

Prepared in cooperation with the
U.S. Environmental Protection Agency and the City of Lincoln

Occurrence of Selected Pharmaceutical and Non- Pharmaceutical Compounds and Stable Hydrogen and Oxygen Isotope Ratios in a Riverbank Filtration Study, Platte River, Nebraska, 2002 to 2005, Volume 2

Data Series 141

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By J.R. Vogel, L.B. Barber, E.T. Furlong, T.B. Coplen, I.M. Verstraeten, and M.T. Meyer

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Data Series 141

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Conversion Factors and Datums

Multiply	By	To obtain
Length		
centimeter (cm)	0.3937	inch (in.)
millimeter (mm)	0.03937	inch (in.)
micrometer (µm)	0.00003937	inch (in.)
nanometer (nm)	0.0000003937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
Volume		
liter (L)	33.82	ounce, fluid (fl. oz)
milliliter (mL)	0.03382	ounce, fluid (fl. oz)
microliter (µL)	0.00003382	ounce, fluid (fl. oz)
liter (L)	2.113	pint (pt)
liter (L)	1.057	quart (qt)
liter (L)	0.2642	gallon (gal)
Flow rate		
centimeter per second (cm/s)	0.03281	foot per second (ft/s)
cubic meter per second (m ³ /s)	35.31	cubic foot per second (ft ³ /s)
milliliter per minute (mL/min)	0.3804	gallon per day (gal/d)
Mass		
nanogram (ng)	3.527 x 10 ⁻¹¹	ounce, avoirdupois (oz)
microgram (µg)	0.0000003527	ounce, avoirdupois (oz)
milligram (mg)	0.00003527	ounce, avoirdupois (oz)
gram (g)	0.03527	ounce, avoirdupois (oz)
kilogram (kg)	2.205	pound, avoirdupois (lb)

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

$$^{\circ}\text{F}=(1.8\times^{\circ}\text{C})+32$$

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

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

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

Altitude, as used in this report, refers to distance above the vertical datum.

Concentrations of chemical constituents in water are given either in milligrams per liter (mg/L) or micrograms per liter (µg/L).

Water year is the 12-month period, October 1 through September 30, and is designated by the calendar year in which it ends. Thus, the water year ending September 30, 2003, is called the "2003 water year."

Occurrence of Selected Pharmaceutical and Non-Pharmaceutical Compounds, and Stable Hydrogen and Oxygen Isotope Ratios in a Riverbank Filtration Study, Platte River, Nebraska, 2002 to 2005, Volume 2

By J.R. Vogel, L.B. Barber, E.T. Furlong, T.B. Coplen, I.M. Verstraeten, and M.T. Meyer

Abstract

This document is the second volume of a data series report that describes the data collected during a study conducted during 2001 through 2005 by the U.S. Geological Survey, in cooperation with the U.S. Environmental Protection Agency and the City of Lincoln, at an established riverbank-filtration well field with horizontal collector wells and vertical wells. The data were collected as part of a study designed to help researchers better understand the efficiency of riverbank filtration with respect to endocrine disrupting compounds and to evaluate the use of riverbank filtration as an effective means of drinking-water treatment. This study provides information that will be useful for (1) increased understanding of the processes and factors controlling the transport of endocrine disrupters, such as pesticides and pharmaceuticals during riverbank filtration, (2) better understanding of the physical and chemical processes that affect riverbank-filtration efficiency, and (3) managing the water resources of the eastern Platte River Basin. This report presents analytical methods and additional data for pharmaceuticals, dissolved organic carbon (DOC), ultraviolet absorbance at 254 nanometer (nm) wavelength (UV_{254}), specific ultraviolet absorbance (SUVA), nitritotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), nonylphenol ethoxycarboxylates (NPECs), and stable hydrogen and oxygen isotope ratios that were not available at the time of publication of Volume 1 in the data series. Data are presented as generalized statistics and in figures showing temporal variations.

Sites from which water-quality samples were collected for this study included wastewater sites (a cattle feedlot lagoon, a hog confinement lagoon, and wastewater-treatment plant effluent), surface-water sites (Platte River, Salt Creek, and Loup Power Canal), ground-water sites (one collector well and five vertical wells), and drinking-water sites (raw and finished). Field water-quality properties also were measured in samples from these sites.

Pharmaceuticals detected at least once in samples collected from the Platte River included 1,7-dimethylxan-

thine, acetaminophen, caffeine, carbamazepine, and cotinine. Among the ground-water samples, pharmaceutical compounds detected at low concentrations in at least one sample included 1,7-dimethylxanthine, acetaminophen, carbamazepine, and trimethoprim.

When analyzing for non-pharmaceutical compounds in samples from the wastewater sites, the wastewater-treatment plant effluent samples had the highest concentrations of each of NTA, EDTA, and NPECs compounds. Surface-water samples from Salt Creek had higher concentrations of EDTA and NPECs than samples from the Platte River. NTA was not detected in any samples from the ground-water sites. EDTA was detected in all samples from all wells. Detectable concentrations of EDTA were also observed in all samples from the raw water and finished water.

Introduction

Increased use of water from alluvial aquifers along riverbanks is expected given the rise in demand for drinking water (Solley and others, 1998), the ease of obtaining water from alluvial aquifers, the positive effects of riverbank filtration on the quality of surface water, and the potential promulgation of more stringent drinking-water regulations in the United States. This growing need for high-quality drinking water from alluvial aquifers has led to an increasing interest in the use of riverbank filtration as an inexpensive means of water-supply pretreatment.

Endocrine disrupting chemicals can be strictly defined as compounds in which the primary effect of the chemicals is on the endocrine system. These may include effects on the level of receptor-mediated hormone action, hormone synthesis, or clearance (Pickering and Sumpter, 2003). Rivers and streams may contain endocrine disrupting compounds, including pharmaceuticals and pesticides (Heberer and Stan, 1998; Heberer and others, 1998, 2001; Heberer and Dünbier, 1999; Ternes, 1998; Daughton and Ternes, 1999; Kolpin and others, 2002; Verstraeten and others, 1999, 2003; Verstraeten and

Heberer, 2002; Verstraeten, Heberer, and Scheytt, 2002; and Verstraeten, Thurman, and others, 2002). By using a system that utilizes riverbank filtration as a pre-treatment for drinking water, ground-water recharge is induced from surface water by enhancing seepage losses from a stream. Filtration in riverbeds improves the raw surface-water quality by diminishing the concentrations of endocrine disrupters by the mechanisms of: (1) filtration; (2) dilution with ground water; (3) adsorption; and (or) (4) providing opportunities for degradation of biodegradable compounds. Riverbank filtration is considered to be a natural treatment technology of increased interest to water utilities with respect to the removal of microorganisms and removal of potential endocrine disrupters.

To understand the efficiency of riverbank filtration with respect to organic compounds including endocrine disrupting compounds, more information is needed concerning the fate of contaminants as they move through the riverbed sediments into an aquifer and on to collector wells. A study was conducted during 2001 to 2005 at a riverbank filtration site on the Platte River in eastern Nebraska (fig. 1) by the U.S. Geological Survey (USGS), in cooperation with the U.S. Environmental Protection Agency (USEPA) and the City of Lincoln, to evaluate the use of riverbank filtration as an effective means of drinking-water treatment. During the study, water-quality samples were collected monthly or quarterly from 3 wastewater sites, 3 surface-water sites, 6 ground-water sites, and 2 drinking-water sites. The samples were analyzed for selected pharmaceutical and non-pharmaceutical compounds and for stable hydrogen and oxygen isotope ratios. Additional stable hydrogen and oxygen isotope ratios from wells in the area of the well field also are included in the data tables of this report. One sample also was collected in April 2003 from the Loup Power Canal, which discharges into the Platte River upstream from the riverbank-filtration site. The objectives of the study were to provide information useful for (1) increased understanding of the processes and factors important in controlling the transport of endocrine disrupters such as pesticides and pharmaceuticals during riverbank filtration, (2) better understanding of the physical and chemical processes and factors that affect riverbank-filtration efficiency, and (3) managing the water resources of the eastern Platte River Basin.

The purpose of this report is to describe sampling and analytical methods used during the study and to present data obtained during the study from 2002 through 2005 that were unavailable at the time of publication of Volume 1 of the data series report for this study (Vogel and others, 2005). Data are presented for pharmaceuticals, dissolved organic carbon (DOC), ultraviolet absorbance at 254 nm wavelength (UV_{254}), specific ultraviolet absorbance (SUVA), nitrilotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), nonylphenol ethoxycarboxylates (NPECs), and stable hydrogen and oxygen isotope ratios. Data are presented as generalized statistics.

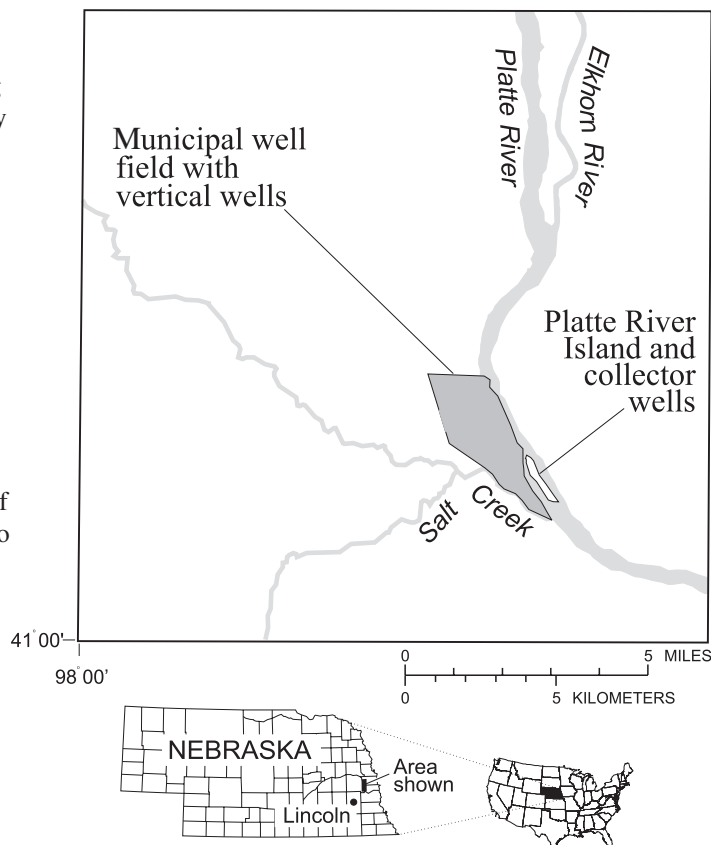


Figure 1. Location of the riverbank filtration study at a municipal well field along the Platte River in eastern Nebraska.

Environmental Setting

The Platte River and its tributaries receive municipal wastewater from most cities along its course, except the City of Omaha, which releases wastewater into the Missouri River above the Platte River confluence. Vogel and others (2005) describe wastewater inputs associated with the Platte River including sewage treatment plants and animal feeding operations. The alluvial sediments deposited by the Platte River, consisting mainly of sand and gravel with some silt and clay, increasingly have been developed for drinking-water supplies by cities along the Platte River. At the same time, river and ground-water quality are being influenced by releases of wastewater and runoff from fields along the river. The municipal water supply from the well field along the river generally is affected by the quality of water from the local streams and the main channel (Verstraeten and others, 1999). The well field consists of 2 horizontal and 36 vertical wells completed in the alluvial sediments, generally at depths of less than 40 m. Water obtained from the well field is used for a population of more than 230,000 people, which is growing at a rate that will require development of additional large capacity wells in the future.

Methods

This section describes water-quality sampling sites and methods, and laboratory analytical methods. Quality-assurance/quality-control samples collected for this study are also described.

Sampling Methods

Water-quality samples were collected from 14 sites (table 1). Representative samples of surface water and ground water, and grab samples of raw water and finished water were collected at the well field to evaluate changes in concentrations and loading over time. Well W90-1H is a horizontal collector well on an island in the middle of the Platte River, and wells W54-10 and W56-5 are vertical production wells relatively close to the Platte River, and W49-9 is a vertical production well farther from the river. Ashland Deep is a monitoring well that is farther from the river relative to wells W54-10 and W56-5. Raw water is influent to the drinking-water treatment plant that uses water from the site as source water. In general, the raw water is approximately 50 percent vertical-well water and 50 percent horizontal-well water. This ratio varies throughout the year based on management of the well field. Finished water is the effluent of the drinking-water treatment plant after treatment by rapid sand filtration, ozonation, and chloramines. Grab samples from wastewater-treatment plant effluent, grab samples from the banks of two lagoons of confined animal feeding operations (CAFOs), and representative samples from Salt Creek near the well field also were collected. One representative sample set was collected during spring base flow from the Loup Power Canal near its confluence with the Platte River upstream from the well-field site. Finally, a few water samples also were collected from a public-supply ground-water well (Memphis) 11 kilometers (km) upgradient (northeast) from the well field for comparison.

Representative samples were collected and cross contamination of samples was prevented by using approved USGS sampling protocols (U.S. Geological Survey, 1997-2004). Water samples were analyzed in the field for pH, temperature, specific conductance, dissolved oxygen (DO) and turbidity using USGS standard methods for collecting field measurements (U.S. Geological Survey, 1997-2004). All sampling equipment was cleaned and sterilized using standard USGS methods for the constituent of concern (U.S. Geological Survey, 1997-2004).

Analytical Methods

Pharmaceuticals, non-pharmaceutical compounds (DOC, UV₂₅₄, SUVA, organic wastewater compounds, NTA, EDTA, and NPECs), and stable hydrogen and oxygen isotope ratios were determined by analytical laboratory methods. Pharma-

ceutical analysis was completed at the USGS National Water Quality Laboratory (NWQL) using USGS approved methods. The NWQL is certified by the National Environmental Laboratory Accreditation Program, which is the only program that accredits environmental laboratories on a national basis for drinking-water analyses. Other laboratory analyses described in this report were completed at various other USGS research laboratories. The USGS National Water Information System (NWIS) database permanently stores water-quality information collected by the USGS. However, some analytical data are not entered into the NWIS database, such as values for constituents that were obtained using non-approved methods (screening or research methods). These data are entered into a project water-quality database that is archived by the USGS Nebraska Water Science Center office.

Pharmaceutical Compounds

Pharmaceuticals were analyzed at the NWQL using a custom method designed to determine concentrations of 27 over-the-counter and prescription pharmaceuticals and their metabolites in filtered natural-water samples (table 2). Pharmaceuticals were extracted by using disposable polypropylene syringe cartridges that contain 0.5 g of a polymeric sorbent. One liter of sample was pumped through the solid-phase extraction (SPE) cartridge at a flow rate of 15 mL/min.

After extraction, the adsorbed compounds were eluted from the SPE cartridge by using two sequential elutions of 6 mL methanol and 6 mL methanol that was acidified with trifluoroacetic acid. The two fractions were reduced under nitrogen to near dryness and then combined in a final volume of 1,000 μ L. Analytes were chromatographically separated by high-performance liquid chromatography (HPLC) by using a reverse-phase octadecylsilane HPLC column and gradient elution, which was coupled to an electrospray ionization interface and quadrupole mass spectrometer for detection, identification, and quantitation. The extract was analyzed by using positive electrospray ionization. This method was in development for the duration of this study, with some compounds dropped from the method during the course of the study. The analytical results from this custom method are archived in the project database.

Non-Pharmaceutical Compounds

A suite of non-pharmaceutical compounds were analyzed by the U.S. Geological Survey National Research Program, Boulder Laboratories under the direction of Dr. Larry Barber as part of this study (table 3). Details of the DOC analytical methods are reported elsewhere (Barber and others, 2001). Briefly, DOC was measured by ultraviolet (UV)/ammonium persulfate oxidation, with conductivity detection using a Sievers Model 800 carbon analyzer. Ultraviolet light absorbance of the filtered samples was measured at 254 nm in a 1-cm light path quartz cell using a Spectronics/Unicam

Genesys model 10UV spectrometer. The UV_{254} data were converted to SUVA absorbance (Chin and others, 1994; Barber and others, 2001) by normalizing to DOC concentration ($SUVA = UV_{254}/DOC$).

NTA, EDTA, nonylphenol monoethoxycarboxylate (NP1EC), nonylphenol diethoxycarboxylate (NP2EC), nonylphenol triethoxycarboxylate (NP3EC), and nonylphenol tetraethoxycarboxylate (NP4EC) were measured using a modification (Barber and others, 2000, 2003) of the method of Schaffner and Giger (1984). Samples (100 mL) were oven evaporated to dryness (90 °C), acidified with 5 mL of 50 percent (volume/volume) formic acid/distilled water and vacuum evaporated to dryness (25 °C). Acetyl chloride/propyl alcohol (10 percent volume/volume) was added, the sample heated at 90 °C for 1 hour to form the propyl-esters, and the propyl-esters were extracted into chloroform. The chloroform extracts were evaporated to dryness and re-dissolved in toluene for analysis by gas chromatography/mass spectrometry (GC/MS) as described next.

Alkylphenol and other wastewater compounds were measured as described in Barber and others (2000, 2003). This method uses continuous liquid-liquid extraction (CLLE) with methylene chloride at pH 2. The CLLE exposes the sample to methylene chloride by refluxing and dispersing the solvent through a coarse glass frit, resulting in formation of micro-droplets that travel an extended path through the sample matrix allowing effective partitioning of the wastewater compounds into the solvent. After extraction, the solvent was dried over sodium sulfate and the volume reduced to 500 L under a stream of nitrogen for GC/MS analysis.

Hormones were extracted by SPE using octadecyl surface-modified-silica (C18) ENVI-Disk™ (47 mm, 5 µm mean flow-through porosity) using a stainless steel pressurized filtration apparatus (Barber and others, 2000, 2003). All glassware used in the hormone isolation procedure was deactivated with Sylon-CT (Supelco). The SPE disks were placed in the filtration apparatus and conditioned by double rinsing with methanol followed by distilled water. A 1-L raw sample was passed through the disk at a flow rate of 4 mL/min, the disk was dried for 5 minutes with nitrogen gas at ambient temperature, and the disk was eluted with 25 mL of methanol followed by two rinses with 10 mL of methanol. The methanol was reduced in volume to 2 mL by nitrogen evaporation, quantitatively transferred to a 5-mL reaction vial, and evaporated to dryness. The residue was reacted with 2 percent *o*-methoxyamine hydrochloride (MOX) in pyridine followed by reaction with bis(trimethylsilyl)trifluoroacetamide (BSTFA) containing 10 percent trimethylchlorosilane (TMCS). This reaction forms the MOX ethers of the keto groups and the trimethylsilyl (TMS) ethers of the hydroxy groups, making the compounds more amenable to GC/MS analysis.

The propyl-ester derivatives (NTA, EDTA, NPEC), the wastewater compounds, and the MOX/TMS derivatives of the steroid/hormone compounds were analyzed by electron impact GC/MS in both the full-scan and selected ion monitoring (SIM) modes. The general GC conditions were: Hewlett

Packard (HP) 6890 GC; column - HP Ultra II (5 percent phenylmethyl silicone), 25 m x 0.2 mm, 33 µm film thickness; carrier gas, ultra-high purity helium with a linear-flow velocity of 27 cm/s; injection port temperature, 300 °C; initial oven temperature, 50 °C; split vent open, 0.75 minute; ramp rate, 6 °C/min to 300 °C; hold time, 15 minutes at 300 °C. The MS conditions are as follows: HP 5973 Mass Selective Detector; tune with perfluorotributylamine; ionization energy, 70 electron volts (eV); source pressure, 1×10^{-5} torr; source temperature, 250 °C; interface temperature, 280 °C; full scan, 40 to 550 atomic mass units (amu) at 1 scan per second. Concentrations were calculated based on SIM data using diagnostic ions for each compound (table 4). Each compound was identified based on matching of retention times (± 0.02 minutes) and ion ratios (± 20 percent) determined from analysis of authentic standards. An 8-point calibration curve (typically ranging from 0.01 to 35 ng/µL) and internal standard (deuterated polycyclic aromatic hydrocarbons, table 4) procedures were used for calculating concentrations. Surrogate standards (table 3) were added to the samples prior to extraction and derivatization to evaluate compound recovery and whole method performance.

Stable Hydrogen and Oxygen Isotope Ratios

Variations in stable isotope abundance ratios typically are small. Stable isotope ratios commonly are determined as relative difference in the ratio of the less abundant isotope (usually heavy) to the more abundant isotope (usually light) of the sample with respect to the reference. This difference is designated $\delta(E)$ notation (pronounced delta) and it is defined according to the relation in equation 1:

$$\delta(iE) = \left[\frac{n_x(iE)/n_x(jE)}{n_{ref}(iE)/n_{ref}(jE)} - 1 \right] \quad (1)$$

where $\delta(E)$ refers to the delta value of isotope number i of element E of sample X relative to the reference, and $n_x(iE)/n_x(jE)$ and $n_{ref}(iE)/n_{ref}(jE)$ are the ratios of the isotope amounts in unknown X and a reference. A positive $\delta(E)$ value indicates that the unknown is more enriched in the heavy isotope than the reference. A negative $\delta(E)$ value indicates that the unknown is depleted in the heavy isotope relative to the reference. The $\delta(E)$ is commonly shortened to $\delta'E$ and has been reported in parts per hundred (% or percent), parts per thousand (‰ or per mill), and parts per ten thousand. Herein, $\delta(E)$ values are given in per mill; thus, the expression can be written

$$\delta(iE) = \left[\frac{n_x(iE)/n_x(jE)}{n_{ref}(iE)/n_{ref}(jE)} - 1 \right] \cdot 1000 \text{ ‰} \quad (2)$$

because a per mill is 1/1000, and $1000 \cdot 1/1000 = 1$.

The stable hydrogen isotope ratio is:

$$\delta^2\text{H} = \left[\frac{n_x(^2\text{H})/n_x(^1\text{H})}{n_{\text{VSMOW}}(^2\text{H})/n_{\text{VSMOW}}(^1\text{H})} - 1 \right] \cdot 1000\text{‰} \quad (3)$$

where the isotope ratio is expressed relative to Vienna Standard Mean Ocean Water (VSMOW) reference water and is normalized such that $\delta^2\text{H}$ of Standard Light Antarctic Precipitation (SLAP) reference water is -428‰ (Coplen, 1996). Hydrogen isotope ratios were determined by hydrogen-water equilibration and analysis by isotope ratio mass spectrometry (Coplen and others, 1991). About 25 percent of analyses each day were reference samples and samples are analyzed in replicate. The 2-sigma uncertainty of hydrogen isotopic results is 2 per mill. This means that if a sample was resubmitted for analysis at a later date, there was a 95-percent probability that the hydrogen isotopic result reported will be within 2 per mill of that originally reported.

The oxygen isotope ratio is:

$$\delta^{18}\text{O} = \left[\frac{n_x(^{18}\text{O})/n_x(^{16}\text{O})}{n_{\text{VSMOW}}(^{18}\text{O})/n_{\text{VSMOW}}(^{16}\text{O})} - 1 \right] \cdot 1000\text{‰} \quad (4)$$

where the isotope ratio is expressed relative to VSMOW reference water and is normalized such that $\delta^{18}\text{O}$ of SLAP reference water is -55.5‰ (Coplen, 1996). Oxygen isotope ratios were determined by the carbon dioxide-water equilibration method of Epstein and Mayeda (1953). About 20 percent of analyses each day were isotopic reference waters and about 35 percent of samples were analyzed in replicate. The 2-sigma uncertainty of oxygen isotopic results is 0.2 per mill. This means that if a sample is resubmitted for analysis at a later date, there is a 95-percent probability that the isotopic result reported will be within 0.2 per mill of that originally reported.

Quality Assurance/Quality Control

Various quality-assurance (QA) samples were collected for this study. Duplicate samples consist of splits from the same sample aliquot that are collected in such a manner that the samples are assumed to be essentially identical in composition. Five duplicate samples for analysis of NTA, EDTA, and NPECs were collected during the study: a wastewater-treatment plant effluent sample in May 2003, a surface-water sample from the Platte River in May 2003, a ground-water sample from well W90-1H in May 2002, a ground-water sample from well W49-9 in May 2003, and a finished-water sample in August 2002. Laboratory reagent blanks (LRB) and laboratory reagent spikes (LRS) were analyzed throughout the study for pharmaceutical compounds. The LRB is prepared using an appropriate matrix. The selected matrix should have negligible concentrations of compounds for that particular analysis. The LRB was processed in the same way

as the accompanying environmental sample and so was used to monitor for random contamination introduced from laboratory processing. If a compound was detected and identified in the LRB, quantitation of that same compound in the environmental sample was qualified.

The LRS is a sample where known concentrations of the compounds of interest are added, usually into a synthetic (reagent) matrix. Evaluation of reagent spike data yields information about method performance (Pirkey and Glodd, 1998). In addition, a surrogate spike (SS) of 4-*n*-NP2EC was analyzed concurrently with each analysis for DOC, UV₂₅₄, SUVA, NTA, EDTA, and NPECs to determine percent recovery in the sample matrix. Likewise, an SS of D21-4-methyl-2,6-di(*tert*-butyl)phenol, 4-*n*-nonylphenol, and D6-bisphenol A was analyzed concurrently with each analysis of the alkylphenol and other organic compounds schedule.

An equipment blank for analysis of pharmaceuticals was collected in January 2005. Equipment blanks are samples prepared in the field using normal sampling protocol, except using an ultrapure water sampling matrix as the sample source. Additional quality-assurance and quality-control (QC) measures inherent to the laboratory methods and consistent with the QA of NTA, EDTA, NPECs, hormones, and alkylphenol and other wastewater compounds also were taken. The results of the QA/QC samples are presented in the tables and discussed in the text in the following sections of the report.

Streamflow and Well Field Pumpage

Streamflow in the Platte River from April 2004 to January 2005 at the established well field was compared to the natural variability in the hydrologic system through use of long-term streamflow information. Historical median streamflow data used for comparisons are available at <http://nwis.waterdata.usgs.gov/ne/nwis/sw> for the Platte River near Ashland (station 06801000) for water years 1929 to 2003. Daily mean streamflow during April 2004 to January 2005 was compared to the historical mean daily streamflow in the Platte River (fig. 2). Flow conditions were tracked for several days around each sample date at this site (fig. 3). Comparative streamflow and streamflow conditions during sampling times between December 2001 and May 2003 were documented by Vogel and others (2005).

Pumping was variable during the period from April 2004 to January 2005 in the horizontal collector well W90-1H (fig. 4). Pumpage in this well for the period between December 2001 and May 2003 was documented by Vogel and others (2005). Monthly pumping from vertical wells W49-9, W54-10, and W56-5 also was variable from November 2001 to January 2005 (table 5).

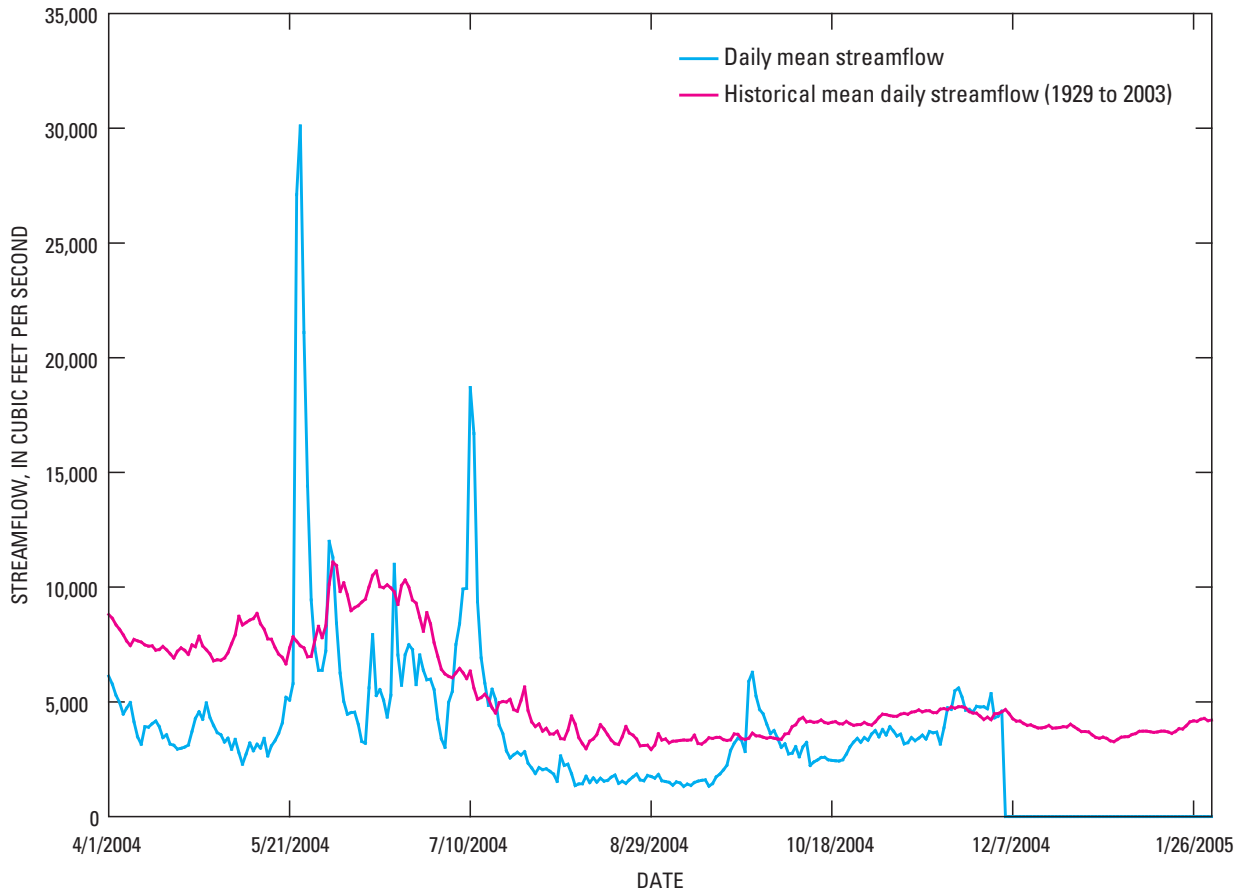


Figure 2. Comparison of average daily streamflow and historical mean daily streamflow at the Platte River near Ashland gage.

Field Water-Quality Properties

Field water-quality properties were measured at selected sites between April 2004 and January 2005 (table 6). Additional field-water quality values for all samples analyzed for NTA, EDTA, NPECs, and hormones were reported in Vogel and others (2005). Among the five samples collected at the Platte River site, specific conductance varied from 390 microSiemens (μS)/cm in November 2004 to 575 $\mu\text{S}/\text{cm}$ in January 2005. In samples from ground-water sites, well W49-9 consistently had the highest specific conductance, and wells W54-10 and W56-5 had the lowest specific conductance. Specific conductance values from samples from wells W54-10 and W56-5 were very similar to each other.

Water temperature in Platte River samples, and to a lesser extent W90-1H, W54-10, and W56-5 samples, reflected the air temperature at time of measurement. The water temperature was most consistent throughout the sampling period in wells W49-9 and Ashland Deep, which were located farther from the river than were the other wells.

The pH in the Platte River samples was higher during the spring than winter. All pH measurements in the ground-water wells generally were stable. The lowest consistent pH readings were from samples collected from well W49-9, whereas the highest consistent pH readings were from samples collected from wells W90-1H and W54-10.

Dissolved oxygen was consistently higher in surface-water samples collected from the Platte River than in ground-water samples. The DO concentrations in ground-water samples were generally less than 1 mg/L during the September and November samples, and greater than 1 mg/L during the April and January samples, except for samples from the Ashland Deep well, which were always less than 1 mg/L.

In general, surface-water samples from the Platte River had substantially greater turbidity than ground-water samples; however, turbidity was not always measured in ground-water samples. In ground-water samples in which turbidity was measured, the turbidity was always less than 1.0 nephelometric turbidity units (NTU) except for samples from the Ashland Deep well.

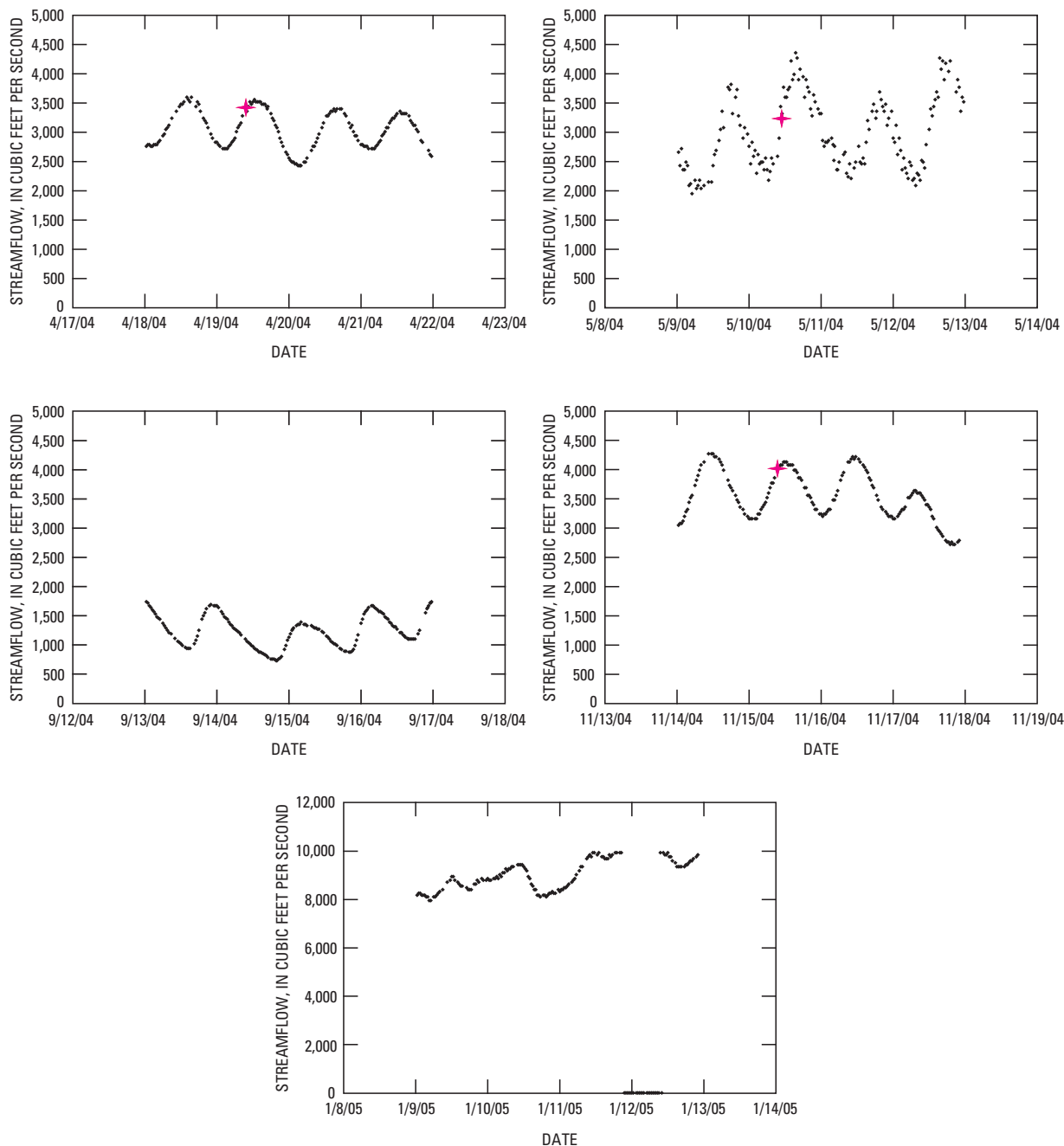


Figure 3. Flow conditions during sampling at the Platte River near Ashland gage, April 2004 to January 2005. Sample collection times are represented by stars.

Pharmaceutical Compounds

Results of analyses for pharmaceuticals in samples collected between April 2004 and January 2005 are presented in this section of the report. Results of QA/QC samples that were analyzed for pharmaceutical compounds during that period also are presented.

Concentrations of 27 pharmaceuticals were determined in samples from one surface-water site, five ground-water

sites, and one drinking-water site (tables 7 and 8). One duplicate sample was collected and analyzed for pharmaceuticals in January 2005 from the Platte River. In the Platte River environmental sample from January 2005, acetaminophen and cotinine were detected at low levels, but pharmaceuticals were not detected in the duplicate sample. A set blank, set spike, and 0.10 continuing calibration verification (ccv) also were analyzed during each analysis run (table 9). Several compounds, including 1,7-dimethylxanthine, azithromycin, cimetidine, erythromycin, fluoxetine, gemfibrozil, ibuprofen,

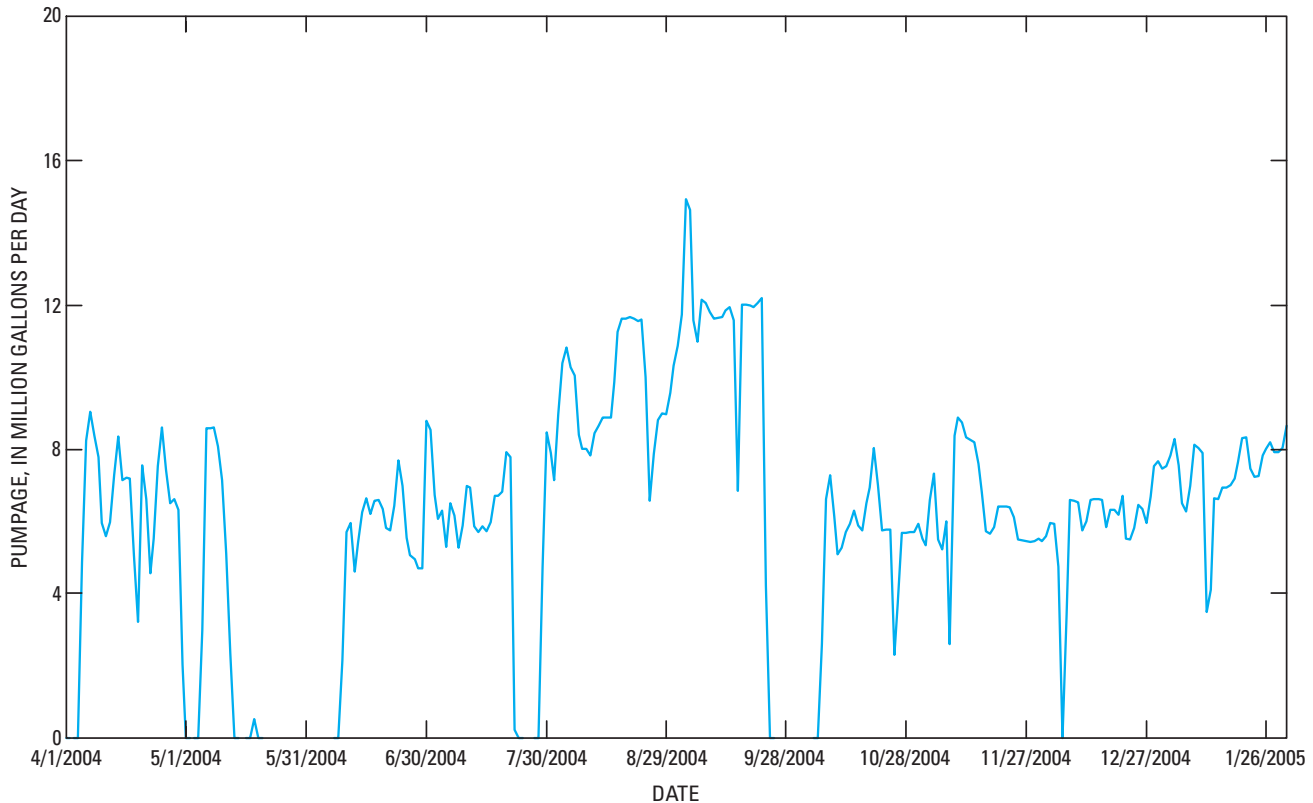


Figure 4. Pumpage in collector well W90-1H during the period of study.

miconazole, ranitidine, salbutamol, and sulfamethoxazole, were recovered in concentrations less than 60 percent of the surrogate spike level on some of the sampling dates. These compounds may still be present in environmental samples from the dates that the surrogate spike recovery was less than 60 percent, but not detectable due to matrix or interaction effects.

Measured concentrations less than the Laboratory reporting level (LRL) are denoted on the data tables with an “E” (estimated). Measured concentrations for compounds where the LRL was not determined also are denoted with an “E.” Results are denoted with a “B” when the measured concentration is less than 10 times the concentration detected in the laboratory blank for that compound. Finally, detections of caffeine, caffeine degradates, and cotinine (nicotine degradate) may be a result of contamination because the analytical method is very sensitive, and the use of products containing these compounds prior to or during sampling, sample processing, or analysis could result in detectable concentrations.

In samples collected from the Platte River, five compounds (1,7-dimethylxanthine, acetaminophen, caffeine, carbamazepine, and cotinine) were detected at least once. Among the ground-water samples, pharmaceutical compounds detected at low concentrations in at least one sample included 1,7-dimethylxanthine (in W54-10 and W56-5), acetaminophen (in W49-9 and W56-5), carbamazepine (in W90-1H, W49-9,

W56-5, and Ashland Deep), and trimethoprim (in W56-5). In the finished-water samples none of the pharmaceutical compounds were detected except for a low estimated concentration of carbamazepine in the sample collected on November 16, 2004.

Non-Pharmaceutical Compounds

Results for non-pharmaceutical compounds collected between February 2002 and May 2003 are presented in this section of the report. Non-pharmaceutical compounds presented here include DOC, UV₂₅₄, SUVA, NTA, EDTA, NPECs, and hormones.

Dissolved Organic Carbon, Ultraviolet Absorbance at 254 nm Wavelength, and Specific Ultraviolet Absorbance

Samples for analysis of DOC, UV₂₅₄, and SUVA were collected from 3 wastewater sites, 2 surface-water sites, 4 ground-water sites, and 2 drinking-water sites (table 10). The highest DOC concentrations of the wastewater samples were measured in cattle feedlot lagoon samples, and the lowest

DOC concentrations of the wastewater samples were measured in the wastewater-treatment plant effluent samples. Cattle feedlot lagoon samples also generally had the highest UV_{254} measurements. Samples from both lagoons had similar SUVA measurements, but samples from the wastewater-treatment plant effluent had SUVA measurements that were less variable and in the lower range of measurements from lagoon samples. Samples from both surface-water sampling sites showed similar ranges of DOC, UV_{254} , and SUVA. In ground-water samples, DOC, UV_{254} , and SUVA measurements generally decreased relative to distance of the well from the Platte River. DOC, UV_{254} , and SUVA also were similar in samples from both raw and finished water. Generally, SUVA measurements were in the same range for samples from all sites except the cattle and hog wastewater lagoons.

Nitritriacetic Acid, Ethylenediamine-tetraacetic Acid, and Nonylphenol Ethoxycarboxylates

Samples for analysis of NTA, EDTA, and NPECs were collected from 3 wastewater sites, 3 surface-water sites, 4 ground-water sites, and 2 drinking-water sites (tables 11 and 12). Results are denoted with a “B” when the measured concentration is less than 10 times the greatest concentration detected in any LRB for that compound. In this case, NTA concentrations less than 7.0 $\mu\text{g/L}$, NP1EC concentrations less than 2.0 $\mu\text{g/L}$, NP2EC concentrations less than 1.0 $\mu\text{g/L}$, and total NPEC concentrations less than 10 $\mu\text{g/L}$ were denoted with a “B.” In addition, spike recovery percentages less than 60 percent or more than 150 percent may be indicative of matrix or interaction effects, and concentrations in environmental compounds may be similarly over or underestimated.

Five QA/QC duplicate samples were collected during the study and analyzed for NTA, EDTA, and NPECs. The largest detected percentage difference between the environmental sample and the duplicate sample for NTA in samples not denoted with a “B” was 0 percent (0 $\mu\text{g/L}$) for the wastewater-treatment plant effluent on May 21, 2003. The largest detected percentage difference between the environmental sample and the duplicate sample for EDTA in samples not denoted with a “B” was 20 percent (0.1 $\mu\text{g/L}$) in well W49-9 sample on May 27, 2003. The largest detected percentage difference between the environmental sample and the duplicate sample for NP1EC in samples not denoted with a “B” was 17 percent (15 $\mu\text{g/L}$) for the wastewater-treatment plant effluent on May 21, 2003. The largest detected percentage difference between the environmental sample and the duplicate sample for NP2EC in samples not denoted with a “B” was 36 percent (25 $\mu\text{g/L}$) for the wastewater-treatment plant effluent on May 21, 2003. The largest detected percentage difference between the environmental sample and the duplicate sample for NP3EC in samples not denoted with a “B” was 22 percent (0.7 $\mu\text{g/L}$) for the wastewater-treatment plant effluent on May 21, 2003. The largest detected percentage difference between the

environmental sample and the duplicate sample for NP4EC in samples not denoted with a “B” was 25 percent (0.3 $\mu\text{g/L}$) for the wastewater-treatment plant effluent on May 21, 2003. The largest detected percentage difference between the environmental sample and the duplicate sample for total NPECs in samples not denoted with a “B” was 20 percent (30 $\mu\text{g/L}$) for the wastewater-treatment plant effluent on May 21, 2003.

Among the samples from the wastewater sites, the wastewater-treatment plant effluent samples had the highest concentrations of each of these compounds. NTA was not detected in any of the three samples from the cattle feedlot lagoon. Samples from the cattle feedlot lagoons had detections of NP3EC and NP4EC only once, in samples collected on August 15, 2002. Surface-water samples from Salt Creek had higher concentrations of EDTA and NPECs than samples from the Platte River. NTA and NP4EC were not detected in samples from the Platte River. NTA was not detected in any samples from the ground-water sites. EDTA was detected in all samples from all wells, with the highest average concentrations in well W54-10 and lowest average concentrations in well W49-9. Low concentrations of EDTA were each detected in all samples from the raw water and finished water.

Alkylphenol and Other Wastewater Compounds

Samples were collected for analysis of alkylphenol and other wastewater compounds from 3 wastewater sites and 2 surface-water sites between August 12, 2002, and August 15, 2002 (table 13). Three laboratory reagent blanks and two laboratory reagent spikes also were analyzed during the study for QA/QC purposes.

In a cattle feedlot lagoon sample collected on August 15, 2002, 12 of 27 compounds from this schedule were detected (4-methylphenol; 4-*tert*-butylphenol; 4-*tert*-pentylphenol; 2,6-di-*tert*-butyl-1,4-benzoquinone; 2,6-di-*tert*-butyl-4-methylphenol; 4-(*tert*-octyl)phenol; 4-nonylphenol; caffeine; 4-*t*-octylphenolmonoethoxylate (4-OP1EO); triclosan; 4-*t*-octylphenoldiethoxylate (4-OP2EO); and bisphenol A). In a hog confinement lagoon sample collected on August 15, 2002, 9 of 27 compounds from this schedule were detected (4-methylphenol; 4-*tert*-butylphenol; 4-*tert*-pentylphenol; 2,6-di-*tert*-butylphenol; 2,6-di-*tert*-butyl-1,4-benzoquinone; 4-(*tert*-octyl)phenol; 4-nonylphenol; triclosan; and bisphenol A). In a wastewater-treatment plant effluent sample collected on August 14, 2002, 19 of 27 compounds from this schedule were detected (1,4-dichlorobenzene; 1,2-dichlorobenzene; 4-methylphenol; 4-*tert*-butylphenol; 4-*tert*-pentylphenol; 2,6-di-*tert*-butylphenol; 2,6-di-*tert*-butyl-1,4-benzoquinone; 2[3]-*tert*-butyl-4-methylphenol; 4-(*tert*-octyl)phenol; 4-nonylphenol; caffeine; 4-OP1EO; 4-nonylphenolmonoethoxylate (4-NP1EO); triclosan; bisphenol A; 4-nonylphenoldiethoxylate (4-NP2EO); 4-*t*-octylphenoltriethoxylate (4-OP3EO); 4-nonylphenoltriethoxylate (4-NP3EO); and 4-nonylphenoltetraethoxylate (4-NP4EO)). In a sample collected from the Platte River on August 12, 2002, 7 of 27 compounds from this schedule

were detected (2,6-di-*tert*-butylphenol; 2,6-di-*tert*-butyl-1,4-benzoquinone; 4-(*tert*-octyl)phenol; 4-nonylphenol; 4-OP1EO; bisphenol A; and triclosan). In a sample collected from Salt Creek on August 13, 2002, 12 of 27 compounds from this schedule were detected (4-methylphenol; 4-*tert*-butylphenol; 4-*tert*-pentylphenol; 2,6-di-*tert*-butyl-1,4-benzoquinone; 4-(*tert*-octyl)phenol; 4-nonylphenol; caffeine; 4-OP1EO; triclosan; 4-OP2EO; bisphenol A; and 4-OP3EO).

Hormones

Samples for analysis of 20 hormones were collected from 3 wastewater sites, 3 surface-water sites, 3 ground-water sites, and 2 drinking-water sites (tables 14 and 15). Results are denoted with a “B” when the measured concentration is less than 10 times the greatest concentration detected in any LRB for that compound. Spike recovery percentages less than 60 percent or more than 150 percent may be indicative of matrix or interaction effects and concentrations in environmental compounds may be similarly over or underestimated.

The hormones 3- β -coprostanol and cholesterol were detected in all samples collected from the three wastewater sites (cattle feedlot lagoon, hog confinement lagoon, and wastewater-treatment plant effluent). Other hormones detected at least once in samples from the wastewater sites included *cis*-androsterone (1/4 samples), stanolone (1/4 samples), 17- β -estradiol (2/4 samples), and estriol (1/4 samples) in the wastewater-treatment plant effluent, and testosterone in the hog confinement lagoon (1/3 samples). Hormones detected at least once in samples from the surface-water sites included equilin (1/7 samples), equilenin (1/7 samples), and 3- β -coprostanol (4/7 samples) in the Platte River samples and equilenin (1/6 samples), 17- β -ethynylestradiol, (1/6 samples), and 3- β -coprostanol (6/6 samples) in the Salt Creek samples. No hormones were detected in samples from the ground-water or drinking-water sites.

Stable Hydrogen and Oxygen Isotope Ratios

Stable hydrogen and oxygen isotope ratios were measured in surface-water and ground-water samples (table 16). Stable hydrogen isotope ratios of surface water ranged from -63.5 per mill to -48.7 per mill relative to VSMOW reference water. Stable oxygen isotope ratios of surface water ranged from -8.57 per mill to -6.09 per mill. Stable hydrogen isotope ratios of ground water showed seasonal variation of -70.4 per mill to -47.6 per mill relative to VSMOW reference water. Stable oxygen isotope ratios of ground water ranged from -9.42 per mill to -5.84 per mill.

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Table 1. Sites at which samples were collected for analysis during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.

[SW, surface water; GW, ground water; WW, wastewater; DW, drinking water]

Station name	Site type	Station number
Platte River near Ashland (well field)	SW	06801000
Salt Creek near Ashland (well field)	SW	06805000
Loup Power Canal (outside well field)	SW	412411097165601
W90-1H (well field)	GW	410322096191701
W54-10 (well field)	GW	410315096193501
W49-9 (well field)	GW	410349096202101
W56-5 (well field)	GW	410537096202701
Ashland Deep monitoring well (well field)	GW	410334096182801
Memphis, G040474 Ithaca (outside well field)	GW	410547096254801
Raw Water (well field)	DW	410315096190101
Finished Water (well field)	DW	410315096190102
Cattle Feedlot Lagoon (outside well field)	WW	410322096190103
Hog Confinement Lagoon (outside well field)	WW	410322096190104
Wastewater Treatment Plant Effluent (outside well field)	WW	06803496

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Table 2. Pharmaceuticals, including common names and general uses, analyzed for in water-quality samples.

[--, none]

Compound	Common name	Use
1,7-dimethylxanthine	--	caffeine metabolite
Acetaminophen	Tylenol	over-the-counter analgesic
Azithromycin	Zithromax	antibiotic
Caffeine	No-Doz	stimulant
Carbamazepine	Tegretol	management of epilepsy, bipolar disorder
Cimetidine	Tagamet	acid reducer; prescription and over-the-counter
Clarithromycin	Biaxin	antibiotic
Codeine	Robitussin AC	opiod narcotic; cough suppressant
Cotinine	--	nicotine metabolite
Dehydronifedipine	--	antianginal
Digoxigenin	Lanoxicaps; Lanoxin	cardiac stimulant/regulator, digoxin metabolite
Diltiazem	Cardizem CD	antianginal, antiarrhythmic, and antihypertensive
Diphenhydramine	Benadryl	antihistamine
Erythromycin	E-mycin, Ery-tab, Benzamycin	antibiotic
Fluoxetine	Prozac	antidepressant
Furosemide	Lasix	diuretic
Gemfibrozil	Lopid	antihyperlipidemic
Ibuprofen	Advil	over-the-counter analgesic
Metformin	Glucophage	antidiabetic
Miconazole	Micatin, Monistat	antifungal agent
Paroxetine metabolite	Paxil	antidepressant
Ranitidine	Zantac	acid reducer; prescription and over-the-counter
Salbutamol	Albuterol Aerosol	bronchiodilator for asthma
Sulfamethoxazole	component of Bactrim	antibiotic
Thiabendazole	Mintezol	treats worm infections
Trimethoprim	component of Bactrim	antibiotic
Warfarin	Coumadin Tabs	anticoagulant

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14 Occurrence of Selected Compounds, Riverbank Filtration Study, Platte River, Nebraska, Volume 2

Table 3. List of non-pharmaceutical organic compounds analyzed for in water-quality samples by the U.S. Geological Survey National Research Program, Boulder Laboratories during the riverbank filtration study, Platte River, Nebraska, including registry numbers, common species.

[Surrogate standards (SS) and internal standards (IS) are italicized; CAS#, chemical abstracts registry number; MCL, Maximum Contaminant Level in micrograms per liter (U.S. Environmental Protection Agency, 2002); LC50, lowest lethal concentration for 50 percent of the population of the most sensitive indicator species (see footnote 2); studies, number of studies; --, not available; n, normal; *t*, *tert*]

Method/compound	Abbreviation used in this report	CAS#	Source/use	MCL, LC50/studies
Organic carbon				
Dissolved organic carbon	DOC	--	natural organic matter	--, --/0
Total organic carbon	TOC	--	natural organic matter	--, --/0
Ultraviolet light absorption	UV ₂₅₄	--	natural organic matter	--, --/0
Specific ultraviolet light absorption	SUVA	--	natural organic matter	--, --/0
Nitritotriacetic acid/ethylenediaminetetraacetic acid/nonylphenolethoxycarboxylates				
Nitritotriacetic acid	NTA	139-13-9	metal complexing agent	--, --/0
Ethylenediaminetetraacetic acid	EDTA	60-00-4	metal complexing agent	--, --/0
4-Nonylphenolmonoethoxycarboxylate	NP1EC	3115-49-9	surfactant metabolite	--, --/0
4-Nonylphenoldiethoxycarboxylate	NP2EC	106807-78-7	surfactant metabolite	--, --/0
4-Nonylphenoltriethoxycarboxylate	NP3EC	1878-68-8	surfactant metabolite	--, --/0
4-Nonylphenoltetraethoxycarboxylate	NP4EC	--	surfactant metabolite	--, --/0
<i>4-Bromophenyl acetic acid (SS)</i>	<i>BPAA</i>		<i>surrogate standard</i>	--, --/0
<i>d¹² Ethylenediaminetetraacetic acid (IS)</i>	<i>D12 EDTA</i>	<i>203806-08-0</i>	<i>internal standard</i>	--, --/0
<i>4-n-Nonylphenoldiethoxycarboxylate (SS)</i>	<i>nNP2EC</i>	--	<i>surrogate standard</i>	--, --/0
Wastewater compounds				
Bisphenol A	BPA	80-05-7	plasticizer	--, ¹ 3,600/26
4- <i>t</i> -Butylphenol	TBP	98-54-4	antioxidant	--, --/0
2[3]- <i>t</i> -Butyl-4-methoxyphenol	BHA	25013-16-5	antioxidant	--, ² 870/14
Caffeine	CAFF	58-08-2	stimulant	--, --/0
2,6-Di- <i>t</i> -butyl-1,4-benzoquinone	DTBB	719-22-2	antioxidant byproduct	--, --/0
2,6-Di- <i>t</i> -butyl-4-methylphenol	BHT	128-37-0	antioxidant	--, ³ 1,140/15
2,6-Di- <i>t</i> -butylphenol	DTBP	128-39-2	antioxidant	--, --/2
1,2-Dichlorobenzene	1,2DCB	95-50-1	fumigant	--, --/0
1,3-Dichlorobenzene	1,3DCB	541-73-1	fumigant	--, --/0
1,4-Dichlorobenzene	1,4DCB	106-46-7	deodorizer	75, --/--
4-Ethylphenol	EP	123-07-9	plasticizer	--, --/0
4-Methylphenol	MP	106-44-5	disinfectant	--, ³ 1,400/74
4-Nonylphenol	NP	25154-52-3	surfactant metabolite	--, ¹ 130/135
4-Nonylphenolmonoethoxylate	NP1EO	9016-45-9	surfactant metabolite	--, ³ 14,450/4
4-Nonylphenoldiethoxylate	NP2EO	--	surfactant metabolite	--, ³ 5,500/6
4-Nonylphenoltriethoxylate	NP3EO	--	surfactant metabolite	--, --/0
4-Nonylphenoltetraethoxylate	NP4EO	--	surfactant metabolite	--, --/0
4- <i>n</i> -Octylphenol	NOP	1806-26-4	plasticizer	--, --/0
4- <i>t</i> -Octylphenol	TOP	140-66-9	surfactant metabolite	--, --/0
4- <i>t</i> -Octylphenolmonoethoxylate	OP1EO	9036-19-5	surfactant metabolite	--, --/0
4- <i>t</i> -Octylphenoldiethoxylate	OP2EO	--	surfactant metabolite	--, --/0
4- <i>t</i> -Octylphenoltriethoxylate	OP3EO	--	surfactant metabolite	--, --/0

Table 3. List of non-pharmaceutical organic compounds analyzed for in water-quality samples by the U.S. Geological Survey National Research Program, Boulder Laboratories during the riverbank filtration study, Platte River, Nebraska, including registry numbers, common sources/uses, and their Maximum Contaminant Level or lowest lethal concentration for 50 percent of the most sensitive indicator species.—Continued

Method/compound	Abbreviation used in this report	CAS#	Source/use	MCL, LC50/studies
Wastewater compounds—continued				
4- <i>t</i> -Octylphenoltetraethoxylate	OP4EO	--	surfactant metabolite	--, --/0
4- <i>t</i> -Octylphenolpentaethoxylate	OP5EO	--	Surfactant metabolite	--/--/0
4- <i>t</i> -Pentylphenol	TPP	80-46-6	plasticizer	--, --/0
4-Propylphenol	PP	645-56-7	plasticizer	--, --/0
Triclosan	TRI	3380-34-5	antimicrobial	--, ¹ 180/3
<i>D6-Bisphenol A (SS)</i>	<i>D6 BPA</i>	86588-58-1	surrogate standard	--, --/0
<i>D₂₁-2,6-Di-<i>t</i>-butyl-4-methylphenol (SS)</i>	<i>D21 BHT</i>	64502-99-4	surrogate standard	--, --/0
<i>4-n-Nonylphenol (SS)</i>	<i>nNP</i>	104-40-5	surrogate standard	--, --/0
<i>4-n-Nonylphenolmonoethoxylate (SS)</i>	<i>nNP1EO</i>	--	surrogate standard	--, --/0
<i>4-n-Nonylphenoldiethoxylate (SS)</i>	<i>nNP2EO</i>	--	surrogate standard	--, --/0
Hormones/steroids				
<i>cis</i> -Androsterone	AND	53-41-8	urinary steroid	--, --/0
4-Androstene-3,17-dione	ANDD	63-05-8	androgen hormone	--, --/0
Cholesterol	CHO	57-88-5	animal steroid	--, --/0
3- β -Coprostanol	COP	360-68-9	animal fecal steroid	--, --/0
Diethylstilbesterol	DES	56-53-1	synthetic estrogen	--, --/0
Epitestosterone	ETES	481-30-1	androgen hormone	--, --/0
Equilenin	EQUI	517-09-9	estrogen replacement	--, --/0
Equilin	EQUIN	474-86-2	estrogen replacement	--, --/0
17- α -Estradiol	AE2	57-91-0	reproductive hormone	--, --/0
17- β -Estradiol	BE2	50-28-2	reproductive hormone	--, --/0
Estriol	E3	50-27-1	reproductive hormone	--, --/0
Estrone	E1	53-16-7	reproductive hormone	--, --/11
17- α -Ethinylestradiol	EE2	57-63-6	ovulation inhibitor	--, --/22
11-Ketotestosterone	KTES	564-35-2	androgen hormone	--, --/0
Mestranol	MES	72-33-3	ovulation inhibitor	--, --/0
19-Norethisterone	NOR	68-22-4	ovulation inhibitor	--, --/0
Progesterone	PRO	57-83-0	reproductive hormone	--, --/0
Stanolone	STA	521-18-6	androgen hormone	--, --/0
Testosterone	TES	58-22-0	reproductive hormone	--, --/4
Trenbolone	TRE	10161-33-8	growth promoter	--, --/0
<i>d4-17-β-Estradiol (SS)</i>	<i>D4 E2</i>	66789-03-5	surrogate standard	--, --/0
<i>d3-Testosterone (SS)</i>	<i>D3 TES</i>	77546-39-5	surrogate standard	--, --/0
<i>d7-Cholesterol (SS)</i>	<i>D7 CHO</i>	83199-47-7	surrogate standard	--, --/0

¹*Pimephales promelas* (fathead minnow), 96-hour exposure (U.S. Environmental Protection Agency, 2002)

²*Oncorhynchus mykiss* (rainbow trout), 96-hour exposure (U.S. Environmental Protection Agency, 2001)

³*Daphnia magna* (water flea), 48-hour exposure (U.S. Environmental Protection Agency, 2001)

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Table 4. List of non-pharmaceutical target compounds and ions (presented in order of relative chromatographic elution) used in selected ion monitoring (SIM) gas chromatography/mass spectrometry (GC/MS) analysis.

[See table 3 for compound abbreviations. Surrogate standards (SS) are shown in bold italics; internal standards (IS) are shown in italics; M⁺, molecular ion; Tgt, target ion used for quantitation; Q1, first qualifier ion; Q2, second qualifier ion; Q3, third qualifier ion; --, not applicable]

Compound abbreviations	M ⁺	Tgt	Q1	Q2	Q3
Nitrilotriacetic acid/Ethylenediaminetetraacetic acid/Nonylphenoethoxycarboxylates (propyl ester derivatives)					
<i>C9 Benzene (IS)</i>	204	92	204	133	--
<i>4-Bromophenyl acetic acid (SS)</i>	257	171	257	90	--
NTA	317	317	230	144	--
NP1EC	320	249	320	235	--
NP2EC	364	103	364	293	--
<i>nNP2EC (SS)</i>	364	103	364	145	--
<i>D12 EDTA (IS)</i>	472	236	472	150	--
EDTA	460	460	230	144	--
NP3EC	408	323	408	103	--
NP4EC	452	367	452	103	--
Wastewater compounds					
1,3DCB	146	146	111	75	--
D4-1,4-Dichlorobenzene (IS)	151	115	151	78	--
1,4DCB	146	146	111	75	--
1,2DCB	146	146	111	75	--
MP	108	108	107	77	--
EP	122	107	122	77	--
<i>D8-Napthalene (IS)</i>	<i>136</i>	<i>136</i>	<i>108</i>	<i>68</i>	--
PP	136	107	136	77	--
TBP	150	135	150	107	--
TPP	164	135	164	107	--
DTBP	206	191	206	57	--
DTBB	220	177	220	135	--
<i>D10-Acenaphthene (IS)</i>	<i>164</i>	<i>164</i>	<i>162</i>	<i>80</i>	--
BHA	180	165	180	137	--
<i>D21 BHT (SS)</i>	240	222	240	66	--
BHT	220	205	220	57	--
TOP	206	135	206	107	--
NP	220	135	220	107	--
NOP	206	107	206	77	--
<i>D10-Phenanthrene (IS)</i>	<i>188</i>	<i>188</i>	<i>160</i>	<i>80</i>	--
CAFF	194	194	109	82	--
OP1EO	250	179	250	135	--
<i>nNP (SS)</i>	220	107	220	77	--
NP1EO	264	179	264	193	--
TRI	289	218	289	145	--
<i>nNP1EO (SS)</i>	264	107	264	151	--

Table 4. List of non-pharmaceutical target compounds and ions (presented in order of relative chromatographic elution) used in selected ion monitoring (SIM) gas chromatography/mass spectrometry (GC/MS) analysis.—Continued

Compound abbreviations	M ⁺	Tgt	Q1	Q2	Q3
Wastewater compounds—continued					
OP2EO	294	135	294	223	--
D6 BPA (SS)	234	216	234	121	--
BPA	228	213	228	119	--
NP2EO	308	135	308	223	--
nNP2EO (SS)	308	107	308	195	--
OP3EO	338	267	338	135	--
<i>D12-Chrysene (IS)</i>	<i>240</i>	<i>240</i>	<i>236</i>	<i>120</i>	--
NP3EO	352	281	352	267	--
OP4EO	382	135	382	311	--
NP4EO	3,962	325	396	311	--
OP5EC	426	355	426	135	--
Hormones/steroids (MOX/TMS derivatives)					
<i>D12-Chrysene (IS)</i>	<i>240</i>	<i>240</i>	<i>236</i>	<i>120</i>	--
<i>Triphenylene (IS)</i>	228	228	<i>113</i>	226	--
DES	413	413	383	397	217
AND	392	270	391	360	300
AE2	416	285	416	326	401
ETES	390	390	358	268	374
D4 E2 (SS)	420	420	330	329	273
STA	392	392	376	360	286
BE2	416	416	285	326	401
E1	371	371	323	312	340
EQUIN	367	367	279	352	337
D3 TES (SS)	393	393	361	271	377
TES	390	390	358	268	281
ANDD	345	345	313	329	367
MES	382	367	382	227	242
TRE	372	372	266	240	281
NOR	399	384	399	259	209
EQUIN	369	369	354	338	229
EE2	440	425	440	285	300
<i>D12-Perylene (IS)</i>	<i>264</i>	<i>264</i>	<i>260</i>	<i>132</i>	--
KTES	404	404	372	388	359
E3	504	311	504	345	386
PRO	372	372	341	286	100
COP	460	370	460	355	257
D7 CHO (SS)	465	336	465	375	360
CHO	458	329	458	368	353

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18 Occurrence of Selected Compounds, Riverbank Filtration Study, Platte River, Nebraska, Volume 2

Table 5. Monthly pumpage from vertical wells W49-9, W54-10, and W56-5 during the riverbank filtration study, Platte River, Nebraska, 2001 to 2005.

[MG, millions of gallons]

Month and Year	Pumpage, in MG			Month and Year	Pumpage, in MG		
	W49-9	W54-10	W56-5		W49-9	W54-10	W56-5
Nov-2001	16.045	27.975	0.014	Aug-2003	24.958	97.190	39.280
Dec-2001	27.744	88.905	2.541	Sep-2003	10.747	66.418	30.570
Jan-2002	18.269	52.898	20.336	Oct-2003	21.925	81.605	21.712
Feb-2002	33.699	77.728	2.096	Nov-2003	24.278	98.576	8.598
Mar-2002	28.458	62.897	3.963	Dec-2003	41.145	103.161	17.805
Apr-2002	30.429	35.922	1.881	Jan-2004	47.838	103.060	31.881
May-2002	29.934	100.629	9.041	Feb-2004	25.550	93.194	49.427
Jun-2002	40.661	108.557	30.800	Mar-2004	7.638	66.950	24.938
Jul-2002	25.908	91.532	40.369	Apr-2004	3.349	40.703	10.498
Aug-2002	28.870	109.238	43.122	May-2004	15.333	73.240	13.007
Sep-2002	25.480	91.304	29.687	Jun-2004	10.877	56.062	9.231
Oct-2002	23.087	97.632	3.617	Jul-2004	22.742	72.650	6.777
Nov-2002	38.464	68.811	29.413	Aug-2004	28.548	63.030	10.474
Dec-2002	49.136	79.062	51.565	Sep-2004	18.567	79.938	41.770
Jan-2003	3.936	51.475	25.318	Oct-2004	8.582	87.999	6.274
Feb-2003	0	101.201	.003	Nov-2004	12.176	114.170	26.383
Mar-2003	0	88.578	.004	Dec-2004	9.629	59.115	24.310
Apr-2003	27.280	46.493	16.449	Jan-2005	13.220	111.731	57.447
May-2003	22.993	20.326	9.563	Minimum	0	20.326	0.003
Jun-2003	16.048	45.518	22.766	Mean	22.190	76.523	20.706
Jul-2003	31.866	68.918	34.587	Median	23.087	79.062	20.336
				Maximum	49.136	114.170	57.447

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Table 6. Field properties measured for all samples collected during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.[$\mu\text{S}/\text{cm}$, microsiemens per centimeter; $^{\circ}\text{C}$, degrees Celsius; mg/L , milligrams per liter; NTU, nephelometric turbidity units; nm, no measurement]

Station number	Station name	Date	Time	Specific conductance ($\mu\text{S}/\text{cm}$)	Temperature		pH	Dissolved oxygen (mg/L)	Turbidity (NTU)
					Air ($^{\circ}\text{C}$)	Water ($^{\circ}\text{C}$)			
06801000	Platte River near Ashland	4/19/04	0930	432	11.5	13.6	8.81	6.42	46.3
		5/10/04	1030	400	23.5	23.0	8.97	5.64	50.3
		9/14/04	0930	397	22.2	23.4	8.50	5.37	72.5
		11/15/04	1030	390	10.0	8.6	8.09	7.10	65.9
		1/10/05	1130	575	.0	.3	8.13	9.83	3.89
410322096191701	W90-1H	4/20/04	1210	463	23.8	7.1	7.80	3.77	--
		9/14/04	1220	424	30.6	19.8	7.57	.23	.24
		11/16/04	1240	424	14.3	17.0	7.80	1.48	.15
		1/11/05	1700	448	-2.2	8.9	8.06	8.93	.18
410315096193501	W54-10	4/20/04	1625	405	24.4	5.9	8.10	6.08	--
		9/15/04	1330	373	24.0	22.3	7.73	.13	--
		11/16/04	1345	326	14.3	17.2	7.88	2.22	.14
		1/11/05	1430	360	-5.0	12.5	8.03	5.06	.10
410349096202101	W49-9	4/20/04	1425	533	24.4	14.3	7.36	3.36	--
		9/16/04	1130	507	22.5	15.3	7.26	1.12	--
		11/16/04	1540	523	14.3	14.0	7.32	.73	.12
		1/11/05	1625	482	-5.0	18.2	7.43	2.51	.20
410537096202701	W56-5	4/20/04	1525	404	24.4	5.7	7.95	3.01	--
		9/15/04	1420	367	24.0	19.1	7.47	.08	--
		11/16/04	1445	329	14.3	19.2	7.73	.33	.15
		1/11/05	1545	376	-5.0	12.1	7.93	3.85	.20
410334096182801	Ashland Deep	4/20/04	1110	470	21.0	12.6	7.58	.19	--
		9/15/04	1230	487	24.0	12.8	7.49	.46	--
		11/16/04	1540	492	14.3	12.6	7.56	.69	6.45
		1/11/05	1320	469	-5.0	12.4	7.63	.27	1.57
410315096190102	Finished water	4/20/04	1700	491	24.4	18.0	7.76	6.44	--
		9/15/04	1515	450	24.0	20.4	7.34	8.00	--
		11/16/04	1615	412	14.3	18.7	7.56	3.53	--
		1/11/05	1740	457	-5.0	14.5	7.62	8.98	.21

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Table 7. Summary statistics of pharmaceuticals in supplementary samples collected during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.

[All concentrations in micrograms per liter; summary statistics based upon detected concentrations (excluding samples where concentration was less than 10 times the laboratory blank detection as denoted by "B" in table 8); LRL, Laboratory reporting level ; n, number of samples; det, number of detections; max, maximum; med, median; std. dev., standard deviation; E, estimated; na, not applicable; nd, not determined]

Constituent	06801000 Platte River near Ashland						41032096191701 Well W90-1H						410315096193501 Well W54-10						
	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
1,7-Dimethylxanthine	0.144	5	1	E.0027	E.0027	E.0027	na	4	0	na	na	na	na	4	1	E.0030	E.0030	E.0030	na
Acetaminophen	.036	5	2	.061	.052	.052	0.013	4	0	na	na	na	na	4	0	na	na	na	na
Azithromycin	.004	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Caffeine	.016	5	1	.052	.052	.052	na	4	0	na	na	na	na	4	0	na	na	na	na
Carbamazepine	.011	5	1	E.002	E.002	E.002	na	4	1	E.0003	E.0003	E.0003	na	4	0	na	na	na	na
Cimetidine	.012	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Clarithromycin	nd	0	0	na	na	na	na	0	0	na	na	na	na	0	0	na	na	na	na
Codeine	.015	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Cotinine	.014	5	2	E.010	E.009	E.009	E.002	4	0	na	na	na	na	4	0	na	na	na	na
Dehydromifedipine	.015	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Digoxigenin	nd	0	0	na	na	na	na	0	0	na	na	na	na	0	0	na	na	na	na
Diltiazem	.016	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Diphenhydramine	.015	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Erythromycin	.009	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Fluoxetine	.014	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Furosemide	nd	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Gemfibrozil	.013	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Ibuprofen	.042	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Metformin	nd	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Miconazole	.018	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Paroxetine metabolite	nd	0	0	na	na	na	na	0	0	na	na	na	na	0	0	na	na	na	na
Ranitidine	.013	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Salbutamol	.023	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Sulfamethoxazole	.064	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Thiabendazole	.011	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Trimethoprim	.013	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
Warfarin	.012	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na

Table 7. Summary statistics of pharmaceuticals in supplementary samples collected during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Constituent	410349096202101 Well W49-9						410537096202701 Well W56-5						
	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
1,7-Dimethylxanthine	0.144	4	0	na	na	na	na	4	1	E.034	E.034	E.034	na
Acetaminophen	.036	4	1	E.0.0004	E.0.0004	E.0.0004	na	4	1	E.0.12	E.0.12	E.0.12	na
Azithromycin	.004	4	0	na	na	na	na	4	0	na	na	na	na
Caffeine	.016	4	0	na	na	na	na	4	0	na	na	na	na
Carbamazapine	.011	4	1	E.0.007	E.0.007	E.0.007	na	4	2	E.0.07	E.0.04	E.0.04	E.0.04
Cimetidine	.012	4	0	na	na	na	na	4	0	na	na	na	na
Clarithromycin	nd	0	0	na	na	na	na	0	0	na	na	na	na
Codeine	.015	4	0	na	na	na	na	4	0	na	na	na	na
Cotinine	.014	4	0	na	na	na	na	4	0	na	na	na	na
Dehydronfedipine	.015	4	0	na	na	na	na	4	0	na	na	na	na
Digoxigenin	nd	0	0	na	na	na	na	0	0	na	na	na	na
Diltiazem	.016	4	0	na	na	na	na	3	0	na	na	na	na
Diphenhydramine	.015	4	0	na	na	na	na	3	0	na	na	na	na
Erythromycin	.009	4	0	na	na	na	na	4	0	na	na	na	na
Fluoxetine	.014	4	0	na	na	na	na	4	0	na	na	na	na
Furosemide	nd	4	0	na	na	na	na	4	0	na	na	na	na
Gemfibrozil	.013	4	0	na	na	na	na	4	0	na	na	na	na
Ibuprofen	.042	4	0	na	na	na	na	4	0	na	na	na	na
Metformin	nd	4	0	na	na	na	na	4	0	na	na	na	na
Miconazole	.018	4	0	na	na	na	na	4	0	na	na	na	na
Paroxetine metabolite	nd	0	0	na	na	na	na	0	0	na	na	na	na
Ranitidine	.013	4	0	na	na	na	na	4	0	na	na	na	na
Salbutamol	.023	4	0	na	na	na	na	4	0	na	na	na	na
Sulfamethoxazole	.064	4	0	na	na	na	na	4	0	na	na	na	na
Thiabendazole	.011	4	0	na	na	na	na	4	0	na	na	na	na
Trimethoprim	.013	4	0	na	na	na	na	4	1	E.0.08	E.0.08	E.0.08	na
Warfarin	.012	4	0	na	na	na	na	4	0	na	na	na	na

Table 7. Summary statistics of pharmaceuticals in supplementary samples collected during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Constituent	410334096182801 Ashland Deep						410315096190102 Finished water						
	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
1,7-Dimethylxanthine	0.144	4	0	na	na	na	na	4	0	na	na	na	na
Acetaminophen	.036	4	0	na	na	na	na	4	0	na	na	na	na
Azithromycin	.004	4	0	na	na	na	na	4	0	na	na	na	na
Caffeine	.016	4	0	na	na	na	na	4	0	na	na	na	na
Carbamazepine	.011	4	1	E0.001	E0.001	E0.001	na	4	1	E0.002	E0.002	E0.002	na
Cimetidine	.012	4	0	na	na	na	na	4	0	na	na	na	na
Clarithromycin	nd	0	0	na	na	na	na	0	0	na	na	na	na
Codeine	.015	4	0	na	na	na	na	4	0	na	na	na	na
Cotinine	.014	4	0	na	na	na	na	4	0	na	na	na	na
Dehydronifedipine	.015	4	0	na	na	na	na	4	0	na	na	na	na
Digoxigenin	nd	0	0	na	na	na	na	0	0	na	na	na	na
Diltiazem	.016	4	0	na	na	na	na	4	0	na	na	na	na
Diphenhydramine	.015	4	0	na	na	na	na	4	0	na	na	na	na
Erythromycin	.009	4	0	na	na	na	na	4	0	na	na	na	na
Fluoxetine	.014	4	0	na	na	na	na	4	0	na	na	na	na
Furosemide	nd	4	0	na	na	na	na	4	0	na	na	na	na
Gemfibrozil	.013	4	0	na	na	na	na	4	0	na	na	na	na
Ibuprofen	.042	4	0	na	na	na	na	4	0	na	na	na	na
Metformin	nd	4	0	na	na	na	na	4	0	na	na	na	na
Miconazole	.018	4	0	na	na	na	na	4	0	na	na	na	na
Paroxetine metabolite	nd	0	0	na	na	na	na	0	0	na	na	na	na
Ranitidine	.013	4	0	na	na	na	na	4	0	na	na	na	na
Salbutamol	.023	4	0	na	na	na	na	4	0	na	na	na	na
Sulfamethoxazole	.064	4	0	na	na	na	na	4	0	na	na	na	na
Thiabendazole	.011	4	0	na	na	na	na	4	0	na	na	na	na
Trimethoprim	.013	4	0	na	na	na	na	4	0	na	na	na	na
Warfarin	.012	4	0	na	na	na	na	4	0	na	na	na	na

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Table 8. Pharmaceutical data for samples collected during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.

[All units are in micrograms per liter; nd, not determined; --, constituent not analyzed; <, less than; E, estimated quantity below laboratory reporting level but above method detection limit; B, detected in blank, level <10X blank detection; nondetect, constituent not detected and laboratory reporting level not determined]

Station number	Station name	Date	Time	1,7-dimethyl-xanthine	Acetamino-phen	Azithromycin	Caffeine	Carbama-zapine	Cimetidine	Clarithromycin
<i>Laboratory reporting level --></i>										
6801000	Platte River near Ashland	4/19/04	0930	<0.144	<0.036	<0.004	<0.016	<0.011	<0.012	--
		5/10/04	1030	E.027	.042	<0.004	.052	<0.011	<0.012	--
		9/14/04	0930	<.144	<.036	<.004	<.016	<.011	<.012	--
		11/15/04	1030	<.144	<.036	<.004	<.016	E.002	<.012	--
		1/10/05	1130	<.144	.061	<.004	<.016	<.011	<.012	--
410322096191701	W90-1H	4/20/04	1210	<.144	<.036	<.004	<.016	<.011	<.012	--
		9/14/04	1220	<.144	<.036	<.004	<.016	<.011	<.012	--
		11/16/04	1240	<.144	<.036	<.004	<.016	<.011	<.012	--
		1/18/05	1700	<.144	<.036	<.004	<.016	E.003	<.012	--
410315096193501	W54-10	4/20/04	1625	E.030	<.036	<.004	<.016	<.011	<.012	--
		9/15/04	1330	<.144	<.036	<.004	<.016	<.011	<.012	--
		11/16/04	1345	<.144	<.036	<.004	<.016	<.011	<.012	--
		1/11/05	1430	<.144	<.036	<.004	<.016	<.011	<.012	--
410349096202101	W49-9	4/20/04	1425	<.144	<.036	<.004	<.016	<.011	<.012	--
		9/16/04	1130	<.144	<.036	<.004	<.016	<.011	<.012	--
		11/16/04	1540	<.144	E.0004	<.004	<.016	<.011	<.012	--
		1/11/05	1625	<.144	<.036	<.004	<.016	E.007	<.012	--
410537096202701	W56-5	4/20/04	1525	E.034	E.012	<.004	<.016	<.011	<.012	--
		9/15/04	1420	<.144	<.036	<.004	<.016	<.011	<.012	--
		11/16/04	1445	<.144	<.036	<.004	<.016	E.001	<.012	--
		1/11/05	1545	<.144	<.036	<.004	<.016	E.007	<.012	--
410334096182801	Ashland Deep	4/20/04	1110	<.144	<.036	<.004	<.016	<.011	<.012	--
		9/15/04	1230	<.144	<.036	<.004	<.016	<.011	<.012	--
		11/16/04	1540	<.144	<.036	<.004	<.016	E.001	<.012	--
		1/11/05	1320	<.144	<.036	<.004	<.016	<.011	<.012	--

Table 8. Pharmaceutical data for samples collected during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Station number	Station name	Date	Time	1,7-dimethyl-xanthine	Acetaminophen	Azithromycin	Caffeine	Carbamazepine	Cimetidine	Clarithromycin	
<i>Laboratory reporting level --></i>											
410315096190102	Finished water	4/20/04	1700	<0.144	<0.036	<0.004	<0.016	<0.011	<0.012	nd	
		9/15/04	1515	<.144	<.036	<.004	<.016	<.011	<.012	--	
		11/16/04	1615	<.144	<.036	<.004	<.016	E.002	<.012	--	
		1/11/05	1740	<.144	<.036	<.004	<.016	<.011	<.012	--	
Duplicates											
6801000	Platte River near Ashland	1/10/05	1140	<.144	<.036	<.004	<.016	<.011	<.012	--	
<i>Laboratory reporting level --></i>											
Station number	Station name	Date	Time	Codeine	Cotinine	Dehydronifedipine	Digoxigenin	Diltiazem	Diphenhydramine	Erythromycin	
<i>Laboratory reporting level --></i>											
6801000	Platte River near Ashland	4/19/04	0930	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		5/10/04	1030	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		9/14/04	0930	<0.015	E:010	<0.015	--	<0.016	<0.015	<0.009	
		11/15/04	1030	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		1/10/05	1130	<0.015	E:007	<0.015	--	<0.016	<0.015	<0.009	
410322096191701	W90-1H	4/20/04	1210	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		9/14/04	1220	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		11/16/04	1240	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		1/18/05	1700	<0.015	0.014	<0.015	--	<0.016	<0.015	<0.009	
410315096193501	W54-10	4/20/04	1625	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		9/15/04	1330	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		11/16/04	1345	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		1/11/05	1430	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
410349096202101	W49-9	4/20/04	1425	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		9/16/04	1130	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		11/16/04	1540	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	
		1/11/05	1625	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009	

Table 8. Pharmaceutical data for samples collected during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Station number	Station name	Date	Time	Codeine	Cotinine	Dehydronife-dipine	Digoxigenin	Diltiazem	Diphenhy-dramine	Erythromycin
<i>Laboratory reporting level --></i>										
410537096202701	W56-5	4/20/04	1525	<0.015	<0.014	<0.015	nd	<0.016	0.015	0.009
		9/15/04	1420	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
		11/16/04	1445	<0.015	<0.014	<0.015	--	B.009	B.016	<0.009
		1/11/05	1545	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
410334096182801	Ashland Deep	4/20/04	1110	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
		9/15/04	1230	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
		11/16/04	1540	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
		1/11/05	1320	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
410315096190102	Finished water	4/20/04	1700	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
		9/15/04	1515	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
		11/16/04	1615	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
		1/11/05	1740	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
Duplicates										
6801000	Platte River near Ashland	1/10/05	1140	<0.015	<0.014	<0.015	--	<0.016	<0.015	<0.009
<i>Laboratory reporting level --></i>										
6801000	Platte River near Ashland	4/19/04	0930	<0.014	nd	<0.013	0.042	nd	0.018	nd
		5/10/04	1030	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		9/14/04	0930	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		11/15/04	1030	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		1/10/05	1130	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
410322096191701	W90-1H	4/20/04	1210	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		9/14/04	1220	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		11/16/04	1240	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		1/18/05	1700	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
410315096193501	W54-10	4/20/04	1625	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		9/15/04	1330	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		11/16/04	1345	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		1/11/05	1430	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--

Table 8. Pharmaceutical data for samples collected during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Station number	Station name	Date	Time	Fluoxetine	Furosemide	Gemfibrozil	Ibuprofen	Metformin	Miconazole	Paroxetine metabolite
<i>Laboratory reporting level --></i>										
410349096202101	W49-9	4/20/04	1425	<0.014	nd	0.013	0.042	nd	0.018	nd
		9/16/04	1130	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		11/16/04	1540	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		1/11/05	1625	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
410537096202701	W56-5	4/20/04	1525	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		9/15/04	1420	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		11/16/04	1445	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		1/11/05	1545	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
410334096182801	Ashland Deep	4/20/04	1110	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		9/15/04	1230	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		11/16/04	1540	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		1/11/05	1320	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
410315096190102	Finished water	4/20/04	1700	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		9/15/04	1515	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		11/16/04	1615	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
		1/11/05	1740	<0.014	nondetect	<0.013	<0.042	nondetect	<0.018	--
Duplicates										
6801000	Platte River near Ashland	1/10/05	11:40	B.021	nondetect	<0.013	<0.042	nondetect	<0.018	--
<i>Laboratory reporting level --></i>										
6801000	Platte River near Ashland	4/19/04	0930	<0.013	<0.023	0.064	0.011	0.013	0.012	<0.012
		5/10/04	1030	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012	<0.012
		9/14/04	0930	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012	<0.012
		11/15/04	1030	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012	<0.012
		1/10/05	1130	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012	<0.012
410322096191701	W90-1H	4/20/04	1210	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012	<0.012
		9/14/04	1220	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012	<0.012
		11/16/04	1240	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012	<0.012
		1/18/05	1700	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012	<0.012

Table 8. Pharmaceutical data for samples collected during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Station number	Station name	Date	Time	Ranitidine	Salbutamol	Sulfamethoxazole	Thiabendazole	Trimethoprim	Warfarin
<i>Laboratory reporting level --></i>									
410315096193501	W54-10	4/20/04	1625	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		9/15/04	1330	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		11/16/04	1345	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		1/11/05	1430	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
410349096202101	W49-9	4/20/04	1425	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		9/16/04	1130	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		11/16/04	1540	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		1/11/05	1625	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
410537096202701	W56-5	4/20/04	1525	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		9/15/04	1420	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		11/16/04	1445	<0.013	<0.023	<0.064	<0.011	E.008	<0.012
		1/11/05	1545	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
410334096182801	Ashland Deep	4/20/04	1110	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		9/15/04	1230	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		11/16/04	1540	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		1/11/05	1320	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
410315096190102	Finished water	4/20/04	1700	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		9/15/04	1515	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		11/16/04	1615	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
		1/11/05	1740	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
Duplicates									
6801000	Platte River near Ashland	1/10/05	11:40	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012

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Table 9. Laboratory quality assurance/quality control data for pharmaceutical analyses during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Sampled station name(s)	Sample type	Sampling trip date	1,7-dimethyl-xanthine	Acetaminophen	Azithromycin	Caffeine	Caffeine ¹³ C surrogate	Carbamazepine	Cimetidine	Clarithromycin
<i>Laboratory reporting level --></i>										
W49-9	Set blank	9/16/04	<0.144	<0.036	<0.004	<0.016	nd	0.011	0.012	nd
	Set spike	9/16/04	.562	.658	.010	.514	nd	.67	.115	nd
	Spike percentage recovery	9/16/04	104	122	2	94	0	122.00	22	0
	0.10 ccv	9/16/04	E.094	.13	.09	.093	nd	.10	.11	nd
	Comments	9/16/04	--	--	--	--	CRFM	--	--	CRFM
Platte River near Ashland	Set blank	11/15/04	<.144	<.036	<.004	<.016	nd	<.011	<.012	nd
	Set spike	11/15/04	.165	.363	.0114	.39	nd	.49	.18	nd
	Spike percentage recovery	11/15/04	33	73	2	79	0	97	35	0
	0.10 ccv	11/15/04	E.098	.10	.09	.095	nd	.096	.090	nd
	Comments	11/15/04	--	--	--	--	CRFM	--	--	CRFM
W90-1H	Set blank	11/16/04	<.144	<.036	<.004	<.016	nd	<.011	<.012	nd
W56-5	Set spike	11/16/04	.183	.38	.01	.51	nd	.52	.056	nd
W54-10	Spike percentage recovery	11/16/04	37	77	3	101	0	103	11	0
W49-9	0.10 ccv	11/16/04	E.092	.11	.09	.097	nd	.10	.091	nd
Ashland Deep	Comments	11/16/04	--	--	--	--	CRFM	--	--	CRFM
Finished water										
Platte River near Ashland	Set blank	1/10/05	<.144	<.036	<.004	<.016	nd	<.011	<.012	nd
	Set spike	1/10/05	.268	.42	.08	.48	nd	.42	.18	nd
	Spike percentage recovery	1/10/05	52	82	16	92	0	80	34	0
	0.10 ccv	1/10/05	E.062	.084	.08	.074	nd	.081	0.086	nd
	Comments	1/10/05	--	--	--	--	CRFM	--	--	CRFM

Table 9. Laboratory quality assurance/quality control data for pharmaceutical analyses during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Sampled station name(s)	Sample type	Sampling trip date	1,7-dimethyl-xanthine	Acetaminophen	Azithromycin	Caffeine	Caffeine ¹³ C surrogate	Carbamazepine	Cimetidine	Clarithromycin
<i>Laboratory reporting level --></i>										
W56-5	Set blank	1/11/05	<0.144	<0.036	<0.004	<0.016	nd	<0.011	0.012	nd
W54-10	Set spike	1/11/05	.245	.40	.08	.50	nd	.46	.19	nd
W49-9	Spike percentage recovery	1/11/05	49	80	15	99	0	93	37	0.00
Ashland Deep	0.10 ccv	1/11/05	E.057	.090	.06	.075	nd	.092	0.079	nd
Finished water	Comments	1/11/05	--	--	--	--	CRFM	--	--	CRFM
W90-1H	Set blank	1/18/05	<.144	<.036	<.004	<.016	nd	<.011	<.012	nd
	Set spike	1/18/05	.261	.405	.020	.54	nd	.51	.15	nd
	Spike percentage recovery	1/18/05	52	81	4	108	0	102	29	.00
	0.10 ccv	1/18/05	E.078	.073	.05	.061	nd	.070	.068	nd
	Comments	1/18/05	--	--	--	--	CRFM	--	--	CRFM
<i>Laboratory reporting level --></i>										
Platte River near Ashland	Set blank	4/19, 4/20/2004	<0.015	<0.014	<0.015	nd	<0.016	<0.015	<0.009	1.4
W90-1H	Set spike	4/19, 4/20/2004	.506	.34	.48	nd	.31	.342	.07	1.2
	Spike percentage recovery	4/19, 4/20/2004	90	61	86	0	55	61	13	107
	0.10 ccv	4/19, 4/20/2004	.09	.09	.10	nd	.10	.10	.08	.09
	Comments	4/19, 4/20/2004	--	--	--	CRFM	--	--	--	--
W49-9	Set blank	4/20/04	<.015	<.014	<.015	nd	<.016	<.015	<.009	1.10
W56-5	Set spike	4/20/04	.49	.37	.45	nd	.32	.345	.12	1.09
W54-10	Spike percentage recovery	4/20/04	86	66	79	0	56	61	21	96
Ashland Deep	0.10 ccv	4/20/04	.10	.10	.10	nd	.10	.10	.09	.09
Finished water	Comments	4/20/04	--	--	--	CRFM	--	--	--	--

Table 9. Laboratory quality assurance/quality control data for pharmaceutical analyses during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Sampled station name(s)	Sample type	Sampling trip date	Codeine	Cotinine	Dehydronifedipine	Digoxigenin	Diltiazem	Diphenhydramine	Erythromycin	Ethyl Nicotinate-d4 Standard
<i>Laboratory reporting level --></i>										
			<i>0.015</i>	<i>0.014</i>	<i>0.015</i>	<i>nd</i>	<i>0.016</i>	<i>0.015</i>	<i>0.009</i>	<i>nd</i>
Platte River near Ashland	Set blank	5/10/04	<0.015	<0.014	<0.015	nd	<0.016	<0.015	<0.009	1.20
	Set spike	5/10/04	.531	.401	.60	nd	.34	.407	<.009	1.2
	Spike percentage recovery	5/10/04	97	73	109	0	62	74	0	112
	0.10 ccv	5/10/04	.11	.11	.11	nd	.11	.11	.10	.10
	Comments	5/10/04	--	--	--	CRFM	--	--	--	--
Platte River near Ashland	Set blank	9/14, 9/15/2004	<.015	<.014	<.015	nd	<.016	<.015	<.009	1.31
W90-1H	Set spike	9/14, 9/15/2004	.474	.565	.64	nd	.384	.493	.097	1.21
W56-5	Spike percentage recovery	9/14, 9/15/2004	94	112	126	0	76	98	20	119
W54-10	0.10 ccv	9/14, 9/15/2004	.09	.10	.09	nd	.10	.10	0.11	.10
Ashland Deep Finished water	Comments	9/14, 9/15/2004	--	--	--	CRFM	--	--	--	--
W49-9	Set blank	9/16/04	<.015	<.014	<.015	nd	<.016	<.015	<.009	1.27
	Set spike	9/16/04	.447	.553	.696	nd	.356	.419	.026	1.19
	Spike percentage recovery	9/16/04	82	102	128	0	66	78	4	110.00
	0.10 ccv	9/16/04	.10	.10	.10	nd	.10	.10	.10	.09
	Comments	9/16/04	--	--	--	CRFM	--	--	--	--
Platte River near Ashland	Set blank	11/15/04	<.015	<.014	E.010	nd	E.007	E.008	<.009	nd
	Set spike	11/15/04	.71	.55	.40	nd	.30	.43	.035	1.27
	Spike percentage recovery	11/15/04	142	109	79	0	60	86	7	127
	0.10 ccv	11/15/04	.096	.094	.087	nd	.088	.089	.091	.115
	Comments	11/15/04	--	--	--	CRFM	--	--	--	--

Table 9. Laboratory quality assurance/quality control data for pharmaceutical analyses during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Sampled station name(s)	Sample type	Sampling trip date	Codeine	Cotinine	Dehydronifedipine	Digoxigenin	Diltiazem	Diphenhydramine	Erythromycin	Ethyl Nicotinate d4 Standard
<i>Laboratory reporting level --></i>										
			0.015	0.014	0.015	nd	0.016	0.015	0.009	nd
W90-1H	Set blank	11/16/04	<0.015	<0.014	E0.011	nd	E0.007	E0.009	<0.009	nd
W56-5	Set spike	11/16/04	.47	.33	.52	nd	.36	.37	.014	1.12
W54-10	Spike percentage recovery	11/16/04	94	67	103	0	71	74	3	112
W49-9	0.10 ccv	11/16/04	.095	.094	.093	nd	.091	.093	.092	0.085
Ashland Deep	Comments	11/16/04	--	--	--	CRFM	--	--	--	--
Finished water										
Platte River near Ashland	Set blank	1/10/05	<0.015	<0.014	<0.015	nd	.016	<0.015	<0.009	nd
	Set spike	1/10/05	.62	.47	.41	nd	.32	.40	0.1	.61
	Spike percentage recovery	1/10/05	118	90	80	0	62	78	20	59
	0.10 ccv	1/10/05	.083	.077	.070	nd	.081	.081	.08	.08
	Comments	1/10/05	--	--	--	CRFM	--	--	--	--
W56-5	Set blank	1/11/05	<0.015	<0.014	E.010	nd	E.015	E.009	<0.009	nd
W54-10	Set spike	1/11/05	.37	.39	.52	nd	.32	.37	.074	.99
W49-9	Spike percentage recovery	1/11/05	74	79	104	0	63	74	15	99
Ashland Deep	0.10 ccv	1/11/05	.076	.078	.10	nd	.089	.083	.10	.079
Finished water	Comments	1/11/05	--	--	--	CRFM	--	--	--	--
W90-1H	Set blank	1/18/05	<0.015	<0.014	E.008	nd	E.007	<0.015	<0.009	1.27
	Set spike	1/18/05	.47	.47	.49	nd	.317	.358	.025	.83
	Spike percentage recovery	1/18/05	93	94	98.6	0	63	72	5	83
	0.10 ccv	1/18/05	.073	.073	.068	nd	.060	.067	.04	.07
	Comments	1/18/05	--	--	--	CRFM	--	--	--	--

Table 9. Laboratory quality assurance/quality control data for pharmaceutical analyses during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Sampled station name(s)	Sample type	Sampling trip date	Ranitidine	Salbutamol	Sulfamethoxazole	Thiabendazole	Trimethoprim	Warfarin
<i>Laboratory reporting level --></i>								
			<i>0.013</i>	<i>0.023</i>	<i>0.064</i>	<i>0.011</i>	<i>0.013</i>	<i>0.012</i>
Platte River near Ashland	Set blank	5/10/04	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
	Set spike	5/10/04	.25	.28	.506	.43	.4	.53
	Spike percentage recovery	5/10/04	45	51	46	79	64	97
	0.10 ccv	5/10/04	.11	.12	.11	.10	.11	.11
	Comments	5/10/04	--	--	--	--	--	--
Platte River near Ashland	Set blank	9/14, 9/15/2004	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
W90-1H	Set spike	9/14, 9/15/2004	.224	.354	.498	.593	.541	.532
W56-5	Spike percentage recovery	9/14, 9/15/2004	44	70	98	118	106	106
W54-10	0.10 ccv	9/14, 9/15/2004	.09	.11	.10	.10	.11	.10
Ashland Deep	Comments	9/14, 9/15/2004	--	--	--	--	--	--
Finished water								
W49-9	Set blank	9/16/04	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
	Set spike	9/16/04	.192	.586	.485	.618	.54	.561
	Spike percentage recovery	9/16/04	36	108	90	114	100	104
	0.10 ccv	9/16/04	.09	.11	.11	.10	.11	.11
	Comments	9/16/04	--	--	--	--	--	--
Platte River near Ashland	Set blank	11/15/04	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
	Set spike	11/15/04	.22	.25	.65	.47	.49	.49
	Spike percentage recovery	11/15/04	44	50	130	95	97	98
	0.10 ccv	11/15/04	.088	.10	.11	.087	.10	.10
	Comments	11/15/04	--	--	--	--	--	--

Table 9. Laboratory quality assurance/quality control data for pharmaceutical analyses during the riverbank filtration study, Platte River, Nebraska, 2004 to 2005.—Continued

Sampled station name(s)	Sample type	Sampling trip date	Ranitidine	Salbutamol	Sulfamethoxazole	Thiabendazole	Trimethoprim	Warfarin
<i>Laboratory reporting level --></i>								
			<i>0.013</i>	<i>0.023</i>	<i>0.064</i>	<i>0.011</i>	<i>0.013</i>	<i>0.012</i>
W90-1H	Set blank	11/16/04	<0.013	<0.023	<0.064	<0.011	<0.013	<0.012
W56-5	Set spike	11/16/04	.18	.23	.39	.50	.50	.42
W54-10	Spike percentage recovery	11/16/04	35	47	78	101	101	85
W49-9	0.10 ccv	11/16/04	.092	.11	.12	.091	.11	.11
Ashland Deep	Comments	11/16/04	--	--	--	--	--	--
Finished water								
Platte River near Ashland	Set blank	1/10/05	<.013	<.023	<.064	<.011	<.013	<.012
	Set spike	1/10/05	.17	.23	.46	.48	.43	.50
	Spike percentage recovery	1/10/05	32	44	88	92	84	96
W56-5	0.10 ccv	1/10/05	.076	.093	.079	.076	.088	.073
	Comments	1/10/05	--	--	--	--	--	--
W56-5	Set blank	1/11/05	<.013	<.023	<.064	<.011	<.013	<.012
W54-10	Set spike	1/11/05	.12	.36	.27	.46	.40	.39
W49-9	Spike percentage recovery	1/11/05	24	73	54	91	80	79
Ashland Deep	0.10 ccv	1/11/05	.074	.090	.079	.078	.084	.11
Finished water	Comments	1/11/05	--	--	--	--	--	--
W90-1H	Set blank	1/18/05	<.013	<.023	<.064	<.011	<.013	<.012
	Set spike	1/18/05	.25	.29	.41	.46	.44	.41
	Spike percentage recovery	1/18/05	49	57	82	91	88	82
W90-1H	0.10 ccv	1/18/05	.066	.071	.075	.068	.067	.068
	Comments	1/18/05	--	--	--	--	--	--

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Table 10. Dissolved organic carbon, ultraviolet light absorbance at 254 nanometers, and specific ultraviolet light absorbance measurements from water-quality samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.[DOC, dissolved organic carbon; UV₂₅₄, ultraviolet light absorbance at 254 nanometers; SUVA, specific ultraviolet light absorbance (UV₂₅₄/DOC); mg/L, milligrams per liter; cm, centimeter; --, sample not analyzed]

Station number	Sample name	Date	Time	DOC (mg/L)	UV ₂₅₄ (cm)	SUVA (cm/mg/L)
<i>Method detection limit --></i>				<i>0.2</i>	<i>0.001</i>	<i>0.001</i>
410322096190103	Cattle feedlot lagoon	2/14/02	0900	400	7.125	0.018
		5/9/02	0900	180	8.100	.045
		8/15/02	0900	170	3.950	.023
		8/23/02	0900	64	2.600	.040
		5/22/03	0900	320	5.460	.017
410322096190104	Hog confinement lagoon	2/14/02	1400	140	1.975	.014
		5/9/02	1330	180	8.100	.045
		8/15/02	1230	46	1.068	.023
		8/23/02	1600	40	1.890	.047
		5/22/03	1430	43	.750	.018
06803496	Wastewater treatment plant effluent	2/13/02	0900	--	--	--
		5/8/02	0830	10	.186	.018
		8/14/02	0900	13	.239	.019
		8/22/02	0900	--	--	--
		5/21/03	1030	28	.625	.023
06801000	Platte River near Ashland	12/10/01	1000	--	--	--
		1/7/02	1200	--	--	--
		2/11/02	1000	2.5	.058	.023
		3/11/02	1000	--	--	--
		4/8/02	1100	--	--	--
06801000	Platte River near Ashland	5/6/02	1100	4.1	.107	.026
		6/11/02	1030	--	--	--
		7/9/02	1000	--	--	--
		8/12/02	1140	6.6	.168	0.025
		8/21/02	1100	4.3	.115	.027
		9/9/02	0930	--	--	--
		10/16/02	0930	--	--	--
		11/11/02	1030	2.4	.057	.023
		4/23/03	1000	--	--	--
		5/20/03	1030	6.9	.216	.031
06805000	Salt Creek near Ashland	2/12/02	1000	3.7	.083	.022
		5/7/02	1000	7.7	.212	.028
		8/13/02	1000	3.4	.116	.034
		8/20/02	1200	3.6	.110	.031
		11/12/02	1000	3.4	.085	.025
		4/24/03	0930	--	--	--

Table 10. Dissolved organic carbon, ultraviolet light absorbance at 254 nanometers, and specific ultraviolet light absorbance measurements from water-quality samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	DOC (mg/L)	UV254 (cm)	SUVA (cm/mg/L)
<i>Method detection limit --></i>				<i>0.2</i>	<i>0.001</i>	<i>0.001</i>
410547096254801	G-040474-Memphis	12/17/01	0730	--	--	--
		1/14/02	0730	--	--	--
		2/19/02	0730	0.9	0.019	0.022
		3/18/02	0730	--	--	--
		4/15/02	0730	--	--	--
		6/17/02	0105	--	--	--
		8/19/02	0730	1.1	.020	.018
		9/16/02	0730	--	--	--
410322096191701	W90-1H	12/17/01	0930	--	--	--
		1/14/02	0920	--	--	--
		2/20/02	0900	2.2	.052	.024
		3/18/02	0930	--	--	--
		4/15/02	0930	--	--	--
		5/13/02	0900	2.9	.066	.022
		6/17/02	0930	--	--	--
		7/16/02	0940	--	--	--
		8/19/02	1000	3.2	.110	.034
		8/28/02	0830	2.4	.092	.038
		9/16/02	1020	--	--	--
		10/23/02	0930	--	--	--
		11/18/02	0900	--	--	--
		4/30/03	0900	--	--	--
5/27/03	1030	3.3	.117	.035		
410315096193501	W54-10	12/17/01	1030	--	--	--
		1/14/02	1020	--	--	--
		2/20/02	1100	1.9	.040	.021
		3/18/02	1030	--	--	--
		4/15/02	1050	--	--	--
		5/13/02	1030	1.8	.035	.019
		6/17/02	10:50	--	--	--
		7/16/02	1130	--	--	--
		8/19/02	1200	2.4	.071	.030
		8/28/02	1100	2.0	.077	.039
		9/16/02	1100	--	--	--
		10/23/02	1040	--	--	--
		11/18/02	1100	--	--	--
		4/30/03	1130	--	--	--
5/27/03	1130	2.3	.076	.033		

Table 10. Dissolved organic carbon, ultraviolet light absorbance at 254 nanometers, and specific ultraviolet light absorbance measurements from water-quality samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	DOC (mg/L)	UV254 (cm)	SUVA (cm/mg/L)
<i>Method detection limit --></i>				<i>0.2</i>	<i>0.001</i>	<i>0.001</i>
410349096202101	W49-9	12/17/01	1120	--	--	--
		1/14/01	1110	--	--	--
		2/20/02	1230	1.8	0.035	0.020
		3/18/02	1120	--	--	--
		4/15/02	1150	--	--	--
		5/13/02	1200	1.8	.044	.024
		6/17/02	1150	--	--	--
		7/16/02	1300	--	--	--
		8/19/02	1330	1.9	.047	.024
		8/28/02	1230	1.8	.052	.029
		9/16/02	1130	--	--	--
		10/23/02	1200	--	--	--
		11/18/02	1230	--	--	--
		4/30/03	1230	--	--	--
5/27/03	1300	1.8	.046	.026		
410315096190101	Raw water	12/17/01	1215	--	--	--
		1/14/02	1210	--	--	--
		2/19/02	1030	--	--	--
		3/18/02	1220	--	--	--
		4/15/02	1240	--	--	--
		5/13/02	1400	2.6	.061	.023
		6/17/02	1300	--	--	--
		7/16/02	1300	--	--	--
		8/19/02	1300	3.0	.089	.029
		8/28/02	1330	2.4	.086	.036
		9/16/02	1230	--	--	--
		10/23/02	1300	--	--	--
		11/18/02	1330	--	--	--
		4/30/03	1330	--	--	--
5/27/03	1500	2.3	.067	.029		

Table 10. Dissolved organic carbon, ultraviolet light absorbance at 254 nanometers, and specific ultraviolet light absorbance measurements from water-quality samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	DOC (mg/L)	UV254 (cm)	SUVA (cm/mg/L)
<i>Method detection limit --></i>				<i>0.2</i>	<i>0.001</i>	<i>0.001</i>
410315096190102	Finished water	12/17/01	1230	--	--	--
		1/14/02	1230	--	--	--
		2/19/02	930	--	--	--
		3/18/02	1240	--	--	--
		4/15/02	1310	--	--	--
		5/13/02	1500	--	--	--
		6/17/02	1330	--	--	--
		7/16/02	1330	--	--	--
		8/19/02	1600	2.7	0.061	0.023
		8/28/02	1500	2.6	.058	.023
		9/16/02	1300	--	--	--
		10/23/02	1330	--	--	--
		11/18/02	1430	--	--	--
		4/30/03	1400	--	--	--
		5/27/03	1400	1.9	.042	.022

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Table 11. Summary statistics of nitrilotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), and nonylphenolethoxycarboxylates (NPECs) in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.

[Summary statistics are based on detected concentrations; See table 3 for compound abbreviations; All concentrations in micrograms per liter; LRL, Laboratory reporting level ; n, number of samples ; det, number of detections; max, maximum; med, median; std. dev., standard deviation; na, not applicable]

Constituent	410322096190103 Cattle feedlot lagoon						410322096190104 Hog confinement lagoon						06803496 Wastewater-treatment plant effluent						
	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
NTA	0.5	3	0	na	na	na	na	0	0	na	na	na	na	3	3	22	12	1.5	6.1
EDTA	.1	3	3	12	3.6	5.6	5.7	4	4	7.7	4.4	4.4	2.8	4	4	750	615	588	160
NP1EC	.1	2	2	11	11	11	0.4	4	3	61	58	43	29	4	4	230	98	118	81
NP2EC	.1	3	3	7.6	6.4	5.4	2.9	4	3	60	16	30	26	4	4	370	240	230	126
NP3EC	.1	3	1	.6	.6	.6	na	4	1	3.0	3.0	3.0	na	4	4	6.2	5.0	4.8	1.4
NP4EC	.1	3	1	.2	.2	.2	na	4	1	.4	.4	.4	na	4	4	1.5	1.1	1.2	.3
Total NPECs	.4	2	2	18	18	18	.4	4	3	124	74	74	51	4	4	505	380	354	177

Constituent	06801000 Platte River near Ashland						06805000 Salt Creek near Ashland						
	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
NTA	0.5	7	0	na	na	na	na	2	0	na	na	na	na
EDTA	.1	7	7	2.8	1.6	1.8	0.7	6	6	24	12	14	6.6
NP1EC	.1	2	2	4.1	3.5	3.5	.8	6	6	69	41	43	20
NP2EC	.1	4	2	1.4	1.4	1.4	.1	6	6	88	36	40	27
NP3EC	.1	7	2	.5	.3	.3	.2	6	6	2.0	.8	1.0	.6
NP4EC	.1	7	0	na	na	na	na	6	4	.3	.2	.2	.1
Total NPECs	.4	2	2	5.4	5.2	5.2	.4	6	6	150	87	84	42

Table 11. Summary statistics of nitrilotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), and nonylphenolethoxycarboxylates (NPECs) in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Constituent	410322096191701 Well W90-1H						410349096202101 Well W49-9						410315096193501 Well W54-10						
	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
Ground-water samples																			
NTA	0.5	5	0	na	na	na	na	4	0	na	na	na	na	4	0	na	na	na	na
EDTA	.1	5	5	2.4	1.4	1.4	0.7	4	4	0.9	0.8	0.7	0.2	5	5	3.5	1.6	1.8	1.0
NP1EC	.1	1	0	na	na	na	na	0	0	na	na	na	na	2	0	na	na	na	na
NP2EC	.1	2	0	na	na	na	na	0	0	na	na	na	na	2	0	na	na	na	na
NP3EC	.1	5	1	.1	.1	.1	na	4	0	na	na	na	na	5	1	.2	.2	.2	na
NP4EC	.1	5	0	na	na	na	na	4	0	na	na	na	na	5	0	na	na	na	na
Total NPECs	.4	1	0	na	na	na	na	0	0	na	na	na	na	2	0	na	na	na	na
Drinking-water samples																			
410315096190101 Raw water																			
NTA	0.5	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
EDTA	.1	3	3	2.6	2.2	1.7	1.2	3	3	2.5	0.8	1.2	1.2	3	0	na	na	na	na
NP1EC	.1	2	0	na	na	na	na	2	0	na	na	na	na	2	0	na	na	na	na
NP2EC	.1	1	0	na	na	na	na	2	0	na	na	na	na	2	0	na	na	na	na
NP3EC	.1	3	1	.2	.2	.2	na	3	0	na	na	na	na	3	0	na	na	na	na
NP4EC	.1	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
Total NPECs	.4	1	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
410315096190102 Finished water																			
NTA	0.5	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
EDTA	.1	3	3	2.6	2.2	1.7	1.2	3	3	2.5	0.8	1.2	1.2	3	0	na	na	na	na
NP1EC	.1	2	0	na	na	na	na	2	0	na	na	na	na	2	0	na	na	na	na
NP2EC	.1	1	0	na	na	na	na	2	0	na	na	na	na	2	0	na	na	na	na
NP3EC	.1	3	1	.2	.2	.2	na	3	0	na	na	na	na	3	0	na	na	na	na
NP4EC	.1	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
Total NPECs	.4	1	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na

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Table 12. Nitriotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), and nonylphenolethoxycarboxylates (NPECs) concentrations from selected water-quality samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-n-NP2EC (SS) (% rec)	NTA (µg/L)	EDTA (µg/L)	NP1EC (µg/L)	NP2EC (µg/L)	NP3EC (µg/L)	NP4EC (µg/L)	Total NPECs (µg/L)
06801000—Continued	Platte River near Ashland	10/16/02	0930	--	--	--	--	--	--	--	--
		11/11/02	1030	44	<0.5	2.8	4.1	1.3	<0.1	<0.1	5.4
		4/23/03	1000	62	<.5	1.6	.9	.5	<.1	<.1	1.3
		5/20/03	1030	76	<.5	1.2	1.2	.9	.2	<.1	2.3
06805000	Salt Creek near Ashland	2/12/02	1000	65	<.5	7.5	69	27	.8	.2	97
		5/7/02	1000	110	<.5	11	16	8.2	.4	<.1	25
		8/13/02	1000	170	.6	21	60	88	2.0	.3	150
		8/20/02	1000	90	.8	9.7	29	46	1.4	.2	77
		11/12/02	1000	91	.8	12	50	45	.7	.2	96
		4/24/03	0930	80	1.1	24	32	26	.8	<.1	59
412411097165601	Loup power canal	4/22/03	1030	HM	HM	HM	HM	HM	HM	HM	HM
410547096254801	G-040474-Memphis, 2/19/02	12/17/01	0730	--	--	--	--	--	--	--	--
		1/14/02	0730	--	--	--	--	--	--	--	--
		2/19/02	0730	--	--	--	--	--	--	--	--
		3/18/02	0730	--	--	--	--	--	--	--	--
		4/15/02	0730	--	--	--	--	--	--	--	--
		6/17/02	0105	--	--	--	--	--	--	--	--
		8/19/02	0730	79	<.5	.1	.2	<.1	<.1	<.1	E.2
		9/16/02	0730	--	--	--	--	--	--	--	--
410322096191701	W90-1H	12/17/01	0930	--	--	--	--	--	--	--	--
		1/14/02	0920	--	--	--	--	--	--	--	--
		2/20/02	0900	49	<.5	1.4	.6	.3	<.1	<.1	.9
		3/18/02	0930	--	--	--	--	--	--	--	--
		4/15/02	0930	--	--	--	--	--	--	--	--
		5/13/02	0900	51	<.5	1.4	<.1	<.1	<.1	<.1	<.4
		6/17/02	0930	--	--	--	--	--	--	--	--
		7/16/02	0940	--	--	--	--	--	--	--	--
		8/19/02	1000	98	<.5	2.4	.3	<.1	<.1	<.1	E.3

Table 12. Nitriiotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), and nonylphenolethoxycarboxylates (NPECs) concentrations from selected water-quality samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-n-NP2EC (SS) (% rec)	NTA (µg/L)	EDTA (µg/L)	NP1EC (µg/L)	NP2EC (µg/L)	NP3EC (µg/L)	NP4EC (µg/L)	Total NPECs (µg/L)
410322096191701— Continued	W90-1H	8/28/02	0830	66	<0.5	0.4	0.8	0.5	0.1	<0.1	1.4
		9/16/02	1020	--	--	--	--	--	--	--	--
		10/23/02	0930	--	--	--	--	--	--	--	--
		11/18/02	0900	--	--	--	--	--	--	--	--
		4/30/03	0900	--	--	--	--	--	--	--	--
		5/27/03	1030	56	<.5	1.5	.3	.2	<.1	<.1	.5
410315096193501	W54-10	12/17/01	1030	--	--	--	--	--	--	--	--
		1/14/02	1020	--	--	--	--	--	--	--	--
		2/20/02	1100	62	<.5	1.6	.2	.2	<.1	<.1	.5
		3/18/02	1030	--	--	--	--	--	--	--	--
		4/15/02	1050	--	--	--	--	--	--	--	--
		5/13/02	1030	61	<.5	1.3	<.1	<.1	<.1	<.1	<.4
		6/17/02	10:0	--	--	--	--	--	--	--	--
		7/16/02	1130	--	--	--	--	--	--	--	--
		8/19/02	1200	94	<.5	1.8	<.1	<.1	<.1	<.1	<.4
		8/28/02	1100	50	1.7	3.5	1.3	.7	.2	<.1	2.2
		9/16/02	1100	--	--	--	--	--	--	--	--
		10/23/02	1040	--	--	--	--	--	--	--	--
		11/18/02	1100	--	--	--	--	--	--	--	--
		4/30/03	1130	--	--	--	--	--	--	--	--
		5/27/03	1130	56	<.5	1.0	.2	.2	<.1	<.1	.4
410349096202101	W49-9	12/17/01	1120	--	--	--	--	--	--	--	--
		1/14/01	1110	--	--	--	--	--	--	--	--
		2/20/02	1230	140	<.5	.8	.1	.4	<.1	<.1	.5
		3/18/02	1120	--	--	--	--	--	--	--	--
		4/15/02	1150	--	--	--	--	--	--	--	--
		5/13/02	1200	67	<.5	.8	.5	.3	<.1	<.1	.8

Table 12. Nitriiotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), and nonylphenolethoxycarboxylates (NPECs) concentrations from selected water-quality samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-n-NP2EC		NTA (µg/L)	EDTA (µg/L)	NP1EC (µg/L)	NP2EC (µg/L)	NP3EC (µg/L)	NP4EC (µg/L)	Total NPECs (µg/L)
				(SS) (% rec)	I							
410315096190102— Continued	Finished water	4/15/02	1310	--	--	0.5	0.1	0.1	0.1	0.1	0.1	0.4
		5/13/02	1500	--	--	--	--	--	--	--	--	--
		6/17/02	1330	--	--	--	--	--	--	--	--	--
		7/16/02	1330	--	--	--	--	--	--	--	--	--
		8/19/02	1600	91	91	<0.5	0.8	<0.1	<0.1	<0.1	<0.1	<0.4
		8/28/02	1500	92	92	<.5	2.5	.7	.8	<.1	<.1	1.5
		9/16/02	1300	--	--	--	--	--	--	--	--	--
		10/23/02	1330	--	--	--	--	--	--	--	--	--
		11/18/02	1430	--	--	--	--	--	--	--	--	--
		4/30/03	1400	--	--	--	--	--	--	--	--	--
		5/27/03	1400	50	50	<.5	.2	<.1	<.1	<.1	<.1	<.4
Method detection limit -->												
Quality assurance samples												
Duplicate analyses												
06803496	Wastewater-treatment plant effluent	5/21/03	1030	49	49	10	750	75	69	3.2	1.2	149
06803496	Wastewater-treatment plant effluent— Duplicate	5/21/03	1030	77	77	10	680	90	94	3.9	1.5	189
06801000	Platte River near Ashland	5/20/03	1030	76	76	<.5	1.2	1.2	.9	.2	<.1	2.3
06801000	Platte River near Ash- land—Duplicate	5/20/03	1030	31	31	<.5	1.2	1.3	.6	<.1	<.1	1.9
410322096191701	W90-1H	5/13/02	0900	51	51	<.5	1.4	<.1	<.1	<.1	<.1	<.4
410322096191701	W90-1H—Duplicate	5/13/02	0900	51	51	<.5	1.3	<.1	<.1	<.1	<.1	<.4
410349096202101	W49-9	5/27/03	1300	150	150	<.5	.5	.5	.7	<.1	<.1	1.2
410349096202101	W49-9—Duplicate	5/27/03	1300	200	200	<.5	.4	.7	.4	<.1	<.1	1.1
410315096190102	Finished water	8/19/02	1600	91	91	<.5	.8	<.1	<.1	<.1	<.1	<.4
410315096190102	Finished water— Duplicate	8/19/02	1600	120	120	<.5	.8	.2	<.1	<.1	<.1	.5

Table 12. Nitriiotriacetic acid (NTA), ethylenediaminetetraacetic acid (EDTA), and nonylphenoethoxycarboxylates (NPECs) concentrations from selected water-quality samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-n-NP2EC							Total NPECs (µg/L)	
				(SS) (% rec)	NTA (µg/L)	EDTA (µg/L)	NP1EC (µg/L)	NP2EC (µg/L)	NP3EC (µg/L)	NP4EC (µg/L)		
<i>Method detection limit --></i>												
Laboratory reagent blanks												
	Distilled water blank	--	--	--	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.4
	Distilled water blank	--	--	18	<.5	<.1	.2	.1	<.1	<.1	<.1	.4
	Distilled water blank	--	--	72	<.5	<.1	.2	<.1	<.1	<.1	<.1	E.2
	Distilled water blank	--	--	35	<.5	<.1	<.1	<.1	<.1	<.1	<.1	<.4
	Distilled water blank	--	--	11	.7	<.1	<.1	<.1	<.1	<.1	<.1	<.4
	Distilled water blank	--	--	8	<.5	<.1	<.1	<.1	<.1	<.1	<.1	<.4
	Distilled water blank	--	--	6	<.5	<.1	.1	<.1	<.1	<.1	<.1	E.1
Laboratory reagent spikes												
	Distilled water blank + spike	--	--	78	68	47	120	180	60	19	95	
	Distilled water blank + spike	--	--	130	290	68	200	150	100	30	120	

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Table 13. Alkylphenol and other organic compound concentrations in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.

[SS, surrogate spike; % rec, percent recovery; ng/L, nanograms per liter; <, less than; --, sample not analyzed]

Station number	Sample name	Date	Time	D21-4-methyl-2,6-di(<i>tert</i> -butyl)-phenol (SS) (% rec)	4-n-nonylphenol (SS) (% rec)	D6-bisphenol A (SS) (% rec)
Laboratory reporting level				10	10	10
410322096190103	Cattle feedlot lagoon	8/15/02	0900	<10	22	180
410322096190104	Hog confinement lagoon	8/15/02	1230	44	120	190
06803496	Wastewater treatment plant effluent	8/14/02	0900	84	150	<10
06801000	Platte River near Ashland	8/12/02	1130	41	11	<10
06805000	Salt Creek near Ashland	8/13/02	1000	<10	<10	72
Laboratory reagent blanks						
	Distilled water blank	--	--	150	430	<10
	Distilled water blank	--	--	11	160	<10
	Distilled water blank	--	--	<10	37	<10
Laboratory reagent spikes				(% rec)	(% rec)	(% rec)
	Distilled water blank + spike	--	--	110	<10	200
	Distilled water blank + spike	--	--	29	<10	<10
Station number	Sample name	Date	Time	1,3-dichlorobenzene (ng/L)	1,4-dichlorobenzene (ng/L)	1,2-dichlorobenzene (ng/L)
Laboratory reporting level				10	10	10
410322096190103	Cattle feedlot lagoon	8/15/02	0900	<10	<10	<10
410322096190104	Hog confinement lagoon	8/15/02	1230	<10	<10	<10
06803496	Wastewater treatment plant effluent	8/14/02	0900	<10	740	140
06801000	Platte River near Ashland	8/12/02	1130	<10	<10	<10
06805000	Salt Creek near Ashland	8/13/02	1000	<10	<10	<10
Laboratory reagent blanks						
	Distilled water blank	--	--	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10
Laboratory reagent spikes				(% rec)	(% rec)	(% rec)
	Distilled water blank + spike	--	--	64	69	85
	Distilled water blank + spike	--	--	110	120	140

Table 13. Alkylphenol and other organic compound concentrations in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-methylphenol (ng/L)	4-ethylphenol (ng/L)	4-propylphenol (ng/L)	4-tert-butylphenol (ng/L)	4-tert-pentylphenol (ng/L)
<i>Laboratory reporting level</i>				10	10	10	10	10
410322096190103	Cattle feedlot lagoon	8/15/02	0900	100	<10	<10	41	22
410322096190104	Hog confinement lagoon	8/15/02	1230	250	<10	<10	47	73
06803496	Wastewater treatment plant effluent	8/14/02	0900	36,000	<10	<10	290	5,700
06801000	Platte River near Ashland	8/12/02	1130	<10	<10	<10	<10	<10
06805000	Salt Creek near Ashland	8/13/02	1000	35	<10	<10	19	19
Laboratory reagent blanks								
	Distilled water blank	--	--	62	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10	<10
Laboratory reagent spikes				(% rec)	(% rec)	(% rec)	(% rec)	(% rec)
	Distilled water blank + spike	--	--	200	170	170	150	160
	Distilled water blank + spike	--	--	190	140	150	150	160
Station number	Sample name	Date	Time	2,6-di-tert-butylphenol (ng/L)	2,6-di-tert-butyl-1,4-benzoquinone (ng/L)	2[3]-tert-butyl-4-methylphenol (ng/L)	2,6-di-tert-butyl-4-methylphenol (ng/L)	4-(tert-octyl)phenol (ng/L)
<i>Laboratory reporting level</i>				10	10	10	10	10
410322096190103	Cattle feedlot lagoon	8/15/02	0900	<10	700	<10	E3	130
410322096190104	Hog confinement lagoon	8/15/02	1230	190	960	<10	<10	200
06803496	Wastewater treatment plant effluent	8/14/02	0900	56	1,100	24	<10	1,200
06801000	Platte River near Ashland	8/12/02	1130	93	970	<10	<10	160
06805000	Salt Creek near Ashland	8/13/02	1000	<10	370	<10	<10	120
Laboratory reagent blanks								
	Distilled water blank	--	--	<10	<10	<10	<10	24
	Distilled water blank	--	--	<10	<10	<10	<10	110
	Distilled water blank	--	--	<10	<10	<10	<10	E4
Laboratory reagent spikes				(% rec)	(% rec)	(% rec)	(% rec)	(% rec)
	Distilled water blank + spike	--	--	130	120	130	70	180
	Distilled water blank + spike	--	--	7	180	0	20	121

Table 13. Alkylphenol and other organic compound concentrations in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-nonyl-phenol (ng/L)	4-n-octyl-phenol (ng/L)	Caffeine (ng/L)	4-OP1EO (ng/L)	4-NP1EO (ng/L)
<i>Laboratory reporting level</i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410322096190103	Cattle feedlot lagoon	8/15/02	0900	9,000	<10	59	17	<10
410322096190104	Hog confinement lagoon	8/15/02	1230	10,000	<10	<10	<10	<10
06803496	Wastewater treatment plant effluent	8/14/02	0900	14,000	<10	22,000	97	14,000
06801000	Platte River near Ashland	8/12/02	1130	2,100	<10	<10	E8	<10
06805000	Salt Creek near Ashland	8/13/02	1000	5,000	<10	2,600	19	<10
Laboratory reagent blanks								
	Distilled water blank	--	--	83	<10	<10	15	<10
	Distilled water blank	--	--	48	<10	<10	<10	<10
	Distilled water blank	--	--	15	<10	<10	<10	<10
Laboratory reagent spikes				(% rec)	(% rec)	(% rec)	(% rec)	(% rec)
	Distilled water blank + spike	--	--	160	200	320	170	210
	Distilled water blank + spike	--	--	110	120	200	140	180
Station number	Sample name	Date	Time	Triclosan (ng/L)	4-OP2EO (ng/L)	Bisphenol A (ng/L)	4-NP2EO (ng/L)	4-OP3EO (ng/L)
<i>Laboratory reporting level</i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410322096190103	Cattle feedlot lagoon	8/15/02	0900	20	55	620	<10	<10
410322096190104	Hog confinement lagoon	8/15/02	1230	74	<10	390	<10	<10
06803496	Wastewater treatment plant effluent	8/14/02	900	1,400	<10	1,400	15,700	180
06801000	Platte River near Ashland	8/12/02	1130	10	<10	15	<10	<10
06805000	Salt Creek near Ashland	8/13/02	1000	54	92	63	<10	45
Laboratory reagent blanks								
	Distilled water blank	--	--	<10	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10	<10
Laboratory reagent spikes				(% rec)	(% rec)	(% rec)	(% rec)	(% rec)
	Distilled water blank + spike	--	--	170	280	250	240	210
	Distilled water blank + spike	--	--	99	300	210	270	180

Table 13. Alkylphenol and other organic compound concentrations in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-NP3EO (ng/L)	4-OP4EO (ng/L)	4-NP4EO (ng/L)	4-OP5EO (ng/L)
<i>Laboratory reporting level</i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410322096190103	Cattle feedlot lagoon	8/15/02	0900	<10	<10	<10	<10
410322096190104	Hog confinement lagoon	8/15/02	1230	<10	<10	<10	<10
06803496	Wastewater treatment plant effluent	8/14/02	900	5,000	<10	1700	<10
06801000	Platte River near Ashland	8/12/02	1130	<10	<10	<10	<10
06805000	Salt Creek near Ashland	8/13/02	1000	<10	<10	<10	<10
Laboratory reagent blanks							
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
Laboratory reagent spikes				(% rec)	(% rec)	(% rec)	(% rec)
	Distilled water blank + spike	--	--	270	170	180	110
	Distilled water blank + spike	--	--	220	110	130	70

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Table 14. Summary statistics of hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.

[Summary statistics are based on detected concentrations; All concentrations in nanograms per liter; LRL, Laboratory reporting level ; n, number of samples ; det, number of detections; max, maximum; med, median; std. dev., standard deviation; na, not applicable; SS, surrogate spike, units in percent recovery]

Constituent	410322096190103 Cattle feedlot lagoon						410322096190104 Hog confinement lagoon						06803496 Wastewater treatment plant effluent						
	MDL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
Wastewater samples																			
Diethylstilbestrol	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
cis-Androstetrone	10	3	0	na	na	na	na	3	0	na	na	na	na	4	1	38	38	38	na
17- α -Estradiol	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
Epitestosterone	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
Stanolone	10	3	0	na	na	na	na	3	0	na	na	na	na	4	1	53	53	53	na
17- β -Estradiol	10	3	0	na	na	na	na	3	0	na	na	na	na	4	2	42	30	30	16
Estrone	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
Equilin	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
Testosterone	10	3	0	na	na	na	na	3	1	69	69	69	na	4	0	na	na	na	na
4-Androstene-3,17-dione	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
Mestranol	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
Trenbolone	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
19-Norethisterone	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
Equilenin	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
17- α -Ethinylestradiol	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
11-Ketotestosterone	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
Estrilol	10	3	0	na	na	na	na	3	0	na	na	na	na	4	1	44	44	44	na
Progesterone	10	3	0	na	na	na	na	3	0	na	na	na	na	4	0	na	na	na	na
3- β -Coprostanol	10	3	3	22,000	4,500	8,950	11,490	3	3	15,000	10,000	10,870	3,780	4	4	12,000	6,100	6,270	5,460
Cholesterol	10	3	3	56,000	5,300	20,600	30,740	3	3	8,300	4,100	4,900	3,080	4	4	13,000	7,600	7,530	4,770
D4-17-Estradiol (SS)	1	3	na	250	1	84	144	3	na	180	5	62	102	4	na	170	73	91	56

Table 14. Summary statistics of hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Constituent	MDL	410322096190103 Cattle feedlot lagoon					410322096190104 Hog confinement lagoon					06803496 wastewater treatment plant effluent							
		n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
Wastewater samples—continued																			
D3-Testosterone (SS)	1	3	na	290	8	99	165	3	na	140	10	50	78	4	na	230	104	126	72
D7-Cholesterol (SS)	1	3	na	290	36	109	158	3	na	110	82	64	57	4	na	170	88	99	51
Surface-water samples																			
06801000 Platte River near Ashland										06805000 Salt Creek near Ashland									
Constituent	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
Diethylstilbestrol	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
cis-Androsterone	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
17- α -Estradiol	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
Epitestosterone	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
Stanolone	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
17- β -Estradiol	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
Estrone	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
Equilin	10	7	1	55	55	55	na	6	0	na	na	na	na	6	0	na	na	na	na
Testosterone	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
4-Androstene-3,17-dione	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
Mestranol	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
Trenbolone	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
19-Norethisterone	10	7	0	na	na	na	na	6	0	na	na	na	na	6	0	na	na	na	na
Equilenin	10	7	1	E4	E4	E4	na	6	1	90	90	90	na	6	1	90	90	90	na
17- α -Ethinylestradiol	10	7	0	na	na	na	na	6	1	36	36	36	na	6	1	36	36	36	na

Table 14. Summary statistics of hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Constituent	06801000 Platte River near Ashland						06805000 Salt Creek near Ashland						
	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
Surface-water samples—continued													
11-Ketotestosterone	10	7	0	na	na	na	na	6	0	na	na	na	na
Estriol	10	7	0	na	na	na	na	6	0	na	na	na	na
Progesterone	10	7	0	na	na	na	na	6	0	na	na	na	na
3-β-Coprostanol	10	7	4	110	60	62	40	6	6	1,800	520	790	750
Cholesterol	10	1	1	530	530	530	na	6	6	3,500	1,050	1,450	1,170
D4-17-Estradiol (SS)	1	7	na	170	40	79	74	6	na	200	80	93	68
D3-Testosterone (SS)	1	7	na	260	100	112	98	6	na	240	110	110	101
D7-Cholesterol (SS)	1	7	na	200	160	130	64	6	na	240	160	162	60
Ground-water samples													
410322096191701 Well W90-1H													
410349096202101 Well W49-9													
410315096193501 Well W54-10													
Constituent	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
Diethylstilbestrol	10	3	0	na	na	na	na	3	0	na	na	na	na
cis-Androstosterone	10	3	0	na	na	na	na	3	0	na	na	na	na
17-α-Estradiol	10	3	0	na	na	na	na	3	0	na	na	na	na
Epitestosterone	10	3	0	na	na	na	na	3	0	na	na	na	na
Stanolone	10	3	0	na	na	na	na	3	0	na	na	na	na
17-β-Estradiol	10	3	0	na	na	na	na	3	0	na	na	na	na
Estrone	10	3	0	na	na	na	na	3	0	na	na	na	na
Equilin	10	3	0	na	na	na	na	3	0	na	na	na	na
Testosterone	10	3	0	na	na	na	na	3	0	na	na	na	na

Table 14. Summary statistics of hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Constituent	410322096191701 Well W90-1H					410349096202101 Well W49-9					410315096193501 Well W54-10								
	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
Ground-water samples—continued																			
4-Androstene-3,17-dione	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
Mestranol	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
Trenbolone	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
19-Norethisterone	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
Equilenin	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
17- α -Ethinylestradiol	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
11-Ketotestosterone	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
Estriol	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
Progesterone	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
3- β -Coprostanol	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
Cholesterol	10	0	0	na	na	na	na	0	0	na	na	na	na	0	0	na	na	na	na
D4-17-Estradiol (SS)	1	3	na	150	110	103	51	3	na	170	110	110	60	3	na	99	97	81	30
D3-Testosterone (SS)	1	3	na	170	100	109	57	3	na	180	130	123	61	3	na	130	110	98	39
D7-Cholesterol (SS)	1	3	na	190	160	163	25	3	na	200	160	167	31	3	na	150	140	140	10
410315096190101 Raw water																			
Finished water																			
Drinking-water samples																			
Diethylstilbestrol	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na
cis-Androstereone	10	3	0	na	na	na	na	3	0	na	na	na	na	3	0	na	na	na	na

Table 14. Summary statistics of hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Constituent	410315096190101 Raw water					410315096190102 Finished water							
	LRL	n	det	max	med	mean	std. dev.	n	det	max	med	mean	std. dev.
Drinking-water samples—continued													
17- α -Estradiol	10	3	0	na	na	na	na	3	0	na	na	na	na
Epitestosterone	10	3	0	na	na	na	na	3	0	na	na	na	na
Stanolone	10	3	0	na	na	na	na	3	0	na	na	na	na
17- β -Estradiol	10	3	0	na	na	na	na	3	0	na	na	na	na
Estrone	10	3	0	na	na	na	na	3	0	na	na	na	na
Equilin	10	3	0	na	na	na	na	3	0	na	na	na	na
Testosterone	10	3	0	na	na	na	na	3	0	na	na	na	na
4-Androstene-3,17-dione	10	3	0	na	na	na	na	3	0	na	na	na	na
Mestranol	10	3	0	na	na	na	na	3	0	na	na	na	na
Trenbolone	10	3	0	na	na	na	na	3	0	na	na	na	na
19-Norethisterone	10	3	0	na	na	na	na	3	0	na	na	na	na
Equilenin	10	3	0	na	na	na	na	3	0	na	na	na	na
17- α -Ethinylestradiol	10	3	1	22	22	22	na	3	0	na	na	na	na
11-Ketotestosterone	10	3	0	na	na	na	na	3	0	na	na	na	na
Estriol	10	3	0	na	na	na	na	3	0	na	na	na	na
Progesterone	10	3	0	na	na	na	na	3	0	na	na	na	na
3- β -Coprostanol	10	3	0	na	na	na	na	3	0	na	na	na	na
Cholesterol	10	0	0	na	na	na	na	1	0	na	na	na	na
D4-17-Estradiol (SS)	1	3	na	130	51	73	49	3	na	130	29	61	60
D3-Testosterone (SS)	1	3	na	180	73	102	68	3	na	210	64	109	88
D7-Cholesterol (SS)	1	3	na	150	80	89	57	3	na	310	140	168	130

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Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.

[SS, surrogate spike; % rec, percent recovery; ng/L, nanograms per liter; HM, high sample matrix prevented quantitation; <, less than; --, sample not analyzed]

Station number	Sample name	Date	Time	D4-17-Estradiol (SS) (% rec)	D3-Testosterone (SS) (% rec)	D7-Cholesterol (SS) (% rec)	Diethylstilbestrol (ng/L)
<i>Method detection limit --></i>				<i>I</i>	<i>I</i>	<i>I</i>	<i>I0</i>
410322096190103	Cattle feedlot lagoon	2/14/02	0900	HM	HM	HM	HM
		5/9/02	0900	0	0	0	<10
		8/15/02	0900	1	8	290	<10
		8/23/02	0900	--	--	--	--
		5/22/03	0900	250	290	36	<10
410322096190104	Hog confinement lagoon	2/14/02	1400	HM	HM	HM	HM
		5/9/02	1330	0	0	0	<10
		8/15/02	1230	5	10	82	<10
		8/23/02	1600	--	--	--	--
		5/22/03	1430	180	140	110	<10
06803496	Wastewater-treatment plant effluent	2/13/02	0900	--	--	--	--
		5/8/02	0830	170	230	170	<10
		8/14/02	0900	93	65	98	<10
		8/22/02	0900	52	110	51	<10
		5/21/03	1030	49	98	78	<10
06801000	Platte River near Ashland	12/10/01	1000	--	--	--	--
		1/7/02	1200	--	--	--	--
		2/11/02	1000	170	130	200	<10
		3/11/02	1000	--	--	--	--
		4/8/02	1100	--	--	--	--
		5/6/02	1030	130	260	170	<10
		6/11/02	1030	--	--	--	--
		7/9/02	1000	--	--	--	--
		8/12/02	1130	2	0	80	<10
		8/21/02	1100	25	0	160	<10
		9/9/02	0930	--	--	--	--
		10/16/02	0930	--	--	--	--
		11/11/02	1030	170	210	190	<10
06805000	Salt Creek near Ashland	2/12/02	1000	130	140	160	<10
		5/7/02	1000	120	200	150	<10
		8/13/02	1000	31	0	160	<10
412411097165601	Loup Power Canal	8/20/02	1000	41	0	200	<10
		11/12/02	1000	200	240	240	<10
		4/24/03	0930	37	80	61	<10
412411097165601	Loup Power Canal	4/22/03	1030	24	91	56	<10

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	D4-17-Estradiol (SS) (% rec)	D3-Testosterone (SS) (% rec)	D7-Cholesterol (SS) (% rec)	Diethylstilbestrol (ng/L)
<i>Method detection limit --></i>				<i>I</i>	<i>I</i>	<i>I</i>	<i>10</i>
410547096254801	G-040474-Memphis, 2/19/02	12/17/01	0730	--	--	--	--
		1/14/02	0730	--	--	--	--
		2/19/02	0730	130	61	150	<10
		3/18/02	0730	--	--	--	--
		4/15/02	0730	--	--	--	--
		6/17/02	0105	--	--	--	--
		8/19/02	0730	42	56	130	<10
		9/16/02	0730	--	--	--	--
410322096191701	W90-1H	12/17/01	0930	--	--	--	--
		1/14/02	920	--	--	--	--
		2/20/02	0900	150	100	190	<10
		3/18/02	0930	--	--	--	--
		4/15/02	0930	--	--	--	--
		5/13/02	0900	110	170	140	<10
		6/17/02	0930	--	--	--	--
		7/16/02	0940	--	--	--	--
		8/19/02	1000	49	58	160	<10
		8/28/02	0830	--	--	--	--
		9/16/02	1020	--	--	--	--
		10/23/02	0930	--	--	--	--
		11/18/02	0900	--	--	--	--
4/30/03	0900	--	--	--	--		
5/27/03	1030	--	--	--	--		
410315096193501	W49-9	12/17/01	1120	--	--	--	--
		1/14/01	1110	--	--	--	--
		2/20/02	1230	170	130	200	<10
		3/18/02	1120	--	--	--	--
		4/15/02	1150	--	--	--	--
		5/13/02	1200	110	180	140	<10
		6/17/02	1150	--	--	--	--
		7/16/02	1300	--	--	--	--
		8/19/02	1330	50	59	160	<10
		8/28/02	1230	--	--	--	--
		9/16/02	1130	--	--	--	--
		10/23/02	1200	--	--	--	--
		11/18/02	1230	--	--	--	--
4/30/03	1230	--	--	--	--		
5/27/03	1300	--	--	--	--		

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	D4-17-Estradiol (SS) (% rec)	D3-Testosterone (SS) (% rec)	D7-Cholesterol (SS) (% rec)	Diethylstilbestrol (ng/L)
<i>Method detection limit --></i>				<i>I</i>	<i>I</i>	<i>I</i>	<i>10</i>
410349096202101	W54-10	12/17/01	1030	--	--	--	--
		1/14/02	1020	--	--	--	--
		2/20/02	1100	99	110	150	<10
		3/18/02	1030	--	--	--	--
		4/15/02	1050	--	--	--	--
		5/13/02	1030	97	130	130	<10
		6/17/02	1050	--	--	--	--
		7/16/02	1130	--	--	--	--
		8/19/02	1200	46	54	140	<10
		8/28/02	1100	--	--	--	--
		9/16/02	1100	--	--	--	--
		10/23/02	1040	--	--	--	--
		11/18/02	1100	--	--	--	--
		4/30/03	1130	--	--	--	--
5/27/03	1130	--	--	--	--		
410315096190101	Raw water	12/17/01	1215	--	--	--	--
		1/14/02	1210	--	--	--	--
		2/19/02	1030	--	--	--	--
		3/18/02	1220	--	--	--	--
		4/15/02	1240	--	--	--	--
		5/13/02	1400	130	180	150	<10
		6/17/02	1300	--	--	--	--
		7/16/02	1300	--	--	--	--
		8/19/02	1500	40	53	38	<10
		8/28/02	1330	--	--	--	--
		9/16/02	1230	--	--	--	--
		10/23/02	1300	--	--	--	--
		11/18/02	1330	--	--	--	--
		4/30/03	1330	--	--	--	--
5/27/03	1500	51	73	80	<10		
410315096190102	Finished water	12/17/01	1230	--	--	--	--
		1/14/02	1230	--	--	--	--
		2/19/02	0930	--	--	--	--
		3/18/02	1240	--	--	--	--
		4/15/02	1310	--	--	--	--
		5/13/02	1500	130	210	310	<10
		6/17/02	1330	--	--	--	--
		7/16/02	1330	--	--	--	--

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	D4-17-Estradiol (SS) (% rec)	D3-Testosterone (SS) (% rec)	D7-Cholesterol (SS) (% rec)	Diethylstilbestrol (ng/L)
<i>Method detection limit --></i>				<i>I</i>	<i>I</i>	<i>I</i>	<i>10</i>
410315096190102	Finished water	8/19/02	1600	29	64	140	<10
		8/28/02	1500	--	--	--	--
		9/16/02	1300	--	--	--	--
		10/23/02	1330	--	--	--	--
		11/18/02	1430	--	--	--	--
		4/30/03	1400	--	--	--	--
		5/27/03	1400	25	52	54	<10
Quality assurance samples							
Blanks	Distilled water blank	--	--	100	110	45	<10
	Distilled water blank	--	--	24	47	56	<10
	Distilled water blank	--	--	150	210	150	<10
	Distilled water blank	--	--	60	130	71	<10
	Distilled water blank	--	--	110	120	80	<10
	Distilled water blank	--	--	57	100	48	<10
	Distilled water blank	--	--	0	0	0	<10
	Distilled water blank	--	--	--	--	--	<10
	Distilled water blank	--	--	--	--	--	<10
	Distilled water blank	--	--	--	--	--	<10
	Distilled water blank	--	--	--	--	--	<10
	Distilled water blank	--	--	--	--	--	<10
	Distilled water blank	--	--	22	39	17	<10
	Distilled water blank	--	--	20	28	15	<10
	Distilled water blank	--	--	21	33	15	<10
	Distilled water blank	--	--	32	50	15	<10
	Distilled water blank	--	--	40	58	26	<10
Spikes	Distilled water blank + 100 ng/L spike	--	--	162	190	72	60
	Distilled water blank + 100 ng/L spike	--	--	110	120	78	47
	Distilled water blank + 100 ng/L spike	--	--	93	100	62	65
	Distilled water blank + 100 ng/L spike	--	--	90	83	19	64
	Distilled water blank + 100 ng/L spike	--	--	91	89	23	67
	Distilled water blank + 100 ng/L spike	--	--	71	67	22	38
	Distilled water blank + 100 ng/L spike	--	--	100	99	39	62
	Distilled water blank + 10 ng/L spike	--	--	170	160	59	82

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	<i>cis</i> -Androsterone (ng/L)	17- α -Estradiol (ng/L)	Epitestosterone (ng/L)	Stanolone (ng/L)
<i>Method detection limit --></i>							
410322096190103	Cattle feedlot lagoon	2/14/02	0900	HM	HM	HM	HM
		5/9/02	0900	<10	<10	<10	<10
		8/15/02	0900	<10	<10	<10	<10
		8/23/02	0900	--	--	--	--
		5/22/03	0900	<10	<10	<10	<10
410322096190104	Hog confinement lagoon	2/14/02	1400	HM	HM	HM	HM
		5/9/02	1330	<10	<10	<10	<10
		8/15/02	1230	<10	<10	<10	<10
		8/23/02	1600	--	--	--	--
		5/22/03	1430	<10	<10	<10	<10
06803496	Wastewater-treatment plant effluent	2/13/02	0900	--	--	--	--
		5/8/02	0830	<10	<10	<10	53
		8/14/02	0900	<10	<10	<10	<10
		8/22/02	0900	38	<10	<10	<10
		5/21/03	1030	<10	<10	<10	<10
06801000	Platte River near Ashland	12/10/01	1000	--	--	--	--
		1/7/02	1200	--	--	--	--
		2/11/02	1000	<10	<10	<10	<10
		3/11/02	1000	--	--	--	--
		4/8/02	1100	--	--	--	--
		5/6/02	1030	<10	<10	<10	<10
		6/11/02	1030	--	--	--	--
		7/9/02	1000	--	--	--	--
		8/12/02	1130	<10	<10	<10	<10
		8/21/02	1100	<10	<10	<10	<10
		9/9/02	0930	--	--	--	--
		10/16/02	0930	--	--	--	--
		11/11/02	1030	<10	<10	<10	<10
		4/23/03	1000	<10	<10	<10	<10
5/20/03	1030	<10	<10	<10	<10		
06805000	Salt Creek near Ashland	2/12/02	1000	<10	<10	<10	<10
		5/7/02	1000	<10	<10	<10	<10
		8/13/02	1000	<10	<10	<10	<10
		8/20/02	1000	<10	<10	<10	<10
		11/12/02	1000	<10	<10	<10	<10
		4/24/03	0930	<10	<10	<10	<10
412411097165601	Loup Power Canal	4/22/03	1030	<10	<10	<10	<10

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	<i>cis</i> -Androstere- rone (ng/L)	17- α -Estradiol (ng/L)	Epitestoster- one (ng/L)	Stanalone (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410547096254801	G-040474-Memphis, 2/19/02	12/17/01	0730	--	--	--	--
		1/14/02	0730	--	--	--	--
		2/19/02	0730	<10	<10	<10	<10
		3/18/02	0730	--	--	--	--
		4/15/02	0730	--	--	--	--
		6/17/02	0105	--	--	--	--
		8/19/02	0730	<10	<10	<10	<10
		9/16/02	0730	--	--	--	--
410322096191701	W90-1H	12/17/01	0930	--	--	--	--
		1/14/02	0920	--	--	--	--
		2/20/02	0900	<10	<10	<10	<10
		3/18/02	0930	--	--	--	--
		4/15/02	0930	--	--	--	--
		5/13/02	0900	<10	<10	<10	<10
		6/17/02	0930	--	--	--	--
		7/16/02	0940	--	--	--	--
		8/19/02	1000	<10	<10	<10	<10
		8/28/02	0830	--	--	--	--
		9/16/02	1020	--	--	--	--
		10/23/02	0930	--	--	--	--
		11/18/02	0900	--	--	--	--
		4/30/03	0900	--	--	--	--
5/27/03	1030	--	--	--	--		
410315096193501	W49-9	12/17/01	1120	--	--	--	--
		1/14/01	1110	--	--	--	--
		2/20/02	1230	<10	<10	<10	<10
		3/18/02	1120	--	--	--	--
		4/15/02	1150	--	--	--	--
		5/13/02	1200	<10	<10	<10	<10
		6/17/02	1150	--	--	--	--
		7/16/02	1300	--	--	--	--
		8/19/02	1330	<10	<10	<10	<10
		8/28/02	1230	--	--	--	--
		9/16/02	1130	--	--	--	--
		10/23/02	1200	--	--	--	--
		11/18/02	1230	--	--	--	--
		4/30/03	1230	--	--	--	--
5/27/03	1300	--	--	--	--		

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	<i>cis</i> -Androstere- rone (ng/L)	17- α -Estradiol (ng/L)	Epitestoster- one (ng/L)	Stanalone (ng/L)
<i>Method detection limit --></i>							
410349096202101	W54-10	12/17/01	1030	--	--	--	--
		1/14/02	1020	--	--	--	--
		2/20/02	1100	<10	<10	<10	<10
		3/18/02	1030	--	--	--	--
		4/15/02	1050	--	--	--	--
		5/13/02	1030	<10	<10	<10	<10
		6/17/02	1050	--	--	--	--
		7/16/02	1130	--	--	--	--
		8/19/02	1200	<10	<10	<10	<10
		8/28/02	1100	--	--	--	--
		9/16/02	1100	--	--	--	--
		10/23/02	1040	--	--	--	--
		11/18/02	1100	--	--	--	--
		4/30/03	1130	--	--	--	--
		5/27/03	1130	--	--	--	--
410315096190101	Raw water	12/17/01	1215	--	--	--	--
		1/14/02	1210	--	--	--	--
		2/19/02	1030	--	--	--	--
		3/18/02	1220	--	--	--	--
		4/15/02	1240	--	--	--	--
		5/13/02	1400	<10	<10	<10	<10
		6/17/02	1300	--	--	--	--
		7/16/02	1300	--	--	--	--
		8/19/02	1500	<10	<10	<10	<10
		8/28/02	1330	--	--	--	--
		9/16/02	1230	--	--	--	--
		10/23/02	1300	--	--	--	--
		11/18/02	1330	--	--	--	--
		4/30/03	1330	--	--	--	--
		5/27/03	1500	<10	<10	<10	<10
410315096190102	Finished water	12/17/01	1230	--	--	--	--
		1/14/02	1230	--	--	--	--
		2/19/02	0930	--	--	--	--
		3/18/02	1240	--	--	--	--
		4/15/02	1310	--	--	--	--
		5/13/02	1500	<10	<10	<10	<10
		6/17/02	1330	--	--	--	--
		7/16/02	1330	--	--	--	--
		8/19/02	1600	<10	<10	<10	<10

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	<i>cis</i> -Androstere- rone (ng/L)	17- α -Estradiol (ng/L)	Epitestoster- one (ng/L)	Stanalone (ng/L)
<i>Method detection limit --></i>				10	10	10	10
410315096190102	Finished water	8/28/02	1500	--	--	--	--
		9/16/02	1300	--	--	--	--
		10/23/02	1330	--	--	--	--
		11/18/02	1430	--	--	--	--
		4/30/03	1400	--	--	--	--
		5/27/03	1400	<10	<10	<10	<10
Quality assurance samples							
Blanks	Distilled water blank	--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		Spikes	Distilled water blank + 100 ng/L spike	--	--	220	130
--	--			150	92	130	81
--	--			110	96	120	78
--	--			87	90	110	69
--	--			95	93	120	76
--	--			57	62	78	50
--	--			100	100	120	81
--	--			190	160	200	150

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	17- β -Estradiol (ng/L)	Estrone (ng/L)	Equilin (ng/L)	Testosterone (ng/L)
<i>Method detection limit --></i>							
410322096190103	Cattle feedlot lagoon	2/14/02	0900	HM	HM	HM	HM
		5/9/02	0900	<10	<10	<10	<10
		8/15/02	0900	<10	<10	<10	<10
		8/23/02	0900	--	--	--	--
		5/22/03	0900	<10	<10	<10	<10
410322096190104	Hog confinement lagoon	2/14/02	1400	HM	HM	HM	HM
		5/9/02	1330	<10	<10	<10	<10
		8/15/02	1230	<10	<10	<10	69
		8/23/02	1600	--	--	--	--
		5/22/03	1430	<10	<10	<10	<10
06803496	Wastewater-treatment plant effluent	2/13/02	0900	--	--	--	--
		5/8/02	0830	<10	<10	<10	<10
		8/14/02	0900	42	<10	<10	<10
		8/22/02	0900	19	<10	<10	<10
		5/21/03	1030	<10	<10	<10	<10
06801000	Platte River near Ashland	12/10/01	1000	--	--	--	--
		1/7/02	1200	--	--	--	--
		2/11/02	1000	<10	<10	<10	<10
		3/11/02	1000	--	--	--	--
		4/8/02	1100	--	--	--	--
		5/6/02	1030	<10	<10	<10	<10
		6/11/02	1030	--	--	--	--
		7/9/02	1000	--	--	--	--
		8/12/02	1130	<10	<10	<10	<10
		8/21/02	1100	<10	<10	<10	<10
		9/9/02	0930	--	--	--	--
		10/16/02	0930	--	--	--	--
		11/11/02	1030	<10	<10	<10	<10
06805000	Salt Creek near Ashland	4/23/03	1000	<10	<10	55	<10
		5/20/03	1030	<10	<10	<10	<10
		2/12/02	1000	<10	<10	<10	<10
		5/7/02	1000	<10	<10	<10	<10
		8/13/02	1000	<10	<10	<10	<10
412411097165601	Loup Power Canal	8/20/02	1000	<10	<10	<10	<10
		11/12/02	1000	<10	<10	<10	<10
		4/24/03	0930	<10	<10	<10	<10

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	17- β -Estradiol (ng/L)	Estrone (ng/L)	Equilin (ng/L)	Testosterone (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410547096254801	G-040474-Memphis, 2/19/02	12/17/01	0730	--	--	--	--
		1/14/02	0730	--	--	--	--
		2/19/02	0730	<10	<10	<10	<10
		3/18/02	0730	--	--	--	--
		4/15/02	0730	--	--	--	--
		6/17/02	0105	--	--	--	--
		8/19/02	0730	<10	<10	<10	<10
		9/16/02	0730	--	--	--	--
410322096191701	W90-1H	12/17/01	0930	--	--	--	--
		1/14/02	0920	--	--	--	--
		2/20/02	0900	<10	<10	<10	<10
		3/18/02	0930	--	--	--	--
		4/15/02	0930	--	--	--	--
		5/13/02	0900	<10	<10	<10	<10
		6/17/02	0930	--	--	--	--
		7/16/02	0940	--	--	--	--
		8/19/02	1000	<10	<10	<10	<10
		8/28/02	0830	--	--	--	--
		9/16/02	1020	--	--	--	--
		10/23/02	0930	--	--	--	--
		11/18/02	0900	--	--	--	--
4/30/03	0900	--	--	--	--		
5/27/03	1030	--	--	--	--		
410315096193501	W49-9	12/17/01	1120	--	--	--	--
		1/14/01	1110	--	--	--	--
		2/20/02	1230	<10	<10	<10	<10
		3/18/02	1120	--	--	--	--
		4/15/02	1150	--	--	--	--
		5/13/02	1200	<10	<10	<10	<10
		6/17/02	1150	--	--	--	--
		7/16/02	1300	--	--	--	--
8/19/02	1330	<10	<10	<10	<10		
410315096193501	W49-9	8/28/02	1230	--	--	--	--
		9/16/02	1130	--	--	--	--
		10/23/02	1200	--	--	--	--
		11/18/02	1230	--	--	--	--
		4/30/03	1230	--	--	--	--
5/27/03	1300	--	--	--	--		

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	17- β -Estradiol (ng/L)	Estrone (ng/L)	Equilin (ng/L)	Testosterone (ng/L)
<i>Method detection limit --></i>							
410349096202101	W54-10	12/17/01	1030	--	--	--	--
		1/14/02	1020	--	--	--	--
		2/20/02	1100	<10	<10	<10	<10
		3/18/02	1030	--	--	--	--
		4/15/02	1050	--	--	--	--
		5/13/02	1030	<10	<10	<10	<10
		6/17/02	1050	--	--	--	--
		7/16/02	1130	--	--	--	--
		8/19/02	1200	<10	<10	<10	<10
		8/28/02	1100	--	--	--	--
		9/16/02	1100	--	--	--	--
		10/23/02	1040	--	--	--	--
		11/18/02	1100	--	--	--	--
		4/30/03	1130	--	--	--	--
		5/27/03	1130	--	--	--	--
410315096190101	Raw water	12/17/01	1215	--	--	--	--
		1/14/02	1210	--	--	--	--
		2/19/02	1030	--	--	--	--
		3/18/02	1220	--	--	--	--
		4/15/02	1240	--	--	--	--
		5/13/02	1400	<10	<10	<10	<10
		6/17/02	1300	--	--	--	--
		7/16/02	1300	--	--	--	--
		8/19/02	1500	<10	<10	<10	<10
		8/28/02	1330	--	--	--	--
		9/16/02	1230	--	--	--	--
		10/23/02	1300	--	--	--	--
		11/18/02	1330	--	--	--	--
		4/30/03	1330	--	--	--	--
		5/27/03	1500	<10	<10	<10	<10
410315096190102	Finished water	12/17/01	1230	--	--	--	--
		1/14/02	1230	--	--	--	--
		2/19/02	0930	--	--	--	--
		3/18/02	1240	--	--	--	--
		4/15/02	1310	--	--	--	--
		5/13/02	1500	<10	<10	<10	<10
		6/17/02	1330	--	--	--	--
		7/16/02	1330	--	--	--	--
		8/19/02	1600	<10	<10	<10	<10

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	17- β -Estradiol (ng/L)	Estrone (ng/L)	Equilin (ng/L)	Testosterone (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410315096190102	Finished water	8/28/02	1500	--	--	--	--
		9/16/02	1300	--	--	--	--
		10/23/02	1330	--	--	--	--
		11/18/02	1430	--	--	--	--
		4/30/03	1400	--	--	--	--
		5/27/03	1400	<10	<10	<10	<10
Quality assurance samples							
Blanks	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
	Distilled water blank	--	--	<10	<10	<10	<10
Spikes	Distilled water blank + 100 ng/L spike	--	--	200	240	200	240
	Distilled water blank + 100 ng/L spike	--	--	140	160	130	170
	Distilled water blank + 100 ng/L spike	--	--	120	120	84	130
	Distilled water blank + 100 ng/L spike	--	--	100	110	77	110
	Distilled water blank + 100 ng/L spike	--	--	110	120	79	120
	Distilled water blank + 100 ng/L spike	--	--	85	90	64	84
	Distilled water blank + 100 ng/L spike	--	--	120	130	86	120
	Distilled water blank + 10 ng/L spike	--	--	230	260	180	220

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-Androstene- 3,17-dione	Mestranol	Trenbolone	19-Norethis- terone
				(ng/L)	(ng/L)	(ng/L)	(ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410322096190103	Cattle feedlot lagoon	2/14/02	0900	HM	HM	HM	HM
		5/9/02	0900	<10	<10	<10	<10
		8/15/02	0900	<10	<10	<10	<10
		8/23/02	0900	--	--	--	--
		5/22/03	0900	<10	<10	<10	<10
410322096190104	Hog confinement lagoon	2/14/02	1400	HM	HM	HM	HM
		5/9/02	1330	<10	<10	<10	<10
		8/15/02	1230	<10	<10	<10	<10
		8/23/02	1600	--	--	--	--
		5/22/03	1430	<10	<10	<10	<10
06803496	Wastewater-treatment plant effluent	2/13/02	0900	--	--	--	--
		5/8/02	0830	<10	<10	<10	<10
		8/14/02	0900	<10	<10	<10	<10
		8/22/02	0900	<10	<10	<10	<10
		5/21/03	1030	<10	<10	<10	<10
06801000	Platte River near Ashland	12/10/01	1000	--	--	--	--
		1/7/02	1200	--	--	--	--
		2/11/02	1000	<10	<10	<10	<10
		3/11/02	1000	--	--	--	--
		4/8/02	1100	--	--	--	--
		5/6/02	1030	<10	<10	<10	<10
		6/11/02	1030	--	--	--	--
		7/9/02	1000	--	--	--	--
		8/12/02	1130	<10	<10	<10	<10
		8/21/02	1100	<10	<10	<10	<10
		9/9/02	0930	--	--	--	--
		10/16/02	0930	--	--	--	--
		11/11/02	1030	<10	<10	<10	<10
		4/23/03	1000	<10	<10	<10	<10
5/20/03	1030	<10	<10	<10	<10		
06805000	Salt Creek near Ashland	2/12/02	1000	<10	<10	<10	<10
		5/7/02	1000	<10	<10	<10	<10
		8/13/02	1000	<10	<10	<10	<10
		8/20/02	1000	<10	<10	<10	<10
		11/12/02	1000	<10	<10	<10	<10
		4/24/03	0930	<10	<10	<10	<10
412411097165601	Loup Power Canal	4/22/03	1030	<10	<10	<10	<10

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-Androstene- 3,17-dione (ng/L)	Mestranol (ng/L)	Trenbolone (ng/L)	19-Norethis- terone (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410547096254801	G-040474-Memphis, 2/19/02	12/17/01	0730	--	--	--	--
		1/14/02	0730	--	--	--	--
		2/19/02	0730	<10	<10	<10	<10
		3/18/02	0730	--	--	--	--
		4/15/02	0730	--	--	--	--
		6/17/02	0105	--	--	--	--
		8/19/02	0730	<10	<10	<10	<10
		9/16/02	0730	--	--	--	--
410322096191701	W90-1H	12/17/01	0930	--	--	--	--
		1/14/02	0920	--	--	--	--
		2/20/02	0900	<10	<10	<10	<10
		3/18/02	0930	--	--	--	--
		4/15/02	0930	--	--	--	--
		5/13/02	0900	<10	<10	<10	<10
		6/17/02	0930	--	--	--	--
		7/16/02	0940	--	--	--	--
		8/19/02	1000	<10	<10	<10	<10
		8/28/02	0830	--	--	--	--
		9/16/02	1020	--	--	--	--
		10/23/02	0930	--	--	--	--
		11/18/02	0900	--	--	--	--
		4/30/03	0900	--	--	--	--
5/27/03	1030	--	--	--	--		
410315096193501	W49-9	12/17/01	1120	--	--	--	--
		1/14/01	1110	--	--	--	--
		2/20/02	1230	<10	<10	<10	<10
		3/18/02	1120	--	--	--	--
		4/15/02	1150	--	--	--	--
		5/13/02	1200	<10	<10	<10	<10
		6/17/02	1150	--	--	--	--
		7/16/02	1300	--	--	--	--
		8/19/02	1330	<10	<10	<10	<10
		8/28/02	1230	--	--	--	--
		9/16/02	1130	--	--	--	--
		10/23/02	1200	--	--	--	--
		11/18/02	1230	--	--	--	--
		4/30/03	1230	--	--	--	--
5/27/03	1300	--	--	--	--		

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-Androstene- 3,17-dione (ng/L)	Mestranol (ng/L)	Trenbolone (ng/L)	19-Norethis- terone (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410349096202101	W54-10	12/17/01	1030	--	--	--	--
		1/14/02	1020	--	--	--	--
		2/20/02	1100	<10	<10	<10	<10
		3/18/02	1030	--	--	--	--
		4/15/02	1050	--	--	--	--
		5/13/02	1030	<10	<10	<10	<10
		6/17/02	1050	--	--	--	--
		7/16/02	1130	--	--	--	--
		8/19/02	1200	<10	<10	<10	<10
		8/28/02	1100	--	--	--	--
		9/16/02	1100	--	--	--	--
		10/23/02	1040	--	--	--	--
		11/18/02	1100	--	--	--	--
		4/30/03	1130	--	--	--	--
5/27/03	1130	--	--	--	--		
410315096190101	Raw water	12/17/01	1215	--	--	--	--
		1/14/02	1210	--	--	--	--
		2/19/02	1030	--	--	--	--
		3/18/02	1220	--	--	--	--
		4/15/02	1240	--	--	--	--
		5/13/02	1400	<10	<10	<10	<10
		6/17/02	1300	--	--	--	--
		7/16/02	1300	--	--	--	--
		8/19/02	1500	<10	<10	<10	<10
		8/28/02	1330	--	--	--	--
		9/16/02	1230	--	--	--	--
		10/23/02	1300	--	--	--	--
		11/18/02	1330	--	--	--	--
		4/30/03	1330	--	--	--	--
5/27/03	1500	<10	<10	<10	<10		
410315096190102	Finished water	12/17/01	1230	--	--	--	--
		1/14/02	1230	--	--	--	--
		2/19/02	0930	--	--	--	--
		3/18/02	1240	--	--	--	--
		4/15/02	1310	--	--	--	--
		5/13/02	1500	<10	<10	<10	<10
		6/17/02	1330	--	--	--	--
		7/16/02	1330	--	--	--	--

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	4-Androstene- 3,17-dione (ng/L)	Mestranol (ng/L)	Trenbolone (ng/L)	19-Norethis- terone (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410315096190102— Continued	Finished water	8/19/02	1600	<10	<10	<10	<10
		8/28/02	1500	--	--	--	--
		9/16/02	1300	--	--	--	--
		10/23/02	1330	--	--	--	--
		11/18/02	1430	--	--	--	--
		4/30/03	1400	--	--	--	--
		5/27/03	1400	<10	<10	<10	<10
Quality assurance samples							
Blanks	Distilled water blank	--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
Spikes	Distilled water blank + 100 ng/L spike	--	--	270	210	210	160
		--	--	160	99	110	74
		--	--	120	68	77	56
		--	--	100	67	76	59
		--	--	120	46	85	37
		--	--	94	72	70	62
		--	--	130	71	92	66
		--	--	220	230	230	220
		--	--	10	10	10	10

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample Name	Date	Time	Equilenin (ng/L)	17- α -Ethy- nyl estradiol (ng/L)	11-Ketotestos- terone (ng/L)	Estriol (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410322096190103	Cattle feedlot lagoon	2/14/02	0900	HM	HM	HM	HM
		5/9/02	0900	<10	<10	<10	<10
		8/15/02	0900	<10	<10	<10	<10
		8/23/02	0900	--	--	--	--
		5/22/03	0900	<10	<10	<10	<10
410322096190104	Hog confinement lagoon	2/14/02	1400	HM	HM	HM	HM
		5/9/02	1330	<10	<10	<10	<10
		8/15/02	1230	<10	<10	<10	<10
		8/23/02	1600	--	--	--	--
		5/22/03	1430	<10	<10	<10	<10
06803496	Wastewater-treatment plant effluent	2/13/02	0900	--	--	--	--
		5/8/02	0830	<10	<10	<10	<10
		8/14/02	0900	<10	130	<10	<10
		8/22/02	0900	<10	<10	<10	<10
		5/21/03	1030	<10	<10	<10	44
06801000	Platte River near Ashland	12/10/01	1000	--	--	--	--
		1/7/02	1200	--	--	--	--
		2/11/02	1000	<10	<10	<10	<10
		3/11/02	1000	--	--	--	--
		4/8/02	1100	--	--	--	--
		5/6/02	1030	4.0	<10	<10	<10
		6/11/02	1030	--	--	--	--
		7/9/02	1000	--	--	--	--
		8/12/02	1130	<10	<10	<10	<10
		8/21/02	1100	<10	<10	<10	<10
06801000	Platte River near Ashland	9/9/02	0930	--	--	--	--
		10/16/02	0930	--	--	--	--
		11/11/02	1030	<10	<10	<10	<10
		4/23/03	1000	<10	<10	<10	<10
		5/20/03	1030	<10	<10	<10	<10
06805000	Salt Creek near Ashland	2/12/02	1000	<10	<10	<10	<10
		5/7/02	1000	<10	<10	<10	<10
		8/13/02	1000	<10	<10	<10	<10
		8/20/02	1000	90	36	<10	<10
		11/12/02	1000	<10	<10	<10	<10
		4/24/03	0930	<10	<10	<10	<10
412411097165601	Loup Power Canal	4/22/03	1030	<10	<10	<10	<10

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample Name	Date	Time	Equilenin (ng/L)	17- α -Ethy- nylestradiol (ng/L)	11-Ketotestos- terone (ng/L)	Estriol (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410547096254801	G-040474-Memphis, 2/19/02	12/17/01	0730	--	--	--	--
		1/14/02	0730	--	--	--	--
		2/19/02	0730	<10	<10	<10	<10
		3/18/02	0730	--	--	--	--
		4/15/02	0730	--	--	--	--
		6/17/02	0105	--	--	--	--
		8/19/02	0730	<10	<10	<10	<10
		9/16/02	0730	--	--	--	--
410322096191701	W90-1H	12/17/01	0930	--	--	--	--
		1/14/02	0920	--	--	--	--
		2/20/02	0900	<10	<10	<10	<10
		3/18/02	0930	--	--	--	--
		4/15/02	0930	--	--	--	--
		5/13/02	0900	<10	<10	<10	<10
		6/17/02	0930	--	--	--	--
		7/16/02	0940	--	--	--	--
		8/19/02	1000	<10	<10	<10	<10
		8/28/02	0830	--	--	--	--
		9/16/02	1020	--	--	--	--
		10/23/02	0930	--	--	--	--
		11/18/02	0900	--	--	--	--
		4/30/03	0900	--	--	--	--
5/27/03	1030	--	--	--	--		
410315096193501	W49-9	12/17/01	1120	--	--	--	--
		1/14/01	1110	--	--	--	--
		2/20/02	1230	<10	<10	<10	<10
		3/18/02	1120	--	--	--	--
		4/15/02	1150	--	--	--	--
		5/13/02	1200	<10	<10	<10	<10
		6/17/02	1150	--	--	--	--
		7/16/02	1300	--	--	--	--
		8/19/02	1330	<10	<10	<10	<10
		8/28/02	1230	--	--	--	--
		9/16/02	1130	--	--	--	--
		10/23/02	1200	--	--	--	--
		11/18/02	1230	--	--	--	--
		4/30/03	1230	--	--	--	--
5/27/03	1300	--	--	--	--		

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample Name	Date	Time	Equilenin (ng/L)	17- α -Ethinylestradiol (ng/L)	11-Ketotestosterone (ng/L)	Estriol (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410349096202101	W54-10	12/17/01	1030	--	--	--	--
		1/14/02	1020	--	--	--	--
		2/20/02	1100	<10	<10	<10	<10
		3/18/02	1030	--	--	--	--
		4/15/02	1050	--	--	--	--
		5/13/02	1030	<10	<10	<10	<10
		6/17/02	1050	--	--	--	--
		7/16/02	1130	--	--	--	--
		8/19/02	1200	<10	<10	<10	<10
		8/28/02	1100	--	--	--	--
		9/16/02	1100	--	--	--	--
		10/23/02	1040	--	--	--	--
		11/18/02	1100	--	--	--	--
		4/30/03	1130	--	--	--	--
5/27/03	1130	--	--	--	--		
410315096190101	Raw water	12/17/01	1215	--	--	--	--
		1/14/02	1210	--	--	--	--
		2/19/02	1030	--	--	--	--
		3/18/02	1220	--	--	--	--
		4/15/02	1240	--	--	--	--
		5/13/02	1400	<10	<10	<10	<10
		6/17/02	1300	--	--	--	--
		7/16/02	1300	--	--	--	--
		8/19/02	1500	<10	22	<10	<10
		8/28/02	1330	--	--	--	--
		9/16/02	1230	--	--	--	--
		10/23/02	1300	--	--	--	--
		11/18/02	1330	--	--	--	--
		4/30/03	1330	--	--	--	--
5/27/03	1500	<10	<10	<10	<10		
410315096190102	Finished water	12/17/01	1230	--	--	--	--
		1/14/02	1230	--	--	--	--
		2/19/02	0930	--	--	--	--
		3/18/02	1240	--	--	--	--
		4/15/02	1310	--	--	--	--
		5/13/02	1500	<10	<10	<10	<10
		6/17/02	1330	--	--	--	--
		7/16/02	1330	--	--	--	--

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample Name	Date	Time	Equilenin (ng/L)	17- α -Ethy- nylestradiol (ng/L)	11-Ketotestos- terone (ng/L)	Estriol (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>	<i>10</i>
410315096190102	Finished water	8/19/02	1600	<10	<10	<10	<10
		8/28/02	1500	--	--	--	--
		9/16/02	1300	--	--	--	--
		10/23/02	1330	--	--	--	--
		11/18/02	1430	--	--	--	--
		4/30/03	1400	--	--	--	--
		5/27/03	1400	<10	<10	<10	<10
Quality assurance samples							
Blanks	Distilled water blank	--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		--	--	<10	<10	<10	<10
		Spikes	Distilled water blank + 100 ng/L spike	--	--	160	170
--	--			91	78	80	76
--	--			68	54	100	100
--	--			76	68	96	96
--	--			89	48	99	96
--	--			63	65	71	73
--	--			87	71	110	100
--	--			150	180	150	130

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	Progesterone (ng/L)	3- β -Coprostanol (ng/L)	Cholesterol (ng/L)
<i>Method detection limit --></i>						
410322096190103	Cattle feedlot lagoon	2/14/02	0900	HM	HM	HM
		5/9/02	0900	<10	22,000	56,000
		8/15/02	0900	<10	4,500	5,300
		8/23/02	0900	--	--	--
		5/22/03	0900	<10	360	540
410322096190104	Hog confinement lagoon	2/14/02	1400	HM	HM	HM
		5/9/02	1330	<10	15,000	8,300
		8/15/02	1230	<10	10,000	4,100
		8/23/02	1600	--	--	--
		5/22/03	1430	<10	7,600	2,300
06803496	Wastewater-treatment plant effluent	2/13/02	0900	--	--	--
		5/8/02	0830	<10	9,800	9,400
		8/14/02	0900	<10	12,000	13,000
		8/22/02	0900	<10	2,400	5,800
		5/21/03	1030	<10	860	1,900
06801000	Platte River near Ashland	12/10/01	1000	--	--	--
		1/7/02	1200	--	--	--
		2/11/02	1000	<10	<10	B250
		3/11/02	1000	--	--	--
		4/8/02	1100	--	--	--
		5/6/02	1030	<10	74	B320
		6/11/02	1030	--	--	--
		7/9/02	1000	--	--	--
		8/12/02	1130	<10	<10	B310
		8/21/02	1100	<10	110	530
		9/9/02	0930	--	--	--
		10/16/02	0930	--	--	--
		11/11/02	1030	<10	47	B330
		4/23/03	1000	<10	<10	B340
5/20/03	1030	<10	17	B180		
06805000	Salt Creek near Ashland	2/12/02	1000	<10	770	1500
		5/7/02	1000	<10	52	530
		8/13/02	1000	<10	260	600
		8/20/02	1000	<10	240	580
		11/12/02	1000	<10	1,600	2,000
		4/24/03	0930	<10	1,800	3,500
412411097165601	Loup Power Canal	4/22/03	1030	<10	53	640

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	Progesterone (ng/L)	3- β -Coprostanol (ng/L)	Cholesterol (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>
410547096254801	G-040474-Memphis, 2/19/02	12/17/01	0730	--	--	--
		1/14/02	0730	--	--	--
		2/19/02	0730	<10	<10	B42
		3/18/02	0730	--	--	--
		4/15/02	0730	--	--	--
		6/17/02	0105	--	--	--
		8/19/02	0730	<10	<10	B18
		9/16/02	0730	--	--	--
410322096191701	W90-1H	12/17/01	0930	--	--	--
		1/14/02	0920	--	--	--
		2/20/02	0900	<10	<10	B98
		3/18/02	0930	--	--	--
		4/15/02	0930	--	--	--
		5/13/02	0900	<10	<10	B21
		6/17/02	0930	--	--	--
		7/16/02	0940	--	--	--
		8/19/02	1000	<10	<10	B16
		8/28/02	0830	--	--	--
		9/16/02	1020	--	--	--
		10/23/02	0930	--	--	--
		11/18/02	0900	--	--	--
		4/30/03	0900	--	--	--
5/27/03	1030	--	--	--		
410315096193501	W49-9	12/17/01	1120	--	--	--
		1/14/01	1110	--	--	--
		2/20/02	1230	<10	<10	B120
		3/18/02	1120	--	--	--
		4/15/02	1150	--	--	--
		5/13/02	1200	<10	<10	B73
		6/17/02	1150	--	--	--
		7/16/02	1300	--	--	--
		8/19/02	1330	<10	<10	B23
		8/28/02	1230	--	--	--
		9/16/02	1130	--	--	--
		10/23/02	1200	--	--	--
		11/18/02	1230	--	--	--
		4/30/03	1230	--	--	--
5/27/03	1300	--	--	--		

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	Progesterone (ng/L)	3- β -Coprostanol (ng/L)	Cholesterol (ng/L)
<i>Method detection limit --></i>				<i>10</i>	<i>10</i>	<i>10</i>
410349096202101	W54-10	12/17/01	1030	--	--	--
		1/14/02	1020	--	--	--
		2/20/02	1100	<10	<10	B44
		3/18/02	1030	--	--	--
		4/15/02	1050	--	--	--
		5/13/02	1030	<10	<10	B62
		6/17/02	1050	--	--	--
		7/16/02	1130	--	--	--
		8/19/02	1200	<10	<10	B13
		8/28/02	1100	--	--	--
		9/16/02	1100	--	--	--
		10/23/02	1040	--	--	--
		11/18/02	1100	--	--	--
		4/30/03	1130	--	--	--
5/27/03	1130	--	--	--		
410315096190101	Raw water	12/17/01	1215	--	--	--
		1/14/02	1210	--	--	--
		2/19/02	1030	--	--	--
		3/18/02	1220	--	--	--
		4/15/02	1240	--	--	--
		5/13/02	1400	<10	<10	B74
		6/17/02	1300	--	--	--
		7/16/02	1300	--	--	--
410315096190101	Raw water	8/19/02	1500	<10	<10	B12
		8/28/02	1330	--	--	--
		9/16/02	1230	--	--	--
		10/23/02	1300	--	--	--
		11/18/02	1330	--	--	--
		4/30/03	1330	--	--	--
		5/27/03	1500	<10	<10	B120
410315096190102	Finished water	12/17/01	1230	--	--	--
		1/14/02	1230	--	--	--
		2/19/02	0930	--	--	--
		3/18/02	1240	--	--	--
		4/15/02	1310	--	--	--
		5/13/02	1500	<10	<10	<10
		6/17/02	1330	--	--	--
		7/16/02	1330	--	--	--
		8/19/02	1600	<10	<10	B7

Table 15. Hormones in samples collected during the riverbank filtration study, Platte River, Nebraska, 2002 to 2005.—Continued

Station number	Sample name	Date	Time	Progesterone (ng/L)	3- β -Coprostanol (ng/L)	Cholesterol (ng/L)
410315096190102	Finished water	8/28/02	1500	--	--	--
		9/16/02	1300	--	--	--
		10/23/02	1330	--	--	--
		11/18/02	1430	--	--	--
		4/30/03	1400	--	--	--
		5/27/03	1400	<10	<10	B66
Quality assurance samples						
Blanks	Distilled water blank	--	--	<10	<10	34
		--	--	<10	<10	19
		--	--	<10	<10	0
		--	--	<10	<10	14
		--	--	<10	<10	0
		--	--	<10	<10	23
		--	--	<10	<10	7
		--	--	<10	<10	14
		--	--	<10	<10	14
		--	--	<10	<10	14
		--	--	<10	<10	16
		--	--	<10	<10	17
		--	--	<10	<10	7
		--	--	<10	<10	6
		--	--	<10	<10	8
		--	--	<10	<10	7
		--	--	<10	<10	15
		Spikes	Distilled water blank + 100 ng/L spike	--	--	130
--	--			100	75	89
--	--			110	61	86
--	--			87	22	25
--	--			96	27	33
--	--			65	27	36
--	--			100	44	52
--	--			84	66	380

Table 16. Stable hydrogen and oxygen isotopic composition for samples collected during the riverbank filtration, Platte River, Nebraska, 2004 to 2005.

[--, samples lost during shipment; VSMOW, Vienna Standard Mean Ocean Water; SLAP, Standard Light Antarctic Precipitation; ‰, per mill; $\delta^2\text{H}$, Expressed relative to VSMOW reference water on a scale such that $\delta^2\text{H}$ of SLAP reference water is -428 ‰ (Coplen, 1996); $\delta^{18}\text{O}$, expressed relative to VSMOW reference water on a scale such that $\delta^{18}\text{O}$ of SLAP reference water is -55.5 ‰ (Coplen, 1996)]

Station number	Station name	Collection date and time	$\delta^2\text{H}$, per mill	$\delta^{18}\text{O}$, per mill
06801000	Platte River near Ashland	4/19/2004 0930	-59.5	-7.83
		5/10/2004 1030	-53.9	-7.14
		9/14/2004 0930	-48.7	-6.09
		11/15/2004 1030	-63.5	-8.57
		1/10/2005 1130	--	--
410322096191701	W90-1H	4/20/2004 1210	-66.3	-9.11
		9/14/2004 1220	-54.0	-7.06
		11/16/2004 1240	-57.4	-7.66
		1/11/2005 1700	--	--
410315096193501	W54-10	4/20/2004 1625	-68.0	-9.11
		9/15/2004 1330	-52.8	-6.70
		11/16/2004 1345	-60.2	-8.10
		1/11/2005 1430	--	--
410349096202101	W49-9	4/20/2004 1425	-47.9	-5.90
		9/16/2004 1130	-51.4	-6.35
		11/16/2004 1540	-50.9	-6.23
		1/11/2005 1625	--	--
410537096202701	W56-5	4/20/2004 1525	-70.4	-9.42
		9/15/2004 1230	-54.0	-6.96
		11/16/2004 1445	-57.2	-7.56
		1/11/2005 1545	--	--
410334096182801	Ashland Deep	4/20/2004 1110	-47.6	-5.98
		9/15/2004 1230	-48.1	-5.84
		11/16/2004 1540	-49.3	-5.88
		1/11/2005 1320	--	--

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