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CHEMICAL ANALYSIS OF THE WATERS OF YELLOWSTONE NATIONAL PARK, WYOMING FROM 1965 TO 1973

By

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This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards and nomenclature.

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INTRODUCTION

Analyses of Yellowstone Park thermal waters have been reported by many investigators extending back almost one hundred years. The first detailed analyses were reported by Gooch and Whitfield (1888). Allen and Day (1935) were second. White, Brannock, and Murata (1956) and Morey, Fournier, Hemley, and Rowe (1961) reported field analyses of dissolved silica content of hot springs. White, Hem, and Waring (1963) reported six new chemical analyses. Noguchi and Nix (1963) reported partial analyses of five geysers. Rowe, Fournier, and Morey (1973) published the analyses of 166 samples from 89 different locations and the previous analyses of the same hot springs and geysers from 1888 to their study. The analyses compiled here are from 541 samples from 405 different locations of streams, rivers, cold springs, warm springs, hot springs, pools, and geysers.

We are indebted to many colleagues at the Survey who have contributed to this report. These include Manuel Nathenson for his help in writing the computer program, E. E. Bell and H. S. Cortez for coding the analyses, R. O. Fournier, L. P. J. Muffler, A. H. Truesdell, and D. E. White for collecting and locating the water samples. We are also grateful to the U. S. National Park Service for their cooperation and assistance.

SAMPLE COLLECTION

Water samples of springs were collected as close to the main orifice of each spring as was possible or safe. Water samples of known geysers were collected during overflow just prior to eruption or as close to the fountaining water during eruption as was possible or safe. Water samples of streams

and rivers were collected at convenient points (e.g., gage stations, bridges, etc.). In 1966 and 1967, the samples of the Firehole, Gibbon, and Gardner Rivers were checked for uniformity. Samples from both sides and the middle of the rivers were collected and analyzed. These samples were found to be the same within 5% error. No depth integrated samples were collected; all samples must be considered "grab" samples.

Samples were collected in a one liter narrow mouth polyethylene bottle fastened to the end of a jointed aluminum rod. The collecting bottle was rinsed several times prior to sampling. For untreated samples, the sample bottle was rinsed several times with the water collected. For filtered samples, the filter chamber was rinsed with collected water and the filter was pressurized to rinse the filter and sample bottles. Four sample aliquots were normally collected from thermal springs: one was filtered and then acidified (pH >2); one was filtered only; one was for silica only (a diluted sample); and one was for water isotopes.

Prior to 1972, water samples were filtered if filtering equipment could be easily transported to the collection site. The filtering equipment consisted of a 4 liter stainless steel pressure vessel, a 142 mm stainless steel disc filter holder, a bottle of compressed nitrogen, and appropriate tubing. Later a stainless steel milkfilter and small hand pump were used to filter the samples. This equipment was carried to all springs, pools, and geysers for filteration. River and stream samples were neither filtered nor acidified. The effective filter pore sizes were either 0.10 or 0.45 micrometer (μm). A separate sample was taken for silica analysis by

pipetting either 5 or 10 ml of sample into 50 ml of deionized water. In the laboratory these samples were further diluted to a total volume of 100 mls. This collection procedure is similar to that described by Rowe et al. (1973).

FIELD ANALYSIS

Field determinations were usually made for pH and temperature. Determinations of sulfide, alkalinity, and ammonia were made as the situation permitted. Direct potentiometric determinations using specific ion electrodes for sodium (Beckman Instrument #78178) and potassium (Beckman Instrument #78137) were made early in the study. Potentiometric titrations for chloride, using standardized silver nitrate, a silver/silver chloride electrode with appropriate reference electrode, and for alkalinity, using standardized sulfuric acid with a glass electrode, and appropriate reference or a combination electrode were also made early in the study. Ammonia that was determined in the field was measured by specific ion electrode (Orion Model 95-10). Sulfide was determined by iodometric back titration with standardized thiosulfate. Silica was determined by the method of Morey et al. (1961). All field determined constituents are indicated in the table.

LABORATORY ANALYSIS

Silica was determined by either of two methods prior to 1972: 1) reduced molybdate blue method or 2) atomic absorption spectrophotometry (AAS). Both methods are described by Brown et al. (1970). Beginning in 1972 the molybdate blue method described by Rowe et al. (1973) was initiated.

Boron was determined by one of three methods: 1) the curcumin complex method, 2) the dianthrimide method, and 3) the carmine method. The first is described by APHA (1971) and the latter two are described by Brown et al. (1970).

MAJOR CATIONS

Aluminum was normally determined either by a modification of the Morin method (Donaldson, 1966) or by direct aspiration A.A.S. techniques. After 1971 all aluminum values were determined by the method of R. B. Barnes (manuscript in preparation). Sodium, potassium, and lithium were determined by A.A.S. on either a filtered acidified sample or a filtered unacidified sample. Calcium and magnesium were normally determined by A.A.S. on a filtered acidified sample. Generally, if the sample had not been filtered and acidified, iron, manganese, and aluminum were not determined. The procedures for these methods are all found in Brown et al. (1970).

A Kjeldahl distillation was initially used to determine ammonia. The procedure is described by Brown et al. (1970). After 1971 either an ammonia electrode or direct Nesslerization was used. Direct Nesslerization can be used on a majority of Yellowstone National Park waters since the calcium content of these waters is of the order of 1 mg/l.

MAJOR ANIONS

If possible, major anions were analyzed from a filtered unacidified sample. Alkalinity was determined in the lab as described under field analysis when it was not determined in the field.

Sulfate was normally determined by either the thorin procedure (Rainwater and Thatcher, 1960) or chloroanilate procedure (Schafer, 1967). For the chloroanilate method, cations were removed prior to analysis by a strong cation exchanger to which an acetate buffer was added. Barium chloroanilate was then added, mixed, and centrifuged. The color is read on a spectrophotometer at the 330 ion wavelength (D. B. Bird, unpublished data, 1972). When using the thorin procedure, the endpoint was detected either visually or spectrophotometrically. If the concentration of sulfate exceeded 120 mg/l, the samples were diluted. In some cases if the sulfate exceeded 200 mg/l, classical gravimetric procedures were used (Rainwater and Thatcher, 1960).

Of the halides only chloride and fluoride are reported. If the chloride concentration was above 10 mg/l, either a Mohr titration (Brown et al., 1970), or a potentiometric titration using a silver electrode and a modified saturated calomel electrode was used. Chloride concentrations less than 10 mg/l were determined spectrophotometrically by formation of ferric thiocynate complex ion, as described by ASTM (1969). Fluoride was initially determined by the Zircomium - Eriochrome Cyanide R Method which is described by Brown et al. (1970). Later fluoride was determined electrochemically by a fluoride specific ion electrode (Orion 94-09) in conjunction with either a saturated calomel or double junction reference electrode. All samples and standards were adjusted to an ionic strength of ca. 0.5 and buffered at pH 8 by adding an equal volume of an ionic buffer solution to an equal volume of sample or standard. The buffer

solution contained 0.1 M tris - (hydroxymethyl) aminomethane, 0.058 M HCl, and 1.0 M NaCl (R. B. Barnes, unpublished, 1972).

When it was to be analyzed in the laboratory, the sulfide was precipitated in the field with either zinc or cadmium acetate and determined by the method of Brown et al. (1970).

Comparisons of two springs in each of six basins are shown by Stiff diagrams in Figures 1 - 12. All units are millinormal except those for boron and silica which are in millimolar. The results of the analyses are given in Table 1. The order of the analyses is from Heart Lake Geyser Basin westward to Shoshone Geyser Basin, northward to Mammoth Hot Springs and southeastward toward Fishing Bridge. All concentrations are in milligrams per liter (mg/l) unless otherwise indicated. Any analysis with a footnoted 1 indicates this value should read "less than" indicated. All analyses footnoted with a 2 are field analyses. R. O. Fournier and A. H. Truesdell performed all field analyses except those for ammonia and sulfide which were performed by J. M. Thompson. Methods are discussed under field methods.

UNNAMED IN RUSTIC GROUP

HEART LAKE BASIN

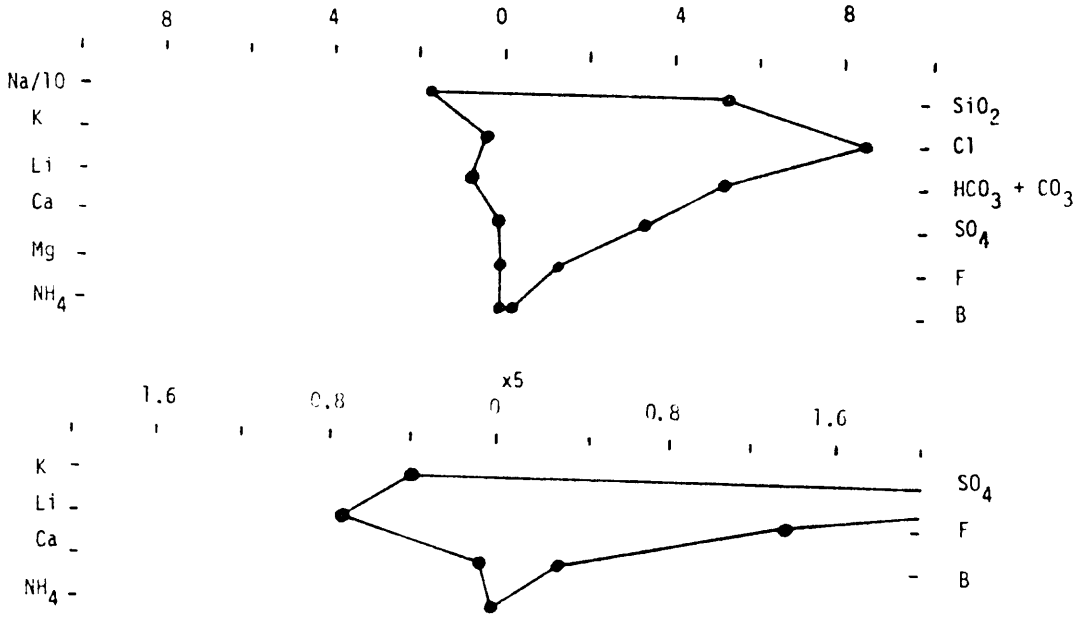

Fig. 1

BASE OF SPIKE GEYSER

HEART LAKE BASIN

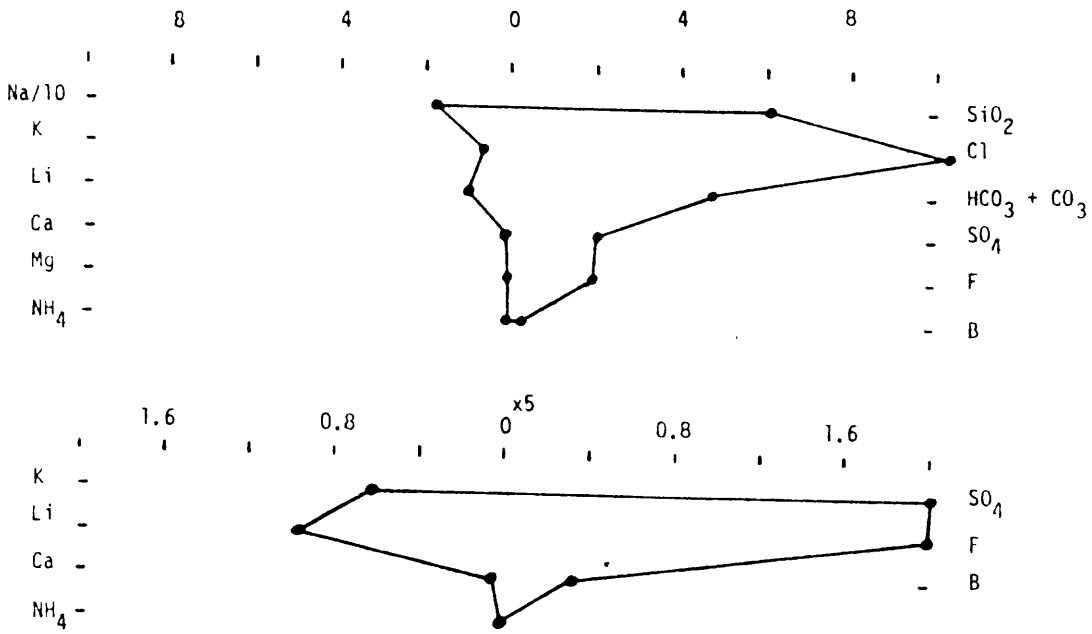

Fig. 2

TAURUS SPRING

SHOSHONE BASIN

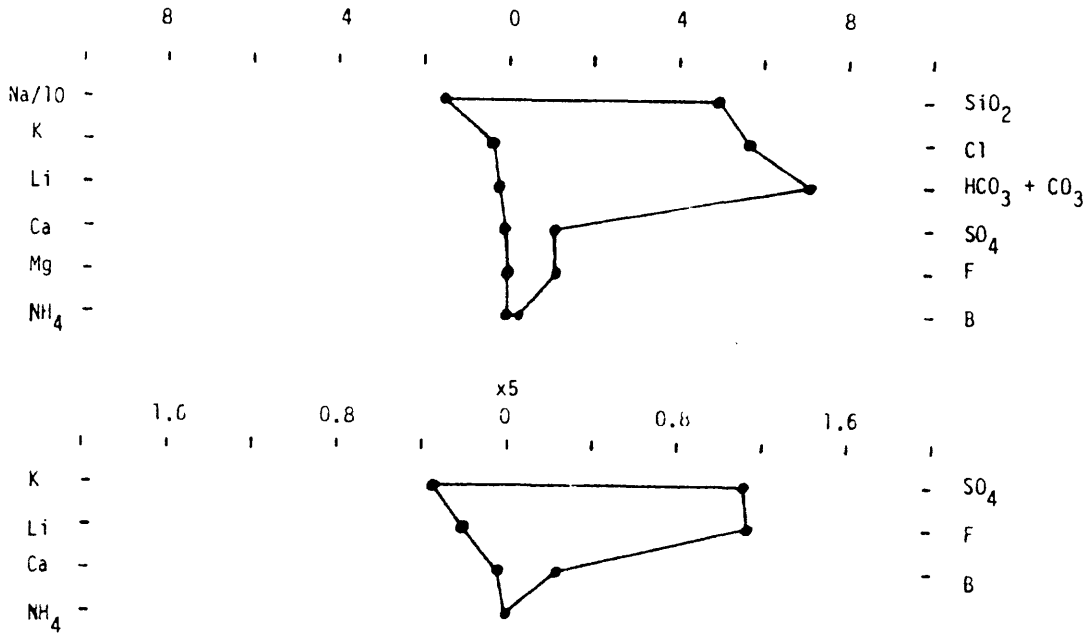

Fig. 3

UNION GEYSER

SHOSHONE BASIN

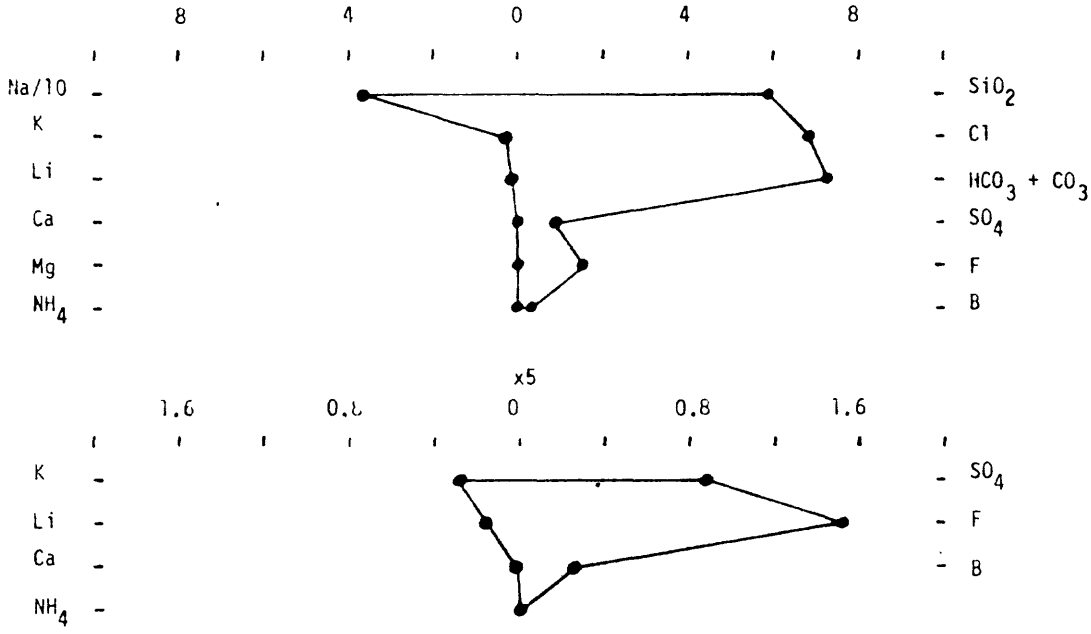

Fig. 4

GIANTESS GEYSER

UPPER BASIN

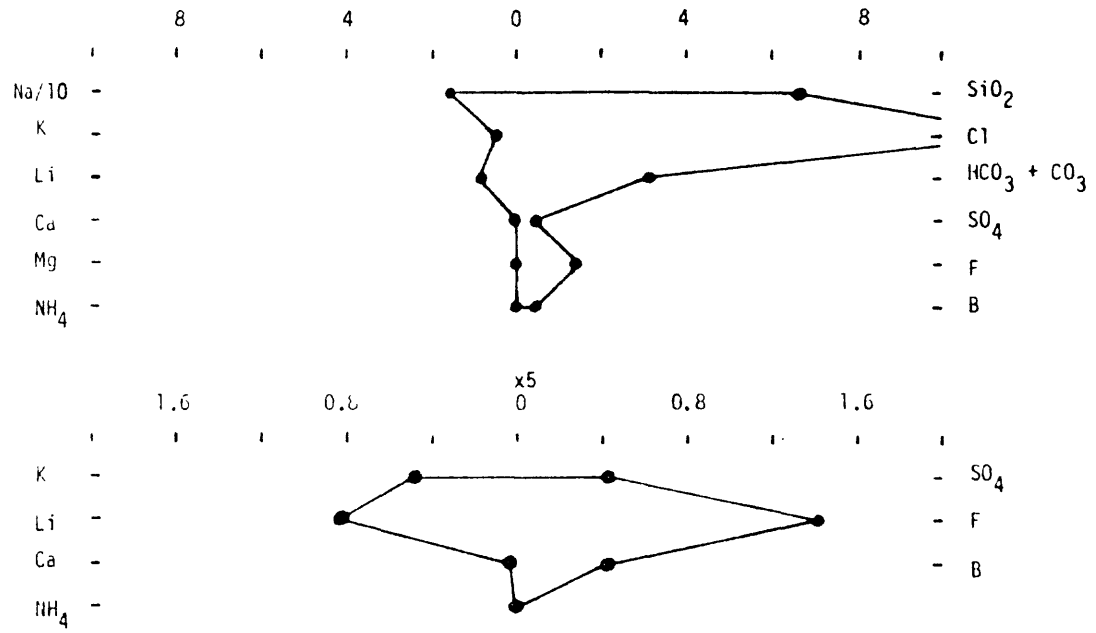

Fig. 5

SAPPHIRE GEYSER

UPPER BASIN

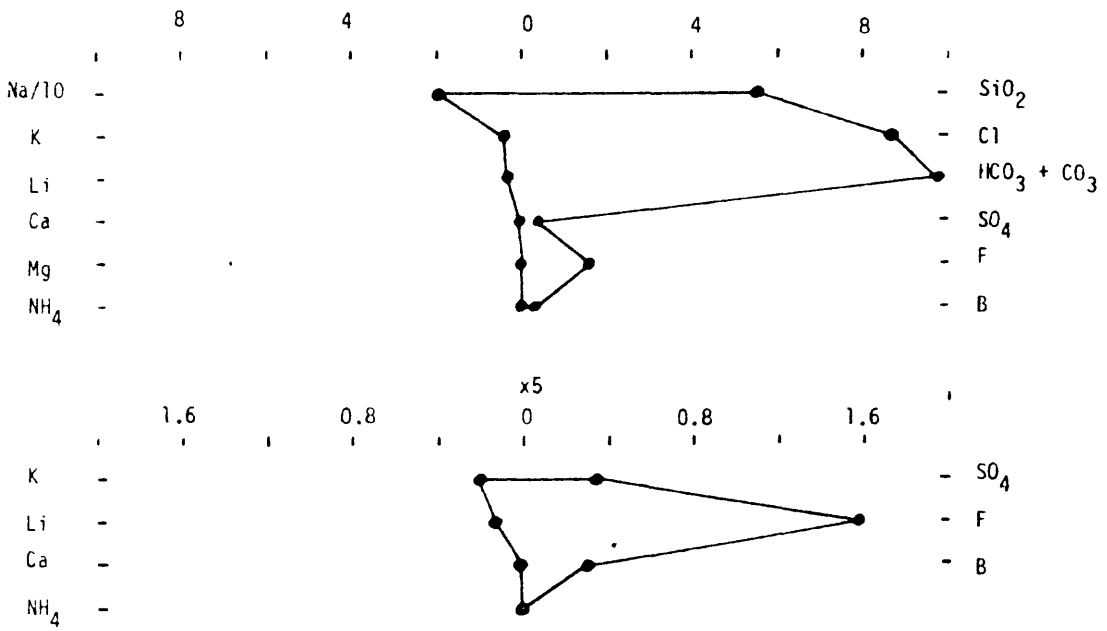

Fig. 6

OJO CALIENTE

LOWER BASIN

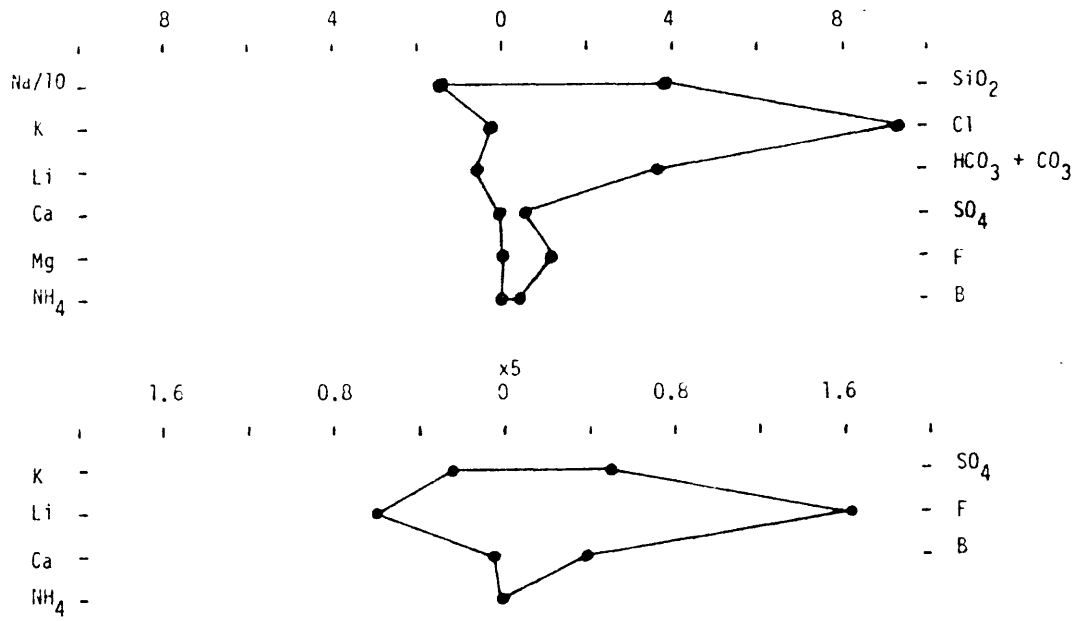

Fig. 7

SPRING BY Y-13 DRILL HOLE

LOWER BASIN

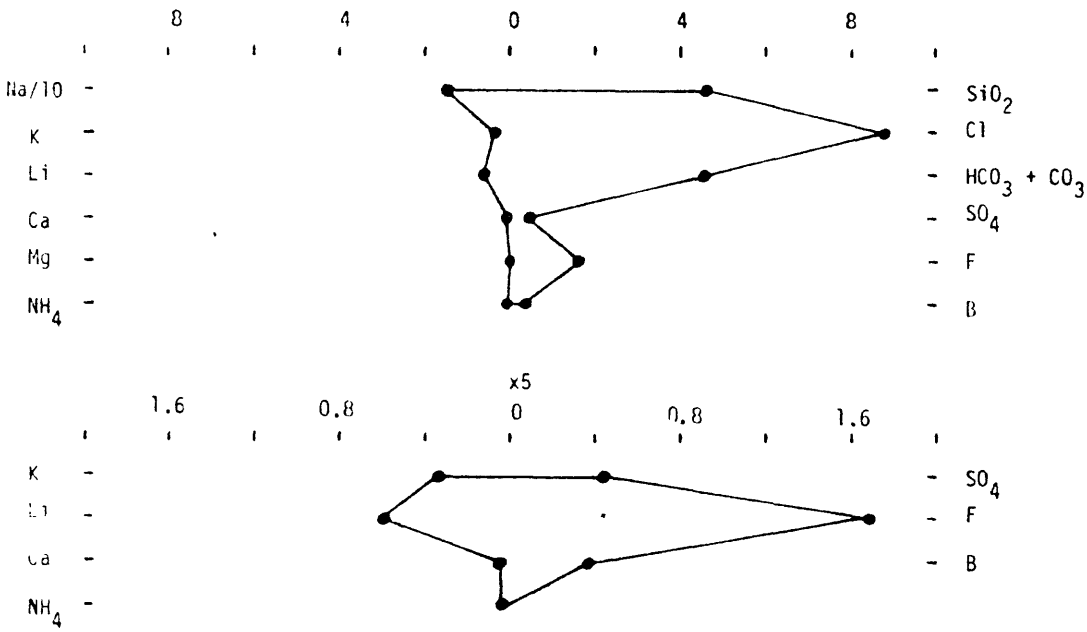

Fig. 8

PERPETUAL SPOUTER ABOVE FIRECRACKER

NORRIS BASIN

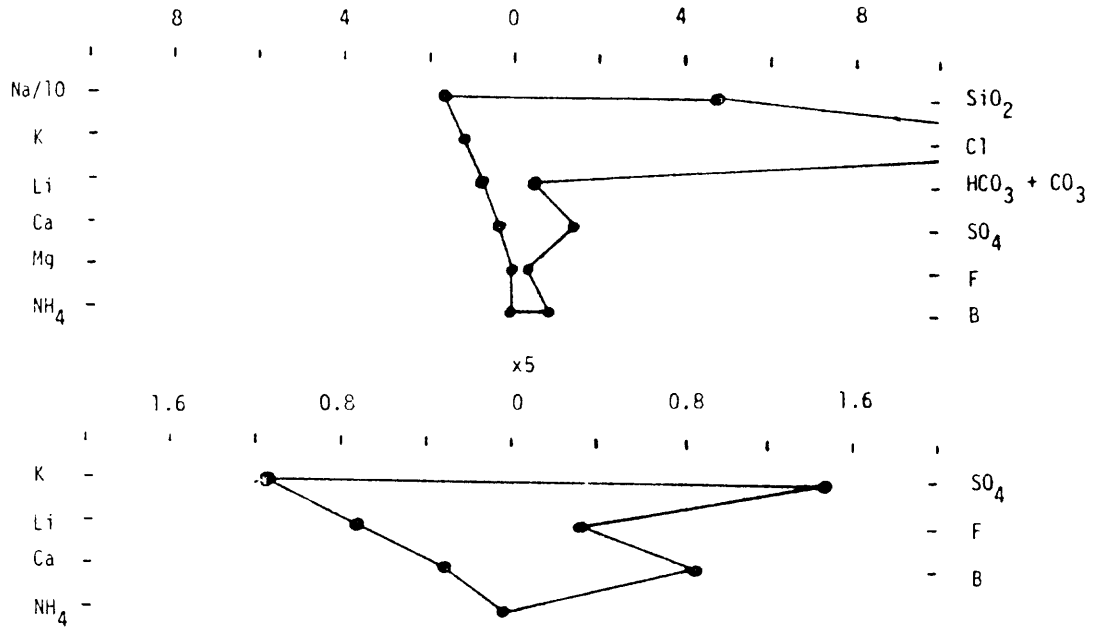

Fig. 9

BASE OF PORCELAIN TERRACE

NORRIS BASIN

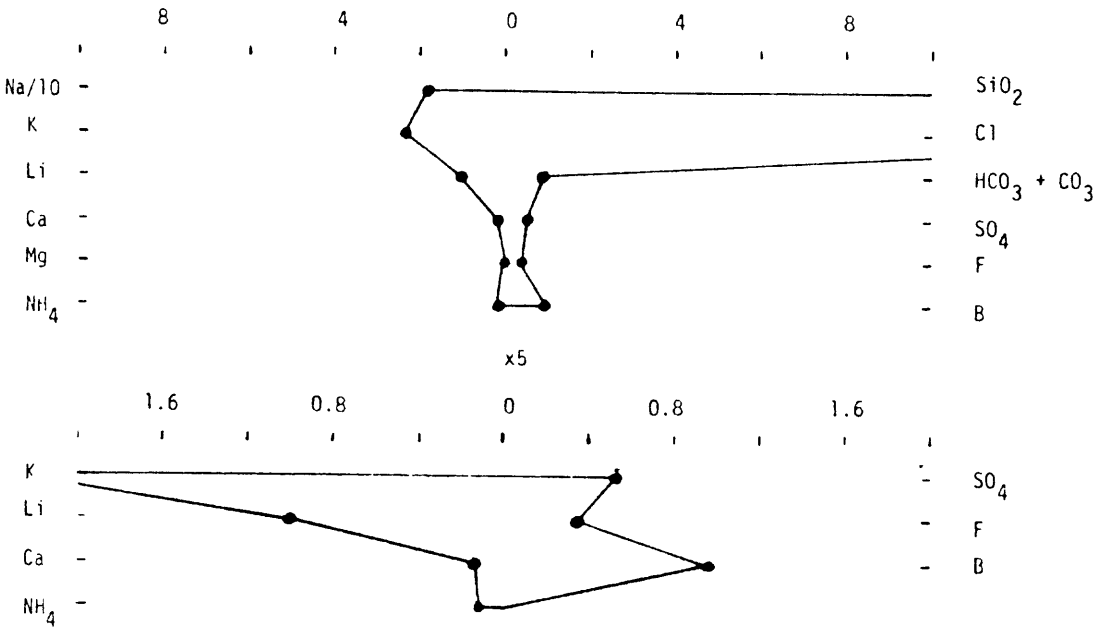

Fig. 10

RAINBOW HOT SPRINGS

EASTERN PARK

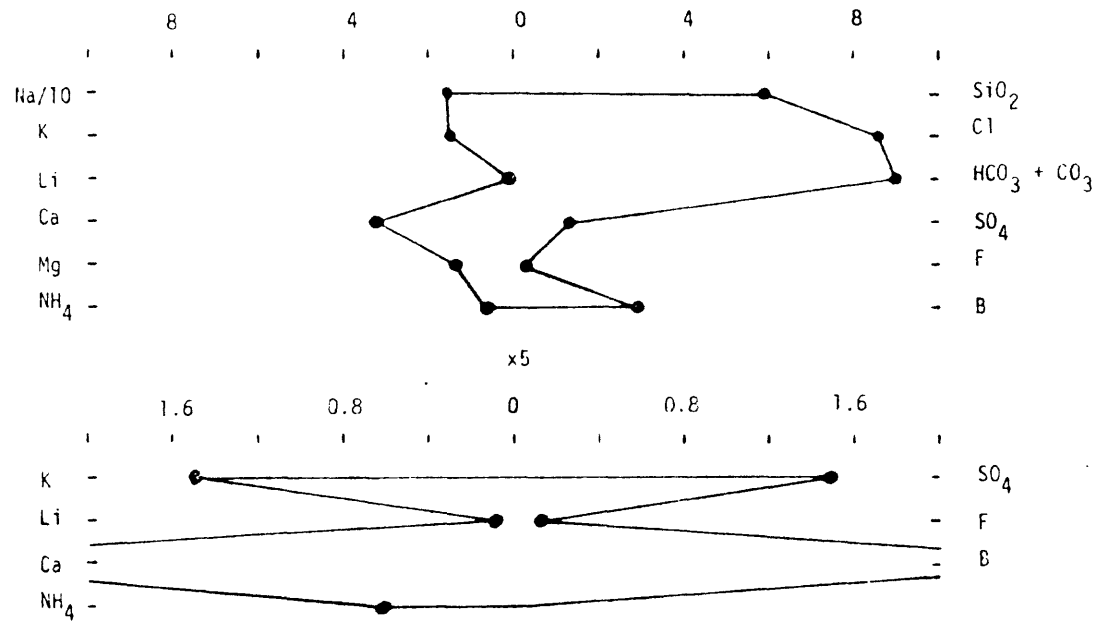

Fig. 11

JOSEPH COATS SPRING

EASTERN PARK

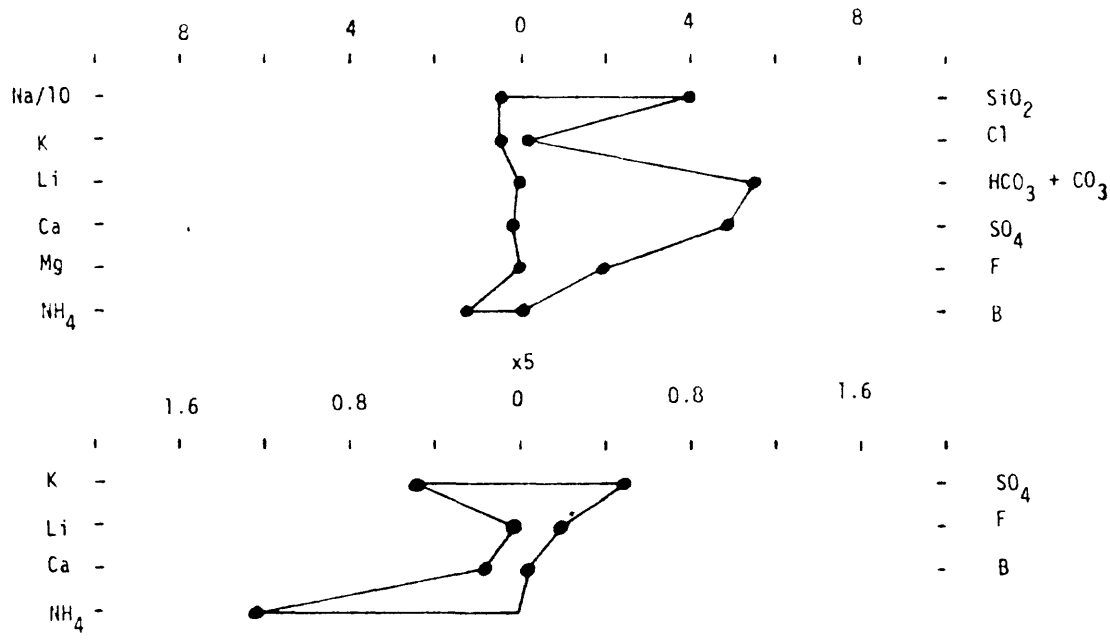

Fig. 12

Table 1.--Analysis of the waters.

HEART LAKE GEYSER BASIN

T7338	SEP 73	RUSTIC		SPRING	ALMOST RECTANGULAR	44 17.682	110 29.987	91.0
T7340	SEP 73	MIDDLE	DOUBLE	SPRING	DOUBLE SPRING	44 18.504	110 30.955	87.0
T7341	SEP 73	FISSURE	GLADE	GEYSER		44 18.887	110 31.268	94.4
T7343	SEP 73	FISSURE		SPRING	SPG 3' S OF TRIPLE BULGER	44 18.909	110 31.268	93.0
T7345	SEP 73	LOWER		POOL	EASTERN: 4' X 3' POOL	44 18.217	110 30.304	94.0
T7346	SEP 73	UPPER	DELUGE	GEYSER		44 19.031	110 31.504	93.0
T7348	SEP 73	UPPER		GEYSER	3 SMALL VENTS EASTERN BASE OF SPIKE	44 19.071	110 31.623	93.5
T7350	SEP 73			SPRING	RED ACID	44 19.073	110 31.600	79.0
W73 1	SEP 73	LOWER		SPRING	WESTERN	44 18.148	110 30.510	
W73 2	SEP 73	FISSURE		SPRING	HOT RIVER FROM BASE OF FISSURE	44 18.908	110 31.295	
W73 3	SEP 73			SPRING	WITCH CRK DISC INTO HEART LAKE	44 17.807	110 30.043	

LEWIS LAKE HOT SPRING

T7351	SEP 73			SPRING	. HOT ON LEWIS LAKE	44 18.500	110 39.410	

SHOSHONE GEYSER BASIN

YM45			UNION	GEYSER		44 21.135	110 47.888	
YW32				POOL	POOL N SIDE FALL CRK	44 21.104	110 48.191	
YW33				SPRING	SPG NR PATROL CABIN	44 21.358	110 47.945	93.6
YW34			BLACK SULFUR	SPRING		44 21.333	110 47.798	92.5
YW35			TAURUS	SPRING		44 21.178	110 47.864	95.0
T7201	SEP 72		BOILING SPG	SPRING	SHOSHONE SPG NUMBER 156	44 21.033	110 48.307	94.0
T7202	SEP 72		BOILING CAULDRO	SPRING	SHOSHONE SPG NUMBER 139	44 21.104	110 48.191	94.5
T7203	SEP 72		VELVET	SPRING	SHOSHONE SPG NUMBER 68	44 21.247	110 47.963	92.8
T7204	SEP 72		GOURD	SPRING	SHOSHONE SPG NUMBER 4	44 21.300	110 47.832	93.0
T7205	SEP 72		UNNAMED	SPRING	SHOSHONE SPG NUMBER 354	44 21.336	110 47.902	93.0
T7206	SEP 72		LITTLE BULGER	SPRING	SHOSHONE SPG NUMBER 13	44 21.314	110 47.811	87.0
T7207	SEP 72		SHIELD	GEYSER	SHOSHONE SPG NUMBER 3	44 21.298	110 47.831	92.5

HEART LAKE GEYSER BASIN																			
T7338	8.7	8.40	318.0			1.2	0.05	405.0	15.5	5.00	0.1	318.0		160.0	303.0	26.0	3.30
T7340	7.7	8.48	207.0			10.0	0.15	310.0	10.0	3.10	0.1	264.0		130.0	233.0	17.0	2.70
T7341	9.0	9.91	318.0			0.9	0.01	400.0	28.0	4.80	0.2	60.0	118.0	170.0	297.0	27.0	3.40
T7343	8.8	9.62	293.0			1.2	0.02	340.0	26.5	4.10	0.1	111.0	70.0	150.0	268.0	24.0	3.00
T7345	9.3	9.65	312.0			1.0	0.02	405.0	11.5	4.30	0.2	152.0	76.0	160.0	303.0	27.0	3.50
T7346	9.5	0.20	415.0			0.9	0.02	440.0	39.0	5.60	0.1		200.0	180.0	354.0	32.0	4.00
T7348	8.9	9.48	366.0			0.9	0.01	400.0	24.2	6.70	0.1	159.0	64.0	100.0	363.0	38.0	3.60
T7350	3.0	1.97	200.0			5.0	1.20	1.7	9.5	0.10	3.8			220.0	3.0	0.2	0.10
W73 1			334.0			0.9	0.03	380.0	9.4	4.00	0.2	149.0	80.0	150.0	270.0	21.0	3.10
W73 2			180.0			1.8	0.05	170.0	8.5	2.00	0.1[1]	54.0	32.0	75.0	137.0	11.0	1.60
W73 3			138.0			5.0	0.80	120.0	10.0	1.30				50.3	89.0	8.7	1.00
LEWIS LAKE HOT SPRING																	
T7351		8.00	330.0			3.2	0.02	140.0	17.0	0.60	0.1	165.0		51.0	79.0	0.1	8.20
SHOSHONE GEYSER BASIN																	
YM45						0.4		348.0	12.0	1.20		313.0	53.0	70.0	238.0	29.7	3.30
YW32								307.0	12.7	1.80		308.0[2]	50.0		186.0	21.6	2.20
YW33								243.0	24.5	1.30		264.0	65.0		132.0	17.8	1.70
YW34								272.0	12.7	1.50		356.0[2]			162.0	19.1	2.10
YW35								340.0	14.7	1.40		308.0	60.0		235.0	25.6	2.90
T7201	7.0	8.50	170.0	0.08	0.05	4.1	0.05	295.0	11.3	1.60		449.0	3.3	36.0	135.0	15.4	1.70
T7202	7.2	9.20	260.0	0.29	0.05	0.5	0.05	325.0	10.7	1.70		416.0		43.0	175.0	18.2	2.10
T7203	7.3	9.30	250.0	0.23	0.05	0.9	0.05	330.0	13.7	1.50		438.0		45.0	183.0	18.8	2.50
T7204	7.5	8.70	256.0	0.17	0.05	1.5	0.05	315.0	12.4	1.60		435.0		46.0	155.0	16.7	2.30
T7205	7.7	9.20	260.0	0.17	0.05	1.1	0.05	315.0	13.3	1.50		425.0		50.0	165.0	17.7	2.30
T7206	8.0	9.40	256.0	0.23	0.05	2.0	0.05	300.0	11.7	1.60		425.0		55.0	157.0	17.0	2.00
T7207	7.5	9.10	250.0	0.26	0.05	2.5	0.05	300.0	12.4	1.60		437.0		46.0	156.0	17.4	2.00

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION			
SHOSHONE	GEYSER	BASIN						
T7208	SEP 72		LITTLE GIANT	GEYSER	SHOSHONE SPG NUMBER 28	44 21.385	110 47.793	92.5
T7209	SEP 72		UNNAMED	SPRING	SHOSHONE SPG NUMBER 32A	44 21.392	110 47.751	94.0
T7210	SEP 72		BLACK SULFUR	SPRING	SHOSHONE SPG NUMBER 17	44 21.329	110 47.779	93.5
T7211	SEP 72		BEAD	GEYSER	SHOSHONE SPG NUMBER 59	44 21.254	110 47.980	90.5
T7212	SEP 72		UNNAMED	SPRING	SHOSHONE SPG NUMBER 12B	44 21.314	11 0.000	89.0
T7213	SEP 72		UNNAMED	SPRING	SHOSHONE SPG NUMBER 162	44 20.918	110 47.758	86.0
T7214	SEP 72		WASHTUB	SPRING	SHOSHONE SPG NUMBER 121	44 20.094	110 47.926	81.0
T7215	SEP 72		UNNAMED	SPRING	SHOSHONE SPG NUMBER 86	44 21.187	110 47.917	94.5
T7216	SEP 72		TAURUS	SPRING	SHOSHONE SPG NUMBER 82	44 21.178	110 47.864	94.5
T7217	SEP 72		PEARL	SPRING	SHOSHONE SPG NUMBER 48	44 21.250	110 47.929	90.0
T7218	SEP 72		UNNAMED	SPRING	SHOSHONE SPG NUMBER 67	44 21.262	110 48.000	93.0
T7219	SEP 72		CORAL	SPRING	SHOSHONE SPG NUMBER 76	44 21.188	110 48.046	80.5
T7220	SEP 72		BRONZE	GEYSER	SHOSHONE SPG NUMBER 78	44 21.233	110 47.902	93.0
T7221	SEP 72		GLEN	SPRING	SHOSHONE SPG NUMBER 65	44 21.272	110 48.032	94.5
T7222	SEP 72		UNNAMED	SPRING	SHOSHONE SPG NUMBER 166	44 21.300	110 47.562	93.0
T7223	SEP 72		UNNAMED	SPRING	SHOSHONE SPG NUMBER 7	44 21.314	110 47.845	93.5
T7305	AUG 73			SPRING	SHOSHONE SPG NUMBER 198	44 21.448	110 47.547	83.0
T7313	AUG 73		UNION	GEYSER	SHOSHONE SPG NUMBER	44 21.135	110 47.888	91.5
T7314	AUG 73			SPRING	SHOSHONE SPG NUMBER 91A	44 21.136	110 47.854	81.0
T7316	AUG 73			SPRING	SHOSHONE SPG NUMBER 182B	44 21.084	110 47.908	0.0
T7319	AUG 73			SPRING	SHOSHONE SPG NUMBER 192	44 21.378	110 47.732	89.5
T7327	AUG 73			SPRING	SHOSHONE SPG NUMBER 110	44 21.407	110 47.937	83.5
T7328	AUG 73			SPRING	SHOSHONE SPG NUMBER 34	44 21.357	110 47.945	98.0
T7329	AUG 73			SPRING	SHOSHONE SPG NUMBER 133	44 21.138	110 48.140	80.0
LONE	STAR	GEYSER	BASIN					
YF355	18 JUL 67		UNNAMED	SPRING	N SIDE RIVER 60 YD E OF BRIG	44 24.980	110 46.716	68.0
YF356	18 JUL 67		UNNAMED	SPRING	FAR W OF TRAIL PAST BRDG	44 24.987	110 48.817	78.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	AS	CONB
SHOSHONE GEYSER BASIN																				
T7208	8.3	9.50	292.0	0.20	0.05		0.9	0.05	300.0	18.4	1.40		394.0		46.0	168.0	17.7	2.20		
T7209	7.5	9.20	308.0	0.29	0.05		1.1	0.05	350.0	15.6	1.60		326.0		50.0	278.0	20.6	3.60		
T7210	6.8	8.80	244.0	0.47	0.05		1.2	0.05	275.0	11.6	1.40		345.0		65.0	133.0	15.2	2.00		
T7211	7.5	8.90	278.0	0.20	0.05		1.1		330.0	15.5	1.60		437.0		47.0	174.0	19.2	2.30		
T7212		8.80	242.0	0.06	0.05		1.6	0.05	280.0	11.7	1.10		322.0		40.0	179.0	18.8	2.20		
T7213	7.0	8.90	344.0	0.10	0.05		0.9	0.05	350.0	12.5	0.65		393.0		43.0	215.0	27.1	2.70		
T7214	7.3	9.00	328.0	0.14	0.05		0.4	0.05	365.0	16.0	1.00		406.0		48.0	238.0	25.5	2.80		
T7215	7.5	9.20	316.0	0.32	0.05		0.7	0.05	375.0	10.3	1.20		419.0		52.0	238.0	24.8	2.90		
T7216	8.0	9.10	296.0	0.26	0.05		0.6	0.05	340.0	13.3	1.40		434.0		53.0	200.0	21.6	2.60		
T7217	7.0	8.70	266.0	0.15	0.05		1.1	0.05	315.0	12.2	1.50		427.0		49.0	178.0	19.2	2.20		
T7218	7.3	8.80	266.0	0.35	0.05		1.0	0.05	315.0	14.8	1.50		432.0		46.0	175.0	19.2	2.20		
T7219	7.5	9.20	286.0	0.29	0.05		1.3	0.05	325.0	11.3	1.50		437.0		48.0	193.0	20.9	2.00		
T7220	7.5	8.80	246.0	0.41	0.05		1.1	0.05	315.0	12.4	1.50		424.0		50.0	167.0	18.6	2.30		
T7221	7.5	8.90	268.0	0.29	0.05		1.1	0.05	315.0	15.6	1.50		433.0		49.0	170.0	19.0	2.30		
T7222	4.0	2.40	404.0	3.50	4.50		4.3	0.49	60.0	32.0	0.16				436.0	60.0	2.7	0.90		
T7223	7.5	9.10	256.0	0.15			1.4	0.05	295.0	11.7	1.50		410.0		57.0	153.0	17.2	2.00		
T7305	7.2	7.80	286.0				0.7	0.14	170.0	15.0	0.30	0.6	213.0		61.0	92.0	8.6	1.10		835
T7313	8.2	8.90	352.0				0.3	0.04	380.0	11.0	1.10	0.1	445.0		42.0	242.0	29.0	2.80		1650
T7314	8.1	8.90	349.0				0.3	0.01[1]	380.0	10.0	1.10	0.1	445.0		46.0	243.0	28.0	2.80		1670
T7316	6.8	7.70	262.0				0.6	0.03	260.0	19.0	0.50	0.4	267.0		54.0	174.0	20.0	1.90		1
T7319	7.4	8.10	350.0				0.3	0.01[1]	350.0	13.0	1.50	0.1	230.0		70.0	323.0	21.5	3.70		1610
T7327	8.6	9.40	299.0				0.5	0.01[1]	300.0	20.0	2.20	0.1	435.0		46.0	158.0	17.6	1.40		1420
T7328	8.4	9.40	300.0				0.6	0.01[1]	250.0	25.0	1.30	0.1	428.0		34.0	123.0	15.6	2.00		1170
T7329	8.3	9.00	310.0				0.5	0.01[1]	310.0	12.0	1.60	0.1	438.0		43.0	183.0	20.0	0.70		1180
LONE STAR GEYSER BASIN																				
YF355							8.6	0.02	307.0	10.1	1.70		250.0		27.2	447.0	19.6	5.00		
YF356							2.1	0.01	281.0	12.9	1.70			78.0	22.0	444.0	15.6	4.50		

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
LONE STAR GEYSER BASIN								
YF357	18 JUL 67		UNNAMED	SPRING	NR TRAIL PAST BRDG	44 24.957	110 48.796	72.0
YF391	1 AUG 67		LONE STAR POOL	POOL	BY BRDG NR DRILL HOLE	44 24.980	110 48.716	68.0
YM 78			UNNAMED	SPRING	W OF LONE STAR RP	44 26.023	110 48.404	93.5
YM 80			UNNAMED	SPRING	W OF LONE STAR RP	44 26.000	110 48.628	94.5
UPPER GEYSER BASIN								
YF175	22 MAY 66		BONITA	SPRING		44 28.216	110 50.585	91.0
YF339	22 OCT 66		BONITA	SPRING		44 28.216	110 50.585	
RF214	30 MAY 66		CAULIFLOWER	SPRING		44 29.105	110 50.975	78.0
RF332	19 SEP 66		CHROMATIC	POOL		44 28.115	110 50.304	
RF283	18 JUN 66		EAR	SPRING		44 27.870	110 49.767	95.0
YF338	22 OCT 66		EAR	SPRING		44 27.870	110 49.767	
YF533	8 SEP 72		EAR	SPRING		44 27.870	110 49.767	95.0
RF284	18 JUN 66		FROG	SPRING		44 27.881	110 50.079	72.0
YF462	28 MAY 70		GIANTESS	GEYSER		44 27.811	110 49.687	95.0
YF534	8 SEP 72		GIANTESS	GEYSER		44 27.811	110 49.687	95.0
RF333	19 SEP 66		INKWELL	SPRING		44 28.141	110 50.385	
YF487	28 MAY 70		INTERCHANGE	SPRING		44 27.672	110 50.645	7.7
YF500	5 JUN 71		INTERCHANGE	SPRING		44 27.672	110 50.645	
YF535	8 SEP 72		INTERCHANGE	SPRING		44 27.672	110 50.645	
RF285	18 JUN 66		LIBERTY POOL	POOL		44 27.900	110 50.074	88.0
RF213	30 MAY 66		MIPROR	SPRING		44 28.988	110 50.958	77.0
RF201	30 MAY 66		MORNING GLORY	SPRING		44 28.506	110 50.558	74.0
YF334	18 SEP 66		OBLONG	GEYSER		44 28.163	110 50.361	
YF316	18 SEP 66		PINE	SPRING		44 27.797	110 50.875	
YF532	8 SEP 72		PUNCH BOWL	SPRING		44 28.167	110 50.866	95.0
YF335	18 SEP 66		ROUND	SPRING		44 28.124	110 50.304	
YF536	8 SEP 72		SAPPHIRE	GEYSER		44 29.104	110 51.268	95.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
LONE STAR GEYSER BASIN																				
YF357							1.7	0.01	268.0	10.4	1.40		98.0		24.0	411.0	17.5	4.50		
YF391		8.19	245.0	0.11	0.01	0.50	8.7	0.02	329.0	9.1	1.70		115.0		22.0	417.0	21.0	4.40		1660
YM 78									342.0							430.0				
YM 80							3.6	0.03	322.0	9.5	3.30		15.0[2]		35.0	458.0	18.5	4.20		
UPPER GEYSER BASIN																				
YF175		8.79							436.0	16.0			440.0	56.5		315.0	15.0			
YF339				0.53			0.2	0.02	456.0	13.4	4.49	0.2	634.0		26.0	307.0		3.20		
RF214	7.4								425.0	21.0			535.0			277.0				1800
RF332		9.29							385.0	17.3	4.99		127.0[2]	105.0[2]		373.0[2]				
RF283									354.0							446.0				1600
YF338				0.35			0.5	0.03	341.0	12.8	5.42	0.3	167.0		26.5	418.0		1.40		
YF533	9.0	9.22	362.0		0.05		0.6	0.01	335.0	16.5	5.20	0.4[2]	174.0		21.5	417.0	26.0	4.30	4.1[2]	
RF284									373.0				307.0	26.4		347.0				1550
YF462		9.07	411.0	0.50			0.5	0.01	360.0	20.7	5.48		106.0	41.0	25.0	425.0	27.5	4.49		
YF534	8.9	9.23	401.0				0.5	0.01	365.0	19.0	5.70		191.0		20.5	439.0	27.0	4.60	4.7	
RF333		8.65							357.0	31.2	3.44		400.0[2]	34.0[2]		269.0[2]				
YF487		8.65	292.0				0.7	0.03	282.0	19.9	2.90		266.0	18.8	19.0	234.0	21.6	2.57		
YF500		8.66	292.0				0.7	0.02	272.0	19.1			274.0	17.3	21.2	224.0	21.0			
YF535		8.65	270.0				0.5	0.01	300.0	19.5	3.20	0.1[1]	273.0	22.0	22.0	226.0	18.5	2.30		
RF285									251.0	17.4	4.30		79.0	118.0		336.0				1600
RF213	7.8								408.0	17.5						286.0				1800
RF201									388.0	20.0	2.08		511.0			287.0				1700
YF334		8.55							392.0	18.7	4.36		386.0[2]	24.0[2]		316.0[2]				
YF316		9.38							453.0	15.7	4.39		232.0[2]	159.0[2]		336.0[2]				
YF532	9.1	8.25	343.0		0.05		0.4	0.01	425.0	17.7	4.00	0.1[2]	610.0		15.7	295.0	29.0	2.90	2.3[2]	
YF335		9.21							475.0	21.9	4.64		320.0[2]	142.0[2]		310.0[2]				
YF536	8.5	9.00	334.0				0.3	0.01	450.0	15.8	2.30	0.2[2]	595.0		16.5	308.0	30.0	3.20	2.6[2]	

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
UPPER	GEYSER	BASIN						
RF202	30 MAY 66		SEISMIC	GEYSER		44 28.812	110 51.007	92.0
YF200	30 MAY 66		SPITEFUL	GEYSER		44 28.473	110 50.511	
YF531	8 SEP 72		SPOUTER	GEYSER		44 27.762	110 51.147	95.0
RF265	13 JUN 66		THREE SISTERS	SPRING		44 27.617	110 50.158	86.0
RF215	30 MAY 66		TORTOISE SHELL	SPRING		44 27.825	110 50.143	92.5
YF549	10 SEP 72		TORTOISE SHELL	SPRING		44 27.825	110 50.143	95.0
RF331	19 SEP 66		WITCHESCAULDRON	SPRING		44 27.977	110 50.317	
YM268	10 OCT 66		RED MUD	SPRING	NR MORNING GLORY	44 28.471	110 50.653	51.0
RF262	13 MAY 66		UNNAMED	SPRING	S OF U.S. DRILL HOLE	44 27.521	110 50.072	95.0
YF474	23 MAY 70		UNNAMED	SPRING	SPG W OF OLD FAITHFUL	44 27.635	110 49.663	90.0
RF203	30 MAY 66		UNNAMED	SPRING	SPG 150' N35W OF SEISMIC	44 28.787	110 50.979	67.5
YF205	30 MAY 66		UNNAMED	SPRING	SPG WITH SIDE SPOUTER NR RIVER	44 28.848	110 51.016	93.0
RF211	30 MAY 66		UNNAMED	POOL	POOL 50YD FROM RD	44 28.933	110 51.006	78.5
YF212	30 MAY 66		UNNAMED	GEYSER	GEYS N49W TO SAPPHIRE	44 28.945	110 51.001	93.0
YF263	13 JUN 66	MYRIAD	UNNAMED	GEYSER	W EDGE OF HOT AREA NR FENNER DH	44 27.530	110 50.087	92.0
YF264	13 JUN 66	MYRIAD	UNNAMED	SPRING	N60W TO FENNER DH	44 27.519	110 50.056	76.0
YF266	13 JUN 66		UNNAMED	SPRING	40YD SW OF 3 SISTERS	44 27.599	110 50.199	88.0
YF287	20 JUN 66		UNNAMED	SPRING	ABV MYSTIC FALLS	44 29.042	110 52.349	92.0
YF315	18 SEP 66		UNNAMED	SPRING	BIG SPG IN BLK SAND MEADOW	44 27.615	110 50.714	72.0
YF501	5 JUN 71		UNNAMED	SPRING	BIG SPG IN BLK SAND MEADOW	44 27.615	110 50.714	76.1
YF343	15 JUL 67		UNNAMED	SPRING	SPG AT STRM BY SEWAGE PLANT	44 27.247	110 50.659	
YF344	15 JUL 67		UNNAMED	SPRING	1ST SPG S OF MALLARD CR	44 30.244	110 49.934	58.0
YF345	15 JUL 67		UNNAMED	SPRING	S OF 344 W OF RD	44 29.929	110 50.237	42.0
YF346	15 JUL 67		UNNAMED	SPRING	S OF 345 E OF RD	44 29.638	110 50.408	59.0
YF347	15 JUL 67		UNNAMED	SPRING	S OF 346 N OF RD	44 29.597	110 50.460	58.0
YF348	15 JUL 67	BLK SAN	UNNAMED	POOL	BLK SAND TERRACE LINE OF POOLS	44 27.447	110 50.583	59.0
YF349	15 JUL 67		UNNAMED	SPRING	SIDE OF HILL ABOVE CAMPGROUND	44 26.875	110 49.356	34.5

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	H	H2S	CHG
UPPER	GEYSER	BASIN																		
RF202									371.0	16.0	3.73		205.0	144.0		279.0				1400
YF200									400.0	25.0						271.0				
YF531	8.5	9.03	311.0		0.05		0.5	0.03	450.0	17.0	3.60	1.2[2]	635.0		17.4	312.0	29.0	3.30	1.2[2]	
RF265		9.35							359.0	17.5	5.53		91.0	76.1		416.0				1550
RF215									409.0				157.0	108.0		389.0				1880
YF549	9.0	9.44	346.0		0.05		0.5	0.01	400.0	19.0	4.80	2.0[2]	395.0		17.9	378.0	30.0	4.00	2.5[2]	
RF331		8.80							403.0	19.9	4.80		348.0[2]	33.0[2]		352.0[2]				
YM268	4.5								82.0	13.3	0.60					48.0				
RF262									354.0	23.8	5.40			63.7		451.0				1540
YF474	8.9	9.12	333.0				0.8	0.01	298.0	16.7	4.83		60.1	43.6	18.2	352.0	25.2			
RF203	8.4								337.0	12.0						257.0				1500
YF205	8.4						0.5		390.0	19.0	3.70		252.0[2]	103.0[2]	23.0	277.0	29.5	3.10		1730
RF211	7.9								389.0	20.0			436.0			279.0				1730
YF212	7.0	.							256.0	15.0	2.40		342.0			202.0				1300
YF263									338.0	14.9	4.86		85.0	61.3		402.0				1530
YF264									365.0	17.3	5.52			110.0		435.0				1550
YF266									422.0	18.5	5.15		234.0			376.0				1560
YF287									129.0	6.9	0.63		237.0[2]			56.5	11.9	1.00		500
YF315		8.32					1.0	0.01	266.0	24.5	2.90		224.0[2]	17.0[2]	24.7	238.0[2]				
YF501							0.8	0.03	247.0	24.9						219.0				
YF343													47.6[2]			7.7[2]				
YF344							4.1		58.9[2]	4.1[2]			107.0[2]			13.2[2]				
YF345													84.5[2]			1.3[2]				
YF346							12.9		26.3[2]	8.8[2]			80.7[2]			0.8[2]				
YF347							8.8		15.4[2]	4.5[2]			40.4[2]			7.4[2]				
YF348													144.0[2]			189.0[2]				
YF349							9.4		50.3[2]	6.5[2]			102.0[2]			22.4[2]				

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
UPPER GEYSER BASIN								
YF489	28 MAY 70	BISQUIT	UNNAMED	SPRING	SPG 50' S20E OF Y8 DM	44 29.076	110 51.056	79.0
YF492	29 MAY 70		UNNAMED	SPRING	FROM CRACK IN MOUND S OF OLD FAITHFUL	44 27.614	110 49.675	91.0
YF502	5 JUN 71		UNNAMED	SPRING	PINE SPG AREA	44 27.797	110 50.875	
YF508	26 SEP 71		UNNAMED	SPRING		44 27.857	110 49.379	59.0
YF509	26 SEP 71		UNNAMED	SPRING		44 27.813	110 49.614	93.5
YF510	26 SEP 71		UNNAMED	SPRING		44 27.345	110 49.165	90.0
YF511	26 SEP 71		UNNAMED	SPRING		44 27.302	110 49.066	65.0
YM210			ISLAND GEYSER	GEYSER	ON ISLAND SE OF BISQUIT BASIN	44 29.039	110 51.205	
J7317	SEP 73		UNNAMED	SPRING	S OF FENNER UPPER BASIN DM	44 27.521	110 50.070	94.0
YT-32		HILLSID		SPRING		44 28.399	110 51.821	
YT9-4	13 SEP 69	HILLSID		SPRING		44 28.015	110 51.765	32.0
YT9-6	16 SEP 69	HILLSID		SPRING		44 28.823	110 52.042	89.5
YT9-7	16 SEP 69	HILLSID		SPRING		44 28.654	110 52.005	78.0
YT9-8	16 SEP.69	HILLSID		SPRING		44 28.569	110 51.966	86.0
T9-88	16 SEP 69	HILLSID		SPRING		44 28.532	110 51.967	67.0
YT9-9	16 SEP 69	HILLSID	ASTA	SPRING		44 28.533	110 51.980	84.5
T9-10	16 SEP 69	HILLSID		SPRING		44 28.489	110 51.957	83.0
T9-11	16 SEP 69	HILLSID		SPRING		44 28.450	110 51.967	83.0
T9-12	16 SEP 69	HILLSID		SPRING		44 28.344	110 51.875	82.0
T9-13	16 SEP 69	HILLSID		SPRING		44 28.304	110 51.873	78.0
T9-14	16 SEP 69	HILLSID		SPRING		44 28.249	110 51.894	39.0
T9-15	16 SEP 69	HILLSID		SPRING		44 28.198	110 51.867	41.0
T9-16	16 SEP 69	HILLSID		SPRING		44 28.145	110 51.833	
T9-17	16 SEP 69	HILLSID		SPRING		44 28.072	110 51.770	32.0
T9-18	16 SEP 69	HILLSID	UNNAMED	SPRING		44 28.735	110 50.558	67.0
T9-19	16 SEP 69	HILLSID	UNNAMED	SPRING		44 28.189	110 49.707	53.0
MIDWAY GEYSER BASIN								
YF226	7 JUN 66	FLOOD	UNNAMED	GEYSER	ON E BANK ACROSS FROM BEY ON W BANK	44 31.250	110 49.688	89.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
UPPER GEYSER BASIN																				
YF489		8.92		0.46			0.5	0.03	429.0	16.5	2.92		471.0	52.7	19.2	293.0	31.2			
YF492		8.64	344.0	0.54			1.0	0.01	307.0	18.7	5.04		123.0	15.0	19.0	362.0	25.8			
YF502		9.47	308.0				0.3	0.01	452.0	15.4			265.0	157.0	23.5	319.0				
YF508		8.30		0.03	0.05	0.02	5.4	0.34	50.0	12.0	0.10	0.1	129.0		8.3	381.0	7.4	0.04		255
YF509		8.50		0.91	0.20	0.01	0.6	0.15	320.0	11.0	5.10	0.1	169.0		42.0	381.0	26.0	3.90		1650
YF510		8.18		0.10	0.05	0.02	2.2	0.05	310.0	26.0	3.40	0.1	127.0		32.0	393.0	27.0	4.00		1650
YF511		3.18		0.73	0.20	0.01	1.8	0.11	220.0	9.0	2.00	0.1	0.0		183.0	183.0	21.0	2.70		1400
YM210									431.0	24.8	2.40		0.0	254.0[2]		294.0[2]	35.8	3.90		
J7317	9.4	9.94	375.0				0.8	0.01	310.0	23.0	4.00	0.1	261.0[1]		24.0	404.0	27.0	4.40	0.2	[1,2]
YT-32		7.92		0.08	0.00	0.00	7.0	0.24	20.4	5.0	0.11	0.1	54.6		2.4	5.0	6.2	0.10		
YT9-4	7.0	7.42	80.0	0.15	0.00	6.36	0.3		10.4	4.2	0.04	0.0	34.2		0.2	4.0	5.6	0.16		
YT9-6	7.0	8.63	163.0	0.23	0.07	0.13	9.0	0.13	128.0	6.3	0.57	0.2	211.0	12.3	11.1	50.0	11.0	0.87		
YT9-7	6.7	8.64	245.0	0.15	0.00	0.10	9.9	0.15	133.0	16.4	0.59	0.1	226.0	13.1	14.2	68.0	10.7	0.93		
YT9-8	7.2	8.66	170.0	0.15	0.00	0.00	8.1	0.14	141.0	7.4	0.72	0.2	217.0	15.6	13.3	66.0	11.6	1.11		
T9-8B	8.5	8.66	160.0	0.69	0.10	1.38	7.8	0.13	147.0	7.7	0.75	0.1	225.0	13.1	13.7	68.0	11.8	1.12		
YT9-9	6.7	8.67	168.0	0.12	0.00	0.00	7.9	0.16	149.0	7.5	0.77	0.1	217.0	15.6	13.7	72.0	11.6	1.14		
T9-10	6.9	8.62	170.0	0.13	0.00	0.00	7.9	0.27	150.0	7.6	0.83	0.1	223.0	13.9	14.2	72.0	12.0	1.17		
T9-11	7.0	8.63	173.0	0.45	0.00	0.00	8.0	0.28	151.0	7.6	0.84	0.1	230.0	10.3	14.2	73.0	12.0	1.20		
T9-12	7.3	8.66	165.0	0.15	0.00	0.00	8.0	0.35	141.0	7.5	0.80	0.2	214.0	14.3	13.0	70.0	12.1	1.12		
T9-13	7.4	8.58	160.0	0.10	0.00	0.00	8.4	0.38	136.0	7.7	0.77		213.0	9.4	12.6	66.0	11.6	1.08		
T9-14	7.0	7.90	165.0	0.14	0.00	0.00	6.8	0.23	22.6	5.9	0.14		58.3		2.8	6.0	6.3	0.12		
T9-15	6.9	8.00	110.0	0.24	0.00	0.00	7.0	0.22	21.4	5.5	0.15	0.1	563.0		1.2	5.0	6.6	0.12		
T9-16	6.0	7.82	105.0	0.19	0.00	0.00	7.1	0.24	19.2	5.1	0.15	0.2	39.6		1.2	12.0	6.2	0.10		
T9-17	6.8	7.73	85.0	0.17	0.00	0.00	6.2	0.28	8.7	4.2	0.05	0.3	34.6		0.9	0.0	5.5	0.02		
T9-18		7.89	120.0	0.17	0.00	0.00	6.6	0.01	18.9	2.0	0.06	0.1	43.3		0.5	0.0	9.8	0.02		
T9-19		7.91	115.0	0.15	0.00	0.00	7.2	0.15	16.2	3.5	0.06	0.2	46.7		0.0	1.0	7.8	0.04		
MIDWAY GEYSER BASIN																				
YF226		9.10											294.0	57.0		234.0				1400

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
MIDWAY	GEYSER	BASIN						
YF227	7 JUN 66	FLOOD	FLOOD	SPRING	E BANK AT BEND IN RIVER	44 31.174	110 49.541	89.0
YF228	7 JUN 66	FLOOD	SHELF	POOL	E BANK SMALL POOL 200' S OF 227	44 31.155	110 49.573	78.0
YF229	7 JUN 66	FLOOD	UNNAMED	POOL	HOT STRM, BASE OF GLACIAL MAT SW END	44 31.138	110 49.633	76.0
YF362	19 JUN 67	RABBIT	UNNAMED	GEYSER	ON HILL E OF RD NR DUMP	44 30.836	110 49.829	
YF368	29 JUN 67	RABBIT	UNNAMED	POOL	LRG POOL AT BEND	44 32.130	110 48.870	87.0
YF369	29 JUL 67	RABBIT	UNNAMED	POOL	SPOUTER AT S FORK B RABBIT CR	44 32.130	110 48.870	92.0
YF370	29 JUL 67	RABBIT	UNNAMED	SPRING	BLUE POOL UP SIDE A RABBIT CR	44 32.130	110 48.870	86.0
YF230	7 JUN 66	RABBIT	UNNAMED	SPRING	NR RABBIT CR DH Y5	44 30.860	110 49.264	90.0
YF392	JUL 67	RABBIT	UNNAMED	SPRING	NR RABBIT CR DH Y5 930	44 30.860	110 49.264	
YF541	9 SEP 72	RABBIT	UNNAMED	SPRING	NR RABBIT CR DH Y5	44 30.860	110 49.264	95.0
YM319	29 AUG 67	RABBIT	UNNAMED	SPRING	MARGIN OF MALLARD LAKE	44 31.130	110 48.300	72.0
YM322	29 AUG 67	RABBIT	UNNAMED	SPRING		44 30.770	110 48.830	69.0
T6701	67	RABBIT	UNNAMED	POOL	CLEAR POOL WITH PINK ALGAE	44 31.390	110 48.790	65.0
T6702	.67	RABBIT	UNNAMED	POOL	LRG POOL 3 ORIFICES RED ALGAE	44 31.380	110 48.770	46.0
T6703	67	RABBIT	UNNAMED	SPRING	SUPER HEATED	44 31.350	110 48.680	96.0
T6704	67	RABBIT	UNNAMED	POOL	VERY LRG BOILING POOL	44 31.300	110 48.690	92.5
T6705	67	RABBIT	UNNAMED	POOL	VERY LRG HOT POOL	44 31.170	110 48.640	77.0
T6706	67	RABBIT	UNNAMED	POOL	SMALL SUPERHEATED POOL	44 31.130	110 48.610	94.0
T6709	67	RABBIT	UNNAMED	POOL	VERY VIOLENT SPOUTER	44 30.470	110 48.240	93.7
T6710	67	RABBIT	UNNAMED	SPRING	SPG UP VALLEY ON W SIDE DEPOSIT MNO2	44 30.450	110 28.230	94.5
T6711	67	RABBIT	UNNAMED	SPRING	ROW OF SPGS TRENDING N40W	44 30.849	110 48.796	80.0
T6712	67	RABBIT	UNNAMED	SPRING	ROW OF SPG TRENDING N40W	44 30.911	110 48.947	80.0
T6713	67	RABBIT	UNNAMED	SPRING	ROW OF SPG TRENDING N40W	44 30.939	110 48.991	75.0
T6714	67	RABBIT	UNNAMED	SPRING	ROW OF SPG TRENDING N40W	44 31.050	110 49.157	40.0
T6715	67	RABBIT	UNNAMED	SPRING	ROW OF SPG TRENDING N40W	44 31.047	110 49.309	92.0
T6716	67	RABBIT	UNNAMED	SPRING	ROW OF SPG TRENDING N40W	44 31.074	110 49.390	85.0
T6717	67	RABBIT	UNNAMED	SPRING	ROW OF SPG TRENDING N40W	44 31.141	110 49.399	90.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
MIDWAY	GEYSER	BASIN																		
YF227		8.94											342.0	24.0		260.0				1430
YF228		9.44											235.0	108.0		247.0				1300
YF229		7.87											300.0			202.0				1200
YF362									409.0	99.4	4.30					311.0	26.7	3.40		
YF368		8.99					0.5	0.01	350.0	12.2	5.60		293.0	48.2	24.0	315.0	27.2	1.00		
YF369		8.14					0.7		449.0	19.5	0.10		86.6		33.2	2.0	5.9	0.06		
YF370		8.76					1.4		325.0	11.3	4.90		305.0	25.0	63.0	290.0	25.2	0.94		
YF230	8.3												419.0	15.0		269.0				1570
YF392		8.44	210.0	0.54	0.01	0.01	0.4	0.01	360.0	9.1	3.20	0.1[1]	447.0	10.0	16.0	268.0	25.0	2.80		1670
YF541	8.3	8.35	225.0		0.05		0.5	0.04	375.0	9.6	3.30	0.3[2]	460.0		25.0	271.0	24.0	2.80	0.8[2]	
YM319	7.0						0.5	0.08	58.2	12.8			42.4		68.2	4.0				
YM322	7.5								333.0	13.9					56.0	231.0				
T6701	9.0						1.2	0.03	371.0	14.2			396.0		25.0	332.0				1550
T6702																				1650
T6703	8.6						1.0	0.02	322.0	9.8			353.0		10.0	287.0				
T6704	8.7																			1560
T6705	9.1						1.0	0.02	371.0	13.2			395.0		22.0	335.0				1750
T6706	8.9																			1600
T6709	7.7						1.6	0.04	53.7	20.1			80.0		56.4	2.1				300
T6710	8.2						3.2	0.02	44.7	13.8			113.0		3.7	2.1				210
T6711	8.5						1.5	0.02	342.0	12.6			344.0		19.0	287.0				
T6712	7.6																			
T6713	7.7																			
T6714	8.7																			
T6715	7.6						0.9	0.02	332.0	9.3			416.0		27.0	272.0				
T6716																				
T6717																				

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
MIDWAY GEYSER BASIN								
T6718	67	RABBIT	UNNAMED	SPRING	ROW OF SPG TRENDING N40W	44 30.920	110 49.440	71.0
YF381	OCT 67		UNNAMED	SPRING	COLD SPG IN PICNIC GROUND	44 30.500	110 49.940	21.0
YF548	10 SEP 72		UNNAMED	SPRING	COLD SPG IN PICNIC GROUND	44 30.500	110 49.940	
YF550	10 SEP 72		UNNAMED	SPRING	0.9 MI N.OF BISQUIT	44 29.640	110 50.440	48.0
YF551	10 SEP 72		UNNAMED	SPRING	1.4 MI N.OF BISQUIT	44 30.020	110 50.190	60.3
J7306	23 SEP 73		UNNAMED	SPRING	1.2 MI N OF BISQUIT	44 29.930	110 50.360	51.0
J7307	23 SEP 73		UNNAMED	SPRING	0.9 MI N OF BISQUIT	44 29.650	110 50.450	48.0
LOWER GEYSER BASIN								
YF340	25 SEP 66	FIRHOLA	STEADY	GEYSER	ALSO CALLED BLACK WARRIOR LAKE	44 32.651	110 47.154	
YF431	18 MAY 68	FIRHOLA	STEADY	GEYSER		44 32.651	110 47.154	
T9-21	SEP 69	FIRHOLA	STEADY	GEYSER		44 33.651	110 47.154	
YF539	9 SEP 72	FIRHOLA	STEADY	GEYSER		44 33.651	110 47.154	95.0
J7308	23 SEP 73	FIRHOLA	STEADY	GEYSER		44 32.651	110 47.154	93.0
RF254	9 JUN 66	FIRHOLA	FIVE SISTERS	SPRING		44 31.939	110 47.779	86.0
YF540	9 SEP 72	FIRHOLA	SHELF	SPRING		44 32.589	110 47.677	95.0
YF326	19 SEP 66	FIRHOLA	ZOMAR	SPRING		44 32.523	110 47.250	
J7310	23 SEP 73	FIRHOLA	ZOMAR	POOL	1/4 MI FROM STEADY 35YD S OF RD	44 32.560	110 47.440	77.5
YF249	9 JUN 65	FIRHOLA	UNNAMED	SPRING	HIGHEST SPG ON LEFT FORK OF WHITE CR	44 31.750	110 47.231	80.0
YF250	9 JUN 66	FIRHOLA	UNNAMED	SPRING	HOT WATERFALL ON WHITE CR	44 31.740	110 47.364	84.5
F250A	JUN 66	FIRHOLA	UNNAMED	SPRING	HILLS OF WHITE CR	44 31.659	110 47.317	79.0
YF252	9 JUN 66	FIRHOLA	UNNAMED	POOL	WITH SIO2 RIM TREE ACROSS POOL	44 31.906	110 47.648	92.0
YF253	9 JUN 66	FIRHOLA	UNNAMED	GEYSER	NR 5 SISTERS	44 31.925	110 47.730	95.0
YF306	14 SEP 66	FIRHOLA	UNNAMED	GEYSER	SUBTERRANEAN GEYSER NW OF NARCISSUS	44 32.735	110 48.060	90.5
YF308	15 SEP 66	FIRHOLA	UNNAMED	GEYSER	N52W OF WHITE DOME	44 32.421	110 48.239	
YF323	19 SEP 66	FIRHOLA	UNNAMED	SPRING	SMALL SPG IN FIREHOLE LAKE AREA	44 32.496	110 47.446	80.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
MIDWAY GEYSER BASIN																				
T6718	7.5						1.9	0.05	252.0	8.9			307.0		20.0	209.0				1220
YF381	5.5	7.29	105.0				2.8		32.0	5.0	0.12		67.0		6.3	17.0				
YF548	7.5	7.93	80.0				3.2	0.70	25.5	3.6	0.10	0.1[1]	28.0		7.0	10.1	1.5	0.10		
YF550	7.5	7.72	100.0				7.4	0.20	8.8	3.4	0.02[1]	0.2	27.0		4.0	0.7	7.0	0.03		
YF551	8.2	8.25	122.0				12.8	0.14	32.0	7.9	0.04	0.1[1]	87.0		7.0	1.0	1.8	0.02		
J7306	6.3	6.70	109.0				7.8	0.18	16.0	4.0	0.01[1]	0.1[1]	43.0		17.0	4.5	7.8	0.10[1]	0.2[1,2]	
J7307	6.4	6.90	107.0				7.8	0.20	10.0	3.6	0.01[1]	0.1[1]	32.0		18.0	0.8	7.8	0.10[1]	0.2[1,2]	
LOWER GEYSER BASIN																				
YF340				0.25			13.2	0.01	90.0	10.3	0.44	0.1	157.0		20.0	46.0		0.56		
YF431									94.4	15.3					22.5	44.0				
T9-21	8.3	8.44	190.0	0.15	0.11	0.15	12.1	0.04	90.6	15.0	0.46	0.1	155.0	4.5	29.5	45.0	10.4	0.52		
YF539	7.9	8.03	274.0				13.0	0.05	90.0	14.1	0.44	0.9[2]	174.0		23.9	43.1	9.8	0.49	0.4[2]	
J7308	6.8	8.40	213.0				15.1	0.05	85.0	16.0	0.40	0.1[1]	165.0		27.0	44.0	10.0	0.50	0.2[1,2]	522
RF254		8.00							134.0							257.0				1410
YF540	8.4	8.97	363.0				1.0	0.04	365.0	18.0	2.00	2.0[2]	270.0		22.9	366.0	19.0	3.80	1.2[2]	
YF326		7.20							98.7	16.8	0.43		157.0[2]			64.0[2]				
J7310	7.0	7.70	197.0				14.0	0.06	105.0	16.8	0.45	0.1	176.0		25.0	61.6	10.0	0.70	0.2	594
YF249	7.0								84.0							62.0				450
YF250	8.0								75.0				122.0			51.0				420
F250A	7.0								59.0							37.6				400
YF252	7.0								188.0							142.0				910
YF253	8.0								296.0				198.0	62.0		253.0				1330
YF306	8.0	9.40							317.0	13.2	2.45		37.0[2]	87.0[2]		345.0[2]				
YF308		8.38							333.0	13.7	3.04		220.0[2]	24.0[2]		331.0[2]				
YF323		7.70							94.2	17.5	0.41		142.0[2]			68.0[2]				

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
LOWER GEYSER BASIN								
YF324	19 SEP 66	FIRHOLA	UNNAMED	SPRING	LRG FLOWING SPG FIREHOLE LAKE	44 32.459	110 47.595	82.0
YF325	19 SEP 66	FIRHOLA	UNNAMED	SPRING	BIGGEST SPG FIREHOLE LAKE	44 32.510	110 47.508	85.0
YF327	19 SEP 66	FIRHOLA	UNNAMED	SPRING	NE BLACK WARRIOR LAKE N SIDE RD	44 32.701	110 47.083	93.0
YF329	19 SEP 66	FIRHOLA	UNNAMED	SPRING	N OF BLACK WARRIOR S OF RD	44 32.696	110 47.307	76.0
J7309	23 SEP 73	FIRHOLA	UNNAMED	SPRING	50 YD W OF SURPRISE 35YD S OF RD	44 32.570	110 47.670	73.0
YM237		FIRHOLA	UNNAMED	SPRING	LRG SPG IN VALLEY WHITE CRK	44	110	77.0
YM244		FIRHOLA	UNNAMED	SPRING	SPG FURTHEST TO SE OF GROUP AT FORK	44 31.740	110 47.364	84.0
						44 33.461	110 48.366	90.0
YF367	20 JUL 67	FOUNTAN	CLIFF	SPRING		44 33.517	110 48.117	
T6608	66	FOUNTAN	LONE	SPRING		44 33.259	110 48.758	
YF366	20 JUL 67	FOUNTAN		SPRING	NR KALEIDOSCOPE	44 33.259	110 48.758	
T6611		FOUNTAN		SPRING	JUST W OF KALEIDOSCOPE	44 33.053	110 49.578	92.0
YF546	10 SEP 72	FOUNTAN		SPRING	NR CLEPSYDRA			
YF544	9 SEP 72	NEZPERC	UNNAMED	SPRING	SPG IN FOUNTAIN FLATS	44 33.954	110 48.963	47.0
RF243	8 JUN 66	NEZPERC	SPOUTER	SPRING	E OF RHYOLITE SLIDE	44 34.408	110 47.587	94.0
RF244	8 JUN 66	NEZPERC		SPRING	VALLEY MOUTH ON SIDE OF NEZ PERCE	44 34.318	110 47.681	87.0
RF245	8 JUN 66	NEZPERC		SPRING	S65W TO TOP WESTERN PORC HILL	44 34.412	110 48.426	76.0
YF342	25 SEP 66	NEZPERC		GEYSER	NEW GEYSER	44 34.436	110 47.648	
YF358	19 JUL 67	NEZPERC	LOST GLASSES	SPRING	MEADOW N OF FLN FLATS RD	44 34.411	110 50.123	90.0
YF359	19 JUL 67	NEZPERC		POOL	BIG POOL FLOODED BY RIVER NR FLN FLAT RD	44 34.255	110 49.943	90.0
YF364	19 JUL 67	NEZPERC		SPRING	100 YD FROM TELE ON FLN FLATS RD	44 34.557	110 49.801	
F231A	8 JUN 66	NEZPERC		SPRING	QUAGMIRE GROUP	44 33.931	110 48.323	71.0
F231C	8 JUN 66	NEZPERC		SPRING	QUAGMIRE GROUP	44 34.024	110 48.419	63.5
BB233		NEZPERC		SPRING	QUAGMIRE GROUP	44 34.020	110 48.240	60.0
FQ237	8 JUN 66	NEZPERC		SPRING	QUAGMIRE GROUP	44 34.005	110 48.284	67.0
RF239	8 JUN 66	NEZPERC	SNORT	SPRING	QUAGMIRE GROUP	44 34.061	110 48.302	95.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
LOWER GEYSER BASIN																				
YF324		7.50							84.8	16.8	0.38		137.0[2]			67.0[2]				
YF325		7.00							93.0	16.3	0.39		130.0[2]			72.5[2]				
YF327		7.10							85.1	13.6	0.43		152.0[2]			41.0[2]				
YF329		7.00							99.2	23.5	0.43		164.0[2]			41.5[2]				
J7309		7.14	251.0				0.6	0.01	290.0	16.8	2.80	0.4	323.0		20.0	242.0	19.5	26.00	0.2	
YM237									44.3	13.7	0.25		112.0			16.0[2]	7.8			
YM244									80.0	16.4	0.31		123.0[2]			50.0[2]				
YF367			178.0						402.0	16.5	1.60					295.0	23.7	2.40		175
T6608		8.20							300.0	18.4	0.85		421.0[2]	1.4[2]		186.0[2]				
YF366		8.80	352.0				0.7		367.0	16.8	2.90		373.0	35.0	35.5	313.0	22.0	2.50		
T6611									374.0	16.9	2.70		332.0[2]	41.0[2]		288.0[2]				
YF546	9.0	9.37	414.0		0.05		0.5	0.01	380.0	12.5	2.80	3.0[2]	380.0		22.0	325.0	22.0	3.50	1.1[2]	
YF544	8.5	8.47	191.0				4.6	0.05	350.0	20.0	2.40	0.2[2]	343.0	22.0	29.0	270.0	20.8	2.90		
RF243		8.50							275.0		2.44		257.0	7.2		264.0				1300
RF244		7.50							264.0							266.0				1220
RF245		8.00							347.0							325.0				1570
YF342									293.0	8.3	3.10									
YF358							1.0	0.01	274.0	11.7	1.90		500.0	48.0	29.0	269.0	28.0	2.30		
YF359							0.4	0.03	317.0	11.5	3.30		600.0	24.0	42.0	310.0	34.8	1.70		
YF364		8.72					3.0	0.03	321.0	14.2	2.00		337.0	24.5	27.8	250.0	24.2	1.60		
F231A		5.50							276.0							265.0				1320
F231C		6.50							311.0							328.0				1400
BB233		7.50							325.0							332.0				1310
FQ237		7.50							288.0							266.0				1300
RF239		8.00							307.0	10.9	3.95		8.5[2]	78.0[2]		344.0[2]				1400

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
LOWER GEYSER BASIN								
YF353	10 JUN 67	NEZPERC	SNORT	SPRING QUAGMIRE GROUP		44 34.061	110 48.302	
YF542	9 SEP 72	NEZPERC	SNORT	SPRING QUAGMIRE GROUP		44 34.061	110 48.302	92.0
RF246	8 JUN 66	NEZPERC	UNNAMED	SPRING E OF WESTERN PORC HILL		44 34.289	110 48.497	94.0
RF247	8 JUN 66	NEZPERC	UNNAMED	SPRING SLOPE OF WESTERN PORC HILL		44 34.343	110 48.762	87.5
YF414	19 JUL 68	NEZPERC	UNNAMED	SPRING 70' E OF Y-13 DRILL HOLE	930	44 34.277	110 48.651	93.0
YF354	10 JUN 67	NEZPERC	UNNAMED	SPRING NW PORCUPINE HILL ON NE SLOPE		44 34.308	110 48.729	
YF363	9 JUL 67	NEZPERC	UNNAMED	SPRING HILLSIDE N OF PORC HILL		44 34.367	110 48.739	
YM491	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 33.931	110 48.323	72.0
YM492	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.040	110 48.169	74.0
YM497	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.020	110 48.240	60.0
YM498	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.040	110 48.201	86.0
YM526	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.005	110 48.284	67.0
YM527	28 SEP.68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.008	110 48.263	72.0
YM528	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 33.954	110 48.279	79.0
YM529	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 33.949	110 48.254	64.0
YM530	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 33.962	110 48.233	80.0
YM531	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.055	110 48.077	84.0
YM532	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.069	110 48.022	66.0
YM533	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.061	110 48.302	93.0
YM534	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.024	110 48.419	65.0
YM535	28 SEP 68	NEZPERC	UNNAMED	SPRING QUAGMIRE GROUP		44 34.040	110 48.433	93.0
YM438	28 SEP 68	NEZPERC	'DEAD SAVAGE'	SPRING MORNING MIST GROUP		44 34.412	110 48.428	79.0
YM449	28 SEP 68	NEZPERC	UNNAMED	SPRING MORNING MIST GROUP		44 34.287	110 48.353	76.0
YM536	28 SEP 68	NEZPERC	UNNAMED	SPRING MORNING MIST GROUP		44 34.209	110 48.632	70.0
YM537	28 SEP 68	NEZPERC	UNNAMED	SPRING MORNING MIST GROUP		44 34.226	110 48.580	64.0
YM538	28 SEP 68	NEZPERC	UNNAMED	SPRING MORNING MIST GROUP		44 34.273	110 48.410	72.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
LOWER	GEYSER		BASIN																	
YF353		9.30	242.0	0.18	0.01	0.01	1.6	0.04	314.0	10.0	4.00	0.1	41.0 [2]	69.0 [2]	23.0	344.0 [2]	33.0	4.10		1550
YF542	9.1	9.38	235.0				1.5	0.01	310.0	10.2	3.70	0.2	174.0		16.9	340.0	31.0	4.40	3.7	
RF246		8.00							332.0		4.70		154.0 [2]	49.0 [2]		371.0	37.2	4.40		1500
RF247		7.00							285.0	7.7	3.43		156.0			305.0				1420
YF414		9.15	280.0		0.10	0.02	0.8	0.01	341.0	19.0	4.60	0.1	156.0	58.0	23.0	312.0	31.0	4.30		1670
YF354			222.0										122.0 [2]			306.0 [2]				
YF363		8.72							276.0	8.4	3.60					292.0	30.9	2.40		
YM491	7.0		220.0				1.3	0.03	277.0	7.6			244.0		21.7	272.0				
YM492	7.0		225.0				1.4	0.03	287.0	9.0			162.0		44.2	304.0				
YM497	7.0		235.0				1.7	0.02	305.0	10.5			187.0		28.2	332.0				
YM498	7.5		286.0				1.7	0.02	301.0	12.4			174.0		21.8	342.0				
YM526	7.0		222.0				2.1	0.02	300.0	9.2			203.0		28.0	323.0				
YM527	7.0		230.0				1.5	0.02	298.0	8.9			186.0		32.2	332.0				
YM528	7.0		240.0				1.5	0.05	252.0	9.6			209.0		20.0	245.0				
YM529	6.5		282.0				4.0	0.04	258.0	11.1			213.0		20.1	256.0				
YM530	6.0		213.0				2.5	0.06	223.0	7.6			180.0		19.6	247.0				
YM531	6.0		249.0				0.5	0.02	44.0	6.5			60.4		28.7	10.2				
YM532	7.0		254.0				4.7	0.10	226.0	10.4			352.0		26.7	147.0				
YM533	7.0		252.0				1.8	0.01	309.0	10.5			175.0		41.9	352.0				
YM534	7.0		252.0				1.3	0.02	311.0	10.0			154.0		61.8	342.0				
YM535	7.0		246.0				1.6	0.02	271.0	7.6			142.0		21.7	320.0				
YM438	8.0		221.0				0.9	0.01	331.0	8.0			259.0		26.2	330.0				
YM449	7.0		224.0				1.4	0.03	313.0	10.5			222.0		40.2	332.0				
YM536	8.5		301.0				0.7	0.01	349.0	13.8			297.0		43.5	346.0				
YM537	7.0		254.0				1.2	1.01	305.0	9.6			251.0		34.8	302.0				
YM538	8.0		240.0				1.2	0.02	314.0	9.1			216.0		33.2	363.0				

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
LOWER GEYSER BASIN								
YM553	28 SEP 68	NEZPERC	UNNAMED	SPRING MORNING MIST GROUP		44 34.379	110 48.928	69.0
YW 87	6 SEP 68	NEZPERC	UNNAMED	SPRING ON S SIDE OF 15' AB CR		44 34.423	110 48.043	62.5
YM445	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.301	110 47.724	71.0
YM452	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.315	110 47.691	94.0
M452A	10 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN	AT N TIP	44 34.318	110 47.681	87.0
YM453	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.382	110 47.644	63.0
YM454	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.364	110 47.614	79.0
M455A	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.338	110 47.628	93.0
YM456	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.458	110 47.451	82.0
YM457	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.477	110 47.403	93.0
M457B	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.502	110 47.403	93.0
YM458	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.580	110 47.302	89.0
YM459	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.654	110 47.302	76.0
YM463	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.843	110 47.256	72.0
M463B	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN	FURTHEST E OF SIO2 DEPOSITI	44 34.846	110 47.258	89.0
YM539	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.260	110 48.020	89.0
YM540	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.250	110 47.963	78.0
YM541	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.300	110 47.972	56.0
YM542	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.377	110 47.674	77.0
YM543	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN	FURTHEST E OF ALKA SPG	44 34.333	110 47.566	93.0
YM544	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.415	110 47.616	93.0
YW217	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN	SAME AS YM 543	44 34.333	110 47.566	93.5
YW218	28 SEP 68	NEZPERC	UNNAMED	SPRING CULEX BASIN		44 34.520	110 47.545	93.0
YF274	13 JUN 66	RIVER	BOULDER	SPRING BASE OF SEDIMENTS SW OF OJO CAL		44 33.520	110 50.610	92.0
YF352	15 JUL 67	RIVER	BOULDER	SPRING		44 33.520	110 50.610	93.0
YF543	9 SEP 72	RIVER	BOULDER	SPRING		44 33.520	110 50.610	95.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
LOWER	GEYSER		BASIN																	
YM553	7.0		205.0				2.1	0.02	293.0	6.1			238.0		15.5	288.0				
YW 87	6.0		193.0				3.0	0.12	219.0	9.6			163.0		19.8	232.0				
YM445	7.0		235.0				1.3	0.02	283.0	10.2			215.0		27.2	288.0				
YM452	7.5		224.0				1.1	0.02	271.0	10.1			207.0		25.2	283.0				
M452A	7.5						1.2	0.02	264.0	9.8			205.0		27.2	279.0				
YM453	7.0		223.0				1.8	0.02	291.0	8.4			193.0		29.5	307.0				
YM454	7.5		224.0				1.3	0.01	285.0	8.4			203.0		22.5	285.0				
M455A	8.0		248.0				1.3	0.01	279.0	9.5			170.0		25.6	315.0				
YM456	7.5		221.0				1.0	0.01	277.0	6.7			202.0		24.6	290.0				
YM457			203.0				1.1	0.02	261.0	9.0			266.0		30.6	228.0				
M457B	7.5		203.0				1.0	0.02	270.0	7.8			279.0		34.0	236.0				
YM458	7.0		179.0				3.3	0.03	204.0	8.8			159.0		24.0	215.0				
YM459	7.0		225.0				0.5	0.01	279.0	4.2			196.0		31.2	309.0				
YM463	7.0		272.0				0.4	0.02	309.0	7.8			167.0		32.2	342.0				
M463B	7.0						0.5	0.02	268.0	9.8			154.0		21.7	415.0				
YM539	7.0		187.0				2.4	0.06	258.0	8.4			218.0		23.0	255.0				
YM540	7.0		188.0				1.8	0.06	269.0	6.0			210.0		26.9	278.0				
YM541	6.0		206.0				2.8	0.01	291.0	8.8			265.0		31.9	272.0				
YM542	7.5		221.0				1.9	0.01	300.0	10.5			185.0		34.6	337.0				
YM543	8.0		242.0				1.2	0.01	287.0	9.0			241.0		56.0	286.0				
YM544	7.0		188.0				2.1	0.01	249.0	6.2			154.0		30.2	265.0				
YW217	8.0																			
YW218	7.5		235.0				1.3	0.02	285.0	7.2			238.0		22.4	288.0				
YF274	8.6	9.25							314.0	8.7	2.54		141.0	57.5		355.0				1480
YF352	8.6	9.15	211.0	0.45	0.02	0.01	1.0	0.02	322.0	8.9	2.60		122.0	62.0	28.0	299.0	31.0			
YF543	9.1	9.18	206.0				0.9	0.01	325.0	8.3	2.80	0.1	260.0		21.0	305.0	31.0	3.80	3.8	

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
LOWER GEYSER BASIN								
YF276	13 JUN 66	RIVER	CAVERN	SPRING	POCKET BASIN	44 33.532	110 49.915	74.0
YF319	18 SEP 66	RIVER	FORTRESS	GEYSER	BIG KETTLE-LIKE GEYSER	44 33.369	110 49.923	95.0
YF420	19 JUL 68	RIVER	FORTRESS	GEYSER		44 33.463	110 49.923	95.0
YF275	13 JUN 66	RIVER	OJO CALIENTE	SPRING		44 33.770	110 50.271	95.0
YF351	10 JUN 67	RIVER	OJO CALIENTE	SPRING		44 33.770	110 50.271	
YF537	9 SEP 72	RIVER	OJO CALIENTE	SPRING		44 33.770	110 50.271	95.0
YF317	18 SEP 66	RIVER	UNNAMED	SPRING	3RD SPG DS OF FORTRESS	44 33.406	110 49.933	87.0
YF421	19 JUL 68	RIVER	UNNAMED	SPRING	OBLONG WITH DK GRN PPT	44 33.406	110 49.933	85.0
YF318	18 SEP 66	RIVER	UNNAMED	SPRING	2ND SPG PS OF FORTRESS	44 33.387	110 49.927	83.0
YF320	18 SEP 66	RIVER	UNNAMED	POOL	RD POOL WITH SIO2 AND YELLOW SEDIMENT	44 33.387	110 49.921	67.0
YF321	18 SEP 66	RIVER	UNNAMED	SPRING	MEADOW RIVER GRP FAR ABV RIVER	44 0.000	110 0.000	72.0
YF350	10 JUN 67	RIVER	UNNAMED	SPRING	ON FNT FLATS RD NR TELEPHONE	44 34.572	110 49.817	
YF419	19 JUL 68	RIVER	UNNAMED	SPRING	1ST SPG N OF TANGLED CR E SIDE RIVER	44 33.319	110 49.897	79.0
YF422	19 JUL 68	RIVER	UNNAMED	SPRING	SMALL SPG ABV RIVER S SIDE POCKET	44 33.540	110 49.879	85.0
YM041	31 MAY 66	RIVER	UNNAMED	SPRING	NW SLOPE OF POCKET BASIN	44 33.990	110 49.648	67.0
YM175	19 SEP 66	RIVER	UNNAMED	SPRING	E SIDE POCKET BASIN	44 33.574	110 49.973	82.0
YM177	19 SEP 66	RIVER	UNNAMED	SPRING	E SIDE OF FIREHOLE R.	44 33.469	110 49.925	
M177A	19 SEP 66	RIVER	UNNAMED	SPRING		44 33.464	110 49.943	
YM178	17 SEP 66	RIVER	UNNAMED	SPRING	E SIDE OF FIREHOLE R.	44 33.432	110 49.885	89.0
YM179	19 SEP 66	RIVER	UNNAMED	SPRING		44 33.395	110 49.904	
M179B	19 SEP 66	RIVER	UNNAMED	SPRING		44 33.385	110 49.884	
YM183	18 SEP 66	RIVER	UNNAMED	SPRING		44 33.266	110 49.775	94.0
YM185	18 SEP 66	RIVER	UNNAMED	SPRING	LRG SPG E SIDE RIVER S END MIDWAY	44 33.574	110 49.651	54.0
YM188	19 SEP 66	RIVER	UNNAMED	SPRING		44 33.452	110 49.993	
YM190	19 SEP 66	RIVER	UNNAMED	SPRING	W SIDE FIREHOLE TOT DISC FROM 5 VENTS	44 33.291	110 50.115	
YM190	19 SEP 66	RIVER	UNNAMED	SPRING		44 33.291	110 50.115	
YM191	19 SEP 66	RIVER	UNNAMED	SPRING		44 33.357	110 50.060	79.5

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
LOWER	GEYSER	BASIN																		
YF276		8.35							310.0	8.8	3.91		184.0	4.6		316.0				1490
YF319		9.42							346.0	13.3	2.78		128.0 2	75.0 2		310.0 2				
YF420			236.0																	
YF275									314.0				214.0			345.0				1530
YF351		8.31	242.0	1.00	0.18	0.01	1.1	0.02	317.0	9.2	4.50	0.1	241.0 2	4.2 2	27.0	331.0 2	33.0	4.00		1610
YF537	8.0	8.19	230.0				0.9	0.02	335.0	9.5	4.20	0.3	225.0		24.0	331.0	31.0	4.10	1.3	
YF317	7.6								314.0	14.7	2.24		219.0 2			310.0 2				
YF421			233.0																	
YF318	7.0	9.15							333.0	14.8	2.48		122.0 2	72.0 2		316.0 2				
YF320	4.5	4.22							332.0	13.2	1.98					206.0 2				
YF321		8.99							300.0	12.6	2.55		60.0	60.0		313.0 2				
YF350			263.0										328.0 2	19.5 2		262.0 2				
YF419	7.5		236.0																	
YF422			276.0																	
YM041	7.0						1.1	0.06	313.0		4.00		164.0 2		72.0	305.0	33.7	4.40		
YM175	7.0	8.50	255.0	0.26			1.4		332.0	15.3	2.67	0.5	184.0	8.6	44.7	330.0	27.9	4.56		
YM177		8.58	190.0	0.05		0.03	6.3	0.12	286.0	16.9	1.77	0.2	212.0	11.5	32.2	274.0	18.9	3.68		
M177A	7.7	8.50	190.0	0.10		0.03	6.8	0.12	287.0	16.9	1.87	0.1	232.0 2	8.6	35.3	271.0	18.6	3.50		
YM178	7.0	8.59							349.0	15.5	2.70		147.0 2	46.0		310.0 2				
YM179		8.59	285.0	0.36		0.01	1.1	0.01	346.0	17.8	2.46	0.3	212.0	12.7	45.4	317.0	25.6	4.50		
M179B		8.60		0.32	0.02		1.0	0.01	343.0	17.6	2.37	0.5	216.0	12.7	42.3	330.0	24.3	4.10		
YM183	7.5	9.07	220.0	0.44	0.01	0.01	1.1	0.02	340.0	11.9	2.24	0.2	213.0	42.0	37.0	293.0	23.2	3.90		
YM185	7.0	7.31							275.0	22.6	1.90		320.0 2			236.0 2				
YM188		8.72		0.46	0.01	0.01	0.9	0.01	328.0	14.3	2.40	0.1	211.0	19.0	32.0	326.0	26.8	4.40		
YM190	7.5	9.15							351.0	14.5	3.50		87.0 2	101.0 2		331.0 2				
YM190	7.5	9.66		0.16	0.01	0.01	0.7	0.01	362.0	15.3	3.70	0.2	67.0	122.0	40.0	320.0	30.0	4.30		
YM191	6.0	7.92		0.45	0.01	0.01	1.1	0.04	363.0	8.3	3.57	0.2	170.0		128.0	314.0	30.2	4.10		

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
LOWER GEYSER BASIN								
YM192	19 SEP 66	RIVER	UNNAMED	SPRING	W SIDE FIREHOLE BANK	44 33.381	110 49.976	92.5
M192B	19 SEP 66	RIVER	UNNAMED	SPRING		44 33.380	110 49.974	79.0
YM194	19 SEP 66	RIVER	UNNAMED	SPRING	LRG SPR AT SW END	44 33.115	110 49.991	86.0
YM194	19 SEP 66	RIVER	UNNAMED	SPRING		44 33.115	110 49.991	86.0
YM221	26 SEP 66	RIVER	UNNAMED	SPRING	HUGE SPRING	44 33.043	110 49.615	46.0
YM224	28 SEP 66	RIVER	UNNAMED	SPRING		44 32.592	110 49.633	28.5
M296C	19 OCT 66	RIVER	UNNAMED	SPRING		44 33.697	110 50.145	63.0
M296D	19 OCT 66	RIVER	UNNAMED	SPRING	S SIDE FIREHOLE ACR FRM 276	44 33.697	110 50.109	85.0
YM299	6 AUG 67	RIVER	UNNAMED	SPRING		44 33.703	110 49.964	87.5
YM300	6 AUG 67	RIVER	UNNAMED	SPRING	DEPOSITING BLACK PPT	44 33.670	110 49.945	89.0
M300C	6 AUG 67	RIVER	UNNAMED	SPRING	COMPLEX POOL FLOWING INTO ABV 2	44 33.686	110 49.942	85.0
YM301	6 AUG 67	RIVER	UNNAMED	SPRING	INTERMITTANT NOT DEPOSITING SIO2	44 33.686	110 49.943	84.7
M301A	6 AUG 67	RIVER	UNNAMED	SPRING	S OF FLVC. POOL SE SIDE OF POCKET BASIN	44 33.689	110 49.947	
YM502	16 SEP 68	RIVER	UNNAMED	SPRING	E BANK FIREHOLE N OF POCKET BASIN.	44 34.234	110 49.968	91.0
YM591	28 AUG 69	RIVER	UNNAMED	SPRING		44 33.540	110 49.879	
YM606	15 SEP 69	RIVER	UNNAMED	SPRING		44 33.792	110 49.883	56.0
YM607	15 SEP 69	RIVER	UNNAMED	SPRING		44 33.763	110 49.895	53.0
YM609	16 SEP 69	RIVER	UNNAMED	SPRING		44 33.796	110 50.014	74.0
YM611	16 SEP 69	RIVER	UNNAMED	SPRING		44 33.795	110 50.205	80.0
YM612	16 SEP 69	RIVER	UNNAMED	SPRING		44 33.766	110 50.100	55.0
YM614	16 SEP 69	RIVER	UNNAMED	SPRING		44 33.703	110 49.953	66.0
YM616	16 SEP 69	RIVER	UNNAMED	SPRING		44 33.703	110 49.947	80.0
YM619	17 SEP 69	RIVER	UNNAMED	SPRING		44 33.615	110 50.000	93.0
YM623	17 SEP 69	RIVER	UNNAMED	SPRING		44 33.624	110 49.927	60.0
M629A	17 SEP 69	RIVER	UNNAMED	SPRING		44 33.745	110 80.061	68.0
M629D	17 SEP 69	RIVER	UNNAMED	SPRING		44 33.742	110 50.113	77.0
YM630	17 SEP 69	RIVER	UNNAMED	SPRING		44 33.726	110 50.079	74.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
LOWER	GEYSER	BASIN																		
YM192	8.0	9.25							344.0	11.2	2.70		49.0 [2]	132.0 [2]		300.0 [2]				
M192B	7.0	7.91		0.18	0.01	0.01	1.1	0.02	306.0	6.8	2.83	0.2	245.0		44.0	260.0	24.8	3.60		
YM194	7.0	9.25							386.0	13.6	1.70		367.0 [2]	24.0 [2]		309.0 [2]				
YM194	7.0	9.82		0.36	0.01	0.10	0.5	0.01	396.0	14.1	2.20	0.2	362.0	43.0	27.0	294.0	27.3	3.80		
YM221	6.0								180.0	19.4	1.20		258.0 [2]			145.0 [2]				
YM224	6.0								152.0	13.4	1.10		181.0 [2]			120.0 [2]				
M296C	7.0	8.52		0.27	0.01	0.01	1.0	0.01	362.0	12.4	4.40	0.3	202.0	11.0	56.0	343.0	31.4	4.60		
M296D	7.0	8.59		0.37	0.01	0.01	1.1	0.01	346.0	11.5	4.36	0.2	208.0	12.3	44.3	333.0	30.0	4.50		
YM299	7.0								240.0	8.4			274.0			231.0				
YM300	6.5								225.0	12.8			103.0			214.0				
M300C	5.0								126.0	16.6			137.0			226.0				
YM301		9.18	250.0	0.82	0.19	0.01	1.3	0.05	325.0	15.2	2.85	0.4	85.0	48.0	60.0	323.0	28.8	4.40		
M301A	7.0								303.0	14.3					57.0	312.0				
YM502	7.5						1.1	0.04	327.0	11.1			283.0		25.0	306.0				
YM591	7.5	9.19	260.0	0.24	0.01	0.01	1.1	0.01	321.0	12.6	2.36	0.3	92.0	45.0	48.0	313.0	26.7	4.30		
YM606	7.0	8.80	215.0	0.32	0.01	0.01	1.1	0.01	337.0	9.3	4.09	0.2	155.0	22.0	51.0	334.0	30.8	4.44		
YM607	7.0	8.82	230.0	0.29	0.01	0.01	0.8	0.01	337.0	9.8	4.08	0.2	152.0	25.0	52.0	323.0	30.3	7.00		
YM609	7.0	8.56	230.0	0.29	0.01	0.01	1.0	0.02	332.0	10.9	4.03	0.3	181.0	9.8	56.0	320.0	29.8	4.40		
YM611	7.0	8.47	240.0	0.10	0.01	0.01	0.8	0.01	328.0	5.0	3.95	0.3	208.0	7.8	40.0	306.0	29.3	4.30		
YM612	7.5	9.23	210.0	0.22	0.01	0.02	1.0	0.01	328.0	7.5	4.05	0.2	106.0	56.0	48.7	314.0	29.0	4.30		
YM614	6.5	8.13	195.0	0.31	0.01	0.03	1.1	0.05	256.0	9.2	2.92	0.3	100.0		95.0	242.0	22.0	3.30		
YM616	7.0	8.39	175.0	0.14	0.01	0.01	1.2	0.05	299.0	11.2	3.64	0.2	161.0	4.0	64.0	285.0	25.8	3.90		
YM619	8.0	9.39	230.0	0.18	0.01	0.01	0.9	0.01	339.0	12.5	3.37	0.3	73.0	75.0	39.0	323.0	27.9	4.40		
YM623	4.0	3.28		3.30	1.40	0.32	6.2	3.36	77.5	38.1	0.74	0.8			193.0	53.0	2.5	0.80		
M629A	7.0	8.18		0.28	0.01	0.01	1.0	0.02	315.0	9.1	4.08	0.1	188.0		57.0	310.0	29.0	4.00		
M629D	7.0	8.10		0.28	0.01	0.01	0.9	0.01	325.0	7.3	4.21	0.3	212.0		47.0	310.0	30.0	4.30		
YM630	7.0	8.09		0.32	0.01	0.01	1.0	0.01	325.0	11.0	4.21	0.3	198.0		56.0	314.0	30.3	4.30		

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
LOWER GEYSER BASIN								
YM633	17 SEP 69	RIVER	UNNAMED	SPRING		44 33.582	110 49.955	88.0
YM634	19 SEP 69	RIVER	UNNAMED	SPRING		44 33.541	110 49.974	93.0
YM639	20 SEP 69	RIVER	UNNAMED	SPRING		44 33.553	110 49.946	75.0
YM640	21 SEP 69	RIVER	UNNAMED	SPRING		44 33.990	110 49.769	61.0
YF269	JUN 66	FAIRY	IMPERIAL	GEYSER		44 31.901	110 52.514	93.0
YF406	JUL 68	FAIRY	IMPERIAL	GEYSER		44 31.901	110 52.514	93.0
T6628	66	FAIRY	IMPERIAL	SPRING		44 31.901	110 52.514	90.0
YF271	JUN 66	FAIRY	LOCOMOTIVE	SPRING		44 33.230	110 51.509	94.0
YF407	JUL 68	FAIRY	LOCOMOTIVE	GEYSER		44 33.230	110 51.509	
YF268	JUN 66	FAIRY	SPRAY	GEYSER		44 31.898	110 52.349	92.0
YF405	JUL 68	FAIRY	SPRAY	GEYSER		44 31.898	110 52.349	93.0
YF267	JUN 66	FAIRY	UNNAMED	SPRING	BASE OF FAIRY FALLS	44 31.539	110 52.165	16.0
YF272	JUN 66	FAIRY	UNNAMED	SPRING	NORTH OF LOCOMOTIVE	44 33.247	110 51.528	93.0
YF273	JUN 66	FAIRY	UNNAMED	SPRING	EAST OF FAIRY GRP NR RD	44 32.462	110 51.307	92.0
YF341	SEP 66	FAIRY	UNNAMED	SPRING	E END OF LOWER FAIRY GRP			
YF553	10 SEP 72	FAIRY	UNNAMED	SPRING	END OF FAIRY MEADOW	44 33.082	110 50.944	87.0
YM 98		FAIRY	UNNAMED	GEYSER	GEYSER POOL AT SE CORNER LOWER FAIRY	44 32.658	110 53.390	89.5
YM102		FAIRY	UNNAMED	POOL	BUBBLING POOL AT SW EDGE LOWER FAIRY	44 33.026	110 52.028	93.2
YM106		FAIRY	UNNAMED	SPRING	NE EDGE OF LOWER FAIRY GRP	44 33.118	110 51.330	87.0
YM112		FAIRY	UNNAMED	SPRING	NW MOST SPG OF LOWER FAIRY GRP	44 33.039	110 51.357	83.5
YM158		FAIRY	UNNAMED	SPRING	0.6 MI NW OF TWIN BUTTE	44 33.020	110 51.005	26.5
YM162		FAIRY	UNNAMED	SPRING	WOODS W OF FAIRY MEADOW BTW 2 SPG GP	44 32.816	110 50.927	54.0
YF278	JUL 68	SENTINL	QUEEN'S LAUNDRY	SPRING		44 33.816	110 52.156	90.0
YF401	JUL 68	SENTINL	QUEEN'S LAUNDRY	SPRING		44 33.816	110 52.156	92.0
YF279	JUN 66	SENTINL	STEEP CONE	GEYSER		44 33.964	110 51.771	95.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	H	H2S	COND
YM633	7.5	9.00	250.0	0.25	0.01	0.01	1.3	0.01	328.0	14.1	2.50	0.5	127.0	32.0	40.0	321.0	28.0	4.40		
YM634		8.08		0.21	0.01	0.01	1.0	0.01	325.0	12.1	2.62	0.4	210.0		46.0	312.0	26.8	4.10		
YM639	7.0	7.80		0.36	0.01	0.01	1.0	0.01	325.0	9.6	2.80	0.2	209.0		48.0	307.0	24.7	4.20		
YM640	6.0	8.33		0.33	0.01	0.01	0.9	0.01	333.0	11.0	4.29	0.2	212.0	4.0	44.0	322.0	31.0	4.40		
LOWER	GEYSER		BASIN																	
YF269							1.0	0.01	290.0	12.4	2.40		298.0 [2]	41.0 [2]	31.0	222.0	24.0	2.90		1300
YF406			244.0																	
T6628	7.0								307.0	12.2	2.50		216.0 [2]	84.0 [2]		202.0 [2]				
YF271		8.70							251.0	4.2	1.46		258.0	17.0		198.0				1150
YF407			167.0																	
YF268		9.20							271.0	11.0	2.25		230.0	58.0		199.0				1250
YF405			226.0																	
YF267																1.6				40
YF272									344.0							275.0				1400
YF273									377.0							285.0				1620
YF341									21.3	25.2	0.04									
YF553	8.2	8.72	289.0				0.5	0.01	390.0	14.4	3.40	0.1	395.0		34.0	319.0	33.0	3.90		
YM 98							0.6	0.01	372.0	11.9	2.80		317.0	4.3	37.0	308.0	31.5	5.70		
YM102		8.45							364.0				378.0	9.6		319.0				
YM106									388.0							376.0				
YM112		7.68					3.1	0.07	297.0	12.2	1.40		362.0		22.0	222.0	26.3	2.90		
YM158									16.2	2.2	0.09		37.0 [2]			1.0 [2]	3.3	0.01		
YM162									124.0	9.7	0.06		161.0 [2]			79.3 [2]	13.7	1.30		
YF278									322.0	12.4	2.20		327.0 [2]	19.0		253.0 [2]	27.9	3.40		1380
YF401			348.0																	
YF279									303.0							276.0				1320

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
LOWER GEYSER BASIN								
YF400	JUL 68	SENTINL	STEEP CONE	GEYSER		44 33.964	110 51.771	95.0
YF281	JUN 66	SENTINL	UNNAMED	SPRING		44 33.875	110 51.812	87.0
YF282	JUN 66	SENTINL	UNNAMED	SPRING	E END OF SENTINEL GROUP	44 33.872	110 51.550	94.0
YF399	JUL 68	SENTINL	UNNAMED	SPRING	SMALL SPG GRP OF 4 CONNECTED POOLS	44 33.941	110 51.766	93.0
YM70		SENTINL	QUEEN'S LAUNDRY	SPRING		44 33.816	110 52.156	
YM87		SENTINL	UNNAMED	SPRING	WESTERNMOST LARGE SPG IN SENTINEL MDW	44 34.167	110 52.624	42.0
SECRET VALLEY HOT SPRINGS								
YM348			UNNAMED	SPRING	MN DEPOSITING SPG	44 40.276	110 47.169	0.0
T6728	67		UNNAMED	SPRING	MN DEPOSITING SPG	44 40.276	110 47.169	35.0
TERRACE HOT SPRINGS								
T6922	SEP 69		TERRACE	SPRING		44 33.930	110 51.783	66.0
YF528	MAY 72		UNNAMED	SPRING	ABV MAIN ORIFICE	44 33.930	110 51.780	65.0
YF529	MAY 72		TERRACE	SPRING	NR FOUNTAINING WATER	44 33.930	110 51.783	
YF545	9 SEP 72		TERRACE	SPRING	NR FOUNTAINING WATER	44 33.930	110 51.783	60.1
J7316	27 SEP 73		TERRACE	SPRING	NR FOUNTAINING WATER	44 33.930	110 51.783	59.0
GIBBON MEADOWS HOT SPRINGS								
YF426	29 SEP 68		SYLVAN SPRING	SPRING		44 42.030	110 46.387	93.0
YF460	9 SEP 69		SYLVAN SPRING	SPRING		44 42.030	110 46.387	
T7382	SEP 73		SYLVAN SPRING	SPRING		44 42.030	110 46.387	
YF372	15 OCT 67		UNNAMED	SPRING	NE GIBBON HILL NEUTRAL SPG	44 42.240	110 41.691	64.0
YF373	15 OCT 67		UNNAMED	SPRING	E OF GIBBON HILL	44 42.326	110 41.728	55.0
YF374	15 OCT 67		UNNAMED	SPRING	E OF GIBBON HILL SMALL ACID SPG	44 42.454	110 41.849	46.0
YF461	9 SEP 69		UNNAMED	SPRING	SW SIDE OF GIBBON HILL	44 41.711	110 46.724	67.5
YM21			UNNAMED	SPRING	JUST NW OF GIBBON HILL	44 42.686	110 42.793	89.0
YM152			UNNAMED	SPRING	NE OF GIBBON HILL	44 42.507	110 40.691	66.5
J7313	25 SEP 73		UNNAMED	SPRING	0.9 MI N OF BERYL	44 41.395	110 44.737	52.0
J7314	25 SEP 73		UNNAMED	SPRING	1.3 MI N OF GIBBON FALLS	44 40.122	110 44.562	31.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	H	H2S	CONO
LOWER GEYSER BASIN																				
YF400			358.0													219.0				1000
YF281									203.0											
YF282									309.0	9.9	1.70			113.0[2]		300.0	31.9	3.80		1380
YF399									313.0	9.1					26.5	257.0				
YM70			336.0						345.0				375.0			236.0				
YM87									54.0							37.0				
SECRET VALLEY HOT SPRINGS																				
YM348													187.0			2.0				
T6728	6.0								42.0	7.7			71.0		4.0					
TERRACE HOT SPRINGS																				
T6922	6.3	8.79	148.0	0.18	0.15	0.12	6.7	0.82	324.0	36.6	0.62		696.0	50.0	10.7	69.0	6.7	1.14		
YF528		8.37	160.0	0.03	0.05	0.09	25.0	0.89	325.0	37.0	0.70	0.1	857.0		15.0	70.0	5.7	1.10		1400
YF529		8.10	160.0	0.09	0.05	0.12	22.0	0.87	300.0	32.0	0.70	0.1	783.0		15.0	65.0	6.1	1.10		1310
YF545		8.60	146.0				22.0	0.87	315.0	34.5	0.60	0.1[1]	645.0	54.0	16.0	64.0	6.9	1.00		
J7316	6.7	7.33	153.0				21.8	0.90	305.0	32.5	0.75	0.1[1]	778.0		13.0	65.0	6.8	1.30		
GIBBON MEADOWS HOT SPRINGS																				
YF426		7.10	675.0		0.10		3.6	0.01	383.0	65.0	5.70	1.0	41.0		178.0	484.0	17.0	8.50		2160
YF460		7.95		1.25			3.7	0.02	395.0	56.8	5.90		63.0		148.0	559.0	20.8			
T7382		5.66	626.0				4.3	0.01	410.0	44.0	4.80		44.0		192.0	531.0	17.6	1.90		
YF372		8.40	210.0						72.0	22.0	0.25		136.0	3.8	49.0	7.8				
YF373	5.5	8.40	195.0						64.0	20.0	0.25		147.0		25.0	11.0				
YF374	3.5		200.0		4.00				12.0	18.0	0.30				23.0	3.0				
YF461	6.5	8.58	162.0	0.22	0.01	0.04	12.0	2.32	62.6	14.5	0.12	0.3	190.0	9.9	4.0	1.6	7.0	0.03		
YM21									269.0	39.0	1.60		427.0[2]	19.0		88.0	15.3	1.70		
YM152		5.66	626.0						71.0	22.0	0.25		144.0[2]		60.0	5.1[2]	9.2	0.15		
J7313	6.5	6.30	154.0				15.2	1.20	60.0	10.5	0.20	0.1[1]	172.0		7.0	7.0	8.0	0.10	0.2	1,2
J7314	6.2	5.99	131.0				14.6	1.00	24.0	5.0	0.10	0.1[1]	107.0		2.0	0.8	8.4	0.10	0.2	1,2

NUMBER	DATE	GROUP	N F	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
GIBBON MEADOWS HOT SPRINGS								
J7315	25 SEP 73		UNNAMED	SPRING	2.5 MI N OF GIBBON FALLS	44 3.973	110 4.518	32.0
YF571	14 SEP 72		UNNAMED	SPRING	COLD SPG AT SYLVAN AREA			5.0
NORRIS GEYSER BASIN								
YF175	25 MAY 66		CISTERN	SPRING		44 43.998	110 42.160	92.0
YF361	19 JUL 67		CISTERN	SPRING		44 43.998	110 42.160	93.0
YF497	3 JUN 71		CISTERN	GEYSER		44 42.938	110 42.041	
YF558	11 SEP 73		CISTERN	SPRING		44 43.998	110 42.160	95.0
YF572	AUG 72		EBONY	GEYSER		44 43.388	110 42.263	
YF379	18 OCT 67		ECHINUS	GEYSER		44 42.938	110 42.041	
YF496	31 MAY 70		ECHINUS	GEYSER		44 42.938	110 42.041	
YF378	18 OCT 67		GREEN DRAGON	SPRING		44 42.819	110 42.335	92.0
YF518	27 SEP 71		GREEN DRAGON	SPRING		44 42.819	110 42.335	
YF505	7 JUN 71		HARDING	GEYSER		44 42.528	110 42.099	93.0
YF402	6 JUL 68		LEDGE	GEYSER		44 43.565	110 42.271	93.0
YF376	18 OCT 67		LITTLEWHIRLIGIG	GEYSER		44 42.651	110 42.138	93.0
YF555	11 SEP 72		LITTLEWHIRLIGIG	GEYSER		44 42.651	110 42.138	92.0
YF185	25 MAY 66		PEARL	GEYSER		44 42.958	110 42.361	84.0
YF377	18 OCT 67		PERPETUAL SPOUT	GEYSER		44 43.213	110 42.465	92.5
YF499	3 JUN 71		PERPETUAL SPOUT	GEYSER		44 43.213	110 42.465	
YF556	11 SEP 72		PERPETUAL SPOUT	GEYSER		44 43.213	110 42.465	92.0
YF186	25 MAY 66		PORK CHOP	SPRING		44 43.949	110 42.408	67.0
YF498	3 JUN 71		PORK CHOP	SPRING		44 42.949	110 42.408	94.5
YF557	11 SEP 72		PORK CHOP	SPRING		44 42.949	110 42.408	91.0
YF375	18 OCT 67		PRIMROSE	SPRING		44 43.342	110 42.034	93.0
YF428	3 JUN 68		STEAMBOAT	GEYSER		44 43.398	110 42.138	
YF383	21 OCT 67		VERMILION	SPRING		44 43.665	110 42.004	80.0
YF360	19 JUL 67		UNNAMED	SPRING	BASE OF PORCLAN TERRACE	44 43.344	110 41.958	94.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
GIBBON MEADOWS HOT SPRINGS																				
J7315	6.2	6.23	138.0				10.5	1.10	73.0	11.0	0.40	0.1[1]	197.0		2.0	8.2	6.3	0.20	0.2[1,2]	
YF571	7.7	7.80	26.0				9.4	16.00	3.0	1.0	0.02	0.1[1]	39.0		2.0	0.2	1.8	0.10		
NORRIS GEYSER BASIN																				
YF175		6.98							300.0	56.0	3.76		39.0			455.0				1700
YF361		7.11	490.0[2]	0.11	0.01	0.05	2.4	0.07	316.0	62.0	4.30	0.6	35.0		82.0	476.0	5.4	7.20		1910
YF497							4.3	0.56	149.0	51.8	1.02				283.0	112.0	4.5			
YF558	7.4	7.30	487.0		0.05		2.6	0.03	310.0	65.0	3.60	0.9[2]	60.0		102.0	464.0	5.4	7.80	1.2[2]	
YF572		7.10	470.0	0.17	0.25	0.04	3.4	0.12	402.0	65.9	5.90	0.5	14.2		42.0	650.0	5.6	9.60		
YF379			265.0[2]	0.60	3.20				153.0	56.0	0.86				370.0	106.0				
YF496			271.0																	
YF378			447.0[2]	1.50	0.40				273.0	62.0	4.00				102.0	447.0				
YF518			334.0				5.6	1.40	145.0	61.0	2.30				190.0	216.0	4.2	4.40		
YF505		3.53	325.0				0.9	0.25	264.0	18.0	0.09				123.0	2.0				
YF402		7.45	582.0				0.4	0.39	402.0	84.8	8.00		27.7		52.0	680.0				
YF376			447.0[2]	1.50	0.40				348.0	79.0	5.30				83.0	609.0				
YF555	3.1	3.30	561.0		1.30		2.0	0.10	345.0	88.0	4.60	6.0[2]			81.0	582.0	4.4	8.80	0.9[2]	
YF185		6.76							430.0							740.0				2400
YF377	7.4		273.0						368.0	47.0	5.10		23.6		72.0	578.0				
YF499							6.6	0.06	369.0	43.2	5.26				73.0	593.0	6.7			
YF556	8.3	8.40	288.0		0.10		6.1	0.06	375.0	45.0	5.00	0.5[2]	30.0		70.7	558.0	6.2	9.00	1.4[2]	
YF186		7.29							449.0							751.0				2300
YF498	6.0						7.3	0.05	452.0	60.6	6.55				27.8	782.0	6.8			
YF557	7.6	7.96	510.0		0.05		7.0	0.07	470.0	61.0	6.30	0.5[2]	30.0		24.6	780.0	7.3	11.40	0.7[2]	
YF375			431.0	0.70	1.00				306.0	75.0	4.60				71.0	532.0				
YF428							5.0	0.83	257.0	53.5	3.31	0.3			158.0	376.0	0.5	4.10		
YF383			268.0		4.50				42.0	35.0	0.12				443.0	12.0				
YF360		7.89	600.0[2]	0.17	0.09	0.02	2.7	0.02	409.0	00.0	6.80	0.2	34.0		40.0	706.0	5.9	10.00		2420

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
NORRIS GEYSER BASIN								
YF380	18 OCT 67		UNNAMED	SPRING	BASE OF PORCLAN TERRACE	44 43.344	110 41.958	
YF507	26 SEP 71		UNNAMED	SPRING	BASE OF PORCLAN TERRACE	44 43.344	110 41.958	93.2
YF554	11 SEP 72		UNNAMED	SPRING	BASE OF PORCLAN TERRACE	44 43.344	110 41.958	92.0
YF382	22 OCT 67		UNNAMED	SPRING	SPG 40' NW OF FENNER HOLE	44 43.622	110 42.210	63.0
YF397	22 OCT 67		UNNAMED	SPRING	AT FENNER DRILL PLUG	44 43.277	110 41.948	92.0
YF503	JUN 71		UNNAMED	GEYSER	NR BEND IN ROAD	44 43.242	110 42.313	92.0
YF504	JUN 71		UNNAMED	SPRING	NR BATHTUB N17W	44 43.205	110 42.171	92.0
YF512	27 SEP 71		UNNAMED	SPRING		44 43.270	110 42.842	54.0
YF513	27 SEP 71		UNNAMED	SPRING		44 43.264	110 42.854	54.0
YF514	27 SEP 71		UNNAMED	SPRING		44 43.774	110 42.304	50.0
YF515	27 SEP 71		UNNAMED	SPRING		44 43.744	110 42.343	93.0
YF516	27 SEP 71		UNNAMED	SPRING		44 43.331	110 41.765	83.0
YF517	27 SEP 71		UNNAMED	SPRING		44 43.321	110 41.765	
YF365	19 JUL 67		UNNAMED	SPRING		44 43.622	110 42.210	20.0
FRYING PAN HOT SPRINGS AREA								
J7312	25 SEP 73		UNNAMED	SPRING	200YD N OF FRYING PAN	44 45.007	110 46.410	61.5
MAMMOTH HOT SPRINGS								
YF570	13 SEP 72		ELEPHANT BACK	SPRING	WEST OF RD AT ELEPHANT BACK	44 57.743	110 42.780	65.0
J7303	21 SEP 73		ELEPHANT BACK	SPRING	ON SW SIDE OF ROAD IN FLOWING WATER	44 57.743	110 42.780	65.0
YF567	13 SEP 72		NEW BLUE	SPRING	NR OLD TERRACE BOARDWALK	44 58.138	110 42.362	70.0
J7301	21 SEP 73		NEW BLUE	SPRING	NR OLD BOARDWALK	44 58.138	110 42.362	78.0
YF569	13 SEP 72		NEW HIGHLAND	SPRING	AT TOP, IN NEW ACTIVITY AREA	44 58.046	110 42.647	75.0
J7302	21 SEP 73		NEW HIGHLAND	SPRING	IN AREA OF ACTIVITY AT TOP	44 58.046	110 42.647	73.5
YF568	13 SEP 72		SQUIRREL	SPRING	SMALL SPG IN SQUIRREL GROUP	44 57.812	110 42.881	75.0
PELICAN VALLEY HOT SPRINGS								
YF432	16 JUN 69		RAVEN CR	SPRING	AT BRGE ON PELICAN SPG CABIN TRAIL	44 36.086	110 12.608	6.0
YF433	16 JUN 69		UNNAMED	SPRING	AREA OF BIG POOL WITH GAS BUBBLES	44 35.991	110 12.177	35.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
NORRIS GEYSER BASIN																				
YF380			593.0		0.20				400.0	96.0	6.80				24.0	703.0				
YF507		8.40	740.0	0.09	0.05	0.02	2.2	0.02	400.0	04.0	6.80	0.5	46.0		34.0	713.0	8.0	11.00		2450
YF554	8.0	8.10	678.0	0.06	0.05[1]		2.7	0.05	420.0	91.0	7.00	2.0[2]	52.0		25.0	709.0	6.6	10.40	1.9[2]	
YF382			208.0	0.10	4.70				63.0	22.0	0.70				337.0	88.0				
YF397	5.0	4.60	391.0				4.9	0.14	440.0	42.5	7.90		1.0		35.0	720.0	6.0			
YF503							3.8	0.02	425.0	34.4	4.82				30.0	703.0				
YF504	6.0						1.6	0.14	327.0	34.8	4.21				34.0	544.0				
YF512		3.30	310.0				3.5	0,14	290.0	37.0	3.70	0.7			92.0	468.0	4.2	7.30		1900
YF513		3.29					3.9	0.13	290.0	37.0	3.90	0.7			94.0	465.0	4.2	7.00		1900
YF514		2.75	280.0				4.5	0.15	250.0	57.0	3.50	1.4			197.0	427.0	3.4	6.60		2250
YF515		3.20					4.3	0.32	305.0	57.0	3.80	1.9			123.0	505.0	4.8	7.80		2100
YF516		8.01	340.0	0.12	0.05	0.02	1.8	0.01[1]	290.0	37.0	3.50	2.1	68.0		39.0	444.0	5.3	9.10		1680
YF517		2.40	340.0				1.1	0.05	220.0	37.0	2.30	3.3			328.0	326.0	3.0	6.40		2800
YF365									111.0	45.6	0.70					75.0	4.5	2.00		
FRYING PAN HOT SPRINGS AREA																				
J7312	2.8	2.12	254.0				6.8	2.40	71.0	29.0	0.20	2.0			335.0	39.0	1.0	0.80	1.2[2]	
MAMMOTH HOT SPRINGS																				
YF570	7.5	7.98			0.20	1.00	416.0	80.00	125.0	57.0	1.20	0.4[2]	875.0		671.0	154.0	2.8	3.50	0.9[2]	
J7303	7.2	7.29	59.0			0.20	378.0	83.00	125.0	53.0	1.50		880.0		681.0	157.0	2.6	3.60	0.5[2]	
YF567		7.30			0.05		394.0	47.00	130.0	57.0	1.70		900.0		592.0	162.0	0.6	3.80	3.1[2]	
J7301			57.8			0.05	330.0	83.00	140.0	56.0	1.60		800.0		601.0	168.0	2.3	3.90	0.5[2]	
YF569	7.4	7.78			0.05		344.0	46.00	135.0	58.0	1.30	0.6[2]	795.0		590.0	171.0	2.5	3.90	3.2[2]	
J7302		7.27	53.8			0.05	345.0	76.00	130.0	55.0	1.60		864.0		568.0	166.0	2.5	3.70	5.8[2]	
YF568	6.9	7.70			0.08		360.0	45.00	115.0	43.0	1.20	0.6[2]	775.0		614.0	143.0	3.1	3.30	2.7[2]	
PELICAN VALLEY HOT SPRINGS																				
YF432		9.13					13.3	4.77	6.7	2.0			50.4		10.0	0.1	0.1			
YF433	6.0	8.50	170.0						140.0	29.6	0.38		372.0		72.0	89.0		4.70		

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
PELICAN VALLEY HOT SPRINGS								
YF434	16 JUN 69		UNNAMED	SPRING	AT N SIDE OF VALLEY E OF SERV RD	44 35.818	110 13.158	69.0
YF435	17 JUN 69		UPPER PELICAN	SPRING	W SIDE OF CR NR OLD WHITE GEY SINTER	44 37.913	110 13.804	59.0
YF436	17 JUN 69		UNNAMED	SPRING	N OF MAIN PELICAN VALLEY	44 36.741	110 13.433	
YF437	17 JUN 69		UNNAMED	SPRING	1ST STM W OF ASTRIGENT NR WOODS	44 35.120	110 16.158	
VERIMILION HOT SPRINGS AREA								
F437B	18 JUN 69		UNNAMED	SPRING	ACID SPG FROM TUFF	44 35.051	110 18.899	51.5
YF438	18 JUN 69		UNNAMED	SPRING	BIGGEST FLOWING SPG	44 35.034	110 18.779	50.0
YF439	18 JUN 69		ASTRIGENT CR	SPRING	FEW HUNDRED YDS BEFORE ENTER PELICAN	44 35.681	110 14.821	
YF440	19 JUN 69		UNNAMED	SPRING	PONUNTRA SPG GRP 3' HIGH MOUND IN NW ARE	44 40.362	110 17.930	67.0
RAINBOW HOT SPRINGS								
YF441	21 JUN 69		UNNAMED	SPRING	SMALL SEEP IN BOG, OIL SLICK ON SURFACE	44 46.136	110 16.223	40.0
YF442	21 JUN 69		UNNAMED	SPRING	BIGGEST FLOWING SPG 60'E MAIN SIO2 DOME	44 46.093	110 16.127	84.0
YF443	21 JUN 69		UNNAMED	SPRING	WESTERN MOST STEEP MOUND N SIDE RIVER	44 46.110	110 16.163	92.0
YF444	21 JUN 69		UNNAMED	SPRING	S SIDE RIVER IN MIDDLE OF ACTIVE AREA	44 45.998	110 15.935	80.0
HOT SPRINGS BASIN								
YF445	22 JUN 69		UNNAMED	SPRING	150' N OF BUF XING, W SIDE ALTERED AREA	44 44.591	110 14.556	92.0
YF446	22 JUN 69		UNNAMED	SPRING	1/2 WAY ALONG ALTERED VALLEY S ABUNDANT	44 44.677	110 15.360	76.0
YF447	22 JUN 69		UNNAMED	SPRING	SMALL STM COMING FROM 2" HOLE 1/2 NS VAL	44 44.824	110 15.396	74.0
YF448	22 JUN 69		UNNAMED	SPRING	PERP SPOUTER N END SULFUR VALLEY	44 44.910	110 15.408	89.0
YF449	23 JUN 69		UNNAMED	SPRING	STM FLOW S INTO BIG STM FLO W INTO BROAD	44 41.873	110 15.504	
JOSEPH COATS HOT SPRINGS								
YF450	26 JUN 69		UNNAMED	SPRING	N SIDE DEPOSIT SULFUR & SILICA VIGOR. BO	44 44.350	110 19.796	85.0
YF451	26 JUN 69		UNNAMED	SPRING	SMALL STM FROM ALTERED SED 20' FROM FUMA	44 44.306	110 19.616	86.0
YF452	26 JUN 69		UNNAMED	SPRING	SMALL SPOUTER UP CR S BROAD CR	44 44.237	110 19.484	93.0
WASHBURN HOT SPRINGS								
YF429	22 JUN 68	LOWER	UNNAMED	SPRING	50' N OF INKPOT LARGE DISC.	44 45.886	110 25.768	86.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
PELICAN VALLEY HOT SPRINGS																				
YF434		8.56	284.0						295.0	52.0	1.02		780.0		15.0	189.0		6.70		
YF435	6.5	8.22	137.0						73.8	20.8	0.11		319.0		16.0	25.0		0.78		
YF436		8.28					19.7	4.88	12.4	3.8			51.0		26.0	9.5	0.1			
YF437		4.35					6.0	0.99	14.3	5.8					30.0	0.2	0.1			
VERIMILION HOT SPRINGS AREA																				
F437B	3.0	2.72	172.0				6.0	1.04	15.4	13.4	0.25	2.3			381.0	17.0	0.2	1.54		
YF438	3.0	2.66	167.0				5.7	1.14	15.9	13.6	0.25	2.0			357.0	14.0	0.2	1.72		
YF439	4.0	3.18					38.2	8.05	56.2	15.2					168.0	52.7	0.4			
YF440	7.0	8.61	247.0				33.8	9.63	430.0	38.5	0.35	0.2	774.0		43.5	244.0	4.5	8.25		
RAINBOW HOT SPRINGS																				
YF441	6.0	8.68	150.0				59.2	21.70	153.0	31.7	0.31	0.1	326.0		2.0	166.0	1.7	14.60		
YF442	7.5	8.34	362.0						321.0	57.2	0.53		493.0		123.0	247.0		25.10		
YF443	7.5	8.38	356.0				64.5	16.20	354.0	58.8	0.55	11.0	550.0		66.0	304.0	2.3	31.50		
YF444	3.0	2.47	318.0				18.2	1.73	107.0	72.8	0.70	26.2			562.0	51.0	0.9	6.08		
HOT SPRINGS BASIN																				
YF445	3.0	2.64	333.0				2.3	0.41	11.5	14.5	0.01	37.4			253.0	0.1	0.2	0.05		
YF446	1.5	1.78	143.0				1.6	0.24	3.3	11.0	0.01	66.6			1850.0	0.1	0.0	3.00		
YF447	1.0	1.83	178.0				1.5	0.25	3.3	9.4	0.02	62.8			1760.0	0.1	0.0	3.60		
YF448	3.0	2.66	317.0				37.1	3.75	187.0	16.0	0.04	171.0			1530.0	0.1	0.8	5.05		
YF449		7.82					5.6	0.45	3.0	1.1			7.5		3.0	0.2	0.1			
JOSEPH COATS HOT SPRINGS																				
YF450	2.0	2.22	65.0				1.6	0.05	2.1	2.6	0.03	199.0			1410.0	0.1	0.0	0.60		
YF451	1.5	1.82	333.0				4.1	0.39	7.0	17.1	0.01	57.3			1830.0	0.1	0.0	0.07		
YF452	8.0	8.38	238.0				3.4	0.01	109.0	19.2	0.18	22.4	335.0		24.0	5.4	3.7	0.36		
WASHBURN HOT SPRINGS																				
YF429							17.2	9.30	27.1	13.7	0.01	658.0	8.2		1950.0	2.1	0.5	7.84		

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
WASHBURN HOT SPRINGS								
YF430	22 JUN 68		UNNAMED	SPRING		44 46.006	110 25.756	
YF467	14 SEP 69		UNNAMED	SPRING	MIDDLE ACTIVE AREA SML CAVERN ABV H2O BL	44 45.972	110 25.732	
J7304	22 SEP 73	UPPER	UNNAMED	SPRING	NR BASE 100' FROM TREES, CLEAR J20	44 45.972	110 25.732	91.0
J7305	22 SEP 73	LOWER	UNNAMED	SPRING	40' W OF INKPOT, 60' W OF TRAIL NO DISC	44 45.860	110 25.804	89.0
YELLOWSTONE CANYON HOT SPRINGS								
YF427	29 SEP 68		7 MI HOLE	SPRING		44 45.118	110 24.437	92.0
YF468	14 SEP 69		7 MI HOLE	SPRING		44 45.118	110 24.437	65.0
YF469	14 SEP 69		UNNAMED	SPRING	ON TRAIL ALONG N85W TREND DEPOSITING SIO	44 45.074	110 25.060	92.0
YF470	14 SEP 69		UNNAMED	SPRING	1ST SPG ON TRAIL TO 7 MI HOLE	44 45.143	110 25.324	83.0
SULFUR CAULDRON HOT SPRINGS								
YM384	26 MAY 68		UNNAMED	SPRING	E SIDE R ACROSS FROM MUD VOLCANO	44 37.536	110 25.751	23.0
YM385	26 MAY 68		UNNAMED	SPRING	S OF 384	44 37.497	110 25.608	88.0
YM386	26 MAY 68		UNNAMED	SPRING	SE OF 385	44 37.447	110 25.668	49.0
YM388	26 MAY 68		UNNAMED	SPRING	SSW OF 386	44 37.500	110 25.747	58.0
YM389	26 MAY 68		UNNAMED	SPRING	NE OF 388	44 37.503	110 25.770	22.0
FIREHOLE RIVER SAMPLES								
YF256	JUN 66				STM CROSSING LONE STAR ROAD	44 26.623	110 48.220	6.5
FR380	AUG 67				STM CROSSING LONE STAR ROAD	44 26.623	110 48.220	
YF199	27 MAY 66		FIREHOLE	RIVER	ABV UPPER BASIN	44 26.316	110 48.197	13.0
YT15	28 SEP 66		FIREHOLE	RIVER	ABV UPPER BASIN	44 26.316	110 48.197	8.3
	OCT 66		FIREHOLE	RIVER	ABV UPPER BASIN	44 26.316	110 48.197	
YF372	5 MAY 67		FIREHOLE	RIVER	ABV UPPER BASIN	44 26.316	110 48.197	
YF192	27 MAY 66		FIREHOLE	RIVER	ABV MIDWAY BASIN	44 30.266	110 50.064	11.0
YF293	24 JUN 66		FIREHOLE	RIVER	ABV MIDWAY BASIN	44 30.266	110 50.064	15.0
YT16	28 SEP 66		FIREHOLE	RIVER	ABV MIDWAY BASIN	44 30.266	110 50.064	

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
WASHBURN HOT SPRINGS																				
YF430									28.6	15.5					2400.0	0.6				
YF467	5.0	4.48	243.0	3.30	6.40	0.10	13.6	4.33	14.8	7.3	0.02	424.0			1260.0	0.1	0.1	6.40		
J7304	8.1	8.00	247.0	0.20	0.10		2.0	4.10	9.7	6.5	0.10[1]	270.0	107.0		900.0	7.0	0.1	6.60	4.5	2290
J7305	7.9	7.69	237.0	0.38	0.20		2.5	0.50	30.0	9.0	0.10[1]	210.0	140.0		712.0	2.2	1.8	0.50	7.8	1960
YELLOWSTONE CANYON HOT SPRINGS																				
YF427			523.0				0.5	0.01	353.0	53.8	3.36	1.3	229.0		124.0	406.0	12.8	13.00		
YF468	3.5	2.48	209.0	7.80	5.80	0.20	20.7	6.70	83.6	41.3	0.65	12.4			524.0	46.0	1.4	3.39		
YF469	7.0	8.88	508.0	0.43	0.04	0.02	0.6	0.01	347.0	52.4	3.32	1.2	110.0	45.0	128.0	376.0	12.4	16.80		
YF470	6.5	8.45	472.0	0.20	0.01	0.20	0.4	0.02	309.0	45.0	3.04	2.0	170.0	12.0	266.0	313.0	9.5	13.70		
SULFUR CAULDRON HOT SPRINGS																				
YM384	1.5								4.3	2.8	0.01				1200.0	2.5				5500
YM385	2.0								25.4	33.8	0.01				2700.0	2.1				5500
YM386	6.5	8.08					77.5	21.90	123.0	36.6	0.16		103.0		452.0	4.0				700
YM388	7.0						78.7	16.40	74.3	47.5	0.20	0.2	344.0		65.0	13.0	2.0	0.20		720
YM389	4.5						6.0	3.16	12.0	3.5	0.05		12.0		36.0	6.0				270
FIREHOLE RIVER SAMPLES																				
YF256			20.4				4.0	0.53	2.3	1.7			11.0		2.0	1.5				5
FR380							2.8	0.69	4.5	1.9			17.0		0.5	1.6				
YF199			34.9										29.3			4.5				6
YT15			44.6				4.0	0.39	13.7	3.5			21.0		2.0	11.2[2]				
			49.3										20.1			12.4				
YF372							2.9	0.49	9.5	2.5			15.0		5.0	9.9				
YF192			45.6						16.2				44.5			16.2				12
YF293			55.3				3.4	0.43	38.5	4.3			56.0		4.0	25.0[2]				
YT16			76.8				4.0	0.44	54.0	10.2			79.0		5.0	38.0[2]				

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
FIREHOLE RIVER SAMPLES								
W1	26 OCT 66		FIREHOLE	RIVER	ABV MIDWAY BASIN	44 30.266	110 50.064	
YF373	14 MAY 67		FIREHOLE	RIVER	ABV MIDWAY BASIN	44 30.266	110 50.064	14.0
YF381	23 JUL 67		FIREHOLE	RIVER	ABV MIDWAY BASIN	44 30.266	110 50.064	
YF475	28 JAN 70		FIREHOLE	RIVER	ABV MIDWAY BASIN	44 30.266	110 50.064	
YF193	27 MAY 66		FIREHOLE	RIVER	BLW LOWER BASIN	44 34.940	110 49.832	16.0
YF258	11 JUN 66		FIREHOLE	RIVER	BLW LOWER BASIN	44 34.940	110 49.832	15.0
YF259	11 JUN 66		FIREHOLE	RIVER	BLW LOWER BASIN ABV CASCADES	44 34.940	110 49.832	14.0
YF294	24 JUN 66		FIREHOLE	RIVER	BLW LOWER BASIN	44 34.940	110 49.832	17.0
YT17	27 SEP 66		FIREHOLE	RIVER	BLW LOWER BASIN	44 34.940	110 49.832	18.0
W2	26 OCT 66		FIREHOLE	RIVER	BLW LOWER BASIN	44 34.940	110 49.832	
YF374	14 MAY 67		FIREHOLE	RIVER	BLW LOWER BASIN	44 34.940	110 49.832	
YF382	23 JUL 67		FIREHOLE	RIVER	BLW LOWER BASIN	44 34.940	110 49.832	
YF394	6 MAY 68		FIREHOLE	RIVER	BLW LOWER BASIN	44 34.940	110 49.832	
YF197	27 MAY 66		FIREHOLE	RIVER	BLW LOWER BASIN BLW FALLS	44 37.906	110 51.820	18.5
YF260	11 JUN 66		FIREHOLE	RIVER	BLW LOWER BASIN BLW FALLS	44 37.906	110 51.820	14.0
YF295	24 JUN 66		FIREHOLE	RIVER	BLW LOWER BASIN BLW FALLS	44 37.906	110 51.820	17.5
T6618	28 SEP 66		FIREHOLE	RIVER	BLW LOWER BASIN BLW FALLS	44 37.906	110 51.820	17.7
GIBBON RIVER SAMPLES								
YF176	24 MAY 66		GIBBON	RIVER	BLW BERYL SPRING	44 3.973	110 4.518	11.0
YF194	27 MAY 66		GIBBON	RIVER	BLW BERYL SPRING	44 3.973	110 4.518	16.0
YF296	24 JUN 66		GIBBON	RIVER	BLW BERYL SPRING	44 3.973	110 4.518	14.0
T6619	27 SEP 66		GIBBON	RIVER	BLW BERYL SPRING	44 3.973	110 4.518	15.5
W4	26 OCT 66		GIBBON	RIVER	BLW BERYL SPRING	44 3.973	110 4.518	
YF376	14 MAY 67		GIBBON	RIVER	BLW BERYL SPRING	44 3.973	110 4.518	12.0
YF384	24 MAY 67		GIBBON	RIVER	BLW BERYL SPRING	44 3.973	110 4.518	21.0

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
FIREHOLE RIVER SAMPLES																				
W1	8.39		80.9				4.4	0.44	58.1	5.8			80.0	3.0	6.0	38.0				
YF373	8.01						4.8	0.48	60.0	5.6			87.0		8.0	41.0				
YF381	7.99						4.1	0.43	47.3	4.5			72.0		4.0	37.0				26
YF475							9.8	0.37	50.3	5.6			85.0			40.0				
YF193			57.3						34.0				66.0			33.0				29
YF258									52.0							36.0				30
YF259	7.91						0.8	0.44	53.0	4.8			74.0		7.0	39.0				29
YF294			81.1				5.3	0.59	75.0	6.2			94.0		16.0	52.0 [2]				
YT17			105.0				6.0	0.58	90.9	7.9			110.0		16.0	66.0 [2]				
W2			107.0				5.3	0.48	99.0	7.9			125.0		14.0	68.0				
YF374	8.22						5.4	0.57	98.2	7.8			133.0	1.0	18.0	76.0				
YF382	8.12						5.0	0.46	82.6	6.9			115.0		12.0	57.0				46
YF394	8.00						5.6	0.68	63.0	6.3			86.0		16.2	49.0				
YF197			56.8													36.0				29
YF260									52.0							36.0				29
YF295			78.4													52.0 [2]				
T6618			100.0													69.0 [2]				
GIBBON RIVER SAMPLES																				
YF176	7.83								22.8	6.5						24.0				
YF194			43.7													24.0				21
YF296	7.87		61.2				7.4	1.45	50.5	8.0			61.0		32.0	43.0 [2]				
T6619	8.03		79.7				7.8	1.48	69.6	12.0			73.0		38.0	63.0				
W4	8.03		88.2				8.1	1.52	76.8	13.9			78.0		40.0	67.0				
YF376	7.88						7.8	1.48	66.4	11.2			61.0		55.0	62.0				
YF384	7.87						7.1	1.38	36.1	6.1			51.3		23.0	33.0				26

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
GIBBON RIVER SAMPLES								
YF395	6 MAY 68		GIBBON	RIVER	BLW BERYL SPRING	44 3.973	110 4.518	
YF191	27 MAY 66		GIBBON	RIVER	AT ELK PARK	44 42.493	110 44.645	18.0
YF297	24 JUN 66		GIBBON	RIVER	AT ELK PARK	44 42.493	110 44.645	15.0
YT20	28 SEP 66		GIBBON	RIVER	AT ELK PARK	44 42.493	110 44.645	
W5	26 OCT 66		GIBBON	RIVER	AT ELK PARK	44 42.493	110 44.645	
YF377	14 MAY 67		GIBBON	RIVER	AT ELK PARK	44 42.493	110 44.645	
YF385	24 JUL 67		GIBBON	RIVER	AT ELK PARK	44 42.493	110 44.645	20.5
YF195	27 MAY 66		GIBBON	RIVER	ABV NORRIS	44 44.393	110 41.820	13.0
YF298	24 JUN 66		GIBBON	RIVER	ABV NORRIS	44 44.393	110 41.820	14.5
YT21	24 SEP 66		GIBBON	RIVER	ABV NORRIS	44 44.393	110 41.820	14.3
W	26 OCT 66		GIBBON	RIVER	ABV NORRIS	44 44.393	110 41.820	
YF378	14 MAY 67		GIBBON	RIVER	ABV NORRIS	44 44.393	110 41.820	
YF386	24 JUL 67		GIBBON	RIVER	ABV NORRIS	44 44.393	110 41.820	19.0
MADISON RIVER SAMPLES								
YF196	27 MAY 66		MADISON	RIVER	AT MADISON JUNCTION	44 38.526	110 52.471	17.0
YF292	24 JUN 66		MADISON	RIVER	AT MADISON JUNCTION	44 38.526	110 52.471	19.5
YT13	27 SEP 66		MADISON	RIVER	AT MADISON JUNCTION	44 38.526	110 52.471	17.0
W3	26 OCT 66		MADISON	RIVER	AT MADISON JUNCTION	44 38.526	110 52.471	
YF371	30 APR 67		MADISON	RIVER	AT MADISON JUNCTION	44 38.526	110 52.471	
YF375	18 MAY 67		MADISON	RIVER	AT MADISON JUNCTION	44 38.526	110 52.471	
YF383	23 JUL 67		MADISON	RIVER	AT MADISON JUNCTION	44 38.526	110 52.471	
YF393	6 MAY 68		MADISON	RIVER	AT MADISON JUNCTION	44 38.526	110 52.471	
OBSIDIAN CREEK SAMPLES								
YF190	27 MAY 66		OBSIDIAN	RIVER	AT OBSIDIAN CLIFF PARKING AREA	44 49.424	110 43.682	20.0
YF299	24 JUN 66		OBSIDIAN	RIVER	AT OBSIDIAN CLIFF PARKING AREA	44 49.424	110 43.682	

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
GIBBON RIVER SAMPLES																				
YF395	7.63						5.7	1.18	38.4	6.3			43.0		32.0	31.0				
YF191			41.8													23.0				18
YF297			56.6				6.3	1.10	39.5	8.0			33.0		31.0	38.0 [2]				
YT20	7.64		76.1				7.1	1.10	56.6	12.4			36.0		36.0	64.0 [2]				
W5	7.70		82.4				6.5	1.08	61.6	13.7			38.0		44.0	68.0				
YF377									55.4	11.1						61.9				
YF385	7.60						5.3	0.89	27.4	5.9			30.0		20.0	29.0				20
YF195			28.4										28.0			2.3				9
YF298			37.4										36.0			3.9 [2]				
YT21	7.95		44.9				5.8	1.06	17.2	4.7			45.0		9.0	5.0 [2]				
W			42.6										52.0			4.8				
YF378	7.90						7.2	1.35	19.8	4.7			50.0		17.0	8.8				
YF386	7.57						5.1	0.89	10.3	2.8			30.0		6.0	4.1				9
MADISON RIVER SAMPLES																				
YF196			53.5													30.8				29
YF292			70.7													45.0 [2]				
YT13	8.26		91.6				6.8	0.80	91.9	8.9			140.0	1.0	14.0	62.0 [2]				
W3	8.39		93.2				6.5	0.76	94.4	8.8			138.0	3.0	18.0	62.0				
YF371	8.39						6.8	0.80	103.0	9.3			143.0	3.0	26.0	76.0				
YF375	8.01						4.8	0.68	61.1	6.6			83.0		19.0	43.0				
YF383	8.07						6.1	0.79	70.4	6.7			113.0		12.0	48.8				40
YF393	7.97						5.3	0.74	60.9	6.0			91.0		16.0	38.0				
OBSIDIAN CREEK SAMPLES																				
YF190			39.6													22.0				19
YF299	6.85		67.4				13.4	2.85	43.9	12.2			8.0		76.0	53.0 [2]				

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
OBSIDIAN CREEK SAMPLES								
YT22	28 SEP 66		OBSIDIAN	RIVER	AT OBSIDIAN CLIFF PARKING AREA	44 49.424	110 43.682	18.0
W6	26 OCT 66		OBSIDIAN	RIVER	AT OBSIDIAN CLIFF PARKING AREA	44 49.424	110 43.682	
HOT RIVER SAMPLES								
YF189	27 MAY 66		HOT	RIVER	ABV GARDNER R	44 59.112	110 41.309	50.0
YF302	24 JUN 66		HOT	RIVER	ABV GARDNER R	44 59.112	110 41.309	
YT23	28 SEP 66		HOT	RIVER	ABV GARDNER R	44 59.112	110 41.309	
W7	26 SEP 66		HOT	RIVER	ABV GARDNER R	44 59.112	110 41.309	
GARDNER RIVER SAMPLES								
YF188	27 MAY 66		GARDNER	RIVER	ABV HOT R.	44 59.063	110 41.230	11.5
YF303	24 JUN 66		GARDNER	RIVER	ABV HOT R.	44 59.063	110 41.230	
YT24	28 SEP 66		GARDNER	RIVER	ABV HOT R.	44 59.063	110 41.230	
W8	26 OCT 66		GARDNER	RIVER	ABV HOT R.	44 59.063	110 41.230	
YF389	24 JUL 67		GARDNER	RIVER	ABV HOT R.	44 59.063	110 41.230	17.5
YF301	24 JUN 66		GARDNER	RIVER	BLW HOT R	45 0.675	110 41.734	14.5
YT25	27 SEP 66		GARDNER	RIVER	BLW HOT R	45 0.675	110 41.734	20.9
W8A	26 OCT 66		GARDNER	RIVER	BLW HOT R	45 0.675	110 41.734	
YF388	24 JUL 67		GARDNER	RIVER	BLW HOT R	45 0.675	110 41.734	20.0
YF396	6 MAY 68		GARDNER	RIVER	BLW HOT R	45 0.675	110 41.734	
YF477	28 JAN 70		GARDNER	RIVER	BLW HOT R	45 0.675	110 41.734	
YF527	MAY 72		GARDNER	RIVER	BLW HOT R	45 0.675	110 0.734	
YF566	12 SEP 72		GARDNER	RIVER	BLW HOT RIVER	45 0.675	110 41.734	
YELLOWSTONE RIVER SAMPLES								
YF519	MAY 72		YELLOWSTONE	RIVER	AT YELLOWSTONE LAKE OUTLET	44 34.043	110 22.896	
YF559	12 SEP 72		YELLOWSTONE	RIVER	AT YELLOWSTONE LAKE OUTLET	44 34.043	110 22.896	
YF454	11 JUL 69		YELLOWSTONE	RIVER	AT CHITTENDEN BRDG	45 6.716	110 47.537	

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
OBSIDIAN CREEK SAMPLES																				
YT22		7.27	90.9				18.7	3.80	73.6	20.0			15.0		94.0	91.0				
W6			95.7													94.0				
HOT RIVER SAMPLES																				
YF189			49.0													133.0				
YF302		8.13	44.6				105.0	66.80	111.0	47.1			99.0		585.0	133.0 [2]				
YT23		8.05	45.0				106.0	69.00	110.0	47.0			96.0		525.0	137.0 [2]				
W7			42.2													137.0				
GARDNER RIVER SAMPLES																				
YF188			17.9													1.6				135
YF303		8.02	14.8				22.7	55.00	4.5	14.7			89.0		10.0	3.5 [2]				
YT24		8.26	25.3				31.9	8.40	11.7	2.8			117.0	1.0	25.0	5.2 [2]				
W8		7.70	27.5				45.4	22.00	34.2	13.2			108.0		156.0	7.0				
YF389		7.93					24.3	6.15	6.0	1.6			90.0		17.0	3.6				18
YF301		8.18	15.5				37.0	9.59	11.4	4.1			116.0		46.0	10.0 [2]				
YT25		8.14	29.2				48.4	21.20	31.6	13.2			119.0		122.0	29.0 [2]				
W8A			30.9													35.0				
YF388		8.24					40.0	10.60	13.2	4.5			121.0	1.0	58.0	13.0				32
YF396		8.12					45.0	13.20	14.6	4.8			140.0		67.0	14.0				
YF477							143.0	21.60	35.6	12.7			199.0			36.0				
YF527		7.70	19.5				31.0	7.80	9.2	3.3	0.08		105.0		37.0	7.8	0.5	0.02		250
YF566			28.0				53.0	14.10	20.5	7.5	0.18	0.1 [1]	169.0		107.0	22.1		0.50		
YELLOWSTONE RIVER SAMPLES																				
YF519		7.50	10.6				4.7	2.40	8.5	1.6	0.04		40.0		7.0	4.6	0.7	0.10		89
YF559			10.3				6.0	2.00	8.3	1.6	0.04	0.1 [1]	38.0		9.4	4.5		0.10		
YF454							10.9	2.38	10.8	2.4			35.0		10.5	5.3	0.6			

NUMBER	DATE	GROUP	NAME	TYPE	DESCRIPTION	LATITUDE	LONGITUDE	TEMP
YELLOWSTONE RIVER SAMPLES								
YF530	MAY 72		YELLOWSTONE	RIVER	AT CHITTENDEN BRDG	44 42.485	110 30.100	
YF561	12 SEP 72		YELLOWSTONE	RIVER	AT CHITTENDEN BRDG	44 48.485	110 30.100	
YF455	11 JUL 69		YELLOWSTONE	RIVER	AT LAMAR BRDG ABV LAMAR R	45 6.716	110 47.537	
YF523	MAY 72		YELLOWSTONE	RIVER	AT LAMAR BRDG ABV LAMAR R	44 55.234	110 24.206	
YF562	12 SEP 72		YELLOWSTONE	RIVER	AT LAMAR BRDG	44 55.234	110 24.206	
YF291	24 JUN 66		YELLOWSTONE	RIVER	AT CORWIN SPRINGS GAGE	45 6.716	110 47.537	29.0
YT14	27 SEP 66		YELLOWSTONE	RIVER	AT CORWIN SPRINGS GAGE	45 6.716	110 47.537	
W9	26 OCT 66		YELLOWSTONE	RIVER	AT CORWIN SPRINGS GAGE	45 6.716	110 47.537	
YF387	24 JUL 67		YELLOWSTONE	RIVER	AT CORWIN SPRINGS GAGE	45 6.716	110 47.537	
YF474	24 JAN 70		YELLOWSTONE	RIVER	AT CORWIN SPRINGS GAGE	45 6.716	110 47.537	
YF526	MAY 72		YELLOWSTONE	RIVER	AT CORWIN SPRINGS GAGE	45 6.716	110 47.537	
YF565	12 SEP 72		YELLOWSTONE	RIVER	AT CORWIN SPRINGS GAGE	45 6.716	110 47.537	
YF520	MAY 72		UNNAMED	RIVER	STM OFF ELEPHANT BACK AT HIWAY BRDG	44 35.379	110 23.099	
YF560	12 SEP 72		UNNAMED	RIVER	STM OFF ELEPHANT BACK AT HIWAY BRDG	44 35.379	110 23.099	
YF524	MAY 72		LAMAR	RIVER	AT LAMAR GAGE	44 55.658	110 23.708	
YF563	12 SEP 72		LAMAR	RIVER	AT LAMAR GAGE SITE	44 55.658	110 23.708	
YF525	MAY 72		LAVA	RIVER	AT HIWAY BRDG	44 51.931	110 38.026	
YF564	12 SEP 72		LAVA	RIVER	AT HIWAY BRDG	44 51.931	110 38.026	

NUMBER	FPH	LPH	SIO2	AL	FE	MN	CA	MG	NA	K	LI	NH4	HCO3	CO3	SO4	CL	F	B	H2S	COND
YELLOWSTONE RIVER SAMPLES																				
YF530		7.00	14.0				4.9	2.30	10.8	2.1	0.04		34.0		13.0	7.2	0.7	0.12		100
YF561			15.1				5.4	2.10	12.4	2.6	0.06	0.1	39.0		13.1	6.5		0.10		
YF455							11.8	2.38	12.8	2.4			36.0		10.9	6.7	0.6			
YF523		7.30	19.8				5.4	2.30	12.7	2.5	0.06		41.0		13.0	6.5	0.6	0.22		110
YF562			21.1				6.4	2.50	16.0	3.1	0.08	0.1	48.0		20.0	8.0		0.30		
YF291		7.63	13.0				9.2	3.50	10.8	1.6			48.0		14.0	4.1[2]				
YT14		7.90	18.0				16.0	5.48	19.8	3.9			72.1		30.0	9.5[2]				
W9		8.06	26.7				19.4	6.50	31.1	4.8			84.0		34.0	13.0				
YF387		7.57					9.4	3.50	10.8	1.5			44.0		19.0	4.5				
YF474							48.5	6.20	26.0	5.2			82.0			13.0				
YF526		7.70	18.8				11.0	3.50	7.6	1.7	0.03		51.0		14.0	3.3	0.3	0.11		110
YF565			19.2				11.8	4.20	13.2	2.8	0.06	0.1	61.0		19.5	6.4		0.20		
YF520		7.30	60.0				5.2	2.40	9.2	2.8	0.02		45.0		6.5	0.8	57.0	0.30		85
YF560			42.8				5.6	1.12	3.0	2.6	0.01	0.1[1]	29.0		3.6	0.3		0.10		
YF524		7.80	17.4				11.8	3.90	3.6	0.8	0.01[1]		57.0		6.4	0.3	0.2	0.03		95
YF563			18.8				9.1	5.00	5.1	1.1	0.01[1]	0.2	81.0		7.3	0.5		0.10		
YF525		7.20	27.1				5.7	2.00	3.2	1.1	0.01[1]		32.0		7.4	0.5	0.7	0.02		60
YF564			35.9				7.3	1.90	4.4	1.5	0.01[1]	0.1	46.0		3.6	0.4		0.10		

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