
Quality of Surface Waters of the United States 1952

Parts 9-14. Colorado River Basin to Pacific
Slope Basins in Oregon and Lower Columbia
River Basin

Prepared under the direction of S. K. LOVE, Chief, Quality of Water Branch

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1253

*Prepared in cooperation with the States of
California and Utah, U. S. Bureau of
Reclamation, and with other agencies*



UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1957

Encl 3-1

SHAKE RIVER MAIN STEM--Continued
 SHAKE RIVER NEAR CLAREMONT, WASH.

LOCATION:--One mile downstream from gaging station, 1 mile upstream from Alpova Creek, 8 miles downstream from Clarston, Asotin County, and 133 miles upstream from mouth.
 DRAINAGE AREA:--103,200 square miles, approximately (above gaging station).
 RECORDS AVAILABLE:--Chemical analyses November 1961 to September 1962.
 Water temperature: November 1961 to September 1962.
 EXTREMES, 1961-62:--Dissolved solids: Maximum 263 ppm Sept. 21-30; minimum, 96 ppm May 21-31.
 Hardness: Maximum, 132 ppm Sept. 21-30; minimum, 81 ppm June 1-10.
 Specific conductance: Maximum daily 463 micromhos for 20; minimum observed, 32.7 Aug. 8-11, 14; minimum observed, 32.7 Jan. 14.
 Water temperature: Maximum observed, 73.7 Aug. 8-11, 14; minimum observed, 32.7 Jan. 14.
 Specific conductance: Maximum observed, 73.7 Aug. 8-11, 14; minimum observed, 32.7 Jan. 14.
 EXTREMES:--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Oregon. Records of discharge for gaging station near Clarston for water year October 1961 to September 1962 available in WSP 1247.
 No appreciable inflow between gaging station and sampling point except during periods of heavy local rains.

Chemical analyses, in parts per million, water year November 1961 to September 1962

Date of collection	Mean discharge (cfs)	Sulfates (SO ₄)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Total Solids (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Iron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃	Percent sodium	Sodium-chloride ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot							Calcium, magnesium
Nov. 14, 16-7, 19-20, 1961	30,780	35	--	37	14	29	6.1	190	35	14	0.5	3.4	0.34	0.37	23,330	150	0	28	1.0	398	7.5	6
Nov. 21, 26-29	31,620	30	0.14	34	12	27	5.1	156	40	15	0.5	2.5	--	0.244	20,820	134	5	29	1.0	372	7.6	6
Dec. 1-10	44,540	30	0.14	32	11	24	5.3	147	37	13	0.5	2.7	--	0.225	37,060	135	5	28	1.0	344	7.6	15
Dec. 12-15, 17	33,940	34	--	37	13	27	6.8	177	36	14	0.4	3.2	-0.13	0.259	23,940	143	0	28	1.0	385	7.0	20
Jan. 4-10, 1962	28,860	29	0.02	34	11	26	6.4	151	40	16	0.3	1.8	--	0.21	16,630	130	6	29	1.0	365	7.2	10
Jan. 11-20	31,910	27	0.02	34	12	26	3.0	151	41	15	0.5	2.8	0.06	0.256	20,140	134	10	28	1.0	365	7.7	3
Jan. 21-31	33,460	27	0.04	34	12	25	3.0	152	40	15	0.5	3.0	--	0.235	31,230	134	10	28	1.0	361	7.8	3
Feb. 1-10	45,070	27	0.20	29	11	22	3.2	132	34	12	0.5	3.4	--	0.213	25,800	118	9	28	0.9	311	7.7	17
Feb. 11-20	35,320	27	0.14	30	10	22	3.1	134	36	13	0.5	3.0	0.06	0.215	23,540	116	6	29	0.9	331	7.7	15
Feb. 21-29	37,240	28	0.06	34	12	23	3.0	151	39	15	0.5	2.7	--	0.231	23,230	134	10	27	0.9	354	7.8	7
Mar. 1-10	25,970	26	0.04	35	12	25	3.2	155	40	16	0.6	2.6	--	0.240	22,240	137	10	28	0.9	368	7.6	5
Mar. 11-20	46,910	25	0.06	34	12	24	3.2	151	38	14	0.6	2.8	0.06	0.236	26,700	134	10	27	0.9	359	7.6	8
Mar. 21-31	75,780	25	0.04	28	9.2	19	3.2	134	29	11	0.5	3.5	--	0.197	40,260	108	6	27	0.8	295	7.6	15
Apr. 1-10	104,910	25	0.04	22	7.5	15	2.7	100	22	8.0	0.5	3.1	--	0.160	45,150	86	4	27	0.7	254	7.4	15
Apr. 11-20	146,100	24	0.25	18	8.3	15	2.6	97	19	7.4	0.5	2.5	0.06	0.182	64,760	87	7	27	0.7	219	7.0	23
Apr. 21-30	194,600	23	0.23	18	6.8	12	2.4	85	15	6.1	0.5	1.7	--	0.137	71,940	73	5	26	0.6	186	7.3	23
May 1-10	183,600	16	0.16	16	5.8	10	1.6	75	13	5.4	0	1.4	--	0.123	60,970	64	2	25	0.5	197	7.3	17
May 11-20	194,700	19	0.14	15	4.9	9.3	2.0	67	13	4.9	0.4	1.7	0.05	0.113	60,010	58	3	25	0.5	187	7.3	15
May 21-31	168,300	16	0.08	14	4.2	8.8	1.4	60	11	4.0	0.4	0.9	--	0.090	50,100	52	3	26	0.5	137	7.4	24
June 1-13	165,000	15	0.06	14	3.9	9.5	1.6	63	12	4.7	0.4	1.1	--	0.097	40,730	51	0	26	0.6	144	7.4	13
June 13-20	104,940	20	0.04	18	5.6	13	2.4	82	18	7.0	0.4	0.6	0.04	0.136	34,270	63	1	26	0.7	190	7.6	5
June 21-30	94,330	19	0.04	18	5.6	13	2.0	86	19	6.2	0.4	0.6	--	0.137	36,930	68	0	26	0.7	189	7.6	5

a Sum of determined constituents.

SHAKE RIVER MAIN STEM

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SHAKE RIVER MAIN STEM--Continued
 SHAKE RIVER NEAR CLARKSTON, WASH.--Continued

Temperature (°F) of water, November 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	40	--	39	38	46	51	56	63	71	63
2		--	--	--	39	38	46	51	57	64	72	65
3		--	37	--	39	39	45	52	59	64	72	64
4		--	35	35	40	39	47	52	61	70	72	64
5		--	--	35	38	39	49	54	61	65	72	65
6		--	39	36	38	39	50	52	60	66	72	65
7		--	40	35	39	39	50	53	59	66	71	65
8		--	39	36	38	40	48	55	61	66	73	63
9		--	--	35	39	40	47	54	60	66	73	64
10		--	39	36	39	41	47	53	60	69	73	64
11		--	--	35	38	42	48	54	59	70	73	63
12		--	38	37	38	42	48	55	58	72	72	63
13		--	39	38	38	42	49	56	62	72	71	61
14		43	39	32	37	42	49	56	67	71	73	61
15		--	40	38	37	42	49	56	67	71	71	59
16		42	--	37	37	43	49	53	59	71	69	60
17		42	42	37	37	43	50	54	59	70	70	60
18		--	--	38	37	43	51	55	61	69	--	60
19		40	--	38	37	42	52	56	62	69	68	61
20		41	--	35	37	43	51	56	63	70	67	61
21		40	--	37	--	43	50	55	62	67	69	62
22		--	--	34	36	43	49	54	61	67	65	62
23		--	--	34	--	43	51	56	60	68	69	59
24		--	--	35	36	46	53	58	61	67	69	61
25		--	--	38	37	44	55	58	65	68	69	61
26		43	--	37	37	45	55	57	69	69	67	62
27		43	--	37	38	46	56	57	60	70	65	65
28		38	--	38	39	46	56	57	63	71	66	60
29		45	--	38	38	46	54	57	69	71	65	59
30		--	--	39	--	46	51	56	62	71	64	62
31		--	--	39	--	45	--	58	--	72	66	--
Average		--	--	35	38	42	50	55	60	69	70	62

Encl 3-2

Quality of Surface Waters of the United States 1953

Parts 9-14. Colorado River Basin to Pacific
Slope Basins in Oregon and Lower Columbia
River Basin

Prepared under the direction of S. K. LOVE, chief, Quality of Water Branch

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1293

*Prepared in cooperation with the States of
California and Utah, U. S. Bureau of
Reclamation, and with other agencies*



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Encl 4-1

LOCATION.--One mile downstream from gaging station, 1 mile upstream from Alpowa Creek, 8 miles downstream from Clarkston, Asotin County, and 133 miles up-stream from mouth.
 DRAINAGE AREA.--103,200 square miles, approximately (above gaging station).
 RECORDS AVAILABLE.--Chemical analyses: November 1951 to September 1953.
 Water temperatures: November 1951 to September 1953.
 EXTREMES, 1952-53.--Dissolved solids: Maximum, 312 ppm Oct. 21-31, 1952; minimum, 53 ppm June 1-10.
 Hardness: Maximum, 168 ppm Sept. 21-30; minimum, 53 ppm June 1-10.
 Specific conductance: Maximum daily, 529 microhos Nov. 30, Dec. 3; minimum daily, 133 microhos May 21.
 Water temperatures: Maximum observed, 72°F Aug. 7-8; minimum observed, 34°F Nov. 29-30.
 EXTREMES, 1951-53.--Dissolved solids: Maximum, 312 ppm Oct. 21-31, 1952; minimum, 96 ppm May 21-31, 1952, June 24-30, 1953.
 Hardness: Maximum, 168 ppm Sept. 21-30, 1953; minimum, 51 ppm June 1-10, 1952.
 Specific conductance: Maximum daily, 529 microhos Nov. 30, Dec. 3, 1952; minimum daily, 118 microhos May 28, 1952.
 Water temperatures: Maximum observed, 73°F Aug. 8-11, 14, 1952; minimum observed, freezing point Jan. 14, 1952.

REMARKS.--Values reported for dissolved solids are residue on evaporation. Records of specific conductance of daily samples available in district office at Portland, Oreg. Discharge records for gaging station near Clarkston for water year October 1952 to September 1953 given in WSP 1287. No appreciable inflow between gaging and sampling point except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1953 to September 1953

Date of collection	Mean discharge (cfs)	Sulfate (SO ₄)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃	Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25°C)	pH	Color		
														Parts per million	Tons per acre-foot							Calcium, mg-nestum	Non-carbonate
Oct. 1-10, 1953..	21,690	35	0.09	39	15	35	3.9	217	47	15	0.6	1.9	--	305	0.41	18,030	159	0	32	1.2	459	8.0	5
Oct. 11-20.....	22,260	34	0.07	39	16	37	3.9	211	52	16	0.6	2.5	0.13	295	0.40	17,730	163	0	32	1.3	479	7.9	5
Oct. 21-31.....	22,170	32	0.04	39	16	37	4.5	203	53	16	0.5	2.1	--	312	0.42	18,680	163	0	32	1.3	472	8.2	8
Nov. 1-30.....	20,670	30	0.04	40	16	36	4.5	204	54	16	0.5	2.1	.11	310	0.42	17,300	166	0	31	1.2	472	7.9	8
Dec. 1-31.....	20,950	35	0.03	39	15	37	4.5	192	56	19	0.6	2.9	.10	300	0.41	16,980	159	2	33	1.3	474	8.0	5
Jan. 1-10, 1953..	23,120	33	0.02	39	15	35	4.5	190	33	20	0.6	3.0	--	291	0.40	19,170	159	3	32	1.2	463	7.8	10
Jan. 11-31.....	48,630	28	0.13	26	9.9	21	3.2	123	31	12	0.5	2.9	.06	197	0.27	20,670	106	5	29	.9	301	7.7	25
Feb. 1-10.....	56,030	27	0.17	22	9.1	17	3.0	106	26	9.5	0.5	1.7	--	173	0.24	27,110	92	4	28	.8	256	7.7	25
Feb. 11-26.....	35,200	28	0.06	29	11	24	3.0	122	36	14	0.5	2.0	.09	218	0.30	20,720	116	1	30	1.0	340	7.6	15
Mar. 1-10.....	32,450	28	0.10	31	12	24	2.6	122	35	15	0.5	1.9	--	229	0.31	20,660	177	10	29	.9	353	7.5	10
Mar. 11-20.....	39,350	23	0.06	29	11	22	2.8	130	37	14	0.5	1.6	.10	210	0.29	24,310	116	11	28	.9	310	7.4	10
Mar. 21-31.....	52,220	27	0.23	26	10	19	2.3	116	31	11	0.5	1.3	--	168	0.26	26,310	106	11	27	.8	263	7.3	20
Apr. 1-10.....	50,910	24	0.11	24	9.3	17	2.3	108	28	10	0.5	1.0	--	173	0.24	23,760	98	10	27	.7	266	7.5	20
Apr. 11-23.....	46,060	24	0.11	23	9.1	17	2.3	108	25	10	0.5	0.6	.08	170	0.23	22,070	95	8	27	.6	261	7.3	15
Apr. 24-30.....	112,060	21	0.28	14	5.6	9.3	1.5	64	23	5.5	0.5	0.7	--	113	0.19	34,170	58	6	25	.5	153	7.4	25
May 1-10.....	83,860	19	0.20	15	5.7	11	1.9	68	17	5.9	0.5	0.5	--	117	0.16	29,650	61	5	27	.6	169	7.4	25
May 11-20.....	93,740	20	0.05	15	4.6	12	1.5	70	16	5.3	0.2	0.5	.10	112	0.19	26,360	56	0	31	.7	166	7.4	20
May 21-31.....	115,800	21	0.06	13	4.9	13	1.5	72	19	5.3	0.3	0.7	--	116	0.16	30,270	58	0	32	.7	171	7.5	20

Snake River Main Stem

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Snake River Main Stem--Continued
Snake River Near Clarkston, Wash.--Continued

Temperature (°F) of water, water year October 1952 to September 1953
(Once-daily measurement at approximately 8 a.m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	51	35	37	45	42	49	50	56	61	70	85
2	62	48	36	38	45	42	47	50	56	61	68	85
3	61	48	37	38	45	41	49	50	56	62	70	85
4	61	45	37	39	45	43	48	52	56	63	70	84
5	58	46	37	39	45	42	49	54	55	64	--	84
6	57	--	37	39	45	42	50	56	55	64	71	84
7	57	44	39	40	45	44	50	56	55	65	72	84
8	57	42	39	40	44	46	50	56	55	61	72	85
9	58	42	37	42	42	44	50	53	55	61	71	86
10	57	45	39	42	42	47	47	51	55	66	70	84
11	58	47	38	42	43	47	48	53	57	67	70	86
12	56	44	39	42	42	46	48	53	57	69	71	86
13	60	47	39	42	43	47	48	54	57	70	70	87
14	62	46	39	43	42	45	49	54	57	70	70	87
15	62	44	38	42	42	46	48	55	57	70	69	87
16	53	44	40	43	43	47	50	56	56	69	71	86
17	53	45	40	42	42	46	52	57	58	70	70	85
18	56	44	39	42	43	45	52	56	58	--	69	85
19	55	44	39	43	41	45	50	56	58	70	70	85
20	53	45	39	43	41	45	49	55	57	69	71	80
21	51	44	40	43	43	45	51	54	57	69	70	80
22	55	40	38	44	39	47	50	53	58	69	67	61
23	55	40	39	43	39	45	50	53	58	69	69	62
24	56	40	37	44	39	47	52	53	59	67	66	60
25	51	39	38	46	40	49	50	52	59	69	66	56
26	51	39	38	44	42	48	56	53	59	67	66	59
27	52	37	38	43	46	49	50	54	59	68	67	59
28	50	36	36	41	45	49	49	54	60	68	67	61
29	52	34	37	42	--	50	51	56	59	69	66	57
30	51	34	37	43	--	49	50	55	60	69	70	57
31	52	--	38	43	--	49	--	55	--	70	65	--
Average	55	43	38	42	43	45	50	54	57	67	69	63

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Encl 5-1

SNAKE RIVER MAIN STEM

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SNAKE RIVER MAIN STEM--Continued

SNAKE RIVER NEAR CLARKSTON, WASH.--Continued

Temperature (°F) of water, water year October 1953 to September 1954

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	57	51	46	38	42	45	45	50	54	61	69	67
2	55	49	46	41	45	46	46	54	54	63	69	66
3	58	47	45	38	43	44	46	51	55	63	69	66
4	55	48	48	41	43	42	47	51	55	68	65	65
5	55	48	44	42	43	45	47	54	58	69	65	66
6	55	48	44	41	43	45	47	54	55	68	69	65
7	58	49	--	42	41	44	47	55	58	70	65	65
8	55	51	--	42	44	45	49	56	57	69	67	61
9	--	47	--	42	43	47	--	58	56	68	69	61
10	56	49	--	39	42	47	48	57	55	68	67	62
11	60	46	--	--	41	46	51	55	58	68	65	64
12	57	47	43	39	44	47	50	54	58	68	68	66
13	56	47	39	39	42	46	51	55	58	69	67	64
14	62	47	41	38	44	45	52	54	58	69	67	--
15	57	48	41	38	44	44	50	56	60	70	67	63
18	57	47	41	37	44	46	50	59	58	71	67	63
17	60	46	42	36	44	43	52	59	58	71	68	61
18	59	49	42	36	44	45	50	58	55	70	68	62
19	59	48	41	37	43	46	52	57	58	70	68	61
20	58	46	41	36	45	45	52	57	56	70	68	61
21	53	46	41	35	44	43	53	56	58	70	67	63
22	50	45	39	39	47	43	51	55	60	68	66	61
23	55	44	40	37	45	45	54	57	59	--	66	60
24	56	46	38	38	46	46	--	65	61	69	65	61
25	53	46	--	38	45	45	53	55	60	68	65	62
26	48	47	39	38	46	47	54	54	62	69	65	--
27	--	--	38	38	44	47	54	54	61	68	67	61
28	54	48	39	38	45	46	54	54	60	68	65	59
29	56	45	40	39	--	46	--	55	61	68	64	58
30	56	47	38	41	--	45	62	54	60	69	68	55
31	50	--	38	39	--	44	--	54	--	70	68	--
Average	56	47	41	39	44	45	50	55	57	68	67	62

Encl 5-2

Quality of Surface Waters of the United States 1955

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1959

Encl 6-1

LOCATION --One mile downstream from gaging station, 1 mile upstream from Alpowa Creek, 8 miles downstream from Clarkston, Asotin County, and 133 miles upstream from mouth of Snake River near Clarkston, Wash.

DRAINAGE AREA --103,200 square miles, approximately (above gaging station).
 RECORDS AVAILABLE --Chemical analyses: November 1951 to September 1955.
 Water temperatures: November 1951 to September 1955.
 EXTREMES 1954-55: Dissolved solids: Maximum, 298 ppm June 9-16, 18, 23.
 Hardness: Maximum, 166 ppm Dec. 21-31, minimum, 34 ppm June 9-16, 18, 23.
 Specific conductance: Maximum, 411, 513 micromhos June 13.
 Water temperatures: Maximum, 74° F July 23, 24, 25; minimum, 33° F Feb. 21, Mar. 4.
 EXTREMES 1951-55: Dissolved solids: Maximum, 411, 513 micromhos June 13.
 Hardness: Maximum, 176 ppm Oct. 21-31, minimum, 34 ppm June 9-16, 18, 23, 1955.
 Specific conductance: Maximum, 411, 522 micromhos June 13, 1955; minimum, 76 ppm June 9-16, 18, 23, 1955.
 Water temperatures: Maximum, 74° F July 23, 24, 25, 1955; minimum, freezing point Jan. 14, 1952.
 REMARKS --Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Ore. Records of discharge for water year October 1954 to September 1955 given in WSP 1397.

Chemical analyses, in parts per million, water year October 1954 to September 1955

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Iron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO ₃	Percent sodium	Specific conductance (micro-mhos at 25°C)	pH		
														Tons per acre-foot	Tons per day						
Oct. 1-10, 1954...	23,110	31		37	15	40	4.1	187	59	18		1.6	0.12	284	0.40	18,340	154	35	1.4	487	7.9
Oct. 11-20	25,580	32		36	15	39	4.0	181	59	20		2.1	0.12	286	.39	19,750	152	3	1.4	452	7.8
Oct. 21-31	25,580	31		37	14	37	3.9	178	55	18		2.2	0.12	276	.38	19,040	150	4	3.4	437	8.0
Nov. 1-10	24,740	31		37	15	36	4.0	187	54	18		2.6	0.12	290	.39	19,370	154	1	3.3	455	8.0
Nov. 11-20	25,560	29		36	14	34	3.7	179	50	18		2.4	0.08	275	.37	18,960	147	1	3.3	434	7.6
Nov. 21-30	25,000	31		37	13	32	3.6	174	49	17		2.5	0.12	273	.37	18,430	146	3	3.2	428	7.8
Dec. 1-10	23,880	30		37	14	34	4.0	181	53	18		2.7	0.06	282	.38	18,180	150	2	3.2	445	7.8
Dec. 11-20	21,850	31		38	15	34	4.0	183	52	19		3.0	0.06	286	.39	16,870	156	7	3.1	450	8.0
Dec. 21-31	20,990	34		42	15	33	3.3	180	56	19		2.3	0.12	296	.40	16,780	166	11	3.0	465	7.8
Jan. 1-10, 1955...	23,070	32		39	15	32	3.3	176	52	18		2.5	0.12	278	.38	17,320	159	15	3.0	434	7.9
Jan. 11-20	21,680	32		40	15	32	3.3	188	52	19		2.1	0.08	285	.39	16,680	162	9	3.0	440	7.9
Jan. 21-31	21,460	31		38	14	31	3.3	172	50	18		1.7	0.12	270	.37	15,640	152	11	3.0	424	8.1
Feb. 1-10	21,840	29		40	14	31	3.3	176	49	18		2.0	0.12	270	.37	15,920	157	13	2.9	427	7.6
Feb. 11-19	20,790	30		35	12	29	3.6	164	46	18		1.2	0.05	262	.35	14,370	137	2	3.1	405	7.7
Feb. 20-28	19,560	29		37	12	30	3.6	168	47	19		1.7	0.12	262	.36	13,860	142	4	3.1	417	7.9
Mar. 1-10	20,120	27		36	12	30	3.6	168	45	18		1.3	0.12	255	.35	13,920	139	2	3.1	408	7.7
Mar. 11-20	23,090	25		32	11	28	3.6	150	43	18		1.1	0.05	238	.32	14,840	125	2	3.2	379	7.8
Mar. 21-31	26,380	24		31	12	27	3.6	149	43	17		1.1	0.12	234	.32	16,870	127	5	3.1	372	8.0

SNAKE RIVER BASIN

SNAKE RIVER MAIN STEM--Continued

SNAKE RIVER NEAR CLARKSTON, WASH.--Continued

Temperature (°F) of water, water year October 1954 to September 1955

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	55	48	38	38	38	39	46	49	54	57	71	65
2	--	47	38	38	36	39	45	51	53	59	72	68
3	55	46	39	38	35	39	47	51	53	57	70	68
4	59	47	40	35	34	33	46	53	54	56	71	72
5	56	47	38	37	36	--	45	54	57	59	70	69
6	55	50	38	37	36	39	45	54	55	56	70	68
7	57	47	38	37	40	45	--	54	56	59	69	--
8	56	49	39	37	42	39	45	55	56	59	70	68
9	60	47	39	36	37	38	49	53	57	59	69	71
10	59	47	43	35	35	39	47	54	57	61	70	68
11	56	46	43	34	36	41	47	54	58	61	72	67
12	57	47	40	35	39	41	47	54	58	64	70	64
13	58	47	39	36	40	41	47	54	59	64	70	62
14	55	--	39	35	39	40	47	51	57	65	71	66
15	56	48	39	35	38	39	47	49	57	67	67	63
16	58	48	36	35	39	39	47	50	57	70	71	61
17	55	47	36	38	37	38	47	52	57	69	69	61
18	59	48	35	36	34	38	47	52	56	70	70	59
19	53	46	37	35	35	38	47	54	57	70	68	60
20	52	46	34	36	36	41	47	56	58	71	70	60
21	--	46	35	36	33	41	49	55	60	71	67	58
22	52	47	35	37	38	43	50	54	61	73	68	58
23	58	49	39	37	37	45	50	54	60	74	68	57
24	59	48	36	36	40	40	50	54	59	74	67	--
25	52	50	35	37	40	39	50	53	60	74	66	50
26	59	47	34	36	38	39	50	54	58	72	66	58
27	47	45	34	36	37	--	48	53	59	72	65	56
28	46	43	34	35	39	44	48	54	59	70	68	60
29	46	44	35	35	--	44	50	54	58	70	60	56
30	47	40	38	35	--	45	49	52	--	69	66	55
31	47	--	40	35	--	45	--	54	--	70	61	--
Average	55	47	38	36	37	40	46	53	57	66	68	62

Quality of Surface Waters of the United States 1956

Parts 9-14. Colorado River Basin to Pacific
Slope Basins in Oregon and Lower Columbia
River Basin

Prepared under the direction of S. K. LOVE, Chief, Quality of Water Branch

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1453

*Prepared in cooperation with the States of
California, New Mexico, and Utah,
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other agencies*



UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1960

Encl 7-1

SNAKE RIVER MAIN STEM

SNAKE RIVER AT CENTRAL FERRY, GARFIELD COUNTY, NEAR POMEROY, WASH.

LOCATION --At bridge on U. S. Highway 295 at Central Ferry, Garfield County, 14 miles northwest of Pomeroy, and about 36 miles downstream from gaging station near Clarkston.

DRAINAGE AREA --103,200 square miles, approximately (at gaging station).

RECORDS AVAILABLE --Chemical analyses: October 1955 to September 1956.

Water temperatures: October 1955 to September 1956.

EXTREMES, 1955-56 --Dissolved solids: Maximum, 257 ppm Oct. 21-31; minimum, 68 ppm May 15-31.

Hardness: Maximum, 136 ppm Oct. 1-10; minimum, 32 ppm May 15-31.

Specific conductance: Maximum daily, 434 microhos Oct. 25; minimum daily, 73 microhos May 25, 27.

Water temperatures: Maximum, 79° F, July 25; minimum, freezing point several days during January and February.

REMARKS --Chemical quality samples were collected at station near Clarkston, Washington (1 mile downstream from gaging station) from November 1951 to September 1955. Records of specific conductance of daily samples available in district office at Portland, Ore. Records of discharge for gaging station near Clarkston for water year October 1955 to September 1956 given in WSP 1447. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, for water year October 1955 to September 1956

Date of collection	Mean discharge (cfs)	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Borates (B)	Dissolved solids (residue at 180°C)		Hardness at CaCO ₃		Percent sodium adsorption ratio	Specific conductance (microhos/cm at 25°C)	pH		
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
Oct. 1-10, 1955	21,840	20	0.05	33	13	33	4.2	180	51	17	0.4	1.9	--	256	0.35	15,160	136	5	34	1.2	415	8.0
Oct. 11-20	26,510	23	.05	31	12	31	4.1	151	49	16	.3	2.4	0.04	245	.33	16,940	137	3	34	1.2	396	7.9
Oct. 21-31	25,460	23	.01	32	12	33	4.0	157	51	18	.4	2.1	--	237	.35	16,290	129	0	35	1.3	413	8.0
Nov. 1-5, 9-11, 13-20	26,310	24	.01	30	12	29	3.8	149	46	16	.3	2.2	.02	238	.32	16,910	124	3	33	1.1	363	8.0
Nov. 6-8, 12-14, 21-30	32,410	21	.05	25	9.8	23	3.5	121	36	12	.3	2.6	--	197	.27	17,240	103	4	32	1.0	309	7.7
Dec. 1-4, 13-16, 20-31	34,300	22	.04	27	8.1	23	3.1	116	33	12	.3	2.7	--	191	.26	17,690	101	6	31	1.0	296	7.7
Dec. 5-12, 15-19	28,430	25	.00	29	11	25	3.6	133	39	14	.5	2.2	.08	218	.30	16,730	118	9	31	1.0	347	7.7
Dec. 20-31	69,400	--	--	16	4.2	11	2.5	66	--	5.5	--	3.0	--	--	--	--	57	3	28	.6	166	7.6
Jan. 1-14, 1956	40,690	25	.03	24	7.5	19	2.9	103	23	10	.3	2.5	.02	174	.24	19,120	91	7	31	.9	258	7.0
Jan. 15-31	47,490	26	.10	24	8.4	20	3.0	110	23	10	.4	2.5	--	188	.26	24,110	94	4	31	.9	274	7.0
Feb. 1-10, 12-14, 17-19	32,920	25	.00	30	10	24	3.2	132	36	14	.3	2.3	--	214	.29	19,020	116	8	30	1.0	324	7.6
Feb. 11, 15-16, 20-29	38,330	24	.02	29	8.3	21	3.1	120	31	12	.3	2.5	.04	194	.26	20,070	106	8	29	.9	301	7.6
Mar. 1-19	43,730	25	.06	27	8.6	19	3.0	117	29	11	.3	2.6	.02	187	.25	22,060	103	7	28	.8	286	7.7
Mar. 20-31	56,870	23	.19	17	8.0	11	2.7	76	16	6.5	.2	2.7	--	141	.19	36,880	87	5	25	.6	182	7.4
Apr. 1-13	87,130	22	.05	20	5.6	12	2.7	84	18	7.8	.2	1.6	--	138	.19	32,460	73	4	25	.6	202	7.6
Apr. 14-30	153,900	17	.06	12	2.6	7.0	1.8	50	9.6	3.2	.2	1.0	.01	98	.13	40,720	41	0	25	.5	120	7.3
May 1-14	141,400	17	.02	13	3.1	6.9	1.7	57	12	4.5	.3	.8	--	94	.13	35,890	45	0	29	.6	135	7.1
May 15-31	223,600	11	.04	8.7	2.4	5.7	1.4	41	7.5	3.0	.2	.8	.04	68	.09	41,050	33	0	27	.4	92	6.8

SNAKE RIVER BASIN

SNAKE RIVER MAIN STEM--Continued

SNAKE RIVER AT CENTRAL FERRY NEAR POMEROY, WASH.--Continued

Temperature (°F) of water, water year October 1955 to September 1956												
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	59	--	41	37	32	38	--	51	60	68	71	68
2	--	48	42	39	32	40	47	51	59	64	71	68
3	59	46	41	37	32	40	46	52	54	64	71	67
4	57	47	--	--	32	--	47	53	55	64	72	67
5	56	46	39	39	33	41	47	--	55	64	70	67
6	--	44	--	38	34	40	47	--	55	65	72	62
7	58	45	--	38	33	41	48	53	58	67	73	61
8	55	--	39	--	34	41	--	49	61	68	74	61
9	55	47	39	40	35	40	50	51	63	72	74	--
10	54	38	38	39	36	40	50	50	61	73	74	61
11	54	--	--	39	36	--	51	50	59	73	74	68
12	54	39	39	39	--	40	51	51	60	75	74	69
13	55	--	37	38	37	42	53	--	61	74	75	70
14	--	35	36	--	--	43	53	53	60	74	76	69
15	58	33	34	--	35	42	--	55	52	74	76	69
16	58	--	--	39	34	40	50	--	54	73	75	70
17	58	33	35	--	35	44	52	--	59	74	76	71
18	57	34	--	--	--	--	52	58	61	76	76	70
19	59	35	35	--	--	44	52	58	60	76	77	71
20	58	--	35	39	34	45	53	--	62	75	77	--
21	58	34	36	40	36	46	52	--	62	75	76	--
22	56	33	--	40	--	46	--	56	62	75	76	--
23	57	--	--	42	36	45	52	56	60	77	--	--
24	55	--	--	41	39	40	51	55	--	76	--	--
25	56	39	--	33	39	--	51	55	62	79	72	--
26	--	40	41	37	38	44	51	54	64	76	71	--
27	--	--	39	37	39	46	--	56	67	77	71	--
28	52	38	--	35	40	47	--	55	66	77	61	--
29	51	40	--	32	39	47	--	54	66	77	61	--
30	--	40	--	31	--	--	50	--	67	76	68	62
31	48	--	--	32	--	--	--	--	--	76	69	--
Average	--	--	--	--	35	--	--	--	60	73	72	--

Quality of Surface Waters of the United States 1957

Parts 9-14. Colorado River Basin to Pacific
Slope Basins in Oregon and Lower Columbia
River Basin

Prepared under the direction of S. K. LOVE, Chief, Quality of Water Branch

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1523

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California, New Mexico, and Utah,
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other agencies*



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Encl 8-1

SNAKE RIVER MAIN STEM

SNAKE RIVER AT CENTRAL FERRY NEAR POMEROY, WASH.

LOCATION.--at bridge on U. S. Highway 295 at Central Ferry, Garfield County, 14 miles northwest of Pomeroy and about 36 miles downstream from gaging station near Clarkston.

DRAINAGE AREA--103,200 square miles, approximately (at gaging station).

RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1957.

EXTREMES, 1956-57.--Discharge: Maximum, 269 ppm Oct. 1-15; minimum, 69 ppm June 1-15.

Hardness: Maximum, 150 ppm Jan. 1-31; minimum, 22 ppm Apr. 27-30.

Specific conductance: Maximum, 449 micromhos Oct. 16-18, 20.

Freezing point: Minimum, 25.7° F. July 25; maximum, 32.0° F. point Feb. 16-18, 20.

EXTREMES 1955-57.--Discharge: Maximum, 269 ppm Oct. 1-15; minimum, 68 ppm May 15-31, 1956.

Hardness: Maximum, 150 ppm Jan. 1-31, 1957; minimum, 22 ppm Apr. 27-30, 1957.

Specific conductance: Maximum, 449 micromhos Oct. 16-18, 20.

Freezing point: Minimum, 25.7° F. July 25; maximum, 32.0° F. point Feb. 16-18, 20.

Water temperatures: Maximum, 79° F. July 25, 1956; minimum, freezing point on several days during January and February, 1956, February 1957.

REMARKS.--Chemical quality samples were collected at station near Clarkston, Washington (1 mile downstream from gaging station) from November 1951 to September 1955. Records of specific conductance of daily samples available in district office at Portland, Ore. Records of discharge for gaging station near Clarkston for water year October 1956 to September 1957 given in WSP 1517. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO ₂) (Pp)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na) (Pp)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO ₃	Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
														Parts per million	Tons per acre-foot						Calcium, magnesium
Oct. 1-15, 1956..	25,760			36	13	35		168	54	18		2.2		269	18,720	143	5	34	1.3	432	7.7
Oct. 16-31.....	28,920			36	12	34		184	54	18		2.4	0.05	268	20,930	139	5	34	1.3	428	7.6
Nov. 1-30.....	28,100			35	12	31		158	47	16		2.3		254	19,270	137	7	33	1.2	406	7.5
Dec. 1-4, 31.....	25,840			37	12	31		162	49	16		2.1	.01	256	17,860	142	9	33	1.1	405	7.6
Jan. 1-31, 1957..	23,960			37	14	31		188	51	18		2.3	.01	266	17,210	150	12	31	1.1	425	7.7
Feb. 1-25.....	26,500			34	12	26		153	44	16		2.6	.04	237	16,960	134	9	29	1.0	382	7.5
Feb. 26-28.....	119,800			17	5.5	13		78	18	5.5		4.1		160	22,510	65	1	30	.7	190	7.5
Mar. 1-21.....	70,980			21	6.9	16		98	24	8.5		2.1	.06	166	23,830	81	1	29	.8	237	7.7
Mar. 22-31.....	57,540			17	6.0	12		80	17	6.5		1.3		132	18,510	67	1	28	.6	190	7.6
Apr. 1-26.....	86,860			17	5.0	12		78	17	6.0		1.2	.05	126	17,290	63	0	29	.7	180	7.5
Apr. 27-30.....	81,720			6.0	1.6	7.1		50	9.7	3.5		.7		80	11,650	22	0	27	.7	115	7.1
May 1-21.....	197,400			11	2.0	6.5		45	8.8	2.5		.5	.04	78	11,450	36	0	28	.5	103	7.1
May 22-31.....	203,400			13	3.6	7.9		59	13	4.8		.7		91	12,490	47	0	25	.5	134	7.3
June 1-15.....	179,700			10	2.6	6.6		48	9.7	3.2		.5		69	9,340	36	0	26	.5	106	7.0
June 16-30.....	75,360			14	3.5	10		64	14	4.2		.5	.05	92	13,720	49	0	30	.6	149	7.1
July 1-17.....	42,470			19	6.2	17		91	25	8.0		.7	.08	139	15,940	73	0	33	.9	224	7.4
July 18-31.....	27,960			25	7.8	25		121	37	11		1.0		185	13,980	94	0	35	1.1	303	7.7

SNAKE RIVER BASIN

SNAKE RIVER MAIN STEM--Continued

SNAKE RIVER AT CENTRAL FERRY NEAR POMEROY, WASH.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

(Once-daily measurement at approximately 4 p.m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	46	40	38	--	--	40	45	62	68	73	73
2	60	45	40	--	--	35	40	45	62	69	75	73
3	62	45	40	38	--	35	40	45	62	70	74	73
4	61	45	39	38	--	35	43	45	62	--	--	73
5	60	45	--	38	--	35	43	--	62	70	73	--
6	60	45	--	38	--	35	43	45	60	--	74	73
7	61	45	--	36	--	35	43	45	60	72	74	73
8	61	45	40	36	--	--	--	45	60	71	75	--
9	62	45	40	36	--	35	43	45	58	72	75	--
10	59	45	40	--	--	35	43	45	60	73	75	72
11	59	45	--	36	--	35	43	45	60	74	--	72
12	59	45	--	34	--	--	43	--	60	74	--	72
13	59	45	40	34	--	--	43	53	60	74	--	--
14	58	45	42	34	--	37	43	53	60	--	--	--
15	56	45	42	34	--	35	43	--	60	73	75	--
16	55	--	42	--	32	37	43	--	--	73	74	--
17	56	--	42	34	32	40	--	53	60	72	74	--
18	55	--	--	34	32	40	43	53	60	72	--	70
19	54	--	42	34	--	40	43	--	62	73	--	70
20	54	--	42	34	32	40	45	--	64	73	--	71
21	54	--	42	--	35	40	--	--	63	--	--	--
22	--	--	40	--	--	--	45	--	63	74	74	--
23	50	--	40	--	--	40	45	57	--	72	--	70
24	50	--	40	--	--	40	45	58	64	75	--	69
25	51	--	--	--	35	40	45	60	65	76	--	65
26	50	--	40	--	35	40	45	60	65	73	75	--
27	48	--	38	--	35	40	45	60	66	74	72	65
28	47	40	40	--	35	40	45	62	--	--	74	67
29	47	40	40	--	--	40	45	62	68	74	74	66
30	47	40	40	--	--	40	48	60	--	75	74	66
31	47	--	38	--	--	40	--	--	--	73	73	--
Average	55	--	--	--	--	38	44	--	62	73	--	--