14	255.64	08/01/94	
		7.88	256.86	08/15/94				8.10	254.68	08/15/94	
		7.24	257.50	08/29/94				7.42	255.36	08/29/94	
		7.97	256.77	09/12/94				8.50	254.28	09/12/94	
		7.12	257.62	09/26/94				6.32	256.46	09/26/94	
		7.20	257.54	10/11/94				8.25	254.53	10/11/94	
		7.56	257.18	10/24/94				8.01	254.77	10/24/94	
		7.67	257.07	11/08/94				8.57	254.21	11/08/94	
		8.03	256.71	11/22/94				9.18	253.60	11/22/94	
		6.68	258.06	12/05/94				6.41	256.37	12/05/94	
		6.08	258.66	12/19/94				6.06	256.72	12/19/94	
		5.03	259.71	01/03/95				5.02	257.76	01/03/95	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		5.45	259.29	01/16/95				5.33	257.45	01/16/95	
		5.55	259.19	01/30/95				5.60	257.18	01/30/95	
		6.18	258.56	02/13/95				6.06	256.72	02/13/95	
		6.22	258.52	02/27/95				6.10	256.68	02/27/95	
		5.58	259.16	03/13/95				5.47	257.31	03/13/95	
		5.84	258.90	03/27/95				5.77	257.01	03/27/95	
		6.33	258.41	04/10/95				6.26	256.52	04/10/95	
		6.27	258.47	04/24/95				6.11	256.67	04/24/95	
		6.75	257.99	05/08/95				6.64	256.14	05/08/95	
		6.37	258.37	05/22/95				6.24	256.54	05/22/95	
		6.89	257.85	06/05/95				6.35	256.43	06/05/95	
MW-2B	268.19	8.23	259.96	06/21/94	260.54	MW-2R	267.67	8.22	259.45	06/21/94	259.97
(210)		8.57	259.62	07/05/94		(311)		8.46	259.21	07/05/94	
		8.83	259.36	07/15/94				8.86	258.81	07/15/94	
		8.48	259.71	08/01/94				8.50	259.17	08/01/94	
		9.12	259.07	08/15/94				9.26	258.41	08/15/94	
		8.51	259.68	08/29/94				8.52	259.15	08/29/94	
		9.27	258.92	09/12/94				9.48	258.19	09/12/94	
		7.71	260.48	09/26/94				7.92	259.75	09/26/94	
		8.37	259.82	10/11/94				8.52	259.15	10/11/94	
		8.64	259.55	10/24/94				8.75	258.92	10/24/94	
		8.91	259.28	11/08/94				9.16	258.51	11/08/94	
		9.31	258.88	11/22/94				9.64	258.03	11/22/94	
		7.56	260.63	12/05/94				7.69	259.98	12/05/94	
		6.94	261.25	12/19/94				6.89	260.78	12/19/94	
		5.60	262.59	01/03/95				5.54	262.13	01/03/95	
		5.99	262.20	01/16/95				5.97	261.70	01/16/95	
		6.20	261.99	01/30/95				6.10	261.57	01/30/95	
		6.41	261.78	02/13/95				6.49	261.18	02/13/95	
		6.91	261.28	02/27/95				6.95	260.72	02/27/95	
		6.29	261.90	03/13/95				6.22	261.45	03/13/95	
		6.59	261.60	03/27/95				6.55	261.12	03/27/95	
		7.17	261.02	04/10/95				7.20	260.47	04/10/95	
		7.05	261.14	04/24/95				7.04	260.63	04/24/95	
		7.64	260.55	05/08/95				7.64	260.03	05/08/95	
		7.21	260.98	05/22/95				7.21	260.46	05/22/95	
		7.47	260.72	06/05/95				7.54	260.13	06/05/95	
MW-11B	262.83	7.23	255.60	06/21/94	255.87	MW-11R	263.30	8.00	255.30	06/21/94	255.73
(319)		7.48	255.35	07/05/94		(219)		8.12	255.18	07/05/94	
		7.75	255.08	07/15/94				8.33	254.97	07/15/94	
		7.32	255.51	08/01/94				7.96	255.34	08/01/94	
		8.21	254.62	08/15/94				8.76	254.54	08/15/94	
		7.57	255.26	08/29/94				8.17	255.13	08/29/94	
		8.58	254.25	09/12/94				8.97	254.33	09/12/94	
		6.51	256.32	09/26/94				7.30	256.00	09/26/94	
		7.70	255.13	10/11/94				7.60	255.70	10/11/94	
		8.10	254.73	10/24/94				8.62	254.68	10/24/94	
		8.65	254.18	11/08/94				9.14	254.16	11/08/94	
		9.21	253.62	11/22/94				9.65	253.65	11/22/94	
		6.56	256.27	12/05/94				7.29	256.01	12/05/94	
		6.28	256.55	12/19/94				7.02	256.28	12/19/94	
		5.29	257.54	01/03/95				6.04	257.26	01/03/95	
		5.57	257.26	01/16/95				6.30	257.00	01/16/95	
		5.82	257.01	01/30/95				6.40	256.90	01/30/95	
		6.50	256.33	02/13/95				6.78	256.52	02/13/95	
		6.30	256.53	02/27/95				7.02	256.28	02/27/95	
		5.68	257.15	03/13/95				6.31	256.99	03/13/95	
		6.00	256.83	03/27/95				6.94	256.36	03/27/95	
		6.47	256.36	04/10/95				7.22	256.08	04/10/95	
		6.35	256.48	04/24/95				7.05	256.25	04/24/95	
		6.85	255.98	05/08/95				7.48	255.82	05/08/95	
		6.44	256.39	05/22/95				7.18	256.12	05/22/95	
		6.54	256.29	06/05/95				7.15	256.15	06/05/95	
MW-16A	269.92	10.98	258.94	06/21/94	259.34	MW-16B	269.81	10.80	259.01	06/21/94	259.46
(233)		11.10	258.82	07/05/94		(321)		10.29	259.52	07/05/94	
		11.30	258.62	07/15/94				11.11	258.70	07/15/94	
		11.19	258.73	08/01/94				10.99	258.82	08/01/94	
		11.92	258.00	08/15/94				11.70	258.11	08/15/94	
		11.23	258.69	08/29/94				11.02	258.79	08/29/94	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		12.02	257.90	09/12/94				11.81	258.00	09/12/94	
		11.19	258.73	09/26/94				10.95	258.86	09/26/94	
		11.15	258.77	10/11/94				10.94	258.87	10/11/94	
		11.62	258.30	10/24/94				11.41	258.40	10/24/94	
		11.75	258.17	11/08/94				11.53	258.28	11/08/94	
		12.11	257.81	11/22/94				11.90	257.91	11/22/94	
		10.79	259.13	12/05/94				10.58	259.23	12/05/94	
		9.91	260.01	12/19/94				9.70	260.11	12/19/94	
		8.52	261.40	01/03/95				8.32	261.49	01/03/95	
		9.02	260.90	01/16/95				8.85	260.96	01/16/95	
		9.10	260.82	01/30/95				8.89	260.92	01/30/95	
		9.84	260.08	02/13/95				9.62	260.19	02/13/95	
		9.93	259.99	02/27/95				9.72	260.09	02/27/95	
		9.23	260.69	03/13/95				9.03	260.78	03/13/95	
		9.50	260.42	03/27/95				9.30	260.51	03/27/95	
		10.15	259.77	04/10/95				9.96	259.85	04/10/95	
		10.11	259.81	04/24/95				9.92	259.89	04/24/95	
		10.62	259.30	05/08/95				10.42	259.39	05/08/95	
		10.20	259.72	05/22/95				10.00	259.81	05/22/95	
		10.51	259.41	06/05/95				10.31	259.50	06/05/95	
MW-12A	265.96	12.90	253.06	06/21/94	253.70	MW-12B	265.61	12.55	253.06	06/21/94	253.70
(220)		13.10	252.86	07/05/94		(320)		12.75	252.86	07/05/94	
		13.33	252.63	07/15/94				12.98	252.63	07/15/94	
		12.89	253.07	08/01/94				12.55	253.06	08/01/94	
		13.18	252.78	08/15/94				12.85	252.76	08/15/94	
		12.54	253.42	08/29/94				12.21	253.40	08/29/94	
		13.10	252.86	09/12/94				12.78	252.83	09/12/94	
		12.11	253.85	09/26/94				11.76	253.85	09/26/94	
		12.32	253.64	10/11/94				11.97	253.64	10/11/94	
		12.42	253.54	10/24/94				12.08	253.53	10/24/94	
		12.44	253.52	11/08/94				12.01	253.60	11/08/94	
		12.66	253.30	11/22/94				12.32	253.29	11/22/94	
		11.61	254.35	12/05/94				11.26	254.35	12/05/94	
		11.74	254.22	12/19/94				11.38	254.23	12/19/94	
		11.29	254.67	01/03/95				10.94	254.67	01/03/95	
		--	--	01/16/95				--	--	01/16/95	
		11.61	254.35	01/30/95				11.26	254.35	01/30/95	
		12.02	253.94	02/13/95				11.63	253.98	02/13/95	
		11.89	254.07	02/27/95				11.58	254.03	02/27/95	
		11.51	254.45	03/13/95				11.13	254.48	03/13/95	
		11.70	254.26	03/27/95				11.32	254.29	03/27/95	
		12.05	253.91	04/10/95				11.68	253.93	04/10/95	
		11.88	254.08	04/24/95				11.52	254.09	04/24/95	
		12.28	253.68	05/08/95				11.93	253.68	05/08/95	
		11.95	254.01	05/22/95				11.58	254.03	05/22/95	
		12.10	253.86	06/05/95				11.74	253.87	06/05/95	
MW-16C	269.71	10.63	259.08	06/21/94	259.50	MW-16R	--	10.08	--	06/21/94	
(344)		10.78	258.93	07/05/94		(345)		10.25	--	07/05/94	
		10.96	258.75	07/15/94				10.37	--	07/15/94	
		10.83	258.88	08/01/94				10.30	--	08/01/94	
		11.54	258.17	08/15/94				11.00	--	08/15/94	
		10.86	258.85	08/29/94				10.31	--	08/29/94	
		11.65	258.06	09/12/94				11.10	--	09/12/94	
		10.77	258.94	09/26/94				10.29	--	09/26/94	
		10.79	258.92	10/11/94				10.25	--	10/11/94	
		11.22	258.49	10/24/94				10.73	--	10/24/94	
		11.38	258.33	11/08/94				10.87	--	11/08/94	
		11.40	258.31	11/22/94				11.23	--	11/22/94	
		10.42	259.29	12/05/94				9.89	--	12/05/94	
		9.56	260.15	12/19/94				9.03	--	12/19/94	
		8.18	261.53	01/03/95				7.71	--	01/03/95	
		8.70	261.01	01/16/95				8.19	--	01/16/95	
		8.75	260.96	01/30/95				8.25	--	01/30/95	
		9.47	260.24	02/13/95				8.93	--	02/13/95	
		9.58	260.13	02/27/95				9.05	--	02/27/95	
		8.89	260.82	03/13/95				8.25	--	03/13/95	
		9.15	260.56	03/27/95				8.25	--	03/27/95	
		9.81	259.90	04/10/95				9.28	--	04/10/95	
		9.76	259.95	04/24/95				9.17	--	04/24/95	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Elevation (ft)	Measure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Elevation (ft)	Measure date	Observed mean
		10.27	259.44	05/08/95				9.72	--	05/08/95	
		9.85	259.86	05/22/95				9.30	--	05/22/95	
		10.16	259.55	06/05/95				9.63	--	06/05/95	
MW-13A	259.85	5.54	254.31	06/21/94	254.74	MW-13B	259.35	4.95	254.40	06/21/94	254.79
(308)		5.70	254.15	07/05/94		(221)		5.12	254.23	07/05/94	
		5.82	254.03	07/15/94				5.23	254.12	07/15/94	
		5.52	254.33	08/01/94				4.93	254.42	08/01/94	
		5.93	253.92	08/15/94				5.35	254.00	08/15/94	
		5.40	254.45	08/29/94				4.83	254.52	08/29/94	
		5.92	253.93	09/12/94				5.31	254.04	09/12/94	
		4.94	254.91	09/26/94				4.37	254.98	09/26/94	
		5.35	254.50	10/11/94				4.75	254.60	10/11/94	
		5.48	254.37	10/24/94				4.88	254.47	10/24/94	
		5.52	254.33	11/08/94				4.91	254.44	11/08/94	
		5.74	254.11	11/22/94				5.14	254.21	11/22/94	
		4.40	255.45	12/05/94				3.84	255.51	12/05/94	
		4.72	255.13	12/19/94				4.13	255.22	12/19/94	
		4.27	255.58	01/03/95				3.71	255.64	01/03/95	
		4.37	255.48	01/16/95				4.77	254.58	01/16/95	
		4.57	255.28	01/30/95				4.00	255.35	01/30/95	
		4.89	254.96	02/13/95				4.24	255.11	02/13/95	
		4.82	255.03	02/27/95				4.28	255.07	02/27/95	
		4.45	255.40	03/13/95				3.88	255.47	03/13/95	
		4.59	255.26	03/27/95				4.04	255.31	03/27/95	
		4.87	254.98	04/10/95				4.28	255.07	04/10/95	
		4.81	255.04	04/24/95				4.24	255.11	04/24/95	
		5.19	254.66	05/08/95				4.59	254.76	05/08/95	
		4.91	254.94	05/22/95				4.31	255.04	05/22/95	
		5.04	254.81	06/05/95				4.45	254.90	06/05/95	
MW-28	275.42	9.03	266.39	06/21/94	266.89	MW-30	267.96	9.86	258.10	06/21/94	258.33
(234)		9.04	266.38	07/05/94		(366)		10.29	257.67	07/05/94	
		9.18	266.24	07/15/94				10.73	257.23	07/15/94	
		8.97	266.45	08/01/94				10.38	257.58	08/01/94	
		9.19	266.23	08/15/94				11.34	256.62	08/15/94	
		8.99	266.43	08/29/94				10.45	257.51	08/29/94	
		9.18	266.24	09/12/94				11.78	256.18	09/12/94	
		8.15	267.27	09/26/94				10.21	257.75	09/26/94	
		8.76	266.66	10/11/94				10.68	257.28	10/11/94	
		8.81	266.61	10/24/94				11.31	256.65	10/24/94	
		9.13	266.29	11/08/94				11.67	256.29	11/08/94	
		9.18	266.24	11/22/94				12.47	255.49	11/22/94	
		8.53	266.89	12/05/94				9.73	258.23	12/05/94	
		8.35	267.07	12/19/94				8.66	259.30	12/19/94	
		7.55	267.87	01/03/95				7.19	260.77	01/03/95	
		7.70	267.72	01/16/95				7.62	260.34	01/16/95	
		7.92	267.50	01/30/95				7.73	260.23	01/30/95	
		7.67	267.75	02/13/95				8.23	259.73	02/13/95	
		8.21	267.21	02/27/95				8.71	259.25	02/27/95	
		7.80	267.62	03/13/95				7.89	260.07	03/13/95	
		8.13	267.29	03/27/95				8.19	259.77	03/27/95	
		8.42	267.00	04/10/95				8.91	259.05	04/10/95	
		8.38	267.04	04/24/95				8.71	259.25	04/24/95	
		8.71	266.71	05/08/95				9.39	258.57	05/08/95	
		8.48	266.94	05/22/95				8.90	259.06	05/22/95	
		8.29	267.13	06/05/95				9.37	258.59	06/05/95	
MW-14A	254.65	6.12	248.53	06/21/94	249.18	MW-14B	255.13	6.40	248.73	06/21/94	249.42
(349)		6.24	248.41	07/05/94		(341)		6.55	248.58	07/05/94	
		6.37	248.28	07/15/94				6.67	248.46	07/15/94	
		6.00	248.65	08/01/94				6.30	248.83	08/01/94	
		6.30	248.35	08/15/94				6.59	248.54	08/15/94	
		5.83	248.82	08/29/94				6.14	248.99	08/29/94	
		6.20	248.45	09/12/94				6.50	248.63	09/12/94	
		4.92	249.73	09/26/94				5.23	249.90	09/26/94	
		5.72	248.93	10/11/94				6.00	249.13	10/11/94	
		5.78	248.87	10/24/94				6.05	249.08	10/24/94	
		5.87	248.78	11/08/94				6.15	248.98	11/08/94	
		6.04	248.61	11/22/94				6.32	248.81	11/22/94	
		4.94	249.71	12/05/94				5.08	250.05	12/05/94	
		5.06	249.59	12/19/94				5.32	249.81	12/19/94	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		4.13	250.52	01/03/95				4.48	250.65	01/03/95	
		4.51	250.14	01/16/95				4.30	250.83	01/16/95	
		5.20	249.45	01/30/95				4.87	250.26	01/30/95	
		5.28	249.37	02/13/95				5.55	249.58	02/13/95	
		5.15	249.50	02/27/95				5.45	249.68	02/27/95	
		4.38	250.27	03/13/95				4.79	250.34	03/13/95	
		4.84	249.81	03/27/95				5.16	249.97	03/27/95	
		5.33	249.32	04/10/95				5.58	249.55	04/10/95	
		--	--	04/24/95				--	--	04/24/95	
		5.71	248.94	05/08/95				6.00	249.13	05/08/95	
		5.31	249.34	05/22/95				5.57	249.56	05/22/95	
		5.42	249.23	06/05/95				5.63	249.50	06/05/95	
MW-33	253.89	6.51	247.38	06/21/94	247.37	MW-34	260.91	--	--	06/21/94	245.67
(306)		6.50	247.39	07/05/94		(281)		15.93	244.98	07/05/94	
		6.97	246.92	07/15/94				15.99	244.92	07/15/94	
		6.92	246.97	08/01/94				15.88	245.03	08/01/94	
		7.26	246.63	08/15/94				16.09	244.82	08/15/94	
		6.98	246.91	08/29/94				15.89	245.02	08/29/94	
		7.20	246.69	09/12/94				16.15	244.76	09/12/94	
		6.09	247.80	09/26/94				15.23	245.68	09/26/94	
		6.52	247.37	10/11/94				15.73	245.18	10/11/94	
		6.22	247.67	10/24/94				15.88	245.03	10/24/94	
		6.88	247.01	11/08/94				15.93	244.98	11/08/94	
		6.62	247.27	11/22/94				16.01	244.90	11/22/94	
		6.11	247.78	12/05/94				15.20	245.71	12/05/94	
		6.10	247.79	12/19/94				14.95	245.96	12/19/94	
		5.47	248.42	01/03/95				13.92	246.99	01/03/95	
		5.77	248.12	01/16/95				13.95	246.96	01/16/95	
		6.20	247.69	01/30/95				14.34	246.57	01/30/95	
		6.52	247.37	02/13/95				14.74	246.17	02/13/95	
		6.54	247.35	02/27/95				14.97	245.94	02/27/95	
		5.81	248.08	03/13/95				13.81	247.10	03/13/95	
		6.22	247.67	03/27/95				14.45	246.46	03/27/95	
		7.26	246.63	04/10/95				15.04	245.87	04/10/95	
		6.52	247.37	04/24/95				14.99	245.92	04/24/95	
		6.92	246.97	05/08/95				15.41	245.50	05/08/95	
		6.63	247.26	05/22/95				15.02	245.89	05/22/95	
		6.78	247.11	06/05/95				15.44	245.47	06/05/95	
MW-14R	255.5	6.81	248.69	06/21/94	249.09	MW-17A	267.05	8.93	258.12	06/21/94	258.53
(222)		7.07	248.43	07/05/94		(258)		9.09	257.96	07/05/94	
		7.01	248.49	07/15/94				9.20	257.85	07/15/94	
		6.68	248.82	08/01/94				9.04	258.01	08/01/94	
		6.90	248.60	08/15/94				9.78	257.27	08/15/94	
		6.46	249.04	08/29/94				9.09	257.96	08/29/94	
		6.92	248.58	09/12/94				9.84	257.21	09/12/94	
		5.67	249.83	09/26/94				9.03	258.02	09/26/94	
		6.38	249.12	10/11/94				9.00	258.05	10/11/94	
		6.43	249.07	10/24/94				9.41	257.64	10/24/94	
		6.59	248.91	11/08/94				9.47	257.58	11/08/94	
		6.76	248.74	11/22/94				9.82	257.23	11/22/94	
		5.79	249.71	12/05/94				8.62	258.43	12/05/94	
		5.76	249.74	12/19/94				7.84	259.21	12/19/94	
		5.13	250.37	01/03/95				6.67	260.38	01/03/95	
		6.59	248.91	01/16/95				7.12	259.93	01/16/95	
		--	--	01/30/95				7.25	259.80	01/30/95	
		7.14	248.36	02/13/95				7.92	259.13	02/13/95	
		6.85	248.65	02/27/95				7.89	259.16	02/27/95	
		6.29	249.21	03/13/95				7.31	259.74	03/13/95	
		5.60	249.90	03/27/95				7.58	259.47	03/27/95	
		6.30	249.20	04/10/95				8.12	258.93	04/10/95	
		--	--	04/24/95				8.08	258.97	04/24/95	
		6.26	249.24	05/08/95				8.59	258.46	05/08/95	
		6.10	249.40	05/22/95				8.28	258.77	05/22/95	
		6.43	249.07	06/05/95				8.44	258.61	06/05/95	
PFH(OBS6)	248.81	10.01	241.80	06/21/94	243.39	P 2	271.32	9.93	261.39	06/21/94	261.62^M
(288)		9.97	241.84	07/05/94		(336)		10.14	261.18	07/05/94	
		9.93	241.88	07/15/94				10.25	261.02	07/15/94	
		6.41	242.40	08/01/94			271.50	10.25	261.25	08/01/94	
		6.79	242.02	08/15/94				10.69	260.81	08/15/94	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Elevation (ft)	Measure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Elevation (ft)	Measure date	Observed mean
		6.56	242.25	08/29/94				10.53	260.97	08/29/94	
		6.85	241.96	09/12/94				11.07	260.43	09/12/94	
		5.69	243.12	09/26/94				9.62	261.88	09/26/94	
		6.50	242.31	10/11/94				10.50	261.00	10/11/94	
		5.87	242.94	10/24/94				10.60	260.90	10/24/94	
		5.95	242.86	11/08/94				10.64	260.86	11/08/94	
		5.89	242.92	11/22/94				10.55	260.95	11/22/94	
		5.50	243.31	12/05/94				10.34	261.16	12/05/94	
		5.56	243.25	12/19/94				10.35	261.15	12/19/94	
		4.07	244.74	01/03/95				8.89	262.61	01/03/95	
		4.00	244.81	01/16/95				9.41	262.09	01/16/95	
		4.14	244.67	01/30/95				7.14	264.36	01/30/95	
		4.16	244.65	02/13/95				7.22	264.28	02/13/95	
		4.48	244.33	02/27/95				9.33	262.17	02/27/95	
		4.01	244.80	03/13/95				8.46	263.04	03/13/95	
		4.64	244.17	03/27/95				9.12	262.38	03/27/95	
		4.54	244.27	04/10/95				9.60	261.90	04/10/95	
		4.57	244.24	04/24/95				10.34	261.16	04/24/95	
		4.48	244.33	05/08/95				10.56	260.94	05/08/95	
		4.52	244.292	05/22/95				10.33	261.17	05/22/95	
		4.82	243.992	06/05/95				10.45	261.05	06/05/95	
MW-17B	267.06	8.94	258.12	06/21/94	258.53	MW-17C	267.28	9.25	258.03	06/21/94	258.46
(322)		9.10	257.96	07/05/94		(323)		9.40	257.88	07/05/94	
		9.21	257.85	07/15/94				9.53	257.75	07/15/94	
		9.07	257.99	08/01/94				9.39	257.89	08/01/94	
		9.79	257.27	08/15/94				10.07	257.21	08/15/94	
		9.10	257.96	08/29/94				9.39	257.89	08/29/94	
		9.85	257.21	09/12/94				10.15	257.13	09/12/94	
		9.03	258.03	09/26/94				9.33	257.95	09/26/94	
		9.01	258.05	10/11/94				9.32	257.96	10/11/94	
		9.42	257.64	10/24/94				9.73	257.55	10/24/94	
		9.49	257.57	11/08/94				9.80	257.48	11/08/94	
		9.85	257.21	11/22/94				10.16	257.12	11/22/94	
		8.62	258.44	12/05/94				8.86	258.42	12/05/94	
		7.85	259.21	12/19/94				8.15	259.13	12/19/94	
		6.67	260.39	01/03/95				7.00	260.28	01/03/95	
		7.14	259.92	01/16/95				7.45	259.83	01/16/95	
		7.25	259.81	01/30/95				7.57	259.71	01/30/95	
		7.93	259.13	02/13/95				8.23	259.05	02/13/95	
		7.91	259.15	02/27/95				8.21	259.07	02/27/95	
		7.33	259.73	03/13/95				7.64	259.64	03/13/95	
		7.58	259.48	03/27/95				7.89	259.39	03/27/95	
		8.15	258.91	04/10/95				8.43	258.85	04/10/95	
		8.08	258.98	04/24/95				8.38	258.90	04/24/95	
		8.69	258.37	05/08/95				8.89	258.39	05/08/95	
		8.19	258.87	05/22/95				8.48	258.80	05/22/95	
		8.45	258.61	06/05/95				8.73	258.55	06/05/95	
P 16	260.43	DRY	--	06/21/94	246.31	SPZ 1	259.17	5.68	253.49	06/21/94	253.35
(280)		DRY	--	07/05/94		(250)		5.89	253.28	07/05/94	
		DRY	--	07/15/94				6.27	252.90	07/15/94	
		DRY	--	08/01/94				6.13	253.04	08/01/94	
		DRY	--	08/15/94				6.85	252.32	08/15/94	
		DRY	--	08/29/94				6.50	252.67	08/29/94	
		DRY	--	09/12/94				7.20	251.97	09/12/94	
		DRY	--	09/26/94				6.16	253.01	09/26/94	
		DRY	--	10/11/94				6.85	252.32	10/11/94	
		DRY	--	10/24/94				6.94	252.23	10/24/94	
		DRY	--	11/08/94				7.24	251.93	11/08/94	
		DRY	--	11/22/94				7.55	251.62	11/22/94	
		DRY	--	12/05/94				6.59	252.58	12/05/94	
		14.51	245.92	12/19/94				7.88	251.29	12/19/94	
		13.48	246.95	01/03/95				3.91	255.26	01/03/95	
		13.51	246.92	01/16/95				3.64	255.53	01/16/95	
		13.90	246.53	01/30/95				4.15	255.02	01/30/95	
		14.29	246.14	02/13/95				4.94	254.23	02/13/95	
		14.54	245.89	02/27/95				4.88	254.29	02/27/95	
		13.37	247.06	03/13/95				4.25	254.92	03/13/95	
		14.01	246.42	03/27/95				4.49	254.68	03/27/95	
		14.62	245.81	04/10/95				5.16	254.01	04/10/95	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		14.54	245.89	04/24/95				5.13	254.04	04/24/95	
		DRY	--	05/08/95				5.74	253.43	05/08/95	
		14.59	245.84	05/22/95				5.56	253.61	05/22/95	
		DRY	--	06/05/95				5.72	253.45	06/05/95	
MW-19A	264.30	8.60	255.70	06/21/94	256.56	MW-19B	263.88	8.20	255.68	06/21/94	256.45
(326)		8.76	255.54	07/05/94		(327)		8.37	255.51	07/05/94	
		8.92	255.38	07/15/94				8.52	255.36	07/15/94	
		8.57	255.73	08/01/94				8.18	255.70	08/01/94	
		8.98	255.32	08/15/94				8.58	255.30	08/15/94	
		8.46	255.84	08/29/94				8.06	255.82	08/29/94	
		8.92	255.38	09/12/94				8.51	255.37	09/12/94	
		8.12	256.18	09/26/94				7.71	256.17	09/26/94	
		7.74	256.56	10/11/94				7.50	256.38	10/11/94	
		8.47	255.83	10/24/94				8.01	255.87	10/24/94	
		7.92	256.38	11/08/94				7.64	256.24	11/08/94	
		8.12	256.18	11/22/94				7.86	256.02	11/22/94	
		7.00	257.30	12/05/94				6.81	257.07	12/05/94	
		7.13	257.17	12/19/94				6.85	257.03	12/19/94	
		6.62	257.68	01/03/95				6.41	257.47	01/03/95	
		6.70	257.60	01/16/95				6.55	257.33	01/16/95	
		6.95	257.35	01/30/95				6.75	257.13	01/30/95	
		7.34	256.96	02/13/95				7.09	256.79	02/13/95	
		7.18	257.12	02/27/95				6.97	256.91	02/27/95	
		6.82	257.48	03/13/95				6.62	257.26	03/13/95	
		7.05	257.25	03/27/95				6.85	257.03	03/27/95	
		7.32	256.98	04/10/95				7.10	256.78	04/10/95	
		7.23	257.07	04/24/95				7.03	256.85	04/24/95	
		7.62	256.68	05/08/95				7.38	256.50	05/08/95	
		7.35	256.95	05/22/95				7.11	256.77	05/22/95	
		7.43	256.87	06/05/95				7.22	256.66	06/05/95	
SPZ 2	252.27	8.14	244.13	06/21/94	244.81	P-1	279.26	11.53	267.73	06/16/94	267.98
(285)		8.39	243.88	07/05/94		(335)		11.80	267.46	07/01/94	
		8.57	243.70	07/15/94				11.97	267.29	07/14/94	
		8.35	243.92	08/01/94				11.83	267.43	08/01/94	
		8.64	243.63	08/15/94				12.28	266.98	08/15/94	
		8.33	243.94	08/29/94				11.84	267.42	08/29/94	
		8.67	243.60	09/12/94				12.25	267.01	09/12/94	
		7.50	244.77	09/26/94				11.41	267.85	09/26/94	
		8.02	244.25	10/11/94				11.78	267.48	10/11/94	
		8.12	244.15	10/24/94				11.97	267.29	10/24/94	
		8.37	243.90	11/08/94				12.15	267.11	11/08/94	
		8.47	243.80	11/22/94				12.24	267.02	11/22/94	
		7.44	244.83	12/05/94				11.46	267.80	12/05/94	
		7.00	245.27	12/19/94				11.10	268.16	12/19/94	
		5.22	247.05	01/03/95				9.95	269.31	01/03/95	
		5.83	246.44	01/16/95				10.50	268.76	01/16/95	
		6.24	246.03	01/30/95				10.34	268.92	01/30/95	
		6.59	245.68	02/13/95				10.43	268.83	02/13/95	
		6.97	245.30	02/27/95				10.70	268.56	02/27/95	
		5.91	246.36	03/13/95				10.04	269.22	03/13/95	
		6.42	245.85	03/27/95				10.67	268.59	03/27/95	
		7.26	245.01	04/10/95				10.83	268.43	04/10/95	
		7.10	245.17	04/24/95				10.90	268.36	04/24/95	
		7.63	244.64	05/08/95				11.20	268.06	05/08/95	
		7.29	244.98	05/22/95				10.97	268.29	05/22/95	
		7.49	244.78	06/05/95				11.24	268.02	06/05/95	
MW-20A	263.23	8.51	254.72	06/21/94	255.13	MW-20B	263.03	8.33	254.70	06/21/94	255.11
(264)		8.70	254.53	07/05/94		(328)		8.50	254.53	07/05/94	
		8.80	254.43	07/15/94				8.62	254.41	07/15/94	
		8.51	254.72	08/01/94				8.33	254.70	08/01/94	
		8.87	254.36	08/15/94				8.68	254.35	08/15/94	
		8.39	254.84	08/29/94				8.18	254.85	08/29/94	
		8.83	254.40	09/12/94				8.64	254.39	09/12/94	
		8.02	255.21	09/26/94				7.83	255.20	09/26/94	
		8.06	255.17	10/11/94				8.26	254.77	10/11/94	
		8.37	254.86	10/24/94				8.18	254.85	10/24/94	
		8.39	254.84	11/08/94				8.20	254.83	11/08/94	
		8.60	254.63	11/22/94				8.41	254.62	11/22/94	
		7.49	255.74	12/05/94				7.49	255.54	12/05/94	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Elevation (ft)	Measure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Elevation (ft)	Measure date	Observed mean
		7.70	255.53	12/19/94				7.50	255.53	12/19/94	
		7.38	255.85	01/03/95				7.18	255.85	01/03/95	
		7.44	255.79	01/16/95				7.24	255.79	01/16/95	
		7.65	255.58	01/30/95				7.45	255.58	01/30/95	
		7.87	255.36	02/13/95				7.68	255.35	02/13/95	
		7.92	255.31	02/27/95				7.61	255.42	02/27/95	
		7.52	255.71	03/13/95				7.32	255.71	03/13/95	
		7.70	255.53	03/27/95				7.53	255.50	03/27/95	
		7.89	255.34	04/10/95				7.70	255.33	04/10/95	
		7.84	255.39	04/24/95				7.64	255.39	04/24/95	
		8.15	255.08	05/08/95				7.97	255.06	05/08/95	
		7.94	255.29	05/22/95				7.73	255.30	05/22/95	
		8.02	255.21	06/05/95				7.83	255.20	06/05/95	
MW-15A	258.53	--	--	06/21/94	242.08	MW-15B	258.61	--	--	06/21/94	243.23
(223)				07/05/94		(342)				07/05/94	
				07/15/94						07/15/94	
				08/01/94						08/01/94	
				08/15/94						08/15/94	
				08/29/94						08/29/94	
				09/12/94						09/12/94	
				09/26/94						09/26/94	
				10/11/94						10/11/94	
				10/24/94						10/24/94	
				11/08/94						11/08/94	
				11/22/94						11/22/94	
				12/05/94						12/05/94	
				12/19/94						12/19/94	
				01/03/95						01/03/95	
				01/16/95						01/16/95	
				01/30/95						01/30/95	
				02/13/95						02/13/95	
				02/27/95						02/27/95	
				03/13/95						03/13/95	
				03/27/95						03/27/95	
				04/10/95						04/10/95	
		15.87	242.66	04/24/95				15.30	243.31	04/24/95	
		15.99	242.53	05/08/95				15.45	243.16	05/08/95	
		16.96	241.56	05/22/95						05/22/95	
		16.98	241.54	06/05/95						06/05/95	
MW-22A	252.52	9.78	242.74	06/21/94	243.53	MW-22B	252.77	10.10	242.67	06/21/94	243.50
(293)		9.60	242.92	07/05/94		(294)		10.25	242.52	07/05/94	
		9.94	242.58	07/15/94				10.26	242.51	07/15/94	
		9.63	242.89	08/01/94				9.94	242.83	08/01/94	
		9.92	242.60	08/15/94				10.24	242.53	08/15/94	
		9.66	242.86	08/29/94				9.97	242.80	08/29/94	
		9.92	242.60	09/12/94				10.23	242.54	09/12/94	
		8.50	244.02	09/26/94				8.81	243.96	09/26/94	
		9.42	243.10	10/11/94				9.72	243.05	10/11/94	
		9.50	243.02	10/24/94				9.80	242.97	10/24/94	
		9.73	242.79	11/08/94				10.03	242.74	11/08/94	
		9.81	242.71	11/22/94				10.13	242.64	11/22/94	
		7.29	245.23	12/05/94				7.63	245.14	12/05/94	
		8.69	243.83	12/19/94				8.98	243.79	12/19/94	
		7.53	244.99	01/03/95				7.80	244.97	01/03/95	
		7.77	244.75	01/16/95				7.98	244.79	01/16/95	
		8.48	244.04	01/30/95				8.75	244.02	01/30/95	
		8.60	243.92	02/13/95				8.85	243.92	02/13/95	
		9.13	243.39	02/27/95				9.03	243.74	02/27/95	
		7.85	244.67	03/13/95				8.12	244.65	03/13/95	
		8.41	244.11	03/27/95				8.73	244.04	03/27/95	
		8.87	243.65	04/10/95				9.18	243.59	04/10/95	
		8.76	243.76	04/24/95				9.06	243.71	04/24/95	
		9.35	243.17	05/08/95				9.36	243.41	05/08/95	
		8.82	243.70	05/22/95				9.13	243.64	05/22/95	
		8.69	243.83	06/05/95				9.02	243.75	06/05/95	
HM 1	267.33	--	--	06/21/94	260.00	MI 32	273.72	--	--	06/21/94	261.32
(299)				07/05/94		(46)				07/05/94	
				07/15/94						07/15/94	
				08/01/94						08/01/94	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
				08/15/94						08/15/94	
				08/29/94						08/29/94	
				09/12/94						09/12/94	
				09/26/94						09/26/94	
				10/11/94						10/11/94	
				10/24/94						10/24/94	
				11/08/94						11/08/94	
				11/22/94						11/22/94	
				12/05/94						12/05/94	
				12/19/94						12/19/94	
				01/03/95						01/03/95	
				01/16/95						01/16/95	
				01/30/95						01/30/95	
				02/13/95						02/13/95	
				02/27/95						02/27/95	
				03/13/95						03/13/95	
				03/27/95						03/27/95	
		7.20	260.13	04/10/95				12.21	261.51	04/10/95	
		7.13	260.20	04/24/95				12.20	261.52	04/24/95	
		7.64	259.69	05/08/95				12.71	261.01	05/08/95	
		7.25	260.08	05/22/95				12.35	261.37	05/22/95	
		7.44	259.89	06/05/95				12.54	261.18	06/05/95	
MW-24A (255)	259.67	9.32	250.35	06/21/94	250.93	MW-24B (333)	259.39	9.01	250.38	06/21/94	250.95
		9.41	250.26	07/05/94				9.12	250.27	07/05/94	
		9.48	250.19	07/15/94				9.17	250.22	07/15/94	
		9.22	250.45	08/01/94				8.92	250.47	08/01/94	
		9.44	250.23	08/15/94				9.13	250.26	08/15/94	
		9.23	250.44	08/29/94				8.93	250.46	08/29/94	
		9.45	250.22	09/12/94				9.14	250.25	09/12/94	
		8.22	251.45	09/26/94				7.93	251.46	09/26/94	
		9.02	250.65	10/11/94				8.72	250.67	10/11/94	
		9.02	250.65	10/24/94				8.71	250.68	10/24/94	
		9.27	250.40	11/08/94				9.00	250.39	11/08/94	
		9.34	250.33	11/22/94				9.04	250.35	11/22/94	
		8.39	251.28	12/05/94				8.06	251.33	12/05/94	
		8.53	251.14	12/19/94				8.24	251.15	12/19/94	
		7.70	251.97	01/03/95				7.42	251.97	01/03/95	
		7.83	251.84	01/16/95				7.53	251.86	01/16/95	
		8.27	251.40	01/30/95				8.00	251.39	01/30/95	
		8.22	251.45	02/13/95				7.86	251.53	02/13/95	
		8.44	251.23	02/27/95				8.10	251.29	02/27/95	
		7.94	251.73	03/13/95				7.67	251.72	03/13/95	
		8.33	251.34	03/27/95				8.05	251.34	03/27/95	
		8.62	251.05	04/10/95				8.32	251.07	04/10/95	
		8.49	251.18	04/24/95				8.20	251.19	04/24/95	
		8.94	250.73	05/08/95				8.65	250.74	05/08/95	
		8.59	251.08	05/22/95				8.31	251.08	05/22/95	
		8.40	251.27	06/05/95				8.12	251.27	06/05/95	
MI-21A (34)	272.61	--	--	06/21/94	261.95	MW-27 (235)	275.21	--	--	06/21/94	265.10
				07/05/94						07/05/94	
				07/15/94						07/15/94	
				08/01/94						08/01/94	
				08/15/94						08/15/94	
				08/29/94						08/29/94	
				09/12/94						09/12/94	
				09/26/94						09/26/94	
				10/11/94						10/11/94	
				10/24/94						10/24/94	
				11/08/94						11/08/94	
				11/22/94						11/22/94	
				12/05/94						12/05/94	
				12/19/94						12/19/94	
				01/03/95						01/03/95	
				01/16/95						01/16/95	
				01/30/95						01/30/95	
				02/13/95						02/13/95	
				02/27/95						02/27/95	
				03/13/95						03/13/95	
				03/27/95						03/27/95	

Appendix 3. Ground-water Levels from biweekly measurements of wells, Milford, New Hampshire--Continued

[ft, feet; --, no data; Meas., measuring; Elev., elevation]

Well name	Meas. point elev. (ft)	Depth to water (ft)	Water Level Eleva-tion (ft)	Mea-sure Date	Observed Mean	Well name	Meas. point elev. (ft)	Depth to Water (ft)	Water Level Eleva-tion (ft)	Measure date	Observed mean
		10.47	262.14	04/10/95				10.08	265.13	04/10/95	
		10.52	262.09	04/24/95				10.05	265.16	04/24/95	
		10.91	261.70	05/08/95				10.42	264.79	05/08/95	
		10.64	261.97	05/22/95				10.07	265.14	05/22/95	
		10.78	261.83	06/05/95				9.93	265.28	06/05/95	
MW-32A	250.46	8.75	241.71	06/21/94	242.71	MW-32B	251.23	9.43	241.80	06/21/94	242.79
(296)		8.85	241.61	07/05/94		(297)		9.55	241.68	07/05/94	
		8.95	241.51	07/15/94				9.63	241.60	07/15/94	
		8.49	241.97	08/01/94				9.19	242.04	08/01/94	
		8.83	241.63	08/15/94				9.52	241.71	08/15/94	
		8.40	242.06	08/29/94				9.09	242.14	08/29/94	
		8.80	241.66	09/12/94				9.49	241.74	09/12/94	
		7.14	243.32	09/26/94				7.85	243.38	09/26/94	
		8.27	242.19	10/11/94				8.97	242.26	10/11/94	
		8.33	242.13	10/24/94				9.03	242.20	10/24/94	
		8.48	241.98	11/08/94				9.16	242.07	11/08/94	
		8.60	241.86	11/22/94				9.32	241.91	11/22/94	
		7.06	243.40	12/05/94				7.55	243.68	12/05/94	
		7.25	243.21	12/19/94				7.95	243.28	12/19/94	
		5.88	244.58	01/03/95				6.55	244.68	01/03/95	
		6.25	244.21	01/16/95				6.95	244.28	01/16/95	
		6.99	243.47	01/30/95				7.68	243.55	01/30/95	
		7.29	243.17	02/13/95				7.99	243.24	02/13/95	
		7.33	243.13	02/27/95				8.05	243.18	02/27/95	
		6.18	244.28	03/13/95				6.86	244.37	03/13/95	
		6.90	243.56	03/27/95				7.61	243.62	03/27/95	
		7.60	242.86	04/10/95				8.30	242.93	04/10/95	
		7.45	243.01	04/24/95				8.15	243.08	04/24/95	
		8.17	242.29	05/08/95				8.87	242.36	05/08/95	
		7.58	242.88	05/22/95				8.27	242.96	05/22/95	
		7.64	242.82	06/05/95				8.34	242.89	06/05/95	
MI-21	274.76	--	--	06/21/94	265.16	MI-20A	--	--	--	06/21/94	--
(33)				07/05/94		(32)				07/05/94	
				07/15/94						07/15/94	
				08/01/94						08/01/94	
				08/15/94						08/15/94	
				08/29/94						08/29/94	
				09/12/94						09/12/94	
				09/26/94						09/26/94	
				10/11/94						10/11/94	
				10/24/94						10/24/94	
				11/08/94						11/08/94	
				11/22/94						11/22/94	
				12/05/94						12/05/94	
				12/19/94						12/19/94	
				01/03/95						01/03/95	
				01/16/95						01/16/95	
				01/30/95						01/30/95	
				02/13/95						02/13/95	
				02/27/95						02/27/95	
				03/13/95						03/13/95	
				03/27/95						03/27/95	
		9.56	265.20	04/10/95				5.95		04/10/95	
		9.54	265.22	04/24/95				9.62		04/24/95	
		9.91	264.85	05/08/95				9.98		05/08/95	
		9.57	265.19	05/22/95				9.71		05/22/95	
		9.44	265.32	06/05/95				9.84		06/05/95	

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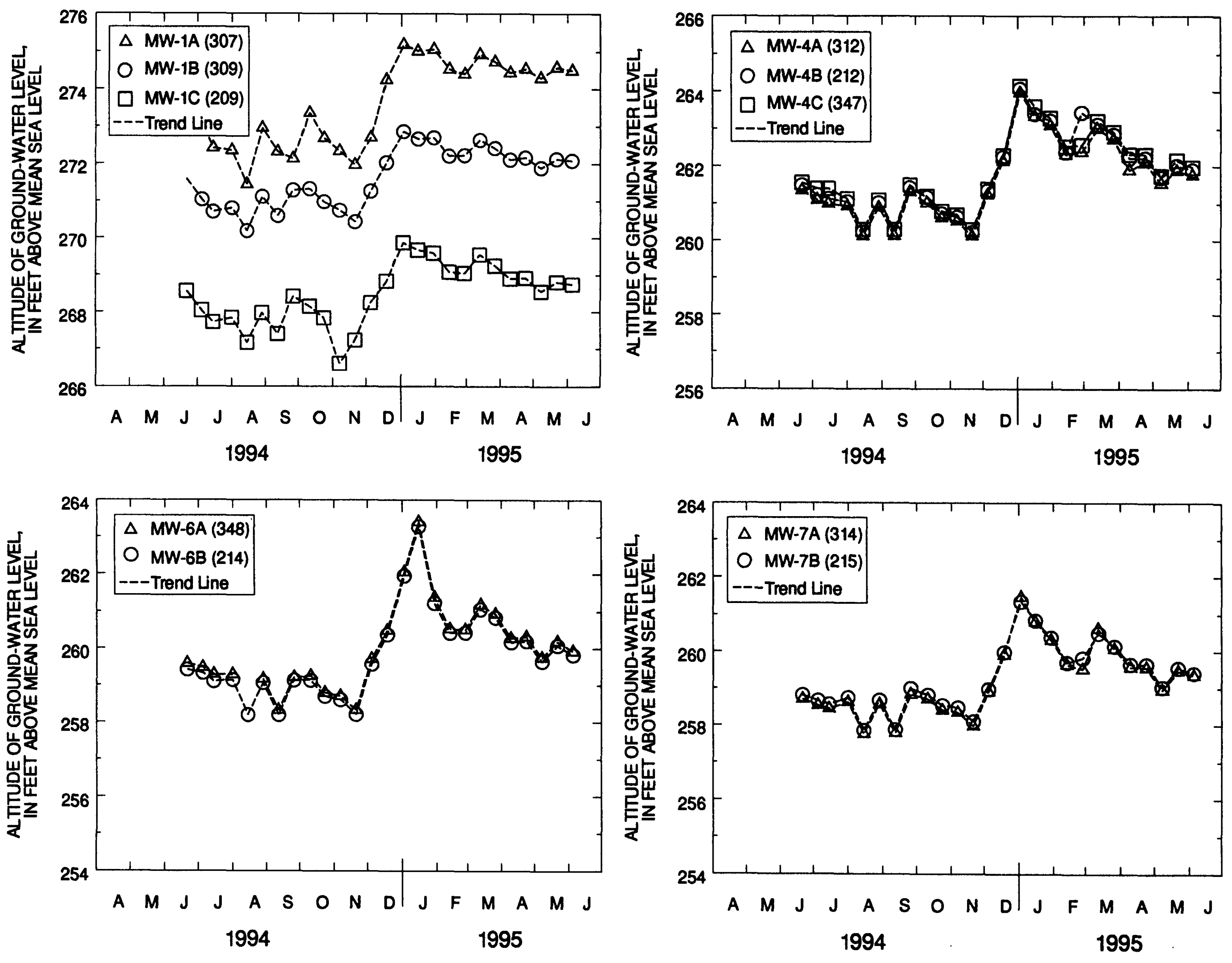
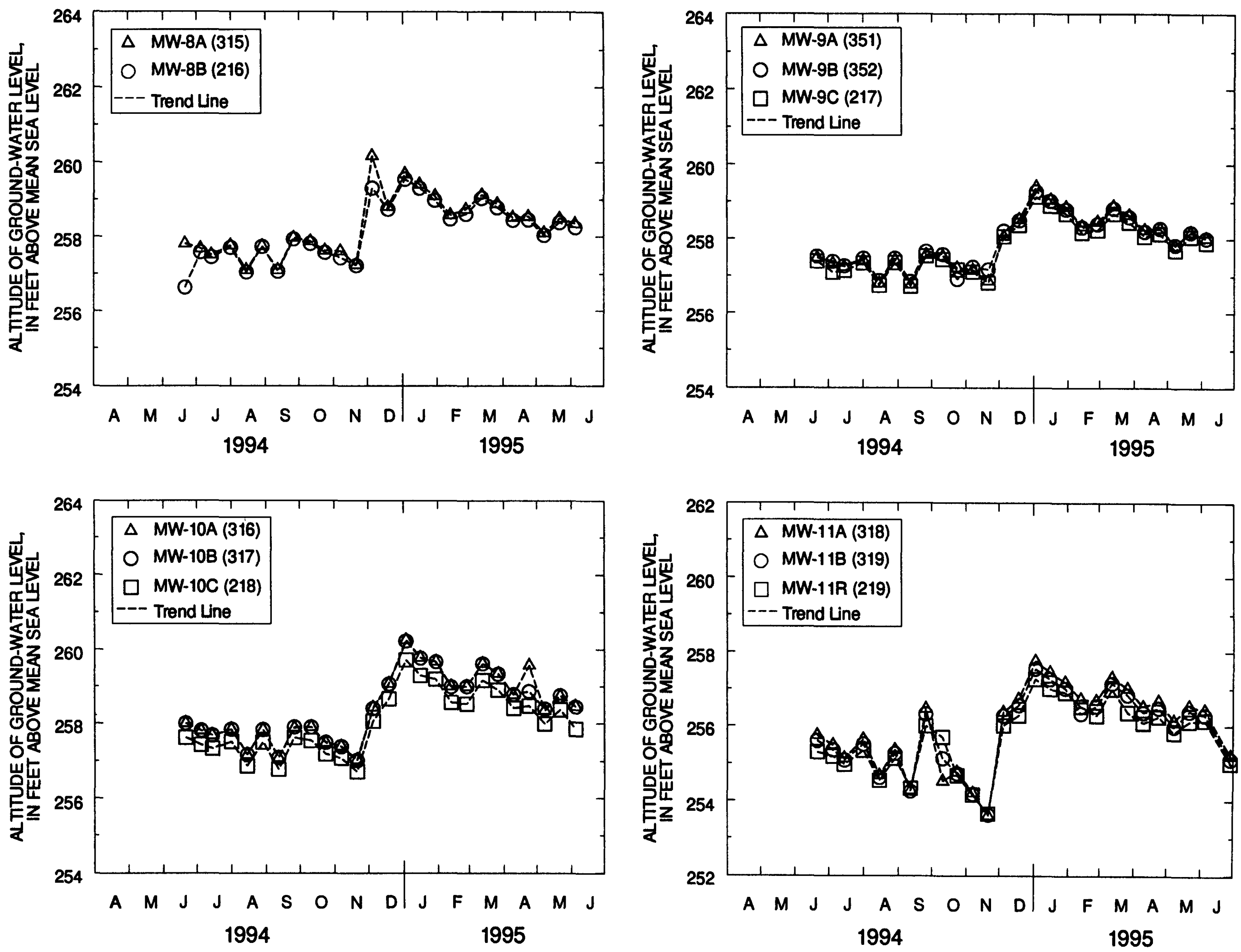
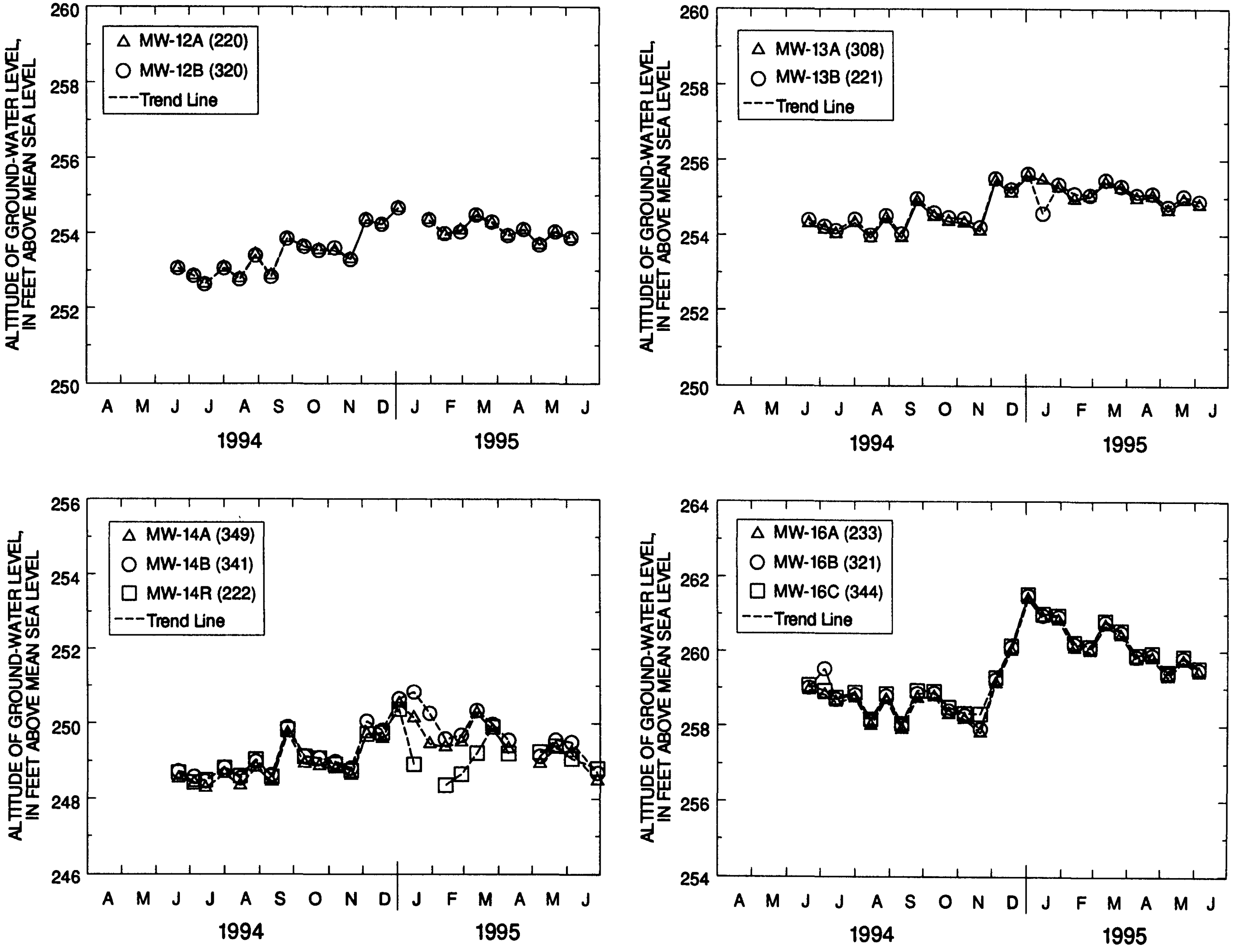
APPENDIX 4



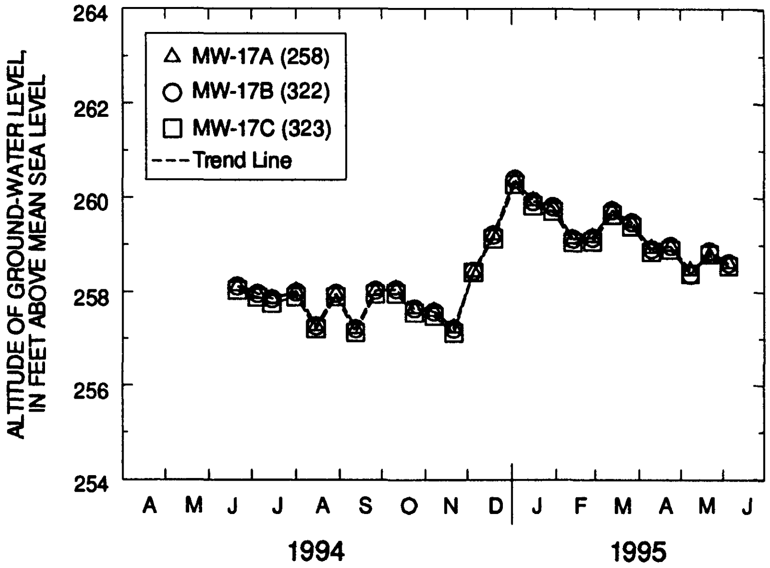
Appendix 4A. Ground-water levels from biweekly measurements of wells, Milford, New Hampshire.

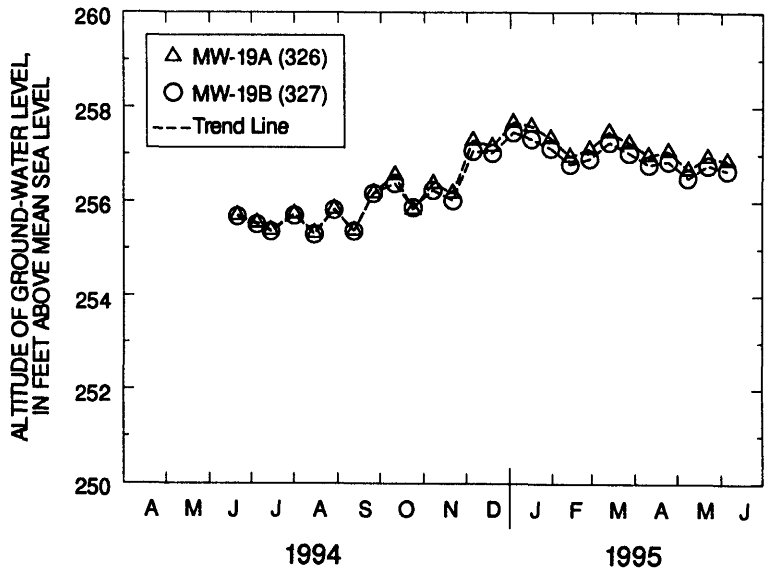


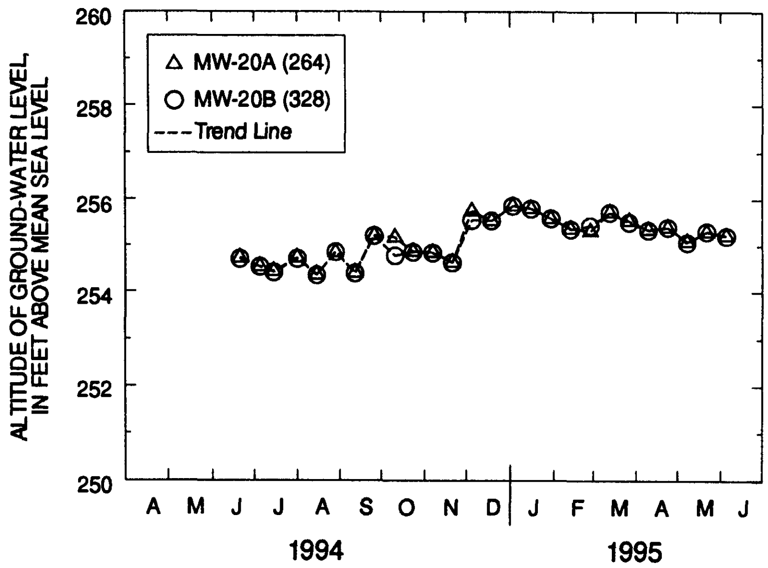
Appendix 4B. Ground-water levels from biweekly measurements of wells, Milford, New Hampshire.



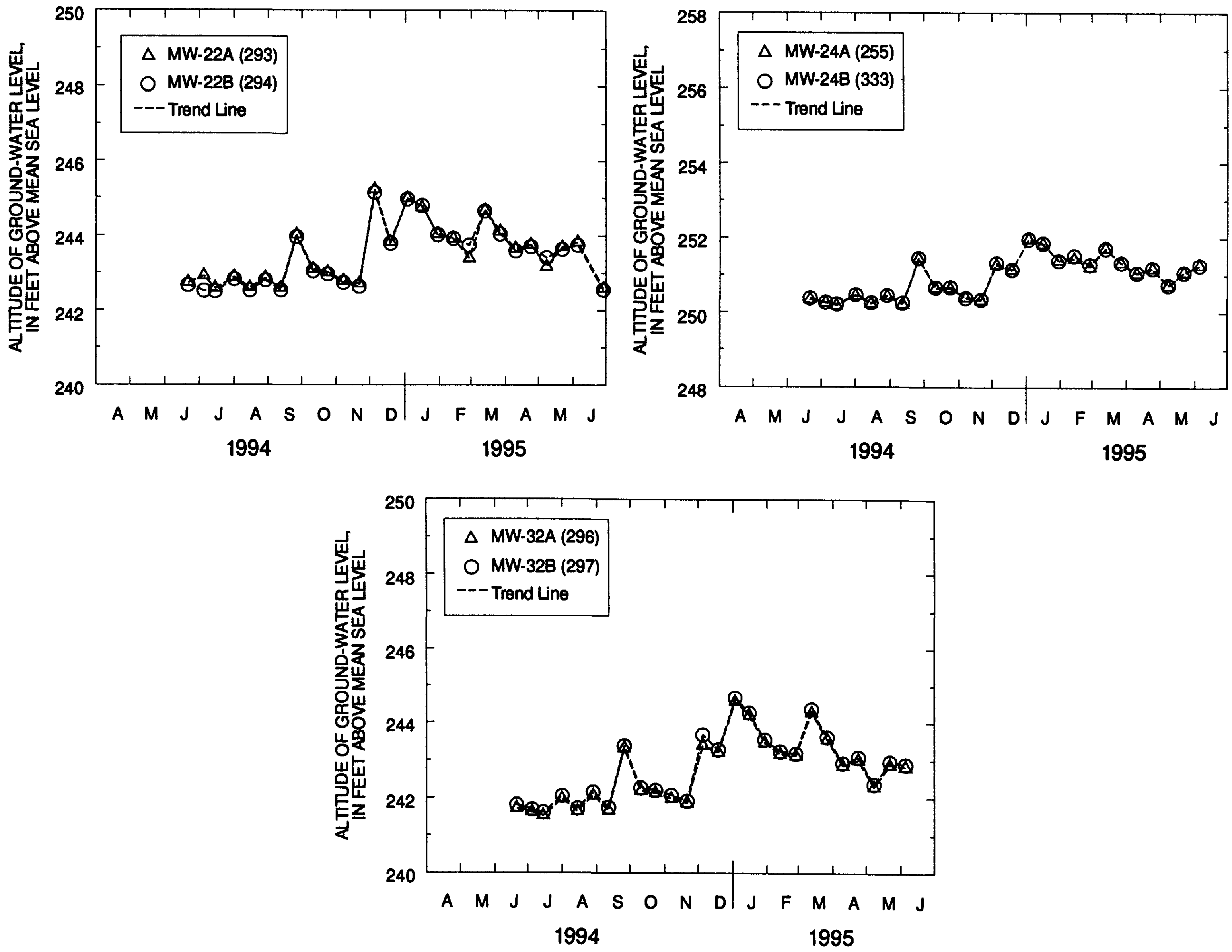
Appendix 4C. Ground-water levels from biweekly measurements of wells, Milford, New Hampshire.



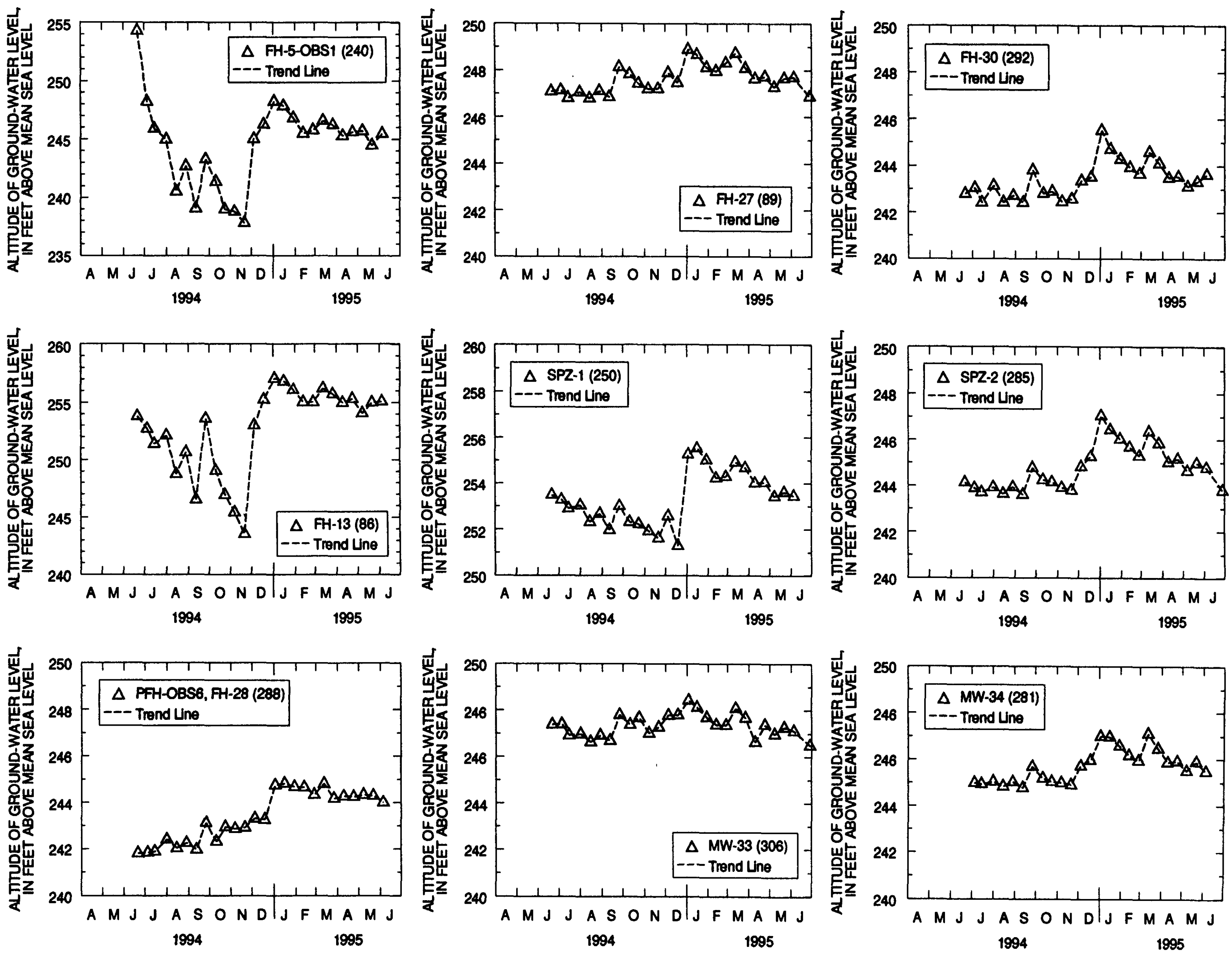




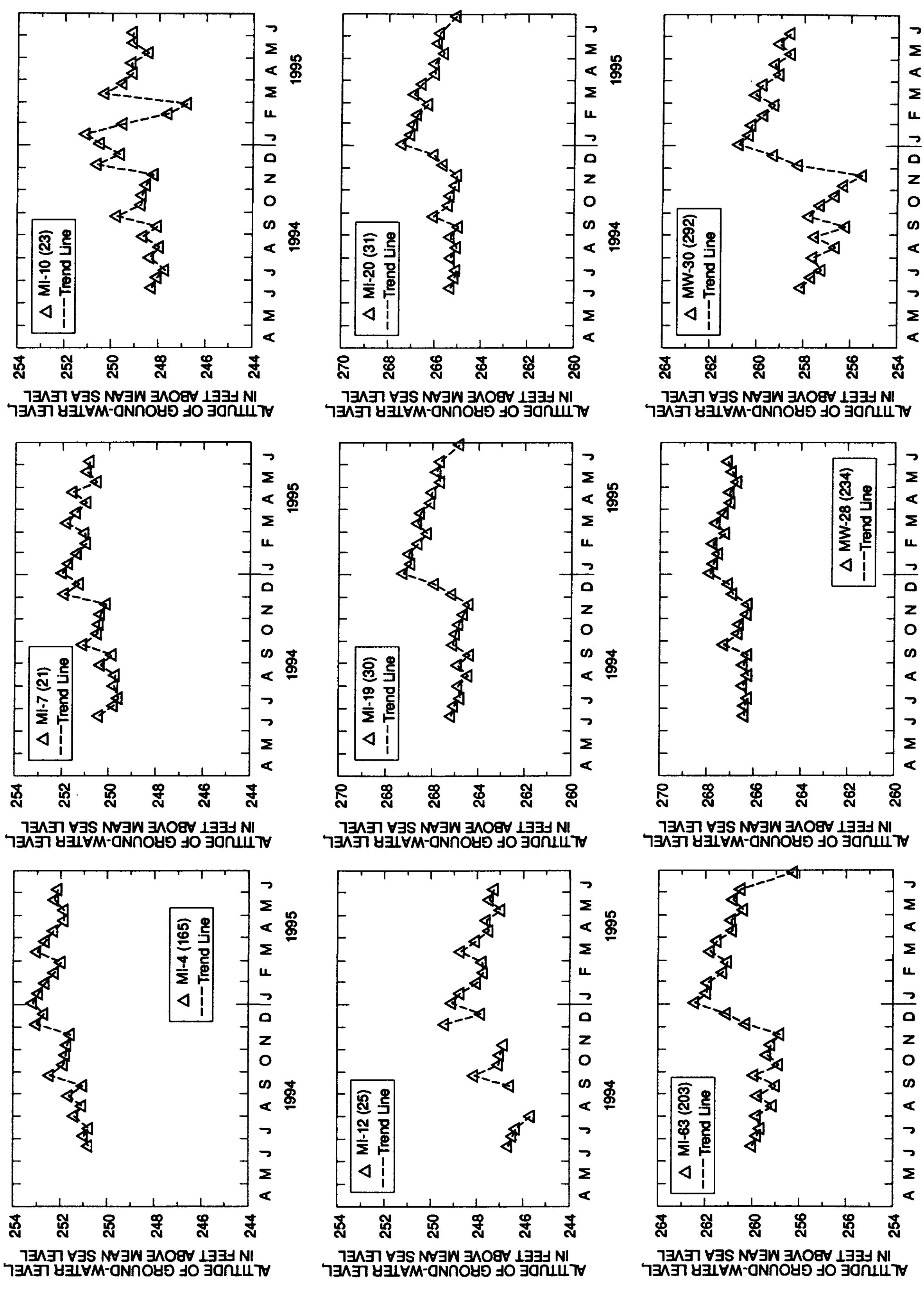
Appendix 4D. Ground-water levels from bieweekly measurements of wells, Milford, New Hampshire.



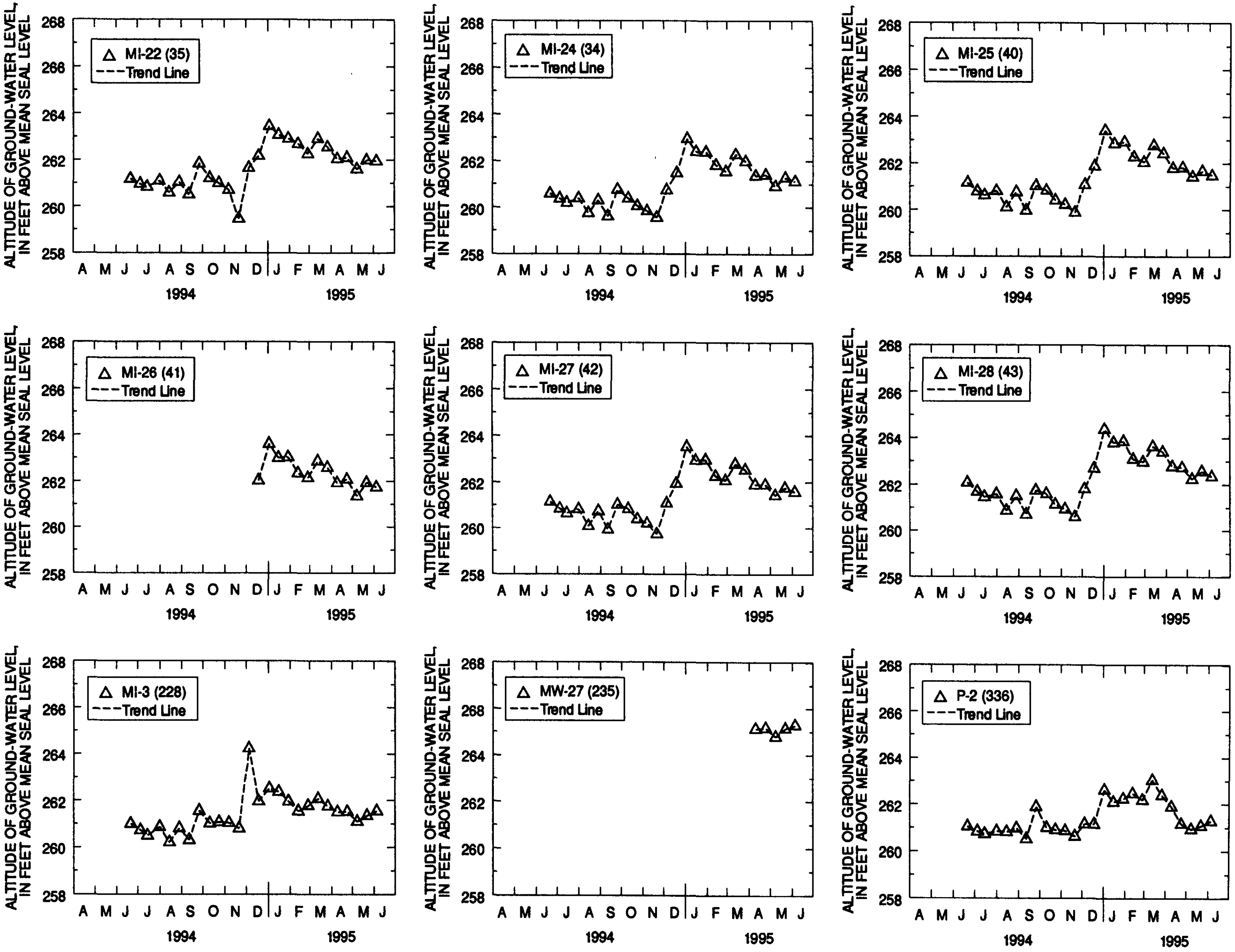
Appendix 4E. Ground-water levels from biweekly measurements of wells, Milford, New Hampshire.



Appendix 4F. Ground-water levels from biweekly measurements of wells, Milford, New Hampshire.



Appendix 4G. Ground-water levels from biweekly measurements of wells, Milford, New Hampshire.



Appendix 4H. Ground-water levels from biweekly measurements of wells, Milford, New Hampshire.

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APPENDIX 5

Appendix 5. Ground-water levels from synoptic measurements of wells, Milford, New Hampshire

[TSC = Top of Steel Casing; TPVC = Top of PVC; NotchSC = Notch in Steel Casing; AHPUMP = Access Hole for Pump; TCplPVC = Top of Coupling in PVC; DTW = Depth to water; MP = Measuring point; LS = Land surface; -- = no data; Data, GEI = GEI; Source, GEOI = GEO Insight; NHDES = New Hampshire Deptartment of Environmental Services; USGS = U.S. Geological Survey]

					1994			1990		1988					
Well number (Plate 1)	Well name	Tape MP	Casing stickup (feet)	MP Eleva-tion (feet)	DTW from MP (feet)	Water level altitude (feet)	Data source	DTW from MP (feet)	Water altitude (feet)	DTW from LS (feet)	DTW from MP (feet)	Water level altitude (feet)	1988/90 Delta DTW MP (feet)	1990/94 Delta DTW MP (feet)	1988/94 Delta H (feet)
1	KEYES-1	--	2	250.71	--	--	--	13.27	237.44	11.45	13.45	237.26	0.18	--	--
2	KEYES-2D	--	1.84	248.45	--	--	--	12.33	236.12	10.82	12.66	235.79	0.33	--	--
3	KEYES-3D	--	20	266.84	--	--	--	30.79	234.05	9.25	29.25	237.59	-1.54	--	--
4	KEYES-4D	--	1.97	245.28	--	--	--	9.27	236.01	7.7	9.67	235.61	0.4	--	--
6	LW-02D	--	2.56	245.66	--	--	--	7.56	238.1	4.97	7.53	238.13	-0.03	--	--
7	LW-03D	--	3.84	251.14	--	--	--	12.03	239.11	10	13.84	237.3	1.81	--	--
8	LW-04	--	3.03	246.43	--	--	--	8.55	237.88	6.27	9.3	237.13	0.75	--	--
15	RFW-2	--	--	253.87	--	--	--	--	--	--	--	--	--	--	--
16	RFW-3	--	-1.01	253.51	--	--	--	--	253.51	5.7	4.69	248.82	--	--	--
17	RFW-4	--	-0.51	252.15	--	--	--	--	252.15	3.29	2.78	249.37	--	--	--
21	MI-7	TSC	1.15	256.68	4.27	252.41	GEOI	5.9	250.78	5.26	6.41	250.27	0.51	1.63	2.14
22	MI-8	--	--	265.95	--	--	--	--	--	--	--	--	--	--	--
23	MI-10	--	--	255.12	--	--	--	6	249.12	--	--	--	--	--	--
24	MI-11	--	2.5	254.52	--	--	--	6	248.52	4.22	6.72	247.8	0.72	--	--
25	MI-12	TSC	1.45	253.26	3.59	249.67	GEOI	5.8	247.46	8.17?	--	253.26	--	2.21	--
26	MI-15	--	--	265.17	--	--	--	--	--	--	--	--	--	--	--
29	MI-18	--	2.00	264.42	8.53	255.89	--	9.13	255.29	8.08	10.08	254.34	0.95	0.6	1.55
30	MI-19	TPVC	2.21	277.93	9.8	268.13	NHDES	--	--	8.08	10.29	267.64	--	--	0.49
31	MI-20	TPVC	2.2	277.93	9.61	268.32	--	--	--	10.65	12.85	265.08	--	--	3.24
32	MI-20A	TPVC	0.5	--	9.8	--	NHDES	--	--	10.23	10.73	--	--	--	0.93
33	MI-21	TPVC	2.3	--	8.33	--	NHDES	--	--	8.47	10.77	--	--	--	2.44
34	MI-21A	--	1.99	--	--	--	ERR	--	--	9.83	11.82	--	--	--	--
35	MI-22	TPVC	2.34	272.34	7.93	264.41	NHDES	--	--	10.07	12.41	259.93	--	--	4.48
37	MI-23	--	2.34	--	--	--	--	--	--	--	--	--	--	--	--
38	MI-24	TPVC	2.8	273.41	9.16	264.25	NHDES	--	--	10.74	13.54	259.87	--	--	4.38
40	MI-25	TPVC	2.25	272.35	8.62	263.73	NHDES	--	--	10.37	12.62	259.73	--	--	4.00
41	MI-26	TPVC	2.22	272.35	8.56	263.79	NHDES	--	--	10.26	12.58	259.77	--	--	4.02
42	MI-27	TPVC	2.9	273.43	9.35	264.08	NHDES	--	--	10.72	13.62	259.81	--	--	4.27
43	MI-28	TPVC	1.5	271.85	7.16	264.69	GEI	10.62	261.23	9.7	11.2	260.65	0.58	3.46	4.04
44	MI-30	TPVC	3.23	269.35	7.77	261.58	GEI	10.71	258.64	8.61	11.84	257.51	1.13	2.94	4.07
45	MI-31	TPVC	1.15	267.23	6.04	261.19	NHDES	9.00	258.23	9.77	10.92	256.31	1.92	2.96	4.88
46	MI-32	TPVC	3.28	273.36	10.55	262.81	NHDES	13.42	259.94	11.03	14.31	259.05	0.89	2.87	3.76
47	MI-33	--	--	265.9	--	--	9.06	256.84	--	--	--	--	--	--	--
48	MI-34	--	1.92	279.84	--	--	13.56	266.28	--	--	--	--	--	--	--
49	MI-35	--	--	263.2	--	--	--	--	--	--	--	--	--	--	--
50	MI-36	--	0.65	270.51	--	--	7.23	263.28	--	--	--	--	--	--	--
51	MI-37	--	--	272.6	--	--	--	--	--	--	--	--	--	--	--

Appendix 5. Ground-water levels from synoptic measurements of wells, Milford, New Hampshire--Continued

[TSC = Top of Steel Casing; TPVC = Top of PVC; NotchSC = Notch in Steel Casing; AHPUMP = Access Hole for Pump; TCplPVC = Top of Coupling in PVC; DTW = Depth to water; MP = Measuring point; LS = Land surface; -- = no data; Data, GEI = GEI; Source, GEOI = GEO Insight; NHDES = New Hampshire Deptartment of Environmental Services; USGS = U.S. Geological Survey]

					1994			1990		1988					
Well number (Plate 1)	Well name	Tape MP	CASING STICKUP (feet)	MP Eleva-tion (feet)	DTW from MP (feet)	Water level altitude (feet)	Data source	DTW from MP (feet)	Water altitude (feet)	DTW from LS (feet)	DTW from MP (feet)	Water level altitude (feet)	1988/90 Delta DTW MP (feet)	1990/94 Delta DTW MP (feet)	1988/94 Delta H (feet)
54	MI-41	TPVC	1.55	260.12	5.14	254.98	GEI	--	--	4.85	6.4	253.72	--	--	1.26
55	MI-42	TPVC	1.29	258.51	3.99	254.52	GEI	--	--	3.84	5.13	253.38	--	--	1.14
56	MI-43	TPVC	1.58	258.82	4.54	254.28	GEI	--	--	4.25	5.83	252.99	--	--	1.29
57	MOW-63	--	--	--	--	--	--	--	--	--	--	--	--	--	--
58	MI-44	TPVC	1.28	260.6	6.13	254.47	GEI	--	--	--	--	--	--	--	--
65	P-03	--	--	263.27	--	--	--	--	--	--	--	--	--	--	--
72	MI-62	--	2.02	259.968	--	--	--	--	--	5.63	7.65	254.34	--	--	--
84	#226inSu	TSC	1.5	262.51	19.05	243.46	USGS	27.02	235.49	32.78	34.28	228.23	7.26	7.97	15.23
85	FH-15	AHPUMP	0	265.72	10.74	254.98	USGS	13.6	252.12	12.54	12.54	253.18	-1.06	2.86	1.8
86	FH-13	TCplPVC	--	269.03	11.8	257.23	USGS	19.15	249.88	--	15.97	253.06	-3.18	7.35	4.17
87	FH-14	AHPUM	BEL.GR	263.53	9.14	254.39	USGS	--	--	20.51	21.88	241.65	--	--	12.74
88	FH-16	--	--	262.99	--	--	--	7.45	255.54	--	--	--	--	--	--
89	FH-27	TSC	--	251.45	4.13	247.32	NHDES	5.55	245.9	--	--	--	--	1.42	--
90	FH-22	TPVC	--	255.1	4.3	250.8	NHDES	7.75	247.35	--	--	--	--	3.45	--
91	FH-24	TPVC	--	253.27	3.8	249.47	NHDES	7.37	245.9	--	--	--	--	3.57	--
92	FH-25	TPVC	--	252.64	6.4	246.24	NHDES	7.25	245.39	--	--	--	--	0.85	--
93	FH-23	TPVC	--	253.7	1.91	251.79	NHDES	7.91	245.79	--	--	--	--	6.00	--
94	FH-21	TPVC	--	251.63	3.98	247.65	NHDES	8.01	243.62	--	--	--	--	4.03	--
122	WW-125	--	--	--	--	--	--	--	--	--	--	--	--	--	--
123	GW-01S	--	--	--	--	--	--	--	--	4.89	--	251.24	--	--	--
124	GW-01D	--	--	--	--	--	--	--	--	4.28	--	252.26	--	--	--
125	GW-01M	--	--	--	--	--	--	--	--	5.11	--	251.6	--	--	--
126	KEYES	--	--	--	--	--	--	--	12.43	--	--	--	--	--	--
132	POTTER 1D	--	--	253.75	--	--	--	--	--	16.1	--	235.65	--	--	--
133	POTTER 2D	--	--	255.77	--	--	--	--	--	18.05	--	235.72	--	--	--
134	POTTER 3D	--	--	255.67	--	--	--	--	--	17.7	--	235.97	--	--	--
136	FORDobs3	--	--	249.06	--	249.06	--	13.19	235.87	--	--	--	--	--	--
142	KEYES 2S	--	2.00	248.45	--	--	--	12.26	236.19	10.55	12.55	236.19	0.29	--	--
143	KEYES 3S	--	2.05	247.67	--	--	--	11.69	235.98	10.1	12.15	235.52	0.46	--	--
144	KEYES 4S	--	2.03	245.31	--	--	--	9.19	236.12	7.7	9.73	235.58	0.54	--	--
145	POTTER 1S	--	--	253.76	--	--	--	--	--	16.07	--	235.69	--	--	--
146	POTTER 2S	--	--	255.79	--	--	--	--	--	18.1	--	235.69	--	--	--
147	POTTER 3S	--	--	255.66	--	--	--	--	--	17.65	--	236.01	--	--	--
150	LW-02S	--	3.11	245.91	--	--	--	6.98	238.93	4.65	7.76	238.15	0.78	--	--
151	LW-03S	--	2.84	250.44	--	--	--	12.2	238.24	10.36	13.2	237.24	1.00	--	--
152	LW-04S	--	2.96	246.46	--	--	--	7.28	239.18	4.76	7.72	238.74	0.44	--	--
163	MI-2	--	--	253.94	--	--	--	--	--	--	--	--	--	--	--

Appendix 5. Ground-water levels from synoptic measurements of wells, Milford, New Hampshire--Continued

[TSC = Top of Steel Casing; TPVC = Top of PVC; NotchSC = Notch in Steel Casing; AHPUMP = Access Hole for Pump; TCplPVC = Top of Coupling in PVC; DTW = Depth to water; MP = Measuring point; LS = Land surface; -- = no data; Data, GEI = GEI; Source, GEOI = GEO Insight; NHDES = New Hampshire Deptartment of Environmental Services; USGS = U.S. Geological Survey]

					1994			1990		1988					
Well number (Plate 1)	Well name	Tape MP	CASING STICKUP (feet)	MP Elevation (feet)	DTW from MP (feet)	Water level altitude (feet)	Data source	DTW from MP (feet)	Water altitude (feet)	DTW from LS (feet)	DTW from MP (feet)	Water level altitude (feet)	1988/90 Delta DTW MP (feet)	1990/94 Delta DTW MP (feet)	1988/94 Delta H (feet)
164	MI-3	--	--	257.28	--	--	--	5.6	251.68	--	--	--	--	--	--
165	MI-4	TSC	2.55	257.49	4.15	253.34	GEOI	5.5	251.99	--	--	--	--	1.35	--
166	MI-5	--	--	255.89	--	--	--	--	--	--	--	--	--	--	--
167	MI-6	--	--	255.66	--	--	--	--	--	--	--	--	--	--	--
169	MI-9	--	--	265.05	--	--	--	--	--	--	--	--	--	--	--
171	MI-29	TPVC	1.14	269.93	6.55	263.38	GEI	10.24	259.69	9.53	10.67	259.26	0.43	3.69	4.12
172	MI-40	--	--	257.4	--	--	--	--	--	--	--	--	--	--	--
203	MI-63	TPVC	--	267.64	8.26	259.38	NHDES	--	--	--	--	--	--	--	--
204	MI-13	--	--	251.42	--	--	--	15.2	236.22	--	--	--	--	--	--
208	FH-5	TSC	1	267.89	--	--	USGS	--	--	43.29	43.29	224.6	--	--	--
209	MW-1C	TPVC	1.89	281.28	11.14	270.14	GEI	--	--	--	--	--	--	--	--
210	MW-2B	TPVC	0.97	269.19	5.35	263.84	NHDES	9.13	260.06	--	--	--	--	3.78	--
212	MW-4B	TPVC	--	268.59	4.49	264.1	GEI	7.9	260.69	5.72	8.33	260.26	0.43	3.41	3.84
213	MW-5B	TPVC	--	269.61	7.7	261.91	GEI	11.62	257.99	10.97	11.98	257.63	0.36	3.92	4.28
214	MW-6B	TPVC	--	268.95	7.12	261.83	GEI	9.96	259.01	9.86	11.71	257.24	1.59	2.84	4.59
215	MW-7B	TPVC	--	264.29	2.9	261.39	GEI	5.95	258.34	5.12	7.13	257.16	1.18	3.05	4.23
216	MW-8B	TPVC	--	263.8	4.22	259.58	GEI	6.27	257.53	6.55	8.55	255.25	2.28	2.05	4.33
217	MW-9C	TPVC	--	268.09	8.9	259.19	GEI	--	--	10.40	12.19	255.9	--	--	3.29
218	MW-10C	TPVC	--	264.74	5.1	259.64	GEI	7.34	257.40	--	--	--	--	2.24	--
219	MW-11R	TSC	--	262.47	5.18	257.29	GEI	7.75	254.72	--	--	--	--	2.57	--
220	MW-12A	TPVC	1.95	265.96	11.42	254.54	GEO	12.35	253.61	--	--	--	--	0.93	--
221	MW-13B	TPVC	--	259.35	3.58	255.77	GEI	4.68	254.67	--	--	--	--	1.10	--
222	MW-14R	TSC	1.7	255.5	4.63	250.87	GEO	--	--	--	--	--	--	--	--
223	MW-15A	TPVC	--	258.53	14.25	244.28	NHDES	--	--	--	--	--	--	--	--
225	MW-26	TPVC	2.45	271.11	4.91	266.2	GEI	6.55	264.56	--	--	--	--	1.64	--
226	MW-25	TPVC	2.66	273.12	5.02	268.1	GEI	6.53	266.59	--	--	--	--	1.51	--
228	MW-3	TPVC	1.85	270.54	7.7	262.84	GEI	9.5	261.04	--	--	--	--	1.8	--
231	MW-18A	TPVC	1.89	269.78	8.59	261.19	GEI	11.82	257.96	--	--	--	--	3.23	--
233	MW-16A	TPVC	--	270.12	8.64	261.48	NHDES	11.64	258.48	--	--	--	--	3.00	--
234	MW-28	TPVC	--	275.42	7.31	268.11	NHDES	10.62	264.8	--	--	275.42	--	3.31	--
235	MW-27	TPVC	--	275.78	8.9	266.88	NHDES	10.86	264.92	--	--	275.78	--	1.96	--
237	MW-23A	--	--	267.51	--	--	--	6.04	261.47	--	--	--	--	--	--
240	FH-10	TSC	0.7	268.01	20.34	247.67	USGS	27.88	240.13	--	--	--	--	7.54	--
242	FH-9	--	--	269.83	--	--	--	--	--	--	--	--	--	--	--
250	SPZ-1	--	--	--	--	--	--	6.62	252.55	--	--	--	--	--	--
251	SP-7	TPVC	--	258.66	2.85	255.81	NHDES	7.54	251.12	--	--	--	--	4.69	--
252	SP-6	TPVC	--	261.05	6.08	254.97	NHDES	7.73	253.32	--	--	--	--	1.65	--

Appendix 5. Ground-water levels from synoptic measurements of wells, Milford, New Hampshire--Continued

[TSC = Top of Steel Casing; TPVC = Top of PVC; NotchSC = Notch in Steel Casing; AHPUMP = Access Hole for Pump; TCplPVC = Top of Coupling in PVC; DTW = Depth to water; MP = Measuring point; LS = Land surface; -- = no data; Data, GEI = GEI; Source, GEOI = GEO Insight; NHDES = New Hampshire Deptartment of Environmental Services; USGS = U.S. Geological Survey]

Well number (Plate 1)	Well name	Tape MP	CASING STICKUP (feet)	MP Elevation (feet)	1994 DTW from MP (feet)	1994 Water level altitude (feet)	1994 Data source	1990 DTW from MP (feet)	1990 Water altitude (feet)	1988 DTW from LS (feet)	1988 DTW from MP (feet)	1988 Water level altitude (feet)	1988/90 Delta DTW MP (feet)	1990/94 Delta DTW MP (feet)	1988/94 Delta H (feet)
254	SP-5	TPVC	--	--	3.41	--	NHDES	--	--	--	--	--	--	--	--
255	MW-24A	--	--	259.67	--	--	--	9.11	250.56	--	--	--	--	--	--
258	MW-17A	TPVC	2.75	267.05	6.77	260.28	GEI	9.33	257.72	--	--	--	--	2.56	--
262	MW-29	TPVC	-0.15	260.9	3.15	257.75	GEI	4.42	256.48	--	--	--	--	1.27	--
264	MW-20A	TPVC	2.43	263.23	7.38	255.85	GEI	8.25	254.98	--	--	--	--	0.87	--
267	SP-4	--	--	258.63	--	--	--	7.38	251.25	--	--	--	--	--	--
268	SP-3	--	--	256.3	--	--	--	7.29	249.01	--	--	--	--	--	--
269	P-9A	--	--	254.73	--	--	--	6.3	248.43	--	--	--	--	--	--
270	P-9B	--	--	255.01	--	--	--	5.97	249.04	--	--	--	--	--	--
271	P-15	TPVC	--	252.08	4.29	247.79	NHDES	5.6	246.48	--	--	--	--	1.31	--
273	HP-1	--	--	254.51	--	--	--	4.25	250.26	--	--	--	--	--	--
274	HP-2	--	--	253.24	--	--	--	4.65	248.59	--	--	--	--	--	--
275	HP-3	--	--	253.53	--	--	--	4.35	249.18	--	--	--	--	--	--
276	P-10	--	--	252.7	--	--	--	6.7	246	--	--	--	--	--	--
277	P-11	--	--	254.54	--	--	--	6.47	248.07	--	--	--	--	--	--
278	MW-21A	--	--	261.27	--	--	--	9.5	251.77	--	--	--	--	--	--
279	SP-2	TPVC	--	251.94	4.78	247.16	NHDES	6.54	245.4	--	--	--	--	1.76	--
280	P-16	TPVC	--	260.43	12.46	247.97	NHDES	11.01?	--	--	--	--	--	--	--
281	MW-34	TPVC	--	260.91	12.92	247.99	NHDES	15.38	245.53	--	--	--	--	2.46	--
282	P-17A	--	--	252.54	--	--	--	--	244.39	--	--	--	--	--	--
283	P-17B	--	--	253.66	--	--	--	--	244.56	--	--	--	--	--	--
284	FERGUSON	--	--	280.08	--	280.08	--	23.45	256.63	--	--	--	--	23.45	--
285	SPZ-2	TPVC	--	252.23	4.37	247.86	NHDES	6.42	245.81	--	--	--	--	2.05	--
287	GORMAN	--	--	271.45	--	--	--	15.8	255.65	--	--	--	--	--	--
288	FH-28	TSC	1.2	248.85	6.4	242.45	USGS	--	--	--	--	--	--	--	--
289	FH-29	TSC	2.6	250.07	5.85	244.22	USGS	--	--	--	--	--	--	--	--
290	P-18	--	--	250.17	--	--	--	7.77	242.4	--	--	--	--	--	--
291	SP-11	--	--	249.67	--	249.67	--	5.98	243.69	--	--	--	--	--	--
292	--	TSC	--	250.69	5.04	245.65	USGS	7.26	243.43	--	--	--	--	2.22	--
293	MW-22A	NotchS	2.34	252.52	7.07	245.45	GEOI	8.7	243.82	--	--	--	--	1.63	--
294	MW-22B	TPVC	2.63	252.77	7.36	245.41	GEOI	8.95	243.82	--	--	--	--	1.59	--
295	P-13	--	--	250.84	--	250.84	--	8.5	242.34	--	--	--	--	--	--
296	MW-32A	--	--	250.46	--	--	--	6.86	243.6	--	--	--	--	--	--
297	MW-32B	--	--	251.23	--	--	--	7.56	243.67	--	--	--	--	--	--
299	HM-1	TPVC	--	262.88	5.56	257.32	NHDES	--	--	--	--	--	--	--	--
301	FH-11	--	--	268.08	--	--	--	--	--	--	--	--	--	--	--
302	FH-19	TSC	--	256.17	7.57	248.6	NHDES	8.79	247.38	--	--	--	--	1.22	--

Appendix 5. Ground-water levels from synoptic measurements of wells, Milford, New Hampshire--Continued

[TSC = Top of Steel Casing; TPVC = Top of PVC; NotchSC = Notch in Steel Casing; AHPUMP = Access Hole for Pump; TCplPVC = Top of Coupling in PVC; DTW = Depth to water; MP = Measuring point; LS = Land surface; -- = no data; Data, GEI = GEI; Source, GEOI = GEO Insight; NHDES = New Hampshire Deptartment of Environmental Services; USGS = U.S. Geological Survey]

					1994			1990		1988					
Well number (Plate 1)	Well name	Tape MP	CASING STICKUP (feet)	MP Eleva-tion (feet)	DTW from MP (feet)	Water level altitude (feet)	Data source	DTW from MP (feet)	Water altitude (feet)	DTW from LS (feet)	DTW from MP (feet)	Water level altitude (feet)	1988/90 Delta DTW MP (feet)	1990/94 Delta DTW MP (feet)	1988/94 Delta H (feet)
304	SP-5	--	--	257.07	--	--	--	5.44	251.63	--	--	--	--	--	--
305	FH-18	--	--	255.01	--	--	--	--	--	--	--	--	--	--	--
306	MW-33	TPVC	--	253.89	5.43	248.46	--	7.35	246.54	--	--	--	--	1.92	--
307	MW-1A	TPVC	1.63	281.26	5.77	275.49	GEI	9.35	271.91	--	--	--	--	3.58	--
308	MW-13A	TPVC	--	258.04	2.33	255.71	GEI	3.39	254.65	--	--	--	--	1.06	--
309	MW-1B	TPVC	1.92	281.38	8.25	273.13	GEI	9.29	272.09	--	--	--	--	1.04	--
310	MW-2A	TPVC	--	269.32	5.95	263.37	NHDES	9.02	260.3	--	--	--	--	3.07	--
311	MW-2R	TPVC	--	268.95	5.38	263.57	NHDES	9.35	259.6	--	--	--	--	3.97	--
312	MW-4A	TPVC	1.79	268.34	4.31	264.03	GEI	7.78	260.56	--	--	--	--	3.47	--
313	MW-5A	TPVC	2.17	269.71	7.78	261.93	GEI	11.65	258.06	--	--	--	--	3.87	--
314	MW-7A	TPVC	2.1	264.4	2.64	261.76	GEI	6.02	258.38	--	--	--	--	3.38	--
315	MW-8A	TPVC	1.93	263.91	4.22	259.69	GEI	6.35	257.56	--	--	--	--	2.13	--
316	MW-10A	TPVC	2.32	263.77	3.6	260.17	GEI	6.21	257.57	--	--	--	--	2.61	--
317	MW-10B	TPVC	2.45	263.55	3.46	260.09	GEI	6.0	257.55	--	--	--	--	2.54	--
318	MW-11A	TPVC	2.05	262.78	4.94	257.84	GEI	6.8	255.98	--	--	--	--	1.86	--
319	MW-11B	TPVC	1.92	262.88	5.19	257.69	GEI	7.0	255.88	--	--	--	--	1.81	--
320	MW-12B	TPVC	1.48	265.61	11.05	254.56	GEOI	12.0	253.61	--	--	--	--	0.95	--
321	MW-16B	TPVC	--	269.87	8.4	261.47	NHDES	11.3	258.57	--	--	--	--	2.9	--
322	MW-17B	TPVC	2.46	267.06	6.78	260.28	GEI	9.3	257.76	--	--	--	--	2.52	--
323	MW-17C	TPVC	2.55	267.28	7.12	260.16	GEI	9.59	257.69	--	--	--	--	2.47	--
324	MW-18B	TPVC	2.29	270.3	9.09	261.21	GEI	12.31	257.99	--	--	--	--	3.22	--
326	MW-19A	TPVC	3.22	263.68	6.5	257.18	GEI	7.78	255.9	--	--	--	--	1.28	--
327	MW-19B	TPVC	2.98	263.44	6.25	257.19	GEI	7.57	255.87	--	--	--	--	1.32	--
328	MW-20B	TPVC	2.21	263.03	7.18	255.85	GEI	8.3	254.73	--	--	--	--	1.1	--
329	MW-21B	--	--	261.77	--	--	--	10.11	251.66	--	--	--	--	--	--
330	MW-21C	--	--	261.34	--	--	--	9.62	251.72	--	--	--	--	--	--
331	MW-23B	--	--	267.4	--	--	--	10.58	256.82	--	--	--	--	--	--
332	MW-23C	--	--	267.34	--	--	--	10.78	256.56	--	--	--	--	--	--
333	MW-24B	--	--	259.39	--	--	--	8.77	250.62	--	--	--	--	--	--
334	MW-31	TSC	--	251.87	2.22	249.65	--	--	--	--	--	--	--	--	--
335	P-1	TPVC	--	279.26	8.68	270.58	NHDES	11.15	268.11	--	--	--	--	2.47	--
336	P-2	TPVC	--	271.32	7.51	263.81	NHDES	9.9	261.42	--	--	--	--	2.39	--
337	P-4	--	--	257.38	--	--	--	3.22	254.16	--	--	--	--	--	--
338	P-14	--	--	248.69	--	--	--	6.75	241.94	--	--	--	--	--	--
339	SP-9	--	--	261.16	--	--	--	7.32	253.84	--	--	--	--	--	
340	SP-10	TPVC	--	263.92	4.43	259.49	--	--	--	--	--	--	--	--	--
341	MW-14B	TPVC	1.76	255.13	4.23	250.9	GEOI	6.35	248.78	--	--	--	--	2.12	--

Appendix 5. Ground-water levels from synoptic measurements of wells, Milford, New Hampshire--Continued

[TSC = Top of Steel Casing; TPVC = Top of PVC; NotchSC = Notch in Steel Casing; AHPUMP = Access Hole for Pump; TCplPVC = Top of Coupling in PVC; DTW = Depth to water; MP = Measuring point; LS = Land surface; -- = no data; Data, GEI = GEI; Source, GEOI = GEO Insight; NHDES = New Hampshire Deptartment of Environmental Services; USGS = U.S. Geological Survey]

					1994			1990		1988					
Well number (Plate 1)	Well name	Tape MP	CASING STICKUP (feet)	MP Eleva-tion (feet)	DTW from MP (feet)	Water level altitude (feet)	Data source	DTW from MP (feet)	Water altitude (feet)	DTW from LS (feet)	DTW from MP (feet)	Water level altitude (feet)	1988/90 Delta DTW MP (feet)	1990/94 Delta DTW MP (feet)	1988/94 Delta H (feet)
342	MW-15B	--	--	258.61	--	--	--	15.35	243.26	--	--	--	--	--	--
344	MW-16C	TPVC	--	269.74	8.24	261.5	NHDES	11.07	258.67	--	--	--	--	2.83	--
345	MW-16R	TSC	--	--	7.73	--	NHDES	--	--	--	--	--	--	--	--
347	MW-4R	TSC	--	267.94	4.29	263.65	GEI	--	--	--	--	--	--	--	--
348	MW-6A	TPVC	2.09	269.11	7.12	261.99	GEI	10.3	258.81		--	--	--	3.18	--
349	MW-14A	TPVC	1.34	254.65	3.9	250.75	GEO	--	--	--	--	--	--	--	--
350	MW-13A	TPVC	1.14	--	3.32	-3.32	GEI	--	--	--	--	--	--	--	--
351	MW-9A	TPVC	1.76	267.76	8.35	259.41	GEI	--	--	--	--	--	--	--	--
352	MW-9B	TPVC	1.63	267.87	8.54	259.33	GEI	--	--	--	--	--	--	--	--
353	FH-17	--	--	272.44	--	--	--	--	--	--	--	--	--	--	--
354	PFHprodW	--	--	251.68	--	--	--	--	--	--	--	--	--	--	--
356	--	--	--	250.05	--	--	--	--	--	--	--	--	--	--	--
357	--	--	--	249.97	--	--	--	--	--	--	--	--	--	--	--
358	--	TSC	--	250.03	5.85	244.18	--	--	--	--	--	--	--	--	--
359	FH-29	TSC	--	249.86	5.21	244.65	--	--	--	--	--	--	--	--	--
360	--	TSC	--	251.03	10.42	240.61	--	--	--	--	--	--	--	--	--
361	P-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--
362	USGS-DIS	--	--	250.02		250.02	--	--	--	--	--	--	--	--	--
364	--	--	--	264.93	--	264.93	--	--	--	--	--	--	--	--	--
365	MW-15R	TPVC	--	--	13.46	-13.46	--	--	--	--	--	--	--	--	--
366	MW-30	TSC	--	--	6.98	-6.98	--	--	--	--	--	--	--	--	--
369	FHwoods	TSC	--	266.46	11.65	254.81	--	--	--	--	--	--	--	--	--
374	FH-26	TPVC	--	--	1.91	-1.91	--	--	--	--	--	--	--	--	--
393	WLR-5	--	--	--	7.78	-7.78	--	--	--	--	--	--	--	--	--
394	HP-4	--	--	250.1	--	250.1	--	--	--	--	--	--	--	--	--

— PAGE 95 FOLLOWS —

APPENDIX 6

Appendix 6. Surface-water and ground-water hydraulic gradients determined from wells in the glacial-drift aquifer and staff gages on the Souhegan River, Milford, New Hampshire

[mm/dd/yr, month day year; P-1 (335), well name and (number); WLR-1 (SG), staff gage at or near well location; units in feet/feet, difference in head divided by horizontal distance; negative values indicate river stage is greater than ground-water level; BDRK, bedrock; --, no data; monitoring well locations shown on figure 7]

Date	Hydraulic gradients between monitoring wells and staff gages (feet/feet)								
	P-1(335)		P-2(336)	MI-63(203)	MW-22A(293)	MW-15A(223)	FH-27(89)	SPZ-2(285)	MW-2A(310)
mm/dd/yy	WLR-1(SG)	P-1(SG)	P-2(SG)	MW-23(SG)	BEDRK(SG)	BEDRK(SG)	FH-27(SG)	WLR-5(SG)	MW-2A(SG)
	Horizontal distance between well and staff gage (feet)								
	253.35	37.50	67.53	851.09	757.88	491.63	43.34	168.74	307.65
4/13/94	-0.00237	--	-0.00049	--	--	--	--	--	--
9/21/94	-.00529	-0.02898	-.01644	--	0.00322	--	0.04199	0.00404	--
9/29/94	--	-.01992	-.01362	--	--	--	--	--	--
10/07/94	-.00278	-.01192	-.00933	--	--	--	--	--	-0.00582
10/11/94	--	-.02418	-.01584	--	--	--	--	--	--
10/24/94	-.00513	-.02445	-.01451	0.00099	.00097	--	.01532	.00321	-.00804
11/08/94	-.00643	-.02352	-.01762	.00073	.00115	--	.01832	.00440	-.01050
11/21/94	-.00785	-.03938	-.02051	-.00016	-.00021	--	.00240	-.00114	-.00962
12/05/94	-.00721	-.03394	-.02004	.00156	.00056	--	.01693	.00481	-.00624
12/19/94	-.00459	-.01538	-.02251	.00247	.00114	--	.00263	.00641	-.00489
1/18/95	-.00663	-.01453	--	.00308	.00119	--	.00771	.00742	-.00338
2/27/95	-.00357	-.00920	-.01118	.00264	.00014	--	.01855	.00629	-.00587
3/27/95	-.00321	-.00485	-.00526	.00327	.00119	--	.01463	.00884	-.00388
4/24/95	-.00314	-.00699	-.02007	.00273	.00114	-0.00048	.01209	.00630	-.00470
5/22/95	-.00347	-.00952	-.02029	.00260	.00103	-.00078	.01347	.00540	-.00528
6/28/95	-.00312	-.01267	-.01348	.00116	.00128	-.00013	.01393	.00508	-.00761
8/03/95	-.00418	-.01965	-.01570	.00031	.00123	-.00033	.01209	.00292	-.00832
9/14/95	--	--	--	-.00053	.00132	-.00018	--	--	-.00962
9/27/95	--	--	-.02177	-.00067	.00135	-.00009	.01624	.00374	-.01040