INTRODUCTION

This atlas presents data on ground-water quality for the Lovelock 1° x 2° quadrangle. The basic data were compiled as part of the Great Basin Regional Aquifer-Systems Analysis of the U.S. Geological Survey (Harrill and others, 1983).

The data herein were obtained from various sources, including published reports and computerized data files. The computer files accessed for this effort are: (1) WATSTORE, the National Water-Data Storage and Retrieval system maintained by the Water Resources Division of the U.S. Geological Survey; (2) WADS, a system created by the Desert Research Institute, University of Nevada; and (3) RASS, a system maintained by the Geologic Division of the U.S. Geological Survey. Other potential major sources of data are: the National Uranium Resource Evaluation (NURE), a U.S. Department of Energy project; reports of sampling efforts begun in 1980 by the U.S. Bureau of Land Management; and U.S. Geological Survey reports on various hydrographic areas. Only those analyses that pass certain quality-control criteria are included herein. A chemical analysis is excluded if (1) determinations do not exist for all of the principal ions, or (2) the analytical results do not meet the following criterion for electrical balance: total cations and total anions must agree within 10 percent, using the formula:

$$\text{imbalance (in percent)} = \frac{(\text{cations} - \text{anions})}{(\text{cations} + \text{anions})} \times 100 ,$$

where the concentrations are expressed in milliequivalents per liter. This electrical imbalance should be small for comprehensive analyses and it therefore serves as a check on the quality of the analytical results.

Where sample sites are closely spaced, or where more than one analysis is available for a single site, areal averaging is applied to prevent overprinting of information on the map (see side 1). Furthermore, if data for a deep well or for a thermal water are available within an area containing other data (shallow or nonthermal), the other data are not included in the averaging. Finally, if data for both a deep well (1,000 feet or greater) and a thermal water (30 °C or greater) are available, only the deep data are used. The averaging is done over a map area of 0.5 inch by 0.5 inch at a scale of 1:250,000, which is equivalent to about 4 square miles. One consequence of this procedure is that the actual map location corresponding to the sampling site does not necessarily coincide exactly with the computer-plotted location on the map (which is at the center of the 4-square-mile averaging area). Thus, the plotted data for springs may be offset from the spring locations shown on the topograhic base map.

The general chemical character of each water (that is, the relative proportions of principal cations and anions) is shown in the trilinear diagrams (side 1) and indicated by a letter code on the map (see "Explanation"). The characteristics and uses of trilinear diagrams are discussed by Hem (1985, p. 178-180). Both the map and the trilinear diagrams used the same depth-and-temperature symbols. The bar graph (side 1) indicates the relative proportion of major cations and anions for the indicated ranges of dissolved-solids concentration.

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CONVERSION FACTORS AND ABBREVIATIONS

"Inch-pound" units of measure used in this report may be converted to International System (metric) units by using the following factors:

Multiply	*By*	*To obtain*
Feet (ft)	0.3048	Meters (m)
Inch (in.)	25.40	Millimeters (mm)
Square miles (mi^2)	2.590	Square kilometers (km^2)

For temperature, degrees Celsius (°C) can be converted to degrees Fahrenheit (°F) by using the formula °F = [(1.8)(°C)] + 32.

Site designation[1]	Latitude, longitude (deg-min-sec)[2]	Type of site	Temperature (degrees Celsius)	pH (units)	Specific conductance (microsiemens per centimeter at 25°C)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Silica (mg/L)	Dissolved solids[3] (mg/L)	Cation-anion balance[4]	Sampling date (year-month-day)	Well depth (feet)	Source of data[5]
THE NEEDLE ROCKS	400842 1194100	Spring	61	7.8	5,800	200	0.3	1,000	120	110	0	350	1,800	--	110	3,800	-3	--	--	Bliss, 1983
GEYSER NEEDLE ROCK	400844 1194034	Spring	56	8.4	6,200	260	0.1	1,100	160	24	1	340	1,900	3.0	110	3,900	3	--	--	Mariner and others, 1974
THE NEEDLE ROCKS - SPRING(?)	400848 1194030	Spring	66	7.6	7,200	320	0.4	1,200	280	100	0	330	1,900	--	82	4,700	10	--	--	Bliss, 1983
THE NEEDLE ROCKS, WESTERN GTHRML	400900 1194030	Well	67	8.1	6,070	280	0.1	1,100	31	12	0	340	1,800	3.0	95	3,700	4	73-10-12	--	Bliss, 1983
COLADO AREA-MINERAL MATERIALS	401442 1182306	Well	66	7.9	10,200	120	19	1,700	120	190	0	280	2,600	4.1	76	5,000	1	64-10-08	--	Bliss, 1983
SOUTHWEST DREDGING CO. WELL	402012 1180812	Well	24	7.4	463	50	9.3	33	1.3	210	0	23	29	0.1	20	270	0	52-05-15	--	Bliss, 1983
NOT SPECIFIED	402437 1184600	Well	20	7.6	423	46	4.1	27	9.8	99	0	61	38	0.3	70	300	1	61-09-14	--	Harrill, 1970
GREAT BOILING SPRINGS	403848 1192148	Spring	91	7.2	7,270	73	0.7	1,500	124	91	0	380	2,200	4.0	170	4,400	0	54-07-31	--	Bliss, 1983
MUD SPRINGS ORIFICE 2	403903 1192302	Spring	74	7.2	--	74	2.5	1,500	134	70	0	370	2,100	--	170	4,400	3	--	--	Anderson, 1977
MUD SPRINGS ORIFICE 2	403903 1192302	Spring	91	7.7	7,460	79	2.8	1,500	100	120	0	380	2,200	4.6	140	4,500	0	80-01-18	--	WATSTORE
MUD SPRINGS ORIFICE 1	403903 1192302	Spring	60	7.8	--	75	2.8	1,500	135	75	0	380	2,100	3.8	170	4,400	3	--	--	Anderson, 1977
MUD SPRINGS ORIFICE 1	403903 1192302	Spring	79	7.1	7,330	77	2.6	1,400	120	120	0	390	2,200	5.0	190	4,400	-3	80-02-05	--	WATSTORE
MUD SPRING-9	403903 1192302	Spring	84	7.0	8,000	73	2.4	1,500	143	70	0	380	2,100	--	170	4,400	3	--	--	Anderson, 1977
MUD SPRING-13	403903 1192302	Spring	42	7.1	7,600	50	2.3	1,600	131	74	0	370	2,400	--	170	4,800	-1	--	--	Anderson, 1977
HORSE	403931 1192113	Spring	63	7.6	--	74	1.0	1,400	130	74	0	360	1,900	4.1	180	4,100	4	--	--	Anderson, 1977
GERLACH AREA-GERLACH HOT SPRINGS	403936 1192148	Spring	84	8.1	7,830	89	1.0	1,500	113	91	0	390	2,200	5.5	170	4,600	1	74-02-19	--	Bliss, 1983
GREAT BOILING SPRIN-3	403939 1192154	Spring	86	7.1	7,610	68	1.2	1,400	130	83	<1	400	2,200	4.5	170	4,400	-3	--	--	Mariner and others, 1974
GREAT BOILING SP-9	403939 1192154	Spring	75	7.6	8,150	73	2.0	1,600	110	90	0	360	2,100	--	180	4,400	6	--	--	Anderson, 1977
GREAT BOILING SP-18	403939 1192154	Spring	58	8.3	7,600	73	2.5	1,600	135	84	0	380	2,200	--	190	4,600	4	--	--	Anderson, 1977
GREAT BOILING SP-22	403939 1192154	Spring	55	8.2	8,100	75	2.5	1,800	128	88	0	380	2,400	--	180	5,000	5	--	--	Anderson, 1977
GREAT BOILING SP-24	403939 1192154	Spring	94	7.6	7,800	73	2.0	1,600	135	66	0	360	2,100	--	170	4,400	6	--	--	Anderson, 1977
GREAT BOILING SP-27	403939 1192154	Spring	63	7.8	--	75	2.2	1,600	148	82	0	380	2,200	--	180	4,600	4	--	--	Anderson, 1977
GREAT BOILING SP-28	403939 1192154	Spring	96	7.1	7,620	68	2.8	1,600	134	160	0	410	2,200	--	170	4,600	2	--	--	Anderson, 1977
GREAT BOILING SP-19	403939 1192154	Spring	98	7.4	7,600	70	1.0	1,400	140	90	0	370	2,100	4.5	170	4,300	0	--	--	Anderson, 1977
GREAT BOILING SP-37	403939 1192154	Spring	65	7.7	--	70	2.2	1,400	133	90	0	350	2,300	--	190	4,600	-4	--	--	Anderson, 1977
GREAT BOILING SP-43	403939 1192154	Spring	46	6.8	7,600	69	2.3	1,800	130	88	0	360	2,200	4.4	170	4,800	9	--	--	Anderson, 1977
GREAT BOILING SP-46	403939 1192154	Spring	84	7.6	7,600	96	2.3	1,400	136	83	0	400	2,400	4.8	170	4,600	-5	--	--	Anderson, 1977
GREAT BOILING SP-55	403939 1192154	Spring	78	7.0	--	73	2.3	1,600	140	85	0	360	2,100	--	180	4,500	6	--	--	Anderson, 1977
BORAX	403939 1192154	Spring	--	8.2	--	78	1.3	1,600	134	75	0	370	2,100	--	170	4,500	6	--	--	Anderson, 1977
GREAT BOILING SP ORIF 46	403939 1192154	Spring	89	7.3	7,530	70	1.1	1,400	120	96	0	380	2,100	5.7	210	4,300	-1	80-01-28	--	WATSTORE
UNSPECIFIED	403941 1192203	Spring	92	8.0	7,300	72	1.2	1,500	110	85	0	370	2,200	5.5	160	4,500	0	77-05-08	--	WATSTORE
GREAT BOILING SP ORIF 48	403942 1192155	Spring	94	7.2	7,400	67	1.5	1,500	100	84	0	370	2,300	5.1	160	4,500	-2	80-01-16	--	WATSTORE
GREAT BOILING SP ORIF 23	403945 1192155	Spring	100	7.2	7,430	74	1.2	1,500	120	100	0	380	2,200	4.7	170	4,500	0	80-01-17	--	WATSTORE
DITCH	404024 1192118	Spring	97	7.2	--	73	2.2	1,400	121	84	0	390	2,200	--	180	4,400	-3	--	--	Anderson, 1977
DITCH	404024 1192118	Spring	90	8.1	7,320	56	0.9	1,400	110	68	0	370	2,000	4.6	70	4,000	1	79-11-28	--	WATSTORE
N33 E23 26D	404237 1192012	Well	16	7.4	1,110	18	5.0	310	10	360	48	79	160	--	44	850	5	45-04-09	--	Sinclair, 1963
GRB	404336 1191554	Well	12	9.3	93,000	1.7	1.8	31,000	170	9,560	900	3,400	44,000	6.9	16	84,000	-5	80-11-12	24	WATSTORE
SPRINGS-GERLACH WAT SUPP	404434 1192610	Spring	12	8.0	448	47	5.7	22	6.2	92	0	32	67	0.1	13	240	-2	80-01-10	--	WATSTORE
MCCLELLAN RANCH	404437 1190939	Well	36	8.6	2,150	21	0.2	320	21	100	15	140	290	3.0	86	940	8	--	--	Anderson, 1977
N33 E25 10B	404441 1191023	Well	20	8.4	1,980	15	4.0	270	9.0	88	14	160	270	--	100	890	1	47-09-02	--	Sinclair, 1963
MCCLELLAN RANCH	404441 1191023	Well	92	7.4	1,410	13	0.6	270	8.4	93	0	160	280	2.8	94	870	0	61-06-12	--	Sinclair, 1963
UNN HOT SP TREGO	404602 1190639	Spring	86	8.4	2,300	25	0.2	460	9.3	150	0	86	520	--	85	1,300	6	--	--	Anderson, 1977
TREGO HOT SPRINGS ORIF A	404602 1190639	Spring	86	8.3	2,250	14	<0.1	470	10	140	1	170	550	4.4	83	1,400	0	80-04-28	--	WATSTORE
WELL NEAR GERLACH	404651 1192239	Well	80	7.9	1,800	31	4.2	340	17	460	4	46	240	7.0	82	990	5	--	--	Anderson, 1977
N35 E23 25B	404823 1191928	Well	13	--	703	30	9.5	110	2.2	220	0	41	86	0.1	36	420	2	61-12-13	--	Harrill, 1969
COYOTE	404833 1191046	Well	22	7.8	5,150	12	19	1,200	15	1,210	0	5.8	1,200	1.5	58	3,000	1	61-05-03	--	Sinclair, 1963
GRL	405042 1190260	Well	13	9.8	32,200	3.0	0.4	7,300	56	2,220	670	92	10,000	6.6	1.0	19,000	-4	80-11-11	322	WATSTORE
N34 E23 10A	405101 1192105	Well	22	7.2	755	72	21	54	10	220	0	67	93	0.1	89	520	2	61-12-13	--	Harrill, 1969
WARD'S HOT SP (FLY, HUALAPAI)	405130 1192054	Well	97	--	--	33	4.6	350	17	440	0	190	240	--	76	1,700	-1	--	--	Bliss, 1983
HUALAPAI FLAT 1	405138 1191905	Spring	32	8.4	2,100	28	0.2	380	17	460	0	250	250	--	88	1,200	-4	--	--	Anderson, 1977
HUALAPAI FLAT 3	405138 1191905	Spring	35	8.4	2,100	24	0.2	380	17	460	0	240	240	--	89	1,200	-3	--	--	Anderson, 1977
WESTERN	405138 1191905	Spring	96	8.4	1,800	22	0.2	390	17	460	0	190	280	7.0	90	1,200	-2	--	--	Anderson, 1977
HUALAPAI FLAT 16	405138 1191905	Spring	94	7.2	1,950	22	0.2	410	17	460	0	210	250	--	90	1,200	1	--	--	Anderson, 1977
HUALAPI FLAT 18	405138 1191905	Spring	91	7.1	2,300	28	0.2	400	18	440	0	200	250	--	88	1,200	2	--	--	Anderson, 1977
HUALAPAI FLAT 41	405138 1191905	Spring	34	7.9	2,060	17	0.2	440	16	460	0	220	260	--	90	1,300	2	--	--	Anderson, 1977
HUALAPAI FLAT 50	405138 1191905	Spring	32	7.9	2,100	18	0.2	430	15	450	0	210	250	--	82	1,200	3	--	--	Anderson, 1977
HUALAPAI FLAT 63	405138 1191905	Spring	82	7.1	2,250	24	0.2	410	14	440	0	390	260	7.0	86	1,400	-8	--	--	Anderson, 1977
HUALAPAI FLAT 82	405138 1191905	Spring	32	8.0	2,100	20	0.2	400	17	470	0	160	250	--	82	1,200	2	--	--	Anderson, 1977
USGS H-7	405157 1191454	Well	15	8.4	4,200	18	17	800	23	550	45	390	760	--	13	2,300	-3	67-08-03	42	Harrill, 1969
JACKSON	405157 1191820	Well	16	7.9	409	27	10	38	8.8	180	0	20	27	0.1	69	290	-1	61-12-12	123	Harrill, 1969
BR11	405221 1191008	Well	15	8.4	10,300	4.7	6.8	2,700	7.5	1,480	19	12	2,700	1.7	51	6,200	8	80-07-15	320	WATSTORE
BR10	405239 1190611	Well	13	7.3	18,200	110	480	3,900	50	1,050	1	100	6,100	0.3	65	11,000	6	80-10-08	320	WATSTORE
JACKSON	405247 1191745	Well	17	7.7	366	26	9.7	33	7.1	160	0	20	25	0.2	66	260	0	61-05-03	190	Harrill, 1969
SAND SPRING LAND CO	405305 1191960	Well	--	8.2	480	39	14	53	13	200	0	62	48	--	35	360	-2	67-07-25	321	WATSTORE
JOHN FITZ	405312 1191854	Well	25	8.3	420	31	13	42	17	170	0	56	38	--	17	300	-2	67-09-28	280	Harrill, 1969
JACKSON	405329 1191854	Spring	21	7.3	509	44	14	35	8.9	180	0	42	46	0.7	60	340	0	67-05-12	158	Harrill, 1969
SAND SPRINGS LAND CO	405420 1191945	Well	24	8.2	440	34	13	44	16	170	0	61	48	--	34	340	-3	67-07-25	321	Harrill, 1969
TH SP #2 SULPHUR 2NW QD	405446 1185904	Spring	21	8.2	12,500	40	31	3,000	120	2,700	22	560	2,600	6.2	59	7,800	3	80-07-15	--	WATSTORE
HAROLD FERRIS	405450 1191854	Well	18	7.8	339	25	9.0	32	4.7	150	0	16	23	0.2	61	240	1	61-05-03	377	Sinclair, 1962
NEGRO	405610 1192139	Well	23	7.4	288	9.0	4.0	21	7.0	75	0	12	13	0.1	64	170	1	--	--	Anderson 1977
RICHARD BAILEY	405632 1191816	Well	26	8.1	480	1.8	0.9	82	39	170	0	77	44	--	17	340	-9	67-06-16	310	Harrill, 1969
UNSPECIFIED	405656 1191920	Well	--	9.0	1,840	18	46	390	16	340	40	210	250	7.9	76	1,200	9	61-05-03	--	Sinclair, 1962
TH SP #1 SULPHUR 2NW QD	405711 1185958	Spring	89	7.0	6,620	23	3.4	1,500	19	930	0	280	1,700	5.8	100	4,100	-1	80-07-08	--	WATSTORE
TH SP#1 SOLD CR 4SE QUAD	405712 1185957	Spring	46	8.2	2,360	23	4.7	420	26	120	1	180	570	1.1	53	1,300	-3	80-06-10	--	WATSTORE
N36 E23 36A	405733 1191957	Well	13	7.2	559	46	20	40	5.1	200	0	69	33	0.1	42	360	1	67-05-12	--	Harrill, 1969
UNNAMED SPRING	405754 1192112	Spring	22	7.2	755	72	21	54	10	220	0	67	93	0.1	89	520	2	61-12-13	--	Bliss, 1983
BLACK ROCK HOT SPRINGS	405822 1190022	Spring	69	7.9	2,050	18	1.9	490	13	900	0	130	160	8.9	62	1,300	2	61-05-03	--	Sinclair, 1963
BLACKROCK SP DEEPHOLEINE	405826 1190025	Spring	77	7.5	2,130	14	3.0	460	14	900	1	130	180	9.4	68	1,300	-3	80-06-24	--	WATSTORE
BRD 52B	405908 1190033	Well	24	9.8	4,110	1.4	0.1	930	38	860	290	40	700	7.9	1.9	2,400	-3	81-06-30	--	WATSTORE
BR06	405934 1190558	Well	17	7.6	26,500	21	140	5,600	72	2,960	6	22	9,100	1.1	59	16,000	-9	80-08-04	290	WATSTORE

[1] Sample-site designations having format N34 E23 10A indicate township, range, and section, respectively; letter following section number indicates quarter section, as follows: A, northeast; B, northwest; C, southwest; D, southeast. Townships and ranges are referenced to Mount Diablo base line and meridian.

[2] Data are listed in order of increasing latitude and, for identical latitudes, increasing longitude.

[3] Computed sum (with bicarbonate multiplied by 0.492 to make results comparable with residue-on-evaporation values).

[4] Computed as described in introductory text. Negative value indicates that anions exceed cations.

[5] WATSTORE is U.S. Geological Survey's National Water Data Storage and Retrieval System. Citations for other sources are listed under "References Cited."