Chemistry and Toxicity of Urban Sediments, Maricopa County, Arizona—Data and Summary Statistics

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CONVERSION FACTORS

Multiply	By	To obtain
centimeter (cm)	0.3937	inch
square centimeter (cm^2)	0.001076	square inch
meter (m)	3.281	foot
square meter (m^2)	10.76	square foot
square kilometer (km^2)	0.3861	square mile
liter (L)	0.2642	gallon
gram (g)	0.03527	ounce
megagram (Mg)	1.102	pound

Air temperatures are given in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) by the following equation:

$$°F = 1.8\,(°C) + 32$$

ABBREVIATED WATER-QUALITY UNITS

Chemical concentration is given only in metric units. Chemical concentration in water is given in milligrams per liter (mg/L) or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the solute mass per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. For concentrations less than 7,000 milligrams per liter, the numerical value is about the same as for concentrations in parts per million. A micron is equal to one-millionth of a meter (10^{-6}). Specific conductance is given in microsiemens per centimeter (µS/cm) at 25°C. Chemical concentration in sediment is given in grams per kilogram (g/kg) or micrograms per gram (µg/g). Micrograms per gram is equivalent to parts per million.

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Abstract

Sediment samples were collected from 24 stormwater retention and detention basins that drain land used for residential, commercial, and industrial purposes in Maricopa County and were analyzed to determine the chemistry and toxicity of pollutants associated with urban stormwater runoff. Samples were collected between January and November 1994. Summary statistics are presented for pH and soil moisture, concentrations of selected inorganic and organic constituents, and concentrations of organochlorine pesticides in sediments associated with each type of land use. Acute toxicity tests were done on sediment samples using the amphipod *Hyalella azteca.* Survival rates ranged from 0 (zero) to 95 percent. The results of a comparative time-series analysis on samples from two residential sites collected during a 5-month period also are presented. Background concentrations of inorganic constituents in sediments were determined for six basins, and discrete samples were collected to characterize the spatial variability of constituent concentrations in one residential basin. The effect of sieving on sediment toxicity was determined by testing whole and sieved samples. Survival rates ranged from 0 (zero) to 42 percent for sieved samples and 14 to 75 percent for unsieved samples.

INTRODUCTION

The chemistry of sediments reflects both the geology of the source area as well as contamination by anthropogenic sources. Sediment chemistry may affect water chemistry as sediments are transported and deposited into ponds, lakes, reservoirs, and streams. In the urban environment, sediments from streets, parking lots, rooftops, construction sites, vacant lots, and landscaped grounds can be transported into rivers, lakes, or reservoirs during rainstorms. Sediments may be transported by flow through gutters, storm drains, detention basins, and stream channels and across urban flood plains. Sediments deposited in stormwater-detention basins are of low mobility compared with sediments deposited in other areas. Consequently, the chemistry of sediments deposited in detention basins reflects the temporal chemistry of sediments from the drainage areas upstream from the basins. This report presents the raw data and summary statistics that describe the chemical composition and toxicity of sediments sampled from detention basins in the Phoenix metropolitan area in Maricopa County, Arizona (fig. 1).

Stormwater retention and detention facilities are integral components of an overall stormwater-management system that includes storm sewers, natural and manmade channels, streets, inlets, and surface and subsurface storage areas (NBS Lowery Engineers & Planners and McLaughlin Water Engineers, Ltd., 1991). Retention and detention facilities store accumulated runoff in different ways. Retention basins are used as permanent

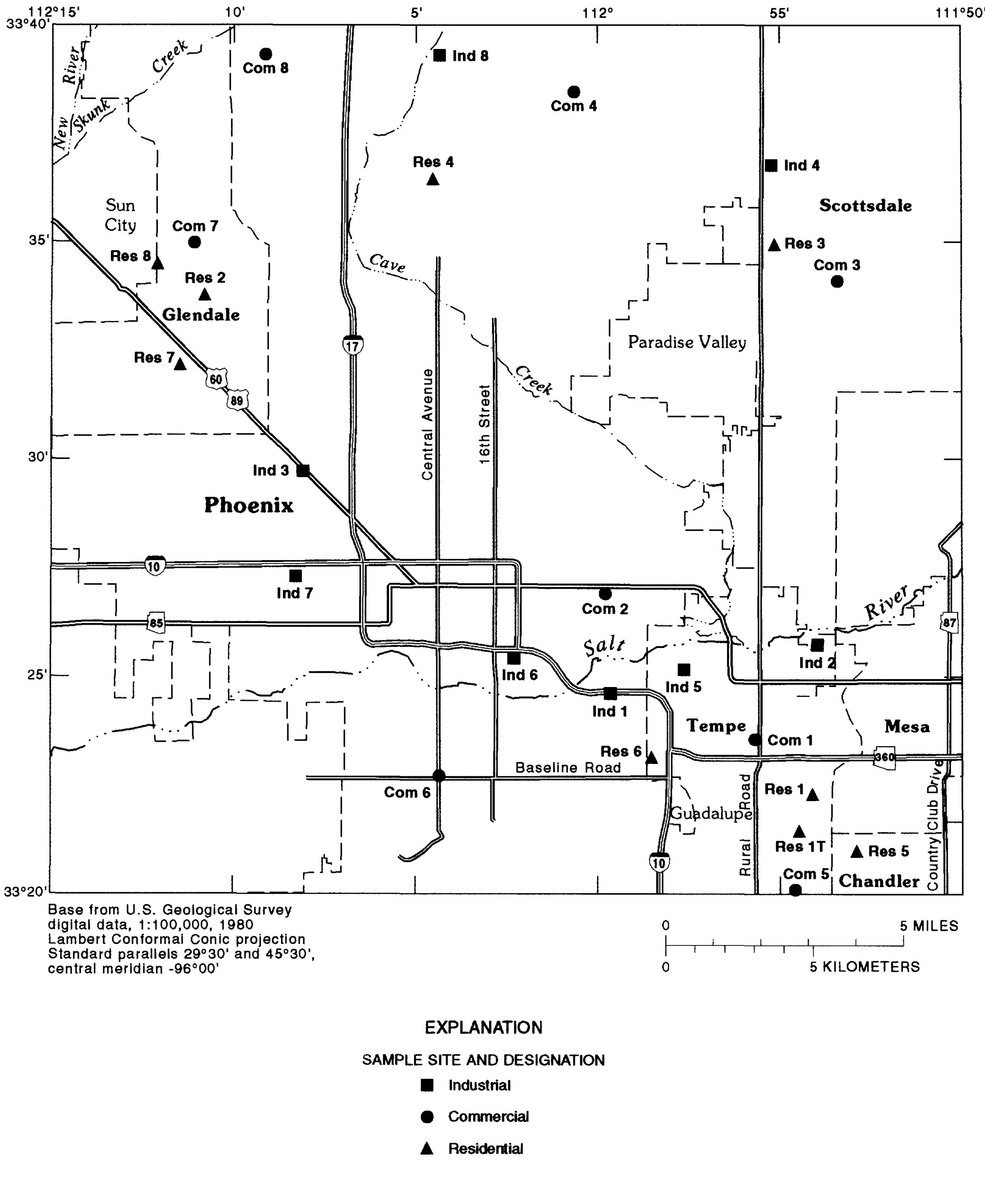

Figure 1. Study area and locations of detention and retention basins sampled, Maricopa County, Arizona.

storage and generally only include outlet structures to deal with inflows that exceed a design storm. Detention basins, however, are used only to attenuate excessive stormwater flows and always include some type of outlet structure. The difference between the inflow from runoff and the design outflow is the storage capacity of a detention basin. Within Maricopa County, retention basins must be able to retain the volume of runoff from a 2-hour storm with a recurrence interval of 100 years. Design requirements for detention basins are that the discharge of a 100-year, 2-hour storm in postdevelopment conditions will not exceed the discharge for predevelopment conditions. For either control structure, all stored runoff must be completely discharged from a basin within 36 hours of the associated storm event. These requirements are set by the Flood Control District of Maricopa County (NBS Lowry Engineers & Planners and McLaughlin Water Engineers, Ltd., 1991) and may be adopted in whole or amended by individual jurisdictions.

Section 402(p) of the Water Quality Act passed by Congress in 1987 requires that all municipalities with populations exceeding 100,000 obtain National Pollutant Discharge Elimination System (NPDES) permits for urban stormwater discharge. The conditions of this permit require that the chemistry of urban stormwater runoff be monitored from basins draining residential, commercial, and industrial land uses for the term of the permit. Stormwater monitoring alone is not adequate, however, to determine if different land-use activities influence the chemistry and toxicity of urban runoff. Recent investigations have shown that stormwater chemistry, which depends primarily on drainage area, storm characteristics, percentage of impervious area, and possibly on land-use activities for certain constituents, is directly related to suspended-solids concentrations (Lopes and others, 1995). Characterizing the chemistry and toxicity of sediments from basins draining homogeneous land uses would be a direct method to determine if land use is a significant factor influencing stormwater chemistry. Hydrophobic chemical partitioning (particulate phase and fraction dissolved) is a function of the chemical concentrations in water and suspended particulate concentrations. Trace-element partitioning is a function of suspended-solids concentration, dissolved-contaminant concentration, and sorbed contaminant concentration. A direct characterization of sediments therefore is needed for a complete understanding of stormwater chemistry.

Purpose and Scope

The purpose of the study was to (1) characterize the chemistry and toxicity of sediments from selected detention basins that drain land used for residential, commercial, and industrial purposes in Maricopa County; (2) determine if there is a statistical difference in the chemical composition of sediments from the different land uses and calculate the mean concentrations of constituents in these sediments; and (3) determine if there are temporal changes in the chemistry of urban sediments. This report presents a description of the sampling procedures used to develop a data set for characterizing the physical and chemical characteristics of detention basins that receive urban stormwater runoff. The descriptive statistics, results of sediment toxicity tests using the organism *Hyalella azteca*, and raw data obtained from this data-collection effort are presented in the section entitled "Basic Data" at the back of the report.

Previous Investigations

Previous investigations of urban stormwater and sediment quality in Maricopa County include Lopes and others (1995), Lopes and Fossum (1995), Rector (1993), and Earth Technology Corporation (1993). Lopes and others (1995) monitored stormwater quality from October 1991 to October 1993 at four drainage basins with urban land use in Maricopa County and found that most event-mean concentrations of constituents were positively correlated with event-mean concentrations of suspended solids. Lopes and Fossum (1995) studied the toxicity of stormwater, streamflow, and bed material in urban Maricopa County. Rector (1993) assessed contaminant levels in sediments and in fish and bird tissues at 22 sites throughout Arizona. Earth Technology Corporation (1993) described the chemistry of sediment samples collected along the Gila River flood plain and above Gillespie and Painted Rock Dams and in Painted Rock Reservoir downstream from the Phoenix metropolitan area.

Acknowledgments

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METHODS

Potential sampling sites were examined before sampling to ensure that selected drainage basins contained areas with a homogeneous land use. This reconnaissance was done in order to characterize the effects of land use on sediment toxicity and chemistry. Eight retention and detention basins in industrial, commercial, and residential areas were selected in urban Maricopa County (fig. 1). Samples of sediments were collected between January and November 1994.

In past decades, much of urbanized Maricopa County was used for agriculture. A basin that was used for agricultural purposes may have residual effects of agricultural practices that might influence sediment chemistry. For this reason, previous uses of the basins were investigated to determine if the basins were used for agriculture and when the basins became urbanized areas.

An additional grass-covered residential basin (Residential 1T) was selected for a comparative time-series analysis. This basin, along with one of the original bare-soil residential basins (Residential 4), was sampled to determine temporal changes in sediment chemistry. Samples were collected on April 7, April 22, May 6, June 27, August 11, and August 31, 1994, and were analyzed to determine if constituent concentrations decrease during dry periods and increase during periods of runoff. Sediment samples also were collected to (1) identify background concentrations of inorganic constituents, (2) characterize the spatial variability of constituent concentrations, and (3) determine the effects of temporal variability and sample preparation on toxicity results.

Sample Collection

Field procedures used in the collection of sediment samples were designed to ensure that sediment samples were representative of those areas in detention and retention basins subject to stormwater inundation and to reduce the potential for sample contamination. Visual field evidence was used to determine the extent of any areas recently inundated in proximity to points of inflow in the basins. A grid pattern was established over these areas and a minimum of eight samples were collected at regular intervals over this grid. Samples were taken from the upper 2 cm of a 100-square-centimeter area at each sampling point.

Sample collection from grass-lined basins first involved the removal of the upper grass-and-root system using a shovel. Most of the work was performed by hand in order to minimize contact between the steel shovel and soil. Soils trapped within the root system were shaken or scraped free before being collected. Plastic or metal spoons were used to collect samples, depending on analysis type, and sample fractions were kept in separate teflon bags.

Soil samples were allowed to air dry for 24 to 72 hours because they were moist and could not be sieved. Once dry, the samples were sieved to segregate the sediments that were less than 125 microns, which is the grain size that has the largest capacity for sorbing constituents and that contains most of the trace metals (Horowitz and Elrick, 1987). Fractions collected with plastic sieves were kept in 500-milliliter plastic containers and were analyzed for metals, chemical-oxygen demand

(COD), nutrients, and total and inorganic carbon. Fractions collected with metal sieves were kept in 500-milliliter glass containers and were analyzed for organochlorine pesticides and base-neutral-acid compounds.

Sample Analyses

Samples collected to characterize sediments from different land uses were analyzed for pH, soil moisture, metals (arsenic, copper, manganese, cadmium, mercury, chromium, iron, cobalt, lead, and zinc), nutrients, organochlorine pesticides, and organic carbon and were tested for toxicity using the amphipod *Hyalella azteca* (Ingersoll and Nelson, 1990; Nebeker and others, 1984; Landrum and Scavia, 1983). Sediments collected from basins Residential 1T and Residential 4, the two basins for the time-series analysis, were analyzed for metals, nutrients, organochlorine pesticides, acid-base-neutral compounds, and COD.

Soil pH samples were prepared by placing 50 g of freshly collected soil in 200 mL of deionized water. Solutions were allowed to equilibrate for 24 hours before measurements were made. Soil moisture was determined by dividing the difference between the initial sample weight and the weight of the oven-dried (at 105°C) sample. This value is reported as a weight percentage.

Background concentrations of inorganic constituents were determined by collecting and analyzing subsurface sediments from soil layers below the assumed infiltration depth of inundating stormwater. This depth was determined by a visual inspection for any apparent color change in the soil. Samples were collected from at least 15 cm below the surface when no color change was noted. Six sites (Residential 1T, Residential 2, Residential 3, Residential 4, Industrial 2, and Industrial 3) were selected for this analysis. All but one site (Residential 3) exhibited the indicative color change for determining the sample collection location. Sediment from Residential 3 was collected from the 15-centimeter depth. Residential 4 was selected for the discrete-location analysis. A grid pattern was established in relation to the point of inflow, and the locations for 10 sampling points were measured and recorded. These discrete samples were analyzed for organochlorine pesticides, metals, nutrients, and organic carbon. Residential 3, Industrial 1, and Commercial 3 were resampled in order to determine the temporal changes in toxicity. Raw and sieved portions of these samples were analyzed to determine the effects of sample preparation on sediment toxicity.

Quality-assurance replicate samples were analyzed for COD, metals, nutrients, acid-base-neutral compounds, organic and inorganic carbon, and organochlorine pesticides. Quality-assurance data for Residential 1T, Residential 4, Residential 5, Residential 7, Commercial 5, Industrial 6, and Industrial 8 are shown in table 13.

Toxicity testing is designed to compare survival rates of *Hyalella azteca* in 100-percent test sediment (test end point) with survival rates in a negative-control sediment of silica sand. Five separate 1-liter glass beakers were filled with 100 g of test and negative-control sediments and 400 mL of reconstituted hard water. The beakers were equipped with aeration devices and allowed to stabilize for 24 hours before testing. Conductivity, pH, hardness, and alkalinity of the water were measured at the end of this equilibration period. Twenty *Hyalella azteca* were introduced to each of the control and test vessels and were screened at the end of the test period (10 days) to determine mortality.

PRESENTATION OF BASIC DATA

The descriptive statistics, results of sediment-toxicity tests using the organism *Hyalella azteca*, and the raw data are presented in tables 1–13 and figures 2–9 in the section entitled "Basic Data" at the back of the report. The physical characteristics reported for the retention and detention basins sampled include year of construction, basin area, drainage area, percentage of the drainage area that determines the basin classification, previous land use, current type of ground cover, and type of stormwater delivery to the basin—storm drain, surface runoff, or a combination of storm drain and surface runoff (tables 1 and 2). Engineering records for Industrial 3 and Industrial 6 were unavailable; therefore, information on these basins is incomplete. Two basins handle the stormwater runoff at Industrial 8; therefore, there are two different detention-basin areas. Physical properties, nutrients, inorganic constituents, and organochlorine pesticides are summarized in tables 3 and 4. Inorganic constituents of surface and subsurface sediment samples are summarized in table 5. The survival rates of *Hyalella azteca* in sediments are given, in percent, in table 6. Chemical and grain-size analyses for surface and subsurface sediments are given in tables 7 and 8. Chemical analyses for discrete samples from Residential 4 are shown to assess spatial variability of selected constituents (table 9). Temporal variations of pH and COD in Residential 1T and Residential 4 are presented in figures 2 and 3. Temporal variations of the nitrogen compounds, phosphorus, copper, lead, and zinc for Residential 1T and Residential 4 are shown in figures 4–9. Chemical analyses for sediments collected April 7 through August 31, 1994, in Residential 1T and Residential 4 for assessment of temporal variability are in table 10. Survival rates for *Hyalella azteca* in 1994 are given in table 11. Laboratory results for effects of sample preparation on toxicity results are shown in table 12. Quality-assurance sample replicates are given in table 13.

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BASIC DATA

(page 9 follows)

Table 1. General summary information for retention and detention basins, Maricopa County, Arizona

Basin type	Construction dates	Basin area, in square meters	Drainage areas, in square kilometers	Land use, in percent
Industrial	1964–89	110–30,000	0.00127–0.886	91–100
Commercial	1981–91	176–2,100	.000641–.0206	100
Residential	1974–88	762–22,900	.0983–.837	48–100

Table 2. Physical characteristics of retention and detention basins

[B, bare ground; Bd, boulder; C, cobble; G, grass; Gr, gravel; H, hedge; R, reeds; T, trees; W, weeds; SR, surface runoff; SD, storm drain. N/A, not applicable]

Basin name	Date of sample	Year of construction	Detention-basin area, in square meters	Drainage-basin area, in square kilometers	Land use, in percent	Previous land use	Ground cover	Type of drainage
				Industrial				
Industrial 1	03–03–94	[1]1964–71	1,300	0.0705	98	Agriculture	B/G/T/W	SR/SD
Industrial 2	03–02–94	1975	4,330	.0900	91	Agriculture	B/G/T/W	SD
Industrial 3	03–02–94	1976	2,060	N/A	N/A	Commercial	B/G/T	SD
Industrial 4	02–17–94	1989	30,000	.886	100	Industrial	B/W	SR/SD
Industrial 5	11–10–94	1970	166	.00127	100	Agriculture	G/W	SR
Industrial 6	12–29–94	1966	N/A	N/A	N/A	Industrial	B/R	SR
Industrial 7	12–15–94	1985	110	.00142	100	Commercial	B/Gr	SR
Industrial 8	11–08–94	1977	360/341	.0286	100	Desert	Bd/Gr	SR
				Commercial				
Commercial 1	03–03–94	1980	2,100	.0175	100	Agricultural/ Bare[2]	G	SR
Commercial 2	03–04–94	1987	688	.00449	100	Commercial	G/H	SR
Commercial 3	03–03–94	1985	1,390	.0192	100	Desert	B/T	SR
Commercial 4	02–17–94	1982	1,300	.0197	100	Desert	B/Gr	SR
Commercial 5	11–10–94	1986	840	.0206	100	Agriculture	B/Gr/W	SR
Commercial 6	12–30–94	[1]1989–91	176	.000641	100	Agricultural/ Bare[3]	B/C/Gr	SR
Commercial 7	12–30–94	1988	438	.00973	100	Agriculture	B/Bd/Gr	SR
Commercial 8	11–08–94	1986	1,540	.000873	100	Desert	B/Gr/T/W	SR
				Residential				
Residential 1	02–16–94	1978	17,700	.702	92	Agriculture	G/T	SD
Residential 1T	04–07–94	1983	22,900	.837	98	Agriculture	G/T/W	SD
Residential 2	03–02–94	1988	4,610	.207	100	Agricultural/ Residential[4]	G/T/W	SR
Residential 3	02–17–94	1985	762	.527	100	Desert	B/T	SR
Residential 4	02–17–94	1979	1,110	.0983	48	Desert	B/T/W	SR
Residential 5	12–15–94	1977	6,680	.400	100	Agriculture	B/Gr/T	SR/SD
Residential 6	12–15–94	1974	4,780	.713	89	Agriculture	G/T	SD
Residential 7	11–08–94	1988	4,050	.111	100	Residential	G/T/W	SD
Residential 8	11–10–94	1984	4,090	.481	100	Agriculture	G/W	SD

[1]Dates from historical aerial photographs.
[2]Agricultural until 1967; bare ground until construction date.
[3]Agricultural until 1973; bare ground until construction dates.
[4]Agricultural until 1972; residential thereafter.

Table 3. Summary statistics for physical properties, nutrients, and inorganic constituents in sediments from detention basins that drain industrial, commercial, and residential basins

[Units are expressed in micrograms per gram unless otherwise noted. mg/kg, milligram per kilogram; g/kg, gram per kilogram; <, less than. N/A, not applicable]

Constituent	Mean	Standard deviation	Median	Maximum	Minimum	Number of non-detections	Detection limit
			Industrial				
pH	7.2	0.32	7.25	7.6	6.6	N/A	N/A
Soil moisture, in percent	2.88	.99	2.5	4	2	0	.1
Nitrogen, NH_4 (mg/kg)	8.68	5.44	7.45	19	2.4	0	.2
Nitrogen, NH_4+organic (mg/kg)	1,141	725	985	2,600	360	0	20.0
Nitrogen, NO_2+NO_3 (mg/kg)[1]	9.13	10.6	8.0	23	<2.0	2	2.0
Phosphorus (mg/kg)	924	253	955	1,300	570	0	40.0
Carbon, inorganic (g/kg)[1]	4.42	4.72	2.80	14.0	<.1	1	.1
Carbon, inorganic+ organic (g/kg)	28.1	16.6	23	51	6	0	.1
Arsenic	8.5	3.16	8	14	5	0	1.0
Cadmium[1]	1.78	1.09	1.50	3.0	<1.0	3	1.0
Chromium	25	9.26	25	40	10	0	1.0
Cobalt	17.5	4.63	20	20	10	0	5.0
Copper	62.5	31.1	65	110	20	0	1.0
Lead	67.5	64.5	50	220	20	0	10.0
Manganese	489	115	480	700	330	0	1.0
Zinc	228	118	200	470	70	0	1.0
Iron	14,600	3,500	14,000	21,000	10,000	0	1.0
Mercury	.041	.024	.03	.07	.02	0	.01
			Commercial				
pH	7.32	.38	7.3	7.9	6.8	N/A	N/A
Soil moisture, in percent	3.62	.74	3.5	5	3	0	.1
Nitrogen, NH_4 (mg/kg)	15.7	9.67	13.5	34	6.1	0	.2
Nitrogen, NH_4+organic (mg/kg)	1,240	911	860	3,200	490	0	20.0
Nitrogen, NO_2+NO_3 (mg/kg)[1]	12.38	5.42	11.5	22	6	0	2.0
Phosphorus (mg/kg)	805	246	790	1,100	480	0	40.0
Carbon, inorganic (g/kg)[1]	4.79	4.11	3.55	12	.9	0	.1

See footnote at end of table.

Table 3. Summary statistics for physical properties, nutrients, and inorganic constituents in sediments from detention basins that drain industrial, commercial, and residential basins—Continued

Constituent	Mean	Standard deviation	Median	Maxi-mum	Mini-mum	Number of non-detections	Detection limit
Commercial—Continued							
Carbon, inorganic+ organic (g/kg)	26.2	15.2	25	49	9.6	0	.1
Arsenic	8	2	7.5	12	6	0	1.0
Cadmium[1]	1.21	.754	1.03	2.0	<1.0	4	1.0
Chromium	18.75	6.41	20	30	10	0	1.0
Cobalt	12.5	4.63	10	20	10	0	5.0
Copper	33.75	11.88	30	50	20	0	1.0
Lead	51.25	51.11	25	150	10	0	10.0
Manganese	518	114	495	700	400	0	1.0
Zinc	195	154	140	530	40	0	1.0
Iron	13,000	1,690	13,000	15,000	10,000	0	1.0
Mercury	.064	.075	.035	.24	.02	0	.01
Residential							
pH	7.08	.37	7	7.8	6.5	N/A	N/A
Soil moisture, in percent	3.28	.95	4	4	2	0	.1
Nitrogen, NH_4 (mg/kg)	11.04	10.6	7.4	36	4.2	0	.2
Nitrogen, NH_4+organic (mg/kg)	1,240	675	1,300	2,200	410	0	20.0
Nitrogen, NO_2+NO_3 (mg/kg)[1]	9.74	7.36	7.5	25	<2.0	1	2.0
Phosphorus (mg/kg)	1,046	401	990	1,900	620	0	40.0
Carbon, inorganic (g/kg)	6.02	9.32	2.05	28	.5	0	.1
Carbon, inorganic+ organic (g/kg)	22.28	17.09	20.5	61	6.5	0	.1
Arsenic	8.12	2.53	8	11	4	0	1.0
Cadmium[1]	2.19	2.35	1	7	<1.0	2	1.0
Chromium	33.75	29.25	20	100	10	0	1.0
Cobalt	12.5	4.63	10	20	10	0	5.0
Copper	42.5	21.21	40	90	20	0	1.0
Lead	43.75	29.25	40	90	10	0	10.0
Manganese	460	194	465	680	190	0	1.0
Zinc	136	92	110	310	50	0	1.0
Iron	13,100	4,245	14,000	18,000	4,800	0	1.0
Mercury[1]	.22	.41	.04	1.20	<.01	1	.01

[1]One or more sampling sites showed concentrations below detection limits for this constituent. Statistics were calculated using log-probability regression methods described in Helsel and Cohn (1989).

Table 4. Summary statistics for organochlorine pesticides in sediments from detention basins that drain industrial, commercial, and residential basins

[Values are in micrograms per kilogram (mg/kg). DDD, dichlorodiphenyldichloroethane; DDE, dichlorodiphenylethylene; DDT, dichlorodiphenyltrichloroethane; PCB, polychlorinated biphenyl; <, less than. Dashes indicate no data]

Constituent	Mean	Standard deviation	Median	Maximum	Minimum	Number of non-detections	Detection limit
Industrial							
Aldrin[1]	2.35	5.48	0.40	6.3	<0.1	2	0.10
Chlordane	55.1	88.4	28.5	270	5	0	1.0
DDD[1]	1.81	3.25	.70	9.8	<.1	3	.10
DDE	46.6	70.3	7.45	190	2.1	0	.1
DDT[1]	3.44	4.72	1.20	12	<.1	2	.1
Dieldrin[1]	3.3	4.24	1.20	11.0	<.4	3	.4
Endrin[2]	---	---	---	---	---	8	.1
Heptachlor[3]	---	---	---	.1	<.1	7	.1
Heptachlor epoxide[3]	---	---	---	1.2	<.1	6	.1
Lindane[3]	---	---	---	.1	<.1	7	.1
Toxaphene[1]	26.6	26.3	15	80	<10	1	10.0
PCB	19.5	19.2	15	58	1	0	1.0
Commercial							
Aldrin[1]	.61	.75	.35	2.4	<.3	2	.10
Chlordane	22.8	16.1	24.5	47	2	0	1.0
DDD[1]	1.40	1.74	.80	4.8	<.1	3	.10
DDE	42.7	57.6	24	180	3.4	0	.1
DDT[1]	5.11	7.99	2.5	24	<.1	3	.1
Dieldrin	1.3	1.3	.85	4.4	.4	0	.4
Endrin[3]	---	---	---	2.2	<.1	7	.1
Heptachlor[2]	---	---	---	---	---	8	.1
Heptachlor epoxide[1]	.19	.31	.42	.9	<.1	5	.1
Lindane[3,4]	---	---	---	.4	<.1	6	.1
Toxaphene[1]	63	59.1	45	160	<10	1	10.0
PCB[4]	17.8	37.5	3	110	2	0	1.0
Residential							
Aldrin[1]	.8	.92	.55	2.7	<.1	2	.10
Chlordane[1]	250	391	23	950	<1.0	1	1.0
DDD[1]	7.38	14.3	1.9	42	<.1	3	.10
DDE	54.1	68.3	22	180	.7	0	.1
DDT[1]	2.55	2.41	2.3	6.4	<2.0	1	.1
Dieldrin[1]	10.8	23.6	3.1	69	<.8	1	.4
Endrin[2]	---	---	---	---	---	8	.1
Heptachlor[3]	---	---	---	.6	<.1	6	.1
Heptachlor epoxide[1]	.85	1.42	.40	4.3	<.1	1	.1
Lindane[3]	---	---	---	.3	<.1	7	.1
Toxaphene[1]	62.4	57.9	50	180	<10	2	10.0
PCB	274	700	7.5	2,000	1	0	1.0

[1]One or more sampling sites showed concentrations below detection limits for this constituent. Statistics were calculated using log-probability regression methods described in Helsel and Cohn (1989).

[2]All sampling sites showed concentrations below detection limits for this constituent. See table 10 for raw data values.

[3]Less than half of sampling sites showed concentrations above detection limits for this constituent. Statistics were not computed. See table 10 for raw data values.

[4]Data set contains estimated values. See table 10 for raw data values.

Table 5. Summary statistics for inorganic constituents in surface and subsurface sediment samples from six detention basins

[Values are in micrograms per gram (mg/g). <, less than. Dashes indicate no data]

Constituent	Sample location	Mean	Standard deviation	Median	Maximum	Minimum	Number of non-detections	Detection limit
Arsenic	Surface	7	2.61	6.5	11	4	0	1.0
	Subsurface	9.83	3.19	9	15	7	0	1.0
Cadmium	Surface[1]	1.74	1.09	1.5	3	<1	1	1.0
	Subsurface[2]	---	---	---	1	<1	4	1.0
Chromium	Surface	23.3	12.11	25	40	10	0	1.0
	Subsurface	20	12.65	15	40	10	0	1.0
Cobalt	Surface	15	5.48	15	20	10	0	5.0
	Subsurface	15	5.48	15	20	10	0	5.0
Copper	Surface	50	28.28	40	90	20	0	1.0
	Subsurface	30	12.65	25	50	20	0	1.0
Lead	Surface	71.7	74.7	45	220	20	0	10.0
	Subsurface	51.7	63.4	25	180	20	0	10.0
Manganese	Surface	427	130	380	630	300	0	1.0
	Subsurface	440	169	415	680	250	0	1.0
Zinc	Surface	188	150	140	470	70	0	1.0
	Subsurface	88	66	70	220	40	0	1.0
Iron	Surface	12,600	4,600	11,500	18,000	6,800	0	1.0
	Subsurface	14,800	6,740	12,500	24,000	7,000	0	1.0
Mercury	Surface	.048	.021	.05	.07	.02	0	.01
	Subsurface	.025	.008	.02	.04	.02	0	.01

[1]One or more sampling sites showed concentrations below detection limits for this constituent. Statistics were calculated using log-probability regression methods described in Helsel and Cohn (1989).

[2] Less than half of sampling sites showed concentrations above detection limits for this constituent. Statistics were not computed. See table 11 for raw data values.

Table 6. Summary statistics for survival rates of *Hyalella azteca*, in percent, in sediments from detention basins

Basin type	Mean	Standard deviation	Median	Maximum	Minimum
Industrial	50.4	43.9	64.5	95	0
Commercial	34	39.7	22	94	0
Residential	48.5	41.0	68.5	94	0

Table 7. Chemical and grain-size analyses for sediments from detention basins that drain industial, commercial, and residential basins

SITE NAME	DATE	PH WATER WHOLE FIELD (STANDARD UNITS) (00400)	MOISTURE CONTENT DRY WT. (% OF TOTAL) (00495)	NITROGEN, NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	NITROGEN, NH4 + ORG. TOT IN BOT MAT (MG/KG AS N) (00626)	NITROGEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	PHOSPHORUS TOTAL IN BOT. MAT. (MG/KG AS P) (00668)
COMMERCIAL 4	02-17-94	7.1	3	6.1	1400	16	480
COMMERCIAL 1	03-03-94	7.0	3	15	1800	6.0	840
COMMERCIAL 3	03-03-94	6.8	4	26	720	10	480
COMMERCIAL 2	03-04-94	7.1	3	15	3200	22	1100
COMMERCIAL 8	11-08-94	7.9	5	11	700	16	1100
COMMERCIAL 5	11-10-94	7.6	3	12	1000	13	970
COMMERCIAL 7	12-30-94	7.5	4	6.5	490	9.0	740
COMMERCIAL 6	12-30-94	7.6	4	34	570	7.0	730
INDUSTRIAL 4	02-17-94	7.6	3	2.4	360	6.0	700
INDUSTRIAL 3	03-02-94	6.6	4	12	2600	7.0	1000
INDUSTRIAL 2	03-02-94	7.4	2	4.1	1400	12	710
INDUSTRIAL 1	03-03-94	7.2	2	5.0	870	9.0	920
INDUSTRIAL 8	11-08-94	6.9	4	19	1600	23	1200
INDUSTRIAL 5	11-10-94	7.2	4	6.5	1100	<2.0	1300
INDUSTRIAL 7	12-15-94	7.3	2	12	610	10	990
INDUSTRIAL 6	12-29-94	7.4	2	8.4	590	<2.0	570
RESIDENTIAL 1	02-16-94	7.0	3	14	2200	6.0	1200
RESIDENTIAL 4	02-17-94	7.1	2	4.5	1300	14	620
RESIDENTIAL 3	02-17-94	7.0	4	5.1	570	9.0	630
RESIDENTIAL 2	03-02-94	6.5	4	6.7	1300	6.0	1100
RESIDENTIAL 7	11-08-94	7.8	4	8.1	640	4.0	940
RESIDENTIAL 8	11-10-94	7.3	4	4.2	410	<2.0	980
RESIDENTIAL 5	12-15-94	6.9	2	9.7	1400	12	1000
RESIDENTIAL 6	12-15-94	7.0	2	36	2100	25	1900

SITE NAME	CARBON, INORGANIC, TOT IN BOT MAT (G/KG AS C) (00686)	CARBON, INORG + ORGANIC TOT. IN BOT MAT (GM/KG AS C) (00693)	ARSENIC TOTAL IN BOTTOM MATERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOTTOM MATERIAL (UG/G AS CD) (01028)	CHROMIUM, RECOV. FM BOTTOM MATERIAL (UG/G) (01029)	COBALT, RECOV. FM BOTTOM MATERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOTTOM MATERIAL (UG/G AS CU) (01043)	LEAD, RECOV. FM BOTTOM MATERIAL (UG/G AS PB) (01052)	MANGANESE, RECOV. FM BOTTOM MATERIAL (UG/G) (01053)	ZINC, RECOV. FM BOTTOM MATERIAL (UG/G AS ZN) (01093)
COMMERCIAL 4	1.2	34	7	2	30	10	40	110	400	280
COMMERCIAL 1	12	33	7	2	10	20	30	20	530	100
COMMERCIAL 3	0.9	9.6	6	<1	20	10	20	20	460	140
COMMERCIAL 2	5.1	42	6	1	20	10	50	150	420	220
COMMERCIAL 8	2.2	14	9	<1	20	10	30	30	660	140
COMMERCIAL 5	3.6	49	8	2	20	10	50	50	700	530
COMMERCIAL 7	3.5	11	9	<1	20	20	30	20	550	110
COMMERCIAL 6	10	17	12	<1	10	10	20	10	420	40
iNDUSTRIAL 4	1.5	6.0	6	<1	10	10	20	20	480	70
INDUSTRIAL 3	<0.1	39	5	3	40	20	90	220	540	470
INDUSTRIAL 2	14	51	9	3	30	20	80	70	360	220
INDUSTRIAL 1	7.4	17	6	1	20	20	70	40	480	170
INDUSTRIAL 8	0.3	50	14	2	30	20	60	60	470	300
INDUSTRIAL 5	6.4	22	12	<1	20	20	30	30	550	170
INDUSTRIAL 7	1.7	16	9	<1	30	20	40	30	700	180
INDUSTRIAL 6	3.9	24	7	3	20	10	110	70	330	240
RESIDENTIAL 1	28	61	9	4	50	10	40	50	190	130
RESIDENTIAL 4	0.5	25	7	1	20	10	40	50	330	180
RESIDENTIAL 3	1.8	7.7	6	<1	10	10	20	20	400	70
RESIDENTIAL 2	1.7	14	11	1	30	20	40	30	630	90
RESIDENTIAL 7	2.3	6.5	11	<1	20	20	30	20	530	50
RESIDENTIAL 8	9.6	21	10	<1	20	10	30	10	670	50
RESIDENTIAL 5	1.3	20	7	1	20	10	50	80	680	210
RESIDENTIAL 6	3.0	23	4	7	100	10	90	90	250	310

Table 7. Chemical and grain-size analyses for sediments from detention basins that drain industial, commercial, and residential basins—Continued

SITE NAME	IRON, RECOV. FM BOTTOM MATERIAL (UG/G AS FE) (01170)	MERCURY RECOV. FM BOTTOM MATERIAL (UG/G AS HG) (71921)	PERTHANE IN BOTTOM MATERIAL (UG/KG) (81886)	ENDOSULFAN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39389)	ALDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39333)	CHLORDANE, TOTAL IN BOTTOM MATERIAL (UG/KG) (39351)	DDD, TOTAL IN BOTTOM MATERIAL (UG/KG) (39363)	DDE, TOTAL IN BOTTOM MATERIAL (UG/KG) (39368)	DDT, TOTAL IN BOTTOM MATERIAL (UG/KG) (39373)	DIELDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39383)
COMMERCIAL 4	13000	0.04	<1.00	<0.1	0.2	47	<0.1	9.3	<0.6	0.8
COMMERCIAL 1	10000	0.03	<16.0	<0.3	<0.4	10	<0.7	180	5.9	0.7
COMMERCIAL 3	13000	0.03	<3.00	<0.1	<0.3	21	<0.3	3.4	<0.4	0.7
COMMERCIAL 2	12000	0.09	<22.0	<0.4	2.4	34	3.4	30	24	4.4
COMMERCIAL 8	15000	0.04	<1.00	<0.1	0.7	28	0.9	48	<0.1	0.8
COMMERCIAL 5	14000	0.02	<16.0	<0.4	0.3	35	4.8	41	5.2	0.9
COMMERCIAL 7	15000	0.24	<2.00	<0.1	0.4	5.0	0.9	12	1.0	0.9
COMMERICAL 6	12000	0.02	<2.00	<0.1	0.5	2.0	0.7	18	4.0	1.6
INDUSTRIAL 4	13000	0.02	<1.00	<0.1	2.0	5.0	<0.1	2.1	0.7	0.4
INDUSTRIAL 3	18000	0.07	<1.00	<0.7	6.3	270	9.8	190	9.9	11
INDUSTRIAL 2	10000	0.07	<21.0	<0.7	5.3	42	<0.6	35	<2.4	8.5
INDUSTRIAL 1	12000	0.07	<1.00	<0.2	0.1	50	<3.9	120	12	3.9
INDUSTRIAL 8	21000	0.02	<1.00	<0.4	<0.1	36	0.7	5.3	<0.1	<0.4
INDUSTRIAL 5	15000	0.03	<1.00	<0.3	0.3	8.0	0.7	5.2	0.3	<0.8
INDUSTRIAL 7	15000	0.03	<2.00	<0.2	0.5	21	1.3	8.0	1.7	2.0
INDUSTRIAL 6	13000	0.02	<2.00	<0.3	<1.0	9.0	1.2	6.9	2.2	<0.8
RESIDENTIAL 1	4800	0.38	<7.00	<0.1	2.7	25	<1.2	20	<2.0	3.5
RESIDENTIAL 4	13000	0.06	<28.0	<0.7	0.7	950	<3.0	12	0.9	2.7
RESIDENTIAL 3	10000	0.02	<1.00	<0.1	<0.1	21	<0.1	1.8	0.2	0.7
RESIDENTIAL 2	18000	0.04	<19.0	<0.3	<0.4	21	4.0	180	6.4	3.6
RESIDENTIAL 7	15000	0.04	<6.00	<0.3	0.4	16	3.6	54	4.5	0.8
RESIDENTIAL 8	17000	<0.01	<1.00	<0.1	0.1	<1.00	0.2	0.7	0.2	<0.8
RESIDENTIAL 5	15000	0.04	<10.0	<0.7	1.5	170	9.0	24	3.7	5.4
RESIDENTIAL 6	12000	1.2	<8.00	<0.5	0.9	800	42	140	4.1	69

SITE NAME	ENDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39393)	HEPTACHLOR, TOTAL IN BOTTOM MATERIAL (UG/KG) (39413)	HEPTACHLOR EPOXIDE TOT. IN BOTTOM MATL. (UG/KG) (39423)	LINDANE TOTAL IN BOTTOM MATERIAL (UG/KG) (39343)	TOXAPHENE, TOTAL IN BOTTOM MATERIAL (UG/KG) (39403)	PCB, TOTAL IN BOTTOM MATERIAL (UG/KG) (39519)	PCN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39251)	METHOXYCHLOR, TOT. IN BOTTOM MATL. (UG/KG) (39481)	MIREX, TOTAL IN BOTTOM MATERIAL (UG/KG) (39758)
COMMERCIAL 4	<0.3	<0.1	<0.2	E0.4	20	14	<1.0	<170	<0.1
COMMERCIAL 1	2.2	<0.3	0.3	<0.1	160	2	<1.0	<0.7	<0.1
COMMERCIAL 3	<0.3	<0.1	<0.1	<0.1	<10	2	<1.0	<2.9	<0.1
COMMERCIAL 2	<1.3	<0.2	0.9	<0.3	80	110	<1.0	<9.0	<0.3
COMMERCIAL 8	<0.1	<0.1	<0.1	<0.1	40	E4	<1.0	<4.0	<0.1
COMMERCIAL 5	<10	<0.1	0.2	0.3	140	6	<1.0	<6.0	<0.1
COMMERCIAL 7	<2.0	<0.1	<0.1	<0.1	10	2	<1.0	<6.0	<0.1
COMMERICAL 6	<0.8	<0.1	<0.1	<0.1	50	2	<1.0	<2.4	<0.1
INDUSTRIAL 4	<0.1	<0.1	<0.1	<0.1	10	1	<1.0	<2.8	<0.1
INDUSTRIAL 3	<0.9	<0.3	1.2	<0.3	80	58	<1.0	<7.1	<0.8
INDUSTRIAL 2	<0.9	<0.1	<0.3	<0.3	30	34	<1.0	<1.8	<0.4
INDUSTRIAL 1	<0.7	0.1	<0.1	<0.1	50	8	<1.0	<3.3	<0.1
INDUSTRIAL 8	<0.1	<0.1	<0.1	<0.1	10	E6	<1.0	<4.0	<0.1
INDUSTRIAL 5	<0.2	<0.1	<0.1	<0.1	<10	5	<1.0	<1.6	<0.1
INDUSTRIAL 7	<2.0	<0.1	0.1	0.1	10	22	<1.0	<6.0	<0.1
INDUSTRIAL 6	<3.0	<1.0	<0.1	<0.1	20	22	<1.0	<2.4	<1.0
RESIDENTIAL 1	<0.6	<0.1	0.4	<0.1	20	160	<1.0	<1.0	<1.1
RESIDENTIAL 4	<1.4	0.6	4.3	<1.0	180	10	<1.0	<1.0	<0.1
RESIDENTIAL 3	<0.1	<0.1	0.1	<0.1	<10	2	<1.0	<7.0	<0.1
RESIDENTIAL 2	<0.8	<0.1	0.4	<0.1	80	5	<1.0	<0.6	<0.1
RESIDENTIAL 7	<4.0	<0.1	0.2	<0.1	60	3	<1.0	<1.6	<0.1
RESIDENTIAL 8	<0.1	<0.1	<0.1	<0.1	<10	1	<1.0	<1.6	<0.1
RESIDENTIAL 5	<9.0	<0.1	0.5	0.3	40	10	<1.0	<12	<0.1
RESIDENTIAL 6	<7.0	0.2	0.9	<0.1	100	2000	<1.0	<9.0	<0.6

Table 7. Chemical and grain-size analyses for sediments from detention basins that drain industial, commercial, and residential basins—Continued

SEDIMENT SIZE ANALYSES

SITE NAME	BED MAT. FALL DIAM.DW % FINER THAN .002 MM (80294)	BED MAT. FALL DIAM. % FINER THAN .004 MM (80157)	BED MAT. FALL DIAM.DW % FINER THAN .008 MM (80293)	BED MAT. FALL DIAM.DW % FINER THAN .031 MM (80283)	BED MAT. FALL DIAM. % FINER THAN .062 MM (80158)	BED MAT. FALL DIAM. % FINER THAN .125 MM (80159)	BED MAT. FALL DIAM. % FINER THAN .250 MM (80160)
COMMERCIAL 4	33	39	46	63	74	83	89
COMMERCIAL 1	26	34	44	62	77	87	95
COMMERCIAL 3	14	14	18	32	47	57	62
COMMERCIAL 2	15	17	22	40	59	76	87
COMMERCIAL 8	17	24	32	49	56	58	59
COMMERCIAL 5	12	16	17	28	35	40	47
COMMERCIAL 7	5	6	7	10	15	18	20
COMMERCIAL 6	16	18	19	30	45	65	78
INDUSTRIAL 4	17	19	21	45	78	85	88
INDUSTRIAL 3	26	36	51	84	94	96	97
INDUSTRIAL 2	41	56	69	91	97	98	99
INDUSTRIAL 1	23	25	27	40	56	65	73
INDUSTRIAL 8	28	37	50	76	84	87	91
INDUSTRIAL 5	29	33	35	48	65	78	87
INDUSTRIAL 7	4	5	5	9	11	14	17
INDUSTRIAL 6	4	5	6	12	26	49	70
RESIDENTIAL 1	33	39	46	63	74	83	89
RESIDENTIAL 4	11	15	21	39	54	62	66
RESIDENTIAL 3	15	15	16	38	66	74	79
RESIDENTIAL 2	17	29	44	74	88	92	93
RESIDENTIAL 7	23	27	30	51	72	88	96
RESIDENTIAL 8	17	18	21	29	38	47	55
RESIDENTIAL 5	22	27	29	40	48	53	59
RESIDENTIAL 6	20	22	24	36	53	63	70

SITE NAME	BED MAT. FALL DIAM.DW % FINER THAN .500 MM (80161)	BED MAT. FALL DIAM. % FINER THAN 1.00 MM (80162)	BED MAT. FALL DIAM.DW % FINER THAN 1.00 MM (80168)	BED MAT. FALL DIAM.DW % FINER THAN 2.00 MM (80169)	BED MAT. FALL DIAM. % FINER THAN 4.00 MM (80170)	BED MAT. FALL DIAM. % FINER THAN 8.00 MM (80171)
COMMERCIAL 4	89	--	93	96	99	100
COMMERCIAL 1	97	--	97	98	100	--
COMMERCIAL 3	68	--	73	79	91	100
COMMERCIAL 2	91	--	94	96	97	100
COMMERCIAL 8	61	--	63	66	72	88
COMMERCIAL 5	53	--	58	68	76	91
COMMERCIAL 7	23	--	25	29	33	34
COMMERCIAL 6	85	--	91	94	96	100
INDUSTRIAL 4	91	--	92	95	100	--
INDUSTRIAL 3	99	100	--	--	--	--
INDUSTRIAL 2	100	100	--	--	--	--
INDUSTRIAL 1	83	--	90	93	96	100
INDUSTRIAL 8	95	--	98	99	100	--
INDUSTRIAL 5	94	--	98	100	100	--
INDUSTRIAL 7	25	--	33	46	55	76
INDUSTRIAL 6	88	--	96	98	98	100
RESIDENTIAL 1	91	--	95	97	99	100
RESIDENTIAL 4	71	--	80	88	95	100
RESIDENTIAL 3	82	--	87	92	97	100
RESIDENTIAL 2	97	--	98	99	100	--
RESIDENTIAL 7	98	--	100	100	--	--
RESIDENTIAL 8	64	--	74	84	91	97
RESIDENTIAL 5	64	--	68	76	85	91
RESIDENTIAL 6	76	--	87	97	100	--

Table 8. Chemical analyses for subsurface sediments collected from selected detention basins to determine background concentrations of inorganic constituents

SITE NAME	DATE	ARSENIC TOTAL IN BOT-TOM MA-TERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOT-TOM MA-TERIAL (UG/G AS CD) (01028)	CHRO-MIUM, RECOV. FM BOT-TOM MA-TERIAL (UG/G) (01029)	COBALT, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS CU) (01043)
RESIDENTIAL 1T	08-02-94	10	1	10	20	20
INDUSTRIAL 2	08-02-94	8	<1	10	10	30
RESIDENTIAL 3	08-02-94	15	1	30	20	50
RESIDENTIAL 4	08-02-94	7	<1	10	10	20
RESIDENTIAL 2	08-02-94	12	<1	40	20	40
INDUSTRIAL 3	08-05-94	7	<1	20	10	20

SITE NAME	LEAD, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS PB) (01043)	MANGA-NESE, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS MN) (01052)	NICKEL, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS NI) (01068)	ZINC, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS ZN) (01093)	IRON, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS FE) (01170)	MERCURY RECOV. FM BOT-TOM MA-TERIAL (UG/G AS HG) (71921)
RESIDENTIAL 1T	30	250	20	50	7000	0.02
INDUSTRIAL 2	40	300	30	80	11000	0.03
RESIDENTIAL 3	170	580	40	220	14000	0.04
RESIDENTIAL 4	20	350	20	40	11000	0.02
RESIDENTIAL 2	20	680	40	70	24000	0.02
INDUSTRIAL 3	20	480	20	70	22000	0.02

Table 9. Chemical analyses for discrete samples from Residential 4 to assess spatial variability of selected constituents

SITE NAME	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	MOIS-TURE CONTENT DRY WT. (% OF TOTAL) (00495)	NITRO-GEN,NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	NITRO-GEN,NH4 + ORG. TOT IN BOT MAT (MG/KG AS N) (00626)	NITRO-GEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	PHOS-PHORUS TOTAL IN BOT. MAT. (MG/KG AS P) (00668)	CARBON, INOR-GANIC, TOT IN BOT MAT (G/KG AS C) (00686)
Residential 4.1	7.1	2	7.5	690	73	670	2.7
Residential 4.2	6.9	2	15	400	16	620	3.7
Residential 4.3	7.0	1	7.6	430	18	560	1.4
Residential 4.4	6.7	3	10	650	14	620	1.0
Residential 4.5	6.9	3	8.4	530	26	540	2.4
Residential 4.6	7.0	4	6.8	580	14	480	1.5
Residential 4.7	6.8	2	14	530	23	640	0.3
Residential 4.8	6.9	2	8.2	490	12	550	0.4
Residential 4.9	6.9	4	9.0	810	49	620	0.3
Residential 4.10	6.9	2	13	150	10	600	0.4

Table 9. Chemical analyses for discrete samples from Residential 4 to assess spatial variability of selected constituents—Continued

SITE NAME	CARBON, INORG + ORGANIC TOT. IN BOT MAT (GM/KG AS C) (00693)	ARSENIC TOTAL IN BOTTOM MATERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOTTOM MATERIAL (UG/G AS CD) (01028)	CHROMIUM, RECOV. FM BOTTOM MATERIAL (UG/G) (01029)	COBALT, RECOV. FM BOTTOM MATERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOTTOM MATERIAL (UG/G AS CU) (01043)	LEAD, RECOV. FM BOTTOM MATERIAL (UG/G AS PB) (01052)	MANGANESE, RECOV. FM BOTTOM MATERIAL (UG/G) (01053)	ZINC, RECOV. FM BOTTOM MATERIAL (UG/G AS ZN) (01093)	IRON, RECOV. FM BOTTOM MATERIAL (UG/G AS FE) (01170)
Residential 4.1	26	4	<1	20	10	50	80	480	190	13000
Residential 4.2	14	7	<1	10	10	40	60	350	180	14000
Residential 4.3	18	5	<1	20	10	30	30	320	110	14000
Residential 4.4	18	6	<1	20	10	170	50	350	140	13000
Residential 4.5	15	6	<1	20	10	30	50	430	120	15000
Residential 4.6	22	6	<1	20	10	30	30	320	100	13000
Residential 4.7	32	6	<1	20	10	50	60	360	210	16000
Residential 4.8	20	6	<1	20	10	40	60	290	150	13000
Residential 4.9	21	6	<1	20	10	50	50	400	170	17000
Residential 4.10	28	6	<1	20	10	30	40	440	90	14000

SITE NAME	MERCURY RECOV. FM BOTTOM MATERIAL (UG/G AS HG) (71921)	PERTHANE IN BOTTOM MATERIAL (UG/KG) (81886)	ENDOSULFAN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39389)	ALDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39333)	CHLORDANE, TOTAL IN BOTTOM MATERIAL (UG/KG) (39351)	DDD, TOTAL IN BOTTOM MATERIAL (UG/KG) (39363)	DDE, TOTAL IN BOTTOM MATERIAL (UG/KG) (39368)	DDT, TOTAL IN BOTTOM MATERIAL (UG/KG) (39373)	DIELDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39383)
Residential 4.1	0.05	<6.00	<2.0	<0.1	410	27	7.9	4.9	3.5
Residential 4.2	0.05	<6.00	<2.0	<0.8	620	34	13	4.6	4.0
Residential 4.3	0.03	<5.00	<1.0	<0.1	320	22	12	4.5	1.9
Residential 4.4	0.03	<5.00	<2.0	2.7	350	20	14	2.8	17
Residential 4.5	0.03	<7.00	1.0	0.4	770	38	12	4.2	5.2
Residential 4.6	0.04	<3.00	<1.0	<0.2	270	18	7.8	2.6	1.6
Residential 4.7	0.05	<6.00	<1.0	<0.6	660	36	14	5.5	0.4
Residential 4.8	0.04	<6.00	<2.0	<1.0	720	37	12	4.4	3.9
Residential 4.9	0.05	<9.00	<3.0	<2.0	760	38	13	4.3	4.1
Residential 4.10	0.02	<4.00	<0.4	0.3	390	26	8.6	3.6	2.9

SITE NAME	ENDRIN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39393)	HEPTACHLOR, TOTAL IN BOTTOM MATERIAL (UG/KG) (39413)	HEPTACHLOR EPOXIDE TOT. IN BOTTOM MATL. (UG/KG) (39423)	LINDANE TOTAL IN BOTTOM MATERIAL (UG/KG) (39343)	TOXAPHENE, TOTAL IN BOTTOM MATERIAL (UG/KG) (39403)	PCB, TOTAL IN BOTTOM MATERIAL (UG/KG) (39519)	PCN, TOTAL IN BOTTOM MATERIAL (UG/KG) (39251)	METHOXYCHLOR, TOT. IN BOTTOM MATL. (UG/KG) (39481)	MIREX, TOTAL IN BOTTOM MATERIAL (UG/KG) (39758)
Residential 4.1	<2.0	0.3	4.6	0.1	10	8	<1.0	<0.8	<0.1
Residential 4.2	<1.0	0.7	5.6	0.2	10	10	<1.0	<0.8	<0.1
Residential 4.3	<0.9	0.4	3.7	0.2	<10	7	<1.0	<0.8	<0.1
Residential 4.4	<0.9	0.8	2.9	0.1	<10	7	<1.0	<0.8	<0.1
Residential 4.5	<2.0	1.0	4.4	0.3	10	6	<1.0	<1.4	<0.1
Residential 4.6	<0.6	0.5	2.3	<0.2	<10	5	<1.0	<4.0	<0.1
Residential 4.7	<1.1	0.8	6.4	0.3	<10	10	<1.0	<4.0	<0.1
Residential 4.8	<2.0	0.8	5.4	0.3	<10	7	<1.0	<4.0	<0.1
Residential 4.9	<2.0	1.0	5.3	0.2	<10	8	<1.0	<4.0	<0.1
Residential 4.10	<0.3	0.8	2.8	<0.2	<10	4	<1.0	<4.0	<0.1

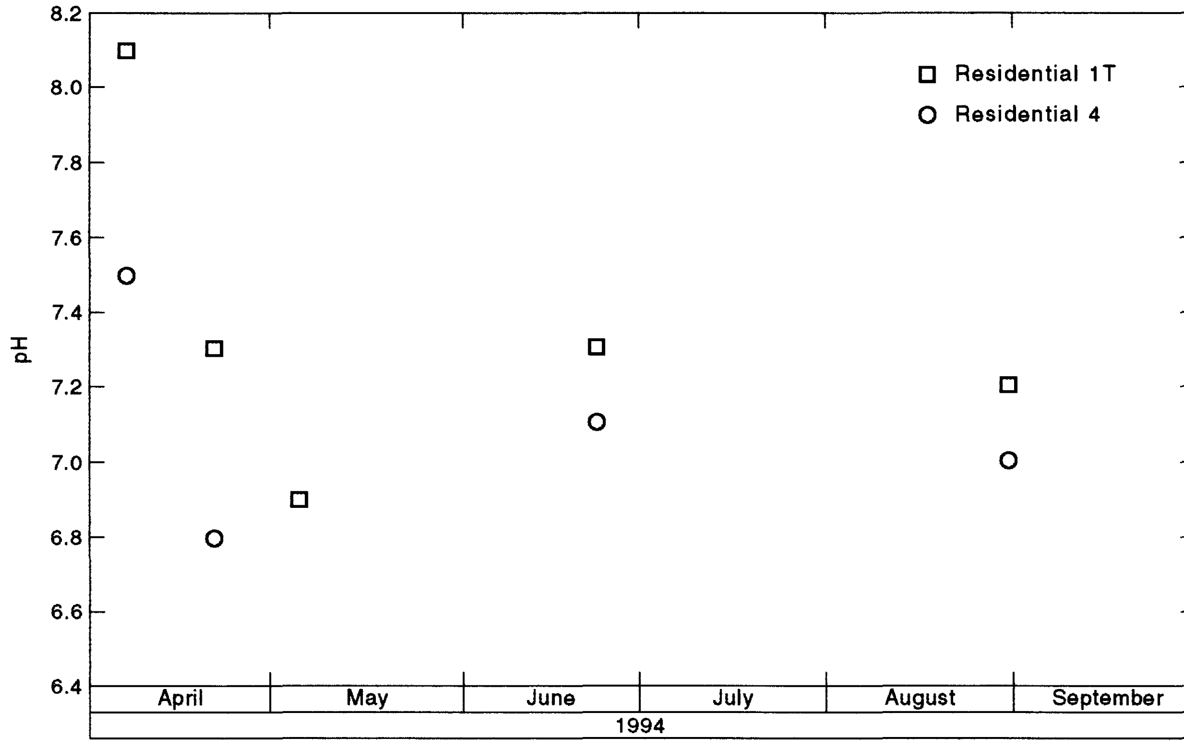

Figure 2. pH in soil at basins Residential 1T and Residential 4.

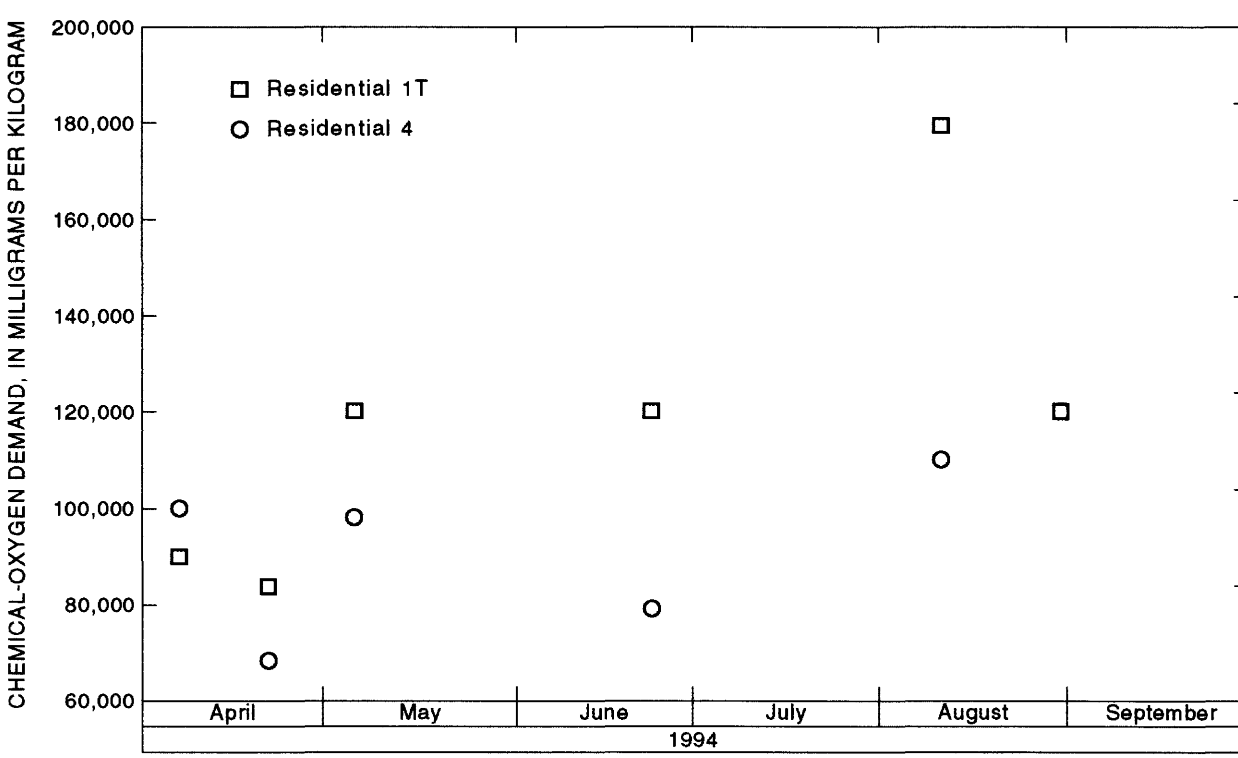

Figure 3. Chemical-oxygen demand in soil at basins Residential 1T and Residential 4.

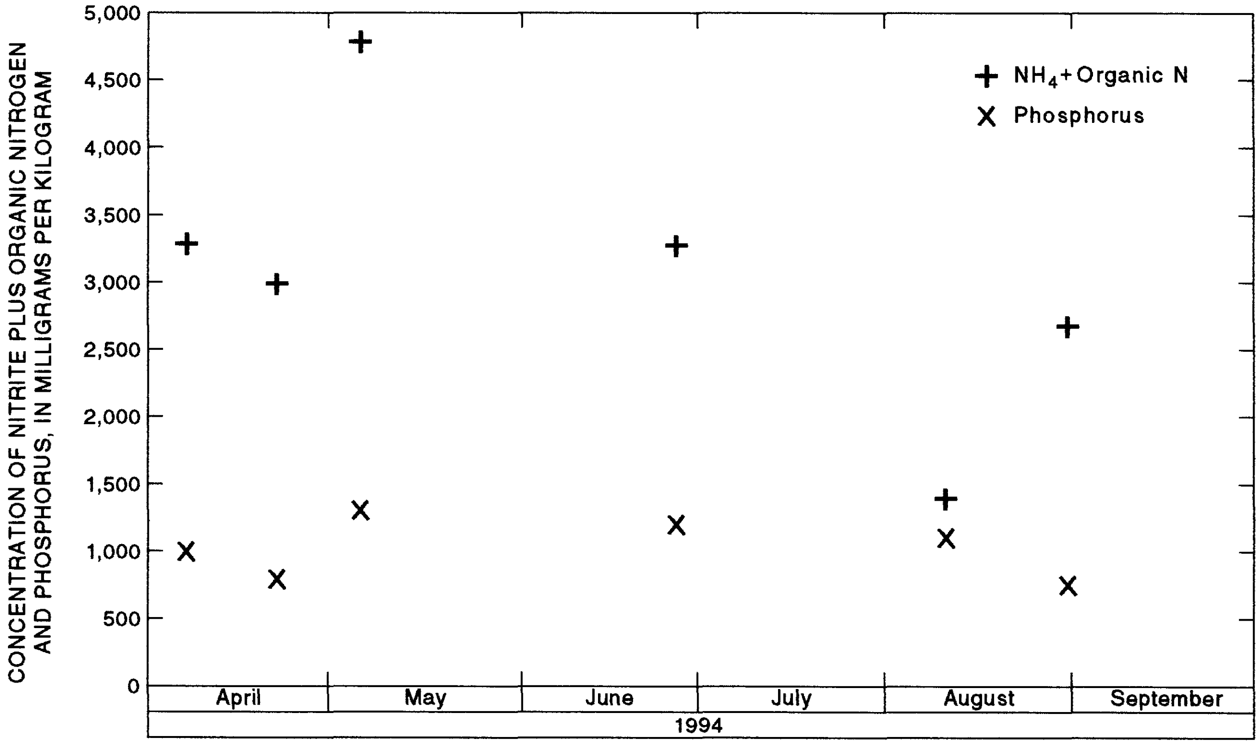

Figure 4. Nitrite plus organic nitrogen and phosphorus in soil at basin Residential 1T.

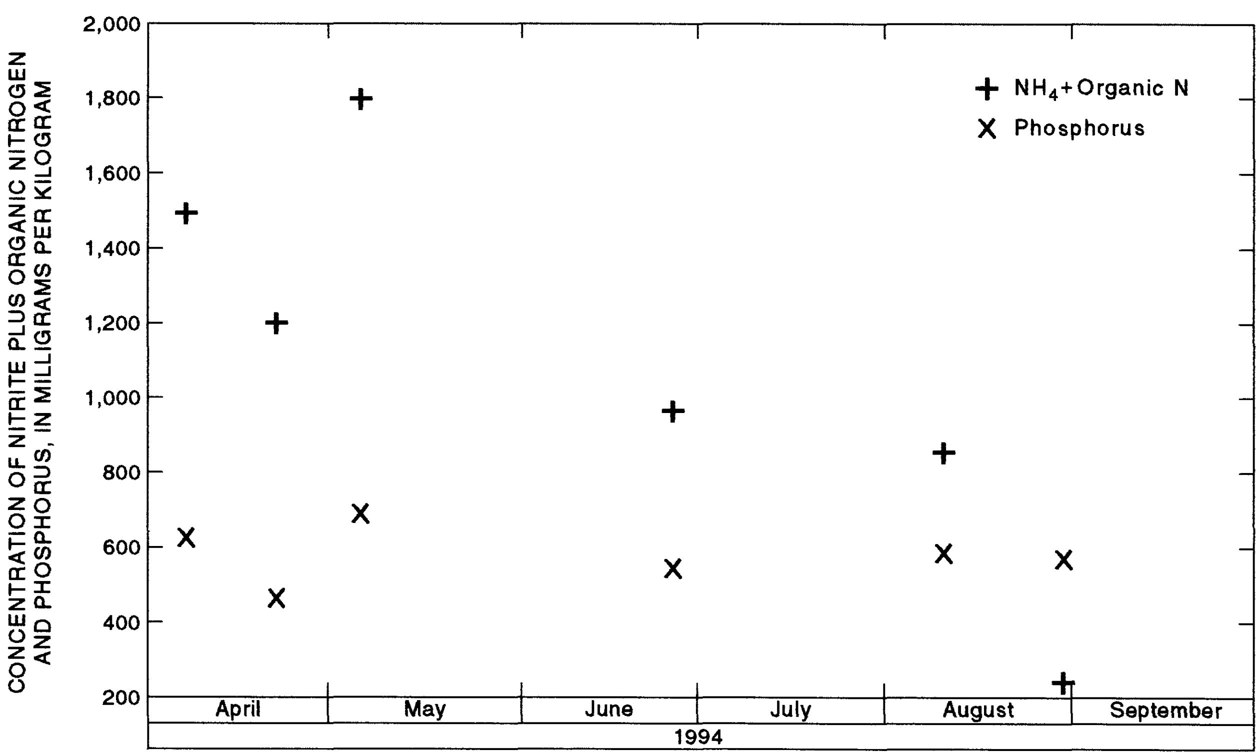

Figure 5. Nitrite plus organic nitrogen and phosphorus in soil at basin Residential 4.

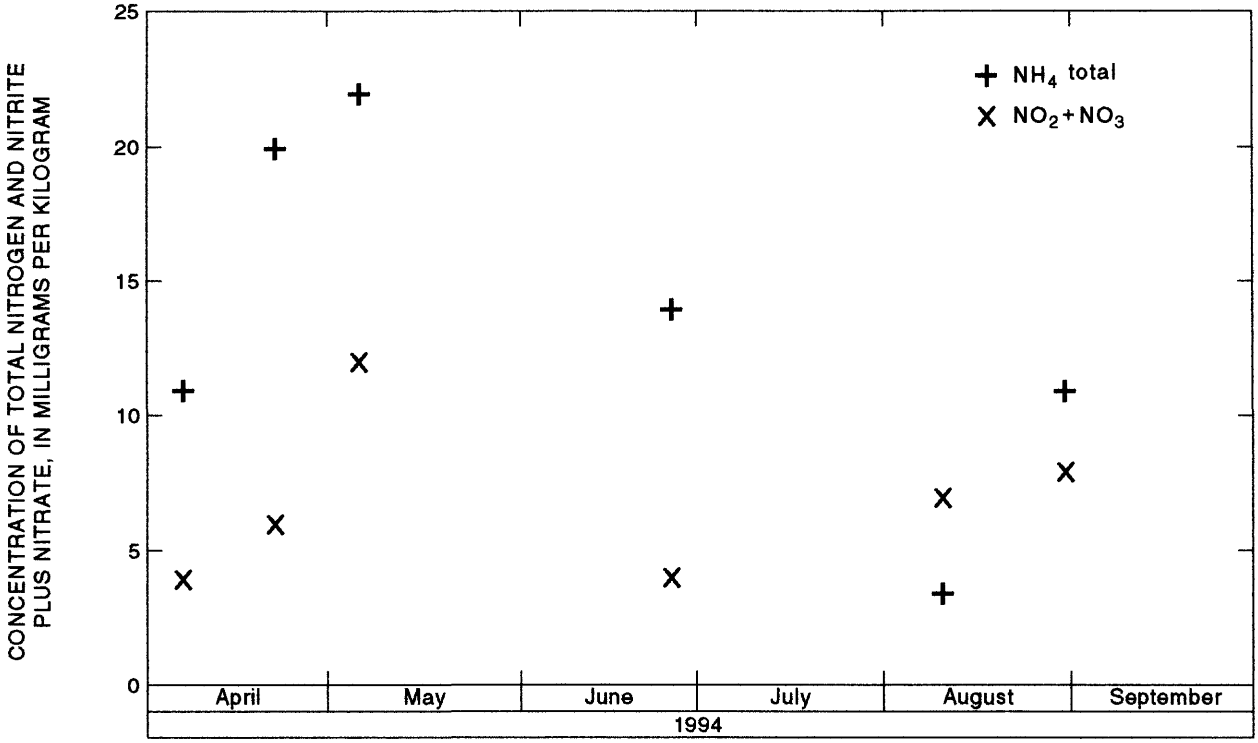

Figure 6. Total nitrogen and nitrite plus nitrate in soil at basin Residential 1T.

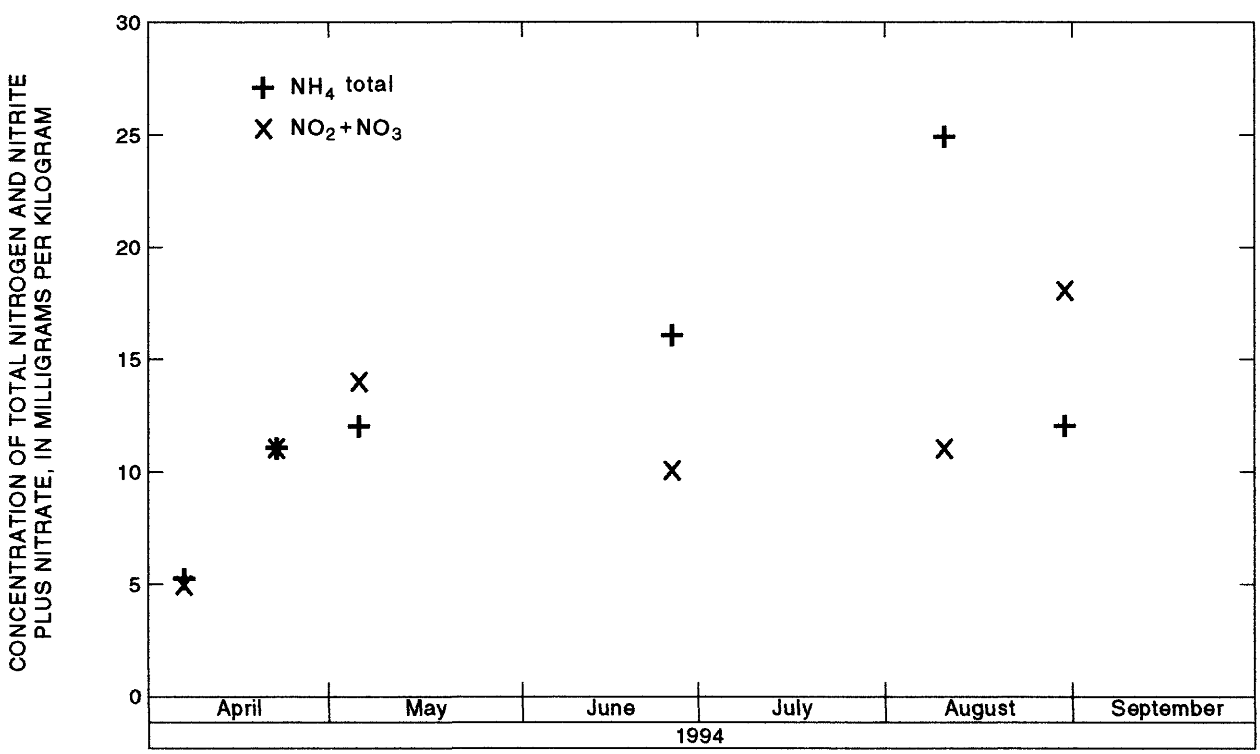

Figure 7. Total nitrogen and nitrite plus nitrate in soil at basin Residential 4.

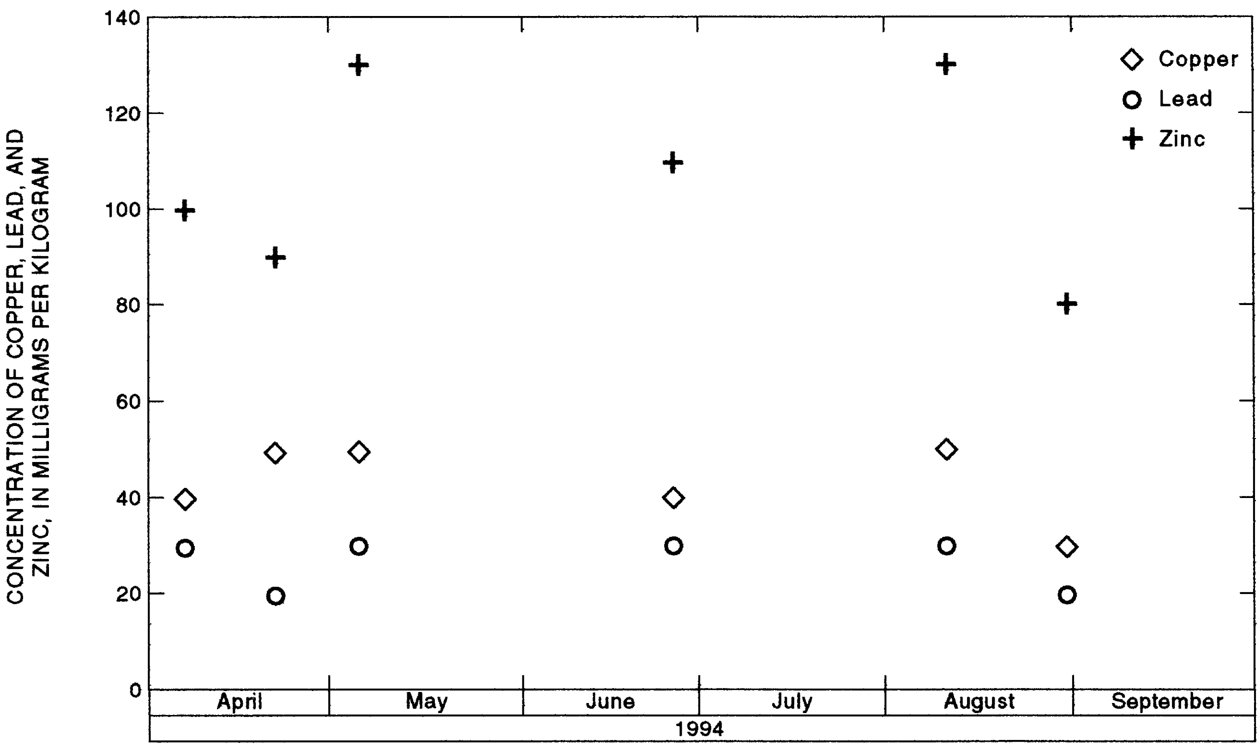

Figure 8. Copper, lead, and zinc in soil at basin Residential 1T.

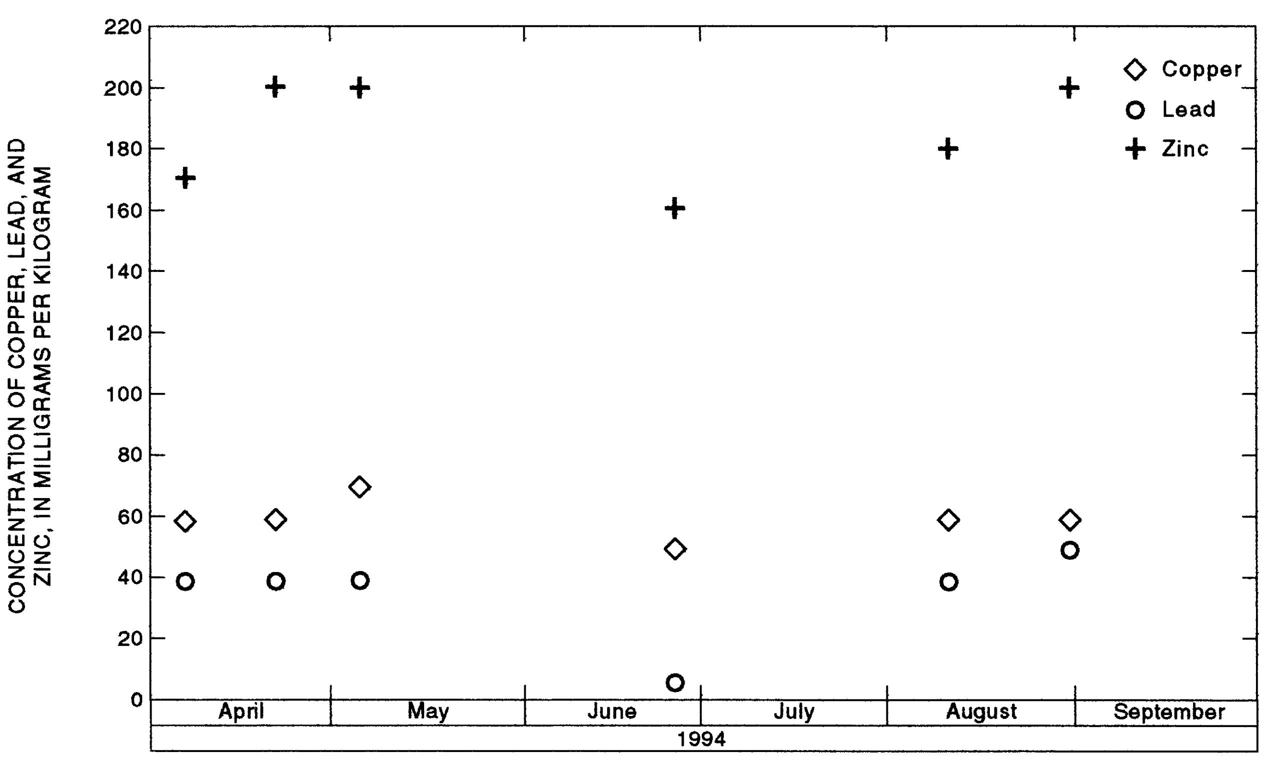

Figure 9. Copper, lead, and zinc in soil at basin Residential 4.

Table 10. Chemical analyses for sediments collected from Residential 1T and Residential 4 from April 7 through August 31, 1994, to assess temporal variability of selected constituents

SITE NAME	DATE	PH WATER WHOLE FIELD (STAND-ARD UNITS) (00400)	MOIS-TURE CONTENT DRY WT. (% OF TOTAL) (00495)	NITRO-GEN,NH4 TOTAL IN BOT. MAT. (MG/KG AS N) (00611)	NITRO-GEN,NH4 + ORG. TOT IN BOT MAT (MG/KG AS N) (00626)	NITRO-GEN, NO2+NO3 TOT. IN BOT MAT (MG/KG AS N) (00633)	PHOS-PHORUS TOTAL IN BOT. MAT. (MG/KG AS P) (00668)	C.O.D. TOTAL IN BOTTOM MA-TERIAL (MG/KG) (00339)
Residential 1T	04-07-94	8.1	4	11	3300	4.0	1000	90000
	04-22-94	7.3	3	20	3000	6.0	780	84000
	05-06-94	6.9	4	22	4800	12	1300	120000
	06-27-94	7.3	5	14	3300	4.0	1200	120000
	08-11-94	6.8	3	3.4	1400	7.0	1100	180000
	08-31-94	7.2	4	11	2700	8.0	750	120000
Residential 4	04-07-94	7.5	3	5.2	1500	5.0	630	100000
	04-22-94	6.8	4	11	1200	11	470	68000
	05-06-94	6.9	3	12	1800	14	690	98000
	06-27-94	7.1	2	16	960	10	550	79000
	08-11-94	6.5	3	11	850	25	590	110000
	08-31-94	7.0	2	12	240	18	570	120000

SITE NAME	ARSENIC TOTAL IN BOT-TOM MA-TERIAL (UG/G AS AS) (01003)	CADMIUM RECOV. FM BOT-TOM MA-TERIAL (UG/G AS CD) (01028)	CHRO-MIUM, RECOV. FM BOT-TOM MA-TERIAL (UG/G) (01029)	COBALT, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS CO) (01038)	COPPER, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS CU) (01043)	LEAD, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS PB) (01052)	MANGA-NESE, RECOV. FM BOT-TOM MA-TERIAL (UG/G) (01053)	ZINC, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS ZN) (01093)	IRON, RECOV. FM BOT-TOM MA-TERIAL (UG/G AS FE) (01170)	MERCURY RECOV. FM BOT-TOM MA-TERIAL (UG/G AS HG) (71921)	PARA-CHLORO-META CRESOL BOT.MAT (UG/KG) (34455)
Residental 1T	4	2	10	10	30	40	300	100	6800	0.03	<600
	6	2	10	10	20	50	260	90	5200	0.02	<600
	5	2	20	10	30	50	360	130	7900	0.04	<600
	4	2	10	20	30	40	410	110	11000	0.05	<600
	6	2	10	20	30	50	370	130	11000	0.04	<600
	5	1	10	10	20	30	260	80	6000	0.05	<600
Residential 4	5	<1	20	10	40	60	330	170	13000	0.05	<600
	8	1	20	10	40	60	290	200	12000	0.06	<600
	6	1	20	10	40	70	370	200	20000	0.06	<600
	4	<1	20	10	7	50	400	160	21000	0.05	<600
	5	<1	20	10	40	60	350	180	14000	0.05	<600
	5	<1	20	10	50	60	370	200	13000	0.05	<600

SITE NAME	2-CHLORO-PHENOL BOT.MAT (UG/KG) (34589)	2,4-DI-CHLORO-PHENOL BOT.MAT (UG/KG) (34604)	2,4-DP, IN BOTTOM MAT. (UG/KG) (34609)	4,6-DINITRO -ORTHO-CRESOL BOT.MAT (UG/KG) (34660)	2,4-DI-NITRO-PHENOL BOT.MAT (UG/KG) (34619)	2-NITRO-PHENOL BOT.MAT (UG/KG) (34594)	4-NITRO-PHENOL BOT.MAT (UG/KG) (34649)	PENTA-CHLORO-PHENOL BOT.MAT (UG/KG) (39061)	PHENOL (C6H-5OH) BOT.MAT (UG/KG) (34695)	2,4,6-TRI-CHLORO-PHENOL BOT.MAT (UG/KG) (34624)	ACE-NAPHTH-ENE BOT.MAT (UG/KG) (34208)
Residential 1T	<200	<200	<200	<600	<600	<200	<600	<600	<200	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	E250	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	E530	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	<200	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	<200	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	<200	<600	<200
Residential 4	<200	<200	<200	<600	<600	<200	<600	<600	<200	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	E360	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	E210	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	<200	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	<200	<600	<200
	<200	<200	<200	<600	<600	<200	<600	<600	<200	<600	<200

Table 10. Chemical analyses for sediments collected from Residential 1T and Residential 4 between April 7 through August 31, 1994, to assess temporal variability of selected constituents—Continued

SITE NAME	ACE- NAPHTH- YLENE BOT.MAT (UG/KG) (34203)	ANTHRA- CENE BOT.MAT (UG/KG) (34223)	BENZO A ANTHRAC ENE1,2- BENZANT HRACENE BOT.MAT (UG/KG) (34529)	BENZO B FLUOR- AN- THENE BOT.MAT (UG/KG) (34233)	BENZO K FLUOR- AN- THENE BOT.MAT (UG/KG) (34245)	BENZO- A- PYRENE BOT.MAT (UG/KG) (34250)	BENZOGH I PERYL ENE1,12 -BENZO- PERYLENE BOT.MAT (UG/KG) (34524)	N-BUTYL BENZYL PHTHAL- ATE BOT.MAT (UG/KG) (34295)	BIS (2- CHLORO- ETHOXY) METHANE BOT.MAT (UG/KG) (34281)	BIS (2- CHLORO- ETHYL) ETHER BOT.MAT (UG/KG) (34276)	BIS (2- CHLORO- ISO- PROPYL) ETHER BOT.MAT (UG/KG) (34286)
Residential 1T	<200	<200	<400	<400	<400	<400	<400	<200	<200	<200	<200
	<200	<200	<400	<400	<400	<400	<400	230	<200	<200	<200
	<200	<200	<400	<400	<400	<400	<400	<200	<200	<200	<200
	<200	<200	<400	<400	<400	<400	<400	<200	<200	<200	<200
	<200	<200	<400	<400	<400	<400	<400	<200	<200	<200	<200
	<200	<200	<400	<400	<400	<400	<400	280	<200	<200	<200
Residential 4	<200	<200	<400	<400	<400	<400	<400	290	<200	<200	<200
	<200	<200	<400	<400	<400	<400	<400	<200	<200	<200	<200
	<200	<200	<400	<400	550	<400	<400	<200	<200	<200	<200
	<200	<200	<400	<400	<400	<400	<400	<200	<200	<200	<200
	<200	<200	<400	<400	<400	<400	<400	<200	<200	<200	<200
	<200	<200	<400	530	<400	<400	<400	330	<200	<200	<200

SITE NAME	4- BROMO- PHENYL PHENYL ETHER BOT.MAT (UG/KG) (34639)	2- CHLORO- NAPH- THALENE BOT.MAT (UG/KG) (34584)	4- CHLORO- PHENYL PHENYL ETHER BOT.MAT (UG/KG) (34644)	CHRY- SENE BOT.MAT (UG/KG) (34323)	1,2,5,6 -DIBENZ -ANTHRA -CENE BOT.MAT (UG/KG) (34559)	DI-N- BUTYL PHTHAL- ATE BOT.MAT (UG/KG) (39112)	1,2-DI- CHLORO- BENZENE BOT.MAT (UG/KG) (34539)	1,3-DI- CHLORO- BENZENE BOT.MAT (UG/KG) (34569)	1,4-DI- CHLORO- BENZENE BOT.MAT (UG/KG) (34574)	DIETHYL PHTHAL- ATE BOT.MAT (UG/KG) (34339)	DI- METHYL PHTHAL- ATE BOT.MAT (UG/KG) (34344)
Residential 1T	<200	<200	<200	<400	<400	<200	<200	<200	1000	<200	<200
	<200	<200	<200	<400	<400	<200	<200	<200	<200	<200	<200
	<200	<200	<200	<400	<400	<200	<200	<200	<200	<200	<200
	<200	<200	<200	<400	<400	<200	<200	<200	<200	<200	<200
	<200	<200	<200	<400	<400	280	<200	<200	1300	<200	<200
	<200	<200	<200	<400	<400	210	290	270	<200	<200	<200
Residential 4	<200	<200	<200	<400	<400	<200	<200	<200	1200	210	<200
	<200	<200	<200	<400	<400	<200	<200	<200	<200	<200	<200
	<200	<200	<200	<400	<400	<200	<200	<200	<200	<200	<200
	<200	<200	<200	<400	<400	<200	<200	<200	<200	<200	<200
	<200	<200	<200	<400	<400	<200	<200	<200	430	<200	<200
	<200	<200	<200	<400	420	<200	<200	400	<200	<200	<200

SITE NAME	2,4-DI- NITRO- TOLUENE BOT.MAT (UG/KG) (34614)	2,6-DI- NITRO- TOLUENE BOT.MAT (UG/KG) (34629)	DI-N- OCTYL PHTHAL- ATE BOT.MAT (UG/KG) (34599)	BIS(2- ETHYL HEXYL) PHTHAL- ATE BOT.MAT (UG/KG) (39102)	FLUOR- ENE BOT.MAT (UG/KG) (34384)	FLUOR- ANTHENE BOT.MAT (UG/KG) (34379)	HEXA- CHLORO- BENZENE TOT. IN BOTTOM MATL. (UG/KG) (39701)	HEXA- CHLORO- BUT- ADIENCE BOT.MAT (UG/KG) (39705)	HEXA- CHLORO- CYCLO- PENT- ADIENE BOT.MAT (UG/KG) (34389)	HEXA- CHLORO- ETHANE BOT.MAT (UG/KG) (34399)
Residential 1T	<200	<200	<400	710	<200	<200	<200	<200	<200	<200
	<200	<200	<400	E1600	<200	330	<200	<200	<200	<200
	<200	<200	<400	980	<200	<200	<200	<200	<200	<200
	<200	<200	<400	460	<200	<200	<200	<200	<200	<200
	<200	<200	<400	1100	<200	<200	<200	<200	<200	<200
	<200	<200	<400	790	<200	<200	<200	<200	<200	<200
Residential 4	<200	<200	<400	<200	<200	340	<200	<200	<200	<200
	<200	<200	<400	E970	<200	<200	<200	<200	<200	<200
	<200	<200	<400	<200	<200	260	<200	<200	<200	<200
	<200	<200	<400	680	<200	270	<200	<200	<200	<200
	<200	<200	<400	1200	<200	290	<200	<200	<200	<200
	<200	<200	<400	1300	<200	320	<200	<200	<200	<200

Table 10. Chemical analyses for sediments collected from Residential 1T and Residential 4 between April 7 through August 31, 1994, to assess temporal variability of selected constituents—Continued

SITE NAME	INDENO (1,2,3-CD) PYRENE BOT.MAT (UG/KG) (34406)	ISO-PHORONE BOT.MAT (UG/KG) (34411)	NAPHTH-ALENE BOT.MAT (UG/KG) (34445)	NITRO-BENZENE BOT.MAT (UG/KG) (34450)	N-NITRO-SODI-METHY-LAMINE BOT.MAT (UG/KG) (34441)	N-NITRO-SODI-PHENY-LAMINE BOT.MAT (UG/KG) (34436)	N-NITRO-SODI-N-PROPYL-AMINE BOT.MAT (UG/KG) (34431)	PHENAN-THRENE BOT.MAT (UG/KG) (34464)	PYRENE BOT.MAT (UG/KG) (34472)	1,2,4-TRI-CHLORO-BENZENE BOT.MAT (UG/KG) (34554)
Residential 1T	<400	<200	<200	<200	<200	<200	<200	<200	<200	<200
	<400	<200	<200	<200	<200	<200	<200	<200	260	<200
	<400	<200	<200	<200	<200	<200	<200	<200	<200	<200
	<400	<200	<200	<200	<200	<200	<200	<200	<200	<200
	<400	<200	<200	<200	<200	<200	<200	<200	<200	<200
	<400	<200	<200	<200	<200	<200	<200	<200	<200	<200
Residential 4	<400	<200	<200	<200	<200	<200	<200	<200	310	<200
	<400	<200	<200	<200	<200	<200	<200	<200	<200	<200
	<400	<200	<200	<200	<200	<200	<200	<200	230	<200
	<400	<200	<200	<200	<200	<200	<200	<200	250	<200
	<400	<200	<200	<200	<200	<200	<200	<200	240	<200
	<400	<200	<200	<200	<200	<200	<200	<200	330	<200

Table 11. Survival rates of *Hyalella azteca* iin sediments collected from industrial, commercial, and residential basins, 1994

Basin name	Date of sampling	Test start date	Survival rate of *Hyallella azteca*, in percent	Basin name	Date of sampling	Test start date	Survival rate of *Hyallella azteca*, in percent
Industrial 1	03–03–94	03–28–94	95	Commercial 5	11–10–94	11–20–94	0
Industrial 2	03–02–94	03–28–94	0	Commercial 6	12–30–94	01–13–95	0
Industrial 3	03–02–94	03–28–94	92	Commercial 7	12–30–94	01–13–95	0
Industrial 4	02–17–94	03–06–94	79	Commercial 8	11–08–94	11–20–94	0
Industrial 5	11–10–94	11–20–94	0	Residential 1	02–16–94	03–06–94	82
Industrial 6	12–29–94	01–13–95	50	Residential 2	03–02–94	03–28–94	68
Industrial 7	12–15–94	01–13–95	87	Residential 3	02–17–94	03–06–94	94
Industrial 8	11–08–94	11–20–94	0	Residential 4	02–17–94	03–06–94	69
Commercial 1	03–03–94	03–28–94	83	Residential 5	12–15–94	01–13–95	0
Commercial 2	03–04–94	03–28–94	44	Residential 6	12–15–94	01–13–95	0
Commercial 3	03–03–94	03–28–94	94	Residential 7	11–08–94	11–20–94	0
Commercial 4	02–17–94	03–06–94	51	Residential 8	11–10–94	11–20–94	75

Table 12. Effects of sample preparation on toxicity results

Basin name	Date sampled	Test start date	Survival rate of *Hyalella azteca*, in percent: Sieved	Unsieved
Industrial 1	08–16–94	08–20–94	0	75
Commercial 3	08–16–94	08–20–94	0	14
Residential 3	08–16–94	08–20–94	42	44

Table 13. Quality-assurance sample replicates for sediments collected from selected detention basins

[Values are for bottom material. mg/kg, milligram per kilogram; g/kg, gram per kilogram; µg/g, micrograms per gram; DDD, dichlorodiphenyldichloroethane; DDE, dichlorodiphenylethylene; DDT, dichlorodiphenyltrichloroethane; PCB, polychlorinated biphenyl; PCN, polychlorinated naphthanlene. <, less than]

Station name	Date	Chemical-oxygen demand, total in bottom material (mg/kg)	Moisture content, dry weight (percent of total)	Carbon, inorganic, total (g/kg as C)	Carbon, inorganic plus organic total (g/kg)
Residential 1T	04–22–94	97,000	4	---	---
Commercial 5	11–10–94	---	---	3.5	45

Station name	Date	Moisture content, dry weight (percent of total)	Nitrogen, NH4 total (mg/kg as N)	Nitrogen, NH4 plus organic total (mg/kg as N)	Nitrogen, NO_2+NO_3 total (mg/kg as N)	Phosphorus, total (mg/kg as P)	Arsenic, total (µg/g as As)	Cadmium, recoverable (µg/g as Cd)
Residential 1T	06–27–94	4	16	3,300	5.0	1,100	5	2
Residential 7	11–08–94	5	4.0	300	<2.0	1,000	12	<1
Industrial 6	12–29–94	1	7.7	550	<2.0	560	7	3

Station name	Date	Chromium, recoverable (µg/g as Cr)	Cobalt, recoverable (µg/g as Co)	Copper, recoverable (µg/g as Cu)	Iron, recoverable (µg/g as Fe)	Lead, recoverable (µg/g as Pb)	Manganese, recoverable (µg/g as Mn)	Zinc, recoverable (µg/g as Zn)
Residential 1T	06–27–94	10	20	30	12,000	40	400	120
Residential 7	11–08–94	20	20	30	19,000	10	680	50
Industrial 6	12–29–94	20	10	130	13,000	70	330	240

Station name	Date	Aldrin, total (µg/kg)	Chlordane, total (µg/kg)	DDD, total (µg/kg)	DDE, total (µg/kg)	DDT, total (µg/kg)	Dieldrin, total (µg/kg)	Endosulfan, total (µg/kg)	Endrin, total (µg/kg)	Heptachlor, total (µg/kg)
Industrial 8	11–08–94	<0.1	38	1.4	6.6	<0.1	0.6	<0.4	<0.1	<0.1
Residential 5	12–15–94	.8	130	7.6	24	4.0	3.5	<.6	<8.0	<.1

Station name	Date	Heptachlor epoxide, total (µg/kg)	Lindane, total (µg/kg)	Methoxychlor, total (µg/kg)	Mirex, total (µg/kg)	PCB, total (µg/kg)	PCN, total (µg/kg)	Perthane, total (µg/kg)	Toxaphene, total (µg/kg)
Industrial 8	11–08–94	<0.1	<0.1	<4.0	<0.1	[1]6	<1.0	<1.00	30
Residential 5	12–15–94	.3	.2	<9.0	<.1	12	<1.0	<9.00	50

See footnote at end of table.

Table 13. Quality-assurance sample replicates for selected detention basins—Continued

Station name	Date	Acenaphthylene (µg/kg)	Acenaphthene (µg/kg)	Anthracene (µg/kg)	Benzo B fluoranthene (µg/kg)	Benzo K fluoranthene (µg/kg)	Benzo-A-pyrene (µg/kg)	Bis (2-chloroethyl) ether (µg/kg)	Bis (2 chloroethoxy) methane (µg/kg)	Bis (2-chloro-iso-propyl) ether (µg/kg)
Residential 4	04–22–94	<200	<200	<200	[1]550	<400	<400	<200	<200	<200

Station name	Date	N-butyl-benzyl-phthalate (µg/kg)	Chrysene (µg/kg)	Diethyl-phthalate (µg/kg)	Dimethyl-phthalate (µg/kg)	Fluoranthene (µg/kg)	Fluorene (µg/kg)	Hexachloro-cyclopentadiene (µg/kg)	Hexachloroethane (µg/kg)	Indeno (1,2,3-CD) pyrene (µg/kg)
Residential 4	04–22–94	240	410	<200	<200	470	<200	<200	<200	<400

Station name	Date	Isophorone (µg/kg)	N-nitrosodi-n-propylamine (µg/kg)	N-nitrosodiphenylamine (µg/kg)	N-nitrosodimethylamine (µg/kg)	Naphthalene (µg/kg)	Nitrobenzene (µg/kg)	Parachlorometa cresol (µg/kg)	Phenanthrene (µg/kg)	Pyrene (µg/kg)
Residential 4	04–22–94	<200	<200	<200	<200	<200	<200	<600	<200	430

Station name	Date	Benzoghi-perylene1, 12-benzo-perylene (µg/kg)	Benzo-A-anthracene1, 2-benzanthracene (µg/kg)	1,2-Dichloro-benzene (µg/kg)	1,2,4-Trichloro-benzene (µg/kg)	1,2,5,6-Dibenzanthracene (µg/kg)	1,3-Dichloro-benzene (µg/kg)	1,4-Dichloro-benzene (µg/kg)	2-Chloronaph thalene (µg/kg)	2-Chlorophenol (µg/kg)
Residential 4	04–22–94	<400	<400	<200	<200	<400	<200	<200	<200	<200

Station name	Date	2-Nitrophenol (µg/kg)	Di-N-octyl-phthalate (µg/kg)	2,4-Dichloro-phenol (µg/kg)	2,4-DP (µg/kg)	2,4-Dinitro-toluene (µg/kg)	2,4-Dinitro-phenol (µg/kg)	2,4,6-Trichloro-phenol (µg/kg)	2,6-Dinitro-toluene (µg/kg)	4-Bromophenyl phenyl ether (µg/kg)
Residential 4	04–22–94	<200	<400	<200	<200	<200	<600	<600	<200	<200

Station name	Date	4-Chlorophenyl phenyl ether (µg/kg)	4-Nitrophenol (µg/kg)	4,6-Dinitro-orthocresol (µg/kg)	Phenol (C6H-5OH) (µg/kg)	Pentachloro-phenol (µg/kg)	Di-N-butyl-phthalate (µg/kg)	Hexachloro-benzene, total (µg/kg)	Hexachloro-butadience (µg/kg)
Residential 4	04–22–94	<200	<600	<600	<[1]470	<600	<[1]270	<200	<200

[1]Estimated.