Hydrogeologic, Water-Quality, and Biogeochemical Data Collected at a Septage-Treatment Facility, Orleans, Cape Cod, Massachusetts, October 1988 Through December 1992

U.S. Geological Survey
Open-File Report 95-439

Prepared in cooperation with the
MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION,
OFFICE OF WATERSHED MANAGEMENT

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CONVERSION FACTORS, WATER-QUALITY AND BIOGEOCHEMICAL INFORMATION, AND VERTICAL DATUM

Conversion Factors

Multiply	By	To obtain
foot (ft)	0.3048	meter
inch (in.)	2.54	centimeter
mile (mi)	1.609	kilometer

Temperature is given in degree Celsius (°C), which can be converted to degree Fahrenheit (°F) by the following equation:

$$°F = 1.8\ (°C) + 32.$$

Water-Quality and Biogeochemical Information

Chemical concentrations are given in milligrams per liter (mg/L) or micrograms per liter (μg/L). Milligrams and micrograms per liter are units expressing the weight of the solute per unit volume (liter of water). One thousand micrograms per liter is equivalent to 1 milligram per liter. Milligrams per liter is approximately equivalent to parts per million. Micrograms per liter is approximately equivalent to parts per billion.

Concentrations of total ammonium are given in micrograms per cubic centimeter ($\mu g/cm^3$), which express the weight of ammonium (as nitrogen) per unit volume (cubic centimeter) of aquifer. Solid-phase carbon and nitrogen concentrations are given as weight percent (%wt/wt), which express the weight of carbon or nitrogen per unit weight of sediment multiplied by 100.

Vertical Datum

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

Hydrogeologic, Water-Quality, and Biogeochemical Data Collected at a Septage-Treatment Facility, Orleans, Cape Cod, Massachusetts, October 1988 Through December 1992

By Leslie A. DeSimone *and* Brian L. Howes

Abstract

Hydrogeologic, water-quality, and biogeochemical data were collected at the site of a septage-treatment facility in Orleans, Massachusetts, from October 1988 through December 1992, where a nitrogen-rich effluent is discharged to the underlying glacial aquifer. The data were collected as part of a study done by the U.S. Geological Survey, in cooperation with the Massachusetts Department of Environmental Protection, Office of Watershed Management, to investigate the effect of effluent discharge on ground-water quality and the transport of effluent nitrogen through the aquifer. Hydrogeologic data include lithologic logs and ground-water levels. Water-quality data include chemical analyses of the treated septage effluent, of ground water at the water table beneath the infiltration beds, and of ground water throughout the aquifer. Dissolved concentrations of dinitrogen gas, nitrous oxide, and dissolved inorganic carbon also were measured. Biogeochemical data include concentrations of total ammonium and solid-phase carbon and nitrogen in aquifer sediments and sediments from the effluent-infiltration beds.

INTRODUCTION

A nitrogen-rich wastewater effluent has been discharged to the glacial aquifer underlying the site of a septage-treatment facility in Orleans, Cape Cod, Massachusetts, since February 1990 (fig. 1). Nitrogen in ground water is a potential health and environmental hazard, because nitrogen is toxic as nitrate and can contribute to eutrophication of surface waters that receive ground-water discharge. Namskaket Marsh, a Massachusetts Area of Critical Environmental Concern (fig. 1), and the tidal creek draining the marsh, an Outstanding Resource Water, are adjacent to the facility and are the probable discharge areas for the effluent-contaminated ground water. Because of the potential effects of the effluent discharge on ground-water quality and on receiving waters, the U.S. Geological Survey (USGS) and the Massachusetts Department of Environmental Protection, Office of Watershed Management, undertook cooperative investigations to study the movement of the effluent through the ground-water-flow system. Beginning in October 1988, the ground-water-flow system and background water quality were investigated through the installation of observation wells and collection of hydrogeologic and water-quality data. From February 1990 through December 1992, the plume of effluent-contaminated ground water was monitored and nitrogen transport through the aquifer was studied (DeSimone and others, 1995). In addition to hydrogeologic and water-quality data, biogeochemical data were collected to study the two natural processes that were most likely to decrease nitrogen concentrations in ground water. These processes were ammonium sorption and denitrification (the microbial transformation of nitrate-nitrogen to dinitrogen gas).

This report presents hydrogeologic, water-quality, and biogeochemical data that were collected at the septage-treatment facility from October 1988 through December 1992. Hydrogeologic data include lithologic logs and ground-water levels. Water-quality data include chemical analyses of the treated septage effluent, of ground water at the water table beneath the infiltration beds, and of ground water throughout the

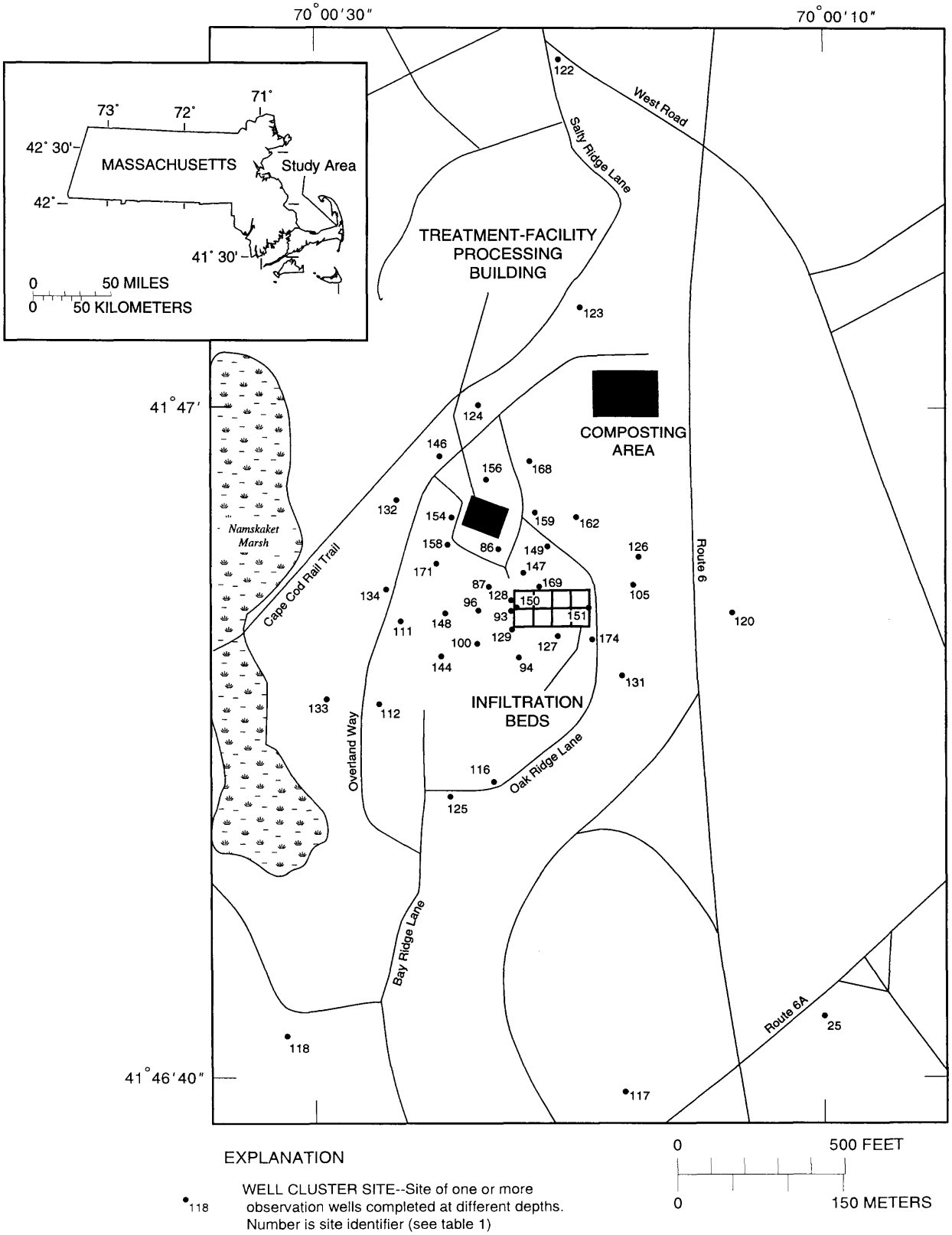

Figure 1. Location of the study area and observation-well network, Orleans, Massachusetts.

aquifer. Water-quality data also include concentrations of dinitrogen gas, nitrous oxide, and dissolved inorganic carbon, which are end products or intermediaries of the denitrification process. Biogeochemical data include concentrations of total ammonium and solid-phase carbon and nitrogen in aquifer sediments and sediments from the effluent-infiltration beds. Additional data collected as part of this investigation and analyses are available in DeSimone and others (1995).

ACKNOWLEDGMENTS

The assistance and cooperation of the Orleans, Brewster, and Eastham Groundwater Protection District and the Town of Orleans are greatly appreciated. The author especially thanks: Wayne McDonald, District Administrator, and Jay Burgess, Chief Operator, Orleans, Brewster, and Eastham Groundwater Protection District, and Nancy Schwinn, Administrative Assistant, Town of Orleans. The technical laboratory assistance of Dale Goehringer, David White, Susan Brown-Ledger, David Schlezinger, and Newton Millham, Woods Hole Oceanographic Institution, also is greatly appreciated.

METHODS

The data-collection network included 93 observation wells, located in 42 well-cluster sites on and near the treatment-facility site (fig. 1). In this report, wells are referred to using the prefix "OSW," whereas cluster sites are referred to by the number, only, of the deepest well in the cluster. Eighty-three of the observation wells (at 33 cluster sites) were installed by the USGS during the study (table 1). These wells were installed using hollow-stem auger drilling and consisted of 2-inch inner-diameter polyvinylchloride pipe, with 1-, 5-, or 10-foot-long polyvinylchloride screens (slot size 0.010 in.). Nine additional wells installed by private engineering firms and an observation well installed by the USGS prior to this study (OSW 25) also were used to collect hydrogeologic data (table 1).

Aquifer sediment samples for lithologic determination were collected during well installation using a split-spoon sampler or wireline-piston corer (Zapico and others, 1987). Effluent samples for water-quality analyses were collected either from the treatment facility's 8-hour composite sampler or directly from the distribution system during discharge. Ground-water samples for water-quality analyses were collected from wells using a stainless steel submersible pump or a Teflon[1] bailer after removal of at least three well volumes. Aquifer and effluent-infiltration-bed samples for biogeochemical analyses were collected in aluminum or polycarbonate, 2-inch-diameter cores with the wireline piston corer (aquifer samples), manually (infiltration-bed surficial samples), or with a split-spoon sampler and portable driving apparatus (infiltration-bed subsurface samples).

Water samples were analyzed for pH and specific conductance using digital meters with temperature-compensated probes. Dissolved oxygen was measured using a pressure- and temperature-compensated probe at or near the well screens and below the submersible pump. Dissolved-oxygen concentrations less than 1 mg/L were measured colorimetrically using sealed ampules (Chemetrics) on water collected from the discharge line of the pump. Water samples for analysis of dissolved dinitrogen and nitrous oxide were collected with a syringe; 15-mL (milliliter) samples were injected into 25-mL serum bottles, which contained 0.1 mL 8-normal sodium hydroxide (a preservative) and were flushed with helium just prior to sampling. Samples for analysis of dissolved inorganic carbon (DIC) also were collected with a syringe; 5-mL samples were injected into sealed 15-mL serum bottles, which contained air headspace and were later injected with 0.5 mL 2-normal sulfuric acid. Triplicate samples were collected for all three analyses.

Chemical analyses for all constituents except dinitrogen, nitrous oxide, and DIC were done by the U.S. Geological Survey National Water-Quality Laboratory, Arvada, Colorado, using standard methods (Wershaw and others, 1987; Fishman and Friedman, 1989). Total ammonium concentrations, concentrations of solid-phase carbon and nitrogen, and dissolved concentrations of dinitrogen, nitrous oxide, and DIC were determined at the Biology Department of the Woods Hole Oceanographic Institution, Woods Hole,

[1]Use of brand names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

Massachusetts. Total ammonium concentrations in aquifer and infiltration-bed sediments were measured by potassium-chloride extraction, which measures sorbed and dissolved ammonium. Methods of sample collection and analysis for total ammonium, solid-phase carbon and nitrogen, and dissolved dinitrogen, nitrous oxide, and DIC are described in detail by DeSimone and others (1995).

For quality-assurance purposes, results of chemical analyses done by the National Water-Quality Laboratory were reviewed on receipt. Verification or duplicate analyses were requested if reported values were unexpectedly high or low. Quality-assurance procedures for other analyses consisted of duplicate or triplicate analyses for most measurements and blanks or controls. Dinitrogen, nitrous oxide, and DIC concentrations were determined as averages of duplicate or triplicate analyses and standard deviations of replicates are reported. Blanks for nitrous oxide analyses consisted of double-distilled water and consistently contained no detectable nitrous oxide. Blanks for DIC analyses consisted of acid-only samples, and the blank concentrations (generally less than 10 percent of the total DIC measurement) were subtracted from the total DIC measurement. Total ammonium concentrations in aquifer and infiltration-bed sediments were measured in duplicate. Blanks for total ammonium analyses consisted of potassium-chloride-only replicates, and blank concentrations (generally near zero) were subtracted from the total ammonium measurement.

HYDROGEOLOGIC, WATER-QUALITY, AND BIOGEOCHEMICAL DATA

Lithologic data at depths from 0 to 145 ft below land surface were collected from the 33 cluster sites installed by the USGS during the study. The locations of all cluster sites and observation wells and screened intervals of the wells are given in table 1; lithologic data for the 33 cluster sites installed by the USGS and for site OSW 25 are given in table 2. Water levels measured at 57 to 91 wells at five times during the study are given in table 3. The five measurement dates coincide approximately with the dates of synoptic water-quality sampling rounds (see below). Additional water-level data and geophysical data are available at the Marlborough, Massachusetts, office of USGS. Water levels were measured at about 1-month intervals from August 1989 to December 1992 at all wells in the network.

Samples of effluent for chemical analyses were collected every 2 weeks to monthly from March 1990 to December 1992. In addition, effluent samples were collected daily for several days in March 1991. Samples of ground water at the water table beneath the infiltration beds were collected concurrently with effluent. These ground-water samples were collected from well OSW 136 (at cluster site 150), which is screened across the water table at 10.3 to 20.3 ft above sea level, or 36.9 to 46.9 ft below land surface (table 1; site location shown in figure 1). Samples of effluent and ground water at the water table beneath the infiltration beds were analyzed for 26 and 24 constituents and properties, respectively, including specific conductance, pH, major ions, nutrients, boron, and organic carbon (tables 4 and 5).

Ground-water-quality sampling also included predischarge sampling, five synoptic samplings of the septage-effluent plume, and monthly sampling at several well-cluster sites (table 6). In March and September 1989, 16 and 29 wells, respectively, were sampled for specific conductance, pH, major ions, selected trace elements, nutrients, and dissolved organic carbon (DOC); dissolved-oxygen concentrations also were measured in February 1990. Synoptic sampling of 33 to 69 wells in and near the effluent plume was done in March, June, and September 1991, and June and December 1992. Ground water collected during synoptic sampling rounds was analyzed for field parameters, major ions, selected trace elements, nutrients, DOC, dinitrogen, nitrous oxide, and DIC. Finally, 7 to 10 wells at 6 sites were sampled monthly from June 1990 through December 1992 for field parameters, chloride, nutrients, and DOC.

Total ammonium was measured in two infiltration beds in March and April 1992, at two sites outside the plume boundaries (sites 168 and 171) in May and June 1992, and at six sites in the septage-effluent plume (sites 93, 96, 147, 149, 156, and 174) from April to September 1992. Many samples collected for measurement of total ammonium also were used to determine concentrations of solid-phase carbon and nitrogen. Sampling locations and concentrations of total ammonium and solid-phase carbon and nitrogen are given in table 7.

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Zapico, M.M., Vales, S., and Cherry, J.A., 1987, A wireline piston core barrel for sampling cohesionless sand and gravel below the water table: Ground Water Monitoring Review, v. 7, p. 74-82.

(p. 7 follows

TABLES 1-7

Table 1. Location of cluster sites and observation wells and screened intervals of wells, Orleans, Massachusetts

[USGS well identifier: All wells installed by the USGS in the sequence indicated by the USGS well identifier, October 1988 to September 1992, unless otherwise noted. Altitude of land surface and screened interval are in feet above (+) or below (-) sea level. Screened interval: Wells consist of 2-inch inner diameter polyvinylchloride pipe, unless otherwise noted; slot size of well screens equal to 0.010 inch. Other data: AM, total ammonium concentrations (table 7); L, lithologic logs (table 2); QW, water-quality data (tables 5 and 6); SC, solid-phase carbon concentrations (table 7); WL, water levels (table 3)]

Cluster site	USGS well identifier	Latitude ° ′ ″	Longitude ° ′ ″	Altitude of land surface	Screened interval		Other data
					Top	Bottom	
25	OSW 25	41 46 42	70 00 10	76.1	0.0	- 1.5	L,WL
86	OSW 137	41 46 56	70 00 23	59.8	+9.7	- .3	L,QW,WL
	OSW 84				-16.0	-17.0	
	OSW 85				-37.6	-38.6	
	OSW 86				-68.2	-69.2	
87	OSW 88	41 46 55	70 00 24	53.4	- .7	- 1.7	L,QW,WL
	OSW 89				-42.5	-43.5	
	OSW 163				-31.1	-36.1	
	OSW 87				-81.6	-82.6	
93	OSW 135	41 46 54	70 00 23	56.5	+18.6	+ 8.6	AM,L,QW,SC,WL
	OSW 178				+ 3.6	- 1.4	
	OSW 90				- 3.1	- 4.1	
	OSW 91				-28.2	-29.2	
	OSW 92				-48.5	-49.5	
	OSW 93				-84.5	-85.5	
94	OSW 108	41 46 53	70 00 23	55.3	+ 6.1	+ 1.1	L,QW,WL
	OSW 95				-25.0	-26.0	
	OSW 166				-47.4	-52.4	
	OSW 94				-73.6	-74.6	
96	OSW 115	41 46 54	70 00 24	46.9	+11.7	+ 6.7	AM,L,QW,SC,WL
	OSW 99				-11.8	-12.8	
	OSW 114				-26.5	-27.5	
	OSW 98				-47.8	-48.8	
	OSW 96				-91.1	-92.1	
100	OSW 102	41 46 53	70 00 24	41.0	-33.1	-34.1	L,QW,WL
	OSW 100				-89.1	-90.1	
105	OSW 103	41 46 55	70 00 18	65.5	+ 3.0	- 2.0	L,QW,WL
	OSW 104				-23.9	-28.9	
	OSW 105				-46.5	-51.5	
111	OSW 110	41 46 54	70 00 27	22.4	+ 1.7	- 3.3	L,QW,WL
	OSW 109				-32.5	-37.5	
	OSW 111				-69.6	-74.6	
112	OSW 112	41 46 51	70 00 28	22.1	+ .6	- 4.4	L,QW,WL

Table 1. Location of cluster sites and observation wells and screened intervals of wells, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Latitude ° ′ ″	Longitude ° ′ ″	Altitude of land surface	Screened interval		Other data
					Top	Bottom	
116	OSW 116	41 46 49	70 00 24	57.0	+10.3	+ 5.3	L,WL
117	OSW 117	41 46 40	70 00 18	52.1	+ 5.0	.0	L,WL
118	OSW 119	41 46 42	70 00 32	12.4	+ 5.4	+ .4	L,WL
	OSW 118				-69.6	-74.6	
120	OSW 121	41 46 54	70 00 14	76.1	+ 8.5	+ 3.5	L,WL
	OSW 120				-28.9	-33.9	
122	OSW 122	41 47 10	70 00 21	39.6	- 2.3	- 7.3	L,WL
123	OSW 123	41 47 03	70 00 20	40.9	+ 3.9	- 1.1	L,WL
124	OSW 124	41 47 00	70 00 24	44.8	+ 3.2	- 1.8	L,QW,WL
125	OSW 125	41 46 49	70 00 25	46.6	+ 9.8	+ 4.8	L,WL
126	[1]OSW 126	41 46 55	70 00 18	64.6	+17.6	- 2.4	WL
127	[1]OSW 127	41 46 53	70 00 21	58.2	+21.2	+ 1.2	QW,WL
128	[1]OSW 128	41 46 53	70 00 23	57.0	+20.0	.0	WL
129	[1]OSW 129	41 46 54	70 00 23	57.0	+20.0	.0	QW,WL
131	[2]OSW 130	41 46 52	70 00 18	67.0	+17.0	- 3.0	WL
	[2]OSW 131				- 1.0	-21.0	
132	[2]OSW 132	41 46 57	70 00 27	45.8	+10.8	- 9.2	WL
133	[2]OSW 133	41 46 51	70 00 31	10.0	+10.0	-10.0	WL
134	[2]OSW 134	41 46 55	70 00 28	22.4	+13.4	- 6.6	WL
144	OSW 145	41 46 52	70 00 26	39.2	+ 2.1	- 2.9	L,QW,WL
	OSW 144				-27.9	-32.9	
146	OSW 146	41 46 58	70 00 26	48.6	+ 6.4	+ 1.4	L,QW,WL
147	OSW 141	41 46 55	70 00 22	57.7	+17.6	+ 7.6	AM,L,QW,SC,WL
	OSW 142				+ 4.6	- .4	
	OSW 165				- 4.9	- 9.9	
	OSW 152				-12.9	-17.9	
	OSW 147				-23.9	-28.9	
148	OSW 143	41 46 54	70 00 26	38.7	+ 1.5	- 3.5	L,QW,WL
	OSW 148				-68.3	-73.3	
149	OSW 107	41 46 56	70 00 21	59.8	+10.5	+ 5.5	AM,L,QW,SC,WL
	OSW 149				-12.2	-17.2	
150	OSW 136	41 46 54	70 00 23	57.2	+20.3	+10.3	L,QW,WL
	OSW 160				+12.7	+ 7.7	
	OSW 150				+6.7	+1.7	

Table 1. Location of cluster sites and observation wells and screened intervals of wells, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Latitude ° ′ ″	Longitude ° ′ ″	Altitude of land surface	Screened interval		Other data
					Top	Bottom	
151	OSW 153	41 46 54	70 00 20	57.1	+12.6	+ 7.6	L,QW,WL
	OSW 157				-25.6	-30.6	
	OSW 151				-52.0	-57.0	
154	OSW 138	41 46 56	70 00 25	56.4	+10.6	+ .6	L,QW,WL
	OSW 155				-46.1	-51.1	
	OSW 154				-65.6	-70.6	
156	OSW 140	41 46 58	70 00 24	55.3	+ 6.9	-3.1	AM,L,QW,SC,WL
	OSW 167				-12.8	-17.8	
	OSW 161				-23.6	-28.6	
	OSW 156				-45.7	-50.7	
158	OSW 158	41 46 56	70 00 26	56.5	-54.5	-59.5	L,QW,WL
159	OSW 159	41 46 57	70 00 22	56.8	+ 3.5	- 6.5	L,QW,WL
162	OSW 164	41 46 57	70 00 20	73.8	+ .4	- 4.6	L,QW,WL
	OSW 162				-45.2	-50.2	
168	OSW 139	41 46 58	70 00 22	50.9	+18.4	+ 8.4	AM,L,QW,SC,WL
	OSW 172				+ 2.8	- 2.2	
	OSW 168				-46.1	-51.1	
169	OSW 170	41 46 55	70 00 22	57.2	-12.8	-17.8	L,QW,WL
	OSW 169				-31.8	-36.8	
171	OSW 113	41 46 55	70 00 26	47.0	+ 9.4	+ 4.4	AM,L,QW,SC,WL
	OSW 171				-44.6	-49.6	
174	OSW 106	41 46 53	70 00 19	55.9	+10.5	+ 5.5	AM,L,QW,SC,WL
	OSW 173				+ 3.5	- 1.5	
	OSW 179				- 6.1	-11.1	
	OSW 175				-18.7	-23.7	
	OSW 174				-32.0	-37.0	

[1] Well not installed by the U.S. Geological Survey. Well consists of 6-inch inner-diameter polyvinylchloride pipe. Data provided by W. Luksha, Metcalf and Eddy Services, Inc. (written commun., 1989).

[2] Well not installed by the U.S. Geological Survey. Well consists of 2-inch inner-diameter polyvinylchloride pipe. Data provided by W. Luksha, Metcalf and Eddy Services, Inc. (written commun., 1989).

Table 2. Lithologic logs at cluster sites, Orleans, Massachusetts

[Description of the sediment is in terms of grain-size diameter, in millimeters (mm): gravel, greater than 2.0 mm; very coarse sand, 1.0-2.0 mm; coarse sand, 0.5-1.0 mm; medium sand, 0.25-0.5 mm; fine sand, 0.125-0.25 mm; very fine sand, 0.062-0.125 mm; silt, 0.004-0.062 mm; clay, less than 0.004 mm. Percentage of grain sizes in a sample: trace, 0-10 percent; little, 10-20 percent; some, 20-35 percent; and, 35-50 percent. Depth below land surface: All depths are in feet below land surface]

Description of material	Depth From	Depth To
CLUSTER SITE 25		
Sand, fine to coarse; and gravel	0	17
Sand, medium to coarse	17	32
Sand, fine to medium	32	82
CLUSTER SITE 86		
No samples	0	42
Sand, fine to medium; trace of silt	42	58
Sand, medium	58	80
Sand, fine to medium; variable amount of silt	80	119
Sand, medium	119	130
CLUSTER SITE 87		
No samples	0	58
Sand, medium to fine	58	63
Sand, fine to very fine; trace of silt	63	112
Sand, medium to fine	112	136
CLUSTER SITE 93		
No samples	0	17
Sand, fine to medium to very fine; trace of silt	17	52
Sand, very coarse to coarse; trace of gravel	52	75
Sand, fine to medium to very fine; trace of silt	75	130
Sand, medium	130	145
CLUSTER SITE 94		
No samples	0	50
Sand, very fine to fine; and sand, very fine to very coarse; trace of silt	50	65
Sand, very coarse to medium	65	130
CUSTER SITE 96		
No samples	0	10
Sand, very fine to fine; trace of silt	10	38
Sand, medium to very coarse	38	45
Sand, fine to medium	45	62
Sand, coarse to very coarse	62	95
Sand, fine to medium	95	140
CLUSTER SITE 100		
No samples	0	48
Sand, medium; some sand, coarse, and gravel	48	75
Sand, fine to very fine; some silt	75	125
Sand, medium	125	131
CLUSTER SITE 105		
No samples	0	55
Sand, medium to coarse	55	60
Sand, fine to very fine; little silt	60	75
Sand, coarse to very coarse; some sand, medium to fine	75	118
Sand, very fine; silt; clay	118	119
CLUSTER SITE 111		
No samples	0	17
Sand, fine to very fine; silt	17	55
Sand, medium to coarse	55	85
Sand, very coarse to coarse; with interbedded sand, fine to medium	85	109
CLUSTER SITE 112		
No samples	0	22
Sand, medium to fine	22	26
CLUSTER SITE 116		
No samples	0	17
Sand, medium to coarse; some sand, very coarse	17	79
CLUSTER SITE 117		
No samples	0	7
Sand, coarse to very coarse; some gravel	7	79
CLUSTER SITE 118		
No samples	0	7
Sand, coarse; some sand, medium to very coarse	7	59
Sand, fine to coarse; trace of silt	59	72
Sand, medium to very coarse; trace of silt	72	90
CLUSTER SITE 120		
No samples	0	6
Sand, medium to fine	6	12
Sand, very coarse to coarse	12	19
Sand, medium to coarse to fine	19	48
Sand, very fine to fine; and silt	48	114
CLUSTER SITE 122		
No samples	0	15
Sand, medium to coarse	15	48
Sand, very fine to fine; little silt	48	49

Table 2. Lithologic logs of observation wells at cluster sites, Orleans, Massachusetts—*Continued*

Description of material	Depth From	Depth To
CLUSTER SITE 123		
No samples	0	7
Sand, medium to very fine; some silt	7	52
Sand, coarse to very coarse; some sand, medium	52	88
Sand, medium to very fine; little silt	88	89
CLUSTER SITE 124		
No samples	0	20
Sand, medium to fine	20	45
Sand, fine to very fine; some silt	45	49
CLUSTER SITE 125		
No samples	0	10
Sand, medium to fine; little sand, very fine, with a variable amount of silt	10	50
CLUSTER SITE 144		
No samples	0	32
Sand, fine to medium; trace of silt	32	38
Sand, coarse to fine; trace of silt	38	72
CLUSTER SITE 146		
No samples	0	53
Sand, fine to medium; trace of silt	53	58
Sand, medium to coarse to very coarse	58	71
Sand, fine to very fine to medium	71	75
CLUSTER SITE 147		
No samples	0	10
Sand, medium	10	40
Sand, fine to medium; variable amount of silt	40	62
Sand, coarse to very coarse	62	95
Sand, very fine to fine; variable amount of silt	95	99
CLUSTER SITE 148		
No samples	0	20
Sand, fine to medium; variable amount of silt	20	78
Sand, medium to fine to coarse; with interbedded sand, fine to medium, with a variable amount of silt near bottom	78	123
Sand, fine; little silt	123	124
CLUSTER SITE 149		
No samples	0	40
Sand, fine to very fine to medium; trace of silt	40	52
Sand, medium to coarse to very coarse; with interbedded sand, fine, near bottom	52	80
Sand, medium to fine; and sand, very fine to fine, with variable amount of silt and clay	80	94
CLUSTER SITE 150		
No samples	0	10
Sand, fine to medium	10	25
Sand, fine to medium; with interbedded sand, fine to very coarse	25	55
Sand, very coarse to coarse	55	60
Sand, fine to medium; variable amount of silt	60	90
CLUSTER SITE 151		
No samples	0	7
Sand, medium to coarse; with interbedded sand, fine, and thin layers of sand, very fine, and silt	7	45
Sand, medium to very coarse; some gravel	45	112
Sand, very fine to fine; little silt	112	114
CLUSTER SITE 154		
No samples	0	7
Sand, medium	7	27
Sand, fine to medium; trace of silt; with sand, very fine to fine, and silt near bottom	27	45
Sand, medium to coarse to very coarse; with interbedded sand, very fine to medium; trace of silt	45	105
Sand, medium to fine	105	129
CLUSTER SITE 156		
No samples	0	10
Sand, medium	10	25
Sand, fine to medium; trace of silt	25	55
Sand, coarse to medium	55	85
Sand, fine; trace of silt; with interbedded sand, fine to medium; some thin clayey silt layers	85	119

Table 2. Lithologic logs of observation wells at cluster sites, Orleans, Massachusetts—*Continued*

Description of material	Depth From	Depth To
CLUSTER SITE 158		
No samples	0	60
Sand, fine to medium; trace of silt	60	90
Sand, fine to very fine	90	115
Sand, medium to very coarse	115	118
Sand, fine to very fine; little silt	118	119
CLUSTER SITE 159		
No samples	0	47
Sand, fine to coarse; trace of silt	47	55
Sand, medium to very fine	55	79
No samples	79	97
Sand, medium	97	108
Sand, fine to very fine	108	109
CLUSTER SITE 162		
No samples	0	57
Sand, coarse to medium	57	75
Sand, medium to fine	75	105
Sand, fine to very fine; and sand, very fine, silt, and clay	105	130
CLUSTER SITE 168		
No samples	0	12
Sand, fine to medium; trace of silt	12	57
Sand, medium to coarse	57	74
Sand, medium to very fine; and clayey silt	74	105
CLUSTER SITE 169		
No samples	0	38
Sand, fine to very fine to medium with trace of silt; with interbedded sand, medium to coarse	38	52
Sand, coarse to very coarse	52	96
Sand, fine to very fine; variable amount of silt; and silty clay	96	113
CLUSTER SITE 171		
No samples	0	40
Sand, very fine; and silt	40	43
Sand, coarse to very coarse to medium	43	83
Sand, fine	83	84
No samples	84	97
CLUSTER SITE 174		
No samples	0	42
Sand, very coarse to coarse; traces of gravel and silt	42	55
Sand, very coarse to coarse; variable amount of gravel	55	93

Table 3. Water levels in observation wells in the study area, Orleans, Massachusetts

[--, well not installed or water level not measured]

Cluster site	USGS well identifier	Water level, in feet above sea level				
		Mar. 27, 1991	July 16, 1991	Sept. 28, 1991	July 2, 1992	Dec. 10, 1992
25	OSW 25	14.27	14.66	14.08	14.64	14.28
86	OSW 137	11.59	11.73	11.25	12.06	11.47
	OSW 84	11.62	11.76	11.72	12.09	11.49
	OSW 85	11.99	12.11	11.63	12.45	11.86
	OSW 86	11.48	11.34	10.88	11.53	11.12
87	OSW 88	12.99	13.79	13.41	14.29	13.63
	OSW 89	12.29	12.77	12.26	13.08	12.62
	OSW 163	--	--	--	13.29	12.73
	OSW 87	11.53	11.35	10.86	11.54	11.16
93	OSW 135	13.98	15.33	15.53	16.81	15.13
	OSW 178	--	--	--	--	--
	OSW 90	12.89	13.69	13.25	14.16	13.50
	OSW 91	12.42	13.66	13.21	14.22	13.48
	OSW 92	11.85	12.77	12.30	13.16	--
	OSW 93	11.38	11.20	10.75	11.52	11.02
94	OSW 108	12.92	13.72	13.26	14.17	13.52
	OSW 95	12.93	13.72	13.26	14.17	13.53
	OSW 166	--	--	--	14.15	13.51
	OSW 94	11.70	11.59	11.11	11.88	11.36
96	OSW 115	11.77	12.01	11.50	12.34	--
	OSW 99	12.51	13.02	12.57	13.46	12.86
	OSW 114	12.91	13.67	13.25	14.13	13.47
	OSW 98	13.00	13.66	13.23	14.22	13.46
	OSW 96	11.52	11.37	10.86	11.55	11.17
100	OSW 102	12.97	13.65	13.23	14.15	13.50
	OSW 100	11.69	11.43	11.05	11.63	11.28
105	OSW 103	12.88	13.73	13.27	14.19	13.52
	OSW 104	12.95	13.76	13.31	14.22	13.56
	OSW 105	12.43	13.15	12.52	13.46	12.94
111	OSW 110	8.99	8.04	7.94	8.73	8.51
	OSW 109	11.48	11.41	11.03	11.74	11.25
	OSW 111	11.53	11.43	11.04	11.68	11.29
112	OSW 112	8.95	8.01	8.17	8.49	8.53
116	OSW 116	12.90	13.40	12.91	13.84	13.16
117	OSW 117	15.31	14.99	14.70	15.27	14.81
118	OSW 119	9.95	9.06	10.77	9.37	9.56
	OSW 118	11.59	11.06	11.09	11.41	11.23
120	OSW 121	13.61	14.36	13.65	14.39	13.94
	OSW 120	13.66	14.07	13.48	14.10	13.83
122	OSW 122	--	11.09	10.58	11.56	10.85
123	OSW 123	12.14	12.34	11.60	12.74	11.91
124	OSW 124	11.65	11.62	10.98	12.14	11.39
125	OSW 125	12.66	--	12.55	13.44	12.78
126	OSW 126	12.96	13.77	13.26	14.22	13.55
127	OSW 127	12.92	13.64	13.20	14.11	13.45
128	OSW 128	14.41	15.62	15.91	17.12	15.25

Table 3. Water levels in observation wells in the study area, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Water level, in feet above sea level				
		Mar. 27, 1991	July 16, 1991	Sept. 28, 1991	July 2, 1992	Dec. 10, 1992
129	OSW 129	12.96	13.67	13.23	14.15	13.49
131	OSW 130	13.40	13.73	13.23	14.07	13.46
	OSW 131	13.21	13.67	13.18	14.01	13.40
132	OSW 132	9.42	9.84	9.76	10.36	10.32
133	OSW 133	8.25	7.59	8.06	7.87	8.01
134	OSW 134	8.44	7.33	7.38	7.93	7.92
144	OSW 145	--	--	11.14	11.96	11.40
	OSW 144	--	--	11.14	11.95	11.42
146	OSW 146	--	11.41	10.83	11.79	11.14
147	OSW 141	13.93	15.03	15.22	16.00	14.83
	OSW 142	13.98	15.05	15.16	16.01	14.83
	OSW 165	--	--	--	14.47	13.83
	OSW 152	--	--	13.40	14.29	13.63
	OSW 147	--	--	13.39	14.29	13.63
148	OSW 143	--	11.63	11.11	11.96	11.39
	OSW 148	--	11.25	10.99	11.58	11.23
149	OSW 107	12.27	12.84	12.16	13.10	12.51
	OSW 149	--	12.67	12.10	12.93	12.31
150	OSW 136	13.83	14.87	14.97	15.98	14.79
	OSW 160	--	--	--	15.91	14.78
	OSW 150	--	13.63	13.05	14.09	13.46
151	OSW 153	--	--	12.95	13.87	13.21
	OSW 157	--	--	13.29	14.21	13.56
	OSW 151	--	11.41	10.98	11.73	11.21
154	OSW 138	--	11.58	11.06	11.89	11.33
	OSW 155	--	--	11.05	11.86	11.34
	OSW 154	--	--	10.83	11.43	11.10
156	OSW 140	11.52	11.58	11.06	11.90	11.35
	OSW 167	--	--	--	11.88	11.33
	OSW 161	--	--	--	11.86	11.31
	OSW 156	--	--	10.83	11.43	11.13
158	OSW 158	--	--	--	11.47	11.11
159	OSW 159	--	--	12.13	12.93	12.29
162	OSW 164	--	--	--	12.88	12.29
	OSW 162	--	--	--	11.63	11.23
168	OSW 139	12.01	12.42	11.81	12.66	12.03
	OSW 172	--	--	--	12.75	12.15
	OSW 168	--	--	--	12.27	11.75
169	OSW 170	--	--	--	14.28	13.62
	OSW 169	--	--	--	14.03	13.40
171	OSW 113	11.55	11.60	11.11	11.92	11.38
	OSW 171	--	--	--	11.82	11.35
174	OSW 106	12.89	13.68	13.24	14.15	13.48
	OSW 173	--	--	--	14.07	13.43
	OSW 179	--	--	--	--	--
	OSW 175	--	--	--	14.20	13.58
	OSW 174	--	--	--	13.58	13.00

Table 4. Chemical analyses of effluent, Orleans, Massachusetts

[Concentrations are given in milligrams per liter unless otherwise noted. µg/L, microgram per liter; µS/cm, microsiemen per centimeter; °C, degree Celsius; <, actual value is less than value shown; --, not analyzed]

Date	Time	Specific conductance, field (µS/cm at 25°C)		pH (standard units)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)	Sulfate, dissolved
		Lab	Field	Lab	Field						
3-08-90	1400	4,450	--	5.7	--	770	1.1	60	2.5	4	11
4-19-90	1300	3,940	4,000	7.2	7.1	610	.3	67	13	91	17
5-17-90	1100	3,330	3,290	7.4	7.4	460	.9	72	28	140	15
6-25-90	1500	2,570	2,500	7.3	7.1	320	5.1	95	24	200	8.0
7-30-90	0830	4,100	4,050	7.3	7.2	680	9.0	90	26	120	30
8-20-90	1400	2,950	2,970	7.1	6.8	430	40	84	26	41	18
10-05-90	1100	4,410	4,620	7.3	7.2	620	.2	93	27	110	18
11-02-90	1600	4,270	--	7.0	6.7	670	1.9	67	29	49	12
12-06-90	1100	4,560	4,700	7.3	7.3	650	.2	71	30	120	33
1-04-91	1030	4,500	4,400	7.3	7.1	620	.9	81	31	230	13
2-20-91	1430	3,240	3,410	7.5	7.4	430	3.2	73	28	120	11
3-05-91	1000	3,780	3,940	7.2	7.3	540	1.3	95	34	72	19
3-18-91	1000	3,730	3,800	7.3	7.3	610	.4	92	32	100	7.6
3-19-91	0930	3,520	3,660	7.3	7.2	550	.6	96	33	160	7.0
3-25-91	1640	3,520	--	7.2	--	480	.8	110	33	180	18
3-25-91	1740	3,530	--	7.2	--	450	.8	110	30	180	2.5
3-26-91	0830	3,510	--	7.2	--	450	.8	110	30	180	20
3-26-91	1215	3,780	--	7.2	--	520	.6	110	33	190	17
3-26-91	1315	3,800	--	7.3	--	510	.6	110	32	190	18
3-27-91	0800	3,970	--	7.4	--	560	.6	110	31	190	15
3-27-91	1220	4,210	--	7.4	--	590	.5	110	33	200	17
3-27-91	1410	4,230	--	7.4	--	620	.5	110	34	190	14
3-28-91	0800	4,220	--	7.5	--	570	.5	100	31	190	18
3-29-91	0800	4,410	--	7.5	--	640	.4	110	33	160	15
3-29-91	1200	--	--	--	--	--	--	--	--	--	--
4-18-91	1545	3,270	--	7.5	7.3	440	1.7	100	31	150	22
5-29-91	1845	--	--	--	--	--	--	--	--	--	2.3
5-31-91	0830	2,230	--	7.2	7.5	280	.5	110	28	75	13
6-13-91	0915	2,480	--	7.5	7.5	290	.6	98	28	110	1.3
6-28-91	0815	2,530	--	7.5	--	250	.3	100	28	130	9.0
7-12-91	0900	2,540	--	7.3	7.4	240	.2	110	28	120	14
7-31-91	0900	3,030	3,190	7.0	7.3	400	1.4	94	26	110	18
8-15-91	0930	3,310	3,360	7.1	7.3	390	.1	130	32	150	20
9-11-91	0900	2,880	--	6.9	--	300	.3	110	32	110	15
10-04-91	1500	2,740	2,730	6.8	6.9	380	1.8	110	32	180	32
10-18-91	0930	2,430	2,780	7.3	7.5	340	1.4	100	31	120	28
11-08-91	0900	3,710	3,780	7.2	7.4	460	.8	200	35	100	65
11-22-91	0915	4,230	4,290	6.9	7.2	540	<.1	210	32	24	20
12-11-91	1200	3,390	--	6.5	--	440	1.1	170	30	21	28
1-08-92	1215	3,690	--	6.8	7.2	540	.8	110	29	70	17
1-27-92	0945	3,390	3,420	6.4	6.9	430	.2	120	27	73	25
2-13-92	1430	4,310	4,020	7.1	7.3	630	1.4	120	30	190	48
3-03-92	1600	3,980	4,150	7.5	7.7	530	.4	110	31	140	40
3-26-92	0900	4,150	4,250	7.5	7.9	440	.5	200	25	170	28
4-06-92	1115	3,270	--	7.7	7.8	380	.3	120	29	49	19

Table 4. Chemical analyses of effluent, Orleans, Massachusetts—*Continued*

Date	Time	Specific conductance, field (µS/cm at 25°C)		pH (standard units)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)	Sulfate, dissolved
		Lab	Field	Lab	Field						
4-13-92	0930	3,160	--	7.5	--	380	<0.1	97	6.7	160	39
4-22-92	1000	3,580	--	7.0	--	510	.8	82	23	120	31
5-13-92	1100	4,040	4,130	7.2	7.5	500	.7	110	32	100	33
5-29-92	1030	3,550	--	7.0	6.8	430	1.9	140	32	47	29
6-19-92	0900	3,580	--	6.9	7.0	450	1.3	110	33	62	24
7-02-92	1000	3,270	--	7.0	--	450	<.1	120	29	98	24
7-15-92	1630	2,850	2,860	6.7	--	370	.4	100	33	56	38
[1]7-30-92	1430	2,940	--	6.0	--	350	.4	91	42	47	40
7-30-92	1530	3,300	--	7.7	--	420	.3	110	41	130	37
8-05-92	1200	2,900	--	7.1	7.1	360	.2	88	34	85	18
8-19-92	0900	2,720	--	7.2	--	330	.3	93	32	100	10
9-02-92	1300	2,970	--	6.9	7.3	340	1.2	94	34	94	59
10-29-92	0900	3,370	--	7.3	7.8	470	.1	87	27	300	15
12-29-92	1300	2,980	--	7.0	7.2	360	1.1	130	27	20	6.5

Date	Time	Chloride, dissolved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, total (as N)	Nitrogen, ammonia plus organic, dissolved (as N)
3-08-90	1400	1,500	1.1	3.8	--	<0.10	16	--	18
4-19-90	1300	1,200	<.1	1.2	--	16	29	--	31
5-17-90	1100	950	.1	1.6	--	2.8	42	--	47
6-25-90	1500	770	<.1	3.1	--	9.4	37	--	40
7-30-90	0830	1,200	.9	1.1	--	10	12	--	14
8-20-90	1400	850	.9	1.7	--	4.9	.11	--	2.2
10-05-90	1100	1,200	<.1	.9	0.08	7.2	1.2	--	32
11-02-90	1600	1,300	.6	1.7	.15	31	1.8	--	19
12-06-90	1100	1,400	.3	.8	<.01	<.10	74	--	86
1-04-91	1030	1,300	.2	.8	<.01	<.10	64	--	68
2-20-91	1430	1,100	.3	2.7	.10	1.2	33	--	32
3-05-91	1000	1,200	.7	1.8	2.4	14	16	--	24
3-18-91	1000	1,300	.4	1.2	--	<.05	.05	--	50
3-19-91	0930	960	.4	1.3	--	.73	8.6	--	49
3-25-91	1640	1,100	.6	1.3	--	.60	45	--	47
3-25-91	1740	970	.4	1.4	--	.62	39	--	60
3-26-91	0830	1,200	.4	1.3	--	.64	45	--	51
3-26-91	1215	1,200	.4	1.3	--	.50	44	--	47
3-26-91	1315	1,200	.4	1.2	--	.45	46	--	48
3-27-91	0800	1,300	.5	1.4	--	.42	48	--	55
3-27-91	1220	1,300	.5	1.5	--	.23	46	--	59
3-27-91	1410	1,300	.5	1.4	--	.23	51	--	59
3-28-91	0800	1,300	.5	1.5	--	.35	48	--	57
3-29-91	0800	1,400	.5	1.3	--	.28	47	--	58
3-29-91	1200	1,500	--	--	--	.20	50	--	62
4-18-91	1545	920	.4	16	1.1	16	21	--	22
5-29-91	1845	640	--	--	--	--	--	--	--
5-31-91	0830	600	.4	1.1	.26	28	1.5	--	3.6
6-13-91	0915	710	.5	1.5	.13	.93	28	--	33
6-28-91	0815	700	<.1	1.4	.02	.17	49	--	58

Table 4. Chemical analyses of effluent, Orleans, Massachusetts—*Continued*

Date	Time	Chloride, dissolved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia plus organic, total (as N)	Nitrogen, ammonia plus organic, dissolved (as N)
7-12-91	0900	690	0.4	1.3	0.16	1.2	45	--	49
7-31-91	0900	820	.6	1.2	11	30	15	--	18
8-15-91	0930	940	.7	1.2	2.6	12	37	--	48
9-11-91	0900	740	.7	1.1	.18	3.4	37	--	36
10-04-91	1500	600	<.1	1.3	8.8	33	.28	--	5.5
10-18-91	0930	630	.2	1.0	.9	24	1.5	--	13
11-08-91	0900	960	.5	1.0	<.01	<.05	<.01	--	3.3
11-22-91	0915	1,100	.3	.5	.10	43	1.4	--	2.8
12-11-91	1200	1,000	1.1	.7	.08	30	.36	--	1.7
1-08-92	1215	1,100	<.1	1.0	.15	31	.59	--	2.4
1-27-92	0945	980	.3	.9	.15	1.2	32	--	39
2-13-92	1430	1,300	.2	.9	.07	2.1	39	--	45
3-03-92	1600	1,200	<.1	1.0	.18	6.6	35	--	37
3-26-92	0900	1,100	<.1	.7	.21	1.8	55	67	62
4-06-92	1115	930	<.1	.8	.90	7.9	42	49	49
4-13-92	0930	920	.6	.7	.97	7.1	40	46	38
4-22-92	1000	1,000	.5	.3	1.3	13	25	32	31
5-13-92	1100	1,100	<.1	.3	10	17	44	57	55
5-29-92	1030	950	<.1	.3	7.9	37	4.6	8.7	6.9
6-19-92	0900	1,000	.2	.7	14	33	3.4	8.7	6.4
7-02-92	1000	930	.3	.5	10	23	6.2	19	7.6
7-15-92	1630	800	.2	1.5	1.8	40	.75	17	2.8
[1]7-30-92	1430	780	<.1	1.6	.05	.11	32	41	40
7-30-92	1530	890	<.1	1.3	.37	.94	37	50	49
8-05-92	1200	800	<.1	1.1	.76	25	26	37	33
8-19-92	0900	730	.2	1.2	.77	14	27	32	29
9-02-92	1300	800	<.1	.2	1.4	25	25	37	30
10-29-92	0900	860	.2	1.4	2.6	4.3	34	53	42
12-29-92	1300	810	<.1	.1	3.7	17	17	21	20

Date	Time	Phosphorus, total (as P)	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Iron (µg/L)	Manganese (µg/L)	Carbon, organic, total (as C)	Carbon, organic, dissolved (as C)
3-08-90	1400	--	0.05	0.02	120	150	360	--	12
4-19-90	1300	--	.41	.27	390	60	80	--	13
5-17-90	1100	--	.61	.45	170	180	60	--	17
6-25-90	1500	--	.08	.01	460	130	210	--	18
7-30-90	0830	--	.04	<.01	300	60	70	--	7.5
8-20-90	1400	--	.03	<.01	200	50	50	--	10
10-05-90	1100	--	.02	<.01	250	80	20	--	11
11-02-90	1600	0.05	--	<.01	170	--	--	--	7.6
12-06-90	1100	.06	--	<.01	130	--	--	--	35
1-04-91	1030	.02	--	<.01	170	--	--	--	100
2-20-91	1430	.05	--	.04	150	60	100	--	10
3-05-91	1000	.79	--	.44	140	--	--	--	13
3-18-91	1000	--	.02	<.01	180	--	--	--	21
3-19-91	0930	--	.01	<.01	180	--	--	--	21
3-25-91	1640	--	.05	.02	130	--	--	--	24

Table 4. Chemical analyses of effluent, Orleans, Massachusetts—*Continued*

Date	Time	Phosphorus, total (as P)	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Iron (µg/L)	Manganese (µg/L)	Carbon, organic, total (as C)	Carbon, organic, dissolved (as C)
3-25-91	1740	--	0.19	0.14	130	--	--	--	24
3-26-91	0830	--	.46	.34	140	--	--	--	22
3-26-91	1215	--	.02	<.01	140	--	--	--	23
3-26-91	1315	--	.04	.02	130	--	--	--	22
3-27-91	0800	--	.02	<.01	140	--	--	--	32
3-27-91	1220	--	.03	<.01	110	--	--	--	30
3-27-91	1410	--	.04	<.01	110	--	--	--	30
3-28-91	0800	--	.03	.01	140	--	--	--	27
3-29-91	0800	--	.05	.02	140	--	--	--	27
3-29-91	1200	--	.03	<.01	--	--	--	--	34
4-18-91	1545	--	1.4	1.1	160	20	10	--	10
5-29-91	1845	--	--	--	--	--	--	--	--
5-31-91	0830	--	.02	<.01	160	--	--	--	13
6-13-91	0915	--	<.01	<.01	170	--	--	--	20
6-28-91	0815	--	.01	<.01	250	--	--	--	43
7-12-91	0900	--	<.01	<.01	320	--	--	--	--
7-31-91	0900	--	.04	<.01	200	--	--	--	15
8-15-91	0930	--	.02	<.01	200	--	--	--	20
9-11-91	0900	--	<.01	<.01	210	--	--	--	22
10-04-91	1500	--	7.1	6.4	230	--	--	--	9.6
10-18-91	0930	--	3.3	3.0	230	--	--	--	10
11-08-91	0900	--	1.3	<.01	240	--	--	--	12
11-22-91	0915	--	.22	.15	390	--	--	--	12
12-11-91	1200	--	4.6	1.0	300	--	--	--	11
1-08-92	1215	--	.75	.63	200	--	--	--	14
1-27-92	0945	--	12	13	140	--	--	--	27
2-13-92	1430	--	.50	.42	140	--	--	--	21
3-03-92	1600	--	.37	.23	170	--	--	--	16
3-26-92	0900	2.0	--	1.7	250	--	--	16	14
4-06-92	1115	.32	--	.11	180	--	--	15	14
4-13-92	0930	.67	--	.09	160	--	--	22	15
4-22-92	1000	1.5	--	1.1	170	--	--	21	13
5-13-92	1100	1.3	--	.77	320	--	--	38	14
5-29-92	1030	.72	.40	.31	320	--	--	28	16
6-19-92	0900	.54	--	<.01	230	--	--	34	17
7-02-92	1000	2.2	--	.41	<10	--	--	26	21
7-15-92	1630	1.2	<.01	.01	170	--	--	41	12
[1]7-30-92	1430	.04	<.01	.01	280	--	--	18	17
7-30-92	1530	.14	.01	<.01	290	--	--	49	42
8-05-92	1200	.33	<.01	<.01	370	--	--	40	27
8-19-92	0900	.22	<.01	<.01	170	--	--	22	10
9-02-92	1300	.13	.02	<.01	170	--	--	28	9.2
10-29-92	0900	2.3	.56	.36	190	--	--	47	20
12-29-92	1300	.15	.03	<.01	240	--	--	20	12

[1] Sample obtained from the unsaturated zone beneath infiltration bed No. 6, 14.5 feet below land surface.

Table 5. Chemical analyses of ground water at the water table beneath the infiltration beds, Orleans, Massachusetts

[Samples were collected from well OSW 136 (table 1). Concentrations are given in milligrams per liter unless otherwise noted. µg/L, microgram per liter; °C, degree Celsius; <, actual value is less than value shown; --, not analyzed]

Date	Time	Specific conductance (µS/cm at 25°C)		pH (standard units)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
		Lab	Field	Lab	Field					
5-08-90	--	--	264	--	--	--	--	--	--	--
5-18-90	1440	--	555	--	--	--	--	--	--	--
5-24-90	--	--	758	--	5.8	--	--	--	--	--
6-06-90	--	--	809	--	--	--	--	--	--	--
6-14-90	--	--	985	--	--	--	--	--	--	--
6-25-90	1700	--	1,540	--	5.7	--	--	--	--	--
7-18-90	0800	--	2,580	5.6	--	--	--	--	--	--
7-30-90	1700	--	2,040	--	5.6	--	--	--	--	--
8-13-90	1530	--	2,310	5.6	--	--	--	--	--	--
8-27-90	1500	--	2,230	--	5.6	--	--	--	--	--
9-10-90	1430	--	2,440	--	5.6	--	--	--	--	--
10-05-90	1330	--	2,620	--	5.6	--	--	--	--	--
11-02-90	1500	2,670	2,780	5.8	5.8	210	110	75	7.6	7.9
12-06-90	1400	3,020	3,100	5.3	5.1	270	120	83	9.1	4.2
1-03-91	1530	3,220	3,140	5.1	5.2	310	93	85	11	<1.0
1-29-91	1400	3,260	3,440	5.0	5.1	340	82	83	9.4	<1.0
2-20-91	1515	3,300	3,380	4.8	5.1	360	81	81	9.9	<1.0
3-05-91	1230	3,290	3,450	5.1	5.0	380	72	80	12	<1.0
3-22-91	1245	3,350	3,200	5.0	--	430	71	61	8.5	<1.0
4-18-91	1400	3,200	2,690	4.8	5.0	370	76	76	10	1.0
5-29-91	1230	3,020	2,850	5.5	5.2	330	83	77	9.2	2.3
6-13-91	0845	3,080	2,840	5.5	5.4	340	84	75	8.9	2.1
6-26-91	1400	3,000	3,030	5.3	5.3	330	71	75	9.4	2.1
7-12-91	1015	2,910	--	5.5	5.3	310	70	77	8.5	2.6
7-31-91	1530	2,720	2,840	5.5	--	300	59	77	8.7	3.5
8-15-91	1030	2,640	2,680	5.1	4.6	310	44	87	8.2	<1.0
9-05-91	1600	2,690	2,750	5.0	5.0	290	58	92	9.9	2.1
10-04-91	1400	2,950	3,000	5.2	5.1	330	56	100	15	<1.0
10-18-91	1000	2,590	2,670	5.2	5.1	300	44	87	14	1.1
11-08-91	1000	2,850	2,930	5.0	5.1	320	44	97	18	<1.0
11-22-91	1230	2,750	2,850	--	5.1	300	42	100	18	<1.0
12-11-91	1130	2,690	--	5.0	--	320	42	99	18	<1.0
1-08-92	1200	2,760	2,890	4.9	5.2	320	43	100	19	1.5
1-27-92	1430	2,830	2,980	4.9	5.1	330	38	110	18	1.2
2-13-92	1400	2,890	3,020	5.0	5.0	360	40	120	17	<1.0
2-19-92	0930	--	--	--	--	--	--	--	--	--
3-03-92	1630	2,910	3,000	5.3	--	340	38	120	16	3.4
3-26-92	1100	2,960	3,050	5.4	5.0	340	45	110	17	3.6
4-06-92	1330	2,990	3,070	5.3	5.6	320	47	120	17	2.1
4-29-92	1400	3,110	3,220	4.6	4.3	360	31	120	21	<1.0
5-13-92	1530	3,050	3,120	4.7	4.7	380	36	120	19	2.2
5-29-92	1400	3,080	--	4.8	4.8	330	51	120	16	2.8
6-09-92	1630	3,040	3,060	4.8	4.9	330	50	110	16	4.1
7-02-92	1300	3,320	--	4.7	--	390	31	120	20	1.2
7-15-92	1730	3,460	3,480	4.6	--	430	21	110	24	2.1

Table 5. Chemical analyses of ground water at the water table beneath the infiltration beds, Orleans, Massachusetts—*Continued*

Date	Time	Specific conductance (µS/cm at 25°C)		pH (standard units)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
		Lab	Field	Lab	Field					
8-05-92	1300	3,490	3,500	4.8	4.6	420	17	110	26	2.6
8-19-92	1000	3,230	3,230	4.8	4.9	390	34	110	24	<1.0
9-03-92	1430	3,130	3,080	4.8	4.9	370	35	110	23	<1.0
10-28-92	1200	3,010	3,060	3.7	4.9	330	30	110	23	<1.0
12-21-92	1500	2,940	2,990	5.0	5.1	340	24	110	25	<1.0

Date	Time	Sulfate, dissolved	Chloride, dissolved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)
5-08-90	--	--	--	--	--	--	--	--
5-18-90	--	--	--	--	--	--	--	--
5-24-90	--	--	--	--	--	--	--	--
6-06-90	--	--	--	--	--	--	--	--
6-14-90	--	--	--	--	--	--	--	--
6-25-90	1700	--	530	--	--	--	1.6	0.02
7-17-90	--	--	--	--	--	--	--	--
7-30-90	1700	<1.0	590	0.7	--	--	--	--
8-13-90	1530	<1.0	690	<.1	--	--	--	--
8-27-90	1500	--	660	--	--	--	11	.11
9-10-90	1430	<1.0	620	<.1	--	--	--	--
10-05-90	1330	<1.0	670	<.1	--	--	--	--
11-02-90	1500	<1.0	760	<.1	16	0.01	4.4	1.0
12-06-90	1400	<1.0	890	.3	18	.09	29	.90
1-03-91	1530	1.4	970	.3	17	.13	30	2.3
1-29-91	1400	<1.0	990	<.1	16	.08	26	1.8
2-20-91	1515	<.10	970	<.1	15	.03	29	1.6
3-05-91	1230	<1.0	1,100	<.1	13	.03	22	1.9
3-22-91	1245	<1.0	970	<.1	16	--	32	1.5
4-18-91	1400	1.0	1,100	.5	16	.02	33	1.1
5-29-91	1230	8.4	900	.1	17	.02	32	.65
6-13-91	0845	.7	950	<.1	17	.02	35	.84
6-26-91	1400	.9	960	<.1	16	<.01	36	.99
7-12-91	1015	.6	840	.3	17	<.01	37	.29
7-31-91	1530	<1.0	770	.1	16	.02	36	.29
8-15-91	1030	.2	750	<.1	17	.03	39	1.2
9-05-91	1600	.6	640	.2	18	.01	38	.25
10-04-91	1400	.2	760	.3	20	.04	33	.85
10-18-91	1000	.2	680	.4	16	.03	36	.78
11-08-91	1000	.1	780	.4	19	.05	42	1.2
11-22-91	1230	1.1	700	.2	18	.07	44	1.1
12-11-91	1130	4.4	780	<.1	19	.06	43	1.0
1-08-92	1200	2.7	870	.6	20	.04	42	.85
1-27-92	1430	.4	760	6.5	17	.03	37	.88
2-13-92	1400	2.1	810	<.1	18	.03	37	.72
2-19-92	0930	--	960	--	--	--	--	--
3-03-92	1630	.7	840	<.1	17	.03	37	.76
3-26-92	1100	1.4	820	<.1	16	.01	37	.55
4-06-92	1330	3.2	890	<.1	18	.01	33	.28
4-29-92	1400	.3	490	.3	15	.03	23	1.1

Table 5. Chemical analyses of ground water at the water table beneath the infiltration beds, Orleans, Massachusetts—*Continued*

Date	Time	Sulfate, dissolved	Chloride, dissolved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)
5-13-92	1530	5.9	840	<0.1	16	0.15	18	0.9
5-29-92	1400	1.3	900	<.1	17	.20	21	1.0
6-09-92	1630	2.0	880	<.1	15	.32	20	1.8
7-02-92	1300	1.8	990	.2	15	.55	20	2.2
7-15-92	1730	2.7	950	<.1	14	.71	25	3.6
8-05-92	1300	1.5	1,000	<.1	14	.42	35	5.7
8-19-92	1000	3.8	900	.1	15	.19	34	7.5
9-03-92	1430	3.8	900	<.1	16	.19	35	1.0
10-28-92	1200	11	820	<.1	19	.12	42	8.8
12-21-92	1500	4.0	830	.3	20	.09	40	6.4

Date	Time	Nitrogen, ammonia plus organic, dissolved (as N)	Phosphorus, total (as P)	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Iron (µg/L)	Manganese (µg/L)	Carbon, organic, dissolved (as C)
5-08-90	--	--	--	--	--	--	--	--	--
5-18-90	--	--	--	--	--	--	--	--	--
5-24-90	--	--	--	--	--	--	--	--	--
6-06-90	--	--	--	--	--	--	--	--	--
6-14-90	--	--	--	--	--	--	--	--	--
6-25-90	1700	0.7	--	0.01	<0.01	20	--	--	1.1
7-17-90	--	--	--	--	--	--	--	--	--
7-30-90	1700	--	--	--	--	--	--	--	--
8-13-90	1530	--	--	--	--	--	--	--	--
8-27-90	1500	.7	--	.02	<.01	40	--	--	1.7
9-10-90	1430	--	--	--	--	--	--	--	--
10-05-90	1330	--	--	--	--	--	--	--	--
11-02-90	1500	1.5	<0.01	--	.01	110	--	--	4.5
12-06-90	1400	1.3	.02	--	<.01	120	--	--	1.8
1-03-91	1530	3.2	.03	--	<.01	130	--	--	1.8
1-29-91	1400	--	<.05	--	.02	120	--	--	2.3
2-20-91	1515	2.6	<.01	--	.02	120	--	--	1.5
3-05-91	1230	2.5	.07	--	.02	110	--	--	2.0
3-22-91	1245	2.2	--	.01	.01	120	30	500	1.5
4-18-91	1400	1.9	--	<.01	.02	110	--	--	1.5
5-29-91	1230	1.3	--	.02	<.01	90	--	--	1.6
6-13-91	0845	.9	--	<.01	.01	10	--	--	3.5
6-26-91	1400	1.5	--	.02	<.01	90	--	--	1.5
7-12-91	1015	--	--	.01	<.01	100	--	--	--
7-31-91	1530	.8	--	.02	<.01	100	--	--	1.6
8-15-91	1030	1.5	--	.03	.03	130	--	--	2.0
9-05-91	1600	1.4	--	.02	<.01	160	--	--	1.7
10-04-91	1400	1.1	--	.03	.03	200	--	--	1.8
10-18-91	1000	1.3	--	.03	.02	170	--	--	1.7
11-08-91	1000	2.2	--	.02	.01	180	--	--	1.8
11-22-91	1230	2.6	--	.02	.02	190	--	--	1.8
12-11-91	1130	6.0	--	.02	.02	170	--	--	1.8
1-08-92	1200	4.8	--	.03	.02	160	--	--	1.7
1-27-92	1430	3.3	--	.05	.02	150	--	--	1.8
2-13-92	1400	2.6	--	.05	.02	160	--	--	1.7

Table 5. Chemical analyses of ground water at the water table beneath the infiltration beds, Orleans, Massachusetts—*Continued*

Date	Time	Nitrogen, ammonia plus organic, dissolved (as N)	Phosphorus, total (as P)	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Iron (µg/L)	Manganese (µg/L)	Carbon, organic, dissolved (as C)
2-19-92	0930	--	--	--	--	--	--	--	--
3-03-92	1630	2.2	--	0.03	<0.01	140	--	--	2.0
3-26-92	1100	1.4	--	.04	<.01	140	--	--	2.0
4-06-92	1330	1.3	--	<.01	.02	130	--	--	1.6
4-29-92	1400	2.6	--	.04	.03	140	--	--	2.1
5-13-92	1530	2.2	--	.02	.02	130	--	--	1.9
5-29-92	1400	2.0	--	.05	.02	120	--	--	2.4
6-09-92	1630	3.2	--	.01	.02	130	--	--	1.7
7-02-92	1300	3.4	--	.02	.02	50	--	--	2.2
7-15-92	1730	5.0	--	<.01	.02	160	--	--	2.6
8-05-92	1300	6.7	--	<.01	.01	190	--	--	3.0
8-19-92	1000	8.0	--	.02	.02	210	--	--	2.2
9-03-92	1430	7.8	--	.02	<.01	200	--	--	2.6
10-28-92	1200	8.6	--	.03	.02	220	--	--	1.8
12-21-92	1500	6.9	--	<.01	<.01	220	--	--	2.1

Table 6. Chemical analyses of ground water, Orleans, Massachusetts

[Concentrations are given in milligrams per liter unless otherwise noted. Specific conductance is in microsiemens per centimeter at 25°C. pH is in standard units. Specified figures for dissolved-oxygen concentrations less than 1 are as specified in the colorimetric measurement method. µg/L, microgram per liter; °C, degree Celsius; <, actual value is less than value shown; --, not analyzed]

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
86	OSW 137	1-03-91	1630	--	716	--	5.5	10.7	4.2	--	--
		2-20-91	0930	--	814	--	5.7	10.7	5.8	--	--
		[1]3-22-91	1045	814	839	5.9	5.6	10.8	5.7	18.4	0.09
			1100	811	--	5.8	--	10.8	--	--	--
		4-18-91	1130	--	891	--	5.6	10.7	5.0	--	--
		5-29-91	0930	--	920	--	5.6	10.9	5.2	--	--
		6-26-91	1030	932	948	5.8	5.7	11.0	5.3	17.5	.3
		7-31-91	1030	--	902	--	5.6	10.9	5.0	--	--
		[1]9-11-91	1100	743	772	5.9	5.7	10.8	5.2	19.0	.4
				744	--	5.8	--	--	--	--	--
		11-08-91	1130	--	720	--	5.7	10.9	4.7	--	--
		12-04-91	1300	--	760	--	5.8	10.7	3.8	--	--
		1-28-92	1430	--	940	--	6.0	10.9	3.3	--	--
		3-04-92	0900	--	1,020	--	6.2	11.0	3.0	--	--
		4-06-92	1615	--	1,040	--	--	11.0	2.9	--	--
		6-11-92	1415	802	809	5.7	6.7	11.2	2.3	18.7	.2
		12-18-92	1430	1,170	1,200	6.3	5.6	11.1	2.7	17.9	.6
	OSW 84	3-22-89	0900	100	--	6.7	--	--	--	--	--
		9-05-89	1015	97	97	7.0	7.0	--	--	--	--
		1-31-90	1400	--	85	--	6.0	11.6	8.6		
		3-22-91	1015	99	102	6.8	6.4	10.4	9.4	18.5	1.2
		[1]6-26-91	0945	99	100	6.5	6.4	10.5	9.3	18.2	.3
			0955	98	--	6.5	--	--	--	--	--
		9-11-91	1030	100	102	6.6	6.5	10.4	10.0	20.4	.5
		6-11-92	1345	116	115	6.7	6.4	10.5	8.9	18.6	.4
		12-18-92	1400	353	351	6.6	6.1	10.6	8.5	18.4	.5
	OSW 85	3-22-89	1200	97	--	6.6	--	--	--	--	--
		9-05-89	1115	99	98	6.1	6.0	--	--	--	--
		3-22-91	1115	97	104	6.2	6.1	10.2	--	21.8	.2
		6-26-91	1015	--	109	--	--	10.2	--	--	--
		9-11-91	1145	--	103	--	6.2	10.0	--	--	--
		6-11-92	1600	107	100	6.3	6.2	--	--	--	--
		12-18-92	1500	320	323	6.8	5.9	--	--	--	--
	OSW 86	3-22-89	1600	94	--	6.4	--	--	--	--	--
		9-05-89	1130	94	96	6.3	6.2	--	--	--	--
		3-22-91	0915	94	97	6.3	5.8	10.1	--	19.5	1.7
		6-26-91	0900	--	136	--	5.9	--	--	17.9	.6
		9-11-91	1000	--	136	--	6.1	--	--	19.4	.3
		6-11-92	1400	156	160	6.1	6.0	--	--	18.4	.5
		12-18-92	1300	174	190	6.4	6.0	--	--	19.5	.4
87	OSW 88	3-23-89	1700	122	--	6.9	--	--	--	--	--
		9-12-89	1100	116	119	6.4	6.2	--	--	--	--
		2-01-90	0900	--	116	--	--	9.2	8.8	--	--
		3-19-91	1500	152	153	6.6	6.0	10.1	10.0	19.7	1.5
		6-27-91	1445	134	133	6.9	6.2	10.2	10.6	18.7	1.0
		9-11-91	1330	139	141	6.4	6.3	10.0	9.8	19.0	.4
		6-11-92	1600	185	185	6.4	6.3	10.2	9.3	18.6	.3
		12-17-92	1530	427	433	7.3	6.0	10.2	7.8	19.2	.3

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
87	OSW 89	9-13-89	1345	99	101	6.1	5.9	--	--	--	--
		3-19-91	1630	96	99	6.5	5.9	10.0	--	--	--
		6-27-91	1400	95	96	6.4	6.4	--	--	--	--
		9-11-91	1400	--	161	--	6.1	--	--	--	--
		10-04-91	1430	166	--	6.3	--	--	--	--	--
		6-12-92	1045	859	866	5.7	5.6	--	--	20.2	--
		12-17-92	1500	2,820	--	5.4	5.6	--	--	--	--
	OSW 163	6-12-92	1000	491	492	6.3	5.5	10.0	--	19.5	0.08
		12-17-92	1445	1,260	1,260	5.8	5.7	10.1	--	19.3	.6
	OSW 87	9-12-89	1830	182	184	5.7	5.6	--	--	--	--
		1-31-90	1700	--	175	--	--	--	1.7	--	--
		3-19-91	1400	147	151	6.6	5.6	10.0	2.2	18.9	1.1
		[1]6-27-91	1300	--	150	--	5.8	10.0	2.4	18.7	.9
			1330	--	--	--	--	--	--	--	--
		9-11-91	1300	149	152	5.9	5.8	9.8	1.7	19.8	.2
		6-12-92	0900	157	158	6.1	5.8	--	--	20.1	.3
		12-17-92	1400	152	154	6.9	5.8	9.8	1.9	19.5	.2
93	OSW 135	5-24-90	1445	267	--	6.4	--	--	--	--	--
		6-06-90	--	--	274	--	--	--	--	--	--
		6-25-90	--	--	250	--	--	--	--	--	--
		7-30-90	1515	--	584	--	5.9	--	--	--	--
		8-13-90	1300	--	712	--	6.0	--	--	--	--
		8-27-90	1300	--	871	--	5.8	--	--	--	--
		9-10-90	1115	--	1,080	--	6.0	--	--	--	--
		10-05-90	1300	--	1,140	--	5.9	--	--	--	--
		11-02-90	1400	--	1,340	--	5.6	--	--	--	--
		12-06-90	1330	--	1,490	--	5.8	--	--	--	--
		1-04-91	1330	--	1,620	--	--	--	--	--	--
		2-20-91	1500	--	1,610	--	5.7	--	--	--	--
		3-19-91	1200	1,480	1,480	6.1	5.7	--	--	--	--
		4-18-91	1600	--	1,390	--	6.4	--	--	--	--
		5-29-91	1345	--	1,160	--	5.5	--	--	--	--
		6-26-91	1430	1,340	1,340	6.0	5.8	12.5	--	--	--
		7-31-91	1515	--	1,800	--	5.7	--	--	--	--
		9-06-91	1345	2,070	2,120	5.7	5.7	--	--	--	--
		11-08-91	1230	--	2,280	--	5.5	--	--	--	--
		12-04-91	1530	--	2,100	--	5.7	--	--	--	--
		1-27-92	1400	--	2,000	--	6.0	--	--	--	--
		2-19-92	1000	--	--	--	--	--	--	--	--
		3-04-92	1115	--	1,930	--	--	--	--	--	--
		4-06-92	1545	--	1,710	--	5.8	--	--	--	--
		6-10-92	1145	2,120	1,770	5.6	5.5	--	--	--	--
		8-06-92	1100	--	1,490	--	5.8	--	--	--	--
		8-19-92	1100	--	1,530	--	5.7	--	--	--	--
		9-10-92	1600	--	1,910	--	--	--	--	--	--
		10-29-92	1230	--	2,330	--	5.6	--	--	--	--
		12-22-92	1145	1,720	--	5.8	5.5	--	--	--	--
	OSW 178	8-20-92	1300	--	2,670	--	--	13.2	.3	--	--
		9-10-92	1330	--	3,100	--	5.6	12.3	.1	--	--
		10-28-92	1315	--	2,510	--	5.5	12.0	.3	--	--
		12-21-92	1430	2,890	2,940	5.3	5.5	12.1	--	18.6	.4

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
93	OSW 90	3-23-89	1000	100	--	6.5	--	--	--	--	--
		9-05-89	1200	98	98	6.7	--	10.2	--	--	--
		1-31-90	1215	--	93	--	6.1	10.0	9.1		
		6-06-90	--	--	124	--	--	10.4	9.5	--	--
		6-14-90	--	--	142	--	--	--	--	--	--
		6-25-90	1400	--	147	--	5.8	--	--	--	--
		7-30-90	1520	--	315	--	6.0	10.5	10.3	--	--
		8-13-90	1430	--	477	--	5.8	10.5	10.2	--	--
		8-27-90	1230	--	599	--	5.6	10.5	10.1	--	--
		9-10-90	1045	--	680	--	5.7	10.6	10.1	--	--
		10-05-90	1230	--	890	--	5.6	10.5	9.9	--	--
		11-02-90	1345	--	1,150	--	5.7	10.6	9.3	--	--
		12-06-90	1130	--	1,560	--	5.9	10.5	1.2	--	--
		1-03-91	1240	--	1,240	--	5.4	10.7	8.1	--	--
		2-20-91	1130	--	1,180	--	5.6	10.9	8.7	--	--
		[1]3-19-91	1100	1,350	1,370	6.1	5.7	11.2	8.2	17.5	0.4
			1110	1,350	--	6.1	--	--	--	--	--
		4-18-91	1045	--	1,470	--	5.5	11.2	1.3	--	--
		5-29-91	1030	--	1,400	--	5.5	11.4	6.8	--	--
		[1]6-25-91	1500	1,530	1,560	5.9	5.7	11.5	6.3	17.9	.3
			1510	1,530	--	5.9	--	--	--	--	--
		7-31-91	0945	--	1,470	--	5.7	11.4	8.0	--	--
		9-05-91	1330	2,160	2,200	5.7	5.7	11.6	3.9	19.6	.3
		11-08-91	0800	--	2,800	--	5.6	11.6	.6	--	--
		12-04-91	0930	--	2,850	--	5.6	11.7	.2	--	--
		1-27-92	1330	--	2,830	--	5.7	12.1	.2	--	--
		3-03-92	1500	--	2,680	--	5.6	12.3	.2	--	--
		4-06-92	1330	--	2,820	--	5.7	12.5	.05	--	--
		6-09-92	1330	2,830	2,860	5.6	5.5	13.0	.05	20.2	.09
		8-06-92	1030	--	2,920	--	5.5	--	.05	--	--
		8-20-92	1330	--	3,050	--	--	12.7	.05	--	--
		9-10-92	1400	--	3,250	--	5.5	12.5	.05	--	--
		10-28-92	1345	--	3,210	--	5.4	12.1	--	--	--
		12-21-92	1400	2,990	3,040	5.5	5.5	12.1	.05	19.2	.08
	OSW 91	3-23-89	1200	136	--	6.6	--	--	--	--	--
		9-05-89	1230	137	--	6.6	--	10.0	--	--	--
		1-31-90	1330	--	133	--	6.0	--	8.7	--	--
		3-19-91	1000	670	687	6.5	5.8	10.4	8.8	16.4	.8
		6-26-91	1415	1,670	1,690	6.0	5.8	10.6	5.3	18.9	.5
		9-05-91	1300	1,700	1,790	5.9	5.8	10.6	4.7	20.1	.2
		6-09-92	1400	2,000	2,020	5.8	5.6	11.2	2.0	19.4	.4
		12-21-92	1330	2,550	2,640	5.6	5.5	11.4	1.2	18.5	.3
	OSW 92	3-23-89	1100	102	--	6.3	--	--	--	--	--
		9-05-89	1315	100	--	6.5	--	10.1	--	--	--
		1-31-90	1430	--	118	--	5.9	9.2	3.4	--	--
		3-18-91	1600	1,280	1,390	6.1	--	10.1	3.5	17.7	.6
		6-26-91	1330	2,070	2,110	5.8	5.5	10.2	3.4	18.1	.06
		9-05-91	1145	2,030	2,190	5.7	5.7	10.0	2.5	20.0	.2
		6-09-92	1530	1,270	1,360	5.9	5.7	10.3	2.0	19.8	.3
		12-21-92	1230	482	505	6.0	5.9	10.5	3.1	19.0	.02

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
93	OSW 93	3-23-89	1300	293	--	6.3	--	--	--	--	--
		9-05-89	1345	304	--	6.2	--	10.1	--	--	--
		1-31-90	1500	--	328	--	--	9.3	0.1		
		3-18-91	1500	284	295	6.5	6.1	10.1	.1	18.5	1.2
		6-26-91	1200	--	273	--	6.3	10.1	--	17.5	.05
		9-05-91	1100	--	295	--	6.3	9.9	.00	21.0	.5
		6-09-92	1700	274	282	6.2	6.2	10.0	.00	--	--
		12-21-92	1100	258	259	6.4	6.1	9.9	.00	19.8	.9
94	OSW 108	9-13-89	1610	127	131	6.1	5.9	--	--	--	--
		2-01-90	1500	--	125	--	6.1	10.0	7.4	--	--
		3-18-91	1330	122	127	6.1	6.0	9.9	10.6	17.4	1.2
		6-25-91	1245	126	131	6.2	5.9	10.0	9.9	17.6	.5
		9-11-91	1600	129	131	6.2	--	9.8	10.1	19.7	.6
		6-08-92	1500	137	137	6.4	5.9	9.9	10.3	19.7	.1
		12-16-92	0830	134	134	6.3	6.0	9.9	9.5	18.7	.3
	OSW 95	3-23-89	1430	133	--	6.2	--	--	--	--	--
		9-13-89	1540	115	119	6.3	6.1	--	--	--	--
		2-01-90	1445	--	111	--	6.3	10.0	10.9	--	--
		3-18-91	1230	142	146	6.4	6.1	9.9	9.4	17.4	1.1
		6-25-91	1200	--	131	--	6.3	9.9	9.4	18.2	.4
		9-11-91	1530	--	118	--	6.2	9.8	9.6	18.4	.05
		6-08-92	1400	107	108	6.4	6.1	9.8	11.1	19.2	.9
		12-15-92	1600	1,010	1,040	6.9	--	9.9	8.2	17.6	.7
	OSW 166	6-08-92	1500	2,160	2,190	5.4	5.4	9.8	1.5	19.2	.5
		12-15-92	1530	2,680	2,720	5.4	5.3	10.1	.4	17.4	.4
	OSW 94	3-23-89	1400	119	--	6.3	--	--	--	--	--
		9-13-89	1500	120	123	6.2	5.9	--	--	--	--
		2-01-90	1400	--	123	--	6.1	10.0	10.7	--	--
		3-18-91	1130	143	146	6.5	6.0	10.0	10.7	16.8	.5
		6-25-91	1100	--	145	--	6.2	10.0	11.7	18.1	.6
		9-11-91	1500	--	144	--	6.2	9.8	11.1	19.6	.5
		6-08-92	1430	120	122	6.5	6.1	9.7	11.4	20.5	.5
		12-15-92	1500	125	120	7.1	6.0	9.7	10.1	18.0	.8
96	OSW 115	9-13-89	1025	120	123	6.3	6.3	--	--	--	--
		2-01-90	1130	--	120	--	6.2	10.6	7.0	--	--
		3-20-91	1030	112	113	6.7	6.3	10.1	9.8	19.3	1.4
		6-27-91	1115	109	110	6.5	6.2	10.1	7.7	19.0	.08
		9-09-91	1245	--	114	--	6.4	9.8	10.7	19.8	1.1
		6-18-92	1530	107	108	6.5	6.2	10.3	11.0	20.1	.2
		8-21-92	1230	--	180	--	--	10.4	9.2	--	--
		12-17-92	1145	222	222	7.3	6.2	10.1	9.1	18.5	.3
	OSW 99	3-24-89	1300	105	--	6.9	--	--	--	--	--
		9-05-89	1445	98	--	6.4	--	--	--	--	--
		3-20-91	1130	274	281	6.3	--	--	--	17.2	.7
		4-18-91	1530	--	293	--	5.8	10.0	8.8	--	--
		5-29-91	1830	--	317	--	5.8	10.0	8.9	--	--
		6-27-91	0830	335	338	6.1	5.8	10.0	10.2	17.5	.7
		7-31-91	1400	--	385	--	5.9	9.9	9.0	--	--
		9-09-91	1030	--	358	--	6.1	9.9	9.4	20.5	.4
		11-08-91	1315	--	380	--	5.9	9.9	8.9	--	--

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
96	OSW 99	12-04-91	1400	--	387	--	6.0	9.9	9.1	--	--
		1-27-92	1200	--	416	--	6.0	9.9	8.4	--	--
		3-04-92	1100	--	476	--	6.1	10.0	8.6	--	--
		4-06-92	1600	--	512	--	6.0	10.0	8.6	--	--
		5-13-92	1430	--	580	--	5.9	10.0	8.5	--	--
		6-17-92	1330	636	641	6.0	5.8	10.1	8.7	20.8	0.3
		8-05-92	1230	692	693	6.2	5.8	10.2	8.0	--	--
		9-03-92	1530	--	767	--	5.8	10.2	6.9	--	--
		10-28-92	1045	--	1,240	--	5.7	10.4	4.7	--	--
		12-17-92	1100	1,430	1,440	5.7	5.7	10.5	4.0	19.9	.6
	OSW 114	9-13-89	--	75	77	6.4	6.2	--	--	--	--
		2-01-90	1115	--	80	--	6.1	9.1	11.7	--	--
		3-20-91	1100	477	487	5.9	5.6	10.0	4.2	18.8	1.2
		4-18-91	1500	--	658	--	5.4	10.1	9.0	--	--
		5-29-91	1800	--	817	--	5.4	10.0	8.9	--	--
		6-27-91	1050	901	917	5.6	5.5	10.1	9.9	17.9	.06
		7-31-91	1500	--	1,080	--	5.6	9.9	8.5	--	--
		9-09-91	1115	--	1,220	--	5.5	9.9	6.8	19.0	.7
		11-08-91	1330	--	1,490	--	5.4	9.9	5.5	--	--
		12-04-91	1500	--	1,710	--	5.5	10.0	4.1	--	--
		1-27-92	1130	--	2,010	--	5.5	10.0	1.9	--	--
		3-04-92	0930	--	2,210	--	5.5	10.1	1.4	--	--
		4-06-92	1530	--	2,450	--	5.4	10.1	.1	--	--
		5-13-92	1400	--	2,520	--	5.3	10.1	.05	--	--
		6-17-92	1230	2,530	2,570	5.3	5.3	10.2	.00	20.2	.6
		8-05-92	1230	2,600	2,630	5.5	5.2	10.3	<.05	--	--
		8-21-92	1230	--	--	--	--	--	--	--	--
		9-03-92	1500	--	2,700	--	5.3	10.4	--	--	--
		10-28-92	1215	--	2,860	--	5.3	10.5	<.05	--	--
		12-17-92	1230	2,870	2,910	5.3	--	10.7	<.05	20.2	.05
	OSW 98	9-05-89	1530	122	--	7.5	--	--	--	--	--
		2-01-90	1030	--	127	--	6.2	9.6	10.1	--	--
		2-20-91	1030	--	797	--	5.5	10.0	9.6	--	--
		3-20-91	1000	860	883	6.0	5.7	10.0	9.2	18.0	.6
		4-18-91	1430	--	800	--	5.6	10.0	9.3	--	--
		5-29-91	1500	--	770	--	5.5	10.0	9.3	--	--
		6-27-91	1015	1,020	1,040	5.8	5.5	10.0	9.5	17.8	.2
		7-31-91	1430	--	1,630	--	5.6	--	4.1	--	--
		9-09-91	1200	--	2,310	--	5.6	9.9	.4	18.8	.7
		11-08-91	1300	--	2,400	--	5.5	9.8	1.2	--	--
		12-04-91	1430	--	2,500	--	5.5	9.9	.3	--	--
		1-27-92	1100	--	2,570	--	5.5	9.9	.9	--	--
		3-04-92	1000	--	2,820	--	5.6	9.9	.4	--	--
		4-06-92	1500	--	2,870	--	5.5	9.9	.1	--	--
		5-13-92	1330	--	2,920	--	5.4	9.9	.05	--	--
		6-17-92	1630	2,780	2,850	5.3	5.4	10.0	.00	21.2	1.0
		7-30-92	0845	2,830	2,840	5.4	5.4	10.0	<.05	--	--
		8-05-92	1630	2,820	2,840	--	--	10.0	<.05	--	--
		9-03-92	1445	--	2,850	--	5.4	10.1	--	--	--
		10-28-92	1115	--	2,830	--	5.4	10.2	<.05	--	--
		12-17-92	1030	1,450	2,870	5.6	5.3	10.2	<.05	20.6	.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
96	OSW 96	3-24-89	1200	137	--	7.2	--	--	--	--	--
		9-13-89	1200	182	186	6.2	6.1	--	--	--	--
		2-01-90	0945	--	196	--	6.1	9.3	0.1	--	--
		3-20-91	0900	193	201	6.5	6.0	10.0	.1	20.3	0.3
		6-27-91	0930	210	201	6.9	6.2	10.0	.00	19.5	.7
		9-09-91	1245	--	278	--	6.2	9.8	.00	19.8	.5
		6-17-92	1530	276	287	6.2	6.1	9.8	.00	19.4	.07
		12-17-92	0930	290	299	7.1	6.1	9.7	.00	20.6	.4
100	OSW 102	9-13-89	1715	125	128	5.9	5.8	--	--	--	--
		3-28-90	1130	--	110	--	5.5	10.1	8.5	--	--
		3-20-91	1500	59	122	6.4	5.9	10.0	8.7	22.4	1.0
		6-28-91	1330	123	123	6.2	5.9	10.0	11.4	19.8	.2
		9-10-91	1530	122	127	6.1	6.0	9.8	12.3	19.2	.1
		6-12-92	1145	94	95	6.2	6.1	9.7	11.6	19.3	.9
		7-30-92	--	--	100	--	--	9.7	10.7	--	--
		12-29-92	0900	897	720	5.9	5.6	9.6	--	19.1	.3
	OSW 100	3-24-89	0800	140	--	6.5	--	--	--	--	--
		9-13-89	1800	143	150	6.1	6.1	--	--	--	--
		3-28-90	1230	--	156	--	5.7	10.1	.1	--	--
		[1]3-20-91	1430	54	160	6.3	6.1	10.1	.00	21.9	.06
			1440	61	--	6.3	--	--	--	--	--
		6-28-91	1230	--	155	--	6.1	10.1	.00	19.1	1.1
		[1]9-10-91	1500	162	166	6.3	6.2	9.9	.00	20.4	.8
			1510	161	--	6.2	--	--	--	--	--
		6-12-92	1200	166	167	6.2	6.2	--	--	20.5	.8
		7-30-92	1500	108	--	6.0	--	--	--	20.1	.1
		12-29-92	0830	174	175	6.3	6.0	--	.00	--	--
105	OSW 103	9-14-89	1730	121	--	6.5	--	--	--	--	--
		3-21-91	1100	140	146	6.4	6.3	10.1	--	16.0	2.9
		6-25-91	1630	142	142	6.5	6.4	--	--	--	--
		9-10-91	1130	--	146	--	6.4	--	--	--	--
		6-09-92	1115	147	146	6.4	6.2	--	--	19.2	1.5
		12-28-92	1130	164	165	6.8	6.2	--	--	--	--
	OSW 104	9-14-89	1045	97	99	6.3	5.9	--	--	--	--
		3-21-91	0845	100	103	6.1	5.9	10.1	10.1	19.4	2.5
		6-25-91	1445	103	102	6.2	6.0	10.1	10.6	17.6	.8
		9-10-91	1030	--	104	--	6.2	9.9	11.1	19.6	.4
		6-09-92	1100	97	98	6.6	6.1	9.9	10.7	18.8	.4
		12-28-92	1100	96	97	6.2	6.0	9.8	10.1	.3	.9
	OSW 105	9-14-89	1015	128	129	6.2	6.1	--	--	--	--
		3-22-90	1515	--	113	--	6.2	10.3	6.3	--	--
		3-21-91	1130	116	116	6.2	6.1	10.1	--	18.7	.6
		6-25-91	1600	111	113	6.3	6.2	10.1	--	18.8	.02
		9-10-91	1100	--	112	--	6.2	10.0	8.2	20.4	.2
		6-09-92	1200	880	875	5.7	5.6	--	--	18.9	.6
		12-28-92	1200	1,540	1,750	5.7	5.6	--	--	17.9	.7
111	OSW 110	9-14-89	1600	129	129	6.3	6.2	--	1.0	--	--

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
111	OSW 109	9-14-89	1310	205	219	5.6	5.8	--	--	--	--
		3-22-90	1630	--	227	--	5.8	10.4	0.7	--	--
	OSW 111	9-14-89	1200	164	186	6.3	6.6	--	--	--	--
		3-28-90	1515	--	191	--	6.1	10.2	.1	--	--
112	OSW 112	9-14-89	1400	228	239	6.1	5.7	--	--	--	--
124	OSW 124	12-28-92	1530	183	183	7.1	5.5	--	--	17.0	0.3
127	OSW 127	3-20-91	1545	81	210	6.6	6.1	10.2	--	--	--
129	OSW 129	3-20-91	1520	105	108	6.1	5.9	9.8	--	--	--
144	OSW 144	12-29-92	1000	175	177	6.9	6.1	9.9	6.8	20.6	.4
146	OSW 146	6-19-92	1030	276	--	--	--	--	--	--	--
			1100	191	190	5.7	5.5	10.5	4.8	18.5	.2
		12-28-92	1500	195	197	6.1	5.6	10.4	4.9	17.4	1.2
147	OSW 141	1-04-91	1300	--	2,300	--	5.6	--	--	--	--
		2-21-91	1330	--	2,680	--	5.5	--	--	--	--
		3-21-91	1700	2,480	2,600	5.7	5.3	11.7	--	17.1	2.1
		4-18-91	1230	--	2,070	--	5.6	11.7	--	--	--
		5-29-91	1330	--	2,300	--	5.4	12.3	--	--	--
		6-28-91	0930	2,170	2,220	5.7	5.6	--	--	21.7	2.0
		7-31-91	1300	--	1,970	--	5.5	11.7	--	--	--
		9-06-91	1130	2,040	1,960	5.6	5.6	--	--	17.3	.3
		11-08-91	1040	--	2,250	--	5.4	--	--	--	--
		12-04-91	1200	--	2,300	--	5.4	--	--	--	--
		12-10-91	1300	--	2,400	--	--	--	--	--	--
		1-28-92	1130	--	2,190	--	--	--	--	--	--
		3-03-92	1230	--	1,800	--	5.6	--	--	--	--
		4-06-92	1230	--	2,440	--	5.4	--	--	--	--
		4-28-92	1200	--	2,130	--	5.4	--	--	--	--
		6-10-92	1145	1,970	1,770	5.6	5.4	--	--	17.7	.4
		8-05-92	1100	--	2,140	--	5.4	12.5	--	--	--
		8-30-92	1600	--	1,970	--	5.5	--	--	--	--
		10-28-92	1215	--	3,010	--	5.5	--	--	--	--
		12-18-92	1130	2,570	2,430	5.3	5.3	--	--	17.3	.3
	OSW 142	1-03-91	1430	--	2,930	--	5.0	11.0	1.5	--	--
		2-20-91	1200	--	3,250	--	5.1	11.3	.8	--	--
		3-21-91	1500	3,100	3,220	5.2	--	11.5	.8	19.7	1.2
		4-18-91	1000	--	2,560	--	5.0	11.7	.5	--	--
		5-29-91	1215	--	2,750	--	5.0	12.0	.6	--	--
		6-06-91	1700	--	--	--	--	--	--	--	--
		6-27-91	0845	2,900	2,950	5.2	5.1	12.3	.3	19.3	.1
		7-23-91	1500	2,980	3,090	5.2	--	--	.3	--	--
		7-31-91	1100	--	3,100	--	5.1	12.4	.1	--	--
		9-06-91	0930	2,860	2,930	5.3	5.2	12.5	.05	21.0	.4
		11-08-91	1100	--	3,010	--	5.1	12.4	.05	--	--
		12-04-91	1000	--	2,920	--	5.1	12.5	.1	--	--
		12-10-91	1100	--	2,920	--	--	--	.05	--	--
		1-28-92	1100	--	2,890	--	5.1	12.9	.05	--	--
		2-06-92	1400	--	--	--	--	--	--	--	--
		3-03-92	1200	--	2,920	--	5.2	13.2	.05	--	--
		4-06-92	1200	--	2,960	--	5.1	13.6	.05	--	--

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
147	OSW142	4-28-92	1300	--	3,080	--	5.0	13.9	0.1	--	--
		6-10-92	1045	3,030	3,050	5.2	5.1	14.3	.05	20.4	0.3
		8-05-92	0815	--	3,390	--	5.1	13.9	.2	--	--
		8-30-92	1630	--	3,230	--	5.2	13.6	.05	--	--
		10-28-92	1200	--	3,260	--	5.1	13.0	<.05	--	--
		12-18-92	1100	3,130	3,170	5.0	5.0	12.8	.05	20.6	.3
	OSW 165	1-28-92	1200	--	3,000	--	5.7	12.6	.05	--	--
		3-03-92	1130	--	3,010	--	5.7	12.8	.05	--	--
		4-06-92	1130	--	3,010	--	5.4	13.2	.05	--	--
		4-28-92	1300	--	3,040	--	5.4	13.6	.05	--	--
		6-10-92	0930	3,120	3,160	5.5	5.5	14.1	.05	20.1	.4
		8-05-92	1030	--	3,310	--	5.4	13.9	.05	--	--
		9-01-92	1330	--	3,360	--	--	13.6	.05	--	--
		10-28-92	1130	--	3,270	--	5.6	13.1	<.05	--	--
		12-18-92	1030	3,130	3,160	5.5	5.5	12.9	.05	20.6	.4
	OSW 152	7-31-91	1615	--	2,710	--	--	11.8	.5	--	--
		9-06-91	1100	2,880	2,970	5.6	5.6	12.0	<.05	21.1	.06
		11-08-91	1015	--	3,090	--	5.4	12.0	.3	--	--
		12-04-91	1030	--	3,050	--	5.5	12.1	<.05	--	--
		12-10-91	1200	--	2,960	--	--	--	.1	--	--
		1-28-92	1030	--	2,890	--	5.5	12.3	.05	--	--
		3-03-92	1100	--	2,980	--	5.5	12.5	.05	--	--
		4-06-92	1100	--	3,100	--	5.3	12.8	.1	--	--
		4-28-92	1500	--	3,190	--	5.2	12.9	.05	--	--
		6-10-92	1015	3,050	3,090	5.3	5.4	13.5	.05	20.3	.4
		7-30-92	1015	3,310	3,280	5.3	--	13.6	--	--	--
		8-05-92	0930	--	--	--	--	--	--	--	--
		9-01-92	1230	--	3,320	--	5.4	13.4	.05	--	--
		10-28-92	1045	--	3,160	--	5.5	13.0	<.05	--	--
		12-18-92	0945	3,160	3,190	5.5	5.4	12.8	.05	20.6	.8
	OSW 147	6-28-91	1000	2,430	2,470	5.7	5.5	10.7	1.3	19.9	.9
		7-24-91	0930	2,620	2,770	5.6	--	--	--	--	--
		7-31-91	1200	--	2,820	--	5.4	11.1	3.0	--	--
		9-06-91	1015	2,830	2,930	5.6	5.6	11.3	.6	19.5	.1
		11-08-91	0930	--	3,020	--	5.6	11.4	.2	--	--
		12-04-91	1130	--	3,000	--	5.4	11.5	.1	--	--
		12-10-91	1130	--	3,000	--	--	--	.1	--	--
		1-28-92	0930	--	3,060	--	5.6	11.2	.1	--	--
		3-03-92	0900	--	3,040	--	5.6	11.7	.05	--	--
		4-06-92	1030	--	3,040	--	5.4	11.8	.05	--	--
		4-29-92	1100	--	3,070	--	5.4	12.0	.05	--	--
		6-10-92	0900	2,850	2,880	5.5	5.5	12.2	.05	20.5	.1
		8-05-92	0930	--	2,790	--	5.4	12.3	.05	--	--
		9-01-92	1300	--	2,800	--	--	12.6	<.05	--	--
		10-28-92	1000	--	3,120	--	5.5	12.2	<.05	--	--
		12-18-92	0900	3,190	3,240	5.5	5.5	12.3	.05	21.2	.5
148	OSW 143	9-10-91	1700	171	162	6.7	--	--	--	--	--
		6-16-92	1230	175	177	6.6	6.2	--	--	--	--
		12-29-92	1515	175	180	6.3	6.0	--	--	--	--
	OSW 148	9-10-91	1630	151	155	6.0	6.0	9.9	.00	21.0	.09
		6-16-92	1045	149	151	6.0	5.9	9.8	--	20.2	1.0
		12-29-92	1100	148	150	6.2	5.7	9.7	.00	21.1	.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
149	OSW 107	9-14-89	1645	182	161	5.7	5.7	--	--	--	--
		2-01-90	1215	--	--	--	--	11.0	7.7	--	--
		6-06-90	--	--	151	--	--	11.0	8.0	--	--
		6-25-90	1630	--	170	--	5.7	--	--	--	--
		7-30-90	1600	--	246	--	5.8	--	--	--	--
		8-13-90	1500	--	257	--	5.7	--	--	--	--
		8-27-90	1430	--	287	--	5.6	--	--	--	--
		9-10-90	1200	--	326	--	5.6	11.1	8.0	--	--
		10-05-90	1340	--	380	--	5.7	--	--	--	--
		12-06-90	1230	--	642	--	5.5	11.1	7.6	--	--
		1-03-91	1550	--	828	--	5.5	11.1	7.6	--	--
		2-20-91	1415	--	1,110	--	5.8	11.2	7.6	--	--
		[1]3-21-91	1600	1,090	1,140	5.7	5.6	11.2	6.7	20.2	2.2
			1610	1,090	--	5.6	--	--	--	--	--
		4-18-91	1200	--	1,490	--	5.3	11.3	6.2	--	--
		5-29-91	1115	--	1,450	--	5.2	11.4	5.7	--	--
		[1]6-27-91	1700	1,330	1,340	5.6	5.5	11.4	5.8	20.0	1.2
			1710	1,340	--	6.2	--	--	--	--	--
		7-09-91	1245	1,340	1,340	5.8	--	--	--	--	--
		9-06-91	1400	1,760	1,800	5.5	5.6	11.4	1.9	--	--
		6-10-92	1500	1,970	1,960	5.4	5.3	12.4	.3	19.2	.05
		7-30-92	1300	2,250	2,250	5.3	--	12.6	.1	--	--
		8-19-92	1230	--	2,490	--	5.4	12.6	.1	--	--
		9-10-92	1530	--	2,650	--	5.4	12.7	.05	18.4	1.1
		12-22-92	0945	2,520	2,550	5.4	5.5	12.6	.05	20.8	.01
	OSW 149	9-06-91	1330	220	224	6.3	6.3	10.5	1.2	--	--
		6-10-92	1600	1,700	1,720	5.6	5.5	10.8	.9	19.1	.2
		8-19-92	1300	--	2,000	--	5.5	11.1	.4	--	--
		9-10-92	1500	--	2,000	--	5.5	11.2	.7	--	--
		12-22-92	0900	2,150	2,180	5.5	5.5	11.4	.4	20.2	.5
150	OSW 160	1-28-92	1530	--	2,930	--	5.7	--	--	--	--
		6-09-92	1645	3,180	3,210	5.4	--	11.5	--	18.8	.3
		12-21-92	1530	2,950	3,020	5.6	5.5	--	--	--	--
	OSW 150	9-06-91	1200	224	237	6.6	6.6	11.9	--	--	--
		6-09-92	1600	468	502	6.4	6.3	--	--	--	--
		12-21-92	1600	482	548	6.5	6.3	--	--	--	--
151	OSW 153	9-05-91	1630	324	331	6.2	6.2	11.6	8.0	18.2	.4
		6-09-92	0915	238	231	6.2	5.8	12.4	--	18.4	.08
		12-16-92	1430	497	498	7.2	5.9	12.9	--	17.7	.3
	OSW 157	9-05-91	1500	1,430	1,460	5.7	5.6	10.9	8.1	19.5	.3
		6-09-92	1000	2,410	2,430	5.5	5.4	11.5	.05	17.9	.3
		12-16-92	1400	2,330	2,360	5.6	5.5	11.7	<.05	18.9	.6
	OSW 151	9-05-91	1615	172	185	6.4	6.6	10.2	.00	22.7	.3
		6-09-92	0830	212	215	6.4	6.2	10.4	.00	19.2	.5
		12-16-92	1330	677	693	6.5	5.6	11.7	--	22.4	.08
154	OSW 138	1-04-91	1030	140	140	6.4	6.0	10.6	--	--	--
		3-20-91	1700	55	149	6.4	6.1	11.0	5.9	19.8	2.3
		6-27-91	1500	149	150	6.4	6.0	11.3	6.1	18.8	.4
		9-09-91	1530	--	154	--	6.1	11.1	6.3	18.9	.2
		6-11-92	1145	171	173	6.1	5.9	11.4	5.1	17.9	.2
		12-29-92	1430	200	200	7.0	5.8	11.3	5.4	17.7	.5

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
154	OSW 155	8-14-91	1245	--	--	--	--	--	--	--	--
		9-09-91	1500	--	105	--	6.6	9.9	9.0	19.7	0.5
		6-11-92	1215	102	103	6.6	6.5	10.0	8.2	18.3	.7
		12-29-92	1500	143	142	7.1	6.2	10.0	7.8	19.7	.07
	OSW 154	9-09-91	1430	--	112	--	6.3	9.8	6.2	19.9	.8
		6-11-92	1245	108	111	6.3	6.2	9.8	4.9	19.3	.5
		12-29-92	1530	106	108	6.6	--	9.7	6.4	19.8	.1
156	OSW 140	1-04-91	1230	161	166	6.4	6.1	10.7	--	--	--
		3-22-91	1200	154	157	6.1	6.0	10.9	9.1	17.3	.8
		6-27-91	1545	161	160	6.0	5.8	11.1	8.8	18.8	.4
		9-06-91	1530	168	171	6.0	5.9	10.9	6.8	17.3	.4
		5-01-92	1130	--	188	--	--	10.5	4.4	--	--
		6-11-92	0900	178	178	6.0	5.8	11.1	6.3	17.4	.4
		12-22-92	1500	193	193	6.1	5.7	11.0	7.0	17.7	.4
	OSW 167	5-01-92	1400	--	500	--	--	10.8	--	--	--
		6-11-92	1045	723	729	5.8	5.8	10.5	7.8	18.7	.1
		9-02-92	1230	--	1,090	--	5.8	10.5	6.8	--	--
		10-28-92	1530	--	1,350	--	5.7	10.5	4.2	--	--
		12-22-92	1400	1,530	1,550	5.7	5.6	10.6	3.8	19.3	.3
	OSW 161	1-28-92	1400	--	549	--	6.2	10.3	8.1	--	--
		3-04-92	0830	--	677	--	6.1	10.3	5.8	--	--
		4-06-92	1700	--	802	--	5.9	10.3	6.4	--	--
		5-01-92	1100	--	918	--	--	10.4	5.5	--	--
		6-11-92	1015	1,080	1,100	5.8	5.7	10.4	7.2	19.1	.1
		7-30-92	1400	1,330	1,320	5.5	--	10.4	6.2	--	--
		9-02-92	1200	--	1,480	--	5.7	10.4	5.8	--	--
		10-28-92	1500	--	1,710	--	5.7	10.4	.2	--	--
		12-22-92	1300	1,850	1,860	5.7	5.7	10.5	2.6	19.8	.3
	OSW 156	9-06-91	1615	132	134	6.6	6.5	9.9	.00	18.1	.1
		6-11-92	0930	137	140	7.2	6.4	10.0	.1	19.0	.07
		12-22-92	1200	127	135	6.9	6.4	10.0	.00	20.0	.23
158	OSW 158	9-09-91	1645	--	113	--	6.3	9.8	3.3	19.7	.8
		6-12-92	1015	112	114	6.5	6.3	9.7	3.0	20.6	.2
		12-29-92	1330	113	116	6.9	6.4	9.6	.9	19.1	.7
159	OSW 159	9-11-91	1630	990	1,040	6.1	6.0	10.5	9.2	20.4	.3
		6-10-92	1630	2,380	2,450	5.6	5.6	10.7	.9	18.9	.0
		12-18-92	1600	2,570	2,640	5.6	5.6	10.8	.7	18.9	.6
162	OSW 164	6-16-92	1600	126	128	6.3	6.2	9.9	10.1	19.5	.6
		12-28-92	1330	132	136	6.2	6.1	9.9	9.4	17.6	.9
	OSW 162	6-16-92	1630	161	176	6.7	6.8	9.9	.05	--	--
		12-28-92	1400	161	180	6.6	6.9	--	.00	--	--
168	OSW 139	9-11-91	1715	165	174	6.5	6.3	--	--	--	--
		6-18-92	1345	169	167	6.3	6.1	--	--	--	--
		12-22-92	1415	165	167	7.3	6.0	--	--	--	--
	OSW 172	7-02-92	1330	166	182	6.6	6.3	--	--	--	--
		12-22-92	1030	127	182	6.1	6.3	--	--	--	--
	OSW 168	6-18-92	1030	154	157	6.2	6.0	9.7	.6	20.1	.3
		12-22-92	1100	148	151	6.6	5.4	9.6	.3	19.5	.3

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Specific conductance		pH		Temperature, water (°C)	Oxygen, dissolved	Nitrogen gas, dissolved (as N)	
				Lab	Field	Lab	Field			Concentration	Standard deviation
169	OSW 170	6-10-92	1300	2,620	2,660	5.6	5.4	13.5	0.05	20.7	0.1
		7-30-92	1200	2,590	2,580	5.2	--	13.1	.05	--	--
		12-16-92	1600	2,750	2,780	5.4	5.3	13.1	<.05	20.3	.3
	OSW 169	6-10-92	1230	3,070	3,120	5.5	5.4	11.5	.2	20.6	.2
		7-30-92	1115	2,980	3,000	5.2	--	11.5	.1	--	--
		12-16-92	1530	2,960	3,000	5.4	5.4	11.7	.05	19.5	.4
171	OSW 113	9-14-89	1445	133	132	6.8	5.9	--	--	--	--
		3-28-90	1600	--	--	--	--	10.0	--	--	--
		3-20-91	1630	126	147	6.4	6.0	10.0	7.8	19.7	.6
		9-09-91	1730	--	153	--	6.0	9.8	9.1	19.5	.8
		6-17-92	1130	156	156	6.1	5.9	10.0	8.6	19.8	.2
		12-29-92	1215	168	169	6.9	5.8	9.6	7.8	20.0	.9
	OSW 171	6-17-92	1030	126	138	6.7	5.8	9.7	.00	19.4	.2
		12-29-92	1200	123	139	6.5	6.8	9.6	.00	19.0	.2
174	OSW 106	3-21-91	1345	439	450	5.9	5.6	11.2	9.9	18.1	2.0
		6-25-91	1330	326	328	6.1	5.7	11.4	10.1	17.7	.05
		[1]9-10-91	1215	--	425	--	5.7	11.3	10.8	20.1	.3
			1225	--	--	--	--	--	--	--	--
		6-08-92	1630	682	687	5.7	5.6	11.8	1.2	19.6	.8
		9-02-92	1530	--	1,210	--	--	11.8	2.0	--	--
		12-16-92	1200	1,140	1,170	7.0	5.5	12.2	3.8	18.2	.9
	OSW 173	6-25-92	1400	1,500	1,510	5.4	5.3	12.4	.05	17.9	.2
		9-03-92	1330	--	--	--	--	--	--	--	--
		12-16-92	1100	2,160	2,180	5.1	5.2	13.2	<.05	18.7	.3
	OSW 179	9-10-92	0900	--	1,460	--	5.6	12.2	--	--	--
		12-16-92	1130	1,730	1,740	5.4	5.4	12.2	5.2	18.4	.3
	OSW 175	6-25-92	1300	1,890	1,900	5.7	5.6	11.8	.1	18.7	.1
		9-03-92	1230	--	--	--	5.9	--	1.9	--	--
		12-16-92	1030	2,340	2,360	5.7	5.3	12.0	1.5	18.6	.2
	OSW 174	6-25-92	1500	190	192	6.3	6.1	10.7	2.1	19.5	.3
		9-10-92	0830	--	222	--	6.1	10.8	2.0	--	--
		12-16-92	0930	224	226	7.0	5.9	11.0	1.9	--	--

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
86	OSW 137	1-03-91	1630	--	--	--	--	--	--	--
		2-20-91	0930	--	--	--	--	--	--	--
		[1]3-22-91	1045	11	4.1	49	35	39	2.8	23
			1100	--	--	48	35	38	2.8	23
		4-18-91	1130	--	--	--	--	--	--	--
		5-29-91	0930	--	--	--	--	--	--	--
		6-26-91	1030	14	.9	56	42	41	3.1	22
		7-31-91	1030	--	--	--	--	--	--	--
		[1]9-11-91	1100	14	.5	43	33	34	2.5	23
			1115	--	--	43	33	35	2.5	24
		11-08-91	1130	--	--	--	--	--	--	--
		12-04-91	1300	--	--	--	--	--	--	--
		1-28-92	1430	--	--	--	--	--	--	--
		3-04-92	0900	--	--	--	--	--	--	--
		4-06-92	1615	--	--	--	--	--	--	--
		6-11-92	1415	32	.3	46	35	36	2.7	21
		12-18-92	1430	85	1.4	73	54	48	3.5	20
	OSW 84	3-22-89	0900	--	--	2.8	1.8	13	1.0	13
		9-05-89	1015	--	--	2.9	1.7	12	.9	13
		1-31-90	1400	--	--	--	--	--	--	--
		3-22-91	1015	.6	.3	3.3	1.8	11	.9	12
		[1]6-26-91	0945	.0	.0	3.1	2.0	12	.9	13
			0955	--	--	3.1	2.0	12	.9	13
		9-11-91	1000	.4	.0	3.1	2.0	12	.8	13
		6-11-92	1345	1.2	.2	3.6	2.3	13	1.0	13
		12-18-92	1400	5.9	.3	17	11	26	1.8	12
	OSW 85	3-22-89	1200	--	--	3.0	1.9	12	1.1	10
		9-05-89	1115	--	--	3.0	1.9	11	1.0	8
		3-22-91	1115	.6	.2	3.3	1.9	11	.9	10
		6-26-91	1015	.2	.0	--	--	--	--	--
		9-11-91	1145	--	--	--	--	--	--	--
		6-11-92	1600	--	--	3.6	2.4	11	.9	9.9
		12-18-92	1500	--	--	18	12	17	1.5	9.9
	OSW 86	3-22-89	1600	--	--	2.6	1.5	12	1.0	9.0
		9-05-89	1130	--	--	2.3	1.5	12	.9	10
		3-22-91	0915	.9	.4	3.5	2.3	12	.8	9.3
		6-26-91	0900	5.9	.2	--	--	--	--	--
		9-11-91	1000	3.7	1.4	--	--	--	--	--
		6-11-92	1400	6.8	.5	5.8	4.4	14	.9	10
		12-18-92	1300	5.7	.3	7.1	5.4	14	1.0	10
87	OSW 88	3-23-89	1700	--	--	3.1	2.1	16	1.1	14
		9-12-89	1100	--	--	2.8	2.0	15	.8	14
		2-01-90	0900	--	--	--	--	--	--	--
		3-19-91	1500	2.5	.9	4.0	2.7	20	1.0	28
		6-27-91	1445	1.1	.6	3.5	2.4	19	.9	26
		9-11-91	1330	3.2	.1	3.6	2.6	19	.9	26
		6-11-92	1600	6.2	.2	5.4	3.7	24	1.2	32
		12-17-92	1530	11	.3	19	13	36	2.0	18

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
87	OSW 89	9-13-89	1345	--	--	2.6	1.7	12	1.2	11
		3-19-91	1630	--	--	2.7	1.8	12	1.0	9.9
		6-27-91	1400	--	--	2.6	1.7	12	1.0	11
		9-11-91	1400	--	--	--	--	--	--	--
		10-04-91	1430	--	--	6.1	4.1	16	1.2	11
		6-12-92	1045	--	--	50	37	34	3.2	6.0
		12-17-92	1500	--	--	310	60	87	10	9.1
	OSW 163	6-12-92	1000	15	0.2	26	19	26	3.0	9.3
		12-17-92	1445	95	1.3	82	59	43	5.1	10
	OSW 87	9-12-89	1830	--	--	6.6	4.2	18	1.4	5.0
		1-31-90	1700	--	--	--	--	--	--	--
		3-19-91	1400	.0	.0	5.0	2.9	16	1.2	6.5
		[1]6-27-91	1300	.0	.0	--	--	--	--	--
			1330	--	--	--	--	--	--	--
		9-11-91	1300	.0	.0	4.7	3.0	16	1.2	7.3
		6-12-92	0900	2.7	1.1	4.9	3.1	17	1.3	7.1
		12-17-92	1400	1.7	.1	4.5	3.0	18	1.2	8.4
93	OSW 135	5-24-90	1445	--	--	9.6	8.8	25	2.3	30
		6-06-90	--	--	--	--	--	--	--	--
		6-25-90	--	--	--	--	--	--	--	--
		7-30-90	1515	--	--	--	--	--	--	--
		8-13-90	1300	--	--	--	--	--	--	--
		8-27-90	1300	--	--	--	--	--	--	--
		9-10-90	1115	--	--	--	--	--	--	--
		10-05-90	1300	--	--	--	--	--	--	--
		11-02-90	1400	--	--	--	--	--	--	--
		12-06-90	1330	--	--	--	--	--	--	--
		1-04-91	1330	--	--	--	--	--	--	--
		2-20-91	1500	--	--	--	--	--	--	--
		3-19-91	1200	--	--	82	71	55	3.8	18
		4-18-91	1600	--	--	--	--	--	--	--
		5-29-91	1345	--	--	--	--	--	--	--
		6-26-91	1430	--	--	76	68	48	3.2	22
		7-31-91	1515	--	--	--	--	--	--	--
		9-06-91	1345	--	--	130	110	64	3.8	17
		11-08-91	1230	--	--	--	--	--	--	--
		12-04-91	1530	--	--	--	--	--	--	--
		1-27-92	1400	--	--	--	--	--	--	--
		2-19-92	1000	--	--	--	--	--	--	--
		3-04-92	1115	--	--	--	--	--	--	--
		4-06-92	1545	--	--	--	--	--	--	--
		6-10-92	1145	--	--	160	80	75	4.7	15
		8-06-92	1100	--	--	--	--	--	--	--
		8-19-92	1100	--	--	--	--	--	--	--
		9-10-92	1600	--	--	--	--	--	--	--
		10-29-92	1230	--	--	--	--	--	--	--
		12-22-92	1145	--	--	140	62	66	5.4	14
	OSW 178	8-20-92	1300	--	--	--	--	--	--	--
		9-10-92	1330	--	--	--	--	--	--	--
		10-28-92	1315	--	--	--	--	--	--	--
		12-21-92	1430	590	3.2	320	25	110	27	<1.0

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
93	OSW 90	3-23-89	1000	--	--	2.0	1.6	14	0.8	12
		9-05-89	1200	--	--	2.2	1.6	15	.7	13
		1-31-90	1215	--	--	--	--	--	--	--
		6-06-90	--	--	--	--	--	--	--	--
		6-14-90	--	--	--	--	--	--	--	--
		6-25-90	1400	--	--	--	--	--	--	--
		7-30-90	1520	--	--	--	--	--	--	--
		8-13-90	1430	--	--	--	--	--	--	--
		8-27-90	1230	--	--	--	--	--	--	--
		9-10-90	1045	--	--	--	--	--	--	--
		10-05-90	1230	--	--	--	--	--	--	--
		11-02-90	1345	--	--	--	--	--	--	--
		12-06-90	1130	--	--	--	--	--	--	--
		1-03-91	1240	--	--	--	--	--	--	--
		2-20-91	1130	--	--	--	--	--	--	--
		[1]3-19-91	1100	21	0.0	82	59	53	3.8	11
			1110	--	--	83	60	53	3.7	11
		4-18-91	1045	--	--	--	--	--	--	--
		5-29-91	1030	--	--	--	--	--	--	--
		[1]6-25-91	1500	22	.7	99	72	53	4.0	11
			1510	--	--	98	72	53	3.9	9.7
		7-31-91	0945	--	--	--	--	--	--	--
		9-05-91	1330	35	1.3	140	110	61	4.8	9.6
		11-08-91	0800	--	--	--	--	--	--	--
		12-04-91	0930	--	--	--	--	--	--	--
		1-27-92	1330	--	--	--	--	--	--	--
		3-03-92	1500	--	--	--	--	--	--	--
		4-06-92	1330	--	--	--	--	--	--	--
		6-09-92	1330	133	3.4	310	44	110	15	9.0
		8-06-92	1030	--	--	--	--	--	--	--
		8-20-92	1330	--	--	--	--	--	--	--
		9-10-92	1400	--	--	--	--	--	--	--
		10-28-92	1345	--	--	--	--	--	--	--
		12-21-92	1400	660	3.0	350	26	110	21	<1.0
	OSW 91	3-23-89	1200	--	--	3.9	2.5	16	1.7	16
		9-05-89	1230	--	--	4	2.5	16	1.5	14
		1-31-90	1330	--	--	--	--	--	--	--
		3-19-91	1000	4.7	.5	42	28	29	2.1	12
		6-26-91	1415	14	.3	120	77	50	3.6	12
		9-05-91	1300	44	1.6	130	66	52	4.0	9.8
		6-09-92	1400	71	1.9	170	74	63	5.3	9.9
		12-21-92	1330	120	.7	210	100	78	6.6	7.9
	OSW 92	3-23-89	1100	--	--	3.2	2	11	.9	9.0
		9-05-89	1315	--	--	3.4	2	12	.9	9.0
		1-31-90	1430	--	--	--	--	--	--	--
		3-18-91	1600	27	.3	78	57	60	2.9	13
		6-26-91	1330	35	4.0	130	99	75	4.7	12
		9-05-91	1145	59	1.2	140	96	60	4.0	11
		6-09-92	1530	110	1.5	100	45	49	3.7	9.8
		12-21-92	1230	38	.6	38	13	24	2.3	8.6

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
93	OSW 93	3-23-89	1300	--	--	13	7.7	22	2.0	8.0
		9-05-89	1345	--	--	14	8.0	23	2.0	7.0
		1-31-90	1500	--	--	--	--	--	--	--
		3-18-91	1500	0.0	0.0	13	7.3	22	1.8	10
		6-26-91	1200	.0	.0	--	--	--	--	--
		9-05-91	1100	.0	.0	--	--	--	--	--
		6-09-92	1700	.0	.0	12	6.9	22	1.9	8.6
		12-21-92	1100	.0	.0	11	6.7	20	1.8	7.2
94	OSW 108	9-13-89	1610	--	--	2.4	2.2	17	.9	9.0
		2-01-90	1500	--	--	--	--	--	--	-
		3-18-91	1330	.0	.0	4.7	2.5	18	1.2	8.5
		6-25-91	1245	.6	.3	2.5	2.4	17	.9	8.2
		9-11-91	1600	.6	.2	2.4	2.3	15	.9	8.7
		6-08-92	1500	1.8	.0	2.5	2.4	18	.9	9.1
		12-16-92	0830	2.1	.1	2.4	2.5	18	.9	10
	OSW 95	3-23-89	1430	--	--	4.4	2.3	17	1.3	11
		9-13-89	1540	--	--	3.4	1.8	15	1.1	12
		2-01-90	1445	--	--	--	--	--	--	--
		3-18-91	1230	3.5	3.8	2.9	2.3	17	1.2	24
		6-25-91	1200	6.4	1.0	--	--	--	--	--
		9-11-91	1530	7.2	.2	--	--	--	--	--
		6-08-92	1400	.0	.0	3.0	1.6	13	1.0	10
		12-15-92	1600	14	.4	71	34	52	4.9	9.0
	OSW 166	6-08-92	1500	62	.7	150	98	57	6.4	7.0
		12-15-92	1530	310	3.8	180	120	83	6.7	8.2
	OSW 94	3-23-89	1400	--	--	2.5	1.9	17	1.0	13
		9-13-89	1500	--	--	2.6	1.8	17	.9	12
		2-01-90	1400	--	--	--	--	--	--	--
		3-18-91	1130	.0	.0	3.6	2.3	18	1.0	11
		6-25-91	1100	.0	.0	--	--	--	--	--
		9-11-91	1500	.0	.0	--	--	--	--	--
		6-08-92	1430	.5	.0	2.6	1.9	16	.9	11
		12-15-92	1500	.5	.2	3.1	2.5	16	1.0	12
96	OSW 115	9-13-89	1025	--	--	4.9	3.1	13	1.0	19
		2-01-90	1130	--	--	--	--	--	--	--
		3-20-91	1030	.6	.1	4.7	3.2	12	.9	19
		6-27-91	1115	.2	.0	4.2	3.0	12	.9	17
		9-09-91	1245	.4	.1	4.1	2.7	12	.9	21
		6-18-92	1530	.4	.3	3.7	2.4	12	1.0	20
		8-21-92	1230	--	--	--	--	--	--	--
		12-17-92	1145	6.0	.2	10	6.4	19	1.5	16
	OSW 99	3-24-89	1300	--	--	2.8	1.7	14	1.2	10
		9-05-89	1445	--	--	2.2	1.8	13	.7	10
		3-20-91	1130	3.8	.9	10	7.8	26	1.5	14
		4-18-91	1530	--	--	--	--	--	--	--
		5-29-91	1830	--	--	--	--	--	--	--
		6-27-91	0830	2.1	1.2	13	10	29	1.7	10
		7-31-91	1400	--	--	--	--	--	--	--
		9-09-91	1030	5.0	.0	14	11	30	1.7	12
		11-08-91	1315	--	--	--	--	--	--	--

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
96	OSW 99	12-04-91	1400	--	--	--	--	--	--	--
		1-27-92	1200	--	--	--	--	--	--	--
		3-04-92	1100	--	--	--	--	--	--	--
		4-06-92	1600	--	--	--	--	--	--	--
		5-13-92	1430	--	--	--	--	--	--	--
		6-17-92	1330	17	0.4	32	27	32	2.2	10
		8-05-92	1230	--	--	36	30	35	2.4	10
		9-03-92	1530	--	--	--	--	--	--	--
		10-28-92	1045	--	--	--	--	--	--	--
		12-17-92	1100	94	1.9	88	67	57	3.8	10
	OSW 114	9-13-89	--	--	--	1.7	1.3	10	.6	9.0
		2-01-90	1115	--	--	--	--	--	--	--
		3-20-91	1100	4.0	.5	20	17	37	1.9	8.4
		4-18-91	1500	--	--	--	--	--	--	--
		5-29-91	1800	--	--	--	--	--	--	--
		6-27-91	1050	7.9	2.1	47	46	36	2.5	4.9
		7-31-91	1500	--	--	--	--	--	--	--
		9-09-91	1115	16	.6	63	61	41	2.7	8.3
		11-08-91	1330	--	--	--	--	--	--	--
		12-04-91	1500	--	--	--	--	--	--	--
		1-27-92	1130	--	--	--	--	--	--	--
		3-04-92	0930	--	--	--	--	--	--	--
		4-06-92	1530	--	--	--	--	--	--	--
		5-13-92	1400	--	--	--	--	--	--	--
		6-17-92	1230	260	2.5	200	90	80	4.8	6.6
		8-05-92	1230	--	--	--	--	--	--	7.5
		8-21-92	1230	--	--	--	--	--	--	--
		9-03-92	1500	--	--	--	--	--	--	--
		10-28-92	1215	--	--	--	--	--	--	--
		12-17-92	1230	130	1.1	300	46	110	12	7.1
	OSW 98	9-05-89	1530	--	--	3.3	2.1	15	1.0	12
		2-01-90	1030	--	--	--	--	--	--	--
		2-20-91	1030	--	--	--	--	--	--	--
		3-20-91	1000	14	.4	50	41	28	3.1	7.5
		4-18-91	1430	--	--	--	--	--	--	--
		5-29-91	1500	--	--	--	--	--	--	--
		6-27-91	1015	13	2.7	58	51	36	3.1	7.7
		7-31-91	1430	--	--	--	--	--	--	--
		9-09-91	1200	33	.1	180	100	58	4.0	8.2
		11-08-91	1300	--	--	--	--	--	--	--
		12-04-91	1430	--	--	--	--	--	--	--
		1-27-92	1100	--	--	--	--	--	--	--
		3-04-92	1000	--	--	--	--	--	--	--
		4-06-92	1500	--	--	--	--	--	--	--
		5-13-92	1330	--	--	--	--	--	--	--
		6-17-92	1630	123	3.5	260	86	110	7.8	7.7
		7-30-92	0845	--	--	300	80	69	7.3	8.9
		8-05-92	1630	--	--	--	--	--	--	8.3
		9-03-92	1445	--	--	--	--	--	--	--
		10-28-92	1115	--	--	--	--	--	--	--
		12-17-92	1030	160	2.2	93	68	49	4.1	8.1

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
96	OSW 96	3-24-89	1200	--	--	5.1	3.2	14	1.4	9.0
		9-13-89	1200	--	--	7.9	4.8	16	1.5	11
		2-01-90	0945	--	--	--	--	--	--	--
		3-20-91	0900	0.0	0.0	8.6	5.0	17	1.5	12
		6-27-91	0930	.0	.0	9.0	6.1	17	1.5	9.3
		9-09-91	1245	.4	.0	12	8.9	18	1.6	15
		6-17-92	1530	11	.5	17	7.5	17	1.5	13
		12-17-92	0930	17	.3	20	7.5	18	1.6	12
100	OSW 102	9-13-89	1715	--	--	3.4	2.4	15	1.3	9.0
		3-28-90	1130	--	--	--	--	--	--	--
		3-20-91	1500	1.0	.7	1.8	1.4	8.6	.5	4.7
		6-28-91	1330	.0	.0	3.0	2.3	15	.9	8.4
		9-10-91	1530	.0	.0	2.9	2.3	15	1.1	8.1
		6-12-92	1145	.0	.0	1.7	1.4	12	1.0	9.7
		7-30-92	--	--	--	--	--	--	--	--
		12-29-92	0900	14	.2	53	38	38	3.1	6.4
	OSW 100	3-24-89	0800	--	--	4.9	3.3	14	1.3	9.0
		9-13-89	1800	--	--	5.3	3.4	14	1.2	9.0
		3-28-90	1230	--	--	--	--	--	--	--
		[1]3-20-91	1430	.0	.0	2.3	1.4	6.5	.8	3.9
			1440	--	--	3.2	2.1	8.3	.8	4.0
		6-28-91	1230	.0	.0	--	--	--	--	--
		[1]9-10-91	1500	.0	.0	5.8	3.8	15	1.4	7.8
			1510	--	--	5.9	3.7	15	1.4	8.4
		6-12-92	1200	.0	.0	6.0	3.7	15	1.3	8.0
		7-30-92	1500	.0	.0	2.2	1.9	13	1.0	11
		12-29-92	0830	--	--	6.3	4.3	15	1.3	7.9
105	OSW 103	9-14-89	1730	--	--	2.7	2.1	16	1.3	12
		3-21-91	1100	.0	.0	3.3	2.2	16	1.3	12
		6-25-91	1630	--	--	3.5	2.4	18	1.3	11
		9-10-91	1130	--	--	3.3	2.4	18	1.2	11
		6-09-92	1115	2.0	.06	3.5	2.6	19	1.2	11
		12-28-92	1130	--	--	4.4	2.9	18	1.3	12
	OSW 104	9-14-89	1045	--	--	1.9	1.8	12	.8	8.0
		3-21-91	0845	.0	.0	1.9	1.8	11	.8	7.2
		6-25-91	1445	.3	.0	2.1	2.0	13	.9	7.9
		9-10-91	1030	.5	.0	2.0	1.9	13	.8	8.7
		6-09-92	1100	.0	.0	1.9	1.8	13	.8	9.0
		12-28-92	1100	.03	4.8	1.7	1.7	12	.7	8.0
	OSW 105	9-14-89	1015	--	--	3.4	2.4	15	1.6	7.0
		3-22-90	1515	--	--	--	--	--	--	--
		3-21-91	1130	.0	.0	3.1	2.2	13	1.0	7.2
		6-25-91	1600	--	--	2.5	2.2	14	.9	7.5
		9-10-91	1100	.0	.0	2.3	2.0	13	.9	8.3
		6-09-92	1200	50	.6	44	39	46	3.0	6.4
		12-28-92	1200	67	2.5	89	78	51	3.8	8.2
111	OSW 110	9-14-89	1600	--	--	3.9	2.5	15	1.6	11

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
111	OSW 109	9-14-89	1310	--	--	9.8	5.0	17	1.5	6.0
		3-22-90	1630	--	--	--	--	--	--	--
	OSW 111	9-14-89	1200	--	--	7.4	3.5	14	1.5	11
		3-28-90	1515	--	--	--	--	--	--	--
112	OSW 112	9-14-89	1400	--	--	8.4	5.6	23	1.4	13
124	OSW 124	12-28-92	1530	9.5	0.3	4.7	6.5	17	1.2	18
127	OSW 127	3-20-91	1545	--	--	4.2	2.7	8.9	.6	11
129	OSW 129	3-20-91	1520	--	--	2.3	2.0	15	.4	12
144	OSW 144	12-29-92	1000	30	.8	5.7	3.5	20	1.3	17
146	OSW 146	6-19-92	1030	--	--	--	--	--	--	--
			1100	--	--	4.8	5.1	22	.9	21
		12-28-92	1500	9.7	.2	4.8	5.4	22	.9	22
147	OSW 141	1-04-91	1300	--	--	--	--	--	--	--
		2-21-91	1330	--	--	--	--	--	--	--
		3-21-91	1700	31	9.4	200	110	19	5.3	9.2
		4-18-91	1230	--	--	--	--	--	--	--
		5-29-91	1330	--	--	--	--	--	--	--
		6-28-91	0930	51	14	170	90	62	6.2	7.6
		7-31-91	1300	--	--	--	--	--	--	--
		9-06-91	1130	43	1.7	160	84	58	6.5	7.4
		11-08-91	1040	--	--	--	--	--	--	--
		12-04-91	1200	--	--	--	--	--	--	--
		12-10-91	1300	--	--	--	--	--	--	--
		1-28-92	1130	--	--	--	--	--	--	--
		3-03-92	1230	--	--	--	--	--	--	--
		4-06-92	1230	--	--	--	--	--	--	--
		4-28-92	1200	--	--	--	--	--	--	--
		6-10-92	1145	130	14	220	34	70	8.3	3.1
		8-05-92	1100	--	--	--	--	--	--	--
		8-30-92	1600	--	--	--	--	--	--	--
		10-28-92	1215	--	--	--	--	--	--	--
		12-18-92	1130	290	34	300	30	87	14	<1.0
	OSW 142	1-03-91	1430	--	--	--	--	--	--	--
		2-20-91	1200	--	--	--	--	--	--	--
		3-21-91	1500	29	11	340	94	81	8.6	4.6
		4-18-91	1000	--	--	--	--	--	--	--
		5-29-91	1215	--	--	--	--	--	--	--
		6-06-91	1700	--	--	--	--	--	--	--
		6-27-91	0845	59	7.4	260	100	79	8.0	2.7
		7-23-91	1500	--	--	280	100	82	9.3	2.4
		7-31-91	1100	--	--	--	--	--	--	--
		9-06-91	0930	140	1.6	290	81	91	13	<1.0
		11-08-91	1100	--	--	--	--	--	--	--
		12-04-91	1000	--	--	--	--	--	--	--
		12-10-91	1100	--	--	--	--	--	--	--
		1-28-92	1100	--	--	--	--	--	--	--
		2-06-92	1400	--	--	--	--	--	--	--
		3-03-92	1200	--	--	--	--	--	--	--
		4-06-92	1200	--	--	--	--	--	--	--

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
147	OSW 142	4-28-92	1300	--	--	--	--	--	--	--
		6-10-92	1045	160	1.9	320	38	120	19	6.5
		8-05-92	0815	--	--	--	--	--	--	--
		8-30-92	1630	--	--	--	--	--	--	--
		10-28-92	1200	--	--	--	--	--	--	--
		12-18-92	1100	630	13	380	16	110	24	<1.0
	OSW 165	1-28-92	1200	--	--	--	--	--	--	--
		3-03-92	1130	--	--	--	--	--	--	--
		4-06-92	1130	--	--	--	--	--	--	--
		4-28-92	1300	--	--	--	--	--	--	--
		6-10-92	0930	130	3.3	340	42	120	17	6.6
		8-05-92	1030	--	--	--	--	--	--	--
		9-01-92	1330	--	--	--	--	--	--	--
		10-28-92	1130	--	--	--	--	--	--	--
		12-18-92	1030	500	5.8	380	28	110	23	<1.0
	OSW 152	7-31-91	1615	--	--	--	--	--	--	--
		9-06-91	1100	86	5.5	340	52	85	8.9	2.0
		11-08-91	1015	--	--	--	--	--	--	--
		12-04-91	1030	--	--	--	--	--	--	--
		12-10-91	1200	--	--	--	--	--	--	--
		1-28-92	1030	--	--	--	--	--	--	--
		3-03-92	1100	--	--	--	--	--	--	--
		4-06-92	1100	--	--	--	--	--	--	--
		4-28-92	1500	--	--	--	--	--	--	--
		6-10-92	1015	150	4.6	350	37	120	17	9.4
		7-30-92	1015	--	--	410	31	120	20	10
		8-05-92	0930	--	--	--	--	--	--	--
		9-01-92	1230	--	--	--	--	--	--	--
		10-28-92	1045	--	--	--	--	--	--	--
		12-18-92	0945	570	5.0	370	30	110	22	<1.0
	OSW 147	6-28-91	1000	56	7.2	190	110	65	5.6	7.9
		7-24-91	0930	--	--	220	110	69	5.3	9.1
		7-31-91	1200	--	--	--	--	--	--	--
		9-06-91	1015	63	.8	220	140	74	4.7	7.7
		11-08-91	0930	--	--	--	--	--	--	--
		12-04-91	1130	--	--	--	--	--	--	--
		12-10-91	1130	--	--	--	--	--	--	--
		1-28-92	0930	--	--	--	--	--	--	--
		3-03-92	0900	--	--	--	--	--	--	--
		4-06-92	1030	--	--	--	--	--	--	--
		4-29-92	1100	--	--	--	--	--	--	--
		6-10-92	0900	300	5.1	240	100	91	7.2	12
		8-05-92	0930	--	--	--				
		9-01-92	1300	--	--	--	--	--	--	--
		10-28-92	1000	--	--	--	--	--	--	--
		12-18-92	0900	220	5.7	370	30	110	18	11
148	OSW 143	9-10-91	1700	--	--	4.9	3.3	19	3.2	21
		6-16-92	1230	--	--	5.9	3.9	17	2.2	21
		12-29-92	1515	--	--	6.2	4.3	17	2.1	19
	OSW 148	9-10-91	1630	.0	.0	4.9	2.9	15	1.5	6.4
		6-16-92	1045	.0	.0	4.8	2.8	15	1.3	5.6
		12-29-92	1100	.0	.0	4.7	3.0	15	1.2	5.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
149	OSW 107	9-14-89	1645	--	--	6.2	4.2	18	1.8	33
		2-01-90	1215	--	--	--	--	--	--	--
		6-06-90	--	--	--	--	--	--	--	--
		6-25-90	1630	--	--	--	--	--	--	--
		7-30-90	1600	--	--	--	--	--	--	--
		8-13-90	1500	--	--	--	--	--	--	--
		8-27-90	1430	--	--	--	--	--	--	--
		9-10-90	1200	--	--	--	--	--	--	--
		10-05-90	1340	--	--	--	--	--	--	--
		12-06-90	1230	--	--	--	--	--	--	--
		1-03-91	1550	--	--	--	--	--	--	--
		2-20-91	1415	--	--	--	--	--	--	--
		[1]3-21-91	1600	17	2.9	64	51	42	3.3	13
			1610	--	--	63	50	37	3.2	13
		4-18-91	1200	--	--	--	--	--	--	--
		5-29-91	1115	--	--	--	--	--	--	--
		[1]6-27-91	1700	26	2.8	75	67	47	3.7	10
			1710	--	--	76	68	48	3.6	13
		7-09-91	1245	--	--	--	--	--	--	13
		9-06-91	1400	--	--	150	68	55	4.6	12
		6-10-92	1500	34	.4	200	41	73	8.3	10
		7-30-92	1300	--	--	230	48	84	9.0	11
		8-19-92	1230	--	--	--	--	--	--	--
		9-10-92	1530	83	1.0	--	--	--	--	--
		12-22-92	0945	278	2.5	300	23	86	19	<1.0
	OSW 149	9-06-91	1330	.0	.0	10	4.3	18	2.8	14
		6-10-92	1600	98	1.7	110	78	55	6.5	12
		8-19-92	1300	--	--	--	--	--	--	--
		9-10-92	1500	--	--	--	--	--	--	--
		12-22-92	0900	240	2.9	160	89	76	6.7	10
150	OSW 160	1-28-92	1530	14	.8	--	--	--	--	--
		6-09-92	1645	14	.3	380	26	120	22	2.3
		12-21-92	1530	--	--	370	9.3	100	28	<1.0
	OSW 150	9-06-91	1200	--	--	10	5.2	20	1.6	16
		6-09-92	1600	--	--	27	13	30	2.6	14
		12-21-92	1600	--	--	31	15	29	2.7	14
151	OSW 153	9-05-91	1630	21	.7	17	7.7	27	2.0	22
		6-09-92	0915	21	.4	14	5.9	17	1.3	12
		12-16-92	1430	35	.5	33	15	30	2.4	14
	OSW 157	9-05-91	1500	24	.6	120	54	43	5.7	13
		6-09-92	1000	98	1.7	170	110	97	6.5	12
		12-16-92	1400	110	.1	220	60	87	6.9	9.2
	OSW 151	9-05-91	1615	.0	.0	6.4	4.0	16	3.0	14
		6-09-92	0830	.0	.0	9.9	6.2	15	2.1	9.9
		12-16-92	1330	4.5	.1	45	22	37	4.0	5.4
154	OSW 138	1-04-91	1030	--	--	4.2	2.8	16	1.6	21
		3-20-91	1700	1.1	.5	2.1	1.4	7.1	1.0	7.8
		6-27-91	1500	2.3	1.0	4.9	3.3	18	1.4	20
		9-09-91	1530	3.2	.1	4.7	3.2	18	1.5	24
		6-11-92	1145	6.6	.3	5.4	3.6	20	1.3	26
		12-29-92	1430	7.1	.1	6.9	5.0	22	1.3	30

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
154	OSW 155	8-14-91	1245	--	--	--	--	--	--	--
		9-09-91	1500	0.3	0.1	3.6	2.0	12	0.9	16
		6-11-92	1215	.4	.0	3.4	2.0	11	.9	13
		12-29-92	1500	2.0	.1	5.2	3.3	15	1.1	14
	OSW 154	9-09-91	1430	.7	.2	3.1	1.9	13	1.9	13
		6-11-92	1245	.7	.0	3.2	1.9	12	1.3	11
		12-29-92	1530	1.0	.4	3.0	2.0	12	1.1	11
156	OSW 140	1-04-91	1230	--	--	4.6	3.0	20	1.4	23
		3-22-91	1200	.7	.2	4.3	2.7	19	1.1	20
		6-27-91	1545	2.3	.5	4.4	3.3	21	1.0	18
		9-06-91	1530	5.5	.4	4.7	3.7	22	1.0	23
		5-01-92	1130	--	--	--	--	--	--	--
		6-11-92	0900	6.8	.5	4.9	3.5	22	1.2	23
		12-22-92	1500	6.2	.4	5.5	4.4	23	1.2	23
	OSW 167	5-01-92	1400	--	--	--	--	--	--	--
		6-11-92	1045	14	1.0	38	26	42	3.0	13
		9-02-92	1230	--	--	--	--	--	--	--
		10-28-92	1530	--	--	--	--	--	--	--
		12-22-92	1400	39	.4	99	71	59	4.2	12
	OSW 161	1-28-92	1400	--	--	--	--	--	--	--
		3-04-92	0830	--	--	--	--	--	--	--
		4-06-92	1700	--	--	--	--	--	--	--
		5-01-92	1100	--	--	--	--	--	--	--
		6-11-92	1015	17	.4	63	45	49	3.7	11
		7-30-92	1400	--	--	77	59	53	3.7	12
		9-02-92	1200	--	--	--	--	--	--	--
		10-28-92	1500	--	--	--	--	--	--	--
		12-22-92	1300	46	.4	110	64	64	4.5	11
	OSW 156	9-06-91	1615	.0	.0	4.6	3.0	13	1.8	18
		6-11-92	0930	.0	.0	6.3	2.7	13	2.3	18
		12-22-92	1200	.0	--	5.2	3.0	13	1.3	16
158	OSW 158	9-09-91	1645	.0	.0	3.7	1.9	12	2.0	11
		6-12-92	1015	.0	.0	3.9	1.8	11	1.0	9.3
		12-29-92	1330	.9	.0	3.7	1.9	11	1.0	7.8
159	OSW 159	9-11-91	1630	14	.2	59	44	43	3.7	13
		6-10-92	1630	86	1.3	150	120	75	5.5	12
		12-18-92	1600	140	--	190	110	90	6.7	10
162	OSW 164	6-16-92	1600	.0	.0	4.0	2.2	14	2.1	13
		12-28-92	1330	2.7	.1	3.9	2.3	16	1.4	15
	OSW 162	6-16-92	1630	--	--	6.9	3.9	14	2.4	21
		12-28-92	1400	.0	.0	6.6	4.0	14	2.0	17
168	OSW 139	9-11-91	1715	--	--	6.6	3.8	18	1.0	19
		6-18-92	1345	--	--	6.2	3.7	18	1.2	19
		12-22-92	1415	--	--	6.5	4.1	18	.9	17
	OSW 172	7-02-92	1330	--	--	6.4	3.7	16	1.8	21
		12-22-92	1030	--	--	7.9	4.4	18	1.8	23

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Nitrous oxide, dissolved (as N)		Calcium, dissolved	Magnesium, dissolved	Sodium, dissolved	Potassium, dissolved	Alkalinity, lab (as $CaCO_3$)
				Concen-tration	Standard deviation					
168	OSW 168	6-18-92	1030	0.0	0.0	3.9	2.2	18	2.6	11
		12-22-92	1100	.0	.0	5.0	3.2	15	1.2	3.8
169	OSW 170	6-10-92	1300	310	7.1	280	42	90	11	11
		7-30-92	1200	--	--	300	39	90	9.7	10
		12-16-92	1600	210	66	300	29	100	13	2.5
	OSW 169	6-10-92	1230	160	1.5	360	49	79	13	9.1
		7-30-92	1115	--	--	380	47	83	12	11
		12-16-92	1530	160	2.7	330	33	100	16	<1.0
171	OSW 113	9-14-89	1445	--	--	4.0	2.8	15	1.3	13
		3-28-90	1600	--	--	--	--	--	--	--
		3-20-91	1630	3.8	2.5	4.8	3.5	15	.9	11
		9-09-91	1730	4.8	.1	5.0	3.6	15	1.0	15
		6-17-92	1130	9.9	.5	5.2	3.9	15	1.0	13
		12-29-92	1215	18	.3	5.6	4.7	17	1.1	13
	OSW 171	6-17-92	1030	.0	.0	5.7	2.7	11	1.6	13
		12-29-92	1200	.0	.0	5.4	2.8	9.9	1.1	11
174	OSW 106	3-21-91	1345	4.0	2.2	18	13	34	2.6	8.4
		6-25-91	1330	2.6	.0	13	10	26	2.2	7.8
		[1]9-10-91	1215	4.4	.2	20	16	26	2.5	6.9
			1225	--	--	19	16	26	2.5	7.1
		6-08-92	1630	29	.5	32	30	34	3.3	6.9
		9-02-92	1530	--	--	--	--	--	--	--
		12-16-92	1200	52	.6	84	41	50	6.5	3.8
	OSW 173	6-25-92	1400	--	--	140	35	62	8.1	7.0
		9-03-92	1330	--	--	--	--	--	--	--
		12-16-92	1100	170	1.4	200	52	79	11	6.1
	OSW 179	9-10-92	0900	--	--	--	--	--	--	--
		12-16-92	1130	98	2.3	140	58	70	5.2	6.0
	OSW 175	6-25-92	1300	--	--	150	73	60	8.0	10
		9-03-92	1230	--	--	--	--	--	--	--
		12-16-92	1030	110	.5	260	20	88	14	3.1
	OSW 174	6-25-92	1500	--	--	6.6	4.1	20	1.8	11
		9-10-92	0830	--	--	--	--	--	--	--
		12-16-92	0930	--	--	8.2	5.3	22	1.7	7.4

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
86	OSW 137	1-03-91	1630	3.5	180	0.2	--	<0.01	5.5	0.06	0.6
		2-20-91	0930	2.9	210	<.1	--	<.01	6.8	.01	.6
		[1]3-22-91	1045	2.7	210	<.1	13	--	5.7	.02	.4
			1100	2.9	200	<.1	13	--	5.7	.02	.5
		4-18-91	1130	--	230	--	--	<.01	7.8	.02	.5
		5-29-91	0930	--	230	--	--	<.01	8.6	<.01	.5
		6-26-91	1030	2.7	260	<.1	13	<.01	8.6	.02	.5
		7-31-91	1030	--	230	--	--	<.01	8.2	.02	.4
		[1]9-11-91	1100	2.7	190	<.1	13	<.01	7.5	.07	.5
			1115	2.8	190	<.1	13	<.01	7.7	.02	.6
		11-08-91	1130	--	180	--	--	<.01	9.0	.02	<.2
		12-04-91	1300	--	190	--	--	<.01	10	.01	<.2
		1-28-92	1430	--	--	--	--	<.01	13	.01	<.2
		3-04-92	0900	--	260	--	--	<.01	14	<.01	<.2
		4-06-92	1615	--	260	--	--	<.01	15	.01	<.2
		6-11-92	1415	1.4	200	.2	12	<.01	11	.01	.2
		12-18-92	1430	2.0	320	<.1	13	.02	12	<.01	.2
	OSW 84	3-22-89	0900	2.2	15	.1	13	--	.23	.02	.2
		9-05-89	1015	2.0	18	.1	14	--	.27	.02	<.2
		1-31-90	1400	--	--	--	--	--	--	--	--
		3-22-91	1015	2.6	21	.2	14	--	.19	.01	<.2
		[1]6-26-91	0945	2.2	20	.1	14	<.01	.21	.02	<.2
			0955	2.2	21	<.1	14	<.01	.23	.02	<.2
		9-11-91	1000	2.5	21	<.1	14	<.01	.24	<.01	<.2
		6-11-92	1345	2.1	26	<.1	13	<.01	.46	<.01	<.2
		12-18-92	1400	.7	94	<.1	15	.02	2.4	<.01	<.2
	OSW 85	3-22-89	1200	8.1	15	.1	13	--	.24	.02	.5
		9-05-89	1115	9.0	16	.1	13	--	.19	<.01	.3
		3-22-91	1115	7.2	18	.2	13	--	.30	<.01	<.2
		6-26-91	1015	--	19	--	--	--	--	--	--
		9-11-91	1145	--	14	--	--	--	--	--	--
		6-11-92	1600	5.7	23	<.1	12	<.01	.42	<.01	<.2
		12-18-92	1500	4.1	81	<.1	13	.02	1.7	.01	<.2
	OSW 86	3-22-89	1600	6.5	17	.1	12	--	.20	.02	.4
		9-05-89	1130	4.0	17	.1	12	--	.17	.01	<.2
		3-22-91	0915	4.3	23	.2	12	--	.17	<.01	<.2
		6-26-91	0900	--	30	--	--	--	--	--	--
		9-11-91	1000	--	30	--	--	--	--	--	--
		6-11-92	1400	4.7	38	<.1	11	<.01	.98	<.01	.2
		12-18-92	1300	4.5	41	<.1	12	.02	.89	<.01	<.2
87	OSW 88	3-23-89	1700	4.4	23	.1	13	--	<.10	.01	<.2
		9-12-89	1100	4.0	20	.1	14	--	<.10	<.01	.2
		2-01-90	0900	--	--	--	--	--	--	--	--
		3-19-91	1500	4.0	24	<.1	15	--	.64	.07	<.2
		6-27-91	1445	5.0	22	.2	16	<.01	.43	<.01	1.0
		9-11-91	1330	3.9	24	<.1	16	<.01	.53	.03	<.2
		6-11-92	1600	3.0	35	<.1	16	<.01	1.5	<.01	<.2
		12-17-92	1530	1.3	100	<.1	17	.03	4.5	.01	<.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
87	OSW 89	9-13-89	1345	6.0	16	<0.1	11	--	0.14	0.01	<0.2
		3-19-91	1630	7.9	16	<.1	11	--	.06	.01	<.2
		6-27-91	1400	6.4	18	.2	11	<0.01	.16	<.01	.3
		9-11-91	1400	--	29	--	--	--	--	--	--
		10-04-91	1430	5.4	41	<.1	12	<.01	.48	<.01	<.2
		6-12-92	1045	3.2	240	<.1	10	<.01	4.3	.01	<.2
		12-17-92	1500	<.1	810	<.1	10	.08	32	2.0	2.2
	OSW 163	6-12-92	1000	2.3	140	<.1	11	<.01	1.7	.01	<.2
		12-17-92	1445	2.8	350	<.1	13	.02	8.4	.02	<.2
	OSW 87	9-12-89	1830	10	40	.1	17	--	<.10	<.01	<.2
		1-31-90	1700	--	--	--	--	--	--	--	--
		3-19-91	1400	13	30	<.1	16	--	<.05	<.01	<.2
		[1]6-27-91	1300	--	35	--	--	--	--	--	--
			1330	--	35	--	--	--	--	--	--
		9-11-91	1300	3.8	30	<.1	12	<.01	.06	.01	<.2
		6-12-92	0900	14	35	<.1	15	<.01	.07	<.01	<.2
		12-17-92	1400	12	29	<.1	17	.03	.14	.01	<.2
93	OSW 135	5-24-90	1445	5.8	55	.1	16	--	1.2	.03	.5
		6-06-90	--	--	--	--	--	--	--	--	--
		6-25-90	--	--	--	--	--	--	--	--	--
		7-30-90	1515	3.4	160	<.1	--	--	--	--	--
		8-13-90	1300	3.0	190	<.1	--	--	--	--	--
		8-27-90	1300	--	260	--	--	--	3.7	.08	.6
		9-10-90	1115	2.4	340	<.1	--	--	--	--	--
		10-05-90	1300	2.1	330	<.1	--	--	--	--	--
		11-02-90	1400	2.9	380	<.1	--	<.01	7.6	.01	.6
		12-06-90	1330	1.5	390	.2	--	<.01	9.1	.05	.5
		1-04-91	1330	2.5	480	.2	--	<.01	11	.07	.8
		2-20-91	1500	2.1	450	<.1	--	<.01	10	.04	.8
		3-19-91	1200	1.7	410	.1	14	--	4.7	.02	.9
		4-18-91	1600	--	420	--	--	.04	10	.13	.9
		5-29-91	1345	--	310	--	--	<.01	10	.02	.4
		6-26-91	1430	2.6	380	<.1	15	<.01	10	.07	.8
		7-31-91	1515	--	510	--	--	<.01	16	.06	.6
		9-06-91	1345	1.5	610	<.1	15	<.01	28	.02	1.5
		11-08-91	1230	--	600	--	--	<.01	27	.06	.3
		12-04-91	1530	--	540	--	--	<.01	25	.05	.3
		1-27-92	1400	--	490	--	--	<.01	25	.04	.4
		2-19-92	1000	--	360	--	--	--	--	--	--
		3-04-92	1115	--	460	--	--	<.01	27	.04	.6
		4-06-92	1545	--	400	--	--	<.01	28	.09	.9
		6-10-92	1145	1.2	540	1.6	16	<.01	25	.02	.9
		8-06-92	1100	--	410	--	--	<.01	15	.04	.5
		8-19-92	1100	--	420	--	--	<.01	16	.04	.4
		9-10-92	1600	--	530	--	--	.01	19	.10	.4
		10-29-92	1230	--	610	--	--	.03	24	.12	.6
		12-22-92	1145	.9	490	<.1	17	.03	20	.17	.4
	OSW 178	8-20-92	1300	--	820	--	--	.11	23	1.3	2.8
		9-10-92	1330	--	890	--	--	.14	28	4.1	4.3
		10-28-92	1315	--	660	--	--	.23	24	3.1	4.0
		12-21-92	1430	2.0	840	<.1	15	.13	36	7.2	7.8

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
93	OSW 90	3-23-89	1000	5.7	17	0.1	12	--	<0.10	0.01	0.3
		9-05-89	1200	5.0	15	.1	13	--	.22	<.01	<.2
		1-31-90	1215	--	--	--	--	--	--	--	--
		6-06-90	--	--	--	--	--	--	--	--	--
		6-14-90	--	--	--	--	--	--	--	--	--
		6-25-90	1400	--	19	--	--	--	1.1	<.01	.5
		7-30-90	1520	2.6	78	<.1	--	--	--	--	--
		8-13-90	1430	1.6	120	<.1	--	--	--	--	--
		8-27-90	1230	--	180	--	--	--	1.5	.05	.3
		9-10-90	1045	1.2	220	<.1	--	--	--	--	--
		10-05-90	1230	<1.0	280	<.1	--	--	--	--	--
		11-02-90	1345	1.3	390	<.1	--	<.01	4.6	.07	.6
		12-06-90	1130	<1.0	430	.3	--	<.01	7.1	.04	<.2
		1-03-91	1240	1.3	360	.2	--	<.01	5.3	.06	.7
		2-20-91	1130	1.1	350	<.1	--	<.01	5.2	.01	.7
		[1]3-19-91	1100	<1.0	390	<.1	14	--	7.8	<.01	.8
			1110	<1.0	390	<.1	14	--	7.6	<.01	.6
		4-18-91	1045	--	500	--	--	<.01	11	<.01	.8
		5-29-91	1030	--	380	--	--	<.01	10	.01	.4
		[1]6-25-91	1500	.9	500	<.1	15	<.01	11	.02	.7
			1510	.9	520	<.1	15	<.01	11	.02	.6
		7-31-91	0945	--	450	--	--	<.01	11	<.01	.6
		9-05-91	1330	.6	630	<.1	16	<.01	18	<.01	.5
		11-08-91	0800	--	630	--	--	<.01	<.05	<.01	.8
		12-04-91	0930	--	800	--	--	.05	34	.94	1.1
		1-27-92	1330	--	760	--	--	.04	35	.69	1.2
		3-03-92	1500	--	740	--	--	.03	34	.78	1.9
		4-06-92	1330	--	790	--	--	.04	36	1.7	4.2
		6-09-92	1330	<.1	720	3.0	15	.05	28	3.0	4.7
		8-06-92	1030	--	880	--	--	.07	21	2.6	4.5
		8-20-92	1330	--	870	--	--	.06	21	2.4	3.9
		9-10-92	1400	--	920	--	--	.05	24	2.9	3.1
		10-28-92	1345	--	870	--	--	.10	27	3.5	4.2
		12-21-92	1400	.5	870	.3	15	.12	34	5.9	6.3
	OSW 91	3-23-89	1200	3.2	27	.1	16	--	<.10	.01	.3
		9-05-89	1230	3.0	28	.1	16	--	<.10	.37	.6
		1-31-90	1330	--	--	--	--	--	--	--	--
		3-19-91	1000	1.6	190	<.1	14	--	2.9	.02	.4
		6-26-91	1415	1.0	510	<.1	16	<.01	14	.05	.6
		9-05-91	1300	.9	500	<.1	15	.01	15	.15	.9
		6-09-92	1400	<.1	500	.4	16	.02	20	.09	.2
		12-21-92	1330	.2	770	<.1	16	.03	25	.25	.4
	OSW 92	3-23-89	1100	8.5	17	.1	15	--	.13	.01	.4
		9-05-89	1315	7.0	18	.1	16	--	.12	<.01	<.2
		1-31-90	1430	--	--	--	--	--	--	--	--
		3-18-91	1600	4.3	390	<.1	17	--	.4	.02	.4
		6-26-91	1330	2.6	620	<.1	18	<.01	15	.02	.5
		9-05-91	1145	3.6	610	.1	17	<.01	20	.04	.8
		6-09-92	1530	5.7	310	1.1	17	<.01	17	<.01	.5
		12-21-92	1230	7.8	130	<.1	16	.02	3.6	.17	<.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
93	OSW 93	3-23-89	1300	11	64	0.1	23	--	<0.10	0.03	0.3
		9-05-89	1345	10	77	.1	24	--	<.10	.02	<.2
		1-31-90	1500	--	--	--	--	--	--	--	--
		3-18-91	1500	10	69	<.1	24	--	.08	.06	<.2
		6-26-91	1200	--	69	--	--	--	--	--	--
		9-05-91	1100	--	72	--	--	--	--	--	--
		6-09-92	1700	8.2	72	<.1	22	<.01	<.05	.08	<.2
		12-21-92	1100	8.5	61	<.1	23	.02	<.05	.02	<.2
94	OSW 108	9-13-89	1610	7.0	24	<.1	11	--	<.10	<.01	<.2
		2-01-90	1500	--	--	--	--	--	--	--	--
		3-18-91	1330	5.3	27	<.1	12	--	.14	.03	<.2
		6-25-91	1245	4.7	31	.1	12	<.01	.19	.01	<.2
		9-11-91	1600	5.0	29	<.1	12	<.01	.25	<.01	<.2
		6-08-92	1500	5.3	32	<.1	12	<.01	.46	<.01	<.2
		12-16-92	0830	5.7	26	<.1	12	.02	.61	<.01	<.2
	OSW 95	3-23-89	1430	3.6	28	.1	11	--	<.10	.02	.5
		9-13-89	1540	4.0	22	.1	11	--	<.10	<.01	<.2
		2-01-90	1445	-	--	--	--	--	--	--	--
		3-18-91	1230	12	20	<.1	11	--	.21	.02	<.2
		6-25-91	1200	--	14	--	--	--	--	--	--
		9-11-91	1530	--	13	--	--	--	--	--	--
		6-08-92	1400	3.5	24	<.1	9.5	<.01	<.05	<.01	<.2
		12-15-92	1600	.4	280	<.1	11	.02	6.1	.01	<.2
	OSW 166	6-08-92	1500	<.1	640	<.1	11	<.01	17	.04	<.2
		12-15-92	1530	<.1	770	<.1	11	.02	37	.01	.4
	OSW 94	3-23-89	1400	4.0	22	.1	10	--	.1	.01	.2
		9-13-89	1500	4.0	23	<.1	10	--	<.10	<.01	<.2
		2-01-90	1400	--	--	--	--	--	--	--	--
		3-18-91	1130	2.7	34	<.1	--	--	<.05	<.01	<.2
		6-25-91	1100	--	35	--	--	--	--	--	--
		9-11-91	1500	--	33	--	--	--	--	--	--
		6-08-92	1430	2.5	29	<.1	10	<.01	<.05	.02	<.2
		12-15-92	1500	2.5	26	<.1	11	.04	.23	.01	<.2
96	OSW 115	9-13-89	1025	6.0	18	.1	23	--	<.10	<.01	<.2
		2-01-90	1130	--	--	--	--	--	--	--	--
		3-20-91	1030	5.1	19	<.1	21	--	<.05	<.01	<.2
		6-27-91	1115	4.8	19	.2	48	<.01	.06	.01	.2
		9-09-91	1245	5.2	16	.1	23	<.01	<.05	.01	<.2
		6-18-92	1530	4.5	17	.1	10	<.01	<.05	.05	<.2
		8-21-92	1230	--	42	--	--	--	--	--	--
		12-17-92	1145	2.7	50	<.1	17	.02	1.1	.01	<.2
	OSW 99	3-24-89	1300	6.7	19	<.1	9.8	--	<.10	.03	.2
		9-05-89	1445	4.0	19	.1	10	--	<.10	.01	<.2
		3-20-91	1130	2.6	69	<.1	11	--	1.0	<.01	<.2
		4-18-91	1530	--	77	--	--	<.01	1.3	.01	<.2
		5-29-91	1830	--	73	--	--	<.01	1.5	.01	.3
		6-27-91	0830	1.7	89	<.1	11	<.01	1.4	.02	.2
		7-31-91	1400	--	100	--	--	<.01	1.4	<.01	.4
		9-09-91	1030	1.4	91	<.1	11	<.01	1.3	<.01	<.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
96	OSW 99	11-08-91	1315	--	100	--	--	<0.01	1.8	<0.01	<0.2
		12-04-91	1400	--	95	--	--	<.01	1.9	<.01	<.2
		1-27-92	1200	--	110	--	--	<.01	2.6	.03	<.2
		3-04-92	1100	--	120	--	--	<.01	2.5	.02	<.2
		4-06-92	1600	--	140	--	--	<.01	3.0	<.01	<.2
		5-13-92	1430	--	150	--	--	.04	3.5	.01	<.2
		6-17-92	1330	1.0	180	<0.1	11	.01	4.6	.03	<.2
		8-05-92	1230	.7	190	.1	11	<.01	5.5	.02	<.2
		9-03-92	1530	--	210	--	--	<.01	7.3	.03	<.2
		10-28-92	1045	--	320	--	--	<.01	12	<.01	.3
		12-17-92	1100	.4	390	<.1	12	.03	14	.03	.5
	OSW 114	9-13-89	--	4.0	12	<.1	8.3	--	.15	<.01	.2
		2-01-90	1115	--	--	--	--	--	--	--	--
		3-20-91	1100	1.1	130	<.1	8.5	--.	1.4	<.01	.3
		4-18-91	1500	--	180	--	--	<.01	2.2	.01	<.2
		5-29-91	1800	--	210	--	--	.01	3.8	.01	<.2
		6-27-91	1050	.7	260	<.1	9.4	<.01	4.9	.01	.6
		7-31-91	1500	--	300	--	--	<.01	5.7	.06	.5
		9-09-91	1115	.5	360	.1	9.8	<.01	6.6	.01	.7
		11-08-91	1330	--	380	--	--	<.01	9.8	<.01	<.2
		12-04-91	1500	--	460	--	--	<.01	12	<.01	<.2
		1-27-92	1130	--	540	--	--	<.01	16	.01	<.2
		3-04-92	0930	--	660	--	--	<.01	20	.03	<.2
		4-06-92	1530	--	720	--	--	<.01	25	<.01	<.2
		5-13-92	1400	--	670	--	--	.04	28	.09	<.2
		6-17-92	1230	.4	510	.2	17	.03	29	.05	<.2
		8-05-92	1230	<.1	770	<.1	10	.04	32	.08	.5
		8-21-92	1230	--	--	--	--	<.01	.57	<.01	<.2
		9-03-92	1500	--	740	--	--	.03	36	.27	2.8
		10-28-92	1215	--	760	--	--	.02	28	2.4	3.0
		12-17-92	1230	<.1	840	<.1	12	.04	9.1	2.6	3.6
	OSW 98	9-05-89	1530	3.0	24	.1	9.9	--	.48	<.01	<.2
		2-01-90	1030	--	--	--	--	--	--	--	--
		2-20-91	1030	1.1	240	<.1	--	<.01	2.7	.04	.5
		3-20-91	1000	1.1	250	<.1	9.3	--	3.2	<.01	.6
		4-18-91	1430	--	220	--	--	<.01	3.2	.01	.4
		5-29-91	1500	--	200	--	--	<.01	4.3	.01	.5
		6-27-91	1015	1.5	290	<.1	9.8	<.01	6.1	<.01	.8
		7-31-91	1430	--	490	--	--	<.01	12	<.01	.4
		9-09-91	1200	.6	540	.1	10	.03	17	.01	1.2
		11-08-91	1300	--	640	--	--	<.01	18	.05	<.2
		12-04-91	1430	--	740	--	--	.02	19	.06	<.2
		1-27-92	1100	--	760	--	--	<.01	20	.04	<.2
		3-04-92	1000	--	800	--	--	<.01	22	.06	<.2
		4-06-92	1500	--	850	--	--	<.01	21	.04	<.2
		5-13-92	1330	--	780	--	--	.03	23	.55	.6
		6-17-92	1630	31	830	.2	10	.02	21	.77	.9
		7-30-92	0845	17	780	<.1	10	.02	24	.77	1.1
		8-05-92	1630	<.1	870	.1	9.9	.02	24	.86	1.0
		9-03-92	1445	--	790	--	--	.03	26	1.0	1.1
		10-28-92	1115	--	770	--	--	.05	30	1.1	1.2
		12-17-92	1030	3.0	390	<.1	12	.04	11	.02	<.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
96	OSW 96	3-24-89	1200	13	25	0.1	17	--	<0.10	0.02	<0.2
		9-13-89	1200	11	35	.1	23	--	<.10	.01	<.2
		2-01-90	0945	--	--	--	--	--	--	--	--
		3-20-91	0900	12	43	<.1	22	--	<.05	<.01	<.2
		6-27-91	0930	11	50	.2	22	<.01	<.05	.02	<.2
		9-09-91	1245	11	69	.2	23	<.01	.20	.02	<.2
		6-17-92	1530	13	66	.1	22	<.01	.39	.02	<.2
		12-17-92	0930	12	66	<.1	22	.02	.92	.06	<.2
100	OSW 102	9-13-89	1715	3.0	18	<.1	11	--	3.1	<.01	.2
		3-28-90	1130	--	--	--	--	--	--	--	--
		3-20-91	1500	2.0	19	<.1	9.3	--	<.05	<.01	<.2
		6-28-91	1330	2.7	33	.2	11	<.01	<.05	<.01	.3
		9-10-91	1530	2.3	32	<.1	11	<.01	<.05	<.01	<.2
		6-12-92	1145	6.7	19	<.1	9.7	<.01	.09	<.01	<.2
		7-30-92	--	--	--	--	--	--	--	--	--
		12-29-92	0900	3.0	240	<.1	11	.03	7.0	.04	<.2
	OSW 100	3-24-89	0800	13	25	.1	20	--	<.10	.04	.5
		9-13-89	1800	11	26	.1	21	--	<.10	.02	<.2
		3-28-90	1230	--	--	--	--	--	--	--	--
		[1]3-20-91	1430	8.8	24	.2	17	--	<.05	.02	<.2
			1440	8.4	23	.2	16	--	<.05	.02	<.2
		6-28-91	1230	--	36	--	--	--	--	--	--
		[1]9-10-91	1500	13	36	<.1	21	<.01	<.05	<.01	<.2
			1510	12	36	<.1	21	<.01	<.05	<.01	<.2
		6-12-92	1200	10	39	<.1	19	<.01	<.05	<.01	<.2
		7-30-92	1500	7.2	23	<.1	10	<.01	.22	.02	<.2
		12-29-92	0830	11	37	<.1	19	.03	<.05	.01	<.2
105	OSW 103	9-14-89	1730	4.0	23	<.1	12	--	<.10	.02	<.2
		3-21-91	1100	4.2	32	.2	13	--	.09	.22	.5
		6-25-91	1630	3.6	34	<.1	12	<.01	.07	.04	1.0
		9-10-91	1130	3.8	32	<.1	12	<.01	.06	.04	<.2
		6-09-92	1115	3.6	36	<.1	12	<.01	.05	.01	<.2
		12-28-92	1130	5.0	37	<.1	11	.02	.37	.21	.3
	OSW 104	9-14-89	1045	5.0	18	<.1	8.5	--	<.10	.28	<.2
		3-21-91	0845	4.4	22	<.1	8.4	--	.07	.02	<.2
		6-25-91	1445	4.2	24	<.1	8.5	<.01	.07	.02	<.2
		9-10-91	1030	4.1	16	<.1	8.5	<.01	<.05	<.01	<.2
		6-09-92	1100	4.4	23	<.1	8.4	<.01	.13	.02	<.2
		12-28-92	1100	4.0	20	<.1	8.1	.03	.07	<.01	<.2
	OSW 105	9-14-89	1015	9.0	24	<.1	12	--	<.10	<.01	.3
		3-22-90	1515	--	--	--	--	--	--	--	--
		3-21-91	1130	10	24	.2	10	--	.06	.03	.3
		6-25-91	1600	5.6	26	.1	9.9	<.01	.08	.02	.2
		9-10-91	1100	6.1	22	<.1	9.9	<.01	.06	.03	<.2
		6-09-92	1200	2.3	250	<.1	10	<.01	6.6	.05	<.2
		12-28-92	1200	3.4	430	<.1	9.9	.03	12	.02	<.2
111	OSW 110	9-14-89	1600	10	21	<.1	17	--	<.10	.02	<.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
111	OSW 109	9-14-89	1310	40	34	0.1	19	--	<0.10	0.02	<0.2
		3-22-90	1630	--	--	--	--	--	--	--	--
	OSW 111	9-14-89	1200	17	24	.1	22	--	<.10	.01	.3
		3-28-90	1515	--	--	--	--	--	--	--	--
112	OSW 112	9-14-89	1400	7.0	48	<.1	16	--	1.2	<.01	.4
124	OSW 124	12-28-92	1530	6.0	26	<.1	10	0.02	4.7	<.01	<.2
127	OSW 127	3-20-91	1545	1.2	20	.2	9.8	--	3.0	<.01	.8
129	OSW 129	3-20-91	1520	4.8	14	.2	11	--	1.4	<.01	.2
144	OSW 144	12-29-92	1000	1.8	26	<.1	12	.03	5.8	<.01	<.2
146	OSW 146	6-19-92	1030	--	29	--	--	--	.51	--	--
			1100	8.0	34	<.1	13	<.01	2.5	.04	<.2
		12-28-92	1500	8.3	33	<.1	13	.02	2.5	<.01	<.2
147	OSW 141	1-04-91	1300	2.1	700	<.1	--	<.01	13	.15	1.0
		2-21-91	1330	1.7	700	<.1	--	<.01	19	.05	.7
		3-21-91	1700	1.2	720	.2	11	--	5.7	.02	.7
		4-18-91	1230	--	750	--	--	.01	23	.06	.8
		5-29-91	1330	--	620	--	--	.01	22	.10	.5
		6-28-91	0930	1.1	650	.2	8.0	.03	19	.24	.8
		7-31-91	1300	--	530	--	--	.02	16	.41	.8
		9-06-91	1130	1.4	600	.2	11	.01	25	.59	1.1
		11-08-91	1040	--	650	--	--	.02	31	.92	1.1
		12-04-91	1200	--	630	--	--	.02	29	.79	.9
		12-10-91	1300	--	680	--	--	.03	34	.79	1.0
		1-28-92	1130	--	540	--	--	.03	31	.87	1.2
		3-03-92	1230	--	450	--	--	.02	26	.74	1.3
		4-06-92	1230	--	640	--	--	.03	34	1.4	3.0
		4-28-92	1200	--	560	--	--	.01	30	.99	3.1
		6-10-92	1145	<.1	480	2.7	10	.04	22	1.3	2.7
		8-05-92	1100	--	680	--	--	.05	19	1.3	2.2
		8-30-92	1600	--	630	--	--	.05	21	1.4	2.0
		10-28-92	1215	--	830	--	--	.05	22	3.2	3.4
		12-18-92	1130	2.5	790	<.1	10	.07	24	1.9	2.3
	OSW 142	1-03-91	1430	2.4	840	.2	--	.02	22	1.3	1.9
		2-20-91	1200	2.3	930	<.1	--	<.01	25	1.8	2.6
		3-21-91	1500	2.2	890	.2	12	--	26	1.6	2.2
		4-18-91	1000	--	1,000	--	--	.03	27	1.7	2.5
		5-29-91	1215	--	910	--	--	.01	27	1.1	1.1
		6-06-91	1700	--	870	--	--	<.01	26	.92	1.6
		6-27-91	0845	1.4	870	.2	20	.01	28	.60	.9
		7-23-91	1500	2.6	900	<.1	12	.01	31	1.2	1.5
		7-31-91	1100	--	880	--	--	.03	30	1.6	1.9
		9-06-91	0930	2.7	760	.2	12	.09	39	2.2	3.0
		11-08-91	1100	--	680	--	--	.03	41	1.5	1.8
		12-04-91	1000	--	800	--	--	.03	41	1.3	2.4
		12-10-91	1100	--	840	--	--	.03	40	1.4	2.6
		1-28-92	1100	--	780	--	--	.02	39	1.5	3.0
		2-06-92	1400	--	930	--	--	--	--	--	--
		3-03-92	1200	--	780	--	--	.02	39	1.0	2.9
		4-06-92	1200	--	830	--	--	.02	32	2.1	3.9

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
147	OSW 142	4-28-92	1300	--	840	--	--	0.03	29	2.0	4.1
		6-10-92	1045	20	900	<0.1	12	.03	25	3.9	5.8
		8-05-92	0815	--	990	--	--	.02	30	9.1	13
		8-30-92	1630	--	930	--	--	.03	32	11.0	13
		10-28-92	1200	--	860	--	--	.04	31	9.5	9.8
		12-18-92	1100	11	860	<.1	12	.04	32	9.0	8.8
	OSW 165	1-28-92	1200	--	790	--	--	.07	37	2.2	3.1
		3-03-92	1130	--	840	--	--	.06	37	2.2	3.4
		4-06-92	1130	--	860	--	--	.05	35	2.0	3.9
		4-28-92	1300	--	830	--	--	.05	36	2.3	4.4
		6-10-92	0930	2.9	900	3.7	14	.05	27	3.0	5.0
		8-05-92	1030	--	970	--	--	.05	24	4.6	7.0
		9-01-92	1330	--	980	--	--	.04	28	1.2	7.5
		10-28-92	1130	--	890	--	--	.04	28	7.1	7.3
		12-18-92	1030	6.6	950	--	14	.06	32	7.6	8.5
	OSW 152	7-31-91	1615	--	880	--	--	.25	28	2.9	3.0
		9-06-91	1100	.2	820	.2	13	.07	34	2.7	3.2
		11-08-91	1015	--	790	--	--	.09	37	3.3	3.8
		12-04-91	1030	--	850	--	--	.07	36	4.0	4.1
		12-10-91	1200	--	800	--	--	.06	35	1.6	4.3
		1-28-92	1030	--	760	--	--	.04	36	4.0	7.6
		3-03-92	1100	--	790	--	--	.04	38	4.5	7.8
		4-06-92	1100	--	870	--	--	.03	33	4.7	6.5
		4-28-92	1500	--	870	--	--	.04	29	4.1	5.7
		6-10-92	1015	15	900	<.1	13	.04	26	3.2	6.2
		7-30-92	1015	20	930	2.5	13	.02	25	4.9	7.4
		8-05-92	0930	--	800	--	--	.06	34	1.0	1.7
		9-01-92	1230	--	800	--	--	.02	29	6.7	7.9
		10-28-92	1045	--	840	--	--	.05	31	1.0	11
		12-18-92	0945	5.4	860	<.1	14	.05	32	8.2	9.4
	OSW 147	6-28-91	1000	.7	740	.2	17	<.01	18	.07	.6
		7-24-91	0930	.7	790	<.1	10	<.01	18	.16	.5
		7-31-91	1200	--	920	--	--	<.01	20	.03	<.2
		9-06-91	1015	1.3	740	.2	9.9	<.01	23	<.01	.7
		11-08-91	0930	--	700	--	--	<.01	24	.01	<.2
		12-04-91	1130	--	830	--	--	.02	24	.06	.2
		12-10-91	1130	--	820	--	--	.02	24	.07	.2
		1-28-92	0930	--	880	--	--	<.01	25	.12	.3
		3-03-92	0900	--	860	--	--	.02	26	.20	.4
		4-06-92	1030	--	900	--	--	.02	27	.23	.3
		4-29-92	1100	--	840	--	--	.03	30	.28	.5
		6-10-92	0900	<.1	840	.2	11	.09	34	.52	.9
		8-05-92	0930	--	--	--	--	--	--	--	--
		9-01-92	1300	--	770	--	--	.05	34	.96	1.9
		10-28-92	1000	--	860	--	--	.08	26	4.6	6.8
		12-18-92	0900	.9	900	<.1	12	.08	26	4.7	5.8
148	OSW 143	9-10-91	1700	17	28	<.1	23	<.01	<.05	.03	.4
		6-16-92	1230	15	29	<.1	24	<.01	.07	.04	.2
		12-29-92	1515	17	28	<.1	22	.03	.08	.03	<.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
148	OSW 148	9-10-91	1630	19	29	<0.1	19	<0.01	<0.05	<0.01	<0.2
		6-16-92	1045	17	27	<.1	19	<.01	<.05	.06	<.2
		12-29-92	1100	17	26	<.1	17	.02	<.05	.02	<.2
149	OSW 107	9-14-89	1645	5.0	17	<.1	10	--	3.4	.03	.6
		2-01-90	1215	--	--	--	--	--	--	--	--
		6-06-90	--	--	--	--	--	--	--	--	--
		6-25-90	1630	--	20	--	--	--	4.6	<.01	.3
		7-30-90	1600	2.6	42	<.1	--	--	--	--	--
		8-13-90	1500	2.3	51	<.1	--	--	--	--	--
		8-27-90	1430	--	56	--	--	--	4.9	.04	.5
		9-10-90	1200	1.9	81	<.1	--	--	--	--	--
		10-05-90	1340	1.8	97	<.1	--	--	--	--	--
		12-06-90	1230	1.5	160	.2	--	<.01	5.8	.01	.5
		1-03-91	1550	1.5	220	.2	--	<.01	7.0	.06	.7
		2-20-91	1415	--	--	--	--	--	--	--	--
		[1]3-21-91	1600	1.1	310	<.1	11	--	9.9	.03	.5
			1610	1.1	300	<.1	10	--	9.6	.02	.4
		4-18-91	1200	--	500	--	--	<.01	15	.01	.6
		5-29-91	1115	--	370	--	--	<.01	15	.01	.4
		[1]6-27-91	1700	.7	380	<.1	10	<.01	14	.02	.7
			1710	.8	370	<.1	11	<.01	14	.01	.6
		7-09-91	1245	1.0	380	<.1	9.5	<.01	14	<.01	.5
		9-06-91	1400	2.7	510	<.1	11	.02	13	.04	.5
		6-10-92	1500	.4	540	<.1	11	.05	23	.72	1.3
		7-30-92	1300	1.5	650	1.4	12	.04	21	.86	1.5
		8-19-92	1230	--	720	--	--	.05	22	1.3	2.3
		9-10-92	1530	--	730	--	--	.06	24	2.0	2.8
		12-22-92	0945	4.2	760	--	12	.07	31	4.3	4.9
	OSW 149	9-06-91	1330	7.2	48	<.1	15	<.01	1.4	.51	.8
		6-10-92	1600	4.7	480	<.1	14	<.01	19	.11	<.2
		8-19-92	1300	--	550	--	--	<.01	24	.04	.3
		9-10-92	1500	--	550	--	--	<.01	26	.05	.4
		12-22-92	0900	3.6	610	--	15	.02	25	.03	.5
150	OSW 160	1-28-92	1530	--	--	--	--	.04	38	1.7	6.4
		6-09-92	1645	23	960	<.1	15	.20	18	2.8	4.9
		12-21-92	1530	2.3	910	--	17	.08	39	6.6	7.4
	OSW 150	9-06-91	1200	2.1	53	<.1	19	<.01	.61	.06	<.2
		6-09-92	1600	.4	130	<.1	20	<.01	2.9	.06	.3
		12-21-92	1600	1.7	130	<.1	20	.03	4.0	.01	<.2
151	OSW 153	9-05-91	1630	1.3	72	.1	22	<.01	4.6	<.01	.5
		6-09-92	0915	1.1	57	.1	14	<.01	3.2	<.01	<.2
		12-16-92	1430	1.2	120	<.1	19	.02	5.9	.03	<.2
	OSW 157	9-05-91	1500	.5	400	<.1	11	<.01	12	.19	.7
		6-09-92	1000	<.1	630	<.1	11	.01	39	<.01	16
		12-16-92	1400	<.1	590	<.1	11	.04	34	.61	2.7
	OSW 151	9-05-91	1615	8.9	37	<.1	21	<.01	<.05	.02	.8
		6-09-92	0830	9.9	54	<.1	13	<.01	.08	.03	<.2
		12-16-92	1330	24	170	<.1	17	.02	.07	.09	<.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
154	OSW 138	1-04-91	1030	9.7	23	<0.1	--	<0.01	0.80	0.05	<0.2
		3-20-91	1700	7.7	12	<.1	17	--	.36	.02	<.2
		6-27-91	1500	12	22	.2	11	<.01	1.2	.02	<.2
		9-09-91	1530	10	14	<.1	17	<.01	1.5	<.01	<.2
		6-11-92	1145	8.8	26	<.1	15	<.01	2.6	<.01	<.2
		12-29-92	1430	8.0	29	<.1	15	.02	2.7	<.01	<.2
	OSW 155	8-14-91	1245	--	17	--	--	<.01	.11	.03	.2
		9-09-91	1500	3.4	23	.1	16	<.01	.11	<.01	<.2
		6-11-92	1215	3.4	23	<.1	14	<.01	.13	<.01	<.2
		12-29-92	1500	2.8	30	<.1	14	.02	.41	<.01	<.2
	OSW 154	9-09-91	1430	5.9	18	<.1	14	<.01	.16	<.01	<.2
		6-11-92	1245	7.6	22	<.1	13	<.01	.15	<.01	<.2
		12-29-92	1530	6.8	19	<.1	13	.02	.17	<.01	<.2
156	OSW 140	1-04-91	1230	9.0	28	.1	16	<.01	1.6	.04	<.2
		3-22-91	1200	9.9	25	.2	15	--	1.3	.02	.3
		6-27-91	1545	11	26	.2	12	<.01	2.5	.08	<.2
		9-06-91	1530	13	25	<.1	16	<.01	1.9	<.01	<.2
		5-01-92	1130	--	30	--	--	<.01	2.1	.02	<.2
		6-11-92	0900	13	28	<.1	13	<.01	2.0	<.01	<.2
		12-22-92	1500	12	29	<.1	15	.01	2.2	.02	<.2
	OSW 167	5-01-92	1400	--	130	--	--	<.01	3.0	.02	<.2
		6-11-92	1045	<.1	200	.2	17	<.01	5.0	.01	<.2
		9-02-92	1230	--	270	--	--	<.01	8.5	.04	<.2
		10-28-92	1530	--	350	--	--	.01	12	<.01	<.2
		12-22-92	1400	.4	430	<.1	16	.02	17	<.01	<.2
	OSW 161	1-28-92	1400	--	150	--	--	<.01	2.1	<.01	<.2
		3-04-92	0830	--	190	--	--	<.01	2.9	.02	<.2
		4-06-92	1700	--	220	--	--	<.01	4.0	.05	<.2
		5-01-92	1100	--	240	--	--	<.01	4.6	.01	<.2
		6-11-92	1015	.3	300	<.1	15	<.01	6.8	<.01	<.2
		7-30-92	1400	1.5	400	<.1	17	<.01	9.6	.02	<.2
		9-02-92	1200	--	400	--	--	<.01	11	.05	<.2
		10-28-92	1500	--	460	--	--	<.01	14	.02	<.2
		12-22-92	1300	1.3	510	<.1	16	.01	19	<.01	<.2
	OSW 156	9-06-91	1615	11	21	.1	21	<.01	<.05	<.01	<.2
		6-11-92	0930	9.9	24	<.1	20	<.01	<.05	.06	<.2
		12-22-92	1200	10	21	.1	21	.02	<.05	.01	<.2
158	OSW 158	9-09-91	1645	2.0	19	<.1	17	<.01	.15	<.01	<.2
		6-12-92	1015	8.3	22	.1	15	<.01	.06	.02	<.2
		12-29-92	1330	8.9	19	<.1	16	.03	.08	.02	<.2
159	OSW 159	9-11-91	1630	2.6	290	<.1	15	<.01	6.0	.01	.6
		6-10-92	1630	.8	710	.6	14	<.01	25	<.01	.2
		12-18-92	1600	.2	770	--	14	.03	26	.14	.8
162	OSW 164	6-16-92	1600	2.0	29	<.1	13	<.01	.11	.04	<.2
		12-28-92	1330	2.3	26	<.1	12	.02	.85	<.01	<.2
	OSW 162	6-16-92	1630	14	25	.2	21	.02	<.05	.11	<.2
		12-28-92	1400	14	26	.2	21	.02	<.05	.07	<.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Sulfate, dissolved	Chloride, dissoved	Fluoride, dissolved	Silica, dissolved	Nitrite, dissolved (as N)	Nitrite plus nitrate, dissolved (as N)	Nitrogen, ammonia, dissolved (as N)	Nitrogen, ammonia, plus organic, dissolved (as N)
168	OSW 139	9-11-91	1715	2.4	33	<0.1	18	<0.01	0.05	<0.01	<0.2
		6-18-92	1345	3.3	36	<.1	20	.01	.05	.05	<.2
		12-22-92	1415	2.7	35	<.1	20	.02	.13	.01	<.2
	OSW 172	7-02-92	1330	3.7	39	<.1	23	.01	.08	.07	<.2
		12-22-92	1030	9.3	35	.1	24	.02	.15	.03	<.2
	OSW 168	6-18-92	1030	11	33	<.1	17	<.01	<.05	.06	<.2
		12-22-92	1100	13	31	<.1	17	.01	<.05	<.01	<.2
169	OSW 170	6-10-92	1300	<.1	740	.3	9.3	.04	37	3.7	4.6
		7-30-92	1200	17	790	1.1	9.9	.05	34	2.9	3.8
		12-16-92	1600	<.1	780	<.1	9.4	.14	26	3.7	6.4
	OSW 169	6-10-92	1230	<.1	920	.2	12	.02	28	2.5	2.8
		7-30-92	1115	--	810	.8	13	.02	30	2.8	3.6
		12-16-92	1530	<.1	850	<.1	12	.03	30	5.6	6.1
171	OSW 113	9-14-89	1445	11	18	<.1	12	--	.85	.02	.3
		3-28-90	1600	--	--	--	--	--	--	--	--
		3-20-91	1630	12	22	.2	13	--	1.3	<.01	<.2
		9-09-91	1730	13	24	.1	14	<.01	1.5	<.01	<.2
		6-17-92	1130	11	26	<.1	14	<.01	2.1	<.01	<.2
		12-29-92	1215	10	25	<.1	13	.02	3.2	<.01	<.2
	OSW 171	6-17-92	1030	12	20	.1	22	<.01	<.05	.05	<.2
		12-29-92	1200	12	19	.1	21	.02	<.05	.04	<.2
174	OSW 106	3-21-91	1345	1.2	120	<.1	9.9	--	1.5	.02	<.2
		6-25-91	1330	1.3	93	<.1	9.8	<.01	1.5	.02	.2
		[1]9-10-91	1215	.9	99	<.1	9.8	<.01	2.1	<.01	.3
			1225	.9	120	<.1	9.8	<.01	2.1	.01	.5
		6-08-92	1630	.8	180	<.1	11	<.01	11	<.01	<.2
		9-02-92	1530	--	310	--	--	.01	19	.31	2.5
		12-16-92	1200	.3	300	<.1	11	.04	14	.73	1.0
	OSW 173	6-25-92	1400	.4	390	.2	10	.04	22	2.5	3.2
		9-03-92	1330	--	390	--	--	.03	23	4.2	4.5
		12-16-92	1100	<.1	600	<.1	12	.05	30	1.1	1.2
	OSW 179	9-10-92	0900	--	400	--	--	.04	20	.23	.4
		12-16-92	1130	.4	470	<.1	11	.02	18	.01	<.2
	OSW 175	6-25-92	1300	5.3	510	.6	12	.04	24	.83	1.1
		9-03-92	1230	--	740	--	--	.02	32	.20	.9
		12-16-92	1030	<.1	660	<.1	12	.05	27	2.1	1.8
	OSW 174	6-25-92	1500	7.1	47	<.1	19	<.01	.10	.03	<.2
		9-10-92	0830	--	55	--	--	<.01	.17	.03	<.2
		12-16-92	0930	7.4	54	<.1	20	.03	.13	.01	<.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved: Concentration (as C)	Carbon, inorganic, dissolved: Standard deviation (as C)
86	OSW 137	1-03-91	1630	--	0.03	--	0.6	--	--	--	--
		2-20-91	0930	--	.05	--	1.0	--	--	--	--
		[1]3-22-91	1045	0.03	.03	20	.7	[2]5	[2]13	32	3.1
			1100	.03	.03	20	.6	[2]4	[2]13	--	--
		4-18-91	1130	.04	.04	--	.6	--	--	--	--
		5-29-91	0930	.04	.01	--	.9	--	--	--	--
		6-26-91	1030	.04	.03	30	.7	--	--	34	3.4
		7-31-91	1030	.04	.02	--	.7	--	--	--	--
		[1]9-11-91	1100	.04	.01	30	.6	--	--	36	1.8
			1115	.04	.02	40	.5	--	--	--	--
		11-08-91	1130	.03	.03	--	.8	--	--	--	--
		12-04-91	1300	.04	.02	--	.6	--	--	--	--
		1-28-92	1430	.02	.03	--	--	--	--	--	--
		3-04-92	0900	.03	.02	--	.8	--	--	--	--
		4-06-92	1615	.02	.03	--	--	--	--	--	--
		6-11-92	1415	.03	.04	50	.6	--	--	37	2.1
		12-18-92	1430	.04	.03	50	.6	--	--	34	3.8
	OSW 84	3-22-89	0900	.04	.04	<10	.4	18	11	--	--
		9-05-89	1015	.05	.05	<10	.6	5	8	--	--
		1-31-90	1400	--	--	--	--	30	40	--	--
		3-22-91	1015	.05	.05	10	.5	[2]7	[2]3	6.3	1.7
		[1]6-26-91	0945	.05	.05	10	.3	--	--	5.7	.8
			0955	.05	.05	<10	.3	--	--	--	--
		9-11-91	1000	.05	.03	<10	.3	--	--	5.9	.1
		6-11-92	1345	.03	.05	<10	.2	--	--	6.5	.6
		12-18-92	1400	.03	.03	10	.2	--	--	8.2	.5
	OSW 85	3-22-89	1200	.03	.03	20	.4	250	72	--	--
		9-05-89	1115	.02	.02	10	.5	13	68	--	--
		3-22-91	1115	.02	.02	10	.4	[2]6	[2]24	7.8	1.6
		6-26-91	1015	--	--	--	--	--	--	6.7	.7
		9-11-91	1145	--	--	--	--	--	--	--	--
		6-11-92	1600	.02	.02	<10	.3	--	--	--	--
		12-18-92	1500	<.01	.01	<10	.3	--	--	--	--
	OSW 86	3-22-89	1600	.03	.02	20	.4	240	93	--	--
		9-05-89	1130	.01	.02	<10	.4	29	54	--	--
		3-22-91	0915	.01	.01	<10	.6	[2]13	[2]36	8.0	.9
		6-26-91	0900	--	--	--	--	--	--	8.5	.2
		9-11-91	1000	--	--	--	--	--	--	8.8	.6
		6-11-92	1400	.01	.02	20	.3	--	--	8.6	.4
		12-18-92	1300	.02	.02	10	.2	--	--	7.2	.0
87	OSW 88	3-23-89	1700	.08	.08	<10	.3	18	18	--	--
		9-12-89	1100	<.01	.07	20	.3	4	12	--	--
		2-01-90	0900	--	--	--	--	40	50	--	--
		3-19-91	1500	.12	.03	10	.4	[2]<10	[2]<10	18	.1
		6-27-91	1445	.1	.11	20	.4	--	--	14	.8
		9-11-91	1330	.12	.09	20	.3	--	--	14	1.4
		6-11-92	1600	.12	.11	20	.3	--	--	--	--
		12-17-92	1530	.06	.07	20	.3	--	--	14	.22

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved	
										Concentration (as C)	Standard deviation (as C)
87	OSW 89	9-13-89	1345	0.01	<0.01	20	0.4	35	64	--	--
		3-19-91	1630	.01	<.01	10	.6	[1]210	[2]10	6.9	--
		6-27-91	1400	<.01	.01	20	.4	--	--	--	--
		9-11-91	1400	--	--	--	--	--	--	--	--
		10-04-91	1430	.03	.05	10	.4	--	--	--	--
		6-12-92	1045	.01	<.01	20	.5	--	--	9.6	--
		12-17-92	1500	.01	.02	140	1.2	--	--	--	--
	OSW 163	6-12-92	1000	.02	.02	<10	.3	--	--	7.6	0.6
		12-17-92	1445	<.01	.02	10	.5	--	--	10	.4
	OSW 87	9-12-89	1830	.02	.01	<10	.2	69	37	--	--
		1-31-90	1700	--	--	--	--	70	30	--	--
		3-19-91	1400	.02	<.01	20	.5	[2]30	[2]<10	7.0	.1
		[1]6-27-91	1300	--	--	--	--	--	--	7.1	.4
			1330	--	--	--	--	--	--	--	--
		9-11-91	1300	.02	<.01	10	--	--	--	7.9	.3
		6-12-92	0900	.03	.02	20	.2	--	--	7.5	.7
		12-17-92	1400	.02	.02	20	.1	--	--	8.0	.5
93	OSW 135	5-24-90	1445	.02	.01	20	1.6	19	430	--	--
		6-06-90	--	--	--	--	--	--	--	--	--
		6-25-90	--	--	--	--	--	--	--	--	--
		7-30-90	1515	--	--	--	--	--	--	--	--
		8-13-90	1300	--	--	--	--	--	--	--	--
		8-27-90	1300	.02	<.01	20	1.4	--	--	--	--
		9-10-90	1115	--	--	--	--	--	--	--	--
		10-05-90	1300	--	--	--	--	--	--	--	--
		11-02-90	1400	--	.01	--	1.3	--	--	--	--
		12-06-90	1330	--	<.01	--	--	--	--	--	--
		1-04-91	1330	--	<.01	--	1.0	--	--	--	--
		2-20-91	1500	--	.02	--	1.1	--	--	--	--
		3-19-91	1200	.17	<.01	40	1.4	[2]10	[2]180	--	--
		4-18-91	1600	.08	.01	--	1.1	--	--	--	--
		5-29-91	1345	.03	<.01	--	1.2	--	--	--	--
		6-26-91	1430	.08	<.01	30	1.4	--	--	--	--
		7-31-91	1515	.02	<.01	--	1.0	--	--	--	--
		9-06-91	1345	.01	<.01	50	.9	--	--	--	--
		11-08-91	1230	.03	.01	--	1.4	--	--	--	--
		12-04-91	1530	.03	<.01	--	1.3	--	--	--	--
		1-27-92	1400	.02	.01	--	1.3	--	--	--	--
		2-19-92	1000	--	--	--	--	--	--	--	--
		3-04-92	1115	<.01	<.01	--	1.3	--	--	--	--
		4-06-92	1545	<.01	<.01	--	.9	--	--	--	--
		6-10-92	1145	<.01	<.01	80	.9	--	--	--	--
		8-06-92	1100	<.01	<.01	--	1.4	--	--	--	--
		8-19-92	1100	<.01	<.01	--	1.1	--	--	--	--
		9-10-92	1600	<.01	.01	--	1.1	--	--	--	--
		10-29-92	1230	.01	.01	--	1.7	--	--	--	--
		12-22-92	1145	<.01	<.01	80	.9	--	--	--	--
	OSW 178	8-20-92	1300	<.01	.01	--	1.2	--	--	--	--
		9-10-92	1330	<.01	.01	--	1.6	--	--	--	--
		10-28-92	1315	.01	.02	--	1.3	--	--	--	--
		12-21-92	1430	<.01	<.01	210	1.9	--	--	25	1.5

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved	
										Concentration (as C)	Standard deviation (as C)
93	OSW 90	3-23-89	1000	0.08	0.07	10	0.3	10	12	--	--
		9-05-89	1200	.07	.07	10	.4	4	7	--	--
		1-31-90	1215	--	--	--	--	20	10		
		6-06-90	--	--	--	--	--	--	--	--	--
		6-14-90	--	--	--	--	--	--	--	--	--
		6-25-90	1400	.09	.08	20	.5	--	--	--	--
		7-30-90	1520	--	--	--	--	--	--	--	--
		8-13-90	1430	--	--	--	--	--	--	--	--
		8-27-90	1230	.05	.04	20	.5	--	--	--	--
		9-10-90	1045	--	--	--	--	--	--	--	--
		10-05-90	1230	--	--	--	--	--	--	--	--
		11-02-90	1345	--	.03	--	.7	--	--	--	--
		12-06-90	1130	--	.03	--	.8	--	--	--	--
		1-03-91	1240	--	.03	--	.5	--	--	--	--
		2-20-91	1130	--	.04	--	.7	--	--	--	--
		[1]3-19-91	1100	.03	<.01	30	.8	[2]<3	[2]34	15	1.6
			1110	.02	<.01	20	.6	[2]5	[2]35	--	--
		4-18-91	1045	.03	.03	--	.7	--	--	--	--
		5-29-91	1030	.05	.02	--	.7	--	--	--	--
		[1]6-25-91	1500	.03	.02	30	.6	--	--	14	.9
			1510	.03	.02	30	.6	--	--	--	--
		7-31-91	0945	.04	<.01	--	.7	--	--	--	--
		9-05-91	1330	.03	.01	50	.8	--	--	13	.4
		11-08-91	0800	.02	<.01	--	1.2	--	--	--	--
		12-04-91	0930	.04	.01	--	1.4	--	--	--	--
		1-27-92	1330	.03	.03	--	1.3	--	--	--	--
		3-03-92	1500	.02	.01	--	1.6	--	--	--	--
		4-06-92	1330	--	.02	--	1.3	--	--	--	--
		6-09-92	1330	.03	.02	150	1.3	--	--	15	.5
		8-06-92	1030	.01	.03	--	1.6	--	--	--	--
		8-20-92	1330	<.01	.02	--	1.5	--	--	--	--
		9-10-92	1400	.02	.02	--	1.7	--	--	--	--
		10-28-92	1345	.04	.03	--	1.6	--	--	--	--
		12-21-92	1400	.04	.02	210	1.8	--	--	25	.9
	OSW 91	3-23-89	1200	.04	.04	10	.3	20	11	--	--
		9-05-89	1230	<.01	<.01	10	.7	1,200	63	--	--
		1-31-90	1330	--	--	--	--	340	40	--	--
		3-19-91	1000	.25	<.01	20	1.2	[2]6	[2]37	8.4	1.2
		6-26-91	1415	.18	.02	50	1.3	--	--	12	1.1
		9-05-91	1300	.13	<.01	50	1.0	--	--	11	.6
		6-09-92	1400	.02	.02	20	.6	--	--	13	.5
		12-21-92	1330	<.01	.01	60	.8	--	--	17	1.1
	OSW 92	3-23-89	1100	.03	.04	<10	.3	1,500	210	--	--
		9-05-89	1315	.02	.02	20	.3	1,300	170	--	--
		1-31-90	1430	--	--	--	--	1,200	120	--	--
		3-18-91	1600	.03	.03	20	.7	[2]53	[2]110	16	.9
		6-26-91	1330	.03	.02	30	.8	--	--	19	1.5
		9-05-91	1145	.03	.01	50	.9	--	--	14	.7
		6-09-92	1530	.03	.03	60	.5	--	--	12	.1
		12-21-92	1230	.02	.02	30	.3	--	--	8.2	.4

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved	
										Concentration (as C)	Standard deviation (as C)
93	OSW 93	3-23-89	1300	0.01	0.02	20	0.2	6,200	190	--	--
		9-05-89	1345	<.01	<.01	30	.4	7,200	160	--	--
		1-31-90	1500	--	--	--	--	7,800	160	--	--
		3-18-91	1500	<.01	<.01	20	.3	[2]6,500	[2]150	12	0.2
		6-26-91	1200	--	--	--	--	--	--	13	1.9
		9-05-91	1100	--	--	--	--	--	--	10	.4
		6-09-92	1700	.03	.03	20	.1	--	--	10	.6
		12-21-92	1100	.04	<.01	20	.1	--	--	10	.4
94	OSW 108	9-13-89	1610	<.01	.02	30	.3	10	37	--	--
		2-01-90	1500	--	--	--	--	50	70	--	--
		3-18-91	1330	.03	.03	20	.4	[2]16	[2]1	7.1	.01
		6-25-91	1245	.04	.03	10	.4	--	--	7.8	1.0
		9-11-91	1600	.05	.02	10	.4	--	--	8.1	1.0
		6-08-92	1500	.05	.04	20	.3	--	--	8.2	--
		12-16-92	0830	.04	.05	10	.7	--	--	9.5	1.2
	OSW 95	3-23-89	1430	.13	.11	20	.7	--	--	--	--
		9-13-89	1540	.14	.12	30	.3	3	2	--	--
		2-01-90	1445	--	--	--	--	30	40	--	--
		3-18-91	1230	.14	.16	30	.6	--	--	15	1.2
		6-25-91	1200	--	--	--	--	--	--	17	1.2
		9-11-91	1530	--	--	--	--	--	--	13	.4
		6-08-92	1400	.13	.13	<10	.1	--	--	6.8	.2
		12-15-92	1600	.04	.04	20	.2	--	--	15	1.4
	OSW 166	6-08-92	1500	.02	.02	60	.7	--	--	18	.2
		12-15-92	1530	.02	.02	90	.9	--	--	19	.2
	OSW 94	3-23-89	1400	.05	.05	10	.2	43	13	--	--
		9-13-89	1500	.06	.04	10	.3	5	5	--	--
		2-01-90	1400	--	--	--	--	30	40	--	--
		3-18-91	1130	.05	<.01	20	--	[2]7	[2]2	6.9	.2
		6-25-91	1100	--	--	--	--	--	--	7.7	.7
		9-11-91	1500	--	--	--	--	--	--	8.4	.8
		6-08-92	1430	.04	.06	20	.2	--	--	8.0	.5
		12-15-92	1500	.04	.06	10	.2	--	--	6.7	.4
96	OSW 115	9-13-89	1025	.12	.09	20	.4	14	20	--	--
		2-01-90	1130	--	--	--	--	60	50	--	--
		3-20-91	1030	.13	.15	10	.5	[2]<10	[2]<10	11	2.8
		6-27-91	1115	.14	.13	10	.4	--	--	11	.8
		9-09-91	1245	.15	.13	20	.3	--	--	11	.5
		6-18-92	1530	.16	.15	<10	.2	--	--	11	.2
		8-21-92	1230	--	--	--	.2	--	--	--	--
		12-17-92	1145	.05	.06	20	.2	--	--	9.9	.7
	OSW 99	3-24-89	1300	.01	.04	<10	.9	130	81	--	--
		9-05-89	1445	.02	.03	<10	.5	58	17	--	--
		3-20-91	1130	.01	<.01	10	.6	[2]40	[2]<10	12.1	.5
		4-18-91	1530	.03	.03	--	.3	--	--	--	--
		5-29-91	1830	.03	<.01	--	.4	--	--	--	--
		6-27-91	0830	.03	.02	20	.4	--	--	12.6	1.2
		7-31-91	1400	.02	<.01	--	.5	--	--	--	--
		9-09-91	1030	.03	<.01	10	.3	--	--	10.8	.4
		11-08-91	1315	.01	.03	--	.3	--	--	--	--

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved	
										Concentration (as C)	Standard deviation (as C)
93	OSW 99	12-04-91	1400	0.03	0.01	--	0.3	--	--	--	--
		1-27-92	1200	.04	.06	--	.4	--	--	--	--
		3-04-92	1100	.01	.02	--	.6	--	--	--	--
		4-06-92	1600	.01	.02	--	.3	--	--	--	--
		5-13-92	1430	.02	.03	--	.3	--	--	--	--
		6-17-92	1330	.02	.02	10	.2	--	--	11	0.1
		8-05-92	1230	<.01	.02	20	.2	--	--	--	--
		9-03-92	1530	.02	.01	--	.3	--	--	--	--
		10-28-92	1045	.02	.02	--	<.1	--	--	--	--
		12-17-92	1100	.01	.02	30	.5	--	--	14	.3
	OSW 114	9-13-89	--	.07	.05	<10	.4	<3	5	--	--
		2-01-90	1115	--	--	--	--	10	<10	--	--
		3-20-91	1100	.03	<.01	20	.5	[2]<10	[2]<10	14	1.8
		4-18-91	1500	.04	.02	--	.4	--	--	--	--
		5-29-91	1800	.03	<.01	--	.4	--	--	--	--
		6-27-91	1050	.03	.02	20	.5	--	--	15	1.9
		7-31-91	1500	.02	<.01	--	.5	--	--	--	--
		9-09-91	1115	.03	<.01	30	.6	--	--	13	.6
		11-08-91	1330	.01	.02	--	.5	--	--	--	--
		12-04-91	1500	.03	<.01	--	.5	--	--	--	--
		1-27-92	1130	.02	.03	--	.7	--	--	--	--
		3-04-92	0930	.01	<.01	--	1.0	--	--	--	--
		4-06-92	1530	.01	.01	--	.9	--	--	--	--
		5-13-92	1400	<.01	.01	--	1.1	--	--	--	--
		6-17-92	1230	.04	.01	90	1.1	--	--	20	1.3
		8-05-92	1230	<.01	<.01	130	1.0	--	--	--	--
		8-21-92	1230	.06	.06	--	--	--	--	--	--
		9-03-92	1500	.07	<.01	--	1.1	--	--	--	--
		10-28-92	1215	.02	.02	--	1.3	--	--	--	--
		12-17-92	1230	.02	.01	150	1.3	--	--	21	1.9
	OSW 98	9-05-89	1530	.07	.07	<10	.5	6	5	--	--
		2-01-90	1030	--	--	--	--	40	40	--	--
		2-20-91	1030	--	.02	--	.6	40	<10	--	--
		3-20-91	1000	.02	<.01	20	.6	--	--	12	1.0
		4-18-91	1430	.03	.03	--	.5	--	--	--	--
		5-29-91	1500	.04	.01	--	1.3	--	--	--	--
		6-27-91	1015	.02	.02	30	.5	--	--	12	1.0
		7-31-91	1430	.02	<.01	--	.7	--	--	--	--
		9-09-91	1200	.02	<.01	60	.9	--	--	16	.2
		11-08-91	1300	.01	.02	--	.9	--	--	--	--
		12-04-91	1430	.03	<.01	--	1.1	--	--	--	--
		1-27-92	1100	.02	.03	--	1.0	--	--	--	--
		3-04-92	1000	.01	<.01	--	1.3	--	--	--	--
		4-06-92	1500	.02	.01	--	1.0	--	--	--	--
		5-13-92	1330	.01	.01	--	1.0	--	--	--	--
		6-17-92	1630	.09	<.01	110	1.0	--	--	23	--
		7-30-92	0845	.02	.01	110	1.1	--	--	--	--
		8-05-92	1630	<.01	<.01	110	.8	--	--	--	--
		9-03-92	1445	.04	<.01	--	1.0	--	--	--	--
		10-28-92	1115	.01	.01	--	1.1	--	--	--	--
		12-17-92	1030	<.01	.01	20	.4	--	--	24	.1

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved	
										Concentration (as C)	Standard deviation (as C)
93	OSW 96	3-24-89	1200	0.02	0.03	20	0.3	79	49	--	--
		9-13-89	1200	<.01	<.01	20	.2	1,700	68	--	--
		2-01-90	0945	--	--	--	--	2,000	70	--	--
		3-20-91	0900	<.01	<.01	20	.5	[2]480	[2]20	10	1.1
		6-27-91	0930	.04	.04	20	.3	--	--	9.2	1.0
		9-09-91	1245	.01	<.01	20	.3	--	--	8.8	.5
		6-17-92	1530	.09	<.01	20	.1	--	--	8.9	.0
		12-17-92	0930	.01	.02	20	.4	--	--	9.5	.2
100	OSW 102	9-13-89	1715	.02	.02	110	.4	<3	25	--	--
		3-28-90	1130	--	--	--	--	10	10	--	--
		3-20-91	1500	<.01	<.01	<10	--	[2]16	[2]6	6.8	.3
		6-28-91	1330	.01	<.01	20	.3	--	--	8.1	1.5
		9-10-91	1530	.02	<.01	20	.4	--	--	7.1	.3
		6-12-92	1145	.03	.08	10	.4	--	--	7.4	.2
		7-30-92	--	--	--	--	--	--	--	--	--
		12-29-92	0900	<.01	.02	50	.3	--	--	11	.1
	OSW 100	3-24-89	0800	.04	.04	20	.3	1,600	92	--	--
		9-13-89	1800	<.01	.02	20	.3	1,800	76	--	--
		3-28-90	1230	--	--	--	--	1,800	60	--	--
		[1]3-20-91	1430	<.01	<.01	20	--	[2]710	[2]28	7.6	1.3
			1440	.04	.02	10	.2	[2]980	[2]38	--	--
		6-28-91	1230	--	--	--	--	--	--	7.0	.3
		[1]9-10-91	1500	.05	.02	20	.4	--	--	7.1	.1
			1510	.05	<.01	20	.4	--	--	--	--
		6-12-92	1200	.04	.04	20	.2	--	--	7.6	.5
		7-30-92	1500	.01	.02	140	.3	--	--	7.2	.2
		12-29-92	0830	.05	.03	20	.1	--	--	--	--
105	OSW 103	9-14-89	1730	.04	.02	10	.7	5	39	--	--
		3-21-91	1100	.17	.15	20	.8	[2]360	[2]71	8.7	.2
		6-25-91	1630	.03	.03	10	.8	--	--	--	--
		9-10-91	1130	.03	<.01	10	.5	--	--	--	--
		6-09-92	1115	.02	.03	10	.3	--	--	5.7	.4
		12-28-92	1130	.04	.03	20	1.0	--	--	--	--
	OSW 104	9-14-89	1045	.01	.04	20	.3	7	52	--	--
		3-21-91	0845	.11	.04	20	.6	[2]7	[2]18	7.5	1.7
		6-25-91	1445	.04	.03	10	.4	--	--	5.7	.1
		9-10-91	1030	.04	.02	10	.3	--	--	5.0	.3
		6-09-92	1100	.04	.05	10	.1	--	--	5.6	.5
		12-28-92	1100	.05	.05	20	.2	--	--	.1	.1
	OSW 105	9-14-89	1015	.03	<.01	30	.3	190	120	--	--
		3-22-90	1515	--	--	--	--	9,200	230	--	--
		3-21-91	1130	.02	.02	20	1.0	[2]23	[2]15	7.6	1.1
		6-25-91	1600	.02	.02	10	.5	--	--	6.3	.0
		9-10-91	1100	.03	<.01	20	.8	--	--	5.1	.1
		6-09-92	1200	<.01	.02	10	.3	--	--	6.6	2.3
		12-28-92	1200	.03	.02	30	.4	--	--	12	.3
111	OSW 110	9-14-89	1600	<.01	<.01	40	.7	5	260	--	--
	OSW 109	9-14-89	1310	<.01	.01	20	.2	2,900	99	--	--
		3-22-90	1630	--	--	-	--	3,200	80	--	--

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved	
										Concentration (as C)	Standard deviation (as C)
111	OSW 111	9-14-89	1200	<0.01	<0.01	30	0.2	9,000	270	--	--
		3-28-90	1515	--	--	--	--	50	30	--	--
112	OSW 112	9-14-89	1400	.03	.02	20	.3	14	65	--	--
124	OSW 124	12-28-92	1530	.01	.02	<10	.4	--	--	42	1.7
127	OSW 127	3-20-91	1545	.05	.06	<10	--	9	2	--	--
129	OSW 129	3-20-91	1520	.06	.06	<10	--	6	3	--	--
144	OSW 144	12-29-92	1000	.08	.08	90	.2	--	--	12	--
146	OSW 146	6-19-92	1030	--	--	--	--	--	--	--	--
			1100	<.01	<.01	20	.4	--	--	--	--
		12-28-92	1500	.01	.02	20	.3	--	--	44	2.6
147	OSW 141	1-04-91	1300	--	<.01	--	1.2	--	--	--	--
		2-21-91	1330	--	<.01	--	1.6	--	--	--	--
		3-21-91	1700	.03	<.01	80	1.3	[2]30	[2]650	16	1.6
		4-18-91	1230	<.01	.01	--	1.2	--	--	--	--
		5-29-91	1330	.01	<.01	--	1.4	--	--	--	--
		6-28-91	0930	<.01	<.01	90	1.4	--	--	19	1.2
		7-31-91	1300	.01	<.01	--	2.3	--	--	--	--
		9-06-91	1130	.01	<.01	90	1.2	--	--	22	.8
		11-08-91	1040	<.01	<.01	--	1.2	--	--	--	--
		12-04-91	1200	.01	<.01	--	1.3	--	--	--	--
		12-10-91	1300	--	--	--	1.3	--	--	--	--
		1-28-92	1130	<.01	<.01	--	1.3	--	--	--	--
		3-03-92	1230	<.01	<.01	--	1.8	--	--	--	--
		4-06-92	1230	<.01	<.01	--	1.4	--	--	--	--
		4-28-92	1200	.02	.01	--	1.1	--	--	--	--
		6-10-92	1145	.01	.02	110	1.0	--	--	24	2.1
		8-05-92	1100	.03	<.01	--	1.4	--	--	--	--
		8-30-92	1600	.07	<.01	--	1.4	--	--	--	--
		10-28-92	1215	.03	.02	--	2.0	--	--	--	--
		12-18-92	1130	.01	.02	130	1.5	--	--	15	1.8
	OSW 142	1-03-91	1430	--	.02	--	1.3	--	--	--	--
		2-20-91	1200	--	.04	--	1.8	--	--	--	--
		3-21-91	1500	.02	<.01	120	1.5	[2]40	[2]770	16	1.5
		4-18-91	1000	.03	.03	--	1.6	--	--	--	--
		5-29-91	1215	.01	<.01	--	1.4	--	--	--	--
		6-06-91	1700	.01	<.01	--	1.4	--	--	--	--
		6-27-91	0845	.01	<.01	20	1.2	--	--	17	1.8
		7-23-91	1500	.02	<.01	100	1.4	--	--	--	--
		7-31-91	1100	.02	<.01	--	1.4	--	--	--	--
		9-06-91	0930	.01	<.01	150	1.7	--	--	17	.4
		11-08-91	1100	<.01	.01	--	1.7	--	--	--	--
		12-04-91	1000	.02	<.01	--	1.7	--	--	--	--
		12-10-91	1100	--	--	--	1.9	--	--	--	--
		1-28-92	1100	<.01	<.01	--	1.6	--	--	--	--
		2-06-92	1400	--	--	--	--	--	--	--	--
		3-03-92	1200	.01	<.01	--	1.7	--	--	--	--
		4-06-92	1200	.02	<.01	--	1.6	--	--	--	--
		4-28-92	1300	.03	.02	--	1.6	--	--	--	--
		6-10-92	1045	.02	.02	150	1.8	--	--	23	.1

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved	
										Concentration (as C)	Standard deviation (as C)
147	OSW 142	8-05-92	0815	<0.01	.01	--	2.0	--	--	--	--
		8-30-92	1630	.02	.01	--	2.3	--	--	--	--
		10-28-92	1200	.02	.02	--	2.3	--	--	--	--
		12-18-92	1100	.02	.03	220	2.4	--	--	24	0.5
	OSW 165	1-28-92	1200	<.01	<.01	--	--	--	--	--	--
		3-03-92	1130	<.01	<.01	--	1.9	--	--	--	--
		4-06-92	1130	<.01	<.01	--	1.5	--	--	--	--
		4-28-92	1300	.02	.01	--	1.5	--	--	--	--
		6-10-92	0930	.02	.03	160	1.7	--	--	25	.5
		8-05-92	1030	.01	.02	--	2.1	--	--	--	--
		9-01-92	1330	.02	.02	--	2.2	--	--	--	--
		10-28-92	1130	.04	.03	--	2.0	--	--	--	--
		12-18-92	1030	.02	.02	200	2.2	--	--	23	.5
	OSW 152	7-31-91	1615	<.01	<.01	--	1.4	--	--	--	--
		9-06-91	1100	<.01	<.01	120	1.6	--	--	16	1.0
		11-08-91	1015	<.01	<.01	--	1.8	--	--	--	--
		12-04-91	1030	.02	<.01	--	1.9	--	--	--	--
		12-10-91	1200	--	--	--	1.9	--	--	--	--
		1-28-92	1030	<.01	.01	--	1.8	--	--	--	--
		3-03-92	1100	<.01	<.01	--	2.0	--	--	--	--
		4-06-92	1100	<.01	<.01	--	1.6	--	--	--	--
		4-28-92	1500	.01	<.01	--	1.6	--	--	--	--
		6-10-92	1015	.01	.02	140	1.7	--	--	23	.3
		7-30-92	1015	<.01	.01	140	2.1	--	--	--	--
		8-05-92	0930	<.01	<.01	--	1.2	--	--	--	--
		9-01-92	1230	<.01	.01	--	2.0	--	--	--	--
		10-28-92	1045	.03	.02	--	2.6	--	--	--	--
		12-18-92	0945	.01	.03	190	2.0	--	--	24	.4
	OSW 147	6-28-91	1000	.02	<.01	70	1.2	--	--	16	2.1
		7-24-91	0930	.02	<.01	70	1.2	--	--	--	--
		7-31-91	1200	.01	<.01	--	1.1	--	--	--	--
		9-06-91	1015	.05	<.01	70	1.0	--	--	14	.2
		11-08-91	0930	<.01	.01	--	1.2	--	--	--	--
		12-04-91	1130	.02	<.01	--	1.2	--	--	--	--
		12-10-91	1130	--	--	--	1.2	--	--	--	--
		1-28-92	0930	<.01	<.01	--	1.2	--	--	--	--
		3-03-92	0900	.01	<.01	--	1.4	--	--	--	--
		4-06-92	1030	<.01	<.01	--	1.2	--	--	--	--
		4-29-92	1100	<.01	<.01	--	1.2	--	--	--	--
		6-10-92	0900	.01	.02	140	1.4	--	--	29	1.5
		8-05-92	0930	--	--	--	--	--	--	--	--
		9-01-92	1300	<.01	.01	--	1.4	--	--	--	--
		10-28-92	1000	.02	.02	--	1.6	--	--	--	--
		12-18-92	0900	.03	.04	150	1.9	--	--	22	.7
148	OSW 143	9-10-91	1700	.06	<.01	20	1.3	--	--	--	--
		6-16-92	1230	.13	.03	20	.8	--	--	--	--
		12-29-92	1515	.04	.03	20	.6	--	--	--	--
	OSW 148	9-10-91	1630	.04	<.01	20	.4	--	--	8.4	.2
		6-16-92	1045	.05	.05	20	.2	--	--	8.0	.3
		12-29-92	1100	.04	.04	20	.2	--	--	9.4	.2

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved: Concentration (as C)	Carbon, inorganic, dissolved: Standard deviation (as C)
149	OSW 107	9-14-89	1645	0.01	<0.01	20	0.5	270	250	--	--
		2-01-90	1215	--	--	--	--	20	360	--	--
		6-06-90	--	--	--	--	--	--	--	--	--
		6-25-90	1630	<.01	<.01	20	.7	--	--	--	--
		7-30-90	1600	--	--	--	--	--	--	--	--
		8-13-90	1500	--	--	--	--	--	--	--	--
		8-27-90	1430	<.01	<.01	20	.5	--	--	--	--
		9-10-90	1200	--	--	--	--	--	--	--	--
		10-05-90	1340	--	--	--	--	--	--	--	--
		12-06-90	1230	--	<.01	--	.6	--	--	--	--
		1-03-91	1550	--	<.01	--	.5	--	--	--	--
		2-20-91	--	--	--	--	--	--	--	--	--
		[1]3-21-91	1600	<.01	<.01	20	.8	[2]16	[2]22	26	1.9
			1610	.11	<.01	20	.6	[2]13	[2]20	--	--
		4-18-91	1200	<.01	<.01	--	.7	--	--	--	--
		5-29-91	1115	<.01	<.01	--	.9	--	--	--	--
		[1]6-27-91	1700	.02	.01	30	.6	--	--	29	3.2
			1710	.02	<.01	30	.6	--	--	--	--
		7-09-91	1245	.02	.02	30	.6	--	--	--	--
		9-06-91	1400	<.01	<.01	70	.9	--	--	--	--
		6-10-92	1500	.02	<.01	110	1.0	--	--	24	.3
		7-30-92	1300	<.01	.02	100	1.3	--	--	--	--
		8-19-92	1230	<.01	.01	--	1.2	--	--	--	--
		9-10-92	1530	<.01	<.01	--	1.4	--	--	27	.3
		12-22-92	0945	.02	.01	150	1.6	--	--	24	.4
	OSW 149	9-06-91	1330	.01	<.01	20	.6	--	--	12	.2
		6-10-92	1600	<.01	<.01	50	.8	--	--	23	.2
		8-19-92	1300	<.01	<.01	--	.6	--	--	--	--
		9-10-92	1500	<.01	<.01	--	1.0	--	--	--	--
		12-22-92	0900	.01	.01	80	.7	--	--	24	.8
150	OSW 160	1-28-92	1530	<.01	<.01	--	--	--	--	6.5	.1
		6-09-92	1645	.02	.02	150	2.2	--	--	8.3	.5
		12-21-92	1530	<.01	<.01	220	2.4	--	--	--	--
	OSW 150	9-06-91	1200	.03	.02	10	.4	--	--	--	--
		6-09-92	1600	.01	.03	20	.4	--	--	--	--
		12-21-92	1600	<.01	.01	10	.2	--	--	--	--
151	OSW 153	9-05-91	1630	.07	.04	10	.4	--	--	14	.5
		6-09-92	0915	.07	.07	20	.3	--	--	10	.7
		12-16-92	1430	.06	.07	20	.3	--	--	12	.9
	OSW 157	9-05-91	1500	.03	.02	30	.7	--	--	19	.6
		6-09-92	1000	.02	.02	150	.9	--	--	25	.7
		12-16-92	1400	.02	.04	130	.9	--	--	23	1.0
	OSW 151	9-05-91	1615	.03	<.01	10	.4	--	--	6.2	.2
		6-09-92	0830	.02	.01	<10	.2	--	--	5.3	.5
		12-16-92	1330	<.01	<.01	20	.3	--	--	7.7	1.1
154	OSW 138	1-04-91	1030	--	.04	<10	.5	<3	130	--	--
		3-20-91	1700	.03	.03	<10	--	[2]12	[2]67	19	.9
		6-27-91	1500	.06	.04	20	.5	--	--	18	.5
		9-09-91	1530	.05	.02	20	.5	--	--	21	1.1
		6-11-92	1145	.04	.05	20	.4	--	--	26	.2
		12-29-92	1430	.06	.06	10	.3	--	--	34	1.9

Table 6. Chemical analyses of ground water, Orleans, Massachusetts—*Continued*

Cluster site	USGS well identifier	Date	Time	Phosphorus, dissolved (as P)	Phosphorus, orthophosphate, dissolved (as P)	Boron (µg/L)	Carbon, organic, dissolved (as C)	Iron (µg/L)	Manganese (µg/L)	Carbon, inorganic, dissolved	
										Concentration (as C)	Standard deviation (as C)
154	OSW 155	8-14-91	1245	0.10	0.10	--	0.3	--	--	--	--
		9-09-91	1500	.10	.08	<10	.3	--	--	5.5	0.3
		6-11-92	1215	.08	.10	<10	.3	--	--	4.8	.7
		12-29-92	1500	.08	.09	10	.1	--	--	7.3	.5
	OSW 154	9-09-91	1430	.04	.02	<10	.3	--	--	7.8	.8
		6-11-92	1245	.04	.03	<10	.2	--	--	7.6	.2
		12-29-92	1530	.02	.02	<10	.1	--	--	8.7	.5
156	OSW 140	1-04-91	1230	--	.04	20	.5	6	100	--	--
		3-22-91	1200	.04	.05	20	.7	[2]5	[2]67	30	2.8
		6-27-91	1545	.05	.05	90	.5	--	--	24	.5
		9-06-91	1530	.07	.05	20	.6	--	--	25	.8
		5-01-92	1130	.05	.06	--	.4	--	--	--	--
		6-11-92	0900	.08	.07	20	.5	--	--	30	1.3
		12-22-92	1500	.06	.06	20	.4	--	--	31	.1
	OSW 167	5-01-92	1400	<.01	.02	--	.3	--	--	--	--
		6-11-92	1045	.03	.02	20	.3	--	--	15	.6
		9-02-92	1230	.01	.01	--	.3	--	--	--	--
		10-28-92	1530	.01	.02	--	.3	--	--	--	--
		12-22-92	1400	.03	.02	30	.4	--	--	20	.4
	OSW 161	1-28-92	1400	.02	.03	--	.4	--	--	--	--
		3-04-92	0830	.02	.02	--	.7	--	--	--	--
		4-06-92	1700	.03	.03	--	.3	--	--	--	--
		5-01-92	1100	.02	.03	--	.3	--	--	--	--
		6-11-92	1015	.03	.03	20	.3	--	--	13	.7
		7-30-92	1400	.03	.03	<10	.5	--	--	--	--
		9-02-92	1200	.02	.03	--	.4	--	--	--	--
		10-28-92	1500	.04	.03	--	.4	--	--	--	--
		12-22-92	1300	.04	.03	30	.5	--	--	19	1.6
	OSW 156	9-06-91	1615	.03	.02	<10	.3	--	--	7.9	.4
		6-11-92	0930	.03	.03	<10	.3	--	--	8.1	.4
		12-22-92	1200	.03	.02	<10	.3	--	--	7.9	.3
158	OSW 158	9-09-91	1645	.04	.02	<10	.3	--	--	6.3	.3
		6-12-92	1015	.08	.08	<10	.2	--	--	6.2	.6
		12-29-92	1330	.14	.09	<10	.1	--	--	6.4	.4
159	OSW 159	9-11-91	1630	.02	<.01	20	.5	--	--	12	.5
		6-10-92	1630	<.01	<.01	60	.8	--	--	18	.6
		12-18-92	1600	<.01	.01	90	.9	--	--	17	.4
162	OSW 164	6-16-92	1600	.16	.05	10	.2	--	--	8.3	.3
		12-28-92	1330	.08	.07	10	.2	--	--	11	.3
	OSW 162	6-16-92	1630	.05	.01	10	.4	--	--	--	--
		12-28-92	1400	.23	<.01	10	.3	--	--	8.2	.2
168	OSW 139	9-11-91	1715	.05	.02	10	.4	--	--	--	--
		6-18-92	1345	.06	.06	10	.4	--	--	--	--
		12-22-92	1415	.07	.05	20	.3	--	--	--	--
	OSW 172	7-02-92	1330	.05	.04	20	.7	--	--	--	--
		12-22-92	1030	.04	.03	10	.6	--	--	--	--
	OSW 168	6-18-92	1030	.04	.03	10	.6	--	--	9.5	.6
		12-22-92	1100	.03	.02	10	.2	--	--	8.8	.2

Table 7. Sampling locations and concentrations of total ammonium and solid-phase carbon and nitrogen in infiltration-bed and aquifer sediments, Orleans, Massachusetts

[Sampling interval in feet below land surface; μg/g, microgram per gram of dry sediment; μg/cm^3, microgram per cubic centimeter of aquifer; %wt/wt, weight percent; --, not determined]

Sampling location	Date	Sample No.	Sampling interval		Total ammonium		Solid-phase carbon (%wt/wt)	Solid-phase nitrogen (%wt/wt)
			Top	Bottom	(μg/g as N)	(μg/cm^3 as N)		
Infiltration bed A, Surface	3-11-92	1	0	0.16	7.17	11.05	--	--
		2	0	.16	10.79	16.61	--	--
		3	0	.16	9.01	13.88	--	--
		4	0	.16	6.66	10.26	--	--
		5	0	.16	1.10	1.69	--	--
		6	0	.16	8.86	13.65	--	--
		7	0	.16	7.50	11.55	--	--
		8	0	.16	6.06	9.34	--	--
		9	0	.16	5.91	9.10	--	--
		10	0	.16	4.01	6.18	--	--
		11	0	.16	5.23	8.05	--	--
Infiltration bed A, Core 1	3-11-92	44	.16	.33	.09	.15	--	--
		45	.33	.66	.09	.14	--	--
		46	.66	.98	1.32	2.14	--	--
		47	.98	1.31	2.37	3.84	--	--
		74	1.31	1.64	4.75	7.69	--	--
Infiltration bed A, Core 2	3-11-92	50	.16	.33	10.81	17.51	--	--
		51	.33	.66	3.03	4.90	--	--
		53	.66	.98	5.59	9.05	--	--
		73	.98	1.31	3.15	5.10	--	--
Infiltration bed A, Core 3	3-11-92	55	.16	.33	.67	1.08	--	--
		56	.33	.66	.68	1.10	--	--
		57	.66	.98	.19	.31	--	--
		58	.98	1.31	.13	.21	--	--
		59	1.31	1.64	1.35	2.18	--	--
		76	1.64	1.97	13.91	22.53	--	--
		77	1.97	2.30	2.36	3.83	--	
Infiltration bed A, Core 4	3-11-92	61	.16	.33	11.33	18.35	--	--
		62	.33	.66	18.61	30.13	0.070	--
		63	.66	.98	2.96	4.79	--	--
		64	.98	1.31	4.36	7.05	.011	--
		65	1.31	1.64	.82	1.32	--	--
		75	1.64	1.87	2.80	4.53	.008	--
		66	1.87	2.03	2.20	3.57	.014	--
		67	2.03	2.20	2.86	4.64	--	--
		68	2.20	2.53	4.34	7.03	.010	--
		69	2.53	2.85	6.75	10.92	--	--
		70	2.85	3.18	8.98	14.55	--	--
		71	3.51	3.84	7.22	11.69	--	--
		72	3.84	4.17	4.57	7.39	.012	--
Infiltration bed A, Core 5	3-11-92	13	.16	.33	.65	1.05	--	--
		14	.33	.66	1.50	2.43	--	--
		15	.66	.98	.97	1.57	--	--
		16	.98	1.31	.94	1.53	--	--
		17	1.31	1.64	.80	1.29	--	--
		19	1.97	2.13	.18	.29	--	--

Table 7. Sampling locations and concentrations of total ammonium and solid-phase carbon and nitrogen in infiltration-bed and aquifer sediments, Orleans, Massachusetts—*Continued*

Sampling location	Date	Sample No.	Sampling interval		Total ammonium		Solid-phase carbon (%wt/wt)	Solid-phase nitrogen (%wt/wt)
			Top	Bottom	(μg/g as N)	(μg/cm^3 as N)		
Infiltration bed A, Core 5	3-11-92	20	2.13	2.30	0.06	0.10	--	--
		21	2.30	2.62	.06	.09	--	--
		22	2.62	2.95	.06	.10	--	--
		23	2.95	3.28	.10	.16	--	--
		23A	3.28	3.58	.11	.18	--	--
Infiltration bed A, Core 6	3-11-92	25	.16	.33	4.10	6.64	--	--
		26	.33	.66	.55	.89	--	--
		27	.66	.98	.10	.17	--	--
		28	.98	1.15	3.94	6.38	--	--
		29	1.15	1.31	.61	.98	--	--
		30	1.31	1.64	.07	.11	--	--
		31	1.64	1.97	.07	.12	--	--
		32	1.97	2.30	.06	.09	--	--
		78	2.30	2.62	.05	.08	--	--
		79	2.62	2.79	.05	.09	--	--
Infiltration bed A, Core 7	3-11-92	33	0	.16	--	--	0.17	0.02
		34	.16	.33	.35	.56	.08	.01
		35	.33	.66	.27	.44	.06	0
		36	.66	.98	.36	.58	--	--
		37	.98	1.31	.10	.17	.06	.01
		80	1.31	1.64	.60	.97	--	--
		81	1.64	1.97	.15	.24	.06	.01
		38	1.97	2.13	.72	1.17	--	--
		39	2.13	2.30	.06	.10	.06	.02
		40	2.30	2.62	.05	.08	--	--
		41	2.62	2.95	.06	.10	.04	0
		42	2.95	3.28	.05	.08	--	--
		82	3.28	3.61	.06	.09	--	--
		83	3.61	3.94	.04	.07	.03	.0
Infiltration bed B, Surface	4-12-92	1	0	.16	21.23	32.71	.35	.05
		2	0	.16	27.35	42.13	--	--
		3	0	.16	24.75	38.13	.35	.07
		4	0	.16	30.17	46.47	.41	.05
		5	0	.16	37.65	57.99	.84	.13
		6	0	.16	30.32	46.71	.51	.06
		7	0	.16	32.04	49.36	.72	.07
		8	0	.16	27.23	41.94	.28	.03
		9	0	.16	23.27	35.84	.41	.05
		10	0	.16	30.82	47.48	.78	.18
		11	0	.16	29.78	45.88	.38	.10
		12	0	.16	29.15	44.91	.22	.03
		14	0	.16	30.77	47.40	.25	.06
		16	0	.16	32.10	49.45	.43	.05
		18	0	.16	21.51	33.13	.42	.08
		20	0	.16	25.99	40.04	1.30	.22
Cluster site 93	8-17-92	1	38.7	39.1	.04	.06	.029	--
		3	41.2	41.6	.44	.70	.023	--
		4	43.3	43.7	1.88	3.01	.042	--

Table 7. Sampling locations and concentrations of total ammonium and solid-phase carbon and nitrogen in infiltration-bed and aquifer sediments, Orleans, Massachusetts—*Continued*

Sampling location	Date	Sample No.	Sampling interval		Total ammonium		Solid-phase carbon (%wt/wt)	Solid-phase nitrogen (%wt/wt)
			Top	Bottom	(µg/g as N)	(µg/cm^3 as N)		
Cluster site 93	8-17-92	5	45.3	45.7	2.56	4.10	0.027	--
		6	48.1	48.5	2.34	3.75	.031	--
		7	50.5	50.9	1.29	2.06	.017	--
		8	53.7	54.1	2.62	4.20	.025	--
		9	56.0	56.4	.50	.80	.002	--
		10	60.5	60.9	.83	1.33	.003	--
		11	66.1	66.5	2.21	3.54	.011	--
		12	68.9	69.3	1.13	1.81	.016	--
		13	70.4	70.8	1.15	1.83	.002	--
		14	54.5	54.9	.42	.68	.004	--
		16	76.3	76.6	.83	1.32	.003	--
Cluster site 96	8-04-92	1	48.7	49.0	.13	.21	.067	--
		2	50.5	50.9	.35	.56	.009	--
		3	53.8	54.2	.08	.13	.021	--
		4	55.4	55.7	.58	.94	.040	--
		5	59.4	59.8	.14	.22	.028	--
		6	67.3	67.7	.05	.08	.003	--
	8-05-92	7	69.0	69.4	.25	.39	.003	--
		8	70.5	70.9	.72	1.15	.017	--
		9	76.4	76.8	.91	1.45	--	--
		10	78.0	78.4	.82	1.31	.005	--
		11	92.9	93.3	.23	.36	.005	--
	8-06-92	12	86.0	86.4	.40	.64	--	--
		13	93.8	94.2	.24	.39	.033	--
		14	95.8	96.2	.09	.15	.046	--
		15	97.3	97.7	.21	.33	.001	--
		16	--	--	.29	.46	--	--
	8-21-92	29	39.8	40.2	.08	.13	--	--
		30	43.7	44.1	.19	.31	.135	--
		31	45.6	46.0	.15	.25	.012	--
Cluster site 147	4-28-92	1	48.9	49.3	.76	1.21	.023	--
		2	50.5	50.9	1.27	2.04	.004	--
		3	60.6	61.0	2.33	3.73	.036	--
		4	64.4	64.8	1.15	1.85	.011	--
		5	70.5	70.9	1.67	2.68	.007	--
	4-30-92	6	44.0	44.4	.06	.09	--	--
		7	53.8	54.2	3.96	6.34	--	--
		8	75.2	75.6	.64	1.02	--	--
		9	80.2	80.6	1.87	2.99	--	--
		10	89.8	90.2	.45	.71	--	--
	8-30-92	1	44.0	44.4	.15	.24	.040	--
		2	45.9	46.3	7.13	11.40	.027	--
		3	48.8	49.2	7.00	11.20	.014	--
		4	50.8	51.2	6.93	11.09	.012	--
		5	53.8	54.2	4.69	7.51	.010	--
		6	55.8	56.2	1.17	1.88	.034	--

Table 7. Sampling locations and concentrations of total ammonium and solid-phase carbon and nitrogen in infiltration-bed and aquifer sediments, Orleans, Massachusetts—*Continued*

Sampling location	Date	Sample No.	Sampling interval		Total ammonium		Solid-phase carbon (%wt/wt)	Solid-phase nitrogen (%wt/wt)
			Top	Bottom	(µg/g as N)	(µg/cm^3 as N)		
Cluster site 147	9-01-92	7	60.5	60.9	3.57	5.71	0.030	--
		8	65.5	65.9	4.30	6.88	.016	--
		9	70.5	70.9	1.77	2.84	.005	--
		10	75.5	75.9	1.54	2.46	.003	--
		11	80.5	80.9	.90	1.43	.002	--
	9-02-92	12	85.5	85.9	.71	1.14	.000	--
		13	90.5	90.9	3.10	4.97	.002	--
		14	95.5	95.9	.47	.75	.033	--
Cluster site 149	8-19-92	15	44.8	45.2	.02	.04	.037	--
		17	48.9	49.3	.08	.12	.035	--
		18	50.4	50.8	.35	.56	.011	--
		19	55.6	56.0	.26	.42	.001	--
		20	60.6	61.0	1.71	2.73	.009	--
		21	65.6	66.0	.55	.89	.005	--
		22	70.6	71.0	.81	1.29	.037	--
		23	75.6	76.0	.03	.05	.003	--
		24	79.0	79.4	.23	.37	.008	--
		25	80.6	81.0	.59	.95	.005	--
		26	59.0	59.4	.71	1.14	.005	--
		27	64.0	64.4	.52	.84	.003	--
		28	59.0	59.4	.38	.60	.003	--
	8-21-92	29	--	--	--	--	.013	--
Cluster site 156	5-01-92	12	68.7	69.1	.12	.20	.005	--
		13	70.8	71.2	.10	.16	.006	--
		14	75.4	75.8	.38	.60	.007	--
		15	77.4	77.8	.36	.58	--	--
		16	80.6	81.0	.67	1.07	.004	--
		17	79.5	79.9	.58	.93	--	--
		18	85.7	86.1	.06	.09	.021	--
		19	86.9	87.3	.39	.63	.089	--
Cluster site 168	5-05-92	20	58.7	59.1	.03	.05	--	--
		21	65.3	65.6	.06	.09	--	--
		22	73.8	74.1	.05	.09	.009	--
		23	84.6	85.0	.04	.06	.004	--
		24	93.1	93.4	.07	.11	.022	--
		25	93.7	94.1	.08	.13	.065	--
		26	94.5	94.8	.23	.37	.137	--
		27	103.1	103.5	.07	.12	.013	--
		28	104.1	104.5	.33	.53	.109	--
Cluster site 171	6-16-92	1	58.8	59.2	.05	.08	.003	--
		2	64.8	65.2	.51	.82	.147	--
		3	67.8	68.2	.04	.06	.007	--
		4	83.8	84.2	.10	.16	.012	--
		5	96.8	97.2	.10	.15	.011	--
		6	97.8	98.2	.08	.12	.024	--
		7	98.8	99.2	.23	.36	.137	--

Table 7. Sampling locations and concentrations of total ammonium and solid-phase carbon and nitrogen in infiltration-bed and aquifer sediments, Orleans, Massachusetts—*Continued*

Sampling location	Date	Sample No.	Sampling interval		Total ammonium		Solid-phase carbon (%wt/wt)	Solid-phase nitrogen (%wt/wt)
			Top	Bottom	(µg/g as N)	(µg/cm^3 as N)		
Cluster site 174	9-02-92	15	45.6	46.0	0.60	0.96	0.018	--
		16	50.5	50.9	1.42	2.27	--	--
		17	44.0	44.4	.25	.40	.014	--
Cluster site 174	9-03-92	18	55.5	55.9	2.01	3.22	.010	--
		19	60.5	60.9	1.60	2.55	.005	--
		20	65.5	65.9	.87	1.40	.007	--
		21	69.8	70.2	.91	1.46	.006	--
	9-04-92	22	75.5	75.9	1.11	1.78	--	--
		23	80.5	80.9	.95	1.51	--	--
		24	85.5	85.9	.78	1.24	--	--