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Water Column and Bed-Sediment Core Samples Collected from Brownlee Reservoir near Oxbow, Oregon, 2012

Data Series 809

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

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By Ryan L. Fosness, U.S. Geological Survey; Jesse Naymik, Idaho Power Company; Candice B. Hopkins, U.S. Geological Survey; and John F. DeWild, U.S. Geological Survey

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SALLY JEWELL, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

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Conversion Factors, Datums, and Abbreviations and Acronyms

Conversion Factors

SI to Inch/Pound

Multiply	By	To obtain
	Length	
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
	Volume	
liter (L)	33.82	ounce, fluid (fl. oz)
liter (L)	61.02	cubic inch (in^3)
	Mass	
gram (g)	0.03527	ounce, avoirdupois (oz)
kilogram (kg)	2.205	pound avoirdupois (lb)

Concentrations of chemical constituents in water are given in either milligrams or micrograms per liter (mg/L or µg/L) or milligrams or micrograms per kilogram (mg/kg or µg/kg). Units in nanograms per liter (ng/L) are approximately equivalent to parts per trillion (10^{12}).

Datums

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

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

Conversion Factors, Datums, and Abbreviations and Acronyms—Continued

Abbreviations and Acronyms

DO	dissolved oxygen
IDEQ	Idaho Department of Environmental Quality
IPC	Idaho Power Company
HCC	Hells Canyon Complex
MRL	USGS Mercury Research Laboratory
ODEQ	Oregon Department of Environmental Quality
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PEC	probable effect concentration
SVOC	semi-volatile organic compound
TEC	threshold effect concentration
TOC	total organic carbon
USGS	U.S. Geological Survey

Water Column and Bed-Sediment Core Samples Collected from Brownlee Reservoir near Oxbow, Oregon, 2012

By Ryan L. Fosness[1], Jesse Naymik[2], Candice B. Hopkins[1], and John F. DeWild[1]

Abstract

The U.S. Geological Survey, in cooperation with Idaho Power Company, collected water-column and bed-sediment core samples from eight sites in Brownlee Reservoir near Oxbow, Oregon, during May 5–7, 2012. Water-column and bed-sediment core samples were collected at each of the eight sites and analyzed for total mercury and methylmercury. Additional bed-sediment core samples, collected from three of the eight sites, were analyzed for pesticides and other organic compounds, trace metals, and physical characteristics, such as particle size.

Total mercury and methylmercury were detected in each of the water column and bed-sediment core samples. Only 17 of the 417 unique pesticide and organic compounds were detected in bed-sediment core samples. Concentrations of most organic wastewater compounds detected in bed sediment were less than the reporting level. Trace metals detected were greater than the reporting level in all the bed-sediment core samples submitted for analysis. The particle size distribution of bed-sediment core samples was predominantly clay mixed with silt.

Introduction

Idaho Power Company (IPC) owns and operates Brownlee Dam, which forms Brownlee Reservoir (fig. 1), the farthest upstream and largest in area and volume within IPC's Hells Canyon Hydroelectric Project (Brownlee, Oxbow, and Hells Canyon Reservoirs), commonly referred to as the Hells Canyon Complex (HCC). Brownlee Dam was completed in May 1959, and along with the Oxbow and Hells Canyon Dams, effectively blocked the upstream migration of anadromous fish species (Idaho Power Company, 2003). A flow requirement management plan incorporated by IPC was adopted in 1991 to protect salmonid spawning areas downstream of the HCC. This plan called for constant streamflow releases from Brownlee Reservoir during the early part of the salmonid (including fall Chinook) spawning period in late October (Idaho Power Company, 1991). However, water temperatures in the Snake River downstream of the Hells Canyon Hydroelectric Project are warmer than the temperature criteria set for salmonid spawning by the Idaho Department of Environmental Quality (IDEQ) and Oregon Department of Environmental Quality (IDEQ and ODEQ; 2004). IPC is researching strategies to comply with the set temperature criteria during the salmonid spawning period. One potential strategy involves pumping hypolimnetic (cooler water from the deepest areas of the reservoir) into the Brownlee Dam powerhouse intake and downstream to the Snake River. A concern associated with accessing the deep, cool water is re-suspending and transporting potentially contaminated water and bed-sediment.

Purpose and Scope

This report documents the methods used to collect and analyze the water column and bed-sediment core samples from Brownlee Reservoir, and presents the results of the analyses. Characterization of the water column and bed-sediment chemistry in the reservoir provides data to better understand the potential effects of transporting potentially contaminated water from the hypolimnetic zone downstream.

Description of the Study Area

Brownlee Reservoir forms a part of the Idaho-Oregon border along the Snake River (fig. 1). The reservoir is about 92 km long (general flow direction is from south to north), less than 1 km wide, and reaches depths exceeding 90 m near Brownlee Dam. The reservoir is defined by steep margins and a well-defined pre-impoundment thalweg. The mean pool elevation for Brownlee Reservoir for water years 2010–11 ranged from 614 to 633 m above the NGVD 29 datum. Typically, IPC draws the reservoir down (about 12–18 m during 2010 and 2011) in the early spring to create storage capacity for snowmelt runoff. The Snake River is the main contributor of streamflow to Brownlee Reservoir, but the Burnt and Powder Rivers, and Dennett, Sturgill, and Brownlee Creeks discharge directly to the reservoir (fig. 1). Wood and Etheridge (2011) provide a more comprehensive description of land use, drainage area, and other characteristics of the Snake River watershed upstream of Brownlee Reservoir.

[1]U.S. Geological Survey.

[2]Idaho Power Company.

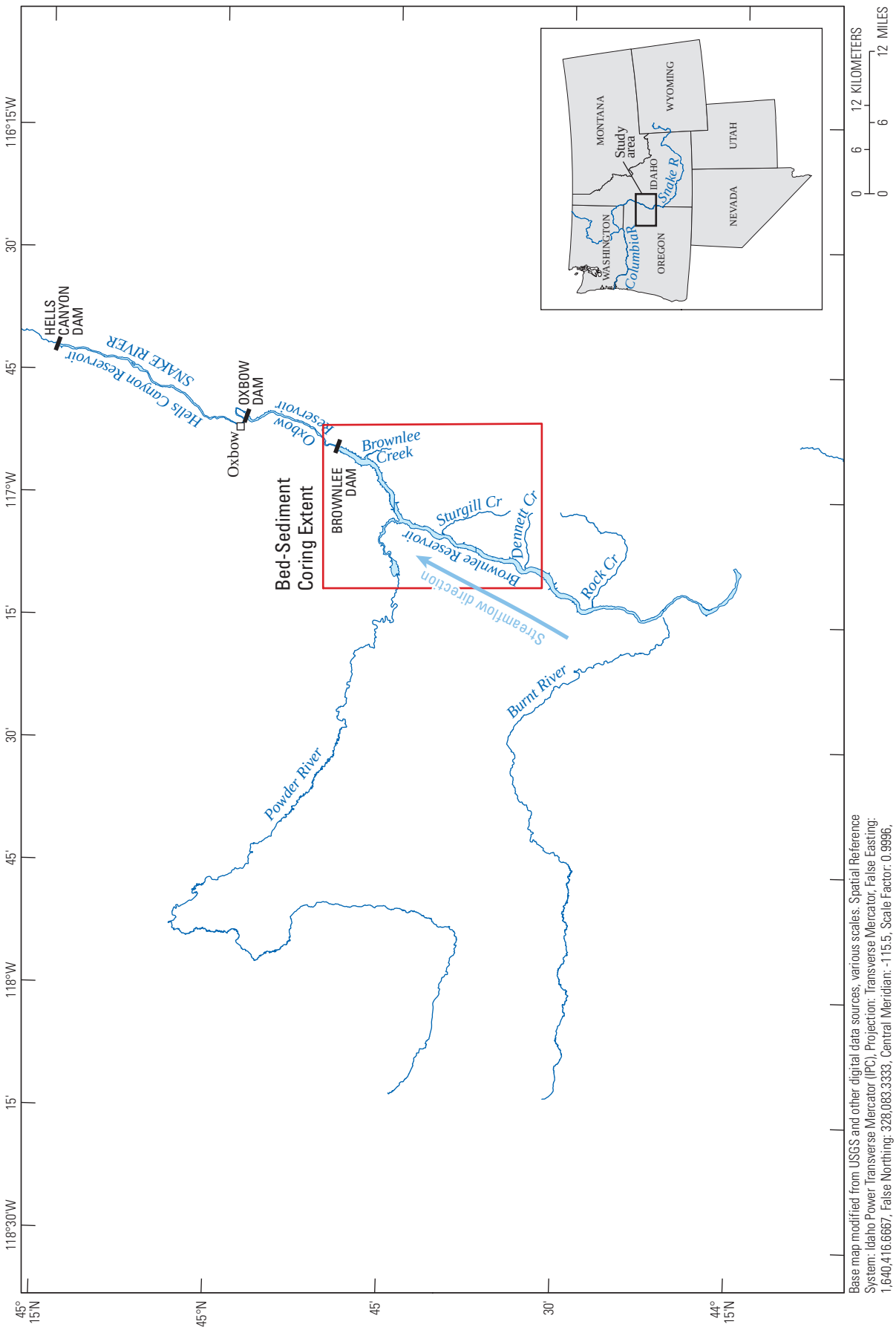


Figure 1. Lower Snake River drainage basin and tributary subbasins to Brownlee Reservoir near Oxbow, Oregon.

Previous Investigations

Although numerous water-quality and sediment studies have been completed in Brownlee Reservoir, most previous investigations have focused on specific compounds and have not included the wide array of constituents that may be present in the water column and bed-sediment.

In 1998, the U.S. Geological Survey (USGS), in cooperation with IPC, collected bed-sediment and fish-tissue samples at two sites in an upstream part of Brownlee Reservoir near the Burnt River and Dennett Creek. The sediment samples were collected and analyzed for organochlorine compounds and trace elements. Bed-sediment samples collected at the Burnt River contained the largest concentration of detected organochlorine compounds (Dacthal, p,p'-DDD, p,p'-DDE, p,p'-DDT, and Hexachlorobenzene) in the Snake River Basin. However, the concentrations of the organochlorine compounds were significantly reduced at the downstream site near Dennett Creek where the only detected compounds were p,p'-DDD and p,p'- DDE. Concentrations of trace metals including arsenic, cadmium, chromium, copper, nickel, and zinc in the bed sediment collected near Dennett Creek were the largest in the Snake River Basin. The concentration of the trace elements generally increased from the site at Burnt River to the site near Dennett Creek (Clark and Maret, 1998).

In a follow-up study done in 1998 and 1999, CH2M HILL (2000) did sediment coring throughout Brownlee Reservoir, including sites near those sampled by Clark and Maret (1998). The objective of the CH2M HILL study was to determine the physical and mineralogical characteristics of sediment along the thalweg of the channel through Brownlee Reservoir. As part of the study, CH2M HILL analyzed the bed sediment for selected organochlorine and trace elements. Generally, organochlorine and trace element concentrations (including total mercury) in the bed sediment increased in a northerly direction toward Brownlee Dam (CH2M HILL, 2000). Physical and mineralogical results from the study provided insight into the sedimentation patterns in the reservoir; silt and clay-sized-sediment accounted for more than 99 percent of the total particle-size distribution near Brownlee Dam.

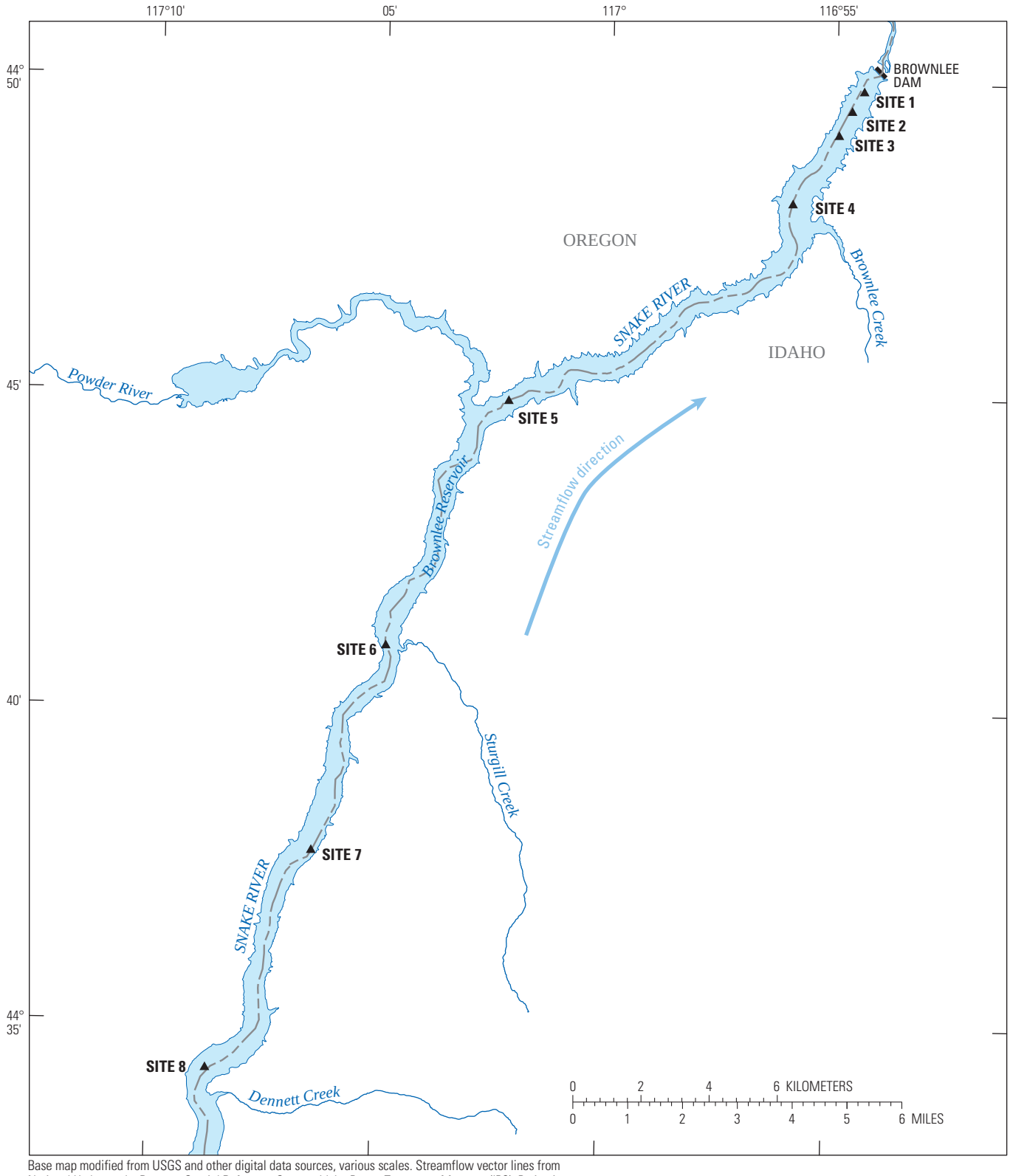
In June and September 2006, Brandt (2007) collected water samples upstream and downstream of Brownlee Reservoir to determine the concentration and load of total mercury into and out of Brownlee Reservoir. The results were used to estimate a mass balance for total mercury and to identify the major sources of mercury to Brownlee Reservoir. Findings from the study indicated relatively low concentrations and loadings of total mercury to the reservoir. However, the reservoir seemed to be acting as a mercury sink; less than 50 percent of the total mercury entering Brownlee Reservoir was transported through the reservoir.

In October of 2010 and 2011, Harrison and others (2012) collected water samples from the hypolimnion and discharge waters of Brownlee Reservoir, and analyzed the samples for selected organic and inorganic compounds (including mercury). Seventeen inorganic constituents were analyzed in 2010, and 470 organic constituents were analyzed in 2011 along with total mercury and methylmercury. Of the 470 organic constituents analyzed in 2011, only 7 pesticides, including the isomers or degradates of pesticides, were detected in the water column. Other organic compounds, including semi-volatile organic compounds (SVOCs), individual polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and dioxins, were detected at levels less than the laboratory limits of quantification. All concentrations were less than the aquatic-life criteria and benchmarks established by the U.S. Environmental Protection Agency (EPA) (Stephan and others, 1985). However, fish consumption advisories based on mercury are in place for Brownlee Reservoir, and the relatively high methylmercury concentrations detected in the hypolimnion of Brownlee Reservoir (2.5–2.9 ng/L) were noted by Harrison and others (2012) as a human health concern.

Methods

Sampling Methods

Water-column sampling and bed-sediment coring were done during the week of May 7–11, 2012. Field personnel from the USGS Idaho Water Science Center in Boise and the USGS Mercury Research Laboratory (MRL) in Madison, Wisconsin collected samples from eight sites (fig. 2, table 1) to provide a spatial representation of the northern half of the reservoir. Sites 1–3 were slightly upstream of the deepest part of the reservoir near Brownlee Dam. Sites 4–8 were located coincident with the confluences of reservoir tributaries. All of the sites were within the pre-impoundment thalweg to target the zone of maximum sediment accumulation of fine-grained (less than 0.063 mm) bed sediment (van Metre and others, 2004). High-resolution bathymetry provided by IPC was used to identify the pre-impoundment thalweg at each of the sites.



Base map modified from USGS and other digital data sources, various scales. Streamflow vector lines from National Hydrography Dataset. Spatial Reference System: Idaho Power Transverse Mercator (IPC), Projection: Transverse Mercator, False Easting: 1,640,416.6667, False Northing: 328,083.3333, Central Meridian: -115.5, Scale Factor: 0.9996, Latitude Of Origin: 42, Horizontal Datum: North American Datum of 1983.

Figure 2. Locations where water-column samples and bed-sediment core samples were collected from Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

Table 1. Description of sites and number of water-column and bed-sediment core samples collected from Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[**NWIS site**: All sites are in Snake River upstream of Brownlee Dam, Idaho. **River mile designation**: Designations are commonly referenced locations, so a conversion to kilometers was not made or recommended. Online data can be viewed at http://waterdata.usgs.gov/nwis/inventory by entering the National Water Information System (NWIS) site No. for each site using a multiple site numbers search criteria. –, no sample]

NWIS site name	NWIS site No.	River mile designation	Water-column mercury samples	Bed-sediment cores			
				Mercury (total and methylmercury)	Organics and trace elements	Description and particle size	Replicates
Site 1	444954116542400	285.1	3	1	4	1	2
Site 2	444935116544000	285.5	3	1	–	–	2
Site 3	444912116545700	286.0	3	1	–	–	2
Site 4	444807116555700	287.6	3	1	–	–	2
Site 5	444455117021200	295.1	3	1	4	1	2
Site 6	444101117045000	300.7	3	1	–	–	2
Site 7	443745117062500	305.1	3	1	–	–	2
Site 8	443416117084000	310.0	3	1	4	1	2

Water Column Profiles

Before sampling, water column profiles of temperature, dissolved oxygen (DO), and specific conductance were collected at each site using a Sea-Bird Electronics, Inc. SeaCAT Profiler CTD SBE-19plus (SEACAT) (fig. 3). The water column profiles were used to understand the stratification of the reservoir and to identify specific depths from which to collect water samples for analysis of total mercury and methylmercury. The SEACAT is designed to drift slowly (approximately 0.5 m per second) downward through the water column, continuously collecting data four times per second. Post-processed readings provided data at intervals of about 0.5 m within the water column. The SEACAT was calibrated by the manufacturer prior to the field work, and was verified each day using an independent probe (Hydrolab® multiprobe).

Water-Column Samples

Three zones were targeted for water-column sampling based on the information collected from the water column profiles. Samples were collected at about 0.5 m below the water surface in the upper part of the epilimnion (warmer upper zone), near the bottom of the metalimnion (middle zone) where the temperature and DO sharply decreased, and in the hypolimnion (bottom zone) slightly above the reservoir bed. Water column samples were collected at sites 1–8 for mercury analysis using the methods described in Lewis and Brigham (2004). A horizontally oriented Niskin point-sampler (fig. 4) was used to collect samples from each of the three targeted zones in the water column. The pre-cleaned Niskin sampler was lowered in the “open” position, and a triggering device was used to collect the sample at the desired depth. Each water sample was transferred to a separate pre-cleaned container and stored on ice.

Figure 3. Sea-Bird Electronics, Inc. SEACAT Profiler CTD SBE-19plus, used to collect water column profiles of temperature, dissolved oxygen, and specific conductance in Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

Figure 4. Niskin point-sampler used to collect water column samples in Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

Bed-Sediment Core Samples

Bed-sediment core samples were collected at each of the eight sites for analysis of total mercury and methylmercury. Additional bed-sediment core samples were collected at sites 1, 5, and 8 for analysis of organics and trace metals, description of particle size, and replicates (table 1).

A lightweight gravity core sampler was determined to be the most appropriate device for the bed-sediment coring. Two types of gravity core samplers were used. The first type was a lightweight 5.1 cm (inside diameter) Ballchek™ Corer (fig. 5) with an automatic check valve and three fins for stabilization. The Ballchek™ valve allowed water to flow through the core barrel on descent and prevented disturbance to the surficial bed-sediment upon collection. The second core sampler was a K-B™ Corer, which is a heavier version of the Ballchek™ Corer. The K-B™ Corer was used only at site 8 where the bed sediment was more consolidated. A 5.1-cm-diameter, 91.4-cm-long stainless-steel core barrel was threaded to the selected core sampler, and a plastic (cellulose acetate butyrate) liner was placed in the core barrel. The bed-sediment was cohesive and easily retained in the core barrel, negating the need for a core catcher at the bottom of the barrel. A nose piece made of Lexan® was attached to the bottom of the core barrel to hold the core liner in place and to prevent the stainless steel core barrel from contacting the sediment. A hand-winch was used to lower and raise the core barrel from the coring vessel. After each core was captured and brought to the surface, the liner was removed from the core barrel, and was capped, labeled, measured, and photographed (fig. 6). After all the cores were collected at the site, they were transferred to shore for subsampling. All equipment used to collect the bed-sediment core samples was decontaminated prior to sampling using methods described in Shelton and Capel (1994) and in chapter 8 of the USGS National Field Manual (Radtke, 2005).

Underwater Videography

The physical composition of the bed sediment collected from Brownlee Reservoir caused little resistance to core penetration. To ensure that a consistent core length was collected and that disturbance to the sample was minimized, an underwater video camera was used to monitor the core-barrel penetration. The camera was mounted above the bottom of the core barrel and oriented to look downward (fig. 7*A*). The transmitted video (fig. 7*B*) allowed field personnel to monitor the position of the core barrel as it was lowered into the sediment to obtain a consistent core length of about 75 cm.

Figure 5. Ballchek™ bed-sediment core sampler used in Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

Sample Processing

Following collection, water column and bed-sediment core samples were transferred to a mobile laboratory on shore and prepared for subsampling. Water samples were filtered in the field prior to shipment. A description of the processing, preservation, storage, and shipment of the samples for mercury analysis is available in Lewis and Brigham (2004). Bed-sediment cores were subsampled and prepared for mercury analysis using methods described by Lewis and Brigham (2004) and by Radtke (2005). A core pusher was used to extrude each core (fig. 8). The minimum core length for mercury analysis was 30 cm; the subsampling interval was based on sediment layering, but generally was 2 cm or less. From each core, 8 to 10 subsamples were taken. A minimum of 2 g of sediment (dry weight) were required from each subsample for mercury analysis.

Bed-sediment cores from sites 1, 5, and 8 were subsampled for pesticides and organic compounds, trace metals, and physical characteristics. Four cores were collected at each of the three sites to provide a sufficient quantity of sediment for laboratory analyses. A core pusher was used to extrude each core into a top sample designated “a” (0–30 cm), and a bottom sample designated “b” (30–75 cm). The respective top and bottom samples from each of the four cores were homogenized into a single top and bottom sample prior to subsampling for laboratory analysis. This was necessary to ensure enough material was available for all laboratory analyses and to maintain consistency between the sites.

Figure 6. Typical (*A*) core recovery and (*B*) close-up of organic material on top of core sample collected from site 2 at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

Figure 7. Underwater video camera system used to assist with sediment coring showing (*A*) components of camera mounted on core barrel, and (*B*) example image of collection of bed-sediment core sample in Brownlee Reservoir, Oregon, May 7–9, 2012.

Figure 8. Extraction process used to subsample bed-sediment cores collected from Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

Laboratory Methods

Water column and bed-sediment core samples were analyzed at seven laboratories based on the constituents of interest (table 2). Water column and bed-sediment core samples were analyzed for total mercury and methylmercury at the MRL. Core samples were analyzed for selected pesticides, organic compounds, trace metals, and physical characteristics at the University of Idaho-Analytical Sciences Laboratory (UI-ASL), Pace Analytical Services, Inc. (Pace), Pacific Agriculture Laboratory (PacAg), USGS National Water Quality Laboratory (NWQL), USGS Pesticide Fate Research Group Production Laboratory (PFRG), and the USGS Kansas Water Science Center Organic Geochemistry Research Laboratory (OGRL).

Laboratory methods and abbreviated descriptions of the techniques used to analyze samples are described in table 2. A listing of all EPA methods and documentation is available at ALS Environmental (2013). A list of standard methods is available at American Public Health Association (2006). American Society for Testing and Materials (ASTM) methodology is available at American Society for Testing and Materials (2013).

Mercury in Water and Sediment

The MRL analyzed water column and bed-sediment core samples using methods described in table 2. Water samples were analyzed for filtered and particulate total mercury, filtered and particulate methylmercury, and dissolved organic carbon. At each of the 8 sites, 8 to 10 subsamples of bed sediment from cores were collected and analyzed for total mercury, methylmercury, percentage of dry weight, and percentage of loss on ignition. Additional information about laboratory procedures can be accessed at U.S. Geological Survey (2013).

Pesticides and Other Organic Compounds

Bed-sediment core samples were analyzed for pesticides and organic compounds using the methods listed in table 2. The UI-ASL in Moscow, Idaho, analyzed bed-sediment core samples for selected herbicides and carbamate insecticides using modified EPA methods. The Pace Analytical Laboratory in Minneapolis, Minnesota, followed EPA methods to analyze bed-sediment core samples for SVOCs, PAHs, organochlorine pesticides, PCBs, chlorinated herbicides, and dioxin. The PacAg Laboratory in Portland, Oregon, followed EPA methods to analyze bed-sediment core samples for halogenated pesticides, organophosphorus and organosulfur pesticides, phenylurea herbicides, and carbamate insecticides. The PacAg laboratory also processed bed-sediment core samples for the herbicide glyphosate and its breakdown product aminomethylphosphonic acid (AMPA). The NWQL in Lakewood, Colorado, analyzed bed-sediment core samples for wastewater compounds using methods listed in table 2. The PFRG laboratory in Sacramento, California, analyzed bed-sediment core samples for current-use pesticides, their degradation products, and organochlorine insecticides. The Kansas Water Science Center Organic Geochemistry Research Laboratory in Lawrence, Kansas, analyzed bed-sediment core samples for glyphosate, AMPA, and the herbicide glufosinate.

Physical Characteristics and Trace Metals

Bed-sediment core samples were analyzed for physical characteristics and trace metals using methods listed in table 2. The Pace Analytical Laboratory in Minneapolis, Minn., analyzed physical characteristics (total solids, total organic carbon (TOC), grain size, pH, and redox state) using EPA methods, standard methods, and ASTM methods. The NWQL in Lakewood, Colo., analyzed bed-sediment core samples for trace metals in sediment.

Table 2. Techniques and associated methodologies used by laboratories to analyze water and bed-sediment core samples collected from Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[**Abbreviations:** ASTM, American Society for Testing and Materials; CFAFD, cold vapor atomic fluorescence detection; CVAFS, cold vapor atomic fluorescence spectrometry; GC, gas chromatography; GC-ECD, gas chromatography-electron capture detector; GC-FPD, gas chromatography-flame photometric detector; GC-MS, gas chromatography-mass spectrometry; HPLC, high performance liquid chromatography; HR-GC-MS, high resolution-gas chromotography-mass spectrometry; HPLC/ICP-MS, high performance liquid chromatography inductively coupled plasma-mass spectrometry; ICP-MS, inductively coupled plasma-mass spectrometry; LC/MS/MS, liquid chromatography coupled to a tandem mass spectrometer; PCB, polychlorinated biphenyls; SIM, selective ion monitoring; TOC, total organic carbon; EPA, U.S. Environmental Protection Agency; USGS, U.S. Geological Survey; cm, centimeter; °C, degrees Celsius]

Chemical or method name	Method	Techniques used for analysis	Method citation
		USGS—Mercury Research Laboratory (water column)	
Filtered total mercury	EPA Method 1631, Rev. E	Oxidation, purge and trap, and CVAFS	U.S. Environmental Protection Agency (2002)
Filtered methylmercury	USGS Open-File Report 01-445	Aqueous phase ethylation and chromatographic separation with CVAFD	DeWild and others (2002)
Particulate total mercury	USGS Techniques and Methods Report 5A-8	Oxidation, CVAFS	Olund and others (2004)
Particulate methylmercury	USGS Techniques and Methods Report 5A-7	Filtration, reaction and distillation, CVAFS	DeWild and others (2004)
Dissolved organic carbon	Shimadzu TOC	Catalytically-aided platinum 680°C combustion technique	Shimadzu (2013)
		USGS—Mercury Research Laboratory (bed sediment)	
Sediment total mercury	USGS Techniques and Methods 5A-8 - acid digestion	Acid digestion, oxidation, and CVAFS	Olund and others (2004)
	EPA Method 7473 (SW-846) Rev. 0 - direct combustion	Dry, chemical decomposition, amalgamation, and GC-MS	U.S. Environmental Protection Agency (2007a)
Sediment methylmercury	USGS Techniques and Methods 5A-7	Reaction, ethylation, GC, and CVAFS	DeWild and others (2004)
Dry weight percent (percent solids)	USGS Techniques of Water-Resources Investigations 5-A1, 3rd ed., p. 48	Dry, weight	Fishman and Freidman (1989)
Percent loss on ignition	USGS Techniques of Water-Resources Investigations 5-A1, 3rd ed., p. 451	Dry, weight	Fishman and Freidman (1989)
		University of Idaho—Analytical Sciences Laboratory	
Carbamates	EPA 632 Modified	Extraction, dry, and HPLC	U.S. Environmental Protection Agency (1993)
Chlorinated acid herbicides	EPA 8151 Modified	Extraction, esterification, and GC-ECD	U.S. Environmental Protection Agency (1996a)
GC/MS extras	EPA 8141 Modified	Extraction, exchange, and GC-FPD	U.S. Environmental Protection Agency (2000)
Organochlorine pesticides	EPA 8081 Modified	Extraction, neutralization, and GC-ECD	U.S. Environmental Protection Agency (1996b)
Organophosphate and organonitrogen pesticides	EPA 8141 Modified	Extraction, exchange, and GC-FPD	U.S. Environmental Protection Agency (2000)
Urea pesticides	EPA 632 Modified	Extraction, dry, and HPLC	U.S. Environmental Protection Agency (1993)
		Pace Analytical Services, Inc.	
Semivolatile organics	EPA 8270 (GC-MS)	Preparation and GC-MS	U.S. Environmental Protection Agency (1996c)
Polynuclear aromatic hydrocarbons PAH (low level)	EPA 8270(GC-MS, SIM mode)	Preparation and GC-MS	U.S. Environmental Protection Agency (1996c)
Organochlorine pesticides	EPA 8081 (GC-ECD)	Extraction, cleanup, and GC-ECD	U.S. Environmental Protection Agency (1996b)
PCBs	EPA 8082 (GC-ECD)	Extraction, cleanup, and GC-ECD	U.S. Environmental Protection Agency (1996d)
Chlorinated herbicides	EPA 8151	Extraction, esterification, and GC-ECD	U.S. Environmental Protection Agency (1996a)

Table 2. Techniques and associated methodologies used by laboratories to analyze water and bed-sediment core samples collected from Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

[**Abbreviations:** ASTM, American Society for Testing and Materials; CFAFD, cold vapor atomic fluorescence detection; CVAFS, cold vapor atomic fluorescence spectrometry; GC, gas chromatography; GC-ECD, gas chromatography-electron capture detector; GC-FPD, gas chromatography-flame photometric detector; GC-MS, gas chromatography-mass spectrometry; HPLC, high performance liquid chromatography; HR-GC-MS, high resolution-gas chromotography-mass spectrometry; HPLC/ICP-MS, high performance liquid chromatography inductively coupled plasma-mass spectrometry; ICP-MS, inductively coupled plasma-mass spectrometry; LC/MS/MS, liquid chromatography coupled to a tandem mass spectrometer; PCB, polychlorinated biphenyls; SIM, selective ion monitoring; TOC, total organic carbon; EPA, U.S. Environmental Protection Agency; USGS, U.S. Geological Survey; cm, centimeter; °C, degrees Celsius]

Chemical or method name	Method	Techniques used for analysis	Method citation
		Pace Analytical Services, Inc.—Continued	
Dioxin (2,3,7,8-TCDD)	EPA 1613 (HR-GC-MS)	Extraction, filtration, dry, and HR-GC-MS	U.S. Environmental Protection Agency (1994)
Total solids	SM 2540B	Dry, weigh	American Public Health Association (1999)
TOC	SW 9060 mod.	Carbonaceous analysis	U.S. Environmental Protection Agency (1986)
Grain size	ASTM D422	Sieve and weigh	American Society for Testing and Materials (1998)
pH	EPA 9045	Mix with reagent, measure pH	U.S. Environmental Protection Agency (2004)
Redox	ASTM D1498	Reduction-oxidation potential measurement	American Society for Testing and Materials (1990)
		Pacific Agricultural Laboratory	
Aminomethylphosphonic acid (AMPA) Glyphosate	Monsanto FLP Method (HPLC-FLD)	Preparation, extraction, and HPLC	M.E. Oppenhuizen, Monsanto Corporation, unpub. data (1993)
Halogenated pesticides	EPA 8081B (GC-ECD)	Extraction, cleanup,and GC-ECD	U.S. Environmental Protection Agency (1996b)
Organophosphorous and organosulfur pesticides	EPA 8141B (GC-FPD)	Extraction, exchange, and GC-FPD	U.S. Environmental Protection Agency (2000)
Organonitrogen pesticides	EPA 8270D (GC-MS, SIM mode)	Preparation and GC-MS	U.S. Environmental Protection Agency (1996c)
Phenylurea herbicides	EPA 8321B (HPLC-MS)	Direct injection, HPLC-MS	U.S. Environmental Protection Agency (2007b)
Carbamate pesticides	EPA 8321B (HPLC-MS)	Direct injection, HPLC-MS	U.S. Environmental Protection Agency (2007b)
		USGS—National Water Quality Laboratory	
Wastewater compounds in sediment	USGS Techniques and Methods Report 5-B2	Extraction, isolation, dry, and GC-MS	Burkhardt and others (2006)
Routine metals in sediment	USGS Techniques and Methods Report 5-B1	Digestion, HPLC/ICP-MS	Garbarino and others (2006)
		USGS—Pesticide Fate Research Group Production Laboratory	
Current-use pesticides Organochlorine pesticides	Multi-residue method (GC-MS)	Extraction, cleanup, GC-MS	Smalling and Kuivila (2008)
		USGS—Kansas Water Science Center Organic Geochemistry Research Laboratory	
Glyphosate Aminomethylphosphonic acid (AMPA) Glufosinate	USGS O-2141-09	Derivatization, extraction, elution, LC/MS/MS	Meyer and others (2009)

Quality Assurance and Quality Control

This study followed the USGS Idaho Water Science Center's quality-assurance plan for the collection of water-quality samples (Mark Hardy, U.S. Geological Survey, written commun., 2008). Quality-control and environmental samples were collected. Quality control for bed-sediment core samples included one split field replicate sample for each laboratory analysis. The split replicate samples from the laboratory were reviewed to ensure no major discrepancies between the environmental and split replicate samples. Sample blinds or blank samples were not submitted as part of this study. However, all laboratory methods and internal quality-control standards for each laboratory included in this study were reviewed and approved by the USGS. Two core samples from each of the 8 sites (16 samples) were collected concurrently as replicate core samples, but were not submitted for analysis. The replicate core samples were frozen immediately after being transferred to the on-site sample preparation area and were subsequently transferred to an IPC storage facility for long-term storage.

Water Column and Sediment Core Samples

Total Mercury and Methylmercury in Water and Sediment

The MRL analyzed water samples for filtered and particulate total mercury, filtered and particulate methylmercury, and dissolved organic carbon (table 3). Filtered total mercury concentrations in water ranged from 0.38 to 1.3 ng/L. Filtered methylmercury concentrations generally increased with depth and were less than 0.13 ng/L, with the exception of the outlier at site 8 (0.61 ng/L). Particulate total mercury concentrations also increased with depth and ranged from 0.287 to 1.89 ng/L. Particulate methylmercury concentrations ranged from 0.027 to 0.312 ng/L. Dissolved organic carbon concentrations ranged from 1.8 to 2.8 mg/L.

Total mercury and methylmercury were detected in all bed-sediment core samples (table 4). Total mercury concentrations in sediment ranged from 51.4 to 112 µg/kg. Methylmercury concentrations ranged from 0.36 to 18 µg/kg, with the highest concentrations occurring near the sediment-water interface. Percentage of dry weight from bed-sediment core samples ranged from 5.52 to 31.53 percent. The measured percentage of loss on ignition ranged from 6.68 to 17.28 percent.

Pesticides and Organic Compounds

Bed-sediment core samples collected at sites 1, 5, and 8 were analyzed for 417 pesticides and other organic compounds. Concentrations of pesticides and other organic compounds are listed by the laboratory in which they were analyzed.

University of Idaho-Analytical Sciences Laboratory

Bed-sediment core samples from sites 1, 5, and 8 were analyzed at UI-ASL for selected herbicides and carbamate pesticides (table 5). The carbamate pesticide baygon (propoxur) was detected in cores 5b, 8a, and 8b at concentrations of 6.1, 6.1, and 7.3 µg/kg, respectively. The chlorinated acid herbicide 2,4-dichlorobenzoic acid was present at concentrations less than the reporting level of 10 µg/kg in core samples 1a, 1b, 5a, 5b, and 8a, and the chlorinated acid herbicide pentachlorophenol was less than the reporting level of 8 µg/kg in core 8b. The organochlorine pesticide compound dichlorodiphenyldichloroethylene (DDE), a breakdown product of dichlorodiphenyltrichloroethane (DDT), was less than the reporting level of 3 µg/kg in cores 5b, 8a, and 8b. The pesticide prometon was less than the reporting level of 5 µg/kg in cores 5b, 8a, and 8b. No urea pesticides were detected in the bed-sediment core samples.

Pace Analytical Services Laboratory

Bed-sediment core samples at sites 1, 5, and 8 were analyzed by the Pace Analytical Services Laboratory for SVOCs, PAHs, organochlorine pesticides, PCBs, chlorinated herbicides, and dioxin. SVOCs, chlorinated herbicides, or PAHs were not detected (table 11; at back of report). The breakdown product 4,4'-DDE was the only organochlorine pesticide detected; however, the concentrations were less than the adjusted reporting limit (but greater than the detection limit) in every sample analyzed. Cores 5a, 8a, and 8b were not analyzed for PCBs due to miscommunications with the laboratory, but PCBs were not detected in samples collected from the three remaining core samples (1a, 1b, and 5b). Chlorinated herbicides were analyzed for bed-sediment core samples collected at site 1 due to a miscommunication at the laboratory; no chlorinated herbicides were detected in either of the cores collected at site 1. Dioxin was not detected in any of the bed-sediment core samples.

Table 3. Total mercury, methylmercury, and dissolved organic carbon concentrations in water-column samples collected from Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Samples analyzed at U.S. Geological Survey Mercury Research Laboratory according to laboratory methodologies listed in table 2. **Abbreviations:** m, meter; ng/L, nanogram per liter; mg/L, milligram per liter; USGS, U.S. Geological Survey; –, no data available]

Sample collection			Total mercury (filtered) (ng/L)	Methylmercury (filtered) (ng/L)	Total mercury (particulate) (ng/L)	Methylmercury (particulate) (ng/L)	Dissolved organic carbon (mg/L)
Date	Time	Depth in water column (m)					
USGS 444954116542400–Site 1							
05-07-12	1300	0.50	1.03	0.07	0.540	0.034	2.7
	1318	47.0	0.38	0.06	0.374	0.027	1.9
	1330	76.7	0.45	0.12	0.457	0.167	1.9
USGS 444935116544000–Site 2							
05-08-12	1225	0.50	1.29	0.05	0.424	0.054	2.7
	1220	47.0	0.48	0.06	0.397	0.043	2.0
	1215	81.3	0.48	0.10	0.461	0.229	1.9
USGS 444912116545700–Site 3							
05-08-12	1610	0.50	1.05	0.09	0.413	0.050	2.7
	1605	47.0	0.45	0.04	0.359	0.031	1.9
	1550	83.6	1.19	0.10	1.89	0.224	1.9
USGS 444807116555700–Site 4							
05-08-12	1425	0.50	1.08	0.08	0.602	0.061	2.8
	1420	47.0	0.42	0.06	0.470	0.031	2.0
	1415	79.3	0.49	0.12	0.755	0.265	1.9
USGS 444455117021200–Site 5							
05-09-12	0818	0.50	1.05	0.08	0.441	0.038	2.4
	0828	47.0	0.46	0.07	0.484	0.054	2.0
	0833	65.6	0.41	0.12	0.953	0.178	1.8
USGS 444101117045000–Site 6							
05-08-12	1210	0.50	1.14	0.08	0.287	0.035	2.5
	1235	43.0	0.64	0.10	0.505	–	2.2
	1220	57.0	0.48	0.10	0.960	0.140	2.0
USGS 443745117062500–Site 7							
05-09-12	1030	0.50	1.09	0.06	0.618	0.048	2.4
	1025	10.0	1.15	0.08	1.08	0.040	2.4
	1020	47.3	0.91	0.11	1.79	0.312	2.3
USGS 443416117084000–Site 8							
05-08-12	0907	0.50	1.27	0.08	0.673	0.036	2.4
	0930	10.3	1.26	0.08	1.10	0.050	2.8
	0913	32.3	1.01	0.61	1.38	0.106	2.4

Table 4. Total mercury and methylmercury concentrations and selected physical characteristics of bed-sediment samples collected from Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Samples analyzed at U.S. Geological Survey Mercury Research Laboratory according to laboratory methodologies listed in table 2. **Abbreviations:** m, meter; µg/kg, microgram per kilogram; USGS, U.S. Geological Survey]

Sample date	Time	Sample interval (m)	Total mercury (µg/kg)	Methylmercury (µg/kg)	Dry weight percent solids (percent)	Loss on ignition (percent)
USGS 444954116542400—Site 1						
05-07-12	1351	0–0.01	98.2	15	8.58	17.28
	1352	0.01–0.02	64.5	6.1	9.32	15.66
	1353	0.02– 0.05	86.1	2.8	11.88	9.29
	1354	0.05–0.1	96.3	3.1	11.11	12.98
	1355	0.1–0.15	99.6	1.2	10.22	13.47
	1356	0.15–0.25	100	0.94	14.01	13.45
	1357	0.25–0.3	91.7	0.88	16.28	9.65
	1358	0.3–0.35	110	0.6	21.18	6.95
	1350	0.35–0.4	84.6	0.73	19.97	8.59
USGS 444935116544000—Site 2						
05-09-12	1240	0–0.01	99.2	18	8.7	15.36
	1241	0.01–0.02	61	5.2	9.11	15.14
	1242	0.02–0.05	97.7	5.3	8.21	11.27
	1243	0.05–0.1	90.9	2.4	12.2	11.95
	1244	0.1–0.15	100	1.3	9.74	14.03
	1245	0.15–0.25	105	1.1	14.44	11.77
	1246	0.25–0.3	98.2	1.1	12.95	11.37
	1247	0.3–0.35	97	0.58	21.62	8.47
	1248	0.35–0.4	80.3	0.64	19.11	8.48
USGS 444912116545700—Site 3						
05-08-12	1630	0–0.01	103	18	8.13	13.84
	1631	0.01–0.03	77.9	7.7	8.39	15.57
	1632	0.03–0.07	83.3	4.2	8.82	9.51
	1633	0.07–0.12	93.6	3.2	13.34	11.23
	1634	0.12–0.17	98.4	1.5	10.7	16
	1635	0.17–0.22	112	1	15.86	8.98
	1636	0.22–0.32	104	2	11.81	16.03
	1637	0.32–0.42	101	0.74	17.62	9.55
USGS 444807116555700—Site 4						
05-08-12	1440	0–0.01	81.8	13	6.75	14.16
	1441	0.01–0.03	74.2	5.3	8.53	14.91
	1442	0.03–0.05	77.6	8.5	5.52	13.74
	1443	0.05–0.07	88.4	2.4	9.84	9.97
	1444	0.07–0.09	84.9	4.6	7.59	13.16
	1445	0.09–0.11	80.2	7.2	7.42	11.62
	1446	0.11–0.21	74.2	2.1	15.38	10.73
	1447	0.21–0.31	84.8	1.7	15.00	12.25
	1448	0.31–0.41	96.3	0.86	16.83	11.08

Table 4. Total mercury and methylmercury concentrations and selected physical characteristics of bed-sediment samples collected from Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

[Samples analyzed at U.S. Geological Survey Mercury Research Laboratory according to laboratory methodologies listed in table 2. **Abbreviations:** m, meter; µg/kg, microgram per kilogram; USGS, U.S. Geological Survey]

Sample date	Time	Sample interval (m)	Total mercury (µg/kg)	Methylmercury (µg/kg)	Dry weight percent solids (percent)	Loss on ignition (percent)
USGS 444455117021200—Site 5						
05-09-12	0850	0–0.02	75.1	7.3	6.44	12.56
	0851	0.02–0.04	74.1	5.7	8.06	11.22
	0852	0.04–0.06	70.8	3	11.16	11.43
	0853	0.06–0.08	71.1	4.1	9.16	12.22
	0854	0.08–0.1	78.2	2	17.58	7.88
	1440	0.1–0.2	75.9	1.7	19.62	11.02
	1441	0.2–0.3	82.5	1.2	13.98	12.34
	1442	0.3–0.4	78.6	0.54	25.05	7.95
USGS 444101117045000—Site 6						
05-08-12	1250	0–0.01	99.2	12	6.86	12.25
	1251	0.01–0.03	91.7	12	11.02	10.52
	1252	0.03–0.05	81.1	11	12.26	11.87
	1253	0.05–0.07	73.4	5.5	13.52	12.53
	1254	0.07–0.09	73.1	2.2	16.07	8.8
	1255	0.09–0.11	75.8	2	17.18	8.75
	1256	0.11–0.21	73.6	1.8	17.24	9.61
	1257	0.21–0.31	68.2	1.8	21.57	7.35
	1258	0.31–0.41	77.2	1.4	20.09	10.15
USGS 443745117062500—Site 7						
05-09-12	1045	0–0.02	84.9	12	15.29	10.71
	1046	0.02–0.04	71.4	6.3	16.5	10.43
	1047	0.04–0.06	62.2	1.6	20.18	8.14
	1048	0.06–0.08	65.4	2	20.42	8.84
	1049	0.08–0.11	67.4	1.6	19.85	8.59
	1050	0.11–0.23	64.1	1.4	19.89	9.54
	1051	0.23–0.33	65.4	1.4	24.86	14.4
	1052	0.33–0.43	67.8	0.72	19.93	10.5
USGS 443416117084000—Site 8						
05-08-12	0945	0–0.01	75.9	10	12.84	10.48
	0946	0.01–0.03	72.7	8.1	20.68	8.82
	0947	0.03–0.05	74.7	4.2	22.19	8.21
	0948	0.05–0.1	57.8	1.2	23.66	8.72
	0949	0.1–0.12	60.6	1.8	27.03	7.16
	0950	0.12–0.14	51.4	1.1	28.53	7.87
	0951	0.14–0.18	56.8	0.78	26.25	6.68
	0952	0.18–0.24	54.3	0.52	22.51	8.95
	0953	0.24–0.28	55.8	0.36	23.62	9.41
	0954	0.28–0.29	54.7	0.46	31.53	7.06

Table 5. Selected herbicide and carbamate insecticide concentrations in bed-sediment core samples collected at selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Samples analyzed at University of Idaho-Analytical Sciences Laboratory according to laboratory methodologies listed in table 2. All values are in micrograms per kilogram (wet weight). **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. **Abbreviations:** NWIS, National Water Information System; GC/MC, gas chromatography/mass spectometry; cm, centimeter; ND, not detected; <, less than]

Parameter	CASRN	Reporting level	NWIS site name with sample date and time					
			Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
			05-07-12 1400	05-07-12 1415	05-09-12 0900	05-09-12 0915	05-08-12 0900	05-08-12 0915
Carbamates								
Aldicarb	00116-06-3	10	ND	ND	ND	ND	ND	ND
Aldicarb Sulfone	01646-88-4	10	ND	ND	ND	ND	ND	ND
Aldicarb Sulfoxide	01646-87-3	10	ND	ND	ND	ND	ND	ND
Baygon (Propoxur)	00114-26-1	5	ND	ND	ND	6.1	6.1	7.3
Carbaryl	00063-25-2	5	ND	ND	ND	ND	ND	ND
Carbofuran	01563-66-2	5	ND	ND	ND	ND	ND	ND
Methiocarb	02032-65-7	5	ND	ND	ND	ND	ND	ND
Methomyl	16752-77-5	5	ND	ND	ND	ND	ND	ND
Oxamyl	23135-22-0	5	ND	ND	ND	ND	ND	ND
Chlorinated acid herbicides								
2,4,6-Trichlorophenol	00088-06-2	10	ND	ND	ND	ND	ND	ND
2,4-D	00094-75-7	20	ND	ND	ND	ND	ND	ND
2,4-DB	00094-82-6	20	ND	ND	ND	ND	ND	ND
2,4-Dichlorobenzoic acid	000-50-84-0	10	<10	<10	<10	<10	<10	ND
3,5-Dichlorobenzoic acid	00051-36-5	10	ND	ND	ND	ND	ND	ND
Bentazon	25057-89-0	20	ND	ND	ND	ND	ND	ND
Bromoxynil	01689-84-5	10	ND	ND	ND	ND	ND	ND
Dacthal (DCPA)	02136-79-0	8	ND	ND	ND	ND	ND	ND
Dicamba	01918-00-9	8	ND	ND	ND	ND	ND	ND
Dichloroprop	00120-36-5	25	ND	ND	ND	ND	ND	ND
Diclofop methyl	51338-27-3	25	ND	ND	ND	ND	ND	ND
Dinoseb	00088-85-7	20	ND	ND	ND	ND	ND	ND
MCPA	00094-74-6	20	ND	ND	ND	ND	ND	ND
MCPP	07085-19-0	20	ND	ND	ND	ND	ND	ND
Pentachlorophenol	00087-86-5	8	ND	ND	ND	ND	ND	<8
Picloram	01918-02-1	15	ND	ND	ND	ND	ND	ND
Triclopyr	55336-06-3	10	ND	ND	ND	ND	ND	ND
GC/MS extras								
Acephate	30560-19-1	50	ND	ND	ND	ND	ND	ND
Bensulide	00741-58-2	5	ND	ND	ND	ND	ND	ND
Captan	00133-06-2	10	ND	ND	ND	ND	ND	ND
Coumaphos	00056-72-4	5	ND	ND	ND	ND	ND	ND
Diflubenzuron	35367-38-5	5	ND	ND	ND	ND	ND	ND
Dimethoate	00060-51-5	5	ND	ND	ND	ND	ND	ND
Fenthion	00055-38-9	5	ND	ND	ND	ND	ND	ND
Iprodione	36734-19-7	10	ND	ND	ND	ND	ND	ND
Methamidophos	10265-92-6	5	ND	ND	ND	ND	ND	ND
Naled	00300-76-5	50	ND	ND	ND	ND	ND	ND
Oryzalin	19044-88-3	5	ND	ND	ND	ND	ND	ND
Phosmet	00732-11-6	5	ND	ND	ND	ND	ND	ND

Table 5. Selected herbicide and carbamate insecticide concentrations in bed-sediment core samples collected at selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

[Samples analyzed at University of Idaho-Analytical Sciences Laboratory according to laboratory methodologies listed in table 2. All values are in micrograms per kilogram (wet weight). **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. **Abbreviations:** NWIS, National Water Information System; GC/MC, gas chromatography/mass spectometry; cm, centimeter; ND, not detected; <, less than]

Parameter	CASRN	Reporting level	NWIS site name with sample date and time					
			Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
			05-07-12 1400	05-07-12 1415	05-09-12 0900	05-09-12 0915	05-08-12 0900	05-08-12 0915
Organochlorine pesticides								
Acetochlor	34256-82-1	2.5	ND	ND	ND	ND	ND	ND
Chlordane (alpha)	00319-84-6	2	ND	ND	ND	ND	ND	ND
Chlordane (gamma) (Lindane)	00058-89-9	2	ND	ND	ND	ND	ND	ND
Chlorobenzilate	00510-16-6	5	ND	ND	ND	ND	ND	ND
Chloroneb	02675-77-6	2.5	ND	ND	ND	ND	ND	ND
Chlorothalonil	01897-45-6	2.5	ND	ND	ND	ND	ND	ND
DCPA (parent)	01861-32-1	2.5	ND	ND	ND	ND	ND	ND
DDD	00072-54-8	3	ND	ND	ND	ND	ND	ND
DDE	00072-55-9	3	ND	ND	ND	<3	<3	<3
DDT	00050-29-3	30	ND	ND	ND	ND	ND	ND
Dichlobenil	01194-65-6	5	ND	ND	ND	ND	ND	ND
Dieldrin	00060-57-1	3	ND	ND	ND	ND	ND	ND
Etridiazole	02593-15-9	5	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	00118-74-1	2	ND	ND	ND	ND	ND	ND
Oxyfluorfen	42874-03-3	5	ND	ND	ND	ND	ND	ND
Permethrin (cis)	52645-53-1	10	ND	ND	ND	ND	ND	ND
Propachlor	01918-16-7	5	ND	ND	ND	ND	ND	ND
Organophosphate and organonitrogen pesticides								
Alachlor	15972-60-8	5	ND	ND	ND	ND	ND	ND
Ametryn	00834-12-8	5	ND	ND	ND	ND	ND	ND
Atrazine	01912-24-9	2.5	ND	ND	ND	ND	ND	ND
Benfluralin	01861-40-1	5	ND	ND	ND	ND	ND	ND
Benthiocarb	28249-77-6	2.5	ND	ND	ND	ND	ND	ND
Bromacil	00314-40-9	5	ND	ND	ND	ND	ND	ND
Butachlor	23184-66-9	5	ND	ND	ND	ND	ND	ND
Butylate	02008-41-5	2.5	ND	ND	ND	ND	ND	ND
Carboxin	05234-68-5	5	ND	ND	ND	ND	ND	ND
Chlorpropham	00101-21-3	5	ND	ND	ND	ND	ND	ND
Chlorpyrifos	02921-88-2	2.5	ND	ND	ND	ND	ND	ND
Cycloate	01134-23-2	5	ND	ND	ND	ND	ND	ND
Desethyl Atrazine	06190-65-4	2.5	ND	ND	ND	ND	ND	ND
Di-allate	02303-16-4	5	ND	ND	ND	ND	ND	ND
Diazinon	00333-41-5	2.5	ND	ND	ND	ND	ND	ND
Dichlorvos	00062-73-7	5	ND	ND	ND	ND	ND	ND
Disulfoton	00298-04-4	5	ND	ND	ND	ND	ND	ND
EPTC	00759-94-4	5	ND	ND	ND	ND	ND	ND
Ethalfluralin	55283-68-6	5	ND	ND	ND	ND	ND	ND

Table 5. Selected herbicide and carbamate insecticide concentrations in bed-sediment core samples collected at selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

[Samples analyzed at University of Idaho-Analytical Sciences Laboratory according to laboratory methodologies listed in table 2. All values are in micrograms per kilogram (wet weight). **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. **Abbreviations:** NWIS, National Water Information System; GC/MC, gas chromatography/mass spectometry; cm, centimeter; ND, not detected; <, less than]

Parameter	CASRN	Reporting level	NWIS site name with sample date and time					
			Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
			05-07-12 1400	05-07-12 1415	05-09-12 0900	05-09-12 0915	05-08-12 0900	05-08-12 0915
Organophosphate and organonitrogen pesticides—Continued								
Ethoprop	13194-48-4	2.5	ND	ND	ND	ND	ND	ND
Fenamiphos	22224-92-6	5	ND	ND	ND	ND	ND	ND
Fenarimol	60168-88-9	5	ND	ND	ND	ND	ND	ND
Hexazinone	51235-04-2	5	ND	ND	ND	ND	ND	ND
Malathion	00121-75-5	5	ND	ND	ND	ND	ND	ND
Metalaxyl	57837-19-1	5	ND	ND	ND	ND	ND	ND
Methidathion	00950-37-8	5	ND	ND	ND	ND	ND	ND
Methyl Paraoxon	00950-35-6	10	ND	ND	ND	ND	ND	ND
Methyl Parathion	00298-00-0	5	ND	ND	ND	ND	ND	ND
Metolachlor	51218-45-2	5	ND	ND	ND	ND	ND	ND
Metribuzin	21087-64-9	2.5	ND	ND	ND	ND	ND	ND
Napropamide	15299-99-7	5	ND	ND	ND	ND	ND	ND
Norflurazon	27314-13-2	5	ND	ND	ND	ND	ND	ND
Parathion	00056-38-2	5	ND	ND	ND	ND	ND	ND
Pendimethalin	40487-42-1	2.5	ND	ND	ND	ND	ND	ND
Phorate	00298-02-2	5	ND	ND	ND	ND	ND	ND
Prometon	01610-18-0	5	ND	ND	ND	<5	<5	<5
Pronamide	23950-58-5	5	ND	ND	ND	ND	ND	ND
Propazine	00139-40-2	2.5	ND	ND	ND	ND	ND	ND
Simazine	00122-34-9	2.5	ND	ND	ND	ND	ND	ND
Terbacil	05902-51-2	5	ND	ND	ND	ND	ND	ND
Terbufos	13071-79-9	5	ND	ND	ND	ND	ND	ND
Triallate	02303-17-5	5	ND	ND	ND	ND	ND	ND
Triadimefon	43121-43-3	5	ND	ND	ND	ND	ND	ND
Urea pesticides								
Deisopropyl atrazine (DIA)	01007-28-9	2.5	ND	ND	ND	ND	ND	ND
Diuron	00330-54-1	2.5	ND	ND	ND	ND	ND	ND
Linuron	00330-55-2	5	ND	ND	ND	ND	ND	ND
Tebuthiuron	34014-18-1	5	ND	ND	ND	ND	ND	ND
Tralkoxydim	87820-88-0	5	ND	ND	ND	ND	ND	ND

Pacific Agriculture Laboratory

Pesticide and herbicide concentrations from the bed-sediment core samples from sites 1, 5, and 8 were analyzed at the Pacific Agriculture Laboratory (PacAg) (table 12; at back of report). One halogenated pesticide, p,p'-DDE, was detected at a concentration of 0.03 µg/kg in the core samples collected at site 5b. Organophosphorus and organosulfur pesticides, organonitrogen pesticides, phenylurea herbicides, and carbamate insecticides were not detected in any of the bed-sediment core samples.

The concentrations in the initial bed-sediment core samples analyzed at PacAg for the glyphosate and AMPA were higher than expected. Based on the initial results, follow-up analysis of glyphosate and AMPA was requested. Concentrations from the subsequent analyses at PacAg from core samples 1b and 8a were much lower than the original results. The herbicide glyphosate was detected in one sample and the concentration was close to the reporting level. AMPA, the breakdown product of glyphosate, was not detected in any of the bed-sediment core samples. Additionally, a split core was sent to the OGRL for analysis. The OGRL analyzed for glyphosate, AMPA, and glufosinate, and all results were less than the reporting limit of 20 µg/kg. Results for glyphosate, AMPA, and glufosinate sent to PacAg and OGRL laboratories for analysis on bed-sediment core samples are listed in table 6.

U.S. Geological Survey National Water Quality Laboratory

The NWQL analyzed bed-sediment core samples from sites 1, 5, and 8 for wastewater compounds (table 7). Due to method performance variability, an analyte could have multiple reporting levels in some cases. Concentrations of most wastewater compounds in bed sediment were less than the method reporting levels. Some compound detections are reported at an estimated ("E") level; estimated values may be reported for constituents that were identified with a high level of confidence, but due to matrix interference or other analytical issues, their quantification was more uncertain. Estimated concentration values were considered detections for the bed-sediment samples in this study. The analytes 2,6-Dimethylnaphthalene, 3-Methyl-1(H)-indole (Skatole) (except 1b), 3-beta-Coprostanol, beta-Sitosterol, beta-Stigmastanol, Cholesterol, Indole, Isophorone (except 1a and 5a), and p-Cresol were detected in all samples. Carbazole was detected in samples 5b, 8a, and 8b; 4-Nonylphenol (sum of all isomers) was detected in samples 1b, 5a, and 5b.

U.S. Geological Survey Pesticide Fate Research Group

The USGS-Pesticide Fate Research Group analyzed bed-sediment core samples for an array of pesticides, herbicides, and fungicides. Only samples from the top (0–30 cm) of the bed-sediment cores at sites 1a, 5a, and 8b (table 7) were submitted for analysis. Of the 90 analytes, 2 were detected in the bed-sediment core samples (table 8). One analyte, p,p'-DDE, was detected in samples from sites 1 and 8 at concentrations of 3.2 and 2.1 µg/kg (based on dry weight), respectively. Pendimethalin was detected at a concentration of 24.7 µg/kg in a single core sample collected at site 8.

Physical Characteristics and Trace Metals

The Pace Analytical Laboratory analyzed selected bed-sediment core samples for physical characteristics (table 9). Total organic carbon in bed sediment ranged from 12,400 to 16,800 mg/kg. Grain-size results for samples collected from sites 5 and 8 ranged from 66.0 to 75.8 percent clay and 24.2 to 34.0 percent silt. The pH of the sediment ranged from 7.0 to 7.9, and reduction-oxidation (redox) potential in core samples from sites 5 and 8 ranged from 89.3 to 1,200 millivolts, decreasing both with depth and in a downstream direction. Because of a miscommunication with the analyzing laboratory, no data are available for total solids (all sites), grain-size analysis (sites 1a and 1b), pH (site 1b), and redox (sites 1a and 1b).

Trace metals in bed sediment samples were analyzed by the NWQL (table 10) and were greater than the reporting level in all the samples submitted for analysis. According to sediment quality guidelines published by MacDonald and others (2000), results for arsenic, copper, and nickel were between the consensus-based threshold effect concentration (TEC) and probable effect concentration (PEC) for freshwater ecosystems. The TEC indicates a concentration where adverse effects rarely occur, whereas the PEC indicates a concentration where adverse effects occur more often than not. Because the samples were neither less than the TEC nor greater than the PEC, the samples cannot be determined to be nontoxic or toxic based on these sediment quality guidelines.

Table 6. Laboratory results for glyphosate and breakdown product concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Laboratory results from Pacific Agricultural Laboratory and USGS Organic Geochemistry Research Laboratory. Multiple analyses completed for quality assurance/quality control purposes. **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. **Analysis date:** Additional samples analyzed on 12-14-12 were subsampled from frozen cores and sent to laboratory to compare against data from 05-26-12. **Abbreviations:** cm, centimeter; µg/kg, microgram per kilogram; ND, not detected; <, less than]

NWIS site No.			444954116542400				444455117021200			
NWIS site name			Site 1a		Site 1b		Site 5a		Site 5b	
Sample date / time			05-07-12 1400		05-07-12 1415		05-09-12 0900		05-09-12 0915	
Parameter	CASRN No.	Analysis date	Reporting level (µg/kg)	Detection (µg/kg)	Reporting level (µg/kg)	Detection (µg/kg)	Reporting level (µg/kg)	Detection (µg/kg)	Reporting level (µg/kg)	Detection (µg/kg)
Pacific Agricultural Laboratory: Glyphosate-Monsanto Method (HPLC-FLD)										
Aminomethylphosphonic acid (AMPA)	1066-51-9	05-26-12	94	ND	49	100	33	43	32	44
Glyphosate	1071-83-6		94	130	490	13,000	33	390	32	70
Aminomethylphosphonic acid (AMPA)	1066-51-9	12-14-12	34	ND	36	ND	34	ND	34	ND
Glyphosate	1071-83-6		34	ND	36	39	34	ND	34	ND
USGS-OGRL Laboratory: LCGS Method 0-2141-09										
Glyphosate	1071-83-6	12-14-12	20	<	20	<	20	<	20	<
Aminomethylphosphonic acid (AMPA)	1066-51-9		20	<	20	<	20	<	20	<
Glufosinate	51276-47-2		20	<	20	<	20	<	20	<

NWIS site No.			443416117084000			
NWIS site name			Site 8a		Site 8b	
Sample date / time			05-08-12 0900		05-08-12 0915	
Parameter	CASRN No.	Analysis date	Reporting level (µg/kg)	Detection (µg/kg)	Reporting level (µg/kg)	Detection (µg/kg)
Pacific Agricultural Laboratory: Glyphosate-Monsanto Method (HPLC-FLD)						
Aminomethylphosphonic acid (AMPA)	1066-51-9	05-26-12	50	ND	33	35
Glyphosate	1071-83-6		50	210	33	750
Aminomethylphosphonic acid (AMPA)	1066-51-9	12-14-12	34	ND	34	ND
Glyphosate	1071-83-6		34	34	34	ND
USGS-OGRL Laboratory: LCGS Method 0-2141-09						
Glyphosate	1071-83-6	12-14-12	20	<	20	<
Aminomethylphosphonic acid (AMPA)	1066-51-9		20	<	20	<
Glufosinate	51276-47-2		20	<	20	<

Table 7. Wastewater compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Samples analyzed at the U.S. Geological Survey National Water Quality Laboratory according to laboratory methodologies listed in table 2. **Parameter:** Waste indicators of solids in bottom material, pressurized solvent extraction-solid-phase extraction, by gas chromatography/mass spectrometry. **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠]

NWIS site No.		444954116542400				444455117021200				443416117084000			
NWIS site name		Site 1a		Site 1b		Site 5a		Site 5b		Site 8a		Site 8b	
Sample date / time		05-07-12 1400		05-07-12 1415		05-09-12 0900		05-09-12 0915		05-08-12 0900		05-08-12 0915	
Parameter	CASRN	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)
Wastewater compounds													
1,4-Dichlorobenzene	106-46-7	<	32	<	130	<	34	<	120	<	128	<	130
1-Methylnaphthalene	90-12-0	<	30	<	130	<	30	<	120	<	128	<	130
2,2',4,4'-Tetrabromodiphenylether (PBDE 47)	5436-43-1	<	32	<	127	<	34	<	123	<	128	<	131
2,6-Dimethylnaphthalene	581-42-0	E	100	E	390		150		650		342		340
2-Methylnaphthalene	91-57-6	<	30	<	130	<	30	<	120	<	128	<	130
3-beta-Coprostanol	360-68-9	E	2,900	E	3,600	E	1,700	E	7,900	E	3,900	E	2,200
3-Methyl-1(H)-indole (Skatole)	83-34-1	E	20	<	130		30		130		14		130
3-tert-Butyl-4-hydroxy anisole (BHA)	121-00-6	<	100	<	380	<	100	<	370	<	384	<	390
4-Cumylphenol	599-64-4	<	30	<	130	<	30	<	120	<	128	<	130
4-n-Octylphenol	1806-26-4	<	30	<	130	<	30	<	120	<	128	<	130
4-Nonylphenol (sum of all isomers)	104-40-5	<	480	E	280	E	70	E	230	<	1,920	<	2,000
4-tert-Octylphenol	140-66-9	<	30	<	130	<	30	<	120	<	128	<	130
Acetophenone	98-86-2	<	100	<	380	<	100	<	370	<	384	<	390
Acetyl hexamethyl tetrahydro-naphthalene (AHTN)	21145-77-7	<	30	<	130	<	30	<	120	<	128	<	130
Anthracene	120-12-7	<	30	<	130	<	30	<	120	<	128	<	130
Anthraquinone	84-65-1	<	32	<	130	<	34	<	120	<	128	<	130
Atrazine	1912-24-9	<	60	<	250	<	70	<	250	<	256	<	260
Benzo[a]pyrene	50-32-8	<	30	<	130	<	30	<	120	<	128	<	130
Benzophenone	119-61-9	<	30	<	130	<	30	<	120	<	128	<	130
beta-Sitosterol	83-46-5	E	5,600	E	9,600	E	5,700	E	18,000	E	11,400	E	12,000
beta-Stigmastanol	19466-47-8	E	2,100	E	5,500	E	1,500	E	8,500	E	3,500	E	6,400
bis(2-Ethylhexyl) phthalate	117-81-7	<	160	<	640	<	170	<	620	<	640	<	660
Bisphenol A	80-05-7	<	30	<	130	<	30	<	120	<	128	<	130
Bromacil	314-40-9	<	320	<	1,300	<	340	<	1,200	<	1,280	<	1,300
Camphor	76-22-2	<	30	<	130	<	30	<	120	<	128	<	130
Carbazole	86-74-8	<	30	<	130	<	30	E	20	E	7	E	10
Chlorpyrifos	2921-88-2	<	30	<	130	<	30	<	120	<	128	<	130
Cholesterol	57-88-5	E	7,900	E	10,000	E	7,000	E	21,000	E	15,600	E	8,300
Diazinon	333-41-5	<	30	<	130	<	30	<	120	<	128	<	130
4-Nonylphenol diethoxylate, (sum of all isomers) also known as NP2EO	–	<	640	<	2,500	<	680	<	2,500	<	2,560	<	2,600

Table 7. Wastewater compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

[Samples analyzed at the U.S. Geological Survey National Water Quality Laboratory according to laboratory methodologies listed in table 2. **Parameter:** Waste indicators of solids in bottom material, pressurized solvent extraction-solid-phase extraction, by gas chromatography/mass spectrometry. **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠]

NWIS site No.		444954116542400				444455117021200				443416117084000			
NWIS site name		Site 1a		Site 1b		Site 5a		Site 5b		Site 8a		Site 8b	
Sample date / time		05-07-12 1400		05-07-12 1415		05-09-12 0900		05-09-12 0915		05-08-12 0900		05-08-12 0915	
Parameter	CASRN	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)	Remark code	Detection (µg/kg)
Wastewater compounds—Continued													
4-tert-Octylphenol diethoxylate, also known as OP2EO	2315-61-9	<	30	<	130	<	30	<	120	<	128	<	130
Diethyl phthalate	84-66-2	<	60	<	250	<	70	<	250	<	256	<	260
d-Limonene	5989-27-5	<	30	<	130	<	30	<	120	<	128	<	130
4-tert-Octylphenol monoethoxylate, also known as OP1EO	2315-67-5	<	160	<	640	<	170	<	620	<	640	<	660
Fluoranthene	206-44-0	<	30	<	130	<	30	<	120	<	128	<	130
Hexahydrohexamethyl-cyclopentabenzopyran (HHCB)	1222-05-5	<	30	<	130	<	30	<	120	<	128	<	130
Indole	120-72-9	E	160	E	90	E	50	E	660	E	232	E	200
Isoborneol	124-76-5	<	30	<	130	<	30	<	120	<	128	<	130
Isophorone	78-59-1	<	30	E	20	<	30	E	20	E	15	E	20
Isopropylbenzene	98-82-8	<	60	<	250	<	70	<	250	<	256	<	260
Isoquinoline	119-65-3	<	60	<	250	<	70	<	250	<	256	<	260
Menthol	89-78-1	<	30	<	130	<	30	<	120	<	128	<	130
Metolachlor	51218-45-2	<	30	<	130	<	30	<	120	<	128	<	130
N,N-diethyl-meta-toluamide (DEET)	134-62-3	<	60	<	250	<	70	<	250	<	256	<	260
Naphthalene	91-20-3	<	30	<	130	<	30	<	120	<	128	<	130
4-Nonylphenol monoethoxylate, (sum of all isomers) also known as NP1EO	104-35-8	<	320	<	1,300	<	340	<	1,200	<	1,280	<	1,300
p-Cresol	106-44-5	E	10	E	40		20		60		106		60
Phenanthrene	85-01-8	<	30	<	130	<	30	<	120	<	128	<	130
Phenol	108-95-2	<	50	<	130	<	40	<	120	<	128	<	140
Prometon	1610-18-0	<	30	<	130	<	30	<	120	<	128	<	130
Pyrene	129-00-0	<	30	<	130	<	30	<	120	<	128	<	130
Tris(2-butoxyethyl)phosphate	78-51-3	<	100	<	380	<	100	<	370	<	354	<	390
Tris(2-chloroethyl)phosphate	115-96-8	<	60	<	250	<	70	<	250	<	256	<	260
Tributyl phosphate	126-73-8	<	30	<	130	<	30	<	120	<	128	<	130
Triclosan	3380-34-5	<	32	<	127	<	34	<	123	<	128	<	131
Triphenyl phosphate	115-86-6	<	30	<	130	<	30	<	120	<	128	<	130
Tris(dichloroisopropyl)phosphate	13674-87-8	<	60	<	250	<	70	<	250	<	256	<	260

Table 8. Pesticide concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Samples analyzed by the U.S. Geological Survey Pesticide Fate Research Group according to laboratory methodologies listed in table 2. **NWIS site name:** Top subsample designated "a" (0–30 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. **Detection limit:** Sediment method detection limit. **Abbreviations:** NWIS, National Water Information System; µg/kg, microgram per kilogram; cm, centimeter; ND, not detected]

NWIS site No.			444954116542400	444455117021200	443416117084000
NWIS site name			Site 1a	Site 5a	Site 8a
Sample date / time			05-07-12 1405	05-09-12 0905	05-08-12 0905
Parameter	CASRN	Detection limit (µg/kg)	Result (µg/kg)		
Current-use pesticides					
3,5-Dichloroaniline	626-43-7	3.0	ND	ND	ND
Boscalid	188425-85-6	1.7	ND	ND	ND
Clomazone	81777-89-1	2.5	ND	ND	ND
Cyhalothrin (all isomers)	68085-85-8	2.4	ND	ND	ND
Cyprodinil	121522-61-2	2.4	ND	ND	ND
Difenoconazole	119446-68-3	0.6	ND	ND	ND
Dimethomorph	110488-70-5	2.0	ND	ND	ND
Etofenprox	80844-07-1	2.5	ND	ND	ND
Famoxadone	131807-57-3	2.4	ND	ND	ND
Fenarimol	60168-88-9	1.5	ND	ND	ND
Fenbuconazole	114369-43-6	2.2	ND	ND	ND
Fenhexamid	126833-17-8	3.2	ND	ND	ND
Fludioxonil	131341-86-1	3.7	ND	ND	ND
Fluoxastrobin	361377-29-9	1.8	ND	ND	ND
Flusilazole	85509-19-9	3.0	ND	ND	ND
Flutriafol	76674-21-0	1.3	ND	ND	ND
Imazalil	35554-44-0	2.5	ND	ND	ND
Kresoxim-methyl	143390-89-0	0.6	ND	ND	ND
Prometon	1610-18-0	3.4	ND	ND	ND
Propanil	709-98-8	3.2	ND	ND	ND
Propyzamide	23950-58-5	1.5	ND	ND	ND
Pyraclostrobin	175013-18-0	1.6	ND	ND	ND
Pyrimethanil	53112-28-0	1.2	ND	ND	ND
Tefluthrin	79538-32-2	1.1	ND	ND	ND
Triadimefon	43121-43-3	3.8	ND	ND	ND
Triadimenol	55219-65-3	1.6	ND	ND	ND
Triflumizole	68694-11-1	0.6	ND	ND	ND
Triticonazole	131983-72-7	2.4	ND	ND	ND
Vinclozolin	50471-44-8	1.8	ND	ND	ND
Zoxamide	156052-68-5	1.1	ND	ND	ND
3,4-Dichloroaniline	95-76-1	2.5	ND	ND	ND
Alachlor	15972-60-8	0.96	ND	ND	ND
Allethrin	584-79-2	1.46	ND	ND	ND
Atrazine	1912-24-9	1.7	ND	ND	ND
Azoxystrobin	131860-33-8	1.1	ND	ND	ND
Bifenthrin	82657-04-3	2.21	ND	ND	ND
Butylate	2008-41-5	1.58	ND	ND	ND
Carbaryl	63-25-2	1.8	ND	ND	ND
Carbofuran	1563-66-2	1.5	ND	ND	ND
Chlorothalonil	1897-45-6	1.2	ND	ND	ND
Chlorpyrifos	2921-88-2	2.04	ND	ND	ND
Cycloate	1134-23-2	0.96	ND	ND	ND
Cyfluthrin	68359-37-5	1.96	ND	ND	ND
Cypermethrin	52315-07-8	2.55	ND	ND	ND
Cyproconazole	94361-06-5	1.5	ND	ND	ND
Dacthal (DCPA)	1861-32-1	2.46	ND	ND	ND
Deltamethrin	52918-63-5	2.52	ND	ND	ND

Table 8. Pesticide concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

[Samples analyzed by the U.S. Geological Survey Pesticide Fate Research Group according to laboratory methodologies listed in table 2. **NWIS site name:** Top subsample designated "a" (0–30 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. **Detection limit:** Sediment method detection limit. **Abbreviations:** NWIS, National Water Information System; µg/kg, microgram per kilogram; cm, centimeter; ND, not detected]

NWIS site No.			444954116542400	444455117021200	443416117084000
NWIS site name			Site 1a	Site 5a	Site 8a
Sample date / time			05-07-12 1405	05-09-12 0905	05-08-12 0905
Parameter	CASRN	Detection limit (µg/kg)	Result (µg/kg)		
Current-use pesticides—Continued					
Desulfinylfipronil	205650-65-3	2.76	ND	ND	ND
Diazinon	333-41-5	1.95	ND	ND	ND
EPTC	759-94-4	0.88	ND	ND	ND
Esfenvalerate	66230-04-4	2.13	ND	ND	ND
Ethalfluralin	55283-68-6	1.34	ND	ND	ND
Fenpropathrin	39515-41-8	2.12	ND	ND	ND
Fipronil	120068-37-3	1.86	ND	ND	ND
Fipronil sulfide	120067-83-6	2.22	ND	ND	ND
Fipronil sulfone	120068-36-2	1.09	ND	ND	ND
Hexazinone	51235-04-2	1.2	ND	ND	ND
Iprodione	36734-19-7	0.9	ND	ND	ND
Malathion	121-75-5	1.09	ND	ND	ND
Metconazole	125116-23-6	0.7	ND	ND	ND
Methidathion	950-37-8	2.9	ND	ND	ND
Methoprene	40596-69-8	2.36	ND	ND	ND
Methyl parathion	298-00-0	1.21	ND	ND	ND
Metolachlor	51218-45-2	1.31	ND	ND	ND
Molinate	2212-67-1	1.09	ND	ND	ND
Myclobutanil	88671-89-0	2.9	ND	ND	ND
Napropamide	15299-99-7	1.28	ND	ND	ND
Oxyfluorfen	42874-03-3	3.64	ND	ND	ND
Pebulate	1114-71-2	1.38	ND	ND	ND
Pendimethalin	40487-42-1	0.99	ND	ND	24.7
Permethrin	52645-53-1	0.98	ND	ND	ND
Phenothrin	26002-80-2	1.25	ND	ND	ND
Phosmet	732-11-6	1.37	ND	ND	ND
Piperonyl butoxide	51-03-6	1.64	ND	ND	ND
Prometryn	7287-19-6	2.8	ND	ND	ND
Propiconazole	60207-90-1	1.6	ND	ND	ND
Resmethrin	10453-86-8	1.89	ND	ND	ND
Simazine	122-34-9	1.5	ND	ND	ND
tau-Fluvalinate	102851-06-9	2.6	ND	ND	ND
Tebuconazole	107534-96-3	1.6	ND	ND	ND
Tetraconazole	112281-77-3	1.3	ND	ND	ND
Tetramethrin	7696-12-0	1.36	ND	ND	ND
Thiobencarb	28249-77-6	0.59	ND	ND	ND
Trifloxystrobin	141517-21-7	1.4	ND	ND	ND
Trifluralin	1582-09-8	1.71	ND	ND	ND
Organochlorine pesticides					
p,p'-DDD	72-54-8	1.26	ND	ND	ND
p,p'-DDE	72-55-9	1.4	3.2	ND	2.1
p,p'-DDT	50-29-3	1.4	ND	ND	ND
Pentachloroanisole (PCA)	1825-21-4	1.4	ND	ND	ND
Pentachloronitrobenzene (PCNB)	82-68-8	1.15	ND	ND	ND

Table 9. Physical characteristics of bed-sediment cores collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Samples analyzed at the Pace Analytical Laboratory according to laboratory methodologies listed in table 2. **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. **MDL:** method detection limit; **Abbreviations:** NA, not applicable; SU, standard unit; mV, millivolt; TOC, total organic carbon, Redox, reduction oxidation potential; ASTM, American Society for Testing and Materials; EPA, U.S. Environmental Protection Agency; cm, centimeter; mg/kg, milligram per kilogram; –, no data available]

NWIS site No.				444954116542400		444455117021200		443416117084000	
NWIS site name				Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
Sample date / time				05-07-12 1400	05-07-12 1415	05-09-12 0900	05-09-12 0915	05-08-12 09:00	05-08-12 0915
Parameter	CASRN	Method	MDL (units)	Detection (units vary, noted in MDL)					
TOC	7440-44-0	EPA 9060 mod.	250 (mg/kg)	16,800	13,500	15,500	12,400	13,700	12,900
Grain size	NA	ASTM D422	clay / silt (percent)	–	–	75.8 / 24.2	66.0 / 34.0	68.4 / 31.6	66.4 / 33.6
pH	NA	EPA 9045	0.1 (SU)	7.9	–	7.0	7.1	7.0	7.2
Redox	NA	ASTM D1498	1.0 (mV)	–	–	1,200	673	109	89.3

Table 10. Trace metal concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Samples analyzed at the U.S. Geological Survey National Water Quality Laboratory according to laboratory methodologies listed in table 2. **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. Shaded values exceed threshold effect limits (TEC) but are less than the probable effect limit (PEC) (MacDonald and others, 2000). **Abbreviations:** NWIS, National Water Information System; CAS, Chemical Abstracts Service; cm, centimeter; mg/kg, milligram per kilogram]

NWIS site No.			444954116542400		444455117021200		443416117084000	
NWIS site name			Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
Sample date / time			05-07-12 1500	05-07-12 1515	05-09-12 1500	05-09-12 1515	05-08-12 1500	05-08-12 1515
Trace metal	CASRN	Reporting level (mg/kg)	Detection (mg/kg)					
Aluminum	7429-90-5	25	56,300	36,200	34,400	25,400	24,300	22,000
Arsenic	7440-38-2	0.10	16.8	15.4	13.2	14	12.5	11.3
Boron	7440-42-8	2.4	11.8	9.0	12.4	10.9	9.8	9.7
Cadmium	7440-43-9	0.10	0.56	0.69	0.61	0.65	0.71	0.64
Chromium	7440-47-3	0.10	31.3	33.3	35.4	31.1	29.3	24
Cobalt	7440-48-4	0.10	16.6	15.6	16.3	12.8	10.7	8.52
Copper	7440-50-8	0.10	40.2	41	43.7	38.7	35.3	28.4
Iron	7439-89-6	4.6	34,400	42,300	42,400	35,200	29,500	27,400
Lead	7439-92-1	0.10	13.2	17.5	14.9	13.6	13.4	11.2
Manganese	7439-96-5	0.20	3,160	2,420	1,710	1,440	888	846
Molybdenum	7439-98-7	0.10	1.2	0.33	0.52	0.77	0.37	0.44
Nickel	7440-02-0	0.10	23.7	27.6	29.2	23.1	22.5	18.4
Selenium	7782-49-2	0.10	2.5	1.8	1.79	2.29	1.74	1.67
Vanadium	7440-62-2	0.10	91.3	63.1	73.5	67.7	53.2	46.7
Zinc	7440-66-6	0.10	89.1	113	99.1	90.7	100	86.7

Summary

Total mercury and methylmercury were collected from water column and bed-sediment core samples at eight sites at Brownlee Reservoir near Oxbow, Oregon. Total methylmercury concentrations in the water column increased with depth. Total methylmercury in the bed sediment was largest near the sediment-water interface and decreased substantially with depth.

The bed-sediment core samples from sites 1, 5, and 8 were analyzed for 417 pesticides and other organic compounds. Only 17 of the 417 analytes were detected at or greater than the reporting level, and 11 of the detected analytes were wastewater compounds. Other organics detected in the bed sediment cores included the herbicides 2,4-Dichlorobenzoic acid and pentachlorphenol along with the pesticides 4,4'-DDE, pendimethalin, prometon, and propoxur; 4,4'-DDE was detected in all sediment samples that were analyzed. Initially, glyphosate (and AMPA) analysis indicated an anomalously high concentration of glyphosate, but further analysis at two separate laboratories verified that the initial samples were not accurate.

The physical characteristic analyses included total organic carbon, grain size, pH, and redox. Total organic carbon was consistent throughout the reservoir ranging from 12,400 to 16,800 milligrams per kilogram. The grain size ranged from about 66 to 75.8 percent clay, and about 24 to 34 percent silt. The highest pH was 7.9 and occurred in the northern part of the reservoir at site 1; all other pH samples ranged from 7.0 to 7.2. Redox was not analyzed at site 1; however, redox decreased with depth at sites 5 and 8 and decreased in a downstream direction.

Trace metals were detected at greater than the reporting level in all bed-sediment core samples submitted for analysis. Three trace metals exceeded the sediment quality guidelines. Arsenic (all sites), copper (sites 1a and 1b, 5a and 5b, and 8a), and nickel (sites 1a and 1b and 5a and 5b) each exceeded the threshold effect concentration (TEC), but were less than the probable effect concentration (PEC) for freshwater ecosystem. Because the concentrations were between the TEC and PEC, a determination of toxicity could not be determined.

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Table 11. Organic compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Samples analyzed at Pace Analytical Services, Inc. according to laboratory methodologies listed in table 2. All values are in micrograms per kilogram (wet weight). **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN:** Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. **MDL:** method detection limit. **RL:** reporting level. **Abbreviations:** NWIS, National Water Information System; EPA, U.S. Environmental Protection Agency; SIM, selected ion monitoring; PCBs, polychlorinated biphenyls; TCDD,Tetrachlorodibenzo-p-dioxin; ND, not detected; cm centimeter; µg/kg, microgram per kilogram; –, no data available]

NWIS site No.		444954116542400					
NWIS site name		Site 1a			Site 1b		
Sample date and time		05-07-12 1400			05-07-12 1415		
Compound	CASRN	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)
Semivolatile organics (SVOC)—EPA 8270							
1,2,4-Trichlorobenzene	120-82-1	ND	630	3,040	ND	312	1,510
1,2-Dichlorobenzene	95-50-1	ND	652	3,040	ND	323	1,510
1,2-Diphenylhydrazine	122-66-7	ND	358	15,600	ND	177	7,760
1,3-Dichlorobenzene	541-73-1	ND	695	3,040	ND	344	1,510
1,4-Dichlorobenzene	106-46-7	ND	647	3,040	ND	321	1,510
1-Methylnaphthalene	90-12-0	ND	439	3,040	ND	218	1,510
2,4,5-Trichlorophenol	95-95-4	ND	521	15,600	ND	258	7,760
2,4,6-Trichlorophenol	88-06-2	ND	450	3,040	ND	223	1,510
2,4-Dichlorophenol	120-83-2	ND	455	3,040	ND	225	1,510
2,4-Dimethylphenol	105-67-9	ND	1,520	3,040	ND	753	1,510
2.4-Dinitrophenol	51-28-5	ND	435	15,600	ND	216	7,760
2,4-Dinitrotoluene	121-14-2	ND	424	3,040	ND	210	1,510
2.6-Dinitrotoluene	606-20-2	ND	424	3,040	ND	210	1,510
2-Chloronaphthalene	91-58-7	ND	366	3,040	ND	182	1,510
2-Chlorophenol	95-57-8	ND	667	3,040	ND	331	1,510
2-Methylnaphthalene	91-57-6	ND	449	3,040	ND	223	1,510
2-Methylphenol(o-Cresol)	95-48-7	ND	465	3,040	ND	230	1,510
2-Nitroaniline	88-74-4	ND	422	15,600	ND	209	7,760
2-Nitrophenol	88-75-5	ND	504	3,040	ND	250	1,510
3&4-Methylphenol	108-39-4 [3] and 106-44-5 [4]	ND	408	6,080	ND	202	3,010
3,3'-Dichlorobenzidine	91-94-1	ND	3,080	6,170	ND	1,530	3,060
3-Nitroaniline	99-09-2	ND	597	15,600	ND	296	7,760
4,6-Dinitro-2-methylphenol	534-52-1	ND	2,560	15,600	ND	1,270	7,760
4-Bromophenylphenyl ether	101-55-3	ND	463	3,040	ND	229	1,510
4-Chloro-3-methylphenol	59-50-7	ND	356	3,040	ND	177	1,510
4-Chloroaniline	106-47-8	ND	1,520	3,040	ND	753	1,510
4-Chlorophenylphenyl ether	7005-72-3	ND	409	3,040	ND	203	1,510
4-Nitroaniline	100-01-6	ND	2,220	15,600	ND	1,100	7,760
4-Nitrophenol	100-02-7	ND	7,820	15,600	ND	3,880	7,760
Acenaphthene	[1]83-32-9	ND	360	3,040	ND	178	1,510
Acenaphthylene	[1]208-96-8	ND	352	3,040	ND	174	1,510
Anthracene	[1]120-12-7	ND	390	3,040	ND	193	1,510
Benzo(a)anthracene	[1]56-55-3	ND	429	3,040	ND	213	1,510
Benzo(a)pyrene	[1]50-32-8	ND	434	3,040	ND	215	1,510
Benzo(b)fluoranthene	[1]205-99-2	ND	434	3,040	ND	215	1,510
Benzo(g,h,i)perylene	[1]191-24-2	ND	462	3,040	ND	229	1,510
Benzo(k)fluoranthene	[1]207-08-9	ND	423	3,040	ND	209	1,510
Butylbenzylphthalate	85-68-7	ND	413	3,040	ND	205	1,510
Carbazole	86-74-8	ND	397	3,040	ND	197	1,510
Chrysene	[1]218-01-9	ND	434	3,040	ND	215	1,510
Di-n-butylphthalate	84-74-2	ND	313	3,040	ND	155	1,510
Di-n-octylphthalate	117-84-0	ND	444	3,040	ND	220	1,510
Dibenz(a,h)anthracene	[1]53-70-3	ND	472	3,040	ND	234	1,510
Dibenzofuran	132-64-9	ND	370	3,040	ND	183	1,510

Table 11. Organic compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.		444954116542400					
NWIS site name		Site 1a			Site 1b		
Sample date and time		05-07-12 1400			05-07-12 1415		
Compound	CASRN	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)
Semivolatile organics (SVOC)—EPA 8270—Continued							
Diethylphthalate	84-66-2	ND	399	3,040	ND	198	1,510
Dimethylphthalate	131-11-3	ND	423	3,040	ND	210	1,510
Fluoranthene	[1]206-44-0	ND	371	3,040	ND	184	1,510
Fluorene	[1]86-73-7	ND	390	3,040	ND	193	1,510
Hexachloro-1,3-butadiene	87-68-3	ND	755	3,040	ND	374	1,510
Hexachlorobenzene	118-74-1	ND	427	3,040	ND	212	1,510
Hexachloroethane	67-72-1	ND	718	3,040	ND	356	1,510
Indeno(1,2,3-cd)pyrene	[1]193-39-5	ND	445	3,040	ND	220	1,510
Isophorone	78-59-1	ND	365	3,040	ND	181	1,510
N-Nitroso-di-n-propylamine	621-64-7	ND	472	3,040	ND	234	1,510
N-Nitrosodimethylamine	62-75-9	ND	487	3,040	ND	241	1,510
N-Nitrosodiphenylamine	86-30-6	ND	440	3,040	ND	218	1,510
Naphthalene	[1]91-20-3	ND	591	3,040	ND	293	1,510
Nitrobenzene	98-95-3	ND	610	3,040	ND	302	1,510
Pentachlorophenol	[1]87-86-5	ND	3,080	6,170	ND	1530	3,060
Phenanthrene	[1]85-01-8	ND	406	3,040	ND	201	1,510
Phenol	108-95-2	ND	552	3,040	ND	274	1,510
Pyrene	[1]129-00-0	ND	423	3,040	ND	209	1,510
bis(2-Chloroethoxy)methane	111-91-1	ND	515	3,040	ND	255	1,510
bis(2-Chloroethyl) ether	111-44-4	ND	622	3,040	ND	308	1,510
bis(2-Chloroisopropyl)ether	108-60-1	ND	725	3,040	ND	360	1,510
bis(2-Ethylhexyl)phthalate	117-81-7	ND	712	3,040	ND	353	1,510
Polyaromatic hydrocarbons (PAH) (low level)—EPA 8270(SIM)							
Acenaphthene	[2]83-32-9	ND	42.5	85	ND	22.8	45.6
Acenaphthylene	[2]208-96-8	ND	42.5	85	ND	22.8	45.6
Anthracene	[2]120-12-7	ND	42.5	85	ND	22.8	45.6
Benzo(a)anthracene	[2]56-55-3	ND	2.9	85	ND	1.6	45.6
Benzo(a)pyrene	[2]50-32-8	ND	2.5	85	ND	1.4	45.6
Benzo(b)fluoranthene	[2]205-99-2	ND	13.1	85	ND	7	45.6
Benzo(g,h,i)perylene	[2]191-24-2	ND	2.8	85	ND	1.5	45.6
Benzo(k)fluoranthene	[2]207-08-9	ND	10	85	ND	5.3	45.6
Chrysene	[2]218-01-9	ND	2.8	85	ND	1.5	45.6
Dibenz(a,h)anthracene	[2]53-70-3	ND	2.9	85	ND	1.6	45.6
Fluoranthene	[2]206-44-0	ND	42.5	85	ND	22.8	45.6
Fluorene	[2]86-73-7	ND	3.2	85	ND	1.7	45.6
Indeno(1,2,3-cd)pyrene	[2]193-39-5	ND	2.4	85	ND	1.3	45.6
Naphthalene	[2]91-20-3	ND	1.6	85	ND	0.84	45.6
Phenanthrene	[2]85-01-8	ND	2.4	85	ND	1.3	45.6
Pyrene	[2]129-00-0	ND	3.2	85	ND	1.7	45.6
Organochlorine pesticides—EPA 8081							
4,4’-DDD	72-54-8	ND	30.5	395	ND	16.3	212
4,4’-DDE	72-55-9	19.4	14.2	395	16.2	7.6	212
4,4’-DDT	50-29-3	ND	22.3	395	ND	11.9	212
Aldrin	309-00-2	ND	13.5	395	ND	7.2	212
Chlordane (technical)	57-74-9	ND	3,690	3,950	ND	1,980	2,120
Dieldrin	60-57-1	ND	9.3	395	ND	5	212
Endosulfan I	959-98-8	ND	5.8	395	ND	3.1	212

Table 11. Organic compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.		444954116542400					
NWIS site name		Site 1a			Site 1b		
Sample date and time		05-07-12 1400			05-07-12 1415		
Compound	CASRN	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)
Organochlorine pesticides—EPA 8081—Continued							
Endosulfan II	33213-65-9	ND	13.3	395	ND	7.1	212
Endosulfan sulfate	1031-07-8	ND	10	395	ND	5.4	212
Endrin	72-20-8	ND	12.1	395	ND	6.5	212
Endrin aldehyde	7421-93-4	ND	15.4	395	ND	8.2	212
Endrin ketone	53494-70-5	ND	18.6	395	ND	10	212
Heptachlor	76-44-8	ND	9.1	395	ND	4.9	212
Heptachlor epoxide	1024-57-3	ND	25.8	395	ND	13.8	212
Methoxychlor	72-43-5	ND	244	395	ND	131	212
Toxaphene	8001-35-2	ND	1710	3,950	ND	914	2,120
alpha-BHC	319-84-6	ND	16.1	395	ND	8.6	212
beta-BHC	319-85-7	ND	17.9	395	ND	9.6	212
delta-BHC	319-86-8	ND	20.2	395	ND	10.8	212
gamma-BHC (lidane)	58-89-9	ND	34.4	395	ND	18.4	212
Polychlorinated biphenyls (PCBs)—EPA 8082							
PCB-1016 (Aroclor 1016)	12674-11-2	ND	1,020	2,810	ND	547	1,510
PCB-1221 (Aroclor 1221)	11104-28-2	ND	1,110	2,810	ND	593	1,510
PCB-1232 (Aroclor 1232)	11141-16-5	ND	1,190	2,810	ND	639	1,510
PCB-1242 (Aroclor 1242)	53469-21-9	ND	682	2,810	ND	365	1,510
PCB-1248 (Aroclor 1248)	12672-29-6	ND	597	2,810	ND	319	1,510
PCB-1254 (Aroclor 1254)	11097-69-1	ND	768	2,810	ND	411	1,510
PCB-1260 (Aroclor 1260)	11096-82-5	ND	1,020	2,810	ND	547	1,510
PCB-1262 (Aroclor 1262)	37324-23-5	ND	341	2,810	ND	182	1,510
PCB-1268 (Aroclor 1268)	11100-14-4	ND	512	2,810	ND	274	1,510
Chlorinated herbicides—EPA 8151							
2,4,5-T	93-76-5	ND	28.2	158	ND	15.1	84.8
2,4,5-TP (Silvex)	93-72-1	ND	19.9	159	ND	10.7	85
2,4-D	94-75-7	ND	190	786	ND	102	421
2,4-DB	94-82-6	ND	423	1,580	ND	226	847
Bentazon	25057-89-0	ND	48.3	78.9	ND	25.9	42.2
Dalapon	75-99-0	ND	153	762	ND	81.9	408
Dicamba	1918-00-9	ND	31.9	78.6	ND	17.1	42
Dichlorprop	120-36-5	ND	215	546	ND	115	292
Dinoseb	88-85-7	ND	37.2	158	ND	19.9	84.5
Pentachlorophenol	[3]87-86-5	ND	20.3	23.7	ND	10.9	12.7
Picloram	1918-02-1	ND	13.4	79	ND	7.2	42.3
Dioxin (2,3,7,8-TCDD)—EPA 1613							
2,3,7,8-TCDD	1746-01-6	ND	–	1	ND	–	1

Table 11. Organic compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.		444455117021200					
NWIS site name		Site 5a			Site 5b		
Sample date and time		05-09-12 0900			05-09-12 0915		
Compound	CASRN	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)
Semivolatile organics (SVOC)—EPA 8270							
1,2,4-Trichlorobenzene	120-82-1	ND	441	2,130	ND	317	1,530
1,2-Dichlorobenzene	95-50-1	ND	456	2,130	ND	328	1,530
1,2-Diphenylhydrazine	122-66-7	ND	251	11,000	ND	180	7,880
1,3-Dichlorobenzene	541-73-1	ND	487	2,130	ND	350	1,530
1,4-Dichlorobenzene	106-46-7	ND	453	2,130	ND	326	1,530
1-Methylnaphthalene	90-12-0	ND	307	2,130	ND	221	1,530
2,4,5-Trichlorophenol	95-95-4	ND	365	11,000	ND	262	7,880
2,4,6-Trichlorophenol	88-06-2	ND	315	2,130	ND	227	1,530
2,4-Dichlorophenol	120-83-2	ND	318	2,130	ND	229	1,530
2,4-Dimethylphenol	105-67-9	ND	1,060	2,130	ND	765	1,530
2.4-Dinitrophenol	51-28-5	ND	305	11,000	ND	219	7,880
2,4-Dinitrotoluene	121-14-2	ND	297	2,130	ND	214	1,530
2.6-Dinitrotoluene	606-20-2	ND	297	2,130	ND	214	1,530
2-Chloronaphthalene	91-58-7	ND	257	2,130	ND	184	1,530
2-Chlorophenol	95-57-8	ND	467	2,130	ND	336	1,530
2-Methylnaphthalene	91-57-6	ND	315	2,130	ND	226	1,530
2-Methylphenol(o-Cresol)	95-48-7	ND	325	2,130	ND	234	1,530
2-Nitroaniline	88-74-4	ND	295	11,000	ND	212	7,880
2-Nitrophenol	88-75-5	ND	353	2,130	ND	254	1,530
3&4-Methylphenol	108-39-4 [3] and 106-44-5 [4]	ND	286	4,250	ND	205	3,060
3,3'-Dichlorobenzidine	91-94-1	ND	2,160	4,320	ND	1,550	3,110
3-Nitroaniline	99-09-2	ND	418	11,000	ND	301	7,880
4,6-Dinitro-2-methylphenol	534-52-1	ND	1,790	11,000	ND	1,290	7,880
4-Bromophenylphenyl ether	101-55-3	ND	324	2,130	ND	233	1,530
4-Chloro-3-methylphenol	59-50-7	ND	249	2,130	ND	179	1,530
4-Chloroaniline	106-47-8	ND	1,060	2,130	ND	765	1,530
4-Chlorophenylphenyl ether	7005-72-3	ND	286	2,130	ND	206	1,530
4-Nitroaniline	100-01-6	ND	1,550	11,000	ND	1,120	7,880
4-Nitrophenol	100-02-7	ND	5,480	11,000	ND	3,940	7,880
Acenaphthene	[1]83-32-9	ND	252	2,130	ND	181	1,530
Acenaphthylene	[1]208-96-8	ND	246	2,130	ND	177	1,530
Anthracene	[1]120-12-7	ND	273	2,130	ND	197	1,530
Benzo(a)anthracene	[1]56-55-3	ND	300	2,130	ND	216	1,530
Benzo(a)pyrene	[1]50-32-8	ND	304	2,130	ND	219	1,530
Benzo(b)fluoranthene	[1]205-99-2	ND	304	2,130	ND	219	1,530
Benzo(g,h,i)perylene	[1]191-24-2	ND	324	2,130	ND	233	1,530
Benzo(k)fluoranthene	[1]207-08-9	ND	296	2,130	ND	213	1,530
Butylbenzylphthalate	85-68-7	ND	289	2,130	ND	208	1,530
Carbazole	86-74-8	ND	278	2,130	ND	200	1,530
Chrysene	[1]218-01-9	ND	304	2,130	ND	219	1,530
Di-n-butylphthalate	84-74-2	ND	219	2,130	ND	158	1,530
Di-n-octylphthalate	117-84-0	ND	311	2,130	ND	223	1,530
Dibenz(a,h)anthracene	[1]53-70-3	ND	331	2,130	ND	238	1,530
Dibenzofuran	132-64-9	ND	259	2,130	ND	186	1,530

Table 11. Organic compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.		444455117021200					
NWIS site name		Site 5a			Site 5b		
Sample date and time		05-09-12 0900			05-09-12 0915		
Compound	CASRN	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)
Semivolatile organics (SVOC)—EPA 8270—Continued							
Diethylphthalate	84-66-2	ND	279	2,130	ND	201	1,530
Dimethylphthalate	131-11-3	ND	296	2,130	ND	213	1,530
Fluoranthene	[1]206-44-0	ND	260	2,130	ND	187	1,530
Fluorene	[1]86-73-7	ND	273	2,130	ND	197	1,530
Hexachloro-1,3-butadiene	87-68-3	ND	528	2,130	ND	380	1,530
Hexachlorobenzene	118-74-1	ND	299	2,130	ND	215	1,530
Hexachloroethane	67-72-1	ND	503	2,130	ND	362	1,530
Indeno(1,2,3-cd)pyrene	[1]193-39-5	ND	311	2,130	ND	224	1,530
Isophorone	78-59-1	ND	256	2,130	ND	184	1,530
N-Nitroso-di-n-propylamine	621-64-7	ND	331	2,130	ND	238	1,530
N-Nitrosodimethylamine	62-75-9	ND	341	2,130	ND	245	1,530
N-Nitrosodiphenylamine	86-30-6	ND	308	2,130	ND	222	1,530
Naphthalene	[1]91-20-3	ND	414	2,130	ND	298	1,530
Nitrobenzene	98-95-3	ND	427	2,130	ND	307	1,530
Pentachlorophenol	[1]87-86-5	ND	2,160	4,320	ND	1,550	3,110
Phenanthrene	[1]85-01-8	ND	284	2,130	ND	204	1,530
Phenol	108-95-2	ND	387	2,130	ND	278	1,530
Pyrene	[1]129-00-0	ND	296	2,130	ND	213	1,530
bis(2-Chloroethoxy)methane	111-91-1	ND	361	2,130	ND	260	1,530
bis(2-Chloroethyl) ether	111-44-4	ND	436	2,130	ND	313	1,530
bis(2-Chloroisopropyl)ether	108-60-1	ND	508	2,130	ND	365	1,530
bis(2-Ethylhexyl)phthalate	117-81-7	ND	499	2,130	ND	359	1,530
Polyaromatic hydrocarbons PAH (low level)—EPA 8270(SIM)							
Acenaphthene	[2]83-32-9	ND	32.9	65.8	ND	23.2	46.4
Acenaphthylene	[2]208-96-8	ND	32.9	65.8	ND	23.2	46.4
Anthracene	[2]120-12-7	ND	32.9	65.8	ND	23.2	46.4
Benzo(a)anthracene	[2]56-55-3	ND	2.2	65.8	ND	1.6	46.4
Benzo(a)pyrene	[2]50-32-8	ND	2	65.8	ND	1.4	46.4
Benzo(b)fluoranthene	[2]205-99-2	ND	10.1	65.8	ND	7.1	46.4
Benzo(g,h,i)perylene	[2]191-24-2	ND	2.2	65.8	ND	1.5	46.4
Benzo(k)fluoranthene	[2]207-08-9	ND	7.7	65.8	ND	5.4	46.4
Chrysene	[2]218-01-9	ND	2.1	65.8	ND	1.5	46.4
Dibenz(a,h)anthracene	[2]53-70-3	ND	2.2	65.8	ND	1.6	46.4
Fluoranthene	[2]206-44-0	ND	32.9	65.8	ND	23.2	46.4
Fluorene	[2]86-73-7	ND	2.5	65.8	ND	1.7	46.4
Indeno(1,2,3-cd)pyrene	[2]193-39-5	ND	1.9	65.8	ND	1.3	46.4
Naphthalene	[2]91-20-3	ND	1.2	65.8	ND	0.86	46.4
Phenanthrene	[2]85-01-8	ND	1.9	65.8	ND	1.3	46.4
Pyrene	[2]129-00-0	ND	2.5	65.8	ND	1.7	46.4
Organochlorine pesticides—EPA 8081							
4,4’-DDD	72-54-8	ND	23.5	305	ND	16.6	215
4,4’-DDE	72-55-9	14.3	10.9	305	14.3	7.7	215
4,4’-DDT	50-29-3	ND	17.2	305	ND	12.1	215
Aldrin	309-00-2	ND	10.4	305	ND	7.3	215
Chlordane (technical)	57-74-9	ND	2,850	3,050	ND	2,010	2,150
Dieldrin	60-57-1	ND	7.2	305	ND	5.1	215
Endosulfan I	959-98-8	ND	4.5	305	ND	3.2	215

Table 11. Organic compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.		444455117021200					
NWIS site name		Site 5a			Site 5b		
Sample date and time		05-09-12 0900			05-09-12 0915		
Compound	CASRN	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)
Organochlorine pesticides—EPA 8081—Continued							
Endosulfan II	33213-65-9	ND	10.2	305	ND	7.2	215
Endosulfan sulfate	1031-07-8	ND	7.7	305	ND	5.4	215
Endrin	72-20-8	ND	9.3	305	ND	6.6	215
Endrin aldehyde	7421-93-4	ND	11.8	305	ND	8.3	215
Endrin ketone	53494-70-5	ND	14.3	305	ND	10.1	215
Heptachlor	76-44-8	ND	7	305	ND	4.9	215
Heptachlor epoxide	1024-57-3	ND	19.9	305	ND	14	215
Methoxychlor	72-43-5	ND	188	305	ND	133	215
Toxaphene	8001-35-2	ND	1,320	3,050	ND	929	2,150
alpha-BHC	319-84-6	ND	12.4	305	ND	8.7	215
beta-BHC	319-85-7	ND	13.8	305	ND	9.7	215
delta-BHC	319-86-8	ND	15.6	305	ND	11	215
gamma-BHC (lidane)	58-89-9	ND	26.5	305	ND	18.7	215
Polychlorinated biphenyls (PCBs)—EPA 8082							
PCB-1016 (Aroclor 1016)	12674-11-2	–	–	–	ND	556	1,530
PCB-1221 (Aroclor 1221)	11104-28-2	–	–	–	ND	603	1,530
PCB-1232 (Aroclor 1232)	11141-16-5	–	–	–	ND	649	1,530
PCB-1242 (Aroclor 1242)	53469-21-9	–	–	–	ND	371	1,530
PCB-1248 (Aroclor 1248)	12672-29-6	–	–	–	ND	324	1,530
PCB-1254 (Aroclor 1254)	11097-69-1	–	–	–	ND	417	1,530
PCB-1260 (Aroclor 1260)	11096-82-5	–	–	–	ND	556	1,530
PCB-1262 (Aroclor 1262)	37324-23-5	–	–	–	ND	185	1,530
PCB-1268 (Aroclor 1268)	11100-14-4	–	–	–	ND	278	1,530
Chlorinated herbicides—EPA 8151							
2,4,5-T	93-76-5	–	–	–	–	–	–
2,4,5-TP (Silvex)	93-72-1	–	–	–	–	–	–
2,4-D	94-75-7	–	–	–	–	–	–
2,4-DB	94-82-6	–	–	–	–	–	–
Bentazon	25057-89-0	–	–	–	–	–	–
Dalapon	75-99-0	–	–	–	–	–	–
Dicamba	1918-00-9	–	–	–	–	–	–
Dichlorprop	120-36-5	–	–	–	–	–	–
Dinoseb	88-85-7	–	–	–	–	–	–
Pentachlorophenol	[3]87-86-5	–	–	–	–	–	–
Picloram	1918-02-1	–	–	–	–	–	–
Dioxin (2,3,7,8-TCDD)—EPA 1613							
2,3,7,8-TCDD	1746-01-6	ND	–	1	ND	–	1

Table 11. Organic compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.		443416117084000					
NWIS site name		Site 8a			Site 8b		
Sample date and time		05-08-12 0900			05-08-12 0915		
Compound	CASRN	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)
Semivolatile organics (SVOC)—EPA 8270							
1,2,4-Trichlorobenzene	120-82-1	ND	295	1,420	ND	258	1,250
1,2-Dichlorobenzene	95-50-1	ND	305	1,420	ND	267	1,250
1,2-Diphenylhydrazine	122-66-7	ND	168	7,320	ND	147	6,420
1,3-Dichlorobenzene	541-73-1	ND	325	1,420	ND	285	1,250
1,4-Dichlorobenzene	106-46-7	ND	303	1,420	ND	265	1,250
1-Methylnaphthalene	90-12-0	ND	205	1,420	ND	180	1,250
2,4,5-Trichlorophenol	95-95-4	ND	244	7,320	ND	214	6,420
2,4,6-Trichlorophenol	88-06-2	ND	211	1,420	ND	185	1,250
2,4-Dichlorophenol	120-83-2	ND	213	1,420	ND	186	1,250
2,4-Dimethylphenol	105-67-9	ND	711	1,420	ND	623	1,250
2.4-Dinitrophenol	51-28-5	ND	204	7,320	ND	179	6,420
2,4-Dinitrotoluene	121-14-2	ND	199	1,420	ND	174	1,250
2.6-Dinitrotoluene	606-20-2	ND	199	1,420	ND	174	1,250
2-Chloronaphthalene	91-58-7	ND	171	1,420	ND	150	1,250
2-Chlorophenol	95-57-8	ND	312	1,420	ND	274	1,250
2-Methylnaphthalene	91-57-6	ND	210	1,420	ND	184	1,250
2-Methylphenol(o-Cresol)	95-48-7	ND	218	1,420	ND	191	1,250
2-Nitroaniline	88-74-4	ND	197	7,320	ND	173	6,420
2-Nitrophenol	88-75-5	ND	236	1,420	ND	206	1,250
3&4-Methylphenol	108-39-4 [3] and 106-44-5 [4]	ND	191	2,840	ND	167	2,490
3,3’-Dichlorobenzidine	91-94-1	ND	1,440	2,890	ND	1,260	2,530
3-Nitroaniline	99-09-2	ND	280	7,320	ND	245	6,420
4,6-Dinitro-2-methylphenol	534-52-1	ND	1,200	7,320	ND	1,050	6,420
4-Bromophenylphenyl ether	101-55-3	ND	217	1,420	ND	190	1,250
4-Chloro-3-methylphenol	59-50-7	ND	167	1,420	ND	146	1,250
4-Chloroaniline	106-47-8	ND	711	1,420	ND	623	1,250
4-Chlorophenylphenyl ether	7005-72-3	ND	191	1,420	ND	168	1,250
4-Nitroaniline	100-01-6	ND	1,040	7,320	ND	910	6,420
4-Nitrophenol	100-02-7	ND	3,660	7,320	ND	3,210	6,420
Acenaphthene	[1]83-32-9	ND	168	1,420	ND	148	1,250
Acenaphthylene	[1]208-96-8	ND	165	1,420	ND	144	1,250
Anthracene	[1]120-12-7	ND	183	1,420	ND	160	1,250
Benzo(a)anthracene	[1]56-55-3	ND	201	1,420	ND	176	1,250
Benzo(a)pyrene	[1]50-32-8	ND	203	1,420	ND	178	1,250
Benzo(b)fluoranthene	[1]205-99-2	ND	203	1,420	ND	178	1,250
Benzo(g,h,i)perylene	[1]191-24-2	ND	216	1,420	ND	189	1,250
Benzo(k)fluoranthene	[1]207-08-9	ND	198	1,420	ND	173	1,250
Butylbenzylphthalate	85-68-7	ND	193	1,420	ND	169	1,250
Carbazole	86-74-8	ND	186	1,420	ND	163	1,250
Chrysene	[1]218-01-9	ND	203	1,420	ND	178	1,250
Di-n-butylphthalate	84-74-2	ND	146	1,420	ND	128	1,250
Di-n-octylphthalate	117-84-0	ND	208	1,420	ND	182	1,250
Dibenz(a,h)anthracene	[1]53-70-3	ND	221	1,420	ND	194	1,250
Dibenzofuran	132-64-9	ND	173	1,420	ND	152	1,250

Table 11. Organic compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.		443416117084000					
NWIS site name		Site 8a			Site 8b		
Sample date and time		05-08-12 0900			05-08-12 0915		
Compound	CASRN	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)
Semivolatile organics (SVOC)—EPA 8270							
Diethylphthalate	84-66-2	ND	186	1,420	ND	163	1,250
Dimethylphthalate	131-11-3	ND	198	1,420	ND	174	1,250
Fluoranthene	[1]206-44-0	ND	174	1,420	ND	152	1,250
Fluorene	[1]86-73-7	ND	183	1,420	ND	160	1,250
Hexachloro-1,3-butadiene	87-68-3	ND	353	1,420	ND	309	1,250
Hexachlorobenzene	118-74-1	ND	200	1,420	ND	175	1,250
Hexachloroethane	67-72-1	ND	336	1,420	ND	294	1,250
Indeno(1,2,3-cd)pyrene	[1]193-39-5	ND	208	1,420	ND	182	1,250
Isophorone	78-59-1	ND	171	1,420	ND	150	1,250
N-Nitroso-di-n-propylamine	621-64-7	ND	221	1,420	ND	194	1,250
N-Nitrosodimethylamine	62-75-9	ND	228	1,420	ND	200	1,250
N-Nitrosodiphenylamine	86-30-6	ND	206	1,420	ND	180	1,250
Naphthalene	[1]91-20-3	ND	277	1,420	ND	242	1,250
Nitrobenzene	98-95-3	ND	286	1,420	ND	250	1,250
Pentachlorophenol	[1]87-86-5	ND	1,440	2,890	ND	1,260	2,530
Phenanthrene	[1]85-01-8	ND	190	1,420	ND	166	1,250
Phenol	108-95-2	ND	258	1,420	ND	226	1,250
Pyrene	[1]129-00-0	ND	198	1,420	ND	173	1,250
bis(2-Chloroethoxy)methane	111-91-1	ND	241	1,420	ND	211	1,250
bis(2-Chloroethyl) ether	111-44-4	ND	291	1,420	ND	255	1,250
bis(2-Chloroisopropyl)ether	108-60-1	ND	339	1,420	ND	297	1,250
bis(2-Ethylhexyl)phthalate	117-81-7	ND	333	1,420	ND	292	1,250
Polyaromatic hydrocarbons PAH (low level)—EPA 8270(SIM)							
Acenaphthene	[2]83-32-9	ND	21.5	43.1	ND	18.9	37.7
Acenaphthylene	[2]208-96-8	ND	21.5	43.1	ND	18.9	37.7
Anthracene	[2]120-12-7	ND	21.5	43.1	ND	18.9	37.7
Benzo(a)anthracene	[2]56-55-3	ND	1.5	43.1	ND	1.3	37.7
Benzo(a)pyrene	[2]50-32-8	ND	1.3	43.1	ND	1.1	37.7
Benzo(b)fluoranthene	[2]205-99-2	ND	6.6	43.1	ND	5.8	37.7
Benzo(g,h,i)perylene	[2]191-24-2	ND	1.4	43.1	ND	1.2	37.7
Benzo(k)fluoranthene	[2]207-08-9	ND	5	43.1	ND	4.4	37.7
Chrysene	[2]218-01-9	ND	1.4	43.1	ND	1.2	37.7
Dibenz(a,h)anthracene	[2]53-70-3	ND	1.5	43.1	ND	1.3	37.7
Fluoranthene	[2]206-44-0	ND	21.5	43.1	ND	18.9	37.7
Fluorene	[2]86-73-7	ND	1.6	43.1	ND	1.4	37.7
Indeno(1,2,3-cd)pyrene	[2]193-39-5	ND	1.2	43.1	ND	1.1	37.7
Naphthalene	[2]91-20-3	ND	0.8	43.1	ND	0.7	37.7
Phenanthrene	[2]85-01-8	ND	1.2	43.1	ND	1.1	37.7
Pyrene	[2]129-00-0	ND	1.6	43.1	ND	1.4	37.7
Organochlorine pesticides—EPA 8081							
4,4’-DDD	72-54-8	ND	3.6	46.4	ND	3	39.2
4,4’-DDE	72-55-9	2.4	1.7	46.4	5.1	1.4	39.2
4,4’-DDT	50-29-3	ND	2.6	46.4	ND	2.2	39.2
Aldrin	309-00-2	ND	1.6	46.4	ND	1.3	39.2
Chlordane (technical)	57-74-9	ND	433	464	ND	366	392
Dieldrin	60-57-1	ND	1.1	46.4	ND	0.92	39.2
Endosulfan I	959-98-8	ND	0.68	46.4	ND	0.58	39.2

Table 11. Organic compound concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.		443416117084000					
NWIS site name		Site 8a			Site 8b		
Sample date and time		05-08-12 0900			05-08-12 0915		
Compound	CASRN	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)	Detection (µg/kg)	MDL (µg/kg)	RL (µg/kg)
Organochlorine pesticides—EPA 8081							
Endosulfan II	33213-65-9	ND	1.6	46.4	ND	1.3	39.2
Endosulfan sulfate	1031-07-8	ND	1.2	46.4	ND	0.99	39.2
Endrin	72-20-8	ND	1.4	46.4	ND	1.2	39.2
Endrin aldehyde	7421-93-4	ND	1.8	46.4	ND	1.5	39.2
Endrin ketone	53494-70-5	ND	2.2	46.4	ND	1.8	39.2
Heptachlor	76-44-8	ND	1.1	46.4	ND	0.9	39.2
Heptachlor epoxide	1024-57-3	ND	3	46.4	ND	2.6	39.2
Methoxychlor	72-43-5	ND	28.6	46.4	ND	24.2	39.2
Toxaphene	8001-35-2	ND	200	464	ND	170	392
alpha-BHC	319-84-6	ND	1.9	46.4	ND	1.6	39.2
beta-BHC	319-85-7	ND	2.1	46.4	ND	1.8	39.2
delta-BHC	319-86-8	ND	2.4	46.4	ND	2	39.2
gamma-BHC (lidane)	58-89-9	ND	4	46.4	ND	3.4	39.2
PCBs—EPA 8082							
PCB-1016 (Aroclor 1016)	12674-11-2	–	–	–	–	–	–
PCB-1221 (Aroclor 1221)	11104-28-2	–	–	–	–	–	–
PCB-1232 (Aroclor 1232)	11141-16-5	–	–	–	–	–	–
PCB-1242 (Aroclor 1242)	53469-21-9	–	–	–	–	–	–
PCB-1248 (Aroclor 1248)	12672-29-6	–	–	–	–	–	–
PCB-1254 (Aroclor 1254)	11097-69-1	–	–	–	–	–	–
PCB-1260 (Aroclor 1260)	11096-82-5	–	–	–	–	–	–
PCB-1262 (Aroclor 1262)	37324-23-5	–	–	–	–	–	–
PCB-1268 (Aroclor 1268)	11100-14-4	–	–	–	–	–	–
Chlorinated herbicides—EPA 8151							
2,4,5-T	93-76-5	–	–	–	–	–	–
2,4,5-TP (Silvex)	93-72-1	–	–	–	–	–	–
2,4-D	94-75-7	–	–	–	–	–	–
2,4-DB	94-82-6	–	–	–	–	–	–
Bentazon	25057-89-0	–	–	–	–	–	–
Dalapon	75-99-0	–	–	–	–	–	–
Dicamba	1918-00-9	–	–	–	–	–	–
Dichlorprop	120-36-5	–	–	–	–	–	–
Dinoseb	88-85-7	–	–	–	–	–	–
Pentachlorophenol	[3]87-86-5	–	–	–	–	–	–
Picloram	1918-02-1	–	–	–	–	–	–
Dioxin (2,3,7,8-TCDD)—EPA 1613							
2,3,7,8-TCDD	1746-01-6	ND	–	1	ND	–	1

[1]Analytical Method: EPA 8270 Preparation Method: EPA 3550.

[2]Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3550.

[3]Analytical Method: EPA 8151.

Table 12. Pesticide and herbicide concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.

[Samples analyzed at Pacific Agriculture Laboratory according to laboratory methodologies listed in table 2. **NWIS site name**: Top subsample designated "a" (0–30 cm), and a bottom subsample designated "b" (30–75 cm). **CASRN**: Chemical Abstracts Service (CAS) Registry Number®, a registered trademark of the American Chemical Society. CAS recommends the verification of the CASRNs through CAS Client Services℠. **Abbreviations:** NWIS, National Water Information System; HPLC-FLD, High Performance Liquid Chromatography with Postcolumn Fluorescence Derivatization, GC-ECD, Gas Chromatograph-Electron Capture Detector; GC-FPD, Gas Chromatography with Flame Photometric Detection; GC-MS, Gas Chromatograph(y)-Mass Spectrometry; SIM, Selected Ion Monitoring; EPA, U.S. Environmental Protection Agency; HPLC-MS, High-Performance Liquid Chromatography with Mass Spectrometry; cm, centimeter; µg/kg, microgram per kilogram; ND, not detected]

NWIS site No.			444954116542400		444455117021200		443416117084000	
NWIS site name			Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
Sample date / time			05-07-12 14:00	05-07-12 14:15	05-09-12 0900	05-09-12 0915	05-08-12 0900	05-08-12 0915
Parameter	CASRN	Reporting level (µg/kg)	Pesticide and herbicide concentration (µg/kg)					
Halogenated pesticides—EPA 8081B (GC-ECD)								
Acetochlor	34256-82-1	0.2	ND	ND	ND	ND	ND	ND
Alachlor	15972-60-8	0.2	ND	ND	ND	ND	ND	ND
Aldrin	309-00-2	0.08	ND	ND	ND	ND	ND	ND
Benfluralin	1861-40-1	0.08	ND	ND	ND	ND	ND	ND
Bifenthrin	82657-04-3	0.08	ND	ND	ND	ND	ND	ND
α-BHC	319-84-6	0.08	ND	ND	ND	ND	ND	ND
β-BHC	319-85-7	0.08	ND	ND	ND	ND	ND	ND
δ-BHC	319-86-8	0.08	ND	ND	ND	ND	ND	ND
γ-BHC (Lindane)	58-89-9	0.08	ND	ND	ND	ND	ND	ND
Captafol	2425-06-1	0.08	ND	ND	ND	ND	ND	ND
Captan	133-06-2	0.2	ND	ND	ND	ND	ND	ND
Chlordane	57-74-9	0.39	ND	ND	ND	ND	ND	ND
Chlorobenzilate	510-15-6	0.2	ND	ND	ND	ND	ND	ND
Chloroneb	2675-77-6	0.2	ND	ND	ND	ND	ND	ND
Chlorothalonil	1897-45-6	0.08	ND	ND	ND	ND	ND	ND
Cyfluthrin	68359-37-5	0.39	ND	ND	ND	ND	ND	ND
Cyhalothrin	68085-85-8	0.39	ND	ND	ND	ND	ND	ND
Cypermethrin	52315-07-8	0.39	ND	ND	ND	ND	ND	ND
p,p'-DDD	72-54-8	0.08	ND	ND	ND	ND	ND	ND
p,p'-DDE	72-55-9	0.027	ND	ND	ND	0.03	ND	ND
p,p'-DDT	50-29-3	0.08	ND	ND	ND	ND	ND	ND
Dacthal (DCPA)	1861-32-1	0.08	ND	ND	ND	ND	ND	ND
Deltamethrin	52918-63-5	0.39	ND	ND	ND	ND	ND	ND
Dichlobenil	1194-65-6	0.08	ND	ND	ND	ND	ND	ND
Dicloran	99-30-9	0.08	ND	ND	ND	ND	ND	ND
Dicofol	115-32-2	0.2	ND	ND	ND	ND	ND	ND
Dieldrin	60-57-1	0.08	ND	ND	ND	ND	ND	ND
Dithiopyr	97886-45-8	0.08	ND	ND	ND	ND	ND	ND
Endosulfan I	959-98-8	0.08	ND	ND	ND	ND	ND	ND
Endosulfan II	33213-65-9	0.08	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	1031-07-8	0.08	ND	ND	ND	ND	ND	ND
Endrin	72-20-8	0.08	ND	ND	ND	ND	ND	ND
Endrin aldehyde	7421-93-4	0.08	ND	ND	ND	ND	ND	ND

Table 12. Pesticide and herbicide concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.			444954116542400		444455117021200		443416117084000	
NWIS site name			Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
Sample date / time			05-07-12 14:00	05-07-12 14:15	05-09-12 0900	05-09-12 0915	05-08-12 0900	05-08-12 0915
Parameter	CASRN	Reporting level (µg/kg)	Pesticide and herbicide concentration (µg/kg)					
Halogenated pesticides—EPA 8081B (GC-ECD)—Continued								
Endrin ketone	53494-70-5	0.08	ND	ND	ND	ND	ND	ND
Esfenvalerate	66230-04-4	0.08	ND	ND	ND	ND	ND	ND
Ethalfluralin	55283-68-6	0.08	ND	ND	ND	ND	ND	ND
Etridiazole	2593-15-9	0.08	ND	ND	ND	ND	ND	ND
Fenarimol	60168-88-9	0.08	ND	ND	ND	ND	ND	ND
Fenvalerate	51630-58-1	0.08	ND	ND	ND	ND	ND	ND
Flutolanil	66332-96-5	0.8	ND	ND	ND	ND	ND	ND
Folpet	133-07-3	0.2	ND	ND	ND	ND	ND	ND
Heptachlor	76-44-8	0.08	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	1024-57-3	0.08	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	118-74-1	0.08	ND	ND	ND	ND	ND	ND
Iprodione	36734-19-7	0.08	ND	ND	ND	ND	ND	ND
Methoxychlor	72-43-5	0.08	ND	ND	ND	ND	ND	ND
Metolachlor	51218-45-2	0.2	ND	ND	ND	ND	ND	ND
Mirex	2385-85-5	0.08	ND	ND	ND	ND	ND	ND
Norflurazon	27314-13-2	0.08	ND	ND	ND	ND	ND	ND
Ovex	80-33-1	0.08	ND	ND	ND	ND	ND	ND
Oxadiazon	19666-30-9	0.08	ND	ND	ND	ND	ND	ND
Oxyfluorfen	42874-03-3	0.08	ND	ND	ND	ND	ND	ND
Pentachloronitrobenzene (PCNB)	82-68-8	0.08	ND	ND	ND	ND	ND	ND
Permethrin	52645-53-1	0.39	ND	ND	ND	ND	ND	ND
Prodiamine	29091-21-2	0.08	ND	ND	ND	ND	ND	ND
Pronamide	23950-58-5	0.08	ND	ND	ND	ND	ND	ND
Propachlor	1918-16-7	0.20	ND	ND	ND	ND	ND	ND
Propanil	709-98-8	0.08	ND	ND	ND	ND	ND	ND
Propiconazole	60207-90-1	0.2	ND	ND	ND	ND	ND	ND
Terbacil	5902-51-2	0.08	ND	ND	ND	ND	ND	ND
Trifloxystrobin	141517-21-7	0.08	ND	ND	ND	ND	ND	ND
Triflumizole	68694-11-1	0.08	ND	ND	ND	ND	ND	ND
Trifluralin	1582-09-8	0.08	ND	ND	ND	ND	ND	ND
Vinclozalin	50471-44-8	0.08	ND	ND	ND	ND	ND	ND
Organophosphorous and organosulfur pesticides—EPA 8141B (GC-FPD)								
Aspon	3244-90-4	0.01	ND	ND	ND	ND	ND	ND
Azinphos-methyl	86-50-0	0.01	ND	ND	ND	ND	ND	ND
Carbofenothion	786-19-6	0.01	ND	ND	ND	ND	ND	ND
Chlorfenvinphos	470-90-6	0.01	ND	ND	ND	ND	ND	ND

Table 12. Pesticide and herbicide concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.			444954116542400		444455117021200		443416117084000	
NWIS site name			Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
Sample date / time			05-07-12 14:00	05-07-12 14:15	05-09-12 0900	05-09-12 0915	05-08-12 0900	05-08-12 0915
Parameter	CASRN	Reporting level (µg/kg)	Pesticide and herbicide concentration (µg/kg)					
Organophosphorous and organosulfur pesticides—EPA 8141B (GC-FPD)—Continued								
Chlorpyrifos	2921-88-2	0.08	ND	ND	ND	ND	ND	ND
Chlorpyrifos-methyl	5598-13-0	0.01	ND	ND	ND	ND	ND	ND
Coumaphos	56-72-4	0.01	ND	ND	ND	ND	ND	ND
Demeton	8065-48-3	0.01	ND	ND	ND	ND	ND	ND
Diazinon	333-41-5	0.01	ND	ND	ND	ND	ND	ND
Dichlorofenthion	97-17-6	0.01	ND	ND	ND	ND	ND	ND
Dichlorvos	62-73-7	0.01	ND	ND	ND	ND	ND	ND
Dicrotophos	141-66-2	0.01	ND	ND	ND	ND	ND	ND
Dimethoate	60-51-5	0.01	ND	ND	ND	ND	ND	ND
Disulfoton	298-04-4	0.01	ND	ND	ND	ND	ND	ND
EPN	2104-64-5	0.01	ND	ND	ND	ND	ND	ND
Ethion	563-12-2	0.01	ND	ND	ND	ND	ND	ND
Ethoprop	13194-48-4	0.01	ND	ND	ND	ND	ND	ND
Famphur	52-85-7	0.01	ND	ND	ND	ND	ND	ND
Fenamiphos	22224-92-6	0.01	ND	ND	ND	ND	ND	ND
Fenitrothion	122-14-5	0.01	ND	ND	ND	ND	ND	ND
Fensulfothion	115-90-2	0.01	ND	ND	ND	ND	ND	ND
Fenthion	55-38-9	0.01	ND	ND	ND	ND	ND	ND
Malathion	121-75-5	0.01	ND	ND	ND	ND	ND	ND
Methidathion	950-37-8	0.01	ND	ND	ND	ND	ND	ND
Merphos	150-50-5	0.01	ND	ND	ND	ND	ND	ND
Mevinphos	7786-34-7	0.01	ND	ND	ND	ND	ND	ND
Monocrotophos	6923-22-4	0.01	ND	ND	ND	ND	ND	ND
Parathion	56-38-2	0.01	ND	ND	ND	ND	ND	ND
Parathion-methyl	298-00-0	0.01	ND	ND	ND	ND	ND	ND
Phorate	298-02-2	0.01	ND	ND	ND	ND	ND	ND
Phosmet	732-11-6	0.01	ND	ND	ND	ND	ND	ND
Phosphamidon	13171-21-6	0.01	ND	ND	ND	ND	ND	ND
Pirimiphos-methyl	29232-93-7	0.01	ND	ND	ND	ND	ND	ND
Propargite	2312-35-8	0.098	ND	ND	ND	ND	ND	ND
Ronnel	299-84-3	0.01	ND	ND	ND	ND	ND	ND
Sulprofos	35400-43-2	0.01	ND	ND	ND	ND	ND	ND
Terbufos	13071-79-9	0.01	ND	ND	ND	ND	ND	ND
Tetrachlorvinphos	22248-79-9	0.01	ND	ND	ND	ND	ND	ND
Tokuthion	34643-46-4	0.01	ND	ND	ND	ND	ND	ND
Tricloronate	327-98-0	0.01	ND	ND	ND	ND	ND	ND

Table 12. Pesticide and herbicide concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.			444954116542400		444455117021200		443416117084000	
NWIS site name			Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
Sample date / time			05-07-12 14:00	05-07-12 14:15	05-09-12 0900	05-09-12 0915	05-08-12 0900	05-08-12 0915
Parameter	CASRN	Reporting level (µg/kg)	Pesticide and herbicide concentration (µg/kg)					
Organonitrogen pesticides—EPA 8270D (GC-MS, SIM mode)								
Amitraz	33089-61-1	0.098	ND	ND	ND	ND	ND	ND
Ametryn	834-12-8	0.051	ND	ND	ND	ND	ND	ND
Atrazine	1912-24-9	0.051	ND	ND	ND	ND	ND	ND
Azoxystrobin	131860-33-8	0.02	ND	ND	ND	ND	ND	ND
Bensulide	741-58-2	0.02	ND	ND	ND	ND	ND	ND
Boscalid	188425-85-6	0.02	ND	ND	ND	ND	ND	ND
Bromacil	314-40-9	0.02	ND	ND	ND	ND	ND	ND
Bromopropylate	18181-80-1	0.098	ND	ND	ND	ND	ND	ND
Carfentrazone-ethyl	128639-02-1	0.02	ND	ND	ND	ND	ND	ND
Clothianidin	210880-92-5	0.02	ND	ND	ND	ND	ND	ND
Cyanazine	11096-88-1	0.098	ND	ND	ND	ND	ND	ND
Diclofop-methyl	51338-27-3	0.098	ND	ND	ND	ND	ND	ND
Dimethenamid	87674-68-8	0.051	ND	ND	ND	ND	ND	ND
Diphenylamine	122-39-4	0.02	ND	ND	ND	ND	ND	ND
Ethofumesate	26225-79-6	0.051	ND	ND	ND	ND	ND	ND
Fenbuconazole	114369-43-6	0.098	ND	ND	ND	ND	ND	ND
Fenoxaprop-ethyl	82110-72-3	0.098	ND	ND	ND	ND	ND	ND
Fipronil	120068-37-3	0.098	ND	ND	ND	ND	ND	ND
Fluazifop-P-butyl	69806-50-4	0.098	ND	ND	ND	ND	ND	ND
Fludioxonil	131341-86-1	0.098	ND	ND	ND	ND	ND	ND
Flumioxazin	103361-09-7	0.02	ND	ND	ND	ND	ND	ND
Fluometuron	2164-17-2	0.02	ND	ND	ND	ND	ND	ND
Fluroxypyr-meptyl	81406-37-3	0.051	ND	ND	ND	ND	ND	ND
Hexazinone	51235-04-2	0.051	ND	ND	ND	ND	ND	ND
Imidacloprid	138261-41-3	0.02	ND	ND	ND	ND	ND	ND
Isoxaben	82558-50-7	0.02	ND	ND	ND	ND	ND	ND
Mefenoxam	70630-17-0	0.051	ND	ND	ND	ND	ND	ND
Metalaxyl	57837-19-1	0.051	ND	ND	ND	ND	ND	ND
Metribuzin	21087-64-9	0.098	ND	ND	ND	ND	ND	ND
Myclobutanil	88671-89-0	0.098	ND	ND	ND	ND	ND	ND
Napropamide	15299-99-7	0.098	ND	ND	ND	ND	ND	ND
Pendimethalin	40487-42-1	0.08	ND	ND	ND	ND	ND	ND
Pirimicarb	23103-98-2	0.051	ND	ND	ND	ND	ND	ND
Prometon	1610-18-0	0.098	ND	ND	ND	ND	ND	ND
Prometryn	7287-19-6	0.051	ND	ND	ND	ND	ND	ND
Propazine	139-40-2	0.051	ND	ND	ND	ND	ND	ND
Pyraclostrobin	175013-18-0	0.02	ND	ND	ND	ND	ND	ND

Table 12. Pesticide and herbicide concentrations in bed-sediment core samples collected from selected sites at Brownlee Reservoir near Oxbow, Oregon, May 7–9, 2012.—Continued

NWIS site No.			444954116542400		444455117021200		443416117084000	
NWIS site name			Site 1a	Site 1b	Site 5a	Site 5b	Site 8a	Site 8b
Sample date / time			05-07-12 14:00	05-07-12 14:15	05-09-12 0900	05-09-12 0915	05-08-12 0900	05-08-12 0915
Parameter	CASRN	Reporting level (µg/kg)	Pesticide and herbicide concentration (µg/kg)					
Organonitrogen pesticides—EPA 8270D (GC-MS, SIM mode)—Continued								
Pyridaben	96489-71-3	0.098	ND	ND	ND	ND	ND	ND
Pyrimethanil	53112-28-0	0.02	ND	ND	ND	ND	ND	ND
Sethoxydim	74051-80-2	0.51	ND	ND	ND	ND	ND	ND
Simazine	122-34-9	0.098	ND	ND	ND	ND	ND	ND
Simetryn	1014-70-6	0.051	ND	ND	ND	ND	ND	ND
Sulfentrazone	122836-35-5	0.02	ND	ND	ND	ND	ND	ND
Tebuconazole	107534-96-3	0.098	ND	ND	ND	ND	ND	ND
Tebuthiuron	34014-18-1	0.098	ND	ND	ND	ND	ND	ND
Thiabendazole	148-79-8	0.02	ND	ND	ND	ND	ND	ND
Triadimefon	43121-43-3	0.098	ND	ND	ND	ND	ND	ND
Phenylurea herbicides—EPA 8321B (HPLC-MS)								
Diuron	330-54-1	0.02	ND	ND	ND	ND	ND	ND
DCPMU	3567-62-2	0.02	ND	ND	ND	ND	ND	ND
Fenuron	101-42-8	0.02	ND	ND	ND	ND	ND	ND
Linuron	330-55-2	0.02	ND	ND	ND	ND	ND	ND
Monuron	150-68-5	0.02	ND	ND	ND	ND	ND	ND
Neburon	555-37-3	0.02	ND	ND	ND	ND	ND	ND
Siduron	1982-49-6	0.02	ND	ND	ND	ND	ND	ND
Carbamate pesticides—EPA 8321B (HPLC-MS)								
3-Hydroxycarbofuran	16655-82-6	0.02	ND	ND	ND	ND	ND	ND
Aldicarb	116-06-3	0.02	ND	ND	ND	ND	ND	ND
Aldicarb sulfone	1646-88-4	0.02	ND	ND	ND	ND	ND	ND
Aldicarb sulfoxide	1646-87-3	0.02	ND	ND	ND	ND	ND	ND
Bendiocarb	22781-23-3	0.02	ND	ND	ND	ND	ND	ND
Carbaryl	63-25-2	0.02	ND	ND	ND	ND	ND	ND
Carbofuran	1563-66-2	0.02	ND	ND	ND	ND	ND	ND
Diflubenzuron	35367-38-5	0.02	ND	ND	ND	ND	ND	ND
Fenobucarb	3766-81-2	0.02	ND	ND	ND	ND	ND	ND
Methiocarb	2032-65-7	0.02	ND	ND	ND	ND	ND	ND
Methomyl	16752-77-5	0.02	ND	ND	ND	ND	ND	ND
Oxamyl	23135-22-0	0.02	ND	ND	ND	ND	ND	ND
Propoxur	114-26-1	0.02	ND	ND	ND	ND	ND	ND
Thiobencarb	28249-77-6	0.02	ND	ND	ND	ND	ND	ND

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