DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF-1405-B
SHEET 1 OF 2

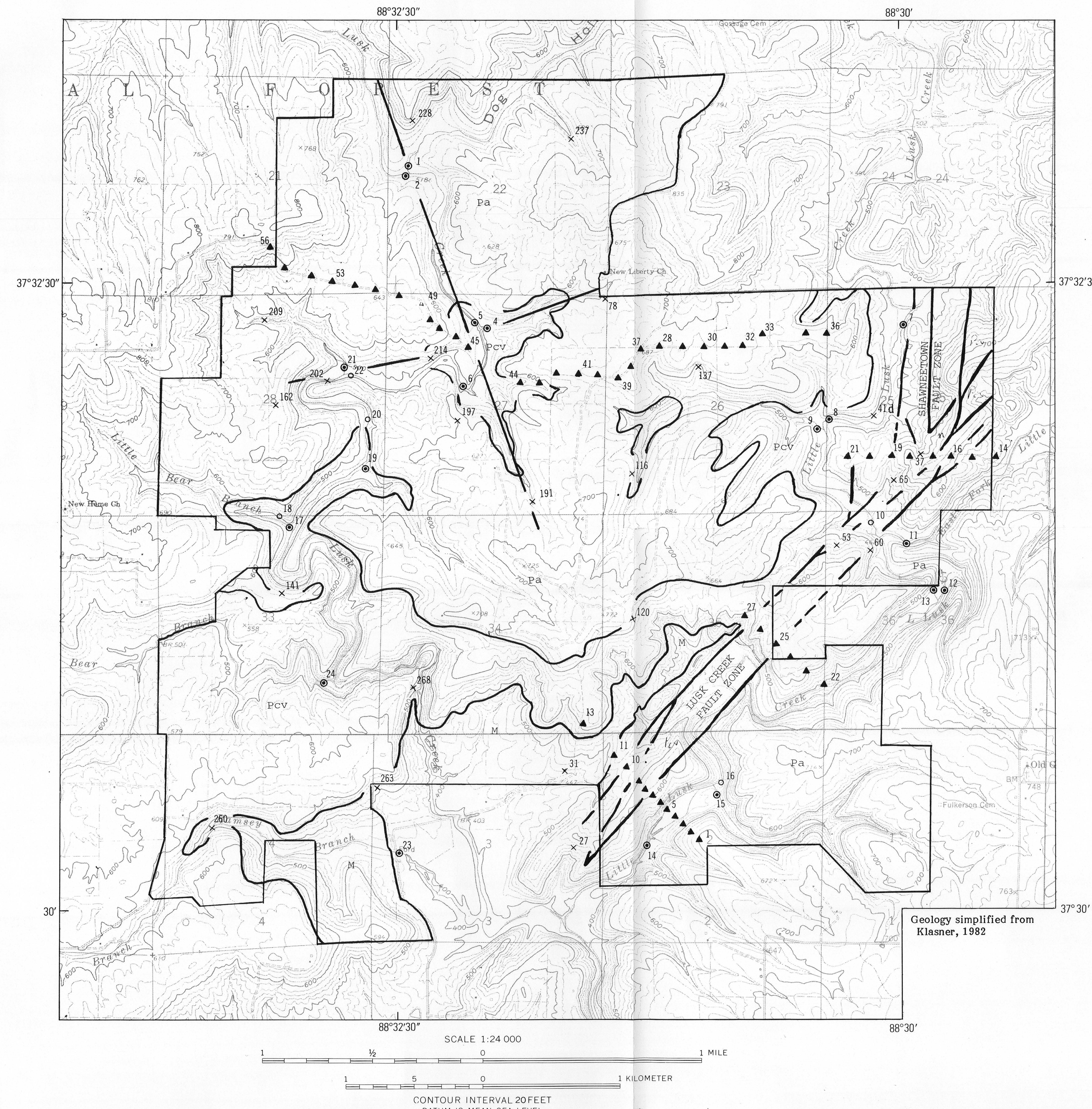


Figure 1.--Localities of samples for geochemical analyses and generalized bedrock geology.

DESCRIPTION OF MAP UNITS

Pa — Abbott Formation (Pennsylvanian)--Thin-bedded to massive siltstone, sandstone, and minor conglomerate having intercalated shale beds. Commonly crossbedded

Pvc — Caseyville Formation (Pennsylvanian)--Generally thick-bedded sandstone and conglomerate, minor thinly bedded siltstone and shale

M — Mississippian strata undivided--Generally micritic to bioclastic limestone and minor siltstone. Mississippian strata exposed along fault zone is generally siliceous, fine-grained sandstone, siltstone, or breccia

Contact

Fault

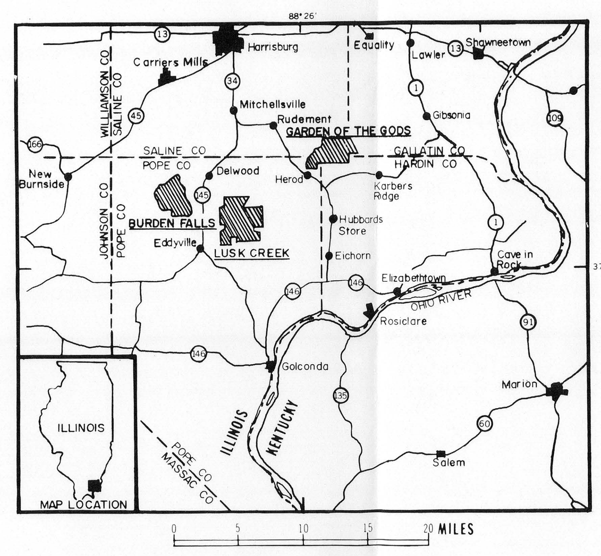
▲30 Soil sample

×60 Bedrock sample

⊙9 Panned and unpanned stream sediment sample

○16 Unpanned stream sediment sample

Base for figures 1-5 from U.S. Geological Survey Eddyville, 1961; Herod, 1959; and Waltersburg, 1962



Index map showing the location of the Lusk Creek Roadless Area and other roadless areas.

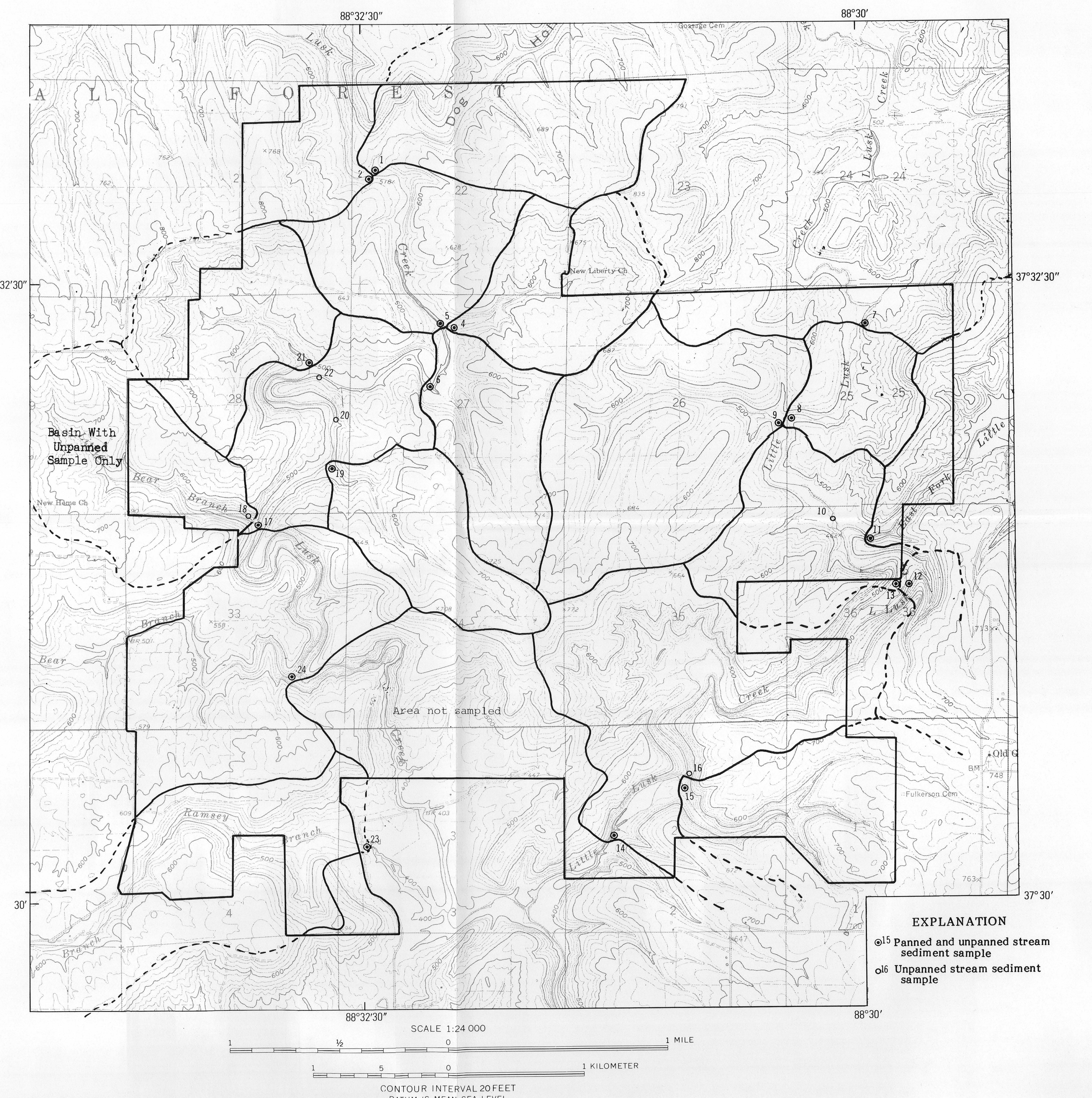


Figure 2.--Localities of drainage basins sampled for panned or unpanned stream sediments.

Table 1.-- *Analyses of 25 rock, 54 soil, and 18 panned and 23 unpanned stream-sediment samples from Lusk Creek Roadless Area, Pope County, Ill.*

All analyses except fluorine by six-step, direct-current arc, optical-emission spectrographic methods (Grimes and Marranzino, 1968) by G. W. Day. Fluorine was detected by a wet chemical-ion detection method (Levinson, 1974, p. 732-734), except for panned stream sediment samples, which were by fluorometry. The semiquantitative spectrographic values are reported as six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2, 0.15, or multiples of 10 of these numbers) and are approximate geometric midpoints of the concentration ranges. The expected precision is within one adjoining reporting interval on each side of the reported value 83 percent of the time and within two adjoining intervals 96 percent of the time (Motooka and Grimes, 1976). Symbols used: pct, percent; ppm, parts per million; s, semiquantitative spectrographic analysis; >, greater than value shown; <, less than value shown; N, not detected; IS, insufficient sample. Elements looked for spectrographically but not found and the lower limit of detection in ppm are: Ag (0.5); As (200); Au (10); Cd (20); Mo (5); Sb (100); Sn (10); Th (100); W (50); and Zn (200).
Exceptions: Ag was reported as 1 ppm in soil sample LS53; and Zn as 1,500 ppm in rock sample LB27a.

BEDROCK SAMPLES

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	B-ppm s	Ba-ppm s	Be-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s	Sc-ppm s	Sr-ppm s	V-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	SI-F	U-INST
LB 27a	37 30 17	88 31 39	.30	.50	15.00	.05	200	<10	20	N	N	10	15	N	N	<5	200	N	N	10	N	1,500	70	25,000	.30
LB 27b	37 30 17	88 31 39	.30	.10	3.00	.10	20	10	70	N	N	30	15	N	N	5	10	N	N	10	N	N	150	37,000	.20
LB 31	37 30 32	88 31 39	3.00	.70	.20	.20	1,000	10	150	N	20	50	15	20	N	30	N	<5	N	30	20	N	300	200	.30
LB 37	37 31 48	88 29 55	.20	.10	3.00	.10	100	10	20	N	N	20	7	N	N	5	N	N	N	10	N	N	100	6,000	.40
LB 41d	37 31 59	88 30 12	.30	.07	.10	.05	30	10	100	N	N	N	<5	N	N	5	N	N	N	10	N	N	100	200	N
LB 53	37 31 27	88 30 17	.70	.10	<.05	.30	20	50	100	1	5	30	5	20	N	5	N	5	N	30	10	N	200	300	.20
LB 60a	37 31 26	88 30 10	5.00	.07	<.05	.10	700	20	70	N	5	70	10	N	N	10	N	N	N	20	N	N	70	100	N
LB 65a	37 31 42	88 30 1	.05	.02	2.00	.10	N	10	N	N	N	70	<5	N	N	<5	N	N	N	10	N	N	200	94,000	.20
LB 65b	37 31 42	88 30 1	.07	.07	15.00	.05	N	10	20	N	N	10	<5	20	N	<5	30	N	N	10	10	N	200	154,000	.10
LB 78	37 32 27	88 31 26	.20	.07	.10	.30	10	50	70	N	N	50	5	20	N	<5	N	N	N	20	30	N	500	13,000	.30
LB116	37 31 42	88 31 17	2.00	.02	<.05	.03	150	30	70	N	5	50	5	N	N	10	N	N	100	10	N	N	30	300	.20
LB120	37 31 10	88 31 18	1.00	<.02	<.05	.03	10	10	50	N	N	N	5	N	N	5	N	N	N	10	N	N	50	100	.20
LB137	37 32 11	88 31 0	.20	.05	.10	.03	50	10	100	N	N	10	<5	N	N	5	N	N	100	10	50	N	30	<100	.10
LB141	37 31 11	88 33 7	10.00	<.02	<.05	.10	150	20	50	15	N	70	20	N	20	15	<10	N	N	15	N	N	300	100	.40
LB162	37 32 1	88 33 35	1.00	.05	.05	.15	100	10	70	N	N	30	5	N	N	5	N	N	N	10	N	N	200	N	.20
LB191	37 31 35	88 31 44	.50	<.02	<.05	.02	20	10	20	N	N	N	<5	N	N	5	N	N	100	10	N	N	30	<100	.30
LB197	37 31 55	88 32 11	2.00	<.02	<.05	.02	10	10	<20	N	N	N	<5	N	N	5	N	N	N	10	N	N	30	<100	.10
LB202	37 32 7	88 32 49	2.00	.02	.10	.10	100	10	100	N	5	N	<5	N	N	5	N	N	500	20	N	N	100	<100	.20
LB209	37 32 21	88 33 11	.50	.07	<.05	.20	300	20	100	N	10	30	<5	N	N	5	N	N	N	10	<10	N	500	N	.40
LB214	37 32 13	88 32 23	.30	.07	.20	.02	10	<10	20	N	N	N	<5	N	N	5	N	N	N	10	N	N	10	N	.10
LB228	37 33 8	88 32 28	3.00	.07	.10	.15	100	30	150	1	5	70	7	N	N	7	N	N	N	20	<10	N	700	N	.10
LB237	37 33 4	88 31 36	1.00	.30	.05	.30	20	30	200	1	N	70	10	N	N	15	<10	5	N	50	20	N	300	100	1.30
LB260	37 30 19	88 33 24	2.00	2.00	20.00	.10	1,000	<10	70	N	N	10	<5	N	N	10	<10	N	500	20	<10	N	20	200	3.10
LB263	37 30 30	88 32 35	.20	.50	15.00	.02	200	N	N	N	N	N	N	N	N	N	N	N	300	10	N	N	N	100	5.20
LB268	37 30 50	88 32 23	1.00	.30	.50	.20	10	30	70	N	N	70	<5	N	N	5	N	<5	N	30	10	N	200	200	N

SOIL SAMPLES

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	B-ppm s	Ba-ppm s	Be-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s	Sc-ppm s	Sr-ppm s	V-ppm s	Y-ppm s	Zr-ppm s	SI-F	U-INST
LCS1	37 30 15	88 30 53	3.0	.7	.10	.5	500	N	70	500	1.0	20	70	20	50	<20	30	30	15	100	150	30	500	100	3.3
LCS2	37 30 18	88 30 58	2.0	.5	.10	.7	700	N	70	500	1.5	15	70	20	50	<20	20	20	10	100	100	50	500	<100	3.0
LCS3	37 30 22	88 31 5	2.0	.3	.10	.5	1,000	N	70	500	1.5	15	70	20	50	<20	20	30	10	100	100	30	700	<100	2.1
LCS4	37 30 23	88 31 7	1.5	.2	.10	.5	700	N	70	500	1.0	15	50	15	50	<20	20	20	5	100	70	30	500	N	1.3
LCS5	37 30 25	88 31 11	1.0	.2	.07	.5	500	N	50	300	1.0	10	50	7	50	<20	20	10	5	100	50	50	1,000	N	.9
LCS6	37 30 26	88 31 13	1.5	.3	.10	.7	700	N	70	300	1.5	15	50	20	50	<20	20	30	10	100	100	50	500	<100	1.8
LCS7	37 30 27	88 31 15	2.0	.3	.07	.5	500	N	70	500	1.5	20	50	20	50	<20	30	20	10	100	100	50	500	<100	2.0
LCS8	37 30 29	88 31 17	3.0	.5	.10	.5	500	N	70	500	1.5	20	70	20	30	<20	30	30	15	100	100	30	300	100	1.8
LCS9	37 30 32	88 31 19	1.5	.3	.15	.5	500	N	70	500	1.0	20	70	20	30	<20	20	20	10	100	100	50	500	<100	2.0
LCS10	37 30 33	88 31 24	1.5	.3	.10	.7	700	N	70	500	1.0	20	70	20	50	<20	20	50	10	100	100	50	700	N	2.0
LCS11	37 30 37	88 31 29	3.0	.5	.15	.5	150	N	70	500	1.0	10	70	30	50	<20	20	30	15	100	150	30	500	200	1.5
LCS13	37 30 47	88 31 39	3.0	.5	.10	.5	200	N	70	500	1.0	15	70	20	30	<20	30	30	15	100	150	30	500	200	2.8
LCS14	37 31 47	88 29 32	2.0	.3	.10	.7	300	N	50	500	.7	15	70	15	30	<20	20	15	7	100	100	30	1,000	N	1.6
LCS15	37 31 47	88 29 38	2.0	.3	.15	.5	150	N	50	300	.7	10	70	15	30	<20	20	10	10	100	100	20	1,000	200	1.6
LCS16	37 31 47	88 29 44	3.0	.5	.10	.5	200	N	100	500	1.0	10	70	20	70	<20	20	15	10	100	100	30	700	<100	1.6
LCS17	37 31 47	88 29 50	1.0	.2	.05	.7	100	N	50	300	.7	7	50	10	30	<20	10	15	5	100	50	20	700	N	.5
LCS18	37 31 48	88 29 56	2.0	.3	.10	.7	300	N	70	500	1.0	10	50	15	50	<20	15	20	7	100	100	30	700	<100	1.1
LCS19	37 31 47	88 30 2	5.0	.5	.05	.5	200	N	100	500	1.5	15	70	20	50	<20	30	20	15	100	150	20	500	200	2.4
LCS20	37 31 49	88 30 9	1.5	.2	.07	.7	1,000	N	70	500	.7	15	50	15	50	<20	20	20	7	100	100	50	700	<100	1.7
LCS21	37 31 48	88 30 15	2.0	.2	.10	.5	700	N	70	500	1.0	15	70	15	50	<20	20	20	10	100	100	30	700	<100	2.1
LCS22	37 30 55	88 30 24	2.0	.2	.10	.5	500	N	70	300	1.0	15	50	15	50	<20	20	20	10	100	100	30	700	<100	1.7
LCS23	37 30 58	88 30 29	1.5	.2	.10	.7	500	N	50	500	1.0	10	50	15	50	<20	20	20	7	100	100	20	700	N	1.1
LCS24	37 30 59	88 30 34	2.0	.5	.07	.5	500	N	50	500	1.5	15	70	20	50	<20	30	30	10	100	100	30	500	100	2.4
LCS25	37 31 2	88 30 37	5.0	.5	.10	1.0	500	N	100	500	1.5	10	500	20	50	<20	20	20	15	150	150	50	1,000	100	2.5
LCS26	37 31 7	88 30 42	3.0	.5	.15	1.0	1,000	N	100	700	1.0	15	100	20	50	20	20	20	10	150	100	50	1,000	<100	1.8
LCS27	37 31 10	88 30 46	2.0	.3	.10	1.0	700	N	70	500	1.5	15	70	20	50	<20	20	20	10	100	100	50	700	N	1.2
LCS28	37 31 15	88 31 11	2.0	.3	.10	.7	500	N	70	500	1.0	10	70	20	50	<20	15	30	10	100	100	30	700	N	1.1
LCS29	37 32 15	88 31 3	3.0	.5	.20	1.0	200	N	70	500	1.5	10	70	20	50	<20	20	20	15	100	100	50	700	100	1.5
LCS30	37 32 14	88 30 57	3.0	.5	.10	1.0	500	N	100	500	1.5	15	70	30	50	<20	20	20	15	100	100	30	1,000	<100	1.7
LCS31	37 32 16	88 30 50	2.0	.3	.15	.7	700	N	70	500	1.5	15	70	20	50	20	20	20	10	100	100	30	1,000	<100	2.0
LCS32	37 32 16	88 30 45	5.0	.7	.10	.7	500	N	100	500	1.5	10	70	30	50	<20	30	30	15	100	150	30	500	200	3.4
LCS33	37 32 18	88 30 40	2.0	.3	.10	.7	500	N	70	500	1.0	10	70	20	50	<20	20	20	10	100	100	30	1,000	N	1.8
LCS35	37 32 18	88 30 30	2.0	.3	.10	1.0	1,500	N	70	500	1.0	15	70	20	50	<20	20	20	10	100	100	50	1,000	N	1.8
LCS36	37 32 18	88 30 23	2.0	.3	.15	.7	2,000	N	70	700	1.0	15	70	20	70	<20	20	30	10	150	100	50	700	N	1.8
LS37	37 32 17	88 31 16	3.0	.5	.20	.7	700	N	50	500	1.0	10	70	10	50	20	15	20	5	100	70	30	500	N	.9
LS38	37 32 12	88 31 19	1.0	.3	.10	.5	700	N	30	200	N	15	50	7	20	<20	15	15	5	N	30	30	300	N	.7
LS39	37 32 8	88 31 23	2.0	.3	.10	.5	150	N	30	200	N	5	50	7	N	<20	10	<10	5	N	30	10	300	N	.6
LS40	37 32 8	88 31 30	2.0	.3	.10	.5	200	N	30	200	N	7	30	10	20	<20	10	10	5	N	50	10	300	N	.5
LS41	37 32 9	88 31 37	2.0	.5	.10	.5	700	N	50	300	1.0	15	70	10	30	20	15	10	5	100	70	30	500	N	.6
LS42	37 32 9	88 31 42	2.0	.5	.15	.5	700	N	50	300	1.0	15	50	10	30	20	15	20	5	100	70	30	700	N	.7
LS43	37 32 9	88 31 48	1.0	.2	.10	.3	500	N	30	150	N	5	50	7	20	<20	10	10	5	N	30	20	500	<100	.2
LS44	37 32 8	88 31 55	1.0	.3	.10	.3	700	N	30	200	1.0	7	70	10	20	<20	10	200	<5	100	30	10	500	N	.2
LS45	37 32 14	88 32 7	2.0	.5	.20	.5	1,000	N	30	300	1.0	10	70	15	20	20	15	20	5	100	50	20	500	N	.3
LS46	37 32 17	88 32 13	3.0	.5	.15	.5	200	N	30	200	1.0	10	70	10	20	20	15	<10	5	100	50	20	500	<100	.4
LS47	37 32 19	88 32 18	1.0	.2	.07	.5	500	N	30	150	N	15	30	7	20	<20	10	10	<5	N	30	15	500	<100	.3
LS48	37 32 23	88 32 21	3.0	.3	.05	.2	100	N	20	100	N	5	30	10	N	N	10	<10	<5	N	30	<10	200	200	.4
LS49	37 32 26	88 32 23	2.0	.3	.10	.5	700	N	30	200	N	15	50	10	20	<20	10	10	5	100	50	20	500	<100	.4
LS50	37 32 28	88 32 29	2.0	.3	.10	.5	700	N	30	200	N	10	50	10	20	<20	10	15	5	100	50	30	500	N	.3
LS51	37 37 29	88 32 36	2.0	.2	.07	.2	700	N	20	150	N	10	30	10	N	N	10	<10	5	N	30	20	300	N	.6
LS52	37 37 30	88 32 43	2.0	.3	.10	.5	700	N	30	200	1.0	10	50	10	20	<20	10	<10	5	N	50	20	500	N	.4
LS53	37 32 31	88 32 49	2.0	.2	.10	.5	700	1.0	30	200	N	10	30	10	20	<20	10	<10	5	N	30	20	500	N	.3
LS54	37 32 32	88 32 56	2.0	.2	.10	.3	200	N	20	150	N	10	30	10	N	N	10	<10	5	N	30	20	300	<100	.2
LS55	37 32 34	88 33 4	1.0	.2	.10	.5	500	N	30	200	1.0	7	30	7	20	<20	10	<10	5	N	30	10	500	N	.3
LS56	37 32 38	88 33 7	2.0	.2	.15	.3	700	N	30	200	1.0	10	50	10	20	<20	15	15	5	N	50	20	300	N	.3

PANNED STREAM SEDIMENT SAMPLES

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	B-ppm s	Ba-ppm s	Be-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	Y-ppm s	Zr-ppm s	SI-F	U-INST
LW 1H	37 32 58	88 32 26	20	.15	<.1	1.0	1,500	150	200	5	50	5,000	50	100	50	100	30	15	N	700	100	100	>2,000	100	<20
LW 2H	37 32 57	88 32 27	20	.15	<.1	.7	1,000	150	150	7	30	5,000	30	100	<50	100	30	15	N	300	150	70	>2,000	100	<20
LW 4H	37 32 21	88 32 1	20	.15	<.1	.7	1,500	150	700	5	50	1,500	30	50	<50	100	100	15	N	300	100	150	>2,000	200	<20
LW 5H	37 32 23	88 32 7	30	.10	<.1	1.0	1,000	150	150	7	50	3,000	30	100	<50	100	30	20	N	500	150	150	>2,000	<100	<20
LW 6H	37 32 6	88 32 12	20	.10	<.1	.7	1,000	150	300	7	50	3,000	30	70	50	100	30	20	N	300	100	100	>2,000	200	<20
LW 7H	37 32 17	88 29 59	30	.15	.1	1.5	1,000	300	300	7	50	5,000	50	200	200	150	50	30	N	1,000	100	100	>2,000	200	<20
LW 8H	37 31 57	88 30 21	20	.15	.1	1.0	1,000	300	700	10	50	5,000	50	300	70	100	150	20	N	2,000	100	150	>2,000	300	<20
LW 9H	37 31 56	88 30 25	20	.20	<.1	>2.0	1,500	500	700	7	50	5,000	30	150	100	100	50	50	N	700	150	300	>2,000	200	<20
LW11H	37 31 27	88 29 56	20	.10	<.1	.5	700	200	500	5	20	5,000	50	70	70	70	70	10	N	200	100	70	>2,000	200	<20
LW12H	37 31 15	88 29 46	30	.15	<.1	.5	2,000	150	300	5	50	5,000	30	70	<50	100	50	15	N	300	150	70	>2,000	100	<20
LW13H	37 31 16	88 29 49	30	.15	.1	2.0	1,000	300	700	7	50	5,000	20	200	70	100	50	30	N	1,000	150	150	>2,000	200	<20
LW14H	37 30 16	88 31 12	30	.10	<.1	.7	1,000	150	500	7	30	1,000	30	150	<50	100	50	15	N	1,000	100	70	>2,000	100	<20
LW15H	37 30 28	88 30 55	30	.15	.1	1.5	1,500	200	200	7	50	5,000	30	200	50	100	30	30	N	300	150	150	>2,000	100	<20
LW17H	37 31 31	88 33 1	20	.10	<.1	1.0	1,000	150	700	5	30	2,000	30	150	50	70	50	20	N	200	100	100	>2,000	100	<20
LW19H	37 31 45	88 32 40	20	.20	<.1	2.0	1,000	700	1,500	5	30	5,000	30	70	70	70	150	30	N	200	200	200	>2,000	200	<20
LW21H	37 32 7	88 32 45	30	.15	<.1	.5	2,000	70	1,000	5	50	1,500	50	200	N	100	50	15	N	300	150	70	>2,000	200	<20
LW23H	37 30 14	88 32 29	20	.10	<.1	>2.0	700	200	1,500	7	N	200	15	300	70	50	100	10	50	1,000	200	200	>2,000	N	
LW24H	37 30 55	88 32 54	20	.10	<.1	>2.0	1,000	200	700	5	N	150	15	300	50	50	150	10	500	1,000	200	150	>2,000	<100	IS

UNPANNED STREAM SEDIMENT SAMPLES

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	B-ppm s	Ba-ppm s	Be-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Nb-ppm s	Ni-ppm s	Pb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	Y-ppm s	Zr-ppm s	SI-F	U-INST
LW1L	37 32 58	88 32 25	1.5	.10	.07	.20	1,000	50	150	1.0	15	70	10	20	N	30	20	<5	N	N	50	15	200	<100	.05
LW2L	37 32 57	88 32 27	3.0	.10	.07	.20	1,000	50	150	1.0	20	100	10	30	N	30	20	5	N	N	70	20	200	100	<.05
LW4L	37 32 21	88 32 1	1.0	.10	.07	.20	500	50	150	1.0	10	20	7	70	N	20	100	N	N	100	50	15	200	<100	<.05
LW5L	37 32 23	88 32 7	3.0	.10	.07	.20	500	50	100	1.5	15	30	10	30	N	20	50	5	N	100	50	20	500	<100	.05
LW6L	37 32 6	88 32 12	2.0	.10	.05	.15	500	50	100	1.0	15	200	7	N	N	20	20	5	N	N	50	15	500	<100	.05
LW7L	37 32 17	88 29 59	2.0	.07	.05	.15	500	50	100	1.0	15	50	7	20	<20	20	20	<5	N	N	50	20	200	<100	<.05
LW8L	37 31 57	88 30 21	1.0	.07	.05	.15	200	70	100	<1.0	10	30	5	20	N	15	15	N	N	N	50	15	150	<100	N
LW9L	37 31 56	88 30 25	1.5	.10	.07	.20	1,000	70	150	1.0	20	50	7	30	N	20	20	5	N	N	70	20	300	<100	.05
LW10L	37 31 32	88 30 8	.7	.05	.05	.15	200	50	100	<1.0	5	30	<5	20	N	10	10	N	N	N	30	10	150	<100	<.05
LW11L	37 31 27	88 29 56	2.0	.07	.05	.30	1,000	70	150	1.0	15	100	7	30	<20	20	20	<5	N	100	50	20	700	<100	N
LW12L	37 31 15	88 29 46	2.0	.15	.10	.30	1,000	100	200	1.5	15	50	10	50	<20	30	30	7	N	100	70	30	500	<100	<.05
LW13L	37 31 16	88 29 49	2.0	.10	.07	.20	700	70	150	1.0	10	150	7	30	<20	20	15	5	N	100	50	20	500	<100	<.05
LW14L	37 30 16	88 31 12	2.0	.15	.05	.20	700	70	150	1.0	15	150	7	20	<20	20	20	5	N	N	70	20	500	<100	N
LW15L	37 30 28	88 30 55	2.0	.10	.05	.20	700	70	150	<1.0	15	100	7	20	20	20	20	N	N	N	70	15	700	<100	<.05
LW16L	37 30 31	88 30 55	1.5	.10	.07	.20	500	50	150	<1.0	10	150	5	20	<20	15	15	5	N	N	50	15	700	<100	<.05
LW17L	37 31 31	88 33 1	2.0	.15	.07	.20	700	50	150	1.0	10	70	7	30	N	20	50	5	N	100	50	15	500	<100	<.05
LW18L	37 31 32	88 33 2	3.0	.10	.05	.20	700	70	100	1.0	15	50	7	20	N	20	30	5	N	N	50	15	500	<100	<.05
LW19L	37 31 45	88 32 40	1.5	.15	.05	.20	700	50	100	1.0	10	100	7	30	N	20	20	5	N	N	30	15	300	<100	<.05
LW20L	37 31 56	88 32 40	2.0	.10	.05	.20	1,000	50	100	1.0	20	100	7	20	N	20	20	5	N	N	50	10	200	<100	<.05
LW21L	37 32 7	88 32 45	3.0	.15	.07	.20	1,000	50	150	1.0	20	70	7	30	N	30	30	5	N	N	50	15	300	<100	N
LW22L	37 32 11	88 32 48	2.0	.10	.07	.20	200	50	150	1.0	10	200	7	30	N	20	20	5	N	N	50	20	700	<100	N
LW23L	37 30 14	88 32 29	3.0	.20	.10	.30	1,000	50	300	1.5	15	50	15	50	<20	20	15	7	N	100	70	20	700	<100	1.20
LW24L	37 30 55	88 32 54	5.0	.20	.10	.50	3,000	50	300	2.0	20	300	20	70	<20	30	20	10	N	100	70	20	500	<100	1.50

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 Lusk Creek Roadless Area in the Shawnee National Forest, Pope County, Ill. The area 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

The Lusk Creek Roadless Area (Index map) lies along the western edge of the Illinois-Kentucky fluorspar district in which fluorite deposits occur as lenticular-type veins emplaced along fault zones or as stratiform-shaped bedding-replacement deposits that occur along fault zones (Grogan and Bradbury, 1967; Trace, 1974). Although mineralogy varies between deposits, Trace (1974) points out that the principal minerals are fluorite (CaF) and calcite ($CaCO_3$), and associated with these minerals are lesser amounts of sphalerite (ZnS), galena (PbS), and barite ($BaSO_4$). Minor quantities of iron-rich dolomite ($CaMg(CO_3)_2$), pyrite (FeS_2), and alteration products of zinc, lead, and copper minerals also are found.

Although Van Alstine (1965) notes that opinions differ as to the value of using fluorine in soils and stream sediments for geochemical prospecting for fluorspar, he has shown that residual soil and alluvium (stream sediments) can contain significant concentrations of fluorine in the vicinity of fluorite deposits. Thus, soil and stream sediment samples that were collected for geochemical analyses for several different elements were also analyzed for their fluorine content.

Acknowledgments

The Illinois State Geological Survey helped considerably in this study. Jack A. Simon, Director, provided unpublished data from the Survey files. James C. Bradbury and James W. Baxter, geologists who have worked in the southern Illinois region, spent several hours discussing the geology of the region with the senior author and also provided well-log data and geologic reports. The U.S. Forest Service personnel at Harrisburg, Ill. provided trail maps for the Lusk Creek study area. Daniel Shuart and Donald O'Brien assisted in the collection of samples. Dan Osterfeld and Katherine Portner helped in the preparation of illustrations for this report. Geochemical analyses for fluorine and uranium were done by B. F. Abrogast, J. D. Sharkey and W. W. Vaughn of the U.S. Geological Survey laboratories, Denver, Colo. J. T. Hanley and P. G. Schruben formatted the analytical data by computer methods for table 1.

ACCOMPANYING GEOLOGIC STUDIES

In addition to geologic mapping in the study area (Klasner, 1982; fig. 1), all of the unprocessed panned stream-sediment samples were examined with a binocular microscope. The major constituents found were quartz and lithic fragments, along with minor amounts of fluorite, zircon, and possibly barite were also observed. Although most of the numerous opaque grains observed were identified as lithic fragments, some are most likely opaque oxide and sulfide minerals. Eighteen thin sections of rock were also studied microscopically; the results are documented in Klasner (1982). Fluorite, calcite, sphalerite, barite, and galena were observed at mines along the Lusk Creek and Shawneetown fault zones.

GEOCHEMICAL TECHNIQUES

Along with standard geologic techniques, geochemical techniques are an effective tool in exploration for mineral resources (Hawkes and Webb, 1962). The effectiveness lies in the fact that key indicator elements of mineral deposits may be dispersed as halos in bedrock, overlying soils, and stream sediments about a mineral deposit.

A total of 120 samples were collected from the Lusk Creek study area for geochemical analyses (fig. 1). Included are 25 bedrock samples, 41 stream-sediments samples (panned and unpanned), and 54 soil samples from the B or A_2 horizon below the dark, humic A_1 soil zone. Soil samples were not generally taken in areas covered by the deposits of loess (fine-grained silt and sand deposited by the wind) which have been observed in the study area (Klasner, 1982). All samples were analyzed for 31 elements by the semiquantitative six-step, direct-current arc, optical-emission spectrographic method (Grimes and Marranzino, 1968). Uranium was determined by a fluorometric method and fluorine by wet chemical-ion detection method (see Levinson, 1974, p. 296-297 for brief discussions of these techniques). The elements that occurred in detectable amounts are shown in table 1. Arsenic, gold, bismuth, cadmium, molybdenum, antimony, tin, thorium, and tungsten were not detected spectrographically in any samples; silver and zinc were detected spectrographically in only one sample each.

Location of stream-sediment samples were selected so that most small drainage basins were sampled throughout the study area (fig. 2). A small portion of the south-central part of the area under private ownership was not sampled because the owner did not permit access to the stream.

Both unpanned and panned samples were taken at most locations. Unpanned sediments consist of the finest-grained sediments available in the stream bed. Samples were sieved to minus 80 mesh (0.007 in. or 0.177 mm) for analysis. Sediments that had a large range in grain size were collected for panning. Panning partially separates the light (less dense) minerals from the heavy (more dense) minerals. Heavy minerals were further concentrated by magnetic separation (removal of magnetite) and by use of dense fluids. The resulting heavy-mineral concentrate was analyzed.

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GEOCHEMICAL SURVEY OF THE LUSK CREEK ROADLESS AREA, POPE COUNTY, ILLINOIS

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