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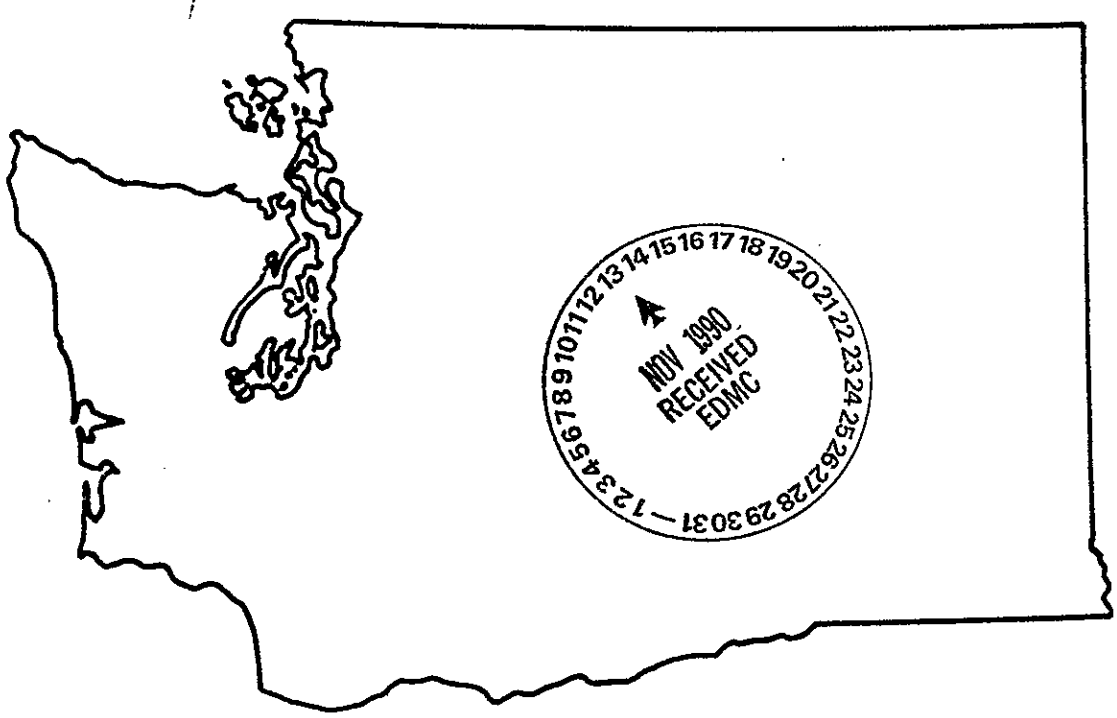
Water Resources Data
Washington
Water Year 1985

By E.H. McGavock, W.D. Wiggins, R.L. Blazs, P.R. Boucher, L.L. Reed, and M.L. Smith



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U.S. GEOLOGICAL SURVEY WATER-DATA REPORT WA-85-1
Prepared in cooperation with the State of Washington
and with other agencies

UNITED STATES DEPARTMENT OF THE INTERIOR

DONALD PAUL HODEL, Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

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1987

12472800 COLUMBIA RIVER BELOW PRIEST RAPIDS DAM, WA

LOCATION.--Lat 46°37'44", long 119°51'49", in SE¼NW¼ sec.7, T.13 N., R.24 E., Grant County, Hydrologic Unit 17020016, on left bank 2.6 mi downstream from Priest Rapids Dam, 14.7 mi south of Beverly, and at mile 394.5.

DRAINAGE AREA.--96,000 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--January 1917 to current year. January 1917 to September 1930, at site 3.4 mi downstream, published as "at Vernita." October 1930 to July 27, 1959, at site 46.5 mi upstream, published as "at Trinidad."

REVISED RECORDS.--WSP 1933: Drainage area. WDR WA-82-2: 1965(m), 1971(m).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1930, nonrecording gages at site 3.4 mi downstream at datum 388.7 ft above National Geodetic Vertical Datum of 1929. Oct. 1, 1930, to July 27, 1959, water-stage recorder at site 46.5 mi upstream at datum 499.3 ft above National Geodetic Vertical Datum of 1929 (river-profile survey).

REMARKS.--No estimated daily discharges. Water-discharge records excellent. Diversions for irrigation of about 500,000 acres upstream from station. Flow regulated by 10 major reservoirs and numerous smaller reservoirs and powerplants. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--68 years, 119,900 ft³/s, 86,870,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 692,600 ft³/s June 12, 1948, gage height, 59.35 ft, site and datum then in use; minimum, 4,120 ft³/s Feb. 10, 1932, gage height, 11.40 ft, site and datum then in use.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 7, 1894, reached a discharge of about 740,000 ft³/s, based on information obtained at other points.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 219,000 ft³/s Jan. 19, elevation, 412.72 ft; minimum, 37,100 ft³/s Aug. 5, elevation, 396.51 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	80400	96600	80900	89600	154000	135000	68500	127000	121000	105000	59600	51[illegible]
2	98600	62800	62700	125000	149000	126000	81300	135000	84900	122000	58300	[illegible]
3	89000	53300	101000	157000	153000	124000	95400	134000	123000	110000	41500	8840[illegible]
4	82600	47600	134000	152000	154000	125000	78300	127000	115000	76900	39000	7550[illegible]
5	90600	72100	130000	135000	179000	132000	65300	130000	112000	71900	60600	6380[illegible]
6	80700	69100	115000	138000	179000	127000	63800	154000	122000	87600	74600	654[illegible]
7	60000	67000	121000	136000	158000	129000	62500	159000	98900	87000	88400	4690[illegible]
8	70100	81100	87200	137000	154000	127000	62500	163000	68700	78800	81900	4070[illegible]
9	80200	92300	94400	153000	150000	114000	63200	159000	76800	84700	73900	6030[illegible]
10	72700	60900	107000	146000	143000	121000	62600	159000	98600	80600	65600	5450[illegible]
11	88400	57200	106000	156000	130000	117000	62500	157000	87700	77600	52300	562[illegible]
12	78900	61100	94000	159000	129000	80900	62700	155000	104000	72800	64800	637[illegible]
13	78800	84000	108000	140000	131000	116000	62500	146000	105000	56300	82900	59[illegible]
14	68600	94600	107000	135000	148000	111000	63700	156000	111000	57200	91100	425[illegible]
15	93500	99400	98300	130000	155000	120000	82200	160000	117000	86800	89400	392[illegible]
16	94300	87800	80800	133000	149000	104000	126000	147000	98400	108000	68500	63300
17	90300	101000	111000	154000	146000	75500	129000	98100	104000	109000	71000	6820[illegible]
18	86600	71400	134000	163000	151000	99000	123000	128000	143000	78200	65800	7240[illegible]
19	73100	88800	138000	163000	153000	110000	120000	110000	142000	67300	76700	51000
20	65500	110000	138000	155000	152000	98600	132000	136000	135000	60200	58100	65000
21	81300	96200	134000	157000	134000	114000	89200	134000	130000	64100	68000	5240[illegible]
22	92400	84600	112000	157000	138000	119000	119000	126000	97300	92100	59900	6040[illegible]
23	96000	68300	76300	161000	132000	120000	139000	127000	84300	98400	56900	8630[illegible]
24	88800	58200	86700	174000	128000	100000	135000	137000	105000	89600	54200	8890[illegible]
25	92800	51500	69800	165000	132000	114000	131000	113000	106000	79100	57500	95100
26	89400	64500	81100	159000	132000	120000	122000	94800	119000	66000	80800	9400[illegible]
27	67500	109000	98700	133000	128000	120000	120000	110000	112000	55800	89500	89900
28	49200	112000	103000	145000	134000	118000	119000	131000	118000	51800	63800	8100[illegible]
29	80200	95800	98000	151000	---	122000	126000	143000	111000	69900	63800	7670[illegible]
30	91700	85500	74900	167000	---	103000	140000	150000	103000	60000	66400	103000
31	77100	---	90000	167000	---	67600	---	122000	---	66100	44200	---
TOTAL	2529300	2383700	3172800	4592600	4075000	3509600	2907200	4227900	3253600	2470800	2069000	2015100
MEAN	81590	79460	102300	148100	145500	113200	96910	136400	108500	79700	66740	67170
MAX	98600	112000	138000	174000	179000	135000	140000	163000	143000	122000	91100	103000
MIN	49200	47600	62700	89600	128000	67600	62500	94800	68700	51800	39000	3920[illegible]
AC-FT	5017000	4728000	6293000	9109000	8083000	6961000	5766000	8386000	6454000	4901000	4104000	3997000

CAL YR 1984 TOTAL 41528100 MEAN 113500 MAX 207000 MIN 47600 AC-FT 82371000
WTR YR 1985 TOTAL 37206600 MEAN 101900 MAX 179000 MIN 39000 AC-FT 73799000

12472800 COLUMBIA RIVER BELOW PRIEST RAPIDS DAM, WA--Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--
WATER TEMPERATURES: March 1980 to current year. Temperature records for site "at Vernita Bridge, near Priest Rapids Dam" (station 12472900) for period July 1974 to September 1980 are equivalent.

INSTRUMENTATION.--Temperature recorder since December 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURES: Maximum, 21.5°C Aug. 4, 1985; minimum, 1.0°C Feb. 3-11, 1985.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURES: Maximum, 21.5°C Aug. 4; minimum, 1.0°C Feb. 3-11.

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	17.0	16.0	16.5	11.5	11.0	11.5	9.0	8.5	8.5	3.0	3.0	3.0
2	17.5	16.5	17.0	12.0	11.0	11.5	8.5	8.0	8.0	3.0	3.0	3.0
3	17.0	16.5	17.0	12.0	11.0	11.5	8.0	7.5	7.5	3.0	3.0	3.0
4	17.0	16.5	17.0	12.0	11.0	11.5	7.5	7.5	7.5	3.0	3.0	3.0
5	17.0	16.0	16.5	11.5	11.0	11.0	7.5	7.0	7.5	3.0	2.5	3.0
6	17.0	16.5	16.5	11.5	11.0	11.0	7.5	7.0	7.0	2.5	2.5	2.5
7	17.5	16.5	17.0	11.5	11.0	11.0	7.0	7.0	7.0	3.0	2.5	2.5
8	17.0	16.5	17.0	11.0	11.0	11.0	7.0	6.5	7.0	3.0	2.5	3.0
9	17.0	16.0	17.0	11.5	10.5	11.0	7.0	6.5	6.5	3.0	3.0	3.0
10	17.0	16.5	17.0	11.5	10.5	11.0	7.0	6.5	6.5	3.0	3.0	3.0
11	17.0	16.0	16.5	11.0	10.5	11.0	6.5	6.5	6.5	3.0	3.0	3.0
12	16.5	16.0	16.0	11.0	10.5	10.5	6.5	6.5	6.5	3.0	3.0	3.0
13	16.0	15.5	16.0	10.5	10.5	10.5	6.5	6.0	6.0	3.0	3.0	3.0
14	16.0	15.5	15.5	11.0	10.5	10.5	6.5	6.0	6.0	3.0	2.5	3.0
15	15.5	15.0	15.5	10.5	10.5	10.5	7.0	6.0	6.0	3.0	3.0	3.0
16	15.5	15.0	15.5	11.0	10.0	10.5	6.5	6.0	6.0	3.0	2.5	2.5
17	15.5	14.5	15.0	11.0	10.0	10.5	6.0	5.5	5.5	2.5	2.5	2.5
18	15.0	14.5	15.0	11.0	10.5	10.5	5.5	4.5	5.0	2.5	2.5	2.5
19	15.0	14.0	14.5	11.0	10.5	10.5	5.0	4.5	5.0	2.5	2.5	2.5
20	14.5	14.0	14.0	11.0	10.5	10.5	5.0	4.5	4.5	2.5	2.5	2.5
21	14.5	14.0	14.0	11.0	10.5	10.5	4.5	4.5	4.5	2.5	2.5	2.5
22	14.5	13.5	14.0	10.5	10.5	10.5	4.5	4.5	4.5	2.5	2.5	2.5
23	14.0	13.5	13.5	10.5	10.0	10.5	5.0	4.5	5.0	2.5	2.5	2.5
24	14.0	13.0	13.5	10.5	10.0	10.0	4.5	4.5	4.5	2.5	2.5	2.5
25	14.0	13.5	13.5	10.5	10.0	10.0	4.5	4.5	4.5	2.5	2.5	2.5
26	13.5	13.0	13.5	10.0	9.5	9.5	4.5	4.0	4.5	2.5	2.5	2.5
27	13.5	12.0	13.0	9.5	9.5	9.5	4.5	4.0	4.5	2.5	2.5	2.5
28	13.0	12.0	12.5	9.5	9.0	9.5	4.0	4.0	4.0	2.5	2.0	2.5
29	13.0	12.0	12.5	9.5	9.0	9.0	4.0	3.5	4.0	2.5	2.0	2.5
30	12.5	12.0	12.0	9.0	9.0	9.0	4.0	3.0	3.5	2.0	2.0	2.0
31	12.0	11.5	12.0	---	---	---	3.5	3.0	3.5	2.0	2.0	2.0
MONTH	17.5	11.5	15.0	12.0	9.0	10.5	9.0	3.0	5.5	3.0	2.0	2.5

12472800 COLUMBIA RIVER BELOW PRIEST RAPIDS DAM, WA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	2.0	1.5	1.5	3.5	3.0	3.5	6.0	5.0	5.5	9.0	8.0	8.5
2	1.5	1.5	1.5	3.5	3.0	3.0	6.0	6.0	6.0	9.0	8.5	9.0
3	1.5	1.0	1.0	3.5	3.0	3.0	6.0	5.5	6.0	9.5	9.0	9.0
4	1.0	1.0	1.0	3.5	3.0	3.0	7.0	5.5	6.0	9.5	9.0	9.0
5	1.0	1.0	1.0	3.0	3.0	3.0	7.5	6.0	6.5	9.5	9.0	9.0
6	1.0	1.0	1.0	3.5	3.0	3.0	7.5	6.5	6.5	9.5	9.0	9.5
7	1.0	1.0	1.0	3.5	3.0	3.0	7.5	6.5	7.0	9.5	9.5	9.5
8	1.0	1.0	1.0	3.5	3.0	3.0	8.0	6.5	7.0	10.0	9.5	9.5
9	1.0	1.0	1.0	3.5	3.0	3.5	8.0	6.5	7.0	10.0	10.0	10.0
10	1.5	1.0	1.0	3.5	3.0	3.5	8.5	7.0	7.5	10.5	10.0	10.0
11	1.5	1.0	1.5	3.5	3.0	3.5	8.5	7.5	8.0	10.0	10.0	10.0
12	1.5	1.5	1.5	4.5	3.5	4.0	9.0	7.5	8.0	10.0	10.0	10.0
13	2.0	1.5	1.5	4.0	3.5	3.5	9.0	7.5	8.5	10.5	10.0	10.0
14	2.0	1.5	1.5	4.0	3.5	3.5	9.5	8.0	8.5	10.5	10.5	10.5
15	2.0	1.5	2.0	4.0	3.5	3.5	8.5	8.0	8.5	11.0	10.5	10.5
16	2.5	2.0	2.0	4.5	3.5	4.0	8.5	8.0	8.0	11.0	10.5	11.0
17	2.5	2.0	2.0	5.0	4.0	4.0	8.5	8.0	8.0	12.0	11.0	11.5
18	2.5	2.0	2.5	4.5	4.0	4.0	8.5	8.0	8.5	12.0	11.0	11.5
19	2.5	2.5	2.5	4.5	4.0	4.5	8.5	8.0	8.0	12.5	12.0	12.0
20	2.5	2.0	2.5	4.5	4.0	4.5	8.0	7.5	8.0	12.5	12.0	12.0
21	2.5	2.5	2.5	4.5	4.0	4.5	8.5	7.5	8.0	12.5	12.0	12.0
22	3.0	2.5	2.5	4.5	4.5	4.5	8.0	7.5	8.0	13.0	12.0	12.5
23	3.0	3.0	3.0	4.5	4.5	4.5	8.0	7.5	8.0	13.0	12.5	13.0
24	3.0	3.0	3.0	5.0	4.5	5.0	8.0	7.5	7.5	13.0	13.0	13.0
25	3.0	3.0	3.0	5.0	4.5	4.5	7.5	7.0	7.5	14.0	13.0	13.5
26	3.5	3.0	3.0	4.5	4.5	4.5	8.0	7.0	7.5	14.5	13.0	13.5
27	3.5	3.0	3.0	4.5	4.0	4.5	8.5	7.5	8.0	14.0	13.5	13.5
28	3.0	3.0	3.0	5.0	4.5	4.5	8.5	8.0	8.0	14.0	13.0	13.5
29	---	---	---	5.0	4.5	4.5	8.5	8.0	8.0	13.5	13.0	13.0
30	---	---	---	5.0	4.5	4.5	8.0	8.0	8.0	13.5	13.0	13.0
31	---	---	---	6.0	5.0	5.5	---	---	---	14.0	13.0	13.0
MONTH	3.5	1.0	2.0	6.0	3.0	4.0	9.5	5.0	7.5	14.5	8.0	11.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	13.5	13.0	13.5	17.0	16.5	17.0	20.5	19.0	20.0	19.5	19.0	19.5
2	14.5	13.5	13.5	17.5	16.5	17.0	20.5	19.0	19.5	20.0	19.0	19.5
3	14.0	13.0	13.5	17.5	16.5	17.0	21.0	19.0	20.0	20.0	19.0	19.5
4	14.0	13.5	14.0	18.0	16.5	17.0	21.5	19.0	20.0	20.0	19.0	19.5
5	14.5	13.5	14.0	18.0	16.5	17.0	20.5	19.0	20.0	19.5	19.0	19.5
6	14.0	13.5	13.5	17.5	16.5	17.0	20.5	19.0	20.0	19.5	18.5	19.0
7	14.0	13.5	14.0	18.0	17.5	17.5	20.0	19.5	20.0	19.5	18.0	18.5
8	15.0	13.5	14.0	18.5	17.5	18.0	20.0	19.0	19.5	19.0	18.0	18.5
9	15.0	13.5	14.0	19.0	18.0	18.5	20.0	18.5	19.5	19.0	18.0	18.5
10	15.0	14.0	14.5	19.5	18.0	18.5	19.5	18.5	19.0	19.5	18.0	18.5
11	15.0	14.0	14.5	19.0	18.0	19.0	20.0	18.5	19.0	18.5	18.0	18.5
12	15.0	14.5	15.0	19.5	18.5	19.0	20.0	18.5	19.0	18.5	17.5	18.0
13	15.0	14.5	14.5	20.0	18.5	19.0	20.0	19.0	19.5	18.5	18.0	18.0
14	15.0	14.5	14.5	20.5	18.5	19.5	20.0	19.0	19.5	19.0	18.0	18.5
15	15.5	14.5	15.0	20.0	19.0	19.5	19.5	19.0	19.5	19.5	17.5	18.0
16	15.5	15.0	15.5	19.5	19.0	19.5	19.5	18.5	19.0	18.0	17.5	17.5
17	16.0	15.0	15.5	19.5	19.0	19.0	20.0	19.0	19.5	18.0	17.5	17.5
18	16.0	15.0	15.5	20.0	19.0	19.5	20.0	19.0	19.5	18.0	17.0	17.5
19	16.0	15.5	16.0	20.5	19.0	19.5	19.5	18.5	19.0	18.5	17.0	17.5
20	16.5	15.5	16.0	21.0	19.0	20.0	18.5	17.5	18.5	18.0	17.0	17.5
21	16.5	16.0	16.0	21.0	19.5	20.0	19.0	17.5	18.0	18.0	17.0	17.5
22	17.0	16.0	16.0	20.0	19.5	20.0	19.0	17.5	18.5	18.0	17.0	17.5
23	16.5	15.5	16.0	20.5	19.5	20.0	20.0	18.0	19.0	17.5	17.0	17.5
24	16.0	15.0	15.5	20.0	19.5	19.5	20.0	19.0	19.0	18.0	17.0	17.5
25	16.0	15.5	15.5	20.0	19.0	19.5	20.5	19.0	19.5	18.0	17.5	18.0
26	16.5	15.5	16.0	20.0	19.0	19.5	19.5	19.0	19.5	18.0	17.5	17.5
27	16.5	16.0	16.5	20.5	19.0	19.5	19.5	19.0	19.5	18.0	17.0	17.5
28	17.0	16.0	16.5	21.0	19.0	20.0	20.0	18.5	19.5	17.5	17.0	17.5
29	17.0	16.0	16.5	20.5	19.5	20.0	20.5	19.0	19.5	17.5	17.0	17.0
30	17.5	16.5	17.0	20.5	19.5	20.0	20.0	18.5	19.5	17.5	16.5	17.0
31	---	---	---	20.5	19.5	20.0	20.5	18.5	19.5	---	---	---
MONTH	17.5	13.0	15.0	21.0	16.5	19.0	21.5	17.5	19.5	20.0	16.5	18.0
YEAR	21.5	1.0	11.0									

12472900 COLUMBIA RIVER AT VERNITA BRIDGE, NEAR PRIEST RAPIDS DAM, WA
(National stream quality accounting network station)

LOCATION.--Lat 46°38'34", long 119°43'54", in NW¼SE¼ sec.6, T.13 N., R.25 E., Grant County, Hydrologic Unit 17020016, at State Highway 24 Vernita Bridge crossing, 9.0 mi downstream from Priest Rapids Dam, and at mile 388.1.

DRAINAGE AREA.--96,000 mi², approximately.

PERIOD OF RECORD.--Water years 1962-63, 1972, 1974 to current year.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURES: July 1974 to September 1980.

REMARKS.--October 1971 to September 1972, at site 6.4 mi upstream, published as 12472800 "below Priest Rapids Dam." Prior to October 1971 published as 12472800 "at Vernita Ferry."

WATER QUALITY DATA, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	TIME	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH (STAND-ARD UNITS)	TEMPER-ATURE (DEG C)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS NONCAR-BONATE (MG/L AS CACO3)
NOV												
14...	1330	75000	135	7.60	11.0	2.2	10.8	98	<1	1300	70	8
JAN												
22...	1100	161000	138	7.40	2.5	0.7	14.8	108	K1	E13	75	6
MAR												
26...	1045	119000	157	7.90	4.0	1.2	13.5	106	K1	K2	79	5
MAY												
28...	1130	89000	129	8.10	13.5	2.4	11.4	111	K2	K2	65	4
JUL												
29...	1145	55000	126	8.20	20.0	1.9	11.5	130	K1	--	62	7
SEP												
30...	1150	114000	139	7.90	17.0	1.0	9.8	103	K10	200	62	--

DATE	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	PERCENT SODIUM	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY WH WAT TOTAL FIELD MG/L AS CACO3	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)
NOV												
14...	21	4.3	2.4	7	0.1	0.8	62	11	1.3	0.2	4.9	78
JAN												
22...	22	4.8	2.2	6	0.1	0.8	69	13	2.1	0.1	5.1	72
MAR												
26...	23	5.2	2.1	5	0.1	0.7	74	14	1.0	0.1	4.6	93
MAY												
28...	19	4.2	2.4	7	0.1	0.6	61	15	1.2	0.1	6.0	73
JUL												
29...	18	4.1	2.4	8	0.1	0.9	55	8.7	1.1	0.1	3.6	66
SEP												
30...	18	4.1	2.2	7	0.1	0.9	63	10	1.2	0.1	4.1	78

DATE	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	SOLIDS, RESIDUE AT 105 DEG. C, SUS-PENDED (MG/L)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)
NOV												
14...	83	0.11	15800	2	<0.01	<0.10	0.01	0.2	0.02	0.01	0.02	20
JAN												
22...	92	0.1	31300	1	<0.01	<0.10	0.01	0.2	0.02	0.01	0.01	--
MAR												
26...	95	0.13	29900	7	--	0.10	0.03	0.2	0.01	<0.01	<0.01	<10
MAY												
28...	85	0.1	17500	1	<0.01	0.15	0.04	0.4	0.02	<0.01	<0.01	<10
JUL												
29...	72	0.09	9800	2	<0.01	<0.10	0.04	0.4	0.02	0.02	0.03	<10
SEP												
30...	78	0.11	24000	1	--	<0.10	0.04	0.4	0.03	0.02	0.02	--

E - Estimated value based on values reported by the Denver Central Laboratory.
K - Results based on colony count outside the acceptable range (non-ideal colony count).

12472900 COLUMBIA RIVER AT VERNITA BRIDGE, NEAR PRIEST RAPIDS DAM, WA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COBALT, DIS-SOLVED (UG/L AS CO)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	LITHIUM DIS-SOLVED (UG/L AS LI)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
NOV											
14...	<1	37	<0.5	<1	<1	<3	80	31	19	<4	4
JAN											
22...	--	--	--	--	--	--	--	--	--	--	--
MAR											
26...	<1	31	<0.5	<1	<1	<3	2	7	1	6	4
MAY											
28...	<1	32	<0.5	<1	<1	<3	44	11	<1	<4	1
JUL											
29...	<1	32	<0.5	<1	1	<3	20	6	1	<4	1
SEP											
30...	--	--	--	--	--	--	--	--	--	--	--

DATE	MERCURY DIS-SOLVED (UG/L AS HG)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	VANA-DIUM, DIS-SOLVED (UG/L AS V)	ZINC, DIS-SOLVED (UG/L AS ZN)	CARBON, ORGANIC TOTAL (MG/L AS C)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY)
NOV											
14...	<0.1	<10	<1	<1	<1	110	<6	17	5.1	2	405
JAN											
22...	--	--	--	--	--	--	--	--	--	1	435
MAR											
26...	<0.1	<10	<1	<1	<1	110	<6	11	2.3	4	1290
MAY											
28...	<0.1	<10	3	<1	<1	80	<6	7	4.0	2	481
JUL											
29...	<0.1	<10	<1	<1	<1	79	<6	8	4.6	4	594
SEP											
30...	--	--	--	--	--	--	--	--	--	3	923

12473520 COLUMBIA RIVER AT RICHLAND, WA

LOCATION.--Lat 46°18'46", long 119°15'28", in NW¼NW¼ sec.36, T.10 N., R.28 E., Benton County, Hydrologic Unit 17020016, at city of Richland pumping plant, 4.8 mi upstream from Yakima River, and at mile 340.2.

DRAINAGE AREA.--96,900 mi², approximately.

PERIOD OF DAILY RECORD.--
WATER TEMPERATURE: July 1974 to current year. Unpublished records of stage at site 2.3 miles downstream are available in files of the Geological Survey, and U.S. Army Corps of Engineers.

INSTRUMENTATION.--Water-temperature recorder with probe located at city of Richland pumping-plant pier near right bank from July 1974 until January 1977. Since January 1977, recorder probe located 200 ft streamward from plant.

REMARKS.--Equipment malfunction Nov. 12 to Dec. 4. Water temperatures as recorded for the period July 1974 to January 1977 did not represent mean stream temperatures (see previous state reports for correlation between thermal load measurements and recorded temperatures). Temperature probe, relocated January 1977, represents both horizontal and vertical cross section of the river.

EXTREMES FOR PERIOD OF DAILY RECORD.--
WATER TEMPERATURES: Maximum, 22.0°C July 21, Aug. 4, 5, 1985; minimum, 0.5°C Feb. 1-4, 1979, Feb. 4, 1985.

EXTREMES FOR CURRENT YEAR.--
WATER TEMPERATURES: Maximum, 22.0°C July 21, Aug. 4, 5; minimum, 0.5°C Feb. 4.

WATER QUALITY DATA, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DATE	TIME	SPECIFIC CONDUCTANCE (US/CM)	PH (STANDARD UNITS)	TEMPERATURE (DEG C)	TURBIDITY (NTU)	OXYGEN, DISSOLVED (MG/L)	OXYGEN, DISSOLVED (PERCENT SATURATION)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	STREPTOCOCCI FECAL, KF AGAR (COLS. PER 100 ML)	HARDNESS (MG/L AS CACO3)
NOV										
15...	1130	140	8.10	10.5	2.6	10.8	96	K3	E3600	71
MAR										
27...	1030	164	7.80	4.0	1.3	13.6	107	<1	K3	78
MAY										
29...	1015	127	8.00	13.0	2.9	11.4	110	K5	180	62
JUL										
30...	1030	125	8.30	20.5	1.6	9.9	113	K13	>400	60

DATE	HARDNESS NONCARBONATE (MG/L AS CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	ALKALINITY WH WAT TOTAL FIELD MG/L AS CACO3	CHLORIDE, DISSOLVED (MG/L AS CL)	SOLIDS, RESIDUE AT 180 DEG. C DISSOLVED (MG/L)	SOLIDS, RESIDUE AT 105 DEG. C, SUSPENDED (MG/L)	NITROGEN, NITRITE DISSOLVED (MG/L AS N)	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N)
NOV									
15...	9	21	4.5	62	2.3	79	6	<0.01	0.12
MAR									
27...	0	23	5.0	78	1.0	85	7	<0.01	0.10
MAY									
29...	0	18	4.2	62	1.1	72	5	<0.01	<0.10
JUL									
30...	--	17	4.2	66	1.1	68	6	<0.01	<0.10

DATE	NITROGEN, AMMONIA DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N)	PHOSPHORUS, TOTAL (MG/L AS P)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P)	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)	CARBON, ORGANIC TOTAL (MG/L AS C)	SEDIMENT, SUSPENDED (MG/L)
NOV									
15...	0.02	<0.2	0.03	0.02	<10	--	37	1.5	6
MAR									
27...	0.04	0.2	0.01	<0.01	<10	2	<3	1.0	5
MAY									
29...	0.04	0.3	0.02	<0.01	<10	--	11	4.5	4
JUL									
30...	0.04	0.4	0.02	<0.01	<10	--	5	6.1	7

E - Estimated value based on values reported by Denver Central Laboratory.
K - Results based on colony count outside the acceptable range (non-ideal colony count).

12473520 COLUMBIA RIVER AT RICHLAND, WA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	17.5	17.0	17.0	11.5	11.0	11.5	---	---	---	3.5	3.0	3.0
2	17.5	17.0	17.0	11.5	11.0	11.0	---	---	---	3.5	3.0	3.0
3	17.0	17.0	17.0	11.0	11.0	11.0	---	---	---	3.5	3.0	3.0
4	17.0	16.5	16.5	11.5	11.0	11.5	---	---	---	3.5	3.0	3.0
5	16.5	16.5	16.5	11.5	11.5	11.5	7.0	7.0	7.0	3.0	3.0	3.0
6	17.0	16.5	16.5	11.5	11.0	11.5	7.0	7.0	7.0	3.0	2.5	3.0
7	17.0	16.5	17.0	11.0	10.5	11.0	7.0	7.0	7.0	3.0	2.5	3.0
8	17.0	17.0	17.0	11.0	10.5	11.0	7.0	6.5	7.0	3.0	3.0	3.0
9	17.0	17.0	17.0	11.0	11.0	11.0	7.0	6.5	6.5	3.0	3.0	3.0
10	17.0	16.5	16.5	11.0	11.0	11.0	7.0	6.5	6.5	3.0	3.0	3.0
11	16.5	16.0	16.0	11.0	11.0	11.0	6.5	6.0	6.5	3.5	3.0	3.0
12	15.5	15.0	15.5	---	---	---	6.5	6.0	6.5	3.5	3.0	3.0
13	15.5	15.0	15.0	---	---	---	6.0	6.0	6.0	3.5	3.0	3.0
14	15.5	15.0	15.0	---	---	---	6.5	6.0	6.0	3.0	3.0	3.0
15	15.0	14.5	15.0	---	---	---	6.5	6.0	6.0	3.0	3.0	3.0
16	15.0	14.5	15.0	---	---	---	6.0	6.0	6.0	3.0	3.0	3.0
17	15.0	14.5	14.5	---	---	---	6.0	5.0	5.5	3.0	3.0	3.0
18	14.5	14.0	14.0	---	---	---	5.0	5.0	5.0	3.0	2.5	2.5
19	14.0	14.0	14.0	---	---	---	5.0	4.5	5.0	2.5	2.5	2.5
20	14.0	13.5	13.5	---	---	---	4.5	4.5	4.5	2.5	2.5	2.5
21	14.0	13.5	13.5	---	---	---	4.5	4.5	4.5	2.5	2.5	2.5
22	13.5	13.0	13.5	---	---	---	5.0	4.5	4.5	2.5	2.5	2.5
23	13.5	13.0	13.5	---	---	---	5.0	5.0	5.0	2.5	2.5	2.5
24	14.0	13.0	13.5	---	---	---	5.0	5.0	5.0	2.5	2.5	2.5
25	13.5	13.0	13.5	---	---	---	5.0	5.0	5.0	2.5	2.5	2.5
26	13.0	12.5	13.0	---	---	---	5.0	5.0	5.0	2.5	2.5	2.5
27	12.5	12.0	12.0	---	---	---	5.0	4.5	4.5	2.5	2.5	2.5
28	12.5	12.0	12.0	---	---	---	4.5	4.5	4.5	2.5	2.5	2.5
29	12.5	12.0	12.0	---	---	---	4.5	4.0	4.0	2.5	2.0	2.5
30	12.0	11.0	11.5	---	---	---	4.0	4.0	4.0	2.5	2.0	2.0
31	11.5	11.0	11.5	---	---	---	3.5	3.5	3.5	2.0	2.0	2.0
MONTH	17.5	11.0	14.5	---	---	---	---	---	---	3.5	2.0	2.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	2.0	1.5	1.5	3.5	3.0	3.0	6.0	5.0	5.5	9.5	8.5	9.0
2	1.5	1.5	1.5	3.5	3.0	3.0	6.5	5.5	6.0	9.5	9.0	9.5
3	1.5	1.0	1.0	3.5	3.0	3.0	6.5	6.0	6.0	9.5	9.0	9.5
4	1.0	.5	1.0	3.5	3.0	3.0	6.5	5.5	6.0	9.5	9.0	9.5
5	1.0	1.0	1.0	3.5	3.0	3.0	7.0	6.0	6.5	9.5	9.0	9.5
6	1.0	1.0	1.0	3.5	3.0	3.0	7.5	7.0	7.0	9.5	9.0	9.5
7	1.0	1.0	1.0	3.5	3.0	3.0	7.5	7.0	7.5	10.0	9.0	9.5
8	1.0	1.0	1.0	3.5	3.0	3.0	8.0	7.5	8.0	10.5	9.0	10.0
9	1.0	1.0	1.0	3.5	3.0	3.5	8.5	7.5	8.0	10.5	9.5	10.0
10	1.5	1.0	1.0	3.5	3.0	3.5	9.0	8.0	8.5	10.5	9.5	10.0
11	2.0	1.5	1.5	3.5	3.0	3.5	9.0	8.5	8.5	10.5	9.5	10.0
12	2.0	1.5	2.0	4.0	3.0	3.5	9.5	8.5	9.0	10.5	9.5	10.0
13	2.0	1.5	2.0	4.0	3.5	4.0	9.5	8.5	9.0	11.0	9.5	10.5
14	2.0	1.5	2.0	4.0	3.5	3.5	10.0	9.0	9.5	11.0	10.0	10.5
15	2.0	1.5	2.0	4.0	3.5	4.0	9.5	9.0	9.5	11.5	10.5	11.0
16	2.0	1.5	2.0	4.0	3.5	4.0	9.0	8.5	8.5	12.0	10.5	11.5
17	2.5	2.0	2.0	4.5	4.0	4.0	8.5	8.0	8.5	12.5	11.0	11.5
18	2.5	2.0	2.5	4.5	4.0	4.5	8.5	8.0	8.5	13.0	12.0	12.5
19	2.5	2.0	2.5	4.5	4.0	4.0	8.5	8.0	8.0	13.0	12.0	12.5
20	2.5	2.0	2.5	5.0	4.0	4.5	8.0	7.5	8.0	13.0	12.5	13.0
21	2.5	2.0	2.5	4.5	4.0	4.5	8.5	7.5	8.0	13.5	12.0	13.0
22	3.0	2.0	2.5	4.5	4.0	4.5	8.5	8.0	8.0	13.5	12.5	13.0
23	3.0	2.5	3.0	4.5	4.0	4.5	8.5	8.0	8.0	14.0	13.0	13.5
24	3.5	3.0	3.0	5.0	4.5	4.5	8.0	7.5	8.0	14.0	13.0	13.5
25	3.0	2.5	3.0	5.0	4.5	4.5	8.0	7.5	8.0	14.5	13.0	14.0
26	3.0	2.5	3.0	4.5	4.0	4.5	8.0	7.0	7.5	14.5	14.0	14.0
27	3.5	2.5	3.0	4.5	4.0	4.5	8.5	7.5	8.0	14.5	14.0	14.0
28	3.5	3.0	3.0	5.0	4.0	4.5	9.0	8.0	8.5	14.0	13.5	14.0
29	---	---	---	4.5	4.5	4.5	9.0	8.0	8.5	14.0	13.0	13.5
30	---	---	---	5.5	4.5	5.0	9.0	8.0	8.5	14.0	13.0	13.5
31	---	---	---	5.5	5.0	5.0	---	---	---	14.0	13.0	13.5
MONTH	3.5	.5	2.0	5.5	3.0	4.0	10.0	5.0	8.0	14.5	8.5	11.5

12473520 COLUMBIA RIVER AT RICHLAND, WA--Continued

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	14.0	13.5	13.5	18.0	17.0	17.5	20.5	20.0	20.5	20.0	19.5	19.5
2	14.5	13.5	14.0	18.0	17.0	17.5	20.5	20.5	20.5	20.0	19.0	19.5
3	15.0	14.5	14.5	18.0	17.0	17.5	21.5	20.5	21.0	20.0	19.5	19.5
4	15.0	14.0	14.5	18.5	17.5	18.0	22.0	21.0	21.5	20.0	19.5	19.5
5	15.0	14.0	14.5	18.5	17.5	18.0	22.0	20.5	21.5	19.5	19.0	19.5
6	14.5	14.0	14.0	18.5	17.5	18.0	21.0	20.5	21.0	19.5	19.0	19.0
7	14.5	14.0	14.0	18.5	17.5	18.0	21.0	20.0	20.5	19.0	18.5	19.0
8	15.0	14.0	14.5	19.5	18.5	19.0	20.0	19.0	19.5	19.0	18.5	19.0
9	15.5	14.5	15.0	20.0	19.0	19.5	20.0	19.0	19.5	18.5	18.0	18.5
10	16.0	15.0	15.0	20.5	19.0	20.0	19.5	19.0	19.0	19.0	18.0	18.5
11	16.0	15.0	15.5	20.5	19.5	20.0	19.5	18.5	19.0	19.0	18.0	18.5
12	16.5	15.5	16.0	20.0	19.0	19.5	20.0	19.5	19.5	18.5	18.0	18.0
13	16.0	15.5	15.5	20.0	19.0	19.5	20.0	19.0	19.5	18.5	18.0	18.0
14	16.0	15.0	15.5	20.5	20.0	20.0	20.0	19.5	20.0	18.5	18.0	18.0
15	16.0	15.0	15.5	21.0	20.5	20.5	20.0	19.5	19.5	18.5	18.0	18.0
16	16.0	15.0	15.5	20.5	19.5	20.0	20.0	19.0	19.5	18.0	17.0	17.5
17	16.5	15.5	16.0	20.5	19.5	20.0	20.0	19.5	20.0	17.5	17.0	17.0
18	17.0	16.0	16.5	20.5	19.5	20.0	20.0	19.5	20.0	17.5	17.0	17.5
19	17.0	16.0	16.5	21.0	20.0	20.5	20.0	19.5	19.5	17.5	17.0	17.5
20	17.0	16.0	16.5	21.5	20.5	21.0	20.0	19.0	19.0	17.5	17.0	17.5
21	17.0	16.0	16.5	22.0	21.0	21.5	19.0	18.5	18.5	17.5	17.0	17.5
22	17.5	16.0	17.0	21.5	21.0	21.5	19.5	18.5	19.0	17.5	17.0	17.5
23	17.0	16.5	17.0	21.5	20.5	21.0	19.5	19.0	19.5	17.5	17.0	17.0
24	17.0	16.0	16.5	21.0	20.0	20.5	20.0	19.5	20.0	17.5	17.0	17.0
25	17.0	16.0	16.5	21.0	20.0	20.5	20.5	20.0	20.0	18.0	17.0	17.5
26	17.0	16.0	16.5	21.0	20.0	20.5	20.5	20.0	20.0	17.5	17.0	17.5
27	17.0	16.0	16.5	21.0	20.5	20.5	20.0	19.5	20.0	17.5	17.0	17.0
28	17.0	16.0	16.5	21.0	20.5	21.0	20.0	19.5	20.0	16.5	16.0	16.5
29	17.0	16.5	17.0	21.5	21.0	21.0	20.5	19.5	20.0	16.5	16.0	16.5
30	17.5	16.5	17.0	21.0	20.5	21.0	20.5	20.0	20.0	17.0	16.0	16.5
31	---	---	---	20.5	20.0	20.5	20.0	19.5	19.5	---	---	---
MONTH	17.5	13.5	15.5	22.0	17.0	20.0	22.0	18.5	20.0	20.0	16.0	18.0