Database For Estimating Background and Threshold Nitrate Concentrations Using Probability Graphs

S.V. Panno, W.R. Kelly, A.T. Martinsek and K.C. Hackley

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INTRODUCTION

This is a presentation of the data base that was used for a paper on background and threshold NO_3^- values and supplementary materials that support finding described in Panno et al. 2006a. The paper, published in the journal Ground Water, applied an exploration geochemistry procedure to separate different populations of NO_3-N concentrations in groundwater samples collected from wells and springs in Illinois' sinkhole plain. We used the procedure to identify present-day background and sources of contaminant concentrations of NO_3-N based on other statistical, analytical and land use data.

In this paper, we describe the samples collected and data compiled, and the chemical, isotopic, and bacterial results obtained for all samples. The results of these additional data reveal the sources of NO_3-N in the groundwater samples that were used to interpret the cumulative probability graphs. A more in-depth explanation of the analytical techniques and techniques used to determine background concentrations of NO_3^- in the study area are available in Panno et al. (2006a).

METHODS

Sample Collection

The groundwater samples were collected from springs and wells sustained by the karst aquifers of Illinois' sinkhole plain. Nitrate in groundwater from the karst aquifer should be associated with are natural soil processes, natural fauna, and/or anthropogenic sources. Land use in the study area is dominated by row-crop agriculture, small livestock operations and wooded areas.

Data for a total of 432 samples collected between 1994 and 2000 were compiled from Panno et al. 1996; 2001; 2003; Hackley et al., in press); all samples were collected by one or more of the authors of this paper and Panno et al. (2006a). The data were divided into two groups for statistical evaluation, one with 232 samples from springs and seeps (Table 1) and the other with 200 well-water samples (Table 2). The two groups represent distinct subsurface environments that are expected to influence NO_3-N concentrations in different ways. Spring discharge represents a blend of soil water and shallow and deep groundwater draining into a central conduit system. Water from point sources (e.g., septic effluent) mixes with water from non-point sources (e.g., synthetic fertilizers) and water from forested areas. Conversely, groundwater sampled from wells typically originates from crevices and conduits and may undergo mixing of contaminated, near surface sources with groundwater from deeper, more pristine sources.

Sample data were collected based on availability and distribution throughout the study area and through time (many of the spring and well samples were collected on a seasonal basis). The samples represent a variety of geologic/hydrogeologic characteristics (karst, covered karst and non-karst terrains) and land uses. The spring water samples were collected from 16 karst springs (the largest springs in the study area) and 16 cave stream, tributary and seep locations from Illinois Caverns (one of the largest caves in the study area and Illinois), and the well-water samples from 61 wells from karst and covered karst terrains; a few wells immediately adjacent to covered karst terrain that intersected Mississippian-age limestone were also selected (Figure 1). Well depths ranged from 6 to 191 m (Table 2). One of the springs and two of the wells were sampled ten or more times; the number of samples collected from the other springs, seeps, and wells ranges from one to seven.

Analytical Techniques

All groundwater samples were analyzed by the authors of this paper using the same analytical techniques for each (Panno et al. 1996, 2001; Hackley et al. in press). However, not all of the samples were analyzed for all of

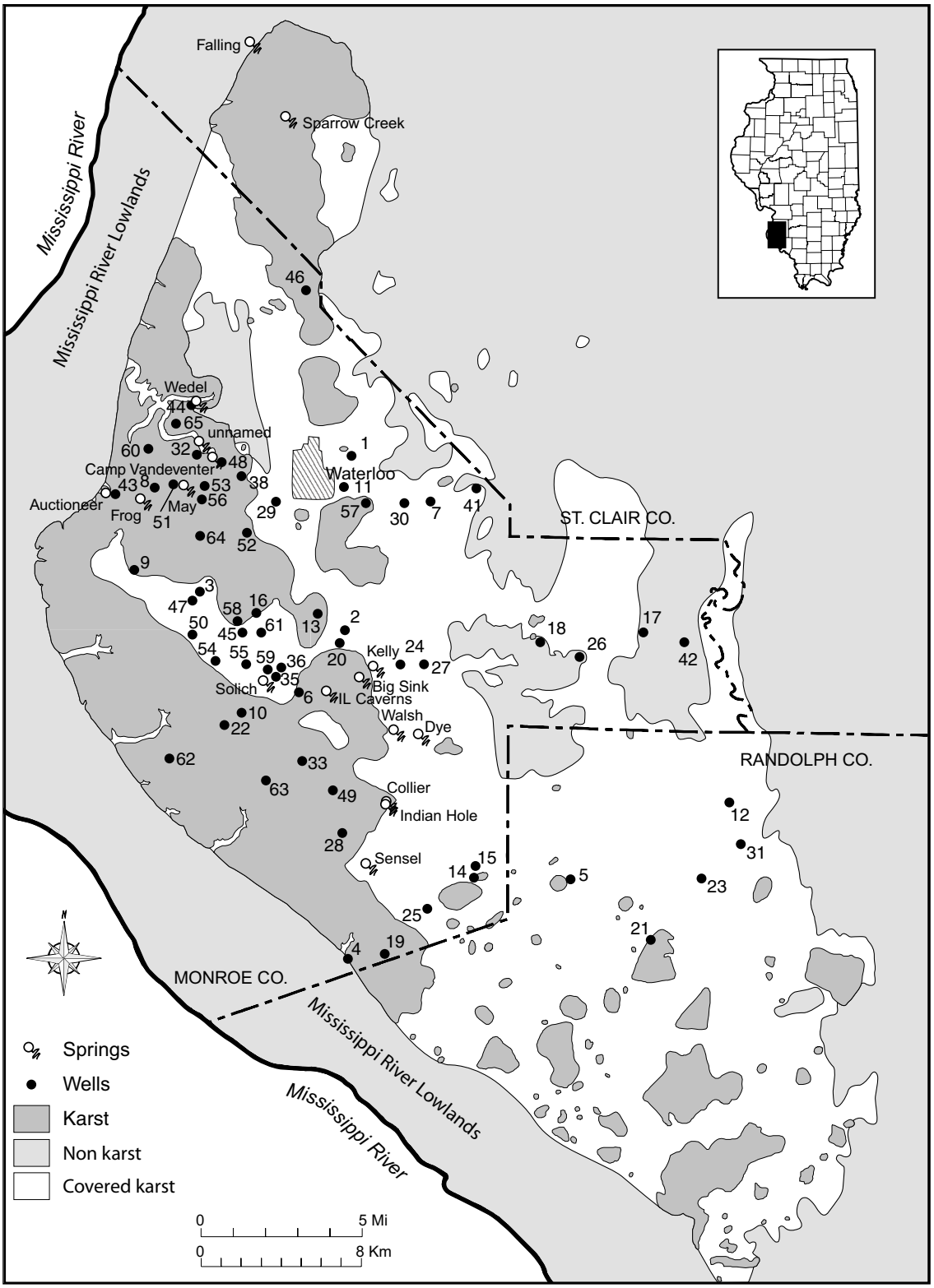

Figure 1. Map of southwestern Illinois' sinkhole plain showing well locations and numbers, and spring locations and names.

the parameters listed in the tables. All water samples were measured for temperature, pH, Eh and specific conductance at the time of their collection. Field measurements for pH and specific conductance were made using meters that allowed temperature compensation and all instruments were calibrated with appropriate standards. Cation concentrations were determined using inductively coupled argon plasma spectrometry; anion concentrations were determined using ion chromatography as described in Panno et al. (1996). Analytical precision for Cl^-, NO_3^- and SO_4^{2-} was ± 0.02 mg/L. Enzyme-linked immunosorbent assays (ELISA) were used to detect atrazine, alachlor and cyanazine and their metabolites (break-down products) as described in Panno et al. (2003). Samples collected for bacterial analysis were analyzed within 24 hours for colonies, total coliform, fecal coliform, and fecal enterococci using standard methods to isolate and identify bacterial colonies present (Clesceri et al. 1989; Kelly et al. submitted). Nitrogen and oxygen isotopic analyses of spring and well water samples were conducted using methods described in Hackley et al. (in press).

Cumulative Probability Plots

In this study we used cumulative probability plots developed by Sinclair (1974, 1991) to separate populations of data to identify the range of background concentrations and thresholds between populations. Nitrate or any other ionic concentrations can be divided into two or more populations separated by inflection points on cumulative probability graphs (Figure 2). The populations determined in this manner are designated as "background" and one or more "anomalies," and the concentrations at the inflection points are defined as "threshold" values. The background is used as the baseline concentration, whereas anything above this threshold concentration is interpreted as an anomaly and indicates the presence or influence of a contaminant (Sinclair, 1983). It is important to note that a minimum of about 100 values is needed and "the determination of thresholds must be viewed as an estimation procedure in the statistical sense, subject to random and systematic error" (Sinclair 1991).

On cumulative probability plots, maximum curvature of the lines reveals inflection points or threshold values between populations. This is based on the fact that the values of a single normally or lognormally distributed population will form a straight line. Two or more mixed populations will result in a curved line with one or more pronounced inflection point(s). Those inflection points are thresholds distinguishing two or more overlapping populations (Figure 2).

The NO_3-N concentrations from spring (n = 232) and well samples (n = 200) were log transformed prior to plotting on separate cumulative probability plots. Class intervals of 0.25 mg/L for springs and 0.20 mg/L for wells were selected by trial and error in order to create smooth curves on the probability plots (Figures 2 and 3 in Panno et al. 2006a). That is, the optimum class intervals were sought to yield cumulative probability curves that had enough points to delineate each of the thresholds; this resulted in about 20 classes for each data set. The midpoints between data classes were plotted against cumulative percentages and a relatively smooth line was constructed connecting the data points. Thresholds were chosen at the intersection of two "linear" segments of the probability curves. Because of the paucity of data points at the extremes of the data set, abrupt changes in slope may be present that reflect only the incompleteness of the data set and not an inflection point or threshold.

In addition to NO_3-N concentrations, NO_3^- stable isotope values were available for 28 well samples and atrazine concentrations were available for 206 spring and 172 well samples, respectively (Panno et al., 1996; 2001; 2003; Hackley et al., in press). Nitrate isotope data can be a useful tool for identifying sources of NO_3^- in the environment, as well as for determining whether denitrification has occurred (Heaton, 1986; Böttcher et al., 1990; Kendall et al., 1995; Aravena and Roberston, 1998; Panno et al., 2001). Chloride (Cl^-) and bromide (Br^-) data (Tables 1 and 2), land use information (Table 2), and sampling dates (Tables 1 and 2) were also used to help interpret NO_3^- sources and the results from the NO_3-N probability graphs. Plotting Cl/Br vs Cl^- and vs total N (Panno et al. 2006b) is a new technique that can separate different sources of Cl^- which, because Cl^- and NO_3^- often covary, can help resolve the sources of NO_3^-.

RESULTS AND DISCUSSION

Data Base

All data used in this investigation are presented (Tables 1 and 2) and discussed herein; most of the data interpretation is presented in Panno et al. (2006a). Data presented in Tables 1 and 2 are keyed to the sample locations

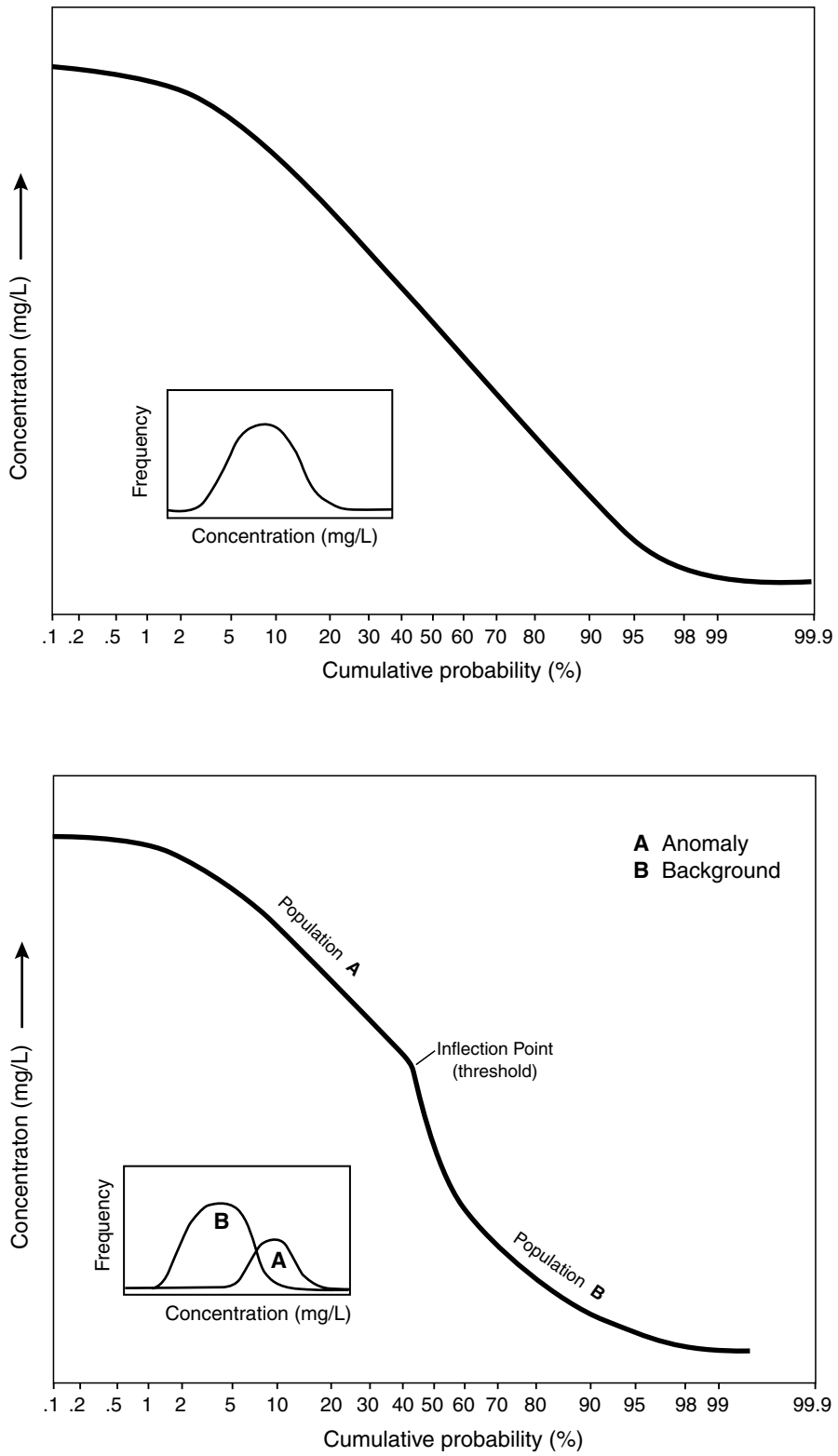

Figure 2. Cumulative probability plots for a single population (top) and two populations (bottom). An inflection point is indicated at the threshold between the two populations (bottom).

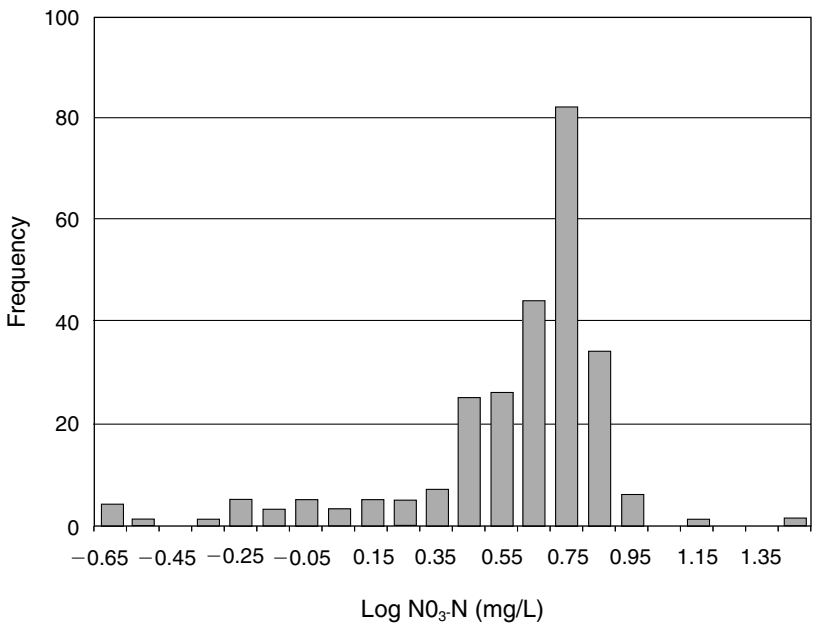

Figure 3. Histogram of spring and cave water NO_3-N data. Modified from Panno et al. (2006a).

(wells and springs) shown on Figure 1. Only Na^+, SO_4^{2-}, Cl^-, Br^- and NO_3-N concentrations, and NO_3^- isotopes were used in this investigation; these and additional chemical, isotopic and bacterial data are presented for completeness and so that they can be easily referenced, by the authors, for other publications (e.g., Kelly et al. submitted).

Brief Data Assessment

In general, groundwater from springs/caves and wells in the sinkhole plain of southwestern Illinois is a Ca-HCO_3 type water. This groundwater is typically well oxygenated, as shown by positive redox values, and has relatively low concentrations of K^+, NO_3^-, Cl^- and SO_4^{2-} unless adulterated by surface-borne contaminants or deep, saline groundwater. Tritium was always present in the groundwater samples from springs, caves and wells and was typically modern (Hackley et al. in press). Wells drilled through the Mississippian carbonate rock that intersect deeper sandstone may produce Na-HCO_3 type waters (Table 1). These deeper wells contain elevated concentrations of Cl^- and SO_4^{2-} from Illinois Basin brines.

Nitrate-N concentrations in spring and cave water samples have a broad range (0.18 to 30.3 mg/L) with most of the data falling between 2.2 and 8.9 mg/L. The distribution appears to be slightly skewed to the left (possibly a mixture of at least 2 populations) with a tail that extends to lower concentrations because of dilution from inflow during recharge events (Figure 3). These concentrations represent an amalgam of background concentrations, and fertilizer and livestock contamination. Nitrate-N concentrations in well water samples range from < 0.1 to > 80 mg/L with a distribution that is much more complex and could represent multiple populations. Very low NO_3-N concentrations found in relatively deep wells may represent groundwater that has been isolated from surface-borne contamination, but such values are rare. Most groundwater samples are well oxygenated, as shown by positive redox values (Table 2). Well water samples possess a range of concentrations that reflect NO_3^- background values, contamination by fertilizers and livestock, and NO_3^- that has undergone various degrees of denitrification (Figure 4).

An examination of NO_3-N relative to well depth revealed an enrichment in the upper 40 m of the bedrock aquifer (Figure 5). Stratification of NO_3-N is common in the karst aquifers of the study area (Hackley et al. in press). Sporadic enrichments of NO_3-N are found below 40 m and to a depth of 170 m or more; even the deepest well (191 m) has over 2 mg/L NO_3-N. Such mixing is almost certainly due to the infiltration and mixing of contaminated shallow groundwater with deeper groundwater (Figure 6).

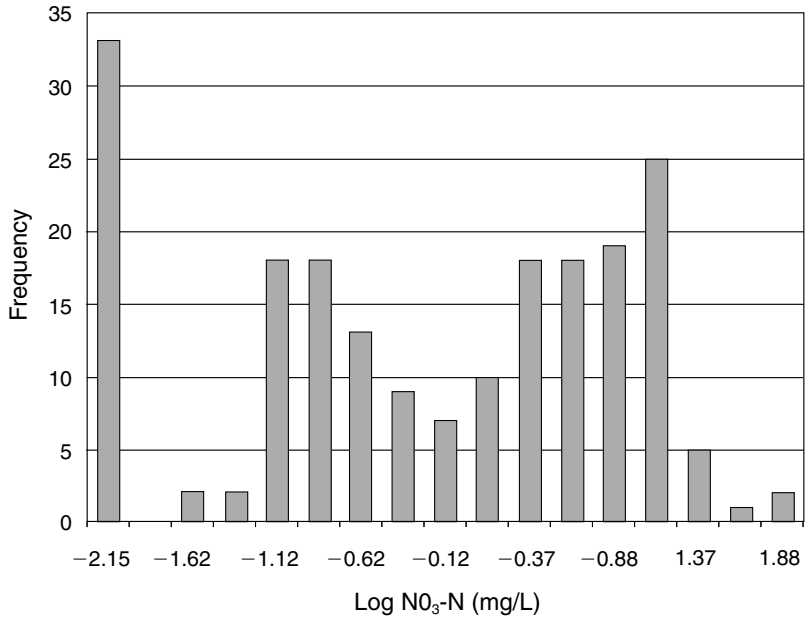

Figure 4. Histogram of well water NO_3-N values. Modified from Panno et al. (2006a).

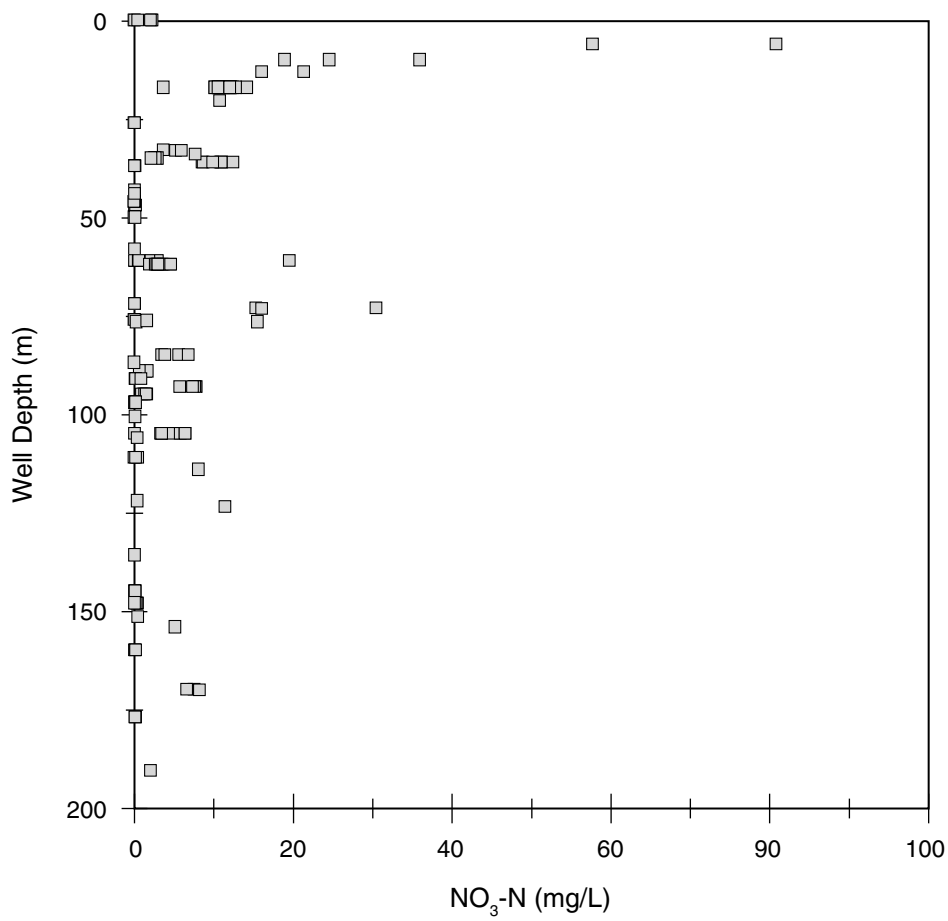

Figure 5. Nitrate-N concentrations vs *well depth reveals the stratification of NO_3^- in the shallow karst aquifer and the infiltration of NO_3^- into the deeper groundwater via the well bore.*

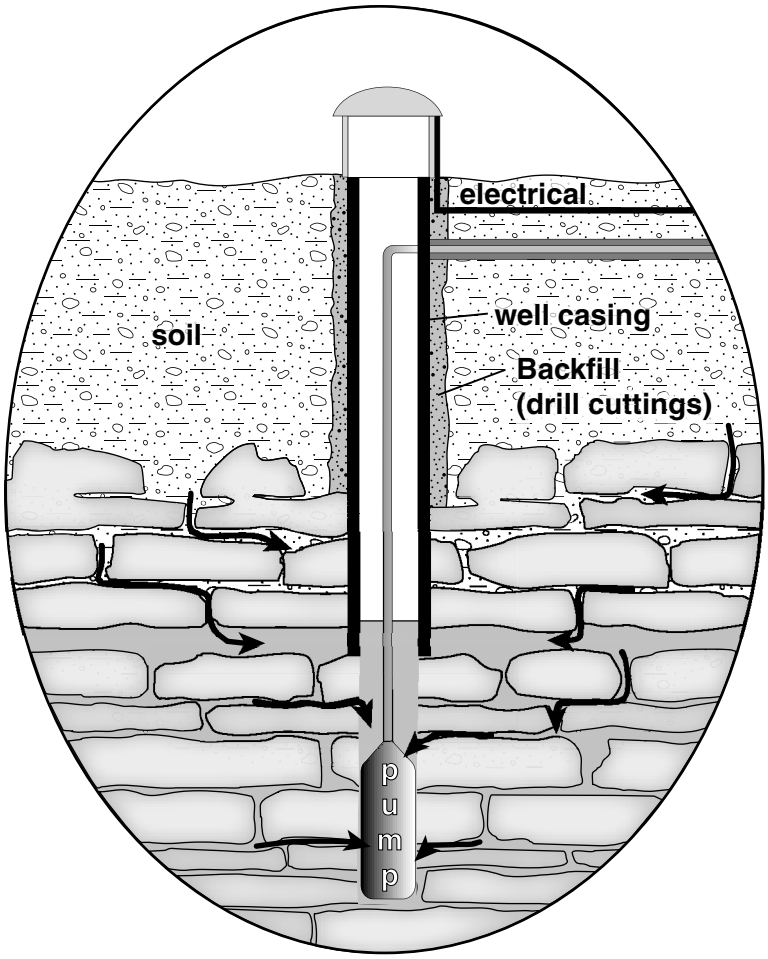

Figure 6. Cross sectional diagram of a well constructed in creviced bedrock in Illinois. Well casing extends through the soil and only about a meter into bedrock. The well is open below this point and crevices and bedding planes provide avenues for contaminated water from the shallow karst aquifer to enter the well bore.

Nitrate isotopes in groundwater samples from many of the same wells were studied by Hackley et al. (in press). A plot of δ15N *vs* δ^{18}O values showed that well water samples known to be contaminated with animal waste (wells 34, 35, 45, 47) plotted near the human and animal waste domain (Figure 7). Nitrate isotopes also revealed that wells 1, 3, 6, 10, 13, 22, 24, 28, 29 and 59 contained NO_3^- derived primarily from synthetic fertilizer. Well 16 groundwater showed the greatest degree of dentrification (Figure 7); the origin of the NO_3 in these two samples was probably N-fertilizer based on land use (Table 2) and proximity to row crops.

Chloride was used as an indicator for the presence of septic effluent, animal waste, and basin brines present in groundwater samples from wells and springs through the use of modified scatter diagrams of Cl/Br vs Cl^- (Panno et al. 2006b). These diagrams revealed the origin of Cl^- in groundwater samples (Figure 8 and 9) and confirmed the source of Cl^- in the samples described above, and most other groundwater samples described below.

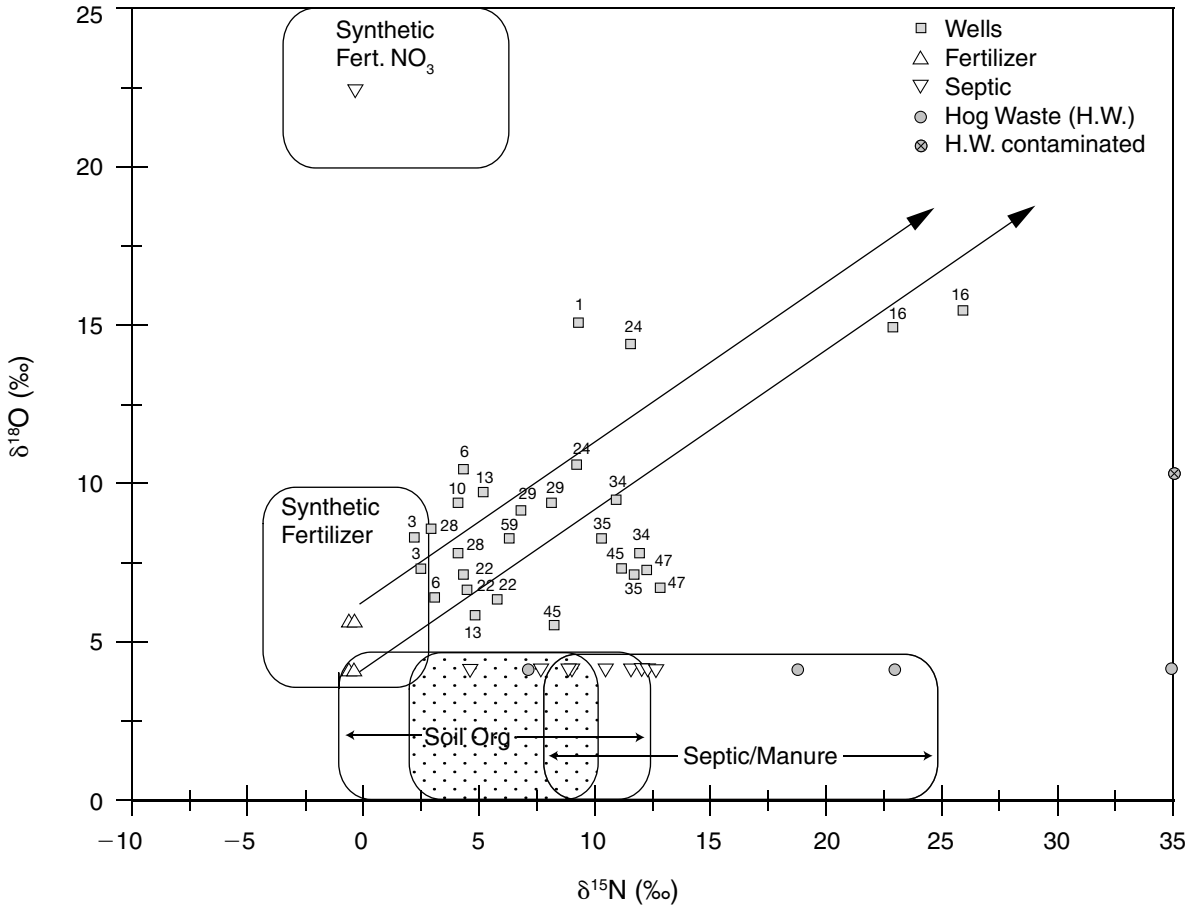

Figure 7. Nitrate isotope scatter diagram for well water samples. Well sample numbers correspond with those of Hackley et al. (in press); samples that plotted closest to the septic/manure domain are also known to be in close association with animal waste (modified from Hackley et al. in press).

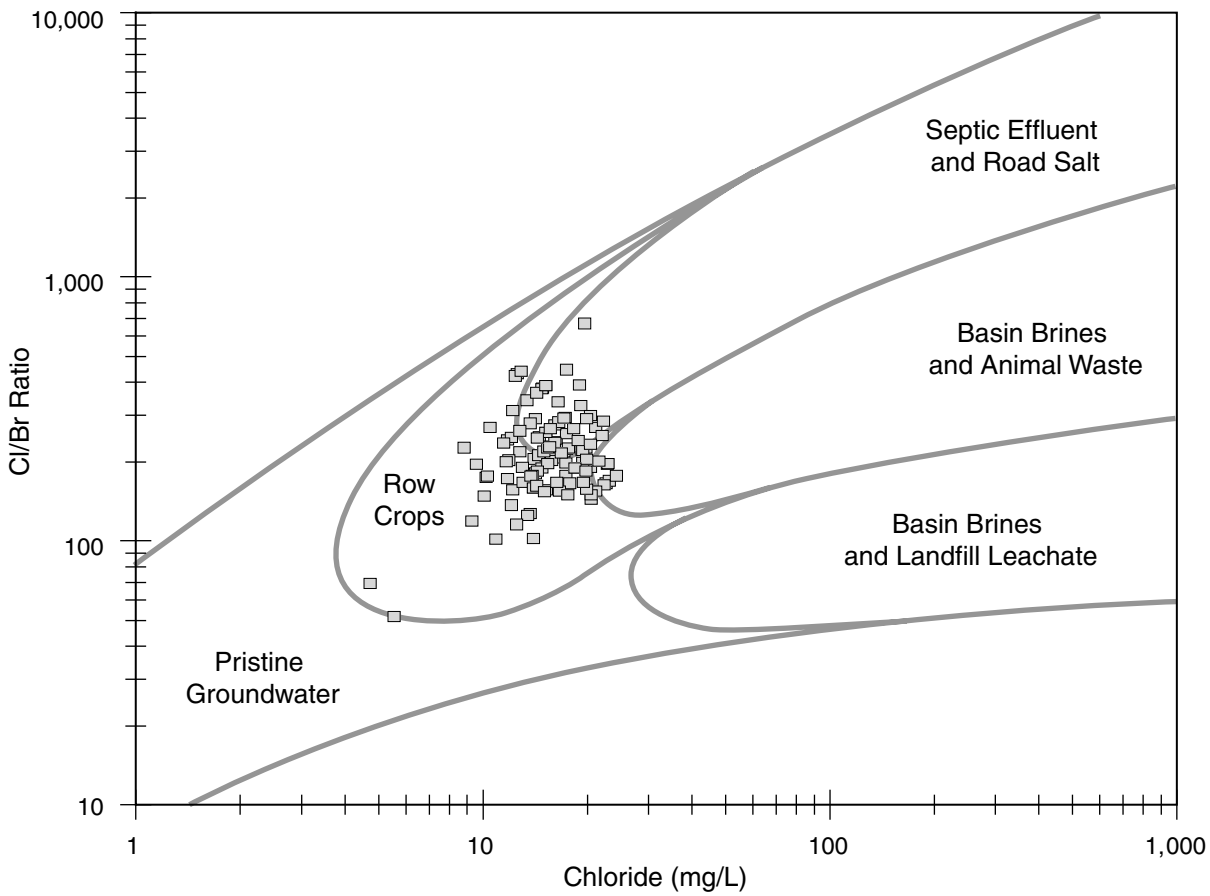

Figure 8. Cl/Br vs *Cl scatter diagram of all spring and cave stream and seep water samples. These samples form a tight cluster at the margins of the domains for row crops, road salt/septic effluent, and animal waste/basin brines (modified from Panno et al. 2006b).*

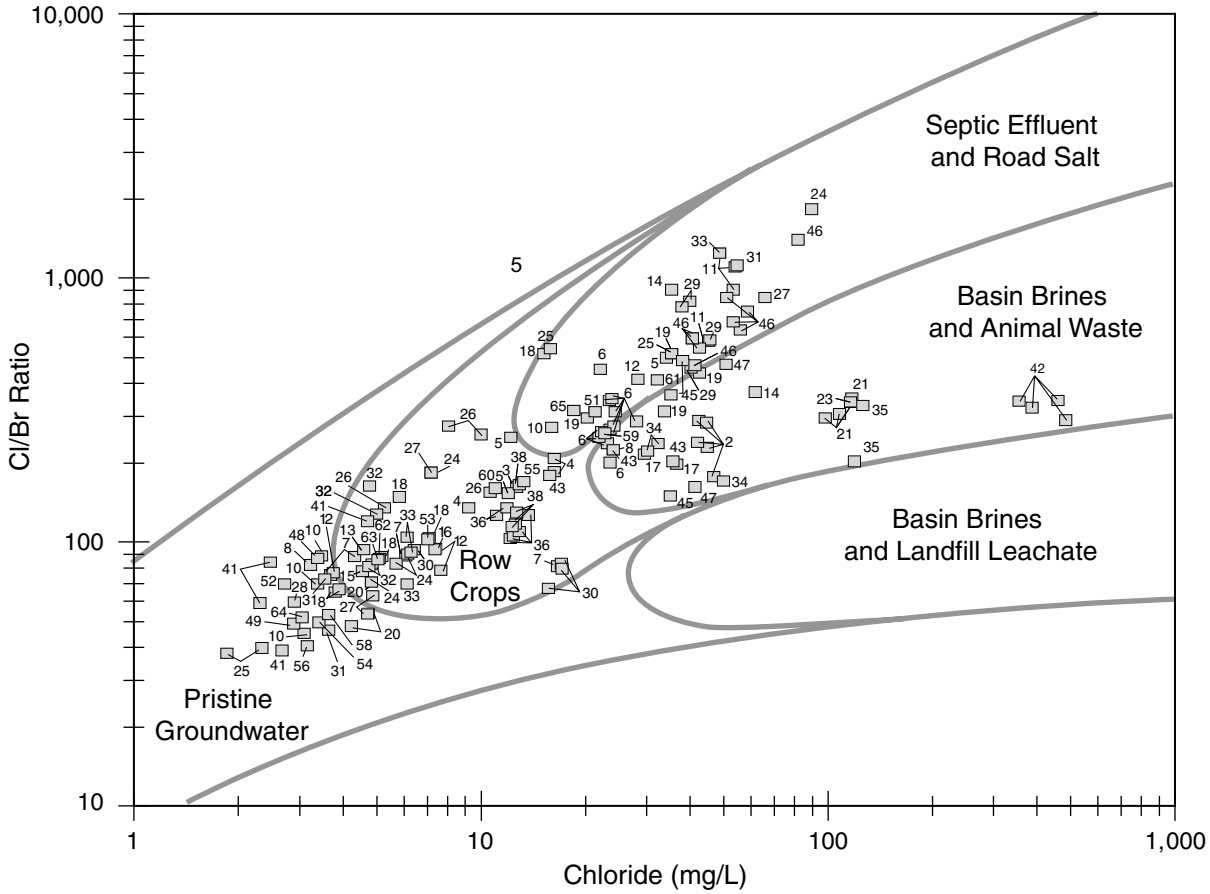

Figure 9. Cl/Br vs *Cl scatter diagram of all well water samples. These samples are scattered in all but one of the domains indicating multiple sources for halides in these samples (modified from Panno et al. 2006b).*

The spring and cave water samples are best characterized as a mixture of row crop- and septic effluent- and/or animal waste-affected groundwater. The halide contents of the samples fell on or near the boundaries of these Cl^- sources on the Cl/Br vs Cl^- scatter diagram developed by Panno et al. (2006a) (Figure 8). All of the spring and cave water data plot in a tight cluster that reflects the origin of these groundwater samples; that is, they typically are an amalgam of all three sources of Cl^-. A NO_3^- isotope scatter diagram (Figure 10) shows that most of the spring and cave water samples fell into a range that would indicate they were dominated by synthetic N-fertilizer which is consistent with findings by Panno et al. (2001) and Hackley et al. (in press).

The halide content of the groundwater samples from wells revealed that these samples had a more complex origin (Figure 9). Many of the samples fell into the pristine groundwater category, probably due to well depth and local hydrogeology. Wells initially identified as having livestock in their vicinity and assumed to have been contaminated by animal waste based on land use and chemical composition (elevated Cl^- and NO_3^- concentrations greater than 15 mg/L) (Table 2), plotted within the domain of animal waste (i.e., wells 14, 22, 33, 35, 45 and 47). Wells 35, 45 and 47 were dug wells in covered karst areas with depths of 13 m or less. Wells having elevated Cl/Br ratios but lower NO_3^- concentrations and suspected of being contaminated with septic effluent and/or road salt (i.e., wells 11, 14, 24, 27, 29, 33, and 46) (Figure 11) plotted in a domain that suggested that the dominant source of Cl^- for these samples was road salt. In addition, several groundwater samples with elevated Na^+, Cl^- and SO_4^{2-} concentrations and very low NO_3^- concentrations were assumed to contain basin brines (i.e., wells 21 and 42) (Table 2).

The plot of δ15N values versus NO_3-N concentrations for 28 of the well-water samples (data from Hackley et al. in press) shows a sample population with elevated NO_3-N concentrations (> 15 mg/L) and δ15N values between 8 and 13 ‰ (Figure 12). All of these samples were collected at farms with wells located in close proximity to livestock. Nitrate that is primarily from soil or synthetic fertilizer sources tends to have δ15N values that are less than 10 ‰ and typically less than 5 ‰, in Illinois, whereas NO_3^- from livestock waste or septic systems typically has somewhat larger δ15N values, generally between 8 and 20 ‰ (Hackley et al. in press). The NO_3^- isotope picture is complicated by denitrification; as NO_3^- is degraded by denitrification, the δ15N value of the NO_3^- remaining in solution increases. These isotopic values and land use data indicate that samples with NO_3-N concentrations > 15 mg/L are contaminated by livestock waste, while the NO_3-N in samples with lower concentrations and similar or lower δ15N values are primarily from the degradation of soil organic matter and synthetic fertilizer sources (Panno et al. 2006a). The data points clustered along and to the left of the denitrification vector in Figure 12 are all from wells located in cropped areas. The value of 15 mg/L NO_3^- concentration that separates livestock waste contamination sources from soil/synthetic fertilizer sources is commensurate with the threshold values determined using cumulative probability graphs (17 mg/L) (Panno et al. 2006a).

Most of the samples with NO_3-N concentrations between the present-day threshold values of 2.1 and 15 mg/L had δ15N values between 2 and 10 ‰ (Figure 12). Land use in the vicinity of these well-water samples was predominantly row-crop agriculture. Consequently, the NO_3^- is most likely from synthetic fertilizer and soil organic carbon. The trend of decreasing NO_3-N concentrations with increasing δ15N values suggests denitrification (Hackley et al. in press). The two samples with NO_3-N concentrations less than 2.1 mg/L and δ15N values greater than 20 ‰ have probably undergone considerable denitrification. The original source of the NO_3-N for these samples is difficult to determine. The other well samples with NO_3-N concentrations less than 2.1 mg/L may represent background conditions or groundwater that has undergone denitrification (Panno et al. 2006a).

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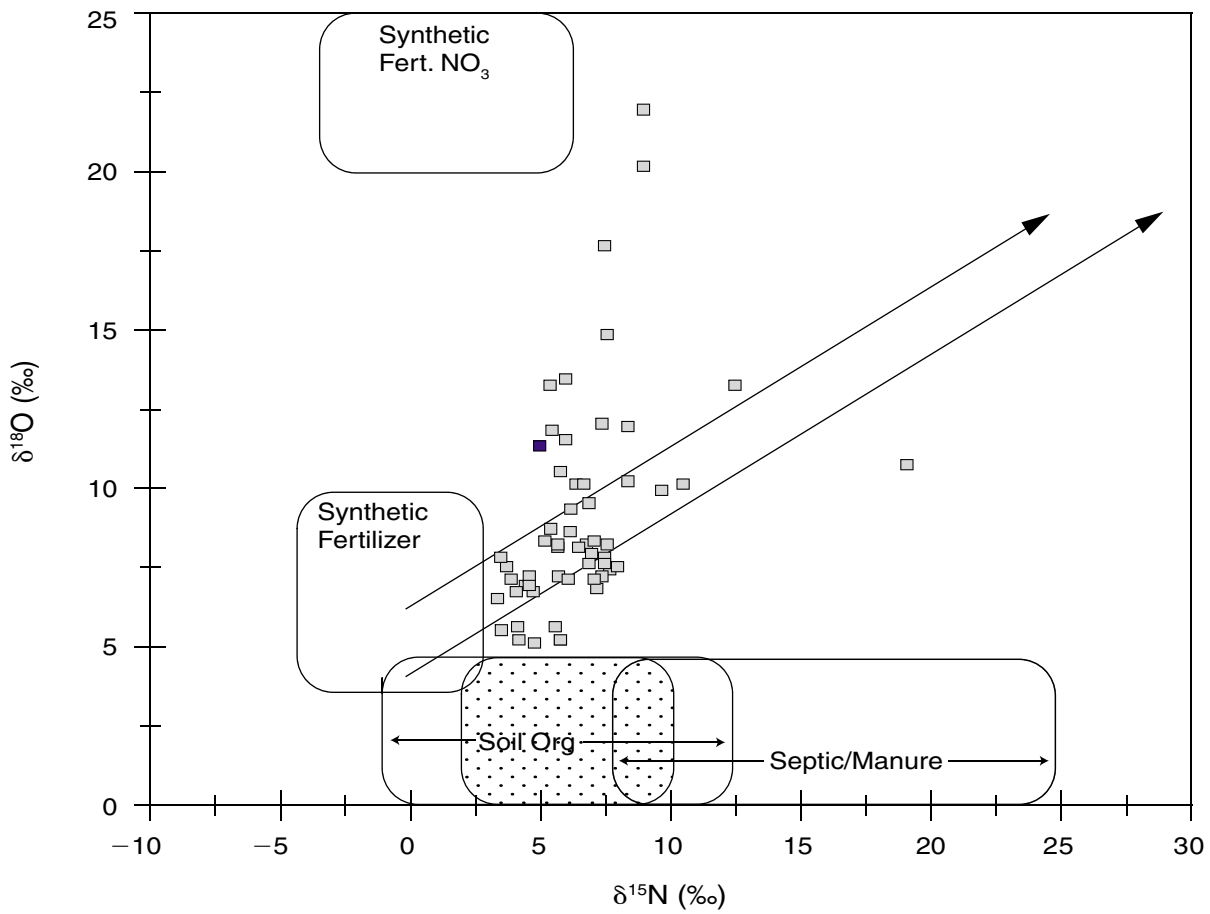

Figure 10. Nitrate isotope scatter diagram for spring and cave water samples. Most samples tended to cluster along denitrification vectors extending from mineralized fertilizer which is consistent with findings by Panno et al. (2001) and Hackley et al. (in press).

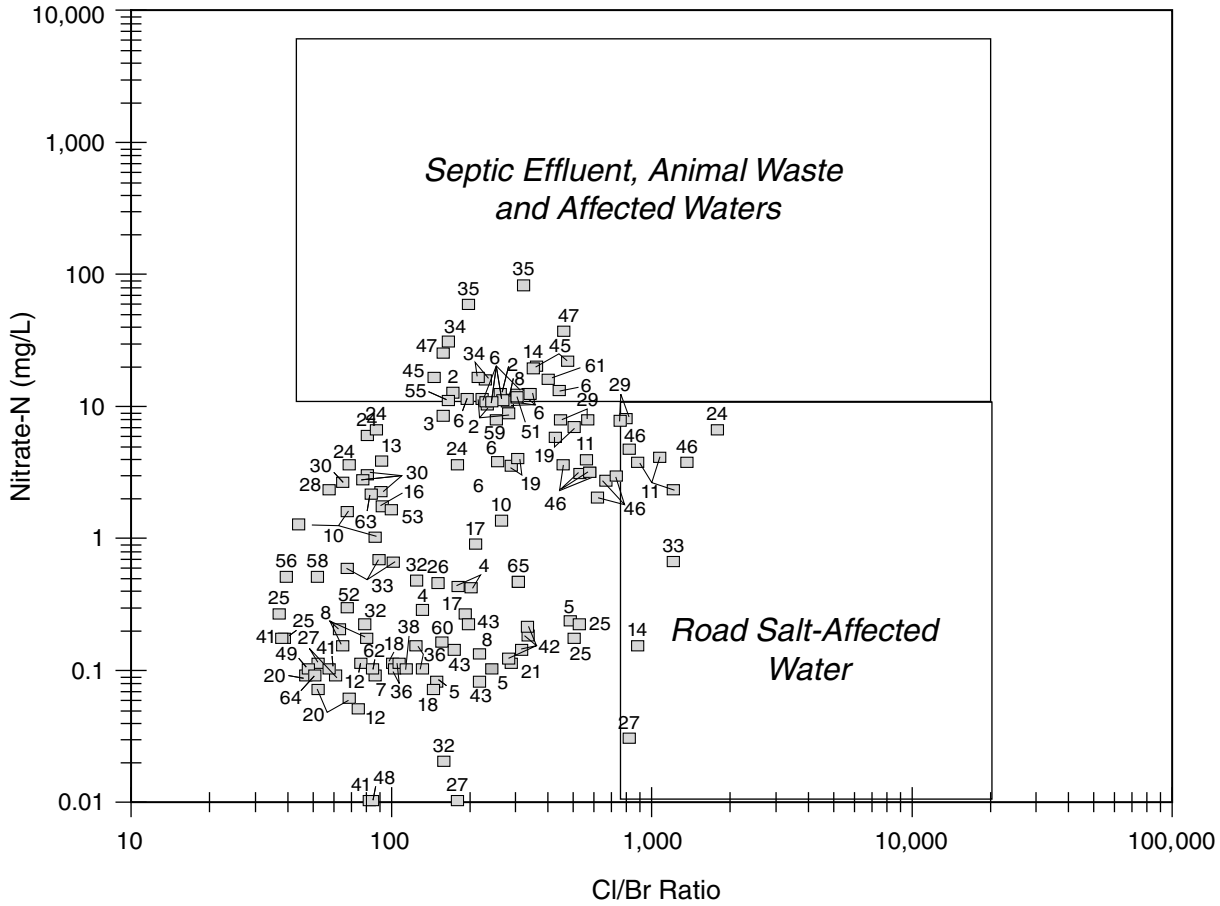

Figure 11. Scatter diagram of Cl/Br ratios vs NO_3*-N suggests that a dozen or so of the well water samples were contaminated with road salt (modified from Panno et al. 2006b).*

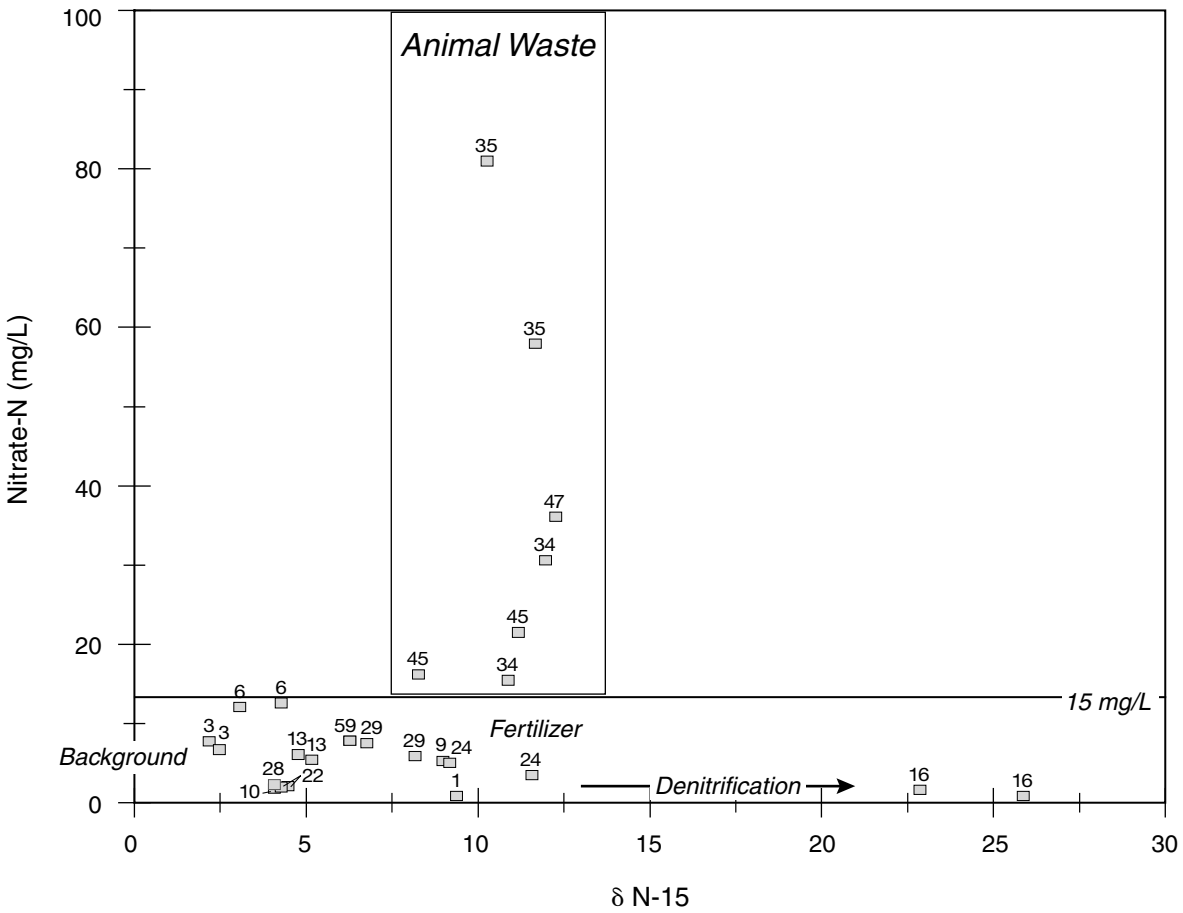

Figure 12. $\delta^{15}N$ vs NO_3-N concentration for 28 well-water samples (data from Hackley et al., in press). Wells contaminated with animal waste have high NO_3-N concentrations (> 15 mg/L). Arrow indicates the trend toward increasing δ15N values as NO_3-N concentrations decrease due to denitrification.

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Table 1. Chemical and isotopic data for karst springs and numerous sampling locations in Illinois Caverns. All data are reported as mg/L unless indicated.

Sample Numbers	Date Sampled	Temp. (degrees C)	pH	Eh (mV)	Sp.Cond. (uS/cm)	Tot.Alk. (as $CaCO_3$)	Na	K	Ca	Sr	Ba	Mg	SiO_2	HCO_3	NO_3	SO_4	Cl	Br	F	Fe	Mn	$\delta^{15}N$ (air) (ppt)	$\delta^{18}O$ (smow) (ppt)	Cl/Br Ratio	Bacterial Colonies cfu	Coliform cfu	Fecal Coliform cfu	Fecal Enterococcus cfu	Atrazine (ug/L)	Metalachlor (ug/L)	Suspended Solids (mg/L)	Discharge (gpm)	Spring Name and/or Sample Location	Source of Data
IG-1T	Nov.1998	12.8	8.1	475	770	321	21	<1	119	0.22	0.10	29	31	394	3.47	77	12	ND	0.17	<0.01	0.01	6.8	8.2	ND	ND	ND	ND	ND	ND	ND	<25	451	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-1B	Nov.1998	12.6	8.1	496	766	323	21	<1	118	0.22	0.09	29	30	391	3.50	74	12	ND	0.17	<0.01	0.01	ND	ND	ND	>3000000	>2419	49	60	<0.01	ND	<25	451	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-2	Nov.1998	13.5	7.3	506	624	243	22	5	93	0.21	0.09	17	23	296	3.64	53	17	ND	0.13	0.03	0.05	6.5	8.1	ND	>3000000	>2419	108	104	0.04	ND	32	1163	Sparrow Creek Spring	Panno et al. (2001); Hackley et al. (in press)
IG-3	Nov.1998	13.7	7.3	448	471	200	15	4	75	0.19	0.10	11	19	244	3.98	22	10	ND	0.11	0.02	<0.01	5.4	13.2	ND	>3000000	>2419	68	136	0.03	ND	31	1199	Collier Spring	Panno et al. (2001); Hackley et al. (in press)
IG-4	Nov.1998	13.9	7.2	455	481	182	21	4	69	0.19	0.09	12	16	222	4.25	38	12	ND	0.12	0.03	0.05	5.8	10.5	ND	>3000000	>2419	73	126	0.03	ND	32	1176	Indian Hole Spring	Panno et al. (2001); Hackley et al. (in press)
IG-5	Nov.1998	14.0	6.9	460	611	272	27	<1	105	0.16	0.07	11	33	332	5.16	28	8.9	ND	0.09	<0.01	<0.01	6.0	11.5	ND	600	1	0	0	<0.01	ND	<25	62	Sensel Spring	Panno et al. (2001); Hackley et al. (in press)
IG-6	Nov.1998	13.3	8.2	485	554	229	22	<1	92	0.18	0.08	11	21	279	6.65	25	15	ND	0.08	<0.01	<0.01	5.6	5.6	ND	900000	>2419	59	108	0.04	ND	38	55	ILCaverns-Main stream at entrance	Panno et al. (2001); Hackley et al. (in press)
IG-7	Nov.1998	12.8	8.0	472	663	245	45	5	81	0.20	0.09	20	15	299	4.68	69	21	ND	0.13	0.01	0.01	7.7	7.4	ND	>3000000	>2419	86	290	0.04	ND	<25	216	Kelly Spring	Panno et al. (2001); Hackley et al. (in press)
IG-8	Nov.1998	13.6	8.0	483	543	238	22	2	83	0.19	0.08	14	20	290	2.86	32	12	ND	0.10	<0.01	0.02	7.6	14.8	ND	>3000000	>2419	223	143	0.05	ND	<25	920	Camp Vandeventer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-9	Nov.1998	12.7	8.1	460	591	279	16	<1	105	0.18	0.08	14	34	340	5.12	22	8.2	ND	0.13	<0.01	0.02	5.7	8.1	ND	>3000000	>2419	68	116	0.03	ND	<25	43	Auctioneer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-1AB	Feb.1999	11.6	7.8	451	688	298	20	<1	116	0.22	0.11	26	32	363	2.92	61	10	ND	0.18	<0.01	0.06	6.0	13.4	ND	>3000000	>3466	40	36	<0.01	ND	<25	2286	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-2A	Feb.1999	12.0	7.3	462	572	219	22	<1	99	0.20	0.09	17	24	267	3.59	55	15	ND	0.18	<0.01	0.05	6.2	9.3	ND	>3000000	>4800	108	1540	<0.01	ND	<25	14656	Sparrow Creek Spring	Panno et al. (2001); Hackley et al. (in press)
IG-3A	Feb.1999	12.4	7.4	436	521	228	17	<1	100	0.20	0.10	11	24	278	3.69	27	8.4	ND	0.13	<0.01	0.02	6.4	10.1	ND	>3000000	>3106	192	722	<0.01	ND	<25	9997	Collier Spring	Panno et al. (2001); Hackley et al. (in press)
IG-4A	Feb.1999	11.2	7.7	450	467	186	22	<1	79	0.19	0.09	12	18	227	2.79	39	10	ND	<0.10	<0.01	0.04	9.0	21.9	ND	>3000000	2600	86	278	<0.01	ND	33	6867	Indian Hole Spring	Panno et al. (2001); Hackley et al. (in press)
IG-5A	Feb.1999	14.0	6.8	476	605	273	27	<1	123	0.17	0.08	13	37	333	4.90	28	9.0	ND	<0.10	<0.01	<0.01	7.6	8.2	ND	34	4	0	0	<0.01	ND	<25	115	Sensel Spring	Panno et al. (2001); Hackley et al. (in press)
IG-6A	Feb.1999	12.3	7.9	456	535	209	23	<1	96	0.18	0.09	11	23	255	6.89	28	16	ND	0.11	<0.01	0.02	10.5	10.1	ND	>3000000	>3106	156	114	<0.01	ND	<25	185	ILCaverns-Main stream at entrance	Panno et al. (2001); Hackley et al. (in press)
IG-7A	Feb.1999	9.1	7.8	481	616	213	43	<1	89	0.21	0.09	21	16	260	3.65	76	20	ND	<0.10	<0.01	0.01	12.5	13.2	ND	>3000000	>3106	96	1374	<0.01	ND	<25	681	Kelly Spring	Panno et al. (2001); Hackley et al. (in press)
IG-8A	Feb.1999	11.8	7.8	461	476	200	19	<1	83	0.18	0.09	13	19	244	2.82	29	11	ND	0.11	<0.01	0.01	7.5	7.8	ND	>3000000	3972	172	222	<0.01	ND	32	3071	Camp Vandeventer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-9A	Feb.1999	11.9	7.8	438	547	254	14	<1	106	0.19	0.09	13	32	310	4.58	22	7.8	ND	0.18	<0.01	0.14	8.4	11.9	ND	>3000000	1842	220	104	<0.01	ND	<25	91	Auctioneer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-10A	Mar.1999	12.3	7.7	ND	620	253	25	2	95	0.19	0.08	14	22	308	7.48	51	17	ND	0.17	<0.01	0.01	19.1	10.7	ND	ND	ND	ND	ND	ND	ND	<25	ND	Frog Spring	Panno et al. (2001); Hackley et al. (in press)
IG-1BB	May.1999	13.2	8.0	476	806	351	24	<1	128	0.23	0.10	33	27	428	3.00	73	18	ND	0.35	<0.01	0.01	5.7	7.2	ND	>3000000	2600	86	72	0.16	<0.10	<25	50	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-2B	May.1999	13.3	7.0	456	734	287	29	3	113	0.22	0.08	21	22	350	4.83	68	25	ND	0.31	<0.01	0.03	3.7	7.5	ND	>3000000	>4800	570	208	12.1	1.88	<25	100	Sparrow Creek Spring	Panno et al. (2001); Hackley et al. (in press)
IG-3B	May.1999	13.6	7.2	513	523	237	16	<1	83	0.19	0.10	10	19	289	3.91	28	14	ND	0.26	<0.01	0.02	4.5	6.9	ND	>3000000	>4800	182	1096	5.21	0.43	46	143	Collier Spring	Panno et al. (2001); Hackley et al. (in press)
IG-4B	May.1999	13.9	7.6	508	527	233	22	2	106	0.20	0.09	13	15	284	2.84	37	14	ND	0.28	<0.01	0.07	6.2	8.6	ND	>3000000	>4800	110	552	1.09	0.36	27	119	Indian Hole Spring	Panno et al. (2001); Hackley et al. (in press)
IG-5B	May.1999	14.0	6.8	508	604	290	25	<1	95	0.15	0.07	11	28	353	4.61	29	13	ND	0.23	<0.01	<0.01	4.2	5.6	ND	1200	86	2	10	0.11	<0.10	<25	ND	Sensel Spring	Panno et al. (2001); Hackley et al. (in press)
IG-6B	May.1999	13.5	7.7	492	573	240	24	<1	88	0.18	0.09	11	18	293	6.64	28	19	ND	0.23	<0.01	0.01	3.4	6.5	ND	>29000	1960	130	210	0.19	0.11	<25	9	ILCaverns-Main stream at entrance	Panno et al. (2001); Hackley et al. (in press)
IG-7B	May.1999	14.4	7.6	492	694	246	41	3	94	0.22	0.09	25	13	300	4.00	94	20	ND	0.28	<0.01	0.01	5.5	11.8	ND	>3000000	>4800	230	922	3.20	0.72	<25	ND	Kelly Spring	Panno et al. (2001); Hackley et al. (in press)
IG-8B	May.1999	13.5	7.5	430	588	267	24	<1	113	0.19	0.09	16	17	326	2.89	35	16	ND	0.26	<0.01	0.02	5.4	8.7	ND	>3000000	2240	186	160	0.21	<0.10	<25	ND	Camp Vandeventer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-9B	May.1999	13.2	7.7	467	626	314	17	<1	106	0.18	0.08	14	29	383	4.92	27	13	ND	0.32	<0.01	0.02	3.5	5.5	ND	>3000000	1454	17	334	<0.01	<0.10	<25	3	Auctioneer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-10B	May.1999	13.3	7.2	485	650	288	25	<1	104	0.19	0.08	14	22	351	5.51	34	20	ND	0.31	<0.01	0.02	4.8	6.7	ND	>3000000	>4800	192	216	0.10	<0.10	<25	20	Frog Spring	Panno et al. (2001); Hackley et al. (in press)
IG-1CB	Aug.1999	15.0	8.1	336	802	365	22	<1	121	0.22	0.10	32	27	445	3.20	68	14	ND	0.34	<0.01	0.01	5.7	8.2	ND	27000	>3466	12	62	0.23	ND	<25	270	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-1CT	Aug.1999	14.2	7.9	383	823	367	22	<1	125	0.22	0.11	33	27	447	3.29	68	14	ND	0.32	<0.01	0.01	ND	ND	ND	22000	>1226	8	14	ND	ND	<25	270	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-2C	Aug.1999	13.5	7.0	414	733	295	26	<1	114	0.23	0.10	22	23	359	4.60	59	19	ND	0.27	<0.01	0.05	7.0	7.9	ND	49000	>1226	32	94	0.14	ND	<25	406	Sparrow Creek Spring	Panno et al. (2001); Hackley et al. (in press)
IG-3C	Aug.1999	14.8	7.2	417	506	229	13	<1	85	0.21	0.12	10	18	280	3.44	20	13	ND	0.23	<0.01	0.03	7.5	17.6	ND	78000	>4838	50	368	1.40	ND	<25	1767	Collier Spring	Panno et al. (2001); Hackley et al. (in press)
IG-4C	Aug.1999	16.1	7.2	438	438	190	16	<1	65	0.18	0.10	11	11	232	2.28	26	10	ND	0.26	<0.01	0.14	9.0	20.1	ND	79000	>4800	56	146	1.76	ND	30	1432	Indian Hole Spring	Panno et al. (2001); Hackley et al. (in press)
IG-5C	Aug.1999	13.9	7.0	452	610	280	25	<1	103	0.15	0.07	11	28	341	4.67	26	11	ND	0.21	<0.01	<0.01	4.8	ND	ND	900	40	0	4	0.12	ND	<25	138	Sensel Spring	Panno et al. (2001); Hackley et al. (in press)
IG-6C	Aug.1999	13.4	7.5	421	577	239	22	<1	92	0.18	0.09	11	18	292	6.23	24	18	ND	0.22	<0.01	<0.01	3.9	7.1	ND	63000	>4838	110	400	0.11	ND	<25	35	ILCaverns-Main stream at entrance	Panno et al. (2001); Hackley et al. (in press)
IG-1DB	Nov.1999	11.4	8.2	392	745	328	19	3	111	0.20	0.08	32	25	400	3.06	67	10	<0.02	0.24	<0.01	<0.01	7.5	7.6	ND	17000	870	14	42	<0.10	ND	<25	197	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-1DT	Nov.1999	12.1	8.1	421	770	357	17	2	113	0.19	0.08	31	24	435	3.07	67	10	<0.02	0.25	<0.01	0.01	6.9	9.5	ND	1430	390	8	30	<0.10	ND	<25	197	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-2D	Nov.1999	12.4	7.3	425	754	320	22	3	110	0.20	0.07	22	21	390	4.12	61	18	0.04	0.22	<0.01	0.02	6.7	10.1	440	4700	976	62	278	<0.10	ND	<25	ND	Sparrow Creek Spring	Panno et al. (2001); Hackley et al. (in press)
IG-3D	Nov.1999	13.4	7.4	405	620	301	17	3	98	0.21	0.09	14	18	367	3.60	21	9.3	<0.02	0.19	<0.01	0.02	7.2	6.8	ND	27000	1842	626	644	<0.10	ND	<25	559	Collier Spring	Panno et al. (2001); Hackley et al. (in press)
IG-4D	Nov.1999	13.4	7.2	463	629	271	24	2	82	0.23	0.09	18	14	330	2.80	47	12	0.08	0.23	<0.01	0.03	9.7	9.9	154	1600	476	2	62	0.14	ND	<25	772	Indian Hole Spring	Panno et al. (2001); Hackley et al. (in press)
IG-5D	Nov.1999	14.2	6.9	485	587	279	19	<1	95	0.13	0.05	10	25	340	4.20	21	7.3	<0.02	0.11	<0.01	<0.01	5.2	8.3	ND	340	6	0	4	<0.10	ND	<25	69	Sensel Spring	Panno et al. (2001); Hackley et al. (in press)
IG-6D	Nov.1999	13.2	8.2	442	525	221	17	3	79	0.14	0.06	10	16	269	6.00	19	15	0.06	0.12	<0.01	<0.01	4.6	7.2	245	7600	582	66	88	<0.10	ND	<25	14	ILCaverns-Main stream at entrance	Panno et al. (2001); Hackley et al. (in press)
IG-7D	Nov.1999	13.3	8.1	451	730	289	36	4	84	0.18	0.07	23	12	352	3.30	73	19	0.06	0.18	<0.01	0.01	8.4	10.2	322	14000	616	100	324	0.11	ND	<25	233	Kelly Spring	Panno et al. (2001); Hackley et al. (in press)
IG-8D	Nov.1999	13.4	7.9	443	452	198	13	4	64	0.14	0.06	12	13	241	1.74	25	8.6	<0.02	0.19	<0.01	0.03	7.4	12.0	ND	>3000000	>4838	394	>4838	<0.10	ND	<25	537	Camp Vandeventer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-9D	Nov.1999	12.7	8.0	410	575	272	14	2	93	0.14	0.06	13	27	332	5.55	18	7.9	<0.02	0.22	<0.01	<0.01	5.0	11.3	ND	45000	2600	1632	>4838	<0.10	ND	<25	97	Auctioneer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-10D	Nov.1999	13.2	7.5	442	638	288	19	3	100	0.16	0.06	13	21	351	5.57	23	13	0.03	0.22	<0.01	0.01	6.1	7.1	423	120000	>3106	2406	>4838	<0.10	ND	<25	151	Frog Spring	Panno et al. (2001); Hackley et al. (in press)
IG-1EB	Mar.2000	12.6	8.1	450	700	332	20	<2	111	0.22	0.09	30	24	405	2.83	53	12	0.07	0.29	0.02	0.01	8.0	7.5	170	5300	976	20	118	<0.01	ND	13	287	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-1ET	Mar.2000	12.8	8.0	459	710	326	20	<2	112	0.22	0.09	30	24	397	2.95	53	12	<0.02	0.26	<0.01	0.01	7.4	7.2	ND	4100	1034	8	145	<0.01	ND	13	287	Falling Spring	Panno et al. (2001); Hackley et al. (in press)
IG-2E	Mar.2000	13.1	7.3	455	555	201	22	7	75	0.18	0.08	16	16	245	3.27	39	18	<0.02	0.24	0.02	0.01	7.1	8.3	ND	4900	282	20	48	<0.01	ND	13	1035	Sparrow Creek Spring	Panno et al. (2001); Hackley et al. (in press)
IG-3E	Mar.2000	12.9	7.1	444	386	156	13	4	60	0.17	0.08	10	15	190	4.39	20	6.5	<0.02	0.17	0.05	0.01	3.5	7.8	ND	1300	220	40	540	<0.01	ND	33	1196	Collier Spring	Panno et al. (2001); Hackley et al. (in press)
IG-4E	Mar.2000	12.4	7.2	464	478	191	23	<2	68	0.20	0.08	14	12	233	3.86	32	9.4	<0.02	0.21	0.02	0.02	4.6	6.9	ND	2300	570	12	66	<0.01	ND	29	986	Indian Hole Spring	Panno et al. (2001); Hackley et al. (in press)
IG-5E	Mar.2000	14.1	6.7	486	597	282	26	<2	103	0.15	0.07	11	28	344	4.27	21	7.6	<0.02	0.12	<0.01	<0.01	4.8	5.1	ND	400	14	0	16	<0.01	ND	13	49	Sensel Spring	Panno et al. (2001); Hackley et al. (in press)
IG-6E	Mar.2000	13.1	7.9	472	555	237	23	<2	92	0.19	0.08	12	18	289	6.21	19	14	0.07	0.12	<0.01	<0.01	4.2	5.2	203	1100	154	2	80	<0.01	ND	13	11	ILCaverns-Main stream at entrance	Panno et al. (2001); Hackley et al. (in press)
IG-7E	Mar.2000	11.8	7.8	468	777	221	49	3	76	0.14	0.08	22	8.9	269	5.07	77	23	<0.02	0.19	0.03	<0.01	6.9	7.6	ND	6500	870	18	22	<0.01	ND	13	735	Kelly Spring	Panno et al. (2001); Hackley et al. (in press)
IG-8E	Mar.2000	13.2	8.0	452	555	248	23	<2	87	0.21	0.08	17	17	302	2.41	28	13	0.03	0.17	<0.01	0.01	7.1	7.1	417	14000	1034	40	128	<0.01	ND	13	495	Camp Vandeventer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-9E	Mar.2000	12.9	7.9	449	563	269	18	<2	100	0.18	0.08	16	30	328	5.07	18	8.3	<0.02	0.23	<0.01	0.01	4.1	6.7	ND	5700	>1226	10	140	<0.01	ND	13	12	Auctioneer Spring	Panno et al. (2001); Hackley et al. (in press)
IG-10E	Mar.2000	13.1	7.6	508	635	285	25	<2	108	0.20	0.08	16	22	347	4.78	23	15	0.04	0.24	<0.01	0.01	5.8	5.2	375	6300	2240	10	140	<0.01	ND	13	123	Frog Spring	Panno et al. (2001); Hackley et al. (in press)
S229	Apr.1995	12.7	7.8	360	662	264	31	<1	87	ND	ND	17	22	322	4.29	43	24	<0.05	ND	0.01	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Wedel Spring	Panno et al. (1996)
S242	May.1995	14.5	7.6	ND	439	170	16	4	64	ND	ND	11	16	208	1.41	28	13	0.06	ND	0.01	1.09	ND	ND	215	ND	ND	ND	ND	0.15	0.01	ND	ND	Wedel Spring	Panno et al. (1996)
S263	Jun.1995	20.8	7.8	ND	616	245	28	3	86	ND	ND	15	20	298	3.70	38	20	0.09	ND	0.01	0.02	ND	ND	217	ND	ND	ND	ND	0.01	0.01	ND	ND	Wedel Spring	Panno et al. (1996)
S281	Aug.1995	13.5	7.7	ND	633	252	31	3	88	ND	ND	16	20	307	4.52	39	22	<0.05	ND	0.01	0.01	ND	ND	ND	ND	ND	ND	ND	0.12	0.01	ND	ND	Wedel Spring	Panno et al. (1996)
S300	Aug.1995	13.5	7.6	ND	719	288	37	<1	98	ND	ND	18	24	351	5.35	41	23	0.12	ND	0.01	0.01	ND	ND	193	ND	ND	ND	ND	0.19	0.01	ND	ND	Wedel Spring	Panno et al. (1996)
S315	Sept.1995	13.2	8.0	ND	682	273	36	<1	91	ND	ND	17	24	332	5.47	38	23	0.14	ND	0.01	0.01	ND	ND	164	ND	ND	ND	ND	0.12	0.01	ND	ND	Wedel Spring	Panno et al. (1996)
S200	Jan-1995	11.8	6.9	351	641	255	31	<1	90	ND	ND	16	21	311	3.69	38	20	0.09	ND	0.01	0.04	ND	ND	222	ND	ND	ND	ND	ND	ND	ND	ND	Wedel Spring	Panno et al. (1996)
S243	May-1995	14.5	7.6	ND	549	217	24	<1	79	ND	ND	14	18	264	2.44	35	15	0.08	ND	0.01	0.10	ND	ND	186	3000	1000	24	ND	0.13	0.01	<25	ND	Wedel Spring	Panno et al. (1996)
S262	Jun-1995	20.8	7.4	ND	140	45	3.3	5	16	ND	ND	3.4	6.8	55	1.02	6.6	5.0	<0.05	ND	0.12	0.04	ND	ND	ND	ND	ND	ND	ND	0.01	0.01	ND	ND	Wedel Spring	Panno et al. (1996)
S280	Aug-1995	13.5	7.0	ND	710	284	35	<1	98	ND	ND	18	23	347	5.30	40	23	<0.05	ND	0.01	0.11	ND	ND	ND	ND	ND	ND	ND	0.13	0.10	ND	ND	Wedel Spring	Panno et al. (1996)
S301	Aug-1995	13.5	7.1	ND	730	293	37	<1	99	ND	ND	18	24	357	5.44	39	23	0.14	ND	0.01	0.11	ND	ND	167	ND	ND	ND	ND	0.20	0.01	ND	ND	Wedel Spring	Panno et al. (1996)
S316	Sep-1995	13.2	7.2	ND	702	281	35	2	95	ND	ND	17	23	342	5.30	37	23	0.14	ND	0.01	0.09	ND	ND	161	ND	ND	ND	ND	0.14	0.01	ND	ND	Wedel Spring	Panno et al. (1996)
S228	Apr-1995	13.1	7.9	ND	468	183	23	<1	89	ND	ND	15	27	223	5.46	35	38	<0.05	ND	<0.01	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	May Spring	Panno et al. (1996)
S240	May-1995	15.1	7.9	ND	369	141	12	4	53	ND	ND	8.6	17	172	3.28	18	10	0.06	ND	<0.01	0.01	ND	ND	172	ND	ND	ND	ND	0.46	0.33	ND	ND	May Spring	Panno et al. (1996)
S265	Jun-1995	19.4	7.7	ND	432	168	15	4	64	ND	ND	10	18	204	4.50	22	12	0.05	ND	<0.01	<0.01	ND	ND	238	ND	ND	ND	ND	3.83	1.62	ND	ND	May Spring	Panno et al. (1996)
S283	Aug-1995	14.8	7.8	ND	477	186	16	5	70	ND	ND	10	19	227	5.14	25	13	<0.05	ND	<0.01	0.04	ND	ND	ND	ND	ND	ND	ND	6.70	2.00	ND	ND	May Spring	Panno et al. (1996)
S302	Aug-1995	14.0	7.3	ND	604	240	23	2	90	ND	ND	13	24	292	6.98	30	16	0.08	ND	<0.01	<0.01	ND	ND	204	ND	ND	ND	ND	2.64	3.89	ND	ND	May Spring	Panno et al. (1996)
S313	Sep-1995	13.6	7.6	ND	629	250	24	<1	88	ND	ND	13	23	305	7.37	31	18	0.09	ND	0.01	<0.01	ND	ND	194	ND	ND	ND	ND	0.63	0.47	ND	ND	May Spring	Panno et al. (1996)
S201	Jan-1995	11.4	7.6	348	573	227	23	3	85	ND	ND	13	22	276	6.62	32	17	0.05	ND	<0.01	0.01	ND	ND	332	ND	ND	ND	ND	<25	<25	ND	ND	May Spring	Panno et al. (1996)
S241	May-1995	15.1	7.5	ND	489	191	17	3	73	ND	ND	11	19	233	4.48	28	12	0.05	ND	0.01	0.05	ND	ND	244	7000	2000	110	ND	0.15	0.01	ND	ND	May Spring	Panno et al. (1996)
S264	Jun-1995	19.4	7.4	ND	165	55	3.5	8	21	ND	ND	3.8	10	67	2.16	9.1	6.0	<0.05	ND	0.11	0.05	ND	ND	ND	ND	ND	ND	ND	1.20	0.55	ND	ND	May Spring	Panno et al. (1996)
S282	Aug-1995	14.8	7.5	ND	635	253	23	3	97	ND	ND	14	25	308	7.40	31	17	<0.05	ND	<0.01	0.02	ND	ND	ND	ND	ND	ND	ND	5.90	8.10	ND	ND	May Spring	Panno et al. (1996)
S303	Aug-1995	14.0	7.2	ND	643	256	24	2	95	ND	ND	14	25	312	7.45	31	17	0.08	ND	<0.01	0.03	ND	ND	216	ND	ND	ND	ND	0.64	0.19	ND	ND	May Spring	Panno et al. (1996)
S314	Sep-1995	13.6	7.9	ND	627	249	25	<1	90	ND	ND	13	24	304	7.53	30	18	0.10	ND	0.01	0.01	ND	ND	175	ND	ND	ND	ND	0.39	0.18	ND	ND	May Spring	Panno et al. (1996)
S224	Apr-1995	12.9	7.3	371	330	125	18	4	68	ND	ND	17	15	152	2.56	83	12	<0.05	ND	<0.01	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Walsh Spring	Panno et al. (1996)
S249	May-1995	14.8	7.6	ND	353	134	11	3	47	ND	ND	10	17	164	3.00	37	8.9	0.04	ND	<0.01	<0.01	ND	ND	223	ND	ND	ND	ND	0.79	0.30	ND	ND	Walsh Spring	Panno et al. (1996)
S257	Jun-1995	14.5	7.8	ND	427	165	15	2	59	ND	ND	12	15	202	3.53	41	10	0.06	ND	<0.01	<0.01	ND	ND	173	ND	ND	ND	ND	10.0	1.98	ND	ND	Walsh Spring	Panno et al. (1996)
S289	Aug-1995	16.5	7.5	ND	444	173	13	5	60	ND	ND	12	12	210	3.21	40	10	<0.05	ND	<0.01	0.12	ND	ND	ND	ND	ND	ND	ND	13.9	1.32	ND	ND	Walsh Spring	Panno et al. (1996)
S322	Sep-1995	14.9	8.0	ND	497	195	18	4	68	ND	ND	15	13	238	2.63	52	11	0.11	ND	<0.01	<0.01	ND	ND	100	ND	ND	ND	ND	2.68	1.74	ND	ND	Walsh Spring	Panno et al. (1996)
S203	Jan-1995	9.3	7.2	365	305	114	9.2	4	39	ND	ND	8	13	139	3.73	35	12	<0.05	ND	0.09	<0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Walsh Spring	Panno et al. (1996)
S250	May-1995	14.8	7.7	ND	434	168	14	3	61	ND	ND	11	17	205	2.84	38	10	0.05	ND	0.03	0.01	ND	ND	193	4100	4500	2400	ND	0.38	0.40	<25	ND	Walsh Spring	Panno et al. (1996)
S258	Jun-1995	14.5	7.7	ND	758	304	19	9	96	ND	ND	24	17	371	30.30	83	16	0.07	ND	0.02	0.01	ND	ND	234	ND	ND	ND	ND	2.19	1.32	ND	ND	Walsh Spring	Panno et al. (1996)
S288	Aug-1995	16.5	7.4	ND	332	126	8.8	6	44	ND	ND	8.7	13	153	2.60	28	8.1	<0.05	ND	0.13	<0.01	ND	ND	ND	ND	ND	ND	ND	55.0	0.65	ND	ND	Walsh Spring	Panno et al. (1996)
S310	Aug-1995	15.8	7.5	ND	443	172	15	5	59	ND	ND	12	12	210	2.71	42	9.4	0.08	ND	0.01	0.01	ND	ND	118	ND	ND	ND	ND	0.87	1.51	ND	ND	Walsh Spring	Panno et al. (1996)
S323	Sep-1995	14.9	8.3	ND	635	253	26	5	85	ND	ND	21	14	308	2.90	84	14	0.14	ND	<0.01	<0.01	ND	ND	101	ND	ND	ND	ND	0.44	0.62	ND	ND	Walsh Spring	Panno et al. (1996)
S6	Feb-1994	8.0	8.1	395	746	266	48	2	91	ND	ND	48	14	324	0.80	101	21	0.15	ND	<0.01	<0.01	ND	ND	142	>3000000	590	ND	ND	0.01	0.13	<25	ND	Sportsmans Club Spring	Panno et al. (1996)
S36	Apr-1994	13.8	8.0	360	619	225	34	2	80	ND	ND	19	7.1	274	0.60	69	15	0.06	ND	<0.01	0.02	ND	ND	255	>3000000	>2419	ND	ND	0.56	0.51	<25	ND	Sportsmans Club Spring	Panno et al. (1996)
S41	Apr-1994	13.5	7.9	ND	671	242	40	3	83	ND	ND	22	13	295	0.60	82	18	0.07	ND	<0.01	0.01	ND	ND	251	>3000000	>2419	ND	ND	0.34	0.20	<25	ND	Sportsmans Club Spring	Panno et al. (1996)
S49	Apr-1994	14.7	8.0	396	603	220	35	3	73	ND	ND	20	13	268	2.80	74	16	<0.05	ND	<0.01	0.02	ND	ND	ND	>3000000	>2419	ND	ND	3.46	3.28	0.18	ND	Sportsmans Club Spring	Panno et al. (1996)
S58	Apr-1994	12.3	7.6	387	188	56	7.6	5	23	ND	ND	5.1	8.5	68	ND	19	5.4	<0.05	ND	0.01	0.04	ND	ND	ND	ND	ND	ND	ND	16.2	14.10	0.26	ND	Sportsmans Club Spring	Panno et al. (1996)
S57	Apr-1994	12.3	7.2	397	184	60	8.9	6	22	ND	ND	5.1	9.2	73	6.00	19	5.9	<0.05	ND	0.25	0.01	ND	ND	ND	>3000000	>2419	ND	ND	6.35	1.97	0.27	ND	Sportsmans Club Spring	Panno et al. (1996)
S67	May-1994	12.0	7.9	ND	356	122	18	3	48	ND	ND	11	13	149	ND	40	8.6	<0.05	ND	0.06	0.02	ND	ND	ND	ND	ND	ND	ND	0.01	0.01	<25	ND	Sportsmans Club Spring	Panno et al. (1996)
S68	May-1994	12.0	7.9	ND	169	60	7.0	4	22	ND	ND	4.9	8.4	73	1.12	16	4.5	<0.05	ND	0.04	0.01	ND	ND	ND	ND	ND	ND	ND	10.9	8.30	0.29	ND	Sportsmans Club Spring	Panno et al. (1996)
S85	Jun-1994	15.4	7.0	368	273	46	10	6	30	ND	ND	7.1	7.0	56	6.47	27	14	0.04	ND	<0.01	0.06	ND	ND	338	ND	ND	ND	ND	97.5	10.8	0.52	ND	Sportsmans Club Spring	Panno et al. (1996)
S86	Jun-1994	15.4	7.3	394	279	50	11	6	32	ND	ND	7.3	7.2	61	6.97	27	15	0.04	ND	0.04	0.06	ND	ND	373	ND	ND	ND	ND	72.0	13.4	0.46	ND	Sportsmans Club Spring	Panno et al. (1996)
S87	Jun-1994	15.6	7.1	377	254	40	9.3	6	28	ND	ND	6.3	7.0	49	7.19	24	14	0.05	ND	0.03	0.05	ND	ND	286	ND	ND	ND	ND	97.0	16.2	0.54	ND	Sportsmans Club Spring	Panno et al. (1996)
S88	Jun-1994	15.6	7.1	406	244	40	8.4	6	27	ND	ND	6.0	7.1	49	7.36	23	14	0.04	ND	0.04	0.04	ND	ND	360	ND	ND	ND	ND	71.5	12.8	0.49	ND	Sportsmans Club Spring	Panno et al. (1996)
S89	Jun-1994	15.6	7.1	462	243	40	8.4	7	27	ND	ND	5.9	7.0	49	7.01	21	14	<0.05	ND	0.04	0.03	ND	ND	ND	ND	ND	ND	ND	71.0	13.7	0.49	ND	Sportsmans Club Spring	Panno et al. (1996)
S96	Jun-1994	15.7	7.1	470	241	40	8.2	6	27	ND	ND	5.9	7.0	49	6.81	21	14	<0.05	ND	0.03	0.02	ND	ND	ND	ND	ND	ND	ND	68.0	15.3	0.66	ND	Sportsmans Club Spring	Panno et al. (1996)
S97	Jun-1994	15.6	7.1	445	242	42	8.1	6	27	ND	ND	6.0	7.1	51	6.97	21	13	<0.05	ND	0.12	0.03	ND	ND	ND	ND	ND	ND	ND	66.5	15.6	0.47	ND	Sportsmans Club Spring	Panno et al. (1996)
S98	Jun-1994	15.0	7.2	ND	291	66	11	6	33	ND	ND	7.5	8.1	80	5.55	28	12	0.04	ND	0.05	0.01	ND	ND	308	ND	ND	ND	ND	75.0	12.9	0.47	ND	Sportsmans Club Spring	Panno et al. (1996)
S99	Jun-1994	15.0	7.4	ND	390	110	18	5	45	ND	ND	11	10	134	5.20	41	14	0.05	ND	0.02	0.01	ND	ND	276	ND	ND	ND	ND	69.5	11.1	0.41	ND	Sportsmans Club Spring	Panno et al. (1996)
S100	Jun-1994	14.8	7.5	ND	548	180	29	5	65	ND	ND	17	13	219	4.89	65	16	0.08	ND	<0.01	<0.01	ND	ND	199	ND	ND	ND	ND	48.0	8.30	0.33	ND	Sportsmans Club Spring	Panno et al. (1996)
S107	Jun-1994	14.6	7.7	395	666	244	37	4	83	ND	ND	21	15	297	4.59	74	19	0.10	ND	<0.01	<0.01	ND	ND	186	ND	ND	ND	ND	26.4	2.85	0.30	ND	Sportsmans Club Spring	Panno et al. (1996)
S119	Jul-1994	16.6	7.4	424	465	156	24	4	55	ND	ND	14	11	190	2.93	51	12	0.06	ND	0.02	<0.01	ND	ND	200	ND	ND	ND	ND	10.2	2.21	0.26	ND	Sportsmans Club Spring	Panno et al. (1996)
S141	Aug-1994	14.3	8.1	427	782	280	44	2	97	ND	ND	30	15	341	4.00	116	21	0.11	ND	<0.01	0.02	ND	ND	187	12000	1000	ND	ND	0.61	0.19	<25	ND	Sportsmans Club Spring	Panno et al. (1996)
S160	Sep-1994	14.4	8.0	248	781	298	50	3	92	ND	ND	27	17	363	5.20	77	25	0.14	ND	<0.01	0.01	ND	ND	175	ND	ND	ND	ND	0.24	0.13	<25	ND	Sportsmans Club Spring	Panno et al. (1996)

S204	Jan-1995	7.0	7.9	360	602	239	36	2	71	ND	ND	18	13	291	4.46	72	18	0.07	ND	<0.01	0.01	ND	ND	263	6000	2000	1300	ND	0.92	0.27	<25	ND	Sportsmans Club Spring	Panno et al. (1996)
S225	Apr-1995	12.3	8.2	382	602	239	41	2	63	ND	ND	18	9.2	291	3.67	65	20	0.09	ND	<0.01	0.02	ND	ND	218	ND	ND	ND	ND	11.0	0.79	ND	ND	BigSink	Panno et al. (1996)
S251	May-1995	16.1	7.0	ND	194	68	7.5	4	22	ND	ND	4.7	8.7	82	1.73	15	4.8	<0.05	ND	0.11	0.03	ND	ND	ND	ND	ND	ND	ND	4.40	1.55	ND	ND	BigSink	Panno et al. (1996)
S252	May-1995	16.1	8.0	ND	552	218	29	2	69	ND	ND	14	14	266	3.78	48	14	0.08	ND	<0.01	0.02	ND	ND	179	ND	ND	ND	ND	1.46	0.60	ND	ND	BigSink	Panno et al. (1996)
S259	Jun-1995	17.4	7.8	ND	445	173	16	5	42	ND	ND	8.9	9.3	211	2.65	28	11	0.04	ND	0.03	0.00	ND	ND	265	ND	ND	ND	ND	3.51	0.91	ND	ND	BigSink	Panno et al. (1996)
S260	Jun-1995	17.4	7.1	ND	355	135	23	8	52	ND	ND	12	14	165	2.82	39	17	0.06	ND	0.11	0.02	ND	ND	290	ND	ND	ND	ND	8.60	2.30	ND	ND	BigSink	Panno et al. (1996)
S287	Aug-1995	18.2	7.8	ND	651	259	35	5	82	ND	ND	18	16	316	5.34	54	18	0.11	ND	<0.01	0.01	ND	ND	164	ND	ND	ND	ND	1.09	0.26	ND	ND	BigSink	Panno et al. (1996)
S307	Aug-1995	17.3	7.0	ND	283	105	14	6	32	ND	ND	7.1	8.6	128	1.43	21	8.2	<0.05	ND	0.07	0.37	ND	ND	ND	ND	ND	ND	ND	1.28	0.20	ND	ND	BigSink	Panno et al. (1996)
S308	Aug-1995	17.3	7.7	ND	715	286	45	3	83	ND	ND	21	14	349	5.10	65	21	<0.05	ND	<0.01	0.02	ND	ND	ND	ND	ND	ND	ND	0.28	0.13	ND	ND	BigSink	Panno et al. (1996)
S320	Sep-1995	15.5	8.1	ND	718	288	46	2	86	ND	ND	22	15	351	5.46	65	21	0.14	ND	<0.01	0.01	ND	ND	152	ND	ND	ND	ND	0.29	0.01	ND	ND	BigSink	Panno et al. (1996)
S321	Sep-1995	15.5	8.5	ND	728	292	44	3	82	ND	ND	21	14	356	4.99	64	21	0.14	ND	0.01	0.00	ND	ND	148	ND	500	178	ND	0.39	0.01	ND	ND	BigSink	Panno et al. (1996)
S120	Jul-1994	13.9	7.7	442	543	230	22	2	87	ND	ND	11	21	280	4.32	24	15	0.07	ND	<0.01	0.02	ND	ND	209	>3000000	>2419	ND	ND	0.67	0.35	<25	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S143	Aug-1994	13.1	7.8	458	569	248	21	<1	94	ND	ND	12	22	302	4.95	25	15	0.07	ND	<0.01	0.00	ND	ND	216	86000	0	ND	ND	0.30	0.01	<25	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S168	Sep-1994	13.1	7.8	262	572	248	21	<1	88	ND	ND	11	ND	302	4.92	24	16	0.07	ND	<0.01	0.00	ND	ND	226	ND	ND	ND	ND	0.26	0.01	<25	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S208	Jan-1995	13.6	8.0	ND	521	205	15	<1	87	ND	ND	11	20	250	6.44	24	13	<0.05	ND	<0.01	0.00	ND	ND	ND	4000	9000	10	ND	0.01	0.01	<25	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S209	Jan-1995	12.6	7.9	ND	528	208	20	<1	84	ND	ND	10	20	253	6.00	25	16	0.07	ND	<0.01	0.00	ND	ND	233	470	1200	34	ND	0.18	0.11	<25	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S226	Apr-1995	12.8	8.0	ND	498	195	18	<1	72	ND	ND	10	19	238	5.40	27	15	0.06	ND	<0.01	0.01	ND	ND	255	ND	ND	ND	ND	0.17	0.01	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S248	May-1995	13.9	7.9	ND	536	211	20	<1	83	ND	ND	10	20	257	5.71	26	16	0.08	ND	<0.01	0.01	ND	ND	194	ND	ND	ND	ND	0.18	0.01	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S261	Jun-1995	14.3	8.0	ND	531	209	19	<1	82	ND	ND	10	20	255	6.14	26	16	0.07	ND	<0.01	0.03	ND	ND	221	ND	ND	ND	ND	1.38	1.22	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S284	Aug-1995	14.3	7.5	ND	528	208	17	<1	85	ND	ND	8.7	20	253	5.65	22	13	0.07	ND	<0.01	0.01	ND	ND	187	ND	ND	ND	ND	0.55	0.50	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S285	Aug-1995	14.5	7.4	ND	561	222	20	<1	87	ND	ND	11	20	270	5.55	27	15	0.08	ND	<0.01	0.03	ND	ND	181	ND	ND	ND	ND	0.17	0.01	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S286	Aug-1995	14.4	7.5	ND	547	216	19	<1	87	ND	ND	10	20	263	5.52	24	14	0.08	ND	<0.01	0.01	ND	ND	175	ND	ND	ND	ND	0.24	0.20	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S304	Aug-1995	14.0	7.4	ND	561	222	20	<1	86	ND	ND	11	20	270	4.67	26	13	0.08	ND	<0.01	0.01	ND	ND	165	ND	ND	ND	ND	0.01	0.01	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S305	Aug-1995	14.2	7.5	ND	568	225	21	2	88	ND	ND	9.4	20	274	6.03	25	15	0.10	ND	<0.01	0.00	ND	ND	154	ND	ND	ND	ND	0.35	0.39	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S306	Aug-1995	14.0	7.4	ND	567	224	21	2	88	ND	ND	10	20	273	5.12	25	14	0.09	ND	<0.01	0.01	ND	ND	157	ND	ND	ND	ND	0.18	0.39	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
S319	Sep-1995	13.6	8.0	ND	561	222	20	1	86	ND	ND	10	20	270	5.01	24	14	0.11	ND	<0.01	0.00	ND	ND	125	ND	300	68	ND	0.24	0.01	ND	ND	ILCaverns-Main stream at entrance	Panno et al. (1996)
IC-1	Jul.1996	13.5	7.7	ND	603	246	18	<1	100	ND	ND	11	11	299	4.50	26	14	0.09	ND	0.10	0.04	ND	ND	157	25000	>2419	17	124	0.22	0.45	ND	ND	ILCaverns-Main stream	This Study
IC-2	Jul.1996	13.2	7.7	ND	553	224	20	<1	88	ND	ND	11	12	273	5.65	23	10	0.07	ND	<0.01	<0.01	ND	ND	146	14000	866	20	4	<0.01	1.16	ND	ND	ILCaverns-Side Passage	This Study
IC-3	Jul.1996	13.6	7.8	ND	591	238	21	2	94	ND	ND	11	11	290	6.45	25	17	0.11	ND	<0.01	<0.01	ND	ND	153	19000	1120	4	5	2.71	1.34	ND	ND	ILCaverns-Main stream	This Study
IC-4	Jul.1996	13.6	7.8	ND	675	271	31	<1	96	ND	ND	17	11	330	6.20	39	18	0.12	ND	<0.01	<0.01	ND	ND	148	32000	>2419	24	93	0.27	0.37	ND	ND	ILCaverns-Main stream	This Study
IC-5	Jul.1996	12.9	7.9	ND	661	280	19	<1	100	ND	ND	28	12	342	0.22	24	4.8	ND	ND	<0.01	<0.01	ND	ND	ND	220	40	0	0	<0.01	<0.01	ND	ND	ILCaverns-Side Passage	This Study
IC-6	Jul.1996	13.0	7.7	ND	510	199	23	3	64	ND	ND	15	7.1	243	0.72	24	23	ND	ND	<0.01	<0.01	ND	ND	ND	11000	613	5	2	<0.01	0.11	ND	ND	ILCaverns-Side Passage	This Study
IC-7	Jul.1996	13.7	7.5	ND	915	375	51	<1	132	ND	ND	19	11	458	5.20	46	34	ND	ND	<0.01	<0.01	ND	ND	ND	280	96	3	3	0.18	0.12	ND	ND	ILCaverns-Side Passage	This Study
IC-8	Jul.1996	13.5	7.9	ND	1082	452	68	<1	99	ND	ND	56	12	551	2.27	48	44	ND	ND	<0.01	<0.01	ND	ND	ND	115	39	4	1	<0.01	<0.01	ND	ND	ILCaverns-Side Passage	This Study
IC-9	Jul.1996	13.8	7.8	ND	619	260	16	<1	101	ND	ND	15	7	317	2.21	14	13	ND	ND	<0.01	<0.01	ND	ND	ND	310	84	16	58	0.12	<0.01	ND	ND	ILCaverns-Side Passage	This Study
IC-10	Jul.1996	13.5	7.6	ND	1001	359	44	<1	128	ND	ND	40	11	437	6.24	177	23	ND	ND	<0.01	<0.01	ND	ND	ND	960	613	0	18	<0.01	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
IC-11	Jul.1996	13.3	7.8	ND	806	318	43	1	104	ND	ND	23	11	388	8.14	66	22	ND	ND	<0.01	<0.01	ND	ND	ND	1680	248	23	65	<0.01	0.11	ND	ND	ILCaverns-Side Passage	This Study
IC-12	Jul.1996	14.0	7.8	ND	685	273	53	<1	84	ND	ND	7.6	16	332	9.28	39	21	0.08	ND	<0.01	<0.01	ND	ND	266	1700	128	1	2	<0.01	0.39	ND	ND	ILCaverns-Ceiling Seep	This Study
IC-13	Jul.1996	13.7	7.8	ND	611	257	27	2	87	ND	ND	13	11	313	6.01	6.0	17	0.10	ND	<0.01	<0.01	ND	ND	165	36000	>2419	16	435	0.52	0.47	ND	ND	ILCaverns-Main stream	This Study
IC-14	Jul.1996	13.7	7.2	ND	880	376	22	<1	138	ND	ND	15	11	458	1.50	23	25	ND	ND	<0.01	<0.01	ND	ND	ND	13000	816	4	32	<0.01	0.27	ND	ND	ILCaverns-Side Passage	This Study
IC-15	Jul.1996	18.6	6.8	ND	176	58	3.4	4	35	ND	ND	5.0	4.8	70	0.69	3.9	4.1	<0.05	ND	0.04	0.01	ND	ND	ND	4600	147	0	248	0.19	0.20	ND	ND	ILCaverns-Ceiling Seep	This Study
IC-16	Jul.1996	13.6	7.7	ND	659	264	35	<1	85	ND	ND	16	11	322	6.94	35	20	0.10	ND	<0.01	<0.01	ND	ND	196	31000	>2419	3	291	<0.01	0.11	ND	ND	ILCaverns-Side Passage	This Study
IC-17	Jul.1996	18.0	7.5	ND	204	71	3.1	6	31	ND	ND	4.4	4.3	87	0.84	3.8	4.1	<0.05	ND	0.05	0.01	ND	ND	ND	18000	>1413	0	134	<0.01	0.27	ND	ND	ILCaverns-Ceiling Seep	This Study
IC-18	Jul.1996	14.0	7.6	ND	643	264	26	<1	98	ND	ND	13	12	322	3.91	19	22	0.09	ND	<0.01	<0.01	ND	ND	248	14	3	0	0	<0.01	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
IC-19	Jul.1996	13.7	7.8	ND	576	233	21	<1	92	ND	ND	10	12	284	4.96	22	16	0.06	ND	<0.01	<0.01	ND	ND	272	670	248	11	10	<0.01	<0.01	ND	ND	ILCaverns-Side Passage	This Study
IC-20	Jul.1996	13.7	7.4	ND	622	253	26	<1	94	ND	ND	13	12	309	5.52	21	20	0.10	ND	<0.01	<0.01	ND	ND	201	9000	>1413	15	98	<0.01	<0.01	ND	ND	ILCaverns-Side Passage	This Study
IC-21	Jul.1996	13.4	7.4	ND	566	229	19	<1	87	ND	ND	10	11	279	5.44	23	14	0.08	ND	<0.01	<0.01	ND	ND	174	6200	344	6	56	0.56	0.47	ND	ND	ILCaverns-Main stream	This Study
96-29	Aug.1996	14.0	7.9	ND	702	286	49	<1	83	ND	ND	21	12	348	5.05	31	23	0.12	ND	<0.01	<0.01	ND	ND	193	30000	134	18	72	ND	ND	ND	ND	ILCaverns-Ceiling Seep	This Study
96-30a	Aug.1996	13.4	7.7	ND	568	229	20	<1	96	ND	ND	11	12	280	5.48	23	14	0.09	ND	0.02	<0.01	ND	ND	160	30000	698	6	39	ND	ND	ND	ND	ILCaverns-Main stream	This Study
96-31a	Aug.1996	13.7	7.5	ND	770	299	35	<1	106	ND	ND	23	11	365	6.05	73	20	0.13	ND	<0.01	<0.01	ND	ND	155	30000	397	47	173	ND	ND	ND	ND	Dye Spring	This Study
97-130	May.1997	13.1	7.7	424	716	274	35	<1	97	ND	ND	22	19	334	5.92	72	20	0.12	ND	<0.01	<0.01	ND	ND	164	300000	>4000	0	42	ND	<0.01	ND	ND	Dye Spring	This Study
97-132	May.1997	12.9	7.8	446	532	208	21	<1	86	ND	ND	10	21	253	6.37	32	13	0.05	ND	<0.01	<0.01	ND	ND	258	300000	976	2	4	ND	<0.01	ND	ND	ILCaverns-Main stream	This Study
97-131	May.1997	12.6	8.0	424	549	217	21	<1	90	ND	ND	10	18	264	5.14	28	17	0.06	ND	<0.01	0.04	ND	ND	278	300000	>4000	112	62	ND	0.28	ND	ND	ILCaverns-Main stream	This Study
97-137	May.1997	13.3	8.2	476	567	225	23	<1	89	ND	ND	9.4	20	274	7.10	27	18	0.08	ND	<0.01	<0.01	ND	ND	220	27000	922	20	4	ND	0.26	ND	ND	ILCaverns-Main stream	This Study
97-134	May.1997	13.1	8.3	442	628	246	30	<1	86	ND	ND	16	19	300	6.46	43	19	0.10	ND	<0.01	<0.01	ND	ND	186	300000	>4000	4	248	ND	<0.01	ND	ND	ILCaverns-Main stream	This Study
97-133	May.1997	12.7	7.9	430	621	260	18	<1	91	ND	ND	28	21	317	0.26	26	5.6	0.11	ND	0.08	0.01	ND	ND	51	7600	74	0	0	ND	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-135	May.1997	11.6	8.1	440	463	173	30	4	52	ND	ND	14	13	211	0.72	32	23	ND	ND	<0.01	<0.01	ND	ND	ND	300000	>2406	8	8	ND	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-136	May.1997	13.4	7.7	492	824	335	45	<1	123	ND	ND	18	20	409	3.76	45	29	ND	ND	<0.01	<0.01	ND	ND	ND	6800	134	0	8	ND	0.14	ND	ND	ILCaverns-Side Passage	This Study
97-138	May.1997	13.3	8.0	450	876	332	42	<1	108	ND	ND	36	19	405	6.47	107	23	ND	ND	<0.01	<0.01	ND	ND	ND	16000	124	0	0	ND	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-140	May.1997	12.7	8.2	426	780	298	41	1	99	ND	ND	24	18	363	8.01	82	22	0.11	ND	<0.01	0.01	ND	ND	198	170000	1540	4	54	ND	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-142	May.1997	14.3	7.9	426	556	210	54	<1	55	ND	ND	7.0	29	256	8.31	40	23	0.08	ND	<0.01	<0.01	ND	ND	281	47000	26	0	12	ND	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-141	May.1997	13.2	8.3	486	583	230	26	<1	84	ND	ND	13	19	281	6.38	32	18	0.08	ND	<0.01	<0.01	ND	ND	223	300000	>4000	10	88	ND	0.16	ND	ND	ILCaverns-Main stream	This Study
97-139	May.1997	13.3	7.4	486	810	343	19	<1	139	ND	ND	13	21	418	1.13	23	23	ND	ND	<0.01	0.01	ND	ND	ND	1600	26	0	0	ND	0.14	ND	ND	ILCaverns-Side Passage	This Study
97-143	May.1997	13.6	7.6	494	233	83	3.2	<1	36	ND	ND	4.9	5.0	101	0.55	7.2	4.6	<0.05	ND	0.18	0.01	ND	ND	ND	300000	>4000	2	344	ND	0.23	ND	ND	ILCaverns-Ceiling Seep	This Study
97-144	May.1997	14.0	7.7	464	204	69	3.0	<1	29	ND	ND	3.8	3.4	84	0.57	7.4	4.5	<0.05	ND	0.15	<0.01	ND	ND	ND	300000	>4000	2	428	ND	0.15	ND	ND	ILCaverns-Ceiling Seep	This Study
97-145	May.1997	13.4	8.3	464	640	252	34	<1	82	ND	ND	16	19	308	7.10	39	21	0.09	ND	<0.01	<0.01	ND	ND	229	215000	872	2	26	ND	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-146	May.1997	13.9	8.1	456	602	245	22	<1	90	ND	ND	11	18	299	3.40	21	21	0.07	ND	<0.01	<0.01	ND	ND	294	21000	302	0	0	ND	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-147	May.1997	13.5	8.0	446	526	206	22	<1	78	ND	ND	7.8	21	251	4.62	26	20	0.07	ND	<0.01	<0.01	ND	ND	287	300000	722	2	22	ND	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-148	May.1997	13.6	8.1	490	547	219	22	<1	78	ND	ND	11	20	267	5.17	22	17	0.08	ND	<0.01	<0.01	ND	ND	213	300000	>4000	10	82	ND	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-149	May.1997	12.9	8.2	418	549	217	20	<1	83	ND	ND	10	19	265	6.14	27	16	0.07	ND	<0.01	<0.01	ND	ND	224	300000	>4000	30	52	ND	<0.01	ND	ND	ILCaverns-Main stream	This Study
97-153	May.1997	13.1	7.9	434	648	260	42	<1	73	ND	ND	19	21	317	4.33	34	20	0.11	ND	<0.01	<0.01	ND	ND	182	39000	112	0	10	ND	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-77	Jan.1997	10.5	7.4	ND	420	156	15	3	61	ND	ND	10	14	190	4.27	33	10	<0.05	ND	<0.01	<0.01	ND	ND	ND	300000	>4000	146	>4000	0.29	0.12	ND	ND	Dye Spring	This Study
97-84	Jan.1997	11.0	8.0	ND	478	183	19	2	75	ND	ND	12	17	223	5.20	32	12	0.09	ND	<0.01	<0.01	ND	ND	136	300000	>4000	0	>4000	0.35	0.36	ND	ND	ILCaverns-Main stream	This Study
97-96	Jan.1997	12.1	8.1	ND	592	245	14	<1	103	ND	ND	22	22	299	4.50	25	4.0	ND	ND	<0.01	0.03	ND	ND	ND	300000	>4000	720	>4000	0.15	0.10	ND	ND	ILCaverns-Side Passage	This Study
97-94	Jan.1997	7.2	7.8	ND	270	82	17	4	29	ND	ND	7.8	13	100	5.43	34	14	0.11	ND	<0.01	<0.01	ND	ND	124	300000	>4000	614	472	<0.01	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-101	Jan.1997	13.3	7.8	ND	816	333	52	<1	128	ND	ND	17	21	406	4.04	44	28	ND	ND	<0.01	<0.01	ND	ND	ND	14000	582	0	66	0.21	0.48	ND	ND	ILCaverns-Side Passage	This Study
97-87	Jan.1997	12.6	7.4	ND	768	308	52	2	93	ND	ND	33	18	375	1.35	45	34	ND	ND	<0.01	0.04	ND	ND	ND	300000	550	40	>4000	<0.01	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-99	Jan.1997	12.2	8.1	ND	838	319	43	<1	115	ND	ND	33	19	389	7.57	96	22	ND	ND	<0.01	<0.01	ND	ND	ND	300000	>4000	688	>4000	0.14	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-100	Jan.1997	10.0	8.0	ND	669	246	31	2	102	ND	ND	21	17	300	5.21	88	15	0.10	ND	<0.01	0.01	ND	ND	152	680	17	0	0	0.34	0.10	ND	ND	ILCaverns-Side Passage	This Study
97-85	Jan.1997	12.5	8.0	ND	627	244	62	<1	60	ND	ND	8.4	32	297	8.81	40	23	ND	ND	<0.01	<0.01	ND	ND	ND	300000	2826	0	922	0.54	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-91	Jan.1997	13.1	7.2	ND	873	365	27	<1	148	ND	ND	16	21	445	2.03	31	33	ND	ND	<0.01	<0.01	ND	ND	ND	300000	3466	32	>4000	<0.01	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-95	Jan.1997	11.4	8.1	ND	446	172	17	2	72	ND	ND	10	17	210	5.43	22	12	0.05	ND	<0.01	0.01	ND	ND	232	130000	>4000	198	>4000	0.40	0.72	ND	ND	ILCaverns-Main stream	This Study
97-90	Jan.1997	14.4	7.9	ND	322	125	6.1	3	60	ND	ND	5.5	13	152	1.86	7.3	5.9	<0.05	ND	<0.01	0.18	ND	ND	ND	300000	>4000	162	162	0.18	0.18	ND	ND	ILCaverns-Side Passage	This Study
97-89	Jan.1997	11.8	8.0	ND	507	214	3.1	6	29	ND	ND	4.8	3.5	261	0.54	7.3	5.0	ND	ND	<0.01	0.02	ND	ND	ND	13200	>4000	1094	922	0.21	0.17	ND	ND	ILCaverns-Ceiling Seep	This Study
97-98	Jan.1997	9.1	7.5	ND	156	28	27	<1	73	ND	ND	13	18	34	5.89	30	15	0.06	ND	<0.01	0.01	ND	ND	242	1460	74	0	16	0.16	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-93	Jan.1997	14.1	7.3	ND	606	245	25	2	100	ND	ND	13	20	299	7.50	21	19	0.05	ND	<0.01	<0.01	ND	ND	384	14700	520	10	20	0.10	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-97	Jan.1997	12.7	8.0	ND	455	178	17	<1	80	ND	ND	6.6	20	217	4.50	20	13	0.03	ND	<0.01	0.04	ND	ND	433	300000	1828	210	496	0.11	0.11	ND	ND	ILCaverns-Side Passage	This Study
97-78	Jan.1997	12.9	8.0	ND	392	152	13	<1	65	ND	ND	8.0	18	185	3.97	17	7.6	<0.05	ND	<0.01	<0.01	ND	ND	ND	300000	>4000	650	>4000	<0.01	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-79	Jan.1997	10.7	8.0	ND	423	163	14	2	70	ND	ND	8.7	17	199	5.41	20	11	ND	ND	<0.01	0.02	ND	ND	ND	3800	344	6	10	0.53	0.62	ND	ND	ILCaverns-Main stream	This Study
97-81	Jan.1997	11.6	8.2	ND	529	212	25	<1	83	ND	ND	13	18	259	2.97	25	12	0.06	ND	<0.01	<0.01	ND	ND	197	300000	>4000	6	108	<0.01	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-88	Jan.1997	11.1	7.8	ND	377	143	12	2	66	ND	ND	7.5	16	175	5.75	17	8.4	ND	ND	<0.01	0.04	ND	ND	ND	300000	>4000	652	>4000	0.95	1.51	ND	ND	ILCaverns-Main stream	This Study
97-80	Jan.1997	12.4	8.3	ND	529	211	20	1	90	ND	ND	11	21	257	5.99	24	13	0.11	ND	<0.01	0.02	ND	ND	115	16000	450	2	88	0.38	0.40	ND	ND	ILCaverns-Main stream	This Study
97-92	Jan.1997	7.7	8.1	ND	516	199	22	3	80	ND	ND	12	18	243	5.82	30	17	0.06	ND	<0.01	0.04	ND	ND	288	300000	>4000	1162	>4000	0.29	0.16	ND	ND	ILCaverns-Main stream	This Study
97-83	Jan.1997	11.7	8.2	ND	482	193	10	<1	99	ND	ND	6.6	19	236	1.93	27	3.5	<0.05	ND	<0.01	<0.01	ND	ND	ND	7000	1160	2	8	0.13	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-183	Jun.1997	13.9	ND	ND	362	129	ND	ND	ND	ND	ND	ND	ND	157	6.88	26	14	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.4	0.66	ND	ND	Dye Spring	This Study
97-161	Jun.1997	14.3	ND	ND	526	203	ND	ND	ND	ND	ND	ND	ND	247	6.80	33	17	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.60	0.63	ND	ND	ILCaverns-Main stream	This Study
97-158	Jun.1997	12.7	ND	ND	623	260	ND	ND	ND	ND	ND	ND	ND	317	0.23	29	4.8	0.07	ND	ND	ND	ND	ND	68	ND	ND	ND	ND	<0.01	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-162	Jun.1997	13.2	ND	ND	320	110	ND	ND	ND	ND	ND	ND	ND	134	0.42	28	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.14	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-169	Jun.1997	13.7	ND	ND	863	352	ND	ND	ND	ND	ND	ND	ND	430	3.82	47	30	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.15	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-173	Jun.1997	13.0	ND	ND	836	339	ND	ND	ND	ND	ND	ND	ND	414	0.81	45	37	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-172	Jun.1997	13.6	ND	ND	881	335	ND	ND	ND	ND	ND	ND	ND	409	6.61	105	24	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	BDL	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-165	Jun.1997	15.0	ND	ND	666	246	ND	ND	ND	ND	ND	ND	ND	300	14.4	71	21	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19.0	0.20	ND	ND	ILCaverns-Side Passage	This Study
97-166	Jun.1997	14.0	ND	ND	635	247	ND	ND	ND	ND	ND	ND	ND	301	8.10	42	23	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.38	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-179	Jun.1997	13.6	ND	ND	857	361	ND	ND	ND	ND	ND	ND	ND	440	1.08	27	29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.12	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-174	Jun.1997	14.2	ND	ND	522	205	ND	ND	ND	ND	ND	ND	ND	251	5.58	25	16	0.06	ND	ND	ND	ND	ND	263	ND	ND	ND	ND	2.04	0.69	ND	ND	ILCaverns-Main stream	This Study
97-171	Jun.1997	18.3	ND	ND	148	43	ND	ND	ND	ND	ND	ND	ND	53	0.18	5.3	4.8	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.48	0.20	ND	ND	ILCaverns-Ceiling Seep	This Study
97-177	Jun.1997	17.3	ND	ND	155	47	ND	ND	ND	ND	ND	ND	ND	58	0.22	4.7	4.0	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.25	0.11	ND	ND	ILCaverns-Ceiling Seep	This Study
97-175	Jun.1997	13.7	ND	ND	628	250	ND	ND	ND	ND	ND	ND	ND	305	7.11	34	19	0.08	ND	ND	ND	ND	ND	238	ND	ND	ND	ND	3.53	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-176	Jun.1997	14.3	ND	ND	636	262	ND	ND	ND	ND	ND	ND	ND	319	4.20	20	20	0.03	ND	ND	ND	ND	ND	660	ND	ND	ND	ND	0.40	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-170	Jun.1997	14.4	ND	ND	657	269	ND	ND	ND	ND	ND	ND	ND	328	4.04	29	16	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.45	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-163	Jun.1997	14.4	ND	ND	565	225	ND	ND	ND	ND	ND	ND	ND	275	4.28	26	18	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-168	Jun.1997	14.4	ND	ND	509	204	ND	ND	ND	ND	ND	ND	ND	249	4.11	21	12	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.11	<0.01	ND	ND	ILCaverns-Side Passage	This Study
97-182	Jun.1997	15.1	ND	ND	516	203	ND	ND	ND	ND	ND	ND	ND	248	5.65	24	15	0.04	ND	ND	ND	ND	ND	383	ND	ND	ND	ND	1.69	1.02	ND	ND	ILCaverns-Main stream	This Study
97-178	Jun.1997	14.7	ND	ND	475	191	ND	ND	ND	ND	ND	ND	ND	233	1.92	19	7.9	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.01	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study
97-164	Jun.1997	14.2	ND	ND	478	187	ND	ND	ND	ND	ND	ND	ND	228	6.13	20	15	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.30	2.90	ND	ND	ILCaverns-Main stream	This Study
97-160	Jun.1997	15.9	ND	ND	506	193	ND	ND	ND	ND	ND	ND	ND	236	5.52	31	19	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.83	<0.01	ND	ND	ILCaverns-Main stream	This Study
97-159	Jun.1997	13.4	ND	ND	532	211	ND	ND	ND	ND	ND	ND	ND	257	6.01	27	13	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.75	0.16	ND	ND	ILCaverns-Main stream	This Study
97-167	Jun.1997	12.9	ND	ND	521	211	ND	ND	ND	ND	ND	ND	ND	258	1.37	29	3.1	<0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	<0.01	<0.01	ND	ND	ILCaverns-Ceiling Seep	This Study

ND = Not determined.
FS = Falling Spring (sampled at top and bottom on same day)
SC = Sparrow Creek Spring (resurrgence for Stemler Cave)
CL = Collier Spring
IH = Indian Hole Spring (resurrgence for Fogelpole Cave)
SN = Sensel Spring
IC = Illinois Caverns (samples from cave stream near main entrance)
K = Kelly Spring
CV = Camp Vandaventer Spring
A = Auctioneer Cave
F = Frog Cave
W = Wedel Spring
BS = Big Sink
MY = May Spring
DS = Dye Spring (resurrgence for Illinois Caverns)
M = Illinois Caverns, main cave stream
S = Illinois Caverns, side passage
C = Illinois Caversn, ceiling seep
WL = Walsh Spring

Table 2. Chemical and isotopic data for wells in the sinkhole plain. Data are in mg/L unless indicated.

Well Number	Well Depth (m)	Date Sampled	Temp. (degrees C)	pH	Eh (mV)	Sp.Cond. (uS/cm)	Tot.Alk. (as $CaCO_3$)	Na	K	Ca	Sr	Ba	Mg	SiO_2	HCO_3	NO_3	NH_4	SO_4	Cl	Br	F	Fe	Mn	$\delta^{15}N$ of NO_3 (air)	$\delta^{18}O$ of NO_3 (smow)	Cl/Br Ratio	Bacterial Colonies cfu	Coliform cfu	Fecal Coliform cfu	Fecal Streptococcus cfu	Atrazine ug/L	Alachlor	Cyanazine (ug/L)	Land Use and Observations	Terrain	Source of Data
1	ND	Mar.2001	14.7	7.0	281	748	361	52	<1	102	0.26	0.15	28	17	440	0.71	ND	24	32	<0.05	0.50	0.27	0.05	9.4	15.1	ND	ND	ND	ND	ND	ND	ND	ND	Woods	Covered Karst	Hackley et al. In press
2	36	Jun.1994	15.0	7.0	423	1110	452	92	1	109	ND	ND	37	24	ND	11.1	0.04	113	45	0.20	ND	<0.01	<0.01	ND	ND	226	>3000000	40	ND	ND	<0.10	<0.10	<0.10	Livestock, Row Crops	Covered Karst	Panno et al. 1996
2	36	Apr.1994	14.1	7.1	345	1120	391	97	<1	114	ND	ND	37	12	477	12.5	0.13	104	47	0.27	ND	0.11	<0.01	ND	ND	175	30	>1	ND	ND	<0.10	<0.10	<0.10	Livestock, Row Crops	Covered Karst	Panno et al. 1996
2	36	Apr.1994	14.3	6.9	424	1111	390	97	1	111	ND	ND	38	26	475	8.60	0.03	110	48	<0.05	ND	<0.01	<0.01	ND	ND	ND	40	>1	ND	ND	<0.10	<0.10	<0.10	Livestock, Row Crops	Covered Karst	Panno et al. 1996
2	36	May.1994	14.3	6.9	407	1093	394	98	<1	124	ND	ND	40	26	480	10.9	0.02	108	44	<0.05	ND	<0.01	<0.01	ND	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	Livestock, Row Crops	Covered Karst	Panno et al. 1996
2	36	Feb.1995	14.4	6.8	ND	1140	465	92	1	119	ND	ND	38	22	567	8.71	0.04	137	43	0.15	ND	<0.01	<0.01	ND	ND	285	0	0	0	ND	<0.10	<0.10	<0.10	Livestock, Row Crops	Covered Karst	Panno et al. 1996
2	36	Jul.1994	15.7	7.0	411	1123	402	99	<1	116	ND	ND	40	25	490	11.0	ND	112	45	0.16	ND	<0.01	<0.01	ND	ND	281	4	0	ND	ND	<0.10	<0.10	<0.10	Livestock, Row Crops	Covered Karst	Panno et al. 1996
2	36	Sep.1994	14.9	6.9	200	1110	418	92	<1	112	ND	ND	40	ND	ND	9.96	0.03	124	43	0.18	ND	<0.01	<0.01	ND	ND	236	10	0	ND	ND	<0.10	<0.10	<0.10	Livestock, Row Crops	Covered Karst	Panno et al. 1996
3	170	May.1999	15.3	7.2	529	616	251	52	<1	72	0.18	0.05	15	16	306	7.61	ND	42	15	<0.18	0.34	<0.01	<0.01	2.2	8.3	ND	140	44	0	0	<0.10	ND	ND	Row Crops	Karst	Hackley et al. In press
3	170	Jul.1996	16.2	7.2	412	652	249	49	<1	62	ND	ND	14	16	204	8.27	ND	45	13	0.08	ND	<0.01	<0.01	ND	ND	160	22	0	0	0	<0.10	<0.10	ND	Row Crops	Karst	Panno et al. 1996
3	170	Nov.1999	15.2	7.1	430	618	277	50	3	73	0.16	0.05	15	15	338	6.66	ND	36	8.4	<0.02	0.23	<0.01	<0.01	2.5	7.3	ND	ND	ND	ND	ND	ND	ND	ND	Row Crops	Karst	Hackley et al. In press
4	148	Jul.1995	14.1	7.0	338	910	444	12	<1	111	ND	ND	61	ND	541	0.42	ND	62	16	0.09	ND	ND	ND	ND	ND	182	0	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
4	148	Apr.1995	14.4	6.9	385	929	443	11	<1	111	ND	ND	59	26	540	0.41	ND	65	16	0.08	ND	<0.01	<0.01	ND	ND	205	0	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
4	148	Apr.1995	14.7	6.8	443	915	434	16	<1	107	ND	ND	57	27	529	0.41	ND	66	66	<0.05	ND	<0.01	<0.01	ND	ND	ND	0	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
4	148	Jul.1995	14.7	7.0	ND	875	354	ND	ND	ND	ND	ND	ND	ND	431	0.28	ND	ND	9.3	0.07	ND	ND	ND	ND	ND	133	1500	500	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
5	47	Apr.1995	15.2	7.4	105	648	300	118	2	19	ND	ND	8.3	10	366	0.10	ND	26	12	0.05	ND	0.17	<0.01	ND	ND	246	0	0	0	ND	<0.10	<0.10	ND	Urban	Covered Karst	Panno et al. 1996
5	47	Jul.1995	15.6	7.4	ND	586	232	ND	ND	ND	ND	ND	ND	ND	283	<0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	64	800	1200	2	ND	<0.10	0.21	ND	Urban	Covered Karst	Panno et al. 1996
5	47	Jul.1995	15.1	7.5	282	588	294	110	<1	18	ND	ND	7.8	ND	358	0.08	ND	20	12	0.08	ND	ND	ND	ND	ND	151	0	0	0	ND	<0.10	<0.10	ND	Urban	Covered Karst	Panno et al. 1996
5	47	Apr.1995	15.3	7.5	141	658	344	137	<1	21	ND	ND	10	9.1	419	0.23	ND	35	35	0.07	ND	0.09	<0.01	ND	ND	493	26	0	0	ND	<0.10	<0.10	ND	Urban	Covered Karst	Panno et al. 1996
6	17	Apr.1994	13.4	6.8	360	794	324	58	2	98	ND	ND	24	20	395	14.2	0.03	36	23	<0.05	ND	<0.01	<0.01	ND	ND	ND	60	0	ND	ND	<0.10	0.21	<0.10	Row Crops	Covered Karst	Panno et al. 1996
6	17	Aug.1994	14.1	7.0	395	801	325	57	<1	97	ND	ND	24	20	396	12.2	0.05	37	24	0.07	ND	<0.01	<0.01	ND	ND	339	1000	0	ND	ND	0.10	0.23	ND	Row Crops	Covered Karst	Panno et al. 1996
6	17	May.1999	14.1	6.9	494	810	334	61	<1	99	0.19	0.09	24	16	407	12.5	ND	37	27	<0.18	0.31	<0.01	<0.01	4.3	10.4	ND	8000	450	0	44	<0.10	ND	ND	Row Crops	Covered Karst	Hackley et al. In press
6	17	Nov.1999	14.8	6.9	463	796	336	58	3	96	0.17	0.09	22	16	410	12.0	ND	30	22	0.07	0.20	<0.01	<0.01	3.1	6.4	307	ND	ND	ND	ND	ND	ND	ND	Row Crops	Covered Karst	Hackley et al. In press
6	17	May.1994	13.7	7.0	463	799	324	59	2	104	ND	ND	25	20	395	10.2	0.03	36	23	<0.05	ND	<0.01	<0.01	ND	ND	ND	ND	ND	ND	ND	<0.10	0.22	<0.10	Row Crops	Covered Karst	Panno et al. 1996
6	17	Jul.1995	13.4	7.0	361	798	329	54	<1	88	ND	ND	20	ND	401	10.7	ND	35	28	0.10	ND	ND	ND	ND	ND	283	0	0	0	ND	0.13	0.15	ND	Row Crops	Covered Karst	Panno et al. 1996
6	17	Jun.1994	13.9	7.0	ND	797	324	57	<1	96	ND	ND	24	19	395	10.6	0.05	37	23	0.10	ND	<0.01	<0.01	ND	ND	234	>3000000	52	ND	ND	<0.10	0.15	<0.10	Row Crops	Covered Karst	Panno et al. 1996
6	17	Apr.1994	13.5	ND	421	793	322	57	1	93	ND	ND	23	19	393	10.2	0.03	37	24	<0.05	ND	<0.01	<0.01	ND	ND	ND	50	0	ND	ND	<0.10	0.17	<0.10	Row Crops	Covered Karst	Panno et al. 1996
6	17	Apr.1995	13.9	6.9	550	796	305	54	<1	91	ND	ND	22	17	372	12.2	ND	38	24	0.09	ND	<0.01	<0.01	ND	ND	264	88	0	0	ND	0.17	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
6	17	Jul.1995	14.0	7.0	ND	816	329	ND	ND	ND	ND	ND	ND	ND	401	10.9	ND	ND	24	0.09	ND	ND	ND	ND	ND	271	0	0	0	ND	0.12	0.19	0.31	Row Crops	Covered Karst	Panno et al. 1996
6	17	Apr.1994	13.7	7.2	420	824	321	57	<1	96	ND	ND	24	8.9	391	12.8	0.35	37	22	0.05	ND	<0.01	<0.01	ND	ND	446	220	0	ND	ND	<0.10	0.18	<0.10	Row Crops	Covered Karst	Panno et al. 1996
6	17	Apr.1995	14.2	7.0	412	816	167	61	<1	100	ND	ND	24	19	204	11.2	ND	38	24	0.12	ND	<0.01	<0.01	ND	ND	198	0	0	0	ND	0.17	0.16	ND	Row Crops	Covered Karst	Panno et al. 1996
6	17	Feb.1995	13.4	6.8	NA	799	322	55	<1	91	ND	ND	21	17	392	11.3	0.05	38	25	0.08	ND	<0.01	<0.01	ND	ND	308	0	0	0	ND	<0.10	0.14	NA	Row Crops	Covered Karst	Panno et al. 1996
6	17	Jul.1994	13.9	6.9	375	811	326	58	1	96	ND	ND	24	20	397	10.6	ND	36	22	0.09	ND	<0.01	<0.01	ND	ND	246	1	0	ND	ND	<0.10	0.14	<0.10	Row Crops	Covered Karst	Panno et al. 1996
6	17	Feb.1994	12.7	7.1	415	783	323	57	<1	97	ND	ND	57	19	394	3.70	ND	36	23	0.09	ND	<0.01	<0.01	ND	ND	259	20	0	ND	ND	0.46	0.16	<0.10	Row Crops	Covered Karst	Panno et al. 1996
6	17	Sep.1994	13.7	7.0	243	789	326	57	<1	92	ND	ND	23	ND	397	12.1	<0.01	38	24	0.07	ND	<0.01	<0.01	ND	ND	344	112	10	ND	ND	0.11	0.21	<0.10	Row Crops	Covered Karst	Panno et al. 1996
7	58	Apr.1995	14.9	7.1	-38	906	491	29	<1	112	ND	ND	41	13	599	<0.01	ND	6.1	4.4	0.05	ND	2.15	0.10	ND	ND	87	36	0	0	ND	<0.10	<0.10	ND	Urban, H_2S odor	Covered Karst	Panno et al. 1996
7	58	Jul.1995	15.4	7.1	ND	933	378	ND	ND	ND	ND	ND	ND	ND	461	<0.01	ND	ND	17	0.21	ND	ND	ND	ND	ND	80	60	0	0	ND	<0.10	<0.10	ND	Urban, H_2S odor	Covered Karst	Panno et al. 1996
7	58	Apr.1995	14.4	7.1	-7	938	495	35	2	129	ND	ND	46	15	604	0.09	ND	11	6.1	0.07	ND	2.74	0.12	ND	ND	88	98	0	0	ND	<0.10	<0.10	ND	Urban, H_2S odor	Covered Karst	Panno et al. 1996
7	58	Jul.1995	13.6	7.2	-33	902	502	27	<1	114	ND	ND	41	ND	612	<0.01	ND	6.6	3.7	0.05	ND	ND	ND	ND	ND	74	0	0	0	ND	<0.10	<0.10	ND	Urban, H_2S odor	Covered Karst	Panno et al. 1996
8	145	Apr.1995	13.9	7.2	291	615	327	25	2	58	ND	ND	42	12	399	0.20	ND	20	3.8	0.06	ND	<0.01	0.01	ND	ND	64	0	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
8	145	Apr.1995	15.1	6.9	236	589	305	22	<1	52	ND	ND	39	10	372	0.17	ND	17	3.3	0.04	ND	0.03	0.01	ND	ND	81	24	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
8	145	Jul.1995	15.2	6.8	ND	599	238	ND	ND	ND	ND	ND	ND	ND	290	0.13	ND	ND	24	0.11	ND	ND	ND	ND	ND	221	800	116	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
8	145	Jul.1995	13.5	7.3	132	632	335	22	2	57	ND	ND	42	ND	408	0.15	ND	20	3.9	0.06	ND	ND	ND	ND	ND	66	72	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
9	154	Jul.1999	16.6	7.0	415	1378	468	ND	ND	ND	ND	ND	ND	ND	571	5.17	ND	53	115	ND	0.34	ND	ND	9.0	ND	ND	570	650	8	2	0.10		ND	Row Crops	Karst	Hackley et al. In press
10	95	Apr.1995	14.5	7.1	307	607	293	12	<1	78	ND	ND	34	16	357	1.25	ND	16	3.1	0.07	ND	<0.01	<0.01	ND	ND	45	6	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
10	95	May.1999	15.5	7.0	453	588	311	11	<1	77	0.25	0.17	34	14	379	1.63	ND	21	8.7	<0.18	0.58	<0.01	<0.01	4.1	9.4	ND	220	2	0	6	<0.10		ND	Woods	Karst	Hackley et al. In press
10	95	Jul.1995	14.7	7.1	ND	592	235	ND	ND	ND	ND	ND	ND	ND	286	0.99	ND	ND	3.5	0.04	ND	ND	ND	ND	ND	88	6	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
10	95	Jul.1995	14.4	7.3	332	580	307	11	<1	73	ND	ND	33	ND	374	1.34	ND	16	16	0.06	ND	ND	ND	ND	ND	268	0	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
10	95	Apr.1995	14.6	7.0	451	583	303	10	<1	72	ND	ND	32	15	369	1.56	ND	18	3.4	0.05	ND	<0.01	<0.01	ND	ND	68	0	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
11	ND	Jul.1995	14.1	7.1	383	772	293	37	<1	118	ND	ND	16	ND	357	3.69	ND	45	54	0.06	ND	ND	ND	ND	ND	895	0	0	0	ND	<0.10	0.27	ND	Row Crops	Covered Karst	Panno et al. 1996
11	ND	Jul.1995	16.2	6.9	ND	786	316	ND	ND	ND	ND	ND	ND	ND	385	2.27	ND	ND	49	0.04	ND	ND	ND	ND	ND	1228	78	0	ND	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
11	ND	Apr.1995	15.7	6.9	333	783	273	34	<1	111	ND	ND	15	20	333	4.01	ND	47	54	0.05	ND	<0.01	<0.01	ND	ND	1088	12	0	0	ND	<0.10	0.17	ND	Row Crops	Covered Karst	Panno et al. 1996
11	ND	Apr.1995	15.1	7.0	353	781	274	36	<1	111	ND	ND	16	21	334	3.83	ND	47	46	0.08	ND	<0.01	<0.01	ND	ND	570	8	2	0	ND	<0.10	0.15	ND	Row Crops	Covered Karst	Panno et al. 1996
12	26	Jul.1995	15.4	7.5	ND	740	297	ND	ND	ND	ND	ND	ND	ND	362	0.05	ND	ND	3.8	0.05	ND	ND	ND	ND	ND	76	48	84	0	ND	<0.10	<0.10	ND	Livestock	Covered Karst	Panno et al. 1996
12	26	Jul.1995	15.1	7.4	53	742	404	34	<1	93	ND	ND	37	ND	493	<0.01	ND	27	7.5	0.08	ND	ND	ND	ND	ND	93	0	0	0	ND	<0.10	<0.10	ND	Livestock	Covered Karst	Panno et al. 1996
12	26	Apr.1995	15.3	7.4	-4	740	375	30	<1	81	ND	ND	33	15	457	<0.01	ND	29	29	0.07	ND	2.69	0.04	ND	ND	409	0	0	0	ND	<0.10	<0.10	ND	Livestock	Covered Karst	Panno et al. 1996
12	26	Apr.1995	15.2	7.5	-19	751	373	34	<1	94	ND	ND	37	17	455	0.11	ND	29	7.7	0.10	ND	3.10	0.04	ND	ND	77	0	0	0	ND	<0.10	<0.10	ND	Livestock	Covered Karst	Panno et al. 1996
13	33	Nov.1999	14.5	6.9	429	539	219	17	2	99	0.17	0.04	5.7	23	267	5.27	ND	23	15	<0.02	0.09	<0.01	<0.01	5.2	9.7	ND	ND	ND	ND	ND	ND	ND	ND	Urban, Row Crops	Karst	Hackley et al. In press
13	33	May.1999	14.8	6.8	448	586	226	19	<1	105	0.19	0.06	7.4	23	275	5.98	ND	37	23	<0.18	0.19	<0.01	<0.01	4.8	5.8	ND	38	4	0	2	<0.10		ND	Urban, Row Crops	Karst	Hackley et al. In press
13	33	Aug.1996	14.4	7.0	379	541	212	ND	ND	ND	ND	ND	ND	ND	259	3.74	ND	16	4.6	0.05	ND	ND	ND	ND	ND	93	30000	3	0	0	0.18	<0.10	ND	Urban, Row Crops	Karst	Panno et al. 1996
14	61	Apr.1995	15.2	7.0	170	1040	370	60	3	126	ND	ND	34	14	451	19.6	ND	47	62	0.17	ND	0.04	0.04	ND	ND	366	2300	1500	22	ND	<0.10	0.56	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
14	61	Apr.1995	17.6	7.1	144	760	383	30	3	84	ND	ND	38	11	467	0.15	ND	36	36	0.04	ND	0.39	0.05	ND	ND	893	14	0	0	ND	<0.10	BDL	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
14	61	Jul.1995	9.1	7.2	235	770	405	34	<1	94	ND	ND	42	ND	494	0.20	ND	33	4.2	0.04	ND	ND	ND	ND	ND	ND	26	0	0	ND	<0.10	2.39	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
14	61	Jul.1995	21.7	7.1	ND	756	383	31	3	88	ND	ND	39	11	467	0.09	ND	34	2.4	<0.05	ND	0.18	0.04	ND	ND	ND	2100	300	120	ND	0.56	<0.10	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
15	61	Jul.1995	15.5	7.1	ND	762	388	32	3	90	ND	ND	39	11	473	<0.01	ND	33	4.6	0.06	ND	0.61	0.04	ND	ND	77	600	200	0	ND	<0.10	<0.10	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
16	89	May.1999	15.4	7.1	420	702	346	39	<1	69	0.85	0.15	43	9.5	422	1.54	ND	38	12	<0.18	1.85	<0.01	<0.01	22.9	14.9	ND	20	0	0	0	<0.10		ND	Woods	Covered Karst	Hackley et al. In press
16	89	Jul.1996	15.2	7.1	347	702	341	34	<1	59	ND	ND	40	10	280	1.72	ND	32	7.5	0.08	ND	<0.01	<0.01	ND	ND	93	0	0	0	0	<0.10	<0.10	ND	Woods	Covered Karst	Panno et al. 1996
16	89	Nov.1999	14.7	7.0	407	676	347	33	2	64	0.80	0.12	38	8.7	423	0.72	ND	31	5.7	<0.02	1.82	<0.01	<0.01	25.9	15.5	ND	ND	ND	ND	ND	ND	ND	ND	Woods	Covered Karst	Hackley et al. In press
17	91	Apr.1995	16.3	8.5	38	2145	919	508	<1	4.5	ND	ND	2.2	7.4	1120	0.17	ND	165	ND	0.15	ND	0.01	BDL	ND	ND	ND	120	58	0	ND	<0.10	<0.10	ND	Woods, Livestock	Non-Karst	Panno et al. 1996
17	91	Jul.1995	19.1	8.5	ND	2183	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.26	ND	ND	11	0.03	ND	ND	ND	ND	ND	ND	300	8	0	ND	<0.10	<0.10	ND	Woods, Livestock	Non-Karst	Panno et al. 1996
17	91	Apr.1995	15.3	8.6	126	2100	909	559	<1	6.0	ND	ND	3.1	8.6	1108	0.26	ND	165	37	0.19	ND	<0.01	<0.01	ND	ND	195	104	38	0	ND	<0.10	0.23	ND	Woods, Livestock	Non-Karst	Panno et al. 1996
17	91	Jul.1995	14.7	8.2	240	1448	689	336	<1	36	ND	ND	16	ND	840	0.88	ND	132	30	0.14	ND	ND	ND	ND	ND	213	0	0	0	ND	<0.10	<0.10	ND	Woods, Livestock	Non-Karst	Panno et al. 1996
18	72	Jul.1995	16.7	8.8	ND	798	321	ND	ND	ND	ND	ND	ND	ND	392	<0.01	ND	ND	5.2	0.06	ND	ND	ND	ND	ND	87	8	4	0	ND	<0.10	<0.10	ND	Woods	Non-Karst	Panno et al. 1996
18	72	Apr.1995	15.2	8.8	21	780	393	208	<1	0.04	ND	ND	0.01	10	479	0.11	ND	14	7.2	0.07	ND	<0.01	<0.01	ND	ND	102	0	0	0	ND	<0.10	<0.10	ND	Woods	Non-Karst	Panno et al. 1996
18	72	Jul.1995	14.9	8.8	-3	778	417	202	<1	0.01	ND	ND	<0.01	ND	508	0.07	ND	15	5.9	0.04	ND	ND	ND	ND	ND	147	326	66	66	ND	<0.10	<0.10	ND	Woods	Non-Karst	Panno et al. 1996
18	72	Apr.1995	15.4	8.6	50	791	393	199	<1	0.04	ND	ND	<0.01	10	479	<0.01	ND	15	15	0.03	ND	<0.01	<0.01	ND	ND	510	46	0	0	ND	<0.10	<0.10	ND	Woods	Non-Karst	Panno et al. 1996
19	85	Apr.1995	15.6	6.8	440	862	403	17	<1	137	ND	ND	25	26	491	3.49	ND	20	20	0.07	ND	<0.01	0.08	ND	ND	291	2	2	0	ND	<0.10	0.22	ND	Livestock, Row Crops	Karst	Panno et al. 1996
19	85	Jul.1995	14.3	6.7	388	914	431	22	<1	146	ND	ND	23	ND	525	5.65	ND	19	43	0.10	ND	ND	ND	ND	ND	431	280	2	1	ND	<0.10	0.87	ND	Livestock, Row Crops	Karst	Panno et al. 1996
19	85	Apr.1995	14.8	6.8	185	925	427	21	<1	165	ND	ND	27	31	521	3.90	ND	20	34	0.11	ND	<0.01	0.06	ND	ND	310	212	120	0	ND	<0.10	1.60	ND	Livestock, Row Crops	Karst	Panno et al. 1996
19	85	Jul.1995	15.5	6.7	ND	937	380	ND	ND	ND	ND	ND	ND	ND	463	6.84	ND	ND	36	0.07	ND	ND	ND	ND	ND	510	280	120	24	ND	0.23	<0.10	ND	Livestock, Row Crops	Karst	Panno et al. 1996
20	76	Jul.1995	14.0	7.0	-26	868	502	39	<1	99	ND	ND	45	ND	612	0.07	ND	9.4	4.8	0.09	ND	ND	ND	ND	ND	53	185	0	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
20	76	Jul.1995	15.2	6.9	ND	898	363	ND	ND	ND	ND	ND	ND	ND	443	0.06	ND	ND	4.9	0.07	ND	ND	ND	ND	ND	70	3000	2	ND	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
20	76	Apr.1995	14.4	7.0	45	865	469	38	<1	98	ND	ND	44	15	572	0.09	ND	9.3	4.3	0.09	ND	2.55	0.04	ND	ND	47	3000	0	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
21	105	Jul.1995	16.0	8.2	ND	995	404	ND	ND	ND	ND	ND	ND	ND	493	<0.01	ND	ND	117	0.35	ND	ND	ND	ND	ND	334	600	300	2	ND	<0.10	<0.10	ND	Urban, Row Crops, H_2S Odor	Karst	Panno et al. 1996
21	105	Apr.1995	15.3	7.8	391	1008	335	207	<1	23	ND	ND	8.5	10	408	0.11	ND	32	99	0.34	ND	0.83	0.02	ND	ND	292	0	18	0	ND	<0.10	0.41	ND	Urban, Row Crops, H_2S Odor	Karst	Panno et al. 1996
21	105	Jul.1995	15.0	8.3	-10	997	348	221	<1	9.4	ND	ND	4.7	ND	424	<0.01	ND	28	118	0.34	ND	ND	ND	ND	ND	347	0	0	0	ND	<0.10	<0.10	ND	Urban, Row Crops, H_2S Odor	Karst	Panno et al. 1996
21	105	Apr.1995	15.8	8.1	-59	1005	336	221	<1	10	ND	ND	4.9	8.3	410	<0.01	ND	28	109	0.36	ND	0.80	0.01	ND	ND	303	166	2	0	ND	<0.10	<0.10	ND	Urban, Row Crops, H_2S Odor	Karst	Panno et al. 1996
22	61	Jul.1995	14.0	7.1	351	597	317	6.7	<1	77	ND	ND	36	ND	386	1.27	ND	14	14	<0.05	ND	ND	ND	ND	ND	ND	215	10	0	ND	0.10	<0.10	ND	Row Crops	Karst	Panno et al. 1996
22	61	May.1999	14.4	7.0	469	602	325	7.7	<1	83	0.35	0.15	37	14	396	1.99	ND	20	9.0	<0.18	0.65	<0.01	<0.01	4.5	6.6	ND	260	12	0	0	<0.10		ND	Row Crops	Karst	Hackley et al. In press
22	61	Apr.1995	14.4	7.1	375	614	361	7.5	<1	83	ND	ND	39	16	440	1.28	ND	13	2.5	<0.05	ND	<0.01	<0.01	ND	ND	ND	0	0	0	ND	<0.10	0.14	ND	Row Crops	Karst	Panno et al. 1996
22	61	Apr.1995	14.7	7.0	460	595	305	6.4	<1	75	ND	ND	36	14	372	1.56	ND	15	2.7	<0.05	ND	<0.01	<0.01	ND	ND	ND	6	0	0	ND	0.11	<0.10	ND	Row Crops	Karst	Panno et al. 1996
22	61	Jul.1995	14.7	7.1	ND	610	242	ND	ND	ND	ND	ND	ND	ND	295	3.00	ND	ND	6.2	<0.05	ND	ND	ND	ND	ND	ND	215	10	0	ND	0.15	0.15	ND	Row Crops	Karst	Panno et al. 1996
22	61	Nov.1999	15.0	7.0	465	594	323	7.5	3	83	0.31	0.13	34	14	394	1.91	ND	13	3.4	<0.02	0.50	<0.01	<0.01	4.3	7.1	ND	ND	ND	ND	ND	ND	ND	ND	Row Crops	Karst	Hackley et al. In press
23	43	Apr.1995	15.3	7.1	37	704	387	57	<1	59	ND	ND	30	18	472	<0.01	ND	0.4	0.4	<0.05	ND	1.35	0.24	ND	ND	ND	0	0	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
23	43	Apr.1995	14.4	7.2	41	709	388	66	<1	68	ND	ND	34	21	473	0.09	ND	0.3	1.2	<0.05	ND	1.37	0.28	ND	ND	ND	4	0	0	ND	<0.10	0.38	ND	Row Crops	Covered Karst	Panno et al. 1996
23	43	Jul.1995	14.0	7.2	8	706	414	61	<1	62	ND	ND	32	ND	505	<0.01	ND	0.7	1.2	<0.05	ND	ND	ND	ND	ND	ND	116	0	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
23	43	Jul.1995	15.1	7.1	ND	699	280	ND	ND	ND	ND	ND	ND	ND	341	<0.01	ND	ND	117	0.35	ND	ND	ND	ND	ND	334	800	2000	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
24	105	May.1995	14.8	6.9	423	753	320	55	<1	86	0.23	0.07	28	12	391	4.88	ND	74	11	<0.18	0.31	<0.01	0.03	9.2	10.6	ND	190	4	0	0	0.18		ND	Livestock, Row Crops	Covered Karst	Hackley et al. In press
24	105	Jul.1995	14.2	7.0	181	779	322	55	<1	86	ND	ND	29	ND	393	5.87	ND	20	5.7	0.07	ND	ND	ND	ND	ND	82	8	0	0	ND	0.17	0.37	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
24	105	Apr.1995	14.7	7.0	651	792	305	53	<1	82	ND	ND	27	13	372	6.49	ND	90	90	0.05	ND	<0.01	0.08	ND	ND	1808	12	0	0	ND	0.23	0.26	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
24	105	Apr.1995	14.5	7.1	261	797	309	58	<1	88	ND	ND	29	14	377	6.44	ND	95	6.2	0.07	ND	<0.01	0.09	ND	ND	89	0	0	0	ND	0.21	0.38	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
24	105	Jul.1995	14.7	7.0	ND	817	329	ND	ND	ND	ND	ND	ND	ND	401	3.50	ND	ND	4.9	0.07	ND	ND	ND	ND	ND	70	32	2	2	ND	0.25	0.73	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
24	105	Nov.1999	14.4	7.1	334	730	313	48	2	81	0.21	0.06	24	12	382	3.39	ND	64	3.7	<0.02	0.20	<0.01	0.12	11.6	14.4	ND	ND	ND	ND	ND	ND	ND	ND	Livestock, Row Crops	Covered Karst	Hackley et al. In press
24	105	Jul.1995	14.7	7.0	ND	817	329	ND	<1	ND	ND	ND	ND	ND	401	3.50	ND	ND	7.3	0.04	ND	ND	ND	ND	ND	181	32	2	ND	ND	0.73	0.25	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
25	177	Jul.1995	12.2	7.4	206	599	330	52	3	35	ND	ND	33	ND	402	0.26	ND	15	1.9	0.05	ND	ND	ND	ND	ND	37	0	0	0	ND	<0.10	<0.10	ND	Row Crops, Woods	Covered Karst	Panno et al. 1996
25	177	Jul.1995	19.0	7.4	ND	594	236	ND	ND	ND	ND	ND	ND	ND	287	0.17	ND	ND	36	0.07	ND	ND	ND	ND	ND	510	142	32	0	ND	<0.10	<0.10	ND	Row Crops, Woods	Covered Karst	Panno et al. 1996
25	177	Apr.1995	17.0	7.4	378	596	306	49	3	37	ND	ND	33	8.6	373	0.22	ND	16	16	0.03	ND	<0.01	<0.01	ND	ND	533	8	2	0	ND	<0.10	<0.10	ND	Row Crops, Woods	Covered Karst	Panno et al. 1996
25	177	Apr.1995	14.8	7.4	188	614	309	63	3	37	ND	ND	33	9.5	377	0.17	ND	15	2.4	0.06	ND	<0.01	<0.01	ND	ND	39	38	0	0	ND	<0.10	1.11	ND	Row Crops, Woods	Covered Karst	Panno et al. 1996
26	106	Apr.1995	17.2	9.1	125	706	348	173	<1	0.1	ND	ND	0.3	10	424	<0.01	ND	5.3	5.3	0.04	ND	0.01	<0.01	ND	ND	133	10	0	0	ND	<0.10	<0.10	ND	Woods	Non-Karst	Panno et al. 1996
26	106	Apr.1995	15.4	9.3	31	704	347	183	<1	1.5	ND	ND	0.3	10	423	0.45	ND	5.4	11	0.07	ND	<0.01	<0.01	ND	ND	153	0	0	0	ND	<0.10	0.40	ND	Woods	Non-Karst	Panno et al. 1996
26	106	Jul.1995	14.9	9.2	50	695	373	176	<1	0.8	ND	ND	0.3	ND	455	<0.01	ND	5.1	10	0.04	ND	ND	ND	ND	ND	253	52	0	0	ND	<0.10	<0.10	ND	Woods	Non-Karst	Panno et al. 1996
26	106	Jul.1995	16.8	9.1	ND	708	283	ND	ND	ND	ND	ND	ND	ND	346	<0.01	ND	ND	8.1	0.03	ND	ND	ND	ND	ND	271	28	0	0	ND	<0.10	<0.10	ND	Woods	Non-Karst	Panno et al. 1996
27	46	Jul.1995	15.2	6.8	ND	858	346	ND	ND	ND	ND	ND	ND	ND	422	0.01	ND	ND	7.3	0.04	ND	ND	ND	ND	ND	181	12	0	0	ND	<0.10	<0.10	ND	Woods	Covered Karst	Panno et al. 1996
27	46	Apr.1995	14.6	6.9	297	840	400	28	<1	122	ND	ND	39	12	488	0.11	ND	69	4.8	0.09	ND	<0.01	0.01	ND	ND	53	6	4	0	ND	<0.10	0.16	ND	Woods	Covered Karst	Panno et al. 1996
27	46	Jul.1995	14.2	6.8	367	847	417	27	<1	121	ND	ND	39	ND	508	0.09	ND	65	4.9	0.08	ND	ND	ND	ND	ND	62	246	1	0	ND	<0.10	<0.10	ND	Woods	Covered Karst	Panno et al. 1996
27	46	Apr.1995	14.8	6.8	123	851	403	34	<1	113	ND	ND	36	11	491	0.03	ND	67	67	0.08	ND	<0.01	0.01	ND	ND	831	180	0	0	ND	<0.10	<0.10	ND	Woods	Covered Karst	Panno et al. 1996
28	ND	May.1999	15.3	7.1	432	578	291	13	<1	104	0.14	0.05	13	27	354	2.24	ND	26	8.4	<0.18	0.30	<0.01	<0.01	4.1	7.8	ND	32	0	0	0	<0.10	ND	ND	Woods	Karst	Hackley et al. In press

28	ND	Jul.1996	15.4	7.0	415	611	302	12	<1	103	ND	ND	15	29	248	2.28	ND	22	2.9	0.05	ND	<0.01	<0.01	ND	ND	58	0	0	0	0	0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
28	ND	Nov.1999	14.9	6.9	450	591	315	12	3	103	0.16	0.05	18	22	384	2.12	ND	14	3.1	<0.02	0.24	<0.01	<0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Woods	Karst	Hackley et al. In press
29	93	Jul.1995	15.0	7.0	ND	867	350	ND	ND	ND	ND	ND	ND	ND	427	7.86	ND	ND	40	0.05	ND	ND	ND	ND	ND	806	2900	38	ND	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
29	93	Apr.1995	14.8	7.0	273	806	295	40	<1	112	ND	ND	15	21	360	7.61	ND	58	38	0.05	ND	0.01	<0.01	ND	ND	766	176	2	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
29	93	Apr.1995	14.6	7.0	334	874	305	49	<1	123	ND	ND	16	23	372	7.71	ND	59	41	0.09	ND	<0.01	<0.01	ND	ND	451	2900	38	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
29	93	Jul.1995	14.1	7.0	828	828	305	46	<1	122	ND	ND	15	ND	372	7.66	ND	56	46	0.08	ND	ND	ND	ND	ND	575	80	1	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
29	93	May.1999	14.6	6.9	795	866	314	53	<1	127	0.19	0.09	16	21	383	7.43	ND	55	48	<0.18	0.25	<0.01	<0.01	6.8	11.5	ND	230	0	0	0	<0.10	ND	ND	Row Crops	Covered Karst	Hackley et al. In press
29	93	Nov.1999	14.7	6.8	409	804	315	44	2	128	0.20	0.09	16	21	384	5.78	ND	46	39	<0.02	0.17	<0.01	<0.01	8.2	9.4	ND	ND	ND	ND	ND	ND	ND	ND	Row Crops	Covered Karst	Panno et al. 1996
30	35	Apr.1995	14.2	6.9	316	987	359	36	<1	186	ND	ND	27	20	438	2.59	ND	231	16	0.24	ND	<0.01	<0.01	ND	ND	66	14	0	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
30	35	Apr.1995	14.5	6.8	327	997	382	38	1	144	ND	ND	25	17	466	2.96	ND	105	17	0.21	ND	<0.01	0.01	ND	ND	82	20	0	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
30	35	Jul.1995	13.6	6.8	333	1002	387	34	<1	193	ND	ND	28	ND	472	2.71	ND	180	17	0.22	ND	ND	ND	ND	ND	79	58	0	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
30	35	Jul.1995	14.8	6.8	ND	1023	416	ND	ND	ND	ND	ND	ND	ND	507	2.20	ND	ND	6.5	0.07	ND	ND	ND	ND	ND	92	8	0	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
31	34	Apr.1995	14.4	7.0	25	884	425	41	2	121	ND	ND	44	27	518	<0.01	ND	58	3.7	0.08	ND	5.45	0.27	ND	ND	46	0	0	0	ND	<0.10	0.39	ND	Row Crops	Covered Karst	Panno et al. 1996
31	34	Jul.1995	14.4	7.0	ND	876	354	ND	ND	ND	ND	ND	ND	ND	432	<0.01	ND	ND	1.2	<0.05	ND	ND	ND	ND	ND	ND	16	8	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
31	34	Jul.1995	13.7	7.0	20	873	448	38	<1	112	ND	ND	42	ND	546	<0.01	ND	53	3.6	0.05	ND	ND	ND	ND	ND	72	0	1	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
31	34	Apr.1995	14.4	7.0	27	872	419	33	<1	95	ND	ND	36	22	511	<0.01	ND	55	55	0.05	ND	5.23	0.22	ND	ND	1106	0	0	0	ND	<0.10	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
32	111	Jul.1995	14.2	8.0	-83	626	316	111	3	12	ND	ND	14	ND	385	<0.01	ND	13	4.9	0.06	ND	ND	ND	ND	ND	82	368	2	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
32	111	Jul.1995	15.1	7.7	ND	617	245	ND	ND	ND	ND	ND	ND	ND	299	0.47	ND	ND	5.1	0.04	ND	ND	ND	ND	ND	126	368	74	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
32	111	Apr.1995	14.8	7.8	-49	600	301	92	4	17	ND	ND	19	8.2	367	0.02	ND	14	4.8	0.03	ND	0.10	<0.01	ND	ND	161	44	8	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
32	111	Apr.1995	14.8	7.7	93	622	294	105	3	20	ND	ND	21	10	358	0.22	ND	14	4.8	0.06	ND	0.14	0.01	ND	ND	80	8	46	20	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
33	61	Apr.1995	14.7	7.1	358	659	313	176	<1	0.1	ND	ND	0.06	12	382	0.58	ND	18	6.2	0.09	ND	<0.01	<0.01	ND	ND	69	6	0	0	ND	<0.10	0.18	ND	Livestock, Woods	Karst	Panno et al. 1996
33	61	Apr.1995	17.4	7.2	300	639	315	158	<1	0.2	ND	ND	0.12	11	384	0.67	ND	18	6.3	0.07	ND	<0.01	<0.01	ND	ND	91	24	0	0	ND	<0.10	<0.10	ND	Livestock, Woods	Karst	Panno et al. 1996
33	61	Jul.1995	18.6	7.2	ND	656	262	ND	ND	ND	ND	ND	ND	ND	319	0.65	ND	ND	49	0.04	ND	ND	ND	ND	ND	1228	100	0	0	ND	<0.10	<0.10	ND	Livestock, Woods	Karst	Panno et al. 1996
33	61	Jul.1995	13.5	7.2	335	644	333	174	<1	0.1	ND	ND	0.07	ND	406	0.64	ND	17	6.2	0.06	ND	ND	ND	ND	ND	103	0	0	0	ND	<0.10	<0.10	ND	Livestock, Woods	Karst	Panno et al. 1996
34	73	Nov.1999	14.5	6.8	ND	929	412	45	2	127	0.20	0.09	32	18	502	15.4	ND	14	33	0.14	0.20	<0.01	<0.01	10.9	9.5	233	ND	ND	ND	ND	ND	ND	ND	Livestock, Woods	Karst	Hackley et al. In press
34	73	May.1999	15.1	6.7	485	1122	385	53	<1	145	0.23	0.12	40	18	469	30.5	ND	32	50	0.30	0.29	<0.01	<0.01	12.0	7.8	168	67	0	0	0	0.14	ND	ND	Livestock, Woods	Karst	Hackley et al. In press
34	73	Jul.1996	16.5	6.8	342	1009	417	53	<1	121	ND	ND	34	21	342	16.1	ND	20	31	0.14	ND	<0.01	<0.01	ND	ND	218	15	2	0	0	0.60	0.48	ND	Row Crops	Karst	Panno et al. 1996
35	6	Nov.1999	15.8	6.9	432	1718	410	67	2	205	0.53	0.30	64	23	500	80.9	ND	59	127	0.39	0.19	<0.01	0.01	10.3	8.3	326	ND	ND	ND	ND	ND	ND	ND	Livestock, Row Crops	Covered Karst	Hackley et al. In press
35	6	May.1999	15.8	6.7	504	1595	386	67	<1	203	0.56	0.31	67	23	470	57.8	ND	54	120	0.60	0.32	<0.01	<0.01	11.7	7.1	200	14000	>3466	0	198	<0.10	ND	ND	Livestock, Row Crops	Covered Karst	Hackley et al. In press
36	37	Jan.1994	14.5	6.1	ND	809	427	42	<1	101	ND	ND	41	18	521	<0.01	ND	26	12	0.12	ND	1.75	0.13	ND	ND	102	40	0	ND	ND	<0.10	ND	ND	Livestock, Row Crops, H_2S Odor	Covered Karst	Panno et al. 1996
36	37	Nov.1999	15.2	6.9	144	776	413	28	2	92	0.33	0.15	31	13	504	<0.02	ND	22	11	0.09	0.32	1.32	0.01	ND	ND	124	ND	ND	ND	ND	ND	ND	ND	Livestock, Row Crops, H_2S Odor	Covered Karst	Hackley et al. In press
36	37	Jul.1994	19.9	7.0	233	836	432	47	<1	100	ND	ND	41	18	527	0.10	ND	28	13	0.12	ND	0.52	0.13	ND	ND	104	20	0	ND	ND	<0.10	<0.10	<0.10	Livestock, Row Crops, H_2S Odor	Covered Karst	Panno et al. 1996
36	37	Apr.1994	14.0	7.2	152	834	427	44	<1	100	ND	ND	39	8	521	0.10	0.31	29	12	0.09	ND	<0.01	0.13	ND	ND	133	20	0	ND	ND	<0.10	<0.10	<0.10	Livestock, Row Crops, H_2S Odor	Covered Karst	Panno et al. 1996
36	37	Sep.1994	14.7	7.0	-46	795	420	41	<1	96	ND	ND	39	ND	512	0.15	0.24	26	14	0.11	ND	0.94	0.11	ND	ND	125	210	72	ND	ND	<0.10	<0.10	<0.10	Livestock, Row Crops, H_2S Odor	Covered Karst	Panno et al. 1996
36	37	Aug.1994	14.8	ND	232	823	426	40	<1	102	ND	ND	40	17	519	0.11	0.26	26	13	0.12	ND	1.36	0.12	ND	ND	108	3100	0	ND	ND	<0.10	<0.10	ND	Livestock, Row Crops, H_2S Odor	Covered Karst	Panno et al. 1996
38	44	Apr.1995	14.8	7.2	-26	744	375	27	<1	86	ND	ND	31	14	457	<0.01	ND	15	13	0.10	ND	2.93	0.14	ND	ND	128	26	0	0	ND	<0.10	<0.10	ND	Woods, H_2S Odor	Karst	Panno et al. 1996
38	44	Apr.1995	14.8	7.2	18	773	376	29	<1	92	ND	ND	33	16	458	0.10	ND	15	13	0.11	ND	3.77	0.15	ND	ND	115	0	0	0	ND	<0.10	0.19	ND	Woods, H_2S Odor	Karst	Panno et al. 1996
38	44	Jul.1995	15.7	6.7	ND	764	307	ND	ND	ND	ND	ND	ND	ND	374	<0.01	ND	ND	13	0.08	ND	ND	ND	ND	ND	163	348	0	0	ND	<0.10	<0.10	ND	Woods, H_2S Odor	Karst	Panno et al. 1996
38	44	Jul.1995	13.9	7.2	NA	749	397	29	<1	93	ND	ND	34	ND	484	<0.01	ND	14	12	0.11	ND	ND	ND	ND	ND	113	0	0	0	ND	<0.10	<0.10	ND	Woods, H_2S Odor	Karst	Panno et al. 1996
41	50	Jul.1995	15.3	7.1	ND	625	249	ND	ND	ND	ND	ND	ND	ND	303	<0.01	ND	ND	4.8	0.04	ND	ND	ND	ND	ND	119	14	0	0	ND	<0.10	<0.10	ND	Woods	Covered Karst	Panno et al. 1996
41	50	Sep.1994	13.8	7.1	107	621	350	14	<1	95	ND	ND	27	ND	427	0.10	ND	8.9	2.3	0.04	ND	ND	ND	ND	ND	58	0	0	0	ND	<0.10	<0.10	ND	Woods	Covered Karst	Panno et al. 1996
41	50	Apr.1995	14.7	7.1	27	627	336	11	<1	81	ND	ND	23	8.2	410	0.01	ND	9.4	2.5	0.03	ND	0.73	0.11	ND	ND	83	12	0	0	ND			ND	Woods	Covered Karst	Panno et al. 1996
41	50	Apr.1995	14.6	6.8	129	631	339	14	<1	100	ND	ND	28	10	413	0.17	ND	10	2.7	0.07	ND	0.63	0.14	ND	ND	38	42	0	0	ND	<0.10	<0.10	ND	Woods	Covered Karst	Panno et al. 1996
42	97	Apr.1994	16.0	8.1	-43	3361	1078	732	<1	8.5	ND	ND	5.2	7.1	1314	0.14	ND	175	390	1.22	ND	0.27	0.01	ND	ND	320	0	0	0	ND	<0.10	<0.10	ND	Row Crops, H_2S Odor	Non-Karst	Panno et al. 1996
42	97	Sep.1994	13.8	8.0	-18	2782	1120	857	2	13	ND	ND	7.5	ND	1366	0.12	ND	181	489	1.71	ND	ND	ND	ND	ND	286	0	0	0	ND	<0.10	<0.10	ND	Row Crops, H_2S Odor	Non-Karst	Panno et al. 1996
42	97	Apr.1995	15.0	8.2	1	3343	1096	910	<1	7.6	ND	ND	4.8	8.3	1336	0.18	ND	182	465	1.37	ND	0.20	0.01	ND	ND	339	0	0	0	ND	<0.10	0.39	ND	Row Crops, H_2S Odor	Non-Karst	Panno et al. 1996
42	97	Jul.1995	16.9	8.0	ND	3431	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.21	ND	ND	358	1.06	ND	ND	ND	ND	ND	338	32	0	0	ND	<0.10	<0.10	ND	Row Crops, H_2S Odor	Non-Karst	Panno et al. 1996
43	160	Jul.1995	15.7	7.3	ND	956	388	ND	ND	ND	ND	ND	ND	ND	473	0.08	ND	ND	24	0.11	ND	ND	ND	ND	ND	221	900	2	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
43	160	Apr.1995	14.6	7.2	216	903	372	120	3	36	ND	ND	33	7.9	454	0.14	ND	72	16	0.09	ND	0.01	<0.01	ND	ND	177	58	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
43	160	Apr.1995	14.1	7.5	316	978	425	199	4	32	ND	ND	28	8.8	518	0.22	ND	81	36	0.18	ND	<0.01	<0.01	ND	ND	200	8	0	0	ND	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
44	ND	Apr.1995	15.1	7.2	320	557	285	21	4	40	ND	ND	39	7.7	347	0.05	ND	12	1.7	<0.05	ND	<0.01	<0.01	ND	ND	ND	4	0	0	ND	<0.10	<0.10	ND	Livestock, Woods	Karst	Panno et al. 1996
45	10	Jul.1996	15.5	7.0	372	904	289	68	<1	99	ND	ND	20	19	237	19.0	ND	52	36	0.10	ND	<0.01	<0.01	ND	ND	356	2700	270	10	4	<0.10	<0.10	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
45	13	Nov.1999	15.2	6.8	417	894	304	65	2	107	0.19	0.11	20	17	371	21.4	ND	45	38	0.08	0.18	<0.01	<0.01	11.2	7.3	480	ND	ND	ND	ND	ND	ND	ND	Livestock, Row Crops	Covered Karst	Hackley et al. In press
45	13	May.1999	15.4	7.0	467	844	290	68	<1	100	0.19	0.11	19	17	353	16.1	ND	50	35	0.24	0.29	<0.01	<0.01	8.3	5.5	148	2700	1840	2	110	<0.10		ND	Livestock, Row Crops	Covered Karst	Hackley et al. In press
46	62	Apr.1994	14.9	6.4	416	720	232	31	<1	106	ND	ND	16	15	283	2.00	0.34	45	57	0.09	ND	0.15	<0.01	ND	ND	628	440	>1	>1	ND	<0.10	<0.10	<0.10	Row Crops	Karst	Panno et al. 1996
46	62	Sep.1994	15.3	6.8	261	772	308	27	1	120	ND	ND	17	ND	376	3.01	0.06	38	43	0.08	ND	<0.01	0.08	ND	ND	538	5200	2000	ND	ND	<0.10	<0.10	<0.10	Row Crops	Karst	Panno et al. 1996
46	62	Jul.1994	16.2	6.9	372	791	292	30	2	123	ND	ND	17	32	356	2.69	ND	40	54	0.08	ND	<0.01	0.02	ND	ND	674	>3000000	65	ND	ND	<0.10	<0.10	<0.10	Row Crops	Karst	Panno et al. 1996
46	62	Jun.1994	15.2	6.7	379	680	250	25	<1	112	ND	ND	16	32	305	3.53	0.04	39	42	0.09	ND	<0.01	<0.01	ND	ND	463	ND	ND	ND	ND	<0.10	<0.10	<0.10	Row Crops	Karst	Panno et al. 1996
46	62	Aug.1994	16.1	6.7	313	764	301	25	1	127	ND	ND	17	32	367	3.08	0.11	39	41	0.07	ND	0.02	0.15	ND	ND	586	3000	2000	ND	ND	0.11	<0.10	ND	Row Crops	Karst	Panno et al. 1996
46	62	Mar.1994	14.8	6.9	460	777	292	33	2	126	ND	ND	33	31	356	2.89	0.03	41	59	0.08	ND	0.03	0.03	ND	ND	740	>1	>3466	ND	ND	<0.10	<0.10	<0.10	Row Crops	Karst	Panno et al. 1996
46	62	Apr.1994	15.3	6.8	363	739	250	28	2	106	ND	ND	16	32	305	4.60	0.04	43	52	0.06	ND	<0.01	0.01	ND	ND	832	>3000000	>3466	ND	ND	<0.10	<0.10	<0.10	Row Crops	Karst	Panno et al. 1996
46	62	Feb.1995	14.9	6.5	ND	868	351	38	1	124	ND	ND	17	29	427	3.69	0.04	40	83	0.06	ND	<0.01	0.08	ND	ND	1380	146	28	0	ND	<0.10	<0.10	NA	Row Crops	Karst	Panno et al. 1996
46	62	Aug.1994	16.1	6.7	313	764	301	25	1	127	ND	ND	17	32	367	3.08	0.11	39	41	0.07	ND	0.02	0.15	ND	ND	586	3000	2000	ND	ND	0.11	<0.10	<0.10	Row Crops	Karst	Panno et al. 1996
46	62	May.1994	14.9	6.7	ND	625	204	28	1	99	ND	ND	14	33	249	4.67	0.06	39	44	<0.05	ND	<0.01	0.01	ND	ND	ND	ND	ND	ND	ND	<0.10	<0.10	<0.10	Row Crops	Karst	Panno et al. 1996
47	10	May.1999	15.1	7.0	494	1064	352	84	<1	95	0.24	0.09	44	19	430	24.6	ND	64	42	0.26	0.40	<0.01	0.01	ND	ND	160	>3000000	870	46	192	0.65	ND	ND	Livestock, Row Crops	Covered Karst	Hackley et al. In press
47	10	Nov.1999	15.6	6.9	396	1232	410	102	2	113	0.26	0.10	44	18	500	36.0	ND	82	51	0.11	0.31	<0.01	<0.01	12.3	7.2	466	ND	ND	ND	ND	ND	ND	ND	Livestock, Row Crops	Covered Karst	Hackley et al. In press
48	87	Aug.1996	14.1	7.4	116	648	257	ND	ND	ND	ND	ND	ND	ND	314	0.01	ND	12	3.4	0.04	ND	ND	ND	ND	ND	86	15	0	0	0	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
49	ND	Jul.1996	14.6	7.1	175	612	332	9	<1	71	ND	ND	39	13	272	0.10	ND	7.7	2.9	0.06	ND	0.02	<0.01	ND	ND	49	0	0	0	0	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
50	114	Jul.1996	16.3	7.1	854	814	294	57	<1	91	ND	ND	13	21	241	8.13	ND	62	36	<0.05	ND	<0.01	<0.01	ND	ND	ND	20	0	0	0	0.13	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
51	123	Jul.1996	15.4	6.7	392	808	318	22	<1	131	ND	ND	18	32	261	11.5	ND	41	22	0.07	ND	<0.01	<0.01	ND	ND	307	0	0	0	0	<0.10	<0.10	ND	Livestock, Row Crops	Karst	Panno et al. 1996
52	77	Aug.1996	15.5	7.4	227	610	241	ND	ND	ND	ND	ND	ND	ND	294	0.29	ND	12	2.7	0.04	ND	ND	ND	ND	ND	69	25	0	0	0	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
53	76	Jul.1996	15.9	7.2	270	682	338	73	4	48	ND	ND	24	13	277	1.61	ND	15	7.1	0.07	ND	<0.01	<0.01	ND	ND	101	76	0	0	0	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
54	77	Jul.1996	16.4	7.3	60	591	317	16	<1	49	ND	ND	39	10	260	<0.01	ND	15	3.4	0.07	ND	0.33	<0.01	ND	ND	49	630	64	0	0	<0.10	<0.10	ND	Woods	Covered Karst	Panno et al. 1996
55	20	Jul.1996	16.2	7.1	379	726	292	47	<1	69	ND	ND	18	16	239	10.8	ND	39	13	0.08	ND	<0.01	<0.01	ND	ND	168	1100	60	0	2	0.16	<0.10	ND	Row Crops	Covered Karst	Panno et al. 1996
56	151	Jul.1996	15.0	7.2	376	673	343	172	<1	0.04	ND	ND	0.02	8.3	281	0.50	ND	12	3.2	0.08	ND	0.05	<0.01	ND	ND	40	0	0	0	0	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
58	ND	Jul.1996	15.3	7.4	362	608	319	47	<1	35	ND	ND	34	8.5	262	0.50	ND	12	3.7	0.07	ND	0.03	<0.01	ND	ND	53	1300	70	20	52	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
59	34	Mar. 2001	8.3	7.1	422	885	372	77	<1	93	0.24	0.14	32	16	454	7.71	ND	51	23	0.09	0.30	1.15	0.09	6.3	8.2	256	ND	ND	ND	ND	ND	ND	ND	Livestock, Row Crops	Covered Karst	Hackley et al. In press
60	101	Aug.1996	14.6	7.1	150	586	231	ND	ND	ND	ND	ND	ND	ND	282	0.16	ND	35	11	0.07	ND	ND	ND	ND	ND	159	36	0	0	0	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
61	77	Jul.1996	16.4	7.1	430	781	265	50	<1	86	ND	ND	13	20	217	15.6	ND	47	33	0.08	ND	<0.01	<0.01	ND	ND	406	400	10	0	0	<0.10	<0.10	ND	Livestock, Row Crops	Covered Karst	Panno et al. 1996
62	148	Jul.1996	18.5	7.2	232	601	307	19	<1	50	ND	ND	45	8.4	252	0.10	ND	14	5.1	0.06	ND	<0.01	<0.01	ND	ND	86	30000	0	0	0	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
63	191	Jul.1996	14.2	6.8	392	809	403	15	<1	136	ND	ND	20	23	331	2.11	ND	28	5.1	0.06	ND	0.03	0.08	ND	ND	85	1300	100	6	0	0.40	<0.10	ND	Row Crops	Karst	Panno et al. 1996
64	136	Jul.1996	16.0	7.4	121	636	336	54	4	37	ND	ND	37	8.4	276	0.09	ND	13	3.1	0.06	ND	0.42	<0.01	ND	ND	51	0	0	0	0	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996
65	122	Jul.1996	15.4	7.1	463	692	338	35	3	66	ND	ND	40	12	277	0.46	ND	19	19	0.06	ND	<0.01	<0.01	ND	ND	312	26	6	2	0	<0.10	<0.10	ND	Woods	Karst	Panno et al. 1996