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DATA ON THE SOLUTE CONCENTRATION WITHIN THE SUBSURFACE FLOWS OF LITTLE LOST MAN CREEK IN RESPONSE TO A TRANSPORT EXPERIMENT, REDWOOD NATIONAL PARK, NORTHWEST CALIFORNIA

Gary W. Zellweger, Vance C. Kennedy, Kenneth E. Bencala,
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Open-File Report OFR 86-403W

October 1986

UNITED STATES DEPARTMENT OF THE INTERIOR

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CONVERSION FACTORS

TO CONVERT FROM	TO	MULTIPLY BY
meters (m)	yards (yd)	1.094
meters (m)	feet (ft)	3.281
centimeters (cm)	inches (in)	0.394
centimeters (cm)	feet (ft)	0.0328
millimeter (mm)	inches (in)	0.00328
kilometer (km)	mile (mi)	0.6214
square kilometer (km^2)	square mile (mi^2)	0.3861
square kilometer (km^2)	acre	2.471
liter (L)	cubic meter (m^3)	0.001
liter per second (L/s)	cubic feet per second (ft^3/s, cfs)	0.0353
gram (g)	pound (lb)	0.002204
milligram per liter (mg/L)	part per million	1.0

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ABSTRACT

A solute transport experiment was conducted on a 327-meter reach of Little Lost Man Creek, a small stream in Humboldt County, California. Solutes were injected for 20 days. Chloride was used as a conservative tracer; lithium, potassium, and strontium were used as reactive tracers. In addition, nitrate and phosphate were added as biological reactants. Eighteen shallow wells were dug along the length of the study reach, 1 to 10 meters laterally from the edge of the stream. The wells and sites in the stream were monitored for the injected solutes during and after the injection.

Solute concentrations in the wells and stream are indicative of transport properties of stream and subsurface channel flow. This report presents the results of the analyses of the well samples and chemical data relevant to the interpretation of hydrological and chemical interaction between the stream and adjacent channel subsurface flows in the streambed. Calculations of the percentage of stream water in the well water were made from the conservative tracer measurements. The composition of well water ranged from 47 percent to 100 percent stream water with most values above 90 percent. The time for water to travel from the beginning of the study reach to the wells was

approximately three times as great as the travel time in the stream at the same distance down the reach. Three conclusions can be drawn; 1) Water in the stream exchanges extensively with water in the rest of the channel. 2) The interstitial water in the channel gravels achieves almost the same composition as the stream. 3) Under low-flow conditions the stream gravels contain a significant portion of the stream volume.

Plots of normalized chloride, lithium, and strontium concentrations at three stream sites are included in this report.

INTRODUCTION

This report presents data obtained from a field experiment in which solutes of differing chemical characteristics were injected into a stream under low-flow conditions and their transport monitored by sampling the stream and water in the channel gravels downstream. The experimental site was Little Lost Man Creek, a small, cobble-bed, pool-and-riffle, mountain stream with summer discharge of 5-10 L/s. Previous work investigating the transport of injected chloride, strontium, potassium and sodium in a small stream (Kennedy and others, 1984/1985; Bencala and Walters, 1983) indicated extensive interaction between water in the stream and water in the gravel streambed. Calculations had shown that large portions of streamflow had gone into temporary storage. Little Lost Man Creek was selected as a site for study of stream-streambed interaction because of the large amount of gravel in its channel, easy access, pristine nature, and isolation from anthropogenic disruption.

The purpose of the injection experiment was to expand the knowledge gained in earlier studies of this kind and to provide data for interpreting the chemical transport aspects of stream-streambed interaction. To accomplish this, water in both the channel and in adjacent gravels was sampled over a period of several weeks during and after the injection. This report presents calculations of the percent of stream water in wells and of travel time to wells; normalized concentration plots graphically showing the responses of conservative and nonconservative tracers; and solute concentration data from the water samples collected from the channel gravels.

The study was conducted from August 16 through October 16, 1979. Chloride, lithium, potassium, strontium, and nitrate were injected into the

creek for 20 days beginning August 21, 1979. Phosphate and bromide were added in a separate injection for 6 days beginning September 4, 1979. Chloride was treated as the conservative tracer; all of the other ions were to some degree nonconservative with the exception of bromide for which analyses are incomplete. Wells were dug at eighteen locations adjacent to the stream. Water from the wells was collected during the injection period and for up to a month after injection ended. Stream samples were collected at least five times daily at five locations along the length of the study reach and at two side channels. Discussion of cation and anion transport in the stream during this experiment can be found in Bencala and others, (1983), Bencala and others, (1984a), Bencala and others, (1984b). Biological uptake of nitrate in the channel is described in Triska and others, (1984).

EXPERIMENT

Field Site

Little Lost Man Creek, a tributary to Prairie Creek, is a third-order, pool-and-riffle, pristine mountain stream that lies mostly within Redwood National Park in Humboldt County in northwest California, about 5 km north of the town of Orick (fig 1). The 10-km, north-northwest flowing stream drains an area of 9.4 km^2 and is between 24 and 695 m in elevation above sea level (Iwatsubo and others, 1975). Its discharge ranges from typical late summer lows of 7 L/s to a record high of 22,900 L/s. Average annual rainfall is 1,780 mm at the Prairie Creek rain gage, approximateley 3 km northwest of the study reach (National Oceanic and Atmospheric Administration, 1980). Rain falls mostly from December through March, with very little rain from June

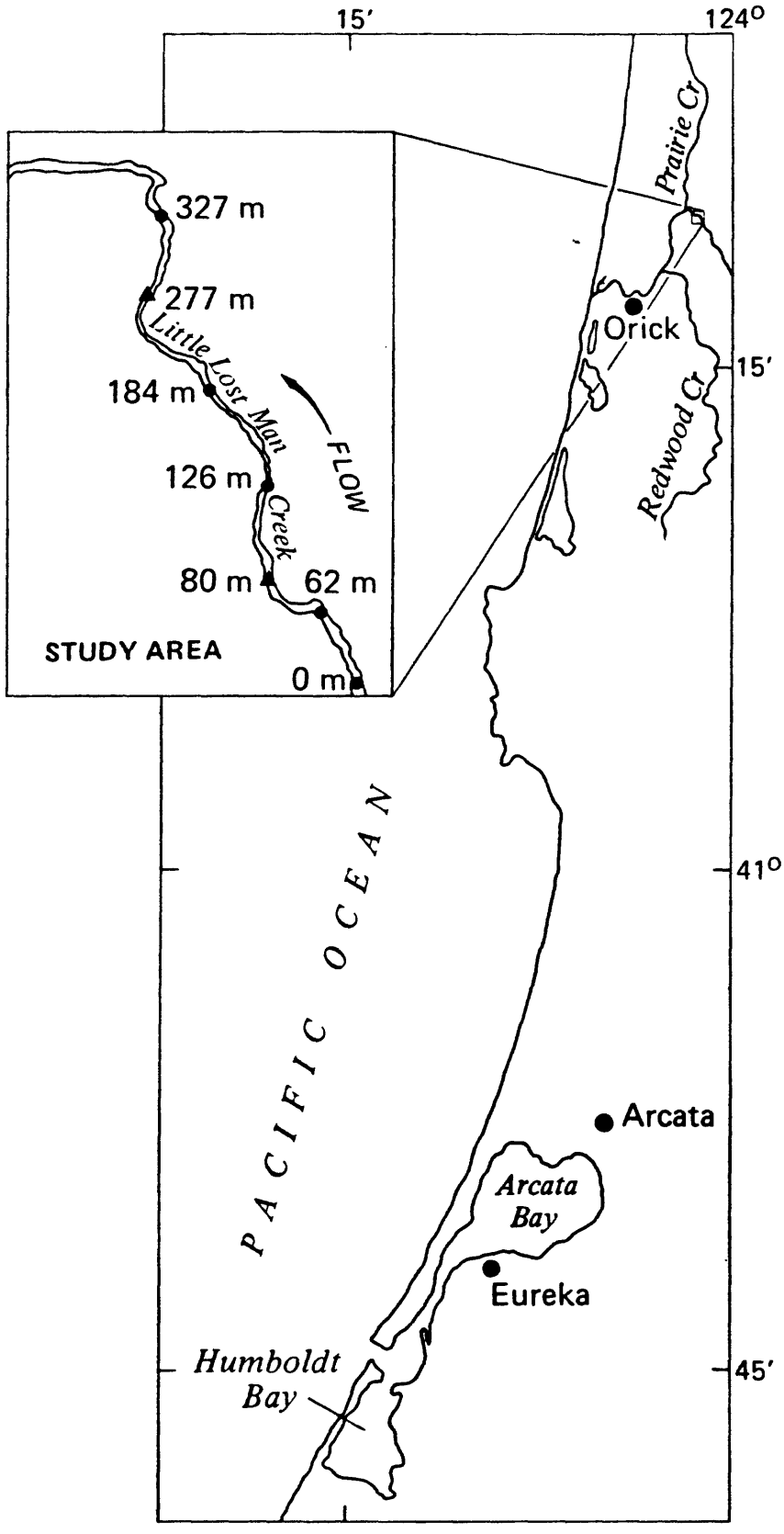

Figure 1.-- Map of study area location in Northwest California.

through September. Table 1 is a list of water quality data from a composite of samples collected August 16 through August 21, 1979.

The stream sediments were poorly sorted and commonly ranged from sand to boulder size, intermingled with woody matter and logs up to one-half meter diameter. Little clay and silt were deposited in the streambed, permitting a considerable amount of water to flow through the sediments (Bencala and others, 1984b). During the low-flow season the creek surface in much of the study reach occupied only about twenty percent of the bank-full width. The steep terrain was heavily forested by mature redwood trees.

The study reach was 327 meters long with a slope of 0.018. Calculations of discharge along the reach were made by the chloride dilution technique (see Kilpatrick, 1984), where chloride was injected at a steady rate and discharge was calculated from the increase in chloride concentration in the stream. Discharge during the experiment was about 7 L/s in the beginning, rose to about 24 L/s after a small storm on September 1-2, and decreased over the following week to 6 L/s (fig. 2). For the first 10 days of the injection, when discharge was relativly low, discharge varied diurnally, with the minimum occurring during late afternoon.

Injection and sampling

A solution containing chloride, 165.6 g/L; nitrate-N, 1.90 g/L; lithium, 20.2 g/L; strontium, 21.6 g/L; and potassium, 20.8 g/L, was injected into Little Lost Man Creek--for 20 days from 10:00 am August 21 to 10:00 am September 10, 1979. The rate of injection was directly measured each day, and averaged 39.97 $\pm$ 0.16 mL/min. The approximateley 1,200 L of solution was mixed and stored in a collapsible plastic tank, 2.4 m in diameter and 0.5 m deep.

TABLE 1

WATER QUALITY DATA FOR LITTLE LOST MAN CREEK DURING THE PERIOD OF AUGUST 16-AUGUST 21 1979

PARAMETER	Concentration mg/L
Alkalinity, Total as $CaCO_3$	28
Calcium, Dissolved	5.4
Chloride, Dissolved	6.1
Fluoride, Disssolved	< 0.1
Hardness (as $CaCO_3$)	22
Magnesium, Dissolved	2.0
Nitrate, Dissolved (as N)	< 0.1
Potassium, Dissolved	0.6
Silica, Dissolved	7.8
Sodium, Dissolved	6.3
Sulfate, Dissolved	2.6
pH	7.6
Specific Conductance	78 uS/cm

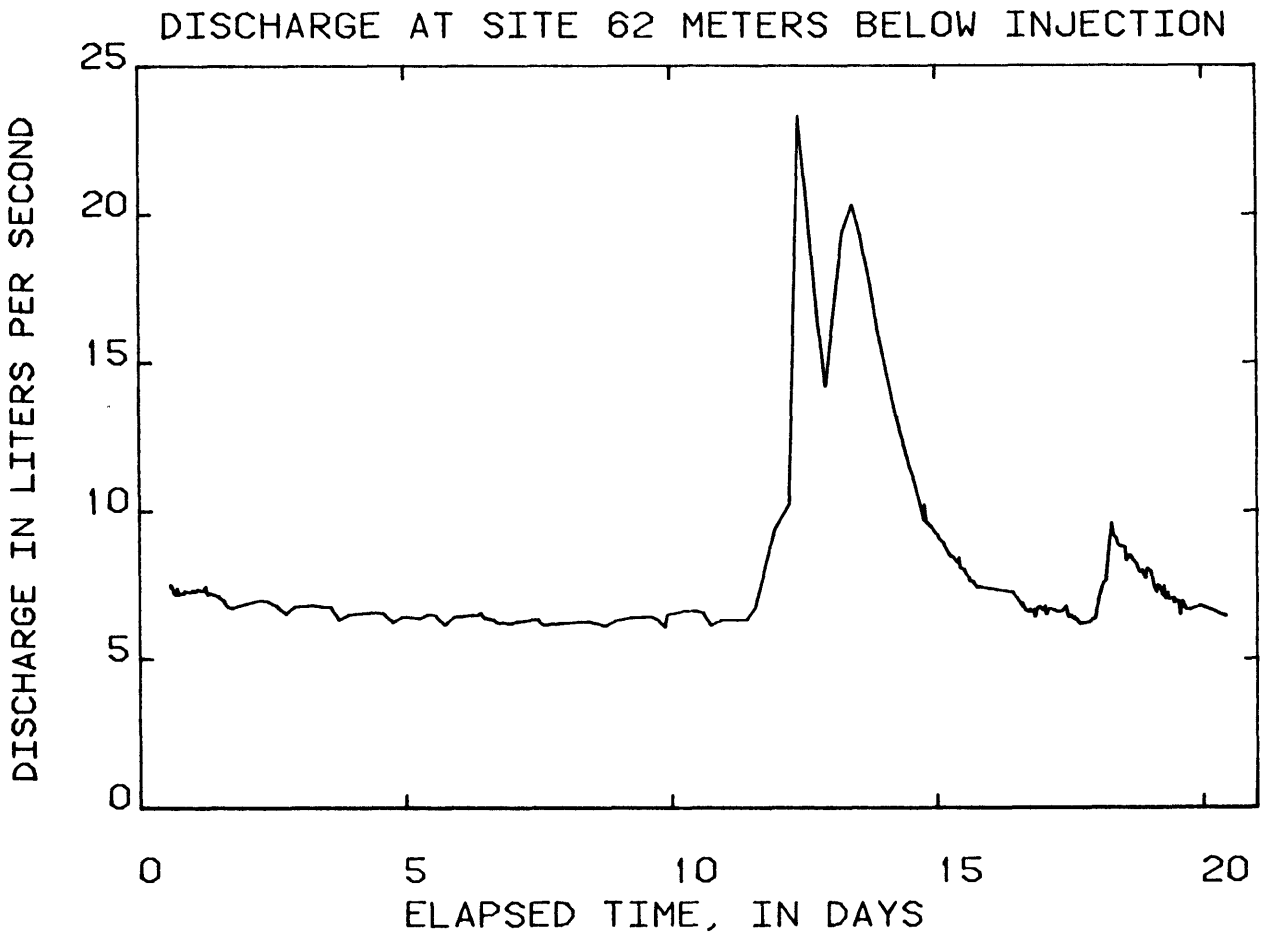

Figure 2.--Discharge at a site 62 m below the injection. For the period 0-20 days after the start of injection on August 21, 1979. Calculated from the dilution of chloride.

At a second injection site, 58 m below the main injection site, a solution containing phosphate, 2.29 $\pm$ 0.10 g/L; and bromide, about 15.8 $\pm$ 0.11 g/L was injected at a rate of 29.8 mL/min. Injection started at 10:00 am September 4, and continued until 10:00 am September 10.

The stream was sampled at five sites on a regular basis throughout the experiment. Twelve other stream sites were sampled less regularly. Eighteen well sites were sampled with varying frequency. Twelve of the wells were dug before the injection started, the other six were dug at various times during the study period.

The wells were open pits 0.1 to 1.0 m deep, dug into the gravel at distances of 1 to 10 m from the stream (fig. 3). They were dug with a shovel or hand trowel and remained unlined and uncovered. Throughout this report all stream and well sites are designated by distance downstream of the injection site. Wells are also designated by the lateral landward distance from the right or left edge of the stream. For example, a well site 50 m downstream and 2 m to the right of the stream edge is labeled 50m 2R. All wells were in exposed gravel bars within the incised channel. Two sites, 80m and 277m, were located where water was seeping into the stream. These appeared to be return flows that had seeped from the stream, through the gravel, and reappeared on the surface in a side channel and were returning to the main stream (Bencala and others, 1984b).

Well samples were collected by placing a silicone rubber tube into the well and pumping the water with a peristaltic pump through an in-line filter containing a 0.45 um Millipore HATF[1] (no surfactant) membrane into polethylene

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1 Use of company names is for identification purposes only and does not imply official endorsment of any product.

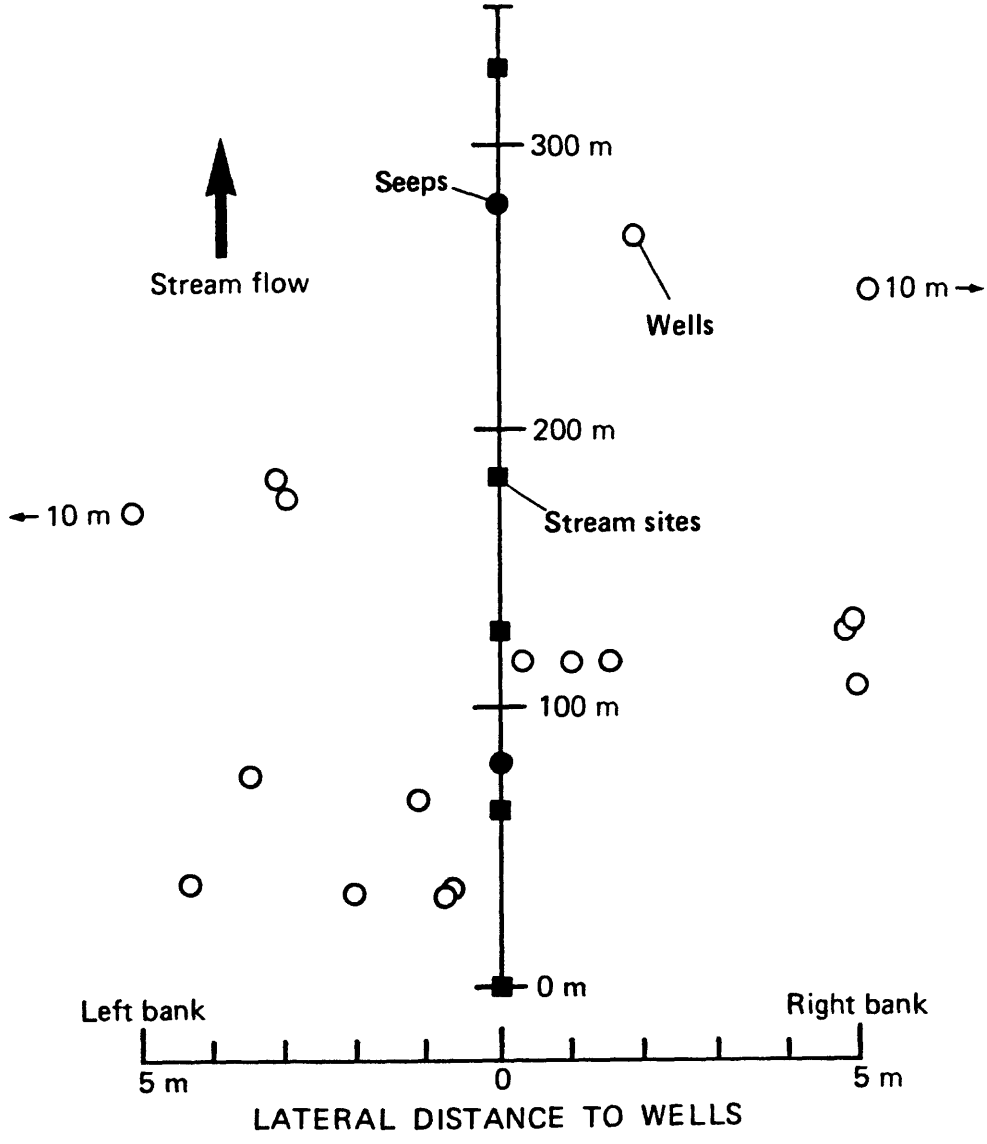

Figure 3.--Schematic diagram of the sample site locations. Downstream is at the top of the page. The injection site is at 0 meters. Two wells located 10 m to the left and right of the stream would plot off scale on this diagram.

bottles. The filter holder was made of Lucite and all of the tubing was silicone rubber. Stream samples were collected in a polyethylene scoop then filtered like the well samples.

Two bottles were usually filled at the same sampling time. One bottle, for analysis of chloride, lithium, strontium, and silica was prewashed in one molar nitric acid, rinsed with distilled water, and with the sample before filling. It was then refrigerated within 8 hours and remained so, in the dark, until analysis. The other bottle, for analysis of nitrate and phosphate, was prewashed in one molar hydrochloric acid, rinsed in distilled water, and prerinsed with the sample. This sample was frozen within 8 hours and remained so until analysis.

Analytical Methods

Analyses were made in the project laboratory at Western Region research facilities in Menlo Park, California. Chloride, nitrate, phosphate and silica were measured using a Technicon AutoAnalyzer II. Lithium, strontium and potassium were analyzed by atomic adsorption spectroscopy. Three composites were made at varying concentration levels and analyzed each day when samples were analyzed. Precision was estimated from these repeated analyses.

Chloride was determined using an automated mercuric thiocyanate method adapted from Technicon Industrial Systems (1974). The method was modified so that the ferric nitrate and mercuric thiocyanate are mixed on line and methanol was eliminated from the mercuric thiocyanate solution. Precision was 1 percent over the range analyzed. This method detects bromide together with chloride. The bromide injection caused the stream bromide concentration to increase from 0.02 mg/L to about 1 mg/L depending on distance below the

injection point and time after the start of injection. Samples taken below 58 m and after 10:00 am September 4 may have been subject to some bromide interference. Because bromide had not been measured satisfactorily enough to correct for this interference, no correction has been applied to the chloride data. However, the maximum effect of 1 mg/L bromide has been determined to have caused a sample with a concentration of 20.0 mg/L chloride to be measured and reported as 20.8 mg/L.

Nitrate was determined as nitrate plus nitrite using the cadmium reduction method as described in Technicon Industrial Systems (1972). Nitrate is reported as N. The precision was 1 ug/L below 100 ug/L and 1 percent of values above 100 ug/L. Nitrite was measured at a few well sites where it would have been most likely to occur and was less than 1 ug/L as N .

Orthophosphate was determined using the phosphomolybdate method described by Technicon Industrial Systems (1973). Precision was 1 ug/L for the full range reported.

Silica was determined following the molybdate blue method described in Technicon Industrial Systems (1976). Silica is reported as SiO_2 with a precision of 0.05 mg/L for the full range reported.

Lithium, strontium, and potassium were analyzed by atomic adsorption spectroscopy using a Perkin-Elmer model 303 spectrophotometer, generally following the methods described by Skougstad and others (1975) with slight modification. The solution used to suppress interferences in strontium and potassium analyses was 20 g/L La_2O_3 and 10 g/L NaCl. One part of this solution was added to 10 parts of sample and standards when analyzing potassium and strontium. This was sufficient to mask interferences and eliminated the problem of lanthanum salt clogging the burner. Lithium was analyzed without any pretreatment as there were no interferences in the sample matrix.

The precision, based on replicates analyzed over time was:

Lithium	n=40	0.01 mg/L for less than 1.0 mg/L 1 percent for values above 1.0 mg/L
Strontium	n=34	0.01 mg/L for less than 1.0 mg/L 1 percent for values above 1.0 mg/L
Potassium		0.02 mg/L for all measurements as estimated fron analysis of regressions of standards

RESULTS

Percent of stream water in wells and travel time of stream water to the wells

Calculations of the percent of stream water contribution to water in the wells and travel time of stream water to the wells can be made from the change in concentrations of chloride in the wells and stream. Tracer-tagged water will be referred to as stream water. Water containing no tracer will be referred to as ground water.

Prior to the chloride injection background chloride values were measured at 5 stream sites along the length of the study reach for 24 hours on August 16. These measurements showed no significant change in chloride concentration with distance or time. Calculations of discharge along the reach were made by the chloride dilution technique on samples collected on August 28 after 7 days

of steady chloride injection. The increase in discharge was about 15 percent over the length of the study reach. Assuming there was also a 15 percent discharge increase on August 16, this increase had caused no significant increase or decrease in background chloride concentration. It was therefore assumed that ground water had the same, or very nearly the same chloride concentration as the stream.

Flow of interstitial water at the well sites (Q_w) comes from two sources, stream water (Q_s), and ground water (Q_g). As the injection experiment proceeds the concentration of the conservative tracer in the wells will rise to some value and level off. At this steady state the water flowing through a well is the sum of water coming from the two water sources, as in equation 1.

$$Q_w = Q_g + Q_s \tag{1}$$

And the mass of solute in the well is the sum of the masses of solute from the two sources.

$$C_w Q_w = C_s Q_s + C_g Q_g \tag{2}$$

where C_s, C_g, and C_w are the tracer concentrations in the stream, ground water, and wells, respectively. Combining equations 1 and 2 and rearranging gives

$$Q_w (C_w - C_g) = Q_s (C_s - C_g) \tag{3}$$

Thus the percentage of well water that has been in the stream study reach is equal to

$$100 \times \frac{Q_s}{Q_w} = 100 \times \frac{C_w - C_g}{C_s - C_g} \tag{4}$$

Tables 2 and 3 summarize the computed values of percentage stream water in the wells for those wells with sufficient data for calculations. Some of the wells were abbandond early in the experiment. The ground-water chloride

TABLE 2

PERCENTAGE STREAM WATER COMPOSITION OF WELLS
BASED ON AUGUST 31 CHLORIDE VALUES, CIRCA 1000 HOURS

SITE	WELL CHLORIDE mg/L	ADJACENT CREEK CHLORIDE mg/L	PERCENT STREAM WATER
37m 4.3 R	23.0	23.5	97
74m 3.5 L	22.8	23.5	96
117m 1.0 R	23.0	22.6	102
117m 1.5 R	23.0	22.6	102
178m 3.0 L	21.2	22.3	93
265m 1.8 R	20.2	22.1	88

Percent stream water is the portion of water in the well on this date that had been in the stream study reach and was tracer tagged.

TABLE 3

PERCENTAGE STREAM WATER COMPOSITION OF WELLS
BASED ON SEPTEMPER 10 CHLORIDE VALUES, CIRCA 1000 HOURS

SITE	WELL CHLORIDE mg/L	ADJACENT CREEK CHLORIDE mg/L	PERCENT STREAM WATER
37m 4.3 R	21.0	22.1	93
74m 3.5 L	21.5	22.1	96
108m 5.0 R	21.1	22.3	93
117m 1.0 R	21.7	22.3	96
126m 4.9 R	20.7	22.0	92
129m 5.0 R	15.6	22.0	60
169m 10.0 L	13.5	21.9	47
178m 3.0 L	19.8	21.9	87
247m 10.0 R	17.9	21.6	76
265m 1.8 R	18.4	21.6	79

concentration, C_g, used for all calculations was 6.13 mg/L as determined from the average of several measurements at five sites on the day of injection before the arrival of chloride. Stream water had reached erery well indicating that the interaction between the surface atream and interstitial gravles was extensive. Chloride concentration in the stream varied diurnally. Some wells were responsive enough to show diurnal variations in chloride concentration, which, if they were out of phase with the stream due to travel-time effects, would account for calculations of slightly more than 100 percent stream water. Analytical error could also be responsible for this small excess.

A small storm occurred on September 1-2 which temporarily increased the discharge from 7 to about 24 L/s. This diluted the concentration of the conservative tracer, chloride, and probably caused water of a lower chloride concentration to enter the interstitial gravel. The result would have been that not enough time passed for the wells to return to steady state before September 10 when the samples for table 3 were collected. Therefore the percent stream water content of the wells in table 3 should be considered a minimum. Even if the average stream water content of the wells were only 80 percent it is clear that during low flow in a channel where the wetted width is about 20 percent of the incised channel the stream gravels contain a major part of the stream volume.

Travel time for each well is defined as the time for solute to migrate from the injection site to the well. It can be defined as the time for the tracer concentration in the well to rise halfway from background (C_o) to the "plateau level" (C_p) (see figure 4).

Figure 5 is a plot of travel times for some stream sites and for well sites for which there were sufficient samples. Travel time to the wells was

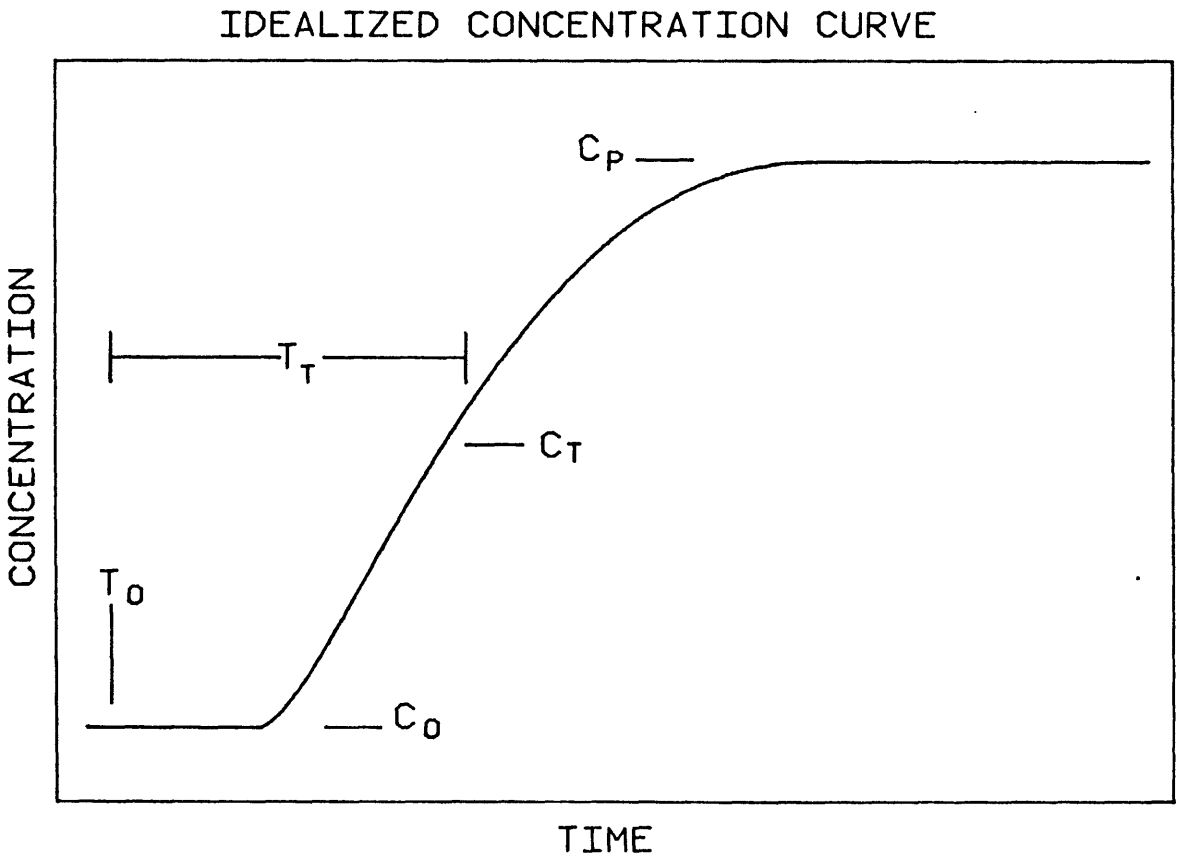

Figure 4.--Idealized concentration curve of solute arrival at a well site. C_O is the background constituent concentration of ground water. C_p is the 'plateau' level concentration. C_T is halfway between. T_o is the start of the injection and t_T is the time of C_T.

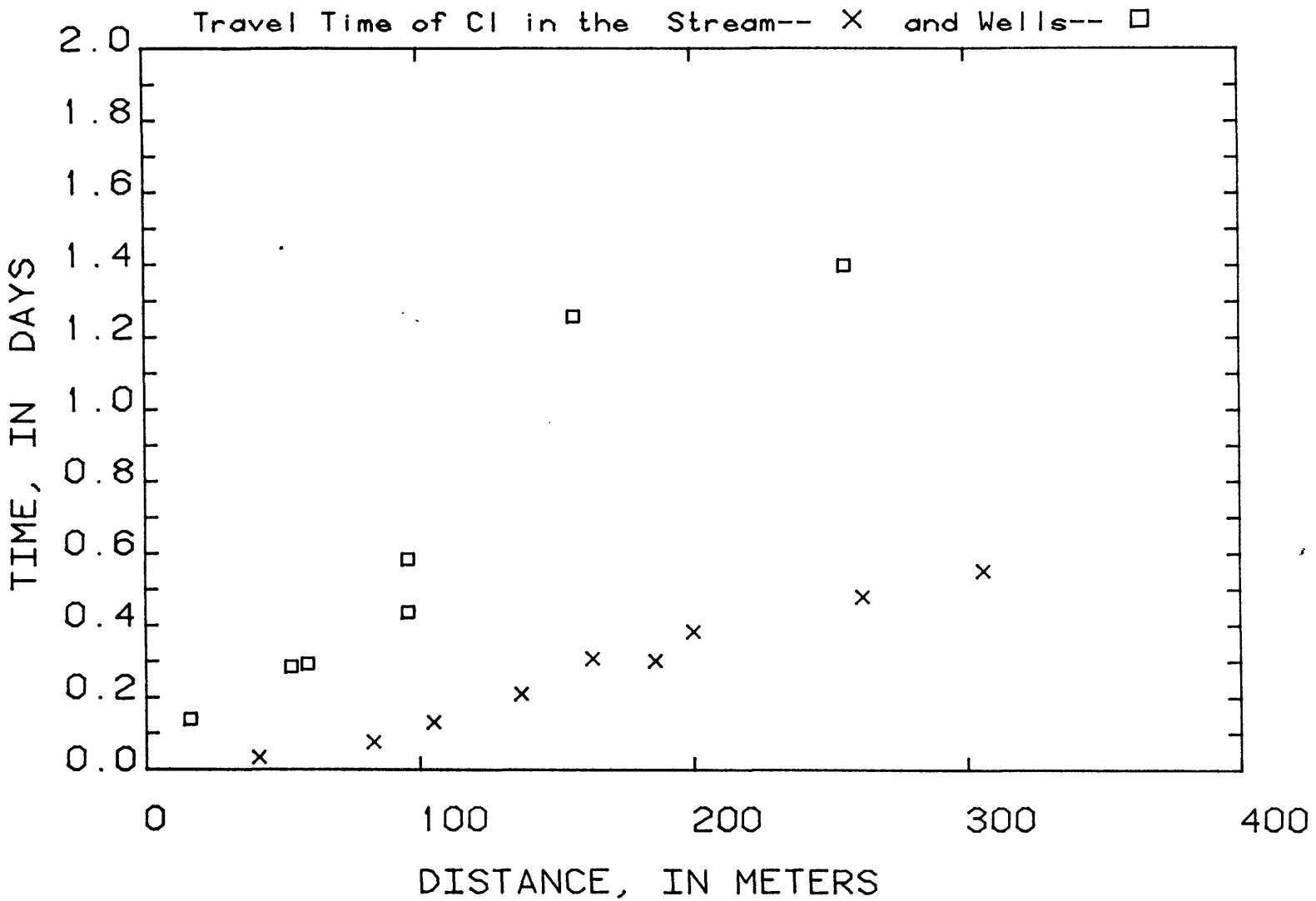

Figure 5.--Calculated travel times to stream and well sites.

typically about three times as great as to a point of equal downstream distance in the stream.

Normalized conservative and reactive solute response

Normalizing the data makes it possible to see the magnitude of streambed reaction by comparing the transport response of conservative and non-conservative solutes. Normalized values were used for comparing the responses of chloride and lithium. They were calculated for a given site by dividing the net concentration (i.e., measured value at the site less background) by the net plateau concentration at the 5m stream site just below the mixing reach, as shown by equation 5.

$$\text{The normalized concentration} = \frac{C - C_o}{C_p - C_o} \qquad (5)$$

C, C_p, and C_o are the measured, plateau, and background concentrations respectively, for each constituent.

The plateau and background values used for normalized concentration calculations were:

	Plateau	Background
Chloride	23.76 mg/L	6.13 mg/L
Lithium	2.14 mg/L	0.0 mg/L
Strontium	2.36 mg/L	0.07 mg/L

Figures 6a, 6b, and 6c are synoptic plots for days 0, 5, and 10, respectively, of normalized chloride and lithium concentrations along the

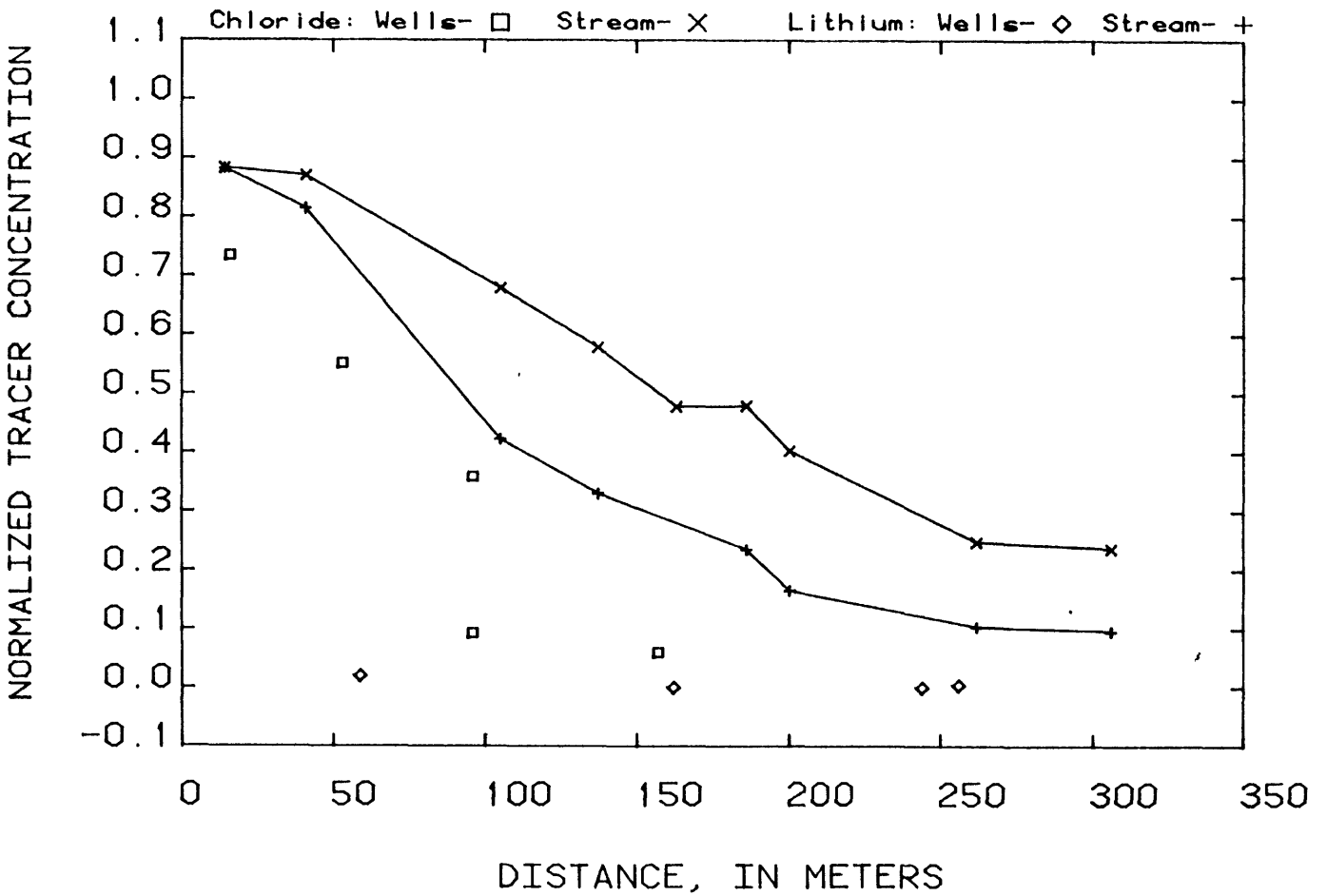

Figure 6a.--Synoptic plot of chloride and lithium on day 0. This set of samples was collected approximatly 6 hours after the start of the injection. Stream sites are connected by a line.

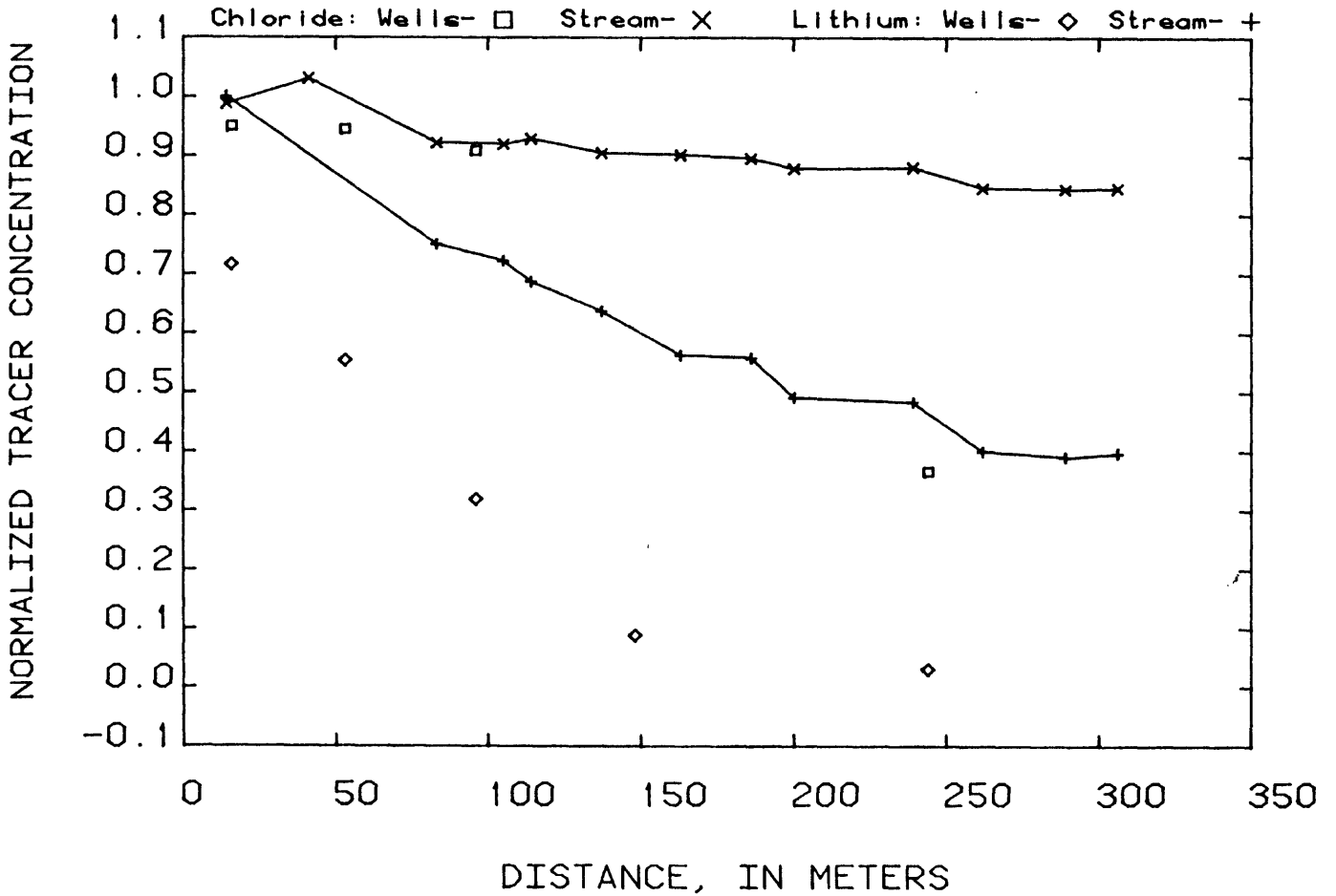

Figure 6b.--Synoptic plot of chloride and lithium of day 5. Stream sites are connected by a line.

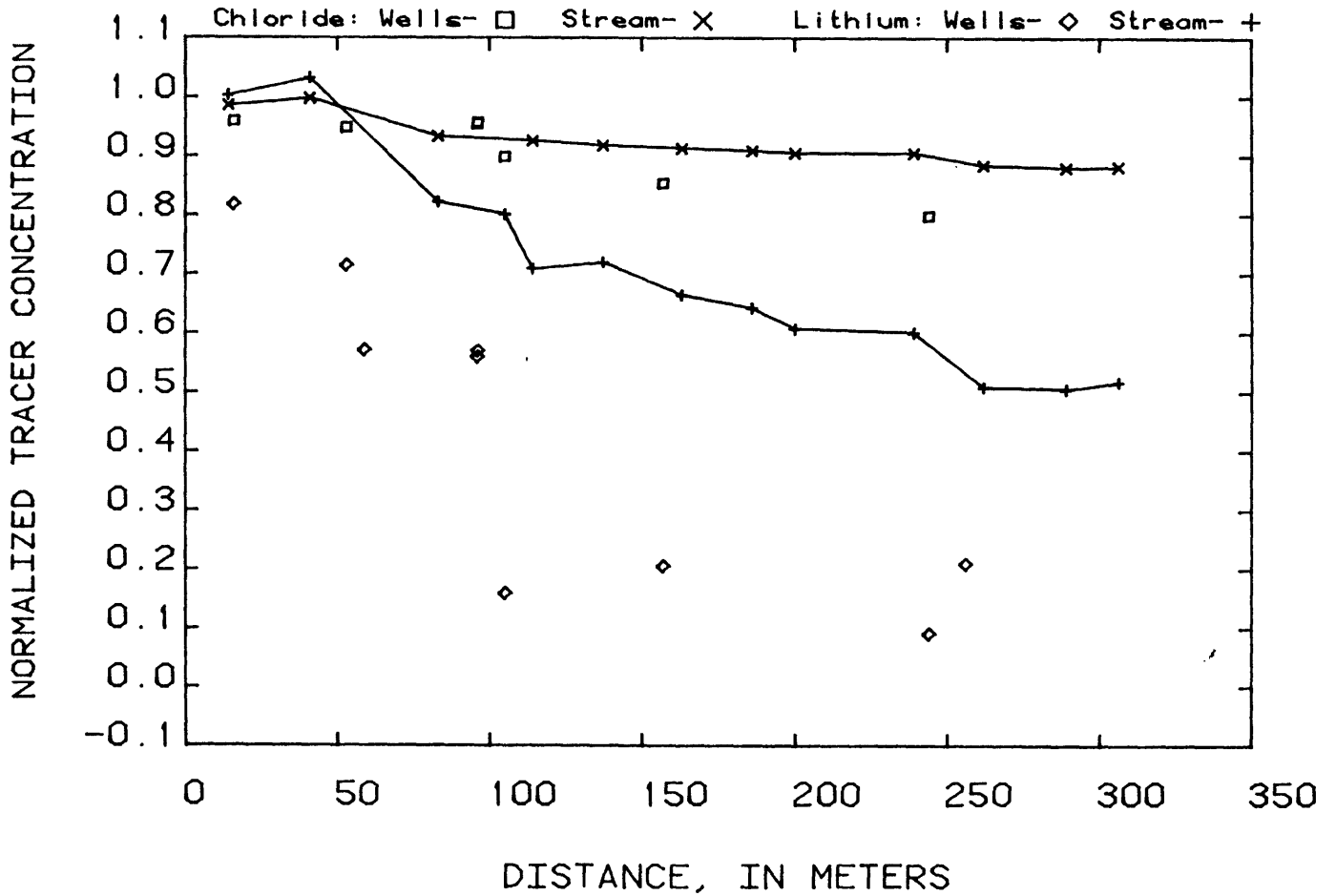

Figure 6c.--Synoptic plot of chloride and lithium on day 10. Stream sites are connected by a line.

stream and in the wells. After 10 days (fig 6c), chloride concentrations in the wells had increased to nearly in-stream levels. Lithium concentrations in upstream wells continued to approach the in-stream values; however, lithium concentrations in wells more than 100 meters downstream remained significantly lower than in-stream levels.

PRESENTATION OF DATA

This report presents data primarily with regard to the subsurface flows. To provide a frame of reference for transport within the stream, Appendix 1 contains plots of chloride, lithium, and strontium at three stream sites. The 5m site is at the downstream end of the mixing zone and represents solute concentration immediately after mixing. The 62m and 327m sites are at the beginning and end, respectively, of the regularly monitored experimental reach.

In Appendix 2, chloride and lithium concentrations at the well sites are plotted as normalized values. The normalized concentrations for chloride in the wells are generally close to the normalized values for chloride in the stream. However, the values for lithium are severely attenuated. On day 10, at site 265m 1.8R, normalized chloride is 0.90 and lithium is 0.17 compared to values of 0.90 and 0.51 respectively at stream site 327m. This demonstrates lithium removal by the stream sediments. The effect is not strongly related to the lateral distance from the well to the stream, suggesting that, in this stream, water does not flow laterally into the channel gravels.

The data tables in Appendix 3 contain the results of the analytical measurements. Nitrate is reported in ug/L as N. Phosphate is reported in ug/L as P. Silica is in mg/L as SiO_2. All others are as shown in the tables. Analyses not made or rejected are blank.

ACKNOWLEDGEMENT

This field experiment continued for nine weeks. It is only with the cooperation of many dedicated people that experimental work of this sort is possible. We wish to acknowledge our appreciation of the efforts of: James W. Ball, Jo M. Burchard, Charles W. Culbertson, Everett A. Jenne, Irene B. Leaffer, Kenneth Leap, Amy Newson, Ronald S. Oremland, Keith Pine, Ronald E. Rathbun, Barbara Reilly, Kent Stanley, and David V. Vivit.

SUMMARY

This report contains 1,867 analyses of samples collected from 18 well sites and two seeps during a solute transport experiment, tables of calculated percentages of stream water contribution to wells, and travel times to the wells. Plots of normalized concentrations at the wells sites and three stream sites are included. These tables and plots demonstrate how conservative tracers may be used to investigate the extent and rate of the movement of stream water through channel gravels in small streams. The experiment has shown that almost complete exchange of water commonly occurs between the surface stream and the channel gravels in a short time.

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--- 1973, Orthophosphate in water and seawater, Industrial method no. 155-71W/Tentative.

--- 1974, Chloride in water and wastewater, Industrial method no. 99-70W/B.

--- 1976, Silicates in water and wastewater, Industrial method no. 105-71W/B.

Triska, F. J., Kennedy, V. C., Avanzino, R. J., Zellweger, G. W., 1983, Hydrologic storage and biotic utilization of injected solutes in the wetted channel and adjacent riparian areas of a small mountain stream, Abstract: EOS v. 65, no. 16, p 21.

APPENDIX I

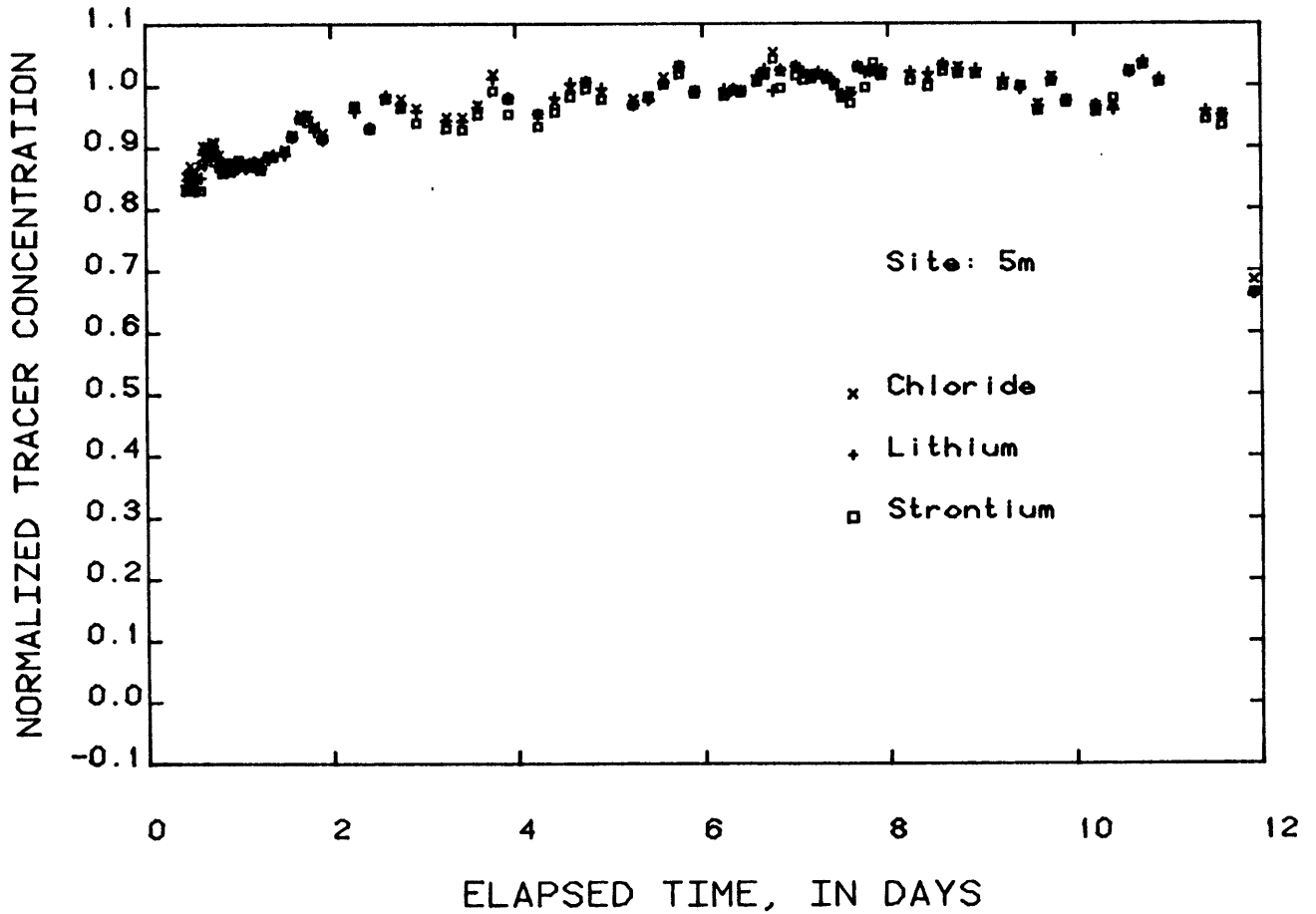


Figure A1-1.--Plot of normalized concentration of chloride, lithium, and strontium at a stream site 5 meters below the point of injection.

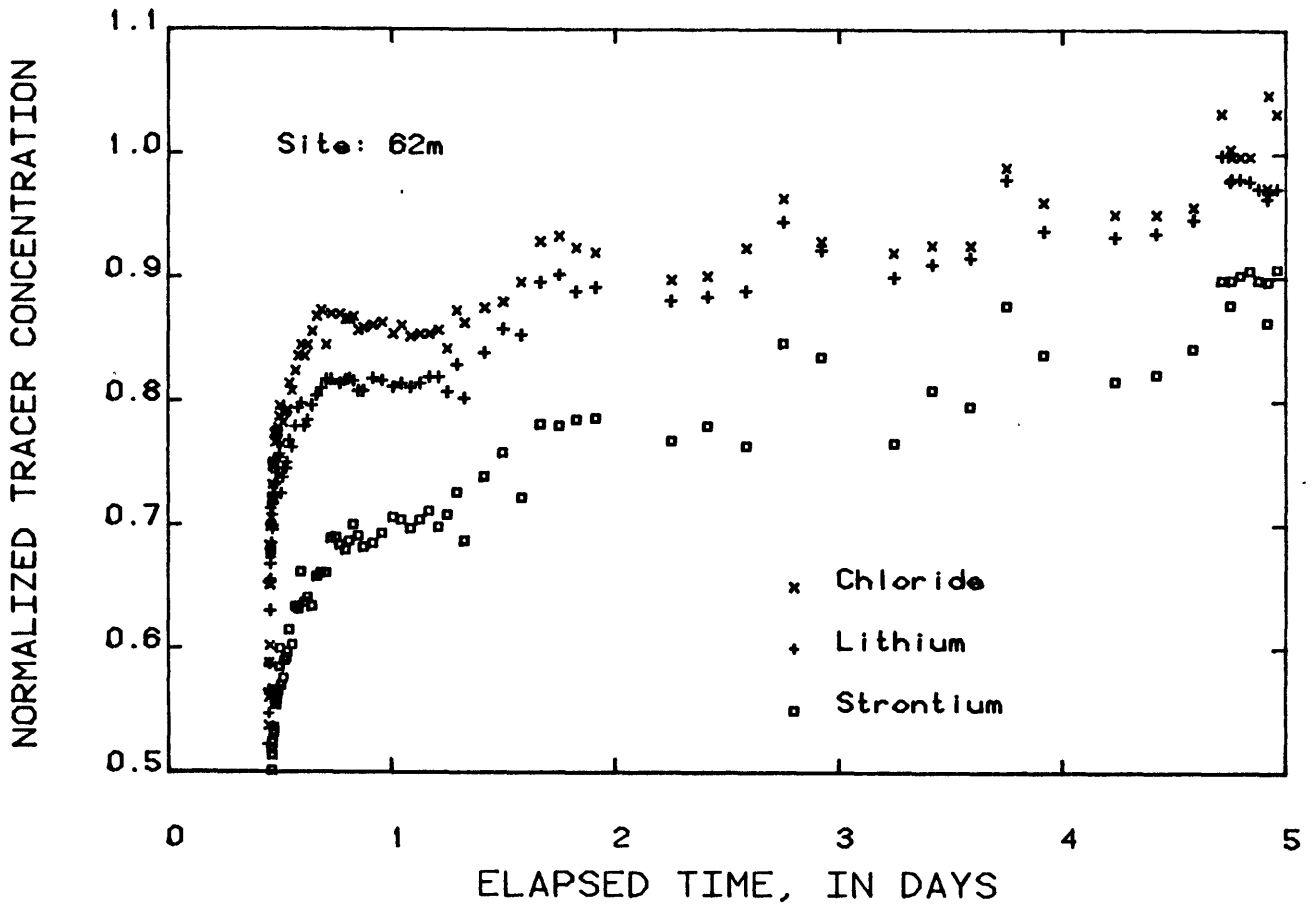


Figure A1-2.--Plot of normalized concentration of chloride, lithium, and strontium at a stream site 62 meters below the point of injection.

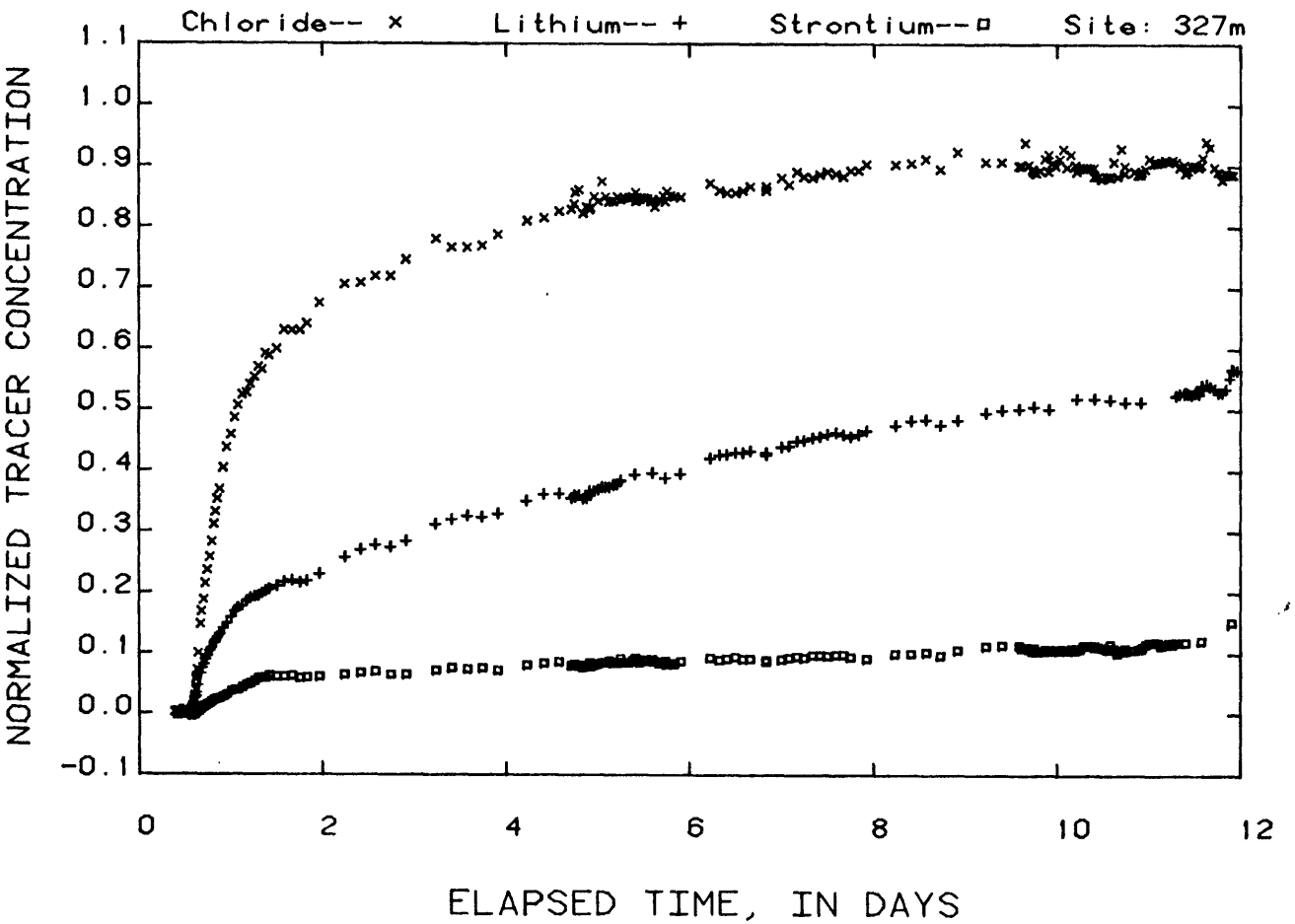
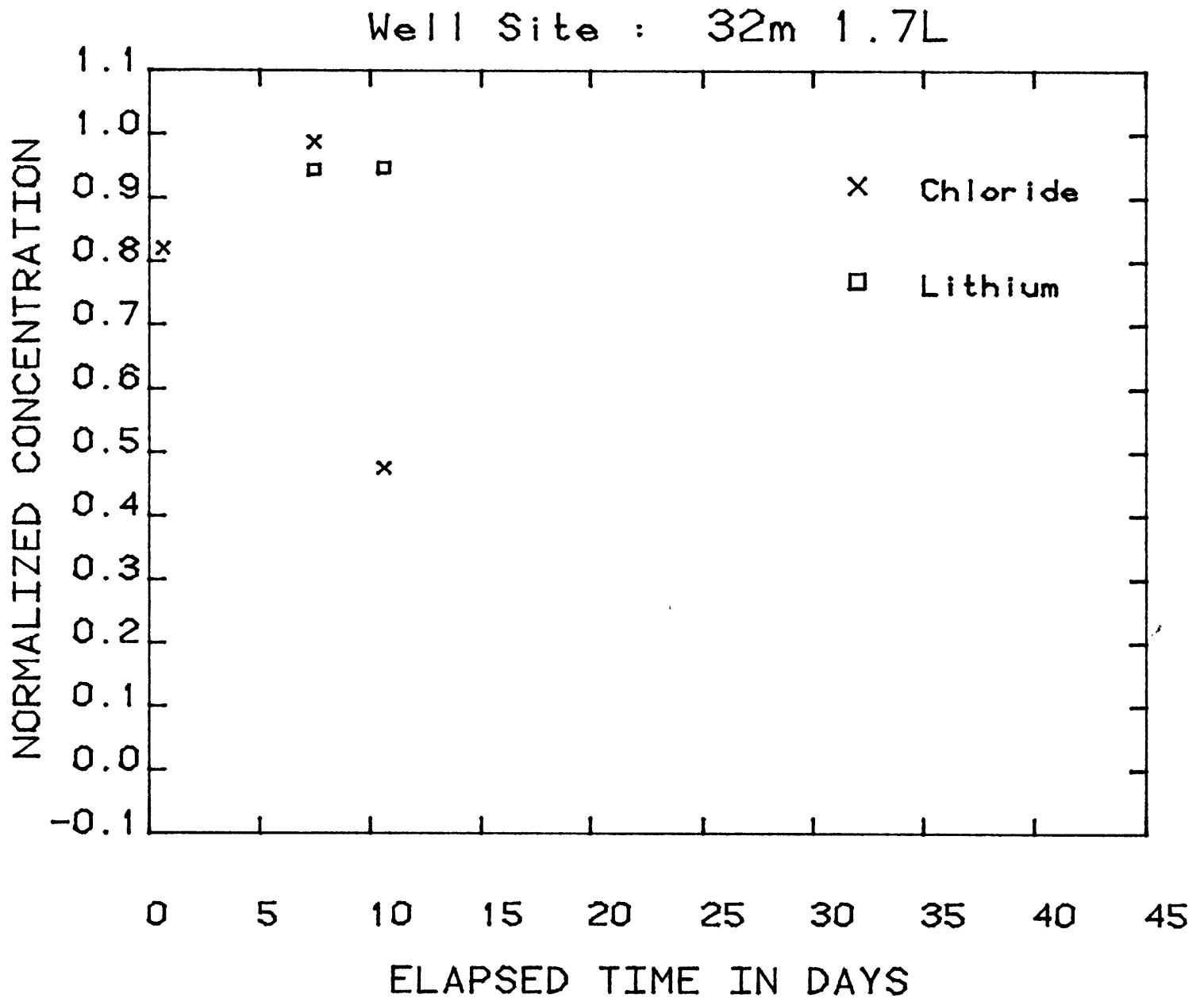
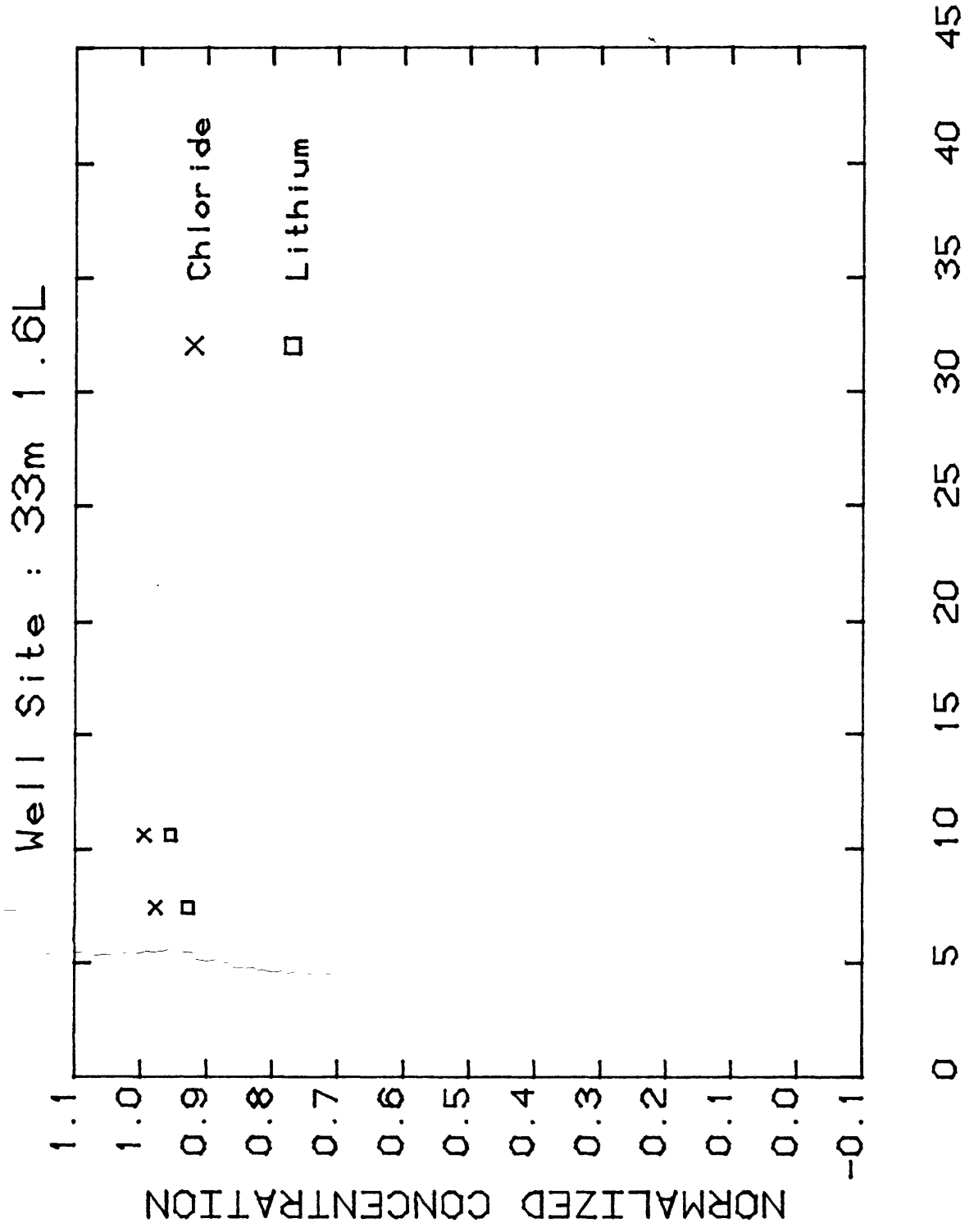
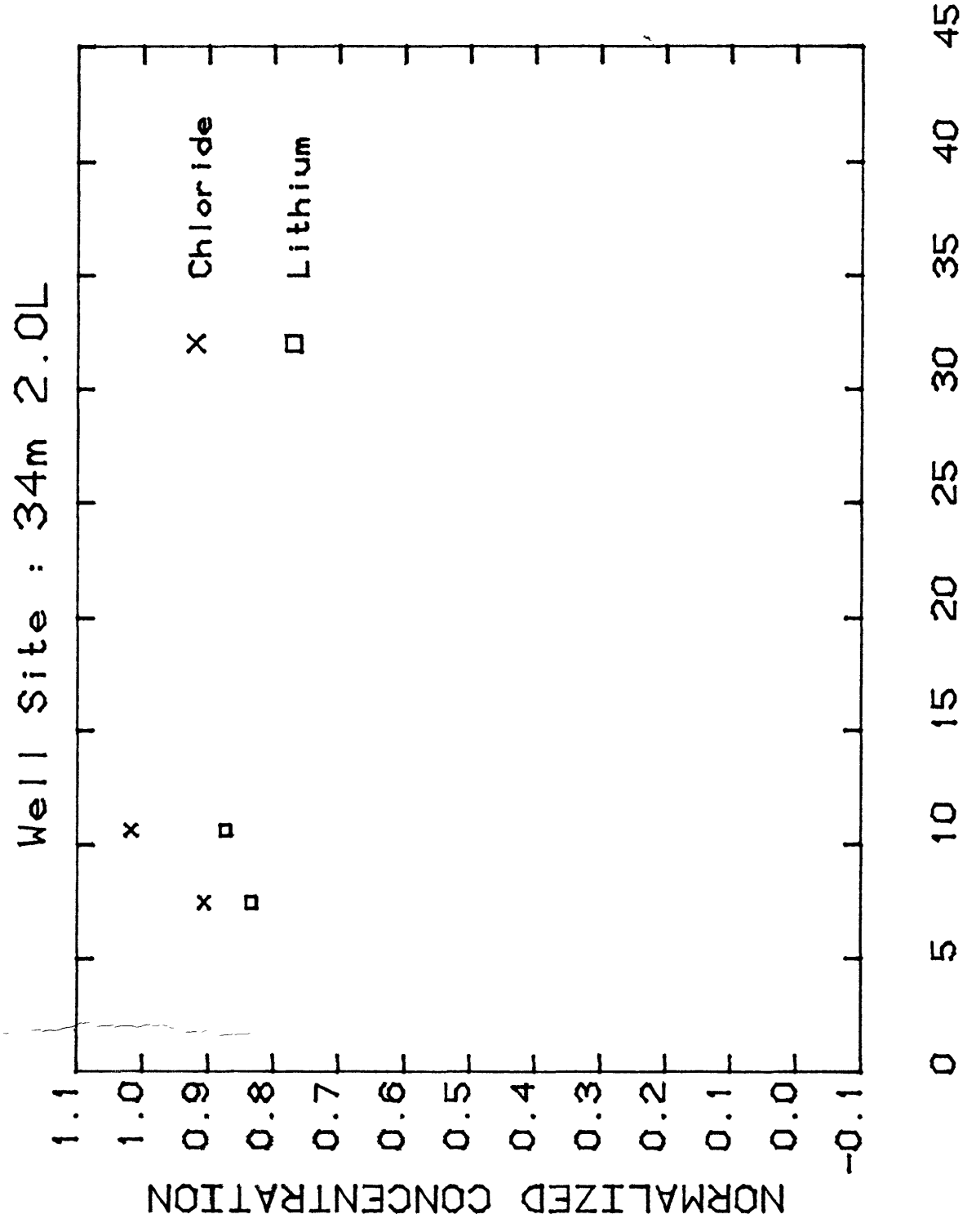


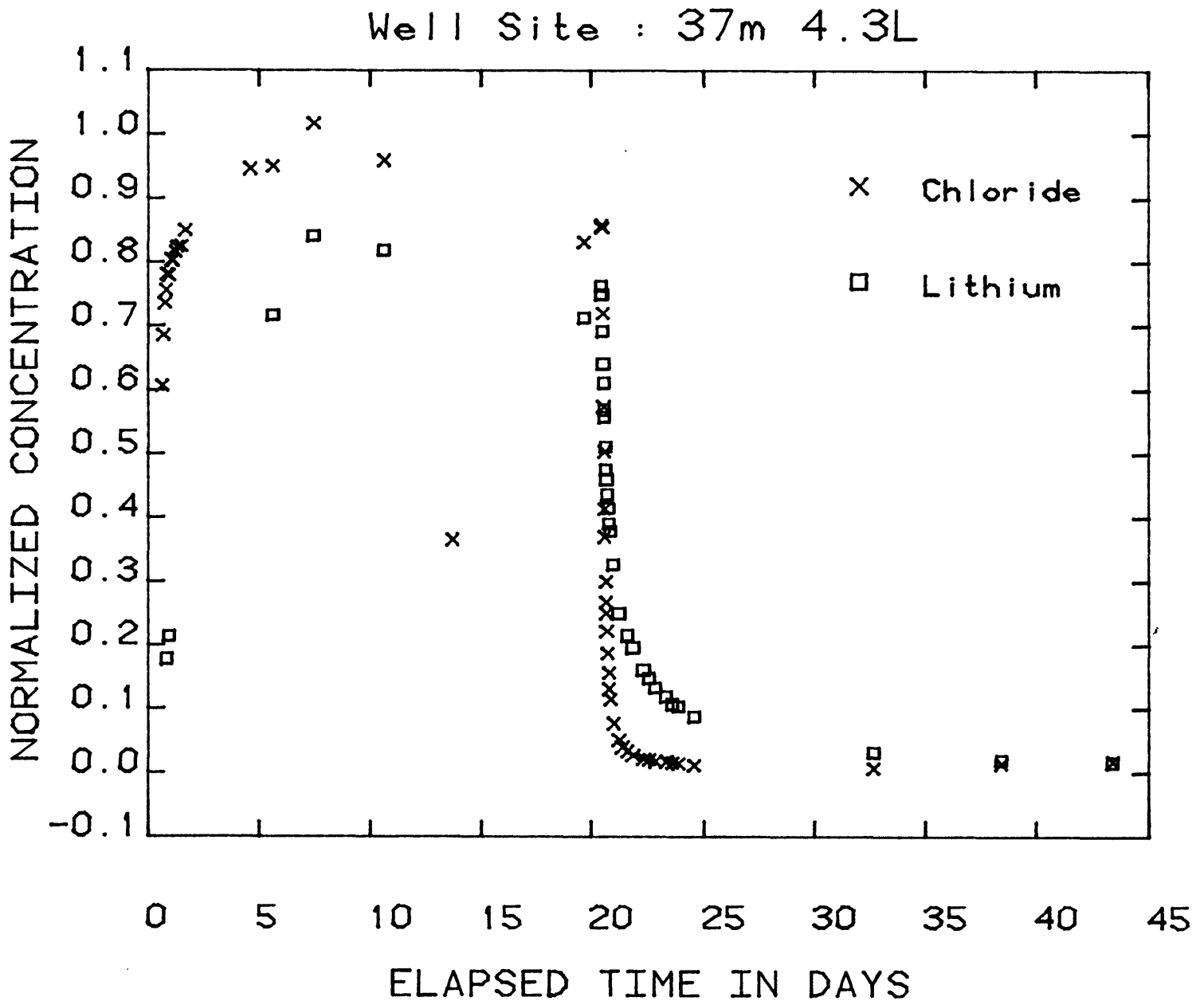
Figure A1-3.--Plot of normalized concentration of chloride, lithium, and strontium at a stream site 327 meters below the point of injection.

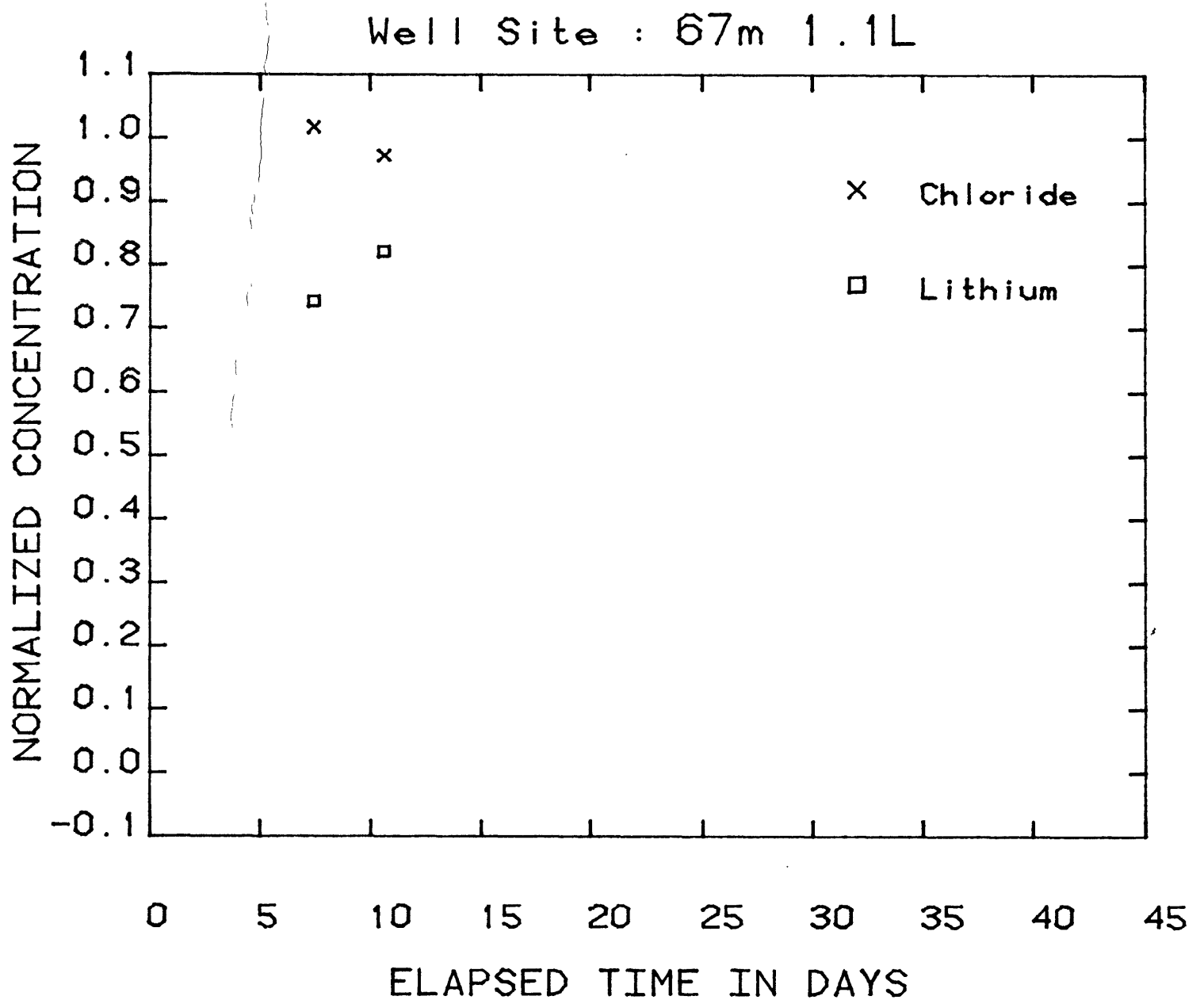
APPENDIX II


Well Site : 32m 1.7L
NORMALIZED CONCENTRATION
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS
Chloride
Lithium


Well Site : 33m 1.6L
Chloride
Lithium
NORMALIZED CONCENTRATION
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 34m 2.0L
Chloride
Lithium
NORMALIZED CONCENTRATION
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 37m 4.3L
NORMALIZED CONCENTRATION
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 67m 1.1L
NORMALIZED CONCENTRATION
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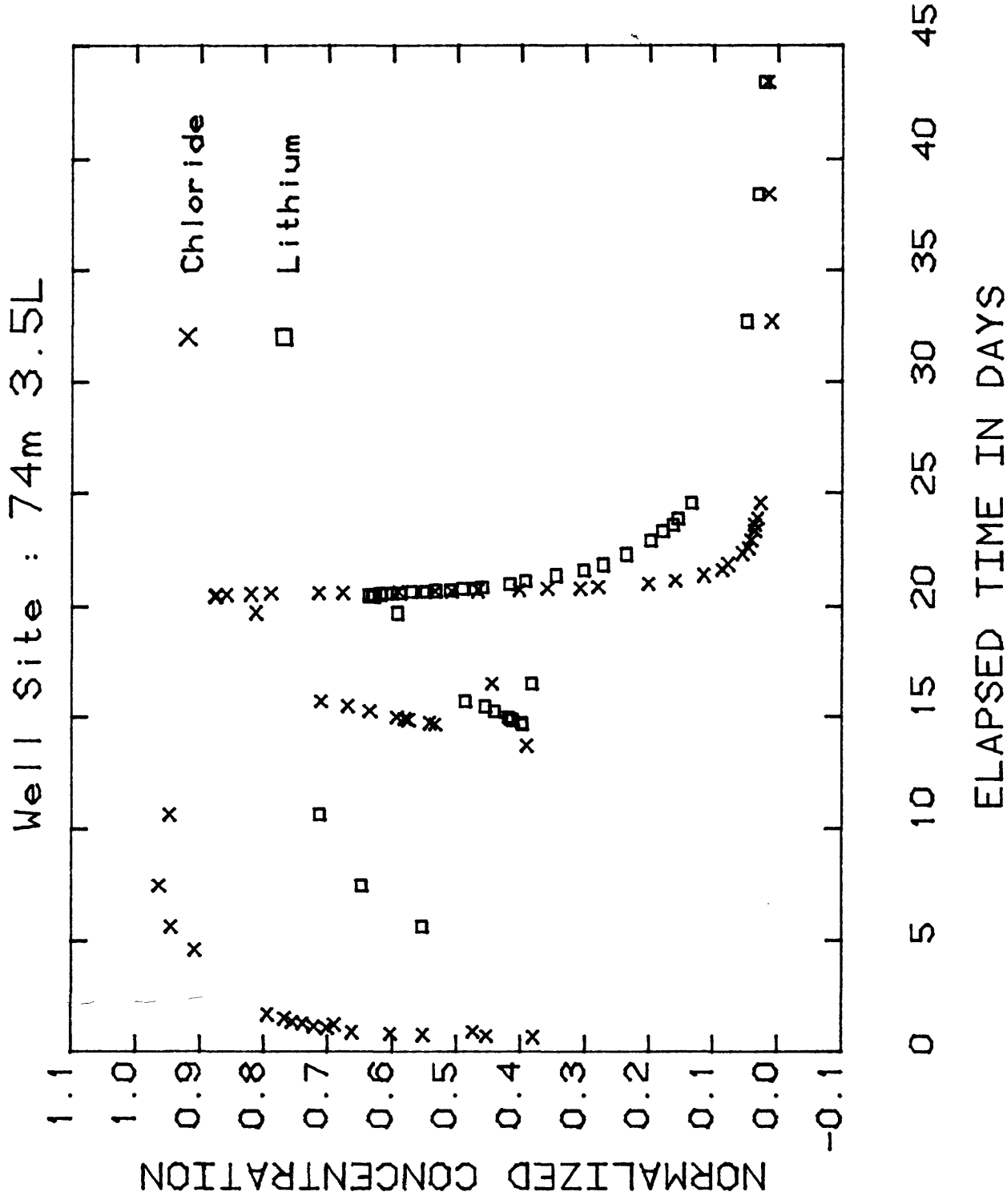
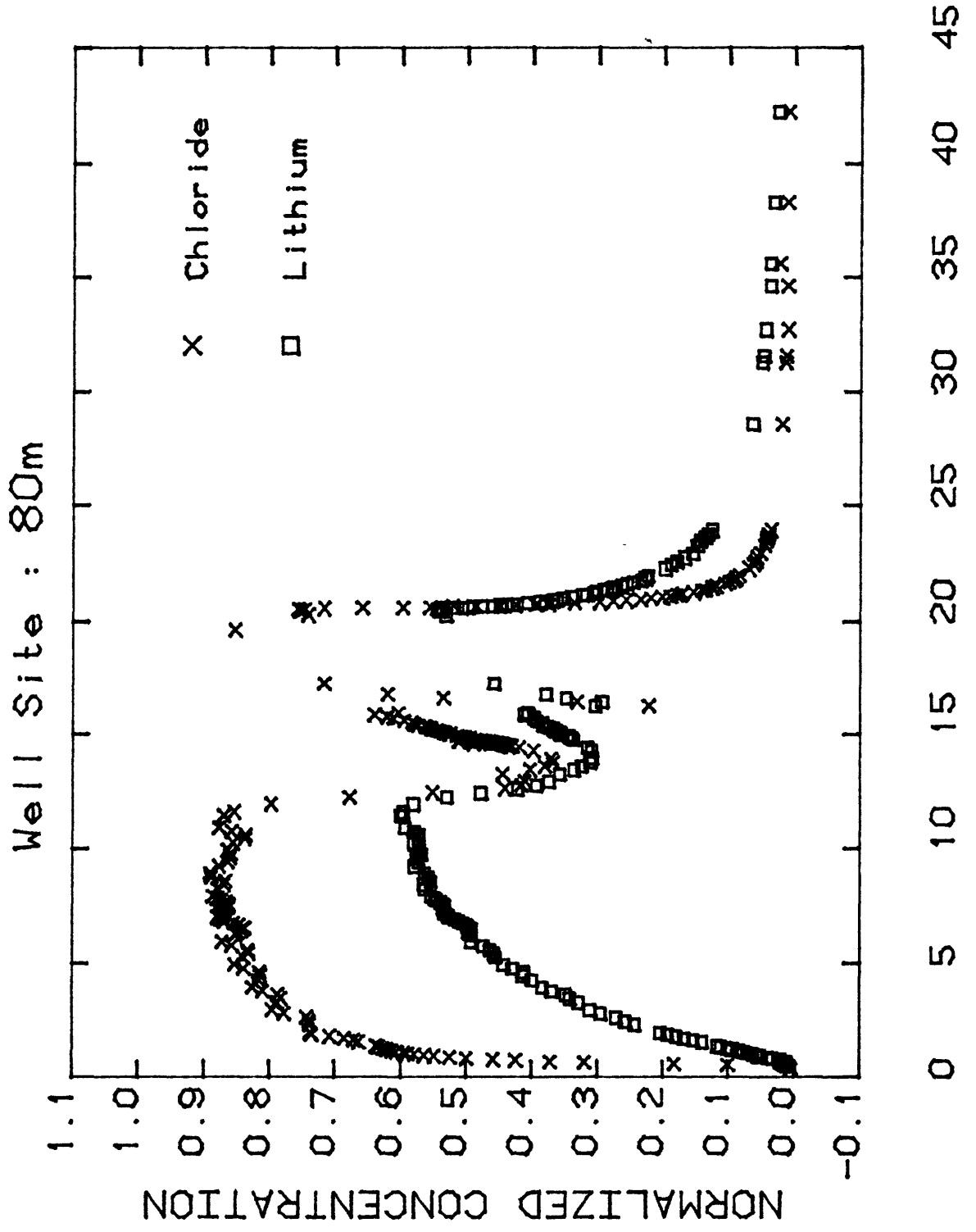
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 74m 3.5L
Chloride
Lithium
NORMALIZED CONCENTRATION
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 80m
Chloride
Lithium
NORMALIZED CONCENTRATION
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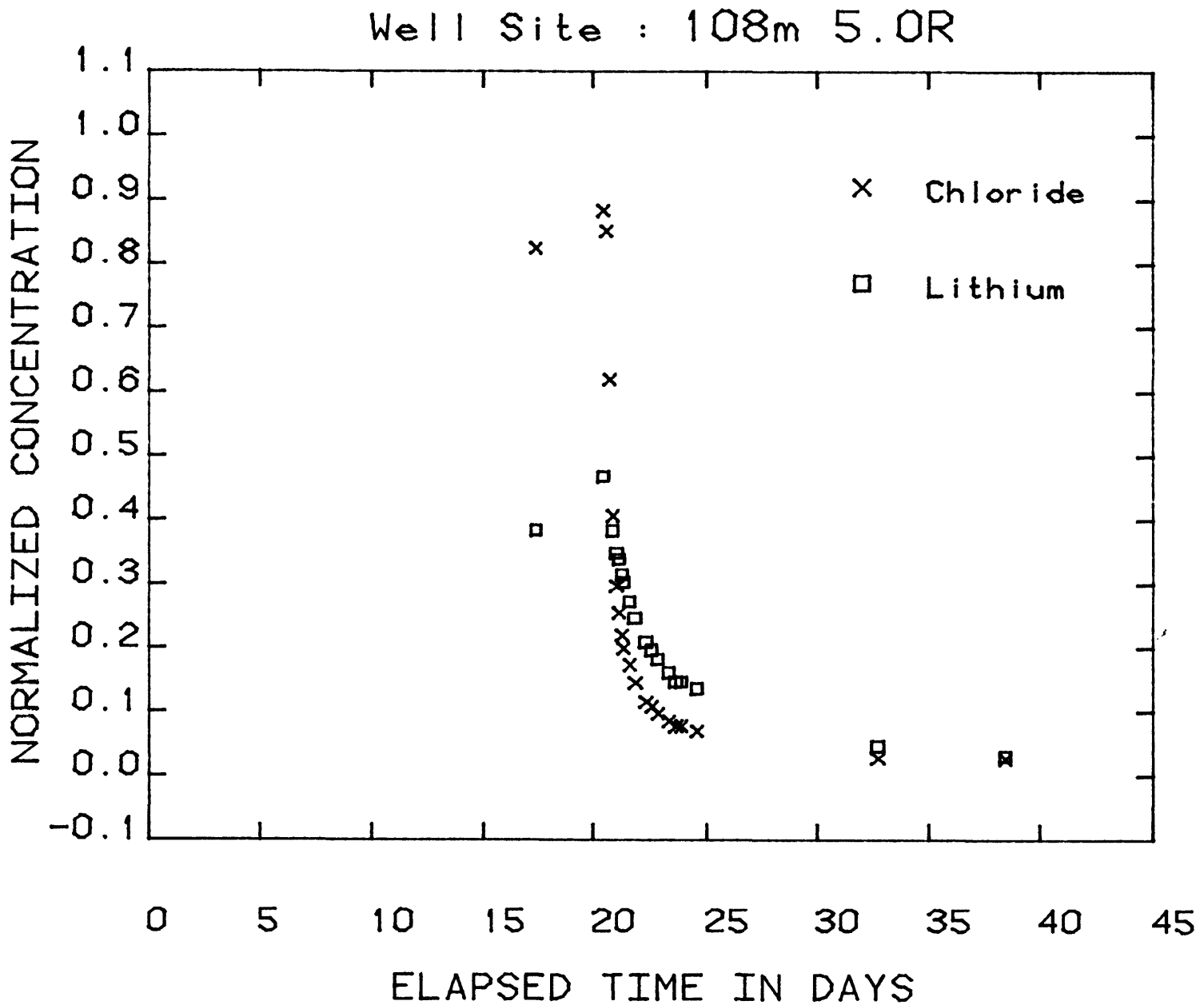
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 108m 5.OR
NORMALIZED CONCENTRATION
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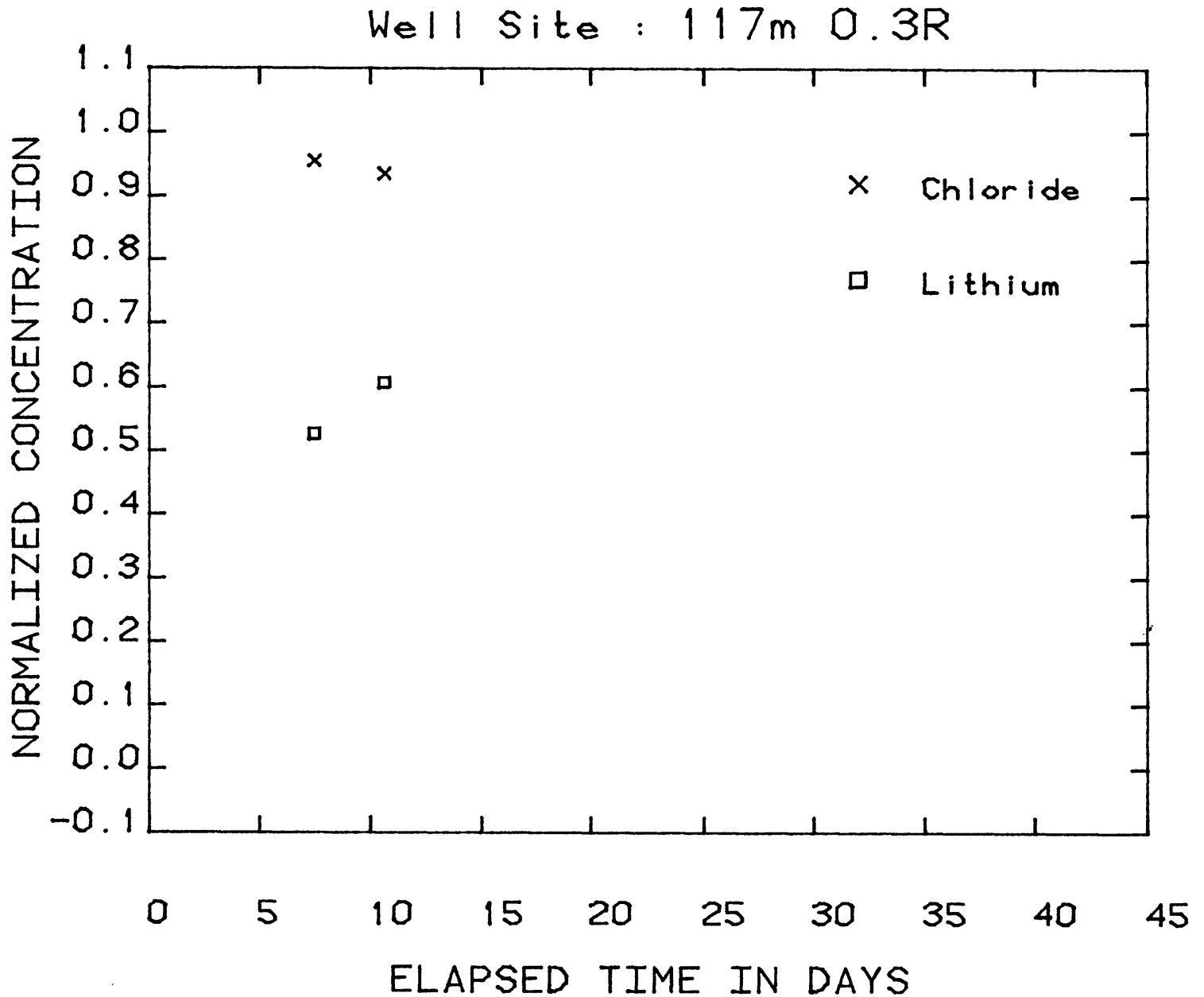
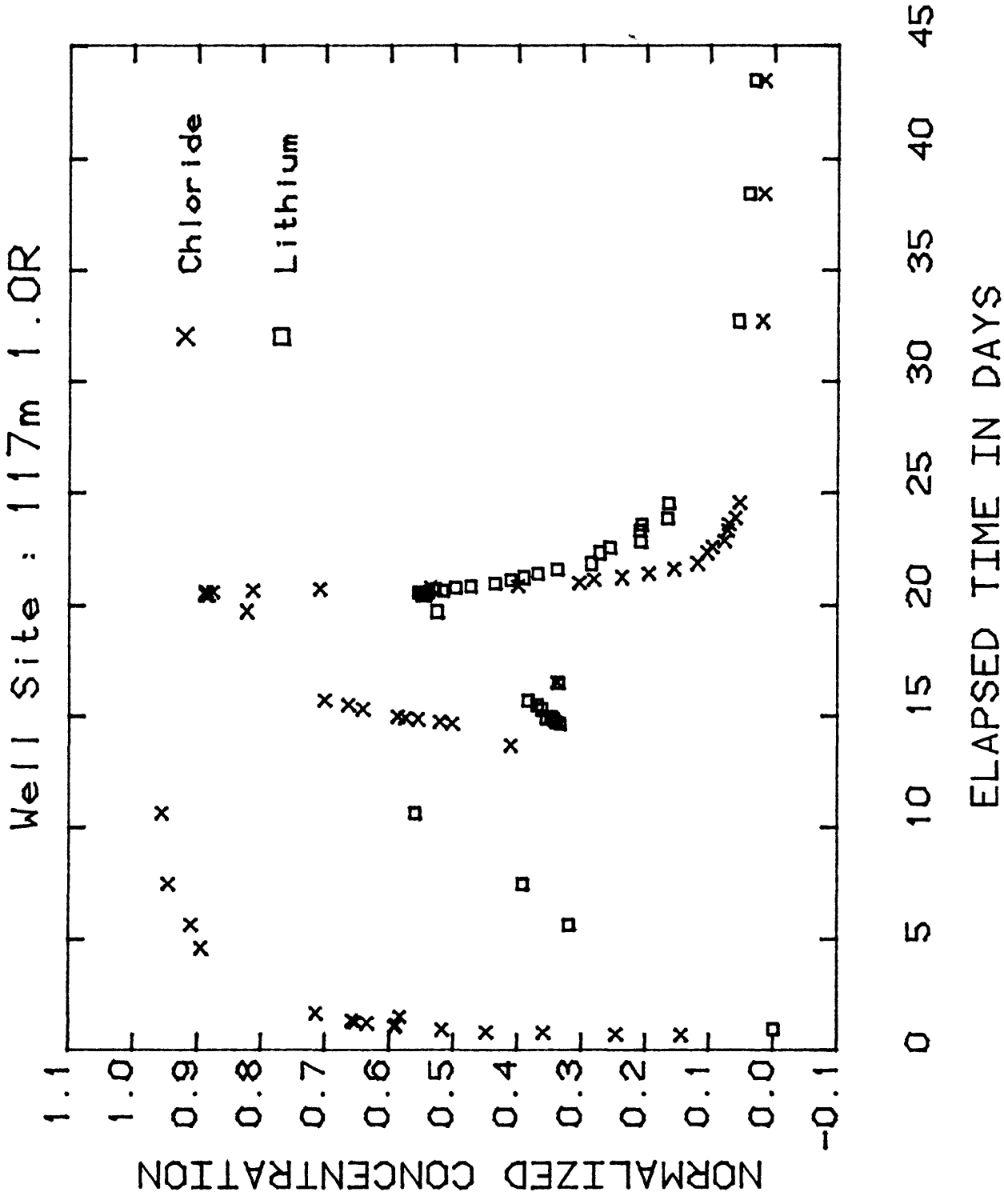
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 117m 0.3R
NORMALIZED CONCENTRATION
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 117m 1.OR
Chloride
Lithium
NORMALIZED CONCENTRATION
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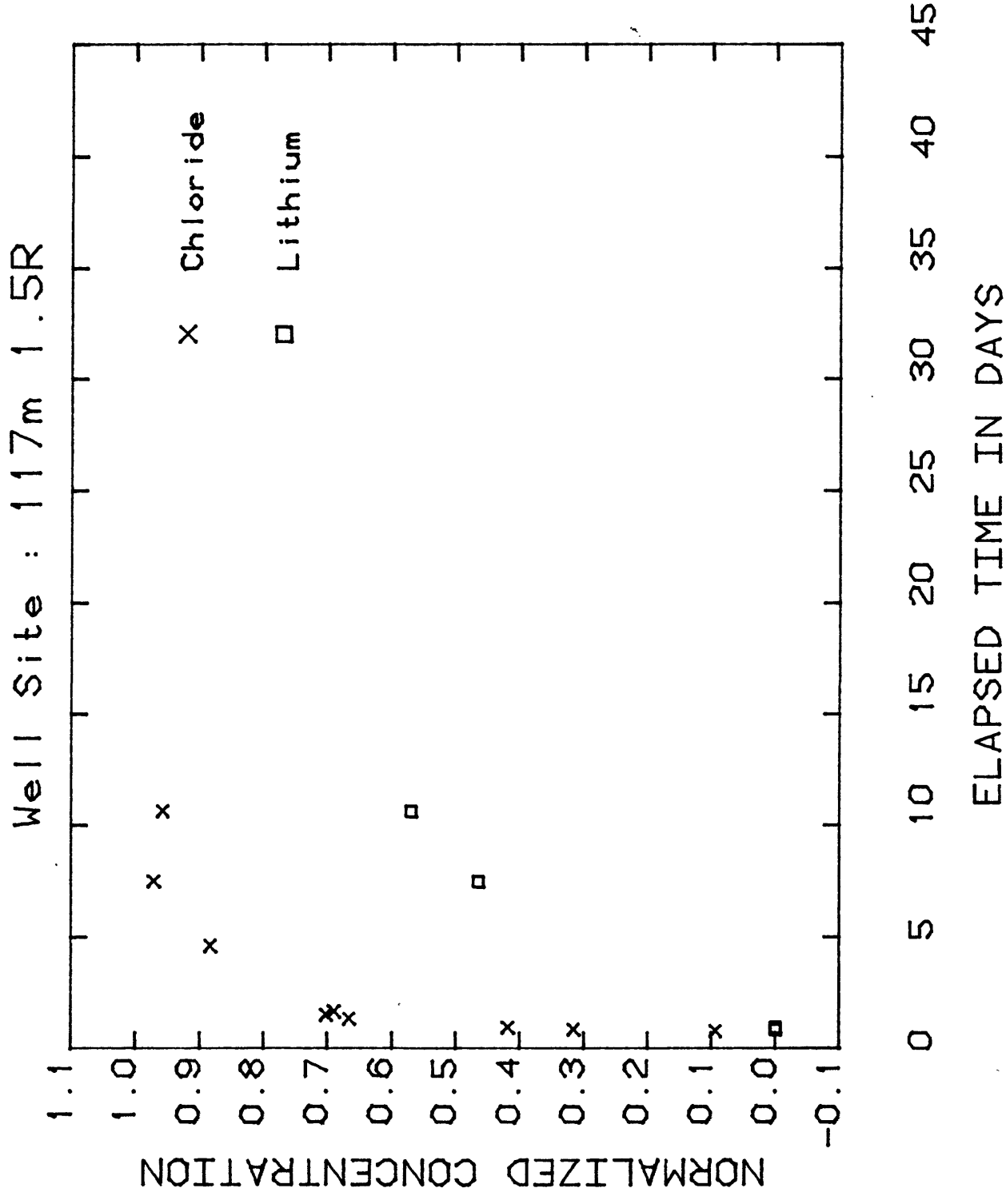
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 117m 1.5R
Chloride
Lithium
NORMALIZED CONCENTRATION
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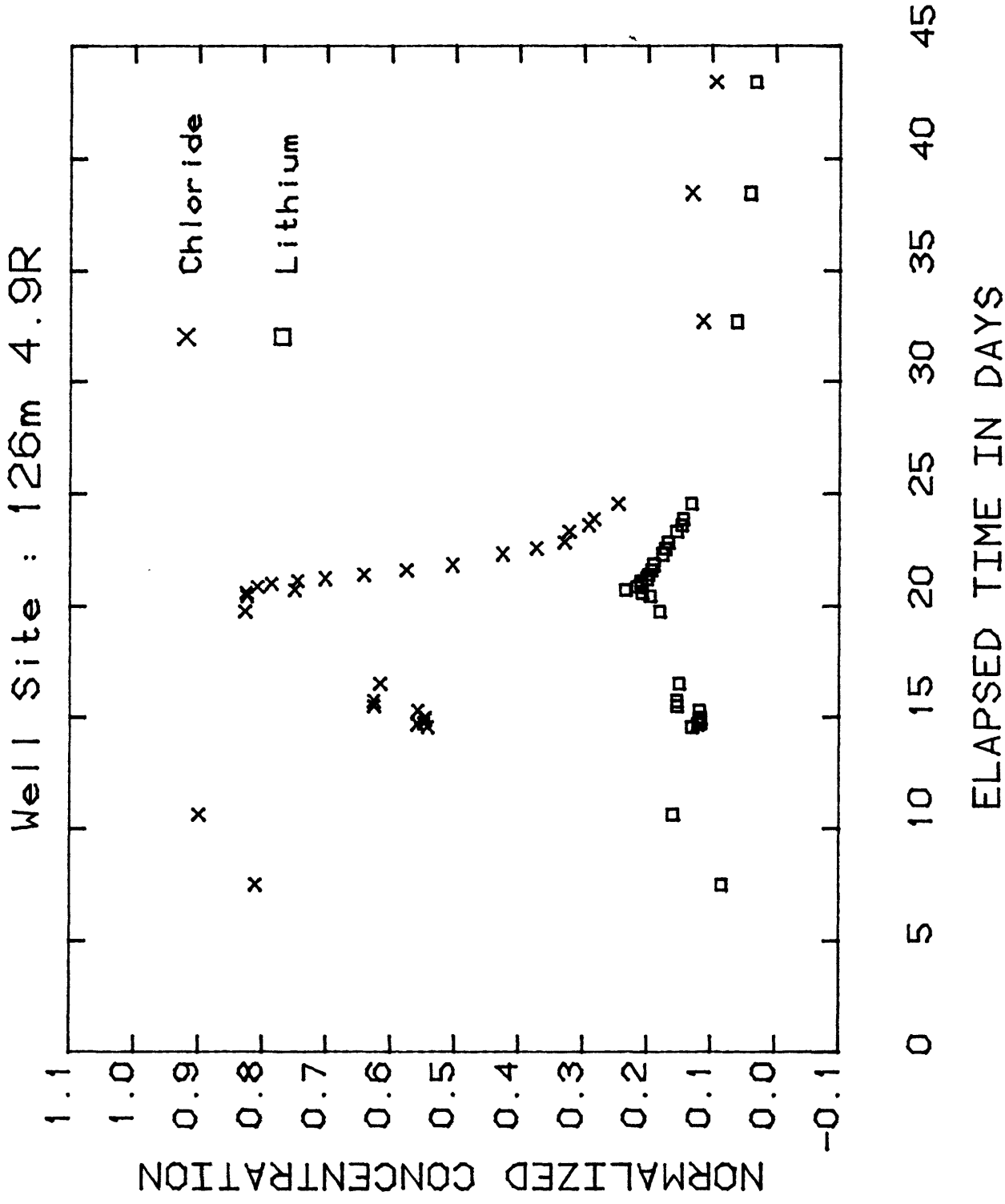
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 126m 4.9R
Chloride
Lithium
NORMALIZED CONCENTRATION
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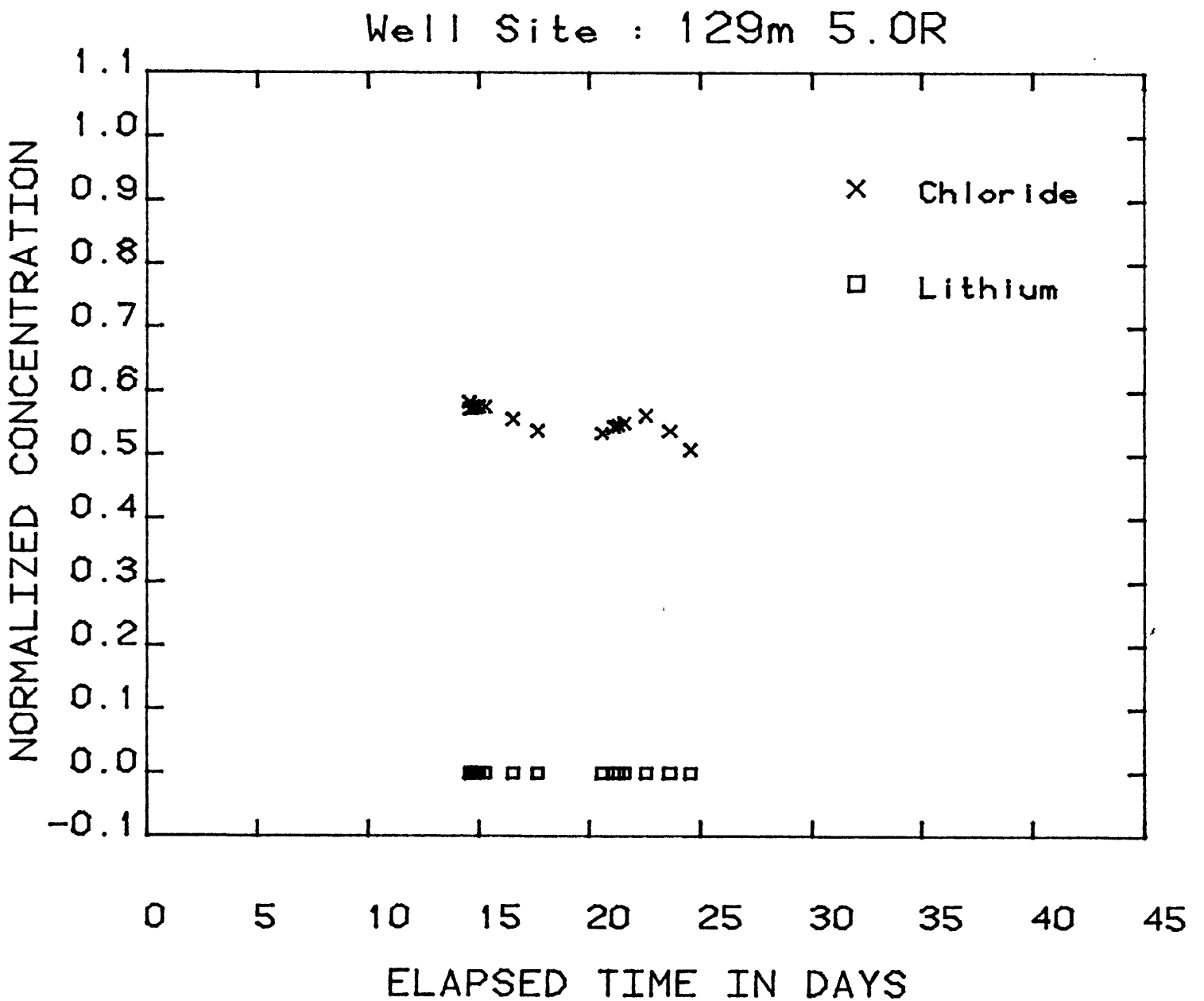
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 129m 5.0R
NORMALIZED CONCENTRATION
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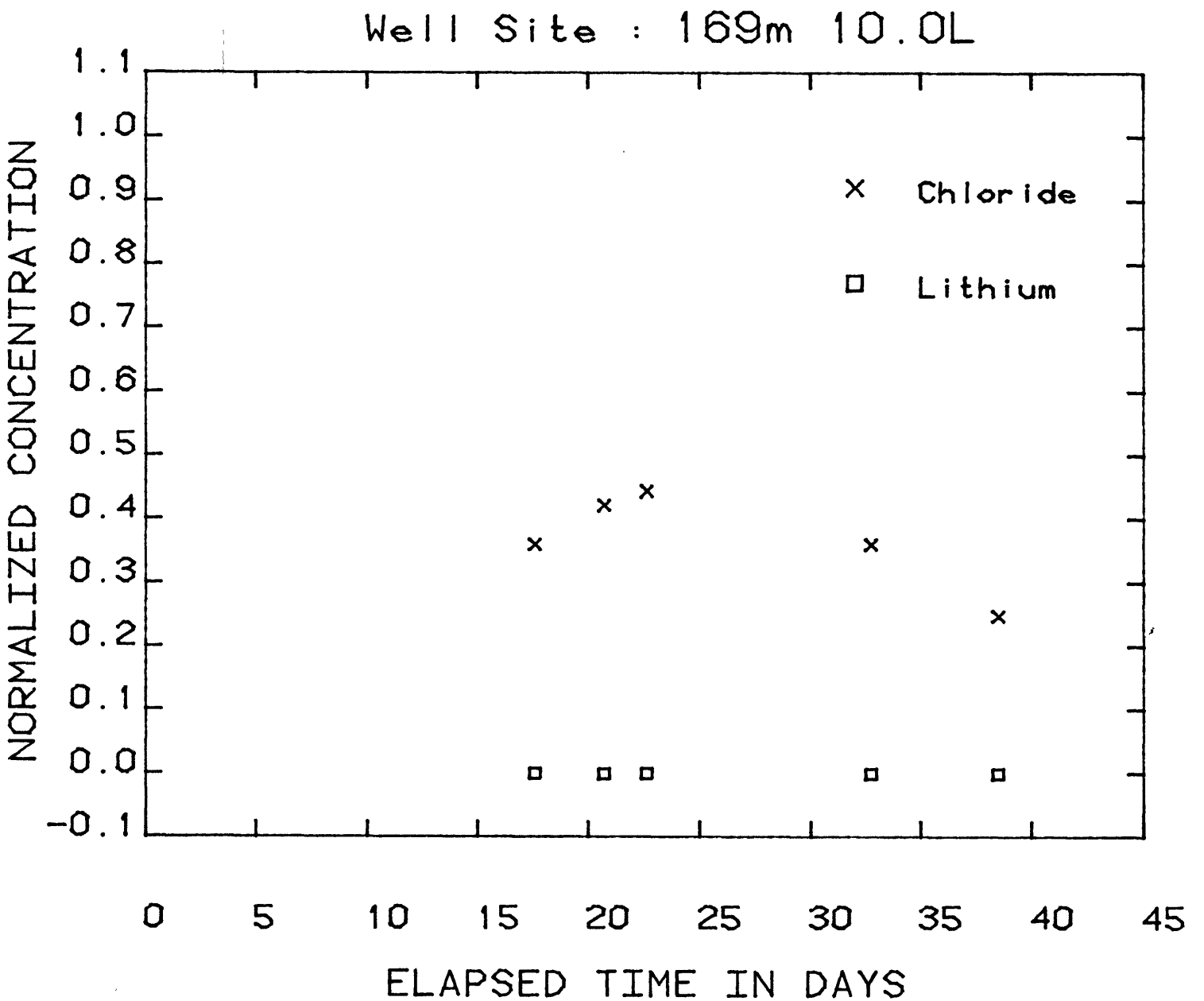
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 169m 10.0L
NORMALIZED CONCENTRATION
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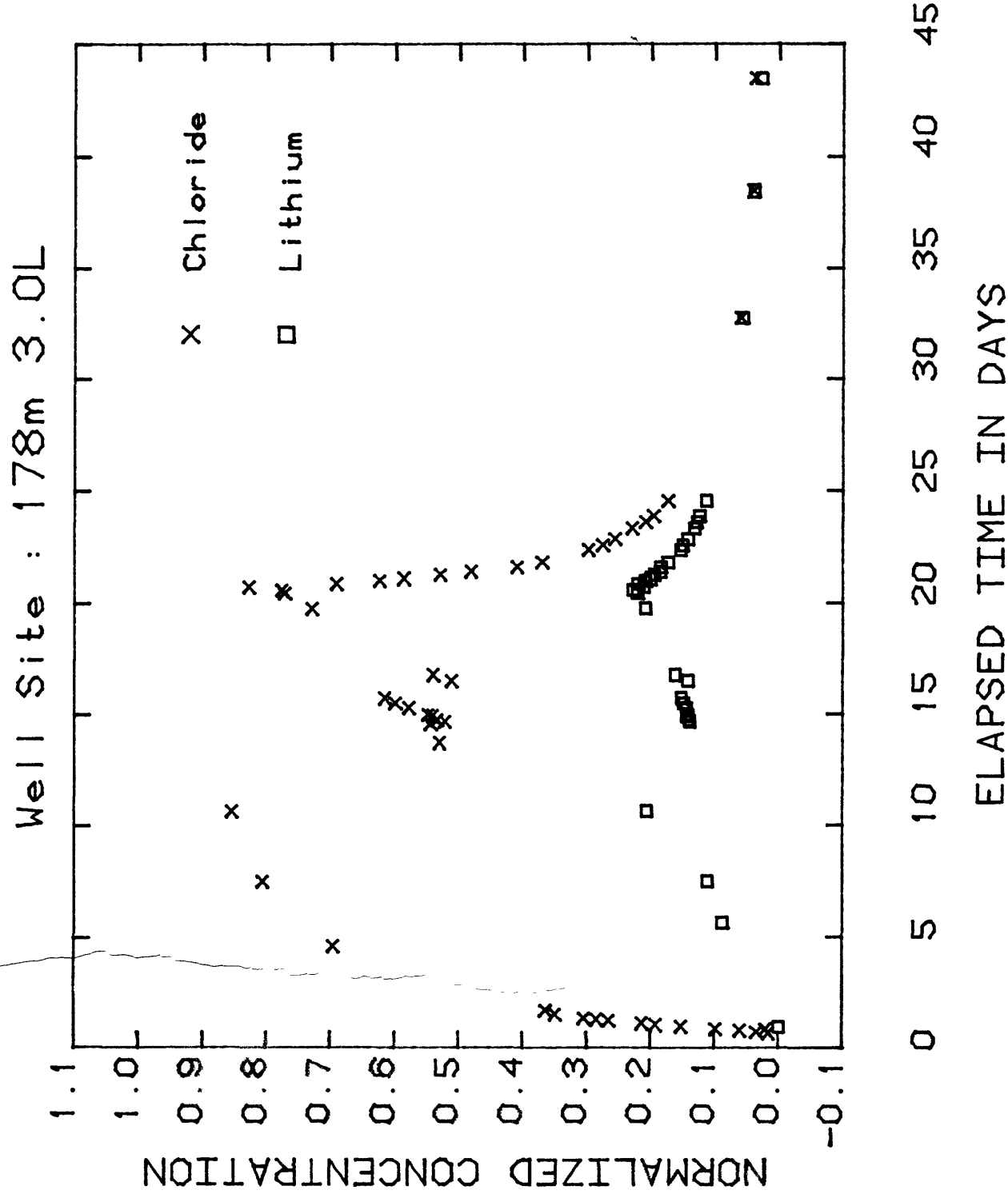
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 178m 3.0L
Chloride
Lithium
NORMALIZED CONCENTRATION
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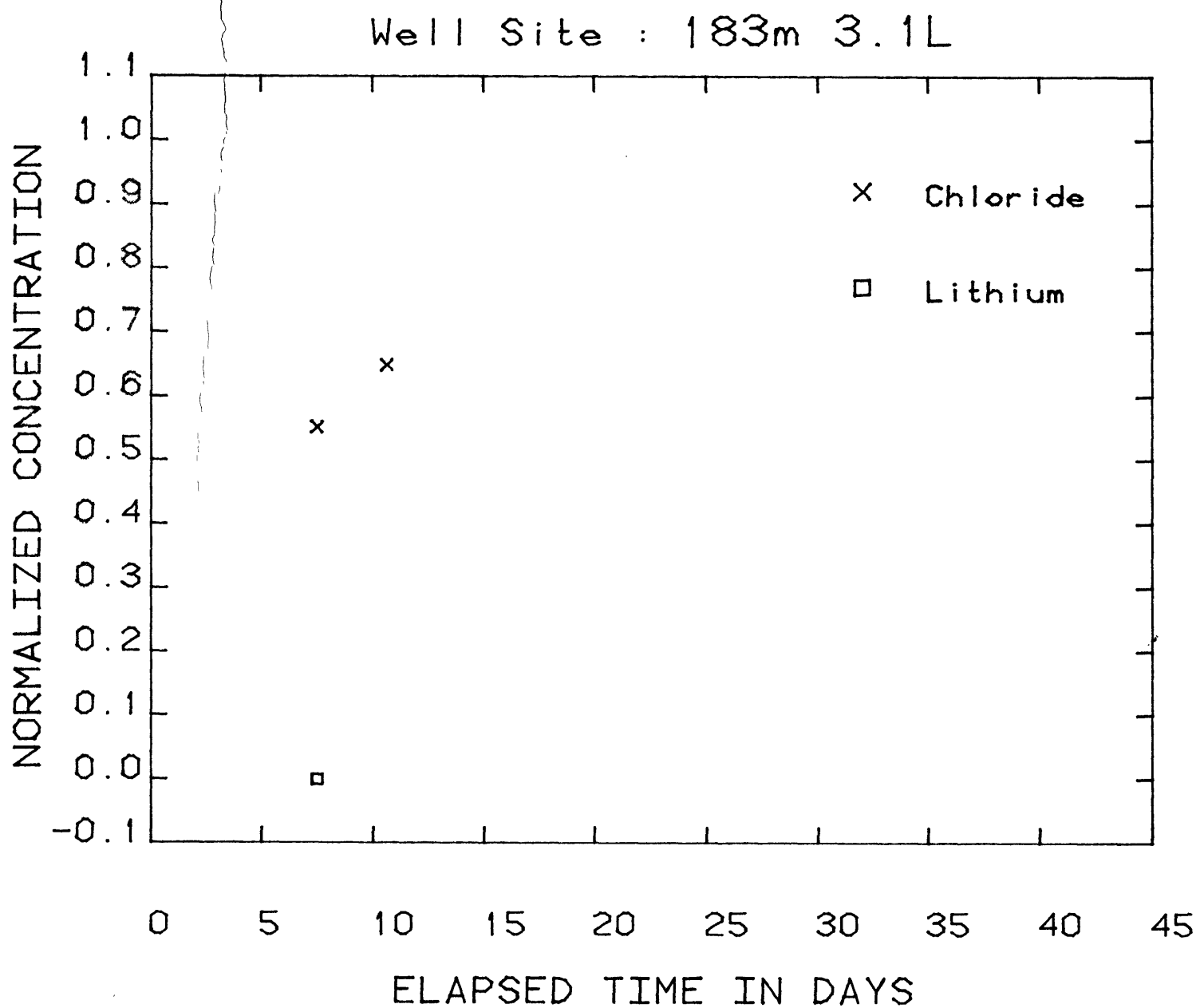
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 183m 3.1L
NORMALIZED CONCENTRATION
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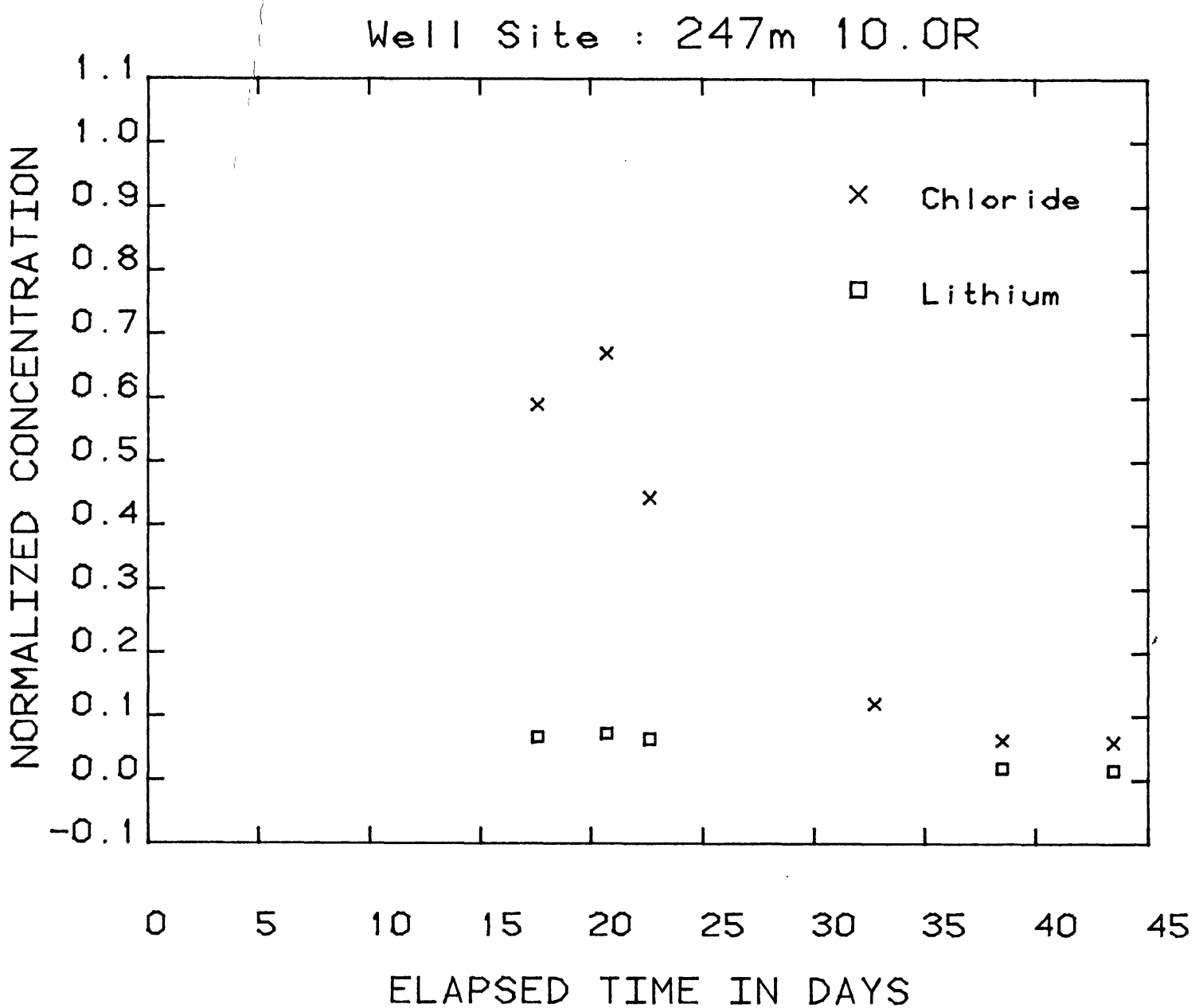
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 247m 10.0R
NORMALIZED CONCENTRATION
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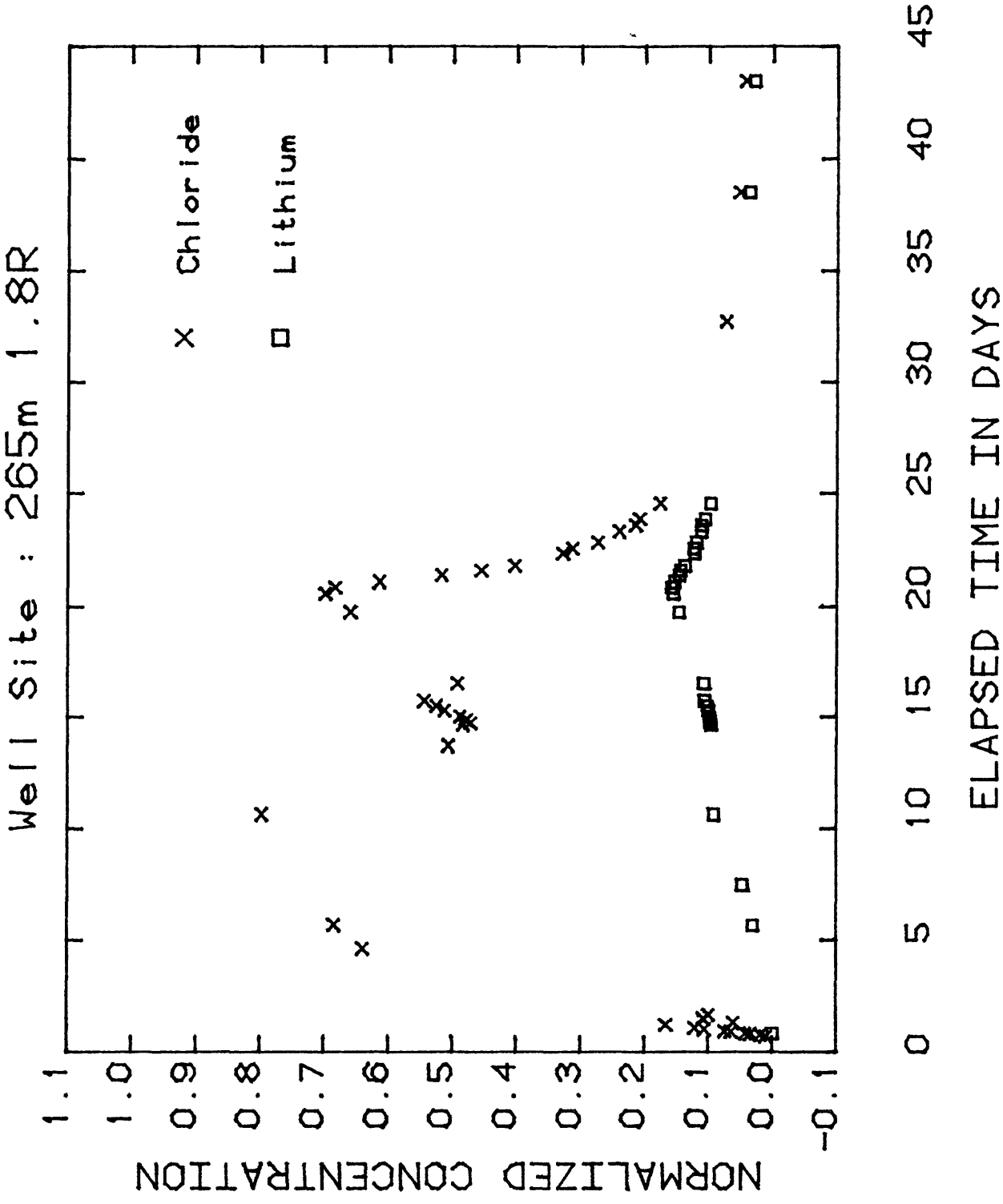
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 265m 1.8R
Chloride
Lithium
NORMALIZED CONCENTRATION
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1.0
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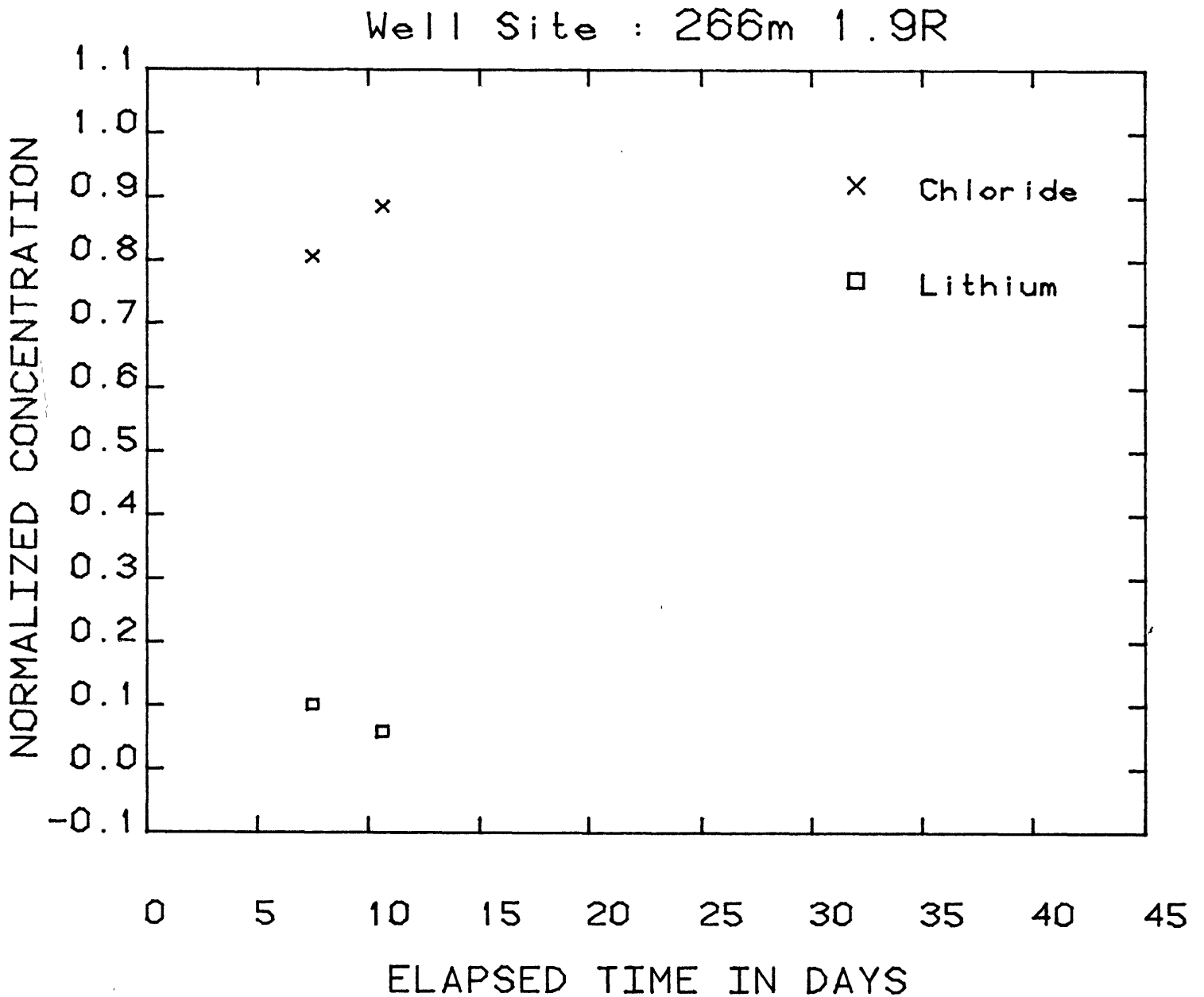
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 266m 1.9R
NORMALIZED CONCENTRATION
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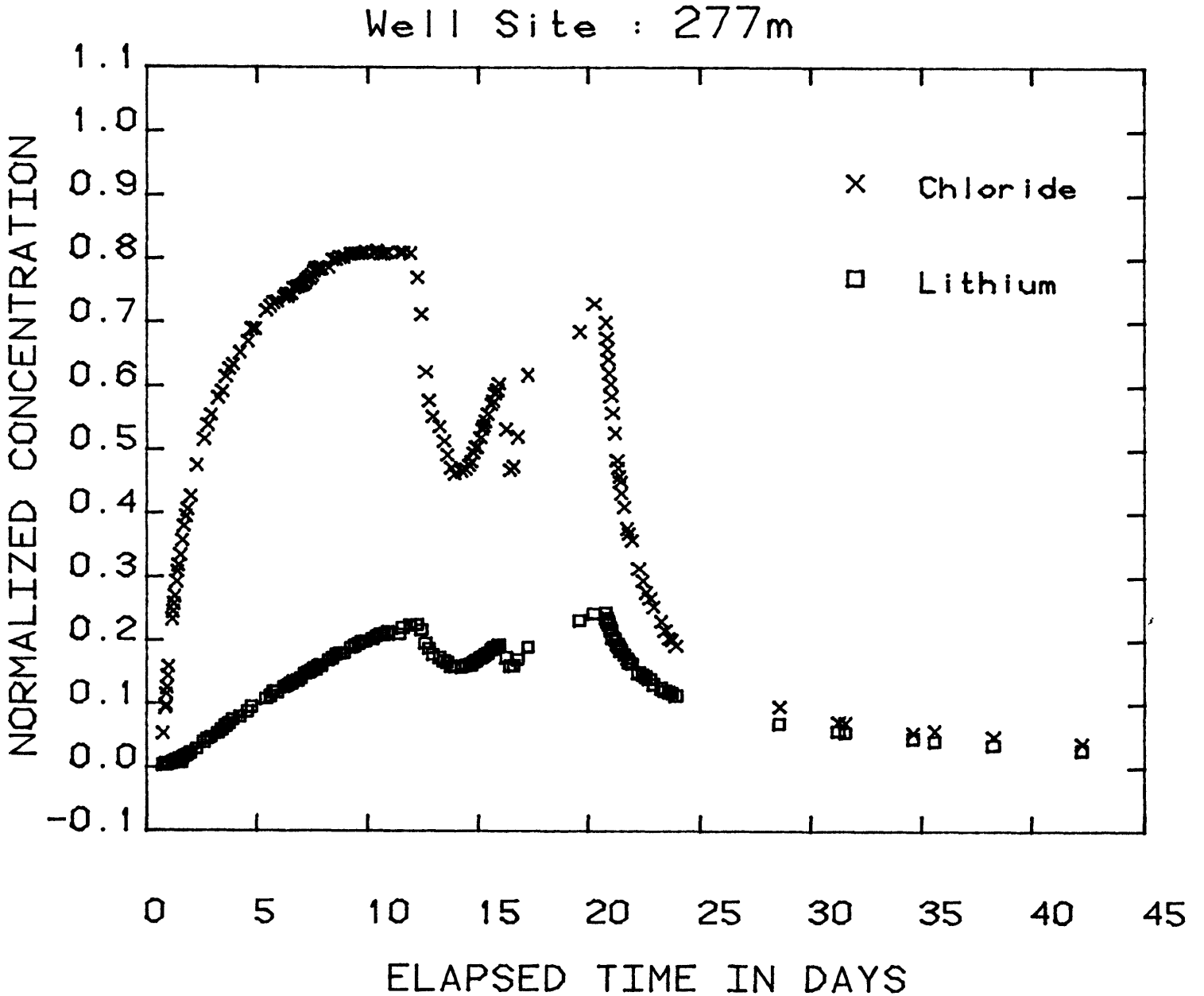
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS


Well Site : 277m
NORMALIZED CONCENTRATION
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1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
Chloride
Lithium
0
5
10
15
20
25
30
35
40
45
ELAPSED TIME IN DAYS

APPENDIX III

SOLUTE CONCENTRATION

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
		Little Lost Man Creek 1979			Site : 32m, 1.7L			
Aug 21	1511	20.6					182	9
Aug 28	1106	23.6	0.17	2.02		7.70		
Aug 31	1452	14.5	1.80	2.03		7.50		
		Little Lost Man Creek 1979			Site : 33m, 1.6L			
Aug 28	1110	23.4	0.97	1.99		7.60		
Aug 31	1456	23.7	1.41	2.05		7.55		
		Little Lost Man Creek 1979			Site : 34m, 2.0L			
Aug 28	1112	22.1	0.48	1.79		7.65		
Aug 31	1500	24.1	0.62	1.87		7.70		
		Little Lost Man Creek 1979			Site : 37M, 4.3L			
Aug 21	1515	16.8					159	8
Aug 21	1626	18.2					122	8
Aug 21	1800	19.1					132	8
Aug 21	1912	19.5					137	8
Aug 21	1952	19.9	0.10	0.38		7.60		
Aug 21	2118							8
Aug 21	2220	19.9	0.10	0.46		7.60		
Aug 22	109	20.3					158	9
Aug 22	234	20.3					156	8
Aug 22	444							7
Aug 22	604	20.5					163	8
Aug 22	721	20.6					166	8
Aug 22	1126	20.7					165	8
Aug 22	1530	21.1					172	8
Aug 25	1405	22.8					200	8
Aug 26	1512	22.9	0.16	1.54		7.70	191	11
Aug 28	1115	24.1	0.19	1.80		7.90		
Aug 31	1505	23.1	0.25	1.75		7.50		
Sep 3	1610	12.6					84	11
Sep 9	1630	20.8	0.32	1.53		7.65	169	8
Sep 10	1000	21.3	0.35	1.61		7.65	181	8
Sep 10	1028	21.3		1.64		7.65	170	8
Sep 10	1057	21.2		1.61		7.60	175	8
Sep 10	1127	20.8		1.60		7.60	176	10
Sep 10	1156	18.8		1.48		7.60	154	9

SOLUTE CONCENTRATION

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Little Lost Man Creek 1979 Site : 37M, 4.3L								
Sep 10	1231	16.3		1.37		7.60	128	10
Sep 10	1258	15.0	0.27	1.31		7.60	114	
Sep 10	1327	13.4		1.22		7.60	105	8
Sep 10	1355	12.7		1.20		7.60	99	8
Sep 10	1437	11.4		1.10		7.60	91	11
Sep 10	1511	10.8		1.02		7.65	84	12
Sep 10	1531	10.5		1.02		7.65	82	18
Sep 10	1559	10.1		0.99		7.65	79	12
Sep 10	1700	9.43		0.94		7.70	75	14
Sep 10	1754	8.90		0.89		7.70	72	11
Sep 10	1902	8.44		0.84		7.70	68	14
Sep 10	1956	8.17		0.81		7.75	65	14
Sep 10	2324	7.49		0.70		7.75	63	14
Sep 11	509	7.04		0.54		7.70	64	12
Sep 11	825	6.85				7.70	59	10
Sep 11	1419	6.73	0.24	0.46		7.70	58	9
Sep 11	2007	6.61		0.42		7.75		
Sep 12	749	6.51	0.25	0.35		7.75		
Sep 12	1407	6.49		0.32		7.75	61	11
Sep 12	2051	6.44		0.29		7.85		
Sep 13	737	6.43		0.26		7.80		
Sep 13	1504	6.40		0.23		7.80	65	11
Sep 13	2100	6.38		0.22		7.90		
Sep 14	1328	6.35		0.19		7.85		
Sep 22	1645	6.27	0.28	0.07		7.70		
Sep 28	954	6.39	0.27	0.04		7.55	45	10
Oct 3	955	6.43	0.27	0.04		7.60	57	11
Oct 6	1418	6.27	0.27			7.55	49	10
Oct 13	1407	6.34				7.40	29	11
Little Lost Man Creek 1979 Site : 67m, 1.1L								
Aug 28	1120	24.1	0.40	1.60		7.70		
Aug 31	1512	23.3	0.48	1.76		7.65		
Little Lost Man Creek 1979 Site : 74m, 3.5L								
Aug 21	1522	12.8					102	11
Aug 21	1631	14.1					123	10
Aug 21	1805	15.9					124	10
Aug 21	1920	16.8					128	10
Aug 21	1926	16.7	0.11	0.06	0.68	7.65		
Aug 21	2025	17.8					144	8

SOLUTE CONCENTRATION

Little Lost Man Creek 1979 Site : 74m, 3.5L

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Aug 22	59	18.5					154	6
Aug 22	226	18.8					162	9
Aug 22	449	18.3					164	8
Aug 22	608	19.2					183	8
Aug 22	726	19.5					180	8
Aug 22	1131	19.7					184	7
Aug 22	1533	20.1					186	8
Aug 25	1410	22.2					218	8
Aug 26	1510	22.8	0.14	1.19	1.13	7.75	221	10
Aug 28	1122	23.1	0.11	1.39	1.04	7.75		
Aug 31	1516	22.9	0.13	1.53	1.18	7.70		
Sep 3	1620	13.0					113	14
Sep 4	1540	15.6	0.12	0.86	1.17	7.75	140	11
Sep 4	1643	15.7		0.86	1.18	7.75	143	12
Sep 4	1958	16.3		0.89	1.18	7.80	151	7
Sep 4	2118	16.4		0.89	1.19	7.80	150	10
Sep 4	2245	16.6		0.90	1.19	7.80	153	10
Sep 5	551	17.3		0.95	1.20	7.75	167	14
Sep 5	1111	17.9		0.98	1.20	7.80	172	14
Sep 5	1634	18.7		1.05	1.21	7.75	173	13
Sep 6	1117	14.0		0.82	1.16	7.75	135	16
Sep 9	1633	20.5		1.27	1.33	7.75	194	19
Sep 10	1002	21.6		1.35	1.36	7.75	210	14
Sep 10	1030	21.6		1.36	1.35	7.75	210	16
Sep 10	1059	21.6		1.37	1.33	7.70	211	15
Sep 10	1129	21.5		1.35	1.33	7.75	211	13
Sep 10	1158	21.3		1.35	1.33	7.75	208	14
Sep 10	1233	20.6		1.33	1.31	7.70	201	16
Sep 10	1300	20.1		1.31	1.29	7.70	200	18
Sep 10	1329	18.8		1.29	1.29	7.70	187	21
Sep 10	1357	18.1		1.26	1.27	7.70	178	23
Sep 10	1439	16.6		1.22	1.25	7.70	163	21
Sep 10	1515	15.6	0.13	1.18	1.23	7.70	153	18
Sep 10	1533	15.1		1.18	1.21	7.70	148	19
Sep 10	1602	14.4		1.14	1.19	7.70	139	20
Sep 10	1702	13.2		1.10	1.18	7.70	131	18
Sep 10	1756	12.5		1.05	1.16	7.70	123	17
Sep 10	1905	11.6		1.01	1.14	7.70	114	17
Sep 10	1958	11.1		0.99	1.14	7.70	108	20
Sep 10	2326	9.69		0.90	1.11	7.75	97	20
Sep 11	221	8.95		0.84	1.09	7.75	93	21
Sep 11	827	8.16		0.74	1.09	7.75	77	20
Sep 11	1420	7.65		0.65	1.07	7.75	80	18
Sep 11	2009	7.50		0.59	1.11	7.75		
Sep 12	751	7.10		0.51	1.08	7.75		
Sep 12	1408	6.94	0.12		1.09	7.75	79	18
Sep 12	2121	6.86		0.43	1.08	7.80		

SOLUTE CONCENTRATION

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
		Little Lost Man Creek 1979			Site : 74m, 3.5L			
Sep 13	739	6.75		0.39	1.10	7.85		
Sep 13	1505	6.75		0.35	1.13	7.80	79	17
Sep 13	2101	6.69		0.33	1.11	7.85		
Sep 14	1330	6.59	0.12	0.29	1.09	7.85		
Sep 22	1655	6.32	0.14	0.11		7.65		
Sep 28	1005	6.38	0.15	0.07		7.55	64	13
Oct 3	1014	6.41	0.15	0.05		7.55	73	12
Oct 6	1437	6.32	0.16	0.04		7.45	63	11
Oct 13	1411	6.40	0.17	0.04	0.83	7.35	55	14
Oct 17	1524	6.93	0.16	0.03		7.50	74	13
		Little Lost Man Creek 1979			Site : 104m Seep			
Aug 21	828	6.21	0.07				55	
Aug 21	1139	6.31	0.09	0.01			52	
Aug 21	1239	7.91	0.13	0.03			62	
Aug 21	1327	9.34	0.15	0.03			75	
Aug 21	1502	11.8	0.18	0.05			90	
Aug 21	1605	12.7	0.12	0.02			97	
Aug 21	1710	13.6	0.13	0.05			104	
Aug 21	1800	14.2	0.10	0.04			109	
Aug 21	1917	14.9	0.12	0.07			116	
Aug 21	2007	15.4	0.14	0.09			121	
Aug 21	2112	15.8	0.18	0.11			125	
Aug 21	2209	16.1	0.14	0.12			123	
Aug 21	2309	16.3	0.13	0.13			132	
Aug 22	9	16.5	0.11	0.14			135	
Aug 22	102	16.6	0.12	0.16			136	
Aug 22	202	16.8	0.11	0.16			140	
Aug 22	302	17.0	0.13	0.18			143	
Aug 22	420	17.1	0.12	0.21			148	
Aug 22	453	17.1	0.10	0.20			146	
Aug 22	550	17.2	0.12	0.22			150	
Aug 22	707	17.3	0.14	0.24			156	
Aug 22	803	17.4	0.12	0.25				
Aug 22	911						156	
Aug 22	1210	17.8	0.13	0.30			157	
Aug 22	1406	18.0	0.14	0.33			159	
Aug 22	1605	18.2	0.13	0.36			162	
Aug 22	1803	18.6	0.12	0.39			166	
Aug 22	1954	19.1	0.10	0.41			167	
Aug 22	2158	19.1	0.11	0.44			172	
Aug 23	622	19.2	0.10	0.52			176	
Aug 23	957	19.2	0.10	0.55			177	
Aug 23	1401	19.2	0.11	0.58			180	

SOLUTE CONCENTRATION

Little Lost Man Creek 1979 Site : 104m Seep

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Aug 23	1803	19.8	0.15	0.63			179	
Aug 23	2206	20.2	0.12	0.67				
Aug 24	553	20.0	0.11	0.71			194	
Aug 24	1001	19.9	0.13	0.73			194	
Aug 24	1407	20.0	0.12	0.75			193	
Aug 24	1800	20.4	0.16	0.79			194	
Aug 24	2206	20.7	0.16	0.82			197	
Aug 25	538	20.5	0.14	0.86			201	
Aug 25	1001	20.5	0.17	0.89			201	
Aug 25	1400	20.5	0.14	0.89			198	
Aug 25	1800	20.9	0.15	0.92			198	
Aug 25	2203	21.2	0.14	0.95			187	
Aug 26	612	21.0	0.14	0.98			201	
Aug 26	1002	20.8	0.12	0.98			200	
Aug 26	1355	20.8	0.12	1.00			196	
Aug 26	1752	21.2	0.13	1.02			198	
Aug 26	2155	21.5	0.15	1.06			203	
Aug 27	531	21.2	0.13	1.06			204	
Aug 27	759	21.1	0.15	1.06			206	
Aug 27	957	21.0	0.13	1.06			203	
Aug 27	1207	20.9	0.12	1.06		7.85	200	10
Aug 27	1400	20.9	0.13	1.07			199	
Aug 27	1601	21.1	0.14	1.07			198	
Aug 27	1813	21.2	0.12	1.08			198	
Aug 27	2009	21.4	0.15	1.10			199	
Aug 27	2216	21.5	0.21	1.11			200	
Aug 28	12	21.6	0.16	1.13			203	
Aug 28	203	21.5	0.18	1.13			204	
Aug 28	407	21.5	0.14	1.14			204	
Aug 28	553	21.5	0.14	1.14			205	
Aug 28	811	21.4	0.15	1.15			205	
Aug 28	1002	21.4	0.12	1.15			204	
Aug 28	1202	21.3	0.11	1.14			200	
Aug 28	1414	21.3	0.12	1.15			198	
Aug 28	1607	21.4	0.12	1.16			198	
Aug 28	1804	21.5	0.14	1.17			199	
Aug 28	2007	21.6	0.12	1.18			200	
Aug 28	2211	21.8	0.12	1.19			201	
Aug 29	554	21.6	0.13	1.21			203	
Aug 29	1013	21.5	0.14	1.21			201	
Aug 29	1402	21.4	0.12	1.19			198	
Aug 29	1802	21.8	0.21	1.20			199	
Aug 29	2223	21.8	0.11	1.21			202	
Aug 30	532	21.6	0.12	1.24			204	
Aug 30	1000	21.4	0.16	1.23			203	
Aug 30	1426	21.3	0.14	1.23			199	
Aug 30	1810	21.3	0.14	1.22			195	

SOLUTE CONCENTRATION

Little Lost Man Creek 1979 Site : 104m Seep

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Aug 30	2200	21.4	0.14	1.23			195	
Aug 31	529	21.2	0.12	1.24			197	
Aug 31	1004	20.9	0.14	1.23			195	
Aug 31	1408	20.9	0.13	1.23			193	
Aug 31	1745	21.3	0.17	1.24			194	
Aug 31	2157	21.6	0.12	1.27			204	
Sep 1	1002	21.5	0.15	1.29			208	
Sep 1	1408	21.2	0.16	1.28			198	
Sep 1	2210	20.2	0.14	1.25			190	
Sep 2	531	18.1	0.12	1.14		7.90	166	9
Sep 2	1003	15.9	0.13	1.03		7.85	146	11
Sep 2	1411	13.9	0.12	0.91		7.90	130	9
Sep 2	1759	13.5	0.11	0.84		8.00	123	10
Sep 2	2155	13.4	0.11	0.80		8.00	124	10
Sep 3	534	14.0	0.12	0.77		8.00	158	10
Sep 3	1003	13.2	0.12	0.72		8.00	141	11
Sep 3	1342	12.8	0.11	0.70		8.00	128	11
Sep 3	1806	12.6	0.12	0.67		8.00	119	11
Sep 3	2200	12.7	0.13	0.66		8.00	118	11
Sep 4	548	13.2	0.11	0.66		8.05	103	10
Sep 4	953	13.5	0.12	0.68		7.95		
Sep 4	1051	13.7				8.00		
Sep 4	1102	13.8				8.00		
Sep 4	1117	13.8				7.95		
Sep 4	1132	13.8				8.00		
Sep 4	1202	13.8				8.00		
Sep 4	1217	13.9				7.95		
Sep 4	1232	13.9				7.95		
Sep 4	1247	14.0				7.95		
Sep 4	1302	14.3				8.15		
Sep 4	1317	14.0				8.00		
Sep 4	1320					7.75		
Sep 4	1332	14.8				8.30		
Sep 4	1347	14.1				7.95		
Sep 4	1402	14.5				8.20		
Sep 4	1417	14.2				7.95		
Sep 4	1432	14.2				7.95		
Sep 4	1447	14.2				8.00		
Sep 4	1502	14.3				7.95		
Sep 4	1517	14.8				8.20		
Sep 4	1532	14.3				7.95		
Sep 4	1547	15.2				8.35		
Sep 4	1602	15.2				8.30		
Sep 4	1617	14.5				8.00		
Sep 4	1632	14.9				8.20		
Sep 4	1647	14.6				8.00		
Sep 4	1702	14.7				8.00		

SOLUTE CONCENTRATION

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Little Lost Man Creek 1979 Site : 104m Seep								
Sep 4	1717	14.7				8.00		
Sep 4	1803	14.7	0.14	0.72		8.00	134	8
Sep 4	1905	14.9	0.13	0.73		8.00		
Sep 4	2009	15.0	0.16	0.74		8.00		
Sep 4	2111	15.1	0.14	0.74		8.00		
Sep 4	2218	15.2	0.14	0.74		8.00		
Sep 4	2317	15.4	0.14	0.77		8.05		
Sep 5	6	15.4	0.14	0.77		8.00		
Sep 5	57	15.5	0.14	0.77		8.00		
Sep 5	207	15.6	0.15	0.77		8.00		
Sep 5	311	15.7	0.14	0.78		8.00		
Sep 5	412	15.8	0.15	0.78		8.05		
Sep 5	505	15.9	0.14	0.79		8.00		
Sep 5	617	15.9	0.15	0.79		8.00		
Sep 5	706	16.0	0.14	0.80		8.00		
Sep 5	803	16.1	0.15	0.81		7.95		
Sep 5	909	16.3	0.00	0.82		8.00		
Sep 5	1004	16.4	0.00	0.83		7.95		
Sep 5	1204	16.4	0.00	0.83		7.95		
Sep 5	1404	16.6	0.00	0.84		7.95	151	9
Sep 5	1611	16.9		0.85		7.95		
Sep 5	1734	17.1		0.85		8.00		
Sep 5	2002	17.4		0.88		7.95		
Sep 5	2200	16.8		0.87		8.00		
Sep 6	554	10.1		0.65		7.95		
Sep 6	948	12.0		0.63		7.95		
Sep 6	1411	15.6		0.75		7.90	145	10
Sep 6	1803	17.1		0.81		7.90		
Sep 7	604	18.8		0.98		7.90	177	9
Sep 10	558	19.2		1.14		7.90	183	9
Sep 10	1037	19.4		1.17		7.85	184	9
Sep 10	1059	19.5		1.16		7.90	184	9
Sep 10	1133	19.5		1.16		7.90	183	9
Sep 10	1201	19.3		1.17		7.95	181	8
Sep 10	1232	18.8		1.15		7.85	178	8
Sep 10	1302	17.8		1.12		7.90	167	7
Sep 10	1338	16.7		1.09		7.90	156	9
Sep 10	1403	15.9		1.07		7.90	150	10
Sep 10	1432	15.3		1.06		7.90	145	10
Sep 10	1502	14.7		1.02		7.90	137	10
Sep 10	1532	14.1		0.99		7.85	132	11
Sep 10	1602	13.6		0.96		7.90	126	12
Sep 10	1632	13.1		0.94		7.85	122	11
Sep 10	1702	12.8		0.92		7.85	118	11
Sep 10	1801	12.1		0.88		7.90	112	11
Sep 10	1914	11.4		0.83		7.90		
Sep 10	2010	11.0		0.82		7.90		

SOLUTE CONCENTRATION

Little Lost Man Creek 1979 Site : 104m Seep

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Sep 10	2106	10.7		0.79		7.95		
Sep 10	2207	10.3		0.78		7.95	95	10
Sep 10	2309	10.0		0.76		7.95		
Sep 11	20	9.70		0.73		7.95		
Sep 11	121	9.48				7.95	91	10
Sep 11	213	9.32		0.69		7.85		
Sep 11	308	9.20		0.68		7.90		
Sep 11	420	9.16		0.66		7.90	88	10
Sep 11	523	8.85		0.65		7.90		
Sep 11	711	8.63		0.62		7.90		
Sep 11	806	8.51		0.62		7.90		
Sep 11	922	8.36		0.60		7.90		
Sep 11	1014	8.34		0.59		7.90		
Sep 11	1144	8.23		0.57		7.90		
Sep 11	1409	8.00		0.55		7.85	82	12
Sep 11	1604	7.88		0.53		7.85		
Sep 11	1807	7.76		0.50		7.85		
Sep 11	2009	7.70		0.49		7.90		
Sep 11	2208	7.62		0.48		7.95		
Sep 12	613	7.36		0.42		7.90	78	10
Sep 12	959	7.24		0.41		7.90		
Sep 12	1407	7.18		0.39		7.85	76	11
Sep 12	1752	7.14		0.36		7.90		
Sep 12	2205	7.04		0.33		7.95		
Sep 13	614	6.93		0.32		7.95	78	9
Sep 13	1036	6.89		0.31		7.90		
Sep 13	1428	6.86		0.29		7.95	76	11
Sep 13	1757	6.85		0.29		7.95		
Sep 13	2202	6.78		0.27		7.95		
Sep 18	1427	6.48		0.14		7.85	19	11
Sep 21	624	6.38		0.11		7.80		
Sep 21	1414	6.37		0.10		7.85		
Sep 22	1701	6.31		0.10		7.80		
Sep 24	1422	6.33		0.08		7.75		
Sep 25	1419	6.55		0.08		7.75		
Sep 28	623	6.34		0.07		7.70		
Oct 2	602	6.30		0.05		7.70		
Oct 6	1431	6.38		0.05		7.70		
Oct 9	1225	6.27		0.04		7.50		
Oct 13	1413	6.43		0.03		7.60		
Oct 16	1127	7.16		0.03		7.85		

SOLUTE CONCENTRATION

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
		Little Lost Man Creek 1979			Site : 108m, 5.0R			
Sep 7	905	20.7	0.11	0.82	1.07	7.85	168	18
Sep 10	1042	21.7	0.10	1.00	1.14	7.80	184	19
Sep 10	1340	21.1			1.13	7.80	182	23
Sep 10	1653	17.1			1.05	7.80	143	29
Sep 10	2040	13.3		0.82	0.99	7.80	111	30
Sep 11	8	11.4		0.75	0.87	7.80	98	28
Sep 11	239	10.6		0.73	0.87	7.80	92	36
Sep 11	546	10.0		0.68	0.95	7.80	77	41
Sep 11	810	9.64		0.65	0.95	7.80	78	26
Sep 11	1423	9.18		0.58	0.92	7.80	84	23
Sep 11	2011	8.70		0.53	0.90	7.80		
Sep 12	800	8.16		0.45	0.93	7.80		
Sep 12	1413	8.05		0.42	0.91	7.80	81	24
Sep 12	2057	7.84		0.39	0.91	7.85		
Sep 13	749	7.63		0.35	0.95	7.85		
Sep 13	1520	7.49		0.31	0.97	7.90	80	24
Sep 13	2105	7.50		0.31	0.93	7.90		
Sep 14	1331	7.36	0.10	0.29	0.87	7.85		
Sep 22	1657	6.62		0.10	0.92	7.65		
Sep 28	1040	6.59	0.12	0.07	0.97	7.55	58	15
Oct 6	1445	6.41		0.04	0.80	7.45	60	15
Oct 13	1418	7.06		0.03	0.91	7.30		12
Oct 17	1518	7.07	0.11	0.03	0.74	7.50	75	13
		Little Lost Man Creek 1979			Site : 117m, 0.3R			
Aug 28	1126	23.0	0.12	1.13		7.70		
Aug 31	1459	22.6	0.11	1.30		7.70		
		Little Lost Man Creek 1979			Site : 117m, 1.0R			
Aug 21	1558	8.66					40	9
Aug 21	1636	10.5					48	9
Aug 21	1811	12.5					64	8
Aug 21	1925	14.0					67	9
Aug 21	2150	15.3					71	11
Aug 21	2227		0.11	0.00	0.67			
Aug 22	51	16.6					95	7
Aug 22	215	16.5					86	7
Aug 22	452	17.3					98	6
Aug 22	612	17.6					97	6
Aug 22	729	17.7					99	6
Aug 22	1136	16.4					99	6

SOLUTE CONCENTRATION

Little Lost Man Creek 1979 Site : 117m, 1.0R

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Aug 22	1538	18.7					127	6
Aug 25	1416	21.9					152	6
Aug 26	1518	22.2	0.12	0.68	0.83	7.80	162	6
Aug 28	1130	22.8	0.11	0.84		7.65		
Aug 31	1500	23.0		1.20	0.86	7.80		
Sep 3	1625	13.4					71	10
Sep 4	1532	15.0	0.08	0.72	0.85	7.65	94	8
Sep 4	1700	15.3		0.73	0.85	7.70	101	6
Sep 4	2006	15.9		0.74	0.84	7.70	104	8
Sep 4	2129	16.3		0.76	0.89	7.70	114	6
Sep 4	2300	16.5		0.75	0.86	7.70	112	6
Sep 5	653	17.4		0.78	0.85	7.70	148	8
Sep 5	1117	17.8	0.09	0.79	0.84	7.70	132	8
Sep 5	1638	18.5		0.82	0.85	7.70	125	8
Sep 6	1129	12.1		0.72	0.78	7.70	87	11
Sep 9	1638	20.7		1.13	1.09	7.75	167	19
Sep 10	1004	21.7		1.17	1.06	7.70	183	13
Sep 10	1102	21.8	0.10	1.18	1.06	7.70	178	16
Sep 10	1149	21.8		1.17	1.09	7.70	183	17
Sep 10	1302	21.8		1.19	1.07	7.70	183	19
Sep 10	1400	21.6		1.16	1.02	7.75	187	20
Sep 10	1517	20.5		1.11	0.96	7.70	164	18
Sep 10	1610	18.6		1.13	1.01	7.70	148	23
Sep 10	1804	15.6		1.07	1.03	7.75	134	26
Sep 10	2010	13.2		1.02	1.01	7.75	114	30
Sep 10	2336	11.5		0.94	0.95	7.70	96	27
Sep 11	223	11.1		0.88	0.85	7.70	94	21
Sep 11	512	10.3		0.84	0.85	7.75	88	26
Sep 11	853	9.58	0.07	0.79	0.84	7.75	78	21
Sep 11	1417	8.88		0.73	0.86	7.70	75	21
Sep 11	2006	8.23		0.61	0.99	7.80		
Sep 12	753	7.97		0.59	0.84	7.75		
Sep 12	1410	7.83	0.06	0.55	0.84	7.70	73	21
Sep 12	2048	7.49		0.45	0.96	7.80		
Sep 13	749	7.40		0.45	0.86	7.80		
Sep 13	1508	7.37	0.07	0.44	0.80	7.70	65	18
Sep 13	2057	7.19		0.36	0.96	7.80		
Sep 14	1326	7.08	0.07	0.35	0.86	7.80		
Sep 22	1656	6.45	0.09	0.12	0.95	7.60		
Sep 28	1020	6.41	0.09	0.09	0.82	7.40	44	15
Oct 3	1114	6.41	0.09	0.07	0.82	7.45	51	13
Oct 6	1451	6.33	0.10	0.06	0.78	7.35	43	12
Oct 13	1416	6.50		0.05	0.85	7.25	60	18
Oct 17	1540	7.02	0.09	0.04	0.72	7.40	52	12

SOLUTE CONCENTRATION

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
		Little Lost Man Creek 1979			Site : 117m, 1.5R			
Aug 21	1815	7.78					32	8
Aug 21	2003	11.7		0.00		7.45		
Aug 21	2230	13.5		0.00		7.55		
Aug 22	734	17.9					123	6
Aug 22	1140	18.5					117	5
Aug 22	1540	18.3					120	6
Aug 25	1416	21.7					173	6
Aug 28	1134	23.3	0.12	1.00		7.90		
Aug 31	1502	23.0	0.11	1.22		7.75		
		Little Lost Man Creek 1979			Site : 126m, 4.9R			
Aug 28	1144	20.4	0.09	0.18		8.05		
Aug 31	1507	22.0	0.08	0.34		8.20		
Sep 4	1315	15.7		0.28	0.54	7.95		
Sep 4	1548	16.0		0.26	0.59	7.95	157	9
Sep 4	1718	15.8	0.07	0.25	0.56	8.00	143	7
Sep 4	2048	15.8		0.25	0.59	8.00	147	8
Sep 4	2305	15.8		0.25	0.59	8.00	145	9
Sep 5	608	16.0		0.25	0.58	8.00	133	8
Sep 5	1126	17.2		0.33	0.64	7.95	143	8
Sep 5	1644	17.2	0.08	0.33	0.77	7.95	151	10
Sep 6	1133	17.0	0.08	0.32	0.74	8.05	151	8
Sep 9	1731	20.7	0.09	0.39	0.92	8.10	130	5
Sep 10	1045	20.7		0.42	0.86	8.10	143	4
Sep 10	1342	20.7	0.09	0.45	0.83	8.05	153	6
Sep 10	1712	19.4		0.50	0.79	7.70	163	11
Sep 10	2012	20.4		0.46	0.79	8.05	153	6
Sep 10	2338	20.0		0.45	0.80	8.05	140	4
Sep 11	237	19.3		0.45	0.78	8.05	132	6
Sep 11	524	18.5		0.43	0.78	8.05	69	6
Sep 11	855	17.5		0.43	0.74	8.00	101	5
Sep 11	1416	16.3	0.07	0.41	0.73	8.00	103	7
Sep 11	2004	15.0		0.41	0.73	7.95		
Sep 12	755	13.7		0.38	0.77	8.00		
Sep 12	1412	12.7	0.07	0.37	0.74	7.95	57	8
Sep 12	2046	11.9		0.36	0.71	8.00		
Sep 13	745	11.8		0.33	0.78	8.10		
Sep 13	1509	11.3	0.07	0.32		8.05	62	6
Sep 13	2103	11.1		0.31	0.87	8.05		
Sep 14	1328	10.5	0.06	0.29	0.76	8.05		
Sep 22	1659	8.13		0.13	0.79	8.05		
Sep 28	1054	8.44	0.04	0.09	0.80	7.90	11	10
Oct 3	1023	7.80	0.04	0.07	0.70	7.90	36	10
Oct 6	1511	7.62		0.06	0.72	7.90	37	18

SOLUTE CONCENTRATION

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
		Little Lost Man Creek 1979			Site : 126m, 4.9R			
Oct 13	1614	8.93	0.07	0.05		8.00	4	27
Oct 17	1544			0.03		7.80		
		Little Lost Man Creek 1979			Site : 129m, 5.0R			
Sep 4	1334	16.4					8	10
Sep 4	1410	16.2		0.00		8.90	4	6
Sep 4	1555	16.2	0.05	0.00		8.85	7	8
Sep 4	1733	16.3		0.00		8.90	10	8
Sep 4	2056	16.3		0.00		8.90	11	9
Sep 5	3	16.3		0.00		8.90	11	10
Sep 5	616	16.3		0.00		8.95	14	12
Sep 6	1215	15.9	0.05	0.00		8.80	5	11
Sep 7	1510	15.6		0.00		8.75	3	7
Sep 10	1318	15.6		0.00		8.90	6	6
Sep 11	253	15.7		0.00		8.90	3	7
Sep 11	804	15.8		0.00		8.90	4	6
Sep 11	1424	15.8		0.00		8.90	3	6
Sep 12	1415	16.0		0.00		8.85	3	4
Sep 13	1524	15.6	0.07	0.00		8.80	3	10
Sep 14	1333	15.1	0.07	0.00		8.85		
		Little Lost Man Creek 1979			Site : 169m, 10.0L			
Sep 7	1336	12.5	0.08	0.00		7.35	6	7
Sep 10	1639	13.6	0.07	0.00	0.57	7.45	3	7
Sep 12	1450	13.9	0.08	0.00	0.63	7.50	3	6
Sep 22	1758	12.5		0.00	0.63	7.65		
Sep 28	1115	10.5		0.00	0.60	7.65		
		Little Lost Man Creek 1979			Site : 178m, 3.0L			
Aug 21	1529	6.41					66	12
Aug 21	1642	6.74					67	8
Aug 21	1821	7.20					75	10
Aug 21	1930	6.49					57	10
Aug 21	2010	7.87					74	10
Aug 21	2140						80	11
Aug 21	2236	8.82	0.07	0.00		7.55		
Aug 22	45	9.53					91	11
Aug 22	206	9.90					89	10

SOLUTE CONCENTRATION

Little Lost Man Creek 1979 Site : 178m, 3.0L

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Aug 22	500	10.8					97	10
Aug 22	616	11.2					101	10
Aug 22	739	11.5					104	9
Aug 22	1149	12.3					110	9
Aug 22	1543	12.6					112	9
Aug 25	1420	18.4					172	5
Aug 26	1524		0.10	0.19		7.70	181	6
Aug 28	1133	20.4		0.24		7.70		
Aug 31	1511	21.2	0.10	0.44		7.70		
Sep 3	1639	15.5					135	9
Sep 4	1315	15.7					133	8
Sep 4	1535	15.3	0.08	0.30		7.65	134	9
Sep 4	1715	15.6		0.30		7.65	134	8
Sep 4	2135	15.7		0.31		7.65	137	10
Sep 4	2312	15.8		0.30		7.65	136	6
Sep 5	623	16.3		0.31		7.65	143	7
Sep 5	1133	16.7	0.09	0.32		7.65	146	7
Sep 5	1649	17.0		0.33		7.65	148	8
Sep 6	1137	15.2	0.08	0.31		7.60	131	9
Sep 6	1748	15.7		0.35		7.60	140	10
Sep 9	1652	19.0	0.10	0.45		7.70	163	10
Sep 10	1035	19.7	0.09	0.48		7.70	169	6
Sep 10	1407	19.8		0.49		7.70	169	9
Sep 10	1715	20.7		0.45		8.05	156	6
Sep 10	2026	18.3		0.47		7.70	152	12
Sep 10	2359	17.1		0.45		7.70	144	8
Sep 11	156	16.5		0.43		7.70	141	10
Sep 11	527	15.5		0.42		7.70	134	10
Sep 11	910	14.6	0.08	0.40		7.65	121	10
Sep 11	1414	13.4		0.40		7.65	119	10
Sep 11	2002	12.7		0.37		7.70		
Sep 12	842	11.4		0.33		7.70		
Sep 12	1358	11.0	0.08	0.32		7.70	106	14
Sep 12	2044	10.7		0.31		7.75		
Sep 13	731	10.2		0.28		7.75		
Sep 13	1514	9.80	0.06	0.28		7.75	100	12
Sep 13	2054	9.60		0.27		7.80		
Sep 14	1322	9.19	0.07	0.25		7.80		
Sep 22	1800	7.19		0.12		7.70		
Sep 28	1105	6.85	0.06	0.09		7.50	72	12
Oct 3	1103	6.79	0.07	0.06		7.45	78	10
Oct 6	1530	6.68	0.08	0.06		7.40	74	9
Oct 13	1624	6.62	0.07	0.05		7.30	66	14
Oct 17	1511	7.19	0.07	0.04		7.45	96	10

SOLUTE CONCENTRATION

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
		Little Lost Man Creek 1979			Site : 183m, 3.1L			
Aug 28	1135	15.9	0.09	0.00		7.90		
Aug 31	1516	17.6	0.10			7.80		
		Little Lost Man Creek 1979			Site : 265m, 1.8R			
Aug 21	1650	6.31					70	12
Aug 21	1825	6.48					77	12
Aug 21	1937	6.73					75	12
Aug 21	2013	6.88		0.00	0.60	7.70		
Aug 21	2152	7.26					76	12
Aug 21	2240	7.44					78	10
Aug 22	40	8.00					81	12
Aug 22	155	8.28					86	11
Aug 22	506	9.07					91	11
Aug 22	745	7.21					71	9
Aug 22	1145	8.02					81	10
Aug 22	1548	7.89					80	9
Aug 25	1424	17.4					162	8
Aug 26	1623	18.2		0.07	0.70	7.85	174	8
Aug 28	1151	25.7	0.12	0.10		7.90		
Aug 31	1535	20.2		0.20		7.85		
Sep 3	1645	15.1					138	9
Sep 4	1515	14.7		0.21	0.72	7.80	132	7
Sep 4	1707	14.5		0.21	0.71	7.85	125	6
Sep 4	2021	14.6		0.21	0.71	7.80	130	9
Sep 4	2342	14.7		0.21	0.71	7.85	131	8
Sep 5	631	15.2		0.22	0.71	7.85	136	9
Sep 5	1140	15.4		0.22	0.71	7.85	138	9
Sep 5	1657	15.7		0.23	0.72	7.80	139	9
Sep 6	1145	14.8		0.23	0.71	7.80	130	7
Sep 9	1701	17.8		0.32	0.77	7.85	155	9
Sep 10	1311	18.5		0.33	0.75	7.85	161	7
Sep 10	2024	18.2		0.34	0.78	7.85	154	12
Sep 11	153	17.0		0.33	0.74	7.85	143	7
Sep 11	907	15.3		0.32	0.71	7.80	126	7
Sep 11	1411	14.2		0.31	0.72	7.80	123	6
Sep 11	1959	13.2		0.30	0.70	7.80		
Sep 12	840	11.9		0.26	0.69	7.90		
Sep 12	1356	11.7		0.27	0.74	7.85	105	11
Sep 12	2042	11.0		0.26	0.68	7.90		
Sep 13	729	10.4		0.24	0.67	7.85		
Sep 13	1512	9.92		0.24	0.66	7.90	97	12
Sep 13	2052	9.81		0.23	0.68	7.90		
Sep 14	1320	9.24		0.21	0.66	7.90		
Sep 22	1805	7.42				7.85		

SOLUTE CONCENTRATION

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
		Little Lost Man Creek 1979			Site : 265m, 1.8R			
Sep 28	1130	7.06		0.08	0.66	7.70	73	13
Oct 3	1143	6.90		0.07	0.62	7.60	78	12
Oct 6	1610	7.04		0.06		7.55	93	16
Oct 13	1736	7.44	0.06	0.05			73	23
Oct 17	1455	7.38		0.04	0.79	7.55	98	11
		Little Lost Man Creek 1979			Site : 266m, 1.9R			
Aug 28	1154	20.4	0.11	0.22		7.80		
Aug 31	1527	21.7	0.11	0.13		8.05		
		Little Lost Man Creek 1979			Site : 247m, 10.0R			
Sep 7	1412	16.5	0.08	0.14	0.71	7.90	88	8
Sep 10	1644	17.9	0.08	0.16	0.79	7.90	63	10
Sep 12	1447	14.0	0.07	0.14	0.80	7.90	45	6
Sep 22	1803	8.25	0.06		0.69	7.90		
Sep 28	1118	7.24	0.04	0.04	0.62	7.75	25	18
Oct 3	1123	7.18	0.05	0.03	0.73	7.70	21	26
Oct 6	1549	7.21	0.11	0.03	1.11	7.75	30	18
Oct 13	1725	7.20			1.11	7.50	56	38
Oct 17	1503	7.19	0.05	0.04	0.62	7.50	67	13
		Little Lost Man Creek 1979			Site : 277m, Seep			
Aug 21	1746	7.07	0.07	0.01			73	
Aug 21	1952	7.77	0.07	0.01			79	
Aug 21	2018	7.84	0.07	0.01			78	
Aug 21	2047	8.16	0.08	0.01			82	
Aug 21	2127	8.34	0.07	0.01			84	
Aug 21	2219	8.66	0.07	0.01			87	
Aug 21	2306	8.92	0.08	0.01			89	
Aug 22	25						120	
Aug 22	110						122	
Aug 22	322	10.3	0.08	0.02			99	
Aug 22	420	10.5	0.08	0.02			101	
Aug 22	502	10.7	0.08	0.02			102	
Aug 22	610	10.9	0.08	0.02				
Aug 22	803	11.3	0.10	0.02			109	
Aug 22	905	11.6	0.09	0.03			113	
Aug 22	1004	11.7	0.09	0.03			112	

SOLUTE CONCENTRATION

Little Lost Man Creek 1979 Site : 277m, Seep

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Aug 22	1204	12.0	0.09	0.03			123	
Aug 22	1404	12.4	0.09	0.03			116	
Aug 22	1604	12.8	0.09	0.04			119	
Aug 22	1817	13.1		0.04			120	
Aug 22	1959	13.3	0.09	0.04			126	
Aug 22	2317	13.7	0.08	0.05			125	
Aug 23	558	14.5	0.07	0.07			142	
Aug 23	1009						146	
Aug 23	1357	15.2	0.07	0.09			148	
Aug 23	1759	15.6	0.08	0.10				
Aug 23	2202	15.9	0.08	0.10			155	
Aug 24	548	16.4	0.07	0.12			166	
Aug 24	956	16.6	0.08	0.13			169	
Aug 24	1403	17.0	0.07	0.14			169	
Aug 24	1757	17.2	0.07	0.15			171	
Aug 24	2201	17.3	0.09	0.16			173	
Aug 25	532	17.6	0.09	0.17			181	
Aug 25	1357	17.9	0.10	0.19			182	
Aug 25	1756	18.3	0.10	0.20			180	
Aug 25	2159	18.3	0.09				182	
Aug 26	958	18.8	0.10	0.23			186	
Aug 26	1430	18.9	0.10	0.24			184	
Aug 26	1747	19.0	0.10	0.26			185	
Aug 26	2152	19.1	0.09	0.25			187	
Aug 27	528	19.2	0.09	0.27			192	
Aug 27	756	19.3	0.10	0.27			193	
Aug 27	954	19.2	0.09	0.28			193	
Aug 27	1202	19.3	0.09	0.28			192	
Aug 27	1356	19.3	0.09	0.29			190	
Aug 27	1558	19.4	0.10	0.29			189	
Aug 27	1806						188	
Aug 27	2003	19.5	0.09	0.29			190	
Aug 28	5	19.5	0.09	0.30			191	
Aug 28	157	19.5	0.09				192	
Aug 28	401	19.6		0.32			193	
Aug 28	546	19.6	0.10	0.32			195	
Aug 28	808	19.7	0.10	0.32			195	
Aug 28	958	19.7	0.10	0.32			193	
Aug 28	1158	19.8	0.11	0.33			191	
Aug 28	1409	19.9	0.12	0.33			191	
Aug 28	1604	20.0	0.11	0.33			189	
Aug 28	1759	20.0	0.12	0.34			189	
Aug 28	2002	20.0	0.11	0.34			191	
Aug 28	2205	20.0	0.12	0.35			192	
Aug 29	550	20.0	0.11	0.36			196	
Aug 29	1008	20.2	0.11	0.37			195	
Aug 29	1357	20.2	0.11	0.38				

SOLUTE CONCENTRATION

Little Lost Man Creek 1979 Site : 277m, Seep

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Aug 29	1756	20.3		0.38			191	
Aug 29	2217	20.3		0.39			193	
Aug 30	615	20.4		0.40			197	
Aug 30	955	20.4		0.41			197	
Aug 30	1421	20.4		0.42			191	
Aug 30	1804	20.4		0.43			192	
Aug 30	2153	20.4		0.43			192	
Aug 31	525	20.4		0.43			195	
Aug 31	958	20.5		0.44			196	
Aug 31	1401	20.4		0.45			191	
Aug 31	1750	20.4		0.45			189	
Aug 31	2149	20.4		0.46			193	
Sep 1	955	20.4		0.45			208	
Sep 1	1401	20.4		0.47			200	
Sep 1	2202	20.4		0.48			191	
Sep 2	527	19.7		0.48		7.80		
Sep 2	956	18.7		0.46		7.80		
Sep 2	1405	17.1		0.42		7.75		
Sep 2	1754	16.3		0.40		7.80		
Sep 2	2201	15.9		0.38		7.80		
Sep 3	531	15.6		0.37		7.80		
Sep 3	955	15.2		0.36		7.80		
Sep 3	1336	14.8		0.36		7.80		
Sep 3	1801	14.5		0.34		7.80		
Sep 3	2156	14.3		0.34		7.80		
Sep 4	541	14.4		0.34		7.85		
Sep 4	1005	14.4		0.34		7.80	134	10
Sep 4	1401	14.5		0.35		7.70	132	11
Sep 4	1614	14.6		0.35		7.80	133	9
Sep 4	1825	14.8		0.36		7.80	135	
Sep 4	2031	15.0		0.36		7.85	137	9
Sep 4	2148	15.0		0.36		7.85		
Sep 5	144	15.3		0.37		7.85	142	8
Sep 5	355	15.5		0.37		7.85	145	9
Sep 5	536	15.6		0.38		7.80		
Sep 5	710	15.7		0.38		7.80	149	9
Sep 5	956	15.9		0.39		7.85		
Sep 5	1359	16.2		0.40		7.85	146	9
Sep 5	1603	16.3		0.40		7.80		
Sep 5	1733	16.5		0.41		7.85		
Sep 5	2003	16.6		0.41		7.80	149	9
Sep 5	2157	16.8		0.41		7.85		
Sep 6	546	15.5		0.37		7.85	140	13
Sep 6	952	14.4		0.34		7.80	133	12
Sep 6	1406	14.5		0.35		7.80		
Sep 6	1801	15.3		0.37		7.80	137	12
Sep 7	555	17.0		0.41		7.80	162	13

SOLUTE CONCENTRATION

Little Lost Man Creek 1979 Site : 277m, Seep

DATE	TIME	Chloride mg/L	Strontium mg/L	Lithium mg/L	Potassium mg/L	Silica mg/L	Nitrate as N µg/L	Phosphate as P µg/L
Sep 9	1358	18.2		0.50		7.80	160	12
Sep 10	551	19.0		0.52		7.75	168	13
Sep 10	1758	18.5		0.52		7.80	161	13
Sep 10	1908	18.0		0.50		7.85	157	11
Sep 10	2004	17.7		0.50		7.80	155	10
Sep 10	2102	17.5		0.49		7.80	152	13
Sep 10	2203	17.1		0.48		7.80		
Sep 10	2302	16.8		0.47		7.80		
Sep 11	7	16.4		0.46		7.80	151	10
Sep 11	159	16.0		0.44		7.80		
Sep 11	405	15.4		0.43		7.80	139	11
Sep 11	703	14.7		0.42		7.75		
Sep 11	800	14.5		0.41		7.75		
Sep 11	915	14.2		0.41		7.75		
Sep 11	1005	14.1		0.40		7.75		
Sep 11	1139	13.8		0.40		7.75		
Sep 11	1404	13.4		0.38		7.75		
Sep 11	1600					7.65		
Sep 11	1804	12.8		0.37		7.75		
Sep 11	1958	12.6		0.36		7.80	117	12
Sep 11	2204	12.4		0.35		7.80		
Sep 12	605	11.7		0.32		7.80		
Sep 12	956	11.3		0.32		7.80		
Sep 12	1358	11.0		0.31		7.80	196	
Sep 12	1749	10.8		0.30		7.85		
Sep 12	2201	10.6		0.28		7.85		
Sep 13	607	10.2		0.27		7.80	105	13
Sep 13	1031	9.94		0.26		7.80		
Sep 13	1417	9.73		0.26		7.80	95	13
Sep 13	1752	9.69		0.25		7.85		
Sep 13	2159	9.52		0.24		7.85		
Sep 18	1445	7.83		0.15		7.75	82	14
Sep 21	610	7.41		0.12		7.70	85	17
Sep 21	1403	7.37		0.12		7.75	84	15
Sep 24	1408	7.11		0.10		7.65	77	17
Sep 25	1407	7.16		0.09		7.65		
Sep 28	609	7.01		0.08		7.60	75	12
Oct 2	550	6.80		0.06		7.55		
Oct 6	1601	6.74		0.05		7.50	71	13
Oct 9	1317	6.62		0.05		7.35	64	11
Oct 13	1733	6.88		0.05		7.25	60	11
Oct 16	1224	7.27		0.04		7.50	108	10
Oct 17	1558	7.13				7.45		