



Figure 39. Location of surface-water stations in the Cowlitz River Basin, including the Toutle River Basin.

14226500 COWLITZ RIVER AT PACKWOOD, WA

LOCATION.--Lat 46°36'47", long 121°40'41", in SE $\frac{1}{4}$ SE $\frac{1}{4}$, sec.16, T.13 N., R.9 E., Lewis County, Hydrologic Unit 17080004, on right bank on upstream side of Forest Service bridge, 0.6 mi northwest of Packwood, 0.8 mi upstream from Skate Creek, and at mile 126.5.

DRAINAGE AREA.--287 mi².

PERIOD OF RECORD.--July 1911 to December 1919, September 1929 to current year. Published as "at Lewis" 1911-19.

REVISED RECORDS.--WSP 884: 1938. WSP 1348: 1916-18(M), 1934. WSP 1638: 1947(P).

GAGE.--Water-stage recorder. Datum of gage is 1,048.0 ft above NGVD of 1929 (Bureau of Public Roads benchmark). July 1, 1911, to Dec. 31, 1919, nonrecording gages at site about 1 mi upstream at different datums. Sept. 30, 1929, to Jan. 1, 1930, nonrecording gage at present site and datum.

REMARKS.--No estimated daily discharges. Records good, except for those above 10,000 ft³/s, which are fair. Minor regulation by Packwood Lake beginning June 1964. Small diversions for domestic use. Water temperatures November 1970 to April 1971. U.S. Geological Survey satellite telemeter at station. Water is diverted from Packwood Lake for power generation and is discharged into Cowlitz River about 1 mi downstream from station. Monthly mean diversion in cubic feet per second for the current water year, as furnished by Energy Northwest is as follows:

October	8.1	January	66.9	April	51.2	July	93.3
November	69.6	February	89.6	May	144	August	64.1
December	79.0	March	41.2	June	184	September	111

AVERAGE DISCHARGE.--75 years (water years 1930-2004), 1,592 ft³/s, 1,154,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,600 ft³/s, Dec. 21, 1933, gage height, 13.0 ft; maximum gage height, 13.73 ft, Dec. 2, 1977; minimum discharge, 130 ft³/s, Nov. 29, 1952.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,500 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Oct 21	0400	*10,100	*7.22	Jan 30	0600	7,730	5.90
Nov 19	0815	9,040	6.64				

Minimum discharge, 231 ft³/s, Oct. 6, gage height, 0.66 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	367	1,120	3,500	966	3,700	769	1,980	3,690	2,930	1,950	789	804
2	372	1,080	3,290	941	2,980	740	1,750	4,380	2,780	1,840	805	750
3	360	992	4,240	922	2,420	750	1,740	4,490	3,120	1,740	762	607
4	342	902	3,570	882	2,030	822	2,090	4,350	3,740	1,560	680	587
5	328	820	3,580	818	1,700	833	2,260	3,610	3,940	1,460	637	553
6	296	770	4,020	835	1,500	809	2,260	2,700	4,030	1,480	698	544
7	381	738	3,510	870	1,350	899	2,510	2,610	2,940	1,450	1,130	537
8	341	701	2,980	944	1,190	1,260	2,530	2,840	2,820	1,060	669	525
9	447	669	2,510	1,020	1,090	2,160	2,540	2,670	2,800	1,010	624	503
10	321	732	2,140	1,150	1,050	2,440	2,710	2,470	2,860	916	633	456
11	283	1,530	1,790	1,230	1,010	2,250	3,040	2,160	2,460	846	698	1,840
12	703	1,200	1,800	1,300	974	2,270	3,440	1,920	1,980	920	702	1,190
13	899	1,080	2,130	1,500	938	2,110	3,740	1,830	2,820	1,090	726	1,510
14	477	1,070	2,230	2,180	949	1,950	3,410	1,920	3,070	1,180	734	2,340
15	407	1,070	1,850	4,100	923	1,800	2,960	2,240	2,520	1,250	689	2,820
16	1,390	1,110	1,630	4,440	938	1,660	2,520	2,260	2,470	1,170	734	2,610
17	2,760	1,420	1,510	3,660	955	1,700	2,220	2,200	2,720	1,170	706	2,670
18	1,330	5,470	1,400	3,230	1,070	1,810	2,000	2,400	2,930	1,160	635	2,360
19	1,010	7,350	1,340	2,960	1,100	1,800	1,810	2,780	2,730	1,320	641	2,090
20	3,640	4,740	1,360	2,610	1,080	1,570	1,790	3,000	2,580	1,140	636	1,750
21	6,620	3,580	1,400	2,250	1,020	1,450	1,700	3,220	2,760	899	599	1,420
22	2,960	2,860	1,330	1,910	959	1,770	1,610	3,080	2,990	900	932	1,190
23	2,040	2,400	1,270	2,130	907	2,410	1,840	2,840	3,140	928	599	1,050
24	1,340	2,090	1,260	2,620	873	2,680	1,940	2,440	3,140	961	1,890	910
25	1,140	1,850	1,250	2,380	843	2,560	2,020	2,390	2,940	947	3,730	833
26	1,130	1,640	1,160	2,120	814	2,410	2,760	4,310	2,620	843	3,000	774
27	1,120	1,430	1,110	1,840	804	2,350	3,790	5,320	2,310	813	2,130	744
28	2,090	1,660	1,080	2,150	795	2,170	3,570	4,890	2,160	841	1,500	683
29	2,370	4,730	1,040	4,780	788	2,100	3,140	3,550	2,170	835	1,180	650
30	1,410	4,030	989	6,820	---	2,310	3,170	3,660	2,110	819	1,040	604
31	1,150	---	982	4,710	---	2,240	---	3,670	---	780	905	---
TOTAL	39,824	60,834	63,251	70,268	36,750	54,852	74,840	95,890	84,580	35,278	31,833	35,904
MEAN	1,285	2,028	2,040	2,267	1,267	1,769	2,495	3,093	2,819	1,138	1,027	1,197
MAX	6,620	7,350	4,240	6,820	3,700	2,680	3,790	5,320	4,030	1,950	3,730	2,820
MIN	283	669	982	818	788	740	1,610	1,830	1,980	780	599	456
AC-FT	78,990	120,700	125,500	139,400	72,890	108,800	148,400	190,200	167,800	69,970	63,140	71,220

14226500 COWLITZ RIVER AT PACKWOOD, WA—Continued

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

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 2004, BY WATER YEAR (WY)													
MEAN	810	1,599	1,749	1,539	1,412	1,237	1,719	2,814	3,052	1,773	823	583	
MAX	2,683	5,023	6,025	4,104	4,690	3,478	2,833	5,209	6,085	4,265	1,824	1,527	
(WY)	(1956)	(1996)	(1934)	(1974)	(1996)	(1972)	(1991)	(1949)	(1974)	(1933)	(1999)	(1959)	
MIN	237	196	319	364	396	495	668	1,548	842	527	445	344	
(WY)	(1988)	(1953)	(1953)	(1937)	(1933)	(1955)	(1975)	(1977)	(1992)	(1992)	(1987)	(1987)	
SUMMARY STATISTICS													
	FOR 2003 CALENDAR YEAR					FOR 2004 WATER YEAR			WATER YEARS 1930 - 2004				
ANNUAL TOTAL	634,015					684,104							
ANNUAL MEAN	1,737					1,869			1,592				
HIGHEST ANNUAL MEAN									2,411				
LOWEST ANNUAL MEAN									923				
HIGHEST DAILY MEAN	15,800					Jan 31		7,350		Nov 19		27,700	
LOWEST DAILY MEAN	257					Sep 18		283		Oct 11		144	
ANNUAL SEVEN-DAY MINIMUM	300					Sep 16		342		Oct 5		156	
ANNUAL RUNOFF (AC-FT)	1,258,000					1,357,000			1,154,000				
10 PERCENT EXCEEDS	3,600					3,560			3,360				
50 PERCENT EXCEEDS	1,310					1,640			1,100				
90 PERCENT EXCEEDS	456					695			450				

14231000 COWLITZ RIVER AT RANDLE, WA

LOCATION.--Lat 46°31'57", long 121°57'20". in NW $\frac{1}{4}$ NE $\frac{1}{4}$, sec.17, T.12 N., R.7 E., Lewis County, Hydrologic Unit 17080004, on left bank on upstream side of Cispus Road bridge in the town of Randle, and at mile 102.9.

DRAINAGE AREA.--541 mi².

PERIOD OF RECORD.--October 1910 to December 1911, October 1993 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 900 ft above NGVD of 1929 from topographic map. October 1910 to December 1911, nonrecording gage at same site at different datum.

REMARKS.--No estimated daily discharges. Records good. Small diversions for domestic use and irrigation upstream from station. Minor regulation by Packwood Lake for power production. U.S. Geological Survey satellite telemeter at station. Due to bank overflow, discharges above 19.00 ft gage height cannot be determined by direct methods.

AVERAGE DISCHARGE.--11 years (water years 1994-2004), 2,836 ft³/s, 71.22 in/yr, 2,054,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 24.90 ft, Feb. 9, 1996, from outside high-water mark; minimum daily discharge, 278 ft³/s, Nov. 3, 4, 2002.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 19,900 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 30	1145	*13,700	*14.29				

Minimum discharge, 424 ft³/s, Oct. 6, 7, gage height, 3.56 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	619	1,370	4,780	1,480	6,920	1,480	2,860	4,000	5,400	2,440	1,040	1,300
2	578	1,270	4,210	1,420	5,700	1,420	2,600	4,900	4,860	2,380	1,030	1,250
3	577	1,190	5,290	1,380	4,900	1,410	2,510	5,310	4,760	2,250	1,030	1,150
4	540	1,130	4,960	1,310	4,220	1,590	2,740	5,250	5,200	2,140	969	1,080
5	492	1,050	4,780	1,210	3,660	1,630	2,910	4,990	5,450	1,990	936	1,040
6	458	980	5,460	1,220	3,300	1,680	2,880	4,250	5,800	1,990	919	989
7	502	899	5,080	1,230	3,050	1,690	3,040	3,790	5,050	1,980	1,290	964
8	462	857	4,280	1,260	2,780	2,060	3,110	3,930	4,760	1,770	1,030	936
9	608	803	3,680	1,420	2,570	2,870	3,110	3,840	4,700	1,680	907	916
10	545	813	3,270	1,660	2,420	3,450	3,200	3,590	4,640	1,540	875	878
11	479	1,770	2,910	1,800	2,310	3,280	3,540	3,320	4,330	1,440	919	1,570
12	696	1,880	2,740	1,870	2,210	3,200	4,010	3,030	3,670	1,400	935	1,540
13	1,400	1,560	3,210	2,070	2,120	3,060	4,540	2,880	3,960	1,460	945	1,550
14	924	1,400	3,700	2,640	2,070	2,850	4,300	2,800	4,450	1,510	971	3,010
15	732	1,290	3,250	4,710	2,010	2,690	3,750	3,020	3,810	1,540	919	3,220
16	1,220	1,350	2,900	6,290	1,980	2,520	3,250	3,070	3,620	1,600	944	3,680
17	2,820	2,120	2,740	5,520	2,040	2,500	2,900	3,020	3,580	1,540	927	3,510
18	2,070	5,540	2,500	4,730	2,200	2,540	2,640	3,110	3,760	1,530	905	3,420
19	1,430	9,910	2,370	4,310	2,310	2,580	2,430	3,430	3,600	1,560	875	3,150
20	2,230	6,690	2,330	3,880	2,240	2,380	2,380	3,700	3,370	1,570	886	2,740
21	7,280	4,830	2,370	3,460	2,100	2,250	2,320	4,070	3,450	1,330	855	2,380
22	3,940	3,640	2,280	3,140	1,970	2,380	2,240	3,940	3,530	1,270	1,090	2,110
23	2,700	2,970	2,190	3,220	1,860	2,950	2,290	3,970	3,740	1,270	960	1,860
24	1,950	2,680	2,140	3,820	1,790	3,360	2,410	3,480	3,800	1,260	1,400	1,580
25	1,530	2,490	2,110	3,730	1,720	3,380	2,410	3,210	3,680	1,260	3,730	1,460
26	1,330	2,230	1,970	3,450	1,660	3,270	2,790	4,440	3,350	1,200	4,090	1,390
27	1,240	2,000	1,870	3,150	1,620	3,210	3,970	6,930	3,010	1,150	3,160	1,270
28	1,420	1,980	1,820	3,330	1,570	3,090	4,230	7,180	2,800	1,140	2,320	1,180
29	2,910	5,190	1,710	6,950	1,530	2,950	3,690	6,370	2,700	1,120	1,860	1,200
30	1,880	5,810	1,590	12,800	---	3,130	3,560	5,990	2,600	1,110	1,610	1,120
31	1,520	---	1,540	9,400	---	3,120	---	6,190	---	1,060	1,440	---
TOTAL	47,082	77,692	96,030	107,860	76,830	79,970	92,610	131,000	121,430	48,480	41,767	53,443
MEAN	1,519	2,590	3,098	3,479	2,649	2,580	3,087	4,226	4,048	1,564	1,347	1,781
MAX	7,280	9,910	5,460	12,800	6,920	3,450	4,540	7,180	5,800	2,440	4,090	3,680
MIN	458	803	1,540	1,210	1,530	1,410	2,240	2,800	2,600	1,060	855	878
AC-FT	93,390	154,100	190,500	213,900	152,400	158,600	183,700	259,800	240,900	96,160	82,840	106,000
CFSM	2.81	4.79	5.73	6.43	4.90	4.77	5.71	7.81	7.48	2.89	2.49	3.29
IN.	3.24	5.34	6.60	7.42	5.28	5.50	6.37	9.01	8.35	3.33	2.87	3.67

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 2004, BY WATER YEAR (WY)

MEAN	1,344	3,158	3,603	3,690	3,513	2,994	3,236	4,263	4,082	2,209	1,115	880
MAX	3,690	9,466	6,632	5,981	8,136	4,912	4,737	6,748	6,662	4,822	2,382	1,781
(WY)	(1998)	(1996)	(1996)	(1997)	(1996)	(1997)	(2002)	(1997)	(1999)	(1999)	(1999)	(2004)
MIN	410	365	930	1,391	1,323	1,658	2,132	3,168	2,404	1,290	715	593
(WY)	(2003)	(1994)	(2001)	(2001)	(1994)	(2001)	(1998)	(2003)	(2001)	(2001)	(1994)	(1998)

14231000 COWLITZ RIVER AT RANDLE, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1994 - 2004	
ANNUAL TOTAL	987,750		974,194			
ANNUAL MEAN	2,706		2,662		2,836	
HIGHEST ANNUAL MEAN					3,982	
LOWEST ANNUAL MEAN					1,573	
HIGHEST DAILY MEAN	25,000	Feb 1	12,800	Jan 30	35,000	Feb 9, 1996
LOWEST DAILY MEAN	458	Oct 6	458	Oct 6	278	Nov 3, 2002
ANNUAL SEVEN-DAY MINIMUM	507	Oct 5	507	Oct 5	281	Oct 31, 2002
ANNUAL RUNOFF (AC-FT)	1,959,000		1,932,000		2,054,000	
ANNUAL RUNOFF (CFSM)	5.00		4.92		5.24	
ANNUAL RUNOFF (INCHES)	67.92		66.99		71.22	
10 PERCENT EXCEEDS	4,910		4,770		5,350	
50 PERCENT EXCEEDS	2,210		2,380		2,250	
90 PERCENT EXCEEDS	697		963		685	

14231900 CISPUS RIVER ABOVE YELLOWJACKET CREEK, NEAR RANDLE, WA

LOCATION.--Lat 46°26'38", long 121°50'28", in NE¹/₄, sec.18, T.11 N., R.8 E., (unsurveyed), Lewis County, Hydrologic Unit 17080004, Gifford Pinchot National Forest, on right bank 600 ft downstream from Forest Service Road 28 bridge, 2.5 mi downstream from North Fork, 8.5 mi southeast of Randle, and at mile 17.4.

DRAINAGE AREA.--250 mi².

PERIOD OF RECORD.--August 1996 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,260 ft above NGVD of 1929.

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

AVERAGE DISCHARGE.--9 years (water years 1996-2004), 1,033 ft³/s, 56.12 in/yr, 748,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,800 ft³/s, Jan. 31, 2003, gage height, 9.50 ft from floodmarks, result of slope-area measurement; minimum daily discharge, 165 ft³/s, Oct. 31, Nov. 1, 2, 2003.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Feb. 8, 1996, reached stage of 12.50 ft, discharge from floodmarks 24,600 ft³/s by slope-area measurement made about 7 mi downstream near Forest Service Road 25 bridge, adjusted for flow from intervening area.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan. 30	0515	*3,350	*4.78				

Minimum daily discharge, 213 ft³/s, Oct. 11.

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	e310	e435	946	562	1,860	642	1,150	1,520	1,850	966	e516	e440
2	e296	e416	931	546	1,530	630	1,080	1,690	1,690	928	e529	e418
3	e282	e388	1,300	539	1,330	622	1,090	1,910	1,640	898	e492	e389
4	e268	e332	1,200	525	1,200	655	1,140	1,900	1,700	885	e445	e411
5	e241	e322	1,260	520	1,100	652	1,180	1,800	1,730	831	e418	e396
6	e234	e313	1,600	520	1,040	657	1,180	1,570	1,790	823	e428	e375
7	e303	e294	1,380	520	993	688	1,220	1,470	1,640	855	e592	e368
8	e275	e303	1,180	538	933	805	1,230	1,480	1,690	750	e434	e368
9	e372	e303	1,060	587	876	979	1,270	1,430	1,620	732	e412	e346
10	e255	e343	980	648	836	1,040	1,320	1,360	1,590	704	e412	e346
11	e213	e716	897	652	801	1,030	1,420	1,290	1,530	676	e424	e597
12	e481	e543	866	654	762	1,000	1,590	1,230	1,410	703	e425	e541
13	e640	e548	935	684	752	972	1,690	1,190	1,420	696	e438	e539
14	e322	e548	926	778	729	947	1,620	1,170	1,440	693	e456	e639
15	e247	e547	847	1,050	714	937	1,480	1,200	1,340	705	e430	e612
16	e550	e554	807	1,280	719	912	1,350	1,220	1,290	694	e473	e595
17	e796	e564	778	1,190	729	942	1,300	1,200	1,290	679	e460	e643
18	e593	e671	735	1,130	808	989	1,190	1,250	1,320	659	e434	e722
19	e521	1,230	713	1,090	822	988	1,160	1,560	1,280	685	e434	e726
20	e543	984	707	1,040	785	936	1,130	1,490	1,220	661	e425	e671
21	e1,060	786	730	974	749	905	1,090	1,520	1,210	622	e408	e614
22	e648	656	703	926	719	959	1,040	1,530	1,240	607	e601	e585
23	e522	608	692	982	696	1,110	1,050	1,550	1,270	630	e563	e534
24	e427	585	721	1,070	675	1,180	1,060	1,390	1,300	e618	e628	e503
25	e406	580	722	1,040	670	1,210	1,080	1,320	1,250	e611	959	e476
26	e417	571	676	988	653	1,210	1,170	1,770	1,180	e594	827	e439
27	e406	537	656	939	668	1,200	1,400	2,550	1,120	e590	705	e407
28	e669	541	664	992	674	1,210	1,510	2,770	1,050	e620	e589	e412
29	e942	874	611	1,790	663	1,180	1,400	2,450	1,020	e590	e541	e394
30	e523	929	564	3,060	---	1,250	1,380	2,220	994	e573	e483	e367
31	e435	---	571	2,410	---	1,210	---	2,120	---	e536	e462	---
TOTAL	14,197	17,021	27,358	30,224	25,486	29,647	37,970	50,120	42,114	21,814	15,843	14,873
MEAN	458	567	883	975	879	956	1,266	1,617	1,404	704	511	496
MAX	1,060	1,230	1,600	3,060	1,860	1,250	1,690	2,770	1,850	966	959	726
MIN	213	294	564	520	653	622	1,040	1,170	994	536	408	346
AC-FT	28,160	33,760	54,260	59,950	50,550	58,800	75,310	99,410	83,530	43,270	31,420	29,500
CFSM	1.83	2.27	3.53	3.90	3.52	3.83	5.06	6.47	5.62	2.81	2.04	1.98
IN.	2.11	2.53	4.07	4.50	3.79	4.41	5.65	7.46	6.27	3.25	2.36	2.21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 2004, BY WATER YEAR (WY)

MEAN	479	890	1,042	1,282	977	1,073	1,267	1,816	1,728	923	516	406
MAX	1,172	1,720	1,763	2,322	1,548	1,675	1,756	2,865	2,814	1,869	836	583
(WY)	(1998)	(2000)	(1999)	(1997)	(2003)	(2003)	(1997)	(1997)	(1999)	(1999)	(1999)	(1997)
MIN	247	340	369	426	414	574	785	1,278	889	500	347	274
(WY)	(2003)	(2003)	(2001)	(2001)	(2001)	(2001)	(2001)	(2003)	(2001)	(2001)	(2003)	(2001)

14231900 CISPUS RIVER ABOVE YELLOWJACKET CREEK, NEAR RANDLE, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1996 - 2004	
ANNUAL TOTAL	352,150		326,667			
ANNUAL MEAN	965		893		1,033	
HIGHEST ANNUAL MEAN					1,381	1997
LOWEST ANNUAL MEAN					580	2001
HIGHEST DAILY MEAN	9,800	Jan 31	3,060	Jan 30	9,800	Jan 31, 2003
LOWEST DAILY MEAN	213	Oct 11	213	Oct 11	165	Oct 31, 2002
ANNUAL SEVEN-DAY MINIMUM	254	Sep 16	270	Oct 5	177	Oct 28, 2002
ANNUAL RUNOFF (AC-FT)	698,500		647,900		748,000	
ANNUAL RUNOFF (CFSM)	3.86		3.57		4.13	
ANNUAL RUNOFF (INCHES)	52.40		48.61		56.12	
10 PERCENT EXCEEDS	1,630		1,510		1,900	
50 PERCENT EXCEEDS	823		751		848	
90 PERCENT EXCEEDS	308		412		340	

e Estimated

14233500 COWLITZ RIVER NEAR KOSMOS, WA

LOCATION.--Lat 46°27'59", long 122°06'28", in NE $\frac{1}{4}$ SW $\frac{1}{4}$, sec.6, T.11 N., R.6 E., Lewis County, Hydrologic Unit 17080005, at Cowlitz Falls Dam, 1.1 mi downstream from Cispus River, 8 mi southwest of Randle, 4.5 mi southeast of Kosmos.

DRAINAGE AREA.--1,040 mi².

PERIOD OF RECORD.--October 1947 to current year. October 1967 to March 1994, published as "14233400 Cowlitz River near Randle."

GAGE.--Discharge determined from flow through turbines and outlet structures of Cowlitz Falls Dam. Prior to December 1948, nonrecording gage at site 0.8 mi downstream. December 1948 to September 1967, water-stage recorder at site 0.3 mi downstream, at datum 760.96 ft above sea level. October 1967 to March 1994, water-stage recorder, at site 0.6 mi upstream, at datum 799.42 ft above NGVD of 1929.

REMARKS.--Flow regulated by Cowlitz Falls Dam since Mar. 8, 1994. Water temperatures November 1952 to August 1968, April 1969 to September 1982. Chemical analyses July 1959 to September 1970, December 1973 to September 1985.

COOPERATION.--Records provided by Lewis County Public Utility District since Mar. 8, 1994. U.S. Geological Survey made two discharge measurements at this site during the year.

AVERAGE DISCHARGE.--57 years (water years 1948-2004), 4,799 ft³/s, 3,477,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 103,000 ft³/s, Feb. 9, 1996; no flow part or all of many days 1994-2004.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,400 ft³/s, Jan. 30; minimum discharge, no flow on many days.

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	963	1,700	5,870	2,490	11,800	2,790	4,820	6,080	7,640	2,970	1,600	1,730
2	831	1,690	5,360	2,350	9,230	2,730	4,360	7,230	6,740	3,200	1,490	1,780
3	878	1,690	7,330	2,280	7,610	2,710	4,260	8,010	6,480	3,050	1,540	1,730
4	624	1,460	6,990	2,160	6,430	3,020	4,600	8,140	6,900	3,000	1,510	1,500
5	914	1,520	6,870	1,950	5,700	3,030	4,780	7,390	7,320	2,760	1,450	1,520
6	912	1,500	9,030	1,910	5,160	3,140	4,770	6,380	7,860	2,700	1,520	1,450
7	923	1,290	7,890	2,150	4,840	3,120	4,860	5,840	7,070	2,770	1,800	1,350
8	944	1,330	6,410	2,140	4,640	3,590	5,000	5,930	6,650	2,520	1,570	1,420
9	1,090	1,470	5,550	2,460	4,240	4,690	5,060	5,850	6,620	2,400	1,430	1,310
10	991	1,330	4,820	2,910	3,640	5,620	5,170	5,680	6,420	2,270	1,360	1,340
11	933	2,140	4,270	3,120	3,610	5,120	5,890	4,950	5,820	2,290	1,400	1,940
12	1,100	2,310	4,070	3,190	3,520	5,090	6,110	4,700	5,310	2,130	1,390	2,060
13	1,750	1,970	4,790	3,420	3,430	4,850	7,050	4,470	5,450	2,180	1,400	2,020
14	1,740	2,040	5,490	4,140	3,370	4,590	6,960	4,360	6,020	1,900	1,470	3,610
15	1,260	1,740	4,840	6,410	3,310	4,300	5,920	4,560	5,320	2,250	1,430	3,610
16	1,530	1,770	4,360	8,820	3,310	4,130	5,300	4,730	4,960	2,220	1,380	4,230
17	2,710	2,720	4,110	7,550	3,480	4,240	4,830	4,650	4,880	2,220	1,410	4,000
18	2,660	5,780	3,820	6,580	3,830	4,210	4,440	4,750	5,070	2,170	1,400	4,220
19	1,780	12,500	3,640	5,990	4,020	4,180	4,100	5,380	4,880	2,200	1,320	4,110
20	2,240	8,610	3,550	5,410	3,840	4,060	4,120	5,790	4,670	2,280	1,320	3,650
21	8,360	5,620	3,790	4,980	3,670	3,790	4,000	5,790	4,760	1,910	1,250	3,570
22	4,090	4,320	3,500	4,580	3,490	3,940	3,840	5,910	4,610	1,970	1,630	2,690
23	2,920	3,580	3,430	4,820	3,280	4,680	3,890	6,200	4,900	1,820	1,760	2,370
24	2,240	3,330	3,410	5,580	3,150	5,330	4,000	5,360	5,020	1,960	1,710	2,210
25	1,890	3,190	3,470	5,640	3,130	5,610	3,990	5,000	4,860	1,770	4,450	2,100
26	1,690	2,960	3,240	5,320	2,980	5,460	4,450	6,350	4,420	1,790	5,000	2,090
27	1,690	2,680	3,120	4,820	3,000	5,450	5,980	10,200	4,020	1,700	3,910	1,920
28	1,740	2,680	2,960	5,220	2,930	5,200	6,520	11,400	3,730	1,690	3,010	1,830
29	3,140	6,340	2,850	11,200	2,920	4,940	5,910	9,740	3,920	1,680	2,500	1,780
30	2,270	7,380	2,640	20,200	---	5,210	5,680	8,660	3,530	1,710	2,140	1,740
31	1,820	---	2,540	16,300	---	5,240	---	8,880	---	1,620	2,140	---
TOTAL	58,623	98,640	144,010	166,090	127,560	134,060	150,660	198,360	165,850	69,100	58,690	70,880
MEAN	1,891	3,288	4,645	5,358	4,399	4,325	5,022	6,399	5,528	2,229	1,893	2,363
MAX	8,360	12,500	9,030	20,200	11,800	5,620	7,050	11,400	7,860	3,200	5,000	4,230
MIN	624	1,290	2,540	1,910	2,920	2,710	3,840	4,360	3,530	1,620	1,250	1,310
AC-FT	116,300	195,700	285,600	329,400	253,000	265,900	298,800	393,400	329,000	137,100	116,400	140,600

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

MEAN	2,114	4,932	6,181	5,826	5,746	4,739	5,718	7,887	7,255	3,880	1,923	1,479
MAX	6,302	14,650	16,520	13,820	15,610	14,510	9,738	13,760	16,130	8,580	3,705	2,881
(WY)	(1960)	(1996)	(1978)	(1974)	(1996)	(1972)	(1990)	(1949)	(1974)	(1974)	(1974)	(1959)
MIN	589	648	1,100	1,640	1,815	2,270	2,656	4,017	2,176	1,336	1,042	952
(WY)	(2003)	(1953)	(1953)	(1979)	(1977)	(1955)	(1975)	(1992)	(1992)	(1992)	(1992)	(2001)

14233500 COWLITZ RIVER NEAR KOSMOS, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1948 - 2004	
ANNUAL TOTAL	1,566,763.0		1,442,523			
ANNUAL MEAN	4,293		3,941		4,799	
HIGHEST ANNUAL MEAN					7,236	
LOWEST ANNUAL MEAN					2,509	
HIGHEST DAILY MEAN	44,500	Feb 1	20,200	Jan 30	84,300	Feb 9, 1996
LOWEST DAILY MEAN	0.00	Sep 19	624	Oct 4	0.00	Sep 9, 1995
ANNUAL SEVEN-DAY MINIMUM	340	Sep 17	861	Oct 2	340	Sep 17, 2003
ANNUAL RUNOFF (AC-FT)	3,108,000		2,861,000		3,477,000	
10 PERCENT EXCEEDS	7,730		6,590		9,370	
50 PERCENT EXCEEDS	3,600		3,610		3,750	
90 PERCENT EXCEEDS	1,030		1,470		1,280	

COWLITZ RIVER BASIN

14234800 RIFFE LAKE NEAR MOSSYROCK, WA

LOCATION.--Lat 46°32'07", long 122°25'25", in SE $\frac{1}{4}$ SW $\frac{1}{4}$, sec.10, T.12 N., R.3 E., Lewis County, Hydrologic Unit 17080005, in emergency generator room on top of Mossyrock Dam on Cowlitz River, 2.8 mi east of Mossyrock, and at mile 65.5.

DRAINAGE AREA.--1,154 mi².

PERIOD OF RECORD.--April 1968 to current year.

REVISED RECORDS.--WDR WA-74-1: 1973.

GAGE.--Water-stage recorder; nonrecording gage prior to July 25, 1968. Datum of gage is NGVD of 1929 (levels by City of Tacoma).

REMARKS.--Reservoir is formed by concrete arch dam, completed in April 1968; storage began Apr. 3, 1968. Useable capacity, 1,297,400 acre-ft between elevations 600 ft, minimum operating level, and 770 ft, normal operating pool. Unused storage below elevation 600 ft, 288,900 acre-ft. Crest of spillway is at elevation 728.5 ft and top of taintor gates are at elevation 778.5 ft. Water used by City of Tacoma for power generation. Figures given herein represent total contents. Capacity table furnished by City of Tacoma. Chemical analyses December 1973 to September 1983 (samples were taken near the dam).

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,686,300 acre-ft, July 31, 1972, elevation, 778.63 ft; minimum contents since normal low operating level was attained, 517,233 acre-ft, Mar. 9, 2001, elevation, 644.93 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,681,684 acre-ft, June 28, elevation, 778.24 ft; minimum contents, 1,143,393 acre-ft, Jan. 13, elevation, 726.42 ft.

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

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
September 30	751.44	1,386,676	--
October 31	744.61	1,317,682	-68,994
November 30	738.61	1,258,753	-58,929
December 31	736.20	1,235,502	-23,251
Calendar Year 2003	--	--	+57,939
January 31	745.52	1,326,754	+91,252
February 29	739.75	1,269,833	-56,921
March 31	734.69	1,221,052	-48,781
April 30	740.48	1,276,956	+55,904
May 31	763.48	1,513,906	+236,950
June 30	777.66	1,674,845	+160,939
July 31	772.83	1,618,606	-56,239
August 31	768.71	1,571,758	-46,848
September 30	761.81	1,495,775	-75,983
Water Year 2004	--	--	+109,099

14236200 TILTON RIVER ABOVE BEAR CANYON CREEK, NEAR CINEBAR, WA

LOCATION.--Lat 46°35'44", long 122°27'30", in NE $\frac{1}{4}$ SW $\frac{1}{4}$, sec.20, T.13 N., R.3 E., Lewis County, Hydrologic Unit 17080005, on right bank 0.9 mi upstream from Bear Canyon Creek, 3.5 mi southeast of Cinebar, and at mile 7.1.

DRAINAGE AREA.--141 mi².

PERIOD OF RECORD.--October 1956 to current year.

REVISED RECORDS.--WDR WA-72-1: 1957(M), 1959(P), 1960(P), 1961(M), 1963(P), 1964(M), 1965, 1967(P), 1971(P).

GAGE.--Water-stage recorder. Elevation of gage is 600 ft above NGVD of 1929, from topographic map.

REMARKS.--No estimated daily discharges. Records good. Several small diversions for municipal and domestic use upstream from station. No regulation. U.S. Geological Survey satellite telemeter at station. Water temperatures May 1965 to September 1982.

AVERAGE DISCHARGE.--48 years (water years 1957-2004), 822 ft³/s, 79.25 in/yr, 595,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,100 ft³/s, Feb. 8, 1996, gage height, 17.90 ft, from rating curve extended above 10,500 ft³/s on basis of slope-area measurement at gage height of 14.79 ft; minimum discharge, 47 ft³/s, Sept. 4-7, 2003.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan 29	1430	*10,800	*11.02	No other peak greater than base discharge.			

Minimum discharge, 52 ft³/s, Oct. 2, 4, 5, 6, gage height, 2.06 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	55	234	1,930	575	2,570	635	690	275	1,120	206	90	322
2	54	224	1,800	541	1,980	588	609	265	858	198	88	331
3	54	208	2,380	512	1,600	594	563	257	694	197	88	300
4	53	195	1,680	472	1,460	989	545	259	581	190	88	263
5	52	184	2,160	432	1,260	1,190	518	277	545	183	88	239
6	54	174	2,460	429	1,220	1,250	488	245	757	176	103	219
7	81	168	1,810	518	1,290	1,180	465	239	823	176	172	205
8	143	164	1,390	753	1,180	1,280	446	245	718	165	125	194
9	402	158	1,140	1,250	1,050	1,310	436	252	689	159	100	197
10	309	189	1,020	2,050	943	1,150	425	234	688	158	91	187
11	237	1,240	940	1,770	866	982	420	254	668	157	87	601
12	949	796	1,190	1,560	819	880	418	238	611	148	83	447
13	1,150	553	2,070	1,650	775	790	403	223	741	141	81	779
14	538	437	2,310	2,230	935	729	412	211	735	138	79	1,300
15	388	389	1,770	3,700	951	681	425	205	648	133	79	2,020
16	867	583	1,490	3,040	992	633	401	205	567	131	77	1,780
17	721	1,530	1,480	2,000	1,110	601	387	199	502	127	76	1,420
18	458	3,250	1,300	1,720	1,340	618	364	231	455	125	75	1,490
19	369	2,670	1,240	1,740	1,510	649	352	202	418	124	74	1,560
20	429	1,680	1,450	1,550	1,260	583	424	192	381	123	72	1,160
21	1,170	1,150	1,510	1,300	1,060	551	496	185	350	120	78	888
22	738	860	1,260	1,110	913	555	474	218	326	115	313	723
23	694	714	1,090	1,670	812	573	434	317	312	108	191	613
24	521	793	1,050	2,190	750	677	402	252	302	104	526	530
25	414	870	1,140	1,790	696	766	369	227	286	101	1,970	469
26	343	959	988	1,570	665	780	350	424	267	101	1,920	423
27	294	875	891	1,400	731	1,160	342	817	253	99	1,330	386
28	282	1,110	826	2,660	726	1,060	328	1,790	236	95	797	356
29	319	4,180	743	8,710	684	897	306	1,720	223	93	559	332
30	295	2,670	661	6,370	---	881	287	1,740	213	92	434	314
31	258	---	621	3,610	---	802	---	1,540	---	92	359	---
TOTAL	12,691	29,207	43,790	60,872	32,148	26,014	12,979	13,938	15,967	4,275	10,293	20,048
MEAN	409	974	1,413	1,964	1,109	839	433	450	532	138	332	668
MAX	1,170	4,180	2,460	8,710	2,570	1,310	690	1,790	1,120	206	1,970	2,020
MIN	52	158	621	429	665	551	287	185	213	92	72	187
AC-FT	25,170	57,930	86,860	120,700	63,770	51,600	25,740	27,650	31,670	8,480	20,420	39,770
CFSM	2.90	6.90	10.0	13.9	7.86	5.95	3.07	3.19	3.77	0.98	2.35	4.74
IN.	3.35	7.71	11.55	16.06	8.48	6.86	3.42	3.68	4.21	1.13	2.72	5.29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 2004, BY WATER YEAR (WY)

MEAN	396	1,238	1,565	1,562	1,391	1,135	1,026	695	413	191	121	172
MAX	1,240	3,014	3,418	2,869	3,039	2,940	1,724	1,283	1,082	620	332	668
(WY)	(1960)	(1996)	(1976)	(1971)	(1982)	(1972)	(2002)	(1974)	(1981)	(1983)	(2004)	(2004)
MIN	52.0	185	401	415	377	374	433	304	134	93.4	62.2	60.5
(WY)	(1988)	(1994)	(1977)	(1977)	(1977)	(1992)	(2004)	(1980)	(1992)	(1970)	(2003)	(1967)

COWLITZ RIVER BASIN

14236200 TILTON RIVER ABOVE BEAR CANYON CREEK, NEAR CINEBAR, WA—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1957 - 2004	
ANNUAL TOTAL	283,673		282,222			
ANNUAL MEAN	777		771		822	
HIGHEST ANNUAL MEAN					1,228	1972
LOWEST ANNUAL MEAN					464	2001
HIGHEST DAILY MEAN	11,500	Jan 31	8,710	Jan 29	21,000	Feb 8, 1996
LOWEST DAILY MEAN	47	Sep 5	52	Oct 5	47	Sep 5, 2003
ANNUAL SEVEN-DAY MINIMUM	49	Aug 31	58	Oct 1	49	Aug 31, 2003
ANNUAL RUNOFF (AC-FT)	562,700		559,800		595,800	
ANNUAL RUNOFF (CFSM)	5.51		5.47		5.83	
ANNUAL RUNOFF (INCHES)	74.84		74.46		79.25	
10 PERCENT EXCEEDS	1,770		1,690		1,770	
50 PERCENT EXCEEDS	519		543		534	
90 PERCENT EXCEEDS	64		118		93	

14237800 MAYFIELD RESERVOIR NEAR SILVER CREEK, WA

LOCATION.--Lat 46°30'13", long 122°35'11", in SE $\frac{1}{4}$ SW $\frac{1}{4}$, sec.20, T.12 N., R.2 E., Lewis County, Hydrologic Unit 17080005, on right bank at Mayfield Dam on Cowlitz River, 0.3 mi downstream from Silver Creek, 4 mi south of town of Silver Creek, and at mile 52.0.

DRAINAGE AREA.--1,392 mi².

PERIOD OF RECORD.--April 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is NGVD of 1929. Prior to Mar. 5, 1963, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by concrete arch dam, completed April 1962; storage began Apr. 14, 1962. Usable capacity, 21,380 acre-ft between elevation 415 ft, lower limit of operation, and 425 ft, top of taintor gates. Dead storage below elevation 415 ft, 112,340 acre-ft. Crest of spillway is at elevation 385 ft. Water is used by City of Tacoma for power generation. Figures given herein represent total contents. Capacity table furnished by City of Tacoma. Chemical analyses December 1973 to September 1983 (samples were taken near the dam).

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 134,850 acre-ft, Dec. 9, 1971, elevation, 425.50 ft; minimum contents since normal operating level was attained, 112,830 acre-ft, June 4, 1969, elevation, 415.24 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 133,165 acre-ft, June 29, elevation, 424.75 ft; minimum contents, 114,180 acre-ft, Sept. 21, elevation, 415.90 ft.

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

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
September 30	422.89	129,028	--
October 31	423.69	130,788	+1,760
November 30	422.19	127,488	-3,300
December 31	422.92	129,092	+1,604
Calender Year 2003	--	--	-526
January 31	421.70	126,420	-2,672
February 29	419.16	120,972	-5,448
March 31	422.40	127,950	+6,978
April 30	423.81	131,062	+3,112
May 31	422.43	128,016	-3,046
June 30	424.56	132,732	+4,716
July 31	423.33	129,996	-2,736
August 31	423.38	130,106	+110
September 30	423.49	130,348	+242
Water Year 2004	--	--	+1,320

14238000 COWLITZ RIVER BELOW MAYFIELD DAM, WA

LOCATION.--Lat 46°30'38", long 122°36'54", in SE $\frac{1}{4}$ NE $\frac{1}{4}$, sec.24, T.12 N., R.1 E., Lewis County, Hydrologic Unit 17080005, on right bank 1.1 mi upstream from fish barrier dam, 1.4 mi downstream from Mayfield Dam, 1.5 mi upstream from Mill Creek, 2.1 mi downstream from Winston Creek, and at mile 50.6.

DRAINAGE AREA.--1,400 mi².

PERIOD OF RECORD.--August to October 1910, December 1910 to September 1911, October to November 1911 (monthly discharge only), April 1934 to current year. Published as "at Mayfield" water years 1910-11 and "near Mayfield" water years 1934-61.

REVISED RECORDS.--WSP 1318: 1949(M). WSP 1348: Drainage area. WSP 1718: 1943, 1947.

GAGE.--Water-stage recorder. Datum of gage is 226.6 ft above NGVD of 1929. August 1910 to November 1911 nonrecording gage at site 2.5 mi upstream at different datum. Apr. 27 to July 2, 1934, nonrecording gage at present site and datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by Riffe Lake (station 14234800) at mile 65.5 and Mayfield Reservoir (station 14237800) at mile 52.0. Minor diversions for domestic and farm use upstream from station. U.S. Geological Survey satellite telemeter at station. Sediment records October 1978 to September 1980. Water temperatures October 1950 to September 1980.

AVERAGE DISCHARGE.--70 years (water years 1935-2004), 6,238 ft³/s, 60.51 in/yr, 4,519,400 acre-ft/yr, adjusted for storage in Mayfield Reservoir since April 1962, and Riffe Lake since April 1968.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 68,400 ft³/s, Nov. 28, 1995; gage height, 26.19 ft; minimum discharge, 37 ft³/s, Apr. 16, 1962, gage height, 6.42 ft; minimum daily discharge, 451 ft³/s, Apr. 16, 1962.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in December 1933 is known to have exceeded that of Nov. 28, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,900 ft³/s, Jan. 5, gage height, 15.17 ft; minimum discharge, 2,750 ft³/s, Aug. 4-7.

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	3,540	4,700	7,990	5,010	13,500	5,930	5,070	4,090	3,510	5,020	3,060	4,660
2	3,540	4,340	8,440	5,010	13,400	6,380	5,040	4,110	3,970	4,400	3,070	4,650
3	3,540	3,580	9,500	5,020	13,500	6,320	5,060	4,120	3,590	3,180	2,980	4,640
4	3,540	4,280	9,960	6,280	13,100	6,290	5,110	4,700	3,530	2,990	2,840	4,390
5	3,540	4,700	10,000	11,500	13,000	6,350	5,110	4,220	3,530	2,980	2,760	3,830
6	3,540	4,690	10,000	13,400	11,300	5,610	5,850	4,140	3,540	3,220	2,770	3,620
7	3,540	4,800	10,000	13,000	7,530	5,520	5,180	4,090	3,540	3,510	2,760	5,200
8	3,540	3,850	10,000	10,900	7,510	7,540	5,080	3,550	3,960	3,520	2,770	6,070
9	3,540	3,540	9,960	9,940	7,990	8,330	5,080	3,510	3,590	3,510	3,060	6,070
10	3,540	3,540	9,970	7,000	8,200	6,530	5,090	3,500	3,530	3,130	4,410	5,540
11	3,540	4,100	9,950	6,930	7,540	6,400	5,090	4,040	3,530	3,000	5,000	4,890
12	3,540	4,690	8,910	6,690	7,500	5,510	5,920	3,600	3,530	3,000	4,990	4,900
13	3,540	4,680	7,580	6,400	7,060	5,050	5,180	3,530	3,530	3,170	4,460	5,810
14	3,540	4,690	8,890	6,020	5,060	6,360	5,080	3,530	3,530	3,510	3,240	6,530
15	3,550	4,010	10,600	5,610	5,060	7,900	5,040	3,530	4,650	3,920	3,140	6,520
16	4,100	3,570	10,900	5,570	6,850	8,400	5,060	3,530	5,580	3,640	3,140	5,790
17	4,230	4,910	9,430	5,090	8,230	9,070	5,090	3,530	5,570	3,080	3,140	4,920
18	3,530	7,630	8,720	5,040	7,150	9,220	5,140	3,960	4,950	2,990	3,320	4,930
19	3,540	9,170	5,900	5,040	6,140	6,480	5,140	3,580	3,660	3,690	3,630	4,950
20	3,550	9,080	5,250	5,040	5,080	6,420	5,910	3,510	3,530	4,570	3,620	5,260
21	4,500	9,020	5,290	5,030	5,050	6,390	5,180	3,510	3,980	4,590	3,630	5,280
22	4,780	9,000	5,320	5,030	5,060	7,330	5,070	3,520	3,710	4,580	3,670	4,840
23	4,800	9,030	5,290	5,030	5,070	7,810	5,100	3,520	3,570	4,250	3,530	4,150
24	4,670	9,700	5,270	5,580	6,640	8,500	4,220	3,510	3,570	3,550	3,150	3,560
25	3,620	10,000	5,270	6,240	7,220	7,740	4,120	3,950	3,580	3,540	3,410	3,590
26	3,540	8,700	5,210	7,830	7,190	6,320	4,110	3,600	3,580	3,550	3,640	3,570
27	3,540	6,340	5,020	11,000	7,020	5,080	4,740	3,550	3,570	3,560	3,640	4,260
28	3,540	6,350	5,040	13,000	5,130	5,060	4,170	3,550	4,020	4,030	3,610	4,670
29	3,540	6,850	5,020	13,700	5,040	5,620	4,060	3,550	5,010	4,560	3,610	4,790
30	3,540	7,550	5,480	13,300	---	6,150	4,070	3,540	5,020	3,900	3,630	4,820
31	4,260	---	5,610	13,100	---	5,160	---	3,540	---	3,070	3,990	---
TOTAL	116,390	181,090	239,770	243,330	228,120	206,770	149,160	115,710	117,960	113,210	107,670	146,700
MEAN	3,755	6,036	7,735	7,849	7,866	6,670	4,972	3,733	3,932	3,652	3,473	4,890
MAX	4,800	10,000	10,900	13,700	13,500	9,220	5,920	4,700	5,580	5,020	5,000	6,530
MIN	3,530	3,540	5,020	5,010	5,040	5,050	4,060	3,500	3,510	2,980	2,760	3,560
AC-FT	230,900	359,200	475,600	482,600	452,500	410,100	295,900	229,500	234,000	224,600	213,600	291,000
MEAN†	2,662	4,993	7,382	9,288	6,780	5,989	5,966	7,535	6,719	2,693	2,714	3,619
CFSM†	1.90	3.57	5.27	6.63	4.84	4.28	4.26	5.38	4.80	1.92	1.94	2.58
IN.†	2.19	3.98	6.08	7.65	5.22	4.93	4.75	6.21	5.35	2.22	2.24	2.88
AC-FT†	163,700	297,000	454,000	571,200	390,100	368,300	354,900	463,400	399,700	165,600	166,900	215,300

CAL YR 2003 TOTAL 2,106,820 MEAN 5,772 MAX 19,500 MIN 2,590 AC-FT 4,179,000 MEAN† 5,850 CFSM† 4.18 IN.† 56.73 AC-FT† 4,236,000

WTR YR 2004 TOTAL 1,965,880 MEAN 5,371 MAX 13,700 MIN 2,760 AC-FT 3,899,000 MEAN† 5,524 CFSM† 3.95 IN.† 53.69 AC-FT† 4,009,000

† Adjusted for change in contents in Riffe Lake and Mayfield Reservoir.

14240304 SPIRIT LAKE AT TUNNEL, AT SPIRIT LAKE, WA

LOCATION.--Lat 46°16'35", long 122°09'41", in NE $\frac{1}{4}$ NE $\frac{1}{4}$, sec.10, T.9N., R.5 E., Skamania County, Hydrologic Unit 17080005, Mount St. Helens National Volcanic Monument, at entrance of Spirit Lake Outlet Tunnel, 5.6 mi north-northeast of the Mount St. Helens volcanic edifice.

DRAINAGE AREA.--18.0 mi², at entrance to Spirit Lake Outlet Tunnel. Prior to the volcanic eruption on May 18, 1980, 14.9 mi².

PERIOD OF RECORD.--October 1987 to current year. Records of contents published in WDR-WA-94-1 are unreliable and should not be used.

GAGE.--Water-stage recorder. Datum of gage is 3,400 ft above NGVD of 1929.

REMARKS.--As a result of the May 18, 1980, eruption, a gravitational landslide ensued, transporting an estimated 0.6 mi³ of debris into the upper North Toutle River drainage basin. A massive debris avalanche completely filled the lake, blocking the natural outlet to the North Fork Toutle River with a deposit several hundred feet thick. This filling caused the lake to rise 200 ft to elevation 3,400 ft. Refer to report by Schuster, R.L., ed., 1986, Landslide Dams: Processes, Risk and Mitigation: Geotechnical Special Publication no. 3, American Society of Civil Engineers, 164 p., for history of Spirit Lake as it was impacted by the eruption and actions taken to reduce the resulting flood threat. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum recorded elevation, 3,460.13 ft, Feb. 5, 1997; minimum recorded elevation, 3,437.00 ft, Oct. 28, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum recorded elevation, 3,444.03 ft, June 8, 9; minimum recorded elevation, 3,438.81 ft, Oct. 1.

ELEVATION ABOVE NGVD 1929, 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	3,438.84	3,440.45	3,442.23	3,441.95	3,442.65	3,441.88	3,442.04	3,442.76	3,443.94	3,442.82	3,440.58	3,440.00
2	3,438.86	3,440.50	3,442.31	3,441.89	3,442.69	3,441.82	3,442.02	3,442.85	3,443.91	3,442.75	3,440.51	3,439.99
3	3,438.88	3,440.51	3,442.30	3,441.84	3,442.68	3,441.82	3,442.02	3,442.92	3,443.90	3,442.66	3,440.44	3,439.96
4	3,438.90	3,440.53	3,442.35	3,441.78	3,442.65	3,441.81	3,442.03	3,443.02	3,443.88	3,442.60	3,440.38	3,439.92
5	3,438.92	3,440.55	3,442.60	3,441.70	3,442.58	3,441.82	3,442.05	3,443.07	3,443.92	3,442.52	3,440.32	3,439.88
6	3,438.96	3,440.57	3,442.66	3,441.75	3,442.64	3,441.83	3,442.05	3,443.08	3,444.01	3,442.46	3,440.34	3,439.85
7	3,439.00	3,440.59	3,442.67	3,441.74	3,442.63	3,441.75	3,442.07	3,443.10	3,444.00	3,442.38	3,440.30	3,439.82
8	3,439.07	3,440.62	3,442.65	3,441.80	3,442.57	3,441.74	3,442.09	3,443.13	3,444.01	3,442.30	3,440.24	3,439.79
9	3,439.11	3,440.64	3,442.61	3,441.76	3,442.51	3,441.76	3,442.12	3,443.14	3,444.00	3,442.23	3,440.18	3,439.76
10	3,439.15	3,440.86	3,442.60	3,441.73	3,442.44	3,441.75	3,442.15	3,443.17	3,443.99	3,442.15	3,440.13	3,439.72
11	3,439.21	3,441.05	3,442.52	3,441.67	3,442.38	3,441.73	3,442.21	3,443.17	3,443.96	3,442.08	3,440.08	3,439.78
12	3,439.38	3,441.10	3,442.56	3,441.61	3,442.31	3,441.70	3,442.28	3,443.16	3,443.93	3,442.00	3,440.03	3,439.74
13	3,439.43	3,441.14	3,442.67	3,441.58	3,442.28	3,441.68	3,442.34	3,443.14	3,443.90	3,441.93	3,439.98	3,439.82
14	3,439.44	3,441.19	3,442.71	3,441.61	3,442.28	3,441.66	3,442.48	3,443.12	3,443.87	3,441.86	3,439.93	3,439.89
15	3,439.53	3,441.27	3,442.66	3,441.68	3,442.22	3,441.64	3,442.50	3,443.12	3,443.82	3,441.79	3,439.88	3,439.91
16	3,439.64	3,441.49	3,442.64	3,441.67	3,442.27	3,441.62	3,442.50	3,443.12	3,443.76	3,441.71	3,439.83	3,439.92
17	3,439.69	3,441.57	3,442.57	3,441.66	3,442.29	3,441.60	3,442.50	3,443.11	3,443.71	3,441.64	3,439.78	3,440.00
18	3,439.68	3,441.63	3,442.52	3,441.68	3,442.30	3,441.65	3,442.49	3,443.10	3,443.67	3,441.58	3,439.73	3,440.11
19	3,439.73	3,442.01	3,442.44	3,441.66	3,442.25	3,441.64	3,442.56	3,443.09	3,443.61	3,441.51	3,439.69	3,440.13
20	3,439.85	3,442.12	3,442.42	3,441.62	3,442.20	3,441.60	3,442.59	3,443.08	3,443.55	3,441.43	3,439.64	3,440.12
21	3,439.90	3,442.18	3,442.37	3,441.57	3,442.13	3,441.58	3,442.58	3,443.08	3,443.50	3,441.36	3,439.69	3,440.11
22	3,439.99	3,442.18	3,442.31	3,441.57	3,442.08	3,441.62	3,442.55	3,443.21	3,443.45	3,441.29	3,439.76	3,440.10
23	3,440.02	3,442.16	3,442.25	3,441.64	3,442.01	3,441.61	3,442.56	3,443.22	3,443.39	3,441.22	3,439.75	3,440.08
24	3,440.05	3,442.12	3,442.31	3,441.73	3,442.02	3,441.74	3,442.53	3,443.20	3,443.33	3,441.15	3,439.85	3,440.06
25	3,440.08	3,442.17	3,442.28	3,441.71	3,442.06	3,441.96	3,442.52	3,443.19	3,443.26	3,441.07	3,440.00	3,440.04
26	3,440.12	3,442.15	3,442.20	3,441.69	3,442.08	3,442.03	3,442.55	3,443.45	3,443.18	3,441.00	3,440.15	3,440.02
27	3,440.14	3,442.10	3,442.19	3,441.66	3,442.05	3,442.04	3,442.62	3,443.64	3,443.12	3,440.93	3,440.15	3,439.99
28	3,440.31	3,442.12	3,442.15	3,441.82	3,442.00	3,442.02	3,442.65	3,443.84	3,443.05	3,440.86	3,440.12	3,439.96
29	3,440.39	3,442.26	3,442.10	3,442.11	3,441.95	3,442.04	3,442.68	3,443.90	3,442.98	3,440.79	3,440.10	3,439.93
30	3,440.42	3,442.23	3,442.03	3,442.52	---	3,442.07	3,442.72	3,443.95	3,442.90	3,440.72	3,440.07	3,439.94
31	3,440.43	---	3,441.98	3,442.61	---	3,442.06	---	3,443.96	---	3,440.65	3,440.04	---
MEAN	3,439.58	3,441.40	3,442.41	3,441.77	3,442.32	3,441.78	3,442.37	3,443.23	3,443.65	3,441.72	3,440.05	3,439.95
MAX	3,440.43	3,442.26	3,442.71	3,442.61	3,442.69	3,442.07	3,442.72	3,443.96	3,444.01	3,442.82	3,440.58	3,440.13
MIN	3,438.84	3,440.45	3,441.98	3,441.57	3,441.95	3,441.58	3,442.02	3,442.76	3,442.90	3,440.65	3,439.64	3,439.72
CAL YR	2003	MEAN	3,441.24	MAX	3,444.83	MIN	3,438.41					
WTR YR	2004	MEAN	3,441.68	MAX	3,444.01	MIN	3,438.84					

14240446 CASTLE LAKE NEAR MOUNT ST. HELENS, WA

LOCATION.--Lat 46°15'31", long 122°16'27", in SE $\frac{1}{4}$ SW $\frac{1}{4}$, sec.14, T.9N., R.4E., Skamania County, Hydrologic Unit 17080005, Mount St. Helens National Volcanic Monument, on right bank at outflow of Castle Lake, 5.0 mi north by northwest of the northwest edifice of Mount St. Helens (at Toutle Glacier).

DRAINAGE AREA.--1.3 mi², at spillway entrance. Prior to the volcanic eruption drainage area is unknown.

PERIOD OF RECORD.--October 1993 to current year (records of contents for water year 1994 published in WDR-WA-94-1 are unreliable and should not be used).

GAGE.--Water-stage recorder with radio telemetry. Datum of gage is 2,498.95 ft above NGVD of 1929, (U.S. Army Corps of Engineers benchmarks).

REMARKS.--As a result of the collapse of the north face of Mount St. Helens on May 18, 1980, a debris avalanche blocked the flow of South Fork Castle Creek forming Castle Lake. Castle Lake would have overtopped the blockage in late 1981 or early 1982. Overtopping most probably would have resulted in a quick release of lake waters as a result of rapid erosion of the blockage. Serious flooding probably would have resulted from the breakout of Castle Lake. As a result, the level of Castle Lake was stabilized with the construction of a spillway in 1981. Refer to report by Schuster, R.L., ed., 1986, Landslide Dams: Processes, Risk and Mitigation: Geotechnical Special Publication no. 3, American Society of Civil Engineers, 164 p., for history of Castle Lake as it was formed and impacted by the eruption and actions taken to reduce the resulting flood threat.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 2,582.76 ft, Feb. 8, 1996; minimum elevation, 2,578.14 ft, Sept. 5-7, 2003.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 2,580.29 ft, Jan. 30; minimum elevation, 2,578.31, Oct. 8.

REVISIONS.--Revised figures of elevation for the water year 2003, superseding those published in the report for 2003 are given below.

EXTREMES FOR WATER YEAR 2003.--Maximum elevation, 2,580.44 ft, Mar. 13, 14; minimum elevation, 2,578.14, Sept. 5-7.

ELEVATION ABOVE NGVD 1929, FEET
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY OBSERVATION AT 2400 HOURS

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2,578.38	2,578.33	2,578.63	2,579.19	2,580.15	2,578.84	2,579.18	2,578.98	2,578.66	2,578.50	2,578.33	2,578.15
2	2,578.38	2,578.32	2,578.62	2,579.53	2,579.85	2,578.84	2,579.16	2,578.98	2,578.64	2,578.49	2,578.31	2,578.16
3	2,578.47	2,578.31	2,578.59	2,579.73	2,579.60	2,578.80	2,579.13	2,578.98	2,578.65	2,578.48	2,578.32	2,578.15
4	2,578.48	2,578.32	2,578.61	2,580.01	2,579.41	2,578.78	2,579.07	2,579.05	2,578.63	2,578.46	2,578.31	2,578.16
5	2,578.47	2,578.31	2,578.61	2,579.88	2,579.25	2,578.98	2,579.05	2,579.03	2,578.60	2,578.46	2,578.32	2,578.15
6	2,578.46	2,578.32	2,578.60	2,579.68	2,579.15	2,578.98	2,579.01	2,578.99	2,578.61	2,578.46	2,578.31	2,578.15
7	2,578.45	2,578.43	2,578.59	2,579.45	2,579.05	2,578.96	2,579.06	2,578.96	2,578.58	2,578.45	2,578.30	2,578.20
8	2,578.44	2,578.58	2,578.57	2,579.28	2,578.98	2,578.94	2,579.12	2,578.93	2,578.57	2,578.45	---	2,578.22
9	2,578.44	2,578.72	2,578.61	2,579.14	2,578.93	2,579.08	2,579.19	2,578.91	2,578.55	2,578.45	---	2,578.24
10	2,578.43	2,578.76	2,578.84	2,579.06	2,578.88	2,579.15	2,579.22	2,578.88	2,578.55	2,578.44	---	2,578.27
11	2,578.42	2,578.73	2,578.92	2,579.05	2,578.84	2,579.29	2,579.22	2,578.87	2,578.53	2,578.45	---	2,578.32
12	2,578.37	2,578.81	2,579.21	2,579.08	2,578.82	2,579.86	2,579.26	2,578.85	2,578.54	2,578.44	---	2,578.31
13	2,578.40	2,578.86	2,579.29	2,579.10	2,578.80	2,580.38	2,579.28	2,578.84	2,578.56	2,578.43	---	2,578.31
14	2,578.40	2,578.82	2,579.85	2,579.07	2,578.79	2,580.36	2,579.25	2,578.82	2,578.55	2,578.43	---	2,578.30
15	2,578.39	2,578.81	2,580.22	2,579.06	2,578.83	2,580.12	2,579.20	2,578.87	2,578.53	2,578.42	---	2,578.29
16	2,578.39	2,578.86	2,580.19	2,579.02	2,578.88	2,579.89	2,579.15	2,578.87	2,578.54	2,578.41	---	2,578.38
17	2,578.38	2,578.89	2,579.91	2,578.96	2,578.93	2,579.65	2,579.13	2,578.87	2,578.52	2,578.39	---	2,578.37
18	2,578.38	2,578.91	2,579.62	2,578.94	2,578.89	2,579.47	2,579.09	2,578.85	2,578.52	2,578.41	---	2,578.37
19	2,578.38	2,578.88	2,579.40	2,578.91	2,578.91	2,579.32	2,579.03	2,578.82	2,578.53	2,578.38	---	2,578.38
20	2,578.38	2,578.86	2,579.28	2,578.88	2,578.96	2,579.41	2,578.98	2,578.81	2,578.57	2,578.41	---	2,578.38
21	2,578.39	2,578.84	2,579.15	2,578.85	2,579.14	2,579.45	2,579.03	2,578.78	2,578.64	2,578.39	2,578.22	2,578.37
22	2,578.39	2,578.81	2,579.05	2,579.00	2,579.14	2,579.88	2,579.02	2,578.78	2,578.64	2,578.41	2,578.22	2,578.36
23	2,578.39	2,578.78	2,579.00	2,579.11	2,579.09	2,579.80	2,579.08	2,578.78	2,578.63	2,578.38	2,578.21	2,578.36
24	2,578.37	2,578.74	2,578.92	2,579.17	2,579.03	2,579.62	2,579.08	2,578.78	2,578.60	2,578.38	2,578.19	2,578.36
25	2,578.37	2,578.73	2,578.95	2,579.21	2,578.99	2,579.47	2,579.03	2,578.77	2,578.59	2,578.36	2,578.19	2,578.36
26	2,578.37	2,578.72	2,578.92	2,579.57	2,578.94	2,579.42	2,579.03	2,578.76	2,578.57	2,578.37	2,578.18	2,578.37
27	2,578.37	2,578.70	2,579.08	2,579.58	2,578.90	2,579.29	2,578.98	2,578.74	2,578.55	2,578.34	2,578.19	2,578.36
28	2,578.38	2,578.68	2,579.09	2,579.46	2,578.87	2,579.20	2,578.95	2,578.72	2,578.56	2,578.34	2,578.18	2,578.35
29	2,578.38	2,578.68	2,579.09	2,579.45	---	2,579.13	2,578.98	2,578.71	2,578.54	2,578.35	2,578.18	2,578.36
30	2,578.33	2,578.66	2,579.13	2,579.60	---	2,579.11	2,579.00	2,578.70	2,578.51	2,578.35	2,578.17	2,578.34
31	2,578.35	---	2,579.09	2,580.34	---	2,579.14	---	2,578.69	---	2,578.34	2,578.17	---
MEAN	2,578.40	2,578.67	2,579.09	2,579.30	2,579.07	2,579.38	2,579.10	2,578.85	2,578.57	2,578.41	---	2,578.30
MAX	2,578.48	2,578.91	2,580.22	2,580.34	2,580.15	2,580.38	2,579.28	2,579.05	2,578.66	2,578.50	---	2,578.38
MIN	2,578.33	2,578.31	2,578.57	2,578.85	2,578.79	2,578.78	2,578.95	2,578.69	2,578.51	2,578.34	---	2,578.15
CAL YR	2002	MEAN	2,578.82	MAX	2,581.73	MIN	2,578.28					

14240446 CASTLE LAKE NEAR MOUNT ST. HELENS, WA—Continued

ELEVATION ABOVE NGVD 1929, 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	2,578.34	2,578.72	2,579.30	2,578.86	2,579.67	2,578.99	2,579.05	2,578.89	2,579.19	2,578.57	2,578.35	2,578.78
2	2,578.34	2,578.72	2,579.50	2,578.82	2,579.43	2,578.95	2,579.01	2,578.89	2,579.10	2,578.55	2,578.34	2,578.74
3	2,578.34	2,578.69	2,579.60	2,578.81	2,579.29	2,578.96	2,578.97	2,578.90	2,579.04	2,578.55	2,578.34	2,578.72
4	2,578.33	2,578.65	2,579.61	2,578.72	2,579.17	2,579.00	2,578.94	2,578.93	2,578.97	2,578.54	2,578.33	2,578.70
5	2,578.33	2,578.65	2,579.90	2,578.76	2,579.05	2,579.04	2,578.93	2,578.91	2,578.99	2,578.51	2,578.33	2,578.67
6	2,578.34	2,578.63	2,580.00	2,578.77	2,579.10	2,579.02	2,578.91	2,578.87	2,579.09	2,578.53	2,578.43	2,578.65
7	2,578.38	2,578.63	2,579.80	2,578.83	2,579.05	2,578.97	2,578.91	2,578.86	2,579.04	2,578.52	2,578.43	2,578.67
8	2,578.44	2,578.63	2,579.57	2,578.95	2,578.99	2,578.98	2,578.90	2,578.88	2,579.10	2,578.51	2,578.43	2,578.65
9	2,578.46	2,578.62	2,579.34	2,579.02	2,578.93	2,579.00	2,578.89	2,578.85	2,579.06	2,578.49	2,578.42	2,578.68
10	2,578.46	2,578.78	2,579.28	2,579.11	2,578.88	2,579.00	2,578.90	2,578.88	2,579.03	2,578.50	2,578.41	2,578.66
11	2,578.48	2,578.93	2,579.16	2,579.10	2,578.83	2,579.00	2,578.90	2,578.87	2,579.01	2,578.48	2,578.41	2,578.75
12	2,578.59	2,578.94	2,579.15	2,579.09	2,578.82	2,578.97	2,578.91	2,578.84	2,578.97	2,578.47	2,578.40	2,578.72
13	2,578.60	2,578.93	2,579.26	2,579.11	2,578.82	2,578.94	2,578.94	2,578.81	2,578.97	2,578.48	2,578.40	2,578.84
14	2,578.60	2,578.89	2,579.27	2,579.21	2,578.87	2,578.92	2,579.04	2,578.78	2,578.94	2,578.49	2,578.39	2,578.88
15	2,578.65	2,578.93	2,579.17	2,579.36	2,578.88	2,578.89	2,579.00	2,578.77	2,578.90	2,578.49	2,578.39	2,578.90
16	2,578.65	2,579.19	2,579.13	2,579.39	2,579.01	2,578.88	2,578.98	2,578.77	2,578.87	2,578.47	2,578.39	2,578.91
17	2,578.67	2,579.27	2,579.04	2,579.31	2,579.07	2,578.86	2,578.94	2,578.76	2,578.84	2,578.46	2,578.37	2,578.99
18	2,578.68	2,579.55	2,578.97	2,579.30	2,579.21	2,578.92	2,578.92	2,578.74	2,578.81	2,578.46	2,578.38	2,579.19
19	2,578.68	2,580.03	2,578.97	2,579.24	2,579.22	2,578.92	2,578.91	2,578.73	2,578.79	2,578.45	2,578.36	2,579.23
20	2,578.81	2,579.84	2,579.02	2,579.16	2,579.16	2,578.89	2,579.00	2,578.72	2,578.76	2,578.46	2,578.36	2,579.22
21	2,578.83	2,579.59	2,579.01	2,579.09	2,579.11	2,578.88	2,578.98	2,578.71	2,578.73	2,578.44	2,578.47	2,579.15
22	2,578.86	2,579.37	2,579.01	2,579.09	2,579.04	2,578.88	2,578.96	2,578.84	2,578.71	2,578.44	2,578.53	2,579.09
23	2,578.87	2,579.27	2,579.04	2,579.22	2,578.99	2,578.89	2,578.95	2,578.83	2,578.69	2,578.42	2,578.59	2,579.01
24	2,578.85	2,579.15	2,579.10	2,579.26	2,579.03	2,578.98	2,578.93	2,578.82	2,578.68	2,578.41	2,578.73	2,578.97
25	2,578.82	2,579.14	2,579.09	2,579.23	2,579.02	2,579.08	2,578.90	2,578.81	2,578.65	2,578.40	2,578.88	2,578.93
26	2,578.78	2,579.06	2,579.03	2,579.18	2,579.09	2,579.16	2,578.91	2,578.91	2,578.63	2,578.39	2,579.03	2,578.88
27	2,578.77	2,578.95	2,579.05	2,579.12	2,579.11	2,579.19	2,578.95	2,579.12	2,578.63	2,578.39	2,579.01	2,578.85
28	2,578.81	2,579.04	2,579.03	2,579.42	2,579.08	2,579.15	2,578.92	2,579.28	2,578.60	2,578.39	2,578.95	2,578.81
29	2,578.80	2,579.31	2,578.92	2,579.91	2,579.04	2,579.07	2,578.91	2,579.31	2,578.59	2,578.37	2,578.90	2,578.80
30	2,578.75	2,579.31	2,578.92	2,580.20	---	2,579.12	2,578.90	2,579.34	2,578.58	2,578.36	2,578.86	2,578.77
31	2,578.73	---	2,578.86	2,579.95	---	2,579.09	---	2,579.27	---	2,578.36	2,578.81	---
MEAN	2,578.61	2,579.05	2,579.23	2,579.18	2,579.07	2,578.99	2,578.94	2,578.90	2,578.86	2,578.46	2,578.53	2,578.86
MAX	2,578.87	2,580.03	2,580.00	2,580.20	2,579.67	2,579.19	2,579.05	2,579.34	2,579.19	2,578.57	2,579.03	2,579.23
MIN	2,578.33	2,578.62	2,578.86	2,578.72	2,578.82	2,578.86	2,578.89	2,578.71	2,578.58	2,578.36	2,578.33	2,578.65
WTR YR	2004	MEAN	2,578.89	MAX	2,580.20	MIN	2,578.33					

14241500 SOUTH FORK TOUTLE RIVER AT TOUTLE, WA

LOCATION.--Lat 46°19'20", long 122°41'45", in SE ¼ NW ¼ sec.29, T.10 N., R.1 E., Cowlitz County, Hydrologic Unit 17080005, on right bank at upstream side of bridge on South Toutle Road, 3.1 mi downstream from Johnson Creek, 0.8 mi upstream from Studebaker Creek, approximately 1.0 mi upstream from mouth, and 1.3 mi southeast of Toutle.

DRAINAGE AREA.--120 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1939 to December 1957, February 1996 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 460 ft above NGVD of 1929, from topographic map. Prior to Feb. 9, 1996, water-stage recorder at site 0.6 mi upstream, at datum at NGVD of 1929 (river-profile survey).

REMARKS.--No estimated daily discharges. Records good. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--26 years (water years 1940-57, 1997-2004), 629 ft³/s, 71.16 in/yr, 455,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, not determined Feb. 8, 1996, gage height, 28.81 ft, from high-water mark; maximum daily discharge, 17,400 ft³/s Feb. 8, 1996; minimum discharge, 61 ft³/s Sept. 3-6, 2003.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 9, 1990, produced discharge of 19,200 ft³/s as recorded at station 14241490, 2.2 mi upstream. A flood believed to be in excess of 100,000 ft³/s (from Ph.d. thesis by Fairchild, U. Wash., 1985) occurred at about 1000 hours on May 18, 1980, from a mudflow caused by the eruption of Mount St. Helens.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan 30	0445	*6,240	*26.13	No other peak greater than base discharge.			

Minimum discharge, 63 ft³/s, Oct. 2, 4, 5, 6, gage height, 20.81 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	65	147	1,010	491	1,820	736	576	326	686	175	102	212
2	64	143	1,060	455	1,420	637	510	331	579	170	100	208
3	65	134	1,740	430	1,140	601	476	325	502	171	101	197
4	64	127	1,160	402	1,040	647	470	332	440	165	102	179
5	64	120	1,700	366	890	722	454	346	442	159	104	169
6	67	115	2,440	375	919	761	426	290	700	156	122	159
7	85	113	1,540	576	1,000	714	407	278	930	167	184	152
8	88	111	1,090	902	906	703	396	314	719	155	121	146
9	114	107	876	1,190	804	754	388	341	804	149	108	148
10	100	109	797	1,340	718	736	381	290	748	147	102	142
11	101	396	725	1,170	651	657	394	399	695	144	99	303
12	209	283	961	1,050	592	598	411	376	645	139	98	197
13	236	229	1,290	1,020	547	550	390	316	641	135	96	315
14	151	197	1,520	1,170	584	516	498	283	577	133	95	411
15	135	193	1,210	1,610	637	488	495	268	515	131	95	437
16	234	430	1,030	1,420	733	461	463	264	462	127	94	409
17	216	758	951	1,130	862	447	424	246	413	124	93	512
18	160	1,360	857	1,050	1,260	499	385	243	370	124	91	918
19	156	2,170	804	1,020	1,230	510	387	228	349	122	90	1,200
20	196	1,270	824	923	1,000	453	528	217	317	122	89	797
21	321	819	865	803	841	425	647	207	286	120	115	591
22	239	597	774	706	718	434	562	275	269	116	403	479
23	280	501	704	897	637	455	512	378	261	113	207	403
24	208	511	799	1,270	668	559	474	312	253	111	332	345
25	176	603	913	1,120	657	652	427	272	239	108	736	305
26	155	684	773	1,000	711	864	404	449	219	107	1,100	275
27	138	545	745	900	1,040	1,010	423	806	205	108	792	253
28	146	564	735	1,250	980	844	403	1,380	196	107	495	232
29	215	1,480	647	4,060	841	736	360	1,110	187	105	362	219
30	188	1,150	558	4,760	---	740	332	958	180	105	284	207
31	161	---	525	2,660	---	669	---	825	---	104	237	---
TOTAL	4,797	15,966	31,623	37,516	25,846	19,578	13,403	12,985	13,829	4,119	7,149	10,520
MEAN	155	532	1,020	1,210	891	632	447	419	461	133	231	351
MAX	321	2,170	2,440	4,760	1,820	1,010	647	1,380	930	175	1,100	1,200
MIN	64	107	525	366	547	425	332	207	180	104	89	142
AC-FT	9,510	31,670	62,720	74,410	51,270	38,830	26,580	25,760	27,430	8,170	14,180	20,870
CFSM	1.29	4.43	8.50	10.1	7.43	5.26	3.72	3.49	3.84	1.11	1.92	2.92
IN.	1.49	4.95	9.80	11.63	8.01	6.07	4.15	4.03	4.29	1.28	2.22	3.26

14241500 SOUTH FORK TOUTLE RIVER AT TOUTLE, WA—Continued

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

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 2004, BY WATER YEAR (WY)												
MEAN	363	874	1,175	1,047	1,082	843	746	640	408	191	120	141
MAX	1,222	1,655	2,031	2,488	2,451	1,647	1,142	1,097	772	414	231	409
(WY)	(1998)	(1956)	(1997)	(1953)	(1996)	(1950)	(1996)	(1948)	(1955)	(1955)	(2004)	(1941)
MIN	75.3	106	389	318	381	297	257	211	132	97.2	77.5	75.3
(WY)	(1953)	(1953)	(1945)	(2001)	(1941)	(1941)	(1941)	(1947)	(1940)	(1940)	(2003)	(2003)

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1940 - 2004	
ANNUAL TOTAL	215,730		197,331			
ANNUAL MEAN	591		539		629	
HIGHEST ANNUAL MEAN					928	
LOWEST ANNUAL MEAN					317	
HIGHEST DAILY MEAN	7,420	Jan 31	4,760	Jan 30	17,400	Feb 8, 1996
LOWEST DAILY MEAN	62	Sep 4	64	Oct 2	62	Sep 4, 2003
ANNUAL SEVEN-DAY MINIMUM	64	Aug 31	68	Oct 1	64	Aug 31, 2003
ANNUAL RUNOFF (AC-FT)	427,900		391,400		455,300	
ANNUAL RUNOFF (CFSM)	4.93		4.49		5.24	
ANNUAL RUNOFF (INCHES)	66.88		61.17		71.16	
10 PERCENT EXCEEDS	1,380		1,070		1,330	
50 PERCENT EXCEEDS	364		424		425	
90 PERCENT EXCEEDS	75		110		98	

14241500 SOUTH FORK TOUTLE RIVER AT TOUTLE, WA—Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--February 1996 to current year.

PERIOD OF DAILY RECORD.--

SUSPENDED SEDIMENT DISCHARGE: February 1996 to March 1999, October 1999 to current year. Water year 1999, daily sediment discharge values for period October to March, monthly sediment discharge values only for the period April to September.

INSTRUMENTATION.--Samples obtained by observer, February 1996 to September 1999. Automatic pumping sampler since October 1999.

REMARKS.--Station was placed in operation after the station at South Fork Toutle River at Camp 12, near Toutle, WA (14241490) was destroyed by flood of February 1996. Current site is 2.2 mi downstream from destroyed station.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATION: Maximum daily, 18,000 mg/L (estimated), Oct. 4, 1997; minimum, 1 mg/L, on many days 1996, 1998-2004.

SEDIMENT DISCHARGE: Maximum daily, 356,000 tons, Jan. 1, 1997; minimum, 0.25 tons, Aug. 29, and Oct. 25, 2002.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATION: Maximum daily, 3,820 mg/L, Sept. 18; minimum, 1 mg/L, Oct. 7, Aug. 11-14.

SEDIMENT DISCHARGE: Maximum daily, 28,500 tons, Jan. 30; minimum, 0.26 tons, Aug. 13.

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY)
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Day	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	NOVEMBER			DECEMBER		
				Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)
	OCTOBER			NOVEMBER			DECEMBER		
1	65	4	0.69	147	92	37	1,010	364	994
2	64	4	0.69	143	68	26	1,060	316	942
3	65	3	0.54	134	46	17	1,740	1,100	5,400
4	64	2	0.40	127	41	14	1,160	417	1,340
5	64	3	0.46	120	38	12	1,700	634	3,250
6	67	3	0.49	115	34	11	2,440	1,190	8,370
7	85	1	0.32	113	38	12	1,540	386	1,630
8	88	3	0.82	111	32	9.4	1,090	194	577
9	114	9	2.7	107	28	8.1	876	106	255
10	100	9	2.4	109	29	8.7	797	45	97
11	101	3	0.93	396	532	637	725	27	53
12	209	e50	e39	283	228	179	961	71	185
13	236	e28	e19	229	106	66	1,290	188	800
14	151	8	3.3	197	57	31	1,520	120	501
15	135	17	6.8	193	45	24	1,210	61	202
16	234	e74	e57	430	379	787	1,030	33	94
17	216	e61	e37	758	804	1,670	951	24	63
18	160	28	12	1,360	2,250	8,510	857	16	36
19	156	25	11	2,170	3,390	20,800	804	13	29
20	196	38	22	1,270	1,410	4,990	824	15	34
21	321	e152	e138	819	545	1,250	865	15	36
22	239	52	34	597	209	342	774	11	23
23	280	e167	e135	501	132	179	704	7	13
24	208	62	35	511	146	202	799	19	43
25	176	36	17	603	300	515	913	e35	e88
26	155	23	9.4	684	297	552	773	10	21
27	138	17	6.4	545	184	272	745	10	21
28	146	37	16	564	197	342	735	12	23
29	215	e120	e72	1,480	1,460	5,910	647	9	16
30	188	e145	e74	1,150	660	2,110	558	8	12
31	161	111	48	---	---	---	525	6	9.2
TOTAL	4,797	---	802.34	15,966	---	49,523.2	31,623	---	25,157.2

14241500 SOUTH FORK TOUTLE RIVER AT TOUTLE, WA—Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY)—CONTINUED
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Day	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)
1	491	5	7.0	1,820	326	1,650	736	7	15
2	455	5	5.9	1,420	129	501	637	3	5.4
3	430	5	5.3	1,140	67	209	601	6	10
4	402	4	4.7	1,040	41	116	647	8	15
5	366	4	4.1	890	24	58	722	9	18
6	375	5	4.7	919	23	59	761	10	20
7	576	11	17	1,000	22	61	714	8	16
8	902	20	49	906	13	32	703	8	14
9	1,190	e47	e154	804	9	20	754	9	18
10	1,340	e74	e268	718	8	16	736	7	14
11	1,170	e35	e112	651	8	14	657	7	12
12	1,050	18	52	592	7	11	598	7	11
13	1,020	15	42	547	6	9.2	550	8	11
14	1,170	41	141	584	6	10	516	8	11
15	1,610	102	443	637	6	9.6	488	9	11
16	1,420	47	182	733	e18	e43	461	9	11
17	1,130	32	97	862	e32	e76	447	8	9.2
18	1,050	18	53	1,260	e153	e530	499	16	22
19	1,020	9	26	1,230	e120	e407	510	12	16
20	923	7	18	1,000	e69	e188	453	9	11
21	803	6	13	841	e41	e94	425	10	11
22	706	6	11	718	26	52	434	10	12
23	897	12	31	637	18	31	455	10	12
24	1,270	39	134	668	15	28	559	10	15
25	1,120	e20	e59	657	11	19	652	12	21
26	1,000	9	26	711	12	23	864	7	17
27	900	4	11	1,040	25	72	1,010	11	29
28	1,250	67	303	980	17	46	844	10	24
29	4,060	1,270	15,100	841	10	22	736	8	16
30	4,760	2,110	28,500	---	---	---	740	9	18
31	2,660	669	4,900	---	---	---	669	9	16
TOTAL	37,516	---	50,773.7	25,846	---	4,406.8	19,578	---	461.6
		APRIL		MAY		JUNE			
1	576	9	15	326	3	2.9	686	7	14
2	510	9	12	331	4	3.6	579	5	8.0
3	476	8	11	325	3	2.6	502	4	5.8
4	470	8	10	332	5	5.0	440	4	4.8
5	454	8	9.4	346	7	6.8	442	6	7.5
6	426	7	8.4	290	4	3.1	700	21	46
7	407	7	7.7	278	5	3.4	930	32	89
8	396	7	7.5	314	5	4.1	719	6	12
9	388	7	7.4	341	6	5.7	804	13	30
10	381	8	7.9	290	5	4.0	748	6	12
11	394	9	9.5	399	7	7.7	695	6	11
12	411	7	7.3	376	5	5.6	645	6	10
13	390	6	6.6	316	6	4.9	641	5	9.4
14	498	11	15	283	5	3.7	577	5	7.7
15	495	8	10	268	3	2.3	515	4	6.2
16	463	6	7.9	264	3	2.0	462	4	5.0
17	424	6	7.1	246	3	1.7	413	4	4.5
18	385	5	4.8	243	2	1.5	370	5	4.6
19	387	4	4.3	228	2	1.3	349	5	4.8
20	528	9	12	217	2	1.2	317	4	3.8
21	647	13	22	207	2	1.1	286	4	3.2
22	562	6	9.2	275	6	6.1	269	5	3.3
23	512	4	5.7	378	10	11	261	5	3.3
24	474	4	5.1	312	4	3.6	253	3	2.3
25	427	4	4.6	272	3	2.4	239	2	1.6
26	404	4	4.0	449	18	32	219	3	1.8
27	423	3	3.4	806	84	268	205	3	1.7
28	403	2	2.4	1,380	140	543	196	3	1.4
29	360	2	2.4	1,110	37	112	187	2	1.2
30	332	3	2.5	958	24	61	180	3	1.7
31	---	---	---	825	13	30	---	---	---
TOTAL	13,403	---	242.1	12,985	---	1,143.3	13,829	---	317.6

14241500 SOUTH FORK TOUTLE RIVER AT TOUTLE, WA—Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY)—CONTINUED
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Day	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)
1	175	4	1.7	102	3	0.83	212	37	21
2	170	3	1.4	100	3	0.84	208	28	16
3	171	2	1.1	101	4	1.0	197	20	11
4	165	2	1.1	102	4	1.0	179	14	6.7
5	159	3	1.3	104	3	0.82	169	11	4.8
6	156	3	1.3	122	7	3.3	159	11	4.7
7	167	3	1.4	184	55	35	152	18	7.2
8	155	3	1.3	121	7	2.1	146	15	5.8
9	149	3	1.2	108	7	2.0	148	14	5.6
10	147	3	1.2	102	2	0.66	142	29	11
11	144	3	1.2	99	1	0.39	303	2,040	1,670
12	139	3	1.1	98	1	0.28	197	1,260	697
13	135	3	1.1	96	1	0.26	315	e1,060	e1,080
14	133	3	1.1	95	1	0.31	411	e1,400	e1,580
15	131	3	1.1	95	2	0.62	437	1,310	1,580
16	127	4	1.2	94	3	0.76	409	723	803
17	124	4	1.3	93	6	1.4	512	1,380	1,930
18	124	4	1.3	91	8	2.1	918	3,820	10,200
19	122	4	1.3	90	4	0.96	1,200	1,920	6,650
20	122	4	1.3	89	2	0.57	797	819	1,780
21	120	4	1.3	115	29	24	591	637	1,030
22	116	5	1.6	403	366	421	479	425	553
23	113	6	1.8	207	274	165	403	245	269
24	111	5	1.6	332	689	945	345	184	172
25	108	4	1.2	736	2,600	5,550	305	142	117
26	107	3	1.0	1,100	1,180	3,470	275	105	78
27	108	3	0.89	792	312	688	253	76	52
28	107	3	0.87	495	175	238	232	62	39
29	105	3	0.85	362	97	96	219	48	28
30	105	3	0.85	284	59	45	207	45	25
31	104	3	0.84	237	44	28	---	---	---
TOTAL	4,119	---	37.80	7,149	---	11,725.20	10,520	---	30,426.8
YEAR	197,331	175,017.64							

e Estimated

14242580 TOUTLE RIVER AT TOWER ROAD, NEAR SILVER LAKE, WA

LOCATION.--Lat 46°20'02", long 122°50'20", in NW ¼ SW ¼ sec.20, T.10 N., R.1 W., Cowlitz County, Hydrologic Unit 17080005, on right bank 10.7 mi downstream from confluence of North and South Forks, 2.9 mi northwest of Silver Lake, and at mile 6.5.

DRAINAGE AREA.--496 mi². A large debris avalanche generated by the eruption of Mount St. Helens on May 18, 1980 blocked tributaries in the upper North Fork Toutle River valley. As a result, from May 19, 1980 to July 7, 1981, approximately 40 mi² was noncontributing. From July 7, 1981 to October 1981, the Coldwater Lake release, approximately 21 mi², was noncontributing. From October 1981 to November 1982, the Castle Lake release, approximately 19.7 mi², was noncontributing. Since November 1982, all areas, including the Spirit Lake release, are effectively contributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1981 to current year.

REVISED RECORDS.--WDR WA-86-1: 1982 (M)(P), 1983 (M)(P), 1984 (M)(P), 1985 (M).

GAGE.--Water-stage recorder. Elevation of gage is 160 ft above NGVD of 1929, from topographic map.

REMARKS.--Records good. No regulation or diversion upstream from station. Some quality of water data available from Washington Office for this station.

AVERAGE DISCHARGE.--23 years (water years 1982-2004), 2,075 ft³/s, 56.83 in/yr, 1,503,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 61,800 ft³/s, Feb. 8, 1996, gage height, 24.91 ft; maximum gage height, 28.03 ft Dec. 3, 1982; minimum daily, 243 ft³/s Oct. 14, 1987.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods occurred on May 18, 1980, from mudflows caused by the eruption of Mount St. Helens. A flood about 1200 hours was due to mudflow from South Fork Toutle River and a larger flood about 2100 hours was due to mudflow from North Fork Toutle River.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 10,000 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Jan 30	0830	*17,000	*12.19	No other peak greater than base discharge.			

Minimum discharge, 242 ft³/s, Oct. 4, 5, 6, gage height, 3.25 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	260	529	3,110	1,660	6,300	2,180	1,890	1,330	2,660	880	531	888
2	253	518	2,980	1,540	4,890	1,970	1,710	1,410	2,310	857	521	870
3	255	494	4,400	1,460	3,940	1,920	1,620	1,470	2,070	856	516	851
4	248	465	3,430	1,360	3,520	2,160	1,610	1,470	1,890	834	520	775
5	248	439	4,050	1,150	3,070	2,320	1,590	1,560	1,830	801	522	739
6	252	420	5,680	1,160	2,960	2,500	1,530	1,380	2,460	784	559	700
7	324	411	4,300	1,990	3,180	2,330	1,490	1,300	2,980	842	711	675
8	338	408	3,270	2,830	2,920	2,330	1,460	1,360	2,500	796	591	656
9	446	400	2,650	3,440	2,640	2,410	1,440	1,480	2,880	757	543	663
10	394	396	2,410	3,730	2,420	2,390	1,420	1,300	2,710	744	516	649
11	373	1,240	2,290	3,380	2,250	2,190	1,470	e1,550	2,580	732	502	921
12	586	1,080	2,700	3,020	2,070	2,040	1,560	e1,500	2,400	706	495	846
13	830	838	3,660	2,870	1,910	1,890	1,570	1,320	2,340	689	488	925
14	609	724	5,040	3,060	2,000	1,790	1,690	1,210	2,220	682	483	1,290
15	522	682	4,110	3,940	2,050	1,690	1,730	1,180	2,010	672	482	1,480
16	651	894	3,400	4,000	2,100	1,590	1,560	1,210	1,790	661	479	1,510
17	699	1,700	3,150	3,340	2,350	1,550	1,460	1,190	1,660	649	472	1,680
18	576	2,260	2,720	3,120	2,980	1,650	1,370	1,230	1,550	647	461	2,290
19	525	3,830	2,510	2,990	3,190	1,780	1,320	1,180	1,480	637	456	2,770
20	581	2,960	2,510	2,710	2,800	1,590	1,580	1,140	1,370	632	449	2,190
21	743	2,060	2,570	2,390	2,520	1,480	1,720	1,120	1,260	623	475	1,760
22	669	1,510	2,330	2,140	2,270	1,490	1,580	1,230	1,210	606	1,460	1,500
23	743	1,360	2,150	2,780	2,060	1,580	1,470	1,960	1,200	594	979	1,320
24	643	1,470	2,240	3,980	2,050	1,850	1,440	1,640	1,180	580	939	1,180
25	572	1,730	2,610	3,750	2,020	2,100	1,350	1,430	1,130	565	1,930	1,080
26	520	2,090	2,280	3,330	2,080	2,390	1,320	1,760	1,060	560	3,220	1,010
27	484	1,620	2,220	2,990	2,530	2,570	1,460	3,090	1,010	557	3,010	958
28	473	1,510	2,380	3,480	2,570	2,310	1,520	4,480	973	549	1,860	904
29	693	4,350	2,140	11,100	2,350	2,110	1,400	3,990	940	542	1,370	865
30	700	3,720	1,850	13,900	---	2,170	1,310	3,470	907	534	1,110	837
31	583	---	1,750	8,830	---	2,140	---	3,120	---	535	969	---
TOTAL	15,793	42,108	92,890	111,420	79,990	62,460	45,640	54,060	54,560	21,103	27,619	34,782
MEAN	509	1,404	2,996	3,594	2,758	2,015	1,521	1,744	1,819	681	891	1,159
MAX	830	4,350	5,680	13,900	6,300	2,570	1,890	4,480	2,980	880	3,220	2,770
MIN	248	396	1,750	1,150	1,910	1,480	1,310	1,120	907	534	449	649
AC-FT	31,330	83,520	184,200	221,000	158,700	123,900	90,530	107,200	108,200	41,860	54,780	68,990
CFSM	1.03	2.83	6.04	7.25	5.56	4.06	3.07	3.52	3.67	1.37	1.80	2.34
IN.	1.18	3.16	6.97	8.36	6.00	4.68	3.42	4.05	4.09	1.58	2.07	2.61

14242580 TOUTLE RIVER AT TOWER ROAD, NEAR SILVER LAKE, WA—Continued

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

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1981 - 2004, BY WATER YEAR (WY)												
MEAN	914	2,796	3,429	3,449	3,422	2,946	2,633	2,074	1,555	800	495	477
MAX	2,931	5,290	6,954	5,939	7,754	5,500	4,697	3,192	2,643	1,653	891	1,159
(WY)	(1998)	(1996)	(1997)	(1997)	(1996)	(1997)	(1991)	(1999)	(1990)	(1983)	(2004)	(2004)
MIN	310	418	1,350	1,167	1,185	1,315	1,521	1,226	539	412	306	277
(WY)	(1988)	(1994)	(2001)	(2001)	(1993)	(1992)	(2004)	(1992)	(1992)	(1992)	(1992)	(1989)
SUMMARY STATISTICS												
	FOR 2003 CALENDAR YEAR				FOR 2004 WATER YEAR				WATER YEARS 1981 - 2004			
ANNUAL TOTAL	700,783				642,425							
ANNUAL MEAN	1,920				1,755				2,075			
HIGHEST ANNUAL MEAN									3,118			
LOWEST ANNUAL MEAN									1,168			
HIGHEST DAILY MEAN	24,100				13,900				48,300			
LOWEST DAILY MEAN	248				248				243			
ANNUAL SEVEN-DAY MINIMUM	255				263				248			
ANNUAL RUNOFF (AC-FT)	1,390,000				1,274,000				1,503,000			
ANNUAL RUNOFF (CFSM)	3.87				3.54				4.18			
ANNUAL RUNOFF (INCHES)	52.56				48.18				56.83			
10 PERCENT EXCEEDS	4,100				3,160				4,110			
50 PERCENT EXCEEDS	1,470				1,500				1,610			
90 PERCENT EXCEEDS	327				520				396			

e Estimated

14242580 TOUTLE RIVER AT TOWER ROAD, NEAR SILVER LAKE, WA—Continued

WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: May to October 1990, May to September 1991.

WATER TEMPERATURE: May to October 1990, May to September 1991.

SUSPENDED SEDIMENT DISCHARGE: February 1981 to current year. Records prior to October 1985 are published in U.S. Geological Survey Open-File Report 85-632; records for 1984-87 are published in U.S. Geological Survey Open-File Report 91-219.

INSTRUMENTATION.--Water-quality monitor May 1990 to September 1991. Automatic pumping sediment sampler since February 1981.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATION: Maximum daily, 232,000 mg/L, Mar. 20, 1982; minimum, 1 mg/L, Oct. 3, 1989.

SEDIMENT DISCHARGE: Maximum daily, 5,930,000 tons, Feb. 20, 1982; minimum, 0.71 tons, Oct. 3, 1989.

EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATION: Maximum daily, 5,100 mg/L, Jan. 29; minimum, 5 mg/L, Oct. 4-5.

SEDIMENT DISCHARGE: Maximum daily, 155,000 tons, Jan. 30; minimum, 3.5 tons, Oct. 5.

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY)
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Day	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY)		
							Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)
OCTOBER			NOVEMBER			DECEMBER			
1	260	6	4.2	529	125	179	3,110	1,030	8,660
2	253	6	4.0	518	97	136	2,980	830	6,710
3	255	6	3.9	494	89	119	4,400	2,090	25,300
4	248	5	3.6	465	80	101	3,430	1,080	10,100
5	248	5	3.5	439	60	72	4,050	1,440	16,800
6	252	6	3.9	420	42	48	5,680	e3,500	e55,000
7	324	10	9.1	411	42	47	4,300	e1,600	e19,000
8	338	8	7.8	408	45	50	3,270	935	8,370
9	446	15	18	400	42	46	2,650	596	4,290
10	394	18	19	396	36	38	2,410	428	2,790
11	373	14	14	1,240	1,200	5,300	2,290	382	2,380
12	586	44	77	1,080	453	1,380	2,700	584	4,310
13	830	118	267	838	157	357	3,660	1,250	16,000
14	609	50	83	724	104	205	5,040	1,160	16,100
15	522	20	28	682	76	140	4,110	676	7,560
16	651	27	49	894	244	812	3,400	537	4,970
17	699	54	103	1,700	1,460	6,760	3,150	630	5,420
18	576	54	83	2,260	2,250	14,200	2,720	419	3,090
19	525	50	71	3,830	e4,500	e49,000	2,510	293	1,990
20	581	47	75	2,960	1,640	13,500	2,510	290	1,970
21	743	2,100	4,360	2,060	749	4,240	2,570	363	2,530
22	669	979	1,790	1,510	372	1,540	2,330	306	1,920
23	743	621	1,260	1,360	318	1,170	2,150	227	1,320
24	643	402	702	1,470	401	1,600	2,240	251	1,540
25	572	224	347	1,730	534	2,640	2,610	385	2,730
26	520	166	233	2,090	707	4,040	2,280	239	1,480
27	484	107	141	1,620	311	1,380	2,220	230	1,400
28	473	79	102	1,510	311	1,350	2,380	237	1,540
29	693	294	552	4,350	3,760	47,500	2,140	161	929
30	700	342	659	3,720	1,790	18,400	1,850	154	770
31	583	165	261	---	---	---	1,750	156	737
TOTAL	15,793	---	11,334.0	42,108	---	176,350	92,890	---	237,706

14242580 TOUTLE RIVER AT TOWER ROAD, NEAR SILVER LAKE, WA—Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY)—CONTINUED
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004

Day	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)	Mean discharge (cfs)	Mean concentration (mg/l)	Load (tons/day)
1	880	25	59	531	7	11	888	96	230
2	857	24	56	521	7	10	870	98	231
3	856	21	48	516	7	9.6	851	89	204
4	834	20	45	520	6	9.0	775	61	128
5	801	19	41	522	7	9.6	739	46	92
6	784	17	37	559	15	23	700	36	68
7	842	22	50	711	37	73	675	31	56
8	796	21	46	591	54	86	656	26	46
9	757	16	32	543	46	68	663	25	45
10	744	15	30	516	32	44	649	31	54
11	732	13	27	502	20	27	921	479	1,350
12	706	14	27	495	17	22	846	1,620	3,870
13	689	15	28	488	15	20	925	653	1,730
14	682	16	29	483	15	19	1,290	1,020	3,530
15	672	18	32	482	14	18	1,480	716	2,920
16	661	18	32	479	14	18	1,510	490	2,010
17	649	16	29	472	12	15	1,680	627	2,870
18	647	16	27	461	10	13	2,290	1,870	12,100
19	637	14	24	456	9	12	2,770	1,740	13,400
20	632	11	19	449	9	11	2,190	596	3,550
21	623	10	18	475	16	22	1,760	333	1,590
22	606	10	17	1,460	678	2,770	1,500	229	929
23	594	10	16	979	296	835	1,320	169	604
24	580	10	15	939	280	825	1,180	143	455
25	565	9	14	1,930	1,230	6,690	1,080	109	316
26	560	9	14	3,220	2,760	24,500	1,010	84	230
27	557	9	13	3,010	1,380	11,700	958	75	193
28	549	9	13	1,860	389	2,010	904	66	162
29	542	8	12	1,370	217	810	865	58	135
30	534	8	12	1,110	154	461	837	50	112
31	535	8	11	969	115	301	---	---	---
TOTAL	21,103	---	873	27,619	---	51,442.2	34,782	---	53,210
YEAR	642,425	1,284,376.2							

e Estimated

14243000 COWLITZ RIVER AT CASTLE ROCK, WA

LOCATION.--Lat 46°16'30", long 122°54'48", in SW ¼ SE ¼ sec.10, T.9 N., R.2 W., Cowlitz County, Hydrologic Unit 17080005, on left bank 40 ft downstream from Arkansas Valley Road bridge in Castle Rock, 2.7 mi downstream from Toutle River, and at mile 17.3.

DRAINAGE AREA.--2,238 mi². A large debris avalanche generated by the eruption of Mount St. Helens on May 18, 1980 blocked tributaries in the upper North Fork Toutle River valley. As a result, from May 19, 1980 to July 7, 1981, approximately 40 mi² was noncontributing. From July 7, 1981 to October 1981, the Coldwater Lake release, approximately 21 mi², was noncontributing. From October 1981 to November 1982, the Castle Lake release, approximately 19.7 mi², was noncontributing. Since November 1982, all areas, including the Spirit Lake release, are effectively contributing.

PERIOD OF RECORD.--December 1926 to current year; October 1985 to April 2000 (seasonal records).

REVISED RECORDS.--WSP 1218: Drainage area. WSP 1638: 1947(P), 1951.

GAGE.--Water-stage recorder. Datum of gage is NAVD of 1988. Prior to Dec. 18, 1933, nonrecording gage at site 2 mi upstream at datum 38.58 ft higher. Dec. 18, 1933, to June 13, 1934, nonrecording gage, and June 14 to Sept. 30, 1934, water-stage recorder, at present site at datum 28.65 ft higher. Oct. 1, 1934, to May 21, 1980, water-stage recorder, on right bank at datum 23.65 ft higher. May 23, 1980, to July 29, 1997, water-stage recorder at present site at datum 23.65 ft higher.

REMARKS.--Records good. Flow regulated by Riffe Lake (station 14234800) at mile 65.5, and Mayfield Reservoir (station 14237800) at mile 52.0. Minor diversions for domestic and farm use upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--62 years (water years 1928-85, 2001-04), 9,163 ft³/s, 55.60 in/yr, 6,639,000 acre-ft/yr, adjusted for storage in Mayfield Reservoir since April 1962, and Riffe Lake since April 1968.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 139,000 ft³/s Dec. 23, 1933, gage height, 55.25 ft present datum, from rating curve extended above 80,000 ft³/s; maximum gage height, 55.76 ft Feb. 8, 1996; minimum discharge, 998 ft³/s Nov. 7, 8, 1935.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 38,100 ft³/s, Jan. 30, gage height, 41.89 ft; minimum discharge, 3,020 ft³/s, Aug. 9, gage height, 31.16 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	3,730	5,210	12,300	7,840	22,200	8,700	7,420	5,500	6,460	5,860	3,390	5,480
2	3,750	5,180	12,600	7,600	20,100	9,230	7,170	5,580	6,180	5,550	3,370	5,480
3	3,760	4,180	14,500	7,440	18,600	9,100	7,060	5,630	5,950	4,270	3,330	5,440
4	3,760	4,360	14,300	7,850	17,400	9,390	7,050	5,970	5,470	3,770	3,190	5,260
5	3,760	5,120	e15,000	12,100	16,600	9,730	7,030	6,030	5,400	3,700	3,090	4,630
6	3,780	5,110	e16,000	14,600	16,100	9,630	7,400	5,570	5,960	3,760	3,140	4,210
7	3,840	5,130	e15,000	15,700	12,400	8,920	7,280	5,480	6,610	4,290	3,290	5,020
8	3,890	4,750	e14,000	15,300	11,800	10,100	6,810	5,160	6,330	4,270	3,150	6,650
9	4,020	3,960	13,300	16,100	11,700	11,600	6,760	5,050	6,690	4,210	3,110	6,680
10	3,950	3,960	13,100	14,100	11,700	10,200	6,740	4,880	6,310	3,970	4,190	6,440
11	3,930	4,900	13,200	13,000	11,000	9,340	6,770	5,340	6,190	3,640	5,240	5,830
12	4,200	5,940	13,100	12,100	10,600	8,420	7,380	5,380	6,000	3,600	5,270	5,770
13	4,530	5,610	13,200	11,100	10,300	7,550	7,260	4,910	5,920	3,570	5,030	6,280
14	4,250	5,480	16,800	11,000	8,190	8,280	6,980	4,820	5,810	4,020	3,760	7,880
15	4,120	5,170	17,100	11,600	7,990	9,610	7,030	4,760	6,140	4,220	3,390	8,240
16	4,500	4,590	16,100	11,300	9,000	10,500	6,840	4,770	7,340	4,340	3,380	7,930
17	5,330	6,220	14,600	9,950	11,800	10,900	6,790	4,750	7,240	3,720	3,370	6,850
18	4,300	10,300	12,800	9,410	11,900	11,500	6,750	5,000	6,840	3,450	3,380	7,400
19	4,120	14,600	10,500	9,430	10,800	9,460	6,730	5,030	5,450	3,640	3,860	8,310
20	4,240	14,000	8,850	9,070	9,310	8,530	7,520	4,710	4,890	4,970	3,850	7,730
21	5,240	12,800	8,870	8,480	8,500	8,330	7,620	4,680	4,990	5,000	3,930	7,450
22	5,650	11,600	8,550	8,080	8,140	8,890	7,060	4,760	5,120	4,990	5,150	6,640
23	5,650	11,200	8,260	8,890	7,840	9,840	6,870	5,480	4,750	4,890	4,740	5,900
24	5,510	11,700	8,390	11,500	8,800	10,400	6,230	5,240	4,730	4,010	4,000	4,930
25	4,600	13,200	9,530	12,500	10,000	11,100	5,700	5,220	4,690	3,900	5,280	4,760
26	4,130	13,800	9,130	12,000	10,100	9,990	5,640	5,490	4,620	3,890	7,440	4,640
27	4,070	9,730	8,920	14,300	10,800	9,080	6,090	6,870	4,550	3,910	7,540	4,880
28	4,050	9,210	10,000	16,800	9,230	8,250	6,070	8,880	4,550	4,050	5,740	5,600
29	4,270	13,100	9,100	28,000	8,370	8,140	5,600	8,450	5,830	4,890	5,110	5,590
30	4,310	13,400	8,520	34,600	---	8,930	5,520	7,550	5,900	4,600	4,790	5,720
31	4,470	---	8,850	25,700	---	8,140	---	7,110	---	3,540	4,660	---
TOTAL	133,710	243,510	374,470	407,440	341,270	291,780	203,170	174,050	172,910	130,490	132,160	183,620
MEAN	4,313	8,117	12,080	13,140	11,770	9,412	6,772	5,615	5,764	4,209	4,263	6,121
MAX	5,650	14,600	17,100	34,600	22,200	11,600	7,620	8,880	7,340	5,860	7,540	8,310
MIN	3,730	3,960	8,260	7,440	7,840	7,550	5,520	4,680	4,550	3,450	3,090	4,210
AC-FT	265,200	483,000	742,800	808,200	676,900	578,700	403,000	345,200	343,000	258,800	262,100	364,200
MEAN†	3,220	7,072	11,730	14,580	10,680	8,732	7,764	9,420	8,547	3,249	3,503	4,848
CFSM†	1.44	3.16	5.24	6.51	4.77	3.90	3.47	4.21	3.82	1.45	1.57	2.17
IN.†	1.66	3.53	6.04	7.51	5.15	4.50	3.87	4.85	4.26	1.67	1.81	2.42
AC-FT†	198,000	420,800	721,200	896,800	614,500	536,900	462,000	579,200	508,600	199,800	215,400	288,500
CAL YR	2003	TOTAL 3,067,390	MEAN 8,404	MAX 47,800	MIN 2,820	AC-FT 608,4000	MEAN† 8,482	CFSM† 3.79	IN.† 51.46	AC-FT† 6,141,000		
WTR YR	2004	TOTAL 2,788,580	MEAN 7,619	MAX 34,600	MIN 3,090	AC-FT 553,1000	MEAN† 7,770	CFSM† 3.47	IN.† 47.27	AC-FT† 5,641,000		

† Adjusted for change in contents in Riffe Lake and Mayfield Reservoir.

e Estimated

14246900 COLUMBIA RIVER AT BEAVER ARMY TERMINAL, NEAR QUINCY, OR—Continued

SUMMARY STATISTICS	FOR 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1969 - 2004	
ANNUAL TOTAL	77,392,000		71,153,700			
ANNUAL MEAN	212,000		194,400		233,900	
HIGHEST ANNUAL MEAN					338,200	
LOWEST ANNUAL MEAN					140,000	
HIGHEST DAILY MEAN	503,000	Feb 1	400,000	Jan 31	864,000	Feb 10, 1996
LOWEST DAILY MEAN	82,900	Sep 15	91,900	Oct 20	63,600	Sep 9, 2001
ANNUAL SEVEN-DAY MINIMUM	90,100	Sep 10	105,000	Oct 1	78,700	Sep 5, 2001
ANNUAL RUNOFF (AC-FT)	153,500,000		141,100,000		169,400,000	
10 PERCENT EXCEEDS	320,000		274,000		379,000	
50 PERCENT EXCEEDS	190,000		189,000		211,000	
90 PERCENT EXCEEDS	111,000		126,000		123,000	

e Estimated