USGS
science for a changing world

Prepared in cooperation with the Eugene Water and Electric Board

Water-Quality Data from Semipermeable-Membrane Devices and Polar Organic Chemical Integrative Samplers Deployed in the McKenzie River Basin, Oregon

Data Series 692
Version 2.0, February 2013

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

Water-Quality Data from Semipermeable-Membrane Devices and Polar Organic Chemical Integrative Samplers Deployed in the McKenzie River Basin, Oregon

By Kathleen A. McCarthy, David A. Alvarez, and Jami H. Goldman

Prepared in cooperation with the Eugene Water and Electric Board

Data Series 692
Version 2.0, February 2013

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

U.S. Department of the Interior
KEN SALAZAR, Secretary

U.S. Geological Survey
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2012

Suggested citation:
McCarthy, K.A., Alvarez, D.A., and Goldman, J.H., 2012, Water-quality data from semipermeable-membrane devices and polar organic chemical integrative samplers deployed in the McKenzie River basin, Oregon: U.S. Geological Survey Data Series 692, 6 p.

Contents

Figures

Conversion Factors, Datum, and Acronyms

Conversion Factors

Inch/Pound to SI

Multiply	By	To obtain
inch (in.)	2.54	centimeter (cm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.590	square kilometer (km^2)
gallon (gal)	3.785	liter (L)
gallon (gal)	0.003785	cubic meter (m^3)

SI to Inch/Pound

Multiply	By	To obtain
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
square kilometer (km^2)	0.3861	square mile (mi^2)
liter (L)	0.2642	gallon (gal)
cubic meter (m^3)	264.2	gallon (gal)
nanogram (ng)	35.27×106	ounce, avoirdupois (oz)
picogram (pg)	35.27×109	ounce, avoirdupois (oz)

Datum

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Acronyms

CERC	Columbia Environmental Research Center
DEET	N,N-diethyltoluamide
DEHP	Diethylhexylphthalate
EEQ	Estradiol equivalent
EST	Environmental Sampling Technologies, Inc.
EWEB	Eugene Water and Electric Board
HCB	Hexachlorobenzene
MDLs	Method detection limits
MQLs	Method quantification limits
NQ	Not quantified
PAH	Polycyclic aromatic hydrocarbon
PBDE	Polybrominated diphenyl ether
PCA	Pentachloroanisole
PCB	Polychlorinated biphenyl
POCIS	Polar organic chemical integrative sampler
PRC	Performance reference compound
QC	Quality control
RSD	Relative standard deviation
SEC	Size exclusion chromatography
SPMD	Semipermeable membrane device
USGS	U.S. Geological Survey

Water-Quality Data from Semipermeable-Membrane Devices and Polar Organic Chemical Integrative Samplers Deployed in the McKenzie River Basin, Oregon

By Kathleen A. McCarthy, David A. Alvarez, and Jami H. Goldman

Abstract

Two types of passive samplers—the semipermeable membrane device (SPMD) and the polar organic chemical integrative sampler (POCIS)—are being used to collect data from the McKenzie River, Oregon. The McKenzie River is the source of drinking water for the City of Eugene, Oregon, and passive-sampler data are part of an ongoing monitoring effort designed to help understand and protect the drinking water source. Data from the passive samplers are reported here. This data report is dynamic and will be appended with additional data as they become available.

Introduction

The McKenzie River is the source of drinking water for approximately 200,000 people in the Eugene area of Oregon (fig. 1). To protect this source, the Eugene Water and Electric Board (EWEB) has implemented a source protection program (Eugene Water and Electric Board, 2000) that includes monitoring water in the McKenzie River basin for the presence of anthropogenic organic compounds.

Among the organic compounds of interest to EWEB are many that may have human-health consequences at concentrations that are orders of magnitude less than the detection limits associated with conventional water-sampling techniques. In addition, many compounds of interest may be present only during episodic events. Two types of passive samplers—the semipermeable membrane device (SPMD) and the polar organic chemical integrative sampler (POCIS)—are being used to address these particular challenges. Both the SPMD (Huckins and others, 2006) and POCIS (Alvarez and others, 2004, 2007) samplers are well suited to overcoming the difficulties of measuring low analyte concentrations and recording episodic analyte loading.

This report presents data obtained from SPMD and POCIS samplers deployed as part of a cooperative study being conducted by the U.S. Geological Survey and EWEB. This report is dynamic, and additional appendixes will be added as new data become available.

Environmental Setting and Data-Collection Sites

The environmental setting of the McKenzie River basin and a discussion of sampling sites in the basin have been previously reported in McCarthy and others (2009) and Kelly and others (2012).

Sample Collection, Laboratory Methods, and Quality Assurance

The methods used to collect, prepare, and analyze samples and to assure the quality of the data are presented in detail in McCarthy and others (2009). Methods are briefly summarized and details specific to each data set are included as a “methods” worksheet in the data workbooks (see appendixes).

SPMD and POCIS Data

The SPMD and POCIS data are available in the appendixes of this report as Microsoft© Excel 2007 (.xlsx) files at http://pubs.usgs.gov/ds/692/.

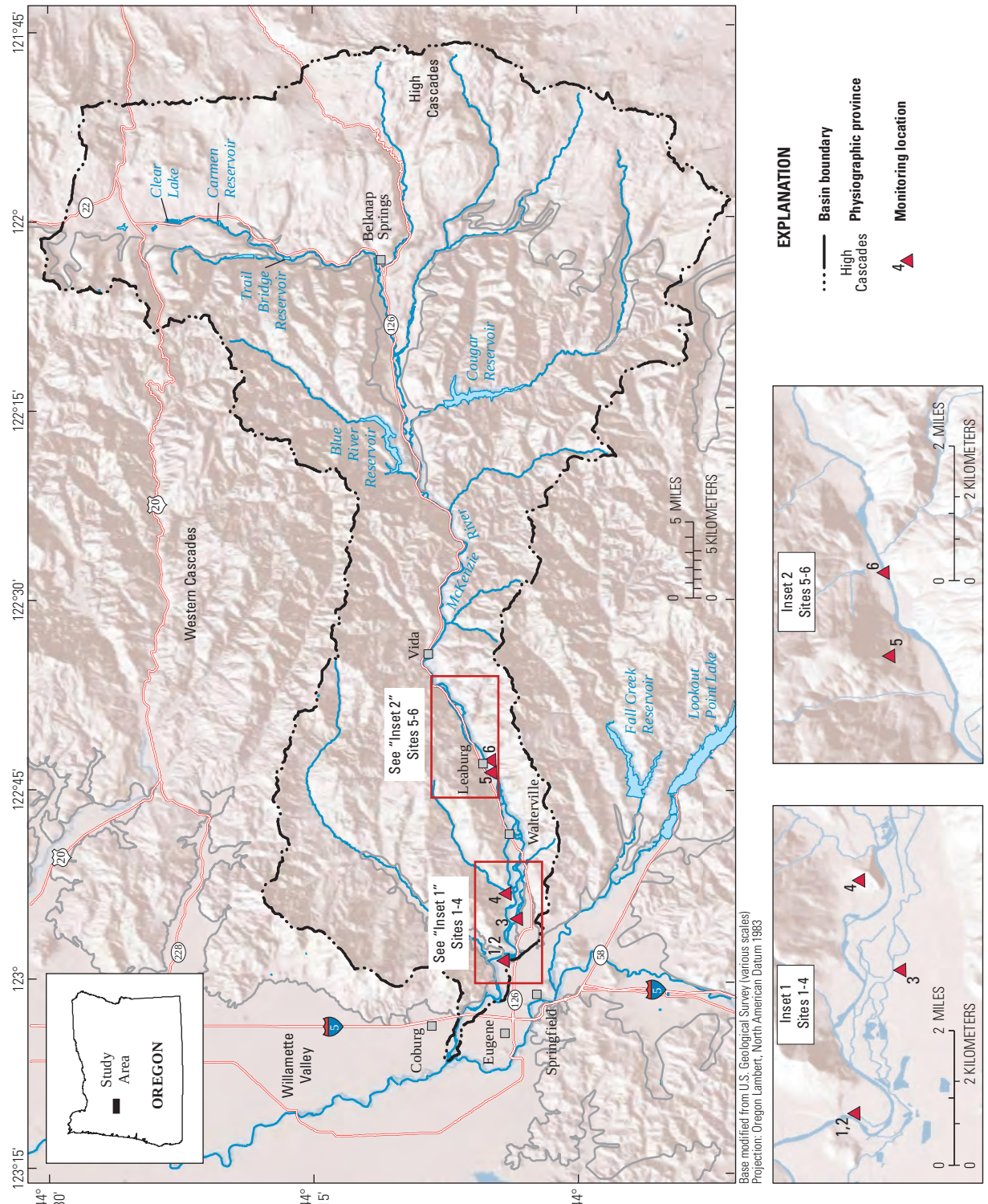

Figure 1. Study area location and data-collection sites, McKenzie River basin, Oregon.

References Cited

Alvarez, D.A., 2010, Guidelines for the use of the semipermeable membrane device (SPMD) and the polar organic chemical integrative sampler (POCIS) in environmental monitoring studies: U.S. Geological Survey, Techniques and Methods 1–D4, 28 p. (Also available at http://pubs.usgs.gov/tm/tm1d4/.)

Alvarez, D.A., Cranor, W.L., Perkins, S.D., Clark, R.C., and Smith, S.B., 2008a, Chemical and toxicological assessment of organic contaminants in surface water using passive samplers: Journal of Environmental Quality, v. 37, p. 1024-1033.

Alvarez, D.A., Cranor, W.L., Perkins, S.D., Schroeder, V.L., Werner, S.L., Furlong, E.T., and Holmes, J., 2008b, Investigation of organic chemicals potentially responsible for mortality and intersex in fish of the North Fork of the Shenandoah River, Virginia, during spring of 2007: U.S. Geological Survey Open-File Report 2008-1093, 16 p. (Also available at http://pubs.er.usgs.gov/publication/ofr20081093.)

Alvarez, D.A., Huckins, J.N., Petty, J.D., Jones-Lepp, F., Stuer-Lauridsen, F., Getting, D.T., Goddard, J.P., and Gravell, A., 2007, Water sampling—Polar organic chemical integrative sampler (POCIS), *in* Greenwood, R., Mills, G., and Vrana, B., eds., Passive sampling techniques in environmental monitoring, 48: Amsterdam, Elsevier, p. 171–198.

Alvarez, D.A., Petty, J.D., Huckins, J.N., Jones-Lepp, T.L., Getting, D.T., Goddard, J.P., and Manahan, S.E., 2004, Development of a passive, in situ, integrative sampler for hydrophilic organic contaminants in aquatic environments: Environmental Toxicology and Chemistry, v. 23, no. 7, p. 1640–1648.

Eugene Water and Electric Board, 2000, Drinking water protection plan: Eugene, Oreg., Eugene Water and Electric Board Technical Report, 23 p., accessed April 20, 2012, at http://www.eweb.org/public/documents/water/WaterProtectionPlan.pdf.

Huckins, J.N., Petty, J.D., and Booij, K., 2006, Monitors of organic chemicals in the environment—semipermeable membrane devices: New York, Springer, 223 p.

Keith, L.H., 1991, Environmental sampling and analysis—A practical guide: Boca Raton, Fla., CRC Press, Inc., p. 101-113.

Kelly, V.J., Anderson, C.W., and Morgenstern, Karl, 2012, Reconnaissance of land-use sources of pesticides in drinking water, McKenzie River, Oregon: U.S. Geological Survey Scientific Investigations Report 2012-5091, 46 p. (Also available at http://pubs.usgs.gov/sir/2012/5091/.)

McCarthy, K.A., Alvarez, David, Anderson, C.W., Cranor, W.L., Perkins, S.D., and Schroeder, Vickie, 2009, Evaluation of passive samplers for long-term monitoring of organic compounds in the untreated drinking water supply for the City of Eugene, Oregon, September–October 2007: U.S. Geological Survey Scientific Investigations Report 2009–5178, 20 p. (Also available at http://pubs.usgs.gov/sir/2009/5178/.)

Petty, J.D., Orazio, C.E., Huckins, J.N., Gale, R.W., Lebo, J.A., Meadows, J.C., Echols, K.R., and Cranor, W.L., 2000, Considerations involved with the use of semipermeable membrane devices for monitoring environmental contaminants: Journal of Chromatography A, v. 879, p. 83-95.

This page intentionally left blank.

Appendix 1. Data from Passive Samplers Deployed in the Mckenzie River Basin, Oregon, During 2007.

Appendix 1 is a Microsoft© Excel spreadsheet and is available for download at http://pubs.usgs.gov/ds/692/.

Appendix 2. Data from Passive Samplers Deployed in the Mckenzie River Basin, Oregon, During 2010.

Appendix 2 is a Microsoft© Excel spreadsheet and is available for download at http://pubs.usgs.gov/ds/692/.

Appendix 3. Data from Passive Samplers Deployed in the McKenzie River basin, Oregon, During 2011.

Appendix 3 is a Microsoft© Excel spreadsheet and is available for download at http://pubs.usgs.gov/ds/692/.

This page intentionally left blank.

Publishing support provided by the U.S. Geological Survey
Publishing Network, Tacoma Publishing Service Center

For more information concerning the research in this report, contact the
Director, Oregon Water Science Center
U.S. Geological Survey
2130 SW 5th Avenue
Portland, Oregon 97201
http://or.water.usgs.gov