UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Uranium and thorium data from water and stream sediments of the Blue Joint Wilderness Study Area, Ravalli County, Montana, and the Blue Joint Roadless Area, Lemhi County, Idaho

By

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and nomenclature.

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Studies Related to Wilderness

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a geochemical survey of the Blue Joint wilderness study area in the Bitterroot National Forest, Ravalli County, Montana, and the Blue Joint roadless area in the Salmon National Forest, Lemhi County, Idaho. The Blue Joint roadless area, Lemhi County, Idaho was included in the River of No Return Wilderness by Public Law 96-312, July 23, 1980. The Blue Joint wilderness study area, Ravalli County, Montana was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

Introduction

Seventy-eight water samples and 82 stream-sediment samples were collected from surface streams within the Blue Joint Wilderness Study Area and Blue Joint RARE II area during the summer of 1979 as part of a mineral resource appraisal of the area.

The stream sediments were analyzed for uranium and thorium by delayed neutron activation. Results of these analyses are given in table 1.

The water samples were analyzed for uranium by fluorometry. They were also analyzed for alkalinity by titration. Specific conductance and pH were measured at the sample site in the field. The results of these analyses are summarized in table 2.

Location

The study area is located approximately 90 miles south of Missoula, Montana, on the Idaho-Montana border in the southern portion of the Bitterroot Mountains. Figure 1 shows the general location.

Sample collection and preparation techniques

Water and stream sediments were sampled by field parties of the U.S. Geological Survey which included W. Rehn, K. Lund, C. Holloway, S. Azadian, P. Billings, H. Brandenburger, R. Bruce, B. Bye, G. Cotton, B. Coxe, M. E. Koesterer, P. Miller, J. Scott, and G. Sims.

Laboratory preparation of the stream-sediment samples was performed by B. Coxe, M. E. Koesterer, G. Sims, R. Wheaton, and J. Scott.

Water samples

At each sample site two samples of water were collected and placed in acid-rinsed polyethylene bottles. In one bottle, 1 pint (473 ml) of water, filtered through a 0.45-μm membrane filter, was collected. At the end of the

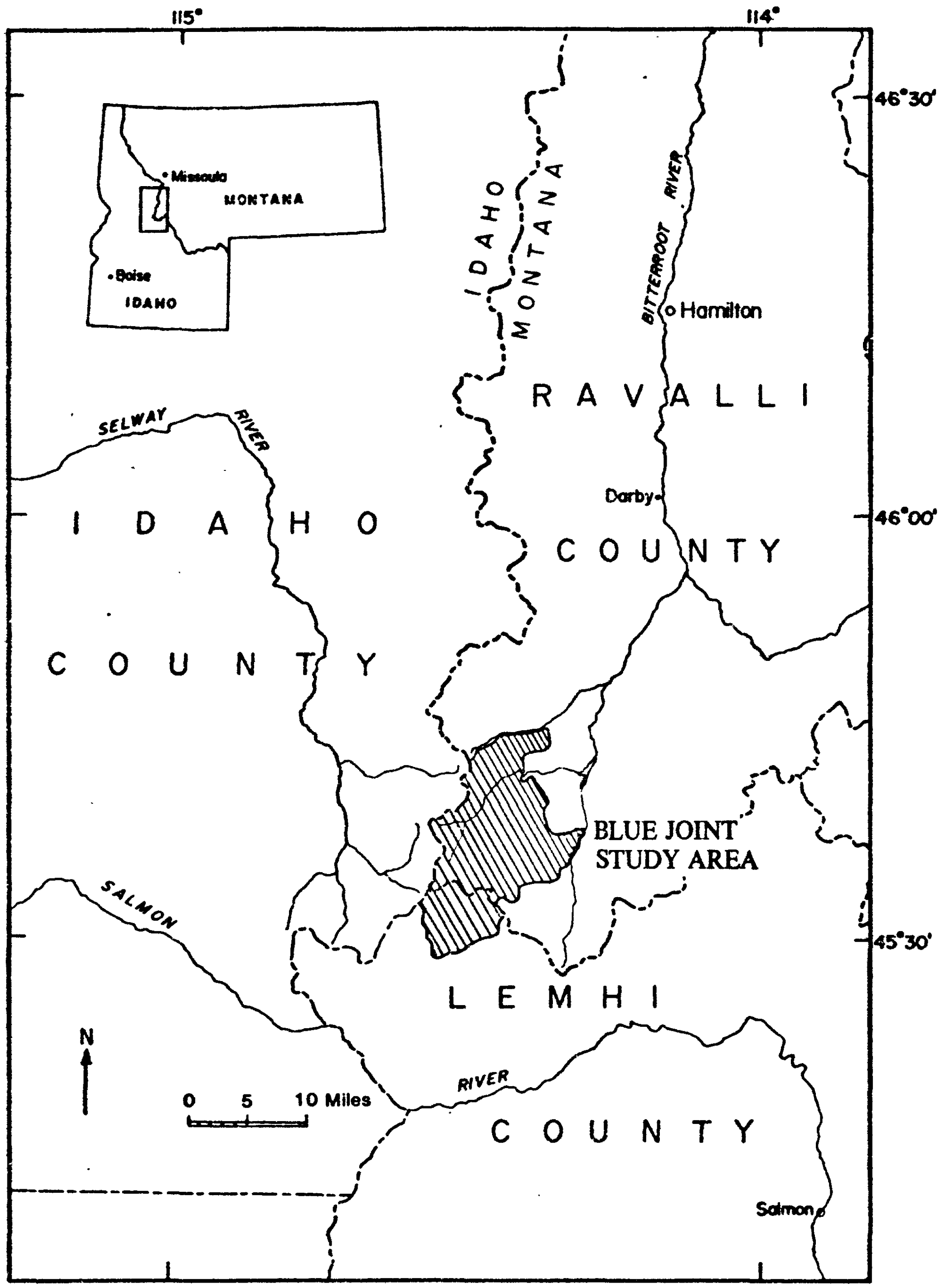

Figure 1.--Index map showing location of study area.

day this sample was adjusted to a pH of 2 with Ultrex concentrated nitric acid.[1] This sample was analyzed for uranium.

In the other bottle, 1 cup (237 ml) of untreated water was taken for a titration alkalinity analysis. The samples were promptly shipped to Denver, Colo., where the analyses were performed by the Geoco Division of EDA Instruments, Inc., under contract to the U.S. Geological Survey, and under supervision of Elwin Mosier. The pH was measured at the sample site by a colorimetric method using a Lamott Wide Range pH Indicator Kit.[1] Specific conductance was measured using a Markson Model JJ-10 portable conductivity meter.[1]

Stream-sediment samples

At each sample site approximately 1 liter of sediment screened to -10 mesh (1.0 mm) was collected along with the two water samples. In the laboratory this material was dried and sieved to less than 170 mesh (0.090 mm). Without further preparation this sample was sent to the U.S. Geological Survey in Lakewood, Colo., to be analyzed for uranium and thorium by delayed neutron activation.

Analytical techniques

Water samples

The water samples were analyzed by the Geoco Division of EDA Instruments, Inc., Wheatridge, Colo. Uranium was analyzed using a variation of the technique described in the Annual Book of ASTM Standards (1975). With this method an aliquot of each sample to be analyzed for uranium is pipetted onto a platinum disk containing a flux pellet of sodium and lithium fluorides and evaporated to dryness. The pellet is then fused on a Geoco fusion burner.[1]

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[1]Use of brand names is for descriptive purposes only and does not constitute endorsement by the U.S. Geological Survey.

The fused pellet is excited by an ultraviolet light source causing it to fluoresce. The amount of fluorescence is directly proportional to the concentration of uranium in the sample. This concentration is determined by measuring the fluorescence with a fluorometer and comparing it to that of a standard sample treated identically.

Alkalinity was determined using a titration method and represents the quantitative capacity of water to neutralize a strong acid to a designated pH.

Stream-sediment samples

The -170 mesh (0.090 mm) fraction of stream-sediment samples was analyzed for uranium and thorium by the U.S. Geological Survey in Lakewood, Colo., using the delayed neutron activation method described by Millard (1976, p. 61-65). The analysts for these samples were H. T. Millard, Jr., M. Coughlin, B. Vaughn, M. Schneider, and W. Stang.

A discussion of the precision and accuracy of this technique is found in Stuckless and others (1977, p. 83-91).

Explanation of tables

The analytical data and sample locations for the stream-sediment samples are summarized in table 1. All analytical values are in parts per million. Qualifying codes n and l, followed by their numerical value, indicate the element was not detected (n) or was detected at a concentration below the limit of determination (l). Also listed are the uranium/thorium ratios for each sample.

Table 2 summarizes the analytical data and sample locations for the water samples. Values for uranium are in parts per billion. Alkalinity is reported in milligrams of calcium carbonate per liter (mg $CaCO_3$/L). Specific conductance is reported in micromhos per centimeter (μmhos/cm). pH is also listed. The use of qualified values, n and l, is as described above. The ratios of uranium/specific conductance were computed for each sample and are also listed.

Sample numbering system

The first digit of each sample number indicates the year of sampling (9 equals 1979). The second and third characters are the sampler's initials. Fourth, fifth, and sixth digits indicate the station at which the sample was taken. Seventh and eighth characters indicate the sample type.

Suffixes (seventh and eighth characters):

SF - less than 170 mesh (0.090 mm) fraction

TF - replicate of SF sample with identical prefix

W - surface stream water sample

X - replicate of W sample with identical prefix

The first digit of each sample number (i.e., 9) was left off the sample location map (pl. 1).

Statistics

Histograms, frequency distributions, minimum, maximum, mean, and standard deviation were computed for uranium in the water samples and uranium and thorium in the stream-sediment samples and are shown on figures 2, 3, and 4.

Correlation coefficients were computed for the variables uranium in water vs. pH, uranium in water vs. specific conductance, uranium in water vs. alkalinity, alkalinity vs. specific conductance, specific conductance vs. pH, alkalinity vs. pH, and uranium in stream sediments vs. thorium in stream sediments. These values are listed on figure 5.

References

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Wenrich-Verbeek, K., 1980, Geochemical exploration for uranium using water and stream sediments: U.S. Geological Survey Open-File Report 80-359, 32 p.

Table 1 ANALYTICAL VALUES FOR STREAM-SEDIMENT SAMPLES

Sample	Lat	Long	Th	U	U/Th x 10
9BB002SF	45.721	-114.493	19.1	16.20	8.48
9BB003SF	45.731	-114.484	22.9	16.80	7.34
9BB013SF	45.495	-114.498	361.0	142.00	3.93
9BB015SF	45.488	-114.511	32.0n	128.00	>40.0
9BB016SF	45.488	-114.535	283.0	160.00	5.65
9BB026SF	45.607	-114.379	22.6	11.70	5.18
9BB028SF	45.608	-114.368	42.8	27.20	6.36
9BB030SF	45.690	-114.490	25.8	21.00	8.14
9BB032SF	45.685	-114.486	24.9	24.40	9.80
9BB036SF	45.517	-114.455	137.0	81.90	5.98
9BB037SF	45.488	-114.542	84.0	80.50	9.58
9BB038SF	45.487	-114.542	27.0n	116.00	>43.0
9BB038TF	45.487	-114.542	20.0n	79.80	>39.9
9BB038TF	45.487	-114.542	79.6	76.70	9.64
9BB040SF	45.513	-114.477	130.0	71.00	5.46
9BC003SF	45.739	-114.431	77.5	57.50	7.42
9BC004SF	45.747	-114.413	125.0	112.00	8.96
9CH005SF	45.736	-114.444	36.2	16.40	4.53
9CH008SF	45.704	-114.481	20.0n	73.10	>36.6
9CH026SF	45.726	-114.424	28.4	25.50	8.98
9CH045SF	45.695	-114.400	22.0n	82.80	>37.6
9CH046SF	46.134	-114.027	45.8	35.50	7.75
9KL001SF	45.586	-114.350	44.3	17.30	3.91
9KL009SF	45.511	-114.552	93.7	40.70	4.34
9KL011SF	45.606	-114.520	63.2	28.10	4.44
9KL012SF	45.611	-114.518	146.0	40.10	2.75
9KL013SF	45.617	-114.516	53.9	30.10	5.58
9KL014SF	45.641	-114.501	13.5	5.90	4.37
9KL015SF	45.667	-114.473	20.5	9.67	4.72
9KL015TF	45.667	-114.473	20.7	9.42	4.55
9KL015TF	45.667	-114.473	20.6	9.63	4.67
9KL016SF	45.667	-114.474	18.7	10.00	5.35
9KL018SF	45.673	-114.462	23.5	9.02	3.84
9KL019SF	45.675	-114.459	68.5	46.70	6.82
9KL022SF	45.637	-114.526	24.5	22.50	9.18
9KL023SF	45.636	-114.505	14.4	10.10	7.01
9KL024SF	45.570	-114.485	92.1	49.40	5.36
9KL024TF	45.570	-114.485	81.6	60.00	7.35
9KL024TF	45.570	-114.485	81.9	58.30	7.12
9KL025SF	45.570	-114.484	56.0	37.90	6.77
9KL027SF	45.574	-114.479	73.0	54.70	7.49
9KL028SF	45.577	-114.476	64.6	32.40	5.02
9KL030SF	45.590	-114.471	37.2	15.20	4.09
9KL032SF	45.591	-114.452	86.1	46.50	5.40
9KL033SF	45.601	-114.420	13.9	5.95	4.28
9KL035SF	45.552	-114.480	10.5	80.70	76.9
9KL037SF	45.552	-114.483	69.5	42.00	6.04
9KL038SF	45.546	-114.489	114.0	68.40	6.00

Table 1.--Continued

Sample	Lat	Long	Th	U	U/Th x 10
9KL040SF	45.531	-114.505	110.0	50.00	4.55
9KL041SF	45.523	-114.526	143.0	106.00	7.41
9KL042SF	45.517	-114.537	101.0	72.20	7.15
9ME001SF	45.541	-114.406	11.7	6.17	5.27
9ME003SF	45.551	-114.393	34.5	19.30	5.59
9ME004SF	45.652	-114.374	13.4	7.09	5.29
9ME005SF	45.650	-114.369	14.1	6.10	4.33
9ME020SF	45.666	-114.399	80.8	47.50	5.88
9ME021SF	45.666	-114.392	36.3	27.80	7.66
9ME025SF	45.683	-114.369	39.5	26.90	6.81
9ME026SF	45.723	-114.373	12.7	3.40	2.68
9ME028SF	45.590	-114.386	15.7	6.63	4.22
9ME030SF	45.597	-114.393	18.5	9.70	5.24
9RB003SF	45.692	-114.429	24.0n	84.50	>35.2
9RB005SF	45.694	-114.413	45.0n	205.00	>45.6
9RB013SF	45.702	-114.459	25.7	9.31	3.62
9RB016SF	45.704	-114.424	27.8	21.40	7.70
9WR005SF	45.545	-114.432	66.9	147.00	22.0
9WR017SF	45.537	-114.525	22.0n	80.50	>36.6
9WR023SF	45.631	-114.491	132.0	82.10	6.22
9WR026SF	45.639	-114.485	161.0	81.90	5.09
9WR029SF	45.659	-114.474	21.0n	85.80	>40.9
9WR032SF	45.618	-114.430	26.0n	100.00	>38.5
9WR034SF	45.622	-114.405	173.0	50.00	2.89
9WR037SF	45.571	-114.451	117.0	59.10	5.05
9WR038SF	45.571	-114.452	27.3	21.00	7.69
9WR040SF	45.582	-114.441	110.0	57.20	5.20
9WR041SF	45.585	-114.438	54.4	19.70	3.62
9WR042SF	45.598	-114.438	9.2n	25.10	>27.3
9WR043SF	45.603	-114.445	56.7	44.30	7.81
9WR046SF	45.539	-114.458	92.9	63.60	6.85
9WR050SF	45.529	-114.480	91.2	41.70	4.57
9WR052SF	45.517	-114.488	126.0	63.90	5.07
9WR053SF	45.504	-114.484	168.0	94.00	5.60

Table 2 ANALYTICAL VALUES FOR WATER SAMPLES

Sample	Lat	Long	U (ppb)	Alk (mg/l CaCO3)	Cond (umhos/cm)	pH	U/Cond x 100
9BB002W	45.721	-114.493	3.00	12.	18.	7.5	17.
9BB003W	45.731	-114.484	0.50	19.	29.	7.3	1.7
9BB007W	45.602	-114.331	0.40	24.	45.	6.5	.89
9BB013W	45.495	-114.498	2.00	28.	49.	7.5	4.1
9BB013X	45.495	-114.498	3.00	28.	49.	7.5	6.1
9BB015W	45.488	-114.511	3.00	36.	58.	7.2	5.2
9BB016W	45.488	-114.535	4.00	39.	70.	7.2	5.7
9BB026W	45.607	-114.379	0.90	13.	36.	7.3	2.5
9BB028W	45.608	-114.368	0.10	16.	58.	7.8	.17
9BB030W	45.690	-114.490	1.00	16.	54.	7.1	1.9
9BB032W	45.685	-114.486	2.00	10.	32.	7.7	6.3
9BB036W	45.517	-114.455	0.30	15.	30.	7.5	1.0
9BB037W	45.488	-114.542	1.00	35.	64.	7.2	1.6
9BB040W	45.513	-114.477	0.20	13.	19.	7.0	1.1
9BC003W	45.739	-114.431	0.20	25.	59.	7.5	.34
9BC004W	45.747	-114.413	0.05n	15.	36.	7.2	<0.14
9CH005W	45.736	-114.444	0.05n	14.	26.	7.1	<0.19
9CH008W	45.704	-114.481	0.10	21.	365.	7.1	.027
9CH026W	45.726	-114.424	0.10	16.	32.	7.0	.31
9CH045W	45.695	-114.400	0.10	8.	27.	6.7	.37
9CH046W	46.134	-114.027	0.35	11.	37.	7.0	.95
9KL001W	45.586	-114.350	0.20	64.	105.	8.2	.19
9KL009W	45.511	-114.552	0.35	5.			
9KL011W	45.606	-114.520	0.45	5.	26.	6.8	1.7
9KL012W	45.611	-114.518	0.50	6.	24.	6.9	2.1
9KL013W	45.617	-114.516	0.70	14.	36.	7.6	1.9
9KL014W	45.641	-114.501	0.20	4.	21.	6.9	.95
9KL015W	45.667	-114.473	0.60	8.	239.	6.9	.25
9KL018W	45.673	-114.462	0.20	8.	23.	6.9	.87
9KL019W	45.675	-114.459	3.00	8.	22.	6.8	14.
9KL022W	45.637	-114.526	0.70	12.	30.	7.0	2.3
9KL022X	45.637	-114.526	0.60	12.	30.	7.0	2.
9KL023W	45.636	-114.505	0.70	14.	38.	6.8	1.8
9KL024W	45.570	-114.485	1.00	11.	32.	6.2	3.1
9KL027W	45.574	-114.479	0.40	11.	32.	6.9	1.3
9KL028W	45.577	-114.476	0.40	10.	27.	6.9	1.5
9KL030W	45.590	-114.471	0.10	11.	28.	6.8	.36
9KL032W	45.591	-114.452	0.20	12.	31.	7.2	.65
9KL033W	45.601	-114.420	0.35	10.	30.	6.8	1.2
9KL035W	45.552	-114.480	0.60	14.	33.	5.9	1.8
9KL037W	45.552	-114.483	0.30	11.	27.	6.9	1.1
9KL038W	45.546	-114.489	0.75	21.	45.	7.0	1.7
9KL040W	45.531	-114.505	0.20	10.	27.	6.9	.74
9KL041W	45.523	-114.526	0.30	12.	34.	7.0	.88
9KL042W	45.517	-114.537	0.20	21.	51.	6.9	.39
9ME001W	45.541	-114.406	0.05n	79.	80.	6.8	<0.063
9ME003W	45.551	-114.393	0.15	19.	30.	7.5	.50

Table 2.--Continued

Sample	Lat	Long	U (ppb)	Alk (mg/l CaCO3)	Cond (umhos/cm)	pH	U/Cond x 100
9ME004W	45.652	-114.374	0.10	13.	20.	6.8	.50
9ME005W	45.650	-114.369	0.05n	8.	11.	6.8	<0.45
9ME020W	45.666	-114.399	0.10	5.	70.	6.8	.14
9ME021W	45.666	-114.392	0.20	6.	80.	7.0	.25
9ME025W	45.683	-114.369	0.20	10.		6.6	
9ME026W	45.723	-114.373	0.20	76.	120.	8.2	.17
9ME028W	45.590	-114.386	0.60	77.	105.	8.0	.57
9ME030W	45.597	-114.393	0.10	14.	30.	6.0	.33
9RB003W	45.692	-114.429	0.65	14.	28.	6.9	2.3
9RB005W	45.694	-114.413	1.00	15.	31.	6.3	3.2
9RB013W	45.702	-114.459	0.05n	7.	11.	6.7	<0.45
9RB016W	45.704	-114.424	0.05n	15.	30.	7.3	<0.17
9SA002W	45.737	-114.467	0.05n	16.			
9WR005W	45.545	-114.432	0.05n	7.	11.	7.0	<0.45
9WR017W	45.537	-114.525	0.20	9.			
9WR023W	45.631	-114.491	0.30	10.	23.	6.9	1.3
9WR026W	45.639	-114.485	0.15	9.	18.	6.9	.83
9WR029W	45.659	-114.474	0.25	14.	34.	7.6	.74
9WR029X	45.659	-114.474	0.20	14.	34.	7.6	.59
9WR032W	45.618	-114.430	0.45	8.	21.	6.6	2.1
9WR034W	45.622	-114.405	0.30	5.	14.	6.9	2.1
9WR037W	45.571	-114.451	0.50	7.	15.	6.9	3.3
9WR041W	45.585	-114.438	0.10	9.	19.	6.9	.53
9WR042W	45.598	-114.438	0.20	22.	44.	6.8	.45
9WR043W	45.603	-114.445	0.30	10.	24.	7.2	1.3
9WR046W	45.539	-114.458	0.30	12.	27.	7.4	1.1
9WR049W	45.582	-114.441	0.30	10.	22.	7.3	1.4
9WR050W	45.529	-114.480	1.00	11.	24.	7.2	4.2
9WR052W	45.517	-114.488	0.50	14.	29.	7.5	1.7
9WR053W	45.504	-114.484	5.00	53.	53.	7.6	9.4
9WR053X	45.504	-114.484	5.00	53.	53.	7.6	9.4

Figure 2 Histogram and frequency distributions for uranium in water samples

Limit - Upper (ppb)		Obs Frq	Cum Frq	Per Frq %	Cum Frq %	Class Midpoint	Distribution
N		8	8	10.3	10.3		XXX
L		0	8	0.0	10.3		
5.000E-02-	4.500E-01	40	48	51.3	61.5	2.500E-01	XXXXXXXXXXXXX
4.500E-01-	8.500E-01	15	63	19.2	80.8	6.500E-01	XXXXX
8.500E-01-	1.250E+00	6	69	7.7	88.5	1.050E+00	XX
1.250E+00-	1.650E+00	0	69	0.0	88.5	1.450E+00	
1.650E+00-	2.050E+00	2	71	2.6	91.0	1.850E+00	X
2.050E+00-	2.450E+00	0	71	0.0	91.0	2.250E+00	
2.450E+00-	2.850E+00	0	71	0.0	91.0	2.650E+00	
2.850E+00-	3.250E+00	4	75	5.1	96.2	3.050E+00	X
3.250E+00-	3.650E+00	0	75	0.0	96.2	3.450E+00	
3.650E+00-	4.050E+00	1	76	1.3	97.4	3.850E+00	
4.050E+00-	4.450E+00	0	76	0.0	97.4	4.250E+00	
4.450E+00-	4.850E+00	0	76	0.0	97.4	4.650E+00	
4.850E+00-	5.250E+00	2	78	2.6	100.0	5.050E+00	X
G		0	78	0.0	100.0		
B		0	78				

Table 3.--Species range, mean, standard deviation and qualified values for water samples. (U-ppb, Alk-mg/liter $CaCO_3$, Cond-micromhos/cm)

Species	Range Minimum	Range Maximum	Mean	Standard Deviation	Qualified Values
Uranium-------------	0.10	5.00	0.77	1.09	8-N
Alkalinity----------	4.00	79.00	17.68	16.18	0
Specific conductance	11.00	365.00	44.53	49.37	0
pH------------------	5.90	8.20	7.08	0.43	0

Table 4.--Correlation coefficient of the variables uranium, alkalinity, pH, and specific conductance in water samples

Variables	Correlation coefficient	Number of valid pairs
Uranium vs alkalinity-------------	0.40	70
Uranium vs specific conductance---	-0.01	67
Uranium vs pH---------------------	0.23	68
Alkalinity vs specific conductance	0.34	74
Alkalinity vs pH------------------	0.50	75
Specific conductance vs pH--------	0.19	74

Table 5.--Species range, mean, standard deviation and qualified values for stream-sediment samples. (values are in parts per million)

Species	Range		Mean	Standard Deviation	Qualified values
	Minimum	Maximum			
Uranium-------------	3.40	205.00	50.28	40.63	0
Thorium-------------	10.50	361.00	70.61	62.30	11-N

Table 6.--Correlation coefficient of the variables uranium and thorium in stream-sediment samples

Variables	Correlation coefficient	Number of valid pairs
Uranium vs thorium	0.81	71

Figure 3.--Histogram and frequency distributions for uranium in stream-sediment samples

Limit - Upper (ppm)	Obs Frq	Cum Frq	Per Frq %	Cum Frq %	Class Midpoint	Distribution
N	0	0	0.0	0.0		
L	0	0	0.0	0.0		
3.000E+00- 1.800E+01	21	21	25.6	25.6	1.050E+01	XXXXXX
1.800E+01- 3.300E+01	15	36	18.3	43.9	2.550E+01	XXXXX
3.300E+01- 4.800E+01	10	46	12.2	56.1	4.050E+01	XXX
4.800E+01- 6.300E+01	9	55	11.0	67.1	5.550E+01	XXX
6.300E+01- 7.800E+01	7	62	8.5	75.6	7.050E+01	XX
7.800E+01- 9.300E+01	10	72	12.2	87.8	8.550E+01	XXX
9.300E+01- 1.080E+02	3	75	3.7	91.5	1.005E+02	X
1.080E+02- 1.230E+02	2	77	2.4	93.9	1.155E+02	X
1.230E+02- 1.380E+02	1	78	1.2	95.1	1.305E+02	
1.380E+02- 1.530E+02	2	80	2.4	97.6	1.455E+02	X
1.530E+02- 1.680E+02	1	81	1.2	98.8	1.605E+02	
1.680E+02- 1.830E+02	0	81	0.0	98.8	1.755E+02	
1.830E+02- 1.980E+02	0	81	0.0	98.8	1.905E+02	
1.980E+02- 2.130E+02	1	82	1.2	100.0	2.055E+02	
G	0	82	0.0	100.0		
B	0	82				

Figure 4.--Histogram and frequency distributions for thorium in stream-sediment samples

Limit - Upper (ppm)	Obs Frq	Cum Frq	Per Frq %	Cum Frq %	Class Midpoint	Distribution
N	11	11	13.4	13.4		XXX
L	0	11	0.0	13.4		
1.000E+01- 4.000E+01	30	41	36.6	50.0	2.500E+01	XXXXXXXXX
4.000E+01- 7.000E+01	12	53	14.6	64.6	5.500E+01	XXXX
7.000E+01- 1.000E+02	12	65	14.6	79.3	8.500E+01	XXXX
1.000E+02- 1.300E+02	7	72	8.5	87.8	1.150E+02	XX
1.300E+02- 1.600E+02	5	77	6.1	93.9	1.450E+02	XX
1.600E+02- 1.900E+02	3	80	3.7	97.6	1.750E+02	X
1.900E+02- 2.200E+02	0	80	0.0	97.6	2.050E+02	
2.200E+02- 2.500E+02	0	80	0.0	97.6	2.350E+02	
2.500E+02- 2.800E+02	0	80	0.0	97.6	2.650E+02	
2.800E+02- 3.100E+02	1	81	1.2	98.8	2.950E+02	
3.100E+02- 3.400E+02	0	81	0.0	98.8	3.250E+02	
3.400E+02- 3.700E+02	1	82	1.2	100.0	3.550E+02	
G	0	82	0.0	100.0		
B	0	82				