

Figure 40. Location of surface-water stations in the Skagit River Basin.

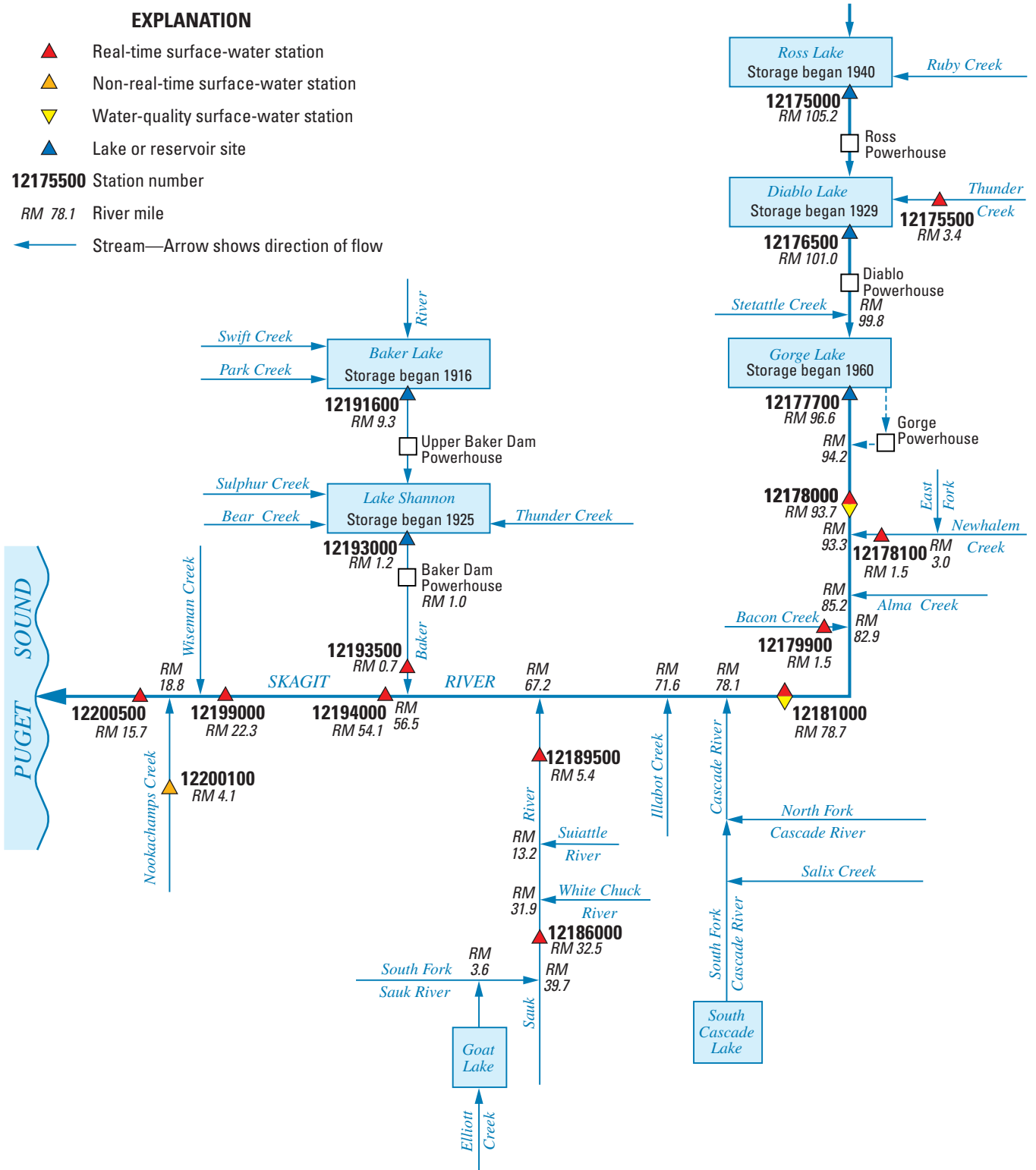


Figure 41. Schematic diagram showing surface-water stations in the Skagit River Basin.

SKAGIT RIVER BASIN

12175000 ROSS RESERVOIR NEAR NEWHALEM, WA  
(International gaging station)

LOCATION.--Lat 48°43'58", long 121°04'02", in SE 1/4 sec.35, T.38 N., R.13 E., Whatcom County, Hydrologic Unit 17110005, Ross Lake National Recreation Area, at Ross Dam on Skagit River, 1.0 mi downstream from Ruby Creek, 9.1 mi northeast of Newhalem, and at mile 105.2.

DRAINAGE AREA.--999 mi<sup>2</sup>, of which 400 mi<sup>2</sup> is in Canada.

PERIOD OF RECORD.--March 1940 to current year (monthend elevations and contents only prior to October 1946). Prior to October 1945, published as "Ruby Reservoir near Newhalem."

REVISED RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is City of Seattle Ross Dam datum; 1.79 ft above NGVD of 1929, U.S. Coast and Geodetic Survey datum; and 0.88 ft above NGVD of 1929, Geodetic Survey of Canada 1959 datum (by water level transfer of elevation from the international boundary). Prior to Sept. 24, 1940, nonrecording gage on west shore at site upstream from Ross Dam at same datum. June 29, 1943, to Apr. 29, 1948, nonrecording gage on right bank at site 500 ft upstream from dam at present datum.

REMARKS.--Reservoir is formed by concrete-arch dam completed to elevation 1,615 ft in 1949, storage began Mar. 11, 1940. Starting about July 1, 1967, taintor gates were extended to elevation 1,602.50 ft. Usable storage, 1,052,300 acre-ft between elevations 1,475 ft, lower limit of operation, and 1,602.5 ft, top of taintor gates. An additional 95,000 acre-ft of storage may be obtained during major floods by surcharge of the reservoir to a maximum elevation of 1,610.5 ft. Dead storage below elevation 1,250 ft, 1,175 acre-ft. Water used by City of Seattle for power development. Figures given herein represent total contents. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--Capacity table furnished by City of Seattle. This station is maintained by the United States under agreement with Canada.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,443,460 acre-ft, July 20, 1981, elevation, 1,603.23 ft; minimum contents observed since dam was completed in 1949, 51,760 acre-ft, Apr. 5, 1952, elevation, 1,348.50 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,431,071 acre-ft, Aug. 19, elevation, 1,602.19 ft; minimum contents 1,067,200 acre-ft, Apr. 20, elevation 1,568.85 ft.

CAPACITY TABLE  
(Based on 25-foot contour intervals furnished by City of Seattle in 1943)

Elevation (feet)	Contents (acre-feet)	Elevation (feet)	Contents (acre-feet)	Elevation (feet)	Contents (acre-feet)
1,490	454,480	1,525	678,950	1,575	1,130,200
1,500	509,240	1,550	888,320	1,603	1,440,700

ELEVATION ABOVE NGVD 1929, FEET  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY OBSERVATION AT 2400 HOURS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1,598.44	1,588.93	1,581.81	1,584.36	1,585.61	1,573.62	1,569.53	1,576.40	1,591.68	1,598.18	1,601.85	1,600.87
2	1,597.85	1,589.06	1,581.54	1,583.63	1,585.05	1,573.25	1,569.48	1,576.55	1,592.00	1,598.36	1,601.89	1,600.57
3	1,597.34	1,588.44	1,581.14	1,582.84	1,584.70	1,572.79	1,569.51	1,576.91	1,592.25	1,598.44	1,601.96	1,600.27
4	1,596.87	1,587.86	1,580.86	1,582.16	1,584.32	1,572.35	1,569.47	1,577.40	1,592.46	1,598.44	1,601.95	1,600.17
5	1,596.51	1,587.10	1,580.73	1,581.22	1,583.90	1,571.80	1,569.42	1,577.81	1,592.76	1,598.61	1,601.89	1,599.96
6	1,596.24	1,586.42	1,580.27	1,580.34	1,583.39	1,571.41	1,569.35	1,578.48	1,592.88	1,598.91	1,601.90	1,599.72
7	1,596.04	1,586.01	1,579.98	1,579.48	1,582.88	1,571.02	1,569.40	1,579.20	1,593.03	1,599.19	1,601.87	1,599.34
8	1,595.91	1,585.86	1,579.78	1,578.58	1,582.22	1,570.85	1,569.39	1,579.85	1,593.22	1,599.42	1,601.85	1,598.90
9	1,595.97	1,585.43	1,579.56	1,577.67	1,581.72	1,570.74	1,569.40	1,580.38	1,593.42	1,599.87	1,601.90	1,598.71
10	1,595.82	1,584.96	1,580.95	1,576.71	1,581.42	1,570.73	1,569.41	1,580.96	1,593.56	1,600.08	1,601.98	1,598.35
11	1,595.68	1,584.28	1,583.70	1,575.73	1,581.08	1,570.78	1,569.30	1,581.62	1,593.73	1,600.23	1,601.98	1,597.95
12	1,595.49	1,583.52	1,584.99	1,575.08	1,580.73	1,570.78	1,569.11	1,582.22	1,593.89	1,600.36	1,602.00	1,597.78
13	1,595.34	1,582.93	1,585.38	1,574.43	1,580.65	1,570.80	1,569.10	1,582.85	1,594.05	1,600.41	1,602.01	1,597.44
14	1,595.19	1,582.29	1,585.89	1,573.66	1,580.23	1,570.71	1,569.07	1,583.62	1,594.16	1,600.47	1,602.06	1,597.16
15	1,595.01	1,581.84	1,586.24	1,572.96	1,579.85	1,570.58	1,569.06	1,584.46	1,594.25	1,600.46	1,602.01	1,596.86
16	1,595.13	1,581.56	1,586.40	1,572.57	1,579.52	1,570.52	1,569.11	1,585.31	1,594.23	1,600.60	1,601.98	1,596.60
17	1,595.10	1,581.33	1,586.36	1,572.35	1,579.07	1,570.40	1,569.18	1,585.99	1,594.34	1,600.61	1,602.10	1,596.29
18	1,594.98	1,581.15	1,586.51	1,573.71	1,578.65	1,570.31	1,569.08	1,586.25	1,594.43	1,600.71	1,602.16	1,596.06
19	1,594.71	1,580.91	1,587.10	1,576.90	1,578.15	1,570.13	1,568.95	1,586.62	1,594.74	1,600.94	1,602.09	1,595.70
20	1,594.41	1,580.60	1,587.49	1,578.96	1,577.74	1,570.13	1,568.95	1,586.78	1,594.90	1,601.06	1,602.05	1,595.39
21	1,594.16	1,580.27	1,587.68	1,580.80	1,577.22	1,570.05	1,569.02	1,587.03	1,595.11	1,601.15	1,602.03	1,595.05
22	1,593.81	1,579.88	1,587.73	1,582.27	1,576.79	1,569.90	1,569.24	1,587.42	1,595.53	1,601.24	1,601.95	1,594.69
23	1,593.51	1,579.51	1,587.73	1,584.23	1,576.31	1,569.85	1,569.66	1,587.61	1,595.89	1,601.35	1,601.94	1,594.38
24	1,593.27	1,580.03	1,587.76	1,585.54	1,575.83	1,569.71	1,570.46	1,587.82	1,596.17	1,601.47	1,601.84	1,594.03
25	1,592.96	1,581.48	1,587.70	1,586.23	1,575.35	1,569.47	1,571.40	1,588.02	1,596.44	1,601.55	1,601.67	1,593.71
26	1,592.63	1,581.92	1,587.60	1,586.47	1,574.91	1,569.68	1,572.41	1,588.21	1,596.76	1,601.52	1,601.57	1,593.31
27	1,592.26	1,582.12	1,587.46	1,586.76	1,574.53	1,569.62	1,573.68	1,588.59	1,597.15	1,601.50	1,601.37	1,593.04
28	1,591.88	1,582.17	1,586.98	1,586.75	1,574.02	1,569.44	1,574.71	1,589.20	1,597.50	1,601.56	1,601.37	1,592.71
29	1,591.21	1,582.02	1,586.37	1,586.63	---	1,569.40	1,575.39	1,589.87	1,597.66	1,601.67	1,601.37	1,592.85
30	1,590.53	1,581.85	1,585.79	1,586.31	---	1,569.33	1,575.97	1,590.63	1,597.81	1,601.66	1,601.27	1,593.24
31	1,589.67	---	1,585.14	1,586.05	---	1,569.32	---	1,591.30	---	1,601.76	1,601.13	---
MAX	1,598.44	1,589.06	1,587.76	1,586.76	1,585.61	1,573.62	1,575.97	1,591.30	1,597.81	1,601.76	1,602.16	1,600.87
MIN	1,589.67	1,579.51	1,579.56	1,572.35	1,574.02	1,569.32	1,568.95	1,576.40	1,591.68	1,598.18	1,601.13	1,592.71
†	1,288,077	1,202,535	1,238,136	1,248,050	1,120,008	1,071,902	1,140,328	1,306,200	1,379,915	1,426,008	1,418,554	1,327,952
‡	-106,319	-85,542	+35,601	+9,914	-128,042	-48,106	+68,426	+165,872	+73,715	+46,093	-7,454	-90,602

CAL YR 2004 MAX 1,602.25 MIN 1,523.77 AC-FT‡ +55,336  
WTR YR 2005 MAX 1,602.16 MIN 1,568.95 AC-FT‡ -66,444

† Contents, in acre-feet, at 2400, on last day of month.  
‡ Change in contents, in acre-feet.

12175500 THUNDER CREEK NEAR NEWHALEM, WA

LOCATION.--Lat 48°40'22", long 121°04'18", in SE¼ sec.23, T.37 N., R.13 E., (unsurveyed) Whatcom County, Hydrologic Unit 17110005, Ross Lake National Recreation Area, on right bank 0.4 mi upstream from high-water line of Diablo Reservoir, 9.0 mi east of Newhalem, and at mile 3.4.

DRAINAGE AREA.--105 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1930 to current year. Published as "above Colonial Creek, near Marblemount" 1930-31.

REVISED RECORDS.--WSP 1012: 1943. WSP 1286: 1931(M), 1932, 1933(M), 1935(M), 1938-39(M), 1941-42(M), 1944-46(M), 1950(M), 1952 (annual runoff in acre-ft). WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,220 ft above NGVD of 1929, from river-profile map.

REMARKS.--Records fair, except for discharges above 3,000 ft<sup>3</sup>/s and estimated discharges, which are poor. No regulation or diversion upstream from station. Large diurnal fluctuations caused by snowmelt during summer months. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--75 years (water years 1931-2005), 619 ft<sup>3</sup>/s, 80.03 in/yr, 448,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,800 ft<sup>3</sup>/s, Oct. 20, 2003, gage height, 15.90 ft, from rating curve extended above 3,500 ft<sup>3</sup>/s and slope-area measurement at gage height of 15.90 ft; minimum discharge not determined, probably less than 50 ft<sup>3</sup>/s during period of ice effect or no gage-height record in February 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--Records for floods, prior to establishment of station, are given in WSP 1527.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov 25	0115	3,010	8.03	Jan 19	0145	*7,520	*10.87
Dec 11	0200	6,260	10.05	Sep 30	0430	6,240	10.04

Minimum daily discharge, 147 ft<sup>3</sup>/s, Jan. 15.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	321	235	345	224	e430	189	249	498	868	1,010	1,010	603
2	315	1,360	320	210	e410	187	250	510	668	930	813	682
3	343	666	e310	194	e400	183	247	541	605	789	775	522
4	338	459	e320	188	419	180	245	581	573	810	806	423
5	327	385	e310	179	403	178	227	634	609	983	853	380
6	505	507	e270	182	366	176	217	730	508	1,620	992	376
7	366	1,300	e250	180	342	195	228	650	480	1,090	999	396
8	592	1,070	e240	176	321	216	244	573	470	1,400	1,030	463
9	757	733	240	169	306	265	235	643	445	1,500	1,160	458
10	441	549	2,310	163	292	283	225	817	518	935	1,110	379
11	365	457	3,310	159	282	270	226	855	575	877	1,030	319
12	365	405	1,120	158	276	308	217	895	529	916	1,030	308
13	375	377	725	155	270	276	209	901	461	874	988	310
14	427	384	655	154	259	254	204	1,120	422	802	1,010	345
15	446	498	566	147	243	240	200	1,260	412	980	1,030	351
16	1,220	413	468	150	233	234	223	1,260	406	1,130	1,050	336
17	782	351	416	485	230	227	241	836	603	1,050	1,090	333
18	567	338	420	3,640	223	218	225	672	642	1,170	867	327
19	412	320	753	e3,400	218	209	222	650	597	1,160	778	323
20	347	296	617	e2,200	211	211	237	548	712	972	941	286
21	319	280	474	e1,600	204	212	276	514	994	904	987	254
22	300	271	411	e1,700	201	199	375	458	1,280	1,090	922	237
23	283	262	371	e1,800	198	192	469	399	972	1,010	682	217
24	265	1,170	342	e1,200	195	186	692	375	867	882	579	209
25	245	1,740	325	e900	193	181	816	397	896	856	597	217
26	233	801	306	e700	190	196	971	510	930	922	656	247
27	221	581	284	e660	188	221	1,090	724	1,100	995	678	271
28	214	464	268	e540	188	219	845	1,030	984	1,110	800	247
29	207	408	259	e460	---	209	636	1,400	1,000	1,090	900	1,910
30	233	377	249	e400	---	217	536	1,370	1,060	1,050	603	3,180
31	231	---	238	e460	---	214	---	1,210	---	1,050	552	---
TOTAL	12,362	17,457	17,492	22,933	7,691	6,745	11,277	23,561	21,186	31,957	27,318	14,909
MEAN	399	582	564	740	275	218	376	760	706	1,031	881	497
MAX	1,220	1,740	3,310	3,640	430	308	1,090	1,400	1,280	1,620	1,160	3,180
MIN	207	235	238	147	188	176	200	375	406	789	552	209
AC-FT	24,520	34,630	34,700	45,490	15,260	13,380	22,370	46,730	42,020	63,390	54,190	29,570
CFSM	3.80	5.54	5.37	7.05	2.62	2.07	3.58	7.24	6.73	9.82	8.39	4.73
IN.	4.38	6.18	6.20	8.12	2.72	2.39	4.00	8.35	7.51	11.32	9.68	5.28

## 12175500 THUNDER CREEK NEAR NEWHALEM, WA—Continued

DISCHARGE, CUBIC FEET PER SECOND—CONTINUED  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 2005, BY WATER YEAR (WY)												
MEAN	452	403	314	266	233	219	383	881	1,312	1,320	992	620
MAX	1,564	1,652	1,023	842	683	663	1,057	1,601	2,072	1,935	1,502	906
(WY)	(2004)	(1996)	(1981)	(1984)	(1991)	(1972)	(1934)	(1993)	(1948)	(1975)	(1999)	(1997)
MIN	192	110	95.2	78.4	57.3	91.1	172	432	706	784	704	367
(WY)	(2003)	(1936)	(1931)	(1979)	(1936)	(1956)	(1975)	(1977)	(2005)	(1993)	(1993)	(1985)

SUMMARY STATISTICS	FOR 2004 CALENDAR YEAR		FOR 2005 WATER YEAR		WATER YEARS 1931 - 2005	
ANNUAL TOTAL	229,325		214,888			
ANNUAL MEAN	627		589		619	
HIGHEST ANNUAL MEAN					863	
LOWEST ANNUAL MEAN					452	
HIGHEST DAILY MEAN	3,310	Dec 11	3,640	Jan 18	9,030	Oct 21, 2003
LOWEST DAILY MEAN	80	Jan 4	147	Jan 15	50	Feb 7, 1936
ANNUAL SEVEN-DAY MINIMUM	84	Jan 4	155	Jan 10	52	Feb 15, 1936
ANNUAL RUNOFF (AC-FT)	454,900		426,200		448,100	
ANNUAL RUNOFF (CFSM)	5.97		5.61		5.89	
ANNUAL RUNOFF (INCHES)	81.25		76.13		80.03	
10 PERCENT EXCEEDS	1,320		1,090		1,360	
50 PERCENT EXCEEDS	458		422		421	
90 PERCENT EXCEEDS	150		206		135	

e Estimated

## 12176500 DIABLO RESERVOIR NEAR NEHALEM, WA

LOCATION.--Lat 48°42'56", long 121°07'52", in SE<sup>1</sup>/<sub>4</sub> sec.5, T.37 N., R.13 E. (unsurveyed), Whatcom County, Hydrologic Unit 17110005, Ross Lake National Recreation Area, at Diablo Dam on Skagit River, 1.2 mi downstream from Thunder Creek, 6.0 mi northeast of Newhalem, and at mile 101.0.

DRAINAGE AREA.--1,125 mi<sup>2</sup>, includes 400 mi<sup>2</sup> in Canada.

PERIOD OF RECORD.--October 1929 to current year. October 1929 to September 1938, monthly change in reservoir contents published with records for Skagit River at Newhalem.

GAGE.--Water-stage recorder. Datum of gage is City of Seattle datum. Prior to Oct. 1, 1964, at datum 0.28 ft higher.

REMARKS.--Reservoir is formed by concrete-arch dam, completed in 1930; storage began in October 1929. Usable storage, 8,820 acre-ft between elevations 1,195 ft, normal lower limit of operation, and 1,205 ft, top of taintor gates. Dead storage, below elevation 1,040 ft, 12,900 acre-ft. Crest of spillway is at elevation 1,187 ft. Water used by City of Seattle for power development at Diablo and Gorge powerplants. Capacity table furnished by City of Seattle. Figures given herein represent total contents. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 90,600 acre-ft, July 14, 1933, elevation, 1,206.5 ft; minimum contents not determined.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 89,065 acre-ft, Sept. 30, elevation, 1,205.11 ft; minimum contents, 81,202 acre-ft, May 9, elevation, 1,196.14 ft.

MONTH-END GAGE HEIGHT AND CONTENTS AT 2400  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
September 30	1,201.90	86,186	--
October 31	1,201.64	85,957	-229
November 30	1,202.86	87,036	+1,079
December 31	1,202.17	86,423	-613
Calendar Year 2004	--	--	-471
January 31	1,201.82	86,115	-308
February 28	1,202.67	86,867	+752
March 31	1,201.30	85,658	-1,209
April 30	1,198.92	83,580	-2,078
May 31	1,198.56	83,271	-309
June 30	1,201.90	86,186	+2,915
July 31	1,203.30	87,428	+1,242
August 31	1,202.09	86,353	-1,075
September 30	1,202.64	86,840	+487
Water Year 2005	--	--	+654

## 12177700 GORGE RESERVOIR NEAR NEWHALEM, WA

LOCATION.--Lat 48°41'53", long 121°12'25", in NW<sup>1</sup>/<sub>4</sub> sec.14, T.37 N., R.12 E., Whatcom County, Hydrologic Unit 17110005, Ross Lake National Recreation Area, at Gorge Dam on Skagit River, 2.4 mi upstream from Gorge powerplant at Newhalem, and at mile 96.6.

DRAINAGE AREA.--1,159 mi<sup>2</sup>, includes 400 mi<sup>2</sup> in Canada.

PERIOD OF RECORD.--June 1960 to current year.

GAGE.--Water-stage recorder; prior to Apr. 1, 1962, reference point on Gorge Dam or water-stage indicator in powerhouse. Datum of gage is 0.00 ft City of Seattle Gorge High Dam datum, and 1.792 ft below NGVD of 1929 (Corps of Engineers' benchmark).

REMARKS.--Reservoir is formed by concrete-arch and gravity dam, completed Dec. 27, 1960; storage began June 27, 1960. Usable storage, 2,115 acre-ft between elevations 865 ft, normal lower limit of operation, and 875 ft, top of gates. Lowest outlet at elevation 760 ft. No dead storage. Crest of spillway is at elevation 825 ft. Water used by City of Seattle for power development at Gorge powerplant. Capacity table furnished by City of Seattle. Figures given herein represent total contents.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 9,761 acre-ft, June 1, 1982, elevation, 880.01 ft; minimum observed contents since normal low operating level was reached in December 1960, 172 acre-ft, Aug. 13, 1997, elevation, 781.75 ft (City of Seattle).

EXTREMES FOR CURRENT YEAR.--Maximum contents, 8,619 acre-ft, Sept. 29, elevation, 875.55 ft; minimum recorded contents, 6,687 acre-ft, July 6, elevation, 866.72 ft.

MONTH-END GAGE HEIGHT AND CONTENTS AT 2400  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
September 30	871.24	7,618	--
October 31	871.01	7,567	-51
November 30	873.25	8,072	+505
December 31	870.75	7,511	-561
Calendar Year 2004	--	--	+52
January 31	872.15	7,820	+309
February 28	873.91	8,226	+406
March 31	871.04	7,574	-652
April 30	871.45	7,664	+90
May 31	873.27	8,077	+413
June 30	871.99	7,784	-293
July 31	872.19	7,829	+45
August 31	872.20	7,832	+3
September 30	873.96	8,238	+406
Water Year 2005	--	--	+620

## 12178000 SKAGIT RIVER AT NEWHALEM, WA

LOCATION.--Lat 48°40'19", long 121°14'48", in SW $\frac{1}{4}$ SE $\frac{1}{4}$  sec.21, T.37 N., R.12 E., Whatcom County, Hydrologic Unit 17110005, Ross Lake National Recreation Area, on right bank 0.4 mi upstream from Newhalem Creek, 0.5 mi downstream from City of Seattle powerplant at Newhalem, 10.8 mi upstream from Bacon Creek, and at mile 93.7.

DRAINAGE AREA.--1,175 mi<sup>2</sup>, of which 400 mi<sup>2</sup> are in Canada.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1908 to May 1914, October 1920 to current year. June 1914 to September 1920 (monthly discharge only), in State Water-Supply Bulletin 6. Published as "near Marblemount" 1908-14, 1920-31.

REVISED RECORDS.--WSP 512: 1909-14. WSP 1012: 1929. WSP 1316: 1914(M). WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 401.5 ft above NGVD of 1929 (river-profile survey). Prior to May 24, 1914, nonrecording gages at site 0.5 mi upstream at datum 91 ft higher. Nov. 15, 1920, to June 4, 1923, nonrecording gage at site about 500 ft upstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Water is diverted 2.9 mi upstream from station and is returned to river at City of Seattle powerplant 0.5 mi upstream from station. Flow regulated by Gorge powerplant since August 1924 and by Ross Reservoir (station 12175000) since March 1940, Diablo Reservoir (station 12176500) since October 1929, and Gorge Reservoir (station 12177700) since June 1960, having a combined total capacity of 1,533,000 acre-ft. U.S. Geological Survey satellite telemeter at station. Chemical analyses October 1973 to September 1974.

AVERAGE DISCHARGE.--97 years (water years 1909-2005), 4,395 ft<sup>3</sup>/s, 3,184,000 acre-ft/yr, adjusted. 45 years (water years 1961-2005), 4,431 ft<sup>3</sup>/s, 3,210,000 acre-ft/yr, regulated.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 63,500 ft<sup>3</sup>/s, Nov. 29, 1909, gage height, 22.0 ft, from floodmark, site and datum then in use; minimum discharge, 54 ft<sup>3</sup>/s, Nov. 1, 1943, gage height, 78.15 ft; minimum daily discharge, 136 ft<sup>3</sup>/s, Aug. 24, 1930.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1815 reached a stage of approximately 20.5 ft, discharge about 115,000 ft<sup>3</sup>/s. Records for other floods, prior to establishment of station, are given in WSP 1527.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 17,600 ft<sup>3</sup>/s, Jan. 19, gage height, 88.26 ft; minimum discharge, 1,710 ft<sup>3</sup>/s, Sept. 25, minimum gage height, 81.82 ft, result of regulation; minimum daily discharge 2,000 ft<sup>3</sup>/s, May 25.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5,360	6,910	4,020	6,510	7,170	4,040	2,590	2,400	2,700	2,370	2,210	3,050
2	5,320	7,200	3,870	6,330	6,880	3,950	2,530	2,580	2,700	2,480	2,210	3,180
3	4,580	7,170	4,420	6,630	7,060	4,020	2,460	2,640	2,320	2,500	2,210	3,140
4	4,490	7,180	4,500	6,770	7,120	4,020	2,460	2,620	2,110	2,580	2,140	2,380
5	3,590	7,150	4,450	6,480	7,180	4,030	2,460	2,620	2,240	2,610	2,150	2,460
6	3,140	7,090	4,540	6,860	7,100	4,040	2,470	2,660	2,240	2,650	2,140	3,050
7	3,300	7,350	4,500	6,700	7,090	3,810	2,460	2,520	2,320	2,490	2,200	3,240
8	3,100	7,350	4,390	7,010	6,820	2,660	2,480	2,500	2,280	2,470	2,230	3,320
9	3,510	7,130	4,330	6,830	6,760	2,650	2,430	2,430	2,160	2,390	2,150	3,380
10	2,940	7,090	5,810	6,900	4,490	2,620	2,440	2,640	2,200	2,370	2,180	3,280
11	2,950	7,270	7,510	6,700	4,560	2,610	2,440	2,640	2,220	2,400	2,180	3,380
12	2,740	7,290	4,120	6,170	4,560	2,540	2,430	2,640	2,220	2,420	2,200	2,960
13	2,730	7,110	4,260	5,210	4,400	2,550	2,420	2,700	2,220	2,450	2,200	2,960
14	2,820	6,510	4,480	4,810	4,580	2,540	2,420	2,900	2,220	2,610	2,190	2,770
15	2,880	6,000	4,440	4,920	4,660	2,540	2,430	2,920	2,220	2,730	2,190	2,790
16	2,990	4,380	4,400	4,730	4,680	2,550	2,430	2,910	2,260	2,690	2,220	2,990
17	3,070	4,300	4,430	6,320	4,580	2,530	2,430	2,890	2,400	2,680	2,170	2,900
18	3,580	4,310	4,440	7,210	4,570	2,570	2,430	2,880	2,360	2,270	2,140	2,960
19	3,420	3,870	4,500	10,500	4,590	3,080	2,520	2,890	2,340	2,230	2,150	2,720
20	3,560	4,200	4,490	6,270	4,570	2,680	2,510	2,560	2,380	2,130	2,150	2,810
21	3,480	4,250	4,540	5,710	4,570	2,600	2,400	2,540	2,320	2,120	2,160	2,830
22	3,920	4,340	4,470	3,780	4,650	2,570	2,430	2,510	2,580	2,090	2,280	2,720
23	3,420	4,410	4,440	4,590	4,540	2,530	2,460	2,510	2,270	2,090	2,200	2,990
24	3,420	4,920	4,400	7,040	4,470	2,570	2,440	2,500	2,150	2,120	2,220	2,540
25	3,520	5,690	4,480	6,790	4,180	2,600	2,440	2,000	2,130	2,150	2,320	2,860
26	3,340	4,410	4,400	6,970	4,170	2,600	2,530	2,050	2,220	2,140	2,300	2,940
27	3,390	4,340	4,220	5,700	4,180	2,650	2,500	2,090	2,180	2,150	2,320	2,520
28	3,580	4,250	5,450	6,900	4,180	2,600	2,460	2,100	2,130	2,410	2,310	2,570
29	5,790	4,400	7,040	7,010	---	2,510	2,440	2,100	2,160	2,220	2,320	2,700
30	6,310	4,230	6,680	7,050	---	2,530	2,430	2,380	2,270	2,210	2,230	4,750
31	6,320	---	6,700	7,010	---	2,530	---	2,630	---	2,210	2,490	---
TOTAL	116,560	172,100	148,720	198,410	148,360	90,320	73,770	78,950	68,520	73,430	68,760	89,140
MEAN	3,760	5,737	4,797	6,400	5,299	2,914	2,459	2,547	2,284	2,369	2,218	2,971
MAX	6,320	7,350	7,510	10,500	7,180	4,040	2,590	2,920	2,700	2,730	2,490	4,750
MIN	2,730	3,870	3,870	3,780	4,170	2,510	2,400	2,000	2,110	2,090	2,140	2,380
AC-FT	231,200	341,400	295,000	393,500	294,300	179,100	146,300	156,600	135,900	145,600	136,400	176,800
MEAN†	2,026	4,327	5,356	6,559	3,015	2,099	3,575	5,245	3,567	3,138	2,080	1,464
CFSM†	1.72	3.68	4.56	5.58	2.57	1.79	3.04	4.46	3.04	2.67	1.77	1.25
IN.†	1.99	4.11	5.26	6.44	2.67	2.06	3.39	5.15	3.39	3.08	2.04	1.39
AC-FT†	124,600	257,400	329,400	403,400	167,400	129,100	212,700	322,600	212,200	193,000	127,900	87,090

CAL YR 2004 TOTAL 1,545,320 MEAN 4,222 MAX 10,700 MIN 2,120 AC-FT 3,065,000 MEAN† 4,299 CFSM† 3.66 IN.† 49.79 AC-FT† 3,120,000

WTR YR 2005 TOTAL 1,327,040 MEAN 3,636 MAX 10,500 MIN 2,000 AC-FT 2,632,000 MEAN† 3,545 CFSM† 3.02 IN.† 40.96 AC-FT† 2,567,000

† Adjusted for change in contents in Ross, Diablo and Gorge Reservoirs.



## WATER-QUALITY RECORDS

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: January 1999 to current year.

INSTRUMENTATION.--Water-temperature sensor interfaced with a data collection platform for satellite telemetry.

REMARKS.--Record good Feb. 10 to Sept. 30; records fair Oct. 1 to Feb. 9.

## EXTREMES FOR PERIOD OF RECORD.--

WATER TEMPERATURE: Maximum, 12.1°C, Aug. 4, 2005; minimum, 2.2°C, Feb. 21, 2002.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum recorded, 12.1°C, Aug. 4; minimum recorded, 3.5°C, Jan. 18.

TEMPERATURE, WATER, DEGREES CELSIUS  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	10.0	9.5	9.7	9.7	9.3	9.5	7.7	7.5	7.5	5.8	5.3	5.6
2	10.0	9.6	9.8	9.4	8.1	8.6	7.7	7.4	7.5	5.5	5.1	5.3
3	9.9	9.6	9.7	9.2	8.5	9.0	7.6	7.4	7.5	5.3	4.9	5.1
4	9.9	9.6	9.7	9.3	9.2	9.2	7.5	7.3	7.4	5.2	4.8	5.0
5	9.9	9.6	9.8	9.5	9.2	9.3	7.5	7.2	7.4	5.1	4.7	4.9
6	9.9	9.6	9.8	9.6	9.3	9.4	7.4	7.0	7.2	5.3	4.8	5.0
7	10.0	9.7	9.8	9.5	9.2	9.3	7.4	7.1	7.2	5.2	4.9	5.0
8	10.0	9.8	9.9	9.5	9.1	9.3	7.4	7.1	7.2	5.2	4.8	5.0
9	9.9	9.6	9.8	9.5	9.2	9.3	7.3	7.0	7.1	5.0	4.6	4.8
10	9.9	9.6	9.7	9.5	9.2	9.3	7.1	5.9	6.6	4.9	4.5	4.7
11	9.9	9.6	9.7	9.4	9.1	9.3	6.0	4.5	5.4	4.8	4.5	4.7
12	10.0	9.6	9.8	9.4	9.1	9.2	6.0	5.8	5.9	4.7	4.4	4.6
13	10.0	9.7	9.8	9.4	9.2	9.3	6.4	6.0	6.2	4.7	4.4	4.6
14	10.0	9.7	9.8	9.4	9.1	9.2	6.5	6.3	6.4	4.6	4.0	4.3
15	9.9	9.7	9.8	9.4	9.0	9.2	6.4	6.1	6.3	4.1	3.8	4.0
16	10.1	9.8	9.9	9.1	8.8	9.0	6.3	6.1	6.2	4.2	3.9	4.1
17	9.9	9.6	9.8	9.0	8.6	8.8	6.3	6.1	6.2	4.4	3.8	4.1
18	9.7	9.4	9.6	8.8	8.5	8.7	6.4	6.1	6.3	4.0	3.5	3.8
19	9.5	9.3	9.4	8.6	8.4	8.5	6.4	6.1	6.3	4.6	3.7	4.3
20	9.6	9.3	9.5	8.6	8.3	8.5	6.2	5.7	5.9	4.6	4.0	4.3
21	9.6	9.4	9.5	8.6	8.3	8.4	6.0	5.8	5.9	4.5	4.2	4.4
22	9.5	9.2	9.4	8.6	8.3	8.4	6.1	5.8	5.9	4.8	4.3	4.5
23	9.3	9.1	9.2	8.7	8.4	8.5	6.1	5.8	5.9	4.8	4.5	4.7
24	9.3	9.1	9.2	8.5	7.8	8.3	6.0	5.7	5.9	4.7	4.2	4.4
25	9.3	9.1	9.2	8.0	7.0	7.4	6.1	5.8	5.9	4.5	4.1	4.3
26	9.4	9.1	9.2	7.6	7.2	7.4	6.0	5.8	5.9	4.6	4.2	4.4
27	9.4	9.1	9.2	7.8	7.5	7.7	6.0	5.7	5.8	4.5	4.2	4.3
28	9.4	9.1	9.2	7.8	7.4	7.7	5.9	5.5	5.7	4.4	4.0	4.3
29	9.6	9.2	9.4	7.7	7.4	7.6	6.0	5.6	5.8	4.5	4.2	4.3
30	9.6	9.3	9.4	7.7	7.4	7.5	6.1	5.6	5.9	4.5	4.0	4.2
31	9.6	9.2	9.4	---	---	---	6.0	5.6	5.8	4.5	4.1	4.3
MONTH	10.1	9.1	9.6	9.7	7.0	8.7	7.7	4.5	6.4	5.8	3.5	4.6



12178100 NEWHALEM CREEK NEAR NEWHALEM, WA

LOCATION.--Lat 48°39'22", long 121°14'14", in SE<sup>1</sup>/<sub>4</sub>SE<sup>1</sup>/<sub>4</sub> sec.28, T.37 N., R.12 E., Whatcom County, Hydrologic Unit 17110005, North Cascades National Park, on left bank 1.2 mi south of Newhalem, 1.5 mi downstream from East Fork, and at mile 1.5.

DRAINAGE AREA.--27.9 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1961 to current year.

REVISED RECORDS.--WDR WA-84-1: 1983.

GAGE.--Water-stage recorder. Elevation of gage is 1,080 ft above NGVD of 1929, by barometer. Prior to October 1981, at datum 0.96 ft lower.

REMARKS.--Records good, except for estimated daily discharges, which are fair. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--44 years (water years 1961-2005), 175 ft<sup>3</sup>/s, 85.19 in/yr, 126,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,430 ft<sup>3</sup>/s, Dec. 26, 1980, gage height, 9.14 ft present datum, from floodmarks, from rating curve extended above 5,570 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum discharge, 20 ft<sup>3</sup>/s, Feb. 1, 1963, gage height, 1.07 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 750 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov 2	0615	1,330	4.87	Jan 18	2145	2,980	6.33
Nov 24	2300	2,300	5.98	Sep 30	0200	1,020	4.20
Dec 11	0000	*3,140	*6.71				

Minimum discharge, 27 ft<sup>3</sup>/s, Sept. 25, 26, 27, 28, 29, gage height, 1.07 ft.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68	130	123	95	162	67	201	180	224	154	70	42
2	63	770	111	86	150	67	174	184	185	144	66	41
3	59	321	103	81	141	65	144	206	181	130	62	39
4	56	217	114	e78	186	62	132	196	163	125	59	38
5	54	173	117	e76	176	61	115	224	164	130	58	39
6	61	216	99	e76	150	60	110	242	149	193	58	36
7	57	423	90	e78	135	76	138	202	179	144	58	35
8	121	335	95	e76	124	83	149	174	204	232	58	35
9	217	237	97	e74	115	118	125	208	174	227	58	36
10	165	187	1,460	e72	108	120	110	254	159	157	57	46
11	116	157	1,260	e70	103	116	112	261	164	143	56	39
12	95	136	444	e70	101	125	105	266	158	133	55	36
13	84	131	308	e70	97	107	95	260	155	125	54	35
14	77	138	406	e68	90	96	91	314	152	116	52	34
15	81	186	353	e68	84	88	89	355	145	115	51	34
16	260	157	262	e70	82	84	172	328	137	137	51	34
17	200	135	224	e130	79	81	171	233	162	121	61	35
18	184	139	235	1,550	76	78	140	192	186	117	54	34
19	141	133	415	1,400	73	75	130	236	174	112	50	33
20	117	114	290	726	69	93	137	201	177	101	49	32
21	110	104	222	672	66	97	168	196	211	94	48	31
22	111	103	188	721	65	83	220	184	253	102	47	30
23	111	107	164	869	63	75	246	161	191	97	45	29
24	106	961	150	e526	63	69	296	147	171	88	42	28
25	95	1,020	148	e339	62	65	324	155	168	83	40	28
26	87	374	142	284	62	87	361	184	161	81	39	27
27	81	257	129	262	61	138	367	226	194	79	39	27
28	77	196	119	217	63	147	274	287	181	78	39	27
29	74	161	114	188	---	127	210	325	163	76	52	299
30	110	140	110	168	---	123	184	298	159	72	50	395
31	113	---	104	176	---	117	---	281	---	70	45	---
TOTAL	3,351	7,858	8,196	9,436	2,806	2,850	5,290	7,160	5,244	3,776	1,623	1,654
MEAN	108	262	264	304	100	91.9	176	231	175	122	52.4	55.1
MAX	260	1,020	1,460	1,550	186	147	367	355	253	232	70	395
MIN	54	103	90	68	61	60	89	147	137	70	39	27
AC-FT	6,650	15,590	16,260	18,720	5,570	5,650	10,490	14,200	10,400	7,490	3,220	3,280
CFSM	3.87	9.39	9.48	10.9	3.59	3.30	6.32	8.28	6.27	4.37	1.88	1.98
IN.	4.47	10.48	10.93	12.58	3.74	3.80	7.05	9.55	6.99	5.03	2.16	2.21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 2005, BY WATER YEAR (WY)

MEAN	129	186	163	141	122	111	151	279	358	257	119	89.1
MAX	395	589	552	340	313	290	267	448	594	476	277	200
(WY)	(2004)	(1996)	(1981)	(1984)	(1991)	(1972)	(1989)	(1972)	(1974)	(1972)	(1999)	(2004)
MIN	28.2	43.4	44.7	29.2	39.9	48.7	68.7	145	175	110	52.4	32.2
(WY)	(1988)	(1980)	(1979)	(1979)	(1969)	(1962)	(1975)	(1977)	(2005)	(1977)	(2005)	(1998)

## 12178100 NEWHALEM CREEK NEAR NEWHALEM, WA—Continued

SUMMARY STATISTICS	FOR 2004 CALENDAR YEAR		FOR 2005 WATER YEAR		WATER YEARS 1961 - 2005	
ANNUAL TOTAL	67,936		59,244		175	
ANNUAL MEAN	186		162		244	
HIGHEST ANNUAL MEAN					1991	
LOWEST ANNUAL MEAN					114	
HIGHEST DAILY MEAN	1,460	Dec 10	1,550	Jan 18	5,300	Dec 26, 1980
LOWEST DAILY MEAN	46	Mar 6	27	Sep 26	20	Feb 1, 1963
ANNUAL SEVEN-DAY MINIMUM	50	Feb 29	28	Sep 22	22	Jan 13, 1993
ANNUAL RUNOFF (AC-FT)	134,800		117,500		126,700	
ANNUAL RUNOFF (CFSM)	6.65		5.82		6.27	
ANNUAL RUNOFF (INCHES)	90.58		78.99		85.19	
10 PERCENT EXCEEDS	355		282		367	
50 PERCENT EXCEEDS	142		118		119	
90 PERCENT EXCEEDS	60		48		50	

e Estimated

12179900 BACON CREEK BELOW OAKES CREEK, NEAR MARBLEMOUNT, WA

LOCATION.--Lat 48°36'17", long 121°23'54", in SE¼ sec.17, T.36 N., R.11 E., Skagit County, Hydrologic Unit 17110005, Mt. Baker Snoqualmie National Forest, on left bank 1.25 mi downstream from Oakes Creek, 5.5 mi northeast of Marblemount, and at mile 1.5.

DRAINAGE AREA.--49.7 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1943 to September 1950, October 1998 to current year. Published as Bacon Creek near Marblemount (station 12180000) 1942-50. Prior to Oct. 1, 1950, at site 1.4 mi downstream at different datum.

GAGE.--Water-stage recorder. Elevation of gage is 410 ft above NGVD of 1929, from topographic map.

REMARKS.--Records fair except estimated daily discharges and those above 5,000 ft<sup>3</sup>/s, which are poor. No regulation or diversion upstream from station. Summer flows augmented by glacial melt. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--14 years (water years 1944-50, 1999-2005), 427 ft<sup>3</sup>/s, 116.70 in/yr, 309,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,100 ft<sup>3</sup>/s, Nov. 26, 1949, gage height, 7.13 ft, at site and datum then in use, on basis of outside high-water mark on pier and by a slope-area determination; maximum gage height, 19.97 ft, Oct. 20, 2003, from outside highwater mark probably caused by debris torrent; minimum discharge, 62 ft<sup>3</sup>/s, Sept. 28, 29, 2005.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec 10	2000	unknown	(a) *10.27	Sep 29	1930	2,260	6.34
Jan 19	0115	*8,120	9.80				

Minimum discharge, 62 ft<sup>3</sup>/s, Sept. 28, 29, gage height, 2.56 ft.

(a) From flood mark.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e190	e320	e400	298	376	160	498	358	408	278	158	103
2	e180	e1,600	e360	279	337	153	429	379	362	258	150	100
3	e170	e1,000	e330	261	311	147	359	447	334	243	141	97
4	e170	e800	e350	248	419	142	324	408	294	227	136	97
5	e165	e700	e350	236	393	138	282	431	307	229	134	97
6	205	e810	e300	228	326	136	272	446	288	472	137	91
7	196	e1,100	e260	225	288	154	322	383	315	361	141	87
8	321	e1,000	e300	215	259	167	341	329	403	718	141	85
9	520	e860	e311	206	240	213	288	394	343	589	143	86
10	413	e740	e4,090	199	227	221	255	470	293	383	142	93
11	313	e680	e2,980	193	216	227	263	504	288	340	139	88
12	257	e620	e1,100	195	212	228	241	484	300	301	138	85
13	226	e580	e790	185	207	202	223	461	320	272	134	81
14	209	e620	1,140	178	197	183	214	534	319	243	131	80
15	212	e720	912	173	185	171	216	627	278	237	131	78
16	481	e640	690	195	177	173	511	712	257	300	131	78
17	447	e580	604	1,070	171	165	439	496	280	268	151	78
18	464	e600	637	4,000	164	160	345	412	298	246	138	76
19	374	e580	1,030	3,680	158	159	326	545	288	231	124	75
20	313	e560	695	2,000	151	289	358	450	286	208	120	75
21	298	e520	558	1,510	145	300	451	460	316	193	121	72
22	309	e520	474	1,640	141	230	577	449	422	195	121	71
23	309	e540	417	1,700	138	201	599	405	360	191	114	71
24	282	e2,000	382	1,050	136	183	674	347	308	178	106	69
25	256	e2,100	413	781	135	169	690	329	290	168	101	67
26	237	e1,000	422	658	134	228	728	363	278	163	98	65
27	222	e700	371	629	133	286	715	412	349	162	97	64
28	213	e600	344	517	138	326	553	474	344	163	98	62
29	210	e500	333	437	---	298	434	521	310	163	111	808
30	312	e450	325	387	---	296	379	490	291	158	118	812
31	309	---	314	421	---	284	---	454	---	156	111	---
TOTAL	8,783	24,040	21,982	23,994	6,114	6,389	12,306	13,974	9,529	8,294	3,956	3,891
MEAN	283	801	709	774	218	206	410	451	318	268	128	130
MAX	520	2,100	4,090	4,000	419	326	728	712	422	718	158	812
MIN	165	320	260	173	133	136	214	329	257	156	97	62
AC-FT	17,420	47,680	43,600	47,590	12,130	12,670	24,410	27,720	18,900	16,450	7,850	7,720
CFSM	5.70	16.1	14.3	15.6	4.39	4.15	8.25	9.07	6.39	5.38	2.57	2.61
IN.	6.57	17.99	16.45	17.96	4.58	4.78	9.21	10.46	7.13	6.21	2.96	2.91

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2005, BY WATER YEAR (WY)

MEAN	434	448	384	381	282	301	401	669	756	519	295	235
MAX	1,984	954	709	774	432	511	604	1,030	1,267	917	644	372
(WY)	(2004)	(1950)	(2005)	(2005)	(1947)	(2003)	(2002)	(1949)	(1950)	(1950)	(1999)	(2004)
MIN	94.3	166	172	113	160	177	260	451	318	233	128	130
(WY)	(2003)	(2001)	(1949)	(1949)	(2001)	(1948)	(1945)	(2005)	(2005)	(1944)	(2005)	(2005)

## 12179900 BACON CREEK BELOW OAKES CREEK, NEAR MARBLEMOUNT, WA—Continued

SUMMARY STATISTICS	FOR 2004 CALENDAR YEAR		FOR 2005 WATER YEAR		WATER YEARS 1943 - 2005	
ANNUAL TOTAL	164,427		143,252			
ANNUAL MEAN	449		392		427	
HIGHEST ANNUAL MEAN					578	
LOWEST ANNUAL MEAN					290	
HIGHEST DAILY MEAN	4,090	Dec 10	4,090	Dec 10	12,500	Oct 20, 2003
LOWEST DAILY MEAN	165	Oct 5	62	Sep 28	62	Sep 28, 2005
ANNUAL SEVEN-DAY MINIMUM	181	Sep 29	67	Sep 22	67	Sep 22, 2005
ANNUAL RUNOFF (AC-FT)	326,100		284,100		309,300	
ANNUAL RUNOFF (CFSM)	9.04		7.90		8.59	
ANNUAL RUNOFF (INCHES)	123.07		107.22		116.70	
10 PERCENT EXCEEDS	674		697		800	
50 PERCENT EXCEEDS	382		291		316	
90 PERCENT EXCEEDS	213		116		139	

e Estimated

## 12181000 SKAGIT RIVER AT MARBLEMOUNT, WA

LOCATION.--Lat 48°32'02", long 121°25'43", in NE<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> sec.7, T.35 N., R.11 E., Skagit County, Hydrologic Unit 17110005, on right bank 0.5 mi north of Marblemount, 0.6 mi upstream from Cascade River, and at mile 78.7.

DRAINAGE AREA.--1,381 mi<sup>2</sup>, of which 400 mi<sup>2</sup> are in Canada.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1943 to July 1944, October 1946 to September 1951, and annual maximum, water years 1952-57. May 1976 to current year.

REVISED RECORDS.--WDR WA-76-1: Drainage area. WDR WA-90-1: 1983, 1976-87 (M).

GAGE.--Water-stage recorder. Datum of gage is 305.1 ft above NGVD of 1929 (river-profile survey).

REMARKS.--Records good. All diversions returned to river upstream from gage. Flow regulated by Ross Reservoir (station 12175000), Diablo Reservoir (station 12176500), and Gorge Reservoir (station 12177700) since 1960. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--34 years (water years 1947-51, 1977-2005), 6,033 ft<sup>3</sup>/s, 4,371,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 64,800 ft<sup>3</sup>/s, Oct. 20, 2003, gage height, 14.11 ft, from rating curve extended above 30,000 ft<sup>3</sup>/s; minimum discharge, 620 ft<sup>3</sup>/s, Mar. 6, 1944, gage height, 0.55 ft; minimum daily discharge, 1,190 ft<sup>3</sup>/s, Feb. 25, 1944.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 36,400 ft<sup>3</sup>/s, Dec. 11, gage height, 10.09 ft; minimum discharge, 1,810 ft<sup>3</sup>/s, Sept. 25, gage height, 2.60 ft.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6,470	8,740	5,600	7,920	8,980	5,080	4,720	3,970	4,390	3,490	2,770	3,400
2	6,360	15,100	5,510	7,660	8,630	4,880	4,450	4,130	4,200	3,520	2,720	3,650
3	5,750	10,800	5,790	7,880	8,630	4,890	4,070	4,420	3,760	3,470	2,700	3,490
4	5,560	9,750	6,170	8,090	9,130	4,870	3,910	4,300	3,250	3,500	2,600	2,790
5	4,620	9,380	6,150	7,700	9,110	4,860	3,720	4,340	3,460	3,560	2,600	2,780
6	4,250	9,400	6,010	7,950	8,800	4,870	3,650	4,480	3,370	4,420	2,590	3,400
7	4,300	10,700	5,960	7,890	8,700	4,860	3,860	4,130	3,550	3,850	2,620	3,630
8	4,480	10,500	5,930	8,160	8,230	3,490	4,000	3,880	3,890	4,690	2,740	3,750
9	5,940	9,600	5,960	7,920	8,420	3,670	3,720	4,020	3,500	4,640	2,600	3,760
10	4,850	9,160	17,500	7,980	5,910	3,660	3,580	4,510	3,340	3,770	2,620	3,770
11	4,410	9,080	20,500	7,800	5,860	3,630	3,610	4,590	3,350	3,670	2,600	3,810
12	3,970	9,030	8,870	7,340	5,800	3,560	3,520	4,560	3,440	3,540	2,610	3,350
13	3,790	8,860	7,690	6,190	5,720	3,460	3,430	4,500	3,440	3,470	2,620	3,430
14	3,820	8,260	8,940	5,870	5,750	3,370	3,400	5,080	3,440	3,540	2,580	3,100
15	3,860	8,280	8,350	5,740	5,810	3,310	3,400	5,350	3,300	3,680	2,570	3,150
16	5,440	6,210	7,370	5,870	5,770	3,340	4,480	5,690	3,240	3,870	2,600	3,390
17	5,210	5,930	6,900	9,570	5,680	3,270	4,340	4,920	3,530	3,710	2,650	3,310
18	5,810	6,080	7,030	19,400	5,640	3,290	3,940	4,550	3,570	3,240	2,550	3,240
19	5,250	5,690	8,490	23,300	5,600	3,810	3,940	5,050	3,500	3,080	2,510	3,090
20	5,090	5,760	7,430	13,400	5,600	3,890	4,000	4,350	3,520	2,890	2,510	3,180
21	4,990	5,670	6,890	11,700	5,560	3,810	4,190	4,330	3,600	2,810	2,520	3,150
22	5,380	5,780	6,540	9,880	5,600	3,530	4,700	4,230	4,340	2,810	2,620	3,070
23	5,040	5,930	6,300	11,300	5,490	3,370	4,880	4,090	3,800	2,790	2,570	3,330
24	4,930	11,700	6,050	11,300	5,370	3,330	5,170	3,870	3,340	2,760	2,530	2,850
25	4,870	15,200	6,240	10,100	5,130	3,340	5,280	3,260	3,260	2,760	2,600	3,150
26	4,590	8,320	6,190	9,830	5,070	3,600	5,510	3,420	3,300	2,720	2,630	3,270
27	4,580	7,290	5,800	8,640	5,080	3,960	5,590	3,680	3,550	2,720	2,630	2,790
28	4,660	6,610	6,660	8,960	5,110	4,060	4,910	3,940	3,440	3,010	2,620	2,820
29	6,790	6,460	8,620	9,030	---	3,820	4,360	4,170	3,330	2,820	2,720	4,990
30	8,100	6,130	8,300	8,870	---	3,840	4,090	4,320	3,370	2,770	2,630	7,830
31	8,060	---	8,090	8,920	---	3,790	---	4,510	---	2,760	2,850	---
TOTAL	161,220	255,400	237,830	292,160	184,180	120,510	126,420	134,640	106,370	104,330	81,280	104,720
MEAN	5,201	8,513	7,672	9,425	6,578	3,887	4,214	4,343	3,546	3,365	2,622	3,491
MAX	8,100	15,200	20,500	23,300	9,130	5,080	5,590	5,690	4,390	4,690	2,850	7,830
MIN	3,790	5,670	5,510	5,740	5,070	3,270	3,400	3,260	3,240	2,720	2,510	2,780
AC-FT	319,800	506,600	471,700	579,500	365,300	239,000	250,800	267,100	211,000	206,900	161,200	207,700

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 2005, BY WATER YEAR (WY)

MEAN	4,399	6,625	6,169	6,768	6,778	5,813	5,581	6,400	7,393	7,507	4,838	3,922
MAX	11,790	22,270	12,120	9,425	13,830	9,415	9,534	10,690	13,590	14,730	9,214	5,828
(WY)	(2004)	(1991)	(1996)	(2005)	(1991)	(1997)	(1951)	(1997)	(1997)	(1950)	(1999)	(2004)
MIN	2,071	1,864	2,609	2,450	2,115	2,222	3,035	3,680	3,492	2,891	2,622	2,144
(WY)	(1978)	(1944)	(1944)	(1944)	(1944)	(1948)	(2001)	(1977)	(2001)	(1977)	(2005)	(1977)

## 12181000 SKAGIT RIVER AT MARBLEMOUNT, WA—Continued

SUMMARY STATISTICS	FOR 2004 CALENDAR YEAR		FOR 2005 WATER YEAR		WATER YEARS 1943 - 2005	
ANNUAL TOTAL	2,320,050		1,909,060			
ANNUAL MEAN	6,339		5,230		6,033	
HIGHEST ANNUAL MEAN					9,617	
LOWEST ANNUAL MEAN					3,710	
HIGHEST DAILY MEAN	20,500	Dec 11	23,300	Jan 19	50,000	Nov 10, 1990
LOWEST DAILY MEAN	3,190	Aug 8	2,510	Aug 19	1,190	Feb 25, 1944
ANNUAL SEVEN-DAY MINIMUM	4,090	Aug 3	2,540	Aug 18	1,520	Feb 20, 1944
ANNUAL RUNOFF (AC-FT)	4,602,000		3,787,000		4,371,000	
10 PERCENT EXCEEDS	8,940		8,760		9,150	
50 PERCENT EXCEEDS	5,600		4,350		5,400	
90 PERCENT EXCEEDS	4,320		2,780		3,200	



## 12181000 SKAGIT RIVER AT MARBLEMOUNT, WA—Continued

## WATER-QUALITY RECORDS

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: March 1986 to current year.

INSTRUMENTATION.--Water-temperature sensor interfaced directly with a data collection platform for satellite telemetry.

REMARKS.--Records good.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 15.0°C (rounded), Aug. 13, 1998, 15.0°C (unrounded), Aug. 5, 2005; minimum, 0.5°C (rounded), Dec. 27, 1996.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 15.0°C, Aug. 5; minimum, 3.3°C, Jan 17.

TEMPERATURE, WATER, DEGREES CELSIUS  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005

DAY	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
1	11.0	9.8	10.3	9.4	8.3	9.2	7.7	7.2	7.5	6.1	5.6	5.9
2	11.2	10.0	10.4	8.3	6.8	7.5	7.8	7.3	7.6	5.6	5.1	5.4
3	11.2	10.0	10.4	8.9	7.9	8.5	7.8	7.5	7.6	5.4	5.0	5.2
4	11.2	9.8	10.4	9.1	8.5	8.8	7.7	7.4	7.5	5.2	4.8	5.0
5	10.9	9.7	10.3	9.4	8.9	9.2	7.5	7.1	7.3	5.2	4.7	5.0
6	10.7	10.2	10.4	9.6	9.2	9.4	7.3	6.9	7.1	5.4	4.9	5.2
7	11.1	10.0	10.5	9.3	9.1	9.2	7.4	7.0	7.2	5.4	5.1	5.3
8	10.5	10.1	10.3	9.5	9.0	9.2	7.3	7.0	7.1	5.3	5.0	5.2
9	10.3	9.8	10.1	9.5	9.1	9.3	7.4	7.0	7.2	5.1	4.7	4.9
10	10.9	9.8	10.2	9.6	9.1	9.3	7.2	4.8	5.7	5.1	4.7	4.9
11	10.9	9.8	10.3	9.4	9.1	9.2	5.7	5.4	5.6	5.1	4.6	4.8
12	11.1	10.0	10.4	9.4	9.0	9.2	6.2	5.5	5.8	5.1	4.6	4.9
13	11.1	9.8	10.4	9.7	9.3	9.5	6.7	6.2	6.5	5.1	4.7	5.0
14	11.1	9.8	10.4	9.5	9.2	9.4	6.7	6.4	6.5	4.8	4.0	4.3
15	10.6	10.2	10.4	9.4	9.0	9.3	6.8	6.4	6.6	4.3	3.7	4.0
16	10.7	10.3	10.5	9.2	8.4	8.9	6.8	6.2	6.6	4.7	4.0	4.3
17	10.3	9.9	10.1	8.8	8.0	8.5	6.8	6.4	6.6	4.7	3.3	4.1
18	9.9	9.4	9.6	8.5	7.9	8.3	7.1	6.7	6.9	4.6	3.5	4.2
19	9.9	9.1	9.5	8.6	7.7	8.2	7.0	6.4	6.8	5.4	4.6	5.1
20	9.9	9.1	9.5	8.4	7.7	8.1	6.4	6.2	6.3	5.5	5.3	5.4
21	10.0	9.5	9.7	8.5	7.6	8.1	6.4	6.2	6.3	5.8	5.4	5.6
22	9.6	9.3	9.5	8.7	8.0	8.4	6.3	6.1	6.2	6.0	5.6	5.8
23	9.3	8.9	9.1	8.7	8.3	8.5	6.3	5.9	6.1	6.3	5.8	6.0
24	9.3	8.5	8.9	8.6	6.8	7.4	6.3	5.9	6.1	6.1	5.5	5.8
25	9.5	8.4	9.0	7.4	6.8	7.1	6.4	6.3	6.4	5.6	5.3	5.5
26	9.5	8.5	9.0	7.5	6.9	7.2	6.5	6.3	6.4	5.7	5.5	5.6
27	9.6	8.5	9.0	7.6	7.1	7.4	6.4	6.0	6.2	5.8	5.5	5.6
28	9.4	8.4	8.9	7.4	6.9	7.2	6.2	5.8	6.0	5.6	5.0	5.3
29	9.9	9.3	9.6	7.5	6.7	7.1	6.4	6.0	6.3	5.5	5.2	5.4
30	9.7	9.1	9.4	7.6	6.9	7.2	6.5	6.3	6.4	5.5	5.3	5.3
31	9.6	8.9	9.2	---	---	---	6.4	6.1	6.2	5.6	5.3	5.4
MONTH	11.2	8.4	9.9	9.7	6.7	8.5	7.8	4.8	6.6	6.3	3.3	5.1



12186000 SAUK RIVER ABOVE WHITE CHUCK RIVER, NEAR DARRINGTON, WA

LOCATION.--Lat 48°10'08", long 121°28'10", on north line, NE<sup>1</sup>/<sub>4</sub>NE<sup>1</sup>/<sub>4</sub>, sec.23, T.31 N., R.10 E., Snohomish County, Hydrologic Unit 17110006, Mount Baker National Forest, on right bank 0.6 mi upstream from White Chuck River, 8.4 mi southeast of Darrington, and at mile 32.5.

DRAINAGE AREA.--152 mi<sup>2</sup>.

PERIOD OF RECORD.--August to November 1910 (fragmentary gage heights only), October 1917 to September 1922, August 1928 to current year. Monthly discharge only for April and May 1921, published in WSP 1316.

REVISED RECORDS.--WSP 752: 1932. WSP 1286: 1918(M), 1920(M), 1921, 1922(M), 1932(M), 1934(M), 1946-47(M), 1949.

GAGE.--Water-stage recorder. Elevation of gage is 930 ft above NGVD of 1929, from river-profile map. Prior to Nov. 18, 1910, nonrecording gage 0.5 mi downstream at different datum.

REMARKS.--Records good, except estimated daily discharges, which are fair. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--81 years (water years 1918-20, 1922, 1929-2005), 1,123 ft<sup>3</sup>/s, 100.40 in/yr, 813,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 44,000 ft<sup>3</sup>/s, Oct. 20, 2003, gage height, 15.39 ft, from rating curve extended above 15,000 ft<sup>3</sup>/s, on basis of slope-area measurement; maximum gage height, 16.03 ft, Dec. 26, 1980; minimum daily discharge, 90 ft<sup>3</sup>/s, Nov. 6, 2002, but may have been lower during period of missing record.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov 2	0930	9,580	8.01	Dec 11	0230	*18,800	*10.56
Nov 25	0345	8,050	7.48	Jan 19	0015	15,800	9.82

Minimum discharge, 99 ft<sup>3</sup>/s, Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	401	865	806	622	948	397	1,140	1,220	1,160	558	293	173
2	381	6,510	724	578	841	390	1,060	1,160	1,000	540	275	173
3	359	2,790	666	538	779	380	898	1,140	897	501	261	163
4	339	1,690	653	502	985	363	857	1,100	802	473	255	153
5	321	1,300	677	474	988	353	748	1,150	783	466	250	150
6	415	1,100	605	460	836	347	688	1,260	736	870	253	143
7	398	1,080	582	451	749	417	798	1,150	715	661	257	139
8	414	1,040	738	430	684	509	914	1,020	779	784	254	137
9	910	904	801	412	636	573	777	1,040	748	1,280	252	162
10	941	810	8,810	394	594	631	692	1,570	692	796	251	214
11	663	738	10,600	376	564	589	734	1,500	705	676	239	191
12	542	677	3,550	384	559	616	687	1,350	800	612	238	172
13	476	631	2,300	364	561	560	622	1,240	751	558	239	158
14	436	603	2,610	342	525	503	602	1,290	707	514	235	147
15	409	679	2,470	327	481	464	576	1,440	687	506	233	142
16	589	695	1,810	376	458	490	988	1,590	651	530	228	142
17	922	665	1,530	2,720	441	491	1,030	1,230	710	487	247	159
18	1,090	768	1,440	10,300	427	463	897	1,070	692	472	232	142
19	817	816	1,720	8,900	411	435	804	1,360	648	456	211	138
20	676	676	1,610	4,040	392	584	822	1,270	646	416	209	133
21	735	598	1,340	3,430	376	709	922	1,170	711	391	206	127
22	744	593	1,160	2,880	364	569	1,180	1,110	830	421	205	122
23	903	607	1,030	3,490	356	504	1,440	993	709	405	192	116
24	784	2,570	940	2,430	351	457	1,690	892	638	365	177	113
25	692	5,530	980	1,920	346	424	1,800	844	599	348	173	110
26	615	2,260	1,010	1,630	342	640	1,930	896	574	339	172	107
27	558	1,560	879	1,470	339	1,250	2,030	1,030	610	327	169	106
28	519	1,220	799	e1,200	348	1,180	1,810	1,170	655	326	166	104
29	492	1,020	762	e1,100	---	1,050	1,550	1,300	605	321	210	628
30	668	909	724	e1,000	---	969	1,350	1,260	590	304	226	1,930
31	671	---	669	e960	---	800	---	1,180	---	296	182	---
TOTAL	18,880	41,904	54,995	54,500	15,681	18,107	32,036	36,995	21,830	15,999	6,990	6,594
MEAN	609	1,397	1,774	1,758	560	584	1,068	1,193	728	516	225	220
MAX	1,090	6,510	10,600	10,300	988	1,250	2,030	1,590	1,160	1,280	293	1,930
MIN	321	593	582	327	339	347	576	844	574	296	166	104
AC-FT	37,450	83,120	109,100	108,100	31,100	35,920	63,540	73,380	43,300	31,730	13,860	13,080
CFSM	4.01	9.19	11.7	11.6	3.68	3.84	7.03	7.85	4.79	3.40	1.48	1.45
IN.	4.62	10.26	13.46	13.34	3.84	4.43	7.84	9.05	5.34	3.92	1.71	1.61

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1918 - 2005, BY WATER YEAR (WY)

MEAN	822	1,208	1,231	1,029	894	778	1,079	1,867	2,155	1,379	588	482
MAX	3,038	4,117	3,512	2,584	2,369	2,442	1,991	2,965	3,648	2,875	1,393	1,504
(WY)	(2004)	(1991)	(1918)	(1953)	(1951)	(1972)	(1934)	(1949)	(1974)	(1954)	(1954)	(1920)
MIN	119	137	347	224	167	293	458	1,119	728	396	215	177
(WY)	(1988)	(1937)	(1986)	(1979)	(1929)	(1955)	(1975)	(1977)	(2005)	(1941)	(1941)	(1942)

## 12186000 SAUK RIVER ABOVE WHITE CHUCK RIVER, NEAR DARRINGTON, WA—Continued

SUMMARY STATISTICS	FOR 2004 CALENDAR YEAR		FOR 2005 WATER YEAR		WATER YEARS 1918 - 2005	
ANNUAL TOTAL	386,821		324,511			
ANNUAL MEAN	1,057		889		1,123	
HIGHEST ANNUAL MEAN					1,557	1950
LOWEST ANNUAL MEAN					631	2001
HIGHEST DAILY MEAN	10,600	Dec 11	10,600	Dec 11	40,000	Oct 20, 2003
LOWEST DAILY MEAN	274	Aug 21	104	Sep 28	90	Nov 6, 2002
ANNUAL SEVEN-DAY MINIMUM	296	Aug 15	111	Sep 22	96	Oct 24, 1987
ANNUAL RUNOFF (AC-FT)	767,300		643,700		813,700	
ANNUAL RUNOFF (CFSM)	6.95		5.85		7.39	
ANNUAL RUNOFF (INCHES)	94.67		79.42		100.40	
10 PERCENT EXCEEDS	1,910		1,510		2,330	
50 PERCENT EXCEEDS	814		653		808	
90 PERCENT EXCEEDS	383		208		292	

e Estimated

## 12189500 SAUK RIVER NEAR SAUK, WA

LOCATION.--Lat 48°25'29", long 121°34'02", in NW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec.19, T.34 N., R.10 E., Skagit County, Hydrologic Unit 17110006, on left bank, 4.4 mi southeast of Rockport, 7.6 mi southeast of Sauk, 7.8 mi downstream from Suiattle River, and at mile 5.4.

DRAINAGE AREA.--714 mi<sup>2</sup>.

PERIOD OF RECORD.--August to October 1910 (fragmentary gage heights), March 1911 to August 1912, July 1928 to current year. Published as "near Suiattle Crossing, near Sauk" 1910-12.

REVISED RECORDS.--WSP 1286: 1929, 1937, 1939.

GAGE.--Water-stage recorder. Datum of gage is 266 ft above NGVD of 1929 (from river-profile survey). Prior to Aug. 4, 1912, nonrecording gages at several sites 1.0 mi downstream to 5.0 mi upstream from present site at various datums. July 24, 1928, to Sept. 16, 1929, nonrecording gage at present site and datum. U.S. Geological Survey satellite telemeter at station.

REMARKS.--Records fair. No regulation. Small diversion for millpond at Darrington and for domestic use.

AVERAGE DISCHARGE.--77 years (water years 1929-2005), 4,332 ft<sup>3</sup>/s, 82.44 in/yr, 3,139,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 106,000 ft<sup>3</sup>/s, Oct. 21, 2003, gage height, 18.96 ft, from rating extended above 50,000 ft<sup>3</sup>/s; minimum discharge, 572 ft<sup>3</sup>/s Dec. 5, 1929, but may have been less during period of ice effect Jan. 10-27, 1930.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 16,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov 2	1245	23,600	9.81	Dec 11	0715	*55,000	*13.84
Nov 25	0615	25,300	10.09	Jan 19	0415	45,000	12.58

Minimum discharge, 808 ft<sup>3</sup>/s, Sept. 27-29, gage height, 2.51 ft.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2,080	2,890	3,580	2,620	3,680	1,780	4,960	4,780	4,880	2,900	1,880	1,190
2	2,010	15,600	3,230	2,440	3,320	1,860	5,220	4,660	4,210	2,900	1,750	1,240
3	1,950	8,020	2,990	2,300	3,070	1,830	4,290	4,600	3,810	2,730	1,660	1,210
4	1,900	5,730	2,970	2,190	3,380	1,780	4,050	4,520	3,550	2,550	1,640	1,070
5	1,840	4,780	3,170	2,110	3,860	1,720	3,620	4,550	3,450	2,560	1,650	1,010
6	2,020	4,260	2,890	2,060	3,270	1,680	3,270	4,870	3,340	3,520	1,710	976
7	2,100	5,030	2,770	2,050	3,000	1,700	3,610	4,450	3,090	3,200	1,750	980
8	2,000	4,990	3,370	1,990	2,760	1,990	4,290	3,900	3,530	2,970	1,720	998
9	3,960	4,200	4,050	1,920	2,610	2,020	3,640	4,170	3,360	4,740	1,740	1,110
10	3,810	3,520	23,700	1,850	2,490	2,230	3,250	5,290	3,050	3,230	1,750	1,170
11	2,950	3,160	37,400	1,790	2,410	2,240	3,210	5,510	3,190	2,800	1,660	1,090
12	2,510	2,910	13,600	1,820	2,350	2,250	3,160	5,160	3,530	2,720	1,640	972
13	2,330	2,750	9,210	1,760	2,430	2,250	2,900	4,930	3,310	2,640	1,640	916
14	2,260	2,660	11,000	1,680	2,360	2,170	2,810	5,110	3,050	2,410	1,610	880
15	2,220	2,940	10,200	1,610	2,230	2,070	2,720	5,660	2,930	2,410	1,610	893
16	3,220	3,150	7,520	1,860	2,130	2,000	4,970	6,690	2,820	2,760	1,610	899
17	4,020	3,070	6,420	6,730	2,090	2,050	4,900	5,110	3,040	2,640	1,740	899
18	4,530	3,310	5,970	28,500	2,040	2,020	3,810	4,320	3,040	2,480	1,680	905
19	3,690	3,760	6,680	31,800	1,990	1,980	3,290	5,290	2,870	2,540	1,480	908
20	3,040	3,120	6,070	14,000	1,930	2,310	3,260	5,000	2,840	2,320	1,490	906
21	3,020	2,750	5,050	11,600	1,870	2,990	3,680	4,450	3,200	2,170	1,520	889
22	3,090	2,650	4,420	10,600	1,820	2,410	4,570	4,160	3,890	2,240	1,530	870
23	3,420	2,720	3,960	14,900	1,780	2,130	5,360	3,730	3,490	2,350	1,390	849
24	3,290	7,180	3,640	10,300	1,750	1,990	6,260	3,300	3,130	2,100	1,220	831
25	3,040	18,000	3,760	7,860	1,730	1,900	6,760	3,120	2,960	1,970	1,240	816
26	2,790	8,050	4,020	6,490	1,710	2,510	7,250	3,250	2,880	1,970	1,250	816
27	2,580	6,140	3,450	5,790	1,700	5,190	7,730	3,770	3,160	1,960	1,270	813
28	2,460	4,880	3,180	4,970	1,680	4,900	7,130	4,330	3,210	1,990	1,290	809
29	2,360	4,260	3,080	4,300	---	4,240	5,980	5,060	3,010	2,020	1,450	1,280
30	2,800	3,960	2,990	3,840	---	4,400	5,210	5,150	2,960	1,930	1,350	6,620
31	2,880	---	2,790	3,760	---	3,730	---	4,860	---	1,890	1,190	---
TOTAL	86,170	150,440	207,130	197,490	67,440	76,320	135,160	143,750	98,780	79,610	48,110	34,815
MEAN	2,780	5,015	6,682	6,371	2,409	2,462	4,505	4,637	3,293	2,568	1,552	1,160
MAX	4,530	18,000	37,400	31,800	3,860	5,190	7,730	6,690	4,880	4,740	1,880	6,620
MIN	1,840	2,650	2,770	1,610	1,680	1,680	2,720	3,120	2,820	1,890	1,190	809
AC-FT	170,900	298,400	410,800	391,700	133,800	151,400	268,100	285,100	195,900	157,900	95,430	69,060
CFSM	3.89	7.02	9.36	8.92	3.37	3.45	6.31	6.49	4.61	3.60	2.17	1.63
IN.	4.49	7.84	10.79	10.29	3.51	3.98	7.04	7.49	5.15	4.15	2.51	1.81

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 2005, BY WATER YEAR (WY)

MEAN	2,889	4,475	4,670	4,194	3,764	3,268	4,000	6,453	7,804	5,577	2,791	2,085
MAX	7,310	14,690	11,580	8,615	9,062	9,443	7,375	10,570	13,520	10,610	5,529	4,941
(WY)	(2004)	(1996)	(1934)	(1974)	(1951)	(1972)	(1934)	(1949)	(1974)	(1972)	(1974)	(1959)
MIN	751	724	1,457	1,199	793	1,523	2,039	4,061	3,293	2,515	1,513	1,089
(WY)	(1988)	(1930)	(1953)	(1979)	(1929)	(1955)	(1975)	(1977)	(2005)	(1941)	(2003)	(1942)

## 12189500 SAUK RIVER NEAR SAUK, WA—Continued

SUMMARY STATISTICS	FOR 2004 CALENDAR YEAR		FOR 2005 WATER YEAR		WATER YEARS 1929 - 2005	
ANNUAL TOTAL	1,523,060		1,325,215		4,332	
ANNUAL MEAN	4,161		3,631		6,048	
HIGHEST ANNUAL MEAN					1972	
LOWEST ANNUAL MEAN					2001	
HIGHEST DAILY MEAN	37,400	Dec 11	37,400	Dec 11	69,900	Nov 24, 1990
LOWEST DAILY MEAN	1,840	Mar 3	809	Sep 28	578	Dec 4, 1929
ANNUAL SEVEN-DAY MINIMUM	1,920	Feb 28	829	Sep 22	604	Nov 29, 1929
ANNUAL RUNOFF (AC-FT)	3,021,000		2,629,000		3,139,000	
ANNUAL RUNOFF (CFSM)	5.83		5.09		6.07	
ANNUAL RUNOFF (INCHES)	79.35		69.04		82.44	
10 PERCENT EXCEEDS	6,790		5,750		8,300	
50 PERCENT EXCEEDS	3,360		2,910		3,330	
90 PERCENT EXCEEDS	2,160		1,370		1,520	

## 12191600 BAKER LAKE AT UPPER BAKER DAM, NEAR CONCRETE, WA

LOCATION.--Lat 48°38'58", long 121°41'22", in SW $\frac{1}{4}$  sec.31, T.37 N., R.9 E., Whatcom County, Hydrologic Unit 17110005, at upper Baker Dam on Baker River near center of dam, 0.3 mi upstream from Sulphur Creek, 8.0 mi north of Concrete, and at mile 9.3.

DRAINAGE AREA.--215 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is NAVD of 1988. Prior to Oct. 1, 2004, datum of gage was 3.77 ft higher at NGVD of 1929.

REMARKS.--Reservoir is formed by concrete gravity dam, completed in June 1959; storage began July 9, 1959. Usable storage, 212,995 acre-ft, between elevations 658.77 ft, minimum operating pool, and 727.77 ft, normal full pool. Dead storage below elevation 658.77 ft, 67,809 acre-ft. Crest of spillway is at elevation 697.77 ft. Water used by Puget Sound Energy for power generation. Capacity table to datum of NAVD of 1988 prepared and furnished by Puget Sound Energy on the basis of a resurvey of the lake bed. Figures given herein represent total contents. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 287,930 acre-ft, July 12, 1972, elevation, 728.26 ft, present datum; minimum contents since normal operating level was reached in August 1960, 102,621 acre-ft, May 8, 1977, elevation, 678.58 ft, present datum.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 275,656 acre-ft, May 16, elevation, 726.73 ft; minimum contents, 180,659 acre-ft, Feb. 21, elevation, 704.88 ft.

MONTH-END ELEVATION AND CONTENTS AT 2400  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
December 31, 2003	702.63	172,483	--
September 30	716.25	226,745	--
October 31	711.30	205,742	-21,003
November 30	709.11	196,898	-8,844
December 31	709.77	199,534	+2,636
Calendar Year 2004	--	--	+27,051
January 31	709.29	197,617	-1,917
February 28	706.48	186,674	-10,943
March 31	718.16	235,228	+48,554
April 30	725.30	268,660	+33,432
May 31	724.83	266,381	-2,279
June 30	725.47	269,487	+3,106
July 31	724.90	266,718	-2,769
August 31	721.99	252,842	-13,876
September 30	712.97	212,666	-40,176
Water Year 2005	--	--	-14,079

## 12193000 LAKE SHANNON AT CONCRETE, WA

LOCATION.--Lat 48°32'53", long 121°44'22", in SW $\frac{1}{4}$  sec.2, T.35 N., R.8 E., Skagit County, Hydrologic Unit 17110005, at Baker Dam on Baker River near left bank, 0.7 mi north of Concrete, and at mile 1.2.

DRAINAGE AREA.--297 mi<sup>2</sup>.

PERIOD OF RECORD.--November 1925 to current year.

GAGE.--Water-stage recorder. Prior to Nov. 11, 1959, water-stage indicator in powerplant. Datum of gage is NAVD of 1988. Prior to Oct. 1, 2004, datum of gage was 3.75 ft higher at NGVD of 1929. Prior to March 1959, at datum 2.03 ft higher. August 31, 1961, to September 30, 1991, at datum 3.90 ft higher.

REMARKS.--Reservoir is formed by concrete-arch and gravity dam, completed in June 1927; storage began in November 1925. Usable storage, 132,900 acre-ft, between elevations 358.75 ft, minimum operating pool, and 442.35 ft, normal full pool. Dead storage below elevation 358.75 ft, 20,795 acre-ft. Spillway crest is at elevation 428.65 ft. Water used by Puget Sound Energy for power generation. Capacity table to datum of NAVD of 1988 prepared and furnished by Puget Sound Energy on the basis of a resurvey of the lake bed. Prior to Nov. 11, 1959, gage-height record furnished by Puget Sound Energy from powerplant log. Figures given herein represent total contents. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 161,470 acre-ft, Sept. 17, 1968, elevation, 443.40 ft, present datum; minimum contents since October 1953, 28,260 acre-ft, Mar. 6, 1969, elevation, 367.60 ft, present datum not determined prior to October 1953 because of incomplete records.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 152,759 acre-ft, July 27, elevation, 441.95 ft; minimum contents, 79,532 acre-ft, Oct. 1, elevation, 403.84 ft.

MONTH-END ELEVATION AND CONTENTS AT 2400  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
December 31, 2003	421.62	110,798	--
September 30	407.59	85,782	--
October 31	424.47	116,231	+30,449
November 30	432.86	133,022	+16,791
December 31	426.70	120,576	-12,446
Calendar Year 2004	--	--	+9,778
January 31	430.08	127,321	+6,745
February 28	434.75	136,985	+9,664
March 31	435.94	139,515	+2,530
April 30	423.65	114,654	-24,861
May 31	440.91	150,412	+35,758
June 30	437.89	143,727	-6,685
July 31	439.57	147,423	+3,696
August 31	415.95	100,357	-47,066
September 30	421.47	110,516	+10,159
Water Year 2005	--	--	+24,734



## 12193500 BAKER RIVER AT CONCRETE, WA

LOCATION.--Lat 48°32'24", long 121°44'31", in NW ¼ NW ¼ sec.11, T.35 N., R.8 E., Skagit County, Hydrologic Unit 17110005, on left bank at upstream side of fish barrier, 0.2 mi northeast of Concrete, 0.3 mi downstream from Baker River powerplant, and at mile 0.7.

DRAINAGE AREA.--297 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1910 to March 1915, September 1943 to current year.

REVISED RECORDS.--WSP 1286: 1911-13(M), 1945-46, drainage area.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929. Prior to Mar. 5, 1915, nonrecording gage at site 0.2 mi downstream at different datum. Sept. 1, 1943, to Jan. 22, 1958, water-stage recorder at site 700 ft upstream at datum 172.6 ft above NGVD of 1929 (from river-profile survey). Jan. 23 to June 11, 1958, powerplant record. Supplementary water-stage recorder on left bank about 40 ft downstream from fish barrier and on tailrace of powerhouse at same datum.

REMARKS.--Records good, except flows below 200 ft<sup>3</sup>/s, which are poor. Flows on occasion may be affected by backwater from Skagit River during high flows. All diversions returned to river upstream from gage; at times, power generation is shut down for maintenance at Baker River or the fish-barrier dam causing the stage to drop below the control. Water is released through a valve-controlled pipe to the fish ladder located on the left bank just downstream from the gage and control. Flow regulated by Baker Lake (station 12191600) since July 1959 and Shannon Lake (station 12193000) since November 1925. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--Puget Sound Energy provided streamflow data from dam upstream during period of backwater.

AVERAGE DISCHARGE.--66 years (water years 1911-14, 1944-2005), 2,649 ft<sup>3</sup>/s, 121.12 in/yr, 1,919,200 acre-ft/yr, adjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,600 ft<sup>3</sup>/s, Nov. 19, 1962, elevation, 186.6 ft, computation of peak flow over dam; minimum daily discharge, 30 ft<sup>3</sup>/s, Mar. 21-26, 1973, Apr. 26-28, May 7-9, 11, 1983, Apr. 20, 24-28, 1986.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 20,300 ft<sup>3</sup>/s, Jan. 20, elevation, 181.74 ft; minimum discharge, 88 ft<sup>3</sup>/s, Feb. 20.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3,810	3,700	3,290	2,640	2,710	102	2,690	3,810	3,720	2,610	3,680	122
2	728	4,230	3,750	2,680	1,160	102	2,580	3,770	3,670	629	3,760	122
3	722	4,110	3,750	2,680	2,500	102	3,640	3,300	2,540	1,930	3,780	431
4	616	3,910	3,770	2,980	2,390	102	2,670	2,050	2,850	2,580	2,470	385
5	653	3,450	3,770	3,050	1,590	102	2,840	1,520	1,360	2,270	3,820	122
6	660	2,790	3,790	181	3,150	102	2,400	2,560	2,520	2,540	2,440	2,370
7	693	4,100	3,810	105	2,790	104	2,240	98	2,330	2,550	3,870	3,220
8	704	4,140	3,810	1,190	2,670	104	929	98	2,250	2,910	3,870	3,420
9	698	3,110	3,810	107	103	1,890	108	128	2,340	2,790	3,890	4,090
10	773	4,100	3,810	920	1,150	236	108	125	2,720	858	3,930	4,080
11	602	4,120	3,730	1,900	1,070	108	920	127	1,760	2,440	3,830	4,080
12	662	4,110	3,710	564	961	108	2,200	130	2,300	2,030	1,870	4,030
13	632	2,530	3,680	845	2,740	2,470	115	132	2,390	2,070	2,490	3,520
14	635	2,300	3,730	1,290	1,820	128	2,360	146	2,790	2,100	2,320	4,050
15	586	2,930	3,670	106	1,910	108	2,640	149	2,420	2,110	2,630	738
16	2,840	3,430	3,690	2,010	1,960	1,010	2,460	3,100	2,470	2,080	1,620	532
17	2,980	2,820	3,690	2,810	1,020	973	241	3,750	2,790	2,010	1,960	684
18	3,230	1,610	3,690	3,690	2,450	108	1,320	3,750	2,280	2,040	2,080	626
19	4,190	2,880	3,690	4,750	97	110	2,460	3,760	2,020	1,960	2,650	662
20	4,240	3,350	3,680	17,700	93	111	2,700	2,760	2,550	2,060	211	746
21	4,280	2,840	3,650	17,400	100	108	2,650	3,010	2,030	2,010	2,030	657
22	4,270	3,010	3,660	7,210	102	108	2,770	3,650	895	2,040	1,990	682
23	4,250	3,160	3,690	8,320	102	108	3,660	3,600	788	1,910	1,810	666
24	3,080	4,340	3,690	4,230	102	108	3,650	3,150	1,800	1,340	2,080	729
25	3,250	4,150	3,710	4,300	102	108	3,640	3,050	118	989	224	673
26	1,200	4,130	3,720	4,270	102	113	3,680	2,770	996	948	1,570	667
27	108	4,120	3,750	4,150	102	115	3,730	1,560	225	1,030	147	674
28	1,400	3,820	3,660	4,010	102	2,820	3,710	2,740	120	1,320	120	656
29	109	2,360	2,880	3,930	---	2,670	3,790	3,210	489	1,490	121	656
30	108	3,640	2,940	3,790	---	1,260	3,820	3,000	2,480	1,730	122	3,170
31	1,110	---	2,310	3,580	---	2,720	---	2,650	---	3,720	122	---
TOTAL	53,819	103,290	111,980	117,388	35,148	18,418	72,721	67,653	60,011	61,094	67,507	47,260
MEAN	1,736	3,443	3,612	3,787	1,255	594	2,424	2,182	2,000	1,971	2,178	1,575
MAX	4,280	4,340	3,810	17,700	3,150	2,820	3,820	3,810	3,720	3,720	3,930	4,090
MIN	108	1,610	2,310	105	93	102	108	98	118	629	120	122
AC-FT	106,800	204,900	222,100	232,800	69,720	36,530	144,200	134,200	119,000	121,200	133,900	93,740
MEAN†	1,889	3,577	3,452	3,863	1,233	1,425	2,569	2,727	1,940	1,985	1,186	1,071
CFSM†	6.36	12.04	11.62	13.01	4.15	4.80	8.65	9.18	6.53	6.68	3.99	3.61
IN.†	7.34	13.43	13.40	15.00	4.32	5.53	9.65	10.59	7.29	7.71	4.61	4.02
AC-FT†	116,200	212,800	212,300	237,600	68,440	87,610	152,800	167,700	115,400	122,100	72,960	63,720

CAL YR 2004 TOTAL 935,609 MEAN 2,556 MAX 4,410 MIN 80 AC-FT 1,856,000 MEAN† 2,609 CFSM† 8.78 IN.† 119.51 AC-FT† 1,893,000

WTR YR 2005 TOTAL 816,289 MEAN 2,236 MAX 17,700 MIN 93 AC-FT 1,619,000 MEAN† 2,251 CFSM† 7.58 IN.† 102.90 AC-FT† 1,630,000

† Adjusted for change in contents in Baker Lake and Lake Shannon.

## 12194000 SKAGIT RIVER NEAR CONCRETE, WA

LOCATION.--Lat 48°31'28", long 121°46'11", in SE¼NE¼ sec.16, T.35 N., R.8 E., Skagit County, Hydrologic Unit 17110007, on right bank at Dalles Bridge, 1.3 mi southwest of Concrete, 2.4 mi downstream from Baker River, and at mile 54.1.

DRAINAGE AREA.--2,737 mi<sup>2</sup>, of which 400 mi<sup>2</sup> are in Canada.

PERIOD OF RECORD.--September 1924 to current year.

REVISED RECORDS.--WSP 1566: 1957. WSP 1736: 1948. WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 130.0 ft above NGVD of 1929. Prior to Dec. 10, 1924, nonrecording gage 200 ft upstream and Dec. 10, 1924, to Sept. 30, 1937, water-stage recorder at present site; both gages at datum 12.7 ft higher.

REMARKS.--Records good. Flow regulated by Ross Reservoir (station 12175000), Diablo Reservoir (station 12176500), Gorge Reservoir (station 12177700), Baker Lake (station 12191600), and Lake Shannon (station 12193000). Chemical analyses November 1970 to September 1971, October 1973 to September 1974. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--81 years (water years 1925-2005), 15,010 ft<sup>3</sup>/s, 10,870,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 166,000 ft<sup>3</sup>/s, Oct. 21, 2003, gage height, 42.21 ft; minimum discharge, probably less than 2,160 ft<sup>3</sup>/s, during period Oct. 1-24, 1925, when recorder was not operating and gates in Baker River Dam were first closed; minimum daily recorded, 2,360 ft<sup>3</sup>/s, Dec. 12, 1929.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of about 1815 reached a stage of 69.3 ft present datum, from floodmarks at site 200 ft upstream, estimated discharge about 500,000 ft<sup>3</sup>/s. Records of other floods, prior to establishment of station, are given in WSP 1527.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 99,400 ft<sup>3</sup>/s, Dec. 11, gage height, 33.78 ft; minimum discharge, 4,460 ft<sup>3</sup>/s, Aug. 21, 24-31, Sept. 1-6, 15-29, gage height, 14.09 ft.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13,400	16,500	15,000	15,000	17,200	7,630	13,900	14,200	15,600	10,700	9,350	4,730
2	9,740	38,600	15,100	14,500	14,700	7,400	14,100	14,100	14,600	8,320	9,290	5,320
3	9,570	31,200	14,300	14,400	15,600	7,300	13,900	13,800	12,300	9,730	9,060	5,300
4	8,860	23,600	15,000	14,800	16,400	7,180	12,400	12,300	11,700	10,100	7,520	5,190
5	7,990	21,300	15,400	14,300	16,300	7,080	11,800	11,800	9,720	9,740	8,960	4,480
6	7,720	19,400	14,800	11,300	16,900	7,030	10,800	13,500	11,200	12,000	7,490	6,850
7	8,030	23,400	14,400	11,200	15,900	7,220	11,100	10,300	10,500	11,800	9,130	8,110
8	7,610	23,100	15,300	12,500	15,000	6,710	10,700	9,400	11,600	11,500	9,220	8,530
9	12,600	20,100	16,200	11,000	12,500	8,330	8,750	9,630	11,300	15,300	9,130	9,390
10	11,700	19,500	38,300	11,700	11,100	7,270	7,980	11,500	10,900	9,690	9,270	9,590
11	9,450	18,800	74,700	12,500	10,500	6,800	9,010	12,200	9,890	10,600	9,040	9,440
12	8,390	18,400	34,000	10,700	10,100	6,850	10,200	11,700	11,100	9,740	6,830	8,980
13	7,760	16,200	25,500	9,940	12,400	9,100	7,440	11,400	10,800	9,580	7,530	8,240
14	7,570	15,100	27,700	10,200	10,900	6,330	9,660	12,000	11,000	9,270	7,250	8,550
15	7,440	16,200	27,700	8,250	10,900	6,010	9,720	12,700	10,200	9,360	7,550	5,350
16	13,000	15,200	22,800	10,800	10,800	6,990	12,800	18,100	9,970	10,200	6,510	5,060
17	14,700	14,000	20,600	16,900	9,670	7,180	11,700	16,400	10,900	9,910	7,120	5,260
18	16,300	12,900	19,700	52,700	11,000	6,020	10,700	14,800	10,700	9,230	7,200	5,140
19	15,700	15,000	22,000	68,300	8,270	6,040	11,200	16,400	9,960	8,960	7,390	5,170
20	14,500	14,400	21,300	51,400	8,120	7,560	11,500	14,600	10,500	8,580	4,840	5,050
21	14,300	13,200	19,000	46,700	7,980	8,210	11,900	14,400	10,400	8,100	6,630	4,920
22	14,500	13,500	17,700	31,000	7,920	6,970	13,400	14,400	10,900	8,090	6,740	4,990
23	14,900	13,800	16,800	39,800	7,820	6,400	15,700	13,700	10,400	8,300	6,490	5,030
24	13,100	24,500	16,100	29,100	7,660	6,060	17,000	12,300	10,100	7,180	6,400	4,960
25	13,000	47,900	16,300	25,300	7,480	5,940	17,800	11,500	7,740	6,540	4,640	4,880
26	10,000	27,900	16,700	23,300	7,300	6,770	18,600	11,200	8,520	6,400	5,920	5,000
27	8,270	23,900	15,600	21,900	7,270	10,800	19,500	10,700	8,420	6,480	4,570	4,900
28	9,570	19,900	15,300	19,800	7,300	13,800	18,300	13,000	8,360	6,980	4,490	4,790
29	9,410	16,300	16,600	19,300	---	12,400	16,300	15,000	8,300	7,220	4,760	5,840
30	12,000	16,700	16,200	18,300	---	11,100	15,000	15,200	10,400	7,170	4,720	22,600
31	13,500	---	15,000	18,100	---	11,800	---	14,300	---	9,420	4,520	---
TOTAL	344,580	610,500	651,100	674,990	314,990	242,280	382,860	406,530	317,980	286,190	219,560	201,640
MEAN	11,120	20,350	21,000	21,770	11,250	7,815	12,760	13,110	10,600	9,232	7,083	6,721
MAX	16,300	47,900	74,700	68,300	17,200	13,800	19,500	18,100	15,600	15,300	9,350	22,600
MIN	7,440	12,900	14,300	8,250	7,270	5,940	7,440	9,400	7,740	6,400	4,490	4,480
AC-FT	683,500	1,211,000	1,291,000	1,339,000	624,800	480,600	759,400	806,400	630,700	567,700	435,500	400,000

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 2005, BY WATER YEAR (WY)

MEAN	11,240	15,600	15,910	14,940	13,750	12,100	13,790	20,140	24,260	19,000	10,780	8,540
MAX	26,670	49,160	34,660	25,240	28,840	23,380	29,270	36,310	43,320	37,430	20,930	16,710
(WY)	(2004)	(1991)	(1976)	(1935)	(1991)	(1972)	(1934)	(1925)	(1972)	(1972)	(1976)	(2004)
MIN	3,808	2,876	5,289	4,485	3,195	6,224	7,716	11,440	10,600	8,856	6,403	4,852
(WY)	(1926)	(1937)	(1930)	(1930)	(1929)	(1929)	(2001)	(1977)	(2005)	(1977)	(1941)	(1942)

## SKAGIT RIVER BASIN

12194000 SKAGIT RIVER NEAR CONCRETE, WA—Continued

SUMMARY STATISTICS	FOR 2004 CALENDAR YEAR		FOR 2005 WATER YEAR		WATER YEARS 1925 - 2005	
ANNUAL TOTAL	5,414,820		4,653,200		15,010	
ANNUAL MEAN	14,790		12,750		21,270	1991
HIGHEST ANNUAL MEAN					9,512	2001
LOWEST ANNUAL MEAN					135,000	Nov 10, 1990
HIGHEST DAILY MEAN	74,700	Dec 11	74,700	Dec 11	2,360	Dec 12, 1929
LOWEST DAILY MEAN	6,290	Mar 7	4,480	Sep 5	2,400	Oct 17, 1925
ANNUAL SEVEN-DAY MINIMUM	8,500	Oct 2	4,730	Aug 27	10,870,000	
ANNUAL RUNOFF (AC-FT)	10,740,000		9,230,000		26,000	
10 PERCENT EXCEEDS	21,600		19,500		12,800	
50 PERCENT EXCEEDS	13,700		10,900		6,700	
90 PERCENT EXCEEDS	9,410		6,400			



## 12200100 NOOKACHAMPS CREEK NEAR CLEAR LAKE, WA

LOCATION.--Lat 48°27'15", long 122°16'14", in SE $\frac{1}{4}$ NE $\frac{1}{4}$  sec.10, T.34 N., R.4 E., Skagit County, Hydrologic Unit 17110007, on right bank downstream from Swan Road bridge, 2.4 mi northeast of Mount Vernon, and at mile 4.1.

DRAINAGE AREA.--69.8 mi<sup>2</sup>.

PERIOD OF RECORD.--October 2004 to September 2005 (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929.

REMARKS.--Records good. No known regulation or diversion upstream from station. Stage can be influenced by backwater from Skagit River.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 33.46 ft, Dec. 11, 12; minimum gage height, 14.87 ft, Aug. 7.

ELEVATION ABOVE NGVD 1929, FEET  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16.26	17.49	18.83	18.08	19.08	16.23	18.76	17.60	17.92	15.83	---	15.83
2	16.00	22.71	18.45	17.83	18.45	16.11	19.35	17.40	17.60	15.53	---	15.83
3	15.52	24.45	18.13	17.61	17.86	15.97	18.94	17.29	16.69	15.34	---	15.81
4	15.46	21.43	18.46	17.62	18.40	15.88	18.82	17.04	16.45	15.53	---	15.84
5	15.41	20.08	19.52	17.40	18.85	15.83	18.54	16.57	15.89	15.46	14.91	15.81
6	15.42	19.26	19.59	17.07	18.93	15.80	18.17	16.96	16.15	16.50	14.90	15.86
7	15.43	20.20	19.13	16.97	18.31	15.79	18.08	16.44	16.01	16.80	14.90	15.86
8	15.45	20.50	19.15	17.04	18.13	15.75	18.96	15.84	16.14	16.34	14.93	15.87
9	16.91	19.63	19.49	16.74	17.51	15.77	18.71	15.80	16.43	18.34	14.94	15.97
10	16.96	19.25	22.25	16.59	16.76	15.82	18.15	16.07	16.15	16.29	14.95	16.16
11	16.25	18.90	30.89	16.74	16.79	15.68	18.21	16.53	15.95	16.05	14.94	16.02
12	16.00	18.72	30.32	16.70	16.49	15.64	18.57	16.39	16.27	15.75	14.92	15.95
13	15.87	17.97	24.60	16.41	17.17	15.63	18.26	16.26	16.24	15.59	14.92	15.95
14	15.79	17.68	23.01	16.29	16.96	15.63	17.86	16.24	16.23	15.49	14.94	15.94
15	15.73	18.07	23.70	16.12	16.74	15.54	17.65	16.73	15.93	15.44	14.92	15.93
16	16.93	18.50	21.92	16.65	16.61	15.77	18.79	18.37	15.82	15.54	14.90	15.93
17	17.90	18.02	20.70	18.33	16.54	16.33	20.18	18.55	16.05	15.64	15.26	15.98
18	18.40	17.70	20.10	26.31	16.42	16.26	19.14	17.75	16.22	15.40	15.12	15.96
19	18.26	18.65	20.25	30.85	16.35	16.07	18.52	18.07	15.96	15.29	15.04	15.97
20	17.51	18.34	20.62	30.60	16.13	16.62	18.16	17.90	15.98	15.24	15.05	15.99
21	17.19	17.75	19.69	28.65	16.06	16.83	17.99	18.23	15.88	15.20	15.09	16.01
22	17.29	17.73	19.13	25.73	16.01	16.28	18.05	17.57	16.11	15.17	15.16	16.00
23	17.66	18.12	18.67	26.01	15.97	16.10	18.60	17.47	16.16	15.15	15.30	16.01
24	---	20.88	18.33	24.29	15.94	15.99	18.84	16.88	15.80	15.12	15.44	16.00
25	---	28.14	18.69	22.53	15.93	15.91	19.09	16.53	15.64	15.10	15.51	15.89
26	16.20	25.90	19.59	21.51	15.90	16.08	19.23	16.24	15.42	15.08	15.57	15.92
27	15.97	22.80	19.02	20.99	15.88	16.96	19.49	15.98	15.51	15.05	15.61	15.92
28	15.89	21.09	18.50	20.15	15.87	18.17	19.30	16.60	15.41	---	15.65	15.99
29	15.96	19.72	18.52	19.90	---	18.20	18.52	17.41	15.39	---	15.76	16.16
30	16.18	19.36	18.55	19.52	---	18.54	17.99	17.80	15.51	---	15.77	19.26
31	16.47	---	18.24	19.27	---	18.21	---	17.07	---	---	15.81	---
MEAN	---	19.97	20.52	20.21	17.00	16.30	18.63	17.02	16.10	---	---	16.05
MAX	---	28.14	30.89	30.85	19.08	18.54	20.18	18.55	17.92	---	---	19.26
MIN	---	17.49	18.13	16.12	15.87	15.54	17.65	15.80	15.39	---	---	15.81

12200500 SKAGIT RIVER NEAR MOUNT VERNON, WA

LOCATION.--Lat 48°26'42", long 122°20'03", in SE¼SE¼ sec.7, T.34 N., R.4 E., Skagit County, Hydrologic Unit 17110007, on right bank 220 ft downstream of bridge on U.S. Highway 99, 1.5 mi north of Skagit Valley Junior College in Mount Vernon, and at mile 15.7.

DRAINAGE AREA.--3,093 mi<sup>2</sup>, of which 400 mi<sup>2</sup> is in Canada.

PERIOD OF RECORD.--October 1940 to current year. Monthly discharge only October 1940, published in WSP 1316.

REVISED RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929. Supplementary water-stage recorder in bridge pier 0.2 mi downstream from base gage from Dec. 3, 1957, to Oct. 15, 1964. Water-stage recorder located on downstream pier of the Highway 99 bridge from Oct. 15, 1964, to Jan. 6, 1993.

REMARKS.--Records good except estimated daily discharges, which are fair. Flow regulated by Ross Reservoir (station 12175000), Diablo Reservoir (station 12176500), Gorge Reservoir (station 12177700), Baker Lake (station 12191600), and Lake Shannon (station 12193000). Small diversions for domestic and municipal use. Chemical analyses July 1959 to September 1971, October 1973 to September 1994. Prior to November 1962, published as "at Lawrence." U.S. Geological Survey satellite telemeter at station. Specific conductance February 1974 to November 1981. Water temperature July 1962 to August 1970, February 1974 to November 1981.

AVERAGE DISCHARGE.--65 years (water years 1941-2005), 16,560 ft<sup>3</sup>/s, 11,990,000 acre-ft, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 152,000 ft<sup>3</sup>/s, Nov. 25, 1990, elevation, 37.37 ft, from floodmarks; minimum discharge, 2,740 ft<sup>3</sup>/s, Oct. 26, 1942, elevation, 7.37 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of 1906 reached a stage of 37 ft, from Great Northern Railway high-water profile, discharge 180,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 50,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov 25	1600	57,300	25.76	Jan 19	1815	68,000	27.95
Dec 11	1930	*76,000	*29.13				

Minimum discharge, 4,950 ft<sup>3</sup>/s, Sept. 24, gage height, 9.06 ft.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13,200	15,700	17,500	17,000	20,400	9,070	16,500	15,500	16,300	11,500	9,970	5,540
2	12,300	30,900	16,900	16,400	18,600	9,050	18,200	15,100	15,500	10,500	9,940	5,960
3	10,800	34,900	16,300	16,000	16,800	8,620	17,000	14,800	13,500	9,630	9,760	6,090
4	9,630	24,900	17,300	16,300	18,400	8,430	15,800	14,300	13,000	10,800	8,570	6,490
5	9,500	21,800	18,900	15,800	19,600	8,240	14,700	13,200	11,200	10,500	9,480	5,350
6	8,770	19,800	17,900	14,400	19,900	8,140	13,800	14,100	12,100	11,900	8,490	5,790
7	8,980	22,700	17,000	13,100	17,900	8,170	13,500	13,100	11,800	13,300	9,490	8,300
8	8,710	23,700	18,000	13,900	17,500	8,270	15,400	11,300	12,000	12,000	9,790	8,880
9	12,100	21,200	19,500	12,900	15,700	7,840	12,500	10,900	12,800	16,700	9,720	9,680
10	13,900	20,400	29,400	12,600	13,000	9,690	11,200	12,000	12,200	12,000	9,780	9,950
11	11,200	19,600	66,800	13,800	13,300	7,870	12,000	13,300	11,100	11,600	9,710	9,950
12	9,910	19,200	52,700	13,500	11,200	7,740	12,100	13,000	12,000	11,000	7,900	9,760
13	9,070	17,300	30,800	12,200	13,700	8,580	10,700	12,700	12,100	10,600	8,170	8,800
14	8,680	16,400	29,700	11,700	13,200	8,820	e10,500	12,700	12,400	10,400	8,040	9,260
15	8,480	17,000	32,900	10,200	12,600	7,080	e13,000	13,600	11,400	10,300	8,190	7,770
16	10,700	18,000	26,800	11,000	12,200	7,030	e17,500	17,300	11,100	10,600	7,710	5,910
17	15,600	16,200	23,600	16,400	12,100	9,110	e15,000	17,900	11,500	11,100	7,680	6,120
18	17,100	14,800	22,200	44,500	11,300	7,340	e13,000	15,900	12,100	10,400	8,070	6,070
19	17,100	17,600	22,900	62,700	11,000	7,050	13,600	16,500	11,100	9,910	8,180	6,130
20	15,200	16,800	24,200	58,500	9,610	9,440	13,900	16,300	11,600	9,790	7,520	5,820
21	14,500	15,100	21,500	51,300	9,380	11,200	14,100	16,700	11,300	9,250	6,070	5,890
22	14,800	15,200	20,000	38,600	9,220	9,120	15,000	15,400	11,900	9,080	7,550	5,850
23	15,500	15,500	18,900	41,400	9,130	8,010	17,300	15,200	12,100	9,360	7,450	5,640
24	13,900	23,600	18,100	34,100	8,970	7,470	18,100	13,900	10,900	8,770	7,180	5,830
25	13,700	51,100	18,600	29,400	8,830	7,180	19,000	13,100	10,300	7,870	7,010	5,480
26	12,500	36,500	20,600	26,800	8,530	8,000	19,400	12,400	9,020	7,590	5,540	5,740
27	9,870	26,500	18,700	25,200	8,450	13,100	20,100	11,800	10,000	7,600	6,710	5,800
28	9,340	22,700	17,600	22,900	8,410	16,000	19,600	13,300	9,630	7,690	5,480	5,460
29	10,700	18,800	18,100	22,500	---	15,800	17,700	15,200	9,310	8,230	5,570	5,750
30	11,600	18,800	18,200	21,500	---	15,400	16,400	16,100	10,300	7,890	5,830	17,500
31	13,100	---	17,200	20,800	---	13,600	---	14,400	---	9,390	5,470	---
TOTAL	370,440	652,700	728,800	737,400	368,930	290,460	456,600	441,000	351,560	317,250	246,020	216,560
MEAN	11,950	21,760	23,510	23,790	13,180	9,370	15,220	14,230	11,720	10,230	7,936	7,219
MAX	17,100	51,100	66,800	62,700	20,400	16,000	20,100	17,900	16,300	16,700	9,970	17,500
MIN	8,480	14,800	16,300	10,200	8,410	7,030	10,500	10,900	9,020	7,590	5,470	5,350
AC-FT	734,800	1,295,000	1,446,000	1,463,000	731,800	576,100	905,700	874,700	697,300	629,300	488,000	429,500

## SKAGIT RIVER BASIN

12200500 SKAGIT RIVER NEAR MOUNT VERNON, WA—Continued

DISCHARGE, CUBIC FEET PER SECOND—CONTINUED  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2005, BY WATER YEAR (WY)												
MEAN	12,410	18,160	18,690	17,740	16,670	14,240	15,070	20,260	24,370	19,980	11,670	9,434
MAX	27,970	52,550	37,930	27,220	31,140	27,010	23,360	36,530	43,460	37,650	21,890	17,540
(WY)	(2004)	(1991)	(1976)	(1974)	(1951)	(1972)	(1943)	(1946)	(1972)	(1972)	(1999)	(1959)
MIN	4,323	6,592	8,358	7,636	7,626	6,856	8,857	12,460	11,720	9,310	6,441	5,023
(WY)	(1943)	(1944)	(2001)	(1942)	(1942)	(1942)	(1973)	(1970)	(2005)	(1977)	(1941)	(1942)
SUMMARY STATISTICS												
	FOR 2004 CALENDAR YEAR					FOR 2005 WATER YEAR			WATER YEARS 1941 - 2005			
ANNUAL TOTAL	5,932,440					5,177,720						
ANNUAL MEAN	16,210					14,190			16,560			
HIGHEST ANNUAL MEAN									23,140			
LOWEST ANNUAL MEAN									10,500			
HIGHEST DAILY MEAN	66,800					Dec 11			66,800			
LOWEST DAILY MEAN	7,970					Aug 15			5,350			
ANNUAL SEVEN-DAY MINIMUM	9,450					Aug 13			5,670			
ANNUAL RUNOFF (AC-FT)	11,770,000					10,270,000			11,990,000			
10 PERCENT EXCEEDS	22,700					21,300			27,200			
50 PERCENT EXCEEDS	14,900					12,200			14,500			
90 PERCENT EXCEEDS	10,700					7,500			7,890			

e Estimated