North Cascades National Park
Ross Lake and Lake Chelan National Recreation Areas
Sedro Woolley, Washington 98284

WATER QUALITY MONITORING OF DRINKING WATER SUPPLY SOURCES IN 1977

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During the 1977 calendar year, the research staff at North Cascades National Park monitored physical, chemical and bacteriological water quality of six streams and a well. These seven waters were important drinking water supply sources for several campgrounds, a fishing resort, and an administrative use and residential area. All water except the well was considered as non-potable.

In the field water temperature was taken with a mercury pocket thermometer; bicarbonate alkalinity was determined with a Lamotte Chemical Company Model WAT-MPS alkalinity test kit; specific conductance was measured with a Beckman RB3-320 Solu Bridge; and pH was determined with a Hach Chemical Company pH narrow-range field test kit Model 17-F using Brom Thymol Blue as the indicator. Stream flow was found by measuring cross-sectional areas of the stream and determining velocity with stop watch timing of several float runs. A General Oceanics, Inc. Model 2030 digital flowmeter was utilized to measure stream velocity in a few situations where discharge was enough to accomodate the instrument.

Water samples were collected in 500 ml sterilized Polypropylene wide-mouth bottles. Samples were kept cold by chemical ice bags in a cooler chest during transport to the N.P.S. laboratory in Sedro Woolley. Total coliform bacterial densities were determined by the Millipore Corporation membrane filtration technique followed by 24 hour incubation at 35 C ($\pm$ 0.5C) in a sterile culture media.

Stream and well water turbidity was measured in the laboratory with a Hach Chemical Company Model 2100 A turbidimeter.

Most of the field and laboratory analysis was carried out by biological technician Kevin Mullen and biological technician (V.I.P.) Val Mullen. Procedures followed those described by Hach Chemical Company (1973), and Millipore Corporation (1972, 1975).

Results are presented in the following tables on pages three through seven.

References

Hach Chemical Company. 1973. Water analysis handbook. Ames, Iowa.

Millipore Corporation. 1975. Total coliform analysis. Cat. No. AB311. Bedford, Mass. 6p.

Millipore Corporation. 1972. Biological analysis of water and wastewater. Application Manual AM 302. 81 p.

Table 1. Physical, chemical, and bacteriological quality determinations of Rhode Creek in 1977. Stream was sampled just below the water supply intake structure.

Date	Time (P.d.t.)	pH Units	HCO_3 Alkalinity (mg/l)	Specific Conductance (Mhos/cm)	Water Temp. (°C)	Turbidity (J.T.U.)	Mean No. Coliforms per 100 ml Sample	Stream Discharge m^3/sec	Stream Discharge ft^3/sec
5/10	1040	7.30	20.5	58	7.6	*	<1.0	0.11	3.9
6/2	1025	7.40	20.0	50	5.3	0.32	4.22	0.18	6.5
6/22	1025	7.30	23.0	56	11.3	0.30	1.78	0.060	2.1
7/5	1049	7.30	34.2	72	8.4	0.39	2.22	0.025	0.89
7/22	1400	7.90	40.5	82	14.2	0.74	5.78	0.025	0.88
8/4	1125	7.80	40.0	90	15.4	0.44	18.8	0.008	0.30
8/24	1110	7.80	45.0	109	12.5	0.56	17.5	0.010	0.36
9/8	1000	7.90	48.0	110	9.3	0.28	3.13	0.010	0.34
9/27	1115	7.85	47.0	111	8.1	0.26	15.0	0.011	0.37
10/17	1100	7.95	51.0	116	6.4	0.21	12.6	0.008	0.27

* Not measured

Table 2. Physical, chemical, and bacteriological quality determinations of Marblemount water supply spring in 1977. Stream was sampled just below the water supply structure.

Date	Time (P.d.t.)	pH Units	HCO_3 Alkalinity (mg/l)	Specific Conductance (Mhos/cm)	Water Temp. (°C)	Turbidity (J.T.U.)	Mean No. Coliforms per 100 ml Sample	Stream Discharge m^3/sec	Stream Discharge ft^3/sec
5/10	1345	7.70	66.0	118	7.2	*	3.3	.0086	0.31
5/26	1530	7.90	52.0	130	7.4	0.51	<1.0	.0089	0.31
6/22	1230	7.70	58.5	122	7.9	0.10	1.67	.0100	0.36
7/5	1350	7.60	63.0	121	7.2	0.34	0.44	.0068	0.24
7/22	1140	8.50	67.0	124	7.5	0.66	0.89	.0091	0.32
8/4	1352	8.00	65.5	130	8.0	0.28	1.14	.0070	0.25
8/24	1335	7.70	66.0	134	7.7	0.29	3.10	.0043	0.15**
9/8	1415	7.95	66.0	138	6.9	0.21	8.13	.0052	0.18**
9/27	1345	8.30	69.0	135	7.9	0.16	1.88	.0051	0.18**
10/17	1315	8.10	66.0	131	7.9	0.19	3.43	.0040	0.14**
11/11	1400	8.00	58.0	124	8.0	0.17	3.02	.0130	0.44

* Not measured

** A considerable amount of stream water was being drawn off to the settling tank before it could be measured as stream flow.

Table 3. Physical, chemical, and bacteriological quality determinations of Deer Creek (Diablo Lake Resort water supply) in 1977. Stream was sampled just below the water intake structure.

Date	Time (P.d.t.)	pH Units	HCO_3 Alkalinity (mg/l)	Specific Conductance (Mhos/cm)	Water Temp. (°C)	Turbidity (J.T.U.)	Mean No. Coliforms per 100 ml Sample	Stream Discharge m^3/sec	Stream Discharge ft^3/sec
5/10	1200	7.10	23.5	66	7.2	*	38.0	0.034	1.2
6/2	1145	7.20	26.0	67	7.1	0.32	4.0	0.022	0.78
6/22	1115	7.10	27.0	63	9.4	0.14	< 1.0	0.021	0.75
7/5	1225	6.90	28.8	64	8.3	0.80	<1.0	0.015	0.53
7/22	1520	7.20	31.0	67	10.3	0.32	22.5	0.013	0.45
8/4	1247	7.00	29.5	68	11.1	0.43	50.0	0.009	0.33
8/24	1200	6.95	29.5	66	10.3	0.32	30.8	0.007	0.25
9/8	1300	7.05	30.5	69	9.3	0.30	775	0.007	0.23
9/13	1530	*	*	*	10.0	0.13	75.0	*	*
9/27	1215	7.00	31.0	78	8.5	0.16	23.3	0.005	0.18
10/17	1140	7.00	30.0	68	7.9	0.21	4.0	0.007	0.24
11/11	1300	7.20	27.0	71	7.5	0.29	32.3	0.017	0.62

* Not measured

Table 4. Physical, chemical, and bacteriological quality determinations of Purple Creek, Hozomeen Creek, and Howlett Creek in 1977. Streams were sampled just below the water supply intake structures.

Date	Time (P.d.t.)	pH Units	HCO_3 Alkalinity (mg/l)	Specific Conductance (Mhos/cm)	Water Temp. (°C)	Turbidity (J.T.U.)	Mean No. Coliforms per 100 ml Sample	Stream Discharge m^3/sec	Stream Discharge ft^3/sec
Purple Creek (Lake Chelan N.R.A.)									
5/17	1600	7.35	21.0	42.5	8.0	0.14	0.0	0.117	4.1
6/15	1035	7.10	23.0	48.0	9.8	0.29	4.44	0.026	0.72
Hozomeen Creek (Ross Lake N.R.A.)									
6/30	1320	7.70	42.5	93.5	8.9	0.15	1.29	0.077	2.7
Howlett Creek (Ross Lake N.R.A.)									
6/30	1400	8.00	75.0	141	9.2	0.21	0.89	0.036	1.3

Table 5. Water quality of Goodell Creek Campground well in 1977. All samples taken from roadside tap in lower (west) unit of the campground.

Date	Time (P.d.t.)	Temp. (°C)	Turbidity (J.T.U.)	Mean No. Coliform Organisms per 100 ml
7/13	1323	12.8	0.43	0.0
8/4	1305	15.8	0.48	0.0
8/24	1255	15.8	0.62	0.0
9/8	1330	13.3	0.27	0.0
9/27	1255	12.1	0.21	0.0
10/17	1225	11.5	0.70	0.0