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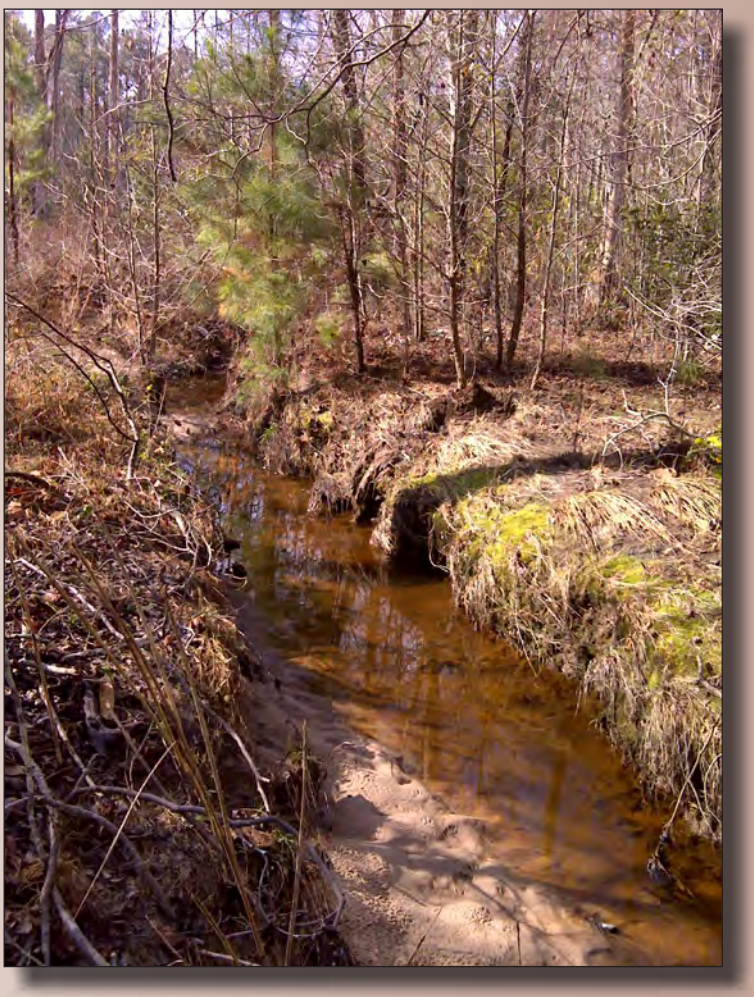
Trace Element, Semivolatile Organic, and Chlorinated Organic Compound Concentrations in Bed Sediments of Selected Streams at Fort Gordon, Georgia, February–April 2010



Open-File Report 2011–1067

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

Cover. Butler Creek tributary (Beaver Pond) at Fort Gordon, Georgia, February 2010 *(Thomas A. Abrahamsen, U.S. Geological Survey)*.

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

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

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Conversion Factors

SI to Inch/Pound

Multiply	By	To obtain
	Length	
centimeter (cm)	0.3937	inch (in.)
millimeter (mm)	0.03937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
kilometer (km)	0.5400	mile, nautical (nmi)
meter (m)	1.094	yard (yd)

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

$$°F=(1.8×°C)+32$$

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Altitude is defined as the distance above the vertical datum.

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

Selected acronyms and abbreviations used in this report include:

INRMP, Integrated Natural Resources Management Plan
LEL, lowest effect level
LRL, laboratory reporting limit
LT-MDL, long-term method detection level
mg/kg, milligram per kilogram
mg/L, milligram per liter
µm, micrometer
µg/kg, microgram per kilogram
NAWQA, National Water-Quality Assessment Program
NWQL, National Water Quality Laboratory
OC, organochlorine pesticide
PAH, polycyclic aromatic hydrocarbon
PCB, polychlorinated biphenyl
PEC, probable effect concentration
PEL, probable effect level
PEL-HA28, probable effect level for *Hyalella azteca*
SPRL, Sediment Partitioning Research Laboratory
SVOC, semivolatile organic compound
TOC, total organic carbon
USEPA, U.S. Environmental Protection Agency
USGS, U.S. Geological Survey

Trace Element, Semivolatile Organic, and Chlorinated Organic Compound Concentrations in Bed Sediments of Selected Streams at Fort Gordon, Georgia, February–April 2010

By Lashun K. Thomas[1], Celeste A. Journey[1], Whitney J. Stringfield[1], Jimmy M. Clark[1], Paul M. Bradley[1], John B. Wellborn[2], W. Hagan Ratliff[3], and Thomas A. Abrahamsen[1]

Abstract

A spatial survey of streams was conducted from February to April 2010 to assess the concentrations of major ions, selected trace elements, semivolatile organic compounds, organochlorine pesticides, and polychlorinated biphenyls associated with the bed sediments of surface waters at Fort Gordon military installation near Augusta, Georgia. This investigation expanded a previous study conducted in May 1998 by the U.S. Geological Survey, in cooperation with the U.S. Department of the Army Environmental and Natural Resources Management Office of the U.S. Army Signal Center and Fort Gordon, that evaluated the streambed sediment quality of selected surface waters at Fort Gordon. The data presented in this report are intended to help evaluate bed sediment quality in relation to guidelines for the protection of aquatic life, and identify temporal trends in trace elements and semivolatile organic compound concentrations at streambed sites previously sampled.

Concentrations of 34 major ions and trace elements and 102 semivolatile organic, organochlorine pesticide, and polychlorinated biphenyl compounds were determined in the fine-grained fraction of bed sediment samples collected from 13 of the original 29 sites in the previous study, and 22 additional sites at Fort Gordon. Three of the sites were considered reference sites as they were presumed to be located away from potential sources of contaminants and were selected to represent surface waters flowing onto the fort, and the remaining 32 nonreference sites were presumed to be located within the contamination area at the fort. Temporal trends in trace elements and semivolatile organic compound concentrations also were evaluated at 13 of the 32 nonreference sites to provide an assessment of the variability in the number of detections and concentrations of constituents in bed sediment associated with potential sources, accumulation, and attenuation processes.

Major ion and trace element concentrations in fine-grained bed sediment samples from most nonreference sites exceeded concentrations in samples from reference sites at Fort Gordon. Bed sediments from one of the nonreference sites sampled contained the highest concentrations of copper and lead with elevated levels of zinc and chromium relative to reference sites. The percentage change of major ions, trace elements, and total organic carbon that had been detected at sites previously sampled in May 1998 and current bed sediment sites ranged from –4 to 8 percent with an average percentage change of less than 1 percent. Concentrations of major ions and trace elements in bed sediments exceeded probable effect levels for aquatic life (based on the amphipod *Hyalella azteca*) established by the U.S. Environmental Protection Agency at 46 and 69 percent of the current and previously sampled locations, respectively. The greatest frequency of exceedances for major ions and trace elements in bed sediments was observed for lead.

Concentrations of semivolatile organic compounds, organochlorine pesticides, and polychlorinated biphenyls were detected in bed sediment samples at 94 percent of the sites currently sampled. Detections of these organic compounds were reported with greater frequency in bed sediments at upstream sampling locations, when compared to downstream locations. The greatest number of detections of these compounds was reported for bed sediment samples collected from two creeks above a lake. The percentage change of semivolatile organic compounds detected at previously sampled and current bed sediment sites ranged from –68 to 100 percent with the greatest percentage increase reported for one of the creeks above the lake.

Concentrations of semivolatile organic compounds and polychlorinated biphenyls in bed sediments exceeded aquatic life criteria established by the U.S. Environmental Protection Agency at three sites. Contaminant compounds exceeding aquatic life criteria included fluoranthene, phenanthrene,

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[3] Environmental Branch, Fort Gordon, Georgia.

anthracene, benzo(*a*)anthracene, chrysene, benzo(*a*)pyrene, and pyrene. The most frequently detected organic compounds among bed sediment samples were pyrene, chrysene, and fluoranthene, which were detected in more than 45 percent of sites and reported at concentrations exceeding probable effect levels for the amphipod *Hyalella azteca* established by the U.S. Environmental Protection Agency.

Introduction

The U.S. Army uses stormwater-quality data to support the development of an Integrated Natural Resources Management Plan (INRMP) for stormwater pollution prevention for Fort Gordon, Georgia. An effective INRMP ensures that natural resource conservation measures and Army activities on the military base are integrated and consistent with Federal requirements (U.S. Code of Federal Regulations, 1998) to manage military installations on an ecosystem basis. Information on the occurrence and distribution of toxic substances in surface-water bodies on the base is needed to develop an INRMP at Fort Gordon, because when transported from source areas and deposited in streams, these substances may adversely affect aquatic life and stream ecosystems.

During February–April 2010, the U.S. Geological Survey (USGS), in cooperation with the U.S. Department of the Army Environmental and Natural Resources Management Office of the U.S. Army Signal Center and Fort Gordon, conducted a spatial survey of stream sediment quality to assess the concentrations of major ions, selected trace elements, semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in streambed sediments at Fort Gordon. This study expanded a previous USGS investigation that evaluated the streambed sediment quality and characteristics of selected surface waters at Fort Gordon (McConnell and others, 2000). For this study, previously sampled streambed sediment sites were evaluated, and additional sites also were assessed to determine the occurrence and distribution of various constituents in bed sediments. The data were collected to provide a temporal comparison of concentrations of selected trace elements and SVOCs in bed sediments relative to previous studies (McConnell and others, 2000; Priest and others, 2002; fig. 1; table 1).

Trace elements, SVOCs, OCs, and PCBs generally have low solubility in natural waters and tend to accumulate on silt- and clay-sized particles and organic matter (Smith and others, 1988; Schwarzenbach and others, 1993; Stumm and Morgan, 1996). The majority of the nonpoint-source contributions of these constituents likely are intermittent or related to storm events (McConnell and others, 2000). These contaminants may not be detected in randomly collected water samples, especially with respect to PCBs and OCs. Bed sediments in depositional environments of streams, however, provide an integrated repository of particulate matter transported by a stream over time. Potential effects of contaminants in the sediment on benthic organisms include both acute and chronic toxicity with individual-, population-, and community-level effects, bioaccumulation of contaminants, and the potential to pass contaminants along to predators of benthic species (Adams and others, 1992). Thus, a spatial survey of bed sediment quality can identify locations, potential source areas, and distributions of trace elements, SVOCs, OCs, and PCBs in surface water.

Purpose and Scope

The purpose of this report is to present data collected as part of an investigation on the occurrence and distribution of trace and major elements, SVOCs, OCs, and PCBs in bed sediments of selected streams at Fort Gordon, Georgia. This investigation expanded a previous USGS study conducted by McConnell and others (2000) that evaluated the streambed sediment quality in selected surface waters at the fort. The data presented in this report are intended to help evaluate the quality of streambed sediments in relation to guidelines for the protection of aquatic life (Persaud and others, 1993; U.S. Environmental Protection Agency, 1996; Canadian Council of Ministers of the Environment, 2001; tables 2, 3) and identify temporal trends in trace elements and SVOC concentrations at sites previously sampled (McConnell and others, 2000; Priest and others, 2002). The report contains concentration data for trace and major elements, SVOCs, OCs, and PCBs, and field water-quality properties for bed sediment samples for 13 of the original 29 sites in the previous USGS study (McConnell and others, 2000) and 22 additional sites at Fort Gordon for the period February–April 2010. Three of the sites were considered reference sites as they were presumed to be located away from potential sources of contaminants and were selected to represent surface waters flowing onto Fort Gordon, and the remaining 32 nonreference sites were presumed to be located within the contamination area at the fort.

Previous Investigations

In 1995, Fort Gordon was assessed as part of a comprehensive water-quality investigation conducted by the U.S. Department of Agriculture, Natural Resources Conservation Service, and the University of Georgia, Environmental and Agricultural Engineering Department. The assessment was conducted to evaluate water-quality conditions at six sites located at Fort Gordon and provided data for the development of a water-quality plan for Fort Gordon (U.S. Department of Agriculture, 1995).

Following the water-quality assessment conducted at Fort Gordon in 1995, the USGS (McConnell and others, 2000) evaluated the occurrence and distribution of trace elements and SVOCs in bed sediments from free-flowing and impounded segments of selected streams located at

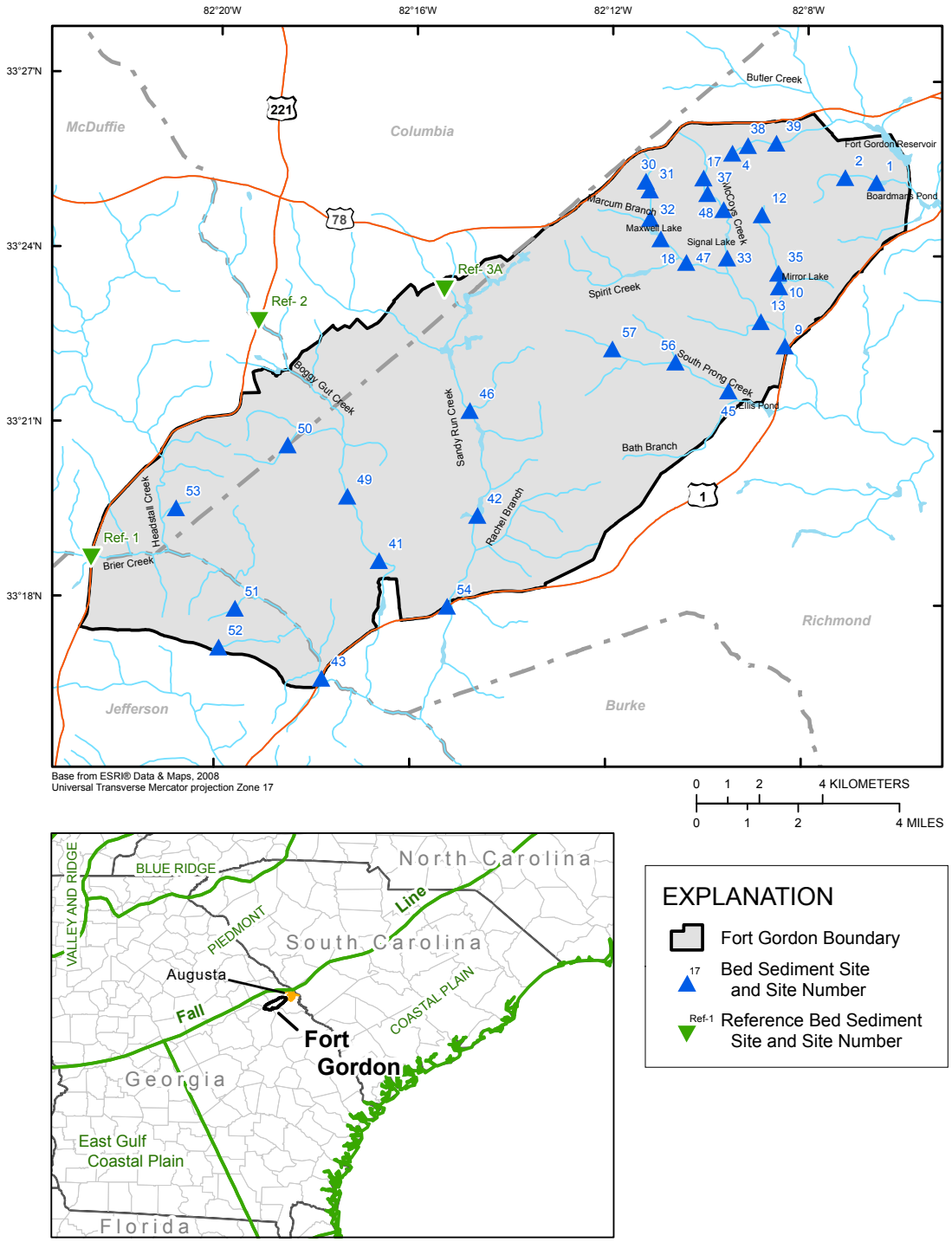

Figure 1. Locations of study area and bed sediment sampling sites at Fort Gordon, GA, February–April 2010.

Fort Gordon. Concentration data for trace elements and SVOCs in bed sediment samples were determined and used to evaluate the association between bed sediment quality and land use and to identify potential source areas of contaminants and sites where bed sediment quality can indicate an increased potential for adverse effects on aquatic life. Results from that study indicated a strong relation between trace element and SVOC concentrations in bed sediments and land use in the basins sampled. Relative rankings of the data indicated that the commercial and industrial areas were major sources for trace elements and semivolatile organic compounds. Results established that sediment-quality screening levels and aquatic life criteria also were exceeded at commercial and industrial land-use sites.

Table 1. Site information for bed sediment samples collected at Fort Gordon, GA, February–April 2010.

[°, degrees; ', minutes; ", seconds; EST, Eastern Standard Time]

Site number (fig. 1)	Station number	Station name	Latitude	Longitude	Date	Time (EST)
1	02196843	Butler Creek tributary above Boardmans Pond at Fort Gordon, GA	33°25'15"	82°06'35"	3/17/10	1330
2	02196842	Soil Erosion Lake at Fort Gordon, GA	33°25'20"	82°07'13"	3/16/10	1330
4	02196823	Butler Creek tributary (Beaver Pond) at Fort Gordon, GA	33°25'44"	82°09'32"	2/3/10	1130
9	021970190	Gordon Lake at Fort Gordon, GA	33°22'26"	82°08'25"	3/17/10	0830
10	021970180	Mirror Lake at Fort Gordon, GA	33°23'27"	82°08'33"	3/17/10	1200
12	021970168	Spirit Creek tributary near headwaters at Fort Gordon, GA	33°24'41"	82°08'55"	2/17/10	1400
13	021970165	Spirit Creek above Gordon Lake at Fort Gordon, GA	33°22'51"	82°08'55"	2/3/10	1600
17	021970140	McCoy Creek above Signal Lake at Fort Gordon, GA	33°25'18"	82°10'07"	2/17/10	1415
18	021970136	Marcum Branch below Maxwell dam at Fort Gordon, GA	33°24'15"	82°10'59"	2/3/10	1400
30	021970130	North Fork Spirit Creek at Fort Gordon, GA	33°25'14"	82°11'18"	2/2/10	1500
31	332505082111300	BS-31 Fort Gordon, GA	33	82	2/2/10	1330
32	332436082111200	BS-32 Fort Gordon, GA	33°24'36"	82°11'12"	2/9/10	1415
33	021970158	McCoy Creek below Signal Lake at Fort Gordon, GA	33°23'56"	82°09'37"	2/3/10	1220
35	021970175	Spirit Creek tributary above Mirror Lake at Fort Gordon, GA	33°23'41"	82°08'34"	2/9/10	1230
37	332502082100200	BS-37 Fort Gordon, GA	33°25'02"	82°10'02"	2/9/10	1045
38	332552082091300	BS-38 Fort Gordon, GA	33°25'52"	82°09'13"	2/3/10	0930
39	02196825	Butler Creek tributary at Willard Trail at Fort Gordon, GA	33°25'55"	82°08'38"	2/3/10	1005
41	331840082164000	BS-41 Fort Gordon, GA	33°18'40"	82°16'40"	2/18/10	1245
42	331928082144000	BS-42 Fort Gordon, GA	33°19'28"	82°14'40"	2/10/10	1030
43	02197557	Brier Creek at U.S. Route 1 near Wrens, GA	33°16'38"	82°17'49"	3/16/10	1030
45	02197023	South Prong Creek above Ellis Pond at Fort Gordon, GA	33°21'39"	82°09'34"	2/10/10	0915
46	332116082145100	BS-46 Fort Gordon, GA	33°21'16"	82°14'51"	2/4/10	0925
47	332351082102700	BS-47 Fort Gordon, GA	33°23'51"	82°10'27"	2/3/10	1430
48	332446082094200	BS-48 Fort Gordon, GA	33°24'46"	82°09'42"	2/17/10	1115
49	331946082172000	BS-49 Fort Gordon, GA	33°19'46"	82°17'20"	2/18/10	1215
50	332038082183400	BS-50 Fort Gordon, GA	33°20'38"	82°18'34"	2/18/10	1000
51	331749082193600	BS-51 Fort Gordon, GA	33°17'49"	82°19'36"	2/18/10	1500
52	331709082195600	BS-52 Fort Gordon, GA	33°17'09"	82°19'56"	2/10/10	1500
53	331932082205000	BS-53 Fort Gordon, GA	33°19'32"	82°20'50"	2/18/10	1100
54	331754082151600	Sandy Run Creek at South Post Border, Fort Gordon, GA	33°17'54"	82°15'16"	4/13/10	1200
56	332208082103900	South Prong Creek below Range 14, Fort Gordon, GA	33°22'08"	82°10'39"	4/14/10	1200
57	332221082115700	Unnamed Creek East of Range 8, Fort Gordon, GA	33°22'21"	82°11'57"	4/14/10	0900
Ref- 1	02197554	Brier Creek at U.S. Route 221 near Wrens, GA	33°18'40"	82°22'33"	2/11/10	0900
Ref- 2	02197558	Boggy Gut Creek at U.S. Route 221 near Harlem, GA	33°22'46"	82°19'11"	2/11/10	1200
Ref- 3A	332321082152300	Ref-3A Fort Gordon, GA	33°23'21"	82°15'23"	2/4/10	0930

Table 2. Bed sediment-quality guidelines for selected major ions and trace elements.

[mg/kg, milligrams per kilogram; %, percent by weight; ---, no guidelines; LEL, lowest effect level; SEL, severe effect level; TET, toxic effect threshold; PEL, probable effect level; PEL-HA28, probable effect level for *Hyalella azteca* (28-day test); PEC, probable effect concentration. Concentrations determined on dry weight of bed sediment samples. PEL-HA28 guidelines established by U.S. Environmental Protection Agency (1996) are highlighted in yellow]

Constituent	Bed sediment-quality guidelines					
	LEL[1] (mg/kg)	SEL[1] (mg/kg)	TET[2] (mg/kg)	PEL[3] (mg/kg)	[4]PEL- HA28 (mg/kg)	Consensus-based PEC[5] (mg/kg)
Arsenic	6	33	17	17	48	33
Cadmium	0.6	10	3	3.5	3.2	4.98
Chromium	26	110	100	90	120	111
Cobalt	*50	---	---	---	---	---
Copper	16	110	86	197	100	149
Iron	2%	4%	---	---	---	---
Lead	31	250	170	91.3	82	128
Manganese	460	1,100	---	---	---	---
Mercury	0.2	2	1	0.486	---	1.06
Nickel	16	75	61	---	33	48.6
Phosphorus (total)	600	2,000	---	---	---	---
Silver	*0.5	---	---	---	---	---
Zinc	120	820	540	315	540	459

[1] Persaud and others, 1993.

[2] St. Lawrence Centre and Ministere de l'Envionnement du Quebec (1992).

[3] Canadian Council of Ministers of the Environment (1999, updated in 2001).

[4] U.S. Environmental Protection Agency (1996, EPA 905/R-96/008).

[5] Ingersol and others, 2000.

*Ontario Ministry of the Environment (1997, appendix revised in 1998).

Table 3. Bed sediment-quality guidelines for selected semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs).

[µg/g, micrograms per gram; µg/kg, micrograms per kilogram; %, percent by weight;---, no guidelines; LEL, lowest effect level; SEL, severe effect level; TET, toxic effect threshold; PEL, probable effect level; PEL-HA28, probable effect level for *Hyalella azteca* (28-day test); PEC, probable effect concentration. Concentrations determined on dry weight of bed sediment samples. PEL-HA28 guidelines established by U.S. Environmental Protection Agency (1996) are highlighted in yellow]

Constituent	Bed sediment-quality guidelines					
	LEL[1] (µg/g)	SEL[1] (µg/g organic carbon)	TET[2] (µg/kg)	PEL[3] (µg/kg)	[4]PEL-HA28 (µg/kg)	Consensus-based PEC[5] (µg/kg)
Acenaphthene	---	---	---	88.9	---	---
Acenaphthylene	---	---	---	128	---	---
Aldrin	0.002	8	---	---	---	---
Anthracene	0.22	370	---	245	170	845
Aroclor™ 1254	---	---	---	340	---	---
Benzo(a)anthracene	0.32	1,480	500	385	280	1,050
Benzo(k)fluoranthene	0.24	1,340	---	---	---	---
Benzo(g,h,i)perylene	0.17	320	---	---	---	---
Benzo(a)pyrene	0.37	1,440	700	782	320	1,450
Chlordane	0.007	6	30	8.87	---	17.6
Chrysene	0.34	460	800	862	410	1,290
Cyanide	*0.1	---	---	---	---	---
DDD (p,p- and o,p-)	0.008	6	60	8.51	---	28
DDE (p,p- and o,p-)	0.005	19	50	6.75	---	31.3
DDT (p,p- and o,p-)	0.008	71	50	4.77	---	62.9
Total DDTs	0.007	12	---	---	---	572
Dibenzo(a,h)anthracene	0.06	130	---	135	---	---
Dieldrin	0.002	91	300	6.67	---	61.8
Endrin	0.003	130	500	62.4	---	207
Fluoranthene	0.75	1,020	2,000	2,355	320	2,230
Fluorene	0.19	160	---	144	150	536
Heptachlor epoxide	0.005	5	30	2.74	---	16
Hexachlorobenzene	0.02	24	---	---	---	---
Indeno(1,2,3-c,d) pyrene	0.2	320	---	---	---	---
Lindane (BHC)	0.003	12	9	1.38	---	4.99
Methylnaphthalene, 2-	---	---	---	201	---	---
Mirex	0.007	130	---	---	---	---
Naphthalene	---	---	600	391	140	561
Phenanthrene	0.56	950	800	515	410	1,170
Pyrene	0.49	850	1,000	875	490	1,520
Total PAHs	4	10,000	---	---	3,400	22,800
Total PCBs	0.07	530	1,000	277	240	676

[1] Persaud and others, 1993.

[2] St. Lawrence Centre and Ministere de l'Envionnement du Quebec (1992).

[3] Canadian Council of Ministers of the Environment (1999, updated in 2001).

[4] U.S. Environmental Protection Agency (1996, EPA 905/R-96/008).

[5] Ingersol and others, 2000.

*Ontario Ministry of the Environment (1997, appendix revised in 1998).

More recent studies also have been conducted at Fort Gordon to assess water-quality and bed sediment conditions. A second study conducted by the USGS (Priest and others, 2002) identified and evaluated major ions, selected trace elements, and nutrients in surface water, streambed-interstitial water, and bed sediments collected within the small arms impact area at Fort Gordon. Concentration data were reported for eight sites along South Prong Creek and Marcum Branch for the period September 4–6, 2001.

Description of the Study Area

Fort Gordon is located in east-central Georgia approximately 13 kilometers southwest of Augusta in Richmond, Columbia, Jefferson, and McDuffie Counties (fig. 1). Fort Gordon lies in the northern part of the Coastal Plain Physiographic Province in Georgia, near the Fall Line (Clark and Zisa, 1976). The Fall Line marks a transitional zone between the Coastal Plain and Piedmont Physiographic Provinces (fig. 1). The general topography of the Fall Line is characterized by rolling hills, with some rock outcroppings in stream valleys. Topographic relief in the Coastal Plain generally is greatest near the Fall Line and decreases in a southeasterly direction. The minimum altitude is approximately 69 meters (m) above the North American Vertical Datum of 1988 (NAVD 88) to the east, and the maximum altitude is about 145 m above NAVD 88 to the northwest.

The climate of the Augusta area is humid subtropical, characterized by hot summers and mild winters. The average daily high temperature is about 32 degrees Celsius (°C) in the summer, and the daily average low temperature is about 2 °C in the winter. In 2009, the total precipitation recorded at Augusta Bush Field Airport was 1.28 m (National Oceanic and Atmospheric Administration, 2010). The driest months were reported for January and August, and the wettest months were reported for October and December. On the basis of the 30-year period, 1971–2000, average precipitation in the Augusta area is about 1.13 m, and snowfall is rare (National Oceanic and Atmospheric Administration, 2010).

Past military activities at Fort Gordon have included division training for Infantry and Armored Divisions, Southeastern Signal School, Military Police, and anti-aircraft Artillery Brigade operations. After the Vietnam War, the U.S. Army consolidated the majority of the communications training at Fort Gordon. In 1974, Fort Gordon was designated as the U.S. Army Signal Center. Currently, Fort Gordon is one of the largest communications/electronics facilities in the world.

General land use in the western part of the fort consists of upland areas that typically are forested and contain wetlands and some small impoundments. The eastern part of Fort Gordon is more developed, with industrial and military-related operation facilities. The largest areas of impervious surfaces at Fort Gordon are located in the eastern part of the fort and include the headwaters of Butler and Spirit Creeks. Bed sediment sites evaluated for this investigation were located throughout the fort.

Streamflow Station and Bed Sediment Numbering System

The USGS has used the same numbering system to identify streamflow stations since 1950. The order of listing stations is in a downstream direction along the mainstream. All stations on a tributary entering upstream from a mainstream station are listed before that station. Each streamflow station is assigned a unique 8- to 14-digit number. The station number, such as 02197500, includes the 2-digit number "02," which refers to the regional basin identifier, plus the 6- to 12-digit downstream order "1975000." Bed sediment sites without a USGS-assigned number are identified by the unique 15-digit number derived from the site's latitude, longitude, and a sequential number. For example, two different types of samples collected from one site with latitude 33°22'10" and longitude –082°10'39" would be assigned identification numbers 332210082103901 and 332210082103902, respectively.

Data Collection and Analysis

The following sections describe methods that were used to collect and evaluate bed sediment samples for trace and major elements, SVOCs, PCBs, OCs, and field water-quality properties (tables 4–6; table 6 is on p. 31 at the back of the report). A discussion on quality-assurance procedures also is provided.

Bed Sediment Data

Bed sediment samples were collected at 32 nonreference sites and 3 reference sites (fig. 1) in exposed and (or) submerged depositional areas that contain fine-grained sediments. Samples at stream sites were collected in accordance with the procedures outlined in chapter A-8 of the USGS National Field Manual (Radtke, 2005; U.S. Geological Survey, variously dated). Samples were collected along a 100-m reach at each of the selected stream sites by using a Teflon™ spatula to scoop the upper 1–2 centimeters (cm) of fine-grained material from the bed deposits. Samples were composited in an acid-rinsed, baked-glass container until sufficient material was collected to process the sample.

Composite subsamples for each site were delivered to the USGS Sediment Partitioning Research Laboratory (SPRL) in Atlanta, Georgia. Samples were prepared for chemical analysis at the USGS SPRL by freeze drying and then sieving through a 63-micrometer (μm) mesh screen. The 63-μm fraction of the sample was analyzed for selected trace and major elements by wet digestion and atomic absorption spectroscopy (method PLA20 in Horowitz and Elrick, 1985a); for the hydrides of antimony, arsenic, and selenium by wet digestion and hydride atomic absorption (method HY017 in Horowitz and Elrick, 1985b); and for mercury by wet digestion and flameless cold vapor atomic absorption (method CV025 in Elrick and Horowitz, 1986).

Table 4. Summary of water-quality data collected for bed sediment samples at Fort Gordon, GA, February–April 2010.

[EST, Eastern Standard Time; °C, degrees Celsius; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mm Hg, millimeters of mercury; mg/L, milligrams per liter; %, percent; ---, no data]

Site number (fig. 1)	Station number	Station name	Date	Time (EST)	Water temperature °C	pH, standard units	Specific conductance, µS/cm	Barometric pressure, mm Hg	Dissolved oxygen, mg/L	Dissolved oxygen saturation, %
1	02196843	Butler Creek tributary above Boardmans Pond at Fort Gordon, GA	3/17/10	1330	14.5	5.88	28.0	755	9.09	90.0
2	02196842	Soil Erosion Lake at Fort Gordon, GA	3/16/10	1330	14.5	6.13	34.0	753	10.4	103
4	02196823	Butler Creek tributary (Beaver Pond) at Fort Gordon, GA	2/3/10	1130	7.65	5.61	33.0	755	7.89	66.6
9	021970190	Gordon Lake at Fort Gordon, GA	3/17/10	0830	13.7	5.58	52.0	756	7.23	70.2
10	021970180	Mirror Lake at Fort Gordon, GA	3/17/10	1200	12.7	5.32	13.0	756	8.14	77.4
12	021970168	Spirit Creek tributary near headwaters at Fort Gordon, GA	2/17/10	1400	5.32	6.64	67.0	748	6.99	56.2
13	021970165	Spirit Creek above Gordon Lake at Fort Gordon, GA	2/3/10	1600	9.66	6.43	54.0	758	10.3	90.9
17	021970140	McCoy Creek above Signal Lake at Fort Gordon, GA	2/17/10	1415	11.8	5.16	23.0	755	10.0	93.5
18	021970136	Marcum Branch below Maxwell dam at Fort Gordon, GA	2/3/10	1400	10.4	5.10	16.0	757	10.7	96.5
30	021970130	North Fork Spirit Creek at Fort Gordon, GA	2/2/10	1500	9.91	4.99	29.0	750	11.1	99.5
31	332505082111300	BS-31 Fort Gordon, GA	2/2/10	1330	10.0	3.86	23.0	751	11.3	102
32	332436082111200	BS-32 Fort Gordon, GA	2/9/10	1415	11.0	4.95	21.0	748	9.45	87.4
33	021970158	McCoy Creek below Signal Lake at Fort Gordon, GA	2/3/10	1220	10.0	7.39	24.0	764	9.90	87.4
35	021970175	Spirit Creek tributary above Mirror Lake at Fort Gordon, GA	2/9/10	1230	8.86	5.59	29.0	752	10.3	90.3
37	332502082100200	BS-37 Fort Gordon, GA	2/9/10	1045	13.0	4.65	26.0	752	8.51	81.8
38	332552082091300	BS-38 Fort Gordon, GA	2/3/10	0930	8.39	5.01	51.0	756	10.3	88.6
39	02196825	Butler Creek tributary at Willard Trail at Fort Gordon, GA	2/3/10	1005	7.75	6.78	33.0	759	9.16	77.2
41	331840082164000	BS-41 Fort Gordon, GA	2/18/10	1245	6.38	4.28	22.0	754	11.0	89.8
42	331928082144000	BS-42 Fort Gordon, GA	2/10/10	1030	7.98	5.14	18.0	753	10.2	87.4
43	02197557	Brier Creek at U.S. Route 1 near Wrens, GA	3/16/10	1030	11.3	5.59	55.0	756	10.0	92.1
45	02197023	South Prong Creek above Ellis Pond at Fort Gordon, GA	2/10/10	0915	6.42	4.20	17.0	754	10.1	82.5
46	332116082145100	BS-46 Fort Gordon, GA	2/4/10	0925	7.73	5.44	20.0	766	10.6	88.1
47	332351082102700	BS-47 Fort Gordon, GA	2/3/10	1430	8.95	4.81	21.0	764	11.3	97.3
48	332446082094200	BS-48 Fort Gordon, GA	2/17/10	1115	8.52	4.27	33.0	752	10.9	94.5
49	331946082172000	BS-49 Fort Gordon, GA	2/18/10	1215	5.30	4.00	23.0	761	---	---
50	332038082183400	BS-50 Fort Gordon, GA	2/18/10	1000	3.86	3.90	24.0	761	14.2	108
51	331749082193600	BS-51 Fort Gordon, GA	2/18/10	1500	7.01	6.19	48.0	754	12.2	101
52	331709082195600	BS-52 Fort Gordon, GA	2/10/10	1500	7.94	4.10	20.0	751	9.77	83.5
53	331932082205000	BS-53 Fort Gordon, GA	2/18/10	1100	7.78	3.36	21.0	755	7.69	65.2
54	331754082151600	Sandy Run Creek at South Post Border, Fort Gordon, GA	4/13/10	1200	18.4	4.95	16.0	765	9.43	100
56	332208082103900	South Prong Creek below Range 14, Fort Gordon, GA	4/14/10	1200	16.6	4.17	13.0	764	9.46	96.8
57	332221082115700	Unnamed Creek East of Range 8, Fort Gordon, GA	4/14/10	0900	16.1	4.01	18.0	765	7.88	79.6
Ref- 1	02197554	Brier Creek at U.S. Route 221 near Wrens, GA	2/11/10	0900	4.71	5.97	50.0	755	10.9	85.7
Ref- 2	02197558	Boggy Gut Creek at U.S. Route 221 near Harlem, GA	2/11/10	1200	4.92	4.86	31.0	752	10.2	81.0
Ref- 3A	332321082152300	Ref-3A Fort Gordon, GA	2/4/10	0930	6.60	4.72	23.0	759	9.21	75.3

Table 5. Concentrations of major ions, selected trace elements, and total organic carbon in bed sediment samples collected at Fort Gordon, GA, February–April 2010.

[EST, Eastern Standard Time; <63 µm, less than 63 micrometers; mg/kg, milligrams per kilogram; %, percent (1% = 10,000 mg/kg); <, less than; ---, no data. Concentrations determined on the less than 63-micrometer (µm) fraction of bed sediment samples]

Site number (fig. 1)	Station number	Station name	Date	Time (EST)	<63 µm %	Silver (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
1	02196843	Butler Creek tributary above Boardmans Pond at Fort Gordon, GA	3/17/10	1330	36	<0.5	31	75	170
2	02196842	Soil Erosion Lake at Fort Gordon, GA	3/16/10	1330	87	<0.5	46	90	260
4	02196823	Butler Creek tributary (Beaver Pond) at Fort Gordon, GA	2/3/10	1130	5.0	<0.5	41	240	170
9	021970190	Gordon Lake at Fort Gordon, GA	3/17/10	0830	34	2.4	44	71	160
10	021970180	Mirror Lake at Fort Gordon, GA	3/17/10	1200	46	<0.5	24	76	91
12	021970168	Spirit Creek tributary near headwaters at Fort Gordon, GA	2/17/10	1400	1.0	<0.5	69	120	450
13	021970165	Spirit Creek above Gordon Lake at Fort Gordon, GA	2/3/10	1600	13	3.1	41	76	120
17	021970140	McCoy Creek above Signal Lake at Fort Gordon, GA	2/17/10	1415	1.0	<0.5	27	98	120
18	021970136	Marcum Branch below Maxwell dam at Fort Gordon, GA	2/3/10	1400	11	<0.5	110	280	170
30	021970130	North Fork Spirit Creek at Fort Gordon, GA	2/2/10	1500	1.0	<0.5	41	140	110
31	332505082111300	BS-31 Fort Gordon, GA	2/2/10	1330	1.0	<0.5	27	65	74
32	332436082111200	BS-32 Fort Gordon, GA	2/9/10	1415	0.5	<0.5	28	72	82
33	021970158	McCoy Creek below Signal Lake at Fort Gordon, GA	2/3/10	1220	6.0	0.8	22	57	77
35	021970175	Spirit Creek tributary above Mirror Lake at Fort Gordon, GA	2/9/10	1230	1.0	<0.5	24	61	130
37	332502082100200	BS-37 Fort Gordon, GA	2/9/10	1045	2.0	<0.5	51	170	120
38	332552082091300	BS-38 Fort Gordon, GA	2/3/10	0930	6.0	<0.5	19	53	53
39	02196825	Butler Creek tributary at Willard Trail at Fort Gordon, GA	2/3/10	1005	4.0	<0.5	33	89	110
41	331840082164000	BS-41 Fort Gordon, GA	2/18/10	1245	36	<0.5	24	44	40
42	331928082144000	BS-42 Fort Gordon, GA	2/10/10	1030	2.0	<0.5	24	61	66
43	02197557	Brier Creek at U.S. Route 1 near Wrens, GA	3/16/10	1030	65	<0.5	16	43	82
45	02197023	South Prong Creek above Ellis Pond at Fort Gordon, GA	2/10/10	0915	2.0	<0.5	23	56	45
46	332116082145100	BS-46 Fort Gordon, GA	2/4/10	0925	2.0	<0.5	20	49	82
47	332351082102700	BS-47 Fort Gordon, GA	2/3/10	1430	2.0	<0.5	45	130	54
48	332446082094200	BS-48 Fort Gordon, GA	2/17/10	1115	32	<0.5	44	84	150
49	331946082172000	BS-49 Fort Gordon, GA	2/18/10	1215	1.0	<0.5	21	37	41
50	332038082183400	BS-50 Fort Gordon, GA	2/18/10	1000	1.0	<0.5	20	37	48
51	331749082193600	BS-51 Fort Gordon, GA	2/18/10	1500	45	<0.5	15	38	65
52	331709082195600	BS-52 Fort Gordon, GA	2/10/10	1500	2.0	<0.5	25	48	89
53	331932082205000	BS-53 Fort Gordon, GA	2/18/10	1100	19	<0.5	15	39	23
54	331754082151600	Sandy Run Creek at South Post Border, Fort Gordon, GA	4/13/10	1200	15	<0.5	20	37	61
56	332208082103900	South Prong Creek below Range 14, Fort Gordon, GA	4/14/10	1200	18	<0.5	37	100	30
57	332221082115700	Unnamed Creek East of Range 8, Fort Gordon, GA	4/14/10	0900	34	0.5	56	120	40
Ref- 1	02197554	Brier Creek at U.S. Route 221 near Wrens, GA	2/11/10	0900	8.0	<0.5	19	45	96
Ref- 2	02197558	Boggy Gut Creek at U.S. Route 221 near Harlem, GA	2/11/10	1200	51	<0.5	19	46	59
Ref- 3A	332321082152300	Ref-3A Fort Gordon, GA	2/4/10	0930	51	<0.5	18	32	69

Table 5. Concentrations of major ions, selected trace elements, and total organic carbon in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standard Time; <63 µm, less than 63 micrometers; mg/kg, milligrams per kilogram; %, percent (1% = 10,000 mg/kg); <, less than; ---, no data. Concentrations determined on the less than 63-micrometer (µm) fraction of bed sediment samples]

Site number (fig. 1)	Date	Cadmium (mg/kg)	Chro-mium (mg/kg)	Cobalt (mg/kg)	Nickel (mg/kg)	Barium (mg/kg)	Vana-dium (mg/kg)	Lithium (mg/kg)	Beryl-lium (mg/kg)	Molyb-denum (mg/kg)	Phos-phorus (mg/kg)	Strontium (mg/kg)	Arsenic (mg/kg)	Anti-mony (mg/kg)	Sele-nium (mg/kg)	Tin (mg/kg)
1	3/17/10	0.7	100	12	23	610	120	30	3.2	2.0	1,400	150	12	1.6	2.7	2.9
2	3/16/10	0.8	130	19	40	850	140	38	3.6	2.2	1,700	210	10	1.8	3.0	3.4
4	2/3/10	1.3	120	5.3	24	390	140	31	1.9	2.4	1,100	110	9.0	5.9	1.6	6.3
9	3/17/10	0.6	94	5.2	20	550	100	32	2.1	2.8	4,000	110	5.8	1.2	1.3	5.2
10	3/17/10	0.1	120	6.3	25	720	160	37	2.5	2.3	1,200	150	11	1.1	0.7	4.1
12	2/17/10	0.9	100	7.2	28	400	140	37	1.9	2.7	1,500	130	11	3.8	1.1	7.9
13	2/3/10	0.4	110	5.7	18	480	110	31	2.2	2.6	3,000	100	6.8	1.6	1.5	10
17	2/17/10	0.3	120	6.4	23	410	160	30	2.3	3.3	1,100	130	19	1.6	2.2	3.3
18	2/3/10	0.5	120	5.0	20	410	140	31	2.2	3.2	1,000	110	11	4.7	1.8	5.1
30	2/2/10	0.7	140	6.8	22	540	180	26	2.3	5.4	1,400	150	17	2.7	2.3	7.2
31	2/2/10	0.1	210	5.8	52	530	160	30	2.1	5.0	1,000	120	11	1.3	1.3	6.0
32	2/9/10	0.1	100	4.4	18	460	140	29	2.0	2.7	940	96	15	1.6	1.7	2.8
33	2/3/10	0.1	110	5.0	18	410	120	32	1.8	1.9	810	94	8.2	1.5	0.7	3.7
35	2/9/10	0.1	99	5.0	20	530	120	30	2.0	1.6	1,200	130	15	1.5	0.9	4.0
37	2/9/10	0.3	140	6.5	23	600	160	29	2.8	3.1	1,400	190	17	2.7	3.3	4.7
38	2/3/10	0.4	87	5.3	18	260	120	33	2.0	1.8	670	69	5.4	0.6	2.0	2.9
39	2/3/10	0.3	110	7.7	19	240	140	32	2.4	2.1	690	88	6.1	2.5	1.7	4.0
41	2/18/10	0.1	69	4.5	15	330	78	27	2.4	1.4	840	89	2.8	0.6	2.2	2.8
42	2/10/10	0.1	110	11	19	350	130	27	2.0	2.0	880	120	12	1.0	1.5	4.9
43	3/16/10	0.2	60	23	17	500	110	38	2.8	1.9	1,100	73	4.0	0.6	0.9	2.9
45	2/10/10	<0.1	94	3.6	19	360	130	25	1.8	1.7	880	150	8.5	1.1	1.8	3.1
46	2/4/10	0.1	87	29	24	450	110	37	2.7	1.5	1,300	130	10	0.9	2.0	4.8
47	2/3/10	0.1	100	4.4	16	440	140	28	1.8	2.5	1,100	120	11	3.2	2.4	4.2
48	2/17/10	0.6	130	8.2	22	610	150	30	2.3	2.7	1,200	160	12	4.5	1.6	4.0
49	2/18/10	0.1	70	4.5	14	300	86	28	2.2	1.4	730	85	4.0	0.7	1.7	2.6
50	2/18/10	<0.1	76	6.6	18	280	94	36	2.6	1.8	840	83	4.7	0.8	2.0	3.1
51	2/18/10	0.1	52	18	14	490	100	36	2.5	1.9	1,000	74	3.8	0.6	0.8	3.2
52	2/10/10	<0.1	68	5.1	22	570	85	38	1.8	1.0	1,100	100	4.3	0.8	1.0	2.4
53	2/18/10	<0.1	47	2.0	9	240	34	10	1.9	<1	1,200	74	2.4	0.4	5.0	<1.0
54	4/13/10	0.7	75	31	21	370	89	27	2.4	1.6	1,000	100	7.5	0.8	2.1	4.4
56	4/14/10	0.1	66	2.4	11	280	85	16	1.3	1.2	860	110	4	0.6	3	2.2
57	4/14/10	<0.1	82	3.2	14	290	110	26	1.4	1.7	920	110	6.8	0.8	1.8	3.2
Ref- 1	2/11/10	0.2	53	28	15	640	120	35	3.0	2.0	1,300	95	5.3	0.6	0.9	3.8
Ref- 2	2/11/10	0.1	100	7.1	24	460	140	64	4.2	1.9	970	130	4.3	0.7	2.4	3.3
Ref- 3A	2/4/10	0.2	80	20	24	300	100	38	2.6	1.5	810	68	15	0.7	2.2	2.1

Table 5. Concentrations of major ions, selected trace elements, and total organic carbon in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standard Time; <63 µm, less than 63 micrometers; mg/kg, milligrams per kilogram; %, percent (1% = 10,000 mg/kg); <, less than; ---, no data. Concentrations determined on the less than 63-micrometer (µm) fraction of bed sediment samples]

Site number (fig. 1)	Date	Mercury (mg/kg)	Thallium (mg/kg)	Uranium (mg/kg)	Manganese (mg/kg)	Iron %	Aluminum %	Titanium %	Calcium %	Potassium %	Magnesium %	Sodium %	Total Carbon %	Total Nitrogen %	Total Sulfur %	Total Organic Carbon %
1	3/17/10	0.3	<50	<50	530	4.9	9.9	0.6	0.1	0.5	0.2	0.1	9.7	0.7	0.1	9.6
2	3/16/10	0.4	<50	<50	320	3.5	11	0.7	0.1	0.5	0.2	0.1	5.3	0.4	0.1	5.3
4	2/3/10	0.2	<50	<50	130	2.7	11	0.8	0.1	0.5	0.2	0.2	6.8	0.3	0.1	6.9
9	3/17/10	0.2	<50	<50	170	2.5	9.7	0.9	0.2	0.6	0.2	0.1	7.7	0.5	0.1	7.6
10	3/17/10	0.1	<50	<50	210	3.6	14	0.8	0.1	0.8	0.2	0.1	3.8	0.2	0.0	3.8
12	2/17/10	0.1	<50	<50	470	3.4	8.4	0.7	0.6	0.9	0.3	0.3	8.0	0.5	0.2	2.5
13	2/3/10	0.4	<50	<50	210	2.8	11	0.9	0.1	0.6	0.2	0.1	6.0	0.4	0.1	5.9
17	2/17/10	0.2	<50	<50	320	8.2	12	0.6	0.1	0.5	0.2	0.1	6.1	0.5	0.1	5.9
18	2/3/10	0.2	<50	<50	95	4.9	11	0.9	0.1	0.5	0.1	0.1	7.7	0.6	0.1	7.2
30	2/2/10	0.3	<50	<50	190	7.6	9.5	1.6	0.2	0.5	0.2	0.2	7.9	0.5	0.1	7.6
31	2/2/10	0.3	<50	<50	200	3.8	11	1.1	0.1	0.6	0.2	0.1	3.2	0.2	0.0	3.2
32	2/9/10	0.2	<50	<50	190	6.1	9.6	0.8	0.1	0.6	0.2	0.1	4.3	0.2	0.1	4.0
33	2/3/10	0.2	<50	<50	240	2.7	9.9	1.0	0.1	0.5	0.1	0.1	2.0	0.1	0.0	1.9
35	2/9/10	0.1	<50	<50	240	6.0	9.3	0.7	0.1	0.5	0.2	0.1	5.0	0.3	0.1	4.8
37	2/9/10	0.9	<50	<50	160	6.3	11	0.8	0.1	0.5	0.2	0.2	5.0	0.3	0.1	4.9
38	2/3/10	0.1	<50	<50	110	2.7	11	0.7	0.1	0.7	0.1	0.1	8.7	0.5	0.1	8.7
39	2/3/10	0.1	<50	<50	220	4.0	14	0.6	0.1	0.7	0.1	0.1	5.5	0.3	0.1	5.4
41	2/18/10	0.3	<50	<50	93	2.0	7.6	0.7	0.0	0.4	0.1	0.1	16	1.0	0.2	15
42	2/10/10	0.1	<50	<50	460	7.4	8.9	0.9	0.0	0.3	0.1	0.1	5.6	0.4	0.1	5.5
43	3/16/10	0.1	<50	<50	1,500	2.2	9.8	0.9	0.1	1.2	0.2	0.2	6.2	0.4	0.1	5.4
45	2/10/10	0.1	<50	<50	92	4.4	9.8	0.8	0.0	0.4	0.1	0.1	8.0	0.5	0.1	7.9
46	2/4/10	0.1	<50	<50	960	5.6	8.8	0.8	0.1	0.4	0.2	0.1	9.3	0.7	0.1	8.8
47	2/3/10	0.2	<50	<50	92	4.8	10	0.8	0.0	0.5	0.1	0.1	11	0.7	0.1	10
48	2/17/10	0.3	<50	<50	250	4.9	9.7	0.8	0.2	0.6	0.2	0.2	6.1	0.4	0.1	6.0
49	2/18/10	0.2	<50	<50	130	2.5	7.2	0.8	0.0	0.4	0.1	0.1	9.8	0.7	0.1	8.6
50	2/18/10	0.2	<50	<50	110	2.7	8.3	0.7	0.0	0.4	0.1	0.1	9.8	0.7	0.2	9.5
51	2/18/10	0.1	<50	<50	990	2.0	9.5	0.9	0.1	1.3	0.2	0.2	4.4	0.4	0.1	4.4
52	2/10/10	0.1	<50	<50	210	1.7	7.3	0.8	0.1	0.8	0.3	0.1	11	0.6	0.1	9.4
53	2/18/10	0.2	<50	<50	60	1.0	4.7	0.3	0.1	0.2	0.1	0.1	27	1.7	0.2	26
54	4/13/10	0.2	<50	<50	820	4.8	7.2	0.9	0.1	0.4	0.1	<0.1	11	0.8	0.1	9.9
56	4/14/10	0.1	<50	<50	85	3.4	5.9	0.6	0.1	0.3	0.1	<0.1	18	1.0	0.2	17
57	4/14/10	0.2	<50	<50	87	3.5	8.4	0.7	0.0	0.3	0.1	<0.1	14	0.9	0.2	14
Ref- 1	2/11/10	0.1	<50	<50	1,600	2.9	9.7	0.9	0.2	1.7	0.2	0.3	2.5	0.2	0.1	2.5
Ref- 2	2/11/10	0.1	<50	<50	75	2.0	11	0.8	0.0	0.6	0.2	0.1	6.5	0.5	0.1	6.4
Ref- 3A	2/4/10	0.1	<50	<50	310	8.0	8.6	0.6	0.1	0.3	0.1	0.0	12	1.0	0.2	12

Aliquot parts from the prepared subsamples were analyzed at the USGS SPRL for total organic carbon (TOC) by acidification with 10-percent hydrochloric acid followed by infrared detection on combustion in an oxygen atmosphere (K.A. Elrick, U.S. Geological Survey, written commun., November 2009). Samples were analyzed for total carbon and nitrogen through combustion in an oxygen atmosphere, chromatographic column separation, and measurement of thermal conductivity (K.A. Elrick, U.S. Geological Survey, written commun., November 2009).

Additional subsamples for the analysis of SVOCs, OCs, and PCBs were delivered to the USGS National Water Quality Laboratory (NWQL) in Denver, Colorado. Samples were sieved though a 2-millimeter filter, and the sieved fraction was analyzed for SVOCs by gas chromatography/mass spectrometry (Furlong and others, 1996; Olson and others, 2004) and for OCs and four congeners of PCBs (Aroclor™ 1016, 1242, 1254, and 1260) by gas chromatography with electron capture detection (Noriega and others, 2004).

Water-Quality Data

Field water-quality properties, such as water temperature, pH, dissolved-oxygen concentration, and specific conductance, were measured in the stream at the time of sampling, using a calibrated multiprobe sonde and following standard USGS protocols (Wilde and Radtke, 1999). Specific conductance and pH measurements were made after the sonde was field calibrated with standard solutions. The dissolved-oxygen probe was calibrated in water-saturated air within a closed chamber that was allowed to equilibrate to ambient air temperature. Field properties were reviewed according to established quality-assurance and quality-control protocols and stored in the Water-Quality Data (QWDATA) system of the USGS National Water Information System (NWIS) database.

Data Analysis

Polychlorinated biphenyls represent a large group of human-induced organic chlorinated biyphenyl compounds called congeners (such as Aroclor™). Organochlorine pesticides include dichlorodiphenyltrichloroethane (DDT) and its degradates of dichlorodiphenyldichloroethane (DDD) and dichlorodiphenyldichloroethylene (DDE). Although banned for decades, PCBs and OCs are extremely resistant to degradation and tend to bioaccumulate (Smith and others, 1988; Schwarzenbach and others, 1993). Semivolatile organic compounds include polycyclic aromatic hydrocarbons, phthalates, and phenol produced by the combustion of fossil fuels (Schwarzenbach and others, 1993). Trace elements occur naturally in rocks and soils, but their concentrations can become elevated because of human activity (Stumm and Morgan, 1996). Some of the potential sources of excess trace elements are fossil fuel combustion, industrial discharges, pesticides, and wastewater discharges.

Bed sediment-quality conditions at the reference sites were used for comparison with other observed site concentrations to identify areas of concern. For this investigation, specific nonreference and reference sites were selected from locations within and away from areas of presumed potential sources of contaminants, respectively. The reference site sediment-quality conditions for trace elements, SVOCs, OCs, and PCBs in the study area are represented by concentrations in samples from three bed sediment sites (Ref-1, Ref-2, Ref-3A; table 1; fig. 1).

Sediment-quality guidelines are used to provide a basis for predicting sediment toxicity or the absence of sediment toxicity of a contaminant to benthic organisms. In this study, trace element, SVOC, OC, and PCB concentrations in bed sediments were evaluated using sediment-quality guidelines, including those based on how aquatic organisms are directly affected by contaminated sediment (Persaud and others, 1993; U.S. Environmental Protection Agency, 1996; Canadian Council of Ministers of the Environment, 2001). The guidelines listed in tables 2 and 3 have the lowest effect levels (LEL) and probable effect levels (PEL) related to potential effects on benthic macroinvertebrates for individual major and trace element, SVOC, OC, and PCB concentrations in bed sediments. Site data were evaluated relative to established sediment-quality aquatic life criteria for benthic organisms to provide an indication of the constituents and sampling locations of concern and those sites that may require further investigation. The guideline concentrations used in the assessment may be over or under protective of aquatic organisms, depending on physical, hydrologic, and ecological conditions at a specific site.

Geospatial data analyses were used to evaluate the spatial and temporal variability in trace and major elements, SVOC, OC, and PCB. Spatial datasets for the bed sampling locations were created for the investigation by using unique spatial identifiers to link bed sediment sites to analytical results for sampling events. The information obtained from the geospatial data analysis was needed to help evaluate the quality of streambed sediments in relation to guidelines for the protection of aquatic life (Persaud and others, 1993; U.S. Environmental Protection Agency, 1996; Canadian Council of Ministers of the Environment, 2001).

Quality Assurance

The quality-assurance procedures that were followed in this investigation complied with the guidelines established by the USGS National Water-Quality Assessment (NAWQA) Program (Mueller and others, 1997). Water-quality and bed sediment sampling protocols documented in the USGS National Field Manual (U.S. Geological Survey, variously dated) and the USGS South Carolina Water Science Center Quality-Assurance Plan for Water-Quality Activities (Journey

and Stringfield, U.S. Geological Survey, written commun., 2006) were used to ensure that proper sampling procedures were followed. The protocol included the collection of replicate bed sediment samples at nonreference and reference sites (tables 7 and 8; table 8 is on p. 42 at the back of the report).

Replicate bed sediment samples were collected at four nonreference and one reference site (sites 2, 9, 13, 51, and Ref-1; tables 7 and 8) to provide an evaluation of the variability in trace elements, SVOC, OC, and PCB concentrations associated with sample collection, processing, and analysis. Bias results associated with sample processing and analyses were evaluated from the relative difference in concentrations between regular and replicate samples. Bed sediment samples were collected at three reference bed sediment sites (Ref-1, Ref-2, and Ref-3A) to serve as a baseline for the sample analysis of trace and major elements, SVOCs, OCs, and PCBs.

In this report, laboratory data have been reported as quantitative, estimated, and censored. Results above a "quantitation limit" (equivalent to the NWQL's laboratory reporting limit, or LRL) are reported as quantitative; results between the "quantitation limit" and the "detection limit" (equivalent to the NWQL's long-term method detection level, or LT-MDL) are reported as estimated (E) because the values are considered semiquantitative, and results below the LT-MDL are reported as censored (< LRL; Childress and others, 1999). In this report, results are listed in tables as follows: (1) quantitative values with no remark code, (2) estimated values with a remark code of E, and (3) censored values as less than LRL values. For graphical purposes, estimated and censored values were not replaced with other values, but were plotted as the reported estimated and LRL values.

Table 7. Concentrations of major ions, selected trace elements, and total organic carbon in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.

[EST, Eastern Standard Time; <63 µm, less than 63 micrometers; mg/kg, milligrams per kilogram; %, percent (1% = 10,000 mg/kg); abs., absolute; <, less than; ---, no data; relative percent difference %, abs. Concentrations determined on the less than 63-micrometer fraction of bed sediment samples]

Site number (fig. 1)	Station number	Station name	Date	Time (EST)	<63 µm %	Silver (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Zinc (mg/kg)
13	021970165	Spirit Creek above Gordon Lake at Fort Gordon, GA	2/3/10	1600	13	3.1	41	76	120
Replicate 13	021970165	Spirit Creek above Gordon Lake at Fort Gordon, GA	2/3/10	1600	13	3.1	41	75	120
Relative percent difference, abs.	021970165	Spirit Creek above Gordon Lake at Fort Gordon, GA	2/3/10	1600	0.00	0.00	0.00	1.3	0.00
51	331749082193600	BS-51 Fort Gordon, GA	2/18/10	1500	45	<0.5	14	39	64
Replicate 51	331749082193600	BS-51 Fort Gordon, GA	2/18/10	1500	45	<0.5	15	36	66
Relative percent difference, abs.	331749082193600	BS-51 Fort Gordon, GA	2/18/10	1500	0.00	---	6.9	8.0	3.1
Ref-1	02197554	Brier Creek at U.S. Route 221 near Wrens, GA	2/11/10	0900	8.0	<0.5	18	46	93
Replicate Ref-1	02197554	Brier Creek at U.S. Route 221 near Wrens, GA	2/11/10	0900	8.0	<0.5	20	43	98
Relative percent difference, abs.	02197554	Brier Creek at U.S. Route 221 near Wrens, GA	2/11/10	0900	0.00	---	10.5	6.7	5.2

Table 7. Concentrations of major ions, selected trace elements, and total organic carbon in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standard Time; <63 µm, less than 63 micrometers; mg/kg, milligrams per kilogram; %, percent (1% = 10,000 mg/kg); abs., absolute; <, less than; ---, no data; relative percent difference %, abs. Concentrations determined on the less than 63-micrometer fraction of bed sediment samples]

Site number (fig. 1)	Date	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Nickel (mg/kg)	Barium (mg/kg)	Vanadium (mg/kg)	Lithium (mg/kg)	Beryllium (mg/kg)	Molybdenum (mg/kg)	Phosphorus (mg/kg)	Strontium (mg/kg)
13	2/3/10	0.40	110	5.5	18	480	110	31	2.1	2.6	2,900	100
Replicate 13	2/3/10	0.40	110	5.8	18	480	110	31	2.2	2.6	3,000	100
Relative percent difference, abs.	2/3/10	0.00	0.00	5.3	0.00	0.00	0.00	0.00	4.7	0.00	3.4	0.00
51	2/18/10	0.08	51	17	13	480	100	35	2.5	1.9	1,000	72
Replicate 51	2/18/10	0.07	52	18	14	490	100	36	2.5	1.9	1,000	76
Relative percent difference, abs.	2/18/10	13.3	1.9	5.7	7.4	2.1	0.00	2.8	0.00	0.00	0.00	5.4
Ref-1	2/11/10	0.30	52	27	14	620	110	34	2.9	2.0	1,300	93
Replicate Ref-1	2/11/10	0.20	54	28	15	650	120	35	3.0	1.9	1,300	97
Relative percent difference, abs.	2/11/10	40.0	3.8	3.6	6.9	4.7	8.7	2.9	3.4	5.1	0.00	4.2

Table 7. Concentrations of major ions, selected trace elements, and total organic carbon in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standard Time; <63 µm, less than 63 micrometers; mg/kg, milligrams per kilogram; %, percent (1% = 10,000 mg/kg); abs., absolute; <, less than; ---, no data; relative percent difference %, abs. Concentrations determined on the less than 63-micrometer fraction of bed sediment samples]

Site number (fig. 1)	Date	Arsenic (mg/kg)	Antimony (mg/kg)	Selenium (mg/kg)	Tin (mg/kg)	Mercury (mg/kg)	Thallium (mg/kg)	Uranium (mg/kg)	Manganese (mg/kg)	Iron %	Aluminum %	Titanium %
13	2/3/10	6.6	1.5	1.4	10	0.33	<50	<50	210	2.8	11.0	0.91
Replicate 13	2/3/10	6.9	1.6	1.6	10	0.37	<50	<50	200	2.8	10.0	0.89
Relative percent difference, abs.	2/3/10	4.4	6.5	13.3	2.0	11.4	---	---	4.9	0.00	9.5	2.2
51	2/18/10	3.8	0.60	0.80	3.5	0.08	<50	<50	970	1.9	9.3	0.89
Replicate 51	2/18/10	3.7	0.50	0.80	2.9	0.06	<50	<50	1,000	2.0	9.6	0.92
Relative percent difference, abs.	2/18/10	2.7	18.2	0.00	18.8	28.6	---	---	3.0	5.1	3.2	3.3
Ref-1	2/11/10	5.3	0.60	0.80	3.6	0.07	<50	<50	1,500	2.8	9.5	0.92
Replicate Ref-1	2/11/10	5.3	0.60	0.90	3.9	0.06	<50	<50	1,600	2.9	9.9	0.93
Relative percent difference, abs.	2/11/10	0.00	0.00	11.8	8.0	15.4	---	---	6.5	3.5	4.1	1.1

Table 7. Concentrations of major ions, selected trace elements, and total organic carbon in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standard Time; <63 µm, less than 63 micrometers; mg/kg, milligrams per kilogram; %, percent (1% = 10,000 mg/kg); abs., absolute; <, less than; ---, no data; relative percent difference %, abs. Concentrations determined on the less than 63-micrometer fraction of bed sediment samples]

Site number (fig. 1)	Date	Calcium %	Potassium %	Magnesium %	Sodium %	Total Carbon %	Total Nitrogen %	Total Sulfur %	Total Organic Carbon %
13	2/3/10	0.12	0.55	0.15	0.13	5.9	0.42	0.08	5.8
Replicate 13	2/3/10	0.12	0.57	0.15	0.11	6.1	0.45	0.08	5.9
Relative percent difference, abs.	2/3/10	0.00	3.6	0.00	16.7	3.3	6.9	2.6	1.7
51	2/18/10	0.13	1.3	0.18	0.21	4.5	0.35	0.07	4.3
Replicate 51	2/18/10	0.14	1.4	0.18	0.21	4.3	0.34	0.08	4.5
Relative percent difference, abs.	2/18/10	7.4	7.4	0.00	0.00	4.5	2.9	5.3	4.5
Ref-1	2/11/10	0.19	1.6	0.21	0.33	2.4	0.22	0.08	2.5
Replicate Ref-1	2/11/10	0.20	1.7	0.22	0.33	2.5	0.22	0.08	2.5
Relative percent difference, abs.	2/11/10	5.1	6.1	4.7	0.00	4.1	0.00	7.4	0.00

Bed Sediment Quality

Field water-quality properties, as well as trace and major elements, SVOCs, OCs, and PCBs in bed sediment samples, were evaluated for selected streams at Fort Gordon, Georgia, to provide an assessment of stream conditions, information on the occurrence and distribution of various constituents in the study area, and an evaluation of the quality of streambed sediments in relation to guidelines for the protection of aquatic life (Persaud and others, 1993; U.S. Environmental Protection Agency, 1996; Canadian Council of Ministers of the Environment, 2001). Temporal trends in trace elements and SVOC concentrations also were identified at 13 non-reference sites previously sampled (McConnell and others, 2000) to provide an assessment of variation associated with changes in potential sources, accumulation, and attenuation processes. Replicate bed sediment samples were collected at four nonreference and one reference site (sites 2, 9, 13, 51, and Ref-1; tables 7 and 8) to provide an estimate of the variability in constituent concentration associated with sample collection, processing, and analysis.

Water-Quality Condition of Streams

For the selected streams at Fort Gordon, water temperature ranged from 3.9 to 18.4 °C with the highest temperatures generally reported at sites sampled during April 2010 (table 4). Specific conductance generally was low in most streams, indicating waters of low dissolved-solids content. Specific conductance at all sites ranged from 13 to 67 microsiemens per centimeter at 25 °C (µS/cm) with values less than 25 µS/cm at more than 50 percent of the sites (table 4).

Measurements of pH indicated that most streams at Fort Gordon were slightly acidic during the sample-collection period, generally having pH values less than 7.0 (neutral). The median value for pH was 5.01, ranging from 3.36 to 7.39 (table 4). For streams supporting warm-water fish species, pH of 6.0 is the threshold used by the Georgia Department of Natural Resources aquatic life criteria (Georgia Department of Natural Resources, 1998). Measured pH values less than 6.0 were reported at 29 of the 35 total sites (reference and nonreference sites).

Dissolved-oxygen concentrations at 34 of the 35 stream sites (reference and nonreference) were greater than the daily average of 5 milligrams per liter (mg/L) but not less than the 4 mg/L Georgia water-quality standard for waters supporting warm-water fish species (Georgia Department of Natural Resources, 1998; table 4). Dissolved-oxygen concentrations were not reported at site 49 because of potential equipment malfunction.

Major Ions, Trace Elements, and Total Organic Carbon Concentrations

Concentrations of 34 major ions, trace elements, and TOC were determined in the fine-grained fraction (<63 µm) of bed sediment samples collected from 32 nonreference sites and 3 reference sites at Fort Gordon (table 5). Analysis of bed sediment samples indicated that the proportion of fine-grained particles ranged from 0.5 percent at site 32 to 87 percent upstream at site 2.

Concentrations of TOC ranged from 1.9 percent (site 33) to 26 percent (site 53) by weight at bed sediment locations, with a mean concentration of 7.9 and 7.0 percent by weight at nonreference and reference sites, respectively. In this investigation, most of the bed sediment samples (97 percent) contained TOC concentrations greater than 2 percent by weight, which is consistent with previous studies (McConnell and others, 2000). The relatively high TOC concentrations can be attributed to analysis of the fine-grained fraction of the sediment sample that contains a large fraction of the TOC and to naturally occurring TOC in the bed sediment samples. The organic carbon content of the sediment can affect how strongly and how much of the SVOCs, OCs, and PCBs are sorbed to the sediment (Smith and others, 1988; Schwarzenbach and others, 1993). Specifically, the greater amount of organic carbon in the sediment, the greater the ability of the sediment to sorb organic compounds.

Major ion and trace element concentrations in fine-grained bed sediment samples at 15 of the 32 nonreference sites at Fort Gordon during February–April 2010 were two times greater than the average concentrations in samples from the 3 reference sites (table 5). At sites 4 and 18, concentrations for several trace elements in bed sediments were greater than 500 percent of the average concentrations in samples from the reference sites (table 5). Bed sediment samples collected from site 37 contained mercury concentrations that were nine times greater than the average concentration of mercury in samples from the reference sites (table 5).

Eight trace elements have LELs, PELs, and the PELs established for the amphipod *Hyalella azteca* (PEL-HA28) in the sediment-quality guideline: arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc (table 2). For this assessment, bed sediment concentrations of these trace elements were compared to established PELs and PEL-HA28s to identify sites that have a greater probability of affecting aquatic biota (Persaud and others, 1993; U.S. Environmental Protection Agency, 1996; Canadian Council of Ministers of the Environment, 2001; table 2). No sites had arsenic concentrations in bed sediment that exceeded the PEL-HA28 of 48 milligrams per kilogram (mg/kg); however, bed sediment arsenic concentrations at sites 30 and 37 were at the PEL of 17 mg/kg (tables 2 and 5). Most sites had

cadmium concentrations in bed sediment that were an order of magnitude below the established PEL and PEL-HA28 of 3.5 mg/kg and 3.2 mg/kg, respectively (tables 2 and 5). Chromium bed sediment concentrations exceeded the PEL of 90 mg/kg at 21 of 35 sites (including 1 of the 3 reference sites). Additionally, 5 of the 21 sites that exceeded the PEL for chromium in bed sediment also exceeded the PEL-HA28 of 120 mg/kg. At least one exceedance was observed for the PEL or PEL-HA28 for zinc, nickel, and copper concentrations in bed sediments. Site 18 had copper concentrations above the PEL-HA28 of 100 mg/kg. Sites 2 and 31 had nickel concentrations above the PEL-HA28 of 33 mg/kg (tables 2 and 5). Site 12 had zinc concentrations above the PEL of 315 mg/kg (tables 2 and 5).

Concentrations of major ions and trace elements in bed sediments exceeded PEL-HA28s for aquatic life established by the U.S. Environmental Protection Agency (USEPA; 1996) at 37 percent of the sampling locations. The greatest number of exceedances was observed at site 2 (fig. 2). The greatest frequency of exceedances for major ions and trace elements was observed in lead when compared to other trace and major elements (tables 2 and 5). On the basis of aquatic life criteria, concentrations of lead exceeded USEPA (1996) guidelines for bed sediment (less than or equal to 82 mg/kg) for the amphipod *Hyalella azteca* at 34 percent of sampling locations (fig. 3).

Semivolatile Organic Compounds, Organochlorine Pesticides, and Polychlorinated Biphenyl Concentrations

Concentrations of SVOCs, OCs, and PCBs were determined in bed sediment samples collected from 32 nonreference and 3 reference sites at Fort Gordon (table 6). Organic contaminant compounds were detected in bed sediment samples at 94 percent of the sites sampled (fig. 4). Nondetections of SVOCs, OCs, and PCBs were observed at reference site Ref-3A, while minimal concentrations of SVOCs and OCs were present at the remaining reference sites (Ref-1 and Ref- 2). DDT and its degradate DDE were detected in bed sediments at one reference site (Ref-2) at or above the levels observed at nonreference sites. The polycyclic aromatic hydrocarbons (PAHs)—pyrene, fluoranthene, chrysene, and benzo(*b*)fluoranthene—also were detected at one or more reference sites within the range observed at nonreference sites. Pentachlorophenol and phenol were also detected at reference site Ref-2, but at slightly lower concentrations than at nonreference sites. No PCBs were detected at any of the reference sites.

Semivolatile organic compounds, OCs, and PCBs in bed sediments were detected with greater frequency in upstream sampling locations when compared to downstream locations (fig. 4). The greatest number of detections for SVOCs, OCs, and PCBs was reported for bed sediment samples collected from sites 4 and 13 (fig. 4; table 6). Relatively high detections of organic contaminants also were reported for samples collected at sites 12, 39, and 48. The average number of SVOCs, OCs, and PCBs detected in bed sediment samples at nonreference and reference sites was 15, 1, and less than 1, respectively. Although SVOCs, OCs, and PCBs were detected at the majority of nonreference sites, concentrations at most sampling locations were at the minimum method reporting levels (table 6). The most frequently detected organic compounds in bed sediment were the PAHs pyrene and fluoranthene (detected at 28 of the 32 nonreference sites). Pyrene and fluoranthene concentrations ranged from the minimum reporting level to 4,590 micrograms per kilogram (µg/kg; site 39) and 6,040 µg/kg (site 39), respectively. Among the nonreference sites, median concentrations of pyrene and fluoranthene were below the minimum reporting level and estimated to be 23 and 28 µg/kg, respectively (table 6).

Other commonly detected PAHs included chrysene and phenanthrene, which were detected at 24 and 21 sites, respectively. Chrysene and phenanthrene concentrations ranged from the minimum reporting level to 18,500 µg/kg (site 12) and 1,970 µg/kg (site 39), respectively. Among the nonreference sites, median concentrations of chrysene and phenanthrene were below the minimum reporting level at concentrations estimated to be at 24 and 36 µg/kg, respectively (table 6). The PCB congener Aroclor™ 1260 was detected at estimated concentrations of 6.18 µg/kg and 3.49 µg/kg at sites 4 and 48, respectively; and congener Aroclor™ 1254 was detected at estimated concentrations of 3.70 µg/kg, 5.83 µg/kg, and 3.20 µg/kg at sites 31, 39, and 48, respectively (table 6). Twelve nonreference sites also had detectable concentrations of either DDT or at least one of its degradates, DDD and DDE (sites 1, 4, 9, 10, 13, 38, 41, 43, 48, 51, 53, and 54).

Compared to other sampling locations, bed sediments from site 12 contained the highest concentrations of chrysene (18,500 µg/kg) with elevated concentrations of phenanthrene (1,020 µg/kg; table 6). The greatest concentrations of pyrene (4,590 µg/kg), phenanthrene (1,970 µg/kg), fluoranthene (6,040 µg/kg), benzo[*a*]anthracene (1,810 µg/kg), and Aroclor™ 1254 (E5.83 µg/kg) were detected in bed sediments from site 39 (table 6). Elevated concentrations of SVOCs for other compounds also were detected in bed sediments collected at this site.

Concentrations of SVOCs, OCs, and PCBs in bed sediments exceeded PEL-HA28s for aquatic life established by the USEPA (1996) at more than 9 percent of nonreference sampling locations with exceedances measured at three sites (table 3). The greatest frequency of detections and exceedances for SVOCs, OCs, and PCBs was observed for fluoranthene when compared to other organic compounds (tables 3 and 6). Concentrations of fluoranthene were detected at 28 nonreference sites and exceeded USEPA (1996) guidelines for bed sediment (less than or equal to 320 µg/kg) for the amphipod *Hyalella azteca* at three sites (sites 12, 33, and 39; fig. 5).

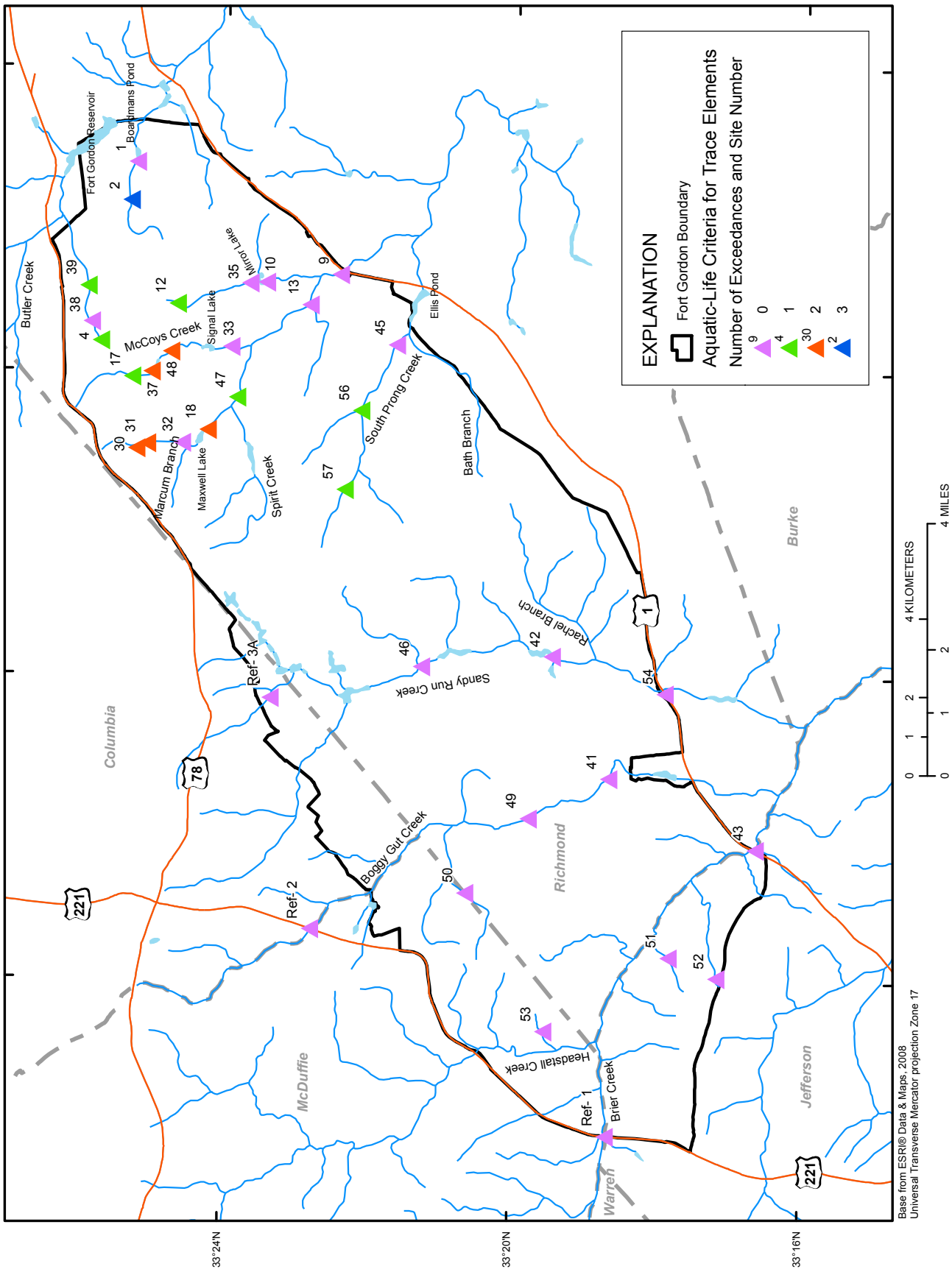

Figure 2. Relation among the number of bed sediment samples exceeding sediment-quality guidelines for selected major ions and trace elements in reference and nonreference bed sediment samples at Fort Gordon, GA, February–April 2010. Sites with the same colors have the same number of exceedances.

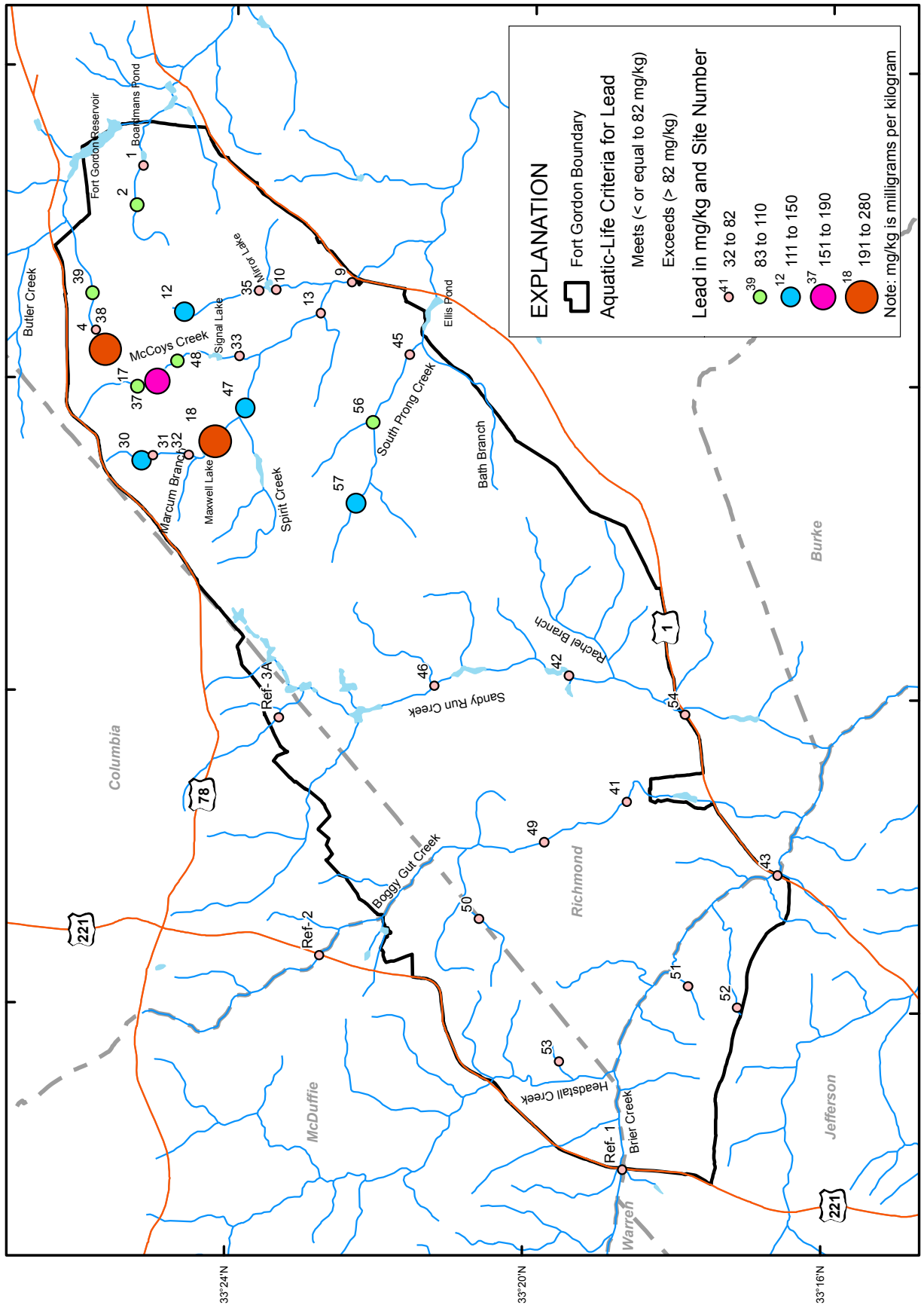

Figure 3. Relation of lead concentrations to aquatic life criteria at sampling locations at Fort Gordon, GA, February–April 2010. Sites with the same colors have the same ranges in lead concentrations.

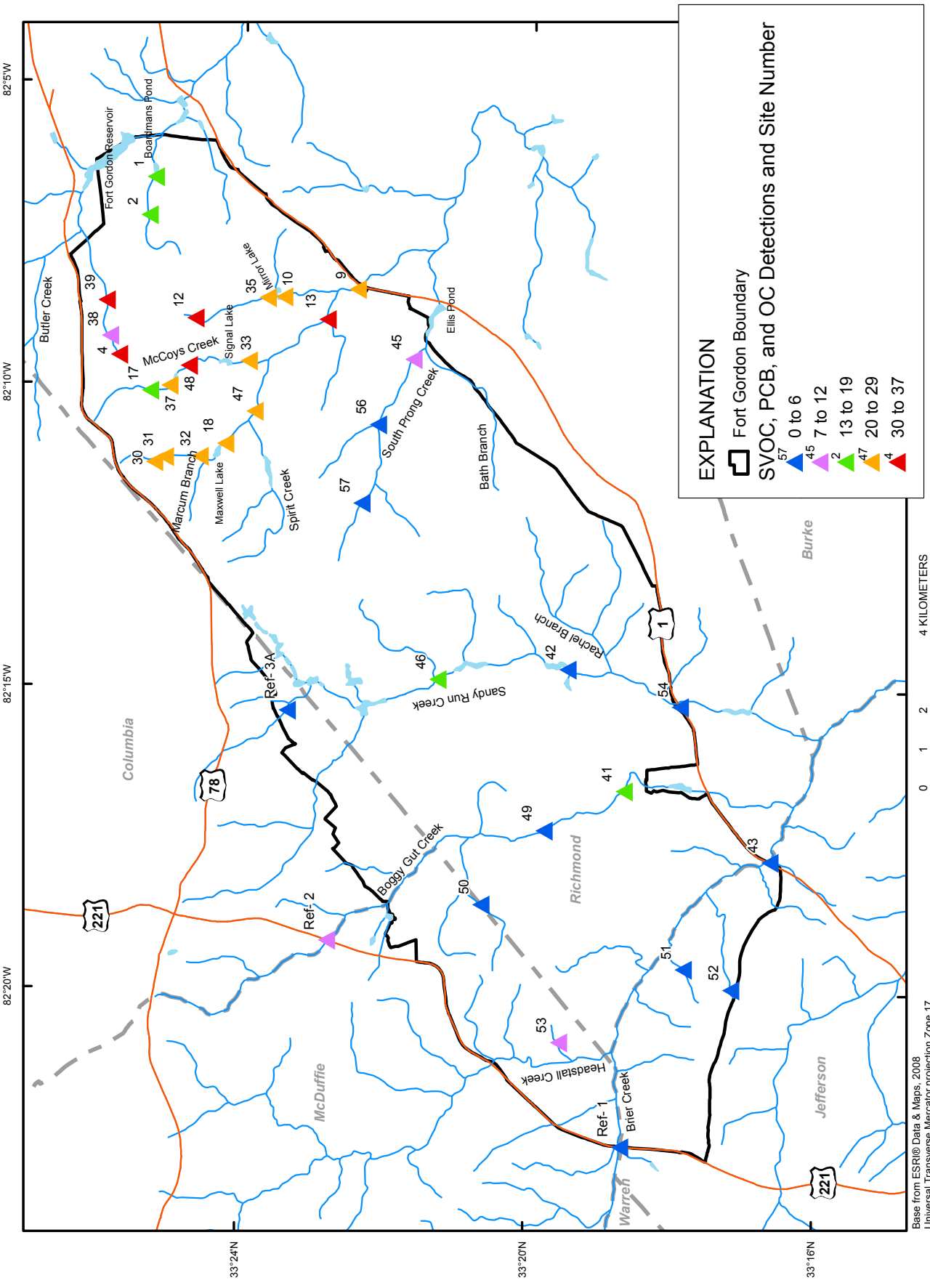

Figure 4. Relation between number of detections of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in nonreference and reference bed sediment samples at Fort Gordon, GA, February–April 2010. Sites with the same colors have the same ranges in the number of detections.

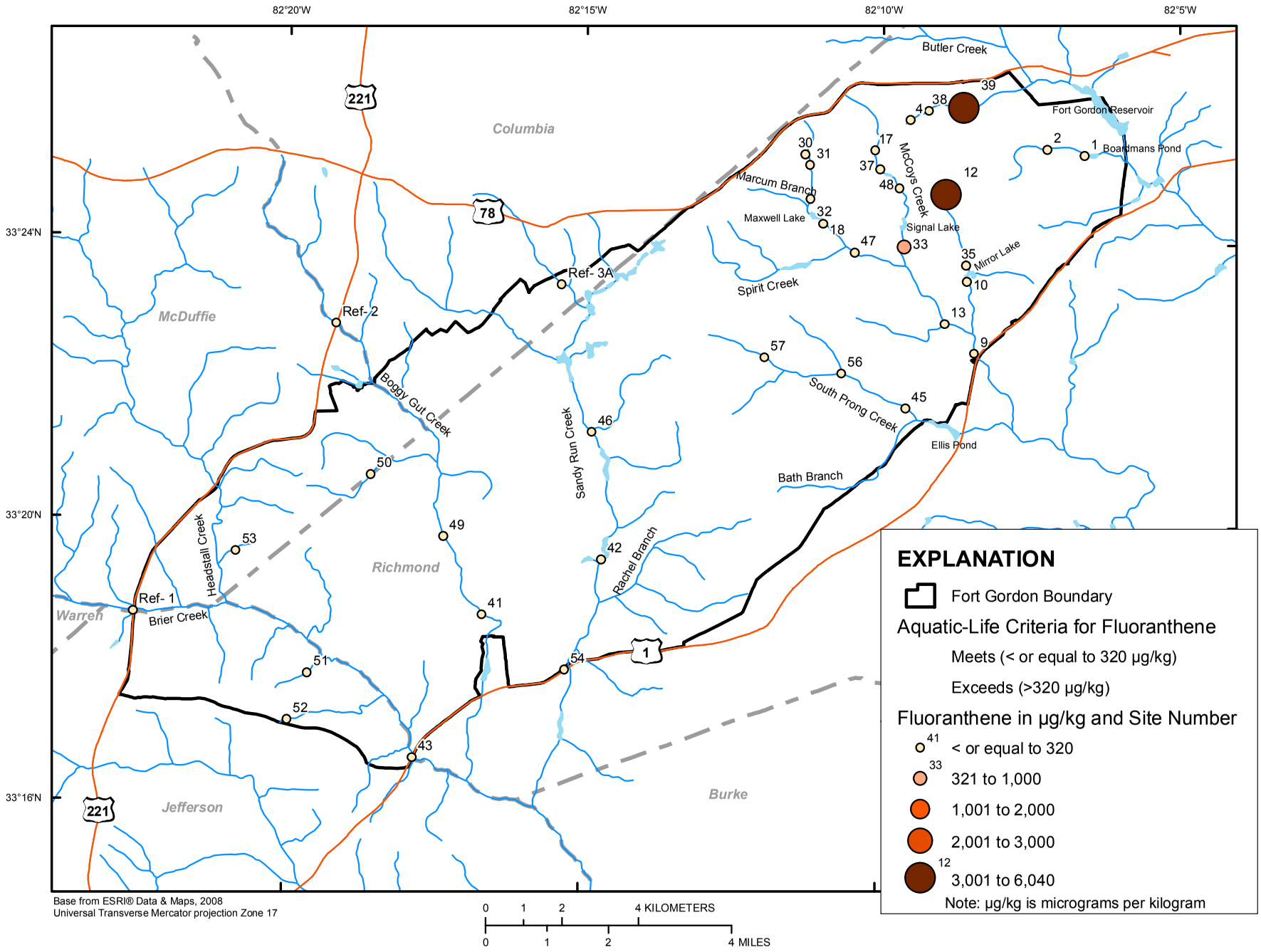

Figure 5. Relation of fluoranthene concentrations to aquatic life criteria at sampling locations at Fort Gordon, GA, February–April 2010. Sites with the same colors have the same ranges in fluoranthene concentrations.

Quality-Control Data for Bed Sediment Samples

Replicate bed sediment samples were collected at nonreference and reference sites to provide an evaluation of the variability in trace and major elements, SVOC, OC, and PCB concentrations associated with sample collection, processing, and analysis (tables 7 and 8). Bias results associated with sample processing and analyses were evaluated from the relative difference in concentrations between regular and replicate samples. Bed sediment samples were collected at three reference bed sediment sites to serve as a baseline for the sample analysis of trace and major elements, SVOC, OC, and PCB concentrations.

Major Ions, Trace Elements, and Total Organic Carbon Concentrations

The average relative differences of major ions, trace element, and total organic carbon concentrations in the regular and replicate samples for nonreference (sites 13 and 51) and reference sites (Ref-1) were 4 and 6 percent, ranging from 0.0 to 28.6 percent and 0.0 to 40 percent, respectively (table 7). Relative differences among concentrations of major ions, trace element, and total organic carbon in the regular and replicate sample for nonreference and reference sites were less than 20 percent at all sampling locations, except for mercury (28.6 percent) and cadmium (40 percent). The standard deviation of concentrations among all quality-control samples (nonreference and reference sites) was less than 10, except for phosphorus, manganese, and barium where greater variability was reported for regular and replicate samples. The low relative differences and overall low standard deviations indicate major ions, trace element, and total organic carbon concentrations in the fine-grained fraction of bed sediments at sampling sites have a low spatial variation and low bias from sample processing and analysis.

Semivolatile Organic Compounds, Organochlorine Pesticides, and Polychlorinated Biphenyl Concentrations

Concentrations of SVOCs, OCs, and PCBs in the quality-control samples were somewhat variable, but not atypical of quantitative analysis of organic contaminants in bed sediments (table 8). The average relative differences of SVOC, OC, and PCB concentrations in the regular and replicate samples for nonreference sites (sites 2 and 9) were 28 percent (table 8). Concentrations of most compounds in the quality-control samples from sampling sites were at the minimum method reporting level; therefore, few compounds were available to evaluate variability and bias from sampling, processing, and analysis. Variation in the method reporting levels could likely be attributed to the individual sample matrix that affects laboratory extraction efficiency of organic compounds from the sediment (Furlong and others, 1996). In replicate samples having reported quantitative or estimated compound concentrations in both samples, the relative differences range from 4.66 to 84.5 percent (table 8). The standard deviation of concentrations for all quality-control samples, however, was relatively low when compared to the range of observed concentrations among the sampling sites. Standard deviations of compound concentrations for regular and replicate samples were less than 10, except for p-Cresol, and bis (2-ethylhexyl) phthalate where greater variability was reported for quality-control samples.

Temporal Variation in Concentrations

Temporal trends were evaluated at 13 nonreference sites that had been sampled previously (McConnell and others, 2000) to provide an assessment of the variability in the number of detections and concentrations for trace and major elements, PAHs, and other SVOCs in bed sediment samples associated with potential sources, accumulation, and attenuation processes. The sampling locations were sites 1, 2, 4, 9, 10, 12, 13, 17, 18, 30, 33, 35, and 45 (table 9). On the basis of available data, temporal variation associated with sediment samples was assessed using percentage changes in the number of detections and in concentrations between previously sampled and current bed sediment constituents to provide an evaluation of the quality of streambed sediments in relation to guidelines for the protection of aquatic life (Persaud and others, 1993; U.S. Environmental Protection Agency, 1996; Canadian Council of Ministers of the Environment, 2001).

Table 9. Percentage change in the number of detections in bed sediment samples collected during May 1998 and February–April 2010 at Fort Gordon, GA.

[EST, Eastern Standard Time; %, percentage change by weight; ---, no data. Percentage changes were determined on the less than 63-micrometer fraction of bed sediment samples]

Site number (fig. 1)	Station number	Station name	Date	Time (EST)	Major ions and trace elements (%)	Semi-volatile organic componds (%)
1	02196843	Butler Creek tributary above Boardmans Pond at Fort Gordon, GA	3/17/10	1330	1.90	-60.9
2	02196842	Soil Erosion Lake at Fort Gordon, GA	3/16/10	1330	-3.76	-55.3
4	02196823	Butler Creek tributary (Beaver Pond) at Fort Gordon, GA	2/3/10	1130	-3.76	-34.9
9	021970190	Gordon Lake at Fort Gordon, GA	3/17/10	0830	-0.65	4.54
10	021970180	Mirror Lake at Fort Gordon, GA	3/17/10	1200	8.27	-47.5
12	021970168	Spirit Creek tributary near headwaters at Fort Gordon, GA	2/17/10	1400	-3.76	-31.3
13	021970165	Spirit Creek above Gordon Lake at Fort Gordon, GA	2/3/10	1600	-0.65	100
17	021970140	McCoy Creek above Signal Lake at Fort Gordon, GA	2/17/10	1415	-3.76	-68.0
18	021970136	Marcum Branch below Maxwell dam at Fort Gordon, GA	2/3/10	1400	-3.76	-19.7
30	021970130	North Fork Spirit Creek at Fort Gordon, GA	2/2/10	1500	1.90	-43.3
33	021970158	McCoy Creek below Signal Lake at Fort Gordon, GA	2/3/10	1220	-0.65	43.1
35	021970175	Spirit Creek tributary above Mirror Lake at Fort Gordon, GA	2/9/10	1230	8.27	-25.9
45	02197023	South Prong Creek above Ellis Pond at Fort Gordon, GA	2/10/10	0915	4.78	-8.33

Major Ions, Trace Elements, and Total Organic Carbon Concentrations

Overall, the percentage change in major ions, trace elements, and TOC detected from 1998 to 2010 was minimal at the 13 sites (table 9). Some exceptions were bed sediment samples collected from sites 10 and 35, for which percentage changes were greater than 8 percent (table 9). For the eight trace elements with established sediment-quality guidelines (table 2), percentage changes in constituent concentrations for bed sediments ranged from –81 to 141 with the greatest percentage change reported for copper at site 13 (table 10). Relatively high percentage changes in constituent concentrations were also observed for cadmium and arsenic at sites 2 and 45, respectively (table 10).

Concentrations of trace elements in bed sediments exceeded PEL-HA28s for aquatic life established by the USEPA (1996) at 46 percent and 69 percent of the current and previously sampled 13 sites, respectively, with the greatest number of exceedances for both sampling periods observed at site 2 (fig. 2; McConnell and others, 2000). Lead concentrations had the greatest frequency of exceedances when compared to other trace and major elements (tables 2 and 5). On the basis of aquatic life criteria, concentrations of lead exceeded USEPA (1996) guidelines for bed sediment (less than or equal to 82 mg/kg) for the amphipod *Hyalella azteca* in more than 45 percent of bed sediments with an average concentration of 133 mg/kg and 111 mg/kg at previously sampled and current locations, respectively (table 5; McConnell and others, 2000). The percentage change in lead concentrations ranged from –48 to 27 with the greatest percentage increase reported for sites 30 and 45 (fig. 6; table 10). Decreases in lead concentrations for bed sediments were reported at 10 of the 13 sites (sites 1, 2, 4, 9, 12, 13, 17, 18, 33, and 35) with the greatest percentage decrease reported for site 17 (table 10). On the basis of quality-control bed sediment data for nonreference sites (table 7), temporal changes in lead concentrations at sites 1 and 18 could be attributed to analytical and sampling variability (table 10). No temporal changes in lead concentrations were reported for bed sediments collected at site 10 (table 10).

Table 10. Percentage change in selected trace element concentrations in bed sediment samples collected during May 1998 and February–April 2010 at Fort Gordon, GA.

[EST, Eastern Standard Time; %, percentage change by weight; ---, no data; *, percentage change could be attributed to analytical and sampling variability. Percentage changes were determined on the less than 63-micrometer fraction of bed sediment samples]

Site number (fig. 1)	Station number	Station name	Date	Time (EST)	Copper (%)	Lead (%)	Zinc (%)	Cadmium (%)	Chromium (%)	Nickel (%)	Arsenic (%)	Mercury (%)
1	02196843	Butler Creek tributary above Boardmans Pond at Fort Gordon, GA	3/17/10	1330	40.9	*-7.41	41.7	75.0	26.6	15.0	13.2	0.00
2	02196842	Soil Erosion Lake at Fort Gordon, GA	3/16/10	1330	12.2	-10.0	36.8	100	-7.14	33.3	-26.5	-64.0
4	02196823	Butler Creek tributary (Beaver Pond) at Fort Gordon, GA	2/3/10	1130	-34.9	-22.6	-32.0	-79.0	9.09	*4.35	*-3.23	*-22.7
9	021970190	Gordon Lake at Fort Gordon, GA	3/17/10	0830	-34.3	-21.1	-40.7	-66.7	-6.00	-9.09	-9.38	-54.8
10	021970180	Mirror Lake at Fort Gordon, GA	3/17/10	1200	*4.35	0.00	-30.0	---	20.0	*-3.85	-18.5	-40.0
12	021970168	Spirit Creek tributary near headwaters at Fort Gordon, GA	2/17/10	1400	13.1	-29.4	21.6	-79.5	2.04	-15.2	*-2.65	-29.4
13	021970165	Spirit Creek above Gordon Lake at Fort Gordon, GA	2/3/10	1600	141	-18.3	36.4	-33.3	32.5	28.6	13.3	*-14.6
17	021970140	McCoy Creek above Signal Lake at Fort Gordon, GA	2/17/10	1415	-30.8	-48.4	-29.4	-50.0	30.4	*-4.17	49.6	-81.4
18	021970136	Marcum Branch below Maxwell dam at Fort Gordon, GA	2/3/10	1400	48.6	*-6.67	30.8	-37.5	20.0	0.00	*-1.79	-33.3
30	021970130	North Fork Spirit Creek at Fort Gordon, GA	2/2/10	1500	*2.50	27.3	-26.7	-56.3	47.4	0.00	40.5	*23.8
33	021970158	McCoy Creek below Signal Lake at Fort Gordon, GA	2/3/10	1220	-33.3	-23.0	-30.0	0.00	0.00	-14.3	9.33	*-27.3
35	021970175	Spirit Creek tributary above Mirror Lake at Fort Gordon, GA	2/9/10	1230	*-4.00	-33.0	18.2	---	*-1.00	-25.9	27.1	-68.8
45	02197023	South Prong Creek above Ellis Pond at Fort Gordon, GA	2/10/10	0915	*4.55	27.3	18.4	---	25.3	18.8	107.3	55.6

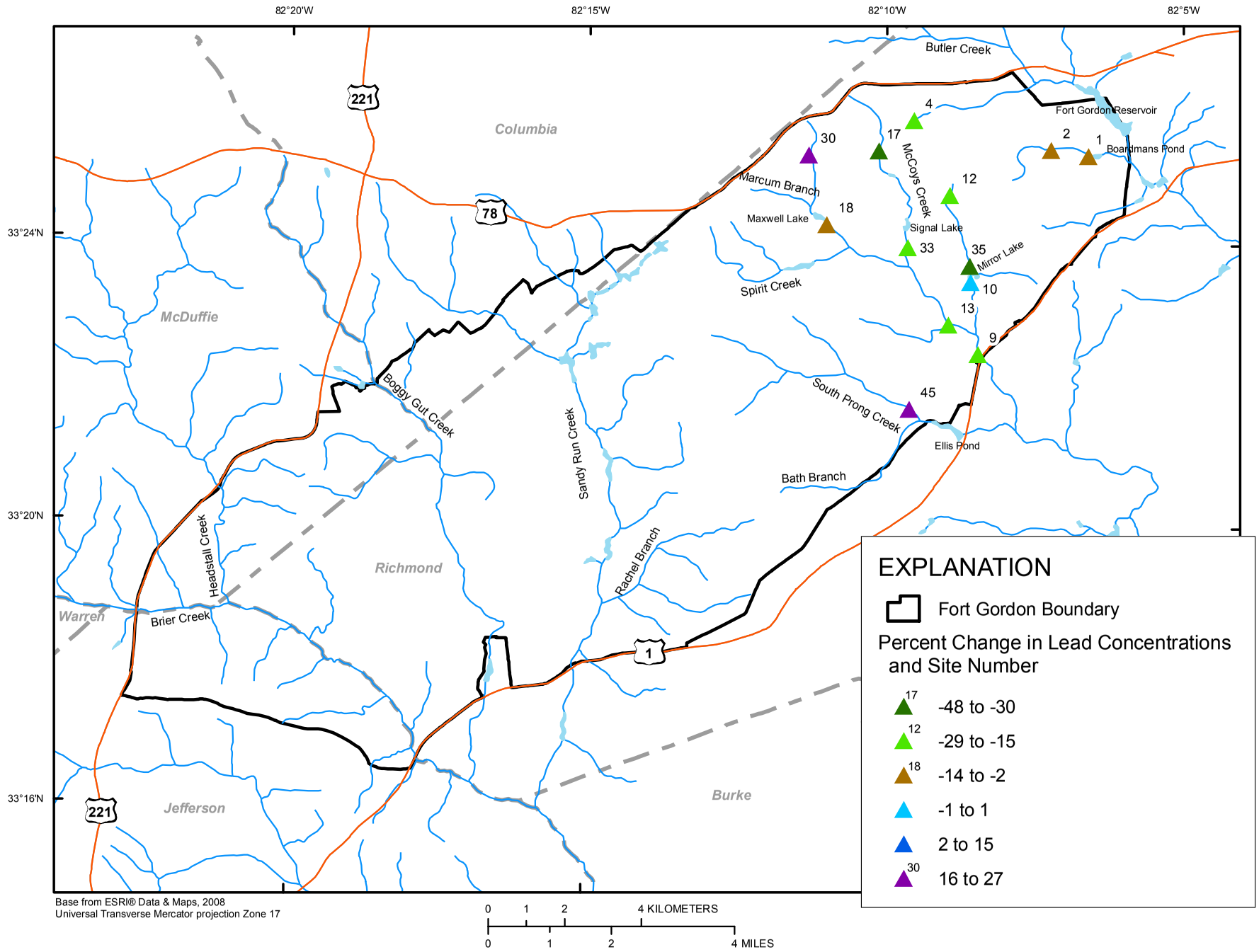

Figure 6. Percentage change in lead concentrations in bed sediment samples collected during May 1998 and February–April 2010 at Fort Gordon, GA. Sites with the same colors have the same ranges in percentage change in lead concentrations.

Semivolatile Organic Compound Concentrations

The average number of detections of PAHs and other SVOCs among previously sampled and current bed sediment constituents were 27 and 23, respectively (table 6; McConnell and others, 2000). Detection percentages of SVOCs in bed sediment samples from sites 4 and 12 were consistently higher (40 percent or greater) when compared to other sampling locations (table 6; McConnell and others, 2000). The percentage change of SVOCs detected in previously sampled and current bed sediments ranged from –68 to 100 with the greatest percentage increase reported for site 13 (fig. 7; table 9). Decreases in SVOC detections in bed sediments were reported at 10 of the 13 sites (sites 1, 2, 4, 10, 12, 17, 18, 30, 35, and 45) with an average percentage change of –40 among the sites (table 9). At sites 9, 13, and 33, increases in SVOC detections were reported for bed sediments, with percentage changes of 5, 100, and 43, respectively (table 9).

The most frequently detected organic compounds among bed sediment samples were pyrene, phenanthrene, and fluoranthene (detected at 45 percent or more sites; table 6; McConnell and others, 2000). The greatest concentrations reported for pyrene, phenanthrene, and fluoranthene at previously sampled bed sediment sites were 12,200 µg/kg, 7,340 µg/kg, and 17,100 µg/kg, respectively (McConnell and others, 2000). Elevated concentrations of pyrene, phenanthrene, and fluoranthene, which exceeded PEL-HA28s for aquatic life established by the USEPA (1996), were also reported at current bed sediment sites (table 6).

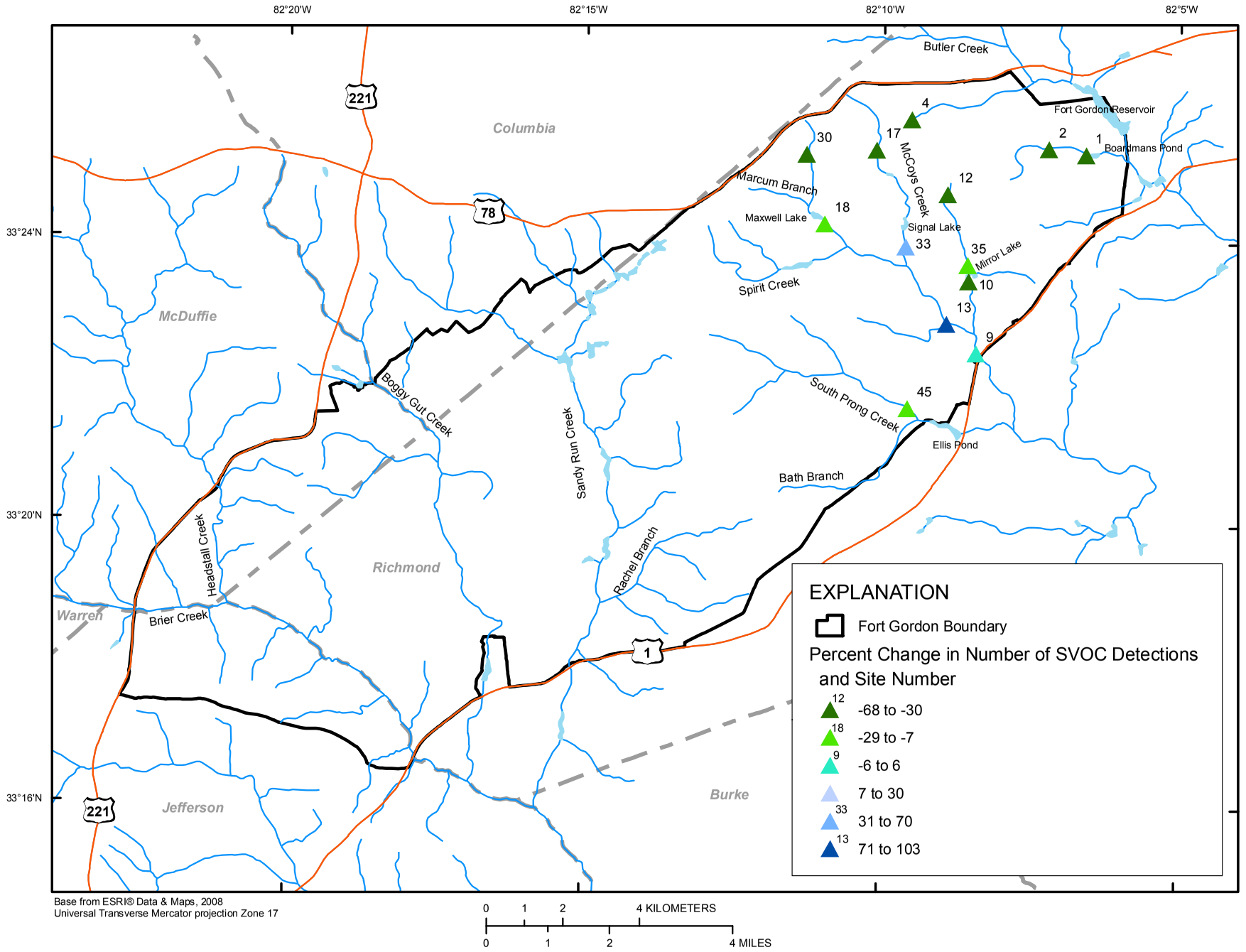

Figure 7. Percentage change in the number of detections for semivolatile organic compounds (SVOCs) in bed sediment samples during May 1998 and February–April 2010 at Fort Gordon, GA. Sites with the same colors have the same ranges in percentage change in the number of detections.

Summary

Analyses of bed sediment data collected during February–April 2010 at 35 sites (32 nonreference sites and 3 reference sites) at Fort Gordon, Georgia, were used to describe the occurrence and distribution of trace and major elements, semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediments of selected streams. The results presented in this report can be used to help evaluate the quality of streambed sediments in relation to guidelines for the protection of aquatic life and identify temporal trends in trace elements and SVOC concentrations at previously sampled sites.

Concentrations of 34 major ions, trace elements, and total organic carbon (TOC) were determined in the fine-grained fraction (<63 micrometers) of bed sediment samples collected from 32 nonreference and 3 reference sites at Fort Gordon. In this investigation, most of the bed sediment samples (97 percent) contained TOC concentrations greater than 2 percent by weight, which is consistent with previous studies. Major ion and trace element concentrations in fine-grained bed sediment samples at 15 of the 32 sites were two times the average concentrations in samples from the 3 reference sites at Fort Gordon. At sites 4 and 18, concentrations for several trace elements in bed sediments were greater than 500 percent of the average concentrations in samples from the reference sites. Bed sediment samples collected at site 37 contained mercury concentrations that exceeded the average concentrations in samples from the reference sites by a factor of nine. The percentage change in major ions, trace elements, and TOC detected at previously sampled and current bed sediment sites ranged from –4 to 8 with an average percentage change of less than 1 percent.

Trace and major element concentrations in bed sediment samples commonly exceeded sediment-quality guidelines for bed sediments. Eight trace elements have sediment-quality guidelines established: arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc. In this investigation, bed sediment concentrations of these trace elements were compared to established sediment-quality guidelines to identify sites that have a greater probability of affecting aquatic biota. No sites had arsenic concentrations in bed sediment that exceeded the probable effect levels for the amphipod *Hyalella azteca* of 48 milligrams per kilogram (mg/kg), but arsenic concentrations in bed sediment at sites 30 and 37 were at the probable effect level of 17 mg/kg. Most sites had cadmium concentrations in bed sediment that were an order of magnitude below the established probable effect levels. Chromium concentrations in bed sediment exceeded the probable effect level of 90 mg/kg at 21 of 35 sites (including 1 of the 3 reference sites). Additionally, 5 of the 21 sites exceeded the probable effect level for amphipod *Hyalella azteca* for chromium in bed sediments. At least one exceedance was observed for the probable effect levels for zinc, nickel, and copper concentrations in bed sediments.

Major ions and trace element concentrations in bed sediments exceeded probable effect levels for aquatic life (based on the amphipod *Hyalella azteca*) at 46 percent and 69 percent of the current and previously sampled locations, respectively, with the greatest frequency of exceedances reported for lead. On the basis of aquatic life criteria, concentrations of lead exceeded bed sediment guidelines (less than or equal to 82 mg/kg) for the amphipod *Hyalella azteca* in more than 45 percent of bed sediments with an average concentration of 133 mg/kg and 111 mg/kg at previously sampled and current locations, respectively.

Concentrations of 102 SVOCs, OCs, and PCBs were determined in bed sediment samples collected from 32 nonreference and 3 reference sites at Fort Gordon. Organic contaminant compounds were detected in bed sediment samples at 94 percent of the sites sampled. Nondetections of SVOCs, OCs, and PCBs were observed at reference site Ref-3A, while minimal concentrations of SVOCs and OCs were present at the other reference sites (Ref-1 and Ref- 2). DDT and its degradate DDE were detected in bed sediments at one reference site (Ref-2) at or above the levels seen at nonreference sites. The polycyclic aromatic hydrocarbons (PAHs)—pyrene, fluoranthene, chrysene, and benzo(*b*)fluoranthene—also were detected at one or more reference site within the range observed at nonreference sites. Pentachlorophenol and phenol were also detected at reference site Ref-2, but at slightly lower concentrations than at nonreference sites. No PCBs were detected at any of the reference sites.

Detections of SVOCs, OCs, and PCBs were reported with greater frequency in bed sediments at upstream sampling locations when compared to downstream locations. The greatest number of detections for SVOCs, OCs, and PCBs were reported for bed sediment samples collected from sites 4 and 13. Relatively high detections of organic contaminants also were reported for samples collected from sites 12, 39, and 48. The most frequently detected organic compounds in bed sediment were the PAHs pyrene and fluoranthene (detected at 28 out of the 32 nonreference sites). Other commonly detected PAHs included chrysene and phenanthrene, which were detected at 24 and 21 sites, respectively. The PCB congener Aroclor™ 1260 was detected at estimated concentrations of 6.18 µg/kg and 3.49 µg/kg at sites 4 and 48, respectively; and congener Aroclor™ 1254 was detected at estimated concentrations of 3.70 µg/kg, 5.83 µg/kg, and 3.20 µg/kg at sites 31, 39, and 48, respectively. Twelve nonreference sites also had detectable concentrations of either DDT or at least one of its degradates, DDD and DDE (sites 1, 4, 9, 10, 13, 38, 41, 43, 48, 51, 53, and 54). The average number of SVOCs, OCs, and PCBs detected in bed sediment samples at nonreference and reference sites was 15, 1, and less than 1, respectively. The percentage change of SVOCs detected at previously sampled and current bed sediment sites ranged from –68 to 100 with the greatest percentage increase reported for site 13.

Concentrations of SVOCs, OCs, and PCBs in bed sediments exceeded probable effect levels for aquatic life (based on the amphipod *Hyalella azteca*) established by the U.S. Environmental Protection Agency at more than 9 percent of nonreference sampling locations with exceedances measured at three sites (sites 12, 33, and 39). Organic contaminants exceeding aquatic life criteria included fluoranthene, phenanthrene, anthracene, benzo(*a*)anthracene, chrysene, benzo(*a*)pyrene, and pyrene. The most frequently detected organic compounds among bed sediment samples were pyrene, chrysene, and fluoranthene, which were detected at more than 45 percent of sites and reported at concentrations exceeding probable effect levels for the amphipod *Hyalella azteca*.

Overall, results of this investigation presented data on trace and major elements, SVOCs, OCs, and PCBs in bed sediments of selected streams collected at Fort Gordon, Georgia. Temporal evaluation of bed sediment constituents provided an assessment in number of detections and concentrations for bed sediment constituents associated with variation in potential sources, accumulation, and attenuation processes. Sediment-quality guidelines have helped to evaluate the potential adverse effects to aquatic life attributed to elevated trace elements, SVOC, OC, and PCB concentrations. Further investigation would be needed to determine the degree to which aquatic ecosystem health has been affected and to identify potential source areas of these contaminants so the appropriate corrective measures can be assessed.

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Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Station number	Station name	Date	Time (EST)	QA/QC surrogate values, as percent recovery (%)			
					2-Fluorobi-phenyl, surrogate, bs<2 mm	alpha-HCH-d6, surrogate, bs	Isodrin, surrogate, bs	Nitrobenzene-d5, surrogate, bs<2 mm
1	02196843	Butler Creek tributary above Boardmans Pond at Fort Gordon, GA	3/17/10	1330	62.0	71.3	70.7	54.0
2	02196842	Soil Erosion Lake at Fort Gordon, GA	3/16/10	1330	40.9	89.9	72.3	32.3
4	02196823	Butler Creek tributary (Beaver Pond) at Fort Gordon, GA	2/3/10	1130	95.9	60.8	72.8	72.3
9	021970190	Gordon Lake at Fort Gordon, GA	3/17/10	0830	73.2	73.2	59.5	60.2
10	021970180	Mirror Lake at Fort Gordon, GA	3/17/10	1200	53.0	73.0	66.8	46.8
12	021970168	Spirit Creek tributary near headwaters at Fort Gordon, GA	2/17/10	1400	68.3	72.5	71.4	58.8
13	021970165	Spirit Creek above Gordon Lake at Fort Gordon, GA	2/3/10	1600	117	59.7	70.2	91.7
17	021970140	McCoy Creek above Signal Lake at Fort Gordon, GA	2/17/10	1415	34.0	84.8	65.1	25.3
18	021970136	Marcum Branch below Maxwell dam at Fort Gordon, GA	2/3/10	1400	98.1	64.1	69.4	76.6
30	021970130	North Fork Spirit Creek at Fort Gordon, GA	2/2/10	1500	61.7	17.7	71.9	44.5
31	332505082111300	BS-31 Fort Gordon, GA	2/2/10	1330	32.0	62.0	80.0	29.9
32	332436082111200	BS-32 Fort Gordon, GA	2/9/10	1415	24.3	81.5	72.3	17.3
33	021970158	McCoy Creek below Signal Lake at Fort Gordon, GA	2/3/10	1220	74.7	65.2	73.8	49.5
35	21970175	Spirit Creek tributary above Mirror Lake at Fort Gordon, GA	2/9/10	1230	58.0	77.2	77.8	54.2
37	332502082100200	BS-37 Fort Gordon, GA	2/9/10	1045	63.8	70.3	73.6	61.1
38	332552082091300	BS-38 Fort Gordon, GA	2/3/10	0930	101	60.5	74.9	78.5
39	02196825	Butler Creek tributary at Willard Trail at Fort Gordon, GA	2/3/10	1005	79.5	60.0	65.4	59.6
41	331840082164000	BS-41 Fort Gordon, GA	2/18/10	1245	63.9	117	71.3	54.7
42	331928082144000	BS-42 Fort Gordon, GA	2/10/10	1030	67.2	83.4	86.9	67.9
43	02197557	Brier Creek at U.S. Route 1 near Wrens, GA	3/16/10	1030	59.1	103	61.4	45.3
45	02197023	South Prong Creek above Ellis Pond at Fort Gordon, GA	2/10/10	0915	65.0	78.7	76.7	61.9
46	332116082145100	BS-46 Fort Gordon, GA	2/4/10	0925	72.1	59.8	73.4	53.2
47	332351082102700	BS-47 Fort Gordon, GA	2/3/10	1430	72.4	58.5	63.1	58.6
48	332446082094200	BS-48 Fort Gordon, GA	2/17/10	1115	62.9	113	72.4	60.6
49	331946082172000	BS-49 Fort Gordon, GA	2/18/10	1215	32.0	82.9	79.2	26.4
50	332038082183400	BS-50 Fort Gordon, GA	2/18/10	1000	23.0	83.2	87.1	16.1
51	331749082193600	BS-51 Fort Gordon, GA	2/18/10	1500	50.2	100	70.9	34.8
52	331709082195600	BS-52 Fort Gordon, GA	2/10/10	1500	72.9	81.0	94.2	72.8
53	331932082205000	BS-53 Fort Gordon, GA	2/18/10	1100	58.3	107	94.5	54.0
54	331754082151600	Sandy Run Creek at South Post Border, Fort Gordon, GA	4/13/10	1200	56.3	75.1	63.2	44.4
56	332208082103900	South Prong Creek below Range 14, Fort Gordon, GA	4/14/10	1200	59.2	74.7	60.1	51.9
57	332221082115700	Unnamed Creek East of Range 8, Fort Gordon, GA	4/14/10	0900	55.8	67.3	47.9	49.6
Ref- 1	02197554	Brier Creek at U.S. Route 221 near Wrens, GA	2/11/10	0900	68.5	76.4	76.9	67.2
Ref- 2	02197558	Boggy Gut Creek at U.S. Route 221 near Harlem, GA	2/11/10	1200	56.6	54.6	65.6	52.8
Ref- 3A	332321082152300	Ref-3A Fort Gordon, GA	2/4/10	0930	---	64.5	77.0	---

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	QA/QC surrogate values, as percent recovery (%)		Semivolatile organic compounds (micrograms per kilograms)								
		Nonachlorobiphenyl, surrogate, bs	p-Terphenyl-d14, surrogate, bs<2mm	1,4-Dichlorobenzene, bs< 2mm	2,4,6-Trichlorophenol, bs< 2 mm	2,4-Dichlorophenol, bs<2mm	2-Methyl-4,6-dinitrophenol, bs<2mm	4-Chloro-3-methylphenol, bs<2mm	C8-Alkylphenol, bs<2mm	Pentachlorophenol, bs<2mm	2,4,6-Trimethylphenol, bs<2mm	2,4-Dinitrophenol, bs<2mm
1	3/17/10	99.4	92.2	<170	<170	<170	---	<170	<170	<170	<170	---
2	3/16/10	99.3	74.5	---	<60.0	<60.0	---	<60.0	<60.0	<60.0	---	---
4	2/3/10	84.1	---	<50.0	<50.0	<50.0	---	<50.0	<50.0	<80.0	<50.0	---
9	3/17/10	107	106	<150	<150	<150	---	<150	<150	<150	<150	---
10	3/17/10	98.9	94.5	<75.0	<75.0	<75.0	---	<75.0	<75.0	<75.0	<75.0	---
12	2/17/10	68.8	89.9	<50.0	<50.0	<50.0	---	<50.0	<50.0	---	<50.0	---
13	2/3/10	77.8	---	<60.0	<60.0	<60.0	---	<60.0	E14.8	<100	<60.0	---
17	2/17/10	113	81.0	---	<50.0	<50.0	---	<50.0	<50.0	E39.7	---	---
18	2/3/10	82.4	---	<60.0	<60.0	<60.0	---	<60.0	<60.0	<80.0	<60.0	---
30	2/2/10	78.6	---	<50.0	<50.0	<50.0	---	<50.0	<50.0	<50.0	<50.0	---
31	2/2/10	72.8	39.0	<50.0	<50.0	<50.0	---	<50.0	<50.0	<50.0	<50.0	---
32	2/9/10	108	82.7	---	<50.0	<50.0	---	<50.0	<50.0	<50.0	---	---
33	2/3/10	79.7	---	<50.0	<50.0	<50.0	---	<50.0	<50.0	<50.0	<50.0	---
35	2/9/10	71.8	84.6	<50.0	<50.0	<50.0	---	<50.0	<50.0	---	<50.0	---
37	2/9/10	68.2	84.2	<50.0	<50.0	<50.0	---	<50.0	<50.0	---	<50.0	---
38	2/3/10	87.6	---	<55.0	<55.0	<55.0	---	<55.0	<55.0	<100	<55.0	---
39	2/3/10	68.9	---	<55.0	<55.0	<55.0	---	<55.0	<55.0	E116	<55.0	---
41	2/18/10	131	77.9	---	<145	<145	---	<145	<145	E63.0	---	---
42	2/10/10	77.3	83.2	<50.0	<50.0	<50.0	---	<50.0	<50.0	---	<50.0	---
43	3/16/10	108	79.8	---	<85.0	<85.0	---	<85.0	<85.0	<85.0	---	---
45	2/10/10	69.4	83.9	<50.0	<50.0	<50.0	---	<50.0	<50.0	---	<50.0	---
46	2/4/10	80.8	---	<55.0	<55.0	<55.0	---	<55.0	<55.0	<55.0	<55.0	---
47	2/3/10	66.1	---	<55.0	<55.0	<55.0	---	<55.0	<55.0	<55.0	<55.0	---
48	2/17/10	111	85.2	---	<75.0	<75.0	---	<75.0	<75.0	E101	---	---
49	2/18/10	131	81.7	---	<55.0	<55.0	---	<55.0	<55.0	<55.0	---	---
50	2/18/10	127	80.6	---	<50.0	<50.0	---	<50.0	<50.0	<50.0	---	---
51	2/18/10	117	75.9	---	<90.0	<90.0	---	<90.0	<90.0	<90.0	---	---
52	2/10/10	89.4	90.0	<50.0	<50.0	<50.0	---	<50.0	<50.0	---	<50.0	---
53	2/18/10	129	75.0	---	<125	<125	---	<125	<125	<125	---	---
54	4/13/10	108	101	<90.3	<90.3	<90.3	---	<90.3	<90.3	<90.3	<90.3	---
56	4/14/10	88.4	116	<100	<100	<100	---	<100	<100	<100	<100	---
57	4/14/10	83.3	79.3	<175	<175	<175	---	<175	<175	<175	<175	---
Ref- 1	2/11/10	72.5	90.5	<55.0	<55.0	<55.0	---	<55.0	<55.0	---	<55.0	---
Ref- 2	2/11/10	62.1	71.3	<90.0	<90.0	<90.0	---	<90.0	<90.0	E16.5	<90.0	---
Ref- 3A	2/4/10	93.2	---	---	---	---	---	---	---	---	---	---

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)										
		2-Nitrophenol, bs<2mm	3,5-Dimethylphenol, bs<2mm	3-Nitrophenol, bs<2mm	2-Chlorophenol, bs<2mm	Phenol, bs<2mm	Azobenzene, bs<2mm	Carbazole, bs<2mm	Hexachlorobenzene, bs<2mm	Hexachlorobenzene, bs	p-Cresol, bs<2mm	Pentachloroanisole, bs<2mm
1	3/17/10	<170	<170	---	<170	<170	<170	E26.3	<170	<9.00	998	<170
2	3/16/10	<60.0	<60.0	---	<60.0	<60.0	<60.0	E2.62	<60.0	<3.00	<60.0	<60.0
4	2/3/10	<50.0	<50.0	<50.0	<50.0	E6.66	<50.0	E19.4	<50.0	<3.00	<50.0	<50.0
9	3/17/10	<150	<150	---	<150	E65.7	<150	<150	<150	<9.00	2,680	<150
10	3/17/10	<75.0	<750	---	<75.0	<75.0	<75.0	E11.2	<75.0	<3.00	E35.0	<75.0
12	2/17/10	---	<50.0	---	<50.0	E6.93	<50.0	352	<50.0	<3.00	E14.4	<50.0
13	2/3/10	<60.0	<60.0	<60.0	<60.0	E39.3	<60.0	E33.5	<60.0	<3.00	72.9	<60.0
17	2/17/10	<50.0	<50.0	---	<50.0	<50.0	<50.0	<50.0	<50.0	<3.00	E0.86	<50.0
18	2/3/10	<60.0	<60.0	<60.0	<60.0	E8.75	<60.0	E8.31	<60.0	<3.00	E10.6	<60.0
30	2/2/10	<50.0	<50.0	<50.0	<50.0	E4.61	<50.0	E2.88	<50.0	<3.00	<50.0	<50.0
31	2/2/10	<50.0	<50.0		<50.0	<50.0	<50.0	E2.73	<50.0	<3.00	<50.0	<50.0
32	2/9/10	<50.0	<50.0	---	<50.0	<50.0	<50.0	E1.86	<50.0	<3.00	<50.0	<50.0
33	2/3/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	E34.0	<50.0	<3.00	<50.0	<50.0
35	2/9/10	---	<50.0	---	<50.0	<50.0	<50.0	E5.31	<50.0	<3.00	<50.0	<50.0
37	2/9/10	---	<50.0	---	<50.0	E3.03	<50.0	E7.93	<50.0	<3.00	<50.0	<50.0
38	2/3/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<3.00	<55.0	<55.0
39	2/3/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	547	<55.0	<3.00	<55.0	<55.0
41	2/18/10	<145	<145	---	<145	<145	<145	E15.9	<145	<9.00	E34.8	<145
42	2/10/10	---	<50.0	---	<50.0	E3.23	<50.0	<50.0	<50.0	<3.00	<50.0	<50.0
43	3/16/10	<85.0	<85.0	---	<85.0	E21.9	<85.0	<85.0	<85.0	<3.00	E31.9	<85.0
45	2/10/10	---	<50.0	---	<50.0	<50.0	<50.0	<50.0	<50.0	<3.00	<50.0	<50.0
46	2/4/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	E2.51	<55.0	<3.00	<55.0	<55.0
47	2/3/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	E2.61	<55.0	<3.00	<55.0	<55.0
48	2/17/10	<75.0	<75.0	---	<75.0	E28.5	<75.0	E22.4	<75.0	<3.00	E66.3	<75.0
49	2/18/10	<55.0	<55.0	---	<55.0	<55.0	<55.0	<55.0	<55.0	<3.00	E0.94	<55.0
50	2/18/10	<50.0	<50.0	---	<50.0	<50.0	<50.0	<50.0	<50.0	<3.00	<50.0	<50.0
51	2/18/10	<90.0	<90.0	---	<90.0	<90.0	<90.0	<90.0	<90.0	<3.00	E6.05	<90.0
52	2/10/10	---	<50.0	---	<50.0	<50.0	<50.0	<50.0	<50.0	<3.00	<50.0	<50.0
53	2/18/10	<125	<125	---	<125	<125	<125	<125	<125	<7.50	E20.9	<125
54	4/13/10	<90.3	<90.3	---	<90.3	<90.3	<90.3	E9.66	<90.3	<3.00	337	<90.3
56	4/14/10	<100	<100	---	<100	<100	<100	<100	<100	<6.00	E94.4	<100
57	4/14/10	<175	<175	---	<175	<175	<175	<175	<175	<10.5	1,060	<175
Ref- 1	2/11/10	---	<55.0	---	<55.0	<55.0	<55.0	<55.0	<55.0	<3.00	<55.0	<55.0
Ref- 2	2/11/10	---	<90.0	---	<90.0	E17.0	<90.0	<90.0	<90.0	<3.00	<90.0	<90.0
Ref- 3A	2/4/10	---	---	---	---	---	---	---	---	<15.0	---	---

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)										
		Pentachloronitrobenzene, bs<2mm	1,2,4-Trichlorobenzene, bs<2mm	1,2-Dichlorobenzene, bs<2mm	1,2-Dimethylnaphthalene, bs<2mm	1,3-Dichlorobenzene, bs<2mm	1,6-Dimethylnaphthalene, bs<2mm	1-Methyl-9H-fluorene, bs<2mm	1-Methylphenanthrene, bs<2mm	1-Methylpyrene, bs<2mm	2,2′-Biquinoline, bs<2mm	2,3,6-Trimethylnaphthalene, bs<2mm
1	3/17/10	<170	<170	<170	<170	<170	E22.3	<170	<170	<170	<170	<170
2	3/16/10	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	E1.14	<60.0	<60.0	<60.0
4	2/3/10	<50.0	<50.0	<50.0	E3.38	<50.0	E8.85	E3.39	E11.4	E10.1	<50.0	E5.01
9	3/17/10	<150	<150	<150	<150	<150	E23.5	<150	<150	<150	<150	<150
10	3/17/10	<75.0	<75.0	<75.0	<75.0	<75.0	E5.52	<75.0	E13.8	<75.0	<75.0	<75.0
12	2/17/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	E4.88	87.3	88.7	<50.0	E1.98
13	2/3/10	<60.0	<60.0	<60.0	<60.0	<60.0	E9.85	<60.0	<60.0	E14.2	<60.0	<60.0
17	2/17/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	E0.65	<50.0	E11.7	<50.0
18	2/3/10	<60.0	<60.0	<60.0	E7.61	<60.0	E19.9	E5.98	<60.0	E9.04	<60.0	E11.7
30	2/2/10	<50.0	<50.0	<50.0	E5.81	<50.0	E17.8	E4.08	E13.0	E7.29	<50.0	E8.82
31	2/2/10	<50.0	<50.0	<50.0	E1.89	<50.0	E5.67	<50.0	E3.86	E2.37	<50.0	E2.54
32	2/9/10	<50.0	<50.0	<50.0	<50.0	<50.0	E0.68	<50.0	E1.43	<50.0	E21.9	<50.0
33	2/3/10	<50.0	<50.0	<50.0	<50.0	<50.0	E2.30	<50.0	E10.0	E13.0	<50.0	<50.0
35	2/9/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	E1.88	E1.77	<50.0	E0.91
37	2/9/10	<50.0	<50.0	<50.0	<50.0	<50.0	E1.83	<50.0	E2.71	E2.87	<50.0	E1.06
38	2/3/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0
39	2/3/10	<55.0	<55.0	<55.0	<55.0	<55.0	E2.98	E12.4	152	167	<55.0	E3.74
41	2/18/10	<145	<145	<145	<145	<145	<145	<145	<145	<145	<145	<145
42	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
43	3/16/10	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0
45	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
46	2/4/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0
47	2/3/10	<55.0	<55.0	<55.0	E0.87	<55.0	E3.27	E1.24	E3.36	E2.90	<55.0	E1.60
48	2/17/10	<75.0	<75.0	<75.0	<75.0	<75.0	E4.99	<75.0	<75.0	E11.4	<75.0	<75.0
49	2/18/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0
50	2/18/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
51	2/18/10	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0
52	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
53	2/18/10	<125	<125	<125	<125	<125	<125	<125	<125	<125	<125	<125
54	4/13/10	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3
56	4/14/10	<100	<100	<100	<100	<100	E13.1	<100	<100	<100	<100	<100
57	4/14/10	<175	<175	<175	<175	<175	E18.1	<175	<175	<175	<175	<175
Ref- 1	2/11/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0
Ref- 2	2/11/10	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0
Ref- 3A	2/4/10	---	---	---	---	---	---	---	---	---	---	---

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)										
		2,4-Dinitrotoluene, bs<2mm	2,6-Dimethylnaphthalene, bs<2mm	2,6-Dinitrotoluene, bs<2mm	2-Chloronaphthalene, bs<2mm	2-Ethylnaphthalene, bs<2mm	2-Methylanthracene, bs<2mm	4-Bromophenyl phenyl ether, bs<2mm	4-Chlorophenyl phenyl ether, bs<2mm	4H-Cyclopenta[def]phenanthrene, bs<2mm	9,10-Anthraquinone, bs<2mm	9H-Fluorene, bs<2mm
1	3/17/10	<170	<170	<220	<170	<170	<170	<170	<170	<170	E101	<170
2	3/16/10	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	E1.62	E10.4	<60.0
4	2/3/10	<50.0	E8.44	<50.0	<50.0	E4.22	E6.10	<50.0	<50.0	E10.5	66.2	E6.92
9	3/17/10	<150	E131	<150	<150	<150	<150	<150	<150	<150	<150	<150
10	3/17/10	<75.0	E5.81	<75.0	<75.0	<75.0	<75.0	<75.0	<75.0	E6.22	E43.1	<75.0
12	2/17/10	<50.0	E1.74	<50.0	<50.0	<50.0	E20.8	<50.0	<50.0	160	804	E28.5
13	2/3/10	<60.0	E10.4	<60.0	<60.0	E4.54	<60.0	<60.0	<60.0	E16.2	127	E6.82
17	2/17/10	<50.0	E0.92	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
18	2/3/10	<60.0	E20.8	<60.0	<60.0	E8.77	<60.0	<60.0	<60.0	<60.0	<60.0	E4.98
30	2/2/10	<50.0	E13.4	<50.0	<50.0	E6.28	E3.29	<50.0	<50.0	<50.0	<50.0	<50.0
31	2/2/10	<50.0	E4.76	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	E1.70	<50.0	<50.0
32	2/9/10	<50.0	E0.59	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	E1.60	E6.39	E0.87
33	2/3/10	<50.0	E2.30	<50.0	<50.0	E1.10	E5.40	<50.0	<50.0	E19.0	96.0	E6.40
35	2/9/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	E3.65	E15.5	E1.49
37	2/9/10	<50.0	E1.68	<50.0	<50.0	E1.00	<50.0	<50.0	<50.0	E4.63	E17.4	E1.34
38	2/3/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0
39	2/3/10	<55.0	E3.48	<55.0	<55.0	<55.0	E34.1	<55.0	<55.0	273	1,240	E72.7
41	2/18/10	<145	<145	<145	<145	<145	<145	<145	<145	<145	<145	<145
42	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
43	3/16/10	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0
45	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
46	2/4/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	E2.41	E9.45	E2.40
47	2/3/10	<55.0	E3.03	<55.0	<55.0	E1.33	E2.60	<55.0	<55.0	E6.13	E15.5	E8.57
48	2/17/10	<75.0	E13.0	<75.0	<75.0	<75.0	<75.0	<75.0	<75.0	<75.0	90.6	<75.0
49	2/18/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0
50	2/18/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
51	2/18/10	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0
52	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
53	2/18/10	<125	<125	<125	<125	<125	<125	<125	<125	<125	<125	<125
54	4/13/10	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3
56	4/14/10	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
57	4/14/10	<175	E37.0	<175	<175	<175	<175	<175	<175	<175	<175	<175
Ref- 1	2/11/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0
Ref- 2	2/11/10	<90.0	<90.0	<265	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0
Ref- 3A	2/4/10	---	---	---	---	---	---	---	---	---	---	---

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)										
		Acenaphthene, bs<2mm	Acenaphthylene, bs<2mm	Acridine, bs<2mm	Anthracene, bs<2mm	Benzo[a]anthracene, bs<2mm	Benzo[a]pyrene, bs<2mm	Benzo[b]fluoranthene, bs<2mm	Benzo[c]cinnoline, bs<2mm	Benzo[ghi]perylene, bs<2mm	Benzo[k]fluoranthene, bs<2mm	Bis(2-chloroethoxy)methane, bs<2mm
1	3/17/10	<170	<170	E46.4	E18.5	<170	E82.2	E157	<170	<170	<170	<170
2	3/16/10	<60.0	<60.0	<60.0	E1.16	E5.61	E8.38	E13.7	<60.0	E32.0	E7.17	<60.0
4	2/3/10	E4.47	E3.86	E15.9	E13.0	E40.3	66.1	119	<50.0	E22.4	E42.2	<50.0
9	3/17/10	<150	E14.2	E92.1	E25.2	E43.2	E60.2	<120	<150	<150	E48.5	<150
10	3/17/10	<75.0	E4.57	<75.0	E6.79	E21.0	E35.5	E63.5	<75.0	E33.8	E24.9	<75.0
12	2/17/10	E15.3	E9.57	263	120	1,100	1,170	2,230	<50.0	E508	E1,200	<50.0
13	2/3/10	E3.06	E7.46	E28.9	E19.4	82.0	133	251	<60.0	E41.0	93.5	<60.0
17	2/17/10	<50.0	<50.0	<50.0	E1.02	<50.0	E3.16	E3.90	<50.0	<50.0	E1.86	<50.0
18	2/3/10	E1.62	E4.31	<60.0	E6.72	E15.2	E23.0	E45.4	<60.0	E8.60	E16.4	<60.0
30	2/2/10	<50.0	E3.60	<50.0	E3.75	E12.8	E14.4	E36.0	<50.0	E4.61	E15.2	<50.0
31	2/2/10	<50.0	<50.0	<50.0	E2.23	E10.7	E10.1	E13.4	<50.0	E9.31	E4.46	<50.0
32	2/9/10	E0.55	<50.0	E1.62	E1.53	E8.46	E8.77	E9.70	<50.0	E19.2	E5.02	<50.0
33	2/3/10	E3.60	E3.00	E30.0	E17.0	130	170	270	<50.0	E130	100	<50.0
35	2/9/10	E0.96	E0.68	E4.97	E3.30	E20.2	E26.5	E54.0	<50.0	E16.2	E22.0	<50.0
37	2/9/10	E0.66	E0.70	E8.15	E2.97	E35.4	E43.7	72.4	<50.0	E27.8	E28.3	<50.0
38	2/3/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	E7.62	<55.0	<55.0	<55.0	<55.0
39	2/3/10	E46.7	E25.0	454	183	1,810	2,190	4,630	<55.0	E1,020	1,470	<55.0
41	2/18/10	<145	<145	E18.9	E4.26	E14.8	<145	E22.4	<145	<145	<145	<145
42	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
43	3/16/10	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0	<85.0
45	2/10/10	<50.0	E2.87	<50.0	E1.56	<50.0	E3.72	E4.77	<50.0	E2.27	E1.72	<50.0
46	2/4/10	E1.22	E1.49	<55.0	E4.22	<55.0	E8.93	E9.88	<55.0	<55.0	E4.95	<55.0
47	2/3/10	E4.69	E2.37	<55.0	E7.38	<55.0	E11.3	E21.7	<55.0	E3.39	E9.59	<55.0
48	2/17/10	<75.0	E23.2	<75.0	E21.9	E75.0	97.3	176	<75.0	E158	76.2	<75.0
49	2/18/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0
50	2/18/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
51	2/18/10	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0
52	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
53	2/18/10	<125	<125	<125	<125	E7.19	<125	<125	<125	<125	<125	<125
54	4/13/10	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3	<90.3
56	4/14/10	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
57	4/14/10	<175	<175	<175	<175	<175	<175	<175	<175	<175	<175	<175
Ref- 1	2/11/10	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0	E2.40	<55.0	<55.0	<55.0	<55.0
Ref- 2	2/11/10	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0	<90.0
Ref- 3A	2/4/10	---	---	---	---	---	---	---	---	---	---	---

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)										
		Chrysene, bs<2mm	Dibenzo[a,h] anthracene, bs<2mm	Diben-zothio-phene, bs<2mm	Fluoran-thene, bs<2mm	Hexa-chlorobu-tadiene, bs<2mm	Hexachlo-rocyclo-pentadiene, bs<2mm	Hexachlo-roethane, bs<2mm	Indeno[1,2,3-cd]pyrene, bs<2mm	Isophorone, bs<2mm	Isoquinoline, bs<2mm	Naphthalene, bs<2mm
1	3/17/10	E96.8	<170	<170	187	<170	---	---	<170	<170	<170	<170
2	3/16/10	E9.37	<60	<60.0	E14.4	<60.0	<180	<180	E35.0	<60.0	<60.0	<60.0
4	2/3/10	69.6	<50.0	E6.04	148	<50.0	---	<50.0	E25.8	<50.0	<50.0	E7.10
9	3/17/10	E49.8	<150	<150	E124	<150	---	---	<150	E32.0	<150	E7.26
10	3/17/10	E38.7	<75.0	<75.0	76.9	<75.0	---	---	E42.2	<75.0	<75.0	E6.26
12	2/17/10	18,500	E210	65.5	3,480	<50.0	---	---	E657	<50.0	<50.0	E6.22
13	2/3/10	148	E16.3	E8.16	312	<60.0	---	<60.0	E50.3	<60.0	<60.0	E7.99
17	2/17/10	E2.75	<50.0	<50.0	E4.49	<50.0	<150	<150	E14.4	<50.0	<50.0	<50.0
18	2/3/10	E23.8	<60.0	E3.94	E44.8	<60.0	---	<60.0	E8.77	<60.0	<60.0	E13.4
30	2/2/10	E19.5	<50.0	E2.52	E21.2	<50.0	---	<50.0	E4.96	<50.0	<50.0	E12.1
31	2/2/10	E8.90	<50.0	<50.0	E23.0	<50.0	---	---	<50.0	<50.0	<50.0	E7.99
32	2/9/10	E11.5	<50.0	E0.81	E24.0	<50.0	<150	<150	E19.1	<50.0	E3.23	<50.0
33	2/3/10	200	E35.0	E7.90	360	<50.0	---	<50	E120	<50.0	<50.0	E2.40
35	2/9/10	E41.0	E5.06	E1.69	75.9	<50.0	---	---	E19.4	<50.0	<50.0	<50.0
37	2/9/10	52.4	E8.43	E1.66	103	<50.0	---	---	E30.0	<50.0	<50.0	E2.19
38	2/3/10	<55.0	<55.0	<55.0	E8.32	<55.0	---	<55.0	<55.0	<55.0	<55.0	<55.0
39	2/3/10	3,070	<300	130	6,040	---	<55.0	<55.0	E1,110	<55.0	<55.0	E9.71
41	2/18/10	E17.5	<145	<145	E32.9	<145	<435	<435	<145	<145	E42.1	E4.44
42	2/10/10	<50.0	<50.0	<50.0	E0.88	<50.0	---	---	<50.0	<50.0	<50.0	<50.0
43	3/16/10	<85.0	<85.0	<85.0	<85.0	<85.0	<270	<270	<85.0	<85.0	<85.0	<85.0
45	2/10/10	E2.55	<50.0	<50.0	E2.81	<50.0	---	---	<50.0	<50.0	<50.0	E1.05
46	2/4/10	E5.07	<55.0	E1.30	E18.3	---	<55.0	<55.0	<55.0	<55.0	<55.0	<55.0
47	2/3/10	E10.0	<55.0	E3.88	E47.4	<55.0	---	<55.0	<55.0	<55.0	<55.0	<55.0
48	2/17/10	134	<75.0	E5.89	231	<75.0	<225	<225	E165	<75.0	E4.97	E5.54
49	2/18/10	E0.91	<55.0	<55.0	E1.82	<55.0	<150	<150	<55.0	<55.0	<55.0	<55.0
50	2/18/10	<50.0	<50.0	<50.0	E0.64	<50.0	<150	<150	<50.0	<50.0	<50.0	<50.0
51	2/18/10	<90.0	<90.0	<90.0	E3.33	<90.0	<270	<270	<90.0	<90.0	<90.0	<90.0
52	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	---	---	<50.0	<50.0	<50.0	<50.0
53	2/18/10	E5.76	<125	<125	E6.38	<125	<270	<270	<125	<125	<125	<125
54	4/13/10	<90.3	<90.3	<90.3	<90.3	<90.3	---	---	<90.3	<90.3	<90.3	<90.3
56	4/14/10	<100	<100	<100	E9.04	<100	---	---	<100	<100	<100	<100
57	4/14/10	<175	<175	<175	<175	<175	<175	<175	<175	<175	<175	<175
Ref- 1	2/11/10	E0.83	<55.0	<55.0	E1.89	<55.0	---	---	<55.0	<55.0	<55.0	<55.0
Ref- 2	2/11/10	<90.0	<90.0	<90.0	E3.74	<90.0	---	---	<90.0	<90.0	<90.0	<90.0
Ref- 3A	2/4/10	---	---	---	---	---	---	---	---	---	---	---

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)										
		Nitro-benzene, bs<2mm	N-Ni-trosodi-n-propyl-amine, bs<2mm	N-Nitroso-diphenyl-amine, bs<2mm	Phenan-threne, bs<2mm	Phenan-thridine, bs<2mm	Pyrene, bs<2mm	Quinoline, bs<2mm	Bis(2-chloro-ethyl) ether, bs<2mm	Bis(2-chlo-roisopropyl) ether, bs<2mm	Bis(2-ethyl-hexyl) phthal-ate, bs<2mm	Benzyl n-bu-tyl phthalate, bs<2mm
1	3/17/10	<170	<170	<170	E75.7	<170	E125	<170	<170	<170	E448	<205
2	3/16/10	<60.0	<60.0	<60.0	E4.75	<60.0	E10.3	<60.0	<60.0	<60.0	E242	<85.0
4	2/3/10	<50.0	<50.0	<50.0	72.0	E6.61	114	<50.0	<50.0	<50.0	213	<60.0
9	3/17/10	<150	<150	<150	E58.7	<150	E102	<150	<150	<150	4,780	<340
10	3/17/10	<75.0	<75.0	<75.0	E36.8	<75.0	E56.4	<75.0	<75.0	<75.0	E149	<90.1
12	2/17/10	<50.0	<50.0	<50.0	1,020	73.8	2,550	E4.42	<50.0	<50.0	173	<75.0
13	2/3/10	<60.0	<60.0	E4.62	110	E11.4	241	<60.0	<60.0	<60.0	861	E202
17	2/17/10	<50.0	<50.0	<50.0	E1.81	<50.0	E4.57	<50.0	<50.0	<50.0	<50.0	<50.0
18	2/3/10	<60.0	<60.0	<60.0	E35.5	<60.0	E36.1	<60.0	229	<60.0	E107	<90.0
30	2/2/10	<50.0	<50.0	<50.0	E24.8	<50.0	E22.6	<50.0	<50.0	<50.0	1,340	311
31	2/2/10	<50.0	<50.0	<50.0	E15.6	<50.0	E18.2	<50.0	<50.0	<50.0	<50.0	<70.2
32	2/9/10	<50.0	<50.0	<50.0	E13.5	<50.0	E17.3	<50.0	<50.0	<50.0	<50.0	<50.0
33	2/3/10	<50.0	<50.0	<50.0	120	E11.0	270	<50.0	<50.0	<50.0	<60.0	<75.0
35	2/9/10	<50.0	<50.0	<50.0	E28.3	<50.0	56.2	<50.0	<50.0	<50.0	130	<75.0
37	2/9/10	<50.0	<50.0	<50.0	E28.2	E2.96	79.9	<50.0	<50.0	<50.0	<50.0	<50.0
38	2/3/10	<55.0	<55.0	<55.0	E3.46	<55.0	E6.11	<55.0	<55.0	<55.0	E154	<90.0
39	2/3/10	<55.0	<55.0	<55.0	1,970	127	4,590	<55.0	<200	<55.0	E113	<110
41	2/18/10	<145	<145	<145	<145	<145	E24.0	<145	<145	<145	<145	<195
42	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	E0.92	<50.0	<50.0	<50.0	<50.0	<50.0
43	3/16/10	<85.0	<85.0	<85.0	<85.0	<85.0	E5.95	<85.0	<85.0	<85.0	E189	<135
45	2/10/10	<50.0	<50.0	<50.0	E2.14	<50.0	E4.33	<50.0	<50.0	<50.0	<50.0	<65.0
46	2/4/10	<55.0	<55.0	<55.0	E12.1	<55.0	E14.9	<55.0	<55.0	<55.0	<55.0	<65.0
47	2/3/10	<55.0	<55.0	<55.0	E39.1	<55.0	E33.2	<55.0	<55.0	<55.0	<55.0	<55.0
48	2/17/10	<75.0	<75.0	E16.3	85.3	E7.09	185	<75.0	<75.0	<75.0	E522	<230
49	2/18/10	<55.0	<55.0	<55.0	<55.0	<55.0	E1.81	<55.0	<55.0	<55.0	<55.0	<75.0
50	2/18/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<55.0
51	2/18/10	<90.0	<90.0	<90.0	<90.0	<90.0	E3.02	<90.0	<90.0	<90.0	629	<90.0
52	2/10/10	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0	<50.0
53	2/18/10	<125	<125	<125	<125	<125	E4.32	<125	<125	<125	<120	<160
54	4/13/10	<90.3	<90.3	E12.4	<90.3	<90.3	<90.3	<90.3	<95.0	<90.3	<120	<130
56	4/14/10	<100	<100	<100	<100	<100	E6.16	<100	<160	<100	<100	<140
57	4/14/10	<175	<175	<175	<175	<175	<175	<175	<175	<175	<175	<175
Ref- 1	2/11/10	<55.0	<55.0	<55.0	<55.0	<55.0	E1.62	<55.0	<55.0	<55.0	<60.0	<65.0
Ref- 2	2/11/10	<90.0	<90.0	<90.0	<90.0	<90.0	E2.83	<90.0	<90.0	<90.0	<90.0	<95.0
Ref- 3A	2/4/10	---	---	---	---	---	---	---	---	---	---	---

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)				Organochlorine pesticides (micrograms per kilogram)						
		Diethyl phthalate, bs<2mm	Dimethyl phthalate, bs<2mm	Di-n-butyl phthalate, bs<2mm	Di-n-octyl phthalate, bs<2mm	beta-HCH, bs	Aldrin, bs	alpha-Endo-sulfan, bs	alpha-HCH, bs	trans-Non-achlor, bs	cis-Chlor-dane, bs	trans-Chlor-dane, bs
1	3/17/10	<170	<170	<170	442	<1.50	<6.00	<1.50	<4.50	<3.00	<3.00	<1.50
2	3/16/10	<60.0	<60.0	<60.0	<60.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
4	2/3/10	<50.0	<50.0	<50.0	E25.1	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
9	3/17/10	E56.8	<150	<150	9,340	<1.50	<6.00	<1.50	<4.50	<3.00	<3.00	<1.50
10	3/17/10	<75.0	<75.0	<75.0	80.2	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	E0.39
12	2/17/10	<50.0	<50.0	<50.0	E33.8	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
13	2/3/10	<60.0	<60.0	E27.9	<110	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
17	2/17/10	<50.0	<50.0	<50.0	E11.4	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
18	2/3/10	<60.0	<60.0	<60.0	<60.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
30	2/2/10	<50.0	<50.0	<50.0	E35.3	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
31	2/2/10	<50.0	<50.0	<50.0	<50.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
32	2/9/10	<50.0	<50.0	<50.0	<50.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
33	2/3/10	<50.0	<50.0	<50.0	E12.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
35	2/9/10	<50.0	<50.0	<50.0	<50.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
37	2/9/10	<50.0	<50.0	<50.0	<50.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
38	2/3/10	<55.0	<55.0	<55.0	<55.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
39	2/3/10	<55.0	<55.0	E33.6	E25.1	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
41	2/18/10	<145	<145	<145	<145	<1.50	<6.00	<1.50	<4.50	<3.00	<3.00	<1.50
42	2/10/10	<50.0	<50.0	<50.0	<50.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
43	3/16/10	<85.0	<85.0	<85.0	<85.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
45	2/10/10	<50.0	<50.0	<50.0	<50.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
46	2/4/10	<55.0	<55.0	<55.0	<55.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
47	2/3/10	<55.0	<55.0	<55.0	<55.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
48	2/17/10	<75.0	<75.0	<75.0	E202	<0.50	<2.00	<0.50	<1.50	E0.51	E0.86	0.78
49	2/18/10	<55.0	<55.0	<55.0	<55.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
50	2/18/10	<50.0	<50.0	<50.0	<50.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
51	2/18/10	<90.0	<90.0	<90.0	<90.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
52	2/10/10	<50.0	<50.0	<50.0	<50.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
53	2/18/10	<125	<125	<125	<125	<1.3	<5.00	<1.30	<3.80	<2.50	<2.50	<1.30
54	4/13/10	<90.3	<90.3	<90.3	<90.3	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
56	4/14/10	<100	<100	<100	<100	<1.00	<4.00	<1.00	<3.00	<2.00	<2.00	<1.00
57	4/14/10	<175	<175	<175	<175	<1.80	<7.00	<1.80	<5.20	<3.50	<3.50	<1.80
Ref- 1	2/11/10	<55.0	<55.0	<55.0	<55.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
Ref- 2	2/11/10	<90.0	<90.0	<90.0	<90.0	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50
Ref- 3A	2/4/10	---	---	---	---	<2.50	<10.0	<2.50	<7.50	<5.00	<5.00	<2.50

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Organochlorine pesticides (micrograms per kilogram)										
		*Chlordane plus degradates, bs	Dieldrin, bs	Endrin, bs	Heptachlor epoxide, bs	Heptachlor, bs	Lindane, bs	Mirex, bs	p,p'-DDD, bs	p,p'-DDE, bs	p,p'-DDT, bs	*DDT plus degradates, bs<2mm
1	3/17/10	<7.50	<1.50	<3.00	<4.50	<3.00	<1.50	<4.50	<7.50	9.55	<3.00	9.55
2	3/16/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
4	2/3/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	E2.46	5.39	<1.00	7.85
9	3/17/10	<7.50	<1.50	<3.00	<4.50	<3.00	<1.50	<4.50	<7.50	11.7	<3.00	11.7
10	3/17/10	E0.39	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	2.52	<1.00	2.52
12	2/17/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
13	2/3/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	1.94	E0.47	2.41
17	2/17/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
18	2/3/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
30	2/2/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<2.50	<5.00
31	2/2/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
32	2/9/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
33	2/3/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
35	2/9/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
37	2/9/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
38	2/3/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	2.68	3.01	5.69
39	2/3/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
41	2/18/10	<7.50	<1.50	<3.00	<4.50	<3.00	<1.50	<4.50	<7.50	3.35	<3.00	3.35
42	2/10/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
43	3/16/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	E1.07	<1.00	E1.07
45	2/10/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
46	2/4/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
47	2/3/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
48	2/17/10	2.15	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	4.17	<1.00	4.17
49	2/18/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
50	2/18/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
51	2/18/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	3.00	<1.00	3.00
52	2/10/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
53	2/18/10	<6.30	<1.30	<2.50	<3.80	<2.50	<1.30	<3.80	<6.20	4.09	<2.50	4.09
54	4/13/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	E1.19	<1.00	E1.19
56	4/14/10	<5.00	<1.00	<2.00	<3.00	<2.00	<1.00	<3.00	<5.00	<3.00	<2.00	<10.0
57	4/14/10	<8.80	<1.80	<3.50	<5.20	<3.50	<1.80	<5.20	<8.80	<5.20	<3.50	<17.5
Ref- 1	2/11/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00
Ref- 2	2/11/10	<2.50	<0.50	<1.00	<1.50	<1.00	<0.50	<1.50	<2.50	2.27	1.02	3.28
Ref- 3A	2/4/10	<12.5	<2.50	<5.00	<7.50	<5.00	<2.50	<7.50	<12.5	<7.50	<5.00	<25.0

Table 6. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[QA/QC, quality assurance/quality control; EST, Eastern Standard Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; --, no data; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Organochlorine pesticides (micrograms per kilogram)		Polychlorinated biphenyl congeners (micrograms per kilogram)		
		p,p'-Methoxychlor, bs	Toxaphene, bs	Aroclor™ 1016 plus Aroclor™ 1242, bs	Aroclor™ 1254, bs	Aroclor™ 1260, bs
1	3/17/10	<10.5	<600	<15.0	<15.0	<15.0
2	3/16/10	<3.50	<200	<5.00	<5.00	<5.00
4	2/3/10	<3.50	<200	<5.00	<5.00	E6.18
9	3/17/10	<10.5	<600	<15.0	<15.0	<15.0
10	3/17/10	<3.50	<200	<5.00	<5.00	<5.00
12	2/17/10	<3.50	<200	<5.00	<5.00	<5.00
13	2/3/10	E2.73	<200	<5.00	<5.00	<5.00
17	2/17/10	<3.50	<200	<5.00	<5.00	<5.00
18	2/3/10	<3.50	<200	<5.00	<5.00	<5.00
30	2/2/10	<3.50	<200	<5.00	<5.00	<5.00
31	2/2/10	<3.50	<200	<5.00	E3.70	<5.00
32	2/9/10	<3.50	<200	<5.00	<5.00	<5.00
33	2/3/10	<3.50	<200	<5.00	<5.00	<5.00
35	2/9/10	<3.50	<200	<5.00	<5.00	<5.00
37	2/9/10	<3.50	<200	<5.00	<5.00	<5.00
38	2/3/10	<3.50	<200	<5.00	<5.00	<5.00
39	2/3/10	<3.50	<200	<5.00	E5.83	<5.00
41	2/18/10	<11.0	<200	<15.0	<15.0	<15.0
42	2/10/10	<3.50	<200	<5.00	<5.00	<5.00
43	3/16/10	<3.50	<200	<5.00	<5.00	<5.00
45	2/10/10	<3.50	<200	<5.00	<5.00	<5.00
46	2/4/10	<3.50	<200	<5.00	<5.00	<5.00
47	2/3/10	<3.50	<200	<5.00	<5.00	<5.00
48	2/17/10	<3.50	<200	<5.00	E3.20	E3.49
49	2/18/10	<3.50	<200	<5.00	<5.00	<5.00
50	2/18/10	<3.50	<200	<5.00	<5.00	<5.00
51	2/18/10	<3.50	<200	<5.00	<5.00	<5.00
52	2/10/10	<3.50	<200	<5.00	<5.00	<5.00
53	2/18/10	<8.80	<500	<12.5	<12.5	<12.5
54	4/13/10	<3.50	<200	<5.00	<5.00	<5.00
56	4/14/10	<7.00	<400	<10.0	<10.0	<10.0
57	4/14/10	<12.2	<700	<17.5	<17.5	<17.5
Ref- 1	2/11/10	<3.50	<200	<5.00	<5.00	<5.00
Ref- 2	2/11/10	<3.50	<200	<5.00	<5.00	<5.00
Ref- 3A	2/4/10	<17.5	<1000	<25.0	<25.0	<25.0

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Station number	Station name	Date	Time (EST)	Quality-assurrance/quality-control surrogate values, as percent recovery (%)					
					2-Fluoro-biphenyl, bs<2 mm	alpha-HCH-d6, surrogate	Isodrin, surro-gate	Nitroben-zene-d5, surrogate, bs<2 mm	Non-achloro-biphenyl, surrogate	p-Terphe-nyl-d14, surrogate, bs<2mm
2	02196842	Soil Erosion Lake at Fort Gordon, GA	3/16/10	1330	40.9	89.9	72.3	32.3	99.3	74.5
Replicate 2	02196842	Soil Erosion Lake at Fort Gordon, GA	3/16/10	1330	36.1	72.9	72.9	26.3	105	84.9
Relative percent difference, abs.	02196842	Soil Erosion Lake at Fort Gordon, GA	3/16/10	1330	12.3	20.9	0.82	20.3	5.84	13.0
9	021970190	Gordon Lake at Fort Gordon, GA	3/17/10	0830	73.2	73.2	59.5	60.2	107	106
Replicate 9	021970190	Gordon Lake at Fort Gordon, GA	3/17/10	0830	71.3	73.3	57.0	57.0	101	103
Relative percent difference, abs.	021970190	Gordon Lake at Fort Gordon, GA	3/17/10	0830	2.68	0.19	4.38	5.39	5.79	2.44

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)									
		1,4-Dichlorobenzene, bs< 2mm	2,4,6-Trichlorophenol, bs< 2 mm	2,4-Dichlorophenol, bs<2mm	2-Methyl-4,6-dinitrophenol, bs<2mm	4-Chloro-3-methylphenol, bs<2mm	C8-Alkylphenol, bs<2mm	Pentachlorophenol, bs<2mm	2,4,6-Trimethylphenol, bs<2mm	2,4-Dinitrophenol, bs<2mm	2-Nitrophenol, bs<2mm
2	3/16/10	---	<60.0	<60.0	---	<60.0	<60.0	<60.0	---	---	<60.0
Replicate 2	3/16/10	<65.0	<65.0	<65.0	---	<65.0	<65.0	<65.0	<65.0	---	<65.0
Relative percent difference, abs.	3/16/10	---	---	---	---	---	---	---	---	---	---
9	3/17/10	<150	<150	<150	---	<150	<150	<150	<150	---	<150
Replicate 9	3/17/10	<145	<145	<145	---	<145	<145	<145	<145	---	<145
Relative percent difference, abs.	3/17/10	---	---	---	---	---	---	---	---	---	---

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)									
		3,5-Dimethylphenol, bs<2mm	3-Nitrophenol, bs<2mm	2-Chlorophenol, bs<2mm	Phenol, bs<2mm	Azobenzene, bs<2mm	Carbazole, bs<2mm	Hexachlorobenzene, bs<2mm	Hexachlorobenzene, bs	p-Cresol, bs<2mm	Pentachloroanisole, bs<2mm
2	3/16/10	<60.0	---	<60.0	<60.0	<60.0	E2.62	<60.0	<3.00	<60.0	<60.0
Replicate 2	3/16/10	<65.0	---	<65.0	<65.0	<65.0	E4.54	<65.0	<3.00	E50.2	<65.0
Relative percent difference, abs.	3/16/10	---	---	---	---	---	E53.4	---	---	---	---
9	3/17/10	<150	---	<150	E65.7	<150	<150	<150	<9.00	2,680	<150
Replicate 9	3/17/10	<145	---	<145	<145	<145	<145	<145	<9.00	2,970	<145
Relative percent difference, abs.	3/17/10	---	---	---	---	---	---	---	---	10.3	---

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)									
		Pentachloronitrobenzene, bs<2mm	1,2,4-Trichlorobenzene, bs<2mm	1,2-Dichlorobenzene, bs<2mm	1,2-Dimethylnaphthalene, bs<2mm	1,3-Dichlorobenzene, bs<2mm	1,6-Dimethylnaphthalene, bs<2mm	1-Methyl-9H-fluorene, bs<2mm	1-Methylphenanthrene, bs<2mm	1-Methylpyrene, bs<2mm	2,2′-Biquinoline, bs<2mm
2	3/16/10	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	E1.14	<60.0	<60.0
Replicate 2	3/16/10	<65.0	<65.0	<65.0	<65.0	<65.0	<65.0	<65.0	E2.46	<65.0	E14.9
Relative percent difference, abs.	3/16/10	---	---	---	---	---	---	---	E73.5	---	---
9	3/17/10	<150	<150	<150	<150	<150	E23.5	<150	<150	<150	<150
Replicate 9	3/17/10	<145	<145	<145	<145	<145	E32.3	<145	<145	<145	<145
Relative percent difference, abs.	3/17/10	---	---	---	---	---	E31.5	---	---	---	---

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)									
		2,3,6-Trimethylnaphthalene, bs<2mm	2,4-Dinitrotoluene, bs<2mm	2,6-Dimethylnaphthalene, bs<2mm	2,6-Dinitrotoluene, bs<2mm	2-Chloronaphthalene, bs<2mm	2-Ethylnaphthalene, bs<2mm	2-Methylanthracene, bs<2mm	4-Bromophenyl phenyl ether, bs<2mm	4-Chlorophenyl phenyl ether, bs<2mm	4H-Cyclopenta[def]phenanthrene, bs<2mm
2	3/16/10	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	E1.62
Replicate 2	3/16/10	<65.0	<65.0	<65.0	<65.0	<65.0	<65.0	<65.0	<65.0	<65.0	E2.29
Relative percent difference, abs.	3/16/10	---	---	---	---	---	---	---	---	---	E34.3
9	3/17/10	<150	<150	E131	<150	<150	<150	<150	<150	<150	<150
Replicate 9	3/17/10	E10.4	<145	E138	<145	<145	<145	<145	<145	<145	<145
Relative percent difference, abs.	3/17/10	---	---	E5.20	---	---	---	---	---	---	---

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)									
		9,10-Anthraquinone, bs<2mm	9H-Fluorene, bs<2mm	Acenaphthene, bs<2mm	Acenaphthylene, bs<2mm	Acridine, bs<2mm	Anthracene, bs<2mm	Benzo[a]anthracene, bs<2mm	Benzo[a]pyrene, bs<2mm	Benzo[b]fluoranthene, bs<2mm	Benzo[c]cinnoline, bs<2mm
2	3/16/10	E10.4	<60.0	<60.0	<60.0	<60.0	E1.16	E5.61	E8.38	E13.7	<60.0
Replicate 2	3/16/10	E13.6	<65.0	<65.0	<65.0	<65.0	<65.0	E6.04	E11.3	E23.0	<65.0
Relative percent difference, abs.	3/16/10	E26.7	---	---	---	---	---	E7.52	E29.7	E50.7	---
9	3/17/10	<150	<150	<150	E14.2	E92.1	E25.2	E43.2	E60.2	<120	<150
Replicate 9	3/17/10	<145	<145	<145	<145	<150	<145	E46.4	E63.2	E125	<145
Relative percent difference, abs.	3/17/10	---	---	---	---	---	---	E7.14	E4.86	---	---

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)									
		Benzo[ghi] perylene, bs<2mm	Benzo[k] fluoran-thene, bs<2mm	Bis(2-chlo-roethoxy) methane, bs<2mm	Chrysene, bs<2mm	Dibenzo[a,h] anthracene, bs<2mm	Dibenzo-thiophene, bs<2mm	Fluoran-thene, bs<2mm	Hexa-chlorobu-tadiene, bs<2mm	Hexa-chlorocy-clopen-tadiene, bs<2mm	Hexachlo-roethane, bs<2mm
2	3/16/10	E32.0	E7.17	<60.0	E9.37	<60.0	<60.0	E14.4	<60.0	<180	<180
Replicate 2	3/16/10	E20.1	E9.23	<65.0	E12.4	<65.0	<65.0	E21.1	<65.0	---	---
Relative percent difference, abs.	3/16/10	E45.7	E25.2	---	E27.8	---	---	E37.7	---	---	---
9	3/17/10	<150	E48.5	<150	E49.8	<150	<150	E124	<150	---	---
Replicate 9	3/17/10	<145	<145	<145	E59.7	<145	<145	E133	<145	---	---
Relative percent difference, abs.	3/17/10	---	---	---	E18.1	---	---	E7.00	---	---	---

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)									
		Indeno[1,2,3-cd]pyrene, bs<2mm	Isopho-rone, bs<2mm	Iso-quinoline, bs<2mm	Naph-thalene, bs<2mm	Nitroben-zene, bs<2mm	N-Nitroso-di-n-pro-pylamine, bs<2mm	N-Nitroso-diphenyl-amine, bs<2mm	Phenan-threne, bs<2mm	Phenan-thridine, bs<2mm	Pyrene, bs<2mm
2	3/16/10	E35.0	<60.0	<60.0	<60.0	<60.0	<60.0	<60.0	E4.75	<60.0	E10.3
Replicate 2	3/16/10	E21.8	<65.0	<65.0	<65.0	<65.0	<65.0	<65.0	E6.47	<65.0	E15.0
Relative percent difference, abs.	3/16/10	E46.5	---	---	---	---	---	---	E30.7	---	E37.2
9	3/17/10	<150	E32.0	<150	E7.26	<150	<150	<150	E58.7	<150	E102
Replicate 9	3/17/10	<145	E41.1	<145	E9.43	<145	<145	<145	E61.5	<145	E107
Relative percent difference, abs.	3/17/10	---	E24.9	---	E26.1	---	---	---	E4.66	---	E4.78

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Semivolatile organic compounds (micrograms per kilogram)								
		Quinoline, bs<2mm	Bis(2-chloroethyl) ether, bs<2mm	Bis(2-chloroisopropyl) ether, bs<2mm	Bis(2-ethylhexyl) phthalate, bs<2mm	Benzyl n-butyl phthalate, bs<2mm	Diethyl phthalate, bs<2mm	Dimethyl phthalate, bs<2mm	Di-n-butyl phthalate, bs<2mm	Di-n-octyl phthalate, bs<2mm
2	3/16/10	<60.0	<60.0	<60.0	E242	<85.0	<60.0	<60.0	<60.0	<60.0
Replicate 2	3/16/10	<65.0	<65.0	<65.0	<65.0	<85.0	<65.0	<65.0	<65.0	<65.0
Relative percent difference, abs.	3/16/10	---	---	---	---	---	---	---	---	---
9	3/17/10	<150	<150	<150	4,780	<340	E56.8	<150	<150	9,340
Replicate 9	3/17/10	<145	<145	<145	1,940	<320	<145	<145	<145	<230
Relative percent difference, abs.	3/17/10	---	---	---	84.5	---	---	---	---	---

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Organochlorine pesticides (micrograms per kilogram)									
		beta-HCH, bs	Aldrin, bs	alpha-Endosulfan, bs	alpha-HCH, bs	trans-Nonachlor, bs	cis-Chlordane, bs	trans-Chlordane, bs	*Chlordane plus degradates, bs	Dieldrin, bs	Endrin, bs
2	3/16/10	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50	<2.50	<0.50	<1.00
Replicate 2	3/16/10	<0.50	<2.00	<0.50	<1.50	<1.00	<1.00	<0.50	<2.50	<0.50	<1.00
Relative percent difference, abs.	3/16/10	---	---	---	---	---	---	---	---	---	---
9	3/17/10	<1.50	<6.00	<1.50	<4.50	<3.00	<3.00	<1.50	<7.50	<1.50	<3.00
Replicate 9	3/17/10	<1.50	<6.00	<1.50	<4.50	<3.00	<3.00	<1.50	<7.50	<1.50	<3.00
Relative percent difference, abs.	3/17/10	---	---	---	---	---	---	---	---	---	---

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Organochlorine pesticides (micrograms per kilogram)									
		Heptachlor epoxide, bs	Heptachlor, bs	Lindane, bs	Mirex, bs	p,p'-DDD, bs	p,p'-DDE, bs	p,p'-DDT, bs	*DDT plus degradates, bs<2mm	p,p'-Methoxychlor, bs	Toxaphene, bs
2	3/16/10	<1.50	<1.00	<0.50	<1.50	<2.50	<1.50	<1.00	<5.00	<3.50	<200
Replicate 2	3/16/10	<1.50	<1.00	<0.50	<1.50	<2.50	E0.77	<1.00	E0.77	<3.50	<200
Relative percent difference, abs.	3/16/10	---	---	---	---	---	---	---	---	---	---
9	3/17/10	<4.50	<3.00	<1.50	<4.50	<7.50	11.7	<3.00	11.7	<10.5	<600
Replicate 9	3/17/10	<4.50	<3.00	<1.50	<4.50	<7.50	10.9	<3.00	10.9	<10.5	<600
Relative percent difference, abs.	3/17/10	---	---	---	---	---	7.22	---	7.22	---	---

Table 8. Concentrations of semivolatile organic compounds (SVOCs), organochlorine pesticides (OCs), and polychlorinated biphenyls (PCBs) in quality-control bed sediment samples collected at Fort Gordon, GA, February–April 2010.—Continued

[EST, Eastern Standadrd Time; µg/kg, micrograms per kilogram; %, percent recovery by weight; <, less than; bs <2 mm, bed sediment smaller than 2 millimeters; E, estimated value; ---, no data; abs., absolute; *, total quantitative and estimated concentration values. Concentrations of chlordane plus degradates determined as the sum of trans-nonachlor, cis-chlordane, and trans-chlordane concentrations. Concentrations of DDT plus degradates determined as the sum of p,p'-DDD, p,p'-DDE, and p,p'-DDT concentrations]

Site number (fig. 1)	Date	Polychlorinated biphenyls (micrograms per kilogram)		
		Aroclor™ 1016 plus Aroclor™ 1242, bs	Aroclor™ 1254, bs	Aroclor™ 1260, bs
2	3/16/10	<5.00	<5.00	<5.00
Replicate 2	3/16/10	<5.00	<5.00	<5.00
Relative percent difference, abs.	3/16/10	---	---	---
9	3/17/10	<15.0	<15.0	<15.0
Replicate 9	3/17/10	<15.0	<15.0	<15.0
Relative percent difference, abs.	3/17/10	---	---	---