Hydrologic Data for the Columbia/Eagle Bluffs Wetland Complex, Columbia, Missouri--1992-93

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By Joseph M. Richards

ABSTRACT

The U.S. Geological Survey in cooperation with the Missouri Department of Conservation and the city of Columbia, Missouri, collected hydrologic data from June 1992 through June 1993 as part of a background hydrologic characterization of the Columbia/Eagle Bluffs Wetland Complex. The wetland complex is being constructed in the Missouri River alluvial plain, adjacent to the Columbia municipal supply wells. Part of the wetland complex will be used to treat sewage effluent from Columbia. The treated effluent will then be used as the major source of water for wetland management practices on the Eagle Bluffs Wildlife Area. This report presents the hydrologic data and documents the procedures used to collect the data. The data include water-quality analyses of samples collected quarterly from 23 wells and 2 surface-water sites and once from 6 wells.

Water samples were analyzed for specific conductance, pH, temperature, dissolved oxygen, bacteria, major cations and anions, nutrients, trace elements, and total and dissolved organic carbon. Dissolved nitrite plus nitrate as nitrogen concentrations were less than 10 milligrams per liter for all but one ground-water sample. Dissolved phosphorous concentrations ranged from less than 0.01 to 1.40 milligrams per liter in the ground-water samples and from 0.05 to 1.30 milligrams per liter in the surface-water samples. Fecal coliform ranged from less than 1 to 6 colonies per 100 milliliters for ground-water samples and from less than 1 to 14,000 colonies per 100 milliliters for surface-water samples. Fecal streptococcus ranged from less than 1 to 150 colonies per 100 milliliters for ground-water samples and from 5 to 19,000 colonies per 100 milliliters for surface-water samples. Samples for well USGS-6 had arsenic concentrations that exceeded 50 micrograms per liter. Manganese concentrations exceeded 50 micrograms per liter at least once for each site. Iron concentrations exceeded 300 micrograms per liter at least once for 28 of 31 sites. Samples from 7 of the 29 wells and both surface-water sites were analyzed for base/neutral/acid semi-volatile organic compounds, purgeable volatile organic compounds, selected pesticides, and selected organochlorine compounds. There were no organic compounds (except for pesticides) detected in any of the samples. Atrazine was the most frequently detected pesticide; it was detected at least once at each ground-water site and consistently at both surface-water sites. Metolachlor, chlorpyrifos, prometon, and simazine also were detected in every sample collected at the surface-water sites.

This report also presents the methods used for installation of the monitoring wells and includes semi-quantitative bulk mineralogy and particle-size distribution data for alluvial material collected from near the depth of the well screen during drilling of 14 of these wells. Data from two continuous water-level recorders and data from quarterly water-level measurements in wells also are included.

INTRODUCTION

The Missouri Department of Conservation (MDC) and the city of Columbia, Missouri, have initiated a project that is anticipated to be a milestone in the treatment of municipal sewage. Because expansion of the Columbia wastewater-treatment facility became necessary, constructing wastewater treatment wetlands, hereafter referred to as treatment wetlands, were chosen as an alternative to expanding the existing activated sludge facilities. The significance of the project is that the MDC agreed to accept the treated effluent from the Columbia treatment wetlands as a water source for managing 1,200 wetland acres on the 2,700-acre MDC Eagle Bluffs Wildlife Area, a restored riverine wetland on the Missouri River alluvium (Baskett, 1991). The combined areas of the Columbia treatment wetlands and the wetlands on the Eagle Bluffs Wildlife Area are termed the Columbia/Eagle Bluffs Wetland Complex.

Upon completion of the construction, the Columbia wastewater-treatment system will be the largest municipal system in the United States to use constructed treatment wetlands when measured by flow volume (Baskett, 1991). The treatment wetlands consist of three wetland units with a total surface area of 91 acres and are designed to treat an average flow of 17.68 Mgal/d (million gallons per day). Flow distribution and control structures have been designed for peak flows of as much as to 60 Mgal/d. Wastewater entering the treatment wetlands will consist of blended primary and secondary treated effluent from the existing city wastewater treatment facility. The Columbia treatment wetlands have been designed to consistently meet National Point Discharge Elimination System permit limitations. Treatment wetlands vegetation will consist primarily of cattails. Treated effluent from the Columbia treatment wetlands will be pumped to the Eagle Bluffs Wildlife Area (Baskett, 1991).

The city of Columbia pumps water for its municipal supply from four pairs of wells located upstream from the Eagle Bluffs Wildlife Area and adjacent to the Columbia treatment wetlands (fig. 1). During 1992, the U.S. Geological Survey (USGS) began a study in cooperation with MDC and the city of Columbia to collect hydrologic data in the Columbia/Eagle Bluffs Wetland Complex. The objective of the study is to evaluate effects on ground- and surface-water flow and quality as the result of the construction of the effluent-wetland treatment system. The first task of the study was to collect background data before the area was inundated and wetland management processes began so that a baseline for the hydrologic environment could be established.

Because wetland areas are sensitive to both chemical and physical changes in the hydrologic environment, a hydrologic monitoring network was developed to provide data that can be used to evaluate changes and to analyze trends. The ability to evaluate changes is especially necessary because treated sewage effluent will be used as a major source of water for wetland management on Eagle Bluffs Wildlife Area. Trend analysis will be an invaluable tool to identify problems before they become widespread or irreversible.

The purpose of this report is to document data-collection techniques, monitoring-well installation, and to present the water-quality data from samples collected between August 1992 and June 1993. The report also presents water-level data collected from the monitoring wells in addition to water-level data collected from two continuous water-level recorders. The report also includes semi-quantitative bulk mineralogy and particle-size distribution data for the alluvial material sampled while installing some of the monitoring wells.

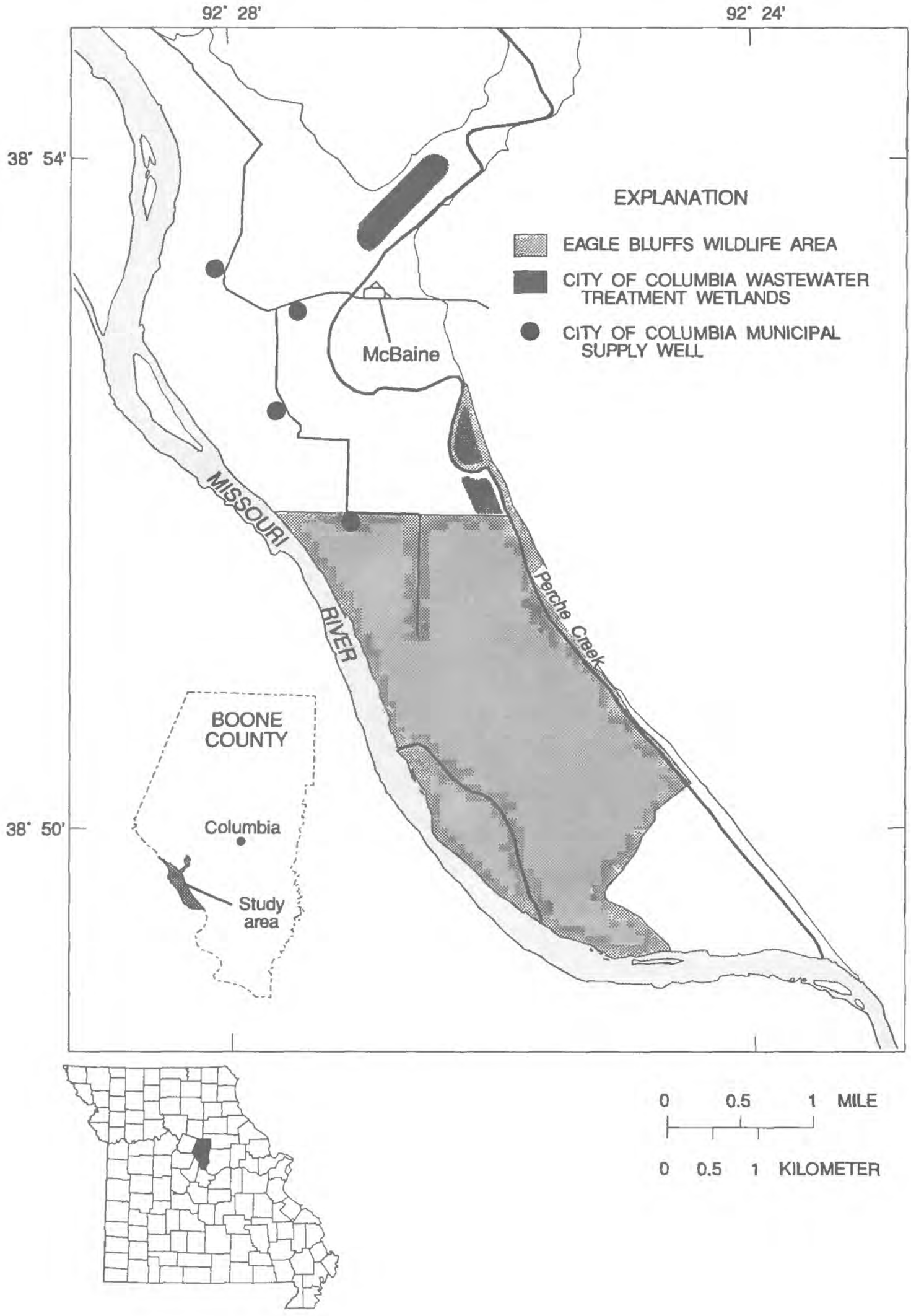

Figure 1. Location of the Columbia/Eagle Bluffs Wetland Complex, near McBaine, Missouri.

STUDY AREA

The Columbia/Eagle Bluffs Wetland Complex is located 7 mi (miles) southwest of Columbia, Missouri, near the town of McBaine, along the north bank of the Missouri River (fig. 1). The 8.7-mi^2 (square mile) area is bounded to the south and west by the Missouri River and to the north and east by the Missouri River bluffs. Perche Creek flows southward along the Missouri River bluffs and discharges into the Missouri River in the southeast part of the study area. Perche Creek currently (1994) is used by the city of Columbia as the discharge point for their treated sewage effluent. Several "blew holes" (scour holes) caused by levee failures during past flooding events have formed along the levees surrounding the study area. Many of these blew holes contain water year-round and provide habitat for fish and other forms of aquatic life. The area outside of the wetlands is flat lying agricultural land that primarily is used for raising row crops such as corn, wheat, and soybeans. The area receives an average of 38 in. (inches) of rain annually (Missouri Department of Natural Resources, 1986).

The surficial material underlying the Columbia/Eagle Bluffs Wetland Complex primarily consists of Missouri River alluvium that is composed of fine sand, silt, or clay near the surface and sand and gravel at depth. The sand and gravel in the lower part of the alluvium form the alluvial aquifer. The average saturated thickness of the alluvial aquifer is approximately 60 ft (feet; Emmett and Jeffery, 1969).

WATER-QUALITY DATA

Water-quality samples were collected at 29 ground-water and 2 surface-water sites (fig. 2). Twenty-three of the wells and both surface-water sites were sampled quarterly and six of the wells were sampled once. The sampling sites included 15 monitoring wells installed by the city of Columbia, 14 monitoring wells installed by the USGS, and 2 surface-water sites. Because of the potential for changes in both ground- and surface-water quality after effluent discharge begins, water samples were analyzed for an extensive series of chemical and physical constituents to establish a pre-effluent discharge baseline.

Sampling Methods

Specific conductance, pH, temperature, dissolved oxygen, fecal coliform, fecal streptococci, and alkalinity were determined onsite. Occasionally, equipment problems occurred onsite and the field specific conductance and alkalinity values were considered unreliable. On such occasions, the reported values in table 1 (at the back of this report) were determined in the laboratory. Specific conductance and temperature values were measured using a portable conductivity meter with temperature compensation designed to express readings in microsiemens per centimeter at 25 °C (degrees Celsius). The pH value of the water was measured at the time of collection with an electronic meter calibrated with buffers bracketing the expected pH values of the samples. Dissolved oxygen concentrations were determined using a low range colorimetric method for ground-water sites and a portable temperature compensated meter for surface-water sites. Alkalinity was determined by incremental titration with either 0.1600 or 1.600 normal sulfuric acid.

Ground-water samples were collected from monitoring wells with a variable-speed 1.8-in. diameter stainless-steel submersible pump with Teflon[1] and stainless-steel impellers and a Teflon discharge line. The pump and discharge line were rinsed with deionized water between wells to reduce the chances of cross-contamination. The water samples were collected after a minimum of three well volumes of water was removed from the well and after measurements of specific conductance, pH, and temperature had stabilized.

[1]Any use of trade, product, or firm name is for descriptive purposes only and does not imply endorsement by the U.S. Govemment.

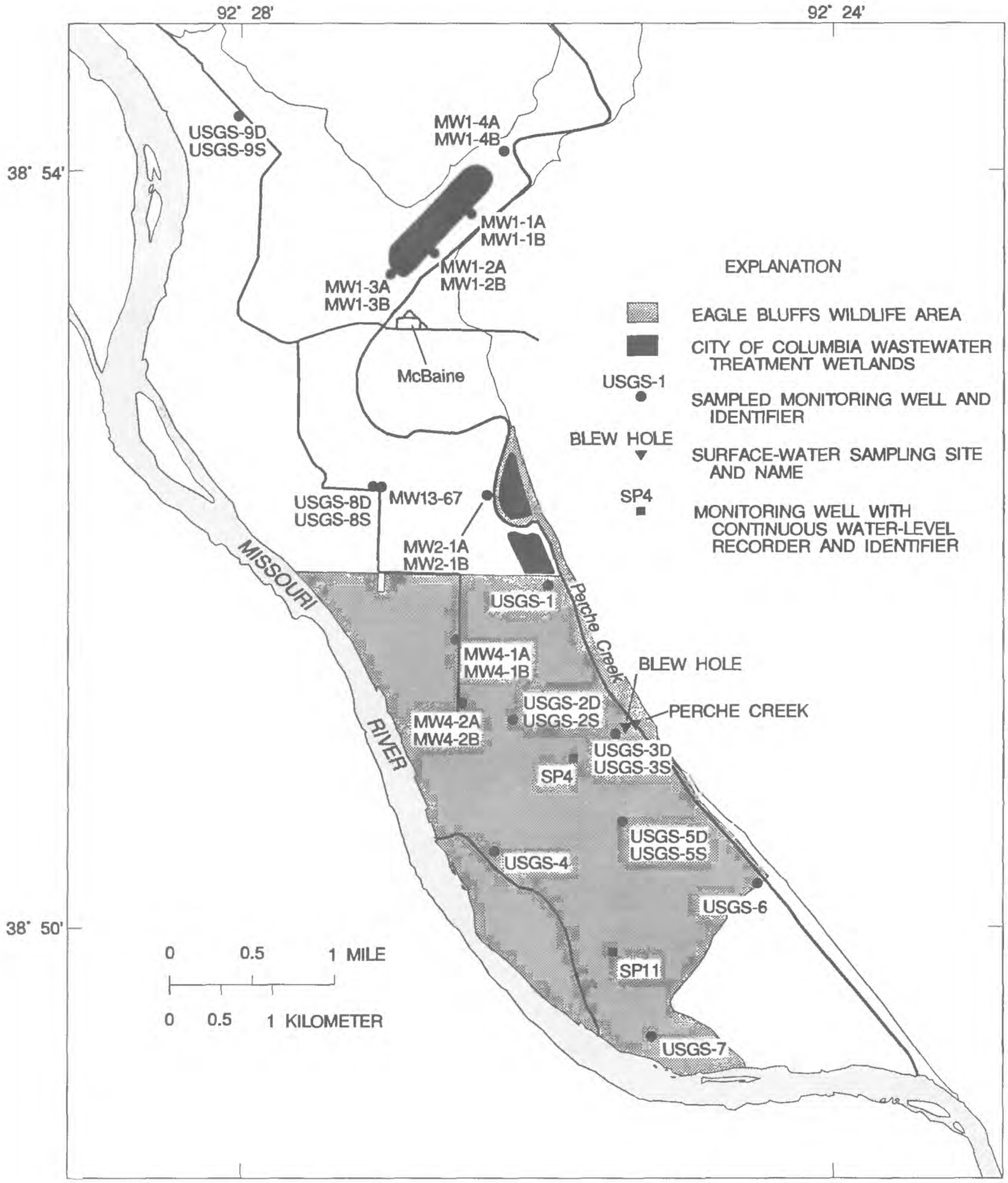

Figure 2. Location of sampling sites and water-level measuring points.

Surface-water samples were collected in a 1-gal (gallon) glass bottle, inserted into an epoxy-coated steel frame designed for collection of samples for trace-element analysis. The sampler was lowered through the water column at three locations (estimated to be of equal width) across the water body. These three samples were then composited in a 5-gal glass container from which sample bottles were filled. The use of a DH-48 or a bag sampler was not possible at either surface-water site because there was virtually no flow.

Inorganic chemical constituents referred to as dissolved were determined from samples that were filtered at the time of sampling through a 0.45-µm (micrometer) polycarbonate filter. Dissolved organic carbon samples were filtered onsite by placing the sample in a stainless steel vessel and forcing the sample through a 0.45-µm silver membrane filter using dry compressed argon as the pressure source. Analytical results for the inorganic constituents and total and dissolved organic carbon are listed in table 1. Dissolved pesticide samples were filtered onsite through an organic-free 0.7-µm glass-fiber filter using a Teflon laboratory pump with Teflon tubing. All samples were analyzed by laboratories of the USGS for inorganic and organic constituents according to methods described by Wershaw and others (1983), Fishman and Friedman (1989), Patton and Truitt (1992), and Fishman (1993).

Based on spatial distribution, 7 of the 29 wells were selected to receive detailed organic sampling. Samples from these seven wells and both surface-water sites were analyzed for base/neutral/acid (BNA) semi-volatile organic compounds, purgeable volatile organic compounds, selected pesticides, and selected organochlorine compounds. Most of the organic compounds were not detected (table 2, at the back of this report). Data for the samples that had organic compounds (pesticides) detected are listed in table 3, at the back of this report. The method detection limits (MDL; less than values) in table 3 vary from constituent to constituent and, over time, for the same constituent. The MDL for the pesticide analyses is "dependent on the method, instrument performance, materials, skill of the analyst, and other operational sources of variation. The MDL is not an absolute and invariant number; it is subject to random variation caused by day-to-day changes in calibration solutions and instrument sensitivity" (J.W. Pritt, U.S. Geological Survey, written commun., 1994). The U.S. Environmental Protection Agency recommends that the MDL estimates be checked every 3 to 6 months or when the analytical procedure changes significantly. The variation in the MDL does not account for matrix interferences (J.W. Pritt, written commun., 1994).

Summary of Inorganic Water-Quality Data

Nutrients (dissolved nitrogen and phosphorous species) are of particular interest in a wetland environment especially one in which the source of water will be sewage effluent. The concentration of dissolved ammonia as nitrogen ranged from less than 0.01 to 3.8 mg/L (milligrams per liter) in the ground-water samples and ranged from 0.03 to 9.4 mg/L in the surface-water samples. Dissolved nitrite plus nitrate as nitrogen concentrations ranged from less than 0.05 to 11 mg/L in ground-water samples and exceeded the State maximum contaminant level (MCL) of 10 mg/L (Missouri Department of Natural Resources, 1993) one time (well USGS-5S). Dissolved nitrite plus nitrate as nitrogen concentrations ranged from less than 0.05 to 0.35 mg/L in surface-water samples. Dissolved phosphorous concentrations ranged from less than 0.01 to 1.4 mg/L in the ground-water samples and ranged from 0.05 to 1.3 mg/L in the surface-water samples.

Also of interest, because sewage effluent will be used as a major source of water for the wetlands, are bacteria in the water samples. Ground-water samples had fecal coliform ranging from less than 1 to 6 colonies/100 mL (colonies per 100 milliliters) and fecal streptococcus ranging from less than 1 to 150 colonies/100 mL. In surface water, fecal coliform ranged from less than 1 to 14,000 colonies/100 mL and fecal streptococcus ranged from 5 to 19,000 colonies/100 mL.

Other significant results included arsenic, barium, iron, and manganese concentrations. Samples from well USGS-6 had concentrations of arsenic [ranging from 54 to 72 µg/L (micrograms per liter)] that exceeded the State MCL of 50 µg/L. Concentrations in samples from all other wells and both surface-water sites were less than the State MCL for arsenic. Barium concentrations ranged from 130 to 1,600 µg/L in ground-water samples and from 84 to 160 µg/L in surface-water samples but remained less than the State MCL of 2,000 µg/L. Iron concentrations ranged from less than 3 to 40,000 µg/L in the ground-water samples and ranged from 10 to 1,600 µg/L in surface-water samples. Iron concentrations exceeded the recommended secondary MCL of 300 µg/L at least once in all ground- and surface-water sites except MW1-4A, MW2-1A, and USGS-9S. Manganese concentrations ranged from 28 to 3,700 µg/L in ground-water samples and ranged from 120 to 2,000 µg/L in surface-water samples. Manganese concentrations exceeded the State recommended secondary MCL of 50 µg/L at least once for all sampling sites. All other constituent concentrations were below their respective State MCL (Missouri Department of Natural Resources, 1993).

Summary of Organic Water-Quality Data

The only organic constituents detected in any of the water samples were pesticides (table 3). Concentrations of alachlor ranged from less than 0.003 to 0.004 µg/L, metolachlor ranged from less than 0.002 to 0.006 µg/L, trifluralin ranged from less than 0.005 to 0.007 µg/L, atrazine ranged from 0.003 to 0.052 µg/L, and metribuzin ranged from less than 0.005 to 0.120 µg/L in ground-water samples. For surface-water samples, concentrations of alachlor ranged from less than 0.003 to 0.012 µg/L, metolachlor ranged from 0.011 to 0.180 µg/L, chlorpyrifos ranged from 0.007 to 0.034 µg/L, diazinon ranged from less than 0.005 to 0.150 µg/L, atrazine ranged from 0.026 to 1.200 µg/L, prometon ranged from 0.007 to 0.032 µg/L, and simazine ranged from 0.012 to 0.035 µg/L. Atrazine was the most frequently detected pesticide and it was detected at least once at each ground-water site and consistently at both surface-water sites. Metolachlor, chlorpyrifos, prometon, and simazine also were detected in every sample collected at the surface-water sites. Although the constituent concentrations were usually greater in the surface-water samples than those in the ground-water samples, all were less than their respective State MCL (Missouri Department of Natural Resources, 1993).

MONITORING-WELL CONSTRUCTION

The 14 wells installed by the USGS were constructed during June 1992. The borings were advanced by drilling with a 4-1/2 in. inside diameter hollow stem auger. During drilling, alluvial samples were collected periodically. A 2-in. inside diameter flush wall schedule 40 polyvinylchloride (PVC) riser with a 10-ft section of 0.010-in. slotted PVC screen was placed into the bore hole. A sand filter pack was then installed 0.5 ft beneath the bottom of the screen and at least 2 ft above the top of the screen. A 5-ft thick bentonite seal was placed above the sand filter pack in wells completed above the water table. Bentonite grout was then placed using a tremie pipe from the top of the bentonite seal (above water table completions) or from the top of the filter pack (below water table completions) to approximately 3 ft below land surface. The upper 3 ft of annular space was filled with cement, and a protective steel casing, with hinged and lockable lid, was placed over the well riser and approximately 2 ft into the cement. A schematic diagram of a typical monitoring well from which water-quality samples were collected is shown in figure 3. Steam cleaning of all drilling equipment was performed before moving to a new well site. Semi-quantitative bulk mineralogy (table 4, at the back of this report) and particle-size distribution (table 5, at the back of this report) analyses were performed on alluvial material collected near the depth of the screen for each of these 14 wells.

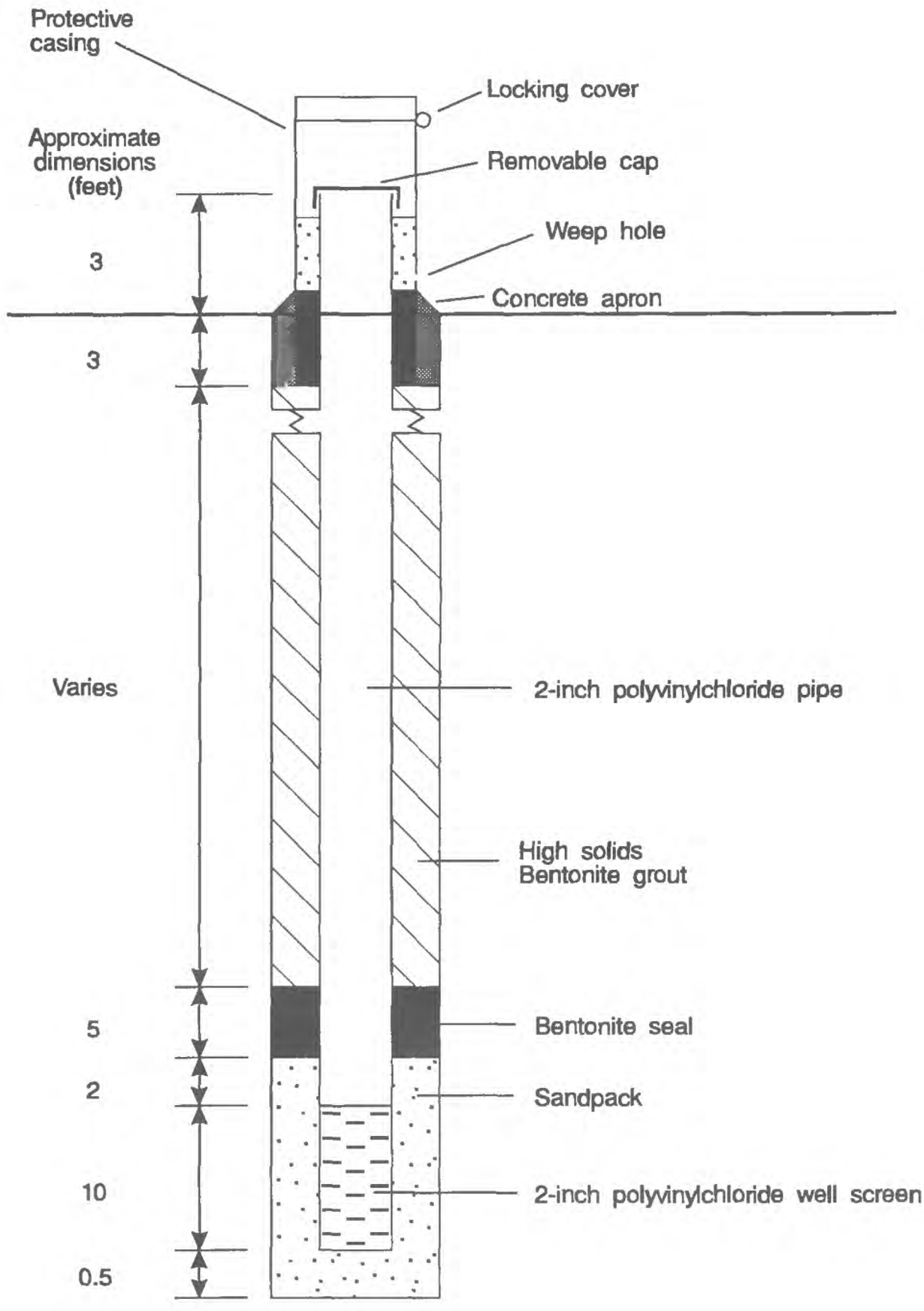

Figure 3. Schematic diagram of a typical monitoring well in the Columbia/Eagle Bluffs Wetland Complex.

Fifteen monitoring wells were installed by the city of Columbia and 14 are similar in construction to the USGS wells. Eight of these wells were drilled in April 1991, and the well-construction data were reported as follows:

> The borings for the wells were advanced with a CME [Central Mining Equipment] 750 drill rig using 6-7/8 in. inside diameter hollow stem auger. The well casings were 2 in. inside diameter schedule 40, PVC pipe. The screened interval of each well began 6 in. from the bottom of the well and had a total length of 9-1/2 ft. The slot size of the screened intervals were 0.010 in. The filter material surrounding the screened intervals were fine grade sands. With the exception of MW4-1A, a 6.5 to 8 ft layer of volclay grout sealed the filter of each well. The remainder of each well was sealed with portland cement. Well MW1-4A was sealed from the top of the filter to the ground surface with volclay grout (C.M. Galuska, Metcalf & Eddy, written commun., 1992).

The six wells installed in May 1993 had a similar construction.

The other monitoring well (MW13-67) installed by the city of Columbia was constructed in 1967 of 2-in. inside diameter PVC pipe. The riser joints were glued and the screen was slotted in the lower 20 ft with a hacksaw. Approximately 15 ft below the land surface, the PVC riser was attached to 2-in. inside diameter galvanized steel riser. Gravel was used as the filter pack around the screen. The annulus of the well above the screen was grouted with a bentonite slurry to about 4 ft from the surface. The upper 4 ft of annulus was filled with cement. The well is covered with a threaded steel cap. Construction data for wells at the Columbia/Eagle Bluffs Wetland Complex are listed in table 6 (at the back of this report).

WATER-LEVEL DATA

Height of measuring-point altitudes, which was the top of the casing, were surveyed to all wells. Water-level measurements were made in all of the monitoring wells at the time each was sampled. An electric tape was lowered into the wells and the depth to the water from the top of the casing was read to the nearest 0.01 ft (table 7, at the back of this report). Water-level data for wells SP4 and SP11 were collected by two continuous recorders at hourly intervals. Daily mean water-level data for wells SP4 and SP11 are presented in table 8 and table 9 (both at the back of this report). It is likely that either the recorder on well SP4 was not working properly or the float mechanism was not moving freely from December 16, 1992, to May 5, 1993. These data are considered unreliable and are presented as an approximation to the actual value for this period.

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ABBREVIATIONS USED IN TABLE 1

Cond	Specific conductance, in microsiemens per centimeter at 25 degrees Celsius
pH	In standard units
Temp	Water temperature, in degrees Celsius
DO	Dissolved oxygen, in milligrams per liter
COD	Chemical oxygen demand, in milligrams per liter
Coli	Fecal coliform colonies per 100 milliliters
Strep	Fecal streptococcus colonies per 100 milliliters
Ca	Dissolved calcium, in milligrams per liter
Mg	Dissolved magnesium, in milligrams per liter
Na	Dissolved sodium, in milligrams per liter
K	Dissolved potassium, in milligrams per liter
Alk	Alkalinity as calcium carbonate, in milligrams per liter
SO_4	Dissolved sulfate, in milligrams per liter
Cl	Dissolved chloride, in milligrams per liter
F	Dissolved fluoride, in milligrams per liter
Br	Dissolved bromide, in micrograms per liter
SiO_2	Dissolved silica, in milligrams per liter
DS	Dissolved solids, residue at 180 degrees Celsius, in milligrams per liter
NO_2	Dissolved nitrite as nitrogen, in milligrams per liter
$NO_2 + NO_3$	Dissolved nitrite plus nitrate as nitrogen, in milligrams per liter
NH_3	Dissolved ammonia as nitrogen, in milligrams per liter
NH_3 + Org N	Dissolved ammonia plus organic nitrogen, in milligrams per liter
P total	Total phosphorous, in milligrams per liter
P	Dissolved phosphorus, in milligrams per liter
P + Ortho P	Dissolved phosphorous plus orthophosphate as phosphorus, in milligrams per liter

Al	Dissolved aluminum, in micrograms per liter
As	Dissolved arsenic, in micrograms per liter
Ba	Dissolved barium, in micrograms per liter
Be	Dissolved beryllium, in micrograms per liter
B	Dissolved boron, in micrograms per liter
Cd	Dissolved cadmium, in micrograms per liter
Cr	Dissolved chromium, in micrograms per liter
Co	Dissolved cobalt, in micrograms per liter
Cu	Dissolved copper, in micrograms per liter
Fe	Dissolved iron, in micrograms per liter
Pb	Dissolved lead, in micrograms per liter
Li	Dissolved lithium, in micrograms per liter
Mn	Dissolved manganese, in micrograms per liter
Hg	Dissolved mercury, in micrograms per liter
Mo	Dissolved molybdenum, in micrograms per liter
Ni	Dissolved nickel, in micrograms per liter
Se	Dissolved selenium, in micrograms per liter
Ag	Dissolved silver, in micrograms per liter
Sr	Dissolved strontium, in micrograms per liter
V	Dissolved vanadium, in micrograms per liter
Zn	Dissolved zinc, in micrograms per liter
TOC	Total organic carbon, in milligrams per liter
DOC	Dissolved organic carbon, in milligrams per liter
--	No data available
<	Less than

Table 1.–Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex

Site identifier (fig. 2)	Date (year-month-day)	Time	Cond	pH	Temp	DO	COD	Coli	Strep	Ca	Mg	Na	K
						Ground Water							
MW1-1A	93-06-03	1515	838	6.7	15.0	<0.1	23	<1	150	100	18	30	3.0
MW1-1B	93-06-03	1615	1,430	6.9	14.5	<.1	25	<1	<1	250	41	21	8.0
MW1-2A	93-06-03	1300	627	7.2	14.5	.3	25	<1	<1	89	23	5.3	3.7
MW1-2B	93-06-03	1330	698	7.2	14.5	<.1	<10	<1	<1	110	23	8.5	4.0
MW1-3A	93-06-03	1740	697	7.1	15.0	<.1	15	[a]6	[a]6	110	25	5.2	6.7
MW1-3B	93-06-03	1845	639	7.1	14.5	<.1	<10	<1	<1	100	21	4.5	3.4
MW1-4A	92-08-27	1645	630	6.8	15.0	<.1	<10	<1	<1	110	25	18	1.9
	92-12-10	1000	700	6.7	15.0	.1	<10	<1	[a]2	100	22	18	1.8
	93-03-09	1315	714	6.9	14.5	--	<10	<1	<1	110	23	17	1.7
	93-06-03	0945	713	6.9	14.0	.1	<10	<1	[a]16	110	22	17	1.8
MW1-4B	92-08-27	1530	535	7.1	15.5	.8	16	<1	<1	84	18	14	4.2
	92-12-10	1100	600	6.9	14.5	--	11	<1	[a]3	77	17	13	3.8
	93-03-09	1400	625	7.0	14.5	<.1	11	<1	<1	86	19	15	3.7
	93-06-03	1100	620	7.1	15.0	.1	18	<1	[a]8	94	18	14	3.9
MW2-1A	92-08-28	1200	603	7.0	14.5	.4	<10	<1	<1	120	27	11	2.8
	92-12-03	1000	699	7.0	14.5	.2	<10	<1	<1	120	25	7.5	2.8
	93-03-05	0930	712	7.0	14.0	.2	<10	<1	<1	120	26	4.8	2.8
	93-06-04	0850	755	7.0	13.5	<.1	<10	<1	[a]1	130	26	5.2	3.1

Table 1.—Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex—Continued

Site identifier (fig. 2)	Date (year-month-day)	Alk	SO_4	Cl	F	Br	SiO_2	DS	NO_2	$NO_2 + NO_3$	NH_3	$NH_3 +$ Org N	P total
						Ground Water--Continued							
MW1-1A	93-06-03	239	180	9.9	0.3	0.02	29	557	<0.01	<0.05	0.98	1.1	0.03
MW1-1B	93-06-03	474	370	17	.2	.10	43	1,030	<.01	<.05	2.5	2.7	.03
MW1-2A	93-06-03	308	28	6.2	.3	.03	21	361	<.01	<.05	.08	<.20	<.01
MW1-2B	93-06-03	322	24	9.1	.2	.05	33	411	<.01	<.05	.42	.40	.29
MW1-3A	93-06-03	305	33	13	.2	.02	48	423	<.01	<.05	.71	.80	.02
MW1-3B	93-06-03	284	--	--	.3	.03	35	385	<.01	<.05	.32	.30	.30
MW1-4A	92-08-27	366	48	9.8	.3	.05	17	435	<.01	<.05	.10	<.20	.08
	92-12-10	293	43	8.0	.4	.06	16	417	<.01	<.05	.10	<.20	.08
	93-03-09	344	39	7.9	.3	.05	16	405	.01	<.05	.11	<.20	.09
	93-06-03	318	38	8.5	.3	.07	16	409	<.01	<.05	.11	<.20	.08
MW1-4B	92-08-27	336	.4	5.6	.3	.03	34	354	<.01	<.05	1.2	3.8	1.3
	92-12-10	330	.4	3.5	.2	.34	32	347	<.01	<.05	3.7	4.0	.91
	93-03-09	[b]330	.2	2.8	.2	<.01	35	346	.02	<.05	3.6	3.9	1.30
	93-06-03	338	<.1	2.9	.2	.05	35	351	<.01	<.05	3.3	4.0	.94
MW2-1A	92-08-28	388	32	7.1	.4	.02	25	441	<.01	.44	<.01	<.20	.07
	92-12-03	360	29	4.0	.3	.13	24	434	.04	.32	.02	<.20	.06
	93-03-05	380	25	4.3	.3	.03	25	443	<.01	<.05	.03	<.20	.03
	93-06-04	369	24	4.8	.3	.04	26	442	<.01	<.05	.05	<.20	.02

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	P	P + Ortho P	Al	As	Ba	Be	B	Cd	Cr	Co	Cu	Fe	Pb
						Ground Water--Continued								
MW1-1A	93-06-03	0.02	0.02	<10	48	130	<0.5	40	5.0	<5	<3	<10	22,000	<10
MW1-1B	93-06-03	<.01	.02	10	2	540	<.5	80	10	<5	<3	<10	33,000	<10
MW1-2A	93-06-03	.02	.02	10	2	360	<.5	40	<1.0	<5	<3	<10	910	<10
MW1-2B	93-06-03	.24	.23	<10	<1	760	<.5	70	3.0	6	<3	<10	5,200	<10
MW1-3A	93-06-03	.05	.04	20	14	320	<.5	30	3.0	<5	<3	<10	9,200	<10
MW1-3B	93-06-03	.04	.02	20	<1	500	<.5	120	<1.0	<5	<3	<10	3,900	<10
MW1-4A	92-08-27	.08	.06	<10	3	160	<.5	50	<1.0	<5	4	<10	86	<10
	92-12-10	.07	.07	<10	<1	190	<.5	60	<1.0	<5	<3	<10	52	<10
	93-03-09	.07	.07	<10	<1	160	<.5	60	<1.0	<5	<3	<10	89	<10
	93-06-03	.07	.06	20	<1	160	<.5	60	<1.0	<5	<3	<10	67	<10
MW1-4B	92-08-27	1.1	<.01	30	32	280	<.5	110	<1.0	<5	30	<10	6,100	<10
	92-12-10	.88	.23	10	31	250	<.5	120	1.0	<5	<3	<10	5,700	<10
	93-03-09	.80	.70	<10	33	260	<.5	120	<1.0	<5	10	<10	6,000	<10
	93-06-03	.14	.13	20	32	280	<.5	120	<1.0	<5	<3	<10	6,800	<10
MW2-1A	92-08-28	.08	.07	10	1	360	<.5	50	<1.0	<5	<3	<10	3	<10
	92-12-03	.04	.04	<10	1	360	.7	50	<1.0	<5	<3	<10	6	<10
	93-03-05	.03	.02	<10	1	420	<.5	60	<1.0	<5	<3	<10	78	<10
	93-06-04	.03	.02	20	<1	420	<.5	60	<1.0	5	<3	<10	80	<10

Table 1.—Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex—Continued

Site identifier (fig. 2)	Date (year-month-day)	Li	Mn	Hg	Mo	Ni	Se	Ag	Sr	V	Zn	TOC	DOC
						Ground Water--Continued							
MW1-1A	93-06-03	20	2,500	0.1	<10	<10	<1	<1.0	360	<6	16	2.8	2.8
MW1-1B	93-06-03	23	2,500	.1	10	<10	<1	<1.0	1,000	6	14	2.6	3.0
MW1-2A	93-06-03	15	460	.1	<10	<10	<1	<1.0	200	<6	<3	.9	.9
MW1-2B	93-06-03	19	410	.1	<10	<10	<1	<1.0	260	<6	<3	1.4	1.4
MW1-3A	93-06-03	22	600	<.1	<10	<10	<1	<1.0	580	<6	4	1.8	1.8
MW1-3B	93-06-03	16	430	.1	10	<10	<1	<1.0	310	<6	<3	1.3	1.5
MW1-4A	92-08-27	49	620	<.1	<10	<10	<1	<1.0	500	<6	<3	1.1	--
	92-12-10	47	520	<.1	<10	<10	<1	<1.0	460	<6	4	1.3	1.6
	93-03-09	45	530	<.1	<10	<10	<1	<1.0	460	<6	3	1.2	1.1
	93-06-03	41	640	.1	<10	<10	<1	<1.0	480	<6	<3	.8	1.0
MW1-4B	92-08-27	18	270	<.1	<10	<10	<1	2.0	410	<6	<3	3.0	--
	92-12-10	17	250	<.1	<10	<10	<1	2.0	400	<6	3	3.6	3.0
	93-03-09	18	280	<.1	<10	<10	<1	<1.0	410	<6	<3	2.9	2.4
	93-06-03	19	310	.1	<10	<10	<1	<1.0	410	<6	12	3.8	2.6
MW2-1A	92-08-28	23	56	<.1	<10	<10	<1	1.0	440	<6	5	1.2	--
	92-12-03	28	98	.2	10	<10	<1	<1.0	450	<6	<3	1.1	1.7
	93-03-05	26	110	<.1	<10	<10	<1	<1.0	470	<6	4	1.4	1.3
	93-06-04	27	200	.1	10	<10	<1	<1.0	520	<6	<3	1.1	1.3

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Time	Cond	pH	Temp	DO	COD	Coli	Strep	Ca	Mg	Na	K
						Ground Water--Continued							
MW2-1B	92-08-28	1000	669	7.0	14.5	0.1	14	<1	<1	130	28	7.9	4.9
	92-12-03	1100	796	7.0	14.0	<.1	11	<1	43	130	26	7.4	4.9
	93-03-05	1015	850	7.0	14.0	<.1	<10	<1	<1	130	26	7.4	4.6
	93-06-04	0950	849	7.0	14.0	<.1	18	<1	[a]5	130	28	7.8	4.8
MW4-1A	92-08-27	1130	797	7.0	14.5	<.1	20	<1	<1	140	42	8.9	5.6
	92-12-09	1500	949	7.0	14.5	<.1	13	<1	[a]8	120	39	8.0	5.6
	93-03-04	1520	971	7.0	14.0	<.1	13	<1	<1	140	39	8.1	5.3
	93-06-07	1615	998	7.0	14.5	<.1	12	<1	<1	130	38	8.4	5.5
MW4-1B	92-08-27	1000	737	7.0	14.5	<.1	18	<1	<1	120	34	14	5.0
	92-12-09	1615	895	7.0	14.0	<.1	17	<1	[a]4	110	34	10	4.9
	93-03-04	1600	934	7.0	14.0	<.1	<10	<1	<1	120	35	10	5.0
	93-06-07	1715	887	7.0	15.0	<.1	26	<1	<1	110	30	14	4.8
MW4-2A	92-08-26	1700	768	6.9	15.0	<.1	16	<1	<1	150	31	7.9	6.6
	92-12-04	0835	897	7.0	15.0	<.1	13	<1	<1	150	31	7.7	6.5
	93-03-02	1400	985	6.9	14.5	<.1	17	<1	<1	150	31	8.3	6.3
	93-06-07	1400	980	6.9	14.5	<.1	10	<1	<1	140	28	8.0	6.2
MW4-2B	92-08-26	1600	732	7.0	15.0	<.1	16	<1	<1	130	27	23	5.4
	92-12-04	0940	812	7.0	14.5	<.1	<10	<1	<1	120	26	23	5.0
	93-03-02	1530	917	6.9	14.5	<.1	89	<1	<1	130	28	18	5.2
	93-06-07	1520	880	7.0	15.0	<.1	<10	<1	<1	110	24	19	5.0
MW13-67	92-08-26	1400	639	7.1	15.0	<.1	14	<1	<1	93	20	35	4.7
	92-12-08	1500	704	7.2	14.5	<.1	<10	<1	[a]1	86	20	29	4.5
	93-03-03	1515	724	7.1	14.0	--	13	<1	[a]1	87	19	31	4.3
	93-06-09	1200	687	7.3	14.5	<.1	<10	<1	<1	72	16	39	4.1

Table 1.–Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex–Continued

Site identifier (fig. 2)	Date (year-month-day)	Alk	SO_4	Cl	F	Br	SiO_2	DS	NO_2	$NO_2 + NO_3$	NH_3	$NH_3 +$ Org N	P total
						Ground Water--Continued							
MW2-1B	92-08-28	468	17	8.2	0.3	0.10	34	510	<0.01	<0.05	0.33	0.40	0.35
	92-12-03	454	17	5.1	.2	.07	32	509	.02	<.05	.37	.40	.30
	93-03-05	429	17	6.0	.2	.04	34	485	<.01	<.05	.35	.40	.37
	93-06-04	457	--	6.3	.2	<.01	35	--	<.01	<.05	.35	.40	<.01
MW4-1A	92-08-27	566	10	7.1	.1	.01	32	592	<.01	<.05	.71	.90	1.3
	92-12-09	536	6.0	2.4	.2	.18	29	569	<.01	<.05	.78	.90	.83
	93-03-04	508	2.1	2.5	.2	.02	31	556	<.01	<.05	.70	.90	1.1
	93-06-07	570	3.9	2.5	.2	.12	30	606	<.01	<.05	.83	.70	1.1
MW4-1B	92-08-27	509	1.5	11	.1	.19	37	537	<.01	<.05	.81	.90	.88
	92-12-09	499	1.4	13	.2	.21	35	547	<.01	<.05	.87	1.0	.78
	93-03-04	481	4.2	6.4	.1	.11	37	543	<.01	<.05	.92	.90	.84
	93-06-07	467	1.2	7.0	.2	.06	34	529	<.01	<.05	.89	.80	.01
MW4-2A	92-08-26	511	24	5.6	.2	.15	28	563	<.01	<.05	.62	.70	.11
	92-12-04	517	22	2.7	.1	.35	29	576	.04	<.05	.67	.70	.11
	93-03-02	676	27	3.4	.1	.05	27	597	.01	<.05	.65	.70	.11
	93-06-07	502	16	3.6	.2	.25	26	582	<.01	<.05	.65	.60	<.01
MW4-2B	92-08-26	482	.50	15	.2	.05	36	519	<.01	<.05	.45	.50	.67
	92-12-04	460	1.0	11	.2	.28	37	510	.03	<.05	.50	.60	.64
	93-03-02	496	<.10	7.6	.2	.08	38	534	<.01	<.05	.51	.50	.63
	93-06-07	451	.70	9.8	.2	.09	33	519	<.01	.11	.48	.40	.70
MW13-67	92-08-26	296	78	19	.2	.06	28	460	<.01	<.05	.36	.40	.46
	92-12-08	278	89	17	.2	.11	27	452	<.01	<.05	.41	.50	.44
	93-03-03	264	94	19	.2	.08	29	458	<.01	<.05	.37	.40	.41
	93-06-09	228	110	18	.3	.12	25	439	<.01	<.05	.41	.30	.05

Table 1.—Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	P	P + Ortho P	Al	As	Ba	Be	B	Cd	Cr	Co	Cu	Fe	Pb
						Ground Water--Continued								
MW2-1B	92-08-28	0.34	<0.01	10	1	1,100	<0.5	70	<1.0	<5	<3	<10	7,500	<10
	92-12-03	.32	.02	<10	<1	1,100	<.5	80	2.0	<5	9	<10	8,300	<10
	93-03-05	.10	<.01	10	<1	1,200	<.5	80	<1.0	<5	<3	<10	8,900	<10
	93-06-04	.01	.01	20	<1	1,100	<.5	50	<1.0	<5	9	<10	9,800	<10
MW4-1A	92-08-27	1.1	<.01	<10	15	560	<.5	120	4.0	<5	<3	<10	21,000	10
	92-12-09	.72	.05	<10	14	540	<.5	130	4.0	<5	<3	<10	19,000	20
	93-03-04	.84	.01	<10	15	500	<.5	110	6.0	<5	<3	<10	20,000	<10
	93-06-07	.86	.02	10	19	510	<.5	110	7.0	<5	<3	<10	25,000	<10
MW4-1B	92-08-27	.82	<.01	20	2	1,600	<.5	110	2.0	<5	50	<10	16,000	<10
	92-12-09	.63	.02	10	3	1,400	<.5	130	4.0	<5	<3	<10	18,000	20
	93-03-04	.64	<.01	<10	1	1,400	<.5	120	2.0	<5	<3	<10	19,000	<10
	93-06-07	.02	.04	<10	<1	1,400	<.5	100	4.0	<5	<3	<10	15,000	<10
MW4-2A	92-08-26	.08	<.01	10	6	370	<.5	50	2.0	<5	50	<10	13,000	<10
	92-12-04	.12	.02	20	6	370	[c]2	100	3.0	<5	<3	<10	12,000	<10
	93-03-02	.07	<.01	10	6	390	<.5	110	<1.0	<5	<3	<10	11,000	<10
	93-06-07	<.01	.02	20	7	370	<.5	100	5.0	<5	<3	<10	13,000	<10
MW4-2B	92-08-26	.66	<.01	10	<1	1,100	<.5	100	1.0	<5	30	<10	9,000	<10
	92-12-04	.50	.04	<10	<1	950	<.5	100	3.0	<5	<3	<10	9,300	10
	93-03-02	.57	.04	<10	<1	1,100	<.5	110	1.0	<5	<3	<10	13,000	<10
	93-06-07	.65	.01	20	<1	960	<.5	110	2.0	<5	<3	<10	9,800	<10
MW13-67	92-08-26	.42	<.01	<10	<1	650	<.5	70	<1.0	<5	20	<10	5,700	<10
	92-12-08	.43	.07	10	<1	620	<.5	90	1.0	<5	<3	<10	5,800	<10
	93-03-03	.41	.01	<10	<1	660	<.5	90	1.0	<5	<3	<10	5,600	<10
	93-06-09	.06	<.01	<10	<1	550	<.5	80	1.0	<5	<3	<10	4,700	<10

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Li	Mn	Hg	Mo	Ni	Se	Ag	Sr	V	Zn	TOC	DOC
						Ground Water--Continued							
MW2-1B	92-08-28	40	1,100	<0.1	<10	<10	<1	<1.0	640	<6	6	1.9	--
	92-12-03	37	750	<.1	20	<10	<1	<1.0	640	<6	<3	1.9	3.2
	93-03-05	38	480	--	<10	<10	<1	<1.0	620	<6	<3	2.4	1.9
	93-06-04	41	560	.1	<10	<10	<1	<1.0	640	<6	6	2.1	2.2
MW4-1A	92-08-27	51	1,400	<.1	<10	10	<1	1.0	1,200	<6	4	3.3	--
	92-12-09	46	1,300	<.1	10	<10	<1	<1.0	1,100	<6	3	3.0	3.6
	93-03-04	48	1,300	<.1	<10	<10	<1	<1.0	1,100	<6	7	3.3	3.8
	93-06-07	48	1,100	<.1	10	<10	<1	<1.0	1,100	<6	<3	3.6	3.4
MW4-1B	92-08-27	47	400	<.1	<10	<10	<1	2.0	920	<6	<3	2.7	--
	92-12-09	47	490	<.1	<10	<10	<1	<1.0	930	<6	<3	2.9	3.7
	93-03-04	48	560	<.1	<10	<10	<1	<1.0	930	<6	<3	--	2.6
	93-06-07	44	370	<.1	<10	<10	<1	<1.0	850	<6	<3	4.0	3.1
MW4-2A	92-08-26	48	2,000	<.1	<10	<10	<1	2.0	980	<6	<3	2.0	--
	92-12-04	46	2,100	.1	<10	<10	<1	1.0	990	<6	8	2.0	3.3
	93-03-02	48	2,000	<.1	<10	<10	<1	<1.0	1,000	<6	4	2.2	2.7
	93-06-07	45	1,800	<.1	<10	<10	<1	<1.0	950	<6	11	2.3	2.1
MW4-2B	92-08-26	39	400	<.1	<10	<10	<1	<1.0	920	<6	3	2.7	--
	92-12-04	37	490	.2	<10	<10	<1	<1.0	890	<6	<3	3.2	3.8
	93-03-02	45	660	<.1	<10	<10	<1	<1.0	960	<6	4	2.6	--
	93-06-07	38	440	<.1	10	<10	<1	<1.0	870	<6	3	2.8	2.6
MW13-67	92-08-26	31	210	<.1	<10	<10	<1	1.0	450	<6	6	2.5	--
	92-12-08	27	200	<.1	<10	<10	<1	1.0	450	<6	16	2.6	2.9
	93-03-03	29	190	<.1	<10	<10	<1	<1.0	430	<6	6	2.5	2.4
	93-06-09	26	160	<.1	<10	<10	<1	<1.0	370	<6	10	2.6	2.4

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Time	Cond	pH	Temp	DO	COD	Coli	Strep	Ca	Mg	Na	K
						Ground Water--Continued							
USGS-1	92-08-18	1600	660	7.0	15.0	<0.1	<10	<1	<1	110	18	5.7	4.4
	92-12-21	1200	710	7.0	15.0	.1	<10	--	--	110	18	6.5	4.6
	93-03-10	1015	733	7.1	14.0	.2	<10	<1	[a]7	120	20	6.6	4.1
	93-06-08	1100	748	7.1	14.0	<.1	<10	<1	<1	120	19	6.6	4.3
USGS-2D	92-08-19	1045	1,020	6.8	15.0	<.1	15	<1	<1	170	36	9.4	6.1
	92-12-01	1230	1,030	6.8	14.5	<.1	21	<1	27	170	35	11	6.4
	93-03-11	1000	1,090	6.8	14.0	<.1	220	<1	<1	160	34	11	5.8
	93-06-08	1450	1,090	6.8	14.5	--	42	<1	<1	150	30	10	6.3
USGS-2S	92-08-19	1145	866	6.9	15.0	<.1	16	<1	<1	150	26	11	6.3
	92-12-01	1130	896	6.9	14.5	<.1	19	<1	<1	140	24	11	6.3
	93-03-11	0900	970	6.9	14.5	<.1	20	<1	<1	150	26	11	6.1
	93-06-08	1415	943	6.9	14.0	--	--	<1	<1	130	23	10	6.0
USGS-3D	92-08-19	1445	1,000	7.2	14.5	<.1	17	<1	<1	160	38	19	5.3
	92-12-03	1445	1,090	7.3	14.5	<.1	13	<1	<1	170	39	19	5.3
	93-03-11	1300	1,160	7.2	14.0	<.1	15	<1	<1	170	40	19	4.9
	93-06-02	1500	1,140	7.2	14.5	<.1	33	<1	<1	160	37	18	5.3
USGS-3S	92-08-19	1645	903	7.0	14.5	<.1	17	<1	<1	160	31	13	5.8
	92-12-03	1400	1,030	7.0	14.5	<.1	15	<1	<1	170	34	17	6.3
	93-03-11	1200	1,050	7.0	14.0	<.1	21	<1	<1	160	33	14	5.6
	93-06-02	1430	1,040	7.1	14.0	<.1	27	<1	<1	160	31	14	5.7
USGS-4	92-08-25	1000	1,370	6.8	15.0	<.1	31	<1	<1	240	61	44	8.5
	92-12-03	1545	1,560	6.9	14.5	<.1	27	<1	<1	--	--	--	8.2
	93-03-10	1700	1,600	6.9	14.0	--	29	<1	<1	230	60	39	7.4
	93-06-08	0930	1,580	6.9	14.5	<.1	19	<1	<1	190	49	37	7.7

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Alk	SO_4	Cl	F	Br	SiO_2	DS	NO_2	$NO_2 + NO_3$	NH_3	NH_3 + Org N	P total
						Ground Water--Continued							
USGS-1	92-08-18	353	18	5.7	0.3	0.05	22	404	<0.01	0.07	0.08	<0.20	0.05
	92-12-21	353	18	2.4	.3	.05	22	420	.05	.08	.12	<.20	.05
	93-03-10	371	19	2.1	.2	.02	23	435	.03	.28	.11	<.20	.07
	93-06-08	406	17	2.8	.2	.05	22	426	<.01	<.05	.14	.30	.04
USGS-2D	92-08-19	622	.3	3.6	.2	.11	42	649	<.01	<.05	.86	.90	.69
	92-12-01	625	.1	3.6	.2	.10	45	628	.03	<.05	1.1	1.1	1.0
	93-03-11	619	<.1	4.2	.1	.58	41	626	.05	.05	1.1	1.2	1.0
	93-06-08	605	<1.0	3.3	.2	.06	37	666	<.01	<.05	1.1	1.2	.02
USGS-2S	92-08-19	504	25	4.1	.2	.02	37	573	.01	<.05	.68	.70	.73
	92-12-01	513	23	1.9	.2	.13	33	558	.02	<.05	.72	.90	.65
	93-03-11	539	24	3.1	.1	.08	34	574	--	--	--	--	--
	93-06-08	476	20	1.6	.2	.03	31	583	<.01	<.05	.66	.60	<.01
USGS-3D	92-08-19	665	<.1	9.0	.3	.09	29	701	<.01	<.05	.59	.60	.45
	92-12-03	658	.4	5.1	.2	.11	31	660	.03	<.05	.64	.70	.62
	93-03-11	657	.5	5.0	.2	.07	30	670	.01	<.05	.64	.70	.71
	93-06-02	644	<.1	5.0	.2	.05	29	664	<.01	<.05	.61	.60	<.01
USGS-3S	92-08-19	545	46	14	.2	.05	29	632	<.01	<.05	.42	.40	.28
	92-12-03	520	51	8.8	.2	.11	31	636	.02	<.05	.38	.50	.46
	93-03-11	545	41	7.2	.2	.05	30	612	.02	<.05	.39	.50	.48
	93-06-02	531	38	8.0	.2	.07	28	626	<.01	<.05	.37	.40	.46
USGS-4	92-08-25	987	1.7	24	<.1	.23	31	1,000	<.01	<.05	.66	.90	.35
	92-12-03	954	--	--	--	--	--	1,010	<.01	<.05	.70	.90	.31
	93-03-10	920	18	13	.1	.16	30	944	.02	<.05	.67	.90	.35
	93-06-08	916	12	13	.2	°2,400	25	980	<.01	<.05	.68	.70	.10

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	P	P + Ortho P	Al	As	Ba	Be	B	Cd	Cr	Co	Cu	Fe	Pb
						Ground Water--Continued								
USGS-1	92-08-18	0.06	0.06	<10	4	220	<0.5	70	1.0	<5	<3	<10	1,300	<10
	92-12-21	.04	.01	<10	3	230	<.5	70	<1.0	<5	<3	<10	800	<10
	93-03-10	.05	.05	<10	5	250	<.5	70	1.0	<5	<3	<10	1,500	<10
	93-06-08	.03	.04	<10	5	240	<.5	60	2.0	<5	<3	<10	1,900	10
USGS-2D	92-08-19	.76	<.01	<10	<1	1,600	<.5	110	3.0	<5	<3	<10	19,000	<10
	92-12-01	.79	.01	<10	<1	1,300	<.5	120	6.0	<5	<3	<10	28,000	<10
	93-03-11	.31	<.01	10	<1	1,100	<.5	130	4.0	<5	8	<10	28,000	20
	93-06-08	.03	.02	10	<1	1,100	<.5	110	7.0	<5	<3	<10	28,000	<10
USGS-2S	92-08-19	.48	<.01	<10	36	380	.5	100	4.0	<5	<3	<10	25,000	<10
	92-12-01	.39	<.01	<10	34	330	.7	110	7.0	<5	10	<10	23,000	<10
	93-03-11	--	--	<10	32	340	<.5	120	2.0	<5	6	<10	21,000	10
	93-06-08	<.01	.01	<10	34	300	<.5	90	6.0	6	<3	<10	20,000	<10
USGS-3D	92-08-19	.45	<.01	<10	38	650	<.5	90	4.0	<5	<3	<10	23,000	<10
	92-12-03	<.01	<.01	50	29	570	<.5	90	4.0	<5	<3	<10	20,000	<10
	93-03-11	.01	<.01	10	30	580	<.5	100	2.0	<5	40	<10	20,000	<10
	93-06-02	<.01	<.01	20	35	570	<.5	90	3.0	<5	20	<10	22,000	<10
USGS-3S	92-08-19	.37	<.01	<10	40	320	<.5	80	4.0	<5	<3	<10	19,000	10
	92-12-03	.01	<.01	<10	24	290	<.5	80	1.0	<5	<3	<10	8,900	<10
	93-03-11	.07	<.01	<10	38	290	<.5	90	2.0	<5	20	<10	17,000	<10
	93-06-02	<.01	<.01	20	38	270	<.5	70	4.0	<5	<3	<10	16,000	<10
USGS-4	92-08-25	.24	<.01	<10	1	520	<.5	140	4.0	<5	<3	<10	18,000	<10
	92-12-03	.09	<.01	<10	<1	--	--	140	--	--	--	--	--	--
	93-03-10	.14	<.01	<10	<1	530	<.5	140	2.0	<5	10	<10	18,000	20
	93-06-08	.01	<.01	<10	<1	460	<.5	110	6.0	<5	<3	<10	16,000	<10

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Li	Mn	Hg	Mo	Ni	Se	Ag	Sr	V	Zn	TOC	DOC
						Ground Water--Continued							
USGS-1	92-08-18	26	330	<0.1	<10	<10	<1	<1.0	630	<6	21	1.5	--
	92-12-21	27	300	.1	<10	<10	<1	<1.0	640	<6	<3	1.5	2.1
	93-03-10	26	360	.1	<10	<10	<1	<1.0	690	<6	<3	1.8	1.6
	93-06-08	29	400	<.1	10	<10	<1	<1.0	710	<6	4	1.6	1.6
USGS-2D	92-08-19	47	830	<.1	<10	<10	<1	6.0	1,200	6	19	2.5	--
	92-12-01	47	1,600	<.1	<10	<10	<1	<1.0	1,200	6	4	4.0	10
	93-03-11	43	1,700	<.1	<10	<10	<1	<1.0	1,100	<6	<3	2.9	2.2
	93-06-08	41	1,600	--	20	<10	<1	<1.0	1,100	6	<3	3.4	--
USGS-2S	92-08-19	38	1,400	<.1	<10	<10	<1	8.0	900	7	22	2.9	--
	92-12-01	34	1,300	.2	10	<10	<1	<1.0	860	7	11	3.3	3.4
	93-03-11	36	1,300	<.1	<10	<10	<1	<1.0	890	<6	<3	3.9	2.5
	93-06-08	35	1,100	<.1	10	<10	<1	<1.0	830	<6	4	3.7	2.7
USGS-3D	92-08-19	34	1,100	<.1	<10	<10	<1	1.0	1,300	7	8	2.9	--
	92-12-03	35	1,100	.2	<10	<10	<1	<1.0	1,300	<6	<3	2.9	3.9
	93-03-11	32	1,200	<.1	<10	<10	<1	<1.0	1,300	<6	<3	2.9	2.3
	93-06-02	31	1,100	<.1	<10	<10	<1	<1.0	1,200	7	3	2.9	2.4
USGS-3S	92-08-19	25	1,500	<.1	<10	<10	<1	1.0	1,100	<6	7	3.0	--
	92-12-03	28	1,600	.2	<10	<10	<1	<1.0	1,100	<6	<3	3.1	3.8
	93-03-11	22	1,400	<.1	<10	<10	<1	<1.0	1,100	<6	<3	3.0	2.4
	93-06-02	25	1,300	<.1	10	<10	<1	<1.0	1,000	<6	16	3.0	2.6
USGS-4	92-08-25	43	3,700	[d]<.1	<10	<10	<1	<1.0	1,500	<6	9	6.2	--
	92-12-03	--	--	<.1	--	--	<1	--	--	--	--	6.4	7.5
	93-03-10	43	3,700	<.1	10	<10	<1	<1.0	1,500	<6	<3	5.0	4.4
	93-06-08	39	3,200	<.1	20	<10	<1	<1.0	1,300	<6	<3	5.0	5.7

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Time	Cond	pH	Temp	DO	COD	Coli	Strep	Ca	Mg	Na	K
						Ground Water--Continued							
USGS-5D	92-08-20	1030	974	6.9	14.5	<0.1	20	<1	<1	180	31	18	6.6
	92-12-01	0830	1,210	7.0	14.0	<.1	17	<1	<1	200	36	23	6.9
	93-03-04	1110	983	7.0	13.5	.4	19	<1	<1	170	31	19	6.2
	93-06-02	1045	1,250	6.9	14.5	<.1	34	<1	<1	180	32	21	6.7
USGS-5S	92-08-20	1130	706	6.9	14.5	<.1	<10	<1	<1	120	29	13	5.3
	92-11-30	1445	764	7.0	15.0	<.1	<10	<1	<1	130	28	15	5.6
	93-03-04	1210	1,190	7.0	14.0	<.1	41	<1	<1	130	26	35	5.5
	93-06-02	1145	854	7.0	13.5	.1	<10	<1	<1	150	28	15	5.3
USGS-6	92-08-25	1200	1,080	6.8	14.0	<.1	29	<1	<1	180	46	22	6.9
	92-12-01	1005	1,280	6.9	14.5	<.1	21	<1	<1	170	42	20	7.3
	93-03-04	0930	1,410	6.9	14.0	<.1	21	<1	<1	190	47	19	7.0
	93-06-02	0845	1,500	6.8	13.5	<.1	32	<1	[a]4	190	47	20	7.5
USGS-7	92-08-24	1500	786	7.0	15.5	<.1	16	<1	<1	140	32	16	6.4
	92-12-01	1500	890	7.0	14.5	<.1	<10	<1	[a]40	130	30	14	6.2
	93-03-10	1500	950	7.1	14.0	<.1	11	<1	<1	140	33	14	5.7
	93-06-02	1700	925	7.0	14.5	<.1	15	<1	<1	150	31	14	6.3
USGS-8D	92-08-26	1030	741	7.0	15.5	<.1	12	<1	<1	140	27	7.1	6.6
	92-12-08	1200	853	7.2	14.5	<.1	<10	<1	<1	120	26	7.0	6.4
	93-03-03	1315	873	7.0	14.0	<.1	11	<1	<1	140	26	7.0	6.4
	93-06-09	0915	863	7.1	14.5	<.1	14	<1	<1	130	24	7.2	6.5
USGS-8S	92-08-26	1200	704	6.9	15.0	.1	10	<1	<1	130	27	6.0	21
	92-12-08	1320	835	7.0	15.0	.2	<10	<1	<1	130	26	5.8	9.3
	93-03-03	1415	871	6.9	14.5	--	53	<1	<1	140	28	6.5	7.6
	93-06-09	0815	834	6.9	14.0	.3	<10	<1	[a]2	120	24	6.1	9.2

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Alk	SO_4	Cl	F	Br	SiO_2	DS	NO_2	$NO_2 + NO_3$	NH_3	$NH_3 +$ Org N	P total
						Ground Water--Continued							
USGS-5D	92-08-20	693	1.7	8.3	0.2	0.11	30	730	0.01	<0.05	0.74	0.80	0.54
	92-12-01	695	<.1	6.2	.2	.23	33	732	.02	<.05	.80	.90	.48
	93-03-04	353	9.8	6.6	.1	.08	30	490	.01	<.05	.75	.80	.41
	93-06-02	699	<.1	6.1	.2	.11	30	736	<.01	<.05	.77	.80	.46
USGS-5S	92-08-20	441	22	7.7	.2	.03	20	500	<.01	1.6	.03	<.20	.02
	92-11-30	416	32	4.5	.2	.46	20	518	.04	2.3	.01	<.20	.02
	93-03-04	661	92	6.1	.1	.01	20	615	.05	11	.02	<.20	.02
	93-06-02	418	28	4.1	.2	.02	20	500	<.01	1.3	.03	<.20	.02
USGS-6	92-08-25	757	1.4	21	.2	.07	35	738	<.01	<.05	2.5	3.1	1.5
	92-12-01	747	7.6	14	.2	.06	31	808	.03	<.05	3.8	4.1	1.7
	93-03-04	731	53	16	.1	.80	34	872	.01	<.05	3.8	4.1	1.4
	93-06-02	820	23	16	.2	.39	32	892	<.01	<.05	3.7	4.1	<.01
USGS-7	92-08-24	494	22	6.9	.1	.04	32	544	<.01	<.05	.72	.80	1.7
	92-12-01	507	21	3.6	.2	1.0	29	552	.04	<.05	.80	.90	.40
	93-03-10	521	21	3.8	.2	.02	30	498	.01	<.05	.78	.80	.34
	93-06-02	477	18	4.0	.2	.05	32	549	<.01	<.05	.77	.80	<.01
USGS-8D	92-08-26	570	26	16	.2	.11	29	506	<.01	<.05	.12	<.20	.45
	92-12-08	432	17	13	.3	.14	26	523	<.01	<.05	.16	.20	.46
	93-03-03	438	21	10	.2	.05	28	524	<.01	<.05	.14	<.20	.42
	93-06-09	470	7.9	10	.3	.06	27	519	<.01	<.05	.17	<.20	.02
USGS-8S	92-08-26	388	64	7.7	.4	.02	20	495	<.01	.14	.03	<.20	.01
	92-12-08	413	50	5.8	.4	.04	20	518	.05	2.3	.02	<.20	<.01
	93-03-03	407	42	5.5	.4	.01	23	539	.05	1.5	.02	<.20	.02
	93-06-09	370	54	5.6	.3	.03	19	501	.03	1.0	.03	<.20	.02

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	P	P + Ortho P	Al	As	Ba	Be	B	Cd	Cr	Co	Cu	Fe	Pb
						Ground Water--Continued								
USGS-5D	92-08-20	0.41	<0.01	<10	2	750	<0.5	90	4.0	<5	<3	<10	20,000	20
	92-12-01	.41	.01	20	2	790	<.5	100	5.0	<5	9	<10	22,000	<10
	93-03-04	.11	<.01	<10	6	650	<.5	90	2.0	<5	<3	<10	21,000	<10
	93-06-02	<.01	<.01	20	4	710	<.5	80	7.0	7	<3	<10	21,000	20
USGS-5S	92-08-20	<.01	.01	<10	<1	330	<.5	70	<1.0	<5	<3	<10	820	<10
	92-11-30	.02	.01	<10	<1	310	.6	60	<1.0	<5	<3	<10	<3	<10
	93-03-04	<.01	.02	<10	<1	260	<.5	70	<1.0	<5	<3	<10	33	<10
	93-06-02	.02	.01	30	<1	280	<.5	40	<1.0	<5	<3	<10	7	<10
USGS-6	92-08-25	1.4	<.01	<10	72	430	<.5	120	7.0	<5	<3	<10	40,000	20
	92-12-01	1.3	.02	10	54	410	.6	140	5.0	<5	<3	<10	31,000	<10
	93-03-04	1.3	.01	<10	57	450	<.5	140	5.0	<5	<3	<10	36,000	10
	93-06-02	.02	.01	<10	57	430	<.5	130	8.0	<5	<3	<10	36,000	10
USGS-7	92-08-24	.36	<.01	<10	<1	590	<.5	90	1.0	<5	<3	<10	9,600	<10
	92-12-01	.26	.02	<10	<1	590	<.5	90	3.0	<5	20	<10	9,500	<10
	93-03-10	.15	.10	<10	<1	610	<.5	110	2.0	<5	<3	<10	9,300	<10
	93-06-02	.02	.02	20	<1	590	<.5	60	1.0	<5	<3	<10	9,900	<10
USGS-8D	92-08-26	.42	<.01	30	<1	670	<.5	50	<1.0	<5	30	<10	9,800	<10
	92-12-08	.29	.03	10	<1	620	<.5	80	2.0	<5	<3	<10	8,800	<10
	93-03-03	.34	.02	<10	<1	670	<.5	60	<1.0	<5	<3	<10	9,500	<10
	93-06-09	.03	.05	<10	<1	600	<.5	70	2.0	<5	<3	<10	9,200	10
USGS-8S	92-08-26	.03	.01	20	1	310	<.5	50	<1.0	<5	<3	<10	410	<10
	92-12-08	<.01	<.01	10	<1	280	<.5	60	<1.0	<5	<3	<10	140	<10
	93-03-03	<.01	<.01	<10	1	290	<.5	60	<1.0	<5	<3	<10	150	<10
	93-06-09	<.01	<.01	40	<1	280	<.5	50	1.0	6	<3	<10	56	<10

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Li	Mn	Hg	Mo	Ni	Se	Ag	Sr	V	Zn	TOC	DOC
						Ground Water--Continued							
USGS-5D	92-08-20	33	2,700	<0.1	<10	<10	<1	2.0	1,200	<6	8	2.9	--
	92-12-01	34	2,900	.2	<10	<10	<1	<1.0	1,200	6	19	6.7	4.1
	93-03-04	31	2,400	<.1	<10	<10	<1	<1.0	1,100	<6	<3	3.5	2.6
	93-06-02	33	2,600	<.1	20	<10	<1	<1.0	1,200	<6	9	3.1	2.6
USGS-5S	92-08-20	39	710	<.1	<10	<10	<1	<1.0	850	<6	3	1.7	--
	92-11-30	38	500	.2	<10	<10	<1	<1.0	870	<6	5	1.9	2.4
	93-03-04	37	330	<.1	<10	<10	4	<1.0	880	<6	4	1.8	2.0
	93-06-02	34	450	[c]1.8	<10	<10	<1	<1.0	880	<6	3	1.4	1.8
USGS-6	92-08-25	16	2,200	[d]<.1	<10	<10	<1	2.0	1,100	7	13	33	--
	92-12-01	11	1,900	.1	20	<10	<1	<1.0	1,100	7	9	5.9	9.3
	93-03-04	12	2,100	<.1	20	<10	<1	<1.0	1,200	8	<3	5.1	3.7
	93-06-02	14	2,300	.1	<10	<10	<1	<1.0	1,300	7	15	5.6	4.2
USGS-7	92-08-24	37	1,000	<.1	<10	<10	<1	<1.0	890	<6	9	2.1	--
	92-12-01	34	1,100	.2	20	<10	<1	<1.0	880	<6	3	2.0	2.7
	93-03-10	33	1,000	<.1	<10	<10	<1	<1.0	890	<6	<3	2.2	1.8
	93-06-02	33	1,100	.1	<10	<10	<1	<1.0	910	<6	<3	2.0	2.4
USGS-8D	92-08-26	33	430	<.1	<10	<10	<1	2.0	830	<6	7	2.0	--
	92-12-08	33	420	<.1	<10	<10	<1	1.0	820	<6	5	2.0	3.7
	93-03-03	34	470	<.1	<10	<10	<1	<1.0	830	<6	<3	1.9	2.4
	93-06-09	33	420	<.1	<10	<10	<1	<1.0	780	<6	5	2.0	2.0
USGS-8S	92-08-26	32	630	<.1	<10	<10	<1	<1.0	1,200	<6	4	1.5	--
	92-12-08	32	450	<.1	<10	<10	<1	1.0	1,100	<6	<3	1.4	1.7
	93-03-03	36	460	<.1	<10	<10	<1	<1.0	1,100	<6	4	1.9	1.7
	93-06-09	32	460	<.1	<10	<10	<1	<1.0	1,000	<6	6	1.7	1.3

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Time	Cond	pH	Temp	DO	COD	Coli	Strep	Ca	Mg	Na	K
Ground Water--Continued													
USGS-9D	92-08-25	1500	510	7.0	15.0	<0.1	10	<1	<1	86	17	7.1	2.1
	92-12-09	0845	567	7.2	14.0	--	<10	<1	<1	80	17	7.4	2.0
	93-03-01	1530	572	7.0	14.0	<.1	<10	<1	<1	88	17	7.0	2.0
	93-06-09	1500	836	7.2	14.5	<.1	<10	<1	<1	89	17	7.6	2.0
USGS-9S	92-08-25	1700	518	7.1	14.0	--	10	<1	<1	88	20	8.5	2.2
	92-12-09	0945	569	7.2	14.0	.3	<10	<1	[a]2	81	20	7.8	2.1
	93-03-01	1550	596	7.1	14.0	.6	<10	<1	<1	87	20	8.0	2.0
	93-06-09	1400	569	7.2	13.5	.2	<10	<1	<1	84	18	7.7	1.8
Surface Water													
Blew hole	92-08-31	1400	456	8.1	22.0	5.7	27	[a]6	[a]23	55	12	33	8.1
	92-12-02	0900	231	7.8	3.0	9.0	33	340	370	31	5.4	6.4	4.9
	93-03-02	1000	223	7.5	3.0	13.2	29	<1	[a]20	49	8.8	14	4.8
	93-06-01	1400	582	7.3	19.5	10.0	180	[a]9	[a]5	97	15	15	5.5
Perche Creek	92-08-31	1500	928	8.0	21.5	6.0	33	[a]120	[a]25	67	19	99	22
	92-12-02	0830	--	8.0	3.5	10.6	29	5,800	7,800	65	12	28	5.2
	93-03-02	0900	928	7.5	3.0	12.9	33	14,000	19,000	79	14	68	6.6
	93-06-01	1340	691	7.6	20.0	19.3	39	<50	<50	86	14	35	7.0

Table 1.–Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex–Continued

Site identifier (fig. 2)	Date (year-month-day)	Alk	SO_4	Cl	F	Br	SiO_2	DS	NO_2	$NO_2 + NO_3$	NH_3	NH_3 + Org N	P total
						Ground Water--Continued							
USGS-9D	92-08-25	254	38	8.6	0.2	0.16	29	345	<0.01	<0.05	0.06	<0.20	0.26
	92-12-09	241	41	9.0	.2	.09	29	358	.01	<.05	.11	<.20	.24
	93-03-01	273	41	8.7	.2	.06	29	366	.01	<.05	.09	<.20	.19
	93-06-09	258	46	9.8	.2	.08	29	381	<.01	<.05	.11	<.20	.11
USGS-9S	92-08-25	271	33	3.9	.1	.01	20	339	.03	1.9	<.01	<.20	.03
	92-12-09	324	32	1.8	.2	.01	19	349	.02	2.3	.02	<.20	.03
	93-03-01	268	35	2.1	.1	.02	20	352	.03	1.9	.01	<.20	.05
	93-06-09	270	36	2.6	.2	.03	19	342	.02	1.2	.02	<.20	.04
						Surface Water--Continued							
Blew hole	92-08-31	161	59	32	.3	<.01	12	318	<.01	<.05	.04	.90	.17
	92-12-02	71	27	6.9	.2	.85	12	205	.09	.22	.23	.90	.25
	93-03-02	131	40	16	.1	<.01	9.4	304	.02	<.05	.03	.90	.18
	93-06-01	258	39	15	.3	<.01	15	347	<.01	<.05	.25	1.0	.14
Perche Creek	92-08-31	257	83	120	<.1	.01	21	572	.09	.18	9.4	26	1.4
	92-12-02	146	92	30	.3	.03	11	338	.05	.35	2.1	2.5	.42
	93-03-02	163	99	110	.2	.02	12	571	.03	.21	2.6	4.0	.56
	93-06-01	203	92	42	.3	<.01	9.4	407	.05	.26	1.3	2.8	.21

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	P	P + Ortho P	Al	As	Ba	Be	B	Cd	Cr	Co	Cu	Fe	Pb
						Ground Water--Continued								
USGS-9D	92-08-25	0.27	<0.01	<10	<1	480	<0.5	30	2.0	<5	<3	<10	8,300	<10
	92-12-09	.24	.03	<10	<1	490	<.5	30	1.0	<5	<3	<10	8,300	20
	93-03-01	.20	<.01	20	<1	490	<.5	20	3.0	<5	<3	<10	8,700	10
	93-06-09	.01	.02	<10	<1	530	<.5	20	3.0	<5	<3	<10	8,800	<10
USGS-9S	92-08-25	.05	.03	<10	5	360	<.5	50	<1.0	<5	<3	<10	24	<10
	92-12-09	.03	.03	10	5	340	<.5	50	<1.0	<5	<3	<10	23	<10
	93-03-01	.04	.05	20	8	360	<.5	50	<1.0	<5	<3	<10	20	<10
	93-06-09	.04	.03	20	5	360	<.5	40	<1.0	<5	<3	<10	8	<10
						Surface Water--Continued								
Blew hole	92-08-31	.05	.03	30	3	130	<.5	80	<1.0	<5	<3	<10	11	<10
	92-12-02	.22	.16	590	2	84	<.5	30	<1.0	<5	3	<10	1,000	<10
	93-03-02	.15	.03	380	2	110	<.5	40	<1.0	<5	<3	<10	770	<10
	93-06-01	.02	<.01	10	4	160	<.5	20	<1.0	<5	<3	<10	29	<10
Perche Creek	92-08-31	1.3	1.2	40	5	120	<.5	210	<1.0	<5	<3	<10	10	<10
	92-12-02	.26	.25	20	<1	94	<.5	60	<1.0	<5	<3	<10	33	<10
	93-03-02	.52	.35	710	2	130	<.5	70	<1.0	<5	<3	<10	1,600	<10
	93-06-01	.05	.02	30	1	120	<.5	70	<1.0	<5	<3	<10	14	<10

Table 1.--Physical properties, inorganic constituent concentrations, and total and dissolved organic carbon concentrations in samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Li	Mn	Hg	Mo	Ni	Se	Ag	Sr	V	Zn	TOC	DOC
						Ground Water--Continued							
USGS-9D	92-08-25	11	320	[d]<0.1	<10	<10	<1	<1.0	190	<6	6	1.2	--
	92-12-09	10	310	<.1	<10	<10	<1	2.0	200	<6	4	1.2	1.8
	93-03-01	9	320	<.1	10	<10	<1	<1.0	190	<6	6	1.2	.9
	93-06-09	11	310	--	<10	<10	<1	<1.0	200	<6	6	1.0	1.2
USGS-9S	92-08-25	6	55	<.1	<10	<10	<1	<1.0	180	<6	5	1.1	--
	92-12-09	5	53	<.1	<10	<10	1	1.0	180	<6	<3	1.0	1.4
	93-03-01	4	36	<.1	<10	<10	2	<1.0	180	<6	5	1.2	1.2
	93-06-09	5	28	<.1	<10	<10	<1	<1.0	190	<6	<3	1.3	1.1
						Surface Water--Continued							
Blew hole	92-08-31	14	120	<.1	<10	<10	<1	<1.0	250	<6	5	10	--
	92-12-02	<4	250	.2	<10	<10	<1	<1.0	110	<6	7	9.6	8.1
	93-03-02	4	340	<.1	<10	<10	<1	<1.0	180	<6	9	11	6.5
	93-06-01	10	2,000	.1	<10	<10	<1	<1.0	360	<6	9	45	43
Perche Creek	92-08-31	22	790	<.1	<10	<10	<1	<1.0	280	<6	<3	11	--
	92-12-02	7	350	.2	<10	<10	<1	<1.0	190	<6	8	7.2	8.3
	93-03-02	10	460	<.1	20	<10	<1	<1.0	240	<6	13	11	5.8
	93-06-01	11	530	.1	<10	<10	<1	<1.0	230	<6	14	9.5	5.7

[a]Non-ideal colony count.
[b]Laboratory value.
[c]Suspect concentration.
[d]Total concentration.

Table 2.–Constituents that were not detected and minimum reporting limits of organic analyses for samples collected from selected monitoring wells in the Columbia/Eagle Bluffs Wetland Complex

[µg/L, micrograms per liter; DDD, 1,1-Dichloro-2,2-bis (p-chlorophenyl) ethane; DDE, Dichlorodiphenyl dichloroethylene; DDT, Dichlorodiphenyl trichloroethane; PCB, Polychlorinated biphenyl; PCN, Polychlorinated napthalene; EPTC, S-Ethyl dipropylthiocarbamate; BHC, 1,2,3,4,5,6-Hexachlorocyclohexane; DCPA, *n*-(3,4-dichlorophenyl)propionamide]

Group or family	Constituent	Minimum reporting limit
	Volatile organic compounds (total)	
Substituted ethane	Chloroethane	3 µg/L
	1,1-Dichloroethane	3 µg/L
	1,2-Dichloroethane	3 µg/L
	1,1,1-Trichloroethane	3 µg/L
	1,1,2-Trichloroethane	3 µg/L
	1,1,1,2-Tetrachloroethane	3 µg/L
	1,1,2,2-Tetrachloroethane	3 µg/L
	Trichlorotrifluoroethane	3 µg/L
Substituted ethene	Vinyl chloride	3 µg/L
	1,1-Dichloroethene	3 µg/L
	cis-1,2-Dichloroethene	3 µg/L
	trans-1,2-Dichloroethene	3 µg/L
	1,1,2-Trichloroethene	3 µg/L
	Tetrachloroethene	3 µg/L
Substituted methane	Bromomethane	3 µg/L
	Dibromomethane	3 µg/L
	1,2-Dibromomethane	3 µg/L
	Bromoform	3 µg/L
	Bromochloromethane	3 µg/L
	Dibromochloromethane	3 µg/L
	Chloromethane	3 µg/L
	Methylene chloride	3 µg/L
	Chloroform	3 µg/L
	Carbon tetrachloride	3 µg/L
	Dichlorobromomethane	3 µg/L
	Dichlorodifluoromethane	3 µg/L
	Trichlorofluoromethane	3 µg/L
Substituted propane	1,2-Dichloropropane	3 µg/L
	1,3-Dichloropropane	3 µg/L
	2,2-Dichloropropane	3 µg/L
	1,2,3-Trichloropropane	3 µg/L
	1,2-Dibromo-3-chloropropane (DBCP)	3 µg/L
Substituted propene	1,1-Dichloropropene	3 µg/L
	cis-1,3-Dichloropropene	3 µg/L
	trans-1,3-Dichloropropene	3 µg/L
Nitrile	Acrylonitrile	20 µg/L
Substituted butene	Hexachlorobutadiene	3 µg/L
Benzene derivatives	Benzene	3 µg/L
	Chlorobenzene	3 µg/L
	1,2-Dichlorobenzene	3 µg/L
	1,3-Dichlorobenzene	3 µg/L
	1,4-Dichlorobenzene	3 µg/L
	1,2,3-Trichlorobenzene	3 µg/L
	1,2,4-Trichlorobenzene	3 µg/L
	Bromobenzene	3 µg/L
	Ethylbenzene	3 µg/L

Table 2.–Constituents that were not detected and minimum reporting limits of organic analyses for samples collected from selected monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Group or family	Constituent	Minimum reporting limit
	Volatile organic compounds (total)--Continued	
Benzene derivatives--Continued	Isopropylbenzene	3 µg/L
	n-Propylbenzene	3 µg/L
	sec-Butylbenzene	3 µg/L
	tert-Butylbenzene	3 µg/L
	n-butylbenzene	3 µg/L
	1,2,4-Trimethylbenzene	3 µg/L
	1,3,5-Trimethylbenzene	3 µg/L
	Xylenes (total)	3 µg/L
	Styrene	3 µg/L
	Toluene	3 µg/L
	1,2-Chlorotoluene	3 µg/L
	1,4-Chlorotoluene	3 µg/L
	p-Isopropyltoluene	3 µg/L
	Napthalene	3 µg/L
Aldehyde	Acrolein	20 µg/L
Ether	2-Chloroethylvinylether	3 µg/L
	Methyltertbutylether (MTBE)	3 µg/L
	Semi-volatile organic compounds (total)	
Acid	2-Chlorophenol	5 µg/L
	2,4-Dichlorophenol	30 µg/L
	2,4-Dimethylphenol	5 µg/L
	4,6-Dinitro-ortho-cresol	30 µg/L
	2,4-Dinitrophenol	20 µg/L
	2-Nitrophenol	5 µg/L
	4-Nitrophenol	30 µg/L
	Para-chloro-meta cresol	30 µg/L
	Pentachlorophenol	30 µg/L
	Phenol	5 µg/L
	2,4,6-Trichlorophenol	20 µg/L
Base and neutral	Acenaphthene	5 µg/L
	Acenaphthylene	5 µg/L
	Anthracene	5 µg/L
	Benzidine	40 µg/L
	Benzo[*a*]anthracene	10 µg/L
	Benzo[*a*]pyrene	10 µg/L
	Benzo[*b*]fluoranthene	10 µg/L
	Benzo[*g,h,i*]perylene	10 µg/L
	Benzo[*k*]fluoranthene	10 µg/L
	bis(2-Chloroethoxy)methane	5 µg/L
	bis(2-Chloroethyl)ether	5 µg/L
	bis(2-Chloroisopropyl)ether	5 µg/L
	bis(2-Ethylhexyl)phthalate	5 µg/L
	4-Bromophenyl-phenylether	5 µg/L
	n-Butyl benzyl phthalate	5 µg/L
	2-Chloronaphthalene	5 µg/L
	4-Chlorophenlyphenylether	5 µg/L
	Chrysene	10 µg/L
	1,2,5,6-Dibenzanthracene	10 µg/L
	1,2-Dichlorobenzene	5 µg/L

Table 2.--Constituents that were not detected and minimum reporting limits of organic analyses for samples collected from selected monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Group or family	Constituent	Minimum reporting limit
	Semi-volatile organic compounds (total)--Continued	
Base and neutral--Continued	1,3-Dichlorobenzene	5 µg/L
	1,4-Dichlorobenzene	5 µg/L
	3,3'-Dichlorobenzidine	20 µg/L
	Diethyl phthalate	5 µg/L
	Dimethyl phthalate	5 µg/L
	di-*n*-Butyl phthalate	5 µg/L
	2,4-Dinitrotoluene	5 µg/L
	2,6-Dinitrotoluene	5 µg/L
	Di-*n*-octyl phthalate	10 µg/L
	1,2-Diphenylhydrazine	5 µg/L
	Fluoranthene	5 µg/L
	Fluorene	5 µg/L
	Hexachlorobenzene	5 µg/L
	Hexachlorobutadiene	5 µg/L
	Hexachlorocyclopentadiene	5 µg/L
	Indeno[*1,2,3-cd*]pyrene	10 µg/L
	Isophorone	5 µg/L
	Naphthalene	5 µg/L
	Nitrobenzene	5 µg/L
	n-Nitrosodimethylamine	5 µg/L
	n-Nitrosodi-n-propylamine	5 µg/L
	n-Nitrosodiphenylamine	5 µg/L
	Phenanthrene	5 µg/L
	Pyrene	5 µg/L
	1,2,4-Trichlorobenzene	5 µg/L
	Pesticides (dissolved)	
Amide	Propanil	<0.016 µg/L
Benzamide	Pronamide	<.009 µg/L
Benzenamine	Ethalfluralin	<.013 µg/L
Carbamate	Pebulate	<.009 µg/L
	Thiobencarb	<.008 µg/L
Carbothioate	Molinate	<.007 µg/L
Cyclohexane	Alpha BHC	<.007 µg/L
Methyluracil	Terbacil	<.03 µg/L
Napthalene	Dieldrin	<.008 µg/L
Organophosphate	Malathion	<.01 µg/L
	Parathion	<.022 µg/L
	Phorate	<.011 µg/L
	Terbufos	<.012 µg/L
Organophosphorus	Azinphos-methyl	<.038 µg/L
	Disulfoton	<.008 µg/L
Phosphorodithioate	Fonofos	<.008 µg/L
	Dimethoate	<.024 µg/L
Pyrethroid	Permethrin	<.016 µg/L
Sulfite ester	Propargite	<.006 µg/L

Table 2.--Constituents that were not detected and minimum reporting limits of organic analyses for samples collected from selected monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Group or family	Constituent	Minimum reporting limit
	Organochlorine compounds (total)	
Pesticides	Aldrin	0.01 µg/L
	Chlordane	.1 µg/L
	DDD	.01 µg/L
	DDE	.01 µg/L
	DDT	.01 µg/L
	Dieldrin	.01 µg/L
	Endosulfan I	.01 µg/L
	Endrin	.01 µg/L
	Heptachlor	.01 µg/L
	Heptachlor epoxide	.01 µg/L
	Methoxychlor	.01 µg/L
	Mirex	.01 µg/L
	Perthane	.1 µg/L
	Toxaphene	1 µg/L
PCB	PCB's total	.1 µg/L
PCN	PCN's total	.1 µg/L

Table 3.--Results of pesticide analyses for water samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex

[<, less than; --, no data available]

Site identifier (fig. 2)	Date (year-month-day)	Time	Acetanilide	Amide	Carbamate				Chloracetanilide		Cyclohexane
			Alachlor	Napropamide	Butylate	Carbaryl	Carbofuran	EPTC	Metolachlor	Propachlor	Lindane, total
					Ground Water						
MW1-3B	93-06-03	1845	0.004	<0.002	<0.002	<0.008	<0.005	<0.002	0.005	<0.002	<0.010
MW1-4A	92-08-27	1645	<.003	.008	<.002	<.008	<.005	<.002	<.002	<.002	<.010
	92-12-10	1000	<.003	<.002	<.002	<.008	<.005	<.002	<.002	<.002	<.010
	93-03-09	1315	--	--	--	--	--	--	--	--	<.010
	93-06-03	0945	.003	<.002	.004	<.008	<.005	.003	.006	.002	<.010
MW4-1A	92-08-27	1130	<.003	.011	<.002	<.008	<.005	<.002	<.002	<.002	<.010
	92-12-09	1500	<.003	.008	<.002	<.008	<.005	<.002	.003	<.002	<.010
	93-03-04	1520	<.005	<.002	<.002	<.008	<.005	<.002	<.005	<.002	<.010
	93-06-07	1615	<.005	<.002	<.002	<.008	<.005	<.002	.002	<.002	<.010
USGS-1	92-08-18	1600	<.003	<.002	<.002	<.008	<.005	<.002	<.002	<.002	<.010
	92-12-21	1200	<.003	<.002	<.002	<.008	<.005	<.002	<.002	<.002	<.010
	93-03-10	1015	<.005	<.002	<.002	<.008	<.005	<.002	<.005	<.002	<.010
	93-06-08	1100	<.005	<.002	<.002	<.008	<.005	<.002	<.005	<.002	<.010
USGS-5S	92-08-20	1130	.003	<.002	<.002	<.008	<.005	<.002	<.002	<.002	<.010
	92-11-30	1445	<.003	<.002	<.002	<.008	<.005	<.002	.002	<.002	<.010
	93-03-04	1210	<.005	<.002	<.002	<.008	<.005	<.002	<.005	<.002	<.010
	93-06-02	1145	.003	<.002	<.002	<.008	<.005	<.002	.004	<.002	<.010

Table 3.--Results of pesticide analyses for water samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Cyclohexane	Dichloroethylene		Dinitroaniline		Organophosphate		Phosphorothioate		Substituted urea
		Lindane, dissolved	2,6 Diethyl-analine	*p,p'* DDE	Pendi-methalin	Trifluralin	Ethoprop	Methyl parathion	Chlor-pyrifos	Diazinon	Linuron
					Ground Water--Continued						
MW1-3B	93-06-03	<0.008	<0.002	<0.002	<0.010	0.006	<0.005	<0.010	<0.004	<0.005	<0.010
MW1-4A	92-08-27	<.008	<.002	<.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	92-12-10	<.008	<.002	<.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	93-03-09	--	--	--	--	--	--	--	--	--	--
	93-06-03	<.008	<.002	.002	<.010	<.006	.003	<.010	<.004	<.005	<.010
MW4-1A	92-08-27	<.008	<.002	<.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	92-12-09	<.008	<.002	<.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	93-03-04	<.008	<.002	<.002	<.010	<.006	<.005	<.010	<.004	<.005	<.010
	93-06-07	<.008	<.002	<.002	<.010	<.006	<.005	<.010	<.004	<.005	<.010
USGS-1	92-08-18	<.008	<.002	<.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	92-12-21	<.008	<.002	.004	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	93-03-10	<.008	<.002	[a]<.020	<.010	<.006	<.005	<.010	<.004	<.005	<.010
	93-06-08	<.008	<.002	<.002	<.010	<.006	<.005	<.010	<.004	<.005	<.010
USGS-5S	92-08-20	<.008	<.002	<.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	92-11-30	<.008	<.002	<.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	93-03-04	<.008	<.002	<.002	<.010	<.006	<.005	<.010	<.004	<.005	<.010
	93-06-02	<.008	<.002	<.002	<.010	<.006	.002	<.010	<.004	<.005	<.010

Table 3.–Results of pesticide analyses for water samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex–Continued

Site identifier (fig. 2)	Date (year-month-day)	Substituted urea	Terepthalate/ Dimethyl	Thiocarbamate	Toluidine	Triazine					Triazinone
		Tebuthiuron	DCPA	Triallate	Benfluralin	Atrazine	Cyanazine	Desethyl atrazine	Prometon	Simazine	Metribuzin
					Ground Water--Continued						
MW1-3B	93-06-03	<0.010	<0.002	<0.003	<0.007	0.006	<0.010	<0.020	<0.010	<0.010	<0.005
MW1-4A	92-08-27	<.010	<.002	<.002	<.005	.003	<.010	<.020	<.010	<.010	.120
	92-12-10	<.010	.002	<.002	<.005	.006	<.010	<.020	<.010	<.010	<.010
	93-03-09	--	--	--	--	--	--	--	--	--	--
	93-06-03	<.010	<.002	.003	.007	.008	<.010	<.020	<.010	<.010	<.005
MW4-1A	92-08-27	<.010	.002	<.002	<.005	.003	<.010	<.020	<.010	<.010	.005
	92-12-09	<.010	.003	<.002	<.005	.005	<.010	<.020	<.010	<.010	<.010
	93-03-04	<.010	<.002	<.003	<.007	<.005	<.010	<.020	<.010	<.010	<.005
	93-06-07	<.010	<.002	<.003	<.007	<.010	<.010	<.020	<.010	<.010	<.005
USGS-1	92-08-18	<.010	<.002	<.002	<.005	.051	<.010	<.020	<.010	<.010	<.010
	92-12-21	<.010	.002	<.002	<.005	.003	<.010	<.020	<.010	<.010	<.010
	93-03-10	<.010	<.005	<.004	<.009	<.006	<.010	<.020	<.010	<.010	<.005
	93-06-08	<.010	<.002	<.003	<.007	<.010	<.010	<.020	<.010	<.010	<.005
USGS-5S	92-08-20	<.010	<.002	<.002	<.005	.052	<.010	<.020	.006	<.010	.007
	92-11-30	<.010	.002	<.002	<.005	.005	<.010	<.020	<.010	<.010	<.010
	93-03-04	<.010	<.002	<.003	<.007	<.005	<.010	<.020	<.010	<.010	<.005
	93-06-02	<.010	<.002	<.003	<.007	.006	<.010	<.020	<.010	<.010	<.005

Table 3.—Results of pesticide analyses for water samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex—Continued

Site identifier (fig. 2)	Date (year-month-day)	Time	Acetanilide	Amide	Carbamate				Chloracetanilide		Cyclohexane
			Alachlor	Napropamide	Butylate	Carbaryl	Carbofuran	EPTC	Metolachlor	Propachlor	Lindane, total
					Ground Water--Continued						
USGS-7	92-08-24	1500	<0.003	<0.002	<0.002	<0.008	<0.005	<0.002	<0.002	<0.002	<0.010
	92-12-01	1500	<.003	<.002	<.002	<.008	<.005	<.002	.002	<.002	<.010
	93-03-10	1500	<.005	<.002	<.002	<.008	<.005	<.002	<.005	<.002	<.010
	93-06-02	1700	.004	<.002	.002	<.008	<.005	.003	.004	.002	<.010
USGS-9S	92-08-25	1700	<.003	<.002	<.002	<.008	<.005	<.002	<.002	<.002	<.010
	92-12-09	0945	<.003	<.002	<.002	<.008	<.005	<.002	<.002	<.002	<.010
	93-03-01	1550	<.005	<.002	<.002	<.008	<.005	<.002	<.005	<.002	<.010
	93-06-09	1400	<.005	<.002	<.002	<.008	<.005	<.002	<.005	<.002	<.010
					Surface Water						
Blew hole	92-08-31	1400	.012	.013	<.002	<.008	<.005	.019	.180	<.002	<.010
	92-12-02	0900	.005	<.002	<.002	<.008	<.005	<.002	.035	<.002	.010
	93-03-02	1000	<.005	<.002	<.002	<.008	.007	<.002	.015	<.002	--
	93-06-01	1400	.006	<.002	.003	.006	.014	.003	.080	.002	<.010
Perche Creek	92-08-31	1500	<.003	.016	<.002	<.008	.029	.014	.011	<.002	.040
	92-12-02	0830	<.003	<.002	<.002	<.008	<.005	<.002	.038	<.002	<.010
	93-03-02	0900	.006	<.002	<.002	.008	.029	<.002	.013	<.002	.010
	93-06-01	1340	.007	<.002	<.002	.009	<.005	<.002	.120	<.002	.030

Table 3.--Results of pesticide analyses for water samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Cyclohexane	Dichloroethylene		Dinitroaniline		Organophosphate		Phosphorothioate		Substituted urea
		Lindane, dissolved	2,6 Diethyl-analine	*p,p'* DDE	Pendi-methalin	Trifluralin	Ethoprop	Methyl parathion	Chlor-pyrifos	Diazinon	Linuron
					Ground Water--Continued						
USGS-7	92-08-24	<0.008	<0.002	<0.002	<0.010	<0.005	<0.005	<0.005	<0.002	<0.005	<0.010
	92-12-01	<.008	<.002	.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	93-03-10	<.008	<.002	[a]<.020	<.010	<.006	<.005	<.010	<.004	<.005	<.010
	93-06-02	<.008	<.002	<.002	<.010	.007	<.005	<.010	<.004	<.005	<.010
USGS-9S	92-08-25	<.008	<.002	<.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	92-12-09	<.008	<.002	<.002	<.010	<.005	<.005	<.005	<.002	<.005	<.010
	93-03-01	<.008	<.002	<.002	<.010	<.006	<.005	<.010	<.004	<.005	<.010
	93-06-09	<.008	<.002	<.002	<.010	<.006	<.005	<.010	<.004	<.005	<.010
					Surface Water--Continued						
Blew hole	92-08-31	.010	.001	.004	<.010	<.005	<.005	.015	.011	.013	<.010
	92-12-02	.018	<.002	.003	<.010	<.005	<.005	<.005	.020	<.005	<.010
	93-03-02	<.008	<.002	<.002	<.010	<.006	<.005	<.010	.007	<.005	<.010
	93-06-01	.011	<.002	<.002	.009	.006	<.005	<.010	.011	.014	<.010
Perche Creek	92-08-31	.078	.003	.008	.013	<.005	<.005	.045	.030	.150	.034
	92-12-02	<.008	<.002	<.002	<.010	<.005	<.005	<.005	.017	.006	<.010
	93-03-02	<.008	<.002	<.002	<.010	<.006	<.005	<.010	.022	.013	<.010
	93-06-01	.068	<.002	.002	.010	<.006	<.005	<.010	.034	.020	<.010

Table 3.--Results of pesticide analyses for water samples collected from monitoring wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Date (year-month-day)	Substituted urea	Terepthalate/ Dimethyl	Thiocara-mate	Toluidine	Triazine					Triazinone
		Tebu-thiuron	DCPA	Triallate	Benfluralin	Atrazine	Cyanazine	Desethyl atrazine	Prometon	Simazine	Metribuzin
					Ground Water--Continued						
USGS-7	92-08-24	<0.010	<0.002	<0.002	<0.005	0.004	<0.010	0..020	<0.010	<0.010	0.006
	92-12-01	<.010	.002	<.002	<.005	.005	.014	<.020	<.010	<.010	.008
	93-03-10	<.010	<.005	<.004	<.009	<.006	<.010	<.020	<.010	<.010	<.005
	93-06-02	<.010	<.002	.002	<.007	.007	<.010	<.020	<.010	<.010	<.005
USGS-9S	92-08-25	<.010	<.002	<.002	<.005	.005	<.010	<.020	<.010	<.010	.005
	92-12-09	<.010	<.002	<.002	<.005	.005	<.010	<.020	<.010	<.010	<.010
	93-03-01	<.010	<.002	<.003	<.007	<.005	<.010	<.020	<.010	<.010	<.005
	93-06-09	<.010	<.002	<.003	<.007	.004	<.010	<.020	<.010	<.010	<.005
					Surface Water--Continued						
Blew hole	92-08-31	.007	.004	.003	<.005	1.200	.130	.035	.032	.035	<.010
	92-12-02	.005	.003	<.002	<.005	.071	<.010	<.020	.012	.013	.011
	93-03-02	.006	.002	<.003	<.007	.074	.011	<.020	.007	.012	<.005
	93-06-01	<.010	<.002	<.003	<.007	.220	.092	<.020	.016	.019	.008
Perche Creek	92-08-31	.005	.005	<.002	<.005	.028	<.010	<.020	.023	.018	<.010
	92-12-02	.012	.003	<.002	<.005	.089	<.010	<.020	.017	.016	<.010
	93-03-02	.009	.004	<.003	<.007	.026	<.010	<.020	.012	.015	<.005
	93-06-01	.008	<.002	.003	<.007	.430	.480	<.020	.030	.019	<.005

[a]Method detection limit raised because of matrix effects.

Table 4.--Semi-quantitative bulk mineralogy for alluvial samples from 14 wells installed in the Columbia/Eagle Bluffs Wetland Complex, June 1992

[Approximate percent by weight of total sample; percentages may not sum to 100 percent due to rounding; nd, not detected; t, trace]

Site identifier (fig. 2)	Depth below surface (feet)	Quartz	Potassium feldspar	Plagioclase feldspar	Mica	Kaolinite	Calcite	Dolomite	Smectite	Amphibole	Pyroxene
USGS-1	27	47	24	22	3	1	2	1	t	t	1
USGS-2D	65	35	31	29	2	1	2	1	t	2	nd
USGS-2S	28	40	32	25	2	1	1	1	nd	t	nd
USGS-3D	60	44	26	23	2	1	2	1	nd	t	2
USGS-3S	23	48	22	22	1	1	2	4	t	t	1
USGS-4	55	43	30	24	1	1	2	2	t	t	nd
USGS-5D	49	43	29	24	1	1	2	2	nd	t	nd
USGS-5S	24	48	20	22	1	1	2	4	t	1	2
USGS-6	26	50	18	23	2	1	3	4	t	t	1
USGS-7	56	33	35	26	2	2	3	1	t	t	1
USGS-8D	64	32	32	26	2	1	2	2	nd	t	1
USGS-8S	25	36	24	20	1	t	3	3	nd	t	nd
USGS-9D	65	44	32	22	1	t	2	2	nd	t	nd
USGS-9S	35	43	32	19	t	t	2	3	nd	t	1

Table 5.--Particle-size distribution for alluvial samples collected from 14 wells installed in the Columbia/Eagle Bluffs Wetland Complex, June 1992

[Percent by weight of total sample; percentages may not sum to 100 percent due to rounding]

Site identifier (fig. 2)	Depth below surface (feet)	Coarse (weight percent)	Silt (weight percent)	Clay (weight percent)
USGS-1	27	96.57	1.93	1.50
USGS-2D	65	98.53	.63	.84
USGS-2S	28	99.58	.21	.21
USGS-3D	60	97.07	1.30	1.63
USGS-3S	23	97.20	1.56	1.25
USGS-4	55	97.80	1.47	.73
USGS-5D	49	98.29	1.22	.49
USGS-5S	24	97.63	1.18	1.18
USGS-6	26	91.80	5.36	2.84
USGS-7	56	98.23	.89	.89
USGS-8D	64	97.53	.93	1.54
USGS-8S	25	99.73	.08	.19
USGS-9D	65	97.19	1.61	1.20
USGS-9S	35	97.03	1.58	1.39

Table 6.--Well-construction data for wells included in the hydrologic monitoring network in the Columbia/Eagle Bluffs Wetland Complex

[--, no data; PVC, polyvinylchloride]

Site identifier (fig. 2)	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	Installation date	Total depth (feet)	Depth to bottom of screen (feet)	Depth to top of screen (feet)	Casing diameter (inches)	Screen slot size (inches)	Casing material	Grout type	Filter pack type
MW1-1A	38° 53′ 47″	092° 26′ 27″	May 1994	31	31	21	2	0.010	PVC	Cement	Sand
MW1-1B	38° 53′ 47″	092° 26′ 27″	May 1994	60	60	50	2	.010	PVC	Cement	Sand
MW1-2A	38° 53′ 35″	092° 26′ 43″	May 1994	31	31	21	2	.010	PVC	Cement	Sand
MW1-2B	38° 53′ 35″	092° 26′ 43″	May 1994	61	61	51	2	.010	PVC	Cement	Sand
MW1-3A	38° 53′ 28″	092° 26′ 59″	May 1994	31	31	21	2	.010	PVC	Cement	Sand
MW1-3B	38° 53′ 28″	092° 26′ 59″	May 1994	61	61	51	2	.010	PVC	Cement	Sand
MW1-4A	38° 54′ 06″	092° 26′ 14″	Apr. 1991	29.5	29.25	19.75	2	.010	PVC	Cement	Sand
MW1-4B	38° 54′ 06″	092° 26′ 14″	Apr. 1991	60	59.75	50.25	2	.010	PVC	Cement	Sand
MW2-1A	38° 52′ 18″	092° 26′ 20″	Apr. 1991	29.8	29.55	20.05	2	.010	PVC	Cement	Sand
MW2-1B	38° 52′ 18″	092° 26′ 20″	Apr. 1991	59.9	59.65	50.15	2	.010	PVC	Cement	Sand
MW4-1A	38° 51′ 32″	092° 26′ 33″	Apr. 1991	29.9	29.65	20.15	2	.010	PVC	Volclay	Sand
MW4-1B	38° 51′ 32″	092° 26′ 33″	Apr. 1991	59.4	59.15	49.65	2	.010	PVC	Cement	Sand
MW4-2A	38° 51′ 12″	092° 26′ 31″	Apr. 1991	29.5	29.25	19.75	2	.010	PVC	Cement	Sand
MW4-2B	38° 51′ 12″	092° 26′ 31″	Apr. 1991	59.9	59.65	50.15	2	.010	PVC	Cement	Sand
MW13-67	38° 52′ 19″	092° 27′ 04″	1967	105	105	85	2	Hacksaw	PVC and steel	Bentonite mud	Gravel
USGS-1	38° 51′ 49″	092° 25′ 55″	June 1992	33	27.5	17.5	2	.010	PVC	Volclay	20/40 sand
USGS-2D	38° 51′ 07″	092° 26′ 10″	June 1992	62	57	47	2	.010	PVC	Volclay	20/40 sand

Table 6.--Well-construction data for wells included in the hydrologic monitoring network in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Latitude (degrees, minutes, seconds)	Longitude (degrees, minutes, seconds)	Installation date	Total depth (feet)	Depth to bottom of screen (feet)	Depth to top of screen (feet)	Casing diameter (inches)	Screen slot size (inches)	Casing material	Grout type	Filter pack type
USGS-2S	38° 51′ 07″	092° 26′ 10″	June 1992	32.4	27.4	17.4	2	0.010	PVC	Volclay	20/40 sand
USGS-3D	38° 51′ 02″	092° 25′ 28″	June 1992	63	58	48	2	.010	PVC	Volclay	20/40 sand
USGS-3S	38° 51′ 02″	092° 25′ 28″	June 1992	32	27	17	2	.010	PVC	Volclay	20/40 sand
USGS-4	38° 50′ 25″	092° 26′ 17″	June 1992	62.6	57.6	47.6	2	.010	PVC	Volclay	20/40 sand
USGS-5D	38° 50′ 34″	092° 25′ 25″	June 1992	51.1	51.1	41.1	2	.010	PVC	Volclay	20/40 sand
USGS-5S	38° 50′ 34″	092° 25′ 25″	June 1992	29.5	24.5	14.5	2	.010	PVC	Volclay	20/40 sand
USGS-6	38° 50′ 14″	092° 24′ 30″	June 1992	33.5	28.5	18.5	2	.010	PVC	Volclay	20/40 sand
USGS-7	38° 49′ 26″	092° 25′ 13″	June 1992	60.8	60.8	50.8	2	.010	PVC	Volclay	20/40 sand
USGS-8D	38° 52′ 20″	092° 27′ 07″	June 1992	62.8	57.8	47.8	2	.010	PVC	Volclay	20/40 sand
USGS-8S	38° 52′ 20″	092° 27′ 07″	June 1992	32.8	27.8	17.8	2	.010	PVC	Volclay	20/40 sand
USGS-9D	38° 54′ 19″	092° 28′ 00″	June 1992	68	63	53	2	.010	PVC	Volclay	20/40 sand
USGS-9S	38° 54′ 19″	092° 28′ 00″	June 1992	38	33	23	2	.010	PVC	Volclay	20/40 sand
SP4	38° 50′ 54″	092° 25′ 45″	1967	95	95	75	2	Hacksaw	PVC and steel	Bentonite mud	Gravel
SP11	38° 49′ 53″	092° 25′ 28″	--	35	--	--	2	--	Steel	--	--

Table 7.--*Quarterly water-level measurements for wells in the Columbia/Eagle Bluffs Wetland Complex*

Site identifier (fig. 2)	Measuring-point altitude (feet above sea level)	Date (year-month-day)	Water level (feet below measuring point)
MW1-1A	578.45	93-06-03	10.57
MW1-1B	578.30	93-06-03	12.99
MW1-2A	573.30	93-06-03	10.59
MW1-2B	573.38	93-06-03	10.67
MW1-3A	574.98	93-06-03	12.16
MW1-3B	574.95	93-06-03	12.17
MW1-4A	583.36	92-08-27	13.89
		92-12-10	13.02
		93-03-09	12.57
		93-06-03	12.64
MW1-4B	583.48	92-08-27	23.43
		92-12-10	25.52
		93-03-09	18.27
		93-06-03	17.94
MW2-1A	576.86	92-08-28	20.29
		92-12-03	19.13
		93-03-05	18.20
		93-06-04	13.58
MW2-1B	576.67	92-08-28	20.20
		92-12-03	18.95
		93-03-05	17.92
		93-06-04	13.40
MW4-1A	572.80	92-08-27	14.25
		92-12-09	13.42
		93-03-04	14.07
		93-06-07	5.76
MW4-1B	572.58	92-08-27	14.14
		92-12-09	13.00
		93-03-04	13.64
		93-06-07	5.44
MW4-2A	572.25	92-08-26	13.63
		92-12-04	11.44
		93-03-02	14.54
		93-06-07	4.59

Table 7.--Quarterly water-level measurements for wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Measuring-point altitude (feet above sea level)	Date (year-month-day)	Water level (feet below measuring point)
MW4-2B	572.22	92-08-26	13.63
		92-12-04	12.48
		93-03-02	14.54
		93-06-07	4.47
MW13-67	575.86	92-08-26	20.76
		92-12-08	20.78
		93-03-03	20.90
		93-06-09	12.07
USGS-1	576.60	92-08-18	11.25
		92-12-21	8.24
		93-03-10	9.72
		93-06-08	4.10
USGS-2D	573.19	92-08-19	12.69
		92-12-01	11.37
		93-03-11	10.57
		93-06-08	5.10
USGS-2S	573.28	92-08-19	12.70
		92-12-01	11.42
		93-03-11	10.64
		93-06-08	5.12
USGS-3D	570.42	92-08-19	11.21
		92-12-03	10.46
		93-03-11	9.08
		93-06-02	5.84
USGS-3S	570.23	92-08-19	11.05
		92-12-03	10.27
		93-03-11	8.90
		93-06-02	5.66
USGS-4	575.71	92-08-25	17.25
		92-12-03	15.65
		93-06-08	7.34
		93-08-23	7.30
USGS-5D	571.98	92-08-20	12.78
		92-12-01	10.87
		93-03-04	13.71
		93-06-02	7.16

Table 7.--Quarterly water-level measurements for wells in the Columbia/Eagle Bluffs Wetland Complex--Continued

Site identifier (fig. 2)	Measuring-point altitude (feet above sea level)	Date (year-month-day)	Water level (feet below measuring point)
USGS-5S	572.01	92-08-20	12.80
		92-11-30	10.79
		93-03-04	13.41
		93-06-02	7.16
USGS-6	570.88	92-08-25	13.16
		92-12-01	10.38
		93-03-04	12.42
		93-06-02	7.80
USGS-7	571.42	92-08-24	14.32
		92-12-01	12.14
		93-03-10	8.40
		93-06-02	8.25
USGS-8D	572.20	92-08-26	17.08
		92-12-08	17.12
		93-03-03	17.29
		93-06-09	8.44
USGS-8S	572.38	92-08-26	17.10
		92-12-08	17.19
		93-03-03	17.29
		93-06-09	8.57
USGS-9D	582.21	92-08-25	19.59
		92-12-09	21.10
		93-03-01	21.57
		93-06-09	12.41
USGS-9S	582.11	92-08-25	19.50
		92-12-09	21.01
		93-03-01	21.49
		93-06-09	12.37

Table 8.--Daily mean water-level data for well SP4 in the Columbia/Eagle Bluffs Wetland Complex, July 1992-June 1993 (measuring-point altitude 571.57 feet above sea level)

[Water levels are in feet below measuring point; --, no data available]

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	--	12.82	13.61	13.48	15.05	11.25	11.74	12.05	12.12	11.68	11.68	5.84
2	--	12.51	13.62	13.56	15.06	10.88	11.74	12.09	12.21	11.68	11.68	5.95
3	--	12.34	13.63	13.61	15.07	10.78	11.74	12.12	12.49	11.68	11.68	6.13
4	--	12.25	13.66	13.77	15.08	11.03	11.74	12.12	12.49	11.68	11.32	6.16
5	--	12.20	13.69	13.81	15.09	11.29	11.74	12.12	12.48	11.68	9.33	6.25
6	--	12.17	13.70	13.82	15.14	11.34	11.74	12.12	12.19	11.68	6.65	5.96
7	--	12.10	13.70	13.82	15.17	11.57	11.74	12.12	12.14	11.68	6.35	5.42
8	--	12.07	13.70	14.14	15.17	11.82	11.74	12.12	12.14	11.68	5.91	--
9	--	12.07	13.70	14.24	15.19	11.90	11.74	12.12	12.14	11.68	5.88	--
10	--	12.02	13.69	14.34	15.19	12.00	11.74	12.12	12.13	11.68	5.85	--
11	--	12.00	13.68	14.38	15.26	12.15	11.74	12.12	12.13	11.68	5.51	--
12	--	11.99	13.62	14.40	15.25	12.15	11.74	12.12	12.13	11.68	5.19	--
13	--	11.98	13.57	14.44	14.98	12.16	11.80	12.12	12.13	11.68	5.11	--
14	--	11.97	13.57	14.41	14.74	12.28	11.99	12.12	12.13	11.68	4.80	--
15	--	11.97	13.61	14.40	14.60	12.03	12.01	12.12	12.13	11.68	4.65	--
16	--	11.97	13.62	14.41	14.53	11.75	12.04	12.12	12.13	11.68	4.62	--
17	--	12.00	13.63	14.41	14.52	11.74	12.05	12.12	12.13	11.68	4.61	--
18	--	12.01	13.63	14.41	14.52	11.74	12.05	12.12	12.13	11.68	4.41	--
19	--	12.03	13.73	14.41	14.52	11.74	12.05	12.12	12.13	11.68	4.40	--
20	--	12.16	13.48	14.38	14.45	11.74	12.05	12.12	12.13	11.68	4.41	--
21	--	12.18	13.19	14.39	14.02	11.74	12.05	12.12	12.13	11.68	4.43	--
22	--	12.27	13.05	14.42	13.18	11.74	12.05	12.12	12.13	11.68	4.45	--
23	--	12.47	12.97	14.48	12.25	11.74	12.05	12.12	12.13	11.68	4.48	--
24	--	12.64	12.88	14.49	11.43	11.74	12.05	12.12	12.13	11.68	4.97	--
25	--	12.77	12.82	14.49	11.27	11.74	12.05	12.12	12.13	11.68	5.24	--
26	--	12.86	12.86	14.49	11.26	11.74	12.05	12.12	12.13	11.68	5.47	--
27	--	13.09	12.92	14.50	11.26	11.74	12.05	12.12	12.13	11.68	5.57	--
28	--	13.26	13.08	14.50	11.26	11.74	12.05	12.12	12.13	11.68	5.63	--
29	--	13.34	13.12	14.52	11.26	11.74	12.05	--	12.13	11.68	5.71	--
30	13.18	13.43	13.12	14.72	11.25	11.74	12.05	--	11.74	11.68	5.73	--
31	13.09	13.55	--	14.97	--	11.74	12.05	--	11.68	--	5.83	--
MEAN	--	12.40	13.43	14.28	13.90	11.69	11.92	12.12	12.14	11.68	6.18	--
MAXIMUM	--	13.55	13.73	14.97	15.26	12.28	12.05	12.12	12.49	11.68	11.68	--
MINIMUM	--	11.97	12.82	13.48	11.25	10.78	11.74	12.05	11.68	11.68	4.40	--

Table 9.--Daily mean water-level data for well SP11 in the Columbia/Eagle Bluffs Wetland Complex, July 1991-June 1993 (measuring-point altitude 574.02 feet above sea level)

[Water levels are in feet below measuring point; --, no data available]

Day	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1	--	12.73	16.82	16.85	18.17	12.82	14.17	16.43	17.06	11.76	9.19	6.81
2	--	12.26	16.84	16.91	18.32	13.21	14.19	16.67	17.13	10.98	9.22	6.81
3	--	12.27	16.88	16.95	18.39	13.55	14.34	16.78	16.81	10.22	9.47	6.81
4	--	12.55	16.93	17.03	18.39	14.10	14.52	16.81	15.48	9.68	9.42	6.81
5	--	12.88	16.91	17.32	18.49	14.38	14.07	16.79	13.93	9.50	8.61	6.81
6	--	13.05	16.83	17.43	18.52	14.53	13.53	16.69	12.98	9.25	8.79	6.81
7	--	13.18	16.80	17.45	18.52	14.93	13.54	16.45	12.33	9.07	8.91	6.81
8	--	13.30	16.70	17.47	18.52	15.15	14.02	16.34	11.98	9.33	8.62	--
9	--	13.32	16.28	17.53	18.53	15.33	14.50	16.27	11.75	9.58	8.42	--
10	--	13.31	16.07	17.58	18.57	15.52	14.91	16.23	11.77	9.44	8.10	--
11	--	13.32	15.91	17.64	18.60	15.60	15.29	16.19	11.89	9.39	7.49	--
12	--	13.34	15.90	17.64	18.56	15.48	15.46	16.18	11.54	9.52	7.16	--
13	--	13.42	15.92	17.41	18.10	15.52	15.77	16.14	11.23	9.08	6.63	--
14	--	13.50	16.18	17.20	17.68	15.59	15.96	15.71	11.08	8.53	5.57	--
15	--	13.62	16.31	17.06	17.50	13.92	16.08	15.48	10.97	8.13	5.56	--
16	--	13.73	16.38	17.02	17.49	11.36	16.15	15.45	11.17	8.08	5.56	--
17	--	13.87	16.41	17.02	17.56	9.99	16.34	15.52	11.72	8.08	5.56	--
18	--	14.19	16.40	17.02	17.88	9.32	16.57	15.57	12.03	8.07	5.58	--
19	--	14.37	16.03	17.02	18.02	9.16	16.79	15.59	12.14	8.06	5.60	--
20	--	14.56	15.48	17.02	17.89	9.24	16.83	15.65	12.35	8.07	5.62	--
21	--	14.60	15.24	17.13	16.90	9.36	16.94	15.74	12.53	8.09	5.62	--
22	--	14.79	15.14	17.39	14.95	9.88	17.02	16.13	12.62	8.11	6.11	--
23	--	15.00	15.09	17.44	13.36	10.74	16.85	16.32	12.65	8.16	6.81	--
24	--	15.36	15.18	17.47	12.41	11.25	16.76	16.44	12.42	8.35	6.81	--
25	--	15.60	15.49	17.51	11.90	11.63	16.39	16.52	12.21	8.40	6.81	--
26	--	15.88	15.81	17.59	11.83	12.08	16.21	16.77	12.16	8.40	6.81	--
27	--	16.04	16.18	17.82	11.83	12.38	16.22	16.94	12.19	8.56	6.81	--
28	--	16.20	16.36	17.96	11.83	12.80	16.36	17.00	12.35	8.91	6.81	--
29	--	16.31	16.49	18.02	12.03	13.04	16.72	--	12.60	9.06	6.81	--
30	12.97	16.56	16.72	18.07	12.42	13.42	16.60	--	12.63	9.17	6.81	--
31	13.04	16.72	--	18.14	--	13.93	16.36	--	12.36	--	6.81	--
MEAN	--	14.19	16.19	17.39	16.44	12.88	15.66	16.24	12.71	8.97	7.16	--
MAXIMUM	--	16.72	16.93	18.14	18.60	15.60	17.02	17.00	17.13	11.76	9.47	--
MINIMUM	--	12.26	15.09	16.85	11.83	9.16	13.53	15.45	10.97	8.06	5.56	--

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