

Data Report for
Shenandoah Watershed Study
and
Virginia Trout Stream Sensitivity Study
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1. Data Reported:

- a) Analyses of Stream Samples (quarterly sample sites, weekly/episode sample sites, and synoptic survey sites)

Time period: 1 July 2003 through 30 June 2004

- b) Analyses of Precipitation Samples (weekly sample sites)

Time period: 1 July 2003 through 30 June 2004, collection interval for each sample must begin in this time period.

- c) Volatile residue analyses (quarterly samples)

Time period: 1 July 2003 through 30 June 2004

- d) Daily Stream Discharge

Time period: 1 October 2003 through 30 September 2004

2. Summary Description of Sampling Program

The reported data are for stream and precipitation samples collected from forested mountain watersheds in Shenandoah National Park and western Virginia. The reported data include chemical analysis of water samples collected quarterly, weekly, and more-frequently during storm flows, and volatile residue analyses of water samples collected quarterly in Shenandoah National Park.

Quarterly samples are collected at 60 headwater stream sites in 20 western Virginia counties. Most of the streams drain National Forest, National Park or other public land. Samples are collected during the last seven days of January, April, July, and October.

Weekly stream samples are collected at six sites in Shenandoah National Park. Weekly precipitation samples are collected at two sites in or near Shenandoah National Park. This report includes data for three streams for which continuous discharge measurements and flow-actuated episodic high-flow event samples are also obtained. This report includes analyses of weekly and episodic event samples, as well as estimated daily discharge.

A listing of all sites is provided in Table 1. Table 1A lists precipitation sites and Table 1B lists stream sites.

3. Data Collection and Analysis:

Staff and volunteers from the Department of Environmental Sciences at UVA (UVA), the Shenandoah National Park (SNP), the USDA Forest Service (USDA), the Virginia Department of Game and Inland Fisheries (VDGIF), and Trout Unlimited (TU) collect the samples at established sites.

Samples are collected in 500 mL low-density and 250 mL high-density polyethylene (Nalgene) bottles that are pre-washed with laboratory-grade detergent and hydrochloric acid and rinsed with de-ionized water. Prior to sample collection each bottle is rinsed three times with the sampled streamwater. Upon collection the samples are placed in insulated containers with refrigerant for delivery to the project laboratory at the Department of Environmental Sciences at the University of Virginia. Upon receipt at the laboratory the samples, minus an aliquot poured off for DOC and aluminum analysis (stream samples only), are preserved by addition of chloroform (0.5mL/500mL) and stored at ambient laboratory temperature (about 23 deg. C). The DOC/aluminum aliquot is preserved by refrigeration. Analyses include major acid-base constituents and DOC. Samples from all projects are analyzed concurrently. Methods of analysis are summarized in Table 2. DOC analysis is performed at the Appalachian Environmental Laboratory at the University of Maryland. All other analyses are performed at the Department of Environmental Sciences, University of Virginia.

The Paine Run, Piney River, and Staunton River watersheds are gauged using standard methods of the U.S. Geological Survey (Rantz et al., 1982). Discharge data for all sites having periods of missing gage data has been estimated using linear regression on discharge at other gauged sites within SNP.

4. Data Quality Assurance:

Quality assurance data for analysis of stream-water samples are obtained by charge balance determination and by analysis of reference samples. Percent charge balance error for the samples is defined as $100 \times (\text{sum cations} - \text{sum anions})/(\text{sum cations} + \text{sum anions})$.

The capability of a process to fall within specified limits is often quantified using the C_p or C_{pk} , also known as process capability ratios. The formulas for C_p and C_{pk} are:

$$C_p = \frac{USL - LSL}{6\sigma}$$
$$C_{pk} = \min\left(\frac{USL - \mu}{3\sigma}, \frac{\mu - LSL}{3\sigma}\right)$$

where USL and LSL are the upper specification limit and lower specification limit, respectively. When a process is “on target”, or no target is known, the C_p is appropriate. When the process is off-target, the C_{pk} provides a better metric of the process’s ability to remain within specification limits. For an off-target process, the C_p provides a metric of the process’s ability to operate within limits *if it were on-target*. Generally, a C_p or C_{pk} in excess of 1.3 is desired, in excess of 1.0 is acceptable (Montgomery, 1997). We report the C_{pk} because the average charge balance of our samples is less than zero. Confidence intervals for C_{pk} can be large for small sample size. Figures 1 and 2 graphically illustrate the frequency with which percent charge balance error falls within the target specification limits of $\pm 15\%$ and $\pm 30\%$ respectively, and give a confidence interval for the C_{pk} .

Actual Process Capability: Stream Sample Charge Balance

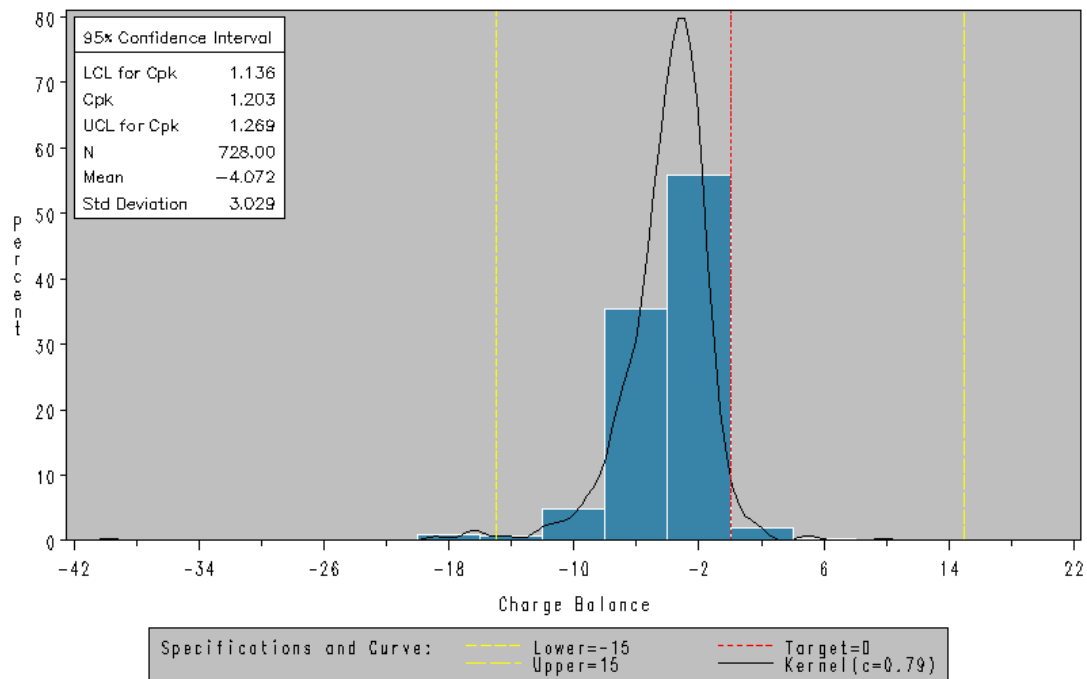


Figure 1

Actual Process Capability: Precipitation Sample Charge Balance

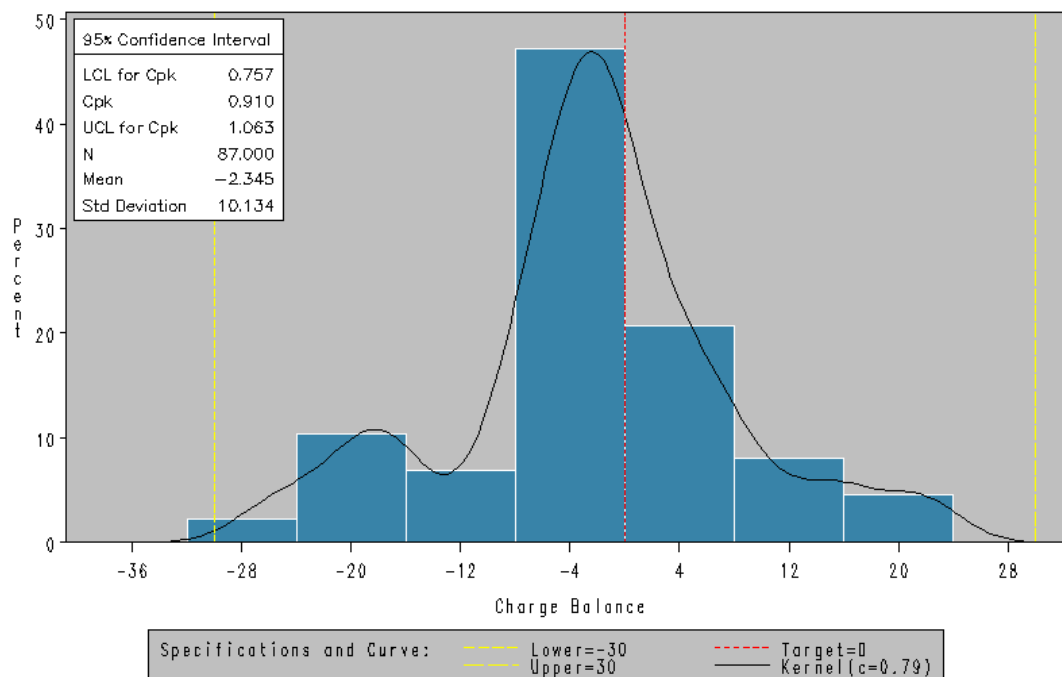


Figure 2

Reference samples were analyzed during all analysis sessions for pH, alkalinity, conductivity, cations, anions, aluminum, DOC, ammonium, and silica. Analysis results for reference samples are summarized in Table 3.

5. Inter-laboratory Quality Assurance:

The project laboratory at the Department of Environmental Sciences at the University of Virginia participates in inter-laboratory quality assurance (QA) studies administered by Environment Canada's National Water Research Institute (NWRI). Environmental programs in both the United States and Canada participate in these studies which are designed for laboratories analyzing acid rain and surface waters. The purpose of these QA studies is to provide a useful means of quantifying laboratory performance and data quality. The QA report for each study includes an assessment of any systematic bias and indicates any results flagged as a result of poor precision. A bias of greater than 5% is considered excessive by NWRI for most parameters in the studies. A result is flagged if its value is beyond that of the median (target) plus or minus the acceptable difference. The acceptable difference is calculated by NWRI using the following formula:

$(\text{Target} - \text{LLBAE}) \times \text{CEI} + \text{BAE}$, where

LLBAE = Lower Limit for use of Basic Acceptable Error

CEI = Concentration Error Increment

BAE = Basic Acceptable Error

(The values for these terms are determined by NWRI.)

Each study consists of ten samples, which are analyzed by the project laboratory by the same means as the project samples and usually included in analysis sessions along with project samples. The analysis results are then reported to the NWRI. We report results for the studies in which the project laboratory has participated to date in Table A.

Table A: Project Laboratory Results for NWRI Inter-laboratory Quality Assurance Studies

Study Date	pH	specific conductance	alkalinity-Gran	chloride	nitrate	sulfate	ammonia	reactive silica	sodium	potassium	calcium	magnesium
10-MAY-94	A	A	N	A	A	A	A	A	A	A	A	A
15-JAN-95	A	1	A	2	A	A	A	3	A	A	A	4
05-SEP-95	A	A	A	A	A	A	N	A	A	A	A	A
01-SEP-96	A	A	A	A	A	A	A	A	5	A	A	A
02-SEP-97	A	A	A	A	A	A	A	A	A	A	A	A
01-SEP-98	A	A	A	A	A	A	6	A	A	A	A	A
01-SEP-99	A	A	A	A	A	A	7	A	A	A	A	A
28-AUG-00	A	A	A	A	A	A	A	8	A	A	A	A
27-AUG-01	A	A	A	A	A	A	9	10	A	A	A	11
03-SEP-02	A	12	A	A	A	A	A	13	A	A	A	A
01-JUN-04	A	A	A	A	A	A	A	A	A	A	A	A

Notes:

- A) Acceptable
- N) No results
- 1) Although no results are flagged, ranking indicates a slight bias low.
- 2) Although no results are flagged, ranking indicates a slight bias low. After these results were submitted, the ion chromatography column used for chloride analyses was replaced.
- 3) Acceptable, except for high on one out of ten samples.
- 4) Although no results are flagged, ranking indicates a slight bias high.
- 5) Flagged very high on one out of ten samples. This was due to a calculation error made after analysis.
- 6) Two out of 10 samples flagged: one extremely low, one low.
- 7) Two out of 10 samples flagged: both very low.
- 8) Flagged extremely low on one sample out of 10.
- 9) Three out of 10 samples flagged: one extremely low, one very low, and one low.
- 10) Satisfactory, except for low on one out of 10 samples.
- 11) Flagged extremely high on one sample out of 10.
- 12) Four out of 10 samples flagged low. Ranking indicates a low bias: -4.64%, blank – 0.3536.
- 13) Two out of 10 samples flagged: one very low, one low.

6. Data Format:

- a. Analysis results are provided on CD in Excel format. Sample data and discharge, along with data definitions, are provided in spreadsheets
 - i. Stream Chemistry.xls
 - ii. Precipitation Chemistry.xls
 - iii. flow.xls
- b. Printouts of chemical analysis results are provided in Table 4A (stream) and Table 4B (precipitation).
- c. Volatile residue analysis results are listed in Table 5.

7. References

- Hirsch, R.M. and Slack, J.R., 1984. A nonparametric trend test for seasonal data with serial dependence. *Water Resources Research*, 20(6), 727-732.
- Rantz, S. E., *et al.*, 1982. Measurement and computation of streamflow: Volume 1. Measurement of stage and discharge. *U.S. Geol. Surv. Water-Supply Paper 2175*, U.S. Geological Survey, Washington, DC.
- Montgomery, D.C., 1997, *Introduction to Statistical Quality Control, Third Edition*, John Wiley & Sons, Inc., New York.

Table 1: Collection Sites

Table 1A: Precipitation sites

Site	Stream	County	USGS 7.5 minute Topo Map	Universal Transverse Mercator coordinates (meters-easting)	Universal Transverse Mercator coordinates (meters-northing)	elevation in feet
A01	MADISON RUN	ROCKINGHAM	GROTTOES	694785	4238318	1270
SHW1	NORTH FORK OF DRY RUN	MADISON	OLD RAG MTN	730981	4277666	3330

Table 1B: Stream sites

Site	Stream	County	USGS 7.5 minute Topo Map	Universal Transverse Mercator coordinates (meters- easting)	Universal Transverse Mercator coordinates (meters- northing)	elevation in feet	area in square kilometers
BA09	CUB RUN	BATH	BATH ALUM VA	613435	4218098	2080	1.89
DR01	DEEP RUN	ROCKINGHAM	GROTTOES	695591	4238919	1360	3.12
M002	LAUREL BED CREEK	RUSSELL	SALTVILLE	429939	4091720	3560	4.34
M003	LAUREL BED LAKE	RUSSELL	SALTVILLE	427573	4089919	3520	6.34
M004	RED BRANCH	RUSSELL	SALTVILLE	425196	4086953	2480	4.60
MAD2	MADISON RUN	ROCKINGHAM	MCGAHEYSVILLE	697162	4235896	1460	5.15
NFDR	NF OF THE DRY RUN	PAGE	THORNTON GAP	729933	4279183	1600	2.31
OB01	OREBANK CREEK	AUGUSTA	SHERANDO	.	.	1766	.
PAIN	PAINE RUN	AUGUSTA	CRIMORA	693243	4229927	1390	12.39
PINE	PINEY RIVER	RAPPAHANNOCK	THORNTON GAP	737523	4287155	1180	12.59

Site	Stream	County	USGS 7.5 minute Topo Map	Universal Transverse Mercator coordinates (meters- easting)	Universal Transverse Mercator coordinates (meters- northing)	elevation in feet	area in square kilometers
RH31	BLACK RUN (LOWER REACH)	ROCKINGHAM	RAWLEY SPRINGS VA	668830	4263828	1720	29.12
RH33	ROCKY RUN OF BRIERY BRANCH	ROCKINGHAM	BRIERY BRANCH VA	664435	4257544	1730	5.04
SK01	RAVENS RUN- UPPER	HIGHLAND		.	.	.	.
SK02	RAVENS RUN- LOWER	HIGHLAND		.	.	.	.
STAN	STAUNTON RIVER	MADISON	MADISON	729396	4258233	1010	10.50
VT01	HELTON CREEK	GRAYSON	WHITETOP MTN	448925	4055170	4000	3.57
VT02	LEWIS FORK	GRAYSON	WHITETOP MTN	453592	4060345	3620	6.67
VT03	FOX CREEK	GRAYSON	WHITETOP MTN	453518	4060913	3580	2.30
VT04	LITTLE WILSON CR	GRAYSON	TROUT DALE	457848	4054507	3500	5.38
VT05	RACCOON BRANCH	SMYTH	TROUT DALE	461965	4066538	2740	4.37
VT06	ROWLAND CREEK	SMYTH	WHITETOP MTN	449700	4065483	2585	7.63
VT09	ROARING FORK- LOWER	TAZEWELL	HUTCHINSON ROCK	457305	4098662	2180	13.45
VT10	LAUREL RUN	BATH	BURNSVILLE	616516	4224450	2380	3.45
VT11	MARE RUN	BATH	WARM SPRINGS	608742	4208518	2030	6.02
VT12	PANTHER RUN	BATH	WARM SPRINGS	608750	4208463	2030	4.04
VT14	LITTLE WILSON CR	BATH	HEALING SPRINGS	608402	4204360	1860	3.27
VT15	PORTERS CREEK	BATH	HEALING SPRINGS	607872	4203442	1980	2.12

Site	Stream	County	USGS 7.5 minute Topo Map	Universal Transverse Mercator coordinates (meters- easting)	Universal Transverse Mercator coordinates (meters- northing)	elevation in feet	area in square kilometers
VT16	N BR SIMPSON CR	ALLEGHANY	LONGDALE FURNACE	616905	4186568	1400	7.65
VT18	BEARWALLOW RUN	HIGHLAND	THORNWOOD	618975	4265821	3140	4.11
VT19	LOST RUN	HIGHLAND	THORNWOOD	619016	4266075	3140	2.43
VT22	CORNELIUS CREEK	BOTETOURT	ARNOLD VALLEY	627860	4154336	1460	4.90
VT23	FALLINGWATER CR	BOTETOURT	PEAKS OF OTTER	624227	4147778	1660	4.55
VT24	SHAWVERS RUN	CRAIG	POTTS CREEK	572792	4163370	1860	5.92
VT25	COVE BRANCH	CRAIG	POTTS CREEK	576985	4158727	1840	10.67
VT26	PINE SWAMP BRANCH	GILES	INTERIOR	534934	4141489	2380	1.95
VT28	NF STONY CREEK	GILES	INTERIOR	538618	4143428	2740	20.92
VT29	WAR SPUR BRANCH	GILES	WAITEVILLE	546564	4138819	2320	3.19
VT31	NOBUSINESS CREEK	GILES	MECHANICSBURG	507203	4121194	2410	17.42
VT32	LAUREL CREEK	GILES	INTERIOR	537402	4136979	3090	4.59
VT33	GUY'S RUN	ROCKBRIDGE	GOSHEN	632054	4199009	1620	10.05
VT34	LAUREL RUN	ROCKBRIDGE	GOSHEN	635745	4198824	1270	8.43
VT36	MEADOW RUN	AUGUSTA	CRIMORA	691758	4225462	1480	8.86
VT37	NORTH RIVER	AUGUSTA	PALO ALTO	649882	4251522	2660	12.36
VT38	RAMSEYS DRAFT	AUGUSTA	WEST AUGUSTA	643961	4241976	2320	23.94
VT39	KENNEDY CREEK	AUGUSTA	BIG LEVELS	674300	4203231	1840	5.98

Site	Stream	County	USGS 7.5 minute Topo Map	Universal Transverse Mercator coordinates (meters- easting)	Universal Transverse Mercator coordinates (meters- northing)	elevation in feet	area in square kilometers
VT40	MILLS CREEK	AUGUSTA	BIG LEVELS	675131	4200825	1980	6.64
VT41	ST MARYS R- LOWER	AUGUSTA	VESUVIUS	663725	4198876	1740	26.93
VT42	HUNTING CREEK	BEDFORD	SNOWDEN	635627	4154888	1880	5.52
VT43	GREASY SPRING BR	AMHERST	MONTEBELLO	662531	4183685	2460	2.63
VT44	GEORGES CREEK	AMHERST	MONTEBELLO	664723	4180372	1600	3.46
VT45	OTTER CREEK	AMHERST	BUENA VISTA	646478	4166256	1300	3.65
VT46	LITTLE COVE CREEK	AMHERST	FORKS OF BUFFALO	658616	4176700	1660	3.51
VT48	BIG MACK CREEK	PULASKI	HIWASSEE	530259	4089949	2160	19.39
VT49	LITTLE STONY CREEK-LOWER	SHENANDOAH	WOLF GAP	704088	4312384	1530	11.09
VT50	LAUREL RUN	SHENANDOAH	WOLF GAP	696758	4308486	1720	4.60
VT51	JEREMYS RUN	PAGE	LURAY	727652	4288251	930	21.97
VT52	MORGAN RUN	PAGE	TENTH LEGION	703720	4266381	1600	3.29
VT53	TWO MILE RUN	ROCKINGHAM	MCGAHEYSVILLE	703527	4245225	1220	5.56
VT54	GERMAN RIVER- UPPER	ROCKINGHAM	COW KNOB	668399	4283080	2500	4.86
VT56	WOLF RUN	ROCKINGHAM	REDDISH KNOB	662303	4254949	1950	5.79
VT57	BLACK RUN- LOWER	ROCKINGHAM	RAWLEY SPRINGS	668572	4263923	1720	28.65
VT58	BROKENBACK RUN	MADISON	OLD RAG MTN	735102	4272372	1080	9.86
VT61	NF THORNTON RIVER	RAPPAHANNOCK	THORNTON GAP	736982	4286022	1100	19.08

Site	Stream	County	USGS 7.5 minute Topo Map	Universal Transverse Mercator coordinates (meters- easting)	Universal Transverse Mercator coordinates (meters- northing)	elevation in feet	area in square kilometers
VT62	HAZEL RUN	RAPPAHANNOCK	OLD RAG MTN	738348	4277397	1080	13.24
VT63	SHOE CREEK	NELSON	MASSIES MILL	666996	4184076	1420	12.60
VT64	CRABTREE CREEK	NELSON	MASSIES MILL	669052	4190771	1580	3.53
VT65	MEADOW CREEK	NELSON	MASSIES MILL	668843	4190742	1620	2.74
VT66	ROSE RIVER	MADISON	OLD RAG MTN	729550	4266066	1120	23.73
VT67	EF CHESTNUT CREEK-LOWER	GRAYSON	LAMBSBURG	518771	4047289	2620	3.50
VT75	WHITE OAK CANYON R	MADISON	OLD RAG MTN	730905	4268968	1160	14.08
VT76	BELFAST CREEK	ROCKBRIDGE	SNOWDEN	633209	4159337	1040	2.07
VT77	MATTS CREEK	BEDFORD	SNOWDEN	639963	4162295	840	2.77
VT78	LITTLE TUMBLING CREEK	TAZEWELL	BROADFORD	438250	4091591	2620	17.90
VT80	LITTLE STONY CREEK-UPPER	SHENANDOAH	WOLF GAP	.	.	1720	.
VT81	EF CHESTNUT CREEK-UPPER	GRAYSON	LAMBSBURG	.	.	0	.
WOR1	WHITE OAK RUN	ROCKINGHAM	MCGAHEYSVILLE	696960	4235772	1480	5.13

Table 2: Summary Of Laboratory Analytical Methods

<u>Aliquot</u>	<u>Instrumentation</u>	<u>Method</u>
a. pH	Orion model 811 pH meter with Corning Combination pH Electrode (Cat. No. 476087) used for analyses through 10/28/03. Orion model 290A+ pH meter with Orion model 9107 pH electrode with ATC used for analyses 10/30/03 and later.	Potentiometric measurement with open-system samples. Within-aliquot stability (≤ 0.01 units/min.) and sequential-aliquot agreement (≤ 0.03 units difference) obtained for all readings.
b. Alkalinity	Orion model 811 pH meter with Corning Combination pH Electrode (Cat. No. 476087) used for analyses through 10/28/03. Orion model 290A+ pH meter with Orion model 9107 pH electrode with ATC used for analyses 10/30/03 and later.	Two-point Gran titration with 100 ml sample volumes and 0.005 N HCl titrant. Titration endpoints were approx. 4.5 and 4.2. Within-aliquot stability (≤ 0.01 units/min.) was obtained for endpoint determinations.
c. Sulfate, Chloride, Nitrate	Dionex Model 14 Ion Chromatograph; HPIC AS14 Separator Column; HPIC AG14 Guard Column; AMMS Anion Micro-Membrane Suppressor	Simultaneous determination by ion chromatography. Injection volume: 200 μ l. Eluent: 1.5 mL 4.8 mM Na_2CO_3 /0.6mM NaHCO_3 /minute. Regenerant: 3-4 ml 0.035 N H_2SO_4 /minute.
d. Calcium, Magnesium, Potassium, Sodium	Thermo Jarrell Ash AA/AE Spectrophotometer Model Smith-Hieftje 22	Flame atomic absorption spectrophotometry. Li/La added to aliquot.
e. Silica	Technicon Autoanalyzer II	Colorimetric detection by molybdate blue technique.
f. Conductivity	VWR-brand (manufactured by Control Company) NIST Traceable digital conductivity meter with automatic temperature compensation to 25 degrees C.	Digital meter and conductivity probe. Readings obtained at ambient lab temperature (about 23 deg. C).
g. Aluminum, Total and Organic Monomeric	Technicon Autoanalyzer II	Colorimetric detection with open-system samples by pyrocatechol violet technique. Fractionation with ion-exchange resin.
h. Ammonium	Technicon Autoanalyzer II	Colorimetric detection by Indophenol blue technique.
i. Volatile Residue	Thermolyne 48000 Furnace	Filtration through glass fiber filter; volatilization in furnace at 500 degrees C.
i. Dissolved Organic Carbon	Dohrmann Phoenix 8000 TOC Analyzer	Ultra-violet promoted persulfate oxidation technique followed by infrared detection. External sparging is used to remove inorganic carbon.

Table 3: Summary of Reference Sample and Field Duplicate Analyses for Sample Period: July 2003 through June 2004

3.1 Analysis of samples used at University of Virginia

3.1.A Reference Samples

Concentrations in $\mu\text{eq/L}$ (alkalinity and ions), $\mu\text{mol/L}$ (SiO_2), $\mu\text{S/cm}$ (conductivity), $\mu\text{g/L}$ (T_{AL} =total monomeric aluminum, O_{AL} =organic monomeric aluminum), and mg/L (DOC).

Chloroform (1 mL/L) added to bulk streamwater samples (other than aluminum aliquots).

Natural audit samples provided by Environmental Assessment Department, Lockheed Engineering and Sciences. Listed target values are based on data collected from multiple laboratories. Samples are maintained at approximately 4 °C. Chloroform (1 mL/L) added (other than aluminum aliquots).

Synthetic audit samples purchased from High Purity Standards, Charleston, South Carolina. Listed target values are provided by High Purity Standards. Samples are maintained at approximately 4°C. Chloroform (1 mL/L) added (other than aluminum aliquots).

CRM – Certified Reference Materials purchased from Environment Canada National Water Research Institute. Target values for these samples are derived from several performance evaluation studies in which multiple laboratories participated. Samples are maintained at approximately 4°C. Chloroform (1 mL/L) added (other than aluminum aliquots).

C_p is only reported for $n \geq 30$. See text for definition of C_p .

QC Type	Site ID	Date	n	Analyte	Mean	Std. Dev.	Min	Max	Target	Recovery low	Recovery high	Std Error	C_p
Bulk	NFDR	03/07/2001	17	ALK	48.83	2.27	45.00	54.40	.	.	.	0.55	.
Bulk	NFDR	03/07/2001	1	CL	29.78	.	29.78	29.78	.	.	.	.	.
Bulk	NFDR	03/07/2001	18	COND	24.72	0.36	24.40	25.70	.	.	.	0.09	.
Bulk	NFDR	03/07/2001	1	NO3	21.49	.	21.49	21.49	.	.	.	.	.
Bulk	NFDR	03/07/2001	20	PH	6.30	0.18	6.11	6.67	.	.	.	0.04	.

QC Type	Site ID	Date	n	Analyte	Mean	Std. Dev.	Min	Max	Target	Recovery low	Recovery high	Std Error	C _p
Bulk	NFDR	03/07/2001	1	SO4	98.70	.	98.70	98.70	.	.	.	.	.
Bulk	NFDR	10/23/2003	39	ALK	73.85	4.28	66.11	81.89	.	.	.	0.69	0.39
Bulk	NFDR	10/23/2003	3	CA	75.52	4.84	72.41	81.09	.	.	.	2.79	.
Bulk	NFDR	10/23/2003	7	CL	30.75	0.38	30.26	31.33	.	.	.	0.14	.
Bulk	NFDR	10/23/2003	42	COND	25.35	0.33	24.70	26.00	.	.	.	0.05	1.01
Bulk	NFDR	10/23/2003	3	K	10.07	0.88	9.50	11.09	.	.	.	0.51	.
Bulk	NFDR	10/23/2003	3	MG	47.24	0.38	46.83	47.57	.	.	.	0.22	.
Bulk	NFDR	10/23/2003	3	NA	72.37	2.60	70.34	75.30	.	.	.	1.50	.
Bulk	NFDR	10/23/2003	7	NO3	7.19	0.13	6.94	7.31	.	.	.	0.05	.
Bulk	NFDR	10/23/2003	43	PH	6.10	0.05	6.00	6.27	.	.	.	0.01	1.02
Bulk	NFDR	10/23/2003	6	SIO2	180.12	1.62	178.92	182.52	.	.	.	0.66	.
Bulk	NFDR	10/23/2003	7	SO4	92.62	0.74	91.17	93.52	.	.	.	0.28	.
Bulk	NFDR	03/09/2005	1	CA	69.46	.	69.46	69.46	.	.	.	.	.
Bulk	NFDR	03/09/2005	2	COND	24.00	0.42	23.70	24.30	.	.	.	0.30	.
Bulk	NFDR	03/09/2005	1	K	7.96	.	7.96	7.96	.	.	.	.	.
Bulk	NFDR	03/09/2005	1	MG	43.70	.	43.70	43.70	.	.	.	.	.
Bulk	NFDR	03/09/2005	1	NA	69.82	.	69.82	69.82	.	.	.	.	.
Bulk	PAIN	02/06/2001	1	COND	21.80	.	21.80	21.80	.	.	.	.	.
Bulk	PAIN	05/20/2003	42	ALK	-5.52	10.05	-29.56	4.64	.	.	.	1.55	0.17
Bulk	PAIN	05/20/2003	1	CL	23.86	.	23.86	23.86	.	.	.	.	.
Bulk	PAIN	05/20/2003	55	COND	24.77	2.42	21.80	29.30	.	.	.	0.33	0.14
Bulk	PAIN	05/20/2003	1	NO3	0.11	.	0.11	0.11	.	.	.	.	.
Bulk	PAIN	05/20/2003	56	PH	5.03	0.24	4.60	5.34	.	.	.	0.03	0.11
Bulk	PAIN	05/20/2003	2	SIO2	86.25	0.07	86.20	86.30	.	.	.	0.05	.
Bulk	PAIN	05/20/2003	1	SO4	115.84	.	115.84	115.84	.	.	.	.	.
Bulk	PAIN	05/24/2004	6	ALK	4.48	2.13	1.90	7.82	.	.	.	0.87	.
Bulk	PAIN	05/24/2004	2	CA	23.05	0.42	22.75	23.35	.	.	.	0.30	.

QC Type	Site ID	Date	n	Analyte	Mean	Std. Dev.	Min	Max	Target	Recovery low	Recovery high	Std Error	C _p
Bulk	PAIN	05/24/2004	7	CL	23.83	0.40	23.24	24.31	.	.	.	0.15	.
Bulk	PAIN	05/24/2004	6	COND	20.42	0.32	19.90	20.80	.	.	.	0.13	.
Bulk	PAIN	05/24/2004	2	K	38.89	1.34	37.94	39.83	.	.	.	0.95	.
Bulk	PAIN	05/24/2004	2	MG	45.27	0.12	45.18	45.35	.	.	.	0.08	.
Bulk	PAIN	05/24/2004	2	NA	21.21	0.46	20.88	21.53	.	.	.	0.33	.
Bulk	PAIN	05/24/2004	7	NO3	0.68	0.16	0.42	0.90	.	.	.	0.06	.
Bulk	PAIN	05/24/2004	6	PH	5.48	0.12	5.38	5.71	.	.	.	0.05	.
Bulk	PAIN	05/24/2004	2	SIO2	68.37	0.06	68.33	68.41	.	.	.	0.04	.
Bulk	PAIN	05/24/2004	7	SO4	105.80	1.71	103.67	108.12	.	.	.	0.65	.
Bulk	PAIN	12/07/2004	2	CA	25.30	0.35	25.05	25.55	.	.	.	0.25	.
Bulk	PAIN	12/07/2004	2	COND	28.65	3.46	26.20	31.10	.	.	.	2.45	.
Bulk	PAIN	12/07/2004	2	K	39.74	0.31	39.53	39.96	.	.	.	0.22	.
Bulk	PAIN	12/07/2004	2	MG	46.50	0.12	46.42	46.58	.	.	.	0.08	.
Bulk	PAIN	12/07/2004	2	NA	21.10	0.25	20.92	21.27	.	.	.	0.17	.
Bulk	PAIN	12/07/2004	3	SIO2	92.54	0.68	91.93	93.28	.	.	.	0.39	.
CRM	AE02	04/05/2004	9	CA	7.83	0.27	7.29	8.13	8.18	89.02	99.39	0.09	.
CRM	AE02	04/05/2004	10	CL	3.59	0.14	3.36	3.78	3.38	99.17	111.67	0.04	.
CRM	AE02	04/05/2004	9	K	0.73	0.11	0.54	0.85	0.77	70.05	110.03	0.04	.
CRM	AE02	04/05/2004	9	MG	2.66	0.18	2.39	2.96	2.47	96.68	120.01	0.06	.
CRM	AE02	04/05/2004	9	NA	2.87	0.16	2.52	3.05	2.92	86.55	104.46	0.05	.
CRM	AE02	04/05/2004	8	NH4	11.50	0.15	11.19	11.69	11.42	98.03	102.39	0.05	.
CRM	AE02	04/05/2004	10	NO3	17.23	0.13	16.97	17.39	16.75	101.32	103.82	0.04	.
CRM	AE02	04/05/2004	5	SIO2	0.49	0.16	0.28	0.70	0.64	44.13	109.08	0.07	.
CRM	AE02	04/05/2004	10	SO4	38.18	0.26	37.88	38.69	37.44	101.17	103.33	0.08	.
CRM	RA97	04/05/2004	8	CA	136.49	4.09	130.04	140.22	131.74	98.71	106.44	1.45	.
CRM	RA97	04/05/2004	8	CL	15.88	0.13	15.68	16.05	14.83	105.70	108.18	0.05	.
CRM	RA97	04/05/2004	8	K	3.98	0.17	3.81	4.22	3.92	97.37	107.84	0.06	.

QC Type	Site ID	Date	n	Analyte	Mean	Std. Dev.	Min	Max	Target	Recovery low	Recovery high	Std Error	C _p
CRM	RA97	04/05/2004	8	MG	81.01	0.72	80.33	82.38	76.87	104.50	107.17	0.26	.
CRM	RA97	04/05/2004	8	NA	12.65	0.37	12.27	13.40	12.01	102.17	111.59	0.13	.
CRM	RA97	04/05/2004	8	NH4	12.46	0.05	12.41	12.58	12.84	96.63	97.92	0.02	.
CRM	RA97	04/05/2004	4	NO3	156.00	0.80	155.20	157.06	148.95	104.20	105.44	0.40	.
CRM	RA97	04/05/2004	5	SIO2	4.71	0.39	4.17	5.10	3.94	105.71	129.27	0.17	.
CRM	RA97	04/05/2004	8	SO4	116.23	0.36	115.86	116.81	109.82	105.49	106.36	0.13	.
De-ionized	DIW	.	55	ALK	-0.47	2.06	-5.60	4.35	.	.	.	0.28	0.81
De-ionized	DIW	.	8	CA	-0.24	0.30	-0.55	0.25	.	.	.	0.11	.
De-ionized	DIW	.	10	CL	0.14	0.08	-0.01	0.23	.	.	.	0.03	.
De-ionized	DIW	.	65	COND	0.17	0.10	0.00	0.50	.	.	.	0.01	3.43
De-ionized	DIW	.	8	K	-0.02	0.12	-0.23	0.10	.	.	.	0.04	.
De-ionized	DIW	.	8	MG	0.25	0.21	0.02	0.58	.	.	.	0.07	.
De-ionized	DIW	.	8	NA	-0.08	0.15	-0.35	0.13	.	.	.	0.05	.
De-ionized	DIW	.	11	NH4	-0.04	0.10	-0.22	0.11	.	.	.	0.03	.
De-ionized	DIW	.	10	NO3	0.04	0.01	0.02	0.05	.	.	.	0.00	.
De-ionized	DIW	.	1	O_AL	0.79	.	0.79	0.79	.	.	.	.	.
De-ionized	DIW	.	7	SIO2	0.25	0.35	-0.40	0.70	.	.	.	0.13	.
De-ionized	DIW	.	10	SO4	0.12	0.05	0.04	0.19	.	.	.	0.01	.
De-ionized	DIW	.	5	T_AL	0.54	0.43	0.18	1.26	.	.	.	0.19	.
Mineral	1185	09/16/1992	1	SO4	83.87	.	83.87	83.87	83.20	100.80	100.80	.	.
Natural	FN10	01/01/1990	3	O_AL	47.48	4.27	44.95	52.41	42.00	107.01	124.79	2.46	.
Natural	FN10	01/01/1990	6	T_AL	143.13	3.13	137.90	146.96	158.00	87.28	93.01	1.28	.
Natural	FN13	04/14/1994	8	CA	106.52	0.87	104.99	107.34	99.26	105.78	108.14	0.31	.
Natural	FN13	04/14/1994	16	CL	10.69	0.13	10.49	10.94	11.91	88.08	91.88	0.03	.
Natural	FN13	04/14/1994	8	K	8.52	0.07	8.45	8.65	8.95	94.44	96.74	0.02	.
Natural	FN13	04/14/1994	8	MG	40.15	0.35	39.75	40.66	38.74	102.62	104.96	0.12	.
Natural	FN13	04/14/1994	8	NA	24.71	0.24	24.27	24.93	25.39	95.60	98.17	0.08	.

QC Type	Site ID	Date	n	Analyte	Mean	Std. Dev.	Min	Max	Target	Recovery low	Recovery high	Std Error	C _p
Natural	FN13	04/14/1994	11	SIO2	18.51	0.49	17.38	19.11	17.75	97.94	107.68	0.15	.
Natural	FN13	04/14/1994	16	SO4	120.36	0.73	119.43	122.03	115.09	103.77	106.03	0.18	.
Natural	FN15	04/14/1994	8	CA	118.29	1.19	116.47	119.91	111.80	104.17	107.25	0.42	.
Natural	FN15	04/14/1994	16	CL	14.71	0.15	14.52	14.95	15.75	92.21	94.90	0.04	.
Natural	FN15	04/14/1994	8	K	11.16	0.13	10.93	11.29	11.35	96.31	99.47	0.05	.
Natural	FN15	04/14/1994	8	MG	30.50	0.24	30.12	30.78	29.67	101.53	103.75	0.09	.
Natural	FN15	04/14/1994	8	NA	30.86	0.20	30.58	31.19	31.08	98.38	100.34	0.07	.
Natural	FN15	04/14/1994	16	NO3	23.24	0.12	22.99	23.46	22.00	104.50	106.63	0.03	.
Natural	FN15	04/14/1994	2	O_AL	59.89	2.96	57.80	61.99	35.42	163.19	175.03	2.10	.
Natural	FN15	04/14/1994	11	SIO2	70.02	0.62	69.29	70.90	69.26	100.05	102.37	0.19	.
Natural	FN15	04/14/1994	16	SO4	135.85	0.54	134.89	136.74	130.92	103.03	104.45	0.14	.
Natural	FN15	04/14/1994	7	T_AL	99.70	1.40	97.09	101.31	165.08	58.81	61.37	0.53	.
Natural	FN16	04/14/1994	7	CA	295.15	2.77	291.32	299.95	285.96	101.87	104.89	1.05	.
Natural	FN16	04/14/1994	14	CL	27.49	0.43	27.04	28.45	27.67	97.75	102.84	0.12	.
Natural	FN16	04/14/1994	7	K	19.34	0.09	19.23	19.51	19.29	99.67	101.13	0.03	.
Natural	FN16	04/14/1994	7	MG	136.52	1.48	134.40	139.01	131.33	102.33	105.84	0.56	.
Natural	FN16	04/14/1994	7	NA	44.51	0.59	43.98	45.76	44.13	99.65	103.69	0.22	.
Natural	FN16	04/14/1994	14	NO3	4.53	0.38	4.03	5.12	5.93	67.84	86.30	0.10	.
Natural	FN16	04/14/1994	11	SIO2	37.51	0.45	36.89	38.18	37.30	98.89	102.36	0.14	.
Natural	FN16	04/14/1994	14	SO4	177.47	0.85	176.20	178.69	174.33	101.07	102.50	0.23	.
Synthetic	HPS1	03/22/2000	7	CL	27.84	0.33	27.38	28.34	28.20	97.10	100.50	0.13	.
Synthetic	HPS1	03/22/2000	7	NO3	32.91	0.28	32.44	33.17	32.20	100.75	103.00	0.11	.
Synthetic	HPS1	03/22/2000	5	SIO2	84.42	0.41	83.76	84.88	88.81	94.32	95.57	0.18	.
Synthetic	HPS1	03/22/2000	7	SO4	104.35	0.73	103.29	105.29	104.00	99.32	101.24	0.28	.
Synthetic	HPS2	03/22/2000	7	NH4	14.53	0.06	14.46	14.63	13.85	104.40	105.60	0.02	.

Table 3.1.B: Field Blanks Used

Site	Date	Time
PINE	2003-07-30	0930
PINE	2003-11-06	1055
PINE	2004-01-28	1230
PINE	2004-04-28	1130

Table 3.1.C: Field Blank Statistics

Analyte	Mean	N	Standard Deviation	Standard Error
ALK	-2.45	4	4.32	2.16
CA	-0.11	4	0.37	0.18
CL	0.19	4	0.07	0.04
COND	0.75	4	0.31	0.16
DOC	0.02	4	0.08	0.04
H	1.46	4	0.24	0.12
K	0.02	4	0.10	0.05
MG	0.41	4	0.12	0.06
NA	-0.13	4	0.22	0.11
NO3	0.02	4	0.01	0.00
SIO2	0.83	4	0.42	0.21
SO4	0.14	4	0.09	0.05
T_AL	0.91	4	0.24	0.12

Table 3.1.D: Detection Limits

Detection limits are determined from DIW QC samples analyzed during the period. The t column is the value of t for the Student's t distribution with $n-1$ d.f. such that $\text{Prob}(x < t) = 0.99$. The Method Detection Limit $\text{MDL} = t \cdot \sigma$, the Minimum Level of Quantitation $\text{ML} = 3.18 \cdot \text{MDL}$, and the Practical Quantitation Limit $\text{PQL} = 5 \cdot \text{MDL}$.

type	site_id	n	analyte	mean	Standard Deviation σ	t	MDL	ML	PQL
De-ionized	DIW	8	CA	-0.24	0.30	2.9980	0.905	2.877	4.523
De-ionized	DIW	10	CL	0.14	0.08	2.8214	0.237	0.754	1.186
De-ionized	DIW	65	COND	0.17	0.10	2.3860	0.232	0.738	1.160
De-ionized	DIW	8	K	-0.02	0.12	2.9980	0.367	1.167	1.834
De-ionized	DIW	8	MG	0.25	0.21	2.9980	0.630	2.005	3.152
De-ionized	DIW	8	NA	-0.08	0.15	2.9980	0.456	1.449	2.278
De-ionized	DIW	11	NH4	-0.04	0.10	2.7638	0.273	0.867	1.363
De-ionized	DIW	10	NO3	0.04	0.01	2.8214	0.029	0.091	0.143
De-ionized	DIW	1	O_AL	0.79	.	.	.	.	.
De-ionized	DIW	7	SIO2	0.25	0.35	3.1427	1.115	3.545	5.574
De-ionized	DIW	10	SO4	0.12	0.05	2.8214	0.132	0.421	0.662
De-ionized	DIW	5	T_AL	0.54	0.43	3.7469	1.617	5.142	8.085

Table 3.1.E: Duplicates Collected

Site	Date	Time
VT12	2004-05-04	1313
VT18	2004-04-28	1320
VT23	2003-07-28	1250
VT24	2003-10-27	1130
VT34	2004-01-29	1215
VT37	2003-07-25	0845
VT37	2004-04-26	0815
VT39	2003-10-27	1215
VT44	2003-10-25	1355
VT51	2003-10-30	0830
VT52	2004-04-26	1230
VT54	2004-02-02	0830
VT57	2003-07-25	1100
VT57	2003-10-29	0930
VT63	2003-07-27	1310
VT66	2004-01-29	1125
VT67	2004-02-05	1030
VT75	2003-07-31	1525
VT75	2004-04-30	1330

Table 3.1.F: Duplicate Statistics

This table gives the mean, standard deviation, and standard deviation of the mean of the differences between duplicates taken during the period, for samples where both values exceeded the MDL listed in Table 3.1.E, for those analytes that had MDLs.

RPD = $200 \cdot (a-b)/(a+b)$, where a and b are the two duplicate values.

Analyte	Mean of Duplicate Differences	N	Standard Deviation	Standard Error	Median RPD	95th Percentile of RPDs
ALK	1.13	18	14.15	3.33	4.93	40.73
CA	-0.24	19	0.67	0.15	0.47	2.94
CL	-0.01	19	0.20	0.05	0.35	1.86
COND	0.04	19	0.27	0.06	0.65	2.92
H	-0.02	19	0.10	0.02	9.22	108.70
MG	0.07	19	0.46	0.11	0.45	1.43
NA	0.06	19	0.48	0.11	0.63	3.08
NO3	0.57	17	1.72	0.42	8.14	172.92
PH	0.03	19	0.16	0.04	0.62	7.89
SIO2	-0.04	19	0.21	0.05	0.19	0.47
SO4	-0.09	19	0.85	0.19	0.53	6.27
T_AL	-1.97	1	.	.	7.36	7.36

Table 3.2 Analysis of reference samples used at University of Maryland for DOC analysis

Samples

10QCCS and 2QCCS ...Separate stocks of standard solutions.

Lab Blank De-ionized water.

Lab Duplicate ...Splits of field samples. Mean is of the percent relative standard deviations between the two split values, for all duplicates.

FNBR002..... Natural field audit sample.

Results

	<u>10QCCS</u>	<u>2QCCS</u>	<u>Lab Blank</u>	<u>Lab Duplicate</u>	<u>FNBR002</u>
Count	85	74	21	64	15
Mean	10.09	2.14	-0.125	4.89	0.56
Std. Dev.	0.36	0.12	0.13	4.00	0.09
Target	10.00	2.00		<10%	
Recovery - Low	93.7	87.7			
Recovery - High	112.5	117.8			
Std. Error	0.039	0.014	0.028	0.50	0.022

Table 4A: Stream Sample Chemistry

Concentrations in µeq/L (alkalinity and ions), µmol/L (SiO₂), µS/cm (conductivity), µg/L (T_AL=total monomeric aluminum, O_AL=organic monomeric aluminum), and mg/L (DOC).

Chloroform (1 mL/L) added to streamwater samples (other than aluminum aliquots).

Site	Date	Time	Project	Method	Temp °C	pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T_AL	O_AL	DOC
BA09	01/31/2004	1322	SWAS	GRAB	1	6.86	96	21	128	40	12	11	56	5	14	60	.	.	.	.
DR01	07/01/2003	1225	SWAS	GRAB	17	5.45	7	20	24	45	26	40	106	0	26	97	.	.	.	.
DR01	07/08/2003	1245	SWAS	GRAB	17	5.45	-0	20	24	44	25	44	107	0	25	96	-0	.	.	.
DR01	07/14/2003	1230	SWAS	GRAB	18	5.30	0	20	23	44	26	41	105	0	26	98	-0	.	.	.
DR01	07/23/2003	1055	SWAS	GRAB	18	5.32	0	19	22	41	26	41	99	1	26	99	-0	.	.	.
DR01	07/29/2003	1135	SWAS	GRAB	19	5.32	1	20	22	41	26	41	98	1	28	102	-0	32	.	1
DR01	08/05/2003	1150	SWAS	GRAB	19	5.37	0	19	20	38	28	42	95	0	27	100	0	.	.	.
DR01	08/12/2003	1115	SWAS	GRAB	18	5.26	-3	20	22	43	26	44	104	-0	23	104	0	.	.	.
DR01	08/19/2003	1205	SWAS	GRAB	19	5.30	0	20	23	43	26	42	104	0	26	106	-0	.	.	.
DR01	08/26/2003	1045	SWAS	GRAB	19	5.13	-4	20	22	42	26	41	101	0	27	106	0	.	.	.
DR01	09/02/2003	1500	SWAS	GRAB	21	5.37	0	19	21	39	27	42	96	0	28	108	-0	.	.	.
DR01	09/09/2003	1055	SWAS	GRAB	17	5.37	0	19	21	40	27	41	95	0	26	105	0	.	.	.
DR01	09/16/2003	1135	SWAS	GRAB	16	5.46	-1	18	20	39	27	41	95	0	26	106	-0	.	.	.
DR01	09/23/2003	1340	SWAS	GRAB	15	5.16	-6	22	27	47	21	49	115	0	21	91	-0	.	.	.
DR01	09/30/2003	1445	SWAS	GRAB	.	5.29	-1	20	26	47	24	38	110	0	23	100	-0	.	.	.
DR01	10/07/2003	1535	SWAS	GRAB	14	5.32	-3	20	25	45	25	37	107	0	24	99	0	.	.	.
DR01	10/16/2003	1330	SWAS	GRAB	13	5.29	-3	20	23	43	26	41	105	0	26	100	0	.	.	.
DR01	10/21/2003	1245	SWAS	GRAB	13	5.37	-1	20	24	43	25	39	104	0	26	100	0	.	.	.
DR01	10/28/2003	1100	SWAS	GRAB	10	5.37	2	20	23	42	25	40	103	0	26	99	0	33	.	1
DR01	11/04/2003	1205	SWAS	GRAB	14	5.36	-1	20	23	42	25	41	105	0	25	102	0	.	.	.
DR01	11/11/2003	1105	SWAS	GRAB	9	5.42	-1	19	23	42	24	41	104	0	24	98	0	.	.	.
DR01	11/18/2003	1025	SWAS	GRAB	10	5.37	-1	20	25	46	24	40	111	0	23	96	0	.	.	.
DR01	11/25/2003	1045	SWAS	GRAB	8	5.42	-1	20	25	47	23	40	111	0	24	95	0	.	.	.
DR01	12/02/2003	1235	SWAS	GRAB	6	5.38	-4	20	25	46	24	37	108	0	24	94	0	.	.	.
DR01	12/09/2003	1115	SWAS	GRAB	5	5.41	-1	20	25	46	24	35	105	0	23	93	0	.	.	.
DR01	12/17/2003	1300	SWAS	GRAB	7	5.42	-1	20	25	47	23	39	109	0	23	92	0	.	.	.
DR01	12/23/2003	1645	SWAS	GRAB	7	5.32	-4	21	25	47	24	37	110	0	23	92	0	.	.	.
DR01	12/29/2003	1300	SWAS	GRAB	7	5.34	-3	20	24	45	23	36	106	0	22	90	0	.	.	.
DR01	01/05/2004	1125	SWAS	GRAB	10	5.32	-5	22	24	44	24	37	106	0	23	94	0	.	.	.
DR01	01/12/2004	1215	SWAS	GRAB	3	5.38	-5	20	25	46	24	34	105	1	23	91	-0	.	.	.
DR01	01/20/2004	1135	SWAS	GRAB	1	5.40	-3	19	25	47	24	33	102	2	23	92	0	.	.	.
DR01	01/27/2004	1030	SWAS	GRAB	1	5.39	-3	19	24	46	24	32	101	2	22	89	0	37	.	1

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
DR01	02/03/2004	1215	SWAS	GRAB	0	5.39	-4	19	24	45	23	31	96	7	22	81	1	.	.	.	
DR01	02/11/2004	1105	SWAS	GRAB	4	5.37	-3	20	24	47	23	38	110	0	21	88	0	.	.	.	
DR01	02/18/2004	1145	SWAS	GRAB	2	5.36	-3	20	25	47	23	34	109	1	21	88	0	.	.	.	
DR01	02/24/2004	1115	SWAS	GRAB	4	5.37	-3	19	24	45	23	35	106	0	22	89	0	.	.	.	
DR01	03/02/2004	1055	SWAS	GRAB	7	5.34	-2	19	24	43	23	36	104	0	22	89	-0	.	.	.	
DR01	03/09/2004	1135	SWAS	GRAB	6	5.44	-6	19	22	41	23	38	100	1	21	90	.	.	.	.	
DR01	03/16/2004	1125	SWAS	GRAB	6	5.28	-4	19	22	42	23	38	99	4	21	85	0	.	.	.	
DR01	03/23/2004	1045	SWAS	GRAB	4	5.46	-1	19	22	41	24	37	100	1	21	88	0	.	.	.	
DR01	03/30/2004	1230	SWAS	GRAB	9	5.44	-2	19	21	39	24	39	100	0	22	89	0	.	.	.	
DR01	04/06/2004	1150	SWAS	GRAB	7	5.43	-2	18	22	40	24	38	100	1	22	87	0	.	.	.	
DR01	04/13/2004	1100	SWAS	GRAB	8	5.47	1	20	23	43	21	47	102	0	20	80	0	.	.	.	
DR01	04/20/2004	1115	SWAS	GRAB	14	5.39	-1	19	23	42	23	42	107	0	22	89	0	.	.	.	
DR01	04/27/2004	1250	SWAS	GRAB	13	5.41	-2	19	23	42	23	41	106	0	22	91	0	34	.	1	
DR01	05/04/2004	1125	SWAS	GRAB	11	5.43	-2	19	22	40	24	41	102	0	22	92	0	.	.	.	
DR01	05/11/2004	1400	SWAS	GRAB	17	5.45	-2	19	21	38	25	43	100	0	23	96	0	.	.	.	
DR01	05/18/2004	1415	SWAS	GRAB	18	5.40	-2	19	21	37	25	44	97	0	24	99	0	.	.	.	
DR01	05/24/2004	1300	SWAS	GRAB	19	5.49	0	19	21	37	29	46	96	1	26	101	0	.	.	.	
DR01	06/01/2004	1415	SWAS	GRAB	17	5.20	-3	19	21	37	25	44	97	0	23	102	0	.	.	.	
DR01	06/08/2004	1445	SWAS	GRAB	.	5.42	0	19	20	36	26	46	98	1	24	101	0	.	.	.	
DR01	06/15/2004	1205	SWAS	GRAB	18	5.45	0	19	20	39	24	44	99	0	23	102	0	.	.	.	
DR01	06/22/2004	0905	SWAS	GRAB	16	5.33	-1	19	20	38	24	45	98	0	23	102	0	.	.	.	
DR01	06/29/2004	1125	SWAS	GRAB	16	5.30	-1	19	20	40	25	42	98	0	23	104	0	.	.	.	
M002	07/30/2003	1210	VTSSS	GRAB	16	4.64	-26	18	20	15	7	4	58	0	10	48	.	102	41	.	
M002	10/28/2003	1040	VTSSS	GRAB	13	4.89	-16	15	22	20	9	11	61	0	16	56	.	76	29	.	
M002	04/27/2004	1145	VTSSS	GRAB	11	4.75	-25	16	19	17	8	5	58	4	11	42	.	94	32	.	
M003	07/29/2003	1130	VTSSS	GRAB	22	6.34	46	15	74	48	9	6	63	0	10	23	.	.	.	.	
M003	10/28/2003	1015	VTSSS	GRAB	13	6.93	99	21	108	74	9	6	62	0	11	27	.	.	.	.	
M003	02/05/2004	1430	VTSSS	GRAB	.	6.70	90	21	106	69	10	7	65	3	11	34	.	.	.	.	
M003	04/27/2004	0930	VTSSS	GRAB	11	6.74	160	27	173	63	10	8	55	15	12	33	.	.	.	.	
M004	07/29/2003	1220	VTSSS	GRAB	15	4.53	-42	34	142	33	17	7	97	0	13	54	.	434	375	.	
M004	10/28/2003	0930	VTSSS	GRAB	12	6.12	48	31	201	47	29	13	142	0	22	83	.	.	.	.	
MAD2	07/29/2003	1055	SWAS	GRAB	19	6.30	128	28	67	91	50	34	64	0	26	149	.	.	.	1	
MAD2	10/28/2003	1425	SWAS	GRAB	11	6.82	123	26	65	90	47	28	71	0	28	135	.	.	.	1	
MAD2	01/27/2004	1230	SWAS	GRAB	1	6.76	78	22	55	78	41	21	70	1	24	117	.	.	.	0	
MAD2	04/27/2004	1350	SWAS	GRAB	14	6.63	102	23	58	79	44	28	68	0	25	130	.	.	.	1	
NFDR	07/02/2003	1145	SWAS	GRAB	16	6.45	68	27	90	50	78	10	94	20	30	173	.	.	.	.	
NFDR	07/09/2003	1150	SWAS	GRAB	17	6.35	58	25	84	48	73	10	99	18	27	167	.	.	.	.	
NFDR	07/15/2003	1115	SWAS	GRAB	15	6.50	69	27	89	50	77	10	95	19	29	175	.	.	.	.	
NFDR	07/22/2003	1205	SWAS	GRAB	17	6.52	70	27	91	50	80	11	93	24	31	184	.	.	.	.	
NFDR	07/30/2003	1045	SWAS	GRAB	18	6.34	83	28	95	52	80	11	89	21	33	188	.	.	.	1	
NFDR	08/06/2003	0950	SWAS	GRAB	17	6.49	89	28	95	53	84	11	88	18	32	192	.	.	.	.	
NFDR	08/13/2003	0915	SWAS	GRAB	18	6.47	87	29	100	54	86	12	89	19	31	192	.	.	.	.	
NFDR	08/20/2003	0915	SWAS	GRAB	.	6.45	90	30	100	56	88	12	90	19	34	200	.	.	.	.	
NFDR	08/28/2003	1125	SWAS	GRAB	19	6.23	94	32	109	60	88	14	91	29	34	197	.	.	.	.	

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
NFDR	09/04/2003	1235	SWAS	GRAB	19	6.47	95	30	107	58	85	14	84	24	30	190	.	.	.	.	
NFDR	09/11/2003	1210	SWAS	GRAB	15	6.45	89	29	100	55	87	12	87	30	31	200	.	.	.	.	
NFDR	09/25/2003	1400	SWAS	GRAB	14	6.24	45	26	83	45	68	12	107	7	27	163	.	.	.	.	
NFDR	10/03/2003	1225	SWAS	GRAB	10	6.43	48	25	79	45	73	11	96	6	28	176	.	.	.	.	
NFDR	10/09/2003	1245	SWAS	GRAB	13	5.99	63	26	84	47	76	11	93	2	30	182	.	.	.	.	
NFDR	10/16/2003	1045	SWAS	GRAB	11	6.39	65	26	84	48	77	13	93	14	31	178	.	.	.	.	
NFDR	10/23/2003	1120	SWAS	GRAB	10	6.57	68	25	81	46	76	11	95	10	30	175	.	.	.	.	
NFDR	10/30/2003	1330	SWAS	GRAB	10	6.58	66	26	82	47	76	12	96	13	30	172	.	.	.	1	
NFDR	11/06/2003	1225	SWAS	GRAB	14	6.55	79	26	88	49	78	14	96	0	29	169	.	.	.	.	
NFDR	11/13/2003	1115	SWAS	GRAB	9	6.50	53	26	85	48	75	12	105	18	28	166	.	.	.	.	
NFDR	11/20/2003	1155	SWAS	GRAB	10	6.35	29	27	89	50	66	14	107	29	25	146	.	.	.	.	
NFDR	11/25/2003	1400	SWAS	GRAB	8	6.52	40	25	79	45	71	11	105	20	28	164	.	.	.	.	
NFDR	12/04/2003	1400	SWAS	GRAB	4	6.48	39	24	76	44	71	10	103	17	29	161	.	.	.	.	
NFDR	12/11/2003	1100	SWAS	GRAB	7	6.20	28	26	88	50	62	13	113	31	22	131	.	.	.	.	
NFDR	12/18/2003	1250	SWAS	GRAB	5	5.98	28	25	73	43	68	10	101	22	25	159	.	.	.	.	
NFDR	12/24/2003	1130	SWAS	GRAB	7	6.20	35	25	76	43	68	10	99	16	24	145	.	.	.	.	
NFDR	12/30/2003	1030	SWAS	GRAB	6	6.42	43	24	75	44	70	10	101	24	26	158	.	.	.	.	
NFDR	01/07/2004	1250	SWAS	GRAB	3	6.50	23	25	78	45	70	9	103	22	26	154	.	.	.	.	
NFDR	01/14/2004	1115	SWAS	GRAB	2	6.52	26	24	76	44	69	9	97	26	27	157	.	.	.	.	
NFDR	01/21/2004	1100	SWAS	GRAB	0	6.47	29	24	75	44	71	8	95	26	28	162	.	.	.	.	
NFDR	01/28/2004	1430	SWAS	GRAB	0	6.45	33	24	73	42	70	8	91	27	28	162	.	.	.	0	
NFDR	02/04/2004	1110	SWAS	GRAB	1	6.48	28	24	74	43	72	8	89	28	28	164	.	.	.	.	
NFDR	02/10/2004	1350	SWAS	GRAB	4	6.48	35	24	72	42	72	9	93	27	24	166	.	.	.	.	
NFDR	02/17/2004	1355	SWAS	GRAB	2	6.49	30	23	71	40	73	8	93	23	26	167	.	.	.	.	
NFDR	02/25/2004	1100	SWAS	GRAB	2	6.43	41	24	73	42	73	8	93	26	26	163	.	.	.	.	
NFDR	03/03/2004	1045	SWAS	GRAB	6	6.48	45	24	75	42	74	9	93	27	27	159	.	.	.	.	
NFDR	03/10/2004	1040	SWAS	GRAB	4	6.49	25	25	84	47	68	9	105	36	24	145	.	.	.	.	
NFDR	03/17/2004	1100	SWAS	GRAB	5	6.32	27	25	79	45	71	9	100	34	25	151	.	.	.	.	
NFDR	03/24/2004	1100	SWAS	GRAB	5	6.16	26	24	78	43	68	9	102	28	25	148	.	.	.	.	
NFDR	03/31/2004	1145	SWAS	GRAB	7	6.60	37	24	77	43	72	10	99	25	26	153	.	.	.	.	
NFDR	04/07/2004	1245	SWAS	GRAB	8	6.48	24	25	81	45	70	10	104	30	24	149	.	.	.	.	
NFDR	04/14/2004	1355	SWAS	GRAB	7	6.34	29	27	92	51	65	11	105	45	22	136	.	.	.	.	
NFDR	04/21/2004	1345	SWAS	GRAB	13	6.55	42	24	81	45	72	11	96	22	26	157	.	.	.	.	
NFDR	04/28/2004	1330	SWAS	GRAB	9	6.01	48	25	82	46	71	10	99	20	25	159	.	.	.	0	
NFDR	05/05/2004	1325	SWAS	GRAB	10	6.53	39	25	83	46	69	10	104	30	24	151	.	.	.	.	
NFDR	05/12/2004	1305	SWAS	GRAB	14	6.53	50	25	83	47	73	11	97	13	26	166	.	.	.	.	
NFDR	05/19/2004	1348	SWAS	GRAB	15	6.35	65	26	86	48	77	11	93	20	28	176	.	.	.	.	
NFDR	05/27/2004	1130	SWAS	GRAB	15	6.49	70	26	89	49	78	12	91	23	27	180	.	.	.	.	
NFDR	06/03/2004	0830	SWAS	GRAB	15	6.34	70	27	91	50	79	12	95	25	28	177	.	.	.	.	
NFDR	06/09/2004	1305	SWAS	GRAB	15	6.10	49	26	88	48	72	11	103	20	25	161	.	.	.	.	
NFDR	06/16/2004	1315	SWAS	GRAB	16	6.51	63	26	89	49	73	11	101	21	27	167	.	.	.	.	
NFDR	06/23/2004	1035	SWAS	GRAB	16	6.20	69	27	93	51	77	11	96	20	28	175	.	.	.	.	
NFDR	06/30/2004	1045	SWAS	GRAB	15	6.31	76	27	94	52	79	11	91	19	30	182	.	.	.	.	
OB01	10/25/2003	1540	SWAS	GRAB	12	6.14	16	8	15	17	16	17	24	0	17	104	.	.	.	.	

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
PAIN	07/01/2003	1015	SWAS	GRAB	17		5.77	3	20	30	51	26	46	112	0	25	89	.	.	.	.
PAIN	07/03/2003	0800	SWAS	ISCO	.		6.08	9	19	29	48	22	45	105	1	21	87	1	4	.	1
PAIN	07/03/2003	1000	SWAS	ISCO	.		5.81	6	19	29	47	22	44	104	1	21	87	1	5	.	2
PAIN	07/08/2003	1030	SWAS	GRAB	17		5.89	8	20	30	49	24	46	111	0	23	89	.	.	.	.
PAIN	07/14/2003	1100	SWAS	GRAB	18		5.80	11	20	30	49	24	47	111	0	23	92	.	.	.	.
PAIN	07/23/2003	0840	SWAS	GRAB	17		5.83	9	20	29	50	24	48	109	1	24	94	.	.	.	.
PAIN	07/29/2003	0940	SWAS	GRAB	20		5.86	13	20	29	49	24	48	105	0	24	94	.	4	.	1
PAIN	08/05/2003	0930	SWAS	GRAB	20		5.85	12	20	27	47	26	49	107	0	24	98	.	.	.	.
PAIN	08/12/2003	0930	SWAS	GRAB	18		5.81	9	20	29	47	24	51	110	0	21	97	.	.	.	.
PAIN	08/19/2003	1040	SWAS	GRAB	20		6.00	10	20	28	46	25	51	111	0	23	98	.	.	.	.
PAIN	08/26/2003	1325	SWAS	GRAB	21		5.32	1	21	27	46	24	50	109	0	23	100	.	.	.	.
PAIN	09/02/2003	1220	SWAS	GRAB	21		5.97	7	20	27	45	24	52	108	0	23	102	.	.	.	.
PAIN	09/09/2003	1335	SWAS	GRAB	18		5.82	7	20	27	46	24	51	108	0	23	102	.	.	.	.
PAIN	09/16/2003	1445	SWAS	GRAB	18		6.10	9	20	27	45	24	51	111	0	22	103	-0	.	.	1
PAIN	09/18/2003	2000	SWAS	ISCO	.		5.64	58	25	53	44	21	49	85	2	20	91	51	29	.	9
PAIN	09/18/2003	2200	SWAS	ISCO	.		5.02	-3	23	35	47	19	49	96	0	17	88	5	62	48	6
PAIN	09/19/2003	0000	SWAS	ISCO	.		5.37	16	25	76	66	16	58	111	3	18	99	30	82	62	7
PAIN	09/19/2003	0200	SWAS	ISCO	.		5.35	15	27	88	67	15	61	122	8	19	102	43	73	56	6
PAIN	09/19/2003	0400	SWAS	ISCO	.		5.34	8	25	51	50	16	59	127	0	18	87	22	73	57	5
PAIN	09/19/2003	0800	SWAS	ISCO	.		5.27	0	24	42	52	18	53	124	0	18	80	0	51	37	4
PAIN	09/19/2003	1200	SWAS	ISCO	.		5.23	-5	24	39	52	18	49	122	0	19	82	0	42	.	3
PAIN	09/19/2003	2000	SWAS	ISCO	.		5.30	-1	23	36	52	19	49	121	0	20	86	0	37	.	2
PAIN	09/20/2003	0400	SWAS	ISCO	.		5.37	0	23	35	50	19	48	118	0	20	88	0	32	.	2
PAIN	09/23/2003	1605	SWAS	GRAB	15		5.22	-1	23	34	52	20	49	121	0	20	89	.	.	.	.
PAIN	09/24/2003	0400	SWAS	ISCO	.		5.48	2	22	33	52	21	48	118	3	21	92	0	30	.	2
PAIN	09/25/2003	1200	SWAS	ISCO	.		5.53	0	21	32	49	22	46	116	2	22	94	1	27	.	1
PAIN	09/26/2003	2000	SWAS	ISCO	.		5.61	2	21	32	49	22	47	115	0	22	97	0	20	.	1
PAIN	09/27/2003	2000	SWAS	ISCO	.		5.55	2	20	30	46	21	46	109	0	21	92	-0	19	.	1
PAIN	09/27/2003	2200	SWAS	ISCO	.		5.60	4	20	30	46	21	47	108	0	21	92	0	23	.	1
PAIN	09/28/2003	0000	SWAS	ISCO	.		5.61	2	20	30	48	21	47	113	0	22	95	-0	24	.	1
PAIN	09/28/2003	0200	SWAS	ISCO	.		5.49	-1	21	31	48	21	47	113	0	22	97	0	24	.	1
PAIN	09/28/2003	0400	SWAS	ISCO	.		5.33	1	21	31	48	22	47	114	0	25	98	1	24	.	1
PAIN	09/28/2003	0800	SWAS	ISCO	.		5.52	1	21	31	48	22	47	113	0	22	97	0	23	.	1
PAIN	09/28/2003	1200	SWAS	ISCO	.		5.42	1	21	30	48	22	46	113	0	22	97	0	21	.	1
PAIN	09/30/2003	1025	SWAS	GRAB	13		5.30	-1	21	30	49	22	44	113	0	22	97	0	23	.	1
PAIN	10/07/2003	1155	SWAS	GRAB	13		5.55	-1	21	30	49	22	43	114	0	22	95	.	.	.	.
PAIN	10/16/2003	1045	SWAS	GRAB	11		5.74	5	20	30	49	23	48	114	0	23	97	0	13	.	1
PAIN	10/21/2003	1535	SWAS	GRAB	15		5.64	4	21	29	48	23	48	114	0	23	97	.	.	.	.
PAIN	10/28/2003	1515	SWAS	GRAB	11		5.85	7	20	30	49	23	46	114	0	24	97	0	14	.	1
PAIN	11/04/2003	1445	SWAS	GRAB	14		5.85	5	20	29	48	23	47	113	0	23	100	.	.	.	.
PAIN	11/05/2003	2000	SWAS	ISCO	.		5.54	3	20	28	43	21	47	101	0	23	88	0	30	.	4
PAIN	11/05/2003	2200	SWAS	ISCO	.		5.60	3	21	30	46	21	53	109	0	24	90	0	18	.	3
PAIN	11/06/2003	0000	SWAS	ISCO	.		5.63	3	21	31	48	22	52	112	0	24	91	0	14	.	3
PAIN	11/06/2003	0200	SWAS	ISCO	.		5.63	-1	21	31	49	22	52	113	0	24	92	0	29	.	2

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
PAIN	11/06/2003	0400	SWAS	ISCO	.		5.63	-11	21	30	49	22	52	113	0	23	92	0	27	.	2
PAIN	11/06/2003	0600	SWAS	ISCO	.		5.65	-10	21	30	50	22	52	113	0	23	94	0	8	.	2
PAIN	11/06/2003	0800	SWAS	ISCO	.		5.72	3	21	30	49	22	52	112	0	24	93	0	26	.	2
PAIN	11/06/2003	1000	SWAS	ISCO	.		5.59	-9	21	29	48	22	52	112	0	23	93	0	28	.	2
PAIN	11/06/2003	1200	SWAS	ISCO	.		5.60	-1	21	30	49	22	51	114	0	22	93	0	25	.	2
PAIN	11/06/2003	1400	SWAS	ISCO	.		5.60	-11	21	29	48	21	50	114	0	23	93	0	28	.	2
PAIN	11/06/2003	1600	SWAS	ISCO	.		5.59	-7	21	29	48	22	51	114	0	23	94	0	25	.	2
PAIN	11/06/2003	2000	SWAS	ISCO	.		5.59	-11	21	29	49	22	50	114	0	23	94	0	26	.	2
PAIN	11/07/2003	0400	SWAS	ISCO	.		5.61	2	21	30	49	22	49	115	2	23	95	1	24	.	2
PAIN	11/11/2003	1310	SWAS	GRAB	11		5.54	-2	20	29	48	23	45	114	0	23	94	0	20	.	1
PAIN	11/12/2003	2000	SWAS	ISCO	.		5.48	1	20	27	44	21	43	104	0	23	86	0	20	.	1
PAIN	11/12/2003	2200	SWAS	ISCO	.		5.52	2	20	29	47	21	45	107	0	21	87	0	38	.	2
PAIN	11/13/2003	0000	SWAS	ISCO	.		5.51	-1	21	29	49	22	47	111	0	21	88	0	39	.	2
PAIN	11/13/2003	0200	SWAS	ISCO	.		5.53	4	21	29	50	22	47	113	1	22	89	1	37	.	2
PAIN	11/13/2003	0400	SWAS	ISCO	.		5.54	4	21	29	51	22	48	115	2	22	90	1	33	.	2
PAIN	11/13/2003	0600	SWAS	ISCO	.		5.56	2	21	29	51	22	49	116	3	22	91	0	28	.	2
PAIN	11/13/2003	0800	SWAS	ISCO	.		5.56	2	21	31	51	22	49	116	3	22	91	0	29	.	2
PAIN	11/13/2003	1200	SWAS	ISCO	.		5.59	-15	21	30	52	23	49	117	1	23	93	1	27	.	2
PAIN	11/13/2003	2000	SWAS	ISCO	.		5.58	1	22	30	50	22	47	116	4	22	93	0	24	.	1
PAIN	11/14/2003	0400	SWAS	ISCO	.		5.58	1	21	30	50	22	47	115	4	22	95	0	20	.	1
PAIN	11/18/2003	1430	SWAS	GRAB	11		5.32	-6	21	29	48	23	45	114	0	23	94	.	.	.	.
PAIN	11/19/2003	1200	SWAS	ISCO	.		5.60	1	19	30	44	21	43	99	0	24	81	0	26	.	2
PAIN	11/19/2003	1400	SWAS	ISCO	.		5.41	1	22	31	51	20	53	110	0	24	79	0	56	42	3
PAIN	11/19/2003	1600	SWAS	ISCO	.		5.36	-4	24	32	53	21	52	116	0	23	81	0	43	.	3
PAIN	11/19/2003	1800	SWAS	ISCO	.		5.46	-5	24	31	51	21	53	120	0	23	83	0	35	.	3
PAIN	11/19/2003	2000	SWAS	ISCO	.		5.92	-7	22	31	51	21	50	114	0	24	84	0	29	.	2
PAIN	11/20/2003	0000	SWAS	ISCO	.		5.70	5	23	32	52	21	50	118	0	23	85	0	26	.	2
PAIN	11/20/2003	0400	SWAS	ISCO	.		5.66	0	22	34	54	21	50	118	8	23	86	1	25	.	2
PAIN	11/20/2003	1200	SWAS	ISCO	.		5.66	1	22	35	56	21	49	117	0	22	89	1	23	.	1
PAIN	11/20/2003	2000	SWAS	ISCO	.		5.62	-0	22	30	49	21	48	116	0	23	90	0	21	.	1
PAIN	11/25/2003	1250	SWAS	GRAB	9		5.44	-4	21	29	49	22	44	115	0	23	93	-0	25	.	1
PAIN	12/02/2003	1440	SWAS	GRAB	6		5.56	-2	21	30	49	22	42	114	0	23	92	.	.	.	.
PAIN	12/09/2003	1435	SWAS	GRAB	6		5.66	1	21	30	50	22	41	114	0	23	90	-0	16	.	1
PAIN	12/10/2003	2200	SWAS	ISCO	.		5.38	1	21	29	50	20	42	107	0	20	76	0	43	.	3
PAIN	12/11/2003	0000	SWAS	ISCO	.		5.34	-3	24	29	51	21	47	114	0	21	76	0	49	40	3
PAIN	12/11/2003	0200	SWAS	ISCO	.		5.41	1	23	32	55	19	48	117	0	20	76	0	40	.	2
PAIN	12/11/2003	0400	SWAS	ISCO	.		5.41	-5	24	33	55	20	47	119	0	20	79	0	36	.	2
PAIN	12/11/2003	0600	SWAS	ISCO	.		5.39	1	24	30	52	20	48	119	0	21	80	0	31	.	2
PAIN	12/11/2003	1000	SWAS	ISCO	.		5.40	3	24	32	54	20	46	119	0	21	82	0	32	.	2
PAIN	12/11/2003	1400	SWAS	ISCO	.		5.35	3	23	31	52	20	46	118	0	21	84	0	29	.	2
PAIN	12/11/2003	2200	SWAS	ISCO	.		5.43	-1	22	30	51	21	46	117	1	22	86	0	27	.	1
PAIN	12/12/2003	0600	SWAS	ISCO	.		5.47	-1	22	31	51	21	45	115	2	21	87	1	25	.	1
PAIN	12/17/2003	1045	SWAS	GRAB	7		5.60	-2	21	30	52	22	43	115	1	22	90	.	.	.	.
PAIN	12/23/2003	1505	SWAS	GRAB	6		5.41	-3	21	29	51	22	42	115	0	22	90	.	.	.	.

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
PAIN	12/29/2003	1100	SWAS	GRAB	5	5.50	-3	21	29	49	22	41	111	1	22	90	.	.	.	.	
PAIN	01/05/2004	0945	SWAS	GRAB	9	5.61	2	21	29	48	22	43	111	0	22	92	.	.	.	.	
PAIN	01/12/2004	0935	SWAS	GRAB	2	5.68	1	20	30	52	22	39	111	4	22	88	.	.	.	.	
PAIN	01/20/2004	1400	SWAS	GRAB	1	5.70	3	21	31	52	22	38	110	3	21	88	.	.	.	.	
PAIN	01/27/2004	1330	SWAS	GRAB	1	5.73	5	20	31	51	22	37	110	4	21	87	0	14	.	0	
PAIN	02/03/2004	1440	SWAS	GRAB	1	5.64	0	20	30	51	21	37	102	9	21	79	.	.	.	.	
PAIN	02/06/2004	1600	SWAS	ISCO	.	5.45	0	21	29	52	21	40	108	0	21	80	0	19	.	2	
PAIN	02/06/2004	1800	SWAS	ISCO	.	5.48	-2	21	31	56	21	41	114	0	20	79	0	37	.	2	
PAIN	02/06/2004	2000	SWAS	ISCO	.	5.47	-1	22	30	58	21	44	118	1	20	79	0	15	.	2	
PAIN	02/06/2004	2200	SWAS	ISCO	.	5.47	-1	22	35	61	21	44	120	0	20	79	0	35	.	2	
PAIN	02/07/2004	0000	SWAS	ISCO	.	5.47	-1	22	31	57	21	44	121	0	21	80	0	33	.	2	
PAIN	02/07/2004	0400	SWAS	ISCO	.	5.48	-6	22	31	55	21	44	121	5	20	81	0	31	.	2	
PAIN	02/07/2004	0800	SWAS	ISCO	.	5.46	-3	22	29	54	21	44	120	0	20	81	-0	10	.	1	
PAIN	02/07/2004	1600	SWAS	ISCO	.	5.49	-3	22	30	54	21	43	119	0	21	83	-0	29	.	1	
PAIN	02/08/2004	0000	SWAS	ISCO	.	5.49	-3	22	30	52	21	42	118	4	20	85	-0	8	.	1	
PAIN	02/11/2004	1005	SWAS	GRAB	4	5.56	1	21	29	52	22	41	115	3	21	88	.	.	.	.	
PAIN	02/18/2004	1040	SWAS	GRAB	2	5.67	3	20	30	51	22	39	111	2	21	88	.	.	.	.	
PAIN	02/24/2004	1340	SWAS	GRAB	5	5.64	1	20	28	49	22	40	110	1	21	87	.	.	.	.	
PAIN	03/02/2004	1320	SWAS	GRAB	9	5.65	1	20	29	47	22	42	110	2	21	85	.	.	.	.	
PAIN	03/09/2004	1320	SWAS	GRAB	6	5.69	2	20	30	49	22	43	109	5	21	86	.	.	.	.	
PAIN	03/16/2004	1410	SWAS	GRAB	6	5.50	2	20	31	49	22	42	109	4	21	78	-0	21	.	1	
PAIN	03/23/2004	1445	SWAS	GRAB	8	5.73	3	20	29	47	22	43	110	2	21	78	.	.	.	.	
PAIN	03/30/2004	1435	SWAS	GRAB	10	5.82	3	19	28	45	22	43	110	0	22	70	-0	12	.	1	
PAIN	04/06/2004	1400	SWAS	GRAB	10	5.77	3	20	28	46	22	43	111	0	22	66	.	.	.	.	
PAIN	04/12/2004	2000	SWAS	ISCO	.	5.35	3	21	29	47	21	44	106	3	21	78	3	29	.	3	
PAIN	04/12/2004	2200	SWAS	ISCO	.	5.34	5	22	31	50	21	46	109	0	21	83	2	36	.	2	
PAIN	04/13/2004	0000	SWAS	ISCO	.	5.44	8	22	33	53	21	46	112	0	22	82	0	30	.	2	
PAIN	04/13/2004	0200	SWAS	ISCO	.	5.46	6	22	32	52	21	48	113	0	22	85	0	29	.	2	
PAIN	04/13/2004	0400	SWAS	ISCO	.	5.40	8	23	33	52	21	49	114	0	21	84	0	27	.	2	
PAIN	04/13/2004	0800	SWAS	ISCO	.	5.44	6	23	32	53	21	48	114	0	21	82	0	10	.	1	
PAIN	04/13/2004	1200	SWAS	ISCO	.	5.38	4	22	31	51	21	47	113	0	21	84	1	21	.	1	
PAIN	04/13/2004	1315	SWAS	GRAB	9	5.48	1	22	33	53	21	47	114	2	20	81	0	28	.	1	
PAIN	04/13/2004	1600	SWAS	ISCO	.	5.59	2	21	31	50	21	46	113	0	21	80	1	23	.	1	
PAIN	04/13/2004	2000	SWAS	ISCO	.	5.58	2	21	32	51	21	46	113	5	21	82	2	23	.	1	
PAIN	04/14/2004	0400	SWAS	ISCO	.	5.50	0	21	32	51	21	46	114	9	21	83	1	5	.	1	
PAIN	04/14/2004	2000	SWAS	ISCO	.	5.53	5	21	32	51	21	46	113	1	21	83	1	18	.	1	
PAIN	04/15/2004	1200	SWAS	ISCO	.	5.57	4	21	32	50	21	45	114	0	21	84	0	15	.	1	
PAIN	04/20/2004	1445	SWAS	GRAB	17	5.71	-1	19	28	45	22	47	112	1	22	80	.	.	.	.	
PAIN	04/27/2004	1500	SWAS	GRAB	14	5.85	3	19	28	44	22	46	111	0	22	76	0	13	.	1	
PAIN	05/04/2004	1430	SWAS	GRAB	14	5.83	3	20	28	46	22	47	110	2	21	81	.	.	.	.	
PAIN	05/11/2004	1015	SWAS	GRAB	16	5.93	5	19	27	45	23	47	109	0	22	72	0	11	.	1	
PAIN	05/18/2004	1020	SWAS	GRAB	17	5.99	5	19	27	45	24	47	107	0	23	69	.	.	.	.	
PAIN	05/24/2004	0951	SWAS	GRAB	18	5.94	8	19	27	45	24	49	107	0	22	69	0	10	.	1	
PAIN	06/01/2004	1145	SWAS	GRAB	18	5.93	9	20	28	46	24	50	108	4	22	79	.	.	.	.	

Site	Date	Time	Project	Method	Temp °C	pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T AI	O AI	DOC
PAIN	06/05/2004	1600	SWAS	ISCO	.	5.50	8	21	28	45	23	48	107	3	21	97	2	18	.	3
PAIN	06/05/2004	1800	SWAS	ISCO	.	5.69	6	21	35	49	24	51	105	0	21	102	4	15	.	1
PAIN	06/05/2004	2000	SWAS	ISCO	.	5.48	0	21	28	47	23	51	107	7	21	96	1	14	.	1
PAIN	06/05/2004	2200	SWAS	ISCO	.	5.44	9	22	33	49	24	51	107	8	21	99	3	14	.	1
PAIN	06/08/2004	1120	SWAS	GRAB	17	5.57	4	21	29	47	24	50	110	4	21	88	0	9	.	1
PAIN	06/15/2004	0915	SWAS	GRAB	17	5.67	5	20	29	47	23	50	110	2	21	89	.	.	.	.
PAIN	06/22/2004	0813	SWAS	GRAB	16	5.65	6	20	28	47	23	49	108	1	22	90	.	.	.	.
PAIN	06/29/2004	0805	SWAS	GRAB	16	5.98	10	20	28	48	24	50	106	0	22	90	.	.	.	.
PINE	07/02/2003	1020	SWAS	GRAB	16	7.03	260	38	157	126	85	8	60	4	30	237	.	.	.	.
PINE	07/03/2003	0600	SWAS	ISCO	.	6.64	219	34	129	98	64	12	53	0	20	218	6	.	.	3
PINE	07/03/2003	0800	SWAS	ISCO	.	6.62	196	35	186	132	65	12	67	0	18	208	3	.	.	4
PINE	07/03/2003	1000	SWAS	ISCO	.	6.72	198	36	151	118	65	9	72	13	17	197	1	.	.	3
PINE	07/03/2003	1200	SWAS	ISCO	.	6.86	210	36	147	117	65	9	72	11	17	197	1	.	.	3
PINE	07/03/2003	1400	SWAS	ISCO	.	6.85	219	37	154	121	69	8	76	9	18	207	0	.	.	2
PINE	07/03/2003	1800	SWAS	ISCO	.	6.83	214	36	149	118	69	7	79	0	19	209	0	.	.	2
PINE	07/03/2003	2200	SWAS	ISCO	.	6.90	222	37	149	122	70	7	80	6	19	212	0	.	.	2
PINE	07/04/2003	0600	SWAS	ISCO	.	6.92	220	36	151	120	72	7	81	4	21	215	0	.	.	1
PINE	07/04/2003	1400	SWAS	ISCO	.	6.99	218	36	143	114	71	6	78	5	22	215	0	.	.	1
PINE	07/09/2003	1015	SWAS	GRAB	17	6.84	239	37	152	120	77	6	65	1	25	231	.	.	.	.
PINE	07/15/2003	1010	SWAS	GRAB	17	7.08	254	38	153	124	80	6	60	3	26	234	.	.	.	.
PINE	07/22/2003	0945	SWAS	GRAB	17	6.95	277	40	160	126	83	7	56	2	27	247	.	.	.	.
PINE	07/30/2003	0930	SWAS	GRAB	18	6.86	295	40	165	130	87	7	52	0	29	254	.	.	.	1
PINE	08/06/2003	0815	SWAS	GRAB	18	7.09	302	41	166	132	91	7	53	-0	29	263	.	.	.	.
PINE	08/13/2003	0745	SWAS	GRAB	18	7.09	317	42	176	140	91	7	54	0	27	257	.	.	.	.
PINE	08/20/2003	0815	SWAS	GRAB	18	7.02	340	45	179	141	104	9	51	0	34	276	.	.	.	.
PINE	08/28/2003	1015	SWAS	GRAB	19	6.75	343	44	184	142	100	9	49	0	28	273	.	.	.	.
PINE	09/04/2003	1055	SWAS	GRAB	19	7.09	316	42	175	141	91	9	54	0	26	265	.	.	.	.
PINE	09/11/2003	1045	SWAS	GRAB	15	6.88	314	42	175	139	93	7	50	0	27	266	.	.	.	.
PINE	09/18/2003	1015	SWAS	GRAB	16	6.76	264	39	159	129	82	6	65	0	26	234	-0	.	.	1
PINE	09/25/2003	1100	SWAS	GRAB	14	6.60	169	34	132	105	64	7	82	0	24	202	.	.	.	.
PINE	10/03/2003	1050	SWAS	GRAB	10	6.81	185	34	134	109	70	6	65	0	27	217	-0	.	.	0
PINE	10/09/2003	1110	SWAS	GRAB	13	6.72	227	36	140	113	74	7	60	0	28	222	.	.	.	.
PINE	10/16/2003	1400	SWAS	GRAB	13	6.72	236	37	147	119	77	8	61	0	32	226	-0	.	.	1
PINE	10/23/2003	1410	SWAS	GRAB	11	7.24	241	35	141	114	76	7	59	0	31	221	.	.	.	.
PINE	10/30/2003	1115	SWAS	GRAB	10	6.97	233	36	143	118	75	7	63	0	32	209	-0	.	.	1
PINE	11/06/2003	1055	SWAS	GRAB	14	6.87	257	38	153	123	79	10	63	0	32	216	.	.	.	.
PINE	11/13/2003	1250	SWAS	GRAB	9	6.92	214	37	146	120	75	8	70	0	32	207	0	.	.	1
PINE	11/19/2003	1200	SWAS	ISCO	.	6.62	198	36	128	93	74	15	63	0	41	357	12	.	.	2
PINE	11/19/2003	1400	SWAS	ISCO	.	6.76	185	39	151	116	67	23	74	0	41	227	1	.	.	5
PINE	11/19/2003	1600	SWAS	ISCO	.	6.99	134	41	161	135	65	20	86	1	39	180	13	.	.	4
PINE	11/19/2003	1800	SWAS	ISCO	.	7.02	128	41	159	130	66	16	91	24	38	176	3	.	.	4
PINE	11/19/2003	2000	SWAS	ISCO	.	7.21	136	41	158	133	66	14	91	3	37	178	1	.	.	3
PINE	11/20/2003	0000	SWAS	ISCO	.	7.31	155	40	156	129	68	12	94	38	35	186	1	.	.	2
PINE	11/20/2003	0400	SWAS	ISCO	.	7.14	169	39	153	126	68	10	93	42	34	192	2	.	.	2

Site	Date	Time	Project	Method	Temp °C	pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T_AI	O_AI	DOC
PINE	11/20/2003	1200	SWAS	ISCO	.	7.18	164	38	149	122	69	9	91	32	32	194	0	.	.	2
PINE	11/20/2003	1410	SWAS	GRAB	10	6.81	184	37	145	120	68	9	90	18	31	194	.	.	.	.
PINE	11/20/2003	2000	SWAS	ISCO	.	7.14	176	37	145	118	68	8	89	29	32	195	-0	.	.	1
PINE	11/25/2003	1135	SWAS	GRAB	8	6.92	181	34	132	108	69	6	73	12	29	198	-0	.	.	1
PINE	12/04/2003	1135	SWAS	GRAB	5	7.05	177	33	126	104	68	6	69	18	29	195	.	.	.	.
PINE	12/11/2003	0000	SWAS	ISCO	.	6.47	142	33	122	98	51	16	75	28	23	144	9	.	.	4
PINE	12/11/2003	0200	SWAS	ISCO	.	6.49	124	33	127	103	51	13	87	31	23	139	4	.	.	3
PINE	12/11/2003	0400	SWAS	ISCO	.	6.58	125	34	129	105	54	12	92	39	23	146	0	.	.	2
PINE	12/11/2003	0600	SWAS	ISCO	.	6.46	134	35	131	106	56	11	94	30	24	154	1	.	.	2
PINE	12/11/2003	0800	SWAS	ISCO	.	6.71	131	35	131	107	57	10	96	26	24	160	0	.	.	2
PINE	12/11/2003	1200	SWAS	ISCO	.	6.79	138	35	132	106	59	9	95	19	25	167	0	.	.	1
PINE	12/11/2003	1600	SWAS	ISCO	.	6.67	139	34	130	108	60	9	93	24	25	171	-0	.	.	1
PINE	12/12/2003	0000	SWAS	ISCO	.	6.91	137	35	128	106	61	8	91	27	26	177	-0	.	.	1
PINE	12/12/2003	0800	SWAS	ISCO	.	6.77	134	34	125	104	62	7	88	31	26	179	-0	.	.	1
PINE	12/12/2003	1310	SWAS	GRAB	6	6.78	153	34	125	103	63	7	87	21	26	181	-0	.	.	1
PINE	12/13/2003	0000	SWAS	ISCO	.	6.86	143	33	125	104	64	7	84	26	27	188	0	.	.	1
PINE	12/18/2003	1045	SWAS	GRAB	4	6.48	145	34	125	103	67	6	75	24	27	195	.	.	.	.
PINE	12/24/2003	1330	SWAS	GRAB	7	6.61	161	33	125	105	68	6	74	20	26	189	.	.	.	.
PINE	12/30/2003	1335	SWAS	GRAB	6	6.87	165	32	120	101	69	6	69	23	28	199	.	.	.	.
PINE	01/07/2004	1500	SWAS	GRAB	3	6.99	175	32	123	103	71	6	63	20	29	206	.	.	.	.
PINE	01/14/2004	1305	SWAS	GRAB	2	7.11	164	32	117	99	69	5	61	23	29	203	.	.	.	.
PINE	01/21/2004	1350	SWAS	GRAB	0	7.08	156	31	116	98	69	5	60	20	29	202	.	.	.	.
PINE	01/28/2004	1230	SWAS	GRAB	0	7.07	159	31	116	96	70	5	59	25	29	204	-0	.	.	0
PINE	02/04/2004	1310	SWAS	GRAB	2	7.07	150	32	117	99	70	5	62	28	29	198	.	.	.	.
PINE	02/10/2004	1200	SWAS	GRAB	4	6.95	149	33	124	105	70	5	77	33	26	200	.	.	.	.
PINE	02/17/2004	1200	SWAS	GRAB	2	6.99	154	33	122	103	70	5	73	27	28	202	.	.	.	.
PINE	02/25/2004	1410	SWAS	GRAB	4	6.97	156	33	123	104	70	5	70	27	27	197	.	.	.	.
PINE	03/03/2004	1330	SWAS	GRAB	8	6.91	170	33	122	101	72	6	65	18	28	200	.	.	.	.
PINE	03/10/2004	1250	SWAS	GRAB	6	7.02	154	33	126	106	71	6	71	28	27	196	.	.	.	.
PINE	03/17/2004	1315	SWAS	GRAB	5	6.96	171	33	127	105	72	6	68	27	27	200	-0	.	.	0
PINE	03/24/2004	1315	SWAS	GRAB	8	6.80	160	33	124	103	71	6	69	20	27	200	.	.	.	.
PINE	03/31/2004	1000	SWAS	GRAB	7	7.22	193	34	131	108	76	6	66	19	28	208	-0	.	.	0
PINE	04/07/2004	1130	SWAS	GRAB	8	7.01	165	34	127	105	70	6	75	26	27	198	.	.	.	.
PINE	04/12/2004	1800	SWAS	ISCO	.	6.46	185	35	119	100	70	9	73	27	26	210	4	.	.	6
PINE	04/12/2004	2000	SWAS	ISCO	.	6.81	168	34	130	106	67	8	76	24	24	191	0	.	.	2
PINE	04/12/2004	2200	SWAS	ISCO	.	6.75	164	36	140	113	67	9	82	32	23	183	0	.	.	2
PINE	04/13/2004	0000	SWAS	ISCO	.	6.81	156	37	142	116	67	8	88	44	23	179	0	.	.	2
PINE	04/13/2004	0200	SWAS	ISCO	.	6.88	161	37	144	118	68	8	90	47	24	180	0	.	.	2
PINE	04/14/2004	1130	SWAS	GRAB	8	6.85	169	35	136	112	68	7	88	23	24	191	0	.	.	1
PINE	04/14/2004	1800	SWAS	ISCO	.	6.98	162	35	132	109	68	7	86	25	25	192	-0	.	.	1
PINE	04/15/2004	1000	SWAS	ISCO	.	7.01	158	34	129	107	67	6	84	33	26	194	0	.	.	1
PINE	04/21/2004	1120	SWAS	GRAB	13	7.21	208	34	135	109	76	7	67	0	27	214	.	.	.	.
PINE	04/28/2004	1130	SWAS	GRAB	10	6.79	214	35	140	115	75	6	72	2	25	212	0	.	.	0
PINE	05/03/2004	0000	SWAS	ISCO	.	7.00	207	35	133	108	71	8	68	10	24	208	0	.	.	5

Site	Date	Time	Project	Method	Temp °C	pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
PINE	05/03/2004	0200	SWAS	ISCO	.	7.17	198	36	141	113	71	8	71	24	23	198	0	.	.	2
PINE	05/03/2004	0400	SWAS	ISCO	.	7.20	194	36	142	116	73	8	73	23	23	199	0	.	.	2
PINE	05/03/2004	0600	SWAS	ISCO	.	7.24	200	36	144	117	73	7	75	25	24	202	-0	.	.	1
PINE	05/05/2004	1105	SWAS	GRAB	11	7.19	193	35	135	112	72	6	73	17	25	203	.	.	.	.
PINE	05/12/2004	1100	SWAS	GRAB	15	7.27	233	36	147	118	79	7	63	10	26	226	-0	.	.	0
PINE	05/19/2004	1211	SWAS	GRAB	16	6.87	260	38	152	123	84	7	58	3	26	241	.	.	.	.
PINE	05/27/2004	0950	SWAS	GRAB	16	7.08	251	39	157	126	86	7	55	0	26	246	0	.	.	0
PINE	06/02/2004	1135	SWAS	GRAB	15	6.79	275	38	157	126	89	7	53	2	27	255	.	.	.	.
PINE	06/05/2004	0400	SWAS	ISCO	.	6.77	246	34	134	107	78	9	48	0	23	231	4	.	.	6
PINE	06/05/2004	0600	SWAS	ISCO	.	6.75	248	38	134	106	81	6	54	0	23	247	0	.	.	3
PINE	06/05/2004	0800	SWAS	ISCO	.	6.86	240	39	153	125	81	8	57	0	23	240	0	.	.	2
PINE	06/05/2004	1000	SWAS	ISCO	.	6.88	244	39	159	130	82	8	59	8	23	231	0	.	.	2
PINE	06/05/2004	1200	SWAS	ISCO	.	6.98	250	39	156	127	82	8	60	9	23	232	0	.	.	2
PINE	06/09/2004	1120	SWAS	GRAB	17	6.65	277	39	156	126	86	7	58	0	25	246	-0	.	.	0
PINE	06/16/2004	1450	SWAS	GRAB	18	7.00	280	39	160	129	87	7	58	1	25	248	.	.	.	.
PINE	06/23/2004	0830	SWAS	GRAB	18	6.80	292	41	169	133	92	7	53	4	27	259	.	.	.	.
PINE	06/30/2004	0845	SWAS	GRAB	16	6.78	300	40	166	132	94	7	49	0	26	265	.	.	.	.
RH31	05/02/2004	1522	SWAS	GRAB	14	6.28	18	21	53	67	25	22	104	22	15	83	.	.	.	.
RH33	05/02/2004	1320	SWAS	GRAB	13	5.05	-12	17	18	42	15	17	88	1	15	79	.	.	.	.
SK01	08/03/2003	1930	VTSSS	GRAB	15	6.46	154	35	139	123	26	22	116	10	14	93	.	.	.	.
SK01	05/07/2004	1600	VTSSS	GRAB	11	6.78	103	29	113	96	24	20	132	0	14	83	.	.	.	.
SK02	08/03/2003	1915	VTSSS	GRAB	18	6.58	234	39	207	106	23	22	94	0	15	93	.	.	.	.
STAN	07/01/2003	1430	SWAS	GRAB	18	6.60	84	18	66	27	61	10	45	0	21	136	.	.	.	.
STAN	07/02/2003	2200	SWAS	ISCO	.	6.36	83	18	63	26	57	11	41	0	19	127	1	.	.	3
STAN	07/03/2003	0400	SWAS	ISCO	.	6.60	80	19	66	27	57	11	43	2	18	125	3	.	.	2
STAN	07/03/2003	0600	SWAS	ISCO	.	6.66	79	19	66	27	56	11	43	1	18	125	4	.	.	2
STAN	07/03/2003	0800	SWAS	ISCO	.	6.69	77	19	66	27	56	11	43	0	17	124	1	.	.	2
STAN	07/03/2003	1000	SWAS	ISCO	.	6.69	79	19	66	28	58	11	46	3	17	128	1	.	.	2
STAN	07/03/2003	1200	SWAS	ISCO	.	6.74	81	19	67	28	58	11	46	4	18	128	5	.	.	2
STAN	07/08/2003	1500	SWAS	GRAB	20	6.51	78	18	64	26	59	10	45	0	21	137	.	.	.	.
STAN	07/14/2003	1415	SWAS	GRAB	20	6.67	88	18	64	26	61	10	43	0	22	141	.	.	.	.
STAN	07/23/2003	1340	SWAS	GRAB	20	6.78	85	19	66	27	64	11	42	0	22	145	.	.	.	.
STAN	07/29/2003	1310	SWAS	GRAB	19	6.34	97	19	67	28	65	11	41	0	22	147	.	.	.	1
STAN	08/05/2003	1330	SWAS	GRAB	21	6.64	105	20	71	29	67	12	45	-0	22	147	.	.	.	.
STAN	08/12/2003	1300	SWAS	GRAB	20	6.59	102	20	73	30	69	12	46	0	20	149	.	.	.	.
STAN	08/19/2003	1345	SWAS	GRAB	19	6.46	102	20	72	29	70	12	47	0	22	150	.	.	.	.
STAN	08/26/2003	0855	SWAS	GRAB	19	6.29	109	21	72	30	70	12	45	0	22	151	.	.	.	.
STAN	09/02/2003	1625	SWAS	GRAB	20	6.30	105	20	75	30	63	16	43	0	19	127	.	.	.	.
STAN	09/09/2003	0905	SWAS	GRAB	17	6.40	104	20	73	30	70	12	45	0	22	150	.	.	.	.
STAN	09/15/2003	1600	SWAS	ISCO	.	6.09	81	21	73	31	62	17	59	0	21	140	3	.	.	10
STAN	09/15/2003	1800	SWAS	ISCO	.	6.17	71	20	71	30	62	14	57	0	20	136	-0	.	.	2
STAN	09/15/2003	2000	SWAS	ISCO	.	6.13	66	20	73	31	62	14	56	0	20	139	0	.	.	2
STAN	09/16/2003	0920	SWAS	GRAB	16	6.97	80	20	71	30	63	12	56	0	20	142	-0	.	.	1
STAN	09/18/2003	1800	SWAS	ISCO	.	6.13	81	19	66	28	59	14	49	0	22	133	4	.	.	2

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T AI	O AI	DOC
					°C																
STAN	09/18/2003	2000	SWAS	ISCO	.	6.16	89	19	64	27	55	16	47	0	21	125	1	.	.	.	2
STAN	09/19/2003	0000	SWAS	ISCO	.	6.05	107	20	113	40	44	27	51	0	18	128	4	.	.	.	4
STAN	09/19/2003	0400	SWAS	ISCO	.	5.95	86	24	126	42	39	27	83	0	18	119	36	.	.	.	4
STAN	09/19/2003	0600	SWAS	ISCO	.	6.02	61	22	124	45	41	24	87	0	19	114	17	.	.	.	3
STAN	09/19/2003	0800	SWAS	ISCO	.	6.04	59	21	79	33	42	22	86	0	18	105	8	.	.	.	2
STAN	09/19/2003	1000	SWAS	ISCO	.	6.04	54	21	74	32	44	21	83	0	19	108	4	.	.	.	2
STAN	09/19/2003	1800	SWAS	ISCO	.	6.10	55	19	67	29	47	17	74	0	20	115	6	.	.	.	2
STAN	09/20/2003	0200	SWAS	ISCO	.	6.08	56	19	65	28	48	16	67	0	21	118	0	.	.	.	1
STAN	09/20/2003	1800	SWAS	ISCO	.	6.14	66	19	65	28	51	16	59	0	21	125	0	.	.	.	1
STAN	09/23/2003	0945	SWAS	GRAB	15	6.16	66	20	69	29	55	14	66	0	20	125	.	.	.	.	.
STAN	09/23/2003	1200	SWAS	ISCO	.	6.18	67	19	70	29	56	15	64	0	22	125	0	.	.	.	2
STAN	09/23/2003	1400	SWAS	ISCO	.	6.17	72	20	69	29	56	16	64	0	22	129	4	.	.	.	1
STAN	09/25/2003	0200	SWAS	ISCO	.	6.29	68	19	68	28	55	14	54	0	23	131	-0	.	.	.	1
STAN	09/30/2003	1615	SWAS	GRAB	13	6.23	67	17	60	26	57	11	45	0	22	139	0	.	.	.	0
STAN	10/07/2003	1730	SWAS	GRAB	14	6.26	81	18	62	26	60	11	44	0	23	141	.	.	.	.	.
STAN	10/16/2003	1510	SWAS	GRAB	13	6.53	75	19	66	28	62	13	46	0	27	140	-0	.	.	.	1
STAN	10/21/2003	0920	SWAS	GRAB	12	6.72	84	18	65	28	62	12	45	0	24	140	.	.	.	.	.
STAN	10/28/2003	0905	SWAS	GRAB	10	6.83	79	20	70	29	63	13	48	0	27	140	0	.	.	.	1
STAN	11/04/2003	0900	SWAS	GRAB	13	6.55	68	19	67	28	63	12	50	0	24	140	.	.	.	.	.
STAN	11/11/2003	0900	SWAS	GRAB	8	6.18	73	19	65	27	62	11	53	0	24	140	-0	.	.	.	0
STAN	11/18/2003	0840	SWAS	GRAB	10	6.28	84	19	66	28	63	11	51	0	23	140	.	.	.	.	.
STAN	11/25/2003	0850	SWAS	GRAB	7	6.27	79	19	64	28	60	10	51	0	23	139	-0	.	.	.	1
STAN	12/02/2003	0920	SWAS	GRAB	5	6.19	77	18	63	27	60	10	53	0	23	139	.	.	.	.	.
STAN	12/09/2003	0925	SWAS	GRAB	5	6.26	78	18	61	26	60	9	50	0	23	138	-0	.	.	.	0
STAN	12/10/2003	2200	SWAS	ISCO	.	6.07	70	18	59	26	55	13	49	0	22	121	3	.	.	.	.
STAN	12/11/2003	0000	SWAS	ISCO	.	6.05	66	18	59	25	47	15	48	0	19	100	8	.	.	.	2
STAN	12/11/2003	0200	SWAS	ISCO	.	6.08	63	18	64	28	49	14	53	0	19	100	7	.	.	.	2
STAN	12/11/2003	0400	SWAS	ISCO	.	6.07	59	20	68	30	53	14	59	0	20	110	5	.	.	.	2
STAN	12/11/2003	0600	SWAS	ISCO	.	6.11	60	20	70	31	56	13	62	0	21	118	3	.	.	.	1
STAN	12/11/2003	1000	SWAS	ISCO	.	6.15	63	21	72	32	59	13	68	1	21	127	8	.	.	.	1
STAN	12/11/2003	1400	SWAS	ISCO	.	6.14	65	21	70	31	59	13	68	0	22	130	4	.	.	.	1
STAN	12/11/2003	2200	SWAS	ISCO	.	6.10	61	21	70	31	60	12	68	0	22	134	4	.	.	.	.
STAN	12/12/2003	0600	SWAS	ISCO	.	6.23	65	19	68	30	60	12	65	0	23	135	3	.	.	.	1
STAN	12/17/2003	1450	SWAS	GRAB	6	6.81	77	18	60	26	59	10	50	0	23	135	.	.	.	.	.
STAN	12/24/2003	1535	SWAS	GRAB	7	6.25	73	18	62	26	59	10	49	0	22	131	.	.	.	.	.
STAN	12/29/2003	1440	SWAS	GRAB	7	6.18	73	17	58	25	58	10	48	0	23	137	.	.	.	.	.
STAN	01/05/2004	1315	SWAS	GRAB	10	6.79	70	18	61	26	60	10	46	0	22	137	.	.	.	.	.
STAN	01/13/2004	1005	SWAS	GRAB	4	6.80	75	18	59	25	57	9	45	0	22	134	.	.	.	.	.
STAN	01/20/2004	0940	SWAS	GRAB	1	6.75	74	18	60	26	58	9	45	0	23	140	.	.	.	.	.
STAN	01/28/2004	0945	SWAS	GRAB	1	6.72	69	18	60	25	58	9	46	0	23	140	0	.	.	.	0
STAN	02/03/2004	1020	SWAS	GRAB	2	6.65	74	17	58	25	56	8	45	0	22	125	.	.	.	.	.
STAN	02/10/2004	0920	SWAS	GRAB	4	6.54	67	20	66	28	65	9	61	1	23	144	.	.	.	.	.
STAN	02/17/2004	0930	SWAS	GRAB	2	6.73	69	19	65	27	63	9	57	0	23	145	.	.	.	.	.
STAN	02/24/2004	0920	SWAS	GRAB	4	6.13	75	19	63	26	63	9	53	0	23	143	.	.	.	.	.

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
STAN	03/02/2004	0900	SWAS	GRAB	7	6.20	78	18	62	26	64	9	51	0	23	142	.	.	.	.	.
STAN	03/09/2004	1010	SWAS	GRAB	6	6.22	77	19	64	27	63	9	50	0	23	141	.	.	.	.	.
STAN	03/16/2004	0935	SWAS	GRAB	6	6.37	73	18	63	27	61	10	51	2	21	130	5	.	.	.	1
STAN	03/23/2004	0900	SWAS	GRAB	4	6.24	74	18	62	26	60	9	51	0	23	136	.	.	.	.	.
STAN	03/30/2004	0910	SWAS	GRAB	8	6.72	80	18	62	26	61	10	49	0	22	138	1	.	.	.	0
STAN	04/06/2004	0940	SWAS	GRAB	6	6.02	74	18	62	26	59	9	51	0	22	135	.	.	.	.	.
STAN	04/13/2004	0910	SWAS	GRAB	8	6.10	72	19	68	29	60	10	56	2	21	130	0	.	.	.	1
STAN	04/20/2004	0905	SWAS	GRAB	12	6.71	80	17	63	26	60	10	52	0	22	136	.	.	.	.	.
STAN	04/27/2004	0920	SWAS	GRAB	11	6.25	85	18	65	27	62	10	49	0	22	140	0	.	.	.	0
STAN	05/04/2004	0915	SWAS	GRAB	11	6.32	79	19	68	29	63	11	64	0	21	139	.	.	.	.	.
STAN	05/11/2004	1540	SWAS	GRAB	16	6.75	81	19	65	27	61	11	51	0	20	132	-0	.	.	.	1
STAN	05/19/2004	1005	SWAS	GRAB	15	6.42	93	19	69	29	63	11	47	0	20	142	.	.	.	.	.
STAN	05/24/2004	1455	SWAS	GRAB	19	6.36	86	19	64	27	66	11	48	0	22	148	0	.	.	.	0
STAN	06/01/2004	1615	SWAS	GRAB	18	6.29	89	19	65	27	66	11	46	0	21	148	.	.	.	.	.
STAN	06/08/2004	1630	SWAS	GRAB	18	6.20	94	19	67	28	66	11	48	0	22	147	0	.	.	.	0
STAN	06/16/2004	0958	SWAS	GRAB	17	6.55	90	19	67	28	65	11	48	0	21	148	.	.	.	.	.
STAN	06/22/2004	1317	SWAS	GRAB	19	6.26	85	19	64	26	65	11	47	0	22	145	.	.	.	.	.
STAN	06/29/2004	1415	SWAS	GRAB	18	6.44	88	18	64	26	65	11	45	0	21	145	.	.	.	.	.
VT01	07/31/2003	1050	VTSSS	GRAB	14	6.65	106	21	91	36	57	9	24	34	13	148	.	.	.	.	.
VT01	10/29/2003	1210	VTSSS	GRAB	8	6.95	98	22	89	37	59	12	30	15	16	145	.	.	.	.	.
VT01	01/27/2004	9999	VTSSS	GRAB	4	6.87	75	20	79	33	55	9	26	43	13	129	.	.	.	.	.
VT01	04/28/2004	1313	VTSSS	GRAB	8	6.36	78	21	86	34	52	10	29	35	15	126	.	.	.	.	.
VT02	07/31/2003	1205	VTSSS	GRAB	15	6.49	36	16	48	23	49	12	50	16	12	138	.	.	.	.	.
VT02	10/29/2003	1330	VTSSS	GRAB	10	6.61	33	16	48	25	50	13	49	15	14	134	.	.	.	.	.
VT02	01/27/2004	9999	VTSSS	GRAB	3	6.39	21	16	49	25	44	11	46	43	12	117	.	.	.	.	.
VT02	04/28/2004	1115	VTSSS	GRAB	6	6.36	20	16	49	24	42	12	47	35	12	115	.	.	.	.	.
VT03	07/31/2003	1145	VTSSS	GRAB	15	6.67	77	15	45	41	32	17	29	0	10	118	.	.	.	.	.
VT03	10/29/2003	1310	VTSSS	GRAB	10	6.75	72	15	43	40	35	18	33	0	12	124	.	.	.	.	.
VT03	01/27/2004	9999	VTSSS	GRAB	3	6.63	49	12	33	31	28	13	31	3	11	106	.	.	.	.	.
VT03	04/28/2004	1140	VTSSS	GRAB	7	6.55	54	12	34	33	25	15	34	0	10	93	.	.	.	.	.
VT04	07/31/2003	0950	VTSSS	GRAB	16	6.30	31	12	28	17	52	10	42	0	10	138	.	.	.	.	.
VT04	10/29/2003	1115	VTSSS	GRAB	9	6.58	39	14	38	19	54	13	47	0	18	139	.	.	.	.	.
VT04	01/27/2004	9999	VTSSS	GRAB	2	6.39	22	13	23	16	53	9	47	9	11	129	.	.	.	.	.
VT04	04/28/2004	1418	VTSSS	GRAB	9	6.43	30	12	23	16	53	11	50	0	11	131	.	.	.	.	.
VT05	07/31/2003	0900	VTSSS	GRAB	16	6.76	104	19	49	66	35	26	41	0	13	121	.	.	.	.	.
VT05	10/29/2003	1355	VTSSS	GRAB	10	6.87	100	19	49	65	36	27	46	0	13	119	.	.	.	.	.
VT05	01/27/2004	9999	VTSSS	GRAB	3	6.60	45	13	24	36	29	17	44	0	11	99	.	.	.	.	.
VT05	04/28/2004	9999	VTSSS	GRAB	.	6.61	43	12	22	34	28	22	44	0	13	101	.	.	.	.	.
VT06	07/31/2003	0825	VTSSS	GRAB	14	6.40	56	17	49	56	29	17	57	1	12	98	.	.	.	.	.
VT06	10/29/2003	1430	VTSSS	GRAB	9	6.75	74	18	50	57	31	18	60	0	12	94	.	.	.	.	.
VT06	01/27/2004	9999	VTSSS	GRAB	3	6.53	34	15	39	46	26	13	57	12	11	83	.	.	.	.	.
VT06	04/28/2004	1030	VTSSS	GRAB	6	6.36	37	15	37	45	25	14	53	5	11	84	.	.	.	.	.
VT09	07/29/2003	1330	VTSSS	GRAB	19	5.53	9	17	53	31	18	11	69	4	14	75	.	12	.	.	.
VT09	10/29/2003	1230	VTSSS	GRAB	11	5.94	10	15	52	32	15	13	76	0	16	67	.	18	.	.	.

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
VT09	04/27/2004	1315	VTSSS	GRAB	10	5.39	-2	14	42	28	14	9	65	4	13	58	.	43	.	.	.
VT10	07/28/2003	1605	VTSSS	GRAB	18	6.32	26	12	36	34	20	12	46	4	17	84	.	.	.	.	.
VT10	10/29/2003	1045	VTSSS	GRAB	10	6.23	19	11	30	32	14	13	51	0	14	75	.	.	.	.	.
VT10	01/31/2004	1522	SWAS	GRAB	0	6.09	15	11	29	31	13	10	50	0	12	64	.	.	.	.	.
VT10	02/02/2004	0944	VTSSS	GRAB	0	6.19	18	12	32	30	20	10	48	1	22	65	.	.	.	.	.
VT10	04/29/2004	1500	VTSSS	GRAB	.	6.17	13	11	26	27	18	12	48	0	16	62	.	.	.	.	.
VT11	07/28/2003	1540	VTSSS	GRAB	18	6.29	19	11	32	32	13	11	37	2	14	80	.	.	.	.	.
VT11	10/29/2003	0955	VTSSS	GRAB	11	6.41	26	10	30	30	13	13	39	0	15	75	.	.	.	.	.
VT11	02/02/2004	1100	VTSSS	GRAB	2	6.26	15	11	30	30	13	10	38	6	14	71	.	.	.	.	.
VT11	04/29/2004	1215	VTSSS	GRAB	11	6.21	17	11	30	29	12	12	39	4	14	55	.	.	.	.	.
VT12	07/28/2003	1520	VTSSS	GRAB	20	6.74	119	22	96	78	14	16	41	14	16	77	.	.	.	.	.
VT12	10/29/2003	0940	VTSSS	GRAB	11	6.95	125	21	91	74	13	15	42	0	16	70	.	.	.	.	.
VT12	02/02/2004	1100	VTSSS	GRAB	0	6.80	89	19	79	67	13	11	42	12	15	59	.	.	.	.	.
VT12	05/04/2004	1313	VTSSS	GRAB	8	6.85	83	18	74	63	14	14	39	12	16	67	.	.	.	.	.
VT14	07/28/2003	1720	VTSSS	GRAB	21	6.29	18	12	33	36	15	12	42	7	15	85	.	.	.	.	.
VT14	10/29/2003	1000	VTSSS	GRAB	9	6.25	19	11	28	30	14	14	44	0	16	79	.	.	.	.	.
VT14	02/02/2004	1050	VTSSS	GRAB	4	6.19	12	10	27	29	14	10	41	6	14	65	.	.	.	.	.
VT14	05/04/2004	1340	VTSSS	GRAB	12	6.20	13	11	26	30	14	12	46	2	14	66	.	.	.	.	.
VT15	07/28/2003	1650	VTSSS	GRAB	20	5.79	20	10	28	26	15	10	27	3	15	102	.	19	.	.	.
VT15	10/29/2003	0935	VTSSS	GRAB	9	5.94	15	9	22	18	14	13	26	0	16	96	.	5	.	.	.
VT15	01/31/2004	1135	SWAS	GRAB	0	5.90	13	7	19	15	13	7	22	1	14	86	.	.	.	.	.
VT15	02/02/2004	1027	VTSSS	GRAB	4	6.16	16	10	26	25	14	9	35	4	13	76	.	.	.	.	.
VT15	05/04/2004	1347	VTSSS	GRAB	12	6.04	10	8	21	18	15	10	26	0	14	80	.	.	.	.	.
VT16	07/29/2003	0750	VTSSS	GRAB	19	5.93	18	16	58	36	15	13	71	3	19	83	.	6	.	.	.
VT16	10/27/2003	0910	VTSSS	GRAB	12	6.29	28	17	61	36	15	18	79	0	20	77	.	.	.	.	.
VT16	01/28/2004	1100	VTSSS	GRAB	0	6.10	14	16	63	36	15	11	82	2	18	68	.	.	.	.	.
VT16	04/26/2004	0930	VTSSS	GRAB	14	6.31	26	16	65	37	16	15	80	0	18	68	.	.	.	.	.
VT18	07/28/2003	1030	VTSSS	GRAB	17	6.71	94	26	89	73	36	22	80	10	12	96	.	.	.	.	.
VT18	10/31/2003	1130	VTSSS	GRAB	9	6.83	66	21	73	61	30	19	79	3	14	92	.	.	.	.	.
VT18	04/28/2004	1320	VTSSS	GRAB	9	6.38	39	20	68	55	25	17	81	9	12	83	.	.	.	.	.
VT19	07/28/2003	1040	VTSSS	GRAB	17	6.66	76	25	89	70	29	23	76	35	13	97	.	.	.	.	.
VT19	10/31/2003	1145	VTSSS	GRAB	10	6.75	58	22	75	62	27	21	74	19	14	90	.	.	.	.	.
VT19	04/28/2004	1340	VTSSS	GRAB	9	6.39	36	20	71	57	23	18	73	22	13	81	.	.	.	.	.
VT22	07/28/2003	1335	VTSSS	GRAB	21	6.82	138	25	80	56	82	15	42	8	26	209	.	.	.	.	.
VT22	10/27/2003	1315	VTSSS	GRAB	12	6.78	119	24	77	55	70	20	53	0	28	176	.	.	.	.	.
VT22	05/03/2004	1212	VTSSS	GRAB	11	6.76	100	21	64	47	69	12	53	3	23	181	.	.	.	.	.
VT23	07/28/2003	1250	VTSSS	GRAB	21	6.64	150	24	73	46	81	17	28	0	29	215	.	.	.	.	.
VT23	10/27/2003	1200	VTSSS	GRAB	13	6.64	134	23	74	47	75	22	42	0	31	184	.	.	.	.	.
VT23	05/03/2004	1100	VTSSS	GRAB	11	6.68	120	21	65	41	75	15	37	0	27	190	.	.	.	.	.
VT24	07/25/2003	1200	VTSSS	GRAB	16	6.29	24	14	55	30	15	11	64	0	16	100	.	.	.	.	.
VT24	10/27/2003	1130	VTSSS	GRAB	12	6.46	35	15	64	29	14	16	65	0	16	97	.	.	.	.	.
VT24	02/04/2004	1530	VTSSS	GRAB	2	6.29	20	14	52	28	16	9	64	2	16	78	.	.	.	.	.
VT24	04/26/2004	1100	VTSSS	GRAB	13	6.19	19	13	47	27	15	13	59	0	16	75	.	.	.	.	.
VT25	07/25/2003	1100	VTSSS	GRAB	18	5.86	4	9	21	23	14	8	39	2	16	75	.	17	.	.	.

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
VT25	10/27/2003	1030	VTSSS	GRAB	12	5.88	8	11	21	23	13	13	41	0	17	76	.	5	.	.	
VT25	02/04/2004	1400	VTSSS	GRAB	4	5.76	3	9	21	23	14	7	41	1	14	64	.	10	.	.	
VT25	04/26/2004	1000	VTSSS	GRAB	14	5.80	5	10	23	24	13	9	43	0	14	59	.	18	.	.	
VT26	07/29/2003	1320	VTSSS	GRAB	16	5.05	-9	18	43	31	13	7	84	0	18	73	.	26	.	.	
VT26	10/29/2003	1430	VTSSS	GRAB	11	5.23	-6	16	44	31	13	12	86	0	21	73	.	23	.	.	
VT26	01/30/2004	1440	VTSSS	GRAB	1	5.21	-6	17	47	35	13	11	87	6	18	64	.	50	10	.	
VT26	04/30/2004	1345	VTSSS	GRAB	.	5.13	-7	18	49	34	13	13	90	8	20	64	.	51	15	.	
VT28	07/29/2003	1239	VTSSS	GRAB	16	5.80	4	9	24	23	11	8	34	0	13	84	.	59	47	.	
VT28	10/29/2003	1400	VTSSS	GRAB	10	5.61	0	10	22	24	12	9	45	0	15	77	.	10	.	.	
VT28	01/30/2004	1400	VTSSS	GRAB	1	5.61	1	9	20	23	11	7	41	0	13	70	.	20	.	.	
VT28	04/30/2004	1300	VTSSS	GRAB	.	5.38	-5	10	20	23	11	8	48	0	14	62	.	27	.	.	
VT29	07/29/2003	0900	VTSSS	GRAB	16	5.47	-0	11	22	23	11	9	42	1	15	58	.	23	.	.	
VT29	10/29/2003	1030	VTSSS	GRAB	10	5.65	-1	9	20	22	11	10	42	0	16	57	.	5	.	.	
VT29	01/30/2004	1000	VTSSS	GRAB	1	5.54	2	9	20	23	10	7	38	3	14	50	.	15	.	.	
VT29	04/30/2004	1030	VTSSS	GRAB	11	5.48	-1	9	20	21	11	8	40	2	14	49	.	5	.	.	
VT31	07/29/2003	1509	VTSSS	GRAB	16	5.20	-8	11	18	22	13	7	41	0	16	75	.	37	.	.	
VT31	10/30/2003	1515	VTSSS	GRAB	9	5.26	-6	11	16	23	14	8	44	0	17	75	.	19	.	.	
VT31	01/30/2004	1600	VTSSS	GRAB	0	5.15	-8	11	15	22	13	6	46	0	16	64	.	35	.	.	
VT31	04/30/2004	1450	VTSSS	GRAB	.	5.05	-10	11	14	21	13	8	48	0	15	61	.	43	.	.	
VT32	07/29/2003	9999	VTSSS	GRAB	14	5.75	12	16	61	42	12	8	77	6	18	61	.	11	.	.	
VT32	10/29/2003	1230	VTSSS	GRAB	9	5.85	9	16	58	39	12	10	79	6	20	59	.	6	.	.	
VT32	01/30/2004	1220	VTSSS	GRAB	1	5.64	1	16	59	38	11	8	78	16	17	51	.	25	.	.	
VT32	04/30/2004	1145	VTSSS	GRAB	.	5.40	-1	17	59	36	11	9	76	23	18	49	.	15	.	.	
VT33	07/28/2003	1232	VTSSS	GRAB	20	7.59	806	90	748	126	23	17	64	0	18	116	.	.	.	.	
VT33	10/27/2003	1212	VTSSS	GRAB	11	7.38	406	52	392	75	20	20	61	0	18	98	.	.	.	.	
VT33	01/29/2004	9999	VTSSS	GRAB	0	7.46	359	46	352	67	20	11	60	0	17	87	.	.	.	.	
VT33	04/25/2004	1430	VTSSS	GRAB	15	7.22	257	35	250	59	20	13	56	0	17	86	.	.	.	.	
VT34	07/28/2003	1200	VTSSS	GRAB	20	6.98	68	19	82	46	20	11	58	5	17	95	.	.	.	.	
VT34	10/27/2003	1242	VTSSS	GRAB	12	6.72	56	18	75	41	19	18	68	0	19	85	.	.	.	.	
VT34	01/29/2004	1215	VTSSS	GRAB	1	6.46	30	15	58	34	18	9	66	1	17	76	.	.	.	.	
VT34	04/25/2004	1500	VTSSS	GRAB	15	6.60	34	15	60	35	19	11	67	0	17	78	.	.	.	.	
VT36	07/31/2003	1130	VTSSS	GRAB	16	5.39	-0	18	26	41	22	28	89	6	25	100	.	34	.	.	
VT36	10/31/2003	0943	VTSSS	GRAB	10	5.47	-2	18	27	39	22	30	94	0	24	91	.	6	.	.	
VT36	01/28/2004	1055	VTSSS	GRAB	0	5.37	-7	18	28	42	21	25	91	6	21	90	.	37	.	.	
VT36	04/29/2004	1100	VTSSS	GRAB	11	5.31	-3	18	28	42	21	28	97	2	21	85	.	36	.	.	
VT37	07/25/2003	0845	VTSSS	GRAB	15	6.38	33	17	41	51	24	20	73	10	15	81	.	.	.	.	
VT37	10/29/2003	1130	VTSSS	GRAB	9	6.41	28	16	39	48	23	17	76	0	16	78	.	.	.	.	
VT37	02/02/2004	1300	VTSSS	GRAB	2	6.24	17	16	41	50	22	14	75	14	14	69	.	.	.	.	
VT37	04/26/2004	0815	VTSSS	GRAB	10	6.27	23	16	40	50	22	18	72	9	14	74	.	.	.	.	
VT38	07/30/2003	1437	VTSSS	GRAB	19	6.63	107	31	102	96	42	26	117	15	18	91	.	.	.	.	
VT38	10/29/2003	1022	VTSSS	GRAB	10	6.53	58	25	80	77	35	20	120	0	17	82	.	.	.	.	
VT38	01/28/2004	1600	VTSSS	GRAB	1	6.61	47	26	79	76	35	17	125	7	16	76	.	.	.	.	
VT38	04/28/2004	1200	VTSSS	GRAB	9	6.45	53	25	77	75	34	19	121	6	16	84	.	.	.	.	
VT39	07/28/2003	0930	VTSSS	GRAB	18	5.33	-4	11	10	16	17	13	43	0	18	85	.	53	20	.	

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
VT39	10/25/2003	1418	SWAS	GRAB	11	5.04	-7	13	12	18	17	15	55	0	16	77	.	.	.	.	
VT39	10/27/2003	1215	VTSSS	GRAB	13	5.16	-5	12	12	17	16	19	51	0	18	78	.		27	.	.
VT39	05/05/2004	1015	VTSSS	GRAB	10	5.05	-10	12	11	18	16	15	55	0	15	69	.		60	13	.
VT40	07/28/2003	1330	VTSSS	GRAB	18	6.07	20	12	17	25	25	25	48	1	20	89	.	.	.	.	.
VT40	10/25/2003	1625	SWAS	GRAB	12	6.02	17	12	17	26	21	23	51	0	17	83	.	.	.	.	.
VT40	10/27/2003	1120	VTSSS	GRAB	13	6.04	18	12	18	27	21	25	52	0	18	81	.	.	.	.	.
VT40	05/05/2004	1140	VTSSS	GRAB	11	6.01	9	11	15	24	23	22	54	0	16	77	.	.	.	.	.
VT41	07/28/2003	0905	VTSSS	GRAB	.	5.98	11	13	33	29	18	16	60	2	18	82	.		11	.	.
VT41	10/25/2003	0950	SWAS	GRAB	9	6.02	14	14	42	27	17	17	67	0	17	76	.	.	.	.	.
VT41	10/27/2003	1340	VTSSS	GRAB	13	6.19	19	14	43	28	17	21	66	0	18	73	.	.	.	.	.
VT41	05/05/2004	0900	VTSSS	GRAB	9	5.91	7	12	29	26	17	18	62	2	16	71	.		12	.	.
VT42	07/28/2003	0840	VTSSS	GRAB	.	6.69	80	15	49	28	51	10	19	4	21	144	.	.	.	.	.
VT42	10/27/2003	0820	VTSSS	GRAB	12	6.54	84	17	55	33	51	15	29	0	23	130	.	.	.	.	.
VT42	05/04/2004	1450	VTSSS	GRAB	10	6.69	63	14	48	27	47	9	24	7	20	128	.	.	.	.	.
VT43	07/27/2003	1355	VTSSS	GRAB	18	6.68	71	11	42	15	43	6	9	0	19	112	.	.	.	.	.
VT43	10/25/2003	1530	VTSSS	GRAB	8	5.86	59	11	36	13	42	8	11	0	19	107	.	.	.	.	.
VT43	01/25/2004	1045	VTSSS	GRAB	1	6.67	44	10	32	12	39	5	12	0	18	100	.	.	.	.	.
VT43	04/27/2004	1400	VTSSS	GRAB	10	6.63	58	10	35	12	39	6	12	0	18	101	.	.	.	.	.
VT44	07/27/2003	1215	VTSSS	GRAB	19	6.57	88	17	59	23	59	9	32	0	21	145	.	.	.	.	.
VT44	10/25/2003	1355	VTSSS	GRAB	9	6.66	72	15	53	21	54	10	36	0	20	135	.	.	.	.	.
VT44	01/25/2004	1210	VTSSS	GRAB	1	6.59	44	15	49	20	49	6	36	0	20	124	.	.	.	.	.
VT44	04/27/2004	1530	VTSSS	GRAB	11	6.68	68	15	54	21	53	8	35	0	20	129	.	.	.	.	.
VT45	07/26/2003	1008	VTSSS	GRAB	20	6.43	64	17	29	58	35	27	49	0	23	121	.	.	.	.	.
VT45	10/25/2003	1645	VTSSS	GRAB	11	6.49	48	16	25	51	33	26	59	0	22	117	.	.	.	.	.
VT45	04/27/2004	1155	VTSSS	GRAB	13	6.49	39	15	23	47	32	27	60	0	21	110	.	.	.	.	.
VT46	07/28/2003	0630	VTSSS	GRAB	19	6.75	99	19	75	25	66	6	31	0	26	149	.	.	.	.	.
VT46	10/27/2003	0830	VTSSS	GRAB	13	5.91	61	20	75	27	56	12	58	0	24	119	.		15	.	.
VT46	05/05/2004	1445	VTSSS	GRAB	12	6.64	65	16	61	21	53	5	45	0	21	123	.	.	.	.	.
VT48	07/24/2003	1430	VTSSS	GRAB	17	6.49	45	17	27	45	33	38	63	0	19	125	.	.	.	.	.
VT48	10/29/2003	1410	VTSSS	GRAB	11	6.63	44	17	26	44	34	38	68	0	19	123	.	.	.	.	.
VT48	01/31/2004	1320	VTSSS	GRAB	0	6.58	36	16	25	43	33	29	69	1	17	117	.	.	.	.	.
VT48	04/30/2004	2130	VTSSS	GRAB	12	6.31	39	16	22	38	32	35	63	0	18	116	.	.	.	.	.
VT49	07/25/2003	1300	VTSSS	GRAB	18	6.62	69	22	97	53	20	12	88	2	16	102	.	.	.	.	.
VT49	10/31/2003	1355	VTSSS	GRAB	11	6.50	36	22	84	60	20	18	117	1	20	86	.	.	.	.	.
VT49	01/30/2004	1250	VTSSS	GRAB	1	6.47	34	19	69	57	19	13	94	7	15	85	.	.	.	.	.
VT49	04/26/2004	1345	VTSSS	GRAB	12	5.49	1	22	59	61	15	24	118	16	16	66	.		81	47	.
VT50	07/25/2003	1410	VTSSS	GRAB	19	4.71	-26	25	29	48	15	13	126	1	17	82	.		216	26	.
VT50	10/28/2003	1530	VTSSS	GRAB	11	4.82	-16	25	35	54	15	19	127	7	18	81	.	.	123	26	.
VT50	01/28/2004	1430	VTSSS	GRAB	0	4.91	-9	24	32	53	14	14	127	8	15	72	.	.	236	20	.
VT50	04/26/2004	1140	VTSSS	GRAB	12	4.84	-19	26	43	60	14	23	115	28	16	66	.	.	165	45	.
VT51	07/31/2003	1720	VTSSS	GRAB	19	7.04	283	44	169	153	79	21	86	0	31	181	.	.	.	.	.
VT51	10/30/2003	0830	VTSSS	GRAB	12	7.25	211	40	144	136	69	20	116	0	32	168	.	.	.	.	.
VT51	01/28/2004	1405	VTSSS	GRAB	0	7.07	145	35	123	120	59	15	112	12	31	146	.	.	.	.	.
VT51	04/30/2004	1430	VTSSS	GRAB	11	6.71	153	36	126	119	62	18	133	0	25	168	.	.	.	.	.

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
VT52	07/25/2003	1000	VTSSS	GRAB	15	6.05	23	21	81	49	18	12	109	0	19	87	.	.	.	.	.
VT52	10/31/2003	1030	VTSSS	GRAB	11	6.44	30	21	88	51	18	14	109	0	20	88	.	.	.	.	.
VT52	01/28/2004	1300	VTSSS	GRAB	6	6.44	33	21	84	56	18	12	110	2	17	84	.	.	.	.	.
VT52	04/26/2004	1230	VTSSS	GRAB	12	6.18	18	20	84	46	16	15	115	0	17	72	.	.	.	.	.
VT53	07/31/2003	1220	VTSSS	GRAB	18	6.28	21	19	31	48	28	39	84	7	24	109	.	.	.	.	.
VT53	10/31/2003	1035	VTSSS	GRAB	10	6.06	13	19	31	48	26	41	104	0	23	100	.	.	.	.	.
VT53	01/28/2004	1148	VTSSS	GRAB	1	5.92	10	18	30	47	26	32	95	2	21	97	.	9	.	.	.
VT53	04/29/2004	1155	VTSSS	GRAB	12	6.02	12	18	29	44	26	37	97	1	22	92	.	.	.	.	.
VT54	07/25/2003	1240	VTSSS	GRAB	16	6.49	72	32	101	95	40	28	122	32	20	102	.	.	.	.	.
VT54	10/29/2003	1345	VTSSS	GRAB	7	6.62	58	27	86	83	34	23	114	20	19	89	.	.	.	.	.
VT54	02/02/2004	0830	VTSSS	GRAB	0	6.51	43	29	91	87	37	19	124	29	18	83	.	.	.	.	.
VT54	04/26/2004	1335	VTSSS	GRAB	11	5.83	43	26	83	78	30	24	109	34	17	83	.	4	.	.	.
VT56	07/25/2003	1000	VTSSS	GRAB	16	5.75	7	14	23	42	16	21	77	3	16	85	.	13	.	.	.
VT56	10/29/2003	1030	VTSSS	GRAB	9	5.65	2	14	21	40	16	19	78	0	15	77	.	3	.	.	.
VT56	02/02/2004	1135	VTSSS	GRAB	1	5.57	-2	15	24	46	15	15	79	6	14	66	.	28	.	.	.
VT56	04/26/2004	0925	VTSSS	GRAB	11	5.54	-1	14	22	41	15	20	78	5	14	71	.	8	.	.	.
VT56	05/02/2004	1236	SWAS	GRAB	13	5.57	0	14	21	40	15	19	76	2	14	71	.	.	.	.	.
VT57	07/25/2003	1100	VTSSS	GRAB	17	6.37	37	23	60	75	28	25	104	23	17	92	.	.	.	.	.
VT57	10/29/2003	0930	VTSSS	GRAB	9	6.45	29	21	53	66	24	21	106	6	16	83	.	.	.	.	.
VT57	02/02/2004	1020	VTSSS	GRAB	1	6.23	20	21	55	70	23	17	106	22	16	74	.	.	.	.	.
VT57	04/26/2004	1020	VTSSS	GRAB	11	6.31	20	21	55	68	24	21	102	23	15	79	.	.	.	.	.
VT58	07/31/2003	1440	VTSSS	GRAB	19	6.85	104	20	65	39	65	11	33	0	23	166	.	.	.	.	.
VT58	10/31/2003	1350	VTSSS	GRAB	12	6.94	97	19	62	37	61	13	40	0	25	156	.	.	.	.	.
VT58	01/29/2004	0955	VTSSS	GRAB	1	6.70	57	17	49	31	55	8	38	0	22	147	.	.	.	.	.
VT58	04/30/2004	1010	VTSSS	GRAB	10	6.41	79	18	58	36	58	11	50	0	21	146	.	.	.	.	.
VT61	07/31/2003	1340	VTSSS	GRAB	19	7.15	364	48	184	160	114	11	59	0	30	288	.	.	.	.	.
VT61	10/31/2003	1245	VTSSS	GRAB	12	7.38	302	45	167	150	99	12	78	0	36	243	.	.	.	.	.
VT61	01/29/2004	0830	VTSSS	GRAB	0	7.16	191	37	131	123	87	8	70	22	31	231	.	.	.	.	.
VT61	04/30/2004	0900	VTSSS	GRAB	9	6.80	255	43	160	144	94	10	102	9	29	244	.	.	.	.	.
VT62	07/31/2003	1405	VTSSS	GRAB	18	6.94	120	20	67	46	67	11	27	0	25	179	.	.	.	.	.
VT62	10/31/2003	1320	VTSSS	GRAB	11	6.94	102	20	61	44	62	14	36	0	29	169	.	.	.	.	.
VT62	01/28/2004	1525	VTSSS	GRAB	1	6.75	72	18	50	37	59	9	32	10	25	160	.	.	.	.	.
VT62	04/30/2004	0935	VTSSS	GRAB	9	6.48	84	19	59	43	60	12	50	0	23	155	.	.	.	.	.
VT63	07/27/2003	1310	VTSSS	GRAB	21	6.65	105	17	65	25	61	9	20	0	22	148	.	.	.	.	.
VT63	10/25/2003	1500	VTSSS	GRAB	8	6.67	83	16	58	23	56	10	22	0	22	142	.	.	.	.	.
VT63	01/25/2004	1120	VTSSS	GRAB	1	6.77	68	15	52	21	53	6	25	0	22	141	.	.	.	.	.
VT63	04/27/2004	1450	VTSSS	GRAB	12	6.92	85	15	55	21	55	8	25	0	21	138	.	.	.	.	.
VT64	07/28/2003	0800	VTSSS	GRAB	19	6.72	68	11	44	15	40	6	8	0	19	109	.	.	.	.	.
VT64	10/27/2003	0950	VTSSS	GRAB	13	6.47	51	14	52	20	37	18	31	0	22	88	.	.	.	.	.
VT64	05/05/2004	1340	VTSSS	GRAB	12	6.70	47	10	36	13	37	5	14	0	18	99	.	.	.	.	.
VT65	07/28/2003	0805	VTSSS	GRAB	19	6.67	77	15	56	18	50	7	20	0	19	131	.	.	.	.	.
VT65	10/27/2003	0955	VTSSS	GRAB	13	6.14	58	16	60	21	47	15	33	0	21	108	.	.	.	.	.
VT65	05/05/2004	1335	VTSSS	GRAB	10	6.63	59	12	45	15	44	6	26	0	18	111	.	.	.	.	.
VT66	07/31/2003	1600	VTSSS	GRAB	19	6.90	194	32	133	99	66	6	40	4	35	158	.	.	.	.	.

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T Al	O Al	DOC
					°C																
VT66	10/31/2003	1510	VTSSS	GRAB	11	7.06	169	29	118	88	57	7	53	0	34	142	.	.	.	.	.
VT66	01/29/2004	1125	VTSSS	GRAB	1	6.68	132	25	97	74	52	4	47	22	31	137	.	.	.	.	.
VT66	04/29/2004	1330	VTSSS	GRAB	12	6.77	145	27	109	80	58	6	53	5	31	147	.	.	.	.	.
VT67	07/28/2003	1240	VTSSS	GRAB	15	6.33	33	9	20	23	33	5	19	0	20	87	.	.	.	.	.
VT67	10/27/2003	1140	VTSSS	GRAB	12	6.37	35	12	29	30	36	18	33	0	22	84	.	.	.	.	.
VT67	02/05/2004	1030	VTSSS	GRAB	3	6.46	39	9	19	21	35	5	18	0	20	83	.	.	.	.	.
VT67	04/30/2004	1015	VTSSS	GRAB	11	6.56	40	10	22	24	35	6	19	0	19	79	.	.	.	.	.
VT75	07/31/2003	1525	VTSSS	GRAB	19	6.74	177	31	129	93	60	5	40	1	37	142	.	.	.	.	.
VT75	10/31/2003	1430	VTSSS	GRAB	11	7.05	131	27	111	81	52	7	53	0	33	126	.	.	.	.	.
VT75	01/29/2004	1045	VTSSS	GRAB	1	6.76	95	24	93	70	50	4	50	25	33	127	.	.	.	.	.
VT75	04/30/2004	1330	VTSSS	GRAB	13	6.77	128	25	102	75	53	6	51	14	30	134	.	.	.	.	.
VT76	07/28/2003	1420	VTSSS	GRAB	21	5.76	14	14	15	32	24	31	53	1	24	115	.	12	.	.	.
VT76	10/27/2003	1345	VTSSS	GRAB	14	5.92	14	13	13	29	22	32	55	0	22	105	.	3	.	.	.
VT76	05/04/2004	1530	VTSSS	GRAB	12	5.96	10	12	11	26	22	28	53	0	19	99	.	7	.	.	.
VT77	07/28/2003	1010	VTSSS	GRAB	.	6.45	49	18	31	50	39	32	61	1	20	105	.	.	.	.	.
VT77	10/27/2003	0915	VTSSS	GRAB	13	6.55	51	18	29	49	35	40	67	0	22	95	.	.	.	.	.
VT77	05/03/2004	1435	VTSSS	GRAB	13	6.49	25	15	24	39	34	27	63	0	18	97	.	.	.	.	.
VT78	07/29/2003	0940	VTSSS	GRAB	17	5.12	-7	13	25	21	11	8	53	0	10	53	.	61	38	.	.
VT78	04/30/2004	0950	VTSSS	GRAB	11	5.00	-11	13	25	21	10	7	62	5	10	51	.	38	.	.	.
VT80	07/25/2003	1230	VTSSS	GRAB	18	5.99	6	16	36	48	20	12	85	4	16	92	.	27	.	.	.
VT80	10/31/2003	9999	VTSSS	GRAB	11	5.55	1	20	45	57	18	17	115	2	18	85	.	63	22	.	.
VT80	01/30/2004	1140	VTSSS	GRAB	1	5.91	8	16	38	53	18	12	91	7	15	86	.	27	.	.	.
VT80	04/26/2004	1300	VTSSS	GRAB	12	5.08	-6	24	52	58	14	24	119	15	16	62	.	166	76	.	.
VT81	07/28/2003	1250	VTSSS	GRAB	15	6.19	34	9	19	22	33	5	19	0	20	88	.	.	.	.	.
VT81	10/27/2003	1150	VTSSS	GRAB	12	6.36	34	12	26	28	36	18	32	0	22	84	.	.	.	.	.
VT81	02/05/2004	1100	VTSSS	GRAB	3	6.48	34	9	18	20	36	5	18	0	19	85	.	.	.	.	.
VT81	04/30/2004	1025	VTSSS	GRAB	10	6.52	39	10	21	24	35	6	20	0	19	79	.	.	.	.	.
WOR1	07/01/2003	1120	SWAS	GRAB	16	6.02	32	19	32	50	21	42	83	3	20	81	-0	.	.	.	.
WOR1	07/08/2003	1150	SWAS	GRAB	16	5.96	20	18	31	48	21	40	82	1	19	80	-0	.	.	.	.
WOR1	07/14/2003	1145	SWAS	GRAB	17	6.30	33	19	33	51	22	43	81	4	20	82	-0	.	.	.	.
WOR1	07/23/2003	0940	SWAS	GRAB	18	6.31	42	20	36	54	22	46	80	8	19	85	-0	.	.	.	.
WOR1	07/29/2003	1040	SWAS	GRAB	20	6.11	49	21	37	55	24	48	79	0	22	90	7	.	.	.	1
WOR1	08/05/2003	1050	SWAS	GRAB	20	6.12	40	19	34	52	22	47	73	-0	19	88	-0	.	.	.	.
WOR1	08/12/2003	1020	SWAS	GRAB	17	6.16	31	17	30	45	21	40	79	0	19	84	0	.	.	.	.
WOR1	08/19/2003	1120	SWAS	GRAB	19	6.16	32	18	30	46	23	43	79	0	21	85	2	.	.	.	.
WOR1	08/26/2003	1200	SWAS	GRAB	19	5.88	40	18	32	49	22	44	77	0	20	87	-0	.	.	.	.
WOR1	09/02/2003	1340	SWAS	GRAB	21	6.33	40	19	33	51	23	47	73	0	20	90	0	.	.	.	.
WOR1	09/09/2003	1235	SWAS	GRAB	18	5.89	32	19	33	51	22	45	77	0	20	88	-0	.	.	.	.
WOR1	09/16/2003	1340	SWAS	GRAB	17	6.09	29	18	30	46	22	41	76	1	19	87	-0	.	.	.	.
WOR1	09/23/2003	1445	SWAS	GRAB	.	5.51	9	21	35	50	18	44	97	0	19	77	-0	.	.	.	.
WOR1	09/30/2003	1145	SWAS	GRAB	13	6.02	19	18	31	47	20	40	85	0	19	85	-0	.	.	.	.
WOR1	10/07/2003	1400	SWAS	GRAB	13	5.79	23	19	31	47	20	40	86	0	20	84	0	.	.	.	.
WOR1	10/16/2003	1150	SWAS	GRAB	14	5.94	21	18	31	48	21	42	85	0	21	83	0	.	.	.	.
WOR1	10/21/2003	1435	SWAS	GRAB	14	5.92	27	19	32	50	21	42	85	0	20	81	0	.	.	.	.

Site	Date	Time	Project	Method	Temp		pH	Alk	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	SiO ₂	NH ₄ ⁺	T_AI	O_AI	DOC
					°C																
WOR1	10/28/2003	1240	SWAS	GRAB	11	6.03	20	18	30	45	21	39	82	0	21	82	0	.	.	.	1
WOR1	11/04/2003	1345	SWAS	GRAB	13	6.00	20	17	29	44	21	39	82	0	20	82	0	.	.	.	.
WOR1	11/11/2003	1220	SWAS	GRAB	10	6.10	15	17	29	45	20	37	84	0	20	80	0	.	.	.	.
WOR1	11/18/2003	1225	SWAS	GRAB	11	5.60	19	18	30	45	20	38	85	0	20	82	0	.	.	.	.
WOR1	11/25/2003	1155	SWAS	GRAB	9	5.91	7	18	30	46	20	38	85	1	20	81	0	.	.	.	.
WOR1	12/02/2003	1350	SWAS	GRAB	7	6.00	12	17	30	46	20	36	83	0	20	81	0	.	.	.	.
WOR1	12/09/2003	1310	SWAS	GRAB	6	6.06	18	18	30	47	20	35	83	4	20	79	0	.	.	.	.
WOR1	12/17/2003	1150	SWAS	GRAB	6	6.16	10	18	30	46	19	36	82	0	19	78	0	.	.	.	.
WOR1	12/23/2003	1550	SWAS	GRAB	6	5.83	15	18	29	46	20	35	83	0	20	80	0	.	.	.	.
WOR1	12/29/2003	1205	SWAS	GRAB	6	5.82	13	18	29	47	20	35	83	2	19	80	0	.	.	.	.
WOR1	01/05/2004	1030	SWAS	GRAB	9	5.88	19	18	30	46	20	38	82	0	20	82	0	.	.	.	.
WOR1	01/12/2004	1320	SWAS	GRAB	4	6.12	12	18	31	49	20	35	84	6	19	78	0	.	.	.	.
WOR1	01/20/2004	1255	SWAS	GRAB	3	6.11	24	18	32	50	20	34	82	3	19	78	0	.	.	.	.
WOR1	01/27/2004	1200	SWAS	GRAB	2	6.08	14	18	33	50	20	33	83	7	18	77	0	.	.	.	0
WOR1	02/03/2004	1335	SWAS	GRAB	2	6.07	15	18	33	51	20	34	82	12	19	73	0	.	.	.	.
WOR1	02/11/2004	1315	SWAS	GRAB	5	6.10	16	17	29	46	20	34	84	3	19	78	0	.	.	.	.
WOR1	02/18/2004	1300	SWAS	GRAB	3	6.07	14	17	30	47	20	33	83	2	19	79	0	.	.	.	.
WOR1	02/24/2004	1225	SWAS	GRAB	4	5.97	16	17	30	46	20	34	82	4	19	79	-0	.	.	.	.
WOR1	03/02/2004	1210	SWAS	GRAB	6	6.16	18	17	31	46	20	35	82	4	19	79	-0	.	.	.	.
WOR1	03/09/2004	1225	SWAS	GRAB	6	5.85	10	18	30	47	20	35	81	6	18	78	.	.	.	.	.
WOR1	03/16/2004	1300	SWAS	GRAB	6	6.04	14	18	32	46	20	36	81	6	18	77	-0	.	.	.	.
WOR1	03/23/2004	1215	SWAS	GRAB	6	5.71	10	18	30	46	20	34	80	7	18	78	-0	.	.	.	.
WOR1	03/30/2004	1335	SWAS	GRAB	10	6.18	10	17	30	45	21	37	82	5	19	79	0	.	.	.	.
WOR1	04/06/2004	1300	SWAS	GRAB	8	6.10	18	17	31	46	20	35	82	6	19	78	-0	.	.	.	.
WOR1	04/13/2004	1215	SWAS	GRAB	9	5.92	15	18	33	49	19	37	87	3	18	70	0	.	.	.	.
WOR1	04/20/2004	1235	SWAS	GRAB	14	6.13	18	17	30	45	20	39	84	5	19	80	0	.	.	.	.
WOR1	04/27/2004	1410	SWAS	GRAB	12	5.39	22	19	30	45	20	40	83	0	19	81	0	6	.	.	0
WOR1	05/04/2004	1255	SWAS	GRAB	12	6.14	16	16	28	43	20	36	78	3	19	79	0	.	.	.	.
WOR1	05/11/2004	1230	SWAS	GRAB	15	6.21	23	18	30	46	21	40	80	5	19	81	0	.	.	.	.
WOR1	05/18/2004	1300	SWAS	GRAB	17	6.17	34	19	33	50	22	45	79	7	19	84	0	.	.	.	.
WOR1	05/24/2004	1059	SWAS	GRAB	17	6.04	31	19	33	49	22	44	79	7	19	86	0	.	.	.	.
WOR1	06/01/2004	1250	SWAS	GRAB	17	5.69	20	19	31	46	22	42	79	7	19	85	.	.	.	.	.
WOR1	06/08/2004	1250	SWAS	GRAB	16	5.71	14	18	30	46	20	39	80	4	19	83	0	.	.	.	.
WOR1	06/15/2004	1030	SWAS	GRAB	16	5.93	21	18	31	46	20	40	79	4	19	85	0	.	.	.	.
WOR1	06/22/2004	1035	SWAS	GRAB	16	5.79	18	18	30	46	21	40	79	1	19	85	0	.	.	.	.
WOR1	06/29/2004	0905	SWAS	GRAB	16	6.01	34	19	33	52	22	43	78	2	19	87	.	.	.	.	.

Table 4B: Precipitation Sample Chemistry

Concentrations in $\mu\text{eq/L}$ (alkalinity and ions), $\mu\text{S/cm}$ (conductivity).
Chloroform (1 mL/L) added to precipitation samples.

Site	Interval Start	Interval End	Project	Method	Volume (mL)	PH	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	NH ₄ ⁺
A01	01JUL03:12:05	08JUL03:12:30	SWAS	BULK	2000	4.48	17	4	1	1	1	31	10	2	1
A01	08JUL03:12:30	14JUL03:12:10	SWAS	BULK	840	4.45	20	10	2	2	2	26	24	4	5
A01	14JUL03:12:10	23JUL03:10:25	SWAS	BULK	2000	4.44	23	8	2	0	1	53	19	2	27
A01	23JUL03:10:25	29JUL03:11:15	SWAS	BULK	725	4.44	22	11	2	1	5	49	22	3	31
A01	29JUL03:11:15	05AUG03:11:30	SWAS	BULK	2000	4.49	17	1	0	0	0	24	12	3	3
A01	05AUG03:11:30	12AUG03:11:00	SWAS	BULK	2000	4.68	13	1	0	0	0	23	10	1	0
A01	12AUG03:11:00	19AUG03:11:45	SWAS	BULK	750	4.23	36	10	2	1	2	94	24	3	55
A01	19AUG03:11:45	26AUG03:11:00	SWAS	BULK	800	4.16	38	18	3	1	2	90	27	5	40
A01	26AUG03:11:00	02SEP03:14:30	SWAS	BULK	1000	4.44	19	8	2	1	2	38	11	2	8
A01	02SEP03:14:30	09SEP03:11:15	SWAS	BULK	1600	4.56	13	1	1	2	1	20	9	2	3
A01	09SEP03:11:15	16SEP03:12:05	SWAS	BULK	1100	4.65	14	5	3	9	1	21	18	10	5
A01	16SEP03:12:05	23SEP03:12:45	SWAS	BULK	2000	4.86	7	0	0	1	0	9	0	1	0
A01	23SEP03:12:45	30SEP03:13:45	SWAS	BULK	1300	4.42	19	3	1	2	2	41	11	5	12
A01	07OCT03:15:00	16OCT03:12:40	SWAS	BULK	1100	4.79	9	4	1	1	7	17	1	3	5
A01	21OCT03:13:10	28OCT03:11:15	SWAS	BULK	1600	4.74	11	6	2	2	3	21	5	3	0
A01	28OCT03:11:15	04NOV03:12:25	SWAS	BULK	200	4.40	19	2	0	0	1	23	15	2	11
A01	04NOV03:12:25	11NOV03:11:30	SWAS	BULK	1750	4.72	10	1	1	1	0	13	0	2	1
A01	11NOV03:11:30	18NOV03:10:45	SWAS	BULK	2000	4.89	7	2	1	1	0	13	0	1	0
A01	18NOV03:10:45	25NOV03:11:00	SWAS	BULK	2000	4.76	13	2	4	16	1	20	7	20	1
A01	25NOV03:11:00	02DEC03:12:50	SWAS	BULK	450	4.61	14	3	1	2	1	25	4	3	6
A01	23DEC03:16:30	29DEC03:12:30	SWAS	BULK	760	4.60	13	1	1	3	1	27	5	5	0
A01	29DEC03:12:30	05JAN04:11:05	SWAS	BULK	225	4.44	31	22	9	26	2	68	34	25	37

Site	Interval Start	Interval End	Project	Method	Volume (mL)	PH	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	NH ₄ ⁺
A01	05JAN04:11:05	12JAN04:12:30	SWAS	BULK	250	4.71	17	29	4	4	1	20	14	7	1
A01	12JAN04:12:30	20JAN04:11:55	SWAS	BULK	150	5.13	19	59	7	6	2	43	37	9	39
A01	27JAN04:11:00	03FEB04:12:35	SWAS	BULK	550	4.75	14	11	2	7	1	27	19	9	1
A01	03FEB04:12:35	11FEB04:12:15	SWAS	BULK	2000	4.43	20	1	1	3	1	35	16	8	18
A01	02MAR04:11:15	09MAR04:11:45	SWAS	BULK	550	4.87	14	13	5	12	2	26	17	12	11
A01	09MAR04:11:45	16MAR04:11:50	SWAS	BULK	950	4.36	28	15	3	2	1	45	40	5	16
A01	16MAR04:11:50	23MAR04:11:00	SWAS	BULK	135	4.24	54	26	5	8	15	122	88	12	144
A01	23MAR04:11:00	30MAR04:12:45	SWAS	BULK	200	4.25	34	32	8	5	5	52	31	10	27
A01	30MAR04:12:45	06APR04:12:05	SWAS	BULK	700	4.14	40	3	2	5	1	53	56	7	15
A01	06APR04:12:05	13APR04:11:20	SWAS	BULK	2000	4.42	24	16	3	2	2	45	30	6	9
A01	13APR04:11:20	20APR04:11:35	SWAS	BULK	1100	4.29	29	2	1	4	1	37	32	6	6
A01	20APR04:11:35	27APR04:13:15	SWAS	BULK	1150	4.64	18	21	10	6	12	44	22	6	37
A01	11MAY04:13:30	18MAY04:13:45	SWAS	BULK	525	4.28	32	22	9	9	10	74	36	11	26
A01	18MAY04:13:45	24MAY04:12:25	SWAS	BULK	2000	4.80	10	3	1	2	1	17	10	3	12
A01	24MAY04:12:25	01JUN04:13:30	SWAS	BULK	2000	4.67	15	8	2	5	1	28	17	5	13
A01	01JUN04:13:30	08JUN04:13:45	SWAS	BULK	1700	4.45	18	2	1	0	1	32	17	3	15
A01	08JUN04:13:45	15JUN04:11:30	SWAS	BULK	2000	4.38	23	4	1	1	1	51	20	4	26
A01	15JUN04:11:30	22JUN04:09:30	SWAS	BULK	1880	4.76	8	2	0	1	0	10	6	2	4
A01	22JUN04:09:30	29JUN04:10:50	SWAS	BULK	1400	4.39	21	6	1	1	1	38	17	2	8
A01	29JUN04:10:50	06JUL04:10:25	SWAS	BULK	2000	4.37	21	3	1	0	0	41	15	3	16
SHW1	02JUL03:12:30	09JUL03:12:45	SWAS	WET_ONLY	4900	4.95	8	2	0	1	1	18	7	1	8
SHW1	09JUL03:12:45	15JUL03:11:45	SWAS	WET_ONLY	710	4.84	10	4	1	2	1	21	15	3	17
SHW1	22JUL03:10:45	30JUL03:12:15	SWAS	WET_ONLY	1130	4.45	25	9	2	1	1	59	24	2	26
SHW1	30JUL03:12:15	06AUG03:10:40	SWAS	WET_ONLY	1350	4.25	30	1	0	1	1	52	25	3	5
SHW1	06AUG03:10:40	13AUG03:09:50	SWAS	WET_ONLY	1700	4.23	31	0	0	0	0	56	22	2	0
SHW1	20AUG03:09:55	28AUG03:12:05	SWAS	WET_ONLY	640	4.23	37	21	4	1	3	96	32	7	58
SHW1	28AUG03:12:05	04SEP03:13:25	SWAS	WET_ONLY	4280	4.58	15	2	1	2	1	32	12	3	0
SHW1	04SEP03:13:25	11SEP03:12:55	SWAS	WET_ONLY	275	4.75	15	3	1	0	1	44	0	3	47
SHW1	11SEP03:12:55	25SEP03:12:30	SWAS	WET_ONLY	14000	5.31	4	5	2	3	7	10	0	3	-0
SHW1	25SEP03:12:30	03OCT03:13:25	SWAS	WET_ONLY	500	4.66	12	2	1	1	1	20	2	2	0
SHW1	09OCT03:14:00	16OCT03:11:30	SWAS	WET_ONLY	1920	5.13	5	4	1	0	4	8	0	1	-0

Site	Interval Start	Interval End	Project	Method	Volume (mL)	PH	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	NH ₄ ⁺
SHW1	23OCT03:12:10	30OCT03:14:05	SWAS	WET_ONLY	1610	4.73	9	1	0	1	1	15	2	3	-0
SHW1	30OCT03:14:05	06NOV03:13:15	SWAS	WET_ONLY	1460	4.98	6	1	0	1	1	10	0	1	0
SHW1	06NOV03:13:15	13NOV03:10:30	SWAS	WET_ONLY	1490	4.83	8	1	1	1	1	14	2	2	0
SHW1	13NOV03:10:30	20NOV03:12:40	SWAS	WET_ONLY	4310	4.96	10	2	4	19	1	16	3	22	0
SHW1	21NOV03:12:05	25NOV03:13:15	SWAS	WET_ONLY	610	4.49	19	2	1	3	1	35	17	6	2
SHW1	25NOV03:13:15	04DEC03:13:15	SWAS	WET_ONLY	943	4.80	9	1	0	1	1	18	0	2	0
SHW1	04DEC03:13:15	11DEC03:11:50	SWAS	WET_ONLY	3910	5.11	6	0	0	0	0	5	2	1	0
SHW1	11DEC03:11:50	18DEC03:13:45	SWAS	WET_ONLY	1410	4.75	12	1	0	1	0	21	9	3	0
SHW1	18DEC03:13:45	24DEC03:10:45	SWAS	WET_ONLY	940	4.62	14	1	1	3	0	26	16	6	1
SHW1	24DEC03:10:45	30DEC03:11:15	SWAS	WET_ONLY	150	4.49	24	23	4	9	2	44	28	14	36
SHW1	30DEC03:11:15	07JAN04:11:50	SWAS	WET_ONLY	665	4.78	13	2	1	4	1	24	7	5	17
SHW1	07JAN04:11:50	14JAN04:10:15	SWAS	WET_ONLY	100	4.65	12	4	1	1	0	7	25	4	7
SHW1	14JAN04:10:15	21JAN04:12:00	SWAS	WET_ONLY	200	4.64	14	7	2	1	1	21	20	6	18
SHW1	21JAN04:12:00	17FEB04:15:00	SWAS	WET_ONLY	3500	4.83	7	1	0	1	0	12	4	4	3
SHW1	17FEB04:15:00	25FEB04:12:05	SWAS	WET_ONLY	150	4.31	33	24	4	4	2	61	51	8	42
SHW1	25FEB04:12:05	03MAR04:11:45	SWAS	WET_ONLY	150	4.42	24	11	6	21	2	25	29	33	14
SHW1	03MAR04:11:45	10MAR04:11:25	SWAS	WET_ONLY	1600	4.60	19	5	3	10	1	32	24	11	15
SHW1	10MAR04:11:25	17MAR04:11:40	SWAS	WET_ONLY	1100	4.37	24	2	0	1	0	36	28	3	14
SHW1	17MAR04:11:40	24MAR04:11:40	SWAS	WET_ONLY	600	4.44	25	4	1	2	1	49	35	3	38
SHW1	24MAR04:11:40	31MAR04:12:40	SWAS	WET_ONLY	550	4.32	26	4	3	10	1	35	27	14	13
SHW1	31MAR04:12:40	07APR04:14:00	SWAS	WET_ONLY	1770	4.26	28	1	0	0	0	41	34	2	19
SHW1	07APR04:14:00	14APR04:13:05	SWAS	WET_ONLY	5250	4.53	16	3	1	1	0	26	16	5	11
SHW1	14APR04:13:05	21APR04:12:30	SWAS	WET_ONLY	350	4.20	49	38	10	7	6	112	61	16	67
SHW1	21APR04:12:30	28APR04:12:45	SWAS	WET_ONLY	2070	4.75	13	7	3	5	3	29	16	4	23
SHW1	28APR04:12:45	05MAY04:12:20	SWAS	WET_ONLY	2840	5.03	6	1	1	3	1	10	0	3	3
SHW1	05MAY04:12:20	12MAY04:12:05	SWAS	WET_ONLY	630	4.80	22	23	7	1	12	75	36	4	61
SHW1	12MAY04:12:05	19MAY04:14:44	SWAS	WET_ONLY	700	4.98	12	12	6	9	5	27	22	8	21
SHW1	19MAY04:14:44	27MAY04:13:15	SWAS	WET_ONLY	2900	5.01	9	4	2	4	2	22	14	3	24
SHW1	27MAY04:13:15	02JUN04:13:30	SWAS	WET_ONLY	1950	5.18	8	4	1	2	1	23	12	2	27
SHW1	02JUN04:13:30	09JUN04:14:05	SWAS	WET_ONLY	3000	4.51	16	1	0	0	1	30	13	2	15
SHW1	09JUN04:14:05	16JUN04:11:48	SWAS	WET_ONLY	1600	4.55	14	1	0	1	0	28	12	2	11

Site	Interval Start	Interval End	Project	Method	Volume (mL)	PH	Cond	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺	SO ₄ ²⁻	NO ₃ ⁻	Cl ⁻	NH ₄ ⁺
SHW1	16JUN04:11:48	23JUN04:12:30	SWAS	WET_ONLY	850	4.83	11	6	1	1	1	29	15	3	26
SHW1	23JUN04:12:30	30JUN04:12:00	SWAS	WET_ONLY	300	4.43	18	1	0	0	0	25	21	3	13
SHW1	30JUN04:12:00	07JUL04:11:50	SWAS	WET_ONLY	2450	4.59	13	1	0	0	0	25	13	2	14

Table 5: Volatile Residue Determination

Sample ID	Organics/L g/L
July-03	
PAIN 7/29/03 09:40	0.00035
VT36 Meadow Run	0.00055
VT51 Jeremy's Run	0.00048
VT53 Twomile Run	0.00045
VT58 Brokenback Run	0.00125
STAN 7/29/03 13:10	0.00080
PINE 7/30/03 09:30	0.00085
VT61 N Fork Thornton River	0.00125
VT62 Hazel Run	0.00256
VT66 Rose River	0.00050
VT75-1 White Oak Canyon Run	0.00045
VT75-2 White Oak Canyon Run	0.00110
October-03	
PAIN 10/28/03 15:15	0.00025
VT36 Meadow Run	0.00020
VT51 Jeremy's Run	0.00026
VT53 Twomile Run	0.00020
VT58 Brokenback Run	0.00060
STAN 10/28/03 09:05	0.00050
PINE 10/30/03 11:15	0.00040
VT61 N Fork Thornton River	0.00020
VT62 Hazel Run	0.00100
VT66 Rose River	0.00060
VT75 White Oak Canyon Run	0.00025
January-04	
PAIN 1/27/04 13:30	0.00005
VT36 Meadow Run	0.00005
VT51 Jeremy's Run	0.00005
VT53 Twomile Run	0.00000
VT58 Brokenback Run	0.00015
STAN 1/28/04 09:45	0.00010
PINE 1/28/04 12:30	0.00015
VT61 N Fork Thornton River	0.00020
VT62 Hazel Run	0.00036
VT66-1 Rose River	-0.00005
VT75 White Oak Canyon Run	0.00000
VT66-2 Rose River	0.00005

Sample ID	Organics/L g/L
April-04	
PAIN 4/27/04 15:00	0.00020
VT36 Meadow Run	0.00015
VT51 Jeremy's Run	0.00040
VT53 Twomile Run	0.00015
VT58 Brokenback Run	0.00095
STAN 4/27/04 09:20	0.00075
PINE 4/28/04 11:30	0.00070
VT61 N Fork Thornton River	0.00135
VT62 Hazel Run	0.00180
VT66 Rose River	0.00030
VT75-1 White Oak Canyon Run	0.00045
VT75-2 White Oak Canyon Run	0.00050