



# TABLES FOR GEOHERMAL RESOURCES MAP OF MONTANA

compiled by  
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Prepared in cooperation with DOE and NOAA.

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Hydrogeologic Map 4

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Montana Bureau of Mines and Geology  
A Department of  
Montana College of Mineral Science and Technology



## PREFACE

This geothermal resource information is largely derived from materials previously available only as open-file reports of the Montana Bureau of Mines and Geology (MBMG). Information on most other sources of data is given in MBMG Bulletin 110.

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In certain areas, the map size did not permit complete display of all the information. Tables contain additional well information for the Camas-Hot Springs area where some flows were estimated from shut-in pressures and where some variation in temperature is shown; additional information is also shown for the Radersburg basin area. Confidential data are not included. They have been considered, however, in establishing the size of the map areas denoted in gray; most of these data suggest reductions in the size of the resource area. In those cases where only confidential information was available for an area, the area was not plotted.

We thank the many investigators who have published their work or permitted us to incorporate their results in this study. We also thank the many landowners who allowed us access to their wells and springs. Their friendliness and helpfulness made collecting data for this project a pleasure.

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TABLE 1 — SPRINGS, INVENTORY DATA

Spring Name	Location				Latitude	Longitude	Altitude (Ft.)	Topographic Map	Source of Water	Estimated Reservoir	Observed		pH	SC ( $\mu$ mho/cm) @ 25° C		TDS
	T	R	S	Tr.						Temp. °C	Temp. °C	Dates		Agency		
Alhambra	8N	3W	16	ACAA	46.4486	111.9828	4,360	Clancy 15'	Boulder batholith: See U.S.G.S. Open-File Report 78-438	96	55.6	08-23-74 09-01-72	USGS* MBMG	7.23 8.84†	929 929	660 630
Anaconda	4N	11W	13	AAA	46.1044	112.9039	5,490	Anaconda 15'	Tertiary volcanics or Madison	75	21.7	06-23-78	MBMG	7.31	2624	2310
Anderson's	3S	13E	29	ABAB	45.5530	110.1422	5,540	McLeod Basin 7.5'	Madison	30	25.0	07-25-72	MBMG	7.84	414	270
Anderson's Pasture	13S	2W	18	ACD	44.7044	111.8925	6,840	Lower Red Rock Lake 15'	Madison 2 springs	45	26.0	10-03-77	MBMG*	7.4	609	400
Apex	5S	9W	10	AADADD	45.4203	112.6911	5,240	Glen 7.5'	Madison	76	25.0	05-25-78	MBMG	7.78	520	340
Avon	10N	8W	24	BBC	46.6111	112.5536	4,900	Avon 15'	Tertiary volcanics, Terrace	--	25.5	06-16-78	MBMG	6.9	870	650†
Bear Creek	9S	9E	19	CAA	45.0320	110.6670	5,600	Gardiner 15'	Tertiary volcanics: Precambrian	--	24.0	05-23-78	MBMG	9.5	2700	2000†
Bearmouth 1 & 2	11N	14W	12	CD	46.7169	113.3031	3,835	Bearmouth 15'	Madison	-- 35	20.2 19.6	06-17-78 03-18-72	MBMG USGS	7.6 7.69	642 610	480† 420
Beaverhead Rock	5S	7W	22	ABBD	45.3919	112.4511	4,810	Beaverhead Rock 7.5'	Tertiary sediments over Madison (?)	--	27.0	08-21-66	MBMG	7.2	--	--
Bedford	7N	1E	23	BAAD	46.3542	111.5667	3,880	Townsend 15'	Tertiary sediments	30	23.6	06-23-78	MBMG	7.2	467	350†
Blue Joint 1	2S	23W	1	ABB	45.6973	114.3809	5,040	Painted Rocks Lake 15'	Idaho batholith: Precambrian Ravalli	45	29.0	08-11-72	MBMG	8.12†	162	145
Blue Joint 2	2S	22W	6	BAD	45.6964	111.3642	4,940	Painted Rocks Lake 15'	Idaho batholith: Precambrian Ravalli	45	29.0	08-11-72	MBMG	8.22†	180	145
Boulder	5N	4W	10	CBA	46.1981	112.0947	4,850	Boulder 15'	Boulder batholith	136	76.0	08-22-74 11-24-64	USGS* HEALTH	8.50 --	523 --	423 388
Bozeman	2S	4E	14	DDBAA	45.6608	111.1869	4,735	Bozeman 15'	Pre-Belt, Tertiary sediments	80 --	54.6	08-25-74 1964	USGS* HEALTH	8.58 --	624 --	433 428
Bridger Canyon	1S	6E	34	BCDD	45.7078	110.9750	4,890	Bozeman Pass 15'	Madison	25	20.2	--	USFWS	7.7	448	270
Broadwater	10N	4W	28	ACA	46.5958	112.1097	4,100	Helena 15'	Belt and Boulder batholith	118	62.0	08-24-74 09-17-64	USGS* HEALTH	8.53 --	796 --	596 563
Brooks	17N	18E	19	DBDBB	47.2192	109.4729	3,760	Lewistown 15'	Kootenai: Madison			08-19-64 06-12-78 09-23-75	HEALTH MBMG USGS	-- 7.33 7.68†	-- 900 882	670 680† 622
Browns	8S	9W	30	DCB	45.1047	112.7508	5,575	Dalys 7.5'	Madison: Tertiary volcanics	30	23.7	06-21-78	MBMG	7.4	645	480†
Camas	21N	24W	3	BBDB	47.6136	114.6672	2,830	Hot Springs 7.5'	Piegan: Diorite sill	100	45.0	11-24-64 07-03-75 09-15-75	MBMG USGS* USGS	-- 9.39 9.11	-- 367 394	270 330 274
Carter's Bridge	3S	9E	1	AADA	45.6108	110.5694	4,560	Brisbin 7.5'	Madison	40	28.0	12-22-78	MBMG	7.8†	850	600
Chico	6S	8E	1	CDCD	45.3381	110.6911	5,280	Emigrant 15'	Tertiary sediments with Tertiary granite and Madison	58	45.0	08-25-74 11-24-64	USGS* HEALTH	7.38 --	379 --	255 254
Deer Lodge Prison	7N	10W	29	BC	46.3331	112.8864	4,960	Racetrack 7.5'	Precambrian Ravalli, 4 springs	40	26.0	03-27-78	MBMG	9.3	220	170
Durfee Creek	12N	23E	19	BB	46.7933	108.8833	4,500	Roundup 1° x 2°	Madison	30	21.1 --	06-13-78 08-15-73	MBMG MBMG	7.25 8.08†	1960 2540	1470† 2630
Elkhorn	4S	12W	29	ACAD	45.4592	113.1069	7,200	Polaris 15'	Boulder batholith	65	48.5	08-20-74 07-27-72	USGS* MBMG	8.94 8.49†	209 219	179 180
Ennis	5S	1W	28	DCAD	45.3675	111.7256	4,920	Ennis 15'	Tertiary sediments over pre-Belt	129	83.2	02-06-69 04-01-76	HEALTH (?) USGS*	-- 7.7	-- 1510	310 1030
Gallogly	1S	19W	15	BCCCAC	45.7497	113.9400	5,400	Lost Trail Pass 7.5'	Idaho batholith	56	49.0 -- 41.7	08-05-64 08-10-72 10-07-80	HEALTH MBMG MBMG	-- 7.81† 9.12†	-- 202 192	144 149 153
Garrison	10N	9W	19	ACB	46.6097	112.7747	4,900	Garrison 15'	Cretaceous — near Madison	35	25.0	08-08-72	MBMG	7.30†	737	530
Granite	11N	23W	7	ABDBA	Combined w/Lolo		4,180	Lolo Hot Springs 7.5'	Wallace: Idaho batholith	80	51.0	06-19-78	MBMG	9.3	280	210†
Green Springs	20N	24W	33	CBA	47.4506	114.6486	2,820	Perma 15'	Alluvium: Precambrian Piegan	--	26.0	1964 06-17-78	HEALTH MBMG	-- 9.2	-- 370	162 280†

TABLE 1 — SPRINGS, INVENTORY DATA (CONTINUED)

Spring Name	Location				Latitude	Longitude	Altitude (Ft.)	Topographic Map	Source of Water	Estimated Reservoir	Observed	Dates	Agency	pH	SC ( $\mu\text{mho/cm}$ ) @ 25° C	TDS
	T	R	S	Tr.						Temp. °C	Temp. °C					
Gregson	3N	10W	2	BDCA	46.0433	112.8106	5,130	Anaconda 15'	Tertiary volcanics: Boulder batholith	118	70.0	08-19-74 04-08-65	USGS* HEALTH (?)	8.41 --	761 --	559 560
Greyson	6N	2E	21	BAAA	46.2678	111.4825	3,820	Duck Creek Pass 15'	Tertiary sediments	25	17.9	06-03-78	MBMG	7.6	610	460†
Hunsaker	4N	2E	32	DBDB	46.0531	111.5011	4,600	Radersburg 15'	Greyson Shale	40	24.5	06-26-79	MBMG	6.90	590	350
Hunters	1S	12E	9	CCADC	45.7572	110.2572	4,380	Hunter's Hot Springs 7.5'	Livingston: Cretaceous volcanics: Tertiary granite	78	59.0	07-02-75 07-25-72	USGS* MBMG	9.13 8.52†	354 387	280 280
Jackson	5S	15W	25	CBBB	45.3677	113.4030	6,470	Jackson (Advance) 7.5'	Alluvium: Tertiary sediments: Missoula Group	125	58.0	08-06-64 07-28-72 08-16-74	MBMG MBMG USGS*	-- 9.04† 6.77	-- 1020 972	662 660 660
La Duke	8S	8E	32	CDBA	45.0903	110.7733	5,280	Miner 15'	Madison	73	65.0	07-02-75 07-26-72	USGS* MBMG	6.52 7.62†	2460 2400	2080 2030
Landusky 1 & 2	25N	24E	32	DBAD	47.8764	108.6572	3,710	Hays 7.5'	Madison: Jurassic	35	21.0	08-16-73	MBMG	8.03†	1800 (?)	1480
Landusky Plunge	24N	24E	12	CDDAB	47.8431	108.5986	3,690	Hays SE 7.5'	Madison: Jurassic	30	24.0	08-16-73	MBMG	8.09†	1262	960
Little Warm Springs 1, 2, 3	26N	26E	32	ACAAA	47.9692	108.3964	3,360	Bear Mountain 7.5'	Madison: Jurassic	35	--	08-16-73 10-04-73	MBMG USGS	8.06† 7.92†	2082 1823	1750 1540
Lodgepole 1, 2, 3	26N	25E	24	CABD	47.9939	108.4444	3,700	Bear Mountain 7.5'	Madison	35	30.0	10-04-73	USGS	8.0†	1430	1100
Lolo	11N	23W	7	ADCC	46.7253	114.5328	4,155	Lolo Hot Springs 7.5'	Wallace: Idaho batholith	83	44.0	08-17-74 08-09-72 06-19-78	USGS* MBMG MBMG	9.27 7.87† 9.6	225 234 307	200 200 230†
Lovells	8S	9W	28	BDBA	45.1114	112.7150	5,490	Gallagher Mountain 7.5'	Tertiary sediments: Tertiary volcanics: Madison	30	19.4	06-21-78	MBMG	7.9	620	420†
McMenomey Ranch	9S	10W	29	AAA	45.0272	112.8444	5,449	Dalys 7.5'	Madison-Beaverhead contact	30	19.0	03-24-78	PRVT.	7.4†	722	480
Medicine	1N	20W	12	CCA	45.8456	114.0361	4,440	Medicine Hot Springs 7.5'	Idaho batholith	82	45.0	08-05-64 08-09-72 08-16-74	HEALTH MBMG USGS*	-- 8.08† 8.59	-- 377 343	170 260 260
New Biltmore	4S	7W	28	BDA	47.4620	112.4744	4,783	Beaverhead Rock 7.5'	Madison	--	--	08-06-64 07-10-72 08-17-74	HEALTH MBMG USGS*	-- 7.34† 6.76	-- 2140 2160	2004 1780 1860
Nimrod	11N	15W	14	CDAA	46.7056	113.4569	3,800	Bearmouth 15'	Cambrian: Madison	30	20.5	08-03-64 03-18-72 06-17-78	HEALTH USGS MBMG	-- 7.63 7.8	-- 856 860	722 630 645†
Norris	3S	1W	14	DAB	45.5750	111.6831	4,805	Norris 15'	Pre-Belt: Tobacco Root stock	107	52.5	08-21-74 11- ? -64 05-04-70	USGS* HEALTH HEALTH	7.58 -- --	903 -- --	640 620 700
Pipestone 1 & 2	2N	5W	28	BDDD	45.8964	112.2319	4,530	Dry Mountain 7.5'	Boulder batholith	88	57.0	08-18-74 08-06-64	USGS* HEALTH	8.72 --	455 --	340 328
Plunkets	4N	1E	27	AA	46.0744	111.5844	4,180	Radersburg 15'	Madison	20	16.5	06-02-78 07-10-79	MBMG MBMG	8.1 7.9	510 400	380† 260
Potosi 1	3S	2W	7	CABA	45.5894	111.8986	6,100	Harrison 15'	Tobacco Root stock	60	49.5	08-21-74	USGS*	8.6	470	330
Potosi 2 & 3	3S	2W	6	CACC	45.6017	111.9003	6,080	Harrison 15'	Tobacco Root stock	60	37.0	06-25-79	MBMG	8.36†	470	360
Pullers	8S	5W	1	AACC	45.1714	112.1525	5,485	Metzel Ranch 7.5'	Tertiary sediments: pre-Belt	90	44.4	05-14-76	USGS*	7.7	1680	1160
Quinn's Hot Springs	18N	25W	9	CDADA	47.3297	114.7881	2,560	Plains 15'	Precambrian Piegan	99	43.4	04-08-65 08-09-72 06-18-78	HEALTH MBMG MBMG	-- 7.91† 8.9	-- 205 170	192 190 130†
Renova	1N	4W	32	DBC	45.7914	112.1265	4,400	Vendome 7.5'	Cambrian, Meagher Limestone	90	50.0	08-13-76	USGS*	7.5	1100	655
Silver Star	2S	6W	1	CCBA	45.6881	112.2942	4,700	Twin Bridges 7.5'	Boulder batholith: pre-Belt contact zone	131	71.5	08-18-74 07-10-72	USGS* MBMG	8.17 8.40†	808 847	610 640
Sleeping Child	4N	19W	7	DCDDBB	46.1053	114.0042	4,750	Deer Mountain 7.5'	Idaho batholith: 2 sources	125	52.0	08-04-64 08-10-72 08-15-74	HEALTH MBMG USGS*	-- 7.98† 8.20	-- 568 538	400 390 390
Sloan Cow Camp	12S	1E	19	CDA	44.7692	111.6500	6,560	Cliff Lake 15'	Alluvium: Pleistocene volcanics (?)	85	29.5	09-29-77	MBMG*	10.05	410	260
Staudenmeyer Ranch	13S	2W	17	CBA	44.7019	111.8775	6,750	Lower Red Rock Lake 15'	Pleistocene rhyolite, 5 springs: Chemistry suggests Madison source	45	28.0	10-03-77	MBMG*	7.5	646	390





TABLE 3 — WELLS, INVENTORY DATA

Well Name	Location				Latitude	Longitude	Altitude (M)	Producing Depth (M)	Topographic Map	Source of Water	Dates	Agency	Estimated Reservoir	Observed	Yield GPM	Field pH	Field SC ( $\mu$ mho/cm @ 25°)	Lab TDS
	T	R	S	Tr.									Temp. °C	Temp. °C				
Angela Hot Springs	11N	43E	21	CDCA	46.6881°N	106.3225°W	919	2496-2530	Alkali Creek 7½'	Lodgepole	11-20-80	MBMG	85	82.	1200 F	7.4	8,320.	6,240.†
Bakers Hole (#WYO26)	13S	05E	15	ABAB	44.7081°N	111.0991°W	2022	19	West Yellowstone 15'	Glacial outwash	08-22-79	MBMG	45	16.	16+ F	6.5	260.	330.
Brant Coulee	02N	34E	15	BBBD	45.9258°N	107.4842°W	969	1809-1826	Dudley Spring 7½'	Tensleep	--	--	76	74.	44 F	--	--	--
Bruce	04N	01E	04	ADDCB	46.1328°N	111.6014°W	1269	50.5-122	Radersburg 15'	Tertiary (Madison Group)	06-29-79	MBMG	45	18.	--	8.34	2,540.	1,370.
Campaqua	22N	23W	29	ACBB	47.6411°N	114.5708°W	835	74	Hot Springs NE 7½'	Ravalli Group	09-15-75	USGS	100	50.	200 F	8.3*	660.*	410.
											01-22-80	MBMG	--	52.	116 F	8.4	--	420.
Colstrip	02N	41E	34	BADCD	45.8869°N	106.6189°W	986	2580	Colstrip East 7½'	Madison Group	10-26-72	MBMG	100	97.	230 F	7.1*	1,890.*	1,470.†
Florence	10N	20W	12	BBBA	46.6461°N	114.0636°W	975	125	Florence 7½'	Pleistocene (?)	08-25-80	MBMG	70	15.	10	8.8*	327.	291.
Fox Inc.	08N	13E	28	CADD	46.4208°N	110.1036°W	1372	183-335 229	Twodot 7½'	Madison Group	10-31-80	MBMG	22	19.	50 F	7.5	930.	429.†
Halvorson Hot Springs	12N	38E	27	ADAC	46.7675°N	106.9194°W	946	916-919	Vanstel 7½'	Piper Limestone	09-05-80	BLM	50	45.	300 F	7.2	9,700.	4,760.
Hanover	16N	17E	22	DCDD	47.1300°N	109.5530°W	1213	232	Spring Creek Junction 7½'	Madison Group	11-12-64	MSBH	22	20.	60 F	--	--	410.
Hanser	08N	13E	31	AACC	46.4136°N	110.1394°W	1407	313	Twodot NW 7½'	Madison Group	10-31-80	MBMG	22	18.	200 F	7.4	1,840.	1,380.†
Hunsaker	04N	02E	18	ACAC	46.1022°N	111.5231°W	1251	33	Radersburg 15'	Tertiary	06-31-80	MBMG	45	15.	17.1	8.17	400.	240.
Koehler	21N	24W	04	ADAB	47.6122°N	114.6700°W	869	91	Hot Springs 7½'	Prichard Formation	12-03-79	MBMG	90	44.8	30 F	9.2	590.	340.
Leistner	21N	24W	04	DABD	47.6075°N	114.6714°W	870	128	Hot Springs 7½'	Prichard Formation	12-03-79	MBMG	90	29.8	30 F	9.49	360.	330.
Lucas	07N	08E	23	AAAC	46.3580°N	110.6814°W	1774	210-1284	Hamen 7½'	Kibbey (?)	05-26-76	USGS	45	42.2	100 F	--	3,300.	3,150.
Marysville	12N	06W	32	ABDC	46.7534°N	112.3760°W	1622	1747	Granite Butte 7½'	Tertiary plutonics	08-29-75	USGS	122	96.5	--	7.9*	950.*	680.
McLeod	02S	13E	15	BCBD	45.6631°N	110.1142°W	1466	686	McLeod 7½'	Kibbey (?)	11-24-64	MSBH	50	48.	15 F	--	--	2,100.
Montaqua	04S	23E	08	AAAA	45.5074°N	108.9027°W	1088	293-1227	Montaqua 7½'	Mowry or Madison Group	11-17-60	USGS	50	39.	--	7.6	3,040.	3,260.
Quinn's Hot Springs	18N	25W	09	DCBC	47.3300°N	114.7869°W	777	44	Plains 15'	Prichard Formation	01-16-81	MBMG	--	25.	75 F	9.2	196.	--
Ringling	07N	07E	25	ADCAC	46.3394°N	110.7865°W	1637	646-707	Ringling 7½'	Madison Group	05-26-76	USGS	50	48.	800 F	6.8	1,630.	1,360.
Rocky Ranch	01S	32E	14	CCDD	45.7367°N	107.7344°W	937	1204	Walker Hill 7½'	Madison Group	11-25-80	MBMG	45	42.	2000 F	7.4	2,790.	3,116.†
Saco (Sleeping Buffalo)	32N	32E	35	DCBC	48.4847°N	107.5275°W	679	975	Bowdoin 7½'	Madison Group	05-10-77	USGS	45	41.3	--	7.38*	3,490.	3,411.
											10-27-80	MBMG	--	42.	90+ F	7.0	3,467.	3,420.
Scott Feed Lot #1	02S	29E	05	DACC	45.6819°N	108.1567°W	1119	913	Woody Mountain NW 7½'	Pryor Conglomerate Morrison	11-25-80	MBMG	46	43.	45 F	7.3	1,870.	1,400.†
Scott Feed Lot #2	02S	29E	05	DABD	45.6839°N	108.1552°W	1125	921	Woody Mountain NW 7½'	Lakota Sandstone	11-25-80	MBMG	46	44.	50	7.3	1,650.	1,240.†
Stellar Creek	10N	39E	09	BBBA	46.6417°N	106.8313°W	882	<del>267</del> 1119	Flat Bottom Coulee NE 7½'	Madison Group	09-05-80	BLM	50	50.	900 F	7.6	7,000.	5,250.†
Symes	21N	24W	04	ADCA	47.6102°N	114.6711°W	864	76	Hot Springs 7½'	Ravalli Group	08-09-72	MBMG	88	38.	100 F	9.8	330.	290.
Two Dot	08N	13E	27	ADAD	46.4260°N	110.0715°W	1350	274	Twodot 7½'	Madison Group	10-31-80	MBMG	22	20.	20 F	7.3	795.	392.
Uranium Test	02S	15W	14	CB	45.6594°N	113.4255°W	1853	150 (?)	Mud Lake 7½'	Insert ?	12-10-75	PRVT.	50	15.5	--	7.85*	2,029.*	1,260.
Wendt	03N	10W	11	BABD	46.0322°N	112.8117°W	1582	61	Anaconda 15'	Tertiary volcanics	10-08-80	MBMG	50	24.	15	8.3	210.	175.

-- Not determined.

\*Laboratory pH or SC.

†Calculated from field SC using equation TDS (mg/L) = SC ( $\mu$  mho/cm) x 0.75 (mg/L)/( $\mu$  mho/cm).

F = Flowing well.

