INTRODUCTION

This atlas presents data on ground-water quality for the Millett 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 Inventory (NURI), 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 required 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 topographic 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 (1970, p. 264-270). Both the map and the trilinear diagrams use 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.

REFERENCES CITED

Bliss, J. D., 1983, Nevada--Basic data for thermal springs and wells as recorded in GEOTHERM, part B: U.S. Geological Survey Open-File Report 83-433B, 707 p.

Ghusn, George, Jr., 1981, Statewide assessment, *in* Trexler, D. T., Koenig, B. A., Flynn, Thomas, Bruce, J. L., and Ghusn, George, Jr., Low-to-moderate temperature geothermal resource assessment for Nevada, area specific studies: Nevada Bureau of Mines and Geology Report DOE/NV/10039-3, p. 191-196.

Harrill, J. R., 1968, Hydrologic response to irrigation pumping in Diamond Valley, Eureka and Elko Counties, Nevada, 1950-65: Nevada Department of Conservation and Natural Resources, Water Resources Bulletin 35, 85 p.

Harrill, J. R., Welch, A. H., Prudic, D. E., Thomas, J. M., Carman, R. L., Plume, R. W., Gates, J. S., and Mason, J. L., 1983, Aquifer systems in the Great Basin Region of Nevada, Utah, and adjacent states--a study plan: U.S. Geological Survey Open-File Report 82-445, 49 p.

Hem, J. D., 1970, Study and interpretation of the chemical characteristics of natural water (2d ed.): U.S. Geological Survey Water-Supply Paper 1473, 363 p.

Rush, F. E., and Schroer, C. V., 1970, Water resources of Big Smoky Valley, Lander, Nye, and Esmeralda Counties, Nevada: Nevada Division of Water Resources, Bulletin 41, 84 p.

Trexler, D. T., Koenig, B. A., Flynn, Thomas, and Bruce, J. L., 1980, Assessment of geothermal resources of Carson-Eagle Valleys and Big Smoky Valley, Nevada--first annual report: Nevada Bureau of Mines and Geology Report DOE/NV/10039-2, 162 p.

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)
Inches (in.)	25.40	Millimeters (mm)
Square miles (mi^2)	2.590	Square kilometers (km^2)

For temperature, degrees Celsius (°C) may 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	Magnesium	Sodium	Potassium	Bicarbonate	Carbonate	Sulfate	Chloride	Fluoride	Silica	Dissolved solids[3]	Cation-anion balance[4]	Sampling date (year-month-day)	Source of data[5]
DIANAS PUNCH BOWL	390147	1164002	Spring	59	7.1	605	50	11	55	15	280	<1	59	8.0	2.8	46	380	1	65-05-28	WATSTORE
DIANA'S PUNCHBOWL	390148	1163954	Spring	60.5	7.3	616	52	11	55	16	300	0	62	10	2.5	43	400	-2	57-05-14	Bliss, 1983
DIANAS HOT SPRING	390149	1163956	Spring	51	6.7	589	47	11	57	15	270	<1	59	8.0	2.8	46	380	2	65-05-28	WATSTORE
NOT SPECIFIED	390149	1163957	Spring	55	8.1	600	51	11	58	16	300	0	61	8.8	2.9	42	400	0	67-05-09	WATSTORE
NOT SPECIFIED	390149	1163957	Spring	50	7.9	586	47	11	55	15	290	0	55	9.0	2.9	44	380	-1	67-06-22	WATSTORE
NOT SPECIFIED	390245	1170955	Spring	18	--	--	12	0.2	25	1.0	74	0	21	3.1	0.6	13	110	0	67-05-08	WATSTORE
NOT SPECIFIED	390445	1163820	Spring	44.5	7.7	550	51	11	46	13	270	0	55	10	2.0	35	350	-1	67-05-09	WATSTORE
NOT SPECIFIED	390445	1163820	Spring	45	--	553	49	11	45	0.1	270	0	53	11	2.1	35	340	-5	67-06-22	WATSTORE
POTTS RANCH HOT SPRING	390457	1163234	Spring	45	6.6	561	52	11	47	13	250	<1	57	10	2.0	36	350	2	65-05-28	WATSTORE
NOT SPECIFIED	390508	1161918	Spring	--	7.4	260	26	4.9	20	4.8	120	0	13	12	0.5	56	200	2	67-08-05	WATSTORE
NOT SPECIFIED	390628	1163208	Spring	15.5	7.4	267	29	3.5	18	4.7	120	0	16	9.8	0.2	42	180	1	67-05-09	WATSTORE
NOT SPECIFIED	390634	1162053	Spring	17	7.7	332	39	14	9.5	2.9	180	0	17	6.3	0.2	26	200	1	67-08-05	WATSTORE
N14 E50 4CDB	391152	1165833	Well	13.5	--	--	32	10	10	2.3	150	0	21	3.9	0.1	24	180	-2	67-05-08	WATSTORE
BRN IR WELL AT PET STA, SCV	391432	1173139	Well	10.6	6.8	230	20	3.8	24	3.8	94	0	13	8.2	0.2	56	180	9	82-07-29	WATSTORE
USGS WELL 49	391608	1173137	Well	9.8	9.6	290	22	2.4	38	4.9	66	14	32	15	0.3	19	180	8	82-08-11	WATSTORE
USGS WELL 50	391608	1173137	Well	10	7.2	540	10	1.1	110	6.0	300	0	11	20	2.9	19	320	-2	82-08-19	WATSTORE
N16 E53 8BCB	391638	1160216	Spring	14.5	7.9	616	62	30	26	5.9	370	0	25	8.8	0.4	16	360	0	67-05-10	WATSTORE
N16 E53 8BCB	391638	1160216	Spring	21	7.9	412	49	12	17	3.0	220	0	25	7.7	0.2	18	240	-1	67-06-26	WATSTORE
FISH CREEK SPRING	391640	1160159	Spring	19	6.7	620	65	28	27	7.5	370	0	31	8.3	0.5	24	370	0	81-07-17	WATSTORE
USGS WELL 23	391659	1172902	Well	10.4	8.4	4,000	110	13	710	17	32	0	180	1,200	0.2	11	2,300	0	82-08-05	WATSTORE
USGS WELL 24	391659	1172902	Well	9.0	6.8	63,700	850	340	16,000	290	200	0	8,700	25,000	1.3	20	51,000	-7	82-08-05	WATSTORE
USGS WELL 27	391718	1173257	Well	8.1	6.9	770	21	3.1	170	8.4	400	0	12	85	4.9	12	510	-2	82-09-01	WATSTORE
SPENCER HOT SPRINGS	391845	1165105	Spring	72	6.5	1,180	43	9.4	200	36	670	<1	51	22	4.7	77	770	-1	65-05-28	WATSTORE
USGS WELL 55	391850	1172842	Well	9.8	8.1	12,000	76	14	2,200	27	170	1	380	3,600	2.2	5.2	6,400	-5	82-08-12	WATSTORE
USGS WELL 56	391850	1172842	Well	10.8	9.2	40,000	10	1.2	11,000	81	3,500	280	3,500	12,000	49	5.0	29,000	0	82-08-12	WATSTORE
HOT SPR OR X	391857	1173245	Spring	98	8.3	740	10	0.3	160	7.5	240	2	110	27	8.3	110	550	4	82-08-03	WATSTORE
SPENCER HOT SPRINGS	391927	1165058	Spring	72	7.6	1,210	46	9.9	210	36	670	0	48	23	6.0	150	850	2	77-05-14	WATSTORE
SPENCER-39 DEAD BURRO	391936	1165127	Well	38.8	7.9	848	25	17	100	22	440	0	35	13	2.1	47	480	-5	65-06-03	Trexler and others, 1980
N16 E53 8BCB	391938	1165118	Well	65.5	--	--	42	9.5	190	34	680	0	46	22	4.9	74	760	-3	67-05-08	WATSTORE
SPENCER 73	391938	1165127	Spring	72.5	8.1	1,020	15	9.1	180	37	530	0	36	23	0.5	93	650	1	65-06-03	Trexler and others, 1980
SPENCER HOT SPRING	391938	1165137	Spring	--	6.6	1,160	49	14	200	31	680	0	41	24	5.0	84	780	2	53-09-17	Rush and Schroer, 1970
SPENCER HOT SPRINGS	391948	1165125	Spring	60.2	7.0	1,150	47	8.3	200	36	670	0	44	22	5.0	81	760	0	54-07-22	Bliss, 1983
USGS WELL 67	391957	1173052	Well	10	10.0	240	5.9	0.1	46	4.7	75	35	11	9.3	0.8	7.5	160	-9	82-08-17	WATSTORE
USGS WELL 68	392019	1172819	Well	9.1	6.6	54,000	150	10	13,000	86	480	0	4,300	20,000	24	3.8	38,000	-7	82-08-18	WATSTORE
WELL NORTH OF LINKA MINE	392022	1164943	Well	--	8.2	808	30	18	95	18	390	0	49	15	1.9	59	480	-2	65-06-03	Trexler and others, 1980
USGS WELL 32	392041	1172849	Well	10.9	7.5	59,000	490	100	14,000	140	140	0	6,000	21,000	0.2	2.5	42,000	-5	82-08-17	WATSTORE
USGS WELL 69	392047	1172642	Well	9.7	9.7	540	6.3	1.3	120	5.8	180	46	33	32	1.2	1.9	330	-2	82-09-01	WATSTORE
USGS WELL 70	392047	1172642	Well	9.2	7.4	28,000	73	41	6,400	75	1,300	2	2,700	8,900	5.4	24	19,000	-7	82-08-18	WATSTORE
UNN HOT SP SMITH CR VALL	392253	1173813	Spring	86	7.7	737	4.8	0.1	170	8.4	250	5	100	22	8.9	110	540	6	65-05-28	WATSTORE
USGS WELL 35	392305	1172841	Well	9.8	6.5	370	29	4.2	33	7.9	100	0	43	28	0.4	56	250	2	82-08-31	WATSTORE
BARTHOLOMAE HOT SP	392410	1162024	Spring	54	9.3	295	1.0	<0.1	64	0.7	140	0	18	6.3	--	85	250	0	65-05-28	WATSTORE
N17 E45 23AA	392418	1162047	Well	68	9.2	298	2.9	0.2	63	0.6	95	22	17	5.2	4.3	75	230	2	67-06-23	WATSTORE
KLOBE HOT SPRINGS WELL	392418	1162048	Spring	67.2	9.4	304	10	0.0	66	1.0	66	41	16	11	4.8	82	270	5	73-09-18	Bliss, 1983
N18 E50 28DBB	392433	1161645	Well	21	7.9	294	22	7.8	23	8.9	150	0	21	5.0	0.5	75	240	-1	67-06-23	WATSTORE
N18 E50 28DBB	392433	1161645	Well	21	7.7	288	22	8.1	23	9.4	150	0	19	4.8	0.7	71	230	0	67-08-05	WATSTORE
N18 E51 30BCA	392445	1164148	Well	13.5	7.7	551	55	14	25	8.0	150	0	79	41	0.3	50	350	-1	67-05-09	WATSTORE
BRN N IR WL, SMITH CR VA	392602	1173020	Well	14.7	7.5	440	35	5.5	48	6.8	150	0	52	25	0.2	62	310	2	82-08-04	WATSTORE
N18 E47 20ADB	393129	1162128	Well	17	8.3	320	4.8	0.7	59	11	150	20	22	5.5	3.4	62	260	-9	67-05-09	WATSTORE
N18 E47 20ADB	393129	1162128	Well	>0.2	8.2	321	6.6	0.7	57	11	150	0	22	5.3	3.4	0.1	180	1	67-06-23	WATSTORE
NOT SPECIFIED	393330	1162132	Spring	42	7.5	600	62	18	42	12	340	0	30	8.9	1.2	28	370	2	77-05-15	WATSTORE
BARTIME RANCH SPRINGS	393330	1162134	Spring	44.3	7.5	634	69	17	37	12	330	0	24	9.0	0.9	37	370	4	80-05	Ghusn, 1981
NOT SPECIFIED	395215	1160354	Well	17	8.3	560	41	27	39	8.2	260	0	45	25	0.4	26	340	2	66-05-05	Harrill, 1978
WALTI HOT SPRINGS	395413	1163514	Spring	72	6.5	592	56	12	44	14	260	<1	64	12	2.5	68	400	0	65-05-28	WATSTORE
SHIPLEY HOT SPRING	395628	1160428	Spring	39	6.7	515	54	18	30	6.1	270	0	35	15	0.4	36	330	0	81-07-13	WATSTORE

[1] Sample-site designations having format N14 E50 04C 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."