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Particle-Associated Contaminants in Street Dust, Parking Lot Dust, Soil, Lake-Bottom Sediment, and Suspended and Streambed Sediment, Lake Como and Fosdic Lake Watersheds, Fort Worth, Texas, 2004

Data Series 211

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Particle-Associated Contaminants in Street Dust, Parking Lot Dust, Soil, Lake-Bottom Sediment, and Suspended and Streambed Sediment, Lake Como and Fosdic Lake Watersheds, Fort Worth, Texas, 2004

By Jennifer T. Wilson[1], Peter C. Van Metre[1], Charles J. Werth[2], and Yanning Yang[2]

Abstract

A previous study of impaired water bodies in Fort Worth, Texas, by the U.S. Geological Survey, reported elevated but variable concentrations of particle-associated contaminants (PACs) comprising chlorinated hydrocarbons, polycyclic aromatic hydrocarbons, and trace elements in suspended and bed sediment of lakes and streams affected by urban land use. The U.S. Geological Survey, in cooperation with the City of Fort Worth, collected additional samples during October 2004 to investigate sources of PACs in the watersheds of two impaired lakes: Lake Como and Fosdic Lake. Source materials and aquatic sediment were sampled and analyzed for PACs. Source materials sampled consisted of street dust and soil from areas with residential and commercial land use and parking lot dust from sealed and unsealed parking lots. Aquatic sediment sampled consisted of bottom-sediment cores from the two lakes and suspended and streambed sediment from the influent stream of each lake. Samples were analyzed for chlorinated hydrocarbons (organochlorine pesticides and polychlorinated biphenyls), polycyclic aromatic hydrocarbons, major and trace elements, organic carbon, grain size, and radionuclides.

Introduction

Particle-associated contaminants (PACs) are an important component of urban nonpoint-source pollution to aquatic systems. PACs, which include chlorinated hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), and trace elements, pose a threat to aquatic biota and humans because many are persistent, bioaccumulative, or toxic (U.S. Environmental Protection Agency, 1997). Occurrence of PACs has resulted in the impairment of thousands of streams, lakes, and reservoirs. PACs were responsible for fish-consumption advisories for 35 percent of total lake acreage and 24 percent of total river mileage in the United States in 2004 (U.S. Environmental Protection Agency, 2005), and PACs comprise more than 20 percent of total maximum daily loads (TMDLs) nationwide (U.S. Environmental Protection Agency, 2006). Lakes and streams in Fort Worth, Tex., are among these impaired water bodies: Lake Como, Echo Lake, Fosdic Lake, and segments of the West Fork Trinity River and Clear Fork Trinity River are under fishing advisories or fish consumption bans and are included in part of a study of TMDLs for legacy pollutants (Van Metre and others, 2003). A “legacy pollutant” is a constituent once widely used for certain applications but now banned or withdrawn from such use.

The U.S. Geological Survey (USGS) studied the occurrence of and trends in PACs in several Fort Worth water bodies (Van Metre and others, 2003) and found relatively high concentrations of chlorinated hydrocarbons, PAHs, and trace elements in the more urban sites. The USGS also found that legacy pollutants and PAHs were not uniformly preserved in bottom sediment in the lakes as they were in suspended sediment in streams (Van Metre and Mahler, 2004).

Higher concentrations of some organic pollutants in streams relative to the downstream reservoirs raises several questions, including: Are some contaminant concentrations in street dust and soil much higher than indicated by measurements in aquatic sediment? One potential PAH contaminant source of particular interest is parking lot sealcoat, the black, shiny substance sprayed or painted on the surfaces of parking lots and driveways to protect the underlying asphalt and to enhance appearance. A recent study of PAH sources to urban water bodies (Mahler and others, 2005), found that sealcoats have extremely high concentrations of PAHs and that sealcoats could account for the majority of PAHs in the streams studied.

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Those streams included the inflows to Lake Como and Fosdic Lake in Fort Worth.

This report, prepared by the USGS in cooperation with the City of Fort Worth and in collaboration with the University of Illinois, documents measured concentrations of PACs in various source materials and aquatic sediment in the Lake Como and Fosdic Lake watersheds (figs. 1 and 2). Source materials consisted of street dust, parking lot dust, and soil. Aquatic sediment consisted of bottom-sediment cores from the two lakes and suspended and streambed sediment from the influent stream to each lake.

Approach

Study Design and Sampling

Samples of source materials and aquatic sediment from the watersheds of Lake Como and Fosdic Lake were collected and analyzed for PACs. Samples of residential street dust, parking lot dust from sealed and unsealed commercial parking lots, commercial soil, residential soil, lake-bottom sediment (core), and suspended and streambed sediment were collected from each watershed. Sampling of street and parking lot dust, soil, and lake-bottom sediment was done during October 20–21, 2004. The street and parking lot dust and soil samples were composed of material expected to wash off (street and parking lot dust) or deemed most likely to erode (soil) in the next rain storm. Sampling of suspended sediment was done during a storm on October 22, 2004. Sampling of streambed sediment was completed after the stormflow receded on October 25, 2004.

Street and parking lot dust samples were collected by sweeping with clean, nylon push brooms and dust pans. Parking lot samples were a composite sample from three commercial parking lots of each surface type, sealed or unsealed. Residential asphalt street dust samples were a composite of sweepings from three blocks of residential roadway in each watershed (figs. 1 and 2). These samples were sieved using a 1-millimeter sieve, homogenized, and split for chemical analyses. Samples for analyses of organic compounds were stored chilled pending analysis.

Each soil sample was a composite of material scraped from an exposed area of soil (scraped to about 1-centimeter deep or less) within a few meters of the street. About 40 locations distributed randomly over a several-block commercial or residential area were sampled to form each composite sample (figs. 1 and 2). About 4 liters of material were collected, air-dried under a hood, broken up, and passed through a 1-millimeter sieve. The material that passed the sieve was homogenized and split for chemical analyses.

Bottom-sediment core samples from the lakes were collected using a 14- by 14-centimeter-square, 50-centimeter-tall box corer following the sampling methods of Van Metre and others (2004). Four cores were collected from a single site in each lake (figs. 1 and 2), corresponding to the lower lake site in Lake Como and mid-lake site in Fosdic Lake reported by Van Metre and others (2003). The cores were sliced at 5-centimeter intervals by vertical extrusion, and segments from corresponding depth intervals from the four cores were combined to form six composite samples to a depth of 30 centimeters. Samples were homogenized, split, and stored chilled.

Suspended sediment samples were obtained during a storm that caused runoff on October 22, 2004, the day after street and parking lot dust, soil, and lake-bottom sediment sampling was completed. Samples were collected by filling three 25-liter polycarbonate containers with water during storm runoff and then filtering the samples at the USGS Texas Water Science Center (WSC) in Fort Worth to isolate the sediment following the method of Mahler and Van Metre (2003). Samples were collected at the same site on each influent stream that was monitored for suspended-sediment chemistry and loads by Van Metre and others (2003). The 25-liter containers were filled by submerging them in the center of the small (1- to 2-meter wide) channel of each stream (figs. 1 and 2). Sediment for elemental analyses was isolated by filtration using 0.45-micrometer Teflon filters held in 140-millimeter-diameter acrylic filter holders. Sediment for organic-compound analyses was isolated by filtration using 0.45-micrometer Teflon filters held in 293-millimeter-diameter stainless steel filter holders. Two organic-compound filters (reused twice each) and eight elemental-analyses filters were used for the Lake Como inflow sample. Three organic-compound filters (reused twice each) and five elemental-analyses filters were used to isolate sediment from the Fosdic Lake inflow sample. For both lakes, all 75 liters were filtered.

Streambed sediment samples were collected 3 days after the storm, on October 25, 2004, from pools in the influent streams to the two lakes near the locations where suspended sediment samples were collected (figs. 1 and 2). Samples were collected from areas of the channel where fine-grained sediment tends to accumulate by scooping the soft, relatively fine-grained sediment with a 125-milliliter baked glass sampling jar. Numerous scoops were combined in 4-liter baked glass sampling jars (total of 6.5 liters from Lake Como inflow channel and 9 liters from Fosdic Lake inflow channel). The wet material was chilled and sieved using a 1-millimeter mesh sieve at the USGS Texas WSC in Austin. The material that passed the sieve was homogenized and split into subsamples for chemical analyses.

Analytical

Analyses included chlorinated hydrocarbons (organochlorine pesticides and polychlorinated biphenyls [PCBs]), PAHs, and major and trace elements. Selected samples were analyzed for organic carbon, grain size, and radionuclides. Samples for analysis of organic compounds were chilled and shipped wet to the USGS National Water Quality Laboratory

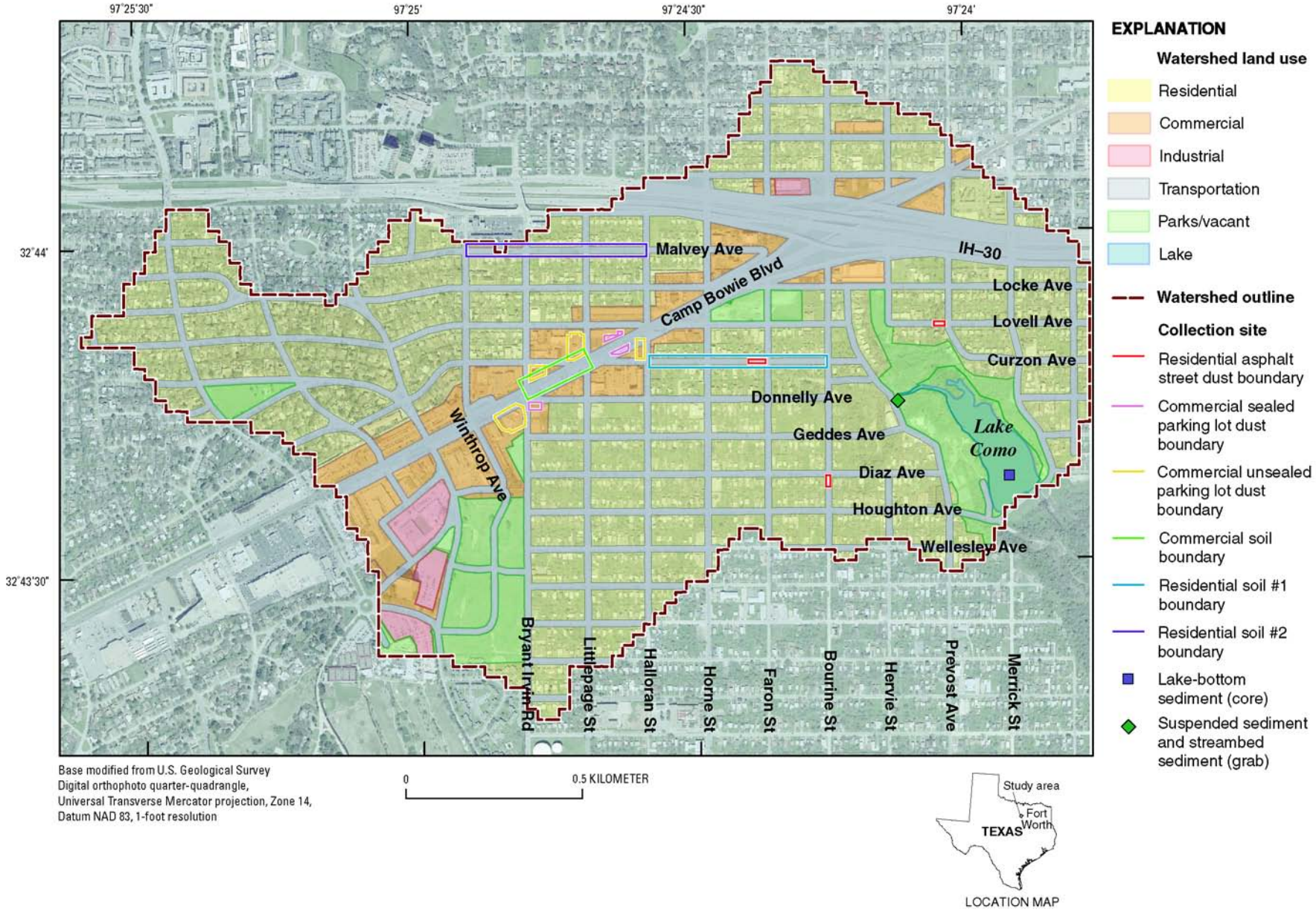

Figure 1. Sites where samples of street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment were collected in Lake Como watershed, October 2004.

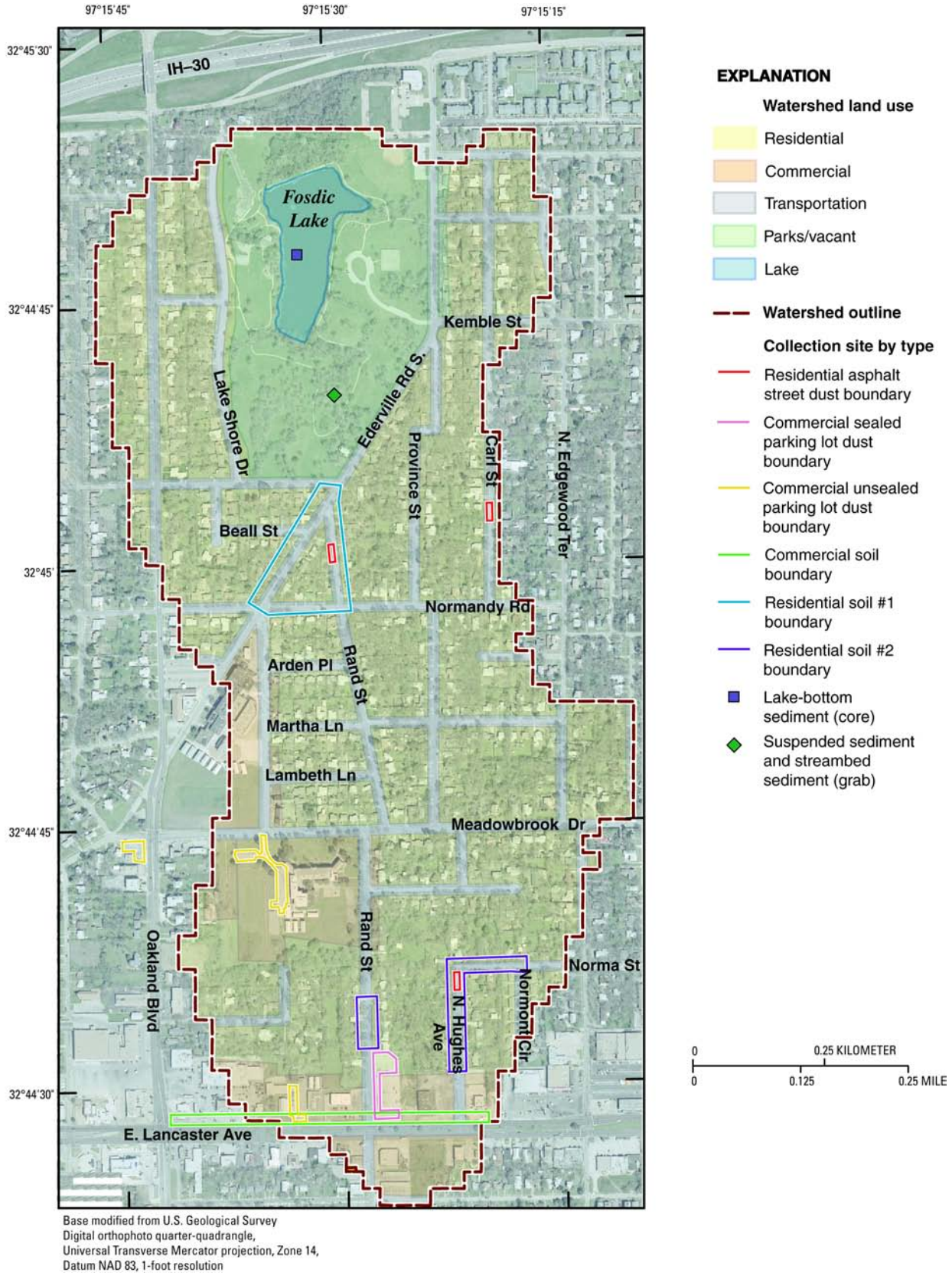

Figure 2. Sites where samples of street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment were collected in Fosdic Lake watershed, October 2004.

(NWQL) in Denver, Colo. Samples for analyses of major and trace elements, forms of carbon, and radionuclides were freeze-dried and ground to a fine powder at the USGS Texas WSC in Austin, prior to analyses by the USGS Geology Discipline Mineral Resources Team Laboratory in Denver, Colo. Samples for analysis of organic carbon were chilled and shipped wet to the laboratory of the University of Illinois Urbana-Champaign, in Urbana, Ill. Samples for analysis of grain size were chilled and shipped wet to the USGS Iowa WSC sediment laboratory in Iowa City. The Iowa sediment laboratory did the grain-size analyses of lake-bottom and streambed sediment samples using sieve and pipet methods (Guy, 1969). Brief descriptions of the other analytical procedures follow.

Organic Compounds

Organochlorine pesticides, PCBs, PAHs, and alkyl-substituted PAHs (alkyl-PAHs) were extracted, isolated, and analyzed using the procedures of Noriega and others (2003) and Olson and others (2003). Briefly, wet lake-bottom sediment and streambed sediment were extracted overnight with dichloromethane in a Soxhlet apparatus. The extract was reduced in volume and filtered. Two aliquots of the sample extract were quantitatively injected into a polystyrene-divinylbenzene gel permeation column and eluted with dichloromethane to remove sulfur and partially isolate the target analytes. The first aliquot was analyzed for PAHs and alkyl-PAHs by capillary-column gas chromatography with detection by full-scan mass spectrometry (MS) or by selected ion monitoring MS. Eighteen parent PAHs, nine specific alkyl-PAHs, and the homologous series of alkyl-PAHs for 2- to 5-ringed PAH were determined.

The second aliquot was split into two sample fractions by combined alumina/silica adsorption chromatography, followed by Florisil adsorption chromatography for further cleanup of the second fraction. Both fractions were analyzed by dual capillary-column gas chromatography with electron capture detection (GC-ECD) for the determination of the organochlorine pesticides and PCBs. Organochlorine pesticides were reported as individual compounds, and PCBs were reported as individual Aroclor (1016/1242, 1254, or 1260) equivalents.

The PCB fraction of the organic compound analysis was analyzed for 27 (of 209 possible) selected PCB congeners along with the other analytes during GC-ECD analysis. The congeners chosen for this analysis were some of the more dominant congeners in the most widely used Aroclors (1016, 1242, 1254, and 1260). In addition to the dominance of these congeners, potential coelution issues and signal response for this analytical method were considered. A series of dilutions of a custom mixture containing the 27 selected PCB congeners was used to make the calibration standards. Calibration standards were prepared at four concentrations, and a minimum of three points were used for the calibration curves. An additional congener solution, prepared at a concentration that was mid-range on the curve, was used as a check standard to verify the calibration curve.

Quality assurance for organic compound analyses was provided by analyzing an environmental duplicate sample, a blank sample, and a spiked sample and by monitoring recovery of surrogate compounds with each set of 12 environmental samples. Van Metre and others (2004) reported that the median relative percent differences using these methods for chlorinated hydrocarbons was 11.8 percent for 41 duplicate samples and for PAHs was 11.9 percent for 40 samples.

Major and Trace Elements

Elemental concentrations were determined on concentrated-acid (hydrochloric-nitric-perchloric-hydrofloric) digests ("total" digestions) by inductively coupled plasma/mass spectrometry at the Mineral Resources Team laboratory in Denver (Briggs and Meier, 2003). Concentrations of mercury were determined by cold-vapor atomic adsorption spectroscopy (Brown and others, 2003). Total carbon was measured by combustion with an automatic carbon analyzer, inorganic carbon was measured as carbon dioxide by coulometric titration, and organic carbon was computed by difference (Arbogast, 1996). Quality assurance was provided by analyzing several standard reference materials, sample replicates, and a blank sample with each batch of as many as 20 samples.

Organic Carbon

Percent organic carbon was determined for selected sediment samples at the University of Illinois Urbana-Champaign laboratory. Sediment was air-dried, ground, and passed through a 200-mesh (75-micrometer) sieve. Inorganic carbon was removed with a 4-normal (N) hydrochloric acid (HCl) treatment, followed by 22-N hydrofluoric acid (HF) and 6-N HCl treatments to remove silicate minerals (Durand and Nicaise, 1980). Easily extracted organic matter such as polysaccharides and other hydrolyzable organic matter was removed by treatment with trifluoroacetic acid (Gelinas and others, 2001). Humic and fulvic acids then were extracted from the sample (Swift, 1996). Humic acid was extracted using 0.1-molar sodium hydroxide (NaOH) and precipitated by neutralization using 6-molar HCl. Fulvic acid, which is not precipitated with 6-molar HCl, was separated by passing through a column of XAD-8 (acrylic ester composition). At this point, the remaining carbon material was enriched in kerogen and black carbon. Kerogen was removed by heat treatment leaving only black carbon. After each treatment step, total organic carbon was analyzed using a carbon dioxide coulometer and thermal combustion at 950 degrees Celsius (Li and Werth, 2001).

Radionuclides

Selected samples from the two lake-bottom sediment cores were analyzed for lead-210 (^{210}Pb), radium-226 (^{226}Ra), and

cesium-137 (^{137}Cs) at a USGS laboratory in Menlo Park, Calif. Activities of total ^{210}Pb, ^{226}Ra, and ^{137}Cs were measured simultaneously by gamma spectrometry on the basis of American Society for Testing and Materials (ASTM) methods C 1402–98 and E 181–98. The analytical method used for the samples in this study is similar to methods described by Robbins and Edgington (1975), Baskaran and Naidu (1994), and Fuller and others (1999). Subsamples of dried sediment samples were counted for radionuclide activity using a high-resolution intrinsic germanium detector gamma spectrometer. The supported ^{210}Pb activity, defined by the ^{226}Ra activity, was determined on each sample from the 352 and 609 kiloelectron-volt gamma emission lines of lead-214 and bismuth-214 (the short-lived daughters of ^{226}Ra), respectively. Self-absorption of the gamma emission line for each isotope was accounted for using an attenuation factor for each counting container calculated from an empirical relation between self-absorption and bulk density developed for this geometry on the basis of the method of Cutshall and others (1983). Detector efficiency for each isotope was determined from National Institute of Standards and Technology traceable standards. National Institute of Standards and Technology and International Atomic Energy Agency reference materials were counted monthly to check detector calibration. The reported uncertainty in the measured activity was calculated from the random counting error of samples, and background spectra at the one standard deviation level was typically within ±10 percent. The measured activities of replicate analysis of material from the same sample agreed to within 15 percent.

Particle-Associated Contaminants in Street Dust, Parking Lot Dust, Soil, Lake-Bottom Sediment, and Suspended and Streambed Sediment

Results of selected physical and chemical analyses (detected constituents only) are presented in tables 1–6 (at end of report). Analyses were not completed for samples collected from parking lots in the Fosdic Lake watershed because sample jars were broken during shipment to the laboratory. Total DDT was computed as the sum of the detected and estimated (identified with an "E" before the concentration) concentrations of *p,p'*-DDD, *p,p'*-DDE, and *p,p'*-DDT. Technical chlordane was computed as 1.6 times the sum of the detected and estimated concentrations of *cis*-chlordane, *trans*-chlordane, and *trans*-nonachlor (Dennis Markovich, U.S. Geological Survey National Water Quality Laboratory, written commun., 2006). The sum of the PCB Aroclors was computed as the sum of the detected and estimated concentrations of PCB Aroclors 1016/1242, 1254, and 1260. The sum of the PCB congeners was computed as the sum of the detected and estimated concentrations of 18 congeners ranging from PCB 52 to PCB 206. Total PAH was computed as the sum of the detected and estimated concentrations of 13 PAHs: napthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, 9H-fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benz(*a*)anthracene, chrysene, dibenzo(*a,h*)anthracene, and benzo(*a*)pyrene (Ingersoll and others, 2000).

The most notable result is the very high PAH concentration in the sample from sealed parking lots in the Lake Como watershed. Total PAH concentration in the sealed parking lot sample is 980,000 micrograms per kilogram, more than 30 times greater than the total PAH concentration of 32,000 micrograms per kilogram measured in the unsealed parking lot sample (table 2). These concentrations are consistent with concentrations in particles collected from runoff from sealed and unsealed parking lots as reported by Mahler and others (2005) for parking lots in Austin. Also noteworthy are the few high concentrations of organochlorine pesticides in commercial and residential soil.

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Table 1. Selected chlorinated hydrocarbon compound concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004.

[In micrograms per kilogram except as indicated; parking lot dust samples not available from Fosdic Lake; concentration in bold exceeds probable effect concentration (MacDonald and others, 2000). ID, identifier; resid., residential; <, nondetection at indicated value; comm., commercial; pkng., parking; lab. dup., laboratory duplicate; E, estimated; --, not applicable; na, not available; nd, not detected]

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	Sample mass (grams)	Aldrin	*p,p′*-DDD	*p,p′*-DDE	*p,p′*-DDT	Dieldrin	Heptachlor epoxide	*p,p′*-Methoxy-chlor
				Lake Como						
CMO resid. asphalt street dust	Street dust (sweeping)	200512301	25.0	<2.0	<24	1.8	<42	<5.0	<1.5	<3.5
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512301	27.4	<2.0	<25	<1.5	<20	<5.0	<15	<35
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512301	24.9	<2.0	<2.5	<1.5	<1.0	<.5	<1.5	<3.5
CMO comm. soil	Soil (grab)	200512301	23.2	<2.0	<2.5	1.4	1.4	1.6	2.5	<3.5
CMO comm. soil lab. dup.	Soil (grab)	200512301	23.2	<2.0	<2.5	1.3	1.7	2.0	2.3	<3.5
CMO resid. soil #1	Soil (grab)	200512301	24.5	<2.0	<2.5	7.4	<1.0	17	2.6	<3.5
CMO resid. soil #2	Soil (grab)	200512301	23.8	<2.0	**31**	**110**	35	**71**	11	<3.5
CMO (0–5)	Lake-bottom sediment (core)	200509402	8.9	E3.3	17	8.4	<2.0	14	<3.0	<7.0
CMO (10–15)	Lake-bottom sediment (core)	200509402	10.2	<4.0	16	E9.4	<2.0	7.5	<3.0	<7.0
CMO (25–30)	Lake-bottom sediment (core)	200509402	11.1	<4.0	16	E12	<2.0	6.8	<3.0	<7.0
Como inflow	Suspended sediment	200509402	.50	<94	<118	<71	<47	61	<71	<165
Como inflow	Streambed sediment (grab)	200506805	21.1	<2.0	E1.9	3.5	E1.0	6.9	E.9	<3.5
				Fosdic Lake						
FOS resid. asphalt street dust	Street dust (sweeping)	200512301	24.9	<2.0	<2.5	4.6	<2.4	2.9	<1.5	<3.5
FOS comm. soil	Soil (grab)	200515209	29.4	<2.0	E2.0	**180**	**63**	23	1.7	<3.5
FOS resid. soil #1	Soil (grab)	200512301	24.5	<2.0	E5.5	17	4.5	23	<1.5	<3.5
FOS resid. soil #2	Soil (grab)	200515209	29.1	<2.0	6.1	19	12	51	<1.5	<3.5
FOS (0–5)	Lake-bottom sediment (core)	200509402	8.4	4.6	27	28	3.0	24	<3.0	<7.0
FOS (5–10)	Lake-bottom sediment (core)	200509402	7.6	<6.0	**31**	**32**	15	21	<4.5	<10.5
FOS (10–15)	Lake-bottom sediment (core)	200509402	7.4	<6.0	23	28	4.9	12	<4.5	<10.5
FOS (15–20)	Lake-bottom sediment (core)	200509402	8.3	<2.0	**37**	27	E1.8	7.2	<1.5	<3.5
FOS (20–25)	Lake-bottom sediment (core)	200515209	11.5	<4.0	16	22	E1.3	3.0	<3.0	<7.0
FOS (25–30)	Lake-bottom sediment (core)	200515209	12.1	<4.0	22	**37**	E1.2	3.5	<3.0	<7.0
Fosdic inflow	Suspended sediment	200509402	1.2	<40	<50	<30	31	17	<30	<70
Fosdic inflow	Streambed sediment (grab)	200509402	23.7	<2.0	12	E5.4	18	17	2.0	E21
Sediment-quality guidelines										
Threshold effect concentration	--	--	--	na	4.88	3.16	4.16	1.9	2.47	na
Probable effect concentration	--	--	--	na	**28**	**31.3**	**62.9**	**61.8**	**16.0**	na

Table 1. Selected chlorinated hydrocarbon compound concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	*cis*-Chlordane	*trans*-Chlordane	*trans*-Nonachlor	PCB Aroclor 1016/1242	PCB Aroclor 1254	PCB Aroclor 1260	PCB 52	PCB 70	PCB 95	PCB 101
					Lake Como							
CMO resid. asphalt street dust	Street dust (sweeping)	200512301	<1.0	<1.0	<1.0	<5.0	6.3	6.8	<1.0	<1.0	<1.0	<1.0
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512301	<10	<5.0	<10	<5.0	7.8	E3.8	<1.0	1.2	1.1	<1.0
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512301	E.7	<.5	<1.0	<5.0	23	E2.5	E.8	E.6	1.5	2.4
CMO comm. soil	Soil (grab)	200512301	1.0	1.7	1.3	<5.0	<5.0	7.9	<1.0	<1.0	<1.0	<1.0
CMO comm. soil lab. dup.	Soil (grab)	200512301	1.3	2.2	2.1	<5.0	<5.0	7.2	<1.0	<1.0	<1.0	<1.0
CMO resid. soil #1	Soil (grab)	200512301	13	10	27	<5.0	24	41	<1.0	<1.0	E.9	1.8
CMO resid. soil #2	Soil (grab)	200512301	21	26	53	<5.0	E3.8	25	<1.0	<1.0	<1.0	<1.0
CMO (0–5)	Lake-bottom sediment (core)	200509402	13	14	13	10	13	17	<2.0	<2.0	<2.0	<2.0
CMO (10–15)	Lake-bottom sediment (core)	200509402	9.0	11	8.5	E6.3	E13	E20	<2.0	<2.0	<2.0	<2.0
CMO (25–30)	Lake-bottom sediment (core)	200509402	12	14	10	E9.3	E21	E29	<2.0	E1.0	E1.4	E1.4
Como inflow	Suspended sediment	200509402	E27	34	E32	<235	<235	<235	<47	<47	<47	<47
Como inflow	Streambed sediment (grab)	200506805	3.4	3.5	3.3	<5.0	9.1	9.9	<1.0	<1.0	<1.0	E.5
					Fosdic Lake							
FOS resid. asphalt street dust	Street dust (sweeping)	200512301	2.8	2.7	2.2	<5.0	13	E3.6	E.6	<1.0	E.8	1.3
FOS comm. soil	Soil (grab)	200515209	3.1	4.6	2.5	<5.0	10	8.3	<1.0	<1.0	E.8	E1.0
FOS resid. soil #1	Soil (grab)	200512301	2.3	2.0	6.8	<5.0	6.3	16	<1.0	<1.0	<1.0	E.5
FOS resid. soil #2	Soil (grab)	200515209	<1.0	<.5	<1.0	E2.3	E3.4	E6.2	<1.0	<1.0	<1.0	<1.0
FOS (0–5)	Lake-bottom sediment (core)	200509402	25	33	25	<10	31	40	<2.0	<2.0	E1.6	2.2
FOS (5–10)	Lake-bottom sediment (core)	200509402	24	29	23	<15	34	42	<3.0	<3.0	E1.9	E2.5
FOS (10–15)	Lake-bottom sediment (core)	200509402	15	18	13	<15	31	47	<3.0	<3.0	E1.9	E2.6
FOS (15–20)	Lake-bottom sediment (core)	200509402	8.3	12	6.9	<5.0	35	48	<1.0	<1.0	E2.1	E2.9
FOS (20–25)	Lake-bottom sediment (core)	200515209	6.3	9.7	5.1	33	29	49	E1.7	<2.0	E1.3	4.2
FOS (25–30)	Lake-bottom sediment (core)	200515209	6.3	12	4.9	<10	37	65	E1.6	E1.0	3.4	5.1
Fosdic inflow	Suspended sediment	200509402	E8.3	E9.2	E8.2	<100	<100	<100	<20	<20	<20	<20
Fosdic inflow	Streambed sediment (grab)	200509402	3.7	4.1	4.1	<5.0	E2.4	E3.0	<1.0	<1.0	<1.0	<1.0
Sediment-quality guidelines												
Threshold effect concentration	--	--	na	na	na	na	na	na	na	na	na	na
Probable effect concentration	--	--	na	na	na	na	na	na	na	na	na	na

Table 1. Selected chlorinated hydrocarbon compound concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	PCB 110	PCB 118	PCB 138	PCB 146	PCB 149	PCB 151	PCB 170	PCB 174	PCB 177	PCB 180	PCB 183
						Lake Como							
CMO resid. asphalt street dust	Street dust (sweeping)	200512301	<1.0	<1.0	E0.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	E0.7	<1.0
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512301	E.7	E.5	<1.0	<1.0	<1.0	<1.0	<1.0	E.6	<1.0	<1.0	<1.0
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512301	2.2	1.8	1.6	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CMO comm. soil	Soil (grab)	200512301	<1.0	<1.0	E.8	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	E.8	<1.0
CMO comm. soil lab. dup.	Soil (grab)	200512301	<1.0	<1.0	E.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	E.7	<1.0
CMO resid. soil #1	Soil (grab)	200512301	2.7	3.0	9.0	E.9	2.6	E.5	2.3	1.1	E.8	3.6	E.6
CMO resid. soil #2	Soil (grab)	200512301	<1.0	<1.0	2.2	<1.0	E.6	<1.0	E.9	E.7	E.5	2.3	<1.0
CMO (0–5)	Lake-bottom sediment (core)	200509402	E1.3	<2.0	2.0	<2.0	E1.1	<2.0	<2.0	<2.0	<2.0	E1.6	<2.0
CMO (10–15)	Lake-bottom sediment (core)	200509402	E1.4	<2.0	2.1	<2.0	E1.3	<2.0	<2.0	<2.0	<2.0	E1.7	<2.0
CMO (25–30)	Lake-bottom sediment (core)	200509402	2.3	E1.5	3.3	<2.0	2.0	<2.0	E1.1	E1.1	<2.0	2.6	<2.0
Como inflow	Suspended sediment	200509402	<47	<47	<47	<47	<47	<47	<47	<47	<47	<47	<47
Como inflow	Streambed sediment (grab)	200506805	E.7	E.5	1.5	<1.0	E.5	<1.0	E.5	<1.0	<1.0	E.9	<1.0
						Fosdic Lake							
FOS resid. asphalt street dust	Street dust (sweeping)	200512301	1.2	1.1	1.4	<1.0	E.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
FOS comm. soil	Soil (grab)	200515209	1.7	1.2	2.2	<1.0	E.9	<1.0	E.6	<1.0	<1.0	1.2	<1.0
FOS resid. soil #1	Soil (grab)	200512301	E.6	E.9	2.3	<1.0	E.8	<1.0	E.8	<1.0	<1.0	1.3	<1.0
FOS resid. soil #2	Soil (grab)	200515209	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	E.8	<1.0
FOS (0–5)	Lake-bottom sediment (core)	200509402	2.8	2.4	5.1	<2.0	2.8	<2.0	E1.6	E1.4	E1.0	3.5	E1.0
FOS (5–10)	Lake-bottom sediment (core)	200509402	3.2	E2.5	5.7	<3.0	3.3	<3.0	E1.8	E1.6	<3.0	3.8	<3.0
FOS (10–15)	Lake-bottom sediment (core)	200509402	3.1	E2.4	5.8	<3.0	3.4	<3.0	E1.9	E1.6	<3.0	4.1	<3.0
FOS (15–20)	Lake-bottom sediment (core)	200509402	3.5	E2.6	6.5	<1.0	3.8	<1.0	E2.1	E1.8	<1.0	4.5	<1.0
FOS (20–25)	Lake-bottom sediment (core)	200515209	4.8	4.0	7.7	E1.8	5.4	E1.3	4.0	2.5	2.7	6.3	2.1
FOS (25–30)	Lake-bottom sediment (core)	200515209	5.9	4.9	9.2	2.4	6.8	2.5	5.0	3.5	3.4	8.6	2.7
Fosdic inflow	Suspended sediment	200509402	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Fosdic inflow	Streambed sediment (grab)	200509402	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Sediment-quality guidelines													
Threshold effect concentration	--	--	na	na	na	na	na	na	na	na	na	na	na
Probable effect concentration	--	--	na	na	na	na	na	na	na	na	na	na	na

Table 1. Selected chlorinated hydrocarbon compound concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	PCB 187	PCB 194	PCB 206	Calculated values			
						Total DDT	Technical chlordane	Sum of PCB Aroclors	Sum of PCB congeners
Lake Como									
CMO resid. asphalt street dust	Street dust (sweeping)	200512301	<1.0	<1.0	<1.0	E1.8	<3.0	E13	E1.3
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512301	<1.0	<1.0	<1.0	<47	<25	E12	E4.1
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512301	<1.0	<1.0	<1.0	<5.0	E1.1	E26	E12
CMO comm. soil	Soil (grab)	200512301	<1.0	<1.0	E.6	E2.8	E6.4	E7.9	E2.2
CMO comm. soil lab. dup.	Soil (grab)	200512301	<1.0	<1.0	<1.0	E3.0	E9.0	E7.2	E1.4
CMO resid. soil #1	Soil (grab)	200512301	1.2	<1.0	E.5	E7.4	**E80**	E65	E32
CMO resid. soil #2	Soil (grab)	200512301	1.5	<1.0	<1.0	176	**E160**	E29	E8.7
CMO (0–5)	Lake-bottom sediment (core)	200509402	<2.0	<2.0	<2.0	E26	**E64**	41	E6.0
CMO (10–15)	Lake-bottom sediment (core)	200509402	E1.0	<2.0	<2.0	E25	**E45**	E39	E7.5
CMO (25–30)	Lake-bottom sediment (core)	200509402	E1.6	<2.0	<2.0	E28	**E57**	E59	E19
Como inflow	Suspended sediment	200509402	<47	<47	<47	<236	**E149**	<705	nd
Como inflow	Streambed sediment (grab)	200506805	E.6	<1.0	<1.0	E6.4	E16	E19	E5.7
Fosdic Lake									
FOS resid. asphalt street dust	Street dust (sweeping)	200512301	<1.0	<1.0	<1.0	E4.6	E12	E17	E7.0
FOS comm. soil	Soil (grab)	200515209	E.6	<1.0	<1.0	245	E16	E18	E10
FOS resid. soil #1	Soil (grab)	200512301	E.8	<1.0	E.8	E27	**E18**	E22	E8.8
FOS resid. soil #2	Soil (grab)	200515209	E.6	<1.0	<1.0	37	<2.5	E12	E2.9
FOS (0–5)	Lake-bottom sediment (core)	200509402	2.2	E1.1	<2.0	58	**E132**	E71	E29
FOS (5–10)	Lake-bottom sediment (core)	200509402	E2.3	<3.0	<3.0	79	**E121**	E76	E29
FOS (10–15)	Lake-bottom sediment (core)	200509402	E2.5	<3.0	<3.0	51	**E73**	E79	E29
FOS (15–20)	Lake-bottom sediment (core)	200509402	E2.7	<1.0	<1.0	E65	**E44**	E83	E33
FOS (20–25)	Lake-bottom sediment (core)	200515209	3.1	2.4	E1.9	E39	**E34**	111	E57
FOS (25–30)	Lake-bottom sediment (core)	200515209	4.2	3.1	2.7	E60	**E37**	E102	E7.6
Fosdic inflow	Suspended sediment	200509402	<20	<20	<20	E31	**E41**	<300	nd
Fosdic inflow	Streambed sediment (grab)	200509402	<1.0	<1.0	<1.0	E35	**E19**	E5.4	nd
Sediment-quality guidelines									
Threshold effect concentration	--	--	na	na	na	5.28	3.24	59.8	59.8
Probable effect concentration	--	--	na	na	na	**572**	**17.6**	**676**	**676**

Table 2. Polycyclic aromatic hydrocarbon (PAH) concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004.

[In micrograms per kilogram except for ratios; parking lot dust samples not available from Fosdic Lake; concentration in bold exceeds probable effect concentration (MacDonald and others, 2000). ID, identifier; resid., residential; <, nondetection at indicated value; E, estimated; comm., commercial; pkng., parking; --, not applicable; na, not available]

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	Mass of sample (grams)	Naph-thalene	C1-128 Isomers, methylated naphtha-lenes	2-Ethyl-naph-thalene	2,6-Dimethyl-naphtha-lene	1,6-Dimethyl-naphtha-lene	C2-128 Isomers, C2-alkyated naph-thalenes	Ace-naph-thylene	1,2-Dimethyl-naphtha-lene
				Lake Como							
CMO resid. asphalt street dust	Street dust (sweeping)	200512303	25.0	<10	E26	<10	<10	<10	E39	<10	<10
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512303	27.4	490	E617	E167	E156	240	E467	2,040	<180
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512303	24.9	38	E87	<10	18	21	E77	89	<10
CMO comm. soil	Soil (grab)	200512303	23.2	18	E39	<11	12	<11	E48	111	<11
CMO resid. soil #1	Soil (grab)	200512303	24.5	<10	E15	<10	<10	<10	E29	16	<10
CMO resid. soil #2	Soil (grab)	200512303	23.8	E9.8	E22	<11	<11	<11	E30	57	<11
CMO (0–5)	Lake-bottom sediment (core)	200509403	8.9	<30	E130	<30	2,180	443	E2,770	<30	<30
CMO (10–15)	Lake-bottom sediment (core)	200509403	10.1	<25	E189	<25	1,720	385	E2,240	45	<25
CMO (25–30)	Lake-bottom sediment (core)	200509403	11.1	30	E307	<20	1,960	168	E2,340	59	<20
Como inflow	Suspended sediment	200509403	.5	<470	E70	<470	<470	<470	E621	E195	<470
Como inflow	Streambed sediment (grab)	200506806	21.1	20	E45	<12	74	28	E130	51	<12
				Fosdic Lake							
FOS resid. asphalt street dust	Street dust (sweeping)	200512303	24.9	<10	E155	<10	22	<10	E85	25	<10
FOS comm. soil	Soil (grab)	200515210	29.4	142	E402	32	80	78	E409	1610	38
FOS resid. soil #1	Soil (grab)	200512303	24.5	<10	E14	<10	<10	<10	E25	80	<10
FOS resid. soil #2	Soil (grab)	200515210	29.1	E7.9	E34	<9	E8.1	E8.4	E38	40	<9
FOS (0–5)	Lake-bottom sediment (core)	200509403	8.4	<30	E160	<30	1,570	425	E2,090	53	<30
FOS (5–10)	Lake-bottom sediment (core)	200509403	7.6	<35	E153	<35	1,380	248	E1,740	57	<35
FOS (10–15)	Lake-bottom sediment (core)	200509403	7.4	<35	E160	<35	1,550	294	E1,990	63	<35
FOS (15–20)	Lake-bottom sediment (core)	200509403	8.3	<30	E187	<30	1,470	266	E1,910	77	<30
FOS (20–25)	Lake-bottom sediment (core)	200515210	11.5	<22	E305	<22	1,050	184	E1,360	120	<22
FOS (25–30)	Lake-bottom sediment (core)	200515210	12.1	<21	E312	<21	991	175	E1,260	126	<21
Fosdic inflow	Suspended sediment	200509403	1.2	<200	E63	<200	<200	<200	<460	E124	<200
Fosdic inflow	Streambed sediment (grab)	200509403	23.7	E10	E14	<11	20	16	E62	28	<11
Sediment-quality guidelines											
Threshold effect concentration	--	--	--	176	na	na	na	na	na	na	na
Probable effect concentration	--	--	--	**561**	na	na	na	na	na	na	na

Table 2. Polycyclic aromatic hydrocarbon (PAH) concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	Acenaphthene	C3-128 Isomers, C3-alkylated naphthalenes	2,3,6-Trimethylnaphthalene	9H-Fluorene	C4-128 Isomers, C4-alkylated naphthalenes	1-Methyl-9H-fluorene	Phenanthrene	Anthracene
				Lake Como						
CMO resid. asphalt street dust	Street dust (sweeping)	200512303	E7.9	<45	<10	11	<30	<10	77	10
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512303	2,670	E1,250	<180	**4,740**	E884	404	**106,000**	**16,700**
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512303	118	<140	<10	198	<75	23	**4,130**	564
CMO comm. soil	Soil (grab)	200512303	70	E88	<11	66	<35	<11	1,090	266
CMO resid. soil #1	Soil (grab)	200512303	<10	E47	<10	<10	<20	<10	37	12
CMO resid. soil #2	Soil (grab)	200512303	34	<50	<11	41	<20	<11	728	120
CMO (0–5)	Lake-bottom sediment (core)	200509403	E13	<330	<30	49	<260	<30	500	93
CMO (10–15)	Lake-bottom sediment (core)	200509403	31	<370	<25	71	<260	<25	682	111
CMO (25–30)	Lake-bottom sediment (core)	200509403	39	<350	<20	79	<260	<20	898	238
Como inflow	Suspended sediment	200509403	<470	<470	<470	E219	<650	<470	**3,990**	501
Como inflow	Streambed sediment (grab)	200506806	76	E73	<12	80	<45	26	**1,540**	201
				Fosdic Lake						
FOS resid. asphalt street dust	Street dust (sweeping)	200512303	36	<95	<10	44	<45	<10	515	73
FOS comm. soil	Soil (grab)	200515210	1,260	E954	66	**1,590**	E467	170	**15,400**	**2,390**
FOS resid. soil #1	Soil (grab)	200512303	13	<40	<10	15	<15	<10	131	156
FOS resid. soil #2	Soil (grab)	200515210	52	E53	<9	64	<19	12	829	149
FOS (0–5)	Lake-bottom sediment (core)	200509403	38	<360	<30	89	<200	<30	812	209
FOS (5–10)	Lake-bottom sediment (core)	200509403	37	<340	<35	86	<160	<35	793	178
FOS (10–15)	Lake-bottom sediment (core)	200509403	38	<390	<35	82	<180	<35	781	170
FOS (15–20)	Lake-bottom sediment (core)	200509403	52	<400	<30	90	<150	<30	1,040	213
FOS (20–25)	Lake-bottom sediment (core)	200515210	65	E305	<22	88	<130	26	1,030	238
FOS (25–30)	Lake-bottom sediment (core)	200515210	60	E343	<21	98	<120	33	903	234
Fosdic inflow	Suspended sediment	200509403	<200	<520	<200	E146	<650	E103	**2,780**	442
Fosdic inflow	Streambed sediment (grab)	200509403	29	E61	E6.7	40	E47	E8.5	840	133
Sediment-quality guidelines										
Threshold effect concentration	--	--	na	na	na	77.4	na	na	204	57.2
Probable effect concentration	--	--	na	na	na	**536**	na	na	**1,170**	**845**

Table 2. Polycyclic aromatic hydrocarbon (PAH) concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	C5-128 Isomers, C5-alkylated naphthalenes	2-Methylanthracene	4,5-Methylenephenanthrene	C1-178 Isomers, methylated phenanthrene/anthracenes	1-Methylphenanthrene	C2-178 Isomers, C2-alkylated phenanthrene/anthracenes	Fluoranthene
			Lake Como						
CMO resid. asphalt street dust	Street dust (sweeping)	200512303	<10	<10	10	E37	<10	E44	171
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512303	<180	1,560	13,600	E27,800	5,280	E15,200	**281,000**
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512303	<10	54	561	E1,050	184	E495	**9,270**
CMO comm. soil	Soil (grab)	200512303	<10	34	149	E425	78	E202	**3,010**
CMO resid. soil #1	Soil (grab)	200512303	<10	<10	<10	E32	<10	E47	116
CMO resid. soil #2	Soil (grab)	200512303	<11	16	89	E195	36	E105	1,910
CMO (0–5)	Lake-bottom sediment (core)	200509403	<55	<30	77	E264	<30	E311	1,470
CMO (10–15)	Lake-bottom sediment (core)	200509403	<45	<25	96	E267	<25	E294	1,850
CMO (25–30)	Lake-bottom sediment (core)	200509403	<35	<20	<20	E416	<20	E356	**2,560**
Como inflow	Suspended sediment	200509403	<470	E230	E296	E1,510	E276	E1,440	**12,500**
Como inflow	Streambed sediment (grab)	200506806	<30	29	172	E419	86	E207	**2,920**
			Fosdic Lake						
FOS resid. asphalt street dust	Street dust (sweeping)	200512303	<15	<10	52	E143	24	E90	1,020
FOS comm. soil	Soil (grab)	200515210	<100	668	1,880	E4,940	1,800	E2,840	**40,900**
FOS resid. soil #1	Soil (grab)	200512303	<10	17	17	E70	E8.4	E46	454
FOS resid. soil #2	Soil (grab)	200515210	<9	25	110	E284	49	E105	1,590
FOS (0–5)	Lake-bottom sediment (core)	200509403	<40	<30	123	E271	<30	E216	1,760
FOS (5–10)	Lake-bottom sediment (core)	200509403	<40	<30	123	E294	<30	E244	1,930
FOS (10–15)	Lake-bottom sediment (core)	200509403	<40	<35	122	E285	<35	E250	1,910
FOS (15–20)	Lake-bottom sediment (core)	200509403	<40	<30	151	E341	<30	E267	**2,520**
FOS (20–25)	Lake-bottom sediment (core)	200515210	<70	44	162	E403	61	E230	**2,630**
FOS (25–30)	Lake-bottom sediment (core)	200515210	<45	48	190	E411	65	E269	**2,530**
Fosdic inflow	Suspended sediment	200509403	<210	E154	250	E1,830	258	E1,940	**7,370**
Fosdic inflow	Streambed sediment (grab)	200509403	<11	20	99	E253	47	E146	1,970
Sediment-quality guidelines									
Threshold effect concentration	--	--	na	na	na	na	na	na	423
Probable effect concentration	--	--	na	na	na	na	na	na	**2,230**

Table 2. Polycyclic aromatic hydrocarbon (PAH) concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	Pyrene	C3-178 Isomers, C3-alkylated phenanthrene/ anthracenes	C4-178 Isomers, C4-alkylated phenanthrene/ anthracenes	1-Methyl-pyrene	C1-202 Isomers, methylated fluoranthene/ pyrenes	C2-202 Isomers, C2-alkylated fluoranthene/ pyrenes
			Lake Como					
CMO resid. asphalt street dust	Street dust (sweeping)	200512303	131	<15	<10	<10	E76	<30
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512303	**215,000**	E2,410	E1,720	5,870	E81,400	<32,600
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512303	**6,610**	<30	<30	199	E2,720	E828
CMO comm. soil	Soil (grab)	200512303	**2,250**	<25	<15	78	E1,040	<540
CMO resid. soil #1	Soil (grab)	200512303	104	<15	<15	<10	E75	<30
CMO resid. soil #2	Soil (grab)	200512303	1,470	E19	<11	48	E643	<290
CMO (0–5)	Lake-bottom sediment (core)	200509403	1,160	<245	<80	<95	E654	<590
CMO (10–15)	Lake-bottom sediment (core)	200509403	1,470	<220	<100	<100	E872	<720
CMO (25–30)	Lake-bottom sediment (core)	200509403	**2,000**	<240	<80	<110	E1,360	<900
Como inflow	Suspended sediment	200509403	**9,240**	E1,140	<520	<470	E4,050	<4,150
Como inflow	Streambed sediment (grab)	200506806	**2,060**	<170	<40	76	E990	E760
			Fosdic Lake					
FOS resid. asphalt street dust	Street dust (sweeping)	200512303	791	<20	<10	23	E297	<120
FOS comm. soil	Soil (grab)	200515210	**34,500**	<1,260	<500	1,040	E11,200	<14,600
FOS resid. soil #1	Soil (grab)	200512303	346	<10	<10	12	E136	<90
FOS resid. soil #2	Soil (grab)	200515210	1,210	<40	<15	45	E523	<280
FOS (0–5)	Lake-bottom sediment (core)	200509403	1,380	<150	<60	<100	E755	<600
FOS (5–10)	Lake-bottom sediment (core)	200509403	**1,550**	<170	<80	<120	E814	<740
FOS (10–15)	Lake-bottom sediment (core)	200509403	**1,550**	<190	<90	<120	E837	<810
FOS (15–20)	Lake-bottom sediment (core)	200509403	**2,030**	<190	<70	<120	E975	<910
FOS (20–25)	Lake-bottom sediment (core)	200515210	**2,060**	<120	<55	76	E1,000	<460
FOS (25–30)	Lake-bottom sediment (core)	200515210	**1,940**	<150	<70	77	E1,230	<490
Fosdic inflow	Suspended sediment	200509403	**5,740**	E1,150	<360	253	E2,580	<2,570
Fosdic inflow	Streambed sediment (grab)	200509403	1,470	E133	<40	51	E659	<690
Sediment-quality guidelines								
Threshold effect concentration	--	--	195	na	na	na	na	na
Probable effect concentration	--	--	**1,520**	na	na	na	na	na

Table 2. Polycyclic aromatic hydrocarbon (PAH) concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	C5-178 Isomers, C5-alkylated phenanthrene/ anthracenes	Benz(*a*)-anthra-cene	Chry-sene	C3-202 Isomers, C3-alkylated fluoranthene/ pyrenes	C1-228 Isomers, methylated benzo(*a*)-anthracene/ chrysenes	C4-202 Isomers, C4-alkylated fluoranthene/ pyrenes
			Lake Como					
CMO resid. asphalt street dust	Street dust (sweeping)	200512303	<20	56	97	<30	<50	<30
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512303	<19,000	**94,900**	**131,000**	<14,500	<33,500	<9,010
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512303	<610	**2,620**	**4,150**	<370	<1,070	<290
CMO comm. soil	Soil (grab)	200512303	<260	**1,100**	**1,650**	<190	<520	<140
CMO resid. soil #1	Soil (grab)	200512303	<30	49	76	<30	<55	<30
CMO resid. soil #2	Soil (grab)	200512303	<210	738	1,190	<110	<350	<110
CMO (0–5)	Lake-bottom sediment (core)	200509403	<200	439	1,160	<137	<307	<248
CMO (10–15)	Lake-bottom sediment (core)	200509403	<210	586	1,240	<190	<410	<290
CMO (25–30)	Lake-bottom sediment (core)	200509403	<240	808	**1,740**	<240	<560	<290
Como inflow	Suspended sediment	200509403	<1,390	**2,760**	**7,690**	<940	<1,870	<1,900
Como inflow	Streambed sediment (grab)	200506806	<330	**1,100**	**1,580**	<110	<380	<220
			Fosdic Lake					
FOS resid. asphalt street dust	Street dust (sweeping)	200512303	<70	316	483	<55	<120	<40
FOS comm. soil	Soil (grab)	200515210	<260	**16,200**	**25,600**	<4,930	<15,300	<1,690
FOS resid. soil #1	Soil (grab)	200512303	<45	150	275	<45	<80	<40
FOS resid. soil #2	Soil (grab)	200515210	<15	643	888	<110	<230	<30
FOS (0–5)	Lake-bottom sediment (core)	200509403	<200	606	1,040	<170	<330	<210
FOS (5–10)	Lake-bottom sediment (core)	200509403	<230	672	1,200	<190	<400	<270
FOS (10–15)	Lake-bottom sediment (core)	200509403	<260	662	1,230	<210	<450	<300
FOS (15–20)	Lake-bottom sediment (core)	200509403	<290	866	**1,540**	<220	<500	<280
FOS (20–25)	Lake-bottom sediment (core)	200515210	<45	899	**1,710**	<230	<470	<85
FOS (25–30)	Lake-bottom sediment (core)	200515210	<40	965	**1,800**	<210	<510	<85
Fosdic inflow	Suspended sediment	200509403	<810	**2,090**	**4,600**	<680	<1,290	<1,240
Fosdic inflow	Streambed sediment (grab)	200509403	<170	727	1,050	<130	<360	<190
Sediment-quality guidelines								
Threshold effect concentration	--	--	na	108	166	na	na	na
Probable effect concentration	--	--	na	**1,050**	**1,290**	na	na	na

Table 2. Polycyclic aromatic hydrocarbon (PAH) concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	C5-202 Isomers, C5-alkylated fluoranthene/ pyrenes	C2-228 Isomers, C2-alkylated benzo(*a*)- anthracene/ chrysenes	Benzo(*b*)- fluoran- thene	Benzo(*k*)- fluoran- thene	Benzo(*e*)- pyrene	Benzo(*a*)- pyrene	Peryl- ene
			Lake Como						
CMO resid. asphalt street dust	Street dust (sweeping)	200512303	<15	<40	E103	E72	71	66	<10
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512303	<1,540	<8,130	E131,000	E90,000	80,400	**103,000**	32,300
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512303	<55	<200	E4,320	E2,760	2,580	**3,030**	867
CMO comm. soil	Soil (grab)	200512303	<25	<140	E1,930	E1,180	1,090	1,260	373
CMO resid. soil #1	Soil (grab)	200512303	<15	<55	E91	E65	77	61	<10
CMO resid. soil #2	Soil (grab)	200512303	<20	<95	E1,640	E829	930	1,020	320
CMO (0–5)	Lake-bottom sediment (core)	200509403	<66	<161	E1,240	E909	743	679	134
CMO (10–15)	Lake-bottom sediment (core)	200509403	<70	<210	E1,290	E1,080	888	869	246
CMO (25–30)	Lake-bottom sediment (core)	200509403	<50	<270	E1,820	E1,440	1,200	1,220	356
Como inflow	Suspended sediment	200509403	<580	<900	8,630	5,610	4,960	**4,420**	992
Como inflow	Streambed sediment (grab)	200506806	<65	<140	1,440	987	918	1,140	302
			Fosdic Lake						
FOS resid. asphalt street dust	Street dust (sweeping)	200512303	<10	<40	E487	E432	317	355	129
FOS comm. soil	Soil (grab)	200515210	<550	<1,810	28,100	21,500	18,600	**22,400**	6,580
FOS resid. soil #1	Soil (grab)	200512303	<10	<30	E444	E245	220	180	54
FOS resid. soil #2	Soil (grab)	200515210	<18	<30	737	650	617	751	210
FOS (0–5)	Lake-bottom sediment (core)	200509403	<200	<170	E1,230	E937	769	847	361
FOS (5–10)	Lake-bottom sediment (core)	200509403	<55	<180	E1,440	E1,160	902	1,000	533
FOS (10–15)	Lake-bottom sediment (core)	200509403	<60	<200	E1,360	E1,240	964	1,010	786
FOS (15–20)	Lake-bottom sediment (core)	200509403	<60	<190	E1,970	E1,460	1,210	1,290	1,020
FOS (20–25)	Lake-bottom sediment (core)	200515210	<40	<110	1,720	1,260	1,490	**1,530**	1,040
FOS (25–30)	Lake-bottom sediment (core)	200515210	<50	<90	1,720	1,410	1,520	**1,550**	1,330
Fosdic inflow	Suspended sediment	200509403	<340	<790	4,800	3,400	3,260	**3,070**	804
Fosdic inflow	Streambed sediment (grab)	200509403	<35	<120	1,040	764	731	891	254
Sediment-quality guidelines									
Threshold effect concentration	--	--	na	na	na	na	na	150	na
Probable effect concentration	--	--	na	na	na	na	na	**1,450**	na

Table 2. Polycyclic aromatic hydrocarbon (PAH) concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	C1-252 Isomers, C1-methylated benzopyrene/ perylenes	C3-228 Isomers, C3-benzo(*a*)-anthracene/ chrysenes	C2-252 Isomers, C2-alkylated benzopyrene/ perylenes	C4-228 Isomers, C4-benzo(*a*)-anthracene/ chrysenes	Benzo-(*g,h,i*)-perylene	Indeno-(1,2,3-*c,d*)-pyrene	Dibenzo-(*a,h*)-anthra-cene
			Lake Como						
CMO resid. asphalt street dust	Street dust (sweeping)	200512303	<70	<30	<75	<30	E47	<10	<10
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512303	E45,500	<7,190	<20,700	<12,300	81,600	84,100	21,300
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512303	E1,510	<150	<580	<420	2,650	3,670	678
CMO comm. soil	Soil (grab)	200512303	E658	<90	<350	<190	1,020	1,600	287
CMO resid. soil #1	Soil (grab)	200512303	E95	<50	<90	<30	E52	E55	<10
CMO resid. soil #2	Soil (grab)	200512303	E545	<70	<270	<180	870	1,250	269
CMO (0–5)	Lake-bottom sediment (core)	200509403	<460	<109	<280	<123	922	923	<260
CMO (10–15)	Lake-bottom sediment (core)	200509403	<570	<130	<410	<170	1,010	1,080	<296
CMO (25–30)	Lake-bottom sediment (core)	200509403	<780	<140	<490	<230	1,300	1,440	<408
Como inflow	Suspended sediment	200509403	<3,350	<710	<2390	<960	5,350	5,590	1140
Como inflow	Streambed sediment (grab)	200506806	<600	<90	<350	<60	1,030	929	251
			Fosdic Lake						
FOS resid. asphalt street dust	Street dust (sweeping)	200512303	<190	<45	<120	<60	259	362	135
FOS comm. soil	Soil (grab)	200515210	E7,310	<1,020	<3,200	<510	17,200	19,900	4,900
FOS resid. soil #1	Soil (grab)	200512303	<100	<30	<80	<30	E109	E170	E39
FOS resid. soil #2	Soil (grab)	200515210	E266	<30	<150	<15	500	634	282
FOS (0–5)	Lake-bottom sediment (core)	200509403	<500	<100	<300	<140	885	951	<275
FOS (5–10)	Lake-bottom sediment (core)	200509403	<600	<100	<360	<160	1,040	1,120	<345
FOS (10–15)	Lake-bottom sediment (core)	200509403	<670	<130	<410	<180	1,120	1,180	<314
FOS (15–20)	Lake-bottom sediment (core)	200509403	<750	<150	<450	<190	1,320	1,450	<330
FOS (20–25)	Lake-bottom sediment (core)	200515210	E651	<65	<230	<60	1,360	1,420	327
FOS (25–30)	Lake-bottom sediment (core)	200515210	E773	<65	<240	<60	1,420	1,510	376
Fosdic inflow	Suspended sediment	200509403	<2,060	<640	<1,810	<670	3,470	3,580	744
Fosdic inflow	Streambed sediment (grab)	200509403	E428	<75	<300	<120	672	795	245
Sediment-quality guidelines									
Threshold effect concentration	--	--	na	na	na	na	na	na	33
Probable effect concentration	--	--	na	na	na	na	na	na	na

Table 2. Polycyclic aromatic hydrocarbon (PAH) concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	C3-252 Isomers, C3-alkylated benzo-pyrene/ perylenes	C4-252 Isomers, C4-alkylated benzo-pyrene/ perylenes	C5-228 Isomers, C5-benzo(*a*)-anthra-cene/ chrysenes	C5-252 Isomers, C5-alkylated benzo-pyrene/ perylenes	Calculated values			
							Total PAH	Fluoran-thene/ pyrene	Benzo-(*a*)-pyrene: benzo-(*e*)-pyrene	Indeno-(1,2,3-*cd*)-pyrene/ benzo-(*g,h,i*)-perlyene
					Lake Como					
CMO resid. asphalt street dust	Street dust (sweeping)	200512303	<25	<25	<25	<30	650	1.3	.9	0
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	200512303	<3,490	<2,550	<2,360	<28,000	**980,000**	1.3	1.3	1.0
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	200512303	<60	<65	<100	<640	**32,000**	1.4	1.2	1.4
CMO comm. soil	Soil (grab)	200512303	<60	<45	<55	<250	11,000	1.3	1.2	1.6
CMO resid. soil #1	Soil (grab)	200512303	<35	<20	<30	<25	490	1.1	.8	1.1
CMO resid. soil #2	Soil (grab)	200512303	<45	<35	<40	<230	7,600	1.3	1.1	1.4
CMO (0–5)	Lake-bottom sediment (core)	200509403	<128	<166	<187	<447	5,700	1.3	.9	1.0
CMO (10–15)	Lake-bottom sediment (core)	200509403	<120	<140	<130	<440	7,100	1.3	1.0	1.1
CMO (25–30)	Lake-bottom sediment (core)	200509403	<160	<160	<120	<510	10,000	1.3	1.0	1.1
Como inflow	Suspended sediment	200509403	<910	<900	<700	<3,520	**43,000**	1.4	.9	1.0
Como inflow	Streambed sediment (grab)	200506806	<90	<85	<90	<425	11,000	1.4	1.2	.9
					Fosdic Lake					
FOS resid. asphalt street dust	Street dust (sweeping)	200512303	<25	<30	<20	<60	3,900	1.3	1.1	1.4
FOS comm. soil	Soil (grab)	200515210	<420	<530	<280	<160	**170,000**	1.2	1.2	1.2
FOS resid. soil #1	Soil (grab)	200512303	<30	<20	<20	<45	1,900	1.3	.8	1.6
FOS resid. soil #2	Soil (grab)	200515210	<25	<17	<14	<20	6,500	1.3	1.2	1.3
FOS (0–5)	Lake-bottom sediment (core)	200509403	<90	<120	<100	<350	7,000	1.3	1.1	1.1
FOS (5–10)	Lake-bottom sediment (core)	200509403	<110	<130	<60	<380	7,700	1.2	1.1	1.1
FOS (10–15)	Lake-bottom sediment (core)	200509403	<120	<110	<90	<380	7,700	1.2	1.0	1.1
FOS (15–20)	Lake-bottom sediment (core)	200509403	<130	<120	<90	<440	9,900	1.2	1.1	1.1
FOS (20–25)	Lake-bottom sediment (core)	200515210	<40	<40	<60	<210	11,000	1.3	1.0	1.0
FOS (25–30)	Lake-bottom sediment (core)	200515210	<50	<50	<60	<210	11,000	1.3	1.0	1.1
Fosdic inflow	Suspended sediment	200509403	<790	<580	<470	<2,150	**27,000**	1.3	.9	1.0
Fosdic inflow	Streambed sediment (grab)	200509403	<90	<70	<60	<400	7,400	1.3	1.2	1.2
Sediment-quality guidelines										
Threshold effect concentration	--	--	na	na	na	na	1,610	na	na	na
Probable effect concentration	--	--	na	na	na	na	**22,800**	na	na	na

Table 3. Major and trace element concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004.

[In micrograms per gram except as indicated; parking lot dust samples not available from Fosdic Lake; concentration in bold exceeds probable effect concentration (MacDonald and others, 2000). ID, identifier; resid., residential; --, not analyzed or not applicable; comm., commercial; pkng., parking; rep., replicate; na, not available; <, nondetection at indicated value]

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	Total carbon (percent)	Inorganic carbon (percent)	Organic carbon (percent)	Alumi-num	Cal-cium	Iron	Potas-sium	Magnes-ium
			Lake Como							
CMO resid. asphalt street dust	Street dust (sweeping)	5824	--	--	--	5,550	158,000	11,000	2,040	2,360
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	5824	--	--	--	4,860	169,000	8,600	2,000	2,600
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	5824	--	--	--	10,200	125,000	19,000	2,680	3,000
CMO comm. soil	Soil (grab)	5824	--	--	--	18,300	55,900	12,000	4,850	2,920
CMO resid. soil # 1	Soil (grab)	5824	--	--	--	17,700	116,000	14,000	4,500	2,540
CMO resid. soil # 2	Soil (grab)	5824	--	--	--	32,100	55,000	19,000	7,750	3,540
CMO (0–5)	Lake-bottom sediment (core)	5885	--	--	--	44,900	204,000	25,000	8,260	5,240
CMO (0–5) rep.	Lake-bottom sediment (core)	5885	--	--	--	43,600	208,000	26,000	8,420	5,130
CMO (0–5) rep.	Lake-bottom sediment (core)	5885	--	--	--	44,800	211,000	26,000	8,490	5,260
CMO (10–15)	Lake-bottom sediment (core)	5885	--	--	--	46,200	175,000	24,000	8,880	5,390
CMO (25–30)	Lake-bottom sediment (core)	5885	--	--	--	40,000	180,000	23,000	7,600	4,820
Como inflow	Suspended sediment	5713	--	--	--	45,600	131,000	26,100	9,410	5,790
Como inflow rep.	Suspended sediment	5713	--	--	--	45,400	131,000	26,100	9,340	5,720
Como inflow rep.	Suspended sediment	5713	--	--	--	43,400	126,000	25,000	9,050	5,450
Como inflow	Streambed sediment (grab)	5710	7.50	4.64	2.86	20,100	185,000	16,400	4,470	3,180
			Fosdic Lake							
FOS resid. asphalt street dust	Street dust (sweeping)	5824	--	--	--	5,870	108,000	16,000	1,710	1,750
FOS resid. asphalt street dust rep.	Street dust (sweeping)	5824	--	--	--	6,160	108,000	16,000	1,740	1,820
FOS resid. asphalt street dust rep.	Street dust (sweeping)	5824	--	--	--	6,240	111,000	17,000	1,800	1,900
FOS comm. soil	Soil (grab)	5824	--	--	--	18,300	49,400	15,000	4,900	1,880
FOS resid. soil # 1	Soil (grab)	5824	--	--	--	22,600	39,300	17,000	4,550	1,930
FOS resid. soil # 2	Soil (grab)	5824	--	--	--	24,000	12,000	14,000	4,100	1,650
FOS (0–5)	Lake-bottom sediment (core)	5885	--	--	--	48,300	91,400	27,000	7,760	3,920
FOS (5–10)	Lake-bottom sediment (core)	5885	--	--	--	47,100	77,800	27,000	7,740	3,840
FOS (10–15)	Lake-bottom sediment (core)	5885	--	--	--	51,500	98,200	29,000	8,250	4,120
FOS ((15–20))	Lake-bottom sediment (core)	5885	--	--	--	50,200	105,000	28,000	8,160	4,120
FOS (20–25)	Lake-bottom sediment (core)	5885	--	--	--	43,700	90,300	25,000	7,170	3,660
FOS (25–30)	Lake-bottom sediment (core)	5885	--	--	--	46,000	88,500	27,000	7,790	3,850
Fosdic inflow	Suspended sediment	5713	--	--	--	62,400	108,000	35,100	10,700	6,380
Fosdic inflow	Streambed sediment (grab)	5710	5.03	3.21	1.82	12,100	116,000	19,000	2,520	2,050
Sediment-quality guidelines										
Threshold effect concentration	--	--	na	na	na	na	na	na	na	na
Probable effect concentration	--	--	na	na	na	na	na	na	na	na

Table 3. Major and trace element concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	Sodium	Phos-phorus	Titan-ium	Arsenic	Barium	Beryll-ium	Cad-mium	Cobalt	Chro-mium
					Lake Como						
CMO resid. asphalt street dust	Street dust (sweeping)	5824	600	370	490	4.1	257	0.28	0.91	2.1	16.8
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	5824	879	330	420	3.0	165	.21	.36	1.8	45.9
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	5824	2,120	390	1,100	3.9	174	.36	.44	3.0	39.5
CMO comm. soil	Soil (grab)	5824	1,120	960	3,000	16	178	.68	.53	3.9	25.9
CMO resid. soil # 1	Soil (grab)	5824	858	700	2,900	6.9	157	.68	.69	4.3	25.3
CMO resid. soil # 2	Soil (grab)	5824	1,140	1,000	3,300	11	220	1.3	.47	6.4	38.9
CMO (0–5)	Lake-bottom sediment (core)	5885	815	1,400	2,300	13	303	1.4	.71	8.1	59.7
CMO (0–5) rep.	Lake-bottom sediment (core)	5885	793	1,500	2,200	13	288	1.4	.70	8.0	63.4
CMO (0–5) rep.	Lake-bottom sediment (core)	5885	798	1,500	2,400	13	300	1.4	.73	8.1	61.1
CMO (10–15)	Lake-bottom sediment (core)	5885	927	1,300	2,300	12	298	1.6	.98	7.9	61.5
CMO (25–30)	Lake-bottom sediment (core)	5885	788	1,600	2,200	13	269	1.3	1.3	7.4	62.8
Como inflow	Suspended sediment	5713	1,100	2,050	2,440	12.5	313	1.4	1.6	8.7	82.0
Como inflow rep.	Suspended sediment	5713	1,090	2,040	2,530	12.6	312	1.5	1.8	8.8	83.2
Como inflow rep.	Suspended sediment	5713	1,040	1,970	2,320	12.4	303	1.5	1.6	8.4	77.4
Como inflow	Streambed sediment (grab)	5710	1,140	686	1,190	7.6	174	.85	.45	5.2	34.9
					Fosdic Lake						
FOS resid. asphalt street dust	Street dust (sweeping)	5824	365	360	480	5.9	115	.51	.47	3.1	13.7
FOS resid. asphalt street dust rep.	Street dust (sweeping)	5824	394	360	440	5.9	104	.51	.49	3.2	14.1
FOS resid. asphalt street dust rep.	Street dust (sweeping)	5824	396	380	480	5.9	116	.47	.48	3.2	14.8
FOS comm. soil	Soil (grab)	5824	1,940	530	3,000	5.5	174	.93	.74	4.6	41.6
FOS resid. soil # 1	Soil (grab)	5824	725	710	3,000	7.6	147	.92	.67	5.2	31.4
FOS resid. soil # 2	Soil (grab)	5824	1,070	490	3,200	6.5	180	.94	.38	5.7	29.6
FOS (0–5)	Lake-bottom sediment (core)	5885	1,090	1,300	2,700	11	237	1.6	1.3	8.9	61.5
FOS (5–10)	Lake-bottom sediment (core)	5885	1,110	1,300	2,800	11	231	1.6	1.4	9.6	63.6
FOS (10–15)	Lake-bottom sediment (core)	5885	1,100	1,400	3,100	12	245	1.7	1.7	10.6	75.0
FOS (15–20)	Lake-bottom sediment (core)	5885	1,070	1,500	2,900	12	241	1.7	2.0	10.4	73.6
FOS (20–25)	Lake-bottom sediment (core)	5885	1,000	1,300	2,600	12	223	1.5	2.2	9.2	72.0
FOS (25–30)	Lake-bottom sediment (core)	5885	1,110	1,300	2,800	12	232	1.6	2.6	9.6	79.8
Fosdic inflow	Suspended sediment	5713	1,060	1,870	2,420	14.2	299	2.0	1.5	12.0	**118**
Fosdic inflow	Streambed sediment (grab)	5710	1,060	409	752	8.4	153	.68	.31	6.0	30.3
Sediment-quality guidelines											
Threshold effect concentration	--	--	na	na	na	9.79	na	na	1.0	na	43.4
Probable effect concentration	--	--	na	na	na	**33**	na	na	**4.98**	na	**111**

Table 3. Major and trace element concentrations in street dust, parking lot dust, soil, lake-bottom sediment, and suspended and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004—Continued.

Sample ID (core interval, in centimeters)	Sample type	Laboratory set number	Copper	Mercury	Lithium	Manganese	Nickel	Lead	Scandium	Strontium	Vanadium	Zinc
					Lake Como							
CMO resid. asphalt street dust	Street dust (sweeping)	5824	10.5	0.03	6.3	276	8.0	73.4	1.2	377	18.0	74.7
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	5824	60.1	<.02	5.7	219	5.5	**133**	.9	387	12.6	297
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	5824	24.8	**6.8**	9.3	338	9.0	**215**	1.8	351	22.8	277
CMO comm. soil	Soil (grab)	5824	19.9	.02	12.4	308	10.7	76.4	3.1	125	29.2	104
CMO resid. soil # 1	Soil (grab)	5824	14.1	.06	11.8	422	10.7	74.9	3.3	164	32.8	87.7
CMO resid. soil # 2	Soil (grab)	5824	**238**	.06	18.4	547	16.0	105	5.5	98.8	51.2	104
CMO (0–5)	Lake-bottom sediment (core)	5885	35.8	.08	26.4	721	23.0	93.6	7.4	272	74.7	220
CMO (0–5) rep.	Lake-bottom sediment (core)	5885	35.6	na	24.4	734	23.0	91.2	7.4	268	75.4	223
CMO (0–5) rep.	Lake-bottom sediment (core)	5885	36.1	na	24.8	740	23.3	93.0	7.6	274	76.2	225
CMO (10–15)	Lake-bottom sediment (core)	5885	38.8	.09	29.2	622	22.8	120	7.6	262	74.4	245
CMO (25–30)	Lake-bottom sediment (core)	5885	43.2	.13	23.3	616	21.1	**160**	6.8	260	66.0	254
Como inflow	Suspended sediment	5713	79.5	.13	25.5	559	39.1	95.6	7.6	238	76.3	**496**
Como inflow rep.	Suspended sediment	5713	80.9	na	24.9	564	40.5	98.8	7.7	239	74.9	**489**
Como inflow rep.	Suspended sediment	5713	77.3	na	24.0	536	38.0	93.1	7.4	232	72.6	**484**
Como inflow	Streambed sediment (grab)	5710	20.3	.04	14.7	410	13.8	**137**	3.8	277	40.3	137
					Fosdic Lake							
FOS resid. asphalt street dust	Street dust (sweeping)	5824	7.6	.14	7.3	439	7.2	40.0	1.5	300	18.4	59.2
FOS resid. asphalt street dust rep.	Street dust (sweeping)	5824	9.2	na	7.9	430	7.4	26.7	1.4	302	18.3	57.6
FOS resid. asphalt street dust rep.	Street dust (sweeping)	5824	7.8	na	7.7	454	7.3	40.1	1.4	307	19.0	60.9
FOS comm. soil	Soil (grab)	5824	23.9	.06	15.0	347	20.8	**180**	3.1	138	29.3	326
FOS resid. soil # 1	Soil (grab)	5824	22.1	.15	18.1	479	12.2	78.8	4.1	79.9	32.7	169
FOS resid. soil # 2	Soil (grab)	5824	11.6	.05	20.4	449	11.1	70.7	4.1	51.8	33.9	95.4
FOS (0–5)	Lake-bottom sediment (core)	5885	34.9	.20	33.6	630	23.5	118	8.2	192	66.1	216
FOS (5–10)	Lake-bottom sediment (core)	5885	36.6	.21	34.2	581	23.6	118	8.4	185	68.1	230
FOS (10–15)	Lake-bottom sediment (core)	5885	40.6	.24	36.6	652	26.0	121	9.0	217	75.8	248
FOS (15–20)	Lake-bottom sediment (core)	5885	42.9	.27	34.5	641	25.7	**129**	8.9	228	72.3	260
FOS (20–25)	Lake-bottom sediment (core)	5885	42.3	.30	29.9	544	23.4	**148**	7.6	197	63.3	261
FOS (25–30)	Lake-bottom sediment (core)	5885	44.2	.36	32.1	519	24.9	**182**	8.2	190	66.0	283
Fosdic inflow	Suspended sediment	5713	56.7	.47	42.7	765	**61.1**	90.3	10.0	232	89.6	**528**
Fosdic inflow	Streambed sediment (grab)	5710	9.6	.02	10.6	427	12.1	80.0	2.5	232	28.3	68.8
Sediment-quality guidelines												
Threshold effect concentration	--	--	31.6	.18	na	na	22.7	35.8	na	na	na	121
Probable effect concentration	--	--	**149**	**1.06**	na	na	**48.6**	**128**	na	na	na	**459**

Table 4. Organic carbon concentrations in street dust, parking lot dust, soil, and lake-bottom sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004.

[Parking lot dust samples not available from Fosdic Lake. ID, identifier; resid., residential; comm., commercial; pkng., parking]

Sample ID (core interval, in centimeters)	Sample type	Organic carbon (percent)	Sample ID (core interval, in centimeters)	Sample type	Organic carbon (percent)
Lake Como			Fosdic Lake		
CMO resid. asphalt street dust	Street dust (sweeping)	2.87	FOS resid. asphalt street dust	Street dust (sweeping)	1.85
CMO comm. sealed pkng. lot dust	Parking lot dust (sweeping)	3.53			
CMO comm. unsealed pkng. lot dust	Parking lot dust (sweeping)	2.78	FOS comm. soil	Soil (grab)	4.25
			FOS resid. soil #1	Soil (grab)	3.96
CMO comm. soil	Soil (grab)	2.92	FOS resid. soil #2	Soil (grab)	3.51
CMO resid. soil #1	Soil (grab)	2.80			
CMO resid. soil #2	Soil (grab)	4.58	FOS.1 (0–2)	Lake-bottom sediment (core)	6.90
			FOS.1 (2–4)	Lake-bottom sediment (core)	7.43
CMO.2 (0–2)	Lake-bottom sediment (core)	4.20	FOS.1 (4–6)	Lake-bottom sediment (core)	7.10
CMO.2 (2–4)	Lake-bottom sediment (core)	3.64	FOS.1 (6–8)	Lake-bottom sediment (core)	8.49
CMO.2 (4–6)	Lake-bottom sediment (core)	4.90			
CMO.2 (6–8)	Lake-bottom sediment (core)	4.87	FOS.1 (8–10)	Lake-bottom sediment (core)	7.31
			FOS.1 (10–12)	Lake-bottom sediment (core)	6.77
CMO.2 (8–10)	Lake-bottom sediment (core)	4.29	FOS.1 (12–14)	Lake-bottom sediment (core)	6.52
CMO.2 (10–12)	Lake-bottom sediment (core)	4.48	FOS.1 (14–16)	Lake-bottom sediment (core)	7.45
CMO.2 (12–14)	Lake-bottom sediment (core)	5.65			
CMO.2 (14–16)	Lake-bottom sediment (core)	4.71	FOS.1 (16–18)	Lake-bottom sediment (core)	6.81
			FOS.1 (18–20)	Lake-bottom sediment (core)	7.32
CMO.2 (16–18)	Lake-bottom sediment (core)	4.95	FOS.1 (20–22)	Lake-bottom sediment (core)	7.38
CMO.2 (18–20)	Lake-bottom sediment (core)	4.48	FOS.1 (22–24)	Lake-bottom sediment (core)	8.36
CMO.2 (20–22)	Lake-bottom sediment (core)	3.75			
CMO.2 (22–24)	Lake-bottom sediment (core)	4.69	FOS.1 (24–26)	Lake-bottom sediment (core)	7.04
			FOS.1 (26–28)	Lake-bottom sediment (core)	6.87
CMO.2 (24–26)	Lake-bottom sediment (core)	5.36	FOS.1 (28–30)	Lake-bottom sediment (core)	6.76
CMO.2 (26–28)	Lake-bottom sediment (core)	5.04	FOS.1 (30–32)	Lake-bottom sediment (core)	6.06
CMO.2 (28–30)	Lake-bottom sediment (core)	4.94			
CMO.2 (30–32)	Lake-bottom sediment (core)	4.10	FOS.1 (32–34)	Lake-bottom sediment (core)	6.02
			FOS.1 (34–36)	Lake-bottom sediment (core)	5.94
			FOS.1 (36–38)	Lake-bottom sediment (core)	5.75
			FOS.1 (38–40)	Lake-bottom sediment (core)	5.04

Table 5. Grain-size distribution in lake-bottom and streambed sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004.

[ID, identifier; <, less than]

Sample ID (core interval, in centimeters)	Sample type	Percentage silt and clay (<0.063 millimeter)	Percentage clay (<0.004 millimeter)
	Lake Como		
CMO (0–5)	Lake-bottom sediment (core)	98.3	59.4
CMO (10–15)	Lake-bottom sediment (core)	97.5	61.0
CMO (25–30)	Lake-bottom sediment (core)	96.8	64.3
Como inflow	Streambed sediment (grab)	37.4	14.1
	Fosdic Lake		
FOS (0–5)	Lake-bottom sediment (core)	79.7	45.3
FOS (5–10)	Lake-bottom sediment (core)	78.1	42.6
FOS (10–15)	Lake-bottom sediment (core)	84.0	51.6
FOS (15–20)	Lake-bottom sediment (core)	83.0	46.2
FOS (20–25)	Lake-bottom sediment (core)	71.9	42.2
FOS (25–30)	Lake-bottom sediment (core)	76.9	40.4
Fosdic inflow	Streambed sediment (grab)	11.7	5.6

Table 6. Radionuclide activities in lake-bottom sediment samples collected in Lake Como and Fosdic Lake watersheds, October 2004.

[ID, identifier; pCi/g, picocuries per gram; 1-sig, one standard deviation; dpm/g, disintegrations per minute per gram]

Sample ID (core interval, in centimeters)	Sample type	Cesium-137 (pCi/g)	Cesium-137 1-sig (pCi/g)	Lead-210 (dpm/g)	Lead-210 1-sig (dpm/g)	Radium-226 (dpm/g)	Radium-226 1-sig (dpm/g)	Calculated values		
								Excess lead-210 (dpm/g)	Excess lead-210 1-sig (dpm/g)	Natural log of excess lead-210
				Lake Como						
CMO (0–5)	Lake-bottom sediment (core)	0.076	0.016	25.05	1.01	2.07	0.17	22.98	1.03	3.13
CMO (10–15)	Lake-bottom sediment (core)	.303	.029	57.00	2.10	4.10	.29	52.90	2.12	3.97
CMO (25–30)	Lake-bottom sediment (core)	.215	.021	19.40	.82	1.37	.14	18.03	.83	2.89
				Fosdic Lake						
FOS (0–5)	Lake-bottom sediment (core)	.163	.046	15.26	.80	1.41	.10	13.85	.80	2.63
FOS (5–10)	Lake-bottom sediment (core)	.314	.078	15.66	.82	1.51	.10	14.15	.82	2.65
FOS (10–15)	Lake-bottom sediment (core)	.222	.057	15.10	.79	1.24	.10	13.86	.80	2.63
FOS (15–20)	Lake-bottom sediment (core)	.240	.062	14.39	.76	1.38	.10	13.01	.77	2.57
FOS (20–25)	Lake-bottom sediment (core)	.251	.061	12.42	.61	1.14	.06	11.28	.61	2.42
FOS (25–30)	Lake-bottom sediment (core)	.336	.082	10.79	.61	1.39	.09	9.40	.62	2.24

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