

Ground-Water-Quality Data for a Treated-Wastewater Plume Undergoing Natural Restoration, Ashumet Valley, Cape Cod, Massachusetts, 1994–2004

By Jennifer G. Savoie, Richard L. Smith, Douglas B. Kent, Kathryn M. Hess,
Denis R. LeBlanc, and Larry B. Barber

USGS Toxic Substances Hydrology Program

Data Series 198

**U.S. Department of the Interior
U.S. Geological Survey**

U.S. Department of the Interior
DIRK KEMPTHORNE, Secretary

U.S. Geological Survey
P. Patrick Leahy, Acting Director

U.S. Geological Survey, Reston, Virginia: 2006

For product and ordering information:
World Wide Web: <http://www.usgs.gov/pubprod>
Telephone: 1-888-ASK-USGS

For more information on the USGS—the Federal source for science about the Earth, its natural and living resources, natural hazards, and the environment:
World Wide Web: <http://www.usgs.gov>
Telephone: 1-888-ASK-USGS

Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Although this report is in the public domain, permission must be secured from the individual copyright owners to reproduce any copyrighted materials contained within this report.

Suggested citation:
Savoie, J.G., Smith, R.L., Kent, D.B., Hess, K.M., LeBlanc, D.R., and Barber, L.B., 2006, Ground-water-quality data for a treated-wastewater plume undergoing natural restoration, Ashumet Valley, Cape Cod, Massachusetts, 1994–2004: U.S. Geological Survey Data Series 198, 1 CD-ROM.

Contents

Abstract.....	1
Introduction.....	1
Monitoring Ground-Water Quality in the Treated-Wastewater Plume.....	3
Monitoring Wells.....	3
Multilevel Samplers.....	3
Sample Collection	3
Sample Analysis.....	3
Water-Quality Data for Samples Collected in the Treated-Wastewater Plume	4
Summary.....	4
Acknowledgments.....	4
References Cited.....	5

Figure

1. Map showing location of study area, monitoring-well and multilevel-sampler sites, partial extent of treated-wastewater plume, and water-table contours, Ashumet Valley, Cape Cod, Massachusetts.....2

Tables

1. Sampling events and dates for ground-water samples collected from monitoring wells and multilevel samplers in the treated-wastewater plume, Ashumet Valley, Cape Cod, Massachusetts, 1994–20043
2. Location coordinates, land-surface and screen altitudes, and altitude of water levels for monitoring wells in the treated-wastewater plume, Ashumet Valley, Cape Cod, Massachusetts
3. Water-level altitudes for monitoring well SDW 395-0028 in the abandoned rapid-infiltration beds near the treated-wastewater plume, Ashumet Valley, Cape Cod, Massachusetts, 1994–2004
4. Location coordinates, land-surface and sampling-port altitudes, and estimated altitude of water levels for multilevel samplers in the treated-wastewater plume, Ashumet Valley, Cape Cod, Massachusetts.....3
5. Laboratory instrumentation and analytical details for chemical analysis of water samples from wells and multilevel samplers in the treated-wastewater plume, 1994–2004
6. Field water-quality analyses for water samples from wells and multilevel samplers in and near the treated-wastewater plume, Ashumet Valley, Cape Cod, Massachusetts, 1994–2004
7. Concentrations of anions and ammonium for water samples from wells and multilevel samplers in and near the treated-wastewater plume, Ashumet Valley, Cape Cod, Massachusetts, 1994–2004
8. Concentrations of dissolved organic carbon, dissolved inorganic carbon, and ultraviolet/visible absorbance for water samples from wells and multilevel samplers in and near the treated-wastewater plume, Ashumet Valley, Cape Cod, Massachusetts, 1994–2004
9. Concentrations of selected inorganic solutes for water samples from wells and multilevel samplers in and near the treated-wastewater plume, Ashumet Valley, Cape Cod, Massachusetts, 1994–2004

Conversion Factors, Vertical and Horizontal Datum, and Abbreviations

Multiply	By	To obtain
foot (ft)	0.3048	meter (m)
gallon (gal)	3.785	liter (L)
gram (g)	0.03527	ounce (oz)
inch (in.)	2.54	centimeter (cm)
mile (mi)	1.609	kilometer (km)
kilogram (kg)	2.205	pound (lb)
Aluminum [Al] (μM)	26.98	Aluminum [Al] ($\mu\text{g/L}$)
Ammonium [NH_4] (μM)	14.01	Ammonium [NH_4 as N] ($\mu\text{g/L}$)
Arsenic [As] (μM)	74.92	Arsenic [As] ($\mu\text{g/L}$)
Barium [Ba] (μM)	137.3	Barium [Ba] ($\mu\text{g/L}$)
Boron [B] (μM)	10.81	Boron [B] ($\mu\text{g/L}$)
Cadmium [Cd] (μM)	112.4	Cadmium [Cd] ($\mu\text{g/L}$)
Calcium [Ca] (μM)	40.08	Calcium [Ca] ($\mu\text{g/L}$)
Carbon, inorganic, dissolved [DIC] (μM)	12.01	Carbon, inorganic, dissolved [DIC] ($\mu\text{g/L}$)
Carbon, organic, dissolved [DOC] (μM)	12.01	Carbon, organic, dissolved [DOC] ($\mu\text{g/L}$)
Chloride [Cl] (μM)	35.45	Chloride [Cl] ($\mu\text{g/L}$)
Chromium [Cr] (μM)	52.00	Chromium [Cr] ($\mu\text{g/L}$)
Cobalt [Co] (μM)	58.93	Cobalt [Co] ($\mu\text{g/L}$)
Copper [Cu] (μM)	63.54	Copper [Cu] ($\mu\text{g/L}$)
Iron [Fe] (μM)	55.85	Iron [Fe] ($\mu\text{g/L}$)
Lead [Pb] (μM)	207.2	Lead [Pb] ($\mu\text{g/L}$)
Magnesium [Mg] (μM)	24.31	Magnesium [Mg] ($\mu\text{g/L}$)
Manganese [Mn] (μM)	54.94	Manganese [Mn] ($\mu\text{g/L}$)
Molybdenum [Mo] (μM)	95.94	Molybdenum [Mo] ($\mu\text{g/L}$)
Nickel [Ni] (μM)	58.71	Nickel [Ni] ($\mu\text{g/L}$)
Nitrate [NO_3] (μM)	14.01	Nitrate [NO_3 as N] ($\mu\text{g/L}$)
Nitrite [NO_2] (μM)	14.01	Nitrite [NO_2 as N] ($\mu\text{g/L}$)
Oxygen, dissolved [O_2] (μM)	31.99	Oxygen, dissolved [O_2] ($\mu\text{g/L}$)
Phosphorus [P] (μM)	30.97	Phosphorus [P] ($\mu\text{g/L}$)
Potassium [K] (μM)	39.10	Potassium [K] ($\mu\text{g/L}$)
Silicon [Si] (μM)	28.09	Silicon [Si] ($\mu\text{g/L}$)
Sodium [Na] (μM)	22.98	Sodium [Na] ($\mu\text{g/L}$)
Strontium [Sr] (μM)	87.62	Strontium [Sr] ($\mu\text{g/L}$)
Sulfate [SO_4] (μM)	96.06	Sulfate [SO_4] ($\mu\text{g/L}$)
Thallium [Tl] (μM)	204.3	Thallium [Tl] ($\mu\text{g/L}$)
Uranium [U] (μM)	238.0	Uranium [U] ($\mu\text{g/L}$)
Vanadium [V] (μM)	50.94	Vanadium [V] ($\mu\text{g/L}$)
Zinc [Zn] (μM)	65.37	Zinc [Zn] ($\mu\text{g/L}$)

Temperature in degrees Celsius ($^{\circ}\text{C}$) may be converted to degrees Fahrenheit ($^{\circ}\text{F}$) as follows:
 $^{\circ}\text{F}=(1.8\times^{\circ}\text{C})+32$

Temperature in degrees Fahrenheit ($^{\circ}\text{F}$) may be converted to degrees Celsius ($^{\circ}\text{C}$) as follows:
 $^{\circ}\text{C}=(^{\circ}\text{F}-32)/1.8$

Vertical coordinate information is referenced to the North American Vertical Datum of 1929 (NGVD 29).

Horizontal coordinate information is referenced to the North American Datum of 1927 (NAD 27).

Altitude, as used in this report, refers to distance above the vertical datum.

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius ($\mu\text{S}/\text{cm}$ at 25°C).

Concentrations of chemical constituents in water are given either in millimoles per liter (mM) or micromoles per liter (μM).

AFCEE	Air Force Center for Environmental Excellence
DIC	dissolved inorganic carbon
DOC	dissolved organic carbon
ICP-AES	inductively coupled plasma atomic emission spectroscopy
L/min	liter per minute
μM	micromoles per liter
μm	micrometer
$\mu\text{g/L}$	micrograms per liter
mL	milliliter
mL/min	milliliter per minute
mg/L	milligram per liter
mN	milliNormal
mm	millimeter
mM	millimoles per liter
MLS	multilevel sampler
MMR	Massachusetts Military Reservation
NAGT	National Association of Geoscience Teachers
NGVD 29	National Geodetic Vertical Datum of 1929
nm	nanometer
NRP	National Research Program
NTU	Nephelometric Turbidity Unit
PVC	polyvinyl chloride
USGS	U.S. Geological Survey
$\mu\text{S}/\text{cm}$	microsiemen per centimeter at 25°C

