



Figure 16. Location of surface-water stations in the Deschutes and Nisqually River Basins.

12079000 DESCHUTES RIVER NEAR RAINIER, WA

LOCATION.--Lat 46°51'08", long 122°40'03", in SE 1/4 SW 1/4, sec.22, T.16 N., R.1 E., Thurston County, Hydrologic Unit 17110016, on right bank about 100 ft upstream from county road crossing, 0.4 mi downstream from outlet of Reichel Lake, 2.7 mi southeast of Rainier, and at mile 25.9.

DRAINAGE AREA.--89.8 mi².

PERIOD OF RECORD.--June 1949 to September 1975; water years 1976-79 (annual maximum); June 1980 to July 1982; June 1983 to October 1987 (seasonal records); October 1987 to September 1998; October 1998 to April 1999 (seasonal record); October 1999 to current year.

REVISED RECORDS.--WSP 1246: Drainage area. WDR WA-83-1: 1978(P).

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 348.77 ft above NGVD of 1929.

REMARKS.--Records good, except for estimated daily discharge and flows above 700 ft³/s, which are fair. Probably some small diversions for irrigation and domestic use upstream from station. No regulation. U.S. Geological Survey satellite telemeter at station. Chemical analyses July 1959 to July 1960, October 1971 to September 1972. Water temperatures August 1968 to September 1970.

AVERAGE DISCHARGE.--43 years (water years 1950-75, 1981, 1988-98, 2000-04), 258 ft³/s, 39.11 in/yr, 187,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,600 ft³/s, Jan. 9, 1990, gage height, 17.01 ft, from outside high-water mark, from rating curve extended above 3,900 ft³/s; minimum discharge, 16 ft³/s, Sept. 7, 1963, gage height, 2.60 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan 30	0930	*2,030	*8.12	No other peak greater than base discharge.			

Minimum discharge, 22 ft³/s, Oct. 1-6.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	67	410	182	680	206	201	76	181	49	28	59
2	22	69	336	167	541	188	182	73	148	48	27	58
3	22	66	495	153	444	178	171	70	127	50	27	55
4	22	63	408	e146	375	188	161	71	109	47	28	50
5	23	60	591	e138	323	205	152	79	100	46	30	46
6	23	58	964	e140	313	254	147	71	110	44	30	43
7	26	56	629	370	357	239	e142	72	113	44	48	42
8	30	56	419	956	318	227	e125	78	106	43	40	41
9	65	56	317	899	277	214	e115	77	104	42	32	41
10	64	56	273	921	247	196	e108	70	101	42	29	41
11	47	93	251	701	229	180	e100	70	96	42	27	95
12	89	105	308	510	211	167	e95	68	90	41	27	92
13	188	87	517	426	198	158	e93	65	97	40	27	88
14	102	80	829	405	203	151	97	62	107	39	26	144
15	76	75	597	504	203	143	100	60	99	38	26	165
16	156	e113	452	477	215	136	94	60	91	38	26	209
17	175	e273	486	365	307	133	93	59	85	37	25	171
18	112	e648	389	310	325	140	90	58	80	36	25	193
19	86	e1,300	321	287	328	162	89	55	76	35	24	263
20	121	e1,030	314	261	288	155	112	55	70	34	24	206
21	546	e511	313	236	251	148	123	55	66	34	25	154
22	289	e328	278	218	225	146	e125	57	63	33	80	124
23	233	e228	247	256	203	142	e116	76	62	32	62	107
24	179	e195	248	370	190	161	e108	64	62	31	48	94
25	141	e240	347	350	181	214	e99	58	61	30	208	84
26	116	414	313	295	176	375	e92	69	59	29	215	77
27	99	286	273	258	212	426	e86	112	56	29	168	71
28	88	343	270	274	233	371	84	228	54	29	118	64
29	86	842	245	882	222	298	81	279	51	28	91	61
30	81	602	216	1,710	---	251	80	214	50	28	76	59
31	73	---	198	982	---	224	---	215	---	28	65	---
TOTAL	3,402	8,400	12,254	14,149	8,275	6,376	3,461	2,776	2,674	1,166	1,732	2,997
MEAN	110	280	395	456	285	206	115	89.5	89.1	37.6	55.9	99.9
MAX	546	1,300	964	1,710	680	426	201	279	181	50	215	263
MIN	22	56	198	138	176	133	80	55	50	28	24	41
AC-FT	6,750	16,660	24,310	28,060	16,410	12,650	6,860	5,510	5,300	2,310	3,440	5,940
CFSM	1.22	3.12	4.40	5.08	3.18	2.29	1.28	1.00	0.99	0.42	0.62	1.11
IN.	1.41	3.48	5.08	5.86	3.43	2.64	1.43	1.15	1.11	0.48	0.72	1.24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 2004, BY WATER YEAR (WY)

MEAN	101	339	518	575	523	412	302	160	101	54.3	39.8	42.6
MAX	385	725	1,063	1,071	1,087	839	659	287	233	110	74.1	99.9
(WY)	(1998)	(1961)	(1956)	(1953)	(1999)	(1972)	(1991)	(1960)	(1990)	(1974)	(1968)	(2004)
MIN	23.1	35.9	163	111	126	116	115	72.2	42.8	28.8	23.8	22.5
(WY)	(1988)	(1953)	(2001)	(2001)	(1993)	(1992)	(2004)	(1994)	(1992)	(2003)	(2003)	(2002)

DESCHUTES RIVER BASIN

12079000 DESCHUTES RIVER NEAR RAINIER, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1949 - 2004	
ANNUAL TOTAL	81,509		67,662			
ANNUAL MEAN	223		185		258	
HIGHEST ANNUAL MEAN					407	1997
LOWEST ANNUAL MEAN					109	2001
HIGHEST DAILY MEAN	2,850	Jan 31	1,710	Jan 30	6,000	Jan 9, 1990
LOWEST DAILY MEAN	19	Sep 5	22	Oct 1	19	Oct 11, 1994
ANNUAL SEVEN-DAY MINIMUM	20	Aug 31	23	Oct 1	20	Sep 23, 2002
ANNUAL RUNOFF (AC-FT)	161,700		134,200		187,300	
ANNUAL RUNOFF (CFSM)	2.49		2.06		2.88	
ANNUAL RUNOFF (INCHES)	33.77		28.03		39.11	
10 PERCENT EXCEEDS	514		394		610	
50 PERCENT EXCEEDS	131		111		139	
90 PERCENT EXCEEDS	23		33		34	

e Estimated

12080010 DESCHUTES RIVER AT E STREET BRIDGE, AT TUMWATER, WA

LOCATION.--Lat 47°00'43", long 122°54'07", in NW¹/₄, Land Grant parcel 60, T.18 N., R.2 W., Thurston County, Hydrologic Unit 17110016, on left bank at "E" Street bridge, 0.2 mi upstream from Capitol Boulevard, and at mile 2.4.

DRAINAGE AREA.--162 mi².

PERIOD OF RECORD.--April 1945 to November 1954, water years 1955-57 (annual maximum), June 1957 to June 1964, published as "12080000 Deschutes River near Olympia". October 1990 to current year.

REVISED RECORDS.--WDR WA-96-1: 1991(P), 1992(P).

GAGE.--Water-stage recorder. Datum of gage is 62.01 ft above NGVD of 1929. April 1945 to November 1954, water-stage recorder, November 1954 to June 1957, crest-stage gage, June 1957 to June 1964, water-stage recorder, at site 1 mi upstream, at different datum.

REMARKS.--Records good, except for estimated daily discharges, which are fair. Some small diversions for irrigation and domestic use upstream from station. No regulation. Miscellaneous discharge measurement site 1971-72, 1975, 1977-90.

AVERAGE DISCHARGE.--29 years (water years 1946-54, 1958-63, 1991-2004), 400 ft³/s, 33.57 in/yr, 290,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft³/s, Feb. 9, 1996, gage height, 34.17 ft, on basis of slope-area measurement of peak flow; minimum discharge, 46 ft³/s, Sept. 29, 30, 2003.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan 30	2130	*2,660	*29.04	No other peak greater than base discharge.			

Minimum discharge, 48 ft³/s, Oct. 1, gage height, 24.54 ft.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	49	121	654	322	1,230	386	344	175	305	109	72	101
2	50	126	534	300	986	363	319	167	266	107	72	94
3	50	120	601	283	833	350	299	162	233	108	72	90
4	51	113	627	267	721	349	287	160	208	106	73	84
5	51	107	609	243	642	371	e275	166	194	104	74	80
6	54	102	1,200	244	586	421	266	163	194	102	88	75
7	58	100	993	337	628	427	254	166	206	101	82	71
8	61	102	673	967	596	404	247	168	200	99	97	68
9	68	99	519	1,280	542	384	240	168	188	99	84	68
10	106	101	452	1,220	497	364	233	161	189	98	77	67
11	96	108	418	1,120	463	340	226	155	184	98	73	101
12	102	166	438	815	431	325	219	153	177	96	73	156
13	194	150	566	675	412	308	215	146	181	94	69	135
14	180	136	1,110	622	416	294	218	143	201	92	68	168
15	133	132	943	684	428	284	223	138	192	89	67	209
16	179	159	706	720	426	272	219	137	178	88	64	274
17	281	367	681	601	514	264	215	136	171	88	63	265
18	194	788	612	523	551	266	210	131	161	87	62	257
19	156	1,690	521	486	568	294	208	127	152	86	61	316
20	248	1,400	481	444	529	289	214	126	147	85	60	319
21	612	737	479	410	482	279	246	125	140	82	67	255
22	546	479	443	379	441	271	245	131	134	82	88	212
23	391	379	409	407	407	261	233	144	130	80	141	183
24	322	384	408	512	380	275	219	146	127	77	115	160
25	261	488	482	559	374	325	214	131	128	80	172	145
26	222	632	495	493	366	460	206	136	125	75	333	132
27	189	467	448	443	373	562	196	192	120	76	263	122
28	166	447	433	450	412	558	190	247	117	75	204	113
29	152	981	408	837	407	478	183	388	114	73	159	108
30	144	953	365	2,210	---	418	179	350	112	73	130	103
31	131	---	341	1,930	---	378	---	327	---	73	112	---
TOTAL	5,497	12,134	18,049	20,783	15,641	11,020	7,042	5,365	5,174	2,782	3,235	4,531
MEAN	177	404	582	670	539	355	235	173	172	89.7	104	151
MAX	612	1,690	1,200	2,210	1,230	562	344	388	305	109	333	319
MIN	49	99	341	243	366	261	179	125	112	73	60	67
AC-FT	10,900	24,070	35,800	41,220	31,020	21,860	13,970	10,640	10,260	5,520	6,420	8,990
CFSM	1.09	2.50	3.59	4.14	3.33	2.19	1.45	1.07	1.06	0.55	0.64	0.93
IN.	1.26	2.79	4.14	4.77	3.59	2.53	1.62	1.23	1.19	0.64	0.74	1.04

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 2004, BY WATER YEAR (WY)

MEAN	161	489	720	758	819	602	461	298	191	129	106	100
MAX	463	921	1,480	1,308	1,753	1,176	936	499	300	186	148	162
(WY)	(1998)	(2000)	(1999)	(1953)	(1999)	(1950)	(1991)	(1948)	(1997)	(1997)	(1997)	(1997)
MIN	75.8	84.1	239	195	244	236	235	140	110	77.1	66.5	54.1
(WY)	(2003)	(1994)	(2001)	(2001)	(1993)	(2001)	(2004)	(1994)	(1992)	(1992)	(2003)	(2003)

DESCHUTES RIVER BASIN

12080010 DESCHUTES RIVER AT E STREET BRIDGE, AT TUMWATER, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1945 - 2004	
ANNUAL TOTAL	125,914		111,253			
ANNUAL MEAN	345		304		400	
HIGHEST ANNUAL MEAN					658	1999
LOWEST ANNUAL MEAN					178	2001
HIGHEST DAILY MEAN	3,730	Feb 1	2,210	Jan 30	8,150	Feb 9, 1996
LOWEST DAILY MEAN	48	Sep 29	49	Oct 1	48	Sep 29, 2003
ANNUAL SEVEN-DAY MINIMUM	49	Sep 27	52	Oct 1	49	Sep 27, 2003
ANNUAL RUNOFF (AC-FT)	249,800		220,700		290,000	
ANNUAL RUNOFF (CFSM)	2.13		1.88		2.47	
ANNUAL RUNOFF (INCHES)	28.91		25.55		33.57	
10 PERCENT EXCEEDS	708		610		880	
50 PERCENT EXCEEDS	243		211		248	
90 PERCENT EXCEEDS	56		77		92	

e Estimated

12082500 NISQUALLY RIVER NEAR NATIONAL, WA

LOCATION.--Lat 46°45'10", long 122°04'57", in SW¼SW¼ sec.29, T.15 N., R.6 E., Pierce County, Hydrologic Unit 17110015, on right bank 100 ft downstream from old railroad bridge, 1.2 mi west of National, 3.3 mi upstream from Mineral Creek, and at mile 57.8.

DRAINAGE AREA.--133 mi².

PERIOD OF RECORD.--May 1942 to current year.

REVISED RECORDS.--WSP 1716: 1943(M), 1947(P), 1950-51, 1956(M). WDR WA-74-1: 1968(M), 1969(M), 1972(P).

GAGE.--Water-stage recorder. Elevation of gage is 1,450 ft above NGVD of 1929, from river-profile map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Small diversions for domestic use. Water temperatures published October 1951 to September 1982. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--62 years (water years 1943-2004), 771 ft³/s, 78.78 in/yr, 558,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,200 ft³/s, Feb. 8, 1996, gage height, 12.18 ft; minimum discharge, 100 ft³/s, Nov. 10, 17, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,600 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan 29	2030	*4,680	*6.72	No other peak greater than base discharge.			

Minimum discharge, 200 ft³/s, Oct. 8, gage height, 2.57 ft.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	334	551	1,180	e410	1,490	401	681	773	1,140	854	637	702
2	343	540	1,060	e390	1,180	375	617	903	1,020	820	623	662
3	336	528	1,440	e360	987	390	617	965	1,060	793	580	575
4	331	517	1,250	e330	902	477	676	920	1,100	756	555	564
5	310	497	1,500	e300	785	462	677	842	1,140	741	535	554
6	274	473	1,800	e310	759	435	648	710	1,400	779	545	542
7	318	457	1,410	469	731	440	673	684	1,170	760	655	564
8	276	447	1,100	579	661	534	670	734	1,120	646	517	567
9	337	449	919	705	605	721	671	709	1,110	637	505	549
10	268	506	811	856	563	789	697	662	1,190	587	561	477
11	230	854	723	829	534	743	765	655	1,060	561	637	1,020
12	450	710	716	792	506	729	848	585	921	617	671	666
13	512	664	949	815	484	695	891	548	1,130	699	667	709
14	328	585	995	913	508	662	827	538	1,070	740	655	800
15	292	529	837	1,460	500	635	734	567	953	760	571	1,060
16	561	597	774	1,670	576	597	661	588	945	726	653	976
17	848	741	739	1,250	620	602	601	579	996	761	612	894
18	643	1,430	665	1,090	704	648	551	634	1,030	753	574	899
19	511	2,190	648	1,010	711	632	506	700	952	779	577	879
20	826	1,300	660	900	652	569	544	745	907	695	574	796
21	1,370	837	664	803	599	549	524	776	962	621	536	703
22	948	607	631	723	548	631	489	797	1,050	661	780	655
23	691	519	606	970	509	737	505	773	1,180	718	463	630
24	589	471	661	1,260	483	798	495	695	1,180	743	984	579
25	575	438	680	1,110	452	780	488	650	1,120	726	1,830	557
26	569	402	610	1,010	440	756	591	1,530	1,000	657	2,020	537
27	573	349	566	921	460	776	780	1,980	911	646	1,460	518
28	807	480	538	1,110	468	730	739	2,050	875	665	1,010	513
29	797	1,660	e497	3,310	430	718	668	1,650	894	665	872	471
30	588	1,470	e460	3,820	---	799	683	1,510	894	653	812	436
31	566	---	e420	2,170	---	756	---	1,430	---	623	753	---
TOTAL	16,401	21,798	26,509	32,645	18,847	19,566	19,517	27,882	31,480	21,842	23,424	20,054
MEAN	529	727	855	1,053	650	631	651	899	1,049	705	756	668
MAX	1,370	2,190	1,800	3,820	1,490	799	891	2,050	1,400	854	2,020	1,060
MIN	230	349	420	300	430	375	488	538	875	561	463	436
AC-FT	32,530	43,240	52,580	64,750	37,380	38,810	38,710	55,300	62,440	43,320	46,460	39,780
CFSM	3.98	5.46	6.43	7.92	4.89	4.75	4.89	6.76	7.89	5.30	5.68	5.03
IN.	4.59	6.10	7.41	9.13	5.27	5.47	5.46	7.80	8.80	6.11	6.55	5.61

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2004, BY WATER YEAR (WY)

	463	825	947	876	821	657	784	1,030	1,053	803	563	434
MEAN												
MAX	1,333	2,696	2,344	1,805	2,330	1,784	1,276	1,681	2,010	1,334	952	739
(WY)	(1948)	(1996)	(1976)	(1974)	(1996)	(1972)	(1990)	(1949)	(1974)	(1974)	(1999)	(1959)
MIN	205	140	246	285	318	296	362	596	490	433	333	275
(WY)	(1990)	(1953)	(1953)	(1979)	(1966)	(1955)	(1975)	(1992)	(1992)	(1992)	(1994)	(1985)

NISQUALLY RIVER BASIN

12082500 NISQUALLY RIVER NEAR NATIONAL, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1942 - 2004	
ANNUAL TOTAL	281,230		279,965			
ANNUAL MEAN	770		765		771	
HIGHEST ANNUAL MEAN					1,186	1996
LOWEST ANNUAL MEAN					496	1944
HIGHEST DAILY MEAN	8,620	Jan 31	3,820	Jan 30	15,700	Feb 8, 1996
LOWEST DAILY MEAN	176	Sep 10	230	Oct 11	105	Nov 10, 1987
ANNUAL SEVEN-DAY MINIMUM	260	Sep 8	288	Oct 5	116	Nov 26, 1952
ANNUAL RUNOFF (AC-FT)	557,800		555,300		558,700	
ANNUAL RUNOFF (CFSM)	5.79		5.75		5.80	
ANNUAL RUNOFF (INCHES)	78.66		78.31		78.78	
10 PERCENT EXCEEDS	1,200		1,140		1,340	
50 PERCENT EXCEEDS	642		671		630	
90 PERCENT EXCEEDS	343		459		320	

e Estimated

12083000 MINERAL CREEK NEAR MINERAL, WA

LOCATION.--Lat 46°44'40", long 122°08'36", in SE¹/₄SW¹/₄, sec.35, T.15 N., R.5 E., Lewis County, Hydrologic Unit 17110015, on right bank 0.3 mi downstream from railroad bridge, 2.3 mi northeast of Mineral, and at mile 1.3.

DRAINAGE AREA.--75.2 mi².

PERIOD OF RECORD.--June 1942 to current year.

REVISED RECORDS.--WSP 1932: Drainage area. WRD WA-74: 1971(P).

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 1,340 ft above NGVD of 1929, from topographic map. Prior to May 14, 1987, at site 0.25 mi downstream at datum 1.90 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.--62 years (water years 1943-2004), 360 ft³/s, 65.11 in/yr, 261,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,900 ft³/s, Feb. 8, 1996, gage height, 12.89 ft, from rating curve extended above 560 ft³/s, based on runoff comparisons with nearby stations; minimum discharge, 13 ft³/s, Sept. 23-25, 1989, gage height, 6.93 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,700 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan 29	2030	*3,450	*11.90	No other peak greater than base discharge.			

Minimum discharge, 15 ft³/s, Oct. 3, 5, 6, gage height, 8.07 ft.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	62	641	217	1,070	287	e325	143	363	78	32	113
2	16	61	591	202	816	266	e285	147	294	76	31	113
3	16	57	849	192	648	258	e270	143	245	79	31	101
4	16	54	646	175	564	275	e265	140	208	73	33	92
5	16	51	1,100	156	482	325	252	141	199	69	35	85
6	16	50	1,330	161	492	343	238	124	287	69	43	79
7	19	49	938	306	495	345	232	115	280	73	73	74
8	32	49	673	479	429	374	e235	116	257	65	50	70
9	97	50	525	692	376	421	e230	125	251	62	39	69
10	76	51	440	911	337	421	e230	111	234	62	35	66
11	48	153	378	723	310	383	e225	114	221	63	33	176
12	207	120	465	630	289	355	e230	104	203	57	32	122
13	209	98	838	630	274	327	232	95	259	55	31	214
14	101	87	888	732	330	309	237	90	250	52	31	290
15	86	87	644	1,140	332	292	222	87	229	50	31	333
16	328	241	576	1,120	420	272	205	87	204	48	30	348
17	209	508	574	804	508	263	200	83	186	47	29	385
18	124	1,690	485	664	658	270	188	93	174	46	29	463
19	102	1,250	438	639	626	276	174	88	162	47	28	466
20	137	714	454	568	530	254	208	80	148	46	27	361
21	265	454	460	486	451	244	206	76	136	44	29	286
22	174	327	408	418	389	252	191	88	128	42	158	238
23	170	274	373	484	347	273	180	106	122	40	81	206
24	128	287	394	635	319	329	172	88	119	38	179	180
25	107	308	413	553	296	355	164	81	117	36	598	160
26	94	273	349	496	284	347	162	180	108	36	562	146
27	84	230	323	438	318	446	175	275	101	35	375	135
28	78	481	303	689	343	e415	168	561	93	34	243	126
29	83	1,380	272	2,420	311	e400	152	536	86	34	180	119
30	77	878	244	2,740	---	376	145	500	82	33	144	114
31	67	---	231	1,580	---	352	---	455	---	33	123	---
TOTAL	3,198	10,374	17,243	22,080	13,044	10,105	6,398	5,172	5,746	1,622	3,375	5,730
MEAN	103	346	556	712	450	326	213	167	192	52.3	109	191
MAX	328	1,690	1,330	2,740	1,070	446	325	561	363	79	598	466
MIN	16	49	231	156	274	244	145	76	82	33	27	66
AC-FT	6,340	20,580	34,200	43,800	25,870	20,040	12,690	10,260	11,400	3,220	6,690	11,370
CFSM	1.37	4.60	7.40	9.47	5.98	4.33	2.84	2.22	2.55	0.70	1.45	2.54
IN.	1.58	5.13	8.53	10.92	6.45	5.00	3.16	2.56	2.84	0.80	1.67	2.83

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 2004, BY WATER YEAR (WY)

MEAN	150	504	675	659	611	486	487	379	207	81.7	47.2	56.4
MAX	527	1,219	1,463	1,568	1,443	1,358	873	745	552	195	109	192
(WY)	(1956)	(1956)	(1976)	(1953)	(1982)	(1972)	(1991)	(1949)	(1955)	(1983)	(2004)	(1959)
MIN	23.1	35.9	128	138	146	155	213	141	50.9	32.9	20.4	18.3
(WY)	(1953)	(1953)	(1977)	(1977)	(1977)	(1992)	(2004)	(1994)	(1992)	(2003)	(2003)	(1989)

NISQUALLY RIVER BASIN

12083000 MINERAL CREEK NEAR MINERAL, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1942 - 2004	
ANNUAL TOTAL	120,087		104,087			
ANNUAL MEAN	329		284		360	
HIGHEST ANNUAL MEAN					527	
LOWEST ANNUAL MEAN					173	
HIGHEST DAILY MEAN	5,020	Jan 31	2,740	Jan 30	9,260	Feb 8, 1996
LOWEST DAILY MEAN	15	Sep 5	16	Oct 1	13	Sep 24, 1989
ANNUAL SEVEN-DAY MINIMUM	16	Sep 1	16	Oct 1	15	Sep 19, 1989
ANNUAL RUNOFF (AC-FT)	238,200		206,500		261,100	
ANNUAL RUNOFF (CFSM)	4.38		3.78		4.79	
ANNUAL RUNOFF (INCHES)	59.40		51.49		65.11	
10 PERCENT EXCEEDS	838		606		780	
50 PERCENT EXCEEDS	206		208		232	
90 PERCENT EXCEEDS	19		43		37	

e Estimated

12085000 ALDER RESERVOIR AT ALDER, WA

LOCATION.--Lat 46°48'09", long 122°18'37", in SE¹/₄NW¹/₄, sec.9, T.15 N., R.4 E., Thurston County, Hydrologic Unit 17110015, near left end of Alder Dam on Nisqually River, 1.0 mi west of Alder, 1.7 mi upstream from La Grande Dam, 4.6 mi upstream from Mashel River, and at mile 44.2.

DRAINAGE AREA.--286 mi².

PERIOD OF RECORD.--November 1944 to current year.

GAGE.--Water-stage recorder. Datum of gage is 7.61 ft above NGVD of 1929 (levels by Tacoma Public Utilities). Prior to July 8, 1946, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by concrete-arch dam; storage began Nov. 7, 1944; dam completed in 1945. Usable capacity, 161,457 acre-ft (based on 1985 resurvey) between gage heights 1,114 ft, lower limit of operating range, and 1,207 ft, top of spillway gates. Unused storage below gage height 1,114 ft, 52,110 acre-ft. Crest of spillway is at gage height 1,177 ft. Figures given herein represent total contents. Water is used by City of Tacoma for power generation. Chemical analyses December 1973 to September 1983 (samples were taken near the dam).

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 233,848 acre-ft, Dec. 4, 1975, gage height, 1,207.68 ft; minimum contents since reservoir first filled, 74,200 acre-ft, Nov. 26, 2000, gage height, 1,137.36 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 191,000 acre-ft, June 26, 27; maximum gage height, 1,199.49 ft, June 27; minimum contents 110,300 acre-ft, Oct. 15, 16, gage height, 1,164.27 ft.

CAPACITY TABLE

(Based on project resurvey and maps provided by Tacoma Public Utilities in 1985)

Gage height (feet)	Contents (acre-feet)	Gage height (feet)	Contents (acre-feet)	Gage height (feet)	Contents (acre-feet)
1,143	80,474	1,170	120,736	1,200	192,544
1,150	89,003	1,180	141,570	1,207	213,570
1,160	103,084	1,190	164,970		

RESERVOIR STORAGE, ACRE FEET
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY OBSERVATION AT 2400 HOURS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	118,700	119,600	160,000	139,100	171,100	164,800	169,300	163,700	172,300	189,800	169,300	176,500
2	117,900	119,100	160,500	137,100	171,700	164,400	169,200	163,700	173,500	189,500	168,600	176,300
3	117,000	118,300	162,400	135,000	171,300	164,000	169,000	164,000	174,500	189,200	168,200	175,700
4	116,200	117,400	162,500	132,800	170,600	163,700	169,100	164,100	175,500	188,700	167,600	175,100
5	115,500	116,600	165,300	130,000	169,300	163,600	169,000	164,100	176,700	188,100	167,000	174,600
6	115,000	115,700	169,100	126,900	168,200	163,600	168,800	163,600	178,400	187,500	166,700	174,200
7	113,500	114,800	170,600	124,700	167,100	163,500	168,700	163,200	179,500	187,100	166,300	173,600
8	112,800	113,900	170,400	123,900	166,400	163,500	168,600	162,800	180,500	186,300	165,600	173,200
9	112,400	113,100	169,300	123,700	165,500	164,000	168,500	162,400	181,600	185,500	165,200	172,700
10	111,800	112,300	167,900	124,600	164,600	164,600	168,300	161,900	182,700	184,600	164,800	172,100
11	110,900	112,700	166,200	124,800	163,500	165,100	168,200	161,400	183,600	183,600	164,500	173,200
12	111,100	112,700	164,800	124,300	162,900	165,400	168,700	160,700	184,100	182,700	164,100	173,500
13	111,400	112,500	165,400	123,800	162,300	165,500	168,900	159,900	185,300	182,100	163,800	174,200
14	110,900	112,100	166,000	124,700	162,000	165,500	169,200	159,100	186,200	181,500	163,300	175,400
15	110,300	111,600	165,500	128,000	161,700	165,500	169,200	158,200	186,900	180,900	162,700	177,300
16	111,400	112,200	164,500	131,800	161,900	165,200	169,000	157,500	187,400	180,300	162,500	179,100
17	112,300	114,100	163,500	133,900	162,600	164,900	168,800	156,700	188,000	179,800	162,200	180,700
18	112,500	123,100	162,100	135,600	163,700	164,800	168,500	156,000	188,500	179,100	161,800	182,600
19	112,400	132,300	160,300	137,200	164,700	164,800	168,000	155,400	188,800	178,600	161,400	184,400
20	113,400	136,700	158,900	138,500	165,500	164,400	167,800	154,800	188,800	177,900	161,200	185,600
21	118,900	139,000	157,400	139,300	165,900	164,000	167,400	154,300	188,900	177,000	160,800	186,200
22	120,400	140,400	155,600	139,800	166,100	163,800	167,000	154,100	189,200	176,300	161,400	186,500
23	121,100	141,400	153,400	141,300	166,000	163,800	166,500	153,700	189,700	175,900	160,900	186,700
24	121,100	142,300	152,100	143,700	166,000	164,200	165,900	153,200	190,300	175,300	162,100	186,400
25	120,800	143,400	151,200	145,300	165,600	165,000	165,200	152,400	190,800	174,600	166,400	186,000
26	120,500	144,000	149,800	146,200	165,300	165,700	164,800	154,300	190,900	173,700	170,900	185,300
27	120,100	144,400	148,300	145,500	165,300	166,800	164,700	157,400	190,800	172,900	173,600	184,700
28	120,900	146,000	146,800	145,300	165,300	167,700	164,600	161,700	190,600	172,200	175,100	184,000
29	121,200	153,300	144,900	153,600	165,200	168,100	164,200	164,900	190,400	171,500	176,000	183,300
30	120,800	158,100	143,200	164,300	---	168,800	163,800	167,900	190,200	170,700	176,400	182,500
31	120,200	---	141,300	169,100	---	169,200	---	170,400	---	169,900	176,500	---
MAX	121,200	158,100	170,600	169,100	171,700	169,200	169,300	170,400	190,900	189,800	176,500	186,700
MIN	110,300	111,600	141,300	123,700	161,700	163,500	163,800	152,400	172,300	169,900	160,800	172,100
†	1,169.74	1,187.12	1,179.87	1,191.59	1,190.07	1,191.63	1,189.50	1,192.11	1,199.20	1,191.91	1,194.30	1,196.44
‡	+600	+37,900	-16,800	+27,800	-3,900	+4,000	-5,400	+6,600	+19,800	-20,300	+6,600	+6,600

CAL YR 2003 MAX 207,300 MIN 110,300 AC-FT‡ +25,900
WTR YR 2004 MAX 190,900 MIN 110,300 AC-FT‡ +62,900

† Gage height, in feet, at end of month.

‡ Change in contents, in acre-feet.

12085500 LA GRANDE RESERVOIR AT LA GRANDE, WA

LOCATION.--Lat 46°49'23", long 122°18'13", in SW¹/₄SE¹/₄, sec.33, T.16 N., R.4 E., Thurston County, Hydrologic Unit 17110015, at left end of gate control structure, 1.1 mi southeast of La Grande, 1.7 mi downstream from Alder Dam, and at mile 42.5.

DRAINAGE AREA.--289 mi².

PERIOD OF RECORD.--January 1945 to current year. January 1945 to September 1951 included in combined adjustment to monthly flow of Nisqually River at La Grande. Month-end contents January 1945 to September 1950, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 7.61 ft below NGVD of 1929 (levels by City of Tacoma). Prior to June 12, 1947, month-end gage heights furnished by City of Tacoma from temporary gages in pool upstream from dam.

REMARKS.--Reservoir is formed by concrete gravity dam completed in 1944; storage began in February 1945. Useable storage, 1,053 acre-ft between gage heights 910 ft, minimum practical head, and 935 ft, normal reservoir level. Dead storage below gage height 910 ft, 1,629 acre-ft. Figures given herein represent total contents. Water used by Tacoma Public Utilities for power generation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 2,760 acre-ft, May 14, 1950, gage height, 936.4 ft; minimum contents observed since reservoir first filled, 1,370 acre-ft, Aug. 24, 1956, gage height, 900.0 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 2,642 acre-ft, Sept. 24, gage height, 934.28 ft; minimum contents, 1,614 acre-ft, Oct. 7, gage height, 909.48 ft.

MONTH-END GAGE HEIGHT AND CONTENTS AT 2400
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
September 30	929.73	2,403	--
October 31	929.22	2,378	-25
November 30	926.54	2,248	-130
December 31	931.24	2,480	+232
Calendar Year 2003	--	--	+210
January 31	930.30	2,432	-48
February 29	930.29	2,432	0
March 31	929.71	2,402	-30
April 30	930.75	2,455	+53
May 31	929.52	2,393	-62
June 30	930.78	2,457	+64
July 31	931.09	2,473	+16
August 31	931.00	2,468	-5
September 30	932.28	2,535	+67
Water Year 2004	--	--	+132

12086500 NISQUALLY RIVER AT LA GRANDE, WA

LOCATION.--Lat 46°50'37", long 122°19'46", in NW¼SE¼, sec.29, T.16 N., R.4 E., Pierce County, Hydrologic Unit 17110015, on right bank 0.4 mi downstream from Tacoma Public Utilities powerplant, 0.6 mi northwest of La Grande, 0.8 mi upstream from Mashel River, and at mile 40.4.

DRAINAGE AREA.--292 mi².

PERIOD OF RECORD.--September 1906 to October 1911, November to December 1911 (gage heights only), October 1919 to September 1931, October 1943 to current year. Monthly discharge only for some periods, published in WSP 1316. Published as "below Little Nisqually River, near La Grande" September 1906 to October 1911, and as "near La Grande" November to December 1911 and October 1919 to September 1931.

REVISED RECORDS.--WSP 1216: Drainage area. WSP 1316: 1927-28(M), 1949-50. WDR-WA-74: 1956(M), 1959-61(M), 1965.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 490 ft above NGVD of 1929, from river-profile map. See WSP 1932 for history of changes prior to Feb. 8, 1945.

REMARKS.--Records good, except for estimated daily discharges, which are fair. Flow regulated by Tacoma Public Utilities powerplant at La Grande since December 1943, by Alder Reservoir (station 12085000) since November 1944, and by La Grande Reservoir (station 12085500) since February 1945. All diversions returned to river upstream from gage. U.S. Geological Survey satellite telemeter at station. Chemical analyses October 1972 to September 1985. Water temperatures October 1965 to September 1982.

AVERAGE DISCHARGE.--78 years (water years 1907-11, 1920-31, 1944-2004), 1,432 ft³/s, 66.60 in/yr, 1,037,000 acre-ft/yr, adjusted for storage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 39,500 ft³/s, Feb. 8, 1996, gage height, 15.30 ft, from rating curve extended above 5,300 ft³/s and computed flow over dam as provided by Tacoma Public Utilities; practically no flow on many days at site "near La Grande" (which excluded diversion between 1920 and 1930) as a result of regulation.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,900 ft³/s, Dec. 4, gage height, 5.83 ft; minimum discharge, 699 ft³/s, Aug. 26-29, gage height 3.47 ft; minimum daily discharge, 704 ft³/s, Aug. 28.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	744	762	1,300	1,840	2,370	1,270	1,260	1,190	1,030	1,090	995	881
2	746	763	1,870	1,840	2,370	1,270	1,260	1,190	1,020	1,090	933	934
3	745	761	2,110	1,840	2,410	1,270	1,200	1,200	1,020	1,090	907	950
4	746	762	2,410	1,840	2,360	1,270	1,200	1,220	1,020	1,090	888	923
5	745	761	2,440	2,080	2,370	1,270	1,190	1,220	1,010	1,090	862	879
6	767	760	2,420	2,330	e2,380	1,280	1,190	1,220	1,020	1,100	831	850
7	824	762	2,410	2,340	e2,360	1,270	1,190	1,220	1,020	1,120	939	849
8	806	762	2,430	2,350	e1,960	1,270	1,190	1,220	1,020	1,120	878	850
9	791	762	2,420	2,350	e1,810	1,270	1,190	1,220	1,020	1,120	793	852
10	799	763	2,420	2,340	e1,750	1,270	1,190	1,210	1,010	1,120	769	858
11	812	762	2,420	2,340	e1,750	1,270	1,190	1,210	954	1,120	795	909
12	813	762	2,420	2,340	1,490	1,270	1,190	1,210	955	1,120	825	858
13	820	760	2,420	2,330	1,440	1,270	1,190	1,200	956	1,100	868	902
14	823	760	2,410	2,060	1,440	1,270	1,190	1,200	954	1,100	930	927
15	824	762	2,410	1,790	1,440	1,270	1,190	1,200	955	1,110	918	926
16	828	760	2,400	1,600	1,440	1,270	1,190	1,200	967	1,110	874	929
17	830	764	2,400	1,430	1,440	1,270	1,190	1,210	971	1,110	833	929
18	827	763	2,400	1,430	1,450	1,270	1,190	1,210	999	1,110	811	932
19	823	769	2,380	1,320	1,440	1,270	1,190	1,210	1,010	1,110	777	932
20	826	767	2,370	1,250	1,290	1,270	1,190	1,210	1,030	1,120	776	932
21	827	761	2,370	1,250	1,270	1,270	1,190	1,210	1,050	1,100	792	929
22	824	759	2,380	1,240	1,270	1,270	1,190	1,210	1,070	1,070	909	926
23	828	757	2,360	1,250	1,270	1,270	1,190	1,210	1,070	1,020	935	930
24	826	758	2,140	1,260	1,270	1,270	1,190	1,210	1,070	1,020	954	1,030
25	827	761	2,010	1,260	1,270	1,270	1,190	1,240	1,070	1,140	807	1,100
26	828	760	2,010	1,440	1,270	1,280	1,190	1,170	1,060	1,110	709	1,100
27	830	759	2,010	2,000	1,270	1,270	1,190	1,100	1,090	1,070	706	1,100
28	834	760	2,010	2,370	1,270	1,270	1,190	1,040	1,090	1,020	704	1,100
29	833	766	2,010	2,410	1,270	1,270	1,190	1,040	1,090	1,020	736	1,100
30	805	762	1,920	2,430	---	1,260	1,190	1,030	1,090	1,040	852	1,100
31	763	---	1,840	2,390	---	1,260	---	1,030	---	1,040	879	---
TOTAL	24,964	22,850	69,320	58,340	48,190	39,370	35,860	36,660	30,691	33,790	26,185	28,417
MEAN	805	762	2,236	1,882	1,662	1,270	1,195	1,183	1,023	1,090	845	947
MAX	834	769	2,440	2,430	2,410	1,280	1,260	1,240	1,090	1,140	995	1,100
MIN	744	757	1,300	1,240	1,270	1,260	1,190	1,030	954	1,020	704	849
AC-FT	49,520	45,320	137,500	115,700	95,580	78,090	71,130	72,720	60,880	67,020	51,940	56,370
MEAN†	815	1,397	1,966	2,333	1,593	1,334	1,106	1,289	1,357	760	952	1,050
CFSM†	2.79	4.78	6.73	7.99	5.46	4.57	3.79	4.14	4.65	2.60	3.26	3.60
IN.†	3.22	5.34	7.76	9.21	5.89	5.27	4.22	5.09	5.18	3.00	3.76	4.01
AC-FT†	50,100	83,090	120,900	143,500	91,680	82,060	65,780	79,260	80,740	46,740	58,540	62,440

CAL YR 2003 TOTAL 494,338 MEAN 1,354 MAX 7,790 MIN 605 AC-FT 980,500 MEAN† 1,391 CFSM† 4.77 IN.† 64.66 AC-FT† 1,007,000

WTR YR 2004 TOTAL 454,637 MEAN 1,242 MAX 2,440 MIN 704 AC-FT 901,800 MEAN† 1,329 CFSM† 4.55 IN.† 61.95 AC-FT† 964,800

† Adjusted for change in contents in Alder and La Grande Reservoirs.
e Estimated

NISQUALLY RIVER BASIN

12087000 MASHEL RIVER NEAR LA GRANDE, WA

LOCATION.--Lat 46°51'25", long 122°18'05", in NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec.21, T.16 N., R.4 E., Pierce County, Hydrologic Unit 17110015, on left bank, 50 ft downstream from State Highway 7 bridge, 1.8 mi northeast of La Grande, and at mile 3.3.

DRAINAGE AREA.--80.7 mi².

PERIOD OF RECORD.--October 1940 to September 1957, October 1991 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 619.53 ft above NGVD of 1929. Prior to Oct. 1, 1957, on right bank at same datum.

REMARKS.--Records good. Small diversion for municipal supply for Eatonville. Some regulation at low water by millpond in Eatonville.

AVERAGE DISCHARGE.--30 years (1940-56, 1992-2004), 223 ft³/s, 37.50 in/yr, 161,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,980 ft³/s, Dec. 11, 1946, gage height, 9.30 ft, from rating curve extended above 3,200 ft³/s, present datum; minimum discharge, 2.3 ft³/s, Aug. 27, 1992.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Nov 29	0645	1,660	5.71	Jan 29	1245	*2,180	*6.13

Minimum discharge, 5.7 ft³/s, Aug. 20, 21, gage height, 2.85 ft.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.2	41	384	119	653	214	189	60	360	37	8.9	63
2	7.2	38	366	109	495	187	161	59	266	35	8.3	70
3	7.4	35	623	102	397	201	145	58	210	38	8.3	59
4	7.6	31	374	91	385	328	135	63	167	36	8.7	47
5	7.5	28	958	e83	333	330	126	99	162	34	10	41
6	7.9	27	1,060	91	336	290	116	69	279	31	15	36
7	12	26	585	472	366	258	108	62	263	33	41	32
8	18	27	388	710	306	285	103	68	222	29	23	29
9	55	26	286	717	260	324	98	72	275	28	15	32
10	56	27	244	708	229	290	93	64	249	28	12	30
11	36	211	228	521	209	237	92	87	242	33	9.8	154
12	62	130	261	420	193	208	92	76	211	27	8.9	113
13	135	85	669	387	182	180	90	67	228	23	8.0	193
14	56	65	748	375	190	163	89	60	212	21	7.6	268
15	38	55	450	438	198	149	87	55	182	19	8.1	328
16	95	96	372	426	280	135	79	68	152	18	7.6	325
17	81	201	394	318	338	128	91	64	130	17	7.5	281
18	51	251	316	306	372	136	118	56	113	17	7.2	324
19	37	444	296	299	377	154	87	76	101	17	6.7	278
20	52	321	287	257	313	138	108	65	87	17	6.3	216
21	76	208	257	220	260	127	116	57	76	17	6.7	162
22	61	146	215	193	217	127	129	96	68	15	9.1	129
23	106	124	189	402	188	129	104	165	67	13	5.6	110
24	70	176	204	743	174	174	95	122	68	12	154	95
25	50	202	273	501	159	247	84	98	67	11	474	81
26	39	195	218	386	153	261	78	574	60	10	637	70
27	34	149	186	321	184	278	78	791	53	10	551	63
28	32	289	180	454	308	256	75	1,230	48	9.5	231	57
29	89	1,180	158	1,780	254	221	68	921	43	9.1	140	53
30	65	596	136	1,600	---	236	63	614	40	8.9	97	51
31	49	---	126	937	---	221	---	503	---	9.3	73	---
TOTAL	1,499.8	5,430	11,431	14,486	8,309	6,612	3,097	6,519	4,701	662.8	2,738.6	3,790
MEAN	48.4	181	369	467	287	213	103	210	157	21.4	88.3	126
MAX	135	1,180	1,060	1,780	653	330	189	1,230	360	38	637	328
MIN	7.2	26	126	83	153	127	63	55	40	8.9	6.3	29
AC-FT	2,970	10,770	22,670	28,730	16,480	13,110	6,140	12,930	9,320	1,310	5,430	7,520
CFSM	0.60	2.24	4.57	5.79	3.55	2.64	1.28	2.61	1.94	0.26	1.09	1.57
IN.	0.69	2.50	5.27	6.68	3.83	3.05	1.43	3.01	2.17	0.31	1.26	1.75

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 2004, BY WATER YEAR (WY)

	107	316	434	366	388	312	281	213	147	56.5	26.1	36.9
MAX	307	688	890	694	786	567	475	441	329	178	88.3	126
(WY)	(1956)	(1956)	(1947)	(1953)	(1996)	(1950)	(1955)	(1945)	(1946)	(1993)	(2004)	(2004)
MIN	10.0	12.9	83.2	113	98.8	88.2	103	67.2	25.2	12.6	7.05	10.4
(WY)	(1953)	(1953)	(1953)	(2001)	(1941)	(1941)	(2004)	(1947)	(1992)	(2003)	(2003)	(2003)

NISQUALLY RIVER BASIN

12087000 MASHEL RIVER NEAR LA GRANDE, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1941 - 2004	
ANNUAL TOTAL	70,432.5		69,276.2			
ANNUAL MEAN	193		189		223	
HIGHEST ANNUAL MEAN					337	
LOWEST ANNUAL MEAN					125	
HIGHEST DAILY MEAN	2,930	Jan 31	1,780	Jan 29	5,570	Dec 11, 1946
LOWEST DAILY MEAN	4.1	Sep 5	6.3	Aug 20	4.1	Sep 5, 2003
ANNUAL SEVEN-DAY MINIMUM	4.6	Sep 1	7.2	Aug 15	4.6	Sep 1, 2003
ANNUAL RUNOFF (AC-FT)	139,700		137,400		161,400	
ANNUAL RUNOFF (CFSM)	2.39		2.35		2.76	
ANNUAL RUNOFF (INCHES)	32.47		31.93		37.50	
10 PERCENT EXCEEDS	425		398		506	
50 PERCENT EXCEEDS	116		117		139	
90 PERCENT EXCEEDS	7.6		16		16	

e Estimated

12088000 OHOP CREEK NEAR EATONVILLE, WA

LOCATION.--Lat 46°52'52", long 122°16'40", in SE¼SE¼, sec.10, T.16 N., R.4 E., Pierce County, Hydrologic Unit 17110015, on left bank, 150 ft downstream from Lynch Creek, 0.2 mi downstream from outlet of Ohop Lake, 0.8 mi northwest of Eatonville, and at mile 6.1.

DRAINAGE AREA.--34.5 mi².

PERIOD OF RECORD.--June 1927 to September 1932, September 1941 to September 1971, June 1993 to current year.

REVISED RECORDS.--WSP 1286: 1946. WSP 1932: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 517.76 ft above NGVD of 1929 (stadia traverse). June 1, 1927 to Sept. 30, 1932, water-stage recorder at datum 4.83 ft higher; Sept. 6, 1941, to Mar. 17, 1942, nonrecording gage and Mar. 18, 1942, to June 15, 1964, water-stage recorder at datum 2.04 ft higher; all at site 250 ft downstream. June 15, 1964, to Aug. 26, 1966, water-stage recorder at site on left bank across stream at datum 2.04 ft higher. Aug. 27, 1966, to Sept. 30, 1971, water-stage recorder at site on right bank at same datum.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Flow affected by natural storage in Ohop Lake.

AVERAGE DISCHARGE.--46 years (water years 1928-32, 1942-71, 1994-2004), 65.6 ft³/s, 25.84 in/yr, 47,530 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,620 ft³/s, Feb. 8, 1996, gage height, 8.76 ft; minimum discharge, 2.2 ft³/s, Sept. 2, 1994, Sept. 1, 2, 2002, and Aug. 25, 2003.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 400 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan 29	1330	514	4.21	Aug 26	2100	*705	*4.82

Minimum discharge, 2.4 ft³/s, July 25, 26, Aug. 17, 18, gage height, 1.18 ft.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	16	116	35	204	77	49	16	100	13	5.0	41
2	9.6	16	97	33	161	66	44	15	76	13	4.7	35
3	8.5	15	118	32	130	68	40	15	61	14	4.5	29
4	7.8	15	91	30	132	117	37	17	49	13	4.9	24
5	7.5	14	146	26	122	113	34	25	44	13	5.3	22
6	7.2	13	170	29	111	97	32	e19	63	12	6.6	19
7	11	12	121	107	114	84	30	e17	65	12	16	17
8	12	11	95	168	101	74	28	e19	55	11	11	16
9	16	11	78	165	88	66	27	e21	57	11	8.1	17
10	21	12	71	137	78	59	25	e19	52	11	6.8	e16
11	17	37	76	112	70	52	24	e33	48	11	5.7	e15
12	20	27	70	93	64	48	23	29	43	10	4.7	e15
13	30	22	156	79	58	44	22	26	49	9.8	3.9	e19
14	20	20	204	71	57	41	22	23	48	9.1	3.4	e62
15	17	18	152	86	55	39	22	20	42	8.8	3.4	121
16	24	19	118	101	58	37	22	20	36	6.3	3.1	106
17	22	31	102	84	61	34	27	19	32	5.3	2.9	90
18	17	37	84	85	62	35	37	17	28	7.3	3.9	105
19	15	73	72	85	71	43	30	16	28	9.9	8.9	89
20	16	80	63	73	65	46	30	18	24	8.9	7.5	73
21	34	67	57	65	58	43	32	18	21	8.5	7.5	58
22	35	50	50	58	52	40	35	23	20	7.3	28	48
23	43	42	46	106	48	38	30	32	20	5.7	19	43
24	29	69	46	209	46	44	27	24	20	5.1	55	40
25	22	73	51	150	43	54	25	21	20	3.2	174	35
26	18	79	50	120	42	63	23	85	19	2.8	283	32
27	15	65	46	106	49	67	21	123	17	4.0	270	29
28	12	77	45	118	106	63	19	241	16	6.7	163	27
29	19	246	43	407	91	51	18	197	15	5.9	105	25
30	21	160	38	384	---	52	17	147	14	5.4	74	25
31	20	---	36	273	---	54	---	132	---	5.4	53	---
TOTAL	577.6	1,427	2,708	3,627	2,397	1,809	852	1,447	1,182	269.4	1,351.8	1,293
MEAN	18.6	47.6	87.4	117	82.7	58.4	28.4	46.7	39.4	8.69	43.6	43.1
MAX	43	246	204	407	204	117	49	241	100	14	283	121
MIN	7.2	11	36	26	42	34	17	15	14	2.8	2.9	15
AC-FT	1,150	2,830	5,370	7,190	4,750	3,590	1,690	2,870	2,340	534	2,680	2,560
CFSM	0.54	1.38	2.53	3.39	2.40	1.69	0.82	1.35	1.14	0.25	1.26	1.25
IN.	0.62	1.54	2.92	3.91	2.58	1.95	0.92	1.56	1.27	0.29	1.46	1.39

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1927 - 2004, BY WATER YEAR (WY)

MEAN	34.3	83.9	119	121	114	95.7	82.2	54.6	40.3	19.7	11.7	15.6
MAX	90.8	235	268	258	305	191	141	138	114	64.5	59.6	70.9
(WY)	(1928)	(1961)	(1947)	(1971)	(1996)	(1932)	(1928)	(1960)	(1942)	(1993)	(1968)	(1968)
MIN	7.69	8.76	24.6	32.8	36.1	46.4	28.4	19.2	12.2	6.04	4.93	4.44
(WY)	(1930)	(1953)	(1953)	(2001)	(2001)	(2001)	(2004)	(1947)	(1932)	(1944)	(2003)	(1952)

12088000 OHOP CREEK NEAR EATONVILLE, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1927 - 2004	
ANNUAL TOTAL	20,285.9		18,940.8			
ANNUAL MEAN	55.6		51.8		65.6	
HIGHEST ANNUAL MEAN					98.4 1956	
LOWEST ANNUAL MEAN					32.4 1994	
HIGHEST DAILY MEAN	762	Jan 31	407	Jan 29	2,090	Feb 8, 1996
LOWEST DAILY MEAN	2.6	Aug 23	2.8	Jul 26	2.5	Aug 23, 1944
ANNUAL SEVEN-DAY MINIMUM	3.1	Aug 19	3.6	Aug 12	3.0	Aug 26, 2002
ANNUAL RUNOFF (AC-FT)	40,240		37,570		47,530	
ANNUAL RUNOFF (CFSM)	1.61		1.50		1.90	
ANNUAL RUNOFF (INCHES)	21.87		20.42		25.84	
10 PERCENT EXCEEDS	130		116		149	
50 PERCENT EXCEEDS	36		34		42	
90 PERCENT EXCEEDS	5.1		8.7		8.2	

e Estimated

12089208 CENTRALIA POWER CANAL NEAR MCKENNA, WA

LOCATION.--Lat 46°54'01", long 122°29'50", in NE $\frac{1}{4}$ SW $\frac{1}{4}$, sec.1, T.16 N., R.2 E., Thurston County, Hydrologic Unit 17110015, on left bank 1,000 ft downstream from headworks at dam, and 3.7 mi southeast of McKenna.

PERIOD OF RECORD.--March 1979 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 330 ft above NGVD of 1929, from topographic map. Prior to Oct. 20, 1999, at site 500 ft upstream at datum 10.00 ft lower.

REMARKS.--Records good, except for estimated daily discharges, which are fair. Flow regulated by headworks 1,000 ft upstream from station. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 900 ft³/s, Nov. 11, 1990, gage height, 7.72 ft at datum then in use; minimum discharge, no flow on many days most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 806 ft³/s, Mar. 19, gage height, 16.34 ft; minimum daily discharge, 18 ft³/s, Sept. 8-14.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	256	286	620	691	695	772	768	603	738	593	564	466
2	258	286	628	689	693	772	764	601	738	591	571	466
3	257	277	628	691	689	771	749	607	739	591	542	469
4	258	272	622	690	692	765	735	632	722	592	529	469
5	259	268	628	687	689	771	711	666	691	590	516	469
6	265	261	627	691	691	771	686	645	733	588	497	467
7	297	258	627	694	711	766	683	641	740	610	581	e100
8	292	259	628	687	722	768	674	650	730	607	561	e18
9	307	258	624	687	729	773	667	657	740	605	484	e18
10	321	259	624	691	734	773	660	647	736	604	441	e18
11	322	392	641	687	738	778	660	661	712	606	463	e18
12	324	393	667	688	736	781	656	644	676	603	475	e18
13	415	324	684	690	738	777	651	620	674	596	466	e18
14	352	302	681	689	731	776	645	625	682	583	467	e18
15	336	297	687	690	739	778	647	621	656	583	466	e50
16	371	309	693	691	737	768	641	625	628	588	470	354
17	390	440	693	691	736	758	660	627	592	587	467	670
18	345	484	690	692	754	768	687	623	595	586	463	770
19	332	612	693	693	765	777	670	635	598	584	441	781
20	348	627	692	693	766	778	675	635	591	590	411	763
21	395	560	692	691	767	773	677	630	596	583	434	740
22	395	497	691	689	768	777	697	635	605	543	466	713
23	425	457	688	690	768	780	669	735	600	517	465	694
24	400	495	688	690	761	774	654	695	602	500	468	699
25	367	519	695	689	760	766	642	691	603	581	468	715
26	359	550	694	687	772	769	633	692	592	586	524	708
27	350	504	693	687	768	768	631	734	599	554	551	711
28	352	525	692	691	769	765	627	728	601	515	471	710
29	387	623	696	690	772	772	610	729	597	506	470	719
30	363	621	696	691	---	771	605	732	595	521	468	643
31	300	---	693	691	---	771	---	731	---	514	464	---
TOTAL	10,398	12,215	20,695	21,388	21,390	23,927	20,134	20,397	19,701	17,797	15,124	13,472
MEAN	335	407	668	690	738	772	671	658	657	574	488	449
MAX	425	627	696	694	772	781	768	735	740	610	581	781
MIN	256	258	620	687	689	758	605	601	591	500	411	18
AC-FT	20,620	24,230	41,050	42,420	42,430	47,460	39,940	40,460	39,080	35,300	30,000	26,720
CAL YR	2003	TOTAL 174,364	MEAN 478	MAX 698	MIN 215	AC-FT 345,900						
WTR YR	2004	TOTAL 216,638	MEAN 592	MAX 781	MIN 18	AC-FT 429,700						

e Estimated

12089500 NISQUALLY RIVER AT MCKENNA, WA

LOCATION.--Lat 46°56'01", long 122°33'35", in SE¼NW¼, sec.28, T.17 N., R.2 E., Thurston County, Hydrologic Unit 17110015, on left bank at downstream side of State Highway 507 bridge at McKenna, and at mile 21.8.

DRAINAGE AREA.--517 mi².

PERIOD OF RECORD.--October 1947 to September 1968, May 1977 to current year.

GAGE.--Water-stage recorder. Datum of gage is 285.47 ft above NGVD of 1929. Oct. 1, 1947, to Sept. 30, 1968, water-stage recorder at site 80 ft downstream at present datum, and Oct. 1, 1968, to Oct. 11, 1985, water-stage recorder at site 20 ft upstream at present datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by Alder Reservoir (station 12085000) at mile 44.2 and La Grande Reservoir (station 12085500) at mile 42.5. Centralia Power Canal (station 12089208) diverts water 4.4 mi upstream from station, which is returned to river at powerplant 9.2 mi downstream from station. Centralia Power Canal was built in 1929 and put into operation in 1930. Minor diversions for irrigation upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--48 years (water years 1948-68, 1978-2004), 1,295 ft³/s, 938,500 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,000 ft³/s, Feb. 8 or 9, 1996, gage height, 17.13 ft, estimated based on comparison with upstream gaging stations; minimum discharge, 20 ft³/s, Sept. 10, 11, 1965, Aug. 31, 1966.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,750 ft³/s, Jan. 30, gage height, 5.23 ft; minimum discharge, 367 ft³/s, Aug. 1, gage height, 0.92 ft.

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	508	520	1,060	1,340	3,010	820	728	620	796	520	450	535
2	510	522	1,780	1,340	2,710	773	695	619	656	521	395	564
3	516	522	2,170	1,320	2,570	782	641	615	571	523	397	573
4	515	521	2,330	1,310	2,450	938	628	619	523	523	395	544
5	512	519	2,750	1,410	2,390	994	628	615	515	522	396	497
6	514	520	3,170	1,770	2,320	949	631	613	582	521	392	463
7	513	523	2,640	2,120	2,370	870	624	613	596	516	393	746
8	514	522	2,380	2,600	1,910	868	620	616	564	516	391	837
9	512	524	2,240	2,690	1,650	884	618	617	578	517	391	840
10	513	525	2,170	2,680	1,510	861	616	616	562	516	395	840
11	520	527	2,130	2,490	1,460	786	612	615	542	518	389	1,050
12	515	524	2,100	2,320	1,180	742	611	639	527	516	402	1,000
13	521	534	2,400	2,250	1,020	712	610	649	528	516	434	1,050
14	529	531	2,920	2,030	1,030	690	607	631	527	516	479	1,260
15	524	528	2,520	1,760	1,040	670	614	631	519	518	495	1,250
16	521	521	2,300	1,680	1,070	659	610	634	514	518	443	1,050
17	519	530	2,310	1,270	1,250	655	610	632	518	519	406	603
18	535	528	2,180	1,220	1,210	648	612	626	513	519	378	553
19	525	622	2,110	1,160	1,240	681	609	623	512	521	386	505
20	531	612	2,060	963	1,010	672	612	618	514	524	402	458
21	529	544	2,050	899	871	653	620	617	515	524	402	410
22	522	526	1,990	854	813	640	618	620	514	525	510	388
23	516	524	1,940	1,070	769	632	614	643	513	523	553	385
24	519	524	1,800	1,650	749	664	618	627	514	522	581	410
25	529	525	1,700	1,490	733	779	616	628	516	526	964	473
26	525	527	1,660	1,380	707	836	613	868	518	519	921	465
27	529	523	1,600	1,780	733	844	611	1,310	521	519	1,100	450
28	518	528	1,600	2,230	909	838	612	1,790	521	519	779	440
29	515	1,460	1,560	3,770	895	773	621	1,650	521	521	567	428
30	519	1,130	1,470	4,420	---	755	619	1,160	520	522	561	501
31	520	---	1,350	3,520	---	773	---	1,010	---	539	565	---
TOTAL	16,108	17,486	64,440	58,786	41,579	23,841	18,698	23,384	16,330	16,139	15,712	19,568
MEAN	520	583	2,079	1,896	1,434	769	623	754	544	521	507	652
MAX	535	1,460	3,170	4,420	3,010	994	728	1,790	796	539	1,100	1,260
MIN	508	519	1,060	854	707	632	607	613	512	516	378	385
AC-FT	31,950	34,680	127,800	116,600	82,470	47,290	37,090	46,380	32,390	32,010	31,160	38,810
CFSM	1.01	1.13	4.02	3.67	2.77	1.49	1.21	1.46	1.05	1.01	0.98	1.26
IN.	1.16	1.26	4.64	4.23	2.99	1.72	1.35	1.68	1.18	1.16	1.13	1.41

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 2004, BY WATER YEAR (WY)

MEAN	825	1,617	2,313	2,140	2,201	1,599	1,344	1,147	890	571	436	521
MAX	1,693	4,071	5,516	4,397	6,198	3,398	2,714	2,659	1,894	1,419	1,104	1,167
(WY)	(1956)	(1956)	(1978)	(1997)	(1996)	(1950)	(1991)	(1949)	(1950)	(1999)	(1999)	(1977)
MIN	298	272	595	620	593	405	553	499	254	85.5	137	148
(WY)	(1962)	(1953)	(2001)	(2001)	(2001)	(1962)	(1978)	(1978)	(1965)	(1965)	(1963)	(1965)

NISQUALLY RIVER BASIN

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SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1948 - 2004	
ANNUAL TOTAL	430,226		332,071			
ANNUAL MEAN	1,179		907		1,295	
HIGHEST ANNUAL MEAN					2,238	
LOWEST ANNUAL MEAN					590	
HIGHEST DAILY MEAN	11,600	Feb 1	4,420	Jan 30	27,300	Feb 9, 1996
LOWEST DAILY MEAN	367	Aug 12	378	Aug 18	22	Sep 11, 1965
ANNUAL SEVEN-DAY MINIMUM	369	Aug 7	392	Aug 5	27	Sep 1, 1965
ANNUAL RUNOFF (AC-FT)	853,400		658,700		938,500	
ANNUAL RUNOFF (CFSM)	2.28		1.75		2.51	
ANNUAL RUNOFF (INCHES)	30.96		23.89		34.05	
10 PERCENT EXCEEDS	2,450		2,050		2,320	
50 PERCENT EXCEEDS	615		616		908	
90 PERCENT EXCEEDS	382		509		386	