Pushpoint Sampling for Defining Spatial and Temporal Variations in Contaminant Concentrations in Sediment Pore Water near the Ground-Water/Surface-Water Interface

By Marc J. Zimmerman, Andrew J. Massey, and Kimberly W. Campo

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Conversion Factors and Miscellaneous Abbreviations

Multiply	By	To obtain
centimeter (cm)	0.3937	inch (in.)
centimeter (cm)	0.03281	foot (ft)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)
liter (L)	33.82	ounce, fluid (fl. oz)
liter (L)	2.113	pint (pt)
liter (L)	1.057	quart (qt)
liter (L)	0.2642	gallon (gal)
liter (L)	61.02	cubic inch (in^3)
kilometer	0.6214	mile (mi)
meter (m)	3.281	foot (ft)
meter (m)	1.094	yard (yd)
milliliter (mL)	0.03382	ounce, fluid (fl. oz)
millimeter (mm)	0.03937	inch (in.)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$°F=(1.8\times°C)+32$$

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (µS/cm at 25°C).

Concentrations of chemical constituents in water are given either in milligrams per liter (mg/L) or micrograms per liter (µg/L).

1,2-DCB	1,2-dichlorobenzene
1,2-DCE	1,2-dichloroethene
1,2,3-TCB	1,2,3-trichlorobenzene
LDPE	low-density polyethylene
PCE	tetrachloroethene
PDB	passive-diffusion-bag sampler
PPS	pushpoint sampler
RPD	relative percent difference
TCE	trichloroethene
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

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Abstract

During four periods from April 2002 to June 2003, pore-water samples were taken from river sediment within a gaining reach (Mill Pond) of the Sudbury River in Ashland, Massachusetts, with a temporary pushpoint sampler to determine whether this device is an effective tool for measuring small-scale spatial variations in concentrations of volatile organic compounds and selected field parameters (specific conductance and dissolved oxygen concentration). The pore waters sampled were within a subsurface plume of volatile organic compounds extending from the nearby Nyanza Chemical Waste Dump Superfund site to the river. Samples were collected from depths of 10, 30, and 60 centimeters below the sediment surface along two 10-meter-long, parallel transects extending into the river. Twenty-five volatile organic compounds were detected at concentrations ranging from less than 1 microgram per liter to hundreds of micrograms per liter (for example, 1,2-dichlorobenzene, 490 micrograms per liter; *cis*-1,2-dichloroethene, 290 micrograms per liter). The most frequently detected compounds were either chlorobenzenes or chlorinated ethenes. Many of the compounds were detected only infrequently. Quality-control sampling indicated a low incidence of trace concentrations of contaminants. Additional samples collected with passive-water-diffusion-bag samplers yielded results comparable to those collected with the pushpoint sampler and to samples collected in previous studies at the site.

The results demonstrate that the pushpoint sampler can yield distinct samples from sites in close proximity; in this case, sampling sites were 1 meter apart horizontally and 20 or 30 centimeters apart vertically. Moreover, the pushpoint sampler was able to draw pore water when inserted to depths as shallow as 10 centimeters below the sediment surface without entraining surface water. The simplicity of collecting numerous samples in a short time period (routinely, 20 to 30 per day) validates the use of a pushpoint sampler as a highly effective tool for mapping the extent of contaminated subsurface plumes, determining their constituents and loadings, and performing technical studies that may be relevant to bioremediation and other activities.

Introduction

The environmental risk posed by contaminants in stream- and lake-bed sediments is affected, in part, by small-scale (meters or less) lateral and vertical variations in concentrations in pore water and by changes in those concentrations with time. The technologies available to collect pore-water samples, including screened well points, passive-water-diffusion-bag samplers (PDBs), and seepage meters are typically (1) unsuitable for collecting water in shallow, biologically active zones; (2) too cumbersome or expensive to define small-scale variations; or (3) too difficult to maintain or reinstall for time-series sampling. For these reasons, lateral and vertical variations of contaminants in pore water are often poorly defined, and temporal variations with changing hydrologic conditions are rarely evaluated. Therefore, the U.S. Geological Survey, in cooperation with the U.S. Environmental Protection Agency (USEPA), began a study in 2002 to determine the effectiveness of a temporary pushpoint sampler for collecting pore-water samples from shallow sediments to measure concentrations of various constituents. Samples were collected at Mill Pond on the Sudbury River in Ashland, MA.

Purpose and Scope

This report documents the testing of a temporary pushpoint sampler, the PushPoint Extreme Sampler (MHE Products, East Tawas, Michigan; U.S. Pat. No. 6,470,967) (fig. 1) at Mill Pond on the Sudbury River in Ashland, MA

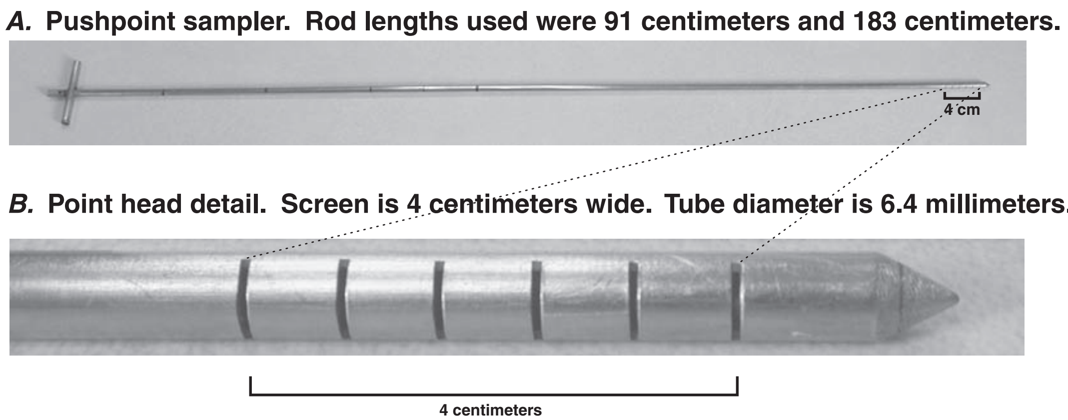
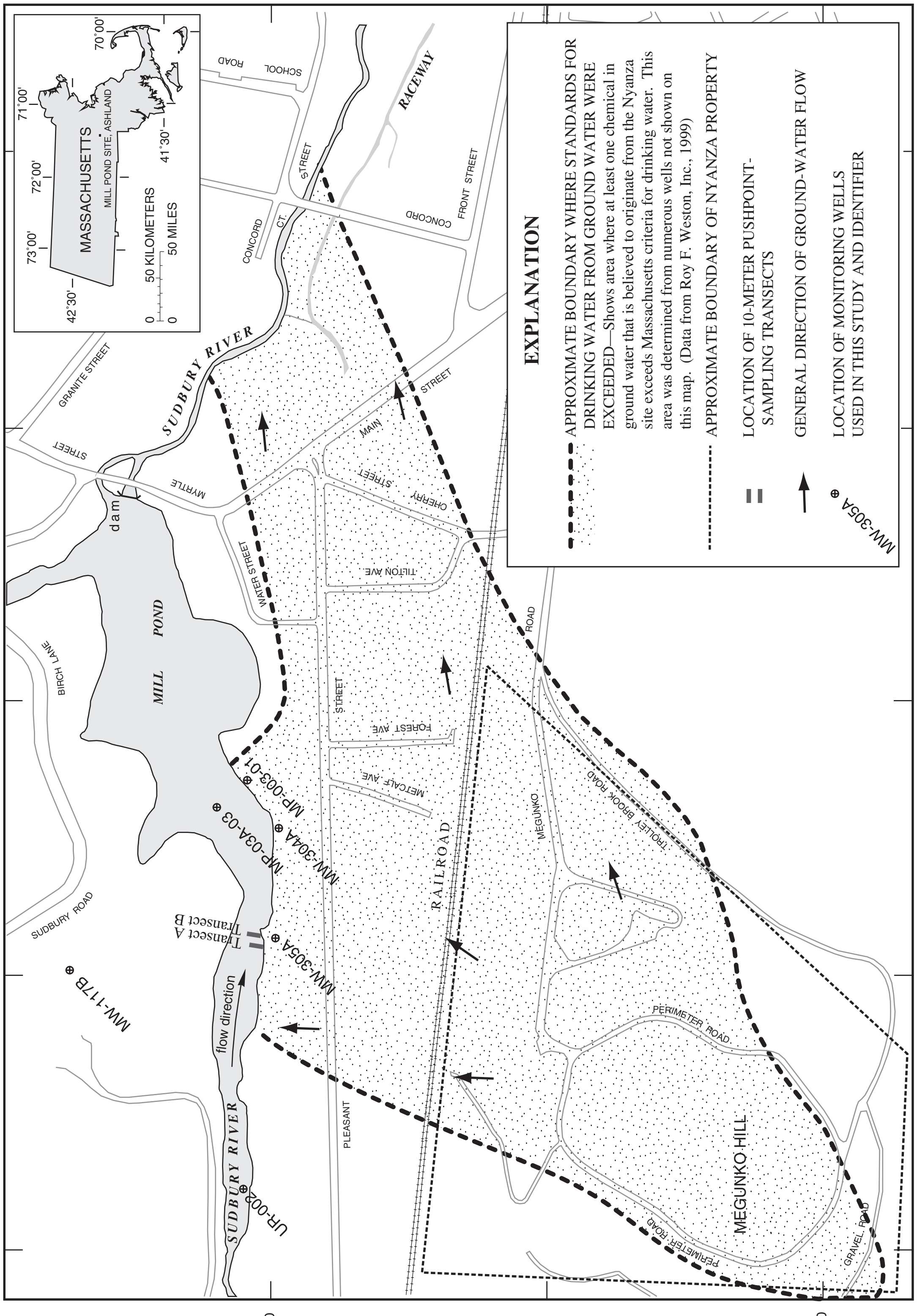


Figure 1. *A*, the 91-centimeter-long PushPoint Extreme Sampler, and *B*, closeup of the slotted screen at the tip.

(fig. 2), to determine its effectiveness as a tool for collecting samples to measure concentrations of volatile organic compounds (VOCs) and other water-quality constituents in pore water from shallow sediments. A positive determination required meeting two objectives as described in the report: first, a successful field demonstration of the minimum sediment depth from which the pushpoint sampler (PPS) could collect pore-water samples without introducing surface water, and second, a field demonstration that the PPS could collect samples clearly differentiating the small-scale spatial and temporal variations in specific conductance, pH, dissolved oxygen, ferrous iron, and VOCs. To collect samples during a range of normal-, high-, and low-flow periods, four study periods were scheduled: June 2002 and April 2003 (normal flow), June 2003 (high flow), and September 2002 (low flow). Finally, the report describes how the data provided by the field demonstration proved useful for screening and interpretation.

Study-Area Description

The Mill Pond on the Sudbury River in Ashland, Massachusetts, was selected as the study site (fig. 2) because ground-water discharge into the pond includes a contaminant plume known to contain VOCs, semivolatile organic compounds, and other constituents, such as metals, from the Nyanza Chemical Waste Dump Superfund site located approximately 0.6 km upgradient (Church and others, 2002a; Campbell and others, 2002; U.S. Army Corps of Engineers, 1999.) The plume flows northward to reach the study site, the closest area of the plume's interaction with the river. The sediments at the study site generally consist of fine-grained sand, silt, and organic matter.



Base map modified from area site plan, Department of the Army New England District Corps of Engineers,
Concord, Massachusetts and Weston Managers Designers/Consultants;
1,000-foot grid based on Massachusetts State coordinate system, mainland zone

Figure 2. The study area, Mill Pond, Sudbury River, Ashland, Massachusetts.

The Pushpoint Sampler

The PPS is a 6.4-mm-diameter stainless-steel tube with a machined point and 4-cm-long slotted-screen zone at the tip (Henry, 2001); 91-cm and 183-cm models were used in this study. An internal guard rod positioned through the bore adds rigidity to the sampler during insertion. After setting the PPS in the sediment at the desired depth, the guard rod is withdrawn. The PPS is designed to sample pore water with minimal disturbance to the site.

During this study, a peristaltic pump was used to draw water samples through the PPS. Approximately 2 m of Norprene tubing connected the pump directly to the PPS. Samples were collected from a boat braced against or lashed to the transect structure (fig. 3).

The PPS has features that make its use attractive when time is limited and a large number of samples is needed:

- Only one site visit is needed to collect one or more samples;
- Many samples can be collected easily to define discharge zones laterally and vertically;
- No onsite installation of equipment is required;
- Substrate disturbance is minimal; and
- Differential heads (water levels) can be measured easily with a manometer.

Those features should be weighed against some of the PPS's potential limitations:

- A sample represents conditions at a point in time and space, not an integration of changes over a longer time period;
- Without semipermanent installation (multilevel sampler, for example), a sample may not be drawn from the identical spot on return visits;
- The physical characteristics of the substrate may prevent sample collection;
- Low yield can make it difficult to obtain flow sufficient for measurement of field properties.

Figure 3. Sample collection from boat on the Mill Pond, Sudbury River, Ashland, Massachusetts.

Study Design

To ensure that surface water was not drawn into a pore-water sample, specific conductance was monitored while approximately 2 L of pore water were collected from 10 cm beneath the sediment surface. To demonstrate the utility of the PPS to collect discrete shallow pore-water samples, two 10-m transects were selected that extended perpendicular to the shore. Sampling sites were distributed at 1-m intervals along the transects and samples were collected from 10, 30, and 60 cm beneath the sediment surface at these sites. In addition, PDBs were installed and sampled to provide a basis to compare the results from this study with previous investigations (Church and others, 2002a; Lyford and others, 2000).

Initial Testing

On June 13, 2002, preliminary testing was done to ensure that pumping did not introduce surface water into the pore-water sample. First, the surface-water specific conductance was measured. Then, the PPS was carefully inserted 10 cm into the riverbed sediment; this insertion placed the uppermost slot of the screen 5 cm below the sediment surface. The pump was turned on and, once the flow became steady, the conductance and volume were monitored until approximately 2 L had flowed through the system. Results from two separate sampling tests show stable pore-water specific-conductance values of 482 ±1 and 610 ±8 μS/cm were maintained and were clearly different from the surface-water values of 367 and 382 μS/cm, respectively. If the pumping were inducing surface water to flow into the PPS, a decrease in the specific conductance would become apparent. During this study, comparing the surface-water specific conductance with the values from all samples collected from 10 cm below the sediment surface confirmed that surface water did not affect the pore-water samples.

Only specific conductance was used to test for surface-water infiltration, although temperature also may have indicated infiltration (Conant, 2004). Measurements of other properties in the field, for example, the concentrations of dissolved oxygen, are not as stable at concentrations lower than 0.5 mg/L. Measurements may also be affected by chemical interactions and the effects are likely to be difficult to quantify accurately in the field. Two examples are oxidation-reduction reactions betweeen dissolved oxygen and iron and pH changes resulting from oxidation of organic matter (Stumm and Morgan, 1996).

Field Study

In April 2002, the Mill Pond study site was outfitted with a staff gage, arbitrarily referenced to a nearby concrete dock, for visual determination of river stage; two parallel, fixed transects extending into the river (figs. 4 and 5); and two piezometers in the river bed for routine confirmation that the area is a gaining reach, where VOC-contaminated ground water discharges to the river. During all four study periods, the water levels inside the piezometers were higher than the external levels as measured down from the tops of the piezometers (table 1), indicating ground-water discharge to the river. The site also has two previously installed monitoring wells on the shore.

The two 10-m-long fixed transects, A and B, were constructed approximately 10 m apart and perpendicular to the shoreline. First, 4-ft steel posts were driven vertically into the bed sediments. The distances of the ends of the transects from the shoreline depended on the river stage: transect A was about 2–3 m from the shoreline and transect B about 0.5–2.5 m from the shoreline (fig. 5). Second, aluminum guide rails were attached horizontally to the posts with clamps for stable anchoring of the small aluminum rowboat during sampling. The horizontal guide rails were removed between sampling events to prevent debris accumulation during high flows. A fiberglass tape measure was attached to each transect to ensure that sampling would take place at the same locations during the four sampling periods from June 17, 2002, to June 26, 2003. Eleven sampling locations 1 m apart were designated along each transect's horizontal rails (fig. 5).

Planned sampling periods were scheduled to target periods of the year that were likely to include a range of streamflows in the study reach of the Sudbury River. Relative to this study site, two periods of moderate, or normal, discharge and one period each of low and high discharge were sought. Based on the hydrological data provided by reading the staff gage, such a range of flows occurred during the four sampling study periods (table 1). Additional corroboration of the flow condition was obtained by comparing the stage with mean daily discharges at a continuous stream-discharge monitoring station located 6.5 km downstream; however, the discharge at that station is subject to the influence of reservoir regulation and flow diversions, and may not closely mirror discharge at the study site.

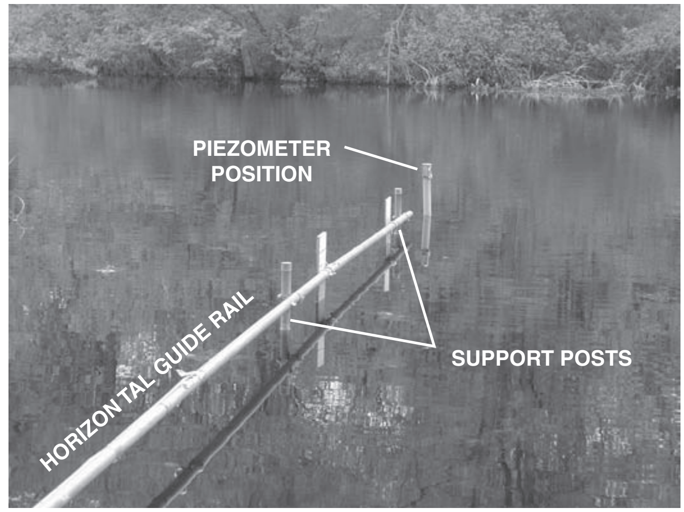


Figure 4. Transect A extending from near shore into the Sudbury River, Ashland, Massachusetts. Surface water flows from left to right.

Sampling Procedures

Samples were collected from 10, 30, and 60 cm below the riverbed at 1-m intervals along the upstream side of each transect. Care was taken to avoid disturbing the sampler during sample collection. Any accidental movement of the sampler while inserted a short distance (centimeters) into the sediment could open a pathway for surface water to flow downward and mix with and dilute the pore-water sample. If the specific conductance of the sample was at or near that of surface water, the sampler was reinserted and the "well" was developed again.

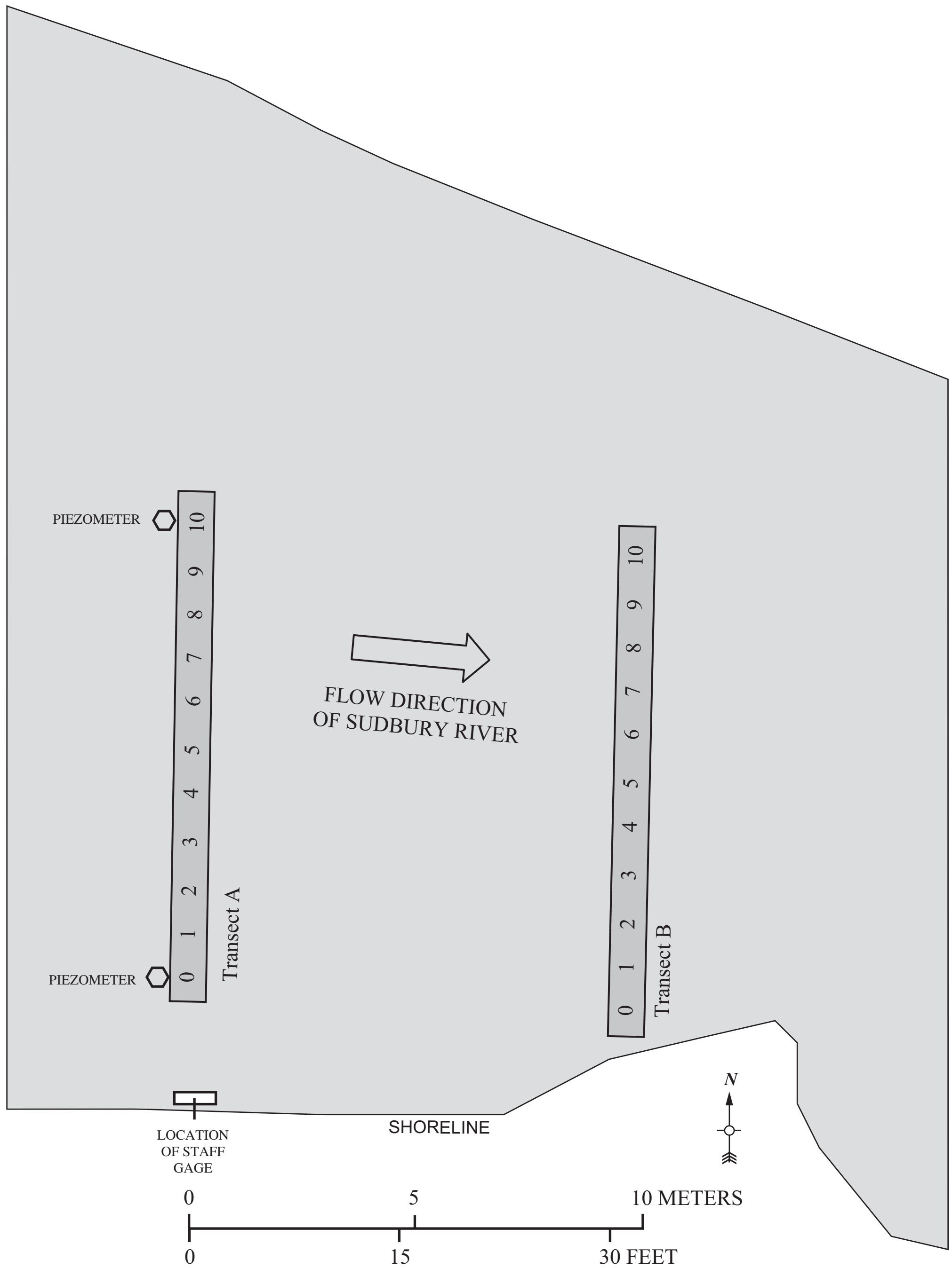


Figure 5. Schematic diagram depicting layout of transects A and B in relation to Sudbury River shoreline at the Mill Pond and flow direction, Ashland, Massachusetts. Numbers along the transects denote sampling locations and distance along transect, in meters.

Table 1. Staff-gage height, streamflow, and piezometer readings during study periods, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.

[**Streamflow:** In cubic feet per second, approximately 6.5 kilometers (4.0 miles) downstream at Saxonville, Massachusetts, U.S. Geological Survey station number 01098530. Piezometer measurements are distances, in feet, from the top of the piezometer to the water surface. NA, not available]

Date	Flow condition	Staff-gage height ft	Streamflow	Nearshore piezometer water levels		Distant piezometer water levels	
				Inside	Outside	Inside	Outside
June 2002							
6-17-2002	Normal	0.5	245	1.03	1.24	0.90	1.14
6-18-2002	Normal	.48	258	NA	NA	.89	1.13
6-19-2002	Normal	.46	227	1.02	1.40	.95	1.11
September 2002							
9-04-2002	Low	0.18	123	1.55	1.62	1.38	1.44
9-05-2002	Low	NA	120	NA	NA	NA	NA
9-06-2002	Low	NA	129	NA	NA	NA	NA
9-09-2002	Low	NA	135	NA	NA	NA	NA
April–May 2003							
4-29-2003	Normal	0.62	269	0.90	1.18	1.06	1.12
4-30-2003	Normal	.58	238	.90	1.23	1.10	1.23
5-01-2003	Normal	.54	220	.98	1.26	1.10	1.25
5-02-2003	Normal	.54	209	1.00	1.25	1.11	1.28
June 2003							
6-23-2003	High	1.07	611	0.39	0.73	0.53	0.74
6-24-2003	High	1.06	600	.43	.75	.53	.76
6-25-2003	High	.92	548	.56	.90	.66	.88
6-26-2003	High	.78	463	.69	1.03	.86	1.03

Occasionally, fine sediment and organic matter clogged the sampler screen; however, repeated flushing and pumping usually cleared the obstruction. If the obstruction did not yield after various attempts to dislodge it, the sampler was removed from the sediment, cleaned, and reinserted within 30 cm of its initial position. Three sampling attempts were made at a specific depth before the effort was abandoned. Approximately 21 percent of the sampling attempts failed because of obstructions by fine-grained materials or organic matter. The use of a screen cover consisting of a fine nylon mesh, a product unavailable at the time of this study, has reduced the failure rate since the study end.

When stable flow at a low pumping rate was established, sampling proceeded. During initial purging of the PPS, specific conductance, pH, dissolved oxygen concentration, and temperature were measured. (Although interpretation of temperature data was not part of this study, Conant (2004) has shown streambed temperature measurement to be a valid approach for delineation and quantification of ground-water discharge zones.) VOC samples were taken once turbidity had visibly dropped and specific conductance and dissolved oxygen had stabilized within a range indicative of pore water. For samples with dissolved oxygen concentrations less than 0.8 mg/L, dissolved oxygen was remeasured colorimetrically (American Public Health Association and others, 1998). Field measurements of dissolved oxygen at concentrations less than 1.0 mg/L by the colorimetric method are more reliable than those made by using an oxygen electrode.

If dissolved oxygen concentrations were near zero (generally, less than 0.02 mg/L, using the colorimetric method), ferrous iron was often measured by using a colorimetric analysis (McCobb and others, 2003). However, measurements were not made consistently throughout the study. Thus, detectable ferrous iron concentrations served primarily to provide additional evidence of a reducing environment, and corroborated the dissolved oxygen measurements. Highly reducing environments can be associated with microbially mediated transformations of hazardous organic contaminants, such as tetrachloroethene (PCE), through processes coupled with iron (III) reduction (Haggblom and others, 2000).

VOC samples were collected in triplicate after the field parameters had been recorded and the dissolved oxygen and ferrous iron colorimetric measurements had been made. The three, 40-mL, amber-glass vials were filled, acidified with HCl, placed in foam sleeves, inserted in plastic bags, and then chilled to below 4°C for transport to the USEPA laboratory in Chelmsford, MA, where the samples were analyzed for VOCs (U.S. Environmental Protection Agency, 1998). In all, 148 samples were collected along transect A and 159 along transect B; these totals include quality-control replicates and blanks.

In order to compare the results obtained by using the PPS with results obtained by using an alternative approach to pore-water sampling, an array of PDBs was deployed at the conclusion of the April–May 2003 round of sampling. Eleven samplers were deployed along the two transects where pushpoint sampling was conducted. The PDB method has been used to sample VOCs plumes in wells and ground-water discharge zones throughout the United States (Vroblesky, 2001), including the Nyanza site in 1999 (Lyford and others, 2000).

The PDBs were constructed from heat-sealed, low-density polyethylene (LDPE) lay-flat tubing filled with deionized water, as described in Vroblesky (2001). Over time, VOCs will diffuse through the plastic membrane into the deionized water inside so that concentrations inside the sampler equilibrate to concentrations in the sediment pore water. Henry's Law predicts how equilibration is affected by temperature, pressure, and the molecular weight of the VOC (Stumm and Morgan, 1996). It is generally recommended that PDBs be deployed for approximately 14 days in most field environments, in order to help ensure equilibration. VOC concentrations from passive sampling are integrated over the time of deployment and, therefore, results from this method are not directly comparable to the results from pushpoint sampling, which is done at a discrete point in time. Vroblesky (2001) has reported that 3 (acetone, methyl *tert*-butyl ether, and styrene) of 40 VOCs had poor recovery levels when PDBs were tested in laboratory conditions.

Insertion of the 20-cm-long, polyethylene-membrane diffusion samplers followed a modification of the method described in Church and others (2002b). The bottom of the sampler was placed approximately 45 cm below the sediment surface. Engineer's flagging tape was attached to the sampler for identification and easy relocation.

These samplers were retrieved after the last round of pushpoint sampling in June 2003, when they had spent 55 days in the sediment. The exterior surfaces of the samplers were cleaned with deionized water to remove any clinging sediment. Then, a corner of the sample bag was cut with clean scissors, and sample water was transferred into 40-mL VOC-sample vials, preserved, and transported to the USEPA laboratory for analysis.

Quality Control

Fifteen trip blanks, 9 field-equipment blanks, and 64 sequential-replicate VOC samples were collected to provide quality-control analyses for the method during the 4 sampling periods; in addition, the USEPA laboratory did its own internal quality-control analyses. The blank samples were analyzed only for VOCs. Trip blanks are analyzed for any VOC contamination that may have resulted from sample handling, transportation, or laboratory contamination; field-equipment blanks are analyzed to verify that sampling equipment was adequately cleaned by showing that no chemical analytes were carried over between samples.

Trip Blanks

Acetone (2-propanone) was the only compound detected in more than two trip blanks (tables 4 and 5, at the back of this report); acetone was also detected in most of the environmental samples collected in 2002 and April and May 2003; it was not detected in the June 2003 samples. The laboratory ascribed nearly all the detections in 2002 to laboratory- or trip-blank contamination, or failure to meet calibration criteria; thus, many of the acetone concentrations are estimates. For those reasons, acetone is not considered further in this report. Only two other compounds were detected in trip blanks: bromomethane (two detections) and chloromethane (one detection). These compounds were rarely detected in environmental samples, and most of those detections were also ascribed to laboratory contamination; thus, these compounds, too, are not discussed further in this report.

Equipment Blanks

VOCs were detected in only one field-equipment blank. The sample collected on transect B, 8 m from shore, on May 2, 2003, was associated with three VOCs: 1,2-dichlorobenzene (0.52 µg/L), acetone (1.9 µg/L), and chlorobenzene (0.53 µg/L). As noted previously, acetone from other sources commonly contaminates the samples. The other concentrations were estimated and less than their reporting limits. The environmental samples collected at the same site and on the same date from a depth of 30 cm were characterized by high concentrations of both 1,2-dichlorobenzene (43 µg/L) and chlorobenzene (37 µg/L), so it is possible that the sampling equipment was inadequately cleaned between samples. In any event, these individual, low-concentration VOC detections do not indicate that sample handling or equipment had a substantial effect on concentrations measured in environmental samples.

Replicates

In most samples, replicate pairs matched closely. Rarely, replicate samples varied noticeably in their chemical characteristics; for example, see the data for the replicate sample collected at 30 cm on transect B, at a distance of 5 m, on June 19, 2002. Field notes indicate difficulties in drawing water for the original sample (dissolved oxygen = 2.85 mg/L), whereas the replicate had a dissolved oxygen concentration of 0.7 mg/L; five of the VOC concentrations in the replicate sample were approximately double their values in the original sample. Because of the consistent results in replicate field-parameter measurements during sampling events in 2002, replicate field-parameter measurements were not made in 2003. Calculations of relative percent difference (RPD) revealed only two samples with RPD values exceeding 30 percent; one of the samples had a single compound for which the RPD exceeded 30 percent. Two other samples had RPD values greater than 20 percent; three of these four samples were associated with slow pumping rates. RPDs as high as these values, although uncommon, point to the importance of sustaining steady pumping rates; difficulty in pumping results in air being drawn into the sampler, which increases the concentration of dissolved oxygen and compromises the sample.

Overview of Data Collection

Specific conductance can serve as a surrogate tracer for other compounds in ground water; relatively high values would indicate the presence of contaminants at levels above background concentrations and would warrant further investigation. The ability to track conductance changes over space and time can substitute for potentially expensive chemical analyses and can be used to differentiate water sources.

The analytical method can detect as many as 73 different VOCs (see appendix at back of this report). In the analyses reported for this study, 27 were detected (table 2). The commonly detected compounds match those reported in previous studies of the Nyanza Chemical Waste Dump Superfund site (Church and others, 2002a; Campbell and others, 2000). Additional studies (Roy F. Weston, Inc., 2003; ICF Consulting, 2003), some of which took place at the same time as the present investigation, provide context for this study (fig. 2; table 3). At a reference site (UR-002) upstream from the plume-discharge zone, VOCs were rarely detected in the surface or ground water or at the sediment-water interface in samples collected in 2001; ground water in samples collected in 1998 from a monitoring well (MW-117B) on the north side of the river contained no detectable VOCs. Ground-water, surface-water, and ground-water/surface-water interface samples collected in 2001 from monitoring wells in the river (MP-03A-03 and MP-003-01) differed in the number of detections; water from well MP-003-01 on the side of the river closest to the Nyanza Chemical Waste Dump Superfund site yielded more VOC detections than well MP-03A-03 closer to the far shore of the river. Ground-water samples collected from monitoring wells MW-304B and MW-305B, which were on the shore and screened in the plume, yielded the highest numbers of detections. Commonly detected VOCs in these studies included chloroethenes, chlorobenzenes, toluene, and acetone.

Many of the detections were rare, or their detection was ascribed to laboratory or trip-blank contamination. Acetone (2-propanone) was the only frequently detected VOC that was primarily a sample contaminant. Many of the rare detections were in concentrations at or below their nominal 1.0 µg/L reporting levels; occasionally, the reporting level varied for specific analytes because of sample dilution or other analytical-instrumentation adjustments.

Table 2. Number, frequency of detection, and concentration ranges of volatile organic compounds detected in primary (that is, not including quality-control replicates) samples reported in this study, Mill Pond, Sudbury River, Ashland.

[n, number of detections; ND, not detected; µg/L, microgram per liter; *, single detection in replicate quality-control sample with estimated concentration of 1.0 microgram, per liter]

Compound	Transect A (107 samples)			Transect B (103 samples)		
	n	Percentage of detections	Concentration range (µg/L)	n	Percentage of detections	Concentration range (µg/L)
1,1,1-Trichloroethane	1	1	ND–1.2	0	0	ND
Tetrachloroethene	3	3	ND–1.2	0	0	ND
Trichloroethene	104	97	ND–43	91	88	ND–83
1,1-Dichloroethene	2	2	0.88–1.0	3	3	ND–1.1
1,1-Dichloroethane	1	1	ND–1.2	9	9	ND–1.9
cis-1,2-Dichloroethene	105	98	ND–41	103	100	1.9–290
trans-1,2-Dichloroethene	0	0	ND	7	7	ND–1.6
Vinyl chloride	9	8	ND–17	59	57	ND–80
Chloroethane	1	1	ND–1.7	3	3	ND–1.4
1,2,3-Trichlorobenzene	98	92	ND–7.3	51	50	ND
1,2,4-Trichlorobenzene	105	98	ND–32	82	80	ND–18
1,2-Dichlorobenzene	107	100	0.82–100	103	100	3.8–490
1,3-Dichlorobenzene	78	73	ND–10	52	50	ND–15
1,4-Dichlorobenzene	105	98	0.63–21	84	82	ND–100
Chlorobenzene	99	93	ND–64	97	94	ND–120
Benzene	2	2	ND–0.94	18	17	ND–2.5
Toluene	0	0	ND	4	4	ND–0.74
Naphthalene	1	1	ND–0.68	1	1	ND–0.51
Bromomethane	4	4	ND–7.3	13	13	ND–3.8
Dichlorodifluoromethane	0*	0	ND	1	1	ND–1.2
1,2,3-Trichloropropane	3	3	ND–26	2	2	ND–21
Butanone (MEK)	0*	0	ND	9	9	ND–2.1
Chloromethane	2	2	ND–11	17	17	ND–2.1
2-Propanone (acetone)	68	64	1.1–130	67	65	ND–24
Carbon disulfide	6	6	ND–19	2	2	ND–4.6
Methyl *tert*-butyl ether	7	7	ND–1.4	3	3	ND–2.2
Tetrahydrofuran	1	1	ND–1.3	0	0	ND

Table 3. Volatile organic compounds detected in selected monitoring locations for the Nyanza Superfund site, Ashland, Massachusetts, 1998, 2000–2003.

[Sources: ICF Consulting, 2003; Monitoring locations shown in figure 2. All units are micrograms per liter. Values separated by a semicolon represent two reported samples. Values separated by a dash represent a range of values for more than two samples reported. GW, ground water; SW, surface water; nd, not detected]

Compound	Sampling location and time period represented in sampling											
	UR-002 (June 2001)			MP-03A-03 (June 2001)			MP-003-01 (June 2001)			MW-117B (March 1998)	MW-304B (April 2002–July 2003)	MW-305B (June–April 2001)
	SW	SW/GW interface	GW	SW	SW/GW interface	GW	SW	SW/GW interface	GW	GW	GW	GW
Trichloroethene	nd	nd	nd	nd–0.31	nd–0.26	nd	nd–1.8	nd–2.8	4.7–89	nd	330–6,000	3.3
1,1-Dichloroethene	nd	nd	nd	nd	nd	nd	nd	nd	nd–0.92	nd	nd	nd
cis-1,2-Dichloroethene	nd	nd	nd	nd	nd	16–37	nd–2.3	nd–3.3	13–160	nd	250–440	0.85
trans-1,2-Dichloroethene	nd	nd	nd	nd	nd	nd–0.34	nd	nd	nd–1.4	nd	nd	nd
1,2-Dichloroethene (total)	nd	nd	nd	nd	nd	16; 40	nd–2.4	nd–3.5	14–170	nd	nd	0.89–13
Methylene chloride	nd–0.65	nd	nd	nd	nd–0.21	nd–0.42	nd–0.21	nd–0.22	nd–1.4	nd	nd–7	nd
Vinyl chloride	nd	nd	nd	nd	nd	4.6–12	nd	nd	1.5–6.9	nd	11–46	nd
1,2,4-Trichlorobenzene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	13–37	nd–4.4
1,2-Dichlorobenzene	nd	nd	nd	nd–0.32	nd–0.31	nd	nd–3.8	nd–4.9	nd	nd	210–300	nd–29
1,3-Dichlorobenzene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	4.2–13	nd
1,4-Dichlorobenzene	nd	nd	nd	nd	nd	nd	nd–0.87	nd–0.78	nd	nd	30–84	nd–6.2
Chlorobenzene	nd	nd	nd	nd	nd	1; 1.5	nd–1.6	nd–2.6	6.8–65	nd	190–370	0.92
Benzene	nd	nd	nd	nd	nd	4.2; 6.6	nd	nd	nd–2	nd	nd	nd–3.4
Nitrobenzene	nd	nd	nd	nd–0.92	nd–0.61	nd	nd–2.3	nd–3.2	nd	nd	46–91	nd–16
3,3-Dimethoxybenzidine	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	0.46
3,3-Dimethylbenzidine	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd–6.6	nd
Aniline	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd–3.8	nd
Toluene	nd	nd	0.9–1.6	nd	nd	17; 19	nd–0.37	nd–0.6	nd	nd	nd	nd
Naphthalene	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Xylene	nd	nd	nd	nd	nd	nd	nd	nd–0.23	nd	nd	nd	nd
Chloromethane	nd	nd–0.37	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Butanone (MEK)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
2-Propanone (acetone)	nd–3.2	2.5–4.8	3.1–8.2	nd–5.9	nd–6.6	110; 110	nd–4.5	nd–4.2	50–1,800	nd	nd–110	nd
Pentachlorophenol	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd–0.37	nd

Spatial and Temporal Variability of Specific Conductance and VOC Concentrations

Pore-water samples were collected four times from June 2002 to June 2003 during periods representing a range of streamflow conditions. The samples in June 2002 and April and May 2003 were taken under normal flow conditions; samples collected in June 2003 represented high flows; and samples collected in September 2002 represented low flows based on stage measurements (table 1). Discharges measured 6.5 km downstream: (1) rose from 227 to 245 ft^3/s at the start of June 2002 sampling; (2) rose from 29 to 123 ft^3/s at the start of the September 2002 sampling period and remained stable; (3) declined from 360 to 269 ft^3/s before the April and May 2003 sampling and continued to decline; and (4) peaked at 611 ft^3/s at the start of the June 2003 sampling period and subsequently declined. The results for specific conductance and two VOCs frequently detected in this study, trichloroethene (TCE) and 1,2-dichlorobenzene (1,2-DCB), demonstrate the applicability of the PPS as a device for obtaining reliable samples to determine concentrations of contaminants in plumes.

Specific Conductance

Of all the field parameters measured in the pore water (temperature, dissolved oxygen, specific conductance), specific conductance is the parameter whose measurements are least likely to be affected by the sampling method. In particular, measurements of dissolved oxygen concentrations were unreliable when pumping difficulties interrupted the sample discharges during this study.

During a given sampling period, specific-conductance values were similar at each sampling site along the transect at all depths (tables 4 and 5; figs. 6 and 7). In general, the lowest specific-conductance values were found in samples collected closest to shore. Overall, there seemed to be a weak, upward trend in specific conductance extending away from shore along both transects during all sampling periods, although, along transect A, values declined at sites farthest from shore. The nearshore upward trends seemed consistent with the discharge of ground water toward the center of the river, whereas discharge from the other side of the river could have caused the offshore decline.

The range and overall variability was greater along transect A (approximately from 400 to 1,300 µS/cm) than along transect B (approximately 450 to 1,150 µS/cm) for all sampling periods. The April and May 2003 samples produced spikes in concentrations at the 3- and 6-m points on transect A. The temporal changes that occurred during the four study periods are generally consistent among the three depths studied. Along both transects, values were generally lowest in June and September 2002. Along transect A, the highest values were observed in samples collected during April and May 2003 followed by June 2003; along transect B, the order of the sampling periods corresponding to the two highest values is reversed.

Volatile Organic Compounds

The most commonly detected VOCs may be grouped into two classes. The first class includes the ethene compounds that are breakdown products of PCE: TCE, 1,1-dichloroethene, *trans*-1,2-dichloroethene, *cis*-1,2-dichloroethene (*cis*-1,2-DCE), and vinyl chloride. The second class includes various chlorinated benzenes: chlorobenzene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene. The data indicate that the detection of any compound from either of these classes is accompanied by other detections from the same class. The concentrations of a VOC representative of each class and selected on the basis of high frequency of detection and high concentration are shown in figures 8–11.

During the four sampling periods, 307 VOC samples were collected and analyzed. The results not only provide detailed information on the spatial and temporal variations in specific conductance and VOC concentrations in the plume beneath the river, but also demonstrate the versatility of the PPS in collecting discrete samples from locations closely spaced both vertically and horizontally (figs. 8–11).

Along transect A, TCE detections were evenly distributed and concentrations were generally highest in samples collected from a depth of 10 cm (figs. 8*A–D*). Along transect B, the TCE detections were grouped at locations closest to and farthest from the shore (figs. 9*A–D*); in general, the highest concentrations were measured in the 30-cm samples taken closest to the shore. The distribution of 1,2-DCB detections and concentrations (figs. 10 and 11) differed substantially from those of TCE. The detections of 1,2-DCB were distributed somewhat more evenly along transect A than those of TCE. Moreover, the concentrations of 1,2-DCB tended to increase with depth and distance from the shore. These results demonstrate that PPS sampling can reveal considerable variation in VOC concentrations over short distances (meters or centimeters).

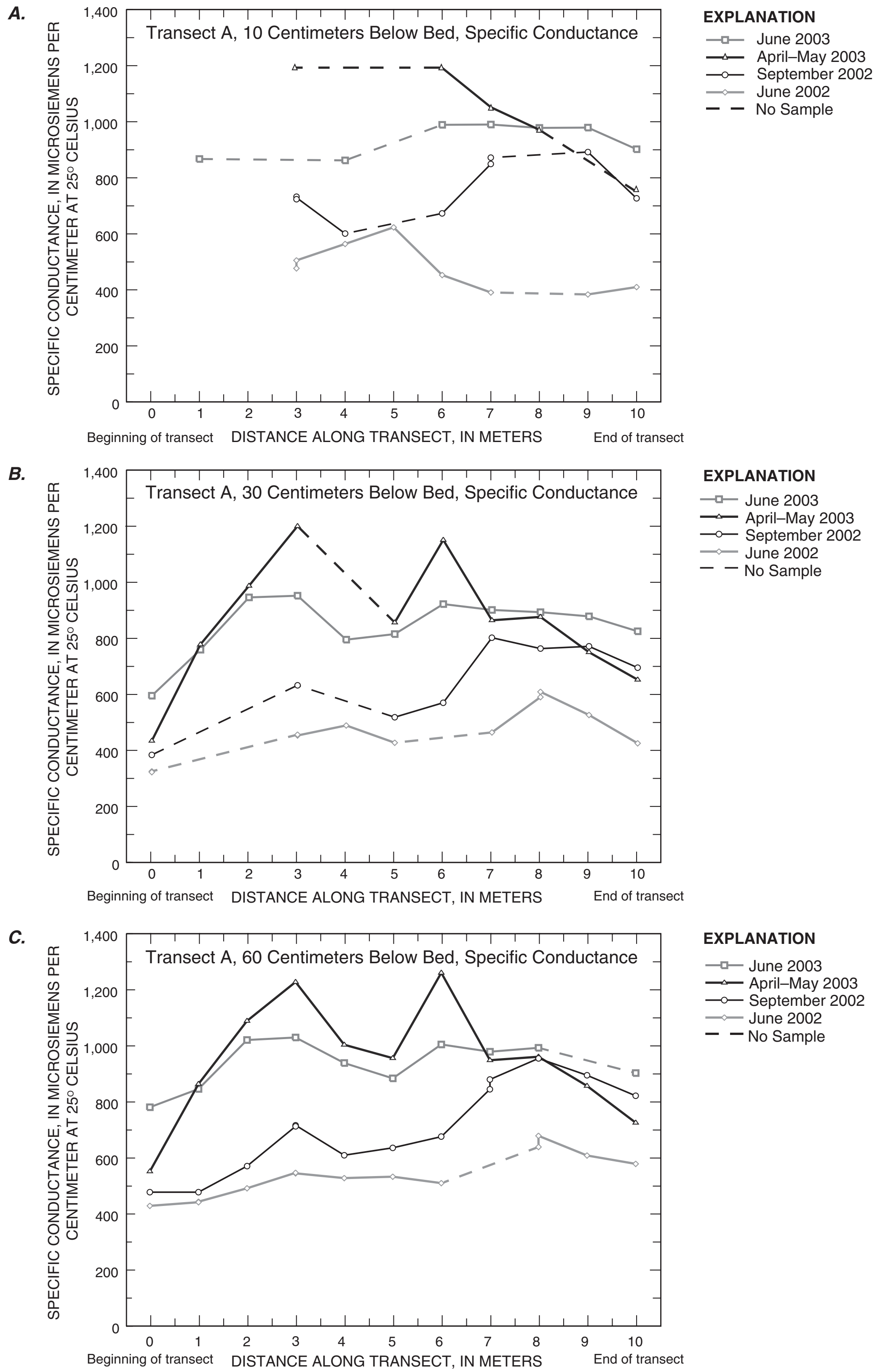


Figure 6. Specific conductance at depths of *A*, 10 centimeters; *B*, 30 centimeters; and *C*, 60 centimeters below sediment surface along transect A. Dashed lines indicate data missing because of failure to draw water at points located between successful sampling points. Data points connected by vertical lines indicate duplicate samples. Transect location shown in figure 2.

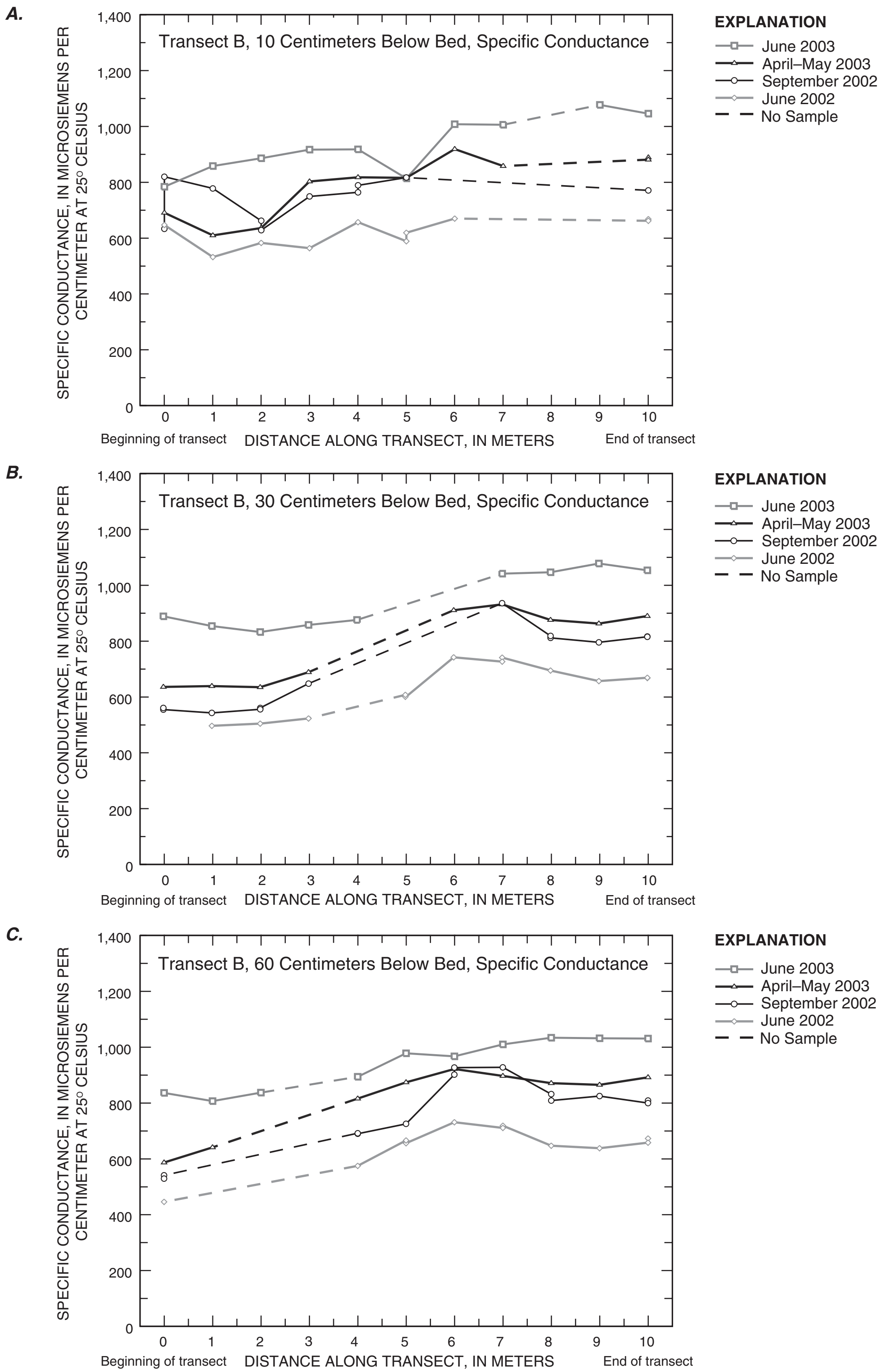


Figure 7. Specific conductance at depths of *A*, 10 centimeters; *B*, 30 centimeters; and *C*, 60 centimeters below the sediment surface along transect B. Dashed lines indicate data missing because of failure to draw water at intermediate points. Data points connected by vertical lines indicate duplicate samples. Transect location shown in figure 2.

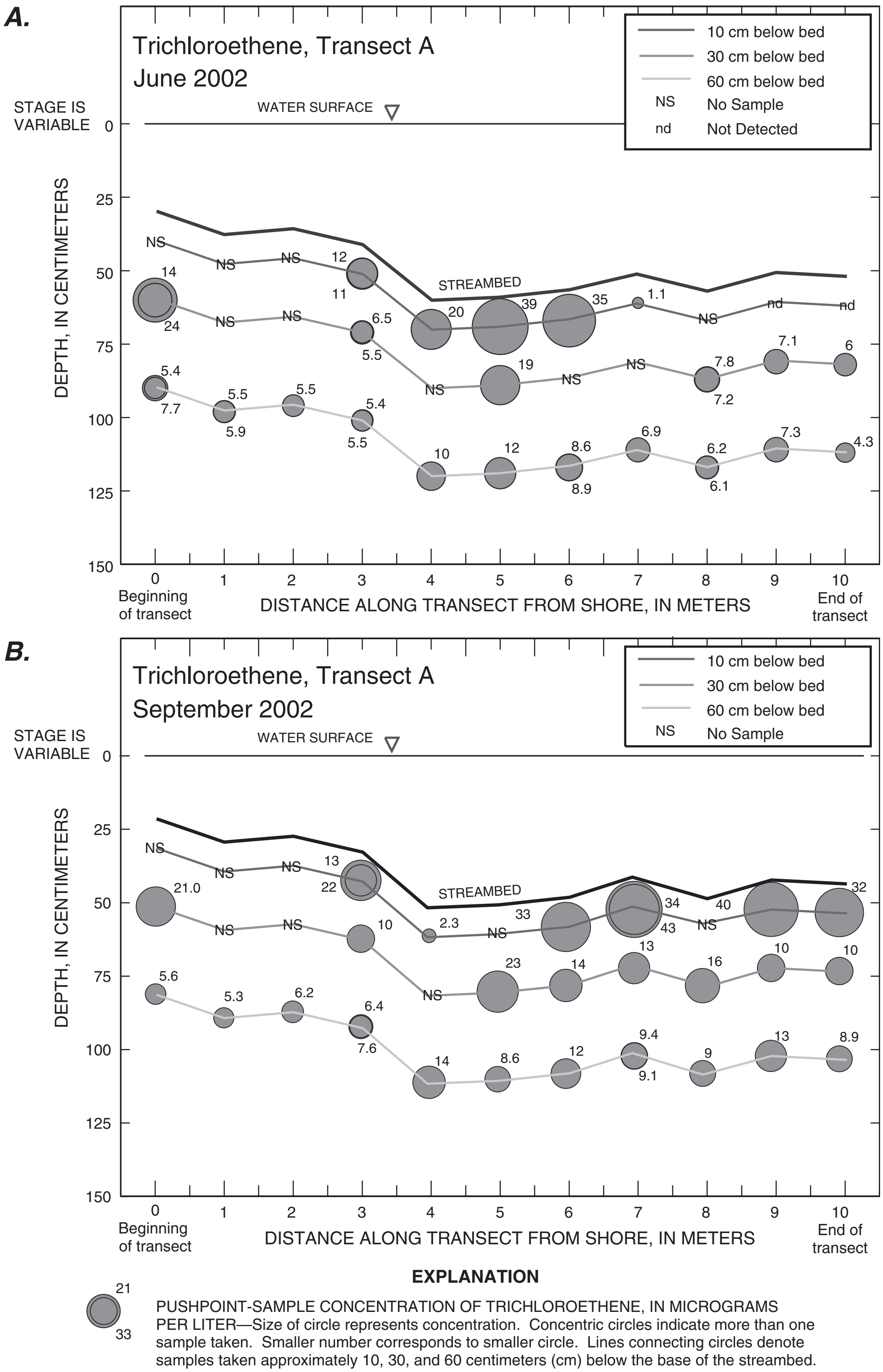
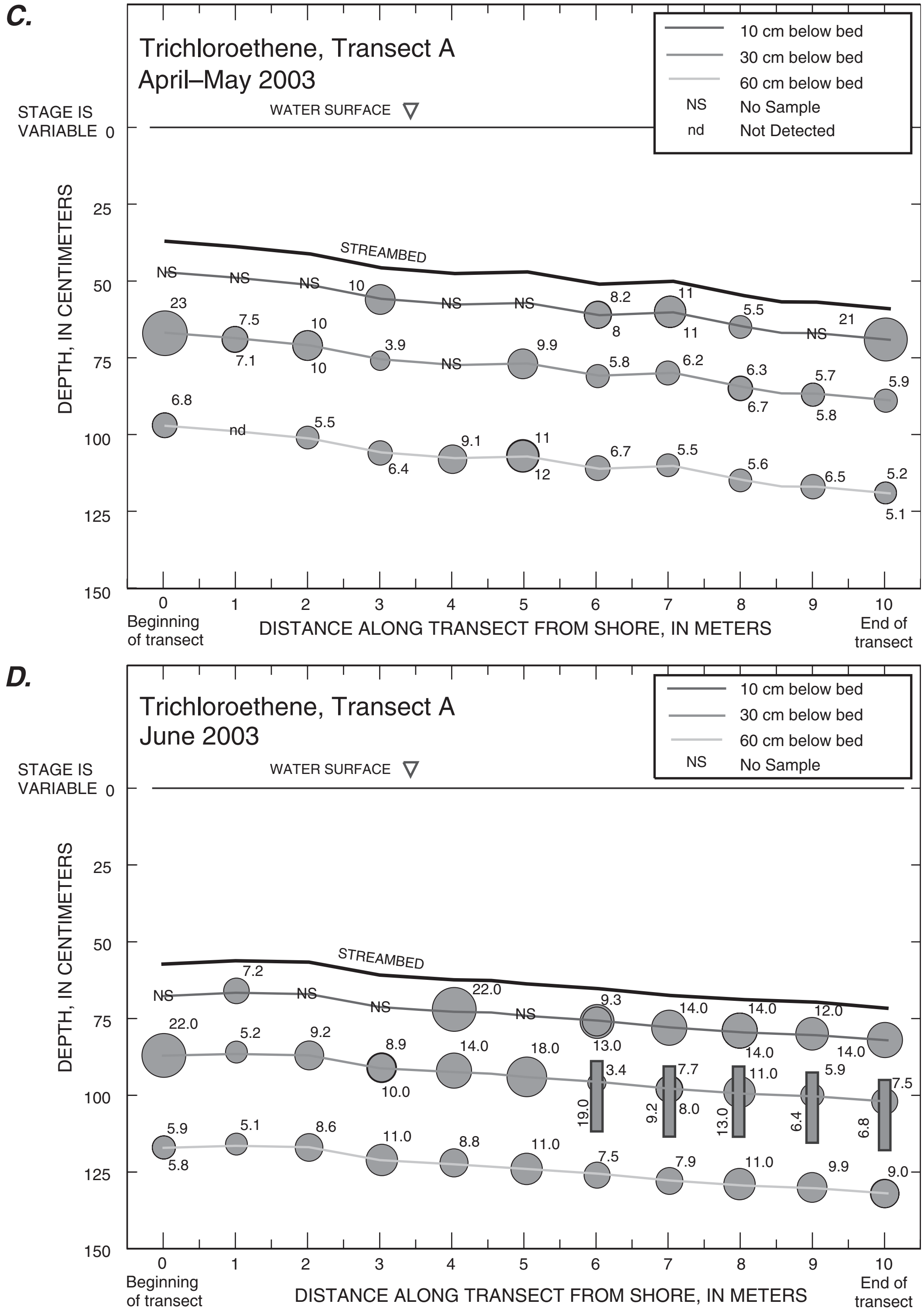
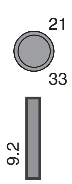


Figure 8. Concentrations of trichloroethene (TCE) at three depths below the sediment surface along transect A in *A*, June 2002; *B*, September 2002; *C*, April–May 2003; and *D*, June 2003, Mill Pond, Sudbury River, Ashland, Massachusetts.



EXPLANATION



PUSHPOINT-SAMPLE CONCENTRATION OF TRICHLOROETHENE, IN MICROGRAMS PER LITER—Size of circle represents point sample concentration. Concentric circles indicate more than one sample taken. Smaller number corresponds to smaller circle. Lines connecting circles denote samples taken approximately 10, 30, and 60 centimeters (cm) below the base of the streambed.

PASSIVE-DIFFUSION-SAMPLE CONCENTRATION OF TRICHLOROETHENE, IN MICROGRAMS PER LITER—Bar length represents depth range of diffusion-sampler sample.

Figure 8—Continued. Concentrations of trichloroethene (TCE) at three depths below the sediment surface along transect A in *A*, June 2002; *B*, September 2002; *C*, April–May 2003; and *D*, June 2003, Mill Pond, Sudbury River, Ashland, Massachusetts.

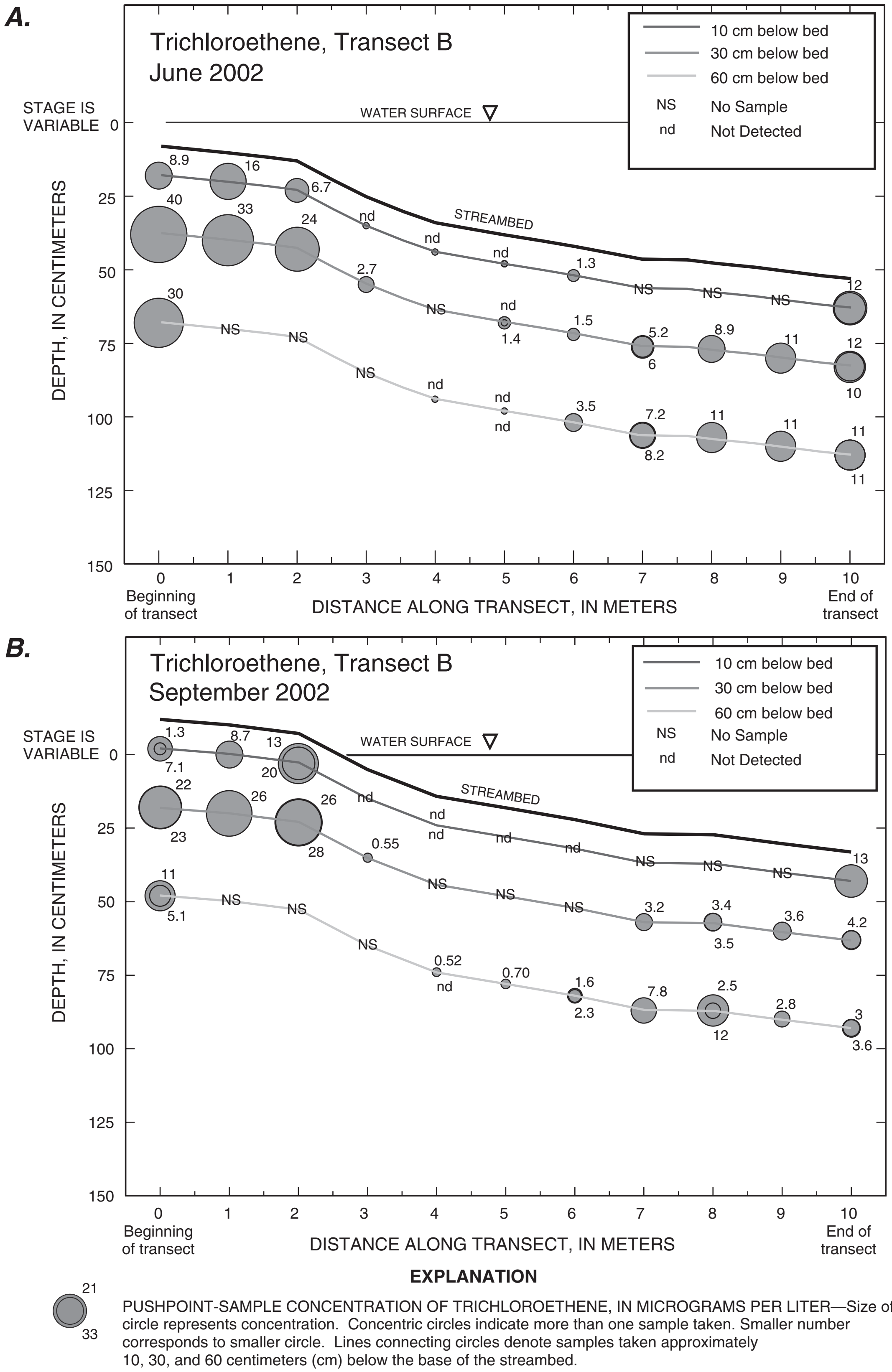


Figure 9. Concentrations of trichloroethene (TCE) at three depths below the sediment surface along transect B in *A*, June 2002; *B*, September 2002; *C*, April–May 2003; and *D*, June 2003, Mill Pond, Sudbury River, Ashland, Massachusetts.

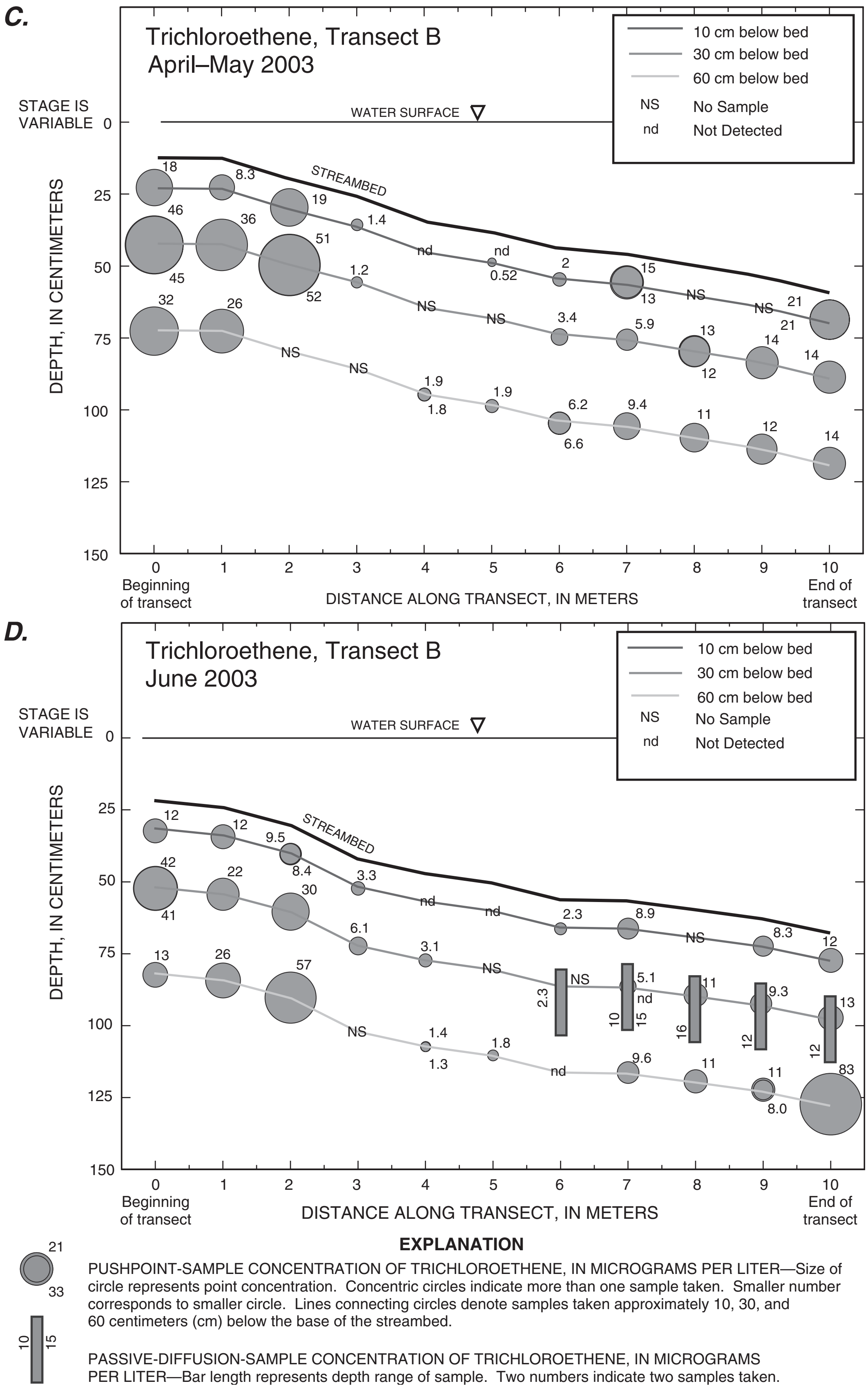


Figure 9—Continued. Concentrations of trichloroethene (TCE) at three depths below the sediment surface along transect B in *A*, June 2002; *B*, September 2002; *C*, April–May 2003; and *D*, June 2003, Mill Pond, Sudbury River, Ashland, Massachusetts.

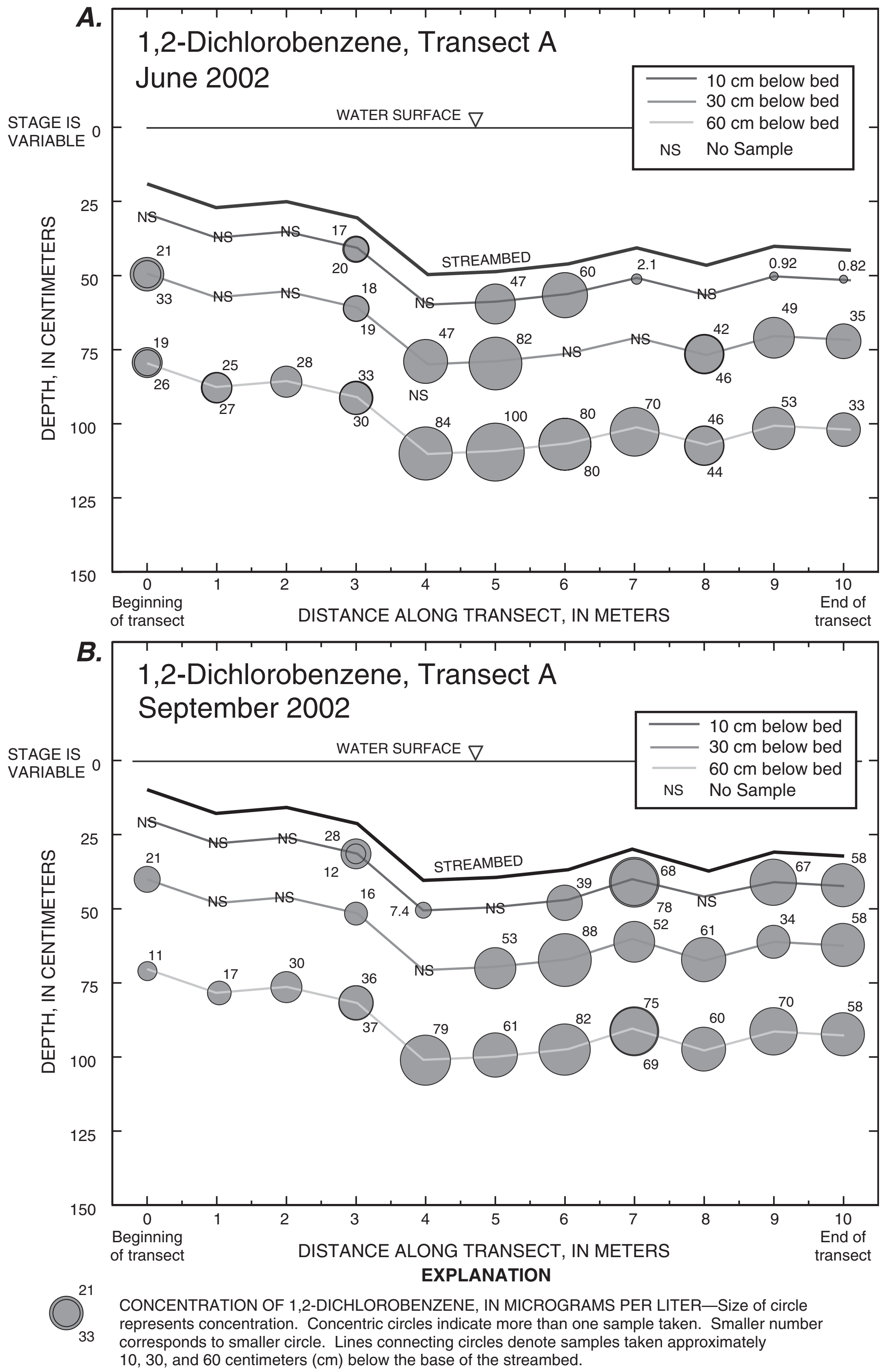


Figure 10. Concentrations of 1,2-dichlorobenzene (1,2-DCB) at three depths below the sediment surface along transect A in *A*, June 2002; *B*, September 2002; *C*, April–May 2003; and *D*, June 2003, Mill Pond, Sudbury River, Ashland, Massachusetts.

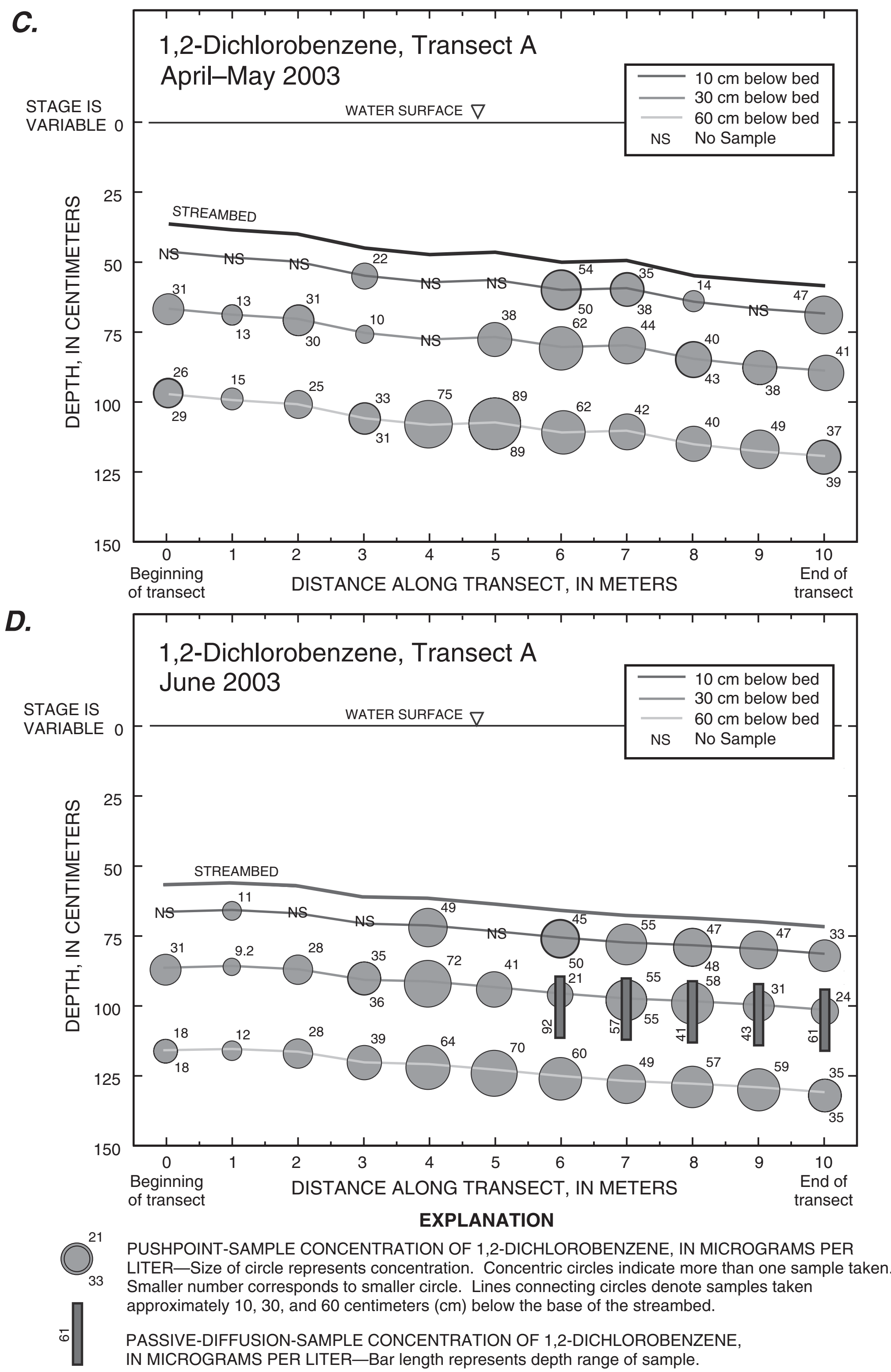


Figure 10—Continued. Concentrations of 1,2-dichlorobenzene (1,2-DCB) at three depths below the sediment surface along transect A in *A*, June 2002; *B*, September 2002; *C*, April-May 2003; and *D*, June 2003, Mill Pond, Sudbury River, Ashland, Massachusetts.

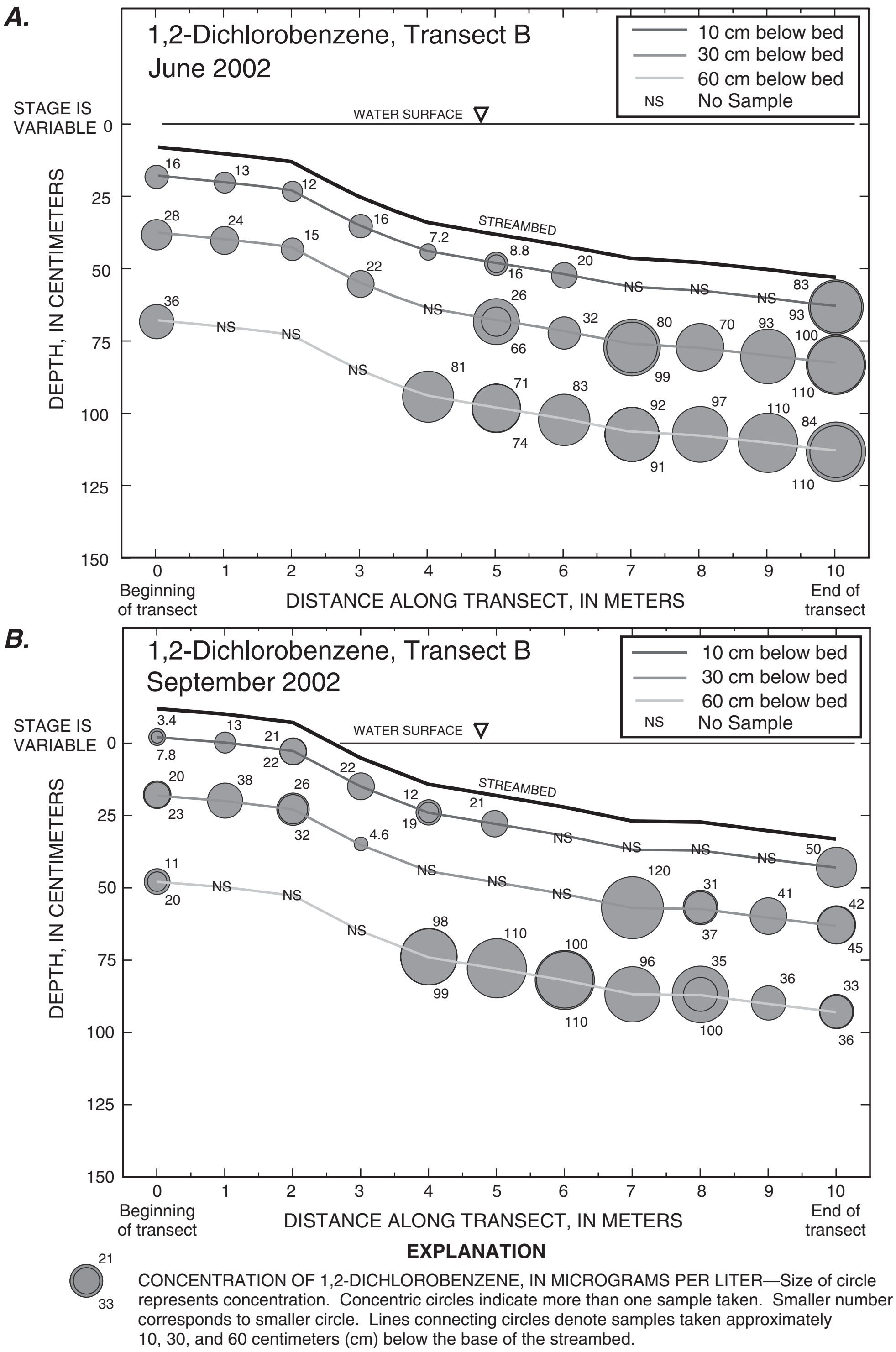


Figure 11. Concentrations of 1,2-dichlorobenzene (1,2-DCB) at three depths below the sediment surface along transect B in *A*, June 2002; *B*, September 2002; *C*, April–May 2003; and *D*, June 2003, Mill Pond, Sudbury River, Ashland, Massachusetts.

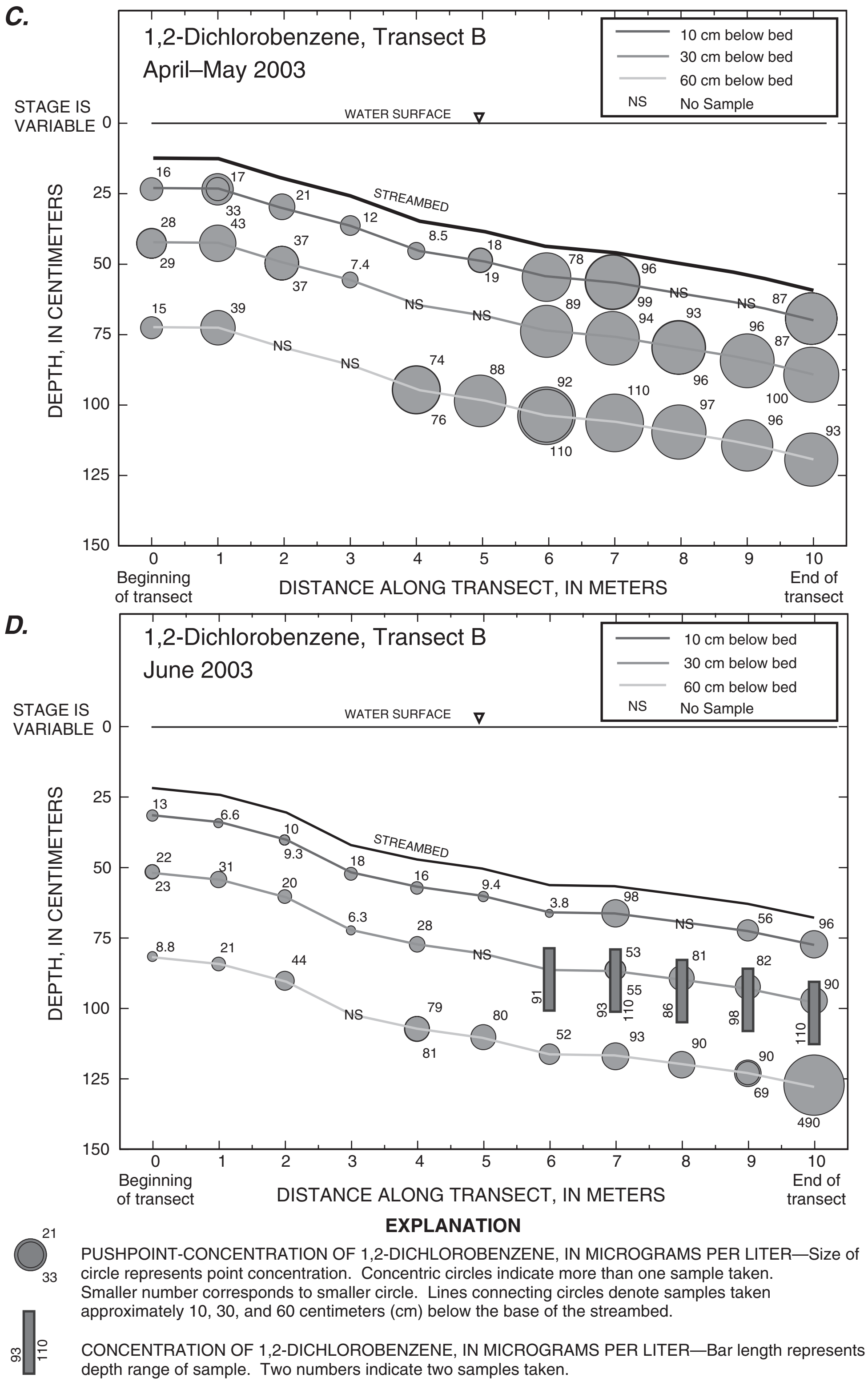


Figure 11—Continued. Concentrations of 1,2-dichlorobenzene (1,2-DCB) at three depths below the sediment surface along transect B in *A*, June 2002; *B*, September 2002; *C*, April–May 2003; and *D*, June 2003, Mill Pond, Sudbury River, Ashland, Massachusetts.

In addition to collecting samples using the PPS in June 2003, samples were collected from the 20-cm-long PDBs that were deployed for 8 weeks at 45 cm below the sediment surface 0.5 m from the five most offshore PPS sites. Almost all of the PDB samples had comparable, but higher concentrations of TCE and 1,2-DCB than those from the 30-cm PPS samples (figs. 8*D*, 9*D*, 10*D*, and 11*D*). Because the PDB method relies on diffusion through the 20-cm-long bag to produce a sample and the PPS, in theory, provides an instantaneous sample from a narrow zone near the 4-cm-long screened section, the dynamically changing nature of the contaminant plume should result in differences between the methods. Thus, whereas the PDB sample results are generally similar to the PPS sample results, the inherent differences in the two methods preclude the use of PDB samples to confirm PPS data.

The spatial and temporal precision with which PPS samples can be collected allows for the design of enhanced sampling programs to examine the details of chemical reactions at a study site. For example, TCE and *cis*-1,2-DCE are degradation products of PCE, in the series PCE→ TCE→ *cis*-1,2-DCE→ vinyl chloride→ ethene. (TCE, a common solvent, could also be the original VOC source.) The entire process is called reductive dechlorination and the transformations from PCE to TCE and from TCE to *cis*-1,2-DCE typically are faster than the others (Wiedemeir and others, 1999). The process can be coupled to ferrous iron reduction in the absence of other electron acceptors.

The data describing spatial differences in concentrations of TCE and *cis*-1,2-DCE in samples collected in the June 2003 samples (figs. 12 and 13) can be interpreted as evidence of the reductive dechlorination pathway; this interpretation is clearest along transect B. At most points along both transects, the concentrations of *cis*-1,2-DCE were higher than those of TCE, likely reflecting the rapid transformation step. Along transect A, the concentrations of *cis*-1,2-DCE and TCE generally differed less than those along transect B. Similar evidence of biodegradation in pore water was reported by Conant and others (2004) in a study of a contaminant ground-water plume discharging to a river in Ontario, Canada. The concentrations of ferrous iron along transect B occasionally exceeded the range of the analytical method; ferrous iron was rarely analyzed along transect A (tables 4 and 5) because the dissolved oxygen concentrations were generally high enough (greater than 0.2 mg/L) that the appearance of ferrous iron was not expected. Along transect B, in particular, the relatively high concentrations of ferrous iron and low concentrations of dissolved oxygen, coupled with the relatively high concentrations of *cis*-1,2-DCE (probably the degradation product) from the same sampling locations, support the inference that reductive dechlorination of TCE is occurring in this vertical interval. By designing a study to sample in this study area more frequently, it may also be possible to estimate process rates and loadings to surface water.

Unlike the PCE/TCE series of degradation products, the chlorobenzenes do not transform as readily from multichlorinated compounds to benzene as an endpoint (Dermietzel and Vieth, 2002). According to Nishino and others (1992) and Van der Meer and others (1998), microbial catabolic pathways may evolve in situ to degrade chlorobenzenes. Their biodegradation may not be as readily inferred from field data as the relation between TCE and *cis*-1,2-DCE. Nevertheless, the data from a well designed study may provide insights into the degradation processes. In this study (fig. 14), the concentration of 1,2,3-trichlorobenzene (1,2,3-TCB) is consistently the lowest along transect A and 1,2-dichlorobenzene (1,2-DCB) is the highest at all but one point. The other chlorobenzene compounds vary within the range of 1,2,3-TCB and 1,2-DCB. Combining field data, such as these, with experimental determinations of transformation rates may yield useful information about the extent of bioremediation of the chlorobenzenes at this study site on the Mill Pond on the Sudbury River in Ashland, MA.

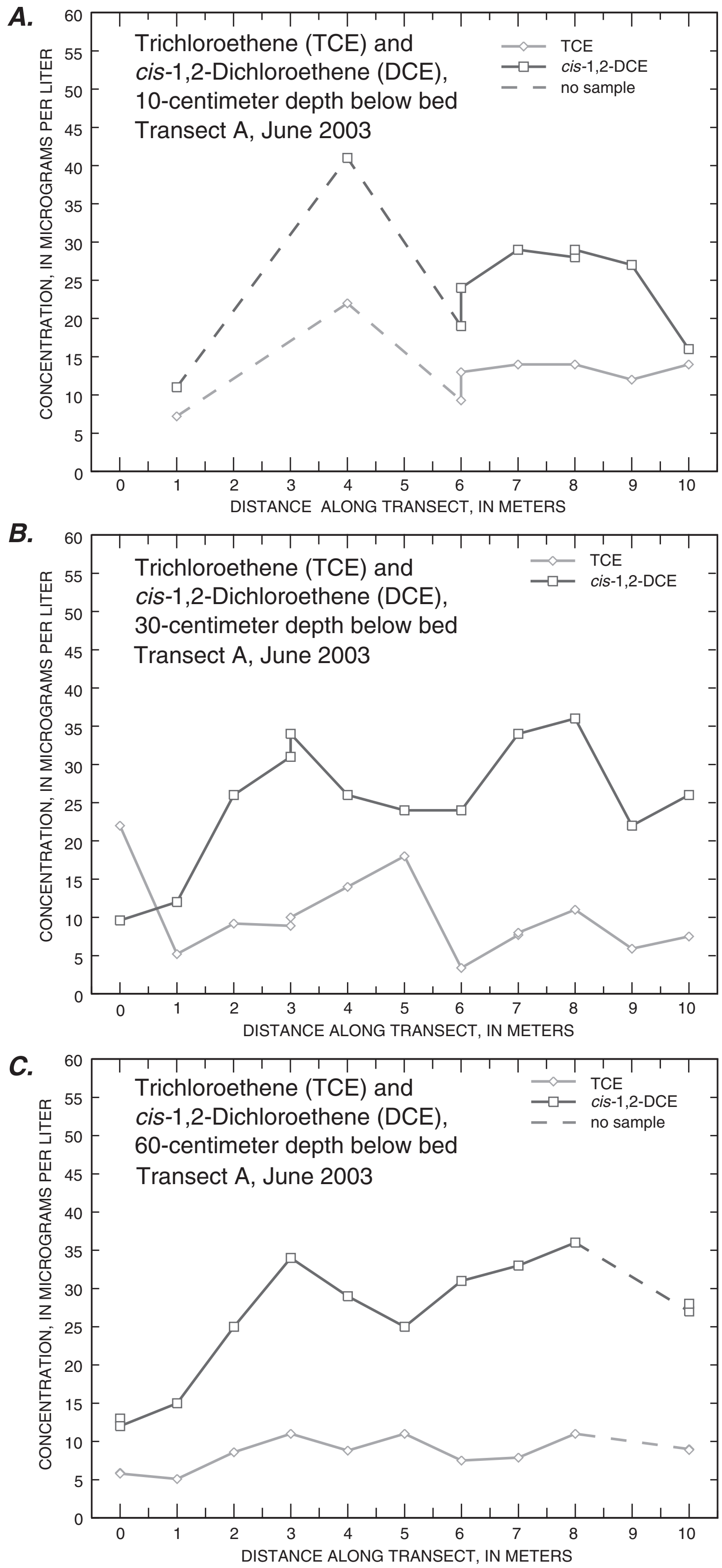


Figure 12. Concentrations of trichloroethene (TCE) and *cis*-1, 2-dichloroethene (*cis*-1,2-DCE) at sediment depths of *A*, 10 centimeters; *B*, 30 centimeters; and *C*, 60 centimeters along transect A, Mill Pond, Sudbury River, Ashland, Massachusetts, June 2003. Dashed lines indicate data missing because of failure to draw water at intermediate points. Data points connected by vertical lines indicate duplicate samples.

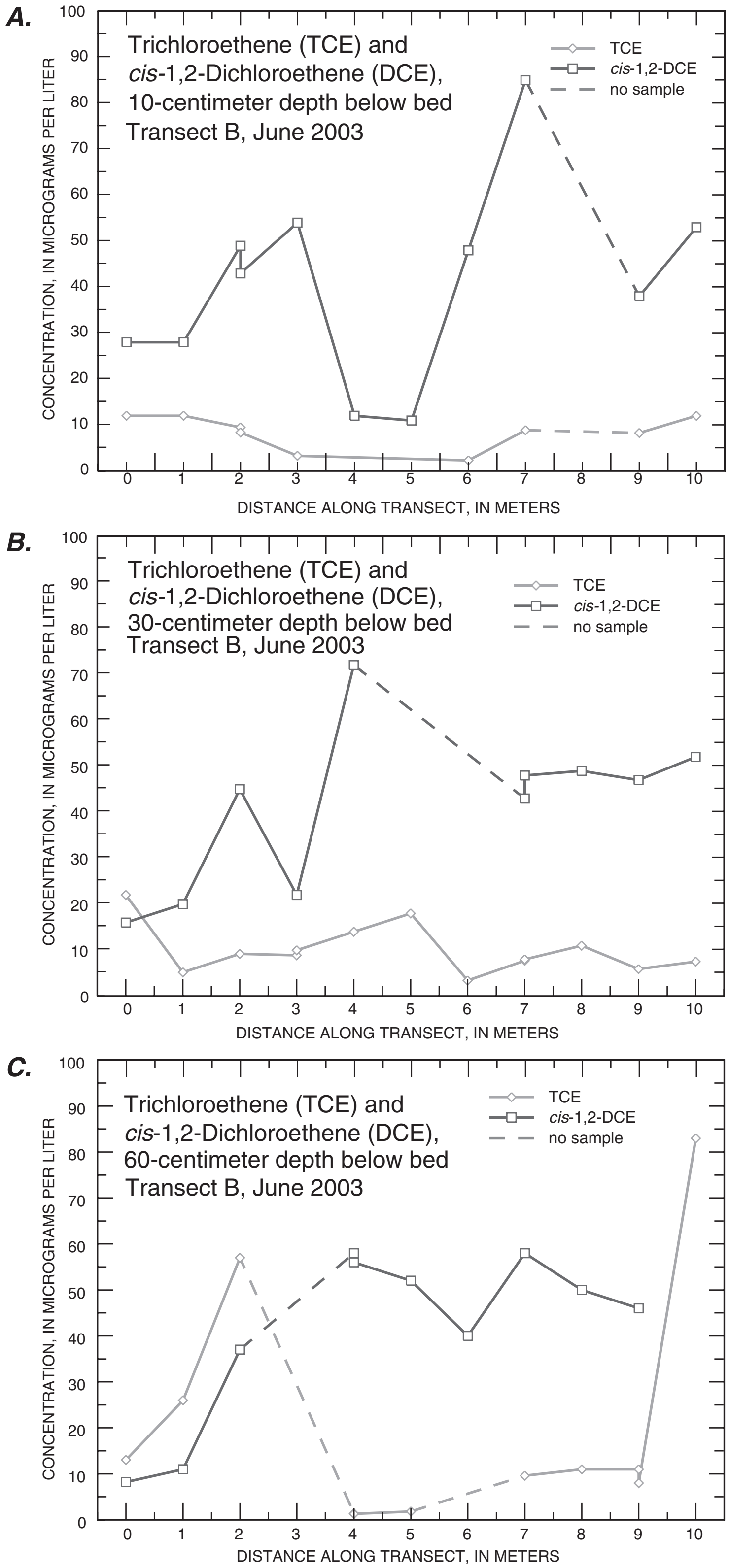


Figure 13. Concentrations of trichloroethene (TCE) and *cis*-1,2-dichloroethene (*cis* 1,2-DCE) at sediment depths of *A*, 10 centimeters; *B*, 30 centimeters; and *C*, 60 centimeters along transect B, Mill Pond, Sudbury River, Ashland, Massachusetts, June 2003. Dashed lines indicate data missing because of failure to draw water at intermediate points. Data points connected by vertical lines indicate duplicate samples.

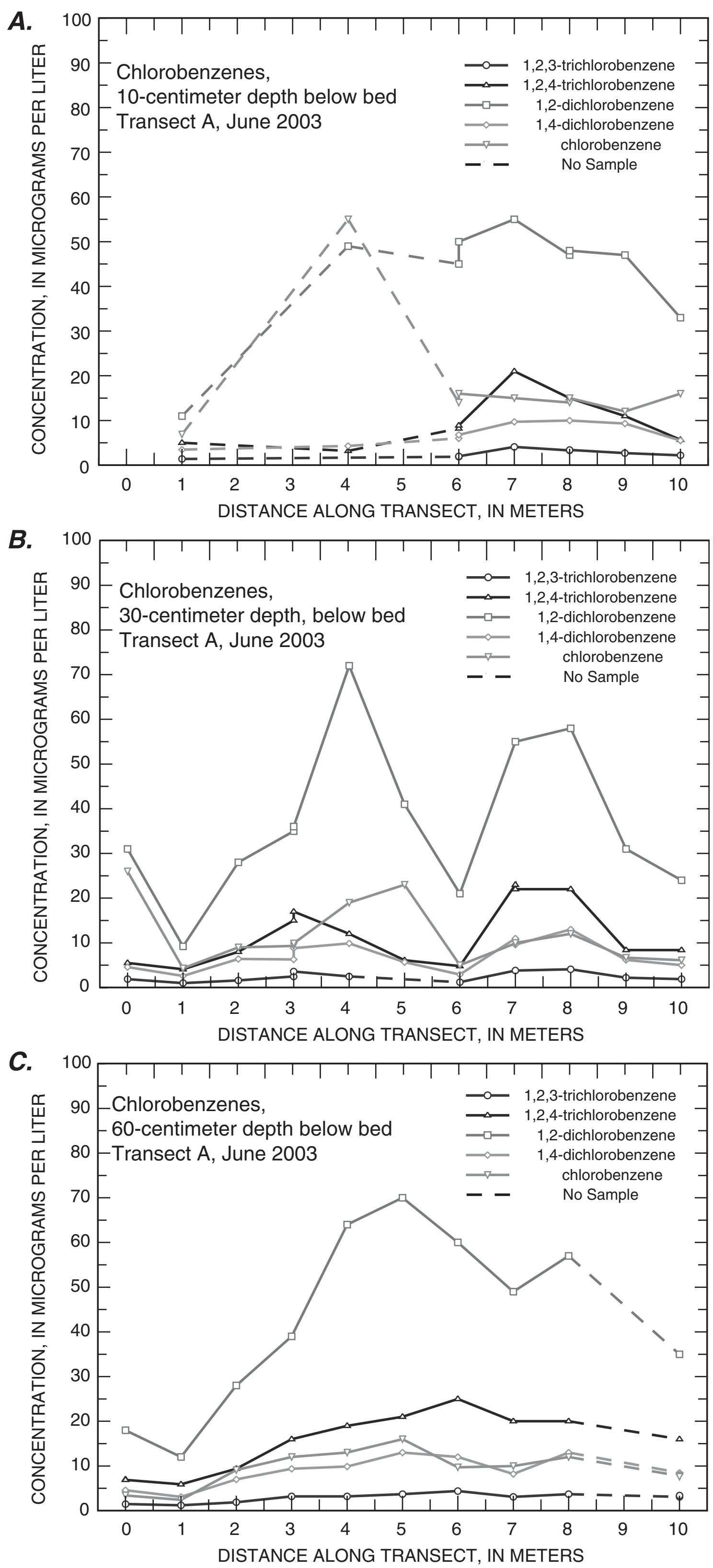


Figure 14. Concentrations of chlorobenzene and related compounds at sediment depths of *A*, 10 centimeters; *B*, 30 centimeters; and *C*, 60 centimeters along transect A, Mill Pond, Sudbury River, Ashland, Massachusetts, June 2003. Dashed lines indicate data missing because of failure to draw water at intermediate sampling points. Data points connected by vertical lines indicate duplicate samples.

Summary and Conclusions

The environmental risk posed by contaminants in streams and lake-bed sediments is affected by lateral and vertical variations in pore-water concentrations. Present technologies available to collect pore-water samples typically are unsuitable for determining lateral and vertical variations in contaminant concentrations. Also, temporal variations in contaminant concentrations are rarely evaluated. Therefore, the U.S. Geological Survey, in cooperation with the U.S. Environmental Protection Agency, began a study in 2002 to determine the effectiveness of a temporary pushpoint sampler for collecting pore-water samples from shallow sediments at Mill Pond on the Sudbury River in Ashland, MA.

During four sampling periods from April 2002 to June 2003, 307 volatile organic compound samples were collected with a pushpoint sampler at depths ranging from 10 to 60 cm below the sediment surface beneath Mill Pond, an impoundment on the Sudbury River. The concentrations obtained were consistent with the range of concentrations reported in previous studies of this Superfund site.

Results of pushpoint sampling at 1-m intervals along two 10-m transects that extended into the Sudbury River demonstrated that the sampler could provide discrete, real-time values for specific conductance to serve as a contaminant tracer in fine horizontal and vertical detail. Similarly, the capacity of the samplers to yield VOC samples with distinctly different concentrations of a variety of compounds, despite separation of sampling points by only tens of centimeters, further demonstrated the usefulness of the PPS in studies of VOC transformations in ground water.

The testing of the PushPoint Extreme Sampler showed it to be a highly cost-effective tool for mapping and sampling contaminated pore water at the study site. Specific conductance values for water samples collected at depths as small as 10 cm below the sediment surface indicated no infiltration of surface water. Occasional difficulties arose in drawing water with a peristaltic pump at a particular site and depth, but the overall ease in collecting samples from many locations and depths far outweighed the occasional inability to obtain a sample. Quality-control samples showed that the pushpoint-sampling technique did not introduce contamination into samples and consistently yielded reproducible results. Results from pushpoint samples were comparable to results from samples collected from PDBs that were deployed for 8 weeks in the sediment immediately adjacent to the pushpoint sampler transects. However, pushpoint samples represent instants in time, whereas PDB samples integrate changes over a longer periods of time (generally, days to weeks); the samples also represent different volumes. Thus, the results of the two methods (PPS and PDB) should not be considered equal or interchangeable.

The pushpoint sampler should continue to prove valuable for studies mapping the presence or extent of ground-water contaminant plumes that are suspected of entering water bodies through shallow sediments. Because of its ease of use, the pushpoint sampler can be applied in studies of microbial transformations of contaminants in ground water near the sediment-water interface of streams and impoundments, a focal point for bioremediation studies. Another area of application would be in situ measurement of the release of nutrients, such as phosphorus, from sediments, a traditional subject of limnological research.

Acknowledgments

Forest P. Lyford, Hydrologist, U.S. Geological Survey, and Richard Willey, Hydrologist, U.S. Environmental Protection Agency, proposed this study and developed its initial framework. The support and cooperation of Sharon Hayes, Remedial Program Manager, U.S. Environmental Protection Agency, is greatly appreciated.

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Tables 4 and 5

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	1,1,1-Trichloroethane	Tetrachloroethene	Trichloroethene
					June 2002						
10	10	6-17-02	1000	14.09	410	6.04	7.49	0.1	ND	ND	ND
10	30	6-17-02	1012	13.64	524	4.72	.74	.4	ND	ND	6.0
10	60	6-17-02	1027	13.14	579	4.62	.53	3.9	ND	ND	4.3
9	10	6-17-02	1045	15.28	384	6.17	7.5	.3	ND	ND	ND
9	30	6-17-02	1053	13.76	625	4.58	.64	.0	ND	ND	7.1
9	60	6-17-02	1102	13.29	609	4.58	.94	.4	ND	ND	7.3
8	10	6-17-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
8	30	6-17-02	1134	13.91	708	4.53	.55	.2	ND	ND	7.8
8	30 REP	6-17-02	1139	13.61	689	4.56	.24	.0	ND	ND	7.2
8	60	6-17-02	1148	13.66	679	4.54	.7	.0	ND	ND	6.2
8	60 REP	6-17-02	1153	13.11	639	4.61	.92	.1	ND	ND	6.1
7	10	6-17-02	1218	15.93	391	6.06	7.45	.7	ND	ND	1.1
7	30	6-17-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
7	60	6-17-02	1236	13.45	563	4.61	.77	.2	ND	ND	6.9
6	10	6-17-02	1250	18.37	453	5.21	3.33	1.9	ND	ND	35
6	30	6-17-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
6	60	6-17-02	1315	14.16	516	4.7	.92	5.2	ND	ND	8.6
6	60 REP	6-17-02	1320	13.96	510	4.71	.71	3.1	ND	ND	8.9
5	10	6-17-02	1348	23.22	623	5.3	1.92	4.6	1.2	ND	39
5	30	6-17-02	1357	14.5	526	5.25	.38	2.1	ND	ND	19
5	60	6-17-02	1402	13.96	533	5.2	.29	3.0	ND	ND	12
4	10	6-17-02	1420	14.81	564	5.82	.97	3.4	ND	ND	20
4	30	6-17-02	1425	17.95	588	5.47	1.96	NS	NS	NS	NS
4	30	6-17-02	1431	17.95	588	5.47	1.96	OR	ND	ND	10
3	10	6-18-02	0957	19.24	505	4.93	5.42	2.6	ND	ND	12
3	10 REP	6-18-02	1005	20.16	477	5.19	4.89	3.9	ND	ND	11
3	30	6-18-02	1019	17.93	552	4.65	1.8	.7	ND	ND	6.5
3	30 REP	6-18-02	1033	16.78	555	4.87	1.97	11.2	ND	ND	5.5
3	60	6-18-02	1041	12.75	545	4.69	.28	.2	ND	ND	5.4
3	60 REP	6-18-02	1048	12.63	547	4.64	.5	1.2	ND	ND	5.2
2	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	30	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	60	6-18-02	1116	12.37	492	4.76	.93	.0	ND	ND	5.5
1	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	30	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	60	6-18-02	1131	12.5	444	4.81	.86	.0	ND	ND	5.5
1	60 REP	6-18-02	1138	12.75	442	4.79	1.29	.0	ND	ND	5.9

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	1,1,1-Trichloroethane	Tetrachloroethene	Trichloroethene
					June 2002—Continued						
0	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
0	30	6-18-02	1150	14.51	424	4.95	0.75	0.5	ND	ND	14
0	30 REP	6-18-02	1158	13.89	421	4.91	.32	.8	ND	ND	24
0	60	6-18-02	1203	15.6	429	4.88	1.45	.3	ND	ND	5.4
0	60 REP	6-18-02	1209	13.05	429	4.69	.77	0	ND	ND	7.7
					September 2002						
10	10	9-04-02	1545	20.72	727	4.59	0.3	NS	ND	ND	32
10	30	9-04-02	1550	19.86	794	4.41	.12	NS	ND	ND	10
10	60	9-04-02	1555	19.18	822	4.41	.53	NS	ND	ND	8.9
9	10	9-04-02	1515	22.09	892	4.51	.35	NS	ND	ND	40
9	30	9-04-02	1525	22.45	870	4.41	1.26	NS	ND	ND	10
9	60	9-04-02	1530	18.85	895	4.27	.11	NS	ND	ND	13
8	10	9-04-02	NA	NS	NS	NS	NS	NS	NS	ND	NS
8	30	9-04-02	1455	21.31	862	4.38	.14	NS	ND	ND	16
8	60	9-04-02	1500	18.53	955	4.22	.09	NS	ND	ND	9.0
7	10	9-04-02	1420	20.54	872	4.38	.55	NS	ND	ND	34
7	10 REP	9-04-02	1425	20.44	849	4.35	.25	NS	ND	ND	43
7	30	9-04-02	1435	23.05	901	4.32	.76	NS	ND	ND	13
7	60	9-04-02	1440	18.11	880	4.22	.11	NS	ND	ND	9.4
7	60 REP	9-04-02	1445	18.27	845	4.16	.1	NS	ND	ND	9.1
6	10	9-04-02	1255	24.2	673	4.64	1.41	NS	ND	ND	33
6	30	9-04-02	1315	18.89	669	4.5	.26	NS	ND	ND	14
6	60	9-04-02	1330	18.34	676	4.42	.17	NS	ND	ND	12
5	10	9-04-02	NA	NS	NS	NS	NS	NS	NS	ND	NS
5	30	9-04-02	1510	24.05	617	5.15	.24	NS	ND	ND	23
5	60	9-04-02	1530	20.87	636	4.61	.4	NS	ND	ND	8.6
4	10	9-04-02	1540	23.54	601	5.52	1.42	NS	ND	ND	2.3
4	30	9-04-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	60	9-04-02	1600	18.3	610	5.15	.19	NS	ND	ND	14
	Trip blank	9-04-02	NA	NA	NS	NS	NS	NS	ND	ND	ND
3	10	9-05-02	1100	20.8	729	4.41	.68	NS	ND	ND	22
3	10 REP	9-05-02	1115	21.73	724	4.6	.71	NS	ND	ND	13
3	30	9-05-02	1130	22.13	731	4.37	1.53	NS	ND	ND	10
3	30 REP	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
3	60	9-05-02	1150	17.44	717	4.43	.18	NS	ND	ND	6.4
3	60 REP	9-05-02	1155	17.45	713	4.27	.13	NS	ND	ND	7.6
2	10	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	30	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	60	9-05-02	1215	19.25	571	4.46	.62	NS	ND	ND	6.2

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	1,1,1-Trichloroethane	Tetrachloroethene	Trichloroethene
					September 2002—Continued						
1	10	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	30	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	60	9-05-02	1250	17.29	478	4.5	0.86	NS	ND	ND	5.3
0	10	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
0	30	9-05-02	1305	18.38	483	4.55	.39	NS	ND	ND	21
0	60	9-05-02	1310	18.7	478	4.61	.39	NS	ND	ND	5.6
					April–May 2003						
	Surface water	4-29-03	M	17.49	438	6.42	9.67	NS	NS	ND	ND
10	10	4-29-03	1329	17.7	750	4.58	.27	NS	ND	ND	21
10	30	4-29-03	1341	13.29	751	4.45	.23	NS	ND	ND	5.9
10	60	4-29-03	1358	15.18	726	4.55	.33	NS	ND	ND	5.2
10	60 REP	4-29-03	1401	NS	NS	NS	NS	NS	ND	ND	5.1
9	10	4-29-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
9	30	4-29-03	1440	17.83	849	5.55	.55	NS	NS	NS	NS
9	30 REP	4-29-03	1444	NS	NS	NS	NS	NS	ND	ND	5.8
9	60	4-29-03	1450	12.49	857	4.49	.45	NS	ND	ND	6.5
8	10	4-29-03	1517	21.95	971	4.64	.96	NS	ND	ND	5.5
8	30	4-29-03	1531	12.95	975	4.49	.35	0.0	ND	ND	6.3
8	30 REP	4-29-03	1534	NS	NS	NS	NS	NS	ND	ND	6.7
8	60	4-29-03	1540	14.11	961	4.47	.33	NS	ND	ND	5.6
7	10	4-29-03	1612	19.37	1,052	4.8	.7	NS	ND	ND	11
7	10 REP	4-29-03	1618	NS	NS	NS	NS	NS	ND	ND	11
7	30	4-29-03	1628	14.32	963	4.44	.2	.1	ND	ND	6.2
7	60	4-29-03	M	13.03	949	4.4	.66	NS	ND	ND	5.5
	Trip blank	4-29-03	NA	NS	NS	NS	NS	NS	ND	ND	ND
	Trip blank	4-30-03	NA	NS	NS	NS	NS	NS	ND	ND	ND
6	10	4-30-03	1049	13.49	1,192	4.38	.53	NS	ND	ND	8.2
6	10 REP	4-30-03	1050	NS	NS	NS	NS	NS	ND	ND	8.0
6	30	4-30-03	1057	11.82	1,250	4.33	.28	3.2	ND	ND	5.8
6	60	4-30-03	1110	12.53	1,261	4.28	.32	2.5	ND	ND	6.7
5	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
5	30	4-30-03	1144	17.04	955	4.87	1.45	NS	ND	ND	9.9
5	60	4-30-03	1153	11.86	956	4.91	.22	3.3	ND	ND	11
5	60 REP	4-30-03	1156	NS	NS	NS	NS	NS	ND	ND	12
	Surface water	4-30-03	1300	16.08	578	6.15	9.03	NS	NS	NS	NS
4	Field blank	4-30-03	1315	NS	NS	NS	NS	NS	ND	ND	ND
4	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	30	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	60	4-30-03	1353	12.56	1,004	4.92	.35	NS	ND	ND	9.1

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	1,1,1-Trichloroethane	Tetrachloroethene	Trichloroethene
				April–May 2003—Continued							
3	10	4-30-03	1423	19.88	1,196	4.51	2.18	NS	ND	ND	10
3	30	4-30-03	1435	20.24	1,299	4.37	2.5	NS	ND	ND	3.9
3	60	4-30-03	1447	11.37	1,228	4.48	.17	0.3	ND	1.2	ND
3	60 REP	4-30-03	1450	NS	NS	NS	NS	NS	ND	1.1	6.4
2	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	30	4-30-03	1514	12.59	1,086	4.51	.29	NS	ND	ND	10
2	30 REP	4-30-03	1517	NS	NS	NS	NS	NS	ND	ND	10
2	60	4-30-03	1521	15.54	1,089	4.33	.28	NS	ND	1.0	5.5
1	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	30	4-30-03	1548	13.99	877	4.49	.29	NS	ND	ND	7.5
1	30 REP	4-30-03	1551	NS	NS	NS	NS	NS	ND	ND	7.1
1	60	4-30-03	1558	17.63	864	4.38	.55	NS	ND	ND	ND
0	Trip blank	5-01-03	NA	NS	NS	NS	NS	NS	ND	ND	ND
0	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
0	30	5-01-03	1131	11.22	533	4.78	.06	1.3	ND	ND	23
0	60	5-01-03	1139	11.62	552	4.85	.7	.1	ND	ND	6.8
0	60 REP	5-01-03	1142	NS	NS	NS	NS	NS	ND	ND	6.8
				June 2003							
	Surface water	6-23-03	M	19.7	311	6.6	7.2	NS	NS	NS	NS
10	Trip blank	6-23-03	NA	NS	NS	NS	NS	NS	ND	ND	ND
10	10	6-23-03	1310	19.1	902	4.7	.7	NS	ND	ND	14
10	30	6-23-03	1330	22.4	924	4.7	1	NS	ND	ND	7.5
10	60	6-23-03	1345	14.5	903	4.5	.8	0.2	ND	ND	9.0
10	60 REP	6-23-03	1350	NS	NS	NS	NS	NS	ND	ND	8.9
9	10	6-23-03	1407	19.1	979	4.7	.5	NS	ND	ND	12
9	30	6-23-03	1415	21.1	977	4.7	.7	NS	ND	ND	5.9
9	Field blank	6-23-03	1425	NS	NS	NS	NS	NS	ND	ND	ND
9	60	6-23-03	1435	14.4	969	4.5	.7	NS	ND	ND	9.9
8	10	6-23-03	1455	18.5	978	4.7	.5	NS	ND	ND	14
8	10 REP	6-23-03	1458	NS	NS	NS	NS	NS	ND	ND	14
8	30	6-23-03	1507	15	992	4.6	.7	NS	ND	ND	11
8	60	6-23-03	1515	14.2	993	4.6	.7	NS	ND	ND	11
7	10	6-23-03	1527	15.9	990	4.7	.7	.3	ND	ND	14
7	30	6-23-03	1527	15.1	1,000	4.6	.7	NS	ND	ND	7.7
7	30 REP	6-23-03	1541	NS	NS	NS	NS	NS	ND	ND	8.0
7	60	6-23-03	1557	14.2	979	4.6	.9	NS	ND	ND	7.9
	Surface water	6-24-03	NA	19.8	346	6.3	7.2	NS	NS	NS	NS

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	1,1,1-Trichloroethane	Tetrachloroethene	Trichloroethene
					June 2003—Continued						
6	10	6-24-03	1012	21.4	989	4.5	0.6	NS	ND	ND	9.3
6	10 REP	6-24-03	1015	NS	NS	NS	NS	NS	ND	ND	13
	Trip blank	6-24-03	NA	NS	NS	NS	NS	NS	ND	ND	ND
6	30	6-24-03	1032	26.8	1,021	4.6	.6	NS	ND	ND	3.4
6	60	6-24-03	1045	14.8	1,005	4.3	.7	NS	ND	ND	7.5
5	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
5	Field blank	6-24-03	1112	NS	NS	NS	NS	NS	ND	ND	ND
5	30	6-24-03	1120	22.9	914	4.9	.9	NS	ND	ND	18
5	60	6-24-03	1130	15.5	884	4.7	.6	NS	ND	ND	11
4	10	6-24-03	1245	19.9	862	4.9	.9	NS	ND	ND	22
4	30	6-24-03	1255	17.2	894	5.1	.6	NS	ND	ND	14
4	60	6-24-03	1308	15.7	939	5.0	.6	NS	ND	ND	8.8
3	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
3	30	6-24-03	1333	14.9	1,051	4.3	.6	NS	ND	ND	8.9
3	30 REP	6-24-03	1336	NS	NS	NS	NS	NS	ND	ND	10
3	60	6-24-03	1342	13.5	1,030	4.4	.7	NS	ND	ND	11
2	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	30	6-24-03	1400	14.2	1,045	4.3	.07	NS	ND	ND	9.2
2	60	6-24-03	1412	13.7	1,021	4.3	.7	0.0	ND	ND	8.6
1	10	6-24-03	1430	21.2	867	4.6	.5	NS	ND	ND	7.2
1	30	6-24-03	1450	21.8	858	4.6	.8	NS	ND	ND	5.2
1	Field blank	6-24-03	1500	NS	NS	NS	NS	NS	ND	ND	ND
1	60	6-24-03	1506	17.3	846	4.5	.5	.1	ND	ND	5.1
0	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
0	30	6-24-03	1538	15.9	694	4.6	.6	NS	ND	ND	22
0	60	6-24-03	1525	14.2	781	4.4	.7	.0	ND	ND	5.9
0	60 REP	6-24-03	1528	NS	NS	NS	NS	NS	ND	ND	5.8
10	PDB	6-26-03	NA	NS	NS	NS	NS	NS	ND	ND	6.8
9	PDB	6-26-03	NA	NS	NS	NS	NS	NS	ND	ND	6.4
8	PDB	6-26-03	NA	NS	NS	NS	NS	NS	ND	ND	13
7	PDB	6-26-03	NA	NS	NS	NS	NS	NS	ND	ND	9.2
6	PDB	6-26-03	NA	NS	NS	NS	NS	NS	ND	ND	19

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,1-Di-chloro-ethene	*cis*-1,2-Di-chloro-ethene	Vinyl chloride	Chloro-ethane	1,2,3-Tri-chloro-benzene	1,2,4-Tri-chloro-benzene	1,2-Di-chloro-benzene	1,3-Di-chloro-benzene
				June 2002							
10	10	6-17-02	1000	ND	ND	ND	ND	ND	ND	[1]0.82	ND
10	30	6-17-02	1012	ND	9.3	ND	ND	2.8	13	35	1.3
10	60	6-17-02	1027	ND	11	ND	ND	2.5	14	33	1.4
9	10	6-17-02	1045	ND	ND	ND	ND	ND	ND	.92	ND
9	30	6-17-02	1053	ND	19	ND	ND	3.7	18	49	1.6
9	60	6-17-02	1102	ND	21	ND	ND	4.0	20	53	1.8
8	10	6-17-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
8	30	6-17-02	1134	ND	23	ND	ND	3.1	18	42	10
8	30 REP	6-17-02	1139	ND	22	ND	ND	3.3	19	46	1.9
8	60	6-17-02	1148	ND	22	ND	ND	2.7	18	46	1.8
8	60 REP	6-17-02	1153	ND	20	ND	ND	3.2	17	44	1.5
7	10	6-17-02	1218	ND	[1].92	ND	ND	ND	[1].59	2.1	ND
7	30	6-17-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
7	60	6-17-02	1236	ND	20	ND	ND	5.1	27	70	2.0
6	10	6-17-02	1250	ND	32	ND	ND	2.5	8.2	60	1.4
6	30	6-17-02	NS	NS	NS	NS	NS	NS	NS	NS	NS
6	60	6-17-02	1315	ND	19	ND	ND	5.7	27	80	2.7
6	60 REP	6-17-02	1320	ND	18	ND	ND	5.1	27	80	2.4
5	10	6-17-02	1348	[1]0.88	36	1.8	ND	1.0	2.4	47	ND
5	30	6-17-02	1357	1.0	24	ND	1.7	4.4	19	82	2.8
5	60	6-17-02	1402	ND	19	ND	ND	4.9	24	100	2.8
4	10	6-17-02	1420	ND	2.0	6.2	ND	ND	5.4	57	2.2
4	30	6-17-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	30	6-17-02	1431	ND	17	17	ND	4.1	23	84	2.6
3	10	6-18-02	0957	ND	15	ND	ND	[1].72	2.8	17	ND
3	10 REP	6-18-02	1005	ND	17	ND	ND	[1].78	2.7	20	[1].59
3	30	6-18-02	1019	ND	9.8	ND	ND	1.5	7.3	18	[1].55
3	30 REP	6-18-02	1033	ND	9.9	ND	ND	2.1	11	19	[1].66
3	60	6-18-02	1041	ND	12	ND	ND	3.0	16	33	1.2
3	60 REP	6-18-02	1048	ND	12	ND	ND	2.3	15	30	1.2
2	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	30	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	60	6-18-02	1116	ND	6.8	ND	ND	2.1	12	28	[1].93
1	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	30	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	60	6-18-02	1131	ND	4.0	ND	ND	1.9	9.3	25	[1].83
1	60 REP	6-18-02	1138	ND	4.2	ND	ND	2.0	9.2	27	[1].80

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,1-Di-chloro-ethene	*cis*-1,2-Di-chloro-ethene	Vinyl chloride	Chloro-ethane	1,2,3-Tri-chloro-benzene	1,2,4-Tri-chloro-benzene	1,2-Di-chloro-benzene	1,3-Di-chloro-benzene
					June 2002—Continued						
0	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
0	30	6-18-02	1150	ND	6.7	ND	ND	1.5	6.8	21	[1]0.69
0	30 REP	6-18-02	1158	ND	12	ND	ND	1.9	6.8	33	1.3
0	60	6-18-02	1203	ND	3.0	ND	ND	1.2	6.1	19	[1].72
0	60 REP	6-18-02	1209	ND	4.1	ND	ND	1.8	7.8	26	ND
					September 2002						
10	10	9-04-02	1545	ND	19	0.7	ND	4.1	9.3	58	1.1
10	30	9-04-02	1550	ND	14	ND	ND	5.4	22	58	1.7
10	60	9-04-02	1555	ND	15	ND	ND	5.6	27	58	2.0
9	10	9-04-02	1515	ND	26	1.4	ND	3.6	11	67	1.2
9	30	9-04-02	1525	ND	16	ND	ND	1.8	8.3	34	ND
9	60	9-04-02	1530	ND	18	ND	ND	4.8	24	70	2.3
8	10	9-04-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
8	30	9-04-02	1455	ND	19	ND	ND	4.2	20	61	2.0
8	60	9-04-02	1500	ND	19	ND	ND	4.9	23	60	2.1
7	10	9-04-02	1420	ND	25	1.6	ND	4.8	17	68	1.8
7	10 REP	9-04-02	1425	ND	25	[1].91	ND	4.7	18	78	2.0
7	30	9-04-02	1435	ND	17	ND	ND	3.6	14	52	1.3
7	60	9-04-02	1440	ND	17	ND	ND	6.4	28	75	2.3
7	60 REP	9-04-02	1445	ND	16	ND	ND	6.2	29	69	2.3
6	10	9-04-02	1255	ND	22	ND	ND	ND	[1]4.2	39	ND
6	30	9-04-02	1315	ND	17	ND	ND	6.9	30	88	2.7
6	60	9-04-02	1330	ND	15	ND	ND	7.3	32	82	2.5
5	10	9-04-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
5	30	9-04-02	1510	ND	20	.78	ND	1.9	6.8	53	ND
5	60	9-04-02	1530	ND	11	ND	ND	4.4	20	61	1.8
4	10	9-04-02	1540	ND	8.1	1.9	ND	ND	ND	7.4	ND
4	30	9-04-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	60	9-04-02	1600	ND	16	ND	ND	5.1	22	79	2.2
	Trip blank	9-04-02	NA	ND	ND	ND	ND	ND	ND	ND	ND
3	10	9-05-02	1100	ND	19	ND	ND	1.8	4	28	ND
3	10 REP	9-05-02	1115	ND	16	ND	ND	ND	1.6	12	ND
3	30	9-05-02	1130	ND	11	ND	ND	1.3	5.2	16	ND
3	30 REP	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
3	60	9-05-02	1150	ND	9.9	ND	ND	3.7	19	36	1.5
3	60 REP	9-05-02	1155	ND	10	ND	ND	3.9	20	37	1.3
2	10	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	30	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	60	9-05-02	1215	ND	6.0	ND	ND	2.3	10	30	ND

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,1-Di-chloro-ethene	*cis*-1,2-Di-chloro-ethene	Vinyl chloride	Chloro-ethane	1,2,3-Tri-chloro-benzene	1,2,4-Tri-chloro-benzene	1,2-Di-chloro-benzene	1,3-Di-chloro-benzene
					September 2002—Continued						
1	10	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	30	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	60	9-05-02	1250	ND	3.1	ND	ND	2.2	9.5	17	0.61
0	10	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
0	30	9-05-02	1305	ND	7.1	ND	ND	2.2	7.7	21	ND
0	60	9-05-02	1310	ND	3.2	ND	ND	[1].76	2.5	11	ND
					April–May 2003						
	Surface water	4-29-03	M	NS	ND	ND	ND	NS	NS	NS	NS
10	10	4-29-03	1329	ND	23	ND	ND	2.3	8.2	47	1.1
10	30	4-29-03	1341	ND	23	ND	ND	2.6	14	41	1.3
10	60	4-29-03	1358	ND	20	ND	ND	2.0	11	37	1.1
10	60 REP	4-29-03	1401	ND	21	ND	ND	2.0	11	39	1.1
9	10	4-29-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
9	30	4-29-03	1440	NS	NS	NS	NS	NS	NS	NS	NS
9	30 REP	4-29-03	1444	ND	28	ND	ND	1.8	9.9	38	1.1
9	60	4-29-03	1450	ND	29	ND	ND	2.4	14	49	1.5
8	10	4-29-03	1517	ND	28	ND	ND	ND	2.8	14	ND
8	30	4-29-03	1531	ND	35	ND	ND	2.1	12	40	1.4
8	30 REP	4-29-03	1534	ND	35	ND	ND	2.2	13	43	1.4
8	60	4-29-03	1540	ND	32	ND	ND	1.8	11	40	1.3
7	10	4-29-03	1612	ND	27	ND	ND	1.4	6.0	35	ND
7	10 REP	4-29-03	1618	ND	28	ND	ND	1.4	5.8	38	ND
7	30	4-29-03	1628	ND	33	ND	ND	2.2	12	44	1.4
7	60	4-29-03	M	ND	32	ND	ND	2.3	13	42	1.4
	Trip blank	4-29-03	NA	ND	ND	ND	ND	ND	ND	ND	ND
	Trip blank	4-30-03	NA	ND	ND	ND	ND	ND	ND	ND	ND
6	10	4-30-03	1049	ND	29	ND	ND	2.3	12	54	1.4
6	10 REP	4-30-03	1050	ND	30	ND	ND	2.2	11	50	1.3
6	30	4-30-03	1057	ND	33	ND	ND	3.4	19	62	1.9
6	60	4-30-03	1110	ND	25	ND	ND	5.4	26	62	2.3
5	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
5	30	4-30-03	1144	ND	17	ND	ND	1.3	4.2	38	6.4
5	60	4-30-03	1153	ND	21	ND	ND	4.8	24	89	2.7
5	60 REP	4-30-03	1156	ND	21	ND	ND	4.9	24	89	2.7
	Surface water	4-30-03	1300	NS	NS	NS	NS	NS	NS	NS	NS
4	Field blank	4-30-03	1315	ND	ND	ND	ND	ND	ND	ND	ND
4	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	30	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	60	4-30-03	1353	ND	20	ND	ND	4.8	23	75	2.3

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,1-Di-chloro-ethene	*cis*-1,2-Di-chloro-ethene	Vinyl chloride	Chloro-ethane	1,2,3-Tri-chloro-benzene	1,2,4-Tri-chloro-benzene	1,2-Di-chloro-benzene	1,3-Di-chloro-benzene
				April–May 2003—Continued							
3	10	4-30-03	1423	ND	16	ND	ND	1.3	4.8	22	ND
3	30	4-30-03	1435	ND	17	ND	ND	ND	3.0	10	ND
3	60	4-30-03	1447	ND	21	6.8	ND	3.2	16	33	1.3
3	60 REP	4-30-03	1450	ND	20	ND	ND	3.0	15	31	1.4
2	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	30	4-30-03	1514	ND	15	ND	ND	2.5	12	31	1.2
2	30 REP	4-30-03	1517	ND	16	ND	ND	2.4	11	30	1.1
2	60	4-30-03	1521	ND	15	ND	ND	2.0	10	25	1.1
1	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	30	4-30-03	1548	ND	9.8	ND	ND	1.4	6.8	13	ND
1	30 REP	4-30-03	1551	ND	8.9	ND	ND	1.8	6.7	13	ND
1	60	4-30-03	1558	ND	ND	ND	ND	1.4	5.9	15	ND
0	Trip blank	5-01-03	NA	ND	ND	ND	ND	ND	ND	ND	ND
0	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
0	30	5-01-03	1131	ND	8.2	ND	ND	2.3	6.9	31	ND
0	60	5-01-03	1139	ND	7.1	ND	ND	2.1	8.1	26	ND
0	60 REP	5-01-03	1142	ND	7.4	ND	ND	1.9	8.3	29	ND
				June 2003							
	Surface water	6-23-03	M	NS	NS	NS	NS	NS	NS	NS	NS
10	Trip blank	6-23-03	NA	ND	ND	ND	ND	ND	ND	ND	ND
10	10	6-23-03	1310	ND	16	ND	ND	2.2	5.7	33	1.0
10	30	6-23-03	1330	ND	26	ND	ND	1.9	8.4	24	1.0
10	60	6-23-03	1345	ND	27	ND	ND	3.1	16	35	1.6
10	60 REP	6-23-03	1350	ND	28	ND	ND	3.4	16	35	1.5
9	10	6-23-03	1407	ND	27	ND	ND	2.7	11	47	1.4
9	30	6-23-03	1415	ND	22	ND	ND	2.2	8.4	31	1.1
9	Field blank	6-23-03	1425	ND	ND	ND	ND	ND	ND	ND	ND
9	60	6-23-03	1435	ND	34	ND	ND	3.9	21	59	2.3
8	10	6-23-03	1455	ND	28	ND	ND	3.3	15	47	1.6
8	10 REP	6-23-03	1458	ND	29	ND	ND	3.4	15	48	1.7
8	30	6-23-03	1507	ND	36	ND	ND	4.1	22	58	2.1
8	60	6-23-03	1515	ND	36	ND	ND	3.7	20	57	2.2
7	10	6-23-03	1527	ND	29	ND	ND	4.1	21	55	1.7
7	30	6-23-03	1527	ND	34	ND	ND	3.8	23	55	1.7
7	30 REP	6-23-03	1541	ND	34	ND	ND	3.8	22	55	1.8
7	60	6-23-03	1557	ND	33	ND	ND	3.1	20	49	1.6
	Surface water	6-24-03	M	NS	NS	NS	NS	NS	NS	NS	NS

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,1-Di-chloro-ethene	*cis*-1,2-Di-chloro-ethene	Vinyl chloride	Chloro-ethane	1,2,3-Tri-chloro-benzene	1,2,4-Tri-chloro-benzene	1,2-Di-chloro-benzene	1,3-Di-chloro-benzene
					June 2003—Continued						
6	10	6-24-03	1012	ND	19	ND	ND	1.9	8.2	45	ND
6	10 REP	6-24-03	1015	ND	24	ND	ND	2.0	8.9	50	1.1
	Trip blank	6-24-03	NA	ND	ND	ND	ND	ND	ND	ND	ND
6	30	6-24-03	1032	ND	24	ND	ND	1.2	4.8	21	ND
6	60	6-24-03	1045	ND	31	ND	ND	4.4	25	60	1.9
5	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
5	Field blank	6-24-03	1112	ND	ND	ND	ND	ND	ND	ND	ND
5	30	6-24-03	1120	ND	24	ND	ND	ND	6.1	41	ND
5	60	6-24-03	1130	ND	25	ND	ND	3.7	21	70	1.9
4	10	6-24-03	1245	ND	41	8.2	ND	ND	3.2	49	1.4
4	30	6-24-03	1255	ND	26	ND	ND	2.5	12	72	1.5
4	60	6-24-03	1308	ND	29	ND	ND	3.2	19	64	1.7
3	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
3	30	6-24-03	1333	ND	31	ND	ND	2.5	15	35	1.1
3	30 REP	6-24-03	1336	ND	34	ND	ND	3.6	17	36	1.6
3	60	6-24-03	1342	ND	34	ND	ND	3.2	16	39	1.6
2	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	30	6-24-03	1400	ND	26	ND	ND	1.6	8.0	28	1.0
2	60	6-24-03	1412	ND	25	ND	ND	1.9	9.4	28	1.3
1	10	6-24-03	1430	ND	11	ND	ND	1.4	5.0	11	ND
1	30	6-24-03	1450	ND	12	ND	ND	1.0	4.1	9.2	ND
1	Field blank	6-24-03	1500	ND	ND	ND	ND	ND	ND	ND	ND
1	60	6-24-03	1506	ND	15	ND	ND	1.2	5.9	12	ND
0	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
0	30	6-24-03	1538	ND	9.6	ND	ND	1.9	5.5	31	ND
0	60	6-24-03	1525	ND	13	ND	ND	1.5	7.0	18	ND
0	60 REP	6-24-03	1528	ND	12	ND	ND	1.5	6.9	18	ND
10	PDB	6-26-03	NA	ND	14	ND	ND	3.0	13	[2]61	1.7
9	PDB	6-26-03	NA	ND	28	ND	ND	2.2	19	43	1.3
8	PDB	6-26-03	NA	ND	33	ND	ND	2.7	15	41	1.3
7	PDB	6-26-03	NA	ND	37	ND	ND	2.9	18	57	1.9
6	PDB	6-26-03	NA	ND	24	ND	ND	4.6	19	92	1.8

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,4-Dichlorobenzene	Chlorobenzene	Benzene	Naphthalene	Bromomethane	Dichlorodifluoromethane	1,2,3-Trichloropropane
				June 2002						
10	10	6-17-02	1000	ND	ND	ND	ND	ND	ND	ND
10	30	6-17-02	1012	7.9	6.7	ND	ND	ND	ND	ND
10	60	6-17-02	1027	7.3	4.2	ND	ND	ND	ND	ND
9	10	6-17-02	1045	ND	ND	ND	ND	ND	ND	ND
9	30	6-17-02	1053	11	8.3	ND	ND	ND	ND	ND
9	60	6-17-02	1102	11	8.8	ND	ND	ND	ND	ND
8	10	6-17-02	NA	NS	NS	NS	NS	NS	NS	NS
8	30	6-17-02	1134	9.2	6.4	ND	ND	ND	ND	ND
8	30 REP	6-17-02	1139	10	7.2	ND	ND	ND	ND	ND
8	60	6-17-02	1148	10	7.8	ND	ND	ND	ND	ND
8	60 REP	6-17-02	1153	9.5	6.7	ND	ND	ND	ND	ND
7	10	6-17-02	1218	[1].63	ND	ND	ND	ND	ND	ND
7	30	6-17-02	NA	NS	NS	NS	NS	NS	NS	NS
7	60	6-17-02	1236	16	9.2	ND	ND	ND	ND	ND
6	10	6-17-02	1250	8.2	30	ND	ND	ND	ND	ND
6	30	6-17-02	NS	NS	NS	NS	NS	NS	NS	NS
6	60	6-17-02	1315	18	14	ND	ND	[3]5.1	ND	ND
6	60 REP	6-17-02	1320	17	12	ND	ND	7.3	ND	ND
5	10	6-17-02	1348	5.0	35	ND	ND	[3]3.4	ND	ND
5	30	6-17-02	1357	21	27	ND	ND	[3]2.4	ND	ND
5	60	6-17-02	1402	21	21	ND	ND	4.1	ND	ND
4	10	6-17-02	1420	7.8	64	ND	ND	ND	ND	ND
4	30	6-17-02	NA	NS	NS	NS	NS	NS	NS	NS
4	30	6-17-02	1431	16	15	ND	ND	ND	ND	ND
3	10	6-18-02	0957	ND	ND	ND	ND	ND	ND	ND
3	10 REP	6-18-02	1005	2.9	13	ND	ND	ND	ND	ND
3	30	6-18-02	1019	3.8	ND	ND	ND	ND	ND	ND
3	30 REP	6-18-02	1033	4.1	4.7	ND	ND	ND	ND	ND
3	60	6-18-02	1041	7.3	4.7	ND	ND	ND	ND	ND
3	60 REP	6-18-02	1048	6.7	ND	ND	ND	ND	ND	ND
2	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS
2	30	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS
2	60	6-18-02	1116	6.5	4.0	ND	ND	ND	ND	ND
1	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS
1	30	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS
1	60	6-18-02	1131	5.6	ND	ND	ND	ND	ND	ND
1	60 REP	6-18-02	1138	5.6	3.8	ND	ND	ND	ND	ND

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,4-Di-chloro-benzene	Chloro-benzene	Benzene	Naphtha-lene	Bromo-methane	Dichloro-difluoro-methane	1,2,3-Tri-chloro-propane
				June 2002—Continued						
0	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS
0	30	6-18-02	1150	4.8	11	ND	ND	ND	ND	ND
0	30 REP	6-18-02	1158	5.9	20	ND	ND	ND	ND	ND
0	60	6-18-02	1203	4.5	4.6	ND	ND	ND	ND	ND
0	60 REP	6-18-02	1209	ND	5.0	ND	ND	ND	ND	ND
				September 2002						
10	10	9-04-02	1545	8.5	47	0.63	0.68	ND	ND	ND
10	30	9-04-02	1550	12	13	ND	ND	ND	ND	ND
10	60	9-04-02	1555	13	11	ND	ND	ND	ND	ND
9	10	9-04-02	1515	10	42	.94	ND	ND	ND	19
9	30	9-04-02	1525	6.5	ND	ND	ND	ND	ND	ND
9	60	9-04-02	1530	15	14	ND	ND	ND	ND	ND
8	10	9-04-02	NA	NS	NS	NS	NS	NS	NS	NS
8	30	9-04-02	1455	13	16	ND	ND	ND	ND	ND
8	60	9-04-02	1500	12	10	ND	ND	ND	ND	18
7	10	9-04-02	1420	13	36	ND	ND	ND	ND	ND
7	10 REP	9-04-02	1425	14	41	ND	ND	ND	ND	ND
7	30	9-04-02	1435	9.9	15	ND	ND	ND	ND	ND
7	60	9-04-02	1440	15	12	ND	ND	ND	ND	ND
7	60 REP	9-04-02	1445	14	11	ND	ND	ND	ND	ND
6	10	9-04-02	1255	5.8	28	ND	ND	ND	ND	ND
6	30	9-04-02	1315	17	19	ND	ND	ND	ND	ND
6	60	9-04-02	1330	16	15	ND	ND	ND	ND	ND
5	10	9-04-02	NA	NS	NS	NS	NS	ND	ND	NS
5	30	9-04-02	1510	7.8	30	ND	ND	ND	ND	ND
5	60	9-04-02	1530	11	13	ND	ND	ND	ND	ND
4	10	9-04-02	1540	1.0	11	ND	ND	ND	ND	ND
4	30	9-04-02	NA	NS	NS	NS	NS	NS	NS	NS
4	60	9-04-02	1600	15	20	ND	ND	ND	ND	ND
	Trip blank	9-04-02	NA	ND	ND	ND	ND	ND	ND	ND
3	10	9-05-02	1100	4.3	23	ND	ND	ND	ND	ND
3	10 REP	9-05-02	1115	1.6	13	ND	ND	ND	ND	ND
3	30	9-05-02	1130	3.3	11	ND	ND	ND	ND	ND
3	30 REP	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS
3	60	9-05-02	1150	8.1	5.6	ND	ND	ND	ND	ND
3	60 REP	9-05-02	1155	8.6	6.6	ND	ND	ND	ND	ND
2	10	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS
2	30	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS
2	60	9-05-02	1215	5.7	5.2	ND	ND	ND	ND	ND

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,4-Di-chloro-benzene	Chloro-benzene	Benzene	Naphtha-lene	Bromo-methane	Dichloro-difluoro-methane	1,2,3-Tri-chloro-propane
				September 2002—Continued						
1	10	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS
1	30	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS
1	60	9-05-02	1250	4.3	2.9	ND	ND	ND	ND	ND
0	10	9-05-02	NA	NS	NS	NS	NS	NS	NS	NS
0	30	9-05-02	1305	5.3	17	ND	ND	ND	ND	ND
0	60	9-05-02	1310	2.2	4.7	ND	ND	ND	ND	ND
				April–May 2003						
	Surface water	4-29-03	M	NS	ND	NS	ND	ND	ND	NS
10	10	4-29-03	1329	7.3	19	ND	ND	ND	ND	ND
10	30	4-29-03	1341	8.8	6.1	ND	ND	ND	ND	ND
10	60	4-29-03	1358	7.3	5.2	ND	ND	ND	ND	ND
10	60 REP	4-29-03	1401	7.5	5.5	ND	ND	ND	ND	ND
9	10	4-29-03	NA	NS	NS	NS	NS	NS	NS	NS
9	30	4-29-03	1440	NS	NS	NS	NS	NS	NS	NS
9	30 REP	4-29-03	1444	7.6	6.0	ND	ND	ND	ND	ND
9	60	4-29-03	1450	10	7.2	ND	ND	ND	ND	ND
8	10	4-29-03	1517	2.7	5.0	ND	ND	ND	ND	ND
8	30	4-29-03	1531	8.7	6.9	ND	ND	ND	ND	ND
8	30 REP	4-29-03	1534	9.0	7.0	ND	ND	ND	ND	ND
8	60	4-29-03	1540	8.2	6.2	ND	ND	ND	ND	ND
7	10	4-29-03	1612	6.2	11	ND	ND	ND	ND	ND
7	10 REP	4-29-03	1618	6.6	11	ND	ND	ND	ND	ND
7	30	4-29-03	1628	9.2	6.8	ND	ND	ND	ND	ND
7	60	4-29-03	M	9.2	5.6	ND	ND	ND	ND	ND
	Trip blank	4-29-03	NA	ND	ND	ND	ND	ND	ND	ND
	Trip blank	4-30-03	NA	ND	ND	ND	ND	ND	ND	ND
6	10	4-30-03	1049	9.9	8.2	ND	ND	ND	ND	ND
6	10 REP	4-30-03	1050	9.1	8.1	ND	ND	ND	ND	ND
6	30	4-30-03	1057	13	7.3	ND	ND	ND	ND	ND
6	60	4-30-03	1110	13	7.3	ND	ND	ND	ND	ND
5	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS
5	30	4-30-03	1144	6.1	12	ND	ND	ND	ND	ND
5	60	4-30-03	1153	17	16	ND	ND	ND	ND	ND
5	60 REP	4-30-03	1156	17	16	ND	ND	ND	ND	ND
	Surface water	4-30-03	1300	NS	NS	NS	NS	NS	NS	NS
4	Field blank	4-30-03	1315	ND	ND	ND	ND	ND	ND	ND
4	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS
4	30	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS
4	60	4-30-03	1353	15	12	ND	ND	ND	ND	ND

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,4-Dichlorobenzene	Chlorobenzene	Benzene	Naphthalene	Bromomethane	Dichlorodifluoromethane	1,2,3-Trichloropropane
				April–May 2003—Continued						
3	10	4-30-03	1423	4.0	7.4	ND	ND	ND	ND	ND
3	30	4-30-03	1435	2.2	2.6	ND	ND	ND	ND	ND
3	60	4-30-03	1447	7.4	4.2	ND	ND	ND	ND	ND
3	60 REP	4-30-03	1450	7.1	4.1	ND	ND	ND	ND	ND
2	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS
2	30	4-30-03	1514	6.9	7.8	ND	ND	ND	ND	21
2	30 REP	4-30-03	1517	6.7	7.9	ND	ND	ND	ND	ND
2	60	4-30-03	1521	5.4	3.6	ND	ND	ND	ND	ND
1	10	4-30-03	NA	NS	NS	NS	NS	NS	NS	NS
1	30	4-30-03	1548	3.7	3.6	ND	ND	ND	ND	ND
1	30 REP	4-30-03	1551	3.6	3.8	ND	ND	ND	ND	ND
1	60	4-30-03	1558	3.4	2.3	ND	ND	ND	ND	ND
0	Trip blank	5-01-03	NA	ND	ND	ND	ND	ND	ND	ND
0	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS
0	30	5-01-03	1131	5.1	ND	ND	ND	ND	ND	ND
0	60	5-01-03	1139	5.3	ND	ND	ND	ND	ND	ND
0	60 REP	5-01-03	1142	5.8	ND	ND	ND	ND	ND	ND
				June 2003						
	Surface water	6-23-03	M	NS	NS	NS	NS	NS	NS	NS
10	Trip blank	6-23-03	NA	ND	ND	ND	ND	ND	ND	ND
10	10	6-23-03	1310	5.5	16	ND	ND	ND	ND	ND
10	30	6-23-03	1330	5.0	6.1	ND	ND	ND	ND	ND
10	60	6-23-03	1345	8.5	7.8	ND	ND	ND	ND	ND
10	60 REP	6-23-03	1350	8.1	7.6	ND	ND	ND	ND	ND
9	10	6-23-03	1407	9.3	12	ND	ND	ND	ND	ND
9	30	6-23-03	1415	6.2	6.7	ND	ND	ND	ND	ND
9	Field blank	6-23-03	1425	ND	ND	ND	ND	ND	ND	ND
9	60	6-23-03	1435	13	11	ND	ND	ND	ND	ND
8	10	6-23-03	1455	10	14	ND	ND	ND	ND	ND
8	10 REP	6-23-03	1458	10	15	ND	ND	ND	ND	ND
8	30	6-23-03	1507	13	12	ND	ND	ND	ND	ND
8	60	6-23-03	1515	13	12	ND	ND	ND	ND	ND
7	10	6-23-03	1527	9.7	15	ND	ND	ND	ND	ND
7	30	6-23-03	1527	11	9.9	ND	ND	ND	ND	ND
7	30 REP	6-23-03	1541	9.6	10	ND	ND	ND	ND	ND
7	60	6-23-03	1557	8.2	10	ND	ND	ND	ND	26
	Surface water	6-24-03	M	NS	NS	NS	NS	NS	NS	NS

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	1,4-Di-chloro-benzene	Chloro-benzene	Benzene	Naphtha-lene	Bromo-methane	Dichloro-difluoro-methane	1,2,3-Tri-chloro-propane
June 2003—Continued										
6	10	6-24-03	1012	6.0	14	ND	ND	ND	ND	ND
6	10 REP	6-24-03	1015	6.8	16	ND	ND	ND	ND	ND
	Trip blank	6-24-03	NA	ND	ND	ND	ND	ND	ND	ND
6	30	6-24-03	1032	2.9	5.0	ND	ND	ND	ND	ND
6	60	6-24-03	1045	12	9.7	ND	ND	ND	ND	ND
5	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS
5	Field blank	6-24-03	1112	ND	ND	ND	ND	ND	ND	ND
5	30	6-24-03	1120	5.7	23	ND	ND	ND	ND	ND
5	60	6-24-03	1130	13	16	ND	ND	ND	ND	ND
4	10	6-24-03	1245	4.3	55	ND	ND	ND	ND	ND
4	30	6-24-03	1255	9.9	19	ND	ND	ND	ND	ND
4	60	6-24-03	1308	9.9	13	ND	ND	ND	ND	ND
3	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS
3	30	6-24-03	1333	6.3	9.3	ND	ND	ND	ND	ND
3	30 REP	6-24-03	1336	8.8	9.9	ND	ND	ND	1.0	ND
3	60	6-24-03	1342	9.4	12	ND	ND	ND	ND	ND
2	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS
2	30	6-24-03	1400	6.4	9.0	ND	ND	ND	ND	ND
2	60	6-24-03	1412	7.0	9.1	ND	ND	ND	ND	ND
1	10	6-24-03	1430	3.5	6.9	ND	ND	ND	ND	ND
1	30	6-24-03	1450	2.6	4.3	ND	ND	ND	ND	ND
1	Field blank	6-24-03	1500	ND	ND	ND	ND	ND	ND	ND
1	60	6-24-03	1506	3.1	2.4	ND	ND	ND	ND	ND
0	10	6-24-03	NA	NS	NS	NS	NS	NS	NS	NS
0	30	6-24-03	1538	4.6	26	ND	ND	ND	ND	ND
0	60	6-24-03	1525	4.3	3.4	ND	ND	ND	ND	ND
0	60 REP	6-24-03	1528	4.6	3.4	ND	ND	ND	ND	ND
10	PDB	6-26-03	NA	8.1	[3]11	ND	ND	ND	ND	ND
9	PDB	6-26-03	NA	8.3	[3]6.7	ND	ND	ND	ND	ND
8	PDB	6-26-03	NA	8.2	9.4	ND	ND	ND	ND	ND
7	PDB	6-26-03	NA	10	[3]17	ND	ND	ND	ND	ND
6	PDB	6-26-03	NA	13	[3]28	ND	ND	ND	ND	ND

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE	Tetrahy-drofuran
				June 2002					
10	10	6-17-02	1000	ND	ND	[2,3]4.1	ND	ND	ND
10	30	6-17-02	1012	ND	ND	[1,2,3]1.8	ND	ND	ND
10	60	6-17-02	1027	ND	ND	[2,3]2.5	ND	ND	ND
9	10	6-17-02	1045	ND	ND	6.0	ND	ND	ND
9	30	6-17-02	1053	ND	ND	ND	ND	ND	ND
9	60	6-17-02	1102	ND	ND	ND	ND	ND	ND
8	10	6-17-02	NA	NS	NS	NS	NS	NS	NS
8	30	6-17-02	1134	ND	ND	[1,2,3]1.9	ND	ND	ND
8	30 REP	6-17-02	1139	ND	ND	[1,2,3]2.6	ND	ND	ND
8	60	6-17-02	1148	ND	ND	[2,3]2.0	ND	ND	ND
8	60 REP	6-17-02	1153	ND	ND	[2,3]4.4	ND	ND	ND
7	10	6-17-02	1218	ND	ND	[2,3]3.1	ND	ND	ND
7	30	6-17-02	NA	NS	NS	NS	NS	NS	NS
7	60	6-17-02	1236	ND	ND	[1,2,3]1.4	ND	ND	ND
6	10	6-17-02	1250	ND	ND	ND	ND	ND	ND
6	30	6-17-02	NS	NS	NS	NS	NS	NS	NS
6	60	6-17-02	1315	ND	1.3	[2,3]23	ND	ND	ND
6	60 REP	6-17-02	1320	ND	1.5	[2,3]4.6	ND	ND	ND
5	10	6-17-02	1348	ND	ND	[2,3]6.2	ND	ND	ND
5	30	6-17-02	1357	ND	ND	[2,3]9.6	ND	ND	ND
5	60	6-17-02	1402	ND	ND	[3]130	ND	ND	ND
4	10	6-17-02	1420	ND	ND	28	ND	ND	ND
4	30	6-17-02	NA	NS	NS	NS	NS	NS	NS
4	30	6-17-02	1431	ND	ND	[3]18	ND	ND	ND
3	10	6-18-02	0957	ND	11	[2,3]6.4	ND	ND	ND
3	10 REP	6-18-02	1005	ND	ND	[2,3]5.8	ND	ND	ND
3	30	6-18-02	1019	ND	ND	[2,3]5.3	ND	ND	ND
3	30 REP	6-18-02	1033	ND	ND	[2,3]6.1	ND	ND	ND
3	60	6-18-02	1041	ND	ND	[2,3]3.8	ND	ND	ND
3	60 REP	6-18-02	1048	ND	ND	[2,3]3.0	ND	ND	ND
2	10	6-18-02	NA	NS	NS	NS	NS	NS	NS
2	30	6-18-02	NA	NS	NS	NS	NS	NS	NS
2	60	6-18-02	1116	ND	ND	[2,3]4.1	ND	ND	ND
1	10	6-18-02	NA	NS	NS	NS	NS	NS	NS
1	30	6-18-02	NA	NS	NS	NS	NS	NS	NS
1	60	6-18-02	1131	ND	ND	[2,3]2.1	ND	ND	ND
1	60 REP	6-18-02	1138	ND	ND	[2,3]2.5	ND	ND	ND

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE	Tetrahy-drofuran
June 2002—Continued									
0	10	6-18-02	NA	NS	NS	NS	NS	NS	NS
0	30	6-18-02	1150	ND	ND	[2,3]2.5	ND	ND	ND
0	30 REP	6-18-02	1158	ND	ND	[2,3]2.3	ND	ND	ND
0	60	6-18-02	1203	ND	ND	[2,3]2.6	ND	ND	ND
0	60 REP	6-18-02	1209	ND	ND	ND	[1]1.1	ND	ND
September 2002									
10	10	9-04-02	1545	ND	ND	[1,2,3]1.7	ND	ND	ND
10	30	9-04-02	1550	ND	ND	ND	ND	ND	ND
10	60	9-04-02	1555	ND	ND	[1,2,3]1.3	ND	ND	ND
9	10	9-04-02	1515	ND	ND	[1,2,3]1.4	ND	ND	ND
9	30	9-04-02	1525	ND	ND	[1,2,3]1.2	ND	ND	ND
9	60	9-04-02	1530	ND	ND	[1,2,3]1.4	ND	ND	ND
8	10	9-04-02	NA	NS	NS	NS	NS	NS	ND
8	30	9-04-02	1455	ND	ND	[1,2,3]1.5	ND	ND	ND
8	60	9-04-02	1500	ND	ND	[1,2,3]1.3	ND	ND	ND
7	10	9-04-02	1420	ND	ND	[1,3]1.6	ND	ND	ND
7	10 REP	9-04-02	1425	ND	ND	[1,3]1.0	ND	ND	ND
7	30	9-04-02	1435	ND	ND	[1,2,3]1.1	ND	ND	ND
7	60	9-04-02	1440	ND	ND	[1,2,3]1.1	ND	ND	ND
7	60 REP	9-04-02	1445	ND	ND	[1,2,3]1.7	ND	ND	ND
6	10	9-04-02	1255	ND	ND	[1,2]7.7	ND	ND	ND
6	30	9-04-02	1315	ND	ND	[2]2.3	[1]1.4	ND	ND
6	60	9-04-02	1330	ND	ND	[2]2.1	ND	ND	ND
5	10	9-04-02	NA	ND	NS	NS	NS	ND	ND
5	30	9-04-02	1510	ND	ND	[1]1.3	ND	ND	ND
5	60	9-04-02	1530	ND	ND	[2]2.4	ND	ND	ND
4	10	9-04-02	1540	ND	ND	[1,2]1.7	ND	ND	ND
4	30	9-04-02	NA	NS	NS	NS	NS	NS	NS
4	60	9-04-02	1600	ND	ND	[1,2]1.7	ND	ND	ND
	Trip blank	9-04-02	NA	ND	ND	[1,2].99	ND	ND	ND
3	10	9-05-02	1100	ND	ND	[1,2,3]1.4	ND	ND	ND
3	10 REP	9-05-02	1115	ND	ND	[1,2,3]1.5	ND	ND	ND
3	30	9-05-02	1130	ND	ND	[1,2,3]2.5	ND	ND	ND
3	30 REP	9-05-02	NA	NS	NS	NS	NS	NS	NS
3	60	9-05-02	1150	ND	ND	[1,2,3]1.6	ND	ND	ND
3	60 REP	9-05-02	1155	ND	ND	[1,2,3]1.2	ND	ND	ND
2	10	9-05-02	NA	NS	NS	NS	NS	NS	NS
2	30	9-05-02	NA	NS	NS	NS	NS	NS	NS
2	60	9-05-02	1215	ND	ND	1.3	ND	ND	ND

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE	Tetrahy-drofuran
				September 2002—Continued					
1	10	9-05-02	NA	NS	NS	NS	NS	NS	NS
1	30	9-05-02	NA	NS	NS	NS	NS	NS	NS
1	60	9-05-02	1250	ND	ND	[1,2,3]1.7	ND	ND	ND
0	10	9-05-02	NA	NS	NS	NS	NS	NS	NS
0	30	9-05-02	1305	ND	ND	[1,3]1.1	ND	ND	ND
0	60	9-05-02	1310	ND	ND	[1,3]1.9	ND	ND	ND
				April–May 2003					
	Surface water	4-29-03	M	NS	ND	NS	ND	ND	ND
10	10	4-29-03	1329	ND	ND	2.0	ND	ND	ND
10	30	4-29-03	1341	ND	ND	1.4	ND	ND	ND
10	60	4-29-03	1358	ND	ND	2.3	ND	ND	ND
10	60 REP	4-29-03	1401	ND	ND	2.2	ND	ND	ND
9	10	4-29-03	NA	NS	NS	NS	NS	NS	NS
9	30	4-29-03	1440	NS	NS	NS	NS	NS	NS
9	30 REP	4-29-03	1444	ND	ND	2.4	ND	ND	ND
9	60	4-29-03	1450	ND	ND	1.7	ND	ND	ND
8	10	4-29-03	1517	ND	ND	2.3	ND	ND	ND
8	30	4-29-03	1531	ND	ND	1.9	ND	ND	ND
8	30 REP	4-29-03	1534	ND	ND	ND	ND	ND	ND
8	60	4-29-03	1540	ND	ND	1.6	ND	ND	ND
7	10	4-29-03	1612	ND	ND	2.0	ND	ND	ND
7	10 REP	4-29-03	1618	ND	ND	2.5	ND	ND	ND
7	30	4-29-03	1628	ND	ND	2.1	ND	ND	ND
7	60	4-29-03	M	ND	ND	1.9	ND	ND	ND
	Trip blank	4-29-03	NA	ND	ND	2.2	ND	ND	ND
	Trip blank	4-30-03	NA	ND	ND	2.0	ND	ND	ND
6	10	4-30-03	1049	ND	ND	2.3	ND	ND	ND
6	10 REP	4-30-03	1050	ND	ND	3.0	ND	ND	ND
6	30	4-30-03	1057	ND	ND	2.1	ND	ND	ND
6	60	4-30-03	1110	ND	ND	ND	ND	ND	ND
5	10	4-30-03	NA	NS	NS	NS	NS	NS	NS
5	30	4-30-03	1144	ND	ND	2.6	ND	ND	ND
5	60	4-30-03	1153	ND	ND	1.6	ND	ND	ND
5	60 REP	4-30-03	1156	ND	ND	ND	ND	ND	ND
	Surface water	4-30-03	1300	NS	NS	NS	NS	NS	NS
4	Field blank	4-30-03	1315	ND	ND	1.9	ND	ND	ND
4	10	4-30-03	NA	NS	NS	NS	NS	NS	NS
4	30	4-30-03	NA	NS	NS	NS	NS	NS	NS
4	60	4-30-03	1353	ND	ND	2.1	ND	ND	ND

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE	Tetrahy-drofuran
				April–May 2003—Continued					
3	10	4-30-03	1423	ND	ND	2.6	ND	ND	ND
3	30	4-30-03	1435	ND	ND	2.1	3.2	ND	ND
3	60	4-30-03	1447	ND	ND	1.4	ND	ND	ND
3	60 REP	4-30-03	1450	ND	ND	1.1	ND	ND	ND
2	10	4-30-03	NA	NS	NS	NS	NS	NS	NS
2	30	4-30-03	1514	ND	ND	ND	ND	ND	ND
2	30 REP	4-30-03	1517	ND	ND	ND	ND	ND	ND
2	60	4-30-03	1521	ND	ND	3.1	ND	ND	ND
1	10	4-30-03	NA	NS	NS	NS	NS	NS	NS
1	30	4-30-03	1548	ND	ND	1.4	1.4	ND	ND
1	30 REP	4-30-03	1551	1.0	ND	3.0	ND	ND	ND
1	60	4-30-03	1558	ND	ND	2.7	1.5	ND	ND
0	Trip blank	5-01-03	NA	ND	ND	3.0	ND	ND	ND
0	10	5-01-03	NA	NS	NS	NS	NS	NS	NS
0	30	5-01-03	1131	ND	ND	3.6	19	ND	ND
0	60	5-01-03	1139	ND	ND	1.7	4.4	ND	ND
0	60 REP	5-01-03	1142	ND	ND	3.0	4.5	ND	ND
				June 2003					
	Surface water	6-23-03	M	NS	NS	NS	NS	NS	NS
10	Trip blank	6-23-03	NA	ND	ND	ND	ND	ND	ND
10	10	6-23-03	1310	ND	ND	ND	ND	ND	ND
10	30	6-23-03	1330	ND	ND	ND	ND	ND	ND
10	60	6-23-03	1345	ND	ND	ND	ND	ND	ND
10	60 REP	6-23-03	1350	ND	ND	ND	ND	ND	ND
9	10	6-23-03	1407	ND	ND	ND	ND	ND	ND
9	30	6-23-03	1415	ND	ND	ND	ND	ND	ND
9	Field blank	6-23-03	1425	ND	ND	ND	ND	ND	ND
9	60	6-23-03	1435	ND	ND	ND	ND	ND	ND
8	10	6-23-03	1455	ND	ND	ND	ND	ND	ND
8	10 REP	6-23-03	1458	ND	ND	ND	ND	ND	ND
8	30	6-23-03	1507	ND	ND	ND	ND	1.1	ND
8	60	6-23-03	1515	ND	ND	ND	ND	1.1	ND
7	10	6-23-03	1527	ND	ND	ND	ND	1.2	ND
7	30	6-23-03	1527	ND	ND	ND	ND	1.3	ND
7	30 REP	6-23-03	1541	ND	ND	ND	ND	1.2	ND
7	60	6-23-03	1557	ND	ND	ND	ND	1.2	1.3
	Surface water	6-24-03	M	NS	NS	NS	NS	NS	NS

Table 4. Results of sampling pore water along transect A during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Reporting level was 1.0 microgram per liter for organic compounds, except for 2-propanone (2.0), butanone (4.0), and carbon disulfide (3.0). Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect A (meters)	Sample depth or description	Date	Time	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE	Tetrahy-drofuran
				June 2003—Continued					
6	10	6-24-03	1012	ND	ND	ND	ND	ND	ND
6	10 REP	6-24-03	1015	ND	ND	ND	ND	ND	ND
	Trip blank	6-24-03	NA	ND	ND	ND	ND	ND	ND
6	30	6-24-03	1032	ND	ND	ND	ND	ND	ND
6	60	6-24-03	1045	ND	ND	ND	ND	ND	ND
5	10	6-24-03	NA	NS	NS	NS	NS	NS	NS
5	Field blank	6-24-03	1112	ND	ND	ND	ND	ND	ND
5	30	6-24-03	1120	ND	ND	ND	ND	ND	ND
5	60	6-24-03	1130	ND	ND	ND	ND	ND	ND
4	10	6-24-03	1245	ND	ND	ND	ND	ND	ND
4	30	6-24-03	1255	ND	ND	ND	ND	ND	ND
4	60	6-24-03	1308	ND	ND	ND	ND	ND	ND
3	10	6-24-03	NA	NS	NS	NS	NS	NS	NS
3	30	6-24-03	1333	ND	ND	ND	ND	1.3	ND
3	30 REP	6-24-03	1336	ND	ND	ND	ND	1.4	ND
3	60	6-24-03	1342	ND	ND	ND	ND	1.3	ND
2	10	6-24-03	NA	NS	NS	NS	NS	NS	NS
2	30	6-24-03	1400	ND	ND	ND	ND	ND	ND
2	60	6-24-03	1412	ND	ND	ND	ND	ND	ND
1	10	6-24-03	1430	ND	ND	ND	ND	ND	ND
1	30	6-24-03	1450	ND	ND	ND	ND	ND	ND
1	Field blank	6-24-03	1500	ND	ND	ND	ND	ND	ND
1	60	6-24-03	1506	ND	ND	ND	ND	ND	ND
0	10	6-24-03	NA	NS	NS	NS	NS	NS	NS
0	30	6-24-03	1538	ND	ND	ND	ND	ND	ND
0	60	6-24-03	1525	ND	ND	ND	ND	ND	ND
0	60 REP	6-24-03	1528	ND	ND	ND	ND	ND	ND
10	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND
9	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND
8	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND
7	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND
6	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND

[1]Estimated value below calibration value.
[2]Estimated value.
[3]Analyte is associated with lab blank or trip blank contamination.

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.

[Diagram of transects is shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	Trichloroethene	1,1-Dichloroethene	1,1-Dichloroethane
					June 2002						
10	10	6-18-02	1305	19.7	668	4.73	1.93	1.1	12	ND	ND
10	10 REP	6-18-02	1312	20.47	662	4.77	2.22	.2	14	ND	ND
10	30	6-18-02	1321	14.11	663	4.69	.53	.3	12	ND	ND
10	30 REP	6-18-02	1326	14.52	664	4.62	.36	.9	10	ND	ND
10	60	6-18-02	1334	13.4	677	4.61	.86	.1	11	ND	ND
10	60 REP	6-18-02	1341	13.32	662	4.63	.45	.6	11	ND	ND
9	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
9	30	6-18-02	1401	13.97	652	4.68	.71	.7	11	ND	ND
9	60	6-18-02	1407	13.11	642	4.67	.74	2.3	11	ND	ND
	Trip Blank	6-19-02	NA	NS	NS	NS	NS	NS	ND	ND	ND
	Trip Blank	6-19-02	NA	NS	NS	NS	NS	NS	ND	ND	ND
8	10	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
8	30	6-19-02	1105	20.23	690	4.84	4.77	1.9	8.9	ND	ND
8	60	6-19-02	1120	13.22	651	4.84	1.32	2.3	11	ND	ND
7	10	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
7	30	6-19-02	1155	13.32	736	5.36	.8	9.1	5.2	ND	ND
7	30 REP	6-19-02	1205	13.3	722	5.38	.56	7.7	6.0	ND	ND
7	60	6-19-02	1215	12.64	723	5.39	.39	NS	7.2	ND	ND
7	60 REP	6-19-02	1225	12.52	715	5.16	.37	NS	8.2	ND	ND
6	Surface Water	6-19-02	1230	19.41	408	6.34	8.5	NS	NS	NS	NS
6	10	6-19-02	1250	21.07	670	6.06	5.11	NS	1.3	ND	ND
6	30	6-19-02	1320	21.27	737	5.79	2.08	NS	1.5	ND	ND
6	60	6-19-02	1325	12.84	735	5.6	.4	NS	3.5	ND	ND
5	10	6-19-02	1350	16.94	619	6.53	.24	NS	ND	ND	[1]0.86
5	10 REP	6-19-02	1355	17.53	589	6.61	.3	NS	ND	ND	ND
5	30	6-19-02	1405	21.12	598	6.21	2.85	NS	ND	ND	ND
5	30 REP	6-19-02	1415	19.28	603	6.27	.7	NS	1.4	ND	ND
5	60	6-19-02	1425	13.6	660	5.99	.1	NS	ND	ND	ND
5	60 REP	6-19-02	1430	13.92	670	5.97	.23	NS	ND	ND	ND
4	10	6-19-02	1450	17.02	657	6.84	.14	NS	ND	ND	ND
4	30	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	60	6-19-02	1500	14.29	579	6.03	.24	NS	ND	ND	ND
3	10	6-19-02	1510	15.87	564	6.55	.38	NS	ND	ND	ND
3	30	6-19-02	1520	18.76	518	6.24	1.33	NS	2.7	ND	ND
3	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	10	6-19-02	1550	15.78	583	6.58	.56	NS	6.7	ND	[1].45
2	30	6-19-02	1600	14.34	500	5.9	.17	NS	24	ND	ND
2	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	10	6-19-02	1620	14.9	532	5.64	.16	NS	16	ND	ND
1	30	6-19-02	1625	13.2	492	5.14	.12	NS	33	ND	ND
1	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03. —Continued

[Diagram of transects is shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	Trichloroethene	1,1-Dichloroethene	1,1-Dichloroethane
June 2002—Continued											
0	10	6-19-02	1630	15.65	647	5.58	0.2	NS	8.9	ND	ND
0	30	6-19-02	1635	13.22	528	5.18	.13	NS	40	ND	ND
0	60	6-19-02	1640	13.1	450	4.78	.27	NS	30	ND	ND
	Trip Blank	6-19-02	NA	NS	NS	NS	NS	NS	ND	ND	ND
September 2002											
10	10	9-06-02	1105	19.56	771	4.56	0.33	NS	13	ND	ND
10	30	9-06-02	1110	18.81	812	4.42	.15	NS	4.2	ND	ND
10	30 REP	9-06-02	1112	18.83	811	4.45	.2	NS	3.7	ND	ND
10	60	9-06-02	1114	18.19	813	4.41	.21	NS	3	ND	ND
10	60 REP	9-06-02	1115	18.65	804	4.45	.22	NS	3.6	ND	ND
9	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
9	30	9-06-02	1117	18.69	791	4.51	.16	NS	3.6	ND	ND
9	60	9-06-02	1125	18.65	829	4.44	.18	NS	2.8	ND	ND
8	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
8	30	9-06-02	1140	18.97	807	4.69	.59	NS	3.4	ND	ND
8	30 REP	9-06-02	1142	18.42	814	4.8	.14	NS	3.5	ND	ND
8	60	9-06-02	1145	18.07	813	4.54	.17	NS	2.5	ND	ND
8	60 REP	9-06-02	1147	17.95	836	4.69	.19	NS	12	ND	ND
7	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
7	30	9-06-02	1155	18.45	931	5.35	.16	NS	3.2	ND	ND
7	60	9-06-02	1200	17.77	932	5.02	.28	NS	7.8	ND	ND
6	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
6	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
6	60	9-06-02	1320	18.94	931	5.54	.24	NS	1.6	ND	ND
6	60 REP	9-06-02	1325	18.42	906	5.5	.23	NS	2.3	ND	ND
5	10	9-06-02	1330	19.13	817	6.33	.18	NS	ND	ND	1.9
5	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
5	60	9-06-02	1345	18.67	729	5.98	.17	NS	[1].7	ND	ND
4	10	9-06-02	1355	19.3	789	6.41	.14	NS	ND	0.55	ND
4	10 REP	9-06-02	1400	19.32	764	6.43	.11	NS	ND	[1].62	ND
4	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	60	9-06-02	1420	18.09	694	5.78	.15	NS	[1].52	ND	ND
4	60 REP	9-06-02	1430	18.15	696	5.84	.14	NS	ND	ND	ND
	Trip Blank	9-06-02	NA	NS	NS	NS	NS	NS	ND	ND	ND
3	10	9-09-02	1030	20.51	749	6.24	.38	NS	ND	1.1	ND
3	30	9-09-02	1040	25.52	643	6.09	2.91	NS	[1].55	[1].77	ND
3	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03. —Continued

[Diagram of transects is shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	Trichloroethene	1,1-Dichloroethene	1,1-Dichloroethane
					September 2002—Continued						
2	10	9-09-02	1050	19.33	628	5.89	0.44	NS	13	ND	ND
2	10 REP	9-09-02	1055	19.03	662	5.79	.55	NS	20	ND	ND
2	30	9-09-02	1100	18.35	556	5.49	.19	NS	26	ND	ND
2	30 REP	9-09-02	1102	18.16	551	5.41	.21	NS	28	ND	ND
2	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	10	9-09-02	1125	20.83	778	5.13	2.89	NS	8.7	ND	ND
1	30	9-09-02	1130	17.86	538	4.79	.26	NS	26	ND	ND
1	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS	NS
0	10	9-09-02	1140	21.07	820	5.92	3.22	NS	1.3	ND	ND
0	10 REP	9-09-02	1143	19.5	633	5.57	.31	NS	7.1	ND	ND
0	30	9-09-02	1147	17.21	550	4.82	.18	NS	22	ND	ND
0	30 REP	9-09-02	1150	17.35	556	4.91	.13	NS	23	ND	ND
0	60	9-09-02	1200	19.82	545	4.6	1.23	NS	11	ND	ND
0	60 REP	9-09-02	1205	20.34	533	4.6	.54	NS	5.1	ND	ND
	Trip Blank	9-09-02	NA	NS	NS	NS	NS	NS	ND	ND	ND
					April–May 2003						
10	10	5-01-03	1301	13.61	889	4.8	0.05	0.6	21	ND	ND
10	10 REP	5-01-03	1304	NS	NS	NS	NS	NS	21	ND	ND
10	30	5-01-03	1313	12.22	885	4.61	.01	.2	14	ND	ND
10	60	5-01-03	1320	11.81	896	4.6	.05	.3	14	ND	ND
9	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
9	30	5-01-03	1340	12.56	858	4.63	.12	1.3	14	ND	ND
9	Field Blank	5-01-03	1353	NS	NS	NS	NS	NS	ND	ND	ND
9	60	5-01-03	1358	12.27	869	4.67	.09	1.6	12	ND	ND
8	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
8	30	5-01-03	1419	11.98	871	4.93	.27	.27	13	ND	ND
8	30 REP	5-01-03	1422	NS	NS	NS	NS	NS	12	ND	ND
8	60	5-01-03	1432	11.41	875	4.88	.02	3	11	ND	ND
7	10	5-01-03	1457	13.46	858	5.63	.11	11.2	15	ND	ND
7	10 REP	5-01-03	1500	NS	NS	NS	NS	NS	13	ND	ND
7	30	5-01-03	1509	13.25	927	5.65	.12	12.1	5.9	ND	ND
7	60	5-01-03	1515	11.33	901	5.37	.02	NS	9.4	ND	ND
6	10	5-01-03	1536	13.8	919	5.97	.08	OR	2	ND	ND
6	30	5-01-03	1551	13.38	906	5.78	.08	11.5	3.4	ND	ND
6	60	5-01-03	1554	11.2	926	5.73	.0	13.9	6.2	ND	ND
6	60 REP	5-01-03	1557	NS	NS	NS	NS	NS	6.6	ND	ND
	Trip Blank	5-02-03	NA	NS	NS	NS	NS	NS	ND	NS	ND
5	10	5-02-03	1103	14.29	816	6.19	.01	OR	ND	ND	ND
5	10 REP	5-02-03	1104	NS	NS	NS	NS	NS	[1].52	ND	[1]0.73
5	30	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
5	60	5-02-03	1120	14.42	878	5.91	.08	OR	1.9	ND	ND

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03. —Continued

[Diagram of transects is shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	Trichloroethene	1,1-Dichloroethene	1,1-Dichloroethane
				April–May 2003—Continued							
4	10	5-02-03	1134	14.26	818	6.52	0.03	OR	ND	ND	ND
4	30	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
4	60	5-02-03	1157	13.2	820	5.8	.08	12.1	1.9	ND	ND
4	60 REP	5-02-03	1200	NS	NS	NS	NS	NS	1.8	ND	ND
3	10	5-02-03	1258	19.45	803	6.38	.95	OR	1.4	ND	0.58
3	30	5-02-03	1309	19.25	684	6.18	.23	OR	1.2	ND	.51
3	60	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
2	10	5-02-03	1330	13.67	636	6.14	.06	NS	19	ND	.82
2	30	5-02-03	1340	12.08	630	5.48	.08	4.0	51	ND	.73
2	30 REP	5-02-03	1343	NS	NS	NS	NS	NS	52	ND	[1].72
2	60	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
1	10	5-02-03	1354	14.85	610	5.9	.09	13.5	8.3	ND	[1].59
1	30	5-02-03	1401	11.53	634	5.06	.08	2.4	36	ND	ND
1	Field Blank	5-02-03	1420	NS	NS	NS	NS	NS	ND	ND	ND
1	60	5-02-03	1429	15.07	645	4.7	.14	.3	26	ND	ND
0	10	5-02-03	1444	17.55	691	5.73	.13	4.9	18	ND	ND
0	30	5-02-03	1451	11.13	631	4.92	.08	2.3	46	ND	ND
0	30 REP	5-02-03	1453	NS	NS	NS	NS	NS	45	ND	ND
0	60	5-02-03	1512	17.48	591	4.97	.59	1.3	32	ND	ND
	Trip Blank	5-05-03	NA	NS	NS	NS	NS	NS	ND	ND	ND
				June 2003							
	Surface Water	6-25-03	M	21	328	6.5	7.4	NS	NS	NS	NS
0	10	6-25-03	1015	18.4	784	5.7	.7	NS	12	ND	ND
0	30	6-25-03	1025	16.7	884	5.0	1.1	NS	42	ND	ND
0	30 REP	6-25-03	1028	NS	NS	NS	NS	NS	41	ND	ND
	Trip Blank	6-25-03	NA	NS	NS	NS	NS	NS	ND	ND	ND
0	60	6-25-03	1045	24.5	840	4.8	1.0	NS	13	ND	ND
1	10	6-25-03	1105	23.9	858	5.5	.9	NS	12	ND	ND
1	30	6-25-03	1115	16.2	849	5.6	.6	NS	22	ND	ND
1	60	6-25-03	1123	20.5	811	4.8	.6	NS	26	ND	ND
2	10	6-25-03	1240	21.9	886	6.4	.5	NS	9.5	ND	ND
2	10 REP	6-25-03	1243	NS	NS	NS	NS	NS	8.4	ND	ND
2	30	6-25-03	1255	16	828	5.6	.5	9.3	30	ND	ND
2	Field Blank	6-25-03	1303	NS	NS	NS	NS	NS	ND	ND	ND
2	60	6-25-03	1312	15.3	841	5.4	.6	5.0	57	ND	ND
3	10	6-25-03	1325	17.5	917	6.4	.5	OR	3.3	ND	ND
3	30	6-25-03	1335	25.4	853	6.2	.5	OR	6.1	ND	ND
3	60	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03. —Continued

[Diagram of transects is shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Temperature (°C)	Specific conductance (µS/cm)	pH (standard unit)	Dissolved oxygen (mg/L)	Ferrous iron (mg/L)	Trichloroethene	1,1-Dichloroethene	1,1-Dichloroethane
June 2003—Continued											
4	10	6-25-03	1400	19.2	918	6.5	0.5	OR	ND	ND	ND
4	30	6-25-03	1420	25.3	871	6.1	.3	OR	3.1	ND	ND
4	60	6-25-03	1439	14.3	898	5.7	.7	OR	1.4	ND	ND
4	60 REP	6-25-03	1442	NS	NS	NS	NS	NS	1.3	ND	ND
5	10	6-25-03	1452	20.5	814	6.5	.4	OR	ND	ND	1.4
5	30	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
5	60	6-25-03	1523	15.5	982	5.8	.8	NS	1.8	ND	ND
6	10	6-25-03	1540	20.8	1008	6.0	.5	OR	2.3	ND	ND
6	30	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
6	Field Blank	6-25-03	1550	NS	NS	NS	NS	NS	ND	ND	ND
6	60	6-25-03	1557	23.6	971	6.0	.8	OR	ND	ND	ND
7	10	6-26-03	1035	21.1	1,006	5.6	.7	11.2	8.9	ND	ND
7	30	6-26-03	1045	20.9	1,037	5.7	.9	14	5.1	ND	ND
7	30 REP	6-26-03	1048	NS	NS	NS	NS	NS	ND	ND	ND
7	Field Blank	6-26-03	1055	NS	NS	NS	NS	NS	ND	ND	ND
7	60	6-26-03	1100	15.2	1,014	5.3	.6	6.8	9.6	ND	ND
	Trip Blank	6-26-03	1108	NS	NS	NS	NS	NS	ND	ND	ND
8	10	6-26-03	NA	NS	NS	NS	NS	NS	NS	NS	NS
8	30	6-26-03	1120	16	1,042	5.2	.8	4.7	11	ND	ND
8	60	6-26-03	1130	14	1,038	4.7	.7	2.8	11	ND	ND
9	10	6-26-03	1140	24.4	1,077	4.7	.5	2.7	8.3	ND	ND
9	30	6-26-03	1150	20	1,073	4.7	.5	2.2	9.3	ND	ND
9	60	6-26-03	1155	14.5	1,036	4.5	.8	2.9	11	ND	ND
9	60 REP	6-26-03	1205	NS	NS	NS	NS	NS	8.0	ND	ND
10	10	6-26-03	1315	18.8	1,046	4.5	.6	.5	12	ND	ND
10	30	6-26-03	1320	16.8	1,049	4.4	.7	NS	13	ND	ND
10	60	6-26-03	1330	14.4	1,035	4.5	.7	NS	83	ND	ND
10	Field Blank	6-26-03	1340	NS	NS	NS	NS	NS	ND	ND	ND
10	PDB	6-26-03	NA	NS	NS	NS	NS	NS	12	ND	ND
9	PDB	6-26-03	NA	NS	NS	NS	NS	NS	12	ND	ND
8	PDB	6-26-03	NA	NS	NS	NS	NS	NS	16	ND	ND
7	PDB	6-26-03	NA	NS	NS	NS	NS	NS	15	ND	ND
7	PDB	6-26-03	NA	NS	NS	NS	NS	NS	10	ND	ND
6	PDB	6-26-03	NA	NS	NS	NS	NS	NS	2.3	ND	ND

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	*cis*-1,2-Di-chloro-ethene	*trans*-1,2-Di-chloro-ethene	Vinyl chloride	Chloro-ethane	1,2,3-Tri-chloro-benzene	1,2,4-Tri-chloro-benzene	1,2 Di-chloro-benzene
					June 2002					
10	10	6-18-02	1305	22	ND	ND	ND	3.5	22	83
10	10 REP	6-18-02	1312	25	ND	ND	ND	4.5	24	93
10	30	6-18-02	1321	24	ND	ND	ND	5.8	35	110
10	30 REP	6-18-02	1326	23	ND	ND	ND	5.7	38	100
10	60	6-18-02	1334	20	ND	ND	ND	4.7	29	84
10	60 REP	6-18-02	1341	21	ND	ND	ND	5.6	35	110
9	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS
9	30	6-18-02	1401	25	ND	ND	ND	5.7	41	93
9	60	6-18-02	1407	24	ND	ND	ND	4.7	37	110
	Trip Blank	6-19-02	NA	ND	ND	ND	ND	ND	ND	ND
	Trip Blank	6-19-02	NA	ND	ND	ND	ND	ND	ND	ND
8	10	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
8	30	6-19-02	1105	20	ND	ND	ND	3.5	25	70
8	60	6-19-02	1120	21	ND	ND	ND	5.0	34	97
7	10	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
7	30	6-19-02	1155	36	ND	ND	ND	5.3	37	80
7	30 REP	6-19-02	1205	33	ND	ND	ND	5.7	38	99
7	60	6-19-02	1215	31	ND	ND	ND	5.2	33	92
7	60 REP	6-19-02	1225	29	ND	ND	ND	4.6	32	91
6	Surface Water	6-19-02	1230	NS	NS	NS	NS	NS	NS	NS
6	10	6-19-02	1250	23	ND	12	ND	ND	2.2	20
6	30	6-19-02	1320	32	ND	ND	ND	[1].93	6.7	32
6	60	6-19-02	1325	36	ND	[1].57	ND	3.8	29	83
5	10	6-19-02	1350	14	ND	40	ND	ND	[1].87	16
5	10 REP	6-19-02	1355	9.4	ND	28	ND	ND	ND	8.8
5	30	6-19-02	1405	65	ND	4.4	ND	ND	2.6	26
5	30 REP	6-19-02	1415	89	ND	ND	ND	1.4	5.6	66
5	60	6-19-02	1425	33	ND	ND	ND	[1]1.6	13	71
5	60 REP	6-19-02	1430	33	ND	ND	ND	[1]1.7	12	74
4	10	6-19-02	1450	[1]1.9	ND	3.7	ND	ND	ND	7.2
4	30	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
4	60	6-19-02	1500	41	ND	ND	ND	2.2	20	81
3	10	6-19-02	1510	31	ND	24	ND	ND	ND	16
3	30	6-19-02	1520	42	ND	19	ND	1.4	ND	22
3	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
2	10	6-19-02	1550	67	1.6	9.8	ND	ND	ND	12
2	30	6-19-02	1600	46	ND	3.1	ND	ND	ND	15
2	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
1	10	6-19-02	1620	33	ND	2.1	ND	ND	ND	13
1	30	6-19-02	1625	18	ND	ND	ND	ND	ND	24
1	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	*cis*-1,2-Di-chloro-ethene	*trans*-1,2-Di-chloro-ethene	Vinyl chloride	Chloro-ethane	1,2,3-Tri-chloro-benzene	1,2,4-Tri-chloro-benzene	1,2 Di-chloro-benzene
June 2002—Continued										
0	10	6-19-02	1630	39	ND	7.4	ND	ND	ND	16
0	30	6-19-02	1635	22	ND	ND	ND	1.3	1.4	28
0	60	6-19-02	1640	18	ND	ND	ND	1.6	5.0	36
	Trip Blank	6-19-02	NA	ND	ND	ND	ND	ND	ND	ND
September 2002										
10	10	9-06-02	1105	13	ND	ND	ND	2.3	12	50
10	30	9-06-02	1110	7.7	ND	ND	ND	2.4	15	45
10	30 REP	9-06-02	1112	7.2	ND	ND	ND	2.3	14	42
10	60	9-06-02	1114	5.7	ND	ND	ND	1.8	11	33
10	60 REP	9-06-02	1115	6.7	ND	ND	ND	1.9	12	36
9	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
9	30	9-06-02	1117	7.6	ND	ND	ND	2.1	13	41
9	60	9-06-02	1125	6.2	ND	ND	ND	1.8	10	36
8	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
8	30	9-06-02	1140	8.7	ND	ND	ND	1.6	9.4	31
8	30 REP	9-06-02	1142	10	ND	ND	ND	2.0	13	37
8	60	9-06-02	1145	7.1	ND	ND	ND	1.9	11	35
8	60 REP	9-06-02	1147	35	ND	[1,3]0.88	ND	5.6	44	100
7	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
7	30	9-06-02	1155	71	ND	[1,3]1	ND	6.1	42	120
7	60	9-06-02	1200	32	ND	ND	ND	6.4	39	96
6	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
6	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
6	60	9-06-02	1320	41	ND	ND	ND	5.1	32	100
6	60 REP	9-06-02	1325	41	ND	ND	ND	5.5	35	110
5	10	9-06-02	1330	13	ND	52	ND	ND	1.0	21
5	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
5	60	9-06-02	1345	48	[1]0.72	1.6	ND	3.6	20	110
4	10	9-06-02	1355	2.7	ND	5.5	ND	.64	ND	12
4	10 REP	9-06-02	1400	5.4	ND	10	ND	ND	[1].62	19
4	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
4	60	9-06-02	1420	55	[1].58	[3]1.1	ND	2.4	23	99
4	60 REP	9-06-02	1430	58	[1].56	[3]1.2	ND	2.2	22	98
	Trip Blank	9-06-02	NA	ND	ND	ND	ND	ND	ND	ND
3	10	9-09-02	1030	41	1.1	[3]80	ND	ND	[1].62	22
3	30	9-09-02	1040	22	ND	[3]47	ND	ND	ND	4.6
3	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	*cis*-1,2-Di-chloro-ethene	*trans*-1,2-Di-chloro-ethene	Vinyl chloride	Chloro-ethane	1,2,3-Tri-chloro-benzene	1,2,4-Tri-chloro-benzene	1,2 Di-chloro-benzene
					September 2002—Continued					
2	10	9-09-02	1050	150	ND	[3]24	ND	ND	ND	22
2	10 REP	9-09-02	1055	72	ND	[3]7.8	ND	ND	[1]1.7	21
2	30	9-09-02	1100	31	ND	ND	ND	ND	ND	26
2	30 REP	9-09-02	1102	28	ND	ND	ND	ND	ND	32
2	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS
1	10	9-09-02	1125	23	ND	ND	ND	ND	ND	13
1	30	9-09-02	1130	14	ND	ND	ND	ND	2.1	38
1	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS
0	10	9-09-02	1140	2.7	ND	2.0	ND	ND	ND	3.4
0	10 REP	9-09-02	1143	22	ND	2.6	ND	ND	[1].67	7.8
0	30	9-09-02	1147	13	ND	ND	ND	ND	ND	23
0	30 REP	9-09-02	1150	14	ND	ND	ND	ND	ND	20
0	60	9-09-02	1200	8.4	ND	ND	ND	[1]1.8	5.4	20
0	60 REP	9-09-02	1205	5.1	ND	ND	ND	ND	4.5	11
	Trip Blank	9-09-02	NA	ND	ND	ND	ND	ND	ND	ND
					April–May 2003					
10	10	5-01-03	1301	60	ND	[3]1.2	ND	3.3	20	87
10	10 REP	5-01-03	1304	59	ND	[3]1.2	ND	3.3	20	87
10	30	5-01-03	1313	70	ND	1.2	ND	3.7	27	100
10	60	5-01-03	1320	68	ND	1.2	ND	3.1	24	93
9	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS
9	30	5-01-03	1340	74	ND	1.5	ND	3.9	30	96
9	Field Blank	5-01-03	1353	ND	ND	ND	ND	ND	ND	ND
9	60	5-01-03	1358	91	ND	1.9	ND	3.4	26	86
8	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS
8	30	5-01-03	1419	71	ND	1.4	ND	3.3	23	96
8	30 REP	5-01-03	1422	92	ND	2.0	ND	3.4	27	93
8	60	5-01-03	1432	87	ND	1.7	1.4	3.4	27	97
7	10	5-01-03	1457	100	ND	13	ND	ND	11	96
7	10 REP	5-01-03	1500	84	ND	9.3	ND	ND	13	99
7	30	5-01-03	1509	72	ND	1.3	ND	3.6	30	94
7	60	5-01-03	1515	84	ND	1.6	ND	4.1	37	110
6	10	5-01-03	1536	48	ND	19	ND	ND	20	78
6	30	5-01-03	1551	73	ND	2.2	ND	3.6	33	89
6	60	5-01-03	1554	76	ND	1.3	ND	3.2	29	92
6	60 REP	5-01-03	1557	81	ND	1.5	ND	3.1	29	110
	Trip Blank	5-02-03	NA	ND	ND	ND	ND	ND	ND	ND
5	10	5-02-03	1103	14	ND	30	ND	ND	1.3	18
5	10 REP	5-02-03	1104	12	ND	25	ND	[1].52	1.8	19
5	30	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
5	60	5-02-03	1120	48	ND	.97	ND	2.0	20	88

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	*cis*-1,2-Dichloroethene	*trans*-1,2-Dichloroethene	Vinyl chloride	Chloroethane	1,2,3-Trichlorobenzene	1,2,4-Trichlorobenzene	1,2 Dichlorobenzene
				April–May 2003—Continued						
4	10	5-02-03	1134	7.4	ND	10	0.55	ND	0.7	8.5
4	30	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
4	60	5-02-03	1157	47	ND	1.1	.84	2.6	20	74
4	60 REP	5-02-03	1200	45	ND	[1].98	.85	2.5	19	76
3	10	5-02-03	1258	28	[1]0.65	13	ND	ND	1.2	12
3	30	5-02-03	1309	16	ND	20	ND	ND	.94	7.4
3	60	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
2	10	5-02-03	1330	51	[1].64	5.3	ND	ND	ND	21
2	30	5-02-03	1340	31	ND	1.6	ND	.95	1.2	37
2	30 REP	5-02-03	1343	32	ND	1.5	ND	[1].87	1.2	37
2	60	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
1	10	5-02-03	1354	32	[1].5	3.9	ND	ND	ND	17
1	30	5-02-03	1401	21	ND	.74	ND	1.0	2.0	43
1	Field Blank	5-02-03	1420	ND	ND	ND	ND	ND	ND	[1].52
1	60	5-02-03	1429	13	ND	ND	ND	1.8	6.0	39
0	10	5-02-03	1444	24	ND	4.5	ND	ND	1.0	16
0	30	5-02-03	1451	15	ND	ND	ND	.71	[1].98	28
0	30 REP	5-02-03	1453	15	ND	ND	ND	[1].81	1.0	29
0	60	5-02-03	1512	13	ND	ND	ND	[1].57	1.1	15
	Trip Blank	5-05-03	1120	ND	ND	ND	ND	ND	ND	ND
				June 2003						
	Surface Water	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS
0	10	6-25-03	1015	28	ND	2.7	ND	ND	ND	13
0	30	6-25-03	1025	16	ND	ND	ND	ND	ND	22
0	30 REP	6-25-03	1028	16	ND	ND	ND	ND	ND	23
	Trip Blank	6-25-03	1040	ND	ND	ND	ND	ND	ND	ND
0	60	6-25-03	1045	8.2	ND	ND	ND	ND	ND	8.8
1	10	6-25-03	1105	28	ND	1.3	ND	ND	ND	6.6
1	30	6-25-03	1115	20	ND	4.4	ND	ND	ND	31
1	60	6-25-03	1123	11	ND	ND	ND	ND	1.1	21
2	10	6-25-03	1240	49	ND	6.6	ND	ND	ND	10
2	10 REP	6-25-03	1433	43	ND	5.8	ND	ND	ND	9.3
2	30	6-25-03	1255	45	ND	3.0	ND	ND	ND	20
2	Field Blank	6-25-03	1303	ND	ND	ND	ND	ND	ND	ND
2	60	6-25-03	1312	37	ND	1.4	ND	ND	1.0	44
3	10	6-25-03	1325	54	ND	25	ND	ND	ND	18
3	30	6-25-03	1335	22	ND	14	ND	ND	ND	6.3
3	60	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	*cis*-1,2-Di-chloro-ethene	*trans*-1,2-Di-chloro-ethene	Vinyl chloride	Chloro-ethane	1,2,3-Tri-chloro-benzene	1,2,4-Tri-chloro-benzene	1,2 Di-chloro-benzene
				June 2003—Continued						
4	10	6-25-03	1400	12	ND	18	ND	ND	ND	16
4	30	6-25-03	1420	72	ND	2.8	ND	ND	1.6	28
4	60	6-25-03	1439	58	ND	2.0	ND	2.8	23	79
4	60 REP	6-25-03	1442	56	ND	1.7	ND	2.8	23	81
5	10	6-25-03	1452	11	ND	39	ND	ND	ND	9.4
5	30	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS
5	60	6-25-03	1523	52	ND	2.0	ND	1.8	21	80
6	10	6-25-03	1540	48	ND	23	ND	ND	4.2	3.8
6	30	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS
6	Field Blank	6-25-03	1550	ND	ND	ND	ND	ND	ND	ND
6	60	6-25-03	1557	40	ND	ND	ND	ND	10	52
7	10	6-26-03	1035	85	ND	12	ND	ND	12	98
7	30	6-26-03	1045	43	ND	ND	ND	ND	16	53
7	30 REP	6-26-03	1048	48	ND	ND	ND	ND	16	55
7	Field Blank	6-26-03	1055	ND	ND	ND	ND	ND	ND	ND
7	60	6-26-03	1100	58	ND	ND	ND	ND	27	93
	Trip Blank	6-26-03	1108	ND	ND	ND	ND	ND	ND	ND
8	10	6-26-03	NA	NS	NS	NS	NS	NS	NS	NS
8	30	6-26-03	1120	49	ND	ND	ND	ND	27	81
8	60	6-26-03	1130	50	ND	ND	ND	ND	28	90
9	10	6-26-03	1140	38	ND	ND	ND	ND	13	56
9	30	6-26-03	1150	47	ND	ND	ND	ND	26	82
9	60	6-26-03	1155	46	ND	ND	ND	ND	24	90
9	60 REP	6-26-03	1205	ND	ND	34	ND	ND	19	69
10	10	6-26-03	1315	53	ND	ND	ND	ND	29	96
10	30	6-26-03	1320	52	ND	ND	ND	ND	25	90
10	60	6-26-03	1330	290	ND	ND	ND	18	150	490
10	Field Blank	6-26-03	1340	ND	ND	ND	ND	ND	ND	1.2
10	PDB	6-26-03	NA	55	ND	ND	ND	4.6	38	110
9	PDB	6-26-03	NA	60	ND	ND	ND	4.6	47	98
8	PDB	6-26-03	NA	61	ND	ND	ND	3.8	42	86
7	PDB	6-26-03	NA	85	ND	ND	ND	4.4	31	93
7	PDB	6-26-03	NA	37	ND	ND	ND	4.2	34	110
6	PDB	6-26-03	NA	43	ND	ND	ND	3.3	40	91

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown on figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	1,3-Di-chloro-benzene	1,4-Di-chloro-benzene	Chloro-benzene	Benzene	Toluene	Naphthalene	Bromo-methane
					June 2002					
10	10	6-18-02	1305	2.2	15	14	ND	ND	ND	ND
10	10 REP	6-18-02	1312	2.4	20	17	ND	ND	ND	ND
10	30	6-18-02	1321	2.9	24	14	ND	ND	ND	ND
10	30 REP	6-18-02	1326	3.4	25	16	ND	ND	ND	ND
10	60	6-18-02	1334	2.9	18	13	ND	ND	ND	ND
10	60 REP	6-18-02	1341	3.4	23	15	ND	ND	ND	ND
9	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS
9	30	6-18-02	1401	4.2	24	17	ND	ND	ND	ND
9	60	6-18-02	1407	3.8	26	15	ND	ND	ND	ND
	Trip Blank	6-19-02	NA	ND	ND	ND	ND	ND	ND	ND
	Trip Blank	6-19-02	NA	ND	ND	ND	ND	ND	ND	ND
8	10	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
8	30	6-19-02	1105	2.3	14	11	ND	ND	ND	ND
8	60	6-19-02	1120	3.2	20	14	ND	ND	ND	ND
7	10	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
7	30	6-19-02	1155	3.8	22	17	ND	ND	ND	ND
7	30 REP	6-19-02	1205	3.7	22	17	ND	ND	ND	ND
7	60	6-19-02	1215	3.5	20	15	ND	ND	ND	ND
7	60 REP	6-19-02	1225	3.3	19	14	ND	ND	ND	ND
6	Surface Water	6-19-02	1230	NS	NS	NS	NS	NS	NS	NS
6	10	6-19-02	1250	.92	4.2	14	ND	ND	ND	ND
6	30	6-19-02	1320	1.0	5.9	8.8	ND	ND	ND	ND
6	60	6-19-02	1325	3.5	18	ND	ND	ND	ND	ND
5	10	6-19-02	1350	[1].43	1.6	18	ND	ND	ND	ND
5	10 REP	6-19-02	1355	ND	ND	13	ND	ND	ND	ND
5	30	6-19-02	1405	1.0	4.2	18	ND	ND	ND	ND
5	30 REP	6-19-02	1415	1.9	8.4	42	ND	ND	ND	ND
5	60	6-19-02	1425	3.0	13	ND	ND	ND	ND	[1,2]1.9
5	60 REP	6-19-02	1430	2.8	13	ND	ND	ND	ND	[1,2]1.8
4	10	6-19-02	1450	ND	ND	ND	ND	ND	ND	[2]2.1
4	30	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
4	60	6-19-02	1500	4.9	16	19	ND	ND	ND	ND
3	10	6-19-02	1510	ND	[1]1.0	ND	ND	ND	ND	[1,2]1.9
3	30	6-19-02	1520	ND	2.2	38	1.0	ND	ND	ND
3	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
2	10	6-19-02	1550	ND	ND	29	1.4	ND	ND	ND
2	30	6-19-02	1600	ND	ND	ND	ND	ND	ND	[1,2]1.3
2	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
1	10	6-19-02	1620	ND	ND	ND	ND	ND	ND	[1,2]1.2
1	30	6-19-02	1625	ND	[1,2]1.3	ND	ND	ND	ND	[1,2]1.6
1	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown on figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Chlorobenzene	Benzene	Toluene	Naphthalene	Bromomethane
				June 2002—Continued						
0	10	6-19-02	1630	ND	1.0	38	ND	ND	ND	ND
0	30	6-19-02	1635	ND	1.9	34	ND	ND	ND	ND
0	60	6-19-02	1640	ND	3.9	26	ND	ND	ND	ND
	Trip Blank	6-19-02	NA	ND	ND	ND	ND	ND	ND	[1,2]0.57
				September 2002						
10	10	9-06-02	1105	1.3	9.9	21	ND	ND	ND	1.1
10	30	9-06-02	1110	1.2	9.3	7.7	ND	ND	ND	[2]2.6
10	30 REP	9-06-02	1112	1.2	8.3	7.1	ND	ND	ND	[2]2.6
10	60	9-06-02	1114	[1].92	6.5	5.3	ND	ND	ND	[2]3.4
10	60 REP	9-06-02	1115	[1].97	7.4	7.1	ND	ND	ND	3.6
9	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
9	30	9-06-02	1117	1.1	8.3	7.8	ND	ND	ND	[2]3.6
9	60	9-06-02	1125	[1].95	7.2	6.1	ND	ND	ND	[2]4.5
8	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
8	30	9-06-02	1140	[1].83	6.1	7.6	ND	ND	ND	[2]4.1
8	30 REP	9-06-02	1142	1	7.7	8.5	ND	ND	ND	3.8
8	60	9-06-02	1145	[1].94	6.8	6.2	ND	ND	ND	[2]4.0
8	60 REP	9-06-02	1147	4.2	28	ND	ND	ND	ND	ND
7	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
7	30	9-06-02	1155	5.1	30	ND	ND	ND	ND	ND
7	60	9-06-02	1200	3.8	23	18	ND	ND	ND	ND
6	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
6	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
6	60	9-06-02	1320	4.1	22	20	ND	ND	ND	ND
6	60 REP	9-06-02	1325	4.1	22	20.4	ND	ND	ND	ND
5	10	9-06-02	1330	ND	2.3	37	ND	ND	ND	ND
5	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
5	60	9-06-02	1345	4.3	22	30	ND	ND	ND	ND
4	10	9-06-02	1355	[1].84	3.2	120	1.6	0.74	ND	ND
4	10 REP	9-06-02	1400	1.1	3.2	96	1.8	[1].85	ND	ND
4	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
4	60	9-06-02	1420	5.5	20	30	ND	ND	ND	ND
4	60 REP	9-06-02	1430	5.7	20	31	ND	ND	ND	ND
	Trip Blank	9-06-02	NA	ND	ND	ND	ND	ND	ND	ND
3	10	9-09-02	1030	[1].64	1.5	64	1.9	[1].67	ND	ND
3	30	9-09-02	1040	ND	ND	35	1.2	ND	ND	ND
3	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown on figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Chlorobenzene	Benzene	Toluene	Naphthalene	Bromomethane
September 2002—Continued										
2	10	9-09-02	1050	ND	ND	82	2.1	ND	ND	ND
2	10 REP	9-09-02	1055	ND	ND	49	[1]1.6	ND	ND	ND
2	30	9-09-02	1100	ND	ND	39	ND	ND	ND	ND
2	30 REP	9-09-02	1102	ND	ND	41	ND	ND	ND	ND
2	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS
1	10	9-09-02	1125	ND	ND	17	ND	ND	ND	ND
1	30	9-09-02	1130	ND	3.1	34	ND	ND	ND	ND
1	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS
0	10	9-09-02	1140	ND	ND	21	ND	ND	ND	ND
0	10 REP	9-09-02	1143	ND	[1].95	33	ND	ND	ND	ND
0	30	9-09-02	1147	ND	ND	28	ND	ND	ND	ND
0	30 REP	9-09-02	1150	ND	ND	28	ND	ND	ND	ND
0	60	9-09-02	1200	ND	3.7	13	ND	ND	ND	ND
0	60 REP	9-09-02	1205	ND	2.4	9.1	ND	ND	ND	ND
	Trip Blank	9-09-02	NA	ND	ND	ND	ND	ND	ND	[1,2,3]1.0
April–May 2003										
10	10	5-01-03	1301	2.2	18	19	ND	ND	ND	ND
10	10 REP	5-01-03	1304	2.2	17	20	ND	ND	ND	ND
10	30	5-01-03	1313	2.7	23	15	ND	ND	ND	ND
10	60	5-01-03	1320	2.5	19	15	ND	ND	ND	ND
9	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS
9	30	5-01-03	1340	3.0	23	17	ND	ND	ND	ND
9	Field Blank	5-01-03	1353	ND	ND	ND	ND	ND	ND	ND
9	60	5-01-03	1358	2.9	22	20	ND	ND	ND	ND
8	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS
8	30	5-01-03	1419	2.7	20	16	ND	ND	ND	ND
8	30 REP	5-01-03	1422	2.9	22	20	ND	ND	ND	ND
8	60	5-01-03	1432	3.2		20	2.5	ND	ND	ND
7	10	5-01-03	1457	3.3	11	26	ND	ND	ND	ND
7	10 REP	5-01-03	1500	3.6	12	28	ND	ND	ND	ND
7	30	5-01-03	1509	3.2	21	20	ND	ND	ND	ND
7	60	5-01-03	1515	4.0	27	27	ND	ND	ND	ND
6	10	5-01-03	1536	8.0	28	49	ND	ND	ND	ND
6	30	5-01-03	1551	4.2	23	27	ND	ND	ND	ND
6	60	5-01-03	1554	3.9	24	26	ND	ND	ND	ND
6	60 REP	5-01-03	1557	3.8	24	25	ND	ND	ND	ND
	Trip Blank	5-02-03	NA	ND	ND	ND	ND	ND	ND	ND
5	10	5-02-03	1103	ND	2.4	50	ND	ND	ND	ND
5	10 REP	5-02-03	1104	ND	[1].84	48	ND	ND	ND	ND
5	30	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
5	60	5-02-03	1120	4.7	17	21	ND	ND	ND	ND

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown on figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	1,3-Di-chloro-benzene	1,4-Di-chloro-benzene	Chloro-benzene	Benzene	Toluene	Naphthalene	Bromo-methane
				April–May 2003—Continued						
4	10	5-02-03	1134	0.77	1.9	86	1.1	0.57	ND	ND
4	30	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
4	60	5-02-03	1157	3.9	15	17	ND	ND	ND	ND
4	60 REP	5-02-03	1200	3.9	15	16	ND	ND	ND	ND
3	10	5-02-03	1258	ND	1.5	22	.68	ND	ND	ND
3	30	5-02-03	1309	ND	1.1	22	1.1	[1].53	ND	ND
3	60	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
2	10	5-02-03	1330	ND	.58	42	1.1	ND	[1]0.51	ND
2	30	5-02-03	1340	ND	1.4	47	.74	ND	ND	ND
2	30 REP	5-02-03	1343	ND	1.5	49	[1].75	ND	ND	ND
2	60	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
1	10	5-02-03	1354	ND	[1].85	24	[1].55	ND	ND	ND
1	30	5-02-03	1401	[1].53	[1 3].52	37	ND	ND	ND	ND
1	Field Blank	5-02-03	1420	ND	ND	[1].53	ND	ND	ND	ND
1	60	5-02-03	1429	[1].89	6.0	20	ND	ND	ND	ND
0	10	5-02-03	1444	ND	1.4	30	[1].56	ND	ND	ND
0	30	5-02-03	1451	ND	1.6	36	[1].52	ND	ND	ND
0	30 REP	5-02-03	1453	ND	1.7	36	ND	ND	ND	ND
0	60	5-02-03	1512	ND	1.2	27	ND	ND	ND	ND
	Trip Blank	5-05-03	1120	ND	ND	ND	ND	ND	ND	ND
				June 2003						
	Surface Water	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS
0	10	6-25-03	1015	ND	ND	28	ND	ND	ND	ND
0	30	6-25-03	1025	ND	ND	34	ND	ND	ND	ND
0	30 REP	6-25-03	1028	ND	1.0	35	ND	ND	ND	ND
	Trip Blank	6-25-03	1040	ND	ND	ND	ND	ND	ND	ND
0	60	6-25-03	1045	ND	ND	11	ND	ND	ND	ND
1	10	6-25-03	1105	ND	ND	15	ND	ND	ND	ND
1	30	6-25-03	1115	ND	1.6	41	ND	ND	ND	ND
1	60	6-25-03	1123	ND	1.5	22	ND	ND	ND	ND
2	10	6-25-03	1240	ND	ND	31	ND	ND	ND	ND
2	10 REP	6-25-03	1433	ND	ND	27	ND	ND	ND	ND
2	30	6-25-03	1255	ND	ND	44	ND	ND	ND	ND
2	Field Blank	6-25-03	1303	ND	ND	ND	ND	ND	ND	ND
2	60	6-25-03	1312	ND	1.9	53	ND	ND	ND	ND
3	10	6-25-03	1325	ND	ND	49	1.5	ND	ND	ND
3	30	6-25-03	1335	ND	ND	19	1.1	ND	ND	ND
3	60	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03.—Continued

[Diagram of transects shown in figure 5. Transect location is shown on figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	1,3-Di-chloro-benzene	1,4-Di-chloro-benzene	Chloro-benzene	Benzene	Toluene	Naphthalene	Bromo-methane
				June 2003—Continued						
4	10	6-25-03	1400	ND	2.8	110	1.1	ND	ND	ND
4	30	6-25-03	1420	ND	2.2	37	ND	ND	ND	ND
4	60	6-25-03	1439	4.4	16	20	ND	ND	ND	ND
4	60 REP	6-25-03	1442	4.7	17	20	ND	ND	ND	ND
5	10	6-25-03	1452	ND	ND	14	ND	ND	ND	ND
5	30	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS
5	60	6-25-03	1523	5.4	17	19	ND	ND	ND	ND
6	10	6-25-03	1540	2.9	9.0	34	ND	ND	ND	ND
6	30	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS
6	Field Blank	6-25-03	1550	ND	ND	ND	ND	ND	ND	ND
6	60	6-25-03	1557	ND	11	15	ND	ND	ND	ND
7	10	6-26-03	1035	ND	14	33	ND	ND	ND	ND
7	30	6-26-03	1045	ND	ND	16	ND	ND	ND	ND
7	30 REP	6-26-03	1048	ND	12	16	ND	ND	ND	ND
7	Field Blank	6-26-03	1055	ND	ND	ND	ND	ND	ND	ND
7	60	6-26-03	1100	ND	20	24	ND	ND	ND	ND
	Trip Blank	6-26-03	1108	ND	ND	ND	ND	ND	ND	ND
8	10	6-26-03	NA	NS	NS	NS	NS	NS	NS	NS
8	30	6-26-03	1120	ND	18	18	ND	ND	ND	ND
8	60	6-26-03	1130	ND	19	18	ND	ND	ND	ND
9	10	6-26-03	1140	ND	10	15	ND	ND	ND	ND
9	30	6-26-03	1150	ND	14	16	ND	ND	ND	ND
9	60	6-26-03	1155	ND	15	17	ND	ND	ND	ND
9	60 REP	6-26-03	1205	ND	12	13	ND	ND	ND	ND
10	10	6-26-03	1315	ND	19	18	ND	ND	ND	ND
10	30	6-26-03	1320	ND	18	19	ND	ND	ND	ND
10	60	6-26-03	1330	15	100	92	ND	ND	ND	ND
10	Field Blank	6-26-03	1340	ND	ND	ND	ND	ND	ND	ND
10	PDB	6-26-03	NA	4.2	23	[3]17	ND	ND	ND	ND
9	PDB	6-26-03	NA	4	27	[3]18	ND	ND	ND	ND
8	PDB	6-26-03	NA	2.4	19	[3]36	ND	ND	ND	ND
7	PDB	6-26-03	NA	2.8	20	[3]37	ND	ND	ND	ND
7	PDB	6-26-03	NA	3.6	26	[3]27	ND	ND	ND	ND
6	PDB	6-26-03	NA	4.5	19	[3]23	ND	ND	ND	ND

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03. —Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Dichloro-difluoro-methane	1,2,3-Tri-chloro-propane	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE
				June 2002						
10	10	6-18-02	1305	ND	ND	ND	ND	[1,2,3]1.8	4.6	ND
10	10 REP	6-18-02	1312	ND	ND	ND	ND	[2,3]7.7	ND	ND
10	30	6-18-02	1321	ND	ND	ND	ND	[2,3]3.0	ND	ND
10	30 REP	6-18-02	1326	ND	ND	ND	ND	[2,3]6.9	[1]2.0	ND
10	60	6-18-02	1334	ND	ND	ND	ND	[3]21	ND	ND
10	60 REP	6-18-02	1341	ND	ND	ND	ND	[2,3]2.5	ND	ND
9	10	6-18-02	NA	NS	NS	NS	NS	NS	NS	NS
9	30	6-18-02	1401	ND	ND	ND	ND	[2,3]2.5	ND	ND
9	60	6-18-02	1407	ND	ND	ND	ND	ND	ND	ND
	Trip Blank	6-19-02	NA	ND	ND	ND	ND	[2,3]3.9	ND	ND
	Trip Blank	6-19-02	NA	ND	ND	ND	ND	[1,2,3]1.1	ND	ND
8	10	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
8	30	6-19-02	1105	ND	ND	ND	ND	[2,3]3.4	ND	ND
8	60	6-19-02	1120	ND	ND	ND	ND	[2,3]2.8	ND	ND
7	10	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
7	30	6-19-02	1155	ND	ND	ND	ND	[2,3]2.2	ND	ND
7	30 REP	6-19-02	1205	ND	ND	ND	ND	[2,3]3.7	ND	ND
7	60	6-19-02	1215	ND	ND	ND	ND	[2,3]2.9	ND	ND
7	60 REP	6-19-02	1225	ND	ND	ND	ND	[2,3]2.4	ND	ND
6	Surface Water	6-19-02	1230	NS	NS	NS	NS	NS	NS	NS
6	10	6-19-02	1250	ND	ND	ND	ND	[2,3]2.1	ND	ND
6	30	6-19-02	1320	ND	ND	ND	ND	[2,3]2.5	ND	ND
6	60	6-19-02	1325	ND	ND	ND	ND	[1,2,3]2.0	ND	ND
5	10	6-19-02	1350	ND	ND	ND	ND	[2,3]4.5	ND	ND
5	10 REP	6-19-02	1355	ND	ND	ND	ND	2.4	ND	ND
5	30	6-19-02	1405	ND	ND	ND	ND	ND	ND	ND
5	30 REP	6-19-02	1415	ND	ND	ND	ND	ND	ND	ND
5	60	6-19-02	1425	ND	ND	ND	ND	[1,2]1.5	ND	ND
5	60 REP	6-19-02	1430	ND	ND	ND	ND	[1,2]1.4	ND	ND
4	10	6-19-02	1450	ND	ND	ND	ND	[1,2]1.4	ND	ND
4	30	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
4	60	6-19-02	1500	ND	ND	ND	ND	ND	ND	ND
3	10	6-19-02	1510	ND	ND	ND	ND	ND	ND	ND
3	30	6-19-02	1520	ND	21	ND	ND	[2,3]2.2	ND	ND
3	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
2	10	6-19-02	1550	ND	ND	ND	ND	[2,3]2.4	ND	ND
2	30	6-19-02	1600	ND	ND	ND	ND	[1,2]1.4	ND	ND
2	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS
1	10	6-19-02	1620	ND	ND	ND	ND	[1,2]1.2	ND	ND
1	30	6-19-02	1625	ND	ND	ND	ND	[1,2]1.3	ND	ND
1	60	6-19-02	NA	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03. —Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Dichloro-difluoro-methane	1,2,3-Tri-chloro-propane	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE
				June 2002—Continued						
0	10	6-19-02	1630	ND	ND	ND	ND	[2,3]3.3	ND	ND
0	30	6-19-02	1635	ND	ND	ND	ND	[2,3]2.3	ND	ND
0	60	6-19-02	1640	ND	ND	ND	ND	[2,3]5.0	ND	ND
	Trip Blank	6-19-02	NA	ND	ND	ND	ND	ND	ND	ND
				September 2002						
10	10	9-06-02	1105	ND	ND	ND	ND	[1,2,3]1.4	ND	ND
10	30	9-06-02	1110	ND	ND	ND	ND	[1,2,3]1.2	ND	ND
10	30 REP	9-06-02	1112	ND	ND	ND	ND	ND	ND	ND
10	60	9-06-02	1114	ND	ND	ND	ND	[1,2,3]1.1	ND	ND
10	60 REP	9-06-02	1115	ND	ND	ND	ND	[1,2,3]1.3	ND	ND
9	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
9	30	9-06-02	1117	ND	ND	ND	ND	ND	ND	ND
9	60	9-06-02	1125	ND	ND	ND	ND	[1,2,3]1.3	ND	ND
8	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
8	30	9-06-02	1140	ND	ND	ND	ND	[1,2,3]1.1	ND	ND
8	30 REP	9-06-02	1142	ND	ND	ND	ND	[1,2,3]1.2	ND	ND
8	60	9-06-02	1145	ND	ND	ND	ND	[1,2,3]1.3	ND	ND
8	60 REP	9-06-02	1147	ND	ND	ND	ND	ND	ND	ND
7	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
7	30	9-06-02	1155	ND	ND	ND	ND	ND	ND	ND
7	60	9-06-02	1200	ND	ND	ND	ND	1.5	ND	ND
6	10	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
6	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
6	60	9-06-02	1320	ND	ND	ND	ND	[1,2,3]1.5	ND	ND
6	60 REP	9-06-02	1325	ND	ND	ND	ND	[1,2,3]1.5	ND	ND
5	10	9-06-02	1330	ND	ND	ND	ND	[1,2,3]1.3	ND	ND
5	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
5	60	9-06-02	1345	ND	ND	ND	ND	2.1	ND	ND
4	10	9-06-02	1355	ND	ND	ND	ND	[3]2.2	ND	ND
4	10 REP	9-06-02	1400	ND	ND	ND	ND	[1,2,3]1.3	ND	ND
4	30	9-06-02	NA	NS	NS	NS	NS	NS	NS	NS
4	60	9-06-02	1420	ND	ND	ND	ND	ND	ND	ND
4	60 REP	9-06-02	1430	ND	ND	ND	ND	[1,2,3]1.0	ND	ND
	Trip Blank	9-06-02	NA	ND	ND	ND	ND	ND	ND	ND
3	10	9-09-02	1030	ND	ND	ND	1.3	[1,2,3]1.6	ND	ND
3	30	9-09-02	1040	ND	ND	ND	1.5	3.1	ND	ND
3	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03. —Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Dichloro-difluoro-methane	1,2,3-Tri-chloro-propane	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE
				September 2002—Continued						
2	10	9-09-02	1050	ND	ND	ND	ND	ND	ND	ND
2	10 REP	9-09-02	1055	ND	ND	ND	ND	[2,3]4.2	ND	ND
2	30	9-09-02	1100	ND	ND	ND	ND	[2,3]5.9	ND	ND
2	30 REP	9-09-02	1102	ND	ND	ND	ND	[1,2,3]9.2	ND	ND
2	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS
1	10	9-09-02	1125	ND	ND	ND	ND	[2,3]4.9	ND	ND
1	30	9-09-02	1130	ND	ND	ND	ND	[1,2,3]2.5	ND	ND
1	60	9-09-02	NA	NS	NS	NS	NS	NS	NS	NS
0	10	9-09-02	1140	ND	ND	ND	ND	[2,3]2.7	ND	ND
0	10 REP	9-09-02	1143	ND	ND	ND	ND	[2,3]2.1	ND	ND
0	30	9-09-02	1147	ND	ND	ND	ND	[1,2,3]5.9	ND	ND
0	30 REP	9-09-02	1150	ND	ND	ND	ND	[1,2,3]7.7	ND	ND
0	60	9-09-02	1200	ND	ND	ND	ND	[1,2,3]3.2	ND	ND
0	60 REP	9-09-02	1205	ND	ND	ND	ND	[1,2,3]3.0	ND	ND
	Trip Blank	9-09-02	NA	ND	ND	ND	1.3	[1,2,3]1.0	ND	ND
				April–May 2003						
10	10	5-01-03	1301	ND	ND	ND	ND	3.8	ND	ND
10	10 REP	5-01-03	1304	ND	ND	ND	ND	3.1	ND	ND
10	30	5-01-03	1313	ND	ND	ND	ND	2.2	ND	ND
10	60	5-01-03	1320	ND	ND	ND	ND	2.8	ND	ND
9	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS
9	30	5-01-03	1340	ND	ND	ND	ND	2.4	ND	ND
9	Field Blank	5-01-03	1353	ND	ND	ND	ND	ND	ND	ND
9	60	5-01-03	1358	ND	ND	ND	ND	3.2	ND	ND
8	10	5-01-03	NA	NS	NS	NS	NS	NS	NS	NS
8	30	5-01-03	1419	ND	ND	ND	ND	2.8	ND	ND
8	30 REP	5-01-03	1422	ND	ND	ND	ND	3.0	ND	ND
8	60	5-01-03	1432	ND	21	ND	ND	24	ND	ND
7	10	5-01-03	1457	ND	ND	ND	ND	4.6	ND	ND
7	10 REP	5-01-03	1500	ND	ND	ND	ND	3.3	ND	ND
7	30	5-01-03	1509	ND	ND	ND	ND	ND	ND	ND
7	60	5-01-03	1515	ND	ND	ND	ND	2.2	ND	ND
6	10	5-01-03	1536	ND	ND	ND	1.3	2.4	ND	ND
6	30	5-01-03	1551	ND	ND	ND	ND	1.4	ND	ND
6	60	5-01-03	1554	ND	ND	ND	ND	2.3	ND	ND
6	60 REP	5-01-03	1557	ND	ND	ND	ND	2.7	ND	ND
	Trip Blank	5-02-03	NA	ND	ND	ND	ND	ND	ND	ND
5	10	5-02-03	1103	ND	ND	ND	ND	2.8	ND	ND
5	10 REP	5-02-03	1104	ND	ND	1.0	ND	3.1	ND	ND
5	30	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
5	60	5-02-03	1120	ND	ND	[1,3].51	1.7	[3]2.1	[1]0.78	ND

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03. —Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Dichloro-difluoro-methane	1,2,3-Tri-chloro-propane	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE
				April–May 2003—Continued						
4	10	5-02-03	1134	ND	ND	2.1	1.7	0.81	ND	ND
4	30	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
4	60	5-02-03	1157	ND	ND	ND	2.0	1.6	ND	0.52
4	60 REP	5-02-03	1200	ND	ND	.92	1.6	1.6	ND	ND
3	10	5-02-03	1258	ND	ND	.72	1.9	2.7	ND	ND
3	30	5-02-03	1309	ND	ND	ND	1.4	3.5	ND	ND
3	60	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
2	10	5-02-03	1330	ND	ND	.69	2.1	.58	ND	ND
2	30	5-02-03	1340	ND	ND	.57	1.5	2.4	ND	ND
2	30 REP	5-02-03	1343	ND	ND	[1,3].64	1.7	[3]1.9	ND	ND
2	60	5-02-03	NA	NS	NS	NS	NS	NS	NS	NS
1	10	5-02-03	1354	ND	ND	[1]1.3	2.0	3.2	ND	ND
1	30	5-02-03	1401	ND	ND	ND	1.6	[1,3].78	ND	ND
1	Field Blank	5-02-03	1420	ND	ND	ND	ND	[3]1.9	ND	ND
1	60	5-02-03	1429	ND	ND	ND	1.7	[3]2.4	ND	ND
0	10	5-02-03	1444	ND	ND	[1,3].7	1.7	1.9	ND	ND
0	30	5-02-03	1451	ND	ND	[1,3].57	1.7	2.4	ND	ND
0	30 REP	5-02-03	1453	ND	ND	ND	1.8	[1,3].65	[1]0.67	ND
0	60	5-02-03	1512	ND	ND	[1,3].64	1.9	1.4	ND	ND
	Trip Blank	5-05-03	1120	ND	ND	ND	ND	ND	ND	ND
				June 2003						
	Surface Water	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS
0	10	6-25-03	1015	ND	ND	ND	ND	ND	ND	2.2
0	30	6-25-03	1025	ND	ND	ND	ND	ND	ND	ND
0	30 REP	6-25-03	1028	ND	ND	ND	ND	ND	ND	ND
	Trip Blank	6-25-03	1040	ND	ND	ND	ND	ND	ND	ND
0	60	6-25-03	1045	ND	ND	ND	ND	ND	ND	ND
1	10	6-25-03	1105	ND	ND	ND	ND	ND	ND	ND
1	30	6-25-03	1115	ND	ND	ND	ND	ND	ND	ND
1	60	6-25-03	1123	ND	ND	ND	ND	ND	ND	ND
2	10	6-25-03	1240	ND	ND	ND	ND	ND	ND	ND
2	10 REP	6-25-03	1433	ND	ND	ND	ND	ND	ND	ND
2	30	6-25-03	1255	ND	ND	ND	ND	ND	ND	ND
2	Field Blank	6-25-03	1303	ND	ND	ND	ND	ND	ND	ND
2	60	6-25-03	1312	ND	ND	ND	ND	ND	ND	ND
3	10	6-25-03	1325	ND	ND	ND	ND	ND	ND	ND
3	30	6-25-03	1335	ND	ND	ND	1.0	ND	ND	ND
3	60	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS

Table 5. Results of sampling pore water along transect B during field studies, Mill Pond, Sudbury River, Ashland, Massachusetts, 2002–03. —Continued

[Diagram of transects shown in figure 5. Transect location is shown in figure 2. **Sample depth or description:** Depth is in centimeters below sediment surface. Unless otherwise indicated, all concentration units are micrograms per liter. M, missing; MTBE, methyl *tert*-butyl ether; NA, not applicable; ND, not detected; NS, not sampled; OR, out of calibration range; PDB, passive-diffusion-bag sampler; REP, replicate sample; °C, degrees Celsius; mg/L, milligram per liter; µS/cm, microsiemens per centimeter]

Distance along transect B (meters)	Sample depth or description	Date	Time	Dichloro-difluoro-methane	1,2,3-Tri-chloro-propane	Butanone (MEK)	Chloro-methane	2-Pro-panone (acetone)	Carbon disulfide	MTBE
				June 2003—Continued						
4	10	6-25-03	1400	ND	ND	ND	ND	ND	ND	ND
4	30	6-25-03	1420	ND	ND	ND	ND	ND	ND	ND
4	60	6-25-03	1439	ND	ND	ND	ND	ND	ND	ND
4	60 REP	6-25-03	1442	ND	ND	ND	ND	ND	ND	ND
5	10	6-25-03	1452	ND	ND	ND	ND	ND	ND	ND
5	30	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS
5	60	6-25-03	1523	ND	ND	ND	ND	ND	ND	[3]1.1
6	10	6-25-03	1540	ND	ND	ND	ND	ND	ND	ND
6	30	6-25-03	NA	NS	NS	NS	NS	NS	NS	NS
6	Field Blank	6-25-03	1550	ND	ND	ND	ND	ND	ND	ND
6	60	6-25-03	1557	ND	ND	ND	ND	ND	ND	ND
7	10	6-26-03	1035	ND	ND	ND	ND	ND	ND	ND
7	30	6-26-03	1045	ND	ND	ND	ND	ND	ND	ND
7	30 REP	6-26-03	1048	ND	ND	ND	ND	ND	ND	ND
7	Field Blank	6-26-03	1055	ND	ND	ND	ND	ND	ND	ND
7	60	6-26-03	1100	ND	ND	ND	ND	ND	ND	ND
	Trip Blank	6-26-03	1108	ND	ND	ND	ND	ND	ND	ND
8	10	6-26-03	NA	NS	NS	NS	NS	NS	NS	NS
8	30	6-26-03	1120	ND	ND	ND	ND	ND	ND	ND
8	60	6-26-03	1130	ND	ND	ND	ND	ND	ND	ND
9	10	6-26-03	1140	ND	ND	ND	ND	ND	ND	ND
9	30	6-26-03	1150	ND	ND	ND	ND	ND	ND	ND
9	60	6-26-03	1155	ND	ND	ND	ND	ND	ND	ND
9	60 REP	6-26-03	1205	ND	ND	ND	ND	ND	ND	ND
10	10	6-26-03	1315	ND	ND	ND	ND	ND	ND	ND
10	30	6-26-03	1320	ND	ND	ND	ND	ND	ND	ND
10	60	6-26-03	1330	ND	ND	ND	ND	ND	ND	ND
10	Field Blank	6-26-03	1340	ND	ND	ND	ND	ND	ND	ND
10	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND	ND
9	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND	ND
8	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND	ND
7	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND	ND
7	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND	ND
6	PDB	6-26-03	NA	ND	ND	ND	ND	ND	ND	ND

[1]Estimated value below calibration value.
[2]Estimated value.
[3]Analyte is associated with lab blank or trip blank contamination.