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Water Quality of Combined Sewer Overflows, Stormwater, and Streams, Omaha, Nebraska, 2006–07

Scientific Investigations Report 2009–5175

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

Front cover. Top left photograph: Combined Sewer Overflow 105 located in north Omaha (Photograph taken by Jason Vogel, U.S. Geological Survey). Middle photograph: U.S. Geological Survey hydrologists, Robert Swanson (left) and Jill Frankforter (right), processing samples during the combined sewer overflow study in Omaha, Nebraska (Photograph taken by Rachael McLeod, U.S. Geological Survey). Bottom right photograph: U.S. Geological Survey hydrologist, Ben Dietsch, collecting a stream sample during the combined sewer overflow study in Omaha, Nebraska (Photograph taken by Rachael McLeod, U.S. Geological Survey).

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KEN SALAZAR, Secretary

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

U.S. Geological Survey, Reston, Virginia: 2009

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Conversion Factors and Datums

SI to Inch/Pound

Multiply	By	To obtain
	Length	
nanometer (nm)	0.00000003937	inch (in.)
micrometer (µm)	0.00003937	inch (in.)
millimeter (mm)	0.03937	inch (in.)
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
	Area	
square kilometer (km^2)	0.3861	square mile (mi^2)
	Volume	
milliliter (mL)	0.03382	ounce, fluid (fl. oz)
liter (L)	33.82	ounce, fluid (fl. oz)
liter (L)	2.113	pint (pt)
liter (L)	1.057	quart (qt)
liter (L)	0.2642	gallon (gal)
	Flow rate	
cubic meter per second (m^3/s)	35.31	cubic foot per second (ft^3/s)
	Mass	
gram (g)	0.03527	ounce, avoirdupois (oz)
kilogram (kg)	2.2046	pound (lb)
	Concentration	
microgram per liter (µg/L)	1	part per billion (ppb)
milligram per liter (mg/L)	1	part per million (ppm)
milligram per liter (mg/L)	0.058	grain per gallon (gr/gal)
MPN/100 mL (most probable number per 100 milliliters)	37.8541	most probably number per gallon (MPN/gal)
	Mass load rate	
milligram per hour (mg/hr)	0.0008466	ounce per day (oz/day)
gram per hour (g/hr)	0.002205	pound per hour (lb/hr)
kilogram per hour (kg/hr)	2.2046	pound per hour (lb/hr)

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

$$°F=(1.8\times°C)+32$$

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).

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

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

Acronyms

AHTN	Acetyl-hexamethyl-tetrahydronaphthalene
BDE	Brominated diphenyl ether
BHA	3-*tert*-Butyl-4-hydroxyanisole
BMP	Best-management practice
BOD	Biochemical oxygen demand
BPC1	Big Papillion Creek at Old 36th St., Bellevue, Nebr.
BPC2	Big Papillion Creek at Harrison St., LaVista, Nebr.
BPC3	Big Papillion Creek at Q St., Omaha, Nebr.
BPC4	Big Papillion Creek at 72nd St., Omaha, Nebr.
C	Combustion product
CAS	Chemical Abstract Service
CC1	Cole Creek at Hillside Dr., Omaha, Nebr.
CC2	Cole Creek at Parkview Lane, Omaha, Nebr.
CC4	Cole Creek at Sorenson Parkway, Omaha, Nebr.
cICP-MS	Cell inductively coupled plasma-mass spectrometry
CLSL	Combined sewer overflow load/stream load (ratio)
COD	Chemical oxygen demand
CSO	Combined sewer overflow
CSO105	Combined Sewer Overflow 105, Minne Lusa, Omaha, Nebr.
CSO106	Combined Sewer Overflow 106, North Interceptor, Omaha, Nebr.
CSO107	Combined Sewer Overflow 107, Grace St., Omaha, Nebr.
CSO108	Combined Sewer Overflow 108, Burt Izard Complex, Omaha, Nebr.
CSO109	Combined Sewer Overflow 109, Leavenworth St., Omaha, Nebr.
CSO115	Combined Sewer Overflow 115, Riverview Blvd., Omaha Nebr.
CSO117	Combined Sewer Overflow 117, Missouri Ave., Omaha, Nebr.
CSO118	Combined Sewer Overflow 118, Ohern St., Omaha, Nebr.
CSO119	Combined Sewer Overflow 119, Monroe St., Omaha, Nebr.
CSO120	Combined Sewer Overflow 120, Burt Izard Overflow, Omaha, Nebr.
CSO203	Combined Sewer Overflow 203, 69th and Evans St., Omaha, Nebr.
CSO205	Combined Sewer Overflow 205, 64th and Dupont St., Omaha, Nebr.
CSS	Combined sewer system
CWQ	Continuous water quality
DCP	Data-collection platform
DEET	N,N-Diethyl-*meta*-toluamide
DO	Dissolved oxygen
E. coli	*Escherichia coli*
EDP	Endocrine-disrupting potency
EDTA	Ethylenediaminetetraacetic acid
EWI	Equal-width increment
F	Fungicide
FNU	Formazin nephelometric units
FR	Flame retardant
FWS	Flow-weighted spatially
FWT	Flow-weighted temporally

G	Grab
GUP	General-use pesticide
H	Herbicide
HBSL	Health-based screening level
HHCB	Hexahydrohexamethyl cyclopentabenzopyran
I	Insecticide
K	Known (endocrine disruptor)
LOWESS	Locally weighted scatterplot smoothing
LPC1	Little Papillion Creek at Grover St., Omaha, Nebr.
LPC2	Little Papillion Creek at Dodge St., Omaha, Nebr.
LPC3	Little Papillion Creek at Western Ave., Omaha, Nebr.
LRL	Laboratory reporting level
MDL	Method detection level
MPN	Most probable number
MR3	Missouri River at Fontanelle Forest, Omaha, Nebr.
MR4	Missouri River at Freedom Park, Omaha, Nebr.
MR5	Missouri River at N.P. Dodge Park, Omaha, Nebr.
MRCB	Missouri River near Council Bluffs, Iowa
NA	Not applicable
NC	Not calculated
NDEQ	Nebraska Department of Environmental Quality
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric turbidity units
NWIS	National Water Information System
NWQL	National Water Quality Laboratory
PAH	Polycyclic aromatic hydrocarbon
PC1	Papillion Creek at Fort Crook, Nebr.
PC2	Papillion Creek at 42nd St., Omaha, Nebr.
PCBS	Papillion Creek Basin stream
QA/QC	Quality assurance/quality control
RPR	Rise, peak, and recession
RSD	Relative standard deviation
S	Suspected (endocrine disruptor)
SC	Specific conductance
SD	Standard deviation
SLRL	Stream load/receiving stream load (ratio)
SWO	Stormwater outfall
SWO1	Stormwater outfall, 9th and Atlas St., Omaha, Nebr.
SWO2	Stormwater outfall, 86th and I St., Omaha, Nebr.
TSS	Total suspended solids
UCL_{90}	Upper 90-percent confidence limit
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UV	Ultraviolet
WQRP	Water-quality relative priority (index)
WT	Water temperature
WW	Wastewater

Water Quality of Combined Sewer Overflows, Stormwater, and Streams, Omaha, Nebraska, 2006–07

By Jason R. Vogel, Jill D. Frankforter, David L. Rus, Christopher M. Hobza, and Matthew T. Moser

Abstract

The U.S. Geological Survey, in cooperation with the City of Omaha, investigated the water quality of combined sewer overflows, stormwater, and streams in the Omaha, Nebraska, area by collecting and analyzing 1,175 water samples from August 2006 through October 2007. The study area included the drainage area of Papillion Creek at Capeheart Road near Bellevue, Nebraska, which encompasses the tributary drainages of the Big and Little Papillion Creeks and Cole Creek, along with the Missouri River reach that is adjacent to Omaha. Of the 101 constituents analyzed during the study, 100 were detected in at least 1 sample during the study. Spatial and seasonal comparisons were completed for environmental samples. Measured concentrations in stream samples were compared to water-quality criteria for pollutants of concern. Finally, the mass loads of water-quality constituents in the combined sewer overflow discharges, stormwater outfalls, and streams were computed and compared.

The results of the study indicate that combined sewer overflow and stormwater discharges are affecting the water quality of the streams in the Omaha area. At the Papillion Creek Basin sites, *Escherichia coli* densities were greater than 126 units per 100 milliliters in 99 percent of the samples (212 of 213 samples analyzed for *Escherichia coli*) collected during the recreational-use season from May through September (in 2006 and 2007). *Escherichia coli* densities in 76 percent of Missouri River samples (39 of 51 samples) were greater than 126 units per 100 milliliters in samples collected from May through September (in 2006 and 2007). None of the constituents with human health criteria for consumption of water, fish, and other aquatic organisms were detected at levels greater than the criteria in any of the samples collected during this study. Total phosphorus concentrations in water samples collected in the Papillion Creek Basin were in excess of the U.S. Environmental Protection Agency's proposed criterion in all but four stream samples (266 of 270). Similarly, only 2 of 84 Missouri River samples had total phosphorus concentrations less than the proposed criterion. The proposed total nitrogen criterion for the Corn Belt and Northern Great Plains ecoregion was surpassed in 80 percent of the water samples collected from the stream sites. Samples with total nitrogen concentrations greater than the proposed criterion were most common at Papillion Creek and Big Papillion Creek sites, where the proposed criterion was surpassed in 90 and 96 percent of the samples collected, respectively. Elevated concentrations of total nitrogen were less common at the Missouri River sites, with 33 percent of the samples analyzed having concentrations that surpassed the proposed nutrient criterion for total nitrogen. The three constituents with measured concentrations greater than their respective health-based screening levels were nickel, zinc, and dichlorvos.

Differences in water quality during the beginning, middle, and end of the combined sewer overflow discharge and the stream hydrograph rise, peak, and recession were investigated. Concentrations from the ending part of the combined sewer overflow hydrograph were significantly different than those from the beginning and middle parts for 3 and 11 constituents, respectively. No constituents were significantly different between the beginning and middle parts of the combined sewer overflow discharge hydrograph. For the stream site upstream from combined sewer overflow outfalls on Cole Creek, the constituents with geometric mean values for the hydrograph rise that were at least twice those for the values of the peak and recession were specific conductance, magnesium, nitrite, N,N-diethyl-*meta*-toluamide (DEET), methyl salicylate, *p*-cresol, and *Escherichia coli.* Similarly, the constituents where the hydrograph peak was at least twice that for the rise and recession at the upstream Cole Creek site were total suspended solids, silver, and benzo[*a*]pyrene. At the Papillion Creek Basin stream sites downstream from combined sewer overflows, the only constituent with concentrations for the hydrograph rise that were significantly different than those for the peak and recession part was specific conductance, although this is a result of groundwater having larger specific conductance than stormwater runoff; therefore, the values decrease as there is more stormwater in the sample (at the peak). No constituents had significantly different concentrations when comparing the peak with the other two hydrograph parts and the recession with the other two hydrograph parts of the storm hydrograph at Papillion Creek Basin sites downstream from combined sewer overflows. At the Papillion Creek Basin stream sites downstream from combined sewer overflows, constituents with significantly larger concentrations

in hydrograph-peak samples relative to those from one of the other two parts of the hydrograph were mostly determined to be derived more from stormwater and included benzo[*a*] pyrene, fluoranthene, phenanthrene, and pyrene. Mercury was the only compound with significantly larger concentrations in the hydrograph-peak samples compared to those from the hydrograph rise that was determined to be derived more from sewage.

The ratio of combined sewer overflow load to receiving stream load was computed for those samples where a concentration and discharge were measured. The higher this ratio, the more of an effect the combined sewer overflow discharge will have on the concentration in the receiving stream. The combined sewer overflow site at 64th and Dupont Street (CSO205) had 88 constituents that had the maximum combined sewer overflow load to receiving stream load ratio for a single sample. The combined sewer overflow site with the most constituents that had the largest geometric mean combined sewer overflow load to receiving stream load ratio also was site CSO205, with 78 constituents. The tributary stream load to the receiving stream load also was computed for those Papillion Creek Basin samples where the constituent of interest was detected in the downstream site of a receiving-stream reach and discharge was measured. The higher the value of this ratio, the larger the effect a tributary stream will have on the concentration in the receiving stream. Of the 38 constituents that were detected in streams in the samples used for these calculations, the maximum single-sample tributary stream load to the receiving stream load ratio for 22 constituents was found in samples from Big Papillion Creek. Big Papillion Creek had the largest geometric mean for this ratio for each of the 38 constituents for which the ratio could be calculated.

Based upon the data collected in this study and analysis using a custom weighting scenario for summarizing the results, the combined sewer overflow sites where implementation of additional controls or the best management practices could potentially achieve the largest water-quality effect for the greatest number of compounds in receiving streams are the combined sewer outfalls at 64th and Dupont Street (CSO205), 69th and Evans Street (CSO203), Monroe Street (CSO119), and the North Interceptor Combined Sewer Overflow (CSO106). Scores from applying a similar custom weighting scenario to stream data indicated that implementing best management practices potentially could have the largest water-quality effect on the greatest number of compounds in Big Papillion Creek, Papillion Creek, Cole Creek, and Little Papillion Creek (in that order).

Introduction

Combined sewer overflows (CSOs) and stormwater runoff have suspected effects on the water quality of receiving waters in the Omaha, Nebr., metropolitan area (City of Omaha, *www.omahacso.com*, accessed February 2008). Combined sewer systems (CSSs) are sewer systems that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Generally, the CSSs transport wastewater to a wastewater treatment facility, but are designed to overflow directly to streams when the design capacity is exceeded (U.S. Environmental Protection Agency, 2004). Because CSOs contain untreated wastewater and contribute pathogens, solids, debris, and toxic pollutants to receiving waters, CSOs can create serious public-health and water-quality concerns (U.S. Environmental Protection Agency, 2004).

The CSS in Omaha exists for about 130 square kilometers (km^2) in the eastern part of Omaha and dates back to the 1800s, when CSSs originally were designed to simply move wastewater and stormwater out of the increasingly urbanized areas, and allow the Missouri River to disperse and carry pollution away (City of Omaha, *www.omahacso.com*, accessed February 2008). As of 2006, rainfall greater than about 2.5 millimeters (mm) typically was enough to cause a CSO in the Omaha CSS. The drainage basins of concern for this study are the Papillion Creek Basin, including the tributaries Cole Creek, Little Papillion Creek, and Big Papillion Creek, and the Missouri River reach adjacent to Omaha (fig. 1).

The U.S. Geological Survey (USGS), in cooperation with the City of Omaha, completed an investigation of the water quality of CSOs, stormwater, and streams in the Omaha, Nebr., area. The objectives of the study were to:

1. describe the water quality of the CSOs, stormwater, and streams during periods when storm, wet-weather, and dry-weather samples were collected;
2. identify significant spatial and seasonal differences in water quality at CSO, stormwater outfall (SWO), and stream-sampling sites;
3. identify constituents that may be considered derived more from stormwater or sewage in the study area;
4. compare measured concentrations in stream samples to water-quality criteria for pollutants of concern;
5. compare water-quality conditions of the rise, peak, and recession of the hydrograph at selected sampling sites; and
6. determine mass loads of water-quality constituents in the CSOs, SWOs, and streams sampled during the study.

Purpose and Scope

The purpose of this report is to present the results of a detailed assessment and analysis of water quality within the CSOs, SWOs, and receiving streams in the Omaha area from August 2006 through October 2007. Concentrations and loads of nutrients, metals, organic compounds, bacteria, and other

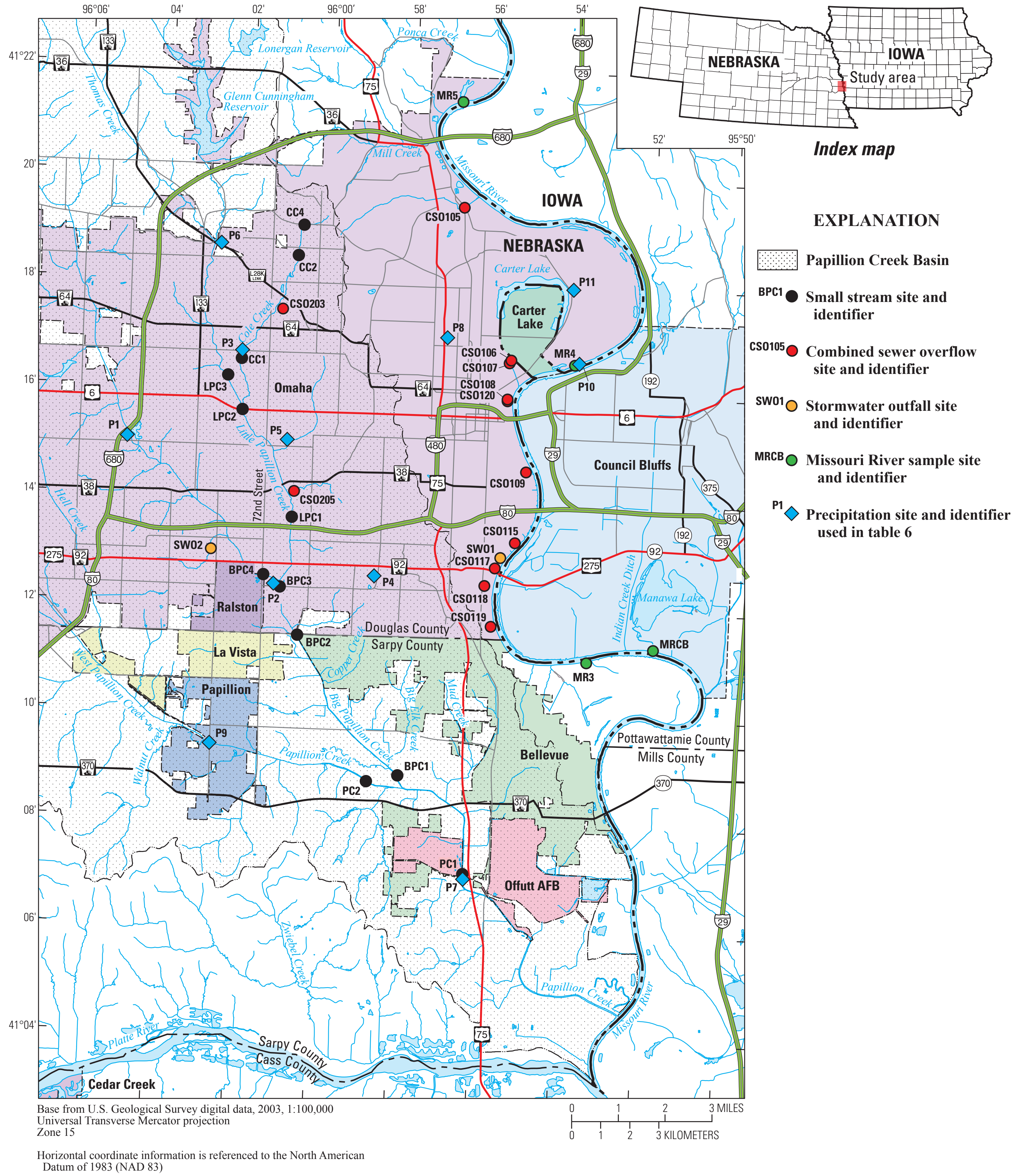

Figure 1. Location of study area.

water-quality constituents of concern during storm and scheduled sampling are discussed. Quality assurance/quality control (QA/QC) sample analyses are discussed to describe the data quality associated with the environmental samples collected during the study. Statistical comparisons to determine significant spatial and temporal differences for constituent concentrations in the basin also are discussed. The measured concentrations in streams are compared to federal and state standards and benchmarks. For selected CSO and stream-sampling sites, the rise, peak, and recession concentrations are compared. Finally, an index based on all data and analyses was calculated to indicate potentially higher priority CSO outfalls or stream reaches for future implementation of control measures or best-management practices (BMPs).

Study Area and Monitoring Network

Omaha is the largest city in Nebraska with a population of 390,007 (U.S. Census Bureau, 2000) and is the government seat for Douglas County. Omaha is located on the eastern edge of Nebraska along the Missouri River, about 30 kilometers (km) north of the mouth of the Platte River. The economy of Omaha includes banking, insurance, telecommunications, architecture/construction, meat packing, and transportation. Omaha has a humid continental climate (Köppen climate classification), with hot summers and cold winters. Average July maximum and minimum temperatures are 31 degrees Celsius (°C) and 19°C, respectively, with moderate humidity and frequent thunderstorms; the January counterparts are -1°C and -12°C (Nebraska State Climate Office, 2008; National Oceanic and Atmospheric Administration, 2008). The maximum temperature recorded in the city is 46°C, the minimum -36°C. Average yearly rainfall is 77 centimeters (cm), falling mostly in the warmer months. Winter precipitation usually takes the form of snow, with average yearly snowfall being 76 cm (Nebraska State Climate Office, 2008; National Oceanic and Atmospheric Administration, 2008).

The CSS in Omaha generally is between the Missouri River and 72nd Street, ranging from the Douglas-Sarpy county line on the south to the Interstate-680 area to the north, and includes more than 132 km^2 (7,300 blocks) and 32 CSO outfalls. Eleven CSO outfalls discharge to tributaries of Papillion Creek, and 21 CSO outfalls discharge to the Missouri River.

The monitoring network for this study was chosen to be representative of CSO outfalls, SWOs, and receiving streams in different areas of the city and in drainages of differing land use or zoning. Samples were collected from 3 stream sites on the Missouri River, and from 10 CSO outfalls and 1 SWO that discharged into the Missouri River. Samples also were collected from 12 Papillion Creek Basin stream (PCBS) sites and from 2 CSO outfalls and 1 SWO that discharged into tributaries of Papillion Creek (table 1). Discharge measurement and water-quality-sampling equipment were installed and operated at 11 PCBS-monitoring locations. The two sites on Cole Creek that were selected for intensive study (real-time water-quality monitors and rise-peak-recession sampling) were chosen because Cole Creek is included on the preliminary 2006 Nebraska list for section 303(d) of the Clean Water Act as being impaired by dissolved oxygen (Nebraska Department of Environmental Quality, 2006), and because the upper end of Cole Creek is upstream from CSO outfalls. Additional sites selected for intense study in the Papillion Creek Basin include the site on Big Papillion Creek downstream from the confluence with Little Papillion Creek (BPC3) and the most downstream monitoring location on Papillion Creek (PC1; fig. 1). BPC3 was selected as a site for determining in-stream effects on water quality in the middle of the CSO discharge area; PC1 was selected as an integrator site to determine overall effects on water quality from all CSO outfalls and stormwater runoff within the Papillion Creek Basin.

Each of the CSO outfall and SWO drainage areas and stream reach subcatchments were characterized by land-use zoning (if available) (City of Omaha, Nebraska, unpub. data, 2008; Sarpy County, Nebraska, unpub. data, 2008) or land cover (U.S. Department of Agriculture, 2006) shown in tables 2 and 3, respectively. Pipe networks upgradient from sites CSO105 and CSO106 and from sites CSO107 and CSO108 cross within the drainage area; therefore, these site pairs were characterized together. Additionally, CSO120 is the overflow for CSO108 and, therefore, these two CSO drainage areas were characterized together (with CSO107) in terms of zoning. The CSO and SWO drainages were completely in the zoned area and did not include any areas zoned as agriculture, so all CSO and SWO drainages were characterized solely by zoning classification.

Residential zoning represents the largest percentage of each of the CSO and SWO drainages that were sampled during the study; however, the second most prevalent zoning type varied among the drainages. Aviation (Eppley Airport) is the second most prevalent zoning type for the CSO105/106 drainage; business district is the second most prevalent for CSO107/108/120 drainage area; industrial is the second most prevalent for CSO109, CSO115, CSO117 (tied with commercial center), CSO205, SWO1, and SWO2 drainage areas; and commercial center is the second most prevalent for CSO117 (tied with industrial), CSO118, and CSO203 drainage areas. Drainages that contain the largest areas for each zoning type are CSO105/106 (aviation, development reserve, industrial, and residential), CSO107/108/120 (business district and downtown service), and CSO205 (commercial center, office, and mixed use).

For the stream reach subcatchments, the most prevalent zoning or land-cover type for CC4, CC2, CC1, LPC2, LPC1, BPC3, and BPC2 was residential, and the most prevalent zoning or land-cover type for LPC3, BPC4, BPC1, PC2, and PC1 was corn or soybeans (table 3). The second most prevalent zoning or land-cover types included development reserve, commercial center, residential, industrial and range, grassland, or floodway. In general, the BPC4, LPC3, BPC1, and PC2 subcatchments have a larger percentage of area outside

Table 1. Station names, field identifiers, and additional site information for combined sewer overflow, stormwater outfall, and stream sites sampled or monitored as part of the combined sewer overflow study in Omaha, Nebraska.

[Site type: SW, surface-water site; CWQ, continuous water-quality site; CSO, combined sewer overflow site; SWO, stormwater outfall site; storm-sample type: NA, not applicable; RPR, rise, peak, and recession; FWT, flow-weighted temporally; FWS, flow-weighted spatially; G, grab]

Station name	Field identifier (fig. 1)	Station number	Site type	Storm-sample type	Additional information
Cole Creek at Sorenson Parkway, Omaha, Nebr.	CC4	411903096004101	SW	NA	Headwaters of Cole Creek
Cole Creek at Parkview Lane, Omaha, Nebr.	CC2	411829096004801	SW, CWQ	RPR	Upstream from CSO outfalls on Cole Creek
Cole Creek at Hillside Dr., Omaha, Nebr.	CC1	411632096020701	SW, CWQ	RPR	Downstream from CSO outfalls on Cole Creek
Little Papillion Creek at Western Ave., Omaha, Nebr.	LPC3	411613096022601	SW	FWT	Upstream from Cole Creek confluence and CSO outfalls on Little Papillion Creek
Little Papillion Creek at Dodge St., Omaha, Nebr.	LPC2	411535096020301	SW	FWT	Downstream from Cole Creek confluence on Little Papillion Creek
Little Papillion Creek at Grover St., Omaha, Nebr.	LPC1	411337096004501	SW	FWT	Downstream from CSO outfalls on Little Papillion Creek
Big Papillion Creek at 72nd St., Omaha, Nebr.	BPC4	411232096012401	SW	FWT	Upstream from Little Papillion Creek confluence and CSO outfalls on Big Papillion Creek
Big Papillion Creek at Q St., Omaha, Nebr.	BPC3	06610770	SW, CWQ	RPR	Downstream from Little Papillion Creek confluence on Big Papillion Creek
Big Papillion Creek at Harrison St., LaVista, Nebr.	BPC2	411126096003101	SW	FWT	Upstream and downstream from CSO outfalls on Big Papillion Creek
Big Papillion Creek at Old 36th St., Bellevue, Nebr.	BPC1	410853095575601	SW	FWT	Downstream from all CSO outfalls in the Papillion Creek basin
Papillion Creek at 42nd St., Omaha, Nebr.	PC2	410845095584201	SW	FWT	Upstream from Big Papillion Creek confluence on Papillion Creek
Papillion Creek at Fort Crook, Nebr.	PC1	06610795	SW, CWQ	RPR	Downstream from Big Papillion Creek confluence on Papillion Creek
Missouri River at N.P. Dodge Park, Omaha, Nebr.	MR5	412126095565201	SW, CWQ	FWS, G	Upstream from all CSO outfalls on the Missouri River; CWQ collected at the west side of the river
Missouri River at Freedom Park, Omaha, Nebr.	MR4	411636095535401	SW	FWS, G	Upstream and downstream from CSO outfalls on the Missouri River
Missouri River at Fontanelle Forest, Omaha, Nebr.	MR3	411105095532301	SW, CWQ	FWS, G	Downstream from all CSO outfalls on the Missouri River; CWQ collected at the west side of the river
Missouri River near Council Bluffs, Iowa	MRCB	06610505	CWQ	NA	Downstream from all CSO outfalls on the Missouri River; CWQ collected at the east side of the river
Combined Sewer Overflow 105, Minne Lusa, Omaha, Nebr.	CSO105	411928095564501	CSO	G	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 106, North Interceptor, Omaha, Nebr.	CSO106	411638095553001	CSO	RPR	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 107, Grace St., Omaha, Nebr.	CSO107	411636095553101	CSO	FWT	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 108, Burt Izard Complex, Omaha, Nebr.	CSO108	411554095553201	CSO	RPR	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 109, Leavenworth St., Omaha, Nebr.	CSO109	411435095550101	CSO	G	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 115, Riverview Blvd., Omaha Nebr.	CSO115	411316095551401	CSO	FWT	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 117, Missouri Ave., Omaha, Nebr.	CSO117	411247095554301	CSO	FWT	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 118, Ohern St., Omaha, Nebr.	CSO118	411227095555701	CSO	FWT (2006), G (2007)	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 119, Monroe St., Omaha, Nebr.	CSO119	411142095554601	CSO	RPR	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 120, Burt Izard Overflow, Omaha, Nebr.	CSO120	411554095553202	CSO	G	CSO outfall that flows into the Missouri River
Combined Sewer Overflow 203, 69th and Evans St., Omaha, Nebr.	CSO203	411729096010801	CSO	RPR	CSO outfall that flows into Cole Creek
Combined Sewer Overflow 205, 64th and Dupont St., Omaha, Nebr.	CSO205	411406096004301	CSO	RPR	CSO outfall that flows into Little Papillion Creek
Stormwater Outfall, 9th and Atlas St., Omaha, Nebr.	SWO1	411259095553501	SWO	FWT	SWO that flows into the Missouri River
Stormwater Outfall, 86th and I St., Omaha, Nebr.	SWO2	411259096024301	SWO	FWT	SWO that flows into Big Papillion Creek

Table 2. Distribution of drainage area among designated land-use zoning or land-cover categories for the combined sewer overflow and stormwater outfall sites in Omaha, Nebraska.

[CSO, combined sewer overflow; SWO, stormwater outfall; bold signifies the CSO that has the largest area for a particular category; italic signifies the most prevalent zoning/land cover for a particular drainage; underscore signifies the second most prevalent zoning/land use for a particular drainage]

Field identifier(s) (table 1; fig. 1)	Area of indicated land-use zoning or land cover, in square kilometers[1]											Drainage-area notes
	Aviation	Business district	Commercial center	Development reserve	Downtown service	Industrial	Office	Residential	Mixed use	Other categories[2]	Total	
CSO105 and CSO106	**8.71**	0	0.49	**1.73**	0	**6.81**	0.05	*17.91*	0.02	0	35.73	Airport
CSO107, CSO108, and CSO120	0	1.02	.28	.01	**.84**	.90	.25	*5.95*	.03	0	9.28	Downtown
CSO109	0	.59	.18	0	.47	1.40	.01	*4.25*	0	0	6.91	Downtown
CSO115	0	.01	.10	0	0	.26	0	*1.82*	0	0	2.19	Zoo
CSO117	0	0	.02	0	0	.02	0	*.99*	0	0	1.03	
CSO118	0	.04	.06	.02	0	0	0	*.94*	0	0	1.06	Packing plant
CSO119	0	0	0	0	0	0	0	*.13*	0	0	.13	Three packing plants
CSO203	0	0	.03	0	0	0	0	*.31*	0	0	.35	
CSO205	0	.01	**.64**	0	0	.94	**.42**	*9.96*	**.07**	0	12.03	University Medical Center
SWO1	0	0	.01	0	0	.12	0	*.33*	0	0	.45	Pesticide plant
SWO2	0	0	.38	.32	0	1.45	.02	*4.10*	0	0	6.28	Industrial area
Total of CSOs and SWOs	8.71	1.67	2.19	2.09	1.31	11.89	0.75	*46.71*	0.12	0	75.43	

[1] Data sources: Zoning from City of Omaha, Nebraska, unpubl. data, 2008, and Sarpy County, Nebraska, unpubl. data, 2008; land cover from U.S. Department of Agriculture, 2006.

[2] Other categories include Offutt Air Force Base, corn, soybeans, alfalfa, small grains, winter wheat, sorghum, other crops, fallow agriculture, pasture, range, grassland, floodway, woods, unclassified, and water.

of the city limits, and therefore have a larger percentage of agriculture than the reach subcatchments that fall within the city limits. Reach subcatchments that were completely in the study area (CC2, CC1, LPC2, LPC1, BPC3, BPC2, BPC1, and PC1) and that contain the largest area for each zoning or land-cover type are LPC2 (commercial center), LPC1 (development reserve, office, residential, and mixed use), BPC2 (industrial), and PC1 (business district; Offutt Air Force Base; corn or soybeans; fallow agriculture; pasture, range, grassland, or floodway; woods; unclassified; urban unzoned; and water).

Methods and Materials

Measurement and Sampling Methods

All water-quality measurements and sample-collection techniques used in this study followed accepted and approved USGS protocols (U.S. Geological Survey, variously dated). Discharge measurements, flow-weighted and grab-sample collection, and field-based and laboratory analysis of environmental and QA/QC samples were completed during this study.

Discharge and Precipitation

Continuous discharge was measured at 10 of the 12 CSO sites and at both SWO sites by a private contractor (ADS Environmental Services, Huntsville, Ala.). At most sites, the continuity equation (flow quantity is equal to the wetted area multiplied by the average velocity) was used to calculate discharge. Because of limitations associated with the CSO site configuration, a weir equation was used instead of the continuity equation for discharge calculation at sites CSO119 and CSO205. The discharge was measured by the contractor, but not used in this report for sites CSO105, CSO109, and CSO117 (between March and October 2007) because of uncertainties associated with continuity equation assumptions used for the discharge calculations. All autosamplers at the CSO and SWO sites were triggered by the contractor flowmeters. The discharge at the CSO and SWO sites is summarized in table 4. All discharge data collected for CSO and SWO sites during the study are available in ADS Environmental (2006, 2007). The maximum instantaneous discharge measured in a CSO during the study was at site CSO205 on May 6, 2007, and the site with the largest mean discharge during flowing conditions was CSO106. The largest SWO discharge measured at the two sites was at site SWO2 on May 5, 2007. More specific information on CSO and SWO discharge

Table 3. Drainage area of stream reach subcatchments distributed among designated land-use zoning or land-cover categories, for stream sites in Omaha, Nebraska.

[CSO; combined sewer overflow; bold signifies the subcatchment that falls completely in the study area that has the largest area for a particular category (does not include CC4, LPC3, BPC4, or PC2); italic signifies the most prevalent zoning/land use for a particular drainage; underscore signifies the second most prevalent zoning/land use for a particular drainage]

Field identifier (table 1; fig. 1)	Area of indicated land-use zoning or land cover, in square kilometers[1]									
	Aviation	Business district	Commercial center	Development reserve	Downtown service	Industrial	Office	Residential	Mixed use	Offut Air Force Base
CC4	0	0	0.22	0.31	0	0	0.08	*1.33*	0	0
CC2	0	0	.09	.13	0	0	.02	*.61*	0	0
CC1	0	.05	.92	.59	0	.03	.08	*8.73*	.23	0
LPC3	.07	0	1.80	10.09	0	2.94	.60	16.91	.40	0
LPC2	0	.02	**1.30**	.11	0	.59	.41	*11.01*	.20	0
LPC1	0	.01	.74	**.74**	0	1.44	**.85**	***11.86***	**.82**	0
BPC4	0	0	4.99	14.05	0	4.94	1.46	50.69	1.67	0
BPC3	0	0	.71	.51	0	2.81	.07	*6.80*	0	0
BPC2	0	.06	.53	3.06	0	**2.93**	.07	*7.95*	.01	0
BPC1	0	.25	.37	.36	0	1.10	.09	3.96	.30	0
PC2	.66	2.28	6.76	13.61	0	19.10	.48	69.08	7.09	0
PC1	0	**3.53**	.02	.03	0	1.82	0	2.08	0	**.27**
Total of all stream sites	0.73	6.19	18.45	43.60	0	37.71	4.22	191.02	10.71	0.27

Table 3. Drainage area of stream reach subcatchments distributed among designated land-use zoning or land-cover categories, for stream sites in Omaha, Nebraska.—Continued

[CSO, combined sewer overflow: bold signifies the subcatchment that falls completely in the study area that has the largest area for a particular category (does not include CC4, LPC3, BPC4, or PC2); italic signifies the most prevalent zoning/land use for a particular drainage; underscore signifies the second most prevalent zoning/land use for a particular drainage]

Field identifier (table 1; fig. 1)	Area of indicated land-use zoning or land cover, in square kilometers[1]									Drainage-area notes
	Corn or soybeans	Other crops[2]	Fallow agriculture	Pasture, range, grassland, or floodway	Woods	Unclassified and unzoned	Urban unzoned	Water	Total	
CC4	0	0	0	0	0	0	0	0	1.94	Headwaters of Cole Creek
CC2	0	0	0	0	0	0	0	0	.85	Upstream from CSO outfalls
CC1	0	0	0	0	0	0	0	0	10.63	Downstream from CSO outfalls
LPC3	*30.10*	3.46	1.16	13.52	1.73	.42	2.14	1.78	88.22	Upstream from CSO outfalls
LPC2	0	0	0	0	0	0	0	0	13.63	Downstream from Cole Creek confluence
LPC1	0	0	0	0	0	0	0	0	16.47	Downstream from CSO outfalls
BPC4	*183.25*	9.76	2.67	48.70	3.69	.55	11.43	1.26	329.65	Upstream from CSO outfalls
BPC3	0	0	0	0	0	0	0	0	10.91	Downstream from Little Papillion Creek confluence
BPC2	0	0	0	0	0	0	0	0	14.62	Downstream from CSO outfalls
BPC1	*6.26*	**.39**	.12	2.33	.48	.07	1.06	0	15.98	Downstream from CSO outfalls
PC2	*102.66*	5.57	1.81	47.64	3.33	.97	24.67	.70	294.05	Upstream from Big Papillion Creek confluence
PC1	***8.73***	.37	**.28**	**5.19**	**.87**	**.23**	**4.87**	**.08**	26.87	Most downstream sampling site; downstream from Big Papillion Creek confluence
Total of all stream sites	*330.99*	19.55	6.03	117.39	10.10	2.24	44.17	3.81	823.82	

[1] Data sources: Zoning from City of Omaha, Nebraska, unpubl. data, 2008, and Sarpy County, Nebraska, unpubl. data, 2008; land cover from U.S. Department of Agriculture, 2006.

[2] Other crops include alfalfa, small grains, and winter wheat.

Table 4. Statistical summary of the measured discharge during periods of flow at combined sewer overflow and stormwater outfall sites during the combined sewer overflow study in Omaha, Nebraska.

[Discharge data from ADS Environmental (2006, 2007); m^3/s, cubic meter per second]

Field identifier (table 1; fig. 1)	Maximum (m^3/s)	Mean (m^3/s)	Date of maximum (month/day/year)
CSO106	11.9	0.095	5/6/2007
CSO107	7.3	.018	5/6/2007
CSO108	15.6	.044	5/6/2007
CSO115	16.4	.024	5/6/2007
CSO117	3.7	.006	5/6/2007
CSO119	8.2	.038	5/23/2007
CSO203	1.6	.001	7/27/2007
CSO205	21.8	.029	5/6/2007
SWO1	1.2	.003	5/6/2007
SWO2	3.0	.008	5/5/2007

measurements can be found in ADS Environmental (2006, 2007).

Continuous stage and discharge data were collected by the USGS at 11 of the 12 stream-sampling sites in the Papillion Creek Basin and along the Missouri River near Omaha, Nebr., from July 2006 through November 2006 and from March 2007 through September 2007. Stage data were measured at 15-minute intervals by using pressure transducers and recorded on data-collection platforms (DCPs). Discharge measurements initially were made at various stages to define the relation between stage and discharge. Discharge measurements were then made at periodic intervals to verify the stage-discharge relation or to define any change in the relation because of changes in channel geometry. At the Missouri River sites, discharge was measured during sample collection at sites MR3 and MR5. Continuous records from the USGS stream gage in the Missouri River near MR4 (USGS station number 06610000, Missouri River at Omaha, Nebr.) were used for discharge data for that site. The discharge at the stream sites is summarized in table 5. For the PCBS sites, the median discharge generally increased from upstream to downstream. The largest measured flow for each site except site LPC3 (July 27, 2007) occurred during the storm on May 6, 2007. For the Missouri River, the USGS stream gage near MR4 (Missouri River at Omaha) was used to summarize the flow. The largest measured flow in the Missouri River was 2,440 cubic meters per second (m^3/s) on May 6, 2007. All discharge data for the stream sites are available online at *http://waterdata.usgs.gov/ne/nwis/sw/*.

Precipitation measurements during each storm-sample collection at 11 sites (fig. 1) were obtained from One Rain (2008), the National Oceanic and Atmospheric Administration (2008), and U.S. Geological Survey (unpub. data, 2006, 2007) (table 6). The largest storm that was sampled had an average rainfall of 69 mm on May 6, 2007. The mean percentage relative standard deviation (RSD) for each of the sampled storms across the study area was 38 percent. The average sampled storm precipitation was 29 mm, 12 mm, and 18 mm during the spring (March through May), summer (June through August), and autumn (September through November), respectively.

Scheduled Sampling

Scheduled samples were collected monthly at predetermined dates regardless of flow for all stream-sampling sites. For the PCBS sites, scheduled samples were grab samples manually collected midstream. The elapsed time since the last measureable precipitation preceding scheduled samples in the Papillion Creek Basin is listed in table 7. Missouri River samples were collected at 10 equally spaced verticals by using a US D-96 bag sampler in accordance with the protocols and

Table 5. Statistical summary of measured discharge at stream sites during the combined sewer overflow study in Omaha, Nebraska.

[m^3/s, cubic meter per second]

Field identifier (table 1; fig. 1)	Discharge at indicated point of statistical distribution (m^3/s)					Date of maximum (month/day/year)
	Minimum	25th percentile	Median	75th percentile	Maximum	
CC2	0.001	0.003	0.003	0.006	27.8	5/6/2007
CC1	.004	.016	.024	.040	32.6	5/6/2007
LPC3	.042	.13	.25	.54	53.0	7/27/2007
LPC2	.079	.16	.24	.51	120	5/6/2007
LPC1	.10	.22	.40	.76	185	5/6/2007
BPC4	.28	.85	1.44	2.55	244	5/6/2007
BPC3	.62	1.22	1.93	3.48	280	5/6/2007
BPC2	.76	1.30	1.95	3.20	283	5/6/2007
BPC1	.82	1.36	2.01	3.62	278	5/6/2007
PC2	.34	.68	1.05	2.10	157	5/6/2007
PC1	1.39	2.32	3.31	5.61	439	5/6/2007
MR4	354	759	810	892	2,440	5/6/2007

Table 6. Precipitation during each storm-sampling event at 11 sites within the combined sewer overflow study area in Omaha, Nebraska.

[Precipitation data from OneRain (2008), National Oceanic and Atmospheric Administration (2008), and U.S. Geological Survey (unpubl. data [2006, 2007]); --, no data; NA, not applicable]

Map reference number (fig. 1)	Precipitation site	Field identifier of closest water-quality sampling site (table 1; fig. 1)	Precipitation, in millimeters, on date indicated (month/day/year)																	Summary statistics for all sites on all dates sampled
			9/9/2006	9/15/2006	9/16/2006	10/26/2006	3/24/2007	4/10/2007	4/22/2007	5/6/2007	5/24/2007	6/22/2007	7/9/2007	7/19/2007	8/6/2007	8/16/2007	9/10/2007	9/24/2007	10/2/2007	
P1	Big Papillion Creek at Interstate 680	LPC2	--	--	--	--	6	17	11	--	31	1	10	--	26	7	--	19	15	NA
P2	Big Papillion Creek at Ralston	BPC3	41	6	24	--	--	16	13	38	24	3	8	24	20	3	35	9	14	NA
P3	Cole Creek at Blondo Street	CC1	28	2	20	--	--	18	11	79	31	1	5	23	16	6	22	17	16	NA
P4	Hitchcock Park	CSO118	41	6	26	3	--	19	17	99	30	--	11	29	16	5	34	11	15	NA
P5	Little Papillion Creek at Aksarben Drive	CSO205	44	3	16	--	14	17	14	54	29	1	14	23	20	5	39	9	--	NA
P6	Little Papillion Creek at Irvington Street	CC2	61	3	25	--	29	17	7	58	25	10	5	33	35	5	54	20	17	NA
P7	Papillion Creek at Fort Crook	PC1	60	2	20	2	20	16	12	114	19	1	3	18	33	6	34	20	17	NA
P8	City Vehicle Maintenance Yard	CSO107	31	--	--	2	19	15	16	16	24	7	4	16	8	5	26	9	10	NA
P9	West Papillion Creek	PC2	--	6	10	3	21	6	17	54	33	6	6	17	34	4	--	6	11	NA
P10	Missouri River at Omaha	MR4	31	7	29	3	17	1	18	103	24	1	3	27	15	6	27	11	12	NA
P11	Eppley Airfield	MR4	39	4	27	3	27	8	25	73	28	1	4	27	8	6	3	11	13	NA
	Mean		42	4	22	3	19	14	15	69	27	3	7	24	21	5	30	13	14	20
	Standard deviation		12	2	6	1	7	6	5	31	4	3	4	5	10	1	14	5	2	7
	Relative standard deviation, in percent		28	43	28	21	38	44	32	45	15	103	56	23	46	21	45	39	17	38

guidelines described by the USGS (U.S. Geological Survey, variously dated). Grab samples also were collected in a 125-milliliter (mL) pre-sterilized bottle during scheduled sample collections for analysis of *Escherichia coli (E. coli)* bacteria to provide data that the Nebraska Department of Environmental Quality (NDEQ) could use for purposes of classifying stream segments with the Papillion Creek Basin for the Nebraska 303(d) list. In addition to these samples, seven samples also were collected from inlet flow sewage from five CSO sites [CSO 115, CSO 118 (two samples), CSO 119, CSO 203, and CSO 205 (two samples)] on November 14, 2006, and/or September 28, 2007. These seven sewage samples were collected from the inlet pipe that was flowing to the wastewater treatment plant; there were not dry-weather flows at the CSO sites on these days.

Table 7. Elapsed time since the last precipitation preceding scheduled sample collection in northern and southern parts of the Papillion Creek Basin in Omaha, Nebraska.

Date sampled	Time since rainfall (days)	
	North from Interstate 80	South from Interstate 80
8/22/2006	2.0	2.0
9/19/2006	2.0	2.0
10/17/2006	1.0	1.0
11/14/2006	4.0	4.0
3/20/2007	10.0	10.0
4/23/2007	1.0	1.0
5/29/2007	3.5	3.5
6/19/2007	12.0	6.0
8/6/2007	9.0	5.0
8/22/2007	2.0	2.0
9/17/2007	7.0	7.0
Overall average:	4.9	4.0
Spring average:	4.8	4.8
Summer average:	6.3	3.8
Autumn average:	3.5	3.5

Stormflow Sampling

Stormflow samples for all CSO and Papillion Creek Basin sites were collected by using automatic samplers with Teflon-lined tubing and fluorinated bottles (Teledyne Isco, Lincoln, Nebr.). Grab samples also were collected in a 125-mL pre-sterilized bottle for analysis of *E. coli* bacteria at the time autosampler samples were retrieved from the field. Automatic samplers for CSO sites were triggered when the overflow was occurring and there was greater than 30 mm of water above the sampling line intake. Papillion Creek Basin sites were triggered when stage increased more than 30 mm in 15 minutes, which was assumed to represent the beginning of a storm runoff hydrograph. Storm samples were processed only when at least 2 of the 3 Papillion Creek CSO and SWO sites were flowing and triggered, and at least 8 of the 10 Missouri River CSO and SWO sites were flowing and triggered. During some storms, mechanical failures or short storm duration did not permit sample collection for every sampling site that triggered.

Most storm samples were composited as temporally flow-weighted samples, meaning the volume of water added to the sample from an individual automatic sampler bottle was proportional to the total discharge volume for the time increment sampled. Compared to other sampling strategies, the use of flow-weighted sampling provides the most accurate estimated mass loads for basin monitoring (Miller and others, 2007). Flow-weighted storm samples were processed as either rise-peak-recession samples, where the storm hydrograph was separated into three different samples when sample volume permitted, or as composite samples representative of the entire hydrograph. When water volume or storm duration did not allow for a composite sample, the sample was analyzed for a subset of analytes as a grab sample from a single autosampler bottle.

Equation 1 shows how the contributing volumes from individual automatic sampler bottles are determined to create a representative flow-weighted sample. The proportion of water added to the sample from individual automatic sampler bottles is normalized on the basis of the volume collected in the sample bottle with the largest total flow volume of water during the time increment ($V_{t\,max}$). Calculated flow volumes during each time increment [$(Q_{ti})(t_i)$] are divided by the calculated flow volume maximum [$(Q_{t\,max})(t_{max})$]. This fraction is multiplied by the volume collected for the maximum volume increment ($V_{t\,max}$) to determine contributing volume of water from the other sampler bottles (V_i).

$$V_i = V_{t\max} \frac{\left[\left(Q_{ti}\right)\left(t_i\right)\right]}{\left[\left(Q_{t\max}\right)\left(t_{\max}\right)\right]} \qquad (1)$$

where:

- V_i is the volume (in milliliters) added to the sample from bottle *i*;
- $V_{t\,max}$ is the volume (in milliliters) of the water collected in the sample bottle for the maximum flow volume;
- Q_{ti} is the discharge (in cubic meters per second) at time bottle *i* was filled;
- t_i is the time increment (in minutes) for bottle *i*;
- $Q_{t\,max}$ is the discharge (in cubic meters per second) for the time increment with the largest flow volume;
- t_{max} is the time increment (in minutes) for the largest flow volume.

The sample line for all automatic samplers was rinsed before storm-sample collection. Rinsing was accomplished by either the automatic sample line rinse that uses automatic liquid detection or discarding the first automatic sampler bottle collected. The automatic sample line rinse was the preferred option because the sample line is rinsed in between every bottle, but could be used only if the sample line was less than 15.2 meters (m) long and had less than 6.1 m of suction head (Sueverkruepp, 1996). Sample line lengths, suction heads, and the sample line rinse method used for all the sampling sites are presented in table 8.

Table 8. Tubing length, suction head, and rinse method for automatic samplers located at the combined sewer overflow, stormwater outfall, and stream sites sampled for the combined sewer overflow study in Omaha, Nebraska.

[m, meter]

Field identifier (table 1; fig. 1)	Tubing length (m)	Suction head (m)	Rinse method
CC1	7.3	4.6	Automatic rinse
CC2	7.6	3.7	Automatic rinse
LPC1	14.9	8.2	First bottle discarded
LPC2	16.8	7.9	First bottle discarded
LPC3	14.6	7.6	First bottle discarded
BPC1	20.1	7.9	First bottle discarded
BPC2	22.9	7.6	First bottle discarded
BPC3	17.1	7.9	First bottle discarded
BPC4	17.4	8.2	First bottle discarded
PC1	15.8	7.6	First bottle discarded
PC2	15.8	8.2	First bottle discarded
CSO105	6.1	3.7	Automatic rinse
CSO106	5.2	3.7	Automatic rinse
CSO107	13.7	6.7	First bottle discarded
CSO108	22.9	8.2	First bottle discarded
CSO109	6.1	4.9	Automatic rinse
CSO115	11.0	3.7	Automatic rinse
CSO117	6.1	3.7	Automatic rinse
CSO118	9.8	4.9	Automatic rinse
CSO119	7.6	4.9	Automatic rinse
CSO120	18.3	7.6	First bottle discarded
CSO203	6.1	3.0	Automatic rinse
CSO205	7.6	3.7	Automatic rinse
SWO1	4.0	2.4	Automatic rinse
SWO2	6.1	3.7	Automatic rinse

Missouri River samples were collected near Omaha, Nebr., at three sites during storm sampling. The storm samples were collected during daylight hours as soon as possible after the triggering of CSO autosamplers, in view of safety issues related to operating a boat on the Missouri River at night during high-flow conditions. Spatially composited storm samples were collected at 10 equal-width increment (EWI) verticals by using a US D-96 bag sampler in accordance with the protocols and guidelines described by the USGS (U.S. Geological Survey, variously dated). In addition to the collection of composite samples, a depth-integrated single-vertical sample was collected near the right bank at the three Missouri River sites. Samples were collected from downstream (MR3) to upstream (MR5) to maximize the chance of sampling the downstream sites whereas CSO outfalls were discharging to the Missouri River.

Continuous Water-Quality Monitoring

Continuous water-quality (CWQ) monitors were deployed at four sites within the Papillion Creek Basin (CC1, CC2, BPC3, PC1) and three on the Missouri River (MR3, MR5, MRCB) near Omaha, Nebr., (fig. 1) from September to November 2006 and from March to September 2007. The benefit of using CWQ monitoring has been demonstrated in previous surface-water monitoring and remediation studies (Christensen, 2001; Wilkison and others, 2002; Irvine and others, 2005a; Poskas and Umberg, 2005; Rasmussen and others, 2005). Water quality in urban basins can change rapidly, requiring repeated sampling during a range of hydrologic conditions. Because traditional water-quality studies collect one sample at a given point in time, diurnal, runoff-related, and seasonal changes in water quality can be difficult to characterize. Continuous monitoring of selected constituents can indicate those changes between discretized sampling, and has been used to support studies for development of surrogates in load calculation, allow for the immediate determination of constituent levels in streams, and optimize water-quality-sampling strategies (Combs and others, 2003).

Continuously Monitored Water-Quality Constituents

Each monitor recorded at 15-minute intervals and provided a continuous record of specific conductance (SC), pH, water temperature (WT), turbidity, and dissolved oxygen (DO). Monitors were operated and maintained in accordance with the standard procedures described in Wagner and others (2006). Specific conductance is the ability of water to conduct an electric current and is a function of the amount of dissolved ions in water (Hem, 1985). Typically, these ion concentrations—and the resulting SC values—are lowest in precipitation and greatest in groundwater that has percolated through mineralogically rich soils. As a result, SC can indicate rainfall runoff in streams and can be used to approximate the recovery time associated with a return to pre-storm conditions following rainfall. SC also can be affected by anthropogenic-contaminant sources including urban and agricultural runoff (Rasmussen and others, 2005). When not associated with rainfall runoff, these contaminants can result in increases in SC.

The pH of water is the concentration of hydrogen ions and is expressed as the negative base-10 logarithm. The pH of water affects the solubility and biological availability of chemicals affecting the growth and behavior of aquatic organisms. The pH of most ambient waters ranges from 6.5 to 8.5 standard units (Hem, 1985), and Nebraska water-quality criteria require that the pH of streams shall be maintained between 6.5 and 9.0 (Nebraska Department of Environmental Quality, 2006).

Water temperature plays a valuable role in the chemistry of freshwater ecosystems by affecting the solubility of dissolved constituents, SC, biological activity, and rates of reactions (U.S. Geological Survey, variously dated). Nebraska water-quality criteria require that discharges to streams not raise the WT greater than 5ºC more than ambient temperature with a maximum-allowable WT of 32ºC (Nebraska Department of Environmental Quality, 2006).

Turbidity is a measure of the clarity of water that is affected by suspended matter such as sediment, particulate-organic matter, plankton, and other microscopic organisms (U.S. Geological Survey, variously dated). More specifically, turbidity is a measure of the optical properties of water that cause light to be scattered or absorbed. This study utilized model 6136 sensors—which measure the amount of light scattered at a right angle from a near-infrared light source—developed by YSI Incorporated (Yellow Springs, Ohio) to collect turbidity measurements. Because the sensors use a near-infrared rather than a white (broad spectrum) light source, turbidity is reported in formazin nephelometric units (FNU) instead of the more common nephelometric turbidity units (NTU). These reporting units are compatible in standard solutions, but may deviate in environmental samples (U.S. Geological Survey, variously dated). The probes have a maximum operating limit of approximately 1,000 FNU; a lower reporting limit of 1 FNU was assigned for this study. Turbidity serves as a proxy for suspended sediment and is sensitive to erosional processes, including eroded upland sediment transported to the stream during rainfall runoff, as well as stream-bank failures that typically follow runoff. Although turbidity is not necessarily harmful, the suspended particles associated with turbidity provide attachment sites for bacteria, nutrients, and pesticides (Rasmussen and others, 2005), may disturb aquatic communities, and may lead to sedimentation problems.

The amount of DO in streams is a function of photosynthetic production, metabolic respiration, and atmospheric reaeration. DO is essential for the growth and survival of aquatic ecosystems, and also is a valuable indicator of aquatic-ecosystem health (U.S. Geological Survey, variously dated). Nebraska water-quality criteria require that DO concentrations remain greater than 5.0 milligrams per liter (mg/L) in warm-water streams such as those of the Papillion Creek Basin (Nebraska Department of Environmental Quality, 2006). Diel fluctuations in DO result from photosynthetic production during daylight and continuous respiratory consumption. This diel effect often is dampened by the introduction of rainfall runoff that disturbs the aquatic community. Seasonal changes in DO are the combined result of changes in the aquatic community and the ability of water to hold more DO as WT decreases. All DO data from the 2006 field season were collected by using an amperometric DO sensor. This sensor has been the standard for in-situ DO measurements for decades but is prone to sensor fouling and calibration drift. Additionally, the amperometric process consumes DO to measure it, limiting the effectiveness in low-velocity streams. These three issues led to significant loss of data during the 2006 field season. As a result, the amperometric DO sensors were replaced by luminescent DO sensors for the 2007 field season—a new technique shown to be comparable with amperometric techniques but not as susceptible to fouling and sensor drift (Alliance for Coastal Technologies, 2004; Johnston and Williams, 2006). A more detailed description of the theory of operation of amperometric and luminescent DO sensors is given in U.S. Geological Survey (variously dated) or Johnston and Williams (2006).

Deployment Configurations

Deployment configurations varied by site, but typically consisted of a polyvinyl chloride pipe housing that was anchored to the streambank or was suspended from a bridge (at PC1). Anchored deployments are more susceptible to streambank erosion and sedimentation problems than suspended deployments; however, they are less susceptible to equipment loss caused by streamflow debris or vandalism. Because of continued sedimentation following runoff, the BPC3 configuration was moved from the streambank to a vertical post set into the streambed on May 22, 2007. The continuous monitor at PC1 was suspended from the bridge because of repeated instrument failures from streambank erosion during high flow during the first few weeks of deployment during the study.

Data Processing

All data collected by the CWQ monitors were processed according to the guidelines of the USGS reported by Wagner and others (2006). Field maintenance QA protocols routinely evaluated error associated with sensor fouling (from algal growth, for example) and with calibration drift. On the basis of the error evaluation, the data were adjusted accordingly or, if the error magnitude was too large, deleted to produce a final water-quality record. Data adjustments and final records were thoroughly checked and reviewed before publication.

Subsets of Time Series Water-Quality Data

In addition to providing a more continuous record of water quality at the seven monitored sites, the CWQ data were used to detect differences between sites by using standard t-tests and paired t-tests (Helsel and Hirsch, 2002); however, the time series CWQ data cannot be tested using t-tests because they are not independently distributed in that each particular data value will be correlated to the value measured immediately preceding it. To perform the t-tests, independently distributed subsets were extracted from the time series data by using a stratified random approach. For a given constituent at a given site, the daily mean data (or daily median data for pH) were first stratified into three seasonal groupings (spring as March, April, and May; summer as June, July, and August; autumn as September, October, and November) and then two groups according to the presence or absence of overflow from site CSO205. From each stratified group, 20 daily values were randomly selected from each group for a maximum of 120 values per site in the subset. This selection was done for each constituent at each site to compile the data used in standard t-tests.

The same stratified random approach was used to compile paired data subsets. Because the data were paired by time, a randomly selected subset of 120 days (20 days within each of the six stratified groups) was identified. Daily CWQ values associated with the subset were compiled from all seven sites for use in paired t-tests.

Water-Quality Sample Processing and Equipment Decontamination

All samples were transported on ice and delivered to a central processing facility (Midwest Laboratories, Omaha, Nebr.). All laboratory working surfaces were covered with aluminum foil before processing. Delivered samples were logged into a custom database that automatically generated supporting documentation for the different analytical laboratories involved and internal water-quality record files. If the sample was a temporally flow-weighted composite, programmed spreadsheets were used to determine the volume needed from each automatic sampler bottle to prepare each composite sample. Automatic sampler bottles were agitated gently by hand until the contents were well mixed. The contents were poured into a tared, 1-liter (L) beaker on a digital scale until the needed fraction was reached. The subsample from each contributing automatic sampler bottle was poured into a Teflon churn (U.S. Geological Survey, variously dated). Once the required bottle fractions were added, the Teflon churn was used to mix the composited sample.

Processed sample bottles were filled from the churn based on a predetermined bottle filling priority. First all raw (unfiltered; includes all constituents not specifically mentioned in this paragraph) bottles were filled, then a small bottle used for nutrient sample filtration was filled, and finally one small beaker was filled for SC, pH, and turbidity measurements. Raw samples were preserved in accordance with the procedures outlined in U.S. Geological Survey (variously dated). For nutrient samples, the filtered sample initially consisted of a 125-mL sample that was filtered into a pre-rinsed polyethylene bottle through a pre-rinsed 45-micrometer (µm) Gelman capsule filter in a processing chamber. Because of the volumes of water collected during storm sampling, a custom method for low volume filtered samples was implemented in October 2006, in which samples were processed using pre-rinsed polypropylene, disposable 30-mL syringes and syringe filters (0.45-µm polyethersulfone filter). The sample was filtered through the syringe filters into pre-rinsed 10.5-mL vacuette tubes to within 1 cm of the top. All processed samples were bagged and stored at 5°C until shipment. Specific conductance, pH, and turbidity measurements were recorded from calibrated field meters. Turbidity was measured using a model 2100P turbidity meter

(Hach Company, Loveland, Colo.). Subsamples were diluted with deionized water when measured turbidity exceeded the sensor measuring limit of 1,000 NTU.

Equipment cleaning used a modified U.S. Geological Survey (variously dated) procedure that was largely driven by safety and cross-contamination concerns. At wash stations located apart from the sample processing stations, equipment was rinsed with tap water to remove any particulates from surfaces, sprayed with disinfectant to kill any residual bacteria (Envirocide™, Metrex Research Corporation, Parker, Colo.), and rinsed with tap water. Teflon churns were disassembled and washed with a 0.2 percent Liquinox solution (Alconox Inc., White Plains, N.Y.), rinsed with tap water three times, given a light methanol rinse, rinsed three times with deionized water, washed in a 5 percent hydrochloric acid solution, and again rinsed three times with deionized water. Washed churns were assembled, allowed to dry on a drying station covered with aluminum foil, and placed within two plastic storage bags until later use.

Analytical Methods

Most of the samples collected were analyzed for a suite of constituents consisting of SC, pH, turbidity, chemical oxygen demand (COD), biochemical oxygen demand (BOD), total suspended solids (TSS), hardness, chloride, nutrients, metals, and organic wastewater compounds (69 compounds typically present in domestic and industrial wastewater samples), and *E. coli* bacteria. Analyses for nutrients, metals, and organic wastewater compounds were completed at the USGS National Water Quality Laboratory (NWQL) in Lakewood, Colo. COD, TSS, and *E. coli* bacteria samples were analyzed at Midwest Laboratories (Omaha, Nebr.). BOD samples collected during the week (Sunday–Thursday) were sent to Analytical Services (Niceville, Fla.) for analysis. If the samples were collected on Friday or Saturday, BOD samples were analyzed by Midwest Laboratories (Omaha, Nebr.) to avoid potential holding time violations. Hardness and chloride samples were analyzed by Ward Laboratories (Kearney, Nebr.).

Discrete Water-Quality Field Measurements

Discrete water-quality field measurements were made in the sample-processing center. The discrete water-quality field measurements included SC, pH, and turbidity. All meters used for field measurements were calibrated using standard USGS procedures (U.S. Geological Survey, variously dated).

Chemical Oxygen Demand

The COD test commonly is used to indirectly measure the amount of organic compounds in water by measuring the oxygen demand resulting from chemical oxidation of organic matter (Masters, 1991). It is expressed in milligrams per liter and indicates the mass of oxygen consumed per liter of solution. COD samples were analyzed by Midwest Laboratories (Omaha, Nebr.) using the automated U.S. Environmental Protection Agency (USEPA) method 410.4, approved for determination of COD in streams and in domestic and industrial waste (Jirska and Carter, 1975). The automated method 410.4 uses a colorimetric method to determine COD concentrations spectrophotometrically at a wavelength of 600 nanometers (nm). The applicable range for the automated method is 3–900 mg/L.

Biochemical Oxygen Demand

Biochemical oxygen demand measures the rate of oxygen uptake by microorganisms in a sample of water at a temperature of 20°C and over an elapsed period of 5 days in the dark. Biochemical oxygen demand is similar in function to COD, in that both indicate the amount of organic compounds in water; however, COD is less specific because it measures everything that can be chemically oxidized rather than only levels of biologically active organic matter (Masters, 1991). Generally, BOD samples were analyzed by Analytical Services laboratory in Niceville, Fla. On occasions when holding time requirements could not be met because of the time of sampling, samples were delivered to Midwest Laboratories (Omaha, Nebr.) for analysis. BOD samples were analyzed using USEPA method 405.1 developed to determine the relative oxygen requirements of municipal and industrial wastewaters, as described in American Public Health Association (1980) and Young (1973). The test is an empirical bioassay-type procedure that measures the DO consumed by microbial life while assimilating and oxidizing the organic matter present.

Hardness

Hardness in water is defined as the presence of multivalent cations. Analysis of the water samples for hardness was completed by Ward Laboratory in Kearney, Nebr., by using standard method 2340B, which is the use of ethylenediaminetetraacetic acid (EDTA) titration to determine hardness through the measurement of calcium and magnesium ions (American Public Health Association, 1998). Use of the EDTA titration methodology is applicable to all waters and is suitable to all concentration ranges.

Total Suspended Solids

Sediment delivery to streams is a concern because of the geomorphological, water-quality, and ecological changes sediment can cause in receiving water bodies. The TSS concentration also has been shown to be a good indicator of bacterial contamination in rivers and streams in Kansas (Rasmussen and Ziegler, 2003; Rasmussen and others, 2005). Gravimetric analysis of TSS samples were done by Midwest Laboratories (Omaha, Nebr.) using the analytical method described by Guy (1969).

Chloride

Chloride concentrations may be used as a surrogate of contamination of streams by wastewater because wastewater generally has elevated concentrations of chloride relative to precipitation or uncontaminated streams (which derive from groundwater springs in the study area). Chloride concentrations were determined by Ward Laboratory in Kearney, Nebr., by using USEPA method 325.2 as approved for National Pollutant Discharge Elimination System (NPDES) monitoring in 1978 (O'Brien, 1962). This method has been approved for use on drinking-, surface-, and saline-water samples, with an applicable range of concentrations from 1 to 200 mg/L as chloride, which could be extended through sample dilution.

Nutrients

Excessive levels of nutrients (nitrogen and phosphorous species) can have negative effects on stream-water quality. In urban areas, nutrients in streams may derive from chemical fertilizers applied to landscaped areas, lawns and gardens, failed septic systems, soil erosion, atmospheric deposition, and intentional or unintentional release of wastewater. Excessive nutrients in streams can stimulate algal growth and cause nuisance algal blooms or eutrophication (Correll, 1998; Smith and others, 1999). Nutrient samples were analyzed for nitrogen (nitrite, nitrite plus nitrate, ammonia, and total nitrogen) and phosphorus (total phosphorus and orthophosphate) from filtered and whole-water samples by NWQL.

Colorimetric analytical methods were used for the analysis of samples for individual nitrogen species (Fishman, 1993). The colorimetric analytical methods can be used to measure ammonia concentrations ranging from 0.002 to 0.30 mg/L; nitrite as nitrogen ranging from 0.001 to 0.20 mg/L; and nitrite plus nitrate as nitrogen between 0.1 and 5.0 mg/L (Fishman, 1993). Constituent concentrations greater than these ranges required sample dilution before analysis. Total nitrogen (organic nitrogen plus ammonia plus nitrite plus nitrate) concentrations were determined by alkaline persulfate digestion (Patton and Kryskalla, 2003).

A colorimetric method of analysis was used for determinations of orthophosphate (Fishman, 1993). Orthophosphate concentrations were determined colorimetrically in the range from 0.01 to 1.0 mg/L. Constituent concentrations greater than this range required sample dilution before analysis. Laboratory analytical methods for total phosphorus varied depending on the range in concentrations detected. Low-level total phosphorus concentrations ranging from 0.004 to 0.20 mg/L as phosphorus were analyzed using EPA method 365.1 (U.S. Environmental Protection Agency, 1993). If total phosphorus concentrations were greater than 0.20 mg/L, the samples were analyzed by using alkaline persulfate digestion (Patton and Kryskalla, 2003).

Metals

Metals can persist in the environment, accumulate in streambed sediment and aquatic life, and may be toxic to humans and aquatic life (Lee and others, 2005). Most samples collected during the study were analyzed for the metals antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, thallium, uranium, vanadium, and zinc by the NWQL. Collision/reaction cell inductively coupled plasma-mass spectrometry (cICP-MS), as described by Garbarino and others (2006), was used in the determination of all metals concentrations except mercury. Mercury determinations were made using cold vapor-atomic fluorescence spectrometry (Garbarino and Damrau, 2001). Whole-water recoverable mercury includes dissolved mercury species and mercury species adsorbed to particulate matter.

Organic Wastewater Compounds

During base- and storm-flow sampling, several organic compounds have been detected in streams receiving CSOs by Wilkison and others (2002). Several wastewater indicator compounds, notably bisphenol A, nonylphenol ethyloxalates, para-cresol, and triclosan, are known or suspected endocrine disrupters (National Research Council, 1999). The pharmacology of many of the other wastewater compounds indicates that deleterious environmental effects are likely, either as agents of endocrine disruption or through direct harm to bacterial and aquatic health (Daughton and Ternes, 1999; Kime, 1999). Concentrations of 69 organic compounds often detected in industrial or domestic wastewater were determined in whole-water samples by using the analytical methods developed by Zaugg and others (2006) at the NWQL. The method is useful in evaluating the effects of combined sanitary and storm-sewer overflow on the water quality of streams, focusing on the determination of compounds that may indicate wastewater or have endocrine-disrupting potency (Zaugg and others, 2006). The endocrine-disruption potency, Chemical Abstract Service (CAS) registry number, and common use, application, or occurrence of the compounds on this analytical schedule are listed in table 9.

E. coli Bacteria

Water contaminated with *E. coli* may signal the presence of other pathogens, such as *Salmonella* species, *Shigella* species, hepatitis A virus, and Norwalk viruses (Kinde and others, 1997; Dombek and others, 2000). Quantification of *E. coli* bacteria density was completed by using the Quantitray 2000 test procedure as approved for ambient and compliance monitoring by the USEPA (IDEXX, 2006). Generally, water samples for *E. coli* were analyzed within 6 hours of sampling and within 2 hours of receipt of sample in laboratory for samples that could be used for compliance monitoring, or within

Table 9. Wastewater method compound names, endocrine-disrupting potency, parameter/method codes, and possible compound uses (modified from Zaugg and others, 2006).

[EDP, endocrine-disrupting potency; CAS, Chemical Abstracts Service; S, suspected; -, not a suspected endocrine disruptor; K, known; CP, combustion product; PAH, polycyclic aromatic hydrocarbon; FR, flame retardant; H, herbicide; GUP, general-use pesticide; I, insecticide; F, fungicide; UV, ultraviolet; WW, wastewater]

Compound name	EDP[1]	CAS Registry Number[2]	Parameter/ method codes[3]	Possible compound uses or sources[4]
1,4-Dichlorobenzene	S	106-46-7	34571Y	Moth repellent, fumigant, and deodorant.
1-Methylnaphthalene	-	90-12-0	81696Z	2 to 5 percent of gasoline, diesel fuel, or crude oil
2,2’,4,4’-Tetrabromodiphenyl ether (BDE congener 47)	-	5436-43-1	63147A	Widely used brominated flame retardant
2,6-Dimethylnaphthalene	-	581-42-0	62805Z	Present in diesel/kerosene (trace in gasoline)
2-Methylnaphthalene	-	91-57-6	30194Z	2 to 5 percent of gasoline, diesel fuel, or crude oil
3,4-Dichlorophenyl isocyanate	-	102-36-3	63145A	Degradate of diuron, a noncrop herbicide
3-*beta*-Coprostanol	-	360-68-9	62806Z	Carnivore fecal indicator
3-Methyl-1H-indole (skatol)	-	83-34-1	62807Z	Fragrance, stench in feces and coal tar
3-*tert*-Butyl-4-hydroxyanisole (BHA)	K	25013-16-5	61702Z	Antioxidant, general preservative
4-Cumylphenol	K	599-64-4	62808Z	Nonionic detergent metabolite
4-*n*-Octylphenol	K	1806-26-4	62809Z	Nonionic detergent metabolite
para-nonylphenol (total)	K	84852-15-3	62829Z	Nonionic detergent metabolite
4-*tert*-Octylphenol	K	140-66-9	62810Z	Nonionic detergent metabolite
5-Methyl-1H-benzotriazole	-	136-85-6	61944Z	Antioxidant found in antifreeze and deicers
Acetophenone	-	98-86-2	62811Z	Fragrance in detergent and tobacco, flavor in beverages
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN)	-	21145-77-7	62812Z	Musk fragrance (widespread use) persistent in groundwater
Anthracene	-	120-12-7	34220Z	Component of tar, diesel, or crude oil; CP
Anthraquinone	-	84-65-1	62813Z	Manufacture of dyes and textiles, seed treatment, bird repellent
Atrazine	K	1912-24-9	39630C	Selective triazine herbicide
Benzo[*a*]pyrene	K	50-32-8	34247Z	Regulated PAH, used in asphalt and in cancer research; CP
Benzophenone	S	119-61-9	62814Z	Fixative for perfumes and soaps
beta-Sitosterol	-	83-46-5	62815Z	Plant sterol
beta-Stigmastanol	-	19466-47-8	61948Z	Herbivore fecal indicator (digestion of sitosterol)
Bis(2-ethylhexyl) phthalate	K	117-81-7	39100C	Plasticizer for polymers and resins, pesticide inert ingredient
Bisphenol A	K	80-05-7	62816Z	Manufacture of polycarbonate resins, antioxidant; FR
Bromacil	-	314-40-9	30234Z	H (GUP); greater than 80 percent noncrop usage on grass/brush
Caffeine	-	58-08-2	81436Z	Beverages, diuretic, very mobile/biodegradable
Camphor	-	76-22-2	62817Z	Flavor, odorant, ointments
Carbaryl	K	63-25-2	39750Z	I; crop and garden uses, low persistence
Carbazole	-	86-74-8	77571Z	I; manufacture of dyes, explosives, and lubricants
Chlorpyrifos	K	2921-88-2	38932Z	I; domestic pest and termite control (domestic use restricted as of 2001)
Cholesterol	-	57-88-5	62818Z	Often a fecal indicator, also a plant sterol
Cotinine	-	486-56-6	61945Z	Primary nicotine metabolite
Diazinon	K	333-41-5	39570Y	I; greater than 40 percent nonagricultural usage, ants, flies.
Dichlorvos	S	62-73-7	30218Z	I; pet collars
Diethyl phthalate (DEP)	K	84-66-2	34336B	Plasticizer for polymers and resins
d-Limonene	-	5989-27-5	62819Z	F; antimicrobial, antiviral, fragrance in aerosols

Table 9. Wastewater method compound names, endocrine-disrupting potency, parameter/method codes, and possible compound uses (modified from Zaugg and others, 2006).—Continued

[EDP, endocrine-disrupting potency; CAS, Chemical Abstracts Service; S, suspected; -, not a suspected endocrine disruptor; K, known; CP, combustion product; PAH, polycyclic aromatic hydrocarbon; FR, flame retardant; H, herbicide; GUP, general-use pesticide; I, insecticide; F, fungicide; UV, ultraviolet; WW, wastewater]

Compound name	EDP[1]	CAS Registry Number[2]	Parameter/ method codes[3]	Possible compound uses or sources[4]
Fluoranthene	-	206-44-0	34376Z	Component of coal tar and asphalt (only traces in gasoline or diesel fuel); CP
Hexahydrohexamethyl cyclopentabenzopyran (HHCB, Galaxolide)	-	1222-05-5	62823Z	Musk fragrance, persistent, widespread in groundwater, concern for bioaccumulation and toxicity
Indole	-	120-72-9	62824Z	Pesticide inert ingredient, fragrance in coffee
Isoborneol	-	124-76-5	62825Z	Fragrance in perfumery, in disinfectants
Isophorone	-	78-59-1	34008Z	Solvent for lacquer, plastic, oil, silicon, and resin
Isopropylbenzene (cumene)	-	98-82-8	77223Y	Manufacture of phenol/acetone, fuels and paint thinner
Isoquinoline	-	119-65-3	62826Z	Flavors and fragrance
Menthol	-	89-78-1	62827Z	Cigarettes, cough drops, liniment, and mouthwash
Metalaxyl	-	57837-19-1	04254Z	H, F (GUP); mildew, blight, pathogens, golf/turf
Methyl salicylate	-	119-36-8	62828Z	Liniment, food, beverage, UV-absorbing lotion
Metolachlor	-	51218-45-2	82612Z	H (GUP), indicator of agricultural drainage
N,N-Diethyl-*meta*-toluamide (DEET)	-	134-62-3	61947Z	I, urban uses, mosquito repellent
Naphthalene	-	91-20-3	34696Y	Fumigant, moth repellent, major component (about 10 percent) of gasoline
Nonylphenol, diethoxy (total)	K	26027-38-3	61703Z	Nonionic detergent metabolite
Nonylphenol, monoethoxy (total)	K	104-35-8	61704A	Nonionic detergent metabolite
Octylphenol, diethoxy	K	26636-32-8	61705Z	Nonionic detergent metabolite
Octylphenol, monoethoxy	K	26636-32-8	61706Z	Nonionic detergent metabolite
p-Cresol	-	106-44-5	77146Z	Wood preservative
Pentachlorophenol	S	87-86-5	39032Z	H, F, wood preservative, termite control
Phenanthrene	-	85-01-8	34416Z	Manufacture of explosives, component of tar, diesel fuel, or crude oil; CP
Phenol	-	108-95-2	34694Z	Disinfectant, manufacture of several products, leachate
Prometon	-	1610-18-0	39056Z	H (noncrop only), applied antecedent to blacktop surfacing
Pyrene	-	129-00-0	34469Z	Component of coal tar and asphalt (only traces in gasoline or diesel fuel); CP
Tetrachloroethylene	-	127-18-4	34475Y	Solvent, degreaser, veterinary anthelmintic
Tribromomethane (bromoform)	-	75-25-2	32104Y	WW ozonation byproduct, military/explosives
Tris(2-butoxyethyl) phosphate	-	78-51-3	62830Z	FR
Tris(2-chloroethyl) phosphate	S	115-96-8	62831Z	Plasticizer, FR
Tris(dichloroisopropyl) phosphate	S	13674-87-8	61707Z	FR
Tributyl phosphate	-	126-73-8	62832Z	Antifoaming agent, FR
Triclosan	S	3380-34-5	61708Z	Disinfectant, antimicrobial (concern for acquired microbial resistance)
Triethyl citrate	-	77-93-0	62833Z	Cosmetics, pharmaceuticals
Triphenyl phosphate	-	115-86-6	62834Z	Plasticizer, resin, wax, finish, roofing paper, FR

[1] Colburn and others (2000).

[2] CAS Registry Number® is a registered trademark of the American Chemical Society. CAS recommends the verification of the CAS Registry Numbers through CAS Client Services (*http://www.cas.org*).

[3] Parameter codes corresponding to sample constituent variables are linked to compound analytical results stored in the USGS National Water Information System database.

[4] ChemFinder Webserver (2006); National Toxicology Program (2006); National Institute of Standards and Technology (2006); HealthCentral.com (2006); Extension TOXicology NETwork (2006).

24 hours for routine monitoring samples. During analysis, water samples often were diluted up to a 1:10,000 ratio, with dilution ratios at each site refined as the project proceeded. In general, dilution ratios were smallest in Missouri River samples (undiluted, 1:10, or 1:100), followed by PCBS samples (1:100 or 1:1,000), and largest in CSO samples (1:1,000 or 1:10,000).

Quality Assurance/Quality Control

QA/QC procedures during the study consisted of a check of the completeness and accuracy of all data collected; an evaluation of interal QA procedures for each of the laboratories used; and the analysis and evaluation of QC samples collected during field activities. Data completeness and accuracy checks consisted of the verification of all data entry and a review of all analytical results to confirm that all requested analyses were completed and that data were loaded into the databases correctly and completely. The following sections describe the internal laboratory QA/QC procedures, as well as field QA/QC procedures implemented during the course of the study.

Internal Laboratory Quality Assurance/Quality Control Procedures

Each of the laboratories used in the study had internal QA/QC procedures that were conducted independent of this study. The results of the laboratories' internal QA/QC were evaluated for a time period immediately preceding and throughout the study.

Internal Quality Assurance/Quality Control Procedures of the U.S. Geological Survey's National Water Quality Laboratory

The standard operating procedure for each NWQL analytical method includes a QC section, and whereas the internal QC checks may differ for each individual procedure, they include a positive control, such as laboratory reagent spikes, and a negative control, such as method blanks, as described in Maloney (2005). The laboratory reagent spike samples are prepared by the laboratory and analyzed with the sample set to provide information regarding recovery of the compounds during analysis. In addition during the analysis of organic compounds, surrogate compounds (chemically representative of most of the target compounds) are added to each sample before preparation and analysis, and the percentage recoveries of each surrogate compound are used to indicate gross sample-processing problems and matrix effects. The analysis of reagent spikes and surrogate recoveries provides data on the method performance during analysis of a particular sample set. Analytical results from method blanks provide information regarding potential contamination of environmental samples at the laboratory. Calibration verification solutions were analyzed periodically to check the internal calibration of the instrument, and low-concentration standards were run at the beginning and end of each sample set to ensure instrument sensitivity (Maloney, 2005). Monthly summaries of results from the USGS Branch of Quality Systems Inorganic Blind Sample Project also were utilized for internal QA/QC for trace metals analysis (U.S. Geological Survey, Branch of Quality Systems, accessed December 12, 2008, at *http://bqs.usgs.gov/bsp/*).

Internal Quality Assurance/Quality Control Evaluations of Non-USGS Laboratories

Analytical laboratories that provide analyses to the USGS were evaluated relative to the objectives of this project. Generally, the evaluation consisted of the review of available blind sample analytical results to determine the ability of the laboratory to produce accurate analytical results at various levels of sample concentrations, as well as a review of results from blank samples to verify that laboratory contamination was not a concern.

Field Quality Assurance/Quality Control Procedures

In addition to the review of internal laboratory QA/QC results, the collection of project-specific QC samples is a required component of water-quality studies. QC samples are collected throughout the course of the study to identify, quantify, and document bias and variability in data as a result of sample collection, processing, shipping, and handling procedures by field and laboratory personnel (U.S. Geological Survey, variously dated). QC sampling consisted of the collection of blank, replicate, and spiked (for organic constituents only) samples. The percentage of QC samples collected varied by analytical method. Three to 8 percent of the environmental samples had associated blank samples (percentage varied by constituent). More than 40 percent of the environmental samples had some constituents that were analyzed in replicate, and 5 percent of the organic compounds had associated spiked samples that were collected and analyzed in association with the environmental sample. The analytical results from these samples were monitored throughout the project to verify that the laboratories and field personnel continued to maintain acceptable performance in the quality of sample results during the project.

Blanks

Blank samples utilize water certified as free of the constituent of interest, and are collected to test for bias from the introduction of contamination into environmental samples. For this study, inorganic-grade blank water was used for blank samples that were analyzed for inorganic constituents including TSS, calcium, magnesium, chloride, nutrients; and metals. In addition, pesticide-grade blank water was used for blank samples analyzed for COD, BOD, wastewater compounds, and *E. coli* bacteria.

Field, equipment, and source-water blanks were collected throughout the study. To measure bias from field sampling and processing techniques, more than 90 field blanks were collected and processed sequentially through each component of the sampling system. The collection and processing of the field blanks was distributed between sites and at varying times during each sampling event, such that at least two sets of field blanks were collected from each of the sampling sites at varying times during the sampling events. Equipment blanks target bias from sample collection and the processing equipment system. Because of the large number of samples processed and the cleaning of equipment at the processing center, one to two equipment blanks were processed and analyzed at various times during each scheduled or storm-related sampling. Source-solution blanks allow the evaluation of the blank reagent water as a source of contamination. As the deionized water at the Midwest Laboratories facility was utilized for all cleaning procedures, source-solution blanks of the deionized water were analyzed, as was the graded-free blank water used for field and equipment blanks

Using the following procedure, remark codes were added to environmental sample records to indicate whether or not the concentrations detected may be the result of contamination. For each compound a upper 90-percent confidence limit (UCL_{90}) was calculated as the concentration at which there is 90-percent confidence that less than 10 percent of the samples had contamination greater than the laboratory reporting level (LRL). The environmental results were qualified with remark code “V” if the reported value was less than the UCL_{90}, or “B” if the reported value was between the UCL_{90} and two times the UCL_{90}; therefore, if a concentration is qualified with a “B”, up to one half of the constituent in that sample may have come from sample contamination. The confidence limit for calculated constituent “nitrate” was assumed to be equal to the measured constituent “nitrite plus nitrate”. For identifying the source of blank contamination, two or three source-solution blanks consisting of deionized water samples from the processing center, and from 17 to 20 equipment blanks were analyzed for each constituent during the study.

Replicates

Replicate samples are used to quantify variability during the sample collection and analysis process (U.S. Geological Survey, variously dated). Three types of replicates—sequential, concurrent, and split—were collected during the project to distinguish the source of variability affecting the samples.

Sequential replicates are collected one after the other to incorporate the total variability introduced from collection, processing, and shipping the sample; the variability inherent in the stream system across a space and time in-between replicate sample collection; and the variability inherent in laboratory handling and analysis of the samples. Sequential replicates were collected only from the Missouri River sites during sampling from September and October 2006. For these Missouri River samples, the environmental and replicate samples were collected about 45 minutes apart. Because of the larger than expected variability between the sequential replicates, Missouri River replicates were replaced by split replicates during storms and concurrent replicates during scheduled samplings, to limit the variability to that associated with sample processing, laboratory handling, and analysis. Sequential replicates were not collected from the PCBS sites during the storm sampling because of the inherent variability resulting from the time needed to collect a sample. About 2 percent of the 476 replicates collected during this study were sequential replicates.

Concurrent replicates are collected nearly simultaneously to incorporate the total variability introduced from collection, processing, and shipping the sample; the variability inherent in the system across a short distance in space; and the variability inherent in laboratory handling and analysis of the samples. Concurrent replicate samples were collected from PCBS sites and from the Missouri River sites during scheduled sampling between March and September 2007. About 48 percent of the 476 replicates collected during this study were concurrent replicates.

Sample volume limitations of flow-weighted samples collected during storms by autosamplers did not allow the collection of concurrent replicates during storms from the CSO, stormwater, or PCBS sites. During storm sampling at these sites, split replicates, or replicates split into subsamples using the Teflon churn at the processing center, were collected to document the variability inherent in laboratory handling and analysis of the samples. Split replicate samples also were collected during storms from the Missouri River during September and October 2006 and from the Missouri River during scheduled sampling events from March through September 2007. Following compositing of the sample in the churn, split replicate samples were withdrawn according to the order in the USGS field manual (U.S. Geological Survey, variously dated), with the environmental sample for each analysis withdrawn first, followed immediately by the split replicate for the same analysis. About 51 percent of the 476 replicates collected during this study were split replicates.

Statistical analysis of the variability between the replicate and environmental data was completed by constituent for paired replicate and environmental samples. Statistics were calculated for environmental/replicate sample pairs if both had measured concentrations that exceeded the LRL or were reported as estimated (E) values by the laboratory (detectable concentrations of the constituent). For constituents that may have been affected by contamination as determined in the analysis of blank samples as described above, sample pairs were used if the measured concentrations of the constituent were greater than the upper confidence limit for the 90th percentile (UCL_{90}) in the environmental and replicate samples. If one value in a sample pair was reported as nondetection, or at a concentration less than the appropriate LRL or UCL_{90}, the sample pair was dropped from the analysis as the concentration could not be quantified and the associated variability may be unduly increased or decreased by arbitrarily assigning a concentration to the sample. For each set of environmental/replicate samples included in the variability analysis, the standard deviation of the concentrations in each pair of replicate and environmental samples (SD_{reps}) was calculated, and a relative standard deviation (RSD) value was calculated as 100 times SD_{reps} divided by the mean concentration of the samples in the set. Generally, the variability between paired analytical results was considered acceptable if the RSD values were greater than 20 percent in less than 5 percent of the sample pairs. If the RSD values exceeded 20 percent in more than 5 percent of the samples for a constituent of interest, the standard estimates of sampling variability were presumed not to apply, and an alternative method of estimating variability was used.

The alternate method is based on graphical analyses of the SD_{reps} and RSD values for all constituent sample pairs, plotted in relation to the pairwise average of replicate concentrations. Concentration ranges corresponding to differing variability were determined with a locally weighted scatterplot smoothing (LOWESS) curve (Systat, Inc., 2002) to identify whether or not threshold change(s) in sampling variability occurred between the concentration ranges. As indicated in a previous study, at the low concentration range, the SD_{reps} of replicates is about constant, and the variability can be estimated as the mean of the pairwise SD_{reps} values (Mueller, 1998). In the middle concentration range, the SD_{reps} generally increases with concentration, and variability can be estimated as the mean of the RSD for all constituent sample pairs, and at high concentrations variability again can be estimated as the mean of the pairwise SD_{reps} (Mueller, 1998). Because of the number of points needed to develop LOWESS curves, these alternate estimates of variability were computed only if there were at least 40 environmental/replicate pairs with detectable concentrations of the constituent. When a threshold was observed in the LOWESS curve at low concentrations, the sampling variability was reported as equal to the mean SD_{reps} for all environmental/replicate sample pairs with average concentrations less than the threshold concentration. For environmental/replicate sample pairs with average concentrations greater than the threshold concentration, the sampling variability was assumed to be equal to the mean RSD. If the threshold concentration was elevated or there was no threshold indicated in the data, sampling variability was assumed to be uniformly elevated and equal to the mean RSD. Uncertainty was reported as a 2-sided 90-percent confidence interval that equals +/-1.645 times sampling variability (either the average SD_{reps} or average RSD). For most constituents analyzed in this study, a second threshold concentration could not be defined, but if multiple thresholds were obvious in the LOWESS plots of the data, additional estimates of sampling variability and uncertainty were determined.

An experiment was done on May 30, 2007, at site LPC3, to determine whether or not there was a significant difference between *E. coli* concentrations in grab samples collected directly from the stream and grab samples collected from the autosampler. This exercise also provided an assessment of the short-term temporal variability of the *E. coli* concentrations at that location and time combined with the variability associated with the analytical methods used. The experiment was done 1 day after a storm when the discharge had already receded, but the water was still turbid relative to base flow. To complete the experiment, a grab sample was collected near the autosampler intake line at the site. A few seconds later (to allow for travel time of the stream water up the intake tube) a sample was collected directly from the autosampler intake line at the autosampler, 25 feet (ft) above the stream. This process was completed 30 times in succession without intervening pauses, to yield 30 pairs of samples, with a sample collected directly from the stream paired with one from the autosampler. The *E. coli* densities from these samples were log-transformed and compared by using a paired t-test ($\alpha = 0.05$) to determine if the samples at each LPC3 collection location were collected from the same underlying population.

Organic Compound Spikes

A spiked sample is an environmental sample to which selected compounds are added after the sample has been processed to test for bias and variability from matrix interference, degradation, or other losses of constituent concentrations during processing (U.S. Geological Survey, variously dated). Because matrix effects of samples containing raw sewage mostly are undocumented, 22 samples were collected for matrix spike analyses from a subset of the sites, representing the different locations and sampling conditions. Percentage recovery of the spiked solution in the environmental sample matrix was calculated by equation 2:

$$\%\ recovery = \frac{\left(C_{spiked} - C_{unspiked}\right) * 100}{\left(\dfrac{C_{spike\ solution} * V_{spike\ solution}}{V_{sample}}\right)} \qquad (2)$$

where

$\%\ recovery$ is percentage recovery of the spike solution,

C_{spiked} is measured concentration in the spiked environmental sample,

$C_{unspiked}$ is measured concentration in the unspiked environmental sample,

$C_{spike\ solution}$ is concentration in the spike solution added to the environmental sample,

$V_{spike\ solution}$ is volume of the spike solution added to the environmental sample, and

V_{sample} is volume of the environmental sample.

Statistical Methods

Comparisons were made among subsets of the environmental data by using Student's t-tests on log-transformed data sets (Ott, 1993). If the probability associated with the t-test statistic was less than 0.05, the sample groupings were considered to be significantly different. The data were log-transformed to improve the normality of the frequency distribution, assumed by the Student's t-test. The lognormal distribution has received wide usage in hydrology because many hydrologic variables have distributions bounded by zero on the left and positively skewed (Haan, 2002). The geometric mean was used to compute the central tendency of a data set and essentially is the average of the log-transformed data. The geometric mean is computed as the *n*-th root of the product of *n* numbers when there was at least 50 percent detections in the data set. The geometric mean was presented as a censored (estimated) value (denoted with an "E") when the calculated geometric mean value was less than the LRL.

Spatial differences were tested among all the data, all scheduled samples (if applicable), scheduled wet-weather samples (if applicable), scheduled dry-weather samples (if applicable), and storm samples. Scheduled wet-weather samples are defined as samples collected after a storm but before the SC returned to pre-storm conditions. Length of time since rainfall was different for each site, and recovery of SC was based upon the record at the CWQ monitor located nearest to it. Similarly, scheduled dry-weather samples were those scheduled samples collected when SC was in a steady-state condition.

To compare seasons, two-sided t-tests were completed on log-transformed data sets. The three seasons considered were compared two seasons at a time. If one season was determined to be significantly greater or less than the other two seasons, it was declared as such. For the PCBS samples, scheduled samples were divided into wet-weather and dry-weather samples as determined by post-storm stream recovery of SC at the nearest CWQ site; however, because of the size of the basin and the lack of a SC response in the Missouri River for all except large localized storms, the scheduled samples in the Missouri River were analyzed only as one group.

Water-Quality and Aquatic Health Standards and Criteria

Water-quality and aquatic health standards and criteria for a waterbody are established by designating its uses, setting criteria to protect those uses, and ultimately protecting the waters from pollutant levels that exceed the criteria. The water-quality results from stream samples collected at sites in the Papillion Creek Basin and Missouri River were compared to existing water-quality and aquatic health criteria. Although water from the streams in the Papillion Creek Basin is not used as a source of drinking water, the Missouri River is a source of water for public supplies for Omaha (withdrawal location is upstream from the study area) and Council Bluffs, Iowa. As such, the data from this study were compared to available drinking-water regulatory standards and health-based screening levels to provide an additional frame of reference for the concentrations measured. Sources of the criteria include the Nebraska Surface Water Quality Standards (Nebraska Department of Environmental Quality, 2006); the USEPA national primary and secondary drinking-water standards (U.S. Environmental Protection Agency, 2003); USEPA proposed nutrient criteria for streams and rivers (U.S. Environmental Protection Agency, 2002); and USGS health-based screening levels (Toccalino and others, 2005; U.S. Geological Survey, 2005).

Although the comparisons of study results to most water-quality and aquatic health standards and criteria consisted of a direct comparison of the measured concentration to the standard or criteria values, comparisons for selected compounds required the calculations of seasonal values or adjustments of the measured concentrations to compensate for the pH or hardness of the water at the time of sampling. Comparisons of *E. coli* measurements with the surface-water-quality standard for primary contact for recreational use require the calculation of a seasonal geometric mean (Nebraska Department of Environmental Quality, 2006). For each sampling site, the analytical results for samples collected from May through September of each sampling year were compared to the standard of a seasonal geometric mean of 126 colony forming units per 100 milliliters (CFU/100 mL). Although described as the colony forming units, the CFU value represents the number of bacteria colonies present per 100 mL, and is comparable to the most probable number per 100 milliliters (MPN/100 mL) calculated using the IDEXX quanti-tray analytical methodology. The acute criteria for ammonia in warm-water systems is based on the classification of the system as Class A or B and on the pH of the sample. The ammonia criteria for Class A warm-water streams ranged from 1.32 (at a pH of 9.0) to a maximum of 46.8 mg/L (at a pH of 6.6); whereas, Class B criteria ranged from 1.56 mg/L (at a pH of 9.0) to a maximum of 55.2 mg/L (at a pH of 6.6). The criteria for many of the metal compounds are sample specific, and were computed for each sample by using the measured concentration of the specific metal and the hardness measurement for the sample, as shown in the formulas in appendix 1. It also should be noted that whereas the metals measurements in this study are for whole-water samples, the aquatic life criteria for all metals except selenium and the chronic criteria for mercury are based on dissolved concentrations. A conversion of the measured metals concentrations would be needed to directly compare the concentrations to the relevant criteria. As such, the comparisons of measured values to the criteria in this report are done with the knowledge that the converted values will be lower than the whole-water concentrations documented in this report. All of the standards and criteria, as well as the formulas needed to determine criteria for selected metal constituents, are given in appendix 1.

Hydrograph Subsection Comparisons

Hydrograph subsection analysis was completed for selected CSO sites. For those sampled storms that were sufficiently long, the samples at CSO106, CSO108, CSO119, CSO203, and CSO205 were composited as three separate samples. Because the CSO hydrographs generally did not follow a traditional rise-peak-recession hydrograph, comparisons were made between the beginning, middle, and ending parts of the hydrograph. Thornton and Saul (1986), Geiger (1987), and Gupta and Saul (1996) investigated the “first flush” in CSOs, which was defined as the initial period of storm flow when pollutants that were derived from within the sewer pipe were significantly higher than those concentrations observed in the later stages of the CSO discharge and determined that the first flush averaged between 20 and 50 minutes. The average collection period for the flow-weighted beginning, middle, and ending composite samples from CSOs in the Omaha study were 35, 80, and 80 minutes, respectively. By this measure, the beginning, and sometimes a part of the middle, parts of the CSO hydrograph could potentially represent the first flush for constituents deriving from within the sewer pipe.

Hydrograph subsection analysis also was completed for selected PCBS sites. For those sampled storms that were sufficiently long, the automatic samples collected at sites CC2, CC1, BPC3, and PC1 were composited as rise, peak, and recession samples. For rise-peak-recession data analysis, this dataset was split between the site upstream from CSO outfalls that would be affected only by stormwater (site CC2), and the three sites downstream from CSO outfalls (sites CC1, BPC3, and PC1). Because of the small data subset that included only one site (CC2) for comparison of concentrations in rise, peak, and recession samples collected upstream from CSO outfalls, these comparisons were made by determining whether or not the geometric mean constituent concentration for one part of the storm hydrograph was at least twice as large as that for the other two parts of the hydrograph. The hydrograph subsection comparisons for the subset of sites downstream from CSO outfalls were made using Student’s t-tests.

Mass Load Calculations

By multiplying the measured discharge by the concentrations and a unit correction factor, flow-weighted loads of each constituent were calculated for each sample for which both values were measured. The ratios of the CSO load to the stream load (CLSL) upstream from the discharge point were computed for those samples where a concentration and discharge were measured. The higher the CLSL ratio, the greater the effect the CSO will have on the water quality in the receiving stream. The ratios of the stream load at each downstream site to the load at the upstream site of the receiving stream (SLRL) were calculated for those samples where the constituent of interest was detected in the downstream site of a stream reach and discharge was measured. The greater the value of this ratio, the larger the effect a stream will have on the concentration in the receiving stream.

Water-Quality Relative Priority Index Calculations

Water-quality relative priority (WQRP) indexes were calculated for CSO outfalls and for stream sites. To assess the CSO outfalls for the WQRP index, the water-quality data were summarized by assigning numeric values to a CSO for a specific constituent: 1 or -1, if the mean concentration for that CSO was significantly larger or smaller, respectively; 1, if the site samples had the maximum measured concentration among all single samples; 1, when a site had the maximum measured instantaneous loading rate; 1, when a site had the maximum measured geometric mean loading rate; 1, if a site had the maximum CLSL ratio; or 1, if a site had the maximum geometric mean CLSL ratio. If a constituent at a specific site does not meet these criteria, it was assigned a zero by default. The values were accumulated, so maximum WQRP index value for a particular constituent at a specific CSO site was 6. The sum of all, or a subset of these values at each CSO site, could be used as a relative guide to determine which CSO sites to prioritize for renovation to achieve the greatest relative improvement for specific compounds or sets of compounds to the water quality in the receiving stream. This summary was not intended to be used as an absolute guide for prioritization of CSO removals, but as an additional piece of information that can be considered when evaluating renovation options. Also, this guide is not valid to use as a comparison index of importance of one specific subset of constituents relative to another subset, because each subset has a different number of compounds that are included in the WQRP index calculation.

To assess the PCBS for the WQRP index, the water-quality data were summarized by assigning numeric values to a stream for a specific constituent: 1, if the concentrations of the stream samples had the maximum measured concentration among all single samples; 1, if a stream had the maximum geometric mean concentration; 1, if a stream had the maximum measured instantaneous loading rate; 1, if a stream had the maximum measured geometric mean loading rate; 1, if a stream had the maximum SLRL ratio among all single samples; or 1, if a stream had the maximum geometric mean of SLRL ratios. If a constituent at a specific stream did not meet these criteria, it was assigned a zero by default. The values were accumulated, so maximum WQRP index value for a particular constituent at a specific site was 6. The sum of all or a subset of these values at each stream could be used as a guide to determine which stream or basin to prioritize for BMP implementation efforts to achieve the greatest relative improvement for specific compounds or sets of compounds to the water quality in the receiving stream. This summary was not intended to be used as an absolute guide for prioritization of streams, but as an additional piece of information that can be considered when evaluating management options. Also, this guide is not valid to use as a comparison index of importance of one specific subset of constituents relative to another subset, because each subset has a different number of compounds that are included in the WQRP index calculation.

Water Quality

A total of 1,175 samples were collected and analyzed for as many as 101 constituents each. All data were reviewed and stored in the USGS National Water Information System (NWIS) database (online at *http://waterdata.usgs.gov/ne/nwis/qw*).

Quality Assurance/Quality Control

Results from internal laboratory and field QA/QC samples were analyzed during the project. QA/QC sample types include blanks, replicates, and spikes as previously described.

Internal Laboratory Quality Assurance/Quality Control

Nine of the 24 inorganic constituents analyzed by the NWQL had a bias or variability in the data that was larger than expected. Barium, beryllium, cobalt, manganese, mercury, and zinc results exhibited negative biases; reported concentrations were lower than expected by 6 to 10 percent at some time during the study as indicated by the monthly summaries of results from the USGS Branch of Quality Systems Inorganic Blind Sample Project (U.S. Geological Survey, Branch of Quality Systems, accessed December 12, 2008, at *http://bqs.usgs.gov/bsp/*). During these time periods environmental sample analysis may be subject to the same biases, and actual concentrations for those constituents may have been higher than reported. Analyses for ammonia, phosphorus, and iron had positive biases, with reported concentrations that were 8 to 12 percent higher than expected at some point during the study as indicated by the USGS Organic Blind Sample Project results. Environmental concentrations of these constituents also may exhibit a similar bias at these times. Information on the type(s) of bias or variability associated with the analyses; the time period for which the situation was noted; actions taken by the NWQL to correct the situation; and the date the situation was resolved is given in appendix 2. The remaining inorganic constituents analyzed by the NWQL demonstrated acceptable variability and negligible bias (U.S. Geological Survey, Branch of Quality Systems, accessed December 12, 2008, at *http://bqs.usgs.gov/bsp/*).

The analytical methodology for organic wastewater compounds in unfiltered samples was approved a short time before the start of this study; therefore, the analysis of variability and bias associated with blind sample analyses is not available. As such, the assessment of blind sample analyses has been limited to data available for filtered samples (NWQL schedule 1433 as shown in appendix 3) through the USGS Organic Blind Sample Project (U.S. Geological Survey, Branch of Quality Systems, accessed December 12, 2008, at *http://bqs.usgs.gov/OBSP/cumulative_ts_charts_March08.html*). As such, the results may under or overestimate bias and variability because they exclude those components associated with matrix effects in unfiltered samples. Because of the large variability or bias, analytical results for some of the compounds, such as cotinine, always are flagged with a remark code ”E”, indicating the value is estimated. The remaining organic constituents analyzed by the NWQL as part of the blind filtered sample analyses demonstrated acceptable variability and bias.

A method blank is an analyte-free reagent carried through the entire laboratory sample preparation and analytical procedure to provide information regarding potential contamination of the sample at the laboratory. Several compounds were detected in method blanks (appendix 4), and the following three compounds had median concentrations in the method blanks greater than the method detection level (MDL) indicating that detectable concentrations of the constituent were in at least 50 percent of the blank samples but at concentrations that were less than the LRL for the analytical method: ethoxyoctylphenol [median = 0.027 micrograms per liter (μg/L); LRL = 1.0 μg/L]; acetophenone (median = 0.1 μg/L; LRL = 0.2 μg/L); bis(2-ethylhexyl) phthalate (median = 0.091 μg/L; LRL = 2.0 μg/L). Environmental samples containing these compounds at comparable concentration levels were already associated with a remark code indicating a problematic sample recovery or the presence of the compound in field blanks. Twenty-three other constituents were detected in method blank samples at concentrations greater than the LRL for the method, but had median concentration levels below the MDL, indicating that contamination of the sample was an isolated occurrence and not likely to affect environmental sample results (appendix 4).

Reagent spikes consist of the addition of a known quantity of one or more compounds of interest added to reagent water before analysis. This analysis yields data on the results that can be expected from a suite of similar samples (accuracy) when used with a synthetic matrix. The reagent spike results for the wastewater compounds during the period of this study are shown in appendix 5. Although the percent recovery of compounds added to the reagent water ranged from 0 to as much as 2,208 percent of the spiked concentration, the median recovery concentrations were less than 101 percent for all compounds, indicating the concentrations are not consistently enhanced in reagent water (appendix 5). Environmental concentrations above laboratory reporting level for several constituents, such as cotinine and 1,4-dichlorobenzene, are flagged with remark code “E” in the environmental data sets because of potentially poor method performance indicated by low recovery percentages.

Field Quality Assurance/Quality Control

Field, source-solution, and equipment blanks were collected during the study. Between 35 and 88 field blanks were collected during the study for each of the analyzed constituents (appendix 6). Of the 101 constituents analyzed, 45 constituents had greater than 99.9 percent confidence that contamination was greater than the LRL in less than 10 percent of the samples, and an additional 32 compounds had greater than 90 percent confidence that contamination was greater than the LRL in less than 10 percent of the samples. The remaining 24 constituents had a UCL_{90} greater than the LRL, indicative of mostly low levels of contamination. The detection level of these 24 constituents was raised to the UCL_{90} value as a result of these analyses.

For identifying the source of blank contamination, 2 or 3 source-solution blanks consisting of deionized water samples from the processing center, and from 17 to 20 equipment blanks were analyzed for each constituent during the study. Four of the constituents detected in field equipment blanks were detected in at least one of the source-solution blanks at levels greater than or equal to the LRL indicating the the deionized source water may be a source of these contaminants. The compounds detected in source-solution and equipment blanks are listed in appendix 7. Of these compounds, all except chloride and nickel were present in the field equipment blanks, also indicating a source of these detections in field blanks was exposure to sampling equipment rather than other contamination sources.

Initially, the evaluation of sampling variability was completed by constituent and by replicate type for all pairs of replicate and environmental samples. Whereas replicate pairs were evaluated by replicate type (grouped as sequential and concurrent replicates), preliminary analyses indicated that differences in variability of replicate samples did not appear to be related to the type of replicate sample. As such, the final statistical analysis used the combined data for all replicate samples with detectable constituent concentrations in both paired samples. The LRL, UCL_{90}, total number of environmental/replicate pairs for each constituent, the number of pairs included in the statistical analysis, the minimum and maximum environmental concentrations, and the number and percentage of replicate pairs with a RSD exceeding 20 percent are listed in appendix 8.

If the pairwise analysis results for a constituent had high variability with a RSD greater than 20 percent in more than 5 percent of the sample pairs analyzed, and 40 or more sample pairs had detectable concentrations of the constituent in both samples, the alternative method of estimating sampling variability was used as described in the “Field Quality Assurance/Quality Control Procedures” section of this report. Of the 63 constituents with 40 or more sample pairs with detectable concentrations in both samples, 44 constituents had sampling variations exceeding an RSD of 20 percent in 5 percent or more of the environmental/replicate pairs, and were evaluated by using this methodology. Thirty-two of the 44 constituents with a RSD greater than 20 percent in more than 5 percent of the environmental/replicate pairs and at least 40 sample pairs with detectable concentrations were from the organic wastewater schedule. No relation between sampling variability and concentration was obvious in environmental/replicate analytes for 30 of these 44 constituents, including lead, mercury, 27 organic wastewater compounds, and *E. coli* (column R, appendix 8). For these constituents, sampling variability associated with the concentrations is presumed to be equal to the mean RSD of replicates that ranged from 5.6 to 30 percent (column S, appendix 8). The median mercury concentration in sample pairs exceeding the 20 percent RSD criterion was less than five times the laboratory LRL or the UCL_{90} (column P, appendix 8), indicating that variability may have been larger because detections were at low concentrations where the analytical method tends to be less precise. Similar to mercury, 25 of the organic wastewater compounds with no concentration-related pattern in variability had median concentrations in samples exceeding the 20 percent RSD criterion that were less than five times the laboratory LRL or the UCL_{90} (column P, appendix 8), indicating that variability may have been larger because detections were at low concentrations where the analytical method tends to be less precise. Only two wastewater compounds (cholesterol and 3-*beta*-coprostanol) manifested large variability at median concentrations more than five times the LRL or UCL_{90} (column P, appendix 8). *E. coli* density is inherently variable in environmental sampling, and its strong association with sediment and related solid matter may result in large differences because of variations in particulate matter in samples affected by wastewater. Sampling variability for the remaining 14 of 44 constituents with a RSD greater than 20 percent in more than 5 percent of the sample pairs analyzed and 40 or more sample pairs had detectable concentrations of the constituent in both samples was determined by using concentration-dependent variability estimation methods (columns R through AJ, appendix 8). Constituents for which concentration-dependent variability estimation methods were used were COD, BOD, TSS, nitrite, ammonia, orthophosphate, beryllium, cadmium, chromium, silver, camphor, methyl salicylate, *p*-cresol, and triphenyl phosphate. Of the 44 constituents with a RSD greater than 20 percent in more than 5 percent of the sample pairs analyzed and 40 or more sample pairs had detectable concentrations of the constituent in both samples, eight (TSS, nitrite, ammonia, beryllium, cadmium, silver, methyl salicylate, and metolachlor) have associated water-quality and aquatic life criteria, standards, or benchmark concentrations (appendix 1). The increased variability associated with TSS, beryllium and cadmium would increase the uncertainty in the number of guidance exceedances because a number of sample concentrations were reported at, or near, criterion, standard, or benchmark concentrations.

To determine whether or not *E. coli* concentrations in samples collected from autosamplers were different from samples collected directly from the stream, 30 pairs of samples were collected in succession from the autosampler and directly from the stream at site LPC3 during a time when the water was turbid and particles potentially could settle in the 14.6 m intake line (7.6 m vertical draw) to the autosampler. Results from paired t-tests ($p < 0.05$ signifying a significant difference) indicated that the null hypothesis that the samples were collected from the same population could not be rejected ($p = 0.20$). Because these sample sets were not significantly different, descriptive statistics were representative of the combined data set, showing a geometric mean *E. coli* density of 4,950 MPN/100 mL, and a standard deviation of 1,280 MPN/100 mL. These results give an example of the variability inherent with *E. coli* sample collection, processing, and analytical methods used at this location during this time.

To determine if the sample matrix caused interference during laboratory analysis, as many as 22 spiked matrix samples for the organic wastewater compounds were collected during the study. Of the 22 spiked matrix samples, as many as 15 were spiked samples from stream and river sites, and as many as seven were spiked samples from CSO and SWO sites. The mean and standard deviation of the percentage recovery for the complete sample set, the stream subset, and the CSO and SWO sample subset are listed in appendix 9. The recovery percentages were compared with the acceptable range determined by analysis of laboratory reagent spikes (Zaugg and others, 2006), and the environmental sample data were qualified with remark code “E” if the spike-recovery percentage was not within the acceptable range. If there was a statistically significant difference between the recovery percentages for the stream-matrix spiked samples and the recovery percentages for the CSO- and SWO-matrix spiked samples, the recovery percentage for each of these sample subsets was used in the comparison with the laboratory-spike recovery; otherwise, the recovery percentage for the entire data set was used.

The organic wastewater compounds that indicated a significantly different recovery percentage between the spiked stream-matrix samples and the spiked CSO- and SWO-matrix samples were diethyl phthalate, 4-*tert*-octylphenol, acetyl-hexamethyl-tetrahydronaphthalene (AHTN), hexahydrohexamethyl cyclopentabenzopyran (HHCB), and indole. Fourteen compounds with determinations not flagged previously with remark code “E” (meaning estimated concentration) by the NWQL had an average recovery percentage outside the acceptable range and, therefore, had remark code “E” added to the determination for these compounds in all the environmental samples. Additionally, three compounds (diethyl phthalate, 4-*tert*-octylphenol, and HHCB) had remark code “E” added to their determinations in the CSO and SWO samples. For these compounds, the “E” code indicates less confidence in the accuracy of the reported values.

Statistical and Graphical Summaries

The analytical results of all samples for all constituents are in appendix 10. Statistical and graphical summaries have been developed for discrete samples and for continuous water-quality measurements collected during the study.

Discrete Sample Summaries

Statistical summaries for all water-quality measurements are shown in tables 10, 11, and 12, at the back of this report for the CSO, SWO, and stream sites, respectively. In tables 10, 11, and 12, the quartiles are reported only when there are at least 10 samples in that grouping because of the uncertainty associated with computing these statistics on small data sets. The *E. coli* densities from the grab samples collected at the PCBS sites each time a scheduled or storm sample was retrieved are summarized in table 13. The stream segments used to summarize results in table 13 have been defined previously by the Nebraska Department of Environmental Quality (2004). The number of samples collected during the study for each stream segment ranged from 17 for segment MT1-10200 to 64 for segment MT1-10111 (Little Papillion Creek). All stream segments had geometric mean *E. coli* densities greater than 3,100 MPN/100 mL except for MT1-10200 (site PC2 on Papillion Creek), with a geometric mean density of 840 MPN/100 mL. Site PC2 does not have any upstream CSO outfalls, and the basin is approximately 55 percent agricultural (table 3).

Table 13. Summary of *E. coli* results of grab samples by stream reach sampled during the combined sewer overflow study in Omaha, Nebraska.

[Only samples with quantifiable densities were included in the summary statistics; MPN/100 mL, most probable number per 100 milliliters]

Stream reach	Stream name	Field identifier of sampling site(s) (table 1; fig. 1)	Number of samples	Geometric mean (MPN/100 mL)
MT1-10111.1	Cole Creek	CC1, CC2	36	3,600
MT1-10111	Little Papillion Creek	LPC1, LPC2, LPC3	64	3,700
MT1-10110	Big Papillion Creek	BPC1, BPC2, BPC3	52	3,700
MT1-10120	Big Papillion Creek	BPC4	18	3,100
MT1-10200	Papillion Creek	PC2	17	840
MT1-10100	Papillion Creek	PC1	18	3,700

Continuous Water-Quality Summaries

Examples of typical responses to a storm recorded by a CWQ monitor are shown in figure 2 (2*A*–2*F*). During base flow, pH, WT, and DO exhibited diel variations in response to changes in air temperature and biological activity. SC remained fairly constant during base flow, indicating a steady contribution of groundwater or other continuous source. This pattern was disrupted during runoff, when the increased streamflow disturbed the diel cycles in pH and DO and led to reduced SC and increased turbidity. To identify basic differences between sites, graphical summaries were prepared for all five constituents by plotting stratified-random subsets using box-and-whisker diagrams (figs. 3–7). Daily summaries of CWQ are provided in appendix 11 and individual

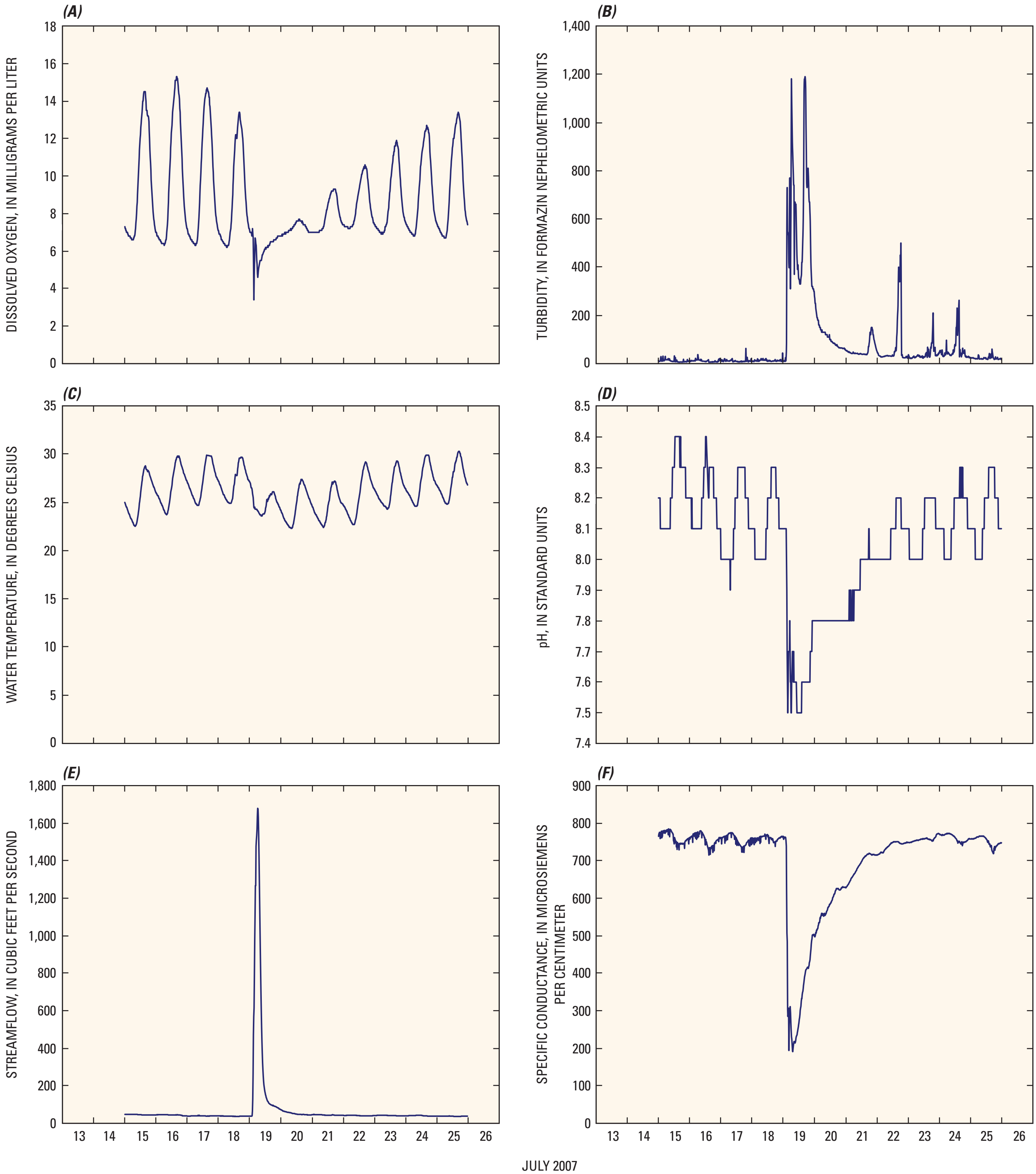

Figure 2. Examples of continuous water-quality data collected (*A–F*) during period with storm runoff at Big Papillion Creek at Q Street, Omaha, Nebraska, July 2007; and (*G–L*) at sampling sites on Cole and Papillion Creeks and Missouri River near Omaha, May through September 2007.

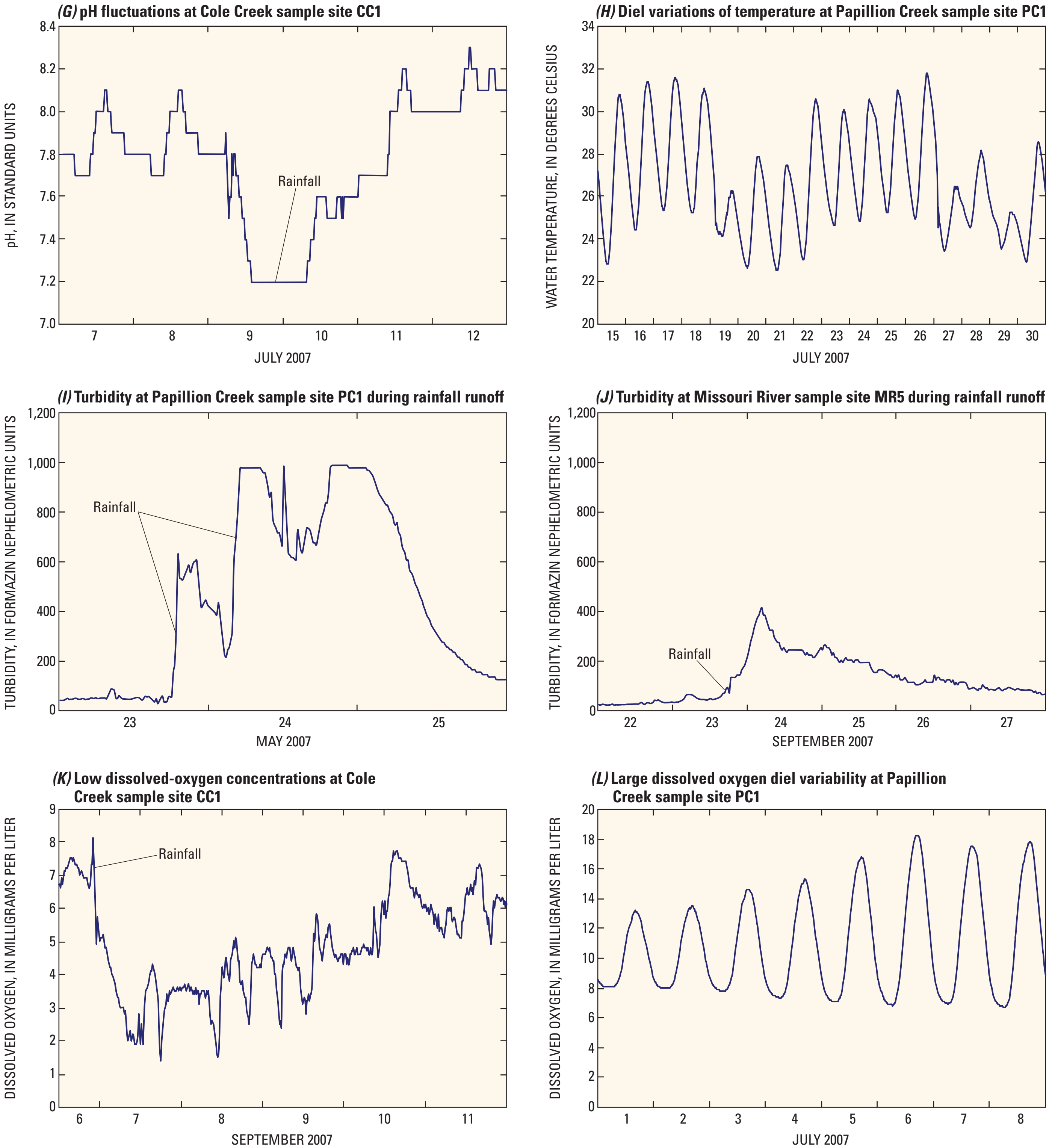

Figure 2. Examples of continuous water-quality data collected (*A*–*F*) during period with storm runoff at Big Papillion Creek at Q Street, Omaha, Nebraska, July 2007; and (*G*–*L*) at sampling sites on Cole and Papillion Creeks and Missouri River near Omaha, May through September 2007.—Continued

measurements (recorded at 15-minute intervals) are provided in appendix 12.

Specific Conductance

Individual measurements of SC during the study period varied from 42 to 2,390 microsiemens per centimeter (µS/cm) and mean-daily values ranged from 229 to 2,125 µS/cm (fig. 3). All of these extremes were recorded at Cole Creek sites. The lower SC values occurred during storms. The median SCs at the two Cole Creek sites were 12 to 27 percent greater than those of the other five sites instrumented (fig. 3). Streams in the Papillion Creek Basin had a more abrupt response to rainfall runoff compared to the Missouri River sites (data in appendix 12). An unexpected rise in SC was measured on July 23, 2007, at site CC2.

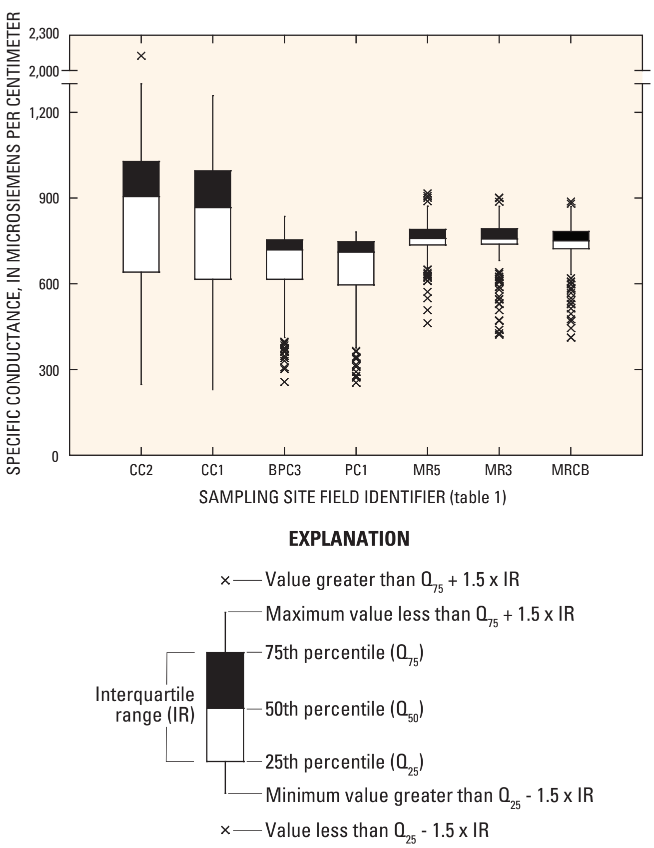

Figure 3. Distribution of daily median specific conductance at the continuous water-quality sites monitored September through November 2006 and March through September 2007 as part of the combined sewer overflow study in Omaha, Nebraska.

pH

Individual pH measurements ranged from 7.1 at sites CC1 and MR5 to 8.9 at site MRCB. Daily median pH values ranged from 7.2 at site CC1 to 8.9 at MRCB (fig. 4). Diel variations in pH changed up to 0.4 standard units from night to day, and were largest in the summer months because of increased biological activity (fig. 2*G*). During photosynthesis, dissolved carbon dioxide is consumed, resulting in a reduction in acidity and increasing the pH during daytime hours. Conversely, respiration produces carbon dioxide, some of which forms carbonic acid, thereby lowering pH during nighttime hours (Rasmussen and others, 2005). Increasing streamflow usually results in a disruption of the diel variation in pH and a drop in pH, which was most obvious at the Cole Creek sites.

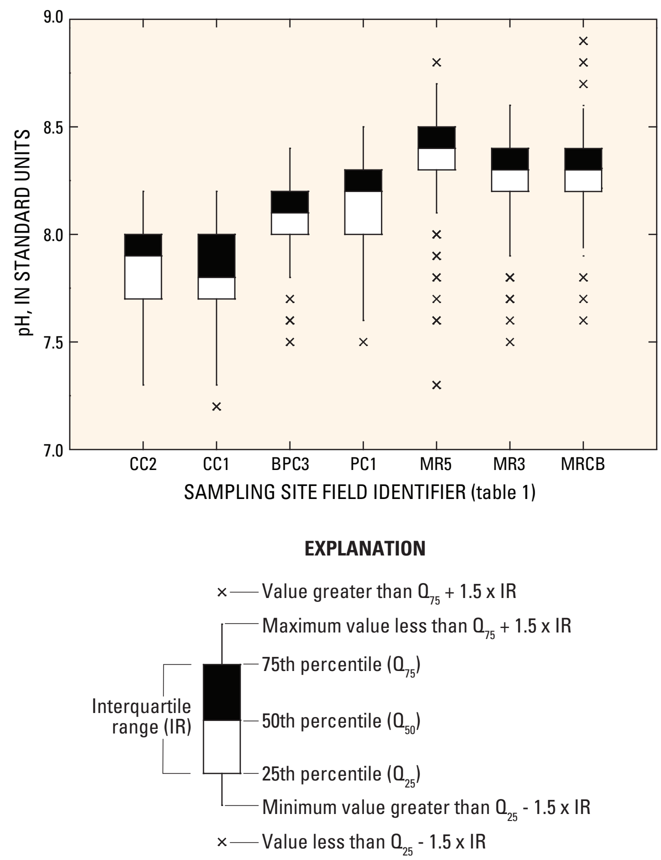

Figure 4. Distribution of daily median pH at the continuous water-quality sites monitored September through November 2006 and March through September 2007 as part of the combined sewer overflow study in Omaha, Nebraska.

Water Temperature

During the study period, no recorded temperature exceeded the NDEQ water-quality criterion of 32ºC. Individual WT measurements ranged from 0.3ºC at site CC1 to 31.8ºC at site PC1. Daily mean WT values ranged from 2.3ºC at site CC1 to 29.7ºC at site MR3 (fig. 5). Diel variations in WT ranged up to 8ºC, with the largest diel variations seen at PC1 (fig. 2*H*). Generally, the Cole Creek sites had lower temperatures than the other sites during the summer months, and, with the exception of site BPC3, were lower than the other sites overall (fig. 5).

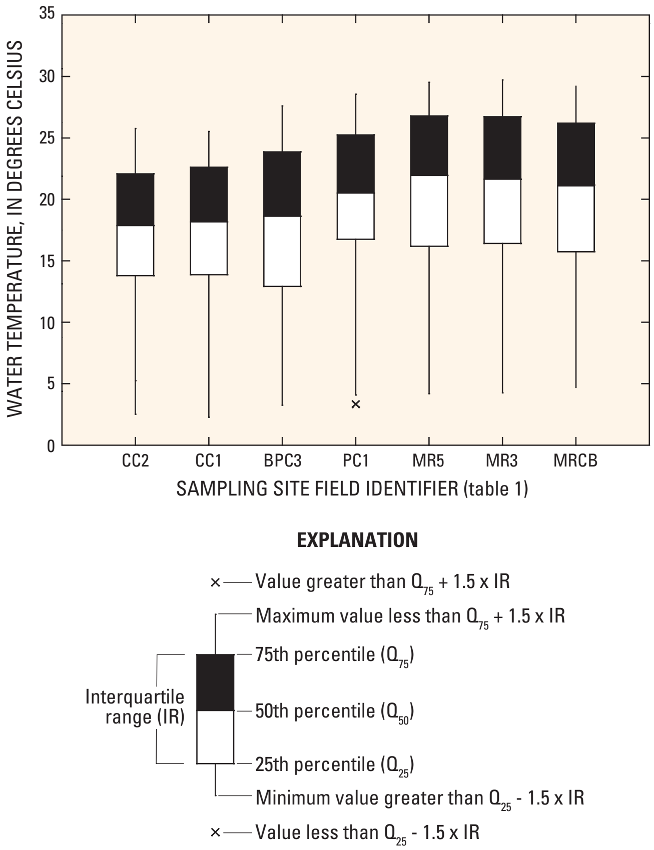

Figure 5. Distribution of daily mean water temperature at the continuous water-quality sites monitored September through November 2006 and March through September 2007 as part of the combined sewer overflow study in Omaha, Nebraska.

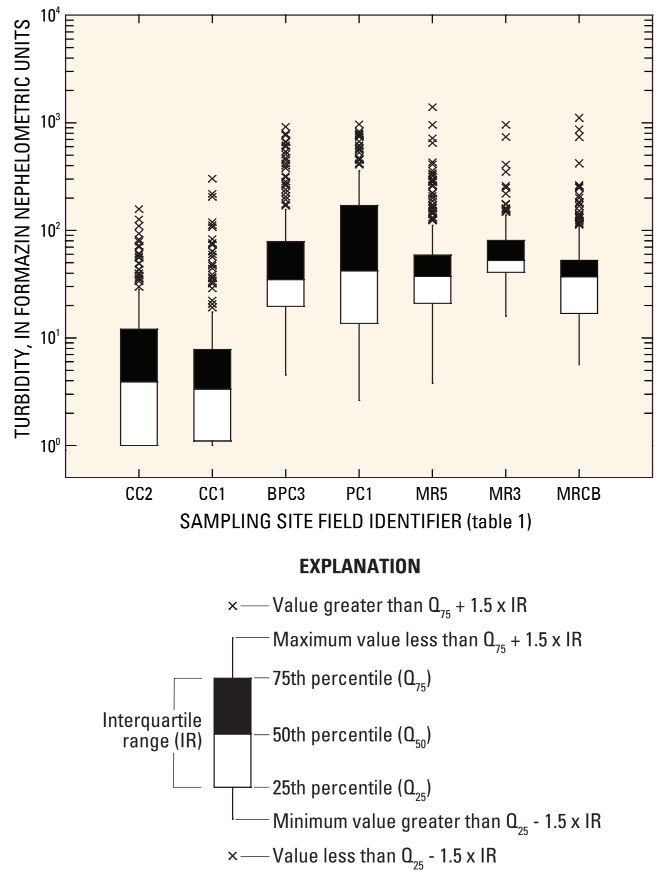

Figure 6. Distribution of daily mean turbidity at the continuous water-quality sites monitored September through November 2006 and March through September 2007 as part of the combined sewer overflow study in Omaha, Nebraska.

Turbidity

Individual and daily mean turbidity measurements ranged from less than 1 FNU to greater than 1,400 FNU. Because of limitations previously described, the sensor limits of the monitoring instrumentation prevented the measurement of turbidity outside of these limits. During periods of runoff, turbidity often exceeded the operational range at sites PC1 and BPC3 (fig. 2*I*); these sites also had the highest standard deviation of turbidity. Of all the Missouri River sites, turbidity at site MR5 varied the most and had the lowest median turbidity (fig. 6). Localized precipitation had a weaker effect on turbidity at the Missouri River sites than at the Papillion Creek Basin sites (fig. 2*I*–2*J*). Cole Creek sites had the lowest median turbidity and a dampened response in turbidity during periods of runoff in comparison to Papillion Creek sites.

Dissolved Oxygen

Individual DO concentration measurements ranged from 0.4 mg/L at site BPC3 to 26.9 mg/L at PC1. Daily mean DO ranged from 3.3 mg/L at site CC1 to 16.8 mg/L at site PC1 (fig. 7). All sites had reported minimums that were less than 5.0 mg/L (the minimum acute toxicity concentration; Nebraska Department of Environmental Quality, 2006). Low DO levels generally coincided with runoff (fig. 2*K*). The CC1 site had the lowest median DO levels of the sites (fig. 7); 10 percent of those values were less than 5.0 mg/L. The PC1 site had the greatest diel variability (fig. 2*L*). The largest diel variation was recorded during the summer months and during low flow when biological activity was the greatest. The Missouri River sites had the largest daily maximums during spring and autumn when water temperatures were lowest and DO solubility was the greatest.

Post-Storm Recovery of Stream Water Quality

The amount of time after a storm for stream water quality to return to pre-storm conditions for SC and turbidity in comparison to discharge for the four CWQ monitoring sites in the Papillion Creek Basin are shown in tables 14 and 15. The recovery period for each constituent on each date was listed in these tables only if the conditions associated with a particular storm were separated from another storm by steady-state conditions. For discharge, recovery period length is analogous to the recession-hydrograph length.

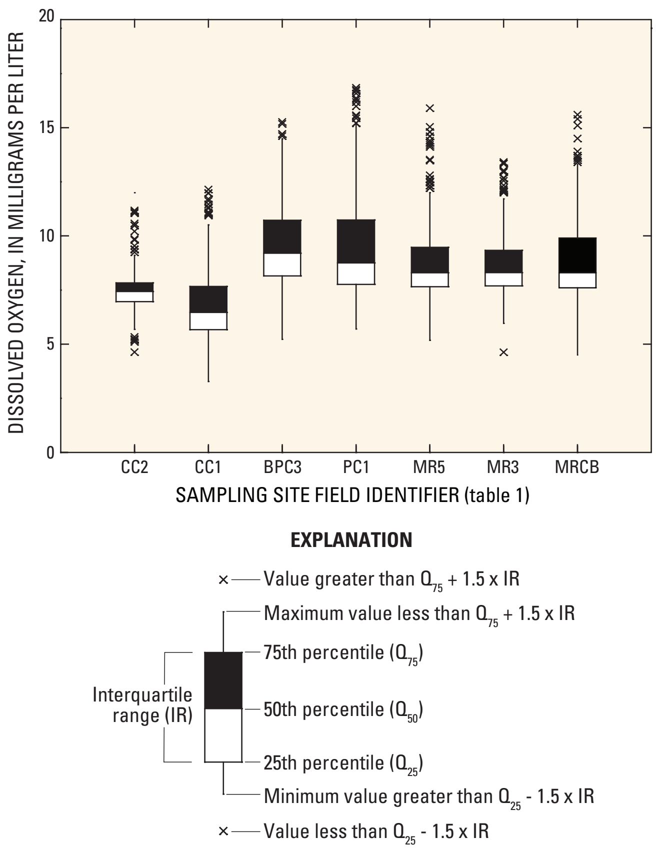

Figure 7. Distribution of daily mean concentration of dissolved oxygen at the continuous water-quality sites monitored September through November 2006 and March through September 2007 as part of the combined sewer overflow study in Omaha, Nebraska.

Specific conductance could be considered a surrogate for dissolved constituents such as chloride or nitrate. The return to pre-storm turbidity could be considered an indicator of return of baseflow conditions for those constituents that are colloidal (such as *E. coli*), dependent on suspended particles (such as TSS), or generally considered particle-associated (such as total phosphorous).

Examples of hydrographs showing three periods of runoff followed by post-storm recovery at all four sites in April, June, and September 2007 are given in figures 8*A*, 8*B*, and 8*C*. The recession-hydrograph length did not show an obvious seasonal pattern. Compared spatially, the recession-hydrograph length generally was monotonically increasing with size of drainage area (that is, CC2 < CC1 < BPC3 < PC1).

The time to return to pre-storm SC at the four PCBS sites, for each storm that was separable from the storm before and after on the SC graph, is listed in table 14. Examples of specific conductance graphs for all four sites for individual storms in April, June, and September 2007 are shown in figures 9*A*, 9*B*, and 9*C*. Based on these data, the stream recovery time for SC was least in summer (June through August) and greatest in autumn (September through November). Compared spatially, the stream recovery time for SC generally was longest for site CC1, but otherwise consistent with the spatial relations for discharge (that is, CC2 < BPC3 < PC1 < CC1). The difference in recovery time between discharge and SC (table 14) likely was caused by gradual loss of bank-stored stream water after the discharge had receded.

Table 14. Amount of time after a storm for a stream to return to pre-storm specific conductance at each of the four continuous water-quality monitoring sites within the Papillion Creek Basin, Omaha, Nebraska.

[Units in days; --, not determined; Std. dev., standard deviation]

Storm date	Field identifier of site (table 1; fig. 1)			
	CC2	CC1	BPC3	PC1
9/21/2006	2.8	--	4.6	--
10/21/2006	--	--	4.4	--
4/10/2007	2.3	3.4	2.9	2.8
5/14/2007	1.8	3.4	--	--
6/2/2007	--	--	2.0	2.1
6/4/2007	--	--	1.8	--
6/13/2007	--	--	1.8	2.9
6/22/2007	2.1	4.1	2.0	2.9
7/9/2007	--	--	--	3.5
7/19/2007	1.8	5.4	--	--
8/28/2007	2.1	7.0	3.8	4.0
9/6/2007	--	--	--	3.4
9/10/2007	3.1	--	1.9	--
9/18/2007	3.5	6.5	5.2	4.9
9/25/2007	--	--	--	5.1
Mean	2.4	5.0	3.0	3.5
Std. dev.	.6	1.6	1.3	1.0

The time to return to pre-storm turbidity at the four PCBS sites, for each storm that was separable from the storm before and after on the turbidity graph, is listed in table 15. Examples of turbidity graphs for all four sites for individual storms in April, June, and September 2007 are shown in figures 10*A*, 10*B*, and 10*C*. Based on the data in table 15, stream recovery time for turbidity did not appear to have a seasonal component, instead appearing to be more dependent on the length of the storm. However, qualitative analysis of turbidity curves at BPC3 and PC1 for recovery periods not separated by steady-state conditions indicated that the recovery period for turbidity at these two sites may be longer in the early spring than during the rest of the year—most likely because larger rains and more sloughing of streambanks that were not yet protected by vegetation growth occurred during that time of the year. Recovery periods for turbidity generally increased from upstream to downstream, analogous to the recession-hydrograph length. The mean recovery time for turbidity generally was longer than recession-hydrograph length, but shorter than the recovery time for SC. The standard deviation of the recovery time for turbidity also was larger than the standard deviation of the recovery time for SC.

Table 15. Amount of time after a storm for a stream to return to pre-storm turbidity at each of the four continuous water-quality monitoring sites within the Papillion Creek Basin, Omaha, Nebraska.

[Units in days; --, not determined; Std. dev., standard deviation]

Storm date	Field identifier of site (table 1; fig. 1)			
	CC2	CC1	BPC3	PC1
9/21/2006	--	--	3.4	--
10/20/2006	0.6	--	1.1	--
10/23/2006	.4	--	--	--
11/10/2006	1.3	--	--	--
4/10/2007	2.2	2.8	1.9	2.0
4/22/2007	1.2	--	--	1.0
5/14/2007	.6	--	--	--
5/24/2007	--	1.4	--	--
5/26/2007	--	1.3	--	--
6/22/2007	1.1	1.2	1.5	1.6
7/9/2007	1.0	--	.5	1.3
7/19/2007	1.3	1.7	--	2.8
7/27/2007	.9	1.8	3.6	--
8/2/2007	--	--	3.6	2.7
8/10/2007	--	1.6	--	--
8/12/2007	1.2	1.7	--	--
8/16/2007	1.3	--	--	--
8/28/2007	1.1	1.4	--	--
9/6/2007	.8	--	.6	--
9/18/2007	--	--	--	3.2
9/24/2007	1.4	--	2.6	2.7
10/2/2007	--	--	1.4	--
Mean	1.1	1.6	2.0	2.2
Std. dev.	.4	.5	1.2	.8

Spatial Comparisons

Spatial comparisons were completed for discrete sample and CWQ results. Student's t-tests of differences between groups of sample results for each water-quality constituent were used to determine if these groups came from the same underlying population with the same mean. If the probability associated with the t-test statistic was less than 0.05, the sample groups were considered to be significantly different.

Water-Quality Comparisons for Discrete Samples

Results of the t-tests are tabulated in appendix 13, 14, and 15. The results of t-tests are highlighted in appendix 16 for each constituent and each site type (CSO, SWO, stream) if the detection rate was at least 50 percent in one of the site groups and if there was a significant difference between the groups. Comparisons that are highlighted in appendix 16 include constituent concentrations at each CSO site compared to the rest of the CSO sites, comparisons between concentrations in samples from the two SWO sites, comparisons between all CSO sites and PCBS dry-weather samples, comparisons between all SWO sites and PCBS dry-weather samples, and comparisons between CSO sites and SWO sites (appendix 13). For each organic compound, appendix 17 lists the CSO sites that are statistically different from the rest of the CSO sites, the site names, *p*-values, and geometric mean of each of the comparison data sets. Constituents that had significantly greater concentrations in dry-weather PCBS samples than in CSO samples were SC, nitrite plus nitrate, hardness, calcium, magnesium, barium, selenium, and uranium. Additionally, constituents with detection rates of at least 50 percent in CSO samples that had concentrations that were not significantly different ($p > 0.05$) in CSO samples than in dry-weather PCBS samples were nitrite, chloride, arsenic, atrazine, metalaxyl, and tetrachloroethene. Except for tetrachloroethene, these constituents are agricultural chemicals or occur naturally, and would have at least one mode of transport to the stream not associated with rainfall runoff (such as groundwater seepage or direct application onto the stream). Greater concentrations in dry-weather stream samples than in CSO samples, or the lack of difference between background concentrations in the streams and concentrations in CSO samples, were indicative that these constituents were likely not derived more from CSO outfalls than from upstream sources. Constituents with concentrations that were significantly less in SWO samples than in dry-weather stream samples were SC, nitrite plus nitrate, hardness, calcium, magnesium, chloride, barium, selenium, uranium, 3-methyl-1H-indole, *beta*-sitosterol, *beta*-stigmastanol, and indole. Results comparisons of concentrations in SWO samples to concentrations in PCBS dry-weather samples for constituents that had a detection rate of at least 50 percent in SWO samples indicated that there were no significant differences for nitrite, total nitrogen, arsenic, beryllium, nickel, thallium, vanadium, 2-methylnaphthalene, anthracene, atrazine, camphor, ethoxyoctylphenol, isophorone, methyl salicylate, metolachlor, naphthalene, and tris(2-butoxyethyl) phosphate. Greater concentrations in dry-weather stream samples than in SWO samples, or the lack of difference between background concentrations in the stream samples and concentrations in SWO samples, are indicative that these constituents were likely not derived more from SWOs than from upstream sources; however, the set of SWO samples used in this analysis was limited to two sampling sites. Constituents with concentrations that were significantly larger or not significantly different in dry-weather stream samples than in CSO and SWO samples were SC, nitrite plus nitrate, nitrite, calcium, magnesium, chloride, arsenic, barium, selenium, uranium, and atrazine.

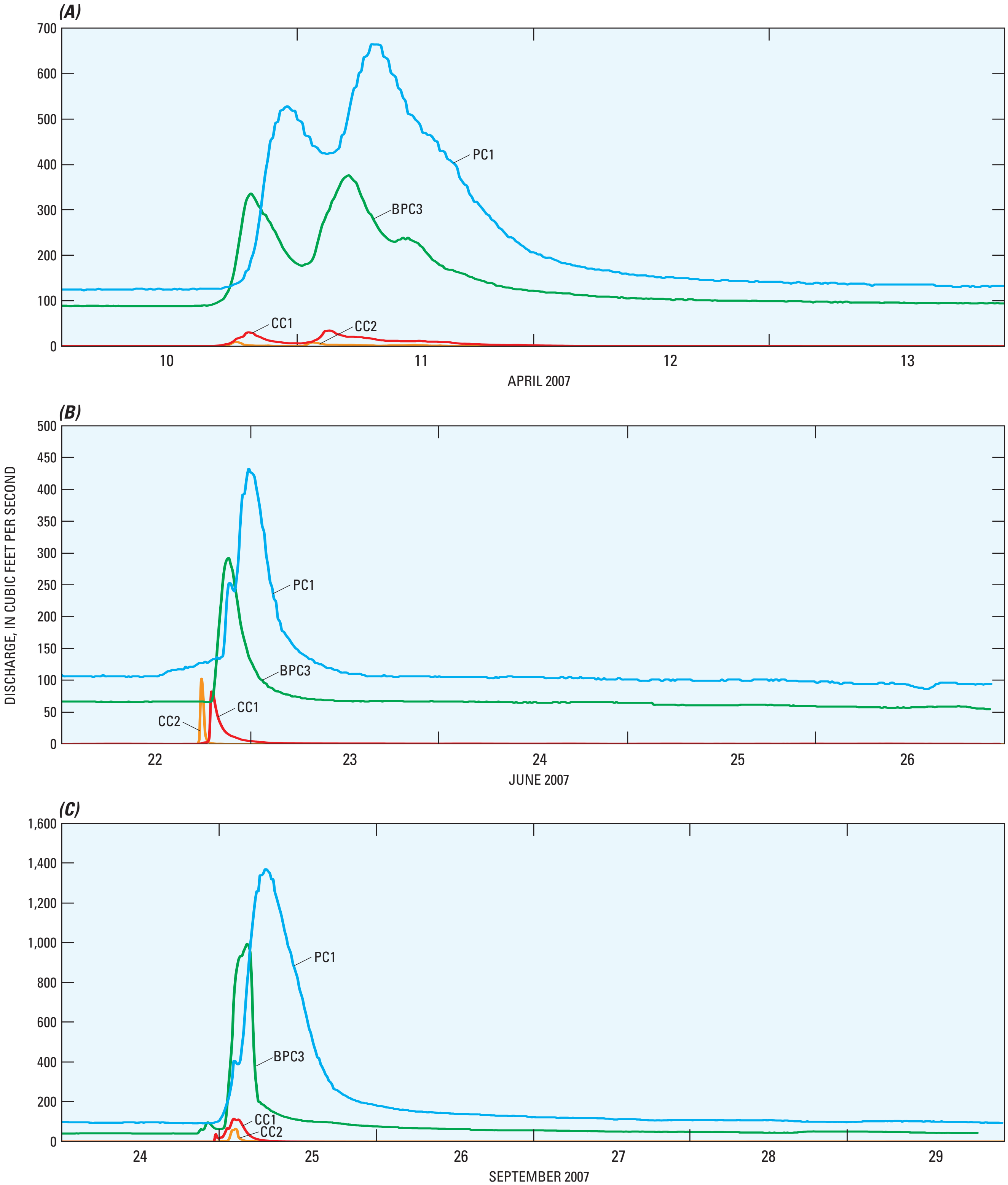

Figure 8. Discharge hydrographs for sites CC2, CC1, BPC3, and PC1 in *A*, April, *B*, June, and *C*, September 2007.

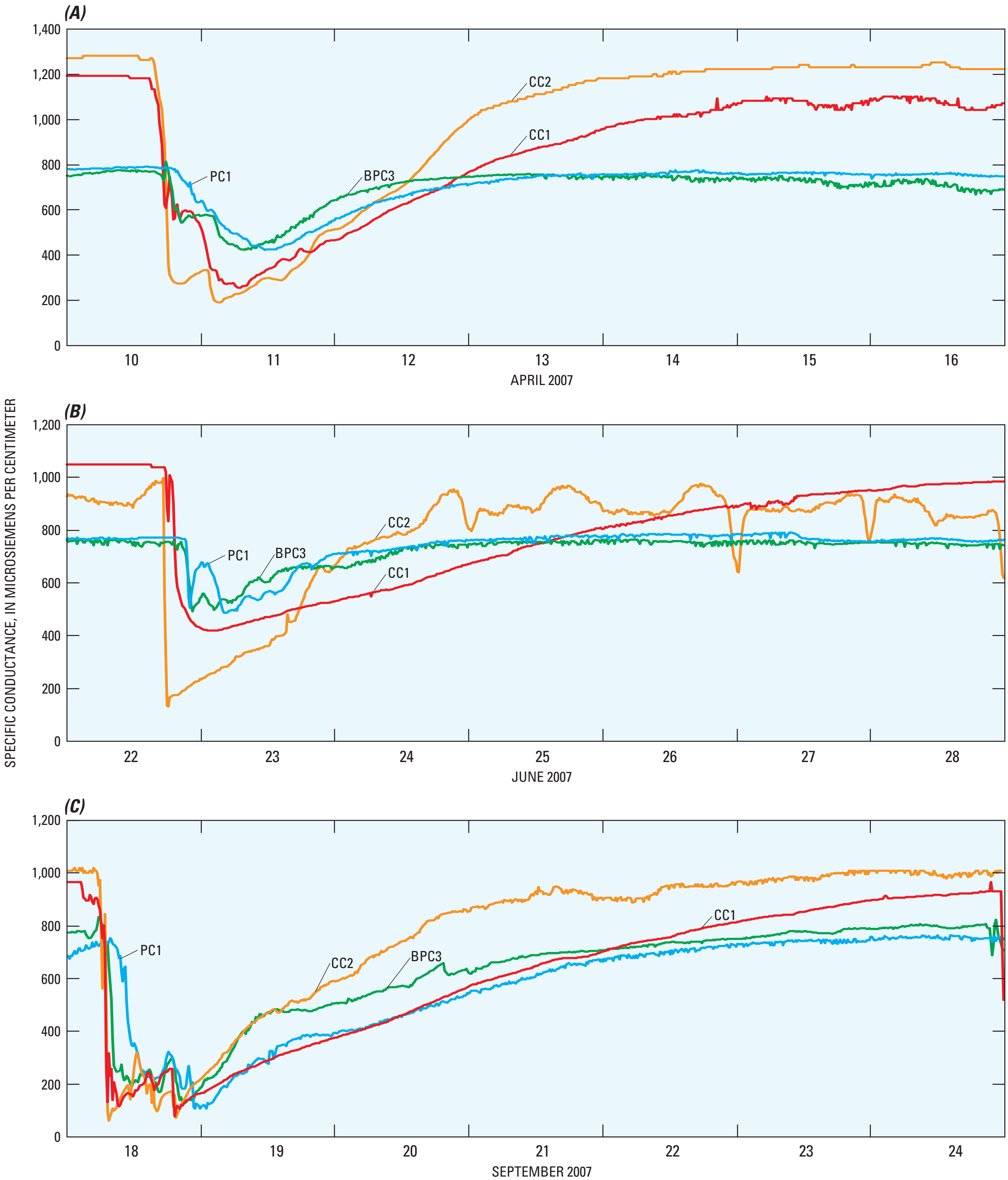

Figure 9. Specific conductance for sites CC2, CC1, BPC3, and PC1 in *A*, April, *B*, June, and *C*, September 2007.

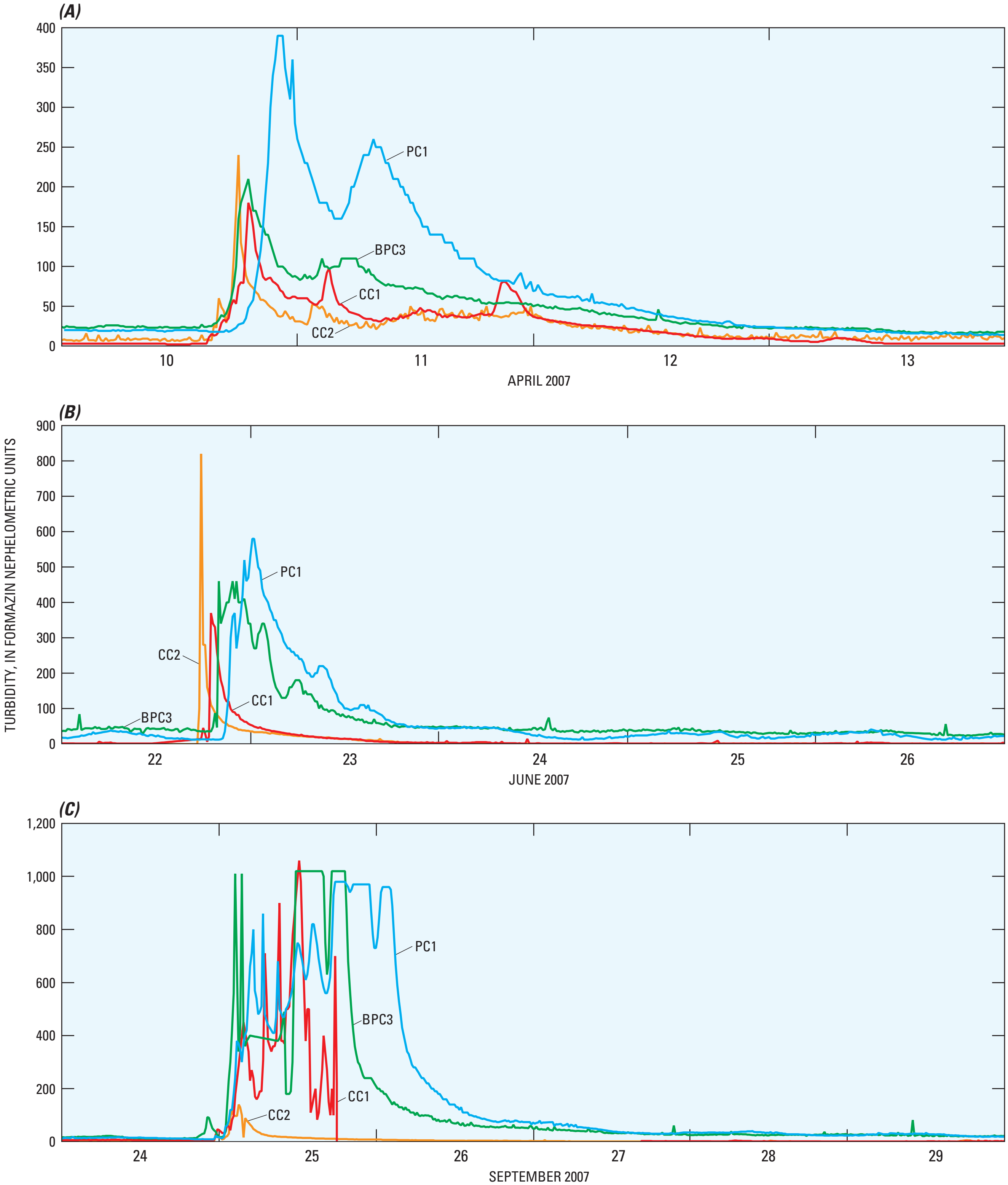

Figure 10. Turbidity for sites CC2, CC1, BPC3, and PC1 in *A*, April, *B*, June, and *C*, September 2007.

Constituents with concentrations that were not significantly different between SWO and CSO samples and also with greater than 50 percent detections in SWO samples may be derived more from stormwater runoff as opposed to influent sewage. These constituents were turbidity, nitrite, nitrite plus nitrate, arsenic, beryllium, cadmium, chromium, cobalt, nickel, thallium, vanadium, zinc, 3,4-dichlorophenyl isocyanate, 9,10-anthraquinone, anthracene, atrazine, benzo[*a*]pyrene, bisphenol A, carbazole, DEET, ethoxyoctylphenol, fluoranthene, isophorone, metolachlor, phenanthrene, phenol, pyrene, triphenyl phosphate, tris(2-chloroethyl) phosphate, and tris(dichloroisopropyl) phosphate. Antimony and bromacil concentrations were significantly less in CSO samples than in SWO samples and had greater than 50 percent detections in SWO samples, and would, therefore, also be considered to derive more from stormwater than sewage. However, because their concentrations during dry-weather stream sampling were significantly larger or not significantly different than in SWO samples, the constituents nitrite, nitrite plus nitrate, arsenic, beryllium, nickel, thallium, vanadium, anthracene, atrazine, ethoxyoctylphenol, isophorone, and metolachlor cannot be determined to be derived more from stormwater discharge to Papillion Creek Basin streams during this study. Therefore, the constituents that could be considered derived more from stormwater than from CSOs in this basin are turbidity, antimony, cadmium, chromium, cobalt, zinc, 3,4-dichlorophenyl isocyanate, 9,10-anthraquinone, benzo[*a*]pyrene, bisphenol A, bromacil, carbazole, DEET, fluoranthene, phenanthrene, phenol, pyrene, triphenyl phosphate, tris(2-chloroethyl) phosphate, and tris(dichloroisopropyl) phosphate.

Constituents with concentrations that were significantly greater in CSO samples compared to SWO samples and also had detection rates greater than 50 percent in CSO samples, and therefore, would be expected to derive more from sewage, were SC, COD, BOD, TSS, calcium, magnesium, chloride, ammonia, total nitrogen, orthophosphate, total phosphorus, barium, copper, lead, mercury, selenium, silver, uranium, 1,4-dichlorobenzene, 3-*beta*-coprostanol, 3-methyl-1H-indole, 4-nonylphenol, AHTN, *beta*-sitosterol, caffeine, camphor, cholesterol, diethyl phthalate, *d*-limonene, ethoxynonylphenol, HHCB, menthol, naphthalene, *p*-cresol, triclosan, tris(2-butoxyethyl) phosphate, and *E. coli*. However, because SC, calcium, magnesium, chloride, barium, selenium, and uranium were significantly larger in dry-weather stream samples than in CSO samples, they would not be considered good indicators of CSO discharge in Papillion Creek Basin streams in this instance. Therefore, the constituents that would be considered derived more from CSOs in Papillion Creek Basin streams were COD, BOD, TSS, ammonia, total nitrogen, orthophosphate, total phosphorus, copper, lead, mercury, silver, 1,4-dichlorobenzene, 3-*beta*-coprostanol, 3-methyl-1H-indole, 4-nonylphenol, AHTN, *beta*-sitosterol, caffeine, camphor, cholesterol, diethyl phthalate, *d*-limonene, ethoxynonylphenol, HHCB, menthol, naphthalene, *p*-cresol, triclosan, tris(2-butoxyethyl) phosphate, and *E. coli*.

For PCBS samples, spatial comparisons and comparisons between sample types (entire data set, dry-weather scheduled, wet-weather scheduled, and storm samples) are highlighted in appendix 16. Constituents with concentrations that were greater in dry weather scheduled samples compared to wet-weather scheduled samples were nitrite plus nitrate, total nitrogen, selenium, uranium, and 11 organic compounds. Constituents that were derived more from CSOs, as indicated by t-test comparisons, and had concentrations significantly greater in wet-weather samples than in dry-weather samples, were ammonia, total phosphorus, copper, mercury, silver, and *E. coli*. Comparisons of each of the individual streams to one another indicated that each of the streams was different for many of the constituents that were analyzed.

Comparisons of t-test results for stream samples collected upstream and downstream from CSO outfalls completed for each sample type gave an indication of those compounds that may have had increased or decreased concentrations in the stream as a result of CSO discharges. In the Papillion Creek Basin, constituents with values significantly greater downstream than upstream from CSO outfalls during storms included SC, total nitrogen, calcium, magnesium, antimony, 1,4-dichlorobenzene, benzo[*a*]pyrene, caffeine, cholesterol, fluoranthene, naphthalene, and *E. coli* bacteria. Of these constituents, total nitrogen, 1,4-dichlorobenzene, caffeine, cholesterol, naphthalene, and *E. coli* bacteria were indicated as being derived more from sewage, whereas antimony, benzo[*a*]pyrene, fluoranthene, and pyrene were indicated as being more derived more from stormwater.

The only constituent in the Missouri River with concentrations that were significantly greater downstream from CSO outfalls during storms was *E. coli* bacteria. Additionally, no significant differences were detected for any constituent between the EWI storm samples and scheduled samples at any Missouri River site (probably because of the relatively small data set at each site), or between the EWI storm samples and the right bank storm samples for all three Missouri River sites combined, or for each site individually (indicating mixing in the river). Further highlighting of results from each of these comparisons is included in appendix 16.

Water-Quality Comparisons for Continuous Data

Boxplots of CWQ data (figs. 3–7) indicated three basic spatial groups of sites: Cole Creek (sites CC1 and CC2); Papillion Creek (sites BPC3 and PC1); and the Missouri River (sites MR3, MR5, and MRCB). SC fluctuations were largest in Cole Creek and smallest in the Missouri River, indicating greater sensitivity to rainfall runoff, or flashiness, in smaller basins. The low turbidity values recorded at Cole Creek sites indicated low suspended-sediment concentrations in the stream. In contrast, the higher turbidity values at the Papillion Creek sites indicated much higher suspended-sediment concentrations; this may be the result of surface erosion and/or streambank failure.

A more specific comparison involved the analysis of sites CC2 and CC1 during periods of runoff. In addition to the difference in their drainage areas, another key difference between the sites is that CSO outfalls occur upstream from site CC1 but not site CC2. Paired comparisons of a subset of CWQ data for days when site CSO205 overflowed indicated that no significant differences in SC, pH, or WT were detected between the two sites. DO decreased by 0.6 mg/L ($p < 0.001$) from site CC2 to site CC1, although DO decreased by 0.8 mg/L ($p < 0.001$) on days without overflow at site CSO205. This decrease may indicate that differences in DO between the two sites are at least partly affected by factors unrelated to CSOs. Turbidity increased by 31 FNU ($p = 0.009$) from site CC2 to site CC1 on days with overflow at CSO205, which may indicate that an additional source is contributing sediment between the two sites at these times.

The configuration of the CWQ monitors allowed for comparisons of downstream and lateral effects of CSOs on measured constituents in the Missouri River. CWQ monitors at the MR5 and MR3 sites were along the west bank of the river. Site MR5 was upstream from CSO outfalls, and site MR3 was downstream from all Omaha CSO outfalls, but upstream from the Papillion Creek confluence. Therefore, comparisons of CWQ data between these two sites may indicate downstream differences along the side of the river into which CSOs are contributing. These comparisons do not, however, necessarily indicate downstream differences across the width of the entire river. By using the paired data subsets, paired t–tests compared the subset representing all days measured (including days with CSOs; hereafter called the “all days” data set) and a secondary subset representing only days on which site CSO205 overflowed (hereafter called the “site CSO205 overflowing” subset). Based on these comparisons, significant differences were observed between MR5 and MR3 as follows: SC was decreased at MR3 by 5 µS/cm for the “all days” data set ($p < 0.001$) but was not significantly different in the “site CSO205 overflowing” subset; pH was decreased at MR3 by 0.1 standard unit for the “all days” data set ($p < 0.001$) and the “site CSO205 overflowing” subset ($p < 0.001$); WT was warmer at MR3 by 0.2°C for the “all days” data set ($p < 0.001$) and the “site CSO205 overflowing” subset ($p < 0.001$); turbidity was lower at MR3 by 26 FNU for the “all days” data set ($p = 0.008$) and by 36 FNU for the “site CSO205 overflowing” subset ($p = 0.043$); and the concentration of DO was decreased at MR3 by 0.2 mg/L for the “all days” data set ($p < 0.001$) and the “site CSO205 overflowing” subset ($p = 0.005$). The results for the “site CSO205 overflowing” subset indicate that dissolved-ion concentrations (as indicated by SC) along the west bank of the Missouri River were not significantly affected by CSOs between sites MR5 and MR3. Despite the potential for increased suspended sediment loading from CSOs, turbidity actually decreased between sites MR5 and MR3 on days when CSO outfalls were flowing. Although DO levels decreased between the two sites on days associated with flowing CSO outfalls, DO levels also decreased on days when there were no CSOs.

In addition to comparisons of EWI samples with right bank samples to evaluate lateral mixing of the Missouri River, CWQ data for sites MR3 and MRCB allowed comparisons of one side of the river with the other. The location of these monitoring sites on opposite banks—with site MR3 along the west bank and site MRCB about 2.2 km downstream along the east bank—allowed a reasonable characterization of each side of the river with negligible intervening stream or CSO inflows. As for the comparisons between sites MR5 and MR3, paired t–tests were performed on a subset of daily CWQ data from sites MR3 and MRCB, and a secondary subset for only those days when site CSO205 was overflowing. These test results indicated that SC was 12 and 10 µS/cm higher at site MR3 than at site MRCB for the “all days” data set ($p < 0.001$) and the “site CSO205 overflowing” subset ($p < 0.001$), respectively; pH was 0.1 standard unit lower at site MR3 than at site MRCB for both the “all days” data set ($p = 0.005$) and the “site CSO205 overflowing” subset ($p = 0.039$); WT was 0.4°C higher at site MR3 than at site MRCB for the “all days” data set ($p < 0.001$) and for the “site CSO205 overflowing” subset ($p = 0.001$); turbidity was not different between sites MR3 and MRCB for either the “all days” data set or the “site CSO205 overflowing” subset; and the concentration of DO was 0.3 and 0.2 mg/L lower at site MR3 than at site MRCB for the “all days” data set ($p < 0.001$) and the “site CSO205 overflowing” subset ($p = 0.001$), respectively.

Seasonal Comparisons for Discrete Water–Quality Samples

Seasonal comparisons were completed for scheduled samples and samples collected during storms. For the PCBS samples, scheduled samples were divided into wet-weather and dry-weather samples as determined by post-storm stream recovery of SC at the nearest CWQ site. The scheduled samples from Missouri River sites were not segregated into dry-weather and wet-weather subsets. This treatment may have skewed the comparison test results for scheduled samples for those seasons when scheduled samples were collected shortly after a storm for constituents that derive largely from stormwater runoff or from CSOs. During the study, one of three, two of four, and two of four scheduled Missouri River samplings in spring, summer, and autumn, respectively, were collected within two days following a local rainstorm. Additionally, the amount of rainfall during each of these sampled storms may have affected the concentrations of the measured constituents. For the storms when samples were collected, the rainfall amounts were significantly different in all three seasons, with the most rainfall in spring storms (geometric mean of 21 mm), followed by autumn (geometric mean of 13 mm) and summer (geometric mean of 8 mm). Further highlighting of seasonal comparison results for the various constituents, sample types, and site types is included in appendix 16 and appendix 18.

For samples collected from CSOs, concentrations were significantly greater in spring than in summer or autumn for chloride, nitrite, nitrite plus nitrate, antimony, selenium, and *beta*-sitosterol, and were significantly less in spring than in summer and autumn for total phosphorus, 4-nonylphenol, acetophenone, cholesterol, triclosan, triphenyl phosphate, and tris(2-chlorethyl) phosphate. Spring concentrations of total phosphorus, 4-nonylphenol, cholesterol, and triclosan, which have been identified through intersite comparisons presented in this report as being derived more from sewage, may have been diluted relative to other seasons by the greater precipitation during spring storms when samples were collected. Summer concentrations in CSO samples were significantly greater than in spring and autumn samples for COD, TSS, total nitrogen, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, silver, thallium, vanadium, zinc, 1,4-dichlorobenzene, 3-methyl-1H-indole, benzo[*a*]pyrene, DEET, ethoxyoctylphenol, and tris(dichloroisopropyl) phosphate, and no constituents had concentrations that were significantly less in the summer than in the spring and autumn. Converse to many of the spring results, summer concentrations of COD, TSS, total nitrogen, barium, copper, lead, mercury, silver, 1,4-dichlorobenzene, and 3-methyl-1H-indole, which have been identified through intersite comparisons presented in this report as being derived more from sewage, may have been less diluted relative to other seasons by the smaller precipitation amounts during summer storms when samples were collected. Concentrations in CSO samples were significantly greater in autumn than in spring and summer for BOD and diethoxynonylphenol, and were significantly less in autumn than in spring and summer for calcium, magnesium, beryllium, uranium, and 3,4-dichlorophenyl isocyanate. No significant seasonal differences were detected for 52 constituents measured during the study in CSO samples.

For samples collected from PCBS sites, concentrations were significantly greater in spring than in summer and autumn for calcium, magnesium, chloride, ammonia, orthophosphate, mercury, selenium, uranium, anthracene, atrazine, benzo[*a*]pyrene, benzophenone, carbaryl, carbazole, ethoxyoctylphenol, fluroanthene, isophorone, menthol, metolachlor, phenanthrene, prometon, pyrene, and triphenyl phosphate, and significantly less in spring than in the summer and autumn for HHCB. PCBS data values were significantly greater in summer than in spring and autumn for turbidity, 3,4-dichlorophenyl isocyanate, 5-methyl-1H-benzotriazole, DEET, tetrachloroethene, and *E. coli* bacteria, and were significantly less in summer than in spring and autumn for SC and camphor. The concentrations in PCBS samples were significantly greater in autumn than in spring and summer for dichlorvos and methyl salicylate, and were significantly less in autumn than in spring and summer for COD, TSS, nitrite, nitrite plus nitrate, phosphorus, barium, cadmium, chromium, cobalt, copper, lead, nickel, silver, vanadium, zinc, 1-methylnaphthalene, 2-methylnaphthalene, 3-methyl-1H-indole, bisphenol A, and indole. No significant seasonal differences were found for 46 constituents measured during the study in PCBS samples.

Concentrations of three constituents were significantly greater in the same season compared to the other two seasons in CSO and PCBS samples; these were chloride and selenium in spring, and DEET in summer. No constituents had significantly different autumn concentrations for CSO and PCBS samples as compared to the other seasons. Results from t-tests for this study indicated that chloride and selenium were likely derived more from sewage; however, analysis of CSO and PCBS sample concentrations of chloride (geometric means of 66.7 mg/L and 54.0 mg/L for CSO and PCBS samples, respectively) and selenium (geometric means of 0.96 µg/L and 1.60 µg/L for CSO and PCBS samples, respectively) during the March 24, 2007, storm runoff indicated that these compounds may have been washed from roofs and roads where they had accumulated during the winter months. General uses of DEET in the study area would indicate that larger concentrations of this compound in the summer derive from sewage (personal usage as insect repellant) and stormwater runoff (spray application to control mosquitoes).

For samples collected from the Missouri River, concentrations were significantly greater in spring than in summer and autumn for COD, BOD, TSS, nitrite, nitrite plus nitrate, ammonia, total nitrogen, phosphorus, orthophosphate, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, silver, uranium, vanadium, zinc, 2,6-dimethylnaphthalene, benzo[*a*]pyrene, benzophenone, *beta*-sitosterol, bromacil, carbazole, fluoranthene, metolachlor, pyrene, and tributyl phosphate, and turbidity also was greatest during spring; concentrations were not significantly less for any constituents in spring. Concentrations in summer Missouri River samples were significantly greater than in spring and autumn for calcium, magnesium, antimony, prometon, and tris(2-butoxyethyl), and SC was significantly greater in summer. Concentrations in summer Missouri River samples were significantly less than in spring and autumn for 9,10-anthraquinone and cholesterol. The concentrations in Missouri River samples were significantly greater in autumn than in spring and summer for 3-*beta*-coprostanol, ethoxynonylphenol, *p*-cresol, and triclosan, and were significantly less in autumn for thallium and atrazine. No significant seasonal differences were measured for 51 constituents during the study in Missouri River samples.

Concentrations of three constituents were significantly greater in spring than in the other seasons for CSO and Missouri River samples; these were nitrite, nitrite plus nitrate, and *beta*-sitosterol. No constituents had significantly different concentrations for CSO and Missouri River samples in summer or autumn. Nitrite and nitrate would likely come from runoff of spring fertilizer applications. Intersite t-test results from this study indicated that *beta*-sitosterol was likely derived more from sewage. The reason for the potential seasonal variation of *beta*-sitosterol in sewage is unknown.

Comparisons and Exceedances of Water-Quality and Aquatic Health Standards and Criteria

The following are results of comparisons between water-quality results from stream samples collected at sites in the Papillion Creek Basin and Missouri River and existing water-quality and aquatic health criteria. Although the comparisons of study results to most water-quality and aquatic health standards and criteria consisted of a direct comparison of the measured concentration to the standard or criteria values, the comparisons for selected compounds required the adjustment of the measured concentrations as mentioned in the methods.

Nebraska Surface-Water-Quality Standards

Surface waters in, or bordering, the state of Nebraska are assigned beneficial uses by the NDEQ, and as such, are protected by an antidegradation clause (Nebraska Department of Environmental Quality, 2006). Streams in this study area have been assigned the following beneficial uses: primary recreational contact; aquatic life—warm-water classes A (capable of maintaining year-round populations of warmwater biota) and B (capable of maintaining year-round populations of only tolerant warmwater biota); water supply for agriculture; and aesthetics. Narrative and numerical water-quality criteria are assigned to waterbodies in accordance with the beneficial uses (Nebraska Department of Environmental Quality, 2006), and are listed in appendix 1. The following descriptions relate the water-quality results from this study to these water-quality criteria.

Primary Recreational Contact

E. coli densities were compared to criteria for sites with primary contact for recreational use (seasonal geometric mean of 126 CFU/100 mL of sample, which is comparable to a value of 126 MPN/100 mL). At the PCBS sites, *E. coli* densities were greater than 126 MPN/100 mL in 99 percent of the samples (212 of 213 samples analyzed for *E. coli*) collected from May through September (in 2006 and 2007), and the geometric means of all samples collected at individual PCBS sites ranged from a minimum of 3,700 MPN/100 mL (14 samples) at site PC2 to a maximum of 29,000 MPN/100mL (22 samples) at site PC1. *E. coli* densities ranged from 72 (site PC2, 9/17/07) to 1,400,000 MPN/100 mL (site BPC2, 7/19/07). *E. coli* densities in 76 percent of Missouri River samples (39 of 51 samples) were greater than the primary-contact standard in samples collected from May through September (in 2006 and 2007). The *E. coli* densities in samples from the downstream Missouri River site (MR3) were greater than the standard in 15 of 17 samples (88 percent). The geometric means of the 17 samples collected from each of the Missouri River sites ranged from 280 MPN/100 mL at site MR-5 to 1,200 MPN/100 mL at site MR-3.

Aquatic Life

Although the NDEQ has general aquatic life criteria for pH and WT, the water-quality comparisons to these values were not evaluated. Water temperature was not measured at the time the discrete water-quality samples were collected; comparison of pH and WT with aquatic life criteria was completed by using the CWQ data set for a subset of sampling sites. As the chronic criterion for ammonia is dependant on measurements of WT and pH in the sample, comparisons of study data to the ammonia chronic criterion also were not evaluated.

All streams in the study were classified as warm-water streams (class A or B), capable of maintaining year-round populations of warm-water biota (biota present in waters where the temperature frequently exceeds 25ºC) (Nebraska Department of Environmental Quality, 2006). Criteria for DO concentrations in warm-water streams are included in appendix 1, but the criteria were not evaluated in association with the discrete water-quality-sampling data because DO was not measured at the time of sample collection. Evaluation of the DO criterion is included for a subset of sites in association with CWQ data (see “Continuous Water-Quality Summaries” section).

Acute and Chronic Toxicity Criteria

Aquatic life acute and chronic exposure criteria have been developed by the Nebraska Department of Environmental Quality (2006) for several compounds. Except for the criterion for selenium and the chronic criterion for mercury, the aquatic life criteria for metals and nutrient constituents are based on dissolved concentrations. As the metals and organic compound concentrations measured in this study are for whole-water samples, a conversion algorithm would be needed to directly compare the measured concentrations to the applicable criteria. As such, it is acknowledged that comparisons of measured whole-water concentrations to the criteria for dissolved concentrations, as done in this report, will overestimate the number and frequency of samples having concentrations that surpass the aquatic life exposure criteria. Also, the criteria developed for many of the metals are sample specific, and were computed for each sample by using the measured concentration of the specific metal and the hardness measurement for the sample as shown in the formulas in appendix 1.

Acute criteria for ammonia in warm-water systems are based on the classification of the stream as a class A or B warm-water habitat, and on the pH of the sample. The ammonia criterion for class A warm-water streams ranged from 1.32 mg/L (at a pH of 9.0 standard units) to a maximum of 46.8 mg/L (at a pH of 6.6 standard units); whereas class B warm-water habitat criteria ranged from 1.56 mg/L (at a pH of 9.0 standard units) to a maximum of 55.25 mg/L (at a pH of 6.6 standard units). Only one sample collected during this study had an ammonia concentration in either range (at site CC-1, 1.49 mg/L). The pH of this sample was 7.8 standard units, and, therefore, the concentration was lower than the calculated criterion for a class B stream.

Few samples had contaminant concentrations in excess of the acute toxicity criteria. As the acute toxicity criterion for zinc is computed from the zinc concentration and sample hardness value, the criterion ranged from 49.3 to 642 µg/L. The concentration of zinc measured in 41 stream samples was greater than the individual computed acute toxicity criterion level, which ranged from 134 to 4,056 µg/L. As the sample-dependant acute toxicity criterion was calculated using whole-water analytical results, the conversions of the whole-water zinc concentrations to estimates of dissolved concentrations will presumably lower the criterion and sample measurements accordingly, and the relations between the criteria and elevated zinc concentrations would remain the same. Samples with elevated zinc concentrations were largely from sites on Little Papillion (11 samples) and Big Papillion Creeks (17 samples).

The chronic toxicity criteria are expressed as a 24-hour or 4-day average value. As this study was not designed to collect frequent periodic samples, the number of exceedences of chronic criteria could not be determined. However, the following paragraphs discuss constituents with measured concentrations in several samples greater than the chronic toxicity levels, indicating that further monitoring of these compounds in the streams may be warranted.

The chronic toxicity criterion for zinc is computed using sample hardness and zinc concentration, and is based on a 4-day average concentration. During this study, the chronic toxicity level for zinc ranged from 49.7 to 647 µg/L. The number of samples with a zinc concentration greater than the computed chronic toxicity level (41 samples) indicates that further monitoring of zinc concentrations in the streams may be warranted. The computed chronic toxicity level was determined from the whole-water sample concentrations, and the presumption is that conversions of data to dissolved concentrations would lower values accordingly.

The 4-day average chronic toxicity level for total selenium is 5 µg/L, and concentrations measured in 43 of 269 samples were in excess of this level, including 31 of 94 samples collected in the Big Papillion Creek Basin. These results indicate that further monitoring of this constituent in the basin may be warranted.

The chronic toxicity criterion for phenanthrene is 6.3 µg/L and is expressed as a 24-hour average concentration. Phenanthrene concentrations detected in two of three stream samples collected during a storm at site CC1 were 11.2 and 7.49 µg/L, resulting in an average concentration during the 3-hour period of 7.48 µg/L. Similarly, the chronic toxicity criterion for dissolved arsenic (16.7 µg/L) is based on a 24-hour average concentration. At site BPC3, measured total arsenic concentrations from three samples collected during 7 hours following a storm ranged from 19.7 to 26.9 µg/L, with an average concentration of 22.3 µg/L. Although elevated concentrations of total arsenic and phenanthrene occurred following a short rain storm, additional sampling would be needed to determine if a prolonged storm may lead to exceedences of chronic toxicity criteria. Additionally, the conversions of the whole-water arsenic concentrations to estimates of dissolved concentrations presumably will lower the sample measurements accordingly.

Water-Supply Criteria for Agricultural Purposes

The only constituent measured during this study with a criterion for a targeted agricultural water supply is SC, with a water-supply criterion for agricultural purposes. The criterion level of 2,000 µS/cm for agricultural land use was not exceeded in any of the samples collected at the Papillion Creek Basin or Missouri River sites.

Public Drinking-Water Standards

The NDEQ Public Drinking-Water standards are legally enforceable water-quality criteria that apply to finished water from public water systems (Nebraska Department of Environmental Quality, 2006). The numerical standards are intended to protect the beneficial use of public drinking-water supplies. Violation of a standard is defined by exceedances of the standard in 10 percent or more of the samples collected during one year. Although exceedances of the standards were not evaluated as part of this report, the measured constituent concentrations were compared with relevant standards. The standard of comparison for lead in drinking water was the USEPA maximum contaminant level (MCL) (0.015 mg/L) (U.S. Environmental Protection Agency, 2003), because a standard for lead was not included in the NDEQ standards.

Although few of the constituents were detected in Missouri River samples at concentrations in excess of the existing standards, some constituents frequently were detected at elevated concentration in samples from the PCBS sites. The measured total arsenic concentrations were greater than the standard for total arsenic (0.01 mg/L) in 63 of 269 other stream samples, but in only one Missouri River sample. Almost one-half of these samples (27 of 63) were collected at sites on Big Papillion Creek, and the maximum concentration detected was 0.032 mg/L. Concentrations of total benzo[*a*]pyrene were greater than the standard (0.0002 mg/L) in 71 PCBS samples and in 1 Missouri River sample. Again, most of the PCBS samples with elevated concentrations of total benzo[*a*]pyrene were collected from sites on Big Papillion Creek (34 of 71). Eleven of the PCBS samples had concentrations of total pentachlorophenol that were greater than the standard of 0.001 mg/L.

For most of the 270 stream samples analyzed, few samples had constituent concentrations greater than the relative drinking-water standard. The following constituents were measured at concentrations greater than the respective drinking-water standard: barium (3 samples), beryllium (11 samples), cadmium (3 samples), and atrazine (1 sample). The number of samples with measured concentrations of total *bis*(2-ethylhexyl)phthalate in excess of the standard could not be determined because the reporting level for the analytical method

(0.00085 mg/L) was greater than the MCL (0.0006 mg/L). The measured concentrations of constituents with secondary drinking-water standards were less than the respective criteria values in all stream samples collected during this study.

Criteria for Human Health

The human health criteria for surface water is given in appendix 1, as toxic substances shall not be present in the water in concentrations that result in objectionable tastes or significant bioaccumulation or biomagnifications in aquatic organisms that renders them unsuitable or unsafe for consumption (Nebraska Department of Environmental Quality, 2006). None of the constituents with human health criteria for consumption of water, fish, and other aquatic organisms were detected at levels greater than the criteria in any of the samples collected during this study. With regards to the human health criteria for consumption of fish and other aquatic organisms, the concentrations of total arsenic measured in 28 of 270 samples from the PCBS were greater than the human health criteria for the consumption of aquatic organisms (16.7 µg/L). Of these samples, 16 were collected from sites on Big Papillion Creek.

Regional Nutrient Criteria for Streams

The USEPA has recommended water-quality criteria specific to aggregated nutrient ecoregions for constituents associated with nutrient enrichment, including total phosphorus and total nitrogen (U.S. Environmental Protection Agency, 2002). Measured concentrations of relevant nutrients in samples collected from the study sites were compared to the proposed criteria. The proposed criterion for streams in the Corn Belt and Northern Great Plains nutrient ecoregion, which includes the Omaha area, is 0.07625 mg/L for total phosphorus (U.S. Environmental Protection Agency, 2002). Exceedances of the proposed criterion would be based on seasonal mean values, which were not determined for this report. Total phosphorus concentrations in PCBS samples were in excess of this proposed criterion in all but four of the stream samples (266 of 270). Similarly, only 2 of 84 Missouri River samples had total phosphorus concentrations less than the proposed criterion.

The proposed total nitrogen criterion for the Corn Belt and Northern Great Plains ecoregion is 2.18 mg/L (U.S. Environmental Protection Agency, 2002). This concentration was surpassed in 80 percent of the water samples collected from the PCBS sites. Samples with total nitrogen concentrations greater than the proposed criterion were most common at Papillion Creek and Big Papillion Creek sites, where the proposed criterion was surpassed in 90 and 96 percent of the samples collected, respectively. Elevated concentrations of total nitrogen were less common at the Missouri River sites, with 33 percent of the samples analyzed having concentrations that surpassed the proposed nutrient criterion for total nitrogen.

Six ecoregions compose the aggregated Corn Belt and Northern Great Plains nutrient ecoregion, and the Omaha area lies within the Western Cornbelt Plains ecoregion. Reference conditions for total nitrogen and phosphorus for this area are slightly higher than the criteria proposed for the aggregated nutrient ecoregion. For the Western Cornbelt Plains the proposed criterion for total nitrogen in streams is 3.26 mg/L, and the proposed criterion for total phosphorus is 0.118 mg/L (U.S. Environmental Protection Agency, 2000). Total phosphorus concentrations greater than this criterion were detected in water from 94 percent of PCBS samples (254 of 270) collected during this study. Total phosphorus concentrations in 16 samples (9 samples from Little Papillion Creek, 2 samples from Cole Creek, and 5 samples from Big Papillion Creek sites) were less than the criterion level. Similarly, 82 percent of the samples (69 of 84) from Missouri River sites had total phosphorus concentrations greater than the proposed criterion. The measured concentrations of total nitrogen were greater than the proposed criterion in 54 percent of the PCBS samples (146 of 270) collected from the stream sites. Samples with total nitrogen concentrations above the proposed criterion were most common at the Big Papillion Creek basin sites, where the measured concentrations were greater than the criterion in 81 percent of the samples collected (77 of 95). Total nitrogen concentrations greater than the proposed criterion were detected in 29 percent of the Missouri River samples analyzed.

Health-Based Screening Levels

Health-based screening level (HBSL) values were developed by the USGS, in cooperation with the USEPA, the New Jersey Department of Environmental Protection, and the Oregon Health and Science University, for 436 unregulated contaminants (including those contaminants with drinking-water guidelines but without MCLs) (Toccalino and others, 2005). HBSLs are estimates of benchmark concentrations of contaminants in water that may be of potential concern for human health (U.S. Geological Survey, 2005), but do not consider all potential human exposure pathways (only drinking water ingestion), nor do they address ecological concerns (Toccalino and others, 2005). The three constituents with measured concentrations greater than their respective HBSLs were nickel, zinc, and dichlorvos. Total nickel concentrations exceeded the HBSL of 100 µg/L in 12 PCBS samples. Six of these samples were collected at sites on Big Papillion Creek, and all were collected during two rain storms (March 24, 2007, and May 6, 2007). Total zinc was detected in four PCBS samples at concentrations greater than the HBSL of 2,000 µg/L. Dichlorvos was detected in 20 PCBS samples at concentrations that exceeded the HSBL of 0.4 µg/L; the number of detections was similar in the various stream reaches where it was detected, but 18 of the 20 samples with concentrations greater than 0.4 µg/L were collected in August and September.

Hydrograph Subsection Comparisons

Comparisons between the beginning, middle, and end of the hydrograph were completed using t-tests for those sampled storms that were sufficiently long at sites CSO106, CSO108, CSO119, CSO203, and CSO205 (fig. 1). Additionally, comparisons between the rise, peak, and recession subsections of the sufficiently long stream hydrographs during storms were completed. Storms were considered sufficiently long if enough water could be collected by the autosampler to analyze multiple samples from these sites.

Combined Sewer Overflows

For those sampled storms that were sufficiently long, the automatic samples collected at sites CSO106, CSO108, CSO119, CSO203, and CSO205 were composited as three separate samples. All data for these sites are listed in appendix 10. Because the CSO hydrographs did not follow a traditional rise-peak-recession progression, comparisons were made between the beginning, middle, and ending parts of the hydrograph. Results from Student's t-test comparisons indicated that no measured constituent concentrations were significantly different between the beginning and the middle parts of the CSO hydrograph. This lack of difference may be partly because the first flush frequently extended into the middle sample.

Measured concentrations from the beginning part of the CSO hydrograph were significantly different than those from the ending part for indole ($p = 0.031$; geometric means of 0.14 and 0.067 µg/L for the beginning and ending parts, respectively), bis(2-ethylhexyl)phthalate ($p = 0.047$; geometric means of 4.51 and 2.04 µg/L for the beginning and ending parts, respectively), and 3-methyl-1H-indole ($p = 0.016$; geometric means of 0.76 and 0.18 µg/L for the beginning and ending parts, respectively). Concentrations from the ending part of the CSO hydrograph were significantly different than those from the middle part for SC ($p = 0.016$; geometric means of 537 and 298 µS/cm for the middle and ending parts, respectively), COD ($p = 0.040$; geometric means of 514 and 197 mg/L for the middle and ending parts, respectively), ammonia ($p = 0.012$; geometric means of 4.74 and 1.23 mg/L as N for the middle and ending parts, respectively), total N ($p = 0.016$; geometric means of 20.5 and 8.24 mg/L for the middle and ending parts, respectively), orthophosphate ($p = 0.038$; geometric means of 0.85 and 0.38 mg/L as P for the middle and ending parts, respectively), magnesium ($p = 0.009$; geometric means of 13.3 and 6.51 mg/L for the middle and ending parts, respectively), chloride ($p = 0.019$; geometric means of 53.1 and 25.6 mg/L for the middle and ending parts, respectively), uranium ($p = 0.010$; geometric means of 2.77 and 1.48 µg/L for the middle and ending parts, respectively), indole ($p = 0.004$; geometric means of 0.14 and 0.067 µg/L for the middle and ending parts, respectively), menthol ($p = 0.039$; geometric means of 2.40 and 0.76 µg/L for the middle and ending parts, respectively), and diethoxyoctylphenol ($p = 0.044$; geometric means of 3.03 and 1.67 µg/L for the middle and ending parts, respectively).

Papillion Creek Basin Streams

For those sampled storms that were sufficiently long, the automatic samples collected at sites CC2, CC1, BPC3, and PC1 were composited as rise, peak, and recession samples. The geometric mean for each constituent at the site upstream from CSO outfalls (CC2) and for the sites downstream from CSO outfalls (CC1, BPC3, and PC1) can be found in table 16; all data for these sites can be found in appendix 10.

Generally for the site upstream from CSO outfalls (CC2), a constituent that had a geometric mean concentration for one part of the storm hydrograph that was twice that of the other two parts of the hydrograph was most concentrated in either the rising or peak parts of the hydrograph. Additionally, constituents that had a geometric mean in one part of the storm hydrograph that was less than 50 percent of that for the other two parts of the hydrograph were least concentrated in either the rising or receding part. The constituents that had geometric mean values for the rising part that were at least twice those for the peak and recession parts were SC, magnesium, nitrite, DEET, methyl salicylate, *p*-cresol, and *E. coli*. Factors potentially contributing to larger concentrations for each of these constituents in the rising part of the storm hydrograph include the location of the source of the constituent, a "first flush" effect of stormwater runoff, and/or dilution of a constant source by larger amounts of streamflow during the peak and recession parts of the hydrograph. The measured constituents that had geometric mean concentrations for the rising part that were at least 50 percent less than those for the peak and recession parts at the site upstream from CSOs were cobalt and silver. These were less concentrated during the rise most likely because of the location of the source of the constituent. The constituents with geometric mean values for the peak part that were at least twice those for the rise and recession parts at the upstream site were TSS, silver, and benzo[*a*]pyrene. Factors potentially contributing to larger concentrations for each of these constituents in the peak part of the storm hydrograph include location of the source of the constituent or association of the constituent with particles, which generally require large forces resulting from larger flows for their transport. No constituents had geometric mean concentrations during the peak part that were at least 50 percent less than those for the rise and recession parts. Additionally, no constituents had geometric mean concentrations during the recession part that were at least twice those for the rise and peak parts. The only constituent measured at the upstream site that had a geometric mean concentration during the recession part that was at least 50 percent less than that for the rise and peak parts was 3,4-dichlorophenyl isocyanate. Factors potentially explaining the smaller concentrations in the recession part of the hydrograph are location of the source or transition to a source-lim-

Table 16. Geometric means of the rise, peak, and recession data subsets for samples collected upstream and downstream from combined sewer overflow outfalls.

[Field identifiers from table 1 and fig. 1; geometric means are only calculated for those subgroups that have at least 50 percent detections; unless otherwise noted, all data in units of micrograms per liter; CSO, combined sewer overflow; cm, centimeter; unfltrd, unfiltered; NTU, nephelometric turbidity units; mg/L, milligram per liter; NC, not calculated because less than 50 percent detections; N, nitrogen; fltrd, filtered; P, phosphorus; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters]

Analyte	Upstream from CSO outfalls (site CC2)			Downstream from CSO outfalls (sites CC1, BPC3, and PC1)		
	Rise	Peak	Recession	Rise	Peak	Recession
Specific conductance (microsiemens/cm), unfltrd	632	243	265	554	424	419
Turbidity (NTU), unfltrd	53	68	88	173	287	214
Chemical oxygen demand (mg/L), unfltrd	47.9	84.4	55.2	96.0	106	80.4
Biochemical oxygen demand (mg/L), unfltrd	NC	NC	NC	23.7	27.3	26.6
Total suspended solids (mg/L), unfltrd	52	216	90	345	646	414
Calcium (mg/L), unfltrd	68.5	42.3	34.2	91.0	69.9	68.5
Magnesium (mg/L), unfltrd	18.0	6.51	6.98	19.3	15.1	15.6
Chloride (mg/L), unfltrd	47.4	23.0	26.7	42.8	31.7	33.8
Nitrite (mg/L as N), fltrd	.085	.032	.036	.045	.047	.053
Nitrite plus nitrate (mg/L as N), fltrd	1.75	.81	.98	1.66	1.39	1.87
Ammonia (mg/L as N), fltrd	.052	.062	.13	.089	.12	.076
Total nitrogen (nitrate + nitrite + ammonia + organic-N) (mg/L), fltrd	3.43	2.55	2.35	4.17	4.12	4.30
Total phosphorus (mg/L), fltrd	.43	.52	.37	.77	1.10	.74
Orthophosphate (mg/L as P), fltrd	.21	.086	.12	.086	.088	.092
Antimony, unfltrd	.68	.78	.54	.96	.82	.75
Arsenic, unfltrd	4.26	6.31	4.79	7.78	8.38	6.28
Barium, unfltrd	165	187	130	301	341	307
Beryllium, unfltrd	NC	.28	.17	.40	.67	.50
Cadmium, unfltrd	.12	.30	.18	.41	.50	.33
Chromium, unfltrd	1.80	5.30	3.15	8.07	10.6	7.90
Cobalt, unfltrd	.89	2.87	1.94	4.16	5.88	3.69
Copper, unfltrd	7.96	12.87	7.81	17.6	21.5	14.5
Lead, unfltrd	3.53	8.98	5.40	17.3	21.0	11.2
Mercury, unfltrd	.011	.024	.016	.027	.050	.033
Nickel, unfltrd	3.51	8.86	5.62	12.5	19.1	14.1
Selenium, unfltrd	1.57	.78	.90	1.98	1.37	1.72
Silver, unfltrd	.13	.81	.34	.11	.19	.13
Thallium, unfltrd	NC	.14	NC	.19	.22	.18
Uranium, unfltrd	1.95	1.11	.96	3.75	3.00	2.33
Vanadium, unfltrd	3.96	9.69	6.33	13.5	21.2	16.2
Zinc, unfltrd	75.0	84.1	53.6	79.8	85.6	57.1
1,4-Dichlorobenzene, unfltrd	.030	.020	.030	NC	.040	.041
1-Methylnaphthalene, unfltrd	NC	NC	NC	NC	NC	NC
2,6-Dimethylnaphthalene, unfltrd	NC	NC	NC	NC	NC	NC
2-Methylnaphthalene, unfltrd	NC	NC	NC	NC	0.034	NC
3,4-Dichlorophenyl isocyanate, unfltrd	3.49	3.45	1.10	2.09	4.13	4.01
3-*beta*-Coprostanol, unfltrd	NC	NC	NC	NC	2.40	NC
3-Methyl-1H-indole, unfltrd	.06	NC	NC	NC	NC	NC
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	NC	NC	NC	NC	NC	NC
4-Cumylphenol, unfltrd	NC	NC	NC	NC	NC	NC
4-*n*-Octylphenol, unfltrd	NC	NC	NC	NC	NC	NC
4-Nonylphenol, unfltrd	1.29	.94	NC	.91	1.05	.85
4-*tert*-Octylphenol, unfltrd	NC	NC	NC	NC	NC	NC
5-Methyl-1CD-benzotriazole, unfltrd	NC	.46	NC	NC	NC	NC
9,10-Anthraquinone, unfltrd	.44	.74	.47	.61	.56	.49
Acetophenone, unfltrd	NC	NC	NC	.27	NC	.20
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	NC	NC	NC	NC	NC	NC
Anthracene, unfltrd	.047	NC	NC	.070	.089	NC
Atrazine, unfltrd	.081	.10	NC	.077	.10	.13
BDE congener 47, unfltrd	NC	NC	NC	NC	NC	NC
Benzo[*a*]pyrene, unfltrd	.074	.26	.072	.24	.30	.15

Table 16. Geometric means of the rise, peak, and recession data subsets for samples collected upstream and downstream from combined sewer overflow outfalls.—Continued

[Field identifiers from table 1 and fig. 1; geometric means are only calculated for those subgroups that have at least 50 percent detections; unless otherwise noted, all data in units of micrograms per liter; CSO, combined sewer overflow; cm, centimeter; unfltrd, unfiltered; NTU, nephelometric turbidity units; mg/L, milligram per liter; NC, not calculated because less than 50 percent detections; N, nitrogen; fltrd, filtered; P, phosphorus; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters]

Analyte	Upstream from CSO outfalls (site CC2)			Downstream from CSO outfalls (sites CC1, BPC3, and PC1)		
	Rise	Peak	Recession	Rise	Peak	Recession
Benzophenone, unfltrd	0.079	0.072	0.10	0.078	NC	NC
beta-Sitosterol, unfltrd	NC	NC	NC	NC	NC	NC
beta-Stigmastanol, unfltrd	NC	NC	NC	NC	NC	NC
Bis(2-ethylhexyl) phthalate, unfltrd	NC	NC	NC	NC	NC	NC
Bisphenol A, unfltrd	.21	.17	NC	.20	0.23	0.20
Bromacil, unfltrd	NC	NC	NC	NC	NC	NC
Caffeine, unfltrd	.57	.34	.28	.96	.74	.65
Camphor, unfltrd	.12	.091	.11	.097	.090	.089
Carbaryl, unfltrd	.14	NC	NC	NC	.111	NC
Carbazole, unfltrd	.14	.25	.17	.20	.22	.18
Chlorpyrifos, unfltrd	NC	NC	NC	NC	NC	NC
Cholesterol, unfltrd	NC	NC	NC	2.04	2.95	NC
Cotinine, unfltrd	NC	NC	NC	NC	NC	NC
DEET, unfltrd	.33	.18	.14	.24	.23	.23
Diazinon, unfltrd	.18	NC	NC	NC	NC	NC
Dichlorvos, unfltrd	.10	NC	NC	.12	NC	NC
Diethoxynonylphenol (all isomers), unfltrd	NC	NC	NC	.90	NC	NC
Diethoxyoctylphenol, unfltrd	.050	.066	.076	NC	NC	NC
Diethyl phthalate, unfltrd	NC	NC	NC	NC	NC	NC
d-Limonene, unfltrd	NC	NC	NC	NC	.054	NC
Ethoxynonylphenol (all isomers), unfltrd	NC	NC	NC	NC	NC	NC
Ethoxyoctylphenol, unfltrd	.30	NC	NC	NC	.35	NC
Fluoranthene, unfltrd	.25	.68	.27	.70	.82	.43
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	NC	NC	NC	NC	.10	NC
Indole, unfltrd	.069	NC	NC	NC	NC	NC
Isoborneol, unfltrd	NC	NC	NC	NC	NC	NC
Isophorone, unfltrd	.059	NC	NC	.057	.052	NC
Isopropylbenzene, unfltrd	NC	NC	NC	NC	NC	NC
Isoquinoline, unfltrd	NC	NC	NC	NC	NC	NC
Menthol, unfltrd	NC	NC	NC	NC	.16	.15
Metalaxyl, unfltrd	NC	NC	NC	NC	NC	NC
Methyl salicylate, unfltrd	.68	.09	NC	NC	NC	NC
Metolachlor, unfltrd	NC	NC	NC	NC	NC	NC
Naphthalene, unfltrd	NC	NC	NC	.046	.053	NC
p-Cresol, unfltrd	.27	.13	.084	.13	NC	NC
Pentachlorophenol, unfltrd	NC	NC	NC	NC	NC	NC
Phenanthrene, unfltrd	.10	.28	.13	.31	.39	.20
Phenol, unfltrd	.47	NC	NC	NC	NC	NC
Prometon, unfltrd	NC	NC	NC	.068	.089	.085
Pyrene, unfltrd	.19	.45	.17	.51	.57	.30
Tetrachloroethene, unfltrd	NC	NC	NC	NC	.063	.053
Tribromomethane (bromoform), unfltrd	NC	NC	NC	NC	NC	NC
Tributyl phosphate, unfltrd	NC	NC	NC	NC	NC	NC
Triclosan, unfltrd	NC	NC	NC	NC	.14	NC
Triethyl citrate, unfltrd	NC	NC	NC	NC	NC	NC
Triphenyl phosphate, unfltrd	.057	.049	.069	.054	.066	.070
Tris(2-butoxyethyl) phosphate, unfltrd	.66	.42	.89	.57	.55	.43
Tris(2-chloroethyl) phosphate, unfltrd	.076	.076	NC	.10	.089	.095
Tris(dichloroisopropyl) phosphate, unfltrd	.043	NC	NC	.08	.07	.07
Escherichia coli, (MPN/100 mL), unfltrd	70,000	12,000	12,000	39,000	47,000	38,000

iting transport state, meaning that most of a finite source had already been washed off into the stream.

For the data from the three rise-peak-recession sites that were downstream from CSO outfalls (CC1, BPC3, and PC1), Student's t-tests were completed on the log-transformed data sets to determine whether or not concentrations for one part of the storm hydrograph were significantly different than those for the other two parts. The test results are reported using a significance level of $\alpha = 0.05$ except where otherwise indicated. The geometric mean for each constituent in samples from each part of the storm hydrograph is shown in table 16. The only constituent with concentrations for the rise part that were significantly different than those for the peak and recession parts was SC ($p = 0.027$ for rise compared with peak and $p = 0.024$ for rise compared with recession), although the source of higher SC in the rise samples was most likely from groundwater springs. No constituents had significantly different concentrations during the peak and recession than for the other two parts of the storm hydrograph at the rise-peak-recession sites that were downstream from CSO outfalls.

Additional constituents had concentrations that differed between parts of the storm hydrograph at the sites downstream from CSOs when significance was declared at $\alpha = 0.10$. The peak and recession concentrations were less than those for the rising part for calcium ($p = 0.084$ for rise compared with peak and $p = 0.064$ for rise compared with recession), and magnesium ($p = 0.043$ for rise compared with peak and $p = 0.063$ for rise compared with recession). For the peak and recession parts of the storm hydrograph, no additional constituents had concentrations that differed significantly from the other two parts when using a significance level of $\alpha = 0.10$. The rise concentration was significantly different than the peak only for chloride ($p = 0.093$) and mercury ($p = 0.071$). No constituent was only significantly different when comparing the rise to the recession. The mean concentration in the peak part of the storm hydrograph was only significantly different than the recession part for benzo[*a*]pyrene ($p = 0.053$), fluoranthene ($p = 0.083$), phenanthrene ($p = 0.076$), and pyrene ($p = 0.044$). All four of these compounds were determined to be derived more from stormwater.

The only constituents that had concentrations that were similarly largest (using a significance level of $\alpha = 0.05$) during one part of the storm hydrograph for both site groups—upstream (at site CC2) and downstream (at sites CC1, BPC3, and PC1) from CSO outfalls—was SC during the rising part, and benzo[*a*]pyrene during the peak part. The larger SC levels in the rising part were likely a result of dilution of ions in base flow by lower ionic strength stormwater runoff, since the background SC values in the groundwater-fed streams were larger during non-storm flow than in stormwater during the storms that were sampled. Benzo[*a*]pyrene was determined to be derived more from stormwater and, therefore, also would be expected to respond similarly to storms upstream and downstream from CSO outfalls.

Generally, the autosamplers at the CSO outfalls and the PCBS sites triggered within 10 minutes of each other (all sample times are listed in appendix 10). The period of time when CSOs were sampled, therefore, generally would correspond to at least part of the hydrograph-rise stream sample and the hydrograph-peak stream sample; however, this period during the storm coincides with the period when the maximum stormwater runoff rate occurs. Diazinon was the only compound with significantly larger concentrations in the hydrograph-rise samples as compared to the hydrograph-peak samples at sites downstream from CSOs, but the overall lack of detections precluded determination of its source(s). General usage and chemical properties of diazinon, an insecticide, would indicate that it was most likely derived more from stormwater runoff. Since 2004, diazinon has not been available for retail purchase for homeowners for residential use (U.S. Environmental Protection Agency, 2001), but Watanabe and others (2008) reported median concentrations of 0.13 mg/L in a San Diego, Calif., stream during storm runoff samples collected in 2006 and 2007.

At the PCBS sites downstream from CSOs, constituents with significantly larger concentrations in hydrograph-peak samples relative to those from one of the other parts of the hydrograph were mostly determined to be derived more from stormwater and included benzo[*a*]pyrene, fluoranthene, phenanthrene, and pyrene. Mercury was the only compound with significantly larger concentrations in the hydrograph-peak samples compared to those from the hydrograph rise that was determined to be derived more from sewage.

Mass Loads

The mass load for each of the samples collected at each site is listed in appendix 19. All grab samples are instantaneous loads; flow-composited whole-storm samples are average loads. The computed values for each CSO, SWO, and stream sample are summarized in appendixes 20, 21, and 22, respectively. Although not explicitly stated in the appendix titles, the values listed for *E. coli* are bacteria transport frequencies, not mass loads.

The largest mass load for a nutrient, metal, and organic compound in a single CSO sample was 247 kilograms per hour (kg/hr) of total nitrogen at site CSO106, 6,500 grams per hour (g/hr) of barium at site CSO120, and 2,890 g/hr of 3,4-dichlorophenyl isocyanate at site CSO119, respectively. The highest bacteria transport frequency was 6.6 x 10^{11} most probable number per second (MPN/sec) of *E. coli* bacteria at site CSO119. The largest mass load for a nutrient, metal, and organic compound in a single PCBS sample was 1,000 kg/hr of phosphorus at site PC1, 313,000 g/hr of barium at site PC1, and 4,010 g/hr of 3,4-dichlorophenyl isocyanate at site BPC1, respectively. The highest bacteria transport frequency in a single PCBS sample was 6.7 x 10^{11} MPN/sec of *E. coli* bacteria at site PC1.

Ratio of CSO Load to Upstream Stream Site Load

The CLSL ratios were computed for those samples where a concentration and discharge were measured, and are shown in appendix 23 and summarized in appendix 24. The greater the CLSL ratio, the more of an effect the CSO will have on the concentration in the receiving stream. CSO205 had 88 constituents that had the maximum CLSL ratio for a single sample, most in the storm samples collected on May 6, 2007 (from a 69-mm storm; table 6), or July 9, 2007 (from a 7-mm storm; table 6). The other sites that had a maximum CLSL ratio for at least one constituent were CSO106 (nine constituents), CSO107 (two constituents), CSO115 (two constituents), CSO119 (one constituent), and CSO203 (one constituent). The CSO with the most constituents that had the largest geometric mean CLSL ratio also was CSO205, with 78 constituents. Other sites that had the maximum geometric mean CLSL ratio for specific constituents were CSO106 (nine constituents), CSO203 (nine constituents), CSO107 (three constituents), CSO119 (three constituents), and CSO115 (one constituent).

Ratio of Tributary Stream Load to Receiving Stream Load

The SLRL ratios were computed for those samples where the constituent of interest was detected in the downstream site of a receiving-stream reach and discharge was measured (appendix 25 and summarized in appendix 26). The greater the value of this ratio, the larger the effect a tributary stream will have on the concentration in the receiving stream. Of the 38 constituents that were detected in streams in the samples used for these calculations, the maximum single-sample ratio for 22 constituents was calculated for Big Papillion Creek samples. Additionally, Cole Creek had the sample with the maximum for this ratio for 15 constituents, and Little Papillion Creek had a sample with the maximum for this ratio for 1 constituent. Big Papillion Creek had the largest geometric mean SLRL ratio for each of the 38 constituents for which the ratio could be calculated.

Assessment of Water-Quality Relative Priority Index

Combined Sewer Overflow Removal Water-Quality Relative Priority Index

Between August 2006 and October 2007, 109 samples were collected from CSO sites in Omaha, Nebr. A WQRP index for all discrete-sample water-quality data from CSO sites has been calculated (appendix 27) and summarized in table 17. This index is not meant to be used as an absolute guide for prioritization of CSO removals, but as an additional piece of information that can be considered when evaluating renovation options. Also note that this index is not valid for use as a indicator of the relative importance of one specific subset of constituents in comparison to another subset, because each subset includes a different number of compounds in the WQRP index calculation.

The CSO sites with the largest WQRP index scores (table 17) for all 101 constituents, shown in parentheses after each site name in this section, were CSO205 (215), CSO106 (107), CSO119 (83), and CSO109 (59). Considering only nutrients (6 constituents), the sites with the largest WQRP index scores were CSO205 (14), CSO119 (11), and CSO106 (7). For the metals analyzed during the study (17 constituents), the sites with the largest WQRP index scores were CSO205 (36), CSO109 (20), and CSO119 (16). The sites with the largest WQRP index scores for organic compounds (69 constituents)

Table 17. Summary of water-quality relative priority index scores, calculated from all discrete water-quality samples collected from combined sewer overflow sites as part of the combined sewer overflow study, Omaha, Nebraska.

[Water-quality relative priority index calculations for combined sewer overflows are listed in appendix 26 for each constituent]

Field identifier (table 1; fig. 1)	Constituents determined to be more derived from sewage[1]	Sum of all constituents[2]	Nutrients	Metals	Organic compounds	All others
CSO105	3	4	0	0	3	1
CSO106	46	107	7	0	94	6
CSO107	7	33	0	3	30	0
CSO108	-12	-9	-4	10	-15	0
CSO109	21	59	3	20	29	7
CSO115	-8	5	-2	-2	8	1
CSO117	1	1	2	0	-1	0
CSO118	-6	2	0	2	0	0
CSO119	31	83	11	16	39	17
CSO203	11	20	1	3	14	2
CSO205	59	215	14	36	153	12

[1] Constituents determined to be more derived from sewage include some nutrients, metals, organic compounds, and other constituents.

[2] Sum of all constituents is the sum of nutrients, metals, organic compounds, and all others listed in the proceeding columns.

were CSO205 (153), CSO106 (94), CSO119 (39), and CSO107 (30). For all the other constituents analyzed during the study (9 constituents: SC, turbidity, COD, BOD, TSS, calcium, magnesium, chloride, and *E. coli*), the sites with the largest WQRP index scores were CSO119 (17), CSO205 (12), CSO109 (7), and CSO106 (6). For those constituents identified in this study as being derived more from sewage than stormwater (30 constituents), the sites with the largest WQRP index scores were CSO205 (59), CSO106 (46), CSO119 (31), and CSO109 (21). The CSO that had the highest WQRP index score for *E. coli* bacteria was CSO119.

Papillion Creek Basin Water-Quality Relative Priority Index

A WQRP index for all discrete-sample water-quality data from PCBS sites was calculated (appendix 28) and summarized in table 18. The sum of all or a subset of these values for each stream could be used as a guide for where to prioritize BMP implementation efforts to achieve the largest decrease of specific compounds or sets of compounds. This index is not meant to be used as an absolute guide for prioritization of streams, but as an additional piece of information that can be considered when evaluating options.

As shown in table 18, the WQRP index scores for all 101 constituents for each named stream in the study area, in order from greatest to least and with the score shown in parentheses after each stream name, were Big Papillion Creek (124), Papillion Creek (113), Cole Creek (63), and Little Papillion Creek (19). Considering only nutrients (6 constituents), the WQRP index scores for each stream, in order from greatest to least, were Big Papillion Creek (16), Cole Creek and Papillion Creek (both 8), and Little Papillion Creek (2). For the metals analyzed during the study (17 constituents), the stream WQRP index scores for each stream, in order from greatest to least, were Big Papillion Creek (54), Papillion Creek (27), and Cole Creek and Little Papillion Creek (both 6). For the organic compounds analyzed during the study (69 constituents), the stream WQRP index scores for each stream, in order from greatest to least, were Papillion Creek (69), Cole Creek (40), Big Papillion Creek (35), and Little Papillion Creek (2). For all other constituents analyzed during the study (9 constituents: SC, turbidity, COD, BOD, TSS, calcium, magnesium, chloride, and *E. coli*), the WQRP index scores for each named stream in the study area, in order from greatest to least, were Big Papillion Creek (19), and Cole Creek, Little Papillion Creek, and Papillion Creek (9 for each). For those constituents identified in this study as being derived more from stormwater than sewage (19 constituents), the WQRP index scores for each stream, in order from greatest to least, were Big Papillion Creek (29), Papillion Creek (21), Cole Creek (15), and Little Papillion Creek (4). The stream with the highest WQRP index score for *E. coli* bacteria also was Big Papillion Creek.

Based upon the data collected in this study and analysis using a custom-weighting scenario for summarizing the results, the combined sewer overflow sites where implementation of additional controls or the BMPs could potentially achieve the largest water-quality effect for the greatest number of constituents in receiving streams are the combined sewer outfalls at 64th and Dupont Street (CSO205), 69th and Evans Street (CSO203), Monroe Street (CSO119), and the North Interceptor Combined Sewer Overflow (CSO106). Scores from applying a similar custom-weighting scenario to stream data indicated that implementing BMPs potentially could have the largest water-quality effect on the greatest number of constituents in Big Papillion Creek, Papillion Creek, Cole Creek, and Little Papillion Creek (in that order).

Table 18. Summary of water-quality relative priority index scores, calculated from all discrete water-quality samples collected from Papillion Creek Basin stream sites as part of the combined sewer overflow study, Omaha, Nebraska.

[Water quality relative priority index calculations for Papillion Creek Basin stream sites are listed in appendix 27 for each constituent]

Stream name (fig. 1)	Constituents determined to be more derived from stormwater[1]	Sum of all constituents[2]	Nutrients	Metals	Organic compounds	All others
Cole Creek	15	63	8	6	40	9
Little Papillion Creek	4	19	2	6	2	9
Big Papillion Creek	29	124	16	54	35	19
Papillion Creek	21	113	8	27	69	9

[1] Constituents determined to be more derived from stormwater include some metals, organic compounds, and other constituents.

[2] Sum of all constituents is the sum of nutrients, metals, organic compounds, and all others listed in the proceeding columns.

Summary

The U.S. Geological Survey, in cooperation with the City of Omaha, investigated the water quality of combined sewer overflows (CSOs), stormwater, and streams in the Omaha, Nebr., area by collecting and analyzing 1,175 water samples from August 2006 through October 2007. The study area included the drainage area of Papillion Creek at Capeheart Road near Bellevue, Nebr., which encompasses the tributary drainages of the Big and Little Papillion Creeks and Cole Creek, along with the Missouri River reach that is adjacent to Omaha. Of the 101 constituents analyzed during the study, 100 were detected in at least 1 sample.

Potential contamination for each constituent was quantified by using blank samples from each site. The laboratory reporting level was increased for 24 constituents based on the results of blank sample analysis. Replicate samples were utilized to determine the variability of the sample collection, processing, and analytical procedures. Of the 63 constituents with 40 or more sample pairs with detectable concentrations in the environmental and replicate samples, 44 constituents had sampling variations exceeding a relative standard deviation (RSD) of 20 percent in 5 or more percent of the environmental/replicate pairs. Additionally, 34 organic compounds were reported as estimated concentrations for all samples, and an additional three compounds were reported as estimated concentrations for CSO and stormwater outfall (SWO) samples only, on the basis of recovery percentages indicated by matrix spike samples.

Spatial and seasonal comparisons were completed for environmental samples by using Student's t-tests. Potential contributions from CSO outfalls, SWOs, and upstream areas for each constituent were assessed using occurrence analysis. Variations within the rise, peak, and recession of storms were analyzed for the CSO and Papillion Creek Basin stream (PCBS) sites. The mass load during each sample collection was calculated and analyzed for each environmental sample where concentration and discharge were measured. Finally, water-quality results from the study were summarized and weighted using a custom index to indicate the CSOs and PCBS reaches where renovation or best-management practice (BMP) implementation might have the largest potential benefit by decreasing the most constituents.

Generally, constituent concentrations were lower in dry-weather stream samples relative to CSO and SWO samples. Constituents with sample concentrations that were significantly larger or not signicantly different in dry-weather PCBS samples compared to CSO and SWO samples—indicating a relatively prominent non-storm related (upstream) source of these compounds—were SC, nitrite plus nitrate, nitrite, hardness, calcium, magnesium, chloride, arsenic, barium, selenium, uranium, and atrazine.

By combining the t-test results of dry-weather stream concentrations in the PCBS samples compared to CSO and SWO sites with the t-test results of CSO samples compared to SWO samples, constituents considered to be derived more from sewage or stormwater in the Papillion Creek Basin were indicated. Constituents that were identified as being derived more from sewage than from stormwater or upstream sources were chemical oxygen demand (COD), biochemical oxygen demand (BOD), total suspended solids (TSS), ammonia, total nitrogen (note that nitrite and nitrate plus nitrite as individual constituents were not identified as being derived more from sewage), orthophosphate, total phosphorus, copper, lead, mercury, silver, 1,4-dichlorobenzene, 3-*beta*-coprostanol, 3-methyl-1H-indole, 4-nonylphenol, acetyl-hexamethyl-tetrahydronaphthalene (AHTN), *beta*-sitosterol, caffeine, camphor, cholesterol, diethyl phthalate, *d*-limonene, ethoxynonylphenol, hexahydrohexamethyl cyclopentabenzopyran (HHCB), menthol, naphthalene, *p*-cresol, triclosan, tris(2-butoxyethyl) phosphate, and *E. coli*. Constituents that were identified as being derived more from stormwater than from sewage or upstream sources were turbidity, antimony, cadmium, chromium, cobalt, zinc, 3,4-dichloroisocyanate, 9,10-anthraquinone, benzo[*a*]pyrene, bisphenol A, bromacil, carbazole, N,N-diethyl-*meta*-toluamide (DEET), fluoranthene, phenanthrene, phenol, pyrene, triphenyl phosphate, tris(2-chloroethyl) phosphate, and tris(dichloroisopropyl) phosphate.

In comparisons of stream samples from upstream and downstream of CSO discharges during storms, constituents that were significantly greater downstream from the CSO outfalls in the PCBS were specific conductance (SC), total nitrogen, calcium, magnesium, antimony, 1,4-dichlorobenzene, benzo[*a*]pyrene, caffeine, cholesterol, fluoranthene, naphthalene, and *E. coli* bacteria. Of these constituents, total nitrogen, 1,4-dichlorobenzene, caffeine, cholesterol, naphthalene, and *E. coli* bacteria were indicated as being derived more from sewage, whereas antimony, benzo[*a*]pyrene, fluoranthene and pyrene were indicated as being derived more from stormwater. The only constituent in the Missouri River with concentrations that were significantly greater downstream from CSO outfalls during storms was *E. coli* bacteria, which was indicated to be derived more from sewage.

Seasonal comparisons indicated that some of the constituent concentrations were significantly greater during the spring, summer, and autumn. Of the 30 constituents indicated to be derived more from sewage, the seasonal comparison results for 9 constituents had greatest concentrations in the summer, and 8 constituents (including *E. coli*) showed no seasonal trends in CSO samples. Of the 19 constituents indicated to be derived more from stormwater, the seasonal comparison results for 5 constituents had significantly lower concentrations in the autumn (including 4 metals), 5 constituents had significantly greater concentrations during the spring (all organic compounds), and 5 constituents showed no seasonal trends (all organic compounds).

Whereas the study was not designed specifically to document exceedences of water-quality standards and criteria, the analytical results were reviewed in relation to several documented standards and criteria to identify compounds that may warrant additional monitoring. The *E. coli* criterion for

sites where primary contact for recreation is a designated use is a seasonal geometric mean of 126 colony forming units per 100 milliliters (CFU/100 mL), and *E. coli* counts in individual samples from the PCBS were greater than 126 CFU/100 mL in 99 percent of the samples collected from May to September of 2006 and 2007. Similarly, *E. coli* counts in 76 percent of Missouri River samples (39 of 51 samples) were greater than this criterion in samples collected during the same time period. The highest percentage of exceedances was at the downstream Missouri River site (MR3) with 15 of 17 samples having *E. coli* counts greater than 126 CFU/100 mL. The geometric means of the 17 samples collected from each of the Missouri River sites ranged from 280 most probable number per 100 milliliters (MPN/100 mL) at the most upstream site (MR5) to 1,200 MPN/100 mL at the most downstream site (MR3).

Several metals were detected in elevated concentrations and may warrant further monitoring. The concentrations of zinc measured in 41 PCBS samples were greater than the computed acute toxicity criterion level and greater than the health-based screening level (HBSL) in 4 samples. The concentrations of arsenic were elevated during storm events, and were measured in excess of drinking-water standards in 63 of 269 PCBS samples and 1 Missouri River sample. The concentrations of arsenic measured in 28 PCBS samples also were greater than the human health criteria for the consumption of aquatic organisms. Other elevated metals concentrations include: nickel in excess of the HBSL (12 samples); selenium in excess of the 4-day chronic toxicity level [5 micrograms per liter (µg/L)] in 43 of 269 samples, including 31 of 94 samples collected from Big Papillion Creek; and concentrations greater than drinking-water standard levels for barium (3 samples), beryllium (11 samples), and cadmium (3 samples).

Most organic wastewater compounds do not have water-quality standards or criteria; however, phenanthrene, benzo[*a*]-pyrene, pentachlorophenol, and atrazine were detected in unfiltered samples at concentrations potentially above the level of criteria that have been established. Concentrations were greater than the 24-hour aquatic life level in two of three stream samples collected during a storm at site CC1. Benzo[*a*] pyrene concentrations were greater than the drinking-water standard level [0.0002 milligrams per liter (mg/L)] in 71 PCBS samples and 1 Missouri River sample. Eleven of the PCBS samples had concentrations of pentachlorophenol that were greater than the level of the drinking-water standard (0.001 mg/L). Dichlorvos was detected in 20 stream samples at concentrations above the HSBL of 0.4 µg/L, and atrazine was detected in excess of the drinking-water standard in 1 stream sample.

Whereas the U.S. Environmental Protection Agency regional nutrient criteria are seasonal averages, total phosphorus concentrations were greater than the proposed criterion for the aggregated Corn Belt and Northern Great Plains ecoregion in more than 99 percent of the stream samples and 98 percent of the Missouri River samples. Similarly, the proposed total nitrogen criteria level was exceeded in 80 percent of the PCBS samples, most commonly at Papillion Creek and Big Papillion Creek sites, but in just 33 percent of the Missouri River samples. When compared to the slightly higher criteria proposed for the Western Cornbelt Plains ecoregion, the percent of samples with concentrations above the proposed levels dropped as expected, with total phosphorus above the proposed level in 94 percent of PCBS samples and 82 percent of the Missouri River samples, and total nitrogen above the proposed level in 54 percent of the PCBS samples and 29 percent of the Missouri River samples.

The largest mass load for a nutrient, metal, and organic compound, for a single CSO sample was 247 kilograms per hour (kg/hr) of total nitrogen in CSO106, 6.5 kg/hr of barium at site CSO120, and 2.9 kg/hr of 3,4-dichlorophenyl isocyanate at site CSO119, respectively. The greatest *E. coli* bacteria transport rate was 6.6 x 10^{11} most probable number per second (MPN/sec) of *E. coli* bacteria at site CSO119. The largest mass load for a nutrient, metal, and organic compound associated with a single PCBS sample was 1,000 kg/hr of phosphorus at site PC1, 310 kg/hr of barium at site PC1, and 4 kg/hr of 3,4-dichlorophenyl isocyanate at site BPC1. The greatest *E.* coli bacteria transport rate was 6.7 x 10^{11} MPN/sec at site PC1.

A water-quality relative priority (WQRP) index was developed to identify the CSO or stream sites where CSO or basin management improvements might provide the greatest water-quality benefits, in terms of the most effect on the largest number of constituents. For the constituents that were indicated to be derived more from sewage, the CSO sites with the largest WQRP index scores were, in descending order, CSO205, CSO106, CSO119, and CSO109. The CSO site that had the greatest WQRP index score for *E. coli* bacteria was CSO119. For the constituents derived more from stormwater in PCBS, the WQRP index indicated that BMP implementation could have the largest potential effect on the most constituents in Big Papillion Creek. The stream with the greatest WQRP index for *E. coli* bacteria also was Big Papillion Creek.

Overall, the results of this study indicate that upstream sources, CSOs, and SWOs each contribute to concentrations of most of the constituents within the Omaha, Nebr., area that were measured during this study. Ionic strength (measured by SC), nitrite, nitrite plus nitrate, calcium, magnesium, chloride, arsenic, barium, selenium, uranium, and atrazine had dry-weather sources upstream from the study area in the PCBS. Constituents measured during this study that were indicated to derive more from sewage that were greater in samples collected downstream from CSO outfalls than in samples collected upstream from CSO outfalls, were total nitrogen, 1,4-dichlorobenzene, caffeine, cholesterol, naphthalene, and *E coli* bacteria in the PCBS, and *E. coli* bacteria in the Missouri River. Finally, constituents that had concentrations significantly larger downstream from CSO outfalls than upstream from CSO outfalls in the PCBS that were derived more from stormwater were antimony, benzo[*a*]pyrene, fluoranthene, and pyrene. None of the constituents indicated to be derived more from stormwater were significantly larger downstream compared to upstream from CSO outfalls in the Missouri River.

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Tables 10–12

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO105					Site CSO106							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	7	7	100	618	336	20	20	100	1,210	881	558	338	535
Turbidity, unfltrd	NTU	7	7	100	939	318	18	18	100	742	352	242	125	215
Chemical oxygen demand, unfltrd	mg/L	6	6	100	1,160	421	16	16	100	1,650	830	530	376	553
Biochemical oxygen demand, unfltrd	mg/L	6	6	100	555	189	19	17	89	530	283	158	88	136
Hardness, unfltrd	mg/L as $CaCO_3$	7	7	100	270	170	17	17	100	580	390	290	200	270
Total suspended solids, unfltrd	mg/L	7	7	100	1,450	537	17	17	100	3,700	1,010	438	187	494
Calcium, unfltrd	mg/L	7	7	100	81	54	17	17	100	181	115	83	58	79
Magnesium, unfltrd	mg/L	7	7	100	15	9	17	17	100	32	24	17	13	16
Chloride, unfltrd	mg/L	7	7	100	68	24	17	17	100	118	81	57	35	49
Nitrite, fltrd	mg/L as N	7	7	100	.17	.06	17	17	100	.23	.07	.02	<.01	.02
Nitrate, fltrd	mg/L as N	6	6	100	1.02	.34	9	9	100	1.50	--	--	--	.24
Nitrite plus nitrate, fltrd	mg/L as N	7	7	100	1.18	.34	17	9	53	1.57	.42	.10	<.06	.11
Ammonia, fltrd	mg/L as N	7	7	100	5.41	2.16	17	17	100	22.1	12.4	6.52	3.95	6.27
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	7	7	100	47.6	15.9	17	17	100	50.2	29.7	24.9	14.1	21.4
Total phosphorus, fltrd	mg/L	7	7	100	13.5	4.17	17	17	100	16.5	6.15	5.42	4.07	5.14
Orthophosphate, fltrd	mg/L as P	7	7	100	1.22	.42	17	17	100	2.16	1.11	.94	.57	.83
Antimony, unfltrd	µg/L	7	7	100	2.48	.64	17	17	100	1.06	.67	.57	.53	.63
Arsenic, unfltrd	µg/L	7	7	100	9.12	5.48	17	17	100	18.6	11.3	4.41	3.17	5.82
Barium, unfltrd	µg/L	7	7	100	317	186	17	17	100	788	426	151	114	186
Beryllium, unfltrd	µg/L	7	6	86	.36	.28	17	11	65	1.18	.39	E.23	<.26	.28
Cadmium, unfltrd	µg/L	7	7	100	1.69	.87	17	17	100	6.51	1.62	.61	.40	.77
Chromium, unfltrd	µg/L	7	7	100	18.7	10.3	17	17	100	50.6	20.7	8.57	4.28	9.22
Cobalt, unfltrd	µg/L	7	7	100	7.21	3.20	17	17	100	24.9	6.17	2.08	1.26	3.06
Copper, unfltrd	µg/L	7	7	100	83.0	45.1	17	17	100	235	106	42.5	22.7	48.0
Lead, unfltrd	µg/L	7	7	100	97.0	45.4	17	17	100	591	91.1	33.8	16.4	39.0
Mercury, unfltrd	µg/L	7	7	100	.24	.09	17	17	100	.39	.14	.06	.03	.08
Nickel, unfltrd	µg/L	7	7	100	25.1	11.8	17	17	100	59.3	24.1	8.79	5.33	11.3
Selenium, unfltrd	µg/L	7	7	100	2.43	.86	17	17	100	5.32	2.39	1.22	.88	1.35
Silver, unfltrd	µg/L	7	7	100	.77	.38	17	17	100	.76	.41	.22	.14	.26
Thallium, unfltrd	µg/L	7	5	71	.27	E.12	17	10	59	.62	.34	.09	<.18	.15
Uranium, unfltrd	µg/L	7	7	100	3.23	2.00	17	17	100	7.37	4.38	4.03	2.60	3.40
Vanadium, unfltrd	µg/L	7	7	100	25.2	13.4	17	17	100	65.3	34.0	8.48	5.69	12.0
Zinc, unfltrd	µg/L	7	7	100	518	245	17	17	100	1,290	507	224	102	229
1,4-Dichlorobenzene, unfltrd	µg/L	7	7	100	E2.19	E1.15	16	16	100	E7.57	E2.21	E1.07	E.52	E1.16
1-Methylnaphthalene, unfltrd	µg/L	7	6	86	E.17	E.04	16	16	100	E.17	E.10	E.07	E.05	E.07
2,6-Dimethylnaphthalene, unfltrd	µg/L	7	6	86	E.12	E.04	16	11	69	E.11	E.09	E.06	<.2	E.06

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO105					Site CSO106							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2-Methylnaphthalene, unfltrd	µg/L	7	6	86	E0.30	E0.05	16	16	100	E0.28	E0.15	E0.11	E0.07	E.11
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	6	3	50	E10.0	--	15	9	60	E11.0	E3.63	E1.30	<2	E.63
3-*beta*-Coprostanol, unfltrd	µg/L	7	7	100	E612	E96.4	16	16	100	E317	E171	E80.6	E58.1	E89.4
3-Methyl-1H-indole, unfltrd	µg/L	7	7	100	E3.82	E.44	16	16	100	E6.44	E2.30	E.86	E.18	E.63
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	7	0	0	--	--	16	5	31	E.34	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	7	0	0	--	--	16	10	63	E1.30	E.19	E.13	<.2	E.17
4-*n*-Octylphenol, unfltrd	µg/L	7	0	0	--	--	16	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	7	6	86	E53.2	E7.59	16	14	88	E33.1	E17.9	E11.3	E7.66	E10.4
4-*tert*-Octylphenol, unfltrd	µg/L	7	3	43	E1.34	--	16	11	69	E5.58	E1.67	B.97	<.5	B.93
5-Methyl-1H-benzotriazole, unfltrd	µg/L	6	3	50	2.72	--	14	5	36	7.93	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	7	5	71	.85	.32	15	7	47	9.64	--	--	--	--
Acetophenone, unfltrd	µg/L	7	4	57	.99	.24	16	13	81	1.82	.78	.75	.68	.54
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	7	7	100	.66	.21	16	12	75	6.00	.42	.29	E.18	.30
Anthracene, unfltrd	µg/L	7	5	71	E.34	E.09	16	8	50	E.30	--	--	--	--
Atrazine, unfltrd	µg/L	7	0	0	--	--	16	1	6	E.29	--	--	--	--
BDE congener 47, unfltrd	µg/L	5	0	0	--	--	13	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	7	7	100	E.84	E.27	16	12	75	E1.50	E.30	E.21	E.10	E.20
Benzophenone, unfltrd	µg/L	7	5	71	.21	E.14	16	13	81	1.51	.46	.31	E.18	.29
beta-Sitosterol, unfltrd	µg/L	7	6	86	57.6	5.17	16	10	63	28.1	13.4	6.85	<.8	1.99
beta-Stigmastanol, unfltrd	µg/L	7	5	71	E11.9	B1.87	16	9	56	E8.30	E3.63	B2.10	<1.78	<1.78
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	7	1	14	E123	--	16	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	7	4	57	1.08	.33	14	10	71	27.2	2.38	1.30	<.4	1.14
Bromacil, unfltrd	µg/L	7	0	0	--	--	15	0	0	--	--	--	--	--
Caffeine, unfltrd	µg/L	7	7	100	E10.4	E2.43	16	16	100	E29.0	E11.8	E10.3	E7.09	E9.12
Camphor, unfltrd	µg/L	7	6	86	.79	.20	16	16	100	40.5	1.52	.65	.47	1.00
Carbaryl, unfltrd	µg/L	7	1	14	E.034	--	16	0	0	--	--	--	--	--
Carbazole, unfltrd	µg/L	7	6	86	.41	E.18	16	9	56	.65	.31	E.18	<.20	.20
Chlorpyrifos, unfltrd	µg/L	7	0	0	--	--	14	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	7	7	100	E381	E72.1	16	15	94	E242	E170	E97.2	E68.1	E90.5
Cotinine, unfltrd	µg/L	7	0	0	--	--	14	4	29	E4.18	--	--	--	--
DEET, unfltrd	µg/L	7	7	100	1.26	.40	16	15	94	4.13	2.37	1.48	.58	1.02
Diazinon, unfltrd	µg/L	7	0	0	--	--	16	0	0	--	--	--	--	--
Dichlorvos, unfltrd	µg/L	7	1	14	E.15	--	16	1	6	.23	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	7	7	100	13.2	4.66	15	12	80	23.8	6.14	4.21	2.07	3.89

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO105					Site CSO106							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	5	0	0	--	--	12	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	7	4	57	E1.82	B0.43	16	15	94	E6.02	E2.69	E1.86	E1.10	E1.55
d-Limonene, unfltrd	µg/L	7	7	100	E2.76	E.88	16	16	100	E12.3	E2.52	E1.44	E.58	E1.37
Ethoxynonylphenol (all isomers), unfltrd	µg/L	7	7	100	49.8	8.12	16	10	63	38.7	16.5	6.43	<2.0	5.58
Ethoxyoctylphenol, unfltrd	µg/L	7	6	86	E.98	E.49	16	15	94	1.52	1.32	E.85	E.57	E.84
Fluoranthene, unfltrd	µg/L	7	7	100	E2.03	E.78	16	12	75	E4.49	E.90	E.53	E.08	E.35
Hexahydrohexamethyl cyclopenta-benzopyran (HHCB), unfltrd	µg/L	7	7	100	E5.17	1.32	16	16	100	6.40	3.23	2.30	1.62	2.07
Indole, unfltrd	µg/L	7	7	100	E4.54	E.16	16	11	69	E.92	E.23	E.12	<.2	E.14
Isoborneol, unfltrd	µg/L	7	4	57	.70	E.17	16	10	63	1.77	.99	.62	<.2	.29
Isophorone, unfltrd	µg/L	7	1	14	E.052	--	16	7	44	.35	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	7	0	0	--	--	16	8	50	E.07	--	--	--	--
Isoquinoline, unfltrd	µg/L	7	0	0	--	--	16	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	7	7	100	2.86	1.16	16	15	94	11.9	5.49	3.64	2.38	2.69
Metalaxyl, unfltrd	µg/L	7	0	0	--	--	16	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	7	6	86	E.58	E.21	16	15	94	E11.1	E.54	E.46	E.23	E.38
Metolachlor, unfltrd	µg/L	7	0	0	--	--	16	0	0	--	--	--	--	--
Naphthalene, unfltrd	µg/L	7	7	100	E.30	E.08	16	16	100	E.38	E.20	E.13	E.08	E.14
p-Cresol, unfltrd	µg/L	7	7	100	E22.9	E.57	16	14	88	E45.2	E5.24	E.29	E.18	E.63
Pentachlorophenol, unfltrd	µg/L	7	2	29	E2.76	--	16	1	6	B1.07	--	--	--	--
Phenanthrene, unfltrd	µg/L	7	7	100	1.39	.37	16	15	94	2.29	.45	.34	.20	.29
Phenol, unfltrd	µg/L	7	4	57	E7.41	B.40	16	10	63	E9.20	E1.72	B.47	<.24	E.55
Prometon, unfltrd	µg/L	7	0	0	--	--	16	1	6	.50	--	--	--	--
Pyrene, unfltrd	µg/L	6	6	100	E2.63	E.82	15	9	60	E3.29	E.87	E.49	<.2	E.32
Tetrachloroethene, unfltrd	µg/L	7	4	57	E.041	E.03	16	9	56	E.079	E.22	E.08	<.4	E.07
Tribromomethane (bromoform), unfltrd	µg/L	7	0	0	--	--	16	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	7	2	29	.26	--	16	9	56	.34	.23	E.13	<.20	E.16
Triclosan, unfltrd	µg/L	7	7	100	E6.80	E1.61	16	16	100	E4.90	E4.10	E3.33	E1.99	E2.53
Triethyl citrate, unfltrd	µg/L	7	5	71	.23	E.13	16	14	88	.73	.44	.36	.23	.30
Triphenyl phosphate, unfltrd	µg/L	7	6	86	.73	E.15	16	13	81	.33	E.18	E.14	E.10	E.14
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	7	7	100	2.89	1.29	16	16	100	13.1	6.76	2.68	1.94	3.31
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	7	4	57	.18	--	16	10	63	.36	.20	E.13	<.20	E.14
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	7	6	86	.24	.10	16	14	88	1.06	.31	E.18	E.14	E.19
Escherichia coli, unfltrd	MPN/100 mL	7	7	100	20,000,000	1,100,000	20	20	100	3,100,000	14,000,000	740,000	220,000	400,000

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2’,4,4’-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO107					Site CSO108				
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	8	8	100	785	357	9	9	100	318	183
Turbidity, unfltrd	NTU	6	6	100	546	220	9	9	100	1,170	279
Chemical oxygen demand, unfltrd	mg/L	7	7	100	1,490	417	8	8	100	463	143
Biochemical oxygen demand, unfltrd	mg/L	7	7	100	305	102	8	8	100	102	B37
Hardness, unfltrd	mg/L as $CaCO_3$	8	8	100	470	200	9	9	100	470	90
Total suspended solids, unfltrd	mg/L	8	8	100	1,390	476	9	9	100	2,260	325
Calcium, unfltrd	mg/L	8	8	100	172	65	9	9	100	162	30
Magnesium, unfltrd	mg/L	8	8	100	16	7	9	9	100	16	4
Chloride, unfltrd	mg/L	8	8	100	108	32	9	9	100	33	14
Nitrite, fltrd	mg/L as N	8	8	100	.14	.04	9	9	100	.13	.05
Nitrate, fltrd	mg/L as N	7	7	100	.84	.42	9	9	100	.68	.50
Nitrite plus nitrate, fltrd	mg/L as N	8	7	88	.98	.35	9	9	100	.81	.56
Ammonia, fltrd	mg/L as N	8	8	100	3.20	1.34	9	9	100	2.63	.78
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	8	8	100	31.9	9.58	9	9	100	8.58	3.41
Total phosphorus, fltrd	mg/L	8	8	100	7.81	2.43	9	9	100	3.46	1.20
Orthophosphate, fltrd	mg/L as P	8	8	100	.59	.20	9	9	100	.58	.23
Antimony, unfltrd	µg/L	8	8	100	3.49	1.22	9	9	100	2.16	1.57
Arsenic, unfltrd	µg/L	8	8	100	30.8	8.26	9	9	100	18.2	5.27
Barium, unfltrd	µg/L	8	8	100	667	196	9	9	100	684	125
Beryllium, unfltrd	µg/L	8	5	63	.87	.28	9	6	67	1.46	.25
Cadmium, unfltrd	µg/L	8	8	100	4.83	1.12	9	9	100	3.58	.66
Chromium, unfltrd	µg/L	8	8	100	86.4	12.5	9	9	100	37.7	9.16
Cobalt, unfltrd	µg/L	8	8	100	18.0	4.33	9	9	100	20.3	3.23
Copper, unfltrd	µg/L	8	8	100	344	59.3	9	9	100	125	39.0
Lead, unfltrd	µg/L	8	8	100	984	100	9	9	100	380	57.2
Mercury, unfltrd	µg/L	8	8	100	6.38	.26	9	9	100	.47	.12
Nickel, unfltrd	µg/L	8	8	100	88.8	17.0	9	9	100	54.1	11.4
Selenium, unfltrd	µg/L	8	8	100	2.33	.72	9	9	100	.72	.45
Silver, unfltrd	µg/L	8	8	100	15.2	1.80	9	9	100	1.19	.38
Thallium, unfltrd	µg/L	8	5	63	.49	E.16	9	5	56	.62	E.13
Uranium, unfltrd	µg/L	8	8	100	6.36	2.20	9	9	100	3.09	.91
Vanadium, unfltrd	µg/L	8	8	100	47.5	16.0	9	9	100	64.2	11.5
Zinc, unfltrd	µg/L	8	8	100	1,280	314	9	9	100	591	155
1,4-Dichlorobenzene, unfltrd	µg/L	8	8	100	E7.54	E.83	7	7	100	E.70	E.40

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO107					Site CSO108				
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
1-Methylnaphthalene, unfltrd	µg/L	8	7	88	E0.59	E0.11	7	7	100	E0.19	E0.07
2,6-Dimethylnaphthalene, unfltrd	µg/L	8	7	88	E.70	E.10	7	6	86	E.26	E.08
2-Methylnaphthalene, unfltrd	µg/L	8	8	100	E.72	E.15	7	7	100	E.28	E.09
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	8	5	63	E14.2	E.99	7	7	100	E146	E13.7
3-*beta*-Coprostanol, unfltrd	µg/L	8	8	100	E170	E79.6	7	7	100	E31.1	E15.8
3-Methyl-1H-indole, unfltrd	µg/L	8	8	100	E5.99	E.39	7	7	100	E.31	E.15
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	8	1	13	E.080	--	7	0	0	--	--
4-Cumylphenol, unfltrd	µg/L	8	0	0	--	--	7	0	0	--	--
4-*n*-Octylphenol, unfltrd	µg/L	8	0	0	--	--	7	0	0	--	--
4-Nonylphenol, unfltrd	µg/L	8	7	88	E46.8	E12.8	7	6	86	E45.6	E11.1
4-*tert*-Octylphenol, unfltrd	µg/L	8	5	63	E3.66	B.79	7	5	71	B.87	B.60
5-Methyl-1H-benzotriazole, unfltrd	µg/L	8	4	50	2.88	--	7	2	29	2.49	--
9,10-Anthraquinone, unfltrd	µg/L	8	7	88	7.82	1.06	7	6	86	1.66	.56
Acetophenone, unfltrd	µg/L	8	5	63	.96	.31	7	5	71	1.12	.30
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	8	6	75	.40	E.18	7	3	43	E.11	--
Anthracene, unfltrd	µg/L	8	5	63	E4.65	E.20	7	7	100	E.44	E.09
Atrazine, unfltrd	µg/L	8	0	0	--	--	7	3	43	E.69	--
BDE congener 47, unfltrd	µg/L	7	0	0	--	--	7	0	0	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	8	8	100	E18.2	E.85	7	7	100	E3.06	E.39
Benzophenone, unfltrd	µg/L	8	4	50	1.27	--	7	4	57	.30	E.11
beta-Sitosterol, unfltrd	µg/L	8	7	88	29.4	5.44	7	5	71	10.6	1.66
beta-Stigmastanol, unfltrd	µg/L	8	4	50	E6.87	--	7	1	14	E4.21	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	8	0	0	--	--	7	0	0	--	--
Bisphenol A, unfltrd	µg/L	7	4	57	1.04	.40	7	6	86	.52	.26
Bromacil, unfltrd	µg/L	8	1	13	.62	--	7	3	43	1.90	--
Caffeine, unfltrd	µg/L	7	7	100	E10.7	E2.32	7	7	100	E6.86	E1.47
Camphor, unfltrd	µg/L	8	7	88	.49	.26	7	5	71	.35	E.11
Carbaryl, unfltrd	µg/L	8	1	13	E.16	--	7	0	0	--	--
Carbazole, unfltrd	µg/L	8	8	100	5.62	.52	7	7	100	.93	.32
Chlorpyrifos, unfltrd	µg/L	7	0	0	--	--	7	0	0	--	--
Cholesterol, unfltrd	µg/L	8	7	88	E356	E83.6	7	7	100	E51.4	E16.7
Cotinine, unfltrd	µg/L	7	0	0	--	--	7	1	14	E.11	--
DEET, unfltrd	µg/L	8	5	63	1.04	.38	7	6	86	.76	.22
Diazinon, unfltrd	µg/L	8	0	0	--	--	7	0	0	--	--

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO107					Site CSO108				
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
Dichlorvos, unfltrd	µg/L	8	1	13	E0.093	--	7	0	0	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	7	5	71	4.03	2.38	7	5	71	12.7	3.01
Diethoxyoctylphenol, unfltrd	µg/L	7	0	0	--	--	7	1	14	B.51	--
Diethyl phthalate, unfltrd	µg/L	8	7	88	E1.43	E.68	7	3	43	E.81	--
d-Limonene, unfltrd	µg/L	8	8	100	E2.44	E.80	7	7	100	E1.12	E.43
Ethoxynonylphenol (all isomers), unfltrd	µg/L	8	8	100	21.5	5.56	7	5	71	11.2	3.36
Ethoxyoctylphenol, unfltrd	µg/L	8	7	88	1.86	E.81	7	4	57	E.70	E.53
Fluoranthene, unfltrd	µg/L	8	8	100	E39.7	E2.47	7	7	100	E8.78	E1.03
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	8	8	100	E4.75	E.96	7	7	100	.80	.27
Indole, unfltrd	µg/L	8	4	50	E.33	--	7	2	29	E.18	--
Isoborneol, unfltrd	µg/L	8	3	38	.34	--	7	2	29	.60	--
Isophorone, unfltrd	µg/L	8	2	25	E.10	--	7	4	57	.23	E.09
Isopropylbenzene, unfltrd	µg/L	8	5	63	E.04	E.02	7	3	43	E.09	--
Isoquinoline, unfltrd	µg/L	8	0	0	--	--	7	0	0	--	--
Menthol, unfltrd	µg/L	8	7	88	1.80	.78	7	7	100	2.28	.42
Metalaxyl, unfltrd	µg/L	8	0	0	--	--	7	0	0	--	--
Methyl salicylate, unfltrd	µg/L	8	7	88	E.22	E.17	7	5	71	E.65	E.08
Metolachlor, unfltrd	µg/L	8	4	50	.41	--	7	2	29	E.081	--
Naphthalene, unfltrd	µg/L	8	8	100	E1.76	E.22	7	6	86	E.54	E.13
p-Cresol, unfltrd	µg/L	8	8	100	E6.75	E.49	7	7	100	E.23	E.10
Pentachlorophenol, unfltrd	µg/L	8	3	38	E7.16	--	6	4	67	E41.8	E2.01
Phenanthrene, unfltrd	µg/L	8	8	100	40.3	1.22	7	7	100	3.57	.48
Phenol, unfltrd	µg/L	8	4	50	E2.61	--	7	1	14	B.36	--
Prometon, unfltrd	µg/L	8	0	0	--	--	7	1	14	E.064	--
Pyrene, unfltrd	µg/L	8	6	75	E38.6	E1.03	7	7	100	E6.57	E.83
Tetrachloroethene, unfltrd	µg/L	8	5	63	E.063	.07	7	6	86	.31	E.08
Tribromomethane (bromoform), unfltrd	µg/L	8	0	0	--	--	7	0	0	--	--
Tributyl phosphate, unfltrd	µg/L	8	2	25	.29	--	7	4	57	.28	E.15
Triclosan, unfltrd	µg/L	8	8	100	E3.64	E1.83	7	7	100	E1.24	E.48
Triethyl citrate, unfltrd	µg/L	8	4	50	E.14	--	7	1	14	.24	--
Triphenyl phosphate, unfltrd	µg/L	8	7	88	E.15	E.12	7	5	71	E.19	E.09
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	8	7	88	8.68	1.13	7	7	100	2.31	.82
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	8	7	88	1.02	.45	7	5	71	.32	E.11
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	8	7	88	68.6	9.10	7	5	71	.25	E.10
Escherichia coli, unfltrd	MPN/100 mL	8	8	100	24,000,000	390,000	9	9	100	590,000	71,000

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO109					Site CSO115							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	6	6	100	787	432	8	8	100	809	--	--	--	384
Turbidity, unfltrd	NTU	5	5	100	886	487	7	7	100	889	--	--	--	255
Chemical oxygen demand, unfltrd	mg/L	6	6	100	1,380	880	8	8	100	758	--	--	--	209
Biochemical oxygen demand, unfltrd	mg/L	7	7	100	534	251	10	9	90	166	113	74	B31	61
Hardness, unfltrd	mg/L as $CaCO_3$	8	8	100	1,350	260	7	7	100	390	--	--	--	150
Total suspended solids, unfltrd	mg/L	7	7	100	7,260	1,020	8	8	100	1,900	--	--	--	430
Calcium, unfltrd	mg/L	8	8	100	487	81	7	7	100	135	--	--	--	49
Magnesium, unfltrd	mg/L	8	8	100	31	11	7	7	100	13	--	--	--	7
Chloride, unfltrd	mg/L	8	8	100	202	42	7	7	100	138	--	--	--	29
Nitrite, fltrd	mg/L as N	7	7	100	.34	.08	8	8	100	.07	--	--	--	.03
Nitrate, fltrd	mg/L as N	6	6	100	1.29	.77	8	8	100	1.58	--	--	--	.85
Nitrite plus nitrate, fltrd	mg/L as N	7	6	86	1.44	.57	8	8	100	1.58	--	--	--	.90
Ammonia, fltrd	mg/L as N	7	7	100	5.66	2.82	8	8	100	1.70	--	--	--	.85
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	7	7	100	37.2	18.7	8	8	100	18.2	--	--	--	6.38
Total phosphorus, fltrd	mg/L	7	7	100	9.71	4.96	8	8	100	4.98	--	--	--	1.52
Orthophosphate, fltrd	mg/L as P	7	7	100	.59	.40	8	8	100	.40	--	--	--	.24
Antimony, unfltrd	µg/L	7	7	100	4.07	1.87	8	8	100	3.40	--	--	--	1.77
Arsenic, unfltrd	µg/L	7	7	100	37.9	9.25	8	8	100	22.0	--	--	--	6.12
Barium, unfltrd	µg/L	7	7	100	1,660	303	8	8	100	634	--	--	--	188
Beryllium, unfltrd	µg/L	7	6	86	4.11	.45	8	7	88	1.01	--	--	--	.37
Cadmium, unfltrd	µg/L	7	7	100	11.7	1.78	8	8	100	2.87	--	--	--	.74
Chromium, unfltrd	µg/L	7	7	100	115	27.2	8	8	100	50.4	--	--	--	11.6
Cobalt, unfltrd	µg/L	7	7	100	62.2	6.25	8	8	100	16.8	--	--	--	5.04
Copper, unfltrd	µg/L	7	7	100	1,880	292	8	8	100	158	--	--	--	40.8
Lead, unfltrd	µg/L	7	7	100	1,320	109	8	8	100	383	--	--	--	66.4
Mercury, unfltrd	µg/L	7	7	100	.90	.26	8	8	100	.31	--	--	--	.07
Nickel, unfltrd	µg/L	7	7	100	164	26.6	8	8	100	46.1	--	--	--	12.9
Selenium, unfltrd	µg/L	7	7	100	1.61	.90	8	8	100	.96	--	--	--	.59
Silver, unfltrd	µg/L	7	7	100	6.03	1.97	8	8	100	.57	--	--	--	.22
Thallium, unfltrd	µg/L	7	6	86	.98	.20	8	5	63	0.43	--	--	--	E.16
Uranium, unfltrd	µg/L	7	7	100	8.05	2.49	8	8	100	2.84	--	--	--	.99
Vanadium, unfltrd	µg/L	7	7	100	137	21.9	8	8	100	41.3	--	--	--	13.5
Zinc, unfltrd	µg/L	7	7	100	2,700	595	8	8	100	877	--	--	--	219
1,4-Dichlorobenzene, unfltrd	µg/L	7	7	100	E5.51	E1.05	7	7	100	E2.08	--	--	--	E.19
1-Methylnaphthalene, unfltrd	µg/L	7	7	100	E1.63	E.25	7	4	57	E.031	--	--	--	E.03
2,6-Dimethylnaphthalene, unfltrd	µg/L	7	7	100	E2.64	E.29	7	0	0	--	--	--	--	--

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO109					Site CSO115							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2-Methylnaphthalene, unfltrd	µg/L	7	7	100	E2.50	E0.36	7	6	86	E0.07	--	--	--	E0.04
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	6	4	67	E30.8	E1.93	7	7	100	E401	--	--	--	E6.71
3-*beta*-Coprostanol, unfltrd	µg/L	7	7	100	E368	E182	7	7	100	E116	--	--	--	E31.5
3-Methyl-1H-indole, unfltrd	µg/L	7	6	86	E18.0	E1.08	7	7	100	E.72	--	--	--	E.21
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	7	1	14	E.043	--	7	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	7	0	0	--	--	7	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	7	0	0	--	--	7	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	7	6	86	E104	E35.4	7	6	86	E61.2	--	--	--	E4.67
4-*tert*-Octylphenol, unfltrd	µg/L	7	7	100	E64.5	E3.81	7	1	14	E1.47	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	7	4	57	2.21	.89	7	0	0	--	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	6	3	50	2.06	--	7	6	86	1.19	--	--	--	.25
Acetophenone, unfltrd	µg/L	7	7	100	6.78	1.49	7	4	57	1.87	--	--	--	.33
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	7	4	57	1.16	.25	7	4	57	.28	--	--	--	E.08
Anthracene, unfltrd	µg/L	7	4	57	E.49	E.14	7	3	43	E.10	--	--	--	--
Atrazine, unfltrd	µg/L	7	2	29	E186	--	7	4	57	E.70	--	--	--	E.22
BDE congener 47, unfltrd	µg/L	6	0	0	--	--	6	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	7	6	86	E2.90	E.87	7	6	86	E1.93	--	--	--	E.29
Benzophenone, unfltrd	µg/L	7	6	86	12.7	1.20	7	2	29	.28	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	7	7	100	43.7	23.8	7	7	100	17.3	--	--	--	7.14
beta-Stigmastanol, unfltrd	µg/L	7	6	86	E9.16	B3.09	7	1	14	E8.49	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	7	2	29	B28.3	--	7	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	5	3	60	.90	.50	6	5	83	.72	--	--	--	.43
Bromacil, unfltrd	µg/L	6	1	17	.23	--	7	3	43	16.6	--	--	--	--
Caffeine, unfltrd	µg/L	6	6	100	E9.59	E6.73	7	7	100	E21.5	--	--	--	E4.26
Camphor, unfltrd	µg/L	7	6	86	.61	.24	7	6	86	E.51	--	--	--	E.17
Carbaryl, unfltrd	µg/L	7	2	29	E.15	--	7	2	29	E.36	--	--	--	--
Carbazole, unfltrd	µg/L	7	4	57	1.12	.52	7	4	57	.49	--	--	--	--
Chlorpyrifos, unfltrd	µg/L	5	0	0	--	--	7	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	7	7	100	E276	E126	7	7	100	E206	--	--	--	E30.8
Cotinine, unfltrd	µg/L	6	0	0	--	--	7	0	0	--	--	--	--	--
DEET, unfltrd	µg/L	7	3	43	1.75	--	7	6	86	5.97	--	--	--	.58
Diazinon, unfltrd	µg/L	7	0	0	--	--	7	0	0	--	--	--	--	--
Dichlorvos, unfltrd	µg/L	7	0	0	--	--	7	1	14	E.093	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	5	5	100	19.1	7.92	7	3	43	2.98	--	--	--	--

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO109					Site CSO115							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	5	0	0	--	--	5	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	7	6	86	E1.63	E0.90	7	5	71	E1.08	--	--	--	B0.40
d-Limonene, unfltrd	µg/L	7	7	100	E144	E12.8	7	7	100	E1.75	--	--	--	E.34
Ethoxynonylphenol (all isomers), unfltrd	µg/L	6	5	83	30.4	12.3	7	4	57	2.86	--	--	--	E1.42
Ethoxyoctylphenol, unfltrd	µg/L	7	7	100	5.95	1.52	7	5	71	E.90	--	--	--	E.46
Fluoranthene, unfltrd	µg/L	7	6	86	E7.71	E1.46	7	7	100	E5.60	--	--	--	E.75
Hexahydrohexamethyl cyclopenta-benzopyran (HHCB), unfltrd	µg/L	7	7	100	4.49	1.93	7	6	86	1.32	--	--	--	.39
Indole, unfltrd	µg/L	7	3	43	E1.38	--	7	5	71	E.18	--	--	--	E.07
Isoborneol, unfltrd	µg/L	7	3	43	.31	--	7	1	14	.08	--	--	--	--
Isophorone, unfltrd	µg/L	7	1	14	.10	--	7	2	29	.09	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	7	5	71	E.24	E.04	7	1	14	E.03	--	--	--	--
Isoquinoline, unfltrd	µg/L	7	0	0	--	--	7	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	7	7	100	2.94	1.70	7	6	86	E2.18	--	--	--	E.52
Metalaxyl, unfltrd	µg/L	7	0	0	--	--	7	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	7	5	71	E.63	E.18	7	7	100	E.49	--	--	--	E.19
Metolachlor, unfltrd	µg/L	6	3	50	142	--	7	2	29	E.099	--	--	--	--
Naphthalene, unfltrd	µg/L	7	7	100	E4.38	E.82	7	4	57	E.12	--	--	--	E.05
p-Cresol, unfltrd	µg/L	7	6	86	E47.6	E1.69	7	7	100	E4.24	--	--	--	E.62
Pentachlorophenol, unfltrd	µg/L	6	3	50	E3.24	--	7	0	0	--	--	--	--	--
Phenanthrene, unfltrd	µg/L	7	7	100	4.32	1.20	7	7	100	2.88	--	--	--	.39
Phenol, unfltrd	µg/L	7	6	86	E12.7	E.71	7	5	71	E2.10	--	--	--	E.64
Prometon, unfltrd	µg/L	7	0	0	--	--	7	3	43	23.5	--	--	--	--
Pyrene, unfltrd	µg/L	5	4	80	E5.44	E1.07	7	6	86	E5.15	--	--	--	E.44
Tetrachloroethene, unfltrd	µg/L	7	7	100	1.20	E.15	7	0	0	--	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	7	0	0	--	--	7	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	7	4	57	7.78	.41	7	0	0	--	--	--	--	--
Triclosan, unfltrd	µg/L	7	7	100	E7.00	E2.45	7	6	86	E2.35	--	--	--	E.53
Triethyl citrate, unfltrd	µg/L	7	2	29	.38	--	7	3	43	.18	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	7	6	86	1.42	.28	7	5	71	.67	--	--	--	.20
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	7	7	100	6.46	3.87	7	6	86	1.65	--	--	--	.36
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	7	4	57	.47	E.14	7	5	71	.62	--	--	--	E.13
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	7	6	86	.58	.22	7	6	86	.46	--	--	--	E.13
Escherichia coli, unfltrd	MPN/100 mL	8	8	100	4,600,000	1,000,000	11	11	100	11,000,000	2,300,000	680,000	310,000	610,000

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO117					Site CSO118				
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	5	5	100	882	498	5	5	100	609	430
Turbidity, unfltrd	NTU	4	4	100	369	260	5	5	100	580	322
Chemical oxygen demand, unfltrd	mg/L	6	6	100	526	234	4	3	75	472	77
Biochemical oxygen demand, unfltrd	mg/L	6	5	83	270	50	3	3	100	138	72
Hardness, unfltrd	mg/L as $CaCO_3$	5	5	100	330	230	5	5	100	260	130
Total suspended solids, unfltrd	mg/L	6	6	100	1,280	429	4	4	100	456	317
Calcium, unfltrd	mg/L	5	5	100	91	66	5	5	100	93	44
Magnesium, unfltrd	mg/L	5	5	100	25	14	5	5	100	7	5
Chloride, unfltrd	mg/L	5	5	100	84	38	5	5	100	126	79
Nitrite, fltrd	mg/L as N	6	6	100	.20	.11	5	5	100	.09	.05
Nitrate, fltrd	mg/L as N	6	6	100	5.07	1.92	5	5	100	1.38	.98
Nitrite plus nitrate, fltrd	mg/L as N	6	6	100	5.25	2.04	5	5	100	1.43	1.04
Ammonia, fltrd	mg/L as N	6	6	100	2.40	.69	5	5	100	2.85	1.32
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	6	6	100	17.0	10.1	5	5	100	9.23	6.63
Total phosphorus, fltrd	mg/L	6	6	100	3.84	1.97	5	5	100	2.61	1.34
Orthophosphate, fltrd	mg/L as P	6	6	100	.57	.30	5	5	100	.60	.30
Antimony, unfltrd	µg/L	6	6	100	1.62	1.08	5	5	100	1.43	1.27
Arsenic, unfltrd	µg/L	6	6	100	10.2	5.84	5	5	100	11.5	5.66
Barium, unfltrd	µg/L	6	6	100	385	189	5	5	100	332	153
Beryllium, unfltrd	µg/L	6	6	100	.72	.35	5	5	100	.64	.27
Cadmium, unfltrd	µg/L	6	6	100	1.28	.49	5	5	100	1.65	.60
Chromium, unfltrd	µg/L	6	6	100	20.4	9.86	5	5	100	23.6	19.5
Cobalt, unfltrd	µg/L	6	6	100	10.8	3.56	5	5	100	9.20	3.90
Copper, unfltrd	µg/L	6	6	100	70.6	30.9	5	5	100	74.5	29.6
Lead, unfltrd	µg/L	6	6	100	144	40.3	5	5	100	179.1	47.4
Mercury, unfltrd	µg/L	6	6	100	2.76	.26	4	4	100	.12	.06
Nickel, unfltrd	µg/L	6	6	100	26.7	10.6	5	5	100	25.6	11.5
Selenium, unfltrd	µg/L	6	6	100	1.86	.88	5	5	100	.86	.52
Silver, unfltrd	µg/L	6	6	100	2.00	.41	5	5	100	2.97	.31
Thallium, unfltrd	µg/L	6	3	50	.36	--	5	4	80	.30	E.14
Uranium, unfltrd	µg/L	6	6	100	3.97	2.12	5	5	100	1.82	1.13
Vanadium, unfltrd	µg/L	6	6	100	30.8	12.2	5	5	100	28.4	13.2
Zinc, unfltrd	µg/L	6	6	100	289	158	5	5	100	412	154
1,4-Dichlorobenzene, unfltrd	µg/L	6	6	100	E.36	E.11	4	4	100	E.73	E.15

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO117					Site CSO118				
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
1-Methylnaphthalene, unfltrd	µg/L	6	3	50	E0.070	--	4	3	75	E0.07	E0.04
2,6-Dimethylnaphthalene, unfltrd	µg/L	6	1	17	E.008	--	4	2	50	E.06	--
2-Methylnaphthalene, unfltrd	µg/L	6	2	33	E.020	--	4	3	75	E.16	E.06
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	6	4	67	E13.8	E.99	4	4	100	E166	E13.1
3-*beta*-Coprostanol, unfltrd	µg/L	6	6	100	E167	E42.4	4	4	100	E23.2	E14.6
3-Methyl-1H-indole, unfltrd	µg/L	6	5	83	E.52	E.26	4	4	100	E.88	E.23
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
4-Cumylphenol, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
4-*n*-Octylphenol, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
4-Nonylphenol, unfltrd	µg/L	6	4	67	E7.57	B2.39	4	2	50	E5.66	B1.94
4-*tert*-Octylphenol, unfltrd	µg/L	6	0	0	--	--	4	2	50	E.79	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	6	3	50	3.05	--	4	2	50	.56	--
9,10-Anthraquinone, unfltrd	µg/L	6	4	67	.76	.21	4	4	100	.86	.48
Acetophenone, unfltrd	µg/L	6	4	67	.85	.26	4	1	25	.71	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	6	4	67	.20	E.11	4	1	25	.11	--
Anthracene, unfltrd	µg/L	6	1	17	E.028	--	4	4	100	E.11	E.09
Atrazine, unfltrd	µg/L	6	2	33	E.16	--	4	2	50	E.24	--
BDE congener 47, unfltrd	µg/L	3	0	0	--	--	4	0	0	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	6	3	50	E.16	--	4	4	100	E.76	E.29
Benzophenone, unfltrd	µg/L	6	5	83	.30	E.16	4	4	100	.27	.20
beta-Sitosterol, unfltrd	µg/L	6	5	83	16.8	4.14	4	3	75	5.42	1.62
beta-Stigmastanol, unfltrd	µg/L	6	3	50	E6.17	--	4	1	25	B3.08	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Bisphenol A, unfltrd	µg/L	6	5	83	.61	.32	4	3	75	.66	.32
Bromacil, unfltrd	µg/L	6	0	0	--	--	4	1	25	2.60	--
Caffeine, unfltrd	µg/L	6	6	100	E141	E7.24	4	4	100	E7.97	E3.80
Camphor, unfltrd	µg/L	6	4	67	.74	E.17	4	4	100	.63	.50
Carbaryl, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Carbazole, unfltrd	µg/L	6	4	67	.26	E.10	4	4	100	.33	E.17
Chlorpyrifos, unfltrd	µg/L	6	0	0	--	--	4	1	25	E.12	--
Cholesterol, unfltrd	µg/L	6	6	100	E77.1	E25.4	4	4	100	E50.0	E19.0
Cotinine, unfltrd	µg/L	6	1	17	E.15	--	4	0	0	--	--
DEET, unfltrd	µg/L	6	4	67	3.82	.28	4	3	75	.64	.34
Diazinon, unfltrd	µg/L	6	0	0	--	--	4	1	25	E.045	--

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO117					Site CSO118				
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
Dichlorvos, unfltrd	µg/L	6	1	17	1.38	--	4	1	25	0.14	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	6	5	83	6.90	1.89	4	2	50	3.99	--
Diethoxyoctylphenol, unfltrd	µg/L	6	2	33	B.72	--	4	0	0	--	--
Diethyl phthalate, unfltrd	µg/L	6	3	50	E2.62	--	4	3	75	E.97	B.48
d-Limonene, unfltrd	µg/L	6	5	83	E3.26	E.31	4	4	100	E3.66	E.23
Ethoxynonylphenol (all isomers), unfltrd	µg/L	6	3	50	10.4	--	4	2	50	4.99	--
Ethoxyoctylphenol, unfltrd	µg/L	6	4	67	E.54	E.46	4	2	50	E.66	--
Fluoranthene, unfltrd	µg/L	6	4	67	E.45	E.21	4	4	100	E1.81	E.83
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	6	6	100	1.56	.66	4	4	100	.80	.32
Indole, unfltrd	µg/L	6	5	83	E.13	E.08	4	2	50	E.10	--
Isoborneol, unfltrd	µg/L	6	1	17	.49	--	4	1	25	.67	--
Isophorone, unfltrd	µg/L	6	4	67	E.11	E.08	4	2	50	E.13	--
Isopropylbenzene, unfltrd	µg/L	6	1	17	E.50	--	4	1	25	E.008	--
Isoquinoline, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Menthol, unfltrd	µg/L	6	6	100	3.47	1.22	4	4	100	2.06	.96
Metalaxyl, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Methyl salicylate, unfltrd	µg/L	6	5	83	E1.57	E.32	4	4	100	E.86	E.15
Metolachlor, unfltrd	µg/L	6	1	17	E.061	--	4	1	25	E.082	--
Naphthalene, unfltrd	µg/L	6	4	67	E.07	E.05	4	3	75	E.10	E.07
p-Cresol, unfltrd	µg/L	6	6	100	E1.71	E.52	4	3	75	E.36	E.14
Pentachlorophenol, unfltrd	µg/L	6	1	17	E.83	--	3	0	0	--	--
Phenanthrene, unfltrd	µg/L	6	4	67	.27	E.14	4	4	100	.90	.40
Phenol, unfltrd	µg/L	6	4	67	E.74	B.26	4	2	50	E.33	--
Prometon, unfltrd	µg/L	6	1	17	.39	--	4	3	75	.70	--
Pyrene, unfltrd	µg/L	6	4	67	E.35	E.18	4	4	100	E1.56	E.73
Tetrachloroethene, unfltrd	µg/L	6	4	67	E.039	E.03	4	4	100	E.02	E.01
Tribromomethane (bromoform), unfltrd	µg/L	6	1	17	E.03	--	4	0	0	--	--
Tributyl phosphate, unfltrd	µg/L	6	6	100	31.6	3.65	4	2	50	E.16	--
Triclosan, unfltrd	µg/L	6	6	100	E1.81	E.85	4	4	100	E1.18	E.58
Triethyl citrate, unfltrd	µg/L	6	0	0	--	--	4	3	75	.22	E.11
Triphenyl phosphate, unfltrd	µg/L	6	2	33	.12	--	4	3	75	E.16	E.09
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	6	4	67	.93	.29	4	4	100	1.49	.76
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	6	4	67	.20	E.09	4	4	100	.23	E.12
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	6	4	67	E.18	E.09	4	4	100	.24	E.14
Escherichia coli, unfltrd	MPN/100 mL	6	5	83	12,000,000	350,000	5	5	100	4,400,000	770,000

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO119								Site CSO120				
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	8	8	100	879	--	--	--	515	1	1	100	94	94
Turbidity, unfltrd	NTU	8	8	100	827	--	--	--	663	1	1	100	420	420
Chemical oxygen demand, unfltrd	mg/L	7	7	100	1,360	--	--	--	684	0	0	--	--	--
Biochemical oxygen demand, unfltrd	mg/L	10	9	90	630	353	253	126	170	0	0	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	8	8	100	260	--	--	--	170	0	0	--	--	--
Total suspended solids, unfltrd	mg/L	8	8	100	1,390	--	--	--	717	0	0	--	--	--
Calcium, unfltrd	mg/L	8	8	100	89	--	--	--	58	0	0	--	--	--
Magnesium, unfltrd	mg/L	8	8	100	10	--	--	--	7	0	0	--	--	--
Chloride, unfltrd	mg/L	8	8	100	170	--	--	--	83	0	0	--	--	--
Nitrite, fltrd	mg/L as N	8	8	100	.08	--	--	--	.03	1	1	100	.01	.01
Nitrate, fltrd	mg/L as N	7	7	100	.95	--	--	--	.60	1	1	100	.36	.36
Nitrite plus nitrate, fltrd	mg/L as N	8	7	88	.99	--	--	--	.45	1	1	100	.37	.37
Ammonia, fltrd	mg/L as N	8	7	88	7.66	--	--	--	1.86	1	1	100	.26	.26
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	8	8	100	55.5	--	--	--	24.6	1	1	100	2.99	2.99
Total phosphorus, fltrd	mg/L	8	8	100	10.5	--	--	--	5.94	1	1	100	1.69	1.69
Orthophosphate, fltrd	mg/L as P	8	8	100	3.96	--	--	--	1.50	1	1	100	.10	.10
Antimony, unfltrd	µg/L	8	8	100	1.21	--	--	--	.80	1	1	100	1.58	1.58
Arsenic, unfltrd	µg/L	8	8	100	10.8	--	--	--	6.07	1	1	100	9.75	9.75
Barium, unfltrd	µg/L	8	8	100	361	--	--	--	170	1	1	100	326	326
Beryllium, unfltrd	µg/L	8	7	88	.88	--	--	--	.30	1	1	100	.78	.78
Cadmium, unfltrd	µg/L	8	8	100	1.54	--	--	--	.79	1	1	100	1.43	1.43
Chromium, unfltrd	µg/L	8	8	100	23.4	--	--	--	12.9	1	1	100	15.1	15.1
Cobalt, unfltrd	µg/L	8	8	100	11.6	--	--	--	4.46	1	1	100	10.2	10.2
Copper, unfltrd	µg/L	8	8	100	79.9	--	--	--	40.1	1	1	100	74.2	74.2
Lead, unfltrd	µg/L	8	8	100	137	--	--	--	49.9	1	1	100	191	191
Mercury, unfltrd	µg/L	8	8	100	.69	--	--	--	.09	1	0	0	--	--
Nickel, unfltrd	µg/L	8	8	100	28.5	--	--	--	13.3	1	1	100	28.6	28.6
Selenium, unfltrd	µg/L	8	8	100	2.12	--	--	--	.83	1	1	100	.38	.38
Silver, unfltrd	µg/L	8	8	100	1.57	--	--	--	.38	1	1	100	.57	.57
Thallium, unfltrd	µg/L	8	5	63	.33	--	--	--	.14	1	1	100	.34	.34
Uranium, unfltrd	µg/L	8	8	100	2.60	--	--	--	1.60	1	1	100	1.43	1.43
Vanadium, unfltrd	µg/L	8	8	100	30.6	--	--	--	14.3	1	1	100	31.9	31.9
Zinc, unfltrd	µg/L	8	8	100	483	--	--	--	266	1	1	100	305	305
1,4-Dichlorobenzene, unfltrd	µg/L	8	8	100	E.74	--	--	--	E.22	1	0	0	--	--
1-Methylnaphthalene, unfltrd	µg/L	8	3	38	E.06	--	--	--	--	1	0	0	--	--
2,6-Dimethylnaphthalene, unfltrd	µg/L	8	4	50	E.10	--	--	--	--	1	0	0	--	--

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO119								Site CSO120				
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
2-Methylnaphthalene, unfltrd	µg/L	8	4	50	E0.07	--	--	--	--	1	0	0	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	7	6	86	E72.0	--	--	--	E4.81	1	0	0	--	--
3-*beta*-Coprostanol, unfltrd	µg/L	8	8	100	E33.9	--	--	--	E7.67	1	0	0	--	--
3-Methyl-1H-indole, unfltrd	µg/L	8	7	88	E7.00	--	--	--	E1.48	1	0	0	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
4-Cumylphenol, unfltrd	µg/L	6	0	0	--	--	--	--	--	1	0	0	--	--
4-*n*-Octylphenol, unfltrd	µg/L	6	0	0	--	--	--	--	--	1	0	0	--	--
4-Nonylphenol, unfltrd	µg/L	7	4	57	E8.56	--	--	--	E3.10	1	0	0	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	6	0	0	--	--	--	--	--	1	0	0	--	--
9,10-Anthraquinone, unfltrd	µg/L	5	3	60	.85	--	--	--	--	1	0	0	--	--
Acetophenone, unfltrd	µg/L	8	4	50	.96	--	--	--	--	1	0	0	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	7	1	14	E1.11	--	--	--	--	1	0	0	--	--
Anthracene, unfltrd	µg/L	7	3	43	E.57	--	--	--	--	1	0	0	--	--
Atrazine, unfltrd	µg/L	5	0	0	E.020	--	--	--	--	1	0	0	--	--
BDE congener 47, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	8	7	88	E.96	--	--	--	E.24	1	0	0	--	--
Benzophenone, unfltrd	µg/L	7	2	29	.15	--	--	--	--	1	0	0	--	--
beta-Sitosterol, unfltrd	µg/L	7	5	71	8.54	--	--	--	B2.51	1	0	0	--	--
beta-Stigmastanol, unfltrd	µg/L	7	4	57	E5.68	--	--	--	B2.21	1	0	0	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	8	0	0	--	--	--	--	--	1	0	0	--	--
Bisphenol A, unfltrd	µg/L	2	1	50	1.23	--	--	--	--	1	0	0	--	--
Bromacil, unfltrd	µg/L	5	2	40	7.25	--	--	--	--	1	0	0	--	--
Caffeine, unfltrd	µg/L	5	5	100	E2.08	--	--	--	E.55	1	0	0	--	--
Camphor, unfltrd	µg/L	8	8	100	.83	--	--	--	.27	1	0	0	--	--
Carbaryl, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
Carbazole, unfltrd	µg/L	6	2	33	.26	--	--	--	--	1	0	0	--	--
Chlorpyrifos, unfltrd	µg/L	5	0	0	--	--	--	--	--	1	0	0	--	--
Cholesterol, unfltrd	µg/L	8	7	88	E210	--	--	--	E24.0	1	0	0	--	--
Cotinine, unfltrd	µg/L	6	0	0	--	--	--	--	--	1	0	0	--	--
DEET, unfltrd	µg/L	7	3	43	.84	--	--	--	--	1	0	0	--	--
Diazinon, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
Dichlorvos, unfltrd	µg/L	7	1	14	E.056	--	--	--	--	1	0	0	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	5	0	0	--	--	--	--	--	1	0	0	--	--

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO119								Site CSO120				
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	2	0	0	--	--	--	--	--	1	0	0	--	--
Diethyl phthalate, unfltrd	µg/L	8	3	38	E0.81	--	--	--	--	1	0	0	--	--
d-Limonene, unfltrd	µg/L	8	7	88	E2.05	--	--	--	E0.33	1	0	0	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	5	0	0	--	--	--	--	--	1	0	0	--	--
Ethoxyoctylphenol, unfltrd	µg/L	6	2	33	E.58	--	--	--	--	1	0	0	--	--
Fluoranthene, unfltrd	µg/L	7	7	100	E1.78	--	--	--	E.60	1	0	0	--	--
Hexahydrohexamethyl cyclopenta-benzopyran (HHCB), unfltrd	µg/L	6	3	50	.80	--	--	--	.21	1	0	0	--	--
Indole, unfltrd	µg/L	8	6	75	E12.4	--	--	--	E.20	1	0	0	--	--
Isoborneol, unfltrd	µg/L	7	2	29	.29	--	--	--	--	1	0	0	--	--
Isophorone, unfltrd	µg/L	7	1	14	E.056	--	--	--	--	1	0	0	--	--
Isopropylbenzene, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
Isoquinoline, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
Menthol, unfltrd	µg/L	8	6	75	.75	--	--	--	.28	1	0	0	--	--
Metalaxyl, unfltrd	µg/L	6	0	0	--	--	--	--	--	1	0	0	--	--
Methyl salicylate, unfltrd	µg/L	7	4	57	E.34	--	--	--	E.10	1	0	0	--	--
Metolachlor, unfltrd	µg/L	6	0	0	--	--	--	--	--	1	0	0	--	--
Naphthalene, unfltrd	µg/L	8	5	63	E.11	--	--	--	E.05	1	0	0	--	--
p-Cresol, unfltrd	µg/L	8	8	100	E170	--	--	--	E9.13	1	0	0	--	--
Pentachlorophenol, unfltrd	µg/L	7	4	57	E.97	--	--	--	--	1	0	0	--	--
Phenanthrene, unfltrd	µg/L	8	6	75	1.08	--	--	--	.27	1	0	0	--	--
Phenol, unfltrd	µg/L	8	7	88	E6.80	--	--	--	E1.58	1	0	0	--	--
Prometon, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
Pyrene, unfltrd	µg/L	6	3	50	E1.45	--	--	--	--	1	0	0	--	--
Tetrachloroethene, unfltrd	µg/L	7	1	14	E.004	--	--	--	--	1	0	0	--	--
Tribromomethane (bromoform), unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
Tributyl phosphate, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
Triclosan, unfltrd	µg/L	5	1	20	E.95	--	--	--	--	1	0	0	--	--
Triethyl citrate, unfltrd	µg/L	7	0	0	--	--	--	--	--	1	0	0	--	--
Triphenyl phosphate, unfltrd	µg/L	7	3	43	.22	--	--	--	--	1	0	0	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	7	5	71	2.20	--	--	--	--	1	0	0	--	--
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	6	1	17	--	--	--	--	--	1	0	0	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	6	2	33	E.09	--	--	--	--	1	0	0	--	--
Escherichia coli, unfltrd	MPN/100 mL	11	11	100	24,000,000	8,400,000	1,300,000	320,000	1,100,000	1	1	100	47,000	47,000

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO203					Site CSO205							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	7	7	100	720	260	12	12	100	654	536	406	336	403
Turbidity, unfltrd	NTU	7	7	100	851	174	11	11	100	715	270	179	85	171
Chemical oxygen demand, unfltrd	mg/L	6	6	100	1,020	242	12	12	100	6,900	411	126	89	205
Biochemical oxygen demand, unfltrd	mg/L	7	6	86	389	57	16	12	75	587	175	36	B23	55
Hardness, unfltrd	mg/L as $CaCO_3$	6	6	100	410	200	12	12	100	550	200	160	130	180
Total suspended solids, unfltrd	mg/L	6	6	100	1,560	359	12	12	100	3,090	537	319	177	341
Calcium, unfltrd	mg/L	6	6	100	145	64	12	12	100	183	60	49	42	55
Magnesium, unfltrd	mg/L	6	6	100	18	8	12	12	100	21	12	9	7	9
Chloride, unfltrd	mg/L	6	6	100	78	18	12	12	100	69	51	35	29	35
Nitrite, fltrd	mg/L as N	6	6	100	.10	.03	13	13	100	.14	.07	.05	.04	.05
Nitrate, fltrd	mg/L as N	6	6	100	7.89	1.34	12	12	100	3.33	1.69	1.39	.75	1.15
Nitrite plus nitrate, fltrd	mg/L as N	6	6	100	7.92	1.44	13	12	92	3.38	1.67	1.44	.77	.90
Ammonia, fltrd	mg/L as N	6	6	100	6.45	1.09	13	13	100	11.5	3.05	1.84	1.10	1.73
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	6	6	100	42.1	12.4	13	13	100	36.7	14.9	7.63	5.34	9.84
Total phosphorus, fltrd	mg/L	6	6	100	12.1	2.03	13	13	100	11.1	3.31	1.48	.92	1.74
Orthophosphate, fltrd	mg/L as P	6	6	100	1.19	.29	13	13	100	1.57	.49	.39	.19	.37
Antimony, unfltrd	µg/L	6	6	100	.69	.42	13	13	100	2.28	1.25	.93	.67	.96
Arsenic, unfltrd	µg/L	6	6	100	9.61	4.29	13	13	100	18.1	5.18	3.98	3.22	4.43
Barium, unfltrd	µg/L	6	6	100	573	146	13	13	100	762	173	130	101	143
Beryllium, unfltrd	µg/L	6	3	50	.60	.25	13	9	69	1.00	.30	.20	<.26	.24
Cadmium, unfltrd	µg/L	6	6	100	2.25	.62	13	13	100	4.22	.67	.53	.24	.52
Chromium, unfltrd	µg/L	6	6	100	32.4	7.25	13	13	100	45.0	12.4	10.1	6.10	9.16
Cobalt, unfltrd	µg/L	6	6	100	11.4	2.70	13	13	100	18.6	3.63	2.33	1.61	2.62
Copper, unfltrd	µg/L	6	6	100	101	24.9	13	13	100	238	56.6	41.4	18.0	32.5
Lead, unfltrd	µg/L	6	6	100	376	52.6	13	13	100	200	48.6	42.5	19.3	35.1
Mercury, unfltrd	µg/L	6	6	100	8.16	.44	13	12	92	.88	.26	.10	.03	.09
Nickel, unfltrd	µg/L	6	6	100	40.8	10.1	13	13	100	56.1	12.0	9.27	5.24	9.12
Selenium, unfltrd	µg/L	6	6	100	6.71	1.70	13	13	100	3.11	1.65	1.35	.72	1.19
Silver, unfltrd	µg/L	6	6	100	.63	.16	13	13	100	7.58	1.81	.99	.28	.56
Thallium, unfltrd	µg/L	6	3	50	.51	--	13	5	38	.49	--	--	--	--
Uranium, unfltrd	µg/L	6	6	100	3.79	1.92	13	13	100	4.47	2.40	1.79	1.29	1.87
Vanadium, unfltrd	µg/L	6	6	100	37.8	10.0	13	13	100	55.4	13.3	10.5	5.30	9.86
Zinc, unfltrd	µg/L	6	6	100	785	147	13	13	100	852	320	195	87.8	174.3
1,4-Dichlorobenzene, unfltrd	µg/L	6	6	100	E123	E.52	11	11	100	E1.51	E.60	E.19	E.08	E.21
1-Methylnaphthalene, unfltrd	µg/L	6	3	50	E.06	--	11	11	100	E.56	E.17	E.10	E.05	E.10

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO203					Site CSO205							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	6	3	50	E0.09	--	11	10	91	E0.52	E0.16	E0.09	E0.05	E0.10
2-Methylnaphthalene, unfltrd	µg/L	6	4	67	E.09	E.04	11	11	100	E.81	E.25	E.14	E.08	E.15
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	6	4	67	E3.85	E.65	11	6	55	E11.4	E8.43	E2.27	<2	E.80
3-*beta*-Coprostanol, unfltrd	µg/L	6	6	100	E420	E59.1	11	11	100	E165	E75.55	E27.20	E13.04	E30.11
3-Methyl-1H-indole, unfltrd	µg/L	6	6	100	E19.1	E.53	11	11	100	E5.38	E.39	E.31	E.14	E.29
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	6	1	17	E.11	--	11	3	27	E.21	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	6	0	0	--	--	11	1	9	E.32	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	6	0	0	--	--	11	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	6	4	67	E51.3	E5.84	11	7	64	E17.0	E8.64	E3.57	<1.6	E3.42
4-*tert*-Octylphenol, unfltrd	µg/L	6	2	33	E2.31	--	11	4	36	E1.62	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	6	0	0	--	--	11	3	27	1.44	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	6	3	50	.64	--	11	11	100	1.36	1.20	.83	.45	.70
Acetophenone, unfltrd	µg/L	6	4	67	1.84	.41	11	7	64	1.11	.86	.62	<.2	.32
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	6	3	50	.53	--	11	5	45	.50	--	--	--	--
Anthracene, unfltrd	µg/L	6	3	50	E1.04	--	11	4	36	E.26	--	--	--	--
Atrazine, unfltrd	µg/L	6	1	17	E.16	--	11	0	0	--	--	--	--	--
BDE congener 47, unfltrd	µg/L	6	0	0	--	--	8	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	6	4	67	E4.00	E.27	11	8	73	E1.09	E.64	E.42	<.2	E.32
Benzophenone, unfltrd	µg/L	6	3	50	E.16	--	11	5	45	.43	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	6	5	83	120	10.2	11	9	82	26.7	12.3	5.77	2.46	4.51
beta-Stigmastanol, unfltrd	µg/L	6	4	67	E8.53	B2.05	11	3	27	E13.8	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	6	0	0	--	--	11	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	5	2	40	.37	--	11	6	55	15.4	.45	.25	<.4	.43
Bromacil, unfltrd	µg/L	6	0	0	--	--	11	2	18	1.45	--	--	--	--
Caffeine, unfltrd	µg/L	6	6	100	E7.90	E3.20	11	11	100	E24.6	E12.2	E8.05	E3.74	E6.59
Camphor, unfltrd	µg/L	6	6	100	.51	.24	11	11	100	.55	.29	.26	E.15	.20
Carbaryl, unfltrd	µg/L	6	1	17	E6.69	--	11	1	9	E.075	--	--	--	--
Carbazole, unfltrd	µg/L	6	3	50	.47	--	11	8	73	.67	.42	.29	<.2	.26
Chlorpyrifos, unfltrd	µg/L	5	1	20	E4.81	--	11	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	6	5	83	E470	E71.8	11	10	91	E174	E55.50	E27.20	E15.65	E28.86
Cotinine, unfltrd	µg/L	6	0	0	--	--	10	0	0	E1.45	--	--	--	--
DEET, unfltrd	µg/L	6	4	67	.95	.26	11	9	82	.90	.66	E.15	E.12	.26
Diazinon, unfltrd	µg/L	6	0	0	--	--	11	0	0	--	--	--	--	--
Dichlorvos, unfltrd	µg/L	6	1	17	.23	--	11	3	27	1.65	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	6	3	50	9.52	--	11	5	45	11.4	--	--	--	--

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CSO203					Site CSO205							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	4	0	0	--	--	11	1	9	B0.81	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	6	6	100	E1.18	E0.66	11	11	100	E1.97	E1.14	E0.91	E0.65	E0.86
d-Limonene, unfltrd	µg/L	6	6	100	E2.79	E.39	11	11	100	E4.30	E2.15	E.75	E.25	E.64
Ethoxynonylphenol (all isomers), unfltrd	µg/L	6	3	50	21.8	--	11	4	36	23.0	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	6	5	83	1.16	E.53	11	6	55	1.40	E.50	E.50	<1.0	E.51
Fluoranthene, unfltrd	µg/L	6	4	67	E6.85	E.60	11	9	82	E3.62	E2.02	E1.54	E.68	E.89
Hexahydrohexamethyl cyclopenta-benzopyran (HHCB), unfltrd	µg/L	6	6	100	4.50	.97	11	10	91	3.10	1.70	.70	.33	.65
Indole, unfltrd	µg/L	6	6	100	E.44	E.09	11	10	91	E.32	E.16	E.10	E.09	E.12
Isoborneol, unfltrd	µg/L	6	1	17	.35	--	11	2	18	1.28	--	--	--	--
Isophorone, unfltrd	µg/L	6	3	50	.19	--	11	2	18	.14	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	6	0	0	--	--	11	4	36	E.024	--	--	--	--
Isoquinoline, unfltrd	µg/L	6	0	0	--	--	11	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	6	6	100	2.66	1.05	11	11	100	6.87	2.58	1.37	.68	1.33
Metalaxyl, unfltrd	µg/L	6	0	0	--	--	11	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	6	5	83	E.90	E.14	11	9	82	E.68	E.44	E.20	E.07	E.18
Metolachlor, unfltrd	µg/L	6	0	0	--	--	11	0	0	--	--	--	--	--
Naphthalene, unfltrd	µg/L	6	2	33	E.17	--	11	10	91	E.63	E.28	E.15	E.12	E.16
p-Cresol, unfltrd	µg/L	6	6	100	E35.6	E1.11	11	8	73	E11.6	E3.28	E.31	<.2	E.55
Pentachlorophenol, unfltrd	µg/L	6	2	33	E1.17	--	11	3	27	E1.15	--	--	--	--
Phenanthrene, unfltrd	µg/L	6	4	67	2.86	.33	11	9	82	1.46	.80	.64	.33	.44
Phenol, unfltrd	µg/L	6	4	67	E1.59	B.33	11	9	82	E28.9	E.91	E.52	E.32	E.71
Prometon, unfltrd	µg/L	6	0	0	--	--	11	2	18	.75	--	--	--	--
Pyrene, unfltrd	µg/L	5	2	40	E3.18	--	11	8	73	E1.88	E1.60	E.78	<.2	E.52
Tetrachloroethene, unfltrd	µg/L	6	4	67	E.062	E.08	11	11	100	.59	E.26	E.12	E.05	E.12
Tribromomethane (bromoform), unfltrd	µg/L	6	0	0	--	--	11	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	6	1	17	E.044	--	11	2	18	E.12	--	--	--	--
Triclosan, unfltrd	µg/L	6	6	100	E7.68	E1.59	11	11	100	E5.26	E2.29	E.84	E.53	E1.00
Triethyl citrate, unfltrd	µg/L	6	2	33	E.08	--	11	6	55	.57	.22	E.07	<.2	E.12
Triphenyl phosphate, unfltrd	µg/L	6	4	67	.27	E.13	11	4	36	.21	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	6	6	100	8.46	1.17	11	11	100	8.43	5.95	3.41	1.22	2.62
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	6	2	33	E.11	--	11	3	27	.32	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	6	3	50	E.19	--	11	3	27	E.18	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	7	7	100	7,700,000	720,000	16	16	100	11,000,000	1,200,000	620,000	220,000	500,000

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All CSO sites draining into the Missouri River east of the Papillion Creek Basin							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	77	77	100	1,210	586	381	245	394
Turbidity, unfltrd	NTU	70	70	100	1,170	552	295	186	299
Chemical oxygen demand, unfltrd	mg/L	68	67	99	1,650	689	429	186	351
Biochemical oxygen demand, unfltrd	mg/L	76	71	93	630	258	121	45	105
Hardness, unfltrd	mg/L as $CaCO_3$	74	74	100	1,400	290	190	120	180
Total suspended solids, unfltrd	mg/L	74	74	100	7,260	956	497	244	500
Calcium, unfltrd	mg/L	74	74	100	487	88	58	37	58
Magnesium, unfltrd	mg/L	74	74	100	32	14	9	5	9
Chloride, unfltrd	mg/L	74	74	100	202	83	36	20	38
Nitrite, fltrd	mg/L as N	76	76	100	.34	.09	.05	.03	.04
Nitrate, fltrd	mg/L as N	64	64	100	5.07	1.01	.64	.41	.58
Nitrite plus nitrate, fltrd	mg/L as N	76	65	86	5.25	.99	.59	.33	.42
Ammonia, fltrd	mg/L as N	76	75	99	22.1	3.79	2.04	.78	1.82
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	76	76	100	55.5	21.9	13.0	6.54	11.5
Total phosphorus, fltrd	mg/L	76	76	100	16.5	5.44	3.46	1.53	2.92
Orthophosphate, fltrd	mg/L as P	76	76	100	3.96	.67	.39	.25	.42
Antimony, unfltrd	µg/L	76	76	100	4.07	1.56	1.05	.66	1.05
Arsenic, unfltrd	µg/L	76	76	100	37.9	9.28	5.34	4.11	6.29
Barium, unfltrd	µg/L	76	76	100	1,660	314	168	113	184
Beryllium, unfltrd	µg/L	76	60	79	4.11	.40	.30	.20	.31
Cadmium, unfltrd	µg/L	76	76	100	11.7	1.44	.74	.46	.82
Chromium, unfltrd	µg/L	76	76	100	115	20.5	11.0	6.53	12.0
Cobalt, unfltrd	µg/L	76	76	100	62.2	7.06	3.51	2.07	3.92
Copper, unfltrd	µg/L	76	76	100	1,880	80.2	42.1	26.2	51.0
Lead, unfltrd	µg/L	76	76	100	1,320	94.3	49.2	26.7	56.6
Mercury, unfltrd	µg/L	75	74	99	6.38	.24	.10	.04	.11
Nickel, unfltrd	µg/L	76	76	100	164	24.3	11.6	7.45	13.3
Selenium, unfltrd	µg/L	76	76	100	5.32	1.18	.72	.54	.80
Silver, unfltrd	µg/L	76	76	100	15.2	.76	.38	.22	.45
Thallium, unfltrd	µg/L	76	49	64	.98	.24	E.11	<.18	E.15
Uranium, unfltrd	µg/L	76	76	100	8.05	2.98	1.93	1.04	1.85
Vanadium, unfltrd	µg/L	76	76	100	137	24.7	12.4	7.78	13.8
Zinc, unfltrd	µg/L	76	76	100	2,700	418	209	147	238
1,4-Dichlorobenzene, unfltrd	µg/L	70	70	100	E7.57	E1.07	E.53	E.24	E.50

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All CSO sites draining into the Missouri River east of the Papillion Creek Basin							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
1-Methylnaphthalene, unfltrd	µg/L	70	56	80	E1.63	E0.09	E0.05	E0.03	E0.06
2,6-Dimethylnaphthalene, unfltrd	µg/L	70	44	63	E2.64	E.09	E.05	<.2	E.07
2-Methylnaphthalene, unfltrd	µg/L	70	59	84	E2.50	E.14	E.07	E.03	E.08
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	66	49	74	E578	E12.6	E2.61	<2	E2.12
3-*beta*-Coprostanol, unfltrd	µg/L	70	70	100	E612	E122	E50.1	E20.3	E45.5
3-Methyl-1H-indole, unfltrd	µg/L	70	67	96	E18.0	E.88	E.37	E.16	E.44
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	69	7	10	E.36	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	68	10	15	E1.30	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	68	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	69	55	80	E104	E19.1	E8.10	B2.92	E7.66
4-*tert*-Octylphenol, unfltrd	µg/L	69	34	49	E64.5	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	65	23	35	7.93	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	65	45	69	9.64	.81	.39	<.2	.36
Acetophenone, unfltrd	µg/L	70	47	67	6.78	.79	.65	<.2	.36
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	69	42	61	6.00	.28	E.11	<.2	E.17
Anthracene, unfltrd	µg/L	69	40	58	E4.65	E.13	E.08	<.2	E.11
Atrazine, unfltrd	µg/L	67	14	21	E186	--	--	--	--
BDE congener 47, unfltrd	µg/L	58	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	70	60	86	E18.2	E.66	E.24	E.15	E.30
Benzophenone, unfltrd	µg/L	69	45	65	12.7	.30	E.14	<.2	.20
beta-Sitosterol, unfltrd	µg/L	69	55	80	57.6	13.8	7.18	2.84	3.82
beta-Stigmastanol, unfltrd	µg/L	69	34	49	E11.9	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	70	3	4	E123	--	--	--	--
Bisphenol A, unfltrd	µg/L	58	41	71	27.2	.86	.38	<.4	.48
Bromacil, unfltrd	µg/L	65	11	17	16.60	--	--	--	--
Caffeine, unfltrd	µg/L	65	65	100	E141	E8.61	E4.60	E1.51	E3.73
Camphor, unfltrd	µg/L	70	62	89	40.5	.54	.30	E.15	.30
Carbaryl, unfltrd	µg/L	69	6	9	E5.23	--	--	--	--
Carbazole, unfltrd	µg/L	68	48	71	5.62	.35	.20	<.2	.22
Chlorpyrifos, unfltrd	µg/L	62	1	2	E.12	--	--	--	--
Cholesterol, unfltrd	µg/L	70	67	96	E381	E134	E60	E21.8	E48.1
Cotinine, unfltrd	µg/L	64	6	9	E4.18	--	--	--	--
DEET, unfltrd	µg/L	69	52	75	5.97	.87	.42	E.17	.46
Diazinon, unfltrd	µg/L	69	1	1	E.36	--	--	--	--
Dichlorvos, unfltrd	µg/L	69	7	10	1.38	--	--	--	--

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All CSO sites draining into the Missouri River east of the Papillion Creek Basin							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxynonylphenol (all isomers), unfltrd	µg/L	63	44	70	23.8	5.23	3.16	<3.2	2.80
Diethoxyoctylphenol, unfltrd	µg/L	53	3	6	B.72	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	70	49	70	E6.02	E1.16	E.79	<.28	B.53
d-Limonene, unfltrd	µg/L	70	68	97	E144	E1.91	E.69	E.28	E.77
Ethoxynonylphenol (all isomers), unfltrd	µg/L	66	44	67	49.8	11.0	2.89	<2	3.85
Ethoxyoctylphenol, unfltrd	µg/L	68	52	76	5.95	E.89	E.53	E.50	E.66
Fluoranthene, unfltrd	µg/L	69	62	90	E39.7	E1.36	E.76	E.36	E.71
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	68	64	94	6.40	2.12	.96	.36	.86
Indole, unfltrd	µg/L	70	45	64	E12.4	E.13	E.07	<.2	E.11
Isoborneol, unfltrd	µg/L	69	27	39	1.77	--	--	--	--
Isophorone, unfltrd	µg/L	69	24	35	.35	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	69	24	35	E.50	--	--	--	--
Isoquinoline, unfltrd	µg/L	69	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	70	65	93	11.9	2.26	1.14	.52	.98
Metalaxyl, unfltrd	µg/L	68	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	69	58	84	E11.1	E.41	E.21	E.07	E.19
Metolachlor, unfltrd	µg/L	67	13	19	142	--	--	--	--
Naphthalene, unfltrd	µg/L	70	60	86	E4.38	E.20	E.10	E.05	E.11
p-Cresol, unfltrd	µg/L	70	66	94	E170	E3.02	E.36	E.13	E.67
Pentachlorophenol, unfltrd	µg/L	66	18	27	E41.8	--	--	--	--
Phenanthrene, unfltrd	µg/L	70	65	93	40.3	.72	.37	.21	.41
Phenol, unfltrd	µg/L	70	43	61	E12.7	E.94	B.36	<.24	B.41
Prometon, unfltrd	µg/L	69	9	13	23.5	--	--	--	--
Pyrene, unfltrd	µg/L	64	49	77	E38.6	E1.21	E.48	E.08	E.48
Tetrachloroethene, unfltrd	µg/L	69	40	58	1.20	E.22	E.12	<.4	E.07
Tribromomethane (bromoform), unfltrd	µg/L	69	1	1	E.03	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	69	29	42	31.6	--	--	--	--
Triclosan, unfltrd	µg/L	67	62	93	E7.00	E2.63	E1.27	E.52	E1.07
Triethyl citrate, unfltrd	µg/L	69	32	46	.73	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	69	50	72	1.42	E.18	E.12	<.2	E.14
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	69	63	91	13.1	2.55	1.34	.60	1.16
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	68	44	65	1.02	.20	E.11	<.2	E.14
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	68	54	79	68.6	.25	E.15	.07	.21
Escherichia coli, unfltrd	MPN/100 mL	86	85	99	24,000,000	1,700,000	620,000	160,000	480,000

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All CSO sites draining into streams in the Papillion Creek Basin							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	19	19	100	720	506	377	231	343
Turbidity, unfltrd	NTU	18	18	100	851	271	177	84	172
Chemical oxygen demand, unfltrd	mg/L	18	18	100	6,900	416	148	86	217
Biochemical oxygen demand, unfltrd	mg/L	23	18	78	587	185	33	B24	56
Hardness, unfltrd	mg/L as $CaCO_3$	18	18	100	550	230	180	130	180
Total suspended solids, unfltrd	mg/L	18	18	100	3,090	745	326	165	347
Calcium, unfltrd	mg/L	18	18	100	183	66	55	42	58
Magnesium, unfltrd	mg/L	18	18	100	21	12	10	6	9
Chloride, unfltrd	mg/L	18	18	100	78	49	34	22	28
Nitrite, fltrd	mg/L as N	19	19	100	.14	.07	.05	.04	.04
Nitrate, fltrd	mg/L as N	18	18	100	7.89	1.92	1.13	.73	1.21
Nitrite plus nitrate, fltrd	mg/L as N	19	18	95	7.92	1.88	.93	.72	1.05
Ammonia, fltrd	mg/L as N	19	19	100	11.5	2.53	1.30	.77	1.49
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	19	19	100	42.1	16.5	8.86	5.47	10.6
Total phosphorus, fltrd	mg/L	19	19	100	12.1	4.06	1.48	.78	1.83
Orthophosphate, fltrd	mg/L as P	19	19	100	1.57	.48	.30	.22	.35
Antimony, unfltrd	µg/L	19	19	100	2.28	1.16	.69	.54	.74
Arsenic, unfltrd	µg/L	19	19	100	18.1	6.85	3.98	2.43	4.39
Barium, unfltrd	µg/L	19	19	100	762	195	130	71.3	144
Beryllium, unfltrd	µg/L	19	12	63	1.00	.33	.20	<.26	.24
Cadmium, unfltrd	µg/L	19	19	100	4.22	1.17	.53	.22	.55
Chromium, unfltrd	µg/L	19	19	100	45.0	13.9	9.71	4.13	8.51
Cobalt, unfltrd	µg/L	19	19	100	18.6	4.31	2.33	1.35	2.65
Copper, unfltrd	µg/L	19	19	100	238	54.9	34.5	15.0	29.9
Lead, unfltrd	µg/L	19	19	100	376	71.0	42.5	17.9	39.9
Mercury, unfltrd	µg/L	19	18	95	8.16	.49	.13	.03	.14
Nickel, unfltrd	µg/L	19	19	100	56.1	13.3	9.27	5.07	9.43
Selenium, unfltrd	µg/L	19	19	100	6.71	2.56	1.35	.67	1.34
Silver, unfltrd	µg/L	19	19	100	7.58	1.26	.39	.12	.38
Thallium, unfltrd	µg/L	19	8	42	.51	--	--	--	--
Uranium, unfltrd	µg/L	19	19	100	4.47	2.58	1.87	1.20	1.88
Vanadium, unfltrd	µg/L	19	19	100	55.4	16.2	10.5	5.27	9.91
Zinc, unfltrd	µg/L	19	19	100	852	373	184	78.2	165.3
1,4-Dichlorobenzene, unfltrd	µg/L	17	17	100	E123	E.78	E.19	E.08	E.28
1-Methylnaphthalene, unfltrd	µg/L	17	14	82	E.56	E.12	E.06	E.03	E.07

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2’,4,4’-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All CSO sites draining into streams in the Papillion Creek Basin							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	17	13	76	E0.52	E0.10	E0.06	<0.2	E0.08
2-Methylnaphthalene, unfltrd	µg/L	17	15	88	E.81	E.18	E.08	E.05	E.10
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	17	10	59	E11.4	E5.67	E1.43	<2	E.74
3-*beta*-Coprostanol, unfltrd	µg/L	17	17	100	E420	E118	E42.8	E16.3	E38.2
3-Methyl-1H-indole, unfltrd	µg/L	17	17	100	E19.1	E.40	E.30	E.13	E.36
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	17	4	24	E.21	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	17	1	6	E.32	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	17	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	17	11	65	E51.3	E12.2	E3.86	<1.6	E4.13
4-*tert*-Octylphenol, unfltrd	µg/L	17	6	35	E2.31	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	17	3	18	1.44	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	17	14	82	1.36	.88	.47	.23	.42
Acetophenone, unfltrd	µg/L	17	11	65	1.84	.91	.71	<.2	.35
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	17	8	47	.53	.20	E.11	E.11	E.14
Anthracene, unfltrd	µg/L	17	7	41	E1.04	--	--	--	--
Atrazine, unfltrd	µg/L	17	1	6	E.16	--	--	--	--
BDE congener 47, unfltrd	µg/L	14	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	17	12	71	E4.00	E.58	E.42	<.2	E.30
Benzophenone, unfltrd	µg/L	17	8	47	.43	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	17	14	82	120	14.7	8.02	2.48	6.02
beta-Stigmastanol, unfltrd	µg/L	17	7	41	E13.8	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	17	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	16	8	50	15.4	--	--	--	--
Bromacil, unfltrd	µg/L	17	2	12	1.45	--	--	--	--
Caffeine, unfltrd	µg/L	17	17	100	E24.6	E9.13	E4.78	E2.97	E5.11
Camphor, unfltrd	µg/L	17	17	100	.55	.37	.26	.15	.21
Carbaryl, unfltrd	µg/L	17	2	12	E6.69	--	--	--	--
Carbazole, unfltrd	µg/L	17	11	65	.67	.42	.21	<.2	.23
Chlorpyrifos, unfltrd	µg/L	16	1	6	E4.81	--	--	--	--
Cholesterol, unfltrd	µg/L	17	15	88	E470	E105	E29.3	E17.8	E39.8
Cotinine, unfltrd	µg/L	16	0	0	--	--	--	--	--
DEET, unfltrd	µg/L	17	13	76	.95	.56	E.15	E.12	.26
Diazinon, unfltrd	µg/L	17	0	0	--	--	--	--	--
Dichlorvos, unfltrd	µg/L	17	4	24	1.65	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	17	8	47	11.4	--	--	--	--

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All CSO sites draining into streams in the Papillion Creek Basin							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	15	1	7	B.81	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	17	17	100	E1.97	E1.00	E0.71	E0.59	E0.78
d-Limonene, unfltrd	µg/L	17	17	100	E4.30	E2.24	E.75	E.14	E.54
Ethoxynonylphenol (all isomers), unfltrd	µg/L	17	7	41	23.0	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	17	11	65	1.40	E.50	E.50	<1	E.52
Fluoranthene, unfltrd	µg/L	17	13	76	E6.85	E2.25	E1.09	E.37	E.77
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	17	16	94	4.50	1.70	.70	.31	.75
Indole, unfltrd	µg/L	17	16	94	E.44	E.16	E.10	E.07	E.11
Isoborneol, unfltrd	µg/L	17	3	18	1.28	--	--	--	--
Isophorone, unfltrd	µg/L	17	5	29	.19	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	17	4	24	E.024	--	--	--	--
Isoquinoline, unfltrd	µg/L	17	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	17	17	100	6.87	2.09	1.37	.72	1.22
Metalaxyl, unfltrd	µg/L	17	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	17	14	82	E.90	E.38	E.13	E.07	E.16
Metolachlor, unfltrd	µg/L	17	0	0	--	--	--	--	--
Naphthalene, unfltrd	µg/L	17	12	71	E.63	E.19	E.13	<.2	E.10
p-Cresol, unfltrd	µg/L	17	14	82	E35.6	E2.97	E.46	E.12	E.71
Pentachlorophenol, unfltrd	µg/L	17	5	29	E1.17	--	--	--	--
Phenanthrene, unfltrd	µg/L	17	13	76	2.86	.86	.59	.21	.40
Phenol, unfltrd	µg/L	17	13	76	E28.9	E.81	E.52	B.25	E.54
Prometon, unfltrd	µg/L	17	2	12	.75	--	--	--	--
Pyrene, unfltrd	µg/L	16	10	63	E3.18	E1.51	E.78	<.2	E.42
Tetrachloroethene, unfltrd	µg/L	17	15	88	.59	.22	.12	.04	.10
Tribromomethane (bromoform), unfltrd	µg/L	17	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	17	3	18	.12	--	--	--	--
Triclosan, unfltrd	µg/L	17	17	100	E7.68	E2.75	E1.01	E.45	E1.17
Triethyl citrate, unfltrd	µg/L	17	8	47	.57	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	17	8	47	.27	--	--	--	E.12
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	17	17	100	8.46	5.78	2.02	.70	1.97
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	17	5	29	.32	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	17	6	35	.19	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	23	23	100	11,000,000	1,200,000	700,000	230,000	560,000

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All CSO sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	96	96	100	1,210	579	378	244	383
Turbidity, unfltrd	NTU	88	88	100	1,170	547	283	166	267
Chemical oxygen demand, unfltrd	mg/L	86	85	99	6,900	676	396	141	317
Biochemical oxygen demand, unfltrd	mg/L	99	89	90	630	246	108	B32	91
Hardness, unfltrd	mg/L as $CaCO_3$	92	92	100	1,350	270	190	130	180
Total suspended solids, unfltrd	mg/L	92	92	100	7,260	873	464	238	465
Calcium, unfltrd	mg/L	92	92	100	487	84	58	40	58
Magnesium, unfltrd	mg/L	92	92	100	32	14	9	5	9
Chloride, unfltrd	mg/L	92	92	100	202	68	35	20	36
Nitrite, fltrd	mg/L as N	95	95	100	.34	.08	.05	.03	.04
Nitrate, fltrd	mg/L as N	82	82	100	7.89	1.05	.73	.45	.68
Nitrite plus nitrate, fltrd	mg/L as N	95	83	87	7.92	1.10	.68	.38	.50
Ammonia, fltrd	mg/L as N	95	94	99	22.1	3.52	1.91	.77	1.75
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	95	95	100	55.5	21.1	11.7	6.43	11.3
Total phosphorus, fltrd	mg/L	95	95	100	16.5	5.43	2.64	1.31	2.66
Orthophosphate, fltrd	mg/L as P	95	95	100	3.96	.62	.38	.24	.41
Antimony, unfltrd	µg/L	95	95	100	4.07	1.43	.96	.62	.98
Arsenic, unfltrd	µg/L	95	95	100	37.9	8.82	5.03	3.92	5.85
Barium, unfltrd	µg/L	95	95	100	1,660	305	163	106	176
Beryllium, unfltrd	µg/L	95	72	76	4.11	.40	.28	E.17	.29
Cadmium, unfltrd	µg/L	95	95	100	11.7	1.41	.67	.44	.76
Chromium, unfltrd	µg/L	95	95	100	115	19.9	10.4	6.19	11.2
Cobalt, unfltrd	µg/L	95	95	100	62.2	6.77	3.33	1.99	3.63
Copper, unfltrd	µg/L	95	95	100	1,880	75.4	41.4	25.9	45.9
Lead, unfltrd	µg/L	95	95	100	1,320	92.4	47.2	25.0	52.8
Mercury, unfltrd	µg/L	94	92	98	8.16	.25	.10	.04	.12
Nickel, unfltrd	µg/L	95	95	100	164	23.1	11.2	6.92	12.4
Selenium, unfltrd	µg/L	95	95	100	6.71	1.33	.79	.54	.88
Silver, unfltrd	µg/L	95	95	100	15.2	.82	.38	.20	.44
Thallium, unfltrd	µg/L	95	57	60	.98	.22	E.10	E<.18	E.14
Uranium, unfltrd	µg/L	95	95	100	8.05	2.96	1.88	1.07	1.85
Vanadium, unfltrd	µg/L	95	95	100	137	22.2	11.6	7.47	12.9
Zinc, unfltrd	µg/L	95	95	100	2,700	419	206	132	222
1,4-Dichlorobenzene, unfltrd	µg/L	87	87	100	E123	E.97	E.48	E.16	E.45
1-Methylnaphthalene, unfltrd	µg/L	87	70	80	E1.63	E.10	E.05	E.03	E.06

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All CSO sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	87	57	66	E2.64	E0.10	E0.05	<0.2	E0.07
2-Methylnaphthalene, unfltrd	µg/L	87	74	85	E2.50	E.15	E.07	E.03	E.08
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	83	59	71	E578	E10.7	E2.37	<2	E1.71
3-*beta*-Coprostanol, unfltrd	µg/L	87	87	100	612	E119	E45.3	E18.0	E44.0
3-Methyl-1H-indole, unfltrd	µg/L	87	84	97	E19.1	E.87	E.35	E.14	E.43
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	86	11	13	E.36	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	85	11	13	E1.30	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	85	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	86	66	77	E104	E17.5	E6.97	B2.27	E6.78
4-*tert*-Octylphenol, unfltrd	µg/L	86	40	47	E64.5	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	82	26	32	7.93	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	82	59	72	9.64	.85	.41	<.2	.37
Acetophenone, unfltrd	µg/L	87	58	67	6.78	.81	.66	<.2	.36
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	86	50	58	6.00	.27	.11	.11	.16
Anthracene, unfltrd	µg/L	86	47	55	E4.65	E.11	E.08	<.2	E.08
Atrazine, unfltrd	µg/L	84	15	18	E186	--	--	--	--
BDE congener 47, unfltrd	µg/L	72	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	87	72	83	E18.2	E.66	E.26	E.15	E.30
Benzophenone, unfltrd	µg/L	86	53	62	12.7	.28	E.12	<.2	E.18
beta-Sitosterol, unfltrd	µg/L	86	69	80	120	14.1	7.31	2.57	4.18
beta-Stigmastanol, unfltrd	µg/L	86	41	48	E13.8	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	87	3	3	E123	--	--	--	--
Bisphenol A, unfltrd	µg/L	74	49	66	27.2	.66	E.29	<.4	.45
Bromacil, unfltrd	µg/L	82	13	16	16.6	--	--	--	--
Caffeine, unfltrd	µg/L	82	82	100	E141	E8.91	E4.64	E1.91	E3.98
Camphor, unfltrd	µg/L	87	79	91	40.5	.50	.29	E.14	.28
Carbaryl, unfltrd	µg/L	86	8	9	E6.69	--	--	--	--
Carbazole, unfltrd	µg/L	85	59	69	5.62	.37	.20	<.2	.22
Chlorpyrifos, unfltrd	µg/L	78	2	3	E4.81	--	--	--	--
Cholesterol, unfltrd	µg/L	87	82	94	E470	E134	E50.7	E21.0	E46.4
Cotinine, unfltrd	µg/L	80	6	8	E4.18	--	--	--	--
DEET, unfltrd	µg/L	86	65	76	5.97	.83	E.38	E.14	.41
Diazinon, unfltrd	µg/L	86	1	1	E.36	--	--	--	--
Dichlorvos, unfltrd	µg/L	86	11	13	1.65	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	80	52	65	23.8	4.65	E2.16	<3.2	E2.56

Table 10. Statistical summaries for all water-quality constituents measured at the combined sewer overflow sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; CSO, combined sewer overflow; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; <, less than; --, not computed; P, phosphorus; µg/L, micrograms per liter; E, estimated; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All CSO sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	68	4	6	B.81	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	87	66	76	E6.02	E1.15	E0.74	B0.28	E0.57
d-Limonene, unfltrd	µg/L	87	85	98	E144	E2.09	E.72	E.25	E.71
Ethoxynonylphenol (all isomers), unfltrd	µg/L	83	51	61	49.8	10.7	2.51	<2.0	3.56
Ethoxyoctylphenol, unfltrd	µg/L	85	63	74	5.95	E.81	E.50	<1.0	E.63
Fluoranthene, unfltrd	µg/L	86	75	87	E39.7	E1.78	E.79	E.36	E.72
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	85	29	34	.35	--	--	--	--
Indole, unfltrd	µg/L	87	61	70	E12.4	E.14	E.07	<.2	E.11
Isoborneol, unfltrd	µg/L	86	30	35	1.77	--	--	--	--
Isophorone, unfltrd	µg/L	86	29	34	.35	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	86	28	33	E.50	--	--	--	--
Isoquinoline, unfltrd	µg/L	86	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	87	82	94	11.9	2.24	1.17	.56	1.03
Metalaxyl, unfltrd	µg/L	85	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	86	72	84	E11.1	E.41	E.21	E.07	E.19
Metolachlor, unfltrd	µg/L	84	13	15	142	--	--	--	--
Naphthalene, unfltrd	µg/L	87	72	83	E4.38	E.19	E.10	E.05	E.11
p-Cresol, unfltrd	µg/L	87	80	92	E170	E3.03	E.37	E.13	E.68
Pentachlorophenol, unfltrd	µg/L	83	23	28	E41.8	--	--	--	--
Phenanthrene, unfltrd	µg/L	87	78	90	40.3	.74	.38	.21	.41
Phenol, unfltrd	µg/L	87	56	64	E28.9	E.94	E.38	<.24	E.44
Prometon, unfltrd	µg/L	86	11	13	23.5	--	--	--	--
Pyrene, unfltrd	µg/L	80	59	74	E38.6	E1.33	E.49	<.2	E.47
Tetrachloroethene, unfltrd	µg/L	86	55	64	1.20	E.22	E.12	<.4	E.08
Tribromomethane (bromoform), unfltrd	µg/L	86	1	1	E.03	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	86	32	37	31.6	--	--	--	--
Triclosan, unfltrd	µg/L	84	79	94	E7.68	E2.75	E1.18	E.51	E1.09
Triethyl citrate, unfltrd	µg/L	86	40	47	.73	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	86	58	67	1.42	E.16	E.11	<.2	E.13
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	86	80	93	13.1	2.97	1.42	.63	1.29
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	85	49	58	1.02	E.18	E.08	<.2	E.13
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	85	60	71	68.6	.20	E.14	<.2	E.17
Escherichia coli, unfltrd	MPN/100 mL	109	108	99	24,000,000	1,500,000	620,000	190,000	490,000

Table 11. Statistical summaries for all water-quality constituents measured at the stormwater outfall sites as part of the combined sewer overflow study in Omaha, Nebraska.

[Field identifiers from table 1 and fig. 1; SWO, stormwater outfall; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site SW02					Site SW01				
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	6	6	100	496	140	4	4	100	1,030	186
Turbidity, unfltrd	NTU	6	6	100	188	83	4	4	100	731	450
Chemical oxygen demand, unfltrd	mg/L	6	5	83	362	77	4	4	100	191	122
Biochemical oxygen demand, unfltrd	mg/L	6	2	33	70	--	7	3	43	87	--
Hardness, unfltrd	mg/L as $CaCO_3$	6	6	100	150	50	4	4	100	300	120
Total suspended solids, unfltrd	mg/L	6	6	100	214	92	4	4	100	802	596
Calcium, unfltrd	mg/L	6	6	100	55	18	4	4	100	100	42
Magnesium, unfltrd	mg/L	6	3	50	4	--	4	4	100	11	4
Chloride, unfltrd	mg/L	6	6	100	33	8	4	4	100	6	4
Nitrite, fltrd	mg/L as N	6	6	100	.13	.04	4	4	100	.03	.02
Nitrate, fltrd	mg/L as N	6	6	100	4.08	.78	4	4	100	.81	.56
Nitrite plus nitrate, fltrd	mg/L as N	6	6	100	4.21	.82	4	4	100	.83	.59
Ammonia, fltrd	mg/L as N	6	6	100	1.15	.42	4	3	75	.61	.12
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	6	6	100	13.5	2.49	4	4	100	4.06	3.06
Total phosphorus, fltrd	mg/L	6	6	100	.84	.31	4	4	100	1.38	1.03
Orthophosphate, fltrd	mg/L as P	6	6	100	.28	.13	4	4	100	.23	.14
Antimony, unfltrd	µg/L	6	6	100	5.87	1.70	4	4	100	1.35	1.19
Arsenic, unfltrd	µg/L	6	6	100	4.31	2.29	4	4	100	13.2	8.52
Barium, unfltrd	µg/L	6	6	100	110	49.5	4	4	100	346	204
Beryllium, unfltrd	µg/L	6	1	17	.20	--	4	4	100	.83	.50
Cadmium, unfltrd	µg/L	6	6	100	.65	.30	4	4	100	1.54	.86
Chromium, unfltrd	µg/L	6	6	100	8.00	4.24	4	4	100	15.9	10.9
Cobalt, unfltrd	µg/L	6	6	100	2.89	1.18	4	4	100	11.5	6.25
Copper, unfltrd	µg/L	6	6	100	46.5	12.5	4	4	100	40.8	28.0
Lead, unfltrd	µg/L	6	6	100	22.1	9.01	4	4	100	135	66.9
Mercury, unfltrd	µg/L	6	6	100	.06	.02	4	4	100	.11	.07
Nickel, unfltrd	µg/L	6	6	100	11.9	4.05	4	4	100	28.2	17.4
Selenium, unfltrd	µg/L	6	6	100	1.86	.46	4	4	100	.99	.53
Silver, unfltrd	µg/L	6	6	100	.24	.08	4	4	100	.52	.23
Thallium, unfltrd	µg/L	6	1	17	E.09	--	4	4	100	.36	.20
Uranium, unfltrd	µg/L	6	6	100	.62	.33	4	4	100	1.84	1.16
Vanadium, unfltrd	µg/L	6	6	100	12.8	5.25	4	4	100	30.6	18.5
Zinc, unfltrd	µg/L	6	6	100	442	156	4	4	100	216	142
1,4-Dichlorobenzene, unfltrd	µg/L	6	1	17	E.02	--	4	0	0	--	--
1-Methylnaphthalene, unfltrd	µg/L	6	2	33	E.08	--	4	1	25	E.03	--

Table 11. Statistical summaries for all water-quality constituents measured at the stormwater outfall sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; SWO, stormwater outfall; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site SW02					Site SW01				
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	6	1	17	E0.06	--	4	1	25	E0.05	--
2-Methylnaphthalene, unfltrd	µg/L	6	3	50	E.10	--	4	2	50	E.07	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	6	5	83	E974	E4.12	4	4	100	E522	E22.4
3-*beta*-Coprostanol, unfltrd	µg/L	6	1	17	B3.29	--	4	0	0	--	--
3-Methyl-1H-indole, unfltrd	µg/L	6	0	0	--	--	4	2	50	E.07	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
4-Cumylphenol, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
4-*n*-Octylphenol, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
4-Nonylphenol, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	6	1	17	E1.26	--	4	1	25	B.60	--
5-Methyl-1CD-benzotriazole, unfltrd	µg/L	5	1	20	3.20	--	4	0	0	--	--
9,10-Anthraquinone, unfltrd	µg/L	6	6	100	6.29	1.91	4	3	75	.55	.25
Acetophenone, unfltrd	µg/L	6	5	83	3.15	.61	4	0	0	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Anthracene, unfltrd	µg/L	6	4	67	E.62	E.07	4	4	100	.41	E.14
Atrazine, unfltrd	µg/L	6	3	50	--	--	4	4	100	E.51	E.15
BDE congener 47, unfltrd	µg/L	5	0	0	--	--	4	0	0	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	6	6	100	E1.00	E.34	4	4	100	E.29	E.26
Benzophenone, unfltrd	µg/L	6	1	17	.37	--	4	1	25	E.091	--
beta-Sitosterol, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
beta-Stigmastanol, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Bisphenol A, unfltrd	µg/L	6	4	67	.45	E.31	4	3	75	1.81	E.26
Bromacil, unfltrd	µg/L	6	3	50	8.46	--	4	4	100	39.80	2.88
Caffeine, unfltrd	µg/L	6	6	100	15.6	1.92	4	4	100	.71	.38
Camphor, unfltrd	µg/L	6	2	33	E.14	--	4	3	75	E.14	E.09
Carbaryl, unfltrd	µg/L	6	0	0	--	--	4	1	25	E.13	--
Carbazole, unfltrd	µg/L	6	6	100	2.95	.53	4	4	100	.40	E.14
Chlorpyrifos, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Cholesterol, unfltrd	µg/L	6	1	17	B3.12	--	4	1	25	B2.43	--
Cotinine, unfltrd	µg/L	6	1	17	1.72	--	4	0	0	--	--
DEET, unfltrd	µg/L	6	4	67	.51	E.25	4	3	75	.77	E.29
Diazinon, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Dichlorvos, unfltrd	µg/L	6	1	17	E.17	--	4	0	0	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	6	1	17	E2.14	--	4	0	0	--	--

Table 11. Statistical summaries for all water-quality constituents measured at the stormwater outfall sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; SWO, stormwater outfall; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site SWO2					Site SWO1				
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	6	2	33	1.58	--	4	0	0	--	--
Diethyl phthalate, unfltrd	µg/L	6	1	17	E1.12	--	4	0	0	--	--
d-Limonene, unfltrd	µg/L	6	1	17	E.32	--	4	1	25	E0.17	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	6	2	33	E1.35	--	4	0	0	--	--
Ethoxyoctylphenol, unfltrd	µg/L	6	5	83	1.27	E0.49	4	1	25	E.50	--
Fluoranthene, unfltrd	µg/L	6	6	100	E3.75	E1.22	4	4	100	E1.27	E.76
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Indole, unfltrd	µg/L	6	2	33	E.061	--	4	0	0	--	--
Isoborneol, unfltrd	µg/L	6	0	0	--	--	4	1	25	.29	--
Isophorone, unfltrd	µg/L	6	4	67	.33	E.09	4	3	75	E.08	E.05
Isopropylbenzene, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Isoquinoline, unfltrd	µg/L	6	1	17	E.09	--	4	0	0	--	--
Menthol, unfltrd	µg/L	6	1	17	E.15	--	4	0	0	--	--
Metalaxyl, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Methyl salicylate, unfltrd	µg/L	6	3	50	E.12	--	4	2	50	E.25	--
Metolachlor, unfltrd	µg/L	6	1	17	E.12	--	4	4	100	E.16	E.06
Naphthalene, unfltrd	µg/L	6	3	50	E.15	--	4	2	50	E.09	--
p-Cresol, unfltrd	µg/L	6	6	100	E.85	E.20	4	3	75	E.29	E.11
Pentachlorophenol, unfltrd	µg/L	6	0	0	--	--	3	0	0	--	--
Phenanthrene, unfltrd	µg/L	6	6	100	2.99	.54	4	4	100	.93	.38
Phenol, unfltrd	µg/L	6	4	67	E1.14	B.33	4	1	25	B.28	--
Prometon, unfltrd	µg/L	6	0	0	--	--	4	1	25	E.12	--
Pyrene, unfltrd	µg/L	6	6	100	E2.44	E.81	4	4	100	E1.18	E.64
Tetrachloroethene, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Tribromomethane (bromoform), unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Tributyl phosphate, unfltrd	µg/L	6	0	0	E.11	--	4	0	0	--	--
Triclosan, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Triethyl citrate, unfltrd	µg/L	6	0	0	--	--	4	0	0	--	--
Triphenyl phosphate, unfltrd	µg/L	6	6	100	E4.62	E.32	4	2	50	E.10	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	6	5	83	1.40	.43	4	3	75	.40	E.18
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	6	6	100	.64	E.19	4	4	100	E.19	E.10
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	6	6	100	.65	.30	4	2	50	E.09	--
Escherichia coli, unfltrd	MPN/100 mL	6	5	83	38,000	8,900	7	7	100	1,200,000	130,000

Table 11. Statistical summaries for all water-quality constituents measured at the stormwater outfall sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; SWO, stormwater outfall; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All SWO sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	10	10	100	1,030	164	117	96	157
Turbidity, unfltrd	NTU	10	10	100	731	377	173	93	163
Chemical oxygen demand, unfltrd	mg/L	10	9	90	362	160	91	54	93
Biochemical oxygen demand, unfltrd	mg/L	13	5	38	87	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	10	10	100	300	150	69	34	72
Total suspended solids, unfltrd	mg/L	10	10	100	802	509	177	103	194
Calcium, unfltrd	mg/L	10	10	100	100	52	25	12	25
Magnesium, unfltrd	mg/L	10	7	70	11	4	B2	<2	B2
Chloride, unfltrd	mg/L	10	10	100	33	8	6	4	6
Nitrite, fltrd	mg/L as N	10	10	100	.13	.04	.02	.02	.03
Nitrate, fltrd	mg/L as N	10	10	100	4.08	.79	.59	.41	.69
Nitrite plus nitrate, fltrd	mg/L as N	10	10	100	4.21	.81	.62	.43	.72
Ammonia, fltrd	mg/L as N	10	9	90	1.15	.54	.39	.20	.26
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	10	10	100	13.5	4.04	2.36	1.56	2.71
Total phosphorus, fltrd	mg/L	10	10	100	1.38	.84	.80	.30	.50
Orthophosphate, fltrd	mg/L as P	10	10	100	.28	.22	.16	.09	.13
Antimony, unfltrd	µg/L	10	10	100	5.87	1.43	1.28	1.10	1.48
Arsenic, unfltrd	µg/L	10	10	100	13.2	7.10	3.92	2.20	3.87
Barium, unfltrd	µg/L	10	10	100	346	156	97.8	50.3	87.1
Beryllium, unfltrd	µg/L	10	5	50	.83	--	--	--	--
Cadmium, unfltrd	µg/L	10	10	100	1.54	.65	.64	.29	.46
Chromium, unfltrd	µg/L	10	10	100	15.9	9.43	7.89	6.63	6.18
Cobalt, unfltrd	µg/L	10	10	100	11.5	4.69	2.77	1.16	2.30
Copper, unfltrd	µg/L	10	10	100	46.5	29.8	22.1	11.0	17.3
Lead, unfltrd	µg/L	10	10	100	135	49.0	20.3	8.38	20.1
Mercury, unfltrd	µg/L	10	10	100	.11	.06	.03	.02	.04
Nickel, unfltrd	µg/L	10	10	100	28.2	13.7	9.99	3.84	7.24
Selenium, unfltrd	µg/L	10	10	100	1.86	.76	.37	.30	.49
Silver, unfltrd	µg/L	10	10	100	.52	.23	.09	.08	.12
Thallium, unfltrd	µg/L	10	5	50	.36	--	--	--	--
Uranium, unfltrd	µg/L	10	10	100	1.84	.94	.56	.34	.55
Vanadium, unfltrd	µg/L	10	10	100	30.6	14.6	12.1	4.94	8.69
Zinc, unfltrd	µg/L	10	10	100	442	200	129	109	150
1,4-Dichlorobenzene, unfltrd	µg/L	10	1	10	E.02	--	--	--	--

Table 11. Statistical summaries for all water-quality constituents measured at the stormwater outfall sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; SWO, stormwater outfall; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All SWO sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
1-Methylnaphthalene, unfltrd	µg/L	10	3	30	E0.08	--	--	--	--
2,6-Dimethylnaphthalene, unfltrd	µg/L	10	2	20	E.06	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	10	5	50	E.10	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	10	9	90	E974	E55.6	E11.8	E0.94	E8.11
3-*beta*-Coprostanol, unfltrd	µg/L	10	1	10	B3.29	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	10	2	20	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	10	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	10	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	10	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	10	0	0	--	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	10	2	20	E1.26	--	--	--	--
5-Methyl-1CD-benzotriazole, unfltrd	µg/L	9	1	11	3.20	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	10	9	90	6.29	2.79	.72	.35	.84
Acetophenone, unfltrd	µg/L	10	5	50	3.15	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	10	0	0	--	--	--	--	--
Anthracene, unfltrd	µg/L	10	8	80	E.62	E.24	E.07	E.04	E.09
Atrazine, unfltrd	µg/L	10	7	70	E.51	E.26	E.11	E.07	E.12
BDE congener 47, unfltrd	µg/L	9	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	10	10	100	E1.00	E.38	E.27	E.23	E.31
Benzophenone, unfltrd	µg/L	10	2	20	.37	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	10	0	0	--	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	10	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	10	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	10	7	70	1.81	.41	E.23	E.22	E.29
Bromacil, unfltrd	µg/L	10	7	70	39.8	1.84	.80	<.2	.89
Caffeine, unfltrd	µg/L	10	10	100	15.6	2.36	.72	.40	1.00
Camphor, unfltrd	µg/L	10	5	50	E.14	--	--	--	--
Carbaryl, unfltrd	µg/L	10	1	10	E.13	--	--	--	--
Carbazole, unfltrd	µg/L	10	10	100	2.95	.68	.27	E.14	.31
Chlorpyrifos, unfltrd	µg/L	10	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	10	2	20	B3.12	--	--	--	--
Cotinine, unfltrd	µg/L	10	1	10	1.72	--	--	--	--
DEET, unfltrd	µg/L	10	7	70	.77	E.39	E.29	<.4	E.27
Diazinon, unfltrd	µg/L	10	0	0	--	--	--	--	--

Table 11. Statistical summaries for all water-quality constituents measured at the stormwater outfall sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; SWO, stormwater outfall; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celsius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All SWO sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Dichlorvos, unfltrd	µg/L	10	1	10	E0.17	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	10	1	10	E2.14	--	--	--	--
Diethoxyoctylphenol, unfltrd	µg/L	10	2	20	1.58	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	10	1	10	E1.12	--	--	--	--
d-Limonene, unfltrd	µg/L	10	2	20	E.32	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	10	2	20	E1.35	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	10	6	60	1.27	E0.50	E0.50	<1	E0.48
Fluoranthene, unfltrd	µg/L	10	10	100	E3.75	E1.50	E.87	E.54	E1.01
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	10	0	0	--	--	--	--	--
Indole, unfltrd	µg/L	10	2	20	E.061	--	--	--	--
Isoborneol, unfltrd	µg/L	10	1	10	.29	--	--	--	--
Isophorone, unfltrd	µg/L	10	7	70	.33	E.08	E.08	<.2	E.07
Isopropylbenzene, unfltrd	µg/L	10	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	10	1	10	E.09	--	--	--	--
Menthol, unfltrd	µg/L	10	1	10	E.015	--	--	--	--
Metalaxyl, unfltrd	µg/L	10	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	10	5	50	E.25	--	--	--	--
Metolachlor, unfltrd	µg/L	10	5	50	E.16	--	--	--	--
Naphthalene, unfltrd	µg/L	10	5	50	E.15	--	--	--	--
p-Cresol, unfltrd	µg/L	10	9	90	E.85	E.28	E.20	E.08	E.16
Pentachlorophenol, unfltrd	µg/L	9	0	0	--	--	--	--	--
Phenanthrene, unfltrd	µg/L	10	10	100	2.99	.85	.40	.22	.47
Phenol, unfltrd	µg/L	10	5	50	E1.14	--	--	--	--
Prometon, unfltrd	µg/L	10	1	10	E.12	--	--	--	--
Pyrene, unfltrd	µg/L	10	10	100	E2.44	E1.14	E.62	E.45	E.74
Tetrachloroethene, unfltrd	µg/L	10	0	0	--	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	10	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	10	0	0	--	--	--	--	--
Triclosan, unfltrd	µg/L	10	0	0	--	--	--	--	--
Triethyl citrate, unfltrd	µg/L	10	0	0	--	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	10	8	80	E4.62	E.21	E.10	E.10	E.19
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	10	8	80	1.40	1.01	.30	E.17	.30
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	10	10	100	.64	.22	E.13	E.08	E.15
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	10	8	80	.65	.43	E.12	E.06	E.16
Escherichia coli, unfltrd	MPN/100 mL	13	12	92	1,200,000	150,000	24,000	12,000	38,000

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CC4					Site CC2							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	4	4	100	1,190	948	32	32	100	1,490	859	393	213	396
Turbidity, unfltrd	NTU	4	4	100	22	10	29	29	100	459	136	22	10	28
Chemical oxygen demand, unfltrd	mg/L	4	2	50	64	--	27	25	93	852	69	51	B35	B54
Biochemical oxygen demand, unfltrd	mg/L	4	1	25	B19	--	31	4	13	405	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	4	4	100	600	410	30	30	100	460	360	220	87	180
Total suspended solids, unfltrd	mg/L	4	1	25	25	--	29	26	90	2,140	240	26	9	46
Calcium, unfltrd	mg/L	4	4	100	182	114	30	30	100	138	100	66	27	51
Magnesium, unfltrd	mg/L	4	4	100	34	29	30	30	100	37	24	12	4	11
Chloride, unfltrd	mg/L	4	4	100	88	69	30	30	100	230	63	47	18	35
Nitrite, fltrd	mg/L as N	4	4	100	.18	.07	30	29	97	.20	.08	.03	.02	.04
Nitrate, fltrd	mg/L as N	4	4	100	2.91	1.83	29	29	100	1.87	1.44	1.01	.61	.89
Nitrite plus nitrate, fltrd	mg/L as N	4	4	100	3.09	1.91	30	30	100	1.95	1.48	1.09	.61	.88
Ammonia, fltrd	mg/L as N	4	3	75	.27	.08	30	24	80	1.21	.19	.09	B.03	.08
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	4	4	100	3.94	2.56	30	30	100	4.08	3.01	2.37	1.88	2.26
Total phosphorus, fltrd	mg/L	4	4	100	.25	.14	30	30	100	1.49	.49	.34	.19	.33
Orthophosphate, fltrd	mg/L as P	4	4	100	.06	.04	30	30	100	.22	.14	.11	.09	.10
Antimony, unfltrd	µg/L	4	4	100	.56	.43	30	30	100	1.38	.78	.59	.44	.61
Arsenic, unfltrd	µg/L	4	4	100	12.4	8.48	30	30	100	14.8	5.96	4.66	3.84	4.99
Barium, unfltrd	µg/L	4	4	100	192	174	30	30	100	502	221	165	127	169
Beryllium, unfltrd	µg/L	4	0	0	--	--	30	14	47	1.27	--	--	--	--
Cadmium, unfltrd	µg/L	4	4	100	.11	.05	30	30	100	1.97	.25	.12	.06	.14
Chromium, unfltrd	µg/L	4	4	100	5.75	1.21	30	28	93	30.8	5.91	1.56	.62	1.99
Cobalt, unfltrd	µg/L	4	4	100	.82	.43	30	30	100	16.3	2.90	1.23	.48	1.34
Copper, unfltrd	µg/L	4	3	75	5.79	3.14	30	29	97	67.5	11.7	5.58	3.25	6.21
Lead, unfltrd	µg/L	4	4	100	2.16	.58	30	30	100	91.4	10.7	2.22	.85	2.96
Mercury, unfltrd	µg/L	4	1	25	.02	--	30	23	77	.09	.02	B.01	B.01	B.01
Nickel, unfltrd	µg/L	4	4	100	4.57	2.57	30	30	100	42.6	8.10	4.27	2.65	4.94
Selenium, unfltrd	µg/L	4	4	100	2.35	1.18	30	30	100	3.11	1.82	1.02	.55	1.01
Silver, unfltrd	µg/L	4	4	100	1.07	.23	30	27	90	16.9	.68	.19	.08	.27
Thallium, unfltrd	µg/L	4	0	0	--	--	30	8	27	.43	--	--	--	--
Uranium, unfltrd	µg/L	4	4	100	3.15	2.47	30	30	100	4.72	3.06	1.73	.77	1.43
Vanadium, unfltrd	µg/L	4	4	100	3.30	E1.47	30	29	97	43.4	10.7	3.11	2.12	4.57
Zinc, unfltrd	µg/L	4	4	100	18.8	8.44	30	29	97	845	77.3	42.5	10.6	30.3
1,4-Dichlorobenzene, unfltrd	µg/L	4	0	0	--	--	30	4	13	E.04	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	4	0	0	--	--	30	3	10	E.04	--	--	--	--
2,6-Dimethylnaphthalene, unfltrd	µg/L	4	0	0	--	--	30	4	13	E.05	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CC4					Site CC2							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2-Methylnaphthalene, unfltrd	µg/L	4	0	0	--	--	30	9	30	E0.05	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	4	2	50	E1.28	--	30	24	80	E107	E11.9	E2.78	E0.60	E1.81
3-*beta*-Coprostanol, unfltrd	µg/L	4	0	0	--	--	30	2	7	E8.11	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	4	1	25	E.08	--	30	7	23	E.12	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	4	0	0	--	--	29	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	4	0	0	--	--	30	1	3	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	4	0	0	--	--	30	1	3	E.01	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	4	0	0	--	--	30	1	3	B1.90	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	4	0	0	--	--	30	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	4	3	75	E1.28	E0.35	30	16	53	E11.6	E1.37	E.35	<1.6	E.70
9,10-Anthraquinone, unfltrd	µg/L	4	4	100	E.13	E.09	30	27	90	6.12	1.26	.42	E.10	.39
Acetophenone, unfltrd	µg/L	4	0	0	--	--	30	13	43	.76	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	4	0	0	--	--	30	1	3	.20	--	--	--	E.11
Anthracene, unfltrd	µg/L	4	1	25	E.015	--	30	10	33	E.39	--	--	--	--
Atrazine, unfltrd	µg/L	4	2	50	E.23	--	30	17	57	E4.56	E.08	E.08	<.2	E.08
BDE congener 47, unfltrd	µg/L	4	0	0	--	--	27	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	4	1	25	E.26	--	30	15	50	E6.96	--	--	--	--
Benzophenone, unfltrd	µg/L	4	2	50	E.085	--	30	6	20	E.077	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	4	0	0	--	--	30	7	23	B3.54	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	4	0	0	--	--	30	1	3	B2.14	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	4	0	0	--	--	30	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	4	1	25	E.071	--	30	17	57	.83	E.22	E.22	<.4	E.17
Bromacil, unfltrd	µg/L	4	0	0	--	--	30	2	7	.33	--	--	--	--
Caffeine, unfltrd	µg/L	4	3	75	E.18	E.12	30	26	87	E4.61	E.71	E.33	E.10	E.28
Camphor, unfltrd	µg/L	4	1	25	E.040	--	30	20	67	.33	E.13	E.09	<.2	E.09
Carbaryl, unfltrd	µg/L	4	1	25	E.15	--	30	15	50	E.78	--	--	--	--
Carbazole, unfltrd	µg/L	4	2	50	E.20	--	30	24	80	2.88	.25	E.13	E.09	E.13
Chlorpyrifos, unfltrd	µg/L	4	0	0	--	--	30	1	3	E.076	--	--	--	--
Cholesterol, unfltrd	µg/L	4	0	0	--	--	30	5	17	E5.75	--	--	--	--
Cotinine, unfltrd	µg/L	4	0	0	--	--	30	2	7	E.23	--	--	--	--
DEET, unfltrd	µg/L	4	3	75	0.57	E.16	30	25	83	1.02	E.25	E.15	E.12	E.18
Diazinon, unfltrd	µg/L	4	1	25	E.34	--	30	7	23	E.31	--	--	--	--
Dichlorvos, unfltrd	µg/L	4	0	0	--	--	30	7	23	E1.88	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	4	3	75	E1.34	E.69	30	5	17	E2.35	--	--	--	--
Diethoxyoctylphenol, unfltrd	µg/L	4	0	0	--	--	30	2	7	E1.11	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CC4					Site CC2							
		Total n	Number of detects	Percent detects	Maximum	Geometric mean	Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethyl phthalate, unfltrd	µg/L	4	0	0	--	--	30	5	17	1.19	--	--	--	--
d-Limonene, unfltrd	µg/L	4	0	0	--	--	30	2	7	E.17	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	4	1	25	E1.35	--	30	4	13	E1.68	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	4	1	25	E.50	--	30	9	30	1.97	--	--	--	--
Fluoranthene, unfltrd	µg/L	4	4	100	E.46	E0.07	30	22	73	E18.3	E0.46	E0.16	E0.08	E0.21
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	4	1	25	E.22	--	29	5	17	E.088	--	--	--	--
Indole, unfltrd	µg/L	4	0	0	--	--	30	9	30	E.13	--	--	--	--
Isoborneol, unfltrd	µg/L	4	0	0	--	--	30	1	3	1.42	--	--	--	--
Isophorone, unfltrd	µg/L	4	2	50	E.028	--	29	14	48	E.081	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	4	0	0	--	--	30	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	4	0	0	--	--	30	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	3	0	0	--	--	29	8	28	.91	--	--	--	--
Metalaxyl, unfltrd	µg/L	4	0	0	--	--	30	1	3	E.13	--	--	--	--
Methyl salicylate, unfltrd	µg/L	4	1	25	E.07	--	30	12	40	E2.04	--	--	--	--
Metolachlor, unfltrd	µg/L	4	2	50	E.12	--	30	4	13	1.41	--	--	--	--
Naphthalene, unfltrd	µg/L	4	0	0	--	--	30	5	17	E.12	--	--	--	--
p-Cresol, unfltrd	µg/L	4	4	100	E.14	E.06	30	21	70	E.78	E.14	E.08	<.2	E.09
Pentachlorophenol, unfltrd	µg/L	4	2	50	E2.15	--	30	6	20	E2.27	--	--	--	--
Phenanthrene, unfltrd	µg/L	4	1	25	E.10	--	30	21	70	8.37	E.19	E.07	<.2	E.11
Phenol, unfltrd	µg/L	4	1	25	B.30	--	30	9	30	E.92	--	--	--	--
Prometon, unfltrd	µg/L	4	1	25	E.08	--	30	9	30	E.10	--	--	--	--
Pyrene, unfltrd	µg/L	4	4	100	E.39	E.05	30	24	80	E12.8	E.30	E.08	E.05	E.15
Tetrachloroethene, unfltrd	µg/L	4	0	0	--	--	30	0	0	--	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	4	1	25	E.04	--	30	1	3	E0.015	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	4	0	0	--	--	30	6	20	E.17	--	--	--	--
Triclosan, unfltrd	µg/L	4	2	50	E.09	--	30	7	23	E.19	--	--	--	--
Triethyl citrate, unfltrd	µg/L	4	2	50	E.22	--	30	3	10	E.15	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	4	2	50	E.10	--	30	16	53	E.10	E.10	E.08	<.2	E.06
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	4	4	100	E10.7	E.97	30	26	87	E306	E.95	E.46	E.27	E.55
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	4	4	100	.20	E.07	30	17	57	E.14	E.09	E.08	<.2	E.08
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	4	4	100	E.08	E.04	30	13	43	E.11	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	4	4	100	6,900	1,100	33	33	100	130,000	28,000	9,600	2,000	7,100

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	36	36	100	1,280	737	603	415	534
Turbidity, unfltrd	NTU	35	35	100	514	121	64	11	41
Chemical oxygen demand, unfltrd	mg/L	32	28	88	552	128	61	B34	68
Biochemical oxygen demand, unfltrd	mg/L	36	16	44	105	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	36	36	100	630	350	240	180	240
Total suspended solids, unfltrd	mg/L	35	30	86	4,440	214	78	9	58
Calcium, unfltrd	mg/L	36	36	100	225	97	71	54	70
Magnesium, unfltrd	mg/L	36	36	100	34	20	16	12	15
Chloride, unfltrd	mg/L	36	36	100	185	71	53	30	44
Nitrite, fltrd	mg/L as N	35	35	100	.14	.07	.04	.02	.04
Nitrate, fltrd	mg/L as N	34	34	100	3.13	1.56	.97	.56	.95
Nitrite plus nitrate, fltrd	mg/L as N	35	35	100	3.22	1.63	.99	.58	.91
Ammonia, fltrd	mg/L as N	35	28	80	1.50	.36	.19	.06	.12
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	36	36	100	8.18	4.28	2.78	1.76	2.73
Total phosphorus, fltrd	mg/L	36	36	100	4.47	.66	.44	.24	.45
Orthophosphate, fltrd	mg/L as P	35	35	100	.25	.19	.16	.11	.13
Antimony, unfltrd	µg/L	36	36	100	2.33	1.29	.78	.68	.91
Arsenic, unfltrd	µg/L	36	36	100	23.5	6.25	4.59	3.85	5.18
Barium, unfltrd	µg/L	36	36	100	1,010	201	169	135	180
Beryllium, unfltrd	µg/L	36	19	53	2.33	E.25	E.14	<.26	E.21
Cadmium, unfltrd	µg/L	36	35	97	3.66	.29	.13	.05	.14
Chromium, unfltrd	µg/L	36	32	89	51.2	7.16	2.27	.86	2.43
Cobalt, unfltrd	µg/L	36	36	100	31.1	2.89	1.31	.62	1.42
Copper, unfltrd	µg/L	36	33	92	137	14.8	7.38	B3.01	7.85
Lead, unfltrd	µg/L	36	36	100	220	14.9	7.08	1.02	5.10
Mercury, unfltrd	µg/L	36	27	75	.14	.03	.02	B.01	.02
Nickel, unfltrd	µg/L	36	36	100	77.1	7.97	4.37	3.06	5.74
Selenium, unfltrd	µg/L	36	36	100	5.65	1.83	1.22	.84	1.28
Silver, unfltrd	µg/L	36	28	78	3.45	.28	.07	.02	.07
Thallium, unfltrd	µg/L	36	7	19	.69	--	--	--	--
Uranium, unfltrd	µg/L	36	36	100	5.16	3.39	2.33	1.57	2.19
Vanadium, unfltrd	µg/L	36	35	97	81.6	8.44	4.03	2.28	5.13
Zinc, unfltrd	µg/L	36	36	100	835	69.5	36.8	9.88	29.9
1,4-Dichlorobenzene, unfltrd	µg/L	34	23	68	E.18	E.08	E.03	<.2	E.04
1-Methylnaphthalene, unfltrd	µg/L	34	9	26	E.18	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2’,4,4’-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	34	7	21	E.11	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	34	13	38	E.17	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	34	26	76	E60.0	E3.78	E1.48	E0.48	E1.22
3-*beta*-Coprostanol, unfltrd	µg/L	34	19	56	E33.00	E5.98	B2.29	<1.8	B1.96
3-Methyl-1H-indole, unfltrd	µg/L	34	18	53	.55	E.10	E.07	<.2	E.07
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	33	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	34	1	3	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	34	1	3	E.11	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	34	6	18	E3.76	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	34	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	32	20	63	E2.50	E.99	E.43	<1.6	E.56
9,10-Anthraquinone, unfltrd	µg/L	34	29	85	6.40	.61	.39	E.08	.30
Acetophenone, unfltrd	µg/L	34	15	44	.97	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	33	3	9	E.20	--	--	--	E.11
Anthracene, unfltrd	µg/L	34	14	41	E.84	--	--	--	--
Atrazine, unfltrd	µg/L	34	21	62	E1.19	E.08	E.08	<.2	E.08
BDE congener 47, unfltrd	µg/L	28	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	34	20	59	E8.87	E.23	E.07	<.2	E.14
Benzophenone, unfltrd	µg/L	34	7	21	.21	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	34	15	44	E9.75	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	34	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	34	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	34	22	65	.52	E.36	E.22	<.4	E.22
Bromacil, unfltrd	µg/L	34	5	15	.50	--	--	--	--
Caffeine, unfltrd	µg/L	34	31	91	E4.63	E1.36	E.96	E.23	E.60
Camphor, unfltrd	µg/L	34	28	82	.28	E.15	E.10	E.07	E.09
Carbaryl, unfltrd	µg/L	34	13	38	E.39	--	--	--	--
Carbazole, unfltrd	µg/L	34	25	74	2.97	E.18	E.12	E.12	E.13
Chlorpyrifos, unfltrd	µg/L	34	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	34	21	62	E23.60	E7.31	B2.59	<1.8	B2.27
Cotinine, unfltrd	µg/L	33	5	15	E.35	--	--	--	--
DEET, unfltrd	µg/L	34	29	85	1.72	E.35	E.22	E.14	E.25
Diazinon, unfltrd	µg/L	34	4	12	E.24	--	--	--	--
Dichlorvos, unfltrd	µg/L	34	8	24	E3.08	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	34	14	41	3.54	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site CC1 Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	34	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	34	17	50	1.08	--	--	--	--
d-Limonene, unfltrd	µg/L	34	15	44	E.65	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	34	12	35	E2.66	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	34	13	38	1.00	--	--	--	--
Fluoranthene, unfltrd	µg/L	34	28	82	E28.6	E0.68	E0.26	E0.08	E0.26
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	33	23	70	.60	E.12	E.11	<.2	E.09
Indole, unfltrd	µg/L	34	14	41	E.31	--	--	--	--
Isoborneol, unfltrd	µg/L	33	1	3	E.11	--	--	--	--
Isophorone, unfltrd	µg/L	34	16	47	E.073	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	34	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	33	2	6	E.09	--	--	--	--
Menthol, unfltrd	µg/L	33	22	67	1.35	.51	.21	<.2	E.17
Metalaxyl, unfltrd	µg/L	34	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	34	13	38	E2.79	--	--	--	--
Metolachlor, unfltrd	µg/L	34	5	15	E.12	--	--	--	--
Naphthalene, unfltrd	µg/L	34	12	35	E.84	--	--	--	--
p-Cresol, unfltrd	µg/L	34	22	65	E2.53	E.15	E.08	<.2	E.14
Pentachlorophenol, unfltrd	µg/L	34	4	12	B1.09	--	--	--	--
Phenanthrene, unfltrd	µg/L	34	22	65	11.2	.29	E.09	<.2	E.17
Phenol, unfltrd	µg/L	34	6	18	E1.30	--	--	--	--
Prometon, unfltrd	µg/L	34	16	47	.41	--	--	--	--
Pyrene, unfltrd	µg/L	34	28	82	E21.1	E.47	E.18	E.08	E.20
Tetrachloroethene, unfltrd	µg/L	34	19	56	E.23	E.22	E.16	<.4	E.08
Tribromomethane (bromoform), unfltrd	µg/L	34	1	3	E.05	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	34	6	18	E.11	--	--	--	--
Triclosan, unfltrd	µg/L	34	22	65	.90	.21	E.09	<.2	E.12
Triethyl citrate, unfltrd	µg/L	34	8	24	E.08	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	34	15	44	E.23	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	34	34	100	E2.86	E1.18	E.79	E.46	E.71
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	34	22	65	.36	E.18	E.08	<.2	E.12
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	34	25	74	.42	E.14	E.09	E.05	E.09
Escherichia coli, unfltrd	MPN/100 mL	38	38	100	410,000	92,000	24,000	1,800	13,000

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site LPC3							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	23	23	100	838	743	586	352	510
Turbidity, unfltrd	NTU	22	22	100	5,120	224	93	22	103
Chemical oxygen demand, unfltrd	mg/L	17	9	53	246	B47	B27	<25.5	B36
Biochemical oxygen demand, unfltrd	mg/L	20	7	35	54	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	20	20	100	460	370	350	230	280
Total suspended solids, unfltrd	mg/L	20	20	100	6,750	283	47	24	95
Calcium, unfltrd	mg/L	20	20	100	139	96	88	61	74
Magnesium, unfltrd	mg/L	20	20	100	38	31	29	17	23
Chloride, unfltrd	mg/L	20	20	100	60	37	32	23	30
Nitrite, fltrd	mg/L as N	20	20	100	.16	.08	.04	.03	.05
Nitrate, fltrd	mg/L as N	20	20	100	3.61	2.10	1.39	.85	1.34
Nitrite plus nitrate, fltrd	mg/L as N	20	20	100	3.77	2.15	1.43	.89	1.39
Ammonia, fltrd	mg/L as N	20	10	50	.33	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	20	20	100	6.49	3.22	2.45	2.00	2.63
Total phosphorus, fltrd	mg/L	20	20	100	3.02	.50	.34	.13	.30
Orthophosphate, fltrd	mg/L as P	20	20	100	.21	.10	.07	.05	.06
Antimony, unfltrd	µg/L	20	20	100	.97	.80	.64	.48	.62
Arsenic, unfltrd	µg/L	20	20	100	23.9	9.37	6.93	4.59	7.14
Barium, unfltrd	µg/L	20	20	100	1,580	216	208	185	250
Beryllium, unfltrd	µg/L	20	10	50	4.65	--	--	--	--
Cadmium, unfltrd	µg/L	20	20	100	3.84	.31	.08	.05	.15
Chromium, unfltrd	µg/L	20	19	95	46.9	6.85	1.62	.89	2.54
Cobalt, unfltrd	µg/L	20	20	100	53.1	4.10	1.13	.76	2.11
Copper, unfltrd	µg/L	20	20	100	103	12.8	4.63	B2.32	6.26
Lead, unfltrd	µg/L	20	20	100	127	9.71	2.06	1.18	3.70
Mercury, unfltrd	µg/L	20	17	85	.14	.02	B.01	B.01	.02
Nickel, unfltrd	µg/L	20	20	100	117	10.94	5.30	3.21	7.31
Selenium, unfltrd	µg/L	20	20	100	7.39	3.62	1.94	1.73	2.40
Silver, unfltrd	µg/L	20	12	60	.65	.08	.02	<.016	.03
Thallium, unfltrd	µg/L	20	6	30	.94	--	--	--	--
Uranium, unfltrd	µg/L	20	20	100	10.2	7.26	5.88	4.01	5.17
Vanadium, unfltrd	µg/L	20	20	100	113	14.3	6.21	3.76	8.29
Zinc, unfltrd	µg/L	20	20	100	436	50.8	13.3	5.34	17.8
1,4-Dichlorobenzene, unfltrd	µg/L	19	0	0	--	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	19	4	21	E.03	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site LPC3							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	19	0	0	--	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	19	3	16	E0.04	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	18	14	78	E40.8	E1.39	E0.65	E0.06	E0.52
3-*beta*-Coprostanol, unfltrd	µg/L	19	3	16	E7.00	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	19	3	16	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	19	1	5	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	19	3	16	E3.20	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	19	12	63	1.51	.95	E.14	<.2	.23
Acetophenone, unfltrd	µg/L	19	8	42	.47	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	19	2	11	E.032	--	--	--	--
Anthracene, unfltrd	µg/L	19	4	21	E.14	--	--	--	--
Atrazine, unfltrd	µg/L	19	12	63	E.68	E.09	E.08	<.2	E.08
BDE congener 47, unfltrd	µg/L	17	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	19	10	53	E1.00	E.16	E.06	<.2	E.08
Benzophenone, unfltrd	µg/L	19	3	16	E.099	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	19	2	11	B2.39	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	19	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	19	8	42	1.68	--	--	--	--
Bromacil, unfltrd	µg/L	19	5	26	1.10	--	--	--	--
Caffeine, unfltrd	µg/L	19	12	63	E1.07	E.59	E.09	<.2	E.16
Camphor, unfltrd	µg/L	19	9	47	.40	--	--	--	--
Carbaryl, unfltrd	µg/L	19	4	21	E.40	--	--	--	--
Carbazole, unfltrd	µg/L	19	12	63	.64	.25	E.12	<.2	E.14
Chlorpyrifos, unfltrd	µg/L	19	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	19	3	16	E4.20	--	--	--	--
Cotinine, unfltrd	µg/L	18	1	6	.80	--	--	--	--
DEET, unfltrd	µg/L	19	15	79	E.38	E.14	E.12	E.09	E.11
Diazinon, unfltrd	µg/L	19	1	5	E.083	--	--	--	--
Dichlorvos, unfltrd	µg/L	19	5	26	E.98	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	19	3	16	E1.43	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site LPC3							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	19	5	26	0.75	--	--	--	--
d-Limonene, unfltrd	µg/L	19	3	16	E.15	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	19	4	21	E1.57	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	19	4	21	E.92	--	--	--	--
Fluoranthene, unfltrd	µg/L	19	12	63	E3.30	E0.56	E0.08	<0.2	E0.16
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	19	2	11	E.064	--	--	--	--
Indole, unfltrd	µg/L	19	6	32	E.051	--	--	--	--
Isoborneol, unfltrd	µg/L	19	1	5	.25	--	--	--	--
Isophorone, unfltrd	µg/L	19	10	53	E.08	E.08	E.08	<.2	E.05
Isopropylbenzene, unfltrd	µg/L	19	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	18	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	19	5	26	.27	--	--	--	--
Metalaxyl, unfltrd	µg/L	19	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	19	4	21	E.74	--	--	--	--
Metolachlor, unfltrd	µg/L	19	3	16	.82	--	--	--	--
Naphthalene, unfltrd	µg/L	19	3	16	E.05	--	--	--	--
p-Cresol, unfltrd	µg/L	19	6	32	E.75	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Phenanthrene, unfltrd	µg/L	19	10	53	1.51	.25	E.07	<.2	E.11
Phenol, unfltrd	µg/L	19	2	11	E1.04	--	--	--	--
Prometon, unfltrd	µg/L	19	8	42	.64	--	--	--	--
Pyrene, unfltrd	µg/L	19	12	63	E2.30	E.37	E.08	<.2	E.12
Tetrachloroethene, unfltrd	µg/L	19	14	74	E.22	E.20	E.04	<.4	E.05
Tribromomethane (bromoform), unfltrd	µg/L	19	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	19	0	0	--	--	--	--	--
Triclosan, unfltrd	µg/L	19	1	5	E.17	--	--	--	--
Triethyl citrate, unfltrd	µg/L	19	0	0	--	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	19	8	42	E.10	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	19	13	68	E3.14	E.51	E.22	<.2	E.22
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	19	7	37	E.13	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	19	5	26	E.15	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	24	24	100	87,000	24,000	5,500	1,500	5,600

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site LPC2 Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	21	21	100	1,020	757	681	423	536
Turbidity, unfltrd	NTU	20	20	100	1,490	705	55	19	87
Chemical oxygen demand, unfltrd	mg/L	16	9	56	353	53	B28	<25.5	B31
Biochemical oxygen demand, unfltrd	mg/L	18	8	44	60	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	19	19	100	600	370	330	260	310
Total suspended solids, unfltrd	mg/L	18	17	94	10,200	90	37	20	56
Calcium, unfltrd	mg/L	19	19	100	187	94	86	70	83
Magnesium, unfltrd	mg/L	19	19	100	41	32	29	20	25
Chloride, unfltrd	mg/L	19	19	100	59	45	37	29	35
Nitrite, fltrd	mg/L as N	19	19	100	.16	.06	.04	.03	.04
Nitrate, fltrd	mg/L as N	19	19	100	3.19	2.08	1.42	.90	1.33
Nitrite plus nitrate, fltrd	mg/L as N	19	19	100	3.35	2.16	1.51	.93	1.38
Ammonia, fltrd	mg/L as N	19	6	32	.28	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	19	19	100	4.87	3.50	2.64	1.83	2.57
Total phosphorus, fltrd	mg/L	19	19	100	6.89	.38	.20	.14	.29
Orthophosphate, fltrd	mg/L as P	19	19	100	.23	.08	.06	.04	.05
Antimony, unfltrd	µg/L	19	19	100	1.30	.84	.69	.53	.68
Arsenic, unfltrd	µg/L	19	19	100	30.2	8.35	6.56	4.21	6.73
Barium, unfltrd	µg/L	19	19	100	2,020	224	201	170	245
Beryllium, unfltrd	µg/L	19	10	53	5.54	E.23	E.13	<.26	E.24
Cadmium, unfltrd	µg/L	19	19	100	5.20	.16	.08	.05	.13
Chromium, unfltrd	µg/L	19	19	100	57.2	5.60	1.01	.75	1.96
Cobalt, unfltrd	µg/L	19	19	100	70.0	1.67	.92	.75	1.63
Copper, unfltrd	µg/L	19	17	89	134	9.71	3.82	B2.44	5.64
Lead, unfltrd	µg/L	19	19	100	188	5.65	1.87	1.18	3.15
Mercury, unfltrd	µg/L	19	9	47	.13	--	--	--	--
Nickel, unfltrd	µg/L	19	19	100	154	5.68	3.92	3.29	6.36
Selenium, unfltrd	µg/L	19	19	100	7.14	3.44	2.48	1.74	2.45
Silver, unfltrd	µg/L	19	13	68	1.35	.08	.02	<.016	.03
Thallium, unfltrd	µg/L	19	4	21	1.06	--	--	--	--
Uranium, unfltrd	µg/L	19	19	100	11.0	6.63	5.03	4.43	5.21
Vanadium, unfltrd	µg/L	19	19	100	143	7.75	5.34	3.59	7.27
Zinc, unfltrd	µg/L	19	18	95	601	40.7	8.70	5.77	15.6
1,4-Dichlorobenzene, unfltrd	µg/L	19	1	5	E.008	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	19	5	26	E.05	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site LPC2							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	19	2	11	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	19	6	32	E.08	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	18	14	78	E30.1	E3.72	E0.73	E0.29	E0.86
3-*beta*-Coprostanol, unfltrd	µg/L	19	1	5	B2.39	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	19	3	16	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	18	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	19	8	42	E1.19	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	19	12	63	1.94	.77	E.12	<.2	.21
Acetophenone, unfltrd	µg/L	19	6	32	.67	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	19	0	0	--	--	--	--	--
Anthracene, unfltrd	µg/L	19	4	21	E.73	--	--	--	--
Atrazine, unfltrd	µg/L	19	12	63	E.71	E.11	E.08	<.2	E.07
BDE congener 47, unfltrd	µg/L	17	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	19	8	42	E3.36	--	--	--	--
Benzophenone, unfltrd	µg/L	19	3	16	E.041	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	19	3	16	B2.03	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	19	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	19	7	37	E.28	--	--	--	--
Bromacil, unfltrd	µg/L	19	1	5	.48	--	--	--	--
Caffeine, unfltrd	µg/L	19	15	79	E1.60	E.37	E.25	E.08	E.20
Camphor, unfltrd	µg/L	19	6	32	E.10	--	--	--	--
Carbaryl, unfltrd	µg/L	19	4	21	E.42	--	--	--	--
Carbazole, unfltrd	µg/L	19	14	74	1.02	.29	E.12	E.02	E.10
Chlorpyrifos, unfltrd	µg/L	19	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	19	2	11	B2.52	--	--	--	--
Cotinine, unfltrd	µg/L	18	0	0	--	--	--	--	--
DEET, unfltrd	µg/L	19	15	79	.50	E.19	E.12	E.10	E.12
Diazinon, unfltrd	µg/L	19	0	0	--	--	--	--	--
Dichlorvos, unfltrd	µg/L	19	6	32	E.25	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	19	2	11	E1.41	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site LPC2							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	19	2	11	0.30	--	--	--	--
d-Limonene, unfltrd	µg/L	19	3	16	E.20	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	19	3	16	E1.35	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	19	1	5	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	19	12	63	E8.51	E0.53	E0.08	<0.2	E0.16
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	19	3	16	E.018	--	--	--	--
Indole, unfltrd	µg/L	19	2	11	E.046	--	--	--	--
Isoborneol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	19	7	37	E.054	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	19	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	18	1	6	E.09	--	--	--	--
Menthol, unfltrd	µg/L	18	6	33	.27	--	--	--	--
Metalaxyl, unfltrd	µg/L	19	0	0	E.13	--	--	--	--
Methyl salicylate, unfltrd	µg/L	19	3	16	E.31	--	--	--	--
Metolachlor, unfltrd	µg/L	19	4	21	1.46	--	--	--	--
Naphthalene, unfltrd	µg/L	19	3	16	E.45	--	--	--	--
p-Cresol, unfltrd	µg/L	19	7	37	E.66	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Phenanthrene, unfltrd	µg/L	19	10	53	4.38	.26	E.07	<.2	E.12
Phenol, unfltrd	µg/L	19	1	5	E1.48	--	--	--	--
Prometon, unfltrd	µg/L	19	6	32	E.11	--	--	--	--
Pyrene, unfltrd	µg/L	19	13	68	E6.07	E.37	E.08	<.2	E.11
Tetrachloroethene, unfltrd	µg/L	19	14	74	E.22	E.14	E.02	<.4	E.04
Tribromomethane (bromoform), unfltrd	µg/L	19	1	5	E.010	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	19	1	5	.37	--	--	--	--
Triclosan, unfltrd	µg/L	19	0	0	--	--	--	--	--
Triethyl citrate, unfltrd	µg/L	19	0	0	--	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	19	7	37	E.20	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	19	14	74	E3.04	E.55	E.22	<.2	E.22
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	19	6	32	E.15	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	19	7	37	E.11	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	23	23	100	130,000	16,000	6,600	2,500	6,000

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site LPC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	23	23	100	910	773	570	338	492
Turbidity, unfltrd	NTU	22	22	100	2,630	820	43	14	80
Chemical oxygen demand, unfltrd	mg/L	17	11	65	889	87	B33	<25.5	B47
Biochemical oxygen demand, unfltrd	mg/L	20	10	50	362	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	20	20	100	740	370	300	250	290
Total suspended solids, unfltrd	mg/L	20	19	95	3,620	596	55	16	94
Calcium, unfltrd	mg/L	20	20	100	241	97	79	66	79
Magnesium, unfltrd	mg/L	20	20	100	36	31	20	19	22
Chloride, unfltrd	mg/L	20	20	100	62	46	39	28	34
Nitrite, fltrd	mg/L as N	20	20	100	.14	.06	.04	.03	.04
Nitrate, fltrd	mg/L as N	20	20	100	3.25	1.78	1.39	1.18	1.40
Nitrite plus nitrate, fltrd	mg/L as N	20	20	100	3.38	1.84	1.41	1.22	1.45
Ammonia, fltrd	mg/L as N	20	11	55	.57	.19	B.05	<.028	B.05
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	20	20	100	6.00	3.79	2.80	2.18	2.94
Total phosphorus, fltrd	mg/L	20	20	100	6.74	.99	.31	.16	.36
Orthophosphate, fltrd	mg/L as P	20	20	100	.16	.10	.07	.04	.06
Antimony, unfltrd	µg/L	20	20	100	1.27	.79	.62	.53	.67
Arsenic, unfltrd	µg/L	20	20	100	30.3	8.68	5.51	3.69	6.26
Barium, unfltrd	µg/L	20	20	100	1,850	251	205	176	250
Beryllium, unfltrd	µg/L	20	12	60	4.88	.42	E.19	<.26	.29
Cadmium, unfltrd	µg/L	20	20	100	5.34	.51	.12	.05	.17
Chromium, unfltrd	µg/L	20	20	100	78.8	12.0	2.01	.87	3.29
Cobalt, unfltrd	µg/L	20	20	100	63.6	5.55	1.19	.62	1.97
Copper, unfltrd	µg/L	20	20	100	150	25.8	4.97	B2.68	7.75
Lead, unfltrd	µg/L	20	20	100	236	26.9	3.84	1.03	5.20
Mercury, unfltrd	µg/L	20	16	80	.26	.05	B.01	B.01	.02
Nickel, unfltrd	µg/L	20	20	100	139	14.8	4.47	2.91	7.25
Selenium, unfltrd	µg/L	20	20	100	6.11	3.16	2.10	1.42	2.03
Silver, unfltrd	µg/L	20	15	75	1.66	.21	.04	E.01	.05
Thallium, unfltrd	µg/L	20	7	35	1.06	--	--	--	--
Uranium, unfltrd	µg/L	20	20	100	10.2	5.58	4.76	3.89	4.54
Vanadium, unfltrd	µg/L	20	20	100	137	18.3	5.06	3.07	8.10
Zinc, unfltrd	µg/L	20	19	95	4,060	773	15.3	6.78	67.2
1,4-Dichlorobenzene, unfltrd	µg/L	22	15	75	E.24	E.03	E.03	<.2	E.03
1-Methylnaphthalene, unfltrd	µg/L	22	10	50	E.07	E.03	E.03	<.2	E.02

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site LPC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	22	3	15	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	22	11	55	E.09	E0.03	E0.03	<.01	E0.03
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	21	14	74	E45.5	E2.69	E.43	<2	E.57
3-*beta*-Coprostanol, unfltrd	µg/L	21	7	35	E17.2	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	22	9	45	E.11	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	21	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	22	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	22	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	22	2	9	B3.01	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	22	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	22	7	35	E100	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	22	15	75	2.98	.79	.33	E.09	.32
Acetophenone, unfltrd	µg/L	22	9	41	.87	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	22	1	5	E.20	--	--	--	--
Anthracene, unfltrd	µg/L	22	8	40	E.58	--	--	--	--
Atrazine, unfltrd	µg/L	22	13	65	E.61	E.10	E.08	<.2	E.08
BDE congener 47, unfltrd	µg/L	17	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	22	13	65	E5.22	E.42	E.08	<.2	E.16
Benzophenone, unfltrd	µg/L	22	2	10	E.073	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	21	3	15	E5.27	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	21	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	22	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	22	10	50	.42	--	--	--	--
Bromacil, unfltrd	µg/L	22	3	15	.29	--	--	--	--
Caffeine, unfltrd	µg/L	22	17	85	E2.51	E.82	E.49	E.06	E.29
Camphor, unfltrd	µg/L	22	14	70	E.15	E.09	E.09	<.2	E.07
Carbaryl, unfltrd	µg/L	22	5	25	E.15	--	--	--	--
Carbazole, unfltrd	µg/L	22	16	80	1.68	.33	E.12	E.06	E.13
Chlorpyrifos, unfltrd	µg/L	22	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	21	8	40	E15.4	--	--	--	--
Cotinine, unfltrd	µg/L	21	2	11	E.31	--	--	--	--
DEET, unfltrd	µg/L	22	14	70	.87	E.16	E.12	<.4	E.12
Diazinon, unfltrd	µg/L	22	1	5	E.055	--	--	--	--
Dichlorvos, unfltrd	µg/L	22	5	25	E.71	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	22	6	30	6.22	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site LPC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	22	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	22	1	5	0.39	--	--	--	--
d-Limonene, unfltrd	µg/L	22	6	30	E.19	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	22	6	30	E2.58	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	22	6	30	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	22	16	80	E13.1	E1.05	E0.13	E0.08	E0.27
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	22	7	35	.26	--	--	--	--
Indole, unfltrd	µg/L	22	6	30	E.059	--	--	--	--
Isoborneol, unfltrd	µg/L	22	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	22	9	45	E.069	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	22	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	22	1	5	E0.13	--	--	--	--
Menthol, unfltrd	µg/L	22	11	55	.48	--	--	--	--
Metalaxyl, unfltrd	µg/L	22	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	22	5	25	E.99	--	--	--	--
Metolachlor, unfltrd	µg/L	22	4	20	16.0	--	--	--	--
Naphthalene, unfltrd	µg/L	22	16	80	E.49	E.10	E.07	E.04	E.07
p-Cresol, unfltrd	µg/L	22	8	40	E.73	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	22	4	20	E2.66	--	--	--	--
Phenanthrene, unfltrd	µg/L	22	14	70	7.08	.45	E.12	<.2	.20
Phenol, unfltrd	µg/L	22	5	25	E1.34	--	--	--	--
Prometon, unfltrd	µg/L	22	6	30	E.15	--	--	--	--
Pyrene, unfltrd	µg/L	22	16	80	E9.70	E.78	E.11	E.07	E.21
Tetrachloroethene, unfltrd	µg/L	22	12	60	E.040	E.22	E.04	<.4	E.05
Tribromomethane (bromoform), unfltrd	µg/L	22	1	5	E.020	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	22	2	10	.63	--	--	--	--
Triclosan, unfltrd	µg/L	22	8	40	.37	--	--	--	--
Triethyl citrate, unfltrd	µg/L	22	1	5	E.040	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	22	8	40	E.12	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	22	17	85	E2.79	E.72	E.40	E.07	E.28
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	22	10	50	E.16	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	22	8	40	.46	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	24	24	100	200,000	35,000	11,000	1,500	7,500

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC4							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	23	23	100	740	711	577	396	478
Turbidity, unfltrd	NTU	22	22	100	2,120	617	179	64	164
Chemical oxygen demand, unfltrd	mg/L	17	9	53	171	91	B28	<25.5	B31
Biochemical oxygen demand, unfltrd	mg/L	20	6	30	177	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	20	20	100	410	340	320	220	260
Total suspended solids, unfltrd	mg/L	19	19	100	7,920	743	155	86	220
Calcium, unfltrd	mg/L	20	20	100	119	96	89	59	72
Magnesium, unfltrd	mg/L	20	20	100	28	25	22	16	18
Chloride, unfltrd	mg/L	20	20	100	70	25	25	20	24
Nitrite, fltrd	mg/L as N	20	20	100	.09	.07	.04	.03	.05
Nitrate, fltrd	mg/L as N	19	19	100	8.68	5.32	4.06	2.66	3.68
Nitrite plus nitrate, fltrd	mg/L as N	20	20	100	8.76	5.34	4.05	2.58	2.96
Ammonia, fltrd	mg/L as N	20	10	50	.36	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	20	20	100	9.50	6.42	5.64	4.20	4.86
Total phosphorus, fltrd	mg/L	20	20	100	3.75	1.04	.38	.27	.49
Orthophosphate, fltrd	mg/L as P	20	20	100	.19	.13	.10	.08	.08
Antimony, unfltrd	µg/L	20	20	100	.98	.67	.60	.47	.57
Arsenic, unfltrd	µg/L	20	20	100	26.0	11.8	7.15	5.64	8.51
Barium, unfltrd	µg/L	20	20	100	1,560	436	274	222	338
Beryllium, unfltrd	µg/L	20	13	65	4.07	.80	E.19	<.26	.38
Cadmium, unfltrd	µg/L	20	20	100	2.88	.77	.18	.10	.25
Chromium, unfltrd	µg/L	20	20	100	43.2	14.5	3.37	1.95	4.58
Cobalt, unfltrd	µg/L	20	20	100	45.0	11.79	2.68	1.46	3.74
Copper, unfltrd	µg/L	20	18	90	69.3	27.7	6.44	4.14	9.33
Lead, unfltrd	µg/L	20	20	100	94.9	26.0	4.59	2.67	6.27
Mercury, unfltrd	µg/L	20	14	70	.15	.06	.02	<.01	.02
Nickel, unfltrd	µg/L	20	20	100	102	27.2	7.47	4.38	10.3
Selenium, unfltrd	µg/L	20	20	100	9.09	6.49	5.34	2.67	3.98
Silver, unfltrd	µg/L	20	15	75	.95	.32	.05	E.01	.07
Thallium, unfltrd	µg/L	20	9	45	1.09	--	--	--	--
Uranium, unfltrd	µg/L	20	20	100	8.01	6.63	5.87	3.88	4.85
Vanadium, unfltrd	µg/L	20	20	100	116	32.0	12.1	7.51	16.1
Zinc, unfltrd	µg/L	20	18	90	240	106	24.4	9.19	26.5
1,4-Dichlorobenzene, unfltrd	µg/L	19	0	0	--	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	19	6	32	E.03	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC4							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	19	0	0	--	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	19	5	26	E0.03	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	19	16	84	E111	E4.79	E1.55	E0.49	E1.56
3-*beta*-Coprostanol, unfltrd	µg/L	19	0	0	--	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	19	4	21	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	19	3	16	E.68	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	19	13	68	1.29	.56	E.08	<.2	E.17
Acetophenone, unfltrd	µg/L	19	2	11	.28	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	19	0	0	--	--	--	--	--
Anthracene, unfltrd	µg/L	19	6	32	E.09	--	--	--	--
Atrazine, unfltrd	µg/L	19	14	74	E1.82	E.14	E.08	<.2	E.11
BDE congener 47, unfltrd	µg/L	17	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	19	12	63	E.59	E.18	E.06	<.2	E.09
Benzophenone, unfltrd	µg/L	19	3	16	E.063	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	19	0	0	--	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	19	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	19	7	37	E.21	--	--	--	--
Bromacil, unfltrd	µg/L	19	4	21	1.24	--	--	--	--
Caffeine, unfltrd	µg/L	19	13	68	E.83	E.28	E.07	<.2	E.12
Camphor, unfltrd	µg/L	19	6	32	E.14	--	--	--	--
Carbaryl, unfltrd	µg/L	19	5	26	E.15	--	--	--	--
Carbazole, unfltrd	µg/L	19	12	63	.45	E.17	E.12	<.2	E.10
Chlorpyrifos, unfltrd	µg/L	19	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Cotinine, unfltrd	µg/L	17	1	6	.037	--	--	--	--
DEET, unfltrd	µg/L	19	14	74	E.28	E.17	E.12	<.4	E.12
Diazinon, unfltrd	µg/L	19	0	0	--	--	--	--	--
Dichlorvos, unfltrd	µg/L	19	6	32	E.59	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	19	2	11	3.20	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC4							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	19	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	19	2	11	E0.15	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	19	5	26	E1.35	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	19	2	11	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	19	15	79	E1.77	E0.51	E0.08	E0.05	E0.16
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	19	2	11	E.021	--	--	--	--
Indole, unfltrd	µg/L	19	2	11	E.039	--	--	--	--
Isoborneol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	19	8	42	E.043	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	19	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	18	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	18	4	22	E.16	--	--	--	--
Metalaxyl, unfltrd	µg/L	19	2	11	E.13	--	--	--	--
Methyl salicylate, unfltrd	µg/L	19	3	16	E.77	--	--	--	--
Metolachlor, unfltrd	µg/L	19	12	63	.40	E.12	E.06	<.2	E.05
Naphthalene, unfltrd	µg/L	19	3	16	E.05	--	--	--	--
p-Cresol, unfltrd	µg/L	19	9	47	E.20	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	19	0	0	--	--	--	--	--
Phenanthrene, unfltrd	µg/L	19	13	68	.86	.26	E.07	<.2	E.10
Phenol, unfltrd	µg/L	19	1	5	E.39	--	--	--	--
Prometon, unfltrd	µg/L	19	6	32	E.14	--	--	--	--
Pyrene, unfltrd	µg/L	19	15	79	E1.27	E.35	E.08	E.04	E.12
Tetrachloroethene, unfltrd	µg/L	19	1	5	E.058	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	19	1	5	E.008	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	19	2	11	E.11	--	--	--	--
Triclosan, unfltrd	µg/L	19	0	0	--	--	--	--	--
Triethyl citrate, unfltrd	µg/L	19	6	32	E.20	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	19	6	32	E.10	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	19	9	47	E.90	--	--	--	--
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	19	6	32	E.11	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	19	5	26	E.09	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	24	22	92	61,000	24,000	10,000	900	4,400

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC3							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	38	38	100	789	690	566	425	508
Turbidity, unfltrd	NTU	35	35	100	1,730	525	190	61	165
Chemical oxygen demand, unfltrd	mg/L	31	23	74	487	125	67	<25.5	54
Biochemical oxygen demand, unfltrd	mg/L	34	18	53	255	54	B21	<19	B19
Hardness, unfltrd	mg/L as $CaCO_3$	35	35	100	530	340	320	250	290
Total suspended solids, unfltrd	mg/L	35	34	97	5,280	1,330	309	88	317
Calcium, unfltrd	mg/L	35	35	100	175	101	89	69	81
Magnesium, unfltrd	mg/L	35	35	100	30	24	22	17	20
Chloride, unfltrd	mg/L	35	35	100	71	38	32	27	32
Nitrite, fltrd	mg/L as N	35	35	100	.10	.07	.05	.04	.05
Nitrate, fltrd	mg/L as N	35	35	100	7.52	3.53	2.56	1.52	2.38
Nitrite plus nitrate, fltrd	mg/L as N	35	35	100	7.59	3.59	2.66	1.60	2.44
Ammonia, fltrd	mg/L as N	35	22	63	.44	.21	.10	<.028	.06
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	35	35	100	8.53	6.02	4.70	3.52	4.54
Total phosphorus, fltrd	mg/L	35	35	100	5.77	1.13	.56	.28	.61
Orthophosphate, fltrd	mg/L as P	35	35	100	.17	.11	.09	.06	.07
Antimony, unfltrd	µg/L	35	33	94	2.21	.94	.69	.51	.65
Arsenic, unfltrd	µg/L	35	34	97	26.9	11.8	6.81	4.52	6.38
Barium, unfltrd	µg/L	35	35	100	1,540	530	249	204	309
Beryllium, unfltrd	µg/L	35	25	71	4.16	.86	.37	<.26	.43
Cadmium, unfltrd	µg/L	35	34	97	4.34	.68	.22	.12	.25
Chromium, unfltrd	µg/L	35	35	100	51.7	18.4	7.35	2.38	6.25
Cobalt, unfltrd	µg/L	35	34	97	54.2	10.4	2.41	1.21	3.06
Copper, unfltrd	µg/L	35	33	94	116	25.6	11.2	4.47	10.4
Lead, unfltrd	µg/L	35	34	97	155	29.2	8.73	2.84	7.50
Mercury, unfltrd	µg/L	35	27	77	.26	.07	.03	B.01	.03
Nickel, unfltrd	µg/L	35	35	100	118	32.2	10.4	4.87	12.3
Selenium, unfltrd	µg/L	35	34	97	9.07	4.62	2.66	1.95	2.22
Silver, unfltrd	µg/L	35	30	86	1.81	.24	.08	.02	.07
Thallium, unfltrd	µg/L	35	18	51	1.00	.28	E.09	<.18	E.16
Uranium, unfltrd	µg/L	35	34	97	7.73	5.97	4.74	3.37	3.56
Vanadium, unfltrd	µg/L	35	35	100	112	37.1	12.0	7.76	16.6
Zinc, unfltrd	µg/L	35	33	94	566	103	41.3	11.8	34.8
1,4-Dichlorobenzene, unfltrd	µg/L	33	19	58	E.38	E.03	E.03	<.2	E.03
1-Methylnaphthalene, unfltrd	µg/L	33	14	42	E.05	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC3							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	33	1	3	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	33	13	39	E.05	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	31	27	87	E91.7	E12.2	E4.55	E0.85	E2.80
3-*beta*-Coprostanol, unfltrd	µg/L	33	7	21	E27.5	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	33	9	27	E.11	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	33	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	33	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	33	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	33	3	9	E4.27	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	33	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	33	7	21	E1.07	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	33	24	73	2.12	.85	.60	<.2	.35
Acetophenone, unfltrd	µg/L	33	15	45	1.23	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	33	4	12	E.15	--	--	--	--
Anthracene, unfltrd	µg/L	33	13	39	E.43	--	--	--	--
Atrazine, unfltrd	µg/L	33	23	70	E1.20	E.19	E.08	<.2	E.11
BDE congener 47, unfltrd	µg/L	27	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	33	27	82	E3.02	E.43	E.10	E.06	E.15
Benzophenone, unfltrd	µg/L	33	10	30	E.08	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	33	5	15	E6.47	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	33	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	33	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	33	18	55	.46	E.22	E.22	<.4	E.21
Bromacil, unfltrd	µg/L	33	8	24	.87	--	--	--	--
Caffeine, unfltrd	µg/L	33	28	85	E2.10	E.89	E.56	E.15	E.37
Camphor, unfltrd	µg/L	33	16	48	E.18	--	--	--	--
Carbaryl, unfltrd	µg/L	33	8	24	E.19	--	--	--	--
Carbazole, unfltrd	µg/L	33	25	76	1.37	.29	E.16	E.12	E.15
Chlorpyrifos, unfltrd	µg/L	33	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	33	8	24	E23.4	--	--	--	--
Cotinine, unfltrd	µg/L	32	3	9	E.31	--	--	--	--
DEET, unfltrd	µg/L	33	28	85	.56	E.25	E.14	E.12	E.16
Diazinon, unfltrd	µg/L	33	3	9	E.19	--	--	--	--
Dichlorvos, unfltrd	µg/L	33	14	42	E.67	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	33	5	15	E1.83	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC3							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	33	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	33	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	33	8	24	E0.27	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	33	9	27	2.60	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	33	9	27	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	33	28	85	E9.68	E0.88	E0.43	E0.08	E0.35
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	33	10	30	.31	--	--	--	--
Indole, unfltrd	µg/L	33	9	27	E.061	--	--	--	--
Isoborneol, unfltrd	µg/L	33	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	33	11	33	E.058	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	33	1	3	E.01	--	--	--	--
Isoquinoline, unfltrd	µg/L	32	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	32	14	44	.56	--	--	--	--
Metalaxyl, unfltrd	µg/L	33	1	3	E.15	--	--	--	--
Methyl salicylate, unfltrd	µg/L	33	12	36	E.79	--	--	--	--
Metolachlor, unfltrd	µg/L	33	15	45	3.26	--	--	--	--
Naphthalene, unfltrd	µg/L	33	15	45	E.21	--	--	--	--
p-Cresol, unfltrd	µg/L	33	10	30	E.54	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	33	5	15	E2.62	--	--	--	--
Phenanthrene, unfltrd	µg/L	33	27	82	4.76	.43	.22	E.07	E.19
Phenol, unfltrd	µg/L	33	5	15	E1.15	--	--	--	--
Prometon, unfltrd	µg/L	33	15	45	.36	--	--	--	--
Pyrene, unfltrd	µg/L	33	28	85	E6.39	E.66	E.27	E.08	E.26
Tetrachloroethene, unfltrd	µg/L	33	13	39	E.097	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	33	1	3	E.024	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	33	3	9	E.19	--	--	--	--
Triclosan, unfltrd	µg/L	33	10	30	.53	--	--	--	--
Triethyl citrate, unfltrd	µg/L	33	7	21	E.10	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	33	17	52	E.13	E.10	E.10	<.2	E.07
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	33	25	76	E2.89	E.77	E.44	E.09	E.29
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	33	16	48	E.15	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	33	14	42	E.13	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	39	39	100	240,000	110,000	18,000	2,500	14,000

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC2							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	21	21	100	776	718	614	437	519
Turbidity, unfltrd	NTU	22	22	100	1,950	844	216	37	167
Chemical oxygen demand, unfltrd	mg/L	17	9	53	241	90	B26	<25.5	B37
Biochemical oxygen demand, unfltrd	mg/L	20	8	40	157	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	20	20	100	420	370	310	260	270
Total suspended solids, unfltrd	mg/L	20	19	95	6,220	1,216	194	86	233
Calcium, unfltrd	mg/L	20	20	100	131	103	86	74	75
Magnesium, unfltrd	mg/L	20	20	100	29	27	23	18	19
Chloride, unfltrd	mg/L	20	20	100	60	33	29	27	29
Nitrite, fltrd	mg/L as N	20	20	100	.09	.07	.04	.03	.05
Nitrate, fltrd	mg/L as N	20	20	100	7.33	4.38	3.20	2.12	2.78
Nitrite plus nitrate, fltrd	mg/L as N	20	20	100	7.42	4.44	3.23	2.15	2.84
Ammonia, fltrd	mg/L as N	20	10	50	.26	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	20	20	100	8.54	6.17	4.93	3.39	4.62
Total phosphorus, fltrd	mg/L	20	20	100	4.40	1.18	.40	.26	.51
Orthophosphate, fltrd	mg/L as P	20	20	100	.17	.11	.10	.07	.09
Antimony, unfltrd	µg/L	20	20	100	1.01	.72	.61	.49	.60
Arsenic, unfltrd	µg/L	20	20	100	24.2	11.9	6.79	5.23	8.03
Barium, unfltrd	µg/L	20	20	100	1,450	454	267	214	328
Beryllium, unfltrd	µg/L	20	12	60	3.78	.86	.26	<.26	.38
Cadmium, unfltrd	µg/L	20	20	100	3.47	.90	.17	.09	.25
Chromium, unfltrd	µg/L	20	19	95	44.5	16.2	5.04	1.82	4.61
Cobalt, unfltrd	µg/L	20	20	100	47.0	12.4	2.56	1.39	3.61
Copper, unfltrd	µg/L	20	19	95	104	28.7	7.01	4.15	9.82
Lead, unfltrd	µg/L	20	20	100	135	32.6	8.27	2.62	7.15
Mercury, unfltrd	µg/L	20	15	75	.18	.06	B.01	B.01	.02
Nickel, unfltrd	µg/L	20	20	100	104	29.1	7.42	3.81	10.41
Selenium, unfltrd	µg/L	20	20	100	8.33	5.85	4.54	2.21	3.33
Silver, unfltrd	µg/L	20	16	80	.90	.16	.06	.02	.06
Thallium, unfltrd	µg/L	20	10	50	1.02	--	--	--	--
Uranium, unfltrd	µg/L	20	20	100	8.03	6.02	5.65	3.96	4.72
Vanadium, unfltrd	µg/L	20	20	100	115	32.1	12.5	6.69	15.1
Zinc, unfltrd	µg/L	20	18	90	1,570	117	29.2	9.54	37.1
1,4-Dichlorobenzene, unfltrd	µg/L	20	8	40	E.07	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	20	5	25	E.03	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC2							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	20	1	5	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	20	4	20	E.03	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	19	17	89	E124	E10.81	E3.13	E0.45	E2.11
3-*beta*-Coprostanol, unfltrd	µg/L	20	5	25	E8.33	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	20	3	15	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	20	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	20	1	5	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	20	1	5	E.11	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	20	0	0	--	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	20	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	19	3	16	E154	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	20	12	60	2.80	.76	E.14	<.2	.23
Acetophenone, unfltrd	µg/L	20	7	35	.51	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	20	1	5	E.13	--	--	--	--
Anthracene, unfltrd	µg/L	20	6	30	E.45	--	--	--	--
Atrazine, unfltrd	µg/L	20	15	75	E1.55	E.17	E.08	E.06	E.11
BDE congener 47, unfltrd	µg/L	18	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	20	11	55	E3.57	E.55	E.06	<.2	E.13
Benzophenone, unfltrd	µg/L	20	5	25	E.064	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	20	1	5	B1.94	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	20	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	20	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	20	8	40	1.16	--	--	--	--
Bromacil, unfltrd	µg/L	20	7	35	.69	--	--	--	--
Caffeine, unfltrd	µg/L	20	16	80	E1.88	.56	.40	E.06	.23
Camphor, unfltrd	µg/L	20	10	50	E.11	--	--	--	--
Carbaryl, unfltrd	µg/L	20	7	35	E.15	--	--	--	--
Carbazole, unfltrd	µg/L	20	12	60	1.46	.22	E.12	<.2	E.13
Chlorpyrifos, unfltrd	µg/L	20	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	20	4	20	E7.14	--	--	--	--
Cotinine, unfltrd	µg/L	18	1	6	.29	--	--	--	--
DEET, unfltrd	µg/L	20	13	65	E.35	E.18	E.12	<.4	E.13
Diazinon, unfltrd	µg/L	20	1	5	E.02	--	--	--	--
Dichlorvos, unfltrd	µg/L	20	6	30	E.51	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	20	3	15	E1.20	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC2							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	20	1	5	E2.00	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	20	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	20	3	15	E.14	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	20	5	25	E1.35	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	20	6	30	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	20	15	75	E10.4	E0.23	E0.08	E0.08	E0.23
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	20	6	30	E.052	--	--	--	--
Indole, unfltrd	µg/L	20	3	15	E.059	--	--	--	--
Isoborneol, unfltrd	µg/L	20	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	20	7	35	E.057	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	20	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	19	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	19	5	26	.30	--	--	--	--
Metalaxyl, unfltrd	µg/L	20	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	20	3	15	E.23	--	--	--	--
Metolachlor, unfltrd	µg/L	20	12	60	4.76	E.12	E.12	<.2	E.07
Naphthalene, unfltrd	µg/L	20	6	30	E.15	--	--	--	--
p-Cresol, unfltrd	µg/L	20	9	45	E.60	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	20	1	5	B.96	--	--	--	--
Phenanthrene, unfltrd	µg/L	20	12	60	5.24	.33	E.08	<.2	E.16
Phenol, unfltrd	µg/L	20	1	5	E.84	--	--	--	--
Prometon, unfltrd	µg/L	20	8	40	E.15	--	--	--	--
Pyrene, unfltrd	µg/L	20	15	75	E7.45	E.68	E.08	E.06	E.17
Tetrachloroethene, unfltrd	µg/L	20	7	35	E.095	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	20	1	5	E.06	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	20	3	15	E.11	--	--	--	--
Triclosan, unfltrd	µg/L	20	7	35	.21	--	--	--	--
Triethyl citrate, unfltrd	µg/L	20	5	25	E.09	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	20	8	40	E.13	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	20	16	80	E1.59	E.49	E.23	E.10	E.23
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	20	9	45	E.12	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	20	5	25	E.09	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	24	24	100	1,400,000	37,000	11,000	1,700	8,700

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	23	23	100	772	677	643	471	535
Turbidity, unfltrd	NTU	21	21	100	1,560	790	142	55	157
Chemical oxygen demand, unfltrd	mg/L	17	8	47	385	--	--	--	--
Biochemical oxygen demand, unfltrd	mg/L	20	7	35	257	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	20	20	100	660	370	310	280	300
Total suspended solids, unfltrd	mg/L	20	20	100	7,830	1,700	271	71	275
Calcium, unfltrd	mg/L	20	20	100	208	102	86	75	83
Magnesium, unfltrd	mg/L	20	20	100	33	26	25	21	21
Chloride, unfltrd	mg/L	20	20	100	61	33	29	27	29
Nitrite, fltrd	mg/L as N	20	20	100	.11	.06	.05	.03	.05
Nitrate, fltrd	mg/L as N	20	20	100	7.31	4.01	3.09	2.24	2.73
Nitrite plus nitrate, fltrd	mg/L as N	20	20	100	7.38	4.07	3.13	2.30	2.79
Ammonia, fltrd	mg/L as N	20	10	50	.30	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	20	20	100	8.35	6.74	4.67	3.53	4.69
Total phosphorus, fltrd	mg/L	20	20	100	7.82	1.10	.50	.23	.58
Orthophosphate, fltrd	mg/L as P	20	20	100	.18	.12	.10	.07	.08
Antimony, unfltrd	µg/L	20	20	100	1.04	.75	.64	.52	.63
Arsenic, unfltrd	µg/L	20	20	100	31.9	14.7	8.05	6.01	9.15
Barium, unfltrd	µg/L	20	20	100	2,120	600	267	225	372
Beryllium, unfltrd	µg/L	20	14	70	5.87	1.22	.26	<.26	.44
Cadmium, unfltrd	µg/L	20	20	100	5.60	1.03	.25	.09	.28
Chromium, unfltrd	µg/L	20	20	100	60.4	19.9	4.10	1.74	4.83
Cobalt, unfltrd	µg/L	20	20	100	77.2	15.4	2.96	1.35	4.00
Copper, unfltrd	µg/L	20	19	95	152	33.6	9.43	4.05	10.7
Lead, unfltrd	µg/L	20	20	100	207	45.0	7.64	2.17	7.79
Mercury, unfltrd	µg/L	20	17	85	.18	.07	.02	B.01	.03
Nickel, unfltrd	µg/L	20	20	100	164	35.8	8.03	4.12	11.7
Selenium, unfltrd	µg/L	20	20	100	8.27	5.48	4.36	2.35	3.38
Silver, unfltrd	µg/L	20	15	75	1.66	.29	.08	.02	.08
Thallium, unfltrd	µg/L	20	10	50	1.26	--	--	--	--
Uranium, unfltrd	µg/L	20	20	100	8.42	6.79	5.69	4.23	4.92
Vanadium, unfltrd	µg/L	20	20	100	154	45.0	11.5	6.48	16.7
Zinc, unfltrd	µg/L	20	18	90	2,030	971	27.6	9.24	59.9
1,4-Dichlorobenzene, unfltrd	µg/L	20	6	30	E.05	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	20	3	15	E.03	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	20	2	10	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	20	3	15	E.03	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	19	17	89	E105	E9.94	E2.20	E0.62	E2.23
3-*beta*-Coprostanol, unfltrd	µg/L	20	2	10	E4.19	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	20	3	15	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	20	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	20	1	5	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	20	1	5	E.11	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	20	1	5	B2.05	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	20	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	20	4	20	E1.31	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	20	13	65	3.01	.39	.25	<.2	.22
Acetophenone, unfltrd	µg/L	20	5	25	2.19	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	20	1	5	E.046	--	--	--	--
Anthracene, unfltrd	µg/L	20	8	40	E.40	--	--	--	--
Atrazine, unfltrd	µg/L	20	14	70	E2.29	E.18	E.08	<.2	E.11
BDE congener 47, unfltrd	µg/L	18	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	20	13	65	E3.85	E.25	E.09	<.2	E.14
Benzophenone, unfltrd	µg/L	20	5	25	E.099	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	20	3	15	E5.52	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	20	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	20	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	20	7	35	3.00	--	--	--	--
Bromacil, unfltrd	µg/L	20	4	20	.67	--	--	--	--
Caffeine, unfltrd	µg/L	20	14	70	2.50	.50	.28	<.2	.20
Camphor, unfltrd	µg/L	20	7	35	E.07	--	--	--	--
Carbaryl, unfltrd	µg/L	20	5	25	E.21	--	--	--	--
Carbazole, unfltrd	µg/L	20	13	65	1.60	E.14	E.12	<.2	E.10
Chlorpyrifos, unfltrd	µg/L	20	1	5	E.028	--	--	--	--
Cholesterol, unfltrd	µg/L	20	3	15	E4.20	--	--	--	--
Cotinine, unfltrd	µg/L	18	2	11	.86	--	--	--	--
DEET, unfltrd	µg/L	20	15	75	E.39	E.16	E.12	E.11	E.13
Diazinon, unfltrd	µg/L	20	1	5	E.02	--	--	--	--
Dichlorvos, unfltrd	µg/L	20	7	35	E1.02	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	20	3	15	E2.40	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site BPC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	20	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	20	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	20	2	10	E0.07	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	20	2	10	E1.38	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	20	3	15	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	20	15	75	E10.7	E0.66	E0.12	E0.08	E0.24
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	20	4	20	E.13	--	--	--	--
Indole, unfltrd	µg/L	20	1	5	E.047	--	--	--	--
Isoborneol, unfltrd	µg/L	20	1	5	E.029	--	--	--	--
Isophorone, unfltrd	µg/L	20	8	40	E.82	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	20	1	5	E.02	--	--	--	--
Isoquinoline, unfltrd	µg/L	19	1	5	E.12	--	--	--	--
Menthol, unfltrd	µg/L	19	6	32	.24	--	--	--	--
Metalaxyl, unfltrd	µg/L	20	1	5	E.13	--	--	--	--
Methyl salicylate, unfltrd	µg/L	20	1	5	E.24	--	--	--	--
Metolachlor, unfltrd	µg/L	20	10	50	.42	--	--	--	--
Naphthalene, unfltrd	µg/L	20	5	25	E.11	--	--	--	--
p-Cresol, unfltrd	µg/L	20	7	35	E.27	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	20	1	5	B.88	--	--	--	--
Phenanthrene, unfltrd	µg/L	20	13	65	5.28	.26	E.09	<.2	E.15
Phenol, unfltrd	µg/L	20	2	10	E1.59	--	--	--	--
Prometon, unfltrd	µg/L	20	9	45	E.16	--	--	--	--
Pyrene, unfltrd	µg/L	20	15	75	E7.78	E.51	E.14	E.08	E.20
Tetrachloroethene, unfltrd	µg/L	20	2	10	E.09	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	20	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	20	2	10	E.11	--	--	--	--
Triclosan, unfltrd	µg/L	20	3	15	.23	--	--	--	--
Triethyl citrate, unfltrd	µg/L	20	5	25	E.11	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	20	6	30	E.12	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	20	12	60	E.91	E.50	E.13	<.2	E.16
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	20	7	35	E.13	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	20	7	35	E.16	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	24	24	100	240,000	26,000	14,000	1,500	7,400

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site PC2							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	20	20	100	776	662	570	436	514
Turbidity, unfltrd	NTU	19	19	100	1,430	813	71	29	122
Chemical oxygen demand, unfltrd	mg/L	16	9	56	215	77	B28	<25.5	B38
Biochemical oxygen demand, unfltrd	mg/L	17	5	29	168	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	19	19	100	430	290	240	200	240
Total suspended solids, unfltrd	mg/L	19	19	100	6,510	1,210	111	54	177
Calcium, unfltrd	mg/L	19	19	100	133	85	68	57	67
Magnesium, unfltrd	mg/L	19	19	100	24	21	17	14	17
Chloride, unfltrd	mg/L	19	19	100	56	42	37	32	35
Nitrite, fltrd	mg/L as N	19	19	100	.06	.04	.03	.03	.03
Nitrate, fltrd	mg/L as N	19	19	100	3.46	2.38	1.57	1.07	1.55
Nitrite plus nitrate, fltrd	mg/L as N	19	19	100	3.49	2.40	1.59	1.09	1.59
Ammonia, fltrd	mg/L as N	19	7	37	.20	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	19	19	100	4.86	3.56	2.97	2.32	2.84
Total phosphorus, fltrd	mg/L	19	19	100	5.88	1.09	.30	.25	.49
Orthophosphate, fltrd	mg/L as P	19	19	100	.21	.14	.12	.09	.10
Antimony, unfltrd	µg/L	19	19	100	.78	.63	.54	.48	.54
Arsenic, unfltrd	µg/L	19	19	100	25.3	10.4	6.43	3.90	6.75
Barium, unfltrd	µg/L	19	19	100	1,880	451	212	186	300
Beryllium, unfltrd	µg/L	19	13	68	6.08	1.02	E.20	<.26	.38
Cadmium, unfltrd	µg/L	19	19	100	4.42	.73	.13	.09	.25
Chromium, unfltrd	µg/L	19	19	100	53.0	15.8	1.96	1.27	3.68
Cobalt, unfltrd	µg/L	19	19	100	63.6	11.8	1.54	.99	3.05
Copper, unfltrd	µg/L	19	18	95	119	26.0	5.90	3.55	9.27
Lead, unfltrd	µg/L	19	19	100	137	23.5	2.89	1.63	4.77
Mercury, unfltrd	µg/L	18	11	61	.15	.03	B.01	<.01	.02
Nickel, unfltrd	µg/L	19	19	100	137	27.9	6.04	3.30	9.31
Selenium, unfltrd	µg/L	19	19	100	5.63	3.92	3.11	2.52	2.87
Silver, unfltrd	µg/L	19	15	79	.86	.15	.04	E.01	.05
Thallium, unfltrd	µg/L	19	8	42	1.13	--	--	--	--
Uranium, unfltrd	µg/L	19	19	100	8.48	6.09	5.43	3.99	4.96
Vanadium, unfltrd	µg/L	19	19	100	139	37.2	9.08	5.46	13.4
Zinc, unfltrd	µg/L	19	18	95	2,520	124	15.6	7.97	30.7
1,4-Dichlorobenzene, unfltrd	µg/L	18	2	11	E.02	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	18	2	11	E.03	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site PC2 Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	18	1	6	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	18	2	11	E.03	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	17	13	76	E28.6	E8.61	E0.48	E0.06	E0.90
3-*beta*-Coprostanol, unfltrd	µg/L	18	0	0	--	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	18	1	6	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	18	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	18	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	18	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	18	0	0	--	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	18	1	6	B.72	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	18	4	22	E30.0	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	18	11	61	.63	.24	E.15	<.2	E.14
Acetophenone, unfltrd	µg/L	18	5	28	.51	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	18	1	6	E.016	--	--	--	--
Anthracene, unfltrd	µg/L	18	2	11	E.035	--	--	--	--
Atrazine, unfltrd	µg/L	18	13	72	E2.10	E.23	E.08	<.2	E.14
BDE congener 47, unfltrd	µg/L	16	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	18	6	33	E.65	--	--	--	--
Benzophenone, unfltrd	µg/L	18	4	22	E.08	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	18	0	0	--	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	18	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	18	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	18	4	22	E.085	--	--	--	--
Bromacil, unfltrd	µg/L	18	2	11	.18	--	--	--	--
Caffeine, unfltrd	µg/L	18	12	67	.59	.28	E.13	<.2	E.13
Camphor, unfltrd	µg/L	18	6	33	E.05	--	--	--	--
Carbaryl, unfltrd	µg/L	18	4	22	E.20	--	--	--	--
Carbazole, unfltrd	µg/L	18	8	44	.36	--	--	--	--
Chlorpyrifos, unfltrd	µg/L	18	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	18	0	0	--	--	--	--	--
Cotinine, unfltrd	µg/L	16	2	13	.076	--	--	--	--
DEET, unfltrd	µg/L	18	13	72	E.32	E.14	E.12	<.4	E.12
Diazinon, unfltrd	µg/L	18	2	11	E.027	--	--	--	--
Dichlorvos, unfltrd	µg/L	18	8	44	E1.29	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	18	3	17	E1.20	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site PC2							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	18	1	6	E1.01	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	18	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	18	1	6	E.04	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	18	3	17	E1.35	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	18	5	28	E.51	--	--	--	--
Fluoranthene, unfltrd	µg/L	18	8	44	E1.62	--	--	--	--
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	18	3	17	E.035	--	--	--	--
Indole, unfltrd	µg/L	18	1	6	E.019	--	--	--	--
Isoborneol, unfltrd	µg/L	18	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	18	8	44	E.063	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	18	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	17	1	6	E.09	--	--	--	--
Menthol, unfltrd	µg/L	18	3	17	E.15	--	--	--	--
Metalaxyl, unfltrd	µg/L	18	2	11	.20	--	--	--	--
Methyl salicylate, unfltrd	µg/L	18	3	17	E.13	--	--	--	--
Metolachlor, unfltrd	µg/L	18	8	44	.36	--	--	--	--
Naphthalene, unfltrd	µg/L	18	2	11	E.05	--	--	--	--
p-Cresol, unfltrd	µg/L	18	7	39	E.21	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	18	3	17	B1.16	--	--	--	--
Phenanthrene, unfltrd	µg/L	18	7	39	1.00	--	--	--	--
Phenol, unfltrd	µg/L	18	1	6	E.48	--	--	--	--
Prometon, unfltrd	µg/L	18	7	39	E.08	--	--	--	--
Pyrene, unfltrd	µg/L	18	8	44	E1.16	--	--	--	--
Tetrachloroethene, unfltrd	µg/L	18	7	39	E.22	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	18	1	6	E.006	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	18	3	17	E.11	--	--	--	--
Triclosan, unfltrd	µg/L	18	0	0	--	--	--	--	--
Triethyl citrate, unfltrd	µg/L	18	0	0	--	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	18	6	33	E.10	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	18	11	61	E.91	E0.33	E0.12	<0.2	E0.14
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	18	8	44	E.08	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	18	6	33	E.07	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	21	20	95	610,000	14,000	2,100	490	2,100

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site PC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	30	30	100	786	667	558	407	497
Turbidity, unfltrd	NTU	28	28	100	1,690	882	439	51	217
Chemical oxygen demand, unfltrd	mg/L	24	14	58	307	95	66	<25.5	B48
Biochemical oxygen demand, unfltrd	mg/L	27	8	30	83	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	27	27	100	500	340	310	220	260
Total suspended solids, unfltrd	mg/L	27	27	100	6,540	1,470	590	79	350
Calcium, unfltrd	mg/L	27	27	100	161	97	86	62	73
Magnesium, unfltrd	mg/L	27	27	100	27	25	21	15	18
Chloride, unfltrd	mg/L	27	27	100	55	38	33	29	31
Nitrite, fltrd	mg/L as N	27	27	100	.10	.06	.04	.03	.04
Nitrate, fltrd	mg/L as N	27	27	100	5.83	3.16	2.50	1.57	2.21
Nitrite plus nitrate, fltrd	mg/L as N	27	27	100	5.90	3.22	2.53	1.61	2.25
Ammonia, fltrd	mg/L as N	27	12	44	.34	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	27	27	100	8.08	5.48	3.45	3.01	4.01
Total phosphorus, fltrd	mg/L	27	27	100	5.63	1.28	.72	.28	.62
Orthophosphate, fltrd	mg/L as P	27	27	100	.18	.14	.11	.07	.09
Antimony, unfltrd	µg/L	27	27	100	.91	.71	.62	.50	.60
Arsenic, unfltrd	µg/L	27	27	100	27.1	13.9	8.65	5.67	8.79
Barium, unfltrd	µg/L	27	27	100	1,760	539	292	222	370
Beryllium, unfltrd	µg/L	27	22	81	4.71	1.15	.70	E.16	.51
Cadmium, unfltrd	µg/L	27	27	100	4.40	.92	.42	.11	.35
Chromium, unfltrd	µg/L	27	27	100	50.7	18.1	9.17	1.74	5.73
Cobalt, unfltrd	µg/L	27	27	100	57.6	16.0	6.21	1.39	4.79
Copper, unfltrd	µg/L	27	27	100	113	31.3	17.1	4.75	13.1
Lead, unfltrd	µg/L	27	27	100	147	34.3	14.1	2.43	9.23
Mercury, unfltrd	µg/L	27	21	78	.18	.06	.03	B.01	.02
Nickel, unfltrd	µg/L	27	27	100	120.6	36.0	16.5	4.33	13.3
Selenium, unfltrd	µg/L	27	27	100	7.59	4.17	3.08	2.20	2.84
Silver, unfltrd	µg/L	27	21	78	.87	.20	.10	.02	.07
Thallium, unfltrd	µg/L	27	15	56	1.05	.41	.21	<.18	.21
Uranium, unfltrd	µg/L	27	27	100	8.21	6.08	5.39	3.68	4.67
Vanadium, unfltrd	µg/L	27	27	100	120	40.2	24.2	6.38	18.0
Zinc, unfltrd	µg/L	27	26	96	510	106	57.9	10.6	37.6
1,4-Dichlorobenzene, unfltrd	µg/L	27	6	22	E.13	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	27	5	19	E.03	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site PC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	27	2	7	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	27	7	26	E.03	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	26	22	85	E154	E24.5	E2.62	E0.22	E2.46
3-*beta*-Coprostanol, unfltrd	µg/L	27	4	15	E12.9	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	27	3	11	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	27	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	27	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	27	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	27	1	4	B2.85	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	27	1	4	B.66	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	27	6	22	E.69	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	27	19	70	1.75	.45	.22	<.2	.22
Acetophenone, unfltrd	µg/L	27	10	37	.52	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	27	1	4	E.20	--	--	--	--
Anthracene, unfltrd	µg/L	27	10	37	E.28	--	--	--	--
Atrazine, unfltrd	µg/L	27	20	74	E1.23	E.20	E.10	<.2	E.12
BDE congener 47, unfltrd	µg/L	25	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	27	18	67	E1.89	E.16	E.06	<.2	E.10
Benzophenone, unfltrd	µg/L	27	10	37	E.13	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	27	2	7	E4.60	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	27	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	27	1	4	B17.9	--	--	--	--
Bisphenol A, unfltrd	µg/L	27	14	52	E.30	E.22	E.22	<.4	E.14
Bromacil, unfltrd	µg/L	27	6	22	1.16	--	--	--	--
Caffeine, unfltrd	µg/L	27	22	81	1.16	.44	.30	E.07	.22
Camphor, unfltrd	µg/L	27	13	48	E.13	--	--	--	--
Carbaryl, unfltrd	µg/L	27	12	44	E.23	--	--	--	--
Carbazole, unfltrd	µg/L	27	20	74	.85	E.14	E.12	<.2	E.09
Chlorpyrifos, unfltrd	µg/L	27	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	27	4	15	E9.17	--	--	--	--
Cotinine, unfltrd	µg/L	24	0	0	--	--	--	--	--
DEET, unfltrd	µg/L	27	23	85	.55	E.21	E.15	E.11	E.15
Diazinon, unfltrd	µg/L	27	0	0	--	--	--	--	--
Dichlorvos, unfltrd	µg/L	27	15	56	E1.19	E.11	E.11	<.2	E.12
Diethoxynonylphenol (all isomers), unfltrd	µg/L	27	6	22	E2.00	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site PC1							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	27	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	27	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	27	2	7	E0.02	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	27	5	19	E2.33	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	27	11	41	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	27	20	74	E6.58	E0.40	E0.15	<0.2	E0.19
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	26	6	23	E.12	--	--	--	--
Indole, unfltrd	µg/L	27	3	11	E.032	--	--	--	--
Isoborneol, unfltrd	µg/L	27	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	27	15	56	E.042	E.08	E.04	<.2	E.05
Isopropylbenzene, unfltrd	µg/L	27	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	26	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	27	8	30	.21	--	--	--	--
Metalaxyl, unfltrd	µg/L	27	1	4	E.13	--	--	--	--
Methyl salicylate, unfltrd	µg/L	27	2	7	E.61	--	--	--	--
Metolachlor, unfltrd	µg/L	27	14	52	.42	E.12	E.12	<.2	E.08
Naphthalene, unfltrd	µg/L	27	4	15	E.07	--	--	--	--
p-Cresol, unfltrd	µg/L	27	5	19	E.17	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	27	3	11	B1.16	--	--	--	--
Phenanthrene, unfltrd	µg/L	27	19	70	2.86	E.15	E.08	<.2	E.11
Phenol, unfltrd	µg/L	27	2	7	E.52	--	--	--	--
Prometon, unfltrd	µg/L	27	16	59	.24	E.09	E.08	<.2	E.07
Pyrene, unfltrd	µg/L	27	20	74	E4.34	E.29	E.11	<.2	E.15
Tetrachloroethene, unfltrd	µg/L	27	6	22	E.030	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	27	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	27	3	11	E.11	--	--	--	--
Triclosan, unfltrd	µg/L	27	9	33	.24	--	--	--	--
Triethyl citrate, unfltrd	µg/L	27	2	7	E.030	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	27	15	56	E.10	E.10	E.07	<.2	E.05
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	27	20	74	E1.11	E.33	E.21	<.2	E.17
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	27	14	52	E.14	E.08	E.08	<.2	E.07
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	27	12	44	E.08	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	30	30	100	1,300,000	60,000	24,000	2,700	15,000

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Cole Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	72	72	100	1,490	859	599	275	482
Turbidity, unfltrd	NTU	68	68	100	514	119	37	10	32
Chemical oxygen demand, unfltrd	mg/L	63	55	87	852	88	52	B32	57
Biochemical oxygen demand, unfltrd	mg/L	71	21	30	405	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	70	70	100	630	360	240	160	220
Total suspended solids, unfltrd	mg/L	68	57	84	4,440	211	41	8	46
Calcium, unfltrd	mg/L	70	70	100	225	103	71	44	63
Magnesium, unfltrd	mg/L	70	70	100	37	25	16	9	13
Chloride, unfltrd	mg/L	70	70	100	230	70	51	28	41
Nitrite, fltrd	mg/L as N	69	68	99	.20	.08	.04	.02	.04
Nitrate, fltrd	mg/L as N	67	67	100	3.13	1.59	1.02	.59	.96
Nitrite plus nitrate, fltrd	mg/L as N	69	69	100	3.22	1.65	1.07	.60	.94
Ammonia, fltrd	mg/L as N	69	55	80	1.50	.26	.13	B.05	.10
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	70	70	100	8.18	3.45	2.47	1.87	2.51
Total phosphorus, fltrd	mg/L	70	70	100	4.47	.55	.34	.20	.37
Orthophosphate, fltrd	mg/L as P	69	69	100	.25	.17	.12	.08	.11
Antimony, unfltrd	µg/L	70	70	100	2.33	1.09	.71	.54	.73
Arsenic, unfltrd	µg/L	70	70	100	23.5	6.22	4.71	3.86	5.24
Barium, unfltrd	µg/L	70	70	100	1,010	208	170	134	175
Beryllium, unfltrd	µg/L	70	33	47	2.33	--	--	--	--
Cadmium, unfltrd	µg/L	70	69	99	3.66	.27	.11	.05	.13
Chromium, unfltrd	µg/L	70	64	91	51.2	6.03	1.69	.65	2.14
Cobalt, unfltrd	µg/L	70	70	100	31.1	2.75	1.16	.41	1.29
Copper, unfltrd	µg/L	70	65	93	137	14.2	6.01	B3.05	6.74
Lead, unfltrd	µg/L	70	70	100	220	13.0	3.84	.74	3.57
Mercury, unfltrd	µg/L	70	51	73	.14	.03	B.01	<.01	.02
Nickel, unfltrd	µg/L	70	70	100	77.1	7.35	4.27	2.78	5.14
Selenium, unfltrd	µg/L	70	70	100	5.65	1.84	1.20	.71	1.15
Silver, unfltrd	µg/L	70	59	84	16.9	.40	.10	.04	.13
Thallium, unfltrd	µg/L	70	15	21	.69	--	--	--	--
Uranium, unfltrd	µg/L	70	70	100	5.16	3.17	2.08	1.36	1.84
Vanadium, unfltrd	µg/L	70	68	97	81.6	8.39	3.34	2.17	4.55
Zinc, unfltrd	µg/L	70	69	99	845	73.6	35.6	8.50	28.0
1,4-Dichlorobenzene, unfltrd	µg/L	68	27	40	E.18	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	68	12	18	E.18	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Cole Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	68	11	16	E0.11	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	68	22	32	E.17	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	68	52	76	E107	E6.69	E1.48	E0.52	E1.33
3-*beta*-Coprostanol, unfltrd	µg/L	68	21	31	E33.0	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	68	26	38	.55	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	66	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	68	2	3	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	68	2	3	E.11	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	68	7	10	E3.76	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	68	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	66	39	59	E11.0	E1.03	E.35	<1.6	E.60
9,10-Anthraquinone, unfltrd	µg/L	68	60	88	6.40	.77	.39	E.08	.31
Acetophenone, unfltrd	µg/L	68	28	41	.97	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	67	4	6	.20	--	--	--	.11
Anthracene, unfltrd	µg/L	68	25	37	E.84	--	--	--	--
Atrazine, unfltrd	µg/L	68	40	59	E4.56	E.08	E.08	<.2	E.08
BDE congener 47, unfltrd	µg/L	59	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	68	36	53	E8.87	E.19	E.06	<.2	E.12
Benzophenone, unfltrd	µg/L	68	15	22	.21	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	68	22	32	E9.75	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	68	1	1	B2.14	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	68	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	68	40	59	.83	E.24	E.22	<.4	E.19
Bromacil, unfltrd	µg/L	68	7	10	.50	--	--	--	--
Caffeine, unfltrd	µg/L	68	60	88	4.63	1.02	.48	E.14	.39
Camphor, unfltrd	µg/L	68	49	72	.33	E.14	E.09	<.2	E.09
Carbaryl, unfltrd	µg/L	68	29	43	E.78	--	--	--	--
Carbazole, unfltrd	µg/L	68	51	75	2.97	.21	E.12	E.08	E.12
Chlorpyrifos, unfltrd	µg/L	68	1	1	E.076	--	--	--	--
Cholesterol, unfltrd	µg/L	68	26	38	E23.6	--	--	--	--
Cotinine, unfltrd	µg/L	67	7	10	E.35	--	--	--	--
DEET, unfltrd	µg/L	68	57	84	1.72	E.30	E.19	E.12	E.21
Diazinon, unfltrd	µg/L	68	12	18	E.34	--	--	--	--
Dichlorvos, unfltrd	µg/L	68	15	22	E3.08	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	68	22	32	3.54	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Cole Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	68	2	3	E1.11	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	68	22	32	1.19	--	--	--	--
d-Limonene, unfltrd	µg/L	68	17	25	E.65	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	68	17	25	E2.66	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	68	23	34	1.97	--	--	--	--
Fluoranthene, unfltrd	µg/L	68	54	79	E28.6	E0.54	E0.16	E0.08	E0.22
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	66	29	44	.60	--	--	--	--
Indole, unfltrd	µg/L	68	23	34	E.31	--	--	--	--
Isoborneol, unfltrd	µg/L	67	2	3	1.42	--	--	--	--
Isophorone, unfltrd	µg/L	67	32	48	E.081	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	68	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	67	2	3	E.09	--	--	--	--
Menthol, unfltrd	µg/L	65	30	46	1.35	--	--	--	--
Metalaxyl, unfltrd	µg/L	68	1	1	E.13	--	--	--	--
Methyl salicylate, unfltrd	µg/L	68	26	38	E2.79	--	--	--	--
Metolachlor, unfltrd	µg/L	68	11	16	1.41	--	--	--	--
Naphthalene, unfltrd	µg/L	68	17	25	E.84	--	--	--	--
p-Cresol, unfltrd	µg/L	68	47	69	E2.53	E.15	E.08	<.2	E.11
Pentachlorophenol, unfltrd	µg/L	68	12	18	E2.27	--	--	--	--
Phenanthrene, unfltrd	µg/L	68	44	65	11.2	.22	E.07	<.2	E.14
Phenol, unfltrd	µg/L	68	16	24	E1.30	--	--	--	--
Prometon, unfltrd	µg/L	68	26	38	.41	--	--	--	--
Pyrene, unfltrd	µg/L	68	56	82	E21.1	E.40	E.09	E.06	E.16
Tetrachloroethene, unfltrd	µg/L	68	19	28	E.23	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	68	3	4	E.05	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	68	12	18	E.17	--	--	--	--
Triclosan, unfltrd	µg/L	68	31	46	.90	--	--	--	--
Triethyl citrate, unfltrd	µg/L	68	13	19	E.16	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	68	33	49	E.23	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	68	64	94	E306	E1.10	E.64	E.30	E.65
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	68	43	63	.36	E.12	E.08	<.2	E.09
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	68	42	62	.42	E.09	E.05	<.2	E.07
Escherichia coli, unfltrd	MPN/100 mL	75	75	100	410,000	45,000	14,000	1,600	8,800

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Little Papillion Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	67	67	100	1,040	764	591	366	522
Turbidity, unfltrd	NTU	64	64	100	5,120	660	47	17	86
Chemical oxygen demand, unfltrd	mg/L	50	29	58	889	68	B29	<25.5	B38
Biochemical oxygen demand, unfltrd	mg/L	58	25	43	362	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	59	59	100	740	370	340	240	300
Total suspended solids, unfltrd	mg/L	58	56	97	10,200	229	43	19	77
Calcium, unfltrd	mg/L	59	59	100	241	97	88	65	80
Magnesium, unfltrd	mg/L	59	59	100	41	31	29	19	24
Chloride, unfltrd	mg/L	59	59	100	62	45	35	26	33
Nitrite, fltrd	mg/L as N	59	59	100	.16	.07	.04	.03	.05
Nitrate, fltrd	mg/L as N	59	59	100	3.61	2.08	1.42	.94	1.37
Nitrite plus nitrate, fltrd	mg/L as N	59	59	100	3.77	2.16	1.49	.97	1.43
Ammonia, fltrd	mg/L as N	59	27	46	.57	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	59	59	100	6.49	3.52	2.64	1.98	2.72
Total phosphorus, fltrd	mg/L	59	59	100	6.89	.56	.22	.14	.31
Orthophosphate, fltrd	mg/L as P	59	59	100	.23	.09	.06	.03	.05
Antimony, unfltrd	µg/L	59	59	100	1.30	.84	.65	.50	.66
Arsenic, unfltrd	µg/L	59	59	100	30.3	8.84	6.10	4.21	6.65
Barium, unfltrd	µg/L	59	59	100	2,020	251	208	179	250
Beryllium, unfltrd	µg/L	59	32	54	5.54	.34	E.13	<.26	.26
Cadmium, unfltrd	µg/L	59	59	100	5.34	.35	.10	.05	.14
Chromium, unfltrd	µg/L	59	58	98	78.8	7.75	1.55	.80	2.46
Cobalt, unfltrd	µg/L	59	59	100	70.0	4.10	.99	.73	1.85
Copper, unfltrd	µg/L	59	58	98	150	13.6	4.63	B2.39	6.42
Lead, unfltrd	µg/L	59	59	100	236	12.0	2.05	1.07	3.79
Mercury, unfltrd	µg/L	59	42	71	.26	.02	B.01	<.01	B.01
Nickel, unfltrd	µg/L	59	59	100	154	10.9	4.72	3.15	6.91
Selenium, unfltrd	µg/L	59	59	100	7.39	3.43	2.24	1.60	2.31
Silver, unfltrd	µg/L	59	40	68	1.66	.09	.02	<.016	.04
Thallium, unfltrd	µg/L	59	17	29	1.06	--	--	--	--
Uranium, unfltrd	µg/L	59	59	100	11.0	6.83	4.98	4.22	4.95
Vanadium, unfltrd	µg/L	59	59	100	143	14.0	5.78	3.26	7.79
Zinc, unfltrd	µg/L	59	57	97	4,060	79.8	11.1	5.46	25.4
1,4-Dichlorobenzene, unfltrd	µg/L	60	16	28	E.24	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	60	19	33	E.07	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Little Papillion Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	60	5	9	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	60	20	34	E.09	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	57	43	78	E45.5	E2.30	E0.62	E0.06	E0.61
3-*beta*-Coprostanol, unfltrd	µg/L	59	11	19	E17.2	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	60	15	26	E.11	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	58	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	60	1	2	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	60	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	60	2	3	B3.01	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	60	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	60	18	31	E100	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	60	40	69	2.98	.84	E.16	<.2	.24
Acetophenone, unfltrd	µg/L	60	23	40	.87	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	60	3	5	E.20	--	--	--	--
Anthracene, unfltrd	µg/L	60	16	28	E.73	--	--	--	--
Atrazine, unfltrd	µg/L	60	38	66	E.71	E.09	E.08	<.2	E.07
BDE congener 47, unfltrd	µg/L	51	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	60	32	55	E5.22	E.18	E.06	<.2	E.09
Benzophenone, unfltrd	µg/L	60	8	14	E.099	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	59	8	14	E5.27	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	59	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	60	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	60	25	43	1.68	--	--	--	--
Bromacil, unfltrd	µg/L	60	9	16	1.10	--	--	--	--
Caffeine, unfltrd	µg/L	60	45	78	E2.51	.69	.21	E.06	.21
Camphor, unfltrd	µg/L	60	29	50	.40	--	--	--	--
Carbaryl, unfltrd	µg/L	60	13	22	E.42	--	--	--	--
Carbazole, unfltrd	µg/L	60	42	72	1.68	.31	E.12	E.04	E.12
Chlorpyrifos, unfltrd	µg/L	60	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	59	13	22	E15.4	--	--	--	--
Cotinine, unfltrd	µg/L	57	3	5	.80	--	--	--	--
DEET, unfltrd	µg/L	60	45	78	.87	E.16	E.12	E.08	E.12
Diazinon, unfltrd	µg/L	60	2	3	E.083	--	--	--	--
Dichlorvos, unfltrd	µg/L	60	16	28	E.98	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	60	11	19	6.22	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Little Papillion Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	60	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	60	8	14	0.75	--	--	--	--
d-Limonene, unfltrd	µg/L	60	12	21	E.20	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	60	13	22	E2.58	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	60	11	19	E.92	--	--	--	--
Fluoranthene, unfltrd	µg/L	60	41	71	E13.1	E0.66	E0.08	E0.06	E0.18
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	60	12	21	.26	--	--	--	--
Indole, unfltrd	µg/L	60	14	24	E.059	--	--	--	--
Isoborneol, unfltrd	µg/L	60	1	2	.25	--	--	--	--
Isophorone, unfltrd	µg/L	60	27	47	E.08	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	60	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	58	2	4	E.13	--	--	--	--
Menthol, unfltrd	µg/L	59	22	39	.48	--	--	--	--
Metalaxyl, unfltrd	µg/L	60	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	60	12	21	E.99	--	--	--	--
Metolachlor, unfltrd	µg/L	60	11	19	16.0	--	--	--	--
Naphthalene, unfltrd	µg/L	60	22	38	E.49	--	--	--	--
p-Cresol, unfltrd	µg/L	60	21	36	E.75	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	60	4	7	E2.66	--	--	--	--
Phenanthrene, unfltrd	µg/L	60	35	60	7.08	.33	E.07	<.2	E.13
Phenol, unfltrd	µg/L	60	8	14	E1.48	--	--	--	--
Prometon, unfltrd	µg/L	60	21	36	.64	--	--	--	--
Pyrene, unfltrd	µg/L	60	42	72	E9.70	E.46	E.08	<.2	E.14
Tetrachloroethene, unfltrd	µg/L	60	40	69	E.22	E.22	E.03	<.4	E.04
Tribromomethane (bromoform), unfltrd	µg/L	60	2	3	E.020	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	60	3	5	.63	--	--	--	--
Triclosan, unfltrd	µg/L	60	9	16	.37	--	--	--	--
Triethyl citrate, unfltrd	µg/L	60	1	2	E.040	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	60	23	40	E.20	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	60	44	76	E3.14	E.57	E.23	E.06	E.23
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	60	23	40	E.16	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	60	20	34	.46	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	71	71	100	200,000	24,000	6,400	1,800	6,000

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Big Papillion Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	105	105	100	789	696	582	441	510
Turbidity, unfltrd	NTU	100	100	100	2,120	646	201	59	162
Chemical oxygen demand, unfltrd	mg/L	82	49	60	487	119	B42	<25.5	B42
Biochemical oxygen demand, unfltrd	mg/L	94	39	41	257	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	95	95	100	660	360	310	250	280
Total suspended solids, unfltrd	mg/L	94	92	98	7,920	1,380	212	81	265
Calcium, unfltrd	mg/L	95	95	100	208	101	88	71	78
Magnesium, unfltrd	mg/L	95	95	100	33	26	23	17	20
Chloride, unfltrd	mg/L	95	95	100	71	35	29	25	29
Nitrite, fltrd	mg/L as N	95	95	100	.11	.07	.04	.03	.05
Nitrate, fltrd	mg/L as N	94	94	100	8.68	4.32	2.98	1.90	2.74
Nitrite plus nitrate, fltrd	mg/L as N	95	95	100	8.76	4.37	3.03	1.86	2.67
Ammonia, fltrd	mg/L as N	95	52	55	.44	.15	.05	<.02	.04
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	95	95	100	9.50	6.41	4.77	3.47	4.62
Total phosphorus, fltrd	mg/L	95	95	100	7.82	1.10	.46	.26	.55
Orthophosphate, fltrd	mg/L as P	95	95	100	.19	.12	.10	.07	.08
Antimony, unfltrd	µg/L	95	93	98	2.21	.77	.64	.49	.62
Arsenic, unfltrd	µg/L	95	94	99	31.9	12.73	7.00	5.11	7.67
Barium, unfltrd	µg/L	95	95	100	2,120	530	267	213	331
Beryllium, unfltrd	µg/L	95	64	67	5.87	.94	.26	<.26	.41
Cadmium, unfltrd	µg/L	95	94	99	5.60	.79	.18	.10	.25
Chromium, unfltrd	µg/L	95	94	99	60.4	17.5	4.80	1.87	5.15
Cobalt, unfltrd	µg/L	95	94	99	77.2	12.5	2.57	1.34	3.46
Copper, unfltrd	µg/L	95	89	94	152	27.8	7.18	4.26	10.1
Lead, unfltrd	µg/L	95	94	99	207	29.2	7.14	2.47	7.14
Mercury, unfltrd	µg/L	95	73	77	.26	.07	.02	B.01	.02
Nickel, unfltrd	µg/L	95	95	100	164	32.5	7.89	4.51	11.3
Selenium, unfltrd	µg/L	95	94	99	9.09	5.60	3.72	2.16	2.97
Silver, unfltrd	µg/L	95	76	80	1.81	.26	.08	.02	.07
Thallium, unfltrd	µg/L	95	47	49	1.26	--	--	--	--
Uranium, unfltrd	µg/L	95	94	99	8.42	6.18	5.53	3.57	4.30
Vanadium, unfltrd	µg/L	95	95	100	154	37.9	11.9	6.93	16.1
Zinc, unfltrd	µg/L	95	87	92	2,030	151	31.0	9.65	36.9
1,4-Dichlorobenzene, unfltrd	µg/L	92	33	36	E.38	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	92	28	30	E.05	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Big Papillion Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	92	4	4	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	92	25	27	E.05	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	88	77	88	E124	E10.4	E2.62	E0.42	E2.17
3-*beta*-Coprostanol, unfltrd	µg/L	92	14	15	E27.5	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	92	19	21	E.11	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	92	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	92	2	2	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	92	2	2	E.11	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	92	4	59	E4.27	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	92	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	91	17	19	E154	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	92	62	67	3.01	.65	.25	<.2	.25
Acetophenone, unfltrd	µg/L	92	29	32	2.19	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	92	6	7	E.15	--	--	--	--
Anthracene, unfltrd	µg/L	92	33	36	E.45	--	--	--	--
Atrazine, unfltrd	µg/L	92	66	72	E2.29	E.17	E.08	<.2	E.11
BDE congener 47, unfltrd	µg/L	80	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	92	63	68	E3.85	E.32	E.08	<.2	E.13
Benzophenone, unfltrd	µg/L	92	23	25	E.099	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	92	9	10	E6.47	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	92	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	92	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	92	40	43	3.00	--	--	--	--
Bromacil, unfltrd	µg/L	92	23	25	1.24	--	--	--	--
Caffeine, unfltrd	µg/L	92	71	77	2.50	.64	.28	E.06	.23
Camphor, unfltrd	µg/L	92	39	42	E.18	--	--	--	--
Carbaryl, unfltrd	µg/L	92	25	27	E.21	--	--	--	--
Carbazole, unfltrd	µg/L	92	62	67	1.60	.23	E.12	<.2	E.12
Chlorpyrifos, unfltrd	µg/L	92	1	1	E.028	--	--	--	--
Cholesterol, unfltrd	µg/L	92	15	16	E23.4	--	--	--	--
Cotinine, unfltrd	µg/L	85	7	8	.86	--	--	--	--
DEET, unfltrd	µg/L	92	70	76	.56	E.18	E.12	<.4	E.14
Diazinon, unfltrd	µg/L	92	5	5	E.19	--	--	--	--
Dichlorvos, unfltrd	µg/L	92	33	36	E1.02	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	92	13	14	3.20	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Big Papillion Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	92	1	1	E2.00	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	92	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	92	15	16	E.27	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	92	21	23	E2.60	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	92	20	22	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	92	73	79	E10.7	E0.81	E0.26	<0.2	E0.24
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	92	22	24	.31	--	--	--	--
Indole, unfltrd	µg/L	92	15	16	E.061	--	--	--	--
Isoborneol, unfltrd	µg/L	92	1	1	E.029	--	--	--	--
Isophorone, unfltrd	µg/L	92	34	37	E.082	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	92	2	2	E.02	--	--	--	--
Isoquinoline, unfltrd	µg/L	88	1	1	E.12	--	--	--	--
Menthol, unfltrd	µg/L	88	29	33	.56	--	--	--	--
Metalaxyl, unfltrd	µg/L	92	4	4	E.15	--	--	--	--
Methyl salicylate, unfltrd	µg/L	92	19	21	E.79	--	--	--	--
Metolachlor, unfltrd	µg/L	92	49	53	4.76	E.12	E.12	<.2	E.07
Naphthalene, unfltrd	µg/L	92	29	32	E.21	--	--	--	--
p-Cresol, unfltrd	µg/L	92	35	38	E.60	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	92	7	8	E2.62	--	--	--	--
Phenanthrene, unfltrd	µg/L	92	65	71	5.28	.32	E.10	<.2	E.15
Phenol, unfltrd	µg/L	92	9	10	E1.59	--	--	--	--
Prometon, unfltrd	µg/L	92	38	41	.36	--	--	--	--
Pyrene, unfltrd	µg/L	92	73	79	E7.78	E.60	E.18	E.08	E.19
Tetrachloroethene, unfltrd	µg/L	92	23	25	E.097	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	92	3	3	E.06	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	92	10	11	E.19	--	--	--	--
Triclosan, unfltrd	µg/L	92	20	22	.53	--	--	--	--
Triethyl citrate, unfltrd	µg/L	92	23	25	.20	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	92	37	40	E.13	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	92	62	67	E2.89	E.50	E.18	<.2	E.19
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	92	38	41	E.15	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	92	31	34	E.16	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	111	109	98	1,400,000	45,000	13,000	1,400	8,400

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Papillion Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	50	50	100	786	667	558	407	504
Turbidity, unfltrd	NTU	47	47	100	1,690	861	205	38	172
Chemical oxygen demand, unfltrd	mg/L	40	23	58	307	87	B34	<25.5	B44
Biochemical oxygen demand, unfltrd	mg/L	44	13	30	168	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	46	46	100	500	330	270	200	250
Total suspended solids, unfltrd	mg/L	46	46	100	6,540	1,490	221	54	264
Calcium, unfltrd	mg/L	46	46	100	161	93	76	57	70
Magnesium, unfltrd	mg/L	46	46	100	27	24	19	15	17
Chloride, unfltrd	mg/L	46	46	100	56	40	34	30	33
Nitrite, fltrd	mg/L as N	46	46	100	.10	.05	.03	.03	.04
Nitrate, fltrd	mg/L as N	46	46	100	5.83	2.78	2.13	1.13	1.90
Nitrite plus nitrate, fltrd	mg/L as N	46	46	100	5.90	2.80	2.16	1.19	1.95
Ammonia, fltrd	mg/L as N	46	19	41	.34	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	46	46	100	8.08	4.63	3.36	2.67	3.48
Total phosphorus, fltrd	mg/L	46	46	100	5.88	1.19	.39	.25	.56
Orthophosphate, fltrd	mg/L as P	46	46	100	.21	.14	.12	.07	.09
Antimony, unfltrd	µg/L	46	46	100	.91	.68	.59	.49	.57
Arsenic, unfltrd	µg/L	46	46	100	27.1	12.9	7.33	4.54	7.88
Barium, unfltrd	µg/L	46	46	100	1,880	510	257	200	339
Beryllium, unfltrd	µg/L	46	35	76	6.08	1.11	.35	E.13	.45
Cadmium, unfltrd	µg/L	46	46	100	4.42	.86	.21	.09	.30
Chromium, unfltrd	µg/L	46	46	100	53.0	17.6	3.89	1.47	4.77
Cobalt, unfltrd	µg/L	46	46	100	63.6	15.2	2.80	1.05	3.98
Copper, unfltrd	µg/L	46	45	98	119	30.9	8.64	4.20	11.3
Lead, unfltrd	µg/L	46	46	100	147	31.2	5.53	1.88	7.03
Mercury, unfltrd	µg/L	45	32	71	.18	.06	.02	<.01	.02
Nickel, unfltrd	µg/L	46	46	100	137	34.2	8.47	3.62	11.5
Selenium, unfltrd	µg/L	46	46	100	7.59	4.19	3.10	2.24	2.85
Silver, unfltrd	µg/L	46	36	78	.87	.15	.08	.02	.06
Thallium, unfltrd	µg/L	46	23	50	1.13	--	--	--	--
Uranium, unfltrd	µg/L	46	46	100	8.48	6.10	5.43	3.70	4.79
Vanadium, unfltrd	µg/L	46	46	100	139	38.6	13.5	6.06	15.9
Zinc, unfltrd	µg/L	46	44	96	2,520	110	24.8	9.78	34.6
1,4-Dichlorobenzene, unfltrd	µg/L	45	8	18	E.13	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	45	7	16	E.03	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Papillion Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	45	3	7	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	45	9	20	E.03	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	43	35	81	E154	E16.3	E1.36	E0.16	E1.65
3-*beta*-Coprostanol, unfltrd	µg/L	45	4	9	E12.9	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	45	4	9	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	45	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	45	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	45	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	45	1	2	B2.85	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	45	2	4	E.72	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	45	10	22	E30.0	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	45	30	67	1.75	.34	.21	<.2	E.18
Acetophenone, unfltrd	µg/L	45	15	33	.52	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	45	2	4	.2	--	--	--	--
Anthracene, unfltrd	µg/L	45	12	27	E.28	--	--	--	--
Atrazine, unfltrd	µg/L	45	33	73	E2.10	E.21	E.09	<.2	E.13
BDE congener 47, unfltrd	µg/L	41	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	45	24	53	E1.89	E.13	E.06	<.2	E.09
Benzophenone, unfltrd	µg/L	45	14	31	E.13	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	45	2	4	E4.60	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	45	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	45	1	2	B17.9	--	--	--	--
Bisphenol A, unfltrd	µg/L	45	18	40	E.30	--	--	--	--
Bromacil, unfltrd	µg/L	45	8	18	1.16	--	--	--	--
Caffeine, unfltrd	µg/L	45	34	76	1.16	.40	.23	E.06	E.17
Camphor, unfltrd	µg/L	45	19	42	E.18	--	--	--	--
Carbaryl, unfltrd	µg/L	45	16	36	E.23	--	--	--	--
Carbazole, unfltrd	µg/L	45	28	62	.85	E.12	E.12	<.2	E.09
Chlorpyrifos, unfltrd	µg/L	45	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	45	4	9	E9.17	--	--	--	--
Cotinine, unfltrd	µg/L	40	2	5	.076	--	--	--	--
DEET, unfltrd	µg/L	45	36	80	.55	E.20	E.12	E.11	E.14
Diazinon, unfltrd	µg/L	45	2	4	E.027	--	--	--	--
Dichlorvos, unfltrd	µg/L	45	23	51	E1.29	E.11	E.11	<.2	E.13
Diethoxynonylphenol (all isomers), unfltrd	µg/L	45	9	20	E2.00	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Papillion Creek stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	45	1	2	E1.01	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	45	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	45	3	7	E.04	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	45	8	18	E2.33	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	45	16	36	E.51	--	--	--	--
Fluoranthene, unfltrd	µg/L	45	28	62	E6.58	E0.32	E0.08	<0.2	E0.15
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	44	9	20	E.12	--	--	--	--
Indole, unfltrd	µg/L	45	4	9	E.032	--	--	--	--
Isoborneol, unfltrd	µg/L	45	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	45	23	51	E.063	E.08	E.06	<.2	E.05
Isopropylbenzene, unfltrd	µg/L	45	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	43	1	2	E.09	--	--	--	--
Menthol, unfltrd	µg/L	45	11	24	.21	--	--	--	--
Metalaxyl, unfltrd	µg/L	45	3	7	.20	--	--	--	--
Methyl salicylate, unfltrd	µg/L	45	5	11	E.61	--	--	--	--
Metolachlor, unfltrd	µg/L	45	22	49	.42	--	--	--	--
Naphthalene, unfltrd	µg/L	45	6	13	E.07	--	--	--	--
p-Cresol, unfltrd	µg/L	45	12	27	E.21	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	45	6	13	B1.16	--	--	--	--
Phenanthrene, unfltrd	µg/L	45	26	58	2.86	E.12	E.07	<.2	E.09
Phenol, unfltrd	µg/L	45	3	7	E.52	--	--	--	--
Prometon, unfltrd	µg/L	45	23	51	.24	E.08	E.08	<.2	E.07
Pyrene, unfltrd	µg/L	45	28	62	E4.34	E.25	E.08	<.2	E.12
Tetrachloroethene, unfltrd	µg/L	45	13	29	E.030	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	45	1	2	E.006	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	45	6	13	E.11	--	--	--	--
Triclosan, unfltrd	µg/L	45	9	20	.24	--	--	--	--
Triethyl citrate, unfltrd	µg/L	45	2	4	E.030	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	45	21	47	E.10	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	45	31	69	E1.11	E.33	E.19	<.2	E.16
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	45	22	49	E.14	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	45	18	40	E.08	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	51	50	98	1,300,000	42,000	9,900	1,200	6,700

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All stream sites in Papillion Creek Basin							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	294	294	100	1,490	733	587	384	505
Turbidity, unfltrd	NTU	279	279	100	5,120	490	101	22	96
Chemical oxygen demand, unfltrd	mg/L	235	156	66	889	90	B45	<25.5	B45
Biochemical oxygen demand, unfltrd	mg/L	267	98	37	405	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	270	270	100	740	360	300	220	260
Total suspended solids, unfltrd	mg/L	266	251	94	10,200	739	116	24	129
Calcium, unfltrd	mg/L	270	270	100	241	98	81	61	73
Magnesium, unfltrd	mg/L	270	270	100	41	26	21	15	18
Chloride, unfltrd	mg/L	270	270	100	230	47	33	25	33
Nitrite, fltrd	mg/L as N	269	268	100	.20	.07	.04	.03	.04
Nitrate, fltrd	mg/L as N	266	266	100	8.68	2.91	1.65	1.02	1.69
Nitrite plus nitrate, fltrd	mg/L as N	269	269	100	8.76	2.95	1.72	1.05	1.69
Ammonia, fltrd	mg/L as N	269	153	57	1.50	.17	B.05	<.028	B.05
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	270	270	100	9.50	4.79	3.36	2.40	3.35
Total phosphorus, fltrd	mg/L	270	270	100	7.82	.92	.36	.20	.44
Orthophosphate, fltrd	mg/L as P	269	269	100	.25	.13	.10	.06	.08
Antimony, unfltrd	µg/L	270	268	99	2.33	.80	.64	.50	.65
Arsenic, unfltrd	µg/L	270	269	100	31.9	9.72	6.38	4.32	6.77
Barium, unfltrd	µg/L	270	270	100	2,120	331	216	177	265
Beryllium, unfltrd	µg/L	270	164	61	6.08	.67	E.18	<1.6	.31
Cadmium, unfltrd	µg/L	270	268	99	5.60	.55	.15	.07	.19
Chromium, unfltrd	µg/L	270	262	97	78.8	11.8	2.77	1.04	3.44
Cobalt, unfltrd	µg/L	270	269	100	77.2	7.09	1.69	.78	2.39
Copper, unfltrd	µg/L	270	257	95	152	21.3	6.34	3.23	8.39
Lead, unfltrd	µg/L	270	269	100	236	21.9	4.34	1.29	5.18
Mercury, unfltrd	µg/L	269	198	74	.26	.04	.02	<.01	.02
Nickel, unfltrd	µg/L	270	270	100	164	19.1	5.68	3.19	8.29
Selenium, unfltrd	µg/L	270	269	100	9.09	4.07	2.31	1.42	2.18
Silver, unfltrd	µg/L	270	211	78	16.9	.24	.08	.02	.07
Thallium, unfltrd	µg/L	270	102	38	1.26	--	--	--	--
Uranium, unfltrd	µg/L	270	269	100	11.0	5.90	4.32	2.84	3.62
Vanadium, unfltrd	µg/L	270	268	99	154	24.2	8.20	3.79	9.88
Zinc, unfltrd	µg/L	270	257	95	4,060	98.9	26.8	7.83	31.3
1,4-Dichlorobenzene, unfltrd	µg/L	265	84	32	E.38	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	265	66	25	E.18	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All stream sites in Papillion Creek Basin							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	265	23	9	E0.11	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	265	76	29	E.17	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	256	207	81	E154	E8.66	E1.50	E0.22	E1.37
3-*beta*-Coprostanol, unfltrd	µg/L	264	50	19	E33.0	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	265	64	24	.55	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	261	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	265	5	2	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	265	4	2	E.11	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	265	7	3	E4.27	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	265	2	1	E.72	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	262	84	32	E154	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	265	192	73	6.40	.65	.24	<.2	.25
Acetophenone, unfltrd	µg/L	265	95	36	2.19	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	262	12	5	.20	--	--	--	--
Anthracene, unfltrd	µg/L	265	86	33	E.84	--	--	--	--
Atrazine, unfltrd	µg/L	265	177	67	E4.56	E.16	E.08	<.2	E.09
BDE congener 47, unfltrd	µg/L	231	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	265	155	59	E8.87	E.22	E.06	<.2	E.11
Benzophenone, unfltrd	µg/L	265	60	23	.21	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	264	41	16	E9.75	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	264	1	0	B2.14	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	265	1	0	B17.9	--	--	--	--
Bisphenol A, unfltrd	µg/L	265	123	47	3.00	--	--	--	--
Bromacil, unfltrd	µg/L	265	47	18	1.24	--	--	--	--
Caffeine, unfltrd	µg/L	265	210	80	4.63	.70	.26	E.06	.25
Camphor, unfltrd	µg/L	265	136	52	.40	E.09	E.09	<.2	E.07
Carbaryl, unfltrd	µg/L	265	83	32	E.78	--	--	--	--
Carbazole, unfltrd	µg/L	265	183	70	2.97	.22	E.12	<.2	E.12
Chlorpyrifos, unfltrd	µg/L	265	2	1	E.08	--	--	--	--
Cholesterol, unfltrd	µg/L	264	58	22	E23.6	--	--	--	--
Cotinine, unfltrd	µg/L	249	19	8	.86	--	--	--	--
DEET, unfltrd	µg/L	265	208	79	1.72	E.21	E.12	E.11	E.15
Diazinon, unfltrd	µg/L	265	21	8	E.34	--	--	--	--
Dichlorvos, unfltrd	µg/L	265	87	33	E3.08	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	265	55	21	6.22	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All stream sites in Papillion Creek Basin							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	265	4	2	E2.00	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	265	30	11	1.19	--	--	--	--
d-Limonene, unfltrd	µg/L	265	47	18	E.65	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	265	59	22	E2.66	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	265	70	27	1.97	--	--	--	--
Fluoranthene, unfltrd	µg/L	265	196	75	E28.6	E0.64	E0.11	<0.2	E0.21
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	260	75	29	.60	--	--	--	--
Indole, unfltrd	µg/L	265	56	21	E.31	--	--	--	--
Isoborneol, unfltrd	µg/L	264	4	2	1.42	--	--	--	--
Isophorone, unfltrd	µg/L	264	116	44	E.08	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	265	2	1	E.02	--	--	--	--
Isoquinoline, unfltrd	µg/L	256	6	2	E.13	--	--	--	--
Menthol, unfltrd	µg/L	257	92	36	1.35	--	--	--	--
Metalaxyl, unfltrd	µg/L	265	8	3	.20	--	--	--	--
Methyl salicylate, unfltrd	µg/L	265	62	24	E2.79	--	--	--	--
Metolachlor, unfltrd	µg/L	265	93	35	16.0	--	--	--	--
Naphthalene, unfltrd	µg/L	265	74	28	E.84	--	--	--	--
p-Cresol, unfltrd	µg/L	265	115	44	E2.53	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	265	29	11	E2.66	--	--	--	--
Phenanthrene, unfltrd	µg/L	265	170	65	11.2	.27	E.07	<.2	E.13
Phenol, unfltrd	µg/L	265	36	14	E1.59	--	--	--	--
Prometon, unfltrd	µg/L	265	108	41	.64	--	--	--	--
Pyrene, unfltrd	µg/L	265	199	76	E21.1	E.45	E.08	E.07	E.16
Tetrachloroethene, unfltrd	µg/L	265	95	36	E.23	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	265	9	3	E.06	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	265	31	12	.63	--	--	--	--
Triclosan, unfltrd	µg/L	265	69	26	.90	--	--	--	--
Triethyl citrate, unfltrd	µg/L	265	39	15	.20	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	265	114	43	E.23	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	265	201	76	E306	E.65	E.29	E.06	E.27
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	265	126	48	.36	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	265	111	42	.46	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	308	305	99	1,400,000	37,000	11,000	1,400	7,600

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site MR5							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	28	28	100	808	796	754	716	731
Turbidity, unfltrd	NTU	24	24	100	676	83	55	35	64
Chemical oxygen demand, unfltrd	mg/L	23	11	48	55	--	--	--	--
Biochemical oxygen demand, unfltrd	mg/L	24	0	0	--	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	28	28	100	380	310	290	250	280
Total suspended solids, unfltrd	mg/L	28	28	100	906	180	106	71	117
Calcium, unfltrd	mg/L	28	28	100	96	77	70	60	69
Magnesium, unfltrd	mg/L	28	28	100	34	28	27	23	26
Chloride, unfltrd	mg/L	28	28	100	20	19	17	15	17
Nitrite, fltrd	mg/L as N	27	27	100	.05	.01	.01	<.01	.01
Nitrate, fltrd	mg/L as N	26	26	100	3.39	2.23	.63	.50	.76
Nitrite plus nitrate, fltrd	mg/L as N	28	28	100	3.41	2.23	.61	.46	.71
Ammonia, fltrd	mg/L as N	28	4	14	.63	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	28	28	100	4.83	3.49	1.25	1.06	1.53
Total phosphorus, fltrd	mg/L	28	28	100	.96	.39	.25	.15	.24
Orthophosphate, fltrd	mg/L as P	28	28	100	.17	.10	.05	.01	.04
Antimony, unfltrd	µg/L	28	28	100	.67	.59	.54	.46	.52
Arsenic, unfltrd	µg/L	28	28	100	10.5	5.38	4.42	3.77	4.44
Barium, unfltrd	µg/L	28	28	100	325	119	86.6	76.0	99.8
Beryllium, unfltrd	µg/L	28	11	39	.80	--	--	--	--
Cadmium, unfltrd	µg/L	28	28	100	.65	.16	.11	.09	.13
Chromium, unfltrd	µg/L	28	28	100	12.3	2.55	1.56	1.14	1.86
Cobalt, unfltrd	µg/L	28	28	100	10.3	2.13	1.31	.95	1.55
Copper, unfltrd	µg/L	28	28	100	19.2	5.90	3.95	3.41	4.88
Lead, unfltrd	µg/L	28	28	100	18.5	2.90	1.88	1.23	2.15
Mercury, unfltrd	µg/L	27	15	56	.03	B.01	B.01	<.01	B.01
Nickel, unfltrd	µg/L	28	28	100	26.4	7.39	5.17	4.12	6.01
Selenium, unfltrd	µg/L	28	28	100	3.12	2.15	1.93	1.78	1.94
Silver, unfltrd	µg/L	28	21	75	.11	.06	.02	E.01	.02
Thallium, unfltrd	µg/L	28	8	29	.34	--	--	--	--
Uranium, unfltrd	µg/L	28	28	100	6.99	4.78	4.55	4.22	4.60
Vanadium, unfltrd	µg/L	28	28	100	32.2	10.6	7.48	5.87	7.97
Zinc, unfltrd	µg/L	28	28	100	60.3	12.8	8.32	6.27	10.2
1,4-Dichlorobenzene, unfltrd	µg/L	28	0	0	--	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	28	0	0	--	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site MR5							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	28	4	14	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	28	0	0	--	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	25	4	16	E.51	--	--	--	--
3-*beta*-Coprostanol, unfltrd	µg/L	28	0	0	--	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	28	0	0	--	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	27	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	28	1	4	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	28	1	4	E.11	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	28	2	7	E.21	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	28	1	4	E.026	--	--	--	--
Acetophenone, unfltrd	µg/L	28	1	4	.58	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	27	1	4	E.03	--	--	--	--
Anthracene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Atrazine, unfltrd	µg/L	28	20	71	E.72	E0.23	E0.10	<0.2	E0.13
BDE congener 47, unfltrd	µg/L	26	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	28	1	4	E.0039	--	--	--	--
Benzophenone, unfltrd	µg/L	28	2	7	E.031	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	28	0	0	--	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	28	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	28	2	7	E.062	--	--	--	--
Bromacil, unfltrd	µg/L	28	1	4	E.10	--	--	--	--
Caffeine, unfltrd	µg/L	28	3	11	E.16	--	--	--	--
Camphor, unfltrd	µg/L	28	5	18	E.09	--	--	--	--
Carbaryl, unfltrd	µg/L	28	1	4	E.13	--	--	--	--
Carbazole, unfltrd	µg/L	28	1	4	E.008	--	--	--	--
Chlorpyrifos, unfltrd	µg/L	28	1	4	E.01	--	--	--	--
Cholesterol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Cotinine, unfltrd	µg/L	28	0	0	--	--	--	--	--
DEET, unfltrd	µg/L	28	4	14	E.049	--	--	--	--
Diazinon, unfltrd	µg/L	28	1	4	E.01	--	--	--	--
Dichlorvos, unfltrd	µg/L	28	0	0	--	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	28	1	4	E1.20	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site MR5							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	28	1	4	B0.60	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	28	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	28	0	0	--	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	28	1	4	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	27	2	7	E.006	--	--	--	--
Indole, unfltrd	µg/L	28	4	14	E.022	--	--	--	--
Isoborneol, unfltrd	µg/L	28	0	0	E.05	--	--	--	--
Isophorone, unfltrd	µg/L	28	2	7	E.026	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	28	1	4	E.09	--	--	--	--
Menthol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Metalaxyl, unfltrd	µg/L	28	1	4	E.13	--	--	--	--
Methyl salicylate, unfltrd	µg/L	28	1	4	E.07	--	--	--	--
Metolachlor, unfltrd	µg/L	28	18	64	.23	E0.12	E0.11	<0.2	E0.06
Naphthalene, unfltrd	µg/L	28	0	0	--	--	--	--	--
p-Cresol, unfltrd	µg/L	28	4	14	E.15	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	27	0	0	--	--	--	--	--
Phenanthrene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Phenol, unfltrd	µg/L	28	1	4	B.28	--	--	--	--
Prometon, unfltrd	µg/L	28	3	11	E.08	--	--	--	--
Pyrene, unfltrd	µg/L	28	2	7	E.08	--	--	--	--
Tetrachloroethene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	28	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	28	1	4	E.11	--	--	--	--
Triclosan, unfltrd	µg/L	28	1	4	E.09	--	--	--	--
Triethyl citrate, unfltrd	µg/L	28	1	4	E.016	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	28	0	0	--	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	28	2	7	E.48	--	--	--	--
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	28	4	14	E.08	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	28	1	4	E.05	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	28	28	100	24,000	340	150	48	160

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site MR4							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	28	28	100	806	795	758	727	732
Turbidity, unfltrd	NTU	24	24	100	369	99	62	31	62
Chemical oxygen demand, unfltrd	mg/L	24	10	42	111	--	--	--	--
Biochemical oxygen demand, unfltrd	mg/L	24	2	8	B25	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	27	27	100	390	330	290	250	290
Total suspended solids, unfltrd	mg/L	28	28	100	499	226	114	70	122
Calcium, unfltrd	mg/L	27	27	100	103	82	71	61	72
Magnesium, unfltrd	mg/L	27	27	100	34	29	27	24	26
Chloride, unfltrd	mg/L	27	27	100	21	18	17	16	17
Nitrite, fltrd	mg/L as N	27	27	100	.05	.01	.01	<.01	.01
Nitrate, fltrd	mg/L as N	27	27	100	3.46	2.32	.68	.47	.73
Nitrite plus nitrate, fltrd	mg/L as N	28	28	100	3.48	2.32	.67	.48	.73
Ammonia, fltrd	mg/L as N	28	4	14	.63	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	28	28	100	4.70	3.82	1.27	1.13	1.63
Total phosphorus, fltrd	mg/L	28	28	100	.82	.40	.24	.15	.24
Orthophosphate, fltrd	mg/L as P	28	28	100	.16	.10	.04	.01	.04
Antimony, unfltrd	µg/L	28	28	100	.68	.61	.56	.49	.54
Arsenic, unfltrd	µg/L	28	28	100	8.36	5.41	4.63	3.69	4.43
Barium, unfltrd	µg/L	28	28	100	203	127	92.1	75.9	99.1
Beryllium, unfltrd	µg/L	28	11	39	.63	--	--	--	--
Cadmium, unfltrd	µg/L	28	28	100	.38	.19	.13	.10	.14
Chromium, unfltrd	µg/L	28	28	100	6.55	3.03	1.67	1.16	1.88
Cobalt, unfltrd	µg/L	28	28	100	5.74	2.60	1.38	1.08	1.59
Copper, unfltrd	µg/L	28	28	100	14.4	5.73	3.80	3.40	4.57
Lead, unfltrd	µg/L	28	28	100	7.88	4.38	1.82	1.45	2.26
Mercury, unfltrd	µg/L	28	16	57	.03	.02	B.01	<.01	B.01
Nickel, unfltrd	µg/L	28	28	100	17.4	8.25	5.30	4.34	5.97
Selenium, unfltrd	µg/L	28	28	100	3.17	2.15	1.93	1.71	1.95
Silver, unfltrd	µg/L	28	23	82	.08	.05	.02	E.01	.02
Thallium, unfltrd	µg/L	28	11	39	E.17	--	--	--	--
Uranium, unfltrd	µg/L	28	28	100	7.03	4.75	4.54	4.35	4.62
Vanadium, unfltrd	µg/L	28	28	100	20.0	10.7	7.76	6.07	8.01
Zinc, unfltrd	µg/L	28	28	100	40.1	17.2	8.79	6.69	10.7
1,4-Dichlorobenzene, unfltrd	µg/L	28	4	14	E.04	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	28	1	4	E.03	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site MR4							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	28	3	11	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	28	1	4	E.03	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	25	4	16	E.60	--	--	--	--
3-*beta*-Coprostanol, unfltrd	µg/L	28	2	7	E13.0	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	28	0	0	--	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	27	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	28	1	4	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	28	1	4	B2.05	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	28	0	0	E.11	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	28	2	7	E8.00	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	28	1	4	E.016	--	--	--	--
Acetophenone, unfltrd	µg/L	28	1	4	.21	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	28	1	4	E.04	--	--	--	--
Anthracene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Atrazine, unfltrd	µg/L	28	20	71	.68	0.25	E0.09	<0.2	E0.12
BDE congener 47, unfltrd	µg/L	26	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Benzophenone, unfltrd	µg/L	28	2	7	E.085	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	28	2	7	E3.58	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	28	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	28	2	7	E.32	--	--	--	--
Bromacil, unfltrd	µg/L	28	0	0	--	--	--	--	--
Caffeine, unfltrd	µg/L	28	4	14	.30	--	--	--	--
Camphor, unfltrd	µg/L	28	6	21	E.09	--	--	--	--
Carbaryl, unfltrd	µg/L	28	0	0	--	--	--	--	--
Carbazole, unfltrd	µg/L	28	1	4	E.006	--	--	--	--
Chlorpyrifos, unfltrd	µg/L	28	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	28	2	7	E7.67	--	--	--	--
Cotinine, unfltrd	µg/L	28	0	0	--	--	--	--	--
DEET, unfltrd	µg/L	28	7	25	E.06	--	--	--	--
Diazinon, unfltrd	µg/L	28	0	0	--	--	--	--	--
Dichlorvos, unfltrd	µg/L	28	0	0	--	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	28	3	11	E1.52	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2’,4,4’-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site MR4							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	28	1	4	0.32	--	--	--	--
d-Limonene, unfltrd	µg/L	28	1	4	E.02	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	28	3	11	E2.92	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	28	1	4	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	28	3	11	E.051	--	--	--	--
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	28	3	11	.21	--	--	--	--
Indole, unfltrd	µg/L	28	2	7	E.005	--	--	--	--
Isoborneol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	28	4	14	E.027	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	28	0	0	--	--	--	--	--
Menthol, unfltrd	µg/L	28	3	11	E.06	--	--	--	--
Metalaxyl, unfltrd	µg/L	28	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	28	1	4	E.07	--	--	--	--
Metolachlor, unfltrd	µg/L	28	17	61	.27	E0.12	E0.12	<0.2	E0.05
Naphthalene, unfltrd	µg/L	28	1	4	E.11	--	--	--	--
p-Cresol, unfltrd	µg/L	28	6	21	E.20	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	26	0	0	--	--	--	--	--
Phenanthrene, unfltrd	µg/L	28	1	4	E.07	--	--	--	--
Phenol, unfltrd	µg/L	28	1	4	E.55	--	--	--	--
Prometon, unfltrd	µg/L	28	1	4	E.08	--	--	--	--
Pyrene, unfltrd	µg/L	28	3	11	E.08	--	--	--	--
Tetrachloroethene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	28	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	28	7	25	E.19	--	--	--	--
Triclosan, unfltrd	µg/L	28	3	11	.35	--	--	--	--
Triethyl citrate, unfltrd	µg/L	28	1	4	E.008	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	28	3	11	E.10	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	28	3	11	E.15	--	--	--	--
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	28	1	4	E.08	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	28	1	4	E.05	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	28	27	96	17,330	640	170	100	250

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site MR3							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	28	28	100	800	788	762	732	730
Turbidity, unfltrd	NTU	24	24	100	345	82	56	33	59
Chemical oxygen demand, unfltrd	mg/L	24	9	38	68	--	--	--	--
Biochemical oxygen demand, unfltrd	mg/L	24	1	4	B32	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	28	28	100	390	320	290	250	280
Total suspended solids, unfltrd	mg/L	28	28	100	406	190	109	77	116
Calcium, unfltrd	mg/L	28	28	100	99	79	72	60	70
Magnesium, unfltrd	mg/L	28	28	100	34	29	27	23	26
Chloride, unfltrd	mg/L	28	28	100	21	19	18	16	17
Nitrite, fltrd	mg/L as N	27	26	96	.05	.01	.01	<.01	.01
Nitrate, fltrd	mg/L as N	26	26	100	3.53	2.47	.71	.46	.77
Nitrite plus nitrate, fltrd	mg/L as N	28	28	100	3.55	2.34	.71	.44	.75
Ammonia, fltrd	mg/L as N	28	7	25	.64	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	28	28	100	4.92	3.88	1.44	1.10	1.70
Total phosphorus, fltrd	mg/L	28	28	100	.67	.39	.24	.16	.25
Orthophosphate, fltrd	mg/L as P	28	28	100	.17	.11	.06	.02	.05
Antimony, unfltrd	µg/L	28	28	100	.69	.61	.58	.50	.55
Arsenic, unfltrd	µg/L	28	28	100	7.81	5.37	4.44	3.58	4.31
Barium, unfltrd	µg/L	28	28	100	185	128	90.8	74.3	95.5
Beryllium, unfltrd	µg/L	28	9	32	.58	--	--	--	--
Cadmium, unfltrd	µg/L	28	28	100	.41	.20	.13	.10	.14
Chromium, unfltrd	µg/L	28	28	100	5.67	2.63	1.61	1.16	1.75
Cobalt, unfltrd	µg/L	28	28	100	4.53	2.14	1.34	.91	1.44
Copper, unfltrd	µg/L	28	28	100	15.2	5.82	3.84	3.12	4.83
Lead, unfltrd	µg/L	28	28	100	14.8	5.17	2.07	1.32	2.55
Mercury, unfltrd	µg/L	28	16	57	.03	.02	B.01	B.01	B.01
Nickel, unfltrd	µg/L	28	28	100	14.8	7.58	5.15	4.10	5.60
Selenium, unfltrd	µg/L	28	28	100	3.16	2.16	1.98	1.81	1.98
Silver, unfltrd	µg/L	28	22	79	.16	.05	.02	.01	.03
Thallium, unfltrd	µg/L	28	7	25	E.16	--	--	--	--
Uranium, unfltrd	µg/L	28	28	100	7.01	4.71	4.51	4.27	4.57
Vanadium, unfltrd	µg/L	28	28	100	15.7	10.4	7.41	6.10	7.49
Zinc, unfltrd	µg/L	28	28	100	89.4	20.5	9.72	6.72	12.5
1,4-Dichlorobenzene, unfltrd	µg/L	28	9	32	E.07	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	28	0	0	--	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site MR3							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	28	1	4	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	28	1	4	E.03	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	25	12	48	E13.0	--	--	--	--
3-*beta*-Coprostanol, unfltrd	µg/L	28	1	4	E4.12	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	28	1	4	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	27	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	25	1	4	E3.20	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	28	3	11	E.054	--	--	--	--
Acetophenone, unfltrd	µg/L	28	0	0	--	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	28	1	4	M	--	--	--	--
Anthracene, unfltrd	µg/L	28	1	4	E.006	--	--	--	--
Atrazine, unfltrd	µg/L	28	22	79	E2.25	E0.23	E0.11	E0.08	E0.13
BDE congener 47, unfltrd	µg/L	26	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	28	2	7	E.31	--	--	--	--
Benzophenone, unfltrd	µg/L	28	2	7	E.059	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	28	1	4	B2.50	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	28	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	28	1	4	E.013	--	--	--	--
Bromacil, unfltrd	µg/L	28	3	11	.52	--	--	--	--
Caffeine, unfltrd	µg/L	28	9	32	.23	--	--	--	--
Camphor, unfltrd	µg/L	28	3	11	E.09	--	--	--	--
Carbaryl, unfltrd	µg/L	28	0	0	--	--	--	--	--
Carbazole, unfltrd	µg/L	28	2	7	E.011	--	--	--	--
Chlorpyrifos, unfltrd	µg/L	28	0	0	--	--	--	--	--
Cholesterol, unfltrd	µg/L	28	4	14	B3.31	--	--	--	--
Cotinine, unfltrd	µg/L	28	0	0	--	--	--	--	--
DEET, unfltrd	µg/L	28	6	21	E.13	--	--	--	--
Diazinon, unfltrd	µg/L	28	0	0	--	--	--	--	--
Dichlorvos, unfltrd	µg/L	28	0	0	--	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	28	3	11	E1.20	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	Site MR3							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	28	0	0	--	--	--	--	--
d-Limonene, unfltrd	µg/L	28	3	11	E0.24	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	28	0	0	--	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Fluoranthene, unfltrd	µg/L	28	4	14	E.85	--	--	--	--
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	22	2	9	E.02	--	--	--	--
Indole, unfltrd	µg/L	28	1	4	E.004	--	--	--	--
Isoborneol, unfltrd	µg/L	27	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	28	2	7	E.029	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	28	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	28	1	4	E.09	--	--	--	--
Menthol, unfltrd	µg/L	27	4	15	E.12	--	--	--	--
Metalaxyl, unfltrd	µg/L	28	0	0	--	--	--	--	--
Methyl salicylate, unfltrd	µg/L	28	0	0	--	--	--	--	--
Metolachlor, unfltrd	µg/L	28	15	54	.25	E0.12	E0.12	<0.2	E0.07
Naphthalene, unfltrd	µg/L	28	0	0	--	--	--	--	--
p-Cresol, unfltrd	µg/L	28	6	21	E.08	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	26	0	0	--	--	--	--	--
Phenanthrene, unfltrd	µg/L	28	2	7	.47	--	--	--	--
Phenol, unfltrd	µg/L	28	0	0	--	--	--	--	--
Prometon, unfltrd	µg/L	28	3	11	E.08	--	--	--	--
Pyrene, unfltrd	µg/L	28	3	11	E.62	--	--	--	--
Tetrachloroethene, unfltrd	µg/L	28	2	7	E.22	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	28	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	28	7	25	E.13	--	--	--	--
Triclosan, unfltrd	µg/L	28	2	7	E.09	--	--	--	--
Triethyl citrate, unfltrd	µg/L	28	0	0	--	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	28	1	4	E.10	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	28	8	29	E.26	--	--	--	--
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	28	6	21	E.11	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	28	8	29	.24	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	28	28	100	20,000	3,800	2,400	530	1,400

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Missouri River stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Specific conductance, unfltrd	µS/cm at 25°C	84	84	100	808	795	758	727	731
Turbidity, unfltrd	NTU	72	72	100	676	98	58	33	62
Chemical oxygen demand, unfltrd	mg/L	71	30	42	111	--	--	--	--
Biochemical oxygen demand, unfltrd	mg/L	72	3	4	B32	--	--	--	--
Hardness, unfltrd	mg/L as $CaCO_3$	83	83	100	390	320	290	250	280
Total suspended solids, unfltrd	mg/L	84	84	100	906	220	111	71	119
Calcium, unfltrd	mg/L	83	83	100	103	80	71	60	70
Magnesium, unfltrd	mg/L	83	83	100	34	29	27	23	26
Chloride, unfltrd	mg/L	83	83	100	21	19	17	15	17
Nitrite, fltrd	mg/L as N	81	80	99	.05	.01	.01	.00	.01
Nitrate, fltrd	mg/L as N	79	79	100	3.53	2.29	.68	.47	.75
Nitrite plus nitrate, fltrd	mg/L as N	84	84	100	3.55	2.28	.68	.46	.73
Ammonia, fltrd	mg/L as N	84	15	18	.64	--	--	--	--
Total nitrogen (nitrate + nitrite + ammonia + organic-N), fltrd	mg/L	84	84	100	4.92	3.82	1.35	1.08	1.62
Total phosphorus, fltrd	mg/L	84	84	100	.96	.39	.24	.15	.24
Orthophosphate, fltrd	mg/L as P	84	84	100	.17	.10	.05	.01	.04
Antimony, unfltrd	µg/L	84	84	100	.69	.61	.56	.48	.54
Arsenic, unfltrd	µg/L	84	84	100	10.5	5.38	4.53	3.67	4.39
Barium, unfltrd	µg/L	84	84	100	325	126	89.1	75.1	98.1
Beryllium, unfltrd	µg/L	84	31	37	.80	--	--	--	--
Cadmium, unfltrd	µg/L	84	84	100	.65	.18	.12	.10	.14
Chromium, unfltrd	µg/L	84	84	100	12.3	2.95	1.62	1.15	1.83
Cobalt, unfltrd	µg/L	84	84	100	10.3	2.39	1.33	.94	1.53
Copper, unfltrd	µg/L	84	84	100	19.2	5.84	3.86	3.27	4.65
Lead, unfltrd	µg/L	84	84	100	18.5	4.38	1.89	1.32	2.31
Mercury, unfltrd	µg/L	83	47	57	.03	.02	B.01	<.01	B.01
Nickel, unfltrd	µg/L	84	84	100	26.4	7.79	5.19	4.14	5.86
Selenium, unfltrd	µg/L	84	84	100	3.17	2.15	1.94	1.78	1.96
Silver, unfltrd	µg/L	84	66	79	.16	.06	.02	E.01	.02
Thallium, unfltrd	µg/L	84	26	31	.34	--	--	--	--
Uranium, unfltrd	µg/L	84	84	100	7.03	4.74	4.54	4.24	4.60
Vanadium, unfltrd	µg/L	84	84	100	32.2	10.5	7.58	5.96	7.82
Zinc, unfltrd	µg/L	84	84	100	89.4	18.2	8.58	6.44	11.1
1,4-Dichlorobenzene, unfltrd	µg/L	84	13	15	E.07	--	--	--	--
1-Methylnaphthalene, unfltrd	µg/L	84	1	1	E.03	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Missouri River stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
2,6-Dimethylnaphthalene, unfltrd	µg/L	84	8	10	E0.05	--	--	--	--
2-Methylnaphthalene, unfltrd	µg/L	84	2	2	E.03	--	--	--	--
3,4-Dichlorophenyl isocyanate, unfltrd	µg/L	75	20	27	E13.0	--	--	--	--
3-*beta*-Coprostanol, unfltrd	µg/L	84	3	4	E13.0	--	--	--	--
3-Methyl-1H-indole, unfltrd	µg/L	84	1	1	E.07	--	--	--	--
3-*tert*-Butyl-4-hydroxyanisole, unfltrd	µg/L	81	0	0	--	--	--	--	--
4-Cumylphenol, unfltrd	µg/L	84	2	2	E.13	--	--	--	--
4-*n*-Octylphenol, unfltrd	µg/L	84	1	1	E.11	--	--	--	--
4-Nonylphenol, unfltrd	µg/L	84	1	1	B2.05	--	--	--	--
4-*tert*-Octylphenol, unfltrd	µg/L	84	0	0	--	--	--	--	--
5-Methyl-1H-benzotriazole, unfltrd	µg/L	81	5	6	E8.00	--	--	--	--
9,10-Anthraquinone, unfltrd	µg/L	84	5	6	E.054	--	--	--	--
Acetophenone, unfltrd	µg/L	84	2	2	.58	--	--	--	--
Acetyl-hexamethyl-tetrahydronaphthalene (AHTN), unfltrd	µg/L	93	3	4	E.04	--	--	--	--
Anthracene, unfltrd	µg/L	84	1	1	E.006	--	--	--	--
Atrazine, unfltrd	µg/L	84	62	74	E2.25	E0.24	E0.10	<0.2	E0.13
BDE congener 47, unfltrd	µg/L	78	0	0	--	--	--	--	--
Benzo[*a*]pyrene, unfltrd	µg/L	84	3	4	E.31	--	--	--	--
Benzophenone, unfltrd	µg/L	84	6	7	E.085	--	--	--	--
beta-Sitosterol, unfltrd	µg/L	84	3	4	E3.58	--	--	--	--
beta-Stigmastanol, unfltrd	µg/L	84	0	0	--	--	--	--	--
Bis(2-ethylhexyl) phthalate, unfltrd	µg/L	84	0	0	--	--	--	--	--
Bisphenol A, unfltrd	µg/L	84	5	6	E.32	--	--	--	--
Bromacil, unfltrd	µg/L	84	4	5	.52	--	--	--	--
Caffeine, unfltrd	µg/L	84	16	19	.30	--	--	--	--
Camphor, unfltrd	µg/L	84	14	17	E.09	--	--	--	--
Carbaryl, unfltrd	µg/L	84	1	1	E.13	--	--	--	--
Carbazole, unfltrd	µg/L	84	4	5	E.011	--	--	--	--
Chlorpyrifos, unfltrd	µg/L	84	1	1	E.01	--	--	--	--
Cholesterol, unfltrd	µg/L	84	6	7	E7.67	--	--	--	--
Cotinine, unfltrd	µg/L	84	0	0	--	--	--	--	--
DEET, unfltrd	µg/L	84	17	20	E.13	--	--	--	--
Diazinon, unfltrd	µg/L	84	1	1	E.01	--	--	--	--
Dichlorvos, unfltrd	µg/L	84	0	0	--	--	--	--	--
Diethoxynonylphenol (all isomers), unfltrd	µg/L	84	7	8	E1.52	--	--	--	--

Table 12. Statistical summaries for all water-quality constituents measured at the stream sites as part of the combined sewer overflow study in Omaha, Nebraska.—Continued

[Field identifiers from table 1 and fig. 1; n, number of samples analyzed; unfltrd, unfiltered; µS/cm, microsiemens per centimeter; °C, degrees Celcius; NTU, nephelometric turbidity units; mg/L, milligram per liter; --, not computed; B, data value between the 90th percentile upper confidence limit and two times the 90th percentile upper confidence limit; $CaCO_3$, calcium carbonate; fltrd, filtered; N, nitrogen; P, phosphorus; µg/L, micrograms per liter; E, estimated; <, less than; BDE congener 47, 2,2',4,4'-tetrabromodiphenyl ether; DEET, N,N-diethyl-*meta*-toluamide; MPN/100 mL, most probable number per 100 milliliters; M, detected but not quantifiable because of matrix interference; Statistics not calculated unless detection rate exceeded 50 percent. Quartiles not computed unless there are at least 10 samples in that subgroup]

Constituent	Units	All Missouri River stream sites							
		Total n	Number of detects	Percent detects	Maximum	Third quartile	Median	First quartile	Geometric mean
Diethoxyoctylphenol, unfltrd	µg/L	84	1	1	B0.60	--	--	--	--
Diethyl phthalate, unfltrd	µg/L	84	1	1	.32	--	--	--	--
d-Limonene, unfltrd	µg/L	84	4	5	E.24	--	--	--	--
Ethoxynonylphenol (all isomers), unfltrd	µg/L	84	3	4	2.92	--	--	--	--
Ethoxyoctylphenol, unfltrd	µg/L	84	2	2	E.50	--	--	--	--
Fluoranthene, unfltrd	µg/L	84	7	8	E.85	--	--	--	--
Hexahydrohexamethyl cyclopentabenzopyran (HHCB), unfltrd	µg/L	77	7	9	.21	--	--	--	--
Indole, unfltrd	µg/L	84	7	8	E.022	--	--	--	--
Isoborneol, unfltrd	µg/L	83	0	0	--	--	--	--	--
Isophorone, unfltrd	µg/L	84	8	10	E.029	--	--	--	--
Isopropylbenzene, unfltrd	µg/L	84	0	0	--	--	--	--	--
Isoquinoline, unfltrd	µg/L	84	2	2	E.09	--	--	--	--
Menthol, unfltrd	µg/L	83	7	8	E.12	--	--	--	--
Metalaxyl, unfltrd	µg/L	84	1	1	E.13	--	--	--	--
Methyl salicylate, unfltrd	µg/L	84	2	2	E.07	--	--	--	--
Metolachlor, unfltrd	µg/L	84	50	60	.27	E0.12	E0.12	<0.2	E0.06
Naphthalene, unfltrd	µg/L	84	1	1	E.11	--	--	--	--
p-Cresol, unfltrd	µg/L	84	16	19	E.20	--	--	--	--
Pentachlorophenol, unfltrd	µg/L	79	0	0	--	--	--	--	--
Phenanthrene, unfltrd	µg/L	84	3	4	.47	--	--	--	--
Phenol, unfltrd	µg/L	84	2	2	E.55	--	--	--	--
Prometon, unfltrd	µg/L	84	7	8	E.08	--	--	--	--
Pyrene, unfltrd	µg/L	84	8	10	E.62	--	--	--	--
Tetrachloroethene, unfltrd	µg/L	84	2	2	E.22	--	--	--	--
Tribromomethane (bromoform), unfltrd	µg/L	84	0	0	--	--	--	--	--
Tributyl phosphate, unfltrd	µg/L	84	15	18	E.19	--	--	--	--
Triclosan, unfltrd	µg/L	84	6	7	.35	--	--	--	--
Triethyl citrate, unfltrd	µg/L	84	2	2	E.02	--	--	--	--
Triphenyl phosphate, unfltrd	µg/L	84	4	5	E.10	--	--	--	--
Tris(2-butoxyethyl) phosphate, unfltrd	µg/L	84	13	15	E.48	--	--	--	--
Tris(2-chloroethyl) phosphate, unfltrd	µg/L	84	11	13	E.11	--	--	--	--
Tris(dichloroisopropyl) phosphate, unfltrd	µg/L	84	10	12	.24	--	--	--	--
Escherichia coli, unfltrd	MPN/100 mL	84	83	99	24,000	1,500	280	100	380

Appendixes 1–28

Appendix 1. Water-quality and aquatic life criteria, standards, and benchmark concentrations for selected constituents analyzed as part of the combined sewer overflow study in Omaha, Nebraska (Nebraska Department of Environmental Quality, 2006; U.S. Environmental Protection, 2002, 2003; U.S. Geological Survey, 2005).

Appendix 2. The types of bias or variability associated with the inorganic analyses and information on corrective actions taken by the U.S. Geological Survey's National Water Quality Laboratory, Denver, Colorado, during the time of the combined sewer overflow study in Omaha, Nebraska.

Appendix 3. The types of bias or variability associated with the dissolved organic wastewater compounds analyses (Schedule 1433) and information on corrective actions taken by the U.S. Geological Survey's National Water Quality Laboratory, Denver, Colorado, during the time of the combined sewer overflow study in Omaha, Nebraska.

Appendix 4. Recovery results for method blanks prepared during the wastewater compound analyses by the U.S. Geological Survey's National Water Quality Laboratory, Denver, Colorado, during the combined sewer overflow study in Omaha, Nebraska.

Appendix 5. Recovery results for reagent spikes prepared during the wastewater compound analyses by the U.S. Geological Survey's National Water Quality Laboratory, Denver, Colorado, during the combined sewer overflow study in Omaha, Nebraska.

Appendix 6. Results of statistical analysis of field blank analytical results collected during the combined sewer overflow study in Omaha, Nebraska.

Appendix 7. Maximum concentration of constituents detected in source-solution and equipment blanks analyzed during the combined sewer overflow study, Omaha, Nebraska, 2006–07.

Appendix 8. Comparison of analytical results for environmental and replicate sample pairs for samples collected during the combined sewer overflow study in Omaha, Nebraska.

Appendix 9. Mean and standard deviation percent recovery for all field matrix spikes, for stream field matrix spikes, and for combined sewer overflow and stormwater outfall field matrix spikes collected during the combined sewer overflow study in Omaha, Nebraska.

Appendix 10. Data from all environmental samples collected during the combined sewer overflow study, Omaha, Nebraska.

Appendix 11. Daily summaries of continuous water-quality data for sites in or near Omaha, Nebraska, August 1, 2006, to September 30, 2007.

Appendix 12. Fifteen-minute values of continuous water-quality data for sites in or near Omaha, Nebraska, August 1, 2006, to September 30, 2007.

Appendix 13. Student's t-test probability values for comparisons of combined sewer overflow and stormwater outfall samples collected during the combined sewer overflow study, Omaha, Nebraska.

Appendix 14. Student's t-test probability values for comparisons of Papillion Creek Basin stream samples collected during the combined sewer overflow study, Omaha, Nebraska.

Appendix 15. Student's t-test probability values for comparisons of Missouri River stream samples collected during the combined sewer overflow study, Omaha, Nebraska.

Appendix 16. Highlights of significant spatial and seasonal differences of each of the constituents considered during the combined sewer overflow study, Omaha, Nebraska.

Table A16–1. Spatial comparisons of the combined sewer overflow water-quality results between the data for an individual site data set and the combined data from the rest of the combined sewer overflow sites where the constituent listed was significantly different from all the rest combined and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–2. Spatial comparisons of the stormwater water-quality results between the data for the two stormwater outfall sites where the constituent listed was significantly different between the two sites and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–3. Spatial comparisons of the water-quality results between the data for stormwater outfall sites and the combined sewer overflow sites, where the constituent listed was not significantly different between the two site types and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–4. Spatial comparisons of the water-quality results between the data for stormwater outfall sites and the combined sewer overflow sites, where the constituent listed was significantly different between the two site types and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–5. Spatial comparisons of the water-quality results between the data for scheduled dry-weather samples from stream sites and scheduled wet-weather samples from stream sites, where the constituent listed was significantly different between the two sample types and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–6. Spatial comparisons of the water-quality results between the data for scheduled dry-weather samples from stream sites and storm samples from stream sites, where the constituent listed was not significantly different between the two sample types and had more than 50 percent detection in one of the data sets in the comparison. Comparisons between scheduled dry-weather stream samples and storm stream samples for all other constituents were significantly different.

Table A16–7. Spatial comparisons of the stream sample water-quality results between the data for two stream sites using all sample types, where the constituent listed was significantly different when comparing the two stream reaches and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–8. Spatial comparisons of the stream sample water-quality results between the data for two stream sites for scheduled dry-weather stream samples, where the constituent listed was significantly different when comparing the two stream reaches and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–9. Spatial comparisons of the stream sample water-quality results between the data for two stream sites for scheduled wet-weather stream samples, where the constituent listed was significantly different when comparing the two stream reaches and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–10. Spatial comparisons of the stream sample water-quality results between the data for two stream sites for storm stream samples, where the constituent listed was significantly different when comparing the two stream reaches and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–11. Spatial comparisons of the stream sample water-quality results between the data upstream and downstream from combined sewer overflows, where the constituent listed was significantly different when comparing the two data sets and there was more than 50 percent detection in one of the data sets in the comparison. Comparisons that are significantly larger upstream from combined sewer overflows are shown in italics.

Table A16–12. Spatial comparisons of the stream sample water-quality results between sites on the Missouri River where the constituent listed was significantly different when comparing the two data sets and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–13. Spatial comparisons of the stream sample water-quality results between scheduled samples and storm equal-width increment samples from all three sites on the Missouri River, where the constituent listed was significantly different when comparing the two data sets and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–14. Seasonal comparisons of the combined sewer overflow water-quality results where all three seasons were significantly different from the others and had more than 50 percent detection in one of the data sets in the comparison.

Table A16–15. Seasonal comparisons of the combined sewer overflow water-quality results where spring was significantly different than summer and autumn, but summer and autumn were not significantly different from one another, and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–16. Seasonal comparisons of the combined sewer overflow water-quality results where summer was significantly different than spring and autumn, but spring and autumn were not significantly different from one another, and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–17. Seasonal comparisons of the combined sewer overflow water-quality results where autumn was significantly different than spring and summer, but spring and summer were not significantly different from one another, and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–18. Seasonal comparisons of the Papillion Creek stream water-quality results (except organic compounds) using all sample types where one season was significantly different than another season, and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–19. Seasonal comparisons of the Papillion Creek stream water-quality results (except organic compounds) using only scheduled samples where one season was significantly different than another season, and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–20. Seasonal comparisons of the Papillion Creek stream water-quality results (except organic compounds) using only storm samples where one season was significantly different than another season, and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–21. Seasonal comparisons of the Missouri River water-quality results using all sample types where one season was significantly different than another season, and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–22. Seasonal comparisons of the Missouri river water-quality results (except organic compounds) using only scheduled samples where one season was significantly different than another season, and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–23. Seasonal comparisons of the Missouri River water-quality results (except organic compounds) using only right bank storm samples where one season was significantly different than another season, and there was more than 50 percent detection in one of the data sets in the comparison.

Table A16–24. Seasonal comparisons of the Missouri River water-quality results (except organic compounds) using only equal-width increment storm samples where one season was significantly different than another season, and there was more than 50 percent detection in one of the data sets in the comparison.

Appendix 17. Site-comparison statistics for organic compounds at sites where there was a significant difference between an individual combined sewer overflow site and the rest of the combined sewer overflows sampled as part of the combined sewer overflow study in Omaha, Nebraska.

Appendix 18. Seasonal comparison statistics for organic compounds for seasons when concentrations in stream samples collected in one season were significantly different ($\alpha < 0.05$) than the other two seasons for all samples collected, for scheduled samples only, and for storm samples only for the combined sewer overflow study in Omaha, Nebraska.

Appendix 19. Mass load from all environmental samples when discharge was concurrently measured during the combined sewer overflow study, Omaha, Nebraska.

Appendix 20. The maximum and geometric mean mass load by site for each of the constituents analyzed in samples collected from combined sewer overflow sites in Omaha, Nebraska.

Appendix 21. The maximum and geometric mean mass load by site for each of the constituents analyzed in samples collected from stormwater outfall sites in Omaha, Nebraska.

Appendix 22. The maximum and geometric mean mass load by site for each of the constituents analyzed in samples collected from stream sites in Omaha, Nebraska.

Appendix 23. Ratio of combined sewer overflow mass load to the stream mass load as calculated for those sample pairs where a constituent was detected and discharge was measured as part of the combined sewer overflow study in Omaha, Nebraska.

Appendix 24. Summary of ratios of the combined sewer overflow mass load to the stream mass load as calculated for those sample pairs where a constituent was detected and discharge was measured as part of the combined sewer overflow study in Omaha, Nebraska.

Appendix 25. Ratio of tributary stream mass load to receiving stream mass load for sample pairs collected at times when the constituent of interest was detected at the downstream site of a stream reach and discharge was measured during the combined sewer overflow study, Omaha, Nebraska.

Appendix 26. Statistical summaries of the ratios of the stream mass load at each downstream tributary stream site to the mass load at the upstream site of the receiving stream for those sample pairs where an analyte was detected at the downstream site of a stream reach and discharge was measured as part of the combined sewer overflow study in Omaha, Nebraska.

Appendix 27. Water-quality relative priority index and component scores for each constituent, calculated from all discrete water-quality samples collected from combined sewer overflow sites as part of the combined sewer overflow study, Omaha, Nebraska.

Appendix 28. Water-quality relative priority index and component scores for each constituent, calculated from all discrete water-quality samples collected from stream sites on the four Papillion Creek Basin streams as part of the combined sewer overflow study, Omaha, Nebraska.

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Back cover. Top left photograph: Sample collection in the Missouri River during the combined sewer overflow study in Omaha, Nebraska (Photograph taken by David Rus, U.S. Geological Survey). Middle photograph: Continuous monitor and sampling site on Cole Creek near Parkview Lane in Omaha, Nebraska (Photograph taken by David Rus, U.S. Geological Survey). Bottom right photograph: Gagehouse next to Papillion Creek near Capeheart Road near Bellevue, Nebraska (Photograph taken by Rachael McLeod, U.S. Geological Survey).

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