DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF – 721

Qualitative data for gaseous springs in Clear Lake, California.

SPRING NO.	GAS ACTIVITY a=weak b=moderate c=rigorous *=warm	SIZE 1=diffuse 2=discrete	SPRING NO.	GAS ACTIVITY a=weak b=moderate c=rigorous *=warm	SIZE 1=diffuse 2=discrete
1	a	2	34	a	2
2	b	1	35	a	2
3	b	1	36	a	2
4	a	1	37	a*	1
5	a	1	38	a	1
6	a	2	39	a*	1
7	a	2	40	a-b	1
8	a	1	41	a*	1
9	a-b-c	1	42	b*	2
10	a	1	43	a	1
11	a	2	44	a	1
12	a-b	1	45	b	2
13	a	1	46	a	1
14	b	1	47	b-c	1
15	c	2	48	b-c*	1
16	a	2	49	a	1
17	a	1	50	a-b*	1
18	b	2	51	a-b	1
19	a	1	52	a	1
20	a	1	53	a	1
21	a-b	1	54	a	1
22	b	2	55	a	1
23	a	2	56	a	1
24	a	1	57	a-b-c*	1
25	a-c*	1	58	a	1
26	a-b	1	59	a-b	1
27	a	1	60	a	2
28	a	2	61	a	1
29	a	1	62	a	2
30	a-b	1	63	a-b	1
31	a-b	1	64	a	1
32	a-b	1	65	a-b	1
33	c	2	66	a	1

Clear Lake is a large freshwater lake in the California Coast Ranges, approximately 150 km north of San Francisco. The lake lies in a broad intermontane valley among hills composed of the Franciscan assemblage and the Clear Lake Volcanic Series of Brice (1953) and Hearn, Donnelly, and Goff (1975). Much of the lake shore is parallel or subparallel to the structural-tectonic pattern of the Franciscan rocks of the Coast Ranges. Gaseous springs, some warm, occur in linear alinements within the lake and along arcuate segments of the shoreline.

The springs shown on this map were located during October and November 1973 and October 1974. Observations were made from an outboard motorboat during calm to dead calm periods because the surface bubbles from the springs are not easily seen in choppy or rough water. The springs were located with respect to shoreline features and by Brunton compass.

The amount of gas issuing from the springs, probably varies from several litres to a few millilitres per minute, although quantitative data were not collected. The volume of gas issuing from individual springs varied with time. Variation of gas production as shown in the table was greatest in the larger springs, which at times bubbled so vigorously that the bottom sediments were disturbed and an aureole of muddy water surrounded the spring site. The gases are composed dominantly of carbon dioxide and methane; reliable quantitative data on composition are lacking.

This map locates only gaseous springs within the lake and on or near its shores. Springs on land in the vicinity of Clear Lake are both gaseous and nongaseous (White and others, 1973; Barnes, Hinkle and others, 1973; Barnes, O'Neil and others, 1973; Waring, 1915). Nongaseous springs are likely to occur within the lake, although none were detected by the methods used in this study.

The faults on this map are those inferred by linear arrays of gaseous springs in the lake or by on-land faults extended into the lake by our data (Sims and Rymer, 1974). Not all gaseous springs on this map are associated with discrete faults; in particular, springs 19 through 33 and 45 through 56 are associated with arcuate segments of shoreline probably shaped by explosion craters associated with eruptive centers of the Clear Lake volcanic field (B.C. Hearn, oral commun., 1974).

References

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Brice, J.C., 1953, Geology of Lower Lake quadrangle, California: Calif. Div. Mines and Geology Bull. 166, 72 p.

Hearn, B.C., Jr., Donnelly, J.M., and Goff, F.E., 1975, Preliminary geologic map of the Clear Lake volcanic field, Lake County, California: U.S. Geol. Survey Open File Report No. 75-391.

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Waring, C.E., 1915, Springs of California: U.S. Geol. Survey Water Supply Paper 338, 410 p.

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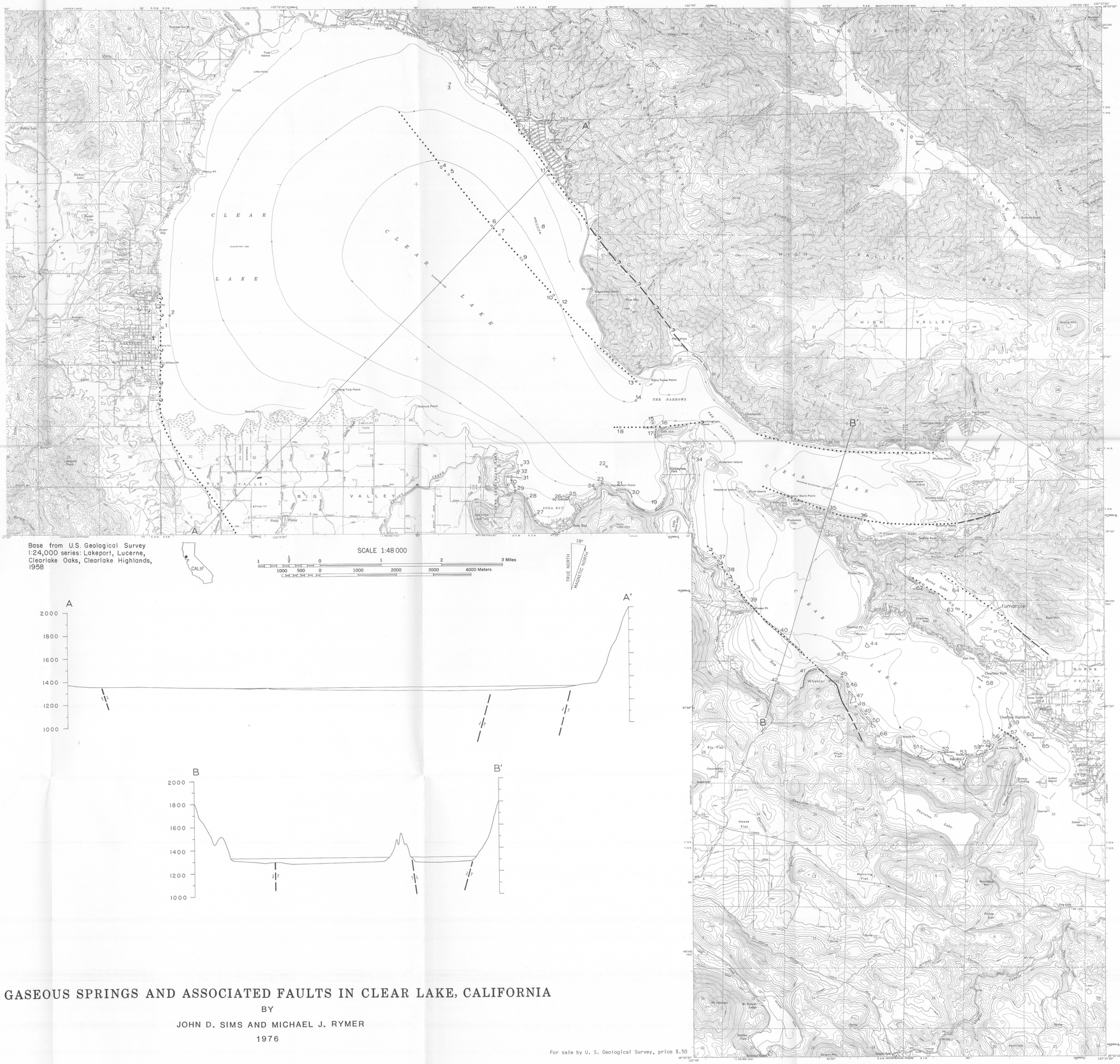
EXPLANATION

6 — Spring(s). Number corresponds to spring number in table 1

5 — Cluster of springs. Number corresponds to spring number in table 1

Fault. Dashed where inferrred; dotted where concealed; queried where questionable; inferrred relative displacement shown in sections



MAP OF GASEOUS SPRINGS AND ASSOCIATED FAULTS IN CLEAR LAKE, CALIFORNIA

BY

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1976

For sale by U. S. Geological Survey, price $.50