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Questa Baseline and Pre-Mining Ground-Water Quality Investigation. 2. Low-Flow (2001) and Snowmelt (2002) Synoptic/Tracer Water Chemistry for the Red River, New Mexico

Prepared in cooperation with the
NEW MEXICO ENVIRONMENT DEPARTMENT

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

Front cover: Downstream view of the Red River near the town of Red River with the Hottentot scar in the background, August 2001.

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U.S. DEPARTMENT OF THE INTERIOR

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Explanation of Abbreviations and Acronyms

--- (not analyzed, measured, or calculated)
˚C (degrees Celsius)
C.I. (charge imbalance)
FA (filtered-acidified)
FU (filtered-unacidified)
FIAS (flow injection analysis system)
GFAAS (graphite furnace atomic absorption spectrometry)
GPS (global positioning system)
HCl (hydrochloric acid)
HDPE (high-density polyethylene)
HGAAS (hydride generation atomic absorption spectrometry)
HNO_3 (nitric acid)
IC (ion chromatography)
ICP-OES (inductively coupled plasma-optical emission spectrometry)
ID (identification)
ISE (ion-selective electrode)
km (kilometers)
LBI (left-bank inflow, looking downstream)
m (meters)
meq/L (milliequivalents per liter)
mM/L (millimoles per liter)
mg/L (milligrams per liter)
MPV (most probable value)

NMED (New Mexico Environment Department)
µg/L (micrograms per liter)
µm (micrometer)
µS/cm (microsiemens per centimeter)
UV (ultraviolet)
n (number of analyses)
N (north)
NMWL (nominal molecular weight limit)
PE (polyethylene)
RA (raw-acidified)
RBI (right-bank inflow, looking downstream)
RSD (relative standard deviation)
RU (raw-unacidified)
s (standard deviation)
SC (specific conductance)
SRS (stream reference sample)
SRWS (standard reference water sample)
THGA (transversely heated graphite atomizer)
UFA (ultrafiltered-acidified)
v/v (volume per volume)
W (west)

CONVERSION FACTORS, ABBREVIATIONS, AND DATUM

Multiply	By	To obtain
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	259.0	hectare (ha)
gallon (gal)	3.785	liter (L)

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

Altitude, as used in this report, refers to distance above or below sea level.

QUESTA BASELINE AND PRE-MINING GROUND-WATER-QUALITY INVESTIGATION. 2. LOW-FLOW (2001) AND SNOWMELT (2002) SYNOPTIC/TRACER WATER CHEMISTRY FOR THE RED RIVER, NEW MEXICO

By R. Blaine McCleskey, D. Kirk Nordstrom, Judy I. Steiger, Briant A. Kimball, and Philip L. Verplanck

ABSTRACT

Water analyses are reported for 259 samples collected from the Red River, New Mexico, and its tributaries during low-flow (2001) and spring snowmelt (2002) tracer studies. Water samples were collected along a 20-kilometer reach of the Red River beginning just east of the town of Red River and ending at the U.S. Geological Survey streamflow-gaging station located east of Questa, New Mexico. The study area was divided into three sections where separate injections and synoptic sampling events were performed during the low-flow tracer study. During the spring snowmelt tracer study, three tracer injections and synoptic sampling events were performed bracketing the areas with the greatest metal loading into the Red River as determined from the low-flow tracer study. The low-flow tracer synoptic sampling events were August 17, 20, and 24, 2001. The synoptic sampling events for the spring snowmelt tracer were March 30, 31, and April 1, 2002.

Stream and large inflow water samples were sampled using equal-width and depth-integrated sampling methods and composited into half-gallon bottles. Grab water samples were collected from smaller inflows. Stream temperatures were measured at the time of sample collection. Samples were transported to a nearby central processing location where pH and specific conductance were measured and the samples processed for chemical analyses. Cations, trace metals, iron redox species, and fluoride were analyzed at the U.S. Geological Survey laboratory in Boulder, Colorado. Cations and trace metal concentrations were determined using inductively coupled plasma-optical emission spectrometry and graphite furnace atomic absorption spectrometry. Arsenic concentrations were determined using hydride generation atomic absorption spectrometry, iron redox species were measured using ultraviolet-visible spectrometry, and fluoride concentrations were determined using an ion-selective electrode. Alkalinity was measured by automated titration, and sulfate, chloride, and bromide were analyzed by ion chromatography at the U.S. Geological Survey laboratory in Salt Lake City, Utah.

INTRODUCTION

The Red River drains 190 square miles of the Sangre de Cristo Mountains and empties into the Rio Grande north of Taos, New Mexico (fig. 1). Waste from abandoned and operational mines, runoff from hydrothermal scars, and urban runoff and waste potentially affect the water quality in the Red River (Plazak, 1996). The U.S. Geological Survey (USGS), in cooperation with the New Mexico Environment Department (NMED), is currently investigating the baseline and pre-mining ground-water quality in the Red River Basin (Nordstrom and others, 2002).

As part of this investigation, tracer studies and synoptic sampling events along the Red River and its tributaries were performed. Water-quality and streamflow data are used to calculate chemical loads from surface and subsurface inflows (Kimball and others, 1999). In mountain streams a substantial amount of water can flow through the streambed, or hyporheic zone, making it difficult to accurately measure streamflow with traditional velocity measurements. Tracer-injection methods are a reliable way to quantify total streamflow by using changes in concentration of a tracer (NaBr) injected at a constant rate and assuming conservation of mass (Kimball and others, 2002). The chemical and streamflow data also can be utilized for reactive-transport modeling (Kimball and others, 1994). Reactive-transport modeling can provide quantitative estimates of downstream chemical behavior of major ions and trace metals in waters under varying flow conditions (Runkel and others, 1996). Reactive-transport models can be used to predict water quality along the stream and can be useful in predicting results for remediation scenarios (Runkel and Kimball, 2002).
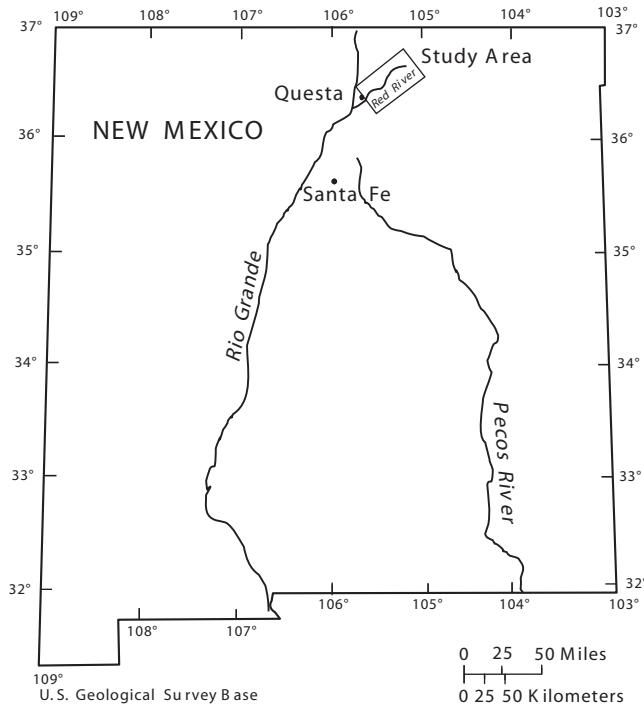
Figure 1. Location of Red River, New Mexico.

Purpose and Scope

The purpose of this report is to provide water-quality data from numerous synoptic sampling sites for low-flow and snowmelt tracer studies conducted in 2001 and 2002 along the Red River and its tributaries, describe methods used to collect and analyze the samples, describe quality-control procedures, make these data available to agencies responsible for managing the area's water resources, and supplement interpretive reports for the baseline and pre-mining ground-water-quality investigation in the Red River Basin.

Synoptic sampling provides a "snapshot" of the water quality during the sampling period (Kimball and others, 2002). The goal of synoptic sampling for the 2001 low-flow tracer study was to identify areas affecting the water quality of the Red River during base flow. The goal of synoptic sampling for the 2002 spring snowmelt tracer study was to obtain information about metal and acid loading to the Red River from snowmelt draining altered areas on the north side of the basin and from the mine area (figs. 2-3). Spring snowmelt tracer studies are typically termed "high-flow" tracer studies; however, the 2002 winter snowpack and snowmelt runoff in the Red River Basin were well below average.

SAMPLE LOCATIONS

Water samples were collected along an approximate 20-km reach of the Red River beginning just east of the town of Red River and ending at the USGS streamflow-gaging station (08265000) located near the Questa Ranger Station east of Questa, New Mexico (figs. 1-3). For the low-flow tracer study, the river was segmented into three reaches: RRU (Red River Upper), RRM (Red River Middle), and RRL (Red River Lower). The RRM and RRL study reaches overlapped each other by 385 m. Separate injections and synoptic sampling events were conducted for each reach (fig. 2). On the basis of metal loading data from the low-flow tracer, the Red River was segmented into three reaches for the spring snowmelt tracer study: RRH (Red River at Hottentot Creek), RRF (Red River at Fawn Lakes), and RRC (Red River at Columbine Creek). Separate injections and synoptic sampling were performed during the spring snowmelt tracer study to encompass the inflows most affecting the water quality in the Red River (fig. 3).

Prior to each tracer study, a reconnaissance of the study reach was performed. Sample sites were selected and marked; their distances downstream from the most upstream tracer-injection point, upstream from the town of Red River (RR-0), were measured using a tape measure (tables 1 and 2). Latitudes and longitudes of the sites were acquired at this time using a portable global positioning system (GPS, Garmin 12C, NAD 27). For the two tracer studies, sample sites having the same sample identification and measured distance may have different latitudes and longitudes because the sample site was in a slightly different location or the GPS measurement was in error. Transport sites, labeled "T", are sites where numerous samples were collected to determine transport characteristics of the injectate.
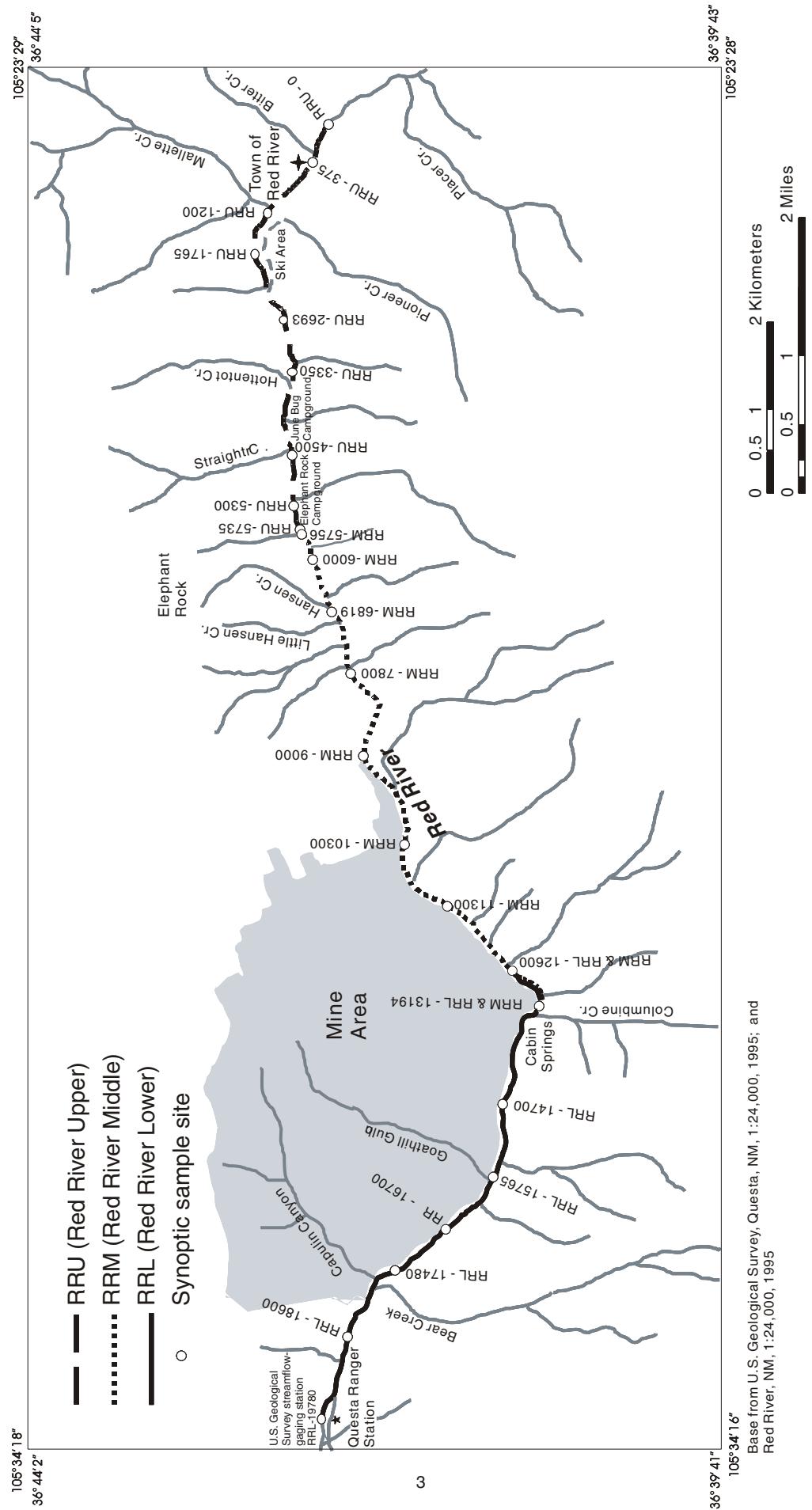
Figure 2. Study reaches and selected synoptic sample sites for the low-flow tracer study, 2001.

Base from U.S. Geological Survey, Questa, NM, 1:24,000, 1995; and
Red River, NM, 1:24,000, 1995
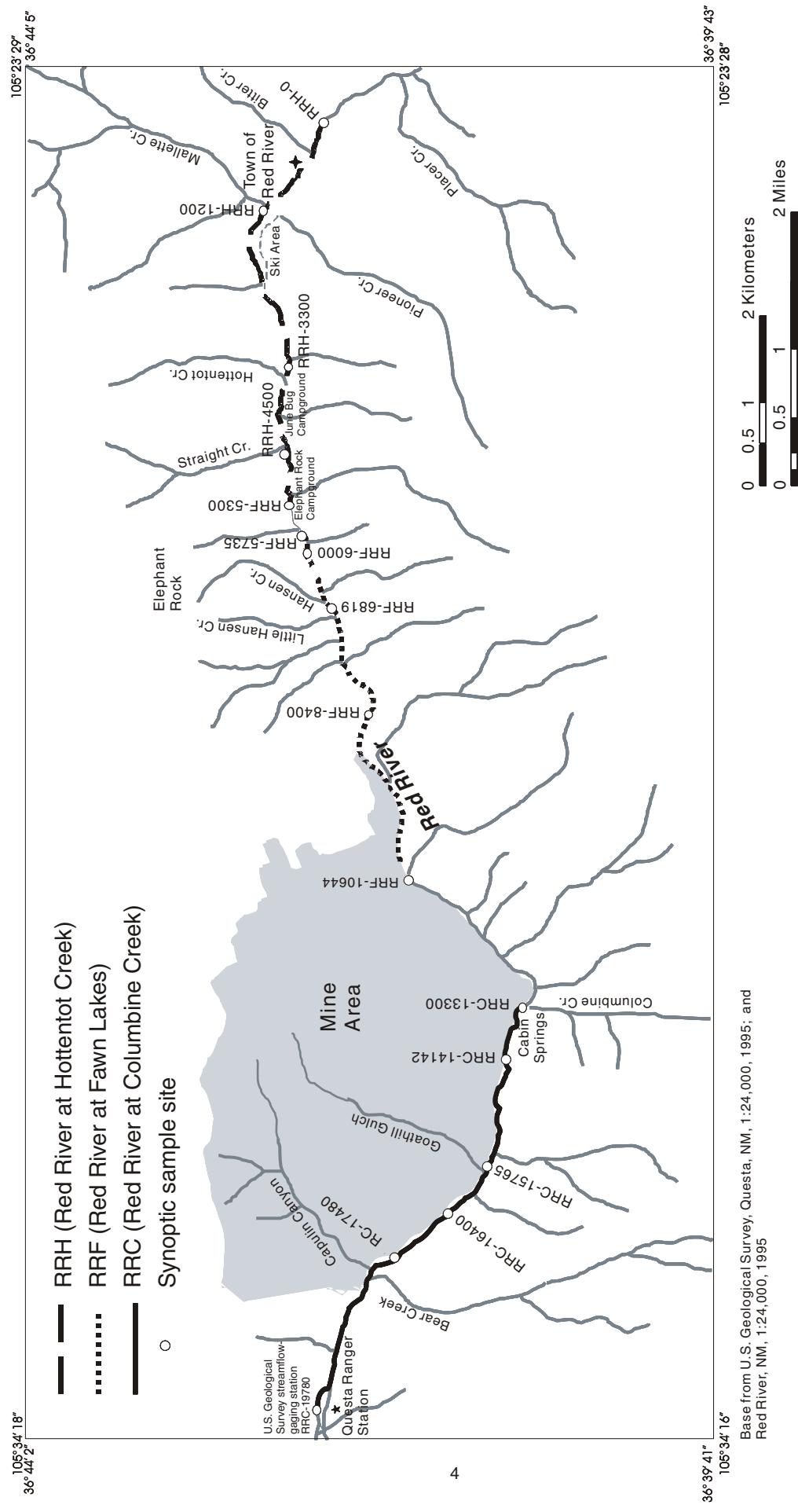
Figure 3. Study reaches and selected synoptic sample sites for the snowmelt tracer study, 2002.

Base from U.S. Geological Survey, Questa, NM, 1:24,000, 1995; and
Red River, NM, 1:24,000, 1995

Table 1. Low-flow synoptic sampling sites

[ID, identification; LBI, left-bank inflow; m, meters; N, north; RBI, right-bank inflow; RRL, Red River Lower; RRM, Red River Middle; RRU, Red River Upper; SC, specific conductance; SRS, stream reference sample; T, transport site; USGS, U.S. Geological Survey; W, west]

Sample ID	Distance (m)	Site description	Latitude (N)	Longitude (W)
RRU-0	0	T0 site - Red River above town of Red River	36°42'13"	105°23'58"
RRU-200	200	Red River near end of left-bank cabins	36°42'15"	105°24'06"
RRU-275	275	RBI - Bitter Creek at mouth	36°42'16"	105°24'08"
RRU-324	324	Red River below Bitter Creek	36°42'17"	105°24'10"
RRU-340	340	LBI - small inflow among willows	36°42'17"	105°24'10"
RRU-375	375	T1 site - Red River near Riverside Lodge (SRS)	36°42'17"	105°24'12"
RRU-380	380	RBI - spring coming from fill material	36°42'18"	105°24'12"
RRU-487	487	RBI - seepage from town of Red River	36°42'19"	105°24'15"
RRU-511	511	RBI - culvert upstream from Riverside Hotel	36°42'20"	105°24'16"
RRU-518	518	Red River below culvert	36°42'20"	105°24'16"
RRU-530	530	RBI - upwelling near concrete block among aluminum precipitate	36°42'20"	105°24'16"
RRU-542	542	RBI - seeps with aluminum precipitate below bridge	36°42'21"	105°24'17"
RRU-570	570	RBI - drive point into gravel bar with many seeps	36°42'21"	105°24'18"
RRU-572	572	RBI - seep from gravel bar	36°42'21"	105°24'18"
RRU-700	700	Red River along seepage zone	36°42'23"	105°24'22"
RRU-705	705	RBI - seep with algae above bridge	36°42'23"	105°24'22"
RRU-750	750	LBI - small pool in moss bank	36°42'24"	105°24'24"
RRU-758	758	RBI - seep with iron precipitate	36°42'25"	105°24'24"
RRU-800	800	Red River below many seeps with aluminum precipitate	36°42'26"	105°24'25"
RRU-834	834	RBI - culvert discharge with orange precipitate	36°42'26"	105°24'26"
RRU-900	900	Red River downstream from culvert discharge	36°42'28"	105°24'28"
RRU-1040	1,040	Red River at walking bridge above Capo's Restaurant	36°42'30"	105°24'31"
RRU-1050	1,050	RBI - second culvert discharge with orange precipitate	36°42'31"	105°24'31"
RRU-1100	1,100	Red River at bridge by ski lift	36°42'33"	105°24'32"
RRU-1117	1,117	RBI - Mallette Creek	36°42'33"	105°24'32"
RRU-1200	1,200	Red River below Mallette Creek	36°42'33"	105°24'36"
RRU-1300	1,300	Red River at doughnut shop street	36°42'35"	105°24'40"
RRU-1463	1,463	RBI - small inflow from culvert	36°42'39"	105°24'44"
RRU-1510	1,510	RBI - seep from gravel with iron precipitate	36°42'39"	105°24'45"
RRU-1640	1,640	Red River at Vail site number 3	36°42'39"	105°24'51"

Table 1. Low-flow synoptic sampling site--Continued

Sample ID	Distance (m)	Site description	Latitude (N)	Longitude (W)
RRU-1658	1,658	RBI - spring with iron precipitate below injection site	36°42'39"	105°24'51"
RRU-1765	1,765	T2 site - Red River above bridge on Inferno Street	36°42'39"	105°24'55"
RRU-1975	1,975	Red River at bridge to large gray apartments	36°42'36"	105°25'03"
RRU-2184	2,184	Red River above Pioneer Creek	36°42'34"	105°25'11"
RRU-2195	2,195	LBI - Pioneer Creek at mouth after diversion	36°42'34"	105°25'11"
RRU-2404	2,404	Red River below Brett's Steakhouse	36°42'33"	105°25'19"
RRU-2406	2,406	RBI - cement culvert below Brett's Steakhouse	36°42'33"	105°25'19"
RRU-2693	2,693	Red River below diversion to campground lake	36°42'28"	105°25'26"
RRU-2830	2,830	RBI - pipe discharge returned from campground lake	36°42'27"	105°25'30"
RRU-3052	3,052	Red River above Hottentot Creek	36°42'25"	105°25'39"
RRU-3350	3,350	T3 site - Red River below Hottentot Creek	36°42'25"	105°25'50"
RRU-3638	3,638	Red River at Junebug Campground	36°42'25"	105°25'58"
RRU-3900	3,900	Red River near Junebug Campground entrance	36°42'27"	105°26'07"
RRU-4100	4,100	LBI - small seep	36°42'28"	105°26'13"
RRU-4200	4,200	Red River below inflow near waste rock	36°42'27"	105°26'16"
RRU-4500	4,500	Red River below Straight Creek debris flow	36°42'24"	105°26'27"
RRU-4800	4,800	Red River along reach of rapid flow	36°42'23"	105°26'38"
RRU-4900	4,900	Red River above Elephant Rock campground	36°42'24"	105°26'42"
RRU-5200	5,200	Red River above walking bridge to Fawn Lakes	36°42'23"	105°26'51"
RRU-5300	5,300	T4 site - Red River above Fawn Lakes diversion (SRS)	36°42'23"	105°26'54"
RRU-5652	5,652	LBI - Fawn Lakes return flow	36°42'19"	105°27'06"
RRU-5735	5,735	Red River below Fawn Lakes return flow	36°42'20"	105°27'08"
RRM-5756	5,756	T0 Site - Red River below Fawn Lakes return	36°42'20"	105°27'08"
RRM-6000	6,000	T1 Site - Red River near Fawn Lakes campground	36°42'18"	105°27'16"
RRM-6175	6,175	Red River above RRM 6214	36°42'14"	105°27'20"
RRM-6214	6,214	RBI - seep draining toe of Hansen fan	36°42'14"	105°27'22"
RRM-6300	6,300	Red River above Hansen Creek inflows	36°42'14"	105°27'25"
RRM-6343	6,343	LBI - draining upstream from altered cliffs on left bank	36°42'14"	105°27'26"
RRM-6600	6,600	Red River near end of altered zone on left bank	36°42'11"	105°27'35"
RRM-6819	6,819	Red River between Hansen and Little Hansen	36°42'08"	105°27'42"
RRM-6971	6,971	RBI - pool above highway culvert on Little Hansen debris fan	36°42'06"	105°27'44"
RRM-7010	7,010	Inflow - seeps from downstream side of Little Hansen	36°42'05"	105°27'47"
RRM-7100	7,100	Red River below Little Hansen debris flow	36°42'05"	105°27'50"

Table 1. Low-flow synoptic sampling sites--Continued

Sample ID	Distance (m)	Site description	Latitude (N)	Longitude (W)
RRM-7200	7,200	Red River below Little Hansen debris flow	36°42'04"	105°27'53"
RRM-7240	7,240	RBI - drainage near well on right blank	36°42'03"	105°27'55"
RRM-7255	7,255	LBI - pond among ferns on left blank	36°42'03"	105°27'55"
RRM-7270	7,270	RBI - small spring along right bank	36°42'03"	105°27'56"
RRM-7295	7,295	Red River below grassy spring on right bank	36°42'03"	105°27'57"
RRM-7300	7,300	LBI - small ditch draining left bank	36°42'03"	105°27'57"
RRM-7352	7,352	RBI - small drainage with iron stain	36°42'04"	105°27'59"
RRM-7395	7,395	Red River separating inflows in narrowed canyon	36°42'03"	105°28'01"
RRM-7400	7,400	LBI - small seep on left bank	36°42'03"	105°28'01"
RRM-7457	7,457	RBI - Waldo Springs pool	36°42'03"	105°28'03"
RRM-7500	7,500	Red River below Waldo Springs	36°42'03"	105°28'04"
RRM-7588	7,588	LBI - draining from hill slope away from stream	36°42'03"	105°28'07"
RRM-7615	7,615	RBI - spring with small channel to stream	36°42'03"	105°28'08"
RRM-7800	7,800	T2 Site - Red River at bend near highway	36°42'01"	105°28'14"
RRM-8100	8,100	Red River below large dead fallen tree	36°41'54"	105°28'20"
RRM-8400	8,400	Red River around end of cliffs on right bank	36°41'52"	105°28'30"
RRM-8700	8,700	Red River close to highway	36°41'56"	105°28'41"
RRM-9000	9,000	Red River near riprap along highway	36°41'56"	105°28'52"
RRM-9300	9,300	Red River along straight reach above mill property	36°41'50"	105°28'59"
RRM-9600	9,600	Red River above mill diversion	36°41'43"	105°29'08"
RRM-9900	9,900	Red River below mill diversion	36°41'40"	105°29'18"
RRM-10200	10,200	Red River near mill water tank	36°41'41"	105°29'30"
RRM-10300	10,300	T3 Site - Red River at bedrock outcrop	36°41'41"	105°29'34"
RRM-10360	10,360	RBI - seep near downstream end of mill yard	36°41'42"	105°29'36"
RRM-10500	10,500	Red River near triple power pole	36°41'39"	105°29'41"
RRM-10519	10,519	RBI - seepage with pond full of algae	36°41'39"	105°29'41"
RRM-10572	10,572	LBI - seepage from along road and Chambers Creek	36°41'39"	105°29'43"
RRM-10644	10,644	Red River below high SC seeps below Sulfur Gulch	36°41'38"	105°29'46"
RRM-10800	10,800	Red River in gully along waste-rock pile	36°41'36"	105°29'50"
RRM-11000	11,000	Red River below old Sulfur Gulch above left bank cliff	36°41'31"	105°29'54"
RRM-11300	11,300	Red River along waste-rock pile near vegetated hill	36°41'23"	105°30'00"
RRM-11600	11,600	Red River below island above large black-rock cliff	36°41'16"	105°30'07"
RRM-11963	11,963	Red River below mile 6 marker below culvert	36°41'11"	105°30'16"
RRM-12200	12,200	Red River below abandoned buildings	36°41'03"	105°30'23"

Table 1. Low-flow synoptic sampling sites--Continued

Sample ID	Distance (m)	Site description	Latitude (N)	Longitude (W)
RRM-12287	12,287	LBI - seep at bedrock manganocrete contact	36°41'03"	105°30'26"
RRM-12308	12,308	RBI - Portal springs	36°41'03"	105°30'26"
RRM-12515	12,515	Red River below Portal springs: RRL injection site	36°41'01"	105°30'30"
RRL-12515	12,515	Red River below Portal springs: RRL injection site	36°41'01"	105°30'30"
RRM-12600; RRL-12600	12,600	Red River below left bank cliff	36°40'56"	105°30'33"
RRM-12900; RRL-12900	12,900	Red River around bend toward Columbine Creek	36°40'49"	105°30'39"
RRM-13194	13,194	T4 site - Red River above Columbine Creek	36°40'51"	105°30'49"
RRL-13194	13,194	T1 site - Red River above Columbine Creek	36°40'51"	105°30'49"
RRL-13210	13,210	LBI - Columbine Creek at mouth	36°40'52"	105°30'50"
RRL-13300	13,300	Red River below Columbine Creek	36°40'55"	105°30'51"
RRL-13600	13,600	Red River below cabins	36°40'56"	105°31'00"
RRL-13675	13,675	RBI - Cabin Springs	36°40'58"	105°30'59"
RRL-13700	13,700	Red River below Cabin Springs	36°40'59"	105°31'00"
RRL-13750	13,750	LBI - seep from manganocrete	36°40'59"	105°31'02"
RRL-13751	13,751	RBI - spring from manganocrete	36°40'59"	105°31'02"
RRL-13900	13,900	Red River below manganocrete springs	36°41'00"	105°31'08"
RRL-14142	14,142	Red River above highway bridge below manganese seeps	36°41'01"	105°31'17"
RRL-14400	14,400	Red River below Columbine well number 1	36°41'01"	105°31'24"
RRL-14570	14,570	RBI - Shaft Spring	36°41'03"	105°31'28"
RRL-14700	14,700	Red River below gravel bar inflow near tall head frame	36°41'05"	105°31'34"
RRL-14790	14,790	Red River below head frame shaft	36°41'03"	105°31'36"
RRL-14800	14,800	RBI - spring drains willows along left bank	36°41'03"	105°31'37"
RRL-14958	14,958	Red River above spring in willows	36°41'04"	105°31'41"
RRL-14973	14,973	RBI - draining gravel bar and spring	36°41'05"	105°31'42"
RRL-15000	15,000	LBI - pit in gravel bar	36°41'04"	105°31'43"
RRL-15044	15,044	RBI - spring above Thunder Bridge	36°41'04"	105°31'44"
RRL-15221	15,221	Red River below Thunder Bridge	36°41'02"	105°31'50"
RRL-15264	15,264	RBI - seep near start of fan from Goathill Gulch	36°41'03"	105°31'51"
RRL-15295	15,295	Red River above left-bank beaver pond discharge	36°41'03"	105°31'53"
RRL-15331	15,331	LBI - discharge from beaver pond	36°41'03"	105°31'54"
RRL-15356	15,356	RBI - small channel of flow from flood plain	36°41'04"	105°31'54"

Table 1. Low-flow synoptic sampling site--Concluded

Sample ID	Distance (m)	Site description	Latitude (N)	Longitude (W)
RRL-15373	15,373	Red River below left bank beaver pond above spring 39	36°41'05"	105°31'56"
RRL-15408	15,408	RBI - spring number 39	36°41'05"	105°31'56"
RRL-15500	15,500	LBI - pond of water in alluvium on left bank	36°41'02"	105°31'43"
RRL-15600	15,600	Red River below spring number 39	36°41'05"	105°32'03"
RRL-15687	15,687	RBI - pond with old metal relic	36°41'06"	105°32'05"
RRL-15765	15,765	T3 site - Red River above Goathill Gulch	36°41'08"	105°32'09"
RRL-16100	16,100	Red River below Goathill Gulch	36°41'12"	105°32'19"
RRL-16400	16,400	Red River at campground below Goathill Gulch	36°41'20"	105°32'25"
RRL-16700	16,700	Red River below ford across stream	36°41'26"	105°32'33"
RRL-17012	17,012	Red River under power lines above Bear Creek	36°41'33"	105°32'42"
RRL-17300	17,300	Red River above small RB culvert under road	36°41'40"	105°32'47"
RRL-17480	17,480	T3 site - Red River at Vail site 13	36°41'44"	105°32'52"
RRL-17574	17,574	RBI - discharge from French drain	36°41'47"	105°32'52"
RRL-17595	17,595	RBI - seep number 13 with *Ulothrix* stringers	36°41'48"	105°32'53"
RRL-17655	17,655	Red River above Capulin Gulch culvert	36°41'50"	105°32'53"
RRL-17670	17,670	RBI - pooled seep below engineered Capulin Gulch	36°41'50"	105°32'54"
RRL-17700	17,700	Red River above Bear Creek inflows	36°41'50"	105°32'55"
RRL-17749	17,749	LBI - Bear Creek at mouth	36°41'50"	105°32'57"
RRL-18000	18,000	Red River below Bear Creek inflows	36°41'55"	105°33'05"
RRL-18160	18,160	LBI - seeps along right bank	36°41'57"	105°33'09"
RRL-18300	18,300	Red River near Vail site 14a	36°42'00"	105°33'13"
RRL-18600	18,600	Red River below peaks on both sides of canyon	36°42'02"	105°33'23"
RRL-18900	18,900	Red River at large right-bank climbing cliff near mouth of canyon	36°42'05"	105°33'34"
RRL-19040	19,040	RBI - pond draining to stream with filamentous algae	36°42'05"	105°33'39"
RRL-19170	19,170	Red River above large diversion structure	36°42'06"	105°33'44"
RRL-19500	19,500	Red River near Forest Service yard	36°42'11"	105°33'53"
RRL-19780	19,780	T4 site - Red River at USGS streamflow-gaging station 08265000	36°42'11"	105°34'03"

Table 2. Snowmelt synoptic sampling sites

[ID, identification; LBI, left-bank inflow; m, meters; N, north; RBI, right-bank inflow; RRC, Red River at Columbine Creek; RRF, Red River at Fawn Lakes; RRH, Red River at Hottentot Creek; SC, specific conductance; SRS, stream reference sample; T, transport site; USGS, U.S. Geological Survey; W, west; ---, no data]

Sample ID	Distance (m)	Site description	Latitude (N)	Longitude (W)
RRH-0	0	Red River above town of Red River	36°42'13"	105°23'58"
RRH-700	618	Red River along seepage zone	36°42'24"	105°24'24"
RRH-1200	1,200	Red River below Mallette Creek	36°42'34"	105°24'38"
RRH-3052	3,052	Red River above Hottentot Creek	36°42'26"	105°25'41"
RRH-3300	3,225	Red River, RRH injection site	36°42'25"	105°25'51"
RRH-3380	3,380	Red River below Hottentot Creek	36°42'25"	105°25'52"
RRH-3638	3,638	Red River at Junebug Campground	36°42'26"	105°26'00"
RRH-3900	3,900	Red River near Junebug Campground entrance	36°42'28"	105°26'10"
RRH-4200	4,200	Red River below inflow near waste rock	36°42'28"	105°26'19"
RRH-4500	4,500	Red River below Straight Creek debris flow	36°42'25"	105°26'29"
RRH-4800	4,800	Red River along reach of rapid flow	36°42'24"	105°26'40"
RRH-4900	4,900	Red River above Elephant Rock campground	36°42'25"	105°26'44"
RRH-5200	5,200	Red River above walking bridge to Fawn Lakes	36°42'24"	105°26'53"
RRH-5300	5,300	T2 site - Red River above Fawn Lakes diversion (SRS)	36°42'24"	105°26'57"
RRF-5735	5,735	Red River below Fawn Lakes return flow (RRF T0)	36°42'21"	105°27'10"
RRF-6000	6,000	T1 Site - Red River below Fawn Lakes	36°42'19"	105°27'19"
RRF-6175	6,175	Red River above RRM 6214	36°42'15"	105°27'23"
RRF-6209	6,209	LBI - seep opposite the Hansen fan	36°42'15"	105°27'24"
RRF-6214	6,214	RBI - seep draining upstream from Hansen fan	36°42'15"	105°27'24"
RRF-6300	6,300	Red River above Hansen Creek inflows	36°42'15"	105°27'28"
RRF-6301	6,301	RBI - spring from bank with pit	36°42'15"	105°27'27"
RRF-6343	6,343	LBI - draining upstream from altered cliffs on left bank	36°42'14"	105°27'28"
RRF-6600	6,600	Red River near end of altered zone on left bank	36°42'14"	105°27'28"
RRF-6819	6,819	Red River between Hansen and Little Hansen flows	36°42'09"	105°27'45"
RRF-6940	6,940	Red River between culvert and Little Hansen	36°42'06"	105°27'47"
RRF-6948	6,948	Red River, start of Little Hansen debris flow	36°42'04"	105°28'00"
RRF-7100	7,100	Red River below Little Hansen debris flow	36°42'06"	105°27'53"
RRF-7150	7,150	RBI - small right-bank seep with iron stain	---	---
RRF-7200	7,200	Red River below Little Hansen debris flow for mixing	36°42'05"	105°27'55"
RRF-7240	7,240	RBI - drainage near well on right bank	36°42'04"	105°27'57"

Table 2. Snowmelt synoptic sampling sites--Continued

Sample ID	Distance (m)	Site description	Latitude (N)	Longitude (W)
RRF-7270	7,270	RBI - small spring along right bank	36°42'04"	105°27'58"
RRF-7295	7,295	Red River below grassy spring on right bank	36°42'04"	105°27'59"
RRF-7297	7,297	RBI - seep from bank with algae	---	---
RRF-7300	7,300	LBI - small ditch draining left bank	36°42'04"	105°27'59"
RRF-7320	7,320	RBI - spring with algae at rock	36°42'04"	105°28'00"
RRF-7352	7,352	RBI - small drainage with iron stain	36°42'04"	105°28'01"
RRF-7377	7,395	Red River separating inflows in narrowed canyon	36°42'04"	105°28'02"
RRF-7383	7,383	LBI - with *Ulothrix* and aluminum precipitate	36°42'04"	105°28'02"
RRF-7457	7,457	RBI - Waldo Springs pool	36°42'04"	105°28'05"
RRF-7500	7,500	Red River below Waldo Springs	36°42'04"	105°28'06"
RRF-7588	7,588	RBI - draining from hillslope away from stream	36°42'04"	105°28'10"
RRF-7615	7,615	RBI - spring with small channel to stream	36°42'04"	105°28'11"
RRF-7700	7,700	Red River to check for aluminum precipitate	36°42'03"	105°28'13"
RRF-7800	7,800	T2 Site - Red River at bend near highway	36°42'02"	105°28'16"
RRF-8400	8,400	Red River around end of cliffs on right bank	36°41'53"	105°28'33"
RRF-10644	10,644	Red River below high SC seeps below Sulfur Gulch	36°41'06"	105°31'35"
RRC-13300	13,300	Red River below Columbine Creek	36°40'54"	105°30'53"
RRC-13465	13,465	Red River downstream from injection	36°40'58"	105°30'58"
RRC-13595	13,595	Red River upstream from Cabin Springs	36°40'57"	105°31'03"
RRC-13700	13,700	Red River below Cabin Springs	36°41'48"	105°32'55"
RRC-13900	13,900	Red River below manganocrete springs	36°41'01"	105°31'11"
RRC-14142	14,142	T1 site - Red River above highway bridge below manganese seeps	36°41'02"	105°31'20"
RRC-14400	14,400	Red River below Columbine well number 1	36°41'01"	105°31'27"
RRC-14700	14,700	Red River below gravel bar inflow near tall head frame	36°41'06"	105°31'35"
RRC-14790	14,790	Red River below head frame shaft	36°41'04"	105°31'38"
RRC-14958	14,958	Red River above spring in willows	36°41'05"	105°31'44"
RRC-14973	14,973	RBI - draining gravel bar and spring	36°41'06"	105°31'44"
RRC-15044	15,044	RBI - spring above Thunder Bridge	36°41'05"	105°31'47"
RRC-15084	15,084	Red River below Thunder Bridge	36°41'04"	105°31'48"
RRC-15087	15,087	LBI - seep below Thunder Bridge (pit)	36°41'04"	105°31'48"

Table 2. Snowmelt synoptic sampling sites--Concluded

Sample ID	Distance (m)	Site description	Latitude (N)	Longitude (W)
RRC-15141	15,141	LBI - seep at base of streambank	36°41'02"	105°31'50"
RRC-15221	15,221	Red River below Thunder Bridge	36°41'03"	105°31'52"
RRC-15264	15,264	RBI - seep near start of fan from Goathill Gulch	36°41'04"	105°31'53"
RRC-15373	15,373	Red River below left-bank beaver pond above Spring 39	36°41'06"	105°31'58"
RRC-15408	15,408	RBI - spring number 39	36°41'06"	105°31'58"
RRC-15507	15,507	RBI - small *Ulothrix* spring	36°41'06"	105°32'02"
RRC-15547	15,547	Red River downstream from high specific conductance spring	36°41'06"	105°32'03"
RRC-15567	15,567	LBI - pond near river birch at bank	36°41'05"	105°32'04"
RRC-15600	15,600	Red River below spring number 39	36°41'06"	105°32'05"
RRC-15687	15,687	RBI - pond with old metal relic	36°41'07"	105°32'06"
RRC-15737	15,737	RBI - near gnarled tree stump	36°41'08"	105°32'09"
RRC-15765	15,765	T2 site - Red River above Goathill Gulch	36°41'08"	105°32'10"
RRC-15950	15,950	Red River at point of widening valley	36°41'12"	105°32'20"
RRC-16100	16,100	Red River below Goathill Gulch	36°41'13"	105°32'21"
RRC-16400	16,400	Red River at campground below Goathill Gulch	36°41'20"	105°32'27"
RRC-16700	16,700	Red River below ford across stream	36°41'27"	105°32'36"
RRC-17012	17,012	Red River under power lines above Bear Creek	36°41'34"	105°32'44"
RRC-17230	17,230	Red River at start of aluminum precipitate zone	36°41'39"	105°32'48"
RRC-17270	17,270	RBI - seep with aluminum precipitate	36°41'41"	105°32'49"
RRC-17288	17,288	LBI - seep in sand with iron stain	36°41'41"	105°32'49"
RRC-17300	17,300	Red River above small right-bank culvert under road	36°41'41"	105°32'49"
RRC-17480	17,480	T3 site - Red River at Vail site 13	---	---
RRC-17525	17,525	RBI - well at downstream end of French drain	36°41'47"	105°32'54"
RRC-17574	17,574	RBI - spring at old tree stump	36°41'48"	105°32'55"
RRC-17595	17,595	RBI - seep number 13 with *Ulothrix* stringers	36°41'48"	105°32'55"
RRC-17655	17,655	Red River above Capulin Gulch culvert	---	---
RRC-17670	17,670	RBI - pooled seep below engineered Capulin Gulch	36°41'51"	105°32'56"
RRC-17700	17,700	Red River above Bear Creek inflows	36°41'52"	105°32'58"
RRC-19780	19,780	T4 site - Red River at USGS streamflow-gaging station 08265000	36°42'12"	105°34'05"

Sample sites were selected upstream and downstream from visible inflows and other features that could affect the river water quality. Numerous surface inflows (tributaries, springs, and seeps) were sampled. In some of the longer reaches between visible inflows, additional stream sites were sampled to detect possible subsurface inflows. For each study reach, selected sample sites are plotted on maps (figs. 2-3).

METHODS OF SAMPLE COLLECTION, TREATMENT, AND ANALYSIS

Synoptic Sample Collection

Stream and large inflow water samples were collected using equal-width and depth-integrated sampling methods using a model DH-81 depth-integrating water sampling device (Ward and Harr, 1990). Samples from a single stream site were composited into a triple-rinsed half-gallon plastic bottle. Small inflow samples were collected as grab samples directly into the half-gallon plastic bottle from as close to the center of flow as possible. Samples were immediately capped and placed in black plastic bags to minimize exposure to atmospheric air and sunlight. Stream temperature was measured on site at the time of sampling. Samples were transported to a nearby central processing location near Cabin Springs just downstream from Columbine Creek where they were processed for analyses of inorganic constituents, and pH and specific conductance were measured. For each synoptic event, a stream reference sample (SRS) was collected in two half-gallon bottles. An SRS is a large volume sample that is analyzed numerous times to monitor precision and accuracy between and during analytical runs.

Sample Treatment

At the central processing location, samples were processed as quickly as possible after collection to minimize oxidation and precipitation reactions. Several sample splits were taken for measurement of field properties and analyses of inorganic constituents (table 3). Sample pH and specific conductance were measured in an unfiltered-unacidified subsample. Specific conductance and pH were calibrated prior to each tracer. Specific conductance and pH standard solutions were periodically checked and the meters were recalibrated as necessary. Samples were filtered using a tangential-flow filtration assembly with either 0.45-μm or 10,000-nominal molecular weight limit (NMWL) or daltons, filter membranes. Fine colloidal material may pass through a 0.45-μm filter membrane (Kennedy and others, 1974, 1976; Laxen and Chandler, 1982). However, because use of the 0.45-μm filter membrane is accepted filtration practice for dissolved metals, the data are expected to be comparable to historical samples collected with 0.45-μm filter membranes. The 10,000-NMWL membranes retain particles in the range of 0.0035 to 0.0055 μm (Millipore Corporation, 1993). Ultrafiltrates produced by tangential-flow ultrafiltration with 10,000-NMWL membranes are the best available approximation to truly dissolved concentrations (Alpers and others, 2000). Prior to the filtering of each sample, the assembly was flushed with 5-percent nitric acid (HNO$_3$) and rinsed with de-ionized water. A clean, unused filter was installed after cleaning and prior to sample filtration. Total recoverable, 0.45-μm filtered-acidified, and 0.45-μm filtered-unacidified sample splits were collected for both stream and inflow samples. Ultrafiltered sample splits were collected for cations, trace metals, and Fe redox determinations from the stream samples. For stream samples, the samples were filtered through the 0.45-μm membrane prior to the 10,000-NMWL membrane. When changing from a 0.45-μm membrane to a 10,000-NMWL membrane, the filter apparatus was not flushed with acid. Total recoverable metals are operationally defined as the metals that are measured in an unfiltered sample acidified with concentrated HNO$_3$ (1 percent v/v). Field blanks for each synoptic sampling event also were processed using the same procedure. Two half-gallon subsamples (filter-acidified with HNO$_3$ and filtered-unacidified) were processed for each SRS.

Analytical Methods

All reagents were of purity at least equal to the reagent-grade standards of the American Chemical Society. Double distilled or de-ionized water and re-distilled or trace metal grade acids were used in all preparations. Each sample was analyzed in at least duplicate for major cations and trace metals. Samples were diluted as necessary to bring the analyte concentration within the optimal range of the method.

Table 3. Sample processing protocol

[As, arsenic; FA, filtered-acidified; Fe(T), ferric iron plus ferrous iron; Fe(II), ferrous iron; FU, filtered-unacidified; HCl, hydrochloric acid; HDPE, high-density polyethylene; HNO_3, nitric acid; mL, milliliter; µm, micrometer; NMWL, nominal molecular weight limit; RA, raw-acidified; RU, raw-unacidified; UFA, ultrafiltered-acidified]

Treatment identification	Sample type	Sample	Filtration	Preservation	Bottle
RU	pH and specific conductance	Stream and inflows	None	None	125-mL clear HDPE
RA	Total recoverable metals and cations	Stream and inflows	None	1% HNO_3	125-mL clear HDPE
FA	Dissolved metals and cations	Stream and inflows	0.45 µm	1% HNO_3	125-mL clear HDPE
UFA-HNO_3	Ultrafiltration: dissolved metals and cations	Stream	10,000 NMWL	1% HNO_3	125-mL clear HDPE
UFA-HCl	Ultrafiltration: dissolved As, Fe(T), and Fe(II)	Stream	10,000 NMWL	1% HCl	125-mL opaque HDPE
FU	Alkalinity and anions	Stream and inflows	0.45 µm	None	125-mL clear HDPE

Unfiltered samples were analyzed for total recoverable metals, and filtered samples were analyzed for dissolved metals and anions (table 3). Analytical methods and detection limits for each chemical constituent are summarized in table 4. The detection limit is the concentration that will produce an absorbance signal three times the standard deviation of the blank. The standard deviation of the blank was determined by making replicate blank measurements that were intermixed with samples.

Concentrations of major cations and trace metals were determined in HNO_3-acidified samples using inductively coupled plasma-optical emission spectrometry (ICP-OES; Leeman Labs – Direct Reading Echelle). Major cations were analyzed using the radial view, and trace metals were analyzed using the axial view. Concentrations of Al less than 100 µg/L; Cd, Cr, and Co less than 10 µg/L; Cu less than 25 µg/L; and Pb were measured using a graphite furnace atomic absorption spectrometer (GFAAS; Perkin Elmer 4110ZL) with a transversely heated graphite atomizer (THGA) and Zeeman-effect background correction. Hydride generation atomic absorption spectrometry (HGAAS; Perkin Elmer AAnalyst 300) was used to measure As concentrations in HCl-acidified samples. A flow injection analysis system (FIAS) was used to generate arsine. Arsenic concentrations in samples preserved with HNO_3 were measured using ICP-OES. Total dissolved Fe (Fe(T)) and dissolved Fe(II) were determined in samples preserved with HCl using a modification of the FerroZine colorimetric method (Stookey, 1970; To and others, 1999). Iron concentrations in samples preserved with HNO_3 were measured using ICP-OES. Concentrations of SO_4, Cl, and Br were determined using an ion chromatograph (IC; Dionex DX-120) (Brinton and others, 1995; Kimball and others, 1999). Fluoride concentrations were determined using an ion-selective electrode (ISE) and mixing samples with total ionic strength buffer. Alkalinity (as $CaCO_3$) was determined by auto-titration (ManTech Associates) using standardized H_2SO_4 (Barringer and Johnsson, 1989).

Quality Assurance

Several techniques were used to assure the quality of the analytical data. These techniques include use of charge imbalance (C.I.), standard reference water samples (SRWS), duplicate sampling, replicate analyses, blank analyses, SRS's, spike recoveries, and determination by alternate method.

Table 4. Analytical techniques and detection limits

[FA, filter-acidified; mg/L, milligrams per liter; HCl, hydrochloric acid; HNO_3, nitric acid; ICP-OES, inductively coupled plasma-optical emission spectrometry; IC, ion chromatography; ISE, ion-selective electrode; GFAAS, graphite furnace atomic absorption spectrometry; HGAAS, hydride generation atomic absorption spectrometry; RA, raw-unacidified; UFA, ultrafiltration-acidified; µg/L, micrograms per liter; <, less than; >, greater than]

Constituent	Analytical method	Method detection limit (mg/L)
Ca	ICP-OES	0.4
Mg	ICP-OES	0.04
Na	ICP-OES	0.05
K	ICP-OES	0.04
SO_4	IC	0.3
Alkalinity as $CaCO_3$	Titration	1
F	ISE	0.05
Cl	IC	0.09
Br	IC	0.01
SiO_2	ICP-OES	0.06
Al	GFAAS (<100 µg/L); ICP-OES (>100 µg/L)	0.001; 0.06
Fe(T)	ICP-OES (RA-HNO_3, FA-HNO_3, UFA-HNO_3); FerroZine (UFA-HCl)	0.010; 0.002
Fe(II)	FerroZine	0.002
B	ICP-OES	0.01
Li	ICP-OES	0.001
Sr	ICP-OES	0.0003
Ba	ICP-OES	0.001
Mn	ICP-OES	0.002
Zn	ICP-OES	0.005
Pb	GFAAS; ICP-OES (RRL-17700B)	0.0003; 0.008
Ni	ICP-OES	0.003
Cu	GFAAS (<25 µg/L); ICP-OES (>25 µg/L)	0.0005; 0.003
Cd	GFAAS; ICP-OES (RRL-17700B)	0.0005; 0.001
Cr	GFAAS	0.0005
Co	GFAAS (<10 µg/L); ICP-OES (>10 µg/L)	0.0008; 0.002
Be	ICP-OES	0.001
Mo	ICP-OES	0.007
V	ICP-OES	0.002
As	HGAAS (UFA-HCl); ICP-OES (FA/RA-HNO_3)	0.0001; 0.04
Se	ICP-OES	0.04

Filtered and ultrafiltered sample data were checked for C.I. using the program WATEQ4F (Ball and Nordstrom, 1991). WATEQ4F uses equation 1 to calculate C.I.:

$$\text{C.I.(percent)} = \frac{100 \times (\text{sum cations} - \text{sum anions})}{(\text{sum cations} + \text{sum anions})/2} \quad (1)$$

where sum cations is the sum of the cations in milliequivalents per liter and sum anions is the sum of the anions in milliequivalents per liter.

The anions measured in the filtered-unacidified (FU) split were used to calculate the C.I. for the stream ultrafiltered-acidified (UFA) splits and the filtered-acidified (FA) splits. The C.I., sum cations (milliequivalents per liter), and sum anions (milliequivalents per liter) are reported in tables 10 and 11. A frequency plot of the C.I. for all synoptic samples described in this report is shown in figure 4. The Gaussian fit C.I. mean is –0.01 percent with a standard deviation of 3.3 percent. Analyses having a C.I. less than 10 percent are considered to be good. Eight sample analyses, of 424, have a C.I. greater than 10 percent; the worst was –20 percent.
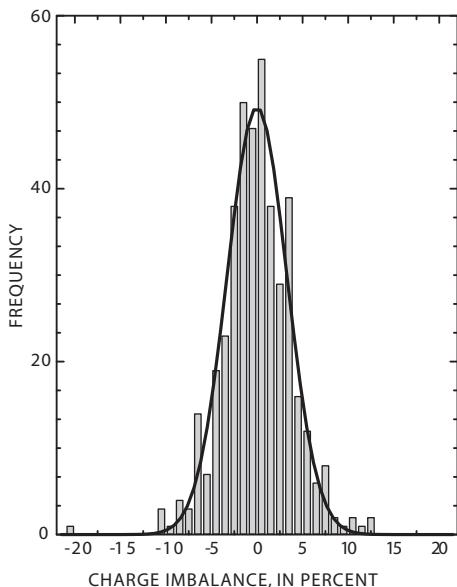
Figure 4. Frequency of change imbalance for all synoptic samples

USGS SRWS's T159, T163, M156, and AMW4 were used as independent standards to check accuracy (Farrar, 2000; Connor and others, 2001). The SRWS were analyzed several times during each analytical run. Analytical results for the SRWS and the most probable

value (MPV) for each constituent are reported in tables 5 and 6. Additional information about the USGS SRWS program can be obtained at URL *http://bqs.usgs.gov/srs*.

Duplicate samples were collected within 5 minutes of each other and processed as separate samples. This was done to check the entire sample collection and processing procedure. Duplicate samples are labeled as "A" or "B" in tables 10 and 11.

Field blanks were analyzed with the samples. Filtration blanks were collected for each filter apparatus at the central processing location. Three samples were collected from the half-gallon sample bottle. Each was filtered through the tangential-flow filtering system. Concentrations of all constituents measured in the FA-HNO_3 and raw-acidified (RA)-HNO_3 splits were less than or at detection limits, except Fe, Zn, and Al. Iron contamination up to 0.042 mg/L was detected in the FA-HCl and the UFA-HCl blanks. Therefore, Fe concentrations determined in FA and UFA-HNO_3 sample splits by ICP-OES are reported for samples containing less than 1.0 mg/L. For samples containing greater than 1.0 mg/L Fe, reported Fe(T) and Fe(II) values were obtained by colorimetric determination of HCl-acidified samples because the possible contamination is less than the error of the measurement. Leaching of Fe from the container walls is the probable source of contamination. Zinc concentrations were detected only in field blanks that were filtered. The filtration assembly is the likely source of Zn contamination. Traces of Al (typically less than 5 µg/L) were detected in blanks. An equipment blank was collected to evaluate contamination by the depth-integrated sampler.

Trip and laboratory blanks were evaluated to detect environmental and laboratory contamination. Acid blanks were collected to test for contamination from acid dispensers and in the HNO_3 and HCl added to samples collected for metal analysis. Blanks were collected by pouring reagent-grade water directly into a half-gallon plastic bottle. A raw sample was collected by transferring water directly into a 125-mL polyethylene bottle. Results for all blanks are reported in tables 7 and 8.

SRS's were analyzed numerous times along with the synoptic samples to monitor precision during and between analytical runs. The chemical compositions of the SRS's are similar to those of the stream samples. The number of analyses (n), the mean value, standard deviation (s), and the percent relative standard deviation (%RSD) are reported for the SRS's (table 9).

Table 5. Measurement of standard reference water samples, low-flow tracer study

[GFAAS, graphite furnace atomic absorption spectrometry; HGAAS, hydride generation atomic absorption spectrometry; ICP-OES, inductively coupled plasma-optical emission spectrometry; ISE, ion-selective electrode; mg/L, milligrams per liter; n, number of analyses; s, standard deviation; SRWS, standard reference water sample; USGS, U.S. Geological Survey; % RSD, percent relative standard deviation; % difference, percent difference; <, less than; ---, no data]

Analyte	Analytical method	USGS SRWS	n	mg/L	s	% RSD	Most probable value, mg/L	% difference
Ca	ICP-OES	T159	35	25.7	0.8	3	25.5	0.7
Ca	ICP-OES	T163	49	6.9	0.5	7	6.3	9.5
Ca	ICP-OES	M156	44	32	1	4	30.2	5.3
Mg	ICP-OES	T159	48	5.8	0.3	4	5.60	4.1
Mg	ICP-OES	T163	49	1.3	0.1	4	1.23	3.6
Mg	ICP-OES	M156	45	7.2	0.5	7	6.92	4.2
Na	ICP-OES	T159	35	96	6	6	100	-3.6
Na	ICP-OES	T163	36	39	2	6	39.6	-0.5
Na	ICP-OES	M156	48	44	2	5	44.6	-0.8
K	ICP-OES	T159	48	1.9	0.1	6	1.5	26
K	ICP-OES	T163	49	1.1	0.1	7	1.02	6.8
K	ICP-OES	M156	48	2.5	0.2	8	2.13	19
Alkalinity as $CaCO_3$	Titration	M160	9	75	2	2	74	1.4
F	ISE	M150	15	1.0	0.04	4	1.0	0.0
SiO_2	ICP-OES	T159	49	11.7	0.5	4	11.5	1.5
SiO_2	ICP-OES	T163	47	4.6	0.2	4	4.56	0.7
SiO_2	ICP-OES	M156	49	5.1	0.3	6	4.73	8.5
Al	ICP-OES	T159	40	<0.06	---	---	0.032	---
Al	ICP-OES	T163	40	<0.06	---	---	0.017	---
Al	GFAAS	T107	8	0.21	0.02	10	0.22	-3.2
Al	GFAAS	T163	5	0.016	0.001	5	0.017	-6.4
Fe	ICP-OES	T159	35	0.050	0.002	5	0.049	1.9
Fe	ICP-OES	T163	36	0.062	0.003	5	0.060	3.1
Fe(T)	FerroZine	AMW-4	3	190	3.6	2	188	1.1
Fe(T)	FerroZine	T163	6	0.064	0.001	1	0.060	6.0
B	ICP-OES	T159	34	0.027	0.004	13	0.028	-4.6
B	ICP-OES	T163	36	0.010	0.004	46	0.011	-8.3
B	ICP-OES	M156	34	0.086	0.006	7	0.079	9.1

Table 5. Measurement of standard reference water samples, low-flow tracer study--Continued

Analyte	Analytical method	USGS SRWS	n	mg/L	s	% RSD	Most probable value, mg/L	% difference
Li	ICP-OES	T159	38	0.009	0.001	7	0.009	5.5
Li	ICP-OES	T163	38	0.0011	0.000	25	0.0016	-30
Sr	ICP-OES	T159	49	0.19	0.01	5	0.190	1.0
Sr	ICP-OES	T163	49	0.037	0.002	6	0.0355	5.2
Sr	ICP-OES	M156	50	0.25	0.02	8	0.239	3.9
Ba	ICP-OES	T159	40	0.039	0.002	6	0.038	1.9
Ba	ICP-OES	T163	40	0.0076	0.0004	6	0.0074	2.3
Mn	ICP-OES	T159	45	0.022	0.001	3	0.022	1.7
Mn	ICP-OES	T163	49	0.015	0.003	5	0.0158	-6.1
Zn	ICP-OES	T159	35	0.020	0.002	8	0.019	3.0
Zn	ICP-OES	T163	36	0.020	0.002	10	0.0185	8.2
Pb	ICP-OES	T159	35	0.017	0.002	9	0.017	2.3
Pb	GFAAS	T159	32	0.0175	0.0004	6	0.0166	5.4
Pb	GFAAS	T163	30	0.035	0.002	3	0.032	9.3
Ni	ICP-OES	T159	35	0.024	0.002	7	0.022	11
Ni	ICP-OES	T163	36	0.017	0.001	8	0.0154	7.3
Cu	ICP-OES	T159	49	0.034	0.002	6	0.033	1.9
Cu	ICP-OES	T163	49	0.036	0.002	5	0.036	0.6
Cu	GFAAS	T159	34	0.034	0.001	6	0.033	0.9
Cu	GFAAS	T163	47	0.035	0.001	3	0.036	-1.5
Cd	ICP-OES	T159	35	0.026	0.001	5	0.024	7.4
Cd	GFAAS	T159	40	0.027	0.002	6	0.024	10
Cd	GFAAS	T163	26	0.008	0.000	3	0.007	16
Cr	GFAAS	T159	43	0.028	0.001	6	0.027	4.4
Cr	GFAAS	T163	47	0.040	0.002	3	0.040	-0.6
Co	ICP-OES	T159	35	0.014	0.002	15	0.013	6.3
Co	ICP-OES	T163	36	0.013	0.002	18	0.012	5.3
Co	GFAAS	T163	48	0.013	0.001	6	0.012	8.5
Co	GFAAS	T159	27	0.014	0.001	3	0.013	7.6
Be	ICP-OES	T159	40	0.011	0.001	7	0.011	3.9
Be	ICP-OES	T163	40	0.023	0.002	7	0.022	4.3
Mo	ICP-OES	T159	35	0.039	0.002	6	0.041	-4.8

Table 5. Measurement of standard reference water samples, low-flow tracer study--Concluded

Analyte	Analytical method	USGS SRWS	n	mg/L	s	% RSD	Most probable value, mg/L	% difference
Mo	ICP-OES	T163	36	0.012	0.002	21	0.0126	-7.6
V	ICP-OES	T159	35	0.015	0.001	7	0.014	3.7
V	ICP-OES	T163	36	0.036	0.002	6	0.035	4.0
V	ICP-OES	M156	36	0.010	0.001	6	0.00953	3.0
As	ICP-OES	T159	44	<0.04	---	---	0.028	---
As	HGAAS	AMW4	12	0.169	0.005	3	0.168	0.7
As	HGAAS	T159	17	0.027	0.004	13	0.028	-4.0
Se	ICP-OES	T163	36	<0.04	---	---	0.0088	---

Table 6. Measurement of standard reference water samples, snowmelt tracer study

[GFAAS, graphite furnace atomic absorption spectrometry; HGAAS, hydride generation atomic absorption spectrometry; ICP-OES, inductively coupled plasma-optical emission spectrometry; ISE, ion-selective electrode; mg/L, milligrams per liter; n, number of analyses; s, standard deviation; SRWS, standard reference water sample; USGS, U.S. Geological Survey; % RSD, percent relative standard deviation; % difference, percent difference; <, less than; ---, no data]

Analyte	Analytical method	USGS SRWS	n	mg/L	s	% RSD	Most probable value, mg/L	% difference
Ca	ICP-OES	T159	32	25.6	0.8	3	25.5	0.4
Ca	ICP-OES	T163	34	6.3	0.3	4	6.3	0.6
Ca	ICP-OES	M156	33	31	1	5	30.2	1.2
Mg	ICP-OES	T159	32	5.7	0.3	6	5.60	1.4
Mg	ICP-OES	T163	34	1.2	0.1	6	1.23	-1.6
Mg	ICP-OES	M156	33	7.0	0.5	7	6.92	1.3
Na	ICP-OES	T159	27	98	4	4	100	-1.5
Na	ICP-OES	T163	32	39	2	5	39.6	-2.0
Na	ICP-OES	M156	33	46	3	6	44.6	2.3
K	ICP-OES	T159	32	1.8	0.1	6	1.5	19
K	ICP-OES	T163	34	1.0	0.1	7	1.02	-0.5
K	ICP-OES	M156	33	2.3	0.2	7	2.13	10
Alkalinity as CaCO3	Titration	M160	9	75	2	2	74	1.4
F	ISE	M150	15	1.0	0.04	4	1.0	0.0
SiO_2	ICP-OES	T159	32	11.7	0.4	3	11.5	2.0

Table 6. Measurement of standard reference water samples, snowmelt tracer study--Continued

Analyte	Analytical method	USGS SRWS	n	mg/L	s	% RSD	Most probable value, mg/L	% difference
SiO_2	ICP-OES	T163	34	4.5	0.1	3	4.56	-0.4
SiO_2	ICP-OES	M156	33	5.0	0.2	4	4.73	5.6
Al	ICP-OES	T163	33	<0.06	---	---	0.0168	---
Al	GFAAS	T107	8	0.220	0.0	8.9	0.220	0.0
Fe	ICP-OES	T159	21	0.05	0.00	7	0.049	2.2
Fe	ICP-OES	T163	22	0.060	0.004	7	0.06	0.6
Fe	FerroZine	AMW4	3	188	1.644	1	188.0	0.1
Fe	FerroZine	T159	2	0.049	0.001	3	0.049	-0.3
B	ICP-OES	T159	16	0.024	0.0	16	0.028	-13
B	ICP-OES	T163	23	<0.01	---	---	0.011	---
B	ICP-OES	M156	22	0.083	0.006	7	0.079	5.3
Li	ICP-OES	T159	21	0.010	0.000	4	0.009	8.1
Li	ICP-OES	T163	22	0.001	0.000	14	0.002	-32
Sr	ICP-OES	T159	32	0.187	0.007	4	0.190	-1.6
Sr	ICP-OES	T163	34	0.035	0.001	4	0.0355	-0.2
Sr	ICP-OES	M156	33	0.25	0.01	4	0.239	3.1
Ba	ICP-OES	T159	21	0.038	0.001	2	0.038	-1.3
Ba	ICP-OES	T163	23	0.0074	0.0002	3	0.0074	-0.1
Mn	ICP-OES	T159	31	0.022	0.001	4	0.022	0.8
Mn	ICP-OES	T163	32	0.016	0.001	5	0.0158	-0.1
Zn	ICP-OES	T163	33	0.019	0.003	14	0.019	4.0
Zn	ICP-OES	T159	29	0.019	0.002	8	0.019	1.2
Pb	ICP-OES	T159	21	0.018	0.002	13	0.017	3.6
Pb	GFAAS	T159	48	0.0165	0.0011	7	0.0166	-0.6
Ni	ICP-OES	T159	32	0.023	0.001	5	0.022	6.3

Table 6. Measurement of standard reference water samples, snowmelt tracer study--Concluded

Analyte	Analytical method	USGS SRWS	n	mg/L	s	% RSD	Most probable value, mg/L	% difference
Ni	ICP-OES	T163	34	0.016	0.001	8	0.015	6
Cu	ICP-OES	T159	32	0.034	0.002	6	0.033	2.0
Cu	ICP-OES	T163	34	0.035	0.002	7	0.036	-1.8
Cu	GFAAS	T159	48	0.033	0.003	10	0.033	0.0
Cd	ICP-OES	T159	21	0.025	0.001	4	0.024	5.1
Cd	ICP-OES	T163	23	0.007	0.000	6	0.007	7.8
Cd	GFAAS	T163	32	0.007	0.001	10	0.007	2.2
Cr	GFAAS	T159	13	0.028	0.003	10	0.027	4.7
Cr	GFAAS	T163	13	0.038	0.003	8	0.040	-6
Co	ICP-OES	T159	32	0.014	0.001	9	0.013	9
Co	ICP-OES	T163	34	0.013	0.001	8	0.012	8.4
Co	GFAAS	T159	37	0.014	0.001	7	0.013	6.9
Co	GFAAS	T163	8	0.013	0.001	5	0.012	12
Be	ICP-OES	T159	21	0.011	0.000	2	0.0108	1.4
Be	ICP-OES	T163	23	0.022	0.001	2	0.022	2.2
Mo	ICP-OES	T159	20	0.037	0.002	6	0.041	-10
Mo	ICP-OES	T163	23	0.010	0.003	28	0.013	-20
V	ICP-OES	T159	21	0.014	0.001	4	0.014	0.2
V	ICP-OES	T163	23	0.035	0.001	3	0.035	-0.4
V	ICP-OES	M156	22	0.009	0.000	5	0.00953	-1.1
As	ICP-OES	T159	21	<0.04	---	---	0.028	---
As	ICP-OES	T163	22	<0.04	---	---	0.0253	---
As	HGAAS	T159	2	0.028	0.000	1	0.0284	-1.9
As	HGAAS	AMW4	13	0.171	0.0	1.1	0.168	1.6
Se	ICP-OES	T163	23	<0.04	---	---	0.009	---

Table 7. Measurement of blanks, low-flow tracer study

[FA, filter-acidified; FU, filtered-unacidified; ICP-OES, inductively coupled plasma-optical emission spectrometry; mg/L, milligrams per liter; RA, raw-acidified; RRL, Red River Lower; RRM, Red River Middle; RRU, Red River Upper; UFA, ultrafiltered-acidified; <, less than; ---, no data]

Sample ID Date collected Treatment	RRU blank 1 8/24/2001 UFA	FA / FU	RA	RRU blank 2 8/24/2001 UFA	FA / FU	RA
Constituent, mg/L						
Ca	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Mg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Na	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
SO_4	---	4	---	---	3	---
Alkalinity as $CaCO_3$	---	---	---	---	<1	---
F	---	<0.05	---	---	<0.05	---
Cl	---	---	---	---	<0.09	---
Br	---	0.6	---	---	0.8	---
SiO_2	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Al	0.004	0.006	0.005	0.003	0.005	0.003
Fe(T), ICP-OES	0.02	<0.010	<0.010	<0.010	<0.010	<0.010
Fe(T), FerroZine	0.004	---	---	<0.002	---	---
Fe(II), FerroZine	<0.002	---	---	<0.002	---	---
B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Li	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sr	0.0003	<0.0003	<0.0003	<0.0003	0.0004	<0.0003
Ba	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	0.018	0.007	<0.005	0.007	0.006	<0.005
Pb	0.0014	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	0.0046	0.0013	<0.0005	0.0022	0.0023	<0.0005
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04

Table 7. Measurement of blanks, low-flow tracer study--Continued

| Sample ID | RRM blank 1 | | | RRM blank 2 | | |
| Date collected | 8/20/2001 | | | 8/20/2001 | | |
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	<0.4	0.5	<0.4	<0.4	<0.4	<0.4
Mg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Na	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
SO_4	---	<0.3	---	---	3	---
Alkalinity as $CaCO_3$	---	<1	---	---	<1	---
F	---	<0.05	---	---	<0.05	---
Cl	---	7.9	---	---	<0.09	---
Br	---	<0.01	---	---	0.7	---
SiO_2	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Al	0.006	0.021	0.003	0.005	0.005	0.003
Fe(T), ICP-OES	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fe(T), FerroZine	0.014	---	---	<0.002	---	---
Fe(II), FerroZine	<0.002	---	---	<0.002	---	---
B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Li	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sr	0.0005	0.0009	<0.0003	<0.0003	<0.0003	<0.0003
Ba	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	0.011	<0.005	<0.005	0.006	<0.005	<0.005
Pb	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	0.0022	0.0007	<0.0005	0.0016	<0.0005	<0.0005
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04

Table 7. Measurement of blanks, low-flow tracer study--Concluded

Sample ID Date collected	RRM D.I. blank 8/24/2001		RRL blank 8/17/2001	
Treatment	RA	UFA	FA / FU	RA
Constituent, mg/L				
Ca	<0.4	<0.4	<0.4	<0.4
Mg	<0.04	<0.04	<0.04	<0.04
Na	<0.05	0.08	<0.05	<0.05
K	<0.04	<0.04	<0.04	<0.04
SO_4	---	---	<0.3	---
Alkalinity as $CaCO_3$	---	---	<1	---
F	---	---	<0.05	---
Cl	---	---	<0.09	---
Br	---	---	<0.01	---
SiO_2	<0.06	<0.06	<0.06	<0.06
Al	0.003	<0.06	<0.06	<0.06
Fe(T), ICP-OES	<0.010	<0.010	<0.010	<0.010
Fe(T), FerroZine	---	---	---	---
Fe(II), FerroZine	---	---	---	---
B	<0.01	<0.01	<0.01	<0.01
Li	<0.001	<0.001	<0.001	<0.001
Sr	<0.0003	0.0006	0.0005	0.0003
Ba	<0.001	<0.001	<0.001	<0.001
Mn	<0.002	<0.002	<0.002	<0.002
Zn	<0.005	0.012	<0.005	<0.005
Pb	<0.0003	0.0004	<0.0003	0.0003
Ni	<0.003	<0.003	<0.003	<0.003
Cu	<0.0005	0.0072	0.0007	0.0006
Cd	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.04	<0.04	<0.04
Se	<0.04	<0.04	<0.04	<0.04

Table 8. Measurement of blanks, snowmelt tracer study

[FA, filter-acidified; FU, filtered-unacidified; ICP-OES, inductively coupled plasma-optical emission spectrometry; mg/L, milligrams per liter; RA, raw-acidified; RRC, Red River at Columbine Creek; RRF, Red River at Fawn Lakes; RRH, Red River at Hottentot Creek; UFA, ultrafiltered-acidified; <, less than; ---, no data]

Sample ID	RRH blank 1			RRH blank 2		
Date collected	4/1/2002			4/1/2002		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Mg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Na	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
SO_4	---	<0.3	---	---	<0.3	---
Alkalinity as $CaCO_3$	---	5.4	---	---	4.1	---
F	---	<0.05	---	---	<0.05	---
Cl	---	<0.09	---	---	<0.09	---
Br	---	<0.01	---	---	<0.01	---
SiO_2	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Al	0.007	0.002	0.001	0.002	0.002	0.002
Fe(T), ICP-OES	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fe(T), FerroZine	---	0.010	---	---	0.021	---
Fe(II), FerroZine	---	0.008	---	---	0.010	---
B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Li	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sr	0.0003	<0.0003	<0.0003	0.0004	<0.0003	<0.0003
Ba	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	0.010	<0.005	<0.005	0.009	<0.005	<0.005
Pb	0.0003	<0.0003	<0.0003	0.0004	<0.0003	<0.0003
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	<0.0005	<0.0005	<0.0005	0.0021	0.0022	<0.0005
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007
Co	<0.0008	0.0026	<0.0008	<0.0008	<0.0008	0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04

Table 8. Measurement of blanks, snowmelt tracer study--Continued

Sample ID Date collected Treatment	RRH trip blank 4/1/2002 RA	RRF blank 1 3/31/2002			RRF blank 2 3/31/2002	
		UFA	FA / FU	RA	UFA	FA / FU
Constituent, mg/L						
Ca	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Mg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Na	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
SO_4	---	---	<0.3	---	---	<0.3
Alkalinity as $CaCO_3$	---	---	2.4	---	---	2.2
F	---	---	<0.05	---	---	<0.05
Cl	---	---	0.09	---	---	<0.09
Br	---	---	<0.01	---	---	<0.01
SiO_2	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Al	0.001	0.002	0.002	0.003	0.002	0.002
Fe(T), ICP-OES	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fe(T), FerroZine	---	---	0.042	---	---	0.012
Fe(II), FerroZine	---	---	0.008	---	---	0.005
B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Li	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sr	<0.0003	0.0005	0.0003	0.0005	0.0004	0.0005
Ba	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	<0.005	0.015	0.007	<0.005	0.007	<0.005
Pb	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0007
Ni	<0.003	0.005	<0.003	<0.003	<0.003	<0.003
Cu	<0.0005	0.0019	<0.0005	<0.0005	0.0009	<0.0005
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.04	<0.0001	<0.04	<0.04	<0.0001
Se	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04

Table 8. Measurement of blanks, snowmelt tracer study--Continued

Sample ID Date collected Treatment	RRF blank 2 3/31/2002 RA	RRF DH-81 blank 3/31/2002 RA	RRF trip blank 3/31/2002 RA	RRC blank 1 3/30/2002 UFA	RRC blank 1 3/30/2002 FA / FU	RRC blank 1 3/30/2002 RA
Constituent, mg/L						
Ca	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Mg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Na	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
SO_4	---	---	---	---	<0.3	---
Alkalinity as $CaCO_3$	---	---	---	---	<1	---
F	---	---	---	---	<0.05	---
Cl	---	---	---	---	<0.09	---
Br	---	---	---	---	<0.01	---
SiO_2	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Al	0.002	0.006	<0.06	0.007	0.002	0.004
Fe(T), ICP-OES	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fe(T), FerroZine	---	---	---	0.014	---	---
Fe(II), FerroZine	---	---	---	0.009	---	---
B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Li	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sr	0.0003	0.0003	<0.0003	0.0009	0.0020	0.0005
Ba	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	<0.005	<0.005	<0.005	0.012	0.005	<0.005
Pb	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	0.0005
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	0.0013	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04

Table 8. Measurement of blanks, snowmelt tracer study--Concluded

Sample ID Date collected Treatment	RRC blank 2 3/30/2002			RRC DH-81 blank 3/30/2002		
	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Mg	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Na	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
K	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
SO_4	---	<0.3	---	---	<0.3	---
Alkalinity as $CaCO_3$	---	5.6	---	---	2.8	---
F	---	<0.05	---	---	<0.05	---
Cl	---	<0.09	---	---	<0.09	---
Br	---	<0.01	---	---	<0.01	---
SiO_2	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Al	0.001	0.0015	0.002	0.001	0.005	0.004
Fe(T), ICP-OES	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Fe(T), FerroZine	0.019	---	---	0.014	---	---
Fe(II), FerroZine	0.016	---	---	0.003	---	---
B	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Li	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sr	0.0007	0.0007	0.0006	0.0008	0.0020	0.0006
Ba	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mn	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Zn	<0.005	<0.005	<0.005	0.011	<0.005	<0.005
Pb	0.0006	<0.0003	<0.0003	0.0006	<0.0003	<0.0003
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	<0.0005	<0.0005	0.0017	0.0008	<0.0005	0.0006
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	0.0037	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04

Table 9. Measurement of stream reference samples

[ID, identification; mg/L, milligrams per liter; n, number of analyses; s, standard deviation; % RSD, percent relative standard deviation; < less than; ---, no data]

Sample ID	RRU-375				RRU-5300			
Analyte:	n	mg/L	s	% RSD	n	mg/L	s	% RSD
As	19	<0.04	---	---	20	<0.04	---	---
Al	19	<0.06	---	---	20	<0.06	---	---
B	19	<0.01	---	---	20	<0.01	---	---
Ba	19	0.043	0.004	9	20	0.041	0.001	4
Be	19	<0.001	---	---	20	<0.001	---	---
Br	9	2.19	0.02	0.6	60	1.58	0.02	0.9
Ca	19	30	1	4	20	35	1	3
Cd	19	<0.001	---	---	20	<0.001	---	---
Cl	9	1.3	0.01	0.8	60	2.31	0.06	0.3
Co	19	<0.002	---	---	20	<0.002	---	---
Cr	19	<0.003	---	---	20	<0.003	---	---
Cu	19	<0.003	---	---	20	0.005	0.001	22
F	---	---	---	---	---	---	---	---
Fe	19	<0.010	---	---	20	0.043	0.003	6
K	19	0.69	0.05	7	20	1.0	0.1	7
Li	19	0.002	0.000	25	20	0.004	0.000	12
Mg	19	4.5	0.3	6	20	7.2	0.4	6
Mn	19	0.003	0.000	6	20	0.10	0.00	2
Mo	19	<0.007	---	---	20	<0.007	---	---
Na	19	3.4	0.2	5	20	5.1	0.2	4
Ni	19	<0.003	---	---	20	0.004	0.001	20
Pb	19	<0.008	---	---	20	<0.008	---	---
SiO_2	19	7.3	0.3	5	20	11	0	4
SO_4	9	15.6	0.03	0.2	60	52.7	0.43	0.8
Se	19	<0.04	---	---	20	<0.04	---	---
Sr	19	0.18	0.01	5	20	0.20	0.01	4
V	19	<0.002	---	---	20	<0.002	---	---
Zn	19	0.007	0.002	24	20	0.013	0.002	12

Table 9. Measurement of stream reference samples--Continued

Sample ID	RRM-T3				RRL-T4			
Analyte:	n	mg/L	s	% RSD	n	mg/L	s	% RSD
As	13	<0.04	---	---	11	<0.04	---	---
Al	13	<0.06	---	---	19	<0.06	---	---
B	13	<0.01	---	---	11	<0.01	---	---
Ba	13	0.035	0.002	6	19	0.029	0.001	5
Be	13	<0.001	---	---	19	<0.001	---	---
Br	54	1.24	0.02	2	8	1.25	0.01	0.9
Ca	13	39	2	6	19	46	2	5
Cd	13	<0.001	---	---	11	<0.001	---	---
Cl	54	2.4	0.08	38	8	0.67	0.02	0.7
Co	13	<0.002	---	---	11	0.003	0.000	15
Cr	13	<0.003	---	---	11	<0.003	---	---
Cu	13	0.004	0.001	23	19	0.004	0.001	34
F	---	---	---	---	---	---	---	---
Fe	13	<0.010	---	---	11	<0.010	---	---
K	13	1.1	0.1	8	19	1.1	0.1	5
Li	13	0.004	0.001	14	19	0.004	0.000	5
Mg	13	8.1	0.7	8	19	10.2	0.4	4
Mn	13	0.13	0.01	6	19	0.41	0.01	2
Mo	13	<0.007	---	---	11	<0.007	---	---
Na	13	5.1	0.4	9	19	5.9	0.4	6
Ni	13	0.005	0.001	18	11	0.017	0.001	8
Pb	13	<0.008	---	---	11	<0.008	---	---
SiO_2	13	11.5	0.7	6	19	10	1	5
Se	13	<0.04	---	---	11	<0.04	---	---
SO_4	54	65.9	1.0	2	8	108	0.06	0.05
Sr	13	0.22	0.02	8	19	0.27	0.01	4
V	13	<0.002	---	---	11	<0.002	---	---
Zn	13	0.007	0.002	22	10	0.081	0.003	4

Table 9. Measurement of stream reference samples--Continued

Sample ID	RRL-T2				RRC			
Analyte:	n	mg/L	s	% RSD	n	mg/L	s	% RSD
As	15	<0.04	---	---	14	<0.04	---	---
Al	23	<0.06	---	---	28	<0.06	---	---
B	13	0.010	0.002	22	14	<0.01	---	---
Ba	23	0.031	0.001	3	14	0.034	0.001	3
Be	23	<0.001	---	---	14	<0.001	---	---
Br	49	1.3	0.03	2	38	3.5	0.14	3
Ca	23	46	4	8	36	37	1	2
Cd	15	<0.001	---	---	14	<0.001	---	---
Cl	49	2.8	0.4	13	38	3.0	0.1	4
Co	15	0.002	0.001	27	36	<0.002	---	---
Cr	15	<0.003	---	---	14	<0.003	---	---
Cu	23	0.003	0.001	50	36	0.004	0.003	67
F	---	---	---	---	---	---	---	---
Fe	15	<0.010	---	---	24	<0.010	---	---
K	23	1.1	0.1	5	36	1.0	0.1	7
Li	21	0.004	0.000	7	14	0.004	0.000	7
Mg	23	9.9	0.4	4	36	8.5	0.3	4
Mn	23	0.29	0.01	2	36	0.13	0.01	10
Mo	15	<0.007	---	---	14	<0.007	---	---
Na	23	5.7	0.2	3	36	6.4	0.3	5
Ni	15	0.014	0.001	11	36	0.007	0.001	21
Pb	15	<0.008	---	---	14	<0.008	---	---
SiO$_2$	21	10	0	4	32	12	1	5
Se	13	<0.04	---	---	14	<0.04	---	---
SO$_4$	49	100	2	2	38	78	5	7
Sr	22	0.26	0.01	3	36	0.23	0.01	3
V	15	<0.002	---	---	14	<0.002	---	---
Zn	14	0.048	0.002	5	34	0.019	0.003	16

Table 9. Measurement of stream reference samples--Concluded

Sample ID	RRF				RRH			
Analyte:	n	mg/L	s	% RSD	n	mg/L	s	% RSD
As	15	<0.04	---	---	7	<0.04	---	---
Al	11	<0.06	---	---	9	<0.06	---	---
B	15	<0.01	---	---	9	<0.01	---	---
Ba	15	0.038	0.001	2	9	0.040	0.001	2
Be	15	<0.001	---	---	9	<0.001	---	---
Br	12	2.9	0.01	0.5	11	1.8	0.01	0.4
Ca	14	38	1	3	9	36	1	4
Cd	15	<0.001	---	---	9	<0.001	---	---
Cl	12	3.75	0.05	1	11	3.73	0.03	1
Co	15	<0.002	---	---	9	<0.002	---	---
Cr	15	<0.003	---	---	9	<0.003	---	---
Cu	15	0.008	0.001	16	9	0.006	0.003	47
F	---	---	---	---	---	---	---	---
Fe	14	0.179	0.006	4	9	0.027	0.013	47
K	15	1.0	0.04	4	9	1.0	0.1	8
Li	15	0.005	0.000	4	9	0.006	0.002	26
Mg	13	8.9	0.7	7	9	8.7	0.3	4
Mn	15	0.099	0.004	4	9	0.13	0.004	3
Mo	15	<0.007	---	---	9	<0.007	---	---
Na	15	6.4	0.3	5	9	6.0	0.2	4
Ni	15	0.005	0.001	20	9	0.007	0.002	24
Pb	15	<0.008	---	---	9	<0.008	---	---
SiO_2	15	12	0	3	9	13	0	3
Se	15	<0.04	---	---	9	<0.04	---	---
SO_4	12	70	0.2	0.1	11	68	0.2	0.3
Sr	15	0.24	0.01	2	9	0.23	0.01	3
V	15	<0.002	---	---	9	<0.002	---	---
Zn	14	0.021	0.003	13	9	0.020	0.001	4

Spike recoveries were performed by spiking RRL-14142 and RRL-14800 with a mixed-element standard, then analyzing them together with the unspiked samples by ICP-OES. Recoveries ranged from 88 to 114 percent.

Several constituents were analyzed by more than one method. Although there is generally a preferred method based on several factors including sample matrix and proximity to the method detection limit, comparing analytical results from alternate methods serves as an accuracy check. Analytical results from ICP-OES are plotted in relation to analytical results from GFAAS for Al, Cd, Cr, Co, and Cu (fig. 5). The uncertainty was calculated on the basis of the method with the higher detection limit. At the method detection limit the uncertainty is 100 percent and decreases to 5 percent at 20 times the detection limit. Considering the uncertainty of the measurements, analytical results obtained by alternate methods are in good agreement with each other.

INTERCOMPARISON BETWEEN FILTRATION METHODS

For stream samples, ultrafiltered sample concentrations and 0.45-μm filtered sample concentrations for Al, Cu, Fe, Mn, Ni, and Zn are shown in figure 6. Differences in measured concentrations between UFA and FA sample splits may be the result of filter pore size, contamination, or filtration timing. For the Red River, only concentrations of Fe and Al ultrafiltrates are consistently lower than 0.45-μm filtrates (fig. 6). However, it is not possible to determine whether differences in Fe and Al concentrations are the result of filter pore size or an artifact of filtration timing. The Fe and Al may have oxidized and formed precipitates during sample processing because samples were filtered through the 10,000-NMWL membrane approximately 5–30 minutes after being filtered through the 0.45-μm membrane. With few exceptions, there is little difference between filter and ultrafiltered concentrations for Mn, Ni, Zn, Ca, Mg, Sr, Ba, Li, K, and Co. Copper concentrations in the ultrafiltered and filtered sample splits do not correlate very well with each other. The scatter in the Cu concentrations is both above and below the 1:1 line. The lower Cu concentrations for UFA splits may be the result of smaller pore size, and the higher Cu concentrations for UFA splits could be caused by contamination from the

filtration apparatus's brass fittings when the 0.45-μm filter was changed to the 10,000-NMWL filter.

WATER-CHEMISTRY DATA FROM LOW-FLOW AND SNOWMELT SYNOPTIC / TRACER STUDIES

Water analyses are reported for each synoptic sampling event in tables 10 and 11. Stream samples are reported before the inflow samples. The samples are organized by distance downstream from the most upstream sample site and are labeled as stream, right-bank inflow (RBI), or left-bank inflow (LBI). Results from each sample split (RA, FA, FU, and UFA) are reported. The Na and Br concentrations in the Red River stream samples are elevated because NaBr was added as the conservative tracer.

Chemical and Physical Relations

A few correlation plots were obtained to determine whether relations between certain parameters are maintained in the Red River as they are for the ground-water chemistry. Dissolved Mg concentrations increase with increasing dissolved Ca concentrations (fig. 7). Magnesium concentrations are comparable in magnitude to Ca concentrations in the Red River Valley because of weathering of the andesite of mafic composition. Dissolved Ca concentrations correlate with increasing SO_4 concentrations because of extensive gypsum dissolution in the area (fig. 8). Specific conductance increases linearly ($R^2=0.99$) with increasing SO_4 concentrations (fig. 9) because SO_4 is the major anion for the inflow samples. Fluoride concentrations do not correlate well with SO_4, but they generally increase as SO_4 concentrations increase (fig. 10).

Downstream Profiles

The pH of the Red River is about neutral and changes little with downstream distance (fig. 11). Specific conductance increases with downstream distance (fig. 12). The dissolved concentrations of constituents fall into one of four categories depending on their trends with downstream distance: (1) increase with distance, (2) decrease with distance, (3) little change with distance, and (4) near or below the method detection limit. Trends for both tracer studies are similar, although stream and inflow concentrations

vary. Concentrations of Ca, Mg, K, SO$_4$, F, Cl, Li, Sr, Mn, Zn, Ni, and Co increase with downstream distance. Plots of SO$_4$, F, Mn, Zn, Ni, and Co as a function of downstream distance are shown in figures 13, 14, 15, 16, 17, and 18, respectively. For many of these constituents, including SO$_4$, Mn, Zn, and Ni, the concentration abruptly increases at a downstream distance of approximately 7,500 and 13,500 m. Dissolved concentrations of Cu, Ba, and alkalinity decrease with downstream distance. Plots of alkalinity and Cu as a function of downstream distance are shown in figures 19 and 20, respectively. Copper may sorb onto suspended Fe particles, Ba may precipitate as BaSO$_4$, and the acid-neutralizing capacity or alkalinity decreases because of low-pH inflows resulting in smaller concentrations downstream. Dissolved Al (fig. 21) and SiO$_2$ change little with downstream distance. Ultrafiltered Fe concentrations vary little with distance and are generally near detection; however, 0.45-μm filtered Fe concentrations are variable. The difference between the ultrafiltered and 0.45-μm filtered Fe concentrations is largest between 500 and 7,500 m (fig. 22). Total recoverable Al and Fe increase with downstream distance (figs. 21-22). Concentrations of B, Pb, Cd, Cr, Be, Mo, V, As, and Se are near or below method detection limits.

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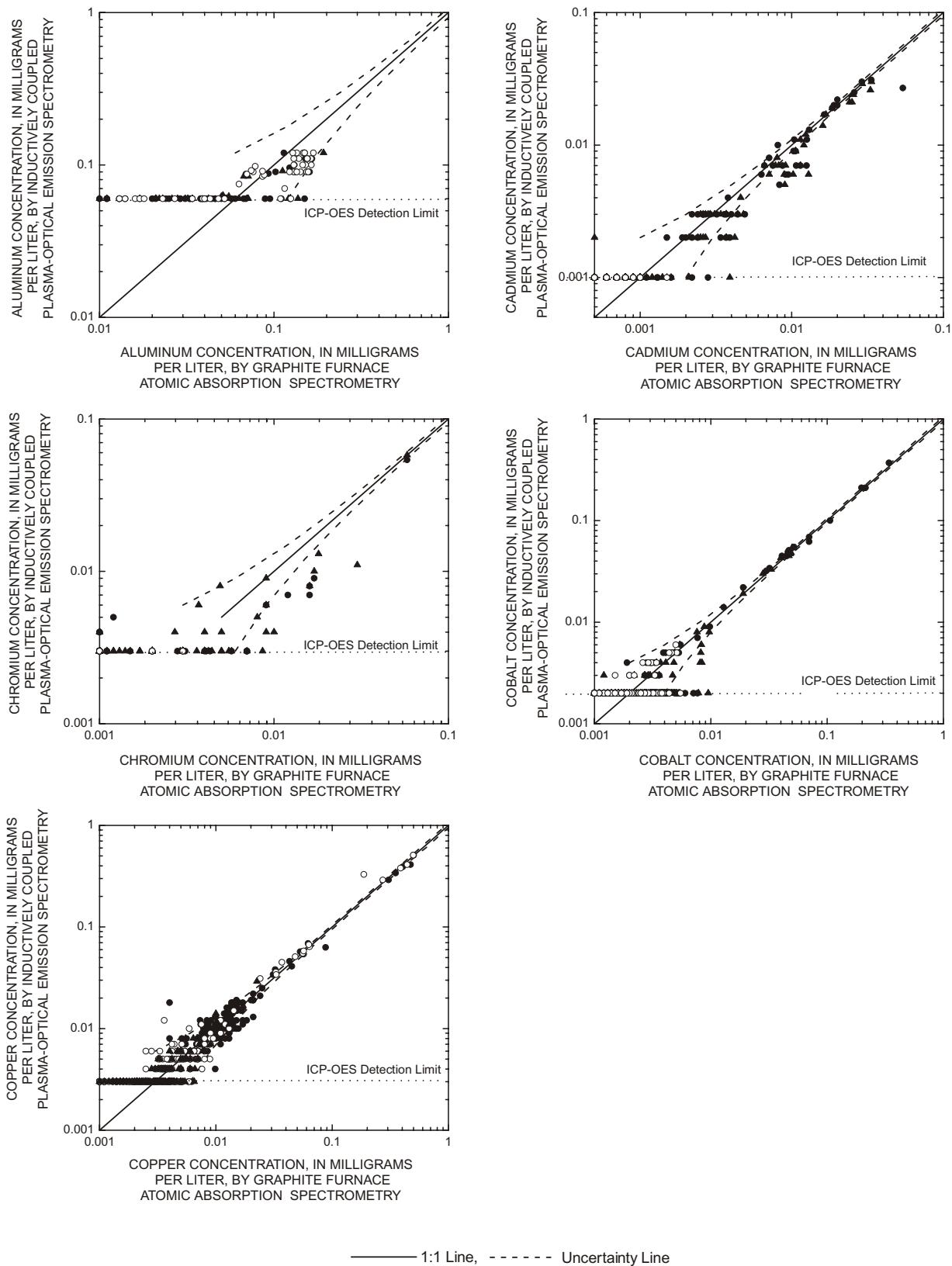
Figure 5. Aluminum, cadmium, chromium, cobalt, and copper concentrations determined by alternate methods.
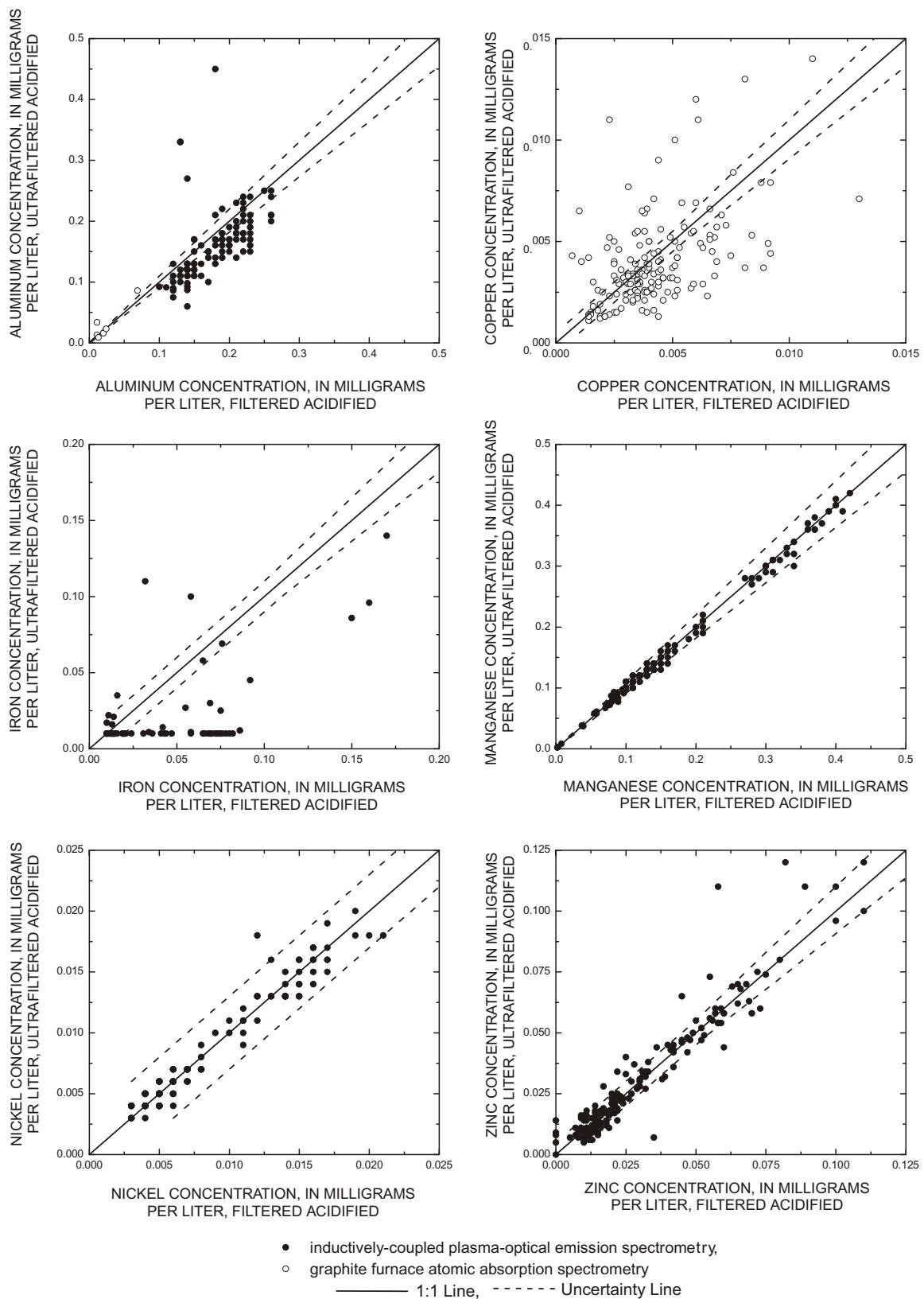
Figure 6. Ultrafiltered and filtered concentrations for aluminum, copper, iron, manganese, nickel, and zinc.

Table 10. Water analyses for the low-flow tracer study

[A or B, duplicate analyses; C.I., charge imbalance from equation 1; FA, filtered-acidified; FU-filtered-unacidified; mg/L, milligrams per liter; meq/L, milliequivalents per liter; SC, specific conductance; RA, raw-acidified; UFA, ultrafiltered-acified; μS/cm, microsiemens per centimeter; ---, no data; °C, degrees Celsius]

Sample Identification	RRU-0			RRU-200		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	8.14			8.09		
SC (μS/cm)	193			198		
Temperature (°C)	9.5			9.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	31	31	30	30	31	30
Mg	4.5	4.5	4.2	4.4	4.5	4.4
Na	2.5	2.6	2.6	3.5	3.3	3.3
K	0.62	0.65	0.60	0.66	0.63	0.64
SO_4	---	15	---	---	15	---
Alkalinity as $CaCO_3$	---	81	---	---	80	---
F	---	<0.05	---	---	<0.05	---
Cl	---	1.0	---	---	1.1	---
Br	---	<0.01	---	---	2.3	---
SiO_2	7.0	7.1	7.1	7.1	7.1	7.1
Al	0.013	0.011	0.050	0.009	0.013	0.054
Fe(T)	<0.010	<0.010	0.050	<0.010	<0.010	0.044
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.001	0.002	0.001	0.002	0.002	0.001
Sr	0.17	0.18	0.17	0.17	0.18	0.17
Ba	0.041	0.041	0.040	0.042	0.041	0.042
Mn	<0.002	0.002	0.003	0.002	0.002	0.004
Zn	<0.005	<0.005	<0.005	0.014	<0.005	<0.005
Pb	<0.0003	<0.0003	0.0004	0.0003	<0.0003	0.0006
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	0.0026	0.0018	<0.0005	0.0065	0.0010	<0.0005
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.00	2.00	---	1.99	2.03	---
Sum anions (meq/L)	1.91	1.91	---	1.91	1.91	---
C.I. (percent)	4.5*	4.8	---	3.6*	6.0	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-324			RRU-375		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	8.14			8.05		
SC (µS/cm)	199			201		
Temperature (°C)	9.5			9.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	31	31	31	30	31	31
Mg	4.6	4.5	4.5	4.5	4.7	4.5
Na	3.3	3.5	3.5	3.4	3.5	3.6
K	0.68	0.69	0.69	0.69	0.73	0.68
SO_4	---	15	---	---	16	---
Alkalinity as $CaCO_3$	---	82	---	---	81	---
F	---	<0.05	---	---	<0.05	---
Cl	---	1.2	---	---	1.3	---
Br	---	2.2	---	---	2.2	---
SiO_2	7.3	7.3	7.5	7.2	7.4	7.4
Al	0.016	0.020	0.055	0.034	0.011	0.052
Fe(T)	<0.010	<0.010	0.048	<0.010	0.011	0.051
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.001	0.002	0.001	0.002	0.002	0.001
Sr	0.17	0.18	0.18	0.17	0.19	0.18
Ba	0.042	0.042	0.044	0.040	0.044	0.045
Mn	0.003	0.003	0.005	0.003	0.003	0.005
Zn	0.009	<0.005	<0.005	0.009	<0.005	<0.005
Pb	0.0004	<0.0003	0.0005	<0.0003	<0.0003	0.0003
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	0.011	0.0023	0.0006	0.0043	0.0007	<0.0005
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.04	2.04	---	1.99	2.06	---
Sum anions (meq/L)	1.97	1.97	---	1.96	1.96	---
C.I. (percent)	3.4*	3.4	---	1.5*	5.1	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-518			RRU-700		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.84			7.81		
SC (μS/cm)	215			220		
Temperature (°C)	9.0			8.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	32	32	32	33	33	33
Mg	5.1	5.2	5.2	5.6	5.6	5.5
Na	3.8	3.8	3.8	3.8	3.9	3.9
K	0.72	0.73	0.72	0.75	0.77	0.74
SO_4	---	24	---	---	27	---
Alkalinity as $CaCO_3$	---	79	---	---	78	---
F	---	<0.05	---	---	0.05	---
Cl	---	1.7	---	---	1.7	---
Br	---	2.1	---	---	2.0	---
SiO_2	8.0	8.1	8.3	8.5	8.5	8.7
Al	0.023	0.024	0.071	0.084	0.087	0.21
Fe(T)	<0.010	0.010	0.054	<0.010	0.016	0.061
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.002	0.002	0.002	0.002	0.003	0.002
Sr	0.19	0.19	0.19	0.20	0.20	0.20
Ba	0.042	0.043	0.045	0.046	0.044	0.045
Mn	0.008	0.008	0.011	0.038	0.037	0.041
Zn	0.008	0.010	0.009	0.018	0.016	0.017
Pb	<0.0003	<0.0003	0.0004	<0.0003	<0.0003	0.0003
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	0.0019	0.0019	0.0019	0.0057	0.0055	0.0082
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.14	2.15	---	2.23	2.23	---
Sum anions (meq/L)	2.09	2.09	---	2.12	2.12	---
C.I. (percent)	2.5*	2.9	---	5.1*	5.3	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-800A			RRU-800B		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.71			7.70		
SC (µS/cm)	223			223		
Temperature (°C)	8.0			8.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	33	32	32	33	33	32
Mg	5.8	5.6	5.3	5.9	5.7	5.4
Na	4.0	3.7	3.7	3.9	4.0	3.8
K	0.78	0.74	0.64	0.73	0.77	0.70
SO_4	---	30	---	---	30	---
Alkalinity as $CaCO_3$	---	76	---	---	82	---
F	---	0.06	---	---	0.06	---
Cl	---	1.7	---	---	1.7	---
Br	---	2.0	---	---	2.0	---
SiO_2	9.0	8.6	8.6	9.1	8.9	8.8
Al	0.13	0.12	0.26	0.076	0.12	0.26
Fe(T)	0.016	0.013	0.062	<0.010	0.014	0.069
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.002	0.003	0.002	0.002	0.003	0.002
Sr	0.19	0.20	0.18	0.20	0.21	0.19
Ba	0.045	0.043	0.043	0.045	0.044	0.042
Mn	0.058	0.055	0.058	0.058	0.058	0.060
Zn	0.021	0.020	0.021	0.023	0.023	0.023
Pb	<0.0003	<0.0003	0.0011	<0.0003	<0.0003	0.0003
Ni	0.003	0.003	0.003	0.004	0.003	0.003
Cu	0.0079	0.0088	0.011	0.0052	0.0068	0.0094
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	0.0010	0.0012	0.0013	0.0014	0.0011	0.0011
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.25	2.17	---	2.25	2.24	---
Sum anions (meq/L)	2.15	2.15	---	2.25	2.25	---
C.I. (percent)	4.6*	1.0	---	0.1*	-0.4	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-900			RRU-1040		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.74			7.73		
SC (µS/cm)	225			227		
Temperature (°C)	8.5			8.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	33	32	32	32	33	33
Mg	5.8	5.6	5.5	5.8	6.0	5.8
Na	3.8	3.8	4.0	4.1	4.0	3.9
K	0.72	0.69	0.71	0.77	0.78	0.72
SO_4	---	31	---	---	33	---
Alkalinity as $CaCO_3$	---	76	---	---	75	---
F	---	0.06	---	---	0.07	---
Cl	---	1.7	---	---	1.7	---
Br	---	2.0	---	---	1.9	---
SiO_2	8.9	8.6	8.9	8.6	9.2	9.2
Al	0.063	0.12	0.23	0.078	0.14	0.28
Fe(T)	<0.010	0.019	0.075	<0.010	0.020	0.090
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.002	0.003	0.002	0.003	0.003	0.003
Sr	0.19	0.19	0.18	0.19	0.20	0.19
Ba	0.043	0.041	0.042	0.042	0.041	0.043
Mn	0.061	0.058	0.063	0.067	0.071	0.075
Zn	0.024	0.023	0.023	0.023	0.024	0.025
Pb	<0.0003	0.0006	0.0004	<0.0003	<0.0003	0.0004
Ni	0.004	0.004	0.003	0.004	0.003	0.003
Cu	0.0066	0.0066	0.0072	0.0053	0.0066	0.011
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	0.0011	0.0011	0.0011	0.0016	0.0014	0.0019
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.24	2.17	---	2.20	2.26	---
Sum anions (meq/L)	2.16	2.16	---	2.19	2.19	---
C.I. (percent)	3.6*	0.6	---	0.6*	3.4	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-1100			RRU-1200		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.69			7.69		
SC (µS/cm)	230			231		
Temperature (°C)	8.0			8.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	33	33	32	34	32	32
Mg	6.1	6.2	5.7	6.4	6.3	5.8
Na	4.1	4.2	3.9	4.1	4.1	4.0
K	0.74	0.83	0.69	0.77	0.82	0.69
SO_4	---	35	---	---	37	---
Alkalinity as $CaCO_3$	---	75	---	---	77	---
F	---	0.08	---	---	0.15	---
Cl	---	1.7	---	---	1.7	---
Br	---	1.9	---	---	1.9	---
SiO_2	9.4	9.3	9.4	9.9	9.7	9.7
Al	0.11	0.13	0.32	0.12	0.14	0.34
Fe(T)	<0.010	0.036	0.12	0.011	0.034	0.12
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.003	0.003	0.003	0.003	0.002
Sr	0.19	0.19	0.18	0.19	0.19	0.18
Ba	0.044	0.043	0.040	0.044	0.042	0.044
Mn	0.086	0.084	0.090	0.091	0.088	0.095
Zn	0.034	0.031	0.028	0.037	0.028	0.031
Pb	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0009
Ni	0.005	0.005	0.004	0.006	0.005	0.005
Cu	0.0079	0.0092	0.013	0.013	0.0081	0.013
Cd	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	0.0014	0.0016	0.0021	0.0012	0.0020	0.0022
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.27	2.29	---	2.34	2.24	---
Sum anions (meq/L)	2.22	2.22	---	2.29	2.29	---
C.I. (percent)	2.4*	3.1	---	2.2*	-2.5	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-1300			RRU-1640		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.68			7.69		
SC (µS/cm)	233			235		
Temperature (°C)	7.5			7.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	33	33	33	33	32	31
Mg	6.5	6.5	6.1	6.6	6.2	5.9
Na	4.3	4.3	4.2	4.1	4.5	4.0
K	0.80	0.85	0.77	0.80	0.88	0.74
SO_4	---	38	---	---	39	---
Alkalinity as $CaCO_3$	---	75	---	---	72	---
F	---	0.10	---	---	0.11	---
Cl	---	1.7	---	---	1.8	---
Br	---	1.9	---	---	1.8	---
SiO_2	10	10	10	10	9.9	10
Al	0.13	0.16	0.33	0.074	0.14	0.33
Fe(T)	0.014	0.042	0.13	<0.010	0.031	0.14
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.004	0.003	0.003	0.003	0.003
Sr	0.19	0.20	0.18	0.19	0.19	0.18
Ba	0.043	0.044	0.042	0.041	0.042	0.042
Mn	0.096	0.096	0.098	0.097	0.095	0.10
Zn	0.030	0.030	0.031	0.034	0.032	0.034
Pb	<0.0003	<0.0003	0.0004	<0.0003	<0.0003	0.0003
Ni	0.006	0.005	0.005	0.006	0.006	0.004
Cu	0.0063	0.0071	0.013	0.0084	0.0076	0.014
Cd	0.0005	0.0006	0.0005	0.0006	0.0006	0.0005
Cr	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	0.0014	0.0020	0.0022	0.0015	0.0022	0.0019
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.31	2.31	---	2.31	2.25	---
Sum anions (meq/L)	2.28	2.28	---	2.24	2.24	---
C.I. (percent)	1.1*	1.2	---	3.0*	0.2	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-1765			RRU-1975		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.70			7.73		
SC (µS/cm)	235			237		
Temperature (°C)	7.0			8.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	33	33	33	34	33	34
Mg	6.5	6.4	6.1	6.7	6.4	6.3
Na	4.4	4.2	4.1	4.4	4.4	4.2
K	0.85	0.88	0.74	0.86	0.85	0.78
SO_4	---	40	---	---	41	---
Alkalinity as $CaCO_3$	---	73	---	---	71	---
F	---	0.11	---	---	0.11	---
Cl	---	1.8	---	---	1.8	---
Br	---	1.7	---	---	1.8	---
SiO_2	10	10	10	11	10	10
Al	0.048	0.14	0.34	0.11	0.14	0.36
Fe(T)	<0.010	0.041	0.15	<0.010	0.043	0.18
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.004	0.003	0.003	0.004	0.003
Sr	0.20	0.20	0.19	0.20	0.20	0.19
Ba	0.043	0.044	0.043	0.045	0.044	0.045
Mn	0.095	0.097	0.10	0.11	0.10	0.11
Zn	0.007	0.035	0.034	0.032	0.032	0.036
Pb	0.0003	0.0004	0.0005	<0.0003	<0.0003	0.0006
Ni	0.005	0.006	0.004	0.006	0.005	0.006
Cu	0.0049	0.0091	0.014	0.0045	0.0067	0.013
Cd	0.0006	0.0005	0.0006	0.0005	0.0005	0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	0.0010	<0.0008	0.0022	0.0015	0.0020	0.0023
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.31	2.30	---	2.37	2.30	---
Sum anions (meq/L)	2.27	2.27	---	2.26	2.26	---
C.I. (percent)	1.8*	1.1	---	5.0*	1.8	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-2184			RRU-2404		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.74			7.76		
SC (µS/cm)	238			241		
Temperature (°C)	7.5			7.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	34	34	33	35	34	34
Mg	6.9	6.7	6.6	7.0	6.8	6.5
Na	4.2	4.4	4.4	4.2	4.3	4.2
K	0.84	0.91	0.83	0.86	0.88	0.76
SO_4	---	42	---	---	47	---
Alkalinity as $CaCO_3$	---	73	---	---	73	---
F	---	0.11	---	---	0.13	---
Cl	---	1.8	---	---	1.8	---
Br	---	1.8	---	---	1.6	---
SiO_2	11	10	11	11	10	11
Al	0.070	0.14	0.37	0.10	0.13	0.36
Fe(T)	<0.010	0.047	0.21	<0.010	0.044	0.23
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.004	0.003	0.004	0.004	0.003
Sr	0.20	0.20	0.20	0.20	0.20	0.19
Ba	0.045	0.043	0.046	0.045	0.044	0.044
Mn	0.11	0.11	0.12	0.11	0.10	0.12
Zn	0.034	0.032	0.039	0.038	0.033	0.035
Pb	<0.0003	0.0004	0.0007	<0.0003	0.0005	0.0008
Ni	0.006	0.006	0.006	0.006	0.005	0.005
Cu	0.0044	0.0092	0.015	0.0053	0.0084	0.013
Cd	0.0015	0.0005	0.0006	<0.0005	0.0006	<0.0005
Cr	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0005
Co	0.0012	0.0015	0.0022	0.0016	<0.0008	0.0018
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.38	2.38	---	2.43	2.37	---
Sum anions (meq/L)	2.31	2.31	---	2.40	2.41	---
C.I. (percent)	3.2*	3.0	---	0.9*	-1.7	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-2693			RRU-3052A		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.78			7.90		
SC (µS/cm)	247			248		
Temperature (°C)	8.0			7.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	34	35	34	34	34	34
Mg	6.9	7.0	6.7	6.9	6.9	6.7
Na	4.4	4.5	4.2	4.4	4.7	4.3
K	0.82	0.94	0.82	0.90	0.94	0.80
SO_4	---	48	---	---	49	---
Alkalinity as $CaCO_3$	---	72	---	---	69	---
F	---	0.12	---	---	0.16	---
Cl	---	1.8	---	---	1.8	---
Br	---	1.6	---	---	1.6	---
SiO_2	11	11	11	11	11	11
Al	0.12	0.14	0.33	0.086	0.12	0.39
Fe(T)	0.027	0.055	0.24	<0.010	0.075	0.35
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.004	0.003	0.004	0.004	0.003
Sr	0.19	0.20	0.19	0.20	0.21	0.19
Ba	0.043	0.042	0.043	0.041	0.044	0.045
Mn	0.11	0.11	0.12	0.12	0.12	0.13
Zn	0.032	0.031	0.035	0.044	0.036	0.035
Pb	0.0004	0.0007	0.0008	<0.0003	<0.0003	0.0008
Ni	0.006	0.006	0.005	0.007	0.006	0.005
Cu	0.0051	0.0066	0.013	0.0033	0.0068	0.013
Cd	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005
Cr	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0005
Co	0.0011	0.0009	0.0020	<0.0008	0.0012	0.0018
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.38	2.44	---	2.38	2.39	---
Sum anions (meq/L)	2.40	2.40	---	2.37	2.37	---
C.I. (percent)	-1.2*	1.6	---	0.2*	0.8	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-3052B			RRU-3350A		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.90			7.99		
SC (µS/cm)	248			249		
Temperature (°C)	7.5			15		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	34	33	34	34	34	35
Mg	7.0	6.5	6.9	6.8	6.9	6.9
Na	4.3	4.5	4.5	4.5	4.4	4.6
K	0.87	0.91	0.88	0.90	0.90	0.89
SO_4	---	49	---	---	50	---
Alkalinity as $CaCO_3$	---	69	---	---	70	---
F	---	0.13	---	---	0.13	---
Cl	---	1.8	---	---	1.8	---
Br	---	1.6	---	---	1.6	---
SiO_2	11	11	11	11	11	12
Al	0.11	0.15	0.35	0.12	0.15	0.35
Fe(T)	<0.010	0.082	0.28	0.012	0.086	0.29
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.004
Sr	0.19	0.21	0.21	0.20	0.21	0.21
Ba	0.040	0.043	0.044	0.041	0.043	0.047
Mn	0.11	0.11	0.12	0.11	0.11	0.12
Zn	0.017	0.021	0.031	0.020	0.021	0.030
Pb	<0.0003	<0.0003	0.0005	<0.0003	0.0015	0.0004
Ni	0.005	0.005	0.005	0.005	0.004	0.005
Cu	0.0057	0.0069	0.013	0.0040	0.0069	0.012
Cd	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	0.0007
Co	<0.0008	0.0016	0.0017	<0.0008	0.0018	0.0018
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.38	2.30	---	2.36	2.36	---
Sum anions (meq/L)	2.37	2.37	---	2.38	2.38	---
C.I. (percent)	0.5*	-2.9	---	-1.0*	-0.9	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-3350B			RRU-3638		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	7.99			8.11		
SC (μS/cm)	249			249		
Temperature (°C)	15			15		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	34	35	34	34	35	33
Mg	6.8	7.0	6.6	6.9	7.0	6.6
Na	4.4	4.7	4.3	4.5	4.7	4.3
K	0.94	0.99	0.85	0.92	0.91	0.86
SO_4	---	50	---	---	50	---
Alkalinity as $CaCO_3$	---	70	---	---	69	---
F	---	0.13	---	---	0.16	---
Cl	---	1.8	---	---	1.8	---
Br	---	1.6	---	---	1.6	---
SiO_2	11	11	11	11	11	11
Al	0.15	0.15	0.33	0.12	0.15	0.32
Fe(T)	0.045	0.092	0.27	<0.010	0.078	0.28
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.005	0.004	0.004	0.004	0.003
Sr	0.21	0.21	0.19	0.20	0.21	0.20
Ba	0.042	0.041	0.044	0.043	0.044	0.045
Mn	0.11	0.12	0.12	0.11	0.11	0.11
Zn	0.018	0.021	0.028	0.012	0.018	0.025
Pb	<0.0003	<0.0003	0.0007	<0.0003	0.0003	0.0006
Ni	0.005	0.005	0.004	0.005	0.004	0.004
Cu	0.0058	0.0073	0.0098	0.0049	0.0062	0.011
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
Co	0.0013	0.0015	0.0014	0.0010	0.0017	0.0016
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.35	2.43	---	2.36	2.43	---
Sum anions (meq/L)	2.38	2.38	---	2.37	2.36	---
C.I. (percent)	-1.1*	2.3	---	-0.2*	2.6	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-3900			RRU-4200		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	8.16			8.18		
SC (µS/cm)	248			249		
Temperature (°C)	---			---		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	34	34	34	34	34	35
Mg	6.9	6.9	6.6	6.7	6.8	7.0
Na	4.3	4.6	4.3	4.3	4.5	4.6
K	0.88	0.90	0.82	0.84	0.96	0.88
SO_4	---	50	---	---	49	---
Alkalinity as $CaCO_3$	---	70	---	---	69	---
F	---	0.13	---	---	0.14	---
Cl	---	1.8	---	---	1.8	---
Br	---	1.6	---	---	1.6	---
SiO_2	11	11	11	11	11	11
Al	0.11	0.16	0.34	0.12	0.14	0.31
Fe(T)	<0.010	0.076	0.27	<0.010	0.074	0.27
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.004	0.003	0.004	0.005	0.004
Sr	0.20	0.21	0.19	0.19	0.21	0.21
Ba	0.044	0.042	0.046	0.040	0.042	0.046
Mn	0.11	0.11	0.11	0.10	0.11	0.11
Zn	0.013	0.018	0.024	0.034	0.022	0.026
Pb	<0.0003	<0.0003	0.0008	0.0005	0.0004	0.0006
Ni	0.005	0.004	0.005	0.005	0.005	0.005
Cu	0.0029	0.0063	0.012	0.014	0.011	0.0096
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	0.0007
Co	<0.0008	0.0011	0.0016	0.0008	0.0015	0.0016
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.38	2.39	---	2.36	2.38	---
Sum anions (meq/L)	2.40	2.40	---	2.38	2.38	---
C.I. (percent)	-0.8*	-0.2	---	-1.0*	-0.1	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-4500			RRU-4800		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	8.20			8.18		
SC (µS/cm)	248			249		
Temperature (°C)	13			13		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	35	35	34	34	34	34
Mg	6.9	7.0	6.8	6.8	6.9	6.7
Na	4.6	4.5	4.5	4.4	4.3	4.3
K	0.93	0.90	0.88	0.91	0.88	0.84
SO_4	---	49	---	---	49	---
Alkalinity as $CaCO_3$	---	71	---	---	70	---
F	---	0.14	---	---	0.13	---
Cl	---	1.8	---	---	1.8	---
Br	---	1.6	---	---	1.6	---
SiO_2	11	11	11	10	10	11
Al	0.12	0.14	0.31	0.11	0.14	0.33
Fe(T)	<0.010	0.072	0.31	<0.010	0.069	0.32
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.003
Sr	0.21	0.21	0.20	0.20	0.21	0.19
Ba	0.042	0.042	0.045	0.042	0.040	0.045
Mn	0.10	0.11	0.11	0.099	0.10	0.11
Zn	0.011	0.019	0.025	0.008	0.015	0.022
Pb	<0.0003	<0.0003	0.0006	<0.0003	<0.0003	0.0012
Ni	0.005	0.004	0.004	0.004	0.004	0.004
Cu	0.0037	0.0081	0.0099	0.0027	0.0058	0.0093
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005
Co	<0.0008	0.0011	0.0019	<0.0008	0.0012	0.0016
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.42	2.42	---	2.35	2.35	---
Sum anions (meq/L)	2.39	2.39	---	2.37	2.37	---
C.I. (percent)	1.1*	1.3	---	-1.0*	-0.8	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-4900			RRU-5200		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	8.17			8.21		
SC (μS/cm)	250			256		
Temperature (°C)	13			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	34	34	35	36	35	34
Mg	6.8	6.9	7.0	7.4	7.2	7.0
Na	4.5	4.3	4.5	4.8	5.1	5.2
K	0.88	0.87	0.89	1.0	1.0	1.0
SO_4	---	49	---	---	53	---
Alkalinity as $CaCO_3$	---	69	---	---	68	---
F	---	0.14	---	---	0.14	---
Cl	---	1.8	---	---	2.3	---
Br	---	1.6	---	---	1.6	---
SiO_2	11	11	12	11	11	12
Al	0.11	0.15	0.33	0.13	0.14	0.30
Fe(T)	<0.010	0.073	0.31	0.030	0.069	0.30
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.003	0.004	0.004
Sr	0.20	0.21	0.21	0.20	0.21	0.21
Ba	0.041	0.041	0.047	0.042	0.041	0.043
Mn	0.10	0.10	0.11	0.10	0.10	0.11
Zn	0.030	0.027	0.026	0.013	0.015	0.025
Pb	0.0007	0.0007	0.0008	<0.0003	<0.0003	0.0005
Ni	0.006	0.005	0.004	0.005	0.004	0.004
Cu	0.0071	0.013	0.0096	0.0047	0.0053	0.0092
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0008
Co	<0.0008	0.0019	0.0015	0.0011	0.0012	0.0016
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.36	2.35	---	2.51	2.46	---
Sum anions (meq/L)	2.35	2.35	---	2.41	2.42	---
C.I. (percent)	0.3*	0.2	---	3.9*	1.7	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-5300			RRU-5735		
Description	stream			stream		
Date Collected	8/24/2001			8/24/2001		
pH	8.17			8.30		
SC (µS/cm)	257			254		
Temperature (°C)	12			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	36	35	35	36	35	35
Mg	7.5	7.3	7.4	7.5	7.2	6.8
Na	5.2	5.2	5.3	5.0	5.0	4.9
K	1.1	1.0	1.1	1.1	1.1	0.98
SO_4	---	53	---	---	52	---
Alkalinity as $CaCO_3$	---	69	---	---	68	---
F	---	0.22	---	---	0.15	---
Cl	---	2.4	---	---	2.3	---
Br	---	1.6	---	---	1.5	---
SiO_2	11	11	12	11	11	11
Al	0.13	0.15	0.31	0.13	0.14	0.32
Fe(T)	0.025	0.075	0.33	<0.010	0.066	0.39
Fe(II)	---	---	---	---	---	---
B	<0.010	0.012	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.003
Sr	0.20	0.20	0.21	0.21	0.21	0.20
Ba	0.041	0.040	0.046	0.041	0.039	0.043
Mn	0.10	0.10	0.11	0.096	0.096	0.11
Zn	0.011	0.016	0.026	0.006	0.013	0.020
Pb	<0.0003	<0.0003	0.0008	<0.0003	<0.0003	0.0013
Ni	0.004	0.005	0.005	0.004	0.003	0.004
Cu	0.0054	0.0058	0.011	0.0045	0.0044	0.0097
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	0.0006
Co	<0.0008	0.0014	0.0013	0.0009	0.0010	0.0010
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.54	2.47	---	2.53	2.46	---
Sum anions (meq/L)	2.43	2.43	---	2.38	2.39	---
C.I. (percent)	4.3*	1.6	---	5.8*	2.8	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-5756			RRM-6000		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.37			8.47		
SC (µS/cm)	244			246		
Temperature (°C)	16			5.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	34	34	35	34	34	35
Mg	6.8	6.9	7.2	7.0	6.8	7.0
Na	4.3	4.4	4.5	4.8	5.0	4.8
K	0.99	1.1	1.1	1.0	1.1	1.1
SO_4	---	49	---	---	50	---
Alkalinity as $CaCO_3$	---	61	---	---	67	---
F	---	0.11	---	---	0.10	---
Cl	---	2.2	---	---	2.2	---
Br	---	0.04	---	---	1.5	---
SiO_2	11	10	11	11	10	11
Al	0.11	0.12	0.36	0.12	0.13	0.33
Fe(T)	<0.010	0.070	0.57	0.069	0.076	0.50
Fe(II)	---	---	---	---	---	---
B	<0.010	0.011	<0.010	<0.010	<0.010	0.010
Li	0.004	0.004	0.004	0.004	0.004	0.004
Sr	0.19	0.20	0.20	0.19	0.20	0.21
Ba	0.036	0.037	0.051	0.038	0.035	0.049
Mn	0.081	0.083	0.099	0.082	0.081	0.095
Zn	0.006	0.010	0.021	0.009	0.008	0.021
Pb	0.0028	0.0006	0.0023	0.0003	0.0005	0.0021
Ni	0.003	0.003	0.004	0.003	0.003	0.003
Cu	0.0037	0.0050	0.0086	0.0069	0.0060	0.0092
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0010	<0.0005	<0.0005	0.0008
Co	0.0009	<0.0008	<0.0008	<0.0008	0.0012	0.0018
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	0.0002	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.34	2.35	---	2.39	2.39	---
Sum anions (meq/L)	2.18	2.18	---	2.33	2.33	---
C.I. (percent)	7.1*	7.8	---	2.5*	2.3	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-6175			RRM-6300		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.47			8.17		
SC (µS/cm)	245			247		
Temperature (°C)	16			16		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	33	35	36	35	34	35
Mg	7.1	7.0	7.2	7.0	6.9	7.2
Na	4.5	4.9	4.8	4.8	4.8	4.7
K	0.94	1.1	1.1	1.1	1.0	1.1
SO_4	---	49	---	---	50	---
Alkalinity as $CaCO_3$	---	65	---	---	66	---
F	---	0.21	---	---	0.11	---
Cl	---	2.2	---	---	2.2	---
Br	---	1.5	---	---	1.4	---
SiO_2	10	11	12	11	11	11
Al	0.12	0.13	0.32	0.13	0.14	0.32
Fe(T)	<0.010	0.068	0.51	0.058	0.065	0.48
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	0.012	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.004
Sr	0.19	0.21	0.21	0.18	0.21	0.21
Ba	0.034	0.038	0.047	0.038	0.036	0.045
Mn	0.077	0.080	0.088	0.075	0.076	0.093
Zn	0.011	0.009	0.020	0.010	0.013	0.020
Pb	<0.0003	<0.0003	0.0019	0.0009	0.0005	0.0029
Ni	0.003	0.003	0.004	0.004	0.004	0.004
Cu	0.0038	0.0051	0.0085	0.0042	0.0052	0.0088
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.0016
Co	<0.0008	0.0011	<0.0008	<0.0008	0.0012	0.0018
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.32	2.42	---	2.43	2.37	---
Sum anions (meq/L)	2.27	2.26	---	2.31	2.31	---
C.I. (percent)	2.0*	6.8	---	5.2*	2.7	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-6600			RRM-6819		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.20			8.15		
SC (μS/cm)	248			248		
Temperature (°C)	15			15		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	35	35	35	33	35	38
Mg	7.1	7.0	7.1	6.8	7.2	7.9
Na	4.6	4.7	4.7	4.6	4.7	5.1
K	1.1	1.1	1.1	0.94	1.1	1.2
SO_4	---	51	---	---	51	---
Alkalinity as $CaCO_3$	---	67	---	---	67	---
F	---	0.08	---	---	0.12	---
Cl	---	2.2	---	---	2.2	---
Br	---	1.4	---	---	1.3	---
SiO_2	11	11	11	11	11	12
Al	0.086	0.11	0.31	0.10	0.12	0.61
Fe(T)	<0.010	0.070	0.50	<0.010	0.080	0.48
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.004
Sr	0.20	0.22	0.21	0.19	0.22	0.22
Ba	0.037	0.038	0.041	0.035	0.039	0.044
Mn	0.074	0.075	0.087	0.072	0.077	0.14
Zn	0.011	0.011	0.018	0.006	0.010	0.033
Pb	0.0004	0.0003	0.0015	0.0005	0.0003	0.0017
Ni	0.003	0.003	0.003	0.003	0.003	0.006
Cu	0.012	0.0060	0.0077	0.0028	0.0044	0.0078
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	0.0037	0.0013	<0.0005	<0.0005	0.0009
Co	<0.0008	0.0017	0.0016	0.0010	0.0010	0.0014
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	0.0002	<0.04	<0.04	0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.43	2.43	---	2.31	2.44	---
Sum anions (meq/L)	2.35	2.35	---	2.35	2.34	---
C.I. (percent)	3.4*	3.2	---	-1.8*	4.2	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-7100			RRM-7200		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.04			8.08		
SC (µS/cm)	251			251		
Temperature (°C)	15			15		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	34	35	33	34	35	35
Mg	7.0	7.0	6.4	6.8	7.2	7.2
Na	4.7	5.0	4.5	4.6	4.7	4.7
K	0.98	1.0	0.94	0.95	1.1	1.1
SO_4	---	53	---	---	53	---
Alkalinity as $CaCO_3$	---	66	---	---	66	---
F	---	0.13	---	---	0.19	---
Cl	---	2.2	---	---	2.2	---
Br	---	1.3	---	---	1.3	---
SiO_2	11	11	11	11	11	11
Al	0.11	0.13	0.34	0.092	0.10	0.32
Fe(T)	0.011	0.058	0.56	<0.010	0.065	0.56
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.003	0.004	0.004	0.004
Sr	0.19	0.20	0.19	0.18	0.22	0.22
Ba	0.034	0.038	0.044	0.033	0.039	0.049
Mn	0.073	0.074	0.083	0.071	0.072	0.088
Zn	0.007	0.010	0.016	0.006	0.010	0.023
Pb	0.0010	0.0004	0.0021	<0.0003	0.0005	0.0021
Ni	0.003	0.003	0.003	0.003	0.003	0.004
Cu	0.0056	0.0045	0.0087	0.0026	0.0040	0.0082
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	0.0010
Co	<0.0008	0.0013	0.0013	<0.0008	<0.0008	0.0016
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.38	2.44	---	2.35	2.44	---
Sum anions (meq/L)	2.37	2.37	---	2.38	2.38	---
C.I. (percent)	0.2*	2.8	---	-1.2*	2.6	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-7295			RRM-7395		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	7.94			7.75		
SC (µS/cm)	259			265		
Temperature (°C)	14			13		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	36	36	34	36	36	34
Mg	7.4	7.3	6.8	7.6	7.6	6.9
Na	4.9	5.3	4.6	4.7	5.1	4.6
K	1.0	1.1	0.98	0.95	1.0	0.97
SO_4	---	57	---	---	62	---
Alkalinity as $CaCO_3$	---	65	---	---	61	---
F	---	0.12	---	---	0.24	---
Cl	---	2.3	---	---	2.3	---
Br	---	1.3	---	---	1.3	---
SiO_2	11	12	11	11	12	11
Al	0.14	0.21	0.40	0.18	0.21	0.57
Fe(T)	<0.010	0.058	0.47	<0.010	0.013	0.51
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.003	0.004	0.004	0.003
Sr	0.20	0.21	0.19	0.20	0.21	0.20
Ba	0.037	0.037	0.040	0.035	0.038	0.043
Mn	0.091	0.097	0.10	0.12	0.12	0.13
Zn	0.011	0.014	0.022	0.014	0.018	0.028
Pb	<0.0003	<0.0003	0.0017	0.0004	<0.0003	0.0024
Ni	0.004	0.004	0.004	0.005	0.005	0.006
Cu	0.0034	0.0042	0.0081	0.0037	0.0089	0.0090
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.0010
Co	0.0013	0.0015	0.0025	0.0020	0.0024	0.0030
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.51	2.52	---	2.51	2.53	---
Sum anions (meq/L)	2.43	2.43	---	2.45	2.45	---
C.I. (percent)	3.3*	3.8	---	2.3*	3.1	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-7500A			RRM-7500B		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	7.75			7.79		
SC (µS/cm)	267			267		
Temperature (°C)	13			13		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	35	36	35	37	37	35
Mg	7.4	7.5	7.3	7.6	7.6	7.3
Na	4.7	5.3	4.7	5.1	5.1	4.8
K	0.95	1.0	0.96	1.0	1.1	1.2
SO_4	---	62	---	---	63	---
Alkalinity as $CaCO_3$	---	63	---	---	61	---
F	---	0.14	---	---	0.18	---
Cl	---	2.3	---	---	2.3	---
Br	---	1.2	---	---	1.3	---
SiO_2	11	11	11	11	11	12
Al	0.15	0.22	0.58	0.17	0.20	0.40
Fe(T)	<0.010	0.021	0.47	<0.010	0.015	0.75
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	0.010	<0.010
Li	0.004	0.004	0.003	0.004	0.004	0.004
Sr	0.19	0.21	0.19	0.20	0.22	0.20
Ba	0.034	0.037	0.040	0.033	0.039	0.060
Mn	0.12	0.13	0.13	0.13	0.13	0.094
Zn	0.017	0.020	0.030	0.018	0.020	0.021
Pb	0.0005	<0.0003	0.0016	0.0003	<0.0003	0.0016
Ni	0.005	0.005	0.006	0.005	0.005	0.004
Cu	0.0032	0.0046	0.0086	0.0041	0.0045	0.0086
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0008	0.0009	<0.0005	0.0009
Co	0.0011	0.0018	0.0033	0.0017	0.0025	0.0030
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.45	2.53	---	2.57	2.58	---
Sum anions (meq/L)	2.50	2.49	---	2.48	2.48	---
C.I. (percent)	-2.0*	1.5	---	3.8*	3.9	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-7800			RRM-8100		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	7.91			8.00		
SC (µS/cm)	270			270		
Temperature (°C)	13			11		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	38	35	37	37	38
Mg	7.8	8.0	7.3	7.6	7.8	8.1
Na	5.1	5.6	4.9	5.2	5.5	5.0
K	1.0	1.1	1.0	1.0	1.0	1.1
SO_4	---	65	---	---	66	---
Alkalinity as $CaCO_3$	---	63	---	---	60	---
F	---	0.14	---	---	0.21	---
Cl	---	2.3	---	---	2.3	---
Br	---	1.3	---	---	1.3	---
SiO_2	11	12	11	11	12	12
Al	0.16	0.23	0.61	0.22	0.22	0.65
Fe(T)	<0.010	0.020	0.48	0.022	0.011	0.54
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.004	0.004	0.004	0.004	0.004
Sr	0.20	0.22	0.21	0.21	0.22	0.24
Ba	0.033	0.039	0.041	0.036	0.033	0.048
Mn	0.13	0.14	0.14	0.13	0.14	0.15
Zn	0.019	0.022	0.031	0.012	0.015	0.034
Pb	<0.0003	<0.0003	0.0017	0.0007	0.0004	0.0021
Ni	0.005	0.006	0.006	0.006	0.006	0.007
Cu	0.0042	0.0052	0.0087	0.0031	0.0035	0.016
Cd	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005
Cr	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.0011
Co	0.0020	0.0018	0.0030	0.0022	0.0021	0.0026
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.58	2.67	---	2.57	2.60	---
Sum anions (meq/L)	2.53	2.53	---	2.50	2.50	---
C.I. (percent)	2.0*	5.5	---	2.8*	4.0	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-8400			RRM-8700		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.08			8.11		
SC (µS/cm)	270			270		
Temperature (°C)	13			13		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	37	35	37	37	39
Mg	7.9	7.7	7.3	7.6	7.6	8.2
Na	5.1	5.5	4.9	5.1	5.4	5.3
K	1.1	1.1	1.0	0.99	1.1	1.2
SO_4	---	65	---	---	66	---
Alkalinity as $CaCO_3$	---	61	---	---	61	---
F	---	0.17	---	---	0.24	---
Cl	---	2.4	---	---	2.4	---
Br	---	1.2	---	---	1.2	---
SiO_2	11	12	12	11	12	13
Al	0.15	0.23	0.66	0.18	0.22	0.68
Fe(T)	<0.010	0.019	0.56	<0.010	0.014	0.58
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	0.012
Li	0.004	0.004	0.003	0.004	0.004	0.004
Sr	0.21	0.23	0.21	0.21	0.22	0.24
Ba	0.036	0.038	0.043	0.035	0.036	0.048
Mn	0.13	0.13	0.14	0.13	0.13	0.15
Zn	0.017	0.018	0.031	0.014	0.014	0.033
Pb	<0.0003	0.0003	0.0022	0.0009	0.0004	0.0017
Ni	0.005	0.006	0.006	0.005	0.004	0.006
Cu	0.0037	0.0040	0.0089	0.0036	0.0037	0.0087
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0010	<0.0005	<0.0005	0.0010
Co	0.0019	0.0026	0.0034	0.0014	0.0019	0.0030
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.59	2.59	---	2.56	2.58	---
Sum anions (meq/L)	2.49	2.50	---	2.52	2.52	---
C.I. (percent)	3.8*	3.8	---	1.7*	2.3	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-9000			RRM-9300		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.16			8.17		
SC (µS/cm)	270			270		
Temperature (°C)	13			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	37	35	37	37	35
Mg	7.7	7.6	7.3	8.3	7.7	7.4
Na	4.8	5.3	4.9	4.7	5.2	4.7
K	0.98	1.1	1.0	0.97	1.1	1.0
SO_4	---	66	---	---	65	---
Alkalinity as $CaCO_3$	---	59	---	---	61	---
F	---	0.21	---	---	0.24	---
Cl	---	2.3	---	---	2.4	---
Br	---	1.2	---	---	1.2	---
SiO_2	11	12	11	11	12	11
Al	0.19	0.23	0.61	0.18	0.23	0.63
Fe(T)	<0.010	0.019	0.51	<0.010	0.019	0.58
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	0.013	<0.010	<0.010
Li	0.004	0.004	0.003	0.004	0.004	0.003
Sr	0.20	0.22	0.20	0.20	0.21	0.20
Ba	0.034	0.034	0.039	0.034	0.036	0.042
Mn	0.13	0.13	0.14	0.12	0.13	0.14
Zn	0.013	0.015	0.028	0.012	0.013	0.028
Pb	0.0005	0.0003	0.0019	0.0007	<0.0003	0.0020
Ni	0.004	0.005	0.006	0.005	0.005	0.006
Cu	0.0052	0.0049	0.0081	0.0066	0.0039	0.0081
Cd	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	0.0012
Co	0.0018	0.0022	0.0027	0.0020	0.0022	0.0028
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.56	2.57	---	2.60	2.58	---
Sum anions (meq/L)	2.47	2.47	---	2.50	2.50	---
C.I. (percent)	3.3*	4.0	---	3.9*	3.0	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-9600			RRM-9900		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.20			8.20		
SC (μS/cm)	270			270		
Temperature (°C)	12			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	36	37	35	38	37	35
Mg	7.5	7.4	7.3	8.3	8.3	7.4
Na	5.1	5.4	4.8	4.7	5.0	4.8
K	1.0	1.1	1.0	1.0	0.99	1.1
SO_4	---	66	---	---	66	---
Alkalinity as $CaCO_3$	---	61	---	---	63	---
F	---	0.24	---	---	0.15	---
Cl	---	2.4	---	---	2.4	---
Br	---	1.2	---	---	1.2	---
SiO_2	11	12	11	11	11	11
Al	0.18	0.22	0.62	0.19	0.21	0.62
Fe(T)	<0.010	0.011	0.56	<0.010	0.012	0.60
Fe(II)	---	---	---	---	---	---
B	<0.010	0.013	<0.010	<0.010	0.010	<0.010
Li	0.004	0.004	0.003	0.004	0.004	0.004
Sr	0.19	0.22	0.20	0.21	0.20	0.21
Ba	0.031	0.037	0.042	0.031	0.030	0.041
Mn	0.12	0.13	0.14	0.12	0.12	0.13
Zn	0.009	0.012	0.026	0.014	0.011	0.025
Pb	<0.0003	<0.0003	0.0021	<0.0003	<0.0003	0.0019
Ni	0.004	0.006	0.006	0.005	0.005	0.006
Cu	0.0029	0.0036	0.0086	0.0036	0.0035	0.0079
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	0.0018
Co	0.0011	0.0021	0.0025	0.0013	0.0022	0.0030
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.51	2.56	---	2.65	2.61	---
Sum anions (meq/L)	2.51	2.50	---	2.55	2.55	---
C.I. (percent)	0.0*	2.3	---	3.8*	2.4	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-10200			RRM-10300		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.19			8.10		
SC (µS/cm)	270			270		
Temperature (°C)	12			11		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	37	38	38	37	35
Mg	8.4	7.5	7.9	8.4	7.9	7.4
Na	5.0	5.4	5.1	5.0	5.4	4.8
K	1.1	1.1	1.2	1.0	1.1	1.0
SO_4	---	66	---	---	65	---
Alkalinity as $CaCO_3$	---	62	---	---	65	---
F	---	0.26	---	---	0.14	---
Cl	---	2.4	---	---	2.4	---
Br	---	1.2	---	---	1.2	---
SiO_2	11	12	12	11	12	11
Al	0.17	0.21	0.66	0.19	0.20	0.62
Fe(T)	<0.010	0.014	0.64	<0.010	<0.010	0.62
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	0.011	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.004
Sr	0.21	0.21	0.24	0.21	0.23	0.20
Ba	0.034	0.036	0.044	0.033	0.036	0.041
Mn	0.12	0.13	0.14	0.12	0.13	0.14
Zn	0.011	0.009	0.029	0.015	0.009	0.025
Pb	<0.0003	<0.0003	0.0027	0.0008	<0.0003	0.0021
Ni	0.005	0.004	0.006	0.004	0.004	0.006
Cu	0.0024	0.0030	0.0080	0.0033	0.0025	0.0083
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0014	<0.0005	0.0066	0.0012
Co	0.0016	0.0022	0.0031	0.0018	0.0020	0.0028
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	0.0002	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.62	2.57	---	2.67	2.61	---
Sum anions (meq/L)	2.53	2.54	---	2.58	2.59	---
C.I. (percent)	3.5*	1.3	---	3.5*	0.8	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-10500			RRM-10644		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.02			7.79		
SC (µS/cm)	273			288		
Temperature (°C)	11			11		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	37	36	41	39	38
Mg	8.3	7.7	7.4	8.5	8.3	7.9
Na	4.9	5.3	4.8	5.2	5.8	5.2
K	1.0	1.0	0.94	1.0	1.1	1.0
SO_4	---	66	---	---	73	---
Alkalinity as $CaCO_3$	---	59	---	---	58	---
F	---	0.34	---	---	0.22	---
Cl	---	2.5	---	---	2.8	---
Br	---	1.2	---	---	1.2	---
SiO_2	11	11	11	11	12	12
Al	0.18	0.21	0.64	0.10	0.17	0.64
Fe(T)	<0.010	0.024	0.58	<0.010	<0.010	0.65
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.003	0.004	0.004	0.004
Sr	0.21	0.22	0.19	0.22	0.24	0.21
Ba	0.033	0.035	0.040	0.034	0.035	0.042
Mn	0.12	0.13	0.14	0.12	0.13	0.14
Zn	0.011	0.014	0.026	0.028	0.017	0.028
Pb	<0.0003	0.0003	0.0019	<0.0003	<0.0003	0.0025
Ni	0.005	0.005	0.005	0.006	0.005	0.006
Cu	0.0031	0.0035	0.0084	0.0032	0.0029	0.0083
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	0.0017
Co	0.0015	0.0024	0.0032	0.0025	0.0021	0.0038
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.62	2.59	---	2.82	2.74	---
Sum anions (meq/L)	2.50	2.50	---	2.61	2.61	---
C.I. (percent)	4.6*	3.3	---	7.9*	4.7	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-10800			RRM-11000		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	7.78			7.86		
SC (µS/cm)	289			289		
Temperature (°C)	11			10		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	39	41	40	39	40	39
Mg	8.7	8.4	8.7	8.8	8.4	8.0
Na	5.0	5.5	4.8	5.0	5.5	5.1
K	1.0	1.1	1.1	1.1	1.1	1.0
SO_4	---	74	---	---	74	---
Alkalinity as $CaCO_3$	---	52	---	---	63	---
F	---	0.29	---	---	0.20	---
Cl	---	2.8	---	---	2.8	---
Br	---	1.2	---	---	1.1	---
SiO_2	11	12	12	11	12	12
Al	0.15	0.17	0.62	0.17	0.18	0.65
Fe(T)	<0.010	0.013	0.59	0.021	0.014	0.70
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.003
Sr	0.22	0.23	0.24	0.22	0.23	0.22
Ba	0.033	0.031	0.045	0.032	0.033	0.046
Mn	0.12	0.13	0.14	0.12	0.12	0.14
Zn	0.021	0.021	0.031	0.015	0.015	0.029
Pb	0.0004	0.0006	0.0020	0.0005	0.0008	0.0028
Ni	0.006	0.005	0.007	0.006	0.005	0.006
Cu	0.0030	0.0036	0.0074	0.0029	0.0027	0.0077
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	0.0013
Co	0.0018	0.0020	0.0026	0.0015	0.0022	0.0031
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.74	2.83	---	2.74	2.78	---
Sum anions (meq/L)	2.51	2.50	---	2.73	2.73	---
C.I. (percent)	8.8*	12	---	0.5*	1.9	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-11300			RRM-11600		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.01			8.05		
SC (µS/cm)	289			287		
Temperature (°C)	10			10		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	39	40	37	39	41	38
Mg	8.7	8.5	7.6	8.5	8.4	8.0
Na	5.2	5.6	4.8	4.9	5.0	5.0
K	1.0	1.1	0.96	1.0	1.0	1.0
SO_4	---	74	---	---	74	---
Alkalinity as $CaCO_3$	---	63	---	---	64	---
F	---	0.34	---	---	0.29	---
Cl	---	2.7	---	---	2.8	---
Br	---	1.1	---	---	1.1	---
SiO_2	11	12	11	11	11	12
Al	0.16	0.18	0.62	0.17	0.19	0.67
Fe(T)	<0.010	0.014	0.62	0.035	0.016	0.79
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.003	0.004	0.003	0.004
Sr	0.22	0.23	0.22	0.21	0.22	0.22
Ba	0.034	0.034	0.041	0.034	0.034	0.045
Mn	0.12	0.13	0.13	0.12	0.12	0.13
Zn	0.016	0.019	0.027	0.020	0.014	0.028
Pb	0.0009	<0.0003	0.0022	0.0008	0.0010	0.0029
Ni	0.005	0.005	0.006	0.005	0.005	0.006
Cu	0.0026	0.0038	0.0073	0.0032	0.0029	0.0078
Cd	<0.0005	<0.0005	<0.0005	0.0005	0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0013	<0.0005	<0.0005	0.0023
Co	0.0011	0.0018	0.0025	0.0015	0.0025	0.0031
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	0.0005	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.74	2.79	---	2.71	2.80	---
Sum anions (meq/L)	2.73	2.72	---	2.75	2.74	---
C.I. (percent)	0.5*	2.5	---	-1.3*	2.2	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-11963			RRM-12200		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	8.12			8.08		
SC (µS/cm)	288			288		
Temperature (°C)	10			9.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	39	40	39	39	40	38
Mg	8.7	8.5	8.0	8.1	8.4	7.7
Na	5.2	5.3	5.1	5.3	5.2	5.2
K	0.99	0.99	1.0	1.0	1.1	1.0
SO_4	---	74	---	---	74	---
Alkalinity as $CaCO_3$	---	62	---	---	61	---
F	---	0.24	---	---	0.29	---
Cl	---	2.8	---	---	2.8	---
Br	---	1.1	---	---	1.2	---
SiO_2	11	11	12	11	11	11
Al	0.15	0.17	0.68	0.14	0.17	0.66
Fe(T)	<0.010	0.014	0.77	<0.010	0.012	0.75
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.003	0.004	0.004	0.003
Sr	0.21	0.22	0.22	0.22	0.23	0.22
Ba	0.032	0.033	0.045	0.032	0.035	0.044
Mn	0.12	0.12	0.14	0.12	0.12	0.13
Zn	0.017	0.014	0.028	0.016	0.016	0.029
Pb	<0.0003	<0.0003	0.0032	<0.0003	0.0005	0.0030
Ni	0.005	0.005	0.006	0.004	0.005	0.005
Cu	0.0035	0.0044	0.0080	0.0033	0.0032	0.0076
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0014	<0.0005	0.0008	0.0016
Co	0.0013	0.0016	0.0026	0.0009	0.0016	0.0027
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.74	2.77	---	2.70	2.77	---
Sum anions (meq/L)	2.70	2.70	---	2.69	2.69	---
C.I. (percent)	1.2*	2.6	---	0.2*	2.9	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-12515A			RRM-12515B		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	7.99			7.98		
SC (µS/cm)	296			296		
Temperature (°C)	9.5			9.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	39	42	39	40	41	40
Mg	8.5	8.9	8.3	8.5	8.5	8.2
Na	5.1	5.2	5.2	5.3	5.2	5.3
K	1.0	1.0	1.1	1.0	1.0	1.1
SO_4	---	77	---	---	78	---
Alkalinity as $CaCO_3$	---	63	---	---	63	---
F	---	0.34	---	---	0.34	---
Cl	---	2.9	---	---	2.9	---
Br	---	1.2	---	---	1.2	---
SiO_2	11	11	12	11	11	12
Al	0.14	0.18	0.69	0.14	0.18	0.73
Fe(T)	<0.010	<0.010	0.81	<0.010	0.010	0.82
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.004
Sr	0.22	0.24	0.23	0.23	0.23	0.23
Ba	0.030	0.034	0.045	0.031	0.030	0.045
Mn	0.13	0.14	0.15	0.14	0.13	0.15
Zn	0.018	0.019	0.028	0.016	0.016	0.031
Pb	<0.0003	0.0013	0.0031	<0.0003	0.0006	0.0029
Ni	0.005	0.005	0.006	0.005	0.006	0.007
Cu	0.0071	0.0042	0.0084	0.0025	0.0032	0.0081
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	0.0018
Co	0.0014	0.0016	0.0028	0.0012	0.0020	0.0024
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	0.0002	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.72	2.89	---	2.77	2.81	---
Sum anions (meq/L)	2.80	2.79	---	2.79	2.79	---
C.I. (percent)	-3.1*	3.6	---	-0.7*	0.9	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-12600			RRM-12900		
Description	stream			stream		
Date Collected	8/20/2001			8/20/2001		
pH	7.97			8.06		
SC (µS/cm)	297			295		
Temperature (°C)	10			9.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	41	41	40	41	42	40
Mg	8.7	8.6	8.1	8.8	8.9	8.3
Na	5.4	5.1	5.1	5.6	5.3	5.4
K	1.1	1.1	1.0	1.1	1.1	1.1
SO_4	---	77	---	---	78	---
Alkalinity as $CaCO_3$	---	62	---	---	62	---
F	---	0.29	---	---	0.34	---
Cl	---	2.9	---	---	2.8	---
Br	---	1.2	---	---	1.2	---
SiO_2	11	11	12	11	11	12
Al	0.15	0.19	0.69	0.13	0.18	0.75
Fe(T)	<0.010	0.013	0.66	<0.010	0.012	0.86
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.005	0.004	0.004
Sr	0.23	0.22	0.22	0.23	0.22	0.23
Ba	0.033	0.032	0.042	0.033	0.035	0.046
Mn	0.14	0.13	0.15	0.14	0.14	0.15
Zn	0.025	0.022	0.029	0.032	0.039	0.031
Pb	<0.0003	0.0004	0.0023	<0.0003	0.0005	0.0036
Ni	0.006	0.006	0.006	0.006	0.006	0.006
Cu	0.0025	0.0038	0.0074	0.0047	0.0063	0.0077
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	0.0022
Co	0.0014	0.0018	0.0028	0.0018	0.0012	0.0027
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	0.0001	<0.04	<0.04	0.0002	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.84	2.82	---	2.86	2.90	---
Sum anions (meq/L)	2.77	2.77	---	2.77	2.77	---
C.I. (percent)	2.6*	1.8	---	3.0*	4.6	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-13194			RRL-12515		
Description	stream			stream		
Date Collected	8/20/2001			8/17/2001		
pH	8.06			8.00		
SC (µS/cm)	297			287		
Temperature (°C)	9.5			---		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	38	41	39	38	40	39
Mg	8.0	8.7	8.1	7.9	7.8	7.9
Na	5.1	5.7	5.2	5.1	5.2	5.2
K	1.0	1.1	1.1	1.1	1.1	1.2
SO_4	---	77	---	---	74	---
Alkalinity as $CaCO_3$	---	60	---	---	63	---
F	---	0.34	---	---	0.31	---
Cl	---	2.8	---	---	2.8	---
Br	---	1.2	---	---	<0.01	---
SiO_2	11	12	12	11	11	13
Al	0.14	0.19	0.75	0.23	0.21	0.88
Fe(T)	<0.010	0.020	0.85	<0.010	<0.010	1.3
Fe(II)	---	---	---	---	---	---
B	<0.010	0.011	<0.010	<0.010	0.011	<0.010
Li	0.004	0.004	0.003	0.004	0.004	0.004
Sr	0.23	0.24	0.23	0.23	0.23	0.25
Ba	0.032	0.034	0.045	0.028	0.028	0.054
Mn	0.13	0.14	0.15	0.11	0.11	0.14
Zn	0.021	0.020	0.030	0.007	0.008	0.029
Pb	0.0003	0.0010	0.0037	0.0005	<0.0003	0.0063
Ni	0.005	0.005	0.006	0.003	0.004	0.005
Cu	0.0026	0.0034	0.0090	0.0039	0.0039	0.0076
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0021	<0.0005	<0.0005	0.0023
Co	0.0015	0.0019	0.0028	0.0010	0.0014	0.0015
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.63	2.85	---	2.65	2.74	---
Sum anions (meq/L)	2.74	2.72	---	2.74	2.73	---
C.I. (percent)	-4.0*	4.7	---	-3.3*	0.3	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-12600			RRL-12900		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	8.04			8.07		
SC (µS/cm)	290			290		
Temperature (°C)	17			17		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	38	40	38	39	38	40
Mg	7.7	8.1	8.1	7.8	7.8	8.0
Na	5.3	5.6	5.8	5.4	5.6	5.8
K	1.0	1.2	1.3	1.1	1.1	1.3
SO_4	---	74	---	---	74	---
Alkalinity as $CaCO_3$	---	60	---	---	60	---
F	---	0.27	---	---	0.22	---
Cl	---	2.8	---	---	2.8	---
Br	---	1.9	---	---	1.9	---
SiO_2	11	11	13	11	11	13
Al	0.21	0.23	1.1	0.20	0.21	0.90
Fe(T)	0.017	<0.010	1.2	<0.010	<0.010	1.2
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	0.010	<0.010	0.011	0.010
Li	0.003	0.004	0.004	0.003	0.004	0.004
Sr	0.21	0.24	0.23	0.22	0.25	0.24
Ba	0.027	0.029	0.048	0.027	0.029	0.050
Mn	0.10	0.11	0.16	0.10	0.11	0.13
Zn	0.007	0.005	0.028	0.011	0.007	0.023
Pb	<0.0003	<0.0003	0.0060	0.0005	<0.0003	0.0059
Ni	0.003	0.003	0.005	<0.003	0.004	0.004
Cu	0.0034	0.0031	0.0074	0.0050	0.0040	0.0076
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	0.0009	0.0016	<0.0005	0.0023	<0.0005
Co	<0.0008	0.0011	0.0019	<0.0008	0.0019	0.0009
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.60	2.74	---	2.66	2.63	---
Sum anions (meq/L)	2.67	2.66	---	2.66	2.66	---
C.I. (percent)	-2.7*	3.0	---	0.2*	-1.3	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-13194			RRL-13300		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	8.06			8.05		
SC (µS/cm)	289			267		
Temperature (°C)	17			16		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	39	39	39	37	36	37
Mg	7.8	8.0	8.0	6.8	6.8	7.1
Na	5.6	5.8	5.5	4.9	5.1	5.3
K	1.1	1.1	1.2	0.98	1.0	1.2
SO_4	---	74	---	---	63	---
Alkalinity as $CaCO_3$	---	62	---	---	63	---
F	---	0.20	---	---	0.26	---
Cl	---	2.7	---	---	2.3	---
Br	---	1.8	---	---	1.5	---
SiO_2	11	11	13	10	10	13
Al	0.20	0.23	0.87	0.16	0.20	0.83
Fe(T)	<0.010	<0.010	1.2	<0.010	<0.010	1.3
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.004	0.004	0.003	0.003	0.004
Sr	0.22	0.24	0.24	0.22	0.22	0.22
Ba	0.028	0.029	0.053	0.031	0.033	0.058
Mn	0.10	0.11	0.14	0.080	0.087	0.12
Zn	0.018	0.011	0.028	0.008	0.007	0.024
Pb	0.0008	0.0005	0.0061	<0.0003	0.0008	0.0060
Ni	0.003	0.003	0.005	<0.003	0.003	0.005
Cu	0.0050	0.0051	0.0080	0.0036	0.0028	0.0068
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	0.0024	<0.0005	<0.0005	<0.0005	0.0024
Co	<0.0008	0.0012	0.0012	<0.0008	0.0010	0.0015
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.67	2.70	---	2.49	2.45	---
Sum anions (meq/L)	2.69	2.69	---	2.50	2.51	---
C.I. (percent)	-0.6*	0.4	---	-0.5*	-2.1	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-13600			RRL-13700A		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	8.05			7.91		
SC (µS/cm)	267			272		
Temperature (°C)	16			16		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	35	36	36	36	36	36
Mg	6.8	7.1	7.1	7.0	7.1	7.2
Na	4.8	5.1	4.9	5.1	5.0	5.1
K	0.94	1.1	1.2	1.0	1.0	1.2
SO$_4$	---	63	---	---	66	---
Alkalinity as CaCO$_3$	---	63	---	---	62	---
F	---	0.26	---	---	0.31	---
Cl	---	2.3	---	---	2.4	---
Br	---	1.5	---	---	1.5	---
SiO$_2$	10	10	13	10	10	13
Al	0.17	0.22	0.92	0.24	0.23	0.91
Fe(T)	<0.010	0.015	1.5	<0.010	<0.010	1.3
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	0.010	<0.010
Li	0.003	0.003	0.003	0.003	0.003	0.003
Sr	0.21	0.22	0.20	0.21	0.22	0.22
Ba	0.030	0.031	0.060	0.032	0.031	0.064
Mn	0.077	0.089	0.12	0.16	0.15	0.18
Zn	0.008	<0.005	0.024	0.016	0.011	0.038
Pb	0.0006	<0.0003	0.0079	<0.0003	0.0003	0.0070
Ni	<0.003	0.003	0.004	0.004	0.004	0.006
Cu	0.0034	0.0035	0.0070	0.0039	0.0040	0.0091
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0030	<0.0005	<0.0005	0.0023
Co	<0.0008	<0.0008	0.0015	0.0012	0.0014	0.0020
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.39	2.48	---	2.47	2.47	---
Sum anions (meq/L)	2.51	2.50	---	2.54	2.54	---
C.I. (percent)	-4.7*	-1.0	---	-3.1*	-2.9	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-13700B			RRL-13900		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.90			7.68		
SC (µS/cm)	272			285		
Temperature (°C)	16			16		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	36	36	38	36	37	38
Mg	7.1	7.1	7.5	7.6	7.8	8.2
Na	4.9	5.2	5.3	5.2	5.2	5.4
K	1.0	1.0	1.2	1.1	1.1	1.3
SO_4	---	66	---	---	73	---
Alkalinity as $CaCO_3$	---	62	---	---	62	---
F	---	0.32	---	---	0.58	---
Cl	---	2.3	---	---	2.4	---
Br	---	1.5	---	---	1.5	---
SiO_2	10	10	12	10	10	13
Al	0.24	0.26	0.88	0.25	0.26	1.2
Fe(T)	<0.010	<0.010	1.0	<0.010	<0.010	1.2
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	0.010	<0.010	<0.010	<0.010
Li	0.003	0.003	0.004	0.004	0.003	0.004
Sr	0.21	0.21	0.22	0.21	0.21	0.24
Ba	0.031	0.033	0.052	0.031	0.031	0.065
Mn	0.15	0.16	0.18	0.31	0.31	0.35
Zn	0.015	0.013	0.031	0.027	0.029	0.068
Pb	0.0005	0.0003	0.0049	0.0005	<0.0003	0.0056
Ni	0.004	0.004	0.005	0.007	0.007	0.009
Cu	0.0036	0.0045	0.0070	0.0050	0.0040	0.011
Cd	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0006
Cr	0.0008	<0.0005	0.0018	<0.0005	<0.0005	0.0024
Co	0.0015	0.0013	0.0023	0.0027	0.0024	0.0031
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.47	2.48	---	2.51	2.58	---
Sum anions (meq/L)	2.54	2.54	---	2.70	2.69	---
C.I. (percent)	-3.1*	-2.6	---	-7.0*	-4.4	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-14142			RRL-14400		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.70			7.83		
SC (µS/cm)	284			283		
Temperature (°C)	16			16		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	38	39	37	39	38	38
Mg	8.0	8.0	8.1	7.9	7.9	8.0
Na	5.1	5.5	5.4	5.3	5.2	5.3
K	1.0	1.1	1.3	1.0	1.1	1.2
SO_4	---	74	---	---	73	---
Alkalinity as $CaCO_3$	---	60	---	---	59	---
F	---	0.53	---	---	0.53	---
Cl	---	2.5	---	---	2.4	---
Br	---	1.5	---	---	1.4	---
SiO_2	10	10	13	10	10	13
Al	0.21	0.24	1.1	0.21	0.26	1.2
Fe(T)	<0.010	<0.010	1.1	<0.010	<0.010	1.3
Fe(II)	---	---	---	---	---	---
B	<0.010	0.011	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.003	0.004	0.003	0.003	0.003
Sr	0.23	0.21	0.22	0.23	0.24	0.25
Ba	0.031	0.033	0.056	0.030	0.033	0.065
Mn	0.30	0.30	0.35	0.31	0.31	0.34
Zn	0.025	0.027	0.068	0.031	0.030	0.067
Pb	<0.0003	<0.0003	0.0056	0.0004	0.0007	0.0055
Ni	0.007	0.008	0.009	0.007	0.007	0.009
Cu	0.0035	0.0036	0.0099	0.0039	0.0034	0.011
Cd	0.0005	<0.0005	0.0006	<0.0005	<0.0005	0.0006
Cr	<0.0005	<0.0005	0.0022	<0.0005	<0.0005	0.0025
Co	0.0021	0.0028	0.0034	0.0024	0.0030	0.0034
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.63	2.70	---	2.68	2.63	---
Sum anions (meq/L)	2.67	2.66	---	2.63	2.63	---
C.I. (percent)	-1.3*	1.3	---	2.0*	0.1	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-14700			RRL-14790		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.85			7.73		
SC (µS/cm)	285			292		
Temperature (°C)	15			15		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	38	38	38	39	39	39
Mg	8.2	8.0	8.1	8.2	8.3	8.5
Na	5.0	5.1	5.5	5.1	5.2	5.6
K	1.1	1.0	1.3	1.0	1.1	1.2
SO_4	---	74	---	---	77	---
Alkalinity as $CaCO_3$	---	59	---	---	60	---
F	---	0.55	---	---	0.60	---
Cl	---	2.4	---	---	2.5	---
Br	---	1.5	---	---	1.5	---
SiO_2	10	10	13	10	10	12
Al	0.20	0.26	1.2	0.21	0.26	1.2
Fe(T)	<0.010	<0.010	1.3	<0.010	<0.010	1.3
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	0.010
Li	0.003	0.003	0.004	0.003	0.003	0.004
Sr	0.23	0.21	0.22	0.23	0.23	0.24
Ba	0.029	0.031	0.061	0.030	0.030	0.059
Mn	0.30	0.30	0.33	0.29	0.30	0.34
Zn	0.023	0.020	0.059	0.031	0.038	0.071
Pb	<0.0003	0.0026	0.0070	0.0006	<0.0003	0.0061
Ni	0.006	0.006	0.009	0.009	0.008	0.012
Cu	0.0029	0.0035	0.011	0.0025	0.0032	0.010
Cd	<0.0005	0.0005	0.0006	0.0006	0.0006	0.0007
Cr	0.0012	<0.0005	0.0024	<0.0005	<0.0005	0.0024
Co	0.0026	0.0022	0.0031	0.0024	0.0022	0.0027
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.65	2.63	---	2.69	2.70	---
Sum anions (meq/L)	2.65	2.65	---	2.73	2.73	---
C.I. (percent)	0.0*	-0.6	---	-1.6*	-1.0	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-14958			RRL-15221		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.72			7.61		
SC (μS/cm)	294			307		
Temperature (°C)	15			14		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	39	39	40	40	39	41
Mg	8.6	8.4	8.7	9.1	9.0	9.4
Na	5.5	5.4	5.7	5.1	5.4	5.6
K	1.1	1.1	1.3	0.98	1.1	1.1
SO_4	---	79	---	---	85	---
Alkalinity as $CaCO_3$	---	58	---	---	59	---
F	---	0.74	---	---	0.65	---
Cl	---	2.4	---	---	2.6	---
Br	---	1.4	---	---	1.3	---
SiO_2	10	10	13	10	10	13
Al	0.25	0.25	1.3	0.17	0.23	1.3
Fe(T)	<0.010	<0.010	1.4	<0.010	<0.010	1.6
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.004	0.004	0.003	0.003	0.004
Sr	0.22	0.23	0.23	0.23	0.23	0.24
Ba	0.030	0.031	0.062	0.030	0.031	0.066
Mn	0.30	0.30	0.33	0.27	0.28	0.31
Zn	0.047	0.052	0.091	0.060	0.057	0.11
Pb	<0.0003	<0.0003	0.0067	<0.0003	0.0003	0.0064
Ni	0.010	0.011	0.012	0.013	0.014	0.017
Cu	0.0034	0.0033	0.010	0.0034	0.0037	0.011
Cd	0.0006	0.0006	0.0008	0.0006	0.0006	0.0008
Cr	<0.0005	<0.0005	0.0029	<0.0005	<0.0005	0.0030
Co	0.0024	0.0027	0.0038	0.0024	0.0027	0.0027
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.74	2.72	---	2.79	2.75	---
Sum anions (meq/L)	2.73	2.73	---	2.85	2.86	---
C.I. (percent)	0.3*	-0.4	---	-2.1*	-3.6	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-15295			RRL-15373		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.58			7.54		
SC (μS/cm)	311			313		
Temperature (°C)	13			13		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	41	41	41	42	41	42
Mg	9.7	9.6	9.6	9.5	8.9	9.9
Na	5.2	5.3	5.6	5.3	5.3	5.8
K	1.0	1.1	1.3	1.0	1.1	1.3
SO_4	---	87	---	---	88	---
Alkalinity as $CaCO_3$	---	58	---	---	61	---
F	---	0.63	---	---	0.68	---
Cl	---	2.6	---	---	2.6	---
Br	---	1.3	---	---	1.3	---
SiO_2	10	10	13	10	10	13
Al	0.16	0.20	1.2	0.17	0.19	1.3
Fe(T)	<0.010	<0.010	1.3	<0.010	<0.010	1.7
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.003	0.004	0.003	0.003	0.004
Sr	0.24	0.25	0.25	0.25	0.23	0.26
Ba	0.029	0.031	0.058	0.030	0.031	0.066
Mn	0.28	0.29	0.32	0.28	0.27	0.32
Zn	0.058	0.060	0.098	0.054	0.059	0.10
Pb	0.0006	<0.0003	0.0053	0.0004	0.0004	0.0070
Ni	0.013	0.012	0.016	0.013	0.012	0.014
Cu	0.0042	0.0038	0.012	0.0029	0.0031	0.011
Cd	0.0007	0.0006	0.0009	0.0007	0.0007	0.0009
Cr	<0.0005	<0.0005	0.0018	<0.0005	<0.0005	0.0024
Co	0.0024	0.0024	0.0025	0.0030	0.0022	0.0038
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.89	2.89	---	2.92	2.83	---
Sum anions (meq/L)	2.86	2.86	---	2.96	2.97	---
C.I. (percent)	1.1*	1.1	---	-1.3*	-4.6	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-15600			RRL-15765		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.44			7.56		
SC (µS/cm)	332			333		
Temperature (°C)	13			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	45	45	45	45	45	45
Mg	10	9.7	10	10	10	10
Na	5.6	5.6	5.7	5.6	5.8	6.1
K	1.1	1.1	1.3	1.0	1.1	1.5
SO_4	---	98	---	---	100	---
Alkalinity as $CaCO_3$	---	58	---	---	59	---
F	---	0.74	---	---	0.68	---
Cl	---	2.8	---	---	2.7	---
Br	---	1.3	---	---	1.2	---
SiO_2	10	9.9	14	10	10	15
Al	0.13	0.15	1.4	0.17	0.15	1.7
Fe(T)	<0.010	<0.010	1.7	<0.010	<0.010	2.6
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.003	0.004	0.003	0.004	0.004
Sr	0.26	0.25	0.27	0.25	0.26	0.27
Ba	0.030	0.032	0.070	0.029	0.030	0.081
Mn	0.28	0.28	0.32	0.28	0.28	0.33
Zn	0.068	0.066	0.10	0.044	0.060	0.10
Pb	<0.0003	<0.0003	0.0080	0.0007	0.0008	0.010
Ni	0.014	0.015	0.018	0.014	0.015	0.016
Cu	0.0033	0.0033	0.011	0.0023	0.0065	0.012
Cd	0.0007	0.0007	0.0009	0.0007	0.0007	0.0008
Cr	<0.0005	<0.0005	0.0032	<0.0005	<0.0005	0.0036
Co	0.0034	0.0024	0.0032	0.0029	0.0026	0.0037
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.10	3.08	---	3.09	3.11	---
Sum anions (meq/L)	3.07	3.08	---	3.11	3.11	---
C.I. (percent)	0.8*	0.0	---	-0.6*	-0.2	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-16100			RRL-16400		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.74			7.81		
SC (μS/cm)	336			335		
Temperature (°C)	12			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	44	44	45	45	45	45
Mg	9.9	9.8	10	10	10	11
Na	5.8	5.8	6.1	5.5	5.7	5.7
K	1.1	1.2	1.5	1.0	1.1	1.6
SO_4	---	100	---	---	100	---
Alkalinity as $CaCO_3$	---	58	---	---	57	---
F	---	0.71	---	---	0.71	---
Cl	---	2.9	---	---	2.8	---
Br	---	1.3	---	---	1.4	---
SiO_2	11	11	15	10	10	17
Al	0.20	0.22	1.8	0.17	0.20	2.1
Fe(T)	<0.010	<0.010	2.7	<0.010	<0.010	3.2
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.003	0.004	0.004
Sr	0.25	0.25	0.27	0.27	0.26	0.28
Ba	0.031	0.031	0.086	0.029	0.031	0.091
Mn	0.28	0.28	0.34	0.29	0.31	0.36
Zn	0.073	0.055	0.11	0.043	0.041	0.11
Pb	0.0008	0.0004	0.013	0.0004	0.0004	0.013
Ni	0.015	0.014	0.017	0.013	0.015	0.018
Cu	0.0055	0.0038	0.013	0.0025	<0.0005	0.014
Cd	0.0007	0.0007	0.0009	0.0006	0.0007	0.0009
Cr	<0.0005	<0.0005	0.0051	<0.0005	0.0071	0.0042
Co	0.0029	0.0025	0.0036	0.0025	0.0027	0.0041
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	0.002	<0.002	<0.002	0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.05	3.04	---	3.09	3.10	---
Sum anions (meq/L)	3.12	3.13	---	3.10	3.10	---
C.I. (percent)	-2.4*	-2.6	---	-0.4*	0.0	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-16700			RRL-17012		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.95			7.97		
SC (µS/cm)	341			347		
Temperature (°C)	12			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	45	46	47	45	46	47
Mg	11	11	11	11	11	11
Na	5.6	5.6	6.2	5.6	5.6	6.0
K	1.0	1.1	1.6	1.0	1.1	1.7
SO_4	---	100	---	---	110	---
Alkalinity as $CaCO_3$	---	56	---	---	56	---
F	---	0.77	---	---	0.77	---
Cl	---	2.8	---	---	2.8	---
Br	---	1.4	---	---	1.5	---
SiO_2	11	10	16	10	10	18
Al	0.16	0.19	2.2	0.18	0.19	2.2
Fe(T)	<0.010	<0.010	3.1	<0.010	<0.010	3.0
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.003	0.004	0.003	0.004	0.004
Sr	0.26	0.27	0.29	0.27	0.27	0.29
Ba	0.029	0.030	0.090	0.028	0.030	0.089
Mn	0.31	0.32	0.37	0.31	0.31	0.37
Zn	0.065	0.045	0.12	0.048	0.047	0.12
Pb	0.0009	0.0010	0.013	0.0008	0.0004	0.012
Ni	0.016	0.016	0.019	0.015	0.016	0.019
Cu	0.0046	0.0027	0.014	0.0041	0.0032	0.012
Cd	0.0008	0.0007	0.0010	0.0007	0.0007	0.0009
Cr	<0.0005	<0.0005	0.0043	<0.0005	<0.0005	0.0041
Co	0.0027	0.0034	0.0049	0.0030	0.0026	0.0040
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	0.002	<0.002	<0.002	0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.17	3.22	---	3.15	3.19	---
Sum anions (meq/L)	3.06	3.06	---	3.26	3.26	---
C.I. (percent)	3.4*	5.1	---	-3.7*	-2.0	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-17300			RRL-17480		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.82			7.80		
SC (µS/cm)	346			348		
Temperature (°C)	11			11		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	47	46	47	46	47	47
Mg	11	10	11	10	11	11
Na	5.8	5.8	6.1	5.9	5.9	5.9
K	1.1	1.1	1.5	1.1	1.1	1.6
SO_4	---	110	---	---	110	---
Alkalinity as $CaCO_3$	---	54	---	---	39	---
F	---	0.89	---	---	0.77	---
Cl	---	2.9	---	---	2.9	---
Br	---	1.4	---	---	1.3	---
SiO_2	10	10	16	11	10	17
Al	0.21	0.22	1.9	0.33	0.13	2.1
Fe(T)	<0.010	<0.010	2.4	<0.010	<0.010	2.7
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.003	0.004	0.004	0.004	0.004
Sr	0.27	0.26	0.28	0.27	0.28	0.29
Ba	0.030	0.030	0.071	0.031	0.030	0.079
Mn	0.33	0.33	0.38	0.34	0.34	0.38
Zn	0.042	0.047	0.11	0.11	0.089	0.12
Pb	0.0006	0.0004	0.011	0.0007	0.0004	0.013
Ni	0.014	0.016	0.018	0.020	0.019	0.021
Cu	0.0031	0.0026	0.012	0.011	0.0061	0.015
Cd	0.0007	0.0008	0.0009	0.0010	0.0008	0.0009
Cr	<0.0005	<0.0005	0.0033	<0.0005	<0.0005	0.0035
Co	0.0029	0.0025	0.0042	0.0032	0.0033	0.0041
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.26	3.13	---	3.14	3.27	---
Sum anions (meq/L)	3.22	3.23	---	2.93	2.92	---
C.I. (percent)	1.2*	-2.9	---	7.0*	11	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-17655			RRL-17700A		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.60			7.57		
SC (μS/cm)	353			343		
Temperature (°C)	11			10		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	48	48	48	46	46	46
Mg	11	11	11	10	11	11
Na	5.8	6.0	6.3	5.9	6.0	5.8
K	1.1	1.1	1.6	1.0	1.1	1.5
SO_4	---	110	---	---	110	---
Alkalinity as $CaCO_3$	---	53	---	---	54	---
F	---	0.85	---	---	0.74	---
Cl	---	3.0	---	---	3.0	---
Br	---	1.2	---	---	1.2	---
SiO_2	10	10	16	11	10	14
Al	0.15	0.20	2.2	0.16	0.16	2.0
Fe(T)	<0.010	<0.010	2.7	<0.010	<0.010	2.2
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.004
Sr	0.28	0.28	0.29	0.26	0.27	0.28
Ba	0.029	0.030	0.083	0.029	0.030	0.075
Mn	0.36	0.37	0.41	0.38	0.37	0.41
Zn	0.070	0.068	0.13	0.058	0.070	0.12
Pb	<0.0003	0.0005	0.011	<0.0003	0.0003	0.0086
Ni	0.017	0.016	0.019	0.016	0.015	0.019
Cu	0.0054	0.0034	0.016	0.0033	0.0038	0.014
Cd	0.0008	0.0008	0.0010	0.0008	0.0008	0.0010
Cr	<0.0005	<0.0005	0.0039	<0.0005	<0.0005	0.0030
Co	0.0031	0.0044	0.0050	0.0032	0.0054	0.0054
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.31	3.32	---	3.14	3.23	---
Sum anions (meq/L)	3.19	3.19	---	3.22	3.21	---
C.I. (percent)	3.5*	3.8	---	-2.4*	0.4	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-17700B			RRL-18000		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.57			7.80		
SC (µS/cm)	346			340		
Temperature (°C)	10			9.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	45	47	47	45	47	47
Mg	10	11	11	9.7	10	9.9
Na	5.7	6.1	6.0	5.7	5.8	6.0
K	1.1	1.1	1.6	1.0	1.1	1.3
SO_4	---	110	---	---	110	---
Alkalinity as $CaCO_3$	---	53	---	---	55	---
F	---	0.74	---	---	0.74	---
Cl	---	3.0	---	---	2.9	---
Br	---	1.2	---	---	1.2	---
SiO_2	10	11	15	10	9.9	14
Al	0.17	0.15	2.3	0.22	0.19	1.7
Fe(T)	<0.010	<0.010	2.3	<0.010	<0.010	1.6
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.005	0.004	0.004	0.004
Sr	0.25	0.27	0.28	0.27	0.26	0.27
Ba	0.028	0.030	0.078	0.030	0.029	0.061
Mn	0.37	0.38	0.42	0.36	0.36	0.39
Zn	0.069	0.063	0.12	0.080	0.080	0.12
Pb	0.0005	0.0005	0.009	<0.0003	<0.0003	0.0074
Ni	0.016	0.017	0.020	0.016	0.016	0.019
Cu	0.0033	0.0031	0.0040	0.0055	0.0035	0.015
Cd	0.0008	0.0008	<0.001	0.0007	0.0007	0.0009
Cr	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	0.0031
Co	0.0039	0.0040	0.0095	0.0031	0.0042	0.0039
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.09	3.28	---	3.07	3.19	---
Sum anions (meq/L)	3.21	3.20	---	3.26	3.25	---
C.I. (percent)	-3.8*	2.5	---	-6.0*	-1.8	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-18300			RRL-18600		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.81			7.68		
SC (μS/cm)	342			340		
Temperature (°C)	9.5			9.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	45	47	47	46	46	46
Mg	10	9.8	11	10	10	10
Na	5.6	6.0	5.9	5.8	5.7	5.8
K	1.1	1.1	1.4	1.0	1.1	1.4
SO_4	---	110	---	---	110	---
Alkalinity as $CaCO_3$	---	54	---	---	54	---
F	---	0.77	---	---	0.89	---
Cl	---	2.9	---	---	3.0	---
Br	---	1.2	---	---	1.2	---
SiO_2	10	10	14	10	10	13
Al	0.18	0.19	1.8	0.21	0.18	1.8
Fe(T)	<0.010	<0.010	1.8	<0.010	<0.010	1.7
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.005
Sr	0.27	0.28	0.28	0.27	0.27	0.27
Ba	0.030	0.030	0.063	0.029	0.029	0.062
Mn	0.37	0.36	0.40	0.36	0.37	0.41
Zn	0.11	0.058	0.12	0.074	0.075	0.12
Pb	0.0012	<0.0003	0.0077	<0.0003	<0.0003	0.0066
Ni	0.015	0.017	0.019	0.016	0.013	0.019
Cu	0.022	0.0029	0.012	0.0026	0.0034	0.014
Cd	0.0008	0.0008	0.0008	0.0008	0.0008	0.0011
Cr	<0.0005	<0.0005	0.0033	<0.0005	<0.0005	0.0021
Co	0.0055	0.0035	0.0033	0.0035	0.0051	0.0041
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.09	3.18	---	3.14	3.14	---
Sum anions (meq/L)	3.23	3.22	---	3.23	3.23	---
C.I. (percent)	-4.4*	-1.2	---	-2.8*	-2.9	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-18900			RRL-19170		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.86			7.84		
SC (μS/cm)	344			340		
Temperature (°C)	9.0			9.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	45	47	45	45	46	45
Mg	9.9	10	11	10	10	10
Na	6.3	6.5	6.2	5.8	5.8	5.9
K	1.1	1.2	1.4	1.1	1.2	1.3
SO_4	---	110	---	---	110	---
Alkalinity as $CaCO_3$	---	54	---	---	54	---
F	---	0.77	---	---	0.77	---
Cl	---	2.9	---	---	3.0	---
Br	---	1.2	---	---	1.2	---
SiO_2	10	11	14	10	10	14
Al	0.23	0.22	1.8	0.24	0.22	1.9
Fe(T)	<0.010	<0.010	1.6	<0.010	<0.010	1.8
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.004
Sr	0.25	0.26	0.28	0.26	0.27	0.27
Ba	0.029	0.029	0.056	0.029	0.029	0.057
Mn	0.39	0.39	0.41	0.41	0.40	0.43
Zn	0.12	0.11	0.12	0.062	0.065	0.13
Pb	<0.0003	0.0003	0.0079	<0.0003	0.0005	0.0070
Ni	0.017	0.017	0.017	0.017	0.016	0.019
Cu	0.0025	0.0035	0.017	0.0023	0.0035	0.014
Cd	0.0008	0.0008	0.0009	0.0007	0.0009	0.0011
Cr	<0.0005	<0.0005	0.0031	<0.0005	<0.0005	0.0026
Co	0.0035	0.0041	0.0039	0.0037	0.0038	0.0048
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.11	3.22	---	3.10	3.15	---
Sum anions (meq/L)	3.24	3.23	---	3.23	3.23	---
C.I. (percent)	-4.0*	-0.2	---	-4.2*	-2.6	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-19500			RRL-19780		
Description	stream			stream		
Date Collected	8/17/2001			8/17/2001		
pH	7.89			7.86		
SC (µS/cm)	343			345		
Temperature (°C)	9.0			9.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	45	45	46	46	47	46
Mg	9.8	10	11	10	10	10
Na	5.8	5.9	5.8	5.9	5.8	5.9
K	1.0	1.1	1.4	1.1	1.1	1.4
SO_4	---	110	---	---	110	---
Alkalinity as $CaCO_3$	---	53	---	---	52	---
F	---	0.74	---	---	0.74	---
Cl	---	3.0	---	---	3.0	---
Br	---	1.2	---	---	1.3	---
SiO_2	10	10	13	10	10	14
Al	0.24	0.22	1.9	0.18	0.21	1.8
Fe(T)	<0.010	<0.010	1.8	<0.010	<0.010	1.8
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.008	0.008	0.004
Sr	0.25	0.27	0.28	0.25	0.27	0.27
Ba	0.027	0.029	0.059	0.028	0.029	0.060
Mn	0.39	0.41	0.42	0.40	0.40	0.42
Zn	0.075	0.072	0.10	0.12	0.082	0.12
Pb	0.0006	0.0004	0.0078	0.0008	0.0011	0.0075
Ni	0.016	0.015	0.020	0.019	0.017	0.019
Cu	0.0025	0.0039	0.015	0.0048	0.0036	0.015
Cd	0.0007	0.0008	0.0010	0.0009	0.0008	0.0010
Cr	0.0005	<0.0005	0.0037	<0.0005	<0.0005	0.0026
Co	0.0036	0.0060	0.0047	0.0038	0.0052	0.0045
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.08	3.10	---	3.15	3.19	---
Sum anions (meq/L)	3.22	3.22	---	3.19	3.19	---
C.I. (percent)	-4.6*	-3.8	---	-1.4*	0.0	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-275		RRU-340		RRU-380	
Description	RBI		LBI		RBI	
Date Collected	8/24/2001		8/24/2001		8/24/2001	
pH	6.19		7.21		7.01	
SC (µS/cm)	271		253		684	
Temperature (°C)	11		10		7.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	34	33	37	37	120	120
Mg	6.6	6.3	5.9	6.0	16	16
Na	9.1	9.1	4.4	4.3	8.4	8.2
K	1.4	1.4	0.95	0.99	1.5	1.6
SO_4	44	---	27	---	260	---
Alkalinity as $CaCO_3$	64	---	91	---	110	---
F	0.12	---	0.08	---	0.31	---
Cl	14	---	5.2	---	3.6	---
Br	<0.01	---	0.03	---	<0.01	---
SiO_2	16	16	10	11	12	13
Al	0.010	0.023	0.007	0.13	0.009	0.034
Fe(T)	<0.010	0.031	0.019	0.23	0.031	0.067
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.002	0.003	0.002	0.002	0.017	0.018
Sr	0.24	0.23	0.28	0.28	1.6	1.6
Ba	0.054	0.050	0.068	0.068	0.080	0.081
Mn	0.013	0.011	0.018	0.028	0.007	0.008
Zn	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Pb	0.0005	0.0004	0.0005	0.0012	0.0003	0.0004
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	0.0054	0.0042	0.0064	0.012	0.0018	0.0014
Cd	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	0.007	<0.007	<0.007	0.015	0.018
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.58	---	2.48	---	6.74	---
Sum anions (meq/L)	2.51	---	2.46	---	6.71	---
C.I. (percent)	2.7	---	0.9	---	0.3	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-487		RRU-511		RRU-530	
Description	RBI		RBI		RBI	
Date Collected	8/24/2001		8/24/2001		8/24/2001	
pH	6.71		5.45		4.42	
SC (µS/cm)	394		154		466	
Temperature (°C)	10		11		8.5	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	45	46	13	13	34	33
Mg	16	16	4.4	4.7	22	22
Na	7.3	7.5	5.6	5.6	10	10
K	1.3	1.6	1.2	1.2	1.7	1.7
SO_4	140	---	57	---	230	---
Alkalinity as $CaCO_3$	53	---	2.5	---	---	---
F	0.75	---	0.19	---	1.4	---
Cl	6.2	---	2.2	---	1.5	---
Br	<0.01	---	<0.01	---	<0.01	---
SiO_2	18	21	25	26	37	37
Al	0.009	1.0	0.32	0.33	6.9	6.9
Fe(T)	0.063	2.2	<0.010	<0.010	0.012	0.034
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.007	0.007	0.003	0.003	0.027	0.026
Sr	0.28	0.29	0.065	0.069	0.14	0.14
Ba	0.052	0.065	0.008	0.008	0.010	0.009
Mn	0.029	0.056	0.13	0.14	1.8	1.8
Zn	0.046	0.14	0.046	0.039	0.57	0.57
Pb	<0.0003	0.0052	0.0004	<0.0003	0.0003	0.0008
Ni	0.016	0.021	0.012	0.012	0.077	0.076
Cu	0.0017	0.015	0.025	0.025	0.33	0.33
Cd	<0.0005	0.0014	<0.0005	<0.0005	0.013	0.013
Cr	<0.0005	0.0039	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	0.0017	0.0049	0.0048	0.038	0.045
Be	<0.001	<0.001	<0.001	<0.001	0.001	0.002
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	0.003	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.56	---	1.26	---	4.08	---
Sum anions (meq/L)	3.82	---	1.24	---	4.10	---
C.I. (percent)	-7.1	---	1.4	---	-0.3	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-542		RRU-570		RRU-572	
Description	RBI		RBI		RBI	
Date Collected	8/24/2001		8/24/2001		8/24/2001	
pH	4.48		4.49		4.39	
SC (µS/cm)	379		475		468	
Temperature (°C)	9.0		8.0		9.5	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	31	30	34	35	34	34
Mg	17	18	22	22	22	21
Na	8.6	8.8	11	10	10	10
K	1.5	2.3	1.8	1.6	1.7	1.7
SO_4	180	---	240	---	230	---
Alkalinity as $CaCO_3$	---	---	---	---	---	---
F	1.1	---	1.3	---	1.6	---
Cl	1.7	---	2.4	---	3.1	---
Br	<0.01	---	<0.01	---	<0.01	---
SiO_2	30	49	38	41	38	39
Al	3.3	7.6	6.8	7.8	6.6	6.8
Fe(T)	0.027	5.9	0.028	0.79	0.032	0.45
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	0.013	<0.010
Li	0.019	0.024	0.030	0.027	0.027	0.028
Sr	0.14	0.15	0.14	0.13	0.13	0.13
Ba	0.008	0.052	0.009	0.012	0.009	0.012
Mn	1.2	1.3	1.9	2.0	1.8	1.8
Zn	0.41	0.41	2.9	2.9	0.56	0.55
Pb	0.0010	0.019	0.0008	0.0025	0.0015	0.0022
Ni	0.055	0.059	0.081	0.081	0.077	0.074
Cu	0.21	0.28	0.34	0.32	0.32	0.32
Cd	0.0083	0.0071	0.011	0.011	0.011	0.010
Cr	<0.0005	0.0092	0.0028	0.0011	<0.0005	0.0019
Co	0.034	0.030	0.055	0.035	0.037	0.049
Be	<0.001	<0.001	0.001	0.001	<0.001	0.002
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	0.009	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.04	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.32	---	4.17	---	4.06	---
Sum anions (meq/L)	3.34	---	4.31	---	4.16	---
C.I. (percent)	-0.7	---	-3.3	---	-2.4	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-705		RRU-750		RRU-758	
Description	RBI		LBI		RBI	
Date Collected	8/24/2001		8/24/2001		8/24/2001	
pH	4.42		6.11		4.45	
SC (µS/cm)	446		464		697	
Temperature (°C)	10		9.5		9.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	34	33	49	49	64	64
Mg	20	21	21	21	36	36
Na	9.4	10	9.2	9.4	12	12
K	1.6	2.2	1.4	1.6	1.7	2.1
SO_4	220	---	210	---	370	---
Alkalinity as $CaCO_3$	---	---	28	---	---	---
F	1.2	---	1.1	---	1.9	---
Cl	3.3	---	5.3	---	4.5	---
Br	0.03	---	0.03	---	0.02	---
SiO_2	37	47	25	29	36	43
Al	5.7	8.6	0.35	1.4	8.7	11
Fe(T)	0.024	3.4	0.017	1.3	0.062	2.6
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.022	0.025	0.013	0.014	0.054	0.057
Sr	0.12	0.13	0.29	0.29	0.37	0.38
Ba	0.012	0.047	0.026	0.034	0.018	0.036
Mn	1.6	1.7	0.15	0.17	1.1	1.1
Zn	0.51	0.50	0.12	0.13	0.37	0.39
Pb	0.0019	0.010	0.0004	0.0021	0.0012	0.0058
Ni	0.070	0.070	0.031	0.035	0.11	0.12
Cu	0.26	0.29	0.0052	0.017	0.22	0.25
Cd	0.0095	0.0090	0.0013	0.0016	0.0037	0.0037
Cr	<0.0005	0.0040	<0.0005	0.0023	<0.0005	0.0026
Co	0.033	0.035	0.0015	0.0029	0.039	0.049
Be	0.001	0.001	<0.001	<0.001	0.003	0.003
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	0.005	<0.002	<0.002	<0.002	0.003
As	<0.0001	<0.0001	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.82	---	4.08	---	6.28	---
Sum anions (meq/L)	4.01	---	4.55	---	6.41	---
C.I. (percent)	-4.7	---	-10.9	---	-2.0	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-834		RRU-1050		RRU-1117	
Description	RBI		RBI		RBI	
Date Collected	8/24/2001		8/24/2001		8/24/2001	
pH	6.19		6.73		7.43	
SC (µS/cm)	485		346		212	
Temperature (°C)	13		10		7.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	50	50	41	42	18	19
Mg	20	20	13	13	8.2	8.4
Na	14	14	7.5	7.5	7.0	6.9
K	3.3	3.4	1.8	1.7	1.4	1.6
SO_4	210	---	120	---	77	---
Alkalinity as $CaCO_3$	23	---	48	---	22	---
F	1.4	---	0.81	---	0.53	---
Cl	6.9	---	2.5	---	0.9	---
Br	0.03	---	0.05	---	<0.01	---
SiO_2	37	38	23	23	27	27
Al	0.36	1.8	0.038	1.6	0.039	0.053
Fe(T)	2.0	4.2	0.87	2.7	0.010	0.051
Fe(II)	1.6	---	---	---	---	---
B	0.014	0.014	0.013	<0.010	<0.010	<0.010
Li	0.015	0.016	0.010	0.009	0.009	0.010
Sr	0.17	0.17	0.21	0.20	0.11	0.12
Ba	0.023	0.022	0.033	0.034	0.027	0.030
Mn	1.2	1.2	0.67	0.67	0.006	0.007
Zn	0.19	0.20	0.11	0.11	0.040	0.040
Pb	0.0004	0.0006	0.0005	0.0003	0.0004	0.0006
Ni	0.037	0.036	0.021	0.020	0.003	0.003
Cu	0.034	0.065	0.012	0.059	0.0027	0.0019
Cd	0.0022	0.0021	0.0013	0.0014	<0.0005	<0.0005
Cr	0.0011	0.0033	0.0008	0.0016	<0.0005	0.0028
Co	0.017	0.014	0.014	0.017	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	0.0002	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	4.37	---	3.24	---	1.81	---
Sum anions (meq/L)	4.48	---	3.28	---	1.99	---
C.I. (percent)	-2.6	---	-1.2	---	-9.5	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-1463		RRU-1510		RRU-1658	
Description	RBI		RBI		RBI	
Date Collected	8/24/2001		8/24/2001		8/24/2001	
pH	6.95		4.42		7.00	
SC (µS/cm)	514		439		330	
Temperature (°C)	13		7.5		10	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	66	66	40	41	45	45
Mg	12	12	16	16	7.6	7.7
Na	17	17	11	10	6.1	6.3
K	8.1	8.3	2.4	2.4	1.6	1.6
SO_4	140	---	210	---	90	---
Alkalinity as $CaCO_3$	106	---	---	---	67	---
F	0.81	---	0.81	---	0.25	---
Cl	11	---	5.6	---	3.4	---
Br	0.09	---	0.03	---	<0.01	---
SiO_2	24	28	38	39	12	13
Al	0.017	0.73	4.6	5.9	0.014	0.031
Fe(T)	0.66	9.1	0.39	4.9	2.3	2.8
Fe(II)	---	---	---	---	2.1	---
B	0.023	0.024	<0.010	0.010	<0.010	<0.010
Li	0.004	0.004	0.021	0.021	0.005	0.006
Sr	0.31	0.30	0.27	0.26	0.30	0.31
Ba	0.052	0.068	0.010	0.015	0.036	0.037
Mn	2.3	2.3	0.79	0.81	0.22	0.22
Zn	0.062	0.075	0.44	0.45	0.007	<0.005
Pb	0.0014	0.0055	0.0006	0.0030	0.0022	0.0005
Ni	<0.003	0.003	0.038	0.037	<0.003	<0.003
Cu	0.011	0.0064	0.049	0.056	0.0018	0.0012
Cd	<0.0005	<0.0005	0.0020	0.0021	<0.0005	<0.0005
Cr	0.0008	0.0042	0.0006	0.0046	0.0025	0.0015
Co	0.0035	0.0044	0.017	0.021	0.0017	0.0014
Be	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
Mo	0.010	0.011	<0.007	<0.007	<0.007	<0.007
V	<0.002	0.002	<0.002	0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	4.87	---	3.82	---	3.05	---
Sum anions (meq/L)	4.92	---	3.92	---	3.10	---
C.I. (percent)	-0.9	---	-2.7	---	-1.7	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-2195		RRU-2406		RRU-2830	
Description	LBI		RBI		RBI	
Date Collected	8/24/2001		8/24/2001		8/24/2001	
pH	7.74		7.55		7.63	
SC (μS/cm)	239		299		300	
Temperature (°C)	8.5		12		6.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	41	40	41	42	40	40
Mg	8.3	7.9	8.3	8.8	7.8	7.8
Na	4.4	4.3	4.6	4.6	6.9	7.2
K	0.95	0.97	1.2	1.3	2.4	2.4
SO_4	83	---	87	---	83	---
Alkalinity as $CaCO_3$	60	---	62	---	58	---
F	0.17	---	0.23	---	0.27	---
Cl	1.3	---	1.5	---	5.3	---
Br	<0.01	---	<0.01	---	0.03	---
SiO_2	12	13	11	12	7.7	8.2
Al	0.060	0.33	0.025	0.32	0.033	0.16
Fe(T)	0.051	0.53	0.048	0.88	0.25	0.85
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	0.013	0.012
Li	0.004	0.004	0.005	0.005	0.004	0.004
Sr	0.24	0.23	0.23	0.25	0.23	0.23
Ba	0.053	0.057	0.050	0.067	0.055	0.057
Mn	0.070	0.084	0.058	0.069	0.42	0.44
Zn	0.013	0.021	0.013	0.006	0.007	0.005
Pb	<0.0003	0.0013	0.0004	0.0016	0.0008	0.0019
Ni	0.005	0.005	<0.003	0.003	<0.003	0.003
Cu	0.0028	0.0075	0.0044	0.0054	0.0036	0.0037
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	0.0009	0.0007	0.0012	<0.0005	0.0011
Co	<0.0008	0.0010	<0.0008	<0.0008	<0.0008	0.0010
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	0.017	0.016
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	0.0002	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.76	---	2.76	---	2.84	---
Sum anions (meq/L)	2.78	---	2.89	---	2.86	---
C.I. (percent)	-0.8	---	-4.7	---	-0.9	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRU-4100		RRU-5652		RRM-6214	
Description	LBI		LBI		RBI	
Date Collected	8/24/2001		8/24/2001		8/20/2001	
pH	5.23		9.01		6.87	
SC (μS/cm)	226		242		236	
Temperature (°C)	19		17		11	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	28	27	33	34	33	33
Mg	3.7	3.5	7.5	7.3	6.9	7.1
Na	0.68	0.70	4.5	4.6	5.3	5.4
K	4.1	3.9	1.1	1.1	0.98	1.2
SO$_4$	99	---	52	---	49	---
Alkalinity as CaCO$_3$	1	---	64	---	62	---
F	0.20	---	0.17	---	0.26	---
Cl	0.5	---	2.3	---	2.9	---
Br	<0.01	---	0.49	---	<0.01	---
SiO$_2$	1.5	2.0	9.4	10	14	14
Al	0.27	0.47	0.096	0.21	0.013	0.021
Fe(T)	0.046	0.44	0.039	0.29	0.060	0.12
Fe(II)	---	---	---	---	---	---
B	0.014	0.012	<0.010	<0.010	<0.010	<0.010
Li	0.013	0.011	0.004	0.003	0.003	0.003
Sr	0.10	0.10	0.20	0.20	0.18	0.20
Ba	0.034	0.042	0.032	0.037	0.032	0.037
Mn	4.1	4.2	0.020	0.056	0.016	0.017
Zn	0.18	0.18	<0.005	0.008	0.014	0.011
Pb	0.0006	0.0027	<0.0003	0.0012	0.0004	<0.0003
Ni	0.048	0.046	<0.003	<0.003	<0.003	0.004
Cu	0.0090	0.0088	0.0042	0.0059	0.0013	0.0007
Cd	0.0034	0.0039	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007
Co	0.080	0.087	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	1.84	---	2.29	---	2.37	---
Sum anions (meq/L)	1.92	---	2.24	---	2.24	---
C.I. (percent)	-4.1	---	2.1	---	5.7	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-6343		RRM-6971		RRM-7010	
Description	LBI		RBI		inflow	
Date Collected	8/20/2001		8/20/2001		8/20/2001	
pH	6.80		2.79		6.33	
SC (μS/cm)	268		3530		573	
Temperature (°C)	7.5		20		17	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	36	37	530	540	88	88
Mg	7.7	8.3	98	98	14	15
Na	4.4	4.6	5.7	6.2	5.5	5.6
K	0.88	0.90	1.1	1.2	2.0	2.1
SO_4	72	---	2500	---	240	---
Alkalinity as $CaCO_3$	54	---	---	---	30	---
F	0.15	---	7.9	---	0.24	---
Cl	2.5	---	0.8	---	2.6	---
Br	<0.01	---	<0.01	---	<0.01	---
SiO_2	12	13	30	31	18	17
Al	0.009	0.010	98	98	0.034	0.11
Fe(T)	<0.010	<0.010	68	68	5.5	5.8
Fe(II)	---	---	9.8	---	5.2	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.002	0.003	0.12	0.13	0.002	0.002
Sr	0.23	0.22	2.3	2.3	0.56	0.51
Ba	0.028	0.026	0.007	0.011	0.043	0.048
Mn	<0.002	<0.002	11	12	0.38	0.37
Zn	0.022	0.020	1.9	2.0	0.010	0.009
Pb	0.0006	<0.0003	<0.0003	0.0007	<0.0003	0.0009
Ni	0.003	0.003	0.82	0.84	0.010	0.009
Cu	0.0022	<0.0005	0.58	0.58	0.0005	<0.0005
Cd	<0.0005	<0.0005	0.013	0.012	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.058	0.058	0.0030	0.0028
Co	<0.0008	<0.0008	0.33	0.35	0.0071	0.0053
Be	<0.001	<0.001	0.018	0.019	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	0.002	0.003	<0.002	<0.002
As	<0.0001	<0.04	0.0008	<0.04	0.0005	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.50	---	30.9	---	5.18	---
Sum anions (meq/L)	2.49	---	30.7	---	4.81	---
C.I. (percent)	0.3	---	0.7	---	7.6	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-7240		RRM-7255		RRM-7270	
Description	RBI		LBI		RBI	
Date Collected	8/20/2001		8/20/2001		8/20/2001	
pH	4.21		6.15		4.23	
SC (µS/cm)	846		564		822	
Temperature (°C)	9.5		17		8.5	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	99	100	82	82	97	98
Mg	32	31	18	19	30	30
Na	9.5	9.1	6.8	7.7	9.2	11
K	1.4	1.3	0.88	1.8	1.3	1.5
SO_4	450	---	250	---	430	---
Alkalinity as $CaCO_3$	---	---	22	---	---	---
F	1.8	---	0.29	---	1.7	---
Cl	6.5	---	4.3	---	6.9	---
Br	<0.01	---	<0.01	---	<0.01	---
SiO_2	31	30	14	21	30	30
Al	14	14	0.093	2.1	13	14
Fe(T)	0.21	0.50	0.15	8.5	0.079	0.54
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.022	0.021	0.003	0.005	0.021	0.025
Sr	0.47	0.46	0.51	0.55	0.45	0.40
Ba	0.007	0.012	0.022	0.11	0.006	0.014
Mn	2.4	2.4	0.17	0.23	2.1	2.2
Zn	0.60	0.61	0.058	0.070	0.57	0.60
Pb	<0.0003	0.0011	0.0004	0.024	0.0008	0.0019
Ni	0.12	0.12	0.017	0.019	0.11	0.12
Cu	0.057	0.056	0.0030	0.0055	0.054	0.059
Cd	0.0040	0.0042	0.0008	0.0007	0.0036	0.0037
Cr	0.0009	0.0012	<0.0005	0.0080	0.0010	0.0014
Co	0.051	0.053	0.0042	0.0042	0.046	0.050
Be	0.003	0.003	<0.001	<0.001	0.003	0.003
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	0.004	<0.002	<0.002
As	<0.0001	<0.04	0.0002	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	7.59	---	5.04	---	7.33	---
Sum anions (meq/L)	7.45	---	4.89	---	7.20	---
C.I. (percent)	1.8	---	3.0	---	1.9	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-7300		RRM-7352		RRM-7400	
Description	LBI		RBI		LBI	
Date Collected	8/20/2001		8/20/2001		8/20/2001	
pH	4.44		5.99		4.11	
SC (µS/cm)	787		1196		913	
Temperature (°C)	12		15		9.5	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	100	100	170	170	120	120
Mg	29	29	37	37	30	30
Na	8.4	9.4	29	30	9.1	9.1
K	1.5	1.7	1.7	3.1	1.5	2.0
SO$_4$	410	---	540	---	490	---
Alkalinity as CaCO$_3$	---	---	11	---	---	---
F	1.5	---	0.45	---	4.6	---
Cl	3.9	---	41	---	3.9	---
Br	<0.01	---	0.05	---	<0.01	---
SiO$_2$	29	30	23	26	35	37
Al	9.5	10	0.31	0.71	12	12
Fe(T)	0.34	0.90	26	28	0.36	4.4
Fe(II)	---	---	25	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.020	0.022	0.007	0.008	0.024	0.025
Sr	0.52	0.50	1.6	1.5	0.65	0.68
Ba	0.017	0.022	0.020	0.032	0.011	0.056
Mn	2.5	2.5	2.5	2.5	2.5	2.4
Zn	0.60	0.63	0.047	0.047	0.72	0.72
Pb	0.0010	0.0022	<0.0003	0.0031	0.0007	0.013
Ni	0.11	0.11	0.031	0.032	0.11	0.11
Cu	0.036	0.038	<0.0005	0.0021	0.065	0.064
Cd	0.0039	0.0037	<0.0005	<0.0005	0.0049	0.0048
Cr	<0.0005	0.0007	0.0065	0.0068	0.0008	0.0043
Co	0.037	0.038	0.026	0.026	0.044	0.044
Be	0.003	0.003	<0.001	<0.001	0.003	0.003
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	0.002
As	<0.0001	<0.04	0.0004	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	7.11	---	11.2	---	8.11	---
Sum anions (meq/L)	6.82	---	10.0	---	8.19	---
C.I. (percent)	4.1	---	12	---	-1.0	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-7457		RRM-7588		RRM-7615	
Description	RBI		LBI		RBI	
Date Collected	8/20/2001		8/20/2001		8/20/2001	
pH	5.52		6.12		4.59	
SC (μS/cm)	902		552		735	
Temperature (°C)	11		12		9.5	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	130	130	77	78	90	90
Mg	36	36	18	19	25	26
Na	15	15	6.9	7.3	11	10
K	1.7	1.7	1.6	1.7	1.5	1.5
SO_4	450	---	240	---	380	---
Alkalinity as $CaCO_3$	11	---	28	---	<1	---
F	0.99	---	0.34	---	1.1	---
Cl	10	---	3.1	---	6.3	---
Br	0.02	---	0.11	---	<0.01	---
SiO_2	21	22	17	19	28	29
Al	1.8	3.9	0.31	0.90	9.3	9.0
Fe(T)	0.067	0.082	0.17	0.22	0.013	0.30
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.010	0.010	0.006	0.007	0.017	0.017
Sr	1.1	1.1	0.49	0.49	0.47	0.49
Ba	0.012	0.011	0.036	0.38	0.009	0.011
Mn	0.91	0.90	0.66	0.68	1.6	1.5
Zn	0.31	0.32	0.11	0.13	0.52	0.50
Pb	0.0007	<0.0003	0.0011	0.0005	0.0014	0.0011
Ni	0.060	0.059	0.024	0.026	0.080	0.079
Cu	0.0095	0.020	0.0046	0.0058	0.047	0.049
Cd	0.0028	0.0024	0.0016	0.0012	0.0037	0.0037
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007
Co	0.015	0.014	0.0077	0.0078	0.031	0.029
Be	<0.001	0.001	<0.001	<0.001	0.002	0.002
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	8.46	---	4.94	---	6.56	---
Sum anions (meq/L)	7.98	---	4.86	---	6.49	---
C.I. (percent)	5.9	---	1.6	---	1.1	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-10360		RRM-10519		RRM-10572	
Description	RBI		RBI		LBI	
Date Collected	8/20/2001		8/20/2001		8/20/2001	
pH	6.64		6.18		6.67	
SC (µS/cm)	388		784		419	
Temperature (°C)	9.0		9.0		7.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	48	51	120	120	61	61
Mg	10	11	24	24	12	13
Na	11	13	15	15	7.8	7.7
K	1.3	1.6	2.5	2.5	1.0	0.91
SO_4	110	---	300	---	130	---
Alkalinity as $CaCO_3$	52	---	74	---	60	---
F	2.3	---	1.2	---	0.77	---
Cl	15	---	14	---	8.2	---
Br	0.02	---	0.04	---	0.03	---
SiO_2	12	14	17	17	13	13
Al	0.35	0.63	0.28	0.28	0.044	0.051
Fe(T)	<0.010	0.41	0.029	0.061	<0.010	0.030
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	0.017	0.018	<0.010	<0.010
Li	0.006	0.007	0.007	0.007	0.003	0.003
Sr	0.26	0.26	0.64	0.66	0.33	0.32
Ba	0.026	0.035	0.047	0.048	0.032	0.032
Mn	0.008	0.020	0.023	0.026	0.006	0.008
Zn	0.069	0.075	0.13	0.12	0.031	0.056
Pb	<0.0003	0.0022	<0.0003	0.0005	0.0007	0.0009
Ni	0.004	0.004	0.009	0.009	0.005	0.005
Cu	0.0018	0.0022	0.0016	0.0018	0.0011	<0.0005
Cd	<0.0005	0.0005	0.0009	0.0008	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	0.0011	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	0.007	0.008	0.012	0.013	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.47	---	7.50	---	4.04	---
Sum anions (meq/L)	3.57	---	6.95	---	3.79	---
C.I. (percent)	-2.8	---	7.7	---	6.2	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRM-12287		RRM-12308		RRL-13210	
Description	LBI		RBI		LBI	
Date Collected	8/20/2001		8/20/2001		8/17/2001	
pH	6.10		4.90		8.17	
SC (µS/cm)	1095		947		152	
Temperature (°C)	9.0		8.5		13	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	160	160	110	110	25	25
Mg	46	46	44	44	2.3	2.4
Na	16	16	20	20	2.2	2.1
K	2.2	2.4	2.2	2.1	0.76	0.76
SO$_4$	540	---	560	---	6.1	---
Alkalinity as CaCO$_3$	58	---	30	---	69	---
F	4.0	---	5.5	---	0.13	---
Cl	10	---	19	---	0.2	---
Br	0.04	---	0.04	---	---	---
SiO$_2$	13	15	17	17	7.3	7.5
Al	2.5	3.3	8.6	8.6	0.031	0.042
Fe(T)	0.54	2.2	<0.010	0.084	<0.010	<0.010
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.006	0.006	0.013	0.012	0.001	0.001
Sr	0.97	0.99	0.69	0.69	0.15	0.15
Ba	0.022	0.038	0.012	0.014	0.051	0.053
Mn	3.0	3.0	2.9	2.9	0.002	<0.002
Zn	0.35	0.34	0.99	0.96	0.022	<0.005
Pb	0.0006	0.0055	0.0012	0.0015	<0.0003	0.0009
Ni	0.090	0.090	0.12	0.11	<0.003	<0.003
Cu	0.0061	0.011	0.12	0.11	0.0070	<0.0005
Cd	0.0091	0.0089	0.010	0.011	<0.0005	<0.0005
Cr	<0.0005	0.0019	<0.0005	<0.0005	<0.0005	<0.0005
Co	0.015	0.015	0.0098	0.0088	<0.0008	<0.0008
Be	<0.001	0.001	0.003	0.003	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	10.3	---	8.70	---	1.53	---
Sum anions (meq/L)	10.3	---	10.64	---	1.48	---
C.I. (percent)	0.5	---	-20.1	---	3.1	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-13675		RRL-13750		RRL-13751	
Description	RBI		LBI		RBI	
Date Collected	8/17/2001		8/17/2001		8/17/2001	
pH	4.40		4.60		4.29	
SC (µS/cm)	1653		1456		1723	
Temperature (°C)	7.5		---		---	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	180	180	160	160	180	190
Mg	95	95	82	82	98	100
Na	23	24	21	21	24	24
K	3.5	3.5	2.8	2.8	3.6	3.7
SO_4	1000	---	860	---	1100	---
Alkalinity as $CaCO_3$	---	---	<1	---	---	---
F	14	---	14	---	16	---
Cl	17	---	14	---	18	---
Br	0.14	---	---	---	0.22	---
SiO_2	20	20	20	20	22	21
Al	39	39	31	31	42	43
Fe(T)	<0.010	0.010	0.014	<0.010	<0.010	<0.010
Fe(II)	---	---	---	---	---	---
B	0.011	<0.010	<0.010	<0.010	0.012	0.011
Li	0.036	0.035	0.029	0.029	0.037	0.038
Sr	1.2	1.2	1.1	1.1	1.2	1.3
Ba	0.021	0.021	0.014	0.014	0.014	0.014
Mn	20	21	17	17	21	23
Zn	3.2	3.3	2.5	2.4	3.2	3.4
Pb	0.0007	0.0011	0.0012	0.0007	0.0009	0.0007
Ni	0.45	0.48	0.37	0.37	0.44	0.47
Cu	0.50	0.49	0.40	0.40	0.57	0.59
Cd	0.029	0.029	0.026	0.025	0.033	0.033
Cr	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	0.0006
Co	0.15	0.15	0.11	0.11	0.17	0.17
Be	0.009	0.009	0.008	0.009	0.010	0.010
Mo	0.016	0.018	0.013	0.010	0.016	0.017
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	0.08	<0.06	<0.06	0.07	<0.06
Sum cations (meq/L)	16.7	---	15.0	---	17.3	---
Sum anions (meq/L)	15.6	---	14.1	---	17.7	---
C.I. (percent)	6.8	---	6.2	---	-2.5	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-14570		RRL-14800		RRL-14973	
Description	RBI		RBI		RBI	
Date Collected	8/17/2001		8/17/2001		8/17/2001	
pH	5.70		5.83		5.91	
SC (µS/cm)	1068		693		1022	
Temperature (°C)	12		13		13	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	140	150	86	88	150	150
Mg	52	54	31	32	50	49
Na	16	17	11	12	14	15
K	2.4	2.6	1.3	2.9	2.3	2.3
SO_4	520	---	330	---	510	---
Alkalinity as $CaCO_3$	9.0	---	10	---	31	---
F	7.4	---	5.3	---	3.7	---
Cl	13	---	4.8	---	10	---
Br	0.04	---	---	---	0.03	---
SiO_2	17	18	16	30	17	17
Al	5.0	5.5	2.6	6.6	1.5	1.5
Fe(T)	<0.010	0.016	1.4	9.1	0.081	0.10
Fe(II)	---	---	1.2	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.007	0.007	0.011	0.012	0.010	0.010
Sr	0.96	1.0	0.51	0.57	0.91	0.90
Ba	0.033	0.034	0.018	0.11	0.033	0.033
Mn	0.34	0.35	0.26	0.31	0.019	0.018
Zn	1.6	1.7	0.94	1.0	1.5	1.5
Pb	<0.0003	0.0012	0.0012	0.025	0.0004	0.0005
Ni	0.20	0.21	0.20	0.21	0.23	0.22
Cu	0.014	0.017	0.0011	0.010	0.0065	0.0054
Cd	0.011	0.011	<0.0005	0.0027	0.0044	0.0044
Cr	0.0005	<0.0005	0.0009	0.0087	<0.0005	<0.0005
Co	<0.0008	<0.0008	0.0031	0.0042	<0.0008	0.0029
Be	0.002	0.002	0.003	0.004	0.002	0.002
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	0.004	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	9.93	---	6.31	---	9.96	---
Sum anions (meq/L)	9.02	---	6.05	---	9.17	---
C.I. (percent)	9.6	---	4.2	---	8.3	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-15000		RRL-15044		RRL-15264	
Description	LBI		RBI		RBI	
Date Collected	8/17/2001		8/17/2001		8/17/2001	
pH	5.98		6.41		6.60	
SC (μS/cm)	921		827		844	
Temperature (°C)	11		16		11	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	130	140	120	120	140	140
Mg	41	43	36	37	31	31
Na	14	14	12	12	11	11
K	2.3	2.8	2.2	2.2	2.2	2.2
SO$_4$	440	---	390	---	390	---
Alkalinity as CaCO$_3$	29	---	33	---	47	---
F	2.3	---	1.9	---	0.74	---
Cl	8.4	---	7.3	---	7.2	---
Br	0.02	---	0.22	---	---	---
SiO$_2$	17	21	17	16	14	15
Al	0.70	1.6	0.45	0.49	<0.06	0.10
Fe(T)	<0.010	2.1	0.36	0.50	0.015	0.12
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.010	0.010	0.009	0.009	0.005	0.005
Sr	0.76	0.78	0.67	0.69	0.71	0.70
Ba	0.043	0.079	0.044	0.045	0.040	0.042
Mn	0.019	0.052	0.19	0.19	0.011	0.012
Zn	1.1	1.2	0.79	0.81	0.11	0.11
Pb	0.0008	0.0094	<0.0003	<0.0003	0.0008	<0.0003
Ni	0.16	0.15	0.13	0.13	0.017	0.018
Cu	0.0054	0.0071	0.0030	0.0024	0.0012	<0.0005
Cd	0.0026	0.0026	0.0022	<0.0005	0.0007	0.0006
Cr	<0.0005	0.0028	0.0007	0.0006	<0.0005	<0.0005
Co	0.0023	<0.0008	0.0028	0.0020	<0.0008	<0.0008
Be	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	8.70	---	7.88	---	8.39	---
Sum anions (meq/L)	8.12	---	7.32	---	7.59	---
C.I. (percent)	6.9	---	7.3	---	10	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-15331		RRL-15356		RRL-15408	
Description	LBI		RBI		RBI	
Date Collected	8/17/2001		8/17/2001		8/17/2001	
pH	7.18		---		4.84	
SC (µS/cm)	286		---		1513	
Temperature (°C)	13		9.0		11	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	43	45	120	120	220	220
Mg	5.7	5.9	22	23	71	73
Na	4.1	4.1	9.7	9.9	30	29
K	0.96	0.98	1.8	1.8	3.7	3.7
SO$_4$	61	---	320	---	870	---
Alkalinity as CaCO$_3$	76	---	53	---	<1	---
F	0.65	---	0.31	---	16	---
Cl	1.2	---	6.2	---	18	---
Br	---	---	---	---	0.06	---
SiO$_2$	9.5	11	12	12	27	27
Al	0.029	0.21	0.057	0.084	15	15
Fe(T)	0.039	0.39	0.012	0.039	0.086	0.18
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	0.014	0.014
Li	0.003	0.003	0.004	0.004	0.064	0.064
Sr	0.30	0.31	0.64	0.66	1.1	1.1
Ba	0.047	0.052	0.038	0.039	0.011	0.012
Mn	0.013	0.019	0.010	0.012	2.2	2.3
Zn	<0.005	<0.005	0.073	0.072	0.89	0.91
Pb	<0.0003	0.0025	0.0005	0.0003	0.0008	0.0012
Ni	<0.003	<0.003	0.008	0.010	0.24	0.23
Cu	<0.0005	0.0028	0.0006	<0.0005	0.23	0.23
Cd	<0.0005	<0.0005	<0.0005	<0.0005	0.0075	0.0082
Cr	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	<0.0008	<0.0008	<0.0008	0.055	0.056
Be	<0.001	<0.001	<0.001	<0.001	0.006	0.006
Mo	0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.67	---	---	---	14.8	---
Sum anions (meq/L)	2.71	---	---	---	14.2	---
C.I. (percent)	-1.4	---	---	---	4.1	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-15500		RRL-15687		RRL-17574	
Description	LBI		RBI		RBI	
Date Collected	8/17/2001		8/17/2001		8/17/2001	
pH	7.35		6.12		4.26	
SC (µS/cm)	478		1085		912	
Temperature (°C)	20		13		11	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	70	69	180	180	100	100
Mg	14	15	40	40	25	25
Na	5.9	5.7	17	17	14	14
K	2.1	2.5	2.5	2.5	1.9	1.9
SO_4	180	---	550	---	500	---
Alkalinity as $CaCO_3$	48	---	35	---	---	---
F	0.63	---	1.2	---	4.9	---
Cl	2.5	---	14	---	11	---
Br	<0.01	---	0.04	---	0.06	---
SiO_2	9.4	14	13	13	30	31
Al	0.098	1.1	0.36	0.37	33	34
Fe(T)	0.062	3.4	1.1	1.2	3.0	3.1
Fe(II)	---	---	0.85	---	2.1	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.006	0.005	0.005	0.028	0.028
Sr	0.48	0.48	1.0	1.0	0.50	0.51
Ba	0.052	0.074	0.022	0.023	0.019	0.019
Mn	0.031	0.15	0.14	0.15	6.4	6.4
Zn	0.005	0.032	0.21	0.22	1.4	1.4
Pb	0.0004	0.0092	0.0012	0.0004	0.0012	0.0013
Ni	0.003	0.005	0.030	0.033	0.14	0.15
Cu	0.0031	0.018	0.0035	0.0067	0.36	0.36
Cd	<0.0005	<0.0005	0.0038	0.0046	0.0066	0.0066
Cr	<0.0005	0.0049	0.0007	0.0009	0.0022	0.0022
Co	0.0016	0.0033	0.0018	0.0022	0.086	0.087
Be	<0.001	<0.001	<0.001	<0.001	0.006	0.006
Mo	0.030	0.038	<0.007	<0.007	<0.007	<0.007
V	<0.002	0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	4.35	---	10.5	---	8.71	---
Sum anions (meq/L)	4.18	---	9.91	---	7.86	---
C.I. (percent)	4.0	---	5.9	---	10	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-17595		RRL-17670		RRL-17749	
Description	RBI		RBI		LBI	
Date Collected	8/17/2001		8/17/2001		8/17/2001	
pH	3.58		3.66		8.06	
SC (μS/cm)	1770		1960		187	
Temperature (°C)	14		13		7.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	180	190	200	210	30	30
Mg	49	49	57	58	2.8	2.8
Na	35	35	32	33	3.9	3.7
K	3.4	3.5	4.5	4.6	0.93	0.99
SO_4	1200	---	1300	---	19	---
Alkalinity as $CaCO_3$	---	---	---	---	66	---
F	11	---	12	---	1.2	---
Cl	33	---	32	---	0.7	---
Br	---	---	---	---	---	---
SiO_2	51	51	59	60	11	12
Al	90	90	100	100	0.072	0.32
Fe(T)	14	14	30	33	0.026	0.19
Fe(II)	9.6	---	22	---	---	---
B	0.021	0.019	<0.010	<0.010	<0.010	<0.010
Li	0.074	0.074	0.095	0.095	0.002	0.002
Sr	0.69	0.69	0.77	0.77	0.13	0.14
Ba	0.006	0.009	0.006	0.007	0.016	0.019
Mn	13	13	16	17	<0.002	0.015
Zn	3.5	3.4	4.0	4.0	0.017	0.008
Pb	0.0012	0.0015	0.0007	0.0010	<0.0003	0.0017
Ni	0.34	0.35	0.40	0.40	<0.003	<0.003
Cu	1.1	1.0	1.1	1.1	0.0010	0.0031
Cd	0.016	0.017	0.019	0.018	<0.0005	<0.0005
Cr	0.0090	0.0091	0.016	0.016	<0.0005	0.0005
Co	0.16	0.16	0.19	0.19	0.0016	<0.0008
Be	0.016	0.015	0.018	0.018	<0.001	<0.001
Mo	0.009	0.011	0.011	0.012	0.011	0.012
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	16.9	---	19.1	---	1.88	---
Sum anions (meq/L)	17.2	---	18.2	---	1.75	---
C.I. (percent)	-1.6	---	5.1	---	7.3	---

* Based on FU anions

Table 10. Water analyses for the low-flow tracer study - Continued

Sample Identification	RRL-18160		RRL-19040	
Description	LBI		RBI	
Date Collected	8/17/2001		8/17/2001	
pH	4.33		4.15	
SC (μS/cm)	434		869	
Temperature (°C)	9.5		13	
Treatment	FA / FU	RA	FA / FU	RA
Constituent, mg/L				
Ca	41	41	76	78
Mg	11	11	31	33
Na	7.1	6.9	15	15
K	1.1	1.2	2.2	2.1
SO_4	210	---	480	---
Alkalinity as $CaCO_3$	---	---	---	---
F	1.9	---	4.7	---
Cl	4.1	---	9.0	---
Br	0.02	---	0.04	---
SiO_2	21	21	21	22
Al	11	12	28	29
Fe(T)	0.11	0.26	0.60	0.62
Fe(II)	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010
Li	0.030	0.029	0.040	0.039
Sr	0.25	0.25	0.42	0.43
Ba	0.015	0.018	0.013	0.013
Mn	2.2	2.3	11	12
Zn	0.88	0.85	2.8	2.8
Pb	0.0011	0.0011	0.0026	0.0012
Ni	0.065	0.068	0.21	0.22
Cu	0.17	0.17	0.18	0.18
Cd	0.0032	0.0034	0.010	0.011
Cr	<0.0005	0.0006	0.0008	0.0010
Co	0.021	0.022	0.084	0.086
Be	0.008	0.008	0.009	0.009
Mo	<0.007	<0.007	0.009	0.007
V	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.79	---	7.97	---
Sum anions (meq/L)	3.70	---	7.69	---
C.I. (percent)	2.6	---	3.6	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study

[A or B, duplicate analyses; C.I., charge imbalance from equation 1; FA, filtered-acidified; FU-filtered-unacidified; mg/L, milligrams per liter; meq/L, milliequivalents per liter; SC, specific conductance; RA, raw-acidified; UFA, ultrafiltered-acidified; µS/cm, microsiemens per centimeter; ---, no data; °C, degrees Celsius]

Sample Identification	RRH-0			RRH-700		
Description	stream			stream		
Date Collected	4/1/02			4/1/02		
pH	8.35			7.94		
SC (µS/cm)	207			224		
Temperature (°C)	6.0			6.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	32	31	31	32	32	32
Mg	5.0	4.9	4.9	5.8	5.7	5.7
Na	3.4	3.8	3.3	3.8	4.2	3.7
K	0.63	0.62	0.63	0.71	0.65	0.65
SO_4	---	14	---	---	26	---
Alkalinity as $CaCO_3$	---	86	---	---	84	---
F	---	<0.05	---	---	0.12	---
Cl	---	3.0	---	---	3.2	---
Br	---	<0.01	---	---	<0.01	---
SiO_2	7.7	7.5	7.4	9.0	9.0	8.8
Al	0.052	0.050	0.12	0.12	0.11	0.22
Fe(T)	<0.010	<0.010	0.034	<0.010	<0.010	0.039
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.002	0.001	0.001	0.004	0.002	0.002
Sr	0.21	0.21	0.20	0.22	0.22	0.22
Ba	0.048	0.048	0.048	0.046	0.045	0.045
Mn	<0.002	<0.002	0.003	0.037	0.039	0.040
Zn	0.005	<0.005	<0.005	0.021	0.021	0.019
Pb	0.0005	<0.0003	<0.0003	<0.0003	<0.0003	0.0004
Ni	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Cu	0.0006	<0.0005	<0.0005	0.0032	0.0049	0.0067
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
Co	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.12	2.08	---	2.20	2.21	---
Sum anions (meq/L)	2.06	2.06	---	2.25	2.25	---
C.I. (percent)	3.1*	1.1	---	-2.1*	-1.7	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRH-1200			RRH-3052		
Description	stream			stream		
Date Collected	4/1/02			4/1/02		
pH	7.72			7.70		
SC (µS/cm)	241			271		
Temperature (°C)	5.5			4.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	33	33	33	36	36	36
Mg	7.0	7.0	6.8	8.4	8.0	8.2
Na	4.5	4.3	4.3	5.0	4.9	4.9
K	0.75	0.76	0.76	0.90	0.86	0.83
SO_4	---	41	---	---	62	---
Alkalinity as $CaCO_3$	---	73	---	---	68	---
F	---	0.16	---	---	0.29	---
Cl	---	3.3	---	---	3.3	---
Br	---	<0.01	---	---	<0.01	---
SiO_2	10	10	11	12	12	12
Al	0.14	0.21	0.42	0.10	0.12	0.46
Fe(T)	<0.010	0.024	0.11	<0.010	0.031	0.36
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.003	0.003	0.006	0.004	0.004
Sr	0.22	0.22	0.22	0.23	0.22	0.23
Ba	0.044	0.048	0.044	0.043	0.041	0.043
Mn	0.12	0.12	0.12	0.17	0.16	0.17
Zn	0.046	0.045	0.042	0.050	0.049	0.055
Pb	<0.0003	<0.0003	<0.0003	0.0004	<0.0003	0.0004
Ni	0.006	0.007	0.006	0.008	0.008	0.008
Cu	0.0043	0.0075	0.014	0.0029	0.0059	0.015
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0010
Co	0.0044	0.0013	0.0017	0.0017	0.0014	0.0018
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.36	2.35	---	2.60	2.57	---
Sum anions (meq/L)	2.31	2.31	---	2.62	2.62	---
C.I. (percent)	1.9*	1.5	---	-0.5*	-2.1	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRH-3300			RRH-3380		
Description	stream			stream		
Date Collected	4/1/02			4/1/02		
pH	7.91			8.02		
SC (µS/cm)	273			276		
Temperature (°C)	13			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	35	36	35	37	36	36
Mg	8.3	8.2	8.3	8.2	8.0	8.2
Na	5.0	4.9	5.1	5.3	5.4	5.4
K	0.94	1.0	1.0	1.0	0.92	1.0
SO$_4$	---	65	---	---	65	---
Alkalinity as CaCO$_3$	---	71	---	---	67	---
F	---	0.31	---	---	0.31	---
Cl	---	3.2	---	---	3.2	---
Br	---	<0.01	---	---	1.9	---
SiO$_2$	12	12	12	12	12	12
Al	0.15	0.18	0.48	0.13	0.15	0.42
Fe(T)	<0.010	0.061	0.33	<0.010	0.039	0.32
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.004	0.005	0.005	0.004	0.005
Sr	0.24	0.23	0.24	0.23	0.24	0.24
Ba	0.043	0.042	0.045	0.042	0.042	0.044
Mn	0.16	0.16	0.17	0.15	0.15	0.16
Zn	0.027	0.032	0.041	0.028	0.030	0.040
Pb	0.0004	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Ni	0.007	0.008	0.007	0.007	0.007	0.008
Cu	0.0069	0.0054	0.013	0.0030	0.0044	0.015
Cd	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005
Cr	0.0010	<0.0005	0.0008	<0.0005	<0.0005	<0.0005
Co	0.0012	0.0015	0.0015	0.0020	0.0011	0.0016
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.52	2.56	---	2.63	2.56	---
Sum anions (meq/L)	2.71	2.71	---	2.66	2.66	---
C.I. (percent)	-7.2*	-5.7	---	-1.2*	-3.7	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRH-3638			RRH-3900		
Description	stream			stream		
Date Collected	4/1/02			4/1/02		
pH	8.14			8.18		
SC (μS/cm)	274			273		
Temperature (°C)	12			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	36	36	37	36	36	36
Mg	8.3	8.3	8.3	8.3	8.3	8.4
Na	5.4	6.1	5.5	5.5	5.5	5.5
K	1.0	1.0	0.92	0.93	0.90	0.92
SO_4	---	64	---	---	64	---
Alkalinity as $CaCO_3$	---	69	---	---	67	---
F	---	0.28	---	---	0.24	---
Cl	---	3.2	---	---	3.3	---
Br	---	1.9	---	---	2.0	---
SiO_2	12	13	12	12	12	12
Al	0.14	0.16	0.43	0.16	0.15	0.43
Fe(T)	<0.010	0.061	0.33	<0.010	0.063	0.37
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.005	0.005	0.006	0.005	0.005
Sr	0.23	0.23	0.24	0.23	0.23	0.23
Ba	0.042	0.043	0.045	0.042	0.042	0.044
Mn	0.15	0.15	0.16	0.15	0.15	0.16
Zn	0.033	0.025	0.039	0.021	0.024	0.041
Pb	0.0004	<0.0003	0.0005	<0.0003	<0.0003	<0.0003
Ni	0.007	0.007	0.008	0.007	0.006	0.007
Cu	0.010	0.0051	0.015	0.0025	0.0048	0.014
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	0.0008
Co	0.0012	0.0013	0.0025	0.0011	0.0022	0.0021
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.59	2.62	---	2.59	2.59	---
Sum anions (meq/L)	2.68	2.68	---	2.63	2.63	---
C.I. (percent)	-3.4*	-2.2	---	-1.6*	-1.7	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRH-4200			RRH-4500		
Description	stream			stream		
Date Collected	4/1/02			4/1/02		
pH	8.19			8.21		
SC (µS/cm)	272			271		
Temperature (°C)	11			11		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	35	35	36	36	35	36
Mg	8.1	8.2	8.0	7.9	7.9	8.3
Na	5.5	5.8	5.4	5.3	5.8	5.6
K	0.93	0.91	0.91	0.87	0.85	0.90
SO_4	---	63	---	---	63	---
Alkalinity as $CaCO_3$	---	66	---	---	68	---
F	---	0.24	---	---	0.28	---
Cl	---	3.2	---	---	3.2	---
Br	---	2.0	---	---	1.9	---
SiO_2	12	12	13	12	12	12
Al	0.15	0.15	0.45	0.15	0.14	0.50
Fe(T)	<0.010	0.059	0.36	<0.010	0.052	0.41
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.006	0.004	0.005	0.005	0.004	0.005
Sr	0.23	0.23	0.23	0.23	0.22	0.23
Ba	0.042	0.043	0.044	0.041	0.041	0.043
Mn	0.14	0.14	0.15	0.14	0.14	0.15
Zn	0.023	0.026	0.039	0.022	0.023	0.041
Pb	<0.0003	<0.0003	0.0004	<0.0003	0.0004	<0.0003
Ni	0.006	0.006	0.007	0.006	0.007	0.007
Cu	0.0032	0.0050	0.013	0.0021	0.0038	0.014
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	0.0012
Co	0.0012	0.0014	0.0038	0.0012	0.0009	0.0033
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.53	2.55	---	2.55	2.53	---
Sum anions (meq/L)	2.61	2.61	---	2.64	2.64	---
C.I. (percent)	-3.0*	-2.2	---	-3.5*	-4.6	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRH-4800			RRH-4900		
Description	stream			stream		
Date Collected	4/1/02			4/1/02		
pH	8.23			8.19		
SC (μS/cm)	270			270		
Temperature (°C)	10			10		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	36	35	35	36	35	36
Mg	8.2	8.4	8.3	8.4	8.4	8.0
Na	5.2	5.5	5.5	5.4	5.8	5.3
K	0.88	0.87	0.94	0.93	0.89	0.93
SO_4	---	62	---	---	63	---
Alkalinity as $CaCO_3$	---	68	---	---	66	---
F	---	0.26	---	---	0.33	---
Cl	---	3.2	---	---	3.3	---
Br	---	1.9	---	---	2.0	---
SiO_2	12	12	13	12	12	12
Al	0.12	0.14	0.51	0.12	0.19	0.51
Fe(T)	<0.010	0.054	0.51	<0.010	0.057	0.49
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.006	0.004	0.004	0.006	0.004	0.004
Sr	0.23	0.22	0.22	0.23	0.23	0.23
Ba	0.042	0.041	0.050	0.043	0.042	0.047
Mn	0.14	0.14	0.16	0.14	0.14	0.15
Zn	0.023	0.021	0.041	0.025	0.020	0.042
Pb	<0.0003	<0.0003	0.0018	<0.0003	<0.0003	0.0014
Ni	0.007	0.006	0.008	0.006	0.006	0.007
Cu	0.0044	0.0042	0.015	0.0030	0.0041	0.015
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0014	<0.0005	<0.0005	0.0012
Co	0.0014	0.0014	0.0015	0.0015	0.0010	0.0013
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.57	2.55	---	2.60	2.57	---
Sum anions (meq/L)	2.62	2.62	---	2.59	2.59	---
C.I. (percent)	-1.9*	-2.7	---	0.4*	-0.9	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRH-5200A			RRH-5200B		
Description	stream			stream		
Date Collected	4/1/02			4/1/02		
pH	8.24			8.21		
SC (µS/cm)	280			281		
Temperature (°C)	9.0			9.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	36	36	36	36	37	37
Mg	8.6	8.4	8.7	8.6	8.4	8.6
Na	6.1	5.6	5.9	6.0	5.9	5.8
K	1.0	1.0	1.1	1.1	1.0	1.0
SO_4	---	68	---	---	68	---
Alkalinity as $CaCO_3$	---	66	---	---	69	---
F	---	0.24	---	---	0.20	---
Cl	---	3.8	---	---	3.7	---
Br	---	1.9	---	---	1.9	---
SiO_2	13	12	13	13	12	13
Al	0.12	0.14	0.52	0.12	0.14	0.47
Fe(T)	<0.010	0.056	0.55	<0.010	0.048	0.44
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.006	0.004	0.005	0.005	0.005	0.005
Sr	0.23	0.23	0.23	0.23	0.23	0.23
Ba	0.040	0.040	0.045	0.041	0.039	0.044
Mn	0.13	0.14	0.15	0.14	0.13	0.15
Zn	0.018	0.022	0.042	0.014	0.022	0.041
Pb	0.0007	<0.0003	<0.0003	0.0008	0.0004	0.0011
Ni	0.006	0.006	0.007	0.006	0.005	0.007
Cu	0.0032	0.0046	0.015	0.0023	0.0051	0.014
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	<0.0005
Co	0.0014	0.0023	0.0018	0.0011	0.0011	0.0020
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.64	2.60	---	2.64	2.66	---
Sum anions (meq/L)	2.70	2.70	---	2.75	2.75	---
C.I. (percent)	-2.3*	-3.8	---	-4.3*	-3.3	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRH-5300		RRF-5735		
Description	stream		stream		
Date Collected	4/1/02		3/31/02		
pH	8.20		8.54		
SC (µS/cm)	280		277		
Temperature (°C)	8.5		11		
Treatment	UFA	RA	UFA	FA / FU	RA
Constituent, mg/L					
Ca	36	37	36	36	35
Mg	8.7	8.6	8.8	8.6	8.8
Na	6.5	6.2	5.5	5.5	5.4
K	1.0	1.1	1.1	1.1	1.0
SO$_4$	68	---	---	68	---
Alkalinity as CaCO$_3$	66	---	---	62	---
F	0.28	---	---	0.29	---
Cl	3.7	---	---	3.8	---
Br	1.8	---	---	<0.01	---
SiO$_2$	12	13	13	13	13
Al	0.10	0.55	0.11	0.15	0.45
Fe(T)	<0.010	0.57	<0.010	0.051	0.38
Fe(II)	---	---	---	---	---
B	<0.010	<0.010	0.011	<0.010	<0.010
Li	0.005	0.004	0.007	0.005	0.005
Sr	0.22	0.23	0.23	0.23	0.23
Ba	0.038	0.047	0.040	0.039	0.041
Mn	0.13	0.16	0.12	0.12	0.13
Zn	0.013	0.044	0.006	0.012	0.034
Pb	<0.0003	0.0016	<0.0003	<0.0003	0.0003
Ni	0.006	0.008	0.004	0.005	0.006
Cu	0.0021	0.015	0.0024	0.0042	0.021
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	0.0015	<0.0005	0.0005	0.0006
Co	0.0013	0.0014	0.0010	0.0012	0.0010
Be	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.67	---	2.61	2.60	---
Sum anions (meq/L)	2.72	---	2.60	2.60	---
C.I. (percent)	-1.9	---	0.4*	-0.2	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-6000			RRF-6175		
Description	stream			stream		
Date Collected	3/31/02			3/31/02		
pH	8.63			8.70		
SC (µS/cm)	281			279		
Temperature (°C)	11			11		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	35	37	36	36	37	36
Mg	8.6	8.7	8.9	8.8	8.7	8.5
Na	6.4	6.4	6.5	6.1	6.6	6.3
K	1.1	1.0	1.0	1.0	1.1	1.1
SO_4	---	68	---	---	68	---
Alkalinity as $CaCO_3$	---	65	---	---	65	---
F	---	0.29	---	---	0.31	---
Cl	---	3.8	---	---	3.7	---
Br	---	3.4	---	---	3.4	---
SiO_2	13	12	13	13	13	13
Al	0.11	0.19	0.44	0.22	0.20	0.39
Fe(T)	<0.010	0.056	0.37	0.10	0.058	0.32
Fe(II)	---	---	---	---	---	---
B	0.012	<0.010	<0.010	<0.010	0.012	<0.010
Li	0.005	0.005	0.005	0.005	0.005	0.005
Sr	0.23	0.23	0.23	0.22	0.23	0.23
Ba	0.040	0.039	0.042	0.038	0.039	0.040
Mn	0.12	0.12	0.13	0.12	0.11	0.13
Zn	0.005	0.010	0.034	0.014	0.010	0.032
Pb	<0.0003	<0.0003	0.0006	<0.0003	<0.0003	0.0009
Ni	0.005	0.005	0.006	0.005	0.004	0.006
Cu	0.0021	0.0046	0.010	0.0090	0.0044	0.013
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0006	0.0005	<0.0005	0.0005
Co	<0.0008	0.0015	<0.0008	0.0010	0.0010	0.0013
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.58	2.68	---	2.62	2.69	---
Sum anions (meq/L)	2.69	2.68	---	2.69	2.69	---
C.I. (percent)	4.0*	0.0	---	-2.5*	0.0	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-6300			RRF-6600A		
Description	stream			stream		
Date Collected	3/31/02			3/31/02		
pH	8.31			8.34		
SC (µS/cm)	283			283		
Temperature (°C)	9.0			9.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	36	37	36	37	38	37
Mg	8.7	8.6	8.7	8.8	8.8	8.3
Na	6.5	6.4	6.2	6.5	6.4	6.3
K	1.1	1.0	1.0	1.1	1.0	1.0
SO_4	---	69	---	---	70	---
Alkalinity as $CaCO_3$	---	63	---	---	64	---
F	---	0.18	---	---	0.29	---
Cl	---	3.7	---	---	3.8	---
Br	---	3.0	---	---	2.9	---
SiO_2	12	12	12	12	12	12
Al	0.13	0.14	0.34	0.089	0.16	0.36
Fe(T)	<0.010	0.039	0.24	<0.010	0.046	0.28
Fe(II)	---	---	---	---	---	---
B	0.011	<0.010	<0.010	0.010	0.010	<0.010
Li	0.005	0.005	0.004	0.006	0.004	0.004
Sr	0.23	0.23	0.23	0.24	0.24	0.23
Ba	0.038	0.037	0.038	0.037	0.036	0.038
Mn	0.10	0.099	0.10	0.087	0.087	0.10
Zn	0.012	0.013	0.026	0.007	0.011	0.028
Pb	<0.0003	<0.0003	0.0005	0.0003	<0.0003	0.0030
Ni	0.004	0.005	0.006	0.004	0.003	0.006
Cu	0.0027	0.0041	0.015	0.0025	0.0039	0.014
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	<0.0008	0.0014	0.0010	<0.0008	0.0012	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.66	2.69	---	2.71	2.75	---
Sum anions (meq/L)	2.67	2.67	---	2.73	2.73	---
C.I. (percent)	-0.5*	0.8	---	-0.6*	1.0	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-6600B			RRF-6819		
Description	stream			stream		
Date Collected	3/31/02			3/31/02		
pH	8.40			8.50		
SC (µS/cm)	284			283		
Temperature (°C)	9.0			8.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	37	37	36	37	37
Mg	8.9	8.7	8.6	8.7	8.6	8.8
Na	6.4	6.3	6.5	6.0	6.3	5.9
K	1.0	1.0	1.0	1.0	1.0	1.0
SO_4	---	70	---	---	71	---
Alkalinity as $CaCO_3$	---	62	---	---	61	---
F	---	0.31	---	---	0.26	---
Cl	---	3.8	---	---	3.8	---
Br	---	2.9	---	---	2.9	---
SiO_2	12	12	12	12	12	13
Al	0.092	0.13	0.35	0.085	0.16	0.33
Fe(T)	<0.010	0.048	0.26	<0.010	0.048	0.26
Fe(II)	---	---	---	---	---	---
B	0.011	<0.010	<0.010	0.011	<0.010	<0.010
Li	0.005	0.004	0.004	0.006	0.004	0.004
Sr	0.23	0.23	0.23	0.23	0.23	0.23
Ba	0.037	0.036	0.038	0.036	0.037	0.038
Mn	0.087	0.087	0.094	0.083	0.089	0.097
Zn	0.008	0.012	0.026	0.007	0.010	0.025
Pb	<0.0003	<0.0003	0.0003	0.0004	<0.0003	<0.0003
Ni	0.005	0.004	0.005	0.004	0.005	0.005
Cu	0.0022	0.0035	0.015	0.0016	0.0037	0.0073
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	0.0011	<0.0008	0.0014	0.0011	<0.0008	0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.71	2.69	---	2.63	2.68	---
Sum anions (meq/L)	2.69	2.70	---	2.68	2.67	---
C.I. (percent)	0.6*	-0.1	---	-1.8*	0.2	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-6940			RRF-6948	
Description	stream			stream	
Date Collected	3/31/02			3/31/02	
pH	8.52			9.05	
SC (μS/cm)	284			278	
Temperature (°C)	8.5			9.0	
Treatment	UFA	FA / FU	RA	FA / FU	RA
Constituent, mg/L					
Ca	37	38	37	37	36
Mg	9.1	8.7	8.6	8.4	8.3
Na	6.4	6.5	6.3	6.3	6.4
K	1.0	1.1	1.1	1.0	1.1
SO_4	---	71	---	71	---
Alkalinity as $CaCO_3$	---	64	---	60	---
F	---	0.16	---	0.26	---
Cl	---	3.8	---	3.8	---
Br	---	2.9	---	2.9	---
SiO_2	12	12	12	11	12
Al	0.092	0.14	0.33	0.18	0.42
Fe(T)	<0.010	0.034	0.27	0.043	0.34
Fe(II)	---	---	---	---	---
B	0.012	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004
Sr	0.23	0.24	0.24	0.23	0.23
Ba	0.035	0.036	0.038	0.033	0.037
Mn	0.084	0.084	0.093	0.058	0.076
Zn	0.009	0.011	0.023	0.005	0.022
Pb	<0.0003	<0.0003	0.0012	<0.0003	0.0005
Ni	0.004	0.004	0.005	<0.003	0.005
Cu	0.0020	0.0033	0.0088	0.0048	0.014
Cd	<0.0005	<0.0005	0.0008	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0005	<0.0005	0.0007
Co	<0.0008	<0.0008	0.0009	<0.0008	0.0009
Be	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.72	2.74	---	2.62	---
Sum anions (meq/L)	2.73	2.72	---	2.61	---
C.I. (percent)	-0.2*	0.7	---	0.4	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-7100A			RRF-7100B		
Description	stream			stream		
Date Collected	3/31/02			3/31/02		
pH	8.37			8.43		
SC (µS/cm)	286			286		
Temperature (°C)	8.0			8.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	38	38	37	38	37
Mg	8.8	8.9	8.5	8.6	8.6	8.9
Na	6.4	6.1	6.2	6.2	6.5	6.2
K	1.1	1.0	1.1	1.0	1.0	1.0
SO$_4$	---	72	---	---	72	---
Alkalinity as CaCO$_3$	---	63	---	---	62	---
F	---	0.36	---	---	0.28	---
Cl	---	3.9	---	---	3.9	---
Br	---	2.8	---	---	2.9	---
SiO$_2$	12	12	12	12	12	12
Al	0.086	0.14	0.30	0.11	0.14	0.29
Fe(T)	<0.010	0.041	0.23	<0.010	0.036	0.23
Fe(II)	---	---	---	---	---	---
B	0.014	<0.010	0.012	0.010	<0.010	<0.010
Li	0.005	0.004	0.004	0.005	0.004	0.004
Sr	0.24	0.23	0.24	0.24	0.23	0.24
Ba	0.036	0.034	0.037	0.035	0.035	0.037
Mn	0.082	0.081	0.092	0.093	0.083	0.088
Zn	0.007	0.010	0.022	0.016	0.009	0.022
Pb	<0.0003	<0.0003	<0.0003	<0.0003	0.0009	0.0006
Ni	0.004	0.004	0.006	0.004	0.004	0.005
Cu	0.0017	0.0028	0.0073	0.0077	0.0031	0.0074
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005
Co	<0.0008	0.0010	0.0014	0.0010	0.0010	0.0009
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	0.0003	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.71	2.75	---	2.68	2.74	---
Sum anions (meq/L)	2.74	2.74	---	2.71	2.71	---
C.I. (percent)	-1.2*	0.4	---	-1.1*	1.1	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-7200			RRF-7295		
Description	stream			stream		
Date Collected	3/31/02			3/31/02		
pH	8.26			7.78		
SC (µS/cm)	287			296		
Temperature (°C)	8.0			7.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	38	37	38	39	39
Mg	8.6	8.7	8.4	9.1	9.0	9.2
Na	6.0	6.1	6.4	6.4	6.5	6.4
K	1.0	1.0	1.1	1.0	1.0	1.0
SO_4	---	72	---	---	79	---
Alkalinity as $CaCO_3$	---	63	---	---	60	---
F	---	0.22	---	---	0.37	---
Cl	---	3.8	---	---	3.9	---
Br	---	2.8	---	---	2.7	---
SiO_2	13	12	13	12	13	13
Al	0.20	0.17	0.30	0.16	0.27	0.51
Fe(T)	0.11	0.032	0.27	<0.010	0.020	0.22
Fe(II)	---	---	---	---	---	---
B	0.011	0.011	0.012	0.010	0.010	<0.010
Li	0.004	0.004	0.004	0.005	0.004	0.005
Sr	0.23	0.23	0.24	0.24	0.24	0.24
Ba	0.035	0.035	0.037	0.035	0.035	0.036
Mn	0.087	0.079	0.089	0.12	0.12	0.13
Zn	0.016	0.010	0.023	0.024	0.022	0.031
Pb	<0.0003	0.0015	0.0015	<0.0003	<0.0003	0.0005
Ni	0.004	0.005	0.005	0.007	0.006	0.008
Cu	0.0064	0.0038	0.013	0.0021	0.0033	0.0084
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
Co	<0.0008	<0.0008	<0.0008	0.0020	0.0015	0.0017
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.68	2.73	---	2.78	2.82	---
Sum anions (meq/L)	2.75	2.74	---	2.83	2.82	---
C.I. (percent)	-2.7*	-0.4	---	-1.7*	0.0	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-7377			RRF-7500A		
Description	stream			stream		
Date Collected	3/31/02			3/31/02		
pH	7.55			7.49		
SC (µS/cm)	307			313		
Temperature (°C)	6.5			6.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	38	40	41	40	41	40
Mg	9.3	9.6	9.8	9.9	10	10
Na	6.3	6.6	6.6	6.6	6.5	6.6
K	1.0	1.0	1.0	1.0	1.0	1.0
SO_4	---	88	---	---	94	---
Alkalinity as $CaCO_3$	---	58	---	---	54	---
F	---	0.34	---	---	0.37	---
Cl	---	3.9	---	---	3.8	---
Br	---	2.7	---	---	2.6	---
SiO_2	13	13	13	13	13	13
Al	0.14	0.18	0.82	0.27	0.14	0.96
Fe(T)	<0.010	<0.010	0.24	0.046	<0.010	0.26
Fe(II)	---	---	---	---	---	---
B	0.011	<0.010	<0.010	0.013	<0.010	<0.010
Li	0.005	0.005	0.005	0.007	0.005	0.005
Sr	0.23	0.25	0.25	0.25	0.25	0.25
Ba	0.033	0.034	0.035	0.035	0.034	0.035
Mn	0.16	0.17	0.18	0.20	0.21	0.21
Zn	0.034	0.033	0.047	0.045	0.042	0.057
Pb	<0.0003	0.0004	0.0004	<0.0003	<0.0003	0.0006
Ni	0.010	0.009	0.010	0.011	0.011	0.012
Cu	0.0023	0.0023	0.0091	0.0040	0.0025	0.0099
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	0.0026	0.0019	0.0026	0.0031	0.0028	0.0036
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.78	2.91	---	2.93	2.98	---
Sum anions (meq/L)	2.96	2.95	---	2.97	2.97	---
C.I. (percent)	-6.2*	-1.4	---	-1.4*	0.4	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-7500B			RRF-7700		
Description	stream			stream		
Date Collected	3/31/02			3/31/02		
pH	7.50			7.63		
SC (µS/cm)	313			318		
Temperature (°C)	6.0			6.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	39	41	41	43	42	41
Mg	9.7	10	10	10	10	10
Na	6.4	6.6	6.4	6.5	6.1	6.5
K	1.0	1.0	1.0	1.1	1.0	1.0
SO_4	---	93	---	---	97	---
Alkalinity as $CaCO_3$	---	53	---	---	55	---
F	---	0.40	---	---	0.49	---
Cl	---	3.9	---	---	3.9	---
Br	---	2.6	---	---	2.6	---
SiO_2	13	13	13	13	13	13
Al	0.12	0.16	0.99	0.13	0.13	0.99
Fe(T)	<0.010	<0.010	0.25	<0.010	<0.010	0.21
Fe(II)	---	---	---	---	---	---
B	0.011	<0.010	0.010	0.010	<0.010	<0.010
Li	0.005	0.005	0.005	0.006	0.005	0.005
Sr	0.24	0.25	0.25	0.25	0.25	0.25
Ba	0.034	0.033	0.036	0.034	0.033	0.034
Mn	0.20	0.20	0.21	0.22	0.21	0.22
Zn	0.036	0.042	0.057	0.055	0.050	0.060
Pb	<0.0003	<0.0003	0.0009	<0.0003	<0.0003	0.0007
Ni	0.010	0.010	0.012	0.013	0.012	0.012
Cu	0.0015	0.0025	0.0099	0.0015	0.0026	0.017
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
Co	0.0029	0.0036	0.0029	0.0031	0.0029	0.0034
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.86	2.98	---	3.07	3.00	---
Sum anions (meq/L)	2.96	2.95	---	3.05	3.05	---
C.I. (percent)	-3.7*	0.9	---	0.6*	-1.7	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-7800			RRF-8400		
Description	stream			stream		
Date Collected	3/31/02			3/31/02		
pH	7.66			7.97		
SC (µS/cm)	318			316		
Temperature (°C)	5.5			5.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	41	41	40	40	40	42
Mg	9.9	10	9.6	9.8	9.7	10
Na	6.1	6.6	6.2	6.0	6.5	6.4
K	1.0	1.0	1.0	0.93	1.0	1.0
SO_4	---	97	---	---	96	---
Alkalinity as $CaCO_3$	---	53	---	---	57	---
F	---	0.52	---	---	0.43	---
Cl	---	3.9	---	---	3.8	---
Br	---	2.6	---	---	2.6	---
SiO_2	13	13	13	13	12	13
Al	0.14	0.19	0.98	0.14	0.16	0.98
Fe(T)	<0.010	<0.010	0.22	0.014	<0.010	0.23
Fe(II)	---	---	---	---	---	---
B	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.007	0.005	0.005	0.005	0.005	0.005
Sr	0.25	0.25	0.25	0.24	0.25	0.25
Ba	0.032	0.033	0.034	0.032	0.033	0.035
Mn	0.21	0.21	0.22	0.21	0.21	0.22
Zn	0.047	0.048	0.064	0.045	0.040	0.059
Pb	<0.0003	<0.0003	0.0005	<0.0003	<0.0003	<0.0003
Ni	0.011	0.010	0.012	0.018	0.012	0.012
Cu	0.0024	0.0026	0.0077	0.0030	0.0030	0.011
Cd	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Co	0.0030	0.0033	0.0027	0.0033	0.0034	0.0033
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.95	2.98	---	2.88	2.90	---
Sum anions (meq/L)	3.03	3.02	---	3.09	3.09	---
C.I. (percent)	-2.6*	-1.6	---	-6.9*	-6.4	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-10644			RRC-13300		
Description	stream			stream		
Date Collected	3/31/02			3/30/02		
pH	8.10			8.27		
SC (µS/cm)	313			281		
Temperature (°C)	4.5			9.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	42	40	41	38	37	38
Mg	10	9.8	10	8.4	8.4	8.4
Na	6.4	6.9	6.6	4.9	5.0	4.8
K	1.0	1.0	1.0	0.89	0.93	1.0
SO_4	---	95	---	---	77	---
Alkalinity as $CaCO_3$	---	56	---	---	55	---
F	---	0.40	---	---	0.27	---
Cl	---	3.9	---	---	2.9	---
Br	---	2.7	---	---	0.02	---
SiO_2	12	13	13	11	11	12
Al	0.45	0.18	0.89	0.14	0.18	0.68
Fe(T)	0.10	<0.010	0.24	<0.010	<0.010	0.14
Fe(II)	---	---	---	---	---	---
B	0.010	<0.010	0.011	<0.010	<0.010	<0.010
Li	0.005	0.005	0.005	0.004	0.004	0.004
Sr	0.24	0.26	0.25	0.22	0.23	0.23
Ba	0.033	0.033	0.035	0.033	0.035	0.037
Mn	0.19	0.20	0.21	0.12	0.12	0.13
Zn	0.040	0.025	0.055	0.010	0.010	0.032
Pb	<0.0003	<0.0003	0.0006	<0.0003	<0.0003	0.0005
Ni	0.012	0.011	0.012	0.006	0.007	0.007
Cu	0.0047	0.0022	0.0084	0.0015	0.0015	0.0088
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
Co	0.0026	0.0027	0.0030	0.0018	0.0013	0.0033
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.01	2.93	---	2.65	2.60	---
Sum anions (meq/L)	3.04	3.04	---	2.62	2.62	---
C.I. (percent)	-0.8*	-4.0	---	1.0*	-0.7	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-13465			RRC-13595		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	8.25			8.25		
SC (µS/cm)	289			289		
Temperature (°C)	8.5			8.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	39	38	37	39	38
Mg	8.3	8.3	8.9	8.2	8.8	8.5
Na	6.5	6.5	6.6	6.4	6.1	6.4
K	1.0	1.0	1.0	0.92	1.0	1.0
SO_4	---	78	---	---	78	---
Alkalinity as $CaCO_3$	---	59	---	---	58	---
F	---	0.38	---	---	0.31	---
Cl	---	2.9	---	---	2.9	---
Br	---	5.1	---	---	5.0	---
SiO_2	11	11	12	11	11	12
Al	0.14	0.14	0.70	0.17	0.15	0.67
Fe(T)	<0.010	<0.010	0.16	<0.010	<0.010	0.17
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.004
Sr	0.23	0.23	0.24	0.22	0.22	0.23
Ba	0.033	0.034	0.037	0.033	0.033	0.036
Mn	0.12	0.13	0.14	0.12	0.13	0.14
Zn	0.009	0.015	0.032	0.010	0.011	0.034
Pb	0.0004	<0.0003	<0.0003	0.0007	<0.0003	<0.0003
Ni	0.006	0.006	0.007	0.007	0.007	0.007
Cu	0.0016	0.0042	0.0084	0.0014	0.0014	0.0085
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	0.0005
Co	0.0011	0.0025	0.0043	0.0013	0.0017	0.0035
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.66	2.76	---	2.65	2.78	---
Sum anions (meq/L)	2.77	2.77	---	2.76	2.76	---
C.I. (percent)	-4.0*	-0.3	---	-4.2*	0.9	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-13700			RRC-13900		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	8.25			8.11		
SC (µS/cm)	290			289		
Temperature (°C)	8.0			7.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	38	37	38	38	37
Mg	8.2	8.3	8.4	8.4	8.6	8.3
Na	6.4	6.5	6.7	6.5	6.4	6.5
K	0.90	0.95	1.0	1.0	1.0	1.0
SO_4	---	78	---	---	78	---
Alkalinity as $CaCO_3$	---	57	---	---	58	---
F	---	0.38	---	---	0.38	---
Cl	---	3.0	---	---	3.0	---
Br	---	4.9	---	---	5.0	---
SiO_2	11	11	12	11	11	12
Al	0.13	0.14	0.64	0.15	0.13	0.57
Fe(T)	<0.010	<0.010	0.20	<0.010	<0.010	0.16
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.004	0.004	0.005
Sr	0.22	0.23	0.24	0.23	0.25	0.23
Ba	0.033	0.034	0.037	0.033	0.037	0.035
Mn	0.12	0.13	0.14	0.13	0.14	0.14
Zn	0.011	0.011	0.035	0.013	0.016	0.035
Pb	<0.0003	<0.0003	0.0003	<0.0003	<0.0003	<0.0003
Ni	0.006	0.006	0.008	0.007	0.008	0.009
Cu	0.0013	0.0019	0.0078	0.0018	0.0016	0.0072
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	0.0006	<0.0005	0.0006	<0.0005	<0.0005	0.0006
Co	0.0016	0.0016	0.0012	0.0015	0.0018	0.0037
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.65	2.71	---	2.73	2.74	---
Sum anions (meq/L)	2.75	2.75	---	2.76	2.76	---
C.I. (percent)	-3.8*	-1.4	---	-1.3*	-0.8	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-14142A			RRC-14142B		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	8.22			8.24		
SC (µS/cm)	289			289		
Temperature (°C)	6.5			6.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	38	37	37	37	36
Mg	8.4	8.3	8.5	8.3	8.5	8.1
Na	6.4	6.4	6.3	6.5	6.4	6.4
K	0.92	0.91	0.93	0.92	0.93	1.0
SO_4	---	78	---	---	78	---
Alkalinity as $CaCO_3$	---	57	---	---	56	---
F	---	0.33	---	---	0.25	---
Cl	---	2.9	---	---	2.9	---
Br	---	4.9	---	---	4.9	---
SiO_2	11	11	12	11	11	12
Al	0.12	0.12	0.66	0.12	0.15	0.66
Fe(T)	<0.010	<0.010	0.20	<0.010	<0.010	0.22
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.005	0.005	0.004	0.005
Sr	0.23	0.23	0.24	0.23	0.23	0.23
Ba	0.033	0.034	0.035	0.033	0.034	0.039
Mn	0.13	0.13	0.15	0.13	0.13	0.15
Zn	0.018	0.014	0.034	0.015	0.014	0.036
Pb	0.0013	<0.0003	<0.0003	0.0006	<0.0003	0.0004
Ni	0.007	0.007	0.008	0.006	0.007	0.008
Cu	0.0030	0.0016	0.011	0.0015	0.0039	0.0084
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0006	0.0005	<0.0005	0.0011
Co	0.0016	0.0013	0.0041	0.0017	0.0010	0.0032
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.67	2.71	---	2.67	2.68	---
Sum anions (meq/L)	2.74	2.74	---	2.71	2.71	---
C.I. (percent)	-2.4*	-0.9	---	-1.7*	-1.2	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-14400			RRC-14700		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	8.19			8.20		
SC (μS/cm)	289			288		
Temperature (°C)	6.0			6.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	37	37	37	38	38
Mg	8.2	8.5	8.3	8.2	8.5	8.6
Na	6.4	6.4	6.3	6.5	6.5	6.0
K	1.0	0.92	0.94	0.93	0.93	0.89
SO_4	---	77	---	---	78	---
Alkalinity as $CaCO_3$	---	60	---	---	59	---
F	---	0.38	---	---	0.33	---
Cl	---	3.0	---	---	2.9	---
Br	---	5.0	---	---	5.0	---
SiO_2	11	11	12	11	11	12
Al	0.11	0.20	0.64	0.13	0.13	0.66
Fe(T)	<0.010	<0.010	0.22	<0.010	<0.010	0.24
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.004	0.004	0.005	0.004	0.004
Sr	0.23	0.23	0.23	0.22	0.23	0.23
Ba	0.033	0.034	0.036	0.033	0.033	0.032
Mn	0.13	0.14	0.16	0.13	0.13	0.15
Zn	0.009	0.013	0.037	0.012	0.014	0.037
Pb	0.0004	<0.0003	<0.0003	<0.0003	<0.0003	0.0006
Ni	0.007	0.007	0.008	0.007	0.007	0.009
Cu	0.0012	0.0019	0.011	0.0011	0.0014	0.011
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	0.0006	0.0007	<0.0005	<0.0005	0.0010
Co	0.0015	0.0011	0.0028	0.0017	0.0021	0.0037
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.66	2.68	---	2.66	2.73	---
Sum anions (meq/L)	2.81	2.80	---	2.78	2.78	---
C.I. (percent)	-5.3*	-4.4	---	-4.5*	-1.7	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-14790			RRC-14958		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	8.17			8.08		
SC (µS/cm)	289			291		
Temperature (°C)	6.0			6.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	37	38	37	37	37	39
Mg	8.3	8.7	8.2	8.6	8.3	8.3
Na	6.3	6.6	6.1	6.6	6.5	6.4
K	0.92	0.93	0.89	0.90	0.93	0.94
SO_4	---	77	---	---	77	---
Alkalinity as $CaCO_3$	---	58	---	---	56	---
F	---	0.33	---	---	0.38	---
Cl	---	2.9	---	---	3.0	---
Br	---	5.0	---	---	5.1	---
SiO_2	11	11	12	11	11	12
Al	0.14	0.14	0.59	0.10	0.14	0.63
Fe(T)	<0.010	<0.010	0.14	<0.010	<0.010	0.17
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.004	0.004	0.004	0.007	0.004	0.004
Sr	0.23	0.23	0.23	0.23	0.23	0.23
Ba	0.033	0.033	0.034	0.033	0.034	0.037
Mn	0.13	0.13	0.15	0.13	0.14	0.14
Zn	0.014	0.015	0.032	0.019	0.017	0.037
Pb	<0.0003	<0.0003	0.0005	<0.0003	<0.0003	0.0005
Ni	0.007	0.008	0.008	0.007	0.007	0.008
Cu	0.0014	0.0015	0.0048	0.0042	0.0014	0.0069
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	0.0007	<0.0005	0.0005	<0.0005	<0.0005	0.0010
Co	0.0018	0.0014	0.0027	0.0019	0.0013	0.0039
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.66	2.75	---	2.70	2.67	---
Sum anions (meq/L)	2.75	2.75	---	2.72	2.72	---
C.I. (percent)	-3.4*	0.2	---	-0.6*	-1.6	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-15084			RRC-15221		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	7.87			7.59		
SC (µS/cm)	308			309		
Temperature (°C)	6.5			6.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	39	38	37	39	42	41
Mg	9.3	9.0	8.4	9.0	9.7	9.1
Na	6.6	6.4	6.6	6.5	6.2	6.4
K	0.92	0.90	1.0	0.88	0.97	1.0
SO$_4$	---	87	---	---	88	---
Alkalinity as CaCO$_3$	---	56	---	---	58	---
F	---	0.53	---	---	0.53	---
Cl	---	3.1	---	---	3.0	---
Br	---	5.0	---	---	4.7	---
SiO$_2$	11	11	11	11	12	12
Al	0.12	0.14	0.56	0.11	0.13	0.65
Fe(T)	<0.010	<0.010	0.15	<0.010	<0.010	0.19
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.004	0.005	0.008	0.004	0.004
Sr	0.24	0.23	0.23	0.24	0.25	0.24
Ba	0.033	0.032	0.034	0.033	0.034	0.038
Mn	0.13	0.13	0.13	0.12	0.12	0.13
Zn	0.047	0.045	0.056	0.043	0.042	0.061
Pb	<0.0003	<0.0003	<0.0003	0.0004	<0.0003	<0.0003
Ni	0.011	0.012	0.012	0.009	0.011	0.011
Cu	0.0013	0.0044	0.0068	0.0040	0.0011	0.0070
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	0.0006
Co	0.0020	0.0020	0.0022	0.0019	0.0018	0.0018
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.84	2.76	---	2.81	2.99	---
Sum anions (meq/L)	2.91	2.92	---	2.96	2.95	---
C.I. (percent)	-2.8*	-5.8	---	-5.4*	1.4	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-15373			RRC-15547		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	7.67			7.47		
SC (μS/cm)	317			362		
Temperature (°C)	6.0			6.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	42	41	43	48	49	47
Mg	9.5	9.3	9.4	11	12	11
Na	6.6	6.1	6.7	7.0	6.7	7.0
K	1.0	0.89	1.1	1.0	1.0	1.0
SO$_4$	---	94	---	---	120	---
Alkalinity as CaCO$_3$	---	56	---	---	56	---
F	---	0.55	---	---	0.66	---
Cl	---	3.1	---	---	3.4	---
Br	---	4.2	---	---	3.9	---
SiO$_2$	11	11	12	11	11	12
Al	0.10	0.092	0.58	0.13	0.15	0.74
Fe(T)	<0.010	<0.010	0.17	0.010	<0.010	0.17
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	0.011	<0.010
Li	0.005	0.004	0.004	0.005	0.005	0.005
Sr	0.26	0.25	0.26	0.28	0.28	0.29
Ba	0.035	0.033	0.039	0.033	0.036	0.033
Mn	0.12	0.11	0.13	0.13	0.15	0.15
Zn	0.042	0.042	0.058	0.058	0.057	0.069
Pb	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0005
Ni	0.011	0.011	0.011	0.013	0.015	0.015
Cu	0.0040	0.0044	0.0062	0.0016	0.0018	0.0089
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
Cr	0.0006	<0.0005	0.0005	<0.0005	0.0007	0.0006
Co	0.0017	0.0015	0.0030	0.0024	0.0020	0.0027
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.98	2.90	---	3.35	3.46	---
Sum anions (meq/L)	3.02	3.02	---	3.50	3.49	---
C.I. (percent)	-1.2*	-4.3	---	-4.5*	-1.0	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-15600			RRC-15765		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	7.49			7.60		
SC (µS/cm)	361			367		
Temperature (°C)	6.0			6.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	46	49	48	48	50	52
Mg	10	11	11	11	11	12
Na	6.7	6.8	6.3	6.9	6.8	7.0
K	1.0	1.0	1.0	1.0	1.0	1.0
SO_4	---	120	---	---	120	---
Alkalinity as $CaCO_3$	---	53	---	---	55	---
F	---	0.60	---	---	0.69	---
Cl	---	3.4	---	---	3.5	---
Br	---	3.9	---	---	3.9	---
SiO_2	11	11	12	11	12	12
Al	0.094	0.12	0.71	0.091	0.11	0.81
Fe(T)	<0.010	<0.010	0.20	<0.010	<0.010	0.25
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.005	0.004	0.005	0.004	0.005
Sr	0.27	0.28	0.27	0.27	0.29	0.30
Ba	0.032	0.033	0.034	0.032	0.034	0.035
Mn	0.13	0.13	0.15	0.13	0.14	0.15
Zn	0.054	0.058	0.068	0.058	0.060	0.074
Pb	0.0006	<0.0003	0.0011	<0.0003	<0.0003	0.0005
Ni	0.013	0.014	0.014	0.013	0.013	0.014
Cu	0.0021	0.0030	0.0089	0.0014	0.0023	0.012
Cd	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0006
Cr	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	0.0009
Co	0.0020	0.0037	0.0031	0.0018	0.0022	0.0015
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.17	3.39	---	3.34	3.43	---
Sum anions (meq/L)	3.46	3.44	---	3.48	3.47	---
C.I. (percent)	-8.8*	-1.5	---	-4.0*	-1.1	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-15950			RRC-16100		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	7.71			7.78		
SC (μS/cm)	370			370		
Temperature (°C)	6.0			5.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	49	49	48	49	51	48
Mg	11	12	11	11	12	11
Na	7.1	6.9	6.8	7.1	6.6	6.9
K	1.0	1.0	1.0	1.0	1.1	1.1
SO_4	---	120	---	---	120	---
Alkalinity as $CaCO_3$	---	55	---	---	54	---
F	---	0.66	---	---	0.58	---
Cl	---	3.5	---	---	3.5	---
Br	---	3.8	---	---	3.8	---
SiO_2	11	12	13	11	11	12
Al	0.16	0.14	0.76	0.14	0.15	0.75
Fe(T)	0.013	<0.010	0.19	<0.010	<0.010	0.18
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	0.011
Li	0.005	0.004	0.005	0.006	0.005	0.005
Sr	0.29	0.29	0.29	0.28	0.28	0.29
Ba	0.034	0.034	0.036	0.032	0.033	0.036
Mn	0.14	0.15	0.16	0.14	0.16	0.16
Zn	0.060	0.059	0.070	0.056	0.055	0.076
Pb	0.0004	<0.0003	0.0005	<0.0003	<0.0003	<0.0003
Ni	0.013	0.014	0.015	0.015	0.015	0.014
Cu	0.0065	0.0037	0.0093	0.0025	0.0020	0.013
Cd	<0.0005	<0.0005	0.0005	<0.0005	0.0007	0.0006
Cr	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0006
Co	0.0025	0.0036	0.0036	0.0022	0.0024	0.0048
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.40	3.47	---	3.40	3.55	---
Sum anions (meq/L)	3.47	3.47	---	3.45	3.44	---
C.I. (percent)	-2.1*	0.1	---	-1.5*	3.2	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-16400			RRC-16700		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	7.88			7.94		
SC (µS/cm)	370			369		
Temperature (°C)	5.0			4.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	48	50	51	48	51	49
Mg	11	11	11	11	11	11
Na	7.1	6.6	6.8	7.0	6.9	7.0
K	1.0	1.1	1.0	1.0	1.1	1.0
SO_4	---	120	---	---	120	---
Alkalinity as $CaCO_3$	---	53	---	---	53	---
F	---	0.66	---	---	0.66	---
Cl	---	3.5	---	---	3.5	---
Br	---	3.7	---	---	3.7	---
SiO_2	11	11	13	11	12	12
Al	0.13	0.13	0.79	0.12	0.16	0.77
Fe(T)	<0.010	<0.010	0.23	<0.010	<0.010	0.19
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.005	0.005	0.005	0.004	0.005
Sr	0.28	0.28	0.29	0.28	0.30	0.29
Ba	0.033	0.033	0.034	0.033	0.035	0.035
Mn	0.14	0.14	0.16	0.14	0.15	0.16
Zn	0.052	0.052	0.074	0.055	0.056	0.070
Pb	<0.0003	<0.0003	0.0005	0.0004	<0.0003	<0.0003
Ni	0.013	0.014	0.015	0.013	0.013	0.016
Cu	0.0013	0.0021	0.0087	0.0013	0.0014	0.013
Cd	0.0006	<0.0005	0.0006	0.0006	<0.0005	0.0006
Cr	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	0.0005
Co	0.0020	0.0026	0.0022	0.0021	0.0023	0.0047
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.35	3.43	---	3.35	3.49	---
Sum anions (meq/L)	3.44	3.43	---	3.44	3.43	---
C.I. (percent)	-2.4*	-0.1	---	-2.6*	1.7	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-17012			RRC-17230		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	7.88			7.66		
SC (µS/cm)	371			372		
Temperature (°C)	4.5			4.0		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	51	51	50	50	49	49
Mg	11	12	11	11	11	11
Na	7.1	6.8	7.0	7.2	7.0	7.3
K	1.0	1.1	1.0	1.0	1.0	1.0
SO_4	---	120	---	---	120	---
Alkalinity as $CaCO_3$	---	53	---	---	54	---
F	---	0.75	---	---	0.66	---
Cl	---	3.5	---	---	3.7	---
Br	---	3.6	---	---	3.6	---
SiO_2	11	12	12	12	11	12
Al	0.15	0.17	0.74	0.21	0.18	0.91
Fe(T)	<0.010	<0.010	0.19	0.011	<0.010	0.21
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	0.011
Li	0.005	0.005	0.004	0.005	0.005	0.005
Sr	0.29	0.29	0.29	0.29	0.29	0.29
Ba	0.033	0.035	0.034	0.033	0.034	0.035
Mn	0.15	0.15	0.15	0.17	0.17	0.17
Zn	0.049	0.053	0.074	0.054	0.058	0.077
Pb	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0007
Ni	0.013	0.014	0.016	0.014	0.014	0.016
Cu	0.0031	0.0052	0.011	0.0052	0.0023	0.017
Cd	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0006
Cr	<0.0005	0.0005	0.0005	<0.0005	<0.0005	0.0006
Co	0.0029	0.0040	0.0046	0.0025	0.0018	0.0049
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.50	3.56	---	3.46	3.40	---
Sum anions (meq/L)	3.44	3.43	---	3.46	3.46	---
C.I. (percent)	1.6*	3.6	---	0.1*	-1.6	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-17300			RRC-17480		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	7.61			7.54		
SC (µS/cm)	371			374		
Temperature (°C)	3.5			2.8		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	47	50	50	49	53	51
Mg	11	11	12	11	12	11
Na	7.0	7.1	7.1	7.1	6.7	6.7
K	1.0	1.1	1.1	1.0	1.0	1.0
SO$_4$	---	130	---	---	130	---
Alkalinity as CaCO$_3$	---	51	---	---	52	---
F	---	0.55	---	---	0.72	---
Cl	---	3.8	---	---	3.7	---
Br	---	3.6	---	---	3.5	---
SiO$_2$	11	12	13	11	12	13
Al	0.15	0.18	1.0	0.14	0.17	1.0
Fe(T)	<0.010	<0.010	0.18	0.016	<0.010	0.21
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.005	0.004	0.005	0.005	0.005	0.005
Sr	0.28	0.29	0.30	0.28	0.30	0.29
Ba	0.032	0.034	0.036	0.032	0.035	0.034
Mn	0.18	0.19	0.20	0.19	0.21	0.21
Zn	0.063	0.069	0.086	0.070	0.065	0.087
Pb	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	0.0003
Ni	0.014	0.015	0.015	0.016	0.017	0.017
Cu	0.0039	0.0025	0.013	0.0050	0.0025	0.013
Cd	0.0005	<0.0005	0.0006	0.0006	0.0005	0.0007
Cr	<0.0005	<0.0005	0.0006	0.0030	<0.0005	0.0006
Co	0.0027	0.0029	0.0051	0.0034	0.0029	0.0025
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.29	3.44	---	3.39	3.64	---
Sum anions (meq/L)	3.61	3.59	---	3.63	3.61	---
C.I. (percent)	-9.0*	-4.4	---	-6.7*	0.9	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-17655			RRC-17700A		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	7.34			7.10		
SC (µS/cm)	384			394		
Temperature (°C)	2.5			2.5		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	50	54	50	50	53	51
Mg	11	12	12	11	12	12
Na	7.1	6.9	6.8	7.7	7.3	7.2
K	1.0	1.1	1.0	1.1	1.2	1.1
SO_4	---	140	---	---	140	---
Alkalinity as $CaCO_3$	---	46	---	---	45	---
F	---	0.93	---	---	0.72	---
Cl	---	3.8	---	---	4.5	---
Br	---	3.4	---	---	3.4	---
SiO_2	11	12	13	11	12	13
Al	0.12	0.13	1.8	0.11	0.12	2.0
Fe(T)	0.086	0.15	0.45	0.14	0.17	0.44
Fe(II)	---	---	---	---	---	---
B	<0.010	0.010	<0.010	<0.010	0.012	<0.010
Li	0.006	0.005	0.005	0.006	0.006	0.006
Sr	0.29	0.29	0.29	0.28	0.29	0.29
Ba	0.032	0.035	0.036	0.031	0.032	0.034
Mn	0.30	0.34	0.32	0.32	0.34	0.35
Zn	0.11	0.10	0.12	0.10	0.11	0.13
Pb	0.0006	<0.0003	<0.0003	<0.0003	<0.0003	0.0007
Ni	0.018	0.020	0.019	0.018	0.021	0.021
Cu	0.0055	0.0059	0.021	0.0026	0.0052	0.021
Cd	0.0006	0.0007	0.0009	0.0010	0.0009	0.0009
Cr	<0.0005	<0.0005	0.0010	<0.0005	0.0006	0.0013
Co	0.0044	0.0041	0.0081	0.0046	0.0047	0.0097
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.43	3.69	---	3.46	3.67	---
Sum anions (meq/L)	3.70	3.68	---	3.69	3.68	---
C.I. (percent)	-7.6*	0.2	---	-6.4*	-0.3	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-17700B			RRC-19780		
Description	stream			stream		
Date Collected	3/30/02			3/30/02		
pH	7.31			7.82		
SC (µS/cm)	388			388		
Temperature (°C)	2.5			12		
Treatment	UFA	FA / FU	RA	UFA	FA / FU	RA
Constituent, mg/L						
Ca	51	52	52	50	52	50
Mg	12	12	12	11	12	11
Na	7.1	7.4	7.2	7.4	7.0	7.2
K	1.0	1.0	1.0	1.1	1.0	1.1
SO_4	---	140	---	---	140	---
Alkalinity as $CaCO_3$	---	44	---	---	44	---
F	---	0.78	---	---	0.89	---
Cl	---	3.8	---	---	3.8	---
Br	---	3.4	---	---	3.5	---
SiO_2	11	11	13	11	11	13
Al	0.12	0.13	1.9	0.17	0.20	2.4
Fe(T)	0.096	0.16	0.43	<0.010	<0.010	0.45
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.006	0.005	0.004	0.006	0.006	0.005
Sr	0.29	0.30	0.29	0.28	0.29	0.30
Ba	0.033	0.033	0.032	0.031	0.031	0.034
Mn	0.32	0.33	0.36	0.42	0.42	0.43
Zn	0.096	0.10	0.13	0.060	0.073	0.15
Pb	<0.0003	<0.0003	0.0004	<0.0003	<0.0003	0.0016
Ni	0.018	0.019	0.020	0.018	0.019	0.022
Cu	0.0029	0.0032	0.024	0.0013	0.0021	0.025
Cd	0.0008	0.0008	0.0008	0.0009	0.0008	0.0009
Cr	<0.0005	0.0006	0.0011	<0.0005	<0.0005	0.0008
Co	0.0050	0.0039	0.0082	0.0051	0.0047	0.0083
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.04	<0.0001	<0.04	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.56	3.62	---	3.40	3.55	---
Sum anions (meq/L)	3.65	3.65	---	3.62	3.61	---
C.I. (percent)	-2.7*	-0.9	---	-6.3*	-1.6	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-6209		RRF-6214		RRF-6301	
Description	LBI		RBI		RBI	
Date Collected	3/31/02		3/31/02		3/31/02	
pH	7.02		7.04		6.93	
SC (µS/cm)	317		275		279	
Temperature (°C)	3.0		4.5		5.5	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	43	44	38	37	37	38
Mg	9.4	10	7.6	7.7	7.8	7.8
Na	6.0	5.7	4.7	4.4	4.8	4.8
K	1.0	1.2	0.83	0.83	0.88	0.90
SO_4	95	---	75	---	---	---
Alkalinity as $CaCO_3$	54	---	55	---	---	---
F	0.26	---	0.12	---	---	---
Cl	4.1	---	3.7	---	---	---
Br	0.03	---	0.03	---	---	---
SiO_2	11	14	11	11	12	12
Al	0.069	0.80	0.046	0.13	0.067	0.12
Fe(T)	<0.010	3.3	<0.010	0.29	<0.010	0.29
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.004	0.002	0.002	0.003	0.003
Sr	0.33	0.33	0.22	0.22	0.22	0.22
Ba	0.029	0.090	0.034	0.039	0.030	0.036
Mn	<0.002	0.055	<0.002	0.007	<0.002	0.005
Zn	0.009	0.020	0.014	0.014	0.022	0.023
Pb	<0.0003	0.015	<0.0003	0.0015	<0.0003	0.0020
Ni	<0.003	0.004	<0.003	<0.003	<0.003	<0.003
Cu	0.0006	0.0056	<0.0005	<0.0005	<0.0005	0.0011
Cd	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cr	<0.0005	0.0042	<0.0005	0.0006	<0.0005	0.0006
Co	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
Be	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	3.00	---	2.60	---	---	---
Sum anions (meq/L)	2.98	---	2.62	---	---	---
C.I. (percent)	0.8	---	-1.0	---	---	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-6343		RRF-7150		RRF-7240	
Description	LBI		RBI		RBI	
Date Collected	3/31/02		3/31/02		3/31/02	
pH	7.09		6.51		4.33	
SC (μS/cm)	278		406		802	
Temperature (°C)	6.0		14		7.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	37	38	55	57	97	92
Mg	8.0	7.7	9.6	10	29	30
Na	4.8	4.5	7.0	7.0	9.3	9.4
K	0.88	0.84	1.3	1.4	1.2	1.3
SO$_4$	79	---	160	---	460	---
Alkalinity as CaCO$_3$	52	---	36	---	---	---
F	0.22	---	0.59	---	1.7	---
Cl	3.1	---	4.5	---	4.7	---
Br	<0.01	---	0.03	---	<0.01	---
SiO$_2$	12	12	15	16	28	29
Al	0.052	0.070	0.10	0.42	13	13
Fe(T)	<0.010	<0.010	3.9	6.7	0.035	0.62
Fe(II)	---	---	3.8	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.003	0.003	0.003	0.004	0.022	0.023
Sr	0.23	0.22	0.35	0.36	0.41	0.42
Ba	0.027	0.027	0.012	0.030	0.006	0.015
Mn	<0.002	0.007	0.46	0.46	2.1	2.1
Zn	0.025	0.023	0.009	0.013	0.62	0.59
Pb	0.0005	<0.0003	0.0006	0.0072	<0.0003	0.0033
Ni	<0.003	<0.003	0.016	0.017	0.12	0.11
Cu	<0.0005	<0.0005	<0.0005	0.0017	0.055	0.057
Cd	<0.0005	<0.0005	<0.0005	<0.0005	0.0022	0.0028
Cr	<0.0005	<0.0005	0.0031	0.0057	0.0009	0.0017
Co	<0.0008	<0.0008	0.0055	0.0054	0.048	0.045
Be	<0.001	<0.001	<0.001	<0.001	0.003	0.003
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	0.0004	<0.04	0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	2.58	---	3.60	---	7.19	---
Sum anions (meq/L)	2.61	---	3.76	---	7.71	---
C.I. (percent)	-1.4	---	-4.4	---	-7.0	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-7270		RRF-7297		RRF-7300	
Description	RBI		RBI		LBI	
Date Collected	3/31/02		3/31/02		3/31/02	
pH	4.37		4.35		4.78	
SC (µS/cm)	780		825		682	
Temperature (°C)	8.0		8.5		6.5	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	92	93	97	95	86	87
Mg	29	28	30	30	24	23
Na	9.6	9.2	9.5	9.7	8.2	8.5
K	1.2	1.3	1.3	1.4	1.6	1.8
SO$_4$	440	---	470	---	360	---
Alkalinity as CaCO$_3$	---	---	---	---	<1	---
F	1.6	---	1.4	---	1.8	---
Cl	4.7	---	5.1	---	4.5	---
Br	0.03	---	<0.01	---	<0.01	---
SiO$_2$	29	27	29	29	23	25
Al	12	12	13	14	7.8	8.6
Fe(T)	0.034	0.051	0.045	0.18	0.049	1.9
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.021	0.021	0.024	0.024	0.016	0.016
Sr	0.41	0.41	0.43	0.44	0.42	0.43
Ba	0.006	0.006	0.007	0.008	0.014	0.029
Mn	2.0	2.0	2.2	2.2	1.9	1.9
Zn	0.56	0.56	0.62	0.59	0.72	0.68
Pb	<0.0003	0.0004	0.0005	0.0009	0.0004	0.0036
Ni	0.11	0.11	0.13	0.12	0.10	0.10
Cu	0.051	0.054	0.058	0.057	0.024	0.041
Cd	0.0024	0.0027	0.0027	0.0029	0.0026	0.0031
Cr	0.0015	0.0008	0.0006	0.0009	<0.0005	0.0029
Co	0.045	0.043	0.051	0.047	0.034	0.033
Be	0.003	0.003	0.003	0.003	0.003	0.003
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	6.95	---	7.22	---	6.19	---
Sum anions (meq/L)	7.41	---	7.85	---	6.26	---
C.I. (percent)	-6.4	---	-8.4	---	-1.0	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-7320		RRF-7352		RRF-7383	
Description	RBI		RBI		LBI	
Date Collected	3/31/02		3/31/02		3/31/02	
pH	4.32		6.00		4.39	
SC (μS/cm)	846		868		828	
Temperature (°C)	7.0		13		7.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	100	100	120	120	99	98
Mg	32	32	30	30	31	30
Na	9.4	10	21	22	9.7	9.4
K	1.2	1.2	2.8	2.7	1.4	1.5
SO$_4$	490	---	440	---	480	---
Alkalinity as CaCO$_3$	---	---	15	---	---	---
F	1.4	---	0.66	---	1.7	---
Cl	4.7	---	15	---	4.1	---
Br	<0.01	---	0.04	---	<0.01	---
SiO$_2$	31	31	20	20	32	35
Al	15	15	0.49	0.97	15	15
Fe(T)	0.021	0.038	6.4	7.3	0.036	1.0
Fe(II)	---	---	6.2	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.024	0.026	0.007	0.008	0.024	0.025
Sr	0.44	0.43	1.1	1.1	0.45	0.45
Ba	0.005	0.006	0.012	0.012	0.007	0.031
Mn	2.4	2.4	0.76	0.76	2.4	2.5
Zn	0.70	0.68	0.062	0.067	0.74	0.74
Pb	<0.0003	<0.0003	<0.0003	<0.0003	0.0003	0.0052
Ni	0.14	0.13	0.025	0.025	0.12	0.12
Cu	0.064	0.063	0.0022	<0.0005	0.067	0.069
Cd	0.0026	0.0026	<0.0005	<0.0005	0.0029	0.0029
Cr	0.0009	0.0008	0.0057	0.0044	<0.0005	0.0020
Co	0.055	0.054	0.0077	0.0076	0.049	0.048
Be	0.003	0.003	<0.001	<0.001	0.003	0.003
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	0.0002	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	7.60	---	7.99	---	7.53	---
Sum anions (meq/L)	8.09	---	8.13	---	7.93	---
C.I. (percent)	-6.3	---	-1.8	---	-5.3	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRF-7457		RRF-7588		RRF-7615	
Description	RBI		RBI		RBI	
Date Collected	3/31/02		3/31/02		3/31/02	
pH	4.96		7.12		4.80	
SC (μS/cm)	832		325		682	
Temperature (°C)	6.0		7.5		7.5	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	110	110	42	43	87	87
Mg	33	32	10	10	25	23
Na	12	12	6.2	6.5	9.5	9.7
K	1.4	1.4	1.1	1.2	1.2	1.2
SO_4	470	---	110	---	370	---
Alkalinity as $CaCO_3$	<1	---	46	---	<1	---
F	1.4	---	0.37	---	0.89	---
Cl	5.5	---	3.9	---	4.8	---
Br	0.03	---	1.6	---	<0.01	---
SiO_2	28	27	12	12	22	23
Al	9.4	9.9	0.11	0.15	6.4	6.5
Fe(T)	0.023	0.031	<0.010	0.061	0.010	0.020
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	0.016	<0.010	<0.010
Li	0.017	0.018	0.003	0.004	0.014	0.013
Sr	0.77	0.76	0.26	0.27	0.46	0.46
Ba	0.007	0.007	0.024	0.025	0.007	0.007
Mn	1.6	1.6	0.063	0.060	1.1	1.1
Zn	0.55	0.52	0.031	0.020	0.38	0.37
Pb	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Ni	0.095	0.088	0.005	0.006	0.062	0.060
Cu	0.045	0.046	0.0009	0.0025	0.034	0.034
Cd	0.0019	0.0025	<0.0005	<0.0005	0.0015	0.0015
Cr	0.0007	<0.0005	<0.0005	<0.0005	0.0006	<0.0005
Co	0.032	0.030	0.0009	0.0010	0.022	0.019
Be	0.002	0.002	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	7.85	---	2.98	---	6.18	---
Sum anions (meq/L)	7.96	---	3.10	---	6.43	---
C.I. (percent)	-1.4	---	-4.2	---	-4.0	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-14973		RRC-15044		RRC-15087	
Description	RBI		RBI		LBI	
Date Collected	3/30/02		3/30/02		3/30/02	
pH	6.18		6.47		6.56	
SC (μS/cm)	586		619		587	
Temperature (°C)	7.5		8.0		8.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	75	72	84	82	85	84
Mg	23	23	24	24	20	18
Na	9.6	8.8	9.9	9.6	8.4	8.4
K	1.2	1.1	1.8	1.8	1.3	1.3
SO_4	270	---	280	---	250	---
Alkalinity as $CaCO_3$	30	---	28	---	42	---
F	5.2	---	2.3	---	0.63	---
Cl	6.0	---	6.1	---	5.5	---
Br	<0.01	---	0.18	---	<0.01	---
SiO_2	14	14	15	16	14	15
Al	1.6	1.6	0.31	0.74	0.089	0.12
Fe(T)	<0.010	0.051	2.5	6.1	<0.010	0.14
Fe(II)	---	---	2.4	---	---	---
B	<0.010	0.010	<0.010	<0.010	0.011	<0.010
Li	0.005	0.005	0.007	0.008	0.005	0.005
Sr	0.45	0.43	0.46	0.47	0.46	0.46
Ba	0.014	0.013	0.025	0.039	0.049	0.052
Mn	<0.002	0.002	0.12	0.13	<0.002	0.009
Zn	0.84	0.75	0.040	0.046	0.033	0.031
Pb	<0.0003	<0.0003	<0.0003	0.0020	<0.0003	0.0006
Ni	0.12	0.11	0.046	0.045	0.005	0.006
Cu	0.0023	0.0011	0.0011	0.0040	0.0013	0.0034
Cd	0.0024	0.0025	<0.0005	0.0012	<0.0005	<0.0005
Cr	<0.0005	<0.0005	0.0028	0.0055	<0.0005	<0.0005
Co	<0.0008	<0.0008	0.0053	0.0084	<0.0008	0.0017
Be	0.002	0.002	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	5.30	---	5.81	---	5.47	---
Sum anions (meq/L)	5.66	---	5.70	---	5.39	---
C.I. (percent)	-6.6	---	1.8	---	1.4	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-15141		RRC-15264		RRC-15408	
Description	LBI		RBI		RBI	
Date Collected	3/30/02		3/30/02		3/30/02	
pH	7.16		6.48		4.82	
SC (µS/cm)	188		661		1526	
Temperature (°C)	5.5		6.0		8.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	29	29	91	92	200	200
Mg	3.2	3.2	22	25	71	74
Na	2.5	2.7	9.7	9.7	27	27
K	0.59	0.66	1.7	1.9	3.7	3.9
SO_4	22	---	300	---	920	---
Alkalinity as $CaCO_3$	69	---	38	---	<1	---
F	0.55	---	1.2	---	8.9	---
Cl	0.8	---	6.1	---	19	---
Br	<0.01	---	<0.01	---	0.05	---
SiO_2	7.8	8.2	14	19	26	29
Al	0.033	0.14	0.12	1.4	18	20
Fe(T)	<0.010	0.12	<0.010	5.0	0.017	0.90
Fe(II)	---	---	---	---	---	---
B	<0.010	<0.010	<0.010	<0.010	<0.010	0.013
Li	0.002	0.001	0.005	0.006	0.073	0.074
Sr	0.17	0.18	0.47	0.49	0.99	1.0
Ba	0.048	0.054	0.026	0.048	0.009	0.018
Mn	<0.002	0.006	0.021	0.11	2.3	2.4
Zn	<0.005	0.005	0.13	0.17	1.1	1.0
Pb	0.0005	0.0005	<0.0003	0.0076	<0.0003	0.0016
Ni	<0.003	<0.003	0.018	0.025	0.29	0.26
Cu	0.0010	0.0019	0.0024	0.021	0.29	0.29
Cd	<0.0005	<0.0005	0.0007	0.0009	0.0081	0.012
Cr	<0.0005	0.0008	<0.0005	0.0086	<0.0005	0.0027
Co	<0.0008	0.0010	<0.0008	0.0042	0.069	0.064
Be	<0.001	<0.001	<0.001	<0.001	0.008	0.008
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	0.003	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	1.79	---	5.85	---	14.2	---
Sum anions (meq/L)	1.85	---	6.25	---	15.1	---
C.I. (percent)	-3.0	---	-6.7	---	-6.0	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-15507		RRC-15567		RRC-15687	
Description	RBI		LBI		RBI	
Date Collected	3/30/02		3/30/02		3/30/02	
pH	4.25		7.16		7.08	
SC (μS/cm)	2520		190		464	
Temperature (°C)	8.5		5.0		7.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	330	320	27	27	65	63
Mg	140	140	4.1	3.8	13	13
Na	50	48	4.3	4.4	7.9	7.9
K	3.7	3.8	0.51	0.56	1.2	1.3
SO$_4$	2000	---	21	---	180	---
Alkalinity as CaCO$_3$	---	---	68	---	53	---
F	20	---	1.8	---	0.72	---
Cl	42	---	0.9	---	4.1	---
Br	<0.01	---	<0.01	---	2.9	---
SiO$_2$	48	48	14	14	12	12
Al	110	110	0.029	0.022	0.17	0.41
Fe(T)	0.068	1.1	<0.010	<0.010	0.12	0.24
Fe(II)	---	---	---	---	---	---
B	<0.010	0.011	<0.010	<0.010	<0.010	<0.010
Li	0.17	0.18	0.003	0.003	0.004	0.004
Sr	1.2	1.2	0.13	0.14	0.38	0.37
Ba	0.006	0.016	0.017	0.016	0.033	0.034
Mn	13	13	<0.002	<0.002	0.13	0.13
Zn	3.3	3.2	0.007	0.008	0.053	0.065
Pb	<0.0003	0.0036	<0.0003	<0.0003	<0.0003	<0.0003
Ni	0.81	0.78	<0.003	<0.003	0.013	0.014
Cu	1.1	1.1	<0.0005	0.0014	0.0011	0.0063
Cd	0.027	0.026	<0.0005	<0.0005	<0.0005	0.0008
Cr	0.0012	0.0049	<0.0005	<0.0005	<0.0005	0.0007
Co	0.37	0.34	<0.0008	<0.0008	0.0017	0.0025
Be	0.017	0.015	<0.001	<0.001	<0.001	<0.001
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	27.8	---	1.85	---	4.20	---
Sum anions (meq/L)	28.4	---	1.88	---	4.48	---
C.I. (percent)	-2.2	---	-1.6	---	-6.4	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-15737		RRC-17270		RRC-17288	
Description	RBI		RBI		LBI	
Date Collected	3/30/02		3/30/02		3/30/02	
pH	4.66		4.05		4.01	
SC (µS/cm)	1488		885		983	
Temperature (°C)	7.0		6.5		6.5	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	230	220	79	82	100	98
Mg	58	57	23	23	26	26
Na	25	22	14	15	14	14
K	3.0	2.9	1.4	1.5	1.5	1.8
SO_4	890	---	510	---	580	---
Alkalinity as $CaCO_3$	<1	---	---	---	---	---
F	4.2	---	4.4	---	4.1	---
Cl	25	---	18	---	12	---
Br	<0.01	---	<0.01	---	<0.01	---
SiO_2	19	20	32	32	33	36
Al	17	18	33	34	34	36
Fe(T)	0.71	1.8	0.064	0.18	3.1	6.3
Fe(II)	---	---	---	---	2.4	---
B	<0.010	0.011	<0.010	<0.010	<0.010	<0.010
Li	0.020	0.022	0.025	0.025	0.026	0.025
Sr	1.1	1.0	0.30	0.32	0.57	0.58
Ba	0.008	0.016	0.007	0.010	0.007	0.027
Mn	3.8	3.6	4.5	4.5	4.9	4.9
Zn	1.4	1.4	1.3	1.3	1.3	1.3
Pb	0.0007	0.0036	<0.0003	<0.0003	0.0007	0.0054
Ni	0.14	0.15	0.13	0.13	0.13	0.13
Cu	0.33	0.34	0.51	0.51	0.38	0.39
Cd	0.013	0.016	0.0063	0.0078	0.0087	0.0080
Cr	0.0011	0.0037	0.0011	0.0017	0.0041	0.010
Co	0.045	0.046	0.062	0.063	0.065	0.068
Be	0.005	0.005	0.007	0.007	0.007	0.008
Mo	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
V	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	14.6	---	7.60	---	8.69	---
Sum anions (meq/L)	14.5	---	8.47	---	9.30	---
C.I. (percent)	0.7	---	-10.8	---	-6.7	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-17525		RRC-17574		RRC-17595	
Description	RBI		RBI		RBI	
Date Collected	3/30/02		3/30/02		3/30/02	
pH	4.11		4.47		3.76	
SC (μS/cm)	1932		997		2050	
Temperature (°C)	9.0		7.0		7.0	
Treatment	FA / FU	RA	FA / FU	RA	FA / FU	RA
Constituent, mg/L						
Ca	220	210	110	110	210	210
Mg	62	62	28	27	63	63
Na	24	24	13	14	25	25
K	2.8	3.1	1.5	1.6	3.2	3.3
SO$_4$	1400	---	610	---	1500	---
Alkalinity as CaCO$_3$	---	---	---	---	---	---
F	16	---	5.5	---	18	---
Cl	20	---	13	---	37	---
Br	<0.01	---	<0.01	---	<0.01	---
SiO$_2$	54	100	29	28	54	55
Al	110	120	38	37	110	110
Fe(T)	28	41	3.5	3.6	27	27
Fe(II)	21	---	2.7	---	20	---
B	0.012	<0.010	<0.010	<0.010	<0.010	<0.010
Li	0.073	0.079	0.027	0.027	0.088	0.092
Sr	1.0	1.0	0.58	0.55	0.80	0.79
Ba	0.007	0.060	0.015	0.014	0.005	0.005
Mn	14	14	7.0	6.6	16	16
Zn	4.0	3.9	1.5	1.5	4.3	4.2
Pb	<0.0003	0.014	<0.0003	0.0011	<0.0003	<0.0003
Ni	0.40	0.44	0.16	0.16	0.41	0.42
Cu	1.1	1.1	0.41	0.41	1.1	1.1
Cd	0.019	0.024	0.0071	0.0091	0.020	0.025
Cr	0.012	0.011	0.0043	0.0036	0.016	0.017
Co	0.20	0.20	0.10	0.11	0.21	0.21
Be	0.018	0.017	0.007	0.007	0.017	0.018
Mo	0.011	0.025	<0.007	<0.007	0.008	0.023
V	<0.002	0.005	<0.002	<0.002	<0.002	<0.002
As	<0.0001	<0.04	<0.0001	<0.04	<0.0001	<0.04
Se	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06
Sum cations (meq/L)	20.1	---	9.41	---	19.8	---
Sum anions (meq/L)	19.4	---	9.66	---	21.9	---
C.I. (percent)	3.2	---	-2.6	---	-10.1	---

* Based on FU anions

Table 11. Water analyses for the snowmelt tracer study - Continued

Sample Identification	RRC-17670	
Description	RBI	
Date Collected	3/30/02	
pH	3.87	
SC (μS/cm)	2070	
Temperature (°C)	7.5	
Treatment	FA / FU	RA
Constituent, mg/L		
Ca	210	220
Mg	63	62
Na	29	27
K	4.0	4.2
SO_4	1500	---
Alkalinity as $CaCO_3$	---	---
F	18	---
Cl	37	---
Br	<0.01	---
SiO_2	60	59
Al	110	120
Fe(T)	32	33
Fe(II)	24	---
B	0.012	<0.010
Li	0.10	0.089
Sr	0.80	0.77
Ba	0.005	0.005
Mn	16	16
Zn	4.2	4.3
Pb	<0.0003	<0.0003
Ni	0.43	0.42
Cu	1.1	1.1
Cd	0.020	0.025
Cr	0.017	0.018
Co	0.21	0.21
Be	0.020	0.020
Mo	0.014	0.022
V	<0.002	<0.002
As	<0.0001	<0.04
Se	<0.06	<0.06
Sum cations (meq/L)	20.0	---
Sum anions (meq/L)	21.8	---
C.I. (percent)	-8.5	---

* Based on FU anions
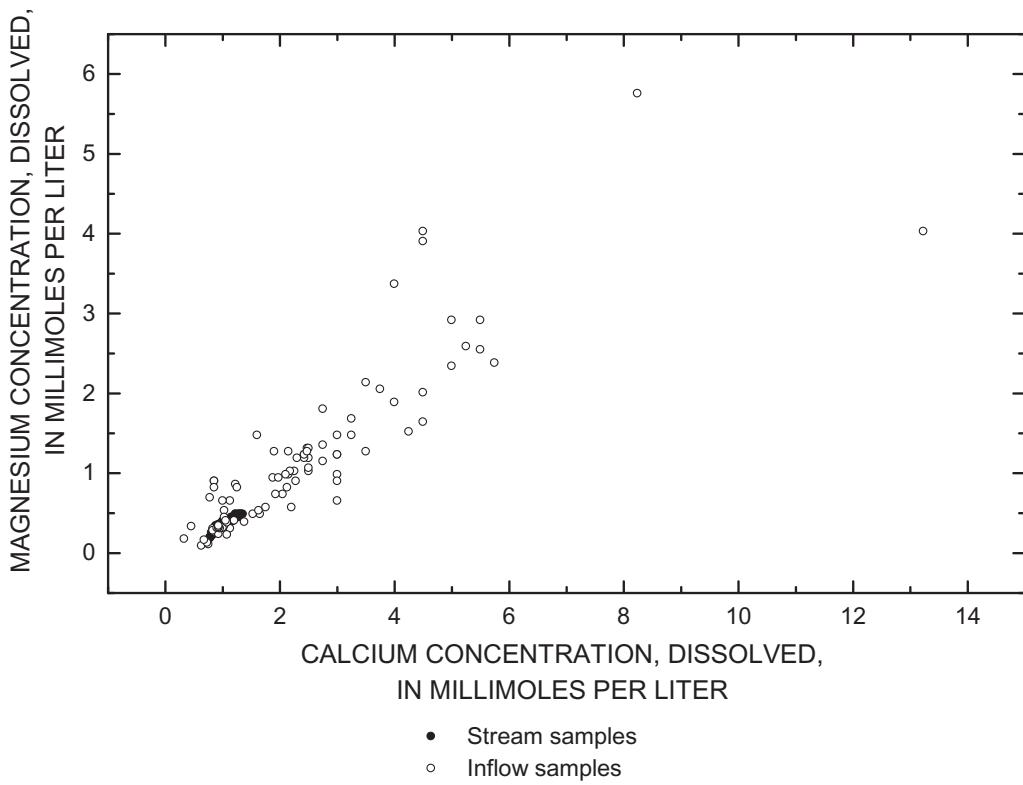
Figure 7. Magnesium concentrations in relation to calcium concentrations.
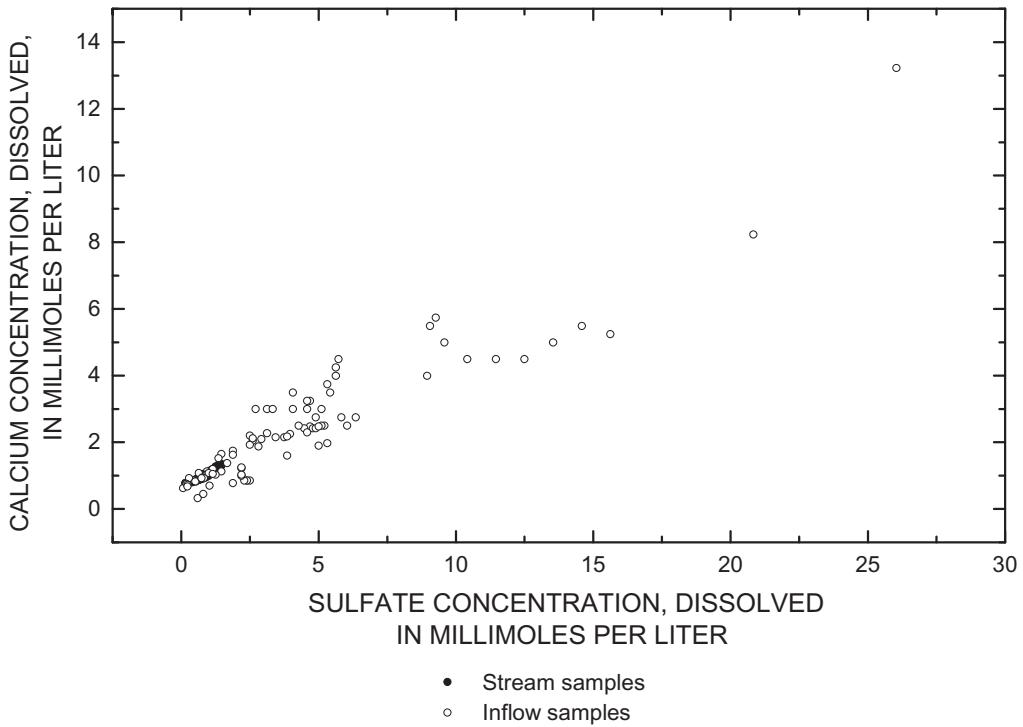
Figure 8. Calcium concentrations in relation to sulfate concentrations.
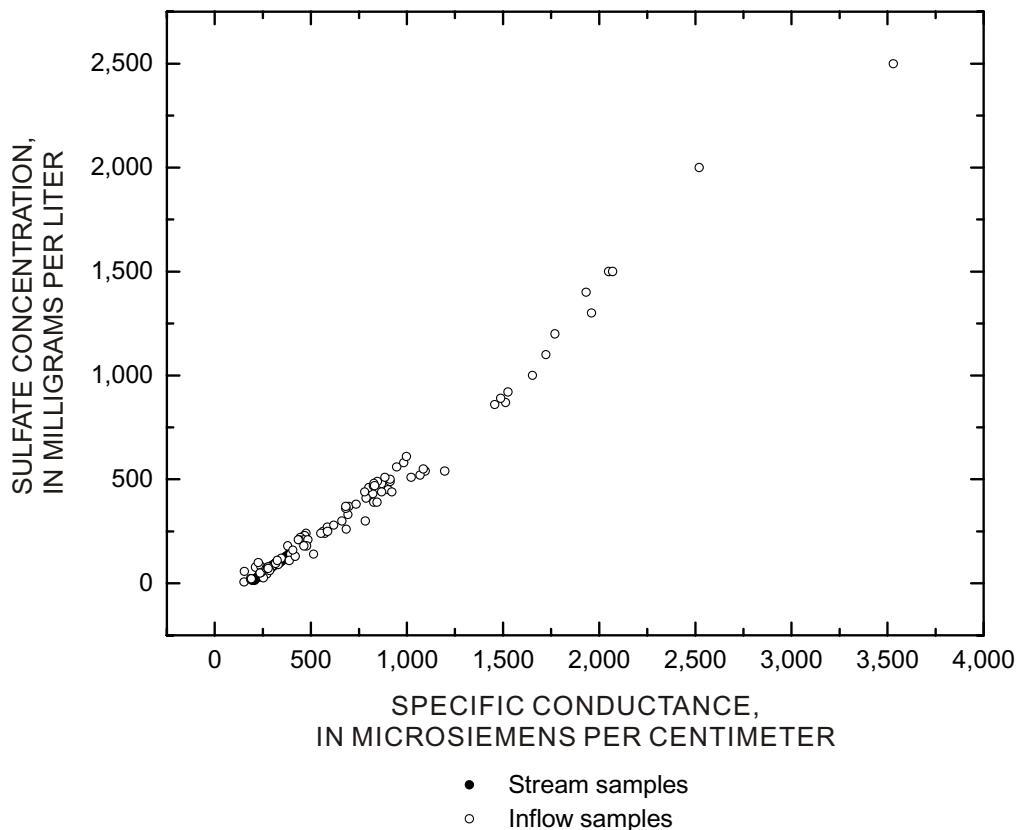
Figure 9. Sulfate concentrations in relation to specific conductance.
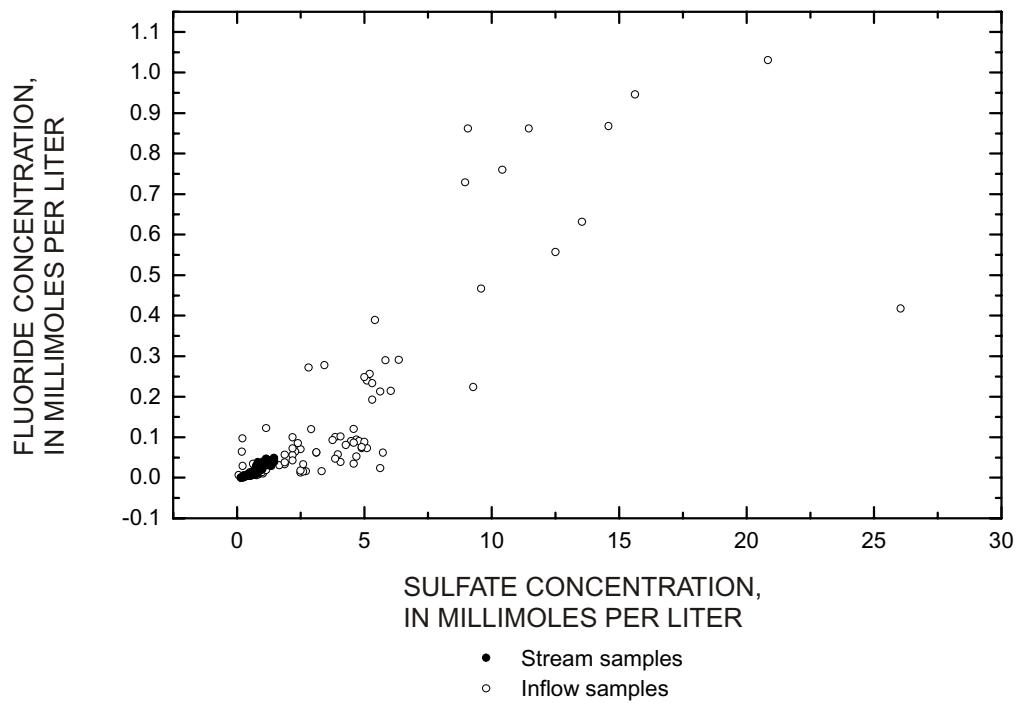
Figure 10. Fluoride concentrations in relation to sulfate concentrations.
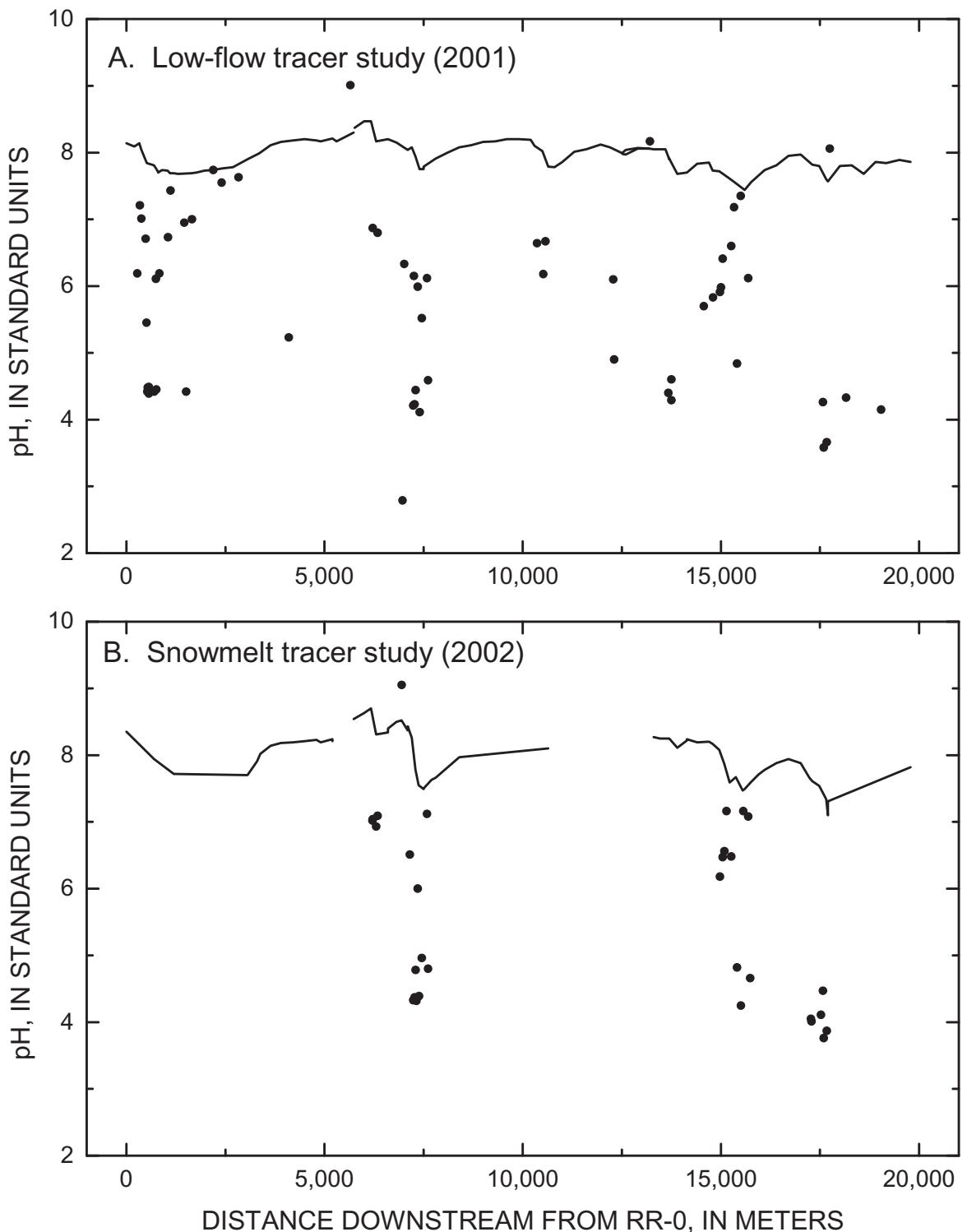
Figure 11. Sample pH as a function of stream distance.
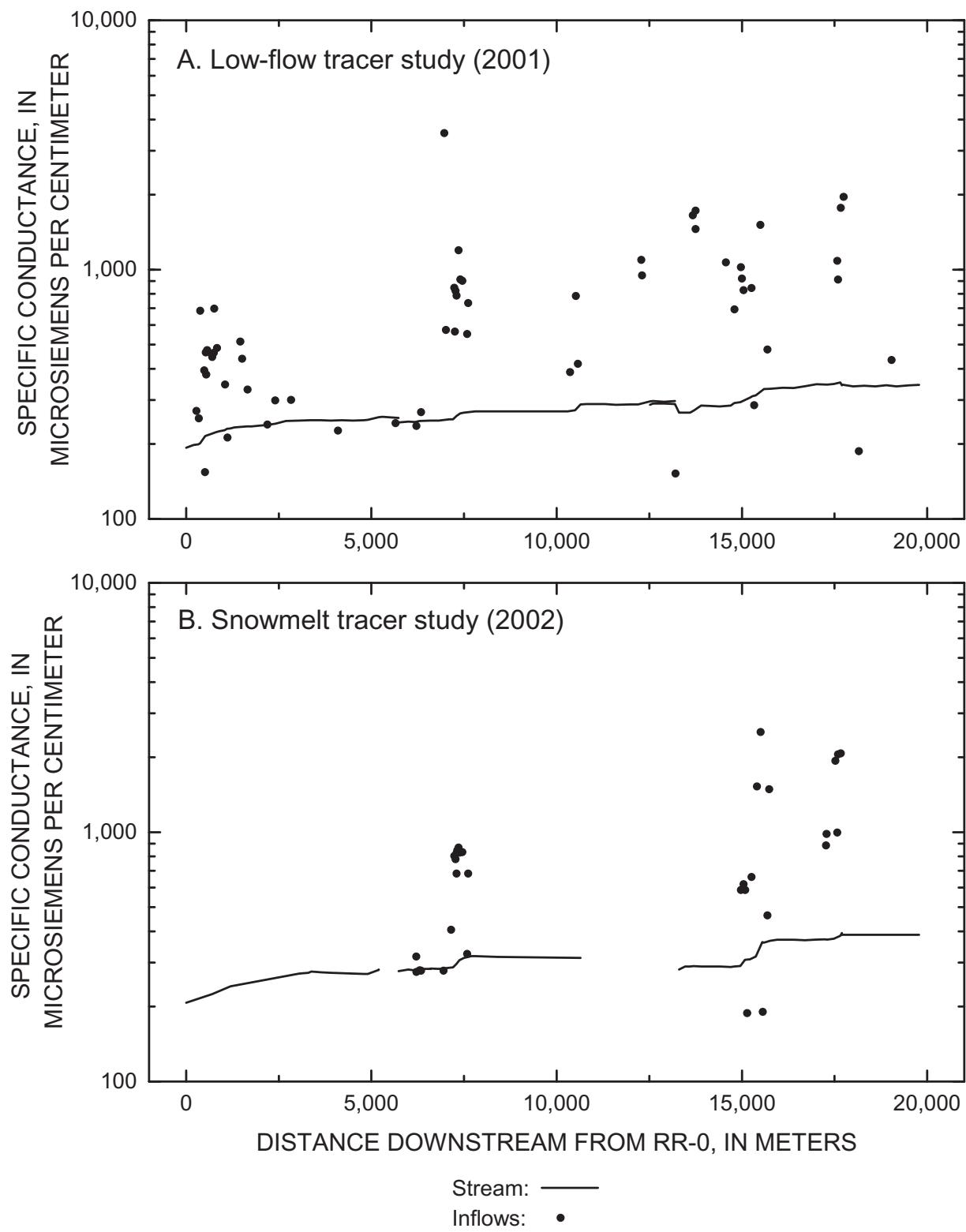
Figure 12. Specific conductance as a function of stream distance.
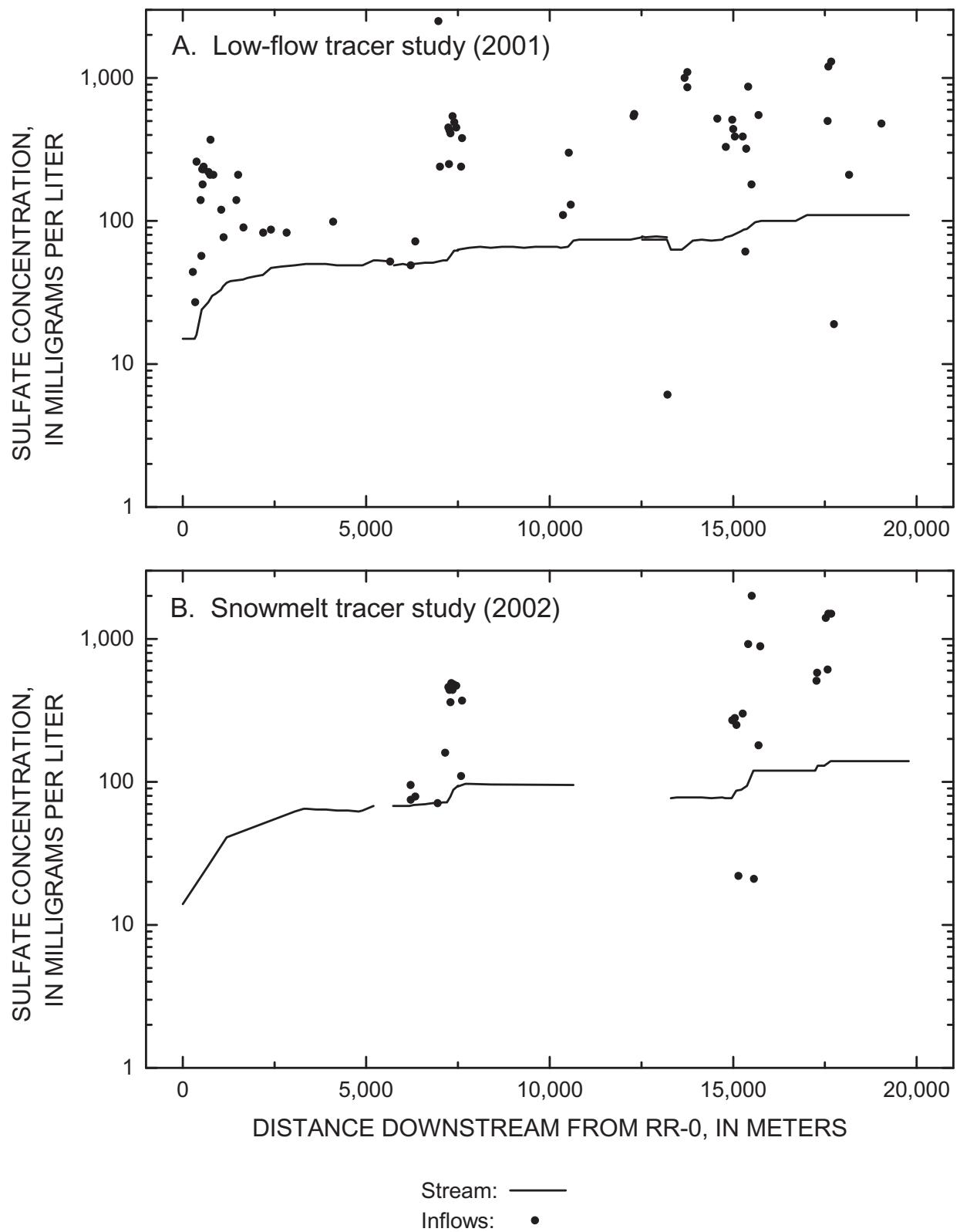
Figure 13. Sulfate concentrations as a function of stream distance.
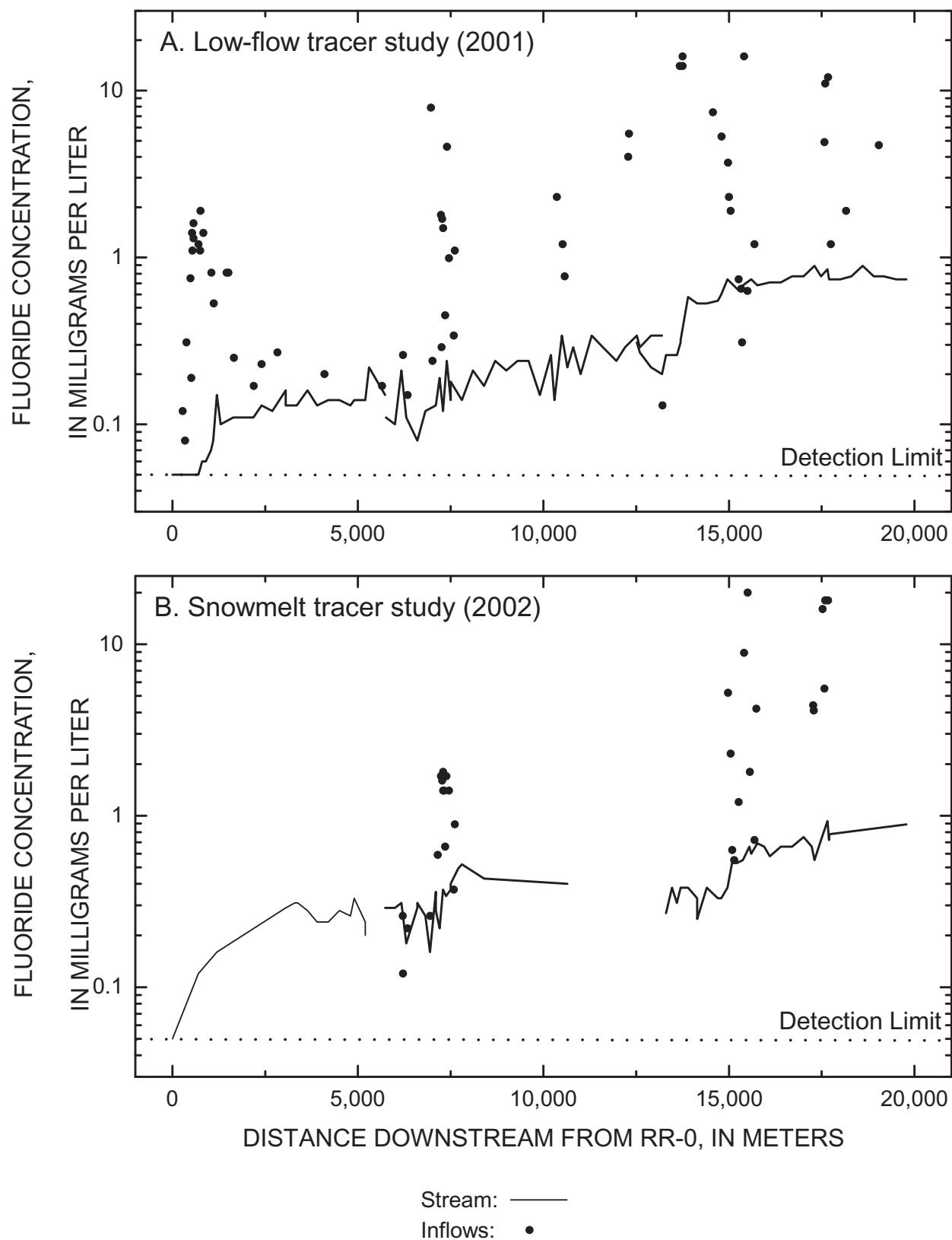
Figure 14. Fluoride concentrations as a function of stream distance.
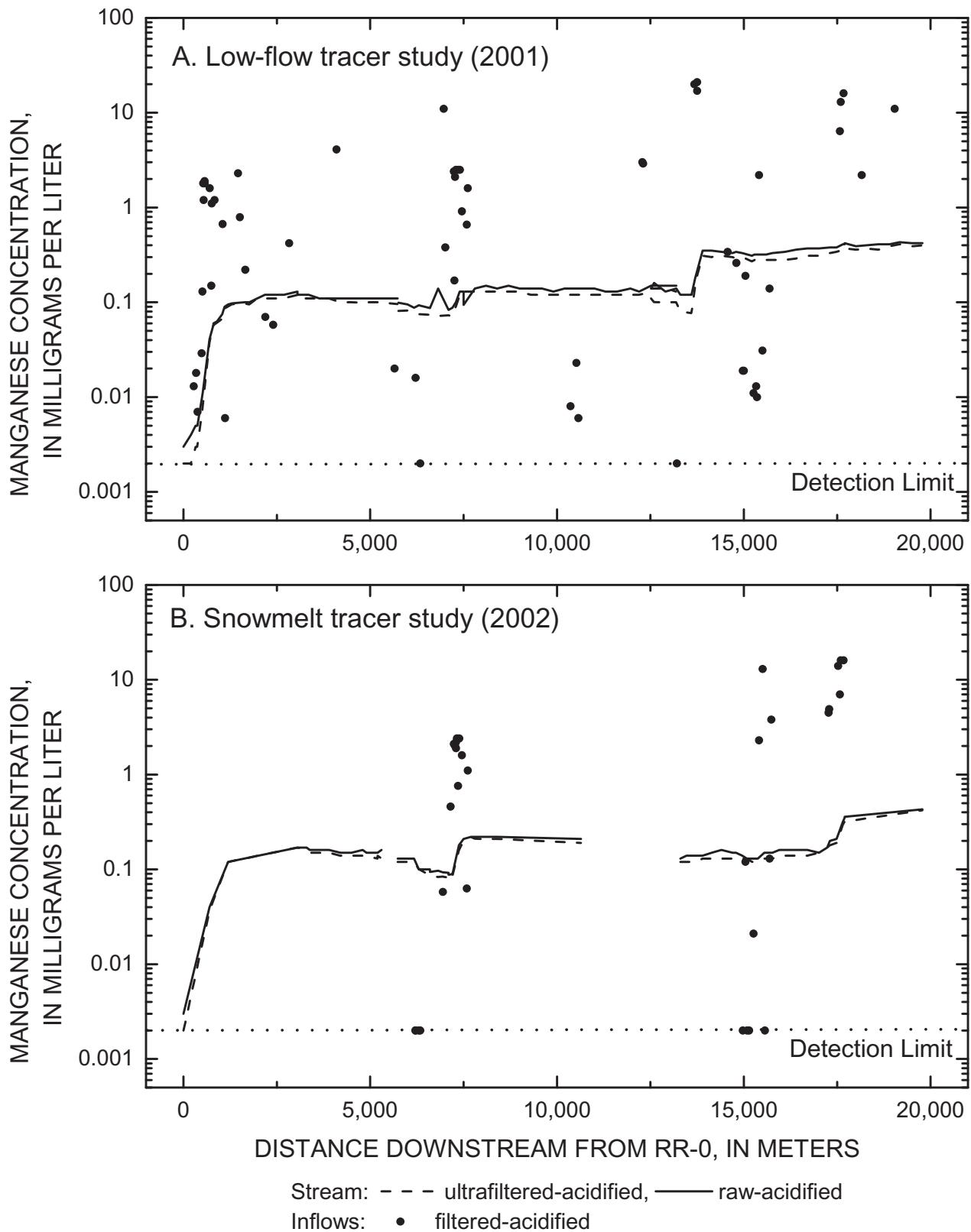
Figure 15. Manganese concentrations as a function of stream distance.
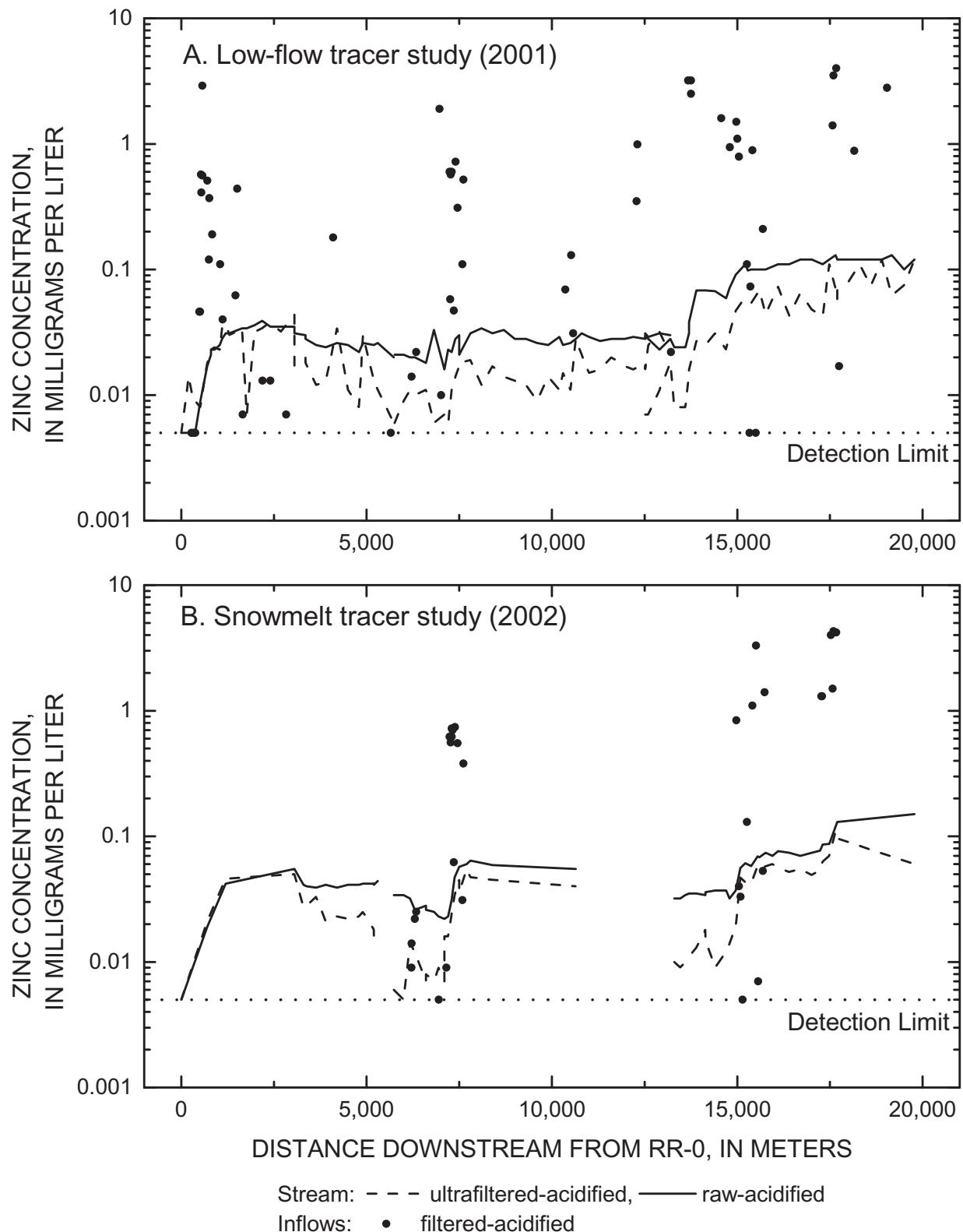
Figure 16. Zinc concentrations as a function of stream distance.

A. Low-flow tracer study (2001)

B. Snowmelt tracer study (2002)

DISTANCE DOWNSTREAM FROM RR-0, IN METERS

Stream: – – – ultrafiltered-acidified, ——— raw-acidified
Inflows: ● filtered-acidified
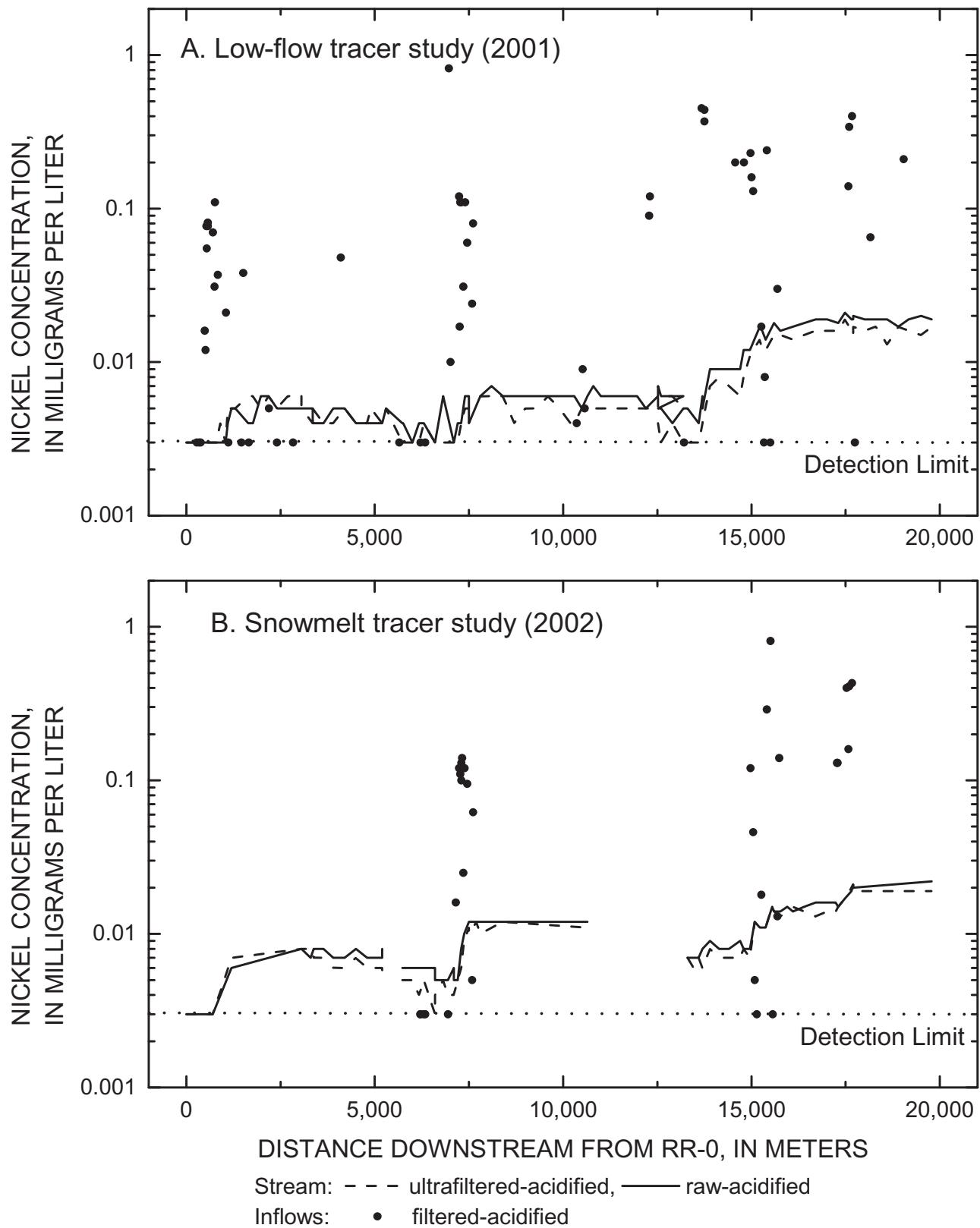
Figure 17. Nickel concentrations as a function of stream distance.
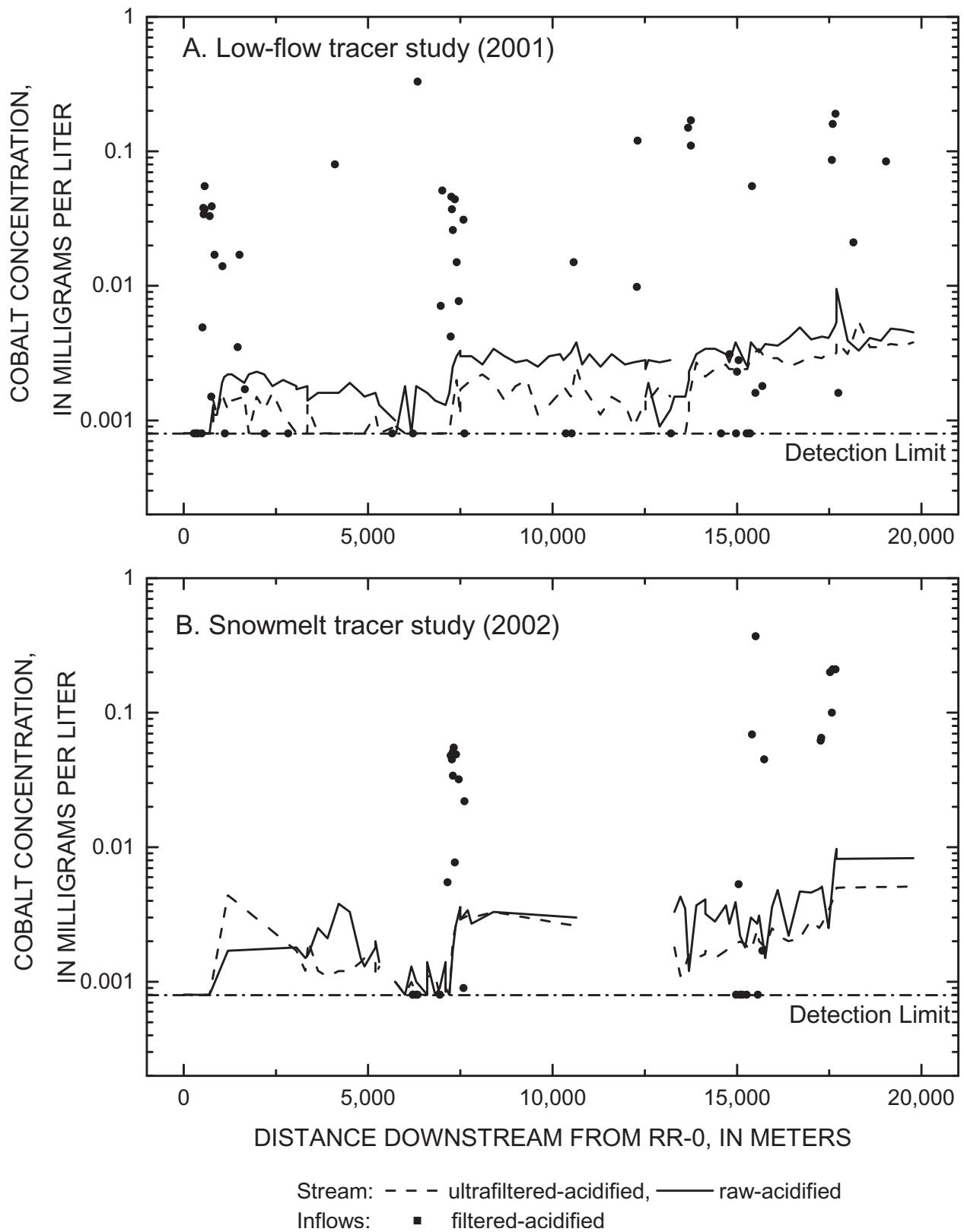
Figure 18. Cobalt concentrations as a function of stream distance.
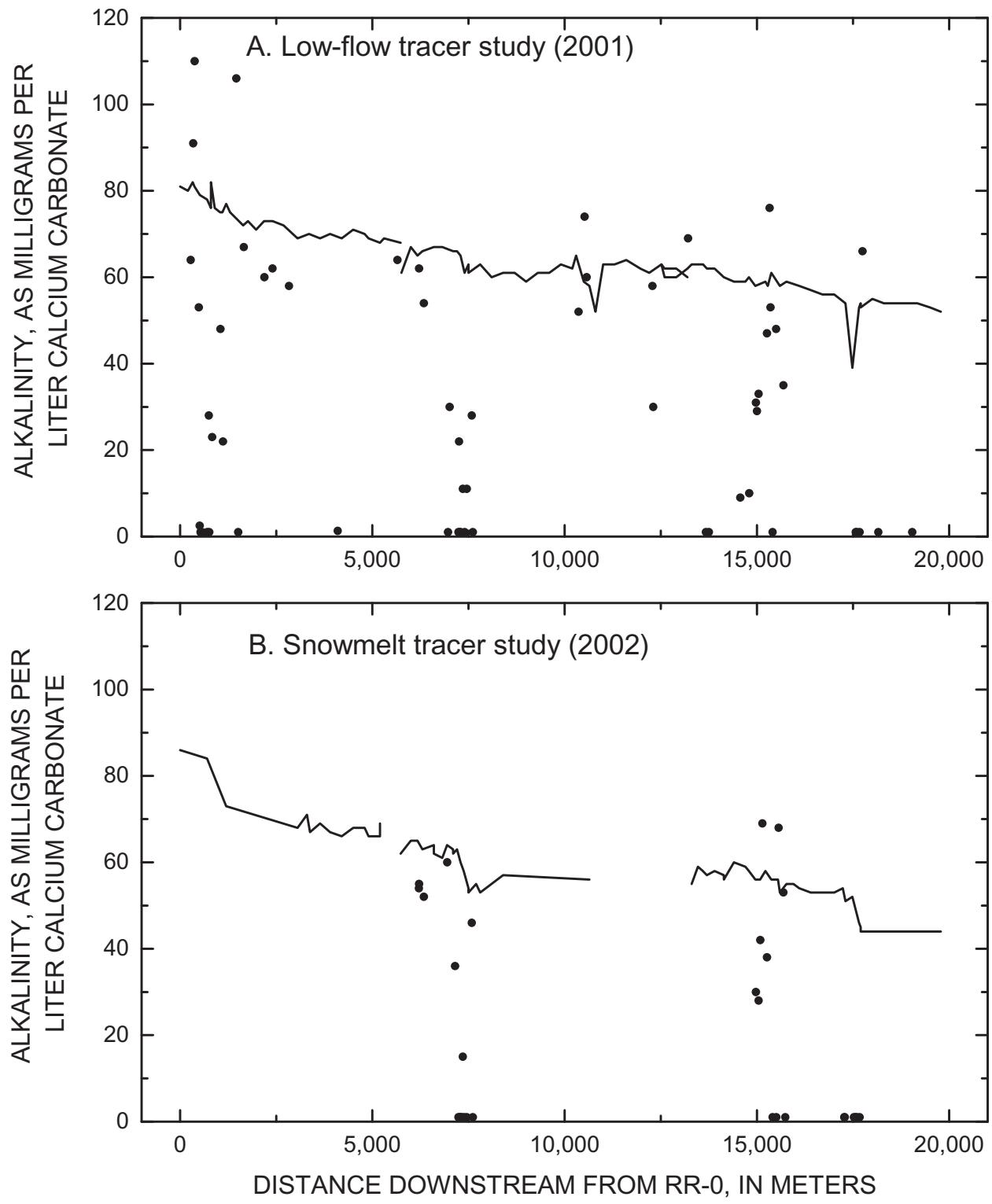
Figure 19. Alkalinity concentrations as a function of stream distance.
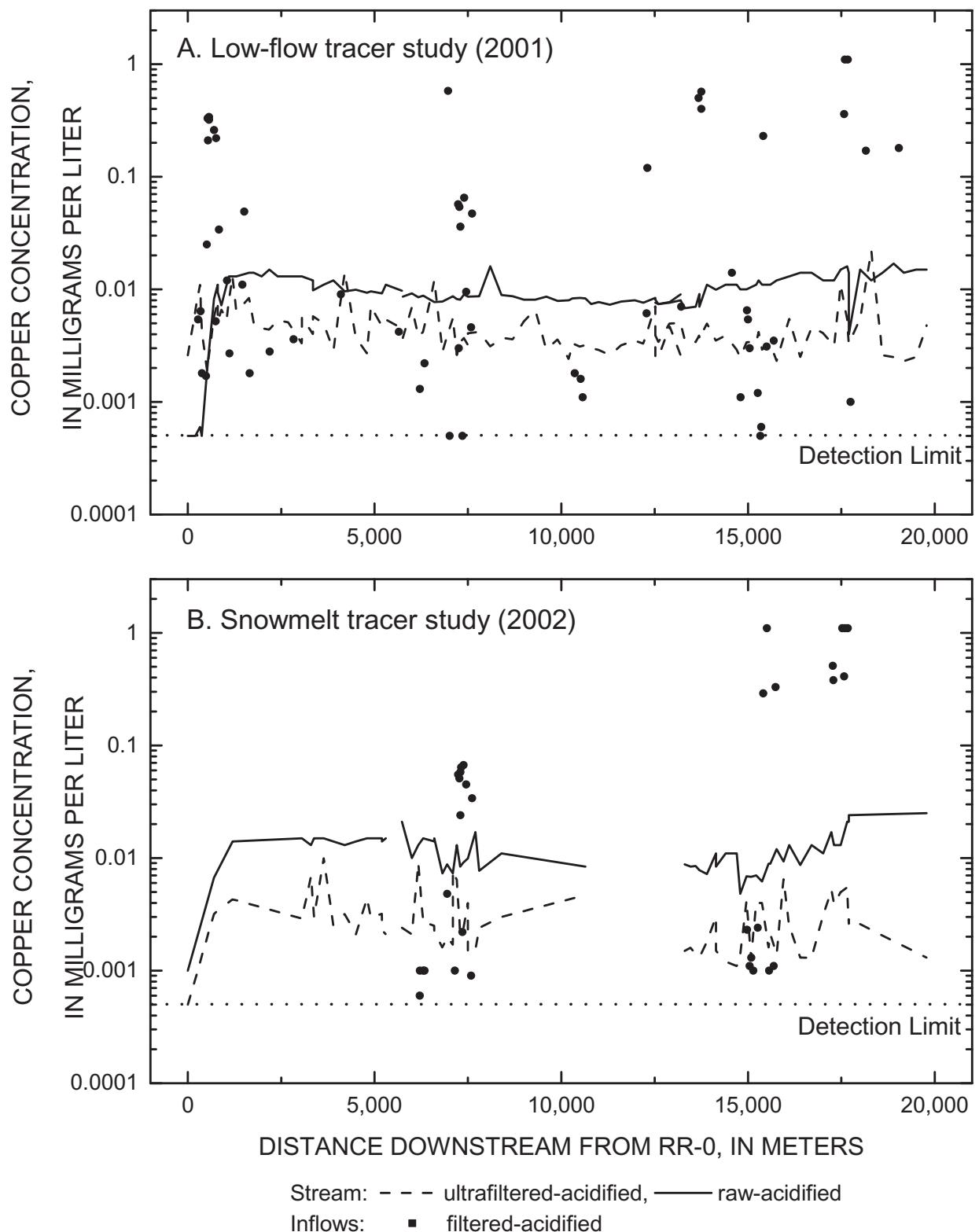
Figure 20. Copper concentrations as a function of stream distance.
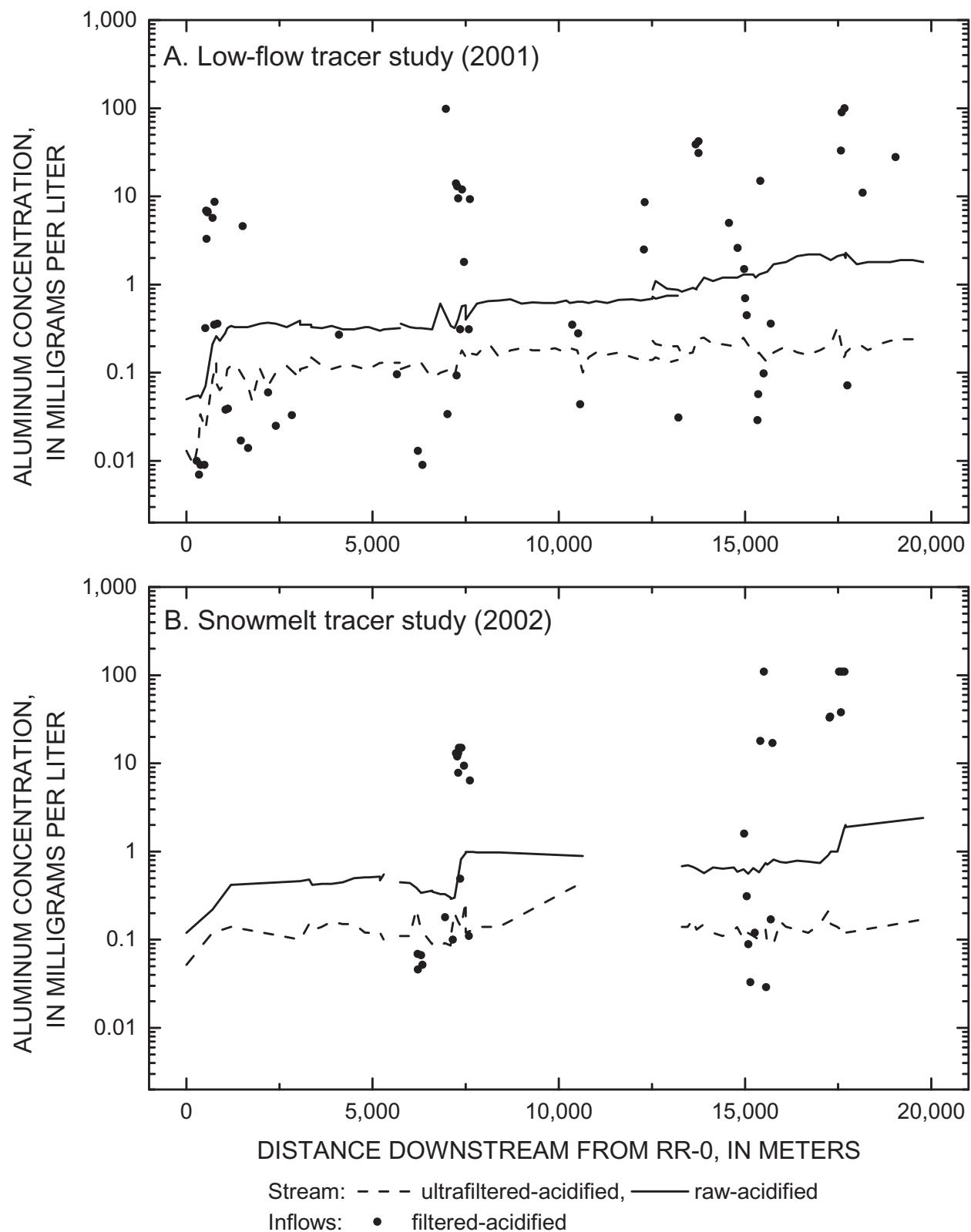
Figure 21. Aluminum concentrations as a function of stream distance.
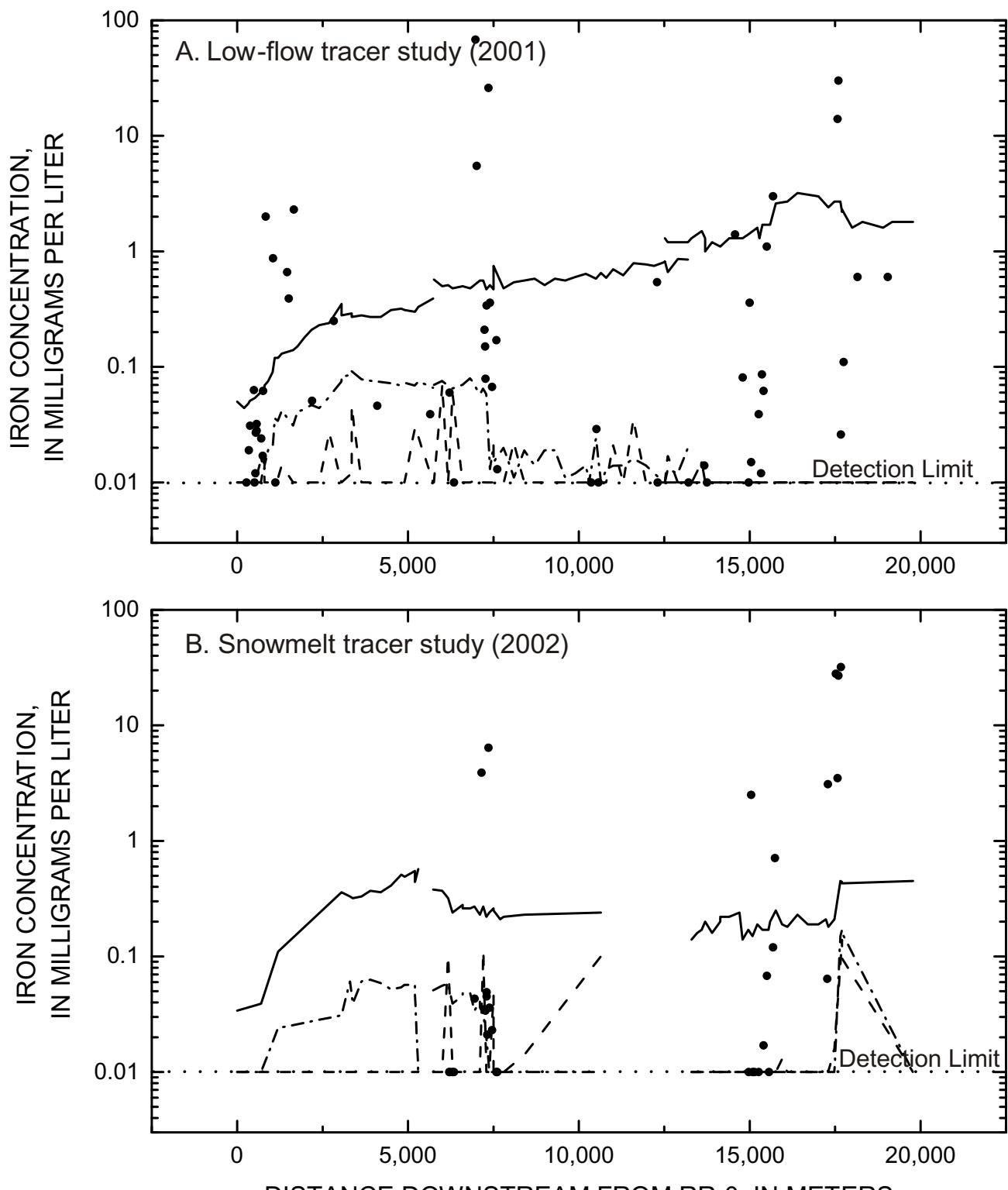
Figure 22. Iron concentrations as a function of stream distance.

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BOOK RATE